ProFantasy Software Ltd's

CARTOGRAPHY SUITE™

Complete User's Guide

ProFantasy Software Ltd

ProFantasy's Cartography Suite

INTRODUCTION

For ten years, ProFantasy Software Ltd has produced the industry standard map making software for gamers. It has become an essential part of roleplaying and war gaming for a large proportion of the gaming community. Hundreds of websites sport downloads of maps and symbol catalogs; dozens of RPG companies have used ProFantasy Cartography for their maps in print.

Campaign Cartographer 2 Pro (CC2 Pro) forms the core of ProFantasy Cartography. It gives you everything you need to create great maps for your games. There are symbols and tools for overland maps from all ages, buildings, floorplans, heraldry, and many other uses. CC2-Pro, on its own, lets you create more and better maps, more quickly, than any comparable software.

Character Artist Pro (CA Pro) Character Artist lets you create attractive, high-quality portraits of characters for your games. When you've made your character, you can place a high-quality image onto your character sheet. You can add your portraits to counters, create silhouettes or make stand-up card figures.

City Designer Pro (CD Pro) lets you create beautiful, incredibly detailed city maps with ease and speed. Add buildings, roads and demographic features with the custom tools.

Dioramas Pro (Dioramas) is innovative card-modelling design software, a printer, and a speck of skill, you can create virtually any model, simply and intelligently.

Dungeon Designer Pro (DD Pro) lets you create floorplans and underground areas using symbols and custom room and corridor creation tools.

Fractal Terrains (FT Pro) builds entire random worlds, creates new worlds or uses real world data to create realistic globes in a many projections. Export the information to CC2 Pro.

Perspectives Pro (Per Pro) creates 3D floorplans and villages in a fixed perspective view. It's fun to use and gives great results.

Our software has always been integrated, this manual follows that tradition, bringing together all ProFantasy Cartography software under one cover. CC2 Pro is covered first – whether or not you have any add-on products, you should start with this section. Fractal Terrains Pro is an exception - if you only have FT Pro, you can start at page 321. We've always worked hard to produce great software, and this tome and the software it supports are the culmination of that effort. However, many of features and tools you see of the direct result of your input. We are very grateful for the feedback you provide and long may it continue.

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CC2 PRO INTRODUCTION

Welcome to Campaign Cartographer 2 Pro, the core of ProFantasy Software's RPG software. The fact you are reading this means that you have made two wise decisions. First, you have chosen to create your maps with CC2 Pro. Second, you have started to read the manual. Please continue. Whatever you play, CC2 Pro will help you improve the quality of your game.

Clear your Mind...

You may well be used to paint programs. In fact, you may even have tried to create maps with a paint program. And if you have, you'll know that they're not very suited to the job. CC2 Pro, on the other hand, is superb at map-making. There is a reason for this difference...

A paint program thinks of a picture as a grid of dots. All it knows about the picture is how big it is (how many dots across and up) and the color of each dot. Once you have drawn a shape it is tricky to change, especially if other shapes have been drawn on top.

CC2 Pro thinks of a picture in a different way. It thinks of a picture as a collection of *entities* (drawing objects), with each entity having a set of *properties* such as color, width, start-point and end-point. This is ideal for map-making:

- ✓ You can go back and change the properties of any entity at any time, even after other shapes have been drawn on top.
- ✓ A CC2 Pro map has no fixed size. If you need more canvas, you simply zoom out.
- ✓ When you zoom in, you see clearer definition, not bigger dots.
- ✓ Entities are attached to layers. By saying which layers are visible, you can change the visible content to suit a particular purpose.
- ✓ The file size is related to the number of objects, not the picture size. A road 1,000 miles long takes up exactly the same memory as a road 1 mile long.
- ✓ Objects can be complex, and even trigger actions. For example, a city symbol can be combined with a link object so that when you click on it, the city map opens.

As you might expect, because CC2 Pro and paint programs think differently, they work differently, too. So clear your mind of any preconceptions you have.

You will find that CC2 Pro is easy to use, but expect it to work differently than a paint program!

Sources of Information

This book leads you through the concepts and techniques used to create maps with CC2 Pro. It starts with the basics, making no assumptions about your knowledge of CC2 Pro.

CC2 Pro's *Quick Start Guide* is available from the Help menu. It takes you through the process of creating a simple map.

CC2 Pro's *help system* contains reference information about every command, an overview of concepts and a large how-to section. If you can't find the answer to a CC2 Pro question in this book, look in the help system.

ProFantasy's website, http://www.profantasy.com, contains downloadable updates, resources, documentation and the latest technical support answers.

How to use the manual

While most of the manual is presented in a tutorial format, each section also stands independently. As an example, take a look at Printing on page 13. Later chapters do assume that you have knowledge of the basics.

If you've bought CC2 Pro together with other ProFantasy products, we thank you. We also recommend that you complete the CC2 Pro tutorial even if you are not interested in creating overland maps of fantasy worlds. The manual is carefully designed to introduce CC2 Pro in easy-to-digest steps.

What's Pro?

CC2 Pro is Campaign Cartographer 2, but more powerful and easier to use.

In late 2001, we evaluated all the suggestions and negative comments we'd received over the years, and sought out people who actively disliked CC2. We also asked our experienced users what we could do to speed things up. Based on all this information, we redesigned CC2 to make it easier to learn, while enhancing its powers. "More powerful, easier to use" was our mantra. Many of the sections in previous manuals are redundant, and you don't need to know much to create a nice looking map. CC2 Pro's powerful CAD tools are still there, ready for advanced users, but you don't have to touch them to create great maps. For full details of the extra features in CC2 Pro, see the readme.txt file that came with CC2 Pro in the System folder.

Installing CC2 Pro

Before installing CC2 Pro and any add-ons we recommend that you check on our website http://www.profantasy.com/service/technical.asp under the question "Optimal installation order" before continuing. You should also register your software and download the latest upgrades before you continue.

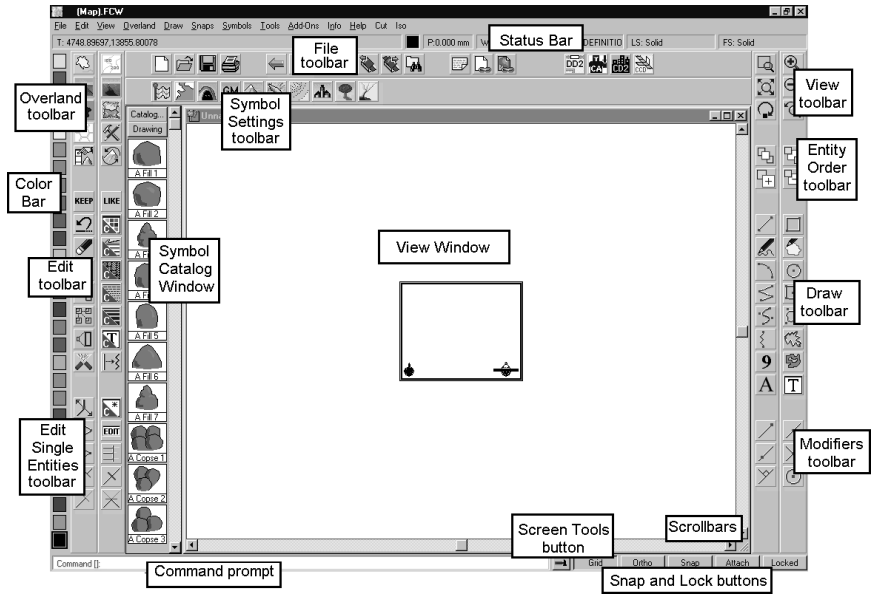
Place the CC2 Pro compact disc into your CD-ROM drive. On most computers there will be a few seconds of whirring, then you will see a window showing the CD's contents. If this doesn't happen, double-click on **My Computer**, then on the button for your CD-ROM drive.

To install CC2 Pro, double-click on the **Setup** button, then follow the on-screen instructions.

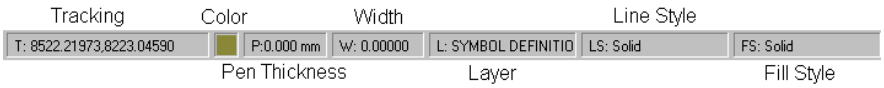
During the installation you will be asked to give your name and CC2 Pro serial number. Your unique serial number is in the back of this manual.

CC2 Pro's Interface

Most people learn by deciding what they want to do, then working out how to do it. Modern Help systems and software manuals follow this trend, including this one. However, if you are like me, you might learn new things just by asking what these pretty buttons do as well as asking which ones to press. Here's a quick overview of CC2 Pro's window furniture and buttons.



The Status Bar



Shows you the current drawing properties (color, line style, etc) for new entities. You can click on any of the indicators to change the current setting. Tracking shows you the current cursor position.

The View Window

This is where you see your drawing. Use the **View** toolbar to control what you see.

The Color Bar

Click here to set the current color. For a wider selection of colors, use the **Color indicator** on the **Status Bar**.

The Command Prompt

This is where CC2 Pro asks you for information. It's also where you type requested values such as scales and points. Keep an eye on it.

The Screen Tools button

lets you control the appearance your CC2 Pro screen, moving toolbars, hiding and showing scroll bars and the catalog window. You can also choose to have large screen buttons here.

Snap and Lock buttons

The **Grid** button turns the visual grid on and off. **Snap** causes points to lock to the grid and to significant points between, and **Ortho** locks the cursor vertically or horizontally. A right click on these buttons lets you select another grid setting. The **Attach** button causes all clicks in the View Window to snap to significant points on any entity; right click for settings. Lock controls group locking.

Toolbars

You can right click on toolbar buttons to see popup menus or secondary options. CC2 Pro's most important commands are found here.

- The **File** toolbar lets you start new drawings, manage files, link with other files and swap between add-ons. Right click on the add-on buttons to see cut down versions of their most important features.
- The **Symbol Settings** toolbar has shortcuts to let you select CC2 Pro's symbol catalogs. If you have add-ons and swap to them different buttons will be displayed.
- The **Overland** toolbar lets you add specialized mapping entities such as landmasses, rivers and roads to your map. It also lets you select symbol catalogs, which appear in the **Symbol Catalog Window**. If you have add-ons, this is where their specialized commands will be displayed.

- The **Edit** toolbar lets you control selections of entities already in the drawing. You can move, rotate, erase or reshape them. You can also change the properties of existing entities.
- The **Single Entities** toolbar lets you trim, break and reshape individually selected entities.
- The **View** toolbar lets you control what you see in the View Window. You can use View buttons at any time, even in the middle of another command.
- The **Entity Order** toolbar lets you control what order entities appear in your drawing, in effect which are in front or behind.
- The **Draw** toolbar is a buffet of CAD commands to add simple entities such as text to your drawing. You can build symbols out of these primitive shapes.
- The **Modifiers** toolbar lets you snap to significant points on an entity whenever you are asked to select a point on the **Command Prompt**.

Read Me - The Most Important Differences

CC2 Pro is easy to use, but there are a few things that make it different to some other software. If you can grasp these simple concepts early on, you'll find CC2 Pro much easier to learn.

- CC2 Pro expects you to choose an editing function, then select what you want to edit. So you would click **Erase** , then click on what you wanted to remove from the drawing, right click, select Do it. This is far quicker for mapping than the standard Windows method of select then edit. This is dealt with throughout the tutorial, and is detailed in *Making a selection* on page 61.
- Right click to complete a command, left click to repeat a command. Select another command to cancel the current one.
- The lower left corner of the screen, called the Command Prompt (prompt), is where CC2 Pro asks you for instructions, and gives you information about shortcuts. You can type here. Keep an eye on it. If you select a menu item, and nothing appears to happen, look down here and you'll see what CC2 Pro wants.
- In CC2 Pro, don't drag the mouse. You get finer control without dragging - left click to start a move, then right click to finish.

The Value of Maps

In the beginning, there were none. Then there were a few, but you had to put up with a world where you could tumble off the edge. Today, maps are super-accurate and so commonplace that you can probably find one in your local convenience store.

The value of maps clearly depends on the era in which your game is set, and whether it is a fantasy game, or true-to-life.

In our own history, maps have always been incredibly valuable tools used for political and commercial exploitation. In the 16th Century the Spanish and Portuguese avoided the new print processes and kept to hand drawn maps which were less likely to fall into enemy hands. And while modern maps may be accurate in shape, they're only as up-to-date as the last time information was gathered. Printed maps don't show changes such as blown-up bridges, or dynamic information such as troop movements.

In a fantasy world, charted by reticent sages and unforthcoming wizards, maps available to the average adventurer should be sparse and maybe even dangerously inaccurate. A map should be a prize worth having. Players should not be allowed to see a full, accurate map of their own lands, let alone the world, without a long struggle.

The CC2 Pro software you have in your hands is capable of mapping Earth in precise and near infinite detail, even recording abstract detail such as mineral locations, ocean currents and population movement. Just because you now have this power, please don't be tempted to give your players more than they deserve.

VIEWING AND PRINTING MAPS

Before getting involved with creating maps, let's see what CC2 Pro can do...

---

1 Start CC2 Pro.

When you installed CC2 Pro, you were given the option to add a CC2 Pro shortcut to your desktop. If you said *Yes* to this, you can click the CC2 Pro button on your main Windows® screen.

If you haven't got a shortcut on your desktop, click Windows® Start menu, then click Programs, then click Campaign Cartographer 2.

The first time you start CC2 Pro, you see the CC2 Pro Welcome Screen. Subsequently you'll see the last map you used.

2 On the **File** toolbar click **Open** .

3 You see the Load Drawing dialog box.

4 Change to CC2 Pro's Examples\Maps folder, click on Carriad.fcw and then click the **Open** Button.

5 CC2 Pro asks if you would like to save the changes to your map. Click **No**.

The Carriad example map loads.

Zooming

One of the great things about CC2 Pro is how it lets you "zoom in" to get a close-up view of an area of your map or "zoom out" to see more of the map at a reduced size.

CC2 Pro has six zoom buttons, grouped at the top right of the drawing window – the **View** toolbar. There is also a View menu, containing more view controlling commands. For now though, we will only worry about the buttons:

Zoom Window. CC2 Pro asks you to click opposite corners of a window (an area) to which you would like to zoom. CC2 Pro will zoom in so that the window you pick fills the screen.

Zoom Extents. CC2 Pro redisplays the map so it completely fills the screen.

Zoom In CC2 Pro zooms in by a factor of 2, increasing the magnification.

Zoom Out CC2 Pro zooms out by a factor of 2, reducing the magnification.

Zoom Last CC2 Pro goes back to the previous view of the map.

Redraw When you edit a map you'll find that, where you make changes, CC2 Pro sometimes leaves a little temporary clutter on screen. **Redraw** cleans up the clutter.

---

1 Click **Zoom Window** .

The Command Line (at the bottom of the screen) reads `zoom window:` and the pointer changes to crosshairs.

2 Click (don't drag) at the bottom left of the island called *Munsch*.

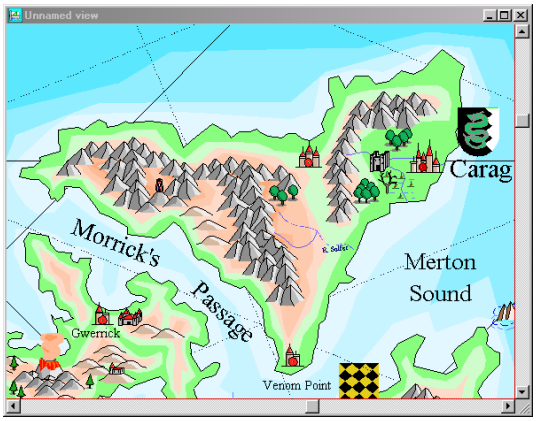
The Command Line reads `Opposite corner:`. Now, when you move the mouse you see a box shrink and grow. This is CC2 Pro showing you the window it will zoom to.

3 Put the opposite corner of the window at the top right of the island then click again.

CC2 Pro zooms in to the island. You can carry on zooming in like this as far as you like.

4 Click **Zoom Extents** to see the whole map again.

5 Click **Zoom Window** and pick a window around *Carag*, the island to the north.



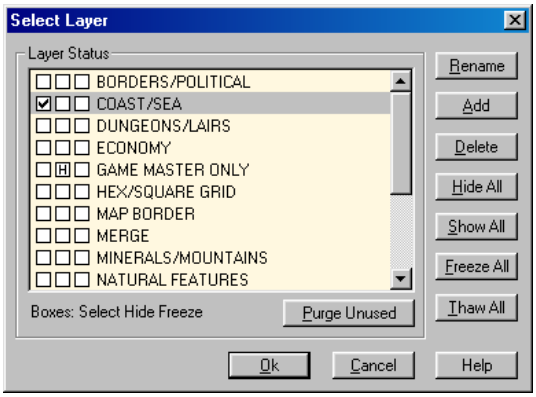
Layers

Maps are built up on *layers*. Everything in your drawing is associated with a particular layer. By hiding and showing layers you can change the visible content to suit a particular purpose – without having to draw a new version. For example, by putting all secrets on the SECRET layer, you can quickly hide them from unauthorized eyes!

---

6 Click the layer indicator L: COAST/SEA on the Status Bar.

You see the Select Layer dialog box which shows the list of layers used in the map.



Next to each layer name are three small boxes.

- The left box is ticked if the layer is the current layer. In this case the current layer is COAST/SEA.
- The middle box contains a small **H** if the layer is hidden. In this case GAME MASTER ONLY is hidden.
- The right box contains a small **F** if layer the layer is frozen (protected).

7 Click the small **H** in the box next to GAME MASTER ONLY.

The **H** is removed. The layer will now be visible.

8 Click on the **OK** button

The map redraws with the GAME MASTER ONLY layer visible. You should see an angel and a crown which were not there before. These mark a site of Good and the location of a Royal Pretender.

> Layers have many other powerful uses, which are explored later in this book. For now I only want to worry about how they affect map viewing and printing.

Printing

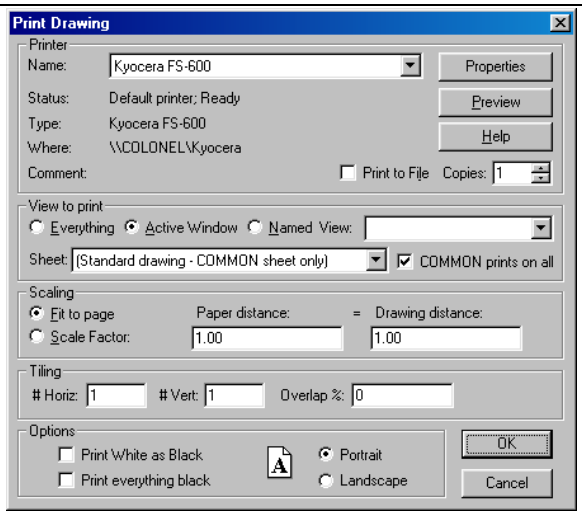
CC2 Pro can print any view of any map either to *fit the page*, or to a precise scale factor (e.g. 1:72 for miniatures), or *tiled* across more than one sheet of paper.

Hidden layers do not print.

---

9 From the **File** toolbar click **Print**.

You see the Print Drawing dialog box, which has five sections – Printer, View to print, Scaling, Tiling and Options.



Printing without worrying about the options

The Print dialog box gives you a great deal of control about how the printed map will look but, with that control, comes options. If you want to print without worrying about the options, these are the settings you want:

- ✓ Printer — Select a working printer
- ✓ View to print — **Everything**
- ✓ Scaling — **Fit to page**
- ✓ Tiling — # Horiz = **1**, # Vert = **1**
- ✓ Print White as Black — **Not checked**
- ✓ Portrait or Landscape — As appropriate

Then click **OK**.

Printing using the options

10 Select the **View to print**.

Everything	The whole map will print, regardless of the current view. To see what CC2 Pro considers is everything, click **Zoom Extents** .
Active Window	The current view will print.
Named View	From the View menu you can save views of a map. If you have previously saved views of the map, they will be listed here.
Sheet	Sheets are an advanced feature of CC2 Pro detailed in CC2 Pro's help system. The normal value is (Standard drawing – COMMON sheet only).

11 Select the Scaling you would like.

Fit to page	Scales the selected view to best fit your paper size and orientation.
Scale factor	• Paper distance refers to real life distance on your piece of paper. • Drawing distance refers to distances as measured from the drawing. To measure distances on the drawing, select Info menu >> Distance and then pick two points to measure between. For example, if you use **Distance** to measure the east-west size of *Carag* island, you'll find it is approximately 425 units across. If you set the Paper Distance to **1**" and Drawing Distance to 100, the print will be at 100 units to the inch. The printed *Carag* island would therefore measure 4.25 inches across.

12 Select the number of pages for print Tiling.

CC2 Pro can create oversized prints by tiling across more than one sheet of paper. When you select print tiling, it's important to use print preview to check what the drawing will look like, or you could find yourself using up many sheets of paper!

# Horiz # Vert	Sets how many sheets the print will use. A value of **1** in each box gives a 1 page print.
Overlap %	Sets the overlap between sheets. A value of **0** means there is no overlap. To make it easier to stick sheets together, set the overlap to **5%**.

THE FIRST MAP

CC2 Pro offers a huge number of easy-to-use tools that make drawing a map quick and painless. This chapter will take you step by step through some of these tools to create your first CC2 Pro map.

While the drawing tools make drawing a map easy, you will sometimes want to use the underlying CAD functions directly. Keep an eye on the gray boxes in this chapter: they explain some of the basic functions of CC2 Pro. If you want to finish your first map quickly you can safely ignore them for now.

This chapter is meant to be an easy and quick introduction into CC2 Pro. Please follow it closely to learn the basic drawing tools. If you make a mistake or are not satisfied with a result, simply use the **Undo** function to go back to an earlier stage.

Start a New Map

1 Start CC2 Pro, either by clicking its icon on the Windows® desktop, or by selecting Windows® Start menu >> Programs >> Campaign Cartographer 2.

2 On the **File** toolbar click **New**.

CC2 Pro offers you a variety of templates to base your new map on. For now simply select the third preview along (the one with blue background and without compass rose and scale bar).

Templates predefine a lot of information for the map, its size, the layers it contains, etc. They are no absolutes though. You can erase anything on a template and start from scratch if you want to.

Parting Land and Sea

We will start by adding a landmass to the map. CC2 Pro has a landmass tool to make this very easy.

1 From the **Overland** toolbar, click **Landmass**.

2 Look at the lower left corner of the screen.

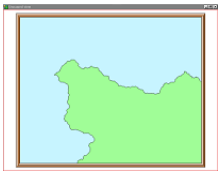
You can see the phrase `Fractal Polygon: First point (E – Edit):`

CC2 Pro is waiting for you to click the first point of a landmass with random nodes.

Important: The lower left corner of the screen, called the Command Prompt (prompt), is where CC2 Pro asks you for instructions, and gives you information about shortcuts. Keep an eye on it! If you select a menu item and nothing appears to happen, look down here and you'll see what CC2 Pro wants.

3 Click somewhere in the blue area.

Don't drag the mouse, just move it around. Notice that when you move outside of the template, the landmass "locks" inside the border.



4 Click more points to create the outline of a landmass you like.

5 Right-click to complete the landmass.

The area you outlined fills with a light green, the default color for landmasses.

The fractal polygon is just the default method for drawing landmasses. You can access others by right-clicking the landmass button. Like most of CC2 Pro's buttons it offers a selection of alternative and/or similar commands on a right-click.

The command prompt now reads `Fractal Polygon: First point (E – Edit)` again. CC2 Pro is waiting for you to add more landmasses.

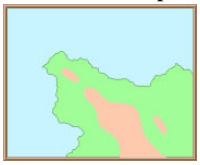
CC2 Pro's commands usually auto-repeat, i.e. if you have finished doing something and left-click again, the command starts anew. Do not worry if this happens accidentally, simply right-click anywhere in the drawing area or hit ESC to cancel the command.

Raising Mountains

Next we will add some mountainous regions to the map by drawing some contour lines and adding symbols.

6 From the **Overland** toolbar, click **Contours**.

As the contour tool does not have a single default setting, CC2 Pro will offer you a variety of styles. Scroll down and select the **Map Contour, Default 10** style.



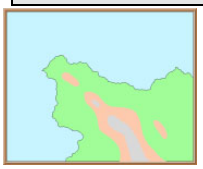
7 Draw the contour the same way you drew the landmass.

Only this time you are not using a fractal polygon but a smooth one. Notice the difference.

8 Add a few more contours for some smaller hilly regions.

After you have finished one contour simply click again to start the next one

Polygons (polys) will be some of the most common entities you draw in CC2 Pro. There are three types: *Regular*, *Smooth* and *Fractal* Polygons. *Regular* ones have a node (or corner) at each point where you click, *Smooth* polys round out these corners to get a smooth (who would have thought it?) outline, and *Fractal* ones insert random nodes between the ones you click.



9 Click **Contours** again.

This time select the **Map Contour, Default 14** setting to draw a gray contour.

10 Draw the contour where your higher Mountains will be on the map.

We will now add some symbols to the drawing. Symbols are little predefined drawings that can be added quickly to a map. CC2 Pro contains a lot of these.

11 Click **Symbol Catalog Setting**.

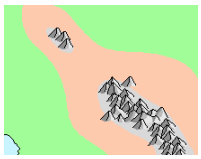
CC2 Pro shows you a list of available symbol catalogs (symbols are organized in catalogs by type). Click **CC2 Filled Mountains**.

CC's catalog window now displays a list of different mountain symbols. You can see all of them by scrolling down the list.

12 Click on a symbol you want to place on the map.

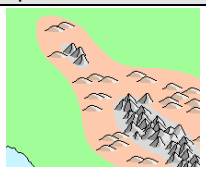
If you now move the cursor into the drawing area you will see it dragging an outline of the symbol you just selected. Simply click on the map where you want it to be and the symbol is placed.

You can continue placing the symbol by clicking again and again, or you can select a new symbol by choosing from the catalog again.



13 Starting from top to bottom place the mountain symbols inside your gray contour. Never mind if some of them overlap the contour slightly.

CC2 Pro's symbols are designed in such a way that they look "right" when placed from north to south, so that the southerly ones cover the base of those behind. This style of map gives the cartographer's impression, not the actual position of each peak. Don't try to add every peak.



14 Scroll down the catalog list and choose a hill symbol.

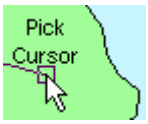
Place a scattering of hills over the light brown contours.

Not All Rivers Flow to the Sea

Now let's add some rivers to our landscape.

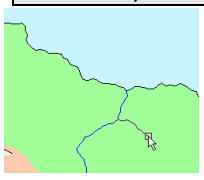
15 Click **Rivers**.

The command prompt now reads `Fractal Path: First Point (E-Edit):` which means CC2 Pro is ready to draw the river. Also, the cursor has now a small square around its point called a *pick cursor*.



The pick cursor will notice if an entity is within its square when you click, and attach the river you are drawing to this entity. This is a convenient way to make sure the river connects with the coast or a tributary

When CC2 Pro gives you the pick cursor when you are drawing, **Attach** is enabled. You can toggle this mode on and off by clicking the Attach button on the lower right of the screen.



16 With the pick cursor click on the coastline where a river runs into the sea.

From there draw the river inland to its source. Notice that the **Fractal Path**, like the **Fractal Polygon**, inserts random nodes into your river.

17 Add some more rivers to your map.

Some of them could be tributaries of other rivers and not run directly into the sea.

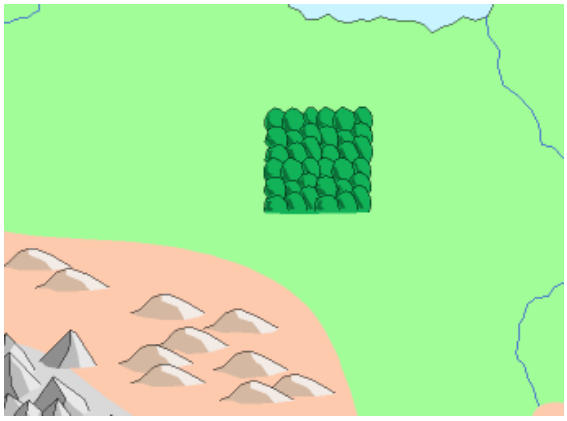
Paths are another type of common entity in CC2 Pro maps. Like Polygons, they come in Regular, Smooth and Fractal varieties.

Forests and Vegetation

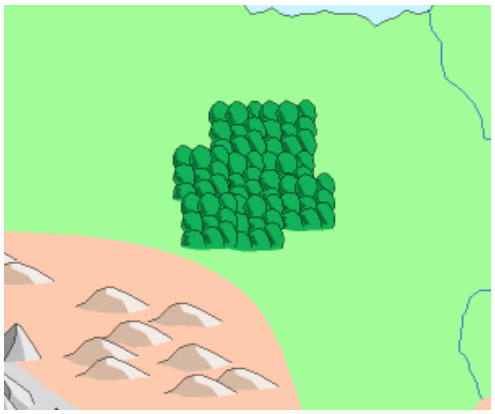
Our land is still pretty bare and lifeless, despite the rivers that run through it. So let's add some forest, fens and meadows.

18 Click Symbol Catalog Settings . Choose **CC2 Filled Vegetation**.

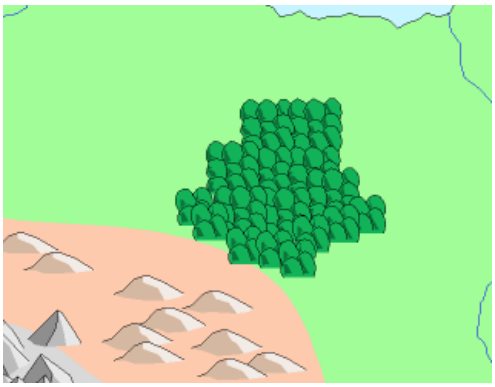
19 Zoom in to a place where your first forest should go. Click the symbol named **D Forest** from the catalog window and place it on the map.



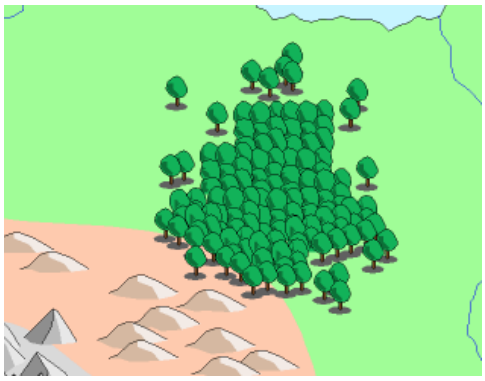
20 Now chose the next smaller symbol from the list (**D Wood**) and place it along the lower edges of our forest.



21 Do the same with the symbol **D Copse**.



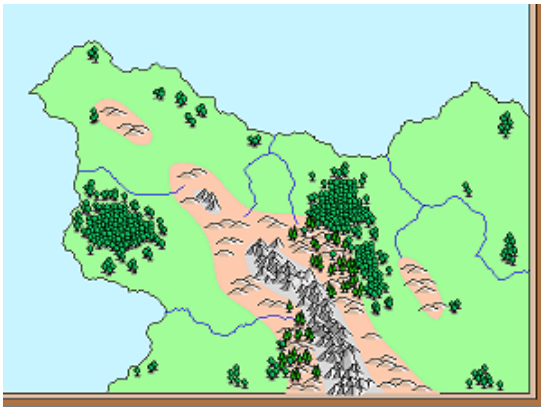
22 Finally place individual tree symbols around the edges of your forest to give it an irregular and finished appearance.



23 Add as much forest to your map as you like.

You can do pine forests with the appropriate symbols or intermingle deciduous and coniferous trees to create mixed forests.

Scattering a few single trees or small groups around the map creates a nice look, but don't overdo it. It is easy to clutter a map with symbols, but exercising restraint usually creates a more beautiful map.



24 Click **All Map Drawing tools** .

This button brings up all the available drawing tools of CC2 Pro including the landmass, contour and river ones we already used.

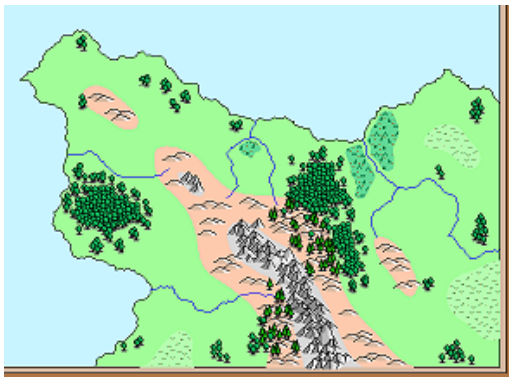
25 Look for and click the **Map Fens 1** tool.

The command prompt reads `Smooth Polygon: First Point:` just like when we added contours.

26 Draw some fens into low-lying areas along the river or coasts. They draw the same as the contours, but look different.

27 Click **All Map Drawing tools** . Click the **Map Meadows 1** tool and add some meadows.

Notice that these polygons also restrict themselves inside the map border.



The Overland menu has a full range of shortcuts to these area fill drawing tools on the Area Fills submenu.

Populating the World

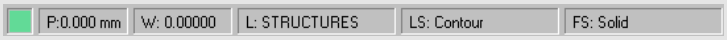
28 Click **Symbol Catalog Settings** .

Choose **CC2 Filled Structures**.

The catalog window display a list of symbols for cities, towns, etc.

The Status Bar

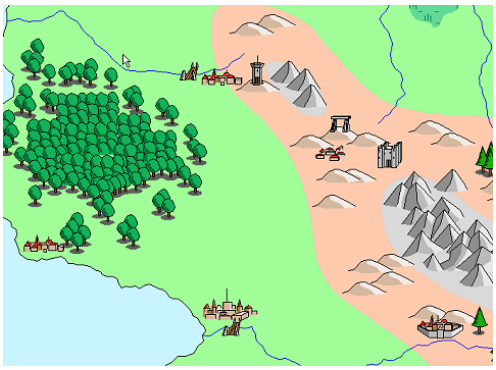
Take a look at the status bar atop the drawing window:



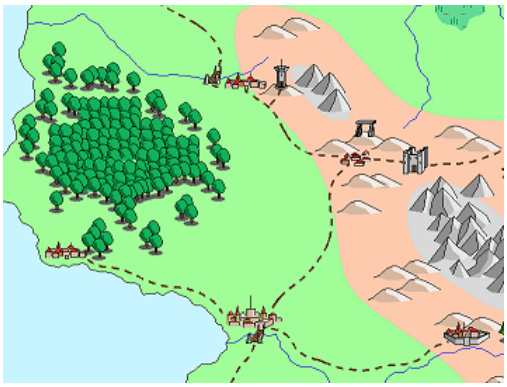
CC2 Pro displays the current settings for new objects here. The L:STRUCTURES part tells you that you are now drawing on the layer **STRUCTURES**.

The drawing tools choose convenient layers for you automatically, but it is always wise to keep an eye on the settings to avoid mistakes. Clicking on the indicators will also bring up the appropriate dialog box to change the setting manually, e.g. if you want to place a wizard's tower on the **GM Only** layer instead of **STRUCTURES**.

29 Place a selection of structure symbols around your map to represent settlements, fortifications, etc.



Click **Default Road** , then connect some of your structures with roads.



Some Editing

Let's say you want to change some details of the objects you just drew. For example you might not like the dotted line style of the roads and wanted to have continuous lines instead. The following example puts you through the basic steps for editing entities. Remember, in CC2 Pro, you choose what you want to do and then what you want to do it to.

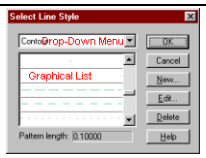
Click **Change Line Style**

The command prompt changes to `Select entities (0 picked)[Dialog]` and the cursor changes into a pick box.

30 With the pick cursor click on each of your roads. You will see them turn gray, meaning that they have been selected for editing.

If you happen to click on an entity you do not want to edit, press ² and click it again. If you miss altogether, you will see a window cursor. Anything in that cursor will be selected when you click again. You can cancel the command by hitting ESC or by right-clicking and choosing Cancel from the pop-up menu.

Once you have selected all roads, right-click and click Do it. The command prompt reads `Line Style name [dialog]`, meaning CC2 Pro expects you to type the name of the new line style or right-click to bring up a dialog.



Right click and select the line style **Solid** from the graphical list or the drop-down menu.
Click **OK** and you will see that all selected roads now have the new line style.

Selecting entities for editing

If you do not have any prior experience with CAD-style programs, take a second to get used to CC2 Pro's selection method. You first select the command you want to execute (for example, **Change Line Style**) and then the entities you want to edit.

You can select the entities by several methods. With the pick cursors you click on the edge of an entity to select it. If you click on an empty area, you open a selection window that will catch all entities within it. Finally, a right-click brings up the *selection pop-up menu* via which you can select entities by their properties, e.g. on which layer they are on, which color they have or what type of entity they are. See *Editing in CC2 Pro* on page 60 for more details.

How far is that?

Scale bars and compass roses are typical accessories of historical maps. CC2 Pro offers a variety of predefined styles for these adornments. Because one drawing unit in the overland maps represents one mile the scale bars will have the correct size by default.

31 Click **Symbol Catalog Settings** . Click **CC2 Filled Scalebars**.

The catalog window displays a list of scale bars.

32 Select one of the 200 mile bars and place it in an empty area of your map.

33 Click **Symbol Catalog Settings** . Choose **CC2 Filled Compass Roses**.

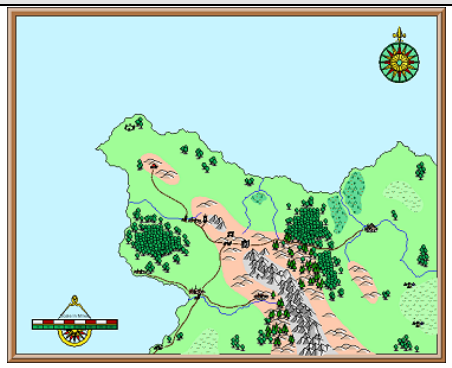
Select the very first symbol from the catalog (named Logo Rose). When you drag it around the map, you will notice that it could do with being a bit larger.

34 Hold down the CTRL key and move the mouse up. The symbol grows larger. By moving the mouse up and down scale the compass rose until you are satisfied with its size. Click to place the symbol.

Manipulating Symbols

You can scale a symbol by pressing CTRL when you insert it. You can also rotate by holding down the SHIFT and CTRL key at the same time. Future symbols will remember the last selected scale and rotation.

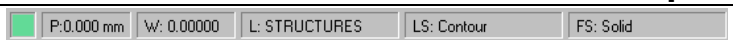
A right click while placing symbol opens the symbol dialog box which gives you greater control over the appearance of the symbols. You can add independent x and y scales, set a numerical rotation and reset the settings to the default values **Set Normal. More** will bring you back to placing symbols and **Finished** will stop the whole placement process.



Labeling the Map

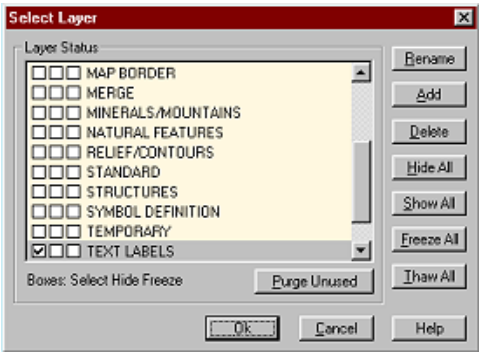
Finally the map needs some text to identify the depicted features.

As there are no predefined drawing tools for adding text, we will set the necessary settings ourselves.



35 Click the *color indicator* on the status bar (the small colored square).
The color dialog comes up. Select black (color 0) and click OK.

36 Click on the layer indicator (it should read L:MAP BORDER).
The layer dialog appears. Scroll down the list of layers until you see the layer named **TEXT LABELS**. Click on the leftmost box beside it so that a small check appears.



Click OK. The layer indicator now reads L:TEXT LABELS, meaning this is the layer we are currently drawing on.

37 Click **Text Specs** **.**
This command changes the current text settings.

In the text dialog set the **Height** to 20 and the font to one you would like for your map.

CC2 Pro offers all True Type® fonts that are installed on your system, when you click the **More Fonts** button. Be aware though that others who want to view your map on their computer need the same fonts installed. Otherwise they will just see a default font.

38 Now click **Text** **.** Enter the name of a feature on your map and click **OK**.

39 You can now move the text around the map, resize and rotate it by holding down CTRL , SHIFT or SHIFT and CTRL .

40 Click to repeat the **Text** command. Add more text. Repeat until you are satisfied.

41 Last but not least think of a title for your map. Place it in the top-left corner of your map.
It doesn't really look like a title at the moment, because it is the same as all the other text. So let us use some editing commands on it to make it stand out.

Click **Change Text Specs** . Click the base of the title text, right-click, choose Do it.
The text dialog comes up and you can change the properties of this particular text.

42 Type 35 in the **Height** and click OK.
The title probably extends now across the map border.

43 Click **Move, Scale, Rotate** to correct this. Select the title text again, right-click, choose Do it

44 Move the text so that it is wholly within the map border. Click to finish.

45 Click **Copy** . Place a copy of your title slightly below and to the left, so that the letters overlap. Click Zoom Window to get a better view if you like.

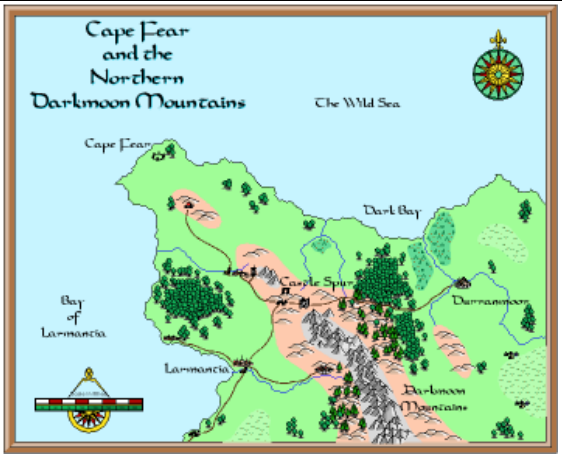
46 Click **Change Color** right click and choose Prior.
The copy you just placed is now selected..

47 Right-click again and choose Do it. Click a suitable color on the color bar on the left of the screen (white or a blue if your title is over water). Click OK

Repeating the Prior Selection

Prior is a way of applying multiple editing commands to the same selection. Just start the second editing command, right click and select Prior (or press p) to select the previous entities.

Your map could look something like this:



Final Touches

We are almost done, only a few things remain to do.

You will notice that some entities like contours or mountains overlap the map border slightly. To correct this we need to bring the map border to the front of the drawing, so that it hides the overlap.

CC2 Pro's Drawing Order

A CC2 Pro map is a database of entities. When the screen updates, the entities are drawn in the order they are encountered in the database, drawing over previous entities. Normally, the database order is the order the entities were added.

You can change the order in which entities are added to the drawing using the Entity Order toolbar buttons – **Bring to Front**, **Send to Back**, **Bring in front of** and **Send Behind**

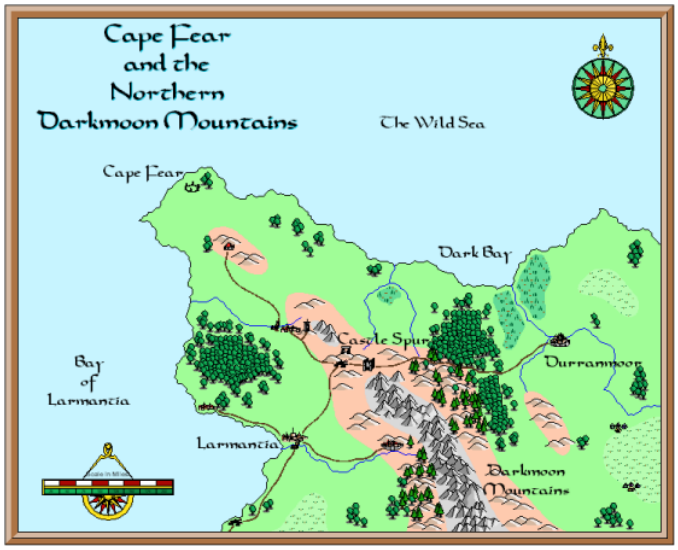
Click **Bring to Front**. Right-click, click Layer, right-click, highlight the layer MAP BORDER and click **OK**. Right-click then click Do it.

The map redraws and the map border should now cover all overlaps.

48 Click File menu >> Save As..., and save your map under a meaningful name.

This is it. You have drawn your first map with CC2 Pro. Feel free to experiment and add to it as you like. The following chapters will expand and upon the basics you learned here and go into more detail.

You can find the example maps for this chapter in the tutorials folder of CC2 Pro.



A Summary of The First Map

If you have simply followed the instructions so far, please go back now and reread the gray boxes of this chapter carefully. They explain a lot of CC2 Pro's basics which will be important for the following chapters. The most central topics of the chapter are summarized here:

- ✓ New maps are based on **templates** that define certain properties for the map.
- ✓ At the **command prompt** CC2 Pro asks for your next instruction and gives information about the current command. Keep an eye on it!
- ✓ CC2 Pro's drawing tools (like the **landmass** tool) have a default action which is activated by left-clicking on the corresponding button. Right-clicking usually provides a list of alternative actions.

- ✓ Commands auto-repeat if you left-click after completing one. ESC or right-click cancel the current command.
- ✓ **Polygons** and **Paths** are some of the most commonly drawn entities in CC2 Pro. They come in Regular, Smooth and Fractal varieties.
- ✓ **Symbols** are predefined small drawings organized into catalogs which can be placed on a map with a simple click.
- ✓ **Attach Mode** (toggled in the lower right corner of the screen) lets you place points exactly on other entities.
- ✓ Current drawing settings like color, layer fill style, etc. are displayed on the **status bar** atop the drawing window.
- ✓ To **edit** existing entities you first choose a command and then **select** the entities you want to edit.
- ✓ There are several **selection methods** the simplest being single picks and selection windows. Further methods will be covered in more detail later.
- ✓ Symbols can be scaled and rotated during placement by holding down the SHIFT and CTRL keys. Right-clicking opens the symbol dialog boy for numerical control.
- ✓ Current drawing settings (color, layer, etc.) can be changed by clicking on the appropriate **indicators** on the **status bar**.

A CC2 Pro map is a database of **entities** (paths polygons, text, symbols, etc.). They are drawn in the order they appear in the database, later ones overlapping earlier entities. This order can be changed by the entity order commands.

MAPPING LAND

In this and the following chapters we will take a closer look at CC2 Pro's functions while drawing a new map. This time we will pay close attention to the commands used and the details of their working.

Be sure to review the things you learned in chapter 2. While we will repeat some of the commands introduced there, we will focus on new or alternative ways of doing things.

Using Drawing Templates

When you start a new map, CC2 Pro presents you with a choice of drawing templates. The template gives the new map pre-defined properties such as fill styles, line styles and layers plus pre-drawn features such as a sized border and a colored background. Some templates are specifically designed for hand-drawn looks, others for scientific looking maps or game boards. If you want to create your own unique map style, you can start with a blank template without any pre-drawn stuff at all.

Choosing a drawing template

1 Click **New** .

You see the Template selection window. Template thumbnails are arranged alphabetically for you to browse.

2 Click on the *1000x800 (Sea background).fct* template.

You see a new map. It has a ready-drawn border and a sea blue background. Less obviously it has also inherited the template's layers, line styles, fill styles, units, grids and current drawing settings. In short, the template has saved you loads of time by correctly presetting all the drawing options.

To start a new drawing based on the current template, right click **New** then click New from Current Template.

Drawing Closer to Land

In chapter 2 we used the default Landmass tool to draw our land area. We will now take a look at different methods.

3 Right-click **Landmass** .

CC2 Pro lists all drawing tools that have the words **Map** and **Land** in their description (see the tool name filter at the top of the dialog box).

4 Scroll down a bit until you find the tool **Map Land, fractal box**. Click on it.

The dialog box closes and CC2 Pro waits for you to place the first corner of the box we want to draw (look at the command prompt!).

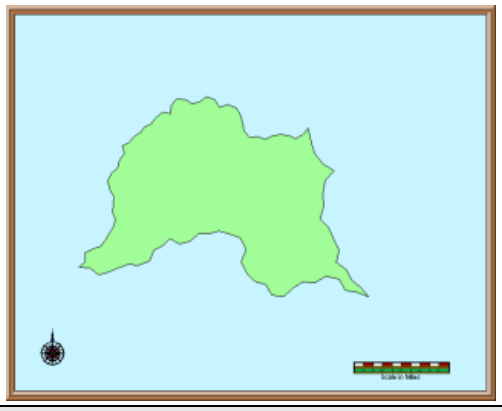
5 Click a spot in the left half of the drawing window.

When you now move the mouse, you will see an outline of the shape we are drawing, changing with the movement of the mouse. If you left-click again, the current shape will be drawn.

But wait a moment and see what the command prompt has to offer: It reads `Second Corner` **-** meaning the next click will set the second corner of the fractal box – `(Space – Randomize, L/R Arrows – Depth, U/D Arrows – Strength).`

6 Try out the keys the command line shows. Pressing SPACE will change the outline shown strongly, it generates a new random appearance each time. The keyboard arrows will change two more settings of the fractal function behind the command. The effects are more gradual – try it out.

7 Once you are satisfied with the apperance of your landmass, click to complete the command. Right click to stop drawing landmasses.



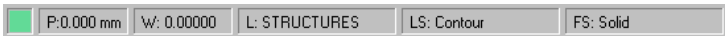
The commands behind the tool

CC2 Pro's **Map Drawing Tools** packages a series of CAD commands into one convenient tool for the user. In the above example, the **Landmass** tool sets the color, layer and fill style, draws a green rectangular box, fractalizes the same to give it a jagged appearance and outlines it in black – all with only a few mouse clicks for the user.

While this is convenient and makes drawing maps quick and easy, you can still go beyond the tools by using the basic commands yourself. Let's try them out, so that you know what we are talking about.

Let's draw a barren, sandy island near out landmass, without using the tools.

8 Check the status bar whether the current layer is COAST/SEA and the fill style is Solid.



If not, click on the relevant indicators and change them appropriately.

9 Change the **current color** to a light yellow (e.g. color #140).

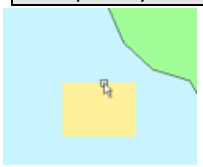
10 From the Draw toolbar, click **Box** then click two points to form a small rectangle near one of the coasts of your landmass.

Notice how the box conforms exactly to our specifications: yellow color, solid fill and no irregular shape or outline. We need to add these features ourselves.

11 Click **Fractalize** .

The Fractalization dialog comes up. The default settings are fine, so simply click **Ok**.

Fractalize is used to add complexity to existing paths or polygons. You can sketch out a simple shape, then add complexity.



12 Click on the edge of the yellow rectangle.

You will see that CC2 Pro adds random nodes to the rectangle, giving it a jagged appearance. Click again and even more nodes appear. Do not overdo it though two or three **fractalizations** should be enough.

13 Finally the outline. Click **Outline** .

Click the edge of the small island. Right-click and select Do it.

See how we achieved basically the same effect with a lot more work? Usually the drawing tools are the quicker and easier alternative. Still, there will be many times when you want to use the standard commands.

Reshaping Land

You can use certain landmass map drawing tools to edit your existing landmasses. When you click a landmass command, the prompt will include `e-Edit`. Press **E** to change the appearance of an existing landmass. Select a starting point on the existing land, then draw the new outline. Finally, right click and click an end node, and the landmass will be reshaped.

A Summary of Mapping Land

These are the new ideas you met in this chapter. If you are in any doubt, re-read the chapter!

- ✓ New maps are based on the template you select. The template gives the map predefined features and properties.
- ✓ Templates are named with their size and any special features they have.
- ✓ The **landmass tool** gives you a variety of methods to draw land.
- ✓ CC2 Pro's drawing tools conveniently group a series of drawing commands into one easy-to-use function.
- ✓ Right click on Landmass to give you a choice of other landmass drawing methods.
- ✓ A Landmass drawn with the appropriate tool consists of a green fractalized polygon and a black outline.

MOUNTAINS

While every fantasy world can have its own rules, most people tend to stick with the ideas that rivers run from mountains to the sea, that habitations grow near rivers, and that trees don't grow well on mountaintops. For these reasons, our next step in world building is mountaineering. Well, you know what I mean!

To work on the same map I am using here, open Map1.fcw from the CC2 Pro Tutorials folder.

---

1 On the **Overland** toolbar, click **Catalog settings** .

Choose the symbol catalog **CC2 Filled Mountain**.

2 **Zoom Window** to get a closer view of the island at the center of the map.

3 Click the 3rd mountain in the Catalog Window .

The mountain symbol attaches to the cursor and moves around the screen as you move the mouse.

4 Click to place the symbol in the northern part of the island.

The symbol is added to the map. The same symbol is still attached to the cursor, ready to be placed again.

5 Place the next symbol to the right and slightly below the first.

6 By choosing and placing symbols, build an interesting range of mountains. If you make a mistake with a symbol, correct it using the **Undo** button .

Tips on mountain ranges

- ✓ Place mountains and forests from north to south so that the southerly ones cover the base of those behind.
- ✓ This style of map gives the cartographer's impression, not the actual position of each peak. Don't try to add every peak.
- ✓ It is very easy to get carried away and add too many mountains, so think Zen and restrain yourself. If you browse the example maps that come with CC2 Pro, you'll see that the most beautiful use symbols sparingly. This also reduces the time taken for the map to redraw.

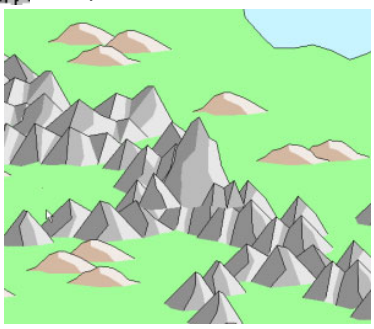
Changing the order that symbols are drawn

It should be added to Murphy's Law that, no matter how carefully you plan your mountain ranges, the last peak always needs to go *right in the middle!*

To continue from my example, load Map2.fcw from CC2 Pro's Tutorial folder.

---

1 Click the great big Great Peak symbol and place it in the middle of the mountain range.



The peak mucks-up the mountain range because it doesn't fit in with the 3D look. It needs to be behind the southerly mountains.

The mountain looks out of place because as the last entity we placed, it is drawn last – above the other mountains.

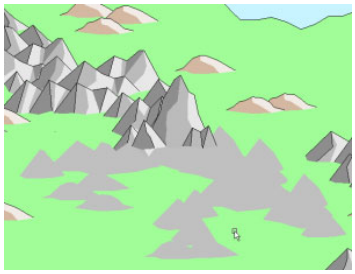
We encountered a similar problem before, when our symbols partly obscured the map border. Refer to chapter 3, **Final Touches** to see the notes there.

2 On the **Entity Order** toolbar click **Bring to Front** .

The Command Line reads `Select entities (0 picked):`.

3 Click on each of the mountains south of the Great Peak.

As you click on each symbol, it is added to the selection. If you select a mountain accidentally, deselect it by pressing `Ctrl` while clicking on the same mountain again.



4 Right-click then select Do It from the Selection popup menu.

The mountains are reordered.

CC2 Pro also has a way of sorting symbols for you – select Symbols menu >> Sort Symbols in Map. This reorders the symbols you select from North to South. It doesn't work with some combinations of symbol sizes, but it's worth a try.

Mountains with a background

As an artistic touch, it looks very effective to set mountains off with a colored background.

In chapter 3 we used contours to give the mountain range some background and definition. This time we will add a smooth polygon via the command of the same name to add some variety to your mapping skills.

5 Click the **Color** indicator on the Status Bar and change the current color to #44 (light brown).

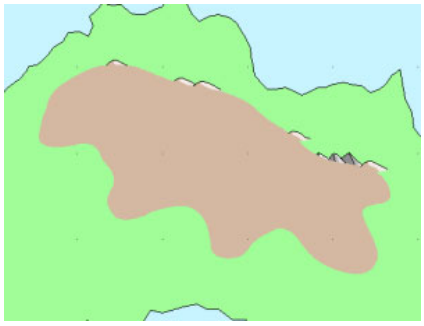
6 On the **Draw** toolbar, click **Smooth Poly** .

The Command Line reads `1st point:` and the cursor changes to crosshairs.

In keeping with the 3D effect of the mountains, the background looks best if it's slightly clipped by the mountain tops, but is well clear of the bases.

7 Click points to create a region enclosing the mountains. When the region is almost complete, right click to close the shape and complete the command.

The smooth polygon is drawn in the current color and fill style. It was created after the mountains, so it is currently in front of them.



Bring in Front of and Send Behind

We need to move the brown background behind the mountains. To do this we will use **Bring in front of** to bring them in front of a reference entity of our choice.

Bring to Front and **Send to Back** move entities to the very front or the very back of the drawing. If we were to use **Send to Back** on the mountain background, it would go behind everything, including the green of the island and the sea blue background.

Bring in front of and **Send Behind** are much more subtle. By picking a reference entity, you say exactly how deep in the drawing the entities will be placed.

8 Click **Bring in front of** .

The Command Line reads `Move above entity:` and the cursor changes to a pick box.

CC2 Pro is waiting for you to pick the reference entity in front of which the mountain background will be moved.

9 Click on the edge of the island.

The Command Line reads `Select entities (0 picked):`.

10 Click on the edge of the brown mountain background then Do it.

The smooth polygon is now behind the mountains.

> The island is already behind all the mountains. By putting the smooth poly right in front of the island, we sandwiched the former between the latter and the mountains.
>
> Always keep your overall map in mind when ordering entities. Sometimes putting something in the right place is just an issue of finding another entity that is already in the right place, and using **Bring in front** of or **Send behind** on it.

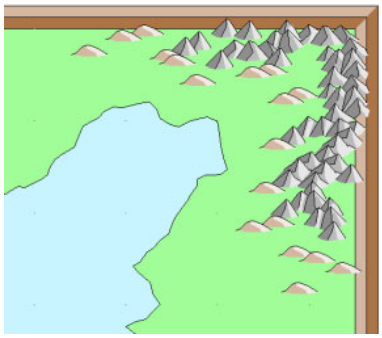
Cropping mountains to the map border

We already have land that extends beyond the map border, so it's just as likely that we'll have mountain ranges that do the same. We already know how to cope with this from out first map in chapter 3, so we will do this quickly.

To use my map, open Map3.fcw from CC2 Pro's Tutorials folder. If you want to work on your own map, place a mountain range in the NE corner of the map, so that a few symbols overlap the border slightly.

---

11 **Zoom Window** on the land in the northeast corner.

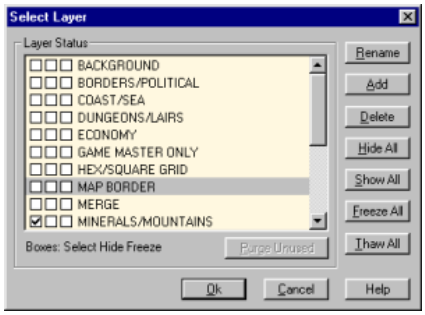


12 Click **Front** .

The Command Line reads `Select entities (0 picked):`.

13 Right click to bring up the selection dialog, click on **Layer** and right click again. The layer dialog box appears.

Look for the layer called MAP BORDER and click on the name, so that it is highlighted. Don't click within the small boxes, as this would change the layer's status.



14 Click **OK**, right click and select Do it.

The map border is brought to the front of the drawing, hiding any bits of mountain outside the viewable map area.

> **Important.** Selecting by layer is often a convenient way to reorder the drawing, but only as long as you plan and draw your map accordingly. Always keep an eye on the Layer indicator to see whether you are still drawing on the correct layer.

Create a Map Background drawing tool

The background for these mountains has to cross the straight edges of the border and yet support the curves of the mountain background. We could use one of the contour drawing tools, but none of the colors match. Instead, we'll make our own custom Drawing Tool to reuse.

15 Click **Map Drawing Tools** .

You can see a list of all the Map drawing tools.

Click **Advanced**>>.

This dialog box allows you to modify or add drawing tool.

> When you select the **Map Drawing Tools** button, CC2 Pro puts Map* in the Tool name filter, which restricts the drawing tools displayed to those that match the filter. The names of all drawing tools specific to overland mapping start with the word Map, so when you create a new overland mapping tool, start its name with Map.

16 From the **Custom tool name** list, select Map Contour Default 01, then click **New**. Type **`Map Mountain Background`**.

We are using this contour drawing tool as the basis for our new style.

17 All the settings are correct except for the Properties.

Draw Tools Options

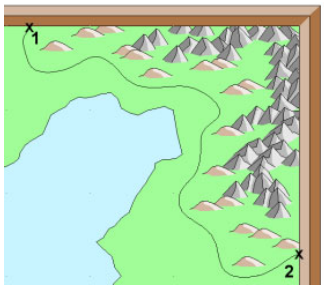
Draw Method	Poly/path- draw with mouse clicks. Sketch – move the mouse to leave a trail Fractal – creates a randomized shape from a few clicks The Options button configures the draw method you have selected.
Closure	Choose either a closed shape like a lake, or an open one like a road.
Outline	Choose the properties of the tool's outline, if any.
Properties	Choose the color, fill style and other properties of the tool. You can use the current properties on the status bar instead of a particular properties.
Restrict to map border	If on, this forces the entity to stay within the border of the map. It only works on rectangular templates.
Front only on layer	Sends the entity to the top of the layer it is on, but behind any other entities.
Attach Mode	Choose whether the tool snaps to significant points on other entities, for example Map Rivers lock onto other entities such as the coast.

18 Click **Properties**, then click the color indicator and set it to light brown (#44). Click **OK**.

19 Pull down the **Layer** list, then select MINERALS/MOUNTAINS.

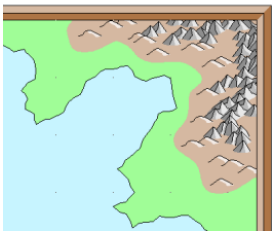
20 Click **Save**.

The new drawing tool is ready to go.



21 Click points to create a smooth path that skirts the mountains. Click outside the map borders and corner to lock the entity, then right click to end the command.

22 As before, we need to put the brown background behind the mountain symbols.



23 Click **Bring in front of** .

The Command Line reads `Move above entity:` and the cursor changes to a pick box.

24 Click on the coast to select it as the reference entity.

The Command Line reads `Select entities (0 picked):`.

25 Click the edge of the mountain background, right-click then Do It.

26 The mountain background is moved just in front of the coast, which is behind the mountains.

A summary of Mountains...

Having read this chapter, you should be able to make molehills out of mountains. If not, go back and dig through it again!

- ✓ Mountain ranges are drawn from north to south, giving a 3D effect as the peaks of the southerly mountains hide the bases of those behind.
- ✓ Do not use too many symbols. Mountains in this style are not supposed to be to scale, nor to illustrate every peak.
- ✓ Entities are drawn on screen in the order they are stored in the map. By default, this is in the same order that the entities were created. You can manually change the order that entities are drawn using **Bring to Front**, **Send to Back**, **Bring in front of** and **Send behind**.
- ✓ Bringing the map border to the front of the drawing will neatly crop entities at the edge of the map.

RIVERS, SETTLEMENTS AND ROADS

High ground forces air to rise and cool, coaxing it into sharing the life-giving moisture it carries. Combine this with prevailing winds, proximity to water, temperature and other climatic considerations and you can easily devise plausible rainfall and river patterns.

And once on the ground, water's downwards journey remains shaped by terrain. Where land falls steeply, water falls straight and frantic. Where land falls gently, water follows as sedately as Old Father Thames. And if rock blocks its progress, a river will stop or turn – for now at least.

Life is opportunist. Settlements will form anywhere a buck can be made, but most frequently at sites of opportunity and safety. A habitable region which is rich in resources (be they mineral, marine, or agricultural) will be keenly prized and, perhaps, fought over. Prosperity is usually the result of a natural advantage, such as a rare local commodity, a position on a trading route or an easily defended location.

But let me cease my pseudo-socio-geographic rambling and hasten to my point… before drawing rivers, settlements or roads, take a step back and think about the factors that influence them. Your maps will benefit.

A simple, meandering river

We will draw the rivers on the island in the center of the map. I have arbitrarily decided that the west of the island is very dry, while the east benefits from plenty of water flowing off the mountains.

To use my map, open Map4.fcw from CC2 Pro's Tutorials folder.

1 **Zoom Window** on the central island.

2 On the Overland menu, right-click **River**. Choose Map River.

CC2 Pro changes the current settings ready for drawing waterways then starts drawing using a smooth path. The color is now **dark blue**, the line style **RIVER**, the layer is **WATER/RIVERS** and the Command Line reads `Smooth Path: First Point:`

> The default river drawing tool is **Fractal Path**. This isn't suitable for our needs, so we've chosen a smooth path because this river is slow and meandering.

3 Click to place the first point at the eastern edge of the mountains.

The Command Line reads `Next point:`.

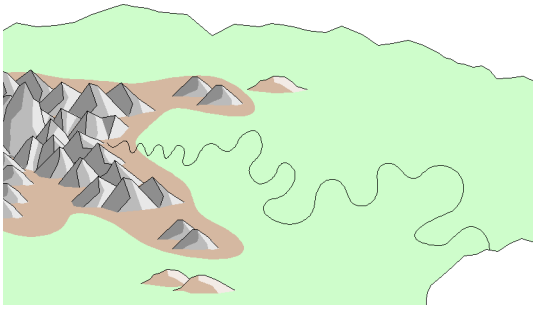
4 Click nodes to create a river that meanders towards the coast.

At first the river should bend frequently. As the river nears the sea, the bends should gradually become larger and more gentle.

> As you add nodes, you see a straight-line frame and the resultant smooth path. The frame is for information only and does not display after the command ends.

5 Where the river meets the sea, click on the coast to attach the last node precisely to the coastline. Right click to end the command.

> Note that the **Attach** button is depressed. Like many other drawing tools, the river tools turn Attach on, so that your river will snap to other rivers and the coast. You can press the Attach button at any time to disable this feature. CC2 use the current Attach setting (usually Nearest Point On) to determine which significant point the river locks to. Right click Attach to change the setting to Nearest Point On if it has been Changed.



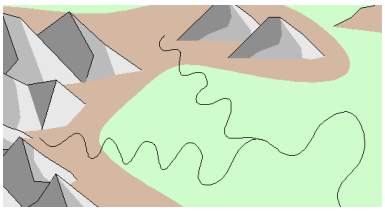
Adding tributary rivers

Most drawing tools repeat automatically. This makes it easy for you to draw a series of rivers, roads, or other map entities.

6 Look at the Command prompt now. What does it say?

If things are going to plan, the Command prompt should read `Smooth Path: First Point:`.

7 **Zoom Window** on the top section of the river and add a tributary from the north.



8 Right-click twice to stop drawing rivers.

Rivers that get wider

It is common to show large rivers growing as they approach the sea. To do this we will make use of the Line Width setting which, until now, has been sitting unused and unloved on the Status Bar.

The main river is a single entity so, if we were to change its width now, the whole length of the river would be changed. For a gradual increase we need to split the main river into sections, then change the width section-by-section.

To use my map, open Tutorial 6.fcw from CC2 Pro's Tutorials folder.

---

9 On the **Single Entities** toolbar, click **Split**.

The Command Line reads `Entity to split:` and the cursor becomes a pick box.

10 Click the main river.

The river is highlighted in gray to show it is selected. The Command Line reads `Split entity at point:` and the cursor becomes crosshairs.

11 Place the crosshairs approximately halfway down the river, then click to create the split.

The command ends and the Command Line reverts to `Command [SPLIT]:`

There is no visible difference, but the river is now two separate smooth paths, meeting at the point where you created the split.

12 Left click.

Split repeats (the last split was successful command, so it is the default command).

> Every command has a text equivalent (which you can type at the Command Line or use in macros). When a command ends successfully, CC2 Pro puts the text equivalent in brackets on the Command Line, ready to execute with a right click. This is CC2 Pro's autorepeat facility.

13 Select the lower end of the river.

The half that you selected is highlighted (proof that the other end is now a separate entity) and the Command Line reads `Split entity at point:`.

14 Split this river section into two approximately equal parts.

15 Left click to repeat **Split**, do the same to the top section.

The river is now in four parts, each seamlessly meeting its neighbors.

16 On the **Edit** toolbar, click **Change Line Width**.

The Command Line reads `Select entities (0 picked):`.

17 Click the section of river nearest the sea, then right click and Do It.

The Command Line reads `New line width [0.0000]:`.

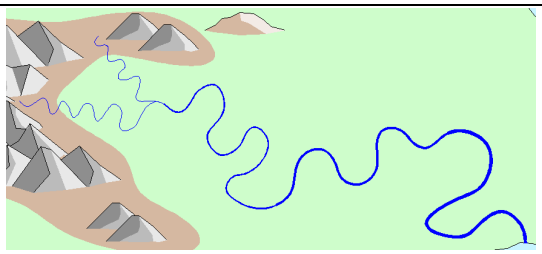
18 Type **1** then press ¶ .

As you type, the numbers appear on the Command prompt. When you press ¶ the command completes. The bottom section of the river is now wider.

> Whenever CC2 Pro asks for a value, such as `line width`, you can type the answer. What you type is displayed on the Command Line.

19 Left click to repeat **Change Line Width** on the next two river sections, typing values of **0.666** and **0.333** respectively (the section at the head of the river does not need changing).

Your river should now look something like this:



20 Add more rivers to complete the island's waterways.

Structures

Well, everyone needs somewhere to live.

CC2 Pro has shortcut buttons to its catalogs. Now is the time to reveal the toolbar!

21 If you can't see **Symbol Settings** toolbar, click **Screen Tools** , then set the Symbol toolbar setting check box until the arrow points upwards.

22 Click **Structures** . Click CC2 Filled Structures.

CC2 Pro changes the current settings ready for adding buildings.

The Catalog Window fills with CC2 Pro's selection of structures symbols.

23 Click on the City 2 symbol .

The symbol attaches to the cursor.

24 Click to place the symbol where the main river meets the sea.

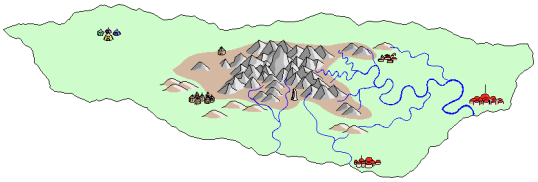
The symbol is placed where you click. The same symbol continues to be available from the cursor.

25 Scroll down the Catalog Window and click on a village symbol.

The symbol at the cursor changes from the city to the village.

26 Click to place the village at the base of the mountains.

27 Selecting from the Catalog Window, place more structures.



28 When you want to stop placing symbols, right click then click **Finished** on the Symbol Parameters dialog box.

> You don't have to click **Finished** to stop placing symbols; instead, you can just choose the next command. This will cancel the symbol placement.

Roads and tracks

To use my map, open Map 6.fcw from CC2 Pro's Tutorials folder.

---

29 On the **Overland** toolbar, click **Road** .

CC2 Pro changes the current settings for drawing roads, and starts drawing with a path.

The Command Line reads `1st point:`.

30 Click points to build a road from the main city to its nearest neighbor. Right click to complete the road.

The road is drawn in a brown dashed line. CC2 Pro changed the current color to **brown** and line style to **Road** (dashed) when you clicked the **Road** button.

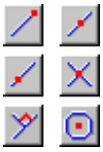
It the road crosses a river, there is no need to break the road. We will add bridges afterwards.

> Remember, at any time you can use the zoom buttons to get a better view of the area you are mapping.

31 Draw any other roads appropriate for your map.

> Because it's not usual for roads to end exactly on rivers or coastlines, the default road does not snap to them. However, you can do individual one-time snaps called modifiers.

Modified for precision



Clustered on the right of the drawing window are CC2 Pro's modifier buttons – **Endpoint**, **Midpoint**, **On**, **Intersection**, **Perpendicular** and **Center**. There are also many more on the Snaps menu.

Modifiers all work the same way:

Whenever CC2 Pro asks you for a point, you can click a modifier button, then pick the entity on which you want the modifier to work.

For example, when CC2 Pro asks for a `1st Point:`, you can click the **On** button, then pick the entity on which you want the point. CC2 Pro will place the point precisely on the entity. You can not achieve the same accuracy by eye.

32 Where two roads join, click modifier buttons such as **Endpoint** and **On** then click on the junction to make the junction precise.

With all modifiers, if you click a point that is not over an entity, CC2 Pro cancels the modifier and the Command Line returns to `Next point:`. To restart the modifier, you must click its button again.

Modifiers only modify one point. If you want to have a permanent modifier (also called a running snap), right click the **Attach** button, choose from the list of options, then click **Attach Enabled**. You can turn snap on and off by clicking the Attach button at any time.

Many of CC2 Pro's map drawing tools have Attach enabled automatically, for example rivers attach On any entity you select. You can tell if Attach is enabled, because the mouse cursor turns into a square pick box.

Reshaping rivers and roads

The basic shapes behind rivers and roads are paths, smooth paths, polygons and smooth polygons. When you create these shapes, you click to place the nodes that define them.

You can reshape these shapes after they have been drawn by editing their nodes. These buttons are found on the **Edit Single Entities** toolbar at the lower left of CC2-Pro's window.

Delete Node. Click then the node you want to remove.

Insert Node. Click then select a point on the road, river or coast. A node is created, moving as you move the cursor. Position the node where you want it, then click to place it.

Node Edit. Click then the node to move. Move the cursor until the node is positioned correctly, the press the left button.

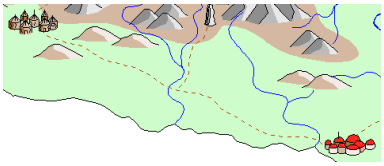
Smoothed paths have a frame which shows the points you selected. When editing smooth paths, you may find it easier to make the frame visible first using Options menu >> Drawing Aids >> Toggle Frames or ² F.

Bridges

Bridges are optional. It is normally very obvious where they are!

---

33 **Zoom Window** to where an east-west road crosses a river.



34 Scroll down the Catalog Window and pick the Bridge, E/W .

The bridge attaches to the cursor, canceling the path command (which was ready to draw a road after you clicked the **Road** button).

35 Place the bridge at the river crossing.

36 Place any other bridges your map requires.

In addition to the Bridge, E/W, structures symbol catalog also contains Bridge, N/S and broken versions of the same.

Excuse me CC2 Pro, how far is it to... ?

When you want information or measurements from your map, look under CC2 Pro's Info menu. It is a mine of useful information.

---

37 Select Info menu >> Length along.

The Command Line reads `Select entity:` and the cursor changes to a pick box.

38 Click on a road.

The road is highlighted in gray and the Command Line reads `From point on entity [entire entity]:`.

39 **Either** right click to accept the default `[entire entity]`
or click two points along the road.

You see a dialog box containing the real-world distance, in miles, between the two points:

Keep this feature in mind when you draw roads. Using sensible start and end points makes it very easy to measure distances later on. For distances as the crow flies, use Info menu >> Distance and click two points to measure between.

FORESTS AND VEGETATION

There are many ways that you can represent forests in CC2 Pro. The method you choose will depend on the style of map that you like, and how fast your computer is – some forest styles redraw much faster than others.

Forest outlines

For the purpose of this tutorial, I have used separate chapters for each type of map feature. In reality, the different map features are very interrelated, with roads, rivers and structures affecting the shape of forests, and vice versa.

For normal mapping it is a good idea to:

- ✓ outline your forests early on,
- ✓ then, knowing which areas are forested, add the rivers, roads and structures,
- ✓ finally add finishing detail to the forests.

An advantage of this sequence is that, after the second stage, you already have a serviceable map.

To use my map, open Map 8.fcw from CC2 Pro's Tutorials folder.

---

1 Click **Vegetation** .

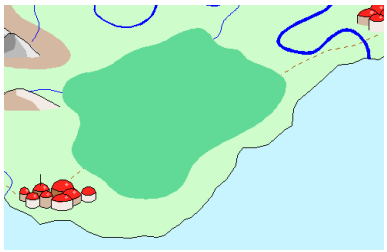
CC2 Pro changes the current settings for drawing vegetation. Click CC2 Filled Vegetation. The Catalog Window fills with CC2 Pro's selection of tree symbols.

The current layer is **VEGETATION**, fill style is **Solid** and color **mid green** (#90).

2 Click **Smooth Poly** .

The Command Line reads `1st point:`

3 Place nodes to create the boundary of a forested area in the southeast of the island. Right click to complete the polygon and end the command.



4 Click to repeat **Smooth Poly** and add any other forests you want on your island.

Now you know where the forests are, you would normally go on to draw the other map features then return to add the finishing touches to the forests.

5 Use **Front** on any rivers and roads hidden by the new forests.

If you draw roads and rivers after the forest boundaries, you wouldn't need to do this.

Forest Frills

The outlined forests are already enough to give you a good working map. You can, however, achieve perfection by adding a few frills.

Frills must make allowance for any roads, rivers and other structures that pass through the forest, so they are added as a finishing touch - after other map features.

Forgotten Realms® style forests

This is the style of forest used we used in Wizards of the Coast's *The Forgotten Realms® Interactive Atlas*.

These forests look great, are quick to draw and use relatively few entities so they don't make excessive demands of your processor.

To use my map, open Map 7.fcw from CC2 Pro's Tutorials folder.

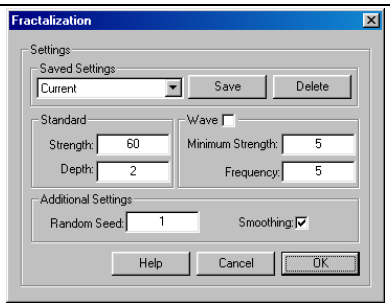
Using Fractalize

6 Click **Fractalize** .

CC2 Pro can add random detail to paths, polygons and similar entities in CC2 Pro.

You see the Fractalize dialog box:

Forgotten Realms® is a registered trademark of Wizards of the Coast, Inc



7 Click to place a tick in the box next to Smoothing.

The original forest boundary is smooth, so the fractal needs to be smoothed, too.

8 Set the Strength between **50** and **70** and the Depth to **2**.

The line of a smooth polygon doesn't pass through every node but is pulled towards each node, rather like a graph. To create a very wavy smooth path you need a few points boldly placed.

Setting the Depth to **2** gives only 4 times as many nodes (not that many), and a Strength between **50** and **70** (quite high) gives bold modification.

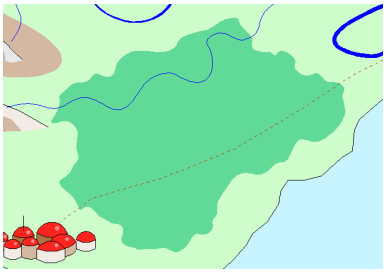
9 Click **OK**.

The Command Line reads `Select polyline:.`

10 Click on the boundary of the southeastern forest.

The fractalization is applied, creating a more detailed and wavy outline.

11 Use the **Delete Node** button to remove any bends you don't like.



12 Click **Outline in Black**.

The Command Line reads `Select entities (0 picked):.`

13 Select the forest then right click and Do It.

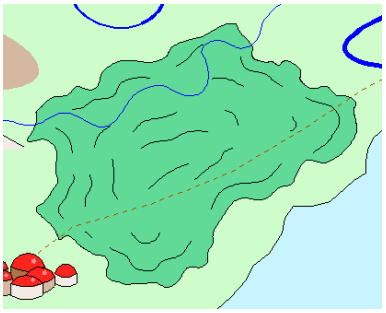
The forest is outlined. The next step is to add interior detail.

14 Click the black box on the color bar.

The black box is now outlined, showing it is the current color.

> You can make a fractal map drawing tool to make this easy for you in future. Click on the **Map Drawing Tool** button then the **Advanced** button to do this. See page 30 for more details.

15 Use **Smooth Path** to draw broken rings inside the forest that approximately mimic the forest boundary.



The inner detail looks best if in bands that are roughly evenly spaced and not too dense. Like mountain symbols, it is tempting to add a lot of detail, but keep in mind how the map will look when zoomed out.

> Remember, after each **Smooth Path** you can click to repeat the same command.

Symbol Forests

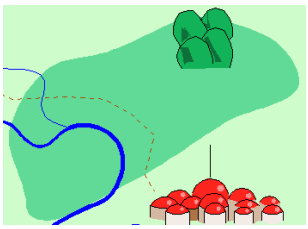
These forests are built with blocks of symbols placed from north to south, much like mountains. As before, CC2 Pro makes it easy to add hundreds of symbols, but please resist the urge. Too many symbols not only spoils a map, it also makes it hard work for your PC to process and your printer to print.

16 **Zoom Window** on the northeastern forest.

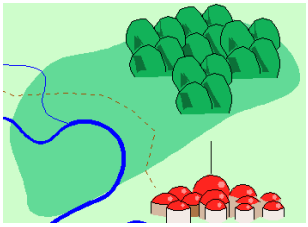
17 Click **Vegetation**.

The drawing settings for vegetation are restored (we had, for example, changed the current color to black).

18 Place the 3rd tree symbol from the Catalog Window at the very north of the forest.

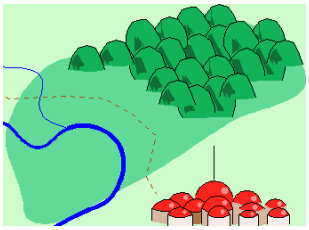


19 Working towards the south, place more of the same symbol until they will not fit without overwriting a road or river.



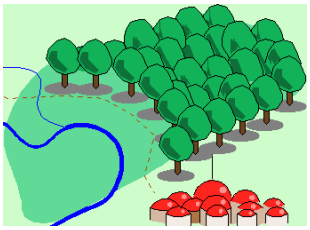
20 Change current symbol to the next smaller treetop and, still working towards the south, use it to fill the remaining gaps.

Leave a generous margin at the boundary, rivers and roads.



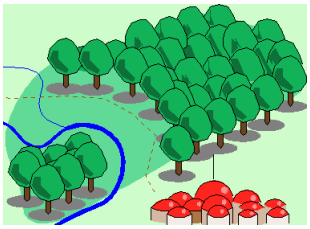
21 Change symbol to the individual tree.

Still working from north to south, place this symbol along south edges.



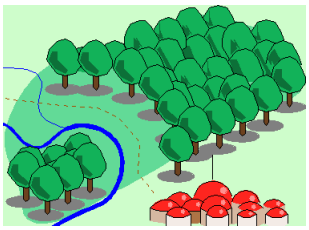
22 Use the same method to add trees south of the river.

This area is so small that it will only require two or three single treetops with a few individual trees at the front.

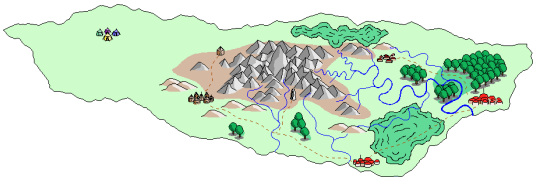


23 Using **Node Edit** , reshape the river, road or both so it fits the finished forest.

To use **Node Edit**, click the node you want to move, then where to move it to. To quickly repeat the command, right click.



24 Using either of the two forest styles, complete the remaining areas which require trees.



Other tree types

CC2 Pro's selection of tree symbols also provides for pine, jungle and mixed forests. Scroll down the Catalog Window to see the selection.

Scattered individual trees

If your style is to use symbol trees, it can look very effective to have single trees scattered around the map. For example, in the highlands you may have a smattering of pine trees.

Marsh, swamp and wasteland

CC2 Pro has the ability to fill a closed polygon with a repeating symbol. Filling mountains and forests in this way looks too repetitive, but for simple symbols, such as marsh and wasteland, it works very well. To use my map, open Map 8.fcw from CC2 Pro's Tutorials folder.

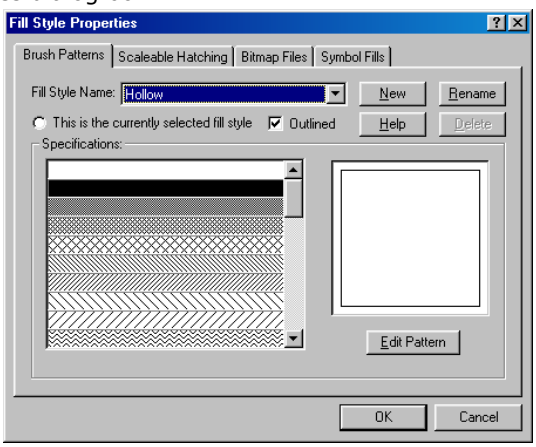
---

25 **Zoom Window** on the eastern base of the mountains.

26 Click **Vegetation** .

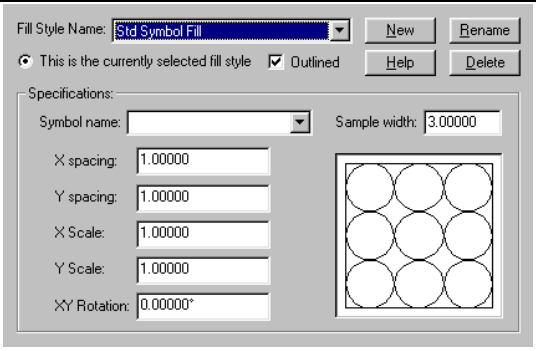
27 Click the **FS: Solid** fill style indicator on the Status Bar.

You see the Fill Style Properties dialog box.



28 Click the **Symbol Fills** tab.

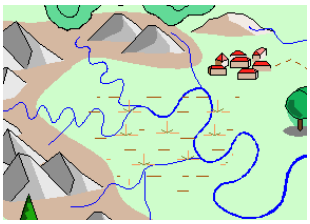
You see the page of dialog box relating to symbol fills.



29 From the drop down list **Fill Style Name**, select **Marsh Symbol**, then click **OK**.

The fill style indicator on the Status Bar now says **Marsh Symbol**.

30 Click **Smooth Poly** and draw an area of marsh where the rivers meet at the base of the mountains.



By selecting the appropriate symbol fill, you can use the same method for **Shrub**, **Fens**, **Swamp**, **Rocky** lands and **Farmland**.

Marsh, swamp and wasteland with a background

The Map Drawing Tools feature lets you add these vegetation symbols with a pre-configured, colored background.

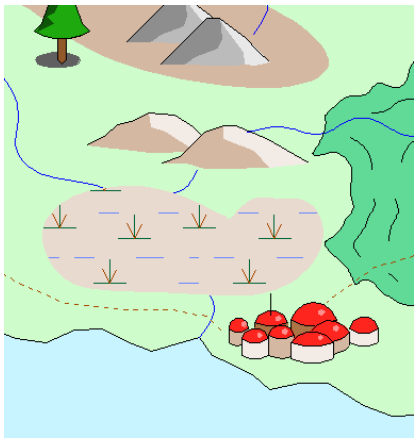
To use my map, open Map 9.fcw from CC2 Pro's Tutorials folder.

---

31 Click Overland menu >> Area Fills >> Swamp.

The prompt reads `Smooth Polygon: First point:`

32 Create a marshy region where two rivers meet to the south of the mountains.



Drawing Tools uses two entities to create the swamp, a solid-filled background and a symbol filled foreground. These are two separate entities, so they must be manipulated individually. The Draw Tools options for these settings gives the Outline entity a symbol fill style like the one used in the example above.

33 Click **Map Drawing Tools**, then **Advanced>>**. Click **Outline**.

The dialog box shows that the outline is created with an extra entity.

34 Click **Properties**.

You can see that the outline has a width of 0 and a fill style of Swamp Symbol. Outlines don't have to be filled black lines – you can use it to create filled areas to sit on top of solid filled entities.

If you wanted to, you could change the fill style to a new symbol fill style, then create a new drawing tool.

A summary of Forests and Vegetation...

Our map is very nearly complete. Before going on, please check that you understand the following:

- ✓ The **Vegetation** button changes the current drawing settings for drawing for vegetation, and loads CC2 Pro's vegetation symbols in the Catalog Window.
- ✓ Drawing the outline to forests early on lets you know how they will effect other map features, and vice versa.
- ✓ Once the other map features have been drawn, you can come back to the forests to add finishing detail.
- ✓ The finishing detail should leave a gap around any other features, such as roads, rivers or buildings, within the forest.
- ✓ To fractalize smooth paths and polygons, in the Fractalize dialog box use a high Strength setting to give strong variation, but low Depth so not too many new nodes are created. Also, the Smoothing box must be ticked.
- ✓ For symbol forests, add the symbols from north to south using progressively smaller symbol blocks. At the front edges use individual tree symbols.
- ✓ Adding too many tree symbols slows down the map and can spoil its look.
- ✓ You can fill regions with a repeating symbol created with a drawing tool. This works best for simple symbols such as marsh, swamp or rock.

TEXT AND LAYERS

Call me radical, but I think maps need labels. They not only tell you what's where, which is always helpful, but they also add finesse - something that I lack but maps should have in abundance.

Layers

An entity's layer is an invisible property which you can use to easily select, hide and show related map features.

When you click a shortcut symbol or drawing tool button, one of the things CC2 Pro does is to set the appropriate current layer. For example, when you click the **Mountains** button, CC2 Pro sets the current layer to **MINERALS/MOUNTAINS**.

When you add an entity to a map, its layer is set to the current layer. Provided you use the shortcut items, map features will automatically be on the correct layer.

Although drawing tools automate standard layer usage, occasionally you will need to control layers manually. This is easy via the Layers dialog box, which you open by clicking the layer indicator on the Status Bar.

Text labels

The key to good text labels is to keep them simple and consistent. For example, when labeling rivers I always use blue Arial font, and the same font height throughout.

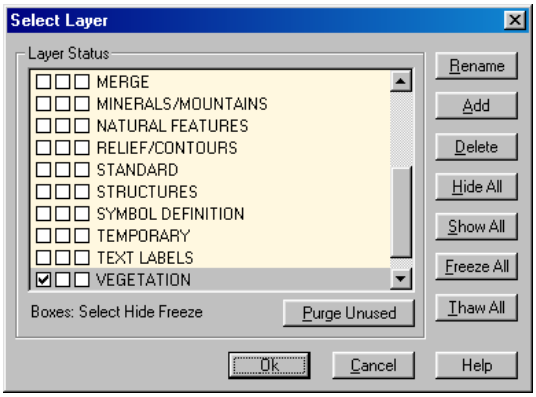
Labels don't have a shortcut button so, before adding the labels, you must manually select the appropriate color and current layer.

To use my map, open Map10.fcw from CC2 Pro's Tutorials folder.

---

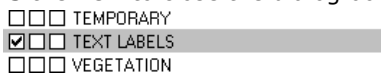
1 Click the layer indicator L: VEGETATION on the Status Bar.

You see the Select Layer dialog box.



The current layer is marked by a tick in the leftmost box next to it. In the dialog box above, the current layer is VEGETATION.

2 Click the leftmost box next to TEXT LABELS then **OK** to close the dialog box.



The current layer is now **TEXT LABELS**.

3 Click the black box on the color bar.

Black is now the current color in the Status Bar. It will contrast well with the green and blue background colors.

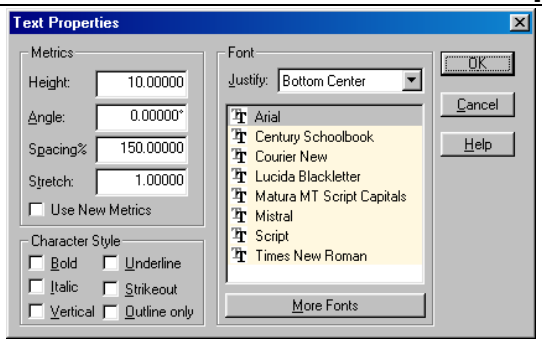
4 Click **Text** .

You see the Enter Text dialog box.

5 In the text box, type a name for the island, such as **LAG BLOSS**.

6 Click **Properties...**.

You see the Text Properties dialog box.



Height	Text height is measured in map units (not point size). Normal size text is approximately 1% of the map height. This map is 800 miles tall, so normal text height is 8-10 units.
Angle	Is the rotation angle of the text. The default angle is 0° to the horizontal. Positive numbers are counterclockwise (anticlockwise).
Spacing	The distance between the baselines of consecutive rows of text, given as a percentage of Height. The default value is 150% which, if text is 10 high, gives baselines 15 units apart and a 5 unit space between rows.
Stretch	Sets the proportion of the text. A value of 2 would produce text that is twice as wide as normal.
Font	Allows you to set the text justification and to choose from the list of fonts already defined in the drawing. To add more fonts to the drawing, click **More Fonts**.

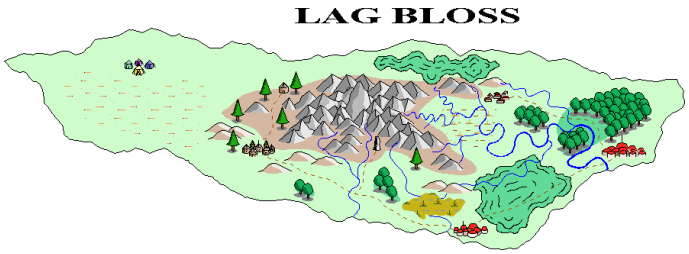
7 Change to the following settings, then click **OK** to return to the Text Entry dialog box:

✓	Height	**16**
✓	Stretch	**2**
✓	Character Style	**Bold**
✓	Font	**Times New Roman**

8 Click **OK** to start placing the text.

The text **LAG BLOSS** is attached to the cursor. It is 16 units high, stretched to double normal width and in Times New Roman bold.

9 Click to place the text north of the island.



Changing text properties on the fly

The Text Properties dialog box lets you type in any text height and angle. However, instead of trying to think in numbers, you can very easily set the text height, angle and justification as you are placing it.

As an example, we will label the main *River Gemima*, after the duck that discovered it!

---

10 Change the current color to **blue**.

11 **Zoom Window** over the main river.

12 Click **Text** A, type **R. Gemima** in the dialog box and then click **OK**.

The text is attached to the cursor and the Command Line reads `Place (Shift=15°Rot, Shift+Ctrl=Rot, Ctrl=Scale, Keystroke) [below prior]:`. The font has gone back to the default – more on that in a moment…

You now have the following options, as per the Command Line:

`Shift=15°Rot`	Press 3 while slowly moving the mouse. The text rotates in 15° increments.

Shift+Ctrl=Rot	Press 3 and 2 together while slowly moving the mouse. The text rotates freely.
Ctrl=Scale	Press 2 while slowly moving the mouse. The text height changes.
Keystroke	Type a number followed by ¶ . The text height becomes the number you entered., Press - , ®, ¯ or ° . The text rotates to horizontal or vertical. Top, Middle or Bottom justification. Left, Center or Right justification. + and - increment and decrement the first number in the text (if it contains a number).

13 Using 2 to resize and 2 + 3 to freely rotate, get the label exactly how you want, then click to place it.

Setting the default text properties for the map

When you added R. Gemima you found that the text properties had reverted to their default settings, instead of the ones you used for LAG BLOSS. This is because you changed the LAG BLOSS settings by clicking the **Properties...** button.

To change the map's default text properties, click **Text Properties** T. This brings up the Text Properties dialog box but, because you clicked its button instead of **Properties...**, the settings you choose will become the default.

Reusing the properties of existing text with KEEP

Keep sets the current drawing settings to match the properties of an entity you select. If you use **Keep** on a piece of text, CC2 Pro will change all the text properties (color, line style, fill style, etc.) to match that text.

---

1 From the Edit toolbar, click **Keep** KEEP.

The Command Line reads `Like entity:`.

2 Click on any road *(yes road, not text)*.

The command ends.

3 Look at the Status Bar.

CC2 Pro has set the current drawing properties to match the road.

The current color is **brown**, the layer is **STRUCTURES** and the line style is **Road**.

4 Click **Keep** KEEP and now select the baseline of the R. Gemima label.

CC2 Pro has kept the color, layer, line style and fill style of the text.

> To select an entity you normally click on any of its edges. Text is an exception. To select text, you must click on its baseline.

Using **Keep** you can come back to river labeling at any time and recreate exactly the same text settings, in a single click.

Draw Like

The Draw Like feature lets you choose a piece of text (or other entity) and immediately start drawing something similar.

1 Right-click **Keep** KEEP, then select Draw Like from the menu.

The prompt reads `Pick master entity:`

2 Click the baseline of the R. Gemima label.

CC2 Pro is ready for you to draw text in exactly the same style.

> Draw Like can't always duplicate the method by which you create an entity. It can't tell a fractal entity from a sketched one. It can't reproduce the two entities created with a drawing tool with the Outline option on. It's still useful, however, for text, roads, rivers, and even symbols.

Outlined text

In some situations text labels are more legible if they are outlined. For example, text over a dark green forest is hard to read if drawn in plain black, but stands out very well if outlined with white.

Outlined text actually involves two text entities: the base text and an outline only copy of the text.

Adding a new layer

It is a good idea to use a separate layer for text outlines; first so they can be hidden if necessary; second so they don't interfere with text searches.

---

3 Click the layer indicator **L: TEXT LABELS** on the Status Bar.
You see the Select Layer dialog box.

4 Click the **Add** button, enter **`TEXT OUTLINES`** as the new layer name, then click **OK**.
TEXT OUTLINES is added to the list of layers in the map.

5 Click **OK** to close the dialog box.
(Note, by adding a layer you have not changed the current layer setting – it is still **TEXT LABELS**.)

Drawing the text and its outline

The solid version of the label goes behind the outline, so we will draw it first, then create a copy of it in exactly the same place. Selecting by Prior, we will change the properties of the copied text to make it outlined.

---

6 Click **Text Properties** and change the following properties:
- ✓ **Times New Roman** font.
- ✓ **10** height
- ✓ **0** angle
- ✓ **Bold** character style.

7 Change the current color to **black**.

8 **Zoom Window** over one of the Forgotten Realms style forests.

9 Click **Text**, type **`Willardwood`** in the dialog box, then click **OK**.
The text is attached to the cursor.

10 Using ² + ³ , rotate the text into position, then click to place it.

11 Press ² C for clipboard copy, P for Prior then D for Do It.
The text is selected and the Command Line reads `Clipboard origin [0,0]:`.

12 Right click to accept the `[0,0]` default.
The text is now in the clipboard, with an origin of 0,0.

13 Click Edit menu >> Paste for clipboard paste then click **OK** to close the Insert Part dialog box.
The Command Line reads `Insert at:`.

14 Type **0,0** then press ¶ .
A copy of the text is pasted precisely over the original.

> The point you selected as the clipboard origin (0,0) was placed at the insertion point, also (0,0). The pasted copy is therefore precisely on top of the original – which is why you can not see it.

15 Right click to stop pasting more copies of the text.

16 Click **Change Text Properties**.
The Command Line reads `Select entities (0 picked):`.

17 Press P for Prior then D for Do It.
You see the Text Properties dialog box ready to change the properties of the pasted text.

18 Click the Outline only setting, then click **OK**.

The copy text is now outline only. The outline, however, is still black and on the TEXT LABELS layer.

At first it looks like the text is white with a black outline. If you redraw, you'll find this is post-edit clutter.

19 **Change Color** selecting by P for Prior then D for Do It.

The Command Line reads `New entity color [dialog]:.`

20 Right click to accept the default `[dialog]`, or click the white box on the Color Bar, or type 15 (the color number for white).

The text Willardwood is now black outlined in white. You may need to click **Redraw** to refresh the screen and see the proper effect.

21 **Change Layer** selecting by P for Prior then D for Do It.

The Command Line reads `Layer name [dialog]:.`

22 **Either** right click for `[dialog]` and select layer TEXT OUTLINES

Or type **`TEXT OUTLINES`** then press ¶ .

The outline text is now on the new TEXT OUTLINES layer.

Multi-line text

Multi-line text is CC2 Pro's jargon for having more than one line of text. There are two ways you can do this, and both are easy.

---

23 Click **Text Properties** and set these text properties:

- ✓ **Times New Roman** font.
- ✓ **30** height
- ✓ **0** angle
- ✓ **Bold** character style.

24 Click **Text**.

25 In the Text Entry dialog box, click the Multi-line option.

The text box grows to accept more than one line of text.

26 Enter a multi-line title for the map such as

`South Lagyuru`
`and Lag Bloss island`

then click **OK**.

Press T then L for top left justification.

27 Click to place the title in the top left corner of the map.

28 Right click to repeat **Text**, type **`(pre cataclysm)`** and then click **OK**.

The default value shown on the Command Line is `[below prior]`.

29 Right click to accept the default.

The new text is placed under the last entry. The space between baselines is 150% of the text height, as set by Spacing in the Text Properties dialog box.

Editing text

After text has been added to a drawing, you can change its content with **Edit**.

On the **Single Entities** toolbar, click **Edit**.

The Command Line reads `Select entity:.`

1 Click on the baseline of the "(pre cataclysm)" text.

You see the Edit Text dialog box.

2 Replace "pre" with **`post`**, then click **OK**.

The map text is updated. No doubt the island's population will be grateful for this change. Little do they know. *Bwa-ha-ha!!!*

Changing text properties

You can change the style of existing text with **Change Text Properties**.

In this example, we will reduce the text height of the text line "and Lag Bloss island". The only complication is that, because the text was drawn as multi-line, the change would normally affect "South Lagyuru" as well.

To change one line of multi-line text, you must first **Explode** it. *Kaboom*.

---

3 From the **Edit** toolbar, click **Explode** .

The Command Line reads `Select entities (0 picked):`.

4 Click on the baseline of either "South Lagyuru" or "and Lag Bloss island".

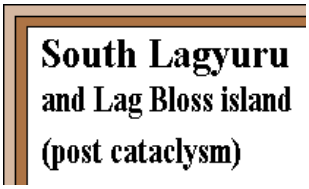
The two lines of text are selected with the one click (evidence that they are one entity).

> Explode breaks selected entities into more primitive entities. In this case, multi-line text is broken into single line text. Paths are exploded into many line segments, as are ellipses. For more information see Explode in CC2 Pro's Help index.

5 Right click, then pick Do It from the popup menu.

There is no visible difference in the map, but the selection is now two separate lines of text.

6 Use **Change Text Properties** on the "and Lag Bloss island" and "(post cataclysm)" lines of text to change their Height to **25**.



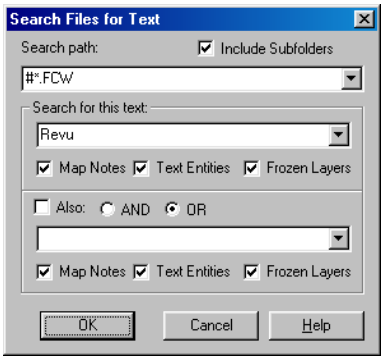
Searching files for text

CC2 Pro has the ability to search files for text.

---

1 On the File toolbar, click **Find in Files** .

You see the Search Files for Text dialog box:



2 Under **Search path**, select #*.FCW.

> What does #*.FCW mean?
>
> | | |
> |---|---|
> | # | searches the folder where CC2 Pro is installed. |
> | $ | searches the folder where the current map is located. |
> | * | means all. |
> | .FCW | is CC2 Pro's file type. |
>
> #*.FCW therefore means search all FCW files in CC2 Pro's folder and
> $*.FCW means search all FCW files in the folder of the current map.

3 Make sure **Include Subfolders** is clicked.

This means CC2 Pro will search all folders under CC2 Pro's folder.

4 In **Search for this text** type **Revu**.

5 Make sure **Map Notes**, **Text Entities** and **Frozen Layers** are ticked.

These are the areas in each map where CC2 Pro will search.

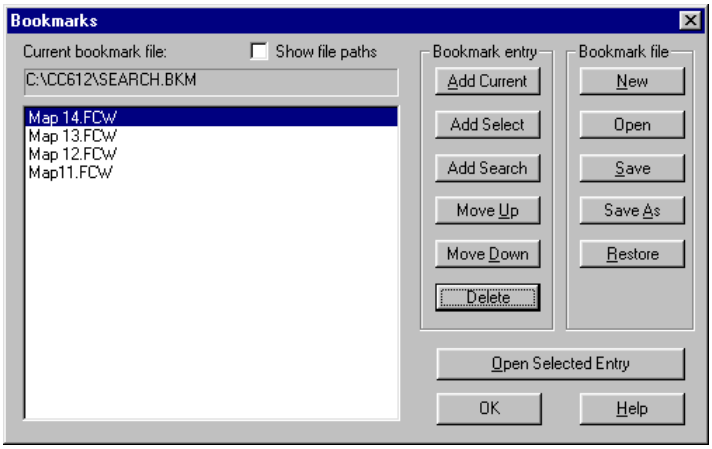
6 If you wanted to search for two keywords, tick the **Also** box and enter the required values.

Or will find files that contain either *Keyword 1* **or** *Keyword 2*, or both.

And will find files that contain both *Keyword 1* **and** *Keyword 2*.

7 Click **OK**.

CC2 Pro searches all maps in all subfolders under your CC2 Pro folder for the text "Revu". The search may take some time, but returns with the Bookmarks dialog box.



As you can see, this dialog box contains many Bookmark options. These are explained in CC2 Pro's help system under bookmarks.

8 Highlight Map 12.FCW then click **Open Selected Entry**.

This map is similar to the one you were working on, except I've sneaked in some special features.

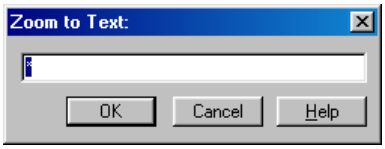
Zoom to Text

CC2 Pro found the Map 12 file because it contains the text "Revu". But where is it?

---

9 Select View menu >> Zoom to Text.

You see the Zoom to Text dialog box.



10 Type in **Revu** as the text to find, then click **OK**.

CC2 Pro zooms to *Revu's Knob*, a standing stone marking his grave.

11 Click **Zoom Out** to get a clearer view of where this feature is in relation to the rest of the map.

The text to find can include special characters.. Type ***** to match any number of characters and **?** to match one character. Also, if the text must match exactly, you can put **=** at the start of the search text.

For example:

Typing **house** matches any text with house in it (e.g. *The House* and *Harbormaster's House*).

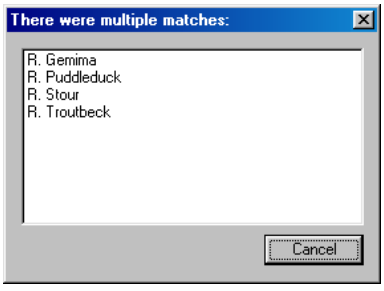
Typing **=house** would only match the text *house* (not *The house* or *House of Fun*).

Typing **=The*** would match any text starting with *The* (*The house*, not *House of Fun*).

Typing **h*s** would match *Harbormaster* and *House*.

12 Repeat **Zoom to Text**, this time typing **R.*** as the text to find.

There is more than one match, so CC2 Pro lists the matched text:



13 Click on R. Gemima.

CC2 Pro zooms to the location of the R. Gemima text.

If there is only one matching text, CC2 Pro will zoom to it straight away. If there are no matches, CC2 Pro retains the current view. If there is more than one match, CC2 Pro will list the available choices. If you've outlined your text, CC2 Pro will list the outline as a separate entry.

The Art of Labeling

One of the subtle things that makes a map aesthetically pleasing is the use of text in a map. The choice of font and its positioning is vital for that professional look.

Fonts of Wisdom

With so many True Type® fonts that either came with your computer or you downloaded off the internet, it is hard to decide which font to use where. No matter how many you have though, there are only three basic kinds of fonts: Serif, San Serif and Decorative.

Serif fonts are the fonts that have the little extras called serifs attached to them to make the letters seem to join together. A good example of this is Times New Roman.

San serif fonts are fonts without the serifs attached. San serif fonts are blocky looking by comparison, and many studies have shown that they are harder to read. The most common day to day uses of san serif fonts are for captions, headlines and for computer displays that are too granular to display the serifs correctly.

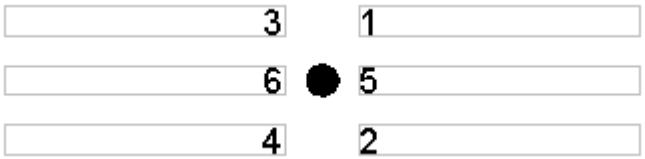
Decorative fonts are non-standard fonts that are created to add flair and beauty to the printed word or add unique symbols and flourishes. The beauty of these decorative fonts is also their biggest flaw. Adding so much extraneous line work to each character detracts from its readability. Today, most decorative fonts are used sparingly, mostly as accents.

Though modern cartographers agree with the restricted use of decorative fonts, the use of serif verses san serif fonts seems to have been turned around. The reasons for this are many. Normal printing is done on a plain background whereas text on a map contends with every other element on the map, possibly even elements directly underneath the text. Map text sometimes must be stretched to fill an area and the serifs that once helped the readability of the text now disrupts it. For these reasons and more, you should use a san serif font in the body of your map and restrict the use of serif fonts to titles and legends. The exception to this is if you want to produce a map in the style of earlier cartographers who hand-labeled their maps with curled copperplate handwriting.

Placing text

Knowing which type of font is best to use is only part of the battle. Knowing where to put the text is just as important. There are three types of elements on a map that you can label with your text: *Points*, *Lines* and *Areas*.

Points are the easiest to understand because they comprise of almost all the text on a given map. Cities are points, mountains are points, as are any other distinct locations. Through case studies, cartographers have determined some of the best placements of a label for a point. Just like the real world though, there is no single correct place for your label and even the better places are not always available. Here is a diagram showing the available placement areas in order from better to worse.

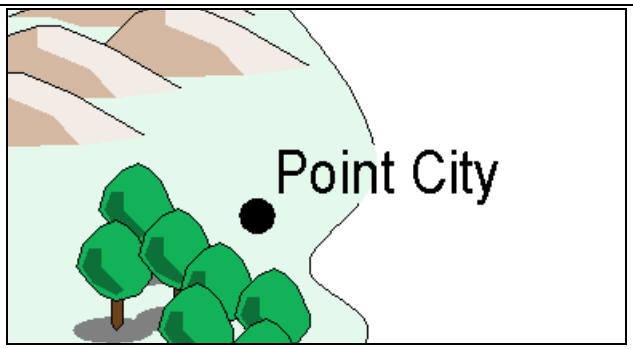


The ideal label placement is the highest value placement point that does not cross or cover any of the other entities on the map. Since this is a nearly impossible thing to do most of the time, try to cover the least prominent element. Whenever you cross another element, the two distinct entities become entangled and both lose some of their value to the map-reader. The best way to overcome this flaw is one of the cartographers little tricks, called *blotting*.

Blotting

To blot out a section of an entity, the cartographer draws over a part of the lesser prominent entity's border with the color that comprises the body of the lesser element since the body color is usually a much lighter color than that used for the border. In essence the cartographer is hiding the border of the lesser element so that the element with a greater importance is clearer to the map-reader.

In the following example you can see the trick of blotting out a coastline to allow for the labeling of a city. In this example the label of the city is clearly more important than the tiny bit of coastline that has been covered. I did this by simply attaching a new smooth path with a thickness higher than the coastline, to the coastline just above the label.



Every so often I reattached the blotting line to the coastline until I reached a point just below the label. After bringing the label to the front of the map, not only is it now much easier to read but much more professional looking as well. Do not limit yourself to just blotting out a single line, though. If you needed to perform a more complicated labeling, such as the name of a forest, you can draw a polygon slightly larger than the label in roughly the same shape as the label. This is much easier than trying to blot out the edge of every tree underneath the label. By coloring it the primary color of the forest, you've allowed the label to be clearly viewed while still maintaining the continuity of the forest. Blotting is a very powerful tool in adding to the readability and to the visual beauty of your maps so experiment and have fun.

Adding an outline

As an alternative to blotting the landscape directly, you can add an outline to the text, usually in white.

1 Click **Copy** . Select all the text you want to outline.

2 Type **0,0** at the `Copy from` and `Copy to` points, right click to finish the copy command.

3 Click **Change Text Properties** , right click Prior, right click Do It.

4 Check the Outline Only check box, OK.

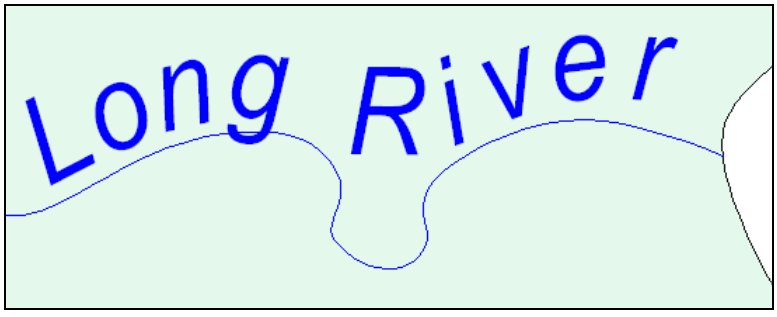
5 Click Change Color right click Prior, right click Do It. Click white on the color bar.

You now have a one-pixel wide outline on your text. You can't change its width on the map, but you can use Edit menu >> Change Properties >> Pen Thickness to change the its thickness.

Line up

The second type of element you will need to label is the line. A line can represent a river, a border, a railroad or any other man-made or natural fixture of the landscape. A few rules of thumb aid the cartographer in labeling lines: Minimize the number of curves, never label upside-down and label vertical lines on the left.

To minimize the number of curves, look for a section of the line that is either fairly straight over the length that will be labeled or one that is the most continuous in its curve. It looks much better to label a river where it makes a graceful half circle or a lazy 'S' than the area where is looks like a readout from a heart-monitor. A label on the outside of a curve is better than a label on the inside of a curve because it is easier to read text where the individual characters are crowded at their base instead of at their top.



You never want to place a label where the text will appear upside-down; it is almost impossible to read upside down text. Labels on a line need not conform to the line a hundred percent. The label needs to only follow the line enough to clearly show that the label does in fact belong to the line. This allows the cartographer to gloss over problem areas like the one in the example above.

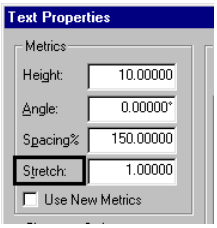
An area for improvement

The last elements you will need to label on your map are areas. Areas come in two flavors, bounded and unbounded. A *bounded* area is an area of fixed size on a map, like a county or state. The most common *unbounded* areas on maps are large bodies of water, such as oceans and seas. Unbounded areas are simply labeled like a point but bounded areas are a special case.

When labeling a bounded area the label needs to lay claim to the entire area. To do that the label needs to stretch from one side of the area to the other. This can be done in two different ways. The easier but incorrect way to label an area is for the cartographer to simply increase the font size of the label to fill the area. This is a poor choice: the size

of the font should be constant for the same type of entity throughout the map, the area may not now be able to contain the label from top to bottom and the now huge letters will obscure much many important details within the area on the map.

The better and correct solution is to stretch the label from one side of an area to the other by adding distance between the individual characters in the label. In this way the entire area will be claimed by the label without the label dominating the area. This will also help keep the font size constant between like entities.



You can do this by increasing the Stretch setting under Text Properties, or, less elegantly, put space characters between each letter of the label.

With correct placement of your text you've eliminated nearly all the possible problems associated with text on your map.

Color and Style

The only remaining question is what font effects do you use where. Font effects consist of color and style you use.

Modern cartographers use black for all labels except for water labels. River, lake and ocean labels should be a dark blue. Other colors such as red should only be used to denote special entities or unique locations and correct use of the color should be listed in the map's key. Font styles on the other hand have very limited use. The only style used is Italic; professional cartographers use it is solely to label bodies of water. However, old style decorative maps make greater use of such features, and underlining is an unobtrusive way of picking out the most important of a particular type of feature.

A summary of Text and Layers...

This chapter has covered everything you need to know about placing text and making it look exactly how you want. It has also introduced the concept of layers.

- ✓ Every entity has a layer property. When an entity is created, its layer is set to the current layer.
- ✓ Click the layer indicator on the Status Bar to bring up the Layers dialog box. This gives you complete control over layers.
- ✓ If a map has lots of entities, hide optional layers to reduce redraw times.
- ✓ If you set text properties as you are placing text (either by clicking the Properties button on the Enter Text dialog box, or on the fly), the changes affect that text only.
- ✓ You can resize and rotate text, and change its properties, while you are placing it.
- ✓ To set the map's default text properties use **Text Properties** or **Keep** on an existing line of text.
- ✓ Outlined text has two copies of the text: the solid version and the outline version.
- ✓ **Explode** multi-line text before you editing individual lines.
- ✓ **Find in Files** lets you search map files for text.
- ✓ **Zoom to Text** lets you find and zoom to text in your maps.

FINISHING TOUCHES

The essential finishing touches to any map are a scale bar to show how large the map is and a compass rose pointing to north.

Further embellishments you might like to add are a grid, olde-worlde navigation lines, decorative ornaments and, maybe, even a few there-be-monsters. For the purposes of this tutorial, I'll assume you're going the whole hog.

In keeping with the progress you are making, the tutorial is gradually making more assumptions about your knowledge. For example, from here on it is assumed that you will use zoom buttons to get a better view and that you'll click to repeat commands - the tutorial will not explicitly tell you to do so.

Inserting a Scale Bar and Compass Rose

CC2 Pro includes symbol catalogs with compass roses and scale bars suitable for any maps.

To use my map, open Map 12.fcw from CC2 Pro's Tutorials folder.

---

1 Right click **Symbol Style Toggle** and choose Filled.

CC2 Pro offers you a choice of symbol styles, and the scale bars and compass rose are filled. There are no Line versions of these symbol catalogs.

> You can left click on Symbol Catalog Settings to toggle to the catalog in the next available style. If there is more than one matching catalog (try Filled Vegetation) you'll see a choice of catalogs. When you click **Symbol Catalog Settings** , it lists only those catalogs which match the style you have just set. If there are no matching catalogs, you will see a blank list.

2 Click **Symbol Catalog Settings** . Scroll down and choose **CC2 Filled Scale Bars**.

In the symbol catalog window, you can see some scale bars.

You don't know which scale bar will fit your drawing, so you'll need to find the map's approximate width.

3 Select Info menu>> Distance and choose the lower left and lower right corners.

It's about 1000 miles across.

4 Scroll down then click on the first 200-mile-long scalebar.

As of version 6.12, you can't see complete symbol names in the symbol catalog window, but we are working on it. Sorry.

5 Right click, and ensure that the scale is 1 and rotation 0.

There is no need to rotate the scale bar, and you definitely don't want to scale it (a scaled scale bar is pretty useless).

6 Click green on the color bar.

7 Click **Symbol Catalog Settings** . Scroll down and choose **CC2 Filled Compass Roses**.

Note that some of the symbols have a garish green background, because the current color on the color bar is green.

8 Click white on the color bar.

Note that the green symbols have turned white.

> Some parts of CC2 Pro's symbols have a varicolor element. They take on the current color.

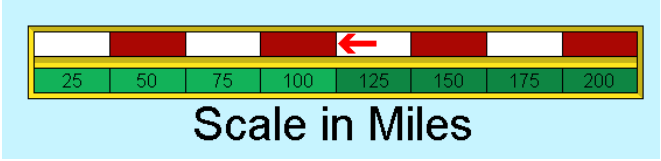
9 Click on the second compass rose down. Right click and type in an angle of 15 degrees.

North isn't straight up the screen in this example.

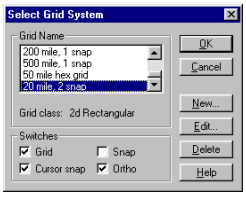
10 Click **Endpoint** .

We want to make sure that the compass rose lines up with the center of the scale bar.

11 Click in the middle of the scale bar, at the point shown.



The compass rose is inserted. Its center point is precisely at the endpoint in the middle of the scale bar. Now it needs to be moved vertically.

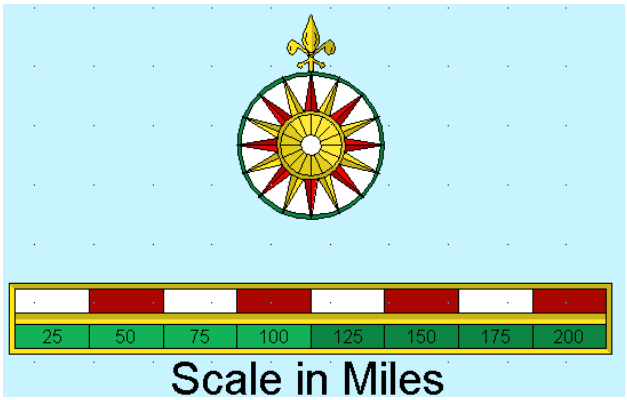


12 Right click the **Ortho** button. Ensure that **Ortho** and **Cursor Snap** are set on.

Ortho forces the next point you click to be either vertical or horizontal from the last.

The Command Line still reads `Insert at[dialog]:.`

13 Click **Move, Scale, Rotate** , selecting the compass rose by P then D, then click a start and end point so that it is above the scale bar.



Ortho is enabled, so the cursor will only move horizontally or vertically. Without **Cursor Snap** the cursor would move freely but jump to the nearest allowed point at the time you clicked.

Before you clicked **Move, Scale, Rotate**, the CC2 Pro was still ready to insert compass roses. When you clicked a new command, the previous one was cancelled. There's no need to complete commands by right clicking – you can just choose a new one.

Grid overlays

CC2 Pro can generate hex and square grid overlays of any size and spacing. Before adding a grid overlay, it is a good idea to create a layer for it, so the overlay can be easily hidden when not wanted.

A square grid overlay

1 Click the Layer indicator to bring up the Select Layer dialog box.

2 Select **HEX/SQUARE** and set it as the current layer.

3 Click the color indicator on the Status Bar and set the current color to a dark gray.

4 Click the Line Style indicator on the Status Bar and select a dashed line style.

5 Click the color indicator on the Status Bar and set the current color to a dark gray.

6 Select Draw menu >> Square Grid.

The Command Line reads `Square grid spacing [10.00]:.`

The distance across our map is 1000 miles, so a grid spacing of 10 would create a very fine grid.

7 Type **50** as the grid spacing, then press ¶ .

The Command Line reads `First corner of square grid [0,0]` and the cursor becomes crosshairs.

8 Right click to accept the `[0,0]` default.

The bottom left corner of all CC2 Pro's original map templates is located at 0,0. The first corner is fixed and now, as you move the mouse, the grid grows and shrinks.

The Command Line reads `Second corner of square grid:.`

If you cast your mind back to the very start of this map, we based it on a 1000 x 800 mile template.

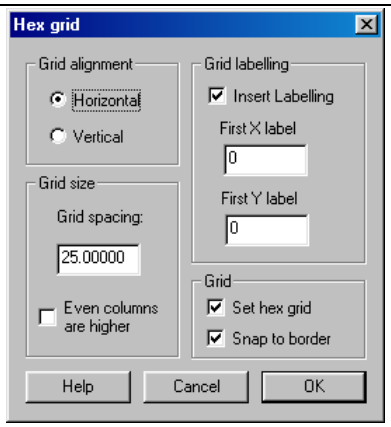
9 Type **1000,800** followed by ¶ , or depress **Snap** and click at the top right corner of the map.

The grid is drawn on the current layer in the current color and line style.

Hex grid

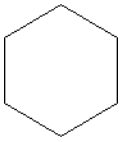
10 Hex grids are used more often than square grids on overland maps and have many more options so CC2 Pro's Hex Grid command not only gets its own button, it also gets a dialog box to control its appearance. Click **Hex Grid** .

You see the Hex Grid dialog box.

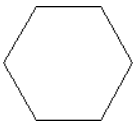


Grid Alignment

Vertical



Horizontal



Grid Labeling

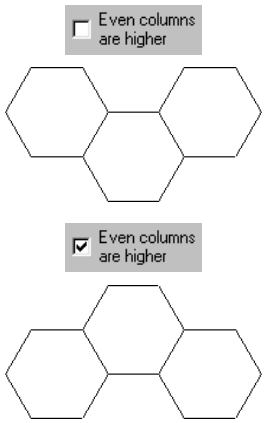
If you tick **Insert Labeling** then CC2 Pro will add a number label to each cell. You can set the start numbers in the First X Label and **First Y Label** boxes. The label consists of two parts, a column and a row label (e.g. AA01). Lettering counts up A through Z then AA-AZ then BA, etc.

Grid Size

The distance between parallel sides of each hex. Set a number appropriate to the map size.

Even columns are higher

Causes the top of the second column to be higher than the top of the first column.

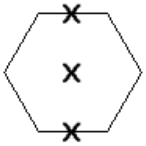


Grid

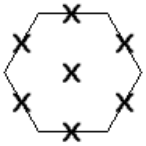
Set hex grid: Changes the grid and snap snaps so that you can snap to important parts of the hex overlay.

Snap to border: Provides additional snap points at the midpoints of hex edges.

Set hex grid
enabled



and Snap to border
enabled

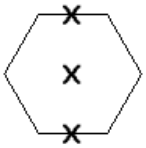


Grid

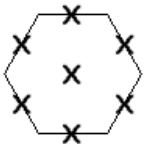
Set hex grid: Changes the grid and snap so that you can snap to important parts of the hex overlay.

Snap to border: Provides additional snap points at the midpoints of hex edges.

Set hex grid
enabled



and Snap to border
enabled



11 Select the options you want, then click **OK**.

The Command Line reads `First corner of hex grid:` and the cursor becomes crosshairs.

12 Click **Endpoint** .

The Command Line reads `Entity:`. CC2 Pro is waiting for you to select the entity whose endpoint you want to use.

> **Endpoint** attaches the point to the nearest endpoint of the entity you select.
> With all modifiers, if you click a point that is not over an entity, CC2 Pro cancels the modifier and the Command Line returns to `Next point:`. To restart the modifier, you must click its button again.

13 Select the bottom left corner of the map.

The point is attached precisely to the endpoint of the border, right in the corner of the map.

The Command Line reads `Second corner of hex grid:`. As you move the cursor, the hex grid shrinks and grows.

14 Click to place the top right corner, using the Endpoint modifier again.

The hex grid is drawn and labeled as you specified.

Navigation lines

Navigation lines (navlines) were used on early maps to give sailors waypoints and bearings when traveling relatively short distances. They give a map an authentic historical look. If you prefer purely functional maps, you'll probably want to do without them.

Navlines from a Template

If you know from the outset that you would like navlines on your map, the simplest method is to select a template that includes them before creating the map.

---

1 Click **New** , then select 1000 x 800 (with navlines).FCT then click **OK**.

CC2 Pro asks if you would like to save the changes to your existing map, which you do.

The new map includes navlines on the NAVIGATION LINES layer. At any time you can hide the navlines by clicking the layer indicator on the Status Bar and hiding the layer.

You can, of course, edit or add to the navlines.

Adding your own navlines

Navigation lines are also available as a CC2 Pro file to be added to any drawing then trimmed.

To use my map, open Map13.fcw from CC2 Pro's Tutorials folder.

---

2 Click the layer indicator on the Status Bar, add a new layer called **NAVIGATION LINES** and set it as the current layer.

The layer indicator on the Status Bar should read **NAVIGATION LINES**.

3 Select Tools menu >> Options >> FCW/FCT/FSC and ensure that Group Parts on Insertion is unchecked.

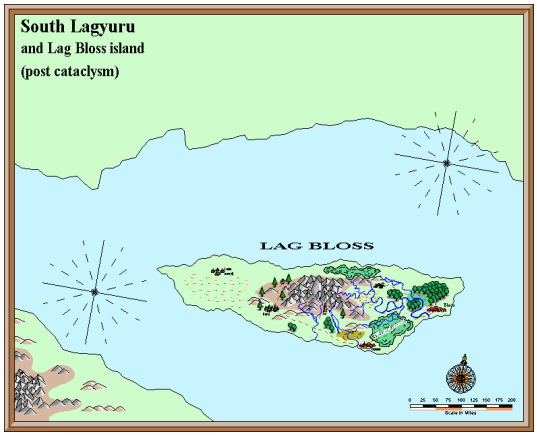
CC2 Pro gives you the option of treating CC2 Pro files you insert as single entities. These files called "parts" offer an alternative to symbols.

4 Select Edit menu >> Insert File. Ensure the Embed in Drawing option is set then pick Navigation lines (200 mile diameter) from CC2 Pro's Parts\Maps\ folder.

You see the insert file dialog box.

You can insert any CC2 Pro file into any other file. It's quicker to do it this way than using the clipboard.

5 Place two copies of the navline part, then right click to stop inserting parts.



6 On the **Edit Single Entities** toolbar click **Trim to Entity** .

The Command Line reads `Select entity to trim to:`.

CC2 Pro wants you to select a boundary entity to which other entities are shortened or lengthened. In this case it's a map border.

7 Select the inside edge of the western map border.

The edge you selected is highlighted and the prompt reads `select entity to trim:`.

8 For both parts, click on all the navlines that you think will intercept the western map border.

It doesn't matter if you make a mistake - just ignore it and keep selecting.

If you accidentally miss, it will cancel **Trim to Entity**. To restart it, click to repeat the last command, reselect the cutting edge, and then keep going.

9 When you've trimmed all the lines that intersect the western map border, right click to cancel the command.

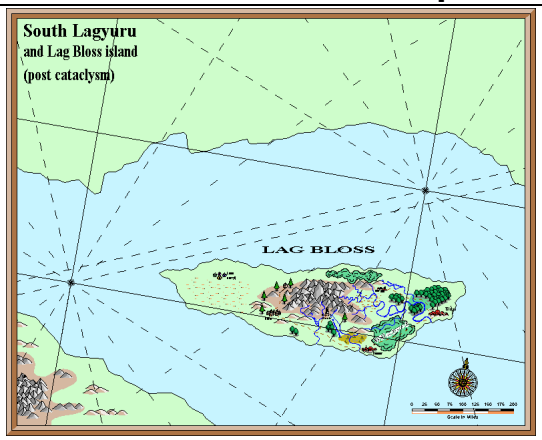
10 Click to repeat the **Trim to Entity** command, this time trimming to the northern map border.

11 Repeat the same process for the southern and eastern borders.

Now all that we need do is put the navlines behind the land.

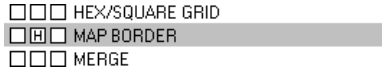
The current drawing order is sea, then land, land features, etc, finally navlines. The simplest method is to bring the navlines just in front of the sea background. In this position they will show over the water, but behind the land and anything drawn on the land.

To select the sea background without picking the border, you must first hide the MAP BORDER layer.



12 Click the layer indicator on the Status Bar and then the middle box next to MAP BORDER.

A small **H** appears in the box, showing it is hidden.



13 Hide the HEX/SQUARE GRID layer, too. Click **OK** to close the dialog box.

The brown border is now hidden, enabling you to see the edge of the blue sea background box. We hid the HEX/SQUARE GRID layer because it has a line on it, enabling you to trim to when the map border is hidden, but you don't want to send your navlines behind that.

14 Use **Bring in front** of to bring the navlines in front of the blue sea background.

You can select the navlines either by clicking on each one, or with two selection windows, or by layer NAVIGATION LINES.

15 Click the layer indicator and show the MAP BORDER layer by clicking the **H** next to it.

Other decorations

There are lots more ways to decorate a map.

✓ www.profantasy.com contains a library of maps and parts contributed by other CC2 Pro users. For example, L. Lee Saunders contributed the beautiful shield and ship that I used to complete Tutorial 16.fcw. You insert these parts in exactly the same way as the scale bar and compass rose. Map library contributions (current at the time of printing) are also included on the CC2 Pro CD-ROM.

✓ Click **Coast/Sea** to load CC2 Pro's sea symbols. These include sea monsters, tidal rips and jagged rocks.

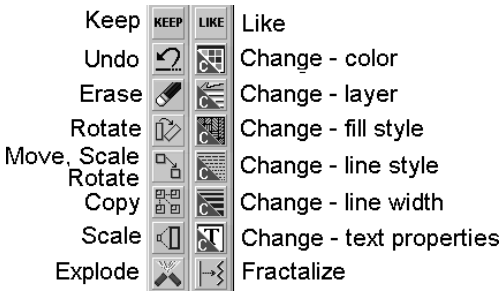
✓ Click **Borders/Political** to load CC2 Pro's symbols associated with land:

Using Save As with the selected CC2 Pro Entities option, you can create your own parts from anything you have drawn in CC2 Pro. You might even consider contributing them to the map library!

EDITING IN CC2 Pro

We've covered many of CC2 Pro's editing functions in previous chapters, but this chapter gives you all the options available.

The Edit toolbar



The Edit toolbar contains all the commands that work on a selection of many entities. When you edit in CC2 Pro, you must choose what you want to do, then select the entities to which to apply your action.

If you've worked through the tutorials, you'll already be familiar with this. Entity selection is covered in full in the next section. Some of the Edit buttons are self-explanatory. The rest are covered below.

If you right click on any Edit button, you'll see a selection of related commands for more specialized purposes. The more important of these are mentioned below. You can find a summary of their operation in

COMMAND REFERENCE on page 1102, and full details in the Help file – look up the menu entry in the Index. Some commands have popup menu equivalents called non-visual. If you are editing very large numbers of entities, or want to type precise values at the command prompt, use these.

Keep. Click on an entity to set the current properties the same as the selected entity.

Undo. Undoes previous commands. Right click for Redo and Redo All. The number of times you can undo depends on when the drawing was last saved, and can be affected by Autosave.

Rotate. Gives you a fine degree of control over rotation, and lets you align your selection to a straight edge.

- Press 3 and move the mouse to rotate in increments of 15º
- Type a value in degrees for a fixed rotation.

Move, Scale, Rotate. The most widely used editing command. You can control the scale, rotation and position of your selection. If you just want to scale or rotate, right click to complete the command.

- Press 2 and move the mouse to rescale.
- Press 3 and 2 together while slowly moving the mouse to rotate freely.
- Press 3 and move the mouse to rotate in increments of 15º

Copy in drawing. This copies the selection immediately, unlike Copy to Clipboard then Paste, which is a two-stage operation. Clipboard commands are on the right click popup menu. If you want to make rows and columns, use Rectangular Array, if you want to make copies around a center (for example the battlements on a round tower) use Circular Array. Each copy is treated as a separate command for Undo.

- Press 2 and move the mouse to rescale the copy.
- Press 3 and 2 together while slowly moving the mouse to rotate the copy freely.
- Press 3 and move the mouse to rotate the copy in increments of 15º

Scale. Resizes the selected entities.

- Press 2 and move the mouse to scale X and Y independently.
- Press 3 to move the scale reference point – this controls the sensitivity of the scale to your mouse movements.

Explode. Breaks entities down into simpler components. For example, a path is broken down into a series of lines. Right click options allow you to convert the other way – for example Line to Path, Path to Poly and Combine Paths.

Change commands. These change the properties of a selection. When asked for the new property, you can either type in a value, click **Like** LIKE when or right click to select from a dialog box. Change Properties is a right-click option which gives you additional change choices. Use this if you want to change more than one property of a selection.

Fractalize adds extra nodes to paths and polygons. See Using Fractalize on page 38 for more details.

One versus Many

Whenever you use an edit or copy command, CC2 Pro needs you to select the entities to use. Some commands work on any number of entities, others on individually selected items. Generally, commands on the **Edit** toolbar work on a selection of entities, while those on the **Single Entities** toolbar work on individually clicked entities. It's easy to tell by watching the Command Line, you can see what your options are. For example:

✓ EDIT **Edit** only affects one entity at a time. The Command Line reads `Select entity:` and you have no option except to click on an entity. If your click misses, the command will end.

✓ **Trim to Intersection** trims two entities to their intersection. The Command Line reads `1st entity:` then `2nd entity:`. At each prompt you have no option except to click on each an entity. If your click misses, the command will end.

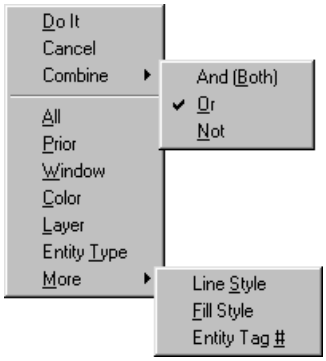
✓ **Copy** will copy any number of entities. The Command Line reads `Select entities (0 picked):`. This tells you that you can select more than one entity, which means you can be selective!

Making a selection

When you start a multiple entity editing command, you will see the following prompt `Select entities (0 picked):`

- Click on an entity's edge to select it.
- If you don't click an entity's edge, you will start selecting by window. All entities inside or touched by the window will be selected.
- Press 2 while selecting to remove entities,
- or right click to bring up the Selection popup menu:

The Selection popup menu



All selects all entities in the map, except those on hidden or frozen layers. Be aware that groups will also be selected regardless of their layer status, even groups with entities on frozen layers.

Prior selects the entities you have just drawn or edited. The prior entities are forgotten as soon as you make another selection so this option is only available the when you first see the selection cursor.

Color, Layer, Line Style and Fill Style select all entities with the property you specify. After clicking one of these you can type the value or right click to select it from the relevant dialog box.

Entity Type lets you select entities by their type. After clicking this you see a dialog box in which you place ticks next to the entity types you want to select. (The ticks from your previous selection will be remembered, so you may need to deselect them.)

Tag #. If you use Info menu >> List on an entity, one of the details CC2 Pro lists is the entity's unique Tag #. You can type this number to select a particular entity again and again.

Combining selections with logic

You can use Or, And and Not to logically combine selection criteria.

Combining selections using:	**Has the following logical effect:**
Or (the default)	Entities that meet any of the criteria are selected. For example, select "Color Red OR Type Text" selects entities that are "red or text".
And Both	Entities that meet all the criteria are selected. For example, selecting "Color Red AND Type Text" selects entities that are "red and text".
not	Entities that meet the criteria are **deselected**. For example, select "Color Red NOT Type Text" selects entities that are "red but not text".

CC2 Pro will let you carry on adding and removing entities from the selection until you right click then click Do It.

Marking Color

The *marking color* is the color that CC2 uses to indicate selected entities for various commands. The default color is a light gray (16). You can change the marking color to a less-used color that may stand out better.

16 Type MCOLOR at the Command Prompt.

17 Right Click to select the Color Dialog and select a bright color that you will not be using in your Drawing. Magenta (6) is often available and stands out well against most other colors.

Selective selections in action

18 Open Map 15.fcw from CC2 Pro's Tutorials folder.

We will change the line style of the solid navigation lines in the map. We could easily pick the lines by clicking on them but, for the sake of learning, we'll select them their properties instead.

The navigation lines were drawn on the NAVIGATION LINES layer.

19 Click **Change Line Style** .

The Command Line reads `Select entities:`.

20 Press L or right click and pick Layer.

The Command Line reads `Layer name [dialog]:`.

21 Click **Like**

and select one of the solid navlines.

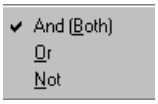
Using **Like**, CC2 Pro gets the layer name from the entity you select. Everything on the NAVIGATION LINES layer is selected. The Command Line reads Select entities (32 picked):.

22 Press B or right click and pick And (Both).

The Command Line still reads Select entities (32 picked):.

23 Right click to bring up the Selection popup menu.

The And (Both) option is now ticked. Future selections will be *and'ed* with the existing selection.



24 Press S or pick Line Style.

The Command Line reads Line style name [dialog]:.

25 Click **Like** and select one of the solid navlines.

Using **Like**, CC2 Pro gets the line style from the entity you select.

Now everything that is ***both*** on the NAVIGATION LINES layer ***and*** has Solid line style is selected. The lines with a dashed style are dropped from the selection.

26 Press D or right click and Do It. Complete the command as normal, selecting a new line style for the selected lines from the dialog box.

Another example: overlapping entities

The inside edge of a map border has at least four overlapping entities:

- There is the blue box of the sea or grass background,
- the brown polygon of the border,
- the black outline to the border,
- and underneath the lot, a green line which, right at the back of the drawing, lets you **Trim to Entity** to the edge of the map.

If you wanted to change the color of the black outline from black to blue you couldn't select it with a click alone, as this would pick all four entities under the click. Instead, you have to make use of a difference between the properties of the four entities. In this case, the outline is the only one of the four which is black.

27 Click **Change Color** then pick the map border at a place where there's no land to further complicate the selection.

The Command Line reads `Select entities (4 picked):`.

All four entities are selected. You only want the one that is both currently selected and black.

28 Press B(and) C(color) 0(black) ¶ D.

The entities that you clicked on which are also color 0 (black) are selected.

29 Complete the command as normal.

If two entities are overlapped and *completely* identical, you can't use their properties to pick them apart. There is, however, a trick you can use:

Edit Properties only affects a single entity. If you use **Edit Properties** and click over two overlapping entities, it takes the first entity under the click as the one to work on and shows you the dialog box. If you then click **OK** without making any changes, then this entity becomes the last entity you selected, and can be picked again with Prior.

CC2 Pro also has a special command to deal with large numbers of duplicates. Type DELDUPS and watch the Command prompt to use it.

USING TEMPLATES

You will have realized by now that CC2 Pro is a huge program. The manual to this point has shown you the essentials you need to create great maps, while resisting the urge to plunge into technical detail. There is a lot more to CC2 Pro!

From here on we'll look at techniques and methods which, while nonessential, give you more options and flexibility with your map making.

Modifying and creating templates

Whenever you start a new drawing you can start choose a template on which to base your map. A template is simply a normal map, which you build to a suitable starting point for new maps, then save as a template.

Whatever has been drawn or defined when the map is saved as a template will be created in any new maps based on the template.

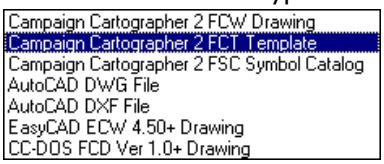
Templates have a .fct file extension.

To modify an existing template

1 Click **Open** .

You see the Load Drawing dialog box.

2 Select Campaign Cartographer FCT Template from the Files of Type list.



3 Change to CC2 Pro's Templates folder, then to the subfolder for the type of template you want, and then click on the template file to edit. Choose a template which is near in size to the one you wish to edit.

4 Make any changes to the template.

You can change anything you like, such as pre-defined fill styles, line styles, layers, fonts and grid systems; the current color, fill style, line style and line width; and settings for **Grid**, **Snap** and **CsrSnap**.

5 Add or edit any pre-drawn entities you want. For example, you might want to add a color contour bar, an extra drawing window or a scale bar. You could erase the existing map border and draw a new one. If the map border is significantly larger or smaller, you might need to re-scale the symbol fill styles.

6 Click **Save** to save the changes.

The next time you open a file, the default file type will be Campaign Cartographer FCT Template. To see your other files, reselect the .FCW file type.

To create a new template from scratch

1 Click **Open** .

You see the Load Drawing dialog box.

2 Select Campaign Cartographer FCT Template from the Files of Type list.

3 Double-click blank.fct.

CC2 Pro opens a blank map template.

4 Add or remove entities, fill styles, line styles, layers, as you wish.

5 Save the template with a new name.

To set the background color, select View menu >> Background Color.

Creating a decorative Coat of Arms

Templates can have special functions. For example, some templates are pre-configured for symbol creation, others for metric scale. This example shows the use of another specialized template designed to create heraldic devices. Our heraldic symbols are based on a mixed bag of historical examples. We make no pretence to follow any rules of heraldry in these examples (it's for fantasy games, right)?

The Shields heraldic template

1 Click New Click Select Path. Navigate to the Templates\Other folder. Click **Open**. Click Shields.fct.

The new map has two drawing windows - the bottom contains shields (Ordinaries), and the top contains a drawing area and the colors (Tinctures). All these features are created by the template.

2 Click the **Catalog...** button at the top of the Catalog Window then select Charges.fsc from CC2 Pro's Symbols\Other folder.

The Charges symbol catalog loads in the Catalog Window. The symbols in the top half of the list are all black.

> Each of the shortcut buttons loads an appropriate symbol catalog in the Catalog Window. You can also load symbol catalogs manually by clicking the **Catalog...** button, as you did here.

3 Select another color from the color bar.

The charges change color to match the new current color. This type of symbol is known as a *varicolor* symbol.

4 Move the cursor over the Catalog Window and right click.

The Catalog Window is shown as a full page, so you can see all the Charges at once.

Some of the Charges do not have the color you selected - these symbols are *Proper*, meaning they maintain their own natural color.

> You can right click over the Catalog Window to see a full page listing of the symbols. Right click again to get back to the normal list.

Copying the shields

The Shields template is set up to allow you to copy shields from the lower drawing window into the upper drawing window, change their properties, then add heraldic symbols from the symbol catalog.

---

5 Click **Copy** .

The Command Line reads `Select entities (0 picked):`.

6 Select the white shield in the bottom left, then right click and Do It.

In the case of this shield, you can select it by clicking its edge. The other shields contain more than one entity, so it is easiest to select them by clicking a window that contains the selection.

The Command Line reads `Copy from point:`.

7 Move the mouse around.

The **Grid** and **Snap** buttons are depressed (how they were saved in the Shields template), so the cursor is forced to *snap* to grid points. Since the shields were positioned on grid points, it is easy to select their corners precisely.

8 Click at the top left corner of the selected shield.

The Command Line reads `Place:`. CC2 Pro wants to know where to put the copy.

9 Move the mouse into the upper drawing window and click at the upper left grid point in this window.

The white shield is copied to where you clicked.

10 Right click to stop copying.

11 Click **Change Color** , selecting by Prior then Do It.

The Command Line reads **New entity color [dialog]:**.

12 Click **Like** .

The Command Line reads `entity:`.

13 Select the edge of the sky blue tincture box.

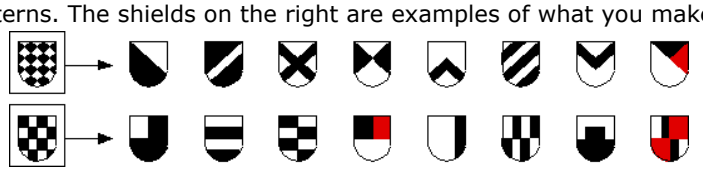
The copied shield is now sky blue.

> During a change command, **Like** sets the property of an entity (e.g. layer, color or line style) equal to the same property of an existing entity that you select.

About the shields

The bottom window contains two types of shield. Those on the left are made of multipolies, exactly as they look:

The two in boxes are composites, made up of many squares or diamonds. By changing the color of individual squares, you can create your own patterns. The shields on the right are examples of what you make.



Adding the Charges

Now you've got a blank shield to work with, it's time to add the Charges from the Catalog Window.

We will place two Leopards, one above the other, using **Keep** to set their color. To fit the Leopards in the shield, we will need to change their size while placing them.

---

14 Click **Keep** then the edge of the gold colored box (top left tincture).

CC2 Pro sets the current color to match. The varicolor symbols in the Catalog Window also change color.

15 Depress **Snap** button to disable Snap.

16 Scroll down the Catalog Window and select the Leopard symbol.

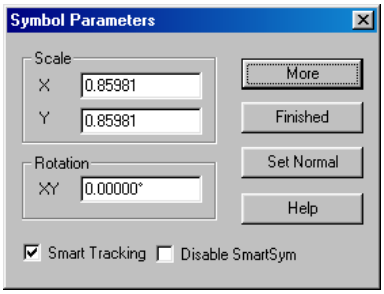
The Leopard symbol attaches to the cursor. It is currently too big for two of them to fit in the shield.

17 Press 2 while slowly moving the mouse towards you.

As you do, the symbol gets smaller. If you move the mouse away from you, the symbol gets bigger. Don't place the Leopard yet…

18 Right click.

You see the Symbol Parameters dialog box.



The values shown in the X and Y Scale are the result of resizing the symbol via the 2 key.

19 Type in an **X Scale** value of **0.8** then click **More**.

The symbol is now 0.8 of its original size.

> When you changed the X Scale, the Y Scale automatically changed to match. To set different X and Y values, change the X first, then change Y (X does not automatically update from Y).
> If you lose track of the symbol scale, right click to bring up the Symbol Parameters dialog box then click **Set Normal**. This resets the X and Y Scale to 1 and the Rotation to 0.

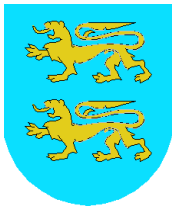
20 Click to place the first Leopard in the upper half of the shield.

One copy of the symbol is placed where you clicked. The same symbol is still attached to the cursor, ready to be placed again.

21 Click to depress the **Ortho** button.

The cursor is now constrained to moving horizontally or vertically from the last point you used. In this case it is the insertion point for the first leopard. **Ortho** will ensure that the second leopard is placed directly below the first.

22 Place the second Leopard below the first.



23 Right click to bring up the Symbol Parameters dialog box and then click **Finished** to complete the symbols.

A summary of Using Templates...

These are the new facts and concepts introduced during this chapter.

- ✓ Templates are pre-defined drawings on which you can base your new maps.
- ✓ CC2 includes templates for a wide variety of applications, including heraldry and starship design.
- ✓ Templates are found in the Templates folder of CC2, subdivided by their application.
- ✓ Templates for different applications are divided by size.
- ✓ You can create your own templates by changing an existing template.

SYMBOL CREATION AND MANAGEMENT

This chapter explains how to choose sets of symbols and insert symbols into your drawings. It also shows you how to create symbols of your own using

But if you still can't find the symbol you want, you can create your own. Anything drawn in CC2 Pro can be converted into a symbol.

Choosing symbols catalogs

CC2 Pro's symbols are divided by type into CC2 Pro drawings called catalogs and stored in CC2 Pro's Symbols folder with a descriptive name. In addition to CC2 Pro's pre-drawn symbols, there are vast symbol libraries included with Dungeon Designer 2 and City Designer 2,Symbol Set 1 – Fantasy Overland, Symbol Set 2 – Fantasy Floorplans and free libraries downloadable from www.profantasy.com. Some sample CD2 and DD2 symbols are available by right clicking their buttons on the File toolbar.

Using the Symbol Catalog Settings buttons

Right click **Symbol Settings** to see the most common symbol settings, or left click to see CC2 Pro's complete list of symbols in the current style.

Using the Symbol Toolbar shortcuts

You can load the most frequently used catalogs, such as Vegetation, Mountains and Structures, by clicking their buttons on the Symbol toolbar. If there is more than one matching catalog in the current style (for example Vegetation 1 and Vegetation 2 in the CC2 Filled style), both are displayed; click one to open it.

If you can't see this toolbar click the **Screen Tools** button and click in the Symbol toolbar check box until it is pointing up – Symbol Toolbar.

Swapping between Symbol Styles

CC2 Pro's symbol catalogs come in two basic styles, CC2 Filled and CC2 Line, and you can toggle between these styles using the Symbol Style Toggle. Right click to see a list of styles, left click to toggle to the next style.

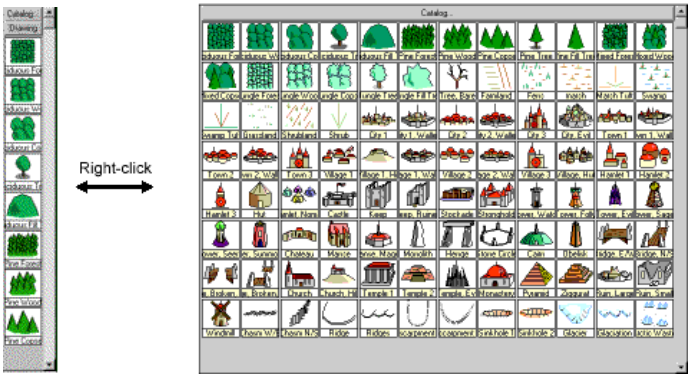
Inserting Symbols from the Catalog Window

The symbol catalog window is where CC2 Pro displays symbols ready for insertion. If you can't see it, click the **Screen Tools** button and check Symbol Catalog to activate it.

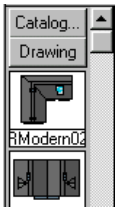
To choose a symbol

Click on a symbol to select it for insertion. Right-click anywhere on the Symbol Catalog to expand to a wide-screen page-at-a-time view. This is helpful for large catalogs. To shrink the full-screen back to a single column display, right-click again anywhere on the expanded catalog.

In either display mode (single column or full screen), use the vertical scroll bar to see additional symbols.



To see a list of symbols already in the drawing

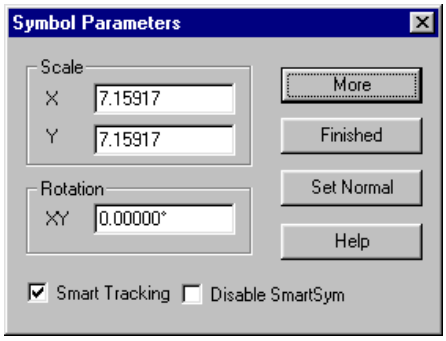


Click the **Drawing** button. This displays all the symbols already added to the drawing, in the order they were added. The first set of symbols are those used in symbol fill styles. Click the **Drawing** button again to see the symbols in the catalog.

To insert a symbol

When you've selected your symbol, you will see a symbol shaped cursor. You can:

- Press 2 then move the mouse up and down to rescale the symbol cursor.
- Press 2 3 and move the mouse around to rotate the symbol cursor
- Press the arrow keys to align the symbol vertically or horizontally



- Right-click to type an in an exact scale and rotation. If you want a different X and Y scale, type the X scale in first, then enter the Y scale otherwise CC2 Pro updates the Y scale to match the X. Click **Set Normal** to set the scale and rotation scale of 1 and no rotation. When you've changed the settings click **More** to add more symbols. CC2 Pro remembers these settings between symbol selections.
- Click to place it in the drawing.

To finish inserting symbols

When you've added enough of a particular symbol, you can click another symbol in the Catalog Window. To stop inserting symbols, you can click another CC2 Pro command or right click then click **Finished** to stop inserting symbols. Clicking a new command is quicker.

What happens when you use a symbol

The first time you select a particular symbol from the Catalog Window, CC2 Pro invisibly adds its symbol definition to the map. You can see these definitions by depressing the **Drawing** button. Thereafter, whenever you place the same symbol, CC2 Pro simply adds a reference to the definition at the location you picked.

This is very efficient because each reference only has to know its location, color, layer, scale, rotation and the name of the symbol it refers to. For the rest, it refers back to the symbol definition.

> The pre-drawn "City 1" symbol contains 53 entities and occupies 3.67 k of memory. However, 10 "City 1" symbols in a map only occupy 4.97 k, not the 36.7 k you might expect. This is because each symbol reference only takes 0.13 k (10 x 0.13 + the original 3.67 = 4.97).

How symbols use layers

So long as you think of symbols as two separate bits - the definition and the reference - this is very straightforward.

Each reference is on a layer. If that layer is hidden, the whole reference is hidden.

The entities within a symbol definition are also on layers. If any of those layers are hidden, the affected entities are hidden in all references to the symbol. By convention, the SYMBOL DEFINITION layer is always visible, so you can safely draw entities on this layer if you want the symbol's visibility to depend solely on the visibility of the reference layer.

Example layer usage in an Infantry symbol definition:	**And if the symbol is inserted on the FRENCH layer, this is how the symbol reference displays with various layers hidden:**
The Infantry symbol is defined using the following layers 1. A crossed-box drawn on the INFANTRY layer: 2. plus a Data label on the DATA layer: Data 3. Gives a symbol definition for a typical Infantry symbol: Data When the symbol is used in a map, this symbol definition is invisibly added to the map, creating any necessary layers.	Symbol reference with all layers visible: Data With the DATA layer hidden but FRENCH and INFANTRY visible: The Data label is hidden. With the INFANTRY layer hidden but FRENCH and DATA visible: Data The infantry symbol is hidden. With the FRENCH layer hidden but INFANTRY and DATA visible: The layer on which the reference was inserted is hidden, so the whole reference is hidden.

Creating a symbol

I want to focus on the concepts of symbols, rather than a complex shape, so we will draw a simple Infantry symbol, suitable for wargame maps. Your symbols can be as complicated as you like.

We will create the infantry symbol so it has a background drawn in the current color when inserted. This will make it easy to distinguish between the infantry of each army.

Using CC2 Pro's Drawing commands

Up to now, you've been using CC2 Pro's Map Drawing Tools and symbols to create your maps. However, these won't do when you are creating symbols. You need CC2 Pro's selection of powerful drawing buttons for this. These add the basic shapes you need to build up the more complex symbols.

Draw commands differ from the Map Drawing Tools commands in that they always use the properties currently set on the status bar rather than preset values. This gives you greater flexibility – but you have to keep your eye on the status bar a lot more, and use the Change buttons when you need to correct things.

1 Start a new map based on the 1000 x 800 Framed template.

CC2 Pro symbols are defined so that, with a symbol scale of 1, they are correctly sized for a 1000 x 800 mile map. You should therefore create overland symbols on this map size.

2 Set the current layer depending on how you want the next entities you draw to behave when the new symbol is inserted:

3 In this case, click the **Layer** indicator, add a new layer called **`INFANTRY`** and set it as the current layer.

4 Insert a single mountain symbol into the map.

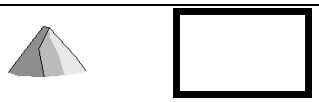
The mountain gives us something with which to compare the size of the new symbol. It won't be included in the symbol.

5 Change the other drawing settings as follows:

- ✓ Line Width **2**
- ✓ Fill Style **Solid**
- ✓ Color **Black**

6 Draw a box , its first corner on a grid point near the mountain, its second corner **`@40,25`**.

Measuring 40 units across and 25 up, the box is approximately twice as big as the single mountain.



7 Draw two lines forming a cross in the box.

To place these lines precisely, either enable **Attach** and set it to Nearest endpoint, or use the **Endpoint** modifier.

Varicolor entities that change color on insertion

This basic infantry symbol, a crossed box, is now drawn. To identify different armies, we will add a varicolor box in the back ground which, when the symbol is inserted, is drawn in the current color.

This symbol is simple, so it only has one varicolor entity. In your own symbols, you can have as many varicolor entities as you want.

Continued from previous instructions…

8 Change the Line Width setting to **0**.

9 Draw a **Box** over the symbol.

The line width is now 0, so the center of the box is filled. The previous box has a non-zero line width, so the fill style was applied to the box outline.

The box completely obscures the rest of the symbol.

10 Click Symbols menu >> Make Varicolor.

The Command Line reads `Select entities:`.

11 Select the last box by Prior, then Do It.

The box is now varicolor. It is currently white but, when the symbol is inserted, it will be drawn in the current color. It still obscures the rest of the window.

12 Click **Send to Back**, again selecting by Prior then Do It.

The background box is now behind the rest of the symbol.

Adding attributes

Attributes are pieces of textual information attached to symbols. If a symbol includes attributes then, every time it is inserted, you will be prompted with dialog boxes asking for the values.

You can use Symbols menu >> Extract Attributes to list all attributes in a map and save it in a text file for use with other applications.

Attributes must be added to the symbol before it is defined, as they are a part of the symbol.

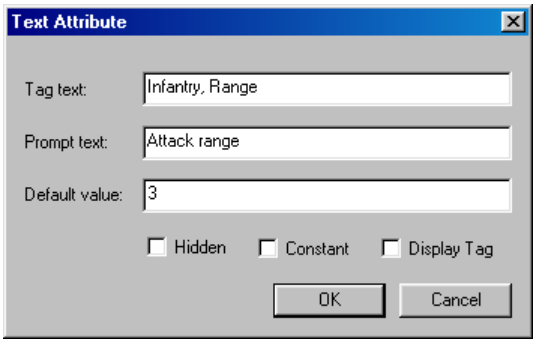
Continued from previous instructions…

13 Click **Text Properties** and make the default text settings **Arial** font, justified **bottom-left**, height **6** and stretch **1**.

You can't change the text properties of attributes when they are set, so it's best to set them before hand.

14 Select Symbols menu >> Define Attribute…

You see the Text Attribute dialog box:



- Tag text is the name of the attribute that will be displayed with extracted information.
- Prompt text is the dialog box prompt you will see when inserting the symbol.
- Tick **Hidden** if you don't want the attribute to display next to the symbol. If an attribute is hidden, you can still extract it or see its value using Info menu >> List.
- Tick Constant to fix the attribute's value to the default.
- Tick Display Tag if you want the attribute label to display, instead of the value.

15 Set the values in the dialog box as follows, then click **OK**.

- ✓ Tag text **Infantry, range**
- ✓ Prompt text **Attack range:**
- ✓ Default value **3**
- ✓ Tick boxes **All clear**

The Command Line reads `Location:`. The text is using the default text properties, which is why we set them before adding the attribute.

16 Place the attribute at the bottom right corner of the symbol.

Adding control points

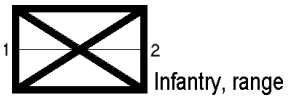
Control points create "smart symbols" which work intelligently with other straight-edged CC2 Pro entities in that both the symbol and the entity are aware of each other during insertion. This awareness allows the entity to automatically create cuts to accommodate the symbol, or have the symbol align or scale itself to fit cleanly. An example of a smart symbol in use is the dungeon door (see page 78)

Continued from previous instructions…

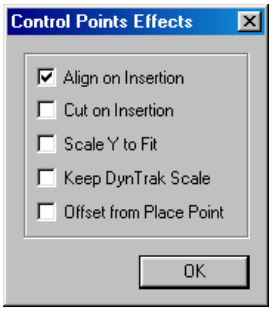
17 Click Symbols menu >> Add Control Points.

The Command Line reads `1st point:` and then `Next point:`. The positioning of these two points is important. Firstly, the two points define a vector that is used to determine smart symbol's alignment with other entities. During placement, this vector remains parallel to the entity, reorienting the symbol accordingly. The alignment vector also tells CC2 Pro how to "flip" the smart symbol during insertion.

18 Using the **Midpoint** modifier , place the control points at the points shown:



You see the Control Points Effects dialog box:



- **Align on Insertion** means the symbol will auto-rotate to align with straight edges underneath the cursor.
- **Cut on Insertion** means the symbol will automatically break any linear entity on which it is inserted. The break will occur at the control points.
- **Scale Y to Fit** forces the smart symbol to resize in the "vertical" direction relative to the width of the line under the cursor. At the same time, the symbol's X scale becomes 1 – irrespective of the current symbol scale. **Scale Y to Fit** only takes effect when inserting into entities with width > 0.
- **Keep DynTrack Scale** is used in conjunction with **Scale Y to Fit**. It forces the X scale to stay at the current symbol scale, changing the proportions of the symbol.
- **Offset from Place Point** inserts the symbol parallel to the initial placement point and orientation. The exact placement is visually determined from the dynamic cursor. This overrides the **Cut on Insertion** check box option (i.e., offset symbols will not cut the locating entity.

19 Click **Align on Insertion** only, then click **OK**.

The control vector is drawn. It will not display in the inserted symbol. To edit the control point settings, use **Edit** and click on the control vector.

Defining the symbol

The symbol you have drawn contains varicolor entities, attributes and Smart Symbol control points. It's a pretty busy symbol, so you can see why I wanted to keep the shape simple!

Your symbols can be as complex or simple as you like. Symbols do not have to include control points, nor do they have to have varicolor entities and nor do they need attributes. All they absolutely need is a few entities. The rest is up to you.

Once you've created all the entities you want in your symbol, you combine them as a symbol definition.

Continued from previous instructions…

20 Select Symbols menu >> Define Symbol.

The Command Line reads `Symbol name:.`

21 Type **`Infantry`** then press ¶ .

The Command Line reads `Symbol origin:.`

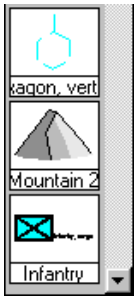
The symbol origin will be the insertion point for copies of the symbol. The point you choose depends on how you will normally pick the point to place the symbol. For the infantry symbol, I would pick the intersection of the cross.

22 Use the **Intersection** modifier to select the middle of the cross.

The Command Line reads `Select entities (0 picked):.`

23 Select the infantry shape, including the control points and attributes then Do It.

The symbol disappears! Don't worry though, it is now defined in the map as a symbol.



24 Click the **Drawing** button at the top of the Catalog Window.

The Catalog Window displays the symbols used or defined in the current drawing. The list includes any symbols placed in the drawing, any symbols used by symbol fill styles and, at the bottom, our new Infantry symbol!

Depending on the current color, the symbol probably looks like a black blob.

25 Select another current color instead of black.

Oh the joy of varicolor!

Using the Symbol Manager

The Symbol Manager, new in CC2 Pro, lets you define, clone, edit, delete, export, import and other manipulate symbol definitions and references.

Making new symbols available as a catalog

You can export symbols from your maps to create new catalog files. The symbol you have made can form the basis of a new catalog

Continued from previous instructions…

26 Click Symbols menu >> Symbol Manager.

You can see a list of symbols, used in the template's symbol fill styles.

27 Select all the symbols other than the infantry symbol you have created, by clicking each in turn with 3 held down.

28 Click the **Delete** button.

All the other symbols in the drawing are deleted.

29 Click **Save As Catalog...** Type **`military`** and add the new catalog to the *Symbols*|*Other* folder.

Cloning and editing symbols

You can easily edit the symbol definitions in any catalog or map. After you have edited a symbol, any references to it (in the current map) will show the edited definition. If you want a new symbol similar to an existing one, you can clone the existing symbol then edit it.

---

1 Click **Open** then select military.fsc from CC2 Pro's Tutorial folder. (You may need to set the file type back to CC2 Pro FCW drawing.)

The tutorial map loads.

2 Click Symbols menu >> Symbol Manager. Click on the Infantry symbol to highlight it.

3 Click the **Clone** button. Type **`Armor`** as the name for the new symbol.
CC2 Pro has created a copy of the symbol with the new name.

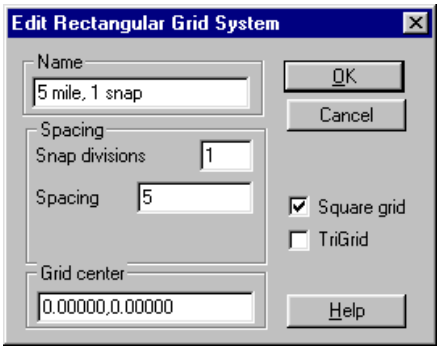
4 Click the **Edit** button. Click two points in the view area to form an editing window for the new symbol.
We are going to erase the diagonal lines and replace them with the standard armor symbol.

5 Click **Erase** . Click the two crossing lines, right click, Do it.
To draw the shape accurately and symmetrically, we'll make use of CC2 Pro's snap grid. This makes your mouse clicks snap on to a predefined grid.

6 Click Info menu >> Distance. Click points at each end of the symbols.
The symbol is sixty miles across, so a grid with snap points about 5 miles across would do the trick.

7 Right-click the **Snap** button. As you can see, there isn't a suitable grid, so we'll add one.

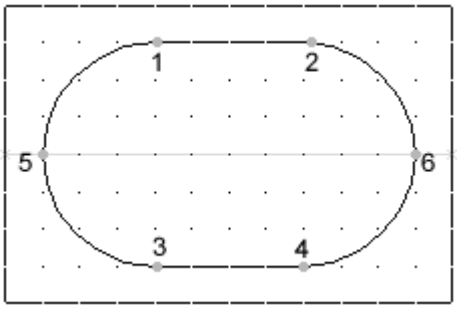
8 Click the **Edit** button. Type the values in as below. Click OK.



9 The color, line style and fill style should all be set up correctly in the example, but for this exercise, click the indicators on the Status Bar to ensure that the following are correctly set:

- ✓ Color is **Black**
- ✓ Line style is **Solid**
- ✓ Fill Style is **Hollow**

10 Click **Line** . Click points 1 and 2 as shown in the diagram (the line is 4 grid points from the left and right edges.) Right click to finish this line, then click to repeat the line command.



11 Add another line, clicking points 3 and 4. Right click.
The standard arc is a 3-point bulge – that is you draw the ends, then stretch the arc to the position you require.

12 Click **Arc** . Click point 1, then point 3, then point 5. Click to repeat then click points 2, then 4, then 6.

13 Click Edit . Click on the base line of the Infantry, Range text attribute. Change the **Tag Text** to read **`Armor, Range`**, and the **Default Value** to **5**.

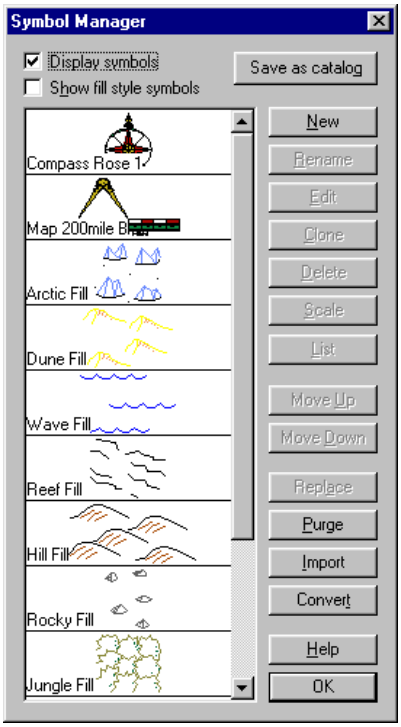
14 Click **Change Layer** , right-click All, right-click, Do it. Right click to see the Layer dialog, click **Add**, type **`Armor`**. Click **OK**.

15 Close the window by clicking the , save changes, then close the Symbol Manager. Save the drawing.
Your symbol catalog has been updated.

Symbol Manager Summary

The Symbol Manager lets you control all aspects of symbol design and catalog manipulation. It lists all the symbols in the current drawing, including those used to make symbol fill styles.

To see the symbol manager, click Symbol Manager on the Symbols menu.



Select **Show Fill Style** symbols if you want to see all the symbol definitions included in symbol fill styles.

Select **Display Symbols** to see a visual display of the symbol definitions.

To save the symbol list as a catalog, click **Save as Catalog**. If **Show symbol fill style** symbols is not selected fill style symbols will not be included.

Create a new symbol definition with **New**.

16 Type a name for new symbol.

17 Click two points to form a drawing window.

18 Add CC2 Pro entities.

19 Close the window.

Rename an existing symbol

20 Select the symbol you wish to rename in the symbol list

21 Click the **Rename** button.

22 Type a unique new name.

Edit an existing symbol.

23 Click two points to form a drawing window.

24 Use CC2 Pro's drawing and editing commands to change the symbol..

25 **Close** the window

Clone an existing symbol. Creates a copy of an existing symbol definition with a new name. Usually, this copy is then edited.

Delete an existing symbol definition, or selection of symbol definitions. It will remove all the symbol references from the drawing, too, so be careful.

Scale an existing symbol definition, or selection of symbol definitions. This affects all existing symbol references, and any you add in the future. Use Symbols menu >> Scale Symbols In Map to scale existing references without changing the definitions.

List the entities in a symbol definition. Click T to save the list as a text file or print it.

Move Up and **Move Down** the order in which symbol definitions are displayed in the catalog window.

Replace all references in the drawing to one symbol definition with another. It does not affect symbol definitions.

Purge all unused symbol definitions from the drawing.

Import symbol definitions from another file. Click the Files of Type list to choose drawing type from which to import symbols, usually another drawing (FCW) or catalog (FSC)

Convert a selection of existing CC2 Pro files into symbol definitions in the current drawing.

Managing Symbol Catalogs

You can always access symbol catalogs directly by clicking the **Catalog...** button, but CC2 Pro offers you a much easier way to manage your catalogs with Symbol Catalog Settings. You can use these to set the layer and other properties for catalogs, and also swap between different styles of symbols

You've already used these without needing to know their intricacies. This section explains how to add your own symbol catalogs to those available.

Swapping between styles

CC2 Pro comes with two styles of symbols, CC2 Filled and CC2 Lined. Each CC2 Filled catalog has an equivalent CC2 Lined catalog. If you have additional symbol sets, you will see additional styles.

1 In CC2 Pro, rather than an add-on, click **Symbol Catalog Settings** .

You can see a list of catalogs.

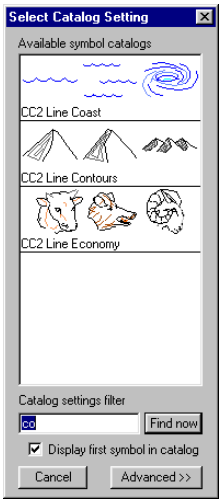
2 Scroll down the list.

Notice that all the settings start with "CC2 Filled"

3 Click **Symbol Style Toggle** . Click **Symbol Catalog Settings** again.

The symbols are not filled, and the settings start with CC2 Line.

Symbol Style Toggle swaps between any installed symbol styles, opening the catalog, if there is only one matching, or displaying the choices in that style if there are more than one.



4 Type **co** into the **Catalog Settings Filter**, then click **Find Now**.

CC2 Pro lists only those settings that include the letters **co**.

5 Click **Advanced**.

Note that the Master Filter is CC2 Line.

First, CC2 Pro applies the Master Filter, which is used to define CC2 Pro's styles, then it applies the Catalog Settings Filter to show only appropriate settings.

6 Type ***** in the Master filter then click **Find Now**. Scroll down the list.

You can see all the available settings, including those for add-ons if you have them installed. This includes CC2 Pro Monochrome symbols.

7 Right click **Symbol Style Toggle** . On the popup menu you can see the various styles available. Click CC2 Filled.

This popup menu is especially useful if you have additional CC2 Pro symbol sets installed.

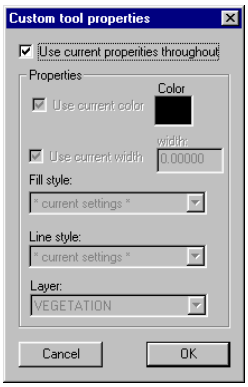
When you click a symbol button, CC2 Pro just sets the Catalog settings filter, and either opens the catalog or displays a choice of catalogs if there is more than one match. For example, if you have CC2 Filled style set, and you click Vegetation, you get a choice of Vegetation 1 and Vegetation 2. CC2 Pro remembers the current filter, and when you swap styles, opens the catalog in the new style. Because there may only be one matching catalog, CC2 Pro strips off any trailing numbers, or comma and their trailing text.

Catalog Settings Properties

Symbol Settings don't just open a catalog, they can also set appropriate properties for the catalog. These properties are persistent.

8 Click each of the symbol buttons in turn. Notice that the layer changes for each one.

9 Click **Symbol Catalog Settings** . Click **Advanced**. Scroll down the list of symbols and click CC2 Filled Heraldic Charges.



10 Click the **Properties**.

Use Current Properties Throughout is set – this means that when you select this setting it just opens up a catalog, it does not set properties.

11 Click **OK**. Click CC2 Filled GM only, (the setting above), then click **Properties**.

- ✓ **Color** is set to the current color
- ✓ **Width** is set to the current width
- ✓ **Fill style** is set to Solid
- ✓ **Line style** is set to Solid
- ✓ **Layer** is set to GM Only

Adding a new setting

Adding a new catalog setting is easy. Let's add the military catalog we made earlier.

12 Click **Symbol Catalog Settings** . Click **Advanced**. Click **New**.

CC2 Pro is asking for a name for the new setting.

If your symbol setting doesn't really fall into either category (filled or line) it's better to save a setting for both styles, so that it shows up when you toggle between styles.

13 Type **`CC2 Filled Military`**. Click **OK**. Click Browse. Double Click the *Tutorials* folder. Double click *military.fsc*.

14 Click **Properties**. Uncheck Use Current Properties Throughout. Set the properties as follows:

- ✓ **Color** is set to the 135.
- ✓ **Width** is set to the current width
- ✓ **Fill style** is set to Solid
- ✓ **Line style** is set to Border
- ✓ **Layer** is set to BORDERS/POLITICAL

Military is a varicolor catalog, so setting the color to gold reminds you of this when you open this setting. BORDERS/POLITICAL seems to be the best layer, but you could add a MILITARY layer and change the setting to this. If a layer or other property does not exist in the current drawing, this setting appears blank, and it is not set.

15 Click **OK**. Click **Save**.

16 Click **New**, type **`CC2 Line Military`**, **OK**, **OK**.

This has added an identical symbol setting for the CC2 Line symbol style.

The text equivalent of the Symbol Settings command is DRAWICONM. Press ENTER, then type the Catalog Settings filter. This is most useful when designing menus.

THE WIDER CAMPAIGN

CC2 Pro includes tools and symbols for adding buildings, rooms and corridors. These are cut-down version of what you will find in City Designer 2 and Dungeon Designer 2, but powerful nonetheless. If you have DD2 or CD2, it's probably worthwhile doing these tutorials, but note that there are many more options in the add-ons than those presented here.

This chapter also covers some more advanced precision drawing features of CC2 Pro, all of which will make you a faster, better mapper.

Adding Caves, Rooms and Corridors

If your rooms are rectangular, there is a simple way to create rooms and corridors. CC2 Pro has built in drawing tools and other commands to make it easy to create floorplans.

Dungeon Drawing tools

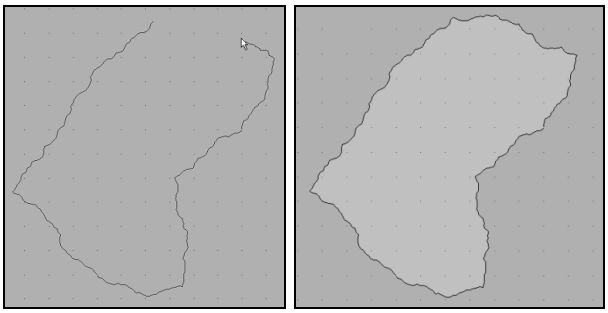
CC2 Pro includes a couple of pre-configured drawing tools like the overland mapping drawing tools to help you create floorplans and cave systems.

1 Right-click **DD2** , click **New Dungeon**, then select 500' x 400' (Tanned Background.fct)

All CC2 Pro's specialized floorplan drawing commands can be found on the DD2 button popup menu – this is true of the other add-ons.

2 Click light gray on the color bar – the one above white. This will be the color for your cave and rooms.

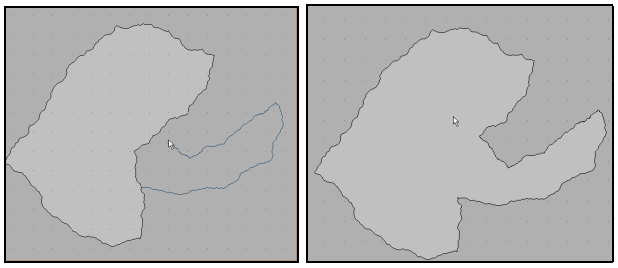
3 Right-click **DD2**, click **Dungeon Drawing Tools**. Click **Dungeon Cave**.



4 Click a few points to create a cave. Right click to complete the cave.

Notice that the prompt reads `Fractal Polygon: First Point (E-Edit):`

5 Press **E**. This lets you add to or subtract from an existing cave. Pick a starting point on the cave you've drawn, and add a passage way. You can also click inside the cave to subtract from it.



6 When you've nearly closed the passageway, right click, move the mouse around to the node you want, then left click.

Clever, eh?

7 Right click **DD2**, click **Room (cut down version)**.

Your choice is limited to background color in the CC2 Pro version. You can click Dungeon Designer Options to see what you get in DD2.

8 Click **OK**. Depress **Snap**. Add a dungeon room by clicking two points. Add more rooms, then right click to finish.

9 Right click **DD2**, click **Corridor (cut down version)**. Type in a suitable corridor width.

The prompt reads Corridor Start point: (C-Connect to wall):

Corridors can connect to rooms rather than vice versa, so it's best to create rooms first, then add connecting corridors. Corridors can connect to other corridors, too.

10 Press **C** then click on the wall of one of your rooms. Draw more corridor points. Press **C** and select a final end for your corridor.

DD2 lets you vary the width of your corridors, and gives you a visual clue to show where your corridor will appear, as well as the options you see in the **Dungeon Designer Options** on the **Corridor (cut down version)** dialog.

Adding doors

11 Right-click **DD2** , click Dungeon Symbols (examples).

The symbol catalog loads. It contains sufficient symbols to draw a simple dungeon. The Dungeon Designer 2 add-on contains fully colored symbols for every occasion.

12 Scroll down the Catalog Window and pick the door symbol from the bottom of the list.

A door appears at the cursor.

13 Place the doors in the middle of a wall.

To place the doors easily, right click on the **Grid** button and select a more frequent grid setting such as 5' grid, 5 snap.

(Optional) Instead of using the grid, you could enable the **Attach** button, with the Attach Mode set to Nearest Point On. This makes doors lock on to the walls when you insert them.

Rotating and aligning symbols

14 Choose a single door from the catalog and press the - ® ¯ and ° arrow keys.

As you press each key, the door rotates:

° and ¯ makes the symbol align with horizontal walls.

- and ® makes the symbol align with vertical walls.

Use ² ³ to rotate the symbol to align to other angles.

Now move the symbol over your walls – the symbol aligns to the walls for you. This symbol is a **smart symbol** – the reason you added control points in the example on page 71.

Other dungeon symbols

Add other dungeon symbols in the usual manner. Note that you will hardly ever have to change the symbol scale, as chairs, tables and doors tend to remain the same size.

Creating urban areas

CC2 Pro also has mapping templates for basic city design. For better cities, use City Designer 2 which includes more than 1500 symbols and automated city building via the House Builder and Street Builder dialog boxes.

City roads

1 Right-click **CD2** , click **New City** then pick 1000' x 800'.fct.

This is a blank drawing template for a medium sized village or small town.

Drawing Units

CC2 Pro has a number of drawing unit options. These are available under File menu >> Drawing Properties >> Units. You can have inches, feet, millimeters, meters or custom format. The tracking units can also vary, so you can track to the nearest millimeter, meter, etc. Units should be defined on templates, rather than after the drawing is started. If you use meters rather than feet, you should use the metric templates or convert Imperial city and dungeon templates and change the units and tracking to meters.

CC2 Pro's campaign scale maps are created at 1 inch = 1 mile. Urban areas and floorplans are created at true scale (1' in the drawing is 1' in real life.) So if you insert a dungeon into a map, it would be vastly bigger.

2 Right click **CD2**. Click **City Draw Tools**. Depress **Snap**. Click City Road, Default.

3 Click points to make a curved road. Add more curved roads, right click to finish each road, then a final right click to finish.

There's only one city road tool in CC2 Pro; you could add others, or use a useful little trick.

4 Click Keep . Click in the middle of a road.

Note that the Status Bar shows the properties of the road, brown, layer Road, etc.

5 Using CC2 Pro's standard drawing tools to create more roads. You can change the width at any time by clicking the **Line Width** indicator.

- ✓ Use **Line** to draw straight roads.
- ✓ Use **Path** to draw roads with corners.
- ✓ Use **Smooth Path** to create curved roads.

Don't let roads made from paths or smooth paths cross themselves - the fill styles becomes transparent where solid entities cross themselves. CC2 Pro cannot calculate the intersections of self-intersecting entities.

6 Right-click **Keep** KEEP. Click Draw Like...
The prompt reads Pick Master Entity

7 Choose the center of any of the roads.
CC2 Pro is now ready to draw a road of the same type.

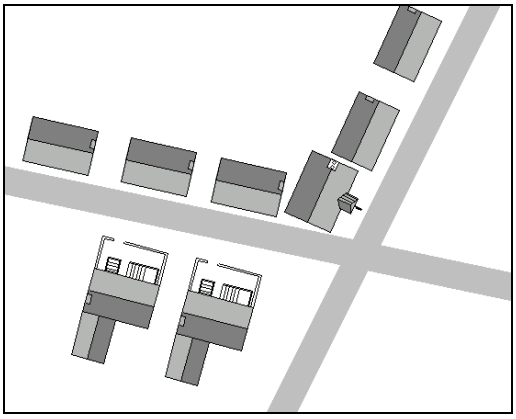
Adding building symbols

You can add buildings to your map using CC2 Pro's building feature, or add one of the many symbols provided.
Continued from previous example…

8 Right-click **CD2**, click **City Symbols (examples)**.
You can see a set of urban symbols.

9 Select a house symbol from the Catalog Window then **Zoom Window** close to an angled road.

10 Select a new current layer (say **Residents 1**



11 Press 2 and 3 while moving the mouse to align the building with the road, then release the keys.

12 Move the mouse slightly so that the building can re-establish itself at the cursor. Move the building into position along side the road and place the symbol.

If roads are angled due north or east, you can use the arrow keys - ® ¯ and ° to change the symbols angle.

13 Choose another symbol. It is at the angle you chose last time (and thus parallel to the same road). Insert this symbol.

You can easily rotate the building through 180° (parallel to the other side of the road) by right clicking and adding (or subtracting) 180° from the Rotation angle.

14 Continue inserting symbols parallel to this road on this side. Change the color and layer as appropriate.

It is possible to get the angle exactly right by using Info menu >> List on a straight road and making a note of the BEARING. You can then type this value into the Rotation angle box when inserting city symbols.

With curved roads, use Draw menu >> Lines >> Perpendicular to draw some lines attached to the curved road. Look at their bearing angle, and subtract 90° to get the correct angle.

Adding buildings with the Building command

CC2 Pro has a cut down version of City Designer 2's building command. It's good for many basic urban applications.

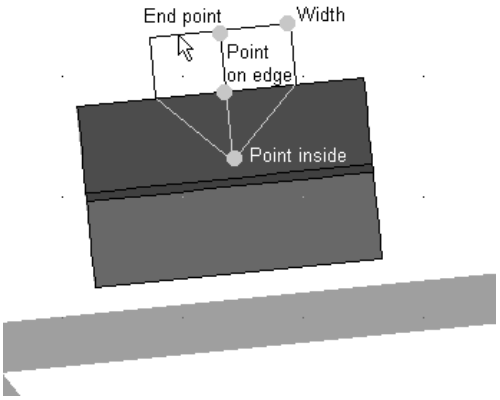
15 Right click **CD2**. Click **Building (Cut down version).**

16 Click Modern Red then **Insert**.

17 Click three points to make the building.
The prompt reads `First House Point (S=Swap colors, E=Extension)`

18 Press **S** three times.
You'll see that the color scheme changes. You can make sure all the dark roof areas point in the same direction.

19 Press **E**, then select a point inside the house.



The prompt reads `House edge`.

You can add extensions directly to a house in mid-command.

20 Click a point on the adjacent house edge.

21 Click a point for the end of the extension, then its width.

You can type in a width, or right click to use the previous width.

Precision drawing

For most overland maps, you only need to be precise when drawing up to the map border or when creating multipolies that require perfect joins. Apart from that, it generally doesn't matter whether a tree is here or slightly to the left of here.

When drawing close up, however, precision starts becoming important. House corners normally want to be square. 10' wide passages want to be 10' wide, not 12. Iris doors on a starship want to be symmetrical, not buckled.

This section does not make use of CC2 Pro-Pro's built in floorplan and building commands – they supplement them, but it's an excellent study in CC2 Pro's powerful tools which will improve your mapping skills.

CC2 Pro can be as precise as you want to be. You can:

- ✓ Place points precisely by using snap and the grid.
- ✓ Place points precisely on an existing entity by using a modifier such as Endpoint, On or Midpoint.
- ✓ Place points precisely on an existing entity by using Attach mode
- ✓ Place points by eye by clicking at the desired location.
- ✓ Place points precisely by typing an **x,y** coordinate. At all times the cursor coordinate is shown on the Status Bar.
- ✓ Place points precisely by typing a coordinate relative to the last point used. Relative coordinates start with @. For example, **@2,3** means *at* 2 across and three up from the last point.
- ✓ Place points precisely by typing an angular coordinate relative to the last point used. Relative angular coordinates start with **<**. For example, **<30,3** means "3 units away at an angle of 30°**".** 0° is east, 90° is north.

The drawing grid

One of your main aids in precision drawing is the Grid. It can be turned on and off in seconds using the 2 buttons at the bottom of the drawing window – **Grid** and **Snap** Related, but different, is **Ortho**.

Grid – When enabled, **Grid** shows a black dot at each grid point. These dots are for your reference only, and do not appear in print-outs.

Snap – Between each grid dot is a number of invisible "snap points" (set in the Grid dialog box). When **Snap** is enabled, CC2 Pro locks any points you place by eye to the nearest snap point. CC2 Pro ignores snap when you are selecting entities for editing or specifying points with typed coordinates or modifiers. The grid does not have to be visible for **Snap** to work.

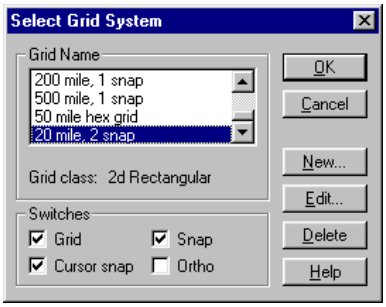
Cursor Snap – forces the cursor to move between allowed co-ordinates only. If **Snap** is disabled then all coordinates are allowed, so the cursor moves smoothly. However, if **Snap** is enabled, only snap points are allowed so the cursor appears to jump as it moves. Right click on **Snap** to access **Cursor Snap**.

Ortho forces the next point you click to be horizontal or vertical from the last. It is particularly useful for drawing straight-line shapes, but not suitable for curves.

> When you zoom out, CC2 Pro displays more drawing area and hence more grid points. If you zoom out far enough, the grid density will become too great to be useful, at which point the grid no longer displays. Similarly, if you zoom in far enough, all snap points will be outside the drawing window, so you won't be able to select points with the cursor.
>
> As you zoom in and out, you may wish to change the current grid.

Selecting a grid system

All CC2 Pro templates have a selection of pre-defined grids. To change the current grid setting, right click on the **Grid** button. (You can change the grid settings in the middle of another command without canceling that command.) You see the Select Grid System dialog box:



Each grid is named with the grid spacing (the spacing of the dots) and the snap frequency. 20 mile, 2 snap has dots every 20 miles and snap points 10 miles (2 snap points per grid point).

Select a grid system by clicking on it in the list of grid names, then clicking **OK**.

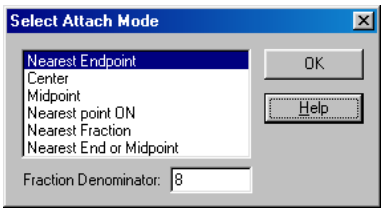
The switches let you change the current button settings from the dialog box.

The buttons to the right of the dialog box let you edit grid systems and create your own.

Attach Mode

Although snap helps you connect things, you don't always want to draw on snap points. Modifiers such as **Endpoint** and **Midpoint** lock the next point to an exact point on an existing reference entity. Each time you want to place a modified point, you have to click a modifier button first… until now.

At the bottom right of the drawing window is the **Attach** button. Click it to enable Attach Mode, right click it to change its settings:



Placing points when Attach Mode is enabled is exactly the same as placing them normally except, if you click on an existing entity, the new point is precisely attached to that entity.

The only Attach Mode that is not also a modifier is Nearest Fraction, for which you type in a **Fractional Denominator** and CC2 Pro will lock to that fraction along a selected entity. For example, type 5 and CC2 Pro will lock to the nearest 20% along an entity.

Drawing a floorplan precisely

Even the smallest overland map template is set up to draw in terms of miles. Unless you're mapping the Taj Mahal, the first thing you must do is select a smaller scale template.

Templates for other map types are in subfolders of Templates.

---

1 Right-click **DD2** , click **New Dungeon**, then select 500' x 400' (Tanned Background.fct)

> This template is based on Imperial units of feet and inches. The symbol ' is for feet and " is for inches. One inch is approx. 25.4 mm. There are 12 inches in 1 foot.
> Dungeon templates also have some custom bitmap fill patterns for wood, water and other likely dungeon features.

2 Click the Line Width indicator W: 0" on the Status Bar.

3 Set the Line with for new entities to **1** then click **OK**.

The walls will have a real width of 1 foot.

4 Click **Path** .

The Command Line reads `1st point:`.

5 Type **100,100** then press ¶ . *(Absolute co-ordinate)*

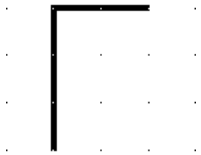
As you type, the numbers appear on the Command Line. When you press ¶ the path is started at co-ordinate 100,100.

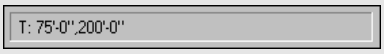
6 Type **@0,30** then press ¶ . *(Relative co-ordinate)*

The next path segment is drawn relative to the last position you used (could be the last position used by the previous command). In this case it is draw at (@)0 across and 30 up.

7 Type `@20,0` then press ¶ . *(Relative co-ordinate)*

The next path segment is drawn 20 across and 0 up. You should now have the beginning of an outline, exactly like this:





The tracking indicator at the top of the screen shows you the current cursor position in terms of drawing units. Clicking the tracking indicator changes the tracking mode between

- *Absolute*. Coordinates are displayed as they are.
- *Relative*. Coordinates are prefixed with `@` and are relative to the last point used.
- *Relative Angular*. Coordinates are prefixed with **<** and are angle and distance from the last point used.
- No display.

8 Click **Arc** .

Starting a new command cancels the last. The path ends and the arc begins. The Command Line reads `1st point:`.

9 Depress the **Snap** button.

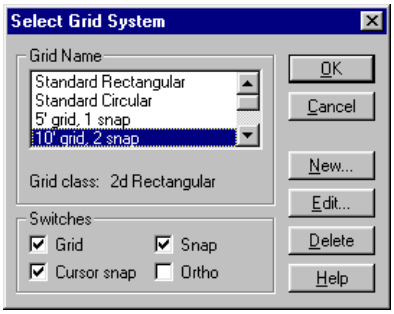
CC2 Pro saves the **Snap**, **Cursor Snap** and **Ortho** button status with each drawing and template, so you can choose suitable presets.

10 Slowly move the mouse.

If you watch closely as you move the mouse, you can see the cursor jumps between snap points.

11 Right click on the **Grid** button.

You see the Select Grid System dialog box:



The current grid system is **10' grid, 2 snap**. This means there are grid points shown every 10 feet and 2 snap points between them – so the snap points are every 5'.

You can change grid settings at any time, even in mid-command.

12 Click the arc's first point on the last point of the path.

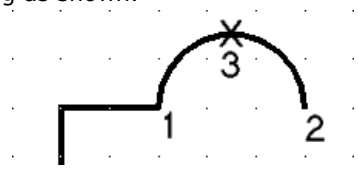
The grid is enabled, so you were able to pick exactly the same point again. No matter how far you zoom in, the arc and path will meet.

13 Place the arc's second point 3 grid dots east of the first.

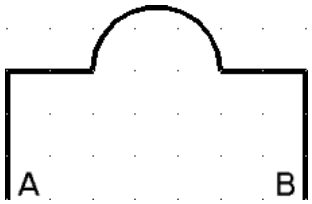
As well as typing coordinates, you can size objects exactly by counting grid points. This span will be 30 feet across.

The two endpoints of the arc have been placed. Now, as you move the cursor, you see how the arc will look when you place the last point.

14 Make the arc a perfect semicircle by clicking as shown.



15 Draw a **Path** which mirrors the first. Right click to end it.



16 Draw another **Path**, and click its 1st point at point A (above).

The Command Line reads `Next point:.`

17 Type **<25,20** then press ¶ . (Relative angular co-ordinate)

The line is drawn at an angle of 30° and a length of 20 feet.

18 Right click to end the last path, then draw a new one, 1st point at B.

The Command Line reads `Next point:.`

19 Type **<155,20** then press ¶ . (Relative angular co-ordinate)

The line is drawn at an angle of 150° and a length of 20 feet. (Remember, 0° is east and 90° is north so 135° is northwest.)

20 Click **Trim to Intersection**.

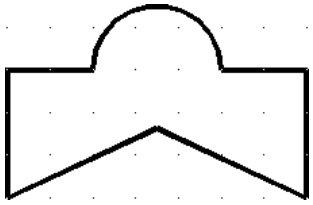
The Command Line reads `1st entity to trim:.`

21 Select the 25° path.

The Command Line reads 2nd `entity to trim:.`

22 Select the 155° path.

The two paths are trimmed to their intersection.



For the sake of practice, I want you to now select points with Attach enabled instead of the grid.

23 Disable **Grid** and **Snap**.

24 Click to enable the **Attach** button.

25 Right click the **Attach** button and select the Nearest Endpoint attach mode.

Any points you click over an existing entity will be modified to the nearest endpoint of that entity.

26 Start a **Path** and, for its first point, click on the arc – near, but not on, an endpoint.

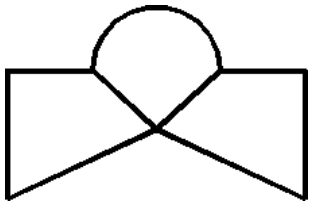
The first point is attached to the nearest endpoint.

27 Click near the end of the trimmed join.

The next point is attached precisely to the endpoint of the join.

28 Click near the other end of the arc, then right click to end the path.

You now have a building wall-plan like this:



Unconventional, I know, but I like it.

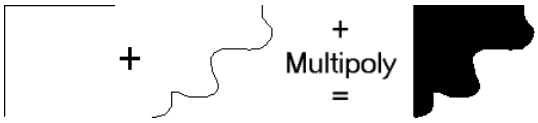
Extracting information

CC2 Pro's info menu can tell you useful information about your maps. You can find the distance along roads. You can find areas of landmasses and terrain. Using List, you can also get the details about any entity you select.

The most useful of these functions is Length Along. Use this to find the exact distance between locations on a road, then add the distance to the map using TEXT.

Multipolies

Multipolies are a way of combining different connected entities into a single shape so they can be filled. In the example below, a straight-edged path is combined with a smooth path.

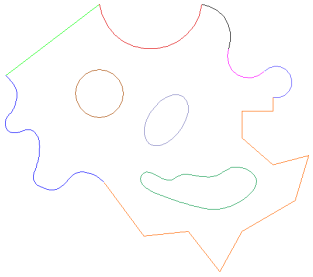


Multipolies can actually combine many and various entities to create very complex shapes, even including cutouts. Multipolies must be drawn absolutely precisely with snaps or Attach enabled, or the fill will "leak" out of the gaps.

---

1 Open Multipoly.fcw from CC2 Pro's Tutorials folder.

You see an outline that I drew using many entities and entity types. I have been very multicolored to help you see each entity.

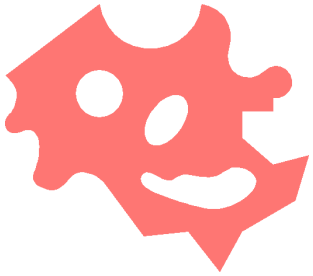


The resultant shape is certainly complex. Perhaps Mr. Rorschach would call it Dazed Clown.

2 On the **Draw** toolbar, click **Multipoly**, select all the entities, then Do It.

The entities are combined as a single shape. The multipoly gets its properties from the current drawing settings (orange color, solid fill, Coast/Sea fill, etc.), not any of its member entities.

The circle, ellipse and smooth polygon in the middle are treated as cutouts.



Editing multipolies

If you try an edit command, such as **Edit**, on the multipoly, you will find it doesn't work. In order to edit a multipoly, you first have to **Explode** it. *Bang*.

Continued from the previous example…

3 Click **Edit** and select the multipoly.

The command stops and nothing happens. A multipoly can not be edited.

4 Click **Explode**, select the multipoly then Do It.

The multipoly reverts to its original entities. Each entity remembers its original color, layer, etc.

5 Now try the **Edit** again.

This time it works. Make any changes you want, then redo the multipoly.

Multipoly text

As if the Dazed Clown isn't enough, how about this:

---

6 Use **Text** to add a line of text such as **`Not bad, eh?`**.

Make the text any size, font, style and color that you like.

7 Right click **Text**, then click Explode Text. Click the baseline of your text and Do It.

There is no visible difference to the text, but it has now been converted from font to a multipoly.

8 Click **Explode**, select the multipoly text then Do It.

The multipoly text is exploded into its constituent entities. It can now be edited like any other entity.

Multipoly text, exploded so it can be edited, then put in the hands of CC2 Pro operated by a lunatic.

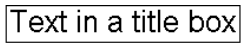
Why use multipoly text

Unlike CC2 Pro's other entity types, True Type (TT) fonts are not infinitely scaleable. Due to the way TT fonts are defined, they can only display and print in whole *point sizes* (a way of measuring text height), and this causes a small problem.

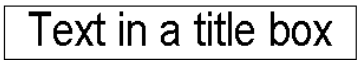
Imagine text in a title box. At one level of zoom CC2 Pro needs a point size of 7 to display the text. 7 is a whole size, so the font obliges.

Now imagine zooming in by a factor of 1.5. CC2 Pro can scale the title box by 1.5, no problem. The text, however, needs to be 1.5 x 7 = 10.5 points. Unfortunately, the font can't do this – it can only do 10 or 11.

CC2 Pro uses the closest available size but, since the text and the box have scaled by different amounts, their relative proportions change.



The same text, Zoomed In by 1.5



In the illustration, the gap between the ends of the text and the box change. This is because the font couldn't precisely reproduce the change in zoom.

Exploding text into multipolies means that the TT font is replaced by native CC2 Pro entities, which allow near infinite zoom. It also lets you alter the text design, to create logos and the like. The down side of multipoly text is that drawing size increases, and the text can no longer be found by text searching.

Tips for Defining a multipoly

The multipoly is a powerful tool that can combine several dissimilar entities and unconnected polygons into one fillable object. Multipoly combines existing entities into one defined object. With a little planning and patience, multipoly can shorten the time needed to create various combinations of entities. There are additional methods to combine different entities to become a fillable polygon (see under *Explode* on page 93). Multipoly is the only one that will work with all entities and multipoly allows multiple unconnected polygons to be fillable as if all were one object. (Square Fill for Dungeon Floors of several rooms and Map Grids for land and offshore islands are two examples.) Use the following guidelines when defining a multipoly.

- Include only 0 line width entities when defining a multipoly. The purpose of a multipoly is to create fillable shapes, and only 0 line width entities are fillable.
- The current properties will be the defined multipoly attributes regardless of the individual Entity attributes used to define the multipoly.
- If you define a multipoly with the Hollow fill style, you will need to have the 'Outlined' box checked in the Fill Style Dialog to allow the multipoly to be visible.
- All entities will revert to their original attributes when the multipoly is exploded, regardless what changes were made to the multipoly after it was defined. This is the reason you do not want to Move or Copy a multipoly to different layers.
- All entities must be joined together for each complete polygon, with no gaps or overlaps, before you define the multipoly. Failure to do this will cause the fill to leak out. Use **Endpoint** or enable Attach Mode set to endpoint to connect the different entities that will be used in the definition of the multipoly.
- If the entities are already drawn, use **Node Edit** to move the endpoint of one entity and connect it to the endpoint of another using the **Endpoint**. Alternatively, **Trim to Intersection** will work with most entities to create a precision connection.
- Don't use smoothed entities that have been trimmed when defining a multipoly. If you must trim a smooth entity, use **Edit**, change the Smoothing setting to No Smoothing, trim, and then use Edit to change the Entity to the desired Smoothing before defining the multipoly.
- Entities in a multipoly and the multipoly itself should all be on the same layer. A multipoly should not be defined on the MERGE Layer, as this is used for defining bitmap symbols (see *Bitmap, creating symbols from* in the Help index)

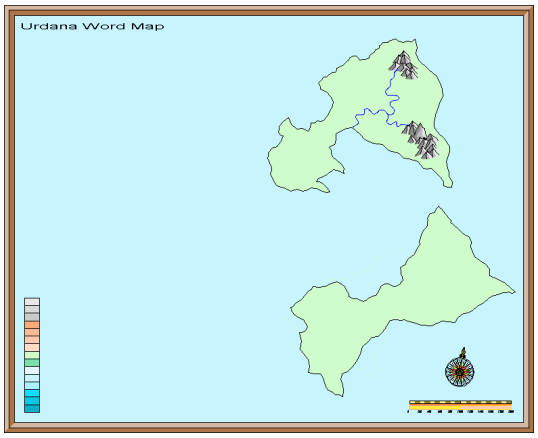
- Do not use **Outline** on a defined multipoly. It is the same as making a copy of the multipoly. Copy the multipoly, use **Explode** on it, change the color to black and use the entities as the outline.

From small scale map to a large scale map

If you have decided to map your world from the top down, you should start by creating an overview map showing only major detail, such as mountain ranges and the greatest rivers. This section shows you how to take an area of the map and create a new larger-scale map from it.

1 **Open** World scale.fcw from CC2 Pro's Tutorial folder.

You see an early map of a new campaign world.



2 Click Edit menu >> Copy. Select the top landmass.

The prompt reads Clipboard origin[0,0] CC2 Pro wants to know the bottom left corner of the clipboard area. This will be the lower left point of the new map you want to make.

3 Look at the tracking indicator and move the mouse until it reads about 6600,4500 then click.

The section you have cropped is about 2000x1600 – use Info menu >> Distance to check this if you like.

Pasting into a new template

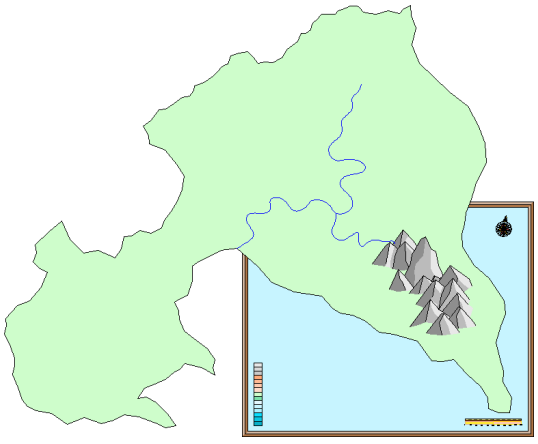
Now that you've got your map section, you'll need to start a blank map into which you can paste the continent.

1 Click **New**, the click 2000 x 1600 (Sea Background).fct.

2 Right-click **Copy**, click Paste (non-visual). Keep the scale at 1 and the rotation at 0.

The prompt reads `Insert at:`

You use non-visual paste because it fixes the scale and rotation angle exactly, ensuring you don't accidentally change anything.



3 Type **0,0** (the lower left corner of the map)

The landmass is pasted into the drawing.

Cropping the land

When you copy a section of one map into another, the copy often needs cropping to the new map's border. This illustration shows a landmass that has been copied down from a larger map. The coast and rivers also need cropping.

The land consists of two polygons, an outline and a solid filled one. You could edit them using **Insert Node**, **Delete Node** and **Node Edit** but, for this many nodes, doing them one by one is not very efficient.

Polygons and paths are very closely related. In fact, a polygon is simply a closed path. Knowing this, you can easily put CC2 Pro's trim commands to use on polygons.

If you make errors following this example, use **Undo** to fix them.

1 Open Map 16.fcw from the Tutorials folder.

The continent has been pasted in from a world-scale map. The land needs cropping to the map border, but the first thing to do is get rid of the black coast outline. We want to edit one entity, not two!

2 **Erase** the coast outline, selecting it by clicking its edge (which gets the green coast as well) ▸ And (Both) ▸ Color ▸ 0 (black) ▸ **Do It**.

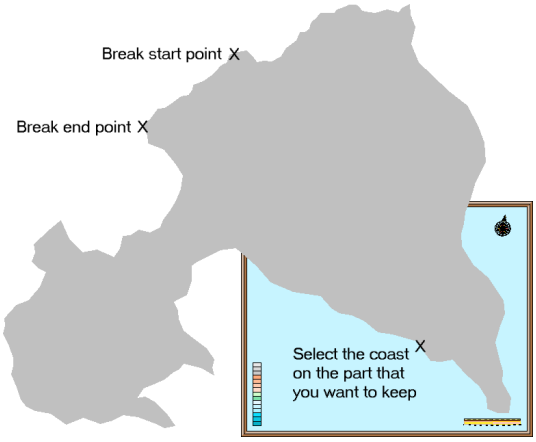
You are left with only the green landmass to edit. Now to convert it to a path…

3 Click **Break**.

The Command Line reads `Entity to break:.`

4 Click the land on the part that you want to keep.

The Command Line reads `Break starts at point:.`



5 Click the start and end points approximately as shown.

The land is broken, becoming a light green path. CC2 Pro knew which section to keep from where you clicked to select the land.

Before trimming the path to the border, let's change its color to one that's easy to see against the blue.

6 Change Color, selecting by Prior then Do It, to black.

7 Click **Trim**.

The Command Line reads `Entity to trim:.`

8 Click the land path on the part that you want to keep.

The Command Line reads `Trim to point [pick point]:.`

9 Click **Intersection** to pick the trim point.

The Command Line reads `Intersection or 1st entity:.`

10 For the 1st entity, click on the coastline.

The Command Line reads `2nd entity:.`

11 Click the inside edge of the north map border.

The path is trimmed to its intersection with the border.

> CC2 Pro can usually find the intersection you want from a single click over it, which is why the first Command prompt is `Intersection or 1st entity:.`
>
> However, in some cases the site of the intersection can be confused by other entities in the same place, so you have to separately pick the two entities that intersect. This is the case with this intersection.
>
> If you click on top of the intersection, the first entity CC2 Pro finds is the brown border polygon and the second is the black internal edge of the border. These entities are parallel so CC2 Pro fails to find an intersection.

12 **Trim** the coastline to where it crosses the west border.

As before, to select the intersection explicitly pick the coastline, then the border (doing it the other way round doesn't work, because the first click is over two entities).

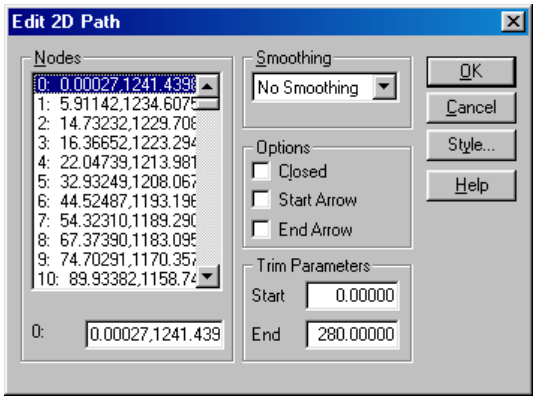
The coastline is now cropped to the border.

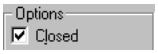
13 **Fractalize** the coastline to add detail.

I suggest a Depth of **3** and Strength of **30**.

14 Click **Edit**, then click the coastline.

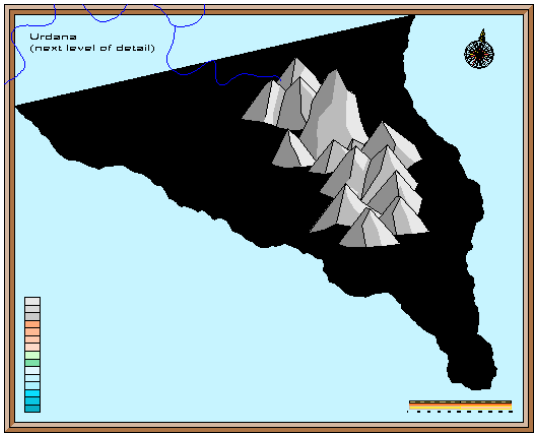
You see the Edit dialog box. The Edit dialog box varies depending on what entity type you are editing.



15 Click to enable the **Closed** setting 

then click **OK**.

The path is now closed, making it a polygon and allowing its solid fill style to apply. Now we need to add a node in the corner.



16 Use **Insert Node** to add a corner node in the straight edge. Use the **Endpoint** modifier to locate the new node in the map corner.

The coastline has been cropped to the border.

17 Change Color, selecting by Prior then Do It, to color **110**.

18 Use **Outline in Black** to draw the black coastline. Redraw to see the changes.

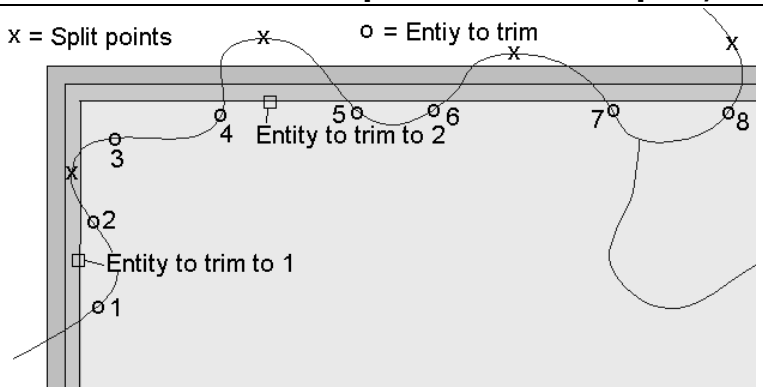
Cropping the rivers and roads

This example only has rivers. If you had roads, you would treat them in exactly the same way.

It is debatable whether it is better to draw over the existing rivers and roads with greater detail, use fractalize or to crop the existing ones and edit them to add detail.

For the sake of practice, we'll crop the existing rivers.

Continued from previous example…



19 Use **Split** to divide the river into separate entities. Click on the split points shown in the diagram.

20 Click **Trim to Entity** then select the point marked **Entity to trim to 1** in the diagram. Click points 1, 2 and 3 to trim the rivers to the west border.

21 Right click to cancel, left click to repeat. Click the **Entity to trim to 2** point in the diagram. Click points 4 to 8 in the diagram.

What's next

After you cropped the edges you need to resize the symbols, and add an outline to your continent.

22 Click Symbols menu >> Scale Symbols in map. Select all the mountains, Do It.

23 The original map was about 5 times taller than this section, so type in 0.2 – a scale of 20% current size.

Adding detail

You've now got the basis for your small-scale map. At this stage, you can add more detailed river and road netweorks, fill in the gaps between the mountains, add forests and new communities. Then you can take a section of this map in just the same way and create an even smaller scale map.

Construction Lines

Construction lines are temporary lines you to help with the placement of symbols or as guides for a complex group of entities such as city walls and roads or text around a curve. Before you start placing symbols for mountains or forests it sometimes useful to use construction lines to indicate the direction and range of those terrain features. A single line can be used to indicate the ridge line of a mountain range or a simple polygon can set the range for a forest. When these symbols have been placed, you can erase the construction lines.

24 Add a layer named **Construction Line** and make it the current layer.

25 Draw paths in a little-used color to represent the ridge-line for each mountain range.

26 Place the desired symbols to represent the mountains and foothills. Keep the line representing the ridge running along the center of your symbol groups.

When you are done placing the symbols you can remove the construction lines selecting by Layer. The same method can be used for various entities and the use of polygons will help with the placement of forests, swamps, and other groups of entities.

If you keep one construction line in the drawing, you can use Draw Like (see page 46) from the **Like** LIKE popup menu to make more without having to change settings

IMPORT, EXPORT AND INSERT

CC2 Pro allows you to import and insert wide variety of vector based file formats and export to even more. CC2 Pro can't convert raster (pixellated) images for import, but you can place such images in your drawings. Pixellated

Using bitmaps or scans in drawings

CC2 Pro maps can include bitmap images, such as scans, clipart or pictures downloaded from the web. The image can either be permanent fixtures in the drawing or, more likely, a temporary entity to trace over. The bitmaps can be included in the CC2 Pro file, or kept in their original files.

Inserting a bitmap picture

In this example, we will insert a hand drawn painted image of some mountains to be traced over and converted to a symbol. Before inserting the bitmap, we will select an overland mapping template and insert a mountain symbol so we can correctly size the inserted bitmap.

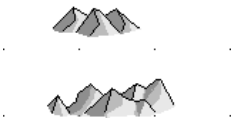
1 If the original image is not a Windows .BMP bitmap, open it in a paint program such as Jasc's *Paint Shop Pro* and, using Save As, convert it to Windows .BMP format.

> If you don't already have a paint program (sometimes called a photo editor), shareware versions are often included on the cover disc of PC magazines. Alternatively, you can download shareware software from the web. For *Paint Shop Pro* go to www.jasc.com.

2 Click **New** to start a fresh map based on a 1000 x 800 mile template.

3 Click File menu >> Save As and give the map a name in the Tutorials folder.
If you don't, the picture won't display until the map is reloaded.

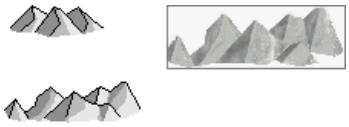
4 Click **Mountains** button and insert two or three mountain symbols in the map.



5 Select Edit menu >> Insert File. Use the following options.
- ✓ Click Embed in Drawing
- ✓ Unclick Outline Bitmap.

6 Select Mountains.bmp from CC2 Pro's tutorial folder.

7 Place opposite corners of a box, nearly the same size as the symbol mountain range. Disable Snap to place the corners freely.



The picture retains the aspect ratio of the original bitmap, but you can force it to distort by pressing SHIFT.

8 The picture size will probably be slightly wrong. Use **Move** on the Prior selection to let you visually resize the picture. Just press 2 while moving the mouse.

9 You can now zoom in and trace over the scanned mountains.

Tracing over a scanned map

Before inserting the scanned map you need to decide or know the real world dimensions of the scanned area and select an appropriate template.

Earth, for example has an equatorial circumference of approximately 25,000 miles. To insert a scanned worldview of Earth you must therefore start with a map measuring at least 25,000 miles east-west.

The example bitmap we will use was taken from Fractal Terrains – created by ProFantasy, capable of building complete, fractally generated landmasses. For argument sake, I am saying the circumference of the random world is 9,830 miles. A small but dense planet.

1 Click **New** to start a fresh map based on a 10000 x 8000 mile template.
This template is large enough to fit the whole random world.

2 Save it with the name **Random** in the CC2 Pro Tutorials folder.

3 Click the Layer indicator, add a new layer **BITMAP** and make it the current layer.

4 Select Edit menu >> Insert File and select Random.bmp from CC2 Pro's Tutorial folder. Use the following options.

- ✓ Unclick Embed in Drawing
- ✓ Click Relative Path
- ✓ Unclick Outline Bitmap.

The Command Line reads `1st corner:`.

5 Type **0,0** then press ¶ .

The Command Line reads `Opposite corner:`.

> At this point you could just click a new point. CC2 maintains the aspect ratio (shape) of the bitmap. Press 3 if you want to distort the bitmap. In this example, we want the bitmap to be an exact size.

6 Type **1,4838** then press ¶ .

The bitmap image of the planet is inserted.

> The source bitmap is 1150 x 566 pixels. A little calculation reveals that if 1150 scales up to 9830 then 566 scales up to 4838. There is, however, no need to work this out. Just get the Y-coordinate correct – CC2 ignores the X-coordinate.

7 You can now trace over the map as normal. When you're done, either hide or delete the BITMAP layer.

When you insert your hand drawn campaign maps, be sure to use the correct sized template, and scale the maps to right size.

Inserting other files into CC2 Pro

In addition to bitmaps, you can also place text files, CC2 Pro files, and AutoCAD DWG and DXF into CC2 Pro. Here is a summary of all the options.

Files of Type

Insertable Files: Shows all files of a type that can be inserted.

CC2 Pro FCW or **FCT Drawing:** Inserts a CC2 Pro drawing. When you have selected your drawing, click an insertion point. Click more insertion points to continue adding files, or right click. See the Command Prompt for scaling and rotation options. Inserted files can be treated as single entities (grouped) or as a set of new entities. Click Tools menu >> Options >> FCW, FSC, FCT to change this setting.

CC2 Pro FSC Symbol Catalog: Insert all the symbol definitions from the selected file, letting you know how many definitions have been added. Click **Symbol Manager** on the **Symbol** menu to see the symbols now in the current drawing.

AutoCAD DWG or **AutoCAD DXF file:** Inserts an vector AutoCAD file. When you have selected your drawing, click an insertion point. Click more insertion points to continue adding files, or right click. Look at the `Prompt` for scaling and rotation options.

BMP Bitmap Inserts a bitmap image, perhaps one you have scanned, into the drawing. After you have selected the bitmap, click a corner for the bitmap. The cursor locks to the ratio of the bitmap you are inserting: press SHIFT if you do not want to maintain the image's aspect ratio.

TXT Text File Inserts a text file. Click an insertion point. The test will have the current text properties. Large text files may be truncated.

Embed in drawing: If this option is set, the file you are inserting will become part of the current drawing. You can edit it just as you can any other entities. If the option is not set, the file is inserted as a reference – you need to open the file that is referenced in order to change its appearance.

Relative path: If you are not using the **embed in drawing** option, **Relative path** ensures that your drawings are portable to other computers. The inserted file is referred to by its position relative to the current file. We recommend you keep bitmaps and other reference files in the same folder as the map into which they are inserted, and use the relative path option.

Outline Bitmaps: Select this option if you would like a visible outline on inserted bitmaps

Importing into CC2 Pro

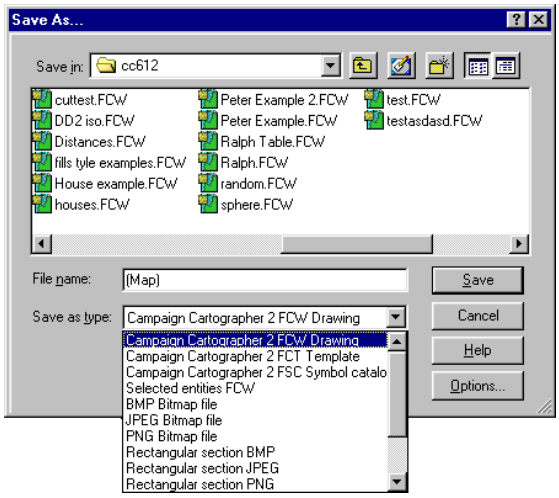
CC2 Pro lets you import AutoCAD DWG or AutoCAD DXF files and CC-DOS files. Click File menu >> Open and click Files of Type to choose a file type. Files imported from AutoCAD will need some work changing colors, fill styles and line styles before they look right. If you find that shapes won't fill, use Path to Poly from the Explode right click popup menu to make them fillable shapes first.

Exporting maps from CC2 Pro

CC2 Pro can also export pictures in a variety of formats. The most popular is as a bitmap, which can be pasted into documents or published on the web. You can also save maps in DXF and DWG vector files, although these file formats do not support all CC2 Pro entity types.

Save As...

The Save as type list on the Save As dialog box lets you save the whole map in a number of file formats. Each has options which you can access from the **Options** button on the dialog box, or by Tools menu >> Options.



Campaign Cartographer 2 FCW Drawing is CC2 Pro's standard file format. FCW files contain information such as fill styles, line styles, layers, views and symbol definitions. They can be save in a compressed or uncompressed format. We recommend compressed unless you have a slow computer.

Campaign Cartographer 2 FCT Template is the same as an FCW file except you can only use SAVE AS to create an FCT (template) file. If you want to add new fill styles and line styles to your drawings, it is best to add them to templates. Templates are what CC2 Pro looks for when you click **New** .

Campaign Cartographer 2 Symbol Catalog files same as an FCW file, but they are used to store symbol definitions. It is these files you select from when you use the Catalog… button or Symbol Settings . By convention, these are given a forest green (color 13) background and saved with the main window minimized.

Selected Entities FCW This lets you save entities in the current drawing to a new CC2 Pro file. For example you could save all the continents from your world map to separate files, ready to be inserted into a new map. When you've chosen a file name selected OK, CC2 Pro will ask you to select entities and a lower left corner for the file.

BMP Bitmap file is a Windows bitmap file. Bitmap files are measured in pixels across and up. Options are width and height in pixels, color depth (24 bit or 8 bit) and **Unused Area**:

- If you select **Normal**, the final image will be exactly the same width and height as the bitmap size. Any additional entities in the map will be added to the final image.
- If you select **Crop** the final image size will have the same ratio as the selected entities or map. The image will have a lower height or width.
- If you select **Blank** the final image will be exactly the same width and height as the bitmap size. Any area outside the selected entities will be blanked out.

JPEG file saves your file as a raster-based bitmap file, ready for the web. JPEG files are small, but lose definition. Options are width and height, **Unused Area** and **Quality**. **Quality** controls the appearance and size of the JPEG. Lower quality JPEGs open more quickly and have a smaller file size, but have less data. If **Progressive** is ticked, the image will open with increasing resolution in a web browser, rather than all at once.

PNG file saves your file as a raster-based bitmap file, ready for the web. The options are width and height in pixels, compression (fast loading versus small file) and **Unused Area**.

Rectangular Sections (bitmap, PNG and JPG) let you export a rectangle of your map at any resolution into a raster based file format. The options are the same as for saving the entire drawing. When you've selected a file name, click two points forming a rectangle to export the file

Enhanced Metafile EMF is a Windows enhanced metafile. Options are X and Y size, and Paint Background color. We recommend a large width and height for better resolution. A good option to import vector data into Microsoft Word®

AutoCAD DXF files are the standard way of exchanging vector information. CC2 Pro can export or import these files up to version 14.

AutoCAD DWG files are AutoCAD®'s native file format. Version 14 is supported.

All text in drawing lets you export all text labels in the drawing. The options allow you to control the ordering of the text file.

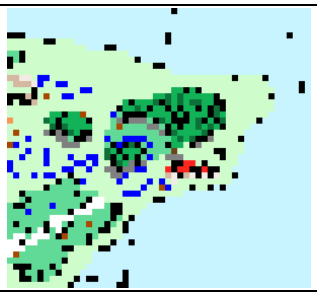
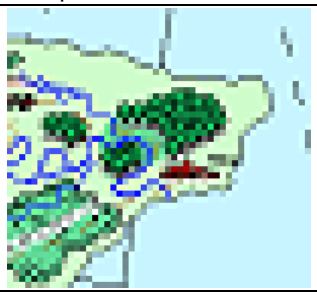
Saving whole maps as bitmaps for the Internet

Internet browsers recognize GIF and JPG files formats. Most now recognize PNG file format. A useful technique to give very good image quality is to create images at greater than the desired size, then use a paint program to *resample* it (reduce its size). The resample process smoothes out rough edges, giving a very clean image and fine detail.

® AutoCAD is a registered trademark of Autodesk, Inc.

® AutoCAD is a registered trademark of Autodesk, Inc.

Resample and resize are two different methods for changing an image's size. Good paint programs, such as Paint Shop Pro®, (http://www.jasc.com) have separate tools for each method, and the results are very different.

The difference between Resize and Resample:	
	
Resized to half size the paint program simply misses out every 2nd pixel. Much of the detail is now missing.	**Resampled** to half size, the paint program blends between the kept and missed pixel, giving a superior image.

Let's say you want a 640 by 480 image for the web.

1 Select File menu >> Save As.

2 Select BMP Bitmap File from the Save as type list box.

3 Click **Options** and type 800 in the **Horizontal Pixels** and 600 in the **Vertical Pixels**. Select **24-bit** color depth.

4 Select a suitable directory and name, click **OK**.

The bitmap is saved with the size and color options you chose. Those options remain default until you change them.

5 Open the same bitmap in a paint program, perform any cropping, then resample it to 640 by 480. Use Save As to save it as a type supported on the Internet, such as GIF or JPG, or PNG.

In Paint Shop Pro you can get even better results by sharpening the resampled image.

Exporting and Importing with the clipboard

CC2 Pro stores clipboard information in three formats. When you paste the information, the application you are pasting into will choose the format it understands. For example, if you paste into another CC2 Pro map, it will paste as normal CC2 Pro entities; if you paste into Microsoft Paint, it will appear as a bitmap.

Exporting from CC2 Pro

You can use the clipboard to copy selected entities to other applications.

1 Press ² C. Select the entities you want to appear in the image.

Remember, entities on frozen layers will not be selected.

2 Open the application you want to paste the bitmap into. Press ² V (or select Paste from the application's Edit menu).

If the application supports bitmaps, you will see the entities you selected. The resolution is the bitmap is set from Tools menu >> Options.

It is likely that you will need to crop the image.

Importing into CC2 Pro using the clipboard

Use ² V or click Edit menu >> Paste to insert entities from the Windows clipboard.

CC2 Pro entities from other drawings are pasted into the current drawing just as you might expect. If you have Tools menu >> Options >> FCW, FSC, FCT >> Group Files on Insertion ticked, the pasted entities will be treated as a single entity, until you ungroup them with Tools menu >> Groups >> Ungroup.

Text from other applications is inserted with the current text properties. Very large chunks of text will be truncated.

Bitmaps are inserted as a bitmap embedded into the drawing, just as if you had inserted a bitmap file. Choose two points to define the extents of the bitmap. The bitmaps aspect ratio is maintained unless you press ³ while selecting the second point.

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Linking files and maps together

Maps can contain any number of hotspots which, when clicked on, perform an action such as opening another file. There is no limit to how many hotspots a map can have, nor to what types of file you can link – so long as a file type is recognized by Windows®, CC2 Pro can open it. If a hotspot links to another file as opposed to performing CC2 Pro commands, we call it a hyperlink.

As your campaign atlas grows, link each map with its neighbors and any larger or smaller scale maps of the same area. This way you can navigate your entire world without ever having to remember a file name.

Hyperlinks are usually invisible, so it is helpful to somehow mark where they are. You can use a convention such as a red dot on cities that are linked, a different font or capitalization, or mark the location with a symbol. The Links symbol catalog in CC2 Pro's Symbols\Other folder contains a suitable selection.

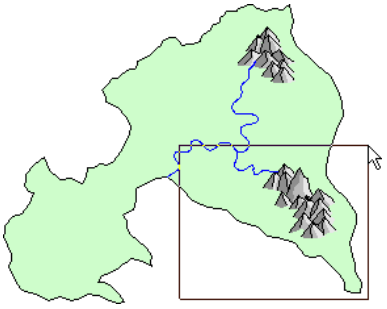
Linking maps to other maps

1 **Open** World scale.fcw from CC2 Pro's Tutorial folder.
You see an early map of a new campaign world.

2 On the **File** toolbar, click **Link with Map**.
You see the Select File dialog box.

3 Select Map 17.fcw from the Tutorial folder, then click **OK**.
The Command Line reads `Hotspot window:`.

4 Click opposite corners of a window around the southeast corner of the northern continent.



The hyperlink window is drawn. Under the window is the hotspot command text `LOADM $continent smoothed.FCW;`
The window and command text are visible because when you add a hotspot all hotspots are shown (at the next redraw), so they can be edited.

Because hyperlinks are usually hidden, it's a good idea to mark areas where you have them.

5 Click the Layer indicator, and add a new layer called **`Map Links`**. Set it current.
You can hide this layer later for printing.

6 Set the color to purple (7) and the fill style to Hollow.

7 Click **Box** then click points on opposite corners of the hyperlink box.

8 Select View menu >> Hide Hyperlinks.
The hotspots are hidden.

9 Move the cursor over the hotspot area.
When the cursor is over the area it becomes a pointing finger.

10 Click over the hyperlinked area.
CC2 Pro is about to load another map, so it asks if you want to save the changes. I suggest you do.
The new map loads. You can now get to this map from the other, simply by clicking over the hotspot.

Add a parent link

Finally, we recommend that you link this child map back to its parent. A link over the compass rose is a good way to do this – and you don't need to mark where it is, either.

11 Click **Link with Map**. Select World Scale.fcw from the Tutorial folder, then click **OK**.

12 Click points to enclose the center of the compass rose. Save the map.

13 Click the compass rose to take you back to the parent map.

Linking maps to other Windows® documents

Continued from previous tutorial…

14 From the **File** toolbar, click **Link with File** .

You see the Select File dialog box allowing you to pick the file from anywhere on your system.

15 Select Urdana.txt from CC2 Pro's Tutorial folder.

The Command Line reads `Hotspot window:`.

16 Click opposite corners of a window around the map title.

17 Select View menu >> Hide Hyperlinks.

The hotspots are hidden.

18 Move the cursor over the new hotspot area and click.

The text file opens. This file could just have easily been a spreadsheet, word-processor document, Internet html document, sound file or any other registered file type.

If the Windows can not view the file type, clicking the hotspot will have no action. If you want to learn how to associate a program with a file type see "associating file types with programs" in the Windows help index.

Other types of hotspot

What a hotspot does is defined by the command text you see below the hotspot window. When you add a link to another file, CC2 Pro creates the hotspot text automatically. To perform other actions you need to use Tools menu >> Macros >> Make Hotspot and create the command text yourself.

In brief, the hotspot text is exactly what you would type at the Command Line to achieve the result you want. For example, if you typed **`NOTES;`** `in the Hotspot box, the hotspot would show the MAP NOTES dialog box. You can add any of the text equivalents of the commands listed in the Macro Command reference.`

Creating hotspot macros is a hefty subject, covered extensively in CC2 Pro's help file.

Editing hotspot links

19 Select View menu >> Show Hyperlinks.

This lets you see the hotspots so you can edit them.

20 Click **Edit** and select the edge of a hotspot window.

You see the Edit dialog box containing the command text that the hotspot executes.

21 Change the text as required.

To make links portable between different computers, which may have CC2 Pro installed in different folders, link text can include the following special characters:

#	means the folder where CC2 Pro is installed.
$	means the folder where the current map is located.

The command text `LOADM $continent smoothed.FCW;` means

`LOADM`	=	CC2 Pro text equivalent of Load map
`$`	=	The same folder as the current map
`Continent smoothed.fcw`	=	The file to load.

Copyright issues

You retain the copyright in all maps you create. You may freely distribute any maps you create, with the following proviso – you may not release maps which, in our opinion, are for the purpose of redistributing CC2's symbols. Think of your maps as documents, and our symbols as fonts. You can print a document containing Times New Roman font, but you can't give the font file away, or produce a "font book."

AN INTRODUCTION TO MACROS

Do you ever find yourself performing the same commands, over and over again? I do. When I'm creating a new drawing, I like to sketch out the general shapes first, setting up the basic layout of my drawing. I do this with width 0 black lines, on a layer called **Temporary**. As the drawing progresses, I am constantly going back to these shapes, editing, adding and deleting. I use the shapes as a guide for the final polished drawing.

However, every time I want to make some additions to my sketches, there are a number of things I have to do first: set the active drawing color to black, set line width to 0, set line style to **Solid**, set fill style to **Hollow**, and set the layer to **Temporary**. This can seriously slow down the drawing process! What I need is a short cut; one command that would do these five things for me. What I need is a macro. (Discerning readers may remember that the **Keep** button allows you to extract properties from an existing entity, but in some cases this macro will be quicker.)

A macro is simply a collection of commands. Since every CC2 command has a text, command line equivalent, CC2 macros are nothing more complicated than lines of text. Each line starts with a command, and is followed by the information that is required by that particular command. Macros are not very complicated to make, and can be of enormous help in eliminating repetitious sequences of commands. In essence, macros are custom commands, tailor made for you!

How to make a macro

I have often found that the best way to learn is by example. So, using the situation I described above, let's go though the process of solving this problem with a new macro.

First of all, you need to know where the macros are kept. CC2 stores all its macros in a single text file, fcw32.mac in the CC2 folder. If you want your macros to be available to you all the time, this is where they need to go. However, you can make our own macro file to store your macros in while you are testing them; it's a good idea not to mess around with the fcw32.mac file until your macros are working flawlessly. All you need is a text editor like Notepad: create a new text file called mymacros.mac, save it in the CC2 folder and start editing.

Once you have your macro file open, start typing! Begin with `MACRO MyMacro`. This marks the start of your macro, and it also gives your macro a name you can type at the prompt. Now, we start adding commands.

Macro equivalents of CC2 Pro commands

At this point, you may ask, "well, yes, but how do I know what commands I need?" Admittedly, most of us use the buttons or the menu options in CC2, but it is possible to type the command at the Command Prompt to do the same tasks. Each menu command has a text equivalent you can type. A complete list of commands is found in *Command Reference* on page *102*. If the command you seek cannot be used in a macro, check *Macro Command Reference* on page *116*, or look in the Help index. You can also try this trick: while in CC2, trigger the command you want to use via the buttons, or the menus. When the command is done, take a look down there on the command line; you will see that sitting there, in brackets, the text equivalent of the command you just used. This works for most of the drawing commands (LINE and POLY, etc.) but not on the clicks on the Status bar.

So now we should know what commands we need. Let's see: we want to change the current color (that would be the `COLOR` command). Then, we want to change the current line width (that's `LWIDTH`). Next, we change the current line style (`LSTYLE`) and the current fill style (`FSTYLE`). Finally we need to change the current layer (that's right: you guessed it: `LAYER`). Now all we have to do is throw those commands into the text file, save it up, and we're done, right? Well not quite...

Each of these commands needs some information to complete it. Figuring out what information is required is fairly straightforward too. You can check the Help file, the Macro Command Reference, or you can try another trick. Again from CC2 Pro, type your command into the command line, then press the SPACE bar. CC2 will actually tell you what it needs next at the prompt. Just keep typing info (don't use the mouse), using spaces to separate your values if more than one piece of information is required. Be sure to pay close attention to every keystroke you use, because this is exactly what we are going to type into the macro.

OK, now we have data to go along with our commands. Change active color to black (0 is the numeric value equivalent), change line width to 0, change the line style to **Solid** and the fill style to **Hollow**. The layer will be changed to **Temporary**. You can throw this into the macro now:

```
MACRO MyMacro
COLOR 0
LWIDTH 0
LSTYLE Solid
FSTYLE Hollow
LAYER Temporary
ENDM
```

Note that we finish off the macro with the `ENDM` command. Also, make sure you leave a couple blank lines after this `ENDM` command; don't ask me why, CC2 just likes that.

That's it. Save the file, and click Tools menu >> Macros >> Load Macros... Select your file, and click Open. Now, in CC2, change the color, line width, layer etc. to other values, just as if you had been drawing a bunch of other stuff. Now, let's test the macro: type **mymacro** at the prompt, and hit ¶ . As if by magic, your drawing settings should change! Aren't macros grand?

Add your macros to CC2 Pro's standard macros

When you are happy that your macros are working, simply copy them from your macro file, and paste them into the beginning of fcw32.mac using a text editor. Save the file. When you start CC2 Pro, the new macros will be ready to use.

An advanced macro example

One of the most useful ways to learn about macros is to analyze what others have done. Here, presented for you, is a working macro with each line described in detail. The macro is called STAIRCASE, and it draws a rudimentary staircase, following the contours of an object that the user selects. You'll need to understand very basic programming concepts to get this macro. It also uses a few concepts described only in the Help index:

- The Percent modifier – snaps a point to a percentage along an entity.
- Relative Polar coordinates – sets a point at a specified angle and distance from the current reference point.
- The Reference Point modifier – sets the reference point.

The macro has four sections, each with its own distinct purpose. We'll start by defining those sections, which will give an overview of how the macro generally works. Then, we'll look at each line of the macro, one by one.

You can find this macro in the file test.mac in the Tutorials folder.

First, here's the macro, divided into its four logical sections:

```
--------------------Section 1--------------------------
MACRO STAIRCASE
ECOFF
SELSAVE
LWIDTH 0;LSTYLE solid;FSTYLE solid
GV varStepWidth 10
GV varStepWidth ^DEnter the stairway width: (10)
GV varStepDepth 1
GV varStepDepth ^DEnter the step spacing (1):
GE varEntity ^DSelect object to draw the staircase along:
IFERR MacroDone
--------------------Section 2--------------------------
GLEN varEntityLen varEntity
GN varStepNum varEntityLen/varStepDepth
GV varUnit 100/varStepNum
GV varCurStep 0
GP varP1 % 0 varEntity
GBRNG varB1 varP1 % .01 varEntity
LINE ref varP1 <varB1+90,(varStepWidth/2) ref varP1 <varB1-90,(varStepWidth/2);
--------------------Section 3--------------------------
:Loop
GV varCurStep varCurStep+1
GP varP1 % (varCurStep*varUnit) varEntity
GBRNG varB1 varP1 % (varCurStep*varUnit)-.01 varEntity
LINE ref varP1 <varB1-90,(varStepWidth/2) ref varP1 <varB1+90,(varStepWidth/2);
IFP varStepNum-varCurStep Loop
--------------------Section 4----------------------------
SELBYP
OFFSETCPY (varStepWidth/2) varEntity ref varP1 <varB1+90,1
OFFSETCPY (varStepWidth/2) varEntity ref varP1 <varB1-90,1
:MacroDone
SELREST
ECON
ENDM
```

Section 1

The macro starts by setting up the necessary drawing settings, and prompting the user for required information. The user provides values for the staircase width, and the step depth. The user also picks an entity to use as a guide, to draw the stairs along.

Section 2

Calculations are made on the data that was provided by the user. Here, the macro determines other values that it will need, and it draws the first stair step.

Section 3

This section is looped; each stair step is drawn in turn. Once all the steps are drawn, the loop quits, and the macro continues.

Section 4

The final elements of the staircase are drawn, and the macro cleans up a few CC2 configuration changes it made.

Line by Line Macro Deconstruction

`MACRO STAIRCASE`

All macros start with a 'MACRO' statement. This defines the name of the macro, and the start of the macro code. Be sure to use a name CC2 Pro doesn't already use, or your command will replace it!

`ECOFF`

This turns off the command line 'echo'; in other words, you won't see all the commands of the macro flashing by on the command line as you run the macro. This makes the macro run cleaner and faster, but if the macro fails halfway through, you will have to manually enter the 'ECON' command to start seeing what you type at the command line. You should add this line only after you have tested your macro.

`SELSAVE`

Save the current selection method for CC2 (see Tools menu >> Options). We will be changing the select mode in this macro, so we use this command to save the user's current setting first. We can restore it at the end of the macro.

`LWIDTH 0;LSTYLE solid;FSTYLE solid`

Set up the drawing properties to use in this macro. Line width of 0, line style of **Solid**, and a fill style of **Solid**. Macro commands are usually separated by new lines (ie one command per line), but you can also separate many commands by a semicolon.

`GV varStepWidth 10`

Here, we define a real variable `varStepWidth`. By giving this variable a starting value, we assure that the variable will have a value, even if the user fails to give it one in the following line. Notice that all the variables in this macro start with the characters **`var`**. This is not a requirement; indeed, your variables can be call just about anything, as long as they do not conflict with any command names, or contain restricted characters. However, this practice helps to identify variables amongst the other code, and also helps to ensure that your variable names are unique.

`GV varStepWidth ^DEnter the stairway width[10]:`

Prompt the user for a value for the `varStepWidth` variable. This variable hold the value for the overall width of the staircase.

The `GV` command requires two pieces of input: first the variable name to be assigned, and second, the value. In the previous macro line, we assigned the variable a fixed value of 10. In this line, we prompt the user to enter a value by using the '^D' command. This allows the user to enter a value at the CC2 Pro prompt. Note that all the text that follows the '^D', up until the first line break, is passed to the prompt. In this case, the prompt text is Enter the stairway width: [10]. The 10 in brackets just lets the user know that a default value of 10 will be used if they choose not to enter any data by right-clicking or hitting 'enter'.

`GV varStepDepth 1`

As with the previous variable, we define a default value.

`GV varStepDepth ^DEnter the step spacing[1]:`

The `varStepDepth` variable defines the desired distance between steps. The actual distance used in the macro will be slightly different, because we will modify this value so that a whole number of steps will be drawn so that there will be no fraction of a step left at the end of the staircase. This calculation comes later.

`GE varEntity ^DSelect object to draw the staircase along:`

The Get Entity command `GE` gets a point from the user with a selection pick box – it's asking for an entity. In this case, the object that we need is the guide entity that we will use to define the path of the staircase. The macro will draw the stairs along the length of the entity that is selected; A line, smooth path, or arc would be good choices as a guide entity, but it is up to the user to pick an object to use

`IFERR MacroDone`

This line does a bit of error checking. Basically, if the user does not pick an object in the previous line (either by right clicking, or clicking in empty space), CC2 sets an internal error flag. The `IFERR` command checks for this flag. If it finds that a selection error has occurred, the flow of the macro branches to the `MacroDone` label. This mean the macro execution jumps to the line immediately after the given label (see the end of the macro).

Labels in CC2 macros are defined by a unique name; a label in a macro cannot share a name with any other label in the same macro. Every label is on its own line, and starts with a colon (:).

`GLEN varEntityLen varEntity`

This line, and two that follow, contain a series of calculations that determine that actual step depth that will be used, based on the total length of the selected entity. First, the GLEN command gets the overall length of the entity varEntity, and stores it in varEntityLen.

```
GN varStepNum varEntityLen/varStepDepth
```

Now that we know how long the guide entity is, we need to determine the number of steps that will fit along its length. To do this, we divide the total length by the depth of one step, giving us the number of steps that will be needed. Since we don't want any fractions of steps, we need to round this number to the nearest whole number. This is easily achieved by using the Get Number command GN rather than the GV command. This automatically rounds the input value to a whole number by removing anything after the decimal point. We assign this rounded value to the variable varStepNum.

```
GV varUnit 100/varStepNum
```

This step is tricky. Since we will be using the Percent Along modifier to get points along the entity, and since the spacing of these points is defined by a distance, we need to express the step depth as the equivalent percentage of the total length. We do this by dividing the number of percent in a whole length (100) by the number of steps. This gives us a percentage value for one step, assigned to varUnit.

Now, this percentage value is 'equivalent' to the user defined step width value, but certainly not equal. Remember, we have rounded off the number of steps so as to avoid any fractions, so this new distance for step widths will be slightly modified, but still fairly close.

```
GV varCurStep 0
```

Set up a counter variable. This will keep track of how many times we have gone through the loop.

```
GP varP1 % 0 varEntity
```

Get the first drawing point. This will be where the first step LINE will be drawn, and is at the 0% mark of the guide entity.

GP asks for two pieces of input: the variable to be assigned (varP1) and the point to assign (% 0 varEntity, or 0% along the entity stored in varEntity.

```
GBRNG varB1 varP1 % .01 varEntity
```

Now we set up to draw the first step line. First, we need an angle to draw the line at. This angle should be perpendicular to the entity, but since this entity could be curved, we should say that the angle must be perpendicular to the entity **at the point the LINE will intersect**. We can approximate this by getting the angle from 0% along the entity varP1 to .01% (% .01 varEntity); a very short distance, but enough to give us an angle.

We draw this first line while we are outside of the loop because of the way we obtain angles inside the loop: by getting a point just before the current point. This technique would not work for the first point (0%) because there can be no point at less than 0%. That's why we get the angle in this line of the macro by getting a point just a little **beyond** our starting point.

```
LINE ref varP1 <varB1+90,(varStepWidth/2) ref varP1 <varB1-90,(varStepWidth/2);
```

Draw a line entity using the LINE command. The LINE command requires a series of points, with a semicolon (;) to finish the LINE. In this line of the macro, we provide the command with two points, using the current point on the entity as a reference. The two points are ref varP1 <varB1+90,(varStepWidth/2) and ref varP1 <varB1-90,(varStepWidth/2). This may look complicated, but it makes sense when you break it down:

ref varP1 <varB1+90,(varStepWidth/2) REF is the reference modifier (see Reference Point in the Help index), this code sets the current reference point to varP1. The second part sets a point at angle (varB1+90) and distance (varStepWidth/2) from the reference point.

varB1 is the angle parallel to the entity, so varB1 plus 90º, is perpendicular to the angle of the entity.

varStepWidth/2 is equal to half of the value of varStepWidth, which is the desired width for the staircase.

Notice that the other point is derived the same way, except we subtract 90 degrees from the angle instead of adding, so that the second point is on the other side of the guide entity.

```
:Loop
```

This line is a label; it marks the start of our loop. **With the lines that follow, remember that each line will not just execute once, but rather multiple times, with certain variables changing for each iteration.**

```
GV varCurStep varCurStep+1
```

This is an example of a variable that will change for each loop iteration. The counter variable varCurStep is incremented by 1, preparing us to draw the next step.

```
GP varP1 % (varCurStep*varUnit) varEntity
```

Get a point on the entity that will be the reference for the current step. `varP1` will hold a point that is a percentage along `varEntity` equal to the percentage of a single step `varUnit` multiplied by the number of steps we have drawn `varCurStep`.

```
GBRNG varB1 varP1 % (varCurStep*varUnit)-.01 varEntity
```

Just like we did for the first line entity before the loop, we get the angle of the guide entity at the point of the reference point. This time, however, we get a second point that is slightly **behind** the reference, rather that ahead. We do this so that when we finally arrive at the last step to be drawn (at 100% of the entity), we do not try to get a point that it 100.01% along the entity.

```
LINE REF varP1 <varB1-90,(varStepWidth/2) REF varP1 <varB1+90,(varStepWidth/2);
```

Draw a line, using the same technique that we used for the first line we drew, before the loop. This time, since the reference angle is derived in the opposite direction (a point before the reference, not after), we **subtract** 90 degrees from the **first** point, rather than the second. This way, all our lines will be drawn the same way, in the same relative direction. In this macro, this does not make much difference, but it is an important lesson to remember for other macros that may be more demanding.

```
IFP varStepNum-varCurStep Loop
```

Here is the end of our loop. The `IFP` statement tests for a positive value. If `varStepNum-varCurStep` is positive (which it would be until the current step number equals the total number of steps), the macro will branch back to the `Loop` label, starting the loop again.

```
SELBYP
```

After drawing all the step LINEs, we just need to draw some edges for the staircase. We do this by creating offset copies of the guide entity. First, this line changes the select by setting to previous, meaning that any time a command needs an entity to act upon, it will automatically use the last entity to have been selected, prior to the command. In this case, the last entity to have been selected is our guide entity.

```
OFFSETCPY (varStepWidth/2) varEntity REF varP1 <varB1+90,1
```

`OFFSETCPY` requires three pieces of input: the distance of the offset, the entity to be copied, and a point that indicated which side of the original entity to copy to. In this case, we provide the command with: `varStepWidth/2` (half of the total width of the staircase), `varEntity` (the guide entity), and `REF varP1 <varB1+90,1` (a point on one side of the entity, using the last value for varP1 (100% along the entity) as a reference, the last value for varB1 plus 90 degrees as an angle, and an arbitrary value of 1 as the distance).

```
OFFSETCPY (varStepWidth/2) varEntity ref varP1 <varB1-90,1
```

Creates another offset copy, this time on the other side of the guide entity.

```
:MacroDone
```

Another label. This one marks a place that the macro can jump to if the user fails to select an entity. See the 10th line of this macro.

```
SELREST
```

This will restore the select by settings that were in place before this macro ran. Otherwise, the user of this macro would find that suddenly, every command that requires an entity (like ERASE, etc) would automatically act upon the last selected entity (such as the last entity to be drawn).

```
ECON
```

Turn on the echo feature of the command line. The macro is over, and now the user will be able to see text that is entered at the command line.

```
ENDM
```

That's it. Were done.

Hints for good macro making

- Every macro must start with the `MACRO` statement, and end with a `ENDM` statement.
- Be sure to separate each macro from its neighbors with a blank line or two.
- Make sure you leave an extra couple blank lines at the end of your macro file.
- Spaces count! Check your macro for double spaces, or spaces at the end of lines. Both are not good.
- If your macro doesn't do what you think it should do, try typing your macro commands one by one into the command line. This way, you can see how CC2 Pro is reacting to your commands.

More information on macro making

The CC2 help file contains plenty of information on the various macro commands available to you. Check out the Alphabetical List of Macro Commands; very useful! There's also a great spreadsheet on the CD in the Documents folder, or available on our website.

On the web, there are many resources that can help; here are two:

CC2-Macro Mailing List: A discussion forum for CC2 macro enthusiasts; beginners and experts alike. This is a great place to ask your macro related questions, and get some friendly advice.

http://groups.yahoo.com/group/CC2-Macros/

CC2 Macro Repository: A collection of macros for CC2, by various authors. Learn from the masters by dissecting and analyzing their macros, or just pick up some cool tools to aid in your drawings.

http://www.greycitadel.com/greycitadel/cc2macros.nsf

COMMAND REFERENCE

This table gives you a list of all CC2 Pro's commands except those used specifically in macros.

- **Command** gives you the command name found on the CC2 Pro's menus, the name that appears when you hover the mouse over a button (tool tip text) or on a right click popup menu. Type the command into CC2 Pro's Help Index or Find list to get more details on the command.
- **Where?** Lets you know which menu, popup menu or toolbar to find the command. CC2 Pro's toolbar layout is shown on page 9. Right click on the button to access a popup menu. For example, a 2-point circle can be accessed by right clicking the **Circle** button on the **Draw** toolbar. **Text Only** means that the command should be typed at the Command prompt.
- The **Text Equivalent** is what you type at the Command prompt to use the command.
- **Use In Macro** If the command is useable in a macro, then **Yes**, otherwise **No**. Note that all commands are useable as the last line in a macro. The next section on page 116 lists macro commands.

Command	Description	Where?	Text Equivalent	Use in Macro
2 Point Circle	2 Point Circle	Draw toolbar, Circle popup	CIR2	Yes
3 Point Circle	3 Point Circle	Draw toolbar, Circle popup	CIR3	Yes
About CC2 Pro…	Display version number	Help menu	VER	No
Add Control Points	Add control point for symbol alignment	Symbols menu	CTRLP	No
Align Grid	Align Grids to selected point	Snaps menu	AGRID	Yes
All Map Drawing Tools	Shows all map drawing tools	Overland menu	DRAWTOOLSM;=MAP*	No
All Map Symbol Settings...	Display all catalog settings for the current style	Overland menu	SYMICONM*	No
All symbols, no layer	Opens the All symbol setting in current style	Overland menu >> Symbol Settings	SYMICONM;All*	No
Angle To	Angle to selected entity	Snaps menu	ANG	Yes
Arc	Add arc of current default type set using Arc…	Draw toolbar	ARCI	No
Arc with arrow	Arc w/ Arrowhead to end	Draw toolbar, Arc popup	ARCA	Yes
Arc with arrow to start	Arc w/ Arrowhead from start	Text only	ARCAS	Yes
Arc with double arrow	Arc with arrowheads at both ends	Draw toolbar, Arc popup	ARCDA	Yes
Arc, Center, Start, End	Center, Start, End Arc	Draw toolbar, Arc popup	ARCS	Yes
Arc, Chained	Same as CARC	Draw toolbar, Arc popup	CARCD	Yes
Arc, Start, Bulge and End	Start, Middle and End Arc	Draw toolbar, Arc popup	ARC3	Yes
Arc, Start, End and Bulge	Start, End and Bulge Arc	Draw toolbar, Arc popup	ARCB	Yes
Arc, Wedge	Wedge (multipoly)	Draw toolbar, Arc popup	ARCW	No
Arc…	Add a chosen arc type, optionally set default for Arc	Draw menu	ARCD	No
Area	Area display, calc	Info menu	AREA	No
Arrow Style	Arrowhead style	Tools menu >> Set Properties	ASTYLE	No
Arrowhead toggle	Toggles arrowhead on selected entity	Text only	AHEAD	Yes
Attach mode	Select Attach mode	Attach button, right click	ATCHMODE	Yes
Attach mode off	Attach mode off	Text only	ATCHOFF	Yes
Attach mode on	Attach mode on	Text only	ATCHON	Yes
Autosave	Set autosave options	File menu	ASAVE	No
Back	Draw selection behind others (send to start of drawing database)	Edit menu >> Entity Order	BACK	Yes
Bearing	Bearing display	Info menu	BEARING	No
Bearing	Same as BEARING	Text only	BRNG	No
Bearing	Snaps cursor a Specific bearing	Snaps menu	BRNG	Yes
Bezier curve	Bezier Curve	Draw menu >> Path…	BEZ	Yes
Body of Water	Display Water area fill drawing tools	Overland menu	DRAWTOOLSM;Map Water*	No
Borders	Display Border area fill drawing tools	Overland menu	DRAWTOOLSM;Map Border*	No
Borders/Political	Opens the Borders symbol setting in current style	Overland menu >> Symbol Settings	SYMICONM;Borders*	No

Command	Description	Where?	Text Equivalent	Use in Macro
Box	Box	Draw menu >> Polygon…	BOX	Yes
Break	Break a gap in entity	Edit menu >> Trims	BREAK	Yes
Bring In Front of	Move selection in display list after selected entity	Edit menu >> Entity Order	ABOVE	Yes
Browse	Browses the current folder	File toolbar, Open popup	BROWSEC	No
Browse Template	Browse for template, use for new drawing	Text only	BROWSET	No
Building (cut-down version)	Cut-down version of CD2 House command for CC2 Pro	File toolbar, CD2 popup	HOUSECC2 Pro	No
Building Options (cut-down version)	Options for cut down CC2 Pro House command	File toolbar, CD2 popup	HOUSECC2 ProOPT	No
Calculate	Calculate expression	Text only	CALC	No
Catalog window off	Turns catalog window off	Text only	CATOFF	Yes
Catalog window on	Turns catalog window on	Text only	CATON	Yes
CC2 Pro Dioramas	Displays "No CCD installed" dialog	Add-Ons menu	NODIORAMAS	Yes
CD2 Examples maps	Displays CD2 example files	File toolbar, CD2 popup	BROWSE;#EXAMPLES\CITIES	No
CD2 Information	Displays CD2 help information	File toolbar, CD2 popup	HELPN 16000	No
Center	Snaps to the center of a selected entity	Snaps menu	CEN	Yes
Center and Point On	Center and Point On Circle	Draw menu >> Circle…	CIRP	Yes
Chained Arc	Chained Arcs	Draw toolbar, Arc popup	CARC	Yes
Chamfer and Trim	Creates a beveled corner between two entities, deletes old corner	Draw menu	TCHAM	Yes
Chamfer only	Creates a beveled corner between two entities, keeps corner	Edit menu >> Trims	CHAM	Yes
Chamfer only	Creates a beveled corner between two entities, keeps corner. Same as CHAM	Text only	CHAMFER	Yes
Change 2nd Color	Change 2nd (interior) color of selection. Use CHANGE	Edit menu >> Change	CHANGEC2	Yes
Change background color	Changes the map (not the view window) background color. This is a macro.	Edit menu	CHANGEBC	Yes
Change Color	Change color of selection	Edit toolbar	CHANGEC	Yes
Change Fill Style	Change fill style of selection	Edit toolbar	CHANGEFS	Yes
Change Layer	Change Layer of selection	Edit toolbar	CHANGEL	Yes
Change Line Style	Change line width of selection	Edit toolbar	CHANGELS	Yes
Change Line Width	Change Line style of selection	Edit toolbar	CHANGELW	Yes
Change pen thickness	Change pen thickness (actual printed width) of selection 0-2.54mm. Use CHANGE	Edit menu >> Change	CHANGEPT	Yes
Change properties	Change properties of selected entities, choose property to change from dialog	Edit menu	CHANGE	No
Change SymDef Color	Change the color of all entities in all symbol references. Can't be undone	Text only	CHANGESC	Yes
Change SymDef Layer	Change the layer of all entities in all symbol references to selected layer. Can't be undone	Text only	CHANGESL	Yes
Change SymDef to Varicolor	Change the color of all entities in all symbol references to varicolor. Can't be undone	Text only	CHANGESCBB	Yes
Change Text	Change all text in selection to new string.	Edit menu >> Change	CHANGETX	No
Change Text	Change all text in selection to new string. Same As CHANGETX	Text only	CHANGEX	No
Change Text Specs	Change Text Properties	Edit toolbar	CHANGET	No
Character Artist	Displays "No CA installed" dialog	Add-Ons menu	NOCHARACTERARTIST	Yes
Character Artist Examples…	Displays Character Artist example files	File toolbar, Character Artist popup	BROWSE;#EXAMPLES\CHARACTERS	No
Character Artist Information	Displays Character Artist intro help topic	File toolbar, Character Artist popup	HELPN 16003	Yes
Circle	Add circle of current default type set using Circle…	Draw toolbar	CIRCLEI	No
Circle Tangent to 2 Circles	Circle Tangent to 2 Circles	Text only	CIRTAN2	Yes

Command	Description	Where?	Text Equivalent	Use in Macro
Circle Tangent to 3 Circles	Circle Tangent to 3 Circles	Text only	CIRTAN3	Yes
Circle…	Add a chosen circle type, optionally set default for Circle	Draw menu	CIRCLED	No
Circular Array	Circular Array	Edit toolbar, Copy popup	CARY	Yes
Circular Part Array	Create a circular array out of selected CC2 Pro file	Text only	CPARY	No
City Designer	Displays "No CD2 installed" dialog	Add-Ons menu	NOCITY	Yes
City Draw Tools	Displays CC2 Pro-only city drawing tools	File toolbar, CD2 popup	DRAWTOOLSM;city*	No
City Symbols (examples)	Opens cut-down CC2 Pro city symbols	File toolbar, CD2 popup	CATALOG #SYMBOLS\CITIES\CITIES_CC2 Pro.FSC	No
Clear Macros	Clear all macros from menu. Be careful not to save over existing macros.	Text only	CLEARM	No
Clipboard Options	Clipboard options. Use Global Options.	Text only	CLIPOPT	No
Clone Symbol Definition	Makes a copy of a symbol definition in the drawing with a new name (use Symbol Manager)	Symbols menu >> Symbol Manager	CLONESYM	No
Coast/Sea	Opens the Coast symbol setting in current style	Overland menu >> Symbol Settings	SYMICONM;Coast*	No
Color	Sets current drawing color, straight to dialog box	Tools menu >> Set Properties	COLORDLG	No
Combine Paths	Combines two paths	Edit menu >> Transform	CMB	No
Configure XPs	View plug in information	Text only	XPCFG	No
Connect	Scale, move and rotate selection so that two points in the selection are in different locations	Edit menu >> Reshape	CONNECT	Yes
Connect copy	Scale, copies and rotate selection so that two points in the selection are in different locations	Text only	CONNECTC	Yes
Contours	Display Contour area fill drawing tools	Overland menu	DRAWTOOLSM;Map Contour*	No
Convert drawings to symbols	Makes symbol definitions from files in selected folder. Use SYMMGR	Symbols menu >> Symbol Manager	LDSYMDEF	Yes
Coordinate	Displays coordinate of selected point	Info menu	ID	No
Copy	Copy to Clipboard (^C)	Edit menu	CLIPCOPY	Yes
Copy in drawing	dynamic copy	Edit menu	COP	No
Copy Text	Copy an edited version of text	Text only	TEXCOPY	No
Copy to Sheet	Copy entities to another sheet	Tools menu >> Sheets	COPYSHT	No
Correct fill styles	Removes legacy fill style from template	Text only	CFS	Yes
Corridor (cut down version)	Cut-down corridor command for CC2 Pro -macro version	Text only	CORRIDORCC2 ProM	Yes
Corridor (cut-down macro version)	Cut-down version of DD2 corridor command for CC2 Pro	File toolbar, DD2 popup	CORRIDORCC2 Pro	No
Count	Displays number and type of all entities in drawing	Info menu	COUNT	No
Count All…	Displays number and type of selected entities	Info menu	COUNTA	No
Crosshairs off	Switch crosshair cursor off	Text only	XHOFF	Yes
Crosshairs on	Switch crosshair cursor on	Text only	XHON	Yes
Current command help	Displays help on current command (F1)	Text only	HELPCON	Yes
Current layer	Sets current layer. Fails in macro if layer not present - use GOLAYER to add a layer	Text only	LAYER	Yes
Cursor Options	Dynamic edit command options	Tools menu >> Options >>Editing Options	DYNOPT	No
Cursor snap off	Turn cursor snap on	Text only	CSNAPOFF	Yes
Cursor snap on	Turn cursor snap off	Text only	CSNAPON	Yes
Curve with Arrow	Draws an entity which curves outside a chain of nodes with an arrow at the start	Draw toolbar, Smooth Path popup	SPLINEA	Yes

Command	Description	Where?	Text Equivalent	Use in Macro
Curve with Double Arrow	Draws an entity which curves outside a chain of nodes with an arrow at both ends	Draw toolbar, Smooth Path popup	SPLINEDA	Yes
Custom Drawing Tools	Display all drawing tools for selection	Draw menu	DRAWTOOLSM;*	No
Cut	Cut to Clipboard (^X)	Edit menu	CLIPCUT	Yes
DD2 Examples maps	Displays DD2 example files	File toolbar, DD2 popup	BROWSE;#EXAMPLES\DUNGEONS	No
DD2 Information	Displays DD2 help information	File toolbar, DD2 popup	HELPN 16001	Yes
Default Body of Water	Adds a new default body of water using Drawing Tools	Overland toolbar	DRAWTOOLSM;Map Water, Default*	No
Default Border	Adds a new default Border using Drawing Tools	Overland toolbar	DRAWTOOLSM;Map Border, Default*	No
Default Contourline	Display the default contour drawing tools	Overland toolbar	DRAWTOOLSM;Map Contour Default*	No
Default Landmass	Adds a new default landmass using Drawing Tools	Overland toolbar, Default Landmass	DRAWTOOLSM;Map Land, Default*	No
Default menu (macro version)	Opens a new menu file, sets as default menu, macro version	Text only	MENUDM	No
Default menu…	Opens a new menu file, sets as default menu	Text only	MENUD	No
Default River	Adds a new default River using Drawing Tools	Overland toolbar	DRAWTOOLSM;Map River, Default*	No
Default Road	Adds a new default Road using Drawing Tools	Overland toolbar	DRAWTOOLSM;Map Road, Default*	No
Define Attributes	Define Symbol Attribute (information to attach to a drawing)	Symbols menu	ATTRIB	No
Define Symbol	Defines a symbol from selection	Symbols menu	DEFSYM	Yes
Define Symbol (Advanced)	Creates a symbol definition from selection with lots of dialog box options for origin, background.	Text only	DEFSYMD	No
Degrees On	Snaps to a specified angle around an arc or circle	Snaps menu	DEG	Yes
Delete duplicates	Deletes duplicates from selected entities	Text only	DELDUPS	Yes
Delete files	Deletes selected files	Text only	DELETE	No
Delete Node	Deletes node nearest to selection point	Edit menu >> Single Entities	DELNODE	Yes
Delete sheet	Delete named sheet	Text only	DELSHT	Yes
Delete Symbol Definition	Deletes a symbol definition. Use SYMMGR.	Symbols menu >> Symbol Manager	DELSYM	No
Desktop color	Change CC2 Pro desktop color	Text only	DSKCOLOR	Yes
Diameter and Center	Diameter and Center Circle	Draw menu >> Circle…	CIRD	Yes
Dioramas Examples…	Displays Dioramas example files	File toolbar, Dioramas popup	BROWSE;#EXAMPLES\DIORAMAS	No
Dioramas Information	Displays Dioramas intro help topic	File toolbar, Dioramas popup	HELPN 16002	Yes
Discard drawing	Discards all edits and starts new drawing based on current template with same name	Text only	DISCARD	No
Distance Along	Displays distance between two points.	Info menu	DISTANCE	No
Distance Along	Displays distance between two points. Same as DISTANCE.	Text only	DIST	No
Distance Along	Shows bearing and distance - can be copied to clipboard	Text only	DIST2	No
Distance Along	Snaps to a specified distance along selected entity.	Snaps menu	DIST	Yes
Distance format	Units Distance format code	Text only	DISTFMT	Yes
Donut	Creates Donut-shape from two concentric circles made into a multipoly.	Draw menu >> Circle…	DONUT	Yes
Double Line	Chain of parallel lines	Draw menu >> Line…	DBLN	Yes
Draw Like	Draw using selected entity as pattern	Draw menu	DRAWLIKE	No
Draw Like Options	Set drawing methods for Draw Like	Draw menu	DRAWLIKEOPT	No
Drawing color map	Use drawing's line width - color map	Text only	DWGCMAP	Yes

Command	Description	Where?	Text Equivalent	Use in Macro
Drawing Tools	Use, create or edit custom drawing tools	Text only	DRAWTOOLSD	No
Drawing Tools (macro and menu version)	Use drawing tool by name (will display dialog box if Tool Name matches more than one option)	Text only	DRAWTOOLSM	Yes
Dungeon Designer	Displays "No DD2 installed" dialog	Add-Ons menu	NODUNGEON	Yes
Dungeon Draw Tools	Displays CC2 Pro-only dungeon drawing tools	File toolbar, DD2 popup	DRAWTOOLSM;Dungeon*	No
Dungeon Symbols (examples)	Opens cut-down CC2 Pro dungeon symbols	File toolbar, DD2 popup	CATALOG #SYMBOLS\DUNGEONS\DUNGEONS_CC2 Pro.FSC	Yes
Dungeons/Lairs	Opens the Dungeon symbol setting in current style	Overland menu >> Symbol Settings	SYMICONM;Dungeon*	No
Dynamic Edit	Move, add and delete nodes	Edit menu >> Single Entities	DYNEDIT	No
Dynamic Pan	Dynamic pan of drawing	Text only	DYNPAN	No
Edit and move text	Edit and move selected text entity	Text only	TEXEDIT	No
Edit Bookmarks	Edit bookmarks	Tools menu >> Bookmarks	BOOKMARK	No
Edit grid	Edit a rectangular grid system	Text only	EGRID	No
Edit macros…	Edits macro definition. CC2 Pro's are very large - use NOTEPAD to edit fcw32.mac, then use Load Macros when you've saved the file	Tools menu >> Macros	EDITMAC	No
Edit Symbol Definition	Edits a symbol definition. Use SYMMGR.	Symbols menu >> Symbol Manager	EDSYMDEF	No
Edit Text	Lets you edit text in selection, one piece at a time	Edit menu >> Edit Text	TED	No
Ellipse	Ellipse, Center and Axis Points	Draw menu >> Circle…	ELIPP	Yes
Ellipse, Center and Inclination	Ellipse, Center and Inclination	Text only	ELIPI	Yes
Ellipse, Circle at Angle to Window	Ellipse, Circle at Angle to Window	Text only	ELIPC	Yes
Elliptical Arc	Elliptical Arc	Draw menu	ELIPA	Yes
End session	Quits CC2 Pro , saves automatically	Text only	END	Yes
Endpoint	Locks to endpoint of selected entity	Snaps menu	EPT	Yes
Erase	Deletes selection	Edit menu	ERASE	Yes
Exit	Quits CC2 Pro with option to save (same as QUIT)	File menu	EXIT	No
Exit	Quits CC2 Pro with option to save. Same as EXIT	Text only	QUIT	No
Explode	Converts selection to more primitive components	Edit menu >> Transform	EXPLODE	Yes
Explode Text	Explodes text into a group of splines and paths	Edit menu >> Edit Text	TEXPLODEMP	Yes
Explode Text	Explodes text into a multipoly of splines and paths	Edit toolbar, Explode popup	TEXPLODE	Yes
Export Text	Exports text in selection to a text file	File toolbar, Save popup	TEXPORT	No
Extract Attributes	Displays text listing of symbol attributes in the drawing	Symbols menu	EXTRACT	No
Farmland	Display Farm area fill drawing tools	Overland menu >> Area fills	DRAWTOOLSM;Map Farm*	No
Fens	Display Fens area fill drawing tools	Overland menu >> Area fills	DRAWTOOLSM;Map Fens*	No
File	Convert multiple CC2 Pro drawings to other formats	File toolbar, Save button popup	CONVF	No
Fill Style (macro version)	Set fillstyle for new entities	Text only	FSTYLE	Yes
Fill Style…	Set fillstyle for new entities, dialog option	Tools menu >> Set Properties	FSTYLEDLG	No
Filled… (symbol style)	Displays matching CC2 Filled catalogs	Overland toolbar, Symbol Style popup	Filled:SYMICONFSET;1;	No
Fillet and Trim	Same as FIL	Edit menu >> Trims	FILLET	Yes
Fillet and Trim	Creates a curved corner, between two entities, removes old corner	Edit menu >> Trims	TFIL	Yes
Fillet Only	Creates a curved corner, between two entities, keeps old corner	Edit menu >> Trims	FIL	Yes

Command	Description	Where?	Text Equivalent	Use in Macro
Find and Replace	Replaces text in selected entities	Edit menu >> Edit Text	TREPLACE	No
Find Text	Finds text. Alternative to Zoom Text	Text only	TFIND	No
Flip	Flip between last Undo and Redo	Edit toolbar, Undo popup	FLIP	Yes
Forest	Display Forest area fill drawing tools	Overland menu >> Area fills	DRAWTOOLSM;Map Forest*	No
Fractal Path	Draws straight-edged entity with chain of fractalised nodes	Draw toolbar	FPATH	Yes
Fractal Polygon	Draws a closed, fillable, straight-edged entity with chain of fractalised nodes	Draw menu >> Polygon…	FPOLY	Yes
Fractalise	Fractalizes an existing shape	Edit menu >> Reshape	FRX	No
Freehand Options	segment length for Freehand Sketch	Text only	FREEHANDOPT	Yes
Freehand Sketch	Draws a freehand (sketched) path	Draw menu >> Path	FREEHAND	No
Freeze all	Make named layer uneditable	Text only	FREEZEA	Yes
Freeze layer	Makes all but the current layer uneditable	Text only	FREEZE	Yes
Freeze layer by filter	Freeze layers that match text filter	Text only	FREEZEF	Yes
Front	Draw selection in front of others (send to end of drawing database)	Edit menu >> Entity Order	FRONT	Yes
Get Random	sets variable to random number 0 to 1. Multiply by N and use GN to get a number between 0 and N	Text only	RANDOM	Yes
Global Layer Settings	Global layer settings, overriding drawing layer settings	Tools menu >> Options	GLS	No
GM Only	Opens the GM Only symbol setting in current style	Overland menu >> Symbol Settings	SYMICONM;GM Only*	No
Grid angle	Sets angle of current angled grid. Fails in macro if current grid not Angled Grid	Text only	GRIDANG	Yes
Group	Makes selection behave as a single entity	Tools menu >> Groups	GROUP	Yes
Grouping off for insert	Turn off grouping on par insert.	Tools >> Options >> FCW, FSC, FCT	NOPARGRPS	Yes
Grouping on for insert	Turn on grouping on par insert.	Tools >> Options >> FCW, FSC, FCT	PARGRPS	Yes
Help	Displays help for CC2 Pro	Help menu	HELP	Yes
Help on help	Displays Windows how to use Help.	Text only	HELPHELP	Yes
Help on ID	Help on specific id number. Macro fails on incorrect help id.	Text only	HELPN	Yes
Hex Grid…	Draws a hexagonal grid	Draw menu	HEXGRID	Yes
Hide all layers	Hide all but the current layer	Text only	HIDEA	Yes
Hide Hyperlinks	Hides hotspots	View menu	ACTHIDE	Yes
Hide layer	Hides a Specific layer. Macro fails if layer not in drawing	Text only	HIDE	Yes
Hide layers by filter	Hide layers that match text filter	Text only	HIDEF	Yes
Hide Sheet	Hide named sheet	Text only	HIDESHT	Yes
House (cut-down version) (macro version)	Cut-down version of CD2 House command for CC2 Pro - macro version (House type 10 is an extension, all the rest are the basic house)	Text only	HOUSECC2 ProM	Yes
Import/Export Settings	Export CC2 Pro registry settings	Tools menu	REGEXPORT	No
increment text	Increments numbers in selected text	Text only	TINC	Yes
Index files	Creates an index file of all the text in the cc2 files in a folder for use with Find Text In Files	Text only	INDEX	Yes
Insert CC2 Pro Drawing	Insert CC2 Pro file with file preview	Edit menu >> Insert File	BROWSEPART	No
Insert CC2 Pro Drawing	Insert CC2 Pro file selected using file browser.	Text only	FILEPART	No
Insert Drawing	inserts a drawing into the current drawing. Use INSERT	Text only	PAR	No
Insert Drawing (macro version)	Insert drawing file into current drawing. Use INSERT or PARS	Text only	PART	No

Command	Description	Where?	Text Equivalent	Use in Macro
Insert Drawing, same scale	Insert a drawing into the current drawing using previous scale	Text only	PARS	No
Insert File…	Insert any file compatible with CC2 Pro	Edit menu >> Insert File	INSERT	No
Insert Node	Adds a node on selected entity with nodes	Edit menu >> Single Entity	INSNODE	Yes
Insert rectangular array	Insert drawing file as rectangular array	Text only	PARY	No
Insert Reference	Insert CC2 Pro drawing as a reference.	Edit menu >> Insert File (embed off)	XREF	No
Insert Symbols	Insert symbol with thumbnail dialog. Use the Catalog window with the Drawing button depressed instead	Text only	INSSYMD	No
Insert Symbols from Drawing	Inserts symbol definitions from selected file. Use SYMMGR	Symbols menu >> Symbol Manager	INSSDEF	No
Insert Text File	Insert text file	Edit menu >> Insert File	TFILE	No
Intersection	Snaps to intersection of selected entity. Fails in macro if you use two point selection, and the first point contains two entities	Snaps menu	INT	Yes
JPEG and PNG Options	controls JPEG and PNG export options	File menu >> Open >> Options	JPEGOPT	No
Keep	Sets the current properties to be those of the selected entities	Tools menu >> Set Properties	KEEP	Yes
Keep text height and angle	Keeps previous text height and angle for use with TEXT. Use TEX	Text only	KEEPTHA	Yes
Landmass	Display landmass area fill drawing tools	Overland menu	DRAWTOOLSM;Map Land*	No
Layer Copy	Copies selection to chosen layer.	Edit toolbar, Copy popup	LAYERCPY	Yes
Layer…	Display layer dialog box	Tools menu >> Set Properties	LAYERDLG	No
Length	Displays length of part or entire entity	Info menu	LENGTH	No
Like	Sets a property of selection to that of selected entity. Use with Change Fill Style, Line Style, Layer, Color	Edit toolbar	LIKE	Yes
Like	Sets property for next drawn entity only to that of selected entity	Edit toolbar, Like	LIKE	Yes
Line	Add line of current default type set in Line…	Draw toolbar	LINEI	No
Line	Draws lines (chain of separate line entities.) with an arrow head. If there is more than one in the chain, its usually better to use PATH	Draw menu >> Line…	LINE	Yes
Line Style…	Set linestyle for new entities, dialog option	Tools menu >> Set Properties	LSTYLEDLG	No
Line to Path	convert chain of lines to path. xyAccept can be any point - it just a left button click.	Edit toolbar, Explode popup	LTP	No
Line Width (macro version)	Set line width for new entities	Text only	LWIDTH	Yes
Line Width…	Set line width for new entities, dialog option	Tools menu >> Set Properties	LWIDTHD	No
Line with Arrow	Line chain with an arrow at the start of each line	Draw menu >> Line…	LINEA	Yes
Line with Double Arrow	Line chain with arrows at the ends of each line	Draw menu >> Line…	LINEDA	Yes
Line, Perpendicular	Draws lines perpendicular to a selected entity	Draw menu >> Line…	LNPRP	Yes
Line, Perpendicular at length	Draws lines of a fixed length perpendicular to a selected entity	Draw menu >> Line…	LNPRPL	Yes
Line… (symbol style)	Displays matching CC2 Line catalogs	Overland toolbar, Symbol Style popup	Line:SYMICONFSET;2;	No
Lines…	Add a chosen line type, optionally set default for Line	Draw menu	LINED	No
Link with CR2 Encounter	Adds an AD&D Core Rules 2 hyperlink	Tools menu >> Hyperlink	LINKE	Yes
Link with File	Add file hyperlink	Tools menu >> Hyperlink	LINKF	Yes

Command	Description	Where?	Text Equivalent	Use in Macro
Link with Map	Add map hyperlink	Tools menu >> Hyperlink	LINKM	Yes
List	Displays a text list of properties and geometry of selected entitles	Info menu	LIST	No
List layers	Displays a text list of all layers in the drawing	Text only	LISTLYR	No
List symbol definitions	Displays a text of properties and geometry of entities in a symbol definition	Symbols menu >> Symbol Manager	LISTSYM	No
List variables	Displays a text list of macro variables	Text only	LISTVARS	No
Load color map	Changes the line width-color mapping to a custom file	Text only	LOADCMAP	Yes
Load macros...	Loads new macros into memory from file	Tools menu >> Macros	LOADMAC	No
Load master filters	Loads a set of master filters by name (used when swapping between Add-Ons menu)	Text only	SYMICONFLOAD	No
Lock Groups	Turns group locking off	Tools menu >> Groups	LOCKOFF	Yes
Lock Text Angle	Sets the text angle for new text to align to an entity	Edit menu >> Edit Text	LOCKTEXT	Yes, but won't take parameters
Make Hotspot	Creates hotspot with attached commands	Tools menu >> Macros	ACTION	No
Make Hotspot (macro version)	Creates a rectangular hotspot with attached commands (macro version)	Text only	ACTIONM	Yes
Make Varicolor	Change selections color to the symbol reference color (varicolor)	Symbols menu	CHGCBB	Yes
Map notes...	Edit, view, and delete notes	File menu >> Drawing Properties	NOTES	No
Marsh	Display Marsh area fill drawing tools	Overland menu >> Area fills	DRAWTOOLSM;Map Marsh*	No
Master Settings Filters	Symbol Settings master filter controls	Symbols menu	SYMICONFOPT	No
Meadow	Display Meadow area fill drawing tools	Overland menu >> Area fills	DRAWTOOLSM;Map Meadow*	No
Menu...	Opens a new menu file	Tools menu	MENU	No
Midpoint	Snaps to midpoint of selected entity	Snaps menu	MID	Yes
Minerals/Mountains	Opens the Mountains symbol setting in current style	Overland menu >> Symbol Settings	SYMICONM;Mountains*	No
Mirror	Mirrors selection about two selected points	Edit menu >> Reshape	MIRROR	Yes
Mirror Copy	Creates a copy mirrored about two selected points	Edit toolbar, Copy popup	MIRCPY	Yes
Move Origin	Set 0,0 point in drawing	View menu	ORIGIN	Yes
Move to Sheet	Moves selection to another sheet	Tools menu >> Sheets	MOVESHT	No
Move, Scale, Rotate	Move, scale, rotate selection using a visual cursor. Use MOVE in macro.	Edit menu	MOV	No
Multiline Text	Multiline text	Text only	TEXML	No
Multiple drawing control	Multiple drawing control	Text only	MDCTL	No
Multipoly	Combines selection into one entity that can be filled.	Draw menu	MPOLY2	Yes
Multipoly	Combines selection into one entity that can be filled. Same as MPOLY2.	Text only	MPOLY	Yes
Name Window	Saves a view	View menu >> Windows	SVNAME	No
Natural Features	Opens the Natural symbol setting in current style	Overland menu >> Symbol Settings	SYMICONM;Natural*	No
Nearest Point On	Snap to point on selected entity	Snaps menu	ON	Yes
Network	Creates a network	Text only	NET	Yes
Network Add	Adds to a network, or starts a new one	Text only	NETADD	Yes
Network Center	Sets the net insertion point to center	Text only	NETCENTER	Yes
Network change node width	Change width of selected node on a net	Text only	NETWIDS	Yes

Command	Description	Where?	Text Equivalent	Use in Macro
Network change span width	Change width of selected span on a net	Text only	NETWIDE	Yes
Network change width	Changes width of selected net	Text only	NETWIDA	Yes
Network Cut	Cut a section from a network	Text only	NETCUT	Yes
Network Left	Sets the net insertion point to left	Text only	NETLEFT	Yes
Network Offset	Makes copies of a network with different width but same location	Text only	NETOFST	Yes
Network Rectangle	Creates or adds a rectangular network	Text only	NETRECT	Yes
Network Remove span	Removes a span from a network	Text only	NETRMV	Yes
Network Right	Sets the net insertion point to right	Text only	NETRIGHT	Yes
Network width	Sets width for nets, optionally add a new net	Text only	NETWID	Yes
New City...	Start a new city based on the selected template	File toolbar, CD2 popup	BROWSET;#TEMPLATES\CITIES	No
New Dungeon...	Start a new dungeon based on the selected template	File toolbar, DD2 popup	BROWSET;#TEMPLATES\DUNGEONS	No
New from current template	Starts a new drawing based on current template.	File toolbar, New popup	NEW	Yes
New Window	Opens a new drawing window	View menu >> Windows	NEWW	No
New...	Starts a new drawing based on the selected map template.	File menu	BROWSET;#TEMPLATES\MAPS	No
Non-visual Copy	Non-visual copy	Edit toolbar, Copy popup	COPY	Yes
Non-visual Move	Moves selection, no visual cursor	Edit toolbar, Move popup	MOVE	Yes
Non-visual Paste	Paste clipboard into drawing	Edit toolbar, Copy popup	PASTE	No
Non-visual Rotate	Rotate selection, no visual cursor	Edit toolbar, Rotate popup	ROTATE	Yes
Non-visual Scale	Scales selection, no visual cursor	Edit toolbar, Scale	SCALE	Yes
Non-visual ScaleXY	Scales selection different xy, no visual cursor	Edit toolbar, Scale	SCALEXY	Yes
Non-visual Stretch	Moves selected nodes of selection	Edit menu >> Reshape	STRETCH	Yes
Number	Adds a series of number labels to the drawing	Draw menu	NUMBER	Yes
Numeric Edit	Changes numerical or text properties of selected entities	Edit menu >> Single Entities	EDIT	No
Offset Chain	Creates an offset of a selected entity or chain in the current properties	Draw menu >> Offset...	OFFSET	Yes
Offset Copy	Creates an offset copy of a selected entity or chain in the current properties	Draw menu >> Offset...	OFFSETCPY	Yes
Offset Default	Add offset of current default type set using Offset...	Text only	OFFSETI	No
Offset One Entity	Creates an offset of a selected entity in the current properties	Draw menu >> Offset...	OFFSET1	Yes
Offset...	Add a chosen offset type, optionally set default for Offset	Draw menu	OFFSETD	No
Open (no preview)	Open file with no preview.	File toolbar, Open popup	OPEN	No
Open Current Bookmark	Opens current bookmark file	Text only	OPENBC	Yes
Open drawing	Open file with no preview. Same as OPEN.	Text only	LOAD	No
Open Next Bookmark	Opens next bookmark file	Tools menu >> Bookmarks	OPENBN	Yes
Open Next Drawing	Open next drawing in file history	File menu >> Recently Used Files	OPENND	Yes
Open Overlay file	Open overlay file	Text only	OPENOVL	No
Open Previous Bookmark	Opens previous bookmark file	Tools menu >> Bookmarks	OPENBP	Yes
Open Previous Drawing	Open previous drawing in file history	File menu >> Recently Used Files	OPENPD	Yes
Open reference	Open reference drawing	Text only	OPENREF	No
Open Registered File	Opens a registered file of any type	Text only	OPENDOC	Yes
Open separate	Open separate drawing	Text only	OPENSEP	No

Command	Description	Where?	Text Equivalent	Use in Macro
Open symbol setting	Opens saved symbol setting using filter combined with current master filter. (may display dialog box if more than one matching setting)	Text only	SYMICONM	Yes
Open…	Open file with file browser and previewer.	File menu	FILE	No
Options	CC2 Pro Options	Tools menu	GLOBALOPT	No
Ortho	Toggle orthogonal locking	Ortho button	ORTHT	Yes
Outline in Black	Add an outline to an object in black	Text only	OUTLINEB	Yes
Outline in Current Color	Add an outline to an object in the current color	Draw menu	OUTLINE	Yes
Pan	Move drawing window in direction and distance specified by two points	View menu >> Zooms	PAN	Yes
Parabolic Curve	Draws an entity which curves outside a chain of nodes	Draw toolbar, Smooth Poly popup	PSPLINE	Yes
Parabolic Polygon	Draws a fillable, closed entity which curves inside a chain of nodes	Draw menu >> Polygon…	SPOLY	Yes
Parabolic Polygon	Draws a closed, fillable entity which curves outside a chain of nodes	Draw toolbar, Smooth Path popup	PSPOLY	Yes
Parallel to	Snap cursor parallel to selected entity	Snaps menu	PRL	Yes
Paste	Dynamic clipboard insertion. Use PARTM if possible.	Edit menu	CLIPINS	Yes
Path	Add path of current default type set in Path…	Draw toolbar	PATHI	No
Path	Draws a straight-edged entity with chain of nodes	Draw menu >> Path…	PATH	Yes
Path to Poly	Converts selected paths to polygons	Edit toolbar, Explode popup	CLOSEPATH	Yes
Path with Arrow	Draws a straight-edged entity with chain of nodes, arrow at both ends	Draw menu >> Path…	PATHA	Yes
Path with Double Arrow	Draws a straight-edged entity with chain of nodes, arrow at one end	Draw menu >> Path…	PATHDA	Yes
Path…	Add a chosen path type, optionally set default for Path	Draw menu	PATHD	No
Pen Thickness…	Set pen thickness for new entities	Tools menu >> Set Properties	PTHICK	No
Percent Along	Percentage along selected entity	Snaps menu	%	Yes
Perpendicular to	Snap cursor perpendicular to selected entity	Snaps menu	PRP	Yes
Pick Aperture	Set aperture of pick box in pixels	Tools menu >> Options	PICKA	Yes
Point	Draws points	Draw menu	POINT	Yes
Polygon	Add poly of current default type set in Poly…	Draw toolbar	POLYI	No
Polygon	Draws a straight-edged, closed, fillable entity with chain of nodes	Draw menu >> Polygon…	POLY	Yes
Polygon…	Draw a chosen polygon type, optionally set default for Polygon	Draw menu	POLYD	No
Popup menu	Displays a popup context menu at the cursor	Text only	CMENU	No
Print…	Prints current drawing	File menu	PRINT	No
Printer Setup	Sets up printer	Tools menu >> Print…	PRINTSU	No
Prompt test color	Prompt text color	Text only	PCOLOR	Yes
Properties	Edit properties of single entities	Edit menu >> Single Entities	PEDIT	No
Protect…	Protects drawing	File menu >> Drawing Properties	PROTECT	No
Purge Fonts	Removes unused fonts from the text options in drawing	Tools menu >> Set Properties >> Text	FONTPURGE	Yes
Purge Symbol Definitions	Removes unused symbol definitions from the drawing	Symbols menu >> Symbol Manager	PURGESYM	No
Quick Help	Displays help	Text only	QHELP	Yes
QuickStart Guide	Resizes CC2 Pro window, displays QuickStart Guide	Help menu	RESIZE;OPENDOC GUIDE.HLP;	No
Radius and Center	Radius and Center Circle	Draw menu >> Circle…	CIRR	Yes
Rectangular Array	Creates an array from a selection	Edit toolbar, Copy popup	REPEAT	Yes

Command	Description	Where?	Text Equivalent	Use in Macro
Redo	Redo last Undo	File menu >> Drawing Properties	REDO	Yes
Redo All	Redo all Undos	Edit toolbar, Undo popup	REDOA	Yes
Redraw	Redraw the screen	View menu	REDRAW	Yes
Ref. Point	Select reference	Snaps menu	REF	Yes
Regular Polygon	Draws regular polygon	Draw menu >> Polygon...	RPOLY	Yes
Relief/Contours	Opens the Contour symbol setting in current style	Overland menu >> Symbol Settings	SYMICONM;Contour*	No
Remove nodes	Reduce number of nodes	Edit menu >> Reshape	REDN	Yes
Rename drawing	Renames the current drawing without saving it	Text only	RENAME	No
Rename Symbol Definition	Rename symbol reference. Use SYMMGR	Symbols menu >> Symbol Manager	RENSYM	No
Repeat drawing tool	Repeat last Draw Tools command. May display dialog box	Text only	DRAWTOOLSP	Yes
Reset Filter	Sets current symbol settings filter to * (used when swapping between Add-Ons menu)	Text only	SYMICONR	Yes
Resize window	Resizes CC2 Pro window for help to be displayed	Text only	RESIZE	Yes
Restore drawing	Reloads current drawing, discarding changes	Text only	RESTORE	No
Reverse Path	Reverses node order of paths. Useful with Combine Paths and Text Along a Curve	Text only	FLP	No
Right click menu	Displays the current right click popup context menu at the cursor	Text only	CMENUR	No
Rivers	Display River area fill drawing tools	Overland menu	DRAWTOOLSM;Map River*	No
Roads	Display Road area fill drawing tools	Overland menu	DRAWTOOLSM;Map Road*	No
Rotated copies	Rotate copy of selection, no visual cursor	Edit toolbar, Rotate popup	ROTCPY	Yes
Room (cut down macro version)	Cut-down room command for CC2 Pro - macro version	Text only	ROOMCC2 ProM	Yes
Room (cut down version)	Cut-down version of DD2 room command for CC2 Pro	File toolbar, DD2 popup	ROOMCC2 Pro	No
Rotate	Dynamic rotate. Use ROTATE in macro.	Edit menu >> Reshape	ROT	No
Rotate Align	Rotate and align selection, no visual cursor	Text only	ROTALN	Yes
Run executable	Launches an executable file by name	Text only	RUNAPP	Yes
Same X	Snaps to Same X as reference point.	Snaps menu	SAMEX	Yes
Same X	Snaps to Same X as reference point. Same as SAMEX.	Text only	HORZ	Yes
Same Y	Snaps to Same Y as reference point.	Snaps menu	SAMEY	Yes
Same Y	Snaps to Same Y as reference point.	Text only	VERT	Yes
Save	Saves current file	File menu	SAVE	Yes
Save All	Saves All open drawings	Text only	SAVEALL	Yes
Save As (macro version)	Saves current file as fcw. Overwrites existing files. Macro version.	Text only	SAVEASM	Yes
Save As (old version)	Saves current file. Use Save As...	Text only	SAVEAS	No
Save As...	Saves current file, or exports to other file formats, saves map sections	File menu	EXPORT	No
Save color map	Saves current line width - color mappings	Text only	SAVECMAP	Yes
Save custom palette	Saves the current palette as the custom palette	Tools menu >> Set Properties >> Color	SAVEPAL	Yes
Save File Options	Save as options for FILE (use GLOBALOPT)	Text only	FILEOPT	No
Save Macros	Saves current macros	Tools menu >> Macros	SAVEMAC	No
Save map section	exports view to JPEG, PNG or BMP	File menu >> Save As >> Rectangular section	WBS	No
Scale	Dynamic scale	Edit menu >> Reshape	SCA	No

Command	Description	Where?	Text Equivalent	Use in Macro
Scale Copy	Scales a copy of a selection, no visual cursor	Edit toolbar, Copy popup	SCLCPY	Yes
Scale Symbol Definitions	rescales symbol definitions about their origin. Can't be undone. Use SYMMGR.	Symbols menu >> Symbol Manager	CHANGESS	Yes
Scale Symbols in Map	Scales selected symbol references about their insertion point	Symbols menu	SCASREF	Yes
Scale X Off	Turn off only X scaling of objects	Text only	SCAXOFF	Yes
Scale Y Off	Turn on only Y scaling of objects	Text only	SCAXON	Yes
Screen Tools	Manage CC2 Pro's screen tools	View menu	TOOLS	No
Script	Runs CC2 Pro text-only commands stored in a text file	Tools menu >> Macros	SCRIPT	No
Search files for text...	Creates bookmark list of files with Specific text	Tools menu	SEARCH	No
Select	selects an entity stored in a variable using STORE	Text only	SELECT	Yes
Select Grid	Select grid system	Snaps menu	SGRID	No
Select Template	Sets the current template for New	File toolbar, New popup	TEMPLATE	No
Selection color	Set color to mark selected entities	Text only	MCOLOR	Yes
Send Behind...	Move selection in display list before selected entity	Edit menu >> Entity Order	BELOW	Yes
Set and add layer	Set current layer, adding the layer if it does not exist	Text only	GOLAYER	Yes
Set default browse folder	Set default browse directory	Text only	BROWSEP	No
Sheet	Sheet manager	Tools menu >> Sheets	SHEET	No
Show extents	Displays XY extents of current drawing	Text only	EXTENTS	No
Show Filtered Layers	Show layers that match text filter	Text only	SHOWF	Yes
Show Hyperlinks	Shows hotspots	View menu	ACTVIS	Yes
Shrubland	Display Shrubland area fill drawing tools	Overland menu >> Area fills	DRAWTOOLSM;Map Shrubland*	No
Smooth Path	Draws an entity which curves inside a chain of nodes	Draw menu >> Path...	SPLINE	Yes
Smooth to Straight	converts path/poly to smooth path/poly	Edit menu >> Transform	CTS	Yes
Snap Toggle	Toggle snap value	Snap button	SNAPT	Yes
Sort Symbols in map	Changes drawing order of selected symbols. Used for mountains, etc.	Symbols menu	SYMSORT	Yes
Split	Splits an entity in two	Edit menu >> Trims	SPLIT	Yes
Square Grid	Draws a square grid	Draw menu	SQGRD	Yes
Straight to Smooth	converts smooth path/poly to path/poly	Edit menu >> Transform	STC	Yes
Stretch	Dynamic stretch	Edit toolbar, Move popup	STR	No
Structures	Opens the Structures symbol setting in current style	Overland menu >> Symbol Settings	SYMICONM;Structures*	No
Swamp	Display Swamp area fill drawing tools	Overland menu >> Area fills	DRAWTOOLSM;Map Swamp*	No
Symbol	Insert Symbol Reference in current drawing by name	Text only	SYMBOL	Yes
Symbol Manager	Symbol manager	Symbols menu	SYMMGR	No
Symbol rename and reorder	Rename and Reorder symbols	Text only	RNSYM	No
Symbol Settings	Symbol Catalog Settings - Opens symbol catalog and optionally sets properties	Symbols menu	SYMICOND	No
Symbol Style Toggle	Move to next style of symbol catalog setting, if one matches the current filter	Overland menu	SYMICONFNEXT	No
Symbols Along...	Draws symbols along selected entity	Draw menu	ESC	No
Tablet calibration	Calibrate an installed digitizing tablet	Text only	TABCAL	No
Tablet configuration	Configure an installed digitizing tablet	Text only	TABCFG	No
Tablet off	De-activate an installed digitizing tablet	Text only	TABOFF	Yes
Tablet on	Activate an installed digitizing tablet	Text only	TABON	Yes
Tangent to	Snaps to tangent	Snaps menu	TAN	Yes
Tangent to two entities	Draws the tangent between two selected entities	Draw menu >> Line...	TANGENT	Yes
Technical Support	Gives help info on technical support	Help menu	TECH	Yes

Command	Description	Where?	Text Equivalent	Use in Macro
Text	Use TEX.	Text only	TEXT	No
Text (visual, macro version)	Macro version of TEX (Text) command, but TEXTM is better	Text only	TEXM	Yes
Text along a curve	Wrap text to path or curve	Draw menu	ATTC	No
Text around Arc	Draws curved text then optionally stretches it	Text only	TEXTARC	No
Text...	Adds text with rotation, scaling justification and property options. Use TEXTM in macros	Draw menu	TEX	No
Text...	Text Properties dialog box	Tools menu >> Set Properties	TSPEC	No
Tip of the Day	Shows tip of the day	Help menu	TIPS	No
Toggle Attach mode	Toggle attach mode	Attach button	ATCHT	Yes
Toggle Crosshairs	Toggle crosshairs display	Tools menu >> Drawing Aids	XHTOG	Yes
Toggle Frames	Toggles state of frame used on smooth entities	Tools menu >> Drawing Aids	FRAMETOG	Yes
Toggle Grid	Toggles grid state	Grid button	GRIDT	Yes
Toggle group locking	Toggles group locking	Text only	LOCKT	Yes
Trim	Trim entity	Edit menu >> Trims	TRIM	Yes
Trim Inside	Trim to inside of one or two entities	Edit menu >> Trims	TRIMIE	Yes
Trim Outside	Trim to outside of one or two entities. Select section to keep	Edit menu >> Trims	TRIMOE	Yes
Trim to Intersection	Trim to intersection	Edit menu >> Trims	TRIMINT	Yes
Trim to Intersection	Trim to specified entity	Edit menu >> Trims	TRIMTO	Yes
Trim to Length	Trim to specified length	Edit menu >> Trims	TRIML	Yes
Undo	Undoes previous non-nestable command	Edit menu	UNDO	Yes
Ungroup	Ungroup selection	Tools menu >> Groups	UNGROUP	Yes
Units...	Set inches per drawing unit	File menu >> Drawing Properties	UNITS	No
Unlock Groups	Turns group locking on	Tools menu >> Groups	LOCKON	Yes
Vegetation	Opens the Vegetation symbol setting in current style	Overland menu >> Symbol Settings	SYMICONM;Vegetation*	No
Version info	Version info. Same as VER.	Text only	ABOUT	No
View Sets (macro version)	Manage view sets	View menu >> Windows	VSET	No
View Sets...	View set macro version	Text only	VSETM	Yes
View-Window Color	Sets view window color	View menu	BKGND	Yes
Water/Rivers	Opens the Water symbol setting in current style	Overland menu >> Symbol Settings	SYMICONM;Water*	No
Write map section	Save selected entities as a CC2 Pro file	File menu >> Save As >> Selected Entities	WRITE	No
Write map section (macro version)	Save selected entities as a CC2 Pro file by name	Text only	WRITEM	Yes
Write Part	Create Part. Same as WRITE	Text only	CPART	No
Zoom Center	Zoom Center view	View menu >> Zooms	ZCEN	Yes
Zoom Extents	Zoom Extents view	View menu >> Zooms	ZEXT	Yes
Zoom Height	Zoom Height view	View, Any popup	ZHGT	Yes
Zoom In	Zoom In view	View menu >> Zooms	ZIN	Yes
Zoom Last	Zoom Last view	View menu >> Zooms	ZLAST	Yes
Zoom Named	Zoom Name View	View menu >> Zooms	ZNAME	No
Zoom Named (macro version)	Zoom Name (macro version)	Text only	ZNAMEM	Yes
Zoom Out	Zoom Out view	View menu >> Zooms	ZOUT	Yes
Zoom Text	Zoom to Text string	Text only	ZTEXT	Yes
Zoom to All Text	Shows a list of all text, click to zoom to the text	View, Any popup	ZTEXTA	No
Zoom to Text	Zoom Text (dialog box version)	View menu >> Zooms	ZTEXTD	No
Zoom Width	Zoom Width view	Text only	ZWID	Yes
Zoom Window	Zoom Window view. Same as ZWIN.	Text only	ZWIN2	Yes
Zoom Window	Zoom Window view	View menu >> Zooms	ZWIN	Yes

CC2 PRO MACRO COMMAND REFERENCE

This table gives you a list of all CC2 Pro's macro-specific commands. The other commands useable in macros are listed in the previous section.

Syntax

The syntax column shows how you should construct your macro commands. If in doubt, type the text equivalent of the command at the keyboard and see what the prompts say.

Delimiters (pressing the ENTER key at the command prompt) are represented by a semicolon. Lines ending in a semicolon require an extra delimiter. Commands which require repeated input are shown with an ellipsis, for example xy1;…;xyN;

Some macro commands work on a current selection of entities. This is represented by [selection]. Right click options (in a macro, two consecutive delimiters) are denoted in square brackets.

(real.expression) is an arithmetic expression. Values stored by these functions are formatted as numeric with 9 decimal places. They can contain variable names defined above, the math operators (+ - * / ( )), and units operators (' , " ,cm ,mm ,m ,km)

Alternative inputs are separated by a /. For example, xyPoint/rDistance means that you can put a point or a real number in the macro. Where an alternative has more than one prompt, it is put in round brackets ()

Some commands such as HIDEF can have text filters. These are string variables, but * represents any string (including spaces) ? represents any character. The filter is assumed to have a * at the beginning, unless you add an =.

Each type of data has a different prefix:

Data type	Prefix	Info
File name	f	Use $ in a macro to represent the current folder; # to represent the CC2 Pro folder. Include the suffix.
Point	xy	xyEntity means that CC2 Pro expects a point on an entity.
Distance	d	Distance can either be a real number, or two points. CC2 Pro calculates and uses the distance between the points.
String	s	Strings must be delimited by an ENTER in a macro
Real number	r	A decimal number, entered as xxx.yyy
Integer	n	A whole number. nColor is a number from 0-255 representing a color.
Variable	v	A variable. This can be followed by any of the other prefixes, for example vfOpen would be a file name variable. Variables are set using the various Get commands.

Example

The syntax for Circular Part Array (macro version) is:

fPart[prior];rScale[prior];rRotate[prior];Spokes[Prior];nRings[Prior];
ArrayCenter[Prior];xyPartOrigin;rAngle[Even];dBetweenRings

The text in your macro might be:

CPARYM;#mypart.fcw;;;5;5;0,0;0,0;;5

In the example, CC2 Pro inserts the file mypart.fcw from your CC2 Pro folder, using the same scale and rotation as before (if this is the first time it uses the default values 1 and 0), with 5 spokes, 5 rings, centered at 0,0 with an origin at 0,0, an even angle between the rings, which are 5 units apart. Try typing it at the command prompt, remembering to press ENTER where you see a semicolon, and after the last argument.

Command	Description	Text Equivalent	Syntax
Actuate	Activates a hotspot	ACT	xyHotspotLocation
Arrow Height	Arrowhead height	ASTYLEH	dHeight
Arrow Style	Arrowhead style	ASTYLEL	dLength
Begin Macro	Begin Macro Definition	MACRO	vMacroName (can't be used on command line)
Catalog	Load a symbol catalog file into the catalog window	CATALOG	fCatalog
Circular Part Array (macro version)	Insert CC2 Pro file by name as circular array	CPARYM	fPart[prior];rScale[prior]; rRotate[prior];Spokes[Prior];nRings[Prior];ArrayCenter [Prior];xyPartOrigin;rAngle [Even];dBetweenRings
Clear Macros	Clear all macros from menu. Be careful not to save over existing macros.	CLEARM	
Color (macro version)	Sets current drawing color by number	COLOR	nColor[dialog]
Concatenate variables	Concatenate variables. Add spaces for delimiters	APND	vsPrefix;sToAdd
Debug on	Turn on macro debug mode	STEP	
Decimal places	Set Units decimal places code	SETDECP	nDecimalPlaces[Prior]

Command	Description	Text Equivalent	Syntax
Define Attributes (macro version)	Define symbol attribute macro version	ATTRIBM	sTagText;sPromptText;sValueText;xyLocation
Deselect entities	de-selects all selected entities (see STORE)	DESELECT	
End macro definition	End macro definition	ENDM	
Exit all macros	Exit all macros from within a macro	EXITAM	
Exit macro	Exit the current macro	EXITM	
Export Text (macro version)	Exports text in selection to a text file. Macro version	TEXPORTM	[selection]
Fractalize (macro version)	Adds extra random nodes to a shape.	FRXM	xyPathEntity1;rDepth;rStrength;(xyPathEntity2;…xyPathEntityN)
Frame Off	Turns guiding frame used on smooth entities off	FRAMEOFF	
Frame On	Turns guiding frame used on smooth entities on	FRAMEON	
Get file name with preview	Get file name variable with dialog box for macro	FILEM	vfFileName ^D
Get angle	Stores an angle	GA	vrAngle;rAngle/(xyBrng1;xyBrng2)
Get angle	Stores an angle	GBRNG	vrAngle;rAngle/(xyBrng1;xyBrng2)
Get arccos	Stores arccos	GACOS	vrAngle;rCos
Get arcsin	Stores arcsin	GASIN	vrAngle;rSin
Get arctan	Stores arctan	GATAN	vrAngle;rTan
Get color	Stores a color number. Works with dialog box option. Sets error flag if dialog box cancelled.	GCOL	vnColor;nColor[dialog]
Get cosine	Stores cosine of angle	GCOS	vrCos;rAngle/(xyBrng1;xyBrng2)
Get distance	Stores a distance. Same as GDIST	GD	vdDist;dDist
Get distance	Stores a distance.	GDIST	vdDist;dDist
Get Entity	Stores a point, using a pick box. Sets the error flag if no entity is selected.	GE	vxyEntity;xyEntity
Get Filename (Open)	Stores a user-chosen file name using Open dialog. No ^D required	GFNO	fAny
Get Filename (Save)	Stores a user-chosen file name (using Save dialog). No ^D required	GFNS	fAny
Get Filename Wildcard (Open)	Stores a user-chosen file name using * or ? Pattern. Uses Open file dialog. No ^D required	GFNOP	fAny;sPattern
Get Filename Wildcard (Save)	Stores a user-chosen file name using * or ? Pattern (using Save dialog). No ^D required	GFNSP	fAny;sPattern
Get file name with preview	Get file name variable with dialog box for macro	FILEM	vfFileName ^D
Get Integer	Stores an integer - will convert a real to an integer by stripping off section after floating point	GN	vnNum;nNum/rReal
Get Length	Stores length of object	GLEN	vrLength;xyEntity
Get Point	Stores a point	GP	vxyPoint;xyPoint
Get Real	Stores real (floating-point) value	GV	vrReal;rReal
Get Reference	Get reference entity (on frozen layers)	GR	vxyPoint;xyRef
Get relative filename	Stores relative file path name. # represents CC2 Pro folder; $, current folder.	GRFN	vfRelative;fAbsolute
Get Sine	Stores sine of angle	GSIN	vrSin;rAngle/(xyBrng1;xyBrng2)
Get String	Stores a line of text	GL	vsText;sText
Get Tangent	Stores tangent of angle	GTAN	vrTan;rAngle/(xyBrng1;xyBrng2)
Get Unbroken String	Stores string - delimiters finish command (space, semicolon, enter)	GW	vsWord;sWord
Get X coord	Stores X coordinate of a point	GETX	vrX;xyPoint
Get Y coord	Stores Y coordinate of a point	GETY	vrY;xyPoint
Go label	Go to macro label	GO	sLabel
Go label	Go to macro label. Same as GO	GOTO	sLabel
Grid off	Turns visual grid off	GRIDOFF	
Grid On	Turns visual grid on	GRIDON	
Grid Value	Sets distance between grid points	GRIDV	dGap[prior]
If defined label	Branch if variable is already defined.	IFDEF	vVariable sLabel
If Error label	Branch if error flag is set (right click or escape)	IFERR	sLabel
If negative	Branch if real.expression < 0	IFN	(real expression) sLabel
If positive	Branch if real.expression > 0	IFP	(real expression) sLabel

Command	Description	Text Equivalent	Syntax
If Zero	Branch if real.expression = 0	IFZ	(real expression) sLabel
Insert Drawing, non-visual	Insert part by name	PARTM	fDrawing;rScale[prior]; rRotate[prior];xy1;…;xyN;
Insert rectangular array (macro version)	Insert drawing file by name as rectangular array	PARYM	fName;nColumns[prior]; nRows[prior];xyOrigin;xy2
Insert Symbols (macro version)	Insert symbol by name	INSSYM	sSymbol;rScaleX[prior]; rScaleY[prior];rRotate; xy1;…xyN;
Insert Text File (macro version)	Insert text file by name	TFILEM	fText;xyPosition [below prior]
Layer	Sets the current layer. Same as LAYER	SETLAYER	sLayer[dialog]
Line style (macro version)	Set linestyle for new entities	LSTYLE	sLineStyle[dialog]
Line to Path (macro version)	convert chain of lines to path (macro version)	LTPM	xyLineChain
Load macros (menu version)	Load macro file, menu or macro version	LOADMACM	fMacros
Master Settings Filters (macro version)	Define Symbol Settings master filter (macro)	SYMICONFOPTM	nFilters;s1[empty]; …sN[Empty];
Menu (macro version)	Load Menu file by name	MENUM	fMenuFile
Message dialog box	Displays message in macro	MSGBOX	sTitle;sBox1;…;sBoxN;
Open drawing (macro version)	Open file, macro version	LOADM	fLoad
Ortho lock off	Turn orthogonal locking off	ORTHOFF	
Ortho lock on	Turn orthogonal locking on	ORTHON	
Pause for input	Pause for user input in macro	^D	sPromptText
Pause macro	Halt macro execution for n seconds, wait for keypress	PAUSE	rSeconds
Prompt Echo Off	Suppress echo of the command prompt	ECOFF	
Prompt Echo On	Restores echo of the Command prompt	ECON	
Redraw restored	Suppress automatic screen redraws	RDON	
Redraw suppressed	Restore automatic screen redraws	RDOFF	
Restore selection method	Restore saved selection method saved using SELSAVE	SELREST	
Save as DXF	Saves current file as DXF.	SAVEDXF	
Save Macros (macro version)	Saves current macros by file name	SAVEMACM	
Save selection method	Save selection method. Restore with SELREST	SELSAVE	
Save variables	Save variable values in a script file	SAVEVARS	fScript
Script (macro version)	Run a script file by name	SCRIPTM	fScript
Select by 1 Each pick	Select entities by single each pick	SELBY1	
Select by All	Select entities by All	SELBYA	
Select by Color	Select entities by Color	SELBYC	
Select by Dialog or popup	Select entities by Dialog	SELBYD	
Select by Layer	Select entities by Layer	SELBYL	
Select by Multiple Each	Select entities by Each picks	SELBYE	
Select by Prior+A465	Select entities by Prior selection	SELBYP	
Select Template (macro version)	Set current template by name	TEMPLATEM	
Set fraction rounding	Set Units fraction rounding code	SETFRAC	nCode[Prior]
Set Master Filter (macro version)	Set Symbol Settings master filter (macro)	SYMICONFSET	nMaster
Show All Layers	Shows all layers	SHOWA	
Show Layer	Shows the named layer	SHOW	sLayer[dialog]
Show Sheet	Show named sheet	SHOWSHT	sSheet
Snap off	Turns snap off	SNAPOFF	
Snap on	Turns snap on	SNAPON	
Snap Value	Set snap points between each grid point	SNAPV	nDivisions[Prior]
Store entity	sets a variable to a selected entity	STORE	vnEntity;xyEntity
Straight to Smooth (macro version)	converts smooth path/poly to path/poly (macro version)	STCM	[selection]
Text (macro version)	Adds text, macro version	TEXTM	sText;xyPosition [below prior]
Text Angle	Set text angle	TSPECA	rAngle[prior]

Command	Description	Text Equivalent	Syntax
Text Font	Set text font by name	TSPECF	sFont
Text Height	Set text height	TSPECH	dHeight
Text Justification	Set text justification	TSPECJ	nCode
Text Spacing	Set text spacing	TSPECP	rSpacing[prior]
Text Stretch	Set text stretch factor	TSPECT	rStretch
Text Style	Set text style	TSPECS	nFlags
Thaw All layers	Thaw All layers	THAWA	
Thaw filtered layers	Thaws layers that match text filter	THAWF	sLayerFilter
Thaw layer	Thaw layer	THAW	sLayer[dialog]
Units (macro version)	Set inches per drawing unit, macro version	UNITM	
Window	Select entities by Window	SELBYW	
Yes or No dialog box	Display Yes/No message box. Sets error flag on No.	ASKBOX	sTitle;sBox1;…;sBoxN;

PROFANTASY SOFTWARE PRESENTS

TM

CC2 Pro Version

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Examples: Linda Kekumu, Tito Leati, Ian Malcomson, Steve Mulhern, Simon Rogers
User's Guide: Linda Kekumu, Simon Rogers, James Cox
Help System: Simon Rogers
Special Thanks To: Steve Mulhern AKA "Halfling", RPG Tools

CA PRO INTRODUCTION

Welcome to Character Artist (CA Pro). CA Pro is an add-on product for CC2 Pro that enables you to create attractive full-length portraits of the characters and humanoid monsters in your game. The portraits can then be exported for use with character sheets, added to CC2 Pro drawings, made into counters, or card stand-up figures. CA also includes symbols for a wide range of monsters, treasure and magical effects.

Finally, CA includes advanced utilities for creating and editing symbol catalogs. These are detailed in *ADVANCED FEATURES* on page 148.

About You

The manual assumes that you have a reasonable grasp of Campaign Cartographer 2 Pro (CC2 Pro). In particular you must be able to use CC2 Pro's editing commands, and understand how to use templates and symbols. If you purchased CA and CC2 Pro together, learn CC2 Pro's basics first!

Other Sources of Information

CC2 Pro's Help System. When you are using CC2 Pro and add-ons you can get in-depth information by pressing , or by selecting Help from CC2 Pro's Help menu.

Web Based Tech Support. ProFantasy's web site www.profantasy.com has a comprehensive technical support section and details about e-mailing for help.

The CC2 Pro mail-list. This is a very active e-mail discussion group to help new users and discuss all things map related. To subscribe follow the instructions at the ProFantasy Software web site, www.profantasy.com

Installing CA

Place the CA compact disc into your CD-ROM drive. On most computers there will be a few seconds of whirring, then you will see a window showing the contents of the CD. If this doesn't happen, double-click "My Computer", then on the for your CD-ROM drive.

To install CA, double-click **Setup** , then follow the on-screen instructions.

During the installation you will be asked to give your name, company and CA Serial number. Your unique serial number is in the back of this manual. Starting CA

Once you have completed the installation, start CC2 Pro. On the **File** toolbar, click **CA** .

Latest Information

To find out about any additions to CA since this manual was written, double-click **Readme** on the CD.

To be sure of getting the latest version of all of our software, please go to our web site www.profantasy.com.

FREQUENTLY USED CLICKS

Before you start creating character portraits, here's an overview of CA's most popular commands.

The CA Bar

Toggle Sex changes the currently selected body part catalog for the current race to that of the other sex. For example, if you have the *male human leg* catalog opened, a click will open the *female human leg* catalog. Click again to revert to the other sex. Right click to choose from a shortcut menu.

Toggle Race changes selected body part catalog for the current sex to the next on the list: Human, Dwarf, Elf, Gnome, Half Elf, Halfling, Half Orc. Click again to move to the next race on the list. For example, if you had the *Female Half-Orc Torso* catalog opened, a click would open the *Female Human Torso* catalog. Right click to choose from a shortcut menu.

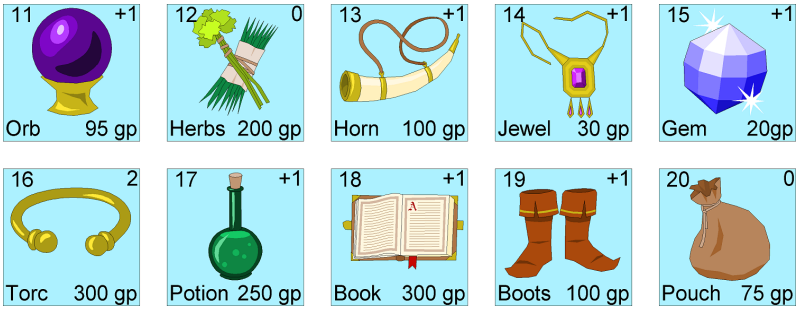
Symbol catalog buttons open a new catalog of the current race and sex in the symbol catalog window. For example, if you had the *female Human Left Leg* catalog open, and you clicked **Torso** , the *Female Human Torso* catalog would open. Right click on **Left Arm** or **Right arm** to see the different poses available, or click to toggle through them.

Catalog symbols for one race or sex don't fit with the another race or sex.

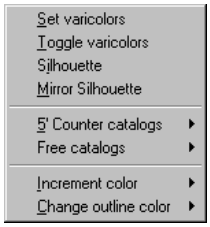
Other symbols

As well as body parts, CA also contains lots of other useful symbol libraries. There are monsters, weapons, magical effects, and treasure available as square counters, hex counters or without constraint. They can enhance existing CC2 Pro or DD2 designs.

The **Symbol Catalog** toolbar gives you access to the symbols. Click for the free-standing catalogs, or right click to get the other catalogs.

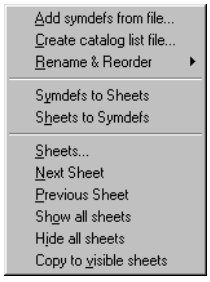


The Character Menu



The Character menu includes all of CA's tools, as well as additional commands to open CA's extra symbol catalogs. You can also change the color scheme of symbols, and the outline colors of entities. Click *Character menu* in the Help index for more details

The Catalog Menu



The Catalog Menu contains new symbol and sheet control commands.

Character Artist introduces a new concept for editing symbols. Symdefs to Sheets converts every symbol in the catalog into a separate named sheet and Sheets to Symdefs converts those sheets back into symbols.

When the symbols are in their sheet form you can use CC2's edit commands to change many symbol definitions at the same time. You can change color schemes or resize the whole catalog.

A little CC2 Pro revision

You need to have a reasonable command of CC2 Pro before you start CA. If you are new to ProFantasy's software, we suggest that you do the first few chapters of the CC2 tutorial before creating your character portraits.

Starting Commands

To start a new command, for example "copy", you can

- ✓ click command's button
- ✓ select it from the menu

- ✓ for some commands, use a hot-key (e.g. CTRL-C)
- ✓ type the command at the Command Line

You know a command has been accepted because the Command Line will change to tell you what CA needs next.

Starting a command will usually cancel any other command that was in progress. Some commands (e.g. endpoint and zooms) are designed to work inside another command and do not cancel the previous command.

Cancelling Commands

To stop a command in mid process, choose a new command. The Command Line will instantly revert to `Command:`.

Ending Commands

All CC2 Pro editing commands require that you choose the command, then the entities you want to affect.

Auto-Repeating Commands

If you want to repeat the previous command, you do not have to reselect its button. Click the left button to repeat the last command.

Changing View

To get a better view of what you are working on, you can *zoom* in or out at any time, even in the middle of another command.

THE 5-MINUTE PORTRAIT

The basic features of CA are incredibly easy to use. In this chapter, you'll learn how to choose the race and sex of your character, add body parts and clothes and select custom colors.

By the end of the chapter, you will be able to create an attractive portrait of a character.

Starting the portrait

For now, correct mistakes by clicking the **Undo** . More powerful editing commands are introduced later in this book.

22 On the File menu click New Portrait >> Human, Elf or Orc.

You see the Select New Drawing Template dialog box.

23 Click HEHH Character Plain.fct

You see a map with a simple frame, on which to create your character.

24 On the File menu >> Save As Change folder to My Designs\Characters. In the **File Name** box type **`Five Minute`** then click **Save**.

Choosing the Race and Sex

CA has very many catalogs, with male and female versions of Dwarf, Elf, Gnome, Half Elf, Halfling, Half Orc and Human. Later you'll find out how to design humanoid monsters, too. Rather than have you use the Catalog button to choose your catalog, we've given you some easy shortcuts to choose the exact catalog you want.

25 Right click **Toggle Race** . Click Elf.

26 Click **Toggle Sex** .

Click to get the *Elf Male* catalog in the window, if it's not already there.

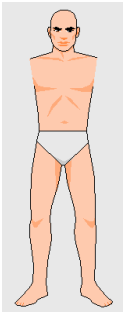
Placing Symbols

This is very easy. You don't even have to aim. Just click symbol from the catalog window, move the mouse to the drawing window, then click.

The template has a single snap point in the middle of the drawing window which causes the symbols to snap into the correct position.

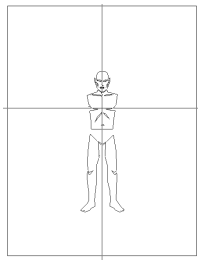
27 Click **Other** .

The other catalog contains stowed items, belts and other accessories, as well as composite shapes.



28 Click EM1 – the first symbol, depicting a body (head, torso and legs)

The *Other* catalogs have lots of useful shortcuts; including this complete torso, head and legs. You could have selected the head, torso and legs and placed these symbols in order, but we are trying to do this in 5 minutes!



29 Move the mouse into the drawing window.

Because Snap is on, and the Grid setting so large, there is only one place that the symbol can go. This makes it very easy for you to place the symbol.

30 Click to place the symbol.

That's how simple it is! All you need to do now is click body part catalogs one at a time and add symbols until you've created a character portrait.

Eye color

31 Click **Zoom Window** . Click two points around the eyes.

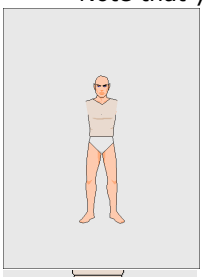
Notice that the eyes are light green.

The Eyes have it – Varicolor Symbols
Some entities in CA's symbols have the ability to appear in different colors. The variable color (varicolor) depends on the current color when you place the symbol. In this case, the current color is light green. If you'd set a different color, before you placed the symbol, the eyes would have been that color. There'll be more on varicolor symbols later.

Adding Clothes

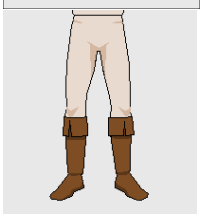
Clothes that match body parts are found in the catalogs for each body part, for example sleeves are found in the *Arms* catalogs. Add clothes for each body part after you have inserted the body part.

32 Click **Torso** . Scroll down the list until you see the EM Shirt T symbol (the first tan-colored item on the list.)
Note that you don't have to cancel the previous symbol selection; selecting a new symbol does that.



33 Click the symbol, then click in the window
Notice how easy it is to dress the figure. Don't worry, we'll be covering up his underwear next.

34 Click **Legs** . Scroll down the list until you see the first trousers on the list EM Pants T a. Place these.



35 Scroll down the list until you see EM Boots Med Brown. Place these.

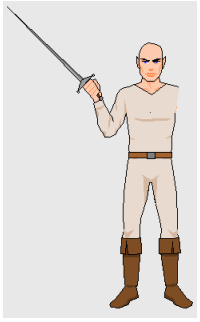
36 Click **Other** . Click first belt and place it.
We added the belt after the trousers and shirt so that it is not obscured by them.

Adding Arms and Weapons

There are three arms catalogs. The *Left* and *Right arm* catalogs give you a choice of three left or right arm positions, the *2-arm* selects the a left and right arm combination that fits with 2-handed weapons.

37 Right click **Right Arm** , then click Right Arm, Hand Up, Elbow Down.

Both the *Left* and *Right Arm* catalogs have three versions, giving you nine basic arm combinations (or eighteen if you include mirror images.) You can click the icon to see one after the other, or right click to choose from all three.

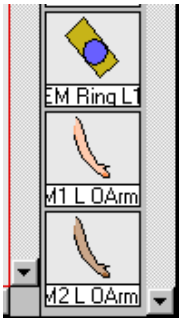


38 Choose the first arm on the list - EM1 R Arm 1. Place it.
Notice how the hand is clasped, as if threatening – or holding a weapon.

39 Scroll down the catalog window. Add the first sleeve you see – EM Sleeve 1 R1 A.

40 Scroll down the list until you see the weapons. Add the first sword you see (EM Rapier R1)
The weapon is designed to fit the arm.

41 Right click **Left Arm** . Click Left arm out at side.
As with the Right arm, there are three catalogs to choose from; we are using the first catalog.



42 Add the first open-handed arm you see from the catalog.

Color

43 Choose a color from the color bar, or click color indicator on the status bar and click on a color from the dialog box.

44 Place the Ring symbol just above the arm you just placed.

The stone of the ring is in the color you chose.

Using varicolor symbols

You've controlled the color of the ring and the eyes of your character. What about symbols with two different shades of the same color, like skin or hair? Well, for this purpose CC2 Pro lets you combine two varicolor symbols, a dark and a light one to make the shadow and main color.

---

45 Click **Head** .

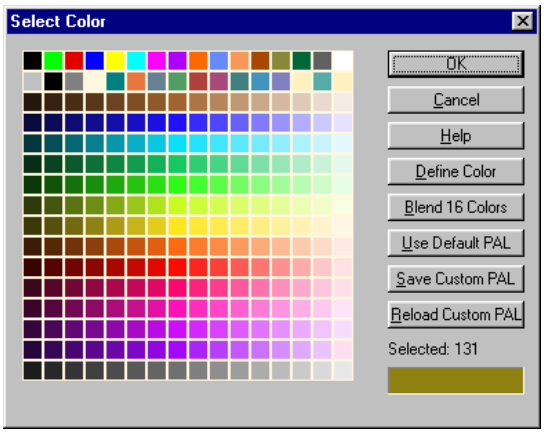
The Head catalog also contains hair, helmets and hats.

46 Scroll down to the EM Hair 31a symbol. (It's the one after the last gray moustache)

Hair, like clothes comes in a number of pre-defined colors; varicolors let you make your own less common hair colors.

47 Select colors from the color bar.

Notice how the colors of the hair in the catalog window change.



48 Click the color indicator on the status bar and select color 131. Select OK.

49 Place the EM Hair 31a symbol.

The symbol is placed with the new color.

You have just placed the light varicolor symbol. The symbol in the list just after EM Hair 31a is designed as shading for this symbol. All varicolor symbols with shading have a light and dark version, one after the other on the symbol list.

50 Select color 129.

You've selected the color for the shadow.

51 Click and place the EM Hair 31a Sh symbol. (It's the one after previous symbol you placed)

Notice how this has formed a shadow for the hair.

You can use the shadow pieces as highlights by choosing a lighter rather than a darker color; in this case you could have chosen color 133 rather than color 129.

In the next chapter, we'll learn to click light and dark varicolors automatically.

A SUMMARY OF BASIC PORTRAIT MAKING

That was pretty, easy, eh? In the next chapter we'll do a more complex figure and learn how to deal with placement errors, (for example what to do if you put an arm on top of a sleeve.) In the meantime, here's a summary of basic placement.

- ✓ Choose a drawing template by clicking one of the New entries on the File menu.
- ✓ Select a race and sex for your character by clicking **Race Toggle** and **Sex Toggle** .
- ✓ Select your catalogs and insert your symbols in the following order: Head , Torso , Legs , Other , Arms , , . This reduces the amount of re-ordering you will have to do.
- ✓ To place a symbol from the catalog, click the symbol and then click in the viewing window.
- ✓ Some symbols have a section in a variable color (varicolor). This section will appear on your portrait in the color that is current at the time you insert the symbol. Examples include Head symbols (click eye color) and most jewelry.
- ✓ Some body parts are made up of two varicolor symbols, one dark and one light, listed one after the other in the catalog. Choose a color then place the light one, choose another color then place the dark one.
- ✓ Add your symbols in the order you want them to appear in the drawing, skin first, then clothes, then extras.
- ✓ The leg armor pieces should be placed in the order you see them in the catalog (Thigh, Shin Knee, Midriff).
- ✓ Some symbols do not fit with other symbols. Certain helms will not fit with certain hairstyles; baggy trousers don't fit with tight boots.
- ✓ Select either the *2 arm* catalog, or toggle through the *Left* and *Right Arm* catalogs to choose your arms. Add clothes or armor. Add weapons from the lower end of the catalog. You may need to add one of the extra hands to cover over a weapon if necessary.
- ✓ Add any extras you want from the *Other* catalog. Note that there are some pre-made body-sections in this catalog.

THE NEXT STEP

Now that you can create a basic character portrait, we'll show you have to correct your mistakes using CC2 Pro's re-ordering buttons and create custom skin tones and colors for clothes.

Selecting varicolors

If you've done the first tutorial, you'll already be familiar with varicolor symbols. Because you usually want to have lots of symbols with the same two colors, CC2 Pro gives you shortcuts to remember your color schemes, making it easier to create consistent portraits.

We are going to create a green-skinned halfling with an unusual taste in clothing.

1 Click **Open** . Select Tutorials\CharacterArtist\Tutorial 2a.fcw.

2 Click **Toggle Varicolor** .

The prompt reads `Dark color number [dialog:` CA is asking you for a color. Remember, to select a color you can choose from the color bar, type a number, or right click and choose from the color dialog box.

3 Press the right button, click color 98 then click **OK**.

The prompt reads `Dark color number [dialog]:`

> The **Toggle Varicolor** switches between two colors that you select. The first time you choose it in a session, it asks for the colors. Thereafter, if you want to change the colors, you choose the adjacent **Select Varicolor** . These are only worth using is you are doing more than one varicolor combination in your portrait, otherwise you should set the colors manually as you did in the previous chapter.

4 Right-click, click color 100 then click OK.

The current color has been set to the light varicolor. We've selected her skin tones, now we start building the portrait.

Using the varicolors for skin

If you are using varicolored skin *and* clothes it's sensible to do all the varicolor work on the skin first, then move on to the clothes. This will save you resetting the varicolor every time you switch catalogs.

5 Set the race to Halfling and the sex to Female using the **Race Toggle** and **Sex Toggle** s.

6 Click **Head** , catalog.

7 Scroll down until you see the green colored head.

The green colored head will be placed in the light varicolor; the next symbol down, the shading for the head in the dark varicolor.

8 Click then place the head.

9 Click **Toggle Varicolor** .

Note that the color on the status indicator has changed to the dark varicolor.

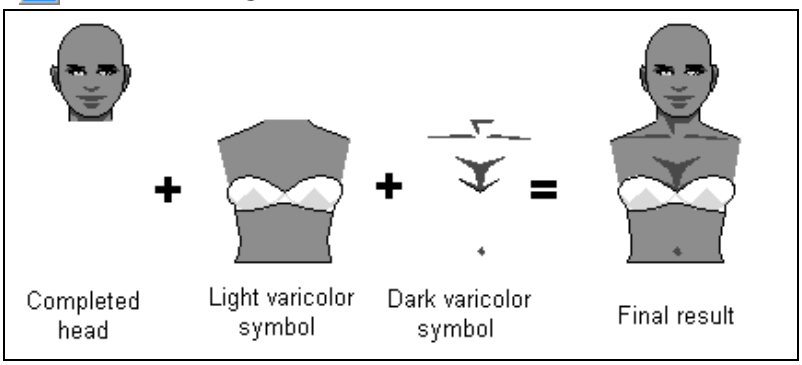
10 Place the next symbol down (HfF4 Head Sh)

11 Now choose another color from the color bar for the eyes.

12 Click HfF Eyes symbol and place it.

> This is how you use all two-part varicolor symbol combinations. The Head has an additional complication; you have to choose a varicolor for the eyes, too.

13 Click **Toggle Varicolor** to restore the light varicolor.



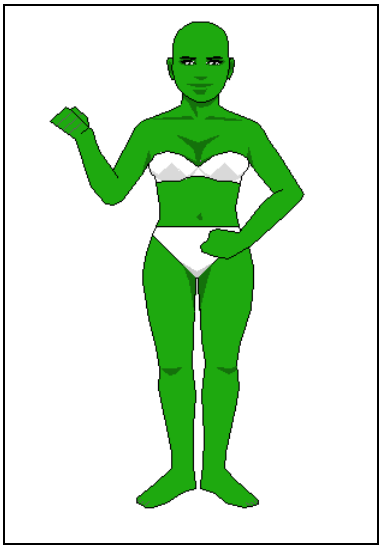
14 Click **Torso**, then choose the green torso symbol. Place it.

15 Toggle the varicolor, choose the torso shading symbol, then place it.

I think you've probably got the hang of this, now, so I'll be brief.

16 Add the legs in the same manner, not forgetting to click varicolor first.

17 Click **2-arm** and add the varicolor arms and shading.



Adding clothes and reordering

You might already be able to see a problem emerging with this figure. When you insert garments over this figure, they will obscure the left arm. CC2 Pro lets change the drawing order of entities so that you can correct problems like this easily.

If you aren't following on from the last section select File menu >> Open >> Tutorials\CharacterArtist\Tutorial 2b.fcw

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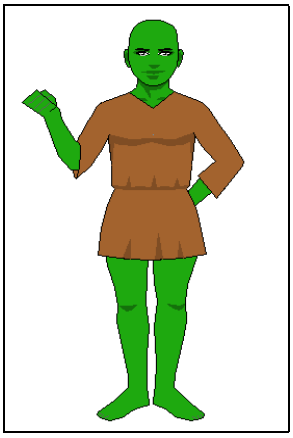
18 Click **Set Varicolor** and choose colors 37 and 39 for the dark and light varicolors.

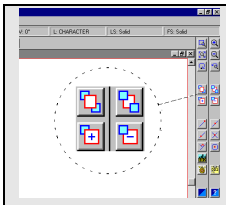
She wears brown clothing.

19 Scroll down the catalog and place the HfF Sleeve O 2H 31. It's the open sleeved varicolor symbol. Toggle the varicolor, then place the torso shading symbol found just after it in the catalog.

20 Click **Torso** , scroll down then click HfF Tunic 31 symbol and shading. Toggle the varicolor where required.



You can see that a problem has arisen. The tunic has obscured her arm.



Sometimes you change your mind about what goes where on your character, add a weapon after an arm, or legs after trousers. This can cause the characters body parts to be drawn on the screen in the wrong order. CC2 Pro's drawings consist of a database of entities

They appear in the database in the order you added them to the drawing. When CC2 Pro refreshes the viewing window, it adds them in the order they are listed in the database. So entities drawn later will appear "on top" of ones added earlier. You can use CC2 Pro's re-orderings to change the drawing order.

Note: You may have to use the Redraw to see the effects of your reordering.

21 Click **Front** . Click arms and sleeves on both sides, Do it.

Front brings the selected entities to the top of the drawing.

22 Click **Legs** then place the first varicolored pants symbols, remembering to toggle the varicolor.

They have been placed, but they obscure the tunic.

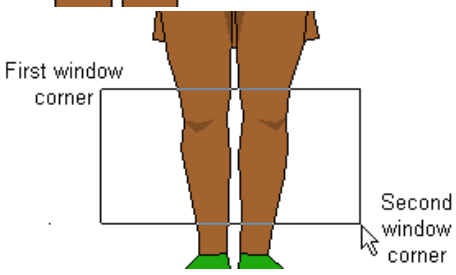
23 Click Back .

The prompt reads `Move below entity:`

The trousers need to be drawn below the tunic, but above the legs.

24 Select a point on the edge of the tunic, away from the body.

The prompt reads `select entities [0 picked]:`



25 Click a point just above and to the left of the knees, then just below and to the right, Do it.

The legs and trousers have been selected and sent to the back

Because the trousers were drawn after the legs, they remain on top of the legs after the legs and trousers were sent to the back. When you use the re-ordering commands, the re-ordered entities still keep their respective positions.

26 Click **Other** and add the brown pouch with the shoulder strap. Now add a belt. Finally add the golden ankh symbol.

The pouch is behind the belt. It needs to be brought in from of the belt, whilst remaining behind the ankh.

> Usually, the first thing a CC2 Pro editing command does is ask for entities to be included in the edit. CC2 Pro then highlights those entities in gray. **Send Behind** and **Bring In Front of** let you choose the reference entity first. It's easier to choose a reference entity when it is not obscured by CC2 Pro's gray highlight.

In this case, it doesn't matter whether you send the pouch beneath the ankh using **Send Behind**, or use **Bring In Front of** to put it just after the belt in the drawing order.

27 Click **Bring in front of**

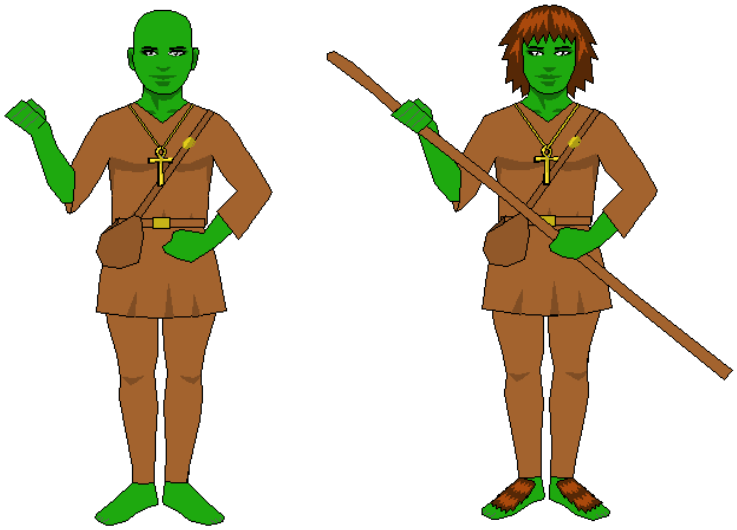
The prompt reads `Move above entity:`

28 Zoom in and select a point on the edge of the belt, being careful not to select part of the tunic accidentally.

The prompt reads `select entities [0 picked]:`

29 Click the pouch, Do it. At this stage, your drawing should appear like Tutorials\CharacterArtist\Tutorial 2c.fcw.

The pouch is now on top of the belt.



30 Add some hair, shoes (or halfling foot hair) and a weapon and she's all dressed up and ready to go! Click **Head** to find hair, **Legs** to find shoes and weapons are found the same catalog as the arms you have chosen, in this case click **2 Arm**.

To see an example of the finished character, open Tutorials\CharacterArtist\Tutorial 2d.fcw

Reshaping your figure

Once you've completed your figure, you might want to change the scale and proportions, to give a little variation between races. Be sure to do this only when you have finished you portrait, as it is more difficult to change a figure once you've rescaled it.

If you aren't following on from the previous section, click **Open**. SelectTutorials\CharacterArtist\Tutorial 2d.fcw

Rescaling visually

31 Click **Scale**.

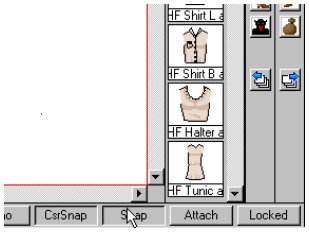
The prompt reads `select entities [0 picked]:`

32 Click two points to make a window around the entire figure, Do it.

The prompt reads `Scale origin:` CC2 Pro is asking for a point around which to scale the figure.

33 Click the snap point in the middle of the figure's chest.

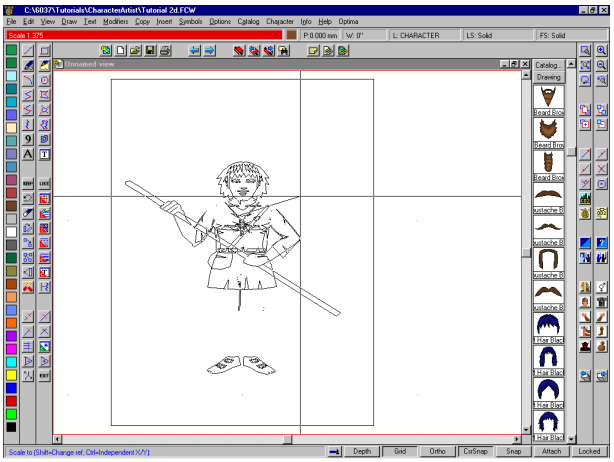
The prompt reads `Scale reference point:` CC2 Pro is asking for a point to anchor the cursor; when you the cursor up and down; it will increase or decrease the scale about this point.



34 You don't want the scale to be restricted by snap points, so click the Snap button to turn snap off.

35 Click a point in between the character's knees.

The prompt reads `Scale to (Shift = change ref, Ctrl = independent X/Y):`



36 Move the mouse up and down.

The dynamic cursor of the figure scales up and down. Note the red indicator in the top left of the screen showing you the scale.

37 Press 2 and move the mouse around.

The figure scales in both the X and Y directions.

> If you click Ortho button (near the Snap button) when you are scaling in the X and Y directions, you can control the X and Y scale absolutely independently.

38 When you are happy with the appearance of the figure, press the left mouse button. Unless you are making a giant, usually only a small cursor movement is required. It's often helpful to scale next to another example of the same race.

Rescaling non-visually

If you want a precise scale factor, you can use CC2 Pro's non-visual editing commands. This is especially useful if you are scaling more than one character at a time.

1 Click **Open**. Select Tutorials\CharacterArtist\Tutorial 2d.fcw.

2 Right-click **Scale**, click Non-visual Scale XY.

3 Click two points to enclose the entire figure in a window, Do it.

The prompt reads `Scale X by [1.00]:`

CC2 Pro is asking for the horizontal scale factor; 1 means no change, 2 would mean twice as wide and 0.5 half as wide.

4 Type in **1.1** then press ¶ .

The prompt reads `Scale Y by [1.00]:` We are going to make her taller, and wider, but more wide than tall.

5 Type in **1.05** then press ¶ .

The figure will be 10% taller and 5% wider.

The prompt reads `Scale center:`

6 Click the snap point in the middle of the figure's chest.

The figure has been scaled.

Mirroring the figure

Character Artist has different left and right arm catalogs; they are not mirror images. CC2 Pro lets you mirror your figures, effectively doubling the number of arm combinations you can have.

1 Click **Open** . Select Tutorials\CharacterArtist\Tutorial 2d.fcw.

2 Select Edit menu >> Non-visual >> Mirror.

3 Click a window around the figure, Do it.

The prompt reads mirror line start: The figure should be mirrored about the center.

4 Click the snap point on the character's chest.

The prompt reads mirror line end: CC2 Pro is asking for the other point required to define the reflection. The mirror line should be exactly vertical to ensure that your character remains vertical.

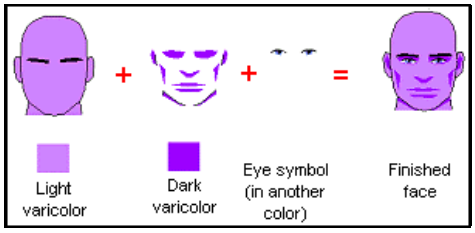
5 Click the next snap point down.

The figure is mirrored. She is now right-handed.

On some templates, you may need to click Zoom Out to find the next snap point.

THE NEXT STEP SUMMARY

Varicolor Symbols



6 Choose your dark and light colors using **Set varicolor** . You can either type a color number in, or right click and select from the dialog box, Colors about two steps apart work best.

7 Click a catalog button.

8 Click a light varicolor symbol such as the head illustrated above and place it.

9 Click **Toggle Varicolor** to set the current color to the dark varicolor, then click dark varicolor symbol that is found directly beneath it in the catalog and place it.

10 Later, when you want to add another body part with the same tones, use **Toggle Varicolor** to set the colors, and insert symbols as above.

11 Repeat this for all the part s of the body.

12 Choose new varicolors for the clothes, if desired, then repeat the process.

Reordering your character

- ✓ If you think ahead, and build the character in the order suggested in the first chapter, you will minimize the need for reordering.
- ✓ Symbols in the catalog are usually listed that they should be placed, for example in the adjacent diagram, you use place the Thigh piece first and the Armor piece last.
- ✓ If you have a simple correction to make, click **Front** to bring obscured pieces to the front of the drawing.
- ✓ If you want to sandwich a new feature between two existing ones, place it, then click **Send Behind** or **Bring in front of** to place it in the correct order.

Reshaping your character

- ✓ Reshape only when you have completed your portrait
- ✓ Use **Scale** to scale your character portrait visually. Click a scale origin in the character's chest, turn Snap off then click a reference point between the character's knees. Move the mouse to rescale. Press 2 and move the mouse to scale X and Y directions independently.
- ✓ Right click **Scale** then click Non-visual Scale XY when you want to scale accurately by an exact amount. Type in X and Y scale factors.
- ✓ Right click **Move** then select Mirror to create a mirror image of your characters. Mirror images add variety to your figures and allow you twice as many arm combinations.

CUSTOMIZING YOUR CHARACTERS

You can already create human demi-humans; in this section you'll learn to make humanoid monsters. You'll also see how to make your portraits into silhouettes, and add shadows. Finally, we'll take a brief look at making adding finishing touches to your characters to make them unique

Creating humanoid monsters

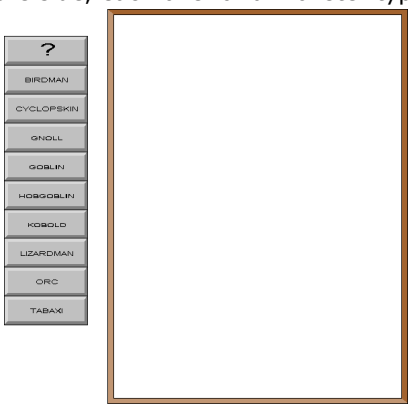
You can use Character Artist to create humanoid monsters ranging from kobolds to snake creatures. There are two monster catalogs, one male and one female all designed to fit on the basic human torso. Combine the monster pieces with the human pieces and you've got some pretty nifty foes for your player's characters.

Using the pre-defined template

There are two methods of creating humanoid monsters. The first is to design them at human size, then scale them afterwards, the second is to use a specially designed template that sets the scale and even the suggested varicolors for you. We'll use this method first.

1 Click **New** . Click Portrait Monster.fct

2 You can see a template with buttons by the side, each one for a monster type.



3 Click **Monster** .

You can see the monster catalog. This consists of various symbols, many varicolored, that can be combined with human pieces.

> When you've clicked **Monster** , clicks on the catalog buttons will select the human version of that catalog. CA stays in "monster mode" until you click **Toggle Race** .

4 If the *Male Monster* catalog isn't visible, click **Toggle Sex** .

5 Click the Tabaxi button.

An arrow points at the Tabaxi button. The color has been set to a light tan (the suggested light varicolor for this creature)

6 Scroll down the monster catalog until you see the Tabaxi head. Right click, just to see the scale.

The Tabaxi button sets the scale for the Tabaxi to an X-scale of 1 and a Y-scale of 0.95, in other words, the same width as a human, but slightly shorter. The symbol scale will remain at this new value until you reset it by right clicking during a symbol insert and selecting **Normal**.

7 Choose **More** then place the head.

8 Click legs and place them.

The head and the legs are the only two symbols specifically for Tabaxi; the rest of the figure needs to be made from other symbols. Other monsters have more body parts. Scroll down the list to see.

9 Click **Torso** , scroll down and place the light varicolor torso.

10 Click **Toggle Varicolor** then select and place the dark varicolor torso shade symbol.

11 Click **Right arm** .

12 Click **Toggle Varicolor** .

13 Click then place the light varicolor arm, HM4 R Arm 1 shown in the diagram.

14 Select **Toggle Varicolor** .

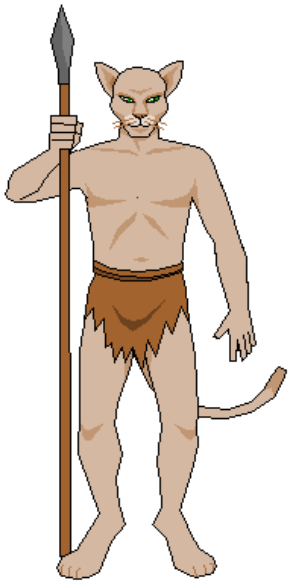
15 Click and place the dark varicolor shade symbol below the light varicolor arm.

16 Scroll down and place the HM Spear R3 symbol.

17 Right click **Left Arm** . Click Left arm at side. Add the light then the dark varicolor arms with the open hand.

18 Click **Monster** .

19 Select and place the first loincloth symbol M Loincloth Ragged 1



20 Click **Front** to bring the legs and loincloth in front of the spear.

Your Tabaxi is finished!

You can hide the buttons on the Monster scale template by clicking the layer indicator L: CHARACTER then hiding the BUTTON layer.

Important: When you have finished creating your monster portraits, you should reset the symbol scale to **1** before creating a new portrait. Click a symbol, right click, click Set Normal, then click finished to do this.

Using the standard template

If you prefer, you can create your monster at human scale, then scale tem after you've finished. Start a blank character, and create the monster at human scale.

When you have completely finished creating the monster, use the SCALE XY to scale the monster to an appropriate size. Turn Snap off. Press 2 and turn Ortho on to scale the figure independently in the X and Y direction.

Alternatively, right click **Scale** then click Non-visual Scale XY. Type in X and Y scale factors and type in the suggested values from the table below.

Creature Type	X scale	Y scale	Dark varicolor	Light varicolor	Notes
Birdman	.9	.9	38	41	
Cyclopskin	1.25	1.2	Use normal skin tones	Use normal skin tones	Use Cyclopskin head
Gnoll	1.1	1.15	42	44	Use Gnoll head
Goblin	0.7	0.65	84	86	Use Goblin head
Hobgoblin	1.1	1.05	161	164	Use Hobgoblin head
Kobold	0.5	0.5	146	148	Use Kobold head
Lizardman	1.15	1.15	82	84	Use Lizardman head, legs and torso.
Orc	1	0.95	144	147	Use Orc head
Tabaxi	1	0.95	42	44	Use Tabaxi head and legs

Making a shadow for your figures

CA has twos for making your portraits into solid black shapes. These can then be used as silhouettes, or as shadows for your figure. The silhouettes can also be used to represent the back of your figures when used to make stand up card figures.

Making a silhouette

21 Open Tutorials\CharacterArtist\Tutorial 3c.fcw.

22 Click **Silhouette** .

The prompt reads `select entities [0 picked]:`

23 Click two points to select the portrait using a window, Do it.

The portrait is converted into a silhouette.

> Silhouettes are often used on counters for use with board games. They are cleaner than full color images, especially if when you are printing them very small.

Making a shadow

24 Open Tutorials\CharacterArtist\Tutorial 3c.fcw

This is an elf portrait. Notice that there is a small shadow disk in place from the Other catalog.

25 Click **Mirror Silhouette** .

The prompt reads `select entities [0 picked]:`

26 Turn Snap off.

The shadow will come from the feet.

Turning Snap off makes it easier to add the mirror line for the silhouette.

27 Click points to select the portrait in a window, Do it.

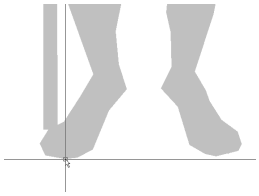
The prompt reads `Start of mirror line:`

CC2 Pro is asking for a line about which to mirror your figure.The basic shadow shape is a silhouette of the figure mirrored about the feet.

28 Zoom in to an area that includes both feet.

29 Click **Endpoint**

The prompt reads `entity:`



30 Click the lowest node on the figure's right foot.

The prompt reads `end of mirror line:`

31 Depress the Ortho button

Ortho lock ensures a perfect horizontal or vertical line for the shadow.

32 Click a point to the side of the first point.

A mirrored silhouette is created.

33 Click **Change Color** . Select the shadow by Prior, Do it. Right click then click color 14 (dark grey)

34 Right click **Scale** then click Non-visual Scale XY.

35 Select by Prior, Do it.
The shadow needs to be foreshortened.

36 Type in value of **1** for X and **0.1** for Y. The scale center is between the character's feet.
Your character now has a shadow.

Adding finishing touches

You can use CC2 Pro's power to customize your characters so that no two are alike. Many examples of this are given in the example drawing found in the drawing Examples\Characters\Creative Use Ideas.fcw
We'll follow a couple of these examples to show you the versatility of CA.

---

37 Open Tutorials\CharacterArtist\Tutorial 3e.fcw.

38 Select male dwarf right arm catalog illustrated.
You know how to do this now, right?

39 Scroll down the catalog list until you see the first light tan colored sleeve then place it

40 Scroll down the list and place one of the right arm armor sections.

41 Click the correct left arm catalog and place the arm symbol illustrated
The prompt reads `end of mirror line:`

42 Scroll down the catalog list until you see the first light tan colored sleeve then place it

43 Scroll down the list and place the left arm armor section that matches the right arm.

44 Turn Snap off.

45 On the **Symbol Catalog** toolbar, Click **Weapons** .
This catalog contains weapons that are designed for us on dungeon maps, or for custom characters like this one. They won't automatically fit into position.

46 Click the bardiche symbol, press ² and move the mouse until the bardiche is more Dwarf size. Place it as in the diagram

47 Click **Rotate**
The prompt reads `Rotation reference point:`

48 Rotate the bardiche and left click when it looks how it is in the diagram.

49 Click correct left arm catalog, scroll down then click, but don't place, the first bare hand symbol you see.

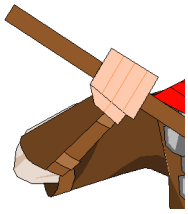
If you change the symbol scale, whether to customize symbols or because you've used a monster template, you must remember to reset the symbol scale and angle back to normal.

50 Right-click, click **Normal**, then click **More**. Turn Snap on. Place the symbol.

51 Click **Right Arm** until you see the correct right arm catalog, scroll down, then click the first bare hand symbol you see. Place it.

The hand is at the wrong angle for the bardiche.

52 Click **Rotate**, click hand by Prior, Do it.



53 Click a reference point in the middle of the hand. Rotate the hand until it looks to be the correct angle for the bardiche.

54 You may need the **Move** to drag the hand into an exact position.

The finished figure has arm positions that are not available in the standard catalogs.

Customising within a character

You can change the appearance of elements within character portraits using CC2 Pro's drawing commands, changing expressions, or adding new items.

55 Open Tutorials\CharacterArtist\Tutorial 4b.fcw

You can see two versions of a dwarf character; the one on the left has had some additional finishing touches to give personality

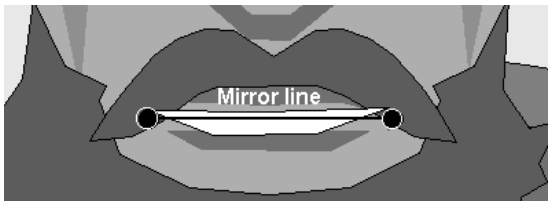
56 Click **Explode** click the head symbol on the right-hand figure. Don't include the beard.

The head, now that it has been converted from a symbol into its constituent parts, moves to the front of the drawing.

57 Click **Bring In Front of**, click edge of the shield, select by Prior, Do it.

The head is now in the correct position.

58 Select the *Dwarven Head* catalog, scroll down and choose the Smile symbol, place it.



59 Click **Zoom Window** to zoom into the face. Right-click **Scale** then click Mirror to turn the smile into a frown, clicking the mirror line points above.

60 Click **Zoom Out** again and click Move. Select an eyebrow, Do it.

61 Choose a move from point. Hold down ² and ³ and move the mouse to get a suitably jaunty angle, then release ² and ³ .

The characters expression has completely changed.

62 On the color bar, click color 11 (Tan.) Click **Line** to give the character some body hair, just like on the left figure.

A SUMMARY OF CUSTOMIZING PORTRAITS

Creating humanoid monsters

There are two monster catalogs, one male and one female all designed to fit on the basic human torso.

1 To start designing monsters, click **Monster**. Click **Toggle Sex** to choose the sex of the monster. When you select the monster catalog, CA stays in "monster mode" until you click **Toggle Race**.

2 Click **New**. Click Portrait Monster.fct

3 Click one of the on-screen buttons to choose a monster type.

4 Insert the appropriate symbols from the *Monster* catalog. Usually there is just a head, occasionally more.

5 Click body part catalog buttons, adding the varicolor symbols, first the light, then select **Toggle Varicolor**, then the dark symbol. Do this for each body part. Now add suitable clothing and other items.

Remember to set the symbol scale to **Normal** when you have finished creating monsters, as CC2 Pro remembers it between drawings.

Alternative method

If you prefer, you can create your monster at human scale by combining human and monster parts, then click **Scale** when you've finished.

Silhouettes

To create a silhouette of your figure click **Silhouette**.

Shadows

You can create a shadow for your figure by clicking **Other** then placing an appropriate shadow symbol from the Other catalog. Alternatively:

1 Click **Mirror silhouette**. Choose a mirror line along the feet.

2 On the Edit menu click Non-visual >> Scale XY to scale the shadow.

USING YOUR CHARACTER PORTRAITS

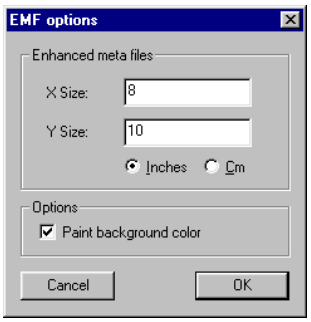
So you've made your character portraits, now what can you do with them? Well, obviously you can print them out from CC2 Pro, but you can also add them to counters, make stand-up card figures, put them on character sheets or even make symbol libraries from them.

Adding your portrait to a character sheet

Via the clipboard

The clipboard is a quick and painless way of exporting your images, but lacks fine control; it doesn't crop the images for you, for example.

3 Open Tutorials\CharacterArtist\Tutorial 4a.fcw.



4 On the Tools menu click Clipboard >> Options >> EMF. Click values in the illustration.

5 Click the Layer indicator then hide the Frame layer.
Most character sheets have a frame for your portrait already.

6 Press ² C, select All, Do it.
The prompt reads `clipboard origin[0,0]:`

7 Click the lower left corner of the image.

8 Start Word® and open Dying Earth.doc.
If you don't have Word, use your word processor. If you want character sheets supplied in another format, please send them to us!

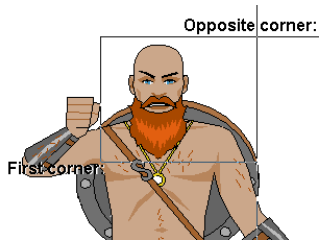
9 Click in text box at the top right and press ² V.
The character portrait is inserted in EMF format.

10 You may need to use Word®'s picture re-sizing and cropping facilities, but here's not the place to describe that!

By saving the entire drawing to a JPEG, or PNG file

CC2 Pro lets you export the entire drawing as a high-resolution JPEG, BMP or PNG file. You can use either of these formats on the web, or pasted into you character sheets. See IMPORT, EXPORT AND INSERT on page **Error! Bookmark not defined.** of the CC2 Pro manual.

By saving an area of the drawing to a JPEG or PNG file



You can save a section of the drawing as a JPEG, PNG or BMP resolution to a file. Instructions are given on page 137 of the CC2 Pro manual.

Creating card stand up figures

Your characters can also be used to create stand up card figures for use with CC2 Dioramas, Dungeon Designer 2, or with miniatures. These can be created on specially designed templates, or else from characters you have already made. We'll show you how to do both.

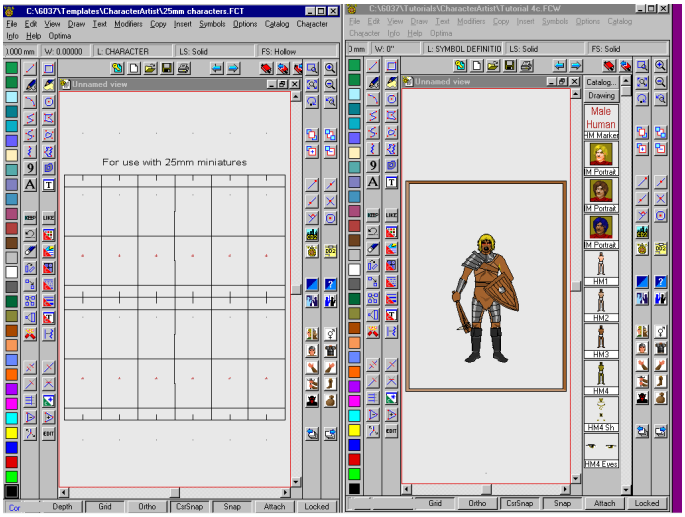
Creating card figures from existing characters

You can simply copy and paste figures you have created into a suitable card figure template. This example assumes that you want to paste lots of figures onto one template.

11 On the File menu click New Card Figure >> Human, Elf, Orc. Click Letter Paper 25mm Characters.fct

There is an A4 sized version of this template.

The card figure templates are designed so that you can print out as many characters as possible on one sheet of paper. The 25mm in the template name means that 25mm is equal to the height of a human-sized figure at this scale. See *Miniature Scale* in the Help index for more information on what the various template sizes mean.



12 Start CC2 Pro again so that it is running twice. Arrange the two windows so that you can easily cut and paste between them.

13 In the new window, open Tutorials\CharacterArtist\Tutorial 4c.fcw.

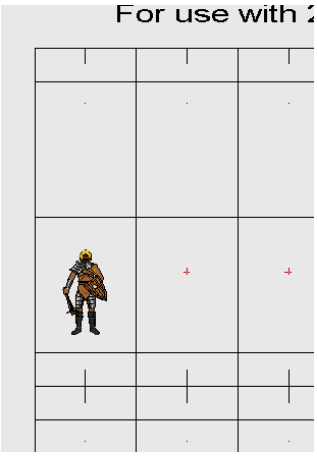
14 On the Edit menu click Copy, or press ² C. Click points to select the character (not the border) in a window, Do it.

You can't see the prompt, because CC2 Pro's window is not wide enough, but you can see the cursor. You are being asked for the clipboard origin.

15 Click the Snap point in the middle of the ogre's chest

The ogre has now been copied to the clipboard.

16 Click the title bar of the other copy of CC2 Pro to make it the current application.



17 Press ² V to paste, select OK on the dialog box, click the red cross in the top left corner of the miniature template.

The figure is placed.

18 Move the mouse across to the next red cross and click.

You can place multiple copies of the same figure.

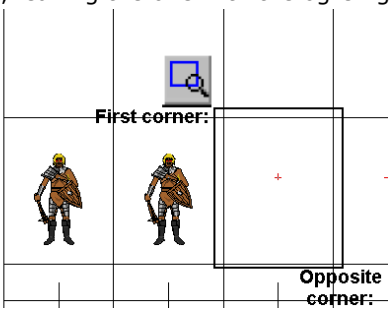
19 Right click to stop pasting.

20 To add more figures to this template, switch to the other CC2 Pro window, open up the drawing with the new figure, then copy and paste again.

Creating card figures from scratch

If you are not continuing from the previous example, open Tutorials\CharacterArtist\Tutorial 4d.fcw and go to step 2.

21 Close down the CC2 Pro with the figure in it, leaving the one with the ogre figure intact.



22 Click Zoom Window and click two points to zoom into the empty figure template next to the second ogre

23 Create your figure in the usual manner. Don't forget that there are other figures on the template when you are editing; don't select by All unless you really mean it!

Adding backs to card figures with Mirror Silhouette

CA does not come with symbols for the back of characters, as this would have halved the number of character pieces we could have made. However, you can create rear views of characters in silhouette to make the backs of card figures. You can add backs to individual characters, or else do a whole batch at once.

---

24 Open Tutorials\CharacterArtist\Tutorial 4e.fcw.

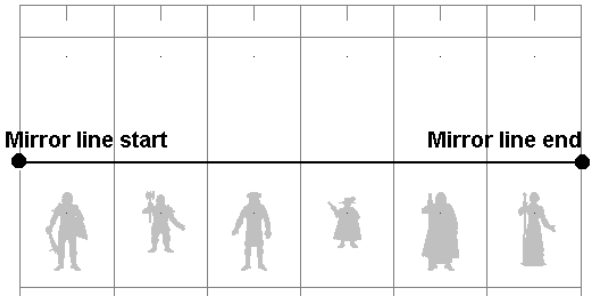
25 Click **Mirror Silhouette** .

The prompt reads `select entities [0 picked]:`

26 Click two points to select the entire top row of figures using a window, Do it.

The prompt reads `Start of mirror line:` The card figure borders are not selected because they are on a frozen layer.

27 Click **Endpoint** , then the **Mirror line Start** illustrated below.



28 Click **Endpoint** , then the **Mirror line end** illustrated above,

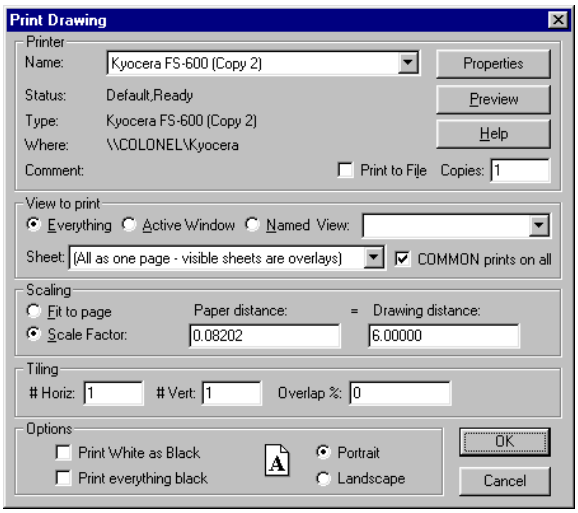
You've added shadow to all the figures.

Printing and assembling card figures

The card figure templates are set up to include the correct printer settings for the miniature scale you have chosen. Figures can be printed onto paper or card. We find 200gsm card works fine, but please check your printer manufacturer's guidelines before printing on card. If there is no mention of printing on card, we recommend that you contact your printer supplier. This example assumes that you have tried a successful test print on card from another application.

---

29 Click **Print** .

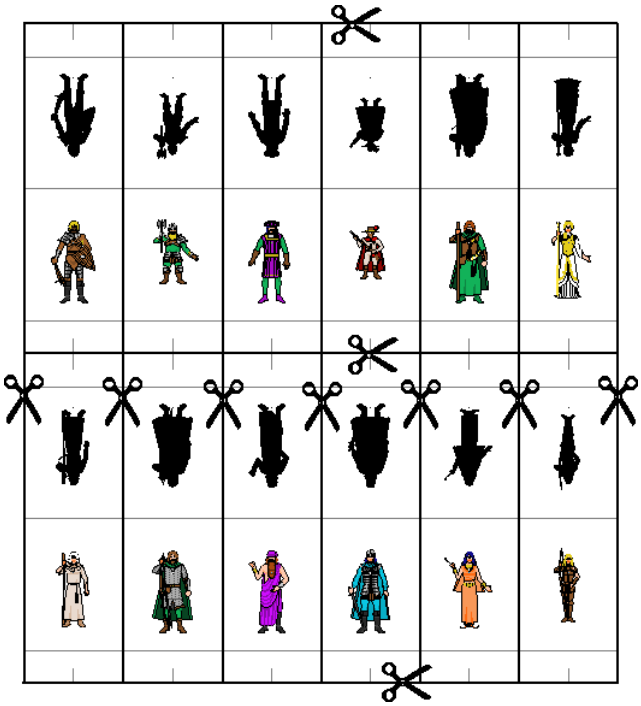


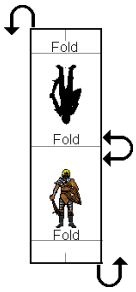
The paper distance is set so that 25mm on the paper equals 6 feet in the drawing. (25mm is 0.08202 feet) If you want to customize your templates, you can type in the scale factor easily – for this drawing just type **25mm** in the Paper Distance and **6'** in the drawing distance; CC2 Pro will convert the numbers for you. CC2 Pro also recognizes **m** for meters.

30 Click Preview. If everything looks fine, select OK.

The drawing prints.

31 Take a craft knife following manufacturer's instructions, or use scissors and cut as illustrated





32 Fold each figure as illustrated.

33 Stick the base pieces together using paper glue or clear sticky tape to give you your counter.

Creating counters

CC2 Pro also includes templates for counters. These counters can be used for wargaming, in place of card figures, or directly on dungeon or overland maps. The templates are found in Templates\CharacterArtist\Counters You can insert portraits into the counter templates just as you did with the card figures, but with one additional step; you need to scale the figure after it has been placed by about **0.85** so that it fits on the counter.

SUMMARY OF USING PORTRAITS

Creating card stand up figures

Converting existing portraits

34 Start a new drawing based on one of the templates in the Templates\CharacterArtist\CardFigures folder.

35 Start another instance of CC2 Pro.

36 Open the first drawing you want to make into a card figure.

37 On the Edit menu click Copy. Select the figure.

38 Click the snap point in the character's chest.

39 Switch to the other instance of CC2 Pro, and paste the figure into the template.

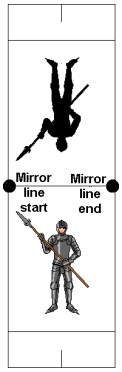
40 Repeat for each character.

From scratch

41 Start a new drawing based on one of the templates in the Templates\CharacterArtist\CardFigures folder.

42 Zoom in to a blank area and start creating your figure.

Adding backs to card figures



43 Click Mirror Silhouette , then click figure.

44 Click two points to make a mirror line as shown in the diagram. Click **Endpoint** before each point to ensure accuracy.

Creating counters

The templates are found in Templates\CharacterArtist\Counters You can insert portraits into the counter templates just as you did with the card figures, but with one additional step; you need to scale the figure after it has been placed by about **0.85** so that it fits on the counter.

ADVANCED FEATURES

In order to create Character Artist, we added some new features that make it easy to manipulate entire symbol catalogs at once. We've added these catalog utilities to CA to make it easy for you to edit and manipulate symbol catalogs, too. This chapter shows you how to use the new catalog utilities and add your own symbols to the CA catalogs.

All Dressed Up

In this section we will be creating a sash symbol for the *Human Male* catalog. Later we will clone the symbol to produce a variety of colors, add the symbols to the Human catalog and make proportional versions for the other racial catalogs.

For step by step diagrams of this section, open Tutorials\CharacterArtist\CA Tutorial 5a.fcw.

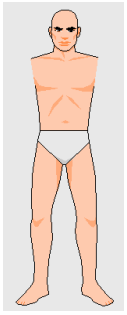
Designing the symbol

45 On the File menu click Open. Click the drop down list and choose CC2 FSC Symbol catalog, select *CA blank.fsc* from the Symbols\CharacterArtist folder.

> *CA_Blank.fsc* is a special, blank catalog for making new Character Artist symbols. It is very important to use a blank catalog when making new symbols and catalogs so you don't end up with unwanted symbol fills in the new catalogs.

46 Right click **Race**, click Human. Right click **Sex**, click **Male**.

47 Click **Other**.



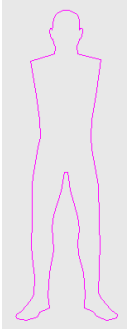
48 Click and place HM1 – the first symbol depicting a body (head, torso and legs)

49 Click **Explode**. Click the symbol you just placed, right click, select Do it.

We need to erase all but the solid filled area of skin. The skin is color 157 (you could click List on the Info menu to discover this.)

50 Click **Erase** All, Not, Color select color 157, Do it.

Remember to right-click to see the entity selection menu.



51 Click **Change Color** Click figure and choose color of #6 (magneta).

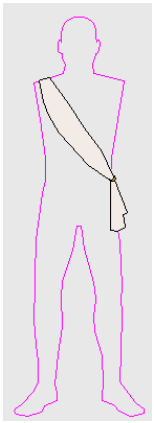
52 Click **Fill Style**. Change the fill style to Hollow.

> To make sure that the sash fits on the standard Human Male, we've insert HM1, exploded it and we will use it as a guideline. We've used this rather garish color to make it easier to see the outline, and we use Hollow so that a fill style doesn't obscure what's underneath.

53 Turn Snap off

> It is easier to see what you are doing and ultimately more accurate to draw your entities with Hollow fillstyle and a bright color first, then change their color and fill later.

54 Set SHADING as the current layer, the fill style to Hollow, color to #1 green and line width to zero.



55 Right click Attach. Click Nearest point ON. Click Attach Enabled. Click **Poly** . Click points to draw the sash and ring.

56 You'll need one polygon for the top sash section, one for the ring and another for the lower sash section.

Avoid using Smooth Paths and Poly in your symbols as they cause a longer redraw. Use Paths, Polys and Arcs instead.

57 Click **Fill Style** . Change the fill style to Solid.

58 Change the color of the sash and ring to color 0 (black)

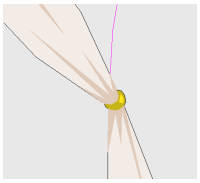
Right Click, select Prior, Right Click, Do it , Right Click, select black #0.

59 Click **Change Color** . Click figure and choose color of #6 (magneta).

60 On the Character menu, click Change outline color To selected color. Click the 2 pieces of the sash, Do it, select color 47.

61 Repeat for the ring selecting color 133.

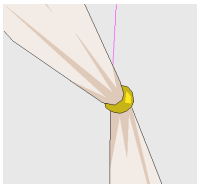
An individual entity in CC2 Pro can display an outline as well as an interior color. Whether the outline is displayed or not is determined by the Outline setting for the current fill style in the Fill Style Properties dialog box. Usually the outline and interior color are the same, however to help make symbols redraw very fast you can use two different colors in a single entity. When you use CC2 Pro's "select by color" editing option, it is the outline color that CC2 Pro is using to find entities.



62 Click **Poly** . Set the fill style to Solid, the color to 45 (tan) and the line width to zero. Draw shading on the sash.

63 Select color 135 for the ring highlight, draw it with the Poly.

Our shading and highlights are usually 2 color tones lighter or darker than the original color



64 Click Path , set OUTLINE as the current layer, choose color 0 black and add a partial outline to the shading where it touches the edge of the sash and ring.

Because we made use of the dual color properties, we cannot **FRONT** the black outline as we would just be fronting the whole sash. We need to add a partial Black outline to the shading entities.

65 Turn Snap back on, set SYMBOL DEFINTION as the current layer then on the Symbols menu, click Define Symbol from the menu. Enter the symbol's name as **`Sash 2A`**, choose the origin where the cursor snaps, click sash and ring Not color 6 (magenta), Do it.

Each CC2 Pro symbol must have its own unique name. Check other catalogs to make sure you are not using a duplicate name. When you successfully define a symbol it will disappear – this is normal! It means CC2 Pro has moved the symbol into the Symbol Definition area of the drawing.

66 On the File menu, click Save As. Type **`Sash.fsc`**.

Congratulations! You've just completed the first sash symbol.

Creating color variants of symbols

In this next section we will clone the sash symbol to create several different colored sash symbols for addition to the *Human Male Other* catalog.

For step-by-step diagrams of this section, open Tutorials\CharacterArtist\Tutorial 5b.fcw.

---

67 If you aren't following on from the last section, open CA Tutorial 5c.fcw.

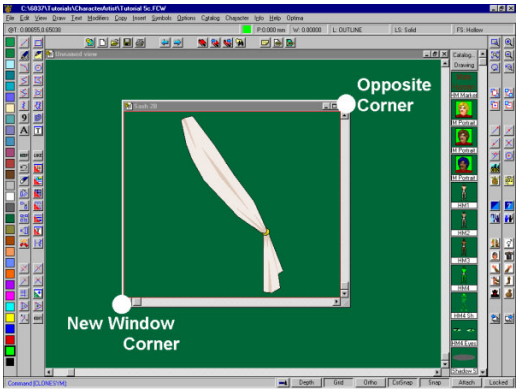
68 On the Symbols menu, click Symbol Manager. Click **Sash 2a**, then click Clone.

We are going to make copies of Sash 2a with different names to make a set of matching symbols for the catalog.

69 Type a new name for the symbol, in this case **`Sash 2B`**

The Command Line reads `New window corner:`

You are being asked to define the corner of a new drawing window in which you can edit the new symbol.



70 Click in the drawing area

The Command Line says `Opposite corner:`

71 Click again in the drawing area.

72 CC2 Pro now displays a clone of **Sash 2a**.

73 We need to change the colors of the sash to match the other symbols in the catalog.

74 Click **Change Color** and change color 45 to color 165.

75 On the Character menu click Change outline color >> To selected color, pick the 2 pieces of the sash and change them to color 167.

76 Click **Close** on the symbol editing window and choose Yes when asked if you want to save the changes.

77 Repeat the above steps to clone additional symbols according to this chart:

Symbol Name	Light Color	Dark Color
`Sash 2C`	#85	#87
`Sash 2D`	#71	#69
`Sash 2E`	#241	#244

78 On the File menu click Save As and give the name Sash.fsc

But I Wanted Chartreuse!

As you know, CA has symbols that are designed to be used one after the other to create new color combinations. The ones with the main skin tone or cloth color are called light varicolor symbols. The ones representing the shadow are called dark varicolor symbols.

In this section we will make a varicolored sash symbol for addition to the catalog. Continue using the *Sash.fsc* file.

---

79 On the Symbols menu, click Symbol Manager. Click **Sash 2a**, then click Clone, naming it Sash 2 V. This will be the main piece or the light varicolor piece.

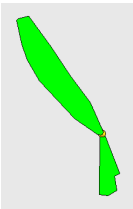
80 Click **Erase**, selecting by color 45, Do it.

81 On the Symbols menu, click Symbol Manager. Click **Sash 2a**, then click Clone. Click 2 pieces of the sash, Do it.

> Varicolor symbols cannot display a separate color for the outline and interior. We need to make both color properties the same color.

82 Click **Change Color** by Prior to color 1 (green).

> **Making symbols varicolor**
>
> Change to Sym Color sets an entity in a symbol definition to the color of the symbol reference. Entities in a symbol definition that have this setting will draw in the current color when inserted. This command only works for entities that will be included in a symbol definition.
>
> When we create varicolored symbols we use green (color 1) for the light varicolor symbols and yellow (color 4) for the dark varicolor symbols. This is for design purposes only. To make these colors varicolor when part of a symbol, you need to change the symbol's color using Symbol Menu >> Same as Sym Color. At this point, the entity retains its original color number but appears white.



83 Click **Outline** . Click the sash.
The sash is now outlined in Black.

84 Click **Change Layer** by Prior to the OUTLINE layer.

85 Click Copy by Prior from 0,0 to 0,0
The Command line reads `Copy from point:`
The Command Line reads `Place (Shift=15°Rot, Shift+Ctrl=Rot, Ctrl=Scale):`

86 `Type in 0,0 then press ¶ .`

We've outlined the sash twice to make the symbol visible whilst dragging. An odd number of stacked entities will be visible, an even number will not.

87 On the Symbols menu, click Change To Sym Color, select by Prior, pick color 1 green >> Do it.

88 Click **Close** on the symbol editing window and choose Yes when asked if you want to save the changes.

89 On the Symbols menu, click Symbol Manager. Click **Sash 2a**, then click Clone, naming it Sash 2 V Sh.

90 Click **Erase** the sash and the ring.

91 Change color 45 to color 4 yellow.

92 Set OUTLINE as the current layer and the color as color 0 (black). Using Path with Attach Mode or the Endpoint modifier, trace a partial outline along the outside edges of the shadow piece.

We are adding this partial outline because the dark varicolor symbols are placed over the light varicolored symbols so the overlap areas need to have an outline.

93 Close the Edit Box and choose Yes when asked if you want to save the changes.

94 On the File Menu click Save As. Give the file the name Sash.fsc

All Mixed Up – Not Even Close!

In this section we will add the new sash symbols to the *Human Male Other* catalog, rename them and quickly place them into the correct order in the catalog.

---

95 On the File menu click Open. Click Symbols\CharacterArtist\HumanMaleOthers.fsc

96 On the File menu click Save As, and make a back up of this file.

97 On the Catalog menu click Add Symdefs from file. Select Tutorials\CharacterArtist\Tutorial 5b.fcw.
This is identical to the file you completed in the last section. It contains symbol definitions of sashes.

Add symdefs from file adds all of the symbol definitions from the selected file into the current catalog. The symbol definitions are inserted in the order they appear in the symbol catalog at the end of the current catalog.

98 On the Catalog menu click Rename and Reorder >> Create Symdef name file. Type **Sash** and press ENTER.

Create Symdef name file takes all the symbol names in the current catalog and exports them into a text file with the file extension LST. The symbols are listed in the same order as they appear in the symbol catalog window.

99 Open the newly created file in a text editor such as Notepad® or Word® You can use the text editor to either rename symbols or re-order them, not both.

100 Cut and paste the symbol names starting Sash 2 and place them symbols below the Sash symbol names.

101 Make sure you save the file in plain text format with the same name when you are done.

You can only rename or re-order symbols, you can't do both at the same time! CC2 Pro will not know to which symbols to apply which names. Be very careful and don't forget what you are doing because it makes a heck of a mess of your catalog if you get it mixed up.

102 On the Catalog menu click Rename and Reorder >> Import reordered symdefs name file then select the list file.
All the symbol definitions will be moved around to reflect your new order.

103 On the File menu click Save.

104 Now make another symbol list file, and use your word processor to rename all the **Sash 2** symbols to **HM Sash 2** symbols.

HM stands for human male. All symbol names have a prefix denoting the race and sex that the symbol is used for. When you insert your own symbols, you should always add the correct prefix, as all symbols must have a unique name.

Pint-Sized Symbols

Character Artist has several different fantasy racial catalogs, all of which are different sizes. In this section we will outline the steps needed to make and add the Sash 2 symbol to each of the racial catalogs. Each race has different proportions, and you'll need to scale your sashes to match these proportions.

Please refer to the above section if you need help with cloning, renaming or re-ordering.

---

105 On the File menu click Open. Click Symbols\CharacterArtist\BodyParts\DwarfMaleOther.fsc

106 On the File menu click Save As, and make a back up of this file.

107 On the Catalog menu click Add Symdefs from file. Click Tutorials\CharacterArtist\Tutorial 5b.fcw.

108 On the Catalog menu, click Symdefs to Sheets

CA allows you to convert symbol definitions into normal CC2 Pro entities, each on its own sheet. You can then change the order of sheets, rename them, or edit the entities on the sheets. When you've finished, you can convert all the sheets back into symbol definitions again.

109 On the Catalog menu, click >> Hide All Sheets

We are going to work on just the Sash symbols.

110 On the Catalog menu, click Sheets, uncheck the Autohide button and unselect all of the Sash symbols at the bottom of the sheet list.

111 Right click Scale , click Non-Visual ScaleXY. Type an X scale of **.95** and a Y scale of **.80**, type **0,0** as the scale origin.

These values are correct for an dwarf figure.

112 Select Catalog Menu >> Sheets to Symdefs

We are turning the sheets back into symbols

So, we've selectively scaled all the Sash symbols we've inserted, whilst leaving the rest of the catalog intact.

113 On the Catalog menu click Rename and Reorder >> Create Symdef name file. Type **DMothers.LST** for the file name.

114 Give the file an appropriate name (e.g. DMothers.LST), open it up in a word processor.

115 Male Dwarf catalog symbols names start DM, so rename all the Sash 2 symbols to include this prefix. In Word® you would click **Replace**, and type **Sash** in the Find box and **DM Sash** in the replace box. Save the file as a plain text file with the file extension LST.

116 On the Catalog menu click Rename and Reorder >>Import renamed symdefs

117 Click the list file. Click **Save** .

118 Choose Catalog Menu >> Rename and Reorder >> Create Symdef name file.

119 Give the file an appropriate name, open it up in a word processor and this time re-order the symbols, move them to the spot in the list below the Sash symbols. Save as a plain text file with the file extension LST.

120 On the Catalog menu click Rename and Reorder >>Import renamed symdefs

121 Click the list file. Click **Save** .

122 Start a new drawing and place a Dwarf Torso and the new sash symbol to make sure they are correctly aligned. If they are not you will need to move the origin for the sash symbol.

123 Repeat for each male catalog using the following chart for the correct dimensions, use 0,0 as the origin. All scaling is based on the Human Male:

Race	Arms (X/Y)	Torsos (X/Y)	Heads (X/Y)	Legs (X/Y)
Human (H)	1/1	1/1	1/1	1/1
Half Orc (HO)	1.05/1.05	1.05/1.05	1.05/1.05	1.05/1.05

Elf (E)	.85/.90	.85/.90	.90/.95	.85/.90
Half Elf (HE)	.8925/.945	.8925/.945	.945/.9975	.8925/.945
Gnome (G)	.75/.60	.75/.60	.80/.75	.75/.60
Halfling (Hf)	.75/.60	.75/.60	.80/.75	.75/.60
Dwarf (D)	.95/.80	.95/.80	.95/.90	.95/.65

124 To create a female sash, you will need to create one from scratch then add to the catalogs and scale as above.

My Symbols Need an Attitude

Attributes are information that you attach to symbols. When you insert the symbol, CC2 Pro will ask for this information and include it as text on the counter. In this section we will make a 5' counter with attributes.

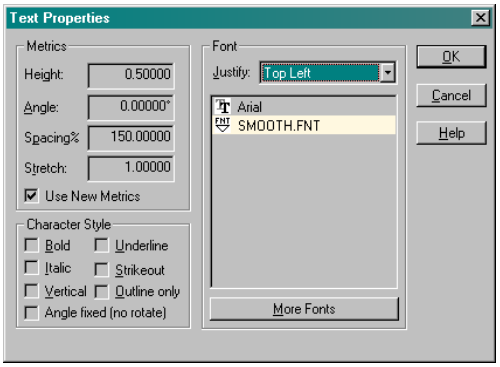
---

125 Open Tutorials\CharacterArtist\Tutorial 5e.fcw

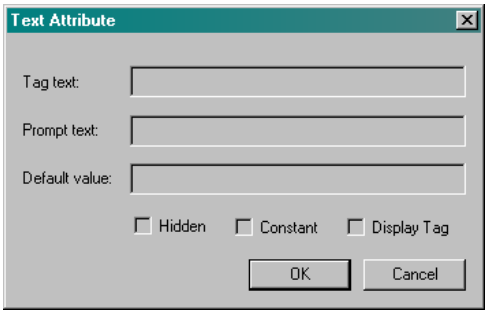
126 Choose Symbols Menu>> Change to symbol color, select color 1 (green), Do it.
When you have defined the counter as a symbol, the background should be in the current color.

127 Right click the Grid button. Click Standard Rectangular grid.

128 Click **Text Properties** [T]. Choose Arial as the font, **.4** as the font size and Justify as Top Left. Select **OK**.



129 On the Symbols Menu, click Define Attribute
The following text box will appear:



Text Attributes

Tag Text: Here you enter the label for each attribute you wish to define. The tag text is fixed for each attribute, though it may hold a variable or constant. An example would be "Name:" This is used when you use the Symbols Menu >> Extract Attributes facility.

Prompt Text: Here you type the prompt you wish to see when inserting the symbol. The prompt should ask for appropriate value data. An example would be "Enter the Character's Name:"

Default value: Here you type the default text value that will be assigned to the tag or leave it blank. If you do not want to be able to modify this value, click Constant checkbox.

Hidden: Usually unchecked. Check to hide display of the tag. Use if the tag does not need to be seen in the drawing, or if there are too many tags to draw neatly or legibly.

Constant: Usually unchecked. Check to assign a constant value to the tag. The default value can not be changed upon insertion. This fixes the value.

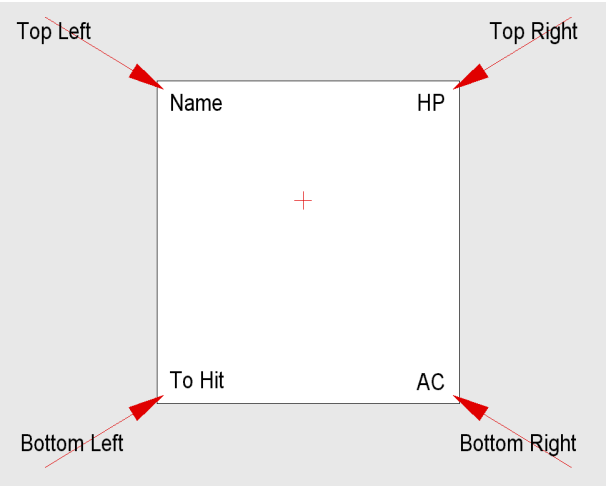
Display Tag: Check to display the tag label instead of the value assigned to it. For example, display **Special** instead of **Breath, only +2 weapons do damage**

130 In the Tag text and Prompt text boxes enter **Name**, leave the Default value blank.
The prompt reads `Location:`

Because the Attribute is text, we need to set up the text properties. We will place the Name attribute in the upper, left corner of the counter, so we have set the text justification to Top Left.

131 Click grid point below and to the right of the top left corner.

132 Set the justification as in the diagram and repeat the above steps for each Attribute you want to add. In each case the tag text and prompt text are as in the diagram. You can enter a default value if you wish.



133 Click Grid button and choose the 5' Grid, 2 snap setting.

134 On the symbol menu, click Define Symbol. Select counter and attributes as a symbol, Do it. Click a symbol origin in the center of the counter.

135 On the File Menu click Save As. Give the file the name Attribute.fsc

136 Click Drawing button (below the Catalog...button)

137 Place the attribute counter. Type in appropriate values.

You now have a counter symbol onto which you can place any character portrait you like.

Creating a set of symbols from scratch

Now that you have mastered the basics and know a bit about making CA symbols it is time to try something a bit more ambitious. Our next goal is to design a wardrobe for an elf warrior. Bearing in mind the thousands of readily available symbols, we want to draw as few new symbols as possible and ensure that the new symbols work well with the old. Here are the steps to develop a set of interlocking lamellar armor to be worn over Elven robes and chain mail.

Add a blank figure

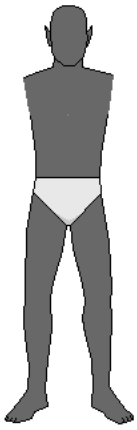
To start we will add a manikin to use as a "sewing model":

138 On the File menu, click New, then Portrait then click the HEHH Character Plain template.

139 Click color #6 (magenta) on the color bar.

140 Right click **Toggle Race** then click Elf, right click **Toggle Sex** then click Male then click **Other** . to select the ElfMaleOthers symbol catalog

141 Click then place the EM4 symbol in the middle of the drawing



Creating a model for the new symbol

It's easier to adapt existing symbols than to create symbols from scratch, so we'll insert some existing color

142 Click the color indicator, then color #51 (dark blue).

143 Click **Torso** then place the varicolor EM Robe 31 symbol on the torso.

144 Next, place the EM Chest Chain shirt on our warrior.

145 Click **Right Arm** then place the EM Sleeve Chain R1 and EM Sleeve Chain R2 on the elf. When we draw the pauldron (A piece of armor covering the shoulder at the junction of the body piece and arm piece), we will draw it to overlap both of these arms.

146 Click **Left Arm** then add an EM Sleeve Chain L1, EM Sleeve Chain L2, and EM Sleeve Chain L3 to the warrior.

147 To ensure that the armor fits under a cloak and that it works with various pant combinations we will add a few more items.

148 Click color #1 (spring green) on the color bar. Click **Other** **.**

149 Place an EM Hood Up 31 and an EM Hood Down 31 on the elf. Click **Back**, and send these two symbols behind the manikin.

150 Click **Leg Catalog** then place a pair of EM Pants 31 L, EM Pants 31 N, and EM Pants 31 T on top of everything else.

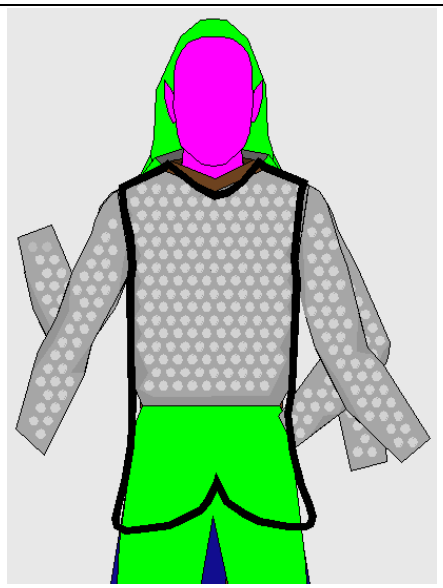
151 You now have a five-armed elf wearing multiple pairs of pants and a robe - oh my! Save your work.

Drawing the symbol

We now have everything in place to create the EM Lamellar Hauberk symbol. Note that overlapping symbols are drawn to realistically cover and expose underlying symbols. Your new symbols need to be drawn in a similar fashion.

152 Click on Snap button to deselect the snap feature. Click **Fill Style** FS: Solid and set the fill style to Hollow. Click color #7 (purple) on the color bar.

You are going to draw an outline of the hauberk to cover the chain mail, remain under the cloak, and overlap the various pants and robe.



153 Click **Polygon** and start drawing the hauberk just below the center of the chain mail's collar. Select the polygon's vertices to expose the chain mail's collar.

154 Overlap the shoulders while staying below the top of the cloaks. Since this armor is worn with underlying chain mail, draw the hauberk to expose the area where the sleeve meets the torso.

155 While staying to the exterior of the torso (chain mail, robe, and pants), follow the fall of the chain mail to the waist.

156 Flare the hauberk out to overlap the upper hips (and the pants), round off the bottom and bring the hauberk to a raised center just above the crotch of the pants. Reverse the process to draw the other half of the hauberk.

157 Save your work.

Now we will create the interweaved lamellar plates that form the hauberk by drawing a series of intersecting paths and deleting hidden features.

158 First click **Erase** and delete everything but the hauberk outline and chain mail shirt. Click the **Color** indicator and select color #131 (bronze)

159 Draw a line connecting the peaked bottom of the collar to the peaked region of the bottom hem. We will use this as the approximate centerline to overlap the lamellar plates.

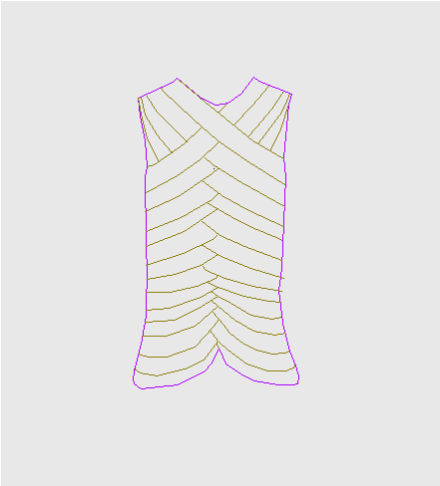
160 Click **Path** . Click **On** . Click the edge of the hauberk just below the left sleeve. Draw a path (use two or three intermediate points) sloping to the right upper shoulder and end the path on the upper edge of the hauberk. The path should intersect approximately one-third the width of the shoulder from the collar and form a lamellar plate of even width across the chest.

161 Now repeat **Path** from just below the right sleeve to the upper left shoulder. At the point where the two plates intersect, click **On** to place a path point on the intersecting line. This point should be about at the intersection of the vertical line.

162 Click **Explode** and click the second line you made. Click **Erase** and delete the section of the line that passes under the top lamellar plate. You should now have a pair of crossed diagonal lamellar plates.

163 Repeat the process for each pair of plates. Remember to add a path point at each intersection with an overlapping plate. As you proceed, some plates may pass under multiple plates. For these lines you do not have to add a path point at each intersection. Instead only place a path point at where the plate goes under and reappears. Proceed in this fashion until all the plates are drawn.

164 Click **Erase** and delete centerline. Save your work.



Filling in the Armor

Now we will go back and add more detail to the armor.

165 Click the **Color** indicator then click color #133 (gold).

166 Click **Erase** and delete the chain mail shirt and the hauberk's outline leaving the network of intersecting plates (paths). Now use **Polygon** to carefully redraw it with a slight curve at the end of each lamellar plate.

167 Click the **Color** indicator then click color #135 (deep yellow). Use **Polygon** to draw irregular highlights on each lamellar plate segment to show reflected light and indicate the curvature of the segment. Assuming the light is coming from the left side of the elf (your right). The highlights should be irregular and are best drawn as triangles with the wider ends towards the elf's left side.

168 Right click **Outline** then click **Outline in Black** select the Hauberk.

169 On the Symbol menu, click Define Symbol and give a name **EM Lamellar Hauberk**. Click **Zoom Extents**. Depress the **Snap** button; the symbol origin should be the center snap point.

Creating the pauldron

At this point you should have a blank template. Now we'll draw the elf with the new symbol so you can work on the pauldrons and gauntlets.

170 Click the Color indicator and choose color #51 (a deep blue).

171 Change to the **ElfMaleTorsos** catalog and place the "EM Chest Chain" hauberk on our warrior.

172 Change to the male elf arm catalogs. Place the **EM Sleeve Chain R1** and **EM Sleeve Chain R2** on the elf. When we draw the pauldron, we will draw it to overlap both of these arms..

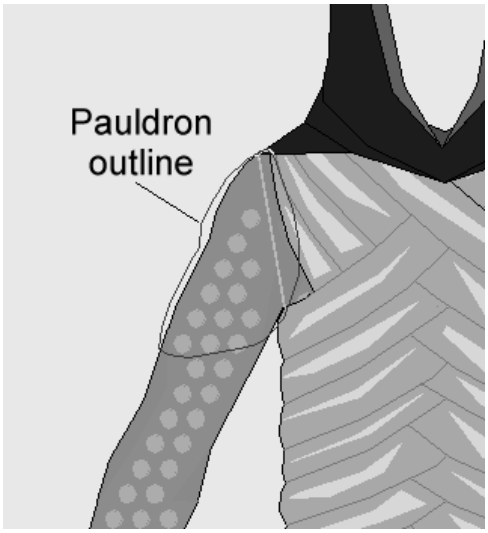
173 Click the **Drawing** button and place the newly created **EM Lamellar Hauberk** on the elf.

174 Place an **EM Hood Up 31** and an **EM Hood Down 31** on the elf.

175 Click **Back** and send these two symbols behind the rest of the symbols.

176 Click the **Color** indicator then click color #6 (pink). Click the **Fill Style** indicator and set the fill style to Hollow.

177 Referring to the drawing below, click **Polygon** and draw a pauldron outline over the elf's left shoulder and arms. Make sure you cover up the underlying hauberk and stay below the edges of the cloaks.

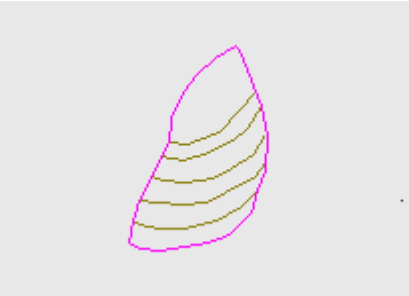


178 Click **Erase** and delete everything but the pauldron outline to avoid interference during the next step.

179 Click the **Color** indicator then click color #131 (bronze). Right click the Attach button and click Nearest point On and **Attach Enabled**.

With Attach on, the drawing cursor will lock to any entity you click near.

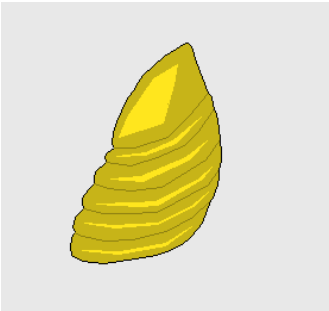
180 Click **Path** and draw a series of overlapping lamellar plates from the bottom to the top of the pauldron.



181 Click **Properties Edit** and set the fill style of the pauldron to Solid.

182 Right click **Outline** then click **Outline in Black**, select by Prior.

183 Click the **Color** indicator then click color #135 (deep yellow). Use **Polygon** to draw irregular highlights on each lamellar plate segment to show reflected light and indicate the curvature of the segment.



184 Right click **Copy**, click Mirror Copy, click a mirror line start point on the center of the drawing, click Zoom Out and click a mirror line end point above it.

This will form the right pauldron.

185 Click **Explode**, select the mirrored copy. and use the symbol tools to define it as a new symbol, EM Lamellar Pauldron R.

Creating the Gauntlets

Following the same approach for the pauldron, draw Lamellar Gauntlets. This time we'll just give hints.

186 Add the EM Chain Glove L2 from the ElfMaleArmsL2 catalog as a guide area.

187 The colors you need to use are color #133 for the armor, color #131 for the internal parths, and 135 for the highlights. The solid area needs to be outlined in black.

188 When you have defined the glove, you'll need to follow the same method make a gauntlet for each of the open and closed hands in each of the arm positions.

Below is our elf with a full set of accoutrements.

ALPHABETICAL LIST OF CA PRO COMMANDS

This table gives you a list of all Character artist commands

- **Command** gives you the command name found on the CA Pro Character and Catalog menus, the name that appears when you hover the mouse over a button (tool tip text) or on a right click popup menu. Type the command into CC2 Pro's Help Index or Find list to get more details on the command.
- **Where?** Lets you know which menu, popup menu or toolbar to find the command. CA's toolbar layout is shown on page 121. Right click on the button to access a popup menu. For example, Dwarf can be accessed by right clicking the **Race** button on the **Draw** toolbar.
- The **Text Equivalent** is what you type at the Command prompt to use the command.
- **Use In Macro** If the command is useable in a macro, then **Yes**, otherwise **No**. Note that all commands are useable as the last line in a macro. SETCOLOR and GETCOLOR are macros in themselves, and can be used within macros on a single line with no prompts.

Command	Description	Where?	Text Equivalent	Use in Macro
Add symdefs from file	Inserts all symbol definitions from a selected file	Character menu >> Change outline color	INSSDEF	no
Copy to visible sheets	Places a copy of the selected entities on every visible sheet in the current drawing	Catalog menu	COPYVIS	yes
Create catalog list file	Create a new drawing with symbols from current drawing listed in it	Catalog menu >> Rename and Reorder	SYMOUT	no
Create symdef name file	Create symbol definition file with list of symbol definition names	Catalog menu >> Rename and Reorder	SYMLST	no
Hide all sheets	Hides all but the current sheet	Catalog menu >> Rename and Reorder	SHIDEA	yes
Import renamed symdefs	Renames symbols based on symbol definition file	Catalog menu	SYMRENAME	no
Import reordered symdefs	Reorders symbols based on symbol definition file	Character toolbar >> Next sheet popup	SYMORDER	no
Interior only, Increment color	Changes the coloring of selection by increasing or decreasing the color numbers of selected entities. Affects only interior color.	Character toolbar >> Next sheet popup	CINC2	yes
Magic catalog, Free standing	Open free standing magic catalog	Catalog menu	CATALOG #symbols\CharacterArtist\Free\Magic.fsc	no
Magic catalog, Horizontal hex counters	Open horizontal hex counters magic catalog	Character toolbar	CATALOG #symbols\CharacterArtist\counters\CountersMagicHH.fsc	no
Magic catalog, Square counters	Open square counters magic catalog	Character toolbar	CATALOG #symbols\CharacterArtist\counters\CountersMagic.fsc	no
Magic catalog, Vertical hex counters	Open vertical hex counters magic catalog	Character toolbar >> Next sheet popup	CATALOG #symbols\CharacterArtist\counters\CountersMagicHV.fsc	no
Mirror Silhouette	Creates a mirrored silhouette from selection	Character toolbar >> Next sheet popup	MIRSIL	yes
Monsters catalog, Free standing	Open free standing monsters catalog	Character toolbar	CATALOG #symbols\CharacterArtist\Free\Monsters.fsc	no
Monsters catalog, Horizontal hex counters	Open horizontal hex counters monsters catalog	Character toolbar >> Next sheet popup	CATALOG #symbols\CharacterArtist\counters\CountersMonstersHH.fsc	no
Monsters catalog, Horizontal hex counters with attributes	Open horizontal hex counters with attributes monsters catalog	Character toolbar >> Next sheet popup	CATALOG #symbols\CharacterArtist\counters\CountersMonstersAttHH.fsc	no
Monsters catalog, Square counters	Open square counters monsters catalog	Character toolbar >> Next sheet popup	CATALOG #symbols\CharacterArtist\counters\CountersMonsters.fsc	no
Monsters catalog, Square counters with attributes	Open square counters with attributes monsters catalog	Character toolbar >> Next sheet popup	CATALOG #symbols\CharacterArtist\counters\CountersMonstersAtt.fsc	no
Monsters catalog, Vertical hex counters	Open vertical hex counters monsters catalog	File toolbar, New popup	CATALOG #symbols\CharacterArtist\counters\CountersMonstersHV.fsc	no
Monsters catalog, Vertical hex counters with attributes	Open vertical hex counters with attributes monsters catalog	File toolbar, New popup	CATALOG #symbols\CharacterArtist\counters\CountersMonstersAttHV.fsc	no

Command	Description	Where?	Text Equivalent	Use in Macro
New card figure, Dwarf, Gnome Halfling	Starts a new card figure for a Dwarf, Gnome or Halfling	File toolbar, New popup	BROWSET;#TEMPLATES\CharacterArtist\CardFigures\DwarfGnomeHalfling;	no
New card figure, Human, Elf, Orc	Starts a new card figure for a Human for an Elf or Orc	File toolbar, New popup	BROWSET;#TEMPLATES\CharacterArtist\CardFigures\HumanElfOrc;	no
New card figure, Monster	Starts a new card figure for a Monster	File toolbar, New popup	BROWSET;#TEMPLATES\CharacterArtist\CardFigures\Monsters;	no
New counter, Sheet	Starts a new sheet of counters	File toolbar, New popup	BROWSET;#TEMPLATES\CharacterArtist\Counters\Sheet	no
New counter, Single	Starts a new single counter	File toolbar, New popup	BROWSET;#TEMPLATES\CharacterArtist\Counters\Single	no
New portrait, Dwarf, Gnome or Halfling	Starts a new portrait for a Dwarf for a Gnome or Halfling	File toolbar, New popup	BROWSET;#TEMPLATES\CharacterArtist\Portraits\DwarfGnomeHalfling	no
New portrait, Human, Elf or Orc	Starts a new portrait for a Human, Elf or Orc	Symbol toolbar	BROWSET;#TEMPLATES\CharacterArtist\Portraits\HumanElfOrc;	no
New portrait, Monster	Starts a new portrait for a Monster	Symbol toobar >> Magic popup	BROWSET;#TEMPLATES\CharacterArtist\Portraits\Monsters;	no
Next sheet	Set next sheet current	Symbol toobar >> Magic popup	SNEXT	yes
Outline and Interior, Increment color	Changes the coloring of selection by increasing or decreasing the color numbers of selected entities.	Symbol toobar >> Magic popup	CINC	yes
Previous sheet	Set previoius sheet current	Symbol toolbar	SPREV	yes
Set varicolors	Sets the dark and light varicolors	Symbol toobar >> Monsters popup	SETCOLOR	yes
Sheets to Symdefs	Converts each sheet into a symbol defintion named after the sheet	Symbol toobar >> Monsters popup	SHTTOSYM	yes
Sheets...	Sheet management	Symbol toobar >> Monsters popup	SHEET	no
Show all sheets	Shows all sheets	Symbol toobar >> Monsters popup	SSHOWA	yes
Silhouette	Creates a silhouette from selection	Symbol toobar >> Monsters popup	SIL	yes
Symdef to Sheets	Converts each symbol defintion into a sheet named after the symbol	Symbol toobar >> Monsters popup	SYMTOSHT	yes
To match interior, change outline color	Makes outline color (1st color) of selection same as interior color (2nd color)	Symbol toolbar	UNOUTLINE	yes
To selected color, change outline color	Changes outline color (first color only) of selection	Symbol toobar >> Treasure popup	OUTLINE2	yes
To selected color, change outline color	Changes outline color (first color only) of selection	Symbol toobar >> Treasure popup	OUTLINE2	yes
Toggle varicolors	Swaps between dark and light varicolors	Symbol toobar >> Treasure popup	COLORTOG	yes
Treasure catalog, Free standing	Open free standing treasure catalog	Symbol toolbar	CATALOG #symbols\CharacterArtist\Free\Treasure.fsc	no
Treasure catalog, Horizontal hex counters	Open horizontal hex counters treasure catalog	Symbol toobar >> Weapons popup	CATALOG #symbols\CharacterArtist\counters\CountersTreasureHH.fsc	no
Treasure catalog, Square counters	Open square counters treasure catalog	Symbol toobar >> Weapons popup	CATALOG #symbols\CharacterArtist\counters\CountersTreasure.fsc	no
Treasure catalog, Vertical hex counters	Open vertical hex counters treasure catalog	Symbol toobar >> Weapons popup	CATALOG #symbols\CharacterArtist\counters\CountersTreasureHV.fsc	no
Weapons catalog, Free standing	Open free standing weapons catalog	Character menu >> increment color	CATALOG #symbols\CharacterArtist\Free\Weapons.fsc	no
Weapons catalog, Horizontal hex counters	Open horizontal hex counters weapons catalog	Character menu >> increment color	CATALOG #symbols\CharacterArtist\counters\CountersWeaponsHH.fsc	no
Weapons catalog, Square counters	Open square counters weapons catalog	Character menu >> Change outline color	CATALOG #symbols\CharacterArtist\counters\CountersWeapons.fsc	no
Weapons catalog, Vertical hex counters	Open vertical hex counters weapons catalog	Character menu >> Change outline color	CATALOG #symbols\CharacterArtist\counters\CountersWeaponsHV.fsc	no

PROFANTASY SOFTWARE PRESENTS

CC2 Pro Version

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CD PRO INTRODUCTION

City Designer Pro (CD Pro) is an add-on for CC2 Pro that allows you to create urban areas from all genres. It has a huge range of smart symbols (over 1,500) ranging from primitive to futuristic and fantastical. It has features to add custom buildings and even whole streets. A powerful index function lets you add a hyperlinked, alphabetical list of text in any map.

At the individual building level

- ✓ You can create custom shaped buildings in many pre-set styles. The styles include shading, which can be swapped around on the fly, roof hatching (such as Thatching) and custom roof edges.
- ✓ Add your own building styles with combinations of colors, roof edges, hatching, roof overlap and other features.
- ✓ Add frills such as dormers, chimneys and extensions to the pre-defined symbols and custom buildings.
- ✓ CC2 Pro's city symbols and frills are "smart". Buildings will align themselves to roads then offset from the road. Staircases lock to building edges, dormers to roofs.

At the street level

- ✓ Road networks are very easy to create.
- ✓ CD2 will create random streets using a large set of parameters that you control. Select from all the house styles you have defined at the building level.
- ✓ CD2 has grids that you can align with roads, making house creation along roads very easy.

Demographic information

- ✓ CD2 will add an easily controlled labeled grid to you map.
- ✓ CC2 Pro will extract text such as street names and add it to the map with its grid coordinates. Click on the label to zoom to the text.
- ✓ CD2 will color your building symbols so that if you hide the correct layers, you can see what all the buildings are for. This information can be concealed from your players; while maintaining the beautiful appearance of you map.

Latest Information

To find out about any additions to CD2 since this manual was written, double-click the **Readme** icon on the CD. Latest information including patches and technical support are available at www.profantasy.com.

What you need to know to use City Designer 2

This manual assumes that you understand the basics of using CC2 Pro. In particular you need to know:

- ✓ How to start, save and print maps.
- ✓ How to add entities to a drawing.
- ✓ How to choose entities for editing (entity selection).
- ✓ What properties are (color, line width etc) and how to set them for new entities and change them for existing entities.
- ✓ How to insert symbols.
- ✓ How to use layers.
- ✓ How to use grid, snap and attach modes.

Installing City Designer 2

Place the CD2 compact disc into your CD-ROM drive. On most computers there will be a few seconds of whirring, then you will see a window showing the contents of the CD. If this doesn't happen, double-click on "My Computer", then on the icon for your CD-ROM drive.

To install CD2, double-click on the **Setup** icon, then follow the on-screen instructions.

Please make sure that if you have Dungeon Designer 2, it is installed first. If you install DD2 later, you will need to re-install CD2 after.

During the installation you will be asked to give your name, company and CD2 Serial number. Your unique serial number is in the back of this manual.

Starting City Designer 2

After you have installed CD2, start CC2 Pro and click on the CD2 icon on the **File** toolbar. You can see a new set of buttons (the **City** toolbar) and a new menu.

The City toolbar

These icons are usually found on the left of the CC2 Pro screen. If you can't see them, select the **Tools** icon and ensure that Left toolbar 1 and 2 are ticked. Most of CD2's features are accessible from the icon bar.

Draws a house	Draws a road
Draws a random street	Sets the random street options

Adds a labeled grid overlay

Adds an A to Z street index

Colors buildings by their layer

City drawing tools

Symbol settings

Toggle symbol style

ROADS AND STREETS

CD2 uses drawing tools to add paths or smooth paths to your drawing to represent roads. You can add any entities you want to represent roads, but CD2 has short cuts to make it easier.

1 Click **New** . Click 1000 x 800.fct.

2 Click **Road** . This adds the default road, a 10-foot wide curve.

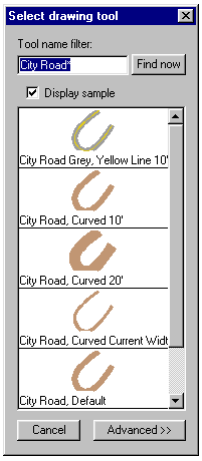
3 Click a start point, then one or more points to create a road. Right click to stop adding points. Make sure the road does not overlap itself.

When you add roads, don't worry if they go over the edge of the map border; you can **Front** the map border at the end.

> The Road commands in CD2 add roads to the ROADS layer. If you prefer, you can add them to any other layer. Start a road command, click on the layer indicator then choose another layer. Continue drawing.

Custom roads

CD2 provides more than one road drawing tool. You can even create your own.



4 Click the Line Width indicator W: 10.00000 and type **5**, OK.
You've set the current width to 5 feet.

5 Right click **Default Road** .
You can see a number of samples, all named, which show you other available road drawing tools. You are given a choice of widths and a "current width" option, as well as a straight road.

6 Click Road, Straight Current Width, last on the list.
You are ready to draw a 5-foot wide, straight road.

7 Click points to make a straight road. Right click to finish the road. Click points to make a second road.

Other road-like areas

You can add squares and other straight-edged solid filled areas by right clicking **Default Road** , then clicking City Road, Filled Area. Click points to create a paved area. Right click to close the area.

Selecting City Symbol catalogs

These buttons open CD2's new symbol catalogs and set an appropriate house setting (more on this later). Each buitton can open more than one catalog. Left click on the button a second or third time to open new catalogs, or right click the button to see a shortcut menu. For example click **Orcs/Halflings/Elves** to open the *Orcs* catalog, click again for the *Halflings* catalog and once more for the *Elves* catalog. Clicking again takes you back to Orcs.

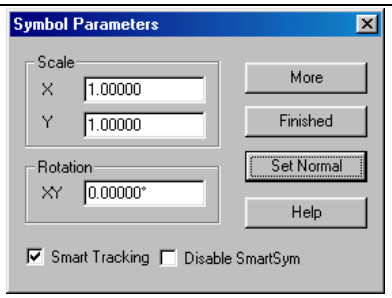
You can also access City catalogs by clicking on the **Catalog...** button then choosing a file from the *Symbols/Cities* folder.

Smart Symbols

City Designer 2 makes use of *smart symbols.* Smart symbols align to roads and then offset from them, making sure that your houses are placed accurately without much effort.

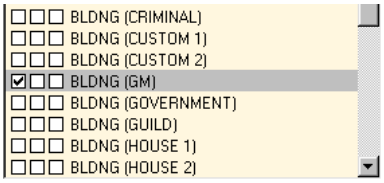
To enable smart symbols: Right click when inserting a symbol and uncheck **Disable SmartSym**.

To enable smart tracking: When smart symbols are in operation, CC2 Pro must check to see if the symbol cursor is over another entity. This can take some time if you have a large drawing. If you find that the symbols are moving too slowly, you can disable the automatic alignment of the smart symbol cursor. To enable, right click when inserting and check **Smart Tracking**.



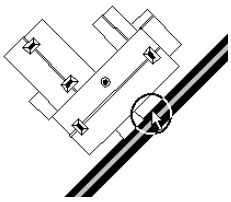
Adding a smart symbol aligned to a road

8 Click the layer indicator and choose a layer on which to add your smart symbol. This should be one of the BLDNG layers.

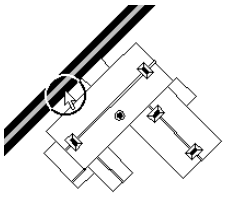


9 Right click a button on the Symbol toolbar and click a catalog.

10 Click a building symbol in the catalog window. Move the building over the map. Notice that whenever a building crosses a road it aligns to it.



Arrow cursor on north side of road.



Arrow cursor on south side of road.

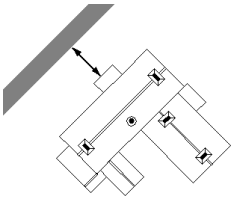
11 Choose a road and hover the building over the road. As you move the cursor slightly away from the center of the road, the building "flips" to that side of the road.

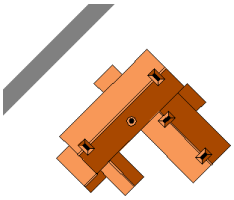
12 Click to establish the position along the road.

The prompt reads `Offset from place point [40]:`.

As you move the cursor, the building now moves perpendicular to the road on a cursor.

13 Click a point, type in a distance, or press the right button to accept the default distance.





Click a point then slide the symbol perpendicular to the road.

14 Click another symbol. Select a point on the road again, making sure that the cursor is on the same side as before. Right click. The symbol is placed an identical distance from the road.

Adding symbols without automatic aligning

As an alternative to automatically aligning symbols, you can align them manually then place them by eye.

15 Disable smart symbols and the smart symbol cursor by clicking a symbol, right clicking then setting the options as below.

Symbols will no longer automatically align to other entities.

16 *(Optional)*On the City menu, click Lock symbol angle. Choose a straight road to which you want to align the symbols.

The symbol angle is now locked in the direction of the road.

17 Start placing symbols.

> You can use the arrows keys to align your symbols north, south, east or west, or press [2] and [3] to rotate freely.

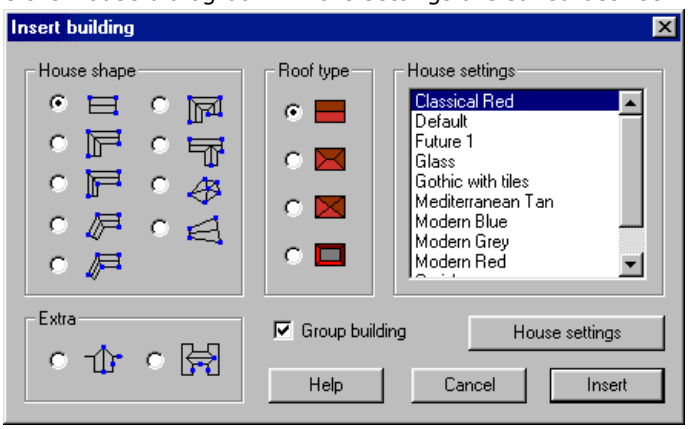
THE HOUSE BUILDER

Although CD2 has over 1,500 symbols, buildings come in all sorts of shapes and sizes – more than any number of symbols can cover. CD2's House lets you create a variety of custom-shaped buildings in a selection of styles. You can also add extensions to individual houses or connections, which join houses together. You can combine symbols and Houses on the same map.

Click **House** to start adding houses to your drawing, or right click to add any house shape in the current style.

The House dialog box

When you click **House**, you see the House dialog box. All the settings are saved between houses.



House shape: Controls the footprint of the building and gives you an idea of how the house will look. Select one option from here, or alternatively choose and extension or connection.

Extra: These shapes are for drawing an extension or connection to an existing house or symbol, instead of a whole new house.

Group building: Check this option if you would like your building to be treated a single entity (recommended).

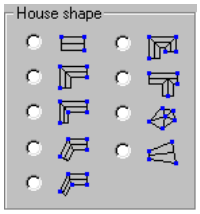
Roof Type: Choose an option here to determine the appearance of the building's roof.

House settings: (List) Choose a pre-defined setting from this list to determine the color, hatching, shading and roof edge characteristics of you buildings. When you select a catalog icon, it chooses an appropriate House Setting for you.

House Settings: **(Button)** Click the **House settings** button to edit house settings and add new ones.

Insert: Starts a new building with the current house dialog box settings.

House Shapes

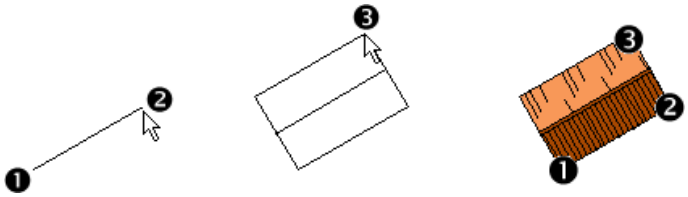


The House dialog box gives you nine base house shapes which allow you to create a wide variety of building outlines.

And if these shapes aren't enough, you can expand on any shape with extensions and connections to neighboring buildings.

The current house shape is remembered between houses.

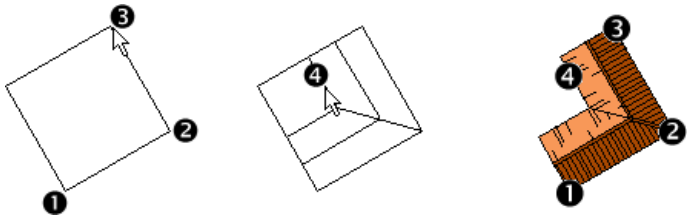
House Shape 1 (Rectangular)



This simple shape is the basis for most houses.

Select 3 points to produce a rectangular house at any angle. The first two points are the long edge of the dark side of the house. The third point defines the depth of the house.

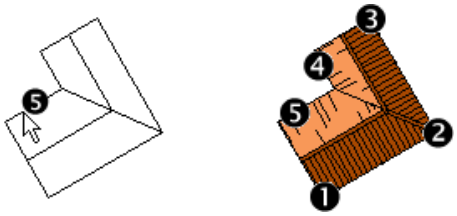
House Shape 2 (Regular L)



This shape produces L-shaped houses with the same width for both sections.

The first two points are the outside edge of the first section, the third point forms a rectangular cursor in which the L is enclosed; the final point sets the inside corner of the L.

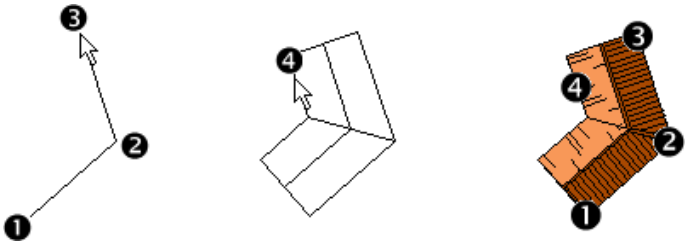
House Shape 3 (Irregular L)



This shapes produce and L-shaped house with the option for a different width for each section.

As with House Shape 2, the first three points define the outside of the L. The fourth and fifth points define the width of the two sections.

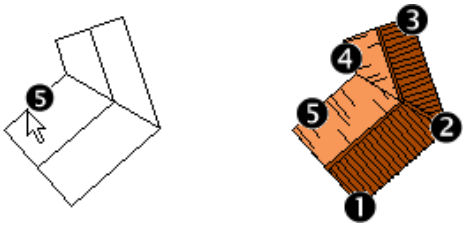
House Shape 4 (Regular V)



This shape produces V-shaped houses with the same width for both sections. You draw it just like a Regular L, except the angle between the roofs isn't locked to 90°.

The first two points are the outside edge of the first section; the third point is the third point of the outside of the V. The fourth point selects the inside of the V.

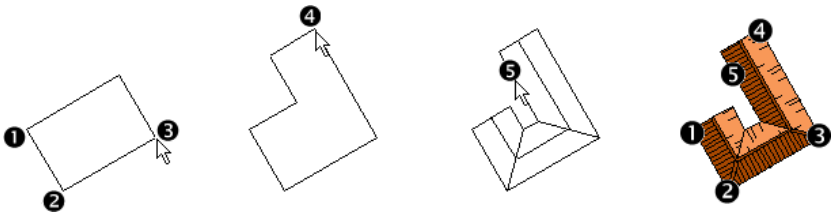
House Shape 5 (Irregular V)



This shape produces V-shaped houses with the option for a different width for each section.

As with the Regular V-shaped house, the first three points define the outside of the V. The fourth and fifth define the width of the two roof sections.

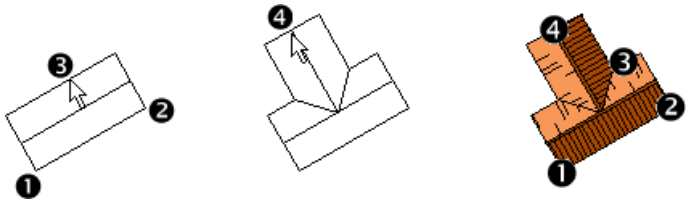
House Shape 6 (Irregular U)



This shape produces a U-shaped house.

The first four points define the outside of the U, the fifth point defines the width of all the roof sections.

House Shape 7 (Irregular T)



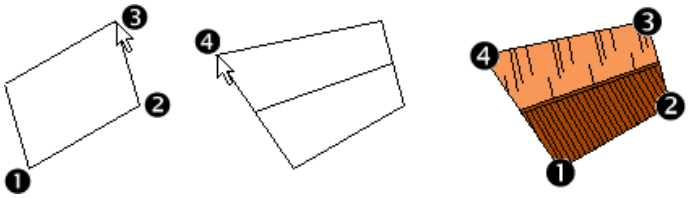
This shape produces a T-shaped house. The first two points describe the length of the T's top bar; the third determines the width of the roofs, the last point the position of the upright.

House Shape 8 (Many sided)

This shape produces a polygonal house with as many sides as you like. It is particularly useful for orc huts or nearly round buildings.

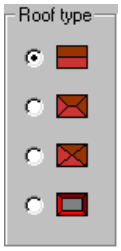
Place as many points as you want to determine the outside edges of the house. When the outline is complete, right click then select the roof vertex. This shape is unaffected by roof types other than flat roof.

House Shape 9 (Four-sided)



This produces an irregular four-sided house with no constraints. The first two points are the long edge of the dark side of the house. The third and fourth points determine the other two corners of the house.

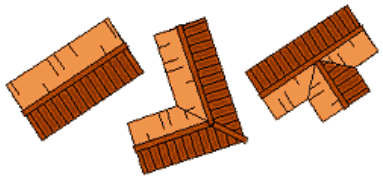
Roof Types



There are four **Roof types** in the House dialog box to control the appearance of the roof inside the building's boundaries.

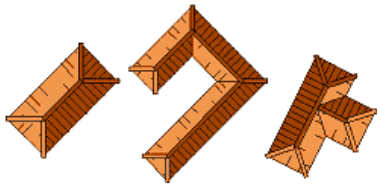
The current roof type is remembered between houses.

Roof Type 1 (Gabled)



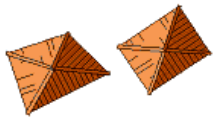
The first type creates houses with a sloping roof, which has *gables*. A gable is the angled section in a wall between roof sections. This roof type affects all house shapes apart from the many-sided roof.

Roof Type 2 (Hip Roof)



This creates a roof with a *hip* roof instead of a gabled roof. A hip roof is one that slopes up from a wall on all sides, rather than having a gable. The angle of the hip is determined by the current Roof Options for this type on the House Settings dialog box..

Roof Type 3 (Central Point)



This only affects the basic house shape (shape 1) and the four-sided irregular house type (shape 8). It creates a roof that slopes up on four sides to a central point. Other house shapes give a Hip Roof.

Roof Type 4 (Flat Roof)

This creates a house with hip roof edges sloping up to a flat area. It works with all house shapes. The color of the roof is controlled by the **Flat Roof Color** of the current house setting. The distance between the edge of the roof and the flat area is controlled by the **Roof Options** for this type in the current house settings. This can be used to make Arabic-style buildings, skyscrapers and houses with roof gardens.

Matching the roof type of symbols

When you add houses to the drawing, you usually want to match them to symbols from the catalog. The House dialog box contains pre-defined house settings to help you match the symbols' appearance. However, you should also check that you are matching the roof type as well. For example, the *Modern Blue* catalog uses hip roofs, so you should set the roof type to **Hip Roof** before inserting the symbols.

To add a house

18 Click the Layer indicator and choose a drawing layer. This should be one of the BLDNG layers.

19 Click the **House** icon .

20 Select a **House shape**.

21 Select a suitable **House setting**.

22 Select a **Roof type**.

The **House setting** name might suggest a particular **Roof type**, for example, with the **Mastaba (use flat roof)** house setting you should use a use a flat roof (the bottom roof type).

23 Click **Insert**.

The prompt reads `First house point:`.

24 Select the first corner of the house. You will be asked for more points until the house is complete. The exact number of points depends on the house shape. The first two points always define a long edge along the dark side of the roof.

When the house is complete, the prompt reads `First house point (S=Swap colors, E=Extension, C=Connection):.`

25 At this point you can:

- Press s a number of times to swap the colors around. The number of combinations depends on the current House Settings;
- Press e to add an extension to the house,
- Press C to connect the house with another house
- Select a point to start a new house of the same type.
- Right click to finish.

Align Houses with Roads using Grid Angle

CD2's symbols automatically align to roads. You also have that option with houses. By changing the angle of CC2 Pro's grid you can draw houses precisely along roads.

Usually, CC2 Pro's grid is aligned horizontally and vertically. CD2 adds the option to angle the grid to make it easy to draw buildings parallel to roads when snap is on.

Only CD2's pre-defined angular grids may be aligned. All CD2 maps include angular grids. You can add angular grids to any map.

Angling the grid

26 On the City menu, click Grid Angle.

The prompt reads `Angle or select entity:.`

27 You can:

- **Either** type an angle for the grid alignment. The command finishes.
- **Or** click a point. If the point is on an entity, CD2 will snap to it. The Command Line reads `bearing to:.`

28 Click a second point. If the point is on an entity, CD will snap to it.

The grid is now aligned.

If you try to align a non-angular grid, a message box says "The currently selected grid is not an angular grid".

An example

The most common use for this command is to make the grid lie parallel to a road, then draw houses along the road.

29 Right click on the **Grid** button, choose an angled grid such as 20' angled, 1 snap.

30 On the City menu, click Grid Angle then click two points on a straight road.

The grid now runs parallel to the road.

31 On the Tools menu, click Align Grid.

This moves the grid so that a grid point is on a selected point. This way you can move the grid so that the fronts of your houses are the correct distance from the road.

32 Click a point, click **On** then click on the center of the road.

33 Right-click the Grid button and enable **Grid**, **Snap** and **CsrSnap**.

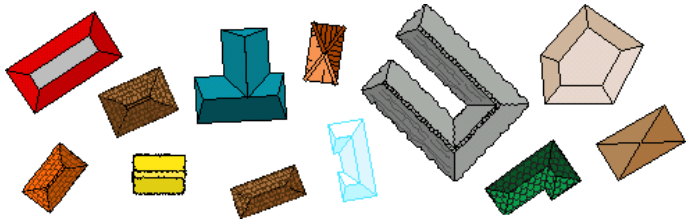
34 Pick a grid with snap points suitable for the size and type of houses you are drawing. A grid with snap points every 5' is about normal. For primitive, higgledy-piggledy buildings, a 1' snap would be better.

35 Click **House** and draw a house along the edge of the road.

To change the layer of a house

Because houses span many layers, changing the layer of a House using **Change Layer** will prevent certain of CD2's features working. Always click on the City Menu then click Change house layer instead.

House Settings



House Settings are pre-defined sets of roof hatching, roof edges colors, and other parameters that determine the "look" of a building. You can choose from one of the pre-defined settings on the House dialog box, or create your own styles. This section tells you how to choose settings; you can design your own.

Getting to the house settings

- To choose a pre-defined house setting, select one from the scroll box on the House dialog box.
- When you click a catalog button, a suitable house setting is selected for you.
- To edit an existing house setting, or add a new one, either select House Settings from the City menu, or select the House Settings button from the House dialog box.

House Settings features

✓ You can export or import your house settings to share them with another user.

✓ You can change the coloration of the house setting, using two or three colors for shading, one for the flat roof type, and others for the hatch coloration and roof edges.

✓ You can include a hatch pattern, irregular roof edges and roof ridges. These are either the default, or can be defined in special "House Style" files.

✓ You can control the width, number, overlap and coloration of roof ridges.

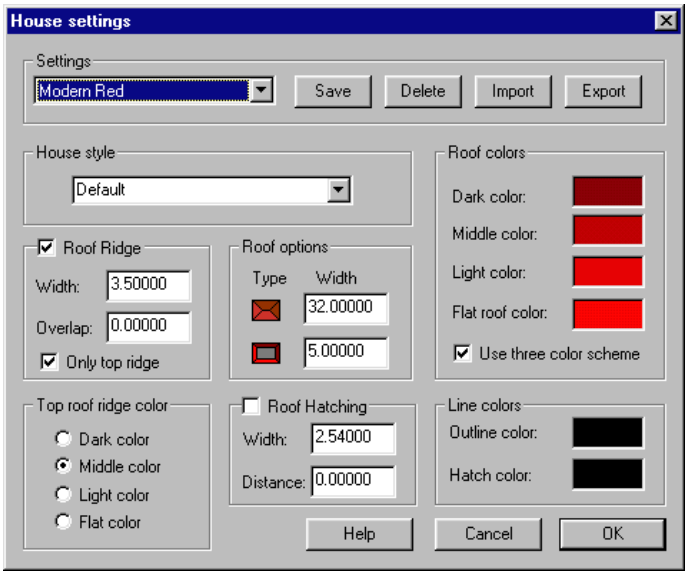
✓ You can control the angle of the Hip Roof shape.

✓ You can control the distance from the edge of the Flat Roof style.

House Settings dialog box

This section gives an overview of the house setting dialog box; each area is described in more detail in the sections following.

The House Settings dialog box is where you edit house settings and add new ones. You can change colors in the dialog box by clicking on the colored box then selecting a new color. If you select color 31, this will appear as the current color when a house is inserted. When you have finished editing the settings, remember to select the **Save** button.



Settings: Pull down the list to edit a new house setting.

Save: Saves the current settings. Type a name or leave the default (current) value, click **OK**.

Import: Imports another user's saved house style settings and files. Choose an HSS file, then select overwrite options.

Delete: Deletes the current house saved setting.

Export: Exports all your house settings and house style files to an HSS file. Other users can then import it.

House Style: Pull this list down to select a House Style file from the Symbols\Cities\House Styles folder. If you want straight edged and ridged houses, select Default.

House styles determine:

✓ The appearance of the edge of the outline of a building (straight, jagged, wobbly)

✓ The style of the roof ridge (rectangular, a single block, like Thatched, or a row of tiles like Gothic)

✓ The appearance of the internal lines of a house (straight, jagged, wobbly)

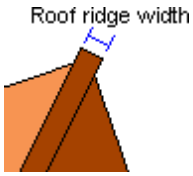
✓ The Roof Hatching style, which can be different for the Flat Roof area and the Medium, Dark and Light colored areas of the roof.

Roof Ridge

The roof ridge is a repeating shape that runs along the internal roof boundaries. You can exclude a roof ridge altogether, or have only a top roof ridge. When created with the Default house style, roof ridges are filled rectangles. Other house styles have different roof ridges.

If you want a roof ridge, select the **Roof Ridge** check box; otherwise uncheck it and don't worry about the other roof ridge options. If you only want a top ridge, select the **Only top ridge** tick box.

The current House Style also controls the appearance of roof ridges.



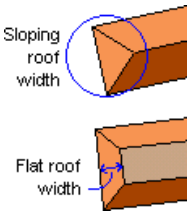
Roof Ridge: Width

Type a value in the **Width** box to specify your the width of your roof ridge.

Roof Ridge: Overlap. Type a value in the **Overlap** box to specify your the overlap of your roof ridge.

Top roof ridge color. The color of the top roof ridge. The colors refer those in the in the **Roof Colors** area.

Roof Options

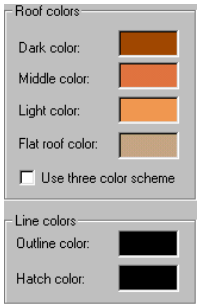


These specify the appearance of houses when a Hip Roof or Flat Roof type is selected.

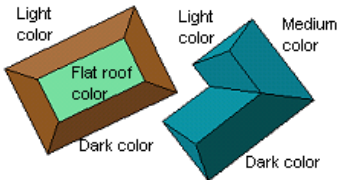
Width sets the angle of the slope. It is measured as a percentage of the roof half-width. 100 gives an angle of 45°.

Flat Roof Width is the offset of the flat roof from the roof edge.

Roof Colors



Buildings created with the House dialog box have a wide variety of color options, selected from the **Roof Color** and **Line Color** group boxes.



Change any colors by clicking on a colored area on the dialog box, selecting a color from the color dialog box, then choosing **OK**.

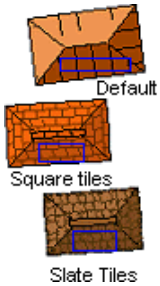
If you choose to **Use three color scheme**, the roof shading will include all three colors. The **Flat roof color** is only relevant if you are using the flat roof type.

As well as controlling the solid filled areas, you can also control the outlines.

Line Colors: Outline color is the color of a building's edges and internal lines.

Line Colors: Hatch color is the color of any roof hatching found in the current house style.

Roof Hatching



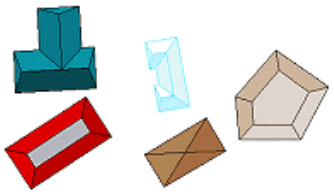
Houses can optionally have fill patterns on top of the solid roof colors. The style of the roof hatching depends on the currently selected House Style. You can have different roof hatching for the Dark, Middle and Light and Flat Roof areas of the roof.

Roof hatching is best confined to small maps, as it increases the size of maps considerably.

Roof Hatching: Width. For the Default house style, this controls the gap between each hatch line. For other styles, it is a scale for the hatch pattern, usually 1.

Roof Hatching: Distance. This is the distance between the roof outline and the hatch pattern. This is usually 0. It does not affect the Default fill pattern.

Creating House Settings



It is very easy to create House Settings. You can then save these and then re-use them in a later session.

Most House Settings are based on the Default house style, which is hard-coded into CD2. It creates straight-edged houses with an optional simple hatching pattern.

To create a basic house setting from scratch

All the options for house setting creation are covered in *House Settings* on page 174, above.

36 Right-click **House** . Click **House Settings**.

You see the House Settings dialog box.

37 Pull down the Settings list and choose a style similar to the one you are making. Select **Save** and choose a new name.

38 Pull down the House Styles list and select a house style. Most often, this will be Default.

39 Choose your **Roof Colors**.

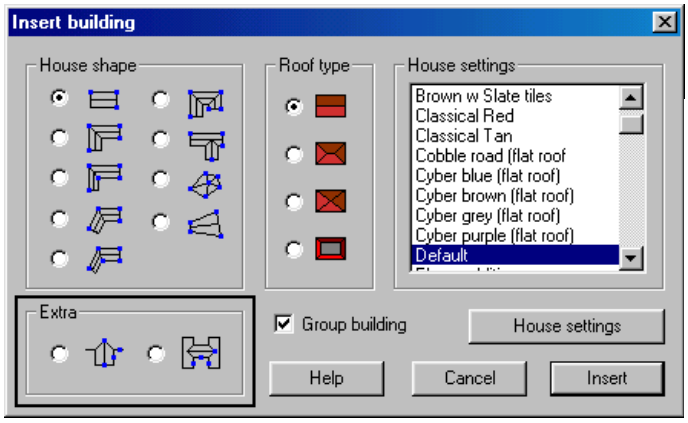
40 Choose your **Roof Ridge** options and colors.

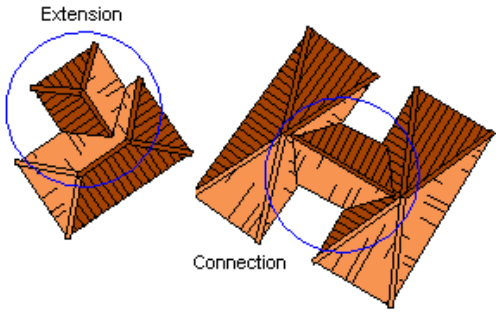
41 Enable **Roof Hatching** if you want it.

42 Select the **Save** button.

> You can test your new House Setting at anytime during this process, select **OK**, then insert a house. Make changes, remembering to save each time.

Extras - Extensions and Connections





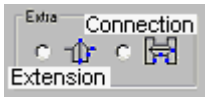
Extensions and connections are special house shapes that extend a house or connect two parallel houses together. They can be added to houses or symbols. They can be used to create house shapes not included in the standard shapes such as H-shaped and Cross-shaped houses.

You must add Extensions and Connections to existing houses. They can be selected from the House dialog box and be added to an existing building, or they can be added in the middle of a House command to a building that you have just finished.

To start an Extra from the dialog box

43 Click the **House**.

44 Click either **Extension** or **Connection**.



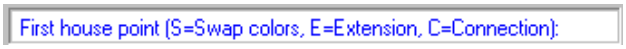
45 Choose a Roof Type and House Setting to match the house you wish to extend.

46 Click **Insert**.

To add an extra just after adding a house

47 Add the house using the house dialog box.

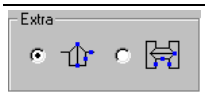
48 When the prompt reads:



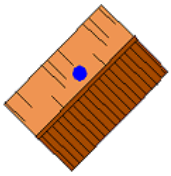
49 Press e to add an extension in the current style and c to connect two houses.

Adding Extensions

Any house or house symbol with a non-curved edge may have an extension added to it.

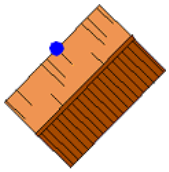


50 First start the Extension, either from the House dialog box or with e just after adding a house.



51 Click a point within the house where you would like the "point" of the extension to appear.

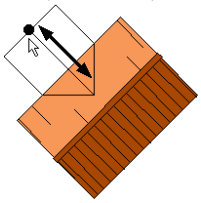
Point within house



52 With the pick box, click a point on the house edge.

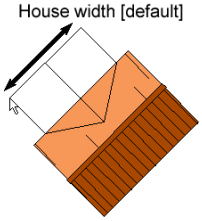
House edge

Extension end point (Shift = slide)

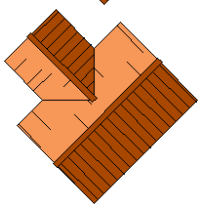


53 Use the mouse and cursor to increase and decrease the length of the extension. If you want you can press 3 and move the mouse to slide the extension along the roof edge. When you are ready, select a point by left clicking.

House width [default]



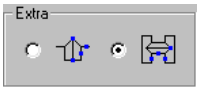
54 Click a point to determine the extension width, or right click to accept the default width



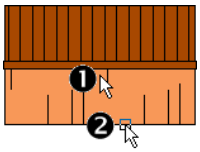
55 You can now right click to finish the extension, press s to swap the colors, press e to start an extension, or press C to start a connection.

Connecting houses

Houses may be connected with a stretch of roof called a connection. Only houses that are relatively close together with parallel roofs can be connected correctly.

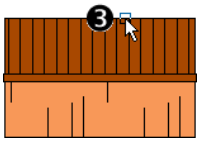


56 First start the Connection, either from the House dialog box or with C just after adding a house.

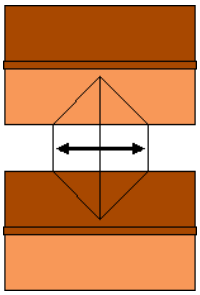


57 At the `Point within house` prompt click a point inside the roof of the first house (marked ❶).

58 At the `House edge` prompt, click the edge of the first house, nearest the second house (marked ❷).

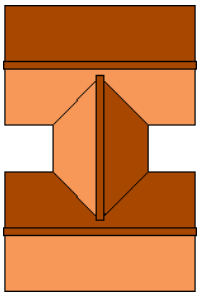


59 At the `Next house edge` prompt, click the edge of the second house (marked ❸).



60 At the `House width[default]` prompt, either click another point, right click to choose the default width (previous) or type in a width.

The connection is drawn.



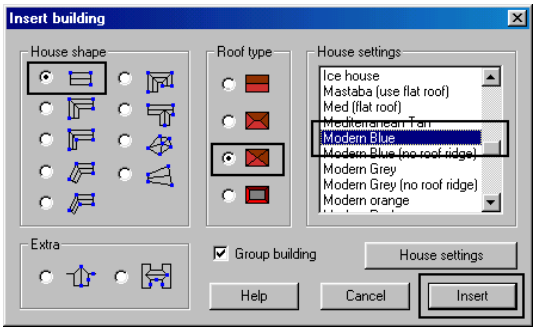
Swapping colors

CD2 houses sloping roofs can have up to three colors. The position of these colors can be "swapped" in mid House command to make sure that the shading looks correct. The colors are called the Dark, Medium and Light colors. The actual colors used depend on the roof colors in the current House Settings. The Medium color is optional and depends on whether the 3 color scheme tick box is checked in the current House Settings.

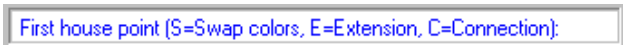
When you first draw a house, the first edge you select is the long edge of the darkest side of the house.

3-color scheme example

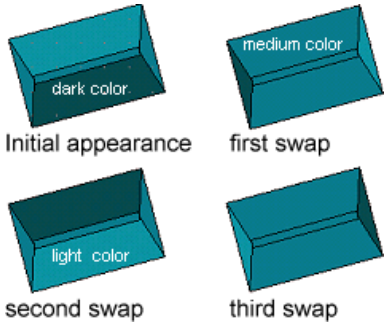
61 Click **House** . Choose a Modern Blue House Setting (which uses a three-color scheme) with the settings as below.



62 Click points to make a house until you see the following prompt:



63 Press S. See how the color scheme changes. Press S again a few times.

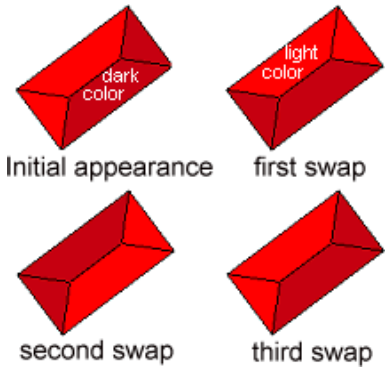


The house shading cycles through four permutations.

2-color scheme example

64 Start a house with the dialog settings as in the previous example, but use the Classical Red house setting.

65 At the swap prompt, press the S key a few times.



NOTE: It is possible to affect the swap color order and mapping. See the file Mappings.fcw in the CC2 Pro System folder for more details.

ADDING RANDOM STREETS

Random Street adds a row of buildings to your city. These can be placed in a straight line or along a straight or curved roads. The exact appearance of the road is random, but you can control the parameters from the **Random Street Options** dialog box. Once you've made the street you can add, remove and edit houses as normal.

To add a random street

66 Click **Random Street** .

The prompt reads `First end of street` and you can see a pick box.

67 Select the center of a road. If you miss, you will be able to add a street in a straight line, not along a road.

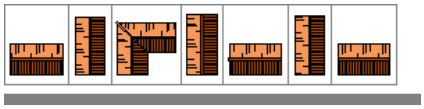
The prompt reads `Pick start position [nearest endpoint]:`.

68 **Either** right click to start the street near the endpoint or the entity you selected **or else** click a point on the entity where you want the street to start.

The prompt reads `Second end of street:`. You can see a dynamic cursor that shows you what the street could look like.

69 Move the mouse up and down the street, noticing that each time you get a slightly different selection of building types.

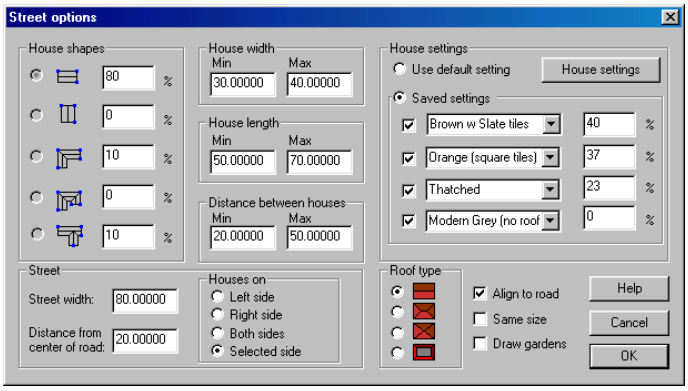
70 When you are happy with the layout, click to select an endpoint.



The prompt reads `First end of street:` again.

Random Street Options

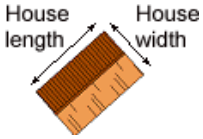
Random Street Options controls the appearance of streets created with the Random Street command. Settings here are saved between sessions. Note that certain settings will produce impossible houses in your street.



House Shapes This group box determines the percentage of each type of house shape along the road. Type in percentage values starting from the top and going down the list.

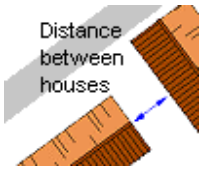
Houses On This sets the side of the road that the houses appear on when you use the Random Street command. **Left side**, **Right side** and **Both sides** are obvious, **Selected side** allows you to choose the side when creating the street.

House width
House length



Type in a maximum and then a minimum value to give a range for the size of random houses. The minimum value for length should be greater than the maximum value for width. These settings are overridden if you select the **Same Size** option.

Distance between houses Type values here to give a range for the distance between the houses in your street. If you want a terrace, type 0 in both the maximum and minimum.



Roof Type Click which roof type you would like for the houses in the street.

House Settings button. Takes you to the House Settings dialog box where you can change and add to the available house settings.

Use Current Settings radio button. If you set this option, the appearance of all the houses for the random street will be determined by the current house setting, otherwise, the **Saved Settings** will be used.

Saved Settings radio button. If this radio button is checked, the appearance of all the houses for the random street will be determined by the settings in the pull down lists and their percentages.

Saved Settings pull down lists. Check the check box for each house setting that you would like included in your street. Pull down the list to select the type. Type in percentages from top to bottom.

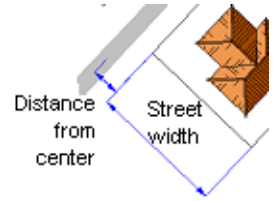
Align to road Select this check box if you would like the roadside faces of the houses to be equidistant from the road.

Same size Check this button if you would like identical sized and shaped houses. The house will have random styles if the **Saved Settings** button is set. They will be the average width, length and distance apart of the current settings.

If **Same size** is set, the House Shapes percentages are ignored - use the **House Shapes** radio button to determine what shape of house to use.

Draw Gardens Check this if you would like boundaries around each house delineating each house's property.

Street width and Distance from center of road Type in values here. The Street Width should be greater than the maximum House Width or House Length settings.

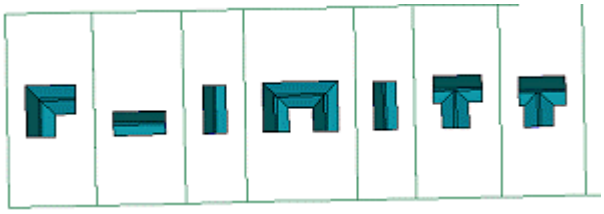


Random Street Options examples

When you want to use Random Streets, you first have to decide the look of the whole town. This will vary according to what era, symbol catalogs and house settings you use. If your streets are fairly uniform, you should put less variation in house dimensions, styles and types.

The easiest way to learn to use the Random Street options is to experiment, but here are a couple of examples to get you started.

Example 1 – A modern well-to-do street



This is a new development with blue roofs. They don't have roof ridges, the houses are spacious and individual, detached with large gardens.

71 Click **Random Street Options** .

You see the Street Options dialog box.

72 We are only going to have one **House Setting** along this street, so click the **Use default setting**. This means that only the current House Settings will be used.

73 Click the **House Settings** button then pull down the **House Settings** list, choose Modern Blue and then select **OK**.

74 The houses in the example street are individual and are not all aligned. They have gardens. Select the **Draw gardens** option, deselect **Align to road** and **Same Size**.

75 They have hip roofs so click , the second roof type on the list.

76 The houses' shapes vary. Starting at the top of the **House Shapes**, type in 20, 10, 25, 25 and 20.

77 The gap between each house is large but fairly constant. Type 50 in the **Maximum** distance and 45 in the **Minimum**.

78 Click **Houses on** to **Both sides**.

79 The **House Length** varies between 60 and 70, the **Width** between 30 and 40.

80 These houses have reasonable sized gardens, so set the **Street width** to 250. The **Distance from the center of road** is 30.

81 Click **Random Street** . Click two points to make the street.

You may wish to move the houses slight towards or away from the road for more variation.

Example 2 – a row of tightly packed village houses

In this example we have a small town which is built primarily of brown tiled buildings. A few have been retiled in the latest fashionable orange clay, and a few are still old-fashioned thatched cottages. The buildings are small and close together

82 Click **Random Street Options** .

83 In House Settings, click **Saved Settings**.

84 There are three styles of houses, so check the first three check boxes in the **Saved Settings** group box.

85 Pull down the settings in turn, choosing Brown (random Tiles), Orange (Square Tiles) and Thatched.

86 Type in **70**, **20** and **10** for the percentages of each type of house.

87 Deselect **Draw gardens** and **Same Size**. Select **Align to road**.

88 There aren't many fancy designs in this street so the **House shapes** percentages from top to bottom are **80**, **0**, **10**, **0**, and **10**.

89 These are small houses. The **Minimum width** is **15** and the **Maximum 20**. The **Minimum length** is **20** and **Maximum 30**. (The minimum length should be greater than the maximum width).

90 The **Distance between houses varies** between **0** and **10** feet.

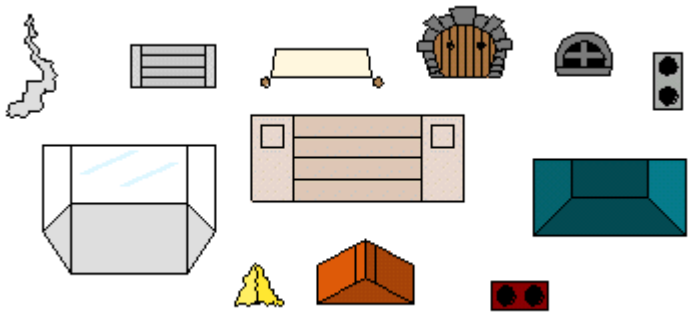
91 The **Street width** is **35** (it should be greater than the maximum length) and the **Distance from the center of the road** is **10** feet. Set **Houses On** to **Both sides**.

92 Click **Random Street** . Add a very short street, maybe three or four houses on each side of the road. This can take some time to calculate, although it redraws quickly enough after the first time.

Not so random

93 To get a street of houses with identical dimensions, click the **Same Size** option. If you want terraced houses, set the **Maximum** and **Minimum Distance between houses** to **0**. If you want them to be identical houses, check the **Current Settings** radio button.

Adding Frills to Buildings

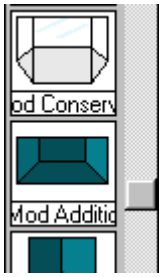


At the end each catalog, CD2 has some symbols that are designed to make buildings more interesting and complex. These include conservatories, dormer windows, smoke, chimneys, and roof holes. These come in three varieties:

- ✓ The first, like round chimneys or smoke are just normal symbols. They don't align to buildings because they don't need to. Just place them as you would any CC2 Pro symbol.
- ✓ The second are extensions like conservatories, stairs or garages. They align to the edges of buildings. Just slide them round the building and place them when you are ready.
- ✓ The third are roof features like dormer windows align to the edge of the roof, then offset inside.

Some of CD2's building types such as Halfling dwellings and Thatched have non-straight outlines. If you move a frill over one of these outlines, the smart symbol aligns to the complex outline, making it flicker all over the place. However, we have added a simple outline to these building types just inside the main edge. It is called a frill track. It is usually hidden by the solid filled roof, but smart symbols will usually lock to it because it is below the jagged outline. If you have difficulty placing smart symbols, zoom out a little or hide the STRUCTURES (SHADING) and STRUCTURES (COLOR) layers before placing frills.

Example 1 – A conservatory



94 Right click Modern Blue/Grey/Red , click Modern Blue.

95 Click a building symbol and add it to the drawing.

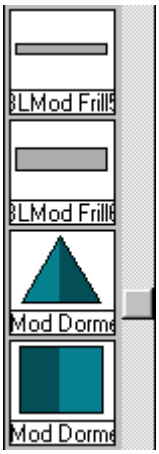
96 Scroll down the symbol catalog and pick the **Mod Conservatory** symbol. Move it over the edge of the blue building.

Notice how it aligns to the outside as your cursor moves just outside the edge.

97 Place the conservatory.

Example 2 – a dormer window

Continued from the previous instructions…



98 Click the **Mod Dormer 1** symbol .

99 Move it over the edge of the blue building.

Notice how it aligns to the inside of the building.

100 Place the dormer.

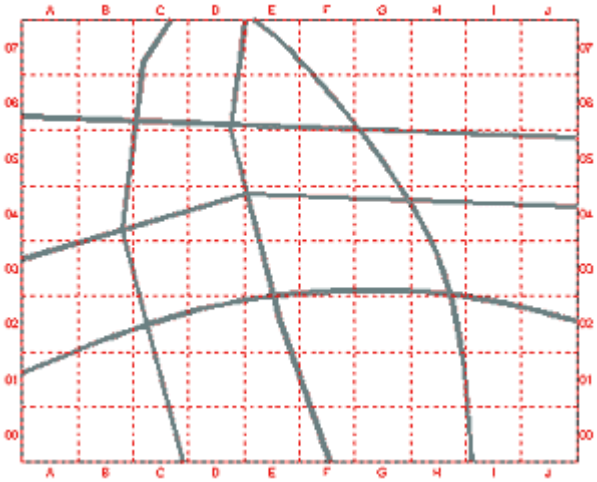
The prompt reads `Offset from place point [40]:`.The frill now moves perpendicular to the roof edge on a cursor.

101 Click a point, type in a distance, or right click to accept the default distance. When you add the next dormer, use the default distance.

ADDING INFORMATION

When you've added your houses and decorated your buildings, you will probably want to add text labels to your drawing. Select a suitable layer and add text in the usual way. After this, you can add a reference grid and finally an index of the street names or other text in your drawing.

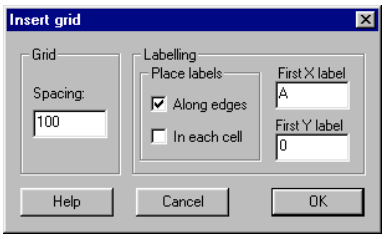
Grid overlays



A grid overlay is a grid of squares, optionally labeled along the axes or in each cell. This acts as a reference, enabling you to locate buildings easily. It has the current properties (color, layer, etc). You need to add a grid overlay in order to add an index of street names.

Grid Overlay dialog box

Click the **Grid Overlay** to add the grid overlay.



Grid Spacing This is the size of each square.

Place Labels: Along edges Places labels along the axes of the grid overlay.

Place Labels: In each cell Each square will include a label if you check this option.

First X label This is the first number or letter for the horizontal axes. You can start at any letter or number. Letters count up A-Z, then AA-AZ etc.

First Y label This is the first number or letter for the vertical axes. You can start at any letter or number. Letters count up A-Z, then AA-AZ etc.

To add a grid overlay

102 Click **Text Properties** . Type a suitable text height.

103 Set the current layer, color and line style by clicking their indicators on the Status Bar.

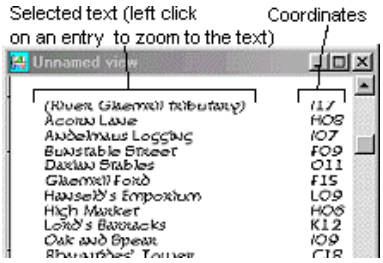
104 Click the **Add Grid Overlay** . Click the dialog box options.

The prompt reads `First corner of square grid[0,0]:`.

105 Right click to start the grid at 0,0 (the bottom left), or click a point with the mouse.
The prompt reads `Second corner of square grid:`.

106 Click a point for the top left corner of the overlay.

Indexes



After you have added a grid overlay to act as a reference, you might want to add an index of street names to your drawing.

Create Index adds an alphabetical index of text to your map. This consists of text that you have selected, arranged in alphabetical order with the Grid Overlay coordinates next to them. Clicking on the entries in the index zooms you to the appropriate place in the map.

To create an index

107 Add a Grid Overlay if there isn't one present.
(If there is no grid overlay present when you get a message box which requests that you add one.)

108 Click **Text Properties**. Type a suitable text height.

109 Set the current layer, color and line style by clicking their indicators on the Status Bar.

110 Click **Create Index** then select the text you wish to add to the index (don't select the grid overlay).
You can see a box, which shows you the boundaries of the index text.

111 Click to place it on the map.

112 Move the mouse over the index – you will see the finger cursor. Click on any entry to zoom to that entry.

Create index tips.

- ✓ The index is useful both on paper and on the screen. The coordinates let you know where to look on a print; the automatic zooming lets you zoom to the text.
- ✓ You can have your index always visible by giving it a window of its own. On the View Menu, click Window then New Window. Create an index-shaped window and, in this window, zoom into the index text. On the Tools menu, click Options, then >> Preferences and make sure that **Maximized view windows cover other windows** is not checked. Finally, left click on the top edge of the main window. You can now left click on any entry and CD2 will zoom to the text in the main window.
- ✓ When you update your map with new text, you will have to update the Index, too. Erase the current index and add a new one.
- ✓ The index is a group (see *Group* in the Help index). If you want to move the text around within it, you must ungroup it first.

DEMOGRAPHIC INFORMATION

Every building, whether a symbol or House can have a solid color. This color is usually hidden. On the City menu click Layers then All BLDNGS with Color, to see the color information. When you first insert a symbol or house, its color is the current color. However, CD2 can automatically change the color according to which layer you have placed your house.

NOTE: Don't use Change Layer to change the layer of buildings, or **Change Color** to change their color, as this will affect all the entities in the building. On the City menu, click Change house layer to change the layer and use Color buildings instead, as they only affect the demographic information.

Change house layer

If you haven't placed your buildings or houses on the correct layer to start with, you should use Change House Layer to set a suitable layers for them.

Change House Layer changes the demographic layer of buildings. The buildings can be symbols or those created with the House command. It should be used in preference to **Change Layer**.

Symbols: Change house layer changes the symbol reference's layer, leaving the symbol definition intact.

Houses: Change house layer changes the layer of the solid colored entity that is used for demographic information. The other layers are left intact.

Color buildings

Color buildings lets you add a solid color that can be hidden to your buildings. The color is set according to the building's layer. The buildings can be created with the various CD2 Symbol Catalogs that are available, or with the HOUSE command. You can also use it as a way of coloring everything in your drawing on a particular layer, not just houses

Color Buildings is a way of adding demographic information to your maps. For example, you could make all the buildings on the BLDNG (RELIGIOUS) layer one color, and all those on the BLDNG (GM) layer another. All this information can be hidden from players.

The layers that are affected and the colors that are set are saved with the drawing; CD2's templates have a suitable set of options saved with the drawing.

To color your buildings

113 If your buildings are not on the correct layers (the BLDNG layers), On the City menu, click Change house layer to correct this.

114 Select the Color Buildings icon .

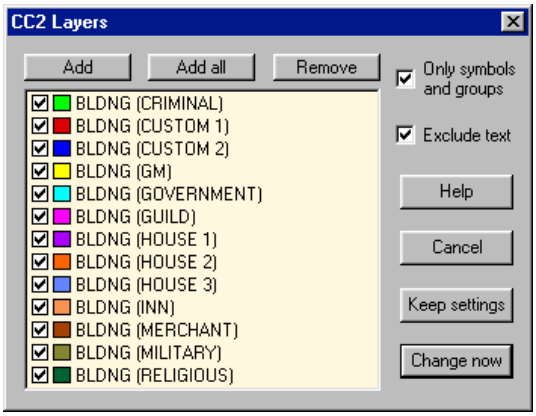
You can see a dialog box with various layers and colors. These are the default settings.

115 Select the **Change Now** button.

116 To see the effect of your efforts, on the City menu click Layers then All BLDNGs with Color. This hides all the roof tops and lets you see what color the buildings are.

The Color Buildings dialog box

To get this dialog box select the Color Buildings icon or City Menu >> Color Buildings.



Add	Adds a selected layer in the drawing to the list of layers that can be colored.
Add All	Adds all the layers in the drawing to the list of layers that can be colored.
Remove	Removes a selected layer in the drawing to the list of layers that can be colored
Only symbols	Select this option if you only want your houses and buildings to be affected, not other entities.

and groups	
Exclude Text	Check this option if do not want the text in your drawing to be colored. Note that this only has an effect if the **Only symbols and groups** option is not selected.
Keep Settings	This keeps any changes you have made to the current Color Layer settings and closed the dialog box.
Change Now	This changes the color of entities in the drawing according to the options in this dialog box.
Include Layer check box	This includes the checked layer as one to be colored.
Color boxes	These show the color that entities on each layer will be changed to, if the check box is ticked. Click on this and choose a color from the color dialog box to select a color for the selected layer.
Layer name	This lists all the layers that can be included in the layer coloration.

NOTE: If no layers appear in this dialog box, it means that you are not using a city template. If you are drawing a city, we suggest that you cut and paste the drawing into a new drawing based on a city template. Otherwise, just use **Add** and **Add All** to add the layers you would like affected.

BUILDING A CITY FROM SCRATCH

One of the most challenging and at the same time satisfying activities I can think of is creating a city map from scratch. There are numerous decisions to make before you even start such a map if you want it to be a work that will withstand scrutiny. For instance, do you want your map to reflect an historical city in the Middle Ages, or do you want it to reflect an altered reality that can accommodate high technology, magic or fantastic creatures? Answering these basic questions will save time when you create your map.

While the techniques in the chapter can be applied to cities with any technological level, the focus will be on building fantasy cities of a medieval nature. This tutorial assumes you already have a basic understanding of CD2. However, it will describe techniques for achieving complicated or less common effects when they clearly depart from what most users reasonably could be expected to know.

Asking Questions that Will Impact On Your Design

Questions, you say, questions? You probably just want to dive and in and get started. After all, it's going to take you many hours to draw the city of your dreams, why waste time on questions? Besides, you already have a perfect picture of it in your head, right? All you need to do is "get it down on paper." After all, you aren't writing a *story*!

Well, you certainly *can* rely on an internal picture of your city, but you might be surprised at how many holes that picture has once you start drawing. And let's examine the idea of creating a story. City maps, perhaps more than any other kind of map you can create with CC2 software, *is* creating a story, a visual story. You are creating an environment where people and creatures live and interact. And just like in other forms of fiction, where the author needs to know a great deal more background detail about his characters and settings than she will actually put into the story, the fantasy cartographer needs to know about the background factors that influence his map. Otherwise, your map is more likely to end up either inconsistent or flat and lifeless. This process of background creation need not be an exhaustive or onerous task; you can spend anywhere from a few minutes to a few hours on it. Either way, thinking through a few simple questions can dramatically impact your end result. And while you are probably right – you *will* be able to answer most of these will little thought – sometimes just asking yourself a question will spark a brilliant idea that might otherwise never have occurred to you.

Who are the city's inhabitants?

"Who" is really two questions: "Who founded the city?" and "Who inhabits the city now?" The answers to these questions need not be the same. For instance, a fantasy city might have been built by the Ancient Ones, a mysterious race lost to time, but now could be inhabited by humans and elves. Why are these questions important? Well, the original builders of the city would have constructed it with their own techniques and uses in mind. However, current residents will likely put their own fingerprints on the city, adding different architectures and buildings to suit their own lifestyles. Knowing who built a city and who lives in it then can be immensely useful in determining a city's structure and flavor. Of course, having the city built by a race other than its current residents suggests the next question…

What is the city's history?

How long ago was the city created? Are the structures ancient monoliths to a bygone age? Are they built of freshly cut timber? There can easily be more than one answer to this question as well. For instance, your city could have an old section and a new section. Each of these areas might have entirely different structures; different types of buildings, layout of roads, population densities, etc… The point is, the age of the city, or its component parts will determine possible layers as well. For instance either new or old cities might have subterranean sewers or even roads, but they could likely be very different in character.

What is the city's purpose?

The next question you need to answer is, why is your city located here? What is its purpose? Is it built at the convenient intersection of trade routes? Was it built to defend some strategic terrain? Perhaps it was built as the capital of a vast empire. Whatever you decide, this purpose will have an impact on your city's layout.

For instance, a city built for defense might have a very dense population entirely behind walls, while a city built for commerce might be wide and open and made of tents. A capital city might have been constructed to show off the cultural and artistic sensibilities and accomplishments of the builders with broad thoroughfares and many museums, like Washington D.C. Or, it might have been built for defense like Tokyo where finding a straight street or even a street sign is nigh impossible. Considering the purpose of the city early on should give you a good handle on its possible structures.

What is the lay of the land?

Cities almost always (at least when using my approach) start with geography. The immediate terrain on which the city will sit will have one of the most direct impacts on the city's structure. This is more than just thinking about elevation and water. It is also about building materials and techniques. For instance, a city built in the mountains will be very different from one built on a river delta at the mouth of a huge river.

While there are many fantastic settings for cities even without leaving the bounds of what is possible (look at the Aztec cities on the mountain tops of South America, for instance), fantasy settings can get even more elaborate. When we introduce elements of fantasy, suddenly cities can float over vast seas of methane or move about on thousands of legs.

Geographic questions are critical: They will have a direct impact on your city when it comes time to start the actual drawing. Having answered it, you will already have an idea of elevations, inclines, the availability of water, and other critical questions that can guide you in drawing city's setting.

What is the city's climate?

Closely related to the immediate geography of a city is the climate of the region where the city is located. A city built in a dry climate is likely to have a much different type of architecture than would a city built in a rain forest. How would the city's inhabitants have adjusted the city to accommodate the climate? Would they have built low dark houses of mud or stone with thick walls to dissipate heat? Would they have constructed buildings with few windows or doors to conserve heat? Knowing the city's climate can have subtle or dramatic impacts on the city's design, but asking the question is the first step to understanding many of the routines of the people who call it home.

How do magic or technology affect the city?

Perhaps one of the most important factors that will affect the structure of your map is the level of technology in the city. Technology impacts everything from building height, to roads, to the types of buildings. In short, nearly every aspect of a city will be influenced by the society's technological level. For instance, just think about the impact of gunpowder on cities in Europe. Eventually, technology made the use of city walls obsolete.

Despite the predominance of walls around cities in the fantasy genre, the same holds true for fantasy worlds where magic replaces, or at least supplements, technology. We like to put walls around cities. Perhaps there is romance in the notion that walls and towers rise above the cities populace in a protective embrace. However, in a world where powerful magic is available, walls may well be superfluous. Or not. The effect of magic on city design is something you will have to decide. The point is, it behooves you to consider the effects of magic and technology on your structures.

What about other potential technological or magical impacts on cities? How might some of the following impact the design of your city?

- Platforms in city squares that allow the citizenry to teleport around the city
- Unmanned carriages that carry people around town at any hour of the day or night
- Devices that automatically produce food or dispose of waste
- Robots or golems that are used for building construction or to keep the peace
- Streetlamps
- Indoor plumbing
- Climate control

This list is anything *but* exhaustive. However, it should be enough to spark your own ideas. If you have a good idea of the types of technology or magic that are available to your citizens, then it will be easier to design a city that makes use of those tools in a sensible, consistent way.

What are the social and political structures – laws, customs and government?

The social and political structures of the town's populace are also likely to influence the design of your city. For instance, a military government is much more likely to fortify and divide a city into defensible quarters than is a government based on consensus. Or a city based run by religious organizations would very likely have a different layout emphasizing holy sites and non-secular buildings.

Likewise, laws and customs will also have their own impact. A society that condones the use of slaves will have towns that may well be different. Consider Rome and the Coliseum. Societies that value sports or other communal events will need to have structures that support that kind of activity while societies that value privacy or learning might have very different architectural needs. Think about how your society impacts the place it calls home. And if it has been around for awhile, think of how this may have changed over time.

What is the calendar?

The city's calendar and the various holidays it recognizes may or many not have an impact on your city's structure. However, consider how cities like Mecca or Jerusalem are impacted by the influx of pilgrims and visitors on a regular basis. Those are cities that are heavily impacted by temporal cycles. Think of all the services and businesses that no doubt exist to service these occasions. Or, perhaps your citizens celebrate a high holy day once a year or even once a decade. Perhaps there is a temple that exists in a prominent or obscure location to serve this occasional function. Your city too, might reflect such influences.

What services are available?

Consider how something simple like having trash collection and dependable law enforcement can change a city. Or how about health care: a city with a hospital – especially if it were central to the city's identity – could completely change the city's layout. How are messages delivered? Do citizens use runners, magic, carrier pigeons, or some other more mundane means like walking? Any of these services might require buildings or other structures that would be noticeable in your city.

What are the primary businesses and means of logistics?

The businesses that are in the city will be in large measure dependent upon where the city is located. For instance, you'll not likely find a large fishing or merchant marine presence in a land-locked city. The businesses found in coastal cities will differ substantially from those located deep in the mountains and this will in turn have a impact on the city's design. For instance, even in a city that has a harbor with access to a large body of water, the prominence of businesses associated with that harbor can vary widely. Perhaps the Sea Merchants are the ruling class. If so, the harbor district is likely to be much wealthier. On the other hand, perhaps sailors and merchants that range the seas are considered the lowest casts of society. In that case, your harbor area is likely to be rougher, smaller and perhaps walled off in some fashion from the rest of the city.

Cities that are located at a crossroads (land or water) are likely to be arranged differently to make the most of the advantages that each location has to offer. For instance, a city located at meeting of two main roads might have a grand bazaar or market located at their junction.

Wherever you decide to locate your city, you will need to think about how the city supplies itself with everything from food to jewels for the ruler's crown. Unless the city is entirely self sufficient (unlikely), there must be some way for goods to enter and depart the city. In many cases this will mean they manually transported. If so, then there are likely stables, hotels, stockyards, and other obvious facilities to service the people who do the transporting.

Take a close look at where you have decided to locate your city. Ask what businesses are likely to thrive there, how goods come and go, and how these factors may impact the city's design.

What are the artistic trends?

Artistic trends in a city may or may not make themselves noticeable in the city's design. For instance, a city that makes use of gargoyles on all the buildings would not be noticeable at the city level though it might well when you get down to the building level. However, a city that placed an emphasis on rooftop gardens would certainly have a unique design; you would likely see many flat-roofed buildings even where gardens did not exist. Perhaps there are large art-filled plazas where people can mingle. Or perhaps the society places no value on art at all, in which case the buildings might be plain and closely spaced. However your society views art, just ask the simple question, "How will this affect the city's appearance?"

Preparation: a final word

These questions are far from the whole story when it comes to developing the background for a city. As we have seen, a city is itself the manifestation of the story of those who call it home. If you take just a little time to answer the above simple questions, you will be well on your way to having a much better understanding of your city and the people who live in it. In the short run it might make no difference at all. In the long run, however, it could very well bring some life to your city that it would never have otherwise known.

Tutorial: Building a City From Scratch

Now that you have an idea of what your city is all about, let's look at how you can create a map of that city. Putting together a city map can be a real challenge. The vast numbers of elements that make up a city mean that you will be juggling more layers than you would on an overland map, and quite possibly many more symbols as well. Getting all these elements to come out in a pleasing whole at the end of the process is a trick. Let's take a look at some ideas for getting past some of the major hurtles.

This tutorial will take you through one process for creating a city with a focus on effectively managing your symbols, layers and other map elements.

Hint: Dealing with Very Large Cities

Very large cities, with hundreds or even thousands of house symbols can pose unique problems. It can be difficult to keep symbols on consistent layers, detail can be lost when viewing the entire map, and redraw times when creating and viewing the map can be slow. To overcome these problems, try this:

Create an overview map of the city (Stages 1 through 3 below)

Outline the major sections of the city and give these sections names

Create separate maps for each of the city sections.

This will give you an overview map showing the grand plan and smaller detail maps of your sections and should make your section maps much more manageable. You could even provide links on the overview map that could then open the city sections when you click on them.

Stage 1: Deciding what to show

Before you start your drawing, there are two decisions you need to make.

First, you need to decide how much of your city you want to show. Do you want to show:

Only a section of the city

Just the area within the city's walls

The city and some of the surrounding countryside

Stage 2: creating the setting – elevation and water

Having decided on the factors that will influence your city, let's put those decisions to the test. Our first job will be creating a background and developing the natural setting for your city. We will look at:

- Drawing a background
- Exploring options for depicting elevation
- Depicting Cliffs
- Adding water as a driver to city design

Drawing a background

The first step to drawing a background is selecting a background color. This is particularly important if you are going to use contours with different colors to depict elevation changes. In choosing an elevation color for the background, it can simplify things later if you select a) the color of lowest elevation, or b) the color of the elevation that will have the largest area showing on the finished map.

1 Click **New** then select a template for your city.

157
46
108
177
86

Right click **Change Color**. Click **Change map background color**.

2 For the purposes of this tutorial we will choose color 46 since our city will be in the foothills of some mountains, so right click then click color 46.

Some useful background colors are:

Arid climates: Colors 155 or 157 or some other orange, yellow or light brown.

Mountains or highlands: Colors 46 or some other gray, orange, or light brown.

Plains or grasslands: Colors 108 to 111.

Forests: Color 86. Or some other mid-level green.

Depicting elevation

Three simple ways to depict elevation changes in your city are to use:

- Contour lines with written elevation labels
- Contour areas with different colors
- A combination of contour areas and lines

Each of these has benefits and drawbacks. Contour lines with labels work well for rural areas but labels tend to get lost in the visual clutter of cities with lots of symbols. Using contour areas that signify change through the use of colors has the benefit of not needing labels but offers readers less exact information. My preference is to use this second somewhat simpler method, relying on the colors to show change.

Generally when adding contours using areas of different color, it seems to work best if you lighten the colors as the elevation increases but this isn't a hard and fast rule, and, in fact, we're going to break it almost immediately in this tutorial.

Let's add some contours to the map above to create a valley.

3 Click CC2 to return to overland mapping tools. Click **Contours** . Click Map Contour, Default 09. Add two areas as in the pictures below.

4 Now add another couple of areas for the next higher level of elevation. In this case, a slightly darker color seems to work best for the next level but play around with the colors until you find something that makes visual sense to you.

5 Click **Outline in Black** then select the new elevation areas.

Hint: Polygons vs. Smooth Polygons
The standard overland mapping contours use smooth polygons to create contours. These redraw more slowly than paths. You should consider using polygons if this is an issue, or if you prefer a rougher look.

Depicting cliffs

Okay, so you should be starting to get the hang of how you can draw incremental changes in elevation. What about something more dramatic like cliffs and bluffs?

Drawing cliffs is simple but can be a bit on the tedious side if you want them to come out well. Here's my preferred method.

6 Select one of the darker brown colors.

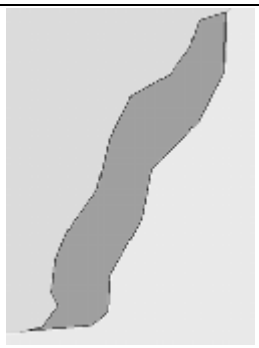
7 Create a layer called CLIFFS.

8 Select one of the darker brown colors.

9 Select one of the middle brown colors (color 42 seems to work well).

10 Now draw a solid **polygon** that starts along one of the contour lines.

11 Complete the cliff area by finishing the polygon back at your starting point.

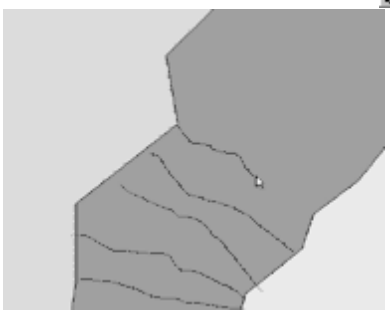


12 Outline the new cliff face in black.

With the cliff area complete, now let's give the cliff some definition by putting in some lines to indicate an elevation drop.

13 Select a dark gray color (color 246 works well).

14 Click the **Freehand Sketch** .

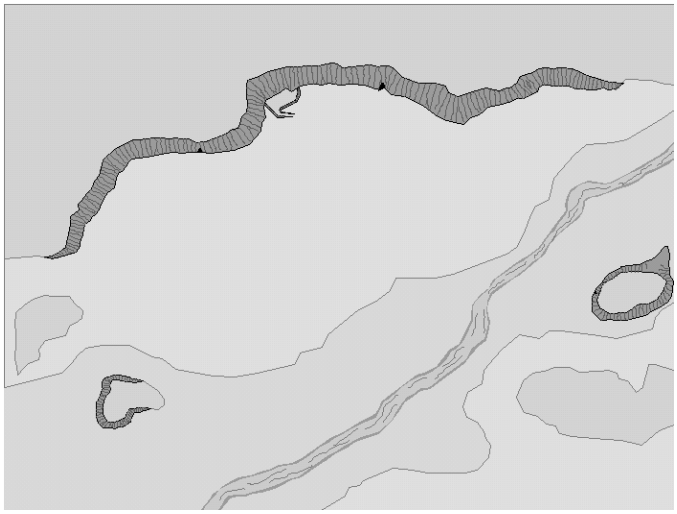


15 Start drawing lines from the highest edge of the cliff downward.

16 Continue drawing these lines (this is the tedious part) until you have the entire cliff face filled in.

Adding water as a driver to city design

Now that our upward elevations are complete, let's look at putting in some water. In this case, you are going to put in a river that passes near the city but not through it.



17 Click **Polygon** to add a river bed to the CONTOUR layer (use color 42)

18 Click to repeat the polygon, then add the river itself to the WATER layer with any light blue color. Remember to keep the river entirely with the boundaries of the riverbed except where the river meets the edge of your map.

19 Add highlights to the river in a darker blue color.

Stage 3: Adding vegetation

What you have at this point is a river valley in the foothills or highlands. You may or may not have cliffs and bluffs. Your setting is just about ready for your city. However, before we start adding the elements of civilization, let's add any major areas of vegetation that might be around the city. In this case, our map will show enough of the surrounding area that this could be some significant coverage.

We're going to add some forested areas around the city both to provide it's citizens with some natural resources as well as to make the geography a little less stark. We'll also add some areas of thick brush, again to break up the landscape a little and to make the map seem more "real."

For basic forests (similar to the ones found on the Wizards of the Coast *Forgotten Realms® Interactive Atlas* CD) we can do this pretty quickly.

20 Change to the VEGETATION layer.

21 Select a mid-tone green (I recommend color 90).

22 Create several filled polygons. Create bulges and concavities in the forest edge to give the impression of a naturally emerging forest border.

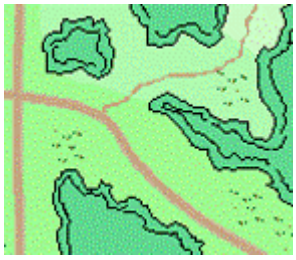
Hint: Expanding Forest Beyond the Map's Borders

If you take some of your forest polygons to the edge of the map you will give your wooded areas the illusion that they continue on beyond the map's borders. Create enough of these polygons to give the impression of wooded areas around your city.

23 Outline your wooded areas in black.

24 Click the **Freehand Sketch** and draw numerous lines along those edges of the wooded area that *not* adjacent to a map border.

25 In order to add some grass and brush, you can use some of the symbols that from the overland map catalogs. The **Grassland** symbol is particularly useful for adding a bit more depth to your map.



NOTE: Be careful not to overdo it. Just a few of these symbols go a long way.

The benefit of creating forests and wooded areas with this method is that they put very little strain on your system's resources and redraw extremely quickly.

Stage 4: Creating the skeleton – the road network

You now have a place – a "where" for your city – that will govern to a large extent how your city will lay out. Roads, second only to the geography itself, will guide your placement of structures. You may have a small town that only has a few dirt tracks, or perhaps you'll have a major city with roads ranging from expensive pavement or cobblestones to gravel. Whatever the case, you will need to think about the traffic patterns in the city. What are the most heavily traveled routes. Those are the routes that will require easy travel. Remember, most societies are going to build travel infrastructure to enhance ease and speed of travel. Keep this in mind as you are deciding where and how extensive each type of road is.

Let's look at:

- Outlining the main area of the town
- Placing main thoroughfares
- Laying secondary roads
- Adding paths and trails
- Creating open spaces and markets

Outlining the main area of the town

The next task is to outline the shape of the town. We will do this before we add the roads because we want to have a sense of where the city proper will be.

26 Create a layer called CITY OUTLINE and make that the active layer.

27 Select a mid to light brown (color 43 often works well).

28 Draw a filled polygon in the shape of the final city along the line the city wall will take. Make sure to overlap where the outline meets the cliffs.

29 Click **Send Behind** to send this city outline behind the cliffs.

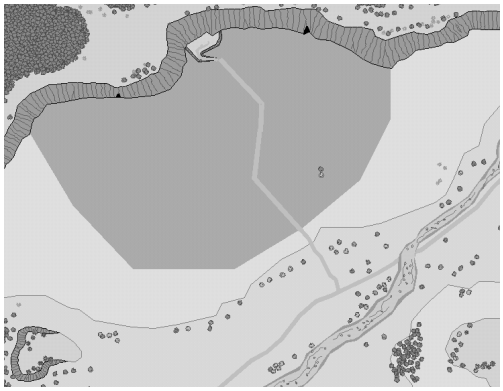
Placing main thoroughfares

Now that you have the city outline in place, it's time to make travel to and from the city possible. We're laying the road network now, while the map is uncluttered because it will be much easier to work with.

But, before we begin to draw the roads, let's go back to a couple of the questions you answered earlier; "What is the city's purpose?" and "Who built the city?" If your city was built by a race or culture that valued order, you might lay your streets out in orderly squares oriented North and South, East and West. However, if a military ruler who feared invasion built your city, then the streets might form a winding maze, nearly incomprehensible to anyone but permanent inhabitants. Think about who built the city and why and let this guide your street layout.

Let's put the primary roads in first.

30 Set your line width to 25. Since this is a main road, we want it to be 25 feet wide but you can vary this to suit your own tastes.



31 Right click **Road** then click City Road, Straight Current Width to draw a road roughly paralleling the river from the lower left map border to the upper right map border.

32 Draw another path perpendicular to this first road leading to what will be the main city gate. Stop this path at the edge of the city outline.

33 When you've finished the road, click to repeat the command, then click **Advanced**>>.

We are going to create a road drawing tool which adds roads in the current color to your design

34 Pull down the **Custom Tool Name** list then click City Road, Straight Current Width

We are going to base the new design on an existing one.

35 Click **New**. Type City Road, Straight Current Width CC.

36 Click **Properties**, click **Use current color**. Click **Save**.

37 Set the color to color 252. We're shifting from a dirt road outside the city to a paved road inside the city.

38 Click **OK** then continue the path with this new color through the city to what will eventually be the main city keep against the cliff wall.

Laying secondary roads

Now let's create the secondary roads, the ones that will service the outlining farms and that will make up the main network of roads within the city. An important point to remember with all road, but particularly ones of a utilitarian nature, is that people are lazy. They're not likely to build a road around something if they can go straight to it. Ask yourself:

- Where are the people in and around this city going
- How would they get there, and
- Why would they go this or that particular way?

Let's put in those roads now.

39 Set the line width to 12 or 15.

40 Right click **Road** then click City Road, Straight Current Width CC. Draw a network of roads outside the city. These are roads that would be big enough to support cart traffic.

41 Change your color to a very light brown (try color 203). We need these roads to show up against the brown of the city outline.

42 Now create a similar network of secondary roads inside the city outline.

Now your map should look something roughly like the image below.

Adding paths and trails

Finally, we want to add some foot trails around the city that show less frequent routes of travel.

43 Set the line width to 7.

44 Set your color back to whatever color you used for the roads outside the city.

45 Set the line style to a dash of some sort (I find the Fence or Contour line styles work well for paths).

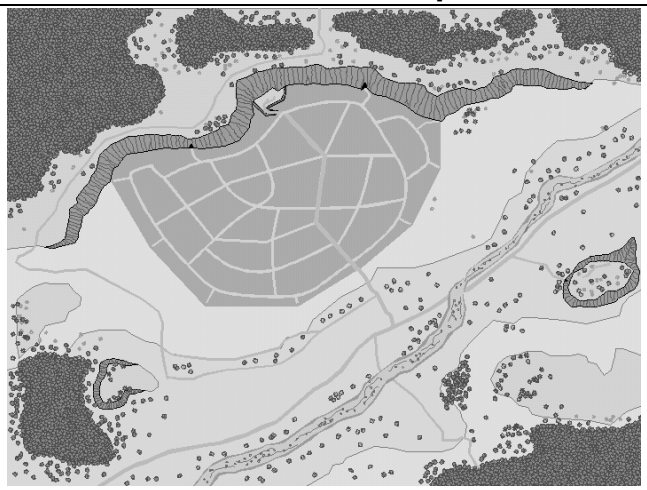
Continue with your custom drawing tool to add some foot paths and trails along routes that people would likely use for foraging, gathering water, leading livestock, tending farm fields, etc.

Creating open spaces and markets

The last skeletal elements we need to add are open common spaces within the city. These are usually markets but might also be athletic or military fields or areas with any number of other uses.

46 Right click **Road** then click City Road, Filled Area. Add a market place as shown in the diagram.

You can add a "current color" drawing tool for filled areas, just as you did for straight roads if you are creating many squares.



Stage 5: Creating the primary structures – walls, landmarks and special purpose buildings

With the framework of roads now in place, you can think about placing those main structural elements that will define much of the city's character. These include any city towers and walls, landmarks (such as freestanding towers, statues, arches, etc.), and prominent buildings.

Creating a wall around your city

With the macros described in

A CD PRO on page 205, creating a wall around your city is simplicity itself.

47 Change to the WALL layer.

48 Use the CurtainWall macro command to construct the wall on top of the outline of the city way from the cliff so that the wall obscures the outline. I recommend using the macro that will put a tower at each angle change.

49 Once the wall is complete, freeze all the other layers and group all of the wall elements together. You will be glad you did this later on if you have to move the wall above or below certain elements.

Adding landmarks

Next add landmarks such as statues, ruins, arches, etc. Perhaps your market is lined with statues of the city's founders, or huge stone sphinxes flank your city-gate. Again, I recommend putting these on a separate layer. Again, it behooves you to re-examine the answers you came up with the questions posed earlier in this chapter. For instance, if humans built your city in the artic circle, then it is unlikely to have many, if any, outdoor meeting places. Perhaps your builders had no use for artwork at all. Or, perhaps the city is a monument to the race and is full to the brim with statues, open courts with artwork and ancient buildings. Anything goes, just try to remain consistent with your original intent.

Adding prominent buildings

Now we're getting to the meat of it, aren't we? We've finally made it to the point of adding actual buildings. These buildings might be of any type that is either important to you, the cartographer, or to the inhabitants of the city. They could include such structures as:

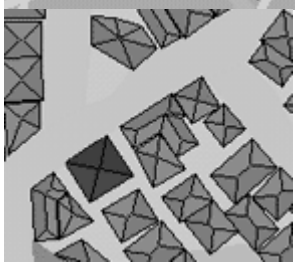
- Military buildings
- Bridges
- Merchant Buildings
- Religious Buildings
- Docks
- Freestanding Towers
- Castles
- Government Buildings

Again, this list is not exclusive; you may well have other types of buildings that you feel need to be called out from the map as well.

Another choice to be made is whether each type of building needs to be on its own layer or, if you have only a few, they all can be placed together on a single layer. In our case we have only a few buildings.

Since we'll be using HOUSE tool to create custom-shaped buildings, there are a couple of ways to add prominent buildings so that they stand out.

Perhaps the simplest way is to use city symbols. The greater level of detail and different colors of these symbols will make them stand out from those we create with the HOUSE tool.



A second alternative is to use the **House** for both normal and prominent buildings but to select a different roof color for each.

For our purposes, symbols will do. Place your prominent structures in locations that make sense for them. For instance, if you are placing a merchant house, it's likely to be near a main road so that its transportation needs are more easily accommodated. And tanneries and other less desirable businesses are likely to be in poorer sections of the city and/or near important resources like water.

Stage 6: Filling in the spaces – houses, houses and more houses

Now you are ready to start filling in the buildings where your population lives their daily lives. These will be the houses. While modern cities or rich neighborhoods might have space around individual houses, in medieval towns and cities (at least those with walls), space was at a premium. Walls were, as a rule, very expensive to build and whoever was financing their construction would want protect the most important areas with the shortest possible length. Therefore, it was common to find as many buildings as possible crammed into the safe space within a city's walls.

Let's take a look at how you can use the placement of houses to create character within your cities.

Placing buildings in crowded cities

So, we already know that space inside a city wall is at a premium. How do we create something that looks authentic, or that, at least satisfies the fantasy genre?

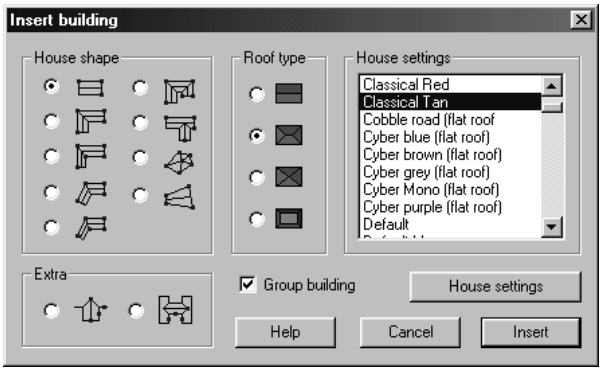
I prefer House to create buildings of different shapes to fill the space pretty closely. Pack the houses in tightly leaving, of course, a wall that allows access to the building from outside, and let the spaces between the buildings become the narrow alleyways of the city.

> **Hint: Multiple Quarters or Neighborhoods**
>
> In large cities, with multiple neighborhoods or quarters, you may want to put all of the houses in each quarter on their own layer. Why? Because as you move on to other quarters, you can hide the ones you have already finished and save yourself loads of redrawing time. Trust me, if you are dealing with hundreds of houses you will be glad you took this approach.

50 Change to the layer where you want these buildings to reside.

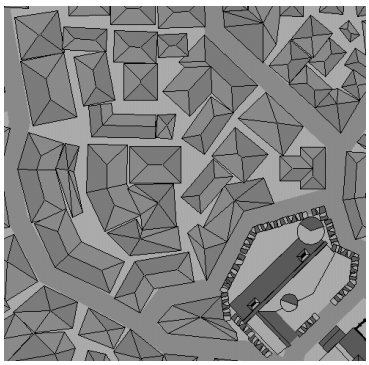
51 Click **House** .

52 Choose a housing style of your liking. Using "Classical Tan" will give you good buildings without putting much of a drain on system resources. If you choose a roof style with a lot of elements, be prepared for long redraw times.



53 Go to it. Start laying down those buildings. However, as you do, there are a couple of things that are good to keep in mind:

- As you zoom in to work on individual blocks of houses, do a check every now and then with your **distance** function to make sure the houses are staying in the habitable range. It's easy to loose perspective and start drawing buildings that are either too big, or too small. Buildings with 15 to 40 foot frontages on a street seem to work well.
- There can be logical blocks of houses even between streets that are separated by alleys formed by the blocks themselves.



- Mix in shapes and sizes that are appropriate to your grand plan and don't allow yourself to start building bigger and bigger houses just so you can finish more quickly. If you need a break, take one. This can be a tedious process but the end result is rewarding.

Placing buildings with some space

Some cities don't cram as many houses into the available space either by luck or from planning and this is the case with the city we're building. We're going to place houses along the streets, but we're going to leave plenty of room in the center of the blocks for agricultural plots. The end result should look something like the image below.

Stage 7: Adding agricultural elements – farms and fields

Rare is the city, especially in a fantasy or middle ages model, which can survive without being surrounded by farms and agriculture. The amount of cultivated land required to sustain urban areas is actually quite staggering. In homage to this principle, it adds a touch of realism if you show cultivated areas outside (and sometimes inside) your city. You can use filled polygons, or symbols from the Overland catalogs to add these areas.

Stage 8: Adding finishing touches – labels, legends and keys

Finishing touches these may be, but some of them are critical to the usability of your map, especially if others are going to use it without your help interpreting it.

Now let's add the final elements:

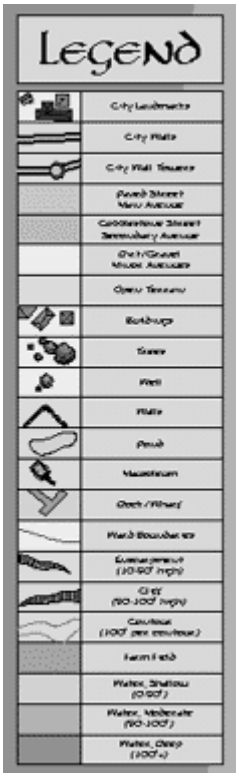
- labels
- a legend
- a key, and
- a scale and compass rose

Adding labels

Labels are optional but important elements because they bring life to your map by showing that someone lives there. Labels, or place names, reflect the people that live in a city as well as provide information and are well worth the effort to add.

While you can sometimes get away with adding labels to streets without adding an outline to the text, outlines are essential for text that is going to overlay buildings. Creating text outlines is covered on page 61 of the CC2 Pro manual and so will not be covered here. However, you can see an example of the use of text outlining below.

Adding a legend



A legend is important for those maps that use obscure symbols or colors, need exact interpretation of details such as elevation, or that must be understood without the aid of outside interpretation.

Most maps can do without a legend, however if you choose to construction one you are better off doing it off to the side of your map and on a layer of its own. Make good use of the **Grid** and **Snap** functions to make sure your elements line up.

If you are intending to do a legend and know this from the start, make allowances in the area of the map when you create it to allow the legend to be place on the map without blocking anything critical.

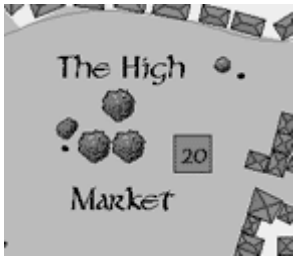
If you draw all of your cities in a similar style, consider adding the legend to your templates, or saving it as a symbol to save redrawing.

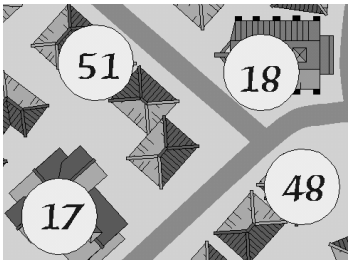
Adding a key

A key is a means of identifying specific elements on a map, usually by numbered labels. If you choose to include a key, make sure that it is the absolute last element you add to the map. The reason for this is twofold. First, if you create it before your map is finished, you will forever be going back to make changes to the key. Second, keeping the numbers on top of the map is a nuisance if you create them too early in the mapmaking process. You'll save yourself some work if you save this until last.

Below are some examples of numbering techniques. You can do numbers with or without backgrounds but I have found that if you have more than ten you may be better off using backgrounds for readability reasons

.



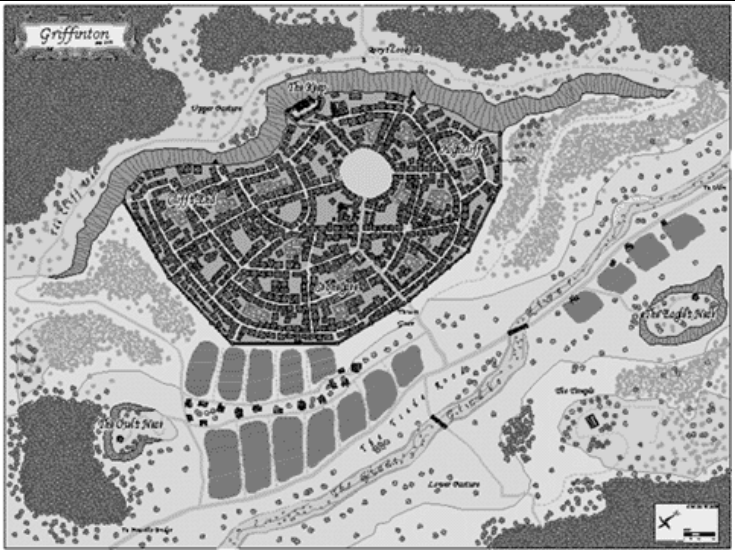


The key itself is, like the legend, most easily constructed off to the side; on its own layer and with use of the **Grid** and **Snap** functions. An example of one type of key is below.

Scales and compass roses

Let me make final plea for our last two elements. In my mind, no map is complete without a scale and compass rose. Even if you have no room, no patience, or no inclination to add any of the other elements in this final stage of mapping, please find a space for these to elements on your maps. They are small quick additions that make a HUGE difference in how readable your maps are in the final analysis.

Before we go, let's take a look at our final map, below.



A final word

Thanks for allowing us these ideas with you, for this chapter has benefited from the shared expertise of dozens of cartographers like yourself. If you have gotten to this point, I'm sure you realize that this chapter has only skimmed the surface of the creation process for city maps. However, I'm hopeful that you have found within it some useful techniques and ideas. Please be sure to share your own ideas on the CC2 list so that they can enrich us all. Join the list at http://www.profantasy.com/community/CC2-L.asp

A CD PRO MACRO

With every type and style of map, there is ample opportunity to automate certain drawing processes with CC2-Pro. City maps are no exception. The elements of an average city map can provide much inspiration for macros: random tree placement, drawing escarpments or palisades, perhaps even generating a random block of houses. Perennial favorites are the 'CityWall' series of macros; automation for producing a drawing of a fortified wall. Presented here is an overview of the latest incarnation of this idea: the more appropriately named 'CurtainWall' macro.

This chapter uses the 'CurtainWall' macro as a springboard for discussing some advanced macro techniques. If you have not already done so, I would recommend reading the chapter on macros in the CC2-Pro manual starting on page 143. That chapter covers the basics of macro creation, and provides the groundwork for the ideas discussed here.

Using CurtainWall and similar macros

You can find the Curtain Wall macro on the ProFantasy Software website in the Downloads section. To use it, unzip it into your CC2-Pro folder, then on the Tools menu , click Macros, script and select the script file CurtainWall. Many powerful macros can be found in the CC2 Macro Repository http://www.greycitadel.com/greycitadel/cc2macros.nsf

Anatomy of the CurtainWall

The CurtainWall macro draws a crenelated wall of a style very similar to some of the symbols included with CD2. The final wall compliments those symbols, and should look perfectly matched when combined on a city map. Like most CC2 drawings, the curtain wall is actually composed of a series of simple entities. The basic wall and parapet are connected 4-sided polygons, and the crennelation is composed of rows of thick line elements, with 3-node paths for the corners (see Figure 1)

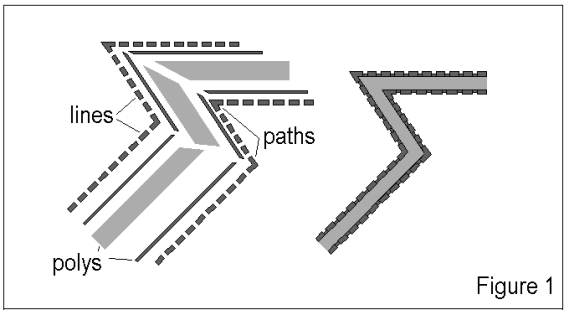


Figure 1

This examination of the base elements of the final macro output emphasizes one of the most important part of macro writing: start with the art. Before the first line of code, you must know what the final drawing will look like. Moreover, you must be able to visualize, not just the simplest method of assembling that drawing, but also the most appropriate method considering the user's input. In this case, the easiest way to create this design would be to draw three paths: one wide, light coloured path to form the entire base of the wall, and two darker, narrow paths on either side of the first, to form the basis of the parapet. Short lengths of line and path entities would complete the crennelation.

However, this method would be problematic in the context of a macro. Since the layout of the wall is dictated by the points chosen by the user, you would not have all the points necessary to draw the paths until the user is finished selecting. In addition, since we would never know exactly how many points the user will select, it becomes very difficult to store all these points until the end. Therefore, we must draw each segment at the user defines it, and to do this, we can't use a path.

This is why polygons are used. We can draw a polygon for each segment that the user defines, beveling the ends of each one so the next one will join seamlessly. Of course, this presents a whole new problem: since the user is selecting the center line of the wall, how to we determine the outer corners? To do this, we must think back to our Geometry classes. Or if you have not yet had the pleasure, you're about to get a crash course!

Trig Identities and CC2-Pro

The easiest way to understand the problem we're facing here is to play with the Double Line drawing tool in CC2-Pro (DBLN). Notice, as you select each point, two lines are being drawn on either side of the path you are tracing. Also notice that, the greater the angle between the segments that you draw, the greater the distance is between the two corners of the two paths being drawn (see Figure 2).

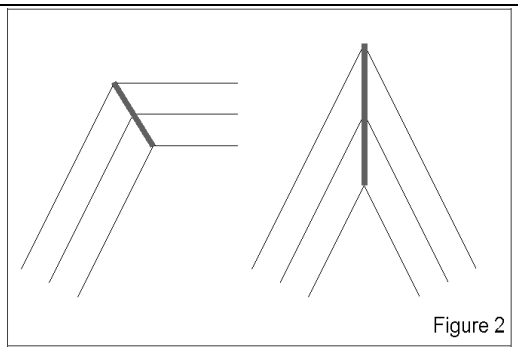


Figure 2

In the case of our macro, we only know a few pieces of information. We know the points that the user selects. Therefore, we know the angles between them. CC2-Pro will let us determine this with the 'get bearing' command (GBRNG). Also, we know the desired width of the final wall. Using this data, we must calculate the position of the two outer points that define the beveled end of each segment.

As it happens, this is just enough information. We can use the central point selected by the user as a reference point to determine the outer points. All we need is the bearing (the angle) and the distance to that point from our reference. Then we can use the 'bearing angle' modifier to get the point:

```
GP (new point) REF (reference point) <(angle),(distance)
```

So, our goal is to obtain these two unknown values: angle and distance to the corner point. The angle value is easy. We know the bearings of the segments on either side of the reference point, and we can see by observation that the bearing from the reference to the corner point is halfway between the two segment angles. So, by averaging the two segment angles, we can calculate the angle to the corner point.

```
(Bearing1+Bearing2)/2 + 90  = (angle to left side corner)
(Bearing1+Bearing2)/2 - 90  = (angle to right side corner)
```

Now all we need is the distance from the reference point to the corner points. As we have seen this distance is related to the angles of the two segments. To understand exactly how they are related, we look to a trigonometric identity.

Trigonometry is the mathematics of triangles, and the relationship between the angles and sides of said triangles. By using trig functions like 'sine', 'cosine' and 'tangent', we can create equations to relate these variables. While a full explanation of these functions is a little out of the scope of this manual, let it simply be said that trig functions can be applied to a number in a similar manner as you would a 'square root' or the like. For more information on trigonometry, refer to a textbook, or a web site such as http://www.math2.org

The equation (or 'identity') that we will use is well known. (see Figure 3)

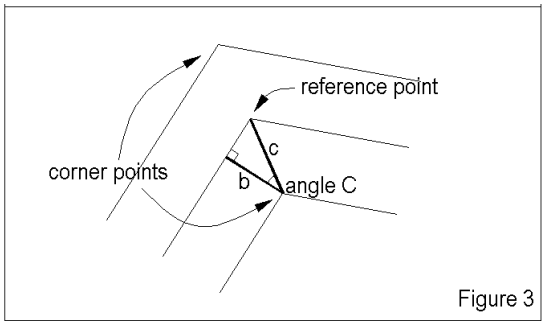


Figure 3

1 / cos(A) = c / b

or

1 / cos(A) x b = c

or, in macro terms,

```
GCOS varCOSA (angle from reference to corner)
GV varDISTC 1/varCOSA*varDISTB
```

That's generally how it works. If you look again at the diagram of the wall's parts (Figure 1), you will note that we actually require three corner points on each side. This will define the end points for the two parapet polygons, and the one wall polygon. We can use the same method as above to determine all of these points, simply by using the same angles, with a different figure for the width (varDISTB).

With these points known, drawing the wall entities becomes an easier matter. The three polygons of each segment are drawn with single commands each, as are the two paths that create the corner cenelation. The line entities that form the straight lengths of crenelation are drawn with a loop very similar to the one used by the Staircase macro detailed in the CC2-Pro manual.

Macro Etiquette

Sometimes, just creating the finished product is not enough. Tools like macros are not only judged by their functionality, but also by their user friendliness. The CurtainWall macro contains several features that make it more polite to the user.

Restored Drawing Settings

During the execution of a macro, many of CC2-Pro's drawing setting can become altered. In order to draw the required entities, a macro will often need to change the current drawing colour, line width, fill style etc. And, when the macro is complete, these setting are left in a state different than when the macro started. From a user perspective, this can become quite annoying. However, with a little bit of effort, we can design our macro to restore all of CC2-Pro's drawing settings to the way they were before the macro started.

There are two techniques we can use to save, and then restore drawing settings. First of all, we can use the SELSAVE and SELREST commands that respectively save, and restore CC2-Pro's 'select by' setting. Since our macro will change this setting, it's only polite to put it back the way we found it.

To save all the other setting, we must use a more complicated procedure. Every entity in a drawing contains a full set of the drawing settings that were active when it was drawn. For example, a simple LINE entity contains many properties, including:

- Color
- 2nd Color
- Line Width
- Line Style
- Fill Style
- Layer

If we draw an entity at the start of the macro, before we change any settings, we know that this entity's properties will be the same as all the active drawing setting. In essence, we have saved these settings.

In our macro, we do not have to draw anything large to save the drawing settings. A single point entity will do. So that it doesn't get in the way, our macro will draw a point that will (hopefully!) be far away from the used drawing area: coordinates (10001,10001) should be far enough. Then, when the macro is finished, we can use the CC2-Pro command Keep on that point. KEEP is a command that changes all the current drawing setting to be like a selected entity; exactly what we are looking for. Once we have restored the drawing settings, the last step is to delete the point we placed. Here are the relevant macro lines:

```
SELSAVE
POINT 10001,10001;
...(rest of the macro)...
SELBY1
KEEP 10001,10001
ERASE 10001,10001
SELREST
```

Grouping Entities

When the CurtainWall macro has finished running, it will have created a large number of entities, which together form the fortified wall. Well, what if the user made a mistake, and placed the wall in the wrong place, or used the wrong settings? The user would now have to delete all of these individual entities to erase the wall. And, if the wall is overlapping other existing entities, the user must be careful not to delete those in the process! Wouldn't it be nice if the macro produced a single, 'wall' entity?

Well, we can do the next best thing, and group all of the parts of the wall together. This way, the wall can be selected as a single entity. The trick is, how can the macro select all of the parts of the wall, in order to GROUP them? One way is to use the 'select by layer' method. If we draw all the wall entities on their own layer, then we can select them all for GROUPing using the SELBYL setting. When we are done, we can move the finished wall back to the original layer. We know which layer that is, because we saved it in a point, remember? (see above) So, here are the steps we need to take:

54 Save setting using SELSAVE and a POINT

Change the current layer to one that you think will not be used by any user. (i.e. 'Macro Construction'). We want to be sure that this layer is empty, so we choose a layer name that is unlikely to be used by anyone else. Since this layer will probably not exist on the user's map, we use the GOLAYER command, which creates a new layer if it doesn't find one by that name.

55 Run the rest of the macro. All the entities drawn will be on our temporary layer.

56 GROUP all the entities on this temporary layer.

Move the Grouped entity to the user's original layer. We do this with the LIKE modifier, which we apply to an entity which is on the original layer (i.e. our setting saving POINT)

Restore all setting.

In terms of the macro, here are the relevant lines:

```
SELSAVE
POINT 10001,10001;
GOLAYER MacroConstruction
...(rest of the macro)...
```

```
SELBYL
CHANGEL MacroConstruction
LIKE
10001,10001
SELBYP
GROUP
SELBY1
KEEP 10001,10001
ERASE 10001,10001
SELREST
```

To group the entities, we first change the 'select by' method to 'select by layer'. We issue the 'change layer' command (CHANGEL); since we are selected by layer, CHANGEL asks for a layer name, which we provide (MacroConstruction). Now CHANGEL wants to know what layer to change the selected entities to: we tell it to change to a layer LIKE the entity at coordinates (10001,10001). Next we change the 'select by' method to 'prior', which selects the last entity you worked on. In this way, the GROUP command automatically works on all of our wall entities. Then, we restore the settings, and we're done!

Saving the Macro Parameters

Since the 'CurtainWall' macro is fairly complex, it stands to reason that there will be a fair number of user definable parameters that can be selected. This is a good thing; it allows users to tweak the look of the wall to suit their map. The parameters for the 'CurtainWall' macro are:

- Dark stone color
- Light stone color
- Wall width
- Right side crenelation
- Left side crenelation

Macro parameters are a great feature, but there is a down side. It can become a little tiresome if you have to enter these parameters each and every time you run the macro. However, there is a way that we can save these parameters. This way, the user only has to answer one question: 'Use the previous settings?' If yes, the previous settings apply. If no, then the user is prompted for new parameters.

The key to this feature is the SAVEVARS command. This command creates a script file that contains the values for all variables that are currently in memory. If you run the script, it resets all of the variables to the values that it contains. In essence, SAVEVARS creates a snapshot of all of the currently defined variables, and running the resulting script restores CC2-Pro to the variables and values contained in that snapshot.

In our macro, before we prompt the user for parameter values, we run a specific script (i.e. 'CurtainWall-vars.scr'), in case it was saved during a previous macro execution. If the script is present, it will load all the variables we need, including a special one that we put there just for testing purposes. If this test variable is defined, then we give the user the option to skip the parameters section and use the saved values. If the test variable is not there, then the user has probably never used this macro before, and we automatically prompt for parameters. After we prompt the user for parameter values, we issue the SAVEVARS command, and save all variable values to the 'CurtainWall-vars.scr' script.

Here's the order of operations:

57 Load the 'CurtainWall-vars.scr' script.

58 If the 'test' variable is set (i.e. the script was there), then give the user the option to accept the saved values. If they choose to skip, then we're done. If not, or if the 'test variable is not defined (i.e. no script present), then continue.

59 Set up default values for all the parameters. This suggests to the user possible values that will result in a good looking wall, and it ensures that all of our variables actually do have values, regardless if the user sets them or not.

60 Prompt the user for the parameter values, indicating what the defaults are.

61 Set the 'test' variable.

62 Save all variables to the script file 'CurtainWall-vars.scr'

In terms of the script, here are the relevant lines:

```
SCRIPTM #CurtainWall-vars.scr
IFDEF varCurtainWallVarsOK DoneVarCheck
:DefineVars
GV varWW 10
GV varRCren 1
GV varLCren 1
GV varColDS 14
GV varColLS 251
GCOL varColDS ^DDark stone colour? (14)
```

```
GCOL varColLS ^DLight stone colour? (251)
GV varWW ^DWall width (10)
GV varRCren ^DRight side crenelation? (1=yes, 0=no)
GV varLCren ^DLeft side crenelation? (1=yes, 0=no)
GW varCurtainWallVarsOK OK
SAVEVARS CurtainWall-vars
GO MacroStart
:DoneVarCheck
GV varUseDefault 1
GV varUseDefault ^DUse saved settings? (1=yes - default - click) (0=no)
IFZ varUseDefault DefineVars
:MacroStart
```

The macro runs the 'CurtainWall-vars' script, which if present, loads all the necessary variables into memory. If the 'test' variable (varCurtainWallVarsOK) is defined (use the IFDEF function to test this), jump to the 'DoneVarCheck'. If not, then continue defining the variables. We assign default values to the five variables, then prompt the user to re-define them if desired. Then we save the variables using the SAVEVARS command. Now we're done, so we jump to the start of the macro ('MacroStart' label).

If the variables were already set, then we end up at the 'DoneVarCheck' section. Here we prompt the user, asking if they would like to use the saved settings. If yes, then we are done, and the macro continues. If no, then we jump to the 'DefineVars' section, as described above.

The Complete 'CurtainWall' Macro

This chapter has discussed some of the more complex aspects of the 'CurtainWall' macro. Of course, there is much more to it, but with this basic understanding of its form, and its more complicated features, you should be able to piece the rest of it together. Take a look at the macro repository (http://www.greycitadel.com/greycitadel/cc2macros.nsf) for more ideas and examples.

ADVANCED FEATURES

Layers

City Designer 2 templates have lots of pre-defined layers to make it easy for you to create your urban areas. The demographic information is stored on the various BLDNG layers, the rest of the house components on the various STRUCTURES layers. Because CD2 uses multi-layered buildings, it has its own Change house layer command on the City menu.

BLDNG layers

Use these to add your house and city symbols if you want your maps to contain demographic information. Click **Color buildings** to add the demographic information.

STRUCTURES layers

These are used to contain the various parts of houses added using symbols and created using the HOUSE command.

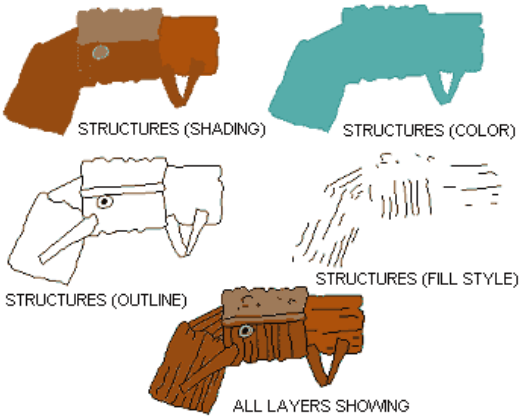
Layer	Purpose
STRUCTURES (COLOR)	Used by house symbols only. Show it if you want to see demographic information.
STRUCTURES (FILL STYLE)	Used for roof hatching in symbols and Houses. Hide this for a faster redraw.
STRUCTURES (SHADING)	Contains the solid filled area of roofs. Hide this to see demographics.
STRUCTURES (OUTLINE)	Shows a line outline of the building.

CD2 Symbols

When you place a symbol, what you see is a reference to the symbol in the drawing. This reference is placed on the current layer. If you start an editing command, any selection by layer will include symbols you have placed on that layer. If you hide the layer, all symbols on that layer will be hidden, even those parts of the symbol on other, visible layers.

In addition, however, symbol definitions contain entities that have layers. If you hide these layers, those parts of the symbol will be hidden in any references in the drawing as well.

CD 2 symbols are drawn on various layers, shown below.



The STRUCTURES (COLOR) layer has a solid filled color silhouette on it that is the same color as the symbol reference. If you use **Color buildings** it is the color of this part of the symbol that is changed.

CD2 Houses

Houses created with **House** share most of their layers with CD2 symbols. There are two important differences. When you draw a house, there is a solid filled area placed on the current layer in the current color that is used for demographic information. This is instead of the STRUCTURES (COLOR) layer used in symbols.

Changing the layer of buildings

Because CD2's Houses are multi-layered, a normal change layer would just change the layer of all the entities in the house. CD2 has a special command called Change House Layer that specifically allows you to change the layer of the demographic information in your houses. It also works on CD2 symbols. So, rather than **Change layer**, on the City menu, click Change house layer to change the layer.

Controlling layers

Layers can be controlled from the layers dialog box, but CD2 gives you a few shortcuts that might help. These are found on the Layers submenu of the City menu.

This submenu includes three shortcut macro commands that make it easy to control the appearance of your drawing. They only function on City templates; otherwise you get a series of error messages, telling you that various layers don't exist.

All BLDNGs with shading

This shows all the entities on the various BLDNGs layers. It also shows the roof shading of the buildings, obscuring the demographic information added with **Color buildings**. These produce maps for your players.

All BLDNGs with color

This shows all the entities on the various BLDNGs layers. It also hides the roof shading of the buildings, showing the demographic information added with **Color buildings**. If the current layer is the STRUCTURES (COLORS) layer, it remains visible.

Hide all BLDNGs

This hides all the BLDNGs and STRUCTURES layers. If the current layer is a STRUCTURES or BLDNGS layer, it remains visible.

Creating an angular grid

In order to use CD2's **Grid Angle** feature, the current grid needs to be an angular grid. CD2's templates include many angular grids, but you may wish to edit these or create your own.

To create an angular grid

1. Right click on the **Grid** button.
2. Click **New** then click Angular Grid, Continue. Choose your options from the dialog box. The **Rotation from the XY plane** should be **0**.

To edit an angular grid

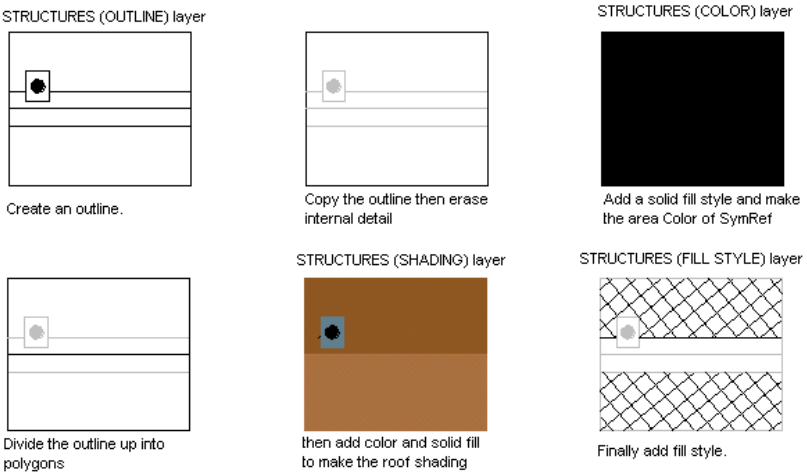
1. Right click on the **Grid** button.
2. Click the grid you want to edit then click **Edit**. Choose your options from the dialog box.

For information on the various dialog box options, see *Edit Angular Grid* in the Help file index.

Symbols

Creating building symbols

Creating city symbols requires knowledge of symbol creation and editing. See your CC2 Pro manual for more details.



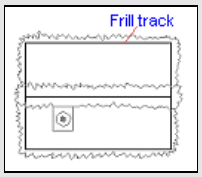
Drawing the outline

1 Start a drawing based on the blank template in CC2 Pro's Cities/Symbols folder.

2 On the **Symbols** menu, click **Symbol Manager.** Click **New** to start a new symbol.

3 Draw the outline of your building on the STRUCTURES (OUTLINE) layer. Use a black, hollow polygon if possible. Use grid and snap to make sure that everything is closed precisely.

4 If you are using complex outline, like Thatched, you will have to draw a simple shape inside the main shape. This will enable building frills to "lock" to the building. It should be sent to the back of the drawing.



The Frill Track: This is an outline placed just inside the edge of buildings with complex outlines to allow frills and extensions to attach correctly to the edge of such buildings.

Drawing the solid area

Each symbol has a solid silhouette used by the **Color buildings** command to give each building a color according to its layer. You need to add this to your symbol.

5 Copy the outline you just drew and change its layer to the STRUCTURES (COLOR) layer. Change the fill style of the copy to Solid.

6 If you are using an outline consisting of more than one entity, you will have to use multipoly then change the layer of the multipoly to the STRUCTURES (COLOR) layer.

7 On the Symbols menu, click Change to SymColor and select the filled area. This changes the color of this area so that when you insert the symbol, this layer appears in the current color.

Add the Shading

8 Set the layer to the STRUCTURES (SHADING) layer. Add the roof shading over the outline using one or more polygons.

9 If necessary, use multipolies created from the outline with any internal lines added to make complex shaded areas.

Add Roof Hatching

10 Set the layer to STRUCTURES (FILL STYLE). Add any roof hatching, such as tiles.

Arranging the layers

The layers should be arranged in the following order:

STRUCTURES (COLOR) at the back
STRUCTURES (SHADING) next
STRUCTURES (OUTLINE) next (except any frill track)
STRUCTURES (FILL STYLE) last.

Finally, if you have drawn a complex outline, you will have to send the frill track to the back. Use **Front** and **Back** to order the layers.

11 Rotate the building so that the side that would face the road is facing down the screen.

12 On the Symbols Menu, click Control Points .

Control Points

This entity type is found in symbol definitions – add them from the Symbols menu. They are used to control the "smart" behavior of symbols. Symbols with control points added can optionally:

- ✓ Align to entities (all smart symbols).
- ✓ Cut gaps in entities (e.g. doors, windows).
- ✓ Offset from entities (buildings offsetting from roads).
- ✓ Scale Y to fit (Windows can expand to the width of walls).
- ✓ Keep the current symbol scale or ignore it.

13 Select **Align on Insertion**, **Keep DynTrack Scale**, and **Offset from Place point**. The other options should be unchecked.

14 Close the window and save the symbol defintion.

Creating frill symbols

As well as creating house symbols you can also create your own building frills. They are drawn just as you would draw for buildings, but they have slightly different control points.

Draw the frill using the method described for creating building symbols, up to the point that you define the symbols.

Defining simple frills

Symbols such a round chimneys (which look the same no matter which way they are aligned) and smoke (which shouldn't align, as they should not be rotated) should be defined without any control points.

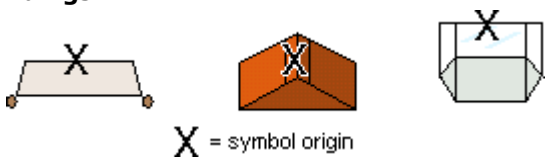
15 On the **Symbols** menu, click **Symbol Manager.** click **New** to start a new symbol.

16 Draw the frill symbol.

17 Align the frill so that it is facing the direction you would like it to face on a city. For example, smoke would go up the screen.

18 On the **View** menu, click **Origin** and choose an appropriate point for the symbol origin (e.g. for a round chimney, the center of the chimney, for smoke, at the base).

Defining frills that go outside buildings



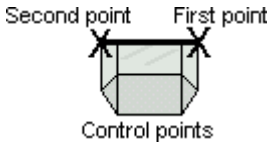
Symbols such as conservatories or awnings need to align to the outside of buildings, but unlike building symbols, they don't need to offset. Once you've placed them, they stay put.

19 On the **Symbols** menu, click **Symbol Manager.** click **New** to start a new symbol.

20 Align the symbol so that the part that faces the building edge goes up the screen.

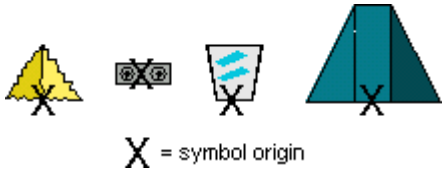
21 On the Symbols Menu, click Control Points . These are drawn from right to left along the edge of the symbol that will align with the building.

22 Select the **Align on Insertion** and **Keep DynTrack Scale** options. Uncheck the others. These control points align to other entities, but should not offset.



23 Define the origin as the center of the control points.

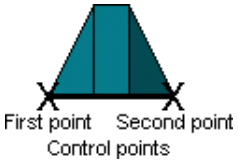
Defining frills that go inside buildings



Place symbols such as roof windows and square chimneys by selecting a roof edge then offsetting the symbol inside the building.

24 Align the symbol so that the side that faces the roof edge is facing down the screen.

25 On the Symbols Menu, click Control Points. These should run from left to right along horizontal edge at the bottom of the screen.



26 Select the **Align on Insertion**, **Keep DynTrack Scale** and **Offset from place point** options. Deselect the others. These control points align to other entities and then offset.

Other types

There are other possibilities. For example, you might want a vehicle symbol where the control point faced up the middle of vehicle, so that it could align to the road. Maybe this could be offset too so that it could be placed on one side of the road.

Making a symbol from a House

Symbols and houses are created in different ways, and have some layer differences, but its not that hard to use the HOUSE command to make a symbol that you can use again. Most of the work has been done for you.

Creating a symbol from a new house

This is far easier than defining a symbol from a house in an existing drawing.

27 Start a drawing based on the blank template in the Cities/Symbols folder.

28 Set the current layer to STRUCTURES (COLOR).

29 Using **House** , Draw the house, adding extensions. On the Tools menu, click Groups, Ungroup and ungroup the house.

30 Add any frill symbols that you want then click Explode and select them.

31 On the Symbols menu, click Change to SymColor, selecting by Layer, STRUCTURES (COLOR). This adds the demographic information.

32 See Defining the Symbol (below) to see how to define the symbol.

Creating a symbol from an existing house

33 Copy the house to the clipboard. Paste it into a new drawing based on the blank template in the Cities/Symbols folder.

34 On the Tools menu, click Groups, Ungroup and ungroup the house. Do this again. (The house may be grouped twice because you have inserted it from the clipboard).

35 On the Info menu, click List and choose the edge of the house. The first tiem listed must be changed to the STRUCTURES (COLOR) layer. Usually, it can be selected by layer.

36 On the Symbols menu, click Change to SymColor, selecting by Layer, STRUCTURES (COLOR). This adds the demographic information.

Defining the symbol

37 Rotate the building so that the side that would face the road is facing down the screen.

38 On the Symbols Menu, click Control Points. For the first control point, select the bottom left corner of the symbol's extents. For the second control point, select the bottom right corner of the symbol's extents.

39 Select **Align on Insertion**, **Keep DynTrack Scale**, and **Offset from Place point**. The other options should be deselected.

40 On the Symbols, click Define Symbol. Type a name then select an origin point in the midpoint of the control point you just added.

Creating House Styles

CD2 comes with many pre-defined house styles; but if this isn't enough you can define your own.

The Default house style is hard-coded into CD2. It produces house with straight edges, rectangular roof edges and a simple fill style.

Starting a new house style

All the other House Styles are defined in CC2 Pro files stored in the Symbols\Citites\House Styles folder. By adding entities to a file in this folder, you can create your own house styles. You can open blank.fcw from the Symbols\Cities\House Styles folder to start a new House Style drawing. You could also open an existing similar house style file, save it under a new name and work on that instead.

This drawing has many layers; adding entities to these layers has a different effect on the house style. If you don't add anything to a particular layer, then CD2 uses the default style. For example, if you add nothing to the ROOF EDGE layers, you will get straight roof edges.

Defining a roof edge

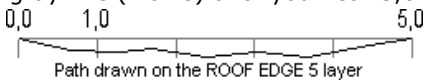
CD2 makes Roof edges by repeating a 5-foot section, then adding and scaling a 1-foot section. These sections must be made from continuous lines or paths.

For example, if you drew a 33-foot long roof, CD2 would join 6 of the 5' sections and add 3 of the 1' sections. The 5' section is drawn on the ROOF EDGE 5 layer, the 1' section on the ROOF EDGE 1 layer. If you don't draw anything on these layers, CD2 defaults to a straight edge.

41 The current layer is **ROOF EDGE 5**. **Snap** is on. Select the **Path** icon.

42 Start the path at 0,0. At this stage you can turn **Snap** off if you want an irregular house edge.

43 Continue the path, staying below the gray line (Y axis) until you near 5,0.



Path drawn on the ROOF EDGE 5 layer

44 At this point, either turn **Snap** on and select the grid point at 5,0 or type **5,0** and press ¶ .

45 Set the layer to **ROOF EDGE 1**. Optionally, hide ROOF EDGE 5. Start a **Path** at 0,0 draw below the gray line and end up at 1,0.

Path drawn on the ROOF EDGE 1 layer

Defining the Roof External section

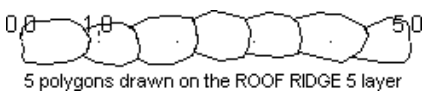
The Roof External section determines the appearance of the short ends of gabled building types and the edge of the roof ridge (unless you have draw on the ROOF RIDGE layer, too). This allows you to create houses with solid roof ridges, such as Thatched. These are drawn in exactly the same way as roof edges, with a 5' section on the ROOF EXTERNAL 5 layer and a 1' section on the ROOF EXTERNAL layer.

Defining the Roof Internal section

The Roof Internal section determines the appearance of the internal lines of the building These are drawn in exactly the same way as roof edges, with a 5' section on ROOF INTERNAL 5 layer and a 1' section on the ROOF INTERNAL 1 layer.

Defining the Roof Ridge

If you want a roof ridge that consists of repeating sections (like roof tiles, slates or whatever), draw it in two sections, a 5' section on the ROOF RIDGE 5 layer and a 1' section on the ROOF RIDGE 1 layer. These must be drawn with polygons.



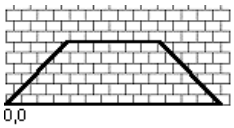
5 polygons drawn on the ROOF RIDGE 5 layer

46 Make the **ROOF RIDGE 5** layer current. Draw a series of polygons or boxes, starting at 0,0 and ending at 5,0.

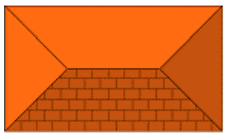
2 polygons drawn on the ROOF RIDGE 1 layer

47 Make the **ROOF RIDGE 1** layer current. Draw a series of polygons or boxes, starting at 0,0 and ending at 1,0.

Defining the Roof Hatching



CD2 applies the roof shape to the HATCHING (DARK) area


The result on an Orange Square Tile house.

Roof hatching is the fill pattern found on roofs. Each different area of the roof can have a different hatching pattern. If you don't add anything to the roof hatching layers, you won't get roof hatching. CD2 starts at 0,0 and puts whatever is there in the lower left corner of the area to be hatched. It then works right, adding and trimming entities that fall within the roof boundaries.

The pattern does not tile. This prevents huge roofs being added to drawings accidentally.

The easiest way to see how to draw roof hatching is to look at the examples in the Symbols\Cities\House Styles folder.

Hatching can be drawn using any entities that can be trimmed, but we recommend that you avoid ellipses and very complex shapes, as they will take a long time to trim when you insert a house using this house style.

- ✓ Draw on the HATCHING (DARK) layer for the hatch pattern for the Dark colored roof areas,
- ✓ Draw on the HATCHING (MEDIUM) layer for the hatch pattern for the Medium colored roof areas,
- ✓ Draw on the HATCHING (LIGHT) layer for the hatch pattern for the Dark colored roof areas.
- ✓ Draw on the HATCHING (FLAT ROOF) layer for the hatch pattern for the Flat Roof areas.

Just set the appropriate layer then add entities.

ALPHABETICAL LIST OF CD PRO COMMANDS

This table gives you a list of all CD 2's commands except those used specifically in macros.

- **Command** gives you the command name found on the CD2's menus, the name that appears when you hover the mouse over a button (tool tip text) or on a right click popup menu. Type the command into CD2's Help Index or Find list to get more details on the command.
- **Where?** Lets you know which menu, popup menu or toolbar to find the command. CD2's toolbar layout is shown on page 165. Right click on the button to access a popup menu
- The **Text Equivalent** is what you type at the Command prompt to use the command.
- **Use In Macro** If the command is useable in a macro, then **Yes**, otherwise **No**. Note that all commands are useable as the last line in a macro. The next section on page 222 lists macro commands with parameters.

Command	Description	Where?	Text Equivalent	Use in Macro
2 Point Circle	2 Point Circle	Draw toolbar, Circle popup	CIR2	Yes
Add city layers	Adds the city designer layers to a template which does not have them	City Menu	PARTM #system\citypart;1;0;-1000,-1000;;RDOFF;UNDO;RDON;	Yes
Add Grid Overlay	Adds a grid labelled along its axes. Used with Create Index to locate streets	City Toolbar	ADDGRID	No
All	Displays matching standard style city catalogs	City toolbar, Symbol Style toggle	SYMICONFSET;1	No
All BLDNGs with color	Shows all demographic information layers	City menu >> Layers	SC	Yes
All BLDNGs with shading	Shows all BLDNG layers, with roof shading obscuring demographic info	City menu >> Layers	SB	Yes
All city drawing tools	Displays all city drawing tools for selection	City menu	DRAWTOOLSM;City*	No
All City Drawing Tools...	Display all city drawing tools	City menu	DRAWTOOLSM;=City*	No
Change House Layer	Change the demographic information layer for symbols and buildings	City Menu	CHANGEHL	Yes
City Road	Displays the city road drawing tools for selection	City menu	DRAWTOOLSM;City Road*	No
Classic	Opens the Classic symbol setting in the current style	City menu >> Symbol Settings	SYMICONM;Classic*	No
Classical	Opens the Classical catalog	Symbols toolbar, Classical/Middle East popup	GN cat7 1;CATICON7	Yes
Classical/Middle East	Toggle between Classical and Middle East catalogs	Symbols toolbar	CATICON7	Yes
Color layers	Sets the color for selected layers in a drawing for demographic information.	City Toolbar	CCL	No
Connection	Connects two buildings with the current style and roof type	City Toolbar, House popup	HOUSEM;11	Yes
Create Index	Adds a index of selected text with coordinates. Click on an entry to zoom to it.	City menu	GAZ	Yes
Cyberpunk	Opens the Cyberpunk catalog	Symbols toolbar, Futuristic/Cyberpunk/Moon popup	GN cat10 2;CATICON10	Yes
Cyberpunk	Opens the Cyberpunk symbol setting in the current style	City menu >> Symbol Settings	SYMICONM;Cyberpunk*	No
Default	Opens the Default catalog	Symbols toolbar, Default/Miscellaneous popup	GN cat1 1;CATICON1	Yes
Default Road	Adds a new default road using Drawing Tools	City Toolbar	DRAWTOOLSM;City Road, Default*	No
Default...	Opens the Default symbol setting in the current style	City menu >> Symbol Settings	SYMICONM;Default*	No
Default/Miscellaneous	Toggle between Default and Miscellaneous catalogs	Symbols toolbar	CATICON1	Yes
Earth	Display Earth area fill drawing tools	City menu >> Area fills	DRAWTOOLSM;Earth*	No
Elf	Opens the Elf catalog	Symbols toolbar, Orc/Halfling/Elf popup	GN cat8 3;CATICON8	Yes
Elven Treehouses	Opens the Elven Treehouses symbol setting in the current style	City menu >> Symbol Settings	SYMICONM;Elven Treehouses*	No
Extension	Adds an extension to a building with	City Toolbar, House popup	HOUSEM;10	Yes

Command	Description	Where?	Text Equivalent	Use in Macro
	the current style and roof type			
Fantasy	Opens the Fantasy catalog	Symbols toolbar, Fantasy/Hovel popup	GN cat2 1;CATICON2	Yes
Fantasy	Opens the Fantasy symbol setting in the current style	City menu >> Symbol Settings	SYMICONM;Fantasy*	No
Fantasy/Hovel	Toggle between Fantasy and Hovel catalogs	Symbols toolbar	CATICON2	Yes
Futuristic	Opens the Futuristic catalog	Symbols toolbar, Futuristic/Cyberpunk/Moon popup	GN cat10 1;CATICON10	Yes
Futuristic/Cyberpunk/Moon	Toggle between Futuristic, Cyberpunk and Moon catalogs	Symbols toolbar	CATICON10	Yes
Gothic	Opens the Gothic catalog	Symbols toolbar, Thatched/Gothic popup	GN cat6 2;CATICON6	Yes
Gothic	Opens the Gothic symbol setting in the current style	City menu >> Symbol Settings	SYMICONM;Gothic*	No
Grass	Display Grass area fill drawing tools	City menu >> Area fills	DRAWTOOLSM;Grass*	No
Grid Angle	Aligns the drawing grid to a specified angle, bearing between two points or selected entity such as a road	City menu	GRIDANG	Yes
Halfling	Opens the Halfling catalog	Symbols toolbar, Orc/Halfling/Elf popup	GN cat8 2;CATICON8	Yes
Halfling Burrows	Opens the Halfling Burrows symbol setting in the current style	City menu >> Symbol Settings	SYMICONM;Halfling Burrows*	No
Hide all BLDNGs	Hides all BLDNGS layers and the structures layer	City menu >> Layers	HB	Yes
House	Adds a building with a selected roof type, shape and style	City menu	HOUSE	No
House (Macro version)	Adds a building with the selected roof shape	Text only	HOUSEM	Yes
House Irregular 4-sided	Adds an irregular four-sided building with the current style and roof type	City Toolbar, House popup	HOUSEM;9	Yes
House Irregular L	Adds an irregular L-shaped building with the current style and roof type	City Toolbar, House popup	HOUSEM;3	Yes
House Irregular T	Adds an irregular T-shaped building with the current style and roof type	City Toolbar, House popup	HOUSEM;7	Yes
House Irregular U	Adds an irregular U-shaped building with the current style and roof type	City Toolbar, House popup	HOUSEM;6	Yes
House Irregular V	Adds an irregular V-shaped building with the current style and roof type	City Toolbar, House popup	HOUSEM;5	Yes
House Many-sided	Adds an irregular many-sided building with the current style and roof type	City Toolbar, House popup	HOUSEM;8	Yes
House Regular L	Adds a regular L-shaped building with the current style and roof type	City Toolbar, House popup	HOUSEM;2	Yes
House Regular V	Adds a regular V-shaped building with the current style and roof type	City Toolbar, House popup	HOUSEM;4	Yes
House settings	Select or define house styles	City menu	HOUSEOPT	No
House, current style	Adds a house in the default shape	City Toolbar, House popup	HOUSEM;	Yes
House, Rectangular	Adds a rectangular building with the current style and roof type	City Toolbar, House popup	HOUSEM;1	Yes
Hovel	Opens the Miscellaneous catalog	Symbols toolbar, Fantasy/Hovel popup	GN cat2 2;CATICON2;	Yes
Hovel	Opens the Hovel symbol setting in the current style	City menu >> Symbol Settings	SYMICONM;Hovel*	No
Igloo	Opens the Igloo catalog	Symbols toolbar, Igloo/Nomad popup	GN cat3 1;CATICON3	Yes
Igloo	Opens the Igloo symbol setting in the current style	City menu >> Symbol Settings	SYMICONM;Igloo*	No
Igloo/Nomad	Toggle between Igloo and Nomad catalogs	Symbols toolbar	CATICON3	Yes
Lock Symbol Angle	Sets the default symbol angle to align to a selected edge	City menu	LOCKANG	Yes, macro
Mediterranean	Opens the Mediterranean symbol	City menu >> Symbol Settings	SYMICONM;Mediterranean*	No

Command	Description	Where?	Text Equivalent	Use in Macro
	setting in the current style			
Middle East	Opens the Middle East catalog	Symbols toolbar, Classical/Middle East popup	GN cat7 2;CATICON7	Yes
Miscellaneous	Opens the Miscellaneous catalog	Symbols toolbar, Default/Miscellaneous popup	GN cat1 2;CATICON1	Yes
Modern	Opens the Modern catalog	Symbols toolbar, Skyscrapers/Modern popup	GN cat9 2;CATICON9	Yes
Modern Blue	Opens the Modern Blue catalog	Symbols toolbar, Modern Blue/Grey/Red popup	GN cat4 1;CATICON4	Yes
Modern Blue/Grey/Red	Toggle between Modern Blue, Grey and Red catalogs	Symbols toolbar	CATICON4	Yes
Modern Grey	Opens the Modern Grey catalog	Symbols toolbar, Modern Blue/Grey/Red popup	GN cat4 2;CATICON4	Yes
Modern Red	Opens the Modern Red catalog	Symbols toolbar, Modern Blue/Grey/Red popup	GN cat4 3;CATICON4	Yes
Modern...	Opens the Modern symbol setting in the current style	City menu >> Symbol Settings	SYMICONM;Modern*	No
Monochrome	Displays matching monochrome style city catalogs	City toolbar, Symbol Style toggle	SYMICONFSET;2	No
Moon	Opens the Moon catalog	Symbols toolbar, Futuristic/Cyberpunk/Moon popup	GN cat10 3;CATICON10	Yes
Moonbase	Opens the Moonbase symbol setting in the current style	City menu >> Symbol Settings	SYMICONM;Moonbase*	No
Nomad	Opens the Nomad catalog	Symbols toolbar, Igloo/Nomad popup	GN cat3 2;CATICON3	Yes
Nomad Tents	Opens the Nomad Tents symbol setting in the current style	City menu >> Symbol Settings	SYMICONM;Nomad Tents*	No
Orc	Opens the Orc catalog	Symbols toolbar, Orc/Halfling/Elf popup	GN cat8 1;CATICON8	Yes
Orc Huts	Opens the Orc Huts symbol setting in the current style	City menu >> Symbol Settings	SYMICONM;Orc Huts*	No
Orc/Halfling/Elf	Toggle between Orc, Halfling and Elf catalogs	Symbols toolbar	CATICON8	Yes
Random Street	Adds a random length of buildings to an existing road, or on their own.	City menu	STREET	Yes
Roads	Opens the Roads catalog	Symbols toolbar, Vehicles/Roads popup	GN cat5 2;CATICON5	Yes
Roads	Opens the Roads symbol setting in the current style	City menu >> Symbol Settings	SYMICONM;Roads*	No
Skyscraper	Opens the Skyscraper symbol setting in the current style	City menu >> Symbol Settings	SYMICONM;Skyscraper*	No
Skyscrapers	Opens the Skyscrapers catalog	Symbols toolbar, Orc/Halfling/Elf popup	GN cat9 1;CATICON9	Yes
Skyscrapers/Modern	Toggle between Skyscrapers and Modern catalogs	Symbols toolbar	CATICON9	Yes
Street Options	Random Street options	City menu	STREETOPT	No
Thatched	Opens the Thatched catalog	Symbols toolbar, Thatched/Gothic popup	GN cat6 1;CATICON6	Yes
Thatched	Opens the Thatched symbol setting in the current style	City menu >> Symbol Settings	SYMICONM;Thatched*	No
Thatched/Gothic	Toggle between Thatched and Gothic catalogs	Symbols toolbar	CATICON6	Yes
Tiled City Blocks	Opens the Tiled City Blocks symbol setting in the current style	City menu >> Symbol Settings	SYMICONM;Tiled City Blocks*	No
Trees, People, Street	Opens the Trees symbol setting in the current style	City menu >> Symbol Settings	SYMICONM;Trees*	No
Vehicles	Opens the Vehicles catalog	Symbols toolbar, Vehicles/Roads popup	GN cat5 1;CATICON5	Yes
Vehicles	Opens the Vehicles symbol setting in the current style	City menu >> Symbol Settings	SYMICONM;Vehicles*	No
Vehicles/Roads	Toggle between Vehicles and Roads catalogs	Symbols toolbar	CATICON5	Yes
Water	Display Water area fill drawing tools	City menu >> Area fills	DRAWTOOLSM;Water*	No

MACRO COMMAND REFERENCE

This table includes CD2 commands useable in macros that have one or more macro parameters. Macro-friendly commands that work straight off are not included;see the table above for those commands. For example, in the previous table, Thatched/Gothic has a text equivalent of CATICON6. You could put this in a macro and it would function with no parameters. The macro version of the House command has many variations of syntax and is detailed here.

For more information on macros, and you how might use this table, see the page 172 in the CC2 Pro manual.

Command	Description	Text Equivalent	Syntax
Change House Layer	Change the demographic information layer for symbols and buildings	CHANGEHL	[selection];sLayer[dialog]
Connection	Connects two buildings with the current style and roof type	HOUSEM;11	xyInHouse;xyEdge1;xyEdge2;xyWidth[default];
Create Index	Adds a index of selected text with coordinates. Click on an entry to zoom to it.	GAZ	[selection];pIndexPosition
Extension	Adds an extension to a building with the current style and roof type	HOUSEM;10	xyInHouse;xyEdge;xyEnd;xyWidth[default];
Grid Angle	Aligns the drawing grid to a specified angle, bearing between two points or selected entity such as a road	GRIDANG	rAngle/xyEntity/(xyBearing1;xyBearing2)
House (Macro version)	Adds a building with the selected roof shape	HOUSEM	[nHouseShape](See individual house types for syntax)
House Irregular 4-sided	Adds an irregular four-sided building with the current style and roof type	HOUSEM;9	xy1stCnr1;xy2ndCnr1;xy3rdCnr1;xy4thCnr1
House Irregular L	Adds an irregular L-shaped building with the current style and roof type	HOUSEM;3	xy1stCnr1;xy2ndCnr1;xy3rdCnr1;xy4thCnr1;xy5thCnr1;
House Irregular T	Adds an irregular T-shaped building with the current style and roof type	HOUSEM;7	xy1stCnr1;xy2ndCnr1;xy3rdCnr1;xy4thCnr1;
House Irregular U	Adds an irregular U-shaped building with the current style and roof type	HOUSEM;6	xy1stCnr1;xy2ndCnr1;xy3rdCnr1;xy4thCnr1;xy5thCnr;
House Irregular V	Adds an irregular V-shaped building with the current style and roof type	HOUSEM;5	xy1stCnr1;xy2ndCnr1;xy3rdCnr1;xy4thCnr1;xy5thCnr1;
House Many-sided	Adds an irregular many-sided building with the current style and roof type	HOUSEM;8	xy1stCnr1…xyNthCnr1;xyCenter1;
House Regular L	Adds a regular L-shaped building with the current style and roof type	HOUSEM;2	xy1stCnr1;xy2ndCnr1;xy3rdCnr1;xy4thCnr1
House Regular V	Adds a regular V-shaped building with the current style and roof type	HOUSEM;4	xy1stCnr1;xy2ndCnr1;xy3rdCnr1;xy4thCnr1;
House, Rectangular	Adds a rectangular building with the current style and roof type	HOUSEM;1	xy1stCorner1;xy2ndCorner1;xy3rdCorner1
Random Street	Adds a random length of buildings to an existing road, or on their own.	STREET	xyEnd1;xyEnd2;

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TM

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Help System: Ian R Malcomson
Thanks To: Beta Testers, CC Mail List, The Colonel and Colin

DIORAMAS PRO INTRODUCTION

Welcome to Dioramas Pro. This book introduces the new Dioramas commands, and shows you how to use them to create three-dimensional fold-up structures to enhance your gaming experience. Additionally, the example drawings provided with your Dioramas installation are explained, and advice is given on the craft of cardboard engineering.

About You

The manual assumes that you have a reasonable grasp of Campaign Cartographer 2 Pro (CC2 Pro). In particular you must be able to use CC2 Pro's editing commands, and understand how to use templates and symbols. If you purchased Dioramas and CC2 Pro together, learn CC2 Pro first!

Other Sources of Information

CC2 Pro's Help System. When you are using CC2 Pro / Dioramas you can get in-depth information by pressing , or by selecting Help from CC2 Pro's Help menu.

Web Based Tech Support. ProFantasy's web site www.profantasy.com has a comprehensive technical support section and details about e-mailing for help.

The CC2 Pro mail-list. This is a very active e-mail discussion group to help new users and discuss all things map related. To subscribe follow the instructions at the ProFantasy Software web site, www.profantasy.com

Installing Dioramas

> Place the Dioramas compact disc into your CD-ROM drive. On most computers there will be a few seconds of whirring, then you will see a window showing the contents of the CD. If this doesn't happen, double-click on "My Computer", then on the icon for your CD-ROM drive.

To install Dioramas, double-Click Setup icon, then follow the on-screen instructions.

During the installation, you will be asked to give your name, company, and Dioramas serial number. Your unique serial number is on the back of the CD case. If the company box is blank, you will have to enter something, even if it is only one character!

Starting Dioramas

Once you have completed the installation, start CC2 Pro. The screen looks the same as before, but with one vital change... Nestled in the middle of the File toolbar is the **Dioramas** button.

If you can't see the **Dioramas** button, Click **Tools** button, then click next to File Toolbar.

Latest Information

To find out about any additions to Dioramas since this manual was written, double-Click **Readme** icon on the CD.

Maps from previous versions

Maps created in older versions of CC2 Pro may exhibit strange behavior with layers and symbols. To fix this load each old map, type **CS**, press · and then save the map.

The Dioramas toolbar

Click **Dioramas** icon. The menu changes to include a new Dioramas heading, and the bottom of the right hand Icon Bar is overtaken by new icons:

Dioramas Options	Change Panel Fill Style
Rectangular Panel	Polygonal Panel
Convert To Panel	Panel Multipoly
Add Tab	Geomorph Tab
Fold Line	Cut Line
Wall Net	Multi-Wall Net

The Dioramas symbol toolbar

There are three symbol catalogs available in Dioramas. To use these click on the buttons on the Symbols toolbar. If you can't see the buttons, Click **Tools** button, then click next to Symbols toolbar

The Castle symbols catalog.

The generic symbols catalog contains nets to be assembled for furniture, etc.

The Wall Features catalog contains doors, windows etc

DIORAMAS GEOMORPHS

Dioramas provides a library pre-drawn geomorphic diorama pieces that can simply be opened, modified to your own specifications by adding fill styles and symbols, and then printed out for final assembly. Users familiar with Dungeon Designer 2 (DD2) will recognize these pieces as being 3D versions of DD2's dungeon geomorphs.

The geomorphic pieces are designed with modularity in mind. That is, rather than representing specific constructions, once you have assembled the pieces, they may be used over and over again during play.

The geomorphic dungeon pieces also support a unique plug-in system. When constructed, each geomorphic piece consists of two or more separate pieces: a floor base, and one or more wall pieces. The floor bases possess fold-over plugs to which wall pieces may be pushed into place. In play, the system allows greater flexibility such that geomorph pieces may be mixed and matched at will, and walls may simply be removed to allow better access to miniatures and battle situations if required.

Dioramas provides two sets of geomorph pieces: a blank set, in template form, allowing you to create geomorphic pieces for your dungeons; and a set of "completed" geomorphs that serve as both examples for the production of your own Dioramas drawings, and as "fire and forget" pieces - that is, they may simply be opened and printed, ready for use, with a little editing.

Creating a new drawing using Dioramas geomorphs

If you want to create a floorplan from plug in sections, adding your own fill styles and symbols, follow these instructions. Completed geomorph examples are found in the Examples\Dioramas\Geomorphs folder.

48 Start CC2 Pro, either by clicking its icon on the Windows® desktop, or by selecting Windows® Start Menu >> Programs >> Campaign Cartographer 2.

49 Click File menu >> New >> Geomorphs...

You can see a selection of templates for full of geomorph pieces.

50 Choose the required geomorph template.

> It is advisable to save Dioramas example geomorphs using File Menu >> Save As, and by providing a new name and folder location for the drawing if you intend to edit the examples (e.g., by adding symbols to them), before you actually start the editing process. This will prevent the example files from being altered in case you wish to utilize in the future.

Adding symbols to Geomorph pieces

Dioramas provides a symbol catalog of features such as doors, windows, shutters, and curtains that can be added to any Dioramas drawing.

51 Click **Dioramas Wall Features** .

The Dioramas Wall Features symbol catalog will open in the Symbol Catalog window.

52 Click the required symbol, and place it within the drawing at the appropriate location.

> The Dioramas Wall Features symbols make use of smart symbol functionality. This means that symbols will align themselves to the edges of drawing entities; Left-clicking when the correct alignment has been achieved will lock the symbol's angle. A second left-click will place the symbol. Smart symbol functionality may be disabled by right-clicking, and selecting the Disable SmartSym check box.

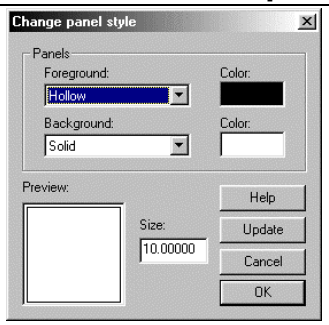
Changing the fill styles of Dioramas Geomorphs

The Dioramas geomorphs start out plain white. You will probably want to add fill style and color to them.

53 Click **Change Panel Fill**

54 Select the panels you wish to change. Right-click when you have selected all required panels.

You see the Change Panel Style dialog box:



The currently selected panel foreground fill style is Hollow and black, and the currently selected background fill style is Solid and white.

55 Use the Foreground drop-list to select the required foreground fill style.

56 To change the color of the foreground fill style, click on the box showing the current foreground color (directly to the right of the Foreground fill style list).

The standard CC2 Pro Select Color dialog box will appear. Click on the color you want, and press OK.

57 Repeat the above steps to change the background fill style and color.

Foreground fills consist of symbol fills (e.g., Slate Fill), while Background fills consist of a Solid color fill, or one of the available bitmap fills.

The actual color used by a bitmap fill style is dependent on the bitmap itself, not on the selected background fill color.

A certain amount of experimentation is necessary to achieve the results you want. As a guide, you can look at the provided Dioramas example files, and the Dioramas Fill Styles palette drawing, which are located in the Examples\Dioramas folder and sub-folders.

Other Geomorph tips and tricks

As you peruse the geomorph templates and examples, you will notice that some geomorph pieces are divided across more than one page, and other pages contain more than one geomorph piece. Do not be afraid to move the pieces around - or even delete them from the drawing - to achieve the result you desire.

The geomorphs are designed to be flexible, to allow you to swap pieces and move them around.. Just because a particular wall section normally "belongs" to a particular geomorph piece, does not mean you cannot use that wall section to plug into a base piece to which it is not normally associated.

Finally, keep all of the geomorph pieces you assemble! Because they are generic in design, a store of pieces will allow you to build rooms, corridors, and so forth as you require during play. Thus there is thus no need to print and assemble separate pieces for every location in a given dungeon, and pieces you assemble for one dungeon may work just as well for delving through a different labyrinth entirely. This philosophy also applies to pieces you create yourself - keep them; your scalpel and printer will thank you in the long run!

CREATING DIORAMAS

You don't have to create your dioramas from the pre-defined pieces described in the previous chapter. You can start from scratch and use the tools provided to make a wide range of shapes.

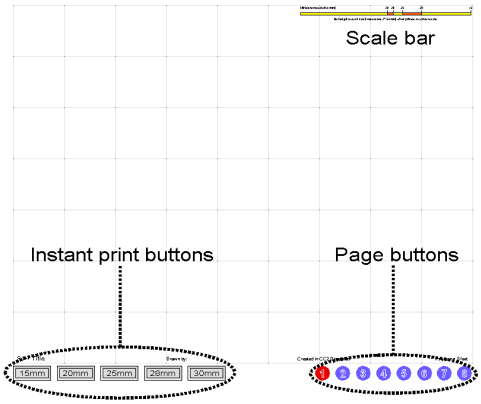
Starting a new blank diorama

1 Click **New** . Click Dioramas.FCT.

2 Save the blank diorama under a new name.

Features of the Dioramas template

The Dioramas template comprises eight pages, each 45'×35', allowing you to draw several diorama pieces within a single drawing.



Each of the template's pages provide additional functionality, in the form of a scale bar, a set of instant print buttons, and a set of page buttons.

The instant print buttons provide an easy method to print your Dioramas drawings at a scale correct for the miniature scale you are designing for. When you click on one of these buttons, Dioramas will ask you whether you want to print. If you answer "Yes" to this prompt, the current page (not the entire drawing) will be printed, at the miniature scale indicated by the instant print button that was activated. For example, pressing the 15mm instant print button will print the current page correct for use with 15mm scale miniatures.

The page buttons permit easy navigation around your Dioramas drawing. The page you are currently working on will be indicated by a red page button. Pressing one of the blue buttons will take you to the indicated page number within your Dioramas drawing.

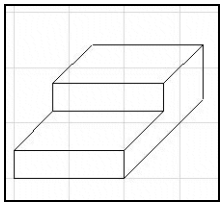
The scale bar provides a double-check when printing a Dioramas drawing to scale. When printed, the actual distance between the left-hand edge of the bar to the relevant miniature scale notch should be 2" (51mm). For example, the entire bar should measure 2" in length when printing to 15mm miniature scale.

A completed example of the following tutorial can be found by opening Steps Example.FCW in your Examples\Dioramas folder. For convenience, all of the steps involved in the example are illustrated within the same drawing, on separate pages.

Planning (the complexities of avoidance)

Sometimes, diorama drawings can be difficult to work through from a cold start. It is often worthwhile to quickly sketch the piece you intend to build. This helps prevent the discovery that your drawing is impossible to construct or that it is not possible to draw the piece you want. Sketching will help you visualize the piece you are drawing. It is a good idea to draw such sketches, and any other construction lines you draw, in an easily selected color, such as red, to ease their removal once you have finished with them.

For the purpose of this example, we will be creating a simple stair section, with 5' exaggerated steps to allow easy placement of miniatures. To help us, we might sketch the intended piece thus:



Note that such sketches do not need to be either proportionally accurate or to scale, nor do you have to use CC2 Pro to construct them. The idea is to simply provide an aid for visualization of the object to be drawn - a hasty scribble on a piece of scrap paper will serve just as well.

Drawing panels

When drawing your dioramas object, think of the object in terms of a series of two-dimensional blocks, each block comprising an area between the corners of the 3D shape. Our stair example comprises eight such blocks - the front of the lower step, the top of the lower step, the front of the upper step, the top of the upper step, the back of the stairs object, its base, and two sides.

The easiest method of converting a 3D object into a flat-pack dioramas drawing is to draw each of these blocks individually, such that they join each other where they will be folded to create the final piece. This method also allows greater flexibility when it comes to selecting fill styles. The most conservative method is to draw all of the blocks as a single object, or panel, and then add in fold lines as necessary to divide this object into the separate blocks it represents.

We will start by drawing the stairs as eight individual panels, beginning with the front of the lower step.

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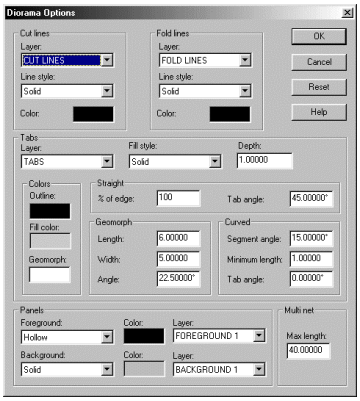
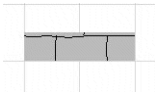
3 Click **Dioramas Options**

The Dioramas Options dialog box will appear:



It is here that you set the currently used Dioramas drawing options. For now, we wish to change the Panels options to reflect a vertical wall panel. Change Foreground to Slate Fill, foreground Color to black (color 0), Background to Solid, and background Color to a light gray (color 252).

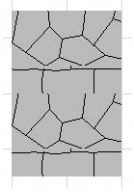


4 Click **Rectangular Panel**, and draw a rectangle 10' wide and 2.5' tall.

5 Now go back to the **Dioramas Options** , and change the **Foreground** to "Paving 31 Symbol".

6 Draw another polygon using the **Rectangular Panel** , this time making it 10' wide by 5' tall.

7 Copy both of the panels you have drawn once, so you now have two 10'×5' polygons, and two 10'×2.5' polygons.



8 Arrange these four polygons so they form a chain.

9 Now we'll draw the back panel for the stairs. Go back to the **Dioramas Options** , and change the **Foreground** back to "Slate Fill".

10 Draw a rectangular panel, making this one 10' wide and 5' tall.

The back panel needs to be tall enough to accommodate the height of both steps. Since each step is 2.5' tall, the back panel needs to be 5' tall.

11 Click **Dioramas Options**, and change the **Foreground** to "Slate Fill 90".

Because the side-panels we are about to draw need to be at a right-angle to the panels we have already drawn, the fill style used must also be aligned to a right-angle from the panels we have already drawn to ensure the final drawing looks right when assembled.

At this point, it is worthwhile scanning up and down the list of available fill styles. You will notice several styles that have been annotated with number values. These numbers refer to the panel angles for which those fill styles are designed. As you will notice, Dioramas provides styles set at 45, 90, 135, 180, 225, and 270°, depending on the nature of the style. It is advisable to stick to increments of 45° when drawing diorama pieces because of this.

12 To draw the side panel, imagine that you are looking at the stairs from the side. Click **Polygon Panel** , and start the panel by selecting the **Endpoint** , and clicking to select the top right corner of the panel representing the top of the uppermost step. Use **Endpoint** again to select the bottom right corner of the same panel.

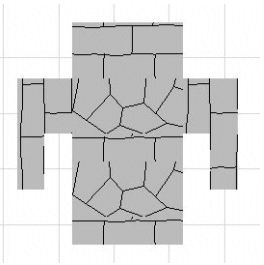
13 To get the point necessary for the step down, type `@2.5,0` at the command line and press · . Continue this method to place the remaining points: `@0,-5` to get to the end of the lower step; `@2.5,0` for the vertical lower step; and `@0,10` for the remaining necessary point. Right click to complete the panel.

When typing co-ordinates during processes, you can either specify absolute co-ordinates, or relative co-ordinates.

Absolute co-ordinates take the entry form `x,y`, and will place the point at the specified position in relation to the drawing's origin (0,0). For example, entering `5,5` will place the point 5' up and 5' to the right of the drawing's origin.

Relative co-ordinates take the entry form `@x,y`, and will place the point at the specified position in relation to the last point drawn. For example, entering `@5,5` will place the point 5' up and 5' to the right of the last point placed.

You can specify negative co-ordinate values if you wish. For example, typing `@-5,-5` will place the point 5' to the left, and 5' down from the last point placed.



14 Click **Copy Menu >> Mirrored Copies**, click the panel we have just drawn, and choose a vertical mirror line that starts at the center of one of the rectangular panel's sides, and ends at the center of another.

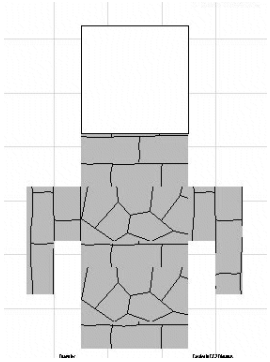
CC2 Pro possesses many different copy commands which are of much use when creating Dioramas drawings. Two of the most useful for Dioramas drawings are:

Mirrored Copies: This command takes the selected entities, and produces a mirror-image of those entities. When using the command, you will be prompted for a mirror line, which will define the result of the copy. Imagine the mirror line as a real mirror - your copy will be produced as if you had placed a mirror along the line and drew the image of the required entities as they appeared within the mirror.

Rotated Copies: This command takes the selected entities, and produces a copy of them rotated anti-clockwise around a given center point. It can be very useful when producing construction lines to use when drawing complex polygon shapes accurately. For example, to produce construction lines to allow accurate drawing of a pentagon, you might draw a circle, then draw a line from the center of that circle vertically to the circle's edge. By performing a rotated copy of the line through 72° around the center of the circle, you gain a second line that can be used to locate another corner point of the final pentagon (there being 360° in total within all polygon shapes, and 360/5 results in an angle of 72°). By left-clicking again (to repeat the last command), right-clicking and choose Prior, pressing · twice (once to use the previously selected angle, and once to use the previously selected rotation center point), and repeating this process a further two times will quickly produce the construction lines needed. Drawing a polygon, snapping each point drawn to the end of the construction lines, will then produce an accurate, regular pentagon.

15 Click on the **Dioramas Options** again, and change Foreground fill style to Hollow, Background fill style to Solid, and background Color to white.

We are about to draw a base for our step object. Because the base will not be in view when the final object is used, there is no need to waste printer ink on drawing unnecessary color fill.



16 Draw a 10'×10' rectangle, attached to the back wall panel of the drawing.

The base panel needs to accommodate both the width of the object, and the combined heights of the panels that will eventually form the horizontal planes of the steps. Since we have drawn each step 5' tall, and there are two steps, the height of the base panel needs to be 10'.

Fold and cut lines

Fold and cut lines are used to guide the constructor of a dioramas object. Their specific use is self-explanatory.

To draw fold lines, click **Fold Lines**, and draw the line in as you would normally draw a line object. Similarly, click the **Cut Lines** to draw cut lines. By default, both cut and fold lines appear as black, solid lines. You can change the style used for cut and fold lines by clicking on the **Dioramas Options**, and setting their options accordingly.

---

17 Click **Fold Lines**, and draw from the top left to the top right of the lower step's vertical panel.

18 Repeat this process for all of the panel intersections.

Glue tabs

Glue tabs are used within the final assembly of a Dioramas object, being the points at which folded panels are attached to each other. As with all Dioramas drawing functions, tab style drawing options may be set through the Dioramas Options dialog.

---

19 Click **Add Tab**.

Dioramas will now begin the tab drawing process, and the command prompt reads `First point (or edge).`

20 Select the long edge of one of the step side panels.

An outline of the tab to be drawn appears, attached to the panel edge selected. By moving the cursor, you will notice the outline extend or contract, from the panel edge to the current cursor position. The command prompt changes to read prompt `Set width [default width](+,- adjust tab count).`

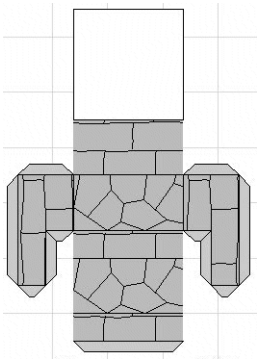
> At this point, you can either left-click to complete the drawing of the tab, type a value at the command prompt to specifically set the width of the tab (this will draw the tab and complete the command), or press the + or - keys on the numeric keypad of your keyboard.
>
> When the + key is pressed, the number of tabs Dioramas will draw along the selected edge will increase (you will see the outline tabs increase in number). Similarly, pressing the - key will decrease the number of tabs to be drawn, to a minimum of a single tab. This is useful when creating particularly complex or delicate objects - an increased number of tabs will, for certain objects, make assembly of the object easier to achieve, at the sacrifice of making it harder to cut out.

With the cursor positioned so that the outline tab appears outside of the panel it is to be attached to, type `1` at the command prompt, and press ↵.

Dioramas will draw the tab, with a width of 1" from the edge of the panel.

> The maximum width of a tab is dependent on the panel it is to be glued to - the tab cannot be of greater width than this panel, and it is recommended that the tab is smaller than this. If more than one tab is to be ultimately glued to a single panel, you must also consider the area required to accommodate all such tabs when deciding the width to use. It is a trade-off between making the tab as large as possible to ease construction, and ensuring that the tabs will not interfere with any other part of the object.
>
> Where you have the option of placing a tab on one of two panels that will ultimately mate, always choose the narrowest of the two panels on which to draw the tab. This will allow you to make the tab as large as possible.

21 Repeat the process for the remaining four edges of the side panel, and the lower edge of the panel representing the vertical front of the lower step.



22 Right-click **Copy**, then select Mirrored Copies selecting a mirror line running vertically through the center of the steps object, to copy the side panel tabs we have drawn across to the opposite side panel.

Complex objects

The steps object we have drawn in the above example is relatively simple. Of course, Dioramas possesses the functionality to allow you to draw structures with greater complexity than this!

As with any Dioramas object, it is often very helpful indeed to quickly sketch the desired result. This is especially true with complex objects. Remember that these sketches only need to provide guidance - accuracy is not important, as long as the sketch provides a useful visualization guide.

You should always, as far as possible, draw panels at 45° increments. This is because the Dioramas fill styles only support 45° angles. If part of your object must be at another angle, consider drawing that part as a separate object to be attached to the final assembly. Of course, this general rule does not apply to panels that will either have no symbol fill style, or those making use of fill styles that, by default, work at any angle.

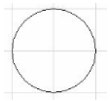
Finally, spend a little time to think about that which you are about to draw. A couple of minutes spent in cogitation can often save painful hours spent seeking and correcting errors later.

Circles and tubes

True circular and tubular objects are almost impossible to achieve in cardboard engineering, unless said circle or tube is the be-all and end-all of the object you are creating. As soon as you require something to be attached to a circle or tube, by way of glue tabs, the practicality of such objects breaks down.

It is better, then, to draw circular and tubular objects as standard polygons; the more sides possessed by such polygons, the more circular they will appear. Obviously, the practicalities of assembly forego drawing polygons with a huge number of sides - the trick is to create a polygon that represents the object you desire as closely as possible, without making assembly impossible.

The following process will guide you through the steps necessary to create a closed tube object (e.g., a circular tower). The steps are illustrated within the Circles and tubes.FCW drawing, located within your Examples\Dioramas folder.



23 Draw a circle of the desired radius.

Circle drawing is discussed within the CC2 Pro manual and on-line help.

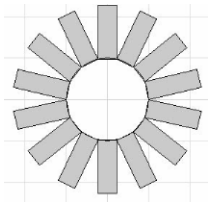
24 Click Add Tabs .

25 Click the edge of the circle.

The outline tabs will appear around the circle. Note that we are using the tabs here to ultimately guide the drawing of our circle representing polygon. We will eventually delete these tabs, along with the circle, so the usual tab drawing guidelines do not apply.

26 Press the ⊞ or ⊟ keypad keys until the desired number of tabs appear.

For the example, I have opted to represent the tube with a 14-sided polygon. Thus, I have used the ⊞ and ⊟ keys until 14 tabs have appeared surrounding the circle.



27 Click outside the circle to complete tab drawing.

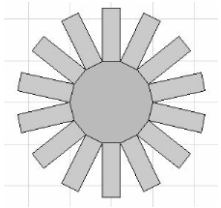
28 Click Erase and delete the circle.

29 Click on the Attach button, so it appears depressed.

The Attach button forces CC2 Pro to use function similar to that supplied by the modifiers (Endpoint, On, etc.) with every click. The major difference between the two being that, where the modifiers will not place a point if you do not click upon an object they can act upon, use of the attach mode will allow such point placement (the point, in this case, will be placed normally).

To set the specific attach mode used, right-click over the Attach button, and select the required mode from the list that appears.

For our purposes, we require the Nearest Endpoint attach mode. It is a good idea to right-click on the Attach button now to check that this is indeed the currently selected mode.



30 Click **Polygonal Panel** , and draw a panel by clicking on the points at which the tabs meet.

Do not click on any point more than once. When you reach the last point around the "circle" before the first point you placed is reached, completing the panel command, by right-clicking and selecting Do It from the menu that appears, will close the polygon between these points.

31 Erase all of the tab entities.

32 Use Info Menu >> Distance to measure the distance along one side of the panel you have just drawn. Make a note of the distance CC2 Pro reports.

Keeping the Attach button down at this point allows the Distance command to be used easily - just click on two adjacent corners of the panel. My example polygon is 2.2252' per side.

33 Click on the Attach button.

Turns attach mode off. We don't need it anymore.

34 Click **Rectangular Panel** , and click within the drawing to start a new panel.

This rectangular panel will form the tube.

35 Type `@14*2.2252,0` at the command prompt.

This will place the second point of our tube panel a horizontal distance from the first point clicked equal to the combined "circumference" of our circle representing polygon.

> CC2 Pro possesses the capability to calculate mathematical equations used in lieu of actual figures. Since we have 14 sides to our base polygon, each being 2.2252' long, we can simply tell CC2 Pro to use 14*2.2252 as a relative X co-ordinate for the second point, and let CC2 Pro do the math for us.
>
> Obviously, you should replace the values used in this example with those that relate to the object you are working to achieve.

36 Click at a point above or below those already placed to complete the tube panel at the desired height.

37 Click on **Fold Lines** .

38 Click Modifiers Menu >> % Along.

39 At the command prompt, type `100/14`.

This is another instance of allowing CC2 Pro to do the hard math for us. We wish to draw our fold line so that it is 1/14th of the distance along the tube panel, or 100% divided by 14. The "14" in this equation should be replaced by the number of sides possessed by your circle representing polygon, if different.

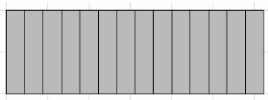
40 Click on one of the long edges of the tube panel.

41 Repeat steps 16 through 18, this time clicking on the opposite edge of the tube panel.

42 Click **Copy** , and select the fold line just drawn.

43 Click on the Endpoint modifier, and click on the closest top corner to the fold line just drawn.

44 Click on the Endpoint modifier again, and this time click on the original fold line, close to its upper end.

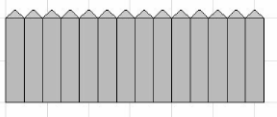


45 Continue placing fold line copies by using the Endpoint modifier, and clicking on the last fold line copy placed, close to its upper end, until all necessary fold lines have been placed (13 in total, or however many your design requires).

46 Click on the **Add Tab** .

47 Select one of the long sides of the tube panel to start the tab.

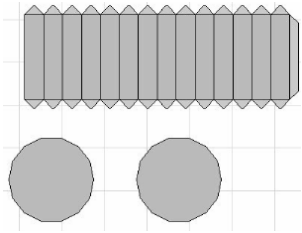
48 Use the + keypad key to increase the number of tabs drawn to 14 (or however many your design requires).



49 Type `1` at the command prompt, and press · to complete the tab command.

50 Right click **Copy** , then select Mirrored Copies and copy the tabs to the opposite side of the tube panel.

51 Click on the Add Tab , and draw a 1' wide tab along one of the short sides of the tube panel.



52 Copy the circle that representing polygon to gain a base for the cylinder.

Multi-page objects

Although it is desirable to keep Dioramas objects to one page as far as possible, particularly large and/or complex objects may require more than one page.

For most drawings, it is simply a case of placing different component parts upon different pages (e.g., placing corridor wall sections on a different page than their base pieces). However, there may be times when a single piece is too large to fit within a single page. When this problem occurs, break the intended drawing into more than one logical component (breaking a long wall section into two wall sections is more logical than, for example, breaking a single wall

section in half lengthways). Keep in mind how easy it would be to re-join the pieces upon assembly, avoiding breaks that would cause unnecessary complications.

Disparate parts of an object should be drawn with such re-joining as a major consideration. Thus, some mechanism, whether through the use of tabs or as an additional panel drawn to mate with a similar panel on another component part, must be provided for. The decision as to which joining method is used must be taken on a case-for-case basis. As a rough rule of thumb: use mating panels when pieces directly abut each other (e.g., a walled corner); and use tabs when one piece is simply an extension of a basic shape (e.g., an extension to a building).

Adding symbols

Dioramas provides two symbol catalogs, which can be used to add life and detail to your Dioramas designs. Both catalogs can be found within your Symbols\Dioramas folder.

Dioramas Wall Features contains symbols that can be added to walls, buildings, etc., including doors, windows, shutters, torch brackets, curtains, and so forth. These symbols are simply placed within a given drawing where necessary.

Dioramas Symbols contains pre-fabricated parts that, when assembled, form common items of furniture, dungeon dressing, etc. The best way to use these is to place those required for a given construction on a separate Dioramas page (or, if available, within hitherto blank areas of pages that have already been used for drawing). Once printed, these symbols are assembled just as any other Dioramas drawing.

Dioramas Castles contains symbols useful for creating 3D castle parts.

Drawing buildings

All of the techniques we have learned thus far can be put forward into drawing buildings of any type, from the simplest cottage to the most complex fortress.

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53 Open Example Buildings.FCW - you'll find it in your Examples\Dioramas folder.

The three relatively simple buildings contained within this drawing have all been drawn using techniques we have already discussed. Since the chapel in the example drawing comprises the most complexity, the following tutorial will guide you through the steps necessary to draw that particular building.Draw a 10' square blank (that is, black hollow foreground, white solid background) panel using the Rectangular Panel .

54 Change the **Panel Options** to Foreground Roof Slate Symbol, Background Slate.

55 Draw a regular triangular panel using the **Polygonal Panel**, with its base against the lower edge of the blank panel, of height 15'.

56 Change the panel options to Foreground Roof Slate 90 Symbol.

57 Draw another triangle, of the same dimensions, with its base against the right edge of the blank panel.

58 Draw in the remaining two steeple roof sections, using Roof Slate 270 Symbol foreground fill for the left-hand side, and Roof Slate 180 for the topmost side.

59 Click **Add Tab**, and place one tab along one side of each of the four spire roof panels, such that the tabs alternate

The tabs must be placed on alternate sides so that no tab will overlap when the model is assembled.

60 Change to another page by pressing one of the blue page buttons.

61 Change the **Panel Options** to Foreground Slate Fill, Background Dark Sandstone.

62 Draw a **Rectangular Panel**, 10' wide and 25' high. Position this panel towards the left edge of the page.

63 Draw a second rectangular panel, this one being 30' wide, and 17.5' high. Position this panel immediately to the right of the panel you drew in step (10).

64 Draw another rectangular panel, this one being 10' wide and 7.5' high. Position this panel so that its lower left corner is attached to the upper left corner of the large panel drawn in step (11), and its upper left corner is attached to the upper right corner of the panel drawn in step (10).

65 Click **Add Tab**, and place tabs along the left hand and topmost edges of the panel drawn in step (10), the right hand edge of that drawn in step (11), and the topmost edge of that drawn in step (12).

66 Draw a 20' long horizontal line away from the panels already drawn.

This is a construction line that we will use to draw a tab that will be used to marry step (11)'s panel with the chapel's roof. We cannot simply add the tab to the topmost edge of the step (11) panel, since the resultant tab would overlap the panel drawn in step (12).

67 Add a tab to the line you've just drawn, so that the tab faces upwards.

68 Delete the construction line.

69 Move the tab drawn in step (15), so that its lower right corner is attached to the upper right corner of the panel drawn in step (11).

70 Click **Fold Lines** , and add a fold line along the leftmost edge of the small panel drawn in step (12).

71 Click on the Cut Lines , and add a cut line along the lower edge of the small panel drawn in step (12).

72 Select Copy Menu >> Mirrored Copies, and copy the panels drawn in steps (10) and (11) through a vertical mirror line.

73 Click on the Drag , right-click to bring up the selection menu, and choose Prior.
This will select the mirrored copies we have just created.

74 Place the selected panels onto a blank page within the current Dioramas drawing.

75 Use the Add Tab to add tabs to the upper and right edges of the tall, narrow panel just placed, and to the upper and left edges of the shorter, long panel.

76 Change to a blank page by clicking on one of the blue page buttons.

77 Click on the Rectangular Panel , and draw a panel that is 25' tall, and 10' wide.

78 Click on the Polygonal Panel .

79 Left-click to place the starting point of our new panel. It is advisable to place this point close to the bottom of the page's grid.

80 To place the next point, type `@0,17.5` at the command prompt, and press · .

81 Type `@5,5` and press · to place the third point.

82 Type `@5,-5` and press · to place the fourth point.

83 The fifth point is placed by typing `@0,-17.5`, and pressing · .

84 Right-click to close the panel.

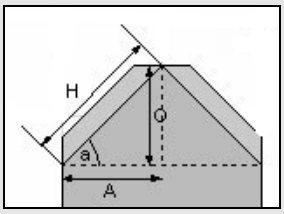
85 Use the Add Tab to add tabs to the upper edge of the rectangular panel, and to each of the sloped edges of the polygonal panel.

86 Change to a blank page by pressing one of the blue page buttons.

87 Change panel options to Foreground Roof Slate Symbol, and Background Slate.Draw a rectangular polygon that is 30.5' wide, and 7.57107' tall.

Mathematical Revision: Pythagoras and trigonometry.

The height of the roof panels (7.57107' in the example) was calculated using Pythagoras' Theorem, and adding a 6" gutter overhang. Consider the following diagram, depicting a portion of a house end panel:



Pythagoras states that *the square of the hypotenuse is equal to the sum of the squares of the other two sides*, thus:

$$H^2 = A^2 + O^2$$

or:

$$H = \sqrt{A^2 + O^2}$$

For the example, this equates to:

$$\sqrt{5^2 + 5^2} = 1.07107$$

Adding on the gutter overhang we require (6", or 0.5'), the total height we need for the roof panel is gained.

The length of the hypotenuse, *H*, is the minimum height of a single roof panel needed to marry properly with the sloping edge of the house wall panel. In most cases, it is simpler to use CC2 Pro's Info Menu >> Distance command, using the Endpoint modifier to snap the points measured between to the ends of the sloped side, to gain this distance. This is, however, not always convenient, and it is in these cases that Pythagoras can be an invaluable tool.
In other situations, even Pythagoras may not provide the necessary solution. If we cannot measure side *H* (or it is inconvenient to do so), and side *A* or side *O* are equally problematical, it may be useful to make use of common trigonometric formulae, such that:

$$H = \frac{A}{Cos(a)}$$

and:

$$H = \frac{O}{Sin(a)}$$

Angle *a* can be measured by using Info Menu >> Bearing Angle, and using the Endpoint modifier to pick up both ends of the sloping side. Most calculators (including that included with the Windows® operating system) provide buttons to automatically calculate angle sines (sin) and cosines (cos). For our example (given that *a* is 45°, and lengths *A* and *O* are both 5'):

$$\frac{5}{Cos(45)} = 7.07107$$

and:

$$\frac{5}{Sin(45)} = 7.07107$$

In summary, if using CC2 Pro's measurement functionality is inconvenient for whatever reason:
Use Pythagoras to calculate *H* if *A* and *O* are both known.
If *O* is unknown, but side *A* and angle *a* are known, calculate *H* by dividing side *A* by the cosine of angle *a*.
If *A* is unknown, but side *O* and angle a are known, calculate *H* by dividing side *O* by the sine of angle *a*.

88 Copy the previous rectangle, so that the copy's top right corner is attached to the original rectangle's lower right corner.

89 Click on the Change Panel Fill , and select the copy you have just made. Right-click, and select Do It to confirm your selection.

90 Change the Foreground fill style to Roof Slate 180 Symbol.

91 Change to a blank page, by pressing one of the blue page buttons.

92 Change the panel options to Foreground Slate Fill, Background Dark Sandstone.

93 Draw a polygonal panel by repeating steps (26) through (32).
Alternatively, copy the panel you've already drawn using those steps to the page you are now working on.

94 Click on Rectangular Panel, and draw a panel that is 5' wide and 17.5' tall. Draw the panel so that it is directly adjacent, and in line with, the polygonal panel.

95 Select Copy Menu >> Mirrored Copies, and copy the rectangular panel across using a mirror line that vertically bisects the polygonal panel.

96 Click on the Add Tabs , and place tabs along all external sides of the panels with the exception of their bases.

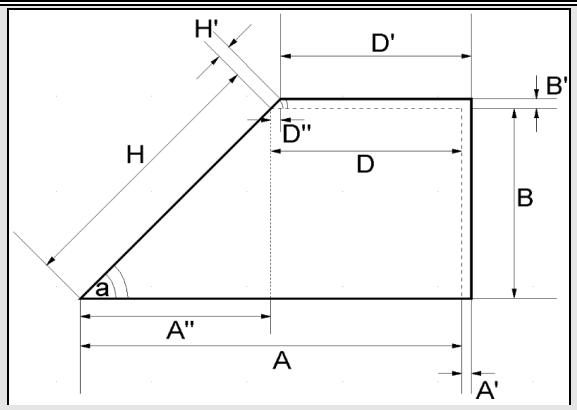
97 Change panel options to Foreground Roof Slate Symbol, and Background Slate.

98 Click on the Polygonal Panel , click to start drawing, then use the following point co-ordinates (remember to follow each co-ordinate pair with ·): `@10.5,0 @0,7.57107 @-5.14645,0`. Right-click to complete the panel.

More Geometry: Extension Roofs
The values listed in the example for the relative co-ordinates of the extension roof panel were calculated using common trigonometry. Namely, the one standard trigonometric formula we have not yet discussed, that for the tangent of an angle:

$$Tan(a) = \frac{O}{A}$$

Consider the following diagram, which represents one panel of an extension roof net:



To draw this panel without including a gutter overhang is a simple task. Starting from the extreme left-hand point, we would simply use:

A horizontal co-ordinate (A) representing the sum of the distance the extension juts into the house (A'') and the distance it juts out from the house (D). This would be @10,0 in the example, since A'' and D are both 5' in length).

A vertical co-ordinate (B) equal to the length of the sloped side of the extension's front wall (calculated as per standard panels - see Mathematical Revision: Pythagoras and Trigonometry above). This calculates to @0,7.07107 for our example.

A negative horizontal co-ordinate (D) equal to the distance the extension juts out from the house. This is @-5,0 in the example.

Right-click to close the panel, which will automatically create side H.

However, if we desire a gutter overhang, things get a little more complicated. In this case, our co-ordinates would be (again, starting from the extreme left-hand point):

A horizontal co-ordinate (A+A') representing the sum of the distance the extension juts into the house (A''), the distance it juts away from the house (D), and the required frontal overhang (A'). The co-ordinate used for the example, using a 6" overhang, is thus @10.5,0.

A vertical co-ordinate (B+B') equal to the length of the sloped side of the extension's front wall (B), plus the required side-wall overhang (B'). For our example, this is @0,7.57107.

A negative horizontal co-ordinate (D') equal the distance the extension juts away from the house (D), plus the required frontal overhang (A'), less the base of a triangle of height equal to the side overhang distance (B'), and the resultant extension of the sloped edge of the extension roof panel (D''). Our example requires a co-ordinate equal to @-5.14645,0, calculated using the formula:

$$D' = D + A' - \left(\frac{B' \times A''}{B} \right)$$

Right-click to complete the panel, which will automatically draw in the side H+H'.

This co-ordinate formula used for D' is derived using trigonometry. To calculate D'', we must apply the tangent formula twice: first to calculate the value of the tangent of angle a, and second to use this value to calculate the length of D''.

First, from the diagram:

$$Tan(a) = \frac{B}{A''}$$

and second:

$$D'' = \frac{B'}{Tan(a)}$$

To avoid dealing with messy tangent values, we can combine these two equations to gain:

$$D'' = \frac{B' \times A''}{B}$$

And, to simplify further, we can combine this into a single equation that can be used to calculate D':

$$D' = D + A' - \left(\frac{B' \times A''}{B} \right)$$

Using the above theory and formulae, any roof overhang may be calculated, including those for roof sections that overhang the front and sides by different amounts.

99 Select Copy Menu >> Mirrored Copies, and copy the panel just drawn over a mirror line extending horizontally across its lower edge.

100 Click on the Change Panel Fill , and select the panel copy. Right-click and select Do It to confirm selection.

101 Change the Foreground fill style to Roof Slate 180 Symbol.

102 Go back to all components of the chapel you have drawn, and add wall feature symbols as desired.

By using the processes learned here, buildings of virtually any complexity may be created. To add even more spice to a building, consider adding beams, wall sections using different panel fill styles, and any other desired frills. You might, for example, wish to draw chimneys to add to your building. These can easily be drawn using the skills you have learned over the course of these tutorials.

PRINTING & CONSTRUCTING

So, you have drawn your Dioramas masterpiece, or simply opened one of the example drawings and wish to construct the model described therein. What now? How do you make sure the printed model suits the miniatures you are using? What should the model be printed on to make sure it does not collapse the first time an ogre steps onto it? Take heart - these questions are about to be answered.

Miniature scales

There are several standard scales used for role-playing and wargaming miniatures, which determine two characteristics: the rough height of a miniature depicting a normal human being; and the ground scale used when utilizing such miniatures in play.

The rough height of a standard miniature is directly determined by that miniature's scale, in that (for example) a 25mm scale figure depicting a normal human being will roughly stand 25mm tall. Although there is a difference between individual companies as to the calculation of a miniature's height (some take it as the overall standard figure height; some measure to the miniature's eye-level, etc.), the "scale = height" provides a reasonable rule of thumb.

The relationship between miniature scale and ground scale is largely down to the specific game being played. For most role-playing games, where an individual miniature represents a single character, the scale of the miniature determines a ground distance of 5 feet Imperial, or two meters metric. It is often the case that the nearest manageable Imperial unit to the miniature's scale is used as representing 5 feet ground distance, such that (for example) a 25mm miniature scale heralds a 1 inch to 5 feet ground scale. Certain games condense ground scales for miniature use in outdoor settings - *Traveller*®, for instance, suggests a 2 meter grid for indoor play, and a 10 meter grid for outdoor play. Similarly, *Dungeons & Dragons*® suggests a 5' grid for indoor play, and a 5 yard (15') grid for outdoor play. Basically, this condensing allows the depiction of the larger fields of combat available within outdoor settings, without requiring huge amounts of floor or table space, while retaining the tactical picture miniature use provides. To provide an example, a 4'×2' table, using a scale of 1"=5', could depict an area up to 240'×120'. At 1"=5 yards, the available ground area that may be depicted on the same table becomes 720'×360'

Wargames offer slightly different ground scaling options. Since most wargames make use of men-to-miniature ratios (usually one miniature is representative of ten individuals, but this scale may be different depending on game system used, and the total number of combatants involved), ground scale can likewise be adjusted to suit. Drawing example from TSR's *BattleSystem*™ wargame, at 25mm miniature scale one inch is taken to represent 10 yards - our 4'×2' table can thus show an area equal to 1,400'×720'. At 15mm miniature scale, where $^{9}/_{16}$" represent 10 yards under this system, our table can show an area of 2,560'×1,280'. By adjusting men-to-miniature ratios, selecting a reasonable miniature scale, and deriving a logical ground scale, any battlefield may be represented by the space available for play. To give a rough idea of the import of such selections, the battle of Agincourt took place over an area of roughly 1,700×2,050 yards, and involved around 40,000 individual combatants. To show this battle using a scale of 1"=10 yards, at a men-to-miniature ratio of 10:1, you would require 4,000 miniatures, and a playing area 14'×17'. By adjusting the miniature and ground scales, and men-to-miniature ratio, the battle would become much easier to represent, and a lot more manageable for game play.

The following summarizes common miniature scales, ground scales for 1:1 men-to-miniature ratios, and CC2 Pro print scale options to achieve correctly scaled counters, CC-Dioramas output, and elevation view character representations. In all cases, miniature scale is representative of 6' in elevation.

Miniature Scale	Ground Scale (representing 5' distances)	Counter/CC-Dioramas		Character Elevations	
		Paper Distance	Drawing Distance	Paper Distance	Drawing Distance
3mm*	$^{1}/_{8}$"	1	480	1	576
6mm*	$^{1}/_{4}$"	1	240	1	288
15mm	$^{9}/_{16}$"	1	106.667	1	128
20mm	$^{13}/_{16}$"	1	73.846	1	88.615
25mm	1"	1	60	1	72
28mm	$1^{1}/_{16}$"	1	56.47	1	67.765
30mm	$1^{3}/_{16}$"	1	50.526	1	60.632

* These scales are usually only used when depicting large scale battles on small play areas. Although CC2 Pro possesses the capability to print counters, characters, and diorama pieces at these scales, you may find resultant outputs difficult to use effectively.

For those wishing the ability to produce inexpensive, customized cardboard counters and miniatures, ProFantasy provides *Character Artist* - an add-on for CC2 Pro consisting of over 17,000 symbols allowing quick and easy production of an almost infinite variety of character portraits and gaming counters.

Tools of the trade

Before you begin to assemble your Dioramas models, you will need certain tools in order to facilitate your efforts. A wise adage to heed states that the ease of a task is directly related to the tools used: loosen a bolt with a hammer, and expect the worst!

The following tools are recommended:

- ✓ A steel ruler
- ✓ A sharp scalpel or craft knife
- ✓ A thick, sturdy piece of card, or a cutting board
- ✓ Paperclips
- ✓ The "right kind" of glue

For those poised with scissors and that plastic ruler left over from your school days, some explanation may be necessary:

Why a steel ruler?

Simply because scalpels find it harder to cut through steel than they do through wood or plastic. Using a steel ruler as a cutting guide will ensure your cuts are straight and accurate, rather than irregular and embedded with ruler-shavings.

Why a scalpel?

The two most common cutting devices - guillotines (paper cutting machines) and scissors - possess two blades, off-set from each other. They cut via a combination of their sharp edges, and the interaction between the two blades. Thus, the cuts they make are not as accurate as would be desired, and they tend to bend the paper as they cut.

By using a scalpel or a craft knife, you can ensure accuracy by cutting in one, smooth motion along the edge of your steel ruler. Because scalpels have but one blade, and the manner in which they cut is entirely down to their sharp edge, the inherent problems shown with scissors and guillotines are negated.

Why a cutting board?

Basically, because your partner or parent would not thank you for leaving scalpel cut marks on their dining table. Remember, when you are cutting things, the scalpel must cut *through* the paper. It is also desirable to use a cutting board because they are designed to possess a certain amount of give - your cuts will be more accurate if you can cut into whatever you are resting your Dioramas print-out upon.

Fairly thick card works well as a substitute cutting board. All you need to remember is that the cutting surface needs to be as flat as possible - if you are disassembling a box to produce a cutting board, use a single panel of the box. Do not create your cutting board across a corner fold-line.

What are the paperclips for?

Virtually anything you find use for them. They can be used to hold your drawing still while cutting it, to "peg up" cut-out parts to avoid losing them, and to hold glued parts together while the glue dries.

When using paperclips on your model, try and use as large a clip as possible, and open the clip out a little before use. Basically, you need to engineer the clip to provide as loose a grip as is necessary to effectively meet its purpose. Too tight, and the clip may bend, distort, or otherwise mar your model.

A sticky subject...

The "right kind" of glue varies, depending on the purpose you wish to set your model to. Some glues provide stronger bonds than others. Some glues provide bonds that last longer than others. Other glues simply do not stick cardboard at all.

So what is best? Well, through trial, tribulation, and decades of research, here are some glue-related pros and cons:

- ✓ Stick glue (the solid stuff that comes in a wind-up, wind-down "lipstick" holder) provides one of the quickest bonding times. However, you do need to make sure it is dry before applying weight to your model (about an hour should do). Stick glue also becomes brittle over time, so it should not be used if you wish some kind of permanence to your models.
- ✓ Mounting glue (the stuff that comes in spray-cans) provides a very quick fix. It also has the advantage of allowing you to re-position glued panels several times, with a relatively low loss of sticking power. However, it does not provide much in the way of strength, nor does it provide permanent bonds.
- ✓ Brown water-based paper glue is quite effective for producing strong, permanent bonds. However, since such glues are usually water-based, glue should be applied conservatively to avoid turning your model into paper maché.
- ✓ PVC, or white, glue provides the best bonds as far as strength and permanence. Since it is not water-based, it also avoids the problem of risking soggy models. On the down side, PVC glue does tend to take some time to dry properly - it is advisable to leave a model to dry for at least a day before using it.
- ✓ Polystyrene and other "thin" glues are the ones normally used for quick household repairs, and those used to assemble plastic model kits. These glues should not be used for cardboard construction, since they tend to soak into the card itself (leaving very little on the surface of the card to actually stick anything to), and become quite brittle when dry (good for sticking rigid surfaces to each other, but not so good when gluing flexible surfaces such as card).

- ✓ Stick-backed plastic tape also deserves a mention. You can get forms of this that are virtually invisible when applied to objects. Bonds using tape are both strong and reasonably permanent, so they are good for speedy assembling if you don't mind having the taped bonds visible.

Warning: Scalpels that are capable of cutting through card are also quite capable of cutting through *you*, too. Always take care when using scalpels, and *never* cut towards any part of your body. If you are the slightest bit unsure as to your ability to use a scalpel, swallow your pride and ask a parent, guardian, or responsible friend to do the cutting for you, or to supervise your own cutting activities.

Always place your scalpel in a safe place, with the blade's guard in place, when not using the tool.

Scalpels are not toys. They can be dangerous if used irresponsibly.

Warning: Some glues are toxic, and some give off toxic fumes. *Always* wash your hands thoroughly after using glue before eating or otherwise placing your hands near to your face. *Always* use glue in a well-ventilated room. Avoid getting glue in your eyes or mouth - if you do so by accident, wash the affected area thoroughly.

Always read instructions and warnings provided with the glue you are using prior to such use.

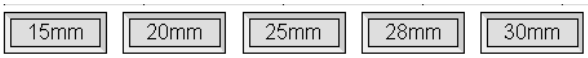
Printing dioramas pages

The first step in constructing your model is to print it out. This can be achieved in one of two ways:

- ✓ Use the instant print buttons provided on the Dioramas drawing pages, or
- ✓ Select File Menu >> Print, and manually set the printing options you require (e.g., scaling)

The instant print buttons provide for the five most common miniature scales used within role-playing and war-games. The section on *Miniature Scales*, above, further discusses CC2 Pro print scale settings.

To use the instant print buttons, simply click on the button showing the miniature scale you wish to print to. You will be prompted to confirm whether you actually want to print or not.



Instant print buttons on the Dioramas drawing page

Paper & card

When you choose the paper or card upon which to print your Dioramas drawing, you must take into account two factors. First, the material needs to be strong enough so that your models will not collapse when you place miniatures upon them. Second, the material needs to be flexible enough to not impede construction.

Unfortunately, that which provides strength (thick card) is too unwieldy for the type of construction we require for our Dioramas models, and, in any case, most printers will not accept card of such thickness.

For use with metal (or substitute metal) miniatures, we have found that 160gsm (approximately 90-110lb) card provides the perfect trade-off solution between printability, strength, and ease of construction.

Of course, if your model only needs to support paper or cardboard miniatures, such as those that can be created using *Character Artist*, it is perfectly adequate to construct your Dioramas models from standard 80gsm (approx. 20-24lb cardstock, or 50-60lb paper) paper. However, such models, if they are to be kept, will need to be stored carefully to prevent crushing.

Printer ink & smudging

Some printers have the unfortunate tendency to print pages that are easily smudged - which, of course, is a disadvantage for Dioramas purposes. While most printed pages can avoid the smudging issue by simply allowing the ink time to set and dry, some inks are still prone to smudging even then.

So how to avoid having your masterpiece ruined by great smudge smears obliterating the detail? Several options are open to you, but the ones we have found to work best involve priming, or varnishing, the surface of your print before you begin construction.

The cheapest method of priming a drawing uses common garden spray furniture polish. Because such polish tends to be quite wet (and thus has the potential to turn your print into mush), you need to be very conservative with its application. Lightly spray the printed page with the polish from a distance of approximately 18" to 2', then leave the page for a couple of hours to allow the polish to dry. If you don't allow the polish to dry, you will find the smudging problems are increased, rather than eliminated.

The best, but more expensive, method uses acrylic matte transparent model varnish, which can be purchased from most hobby and modeling stores. Again, apply the varnish conservatively and wait until it is fully dry before beginning construction.

Acrylic varnish is a useful tool, even if your printed pages do not exhibit smudging problems. If such varnish is applied to a finished model, not only will it protect the printed surfaces of the model from wear and tear, but it will reinforce the structure, sealing glued edges that might otherwise be prone to coming loose when using the model in play.

Constructing dioramas objects

Once you have printed the pages necessary to make your model, and primed them if necessary, you can begin construction.

Remember that patience is a virtue - the more patience you display during the construction of your model, the better that model will be.

Cutting out the pieces

> Remember to avoid injuring yourself in the process of cutting your model out. Not only will the result be painful, big red splodges will also ruin the hard work you have achieved thus far.

103 Place your steel ruler parallel to a cut line in your drawing, slightly below that line.

Remember, you need to accommodate the width of your scalpel blade when placing the ruler. Putting the ruler directly along the cut line will produce a cut that is off-set from the line. It is a good idea to practice a few dummy cuts before working on the model proper, so you can get a feel for the ruler/cut line offset you need to use.

104 Holding the ruler firmly in place, draw the scalpel along the cut line in one smooth motion, applying just enough pressure to wholly pierce the drawing.

Avoid cutting into the drawing proper, but feel free to slice into the surrounding white space. In fact, by cutting into the white space surrounding a drawing, you can ensure an accurate meeting of cuts.

105 Repeat the process for all cut lines within the drawing.

It is sometimes easier to ignore small cut lines, such as those necessary to produce the sloped edges of glue tabs, until the model piece has been cut from the page. You can then go around the piece, with ruler and scalpel, and trim away the remaining small sections. This process avoids damaging the model while you are cutting it out (you can occasionally get a "drag effect" when cutting small, intricate sections; leaving these sections to last goes some way to prevent this effect from damaging your model).

Scoring fold lines

> Just because you are not applying pressure to the scalpel during this process, do not relax your vigilance to avoid being cut yourself. Scalpels are still sharp, and will still be quite capable of damaging you regardless of how much force is being applied.

106 Place your steel ruler parallel to a fold line in your drawing, slightly below that line.

107 Holding the ruler firmly in place, draw the scalpel along the fold line in one smooth motion, applying only light pressure so as to avoid wholly piercing the drawing.

All you really need to do when scoring is to break the upper surface of the card. Usually, simply holding the scalpel steady, applying no pressure at all, will achieve this, since the weight of the scalpel itself will already be applying adequate pressure to the blade.

108 Repeat the process for all fold lines within the drawing.

109 Replace the guard for your scalpel's blade, and place the scalpel in a safe place.

Gluing tabs

110 Fold the tab back along its fold line.

111 Apply glue to the tab, avoiding placing glue on any other part of the piece other than the tab.

112 Attach the tab to the surface to which it marries.

113 Place the model on a flat surface such that the tab is vertically aligned to the surface, and place your ruler next to it.

114 Push the model lightly down to make sure the lower portion of the tab/corner join is aligned properly.

115 Push the model lightly into your ruler to make sure the vertical plane of the tab/corner join is aligned properly

It is a good idea to use two rulers, steel or otherwise, here, placing one ruler "inside" the join, and the other outside so that it overhangs the tab/corner join. The join alignment can then be achieved accurately by pushing the rulers together over the join.

116 Once the joint is aligned properly, put a paperclip over it to hold the tab in place.

Weak paper masking or medical tape, of a type that will not damage your model by pulling the ink away from the card when it is removed, can often provide better stability than a paperclip. The advantage of using paperclips is that they are generally cheaper, and can be re-used.

117 Leave the model to dry.

Note that it is *always* better to leave each individual joint made for a single piece to dry before moving on to the next one. While this does extend the time required to assemble the model somewhat, the final results will be better for it. Always remember, patience! Also, for multi-part constructions, you can always move on to another section of the model while waiting for one section to dry.

118 Repeat as necessary until all joints have been glued, and your model is completed!

119 Take the completed model to your gaming session, and amaze your fellow players with the enhanced visualization it provides.

Mounting Models

Models can be made into more permanent, stronger structures by mounting them onto baseboards of modeling board, stiff cardboard, oil painting board, balsa wood, or plywood. Of course, doing so precludes the use of your assembled model pieces in the more modular or geomorphic methods so far discussed. Once the model is mounted, you can further decorate the baseboard with other scenery modeling pieces, such as those available from most model and craft stores.

You can also reinforce Dioramas pieces with board and so forth to give them added strength and durability should you wish them to withstand the rigors of many play sessions. For example, you could insert blocks of balsa wood, cut to size, inside wall pieces to reinforce them. If you follow this method for geomorph walls to use with the plug-in tabs, remember to leave room for the tabs!

EXAMPLE: One Star Inn

This section will take you through the steps to convert a building symbol to a working three-dimensional model. When you complete this section, you will have reviewed most of the practical information in this manual, and learned a few tricks about making more complex models.

Getting Started

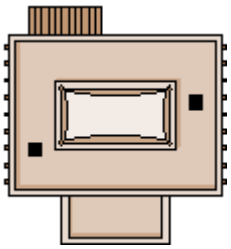
120 Start a new diorama (File >> New >> Blank diorama)

121 Right click **City** , then click **City Symbols, (Examples)** and insert the symbol we are converting.

122 Click "Med House 16" symbol and place it in the file anywhere to the side of the template. We will use that as our model for the exercise.

Overview

We will be working with the "Med House 16" symbol that is included in the Cities_cc2 symbol library. You will have this library on your system whether or not you have the CC2 Cities add-on installed. The symbol is shown to the right, and provides good model detail without being over-complex. We are going to complete five broad steps to convert this overhead view of a Mediterranean house into a wonderful inn.



Med House 16

- ✓ Planning: There are a lot of decisions to be made before we ever start drawing.
- ✓ Panel Layout: Each broad panel of the building will be drawn
- ✓ Test Assembly: You do not have to include this step, but it will save you a lot of rework on any complex project
- ✓ Detailing: Putting in all the details that make the building appear real.
- ✓ Final Assembly: We will not spend any time on assembly in this chapter, but by following the suggestions in Chapter 5, you will have a beautiful inn.

Planning

The first step in building any model must be some thought about what the model will look like and how it will be used. A little work here can spare you a lot of rework and frustration later. Since we are starting with a symbol, we also need to spend some time looking at the symbol to determine style. The decisions we must make are:

- ✓ Style: What materials are used for the building (and what corresponding colors and textures to use) as well as the style to use for ornamentation and details.
- ✓ Modularity: How can the piece be taken apart, either to access an interior space, for storage, or to increase its flexibility.
- ✓ Strength: How strong does the piece need to be, and how should it be constructed based on the planned use.

Ultimately all of these decisions come together to determine how the Diorama should be laid out. This may look like a lot of work, but it really isn't – most of it you will know immediately once you begin.

Let's look at the symbol we are converting:

Style: The flat roof, light color and overall style of the symbol look like dried brick or adobe, possibly a building from Asia Minor or Central America. Stylistically, we will build this with solid-color walls for stucco and some wood for bracing and window beams. We will use some of the wooden symbols from the CC2 Dioramas library, but windows will be open.

The symbol shows rows of bumps on the right and left side – they look like the ends of beams used to support a ceiling or roof. For simplicity we will show those on the proper walls but not try to have them extend beyond the wall the way a real beam would.

We will interpret the rectangular extension at the bottom of the symbol to be the top of a porch or veranda, and the stairs at the back probably go from the bottom floor to the top floor. The building overall will be two stories in height. For visual interest, we will have the second floor overhang the first floor by 2.5 feet on the other three sides, but simplify construction by keeping the back flat. For use with miniatures, we will simplify the outdoor stairs into a few steps, each of which is 5 feet wide.

The symbol in the middle of the roof looks like a tent, maybe over poorer sleeping areas, so we will depict it as a slightly raised area, covered with a cloth hanging from the four corners. The black squares on the roof could be for light, a chimney for an oven, or a ladder to the roof. For this model, we will just leave them as dark squares on the roof.

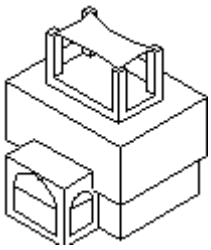
Overall, the building should look like a poorer residence or an inn in a middle-eastern town. We will name it the "One Star Inn".

Modularity: This building is not very large, so storage of the finished building should not be a particular issue. On the other hand, players might want to be able to lift the second floor off the first, or lift off the roof to get access. For either of those, the building should be constructed as separate pieces, one per floor. For simplicity, we will assume that

this building will be used for exterior work, and will not construct it to come apart. This will allow us to strengthen the building by using one piece for the back of both stories and allow us to glue both stories together to make it rigid.

Strength: The building is 40 feet by 30 feet in size, which will cover about 2/3 of one 8½" x 11" (A4) piece of paper when printed at 25mm scale. At this size, as long as the roof has bent tabs on it (which stiffen the cardstock), it should be strong enough for normal use. If you need something sturdier, you could glue one or more vertical pieces across each floor to support the roof or floor above.

When the planning is complete, a quick sketch can help solidify the plan, and make the layout easier. For a complex model, quickly drawing side elevations on paper can make the planning easier. A quick isometric sketch can also be completed in CC2:



Panel Layout

I like to start with the base of the building, to give me something to build on, but for the One Star Inn we have the most information about the roof, so we will start with that. Bring up the diorama file into which you put the Med House 16. We need to draw a panel that is the right color, texture, and size for the roof:

123 Click **Diorama Options** . Set the Panel Foreground to **Dust Grey Symbol** and the Background to a light tan (color 45). This will match the roof of the symbol, and by adding the Dust Grey symbol in the foreground, we will have a little texture in the wall.

124 Get the dimensions of the roof of the symbol, "Med House 16" using the Distance Command (Info>>Distance). Click a point on the top left corner, and another on the top right of the symbol. The distance is 40 feet. Click to repeat the command and measure the right side, close to 30 feet.

125 Click **Rectangular Panel** . Click points to create a panel 40 feet by 30 feet for the building roof. When it is time to assemble the building, we will print this twice – once for the roof and once for the bottom of the upper floor.

126 Now go to the second page of the template and create a Rectangular Panel that is 35 feet x 27.5 feet. There is an overhang of 2.5 feet on the building, and this will be the smaller cross section of the bottom floor of the building.

Tabs go last
Note that we have not placed any of the tabs or details on the panels. We will place all of the tabs at one time to ensure that each joint is covered. The details will be added last, after we are sure the building will assemble correctly.

We will create all of the walls on pages 3-6 of the template. To save space and paper, page 3 will have one copy of the lower and upper floor side walls that must be printed twice. The bottom floor we will make 12.5 feet high, and the upper floor we will make 17.5 feet high (to include space for the joists that stick out of the sides).

127 We will make the walls slightly lighter than the roof. Click **Diorama Options** . Change the Panel Background color to a lighter tan (color 46) for the outer wall. Leave the foreground texture the same as the roof to reflect the same building materials being used.

128 Since the top of the roof is 30 feet wide, make one **Rectangular Panel** , 30 feet x 17.5 feet for the upper side wall. Click a point for one corner then type **`@30,17.5`**. (relative coordinates – see box below) If you align the panel with its long side on the page vertically, you will be able to put a second panel on the same page that is 27.5 feet x 12.5 feet, for the lower floor. This will be for the side of the lower level – it is 2.5 feet narrower to allow for the front overhang of the building. Leave at least 5 feet between the panels so that you will be able to add tabs as needed.

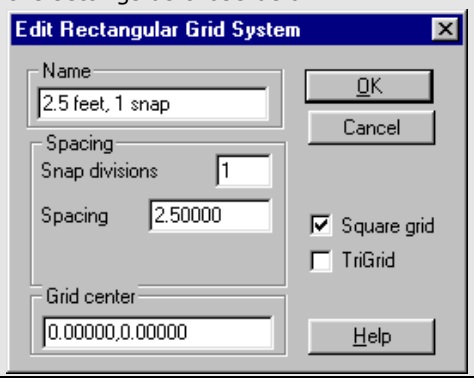
Relative coordinates
These coordinates tell CC2 to draw from the reference point (last selected point) to a coordinate location a relative x,y distance away. Instead of clicking a point, type the "at" sign (@), followed by the x,y distance to the desired point. Relative coordinates can be typed in wherever you are asked for a point at the CC2 `Command` prompt.

129 A nice detail is to include an extra textured tab at the top of all upper walls that can be folded over to form the printed inside of the parapet. To create this, add a **Rectangular Panel**, along the top of the second floor panel (the 17.5 foot tall one) on this page. Use the endpoint modifiers to set the length equal to the panel you just completed, then use relative coordinates (type **@2.5,0**) to make it 2.5 feet high.

130 On the 4th page of the template, place the two long walls of the two floors, one above the other. Each panel is a **Rectangular Panel**, the lower story is 35 feet x 12.5 feet (it is shorter by 5 feet to allow for a 2.5 foot overhang on each side); the upper story is 40 feet x 17.5 feet. Remember to leave room between the panels to allow for tabs and the special parapet fold-over panel (5 feet should be enough).

An Alternative to Relative Coordinates

Instead of typing relative coordinates, you can add a snap grid 2.5 feet wide, and observe the Tracking Indicator on the status bar to make sure your clicks are accurate. To add a new grid, right click on the Snap button, click New, then 2D Rectangular and make the settings as those below:



131 The 5th page will be used for the back of the Inn. Since at the back of the Inn, both the bottom and top floor walls are flush with each other, we will use a single panel for the back. We need a 35-foot wide first floor and a 40-foot wide second floor. You could just copy the two panels you placed on the previous page, and center them one above the each other. Instead for practice we will use the Polygonal Panel. Click **Polygonal Panel**. Click a first point, then use the following relative commands to complete the panel (just type them in as written below):

@35,0 (this forms the bottom)

@0,12.5 (this forms the side of the bottom)

@2.5,0 (the overhang)

@0,17.5 (the side of the upper floor)

@-40,0 (the top of the upper floor)

@0-17.5 (reversing our way down the other side)

@2.5,0 (the second overhang)

Right click to complete the command.

When finish with this panel, all of the walls for the main inn should be complete.

On the 6th page we will place the walls for the veranda. The veranda is just a square box that sits in front of the rest of the house, but there are a few things to consider. To save space, we will make it without a back, and the sidepieces need to have a notch cut out to allow for the overhang for the top floor over the bottom floor. The front of the veranda is a simple rectangular panel 20 feet x 17.5 feet.

132 Click **Rectangular Panel**. Create a 20-foot by 17.5-foot panel, aligned so that the 20-foot side goes up the page. This will be the front of the veranda.

133 Below the front, create the side wall of the veranda, which will be 12.5 feet by 12.5 feet with a notch cut out of the top corner for the Inn wall overhang. Click **Polygonal Panel**. We will start on the lower left corner of the veranda front panel and use relative coordinates:

a Click (Snaps>>Endpoint), or use the **F5 key**, and select the lower left corner of the veranda front. This will ensure that the new panel will be attached to the old panel

@17.5,0

@0,-10

@-5,0

@0,-2.5

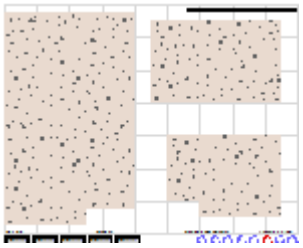
@-12.5,0

Right Click to complete the command

134 Create a mirror copy of the panel you just completed. Right click **Copy** and select Mirrored Copies. Select the panel you just created, and Do It. Create a vertical mirror line to its right and complete the command. If necessary, move the new panel to an open space on the page.

135 Create the roof for the veranda. When you print this page twice, the second copy can be used as the veranda base. Click **Rectangular Panel**. Create a panel that is 20 feet by 10 feet.

136 If desired, create a fold-over panel at the top of all of the veranda walls. The fold-over should be a **Rectangular Panel** that is 2.5 feet wide and runs the length of the wall. Adding fold lines later will be easier if you use two panels for the top of the two attached sides, rather than a single long panel.

When done, the veranda will look like  this. We will return and add the fold lines and tabs in a minute.

There are two special pieces that need to be laid out on the last two sheets of the Diorama. The first is the rooftop sleeping area. We will create walls for two sides of it, then print it twice. Rather than create narrow tubes to match the symbol, we will make upright square pillars to hold the tent.

The long sides of the platform are 22.5 feet long, the shorter sides are 12.5 feet long, and all uprights are 12.5 feet tall.

137 Click **Polygonal Panel** to draw the sides of the room, again using relative coordinates, starting with the longer wall.

Click a first point in the lower left corner of page 7

@22.5,0

@0,12.5

@-2.5,0

@0,-10

@-17.5,0

@0,10

@-2.5,0

Right click

138 Place another **Polygonal Panel** next to it that is only 12.5 feet long, but it similar in all other respects. Using relative coordinates:

(Snaps>>Endpoint) to connect this panel to the previous one.

@12.5,0

@0,12.5

@-2.5,0

@0,-10

@-7.5,0

@0,10

@-2.5,0

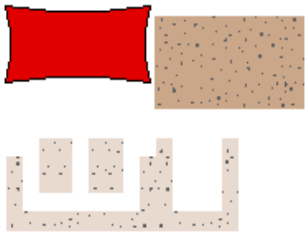
Right Click to complete the panel

139 At the top of each of the shorter side pillars, add **Rectangular Panel** , each of which is 2.5 feet on a side. These will form the tops of the uprights.

140 For the cloth at the top of the roof area, copy the cloth from the original symbol, Med House 16. You will need to explode the symbol, then copy the cloth from the symbol to the proper page of the diorama. When you copy the cloth, increase its size by 10-25% to allow provide an overlap to allow you to glue it to the uprights. Place it on page 7 wherever it will best fit.

141 Also put in a Rectangular Panel for the top and bottom of the sleeping area. The rectangle should be 22.5 feet x 12.5 feet

When this step is finished, your page 6 should look something like this:



The final set of panels to include is a set of stairs, similar to the one you made earlier in the tutorial. Here the stairs need to rise 15 feet and run 15 feet, with steps for miniatures every 5 feet. Create the sides of the stairs using the current option settings for panels, then change the panel options to Foreground "Board L 90" Symbol, and background color 42 to complete the trends and risers of the stairs.

Before we are done with the panels, there are several additional features to make assembly easier.

142 Click **Add Tab** to add tabs to all of the panels at the appropriate place. The most important thing to remember is to ensure you have a tab for each place two panels connect, and to ensure that the tabs correctly overlap. The easiest way to ensure this is to have a rule for tab placement. My default approach is to put tabs on all edges of the roof and floor (this helps to strengthen them and ensure that they are flat), and to put tabs on the right side of each wall.

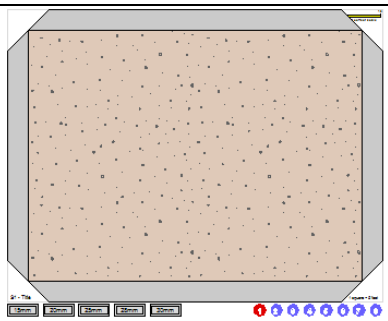
143 When placing tabs on the sides of the upper walls, do not use the tab default to place the tabs. You do not want tabs to cover the fold-over panel at the top of the upper walls, so we must leave the top 2.5 of the panel free of tabs (in addition to leaving the 2.5 foot fold-over flap clear). Instead of selecting the edge of the panel to which the tab should be attached, instead select a point away from any other object. A freestanding tab will begin. Use relative coordinates to make it 15 feet long (instead of the full wall height of 17.5 feet). Then copy the tab to the appropriate wall locations (one front panel, one side panel and the back panel).

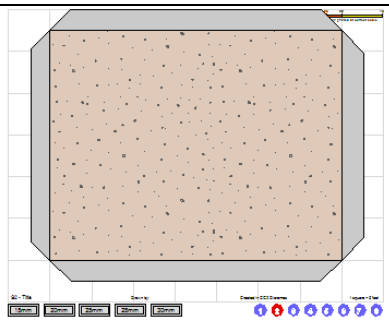
144 Make another shorter tab to place on the side and front of the veranda panels.

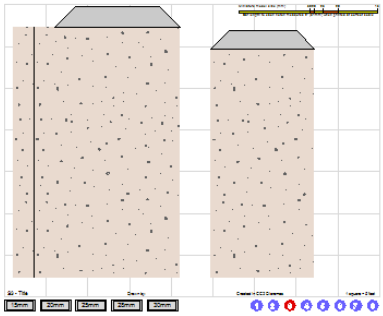
145 Once the tabs are in place, click **Fold Lines** , to place fold lines at each juncture between top-floor panels and the special fold-over parapet panel. Use the endpoint modifier to ensure that the line connects to each end accurately.

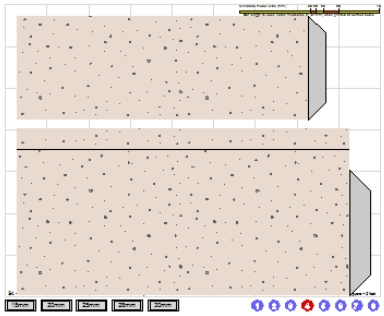
146 Click **Fold Lines** and draw the fold lines between the front and sides of the top-floor sleeping area, and between the front and the side of the veranda.

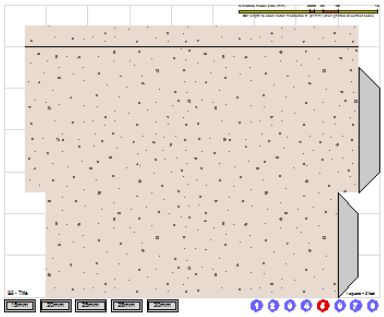
Congratulations, you have now completed the panel layout. If you wish, while the structure of the panels is still clear in your mind, you might want to go back and label each panel – either on the page next to each panel, or on a tab. When you are done, the first 6 pages of your diorama should look like the diagram on the following page:

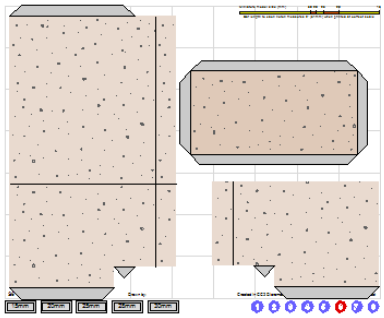


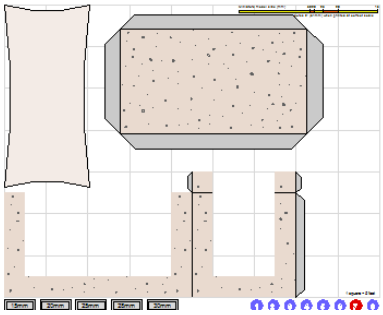


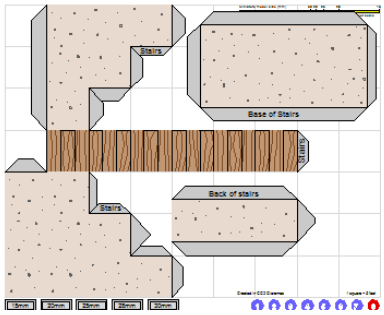











Stairs
Base of Stairs
Stairs
Stairs
Back of stairs

Test Assembly

If this were a new model that you were creating from scratch, it would be a good idea to print a small version of the model now and try to assemble it. Changes to the panel layouts are much easier to make now, before additional details are added to each panel.

To illustrate the importance of this test fitting, when this model was put together for the first time, we identified the following issues (all corrected now):

- ✓ We needed two copies of the top roof (the upper floor needed a floor) – somehow we had missed that
- ✓ We mis-sized one of the upper walls.
- ✓ The tabs and the parapet folds overlapped, so the tabs were visible on the inside of the parapet.
- ✓ We forgot the stairs at the back. Really, it's quit easy to forget a critical piece.
- ✓ The 'cheap sleeping' area on the roof looked too short, so we lengthened the uprights by 2.5 feet

So, anyone can omit parts or misjudge something. Test-fit the model before a lot of work has gone into detailing the panels.

Detailing

The details of the building are what make it unique and bring it to life. Right now this Inn looks like a light brown cardboard box, hardly better than you could create freehand. We now have the opportunity to bring the building to life. Here are the steps I took, but you can do something different if you want a different look for your building. Changing the details is also a great way to take one stock building and use it in multiple places.

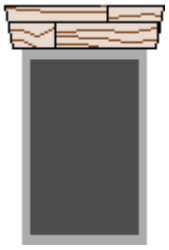
147 Bring the roof details over to the roof. You can just copy the two black squares from the original symbol (set your reference point at the corner of the building using the endpoint modifier to ensure the squares on the model are in the same location as the symbol). I changed these to dark gray rather than black to fit the muted tones of the model.

Many buildings sit on solid foundations of a different material, and adding them to the building can make it look much more realistic. The easiest way to do this is by adding panels.

148 Click **Diorama Options** . Select a Paving Stone Fill foreground and medium gray for the background (color 253). Click **Rectangular Panel** then go to each panel that will sit on the ground (all bottom story wall panels, the ones that are 12.5 feet high) and add a 2.5 feet wide panel across the bottom width of the wall. Do the same for the Veranda wall sections. In all, there should be 5 places where you do this: One side wall that is printed twice, one front wall, one back wall, one piece that is the front and side of the veranda, and one side wall for the veranda.

149 The original symbol showed the ends of the ceiling beams emerging from the walls on the sides and on the veranda. For simplicity, we will add these as brown squares on the appropriate wall panels. The beams in the original symbol are 0.6 feet, so make a single box that size. We are going to make multiple copies of the box, putting them along the bottom of the upper wall side panel, and along the top of the veranda front panel. I placed them 2.5 feet from the bottom of the side wall, and 3 feet apart. The easiest way to do this is using relative coordinates: Place the first box, then use @0,3 to place each successive box 3 feet above the previous one.

150 Doors come next. Click **Wall Features** then select appropriate doors. I placed a reinforced curved door in the middle of the front panel of the building, just at the top of the stone foundation panel. This is the front door. I placed two doors in the back wall, one at the top of where the stairs will go: 15 feet above the base of the panel, and flush with the side of the bottom floor. The other I placed just above the foundation, between 15 and 20 feet from the right wall. One the stair is in place, these two doors will be at the top and bottom of the outdoor stairway.



Finally, we have windows to place. You can easily select from the many beautiful symbols in the Wall Features Catalog, but I chose to have something more rustic, and in keeping with the construction of a poor building in a hot climate. I made windows with no glass, and very little framing.

151 To make a similar window, make a light gray (color 251) solid box that is 3 feet x 4.8 feet. Make a copy of that and change the color to dark gray (color 244), and scale it to 85% the size of the previous box. Now, using the Center Snap, move the middle of the dark box on top of the middle of the light box.

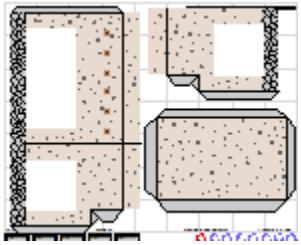
You now have a basic empty window.

To create the header board, you can use a polygonal panel with a brown background (I used color 46) and Board S Symbol for the foreground. It is easiest to draw it away from the other parts of the window and move it to the final location.

Click **Polygonal Panel** . Click your first point, then move 3.5 feet to the right (it should be slightly wider than your window), now go up 1 feet and to the right 0.2 feet (this gives you a little visual interest to the header), the next point is to the left 3.7 feet (to allow for the overlap again) and right click to finish the polygon. You should now have a board that is slightly longer across the top than the bottom. Move the panel that you just made to the middle of the top of the rest of the window

You should now have a window that you can place anywhere you want it. Some of the panels are laid out vertically, and for these you may need to change the fill in the window header foreground from Board S Symbol to Board S 90 Symbol to keep the grain of the windows correctly lined up. In placing windows, try to keep the windows on one floor lined up, and avoid placing them where they will be covered by the back staircase or front veranda.

152 The final detailing step is to provide openings into the veranda. I did this by creating a white box that is 7.5 feet high and 5 feet narrower than the panel, centered along the top of the foundation of each veranda wall panel, like this:
To make the tops of the openings rounded, place a solid white ellipse across the top of each opening, centered on the middle of the top of the opening, with major axis the width of the opening. You can then select the height of the arch to include. Remember to allow space for the tabs in the veranda roof to attach to the wall.



Once you are done with the basic model, there are always significant additional changes or upgrades that can be made. Here are some of the ones you should consider:

- ✓ Change the color of the roof tent to add a splash of color to a drab building
- ✓ Add wall sconces by the front door
- ✓ Add a sign or flag at the front of the building
- ✓ Change the tent supports on the roof to cylinders, or something smaller
- ✓ Add interior detail
- ✓ Add dirt to the model using an overlay layer. Weathering can make the model look much more realistic.
- ✓ Make the top-layer parapet 1 foot wide to match the symbol.

I am sure other ideas will suggest themselves to you as you build this, and other models.

DIORAMAS COMMAND REFERENCE

For details of the meaning of the syntax, see the CC2 Pro manual on page 177.

The only macro-specific commands are those for printing (Print Window, Print Center, Print Named.) They are used by the printing hotspots on the Dioramas templates. One of their parameters is a number (nFlags) which can be set as follows. Add the numbers for multiple effects. For example, 4+1=5 would be portrait, all black.

0=landscape (the default)

1=portrait

2=Print white as black

4=print all black

8=ask to confirm before printing (with a message box)

Command	Description	Where?	Text Equivalent	Syntax	Use in Macro
Castle symbols	Displays the Castle wall symbols	Symbols toolbar	CATALOG #symbols\dioramas\Castles.fsc		Yes
Change Panel Fill Style	Changes the properties of selected panels	Dioramas toolbar	CPANEL		No
Convert to panel	Converts any closed entitiy to a dioramas panel	Dioramas toolbar	PANELCHANGE		Yes
Cut line	Adds line to be cut along to a panel	Dioramas toolbar	CUTLINE	xy1;xy2;…;xyN;	Yes
Dioramas Options	Diorama options for panels, tabs, lines, etc.	Dioramas toolbar	TABOPT		No
Dioramas symbols	Displays the diorama net symbols (furniture etc)	Symbols toolbar	CATALOG #symbols\dioramas\Dioramas symbols.fsc;		Yes
Fold line	Adds a line for scoring and folding panels	Dioramas toolbar	FOLDLINE	xy1;xy2;…;xyN;	Yes
Geomorph tab	Draws fold-over plug-in tabs of the type used by the Dioramas geomorph pieces.	Dioramas toolbar	GTAB	(xy1st;xy2nd)/xyEdgeOfEntity;xySide	Yes
Multipoly panel	Creates a single panel by combining separate closed shapes (eg a donut shape made from two circles)	Dioramas toolbar	PMPOLY2		Yes
Multi-wall net	Converts a path entity to complete 3D wall nets	Dioramas toolbar	WMNET	xyPathToConvert;dWallHeight[prior];dWallWidth[width of path];xyLowerLeftForNets	Yes
Polygonal Panel	Adds a polygonal dioramas panel	Dioramas toolbar	PANELPOLY	xy1;xy2;…;xyN;	Yes
Print Center (macro command)	Prints a view at the given center and specified scale	Text only	PRINTSM	xyViewCen;dPaper;dDrawing;nFlags[0]	Yes
Print Named (macro command)	Prints the specified named view or active window to fit the paper	Text only	PRINTNM	sViewname;nFlags[0];	Yes
Print Window (macro command)	Prints the active window view, to fit the paper	Text only	PRINTWM	xyWindowCorner1[Active Window];(xyWindowCorner2);nFlags[0];	Yes
Rectangular Panel	Adds a rectangular interior panel	Dioramas toolbar	PANEL	xy1stCorner;xy2ndCorner	Yes
Tab	Adds a tab for gluing diorama panels	Dioramas toolbar	TAB	(xy1st;xy2nd)/xyEdgeOfEntity;dWidth[prior]	Yes
Wall Features symbols	Displays the generic wall features symbols	Symbols toolbar	CATALOG #symbols\dioramas\dioramas wall features.fsc		Yes
Wall net	Add a net for a 3D walls with panels, tabs and fold lines	Dioramas toolbar	WALLNET	xy1stEnd;xy2ndEnd;dHeight;dWidth	Yes

PROFANTASY SOFTWARE PRESENTS

TM

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DUNGEON DESIGNER PRO INTRODUCTION

Welcome to Dungeon Designer 2 (DD2). Within this book, we will explore the creation of dungeons using the various functions, symbols, and other niceties provided by DD2 and its parent software package, Campaign Cartographer 2 Pro (CC2-Pro).

What's In A Name?

The word "dungeon" conjures up in many the image of a labyrinthine network of tunnels and rooms, populated by ferocious creatures who guard fabulous treasures. Despite its name, this is not the only type of environment DD2 can map. Where CC2 Pro's main focus is towards outdoor maps of various types, including alien landscapes and undersea realms, DD2 can likewise be applied to a multitude of different interior locales, from labyrinths, to castle and keep floorplans; and from factory floors and space station layouts to that humble inn where the mighty kick off their travel-worn boots to relax over a beer or two between adventures.

You should also realize that the methods described here are not the be-all and end-all of DD2. With experience often comes the knowledge that the methods which example these functions are not the most "correct" or "expedient" way to achieve a specific map - certainly not from the point of view of an individual user. So, take them as what they are meant to be - a mere introduction to the world of DD2 dungeon mapping - and remember that the only person that can ultimately tell you how a map *should* be drawn is you. Which leads us to....

About You

The manual assumes that you have a reasonable grasp of CC2 Pro. In particular you must be able to use CC2 Pro's editing commands, and understand how to use templates and symbols. If you purchased DD2 and CC2 Pro together, learn CC2 Pro first!

Other Sources of Information

CC2 Pro's Help System. When you are using CC2 Pro / DD2 you can get in-depth information by pressing , or by selecting Help from CC2 Pro's Help menu.

Web Based Tech Support. ProFantasy's web site www.profantasy.com has a comprehensive technical support section and details about e-mailing for help.

The CC2 Pro mail-list. This is a very active e-mail discussion group to help new users and discuss all things map related. To subscribe follow the instructions at the ProFantasy Software web site, www.profantasy.com

Installing DD2

Place the DD2 compact disc into your CD-ROM drive. On most computers there will be a few seconds of whirring, then you will see a window showing the contents of the CD. If this doesn't happen, double-click on "My Computer", then on the for your CD-ROM drive.

To install DD2, double-Click **Setup** , then follow the on-screen instructions.

During the installation you will be asked to give your name, company and DD2 Serial number. Your unique serial number is in the back of this manual.

Starting DD2

Once you have completed the installation, start CC2 Pro. The screen looks the same as before, but with one vital change… the **DD2** button on the File toolbar will now let you access a host of new buttons and menus

If you can't see the **DD2** button, click **Tools** button, then click next to File toolbar..

Frequently Used Clicks

Before you start proper dungeon designing, meet some techniques and new buttons that you will be frequently using in the business of designing dungeons.

The DD2 Toolbar

To see the DD2 toolbar, click **DD2** on the File toolbar. The menu changes to include a new Dungeon heading.

Add Room — Add Corridor

Center Justified Door Break — Draw Wall

Toggle Fill Style — Secret layer

Lock Symbol Angle — Dungeon drawing tools

Dungeon symbol settings — Toggle symbol style

Settings Toggle Buttons

The DD2 Bar contains three convenient toggles that can be used to quickly change the current settings to some of those commonly used when drawing dungeons. These are:

Solid / Hollow Fill Style.

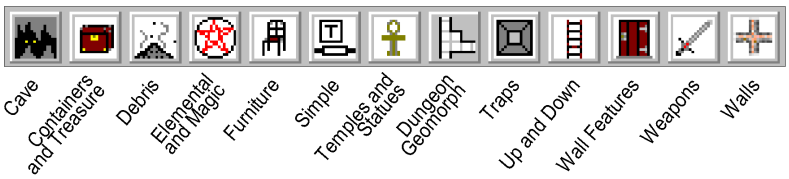
Click this button to toggle the current fill style between Hollow and Solid.

Right Click button to choose from a selection of dungeon fill styles.

Secret Layer.

Click this button to set the current layer to SECRET. Everything subsequently drawn will be on the SECRET layer, until the current layer is changed by clicking on the *Layer* section of the Settings Bar, or by using another DD2 command which alters the current layer setting.

The DD2 Symbol toolbar



The DD2 Symbol Catalog toolbar is usually found under the File toolbar. If you can't see the toolbar, click **Tools** button, then click next to DD2 Symbol Catalog toolbar.

Click on a button to open a catalog in the current symbol style and settings, or select from catalogs which match the selection criteria.

YOUR FIRST FLOORPLAN

DD2's functions allow virtually any level of complexity in the maps you draw, but often simplicity is key. To this end, DD2 provides methods of quickly producing good-looking and functional dungeon maps without having to delve into the more advanced features of the system.

So, buckle yourself in, and let's see if we can knock up a simple dungeon in less than ten minutes.

First steps

1 Click **New**

You see a selection of DD2 templates.

2 Click DD2 250' x 200'.FCT

You now have a new, blank map based on the template you selected, ready for you to draw on.

3 Right click Grid button to see that the grid setting is **5' Grid, 1 Snap**, and the grid is enabled. The current color is black.

4 Click **DD2** on the File toolbar to see the DD2 and DD2 Symbol toolbars.

The entrance room

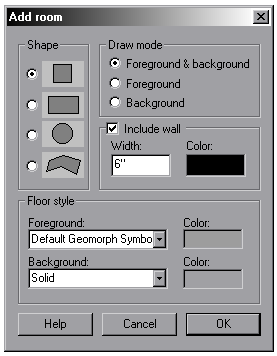
Your blank template is ready to be filled with rooms and corridors.

5 Click **Zoom In**

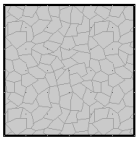
It is often useful to zoom in to the section of a map being worked on, simply because it is thus easier to see what is being drawn.

6 Click **Add Room**

The Add Room dialog appears:



This dialog allows you to set options for the room to be drawn, including its basic shape (square, rectangle, circle, or polygon), drawing mode (foreground & background, foreground only, background only), whether to include a wall or not and properties for the wall if drawn, and the fill styles and colors to be used for the room's foreground and background. For now, retain the default settings as they appear by pressing **OK**.



7 Draw a 30 feet by 30 feet square room.

Because we have opted to draw a square room, the Add Room command expects placement of two corners along one side. To get a 30 feet by 30 feet room, either place the second corner point six snap points (one snap point being 5' in the template we are using) directly up, down, left, or right from the first, or use a vertical or horizontal relative coordinate (e.g., **@30,0** to place a point 30 feet along, and nothing up).

Another room

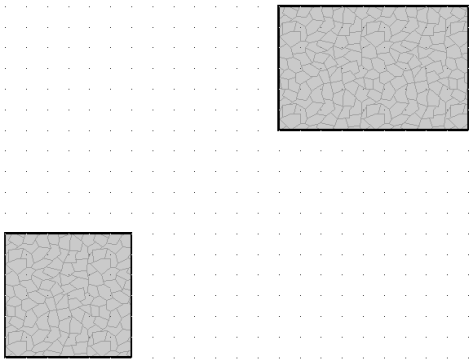
To use our version, do **File menu >> Open**, then select **DD2 Tutorial 01.FCW** from CC2 Pro's **Tutorials\Dungeons** folder.

8 Right click **Add Room**

This time, when the Add Room dialog appears, select the rectangular room shape.

9 Draw a rectangular room to the north and east of the entrance.

This time, DD2 needs placement of three out of the four corners of the rectangular room.



A corridor

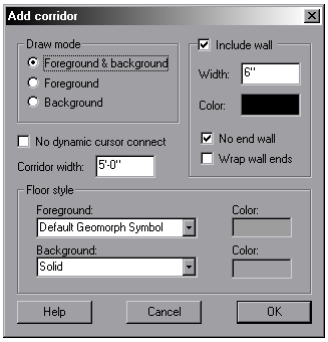
To use our version, do **File menu >> Open**, then select **DD2 Tutorial 02.FCW** from CC2 Pro's **Tutorials\Dungeons** folder.

---

10 Click drawing's scroll bars to center a bit more of the blank drawing to work on.

The scroll bars are used in the same way as most familiar software packages. They can be useful, but for large or more detailed maps it is often better to use the various zoom commands to navigate the drawing space instead.

11 Click **Add Corridor** . This dialog allows you to set options for drawing corridors, much in the same way as the Add Room dialog does for rooms. For now, retain the default settings by pressing **OK**.



The prompt reads `Corridor start point (B connect to wall, C connect no break):`

12 Press C.

You see a dynamic cursor, with one end anchored to the nearest room or corridor.

Pressing C tells DD2 that the next point to be placed connects to another room or corridor. When the connection is made, DD2 ensures that the walls at the connection are dealt with properly. Otherwise, the corridor section drawn will overlap the room's wall.

If you have drawn any overlapping corridor sections, you can correct them by bringing the necessary wall section in front of the corridor. See Entity Order in the Help index for information on bringing entities to the front of a drawing.

13 Move the mouse around the drawing window.

The dynamic cursor anchor moves to the nearest room or corridor.

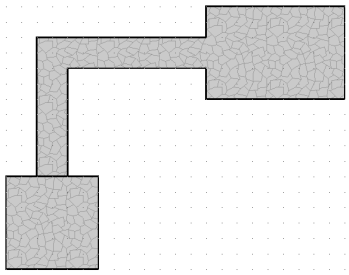
14 Once the dynamic cursor anchor appears at the point on the room you wish to start your corridor, click to place the first corridor point.

15 Click to place a corner in the corridor, so that it heads towards the rectangular room.

Note how DD2 automatically connects the corridor for you.

16 Press B, and move the mouse until the cursor anchor appears at the desired location on the second room. Click to place this point, then right-click to end the command.

Pressing B tells DD2 that the next point to be placed connects to another room or corridor, much in the same way as pressing C does. This time, however, DD2 will break the wall the corridor is attached to, connecting wall sections as necessary.



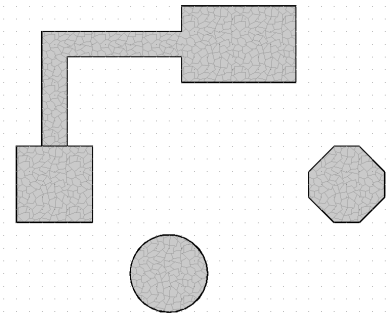
More rooms

Because you can connect corridors to rooms and other corridors (using the B and C keys as we have explored), but not corridors to rooms, it is a good idea to draw in your dungeon's rooms first, before adding any corridors.

To use our version, do **File menu >> Open**, then select **DD2 Tutorial 03.FCW** from CC2 Pro's **Tutorials\Dungeons** folder.

17 Right-click **Add Room** to place more rooms into the dungeon.

Feel free to experiment with the different room shapes, fill styles, etc. You don't need to stick to the rooms we've drawn here.



More corridors...

So far, we have touched on the basic uses of the **Add Corridor** command - simply drawing a section of corridor that turns a corner. The command does possess a set of options that can be used while you are drawing a corridor.

To use our version, do **File menu >> Open**, then select **DD2 Tutorial 04.FCW** from CC2 Pro's **Tutorials\Dungeons** folder.

---

18 Right click **Add Corridor**

This time we are going to add a corridor that connects to our entrance room by "breaking" that room's wall. Right clicking **Add Corridor** starts a corridor with the current settings.

19 Before placing the first point in the corridor, press B.

This activates the "Connect to wall" option of the **Add Corridor** command.

20 Move the mouse so that the cursor anchor appears along the east wall of the entrance room, then click to place the first point of the corridor here.

21 Press C, and move the mouse so that the cursor anchor appears on the western wall of the octagonal room, then click to place the corridor's final point here.

22 Click to repeat the corridor command.

Now we'll add a corridor that leads from the second room, increases in width, and then intersects with the eastern corridor we've just drawn.

23 Press C to create a non-breaking connection, and click to place the first point of the new corridor along the southern wall of the second room.

24 Place a second point just down from the southern room.

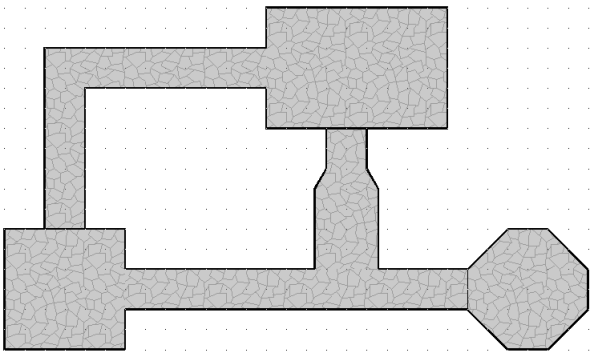
25 Holding the 2 key down, move the mouse to adjust the corridor's width before placing the third point.

You will notice a preview outline of the next corridor section which changes as the mouse is moved to reflect a new corridor width. DD2 will automatically slope the walls of the corridor section to create a gradual change from one width to the next.

26 After placing the third point, press B.

As before, this activates the wall-breaking connection.

27 Place the fourth point of the corridor on the northern wall of the eastern corridor that connects to the entrance room.



Completing the dungeon

More corridor and room sections can be added to the dungeon to complete the complex. Take the opportunity to explore the **Add Room** and **Add Corridor** commands by experimenting with them to finish the dungeon's basic layout.

If you'd like to see what we did, open **DD2 Tutorial 05.FCW**.

> The **Add Room** and **Add Corridor** commands automatically draw several entities, depending on the options selected and the points placed:
>
> Walls are drawn to the WALLS layer
>
> Background floor entities, which are usually solid-filled, are drawn to the BACKGROUND (FLOOR 1) layer.
>
> Foreground floor entities, which are usually of a patterned symbol fill (e.g., the "Paving 31 Symbol" fill style used in the above example) are drawn to the BACKGROUND (FLOOR 2) layer.
>
> Because the process creates standard entities, they can be manipulated in exactly the same way as if they were drawn manually. For example, if you wish to change the wall widths to 1', all you need to do is use the Change Line Width command to alter the wall entities to suit. You do not need to re-draw rooms and corridors using the **Add...** commands if you wish to change the styles used when originally drawn.

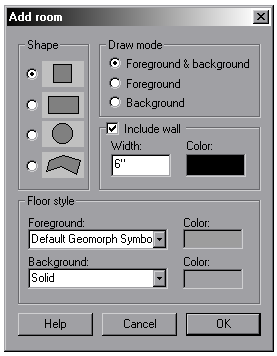
Using different room and corridor styles

As we have touched on already, the **Add Room** and **Add Corridor** commands can draw on the full range of DD2 colors and fill styles. In this tutorial, we shall explore this capability, and will show that a dungeon does not have to stick to the same style throughout.

---

1 Click **New** . Click DD2 250' x 200'.FCT

2 Click **Add Room**



3 In the Foreground drop-list, select **Pebbles Brown Symbol**.

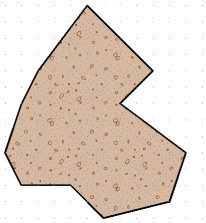
4 Click color box to the right of the Background drop-list.
You see the CC2 Pro color dialog box.

5 Click color 44 (a light brown), then click **OK**.
The Background color box changes to reflect the new selection.

6 Click polygon shape radio button (the lowermost of the available shapes), and press **OK**.
The Command Line reads `First corner:`

7 Click in the drawing to create an irregular-shaped room. Right-click to complete the room once you have placed all of the desired points.

The new room will be drawn with the colors and styles we have selected.



8 Click **Add Room**

The Add Room dialog box appears.

9 Change the Foreground to **Paving 31 Symbol**.

10 Click Foreground color box, and select color 40 (a mid-brown) from the dialog box that appears. Press **OK** to return to the Add Room dialog.

Varicolor Fill Styles

Fill styles identified with a "31" (e.g., **Paving 31 Symbol**, **Rock 31 Symbol**, etc.) use what is known as "symbol color" instead of absolute set colors. This means that the symbol, when placed, will use the current color to draw that fill style.

In the example given, the **Paving 31 Symbol** fill style will be use color 40 when the room is drawn. Whatever color we select for the Foreground will be used to draw the fill style. If the fill style used did not use symbol color functionality, then no matter what color we selected for the Foreground, the symbol would still use the color(s) it was originally defined as when placed. However, entities using non-symbol color fill styles will still be recognized as the color set by the user. For example, setting the Foreground fill style to **Paving L Symbol** and color to 40 will produce a dark gray paving effect, but the foreground entity will be recognized by the system (e.g., when selecting by color) as color 40.

Symbol color functionality is not limited to fill styles. Many symbols used in CC2 Pro, DD2, and other CC2 Pro add-ons make use of symbol color, as we shall explore in a later tutorial.

11 Click circular room shape radio button, and press **OK**.

The command line reads `Center point:`

12 Click to the east of the irregular room to place the center of the circular room.

The command line reads `Point on circle [or radius][SHIFT - move center]:`

13 Either type a radius for the circular room, and press ¶ , or click to place an edge point for the circle.

A circular room will be drawn, using the settings we have chosen.

If you placed the center of the circle too close to the irregular room, hold down 3 and move the mouse before entering a radius or clicking to place the circle's edge. This will allow you to reposition the circular room.

14 Click **Add Corridor**

The Add Corridor dialog box appears.

15 Change the Foreground and Background settings, in the same way as we changed the settings in the Add Room dialog, so that:

- ✓ Foreground is **Paving 31 Symbol**
- ✓ Foreground color is 250 (a medium gray)
- ✓ Background is **Solid**
- ✓ Background color is 254 (a light gray)

16 Press **OK** to start drawing the corridor.

17 Press B, and move the mouse so that the cursor anchor appears along the irregular room.

18 Click to start the corridor.

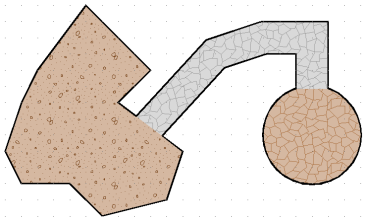
19 Click to place further points along the corridor.

20 Press B, and move the mouse so that the cursor anchor appears along the circular room.

21 Click to place the last point of the corridor.

The corridor will be drawn, breaking into the walls of both rooms.

Notice that, even though the rooms and the corridor use different colors and fill styles, the room and corridor connections still work perfectly!



Changing room and corridor styles

Because the **Add Room** and **Add Corridor** commands place the various dungeon components (foreground, background, and walls) on different layers, it is an easy task to change colors, fill styles, etc. even after a dungeon has been drawn.

To use our version, do **File menu >> Open**, then select **DD2 Tutorial 06.FCW** from CC2 Pro's **Tutorials\Dungeons** folder.

---

22 Click **Change Fill Style**

The Command Line reads `Select entities [0 picked]`

We wish to change the fill style of the irregular room's foreground.

23 Click edge of the irregular room.

The whole of the irregular room will be selected.

Since we only need to select the foreground portion of the room, we need to eliminate the background and wall entities from our selection.

24 Right-click to bring up the selection criteria menu, click **And.** Right-click again to bring the menu back, and select **Layer**. Right-click to bring up the Select Layer dialog box.

25 Click BACKGROUND (FLOOR 2) layer, then press **OK**.

The wall and floor entities are de-selected, leaving only the foreground.

We've selected those entities which are both part of the room and on the BACKGROUND (FLOOR 2) layer.

26 Right-click, and select **Do It**.

The command line reads `Fill style name [dialog]:`

27 Right-click.

You see the Fill Style Properties dialog box

28 Click **Symbol Fills** tab.

29 Change the Fill Style Name to **Dust Brown Symbol**, and press **OK**.

The foreground style of the irregular room has changed.

To see our version, do **File menu >> Open**, then select **DD2 Tutorial 07.FCW** from CC2 Pro's **Tutorials\Dungeons** folder.

> The above process can be adapted to change virtually any aspect of a dungeon's style. To change a dungeon's style globally, use the **Layer** selection criteria to choose all entities on the layer required.
>
> Remember that dungeons drawn with the **Add Room** and **Add Corridor** commands comprise standard CC2 Pro entities. They are thus subject to all of the functions that can normally be used by entities of their type.

THE GEOMORPH DUNGEON

Add Room and **Add Corridor** provide an easy and flexible method to quickly draw dungeons. DD2 also provides a set of geomorph symbols, depicting various corridor and room sections, that can be used instead of, or in combination with, those commands.

The basic geomorph dungeon

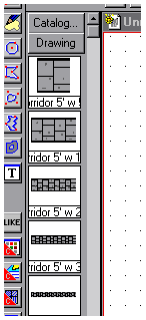
To create a simple dungeon using DD2's geomorph symbols:

1 Click **New** . Click DD2 250' x 200'.FCT

2 Change folder to My Designs\Dungeons. In the File Name box type **Second Dungeon**, then click **Save**.

You see a blank dungeon map, ready for you to draw on. The grid setting is **Dungeon Geomorph**, and the grid is enabled. The current color is gray.

3 Click **Zoom In**



4 Click **Dungeon Geomorph** symbol

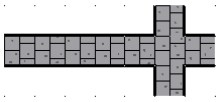
The Dungeon Geomorph symbol catalog will appear in the Catalog Window.

5 Scroll down the Catalog Window and Click first crossroads symbol

The symbol attaches to the cursor, and will move around the screen as you move the mouse.

6 Place the crossroads symbol into the map

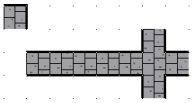
7 Scroll back up the Catalog Window, and find the symbol **Corridor 5' w 20' l.**. Place this next to the crossroads so that the symbols touch.



Because the grid snap settings we are using are specifically designed with the dungeon geomorph symbols in mind, placing the corridor section correctly is an easy task.

Because the Catalog Window isn't wide enough to show the whole name of symbols with long titles, you'll see something similar to "*rridor 5' w 2*" under the required symbol.

8 Scroll down the catalog, and locate the symbol **Room 5' Corner 1**. Place this symbol just to the left, and 10' up from the straight corridor piece just added.



This symbol is to form the first corner of a room.

9 Scroll down the catalog, and locate the symbol **Room 5' Edge**.

10 Press the ° arrow key

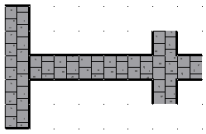
We need a room edge symbol that has a wall to the right so we can put in the easternmost extents of the room. Because the **Room 5' Edge** symbol is drawn so that its wall is to the left, we must rotate the symbol so that the wall is where we need it to be.

The ° arrow key will effectively rotate a symbol so that it is turned through 180°. The other four arrow keys have a similar effect, with the ® key rotating through 90°, the - key rotating through 270°, and the ¯ key resetting rotation back to 0°. You may wish to press these keys now, to see the effect they have.

Note that when an arrow key is used to rotate a symbol, all subsequent symbols will retain the rotation angle until it is changed or reset.

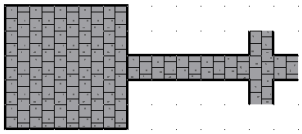
11 Place three of the rotated edge symbols down from the room corner.

12 Find the **Room 5' Corner 1** symbol again. Press the - arrow key to rotate it, and place it at the bottom of the edge symbols just drawn to complete the room's easternmost wall.



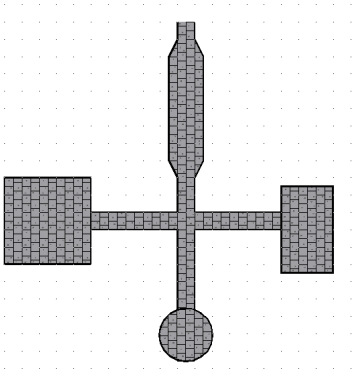
13 Using the arrow keys, and the room edge and corner symbols, complete the outer wall of the room.

14 Find the **Room 5' Tile** symbol, and place it several times within the room to fill up the gap.



More geomorph techniques

The basic method of "pick up symbol, rotate as necessary, drop it in place" described above forms the basic principle of geomorph use. If you scroll through the Dungeon Geomorph symbol catalog, you will find various corridor and room shapes that can be used in exactly the same method as we've already discussed to add to the dungeon. Try adding some more geomorph pieces to the dungeon - don't worry if your dungeon does not end up the same as the one shown here!



Symbol manipulation

Geomorphs are symbols, so they can be manipulated just as any other symbol. This is useful for producing room shapes based on the geomorph symbols, creating angled corridors, etc.

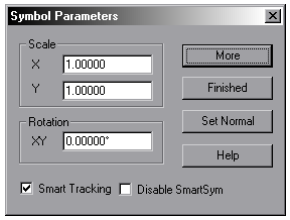
For example, if we wished to place an elliptical room at the northern end of our drawing, we might follow the following procedure.

To use our version, do **File menu >> Open**, then select **DD2 Tutorial 08.FCW** from CC2 Pro's **Tutorials\Dungeons** folder.

---

15 Locate the **Room Circle 15'** symbol in the Dungeon Geomorphs catalog, and click on it.
The symbol attaches to the cursor.

16 Right-click with the mouse.
The Symbol Parameters dialog box appears.



17 In the **X** scale box, type **5**.

18 In the **Y** scale box, type **2**.

Changing Symbol Scales
When you change the X value, the Y value changes to the same number. This makes it very easy to scale symbols in both directions. If you want to scale by different X and Y values, change the X value first.

Symbols can also be rotated and scaled dynamically. To rotate a symbol in this way, hold the ² and ³ keys down together, and move the mouse around. The symbol will rotate according to the movement of the mouse. To scale a symbol like this, hold the ² key down, and move the mouse around. The symbol will grow or shrink according to the movement of the mouse.

19 Click **More**.

The symbol is now an ellipse, 75' across and 30' high.

20 Place the symbol at the end of the north corridor.

Notice that the width of the room's wall has been scaled too, and is now too wide in comparison with the rest of the dungeon. We will fix this problem in the next section.

Exploding the symbols

Because symbols sometimes behave in an undesired way when scaling (for example, the wall thickness problem evident in our last example), and because it is sometimes desirable to change some other aspect of a symbol-drawn map, symbols can be *exploded* into their constituent parts. These parts can then be edited in the same way as any other standard entity.

For example, if we wished to change the wall thickness of our elliptical room to suit the rest of the dungeon:

---

21 Click **Explode** . Select the northern elliptical room. Right-click, and select Do It.

22 Click **Change Line Width** .Right-click, and select **Prior**. Right-click, and select **And**. Right-click, and select **Layer**. Right-click to bring up the Layers dialog, and click on WALLS.

23 Press **OK**.

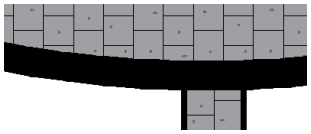
The only entity left selected should be the elliptical room's wall.

24 Right-click, and select **Do It**.

25 Type **6"** and press ¶

The line width of the room's wall will now be 6", the same as all of the other walls in the dungeon.

Before:



After:

Because the geomorph symbols were drawn using the standard DD2 layers, the entities that make up a symbol, once exploded, will retain their respective layers. The layers used are:

- Walls are drawn to the WALLS layer
- Background, solid-fill floor entities are drawn to the BACKGROUND (FLOOR 1) layer.
- Foreground, symbol-filled floor entities are drawn to the BACKGROUND (FLOOR 2) layer.

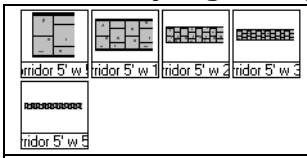
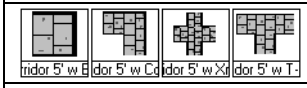
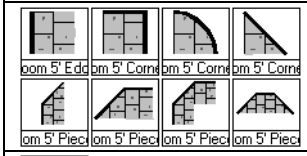
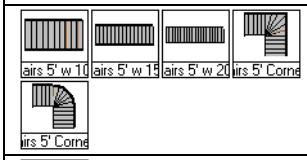
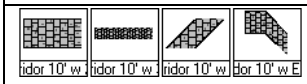
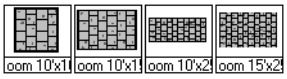
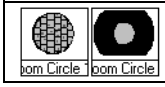
Note that once a symbol has been exploded, it is no longer a symbol.

A note on explosion

The **Explode** command, as we have seen, is very useful when it comes to manipulating symbols, but it also opens up a pitfall ready to swallow you if you do not take care - especially when your drawing consists of a number of different drawing styles.

To avoid exploding things you do not wish to, remember that CC2 Pro's selection criteria menu is but a right-click away. Perhaps the most useful criteria to use in hybrid method dungeons is to use **Entity Type >> Symbol Reference**. This can be used to filter out entities that are not symbols (e.g., **Add Room**, **Add Corridor**, and freehand dungeon sections) when you wish to explode geomorph symbols.

A summary of geomorph symbols

	5′ wide corridors (Symbols in the Catalog Window are scaled to fit the available space. This makes long corridors look thin.)
	5′ wide angled corridors
	5′ wide corridor junctions and bends
	5′ x 5′ tiles for the room edges Use these to create boundaries for unusual rooms.
	5′ x 5′ fill tiles Use these to fill unusual room shapes.
	5′ wide stairs (Symbols in the Catalog Window are scaled to fit the available space. This makes long stairs look thin.)
	Corridor 10′ to 5′ To link corridors of different widths.
 etc.	10′ wide versions of all the above
	Room 1′ x 1′ Right-click while placing, then use different X and Y symbol scales to make rectangular rooms. If you use this you will have to explode the geomorphs afterwards.
	**Rectangular Rooms** A selection of common room sizes.
	Circular rooms (1′ and 10′)

Other Geomorph tips and tricks

Changing the geomorph map's background color

By default, geomorph maps have a coffee colored background. To change the background color, click **Change Color** , select the entities to change by layer BACKGROUND (MAP), then pick a new color.

Changing the background color of geomorph symbols

When you place a geomorph it uses the current color as its background. To change the background color after a geomorph has been placed, use **Change Color** on the whole tile. Only the background color will change. If you have exploded the geomorphs, change color, selecting by layer BACKGROUND (FLOOR 1)

Changing the fill style of geomorph symbols

Once exploded, the fill style, used to depict paving etc., of geomorphs can be changed. To do this, Click **Change Fill Style** , select the entities to change by layer BACKGROUND (FLOOR 2), right-click to bring up the Fill Style dialog, and select a new fill style.

FREEHAND DUNGEONS

Using the **Add Room** and **Add Corridor** commands, or the Dungeon Geomorph symbols, provide a quick method of drawing dungeons. You can also use geomorphs for very speedy dungeon creation. CC2 Pro also has custom drawing tools enabling you to add specialized entities to your drawings. DD2 includes some more of these designed for floorplan creation. You can add caves, freehand look rooms, and water features with a few mouse clicks. Finally, you have the option of using CC2 Pro's basic drawing commands which make for a greater range of possibilities, perhaps at the expense of a little speed. This chapter goes over the basics of drawing tools, then shows you an example freehand dungeon.

Using Dungeon Drawing Tools

CC2 Pro offers you prepackaged drawing tools with predetermined layers, fill styles, colors and other properties. These can be used to create a wide range of map features. Drawing tools are introduced described on page 27-28 of the CC2 Pro manual, and pages 35-37 shows you how to create one of your own.

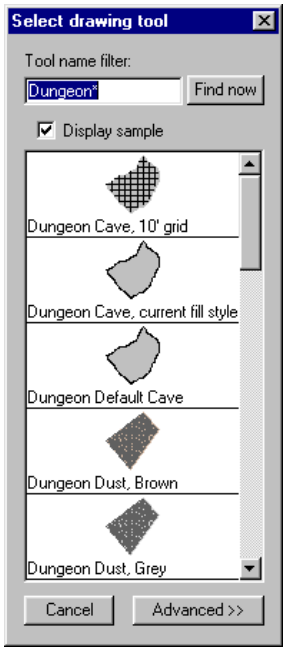
1 Click **New** . Click DD2 250' x 200'.FCT

2 Select File menu >> New. Select File menu >> Save As.

3 Change folder to My Designs\Dungeons. In the File Name box type **`Third Dungeon`**, then click **Save**.

Drawing a Cave

DD2 has three pre-defined cave drawing tools that use fractals to create a suitably ragged edge.



4 Click the color indicator and select color #251.

5 Click **Drawing Tools** .

The Tool name filter is Dungeon*, meaning that all tools with names starting "Dungeon" appear.

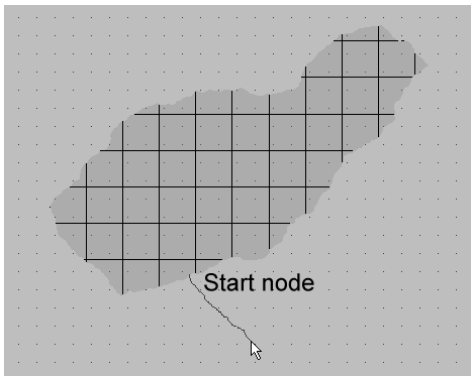
6 Click Dungeon Cave, 10' grid. Click points to create a cave. Right click to complete the first cave.

Note that the prompt reads `Fractal Polygon: First point (E to Edit)`

You can adjust the shape of an existing cave, adding new corridors or subtracting sections, just as you can with lakes.

7 Press e then click a point on the first cave you drew.

The prompt reads Pick Start Node.



8 Click a point on the edge of your existing cave, then further points, until you have nearly reconnected to the first cave. Right click.

The prompt reads `Pick end node to connect to.`

The cursor has locked to the original cave so that you can choose a final point on an existing part of the cave.

9 Click a final node on the cave.

The cave has been reshaped with your new section.

Other drawing tools

There are many other drawing tools. You can draw rooms with fractal edges, giving a hand drawn look, grassy areas, and lava. Drawing tools can use either fixed properties such as fill style or color, or use the current settings. For example, the Default Wall drawing tool draws solid filled walls in the current width. If you right click on **Drawing Tools** , you'll see all the tools available in CC2 Pro and all add-ons, and you can add appropriate ones to the current drawing, for example Map Water, Fractal Box or Map River.

Drawing Freehand

You can use CC2 Pro's basic drawing commands to create any shape you like. This section shows you how to create a floorplan using only these. This can be an advantage when you can't achieve what you want using DD2's commands

1 Click **New** . Click DD2 250' x 200'.FCT

2 Select File menu >> New. Select File menu >> Save As.

3 Change folder to My Designs\Dungeons. In the File Name box type **`Fourth Dungeon`**, then click **Save**.

Drawing the dungeon's outer walls

The easiest way to draw a dungeon is to first draw in its outer walls, and then fill in extra details afterwards.

Walls are usually drawn using paths, but lines, splines, circles, arcs, and polygons are just as good if the situation requires.

There is a short "Do's and Don'ts" list for drawing walls which, if followed, will make many of the later steps a lot easier. So, when drawing walls....

- ✓ *Less is better*. The fewer entities taken to draw a dungeon's walls, the easier it is to manipulate and edit the map.
- ✓ *Don't start at a corner.* If using paths to draw a wall, don't start drawing the wall at a corner. If you start drawing the wall at a gap, a wall's corners will look after themselves.
- ✓ *Avoid unnecessary breaks*. It is easier to break a hole in a wall (e.g., for a door) than it is to trim two wall entities around such a gap.

Now that's out of the way, let's draw our dungeon's outer wall.

To make it easier for you to follow our dungeon, a sketched guide template is provided. To use this, do **File menu >> Open**, then select **DD2 Tutorial 09.FCW** from CC2 Pro's **Tutorials\Dungeons** folder.

---

4 Click **Toggle Fill Style** until the fill style is **Solid**.

5 Click the Line Width indicator and type**1'0"**.

6 Right-click the Grid button and set the grid to **10' Grid, 2 Snap**.

Using the Snap Grid

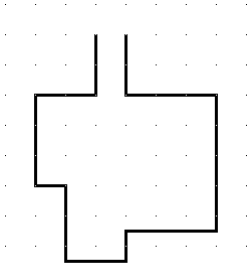
At any time, even in the middle of another command, you can select a new grid setting by right-clicking the **Grid** button at the bottom right of CC2 Pro's Window.

Grids are named after the spacing of the dots that form the grid, and the number of snap points between each dot. For example, the grid selected above has a grid dot every 10', but a snap point every 5'.

If the **Snap** button is down, then things drawn will automatically snap to the nearest snap point.

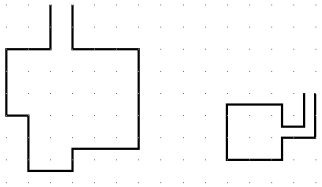
7 Click **Draw Wall**

Draw Wall starts the default Wall drawing tool. You can right click on Draw Wall to see other available wall tools.



8 Click points to form the outer wall of one section of the dungeon.

9 Using the same method, draw the remaining regular outer walls of the dungeon.



Irregular dungeon walls

Not every dungeon has nice, regular walls. Sometimes, it is necessary to draw rough, irregular walls - to depict caves, for example. In the dungeon we are drawing, an irregular tunnel connects the two sections drawn thus far, and a cave section exists just to the south. There are two basic methods for drawing irregular walls, and we'll explore both here.

To use our version, do **File menu >> Open**, then select **DD2 Tutorial 10.FCW** from CC2 Pro's **Tutorials\Dungeons** folder.

---

10 Click **Zoom Window** , and zoom in to the central section between the two dungeon areas drawn.

11 Click **Draw Wall**

12 Click the wall of the left-hand dungeon section to place the first point.

13 Click the **Snap** button to turn snap off.

Drawing snap is no longer on, so entities drawn will not be forced to snap points.

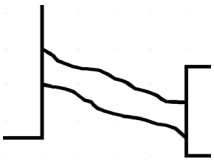
14 Draw a rough wall towards the right hand dungeon section.

You do not need to be accurate here. Draw the wall using a number of mouse clicks, shaking the mouse as you do so to create an irregular effect.

15 Just before reaching the right section's wall, Click **Snap** button to turn snap on, and place the final point on the right section's wall.

16 Right-click to end the command.

17 Right-click to repeat the **Draw Wall** command, and draw the tunnel's second wall by repeating the above process.



Drawing irregular walls using the **Draw Wall** command, or by simply using paths, can occasionally be tedious, particularly if a large cavern is to be drawn.

Fortunately, CC2 Pro provides an answer that speeds the process up and reduces the number of mouse clicks required. This comes in the form of the **Fractilise** command.

To use this method, draw in the to-be-irregular walls using the process described above, but only place a few points to sketch the general shape of the wall required. Once this has been done, Click **Fractilise** , and select the wall drawn. CC2 Pro will then place more points along the wall to give it that irregular look. Another option is to use **the Fractal Path** to draw the wall instead of the **Draw Wall** command.

18 Click **Zoom Window** , and zoom in to the southern portion of the map.

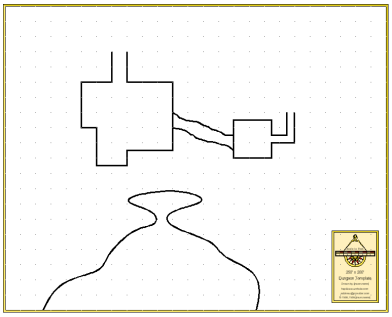
19 Click **Smooth Path** .

When drawing smooth paths, CC2 Pro takes the points drawn and calculates a curved, rather than straight, connection between them. The advantage of this method is that fewer mouse clicks are required to create a nice, irregular effect. The disadvantage is that smooth paths are not as easily manipulated once drawn as regular paths are.

20 Before drawing, make sure that the **Snap** button is pressed down.

21 Sketch the outline of the cavern section, from one point on the map border to another. Right-click to complete the command when finished.

Your dungeon should now look something like this:



You can make irregular sections drawn using the **Smooth Path** look even better by adding more points. If you wish to use commands such as **Fractilise** on a smooth path, or you wish to convert a previously drawn regular path to a smooth path or vice versa, click **Edit** EDIT, select the path in question, and then change the Smoothing option to suit.

Completing the walls

Now that our floor and grid entities are in place, we can complete the dungeon's walls.

To use our version, do **File menu >> Open**, then select **DD2 Tutorial 11.FCW** from CC2 Pro's **Tutorials\Dungeons** folder.

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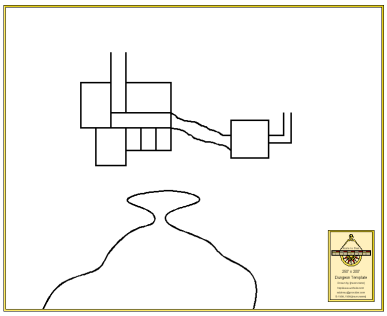
22 Click **Draw Wall**

23 Draw in the remainder of the dungeon's walls.

You should end up with something like this:



24 Select **File menu >> Save** to save your work.

The processes described in this chapter (and, indeed, this whole manual) represent *a* way of doing things, but by no means *the* way. You might think that a thick wall around a cavern section is not required, since no structured wall is present there. The colors and fills styles used might not appeal to you. As you gain experience with the functions provided by CC2 Pro and DD2, you might find other ways of doing things that suit you better than those shown herein.

One of the greatest aspects of the CC2 Pro family is choice. There are no real "wrong" or "right" ways of doing things - only matters of preference. Not only does CC2 Pro provide many different methods and styles for you to use and explore, it also leaves the final decisions to you.

Combining Methods

So far, we have discussed three quite different ways of drawing dungeon maps - using the **Add Room** and **Add Corridor** commands; geomorphs; and freehand. Although each method can be used alone to produce some stunning results, it is also possible to produce maps using two or three methods in combination.

Just how such a combined method map could be formed is not as complex an issue as it may first appear. All three methods make use of three distinct layers for basic dungeon drawing - WALLS, BACKGROUND (FLOOR 1), and BACKGROUND (FLOOR 2). Although adding grid entities has only been discussed for freehand drawings, the methods used there are equally applicable to dungeons drawn using the **Add...** commands, and to geomorph dungeons once geomorph symbols have been exploded.

You may wish to use geomorph symbols for your corridors, add in rooms using the **Add Room** command, and then draw a connecting cavern network freehand. Or perhaps you prefer using the **Add Corridor** command over the geomorphs.

The fact is none of the processes discussed are absolutely unto themselves. Experiment, go wild, and above all have fun!

Remember that a little thought now can save a lot of pain later!

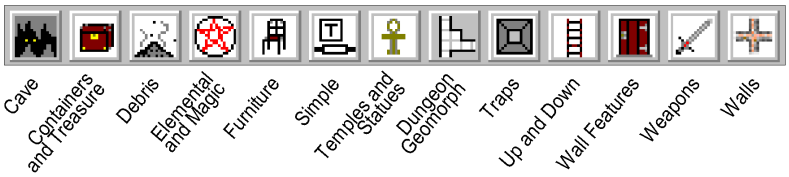
ADDING SYMBOLS

Whichever method of dungeon drawing is used, sooner or later you'll want to place symbols into the map to show doors, stairs, furniture, etc. To this end, DD2 provides a number of new symbols for you to play with.

As with CC2 Pro, symbols are stored in catalogs. You can access symbol catalogs by clicking on the various symbol buttons on the DD2 symbols toolbar, or by loading them manually by clicking on the Catalog button above the Catalog Window. You can also access symbols that have already been placed within the drawing by clicking on the Drawing button.

To use our version, do **File menu >> Open**, then select **DD2 Tutorial 12.FCW** from CC2 Pro's **Tutorials\Dungeons** folder.

Doors and Windows



25 The DD2 Symbol Catalog toolbar is usually found under the File toolbar. If you can't see the toolbar, click **Tools** button, then click next to DD2 Symbol Catalog toolbar.

26 Click **Wall Features** . You are given a choice of three catalogs. Choose DD2 Filled Wall Features, Control Points.

You will notice that the doors and windows in this catalog have blocks of color behind them. These blocks are drawn using "symbol color", in the same way as the floor backgrounds of the Dungeon Geomorph symbols are. Click on a few of the colors along CC2 Pro's color bar, and notice that these blocks change according to the color selected.

Catalog Settings

As with the **Draw Wall** command, DD2's symbol buttons do more than just load a particular symbol catalog. This process saves time, and ensures the default DD2 layering structure (e.g., "all doors go on the WALL FEATURES layer") is held. This is not because symbols from a given catalog *must* be placed on a given layer, but that doing so is convenient and practical.

27 Click the color box and select color #15 (white). This color be the same color used for the solid filled floor.

28 Click **Zoom Window** , and zoom in to the portion of the dungeon where you wish to place a door.

29 Click **Snap** button to turn snap off.

Snap often interferes with smart symbol interaction (see below). When using smart symbols, it is better to switch snap off.

30 Click first open door symbol going down the Catalog Window.

The symbol attaches to the cursor, and will move around the screen as you move the mouse.

31 Move the cursor across a vertical wall section.

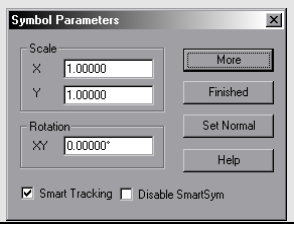
Notice how the symbol automatically aligns itself to the vertical wall as it moves across it. It does this because it is "smart" - it interacts with the drawing by aligning itself to the entities it is moved across.

Smart Symbols

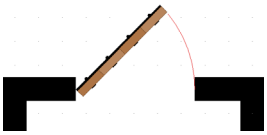
Many of the symbols provided with DD2 are "smart". That is, they interact with the drawing in some way. As we have seen, one way in which smart symbols interact is by aligning themselves to entities in the drawing. We will see later how they can scale themselves, break holes in other entities to accommodate themselves, etc.

Sometimes, having a symbol interact with a drawing can be unwanted, particularly when placing especially complex symbols, or using dynamic or explicit symbol scaling. Because of this, the smart symbol interaction can be switched off, forcing smart symbols to behave in the same way as normal ones.

To turn off smart symbols, right-click at any time you have a symbol attached to your cursor. The Symbol Parameters dialog box will appear. Click to check in the **Disable SmartSym** box, and press **More**.



Smart symbols will not interact with the drawing until you reverse this process, or you start a new CC2 Pro session.



32 Click to place the door symbol on a wall as desired.

The color block underneath the door symbol obscures the wall where the symbol is placed, giving an "open" look.

33 Press » to stop inserting doors.

Doors and windows can be placed into the drawing by repeating the above steps.

It is possible that the above method does not suit a particular map. For example, if adding an exterior door to a building, the block will overlap into the area outside the building, which may look a bit scruffy. Below are some alternative methods you might like to try out.

Cutting doors and windows

Instead of placing a color block over the wall to obscure it, a catalog of smart wall features symbols is provided that literally cut into walls, removing the portion of the wall below them.

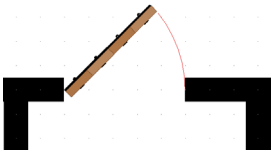
---

34 Click the **Catalog** button, and find Wall Features Cutting.FSC.

The selected catalog will load into the Catalog Window. Notice that it contains the same symbols as the previous catalog, but without the color blocks.

35 Click first open door symbol in the catalog.

The symbol will attach to the cursor, and will move as you move the mouse. Because these symbols are also smart, they will align to entities in the drawing as they move over them.



36 Click to place the door symbol on a wall as desired.

Notice this time that the wall below the symbol is cut out to accommodate the doorway.

Note that while smart symbols will align to other symbols, they will not cut into them. This is worth keeping in mind when adding symbols to a dungeon drawn using the Dungeon Geomorphs symbols. If you wish to use cutting doors and windows with Dungeon Geomorphs, you must first explode the geomorphs.

Non-cutting, non-obscuring doors and windows

Sometimes, the obscuring block or cutting methods are not desired. DD2 provides a catalog of doors and windows that do neither.

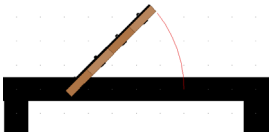
---

37 Click **Catalog** button, and locate Wall Features with control points.FSC.

The selected catalog will load into the Catalog Window. Notice that it contains the same symbols as the previous catalog.

38 Click first open door symbol in the catalog.

The symbol will attach to the cursor, and will move as you move the mouse. Because these symbols are also smart, they will align to entities in the drawing as they move over them.



39 Click to place the door symbol on a wall as desired.

This time, the door symbol will neither obscure the wall, nor cut it to accommodate the doorway.

Choosing the symbol catalog to use

Which method to use is, as ever, your choice. You may even opt to use a combination of methods in a single drawing, placing some doors that obscure the walls below them, some that cut, some that align themselves to walls (especially useful for angled wall sections), and some that don't. To aid you in your decision, consider the following.

The *advantages* of using wall obscuring doors over cutting doors are:

- There are no tell-tale gaps when secret doors are hidden
- They are very easy to place, even at complex junctions
- When erased, they don't leave the problem of a broken wall to solve behind them

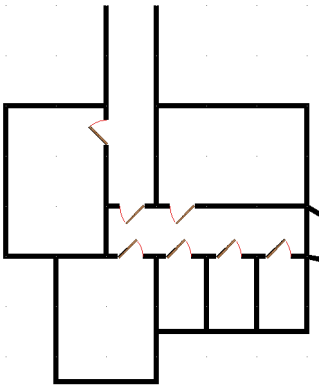
The *disadvantages* of using them are:

- The obscuring mask may be visible against textured backgrounds
- The mask may not be wide enough for very thick walls

- The mask may hide something it is not supposed to

To complete this section...

40 Using whichever method is desired, add doors as shown.



Secret Doors

Now we'll add a couple of secret doors, one at each end of the tunnel. Because I want to be able to hide the doors completely, I'll use the obscuring method rather than the cutting method of adding doors.

To use our version, do **File menu >> Open**, then select **DD2 Tutorial 13.FCW** from CC2 Pro's **Tutorials\Dungeons** folder.

---

41 Click **Wall Features** . Choose DD2 Filled Wall Features, Control Points.

42 Click **Secret Layer**

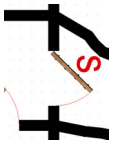
You can see in the Status Bar that the current layer has changed to SECRET. Anything drawn now will be on the SECRET layer, until we choose another layer.

43 Click first secret door in the Catalog Window.

Secret doors are identified with a red letter **S**.

44 Move the secret door to the wall where the tunnel meets this section of the dungeon.

The secret door symbol is smart, so it will align to the wall.



45 Click to place the secret door at the tunnel entrance.

46 Repeat steps 4 and 5 to add a secret door at the other end of the tunnel.

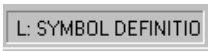
47 Press » to stop inserting symbols.

Hiding Secrets

The advantage of placing secret doors (and other secret things) on a separate layer, apart from the convenience of keeping entities of a particular nature together, comes when producing player handouts or using your DD2 dungeon on-screen to show players the environment their characters are exploring. You can hide the SECRET layer, withdrawing all secrets from view, while leaving the things you want the players to see evident.

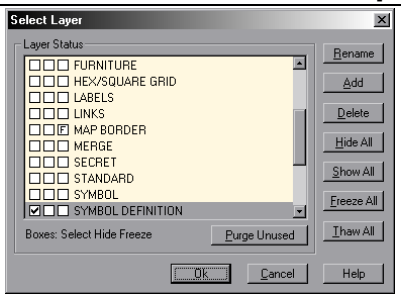
To use our version, do **File menu >> Open**, then select **DD2 Tutorial 14.FCW** from CC2 Pro's **Tutorials\Dungeons** folder.

---

48 Click the Layer indicator 

on the status bar.

The Select Layer dialog box appears.



To the left of each layer's name are three boxes.

- ✓ Clicking in the left-hand box will cause a tick to appear there. Only one layer may have a tick here at any one time. This indicates the layer in current use.
- ✓ Clicking in the central box will cause a letter **H** to appear. This indicates that all entities on the layer are hidden, and will not appear on the screen, nor will they print. This can be set for all layers but the current (ticked) one by pressing the **Hide All** button, and removed by pressing the **Show All** button. Clicking on a box already containing an **H** will clear it.
- ✓ Clicking in the right-hand box will cause a letter **F** to appear. This indicates that the layer is frozen. Entities on a frozen layer may not be erased or otherwise altered. Certain functions (such as smart symbol alignment) will still work with a frozen layer. This can be set for all layers but the by pressing the **Freeze All** button, and removed by pressing the **Thaw All** button. Clicking on a box already containing an **F** will clear it, and thaw the layer.
- ✓ Once all desired layer settings have been placed, clicking **OK** will keep the settings, and apply them to the drawing. Clicking **Cancel** will ignore the settings, reverting them to the state they were at before the Select Layer dialog was used.

49 Click left-hand box for any layer other than SECRET.

Because we have just been working on the SECRET layer, it will be the one currently having a tick next to it. Because we wish to hide the SECRET layer, and the current layer cannot be hidden, we need to select another current layer.

50 Click middle box next to the SECRET layer.

An **H** appears in the box, indicating that the SECRET layer is hidden.

51 Press **OK** to keep the layer settings changes.

We are returned to our drawing, but this time our secret doors cannot be seen. They have become hidden, along with the SECRET layer we put them on.

52 To show the secret doors again, reverse the process, clearing the **H** from the SECRET layer's central box.

Stairs

Our dungeon has two entrances, and each is accessible by a flight of stairs. Here, we are going to place these stairs into the drawing. However, since one entrance is 10' wide, and the other is only 5' wide, we will need to scale our stair symbols to suit.

To use our version, do **File menu >> Open**, then select **DD2 Tutorial 14.FCW** from CC2 Pro's **Tutorials\Dungeons** folder.

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53 Click **Snap** button to depress it and turn snap on.

54 Click **Up and Down** symbol

The current layer is set to UP AND DOWN, and the Catalog Window fills with symbols from **Up and Down.FSC**.

55 Scroll down the catalog window, locate the **Stairs B 10 Up** symbol and click on it.

The stairs symbol attaches itself to the cursor.

Stairs symbols are named after their color, length, and direction. For example, **Stairs B 10 Up** indicates that the stairs are brown, extend for 10', and lead upwards.

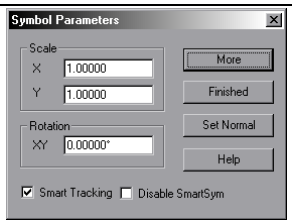
56 Click **Zoom Window** and zoom into the northern entrance to the easternmost dungeon section.

57 Press ®.

The stairs symbol we have selected is normally aligned east to west. We need it to be aligned north to south to fit the entrance.

58 Right-click.

You see the Symbol Parameters dialog box:



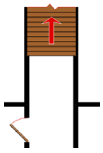
59 Change the **Y** scale value to **2**.

Because the stairs symbol we have selected is only 5’ wide, and the entrance is 10’ wide, we need to scale the symbol to fit.

Looking at the symbol, you might think that using the Y scale parameter would extend the length of the stairs, rather than its width, since the symbol is aligned north to south. However, symbols are scaled with respect to their original alignment, regardless of actual rotation. Thus, because the symbol was originally aligned east to west, it is the Y scale parameter we need to change its width.

60 Press the **More** button.

You are back to placing the symbol, which is now 10’ wide and 10’ long - the right size to fill our entrance.



61 Click to place the stairs at the end of the entrance passageway.

62 Scroll down the Catalog Window, and Click **Stairs G 10 Up** symbol.

The new symbol becomes attached to the cursor. It has inherited the parameters we’ve already set, i.e., it is rotated to vertical and is twice its normal width.

63 Right-click.

You see the Symbol Parameters dialog box.

64 Change the **Y** scale value to **1**.

The stairs for the right-hand dungeon entrance need to be 5’ wide, which happens to be the same as the symbol’s original width.

We could set the Y scale back to 1 by pressing the **Set Normal** button. However, we want to retain the vertical orientation of the stairs. The **Set Normal** button sets X scale and Y scale to 1, but it also sets Rotation to 0°.

65 Press the **More** button.

66 Right-Click **Grid** button, and select **5’ Grid, 2 Snap**.

Because this entrance is only 5’ wide, using the **10’ Grid, 2 Snap** setting will not allow alignment of the stairs to the center of the entrance. Using the **5’ Grid, 2 Snap** will allow this.

Changing the grid settings in the middle of a command will not cancel the command in progress.

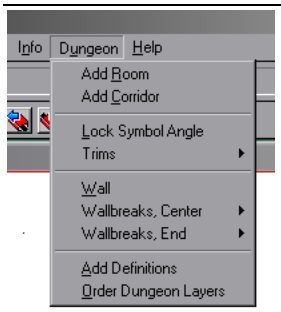
67 Click **Zoom Window** and zoom in to the easternmost dungeon entrance.

68 Click to place the stairs at the entrance.

Re-ordering layers

You will notice that the stairs symbols just placed overlap the dungeon’s walls, which looks a bit messy. We could fix this by fronting the WALLS layer, using the **Bring to Front** . However, this will also cause the walls to be placed in front of the doors we have drawn.

DD2 introduces a command that will automatically re-order layers to suit. This command generally works with default layer use (e.g., doors on the WALL FEATURES layer; walls on the WALLS layer; etc.), so some manual fronting may be necessary in unusual situations.



69 Select **Dungeon menu >> Order Dungeon Layers**.

The objects in the drawing are fronted according to which layer they are on. The walls are now correctly in front of the stairs.

Traps

No dungeon would be complete without a handful of fiendish devices to protect it. Our dungeon is no exception.

DD2 provides a number of mechanical and magical traps to catch the unwary adventurer. By default, these are placed on the TRAPS layer which, in the same way as we have already shown with the SECRET layer, can be hidden when producing maps to show the ignorant....

To use our version, do **File menu >> Open**, then select **DD2 Tutorial 15.FCW** from CC2 Pro's **Tutorials\Dungeons** folder.

---

70 Click **Traps**

The current layer is set to TRAPS, and the Catalog Window fills with symbols from **Traps.FSC**.

71 Zoom to the corridor down from the easternmost stairs.

The builders of this dungeon don't like people wandering down the staircase willy-nilly. So, they've put a fire trap to catch intruders using this entrance.

72 Click Fire Blast symbol

The new symbol is attached to the cursor.

73 Press ®.

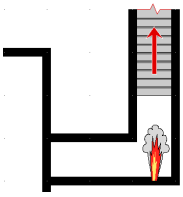
Because the symbol is normally aligned horizontally, and we want it to point vertically towards the staircase, we need to rotate it.

74 Right-click.

You see the Symbol Parameters dialog box.

75 Change the **X** scale parameter to **0.5**, then press the **More** button.

The fire trap symbol was too big to fit into the corridor, so we've had to scale it down. You'll notice that, when you change the X scale parameter, the Y scale parameter automatically changes to suit, so we don't need to worry about keeping the symbol in proportion.



76 Place the fire trap at the end of the corridor.

We now have a fire trap at the bottom of the stairs, ready to char any unwanted intruders.

77 Zoom into the western dungeon section.

The fire trap is not the only fiendish device here...

78 Click Spring Spear symbol

The Spring Spear symbol replaces the Fire Blast as the current symbol attached to our cursor, but it is half-size because of the parameters we set for the fire trap.

79 Right-click.

You see the Symbol Parameters dialog box.

80 Press the **Set Normal** button, then the **More** button.

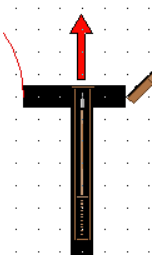
This time, we have two parameters to change (X scale and Y scale), instead of the one we needed in the stairs example. Using the **Set Normal** button in this case, even though we still need the vertical orientation, will generate fewer processes in the long run.

81 Press ®.

This restores the vertical alignment we need.

82 Right-Click **Grid** button, and select **1' Grid, 2 Snap**.

We are going to place the spear trap within a section of wall, so we need to change to a grid setting that will allow this.



83 Place the spear trap so that the arrow portion of the symbol, which shows the direction in which the trap attacks, protrudes from the wall.

The corridor now harbors a short, sharp shock...

84 Right-click and press the **Finished** button.

This ends symbol placement.

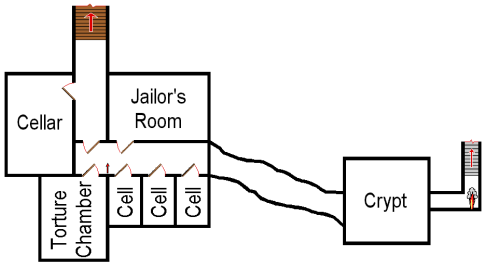
Room Contents

Now we can add more symbols to our dungeon to show the contents of each room. This can be done by following the general processes we have already covered, but here's a reminder of the things we can do:

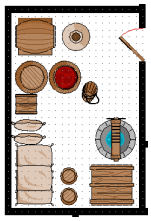
To...	Do...
Select a new symbol catalog, and automatically change the current layer to suit.	Click one of the symbol s on the DD2 bar:
Select a new symbol catalog without changing the current layer.	Click **Catalog** button, and locate the desired symbol catalog.
Change the currently selected symbol.	Click on another symbol in the Catalog Window.
Change the currently selected symbol to one already within the drawing.	Press the **Drawing** button, and select the desired symbol.
Rotate to N, S, E, or W.	Press the ®, -, ¯, or ° keys.
Dynamically rotate a symbol by eye.	Hold down ² and ³, and move the mouse.
Dynamically scale by eye.	Hold down ², and move the mouse.
Rotate or resize precisely.	Right-click to display the Symbol Parameters dialog box, then type the new settings desired.
Reset symbol scale and rotation to normal.	Right-click to display the Symbol Parameters dialog box, then press the **Set Normal** button.
Continue placing symbols from the Symbol Parameters dialog box.	Press the **More** button.
Stop placing symbols.	Click a button or menu entry, press the » key, or right-click and press the **Finished** button.

Non-wall symbols

To decide which symbols to place in which rooms, the specific purpose of each room needs to be determined. Here are the purposes to which I've put them:



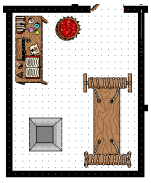
To use our version, do **File menu >> Open**, then select **DD2 Tutorial 16.FCW** from CC2 Pro's **Tutorials\Dungeons** folder.



85 Cellar contents.

The crates, sacks, urns, barrels, and buckets are in the **Containers and Treasure** catalog.

The well is in **Elemental and Magic** catalog.



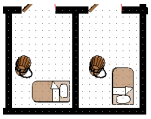
86 Torture Chamber Contents.

The lab table is in **Furniture**.

The brazier is in **Elemental and Magic**.

The rack is in **Weapons**.

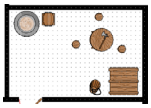
The pit is in **Traps**.



87 Cell contents.

The bed is in **Furniture**.

The bucket is in **Containers and Treasure**.

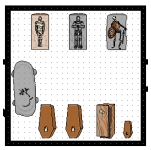


88 Jailor's Room contents

The table and stools are in **Furniture**.

The crate, barrel, bucket, and cauldron are in **Containers and Treasures** .

The axe on the table is in **Weapons** .



89 Crypt contents.

The coffins and altar are in **Temples and Statues** .

To get the half-size coffin, right-click and set X scale to **0.5**.

Text Labels

You can insert text labels into a map to provide information, keys, etc. Different fonts can be used to give a map a particular feel. If you don't have the specific fonts used in this example, don't worry - it doesn't matter. Use any fonts you wish. To give my map an olde worlde feel, I'm going to use an Old English font.

To keep with the default DD2 layers, text should be placed on the TEXT LABELS layer.

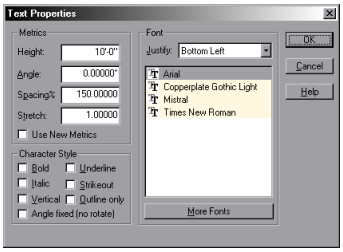
To use our version, do **File menu >> Open**, then select **DD2 Tutorial 17.FCW** from CC2 Pro's **Tutorials\Dungeons** folder.

---

90 Set the current color to black.

91 Click **Text Specs**

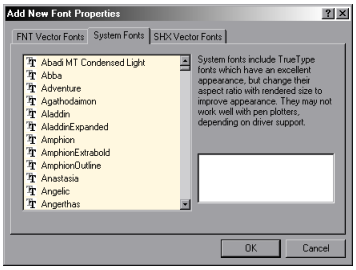
You see the Text Properties dialog box:



92 Change the **Height** to 3'0".

93 Press the **More Fonts** button.

You see the Add New Font Properties dialog box:



Because the font I wish to use is not yet available to the drawing, I need to use this dialog to add it in.

94 Scroll down the list of available fonts, and click the one desired.

95 Click **OK** to add the selected font to the drawing.

You see the Text Properties dialog box again, but this time the font we wish to use is available.

96 Click the desired font.

97 Click **OK**.

You are returned to the drawing. The height that will be used for text has been set to 3'0", and the font to Old English.

98 Click the Layer indicator L: SYMBOL DEFINITIO.

You see the Select Layer dialog box.

99 Find the TEXT LABELS layer, click on its leftmost button to make it the current layer, and click **OK**.

100 Click **Text**

You see the Edit Text dialog box.

101 Type in **`Cellar`**, then press **OK**.

You are returned to the drawing, and the text **`Cellar`** is attached to the cursor.

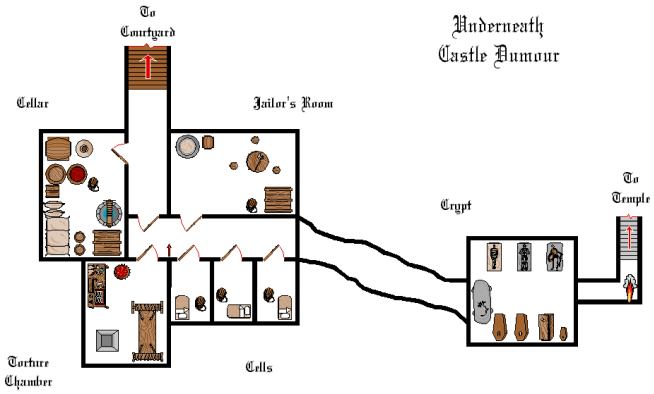
102 Click to place the text near to the cellar.

103 Right-click to repeat the last command, and add text labels for the remaining rooms.

Because the stairs lead *somewhere*, we can add labels to indicate precisely where. Add a text label reading **`To Temple`** above the stairs to the crypt, and one reading **`To Courtyard`** above the one leading to the cellar and jail cells.

104 Click **Text Specs** , and change **Height** to **`4'8"`**.

105 Add **`Underneath Castle Dumour`** as a title to the map.



Arrows

Sometimes, the nature of a map, and the symbols placed within it, prevent text labels being placed so it is absolutely clear what they are indicating. In this case, arrows can be used to make things clearer.

Arrows have other uses too. We have already used three symbols (stairs and a trap) that use arrows to show direction, to name but one further example.

To use our version, do **File menu >> Open**, then select **DD2 Tutorial 12.FCW** from CC2 Pro's **Tutorials\Dungeons** folder.

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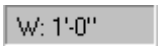
106 Click the Line Width indicator 

and type 0 to set the line width to 0.

107 Right click **Smooth Path** , click Curve with Arrow.

The Command Line reads `1st point:`. CC2 Pro is waiting for you to place the first point of the arrow, which is where the arrowhead will appear.

Notice that there are other arrow options available on the menu: lines, paths, and arcs.

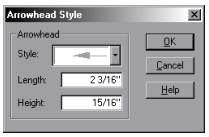
108 Click to place the first point within the cellar, then draw the remainder of the smooth path so that it approaches the **`Cellar`** text label.

You only need to place a few points between the cellar and its label. Right-click to end the command.

At this point, you'll notice that the arrowhead is too small to be seen.

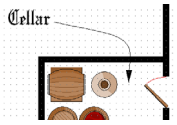
109 Click **Tools menu >> Set Properties >> Arrow Style**.

You see the Arrowhead Style dialog box.



110 In the **Length** box, type **`2'`**.

111 In the **Height** box, type **`1'`**.



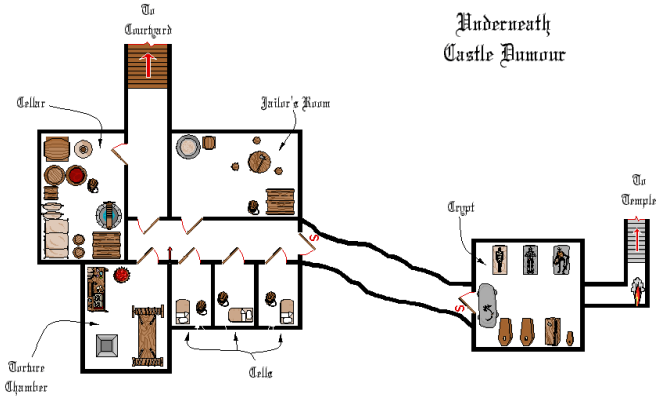
112 Press **OK**.

113 The arrowhead can now be seen.

114 Changing the style options for arrowheads will affect all arrows in the map, except those that form part of symbols etc. The settings will remain for all subsequently drawn arrowheads, until arrowhead style is changed again.

Sometimes, especially in complex maps containing many arrows, it is best to leave editing the arrow style until all arrows have been drawn. This allows you to see how selected arrow styles look across the whole map, to make sure the arrowhead size chosen doesn't cause arrows to obscure important parts of the map, etc.

115 Right-click to repeat the last command, and add the remaining arrows.



Number Labels

Number labels are most often used in conjunction with a written description or key which describes the location.

We will use CC2 Pro's **Number Label** command to add labels to each room in the dungeon. The command is quick to use and, because it automatically increments the number label, it helps prevent duplication.

To use our version, do **File menu >> Open**, then select **DD2 Tutorial 13.FCW** from CC2 Pro's **Tutorials\Dungeons** folder.

---

116 Click **Text Specs** T to set current text height to **3'**.

The **Number Label** command uses the current text specifications. Make any other changes you wish to use (font, etc.), then press **OK**.

117 Set the current color to black.

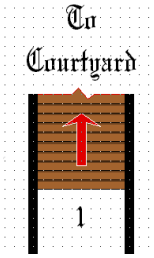
118 Set the current layer to TEXT LABELS.

119 Click **Number Label** 9

The Command Line reads `Number [1]:`

120 Right-click to accept the suggested value (1).

The Command Line reads `Text Position:`



121 Click just below the staircase heading up to the courtyard.

The number 1 is placed. Notice that the text attached to the cursor has now changed to 2.

122 Continue to click to place each desired number label.

123 Press » to finish the command.

Do not finish the command using a right-click, because DD2 will automatically place another text label below the last one you placed.

If you use **Number Label** again in the same mapping session, the suggested start number will be the next one in sequence from the last number label placed.

To use a different start number, type in a value instead of right-clicking to accept the suggested one.

Entering your details into the Drawing Title box

Maps based on DD2's drawing templates have a scale bar and title box in the bottom right hand corner. You can edit the information contained within the box to reflect your map.

To use our version, do **File menu >> Open**, then select **DD2 Tutorial 20.FCW** from CC2 Pro's **Tutorials\Dungeons** folder.

124 Zoom in to the Drawing Title box.

The title box is on the MAP BORDER layer. This is normally frozen to protect it from accidental editing.

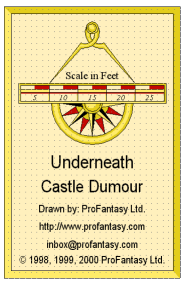
Before we can change the information in the box, we need to thaw the MAP BORDER layer.

125 Click the Layer indicator

.

126 Find the MAP BORDER layer, and click in the rightmost of the three boxes to clear the **F**. Press **OK** to accept the change.

The MAP BORDER layer is now thawed, ready for editing.



127 Click **Edit**

, then select the baseline of the text 250' x 200'.

128 Type **Underneath** over the old text, and press **OK**.

129 Right-click to repeat the **Edit** command, and change the other text lines.

130 Click the Layer indicator

, and freeze the MAP BORDER layer.

SPECIAL EFFECTS

Dungeon maps can be enhanced by adding in various things beyond walls, doors, and other symbols. In this and subsequent chapters, we'll discuss how you might:

- Add solid-filled backgrounds
- Add backgrounds using a fill style
- Create complex walls
- Make custom staircases
- Link maps to other maps
- Move up and down dungeon levels
- Link maps to information
- Customize symbols

When you reach the end of this manual, you still will not have explored every single feature of DD2, for that would require something much larger than the document you are currently holding. However, you should know enough to begin exploring and experimenting on your own. More techniques and commands are discussed in the help system, and there are regular tips and tricks postings at our website, www.profantasy.com.

Loss of detail?

By now, you should be familiar enough with the basic functions of DD2. So, instead of leading you through common processes one click at a time, we shall say things like "bring the WALLS layer to the front", or "change the color of the polygon to black".

Also, we will rarely tell you to zoom in and out. It is assumed that if you need a better view of an object being drawn or an area of the map being worked on, you know that you can change zoom at any time.

If you forget how a command works, or what to do next, remember to look at the Command Line. It will be saying what CC2 Pro needs next.

CC2 Pro's help system contains details for all CC2 Pro and DD2 commands.

But, above all....

Always keep one eye on the Command Line!

Solid Backgrounds

Adding a background to your rooms can take it from looking perfectly good (as it does now), to being absolutely stunning. This only applies if you've been creating a freehand dungeon; if you've used Add Room, Add Corridor or geomorphs, you rooms will already have decent-looking floors.

To use our version, do **File menu >> Open**, then select **DD2 Tutorial 21.FCW** from CC2 Pro's **Tutorials\Dungeons** folder.

Creating floor backgrounds from wall paths

131 Click **Copy** , right click, click **Copy to Layer.**.

132 Select by layer, and choose the WALLS layer.

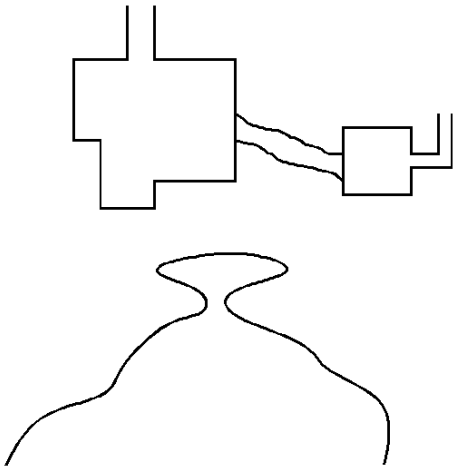
133 Right-click and select **Do It**.

134 Right click to bring up the Layers dialog again. This time, click on BACKGROUND (FLOOR 1) and press OK.

There are now two copies of each wall selection in the drawing, one on the WALLS layer, and one on the BACKGROUND (FLOOR 1) layer.

135 Make BACKGROUND (FLOOR 1) the current layer, and hide all other layers. Press **OK** to return to the drawing.

136 Delete all of the internal walls, leaving only those that extend around the perimeter of the cavern and dungeon sections.



137 Zoom in to the tunnel section and the walls to which it connects.

138 Click **Break** .

139 Select the left-hand dungeon path at a point away from the tunnel.

The **Break** command recognizes the point clicked to be on the section that must be kept. Thus, if we selected the dungeon path at a point between the two tunnel walls, we would be left with just that section after performing the **Break** command, which is not what we need!

140 Click **Intersection**

141 Click point where one of the tunnel walls meets the selected dungeon wall.

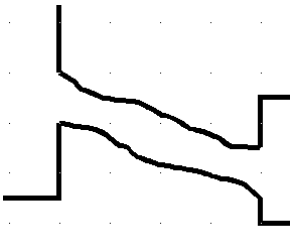
We could use the **Endpoint** modifier , and select the tunnel path to gain our first break point. However, because the tunnel path is irregular, and the **Endpoint** modifier applies to the nearest point on a path (not the end of the path itself), there is a danger of selecting the wrong point to start our break. If both the tunnel and the wall were regular, then the **Endpoint** modifier would be a better choice.

142 Repeat steps 8 to 11 for the other tunnel wall.

The regular dungeon wall will break across the section where it intersects with the tunnel.

143 Repeat the process to break the right-hand dungeon wall across the tunnel.

You should end up with something like this:



144 Click **Edit menu >> Transform >> Combine Paths**.

145 Click one of the wall paths, and another that intersects it.

146 Press the F and/or S keys until the join between the two selected paths is free from strange connecting lines.

Using Combine Paths

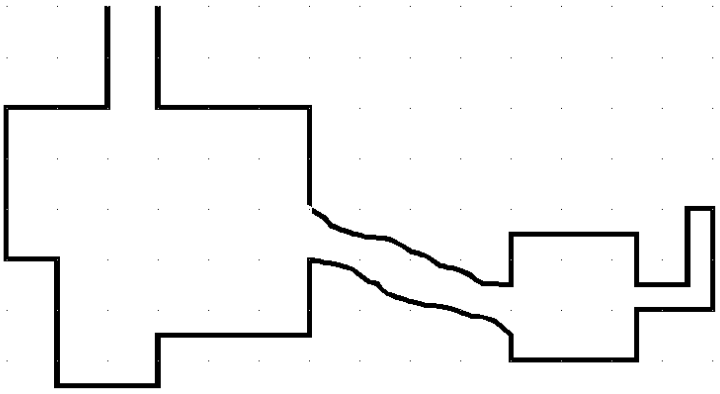
The **Combine** command is a very useful tool. It is used to join two paths together, resulting in a single path. If the paths to be combined do not meet exactly, CC2 Pro adds in a connection. This is where the strange connecting lines that may appear are coming from. Even when two paths do meet, CC2 Pro may attempt to connect the ends of the selected paths. To solve this problem, the **Combine** command allows the user to "flip" the ends of the paths involved, forcing CC2 Pro to re-calculate the connection. Pressing the F key will flip the first path's ends, and pressing the S key will flip the second path. It is often easier to press the F and S keys in succession until the right connection is achieved, rather than to calculate which specific path needs to be flipped.

147 Click to complete the command.

148 Repeat the **Combine** command until all paths in the dungeon section have been connected.

Where there are gaps in the paths (e.g., in the northernmost portion of the left-hand section), the **Combine** command will automatically create a connection across the gap.

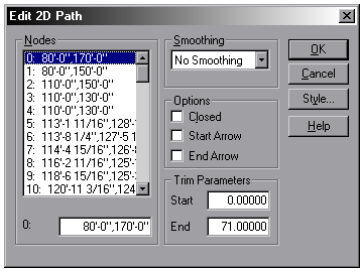
You should end up with something like this:



149 Click **Edit**

150 Select the dungeon section.

The Edit 2D Path dialog will appear:

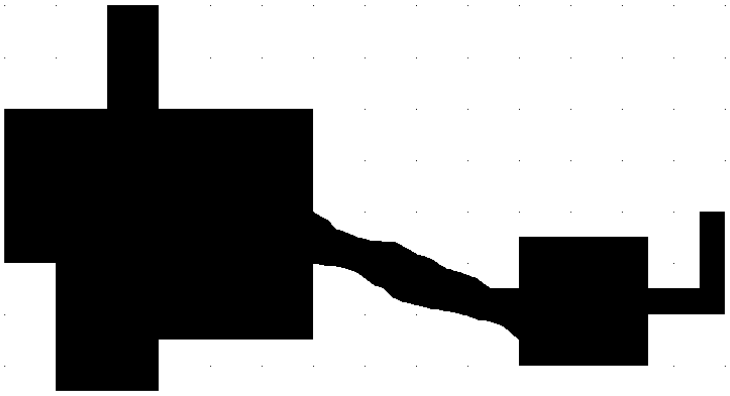


151 Check the **Closed** box, then press **OK**.

This will convert our path entity into a closed polygon.

152 Click **Change Line Width** , and change the line width of the polygon to **0**.

The line width of the floor polygon will be set to zero, giving a solid filled entity like this:



153 Click **Change Color** , and change the color of the polygon to a light gray (color 252).

Floors from combined entities

The above process works if only paths are used, since the **Combine** command cannot join together entities that are not paths. To create floors from a combination of entities requires use of the **Multipolygon** command.

To use our version, do **File menu >> Open**, then select **DD2 Tutorial 22.FCW** from CC2 Pro's **Tutorials\Dungeons** folder.

---

154 Use the following drawing settings:

✓ Current layer BACKGROUND (FLOOR 1)

- ✓ Fill style Solid
- ✓ Line width 0'0"
- ✓ All layers hidden except the current one.

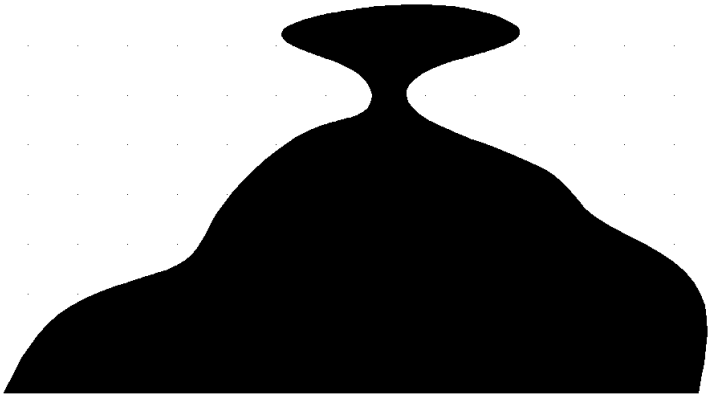
155 Click **Line** , and use the **Endpoint** to draw a line from one end of the cavern wall spline to the other.

156 Click **Multipoly**

157 Select the cavern's smooth path, and the line just drawn.

158 Right-click and select **Do It**.

You should end up with something like this:



159 Change the color of the multipolygon to light gray (color 252).

> If you have used any obscuring mask doors and windows in the map, they will show up against the new floor color. Use the **Change Color** to change these symbols to suit the color of the floor.

Map backgrounds using simple rectangles

Now we can add a colored background to the entire map.

Most DD2 templates have a colored background already – to change the background color, just right click **Change Color** , click **Change Background Color**.

160 Change to these drawing settings:

- ✓ Current layer BACKGROUND (MAP)
- ✓ Fill style Solid
- ✓ Line width 0'0"
- ✓ Color Mid-brown (color 42)
- ✓ Show all layers

161 Click **Box** , and draw a box that fills the map border.

162 Select **Dungeon menu >> Order Dungeon Layers**.

The whole map now has a brown colored background.

Symbol Filled Backgrounds

Symbol filled backgrounds can be used on there own (instead of the solid filled backgrounds discussed above), or in concert with solid backgrounds to give a distinctive effect.

Creating symbol filled backgrounds to be used on their own uses a similar process to that described for solid filled backgrounds, except that the desired symbol fill is used in place of solid.

To use our version, do **File menu >> Open**, then select **DD2 Tutorial 23.FCW** from CC2 Pro's **Tutorials\Dungeons** folder.

Symbol filled floors

163 Show all layers.

164 Select **Copy menu >> Copy To Layer**, and copy all of the entities from BACKGROUND (FLOOR 1) to BACKGROUND (FLOOR 2).

165 Change the fill style of the entities on the BACKGROUND (FLOOR 2) layer to **Paving 31**.

166 Change the color of the BACKGROUND (FLOOR 2) entities to a darker gray than that used for the solid fill floors (e.g., color 247).

167 Select **Dungeon menu >> Order Dungeon Layers**.

Symbol filled map backgrounds

168 Click **Copy** right click and select the BACKGROUND (MAP) layer, **Do it**, type in 0,0 at the Copy from prompt and 0,0 at the Copy to: prompt.

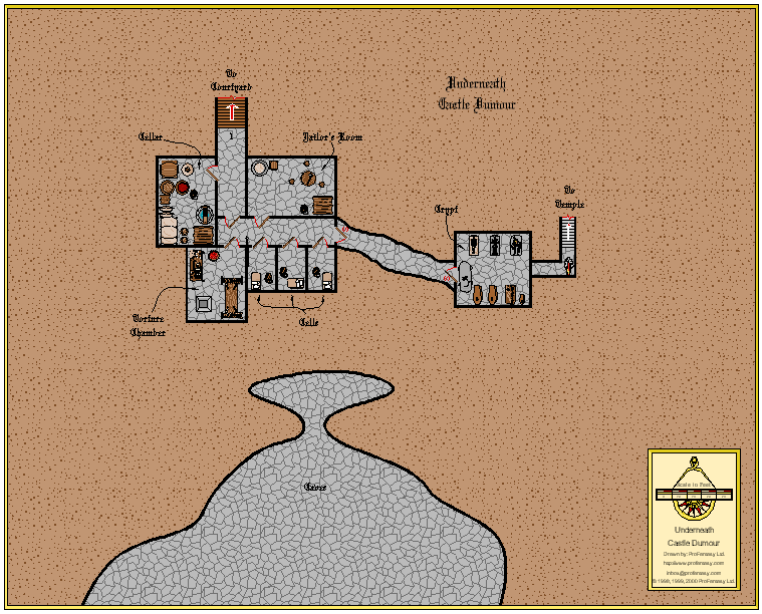
This copies the BACKGROUND (MAP) rectangle below of itself.

169 Selecting the BACKGROUND (MAP) copy by **Prior**, change its fill style to **Dust Brown Symbol**.

170 Click **Front** , select by **Prior**, bring the symbol filled polygon to the front.

171 Select **Dungeon menu >> Order Dungeon Layers**.

Underneath Castle Dumour should now look something like:



To see the completed example, open **DD2 Tutorial 24.FCW** from CC2 Pro's **Tutorials\Dungeons** folder.

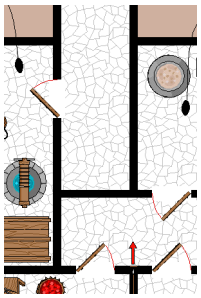
These methods can be used to create all manner of effects, from adding grids (copy the floor backgrounds to the HEX/SQUARE GRID LAYER, and use a grid fill style), to creating parti-shaded floors (e.g., a stone room that gives way to a sandy beach). The processes are the same, with just a little added imagination.

Wall Breaks

Wall breaks let you break a hole of a specified size in a dungeon wall. There are two kinds, **Wall Break, End** where you select one end of the break then an endpoint, and **Wall Break Center**, where you select the center. This example shows a center justified wall break.

172 Open the drawing DD2 Tutorial 25.FCW from CC2 Pro's **Tutorials\Dungeons** folder.

173 Click the Layer indicator and freeze all the BACKGROUND layers.



174 Erase the door into the Jail area.

175 Click **Redraw** .

176 Click **Door Break** .

The Command Line reads `Select entity:`.

177 Click wall at the center of the new door.

A 5' wide hole is made in the wall, centered on the point you clicked.

178 Click Catalog and open the **Wall Features.FSC** catalog.

The new symbol catalog is loaded in the Catalog Window. These are straightforward symbols, with no background mask and no breaking capability.

179 Click a door symbol and place it in the wall break.

Change the grid settings or use the **Endpoint** modifier to help you locate the door accurately.

Creating Unusual Doors

The **Wall Features** catalog contains various symbols that combine with doors to say more about their type or nature.

1 Start a new DD2 drawing.

2 Using the grid, draw a horizontal wall of any thickness.

3 Click **Wall Features** and click the second wall features catalog.

4 Set the color to white (for the background masks).

If you have created a colored floor background, you'll need to pick the color used for the floor instead of white.

5 Select any door and place it on the wall.

6 **Zoom Window** on the area around the door.

7 Scroll down the Catalog Window, past the doors.

You see some red arrows, a skull and two keys. Applied to doors, these have the following meanings:

One Way (direction shown) | *Horizontal Sliding (direction shown)* | *Vertical Sliding* | *Locked* | *Magically Locked* | *Trapped*

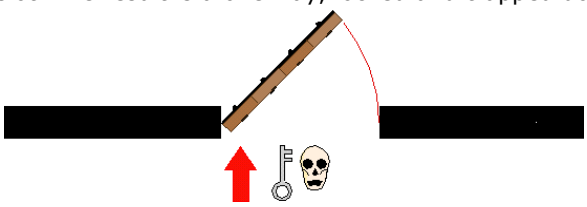
8 Select the **Locked** (key) symbol.

9 Place the key on the same grid point that you used for the door.

A small key is inserted in front of the door. It is offset from the insertion point, so it is positioned correctly in relation to the door.

10 Do the same with the skull and red arrow.

Each symbol takes up its own slot. The result is a one way, locked and trapped door.



Adding Peep Holes and Arrow Slits

So, you've got those pesky, meddling PC's trapped in the room with no exit. Now all you've got to do is teach them a lesson…

11 Start a new DD2 drawing.

12 Click **Wall Width** to set the line width to **1'0"**.

13 Using the grid, draw a horizontal wall.

14 Click **Wall Features** .

15 Set the current color to white.

If you have created a colored floor background, you might wish to select the color used for the floor instead.

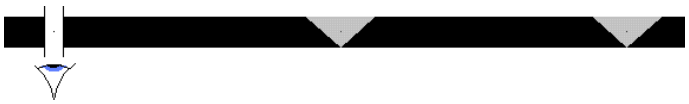
16 Scroll down the Catalog Window and click **Peep Eye** symbol.

17 Place the **Peep Eye** in the wall.

18 Scroll down the Catalog Window and click gray **Arrow G 1'** symbol.

DD2's arrow slits expand to fit the width of the wall that they are in. This is yet another of those smart symbol functions.

19 Place the arrow slit on the wall.



Rooms at an Angle

Everything we have drawn so far has been nicely aligned to a grid. This has made it easy to draw square corners and parallel walls.

Drawing at rooms an angle is slightly harder because we can not make so much use of the grid. A way of avoiding this difficulty is to draw the room square to the grid, then rotate it into position as the last action. If the crypt on our dungeon should have been at an angle, this is what to do:

20 Open DD2 Tutorial 25.FCW

21 Click **Rotate** .

The Command Line reads `Select entities (0 picked):.`

22 Click two points to form a window around the crypt and passage, then **Do It**.

The Command Line reads `Rotate by Angle:.`

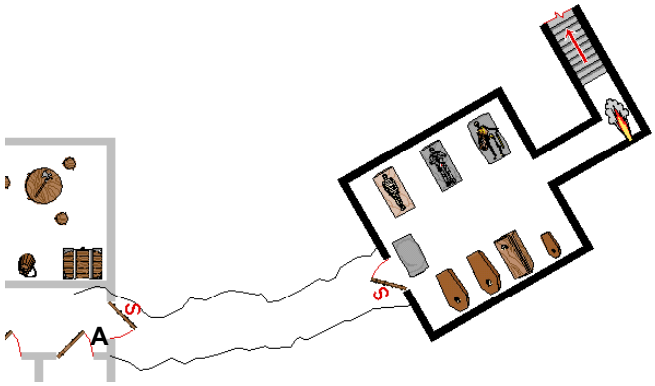
23 Type in **30** then press ¶ .

The Command Line reads `Rotate center:.`

24 Click point **A** at the left end of the bottom passage wall.

Changing the grid setting back to **10' Grid, 2 Snap** makes this easy.

The crypt and passage rotate by 30° anti-clockwise. The point you selected as the "rotate center" does not move.



25 **Trim** the top passage wall where it joins the jail.

Symbols aligned to another entity

Your Wall Features symbols align to walls automatically; when you want another kind of symbol to line up exactly with another object in the drawing, use Lock Symbol Angle.

To use our version, do File menu >> Open >> Angle 2.FCW

---

26 Click **Lock Symbol Angle**.

The Command Line reads `Select straight edge:`.

27 Click left end of the fire blast wall.

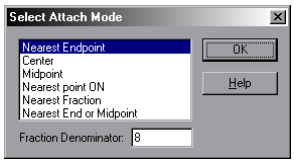
DD2 sets the angle for new symbols equal to the angle of the wall, measured from the end you selected. Selecting the other end of the wall would reverse the symbol angle.

28 Pick the **Sconce** symbol from the end of the **Wall Features** catalog.

You see the **Sconce** symbol attached to the cursor, rotated to the same angle as the wall.

29 Right-click **Attach** button (at the bottom of the screen).

You see the Select Attach Mode dialog box:



30 Click Nearest point ON then **OK**.

31 Click **Attach** button to enable attach mode.

When enabled, buttons appear depressed.

32 Place sconces along the wall.

All you have to do is click close to the point you want the sconce on the wall. The Nearest point ON attach mode then locates the sconce precisely.

Smart symbols align automatically to walls, but other symbols such as furniture don't. Loc**k symbol angle** is useful in this case; it lets you align a chest of draws to a wall, for example.

Text at an Angle

When you want to align text to a straight line, use **Lock Text Angle** to set the angle precisely.

To use our version, do File menu >> Open >> Angle 3.FCW

---

33 Click Edit menu >> Edit Text>> Lock Text Angle.

The Command Line reads `Select straight edge:`.

34 Click left end of the fire blast wall.

The command ends. The new text angle is set.

35 Click **Text** to enter some text.

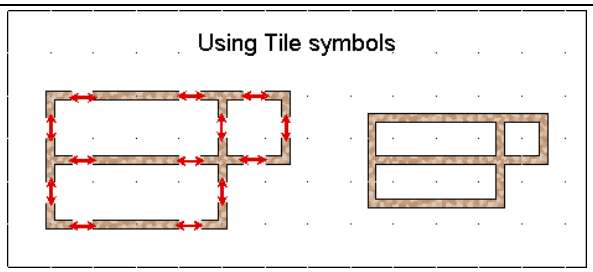
As you place the text, you see it is aligned to the wall.

Like **Lock Symbol Angle**, the angle is measured from the end you select. If you select the other end of the line, the text angle is reversed.

The Tiles catalog

The **Tiles** catalog is used to create boundaries of various kinds including walls, fences and hedges. It is used in a very similar way to the Dungeon Geomorphs.

Tiles can be used to make houses and external floorplans as well as interior dungeon walls. Extra catalogs are released at our web site www.profantasy.com



36 Start a new DD2 drawing.

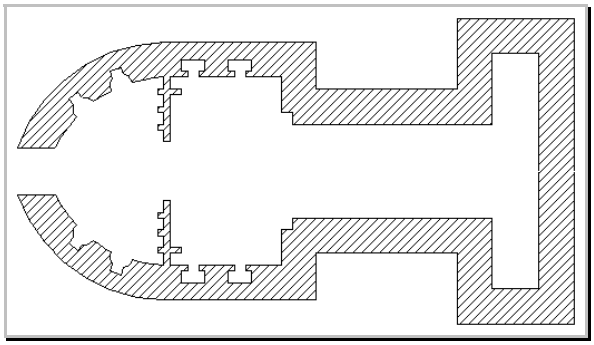
37 Click **Catalog** button and load the Tiles.FSC catalog from CC2 Pro's Symbols\Dungeons\Filled folder.

38 Right-click **Grid** button then select the **Dungeon Geomorph** grid setting.

39 Select tiles from the Catalog Window and place them on your map.
Use the arrow keys to rotate each tile into position.

Complex walls

(with lots of practical use of CC2 Pro's editing tools)



Real walls can have varied thickness and can contain passageways, or even rooms. In this example, we will use a wide selection of CC2 Pro's drawing tools to create an unusual and detailed outline for a cathedral wall. Once the wall outline is ready, we will multipoly it to create a single, filled wall.

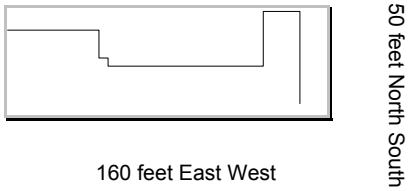
> When creating multipolys, accuracy is essential. If there are gaps or overlaps in the outline then the fill style will escape from the multipoly and bleed over the screen.
> Whenever you are trimming or breaking for a multipoly, ensure accuracy by working to the grid or using a modifier (see the Modifiers menu).

40 Start a new DD2 drawing called **`Cathedral.FCW`**

41 Make sure the following settings are current:

- ✓ Fill style (FS) Hollow
- ✓ Line width (W) 0'-0"
- ✓ Layer WALLS
- ✓ Color Dark Gray
- ✓ Grid 10' Grid, 2 Snap

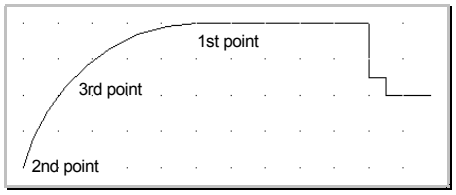
42 Use **Path** to draw the internal walls for the top half of the three rectangular chambers.



We will add the fine detail later. For now, just get the basic shape right. In my example, the east-west range for these walls is 160'. The north-south range is 50' (that's for the top half).

43 Click **Arc** then draw a curved section at the left end of the wall.

Arc uses the start point, end point and a third point to create the arc. In this case, place the start point where the straight wall ends; the end point on the building's centerline; the third point so it gives a smooth curve to continue the wall.



44 Click Draw menu >> Offsets >> Offset Chain.

The Command Line reads `Distance:`.

45 Enter a value of **15'**.

The Command Line reads `Chain entity:`.

46 Pick either the arc or the straight wall.

CC2 Pro selects both the arc and path. It has selected the whole chain. The Command Line reads `Pick a side:`.

47 Click outside of the existing wall.

CC2 Pro creates a copy of the wall, offset by 15 feet.

48 Use **Node Edit** to move the "notch" in the external wall into the normal corner position (in effect removing the notch).

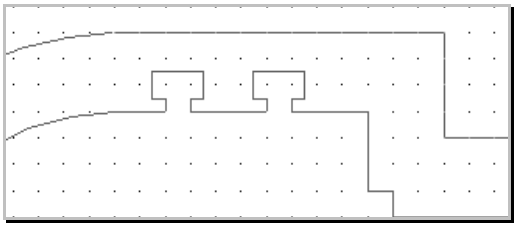
If the walls are black, instead of gray, you might find that they do not display on the white background while you are moving the node.

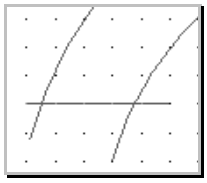
49 Use **Path** to draw an alcove in the wall (as below).

Changing the grid setting to **5' Grid, 2 Snap** will make this easy.

50 **Copy** the alcove to make a second one next to the first.

51 **Break** holes in the main wall at the entrance of each alcove.





52 Use **Line** to draw a horizontal wall across the end of the curves, 20' above the centerline.

53 **Trim to Intersect** on the curves and new wall to clean up the wall end.

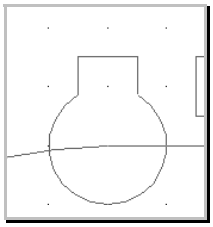
54 Draw a **Circle** next to the existing alcove. Place the circle's center at the point where the arc and straight wall meet.

55 Use **Path** to add three sides of a small square at the top of the circle.

56 Use **Trim to Entity** to trim the path ends to the circle.

57 Make a **Break** in the circle to join it with the square walls.

Use the **Endpoint** modifier ⌑ to select the break's start and end accurately.



58 Right-click **Copy** then Rotated Copies.
The Command Line reads `Select entities (0 picked):`.

59 Select both the circle and path, then Do It.
The Command Line reads `Rotate by Angle:`.

60 Type in **20** then press ¶ .
The Command Line reads `Rotate center:`. We want to put these alcoves along the arced wall, so the center of the arced wall must be the center of rotation.

61 Click **Center** then click arc.
A copy of the circular alcove is created 20 degrees around from the original version.

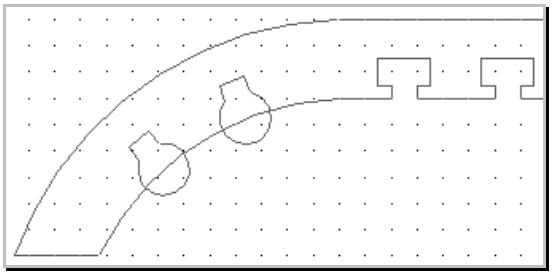
62 Right-click to repeat Rotated Copies command.
The Command Line reads `Select entities (0 picked):`.

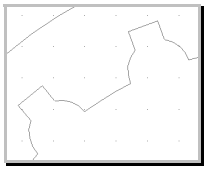
63 Select by Prior, then Do It.
The Command Line reads `Rotate by Angle [20.00000]:`. The default value is the last rotation angle you used.

64 Right-click to accept the last value.
The Command Line reads `Rotate center []:`. The default value is the last center point you used.

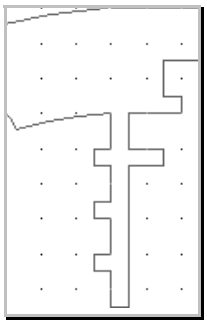
65 Right-click to accept the last value.
A second copy of the alcove is added to the map, 20 degrees further around.

66 Click **Erase** and remove the first circular alcove.
The first alcove was easy to draw because it was square to the grid. Now that you have created the rotated copies, its purpose has been served . It's a tough life being an alcove.





67 Click **Break** and break holes in the main arc to take the circular alcoves. Use the **Intersection** modifier ¥ to select the break points accurately.



68 Click **Break** and remove the alcove arcs where they protrude into the room.

69 Click **Path** and draw the outline of a thinner, buttressed internal wall.
Start the wall at the point where the arced and straight wall meet. Work around anti-clockwise, so the endpoint is also on the straight wall.

70 Click **Trim** and shorten the straight wall.

71 Right-click **Copy** then click Mirrored Copies.
The Command Line reads `Select entities (0 picked):`.

72 Click a window around the walls, then Do it.

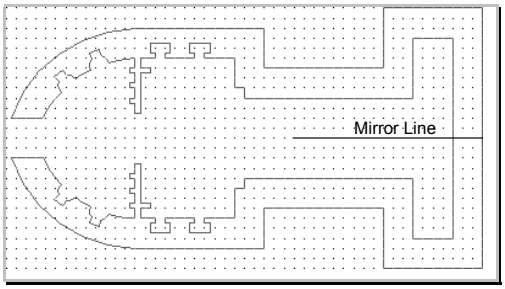
The Command Line reads `Mirror line start:`.

73 Click at the bottom end of the rightmost wall.

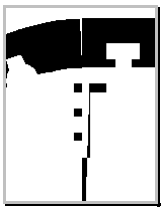
The Command Line reads `Mirror line end:` and you see a rubber band line showing where the mirror line will be.

74 Click so the mirror line is horizontal.

It doesn't matter how long the mirror line is; provided it is at the correct angle and distance from the original version, the copy will be positioned correctly.



75 Set the fill-style to **Solid** and the color to **black**.

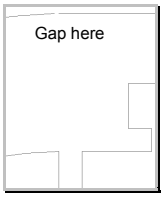


76 Click **Multipoly**, then combine all the walls into one polygon.

The walls fill in black, but there is an error. If you zoom in where the straight and curved wall sections meet, the fill style is escaping. **This is a sure indication that there is an inaccurate join.**

77 Click **Undo**.

The walls return to how they were.



78 Zoom very close on where the straight and curved wall sections meet.

Sure enough, there is a small gap. This is the result of tiny precision errors which creep in.

79 Click **Trim** and trim the arc to the endpoint of the straight section.

You see the gap close.

If you trim the line to the arc, you will find that the line is no longer horizontal – it is the arc's endpoint that is slightly out of place.

Anything which involves calculating the intersection point of the line and arc may have the same precision error. Using the endpoint or grid point doesn't require a calculation, and therefore has no precision error.

80 Repeat the **Trim** on the mirrored version.

81 Click **Multipoly** to combine the walls again.

This time the walls should multipoly neatly into solid black walls.

82 Click **Change Fill Style** on the walls and select **Wide right hatch** from the **Brush Patterns** tab.

This hatch pattern is useful because it doesn't use too much ink when printed, and is easy on the eye. The authentic look is a solid fill style, but choose any fill style or bitmap texture that you like.

If you want a line-only version of the walls again, perhaps to use as the outline to a fill-style, copy the multipoly to the side of the map then explode it. The multipoly will revert to lines, each with their original color and fill-style.

Ironically, although drawing complex walls like this is a more involved process than drawing standard walls, creating background floors for complex walls is simplicity itself. All that needs to be done is to copy the wall to the desired BACKGROUND layer, explode this copy, delete the outer section, and multipoly what remains.

Custom stairs

Multipoly is not only useful for background floors and complex walls. Its ability to combine entities of different types also extends beyond simply combining different types of entities to form a single block.

Here, we will create a custom staircase, one which leads around the edge of a circular tower. We will draw it so that its visual style matches the stairs found in DD2's Up and Down symbol catalog.

---

83 Start a new drawing.

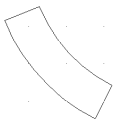
84 Click **Circle**, and draw a black, hollow circle on the UP AND DOWN layer.

This circle represents the outer edge of a tower. Had we drawn the tower, you could use **Copy menu >> Copy to Layer** to create a copy of the tower's outer wall edge on the UP AND DOWN layer.

85 Right-click **Line**, click Perpendicular at Length to draw three lines, each 5' long, perpendicular to the circle. Place the outermost lines approximately 15' away from each other around the circle's circumference, with the third line somewhere between them.

86 Click **Break** to break the circle so that an arc between the two perpendicular lines is all that remains.

87 Click **Arc**, then add an arc from the end of one of the outer lines to the end of the other outer line, placing the third point at the end of the middle line.



88 Click **Erase** and delete the middle line.

This forms the outline of our staircase.

89 Click **Copy**, and the outline off to one side.

Concentrate - here comes the science part!

90 Right-click **Copy**, click Rotated Copies, and select the topmost line comprising the outline copy.

The Command Line reads `Rotate By Angle [90]:`

The angle we need to copy by is equal to 360° multiplied by the fraction of the tower's circumference 1' represents, since we are copying the line to create 1' steps.

Don't panic - the process is worked out for you below. Skip to the last part, where the bit you actually need resides, if you don't care for mathematics. If you do, the following shows where the number crunching comes from.

Math people start here: We need to calculate the ratio between 1' and the entire circumference of the tower's outer wall (against which our staircase is to rest). We know that:

$$Circumference = Diameter \times \pi$$

We also know that:

$$\pi \approx \frac{22}{7}$$

And:

$$Diameter = 2 \times Radius$$

And the final value we require is:

$$\alpha = 360 \times \frac{Arc}{Circumference}$$

Where *Arc* is the required arc distance, in this case 1'.

A simple piece of formula substitution, and we get:

$$\alpha = 360 \times \frac{Arc \times 7}{44 \times Radius}$$

Non-math people start here: Because CC2 Pro can perform calculations for us, all we need to do is enter the numbers, and let CC2 Pro do the actual work.

91 Type **`360*1*7/(44*radius)`**, substituting *radius* for the actual radius of the tower's outer wall.

You can quickly find out the radius required by using **Info menu >> List**, or the **Edit** EDIT, on the staircase's short arc. The 1 used in the formula, representing the arc length desired, is, of course, superfluous. But I've left it in so you can see where to put an arc length value in the formula should you wish to use it for another purpose.

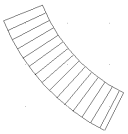
The Command Line now reads `Rotate center [0,0]:`

92 Use the **Center** modifier to select the center of either arc used in the staircase.

93 Right-click to repeat the last command, select by **Prior**, and press ¶ twice.

This will add another 1' step line to our staircase.

Pressing ¶ twice will keep the default values for rotation angle and center, which we have already set in the above steps.



94 Repeat step 11 until the next line to be drawn would be outside the staircase's outline.

These lines will form the basis for our steps.

95 Click **Copy**, and make a copy of the steps off to one side of the template.

96 Right-click **Line**, click Perpendicular at Length to draw a 5' long line, perpendicular to the staircase's outer (long) edge, with an endpoint 9" along the inner (short) arc.

We could alternatively use **Copy menu >> Rotated Copies**, and use the formula discussed in steps 8 and 9 on an arc length of 9".

97 Right-click **Copy**, click Rotated Copies, selecting the line just drawn, and pressing ¶ to keep the default angle.

Because we have already performed a **Rotated Copies** command, CC2 Pro now shows the angle calculated in 9 as its default. Pressing ¶ will accept this.

If you chose to use **Rotated Copies** in step 14, you will need to enter the angle again.

98 Right-click to repeat the command, select by **Prior**, and press ¶ twice. Repeat until every step line has a paired line 3" away.

99 Click **Break** to break up the arcs between each pair of lines.

100 Use **Multipoly** to multipoly all of the step shading arcs and lines together.

With all our mutterings on accuracy when it comes to multipolygons, you might think that using **Multipoly** on a scattered group of entities, such as our steps here, would be asking for problems.

Not so! As long as a multipolygon is comprised of wholly enclosed entities, it matters not that the entities are separated. Problems with multipolygons creep in when some leak into the "outside world" exists.

Of course, using **Multipoly** in this way is increasing the scope for possible problems. However, if you take care of your accuracy, the multipolygons will take care of themselves.

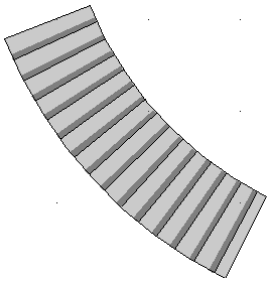
101 Click **Multipoly** to multipoly the copy of the step outline we made in step 7.

102 Change the color of the outline multipoly to light gray (color 253). Change the color of the steps multipoly to dark gray (color 248).

103 Use fronting to bring the steps multipoly in front of the outline multipoly, and the copy made in step 13 in front of all.

104 Move the steps multipoly and the step 13 copy on top of the outline multipoly. This can be accomplished using the **Drag**, and by using the **Center** modifier to set From and To points at the center of the various arcs.

One custom-built tower staircase:



Of course, you can add arrows to the staircase to show direction, or duplicate any of the other effects displayed by DD2's stairs symbols.

The principles used above can be applied to many other situations. Tables that sit neatly into arced corners; raised stages and daises; grand staircases.... The possibilities go on and on.

Multi-leveled dungeons and buildings

In theory we could use different layers for each level, and hide or show layers depending on which dungeon level we want to see. This sounds like a good idea but, in practice, leads to unwieldy maps that are of little use to anyone.

The best, easiest and safest way of separating levels is into different map files. These can easily be linked together, and each will be of manageable size.

We will save our existing Castle Dumour masterpiece as a new map, then erase everything that isn't needed above ground. To select the unwanted bits we will use CC2 Pro's ability to combine selection criteria. We will work with keystrokes instead of mouse-clicks.

To use our version, do File menu >> Open >> Tutorials\Dungeons\DD2 Tutorial 26.FCW

---

105 Use Save As to save the map as **`Above Dumour.FCW`**

This will be the basis of the above ground map. We will erase everything except the stairs, grid and external walls. These features may have an effect on what goes on above them.

106 Click **Erase** .

The Command Line reads `Select entities (0 picked):`.

107 Press A (instead of selecting All from the submenu).

The whole map goes gray. Everything that is not on a frozen or hidden layer is selected. The Command Line still reads `Select entities:`.

108 Press N (instead of selecting Not from the submenu).

Now anything we pick will be removed from the selection.

109 Press L (instead of selecting Layer from the submenu).

The Command Line reads `Layer name [dialog]:`.

110 Press ¶ to accept the suggested option (dialog box).

You see the Select Layer dialog box.

111 Click WALLS then **OK**.

Anything on the WALLS layer is deselected. The Command Line still reads `Select entities:`.

112 Press L (instead of selecting Layer from the submenu).

113 Press ¶ to accept the suggested option (dialog box).

You see the Select Layer dialog box.

114 Click UP/DOWN then **OK**.

Anything on the UP/DOWN layer is deselected (the Not from step 4 is persistent. It will continue until we end the command or change it to And or Or).

115 Press D (instead of selecting Do It from the submenu).

116 Click **Redraw** .

117 Erase the internal walls and cave.

Only the grid overlay, stairs and external walls remain. You would use these to locate features above ground.

Summary of selection keystrokes

Written out step by step, this selection looks more long-winded than it actually is. Think of it as initial letters with an ¶ for each dialog.

Select	All	Not	Layer	WALLS	Not	Layer	UP/DOWN
Keystroke	A	N	L	¶	N	L	¶

(The second N is not strictly necessary because And, Or and Not are persistent, but it is included here for illustrative purpose.)

Summary of And, Or and Not Logic

Since we are on the subject, let's have a revision of And, Or and Not:

Combining selections using:	**Has the following logical effect:**
Or (the default)	Entities that meet any of the criteria are selected. For example, select "Color Red OR Type Text" selects entities that are "red or text".
And (Both)	Entities that meet all the criteria are selected. For example, selecting "Color Red AND Type Text" selects entities that are "red and text".
Not	Entities that meet the criteria are deselected. For example, select "Color Red NOT Type Text" selects entities that are "red but not text".

LINKING MAPS AND INFORMATION

Linking dungeon levels and maps

Adding clickable links to your maps takes them from being standalone guides to an interwoven Campaign Atlas. At the site of each link we will add buttons to remind us of the locations where we can click.

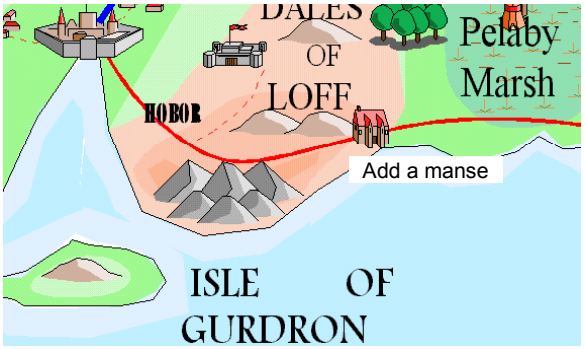
There is no limit to the number of links a map can have.

---

118 In CC2 Pro, Open Jaw Peninsular from CC2 Pro's Examples\Maps folder.
If you haven't got this map, use any other campaign scale map.

119 Zoom in on the lower left corner of the map.
You can see some hills labeled "Dales of Loff".

120 Click **Symbol Catalog Settings**, CC2 Filled Structures. Add a Manse symbol next to the hills.



121 Click **Link with Map**.
You see the Select File dialog box.

122 Click Elementalist Outdoors from the Examples\Dungeons folder then click **OK**.
The Command Line reads `Hotspot window:`.

123 Click two corners of a box tightly around the manse.
You see a line of very large text appear. This text is CC2 Pro's internal commands for the link. If you understand CC2 Pro's script language, you can use the **Edit** to change it.

124 Click View menu >> Hide Hyperlinks.
The link text is no longer visible.

125 Click **Zoom Extents** then save the map.

126 Open Elementalist Outdoors from the Examples\Dungeons folder.

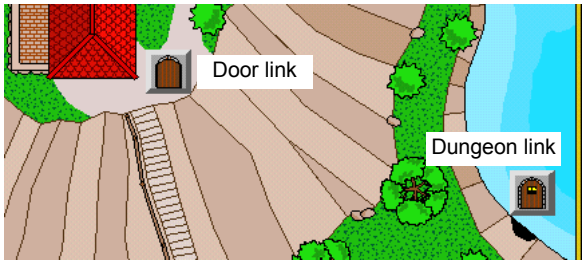
127 Click the layer indicator and set the current layer to LINKS.

128 Click the **Catalog...** button and load Links.FSC from CC2 Pro's Symbols\Other folder.

129 Place the Door link symbol next to the main entrance.

> The link symbol reminds us that a link exists and shows us where to click. It has no actual affect on the way the link operates and is entirely optional. You can hide the link buttons by hiding the LINK layer.
> Alternatively you can represent links with hollow boxes of an unusual color or text underling.
> If you always link doors, stairs and other such areas, you will not need to label the links.

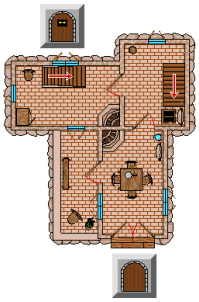
130 Place the Dungeon link symbol next to the cave entrance.



131 Link the door symbol with Elementalist Floorplans in the Examples\Dungeons folder.

132 Link the dungeon symbol with Elementalist Caves in the Examples\Dungeons folder.

133 Select Info menu >> Hide Hotspots.



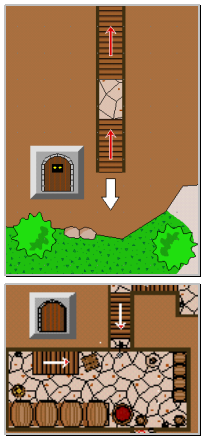
134 Open Elementalist Floorplans, saving the changes to the current drawing.

135 Add link symbols next to the entrance and downwards stairs of the ground floor.

136 Link the stairs to Elementalist Underground.

137 Link the door to Elementalist Outside.

138 Select View menu >> Hide Hyperlinks.



139 Open Elementalist Underground, saving the changes to the current drawing.

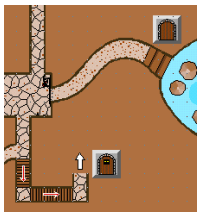
140 Add a Dungeon link symbol at the end of the South passageway.

141 Link the dungeon symbol to Elementalist Caves.

142 Add a Door link symbol next to the stairs in the store room.

143 Link the symbol to Elementalist Floorplans.

144 Open Elementalist Caves, saving changes to the current drawing



145 Add link symbols at the end of the South passageway and at the sea cave.

146 Link the passageway to Elementalist Underground.

147 Link the sea cave to Elementalist Outside.

148 Click View menu >> Hide Hyperlinks.

149 Save the changes.

To use a link, just move the mouse pointer over the link then click.

Linking with files and information

You can link locations on your maps to files or documents from any other Windows® programs on your system. Provided the other program has registered the file types it uses, CC2 Pro knows what to do with them.

In this example, we will add two links to the Elementalist Caves map. The first will link a pile of treasure to a text file of the treasure list; the second will link the mage's desk and her character sheet (in Internet html format, created using TSR's AD&D® Core Rules 2).

Linking to other file types works exactly the same way.

---

150 Open Elementalist Caves.FCW

151 Click **Link with File** .

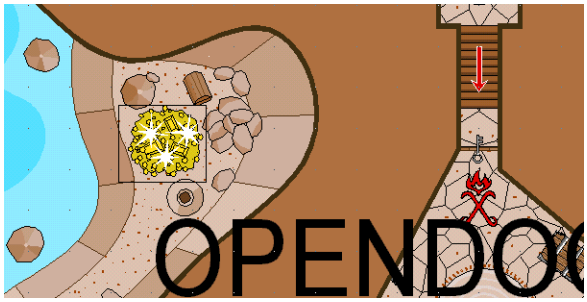
You see the Select File dialog box.

152 Click **Treasure.txt** from the Tutorials folder, then click **OK**.

The Command Line reads `Hotspot window:`.

153 Click two corners of a box around the pile of gold.

You see a line of very large text appear next to the treasure. This text is CC2 Pro's internal commands for the link.



154 Right-click to repeat Link with File.

155 Add a link to **Zodac.html**, also in the Tutorials\Dungeons folder, placing the hotspot around the mage's desk.

156 Click View menu >> Hide Hyperlinks.

157 Click either of the link sites.

The linked file loads in the appropriate program.

Sharing linked maps with other users

Each link created contains the name and full location of a file on your computer. When you share maps with other users, they may well use a different set of folder names to you. If the map is placed on their computer using a different folder, the link will not work. There is an answer. If you keep all of the linked files in the same folder, they will work for other users, as long as they do the same. Link with maps puts in a relative link.

In the following steps we will create a link. We will then edit the link to point to a map "under" the CC2 Pro folder, instead of in one specific place. Provided the other user keeps the linked maps in the same CC2 Pro subfolder, they will work.

---

158 Start a new DD2 map then save it with the name **`Link Demo`**.

159 Use Info menu >> Link with Map to add a link to Tutorial 1 in CC2 Pro's Tutorials folder. Place the link hotspot near the left border.

You see the link box and text appear.

160 Click **Edit**

.

The Command Line reads `Entity to edit:`.

161 Click edge of the link box.

You see the Edit Text dialog box containing the phrase:

`LOADM C:\Cc2\Tutorials\Tutorial 1.FCW;`

The first word, LOADM, is CC2 Pro's text-only command to load a map. The remainder of the phrase is the location of the file on your computer.

> To edit normal text, you Click text's baseline. Link text is a special case. To select link text, Click edge of the hotspot.

162 Replace `C:\Cc2\` with a **#** character.

The text should now read: `LOADM #Tutorials\Tutorial 1.FCW;`

163 Click **OK** to apply the change.

> The # character means "whatever folder CC2 Pro is running from". With the # replacing the absolute folder name, it doesn't matter where CC2 Pro is installed on the other system; provided it has a Tutorials subfolder containing **Tutorial 1.FCW**, the link will work.
>
> CC2 Pro also uses the $ character to represent the current folder, for example if the current map was c:\temp\current.fcw, $next.fcw would be c:\temp\next.fcw.

PRINTING IN DD PRO

CC2 Pro can print any view of any map at any scale. This chapter describes the more printing options relevant to DD2.

Print part of the map to precise scale

164 Click Info menu >> Distance to measure the distance between two points.

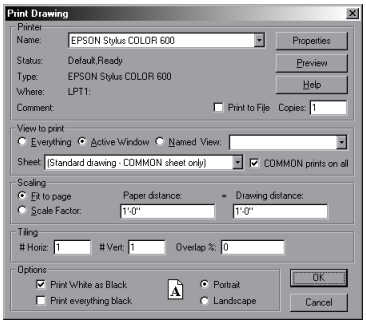
This tells you the units used in the map, and gives you an idea of its size. If you open **Elementalist Floorplans** and measure the ground floor, you will find it is 40′ across.

165 Zoom in on the part of the map you want to print.

The center of your view will be the center of the printed page.

166 Click File menu >> Print.

You see the Print Drawing dialog box.



167 In the View to print section click **Active Window**.

168 In the Scaling section, click **Scale Factor**.

169 In the Drawing distance box enter a distance that relates to the units and size of the map. For example, **10′**.

170 In the Paper distance box, say how big the Drawing Distance you gave should print on paper.

In the illustration, **1" Paper distance = 10' Drawing distance**.

This means that 1″ on paper will represent 10′ in the map. The printed ground floor will measure 4″ across.

171 Click **Print Preview** to check that your print will look OK.

172 Click **OK**.

The map prints at the exact scale you gave.

Printing to scale across many pieces of paper

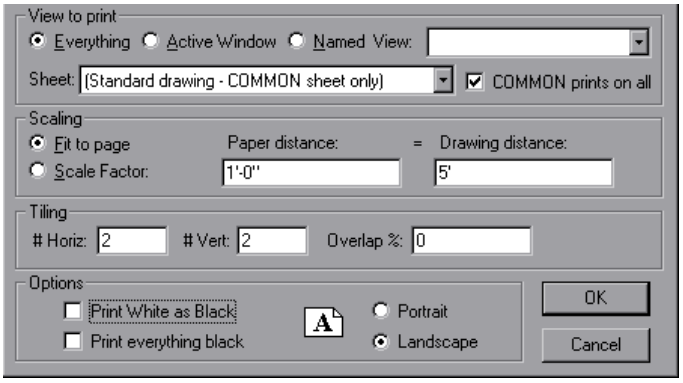
You can print your maps to scale across many pieces of paper; however CC2 Pro does not automatically calculate the number of pieces of paper you need. You can use print preview for this (or a bit of mental arithmetic)

173 Open Elementalist Caves from the Examples\Dungeons.folder.

This map is 250′ across (I used **Info >> Distance** to discover this). We'll print the whole thing out at 1″ on the paper = 5′ in the drawing.

174 Click File menu >> Print.; set the options as below.

I've made a guess at the number of sheets across and up (2 and 2), and I've set Landscape/Portrait to Landscape (to match the shape of the drawing.



175 Select Print Preview.

You can see an image of how the current settings would print. My printer's paper size won't fit the whole drawing on four sheets, it require a lot more paper.

176 Increase the number of sheets across and up, and Print Preview again.

By trial and error, I get 5 sheets horizontally by 6 vertically.

177 You can see now why this doesn't happen automatically – that's 30 sheets of paper! You don't have to print in this example, of course.

CUSTOMIZING SYMBOLS

How symbols work with layers

The rules

- ✓ A symbol definition is like a capsule. It is one object, but it can contain any number of other objects.
- ✓ When you define a symbol, the definition capsule is created on the current layer, but the entities within the definition stay on their existing layers.
- ✓ When you click on a symbol in the Catalog Window, CC2 Pro copies the *definition* to the current drawing. The definition is copied to the same layer that it was originally created on. If that layer does not already exist, it is created.
- ✓ When you place the symbol in the drawing, CC2 Pro adds a *reference* to the definition (it doesn't make a whole new copy of the symbol). The reference is placed on the current layer.
- ✓ If a symbol *reference* is on a hidden layer, that reference is hidden (but references to the same symbol on visible layers remain visible).
- ✓ If entities *within* a symbol definition are on a hidden layer, then those entities will be hidden in all references to that symbol.

What this means in practice

Make sure that all symbols are drawn *and* defined on the SYMBOL DEFINITION layer, unless specific purpose requires otherwise (e.g., the Dungeon Geomorph symbols make use of the WALLS and BACKGROUND (FLOOR #) layers; this type of thing should be the exception rather than the norm). The visibility of each symbol then only depends on:

- ✓ Whether the SYMBOL DEFINITION layer is visible, and
- ✓ Whether the layer that the symbol was placed on is visible.

Symbols and copyright

Any symbols that you create from scratch are your own. You are free to do whatever you want with them.

Symbols that are derived from or incorporate symbols that come with any of ProFantasy's products are the copyright of ProFantasy Software Ltd. Making derivative symbols available to other people is a breach of our copyright.

If you would like to share derivative symbols with other users, send them to us. Subject to them being good quality, we will try to include them in future releases with a credit to you, but copyright with us.

The copyright in any symbols created by ProFantasy Software Ltd that are contained in a map remains with ProFantasy. ProFantasy allows users to distribute maps containing copyright symbols unless the purpose of the map or map set appears to be to distribute copyright symbols, in which case we will assert our copyright.

Creating Symbols (a marvelous, mechanical mouse organ)

Anything you can draw can be converted into a symbol. Here, we will take an existing organ symbol, explode it so that it can be changed, add a mechanism, and then define the modified organ as a new symbol (we won't bother drawing the rodent).

---

178 Start a new DD2 map.

179 Click **Furniture** and insert the **Pipe Organ** symbol.

180 **Zoom Window** on the organ, so it fills the screen.

181 Click Edit menu >> Explode and explode the **Pipe Organ**.

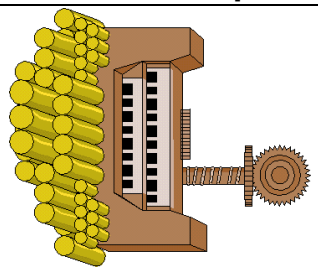
This organ is no longer a symbol; the symbol reference has been replaced by lines, arcs, boxes, etc. (which can be edited).

182 Click **Erase** and get rid of the organ seat.

183 Click **Traps** and scroll down the Catalog Window to the cogs and winch.

184 Add a winch and two cogs as shown below.

Use the **On** and **Midpoint** modifier s to help attach the components accurately. In my version, I right-clicked and set the symbol scale factor to 0.5.



185 Explode the winch and cogs.

The winch and cogs that you placed are no longer symbols.

It is bad practice for one symbol to include another symbol. You can use an existing symbol in a new symbol, but explode it before defining the new symbol.

186 Click Symbols menu >> Define Symbol.

The Command Line reads `Symbol name:`.

187 Type **`Mechanical Organ`** then press ¶ **.**

The Command Line reads `Symbol origin:`. The point you choose will be the insertion point of the new symbol.

188 Click at the middle of the organ's left edge.

The Command Line reads `Select entities (0 picked):`.

189 Click a window around the symbol, then **Do It**.

The symbol disappears, meaning it has been defined.

DD2 symbols are normally defined so that they come away to the right-hand side of a North-South wall, with their insertion point on the wall. Feel free to make sensible exceptions. For example, we use the center-point of circular symbols.

190 Click on Save As and save the map as **`Organ Symbol.fsc`**

Note you are saving it as a symbol catalog.

When you create a symbol, its definition is saved in the current drawing, not the current symbol catalog. For example, at this time the Mechanical Organ has only been defined in the Organ Symbol drawing. It has not yet been defined in any symbol catalogs. You can see which symbols have been defined within a drawing by clicking on the Drawing button to the top of the Catalog Window.

You can make the symbols in a drawing available as a symbol catalog by using Save As to save the drawing as a catalog file.

Adding symbols from a drawing to a catalog

We will save the drawing that contains the symbols we want to add as a catalog, so it can be opened in the Catalog Window. Then we will load the catalog we want to receive the symbols in the main Drawing Window. Clicking the symbol in the Catalog Window will then copy across the symbol definition. Finally, we save the changes.

---

191 Click File >> Open and select Furniture.fsc *(file type CC FSC Symbol Catalog)* from the Symbols\Dungeons\Filled folder.

The catalog has a green background. By convention, we save symbol catalogs with a green background to remind us when we are working on one.

192 Click the Catalog button and open Organ Symbol.fsc.

193 Insert the Organ symbol into the drawing window anywhere. Erase it.

You've added the symbol definition to the current catalog.

194 Click Symbols >> Symbol Manager, uncheck Display Symbols and scroll down the list. Click on the organ symbol at the bottom of the list.

195 Click **Move Up** and move the symbol until it is below the previous organ symbol.

196 Save the drawing.

You've added your symbol to an existing catalog.

Creating Smart Symbols

Smart symbols are created in exactly the same way as other symbols, with the addition of control points. Control points are a special CC2 Pro entity type that shows a symbol how to behave when inserted. This section shows you how to make an existing symbol smart.

---

197 Select File menu >> Open, pull down Files of Type, choose Campaign Cartographer 2 Symbol Catalog.

198 Choose blank.fsc from the Symbols\Dungeons folder.

199 Click **Furniture** .

We are going to create a bench that aligns with walls.

200 Insert a **Bench** symbol.

201 Select the Drawing... button (below the Catalog... button)

You can see the **Bench** symbol in the Catalog Window.

> The **Drawing...** button shows you what symbol definitions are in the current drawing, not those in the current symbol catalog.

202 Click Symbols menu >>Symbol Manager. Click the bench then select Clone. Type **`Bench 2`**.

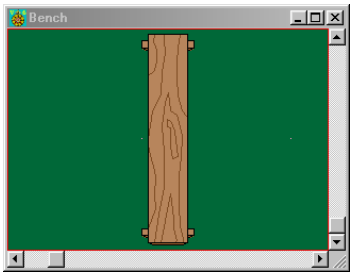
The Command Line reads `New Window Corner`

> Clone Symbol adds a copy of an existing symbol definition with a new name then lets you edit it in a new drawing window. The 0,0 point of the new window is the origin of the symbol

203 Select a point in the lower left of the screen,

The Command Line reads `Opposite Corner`.

204 Select a point above and to the right of the first corner.

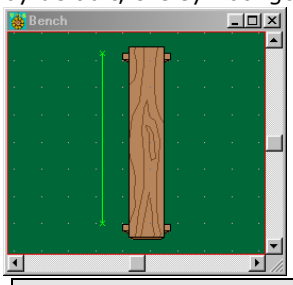


The bench is now ready to be edited.

205 Right click the **Grid** button, click **Standard Rectangular**. Select Symbols menu >> Add Control Points.

The Command Line reads `1st point`

The placement of the control points shows the symbol which way to align. The bench needs to align along a wall, and by default, the symbol goes on the right side of a wall.



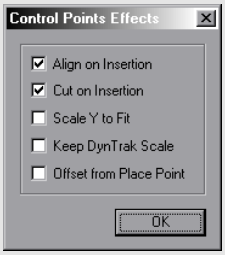
206 Select a point at the top and to the left of the symbol.

The Command Line reads `2nd point`

207 Select a point at the bottom and to the left of the symbol.

The Control Point Effects dialog box appears.

Control Points Effects



The Control Point Effects dialog box controls the behavior of the smart symbol.

Align on Insertion: This option causes the symbol to align to any entity it crosses.

Cut on insertion: This causes the symbol to cut a gap where possible in any entity that allows it.

Scale Y to fit: This is for symbols such as arrow slits that expand or contract to match the width of any symbol on which they are placed. Such symbols are normally drawn 1 unit high.
Keep DynTrak Scale: This means that the symbol should obey the scale factor in the Symbol Parameters dialog box.
Offset from Place Point: If this option is set, the symbol will align to an insertion point, and after you've placed it, will move perpendicular to the wall for a second place point. You can use this option to align a symbol to a wall, but then place it some distance away.

208 In this case, we'll have the bench **Align On Insertion** and **Keep Dyn Trak Scale**.
You can see the control points in your symbol.

209 Close the window and keep the changes.

210 Draw a 1' wide wall across the drawing. Select the **Bench 2** symbol from the Catalog Window. Move it over the wall.
The symbol aligns to the wall.

If you want to change the behavior of the smart symbol, use **Symbols menu >> Edit Symbol**, then select the Bench 2 symbol. You can change the control points properties using the **Edit** EDIT.

MACRO EXAMPLE

This chapter assumes a certain degree of familiarity with CC2Pro macros; if you are new to macro writing, start by reviewing the chapter on macro in the CC2 Pro User Manual.

CliffFace Macro Deconstruction

DD2 presents a unique opportunity to macro writers. With dungeon floorplans, the mapping scale is comparatively larger than overland or city maps, and therefore DD2 maps can contain much more 'real world' detail. Just look at the symbols provided for dressing your dungeons: tables and chairs, weapons and treasure, even bits of trash for the floor. The expectations for detail within the dungeon are high, and so too are the expectations for detail in the dungeons themselves. The depiction of walls, caves and the other physical elements of a dungeon design can be given the same attention to detail as the dungeon dressings. This is where macros can play a part.

The CliffFace macro is an example of this kind of attention. Instead of using a jagged line to depict a cliff drop-off, or the wall of a natural cave, this macro will create an 'artistic' rendering of a broken, stone cliff face. The macro uses a 'guide' entity to trace the cliff along; a line, curve or smooth path will do. There are a few advanced macro features at work here: the user can configure the macro, accepting customized settings for the colors used, and the general dimensions of the drawing. These settings are even remembered from session to session. This macro also demonstrates two important uses of the RANDOM macro command: modifying the position of points to obtain a random placement, and using random variables to make decisions.

Presented below is a section by section breakdown of the inner workings of the CliffFace macro.

```
MACRO CliffFace
ecoff
rdoff
point 10001,10001;
golayer MacroConstruction
```

Standard beginning to a macro: turn off the command line echo and the screen redraw. Drop a point in an out-of-the-way place; we will use this at the end for restoring the user's drawing settings by way of the KEEP command. Last, go to the 'MacroConstruction' layer; we'll move the finish drawing to the current layer once we're done, using that point we dropped and the LIKE command.

```
scriptm #vars-CliffFace.scr
ifdef mcoCliffFaceVarsOK
       mcoDoneVarCheck
:mcoDefineVars
gv mcoCol1 250
gv mcoCol2 251
gv mcoCol3 252
gv mcoCOut 0
gcol mcoCol1 ^DColor 1: (250)
gcol mcoCol2 ^DColor 2: (251)
gcol mcoCol3 ^DColor 3: (252)
gcol mcoCOut ^DOutline color:
       (0)
gv mcoCW 6
gv mcoCW ^DCliff Width: (6)
gv mcoCW mcoCW/2
gv mcoVA .5
gv mcoVA ^DWidth variance:
       (.5)
gv mcoSL 10
gv mcoSL ^DSegment length:
       (10)
gw mcoCliffFaceVarsOK OK
savevars #vars-CliffFace
go mcoStart
:mcoDoneVarCheck
gv mcoUseDefault 1
gv mcoUseDefault ^DUse saved
       settings? (1=yes -
       default - click) (0=no)
ifz mcoUseDefault
       mcoDefineVars
```

This section sets up the variables we will need during the execution of the macro. First we load a script which holds the values that were used last time the macro ran. If this script file exists, it will load, amongst others, a variable called 'mcoCliffFaceVarsOK'. After attempting to load the script file, we check to see if this 'mcoCliffFaceVarsOK' variable exists (IFDEF command), which indicates whether we have our set of predefined variables in memory or not. If we do, then the macro asks the user if they would like to use the saved values. If so, the macro skips the rest of this section and continues. If the user does not want to use the saved setting, or if the settings are not in memory at all, then the macro proceeds to prompt the user for all the necessary variable values. Note that we first set a default value before asking the user. This is not only good manners, but it also saves us from potential problems if the user chooses not to enter any values at the prompts.

```
:mcoStart
ge mcoentity ^DSelect object
       to draw a cliff/cave
       wall along:
iferr mcodone
gdist mcoentitylen % 0
       mcoentity % .1 mcoentity
gv mcoentitylen
       mcoentitylen*1000
gv mcounit 100/mcoentitylen
gv mcoCur 0
gp mcoP1 % 0 mcoentity
gbrng mcoB1 mcoP1 % .01
       mcoentity
RANDOM mcoR1
RANDOM mcoR2
gp mcoPa ref mcoP1
       <mcoB1+90,((mcoR1-
       .5)*(mcoCW*mcoVA))+mcoCW
gp mcoPa2 mcoPa
```

Here's where the real work begins. Since the macro is going to 'crawl' alone a guide entity, we are going to have to use a loop. But first, there are a few things we have to do. That is what this sections does.

To start with, we need to get the guide entity. We prompt the user for the object to use as a guide, checking afterward (with the IFERR statement) if they really clicked on something. If they did not, the script jumps to the end (see below). If they did select something, then we need to get a few bits of information before we proceed with the loop.

We need the overall length of the entity. We could use the GLEN command to determine this, but for various reasons that I won't go into here, there is a less accurate, but more stable way of getting this value, even on curvy entities. We can approximate the length of an entity by measuring a very small part of it, then extrapolating that distance alone the entire entity. We get two points: one at the 0% mark, and the second at the .1% mark. Even very curvy entities will probably have very little curving if you look a small segment, only 1/1000th of the total length.

```
gp mcoPb ref mcoP1 <mcoB1-
       90,((mcoR2-
       .5)*(mcoCW*mcoVA))+mcoCW
gp mcoPb2 mcoPb
color 0
lwidth 0
fstyle solid
selbyp
```

Since we will be crawling along this entity using the '% Along' modifier, we now need to know how to express our linear distances as a percentage of the entities total length. We'll do this by determining the percentage for 1 unit (by dividing 100% by the overall length), then later we can use this value ('mcoUnit') to multiply with other distances to calculate their relative percentage.

Next we set up our first 4 reference points, ready for entering into the loop. Once we start the loop, these points will be recalculated each time we repeat, but for the first time though we must set them up manually. mcoPa and mcoPb are two corners of the poly that makes up a segment of the drawing. mcoPa2 and mcoPb2 are used for the 'chip' polys that can be added to the drawing. More on that later.

Note that we are using two random values to set these points up. This means that the exact position of these points will be different each time the macro is run, even it is run on the exact same guide entity. Random values are the best way to add some variation to macro generated drawings.

Last, we set up our starting drawing settings: color, line width and style, and select mode 'Previous'.

```
:mcoLOOP1
```

Now, we start the loop.

Each time through the loop (or 'iteration'), the macro draws one segment of the cliff wall. As you can see by the macro deconstruction diagram, each segment consists of a 4 sided polygon, randomly colored, and the possibility of a second 'chip' poly on the edge of the segment, simulating a broken corner.

Figuring out where are all the points of these polys will go is not a simple task.

```
RANDOM mcoR1
RANDOM mcoR2
RANDOM mcoR3
RANDOM mcoR4
RANDOM mcoR5
```

Grab some random values; we will use these from modifying the position of points, and for making random decisions.

```
gv mcoCur
mcoCur+(((mcoR1*mcoSL)+(mcoSL*.3))*mcoUnit)
ifn 100-mcoCur mcoDONELOOP1
```

As we crawl along the guide entity, we use a marker to keep track of where we are. The variable 'mcoCur' holds this position, expressed as a percentage of the total length.

At the beginning of the loop, we advance this marker by adding a calculated value to itself. The amount to advance the marker is based on the user setting for the Segment Length. This value is varied by up to 30% more, or up to 70% less by multiplying the 'mcoSL' variable with a random value (from 0 to 1), then adding a fixed 30% of the Segment Length. Finally, we convert the value to a percentage of the total guide entity length by multiplying with 'mcoUnit', calculated earlier. As the macro continues, you will notice this technique for modifying values used often.

After advancing the counter, we check to see if it is now larger than 100. (remember, this part of the macro will be executed over and over again) If so, then we have reached then end of the guide entity (over 100% along the guide), then we quit the loop by jumping to the end of it. See the section 'DONELOOP1' below.

```
gbrng mcoB1 mcoP1 %
      mcoCur+.01
      mcoentity
gp mcoP1 % mcoCur
      mcoentity
gp mcoP2 ref mcoP1
      <mcoB1-
      180,(mcoR2*3)
ifn mcoR3-.5
      mcoControl1
gp mcoP2 % mcoCur
      mcoentity
gp mcoP1 ref mcoP2
      <mcoB1-
      180,(mcoR2*3)
```

Using our newly advanced position marker, we calculate the bearing (mcoB1) of the guide entity at the position of the marker. We also establish two points on the guide, 'mcoP1' and 'mcoP2', slightly offset from each other. Again, we use a random value to calculate these points.

We also make a 'random' decision here: after setting P1 and P2, 50% chance we leave them alone, 50% chance we swap the two points. Why do we do this? We need these two points to later establish the two end points of the segment poly. By offsetting these points, we create a segment end that is not necessarily perpendicular to the guide entity. We occasionally swap the points so that P1 is not always further along than P2, thus preventing the end of the segment from slanting the same way every time.

```
:mcoControl1
gp mcoPc ref mcoP1 <mcoB1-90,((mcoR4-
       .5)*(mcoCW*mcoVA))+mcoCW
gp mcoPd ref mcoP2 <mcoB1+90,((mcoR5-
       .5)*(mcoCW*mcoVA))+mcoCW
```

Here we get the segment endpoints (Pc and Pd). We use P1 and P2 as references, obtaining points at an angle perpendicular to the guide (at that point, using the bearing B1 we calculated earlier), and a distance based on the user preferences for the cliff width, modified by random values.

```
poly mcoPa mcoPb mcoPc mcoPd;
```

Finally, we draw the poly. Points mcoPa and mcoPb are left over from the last iteration of the loop (or set manually before the loop begins, depending on if this the first time through). Pa and Pb are set at the end of the loop, and are essentially points Pc and Pd from the previous iteration. This way, each segment joins with the preceding one.

```
RANDOM mcoR1
changec2 mcoCol1
ifn mcoR1-.3 mcoColBreak1
changec2 mcoCol2
ifn mcoR1-.6 mcoColBreak1
changec2 mcoCol3
:mcoColBreak1
```

Another random decision. This time, we are setting the color of the poly we just created. We change it to Color 1, then test a random variable to see if it is less than .3 (mcoR1-.3). If so (30% chance), then jump to the end of this section (ColBreak1). If not, we continue, changing the color again, this time to Color 2. And again, we test: if the same random variable is less than .6 (30% chance, since we know that it is more then .3), then we jump to ColBreak1. If we are still here (40% chance) then we change the color one final time to Color 3. By testing a single random variable for different value ranges, we cause the macro to perform any number of possible outcomes.

```
RANDOM mcoRTEST
ifn mcoRTEST-.8 mcoBreak2

gbrng mcoBbc mcoPb mcoPc
gdist mcoDbc mcoPb mcoPc
gbrng mcoBba mcoPb mcoPa
gdist mcoDba mcoPb mcoPa
RANDOM mcoR1
RANDOM mcoR2
poly ref mcoPb <mcoBba,(mcoDba*mcoR1*.5)+(mcoDba*.3)
       mcoPb2 mcoPb ref mcoPb
       <mcoBbc,((mcoDbc*mcoR2*.3)+(mcoDbc*.1))*(mcoCW/1
       0);

RANDOM mcoR1
changec2 mcoCol1
ifn mcoR1-.3 mcoColBreak2
changec2 mcoCol2
ifn mcoR1-.6 mcoColBreak2
changec2 mcoCol3
:mcoColBreak2
go mcoBreak3
```

Random decision: do we draw a 'chip' on one side of this segment (20%), on the other side (20%), or no chip at all (60%) for this segment.

If the first test fails (20%), we draw the 'chip' here. We get points around the left end of the segment, and draw a poly to represent the 'chip'. Then we set the color of that poly using the same random method described above. Last, we jump to the end of the 'chip' drawing section (Break3, below).

If the test is true (80%) then we jump to the next section.

```
:mcoBreak2
```

Just like the section above, we test the

```
ifn mcoRTEST-.6 mcoBreak3
gbrng mcoBad mcoPa mcoPd
gdist mcoDad mcoPa mcoPd
gbrng mcoBab mcoPa mcoPb
gdist mcoDab mcoPa mcoPb
RANDOM mcoR1
RANDOM mcoR2
poly ref mcoPa <mcoBab,(mcoDab*mcoR1*.5)+(mcoDab*.3)
       mcoPa2 mcoPa ref mcoPa
       <mcoBad,((mcoDad*mcoR2*.3)+(mcoDad*.1))*(mcoCW/1
       0);
RANDOM mcoR1
changec2 mcoCol1
ifn mcoR1-.3 mcoBreak3
changec2 mcoCol2
ifn mcoR1-.6 mcoBreak3
changec2 mcoCol3
```

random variable. If the test passes (60%), then jump to the end of the section. If not (20%), then draw the chip as above, only on the right end of the segment. Then set the color, as before.

```
:mcoBreak3
gbrng mcoBda mcoPd mcoPa
gdist mcoDda mcoPd mcoPa
gbrng mcoBcb mcoPc mcoPb
gdist mcoDcb mcoPc mcoPb
RANDOM mcoR1
gp mcoPa2 ref mcoPd
       <mcoBda,((mcoDda*mcoR1*.3)+(mcoDda*.1))*(mcoCW/1
       0)
gp mcoPb2 ref mcoPc
       <mcoBcb,((mcoDcb*mcoR1*.3)+(mcoDcb*.1))*(mcoCW/1
       0)
```

This section is tricky. Here we are preparing for the next time through the loop. You may have noticed that in the 'chip' drawing sections above, we make reference to some points: mcoPa2 and mcoPb2. These points are based on the previous segment of the drawing, so here we set up the points in case the next segment needs them for drawing 'chips'.

When you create loops like this one, often your macro will need information from the previous iterations of the loop. In those cases, you need to plan ahead, and set up variables like these to carry those values into the next loop.

```
gp mcoPa mcoPd
gp mcoPb mcoPc
go mcoLOOP1
```

Our loop is almost done. We want the ends of the drawing segments to match each other, so we set up the first two points of the next segment poly (Pa and Pb) to be the same as the last two points from this segment.

Now, we go back to the beginning of the loop.

```
:mcoDONELOOP1


gp mcoP1 % 100 mcoentity
gp mcoPc ref mcoP1 <mcoB1-90,((mcoR4-
       .5)*(mcoCW*mcoVA))+mcoCW
gp mcoPd ref mcoP1 <mcoB1+90,((mcoR5-
       .5)*(mcoCW*mcoVA))+mcoCW
poly mcoPa mcoPb mcoPc mcoPd;

RANDOM mcoR1
changec2 mcoCol1
ifn mcoR1-.3 mcodone
changec2 mcoCol2
```

Here is where we go when the loop is done. But the macro is not over; there is still work to be done. Just because our guide marker has advanced beyond the end of the guide entity, it doesn't mean that the last segment reaches to the end of the guide. The last segment is still short. We have to now draw a single segment to complete the gap between the end of the last segment from the loops, and the end of the guide.

We calculate the two end points Pc and Pd using the end of the guide as a reference, and draw the poly. The color

`ifn mcoR1-.6 mcodone` `changec2 mcoCol3`	is set in the same way as all the other times.
`:mcodone` `selby1`	Now, all that is left to do is clean up.

`keep 10001,10001`
`selby1`
`changel MacroConstruction`
`like`
`10001,10001`
`selbyp`
`group`
`selby1`
	The KEEP command sets CC2's drawing settings to the same as the point we dropped at the beginning of the macro. Next, we move everything on the 'MacroConstruction' layer to the same layer as the point (the same layer that the user was on when the macro began). Then we group everything that we just moved.

`erase 10001,10001`
`selrest`
`rdon`
`econ`
`ENDM`
	Finally, delete the point, restore the 'select by' method that was set before the macro started, and turn on screen redraw and command line echo. And that's it.

DD PRO COMMAND REFERENCE

This table gives you a list of all DD 2's commands except those used specifically in macros.

- **Command** gives you the command name found on the CD2's menus, the name that appears when you hover the mouse over a button (tool tip text) or on a right click popup menu. Type the command into DD2's Help Index or Find list to get more details on the command.
- **Where?** Lets you know which menu, popup menu or toolbar to find the command. DD2's toolbar layout is shown on page 256. Right click on the button to access a popup menu
- The **Text Equivalent** is what you type at the Command prompt to use the command.
- **Use In Macro** If the command is useable in a macro, then **Yes**, otherwise **No**. Note that all commands are useable as the last line in a macro. The next section lists macro commands with parameters.

Command	Description	Where?	Text Equivalent	Use in Macro
Add Corridor	Draws a corridor in a choice of styles	Dungeon toolbar	CORRIDOR	No
Add Corridor (current)	Draws a corridor with the current settings	Dungeon toolbar, Add Corridor right click	CORRIDORM	Yes
Add DD2 Defintions	Makes a template into a DD2 template	Dungeon menu	PARTM #system\walldefs;1;0;-1000,-1000;;RDOFF;UNDO;RDON;	Yes
Add Room	Draws a room in a choice of styles and shapes	Dungeon toolbar	ROOM	No
Add Room (Circular)	Add circular room	Dungeon toolbar, Add Room popup	ROOMM;3	Yes
Add Room (macro version)	Add room macro command	Text only	ROOMM	Yes
Add Room (Polygonal)	Add polygonal room	Dungeon toolbar, Add Room popup	ROOMM;4	Yes
Add Room (Rectangular)	Add rectangular room	Dungeon toolbar, Add Room popup	ROOMM;2	Yes
Add Room (Square)	Add square room	Dungeon toolbar, Add Room popup	ROOMM;1	Yes
All dungeon drawing tools	Displays all dungeon drawing tools	Dungeon toolbar	DRAWTOOLSM;=Dungeon*	No
Cave	Opens the cave symbol setting in current symbol style	Symbol toolbar	SYMICONM;Cave*;	No
Containers and Treasure	Opens the Container and Treasure symbol setting in current symbol style	Symbol toolbar	SYMICONM;Containers and Treasure*;	No
Debris	Opens the Debris symbol setting in current symbol style	Symbol toolbar	SYMICONM;Debris*;	No
Dungeon Geomorph	Opens the geomorph symbol setting in current symbol style	Symbol toolbar	SYMICONM;Geomorphs*;	No
Dust	Display Dust drawing tools	Dungeon menu >> Area fills	DRAWTOOLSM;Dungeon Dust*;	No
Elemental and magic	Opens the Elemental and Magic symbol setting in current symbol style	Symbol toolbar	SYMICONM;Elemental and Magic*;	No
Floors	Display Floor drawing tools	Dungeon menu >> Area fills	DRAWTOOLSM;Dungeon Floor*;	No
Furniture	Opens the furniture symbol setting in current symbol style	Symbol toolbar	SYMICONM;Furniture*;	No
Grass	Display Grass drawing tools	Dungeon menu >> Area fills	DRAWTOOLSM;Dungeon Grass*;	No
Lava	Display Lava drawing tools	Dungeon menu >> Area fills	DRAWTOOLSM;Dungeon Lava*;	No
Lock symbol angle	Sets the current symbol angle	Dungeon toolbar	LOCKANG	Yes, no parameters
Mud, Hot	Display Mud, Hot drawing tools	Dungeon menu >> Area fills	DRAWTOOLSM;Dungeon Mud, Hot*;	No

Command	Description	Where?	Text Equivalent	Use in Macro
Order Dungeon Layers	Reorders all entities by layer	Dungeon menu	ORDERDL	Yes
Pebbles	Display Pebbles drawing tools	Dungeon menu >> Area fills	DRAWTOOLSM;Dungeon Pebbles*;	No
Secret layer	Sets the Secret layer current	Dungeon toolbar	GOLAYER Secret	Yes
Simple	Opens the simple symbol setting in current symbol style	Symbol toolbar	SYMICONM;Simple*;	No
Temples and Statues	Opens the Temples and Statues symbol setting in current symbol style	Symbol toolbar	SYMICONM;Temples and Statues*;	No
Toggle fill style	Toggle between solid and hollow fill style	Dungeon toolbar	FILLTOG	Yes, no parameters
Traps	Opens the traps symbol setting in current symbol style	Symbol toolbar	SYMICONM;Traps*;	No
Up and Down	Opens the up and down symbol setting in current symbol style	Symbol toolbar	SYMICONM;Up and Down*;	No
Wall	Displays dungeon wall drawing tools	Dungeon toolbar, Wall right click	DRAWTOOLSM;Dungeon Wall*;	No
Wall (Default)	Draws the default dungeon wall	Dungeon toolbar	DRAWTOOLSM;Dungeon Wall, Default*	No
Wall Features	Opens the wall features symbol setting in current symbol style	Symbol toolbar	SYMICONM;Wall Features*;	No
Wallbreak	Breaks a hole in a wall, 5' center	Dungeon toolbar	GV wd 5';WBCW	Yes, no parameters
Wallbreaks, Center, 10' wide	Breaks a hole in a wall, centered on insertion point, 10' wide	Dungeon menu >> Wallbreaks, center	GV wd 10;WBCW	Yes, no parameters
Wallbreaks, Center, 3' wide	Breaks a hole in a wall, centered on insertion point, 3' wide	Dungeon menu >> Wallbreaks, center	GV wd 3;WBCW	Yes, no parameters
Wallbreaks, Center, 5' wide	Breaks a hole in a wall, centered on insertion point, 5' wide	Dungeon menu >> Wallbreaks, center	GV wd 5;WBCW	Yes, no parameters
Wallbreaks, Center, User width	Breaks a hole in a wall, centered on insertion point, user defined width	Dungeon menu >> Wallbreaks, center	WBC	Yes, no parameters
Wallbreaks, End, 10' wide	Breaks a hole in a wall, insertion point at end, 10' wide	Dungeon menu >> Wallbreaks, End	GV wd 10;WBEW	Yes, no parameters
Wallbreaks, End, 3' wide	Breaks a hole in a wall, insertion point at end, 3' wide	Dungeon menu >> Wallbreaks, End	GV wd 3;WBEW	Yes, no parameters
Wallbreaks, End, 5' wide	Breaks a hole in a wall, insertion point at end, 5' wide	Dungeon menu >> Wallbreaks, End	GV wd 5;WBEW	Yes, no parameters
Wallbreaks, End, User width	Breaks a hole in a wall, insertion point at end, user defined width	Dungeon menu >> Wallbreaks, End	WBE	Yes, no parameters
Walls	Opens the walls symbol setting in current symbol style	Symbol toolbar	SYMICONM;Walls*;	No
Water	Display Water drawing tools drawing tools	Dungeon menu >> Area fills	DRAWTOOLSM;Dungeon Water*;	No
Weapons	Opens the weapons symbol setting in current symbol style	Symbol toolbar	SYMICONM;Weapons*;	No

MACRO COMMAND REFERENCE

This table includes DD2 commands useable in macros that have one or more macro parameters. Macro-friendly commands that work straight off are not included;see the table above for those commands. For example, in the previous table, Thatched/Gothic has a text equivalent of CATICON6. You could put this in a macro and it would function with no parameters. The macro version of the House command has many variations of syntax and is detailed here.

For more information on macros, and you how might use this table, see the page 172 in the CC2 Pro manual.

Command	Description	Text Equivalent	Syntax
Add Room (Square)	Add a square room with the current settings	ROOMM;1	1;xy1stCnr1;xy2ndCnr1;…; xy1stCnrN;xy2ndCnrN;
Add Room (Rectangular)	Add rectangular room with the current settings	ROOMM;2	2;xy1stCnr1;xy2ndCnr1;xy3rdCnr1;…;xy1stCnrN;xy2ndCnrN;xy3rdCnrN
Add Room (Circular)	Add circular room with the current settings	ROOMM;3	3;xyCenter1;xyEdge1;…; xyCenterN;xyEdgeN;
Add Room (Polygonal)	Add polygonal room with the current settings	ROOMM;4	4;xy1stCnr1;xy2ndCnr1;…; xyNthCnr1;…;; xy1stCnrN;xy2ndCnrN;…;xyNthCnrN
Add Room (macro version)	Add room with the current settings macro command	ROOMM	ROOMM;nRoomType; (see Add Room (*) entries for individual syntax)
Add Corridor (current)	Draws a corridor with the current settings	CORRIDORM	xy1;xy2;…;xyN;

PROFANTASY SOFTWARE PRESENTS

TM

FRACTAL TERRAINS

For CC2 Pro

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FRACTAL TERRAINS INTRODUCTION

Welcome to Fractal Terrains (FT). This book contains step-by-step examples that show you how to create pseudo-realistic worlds, quickly and easily, that can be exported for further enhancement into Campaign Cartographer 2 Pro (CC2 Pro). While CC2 Pro is not required to make use of FT, the two when used together can produce some startling results. Complete the tutorials, and you will be creating your own worlds in minutes.

What's CC2 Pro?

Throughout the text, you'll see references to CC2 Pro. CC2 Pro is ProFantasy Software's vector map making software. FT and CC2 Pro are designed to integrate closely. Even if you don't use CC2 Pro, you might find it useful to download the CC2 Pro viewer at http://www.profantasy.com

Other Sources of Information

FT's Help System. When you are using FT you can get in-depth information by pressing , or by selecting Help from FT's Help menu.

Web Based Tech Support. ProFantasy's web site www.profantasy.com has a comprehensive technical support section and details about e-mailing for help.

The CC2 mail-list. This is a very active e-mail discussion group to help new users and discuss all things map related. To subscribe follow the instructions at the ProFantasy Software web site, www.profantasy.com

Installing FT

Place the FT compact disc into your CD-ROM drive. On most computers there will be a few seconds of whirring, then you will see a window showing the contents of the CD. If this doesn't happen, double-click on "My Computer", then on the for your CD-ROM drive.

To install FT, double-click on **Setup** , then follow the on-screen instructions.

During the installation you will be asked to give your name, company and FT Serial number. Your unique serial number is in the back of this manual. If the company box is blank, you will have to enter something, even if it is only one character!

Starting FT

Once you have completed the installation, start FT. You can do this by double-clicking on the FT icon on your computer's desktop, or by locating FT within your Windows® Start menu.

FT will attempt to load the file you were working on when it was last closed. If you did not manage to close FT down cleanly when last used (e.g., your system crashed, or FT stopped responding due to errors in a binary file you were attempting to import), you may experience problems starting FT as it might be attempting to read data from a corrupt file.

If you do experience such problems, it is recommended that you start FT by double-clicking on a FT file that is known to function normally (either one of your own files, or one of the example files provided on your FT CD will suffice) from Windows® Explorer. Holding down the Shift key while starting FT will prevent it from loading the last saved file and from reloading the window position information.

Latest Information

To find out about any additions to FT since this manual was written, double-click the **Readme** on the CD.

The FT CD

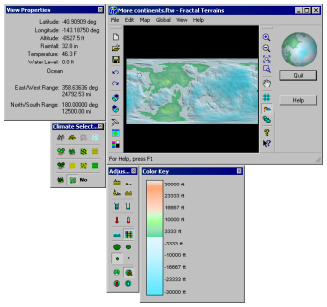
It is worthwhile exploring your FT CD beyond the installation setup files. You will discover examples of worlds created with the software, as well as real-world data that can be used with FT to produce realistic maps based the geography of Earth and Mars. Also included is the latest version of *Wilbur*, a fairly comprehensive fractal world generation tool that possesses a less advanced CC2 export capability. While FT is ideal for quick generation of worlds, shielding you somewhat from the fractal theory the software uses, Wilbur is an excellent tool for those wishing to explore this theory to greater depth.

For more information about Wilbur and real-world data, please refer to the "Readme" and "Credits and Thanks" text files on the CD, respectively. Documentation for Wilbur is also provided.

YOUR FIRST WORLD

FT can be as simple or as complex as you wish it to be. For your first world, we shall explore only the important points. The reference section forming the bulk of this manual explains some of the more complex capabilities of the software.

The first step in creating a world is, obviously, to start FT. Double-click FT on your computer's desktop. You will be presented with several windows that comprise FT's main screen:



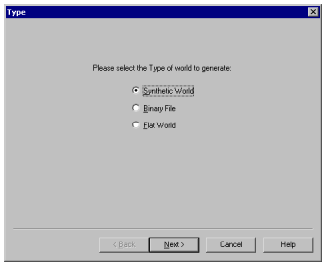
Throughout these tutorials, reference is made to s that access FT's various functions. If you cannot locate an , it will be because the toolbar to which the belongs is not currently shown.

In order to display a required toolbar, go to the **View menu** and click name of the toolbar desired. Toolbars that are currently displayed appear on the menu with a tick next to them. If no tick appears, that toolbar is currently hidden.

To create a new world:

1 On the File Menu click **New**.

You see the Select World Type dialog box:

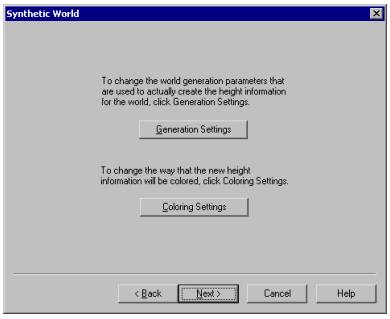


For now, we shall create a synthetic (random) world.

Tutorials covering flat worlds and those created using binary files can be found later in this manual.

2 Ensure that the **Synthetic World** radio button is checked, and click **Next**.

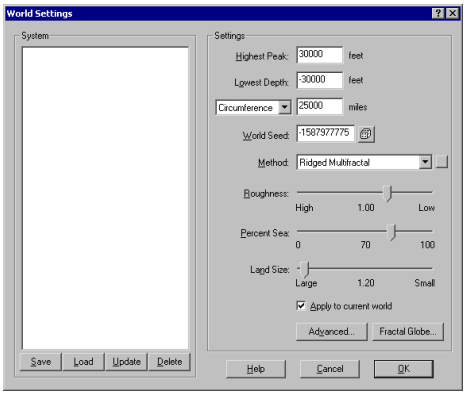
You see the Synthetic World dialog box:



World Settings

3 Click **Generation Settings**.

You see the World Settings dialog box:

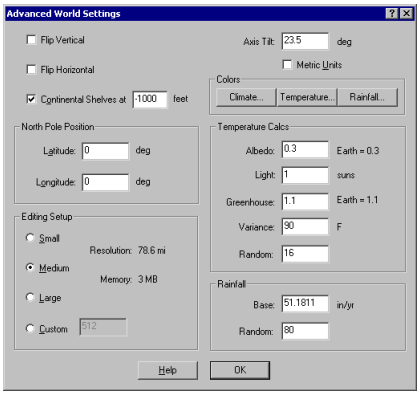


The settings here affect the way in which your new world will be created. These will be explained later. For now, leave them as they appear.

You may save the settings for later use.

4 Click **Advanced**.

You see the Advanced World Settings dialog box:



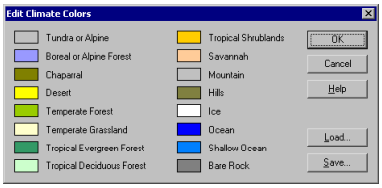
Again, the settings presented by this dialog are further explained later.

5 Click the **Small Editing Setup** radio button.

Changing this setting will affect the resolution used to depict your world, and the amount of memory FT will need. For your first world, we will use the Small setup to save time while you explore FT's functions.

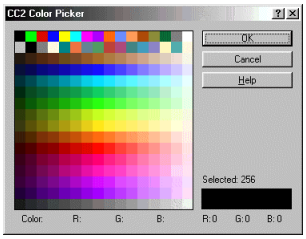
6 Click **Climate**.

You see the Edit Climate Colors dialog box:



7 Click one of the color boxes.

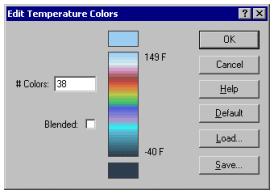
You see the CC2 Color Picker dialog box.



This dialog box is used throughout FT when you select colors. As you move your mouse over the color window, the RGB (Red/Green/Blue) values immediately below the window change to reflect the color currently beneath your cursor. You can choose a color by clicking on it. The color box and RGB values to the left will change to reflect your choice. The **Selected** number indicates the chosen color's value within the standard CC2 palette. Click OK to close this dialog.

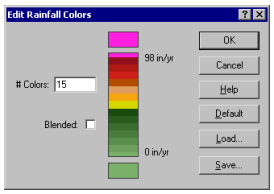
8 Click **Temperature**.

You see the Edit Temperature Colors dialog box:



9 Click **Rainfall**.

You see the Edit Rainfall Colors dialog box:



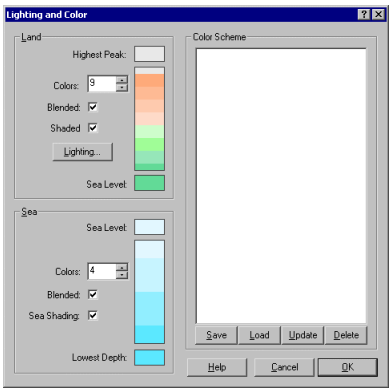
10 Unless you wish to change the color used for the climate form you have chosen, press **Cancel** to return to the Edit Climate Color dialog box.

11 Press **OK** to return to the Advanced World Settings dialog box, and again to return to the World Settings dialog, and once more to return to the Synthetic World dialog.

Color Settings

12 Click **Color Settings**.

You see the Lighting and Color dialog box:



As with the Edit Climate Colors dialog box, you may change the colors used for land height and sea depth contours by clicking on the color boxes.

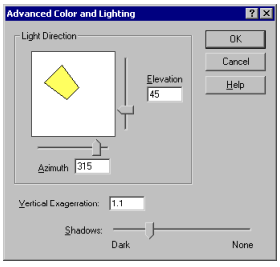
If the **Blended** check boxes are set, FT will draw the contour colors so that the transition between one contour and the next flows smoothly. While this produces a more realistic look, it can slow down world redraws.

If the **Shaded** check box is set, FT will calculate and draw shaded highlights to raised terrain features. As with blending, shading can slow down redraw times, but will produce a more realistic effect. The **Sea Shading** check box is used to tell FT whether to draw similar shading for sea depth contours. This check box will not be available if the Shaded check box is not checked.

You can save your choices to a scheme for use in other worlds of your creation.

13 Click **Lighting**.

You see the Advanced Color and Lighting dialog box.



This box is used to define how contour shading will appear for your world. You can set the vertical (Elevation) and horizontal (Azimuth) angle at which light will appear to strike your world, as well as the intensity of the shading that will be used.

14 Click **OK** to return to the Lighting and Color dialog box, and again to return to the Synthetic World dialog.

15 Click **Next**.

You see a dialog box summarizing the world settings you have chosen. For synthetic worlds, this dialog will be relatively empty.

16 Click **Finish** to complete your world.

FT will spend a few moments calculating, and will then draw the world into the main screen.

Congratulations! You have just created your first world.

NAVIGATING THE WORLD

FT possesses functionality allowing you to move about your world, and to zoom into and out of areas within it. It is a good idea to become familiar with these various functions, as they will be useful when you come to edit and otherwise play with your new creation.

Zooming In and Out

To change the zoomed view of your world:

- ✓ Click **Zoom In** to change the view so that it is zoomed in by a factor of two.
- ✓ Click **Zoom Out** to change the view so that it is zoomed out by a factor of two.
- ✓ Click **Zoom Extents** to change the view so that the entire world fits within the display window.
- ✓ Click **Zoom Window**, then click a point, move the mouse, click another point forming a box. The view will change to show a zoomed view of the area within that box.

Moving around on the main map

You can change the viewed world area at the current zoom level by either panning, or by rotating the small globe in the upper right hand corner of the main FT window.

To pan the current view:

17 Click **Pan**.

The mouse pointer will change to show a hand.

18 Click and hold the mouse button down within the world view.

The mouse pointer will appear to "grab".

19 Move the mouse in the desired pan direction.

The world view will move with the mouse. Notice that, as you move the mouse around, the small globe will appear to rotate in the desired direction.

20 When the desired view appears, release the mouse button.

FT will re-draw the world to show the new view.

21 Holding down the key 3 while using the pan tool will change the map center of projection rather than the offset parameters. For more information on projections see Map Projections.

Moving around using the Globe

The small globe may also be rotated directly to achieve the view you desire. To pan your world using the globe:

22 Click and hold the mouse button down within the world view.

The mouse pointer will appear to "grab".

23 Move the mouse in the desired pan direction.

The world view will move with the mouse. Notice that, as you move the mouse around, the small globe will appear to rotate in the desired direction.

24 When the desired view appears, release the mouse button.

FT will re-draw the world to show the new view.

25 When the desired view appears, release the left mouse button.

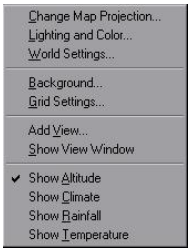
FT will re-draw the world to show the new view.

Using the globe can be useful at times, especially when editing. Note that if the map center has been offset from 0,0 using the pan tool or the Map Projection dialog, moving the globe may not exactly position the central part of the main map at the same part as the center of the globe.

Named Views

You can create named views for your world. When a named view is created, map projection, scale, and position are stored within it. Named views can be used for world navigation and to export sections of worlds. They are especially useful for outputting consistent images of the same portions of a world using different settings and during different FT sessions.

Creating named views



26 Right-click within FT's main screen.

You see the Context menu.

The Context menu provides a quick mouse shortcut to some of the more commonly used commands. You can use it, by right-clicking, instead of using the standard menu and buttons to access these commands.

27 Click **Add View**.

You see the Enter View Name dialog box:

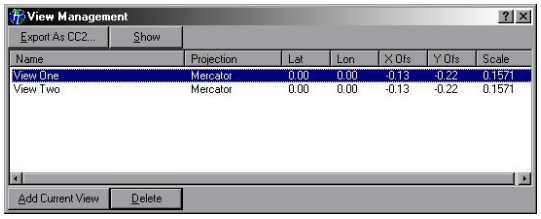
28 Enter a name for your view, then click **OK**.

View names are case sensitive, and can have a maximum of 60 characters. If you intend to export saved views (see *Using named views*), it is advisable to use legal Windows® file names.

The View management commands are available from the View menu as well as from the context menu.

Using named views

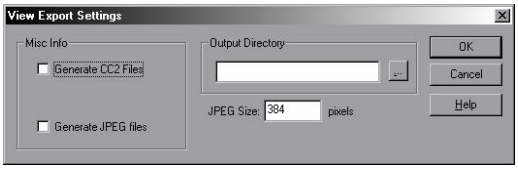
Once you have created named views for your world, you can access them via the Context menu. The **Show View Window** command opens the View Management dialog box:



All named views created for the current world will be listed within the dialog, along with the stored parameters for each. To make use of the View Management functions, click one of the listed views.

Multiple named views can be selected by holding down ² while clicking to select, and selecting names individually, or holding down ³ to select a range of view names.

- ✓ **Show** will change the current world view to reflect the settings stored within the selected named view. Double-clicking on a named view's list entry has the same effect.
- ✓ **Add Current View** will add the current world view as a named view. This function works in the same way as the **Context menu >> Add View** command.
- ✓ **Delete** will remove the selected named views.
- ✓ **Export As CC2** exports the currently selected named views as CC2 and/or JPEG files:



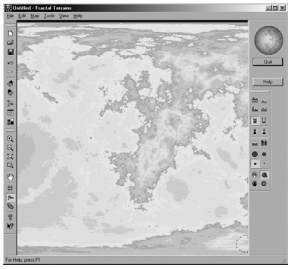
- ✓ Checking the **Generate CC2 Files** box will export the selected named views as CC2 maps. When checked, FT will prompt for selection of an existing CC2 export file (see *Saving And Exporting*).
- ✓ Checking the **Generate JPEG Files** box will export the selected named views as JPEG images. The **JPEG Size** entry is used to determine the width of the exported JPEG images.
- ✓ **Output Directory** allows selection of the directory in which the exported files will be saved. If no directory is specified, then the current one will be used.
- ✓ Exported named views carry file names that reflect their view names. If you wish to use named views for export, you should take care to use only names that are valid Windows® file names, and back up or change the names of existing images and maps that may be affected.

VIEWING WORLD INFORMATION

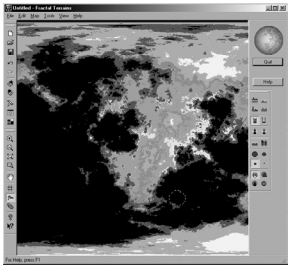
From what we have explored thus far, we know that FT can calculate and show height contours for a world. The clever little beastie does not stop at that, however.

When a world is created, FT will automatically determine its climate, temperature, and rainfall, as well as its general geography. While these calculations are based more on theory than any "true to life" scenario (for example, viewing the climate for your world will very likely reveal huge expanses of forestland - such factors as deforestation and axe-wielding settlers are not figured in the climate calculations), they can be very useful when it comes to adding the finishing touches. As we shall see later, any of these factors that do not suit your concept can easily be changed.

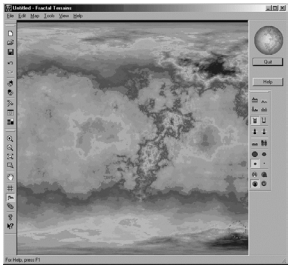
✓ Click **Show Altitudes** to show your world's height contours and general geography (this is the default view).



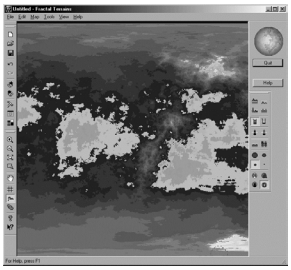
✓ Click **Show Climate** to show the climate zones FT has calculated for your world.



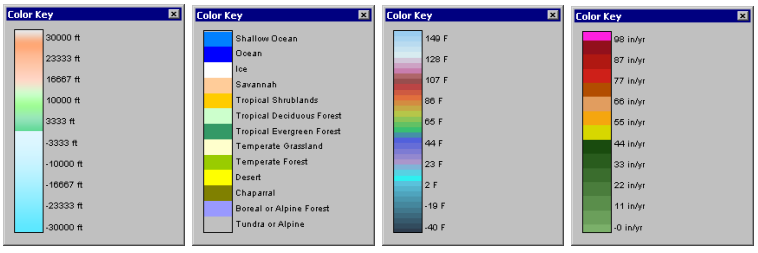
✓ Click **Show Temperature** to show the temperature zones FT has calculated for your world.



✓ Click **Show Rainfall** to show precipitation levels FT has calculated for your world.



For each of these views, different colors are used to indicate the different values FT has calculated. The colors and their associated values are shown within the Color Key window. When you change the view mode, the Color Key window will change accordingly:



You can also measure linear distances across a world. Click **Distance** , and click both ends of the linear distance you wish to measure. FT will report the measurement.

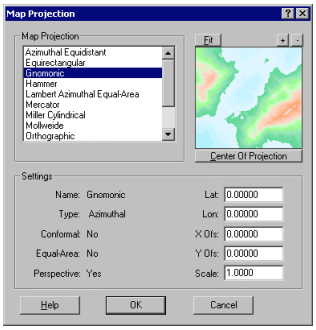
WORLD PROJECTIONS

Displaying a globe on a flat surface poses a problem. Over the years, several different methods of achieving this have been devised. Such methods produce flat-map views, or projections, of the globe. FT has the capability to display your world using many of these.

To change the projection used to display your world:

29 Click **Change Projection** .

You see the Map Projection dialog box:



30 Click one of the listed map projections.

The preview of the world will change to reflect the selected projection.

31 Keep cycling through the available map projections until you find one that you like.

32 Press **OK**.

The view of your world will be updated to reflect the new projection.

The Map Projection dialog has three basic sets of parameters:

- ✓ **Projection Center**, represented by the values Lat (latitude) and Lon (longitude), defines the central point for the projection display;
- ✓ **View Offset** (represented by XOfs and YOfs) defines the offset from the projection center to the center of the area of interest. View Offsets can be used to center a view to a particular latitude and longitude co-ordinate. To calculate the values required to do this when showing the Equirectangular projection, use the following formulae:

$$XOfs = \frac{-longitude}{180}$$

$$YOfs = \frac{-latitude}{180}$$

For example, to center the view to longitude -117, latitude 35 the values used would be 0.65 (XOfs) and -0.19444 (YOfs).

- ✓ **Scale**, expressed as a zoom ratio (e.g., a Scale of 1 will display the entire world, 0.5 will zoom in by a factor of ×2, 4 will zoom out by a factor of $\times^1/_4$, and so on).

Further discussion regarding map projections appears within the reference section to the rear of this manual.

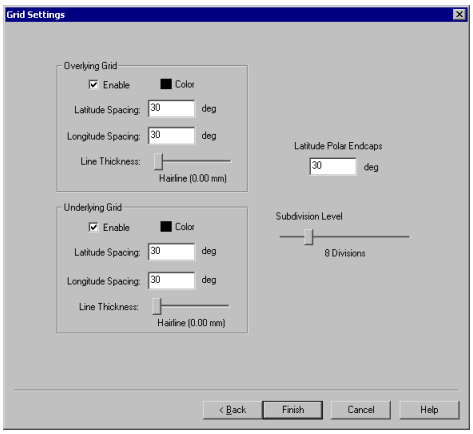
ADDING A GRID

FT has the capability of adding gridlines to your map. Since grids are based upon longitude and latitude, the manner in which a grid is displayed will depend upon the current projection used.

To add a grid to your world:

33 Click **Grid Settings** .

You will see the Grid Settings dialog box:



You can define up two separate grids. This is useful when you wish to depict a second grid using different longitude and latitude settings.

34 Check the Enable box within the Overlying Grid section.

35 Click the Color box within the Overlying Grid section.

You will see the CC2 Color Picker dialog box.

36 Click red (color 2) picker box and press **OK**.

The Overlying Grid color box will change to reflect your choice.

37 Check the Enable box within the Underlying Grid section.

38 Click Color box within the Underlying Grid section.

You will see the CC2 Color Picker dialog box.

39 Click purple (color 230) picker box then click **OK**.

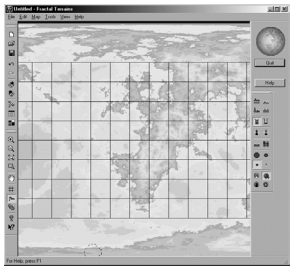
The Underlying Grid color box will change to reflect your choice.

40 Change the Longitude and Latitude Spacing values within the Underlying Grid section so that both are set to 24.

41 Move the Subdivision Level slider bar so that the setting reads 2 Divisions.

42 Click on **OK**.

The world will re-draw to reflect your grid settings:



EDITING YOUR WORLD

FT does not stop once your world has been created. Perhaps the mountains are too high, the seas too deep, or there is something else that you wish you could change to make your world just so. To this end, FT provides a number of editing tools that can be used to tweak your world.

The Editing Tools

FT possesses ten editing tools, all of which are available via the Tool Palette. The tools are:

- ✓ **Raise**, , increases the altitude of the painted area.
- ✓ **Lower**, , decreases the altitude of the painted area.
- ✓ **Rougher**, , increases the height variation (roughness) of the painted area.
- ✓ **Smoother**, , decreases the height variation (roughness) of the painted area.
- ✓ **Wetter**, , increases the level of rainfall within the painted area.
- ✓ **Drier**, , decreases the level of rainfall within the painted area.
- ✓ **Warmer**, , increases the temperature of the painted area.
- ✓ **Colder**, , decreases the temperature of the painted area.
- ✓ **Water Level**, , will adjust the painted area so that its water level is set at a given altitude. All terrain of an altitude lower than that set for the **Water Level** tool will be adjusted to depict water. Higher altitude terrain will not be affected. You can dynamically select the altitude to be used by this tool by holding 3 down while Clicking within the world map on an area of the desired altitude.
- ✓ **Paint Climate**, , will replace the current climate of the area painted with that chosen from the Climate Selector toolbar.

The area of effect of the tools may be modified using other s shown on the tool palette:

- ✓ **Extra-Large Tool**, , will change the size of the paint area to that set for the Extra-Large (XL) brush size in the Tool Settings dialog.
- ✓ **Large Tool**, , will change the size of the paint area to that set for the Large (LG) brush size.
- ✓ **Small Tool**, , will change the size of the paint area to that set for the Small (SM) brush size.
- ✓ **Extra-Small Tool**, , will change the size of the paint area to that set for the Extra-Small (XS) brush size.

Using the Editing Tools

FT's editing functions are all performed in basically the same way. To edit your world:

43 Click the button representing the editing function you wish to use.

The mouse cursor will change to show a paintbrush surrounded by a dashed circle. The circle indicates the area that will be affected by your edit.

44 Move the mouse to the region you wish to edit within your world.

45 Click and hold the mouse button down.

46 Move the mouse across the area you wish to edit.

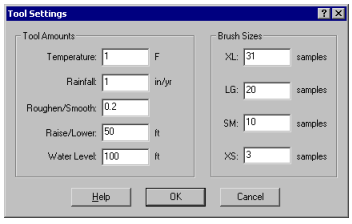
Your edit will be "painted" onto the world as you move the cursor. Since FT needs to calculate edits in order to apply them, it is a good idea to move the mouse slowly to ensure that the edit is applied to the whole region desired.

47 Once you have painted all of the desired area, release the mouse button.

Editing tools only affect the current selection. If you haven't selected any particular region of your map, then the tool will affect any area it touches. For more on selection, see *Selection Functions* on page 333.

Changing the Editing Tools

You can set the extent to which edits are applied by clicking on the **Tool Options** . The Tool Settings dialog box will appear, in which you can specifically set values used by the editing functions:



Note that the editing tools may have no discernable effect when using low tool settings values at high zoom levels.

Also note that there is a peculiarity in the way brush sizes are set in FT. The software requires that sizes, internally, should be odd values. As a result, it adjusts user-entered values, as per:

Entered Value	Actual Size of Brush
0-1	0
2-3	1
4-5	3
6-7	5
8-9	7
10-11	9
32-33	31
64-65	63

Climate Painting

The **Paint Climate** , , is used to change the climate settings for an area painted. To use this tool, you must first select the type of climate you wish to paint from the Climate Selector toolbar. Fifteen climate types are available:

Mountains

Hills

Bare Rock

Ice

Tropical Deciduous Forest

Tropical Evergreen Forest

Tropical Shrublands

Savannah

Temperate Forest

Desert

Chaparral

Temperate Grassland

Boreal or Alpine Forest

Tundra

No Climate

Global Painting

The **Raise**, **Lower**, **Rougher**, **Smoother**, **Warmer**, **Colder**, **Wetter**, and **Drier** tools may be applied globally (i.e., so that they affect the entire world (or current selection) in one fell swoop) by holding 3 down, and clicking on the desired tool.

Selection Functions

FT provides a number of selection tools that can be used to mask portions of a world. When a selection mask is applied, all edits will only affect currently selected portions of a world. For example, if you paint a climate to the world, areas outside the current selection will not have their climates changed, even if the climate-painting tool overlaps the selection border.

When global painting, edits will be applied to all areas within the selection, and areas outside the selection will remain untouched.

Basic Selection Functions

Three basic functions are accessed from the **Select** menu. These are:

- ✓ **All** selects the entire world
- ✓ **Deselect** deselects all current selections
- ✓ **Inverse** inverts the current selection, so that everything currently selected is now de-selected, and everything that was outside the current selection becomes selected

Selection Tools

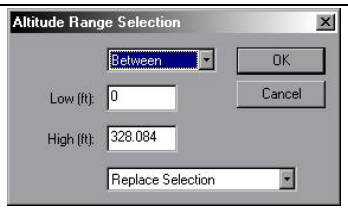
Four tools are provided which allow selection by shape. These tools can be found on the Selection Tools toolbar. Use **View menu >> Selection Tools** to display this toolbar.

- ✓ Click **Select Rectangle** to create a rectangular selection. Click in the main window to place the rectangle's first corner, move the mouse, then Click again to place the opposite corner when the preview displays the rectangle desired
- ✓ Click **Select Ellipse** to create an elliptical selection. Click in the main window to start the selection, move the mouse, then click again to complete when the preview displays the ellipse required
- ✓ Click **Select Freehand** to manually draw a selection mask. Click in the main window to start the selection. Draw the required selection by moving the mouse. Once the desired selection has been outlined, click to complete
- ✓ Click **Select Polygon** to create a polygonal selection. Click in the main window to start the selection, then click to place further points as desired. To complete the selection, either triple-click (effectively clicking once to place the final point, then double-clicking in the same location to complete), or press ¶

These selection tools can also be used to add to or subtract from the current selection. Holding down 3 when completing the selection will add the area to the current selection, and holding down 2 will remove the area drawn from the current selection.

Range Selection Functions

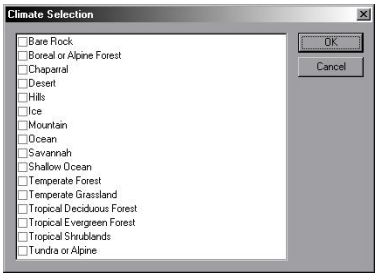
The **Select** menu provides four functions that are used to select portions of the world that conform to given parameters. With the exception of the **Climate Range** function, these tools prompt for the range required via a dialog box. The Altitude Range Selection dialog is shown below, to serve as an example:



- ✓ **Low** and **High** form the range to be processed by the selection. For example, entering 0 in the **Low** box, and 500 in the **High** box when selecting by **Altitude Range** will consider all portions of the map that fall between 0' and 500' in altitude. Units differ for each range selection function differ (e.g., **Temperature Range** expects values in °F).
- ✓ The first drop-list determines how the selection relates to the given range: **Between** considers all portions between the **Low** and **High** values; **Not Between** considers those outside (either lower or higher) the given range; **Above** considers those portions of the world that are higher in respective value than the provided **High** value; and **Below** considers those portions that fall below the **Low** value.
- ✓ The lower drop-list determines how the selection is to be used: **Replace Selection** will clear the current selection, creating a new one based on the parameters given; **Add to Selection** will retain the current selection, adding to it according to the given parameters; **Subtract from Selection** will remove those portions conforming to the given parameters from the current selection.

The four range selection functions are:

- ✓ **Altitude Range** selects by altitude, in feet (or meters)
- ✓ **Temperature Range** selects by temperature, in °F (°C)
- ✓ **Rainfall Range** selects by rainfall, in inches per year (or cm)
- ✓ **Climate Range** selects by climate. This opens a dialog box (shown below) which lists all of the climates FT recognizes. Click boxes to the left of the listed climates to place or clear tick marks. A tick indicates that all regions conforming to that climate will be selected. Selecting by **Climate Range** always replaces the current selection



Selection Mask Modification

The current selection mask can be further modified:

- ✓ **Binarize** will "harden" the selection, so that each pixel is either fully selected or fully deselected. You will be prompted for a threshold value which will determine which pixels remain selected, and which will be deselected, depending on their current selection status. The range of this threshold is from 1 to 255. A value of 1 will fully select all pixels in the current selection, regardless of their partially selected state; a value of 255 will only consider those pixels that are already fully selected; a value of 127 will consider those pixels that are currently from 50% to 100% selected; and so on. Binarized selections cannot have partially selected pixels.
- ✓ **Feather** will "soften" the selection mask, blurring it around the edges. You will be prompted to enter the amount by which the selection is to be smoothed. Feathered selections can have partially selected pixels.
- ✓ **Modify >> Expand** will increase the size of the current selection by one pixel in all directions.
- ✓ **Modify >> Contract** will decrease the size of the current selection by one pixel in all directions.

Selection Mask Files

You can save selections for use in the future as selection mask files. A selection mask file is an 8-bit grayscale bitmap image that is the same size as the resolution set in **World Settings >> Advanced >> Editing Setup**. The grayscale color of each pixel is determined by the amount of the pixel currently selected: fully selected pixels will have an 8-bit grayscale value of 255 (white); fully deselected pixels will have a value of 0 (black); partially selected pixels will be defined by shades of gray, depending on their selection status.

- ✓ Save Selection will save the current selection as a bitmap file
- ✓ Load Selection will prompt for the selection mask file to use, and will then apply that to the current world

Mound

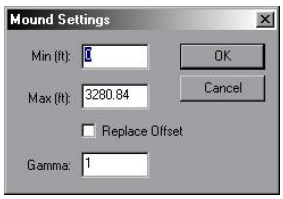
The **Mound** function takes parameters you provide, then adjusts the altitude values within a selection accordingly. It is useful for creating mountains, plateaus, etc.

To use the **Mound** function:

48 Use the selection functions and tools to select the area you wish to be affected.

49 Select **Tools menu >> Mound**.

You see the Mound Settings dialog box:



- ✓ **Min (ft):** is the value that will be applied to the edge of the selection, in feet (or meters).
- ✓ **Max (ft):** is the value that will be applied to the center of the selection, in feet (or meters).
- ✓ If **Replace Offset** is checked, the current values of the selection will be replaced by the **Mound** function. If unchecked, the **Mound** function will add to the current values.
- ✓ **Gamma** indicates the linearity of the mound's slope. A value of 1.0 will produce a mound with fairly shallow-sloping sides. Values less than 1.0 will provide flatter tops and steeper sides. Values greater than 1.0 will produce shallower sides and more pointed center ridges.

50 Enter the parameters as required and press **OK**.

The **Mound** function will be applied to the selection.

Changing Color And Lighting Settings

At any time, you can change the current color and lighting settings used for your world. To do so:

51 Click **Lighting and Color** .

You see the Lighting and Color dialog box.

52 Alter color and lighting options to those desired.

This is performed in the same way as you did when creating your world (see page 324).

53 Press **OK** to apply the changes.

FT will re-draw the world to reflect the new color and lighting settings.

Changing World Settings

You can change the currently used world settings. Note that, for synthetic worlds, changing world settings can alter the world. It is suggested that you save your world before changing its settings.

To change world settings:

54 Click **World Settings** .

You see the World Settings dialog box.

55 Alter the world settings to those desired. Make sure that **Apply to Current World** is checked if you don't want to lose any edits.

This is performed in the same way as you did when creating your world (see page 322).

56 Click **OK** to apply the changes.

FT will re-draw the world to reflect the new world-settings if the **Apply to Current World** box was checked. Otherwise, the settings will be applied in blanket fashion.

SAVING AND EXPORTING

Once you have edited your world so that everything matches your desires, you may now wish to export it to an image file, a series of image files, or even to a Virtual Reality Modeling Language model.

Saving Your World

FT can save your world directly to four different file formats, these being:

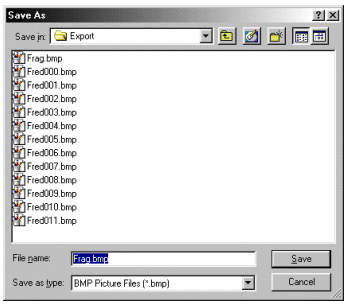
- ✓ FT native format (FTW)
- ✓ Bitmap image format (BMP)
- ✓ JPEG image format (JPG)
- ✓ Wilbur format (MDR)
- ✓ Special MDR (MDR)

You should always save your world in FT's own format, especially if you intend to use FT to further edit and refine it.

To save your world:

57 Select **File menu >> Save As**, or click **Save As** .

You will see the Save As dialog box:



58 Type a name for your world in the **File Name** box.

59 Select the format you desire from the **Save as type** drop-list.

60 Click **Save** button.

The BMP, JPEG, and Wilbur (MDR) formats all save the current display image as either a color map or as a height field readable by Wilbur. These formats have limits on the size of an image that can be saved. The Special MDR format, on the other hand, has no limit on the size of the output image and always outputs its information using a simple Equirectangular projection. This format is very useful when exporting a high resolution image from FT to use as a binary image within FT or as an input file within Wilbur.

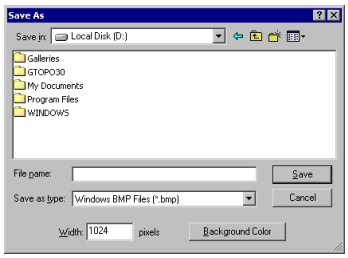
Exporting An Icosahedral Projection

Icosahedral projections are commonly used to depict worlds within science fiction role-playing games. Basically, an icosahedral projection takes the form of a flat-view exploded 20-sided shape.

To save your world as an icosahedral projection:

61 Select **File menu >> Export World >> Icosahedral**.

You will see the icosahedral Save As dialog box:



62 Change the **Width** value if desired.

The higher the **Width** setting, the larger the output file will be.

63 Click **Background Color** button.

You will see the standard Windows® color palette.

64 Choose the color you wish to use for the output file's background and click on **OK**.

The background color is used to fill the rectangular space within the image that is not occupied by the icosahedral projection.

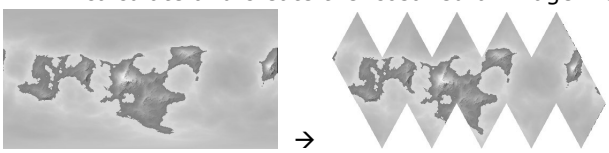
65 Type a name for the file in the **File Name** box.

66 Select the desired file format from the drop-list.

Bitmap and JPEG formats are available for icosahedral export.

67 Click **Save** button.

FT will calculate and create the icosahedral image file.



This icosahedral projection is a simple linear transformation of an equirectangular map as shown above.

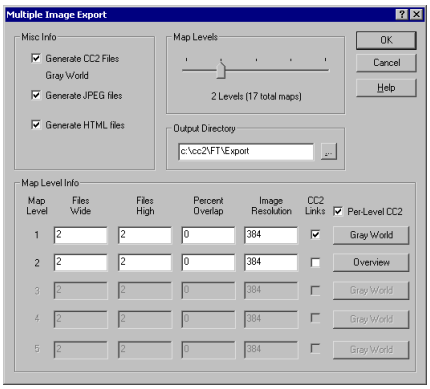
Exporting To Multiple Image Files

FT can output your world to several image files, each comprising a smaller, tiled section of the map. It is often useful to do this, since attempting to depict a detailed world map within a single image can result in an unmanageably huge file.

To export your world to several image files:

68 Select **File menu >> Export World >> Multiple Files**.

You will see the Multiple Image Export dialog box:



69 Check the **Generate JPEG files** box. Ensure that the **Generate CC2 Files box** is unchecked (this we shall cover later).

You can create HTML files linked to the generated JPEG images if you so desire by checking the **Generate HTML files** box. FT will generate hypertext links and navigation buttons linking the generated HTML files together.

70 Change the **Map Levels** and **Map Level Info** settings to those desired.

The **Map Levels** option is used to determine the number of image sets that will be created. The **Map Level Info** settings determines the form those levels take. Each map level set will comprise a number of images that tile together to form the whole world. For example, if two map levels are chosen, you will gain two separate depictions of the world, each comprising a set of image files. **Map Level Info** is set as per:

- ✓ **Map Level:** The map level to which the information row pertains.
- ✓ **Files Wide:** The number of files used to depict the world's horizontal axis at this level.
- ✓ **Files High:** The number of files used to depict the world's vertical axis at this level. The total number of maps that will be produced for the level is equal to the Files Wide value multiplied by the Files High value (i.e., a level set to 5 files wide by 2 files high will produce 10 images).
- ✓ **Percentage Overlap:** The extent to which each file of a given level overlaps with those adjacent to it.
- ✓ **Image Resolution:** The pixel resolution of the resultant images. The higher this value is, the larger the resultant files will be.
- ✓ **Per-Level CC2:** When this item is checked, the button at each level can be used set the CC2 settings that are used for export for that image file level.

71 To choose a location for the output files, Click the directory selection button ... to select the director. If a directory name is entered that does not exist, that directory will be created.

72 Click on **OK** to start the export.

FT will generate the files to the specifications you have set, and an overview file depicting the entire world. This process may take some time, depending on the number and nature of levels you have chosen.

The files will have a filename consisting of a letter and a number. The letter refers to the map level (the overview map will be "A", level one will be "B", and so on). The number refers to the row and column of the map's tile.

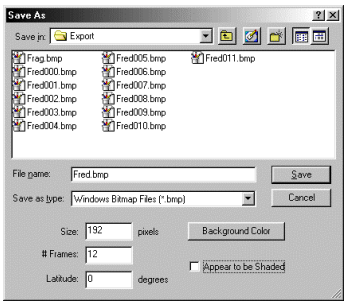
Exporting A Spin View

A spin view is a series of image files that depict the globe in a period of rotation. These files may be then combined to form a rotating globe animation.

To export your world to a spin view:

73 Select **File menu >> Export World >> Spin View**.

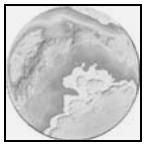
You will see the Spin View Export dialog box:



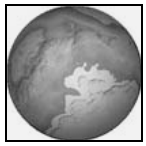
74 Set up the export parameters desired.

For spin view exports, the parameters are:

- ✓ **Size**: The size of each frame in pixels. The higher this value is, the larger the output files will be.
- ✓ **# Frames**: The number of images that will be created. Each image depicts the world at a different stage in its period of rotation. If used for animation, the higher this value is the smoother the resultant animation will be.
- ✓ **Latitude**: The degree of latitude that will form the center point of the rotational view.
- ✓ **Appear to be Shaded**: Check this box if you wish the views to appear shaded:



Unchecked



Checked

75 Type a name for the file in the **File Name** box.

76 Select the desired file format from the drop-list.

Bitmap and JPEG formats are available for spin view export.

77 Click **Save** button.

FT will calculate and create the spin view image files. Each file will consist of the selected filename, plus a numerical suffix indicating where in the rotational sequence the file occurs.

FT does not export directly to a GIF-based spin view animation because of the additional licensing costs involved. There are several software packages that allow individual files, such as those created by FT's spin view export function, to be tied together in a single animation file, including:

Photoshop Elements, from Adobe® (www.adobe.com)

Animation Shop, from Jasc (www.jasc.com)

Ulead GIF Animator, from Ulead (www.ulead.com)

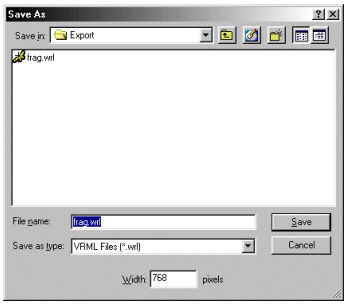
Exporting To VRML

VRML (Virtual Reality Modeling Language) is a modeling language that can be used to depict interactive 3D objects and environments. To use a VRML file, you will need a viewer capable of understanding the language (there are many such viewers available, including plug-ins for Internet browsers).

To export your world to a VRML file:

78 Select **File menu >> Export World >> VRML**.

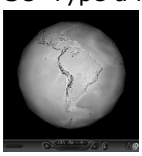
You will see the VRML Save As dialog box:



79 Set the desired width for the output file.

The greater the width, the higher the resolution of the resultant model, but the larger the file size.

80 Type a name for the file in the **File Name** box.



81 Click **Save** button.

FT will calculate and create the VRML file. To view the file, open it with a VRML viewer.

Exporting to Bryce2 and Bryce3D

FT does not support map exports to Bryce2 or Bryce3D formats. However, Wilbur does. It is therefore possible to export a map from FT into a format Wilbur can use, and then to use Wilbur to export the results to Bryce.

Wilbur is provided 'as is' on the FT CD, along with user documentation.

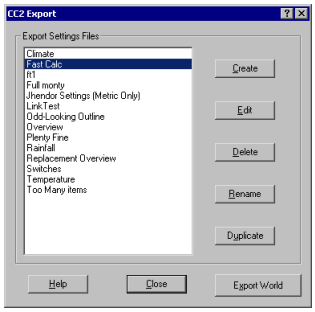
EXPORTING TO CC2 Pro

CC2 Pro is a powerful cartographical tool that can be used to further enhance and manipulate your world. Before you can do so, you must first export the world to one or more CC2 map files.

FT To CC2 Pro Export Options

Whenever you export worlds from FT to CC2 maps, you will be presented with a series of options that will determine what will comprise the resultant CC2 map file. Once you have determined these options, they may be saved for future use. You must create and save options before you can use them to export to CC2 files.

When you must choose CC2 export options, you will see the CC2 Export dialog box:



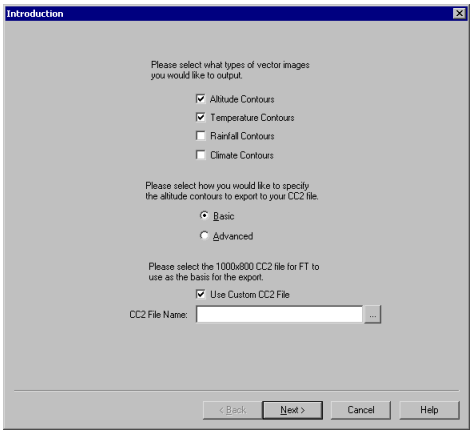
Available export settings files will appear in the list. Other features of the dialog box are:

- ✓ **Create**: Clicking on this button will start the CC2 Export Filter wizard (see below).
- ✓ **Edit**: This will start the CC2 Export Filter wizard, using the currently selected export options file. Changes you make to the settings during the course of the wizard will be saved to this file.
- ✓ **Delete**: Deletes the currently selected export file.
- ✓ **Rename**: Allows you to rename the currently selected export file.
- ✓ **Duplicate**: This creates a duplicate of the currently selected export file. The duplicate file will default to a "Copy of.." filename. You can then use the Rename function to change this.
- ✓ **Export World**: This will export the current world, using the options set within the currently selected export file.

To create a new CC2 export file:

82 Click **Create**.

You will see the CC2 Export Filter wizard's introductory dialog box.



83 Check the export options you require.

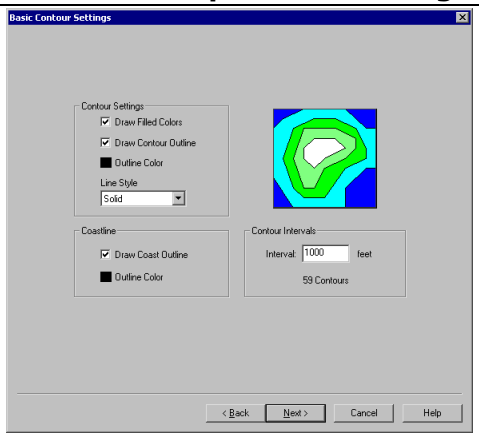
The checkboxes indicate which parts of the FT world data you wish to export to CC2. Each information level will be written to a separate CC2 drawing layer.

The **Basic/Advanced** radio button option is used to determine the options you will be presented with respect to contour output. The **Basic** option will provide a simple set of options. If you need to use non-standard contours, contour labeling, etc., then choose the **Advanced** option.

The Use Custom CC2 File checkbox is used to specify a custom CC2 template. When checked, the CC2 File Name edit box can be used to enter the name of an existing CC2 file or click directory selection button ... to select a CC2 file. The CC2 file must be saved in non-compressed format.

84 Click **Next**, and choose the settings you desire for contour output.

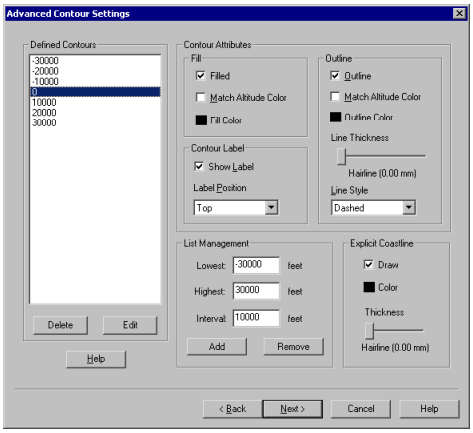
If you opted for Basic contour options, you will be presented with the Basic Contour Settings dialog box:



- ✓ **Draw Filled Contour**: Selecting this option will create solid-filled contour entities.
- ✓ **Draw Contour Outline**: Selecting this option will draw an outline around each contour.
- ✓ **Contour Outline Color**: Clicking on this color box will bring up the CC2 Color Picker, from which you may select the color to use for contour outlines.
- ✓ **Line Style**: Change this option to use a different line style for contour outlines.
- ✓ **Draw Coast Outline**: Selecting this option will draw an outline around the world's coasts.
- ✓ **Coastline Outline Color**: Clicking on this color box will bring up the CC2 Color Picker, from which you may select the color to use for coastal outlines.
- ✓ **Contour Intervals**: This setting will determine how many contours will be drawn, and the altitude represented by each. The lower this is, the higher the number of altitude contours that will be produced.

The thumbnail view will provide a simple overview of the options you have selected.

If you opted for Advanced contour options, you will be presented with the Advanced Contour Settings dialog box:



Contour Attributes > Fill options are:

- ✓ **Filled**: Selecting this option will create contours with a solid fill style.
- ✓ **Match Altitude Color**: Select this option to use the colors set for this world when creating the CC2 file. Uncheck it to choose another color.
- ✓ **Fill Color**: If **Match Altitude Color** is not selected, then you can click on this color box to choose the contour color you wish to use.

Contour Attributes > Outline options are:

- ✓ **Outline**: Check this to produce contour outlines in the resultant CC2 map.
- ✓ **Match Altitude Color**: Uncheck this box to use a color other than those set for the world when creating contour outlines.
- ✓ **Outline Color**: If **Match Altitude Color** is not selected, you can click on this color box to set outline color.
- ✓ **Line Width**: Adjust this slider bar to achieve the line width you wish to use for contour outlines in the CC2 map.
- ✓ **Line Style**: Choose a line style for contour outlines from this drop list.

Contour Attributes > Contour Label options are:

- ✓ **Show Label**: Select this box to produce a text label for each contour. For very rough worlds, this may cause your CC2 output to be smothered in text.
- ✓ **Label Position**: Use this drop list to set the desired position for contour labels, in relation to the contours.

The **List Management** section allows you to define which contours will be drawn in the CC2 map. The options here affect the **Defined Contours** list:

- ✓ **Lowest**: This value defines the lowest height for which a contour will be created. Negative values refer to sea depth contours.
- ✓ **Highest**: This value defines the highest height for which a contour will be created.
- ✓ **Interval**: This value sets the height intervals at which contours will be created between the highest and lowest settings.
- ✓ **Add**: Clicking on this button will create a contour list within the **Defined Contours** section based on your chosen settings.
- ✓ **Remove**: Clicking on this button will remove the whole **Defined Contours** list.

The **Defined Contours** section will display the contours currently set for the export. You can manipulate the list using the **List Management** section, or by selecting one or more contours from the list and then clicking on **Edit** or **Delete**:

- ✓ Clicking on the **Edit** button will allow you to individually set **Contour Attributes** (see above) for the selected contours.
- ✓ Clicking on the **Delete** button will remove the selected contours from the list.

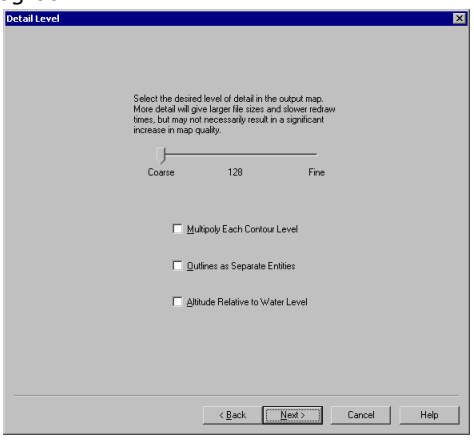
A word of advice and warning: The more contours you define, the larger the CC2 output file will be. The potential exists to produce very large output files indeed. The larger a file, the longer CC2 will take to load and redraw the map. Depending on your system's resources, CC2 may not even be able to open the file in question. We have discovered that a 500MHz machine with 128Mb RAM and a 32Mb graphics card takes around half an hour to load and draw a world map exported from FT of around 50Mb. To be reasonably useable, you should aim to produce output files of 10Mb or less. If this does not provide the level of contour detail you require, consider using the Multiple File export function to split your world up across more than one CC2 map.

The **Explicit Coastline** options are:

- ✓ **Draw**: Select this box to include a coastline outline with the map.
- ✓ **Color**: Click on this color box to select the color you wish to use for the coastline.
- ✓ **Thickness**: Use this slider bar to select the line thickness you wish to use for the coastline.

85 Click **Next**, and select the detail level options you wish to use.

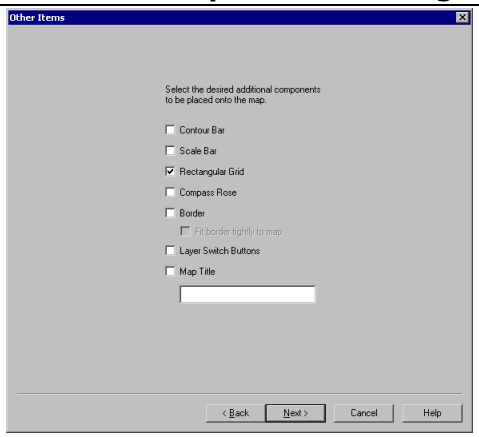
You will see the Detail Level dialog box:



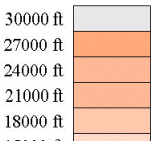
- ✓ The slider bar is used to set the level of detail within the resultant CC2 map. Coarse maps may appear blocky when zoomed in, and are suitable for world overviews. Fine maps will appear more realistic, but will create larger sized files and are thus only suitable for local area views (created using the Multiple Files export, see below).
- ✓ **Multipoly Each Contour Level**: Selecting this option will multipoly all contours of a given level together into a single entity. This will provide greater accuracy, but will slow down load and re-draw times.
- ✓ **Outlines as Separate Entities**: By selecting this option, the solid-fill and outlined contour components will be separated into individual entities. If this is unchecked, contour outlines will be created by using the second color functionality of CC2 - contour and outline will be defined within a single entity. Since entities that use this function are selected by their outline colors, this can cause problems when editing a map (in effect, all contours with the same outline color will be treated as if they were the same overall color). Checking **Outlines as Separate Entities** will eliminate this problem, but will double the number of contour entities created, thus slowing re-draw and load times down and increasing the output file size.
- ✓ **Altitude Relative to Water Level**: By selecting this option, the altitude of exports will be calculated relative to the water level user editing layer. If unchecked, all contours will be computed relative to 0 altitude, not the currently-set sea level. If user-drawn lakes are to appear in the CC2 output, this item must be checked.

86 Click **Next**, and select other items you wish to include in your map.

You will see the Other Items dialog box:



The items selected here will be drawn into the CC2 map. The possible items are:



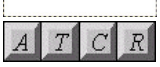
Contour bars show the meaning of individual colors for a given information set. A separate contour bar will be added for each information level you have chosen to create.

Scale bars show actual distances represented by a smaller, scaled distances on a map.

If you opt to include a grid, you will be presented with the Grid Settings dialog box. The grid will be drawn to the settings you choose.

A compass rose shows in which direction north lies. When outputting multiple, linked maps, the compass rose will include links to other files created. Clicking on one of the compass points will load the map that lies in the selected direction at the current map's level. Clicking in the center of the rose will load the next lowest level map.

Selecting the Border check box will produce a map border in the output file. The Fit border tightly to map checkbox can be used to ensure that there is no white space visible between the exported map and the border.



Layer switch buttons allow you to navigate easily between the different information levels you have selected to create, along with their respective scale bars. Click on "A" for Altitude, "T" for Temperature, "C" for Climate, and "R" for Rainfall.

The Title check box will produce a cartouche containing text entered into the edit box.

87 Click **Finish**.

The Finish button may actually appear on the Grid Settings dialog box if you have opted to include a grid. If so, click **Next** to go to the Grid Settings dialog, choose the options you wish, and then click **Finish**.

88 Enter a name for your CC2 export file, and click on **OK**.

You will be returned to the CC2 Export dialog box.

89 To export your world to CC2, select the export file you wish to use and click **Export World**.

FT will now calculate and create the CC2 file (or files) to your chosen specifications. Note that this may take some time, depending on the options you have set in the CC2 export file.

Exporting To A Single CC2 Map

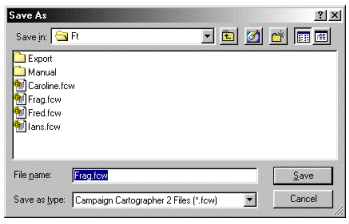
To export your world to a single CC2 file:

90 Choose **File menu >> Save CC2 File**.

You will see the CC2 Export dialog box.

91 Select the desired export file, or create a new one, and press **Export World**.

You will see the Save As dialog box:



92 Give the file a name, and press **Save**.

FT will now create your CC2 file.

This command saves the current FT view to CC2. Thus, to produce a CC2 map covering a small area of your world, just zoom into the area required and follow the steps above. To ensure that the same view can be exported during different FT sessions be certain to use the Named View features available from the View menu.

Exporting To Multiple CC2 Maps

Just as you can export worlds to multiple tiled image files, you can export them to multiple CC2 maps. The procedure is virtually the same as that for multiple image exports:

93 Choose **File menu >> Export World >> Multiple Files**.

The Multiple Image Export dialog box will appear.

94 Click to check the **Generate CC2 Files** box.

You can also check the JPEG and HTML options to simultaneously export your map to all three formats.

95 Set map level options as desired.

These are the same as per multiple image file export (see above). However, one further **Map Level Info** option becomes available:

✓ Check the **CC2 Links** box to compass rose and map links between the generated maps.

96 Type the name of an existing directory to which the map files will be written in the **Output Directory** box, or click directory selection button ... to select the directory from a dialog box.

97 Click on **OK** to start the export.

FT will generate map files to the specifications you have set, and an overview map depicting the entire world. As with multiple image exports, this process may take some time depending on the CC2 export options set.

Standard CC2 layers for FT exports

When FT exports a map to CC2 Pro, it places entities on particular layers:

Entities	Layer	Entities	Layer
Climate contours	CLIMATE	Climate contour bar	CBAR CLIMATE
Rainfall contours	RAINFALL	Rainfall contour bar	CBAR RAINFALL
Temp. contours	TEMPERATURE	Temp. contour bar	CBAR TEMPERATURE
Altitude contours	RELIEF/CONTOURS	Climate contour bar	CBAR CLIMATE
Contour outlines	CONTOUR OUTLINES	Map title	MAP BORDER
Altitude labels	RELIEF/CONTOURS	Map border	SCALE BAR
Coast outline	COAST/SEA	Layer buttons	MAP BORDER
Grid	HEX/SQUARE GRID	Compass rose	MAP BORDER
Scale bar	SCALE BAR	Links	MAP LINKS

Importing CC2 maps with Wilbur

While FT cannot import maps drawn using CC2 Pro, it can import binary files. While a future issue of FT may address CC2 Pro to FT imports more fully, basic contour information can be transported from CC2, through Wilbur, and into FT by following this procedure:

98 In CC2, hide all layers but a specific contour level (or hide everything except the entities you wish to use at a specific altitude level)

99 Use **File >> Save As**, change the file type to PNG and the file size to one unique to the contour level, and press **OK** to save the map

100 Repeat the above two steps for each contour level required

101 Click **Tools >> Options >> JPEG/PNG** and make a note of the file size used for output,

102 Load the lowest level contour image into an image editing package, such as *Adobe® Photoshop*, or *PaintShop Pro*

103 Make the image to grayscale

104 Change the color of the contour concerned to a distinct shade of gray. For the lowest contour level (the coastline), use a near-black shade (black should be used to represent the sea). Increments of 10, on the 0-255 scale, work well

105 Copy the resultant contour (not the entire image) into a new image of the same size

106 Repeat the above process for each of the contour images, until all contours are present in the new image

107 Save the final image as a 256-color Windows® bitmap file

108 Use Wilbur to open the bitmap as a surface (**File >> Open: 8-bit BMP Surface**)

109 Scale the altitudes to the desired level (**Surface >> Point Process >> Scale: To Range**)

110 Use **File >> Save As** to save the file to Muse DTED format (a 16-bit binary format)

111 In FT, use **File >> New**, check the **Binary File** radio button, and press **Next**

112 Click the **Choose Elevation File** button

113 In the Binary Data parameters dialog, select the Muse DTE file you created with Wilbur, set the Per-sample information to 2-byte, LSB First, Signed, Header Length = 1024, Line Width to the width of the image ×2, Width and Height to the width and height of the image, and Map Edges to the locations on the globe where you want the map to be placed

114 Click **OK**, then **Finish**, to produce the map

This process is not perfect, and a certain degree of editing will be necessary to achieve the results you require.

There are several methods by which this process can be made more efficient. For example, using a grayscale contour scheme in CC2 (or by translating a color contour scheme to grayscale, by means of a macro for instance) can eliminate the image editing and building steps between CC2 output and Wilbur.

> Wilbur is included on the FT CD. More information about this program can be found within its own documentation (also provided on the CD) and on the Wilbur website (www.ridgenet.net/~jslayton/software.html).
>
> More information about importing binary files into FT can be found in the next chapter, "*Creating Worlds From Binary Files*".

Importing maps using Selection Mask Files

This process can be used to import continental shapes from existing maps that have been drawn using CC2 or a paint program. It is not as precise, in terms of contours, as the method detailed above, but it is much easier to use.

115 Create an 8-bit grayscale bitmap of your world.

The bitmap should range from black (grayscale color value 0) for regions which are wholly water-filled, to white for regions that are wholly inland. Using only black and white is possible, which will result in fairly chunky coastlines which can later be edited within FT for a nicer effect.

The image size should be twice as wide as it is high (in pixels), and its dimensions should be divisible by 4. As a suggested recommendation, an image size of 1024×512 works well.

You should also bear in mind that this process uses an equirectangular projection, so land distortions should be accounted for.

116 Start FT.

If you have the **Reload last world file on startup** preference option set, you may wish to start a new synthetic world before proceeding.

117 Change the **World Settings** **>> Advanced >> Editing Setup** so that the size (shown in the **Custom** edit box) equals the width of your grayscale bitmap.

If you're using the recommended 1024×512 image size, selecting the **Large Editing Setup** will provide this. Otherwise, you may have to choose **Custom**, and manually enter the required value.

118 Uncheck the **Continental Shelves** box, and press **OK**.

119 Enter 5000 in the **Highest Peak** box, and -20000 for the **Lowest Depth**, then press OK.

120 Select **Tools menu >> Global Set >> Land Offset**, and use a value of -5000 to bring the land below the sea.

121 Select **Select menu >> Load Selection**, and choose the grayscale bitmap you have created for your world.

The bitmap will be loaded as a selection mask. You will now see your continents outlined on the world by selection boxes.

122 If desired, smooth the edges of the selection by using **Select menu >> Feather**.

A value of 1.0 or less will produce good results.

123 If additional land roughness is desired, select **Tools menu >> Global Set >> Land Roughness** with a value of 3 to 8.

124 Select **Tools menu >> Global Set >> Altitude**, with a value of 0.

Your continents will now be roughly at sea level.

125 Select **Tools menu >> Global Smooth**, using a value of 5 to eliminate some of the extremes of roughness in the landscape.

126 Raise the land to bring most of the continents above sea level.

127 Edit the world to place mountain ranges and other features.

Using the **Tools menu >> Mound** function with **Min/Max** values of 0/3000, a **Gamma** of around 4, and **Replace Offset** unchecked, with mountain range areas sketched out using the **Select Freehand** tool can produce some good mountain range effects.

CREATING WORLDS REAL WORLD DATA

As well as being able to create worlds from scratch, FT has the ability to import binary data files that define sections of terrain. You will find examples of such files, from the GTOPO30 real-world data sets, that you can import into FT to produce maps based on Earth.

Note that the binary file used must be present for as long as you intend to use the world file. FT does not import the binary data into its own format, but rather uses the binary file for reference. Moving or deleting the binary file after saving a world created with it will result in the world file being unusable. This can be avoided by using the Burn In To Surface function, which is further detailed below.

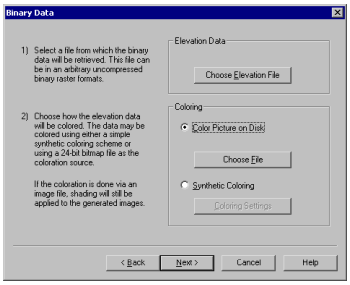
To create a world from a binary file:

128 Select File Menu >> New.

You see the Select World Type dialog box:

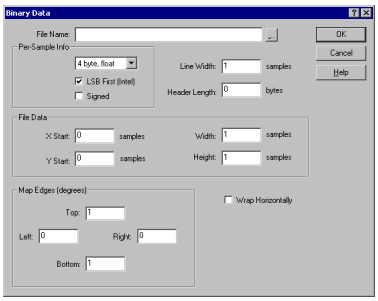
129 Check the **Binary File** radio button, and click on **Next**.

You see the first Binary Data wizard dialog box:



130 Click **Choose Elevation File** button.

You see the Binary Data parameters dialog box:



131 Click ... to select the required file from a dialog box. Select the file *ETOPO5.bin* in the *Terrain Data* folder.

If the selected file has an associated description, you will be prompted as to whether you wish to use this or not. For the most part, the settings on this dialog box will be determined by the binary file selected.

132 Press **OK** to return to the Binary Data wizard.

133 Select the **Synthetic Coloring** radio button.

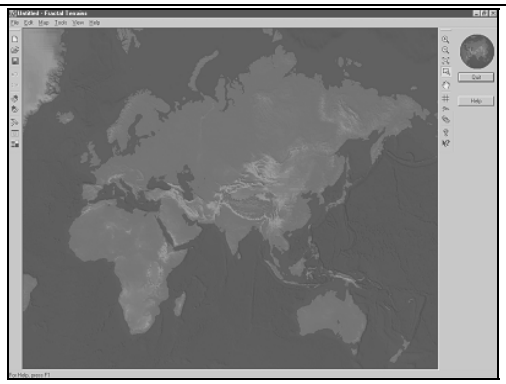
This will use the color settings FT uses by default when creating synthetic worlds.

134 Click **Next**.

A summary of the map to be generated will appear.

135 Click **Finish** to start generation.

FT will calculate the new map, and display it in the main window.



In most cases it is better to copy data files onto your hard drive before using them to make maps, as this improves the speed of FT.

Burn In To Surface

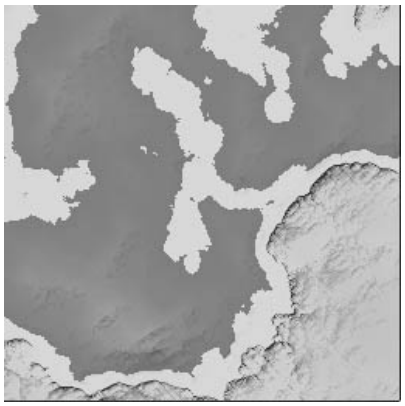
This function takes the current world information, and includes the data directly in the current FT drawing. This removes FT's reliance on binary data files; in effect, the binary data is converted into FT's native format.

As a side effect, the **Burn To Surface** function removes the contribution of the fractal basis function, resulting in a smoother map. This makes the function useful for worlds that do not use binary files (e.g., when a surface has been roughened, using the **Burn To Surface** command will set the roughen channel to 1.0 (the default), and transfer all altitude adjustment to the land offset channel).

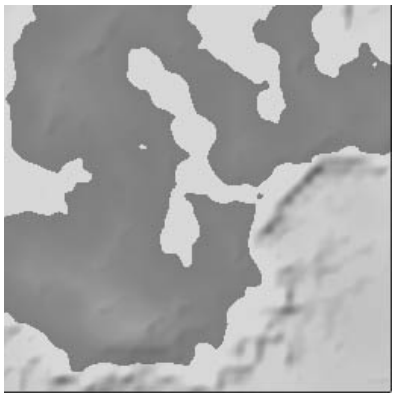
Once the **Burn In To Surface** function has been used, it cannot be undone.

To use the **Burn In To Surface** function, select **Tools menu >> Burn In To Surface**. Since the function cannot be undone, FT will prompt you to make sure you wish to proceed.

The images below show what can happen with the burn operation at differing editing resolutions:



Original



Small (256)

Notice how the fine details are lost at small resolution.

Flat Worlds

If you want to manually draw land patterns, rather than allowing FT to randomly generate them for you, you can create a new world that possesses a flat, featureless terrain.

Using a flat world as a starting point, you can then use the editing tools to paint terrain features as you wish.

To start a new flat world:

136 On the File menu, click New.

You see the Select World Type dialog box:

137 Check the **Flat World** radio button, and click on **Next**.

You see the Synthetic World dialog box.

Because some of FT's editing tools require fractal information, flat worlds use the same underlying setup as do synthetic worlds.

138 Click **Generation Settings** button, and set desired options.

139 Click **Coloring Settings** button, and set desired options.

Steps (3) and (4) are performed in exactly the same way as for synthetic worlds. See the ***Your First World*** tutorial.

140 From the Synthetic World dialog, click on **Next**.
You see summary of the world you are to produce.

141 Click on **Finish** to complete generation setup.
FT will calculate and draw the flat world.

142 On the Tools menu, click Global Set >> Global Raise, type **1000** and press **OK**.
FT has raised the height all over the globe.

> Because of the way the raise and lower tools work, it's better to start with a raised surface and use the lower tools to make seas than vice versa.

The world may now be edited as you see fit using FT's editing tools. See the ***Editing Your World*** tutorial on page 332 for guidelines.

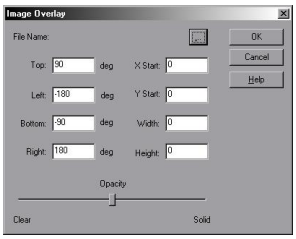
INSERTING OVERLAY IMAGES

You can insert image files as overlays in FT for use as guides when editing. Such images do not form part of the map, and are not saved with the world file. They simply serve as templates to aid your work.

To insert an overlay image:

1 On the Map menu, click Overlay Image.

You see the Image Overlay dialog box:



- ✓ File Name is the image file to use.
- ✓ Top, Left, Bottom, and Right are the edges of the area that will be occupied by the image. Top and Bottom are latitudes, Left and Right are longitudes.
- ✓ X Start, Y Start, Width, and Height indicate the area of the image to be used in the overlay, as pixel references.
- ✓ The Opacity slider controls the transparency of the image, as it will appear in the main window. Moving the slider towards the Clear end of the slider makes the image more transparent, allowing the world below the image to be more clearly seen. Moving the slider towards the Solid end has the opposite effect.

2 Click ..., and select the image file desired.

The types of image file that may be selected is dependent on whether Microsoft Internet Explorer® 4.0 or higher is installed on your system. If it is, you may select BMP, GIF, JPEG, or PNG files. If it is not, you are limited to BMP files alone.

3 Enter parameters into the Image Overlay dialog box according to the parameters of the image selected, and your requirements.

4 Press **OK**.

The image will appear as an overlay in the main window.

To remove the overlay, open the Map Overlay dialog again and click Cancel instead of OK. It may also be removed by re-loading the world once your edits have been saved.

CREATING A WORLD FROM SCRATCH

This brief tutorial is designed for FT users who wish to create an Earth-like world for use in their campaign. The tutorial is divided into three parts: setting up FT parameters to generate a workable world map, tweaking those results within FT, and, finally, optimizing FT's export tools to generate suitable maps for further modification within CC2. While the tutorial contains some specific guidelines, your exact results will vary in accord with FT's randomizing factors and climate model. However, the material herein should be sufficiently informative to help you create relatively detailed, passably realistic, and ultimately satisfying worlds with Fractal Terrains.

This tutorial assumes that you possess familiarity with FT's basics, though instructions are provided for particular menu commands and dialog boxes where necessary.

Generating the World with *Fractal Terrains*

The purpose of Fractal Terrains is to create entire worlds easily and quickly. However, FT does not always produce output that captures the "look and feel" you may desire for the world you've envisioned. Many first-time users expect FT to generate Earth-like worlds right out of the box, and while FT is certainly up to the task, it does require some setting adjustment from you.

By Earth-like, I refer to the general topology of our own planet: spread out a global map to see what I mean. Our planet features clearly distinguishable continents, separated generally by significantly larger bodies of water. Within some landmasses are lakes or large seas that eventually connect to larger oceans. Various elevations and plateaus reach from low coastal areas to high mountain peaks; these peaks are themselves parts of coherent mountain ranges.

While no world randomly created with FT can match exactly our own Earth, we can approach earth-like features with *Fractal Terrains.* The steps below provide a good starting point:

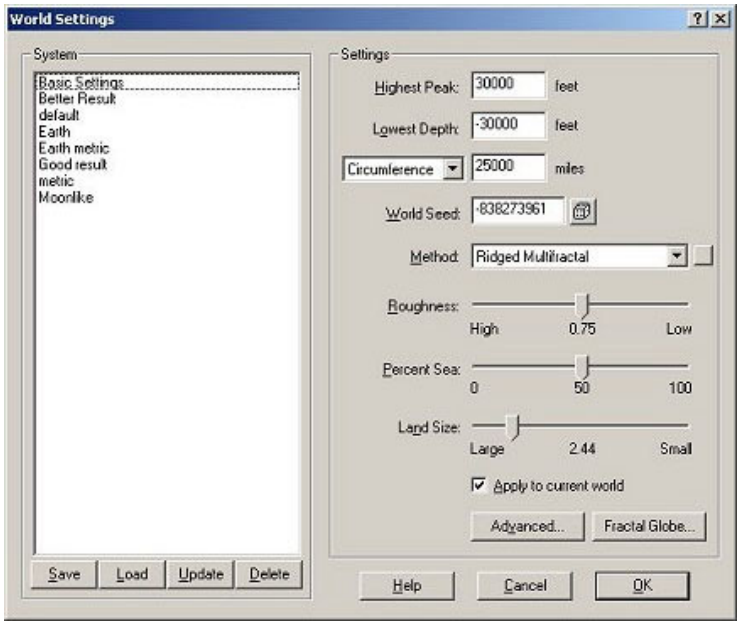
5 Create a new world as outlined in the section **Your First World** (pp. 3-7) of this manual.

6 Depending on your settings, the world thus created may or may not appear very Earth-like. To push the world toward a more Earth-like look and feel, click **World Settings** .

7 The three settings you want to concentrate on are Roughness, Percent Sea, and Land Size. I suggest the following values:

- Roughness: 0.75
- Percent Sea: 50
- Land Size: 2.44

With the exception of the World Seed value, the remaining settings in the **World Settings** dialog may be kept:



8 Click **Advanced** to further adjust output. Again, most settings may be left as they are, but depending on the speed and memory capacity of your PC, you may wish to alter the size of your **Editing Setup,** which affects the file size of your world and the FT's rendering time for map redraws. I recommend the following:

PC Processor Speed	PC RAM (in megabytes)	Editing Setup Setting
Less than 1GHz	Less than 256	Small

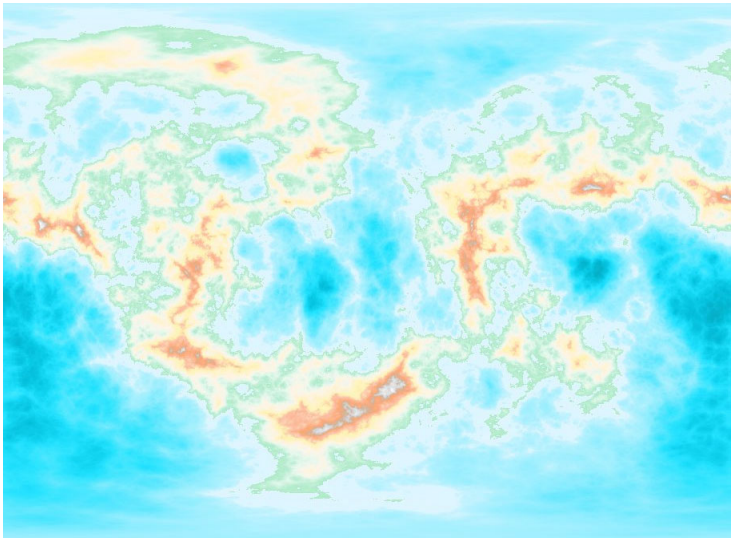
Between 1GHz and 2GHz	Between 256 and 512	Medium
2GHz or more	512 or more	Large

The setting you choose affects the file size and detail of the FT map created, and, while file sizes can be significant (e.g., 12MB at the **Large** setting), the extra detail is worth it. Therefore, I recommend selecting the largest **Editing Setup** option you're comfortable with – if you have a slow PC but you don't mind waiting, by all means go for the **Medium** or **Large** settings. After you've made your **Editing Setup** choice, click OK to return to the **World Settings** dialog box.

9 In the **World Settings** dialog box, click OK to set the world parameters. This will redraw the world using the settings you've just entered.

10 With these settings in place, click **Next World** a few times to cycle through various world layouts. Continue cycling through worlds until you find one that you like. What makes a world layout interesting depends on your tastes, and what you envision going on in the campaign you're designing. This is entirely subjective, and for most, it may be a simple matter of knowing what you want only after you see it. Personally, I evaluate the map in anticipation of where I want to base my campaign, and where I want my adventurers to travel, all the while viewing the terrain in terms of what societies and cultures might be located at any given locale. Remember that the world FT generates doesn't have to be "perfect"—you can edit the map later to create sub-continents, bridge landmasses, or create island archipelagos.

Using the parameters above (with a world seed of 198623990, the Miller Cylindrical projection, and the Jhendor color scheme), I've chosen the following world:



There are a few landmasses I want to edit and a few islands I want to raise, but this world has a good look and feel—plenty of well defined continents, large seas, inland bodies of water, and even a good spot for an island archipelago.

11 When FT has created the right world for your campaign, save the file. You're now ready to use FT's editing commands to customize the world.

Tweaking the FT Output

There are two phases to tweaking the output that FT creates: altering the landmasses, and then the climate. The former is accomplished by raising or lowering elevation; the latter by adjusting climate factors like rainfall and temperature. We'll start by making a few changes to the existing landmasses.

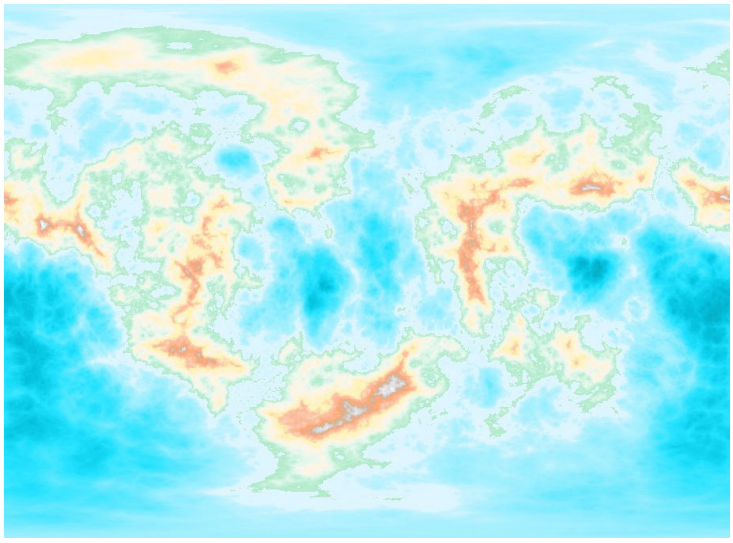
The first thing I want to do is break apart some of the landmasses to establish clearly separated continents. To do so, I'll use **Lower** to sink some of the land bridges into the sea. I'd also like to create a small island archipelago in a tropical region—this area will serve as a setting for a future pirate campaign. Raising islands requires the Raise tool (p. 20), which I'll use to "paint" over a shallow sea area.

Before painting new elevations with the Raise and Lower tools, verify the current Tool Settings via the Tools|Settings menu command. Note the value in the Raise/Lower field; this is the increment by which elevation is changed every time you apply the Raise or Lower tool. I recommend adjusting this to a small and irregular number, which allows you to add or subtract altitude a little at a time and also ensures that the resulting land heights do not appear too artificial. In my Tool Settings dialog box, I entered a Raise/Lower value of 164.042 feet.

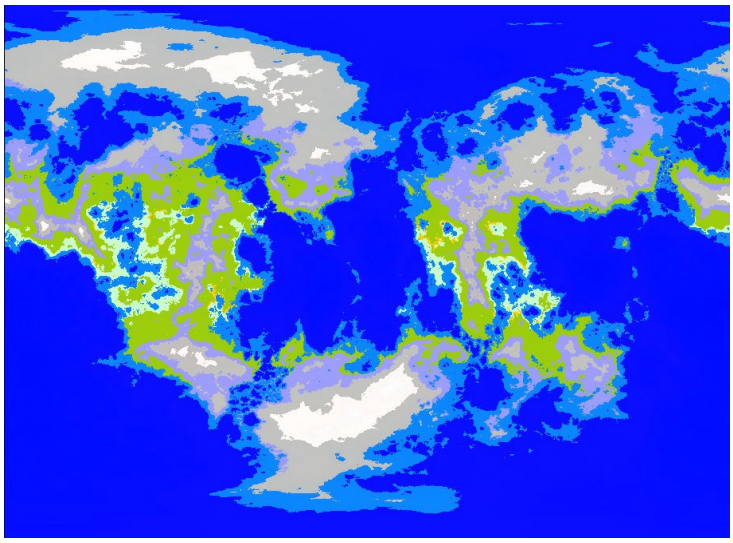
One last recommendation: use the Raise/Lower tools conservatively, especially if you have a slow PC that takes time to redraw. This is especially true when lowering elevations along coastal areas—if you gouge too deeply, you'll remove continental shelves, and your world's beaches will abut deep ocean depths with no realistic gradient or slope. You can always "fix" elevation mistakes with the Raise/Lower tools, but after too many attempts, the world may begin to take a

very different shape from what FT originally created. The sensible practice is to raise or lower elevation bit by bit, waiting for results to appear before continuing.

After my altitude adjustments, my world map looks like this:



The next task in our world tweaking is to check the climate settings to verify that the output contains the climate types desired (for example, if you have a desert-based campaign in mind, you need to make sure your world contains a desert). The climate view is accessed via the Map|Show Climate menu command. Here is the climate view of the world above (if you've adjusted the climate colors on your system (p. 5), the colors you see may not match the colors shown below):



The predominant climate types appear to be Tundra, Alpine forests, Temperate forests, and a scattering of Tropical Deciduous forest. I'd like to add some desert and grassland areas, and, if there's room, add some more tropical jungle.

While FT provides a climate painting tool (p. 20) for changing climate, you may wish to apply the more natural method of climate change of adjusting an area's rainfall or temperature. This makes use of FT's built-in climate modelling rules and also "blends" different climates with realistic borders and gradations. With this in mind, we'll alter rainfall (leaving temperature ranges as FT originally created them) by applying the Wetter/Drier tools (p. 20) to specific areas of the map. The anticipated result is that regional climate will change as rainfall levels fluctuate.

Before adjusting rainfall levels, however, I need to consider some general weather patterns for my world. To provide earth-like results, these considerations need not involve hard science or exact data, but they should be based on the meteorological trends of our own planet. Fortunately, there are a few rules of thumb we can apply, and, while these rules are hardly without exception in the real world, they form enough of a consistent basis to help you place climate types realistically.

First, climate depends largely on temperature and rainfall, both of which are affected by altitude. Low elevations are generally warmer and better suited to retaining moisture than high elevations, which are colder and hold very little moisture. Wind circulation keeps weather moving by pushing pressure cells across land and water. For the most part, these cells circulate in a clockwise direction north of the equator; south of the equator, the opposite is true, and they circulate in an anti-clockwise direction.

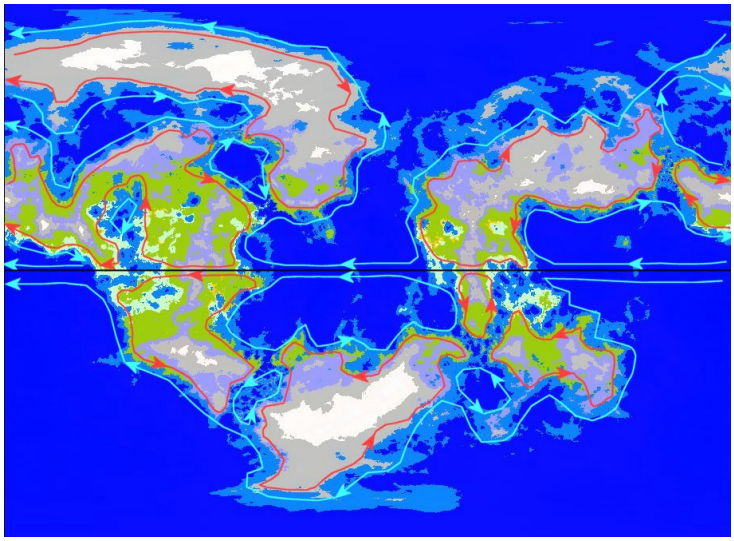
Winds that travel over water tend to pick up moisture, while winds that travel over land eventually lose any moisture they were carrying. Thus, a coastal area in the path of a wind current is likely to receive more rainfall than an area

further inland, though an inland area adjacent to a large lake could conceivably receive a large amount of rain. Lacking large inland bodies of water, however, deep inland areas are likely to be drier than coastal regions, especially if land elevations increase.

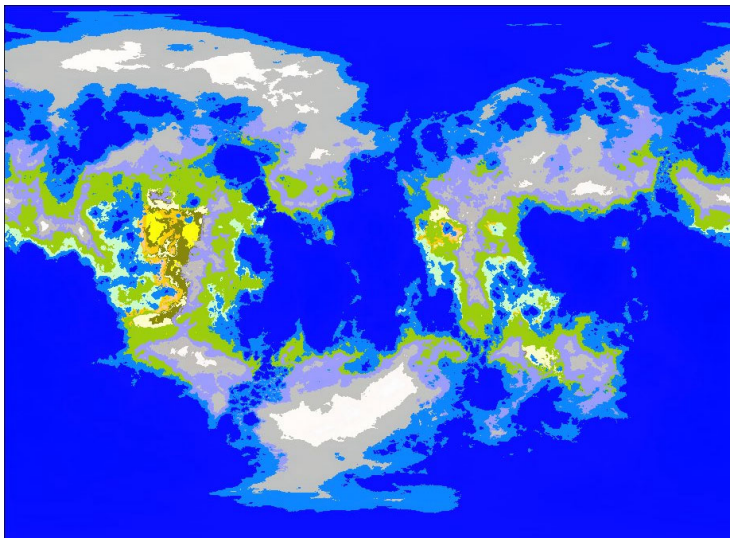
In this respect, high hills and mountains affect rainfall. When the paths of moisture-laden currents intersect with high-elevation landforms, those currents drop their moisture in the form of precipitation—the colder air causes latent moisture to condense and fall as rain (or snow, depending on temperature). On the leeward side of the mountain, however, is found a "rain shadow," an arid region that receives little or no annual precipitation.

Reflecting the patterns of prevailing wind currents on the FT world map helps determine where landforms like deserts, grasslands, tropical forests, deciduous forests, etc. are likely to occur. To simplify the process, imagine a single, predominant current for each large body of water and each large landmass. Imagine further that the path of each current circumnavigates the rough outline of its respective body of water or landmass. Recalling that currents over water carry moisture and deliver rain while currents over land lose moisture and supply little or no precipitation, you can get a rough idea of where to place certain climate types on the FT map.

To illustrate this, the FT map below shows the paths of my predominant currents. Arrows indicate the direction of flow (clockwise in the north and anti-clockwise in the south); red shows land currents and blue shows water currents; the black line represents the equator:



Applying these rules to the world I've created might generate something resembling the following:



From this high-level zoomed out view, the changes may seem slight, but you should note the addition of much desert, chaparral, and grassland area, as well as slightly increased rain forest where appropriate. At this point, you should save your map once more. The next step is to adjust FT's output settings in preparation for export to CC2.

Exporting to *Campaign Cartographer 2*

With your map tweaked to your satisfaction, it's time to export your map into CC2 Pro. There are two factors within FT that will affect the quality of output: the current FT view of the map and the detail level of the export.

When an FT map is exported to CC2 Pro using the File|Save CC2 Pro File menu command, the output consists of the current view. This is a highly advantageous feature of FT, because it saves you a great deal of work when creating detailed maps of your campaign world. Before *Fractal Terrains,* you had to render your entire world into CC2 Pro, then

cut out individual pieces of your map to make smaller, detail maps. This often required redrawing coastlines, recreating ocean and landmass polygons and fills, and replacing scale bars.

Fractal Terrains, however, automates many of these processes. You can use the Save CC2 File command to create a detailed CC2 Pro map of whatever FT view you like. Now, detail maps are better created by zooming in to specific areas of your FT map and then exporting to CC2 Pro.

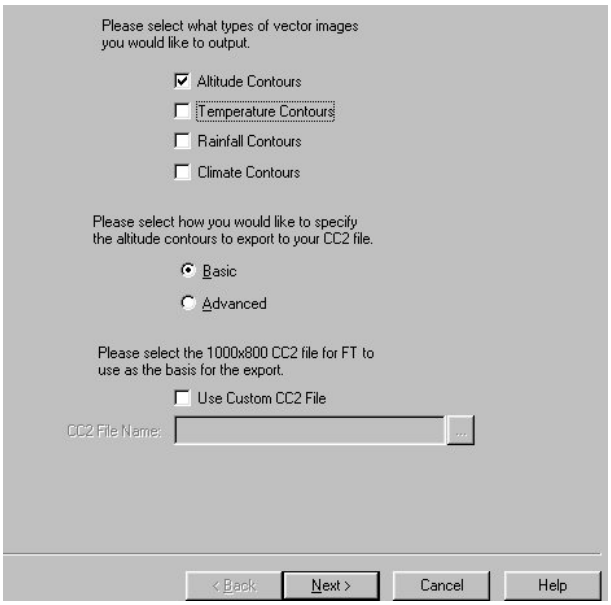
For this portion of the tutorial, we'll create a CC2 Pro map of a detailed campaign area. Again, depending on what changes you made in the previous steps, your results may not match precisely, but the steps below should get you on track:

12 Zoom into an area of the FT map that you would like to detail. Once you find a view you like, I suggest that you save the current view with the View|Add View menu command.

13 Use the File|Save CC2 File menu command to open the CC2 Export dialog box. Chapter 9, Exporting to CC2 Pro (p. 340) contains detailed instructions regarding export instructions. The steps below assume that you have a working knowledge of the CC2 Export options and parameters.

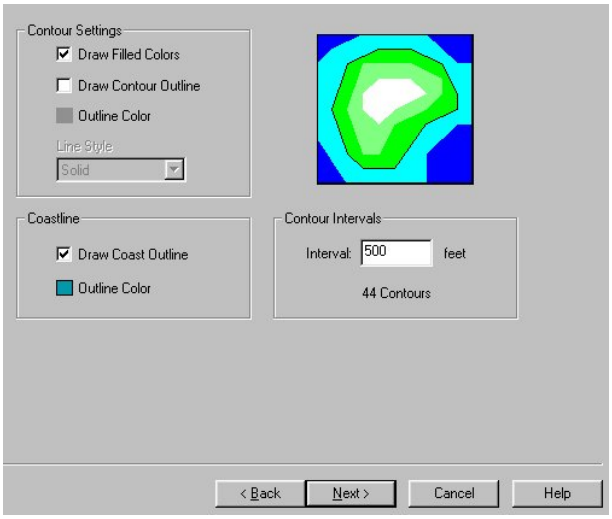
14 Click **Create** to generate a new export setting.

15 In the Introduction dialog box, select the Altitude Contours checkbox, and the Basic option radio button to dictate how contours are exported.



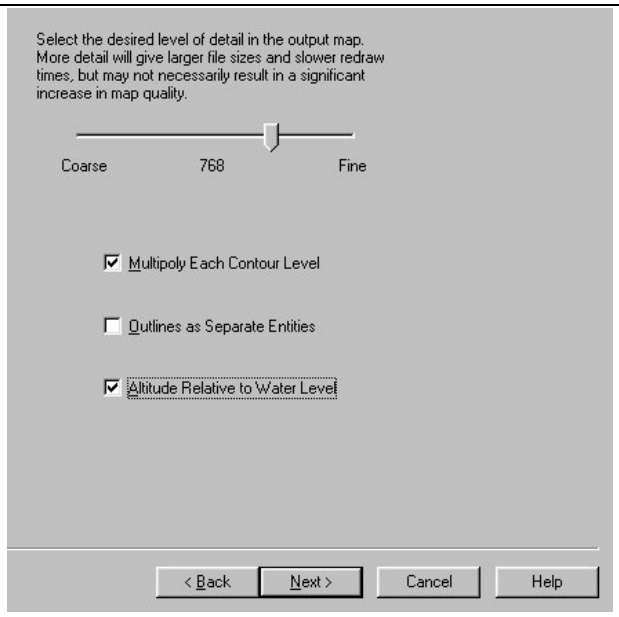
16 Click **Next** to continue.

17 In the Basic Contour Settings dialog box, uncheck the Draw Contour Outline checkbox. Leave the Draw Coastline Outline checkbox checked, but click on the black square next to Outline Color to select colour 68 for your coastlines. Because this is a detail map, you may decrease the Contour Intervals value to show more contours. However, for larger maps, you will want to keep the value high, otherwise your CC2 Pro output will contain more contours than you probably need at the price of an unwieldy filesize.



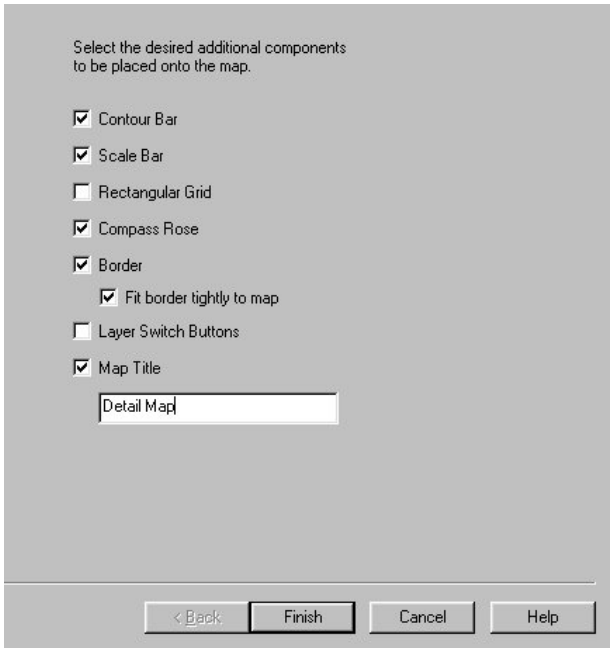
18 Click **Next** to continue.

19 In the Detail Level dialog, you may specify the granularity displayed in your output CC2 Pro map. This aspect of the export is noted most strongly in the rendering of coastlines and small islands—the higher the detail value, the rougher the coasts and the more tiny islands included in the output. As the warning in the manual states, however, higher detail settings can create very large CC2 Pro files with very long redraw times. My recommendation is to start at 256 or 512 and gauge your PC's results from there. If you are satisfied with the combination of detail, filesize, and redraw speed, you may wish to try a higher setting (e.g., 640 or 768). I also suggest that you check the Multipoly Each Contour Level and Altitude Relative to Water Level options.



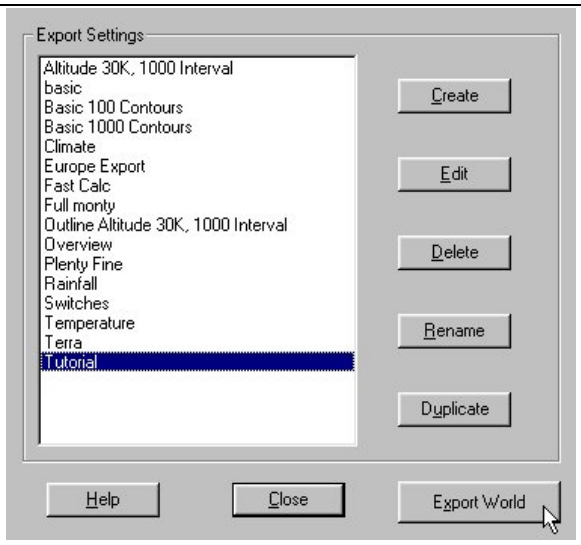
20 Click **Next** to continue

21 In the Other Items dialog box, you may select additional accessories or features that FT will add to your CC2 Pro map. I suggest the following:



22 Click **Finish** to continue. You'll be prompted to enter a name for this export setting; perhaps "Tutorial" is appropriate (you can always edit or delete it later).

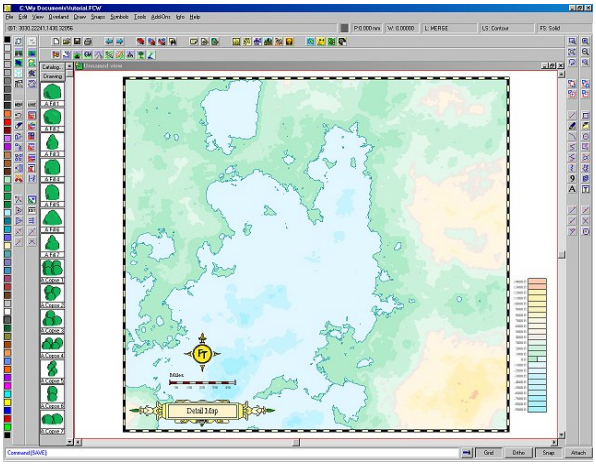
23 You are returned to the CC2 Export dialog box. In the Export Settings options, select the "Tutorial" setting you just saved, then click on the Export World button.



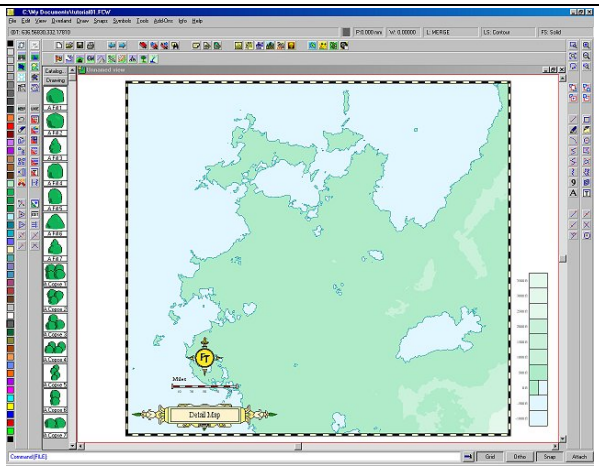
24 You are prompted to select a destination directory and provide a filename for the exported map. Name the map "tutorial.fcw" and click on the Save button. *Fractal Terrains* begins the export process; depending on your PC's speed and memory, and the precise level of detail you specified above, this could take up to several minutes to complete.

25 When the export is complete, you're returned to the CC2 Export dialog box. Click on the Close button and launch CC2 Pro to open the tutorial.fcw map you saved in Step 13, above.

26 By default CC2 Pro saves its files in compressed format. FT uses uncompressed files for easy of writing. If you have this option set (Tools menu >> Options >> FCW, FSC, FCT) the file size will be reduced when you save the map (my tutorial.fcw map opened at 2,247KB but after a quick save command, the filesize was reduced to 1,385KB).



For illustrative purposes only, let's see how adept FT is at creating detail maps by returning to the *Fractal Terrains* map and zooming into a detail view of the detail view you saved in Step 1, above. Follow all the steps as put forth above, using the Tutorial export setting to create your CC2 Pro output. Here's what it looks like on my PC:



A tremendously helpful timesaver offered by FT is the automatic creation of a scale bar sized specifically for the map created. For example, the scale bar in the first display is 500 miles long; in the second detail it is only 100 miles long.

Note also the altitude contour bar on the right has far fewer contours than the first detail view. If you wanted to achieve more granularity, you could reduce the Contour Interval value specified in Step 6 above. While this would not produce contour colours beyond those found in FT, it would increase the step increment of the contour bar exported to CC2 Pro.

In a related vein, be aware that the colours included in the CC2 Pro map match whatever scheme present in the FT view from which the map was exported. Therefore, if you're using the Jhendor colour scheme for altitude, those colours will manifest in the CC2 Pro output. If you change the climate colours, for example, and export a Climate Map (check Climate Contours in Step 4, above), your changes will present in your export.

Regardless, your CC2 Pro map is ready to edit

Conclusion

This concludes the *Fractal Terrains* tutorial on creating earth-like worlds for further development in *Campaign Cartographer 2.* It is hoped that the data above have helped get you on your way to creating your own, quasi-realistic worlds for your own campaigns. Despite anything found above, though, the best advice for getting the most out of FT and CC2 Pro is to experiment, tweak, and explore with the various options available to find the world output perfect for you.

FT REFERENCE

Within the tutorials, you have been introduced to all of FT's component parts. Within this chapter, we shall discuss the more advanced features of the package, and will explore some of FT's features which you have already met in more detail.

Theory

FT does a lot of very peculiar things internally and it may help the understanding of what the tools do if you have an understanding of what the program does.

The Elements

A map is composed of a number of elements that the user normally doesn't think about. A user's view of the world is that it has an altitude, a temperature, a rainfall value, and a climate derived from the two. The program uses a number of other values in its work, however. For instance, the altitude is composed of many different components working together (the fractal basis function, internal scaling and offset factors, user-defined scaling and offset factors, and continental shelves) to get the final altitude value at a point. The temperature and rainfall similarly have user-defined scaling factors and offsets, as well as a fractal basis function.

Fractal basis function

The heart of FT is the fractal basis function – ***fractal()***. In essence, this is a mathematical entity evaluated in 3D space (the surface of the sphere).

The magnitude of the function is used as the basic altitude. FT includes two different basis functions: Ridged Multifractal and Brownian Noise. They look somewhat different in terms of their final output, but they are treated in the same manner internally.

When a new world is generated, FT evaluates the fractal basis function over the sphere. From the results of this calculation, it figures out what the minimum and maximum values are, as well as scale and offset factors required to get the desired percentage of water and min/max values. All the user ever sees of this is the min/max values, percentage sea slider, and choice of basis function.

Because the initial surface evaluation is rather coarse, it is possible that true min/max values won't be found and the surface can exceed the defined min/max values. The derived scaling and offset values (***fsea*** and ***fscale***) are used to convert the raw basis function value (typically in the range of 0.2 to 1.5 for the Ridged Multi-fractal model) into the user-defined min/max range.

Offsets

The land **Raise/Lower** tools work directly on the user-defined offset value. The values are painted directly into the offset map. One simple addition, and that's all there is to it.

Scaling

The land **Roughen/Smooth** tools work on the user-defined scaling value. The values are painted directly into the offset map. One final multiplication is all it contributes.

The roughening effect comes about because it is scaling the fractal basis function. Unfortunately, this can also result in very high altitudes - it can create a world with interesting contours that are just a bit too high. Just set the scaling factor to values less than 1, and the mountains will drop.

Continental Shelves

The continental shelves are an exponential post-process applied to the altitude values. The raw altitude gets offset downward by the amount of the continental shelf level, then an exponent of approximately 2 (or 0.5 in the case of terrain below the shelf level) is applied. After re-scaling to the correct min/max values, the final value is ready for the user-defined offset and scale.

The location of the exponent has some consequences. Offsetting the land doesn't change the presence of the continental shelf or keep it at a constant depth underwater. It would have to come after the user adjustments to do that. It also causes the scaling to be just a hair off, which results in dramatic shifts in the coastlines. Setting the level to 0 will preserve the coastlines at the cost of having very steep ocean dropoffs.

Water Level

The **Water Level** tool works together with the altitude calculation to determine where the water is in the world. If the water level at a given point is higher than the altitude, the coloration will use the water rules. Otherwise it will use the land rules.

The default water level is 0.0, but it can be locally changed to get lakes or dry areas.

The user tools simply paint values into the map.

To ensure that painted water levels are properly represented during CC2 Pro export, the Altitudes relative to Water Level checkbox must be set in the CC2 Export Detail Level settings page.

Rainfall

Rainfall is computed according to the following functions:

$$rain = \left| fBm(lat, lon) \right| \cdot random + rbase$$

$$rain = rain \cdot \frac{temperature(lat,lon) + 30}{60}$$

$$rain = rain + \frac{altitude(lat,lon)}{1000} + uvalue(lat,lon)$$

Where:
random is Random from the rainfall model
rbase is the Base value
uvalue() is the user-defined rainfall value at that point
fBm is the basic Brownian Noise fractal type
Temperature***temperature*** and ***altitude*** are the functions described below

Temperature

Temperature is computed according to the following function:

$$temp_1 = 374 \cdot greenhouse \cdot (1 - albedo) \cdot \sqrt[4]{light}$$

$$temp_2 = temp_1 - 0.8 \cdot tscale + tscale \cdot insolation(axistilt,lat)$$

$$temp_3 = temp_2 - 0.006491 \cdot altitude(lat,lon)$$

$$temp = temp_3 + random * fBm(lat,lon)$$

Where:
temp is the final temperature in Kelvin
greenhouse, ***albedo***, ***light***, and ***axistilt*** are the values entered by the user in the temperature model
tscale is the same as Variance
random is the Random model value
fBm is one of those pesky fractal basis functions again

Climate

Climate is computed directly from rainfall and temperature according to the following table:

Rainfall cm/year	30.0	27.5	25.0	22.5	20.0	17.5	15.0	12.5	10.0	7.5	5.0	2.5	0.0	-2.5	-5.0	-7.5
250.0	t. ever	t. ever	t. ever	t. ever	t. ever	forest	forest	forest	forest	forest	forest	boreal	boreal	boreal	boreal	tundra
237.5	t. decid	t. decid	t. decid	t. decid	t. ever	forest	forest	forest	forest	forest	forest	boreal	boreal	boreal	boreal	tundra
225.0	t. decid	t. decid	t. decid	t. decid	t. decid	forest	forest	forest	forest	forest	forest	boreal	boreal	boreal	boreal	tundra
212.5	t. decid	t. decid	t. decid	t. decid	t. decid	forest	forest	forest	forest	forest	forest	boreal	boreal	boreal	boreal	tundra
200.0	t. decid	t. decid	t. decid	t. decid	t. decid	forest	forest	forest	forest	forest	forest	boreal	boreal	boreal	boreal	tundra
187.5	t. decid	t. decid	t. decid	t. decid	t. decid	forest	forest	forest	forest	forest	forest	boreal	boreal	boreal	boreal	tundra
175.0	t. decid	t. decid	t. decid	t. decid	t. decid	forest	forest	forest	forest	forest	forest	boreal	boreal	boreal	boreal	tundra
162.5	t. decid	t. decid	t. decid	t. decid	t. decid	forest	forest	forest	forest	forest	forest	boreal	boreal	boreal	boreal	tundra
150.0	t. decid	t. decid	t. decid	t. decid	t. decid	forest	forest	forest	forest	forest	forest	boreal	boreal	boreal	boreal	tundra
137.5	t. decid	t. decid	t. decid	t. decid	t. decid	forest	forest	forest	forest	forest	forest	boreal	boreal	boreal	boreal	tundra
125.0	t. decid	t. decid	t. decid	t. decid	t. decid	forest	forest	forest	forest	forest	forest	boreal	boreal	boreal	boreal	tundra
112.5	t. shrub	t. shrub	t. shrub	t. shrub	t. shrub	forest	forest	forest	forest	forest	forest	boreal	boreal	boreal	boreal	tundra
100.0	t. shrub	savannah	savannah	savannah	t. shrub	forest	forest	forest	forest	forest	forest	boreal	boreal	boreal	boreal	tundra
87.5	t. shrub	savannah	savannah	savannah	t. shrub	forest	forest	forest	forest	forest	forest	boreal	boreal	boreal	boreal	tundra
75.0	t. shrub	t. shrub	savannah	savannah	t. shrub	forest	grassland	grassland	grassland	grassland	forest	boreal	boreal	boreal	boreal	tundra
62.5	t. shrub	t. shrub	t. shrub	t. shrub	t. shrub	chaparral	grassland	grassland	grassland	grassland	chaparral	boreal	boreal	boreal	boreal	tundra
50.0	desert	t. shrub	t. shrub	t. shrub	t. shrub	chaparral	grassland	grassland	grassland	grassland	chaparral	boreal	boreal	boreal	boreal	tundra
37.5	desert	desert	desert	desert	desert	chaparral	chaparral	chaparral	chaparral	chaparral	chaparral	chaparral	boreal	boreal	chaparral	tundra
25.0	desert	desert	desert	desert	desert	chaparral	chaparral	chaparral	chaparral	chaparral	chaparral	chaparral	chaparral	chaparral	chaparral	tundra
12.5	desert	desert	desert	desert	desert	desert	desert	desert	desert	desert	desert	desert	desert	desert	desert	tundra

Temperature (C)

Nothing fancy or peculiar, just a straight table lookup.

Climate Considerations & Descriptions

Bare Rock: This climate type is self-descriptive. Very little in the way of vegetation exists in these regions, other than hardy low-level plants, lichens, and so forth.

Boreal: Cold forests, usually of spruce and fir. Standing surface water is common in such regions, and bogs form in areas of saturation.

Chaparral: Low, scrubby brush and grassland. Similar to the hilly regions of California, and certain areas of Australia.

Desert: Regions which see very little annual precipitation. It is low rainfall, not temperature, that defines desert - desert areas on Earth are as diverse as the frozen wastes of Antarctica to the sandy expanses of the Sahara. Because FT's rainfall model does not take into account factors such as weather patterns when computing rainfall, deserts will appear rarely within generated worlds. As such, if desert regions are required, they must usually be painted on by the user.

Grassland: Similar to the North American Great Plains - expanses of grassland with little in the way of large vegetation except along river courses etc. Annual rainfall is not high enough to support forests and so forth.

Hills & Mountains: Regions of altitude variance; self-explanatory.

Ice: Ice caps and so forth. Similar to the regional ice coverage of the Arctic and Antarctic.

Savannah: Tropical grassland, similar to that found within the African plains.

Temperate Forest: Forestland of a type commonly found across North America and Europe. They may be deciduous, evergreen, or of mixed composition.

Tropical Deciduous Forest: Similar to the coastal forests of South America, marked by large annual rainfalls interspersed with dry seasons, at a relatively constant temperature.

Tropical Evergreen Forest: Similar to the rain forests of equatorial Africa and the Amazon basin. Consistently high rainfall levels and little temperature fluctuation.

Tundra: Treeless areas with scattered, low-lying vegetation. Tundra freezes hard during winter, and is subject to permafrost for much of the rest of the year.

FT's Interface

The FT interface consists of a main window (in which the world will be drawn, and most of your work will be done), and several ancillary toolbars and windows. These latter may be dragged onto and off the main window, just as standard Windows® floating toolbars (holding down the Ctrl key while dragging toolbars will prevent them from docking on the main window). The main window may be resized, maximized, and minimized. World re-draws are affected by the size of the main window, and can be quite slow when maximized.

s, Menus and Shortcuts

The following summarizes FT's menus, buttons, and keyboard shortcuts.

Item	Shortcut	Function
File menu		
New	CTRL N	Start a new world
Open	CTRL O	Open an existing world
Save		Save the current world
Save As		Save the current world to a different file (including image file formats)
Save CC2 File	CTRL C	Save the current world to a CC2 file
Revert to Save		Discard all edits in favor of last saved version of this world
Export World >>		
Icosahedral		Export world to an icosahedral projection
Multiple Files		Export world to multiple tiled images and/or CC2 files
Spin View		Export world to images representing a rotational period
VRML		Export world to a VRML model
Revert to Saved		Revert to the saved version of the current world
Print		Prints the current view of the world
Print Setup		Access the standard print setup for your printer
Print Preview		Opens a standard Windows® Print Preview window, showing what the Print command will output
1, 2, etc.		Open previously viewed files
Exit		Quit FT
Edit menu		
Undo		Undo the last command
Redo		Redo the last command
Preferences		Set FT function preferences
Map menu		
Change Projection		Change the map projection used to display the world
Lighting and Color		Change the color and lighting settings for the world
World Settings		Change the current world settings
Background		Change the color and fill used for the world view window's background
Grid Settings		Change the grid settings
Show Altitude	SHIFT A	Change view to show altitude contours
Show Climate	SHIFT J	Change view to show climate contours
Show Rainfall	SHIFT R	Change view to show rainfall contours
Show Temperature	SHIFT T	Change view to show temperature contours
Next World		Draw world using the next sequential seed number. Current edits will be lost
Previous World		Draw world using the previous sequential seed number. Current edits will be lost
Overlay Image		Insert an overlay image to guide editing
Regenerate		Force FT to regenerate the current world

Tools menu

Settings	/	Change values and options used for edit tools
Paint Values >>		
Climate	]	Paint currently selected climate type (see Climate Selector)
Land Offset		Paint the currently set Raise/Lower value
Land Roughness		Paint the currently set Roughness value
Rainfall		Paint the currently set Rainfall value
Temperature		Paint the currently set Temperature value
Water Level	[	Paint the currently set Water value. SHIFT and Click to choose an altitude value to use from the world
Paint Raise >>		
Land Offset	R	Raise the painted area by the currently set Raise/Lower value
Land Roughness		Increase the roughness of the painted area by the currently set Roughness value
Rainfall	W	Increase the rainfall of the painted area by the currently set Rainfall value
Temperature	H	Increase the temperature of the painted area by the current Temperature value
Paint Lower >>		
Land Offset	L	Lower the painted area by the currently set Raise/Lower value
Land Roughness	S	Decrease the roughness of the painted area by the currently set Roughness value
Rainfall	D	Decrease the rainfall of the painted area by the currently set Rainfall value
Temperature	C	Decrease the temperature of the painted area by the currently set Temperature value
Global Set >>		
Altitude		
Land Offset		Set the altitude of the whole world to the currently set Raise/Lower value
Land Roughness		Set the roughness of the whole world to the currently set Roughness value
Rainfall		Set the rainfall of the whole world to the currently set Rainfall value
Temperature		Set the temperature of the whole world to the currently set Temperature value
Water Level		Set the water level of the whole world to the currently set Water Level altitude
Global Raise >>		
Land Offset	SHIFT	Raise the altitude of the whole world by the currently set Raise/Lower value
Land Roughness	SHIFT	Increase the roughness of the whole world by the currently set Roughness value
Rainfall	SHIFT	Increase the rainfall of the whole world by the currently set Rainfall value
Temperature	SHIFT	Increase the temperature of the whole world by the current Temperature value
Water Level		Increase the water level of the whole world by the currently set Water Level value
Global Lower >>		
Land Offset	SHIFT	Lower the altitude of the whole world by the currently set Raise/Lower value
Land Roughness	SHIFT	Decrease the roughness of the whole world by the currently set Roughness value
Rainfall	SHIFT	Decrease the rainfall of the whole world by the currently set Rainfall value
Temperature	SHIFT	Decrease the temperature of the whole world by the currently set Temperature value
Water Level		Decrease the water level of the whole world by the currently set Water Level value
Global Smooth >>		
Land Offset		Blurs the land offset (altitude) editing map
Land Roughness		Blurs the land roughness editing map
Rainfall		Blurs the rainfall editing map
Temperature		Blurs the temperature editing map
Extra Large	4	Use the extra large (XL) brush size for painting to the world
Large	3	Use the large (LG) brush size for painting to the world
Small	2	Use the small (SM) brush size for painting to the world
Extra Small	1	Use the extra small (XS) brush size for painting to the world
Burn Into Surface		Converts the current world into a map in the land offset channel
Mound		Fills the current selection with land offset values from the selection's edge to

		its center
Mountain		Fills the current selection with land offset values from the selection's edge to its center
Select menu		
All		Selects the entire world
Deselect		Removes the current selection
Inverse		Inverts the current selection
Altitude Range		Selects portions of the world by altitude
Climate Range		Selects portions of the world by climate range
Rainfall Range		Selects portions of the world by rainfall range
Temperature Range		Selects portions of the world by temperature range
Binarize		Removes feathering from the current selection mask
Feather		Softens (feathers) current selection mask
Modify >>		
Expand		Expands the current selection mask by 1 pixel in all directions
Contract		Reduces the current selection mask by 1 pixel in all directions
Load Selection		Loads a selection mask file
Save Selection		Saves the current selection as a selection mask file
View menu		View or hide FT's bars:
World Tools		Toggle the World Tools s
Map Tools		Toggle the Map Tools s
Globe Tools		Toggle the Globe Tools
Status Bar		Toggle the Status Bar
Tool Palette		Toggle the Tools Palette s
Map Info		Toggle the Map Info window
Color Key		Toggle the Color Key window
Climate Selector		Toggle the Climate Selector s
Selection Tools		Toggle the Selection Tools s
Help menu		
Help Topics		Open FT's help file
About Fractal Terrains		Display current FT version and program details

Selection Tools		
Select Rectangle		Rectangular selection tool
Select Ellipse		Elliptical selection tool
Select Freehand		Freehand selection tool
Select Polygon		Polygonal selection tool
Climate Selector		Used to select the climate type to paint
Boreal		
Chaparral		
Desert		
Grassland		
Hills		
Ice		
Mountains		
None		
Bare Rock		
Savannah		
Temperate Forest		
Tropical Evergreen Frst.		
Tropical Deciduous Frst.		
Tropical Shrubland		
Tundra		
Other s		
Zoom In		Zoom world view in by a factor of two
Zoom Out		Zoom world view out by a factor of two

Zoom Whole World	«	Zoom whole world to fit in the current window
Zoom Window	a	Zoom into a selected area (Click opposite corners of the area to be zoomed)
Distance		Measures a linear distance
Pan		Move the current world view (Click and hold to drag the view)
Context-Sensitive Help		Gain help on the selected item

Other Keyboard Functions

FT supports some additional keyboard features, and these are described below:

Function	Keyboard/ Shortcut
Show next world without losing edits	CTRL SHIFT
Show previous world without losing edits	CTRL SHIFT
Cancel offset or projection move	SHIFT when releasing button in map projection dialog
Add new selection to current selection	SHIFT when Clicking to end use of a selection tool
Remove new selection from current selection	CTRL when Clicking to end use of a selection tool

Example: To select a rectangular area, click Select Rectangle , click in the main window to place one corner of the desired selection area, then hold SHIFT or CTRL down when Clicking to place the opposite corner to add or remove from the current selection, respectively.

Reset toolbar positions to default	Hold SHIFT during startup
Prevent load of default file	Hold CTRL during startup

Bars

FT's s are contained within standard Windows® floating bars. Each bar and window may be hidden or displayed via the **Tools menu**. If the name of an bar appears with a tick beside it in that menu, it is currently shown. Clicking on the name of a tool bar will add or remove this tick, and accordingly show or hide the tool bar.

For reference, the bars are as follows. The functions of the s are outlined above:

Bar	Buttons
World Tools	
Map Tools	
Tool Palette	
Climate Selector	
Selection Tools	

Information Windows

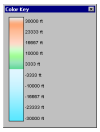
There are three additional floating windows comprising the FT interface, and these can be hidden, dragged, or placed within the main window just as bars. These are summarized below:

Globe Tools — This window contains a globe that can be rotated to adjust the current world view. Click and hold on the globe, and move the cursor to rotate it. The world view will pan accordingly.

Clicking Quit will exit FT.

Clicking Help will open FT's help file.

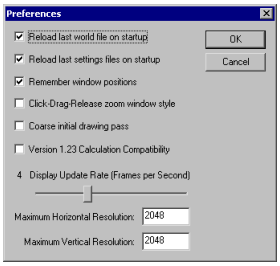
Map Info — This window contains general information about the current world, or the portion of the world beneath the mouse cursor.



Color Key — This window keys the contour colors used for the current world. There are four versions of the color key window, one for each of the information views (Altitude, Climate, Rainfall, and Temperature).

Preferences

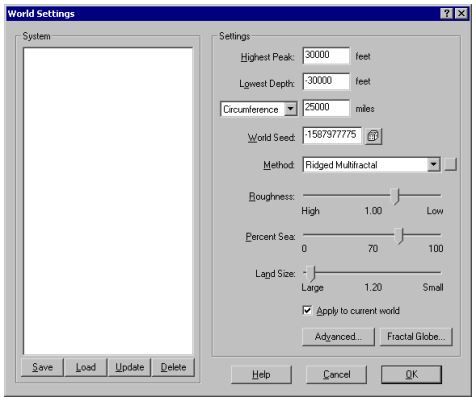
FT allows a certain amount of customization in the way it works. You can alter your preferences by selecting Edit menu >> Preferences, which presents the Preferences dialog box:



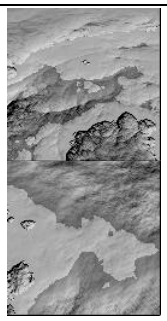
- ✓ **Reload last world file on startup** will automatically open the last saved world you worked on with FT on startup if it is checked. If it is not checked, FT will generate a new random world on startup.
- ✓ **Reload last settings files on startup** will cause FT to automatically use the last saved world generation and color files on startup. If it is not checked, FT will use the default settings.
- ✓ **Remember window position** will cause FT to open in its last used window position on startup, otherwise the default position will be used. Note holding 3 during startup has the same effect.
- ✓ **Click-Drag-Release zoom window style** alters the way the Zoom Window function works. If checked, zoom windows are drawn by clicking at one corner, holding the mouse down, dragging to the opposite corner, and releasing the mouse. If unchecked, zoom windows are drawn by clicking at one corner, and separately clicking on the opposite corner of the window required. By default, this is unchecked.
- ✓ **Coarse initial drawing pass** changes the way FT draws worlds to the screen. If checked, the world view will initially drawn using coarse pixels, creating a blocky-looking view to start with. This view will be subsequently refined by FT as time passes until all generated world data has been drawn. This is useful for quickly seeing the general form of a world before either accepting or rejecting it. If unchecked, FT will fill in the world view's pixels layer by layer, gradually filling in the detail. This is the default method.
- ✓ **Version 1.23 Compatibility** changes the way FT computes worlds. Version 1.23 and earlier had an error in the fractal computations that frequently resulted in inconsistent results from machine to machine and from run to run of the program. Version 1.50 and later corrected this flaw, but at the cost of generating different worlds for the same world seeds. Checking this item will force the old-style calculations, as will loading a pre-V1.50 FTW file. It is unchecked by default.
- ✓ The **Display Update Rate** slider affects how often FT updates the screen information. Reducing the number of updates per second will reduce the computation load for slower video cards or machines. Increasing it might help with the editing response for very fast machines and video cards. The default value of 4 seems to be a good value for most machines.
- ✓ **Maximum Horizontal Resolution** and **Maximum Vertical resolution** control the maximum size that FT will use to display onscreen, regardless of the actual physical display resolution. These values can be reduced to speed up calculations for slower machines, but reducing the values will affect the appearance of the lighting effects. The default values of 2048 for both indicate that the software should just use the physical window size for its computation size.

World Settings

When you create a synthetic or flat world, you will be presented with the World Settings dialog box. You can also access this dialog to edit the currently used settings by clicking on the **World Settings** .



- ✓ The **System** group contains world settings file management controls. Click on **Save** to save the current settings to a file. Select a file from the list and click on **Load** to load the settings contained within it. Click on **Update** to save changes to the currently used setting file. Select a file from the list and click on **Delete** to remove the file from your system.
- ✓ **Highest Peak** sets the maximum altitude for the world. Sometimes the generated world may exceed this value, but it usually keeps within bounds.
- ✓ **Lowest Depth** sets the lowest point in the ocean. Sometimes the generated world may exceed this value, but it usually keeps within bounds.
- ✓ The **Circumference** or **Diameter** (depending on the option selected from the drop-list) sets the size of the world. If Circumference is selected, the value is the distance around the world at the equator. If Diameter is selected, the value is the distance through the north and south poles. All worlds are assumed to be perfectly spherical, not an oblate spheroid like the earth.
- ✓ The **World Seed** is the world number to generate. It sets the random number seed for the internal generators. Values for this seed can range from negative 2,147,483,648 to positive 2,147,483,647. Click on to randomly allocate this value.
- ✓ Method selects the way in which the world altitude will be computed. The two options are available: Ridged Multifractal; and Brownian Noise. Ridged Multifractal is composed of many ridges at different scales. Brownian Noise is basically just random noise at different scales without any particular structure:



Ridged Multifractal

Brownian Noise

The small button next to the method drop list will bring up a dialog that can be used to set parameters for each type of computation method. Each computation method has its own set of parameters that can be adjusted.

- ✓ The **Roughness** slider controls the level of roughness in a surface. This value is roughly the fractal dimension of the surface. The sequence below shows how Roughness affects the surface from high (0.01) to low (1.49):

0.01 0.38 0.75 1.13 1.49

- ✓ **Percent Sea** sets the rough amount of sea that will be found on the map.
- ✓ **Land Size** sets the size of the land masses. The sequence below shows how the changing the setting changes the land mass size:

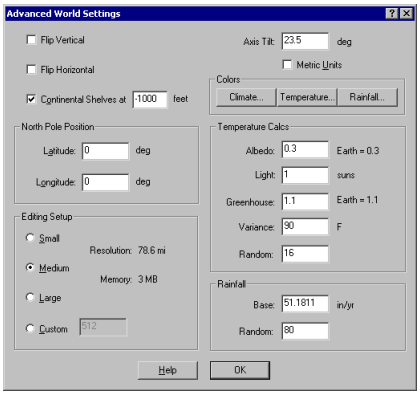
1.00 2.14 3.25 5.50 10.00

The smaller the land size setting, the more continents (or islands) you will get. A value of around 1.6 usually provides good results.

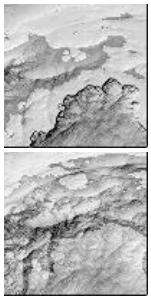
- ✓ If checked, **Apply to Current World** will apply any changes in the world parameters to the current world, preserving any terrain editing. If unchecked, all editing will be lost.
- ✓ Click **Advanced** button to access the Advanced World Parameters dialog box (see below).
- ✓ Click Fractal Globe button to access the Fractal Globe dialog box. This dialog box can be used to change the fractal evaluation size (similar effect to Land Size) as well as the center of evaluation. Each center of evaluation gives a unique world; moving the world center over each possible set of values will result in roughly 2^48 (about 281,500,000,000,000) worlds, each differing slightly from the next.
- ✓ **OK** accepts any changes made to the world settings and creates a new world with those settings.
- ✓ **Cancel** discards any changes and keeps to the current world.
- ✓ **Help** gets help for this dialog.

Advanced World Parameters

These settings allow you to affect the way in which the world is calculated. You may also change climate coloration, the location of the northernmost pole, axial tilt, etc.



- ✓ **Metric Units**, if checked, changes all measurements to metric (kilometers, meters, centimeters, and degrees Celsius). If unchecked, measurements will be in Imperial units (miles, feet, inches, and degrees Fahrenheit).
- ✓ **Flip Horizontal and Flip Vertical allow the world to be flipped around.**
- ✓ If checked, **Continental Shelves** indicates that the continental margins will be computed. The value on this line is the depth at which the shelves will be generated. The pair of images below shows how a world appears with and without continental shelves. Note how turning on Continental Shelves can reduce the relative altitudes of some parts of the map.



With continental shelves

Without continental shelves

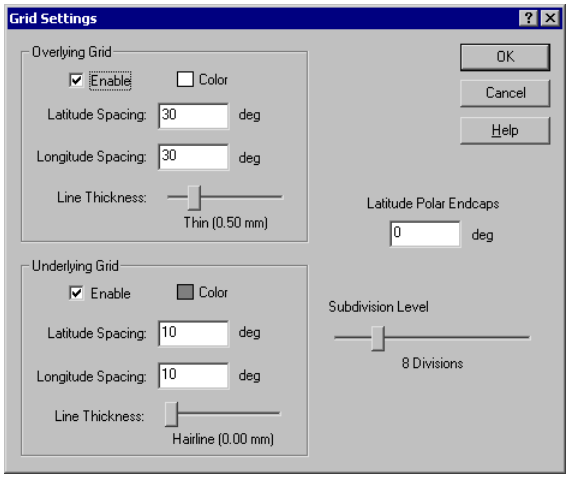
- ✓ The **North Pole Position** group controls the location of the north pole. Changing this value will rotate the map around in its coordinate system. The change will not be applied to any terrain editing changes. **Latitude** and **Longitude** specify the new location on the sphere through which the pole will pass.
- ✓ The **Editing Setup** group sets how the resolution at which editing will be accomplished. **Small**, **Medium**, and **Large** set 256, 512, and 1024 samples horizontally respectively. **Resolution** and **Memory** indicate how big each

sample will be at the equator and how much memory the editing surface will require. Specifying a surface that takes much more than a small fraction of the machine's physical memory size can result in poor performance during editing. **Custom** sets a custom editing size in case one of the other settings isn't to your liking.

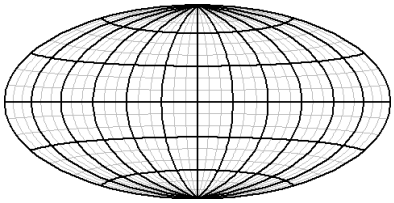
- ✓ **Axis Tilt** specifies the axial tilt of the planet. This parameter affects the temperature distribution of the world.
- ✓ The **Temperature Calcs** group controls the settings for the temperature model. All values are average for an entire year. **Albedo** is the amount of reflectance that the world has (sum of all factors including clouds, land, and sea); an Earth-like world will have a value near 0.3. **Light** indicates the amount of sunlight at all wavelengths reaching the planet in terms of solar radiation units (the Sun = 1). **Greenhouse** indicates the greenhouse warming effect due to atmospheric effects; Earth has a value of approximately 1.1. Values less than 1 have a cooling effect, values greater than 1.0 have a warming effect. **Variance** is a factor that determines how much the temperature varies from the equator to the poles. Earth has roughly a 90°F variance value. **Random** is the amount that a random field will be scaled by to give local temperature disturbances.
- ✓ The **Rainfall** group controls the amount of rainfall. **Base** is the global amount of rainfall. **Random** is a scaling factor that adjusts a fractal field that adds to the Base value to give the final result.
- ✓ Clicking on the **Climate Colors** button brings up the Climate Coloring dialog.

Grid Settings

The Grid Settings dialog box allows you to set a grid for your world.

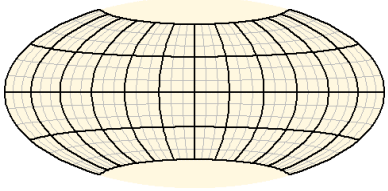


For the above settings, a grid like that shown below will be generated:

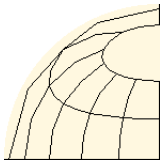


Note how there are two grids: a thick-lined black grid and a thin-lined gray grid. The black grid is the overlying grid, and the thin gray grid is the underlying grid.

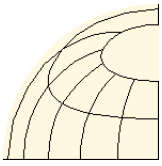
- ✓ **Latitude Endcaps** is the amount of latitude around each pole that will not be drawn. As can be see in the above example grid, the polar regions get a bit cluttered when the lines all intersect. The image below shows the same settings as before, but with 30° latitude endcaps in place:



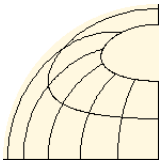
- ✓ **Subdivision Level** is the number of segments between each intersection. For example, a subdivision level of 2 using 30° increments will give a total of 24 line segments along the entire 360° of longitude. For some map projection (Equirectangular, for example), a very low number of subdivisions is usable. For others, such as the Azimuthal Equidistant, it just isn't enough. Note that higher subdivision levels will cause longer re-draw times. The images below show how 2, 4, and 32 subdivisions appear:



2 subdivisions



4 subdivisions



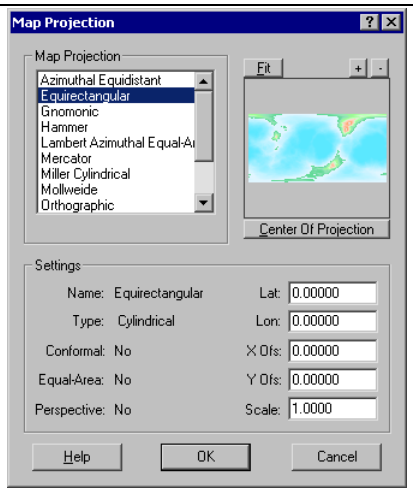
32 subdivisions

For both the **Underlying Grid** and **Overlying Grid** groups, the controls have the following meanings:

- ✓ **Enable** turns the grid on. If not checked, the grid will not be drawn.
- ✓ Click **Color** box to select the color used for the grid.
- ✓ **Latitude Spacing** is the vertical interval at which horizontal gridlines will be drawn.
- ✓ **Longitude Spacing** is the horizontal interval at which vertical gridlines will be drawn.

Map Projections

As noted within the tutorials, displaying a globe across a flat surface provides a unique problem to which there are many solutions. Here, we shall discuss some of those solutions, and explain some of the finer points of the Map Projection dialog box:



- ✓ The **Map Projection** list holds the types of projections that can be displayed.
- ✓ **Fit** fits the projection to a square windows (sets the scale to 1.0).
- ✓ The **+** button zooms in by a factor of 2.
- ✓ The **–** button zooms out by a factor of 2.
- ✓ **Center of Projection** functions as a checkbox. When pressed, it will stay in; when pressed again, it will come out. When in, clicking the mouse on the map display and dragging it will change the center of projection (**Lat** and **Lon**). When out, clicking the mouse on the map display and dragging it will change the offset (**X Ofs** and **Y Ofs**).
- ✓ **Lat** and **Lon** indicate the current latitude and longitude of the center of projection. **Lat** can never be forced exactly to 90 or –90, but can get very close.
- ✓ **X Ofs** and **Y Ofs** control the current position of the map (0,0 means that the center of the map is directly over the center of projection; values from –1 to +1 move the map around).
- ✓ **Scale** sets the zoom level for the map. Values larger than 1 zoom out (make the map appear smaller), while values smaller than 1 zoom in (make the map appear larger).
- ✓ **Name**, **Type**, **Conformal**, **Equal-Area**, and **Perspective** provide feedback about the current map projection. **Name** is the projection name. **Type** is the general class of projection (cylindrical, pseudo-cylindrical, etc). **Conformal** indicates if the projection preserves shapes. **Equal-Area** indicates if the projection preserves areas. **Perspective** indicates if the map if projected onto a point.
- ✓ **Help** gets help for the dialog.
- ✓ **OK** accepts the map projection and redraws the map.
- ✓ **Cancel** discards any modifications to the projection and returns to the main display.

A Glossary for Projections

Many of the terms used in the context of map projections may be unfamiliar. The terms below are commonly encountered:

Azimuthal Pojection – A projection in which the azimuth or direction from a central point to any other point is shown correctly.

Conformal Projection – A projection in which all angles at each point are preserved. This is approximately the same as saying that shapes are preserved.

Cylindrical Projection – A projection resulting from a conceptual projection of the surface points on the sphere passing through the points on a cylinder that is tangent or secant to the sphere. The resultant cylinder is then cut and laid flat.

Equal-area Projection – A projection in which areas are shown proportionate to each other as they are on the surface of the sphere.

Equatorial Aspect – View of an azimuthal projection where the center of projection lies on the equator.

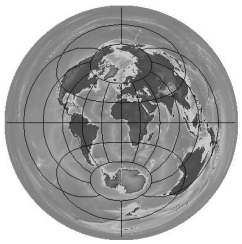
Equidistant Projection – A projection that maintains constant scale along all great circles from one or two points.

Perspective Projection – Projection produced by projecting straight lines radiating from a selected point (or from infinity) through points on the surface of a sphere, and then onto a tangent or secant plane.

Polar Aspect – View of an azimuthal projection where the center of projection lies on one of the poles.

Supported Projections

FT supports a number of projections for various purposes. The default projection is Equirectangular.



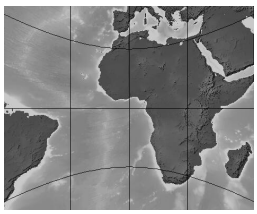
Azimuthal Equidistant

An azimuthal projection capable of showing the entire world at once. Scale between any two points along a line passing through the center of the projection is true. Distorts the shapes and areas of places on the world. Examples of maps using this projection are found as early as the 16th Century.

Equirectangular

This cylindrical projection has the useful property that the scale is constant and true along meridians and the equator. It is by far the simplest projection to construct, being a simple graph of latitude vs. longitude. It distorts both shape and area, with the distortions increasing relative to distance from the equator.

The version of the Equirectangular project used by FT is actually a special case called Plate Carree. In this projection, latitude and longitude are equal in size. It may have been originated by Eratosthenes in ancient Greece, and was widely used in the 15th and 16th Centuries.

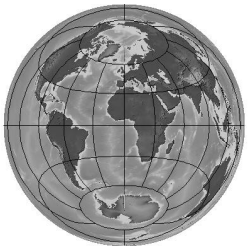


Gnomonic

This azimuthal projection has several useful properties, but does not preserve shape or area. It has the useful property that a straight line on the map will give the shortest distance between those two points. It cannot display the full world, being limited to less than a hemisphere. Another of the projections thought to originate in ancient Greece (this time with Thales), its name is derived from the gnomon on a sundial.

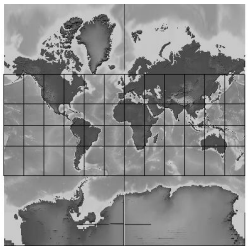
Hammer

This equal-area projection is popular because it reduces distortion in many areas compared to similar projections. It has an elliptical border, which makes it rather decorative as well as functional. Developed in 1892 by H. H. Ernst von Hammer, this projection in widely used where whole-world, equal-area maps are desired.



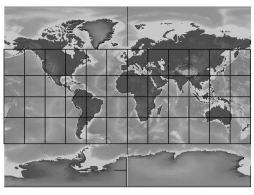
Lambert Azimuthal Equal-Area

This projection is commonly used in atlases for maps of polar regions and Northern and Southern hemispheres. The equatorial aspect is commonly used for maps of the Eastern and Western hemispheres. This equal-area projection is classified as azimuthal.



Mercator

The Mercator projection is the familiar world map in elementary schools. This is an unfortunate fact, because the map has severe distortions of area in the polar regions (which is why Greenland looks bigger than South America). The Mercator projection, while conformal, is infinite in extent (the North and South Poles lie at + infinity and minus infinity respectively). This cylindrical map has the useful property that lines of constant true bearing are straight lines. As such, it is useful for navigation. It was presented by Gerardus Mercator of Flanders in 1569.

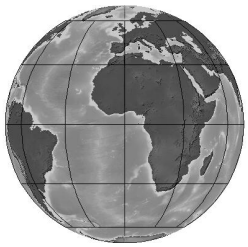


Miller Cylindrical

This cylindrical projection is neither conformal nor equal-area. It is closely related to the Mercator projection, but manages to keep the extreme polar distortions a little more under control. It was developed in 1942 by Osborn Maitland Miller of the American Geographical Society, and was used in many American atlases.

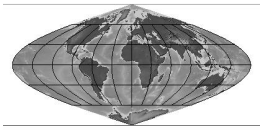
Mollweide

A pseudocylindrical projection, Mollweide is used in thematic and atlas maps of the world. Distortions are severe at higher latitudes and towards the outer edges, but the scale is true at latitudes 44°40' north and south. It was presented by Carl B. Mollweide of Germany in 1805.



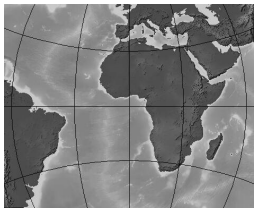
Orthographic

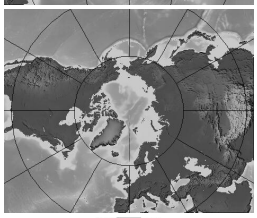
This azimuthal projection shows the world as it would appear if viewed from infinity. It cannot show more than a single hemisphere at a time. The small positioning globe on the main FT interface is implemented using the Orthographic projection.



Sinusoidal

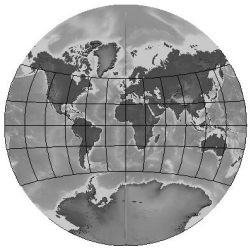
This pseudocylindrical projection has the useful feature that it is relatively easy to compute and is equal-area. It does suffer from significant shape distortion, especially at high latitudes and near the outer edges. It was developed in the 16th century and used in some atlases in the 17th century, sometimes appearing in modern articles desiring to show relative areas.





Stereographic

The stereographic projection is a conformal azimuthal projection commonly used in the polar aspect for topographic maps of the Polar regions. The equatorial aspect was used in the 17th and 18th centuries for maps of the Eastern and Western Hemispheres. While the projection cannot show the whole world, it is quite useful for mapping areas which are roughly circular in extent. Its origins (in polar aspect) may date to the Egyptians and Greeks by the second century B.C.



Van Der Grinten

The Van Der Grinten projection is a polyconic projection that is neither conformal nor equal-area. It encloses the entire world in a circle, but causes great distortions of area near the poles. The scale is true along the equator, but increases rapidly towards the poles. It was presented by Alphons J. van der Grinten of Chicago in 1898.

Wagner IV

A pseudocylindrical projection, Wagner IV is equal-area but not conformal. It was developed in 1934 by Putnins in Latvia, but was popularized by Wagner of Germany in 1949. Shape distortion is not as extreme in the polar regions as is that of the pointed equal-area projections such as sinusoidal, but is still considerable.

Bibliography

Some books that also can help in the understanding of map projections are:

An Album of Map Projections (Snyder and Voxland; US Geologic Survey Professional Paper 1453)

Map Projections – A Reference Manual (Bugayevskiy and Snyder; ISBN 07484 0304 3)

Flattening the Earth (Snyder; ISBN 0-226-76747-7)

The Album is out of print, but the others are readily available.

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