Denford

DENFORD
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Mill CAM Designer 2

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Mill CAM Designer 2 Users Manual



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New Additions

At Denford we constantly try to make our machines and software easier to use . As a result of this many new features have been added to Mill Cam Designer 2, which include:-

- Pre-set student projects
- Comprehensive Curriculum based software
- Step-by-step student project books linking to software
- Comes complete with Quick Start Milling Manual
- Additional cutting depths
- Machine time calculated when G-codes are produced
- 3D Dimensional gradient represented by colour shade
- Ability to import Data Exchange Files (DXF) from popular CAD programs e.g. AutoCAD, Corel, Autosketch
- Co-ordinate positioning of elements



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1 Conventions used in this Manual

Underline	This is used to show keywords. The full definition of these terms is given in Denny's Help Box.
Italics	Used to show menu and button selections. To pull down a menu move the pointer over the title and click once with the left mouse button. To select something from the menu move the pointer onto it, then click with the left button again. To select a button move the pointer over it and click once with the left mouse button.
[ ]	Square brackets contain any text that must be typed in.
[bold]	Square brackets with bold text show individual keys to press, e.g.. [enter] means press the enter key.
+	If a number of keys need to be pressed in sequence they are shown with plus signs.
	This is used to show important notes.
	This shows a right button mouse press.
	This shows a left button mouse press.



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2 Introduction

Mill CAM Designer 2 is a CNC design system which allows the user to draw in a graphical environment. The design is then converted into a G-Code file which is produced automatically.

When using the design screen the tool path is shown in colour. Different line thicknesses show different tool diameters, and different colours represent different depths of cut. Designs are created by combining elements, which can be added or removed at any time. By using co-ordinates Mill CAM Designer 2 allows the size and position of elements to be very accurate.

When the program is opened, a work area is defined, normally the size of the chosen material.

Denny's Help Box

"G-Code is the series of letters and numbers that make up the language used by CNC machinery"

"The Tool Path shows the route followed by the CNC miller when cutting the design"

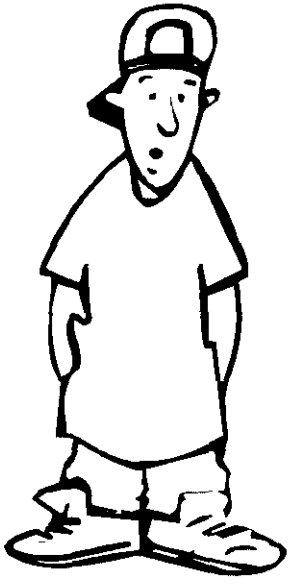
"Elements are different shapes that are put together to make a design"

"The Work Area represents the surface available for machining"



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Introduction



Introducing
Denny Denford

Designs can be saved and loaded at any time, so unfinished drawings can be completed later, changes can be made, and a library of commonly used parts can be compiled.

Mill CAM Designer 2 is very simple to use which will, hopefully, enable a wider range of ages and abilities to use a CNC Milling Machine than was previously possible. It allows your CNC Milling Machine to become an 'everyday tool' rather than one reserved for special occasions.



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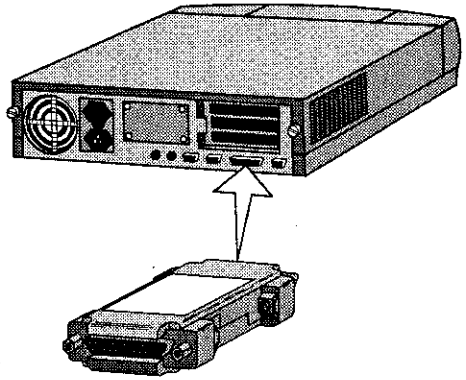
COMPUTERISED MACHINES AND SYSTEMS

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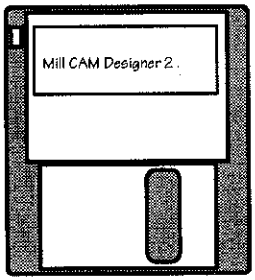
The Mill CAM 2 software will operate *only* as a demo version, unless a Denford security key (dongle) is connected to your computer's, parallel port. By running the software with this security key present, access will be permitted to *all* features of Mill CAM.

Customer Notice: Installation & Operation of Mill CAM Designer 2 software.

Rearview of computer.



Fit the Denford Security Key (dongle) to the parallel port of your computer.

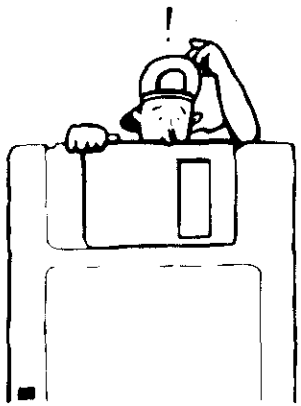


Note - 1 disk is supplied for Mill CAM 2:
1 - The Mill CAM 2 Designer disk.
To install disk , please follow the instructions used to install (Mill CAM 2), located in Section 3 ("Setting Up") of this manual.



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3 Setting UP



To use Mill CAM Designer 2 you need a computer with:-

- a hard disk;
- Windows version 3.1 (or above) installed;
- at least 1 megabyte of free memory.

Installing Mill CAM Designer 2

1. While running Windows, insert the Mill CAM Designer 2 disk into Drive a:. (If you are using another disk drive, replace a: with the letter of that drive.)

2. From Program Manager select *Run...* from the *File* menu (Alt + F + R).

3. A dialogue box will appear, in the command line box. Type: [a:install] and press [enter].

> **Denny's Help Box**
> "A dialogue box is a box that appears in windows and allows you to input data."



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4. This will run the Denford install program. Simply pressing [enter] will install Mill CAM Designer 2 onto your hard disk. It will also create a group window and place the Mill CAM Designer 2 icon in this group window. A Projects icon is also produced at this stage.

Note

It is recommended that you allow the Denford installation program to create its own directories and set up its default values. If you find these inconvenient, then feel free to alter them.

Denny's Help Box

"A group window is shown in Program Manager. It contains the icons of similar programs i.e. all the Denford programs."

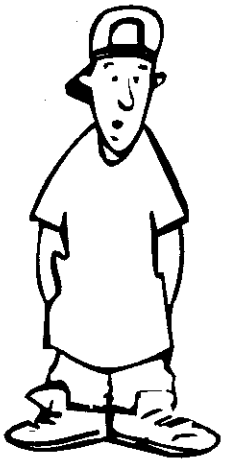
"An icon is a small picture, displayed in windows. When you click twice on it the program associated with that icon will run."



Mill CAM 2 Designers icon

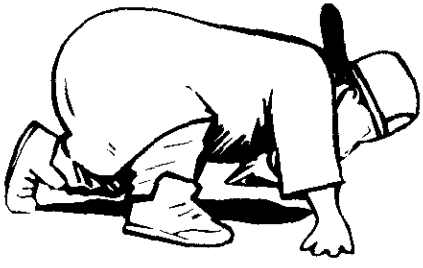


Projects icon



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4 Quick Start



The purpose of this section is to give you a quick guided tour of Mill Cam Designer 2 and let you get to know some of the basic operations.

1. Run Mill CAM by on the Mill CAM Designer 2 icon.

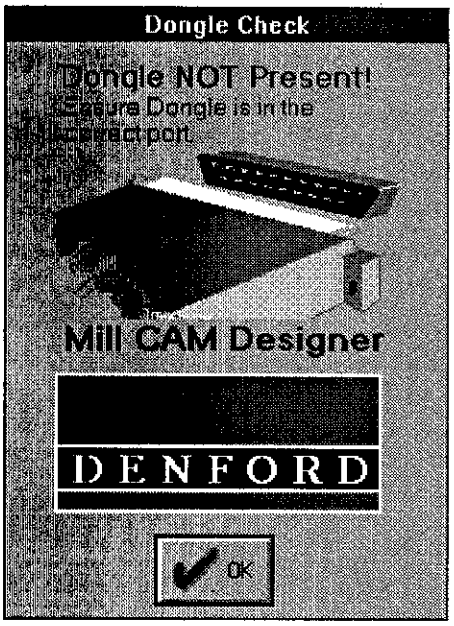
2. The material size screen appears which allows the type of milling machine to be set and the material dimensions to be altered. Change the machine type by on the arrow then again on the appropriate machine type. Leave the material size on the maximum values for the time being. on OK to proceed.

3. The main drawing screen will now be displayed. The large rectangle with the grid is the work area where the design is built up. The buttons on the left hand side are used to add different elements to the work area and change their



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properties. on one of the top six buttons, move to the drawing area then and hold. Now drag the shape out and release the button when the desired size is achieved.

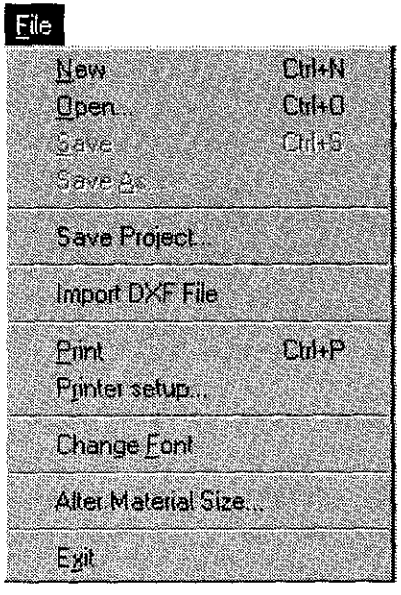


Note

If, when you try to run Mill CAM Designer 2 a 'Dongle Check' appears, make sure that the Security Dongle (supplied with the package) is correctly installed in the correct port. If you still have problems contact Denfords.



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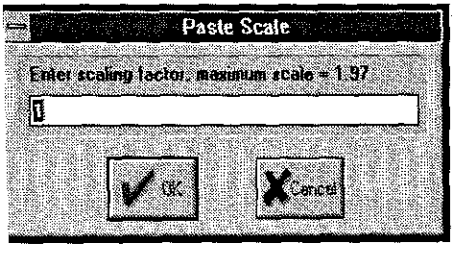


4. Elements can be deleted by R, which will remove them one at a time, the most recent first.

5. To delete the whole drawing select *New* from the *File* menu.

6. L on the *Edit* button will allow you to select a number of elements. Move on to the work area, then L and hold. This will enable you to stretch a marquee box around the elements required.

7. Selected elements can be moved around by choosing *Cut* from the *Edit* menu, followed by *Paste* - also from the *Edit* menu. The scaling dialogue box which appears allows the size of the pasted elements to be altered. Leave this set to 1 if no change is needed, then L on *OK* to proceed. Finally position the elements in their new place and L.





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8. Any selected elements can be duplicated by repeating section 7, but select *Copy* instead of *Cut* from the *Edit* menu.

Note

Cut and *Copy* place the selected elements into the computer's memory and they stay there until something else is Cut or Copied. This means that you can use *Paste* to make multiple copies.

Denny's Help Box

"Information Bar is the top area of the Mill CAM Designer screen that gives you information about program settings and the position of the mouse."

9. Different cutting depths are achieved by selecting the *Depth* button. Then selecting the required starting depth simply by on the marker next to the depth you want. The Information Bar displays details about cutting depths. On the work area elements are shown in different colours depending on the cutting depth that has been set.

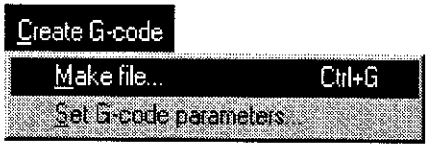


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Denny's Help Box

"The Title Bar is the very top part of the Mill CAM Designer screen. This will always say Mill CAM Designer 2 and either [untitled] or the full name of the file you have just saved."

10. When a design has been completed it can be saved for future reference by on *Save as...* which is on the *File* menu. The dialogue box which appears lets you type in a file name. By default the file is saved in the Data directory of Mill CAM Designer 2. on *OK* when you are ready to save the file. Notice the file details are now shown on the Title Bar. To save the design again after you have made further changes, simply select *Save* from the *File* menu.



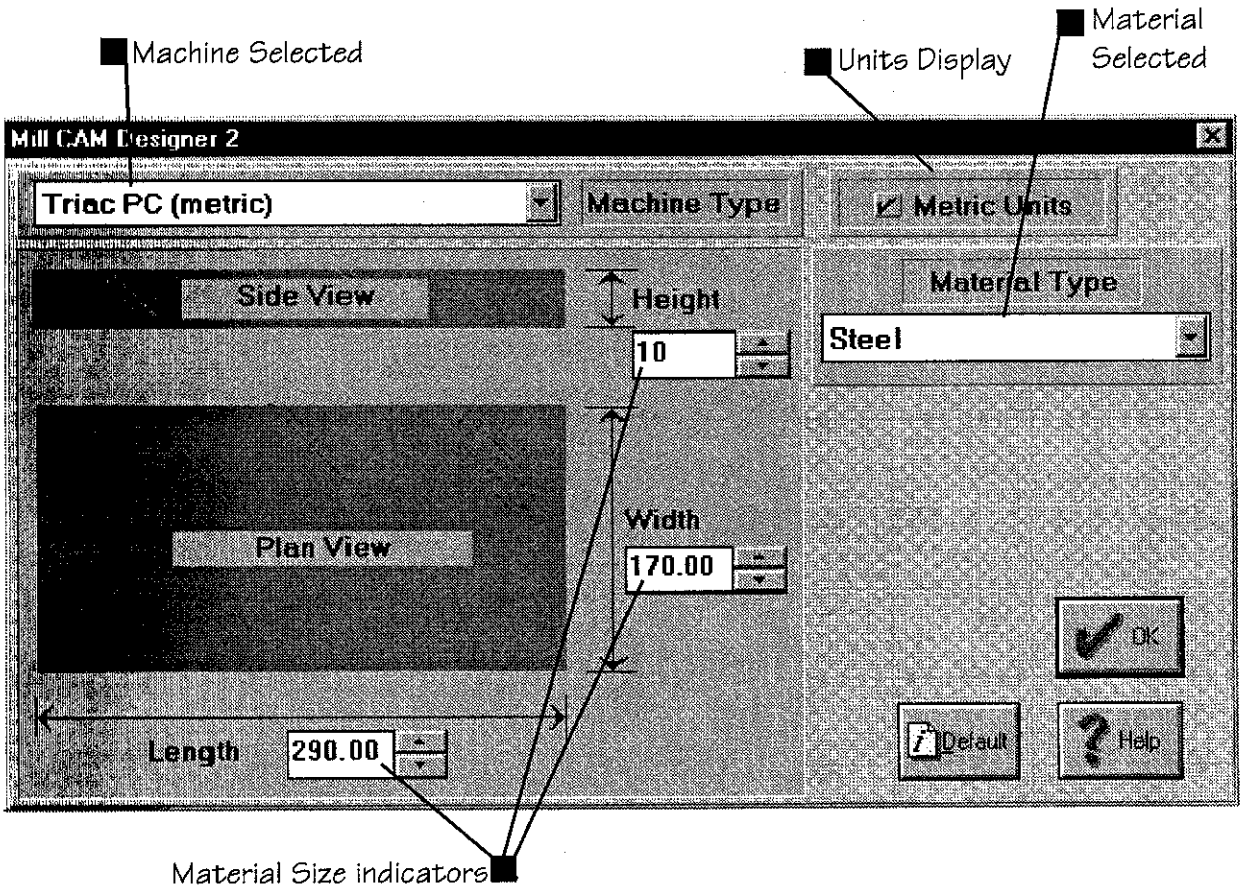
11. To produce the G-Code needed to mill the design select *Make file...* from the *Create G-Code* menu. Type a name into the File Name box of the dialogue box which appears, then on *OK*.



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5 Reference

The material size screen appears when the program is started. From this screen changes can be made to the selected Milling machine and size of the milling area.



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Machine Selected: on the arrow next to Machine Type . Select an appropriate milling machine from the drop down menu by on it.

Units Display: The Metric Units box is ticked automatically if measurements are in millimetres. If not, inches are used.

Note

This is only a display. To select alternative units you need to select the correct machine title

---

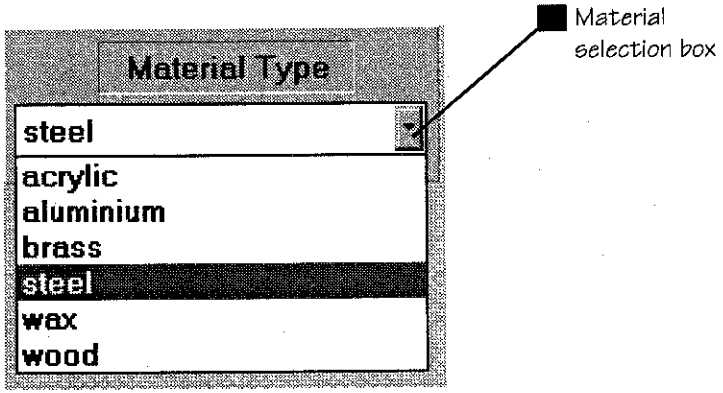
Material Size: on the arrows next to length, width and height to change the size of material. You can return these sizes to their maximum values by on the *Default* button. The default values are the limits for the selected machine.



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Reference

Material Selection: When you click on the down arrow on this box a selection of materials will be displayed. Selecting a particular material will load a specific feeds and speeds file. These files can be generated by the user in the *Set G-Code Parameters* section and saved. The name for the material is then entered into the MCD2.INI - a file found in your Denford directory. See the advanced setup section for more details.

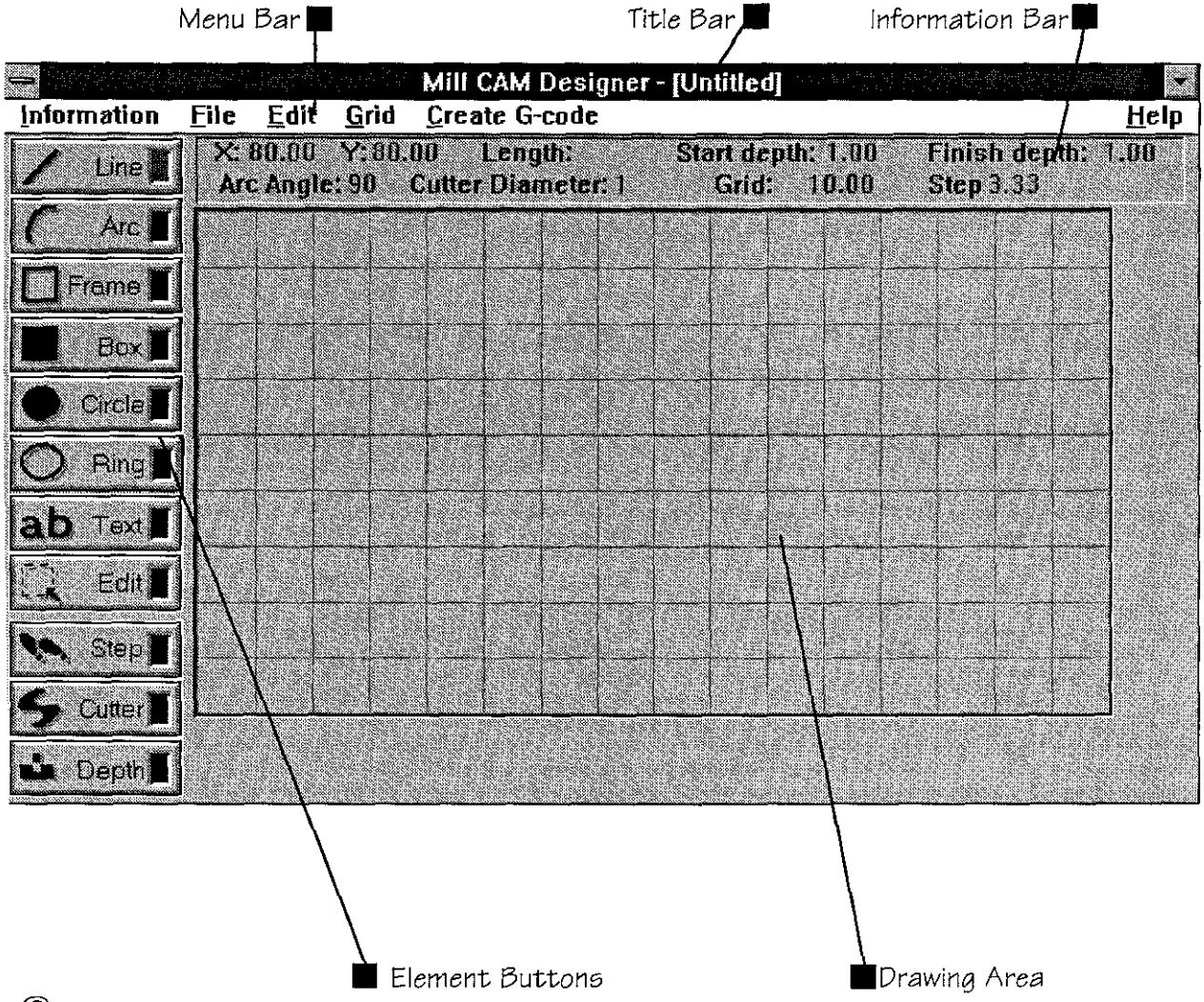


When you are ready click on *OK* to proceed to the main drawing window.



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The main drawing screen appears as shown below:-





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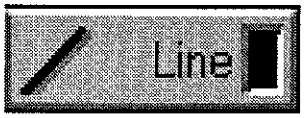
Reference

Drawing Area:	Set the area of your drawing at the start of the program by using the material size screen.
Menu Bar:	Pull the required menu down using  then select an item with .
Title Bar:	This shows the program name 'Mill CAM Designer 2 ' and the file name if you have saved the drawing.
Information Bar:	This provides a continuously updated read-out of useful information. Details given include the current cursor position, depth of cut, diameter of the machine tool and grid size.

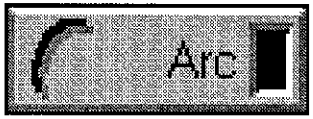
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Several simple shapes, or elements, can be drawn in Mill CAM Designer 2. They are accessed by clicking with the on the element buttons down the left hand side of the main screen. A red light is shown when a button is selected.



Straight lines are added by selecting the button. Then click and hold the at the starting point of the line, then drag the line out and release the mouse button when the end point is reached.



Select the button then click the . A dialogue box appears. From here use the up and down arrows keys to change the angle of the arc drawn. You can also change the direction in which the arc is drawn by selecting clockwise or anticlockwise. Select OK when you are ready to proceed. Click and hold the at the starting point, then stretch the arc out to the finishing point, releasing the mouse button when you have finished. If you click the while dragging the arc, this changes the direction of the arc.

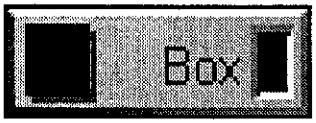


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Reference



Select the button, then click and hold the at the starting point. Drag the frame out until it is the required size (the Information bar shows the distance between opposite corners), then release the mouse button.



Select the button, click and hold the at the starting point. Drag the frame out until it is the correct size (the Information Bar shows the distance between opposite corners), then release the mouse button.



Circles are drawn by selecting the button. Click and hold the when the pointer is at the desired centre point of the circle. Drag the circle outwards until the correct radius is achieved (the radius is shown on the Information Bar), then release the mouse button.



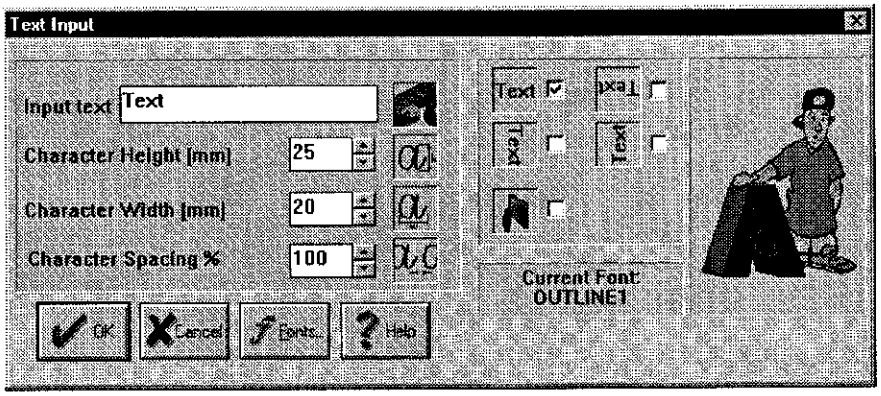
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To add a ring select the button . When the pointer is at the centre of the circle click and hold the . Using the Information Bar as a guide, drag the circle out until the required radius is reached, then release the mouse button.



Select the button, then on the drawing area A dialogue box like the one shown below will appear:-



The cursor will be flashing in the Input Text box. Type the characters required into this box. The width and height of letters can be changed by clicking on the arrows. Change the orientation of the

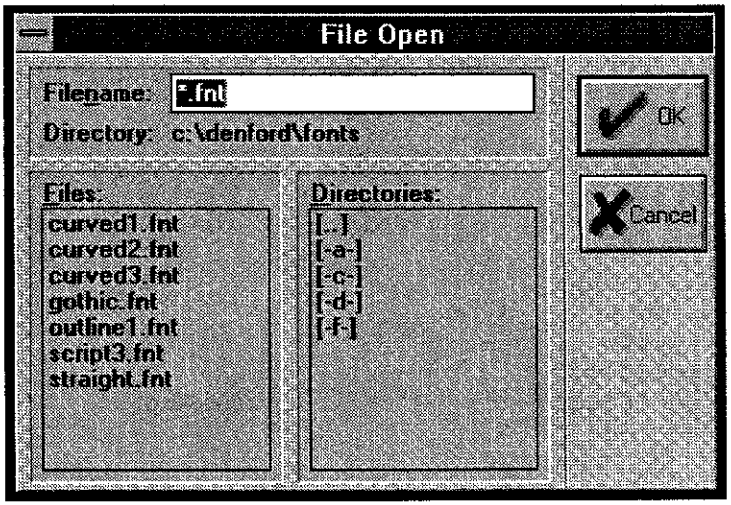


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text by ticking one of the boxes. A mirror image can be produced by ticking the box next to the mirror picture. Character spacing allows the distance between each individual character to be increased or reduced. This facility is very useful when trying to stretch a word to fit a specified space.

> **Denny's Help Box**
> All the different fonts are displayed in the reference section (page 31)

Mill CAM Designer 2 comes supplied with several different fonts. Simply on the *Fonts...* button and another dialogue box appears. The different font options are listed in the *Files..* box. Simply on the one you want and on *OK*.



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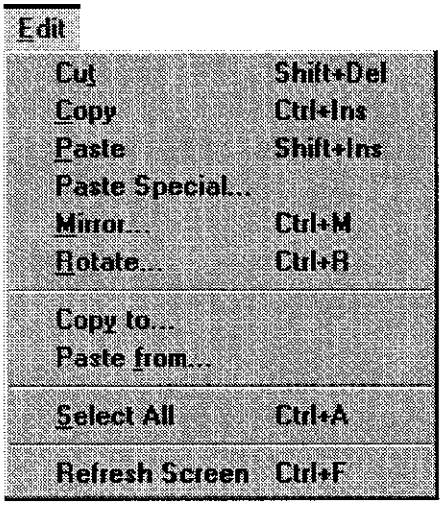


Mill CAM Designer 2 offers several different ways of modifying the elements on the drawing area.



The first step of editing is to select the element(s) to be changed. This can be done in several ways:-

1) on the *Edit* button, then and hold on the drawing area. Drag the marquee box around the elements to select.



2) on the *Edit* button, then on the drawing area. This cycles through individual elements in turn. Delete an element using .

3) From the *Edit* menu choose *Select All*, this will highlight all the elements on the screen.

Denny's Help Box

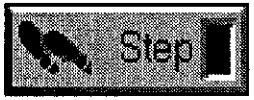
"A marquee box is a box shown by dotted lines. It is dragged around a set of elements to select them."

"Select an object to make it available for editing. A selected object is coloured black."

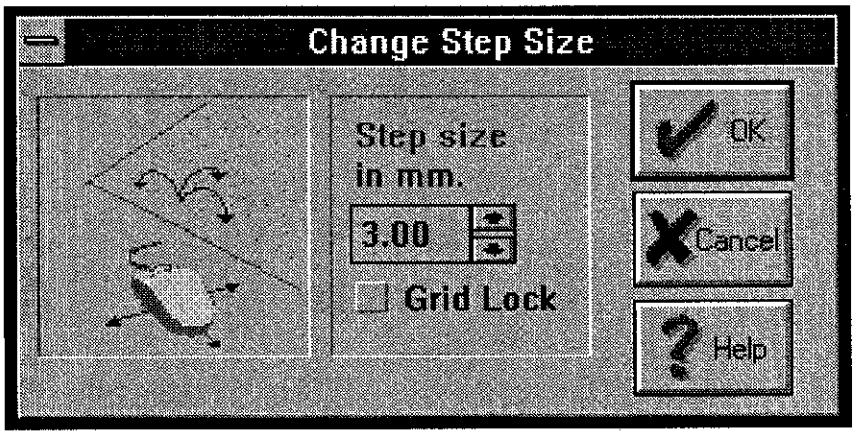


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To enable a good level of accuracy to be achieved when designing with Mill CAM Designer 2, you can control the increments in which elements are drawn.



The *Step* button allows this increment to be adjusted. Use the arrows to reduce the size of step or on the *Grid Lock* box. This will limit movement to the intersections of the grid lines. on *OK* to accept the changes made, or on *Cancel* to abandon them.



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While milling it may be necessary to change the tool bit that is used. This can be done by on the *Cutter* button and selecting a different cutter from the list of twelve. Remember, changing the cutter is time consuming. so try to keep changes to a minimum.

Note Details about how to define new tool settings are given later in the Reference Section.

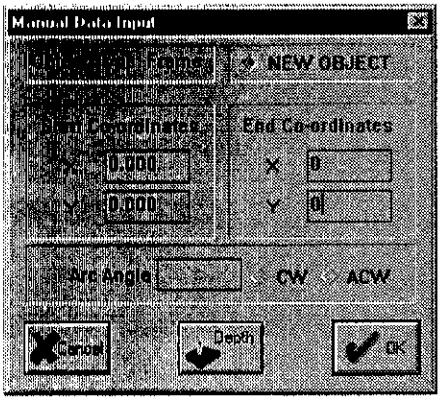


The depth of cut can be changed by on the *Depth* button, then selecting the new depth required. It is possible to cut lines with different start and finish depths. An error message will appear if the depth of cut exceeds the material depth, or the maximum depth allowed for the tool bit that is in use. Mill Cam Designer 2 has the added advantage of having 16 pre-set depths. Depths are in increments of 0.5 to give the user greater flexibility. When the finishing depth of a cut is at a different height to the start depth, a coloured gradient is shown along the length of the cut.

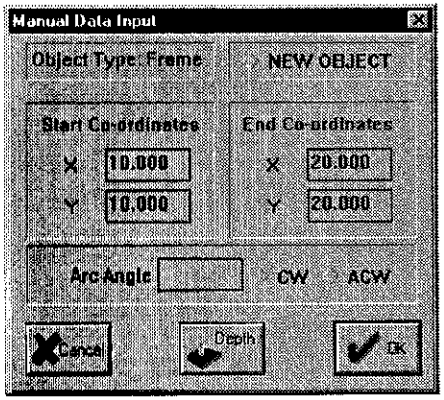


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Reference



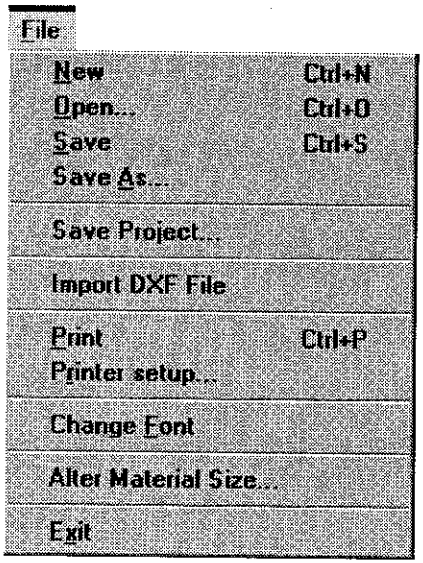
Direct data entry - To improve the accuracy of Mill Cam Designer 2 it is now possible to key in co-ordinates of new objects. To place a new object, simply select the type of object from the tool bar. Next the return button is pressed and an information box like the one to the left appears (*Boxes may vary slightly according to the type of object that is to be created*). The start and end co-ordinates along both axes are keyed in. the OK button and the object is placed in its specified place. During this process it is also possible to change the depth of cut.



Direct data entry - Existing objects can also be manipulated via direct data entry. To edit an existing object, select the object and press the return button on the keyboard. A manual data input box appears with the existing co-ordinates given. It is then possible to modify the existing object by changing its start and end co-ordinates



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File Menu:

Items are selected from the menu bar by on the menu which drops the list down, then on the appropriate item.

New - This clears the screen, after giving you the option to save the changes made.

Open - Allows a previously saved design to be loaded.

Save - Updates the changes made to a previously saved design.

Save As- Allows a design to be saved for the first time.

Save Project - A previously designed default template can be saved. The facility enables the user to tailor the software to their particular needs. Variables such as cutter diameter, depth of cut, workpiece size and G-code parameters can be set. Whilst within the project variables can be changed by pressing "Alt s" and saving the project again. Previously saved projects are accessed via on the projects icon found in the Denford group.

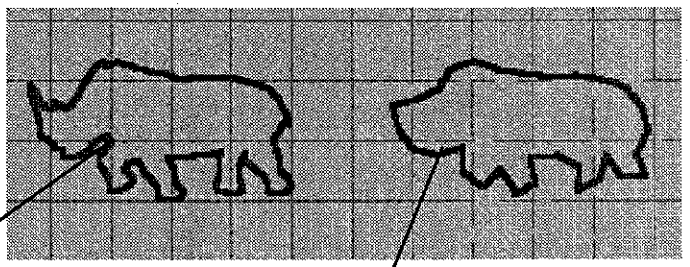
(see pg. 45 for all variables)



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Reference

Import DXF File - A file from a another design package can be placed straight into Mill CAM Designer 2 using the standard DXF format. The imported image can be altered by using the *Minimum Line Length* dialogue box. The figure set determines the minimum length of the straight lines which make up the image. The default value is 1mm. Any higher number reduces the amount of detail which is shown. Less detail means the image can be milled faster. Having on *OK* you can change the size of the new image with the next dialogue box. Then position the image on the design.

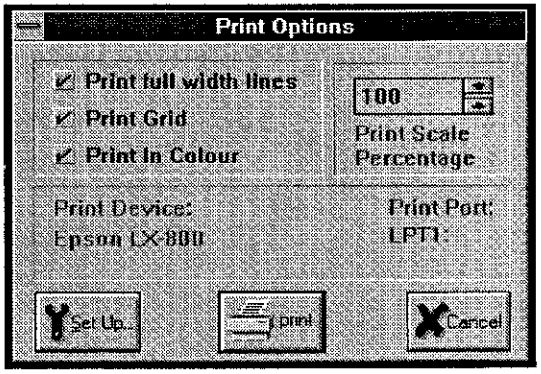


Min. Line Length = 1

Min. Line Length = 4

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Print - You can output a design to a printer using this option. on the ticks to change the appearance of the print out. Alter the size of the printed design using the print scale arrows. Changes can be made to the printer settings by on the *Set Up* button. on the *Print* button to start printing.



Note

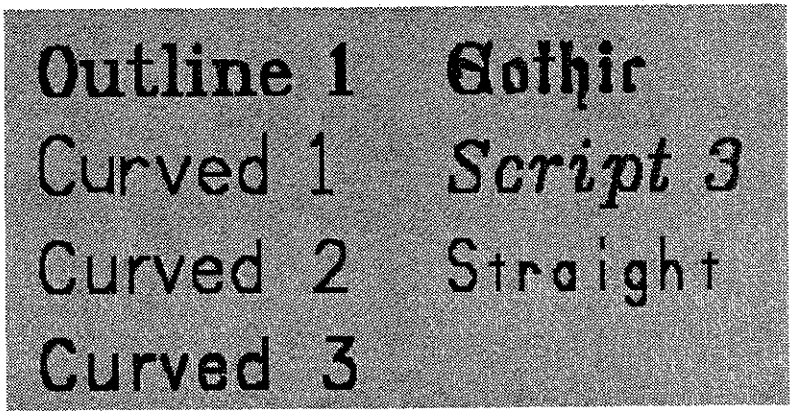
Do not attempt to remove the Dongle in order to connect the printer as this will cause an error and you may lose any unsaved work. A printer may be connected to the end of the dongle

Printer Setup - Allows changes to be made to the settings in Windows Print Manager.



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Change Font - Use this to change the typeface used when adding Text to a design. Simply on the required font then *OK* to continue.



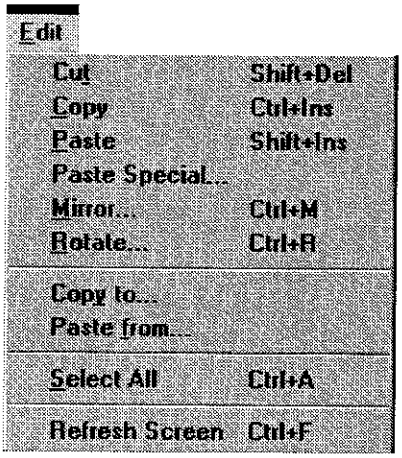
Alter Material Size - This option will take you back to the start screen. You may then alter the material size or select a different machine

Note
All data will be lost unless saved before altering the material size.

Exit - This closes down Mill CAM Designer 2 and you will be prompted to save any unsaved work.



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Edit Menu:

Cut - Any selected elements are removed from the drawing area into an area of computer memory known as the clipboard.

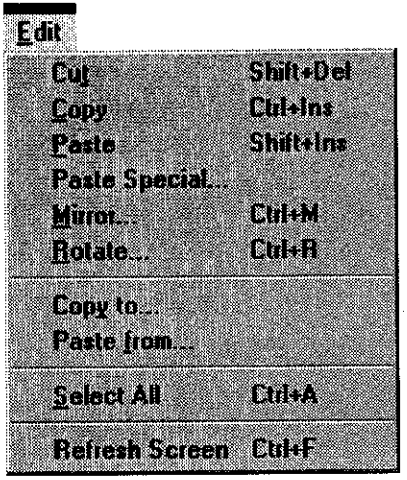
Copy- A duplicate of the selected elements is placed on the Clipboard and the original elements are left on the screen.

Paste- The contents of the clipboard can be placed onto the work area. An option is given to change the size of the elements to be pasted.

Paste Special - Works in the same way as paste , but gives the choice of altering the depth of the elements and/or the cutter diameter. Paste special can be used to overlay the same object in the same place, but set at a different depth. This allows the user to create a deep cut in the workpiece without stressing the machine, or cutter.



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Mirror - Elements which are selected can be flipped over. Denny changes depending on which type of mirror is selected. Also the original elements can be left on the drawing area, or removed.

Rotate - Selected elements can be turned by a known number of degrees by using the arrows on the dialogue box. Boxes and Frames can only be turned in 90 degree steps.

Copy to - Allow you to build up a library of commonly used parts, This function saves the selected elements in a file.

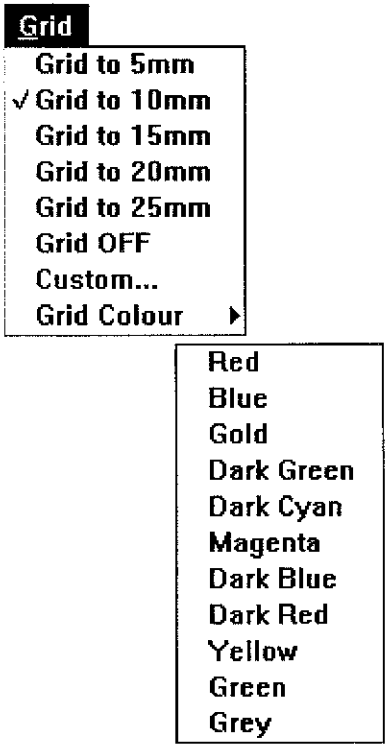
Paste from - Enables you to import other designs or parts from your library into the current drawing.

Select All - Selects the whole design.

Refresh Screen - This will redraw the design area and any elements drawn there. This might be needed after using the cut command.

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Grid:

This menu changes the scale of the grid which is shown on the drawing area. Simply on the scale required and the grid will change. It is also possible to turn the Grid lines off completely using *Grid OFF*.

Custom - Allows the grid values to be set at any required value. This should be used with caution i.e. do not set a value too small or too large.

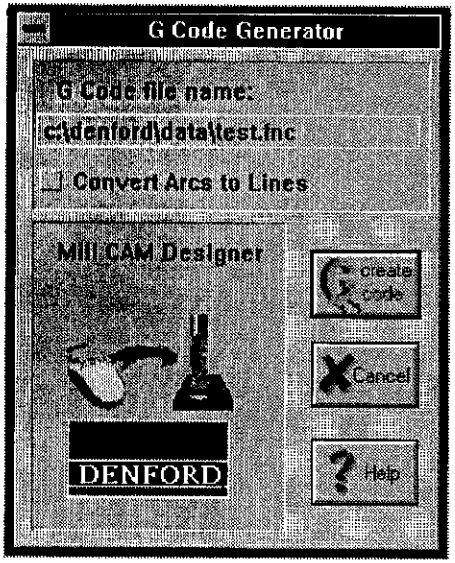
Grid Colour - This gives you a sub menu from which you can select an alternative grid colour. The default colour is the bottom item - Grey.



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Reference





Denny's Help Box

Denlang is the abbreiviation for Denford Machine code language

Create G-Code:

Having finished a design this allows you to produce the code which is needed by the CNC machine to produce your design.

Make File - This will actually produce the G-Code in a form that can be read by the CNC machine selected on the material size screen. An option box will appear, which tells you where the file will be placed. You should click on the *Create G code* button to continue or the *Cancel* button to cancel the code generation process. A new feature that has been included in this section is the ability to find the machining time required to produce your design. The time given is correct to the nearest second.

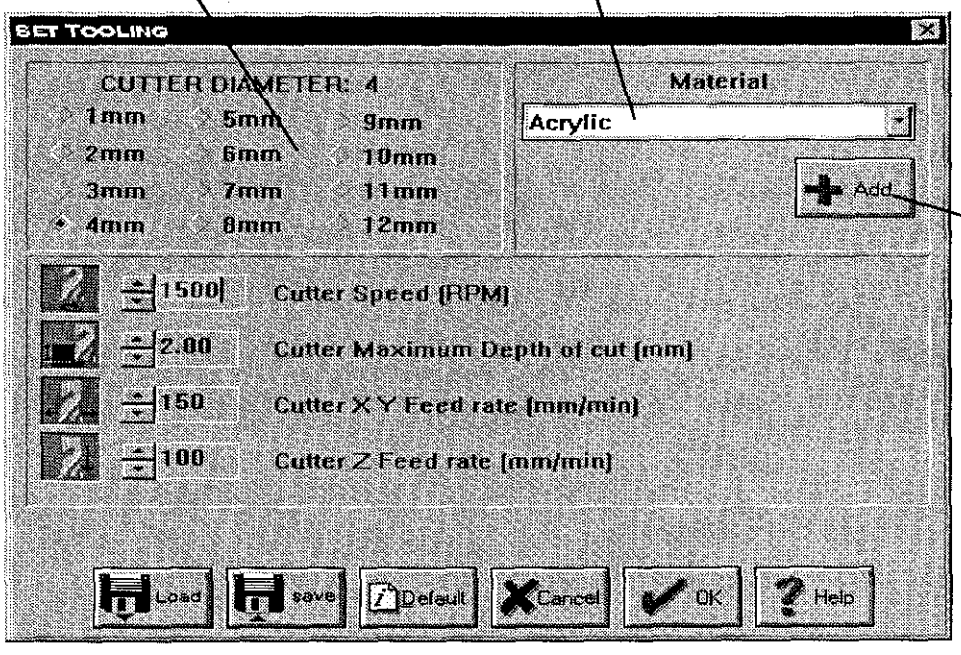
After Mill CAM Designer 2 has processed the information it will automatically hand over further post processing to Denlang, which will display a further box which displays progress with a moving blue line.

When the line reaches the right hand side the *cancel* button will turn into an *OK* button. Click to return to Mill CAM Designer 2 .



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Set G-Code parameters - Use this to set up each machine tool individually. Values can be defined for rotational speed of the cutter, maximum cutting depth, XY feed rate and Z feed rate. Twelve different diameter cutters can be set up and the values saved by on the Save button. The speeds and feeds files can be loaded using this screen or loaded at the program start- see advanced program setup for details.



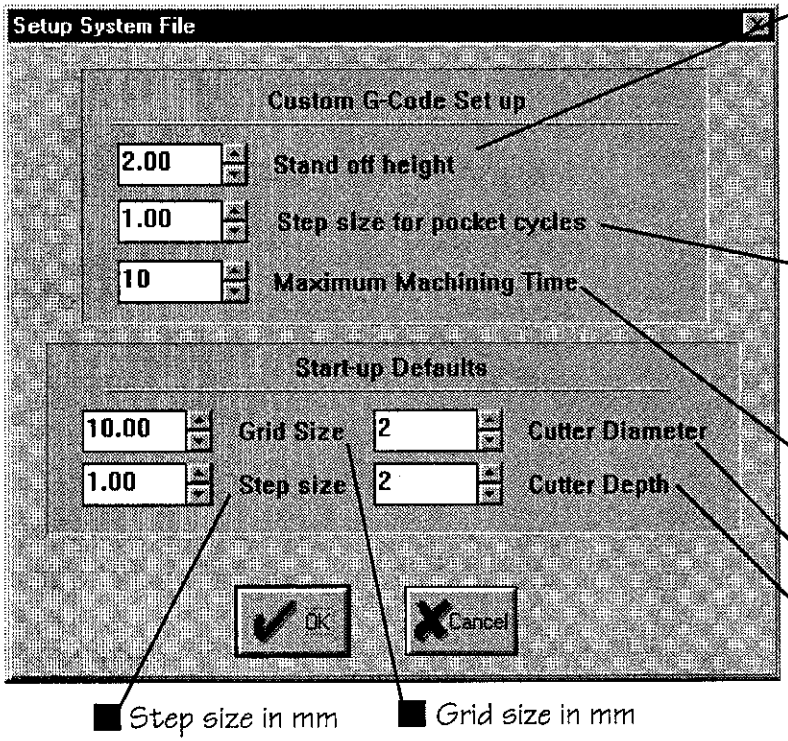
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Reference

[Alt] + [s]- Pressing the 'Alt' and 's' at the same time brings up an option box, as shown below. This allows the user to change the 'Setup System File'.

Custom G-Code Set up - When the G-codes are produced these defaults are automatically set by the Mill Cam 2 Designer program

Start-up Defaults - As the Mill Cam 2 software is started these defaults values are used by the program.



- Stand off height- The working height above the billet. The cutter will travel to this height, before moving rapidly to a different location. The stand off height can be increased to work around any raised part of the billet
- The depth that each pocket cycle will descend until it reaches the required depth. e.g. You require a 4mm pocket. The program will cycle down in 1mm decrements.
- Maximum time allowed for machining in minutes
- Cutter diameter in mm
- Depth of cut
- Step size in mm
- Grid size in mm

Note

Custom G-codes Set-up always default back to the original values at the close of the program.



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6 Tutorial

This section will attempt to provide step by step instructions using some of the facilities included in Mill CAM Designer 2. Firstly a description of each stage will be given, followed by more detailed directions. Co-ordinates given refer to the reading on the Information Bar. Any measurements are given in metric with imperial approximations contained in square brackets.

The Task

<u>Produce a name plate for Denny's Room.</u>



Defining the correct settings.

- Start Mill CAM Designer 2 by clicking on the icon.
- Set a material length of 160mm [6.5"], width at 90mm [4"] and height of 10mm [0.2"].
- Click on OK to proceed.
- From the *Grid* menu select 10mm [0.5"], make sure *Grid Lock* is not selected.
- Click on the *Step* button, set this to 1mm [0.025"]



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Tutorial

- on the *Depth* button and set both start and finish depths to 1mm [0.05"].

- on the Cutter button, choose a 1mm [0.063"] diameter tool.



Add a border to the plate.

- the *Frame* button.

- Start drawing at x=10mm[0.4"], y=80mm [3.75"] drag the box out to x=150mm[6"], y=10mm[0.4"].



Put Denny's name on the plate.

- on the *Depth* button, set a 2mm [0.08"] cutting depth.

- on the *Text* button, type 'Denny' in the *Input Text* box.

- on the *Fonts* button, select the 'Curved 1' font.

Set the text to be upright, at 25mm [1"] high and 20mm [0.8"] wide.

- on OK, set a paste scale of 0.5, and y=53mm [2.1"].

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Put a border around the name.

- on the *Depth* button, set a 1mm[0.04"] milling depth.
- on the *Ring* button, centre the circle at x=105mm[4.4"], y=45mm[1.8"], drag this to a radius of 25mm[1"].



Add a picture of Denny.

- Select Import DXF File from the File menu. Choose the Denny.DXF file from the c:\Denford\Data directory and
- Set the Minimum line Length to 1mm [0.04"], and the Paste scaling to 1.
- Position the image at x=22mm [0.9"], y=72mm

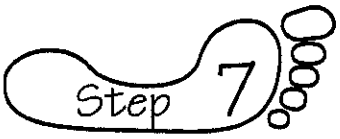


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Save the design.

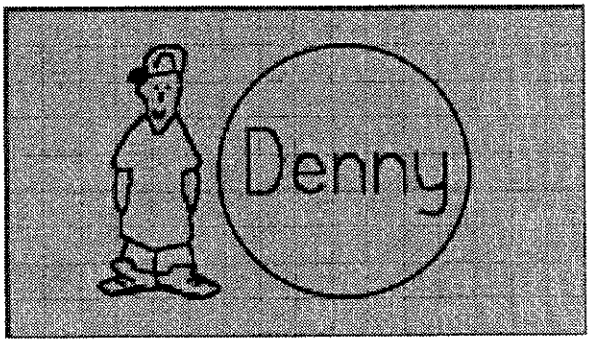
- Select *Save as* from the *File* menu.
- Save the file in the c:\denford\data directory as 'test', on *OK* to continue.



Make a G-code file.

- Select *Make a file* from *Create G-code* menu.
- Save the file in the c:\denford directory as test by *OK* to continue.
- *Create G-code* button.

The file will now be generated and placed in the c:\denford directory. It can then be used to drive your CNC milling machine.



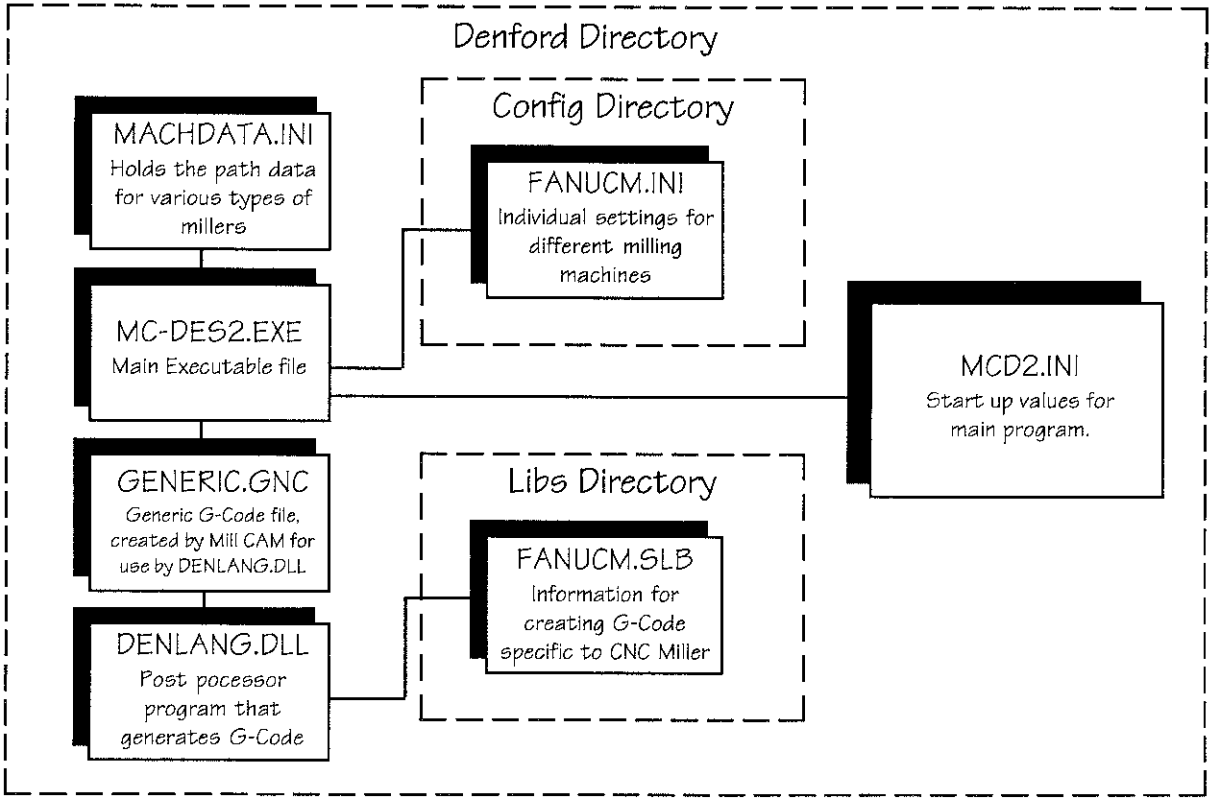
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7 Program Structure

Mill CAM Designer 2 uses and creates several files while it is running. The diagram below shows the position and function of these files.

Position and purpose of the main Mill CAM Designer files





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8 Advanced Program Setup

All of the program features are setup automatically by the installation program. It is possible to alter some program settings manually, to suit your particular needs. Program default values are stored in the file MCD2.ini. This can be found in your Denford directory. The following is an example of the file and a description of the contents:

[Material Size]
Length=160.00
Width=90.00
Height=10.00
Machine=Novamill miller
Material = Steel
complex=1
Tool number=1
Real Tool diameter = 1
Language = 0
NFM=1
Step=5
Grid=10
Tool=2
Depth=1mm

[Materials]
Steel = c:\denford\data\steel.fsf
Aluminium = c:\denford\data\ali.fsf

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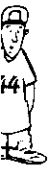
Advanced Program Setup

Plastic = c:\denford\data\plac.fsf
Wood = c:\denford\data\Wood.fsf
[PATH DATA]
Gnc name=C:\MCD\GENERIC.GNC
FONT files=c:\MCD\FONTS\gothic.fnt
Mcd files=a:\
dxf files=c:\FONTS\DXF\
gcode files=c:\DENFORD\
feeds files=c:\denford\data\

[Tool1]
tools maximum depth=2.00
tools rotational speed=3000
tools XY Feedrate=150.00
tools Z Feedrate=100.00

[Tool2]
tools maximum depth=2.00
tools rotational speed=3000
tools XY Feedrate=150.00
tools Z Feedrate=100.00

[Tool12]
tools maximum depth=12.00
tools rotational speed=1500



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Advanced Program Setup

Length-Most recently used material length

Width-Most recently used material width

Height-Most recently used material height

Machine-Most recently used machine type. This is also used to find machine defaults by looking up the name in the file MACHDATA.INI, also in the windows directory.

Complex -Gives the option to turn off complex graphics. When a 1 is present, pasting an object will show the detail of the pasted object. If a 0 is used, then only a dotted rectangle will be shown. This might be of use on a slower computer.

Real tool Diameter -Tells the program whether or not it should draw rubber banded objects in their real diameter or not. Again, this may set to 0 if on a slower computer.

Language -To be used for other language conversion. This must be set to 0 at present.

NFM - Used to disable the *Set G-Code Parameters* menu. This menu option canstill be called by pressing the [Alt] + [Ctrl] + [?]. A 1 will disable the menu, a 0 will show it.

Materials - Stores the names for a particular material and the file where the speeds and feeds are stored on disk.

Depth - Selects the colour of the depth that is set in the start up default values

Grid - Stored default value of the grid in mm

Step - Stored default value of the step in mm

Tool - Default number for start up tool diametre in mm



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Advanced Program Setup

[PATH DATA]

Gnc name -Name and directory where the program will store the temporary file generated by Mill CAM Designer 2 that can be used by the post- processing program.

FONT files -Name and directory of the most recent font to be used.

Mcd files -Directory where the latest Mill CAM Designer 2 , MCD, file was saved.

dxf files -Directory from where the last DXF file was taken .

gcode files -Directory where the finished G-Code file was last saved.

Each tool has an area labelled [Tool1] to [Tool12]. Each takes a similar format, shown below:

[Tool1]
tools maximum depth=2.00
tools rotational speed=1500
tools XY Feedrate=150.00
tools Z Feedrate=100.00

This data is the information loaded as a default when no other speeds and feeds have been specified.

Save Project.ini variables

length = max length of workpiece
Width = max width of workpiece
Height = max height of workpiece
Machine = specific machine used
Max machine time = time allowed for machining
Depth = max depth of cut
step = step size required
grid = grid size required



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Advanced Program Setup

It is possible to lock the MCD2.INI file by changing its attributes to 'read only' or use the DOS command [Attrib +r MCD2.ini]. No changes can then be made to the file. This can be useful when running the software on a network or to stop tampering by other users.

When starting the program, it is possible to disable both the logo screen and the material size screen. This is done by placing either NL or NS respectively after the command line parameters within the program properties box.

By adding the key word FEEDS after the command line parameters and the name of saved feeds and speeds files, Mill CAM Designer 2 will automatically load the feeds and speeds file.

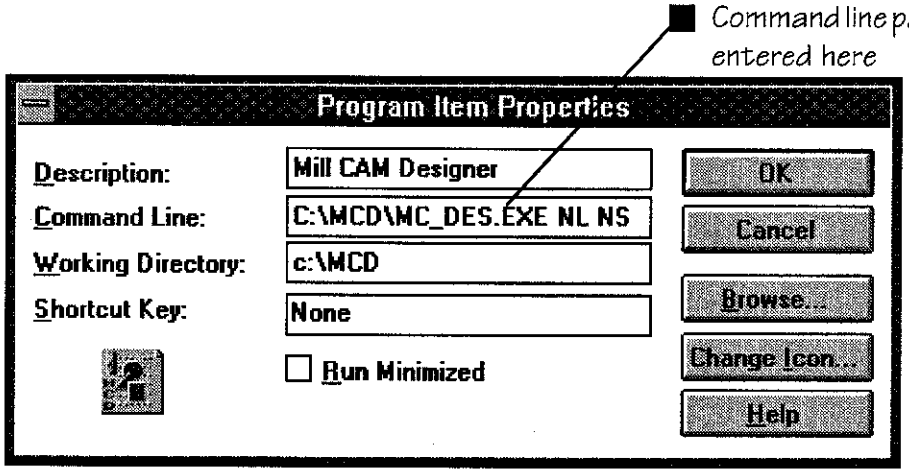


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Advanced Program Setup

Summary of command line parameters

NL or nl = No logo to be displayed.
NS or ns = No material size screen to be displayed.
FEEDS [file name] = Loads a previously saved feeds and speeds file [.fsf]



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9 Advanced Program Features

Various modifications and improvements have been made to Mill CAM Designer 2, during development. These have not been documented in the main reference section because they have either been developed at too late a stage or would complicate the simple nature of the program. They have been documented in this section.

Arcs to lines

This option is available when you generate a G-Code. It will convert Arcs drawn into a series of straight lines. This allows all milling machines to be able to generate arcs with very large radii. It can also be used to prevent mathematical errors occurring, such as when a 'Bad Arc End' message appears when milling. Mill CAM Designer 2 will automatically convert any arc with a radius of greater than 130mm to lines.



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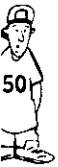
Advanced Program Features

To move an object To move an object marquee select it and . The object will then be cut and be able to be moved around the screen. To fix the object , or to cancel .

To cancel a paste operation When placing a pasted object on the screen, it is possible to exit without pasting by .

DXF Imports Mill CAM Designer 2 has been tested on the following software, to ensure that DXF files can be imported without error:

CorelDraw version 2, 3, 4, 5, 6
Auto Sketch for DOS.
Auto Sketch for Windows.
Both Auto Sketch versions will retain arc formats when transferring information.
Worricad
Techsoft Designer
Design View 3



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10 Technical Specification

The technical data given is correct at the time of printing, but may change with future developments.

- Minimum computer specification to run Mill CAM Designer 2 .
  A PC compatible capable of running Microsoft Windows Version 3.1 or above.

- Maximum number of drawing elements:
  1650

- Maximum number of elements that can be stored in past memory:
  1650

- Maximum number of tools:
  12

- Maximum Tool Diameter:
  12mm [*0.5"*]

- Maximum number of depths:
  16

- Saved File names extension:
  MCD.

- Set grid sizes available:
  5, 10, 15, 20, 25mm [0.25,0.5,0.75,1,1.25"].



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11 Glossary of Terms

Access	Obtain data from some storage device.
Arc	Portion of a circle.
ASCII	(American Standard Code for Information) Sounds like 'askey'. It is a common set of codes for letters, numbers and other characters.
Automation	The automatic control of a process or system without requiring a human operator.
Back-up memory	A means of saving data even when the power to a computer is switched off.
Baud rate	The speed at which data moves from one device to another in bits per second.
Bit	(BInary digiT) The data stored by a single electronic 'switch' which may be ON or OFF.
Bug	An error in a computer program.
CAD	(Computer Aided Design) An application program that allows a designer to draw and edit on a computer screen, before transferring to another media.
CAM	(Computer Aided Manufacture) The use of computer driven robots and machines to help with manufacture.
Character set	A Complete set of characters for a computer.



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Glossary of Terms

Closed-Loop System	A system in which the output, or some result of the output, is fed back for comparison with the input, for the purpose of reducing the difference.
CNC	Computer Numeric Control
computer configuration	The collection of computer hardware that makes up a particular computer system.
Contouring	Co-ordinated simultaneous motion of two or more axes.
Crash	The unexpected stop of a program when it meets a particular condition. Usually caused by a bug in the software.
CRT	Cathode Ray Tube. A display screen, like that on a TV.
Cursor	The marker on the computer screen, that shows the position of the pointing device.
Disk	A magnetic storage device for external data.
DOS	DiskOperatingSystem. A program which controls the operation of a disk drive.
DXF File	Data eXchange File. The standard file format devised for Auto
Execute	Run a computer program, or carry out a single instruction.
Feedback	Returning part of the output back to the input to give more accurate control.



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Glossary of Terms

Feedrate	The rate at which the material is moved towards the cutting tool.
Floppy Disc	A storage device for a computer. It can be removed and used to transport data.
Hard copy	Computer output on paper or similar media.
Hard Disc	A storage device for a computer. It cannot normally be removed from the computer, but it is very fast and can hold a large amount of data.
Hardware	Computer equipment.
Input device.	Equipment that allows data to be entered into a computer, for example, mouse, keyboard or disk drive.
Interactive system	Allows two-way communication between system and user.
Loop	A sequence of steps in a program which is repeated more than once.
Memory.	The place where a computer stores data internally.
Mouse	A hand-held device that moves around a flat surface and transmits details of its position to the computer.
Network	A system of connecting several microcomputers so that they can share common facilities such as printers and hard disks.
Operating system	A program that controls the computer from when it is first switched on.



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Glossary of Terms

Output device	Equipment that allows data from a computer to be made available externally, for example VDU or printer.
Post-processor	A program that takes a generic code and processes it in order to produce a file understood by a machine tool.
Program	The set of instructions that makes the computer carry out the desired processes.
Robot	A machine or device that has been programmed to carry out some process automatically.
Simulation	A computer imitation or representation of a real life situation eg. flight simulation
Software	The programs used in a computer.
VDU	(VisualDisplayUnit) The CRT on which data is displayed and on which it can be edited.
WIMP	(Windows, Icons, Mouse and Pointers) This is used to describe an environment like Microsoft's Windows.
Windows	An easy to use environment that uses icons, a mouse and windowed user areas.
WYSIWYG	(What You See Is What You Get) A phrase used to describe a program that shows on the screen what you will get on paper.



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