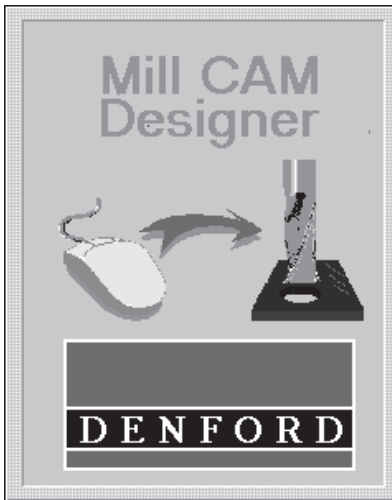




DENFORD

Total Commitment to Education and Training WorldWide.

MillCAM Designer 2 User Manual.



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About this Manual

Disclaimer	We take great pride in the accuracy of information given in this manual, but due to nature of software developments, be aware that software specifications and features of this product can change without notice. No liability can be accepted by Denford Limited for loss, damage or injury caused by any errors in, or omissions from, the information supplied in this manual.
Screenshots	Please note that any screenshots are used for explanation purposes only.
Language	This manual is written using European English.
Contact	Any comments regarding this manual should be referred to the following e-mail address: customer_services@denford.co.uk
Updates	Any updates to this manual will be posted in the "Downloads" section of the Denford website: http://www.denford.co.uk

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Conventions used in this Manual

Mouse Usage	When asked to left click on a menu tile or object, click the LEFT mouse button ONCE. When asked to right click on a menu tile or object, click the RIGHT mouse button ONCE. When asked to double click on an object, click the LEFT mouse button TWICE. When reference to either a left mouse button or right mouse button click command is omitted, always perform one click with the left mouse button.
<u>Underlined text</u>	This is used to show key words. The full definition of any terms are given in the Jargon Buster helpboxes. Similar helpboxes are also used to display any Important Notes or Tips to help you use the program.
"Quotation Marks"	Quotation marks are used to specify any software menu, title and window selections, e.g. click the "File" menu would mean click the left mouse button once, when the cursor is positioned over the File menu label. When a sequence of menu commands are requested, the menu and option names are separated by a vertical line, for example - Click "File Open" would mean open the File menu, then click on the Open option.
Bold Text	Bold Text is used to show any characters, or text, that must be entered, e.g. type file1 would mean type the word file1 into the appropriate text entry box.
[Square Brackets]	Square brackets are used to show any on-screen software button selections, e.g. Click the [OK] button would mean click the left button of the mouse once, when the cursor is directly pointing over the button labeled OK.
[Bold Square Brackets]	Bold square brackets containing text show individual keys to press on your qwerty keyboard, e.g. press [Enter] would mean press the Enter key. If a number of keys must be pressed in sequence they are shown with plus signs outside any square brackets, e.g. press [Alt] + [Enter] would mean press the Alt key first followed by the Enter key second. If a number of keys must be pressed simultaneously they are shown with plus signs inside any square brackets, e.g. press [Alt + Enter] would mean press both the Alt key and Enter key together, at the same time.

Introduction

Congratulations on your purchase of MillCAM Designer 2 software. MillCAM Designer has been specially written to lead you through your first experiences of CAD/CAM, into the exciting stages of CNC manufacture!

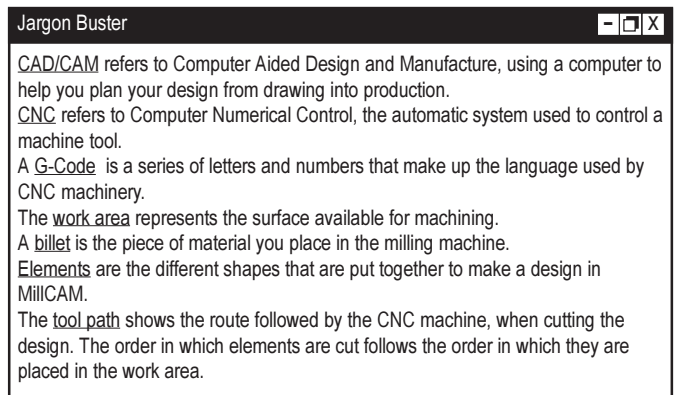
MillCAM Designer 2 is a CNC design system which allows the user to draw in a graphical environment. The design is then converted into a G-Code file, which is produced automatically.

The work area is specified at the start of the program. This represents the billet size available in the CNC machine being used.

Designs are created by combining elements, which can be added or removed at any time. The coloured toolpath follows the order of element placement in the work area. Different line thicknesses show different tool diameters and different colours represent different depths of cut. By using co-ordinates Mill CAM Designer 2 allows the size and position of elements to be edited with great accuracy.

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.

MillCAM designer has been developed to be as simple to use as possible. It will allow your CNC machine to be used as a "everyday tool" rather than one reserved for special occasions.



New Features in MillCAM Designer 2

At Denford Limited 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:

- Preset student projects.
- Additional cutting depths.
- Machine time calculated when G-codes are produced.
- Three 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.
- Advanced menu featuring element grouping, snap to elements and locking axes.
- Free project and program support materials available, via the Denford website (<http://www.denford.com>).



Minimum System Requirements

The following hardware is required to run MillCAM Designer 2.

System Requirements:

- IBM and 100% compatibles.
 - Minimum processor: 486 DX2/66.
Recommended processor: Pentium.
 - 8MB RAM with Win 3.xx.
16MB RAM with Windows 95/98/NT.
 - Microsoft 100% compatible mouse.
 - A VGA graphics card is required.
 - Keyed versions of MillCAM Designer require a parallel port for the security key (dongle).
-

Security Devices

Your MillCAM Designer installation program will be preformatted, ready for use with one of the following security devices:

1) Flash Software

This version does not require a security key. When first starting MillCAM Designer, a screen will appear displaying your user information and licence details.

A single seat licence can be installed to only one computer station at the registered establishment.

A multiple seat licence can be installed to the specified number of computer stations at the registered establishment.

2) Keyed Software

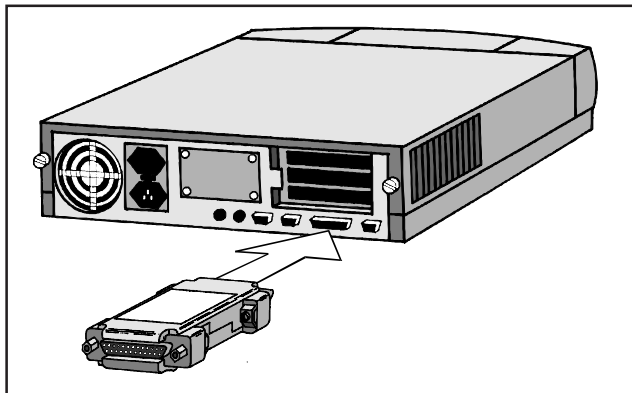
This version uses a security key, called a dongle.

When using the Keyed version of the software, MillCAM Designer will not run without the Denford Security Dongle.

Fit the dongle onto the parallel port of your computer.

The parallel port is usually positioned on the back panel of your computer - a long, thin 25 pin male connector plug. Note that your parallel port may be labelled as the printer port.

The dongle has a pass-through feature, allowing data to be sent to other external devices, such as printers, scanners or zip drives, when the MillCAM software is not being used. Simply plug the parallel port cable, supplied with your external device, directly into the back of the dongle.



Installation Procedure - Windows 3.xx

Note

MillCAM Designer 2 software ships in two different formats: Win 3.xx on floppy disks and Win 95/98/NT on CD-ROM.

Do not attempt to install the Win 95/98/NT version of MillCAM Designer 2 onto a Win 3.xx computer!

Follow these instructions to install the Denford MillCAM Designer 2 software onto a computer running Windows 3.xx. Whilst running Windows on your computer:

- 1) Insert the MillCAM Designer 2 floppy disk into your floppy disk drive, usually labelled drive "a:".
- 2) From "program manager" select "run" from the "file" menu.
- 3) A dialogue box will appear. Type in the command line box **a:install** and press **[Enter]**.
- 4) This will run the Denford install program. Pressing **[Enter]** will install MillCAM Designer 2 onto your hard disk. It will also create a group window and place the "MillCAM Designer 2" icon in this group window.
- 5) Before using MillCAM Designer 2 for the first time, ensure that keyed versions of the software have the dongle fitted to the parallel port of your computer (see page 8). If you did not receive a dongle, you will be using a flash version of the software (see page 8).



The MillCAM Designer 2 icon looks like this.



The MillCAM Designer Projects icon looks like this.

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.

Jargon Buster

A dialogue box is a window that opens to let you enter text into a program.

The command line is where any text entries are entered in a dialogue box.

An icon is a small picture, displayed in Windows. When you double click the icon, the program associated with that icon will run.

A program group, or group window is where a selection of icons can be stored together in the Windows environment.

Installation Procedure - Windows 95/98/NT

Note

MillCAM Designer 2 software ships in two different formats: Win 3.xx on floppy disks and Win 95/98/NT on CD-ROM.

Do not attempt to install the Win 3.xx version of MillCAM Designer 2 onto a Win 95/98/NT computer!

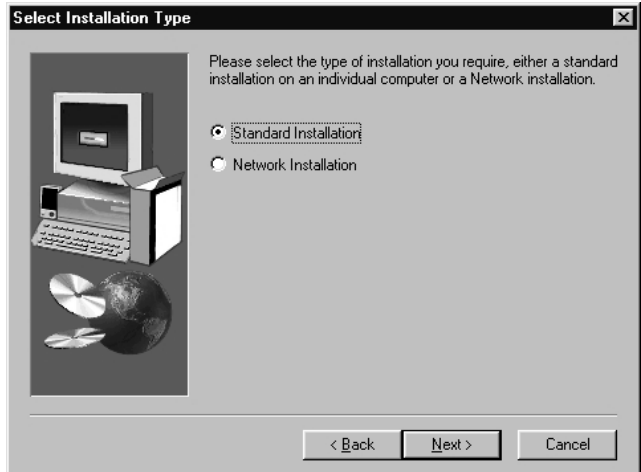
Follow these instructions to install the Denford MillCAM Designer software onto a computer running Windows 95/98/NT. Whilst running Windows on your computer:

- 1) Insert the MillCAM Designer CD-ROM into your CD-ROM drive. If the autorun feature is enabled on your computer, the "MillCAM Designer Installation" start-up window will automatically appear - move to section 4). Otherwise continue as outlined below.
- 2) Double-click the left mouse button on the "My Computer" icon. In the "My Computer" window find your floppy disk drive icon (usually labelled "d:" or "e:") and double-click the left mouse button on this icon.
- 3) The contents of the CD-ROM will be displayed in a new window. Double-click the left mouse button on the file named "Start.exe" to display the "MillCAM Designer Installation" start-up window.
- 4) If you have been supplied with a flash screen version of MillCAM Designer, insert your "Registration" floppy disk when prompted.



Installation Procedure - Windows 95/98/NT

- 5) Select the correct type of installation from the two choices; "Standard", for stand-alone computers, or "Network", for multiple computers linked together by a network.



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.

Select the area of your hard-disk where the program files can be installed, together with any program and folder names. Network users can find additional installation instructions on pages 50-51 of your main "MillCAM Designer 2 User Manual".

- 6) Your computer must be restarted before using MillCAM Designer for the first time.

Ensure that keyed versions of the software have the dongle fitted to the parallel port of your computer. Your parallel port may be labelled as the "printer" port and is usually positioned on the back panel of your computer.

Note

To uninstall MillCAM Designer, click "Windows Startbar | Settings | Control Panel | Add/Remove Programs", then highlight "Mill Cam Designer" and click [OK].

If you did not receive a dongle, you will be using a flash version of the software (in which case your details would have been registered via floppy disk in section 4).



The MillCAM Designer 2 icon looks like this.



The MillCAM Designer Projects icon looks like this.

Quickstart

This section will enable you to become familiar with the features of MillCAM Designer 2, without referring to the reference sections.

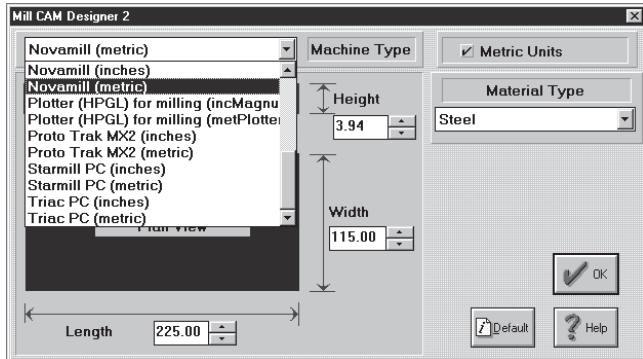
- 1) Start MillCAM Designer 2 by double clicking on the MillCAM icon, or by clicking "Startbar|Programs|Denford|MillCAM Designer" in Windows 95/98/NT. If the program does not open, check that your dongle is correctly installed in the parallel port of your computer.



The MillCAM Designer 2 icon looks like this.

- 2) The materials window allows you to select the material type, CNC machine tool type, the units of measurement and the dimensions of the billet.

Change the machine type by clicking on the arrow to display the dropdown list, then highlight and click on the appropriate machine name and units of measurement.



Selecting the machine name and units of measurement from the Materials window.

Carry out the same procedure for selecting the material type.

Change the billet size values by clicking on the up and down nudge buttons, next to the appropriate value.

Click the [OK] button to proceed.

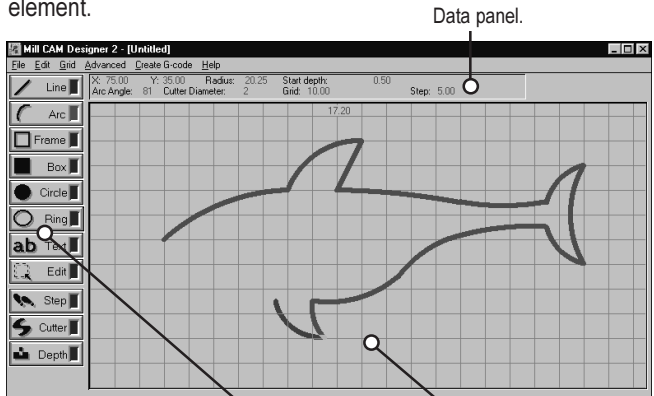
Quickstart

Tip

Note - the order and direction that you place elements will eventually be the order and direction in which they will be machined. Therefore, it is very important to think carefully about what your design will look like when finished, so you can plan the most efficient toolpath, with minimal tool changes.

3) You will now be presented with the design window. The large rectangle with the grey grid represent a plan view of your billet - this is the work area, where your design is drawn. The buttons on the left hand side are used to select the different types of elements, used for building your design.

To select a shape element, click on the appropriate button, then move your cursor into the work area. Click and hold down the left mouse button at the required starting point, then drag out the required element shape, until the desired shape is achieved. Release the left mouse button to confirm the end position of the element.



Your design is constructed within the Design window.

Element buttons.

Work area.

Begin to build up your design, using the different elements available. Refer to the data panel, above the work area, for detailed co-ordinate positions, cutter size and depth of cut settings.

Note

Once a part of an element has been deleted, it cannot be recovered.

4) Elements can be deleted by clicking the right mouse button. This will remove element parts one at a time, the most recently drawn being the first deleted.

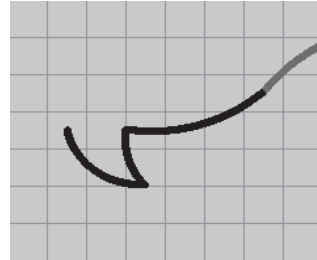
5) To delete an entire drawing, select the "New" option from the "File" menu.

Quickstart

- 6) Left clicking on the "Edit" button will allow you to select a number of elements. Move onto the work area, then click and hold down the left mouse button. Stretch a marquee (a dashed lined box) completely around all the elements you want to select. Elements that you select are always highlighted in black.



Marquee used to select elements.



Selected elements are shown in black.

Note



Cutting and pasting can redefine the order of machining. Any new pasted elements become the last objects placed and therefore the last elements machined.

- 7) Selected elements can be moved around by choosing the "Cut" option from the "Edit" menu, followed by "Paste", also from the "Edit" menu. The "paste scale" window that appears allows the size of the pasted elements to be altered. Leave this set to 1 if no change is needed, then click on [OK] to proceed. Finally position the elements in their new place and left click to confirm their position, or right click to permanently delete these elements.

Tip



The cut and copy commands place the selected elements into the computers memory, where they stay until another element is cut or copied. This allows the paste command to be used to make multiple copies.

- 8) Any selected elements can be duplicated by repeating section 7, but choosing "Copy" instead of "Cut", from the "Edit" menu.

- 9) Different cutting depths are achieved using the "Depth" button. Different depths are shown in the work area using different colours. Using the "Set Cutter Depths" window, click the diamond marker next to the depth you require, then click the [OK] button. All subsequent elements will be placed at the new depth.

Set Cutter Depths	
Start of line depth	End of line depth
<input checked="" type="checkbox"/> 0.50	<input type="checkbox"/> 0.50
<input type="checkbox"/> 1.00	<input type="checkbox"/> 1.00
<input type="checkbox"/> 1.50	<input type="checkbox"/> 1.50

Use the Depth button to select new cutting depths. The black diamond marker shows the currently selected depth. The tickmark shows depths already in use.

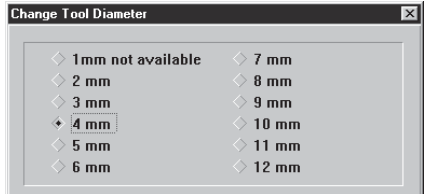
Quickstart

Note

Tool change operations require large amounts of time on a CNC machine tool. Try to plan your design so tool changes are kept to a minimum.

- 10) Different sizes of tool are selected using the "Cutter" button. Using the "Change Tool Diameter" window, click the diamond marker next to the cutter size you require, then click the [OK] button. All subsequent elements will be placed using the chosen cutter size.

Use the Cutter button to select a new size of cutting tool diameter. The black diamond marker shows the currently selected cutter.



Note

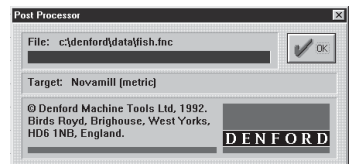
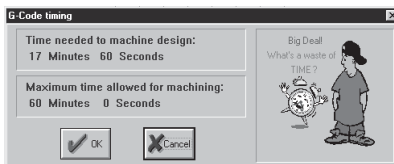
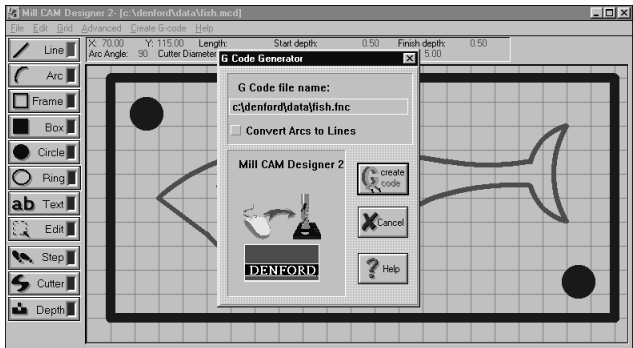
Filename must be no longer than eight characters.

- 11) When your design is complete, save the MillCAM Designer 2 file using the "Save As" command from the "File" menu. MillCAM files are saved in MCD format.

Note

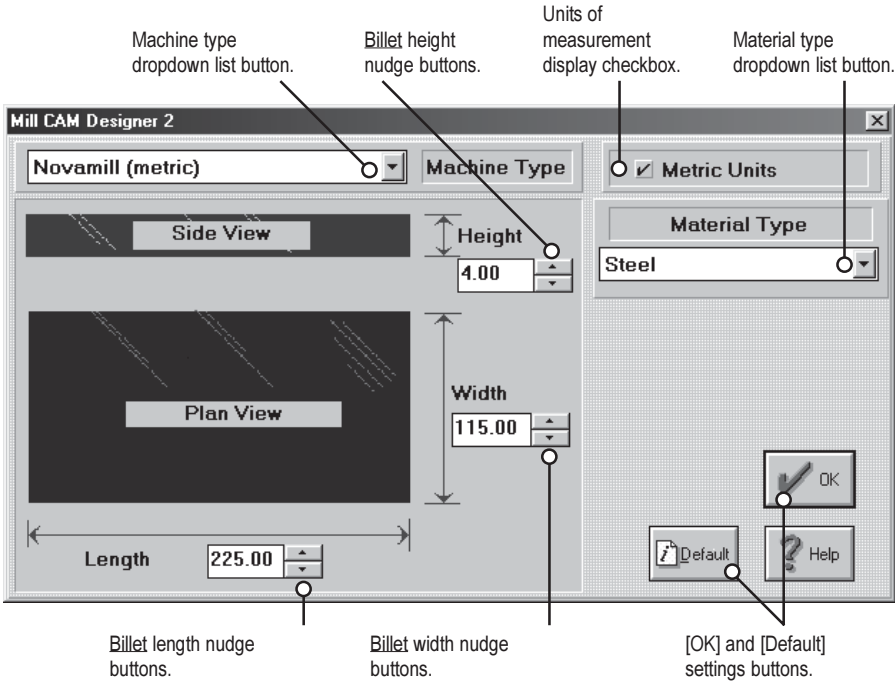
Most CNC machines are different in the way they read or load G-code instructions. Therefore no specific instructions can be given within this manual. Please check the machine manufacturer's manual for exact details.

- 12) To produce a G-code file, the language understood by CNC machines, use the "Make file..." command from the "Create G-code" menu. All that remains is to transfer this file to your CNC machine for parts manufacture!



Material Window

The material window is the first window displayed when the MillCAM Designer 2 program is started.



Jargon Buster - □ X

The term Billet refers to the piece of material that will be machined.

Material Window

Various options are available in the material window:

- 1) **Machine Type** - Click the arrow button next to the "Machine Type" title to display the dropdown list, then click on the name of the machine you intend using for parts manufacture.
- 2) **Units of Measurement** - A tickmark in the "Metric Units" checkbox indicates Metric measurement (millimetres) are selected. No tickmark indicates Imperial measurement (inches). Note that this checkbox is only used for display purposes - The Units of Measurement are set from the options in the "Machine Type" dropdown list.
- 3) **Material Type** - Click the arrow button under the "Material Type" title to display the dropdown list, then click on the name of the material used for your billet.

Note - Selecting a particular material will load a specific machining parameters file. These files can be edited from the design window, using the "Create G-code|Set G-code parameters..." menu. The units of measurement used in the machining parameters file must match the units of measurement used in the machine type (chosen in section 1), i.e. they must be both Metric or both Imperial.

For more information see the G-code Parameters and Advanced setup sections on pages 39 and 46.

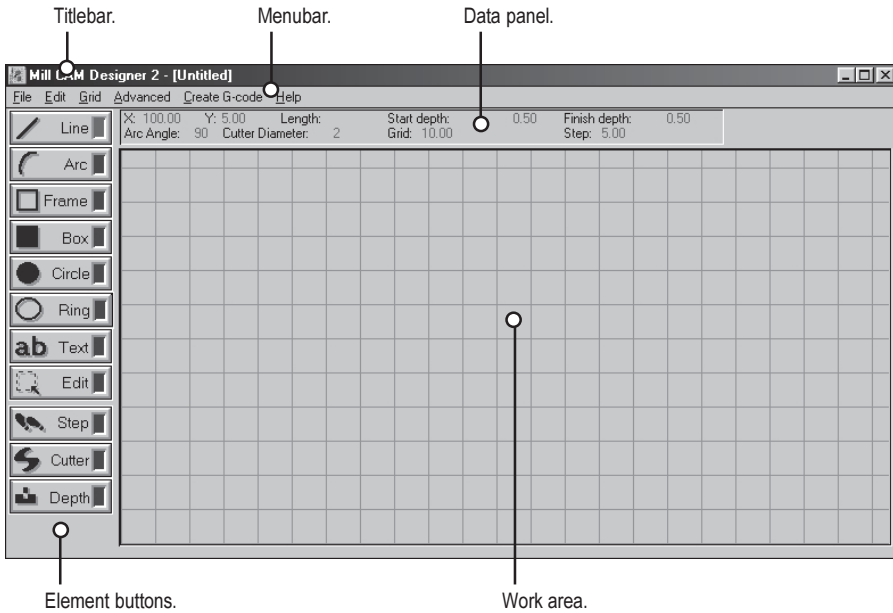
- 4) **Height** - Click the up and down nudge buttons to define the "height" of the billet in the units of measurement previously selected. This will be the Z axis movement of the machine.
- 5) **Width** - Click the up and down nudge buttons to define the "width" of the billet in the units of measurement previously selected. This will be the Y axis movement of the machine.
- 6) **Length** - Click the up and down nudge buttons to define the "length" of the billet in the units of measurement previously selected. This will be the X axis movement of the machine.
- 7) **OK / Default** - Click the [OK] button to save the current settings and open the design window. Click the [Default] button to reset all the options in the materials window.

Jargon Buster

A Parameter is a value contained in a program. Many of these parameter values can be changed by the software user.

Design Window

The design window is displayed following material set-up. This is the main program window where designs are built up.



Work area.

This is the area where the design is constructed, using the element buttons to the left of the display. The working area represents a plan view of the billet (i.e. its length and width), with the depth of cut indicated by the colours used on the element lines.

Menubar.

Click the required menu title to display the dropdown list. Move the cursor down the list, highlighting each option. Click the highlighted option to select it.

Titlebar.

The titlebar shows the name of the program "Mill CAM Designer 2" along with the name of the file currently being edited (if saved previously).

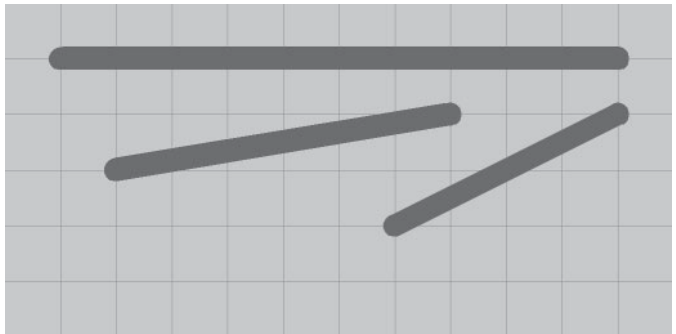
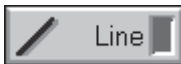
Data Panel.

The data panel provides a continuously updated read-out of useful information, including current co-ordinate position, depth of cut, diameter of the machine cutter and grid size.

Element buttons - Line

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

Note - the order and direction that you place elements in the work area will be identical to the order and direction in which they will be machined. Therefore, it is very important to think carefully about what your design will look like when finished, so you can plan the most efficient toolpath, with minimal tool changes.

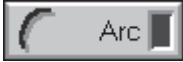


[Line]

Straight lines are added by selecting this button.

Click and hold down the left mouse button at the starting point of the line, then drag the line out and release the mouse button when the end point is reached.

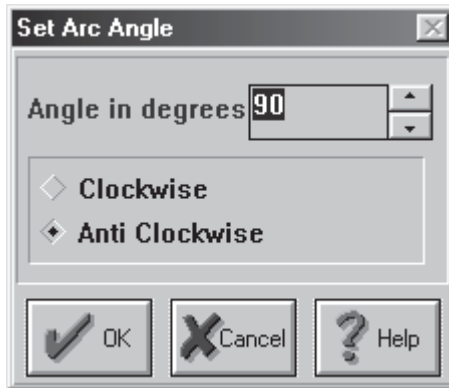
Element buttons - Arc



[Arc]

Curved lines are added by selecting this button.

Click anywhere in the work area. The "Set Arc Angle" window will appear.



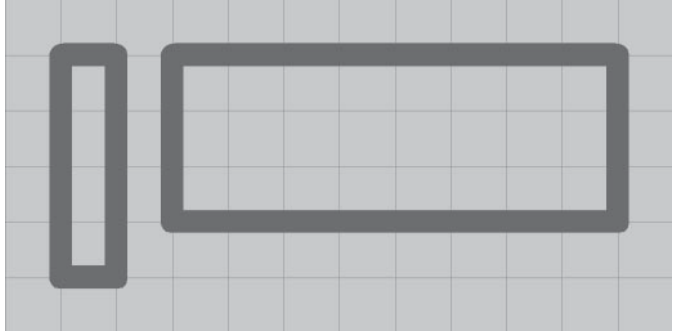
Click the up and down arrows nudge buttons to change the angle of the drawn arc. You can also change the arc direction by selecting the clockwise or anticlockwise diamond markers. Click the [OK] button when you are ready to proceed.

Click and hold down the left mouse button at the starting point, then stretch out the arc to the finishing point, releasing the mouse button when you have finished.

If you click the right mouse button the while dragging the arc, the direction of the arc will reverse.

The arc angle can be changed using the keyboard **[up and down arrow]** keys. To change the arc angle in smaller increments, hold down the **[SHIFT]** key whilst pressing the **[up and down arrow]** keys.

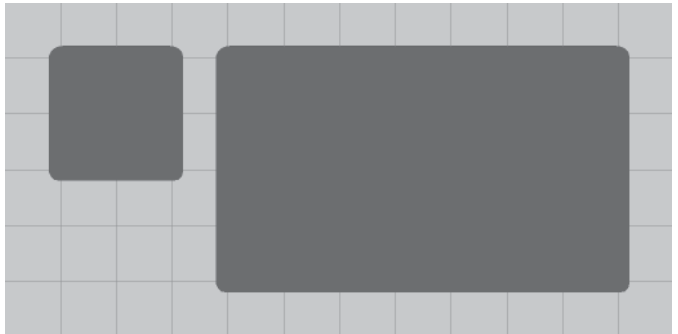
Element buttons - Frame, Box



[Frame]

Straight lined frames are added by selecting this button.

Click and hold down the left mouse button at the starting point of the frame, then drag out the frame to the required size. The data panel shows the distance between opposite corners. Release the left mouse button to finish the operation.

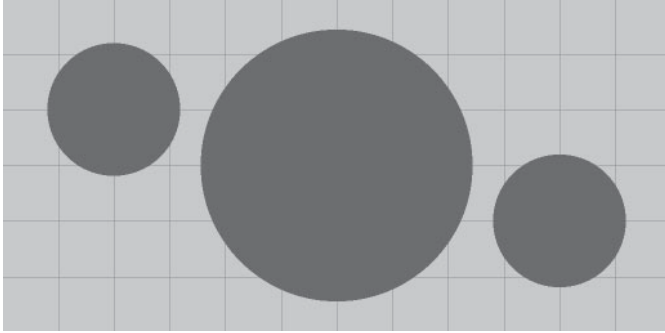


[Box]

Straight lined boxes, called pockets, are added by selecting this button. All the material within the perimeter of the box will be machined to the selected depth.

Click and hold down the left mouse button at the starting point of the box, then drag out the box to the required size. The data panel shows the distance between opposite corners. Release the left mouse button to finish the operation.

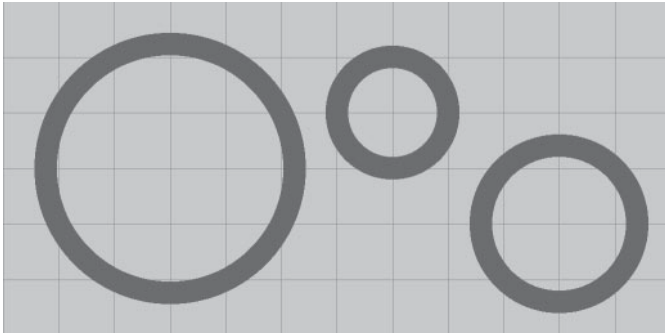
Element buttons - Circle, Ring



[Circle]

Circular pockets are added by selecting this button. All the material within the perimeter of the circle will be machined to the selected depth.

Click and hold down the left mouse button at the desired centre point of the circle, then drag the circle outwards to the required size. The data panel shows the circle radius. Release the left mouse button to finish the operation.

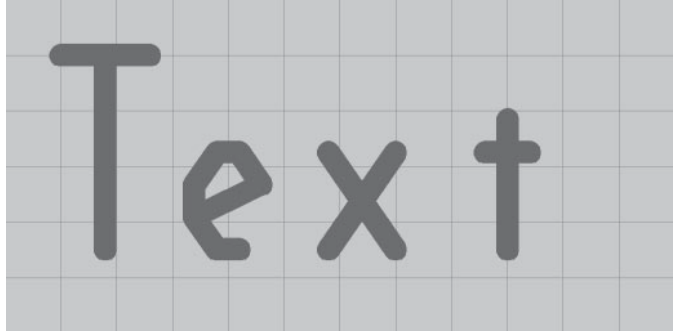


[Ring]

Circular frames are added by selecting this button.

Click and hold down the left mouse button at the desired centre point of the ring, then drag the ring outwards to the required size. The data panel shows the ring radius. Release the left mouse button to finish the operation.

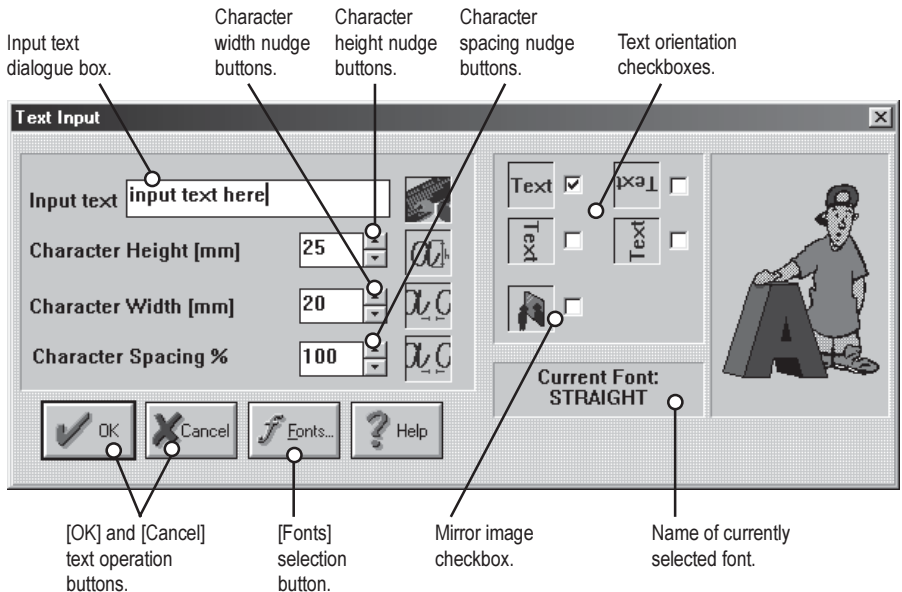
Element buttons - Text



[Text]

Strings of alphanumeric characters are added in your design by selecting this button.

Click anywhere in the work area. The "Text Input" window will appear.



The cursor will be flashing in the "Input text" dialogue box. Type the text required into this box.

continued....

Element buttons - Text

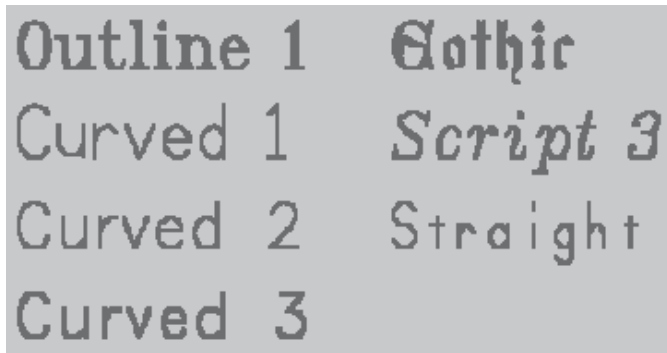
The height, width and spacing of the letters can be changed by clicking on the appropriate up and down arrow nudge buttons.

Character spacing allows the distance between each individual character to be increased or reduced, useful when trying to stretch a word to fit a specified space.

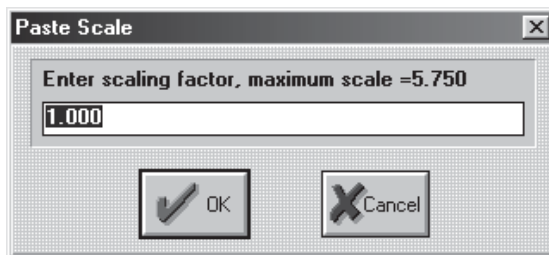
The direction of the text can be specified by clicking in one of the four text orientation checkboxes. A tickmark shows the selected orientation.

A mirror image can be produced by clicking the checkbox next to the mirror picture. A tickmark is displayed when this option is selected.

Select the font style by clicking the "Fonts" button, then load the required font, file extension ".fnt". Available fonts are shown below:



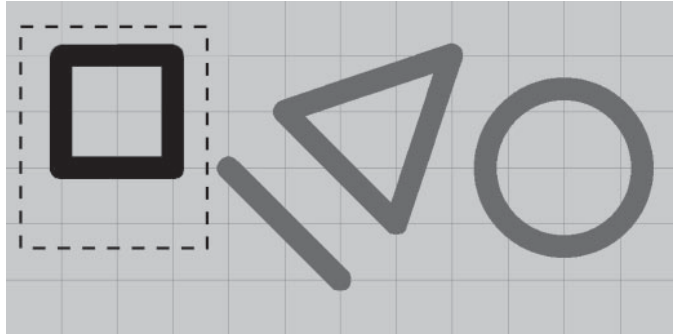
Click the [OK] button to proceed.



The "Paste Scale" window will appear. To fit the text into the work area at its largest possible size, use the maximum scale value suggested in the "Paste Scale" window. For scale 1:1 use a value of 1.000. Click the [OK] button after entering a value.

Move the text to the required position and click the left mouse button to place the text in your design, or the right mouse button to discard it.

Element buttons - Edit



[Edit]

Elements can be selected, moved and deleted using this button. Editing can be performed using several methods:

- 1) Click on the [Edit] button, then click and hold down the left mouse button in the work area. Drag the marquee box completely around the required elements to select them. Selected elements are always coloured black.




To reposition the selected elements:

Click the right mouse button to lift the selected elements from the design. Reposition the elements and click the left mouse button to replace them in their new position. Repositioning elements can redefine the order of machining - the last elements placed become the last elements machined.

To delete the selected elements:

Click the right mouse button to lift the selected elements from the design. Click the right mouse again, to delete them. Note - once an element or a part of an element has been deleted, it cannot be recovered.

- 2) Click on the [Edit] button, then click the right mouse button in the work area. Each right mouse button click cycles through individual element parts in turn. Delete the selected element part using the left mouse button.

Tip   

To select multiple elements, hold down the [CTRL] key whilst clicking on each element in turn. This selection can also be grouped together using the "Advanced | Group" menu command.

Tip   

Click "Edit|Select All" from the menubar to highlight all the elements on the screen.

Jargon Buster   

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

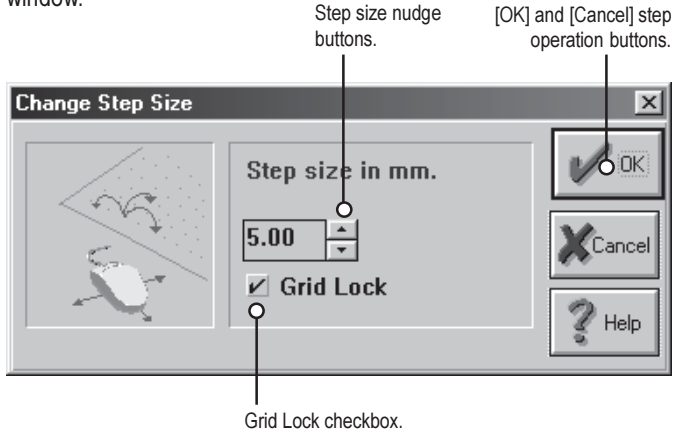
Element buttons - Step



[Step]

To enable a high degree of accuracy in Mill CAM Designer 2, elements are drawn and positioned using increments, called steps. The [Step] button allows this increment value to be adjusted.

Clicking the [Step] button will display the "Change Step Size" window.



Use the up and down arrow nudge buttons to change the size of step.

Click in the "Grid Lock" checkbox to limit movement to the intersections of the grid lines only. A tickmark appears when this option is selected.

Click the [OK] button to accept the changes made, or the [Cancel] button to discard them.

Element buttons - Cutter



[Cutter]

Different diameter cutting tools are selected using this button.

Clicking the [Cutter] button will display the "Change Tool Diameter" window.

Mill CAM Designer 2 allows a range of twelve cutter sizes to be used. A black bullet is displayed to indicate the currently selected cutter. Click the grey diamond marker to the left of the cutter size title you require.

Click the [OK] button to change to the new tool diameter, or the [Cancel] button to discard any changes.

Any elements you place in the work area will now be drawn (and subsequently machined) using this new diameter cutter.

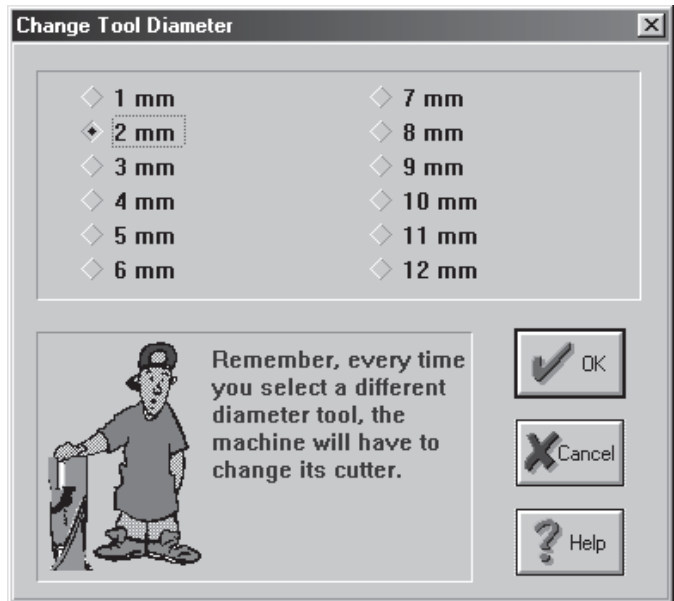
Note - the current cutter size is always shown in the grey data panel, under the menubar.

Note

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

Tip

If you intend using more than one tool diameter, try to draw all the elements you need with each tool before changing to another size. Remember, changing the cutter is time consuming, so try to keep changes to a minimum.



Element buttons - Depth



[Depth]

The depth of cut can be changed by selecting this button.

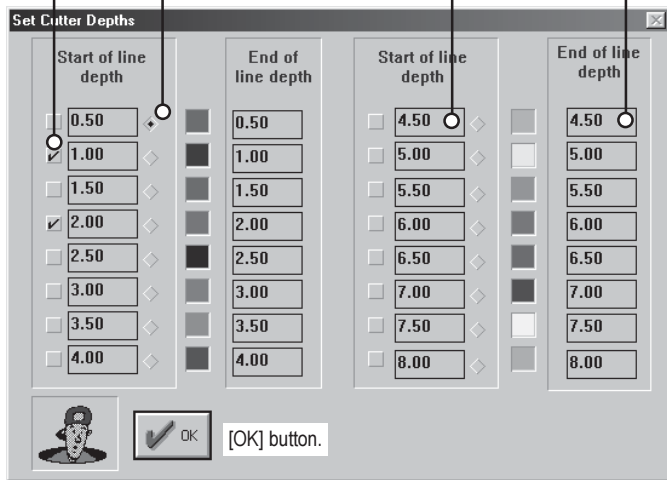
Clicking the [Depth] button will display the "Set Cutter Depth" window.

Depth in use checkbox.

Currently selected depth diamond bullet.

Starting depth dialogue box.

Finishing depth dialogue box.



To select a new depth, click on the grey diamond marker, next to the coloured square. A black diamond bullet shows the depth currently selected. Click the [OK] button to accept the changes made.

The grey squares to the left of each "Start of line depth" value display a tickmark if the indicated depth is being used on any part of the design.

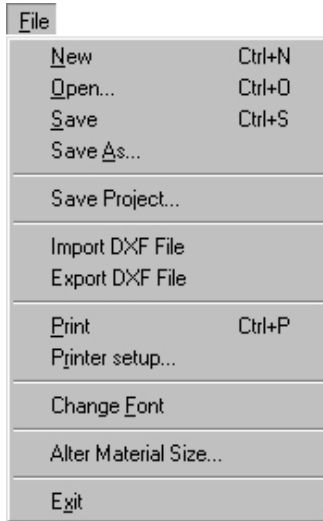
It is possible to cut lines with different start and finish depths. An error message will appear if the depth of cut exceeds the material depth, or the maximum depth allowed for the tool bit that is in use.

Mill CAM Designer 2 has the added advantage of having 16 preset depths. Depths are in increments of 0.5 to give the user greater flexibility.

Individual depth values can be edited by clicking the cursor inside the appropriate depth value dialogue box, then overtyping with the new depth value. This feature allows gradient depths to be set.

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 cutting line. The start of line depth always corresponds with the starting point of the element, allowing control over gradient direction.

File Menu



Click the "File" menu title to display the dropdown list. Move the cursor down the list, highlighting each of the eleven options. Click the highlighted option to select it.

"New"

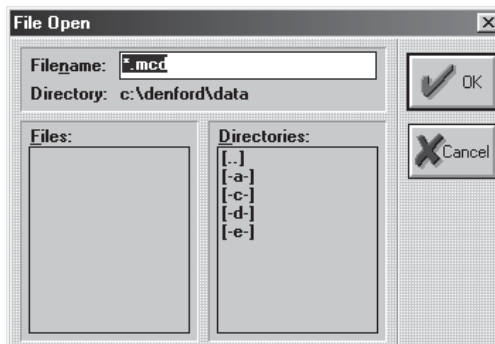
Click this option to start a new design. The screen is cleared after giving you the option to save any previously designed work.

Shortcut keys [Ctrl + N].

"Open..."

Click this option to open a previously saved MillCAM Designer 2 file. Choose the directory and folder from the "Directories:" box, select the ".mcd" filename from the "Files:" box, then click the [OK] button to load the file.

Shortcut keys [Ctrl + O].



File Menu

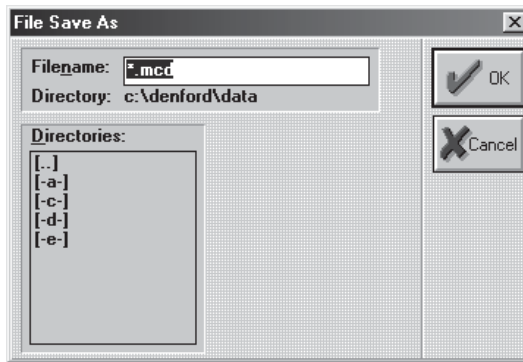
"Save"

Click this option to update the changes made to a previously saved MillCAM Designer 2 file. MillCAM Designer 2 files are saved using the file extension ".mcd".

Shortcut keys **[Ctrl + S]**.

"Save As..."

Click this option to save the current MillCAM Designer 2 file with the option to place the file in a specific directory and folder with a user defined filename. Choose the directory and folder from the "Directories:" box, type the name of the file in the "Filename:" dialogue box, then click the [OK] button to save the file. Filenames must not be longer than eight characters.



"Save Project..."

Click this option to save a collection of program variables as a project template. The facility enables the software to be tailored to individual needs. Variables such as billet size, machine type, material type, maximum machining time, depth of cut, step size, grid size and cutter diameter can be set. When a project template is open, variables can be edited by pressing **[Alt + S]** to access the "Setup System File" window.

Click the arrow button next to the project title to display the dropdown list, then select the title of the required project. Click the [OK] button to save the current MillCAM Designer program variables as the selected project title.

Previously saved project templates can be accessed by clicking the "Projects" icon, found in the "Denford" group, then selecting the required title from the dropdown list.

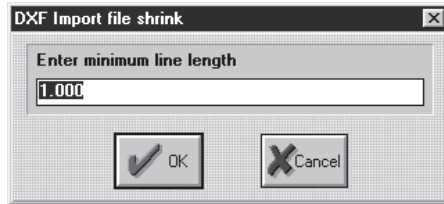
See page 47 for more information about Advanced Program Setup.

File Menu

"Import DXF File"

A file from a another design package can be placed into MillCAM Designer 2 using the DXF (Data eXchange Format) standard.

The imported image can be altered by using the "Minimum Line Length" dialogue box. The value entered determines the minimum length of the straight lines which make up the image. The default value is 1mm. A higher number reduces the amount of detail which is shown. Less detail means the image can be milled faster.



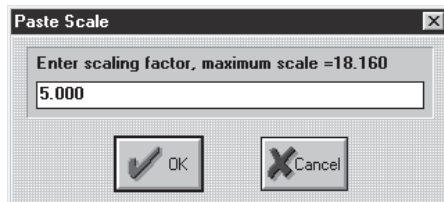
Below: DXF Import Example.



Minimum line length = 1.

Minimum line length = 4.

Click the [OK] button to proceed. The "Paste Scale" window will appear. To fit the image into the work area at its largest possible size, use the maximum scale value suggested in the "Paste Scale" window. For scale 1:1 use a value of 1.000. Click the [OK] button after entering a value.



Move the image to the required position and click the left mouse button to place the image in your design, or the right mouse button to discard it.

File Menu

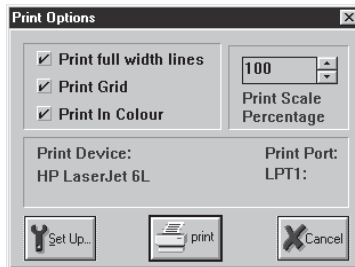
"Export DXF File"

Click this option to save the contents of the working area, using the DXF (Data eXchange Format) standard.

"Print"

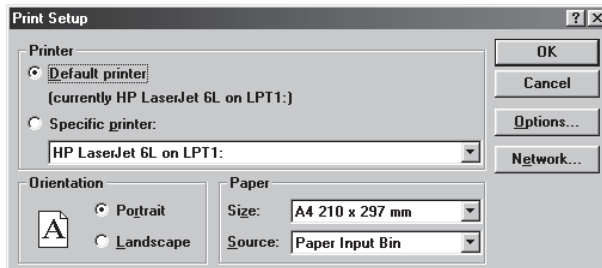
Click this option to print the work area of the design window. The appearance of the printed design can be changed by clicking in the various checkboxes. The [Setup] button accesses the "Print Setup" window. Click the [Print] button to begin printing.

Shortcut keys **[Ctrl + P]**.



"Printer setup"

Click this option to select and configure your printer options.



"Change Font"

Click this option to change the typeface used, when adding text into the work area. Click on the name of the required font, then the [OK] button to continue. A list of the available fonts are shown on page 23.

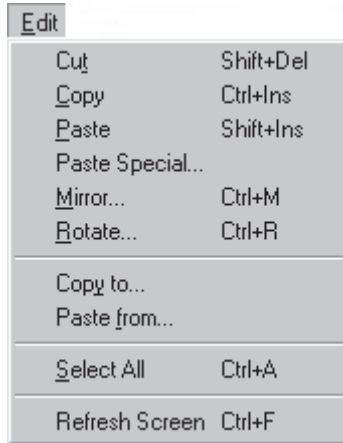
"Alter Material Size"

Click this option to display the material window, where the billet size can be changed. Note - all data will be lost unless saved before selecting this option.

"Exit"

Click this option to close the MillCAM Designer 2 software. The program is closed after giving you the option to save any previously designed work.

Edit Menu



Click the "Edit" menu title to display the dropdown list. Move the cursor down the list, highlighting each of the ten options. Click the highlighted option to select it.

"Cut"

Click this option to remove any selected elements from the work area to an area of the computer memory called the Windows clipboard.

Shortcut keys **[Shift + Del]**.

"Copy"

Click this option to place a duplicate of any selected elements into the Windows clipboard, leaving the originals untouched in the work area.

Shortcut keys **[Ctrl + Ins]**.

"Paste"

Click this option to place any cut or copied elements into the work area. The "Paste Scale" window will appear. To fit the elements into the work area at their largest possible size, use the maximum scale value suggested in the "Paste Scale" window. For scale 1:1 use a value of 1.000. Click the [OK] button after entering a value.

Move the new elements to the required position and click the left mouse button to place the new elements in your design, or the right mouse button to discard them.

Shortcut keys **[Shift + Ins]**.

Edit Menu

"Paste Special..."

Click this option to place any cut or copied elements into the work area with a greater degree of control. This option works in exactly the same way as "Paste", but in addition gives the choice of changing the depth of cut and/or cutter diameter used on the elements.

Using "Copy", then "Paste Special..." elements can be overlaid progressively in identical positions, but with different depths of cut. This allows deep cuts to be performed in stages, without stressing the cutting tool.



"Mirror..."

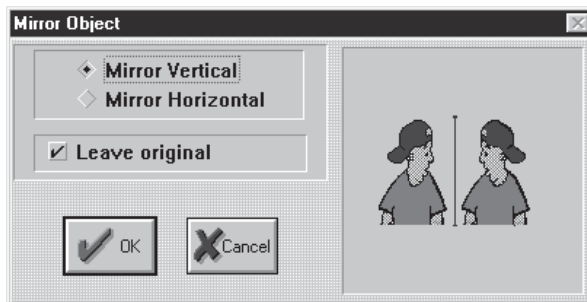
Click this option to flip over selected elements.

Click the grey diamond markers to select between "Vertical" and "Horizontal" mirroring. A black bullet indicates the current selection.

Click the "Leave original" checkbox to indicate whether the original elements should be left in the work area (tickmark visible) or permanently removed (tickmark not visible).

Click the [OK] button to perform the mirror operation.

Shortcut keys [Ctrl + M].



Edit Menu

"Rotate..."

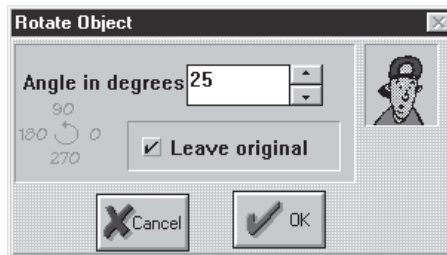
Click this option to turn selected elements by a specified number of degrees.

Click the up and down arrow nudge buttons to specify the angle of rotation.

Click the "Leave original" checkbox to indicate whether the original elements should be left in the work area (tickmark visible) or permanently removed (tickmark not visible).

Click the [OK] button to perform the rotate operation.

Shortcut keys [Ctrl + R].



"Copy to..."

Click this option to save the currently selected elements as a Mill CAM Designer 2 file, allowing a library of commonly used parts to be built up.

"Paste from..."

Click this option to import other previously saved Mill CAM Designer 2 designs or parts into the current work area.

"Select All"

Click this option to select all the elements in the work area.

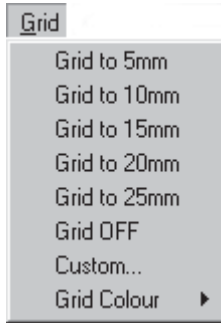
Shortcut keys [Ctrl + A].

"Refresh Screen"

Click this option to redraw the design window. This is commonly required after performing a "cut" command.

Shortcut keys [Ctrl + F].

Grid Menu



Click the "Grid" menu title to display the dropdown list. Move the cursor down the list, highlighting each of the eight options. Click the highlighted option to select it.

"Grid to (number) mm"

There are five preset grid sizes, the lines shown behind the design in the work area. They are 5, 10, 15, 20 and 25mm. A tickmark is shown next to the currently selected option. Click the required grid title to select the new grid size.

"Grid OFF"

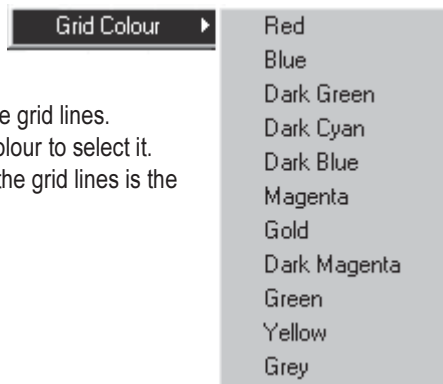
Click this option to completely remove the grid lines from the work area.

"Custom..."

Click this option to set the grid with a user defined value. Note - this value should not be too extreme (i.e. too small or too large).

"Grid Colour"

Click this option to display a sub menu of eleven colours that can be used on the grid lines. Highlight and click a colour to select it. The default colour for the grid lines is the last option, grey.

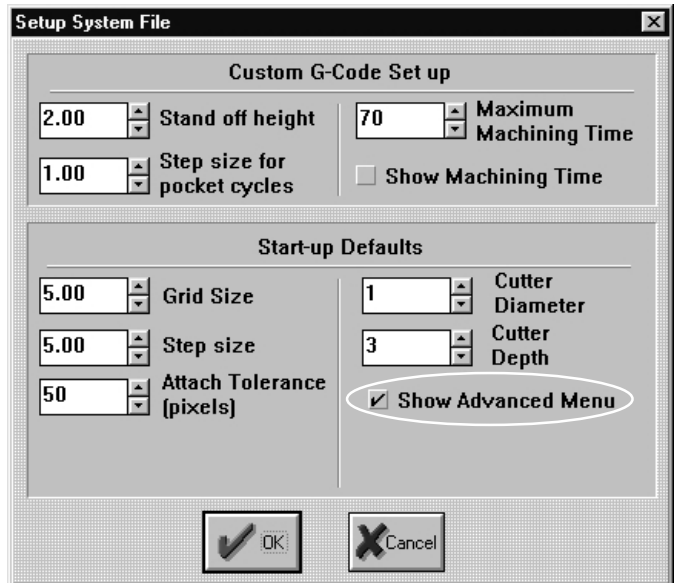


Advanced Menu



The "Advanced" menu can be displayed or hidden from the menubar, according to the requirements of the user. The default setting is hidden.

If the "Advanced" menu is hidden, press your keyboard **[Alt + S]** buttons to display the "Setup System File" window. Click inside the "Show Advanced Menu" checkbox, so a tickmark is displayed (shown below). Save any work, then restart the MillCAM Designer program. The "Advanced" menu will now be displayed.



Advanced Menu

Options available:

"UnDelete"

Click this option to place the last deleted element back into its original position in the working area. If a number of elements have been deleted, each one can be recovered in sequence, using this option.

Shortcut keys **[Alt + BkSp]**.

"Group"

Highlight a number of individual elements, then click this option to group them together as one large object. When a marquee box is drawn around any element belonging to a group, all the associated elements in that particular group are automatically selected.

Note: When text characters are drawn, the elements used to compose each character are automatically grouped upon creation of the text character.

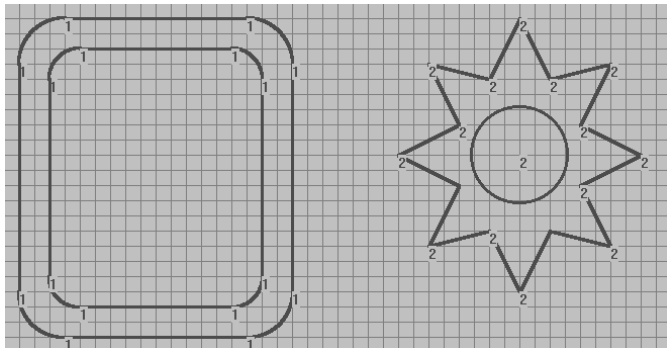
"UnGroup"

Click this option to separate a selected group into its individual elements.

"View Group IDs"

Click this option to view the current groups present in the working area. Each group is defined by a number. This group number is displayed on each element that belongs to the group.

Click the "View Group IDs" menu text to switch the option on (a tickmark is displayed) or off (a tickmark is not displayed).



Above: Two groups are shown in this screenshot: group 1 (on the right) and group 2 (on the left).

Advanced Menu

"Attach"

When this option is switched on, the start point of any new element you draw is automatically snapped to the end point of the element nearest to your cursor.

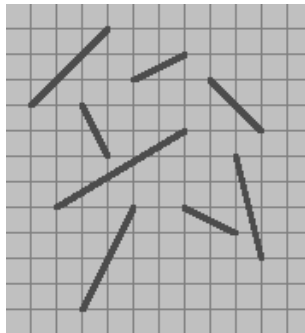
Click the "Attach" menu text to switch the option on (a tickmark is displayed) or off (a tickmark is not displayed).



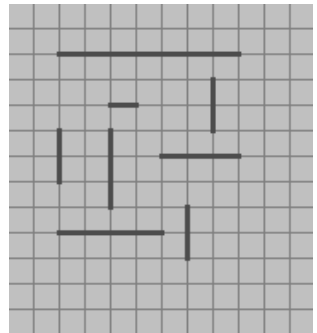
The sensitivity of the "Attach" command can be adjusted using the "Attach Tolerance" option, in the "Setup System File" window (menu: "Advanced|Settings"). This defines the size of the snap-to line boundary in pixels.

"Lock Axes"

When this option is switched on, the start and end points of any new elements can only be positioned horizontally or vertically within the working area.



Above: "Lock Axes" switched off.
Elements can be positioned at any angle.



Above: "Lock Axes" switched on.
Elements can only be positioned horizontally and vertically.

In other words, once you place the start of an element, you can only draw along the directions of the X and Y axes.

Click the "Lock Axes" menu text to switch the option on (a tickmark is displayed) or off (a tickmark is not displayed).

"Settings"

Click this option to display the "Setup System File" window (shown at the bottom of page 37).

Create G-code Menu

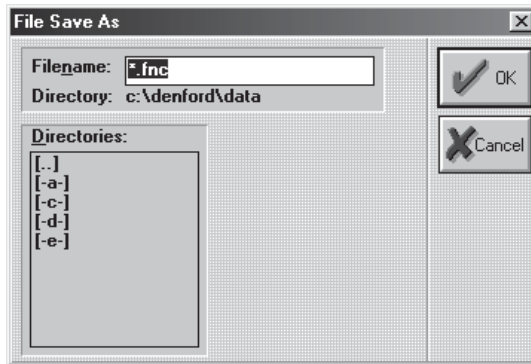


Click the "Create G-code" menu title to display the dropdown list. Move the cursor down the list, highlighting each of the two options. Click the highlighted option to select it.

"Make file..."

Select this option to convert your MillCAM Designer 2 design into a G-code file, a series of letters and numbers that make up the language used by CNC machine tools. G-code files are saved using the file extension ".fnc".

The "File Save As" window will appear. The default path is "c:\denford\data". Choose the directory and folder from the "Directories:" box, then type the name of the file in the "Filename:" dialogue box. Filenames must not be longer than eight characters. Click the [OK] button to begin the conversion process.

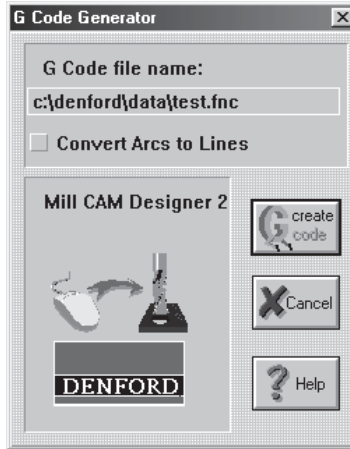


The "G Code Generator" window will be displayed, showing a confirmation of the chosen filename and location.

The "Convert Arcs to Lines" checkbox is used to change any Arcs drawn into a series of straight lines. This allows the CNC machine 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 machining. MillCAM Designer 2 will automatically convert any arc with a radius of greater than 130mm to lines.

Click the "Convert Arcs to Lines" checkbox to indicate whether the arcs should be converted (tickmark visible) or not converted (tickmark not visible), then click the "Create G-code" button.

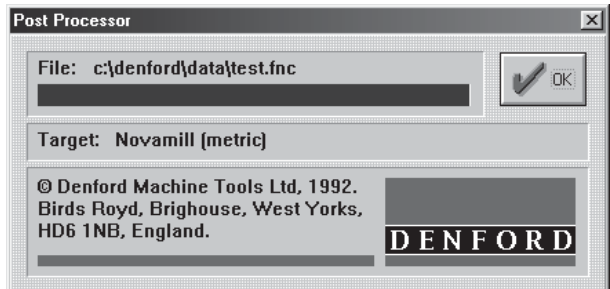
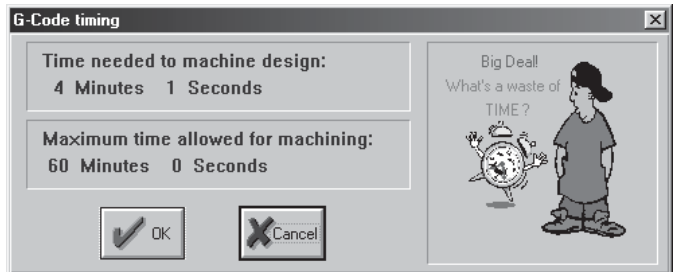
Create G-code Menu



Right: The G Code Generator window.

The "G-Code Timing" window will be displayed, showing an indication of the time required to manufacture the design. If the indicated time is larger than the maximum machining time allowed (set in the "Setup System File" window - press [Alt + S]), the G-code file will not be produced.

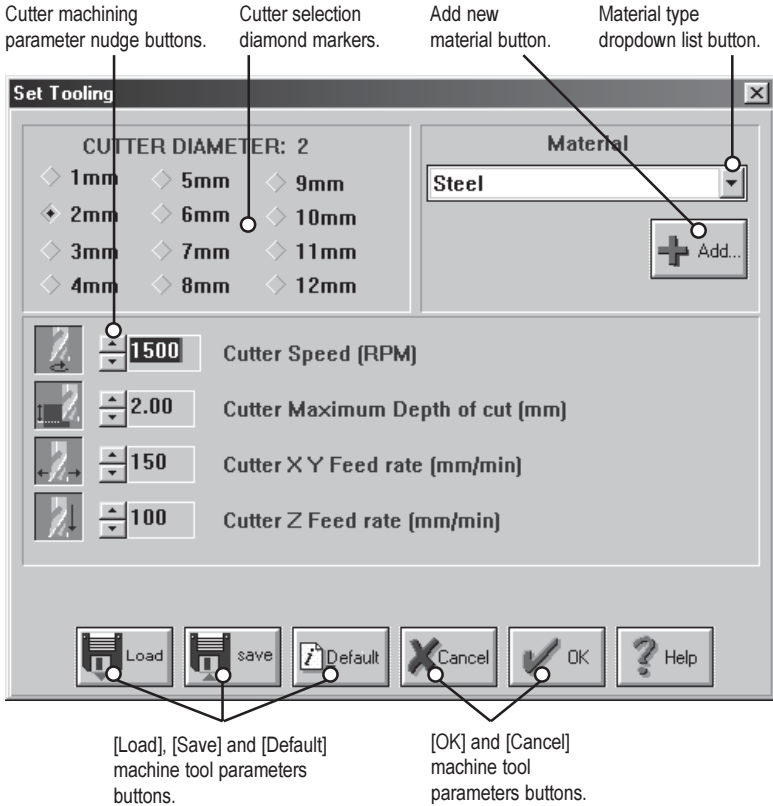
Click the [OK] button to begin converting a valid design into G-code files.



Create G-code Menu

"Set G-code parameters..."

Select this option to configure a machining parameters file, by clicking on the appropriate nudge buttons, diamond markers and dropdown lists. Individual files are saved according to the material being machined - each file contains all the speed and feed values required to safely machine a specific billet material using a range of different sized cutting tools.



Jargon Buster

A Parameter is a value contained in a program. Many of these parameter values can be changed by the software user.

Create G-code Menu

"Cutter Diameter"

To select a cutter diameter, click on the grey diamond marker, next to the appropriate cutter diameter value. A black diamond bullet shows the cutter diameter currently selected. Any previously saved speed and feed values, used with this cutter diameter and the selected material, will automatically load. For new cutter diameters used with the selected material, adjust the machining parameter values as required.

"Machining Parameters"

Click the up and down arrow nudge buttons to specify the value of the following machining parameters, appropriate to both the cutter diameter and the type of material selected:

- Cutter Speed, in RPM (revolutions per minute).
- Cutter Maximum Depth of cut, in mm.
- Cutter X and Y feedrate, in mm/min.
- Cutter Z feedrate, in mm/min.

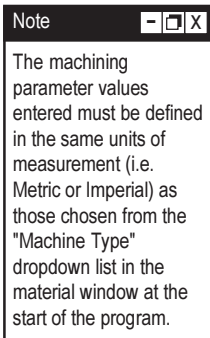
"Material option"

The material option loads machining parameters appropriate for both the material chosen and all cutter diameters specified. Click the arrow button next to the name of the material to display the dropdown list, then click on the name of the material you intend using for parts manufacture.

You can specify your own material by clicking on the [Add...] button, then typing a name for the new material. Adjust the machining parameter values for each cutter diameter as required.

Click the [Save] button to save any changes made to the machining parameters. By default, the machining parameters files are saved to the path "c:\denford\luconfig", using the ".fs" file extension.

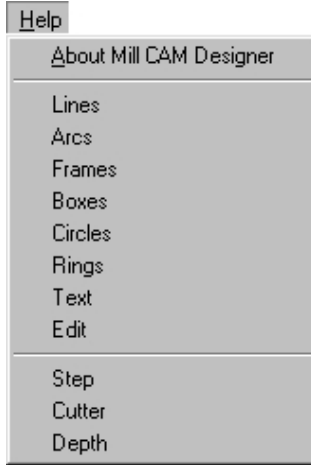
Any material selected or added will be used as the default in the "Material" window, the next time the MillCAM Designer 2 software is run. For more information see Advanced setup on page 46.



"Export to VR Milling"

Click this option to create a G-code file, then automatically load the file into the Denford VR CNC Milling software package. This feature is only enabled when VR CNC Milling is running and requires version 2.90 or above of Denford VR CNC Milling.

Help Menu



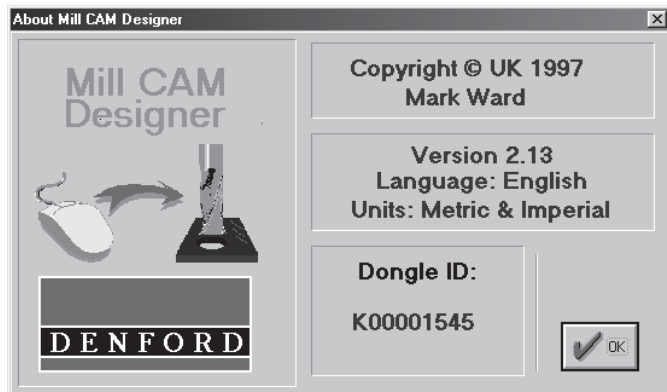
Click the "Grid" menu title to display the dropdown list. Move the cursor down the list, highlighting each of the eleven options. Click the highlighted option to select it.

"About MillCAM Designer"

Click this option to display information about the MillCAM Designer 2 software:

- Software version number.
- Language installed.
- Units installed.
- Dongle / Flash code serial numbers.

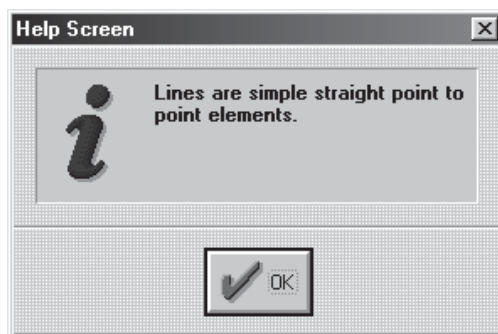
Click the [OK] button to close the window.



Help Menu

Help Screens

Help hints can be displayed for each of the listed topics. To close the Help Screens, click the [OK] button.



Setup System File Window

Pressing the keyboard **[Alt + S]** keys will display the "Setup System File" window.

"Custom G-code Set up"

When a G-code is produced, these defaults are automatically set by the MillCAM Designer 2 program. Click the up and down arrow nudge buttons to specify their values.

- "Stand off height" - The working height above the billet. The cutter will travel to this height before rapidly moving to a different location. The stand off height can be increased to work around any raised part of the billet.
- "Step size for pocket cycles" - The depth that each pocket cycle will descend until it reaches the required depth. For example, if the value is set to 1.00mm and a 4mm pocket is required, the program will cycle down in 1mm decrements until the 4mm level is reached.
- "Maximum Machining Time" - The maximum time allowed for machining any part in MillCAM Designer 2, specified in minutes. When making a G-code file, the program will not allow parts that take longer than this value to be manufactured. The design must be edited so it takes less time to manufacture.
- "Show Machining Time" checkbox - Used to switch the "Maximum Machining Time" feature on (tickmark shown) and off (tickmark not shown). Click inside the checkbox to display or remove the tickmark.

continued....

Setup System File Window

continued...

"Start-up Defaults"

When the MillCAM Designer 2 software is started, these values will apply. Click the up and down arrow nudge buttons to specify their values.

- "Grid Size" - Work area background grid size, in mm.
- "Step size" - Element placement step accuracy, in mm.
- "Attach Tolerance (in pixels)" - Adjusts the sensitivity of the "Attach" command by defining the size of the snap-to line boundary, in pixels. The "Attach" command is accessed from the "Advanced" menu (when available).
- "Cutter Diameter" - The diameter of the cutting tool, in mm.
- "Cutter Depth" - The maximum depth of cut for the cutter selected, in mm.
- "Show Advanced Menu" checkbox - Displays (tickmark shown) or hides (tickmark not shown) the "Advanced" menu, on the main program menubar. Click inside the checkbox to display or remove the tickmark.

Security Issue: To prevent unauthorised direct access to advanced MillCAM features, such as grouping or the "Setup System File" window, we recommend this option be left unchecked.

Click the [OK] button to apply the new settings, or the [Cancel] button to discard any changes.

Note

When changes are made to the "Show Advanced Menu", MillCAM Designer MUST be shutdown, then restarted, in order to view their effect.

Setup System File

Custom G-Code Set up

2.00 Stand off height 70 Maximum Machining Time

1.00 Step size for pocket cycles Show Machining Time

Start-up Defaults

5.00 Grid Size 1 Cutter Diameter

5.00 Step size 3 Cutter Depth

50 Attach Tolerance (pixels) Show Advanced Menu

OK Cancel

Direct Data Entry

The dialog box is titled "Manual Data Input" and has a close button (X) in the top right corner. It contains the following fields and controls:

- Object Type:** Arc
- NEW OBJECT:** A diamond-shaped marker with a black bullet next to it.
- Start Co-ordinates:** X: 0.000, Y: 0.000
- Co-ordinates:** X: 10.000, Y: 10.000
- Arc Angle:** 90
- Direction:** CW and ACW (both unchecked)
- Buttons:** Cancel (with X), Depth (with a hand icon), and OK (with a checkmark).

Manual Data Input for a new element.

The dialog box is titled "Manual Data Input" and has a close button (X) in the top right corner. It contains the following fields and controls:

- Object Type:** Line
- NEW OBJECT:** A diamond-shaped marker without a bullet.
- Start Co-ordinates:** X: 10.000, Y: 10.000
- Co-ordinates:** X: 50.000, Y: 10.000
- Arc Angle:** (empty)
- Direction:** CW and ACW (both unchecked)
- Buttons:** Cancel (with X), Depth (with a hand icon), and OK (with a checkmark).

Manual Data Input for an existing element.

MillCAM Designer 2 allows elements to be placed or edited in the work area manually, using known co-ordinate and measurement values. This feature applies to the Line, Arc, Frame, Box, Circle and Ring elements.

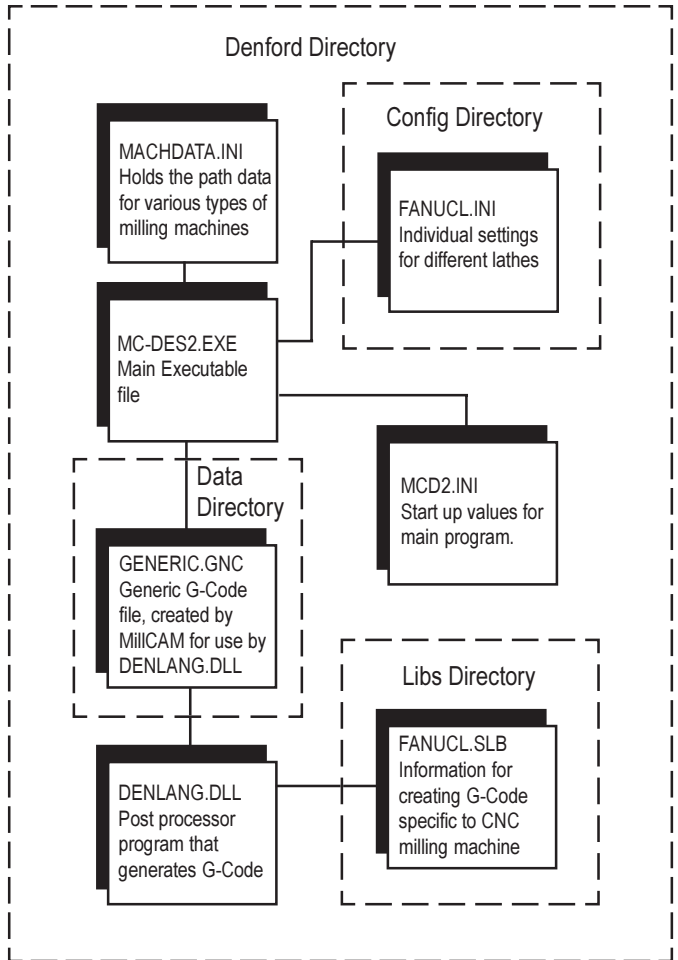
To place a new element manually - Click the appropriate element button, then move the cursor into the work area and press the keyboard **[Enter]** key to display the "MDI (Manual Data Input)" window. The name of the element being placed will be stated in the "Object Type:" box and the "NEW OBJECT" diamond marker will be checked with a black bullet. Enter the Start X and Y co-ordinates in the left box and the End X and Y co-ordinates in the right box. Use the Design window "Data Panel" to help find co-ordinate values. The lower box contains arc angles, circle radius values and CW or CCW directions, when relevant. The Depth of cut can also be specified by clicking on the [Depth] button. Note - the "MDI" window options and layout will vary according to the element being placed. Click the [OK] button to confirm the "MDI" information and click the left mouse button to place the element, or the right mouse button to discard it.

To edit an existing element manually - Select the element to be edited, then press the keyboard **[Enter]** key to display the "MDI" window. The name of the element that can be edited will be stated in the "Object Type:" box and the "NEW OBJECT" diamond marker will be unchecked. Edit the existing element values and parameters, then click the [OK] button to apply these changes. Note - the "MDI" window options and layout will vary according to the element being edited.

Program Structure

MillCAM 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 MillCAM Designer 2 files.



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. The program default values are stored in the "MCD2.ini" file. This can be found in your Denford directory. The following is an example of this file and a description of the contents.

[Material Size]

Length=160.00
Width=90.00
Height=10.00
Max machine time=10
Machine=Novamill (metric)
File=c:\denford\data\test.mcd
Material = Steel
Complex=1
Tool number=1
Real Tool Diameter = 1
Language = English
NFM=1
Step=5
Grid=10
Tool=2
Depth=1mm

[Materials]

Steel=C:\DENFORD\UCONFIG\STEEL.FSF
Aluminium=C:\DENFORD\UCONFIG\ALI.FSF
High Density Polystyrene=C:\DENFORD\UCONFIG\HIGH_POLY.FSF
Acrylic=C:\DENFORD\UCONFIG\ACRYLIC.FSF
Wood = C:\DENFORD\DATA\WOOD.FSF

[Path Data]

GNC Name=C:\DENFORD\DATA\GENERIC.GNC
Font Files=C:\DENFORD\FONTS\STRAIGHT.FNT
MCD Files=C:\DENFORD\DATA\
DXF Files=C:\DENFORD\DATA\
GCode Files=C:\DENFORD\DATA\
Feeds Files=C:\DENFORD\UCONFIG\
Project Files=C:\DENFORD\UCONFIG\Project.ini

[Advanced]

Show Time=1
Show Advanced Menu=1
Attach Tolerance=50

[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
tools XY Feedrate=150.00
tools Z Feedrate=100.00

Advanced Program Setup

The following section explains the parameters listed from the "MCD2.ini" file shown on the previous page:

	[Material size]		[Path Data]
Length:	Most recently used material length.	GNC Name:	Name and directory where the program will store the temporary file, generated by MillCAM Designer 2, used by the post- processing program.
Width:	Most recently used material width.	Font Files:	Name and directory of the most recent font to be used.
Height:	Most recently used material height.	MCD Files:	Directory where the latest MillCAM Designer 2 (".mcd" format), file was saved.
Max machine time:	Sets the maximum milling time for each g-code program (ie, very complex designs must be simplified to allow g-codes to be generated).	DXF Files:	Directory from where the last data exchange file was read.
Machine:	Most recently used machine type. This is also used to find machine defaults by looking up the name in the file "Machdata.ini", in the "Denford" directory.	GCode files:	Directory where the finished G-Code file was last saved.
File:	Directory path of the millcam designer (.mcd) file.		
Material:	Most recently used material.		[Advanced]
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, more beneficial for slower computers.	Show Time:	1 indicates machining time will be used when generating g-codes; 0 indicates machining time will not be used.
Real Tool Diameter:	Tells the program whether it should draw rubber banded objects in their real diameter. This may set to 0 if on a slower computer.	Show Advanced Menu:	1 indicates the menu will be displayed in the main program menubar; 0 indicates the menu will be hidden.
Language:	To be used for other language conversion. By default, the value is set to 0.	Attach Tolerance:	Defines size snap-to line boundary in pixels.
NFM:	Used to disable the "Set G-Code Parameters" menu. This menu option can still be called by pressing the keys [Alt + Ctrl + ?]. A value of 1 will disable the menu, a value of 0 will allow the menu to be displayed.		[Tool number]
Step:	Stored default value of the step in mm.	Length:	Each tool has an area labelled [Tool1] to [Tool12]. This data is the information loaded as a default when no other speeds and feeds have been specified.
Grid:	Stored default value of the grid in mm.	Width:	
Tool:	Default number for start-up tool diameter in mm.	Height:	
Depth:	Selects the colour of the depth that is set in the start-up default values.	Machine:	Specific machine used.
		Max machine time:	Time allowed for machining.
		Depth:	Maximum depth of cut.
		Step:	Step size required.
		Grid:	Grid size required.
		Tool:	Tool number.
		File:	Project template filename and location.
	[Materials]		
	Stores the names for a particular material and the location of the file containing the speeds and feeds.		

Advanced Program Setup

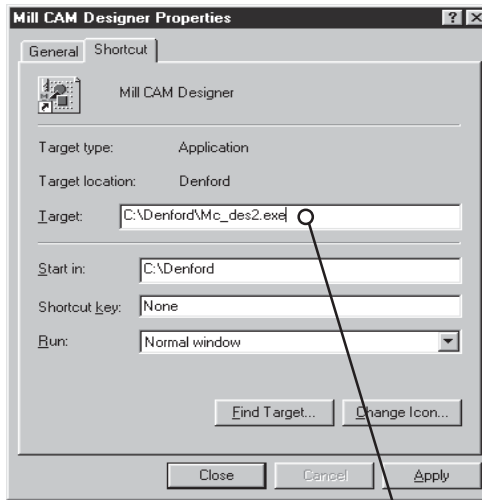
It is possible to lock the "MCD2.ini file by changing its attributes to "read only" or by typing the DOS command **Attrib +r MCD2.ini**. Using this procedure, no changes can be made to the file. This can be useful when running the software on a network or to prevent unauthorised editing of the file by other users.

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

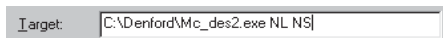
By typing the key word **FEEDS** after the command line parameters, followed by the name of any saved feeds and speeds files, Mill CAM Designer 2 will automatically load the specified feeds and speeds file.

Summary of command line parameters:

- NL or nl: No logo to be displayed.
- NS or ns: No material size screen to be displayed.
- FEEDS (filename): Loads a previously saved feeds and speeds file ".fsf" format.



Shortcut command line parameters are entered here, at the end of the Target: command line. The example shown below would run MillCAM Designer 2 with no logo or materials window at start-up.



Technical Specification

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£).

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
- CorelDraw version 3.
- CorelDraw version 4.
- 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.

Network Installation of MillCAM Designer

To install MillCAM Designer 2 on your server computer:

Install the MillCAM Designer 2 software to the required hard drive on your server computer.

Find the file "MCD2.ini", located in the "Denford" directory.

The "MCD2.ini" file contains a section similar to the following:

```
[Path Data]
GNC Name=P:\Denford\data\generic.gnc
Font Files=P:\Denford\fonts\straight.fnt.
MCD Files=P:\Denford\data\
DXF Files=P:\Denford\data\
GCode Files=P:\Denford\data\
Feeds Files=P:\Denford\config\
Project Files=P:\Denford\config\project.ini
```

where "P" is your server computer hard drive.

In addition to checking that these directories exist in the locations listed, check that the following rules apply:

- 1) "GNC Name=" must point to a read/write file (it is a temporary file created for each student during the G-Code generation process).
- 2) "MCD Files=" must point to a read/write directory (it is the directory where a students design files are kept).
- 3) "G Code Files=" must point to a read/write directory (it is the directory where a students CNC files are kept).
- 4) Workstation computers must have access to the main program file "MCD2.exe" located in the "Denford" directory.

Normally, these three entries must be reconfigured to point towards the students own personal directory area. For example, a student having a personal directory of "N:\Mywork\" would have these entries changed in the server computer "MCD2.ini" file to read:

```
GNC Name=N:\Mywork\generic.gnc
MCD Files=N:\Mywork\
G Code Files=N:\Mywork\
```

Network Installation of MillCAM Designer

To install MillCAM Designer 2 on each workstation computer:

Setup a shortcut to the main program file "MCD2.exe", located in the "Denford" directory on your server computer.

Check that the "WIN.ini" file, located in the "Windows" directory, on each individual workstation computer running MillCAM Designer 2 has the following:

```
[Denford Machine Tools]
Directory=P:\Denford\
```

where "P" is the Network drive mapped to the "Denford" folder on your server computer.

For specialist networks (e.g. RM) contact Denford Customer Services if you experience any problems.

How To...

Selecting Multiple Elements:

Click the [Edit] button, then drag a marquee box around all the elements required. Elements will change black when selected.

Selecting an Individual Element:

Click the [Edit] button, then right click to cycle through each element in the design.

Moving Elements:

- 1) Click the [Edit] button, then drag a marquee box around the elements required.
- 2) Click the right mouse button once. The elements will appear to 'float' above the work area.
- 3) Move the elements to the desired location, then click the left mouse button once.

Resizing Elements:

- 1) Select the elements required.
- 2) From the menubar, click "Edit | Cut".
- 3) From the menubar, click "Edit | Paste".
- 4) The "Paste Scale" window will appear. Enter the desired scale value, then click [OK].
- 5) Position the elements, then place them by clicking the left mouse button once. Note - if elements are not the correct size, please refer to the Cancel Element Placement procedure below.

Cancel Element Placement:

While the elements are still 'floating' above the work area, click the right mouse button. This will remove the elements. This must be done BEFORE placing any elements in the work area.

Removing Elements:

- 1) Select the elements required.
- 2) Click the right mouse button twice.

Quick Creation of a Drilled Hole:

- 1) Click the [Line] button.
 - 2) Click once in the work area. A drilled hole will be created matching the diameter of the cutter (line thickness) used.
-

How To...

Adding Text:

- 1) Click the [Text] button.
- 2) Move the cursor over the work area.
- 3) Click the left mouse button once.
- 4) A "Text Input" window will appear. Enter and format the required text, then click [OK].
- 5) The "Paste Scale" window will appear. Enter a scale value and click [OK].
- 6) Position the text, then place by clicking the left mouse button once.

Adding a New Material Type:

- 1) From the menubar, click "Create G code | Set G code Parameters".
- 2) The "Set Tooling" window will appear. Enter the desired tool settings.
- 3) Click the [Add] button.
- 4) Enter a name for the new material type, then click [OK].
- 5) Click [OK] in the "Set Tooling" window.

Changing the Maximum Machining Time:

- 1) Whilst using the design screen, press the [Alt] + [S] keys.
- 2) Increase or decrease the machine time.
- 3) Click the [OK] button to confirm the changes.

Changing the Cutter Settings:

- 1) From the menubar, click "Create G code | Set G code Parameters".
- 2) Select the cutting tool to be changed.
- 3) Using the arrow keys, change the values assigned to the tool.
- 4) Click the [OK] button to confirm the changes.

Mirroring Elements:

- 1) Select the elements required.
- 2) From the menubar, click "Edit | Mirror".
- 3) Choose the required settings, then click [OK].
- 4) Enter a paste scale, then click [OK].
- 5) Position the elements, then place them by clicking the left mouse button once.

How To...

The information listed below is common to all Windows-based software. If, after following the instructions, you are still having problems changing directories, please refer to your Windows Manual.

Creating G codes and Saving MillCAM Designer Files:

- 1) Open MillCAM Designer.
- 2) Create a design.
- 3) Click "Create G code | Make File" to create a G code file, or "File | Save As" to save the MillCAM design.
- 4) When creating a G code or saving the MillCAM design, the name of your file is entered in the "Filename:" dialogue box.
The location where the file will be saved is stated opposite the "Directory:" title. Using default settings this should read **c:\denford\data**.
- 5) Click the [OK] button to start creating the G code or save the MillCAM design file.

Changing Directories:

To change the directory to read **c:\denford\data**, when not displayed as listed above:

- 1) Using the "Directories." panel of the "File Save" window, click the dots in the square brackets [..] until the directory is displayed as **c:** drive. The current directory is stated opposite the "Directory:" title, directly under the filename dialogue box. Whenever you click on the dots in the square brackets, you will be taken back ONE directory level. If you do not understand directory structures, please refer to your Windows Manual.
 - 2) Once the Directory is displayed as the **c:** drive, double click **[denford]** in the "Directories." panel. The directory should now read **c:\denford**
 - 3) Double click **[data]** in the "Directories." panel. The directory should now read **c:\denford\data**
-

Troubleshooting

Q. When trying to start the software, I receive an error stating "Dongle not present". The software does not open.

- A1. If using the keyed version, check to see that your security key (dongle) is plugged into the parallel port and that the port is functioning correctly.
 - A2. If using the flash (keyless) version, contact Denford for assistance.
-

Q. After creating a design, I cannot create a G-code file.

- A1. Check that the maximum machine time exceeds the time needed to machine the design.
 - A2. If using the keyed version, check to see that your security key (dongle) is plugged into the parallel port.
-

Q. When selecting a depth of cut, an error message appears stating "You cannot cut that deep with the cutter selected".

- A. Choose a different depth of cut OR increase the "Cutter Maximum Depth" for the cutter being used. Click "Create G code | Set G code Parameters" to access the "Set Tooling" window.
-

Q. The cutter I would like to select is "unavailable".

- A. The "Cutter Maximum Depth" is set to zero. You must increase this value. Click "Create G code | Set G code Parameters" to access the "Set Tooling" window. Select the cutting tool and increase the maximum cutting depth value, then click [OK].
-

Q. When machining the part on my CNC machine, the tool cuts too deep into my billet.

- A. First, check that the correct depth of cut is set in the CNC program. To do this, look at the -Z value(s) in the CNC program. This will tell you if the depth was set correctly in MillCAM Designer. If the depth appears to be correct, check the CNC machine offsets are configured correctly. Refer to your CNC machine manual for offset information.
-

Q. Why does the error message "Object Type Unknown" appear when I try to modify the property of an element in Edit mode?

- A. Dragging with the left mouse button to choose elements should only be used when selecting multiple elements to do things like cut, copy, paste etc. This procedure should not be used to select individual elements for property editing - use the right mouse button instead.
-

Q. The "Paste Scale" window is displaying an incorrect maximum scale.

- A. Restart the MillCAM Designer software. If the problem remains, please contact Denford.
-

Technical Support

Denford Limited provides unlimited Technical Support on this software.

Technical Support is only available to registered users. If your software was not registered with Denford Limited at the point of sale, e-mail or fax your registration details to Denford Limited, or your authorised Denford shipping agent as soon as possible.

When you request Technical Support, please be at your computer, with your computer and software documentation to hand. To minimise delay, please be prepared to provide the following information:

- Dongle Serial Number.
- Registered user's name / company name.
- Software name and version number (found in the "Information|About MillCAM Designer" menu).
- The wording of any error messages that appear on your computer screen.
- A list of the steps that were taken to lead up to the problem.

Contact Details:

Denford Limited,
Birds Royd, Brighouse, West Yorkshire, HD6 1NB, UK.
Telephone: 01484 712264
Fax: 01484 722160
ISDN: 01484401157:01484401161
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Technical Support: Monday to Friday 8.30am - 4.30pm GMT

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Denford Inc.
815 West Liberty Street, Medina, Ohio 44256, USA.
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Fax: 330 7253297
E-mail: service@denford.com
Technical Support: Monday to Friday 8.30am - 4.30pm Eastern

<http://www.denford.com>

Glossary

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.
Baud rate	The speed at which data moves from one device to another in bits per second.
Billet	The piece of material that will be machined.
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.
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
Command line	The command line is the text entry in a dialogue box.
Computer configuration	The collection of computer hardware that makes up a particular computer system.
Contouring	Co-ordinated simultaneous motion of two or more axes.
Cursor	The marker on the computer screen, that shows the position of the pointing device.
Dialogue box	A program window that opens to allow text to be entered.
Data	The numbers, digits, characters and symbols operated on by a computer.
Directory	The lettered name given to areas of your computer where files can be stored, commonly referred to on a computer by assigned letters, e.g. c: (hard disk), a: (floppy disk).
Disk	A magnetic storage device for external data.
DOS	Disk Operating System. A program which controls the operation of a disk drive.
DXF File	Data eXchange File. The standard file format devised for AutoCAD.
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.
Feedrate	The rate at which the material is moved towards the cutting tool.
File	An organised collection of related computer data and records.
Filename	Filenames are titles given to your saved files. They must not have more than eight characters, any spaces, or punctuation e.g. millcam.
Floppy Disk	A storage device for a computer. It can be removed and used to transport data.
Folder	Computer directories can contain named folders where files are stored.
Group	A collection of individual elements that can be selected as if they were a single object.
Hard copy	Computer output on paper or similar media.
Hard Disk	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.

Glossary

Icon	An icon is a small picture, displayed in Windows. When you double click the icon, the program associated with that icon will run.
Marquee	A marquee is a box shown using dotted lines. It is dragged completely around a set of elements to select them.
MDI	Manual Data Input. Information entered into a computer by manual method, e.g. a qwerty keyboard.
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.
Parameter	A value contained in a program. Many of these parameter values can be changed by the software user.
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.
Program group	A program group, or group window is where a selection of icons can be stored together in the Windows environment.
Simulation	A computer imitation or representation of a real life situation, e.g. flight simulation.
Software	The programs used in a computer.
Windows	An easy to use environment that uses icons, a mouse and windowed user areas as the computer operating system.
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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Supplement to MillCAM Designer 2 User Manual - Version 2.21 New Features.

About this Supplement.

Disclaimer	We take great pride in the accuracy of information given in this supplement, but due to nature of software developments, be aware that software specifications and features of this product can change without notice. No liability can be accepted by Denford Limited for loss, damage or injury caused by any errors in, or omissions from, the information supplied in this supplement.
Screenshots	Please note that any screenshots are used for explanation purposes only.
Language	This supplement is written using European English.
Contact	Any comments regarding this supplement should be referred to the following e-mail address: customer_services@denford.co.uk
Updates	Any updates to this supplement will be posted in the "Downloads" section of the Denford website: http://www.denford.co.uk
Supplement Content	<p>This supplement outlines the new features added to MillCAM Designer, versions 2.21 and above:</p> <ul style="list-style-type: none">• The ability to group a number of individual elements into single objects (via the new "Advanced" menu).• The ability to snap to the end point of the last drawn line (via the new "Advanced" menu).• The ability to lock the axes in the working area (via the new "Advanced" menu).• The ability to export DXF files (via the "File" menu).• New installation program.

Installing MillCAM Designer

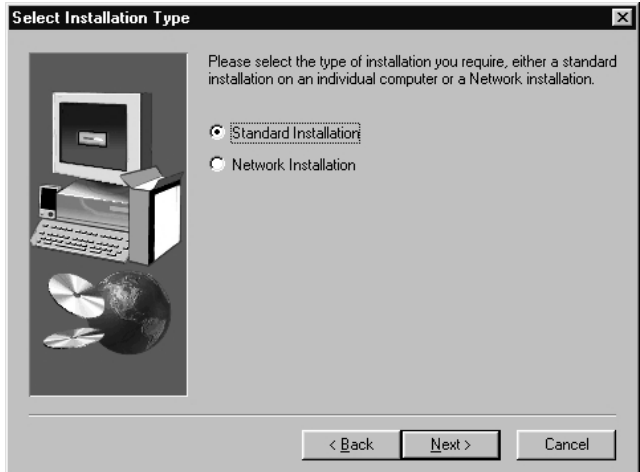
Follow these instructions to install the Denford MillCAM Designer software onto a computer running Windows 95/98/NT. Whilst running Windows on your computer:

- 1) Insert the MillCAM Designer CD-ROM into your CD-ROM drive. If the autorun feature is enabled on your computer, the "MillCAM Designer Installation" start-up window will automatically appear - move to section 4). Otherwise continue as outlined below.
- 2) Double-click the left mouse button on the "My Computer" icon. In the "My Computer" window find your floppy disk drive icon (usually labelled "d:" or "e:") and double-click the left mouse button on this icon.
- 3) The contents of the CD-ROM will be displayed in a new window. Double-click the left mouse button on the file named "Start.exe" to display the "MillCAM Designer Installation" start-up window.
- 4) If you have been supplied with a flash screen version of MillCAM Designer, insert your "Registration" floppy disk when prompted.



Installing MillCAM Designer

- 5) Select the correct type of installation from the two choices; "Standard", for stand-alone computers, or "Network", for multiple computers linked together by a network.



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.

Select the area of your hard-disk where the program files can be installed, together with any program and folder names. Network users can find additional installation instructions on pages 50-51 of your main "MillCAM Designer 2 User Manual".

- 6) Your computer must be restarted before using MillCAM Designer for the first time.

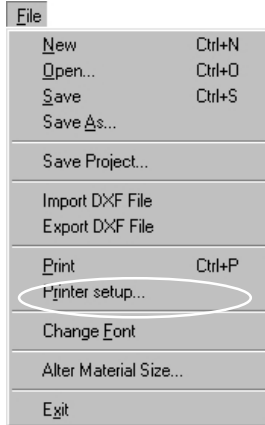
Ensure that keyed versions of the software have the dongle fitted to the parallel port of your computer. Your parallel port may be labelled as the "printer" port and is usually positioned on the back panel of your computer.

If you did not receive a dongle, you will be using a flash version of the software (in which case your details would have been registered via floppy disk in section 4).

Note

To uninstall MillCAM Designer, click "Windows Startbar | Settings | Control Panel | Add/Remove Programs", then highlight "Mill Cam Designer" and click [OK].

Changes to the File menu.



The "File" menu now contains the following additional option:

"Export DXF File"

Click this option to save the contents of the working area, using the DXF (Data eXchange Format) standard.

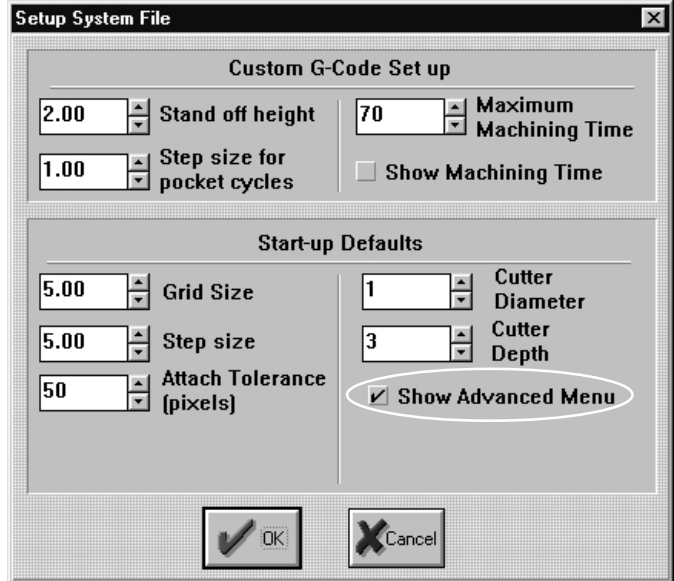
The new Advanced menu.



The "Advanced" menu can be displayed or hidden from the menubar, according to the requirements of the user. The default setting is hidden.

If the "Advanced" menu is hidden, press your keyboard **[Alt + S]** buttons to display the "Setup System File" window (shown on the next page). Click inside the "Show Advanced Menu" checkbox, so a tickmark is displayed (shown below). Save any work, then restart the MillCAM Designer program. The "Advanced" menu will now be displayed.

The new Advanced menu.



Options available:

"UnDelete"

Click this option to place the last deleted element back into its original position in the working area. If a number of elements have been deleted, each one can be recovered in sequence, using this option.

Keyboard shortcut: **[Alt + BkSp]**.

"Group"

Highlight a number of individual elements, then click this option to group them together as one large object. When a marquee box is drawn around any element belonging to a group, all the associated elements in that particular group are automatically selected.

Note: When text characters are drawn, the elements used to compose each character are automatically grouped upon creation of the text character.

"UnGroup"

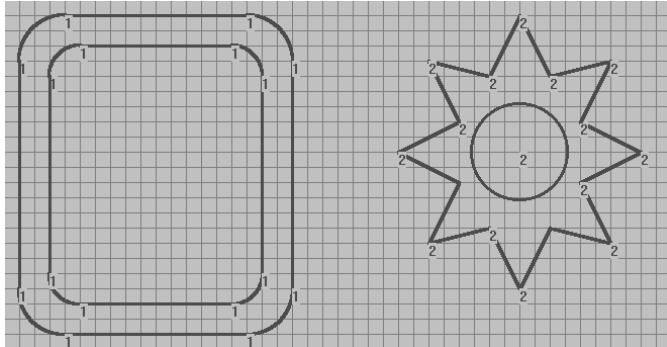
Click this option to separate a selected group into its individual elements.

The new Advanced menu.

"View Group IDs"

Click this option to view the current groups present in the working area. Each group is defined by a number. This group number is displayed on each element that belongs to the group.

Click the "View Group IDs" menu text to switch the option on (a tickmark is displayed) or off (a tickmark is not displayed).



Above: Two groups are shown in this screenshot: group 1 (on the right) and group 2 (on the left).

"Attach"

When this option is switched on, the start point of any new element you draw is automatically snapped to the end point of the element nearest to your cursor.

Click the "Attach" menu text to switch the option on (a tickmark is displayed) or off (a tickmark is not displayed).



The sensitivity of the "Attach" command can be adjusted using the "Attach Tolerance" option, in the "Setup System File" window (menu: "Advanced|Settings"). This defines the size of the snap-to line boundary in pixels.

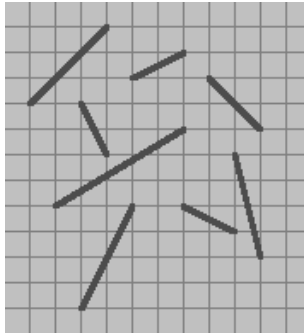
The new Advanced menu.

"Lock Axes"

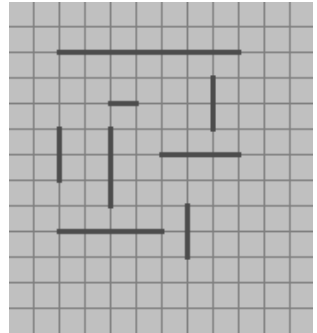
When this option is switched on, the start and end points of any new elements can only be positioned horizontally or vertically within the working area.

In other words, once you place the start of an element, you can only draw along the directions of the X and Y axes.

Click the "Lock Axes" menu text to switch the option on (a tickmark is displayed) or off (a tickmark is not displayed).



Above: "Lock Axes" switched off.

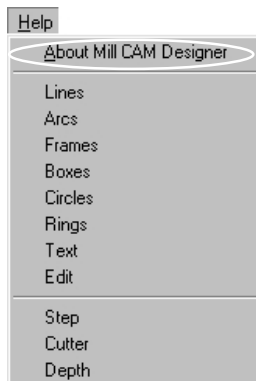


Above: "Lock Axes" switched on.

"Settings"

Click this option to display the "Setup System File" window (shown at the bottom of page 5).

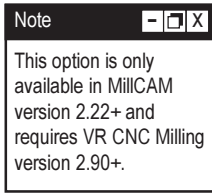
Changes to the Help menu.



The "Information" menu is no longer used in MillCAM Designer versions 2.21 and above.

Any options originally found in the "Information" menu are now accessed using the "Help" menu.

Changes to the Create G-code menu.



The "Create G-code" menu now contains the following additional option:

"Export to VR Milling"

Click this option to create a G-code file, then automatically load the file into the Denford VR CNC Milling software package. This feature is only enabled when VR CNC Milling is running.

Changes to Arc Drawing.

When drawing an arc, the angle of the arc can be changed using the **[up and down arrow]** keys. To change the angle of the arc in smaller increments, hold down the **[SHIFT]** key whilst pressing the **[up and down arrow]** keys.

Changes to Edit Mode.

When editing a drawing, multiple elements can be selected by clicking on each element in turn, whilst holding down the **[CTRL]** key.

For example, select element 1. Hold down **[CTRL]**, then select element 2. Continuing to hold down **[CTRL]**, select element 3. All three elements are now selected.

Don't forget your selection can now be grouped together, using the menu command "Advanced | Group".

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