

## **Cautions**

Try to use only uppercase characters unless your machine specifically requires lower case.  
Make any comments in lower case.

G03 is not treated the same as G3

Do not leave spaces when editing labels unless you really want them.

All labels must match exactly to be interpreted, and are case sensitive.

To change G03 to G3 from the setup screen Labels scroll down to locate G03 and edit it to become G3.  
Then save the INI file.

The system is based on using absolute G90 programming.

From the edit menu files may be converted back and forth between incremental and absolute.

More powerful functions such as rotate can only be performed on an absolute file.

A translate table can be activated to change strings of code as they are transmitted.

Also it can be used to make changes to the editor file.

This is the second implementation of the translate table.

This method translates the editor file using the table.

One use is to edit a file that was transmitted from the machine tool into Gcode.

The operator might have blocked out some lines using the / character.

All of these could be removed at once using the translate table.

It is rather like doing up to 30 search and replace commands at once.

Z Included

On the setup window.

If not checked then Z and related values are omitted.

If you get errors reading non-AUTOCAD DXF files or AutoCAD LITE try not checking Z included



## Commands

### File

New clears the editor for a new file.  
Open a file dialog to load a file.  
Save a file dialog to save a file suggests file name.  
Save As Same as save only asks for a file name.

Save As DXF Writes a Gcode file back as a simple vector file.

Just make sure the file name extension is DXF

This allows an existing Gcode file to be converted back to an Autocad drawing.

Note : Circles and arcs are drawn as a series of straight lines.  
Larger plots yield better resolution DXF files as the file is generated from the plotting coordinates.

The resolution of the circles and arcs is controlled by the Circles/Arcs setting on the Setup Screen.

Increments as small as 1/1000 can be achieved with a setting of 1.  
But remember the file size of the will be considerably larger.

Print Text contents of editor to printer.

Print Window prints the form including the border.

Print Plot at the present scale.

Print Setup selection and setup of printers.

Exit closes the program.

### Edit

Cut the highlighted text to the clipboard.

Copy the highlighted text to the clipboard.

Paste the contents of the clipboard at the cursor.

Delete the highlighted text.

Swap the travel direction of the highlighted text.

G02 X8.993 Y-23.538 I9.093 J-23.309	G02	Paste	Ctrl+V
X5.271 Y-21.916	X5.2	Delete	Ctrl+Del
G03 X5.084 Y-21.911 I5.171 J-22.145	G03	Swap	Ctrl+S
X0.995 Y-23.433	X0.9		
G02 X0.658 Y-23.199 I0.908 J-23.199	G02	Compress	
X0.658 Y-0.673	X0.6	Add Line Numbers	
M05	M05	Remove Line Numbers	
M03	M03		
G41	G41		
X15.068 Y-9.673	X15.068 Y-9.673		
X15.568 Y-9.673	X15.568 Y-9.673		
G02 X12.616 Y-12.625 I12.616 J-9.673	G03 X12.616 Y-6.721 I12.616 J-9.673		
G02 X9.664 Y-9.673 I12.616 J-9.673	G03 X9.664 Y-9.673 I12.616 J-9.673		
G02 X12.616 Y-6.721 I12.616 J-9.673	G03 X12.616 Y-12.625 I12.616 J-9.673		
G02 X15.568 Y-9.673 I12.616 J-9.673	G03 X15.568 Y-9.673 I12.616 J-9.673		
X15.068 Y-9.673	X15.068 Y-9.673		
	M05		

Compress Removes duplicate lines and blanks.

Add Line Numbers.

Remove Line Numbers.

Convert to Incremental G91.

Convert to Absolute G90.

Inch to Metric Multiplies by 25.4

Metric to Inch Multiplies by 0.0393

### **Misc.**

Move Starting Point Forward

Highlight a complete tool path where the beginning meets the end and click this option to move the starting point forward one line.  
(Used to select a more suitable start).

Sort Objects Ascending.

The entire file will be sorted to put the smallest complete paths. (complete tool path where the beginning meets the end) at the top. Often used in flamecutting to ensure that the perimeter cuts are made last. Also useful when cutting lettering as it is usually important for the middle of letters to be cut first.

Sort Objects Descending.

Exact opposite of above.

Largest Object to bottom only.

Like sort ascending except only the longest path is moved.

Line Order N G M X Y Z I J K R.

If letters have been swapped this puts line in order.

Translate using table from setup window.

This is the second implementation of the translate table.

This method translates the editor file using the table.

One use is to edit a file that was transmitted from the machine tool into Gcode.

The operator might have blocked out some lines using the / character.

All of these could be removed at once using the translate label. It is rather like doing up to 30 search and replace commands at once.

Edit Translate Table shortcut to edit the table.

### **Search.**

Find text.

Find Next Find the next occurrence.

Replace Search and replace text.

### **Comm**

Go to Comm F6.

#### **File**

Send Transmit a file via a serial port to a remote machine.

Receive Gets a file from a remote machine.

Clear Clears the transmit and receive buffers of text.

Copy To Editor Transfers a received file to the editor.

#### **Setup ini**

Use Another Machine INI file.

Edit or create a new INI file.

Default Windows.

Toggle Hints on/off.

Print the Gcode manual.rtf Opens Wordpad and loads Manual.rtf.

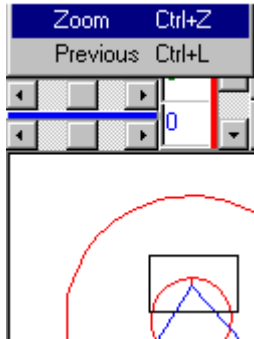
About Displays the About screen.

Go to Gcode web site If possible a connection is made to the internet

taking you to the Gcode web site.

### Zoom

Zoom Draws a box to selected part of a plot and re scales.  
Previous Return to previous view.



### Draw

Line  
Clockwise Arc  
Counterclockwise Arc  
Clockwise Circle

### Counterclockwise Circle

Stop Cut  
Start Cut  
All drawing is done with the mouse.

### Grid

1/10  
1/100  
1/1000  
1/4  
1/8  
1/16

Grid simply presets the scale.



## Drawing

From The Draw menu The following items will show.

Line.

Clockwise Arc.

Counterclockwise Arc.

Clockwise Circle.

Counter Clockwise Circle.

Stop Cut M05 ( or the command designated in the INI file).

Start Cut M03 ( or the command designated in the INI file).

### To draw a line.

Click on line then move the mouse pointer into the window and left click at each line end.

Finally Right Click to terminate drawing or press Esc to end.

### To draw an Arc.

Click on Arc then move the mouse pointer into the window and position the cursor at the center point of the arc then left click

Now move to then ending point of the arc and click.

Note : Arcs and lines always start from the last point drawn.

### To draw a Circle.

Click on Circle then move the mouse pointer into the window and position the cursor at the center point of the circle then left click

Now move out to the desired radius of the circle and click.

Note : Circles are a separate entity and can be drawn at any point.

The code generated by drawing will depend on settings in the INI file.

For example if circles have a lead in or if "R" is used instead of "I J".

See Ini for further details on commands settings.

This tool is provided as a simple way to draw a very elementary shape and is not intended to replace your cad system.

## Grid

Six predefined grid settings are provided.

1/10 1/100 1/1000

1/4 1/8 1/16

Selecting any one of these will adjust the scale proportionally.

Any desired increment can be achieved with a suitable scale.

Just remember the base scale of

1000 = 1.000 per increment of mouse movement.

10000 = 0.100 and so on.





## **INI Files**

Create or edit machine specific INI files using the **Setup** (F10) screen.  
Then save the file from the file menu on this screen.

The last used INI file is always loaded first.

Using the setup window create your own INI file then save it  
Under a name of your choosing i.e. Bridgeport.ini .  
Other INI files can be loaded by selecting **File Load** in the setup window.  
Tip : In creating a new INI file leave the setup window open making changes  
and repeatedly load a DXF file until the desired result is obtained.  
Four sample INI files Named X+RightY+Down.INI and similar names  
show the four possible axis direction combinations.  
One of these will probably form a good basis from which to build on.

## **Labels**

A scroll box contains all the characters that will be  
added to a file as it is converted from DXF to Nester.  
These are contained in the right hand column.  
In the left column is a comment, change to suit.  
Also the axis designations X Y Z.  
These may be changed at will.  
So that X could = Y etc.

Note do not switch axis letters in 3d setups where circular moves will be made in the Z K plane.  
Line might = G01 or be left blank.  
If your machine has Axis A B C D E.  
Instead of X Y Z I J K Then simply substitute the letters.  
And change any comments to be meaningful.  
Load and compare the sample ini files provided.  
or using Notepad print them out for comparison.

## **Dxf**

Selections are provided for Multiplying X Y Z values by -1  
as they are processed from the dxf file.

If checked then the values are negated.  
A check box allows the inclusion or not of the Z axis.  
A check box allows the selection or not of circle lead in and the insertion  
of a line of code between cut off and on.  
This adds code for a lead in move inside all circles.

## **Connect Error**

This is the allowable space between the end of one line and the beginning of the next. Any lines with a  
space above this value will be considered to be the beginning of a new path.

## **Z Offset**

A positive or negative value added to all Z Values  
processed from the dxf file.

## **Decimal Places**

The number of significant places that will be in the file.

## Layer

The name of the AutoCAD layer to provide the Nester data.

If you wish, set this to 0 to use the default layer, or \* to read all layers.

## Z Included

If not checked then Z and related values are omitted.

Note: Z offset can be added to all incoming Z values.

If you get errors reading non AutoCAD DXF files try not checking

## Circle lead in + edit line

These moves are only created when Circle Lead in + Edit Line is checked in the setup window.

The line of code between M05 and M03 is known as the edit line.

The short straight line at the top of the circle is the circle lead in.

## Options

### Incremental Type I J

Two methods are used to define the center point of a circle.

One is where the move is expressed as an incremental move

from the last Absolute position,

another is True absolute from 00.

See the related box **Use R instead of IJK.**

Select the appropriate one.

Note : Fanuc is usually Incremental.

### Make I J circles 4 Quadrants

Some older machines could not make an arc above 90 degrees.

### Cr on transmit

Carriage return characters will be sent at the end of each line.

**Cr LF on transmit** Carriage return and line feed characters will be sent at the end of each line.

### Cr on receive

Carriage return characters will be added to received lines.

**Enable translate** output file on transmit. Translate table from line 30 on anything found.

in the left column will be translated to what is in the right column.

For example:

From	To	Line
J0.000	J.	30
J-0.000	J.	31
K99	M66	32
H100		33 Blank

Note this is a one way trip so if you read a translated file back it may not plot correctly.

The main purpose of this is to allow support for non-standard machines such as Bandit controls.

For an example of its use see the 3dbanditi file.

### Line delay Ms

A delay in 1/1000 sec after each line is sent.

**Char delay Ms**

A delay in 1/1000 sec after each character is sent.  
Used to allow slow machines to process the data as it is sent.

**Scan Time Ms**

A delay in 1/1000 sec between searching the current directory for a new file.  
Too small a value can cause a slow system to hang if the directory contains a lot of files.

**Single Step Ms**

A Delay in 1/1000 sec between 125 and 1000  
Used when the right mouse button is clicked to single step plot a file.  
The mouse cursor must be in the right hand plot window for single step to be operational.

**Transmit as first Ascii character if >-1**

Used to place a non printing control code at the head of the file to be sent.

**Transmit as last Ascii character if >-1**

Used to place a non printing control code at the tail of the file to be sent.

**Tape Punch**

Output to tape punch may be checked.  
Select one of the three parity options.  
These effect how the eighth track in punched.  
A readable header can be checked.  
This will punch the file name into the header of the tape.

The Header length and ASCII char can be selected in two spin edit controls.  
Note: Normally the LF Line feed on transmit is not selected with tape punches.

**Working Directory**

Can contain a path to the normal source of files.  
Example C:\drawings

**Plotting**

Options are provided to negate X and Y to show the same Orientation as the machine.  
Circles / Angles.  
Circle Res can be varied. The lower the value the better the resolution. But more time is taken to plot.

**Step Angle** affects how many degrees the object is rotated through. with each click of a scroll bar.  
Note the Button Flat returns to a perpendicular view.

**Baud Rate**

Should be set to match the machine connected to this computer.  
A common setting is 9600 Baud 8 Data No Parity 1 Stop Bit.

**Com Port**

Select an available one to connect to the machine. Note: The Mouse usually uses com1.

Com2 to 4 is the normal selection

**Notes**

Temporary changes can be made to the Setup window

Without saving the INI file to observe the effect before committing the settings to file .

Use this method to add a new machine tool with different axis directions to those supplied.

See the files Mill ini Lathe ini.

Once developed save the ini file with a unique name .

All ini files should be placed in the same directory as Nester.exe

A number of Fanuc controls need a short line delay 1 or 2 Ms to work properly.

Deckel Maho mills need an Ascii 4 at the end of the file and only allow numeric file names.

Btc Bridgeport mills need Control K sent before the file and control Z at the end. Also use the translate table to remove all minus signs from I and J.



## Overview

Requires Windows 95/98 or NT.

### What Is Nester, The Product?

Nester is specifically designed for converting AutoCAD and other Cad drawings into G-Code programs for use with any 2-D or 3-D Machine such as Wire EDMs, Laser Etchers, Flame cutting, Mills , Lathes etc. Also Nester can be used for creating individual complicated toolpaths for 2-D and 3-D machines. Nester is a low cost opportunity for small independent machine shops to convert their drawings into useful programs for their CNC and DNC equipment

without the hassle of figuring out the geometry manually.

Simply draw the outline of the part to on a dedicated layer.

A full function editor is provided up to 1,000,000-line capacity to fine-tune the file adding tool offsets etc.

Numerous other options such as flipping the part, scaling, rotating are provided.

'Swap' allows the direction of travel to be changed.

File transfer both in an out is supported so this system can be hard wired to a machine tool.

Graph line color changes for red = cutting to blue not cutting.

Files can be saved and retrieved across a network.

Standard ascii format is used for all files.

The program can be configured to support any axis combination. The characters associated with a command can be changed at will. See the Setup window Labels area.

Whichever file is on top in the left window can be moved, scaled and Nested into arrays. Do this with each file in turn and then click in the right window to view all the different files plotted on top of one another.

Move each item to a starting point that does not conflict with another before starting to nest.

Once the files have been created then the nesting functions can be used to group arrays of like or different items into a single tool path.

If you make a mistake simple close that files window and start again with the file.

The option Group all files into one will take any number of open files and group them into one, and then close all but one open window. Leaving a single path to make multiple items.



## Plot

Sliders Move the object about X0.00 Y0.00

By the **INC** amount default of 5.00.

arrows Represent up down left right along with the diagonal arrows.

These allow you to move the starting point with respect to the object.

S Spins the object **INC degrees counter clockwise.**

Changing the increment amount from **5.00 to -90.00** will rotate 90 degrees clockwise.

**X** Multiplies the file by the scale factor to the right.

I.e X 1.100 would increase the object size by 10 %.

I.e. X 0.900 would decrease the object size by 10 %.

Flip and Flop Turn the object over and change the travel direction.

Often used for nesting odd shapes into existing material.

**Highlighted text** If text is highlighted in the left window it will appear black in the right window.

The left window will also show how many lines are selected as Sel[6] .

Any action performed in the right window such as rotation or moving will only be done to the highlighted section of code. If nothing is highlighted the action is done to the entire file.

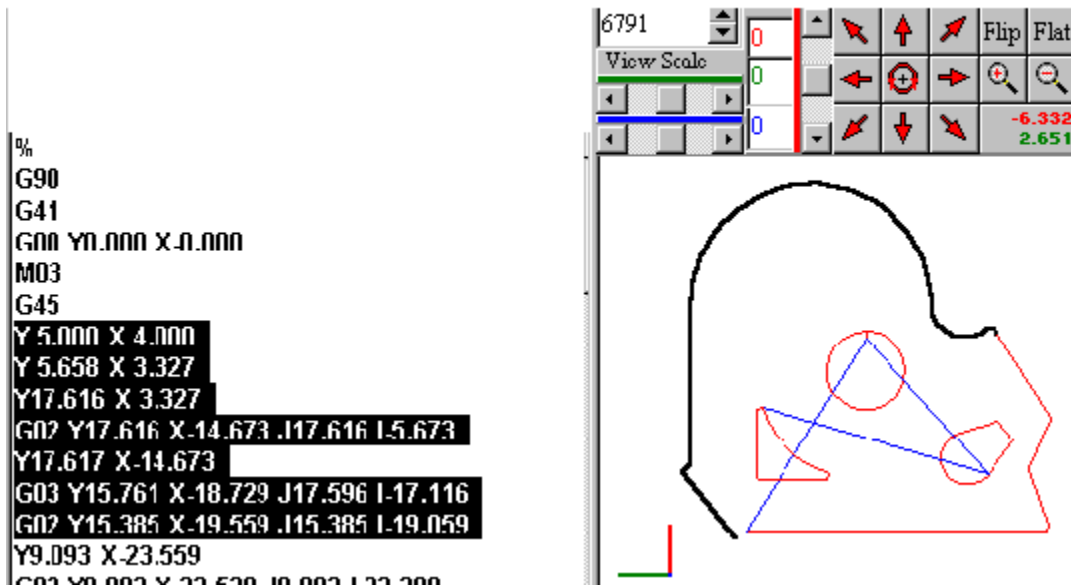
Using this technique it is possible to relocate a block of code. Note all moves will be the Inc amount which defaults to 5.000 This example shows a highlighted portion of the file Exp.

Notice that it has been relocated to the upper left in Increments of 1.000 and the upper left arrow has been pressed.

Sel: [7] indicates that seven lines of code are selected. After performing a move the Black highlight will disappear but the Sel:[7] will remain. To clear a selection simply click in the left window.

If the X 1.000 had been changed to 2.000 and X had been pressed then this block of code would have doubled in size. Many different things can be done with these tools. For example if you need multiple copies of a shape use cut and paste into new windows.. Then highlight one object and slide it over the other to the desired position. Flip or Flop will invert the selected object.

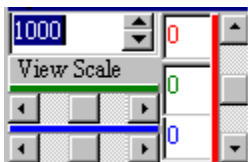




Warning all of the above functions change the source file.

**Scale** Either pressing the arrows or entering a number . changes the scale of the plot.

Shift and an arrow key causes the plot to **Pan** 100 pixels in the direction of the arrow.



First Box: **Red Lettering** - Display the vertical scroll bar angular position

[Normally X axis]

Second Box: **Green Lettering** - Display the upper horizontal scroll bar angular position.

[Normally Y axis]

Third Box: **Blue Lettering** - Display the lower horizontal scroll bar angular position

[Normally Z axis]

Three scroll bars allow objects to be rotated about axis X Y Z . Pressing the button Flat returns to a perpendicular view.

Position Displays the X Y Values in the same units as the source file.

Handy for testing if a component can be made from the available material.

The Plot window title bar will display the tool travel distance.

If the plot window size is increased the maximum X Y dims and area will become visible.



**Warning all of these functions change the source file.**

Clicking the Arrow buttons will move the program in the direction of the arrow by the **Inc** edit box amount. The center button will spin the program by the **Inc** edit box number of degrees. The number can be positive or negative for clockwise or counterclockwise rotation. May be used for nesting odd shapes into existing material. All these buttons slide the program with respect to zero.

Clicking **X** Will multiply the program by the amount in the X edit box. As shown this is 1.000 The number may be greater or less than 0.000. This feature can be used to modify a generic part. For instance suppose you have drawn a one inch wrench. This would allow you to scale the wrench up to one and a half inches or down to nine sixteenth inches.

Examples: 1.100 would increase the size by 10 % --- 0.900 would decrease the size by 10 %.

Clicking **Flip or Flop** turns the object over and changes the travel direction  
May be used for nesting odd shapes into existing material.  
Warning all of the above functions change the source file.

#### **Flat Button**

Clicking the **Flat** button returns all three axis to a perpendicular view.

Selecting **Nest** will show a a small widow with options on how many additional parts are to be cut. Pressing an arrow will array the part in that direction.



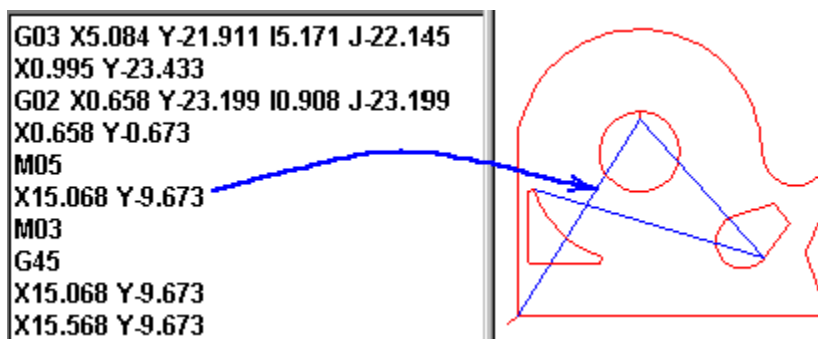
## QuickStart

Select File,Open.  
Highlight the file Exp.dxf as shown below.  
Double click or press Enter.  
The file will then be loaded and processed.  
A small plot will appear in the right window.  
Moving the mouse to the right window and clicking the left button will re plot the file at the new mouse position.

Repeatedly clicking the Right mouse button will single step through the file.  
Plotting one line at a time and marking the position in the source file.

Notice the Blue Lines Produced by the moves between M05 and M03.

These should be edited manually for lead in moves.  
Cut on M03 and Cut off M05 or those statements defined by you.  
These moves are only created when Circle Lead in + Edit Line is checked in the setup window.  
The line of code between M05 and M03 is known as the edit line.  
The short straight line at the top of the circle is the circle lead in.



Now select Setup Use another machine INI file and select 3dMill.ini.  
and reload the file EXP.DXF .  
Notice the different code between moves etc.  
This is the result of two quite different INI files.

## Nesting

From the menu select **Nest**.

Click Suggest Increments.

Increase the Horizontal and vertical quantity to 3.

Then click the top right diagonal arrow.

An array of nine EXP parts will appear.

You can continue to open files and add them to the group.  
Position each new graphic by using the arrow buttons and **INC** value before selecting nest. See [Plot](#) for help on using INC.

Finally select **Group all files into one** below the nest option.

See [Nesting](#) for an example of this.



**Receive**

From The Comm menu The Communications window will open.

Two Edit areas will be visible

Any text sent from a remote system will be displayed here.

It can be transferred to the main editor by selecting

File Copy to Editor.

See **Ini** for further details on communications settings.

See Transmit also for sending files to a machine via the serial port.





## **Sort**

### **Sort Objects ascending.**

The entire file will be sorted to put the smallest complete paths.  
(Complete tool path where the beginning meets the end) at the top.  
Often used in flamecutting to ensure that the perimeter cuts are made last.  
Also useful when cutting lettering as it is usually important for the middle of letters to be cut first.

### **Sort Objects descending.**

Exact opposite of above.

Largest Object to bottom only.

Like sort ascending except only the longest path is moved.



## **Supported Programs**

Autocad versions 10 to 14.

Autosketch.

DesignCad.

Corel Draw.

Turbocad.

Ashlar Vellum.

See the INI setup screen (F10) as some programs  
require a checkbox to be turned on.







## Sample INI

"Sample 1"	"Sample 2"
[Labels]	[Labels]
File Start=%	File Start=#
File End=M30	File End=M30
Arc Cw=G02	Arc Cw=G2
Arc Ccw=G03	Arc Ccw=G3
Lead In=G45	Kerf Comp Left=G41
Kerf Comp Left=G41	Lead In=M7
Absolute=G90	Absolute=G90
Incremental=G91	Incremental=G91
Begin Block=M03	Begin Block=M8
End Block=M05	End Block=G0
I Letter=I	I Letter=J
J Letter=J	J Letter=I
X Letter=X	X Letter=Y
Y Letter=Y	Y Letter=X
Z Letter=Z	Z Letter=Z

This is just a partial listing.





## Nester Help

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The screenshot displays the MDI Nester software interface. The main window shows a nesting plot of wrenches, with a travel distance of 185.772. The plot area includes a grid and various tool settings. A 'Nest Array' dialog box is open, allowing users to adjust the number of vertical and horizontal wrenches in the array, along with their respective increments and clearance.

**MDI Nester**  
File Edit Window Misc Nesting Comm Setup Help

**Plot** Travel Distance = 185.772  
Window Draw Grid Pan Print

7629  
View Scale 0  
Flat 1.000  
Inc 1.000  
Area 624  
13.894 Max 25.7  
13.239 Max 24.0

**2dsamp3**  
2dwrench.txt

```
%  
G9  
G4 use_x2.000  
X0. to_increase_its_size_by_two  
M0 use_2dtorch.ini_to_display_correctly  
%  
G4  
X0. G90  
X0. G41  
X0. X14.750 Y0.000  
X2. M03  
X4. G45 X14.750 Y-0.250  
X4. X14.750 Y-1.250  
G03 X16.270 Y-1.250 I15.510 J-0.688  
X16.270 Y-0.250  
G03 X16.270 Y-0.250 I15.510 J-0.688
```

**Nest Array**

Vert Qty	Increment
3	4.400
Horiz Qty	Increment
2	8.300
Clearance	0.200

Suggest Increments

Taken from the Max value on the plot screen



## Autocad

See also the other Supported Cad programs.

Before using Autocad to create the DXF file.

Check the default measuring system to make sure that angles are measured ccw from 3 o clock.

That moving the cursor up and to the right from world 0,0 increases both X and Y values as positive numbers.

If you are going to produce a 3d path XYZ IJK then be sure to rotate the axis only 90 degrees at a time.

Note : These are the default states from a new Autocad installation.

### Supported Entities

Arc, Circle, Line, Solid, Trace and Polylines .

Your drawing must be created using only these entities.

Draw the object full size. On a layer the same name as the one used in the Nester Setup Window

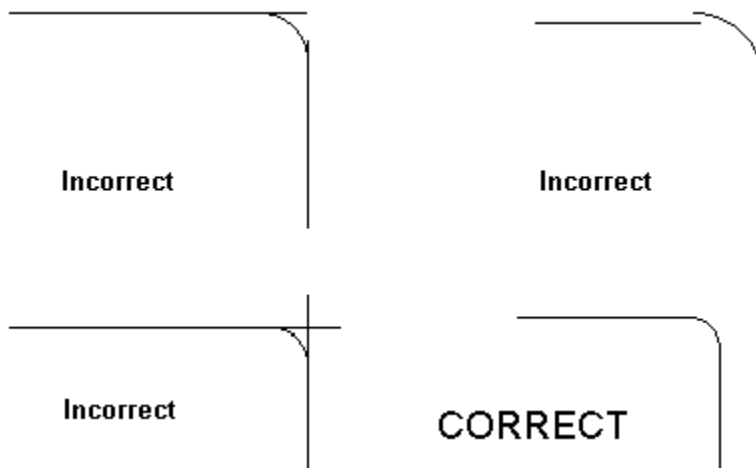
(As shipped this was FLAMECUT ).

Put any dimensions or text on another level.

### Good Drawing Practice

All lines on a path must connect.

Spaces will cause Nester to begin a new path.



### Random Order

The drawing may be created in any order.

On any continuous path all lines must connect.

With no overlap or gap.

To prevent this use commands like Snap to intersect.

Once the DXF file has been processed then use

cut and paste to change the order of processing.

Use Swap to change the direction of travel.

For instance you might want to cut all the holes in an object before cutting the outside path.

Guaranteed cutting order  
Avoids having to use the Swap command.  
Trace over the part shape from another level  
in the order which you want the part to be processed.  
For circles trace from the top center around.  
For lines and arcs trace in the order desired.  
Do not worry about the fact that Autocad draws arcs ccw.

## DXF OUT

Select the command DXF OUT and enter the path to the directory desired ,and a file name without an extension.  
Press Enter to accept the default of 6 Decimal places.  
Press ALT TAB and change to the Nester Program or program manager and run the Nester Program.

Select File Open and load the DXF file.

## Setting X0 Y0 Z0

Pick a point that will become X0.000 Y0.000 Z0.000  
By the commands AutoCad / Menu / USC  
If this is not done then World 0,0,0 will be used.  
This point will become the machine Zero reference.

## 3d Drawing

With 3d drawings always draw the lead in line from 0,0,0 to the beginning of the part first, then continue drawing the tool path. This guarantees that Gcode will detect the correct starting point.  
With 3d drawings Use set UCS X Y Z Axis Rotate only in 90 Degree increments extremely unpredictable results can happen if you draw on an inclined plane.  
With 3d drawings explore them from different view points before committing them to a file  
Drawings may be created in random order.  
On any continuous path all lines must connect with no overlap or gap.  
Use command "Snap" to prevent gaps and intersect lines.  
Once the DXF file has been processed then use cut and paste to change the order of processing.  
Use Swap to change the direction of travel.  
For instance you might want to cut all the holes in an object before cutting the outside path.



## **Vector Error**

Activated from the setup screen (F10)

Example >> 5 Vector Error Deg X Line Comp.

This feature is used to reduce the size of a file when reading a DXF file only contains XYZ data such as those produced by scanning.(Renishaw and like).

If checked as in the above example all vector changes less than 5 degrees will be thrown out.

( Not recommended for dxf files containing arcs and circles).



## Nesting

Once you have one or more working Gcode files in open windows then select Nest.

Nest only works on the active file in the left window. (*Usually the top one*)

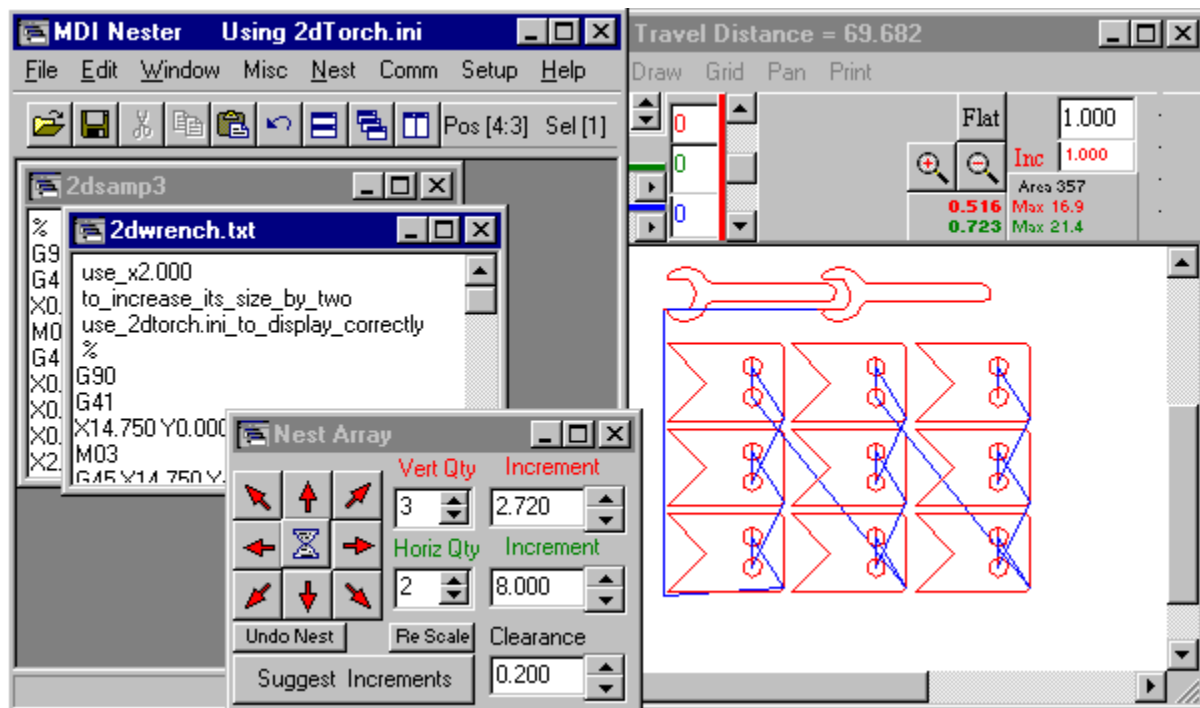
Suggest increments scans the presently selected file and attempts to find the size of the part.  
(*Arcs projecting beyond the part are not taken into account*)

In the sample below the wrench was moved to the top of the group by using the arrow buttons on the plot screen before selecting nest.

Notice that INC has been reduced to 1.00 to allow moving the part in one inch increments.

Nest was then selected with a quantity of two and the right arrow clicked.

The next thing to do will be select **Group all files as one** to generate a single file ready to pass on to the machine tool.











## Gcodes

CNC G-CODES Typical on a Flamecutting machine.

**Red Codes are used by this program**

CODE FUNCTION

**G00 Rapid Traverse**

**G01 Linear Interpolation (Feed)**

**G02 Circular Interpolation Clockwise**

**G03 Circular Interpolation Counterclockwise**

**G04 Dwell**

**G40 Kerf Compensation Off**

**G41 Kerf Compensation Left**

**G42 Kerf Compensation Right**

**G45 Lead in to Kerf Compensation part**

**G70 Input in Inch**

**G71 Input in Millimeter**

**G90 Absolute Programming**

**G91 Incremental Programming**

**G97 Set Program repeat pointer**

**G98 Initiate program repeat at G97**

**M00 Program stop**

**M02 End of program**

**M03 Cutting on**

**M05 Cutting off (Used to swap from blue to red plotting)**

**M08 Plate marker on**

**M09 Plate marker off**

**M30 End of program**

CNC G-CODES Typical on a Milling machine.

**Red Codes are used by this program**

CODE FUNCTION

**G0 Rapid Traverse**

**G1 Linear Interpolation (Feed)**

**G2 Circular Interpolation Clockwise**

**G3 Circular Interpolation Counterclockwise**

**G4 Dwell**

**G8 Modal Deceleration Override Off**

**G9 Modal Deceleration Override On**

**G12 Helical Interpolation CW**

**G13 Helical Interpolation CCW**

**G17 XY Plane Selection**

**G18 ZX Plane Selection**

**G19 YZ Plane Selection**

**G22 Circular Interpolation, Fillet Input CW**

**G23 Circular Interpolation, Fillet Input CCW**  
**G30 Mirror Image Off**  
**G31 Mirror Image X On**  
**G32 Mirror Image Y On**  
**G40 Cutter Diameter Offset Off**  
**G41 Cutter Compensation Left**  
**G42 Cutter Compensation Right**  
**G44 Cutter Compensation, Normal Feedrate**  
**G45 Cutter Compensation, Modify Feedrate**  
**G48 Corner Rounding in Cutter Comp Off**  
**G49 Corner Rounding in Cutter Cornp On**  
**G70 Input in Inch**  
**G71 Input in Millimeter**  
**G72 Transformation Off**  
**G73 Transformation Rotation, Scaling**  
**G74 Multi-quadrant Circle Input Off**  
**G75 Multi-quadrant Circle Input On**  
**G77 Zig-Zag Mill Cycle**  
**G78 Pocket Mill Cycle**  
**G79 Bore Mill Cycle**  
**G80 Drill Cycle Off**  
**G81 Z Cycle, Drill (Feed In, Rapid Out)**  
**G82 Z Cycle, Spot Face (Feed In, Rapid Out)**  
**G83 Z Cycle, Deep Hole (Peck, Rapid Out)**  
**G84 Z Cycle, Tap (Feed In, Feed Out)**  
**G85 Z Cycle, Bore (Feed In, Feed Out)**  
**G86 Z Cycle, Bore (Feed In, Stop-Wait, Rapid Out)**  
**G87 Z Cycle, Chip Break (Peck, Rapid Out)**  
**G89 Z Cycle, Bore (Feed In, Dwell, Feed Out)**  
**G90 Absolute Programming**  
**G91 Incremental Programming**  
**G92 Preset Part Programming Zero Point**  
**G94 Feedrate Per Minute Mode**  
**G95 Feed Per Spindle Revolution (pitch) mode.**  
**G96 Restore Base Part Program Coordinate System**  
**G97 Set Work Coordinate System**  
**G99 Deceleration Override**  
**G170 Outside Frame Mill**  
**G171 Inside Frame Mill**  
**G172 Pocket Frame Mill**  
**G173 Outside Face Mill**  
**G174 Inside Face Mill**  
**G175 Outside Circle Mill**  
**G176 Inside Circle Mill**  
**G177 Pocket Circle Mill**  
**G179 Slot Mill**

**G181-189 Z Cycle (Same as G81-G89) Multi-Hoic**  
**G191-199 Z Cycle (Same as Gg I -Gg9) Frame of floles**  
**M0 PROGRAM STOP (NON MODAL)**  
**M1 OPTIONAL STOP (NON MODAL)**  
**M2 PROGRAM REWIND(NON MODAL)**  
**M3 SPINDLE ON CLOCKWISE \*\***  
**M4 SPINDLE ON COUNTER-CLOCKWISE \*\***  
**M5 SPINDLE OFF \*\***  
**M6 TOOL CHANGE (NON MODAL) \*\***  
**M7 MIST COOLANT \*\***  
**M8 FLOOD COOLANT \*\***  
**M9 COOLANT OFF \*\* only two of these are used to swap from blue to red plotting.**  
**M19 SPINDLE ORIENT**  
**M20 PROGRAM STOP; GO TO CLEAR POINT (NON MODAL)**  
**M21 OPTIONAL STOP; GO TO CLEAR POINT (NON MODAL)**  
**M22 END OF PROGRAM; GO TO CLEAR POINT (NON MODAL)**  
**M25 QUILL OR HEAD UP (NON MODAL)**  
**M26 TOOL CHANGE; GO TO CLEAR POINT (NON MODAL)**  
**M28 RIGID TAPPING OFF**  
**M29 RIGID TAPPING ON**  
**M30 REWIND TO TOP OF LOCAL PROGRAM ( DEFINED BY NUMBER)**  
**M51 AUXILARY FUNCTION TO INDEXER (NON MODAL)**

#### CNC WORDS

**:** DEFINE PROGRAM NUMBER FOR MULTI-PROGRAM STORAGE  
**/** SLASH - BLOCK DELETE OR VALUE SEPARATION  
**\*\*N** SEQUENCE NUMBER  
**\*\*F** FEED RATE  
**\*\*I,J,K,** ARC CENTER OFFSETS  
**\*\*X,Y,Z,** AXIS COMMANDS  
**\*\*S** SPINDLE SPEED  
**T** TOOL SELECT (T1 THRU T99)  
**\*\*A** ANGLE ( IN DECIMAL DEGREES)  
**\*\*B** INCREMENTAL ANGLE  
**\*\*E** ANGLE (COLATITUDE); ABSOLUTE AND DECIMAL DEGREES  
**\*\*R** RADIUS VECTOR DISTANCE Negative for arcs > 180'  
**U,V,W,** INCREMENTAL VALUES FOR X,Y,AND Z RESPECTIVELY  
**\*\*P** PARAMETERS USED IN CANNED CYCLES  
**\*\*Q** DWELL TIME VALUE; USED WITH G4 AND THE G89 CYCLES  
**D** DIAMETER OF CUTTER

**\*\*INPUT VALUES VARY FROM MACHINE TO MACHINE.**  
**CONSULT YOUR MANUAL FOR USAGE**



## LATHE

Support for lathes is provided in three areas

Dxf reading and writing, Lathe plotting and swap YZ

These allow you to draw a part from the centerline.

When it is imported from the dxf file all X values are multiplied by 2.000.

For the benefit of Gcode plot X and I are divided by 2.

The Y and Z axis letters can be swapped since many lathes use X I Z K as axis.

If the lathe support R then select use R instead of IJK.







## TRANSLATE

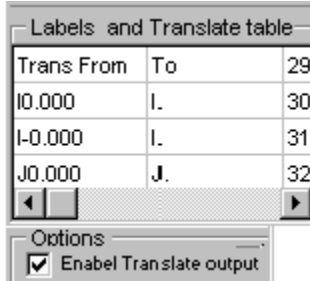
If checked **Translate on file load** will process the incoming file through the translate table.

This can be used to change the sign of value **J to J-** and **J-- to J** will change the sign of all J values in the file. Note the warning below about this being a one way trip.

This method can be used to port files from one machine to another.

If checked **Enable translate output file on transmit.**

In the Labels and Translate table from line 30 on anything found. in the left column will be translated to what is in the right column.



For example :

From To Line

J0.000 J. 30

J-0.000 J. 31

K99 M66 32

H10 33 Blank

Note this is a one way trip so if you read a translated file back it may not.

Plot correctly.

The main purpose of this is to allow support for non standard machines such as Bandit controls.

For an example of its use see the 3dbandit.ini file.

This does not effect the contents of the editor it merely translates the code on the way to the remote machine, or if the Check box

**Don't transmit show output in lower window** is checked then the file is just displayed for your review.





