RoutOut CNC

CAD CAM

Software V2.0

Index.

Page	**Description**
3.	Software Installation.
4.	About Routout CNC
5.	Quick Setup
6.	Designing your first part.
7 - 13	Viewer tool bar options
14 - 20	FL Command Set
21 - 26	Routout Viewer Menu's
27 - 34	Routout Manager Menu's
35	General Wiring Diagram
36	Notes
37	General Contact & Support

Software Installation:

1. Insert the Routout CNC CD into the CD Drive.

2. From Your desktop, double-click on “My Computer”, then double-click on the “D:drive” (“D” is usually the default drive letter for the CD-ROM).

3. Double-click on the “RoutOutCNCV2.EXE” Icon and windows will begin to install the program onto your PC. After the program is installed, Windows may ask you to restart your computer. Please do so.

4. Installation will now be complete.

5. Desktop icons will be produced for both the Routout Viewer and the Routout Manager.

6. When the software is setup please email or phone for the licence key.

About Routout CNC V2.0 Viewer and Manager

Firstly thank you for using Routout CNC, With that said this software will allow you to have hours of enjoyment, whether you are building your own CNC Machine/ converting an existing machine or you have simply bought a kit. The Routout software will enable you to control your new addition to the workshop with ease; Routout CNC Manager will control your stepper motor drive board directly from you LPT port (Parallel Printer Port)

The program comes as two parts:

1. **Routout Viewer (Design and Conversion)**
2. **Routout Manager (LPT Stepper motor Driver)**

Within the ***Routout CNC Viewer software*** this will allow you to create FL files and import HPGL files for editing or converting. These files are then sent to the ***Routout Manager*** where they will be processed and sent down the LPT port to your potter.

The FL file structure is very simple so can be manually entered if you like. (Please see FL commands for more details)

Because of the simple file structure it will allow you to write your own front end for the ***Routout Manager*** if specific functions are needed and you do not wish to use the ***Routout Viewer software***

Remember you need only set most of these settings once. It's worth spending an extra few seconds getting these right.

Quick Setup

Using Corel Draw to create your first part.

You Must Set up the basic operating parameters first.

Remember to set all the settings in the option menu for your configuration.(only needs to be set once) Especially

Routout Manager Settings

1. Set Hardware steps per mm *(This is the number of steps you would issue to your stepper driver to move the axis 1mm - 2000 is default)*

2. Make sure home switches are wired correctly. If you don't have home switches un-check (check limit switches when drawing) Again if no switches are connected you must change the setting in Routout Viewer – Under the work space property page(FL settings) set Home commands to none.

3. LPT port address in Hex i.e. &h378 (this is default) *it is usually LPT1.*

4. Select the correct driver for your operating system.

IO.dll will only drive standard printer port address i.e. &h378

For PCI bus none standard addressing LPT ports please use CNCIO.dll

Routout CNC Viewer Settings

1. Make sure that you set the points per MM in the settings menu and that it corresponds to the Corel Draw resolution i.e. 20 points per mm
2. Make changes to the Max Speed Travel XY, Max Speed Cutting XY, and Max Speed Z also in the settings menu. (Units MM/Second)
3. Set tool cutting diameter (Units MM)
4. Set Tool Depth (Units MM)

Designing you first part in Corel Draw.

1. Draw Part in Corel Draw

2. From the file menu export as DXF file for example 'test.DXF' (Remember to set that if you export in inch units you must import as inch units other wise the drawing will be in the wrong scale) Please Note: ***Corel Draw 11*** does not export HPGL or DXF correctly sometimes.

3. Load DXF file into Routout CNC Viewer select the tools to load (this can be changed at a later stage - Make changes to speed, tool depth etc. save as .FL file

4. Load *.FL file Into Routout CNC Manager - your part will be produced.

Tool Bar Options

Pan Button

Use the pan button when zoomed in to move area of zoom.

Mouse Arrow

Use the mouse arrow to return the mouse back to a pointer.

Delete Selected Polly-Lines

Use the delete selected Polly-lines tool to completely remove item.

Zoom Area

To use Zoom area select zoom tool then hold down the left mouse button and stretch over the area you want to zoom in on.

Zoom Selected Polly-lines

To use Select the Polly-lines you wish to zoom with the tool then press

Display all on page / UN-Zoom

Please Note: After placing an object you can move it by selecting it then holding down CTRL and left clicking / Dragging with your mouse.

Draw Line Tool

Use this tool to draw a Line onto the canvas. Press down and hold the Left hand mouse button where you wish to start drawing then stretch the line to the size that you desire then release the mouse button, the line will be drawn.

Draw Rectangle Tool

Use this tool to draw a rectangle onto the canvas. Press down and hold the Left hand mouse button where you wish to start drawing then stretch the rectangle to the size that you desire then release the mouse button, the rectangle will be drawn. To draw a square, hold down the CTRL button prior to depressing the left hand button.

Draw Triangle Tool

Use this tool to draw a triangle onto the canvas. Press down and hold the Left hand mouse button where you wish to start drawing then stretch the triangle to the size that you desire then release the mouse button, the triangle will be drawn. To draw a triangle with equal sides, hold down the CTRL button prior to depressing the left hand button.

Draw oval /circle Tool

Use this tool to draw an oval onto the canvas. Press down and hold the left hand mouse button where you wish to start drawing then stretch the oval to the size that you desire then release the mouse button, the oval will be drawn. To a circle, hold down the CTRL button prior to depressing the left hand button.

Show Direction of Cut Tool

Use this tool to show the direction the cutting head will take round the drawn object. This will also show the path of the cutter. Only the outline of the object will be shown.

Edit Mode Button

When this tool is pressed and an object selected you can view the objects commands and edit the individual points within that object. For example you can distort / shape circles.

FL Generate Tool

When pressed and then the save button is used it will save the .FL code for loading into the viewer.

Generate HPGL Tool

When pressed and then the save button is used it will save the HPGL /PLT code for loading into another drawing package.

Optimisation Tool (Under Services menu)

Optimise by Tools and Locations will depending on what selection has been made in the Settings - Optimisation window, will either group all tool changes together i.e. reduce number of tool changes needed or optimise routing by position of lines (To cut down on routing time). If both options are selected it will optimise by tool first then by angle.

Delete Polly-line

Delete line tool will only delete up to the last Polly-line, to remove the rest use

Add Vertex

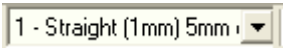
(Must be in edit Mode)

Use the Add Vertex command to add a single movable point to a selected item. The same result can be achieved by a right hand mouse click over a highlighted graphic. Clicking again over the vertex point will remove it.

Add Command By Hand

(Must be in edit Mode)

Use "Add Command By Hand" to add power and Aux commands into the FL code directly.

Tool Selection menu 

When using the tool selection menu simply select the part of the drawing you are interested in changing tools the select the tool from the list. The selected part of the drawing will now use the new tool.

Scale Selection menu

The Scale selection does exactly what it say's it selects the viewing scale. (This does not affect the cutting scale)

Work space property

This allows you to edit the properties of the page i.e. points per mm, workspace area etc.

New Page Icon

Creates new blank page. You should then manually set the page size (manual selection or workspace area – set in the workspace property page)

Tile Button

Tiles the open FL files.

Save FL / PLT File

Load File

Load and save does just that ! That is either load or save .FL File or Plotter File (HPGL) , DXF , G Code

Draw Drill

This will place a drill hole with the tool selected.

Zstep

Z step's the selected object.

For example: If the chosen tool for the selected object had a cutting depth of 5mm and you set a 0.5mm Zstep then the cutter would travel round the object and every pass it would lower the tool 0.5mm until it reached it's tool height of 5mm. (10 passes) Setting Zstep to 0 will remove Zstep.

Spiral Pocket

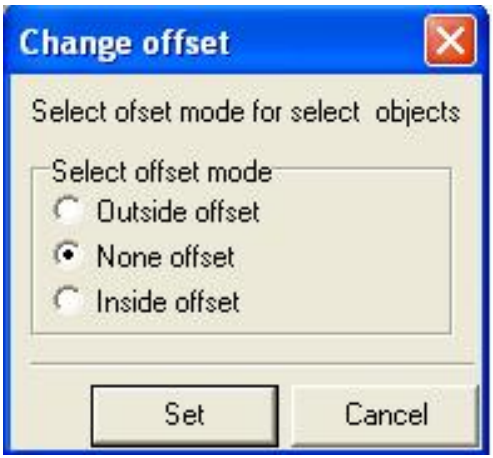
Creates a spiral pocket inside the object

For example: Select an object and apply one of the spiral pocket methods the tool will circle round and round filling in the object. You can also as with the other commands select a tool to do the spiral pocket and also add a Zstep value. Please Note Vector method does not currently allow Zstep feature.

Cutter Offset

Changes the selected object's offset.

For example: If none is selected the tool will follow the centre path of the object. If out side is selected the tool will follow the outside of the object and likewise with inside, the tool will follow the inside of the object.

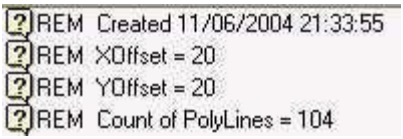


FL Command Set

REM

Rem command adds a Rem Statement to file. The Rem statement has no function and the driver will pass it but it serves as a reminder for the FL file formatting. I.e. Points per MM, Date created etc.

Example:



Home

Home Command does exactly what it says on the tin ! It returns all Axis to the home position until the X, Y & Z switches are High (+5V) at which stage the motors will stop.
See Also: HomeZ and HomeXY

HomeXY

HomeXY Command does exactly what it says on the tin ! It returns XY only to home at which stage the motors will stop.
See Also: HomeZ and Home

HomeZ

HomeZ is the same function as home, but only returns the Z Axis to the home position.
See also: Home

PointsPerMm #

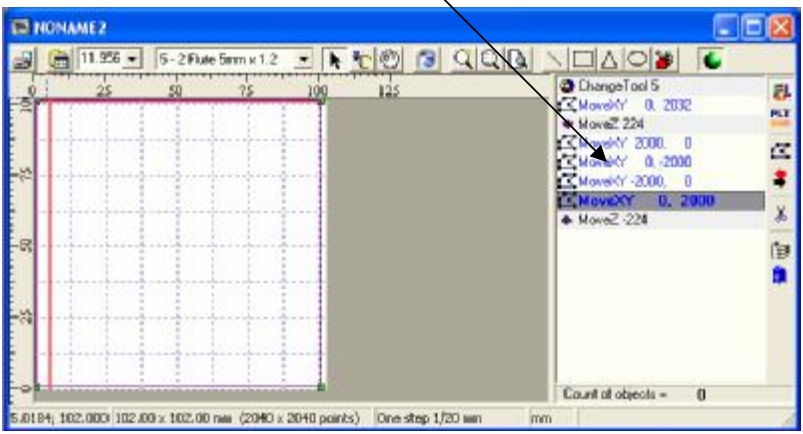
PointsPerMm defines the number of points per mm that your drawing was designed in, for example : If drawing with Coral Draw, then exporting the image as a PLT file then you would get the option to set Number of plotter units if you were to set this to 508 per inch then this would be 20 per mm. Therefore PointsPerMm = 20
Example:-

- PointsPerMm = 20
- Hardware steps per MM = 2000

Therefore MoveXY 2000,0 would move the router 100mm

100 X 100mm Square

```
MoveXY    0,  2032
MoveZ 224
MoveXY  2000,    0
MoveXY    0, -2000
MoveXY -2000,    0
MoveXY    0,  2000
MoveZ -224
```



MaxSpeedTravelXY #

This is the Maximum speed that your CNC machine will travel in mm / second. So the larger the number the faster your CNC machine will go.

Example: **MaxSpeedTravelXY 5** {This will make your CNC machine travel at 5 mm / Second}

See also: General Setup

MaxSpeedCuttingXY #

This is the Maximum speed that your CNC machine will cut in mm / second. So the larger the number the faster your CNC machine will go.

Example: **MaxSpeedCuttingXY 3** {This will make your CNC machine cut at 3 mm / Second}

MaxSpeedZ #

This is the Maximum speed that your CNC machine will move the Z axis in mm / second. So the larger the number the faster your CNC machine will go.

Example: **MaxSpeedZ 4** {This will make your CNC machine move the Z Axis at 4 mm / Second}

ChangeTool #

The ChangeTool command will when the file is down loaded to the Driver prompt the user to replace the tool with the specified tool for example:

ChangeTool 1 { Prompt user to change tool to tool number 1, it will also give the option to adjust the Z axis height }

MoveXY #,#

Examples:-

MoveXY 3,-5 (Step X Axis 3 Steps and Y Axis 5 Steps in reverse)

MoveXY 4,0 (Step X Axis 4 Steps and Y Axis 0)

MoveZ #

Examples:-

MoveZ 5 (Step Z Axis 5 Steps)

MoveZ -10 (Step Z Axis -10 Steps in reverse)

PowerX #

Examples:-

PowerX *1* (Turn on PowerX output)
PowerX *0* (Turn off PowerX output)

PowerY #

Examples:-

PowerY *1* (Turn on PowerY output)

PowerY *0* (Turn off PowerY output)

PowerZ #

Examples:-

PowerZ *1* (Turn on PowerZ output)
PowerZ *0* (Turn off PowerZ output)

PowerXYZ #,#,#

Examples:-

PowerXYZ *1,1,1* (Turn on PowerX, PowerY & PowerZ output)

PowerX *0,1,0* (Turn off powerX, turn on PowerY & Turn Off PowerZ output)

AUX# #

General purpose output line for controlling spindle, coolant, vacuum etc

Example: **AUX1 1** (turn on AUX 1 output line)

Example: **AUX1 0** (turn off AUX 1 output line)

Example: **AUX2 1** (turn on AUX 2 output line)

Example: **AUX2 0** (turn off AUX 2 output line)

Example: **AUX3 1** (turn on AUX 3 output line)

Example: **AUX3 0** (turn off AUX3 output line)

Zstep#

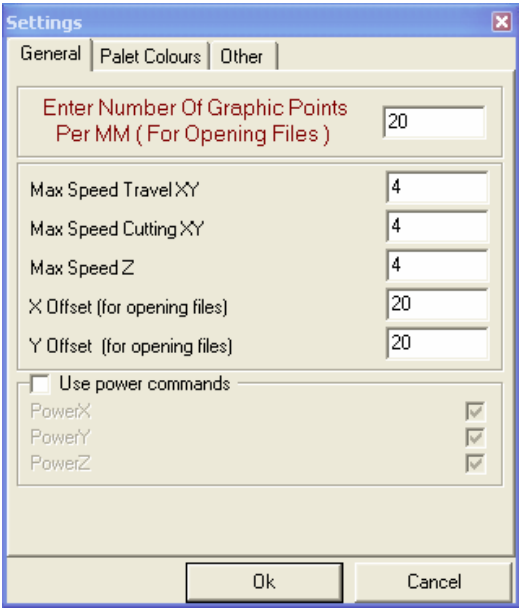
This function repeats the object between the Z down and Z up commands and increments Z in steps. For Example:

PointsPer Mm 10
ZStep 0.5 {Increment in 0.5mm increments}
MoveZ 50
Move XY 100,100
MoveZ -50

Therefore MoveZ would cut to a depth of 5mm in 0.5mm increments.

General Setup Menus – CNC Viewer

General settings window:



Number of Points Per MM: This is the points per MM that the drawing was designed at.

MaxSpeedTravelXY: Speed of the XY when moving (Unit of measure- mm / Second)

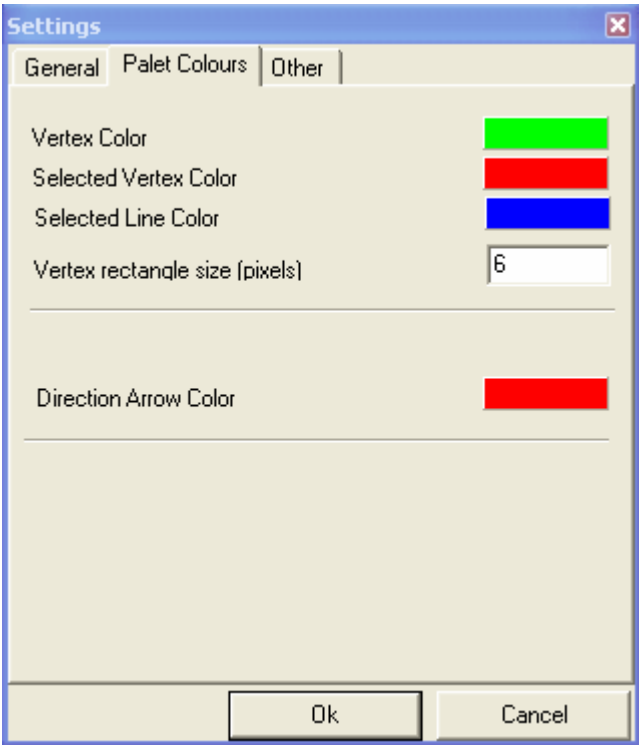
MaxSpeedCuttingXY: Speed of the XY when cutting (Unit of measure- mm / Second)

X Offset & Y Offset will offset whole drawing by X number of drawing points.

Power Commands: Turn these on if you need to control the enable / disable on you stepper motor driver boards.
Default – Off

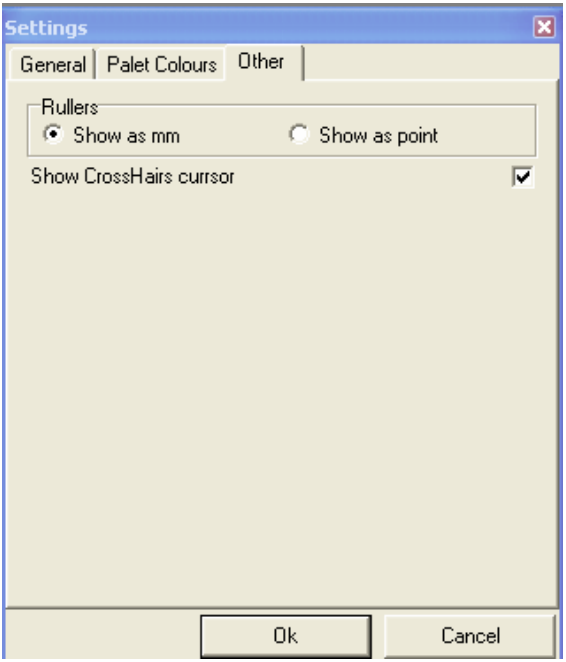
General Pallet Colour's window:

Use this menu to set the general colour option for the form.

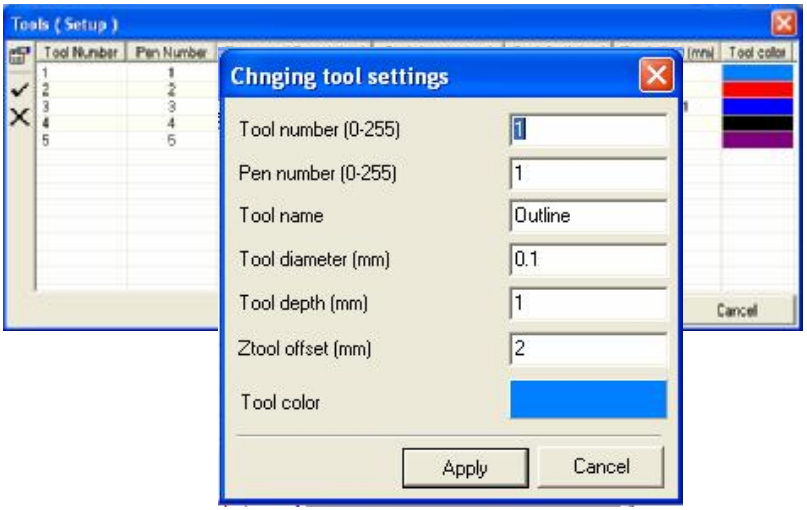


General Tool Other Tab:

Use this page to set rulers and cross hairs



Tool Setup window:



When you double click on the tools window this allows you to edit or create new tools. See the pop up box to the above.

Tool Number: This is the number that will be sent to the driver i.e. Change Tool 1

Pen Number: This is the pen number from the HPGL file / DXF File

Tool Name: This is for your reference only.

Tool Diameter: This is the Diameter of the tool set in mm (this will show on the screen for your reference only)

Tool Depth: This is the cutting depth of the tool in mm

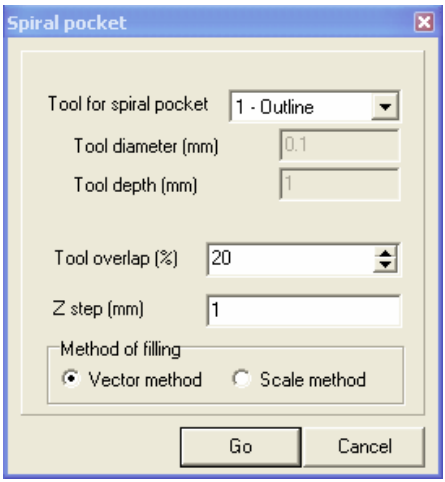
Tool Offset: This sets the tool offset from the work piece (i.e. the height the tool will be above the work when it is not cutting).

Tool Colour: Colour for visual reference only on the display.

Spiral Pocket Window from the Service Menu:

Use this menu to add a spiral pocket to the command.

- Firstly select an object, then click Spiral Pocket from the service menu.
- Spiral Pocket menu will new be displayed.



Tool For Spiral Pocket

Selects the tool that is to be used for the spiral pocket.

Tool Overlap

Selects the amount the tool will be allowed to overlap to complete the Spiral Pocket

Zstep(Function is only available with Scale method)

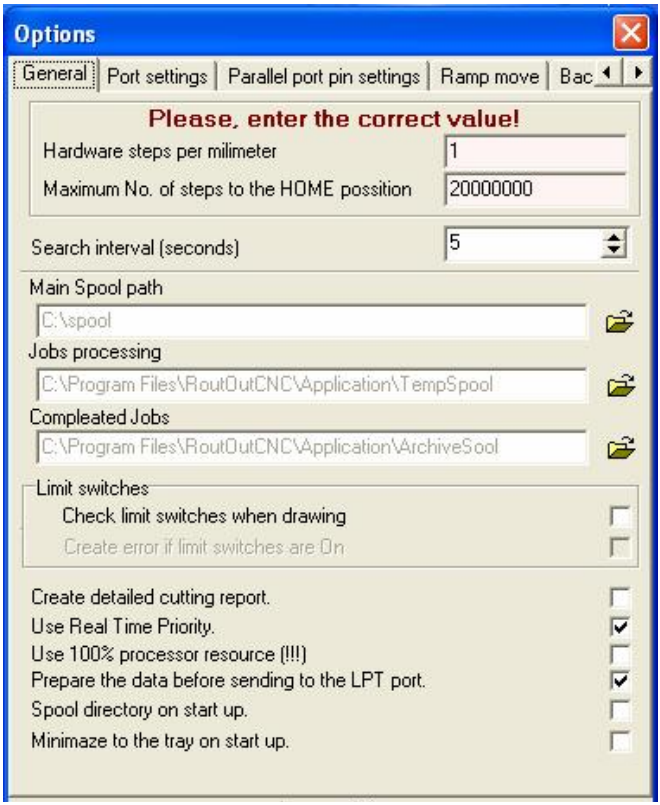
Selects the Z increment used to do the spiral Pocket see – See Zstep Command.

Method of Filling

There are two different methods of filling Scale and vector method.

General Setup Menus – CNC Manager

Options Menu - General



Hardware Points per MM

This is the number of pulses you need to give to your stepper motor driver board to move any axis 1 MM.

Maximum No. of steps to the Home position

This setting specifies the number of steps on any axis to the home position for example : If the maximum dimension of your router table was 2 meters (2000mm) then maximum home position would be 2000 x 2000(hardware steps per MM) = 4000000

Search Interval (Seconds)

Search interval determines the speed at which the automatic spooler will search automatically for FL files. When set to automatic spooling the FL files will be processed when they are saved into the spool directory with no user interaction.

Spool Paths

The spool paths can be set for a different directory if you wish, but unless you specifically need to change them then don't.

The Directory's are as follows:

Main – (This is the directory that the automatic spooler will search for FL files to be processed)

Jobs Processing – (This directory holds the FL files that are currently being produced)

Completed Jobs – (This directory hold all jobs that have been produced and can be re – run from the main screen)

Limit Switches

Check limit switches when drawing – This will prevent the CNC machine from driving the axis past its end stop. It is recommended to keep this enabled (unless you don't have limit switches!)

Create Error if limit switches are On – This Setting will show an error and stop the CNC machine if any of the switches are on whilst moving. You can use this setting to test the limit switches. It is advisable to make sure that this is not enabled after testing for the first time.

Use Real Time Priority

This setting uses more resources when set but will give you smoother and faster stepper motor performance.

Use 100% Processor Resource.

This setting uses more even more resources when set and will give you smoother and faster stepper motor performance. But will make your PC less responsive.

Prepare the data before sending it to the LPT port

It is advisable to have this option checked to speed up the CNC cutting process as all the mathematical calculations are then performed before the cutting / engraving process begins.

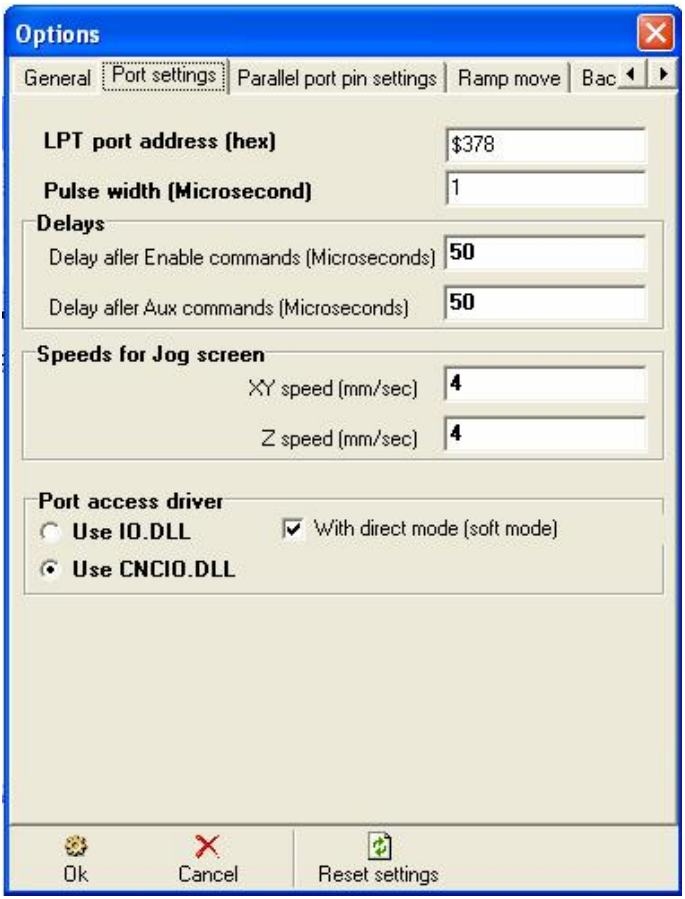
Spool Directory on start-up

Spool directory on start-up does exactly that, it starts the automatic spooler for unattended job submission.

Minimise to the system tray

Minimises the Routout Manager to the system tray.

Options Menu – Port Settings



Lpt Port Address

Enter the base address of your LPT / Printer port here i.e. (&h378) –default

Pulse Width

Default 10 Us (Actual pulse width) modify to suit your driver

Delays

Delays can be specified for the Enable and Aux commands, this is an advantage if for example you control your spindle etc via a relay. (Unit – uS)

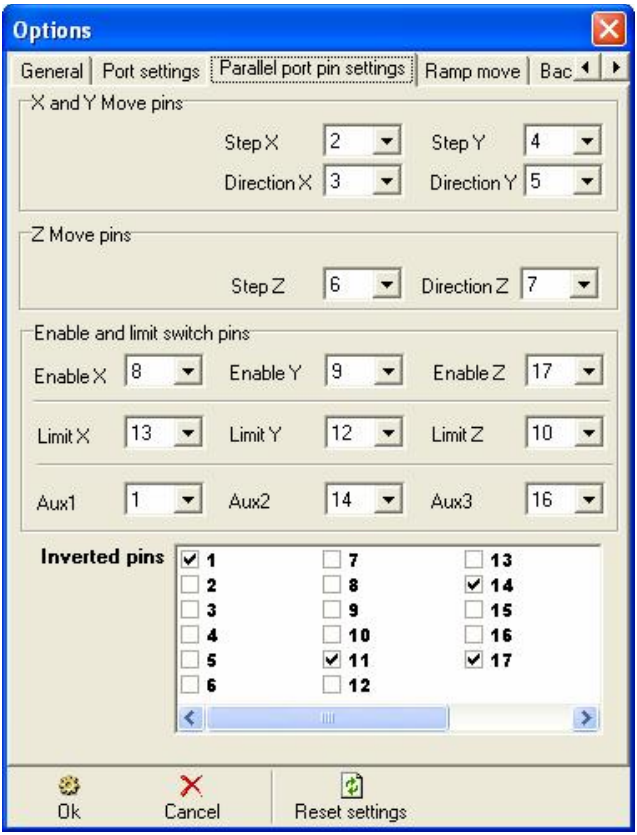
Speed for the Jog Screen

This is the speed that the X, Y and Z axis will move when using the jog screen

Port Access Driver

For guaranteed compatibly the CNCIO.Dll should be used. The IO.Dll will only work with standard port addressing i.e. (&h378)

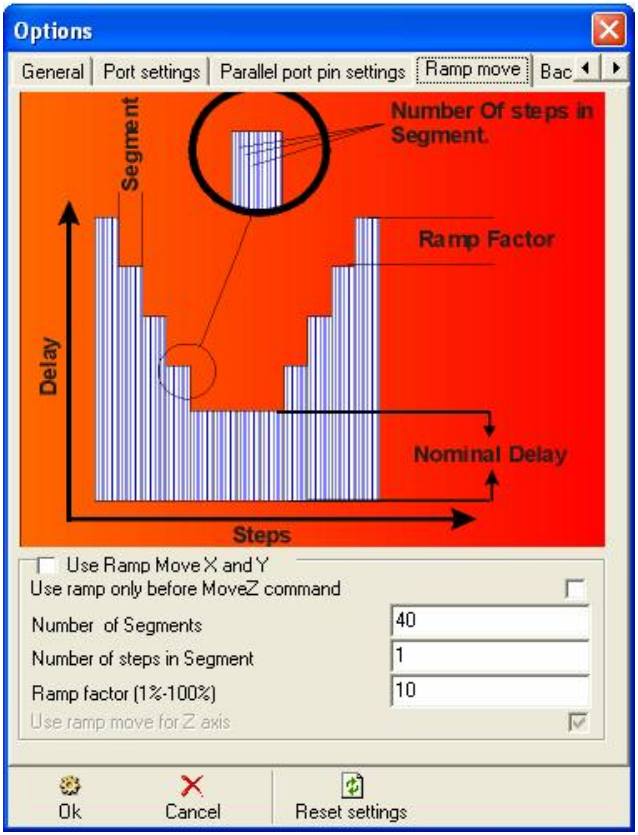
Options Menu – Parallel port pin settings



Port setting page is used to set up the various output / input pins on the parallel port for the step, direction, limit switches etc. Please note these

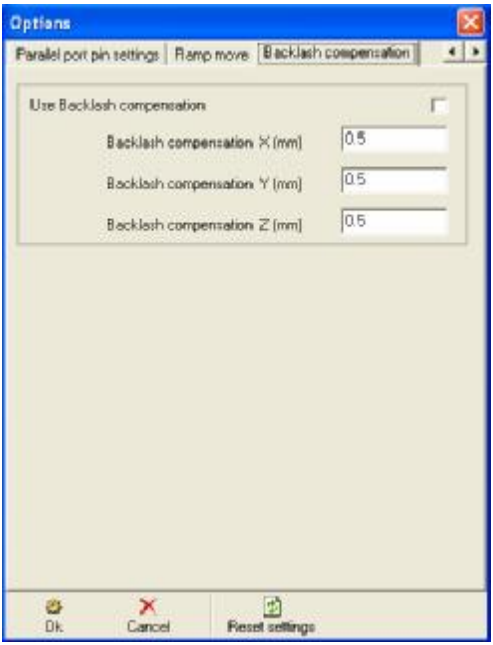
should not need to be changed unless you are configuring it to an existing system and that differs from the default shown. You also get the option to invert pins so that there function becomes inverted.

Options Menu – Ramp Move



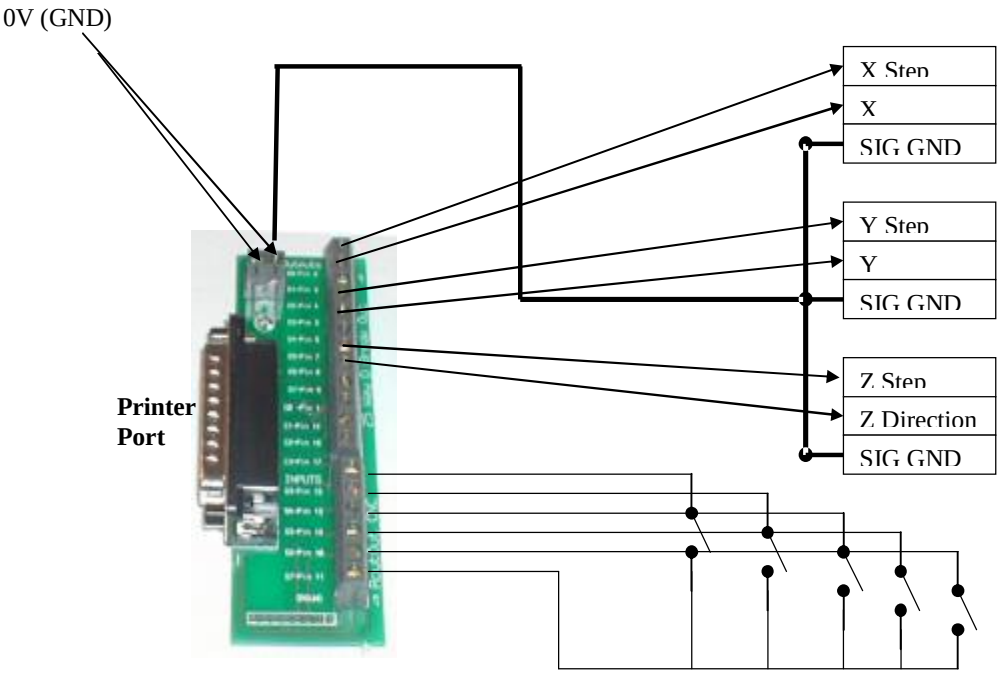
From this screen you can select to enable / disable Ramp move. Enabling this will start the stepper motors slowly then ramp up to the maximum speed (MaxSpeedTravelXY / MaxSpeedCuttingXY) and at the end of the cut / movement the motors will ramp down the speed. Do not have move ramp only before MoveZ command enabled/

Options Menu – Backlash Compensation.



Select use backlash compensation to remove backlash out of the axis. Make sure if this option is selected that the backlash is correct, otherwise each move will contain an error.

General Wiring Diagram shown using the Routout CNC Quick Connector.



Setup Notes:

General and Telephone Support

Telephone Support is Available to all users of the product whether registered or not. Saying this we will however always give priority to those that have registered, also un-registered users will only be able to use the product for thirty days.
Telephone Support is available between 9-5PM GMT

Technical Support Line : (0121) 2884066

To Contact Sales, Please telephone (01269) 841230 or Email Sales@routoutcnc.com

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