

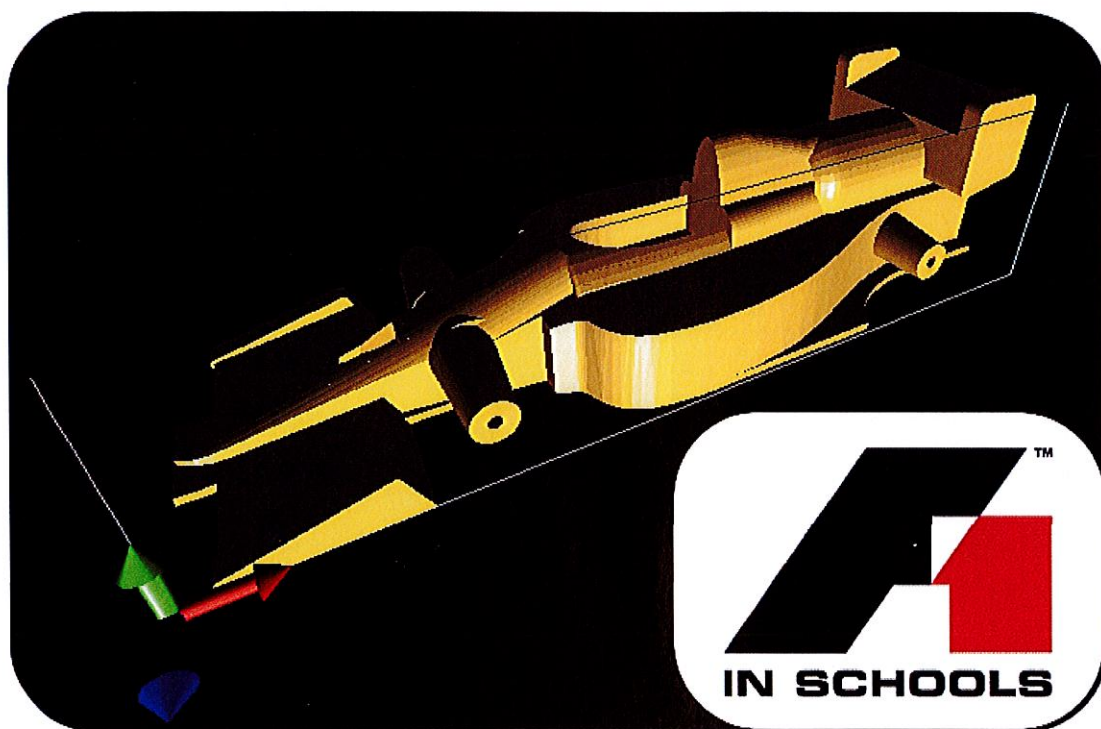


DENFORD

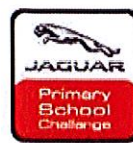
QuickCAM Pro

Advanced Milling CAM Software

F1 in Schools Training Guide



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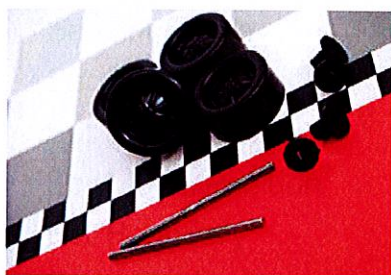
INNOVATIVE EDUCATIONAL PROJECTS





F1 Consumables

F1 IN SCHOOLS EQUIPMENT & CONSUMABLES



MAKE

Formula One Class Wheel Kit

includes:
4x Wheels,
2x Tether Line Guides,
4x Axle Inserts/Grommets (6mm)
2x Axles

Product Code

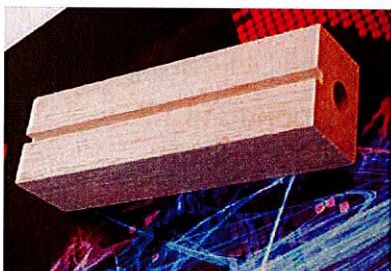
N14759



Bloodhound SSC Class Balsa Wood Blank (pack of 10)

Blank measures 304mm x 41mm x 70mm and contains a pre-drilled hole for the CO2 cartridge.

N53347



Formula One Class Balsa Wood Blank (pack of 10)

This official Formula One Class balsa wood blank measures 223mm x 65mm x 50mm and contains a pre-drilled hole for the CO2 cartridge.

N28886/10



Bloodhound SSC Class Kit Bag (for one car, excluding balsa blank)

Includes 2 x PX rear wheels and 2 x LX front wheels, 1 x sandpaper, 2 x screw eyes, 2 x axles, straw wheel spacers, 4 x washers.

N14634:04



Formula One Class Kit Bag (for one car, excluding balsa blank)

Includes set of 4 x black Fusion wheels, 1 x sandpaper, 2 x screw eyes, 2 x axles, straw wheel spacers, 4 x washers.

N14758:04

A selection of these products can be purchased online at



iSupply3D.com
3D Printing
Rapid Prototyping Supplies

About QuickCAM Pro

QuickCAM Pro is an advanced, yet simple to use, wizard based CAM package, which is used to create cutter paths for machining 3D parts on a milling machine or router. Both STL files and image files can be imported into QuickCam Pro, and a comprehensive set of machining plans can be used individually or in combination to produce complex 3D surfaces and lithophanes.

Introduction

The aim of this training guide is to show you how to navigate your way around QuickCAM Pro and instruct you how to operate this software to manufacture an F1 in Schools balsa wood blank.

This manual will cover all the steps required to convert the STL file of your car into a machined balsa car body.

This manual makes use of screen shots where possible and will use the following conventions:

Instructions will be in this format

Text to be typed will be in this format

Any software buttons to be pressed, a picture of the button will follow the instruction

This manual assumes that your software has already been installed and your machine has been commissioned.

If any of the features described in this manual are not operating as described please check that the version number you are using is the same as that shown on the front cover.

Version is written on the title bar of the main software window.

Denford provide machine training and it is recommended that you undertake the training and use this manual as a revision guide after completion of the machine training.

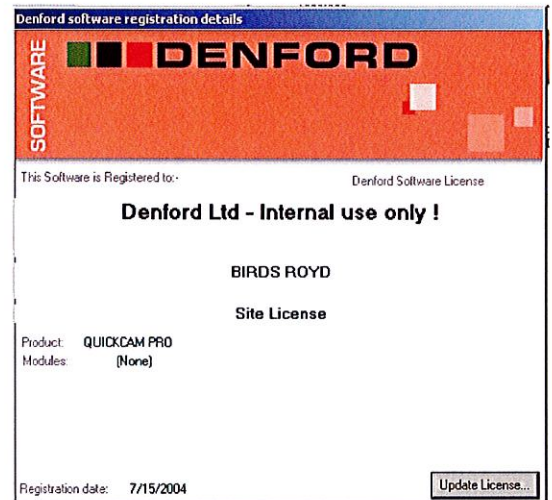
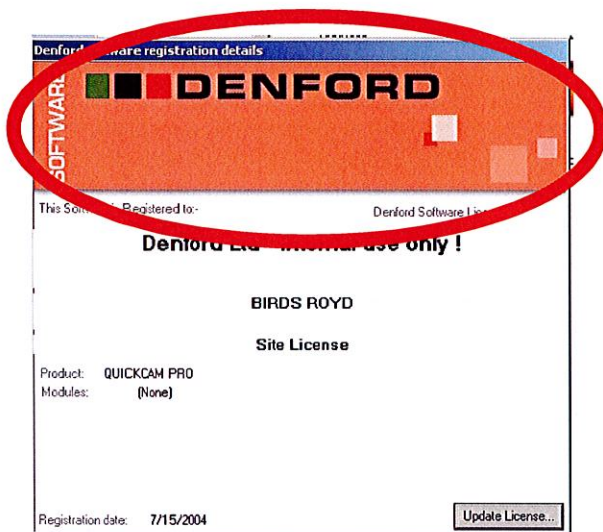
Launching QuickCAM Pro

Open the "Denford Applications" folder.
"Double click" on the QuickCAM Pro icon.

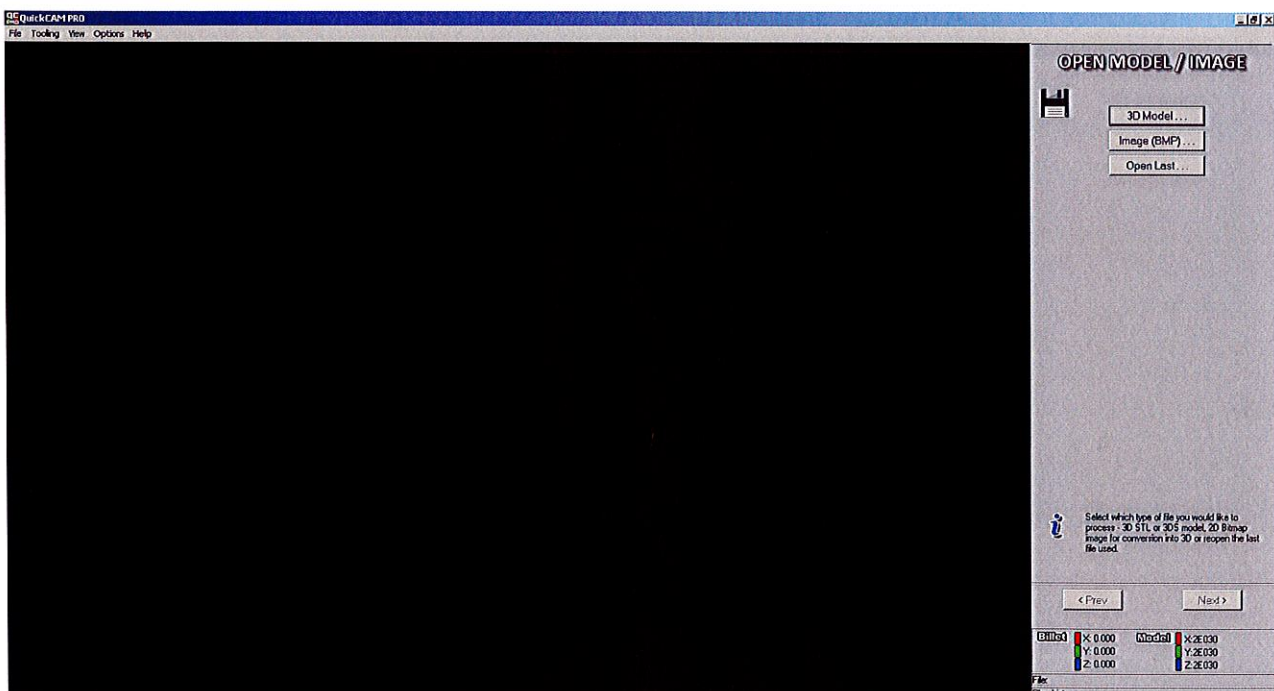


The screen shown on the right will be displayed and the software will take a minute or 2 to open.
You can force the software to open quicker by following the next instruction.

"Double click" on the area circled below.



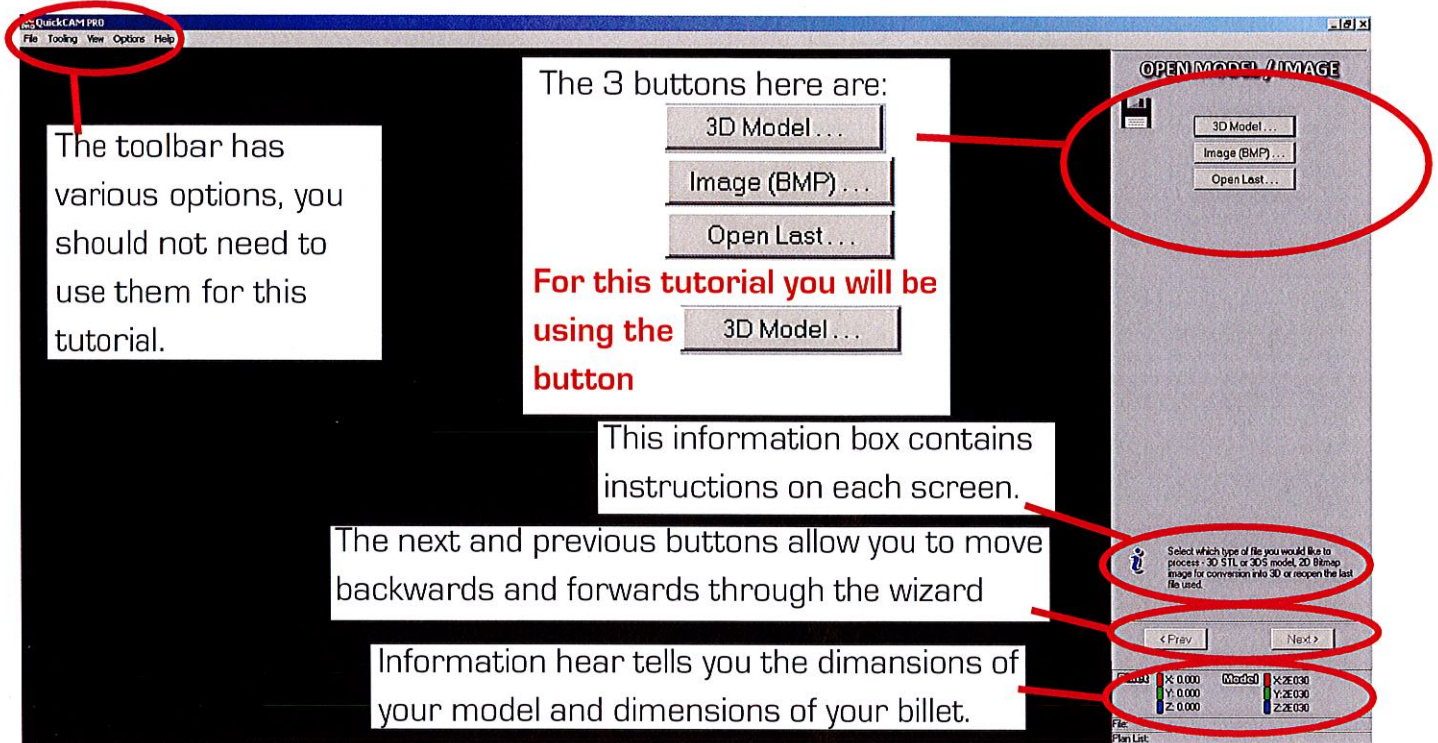
The software will open and you will be greeted with the screen below.



Navigating QuickCAM Pro

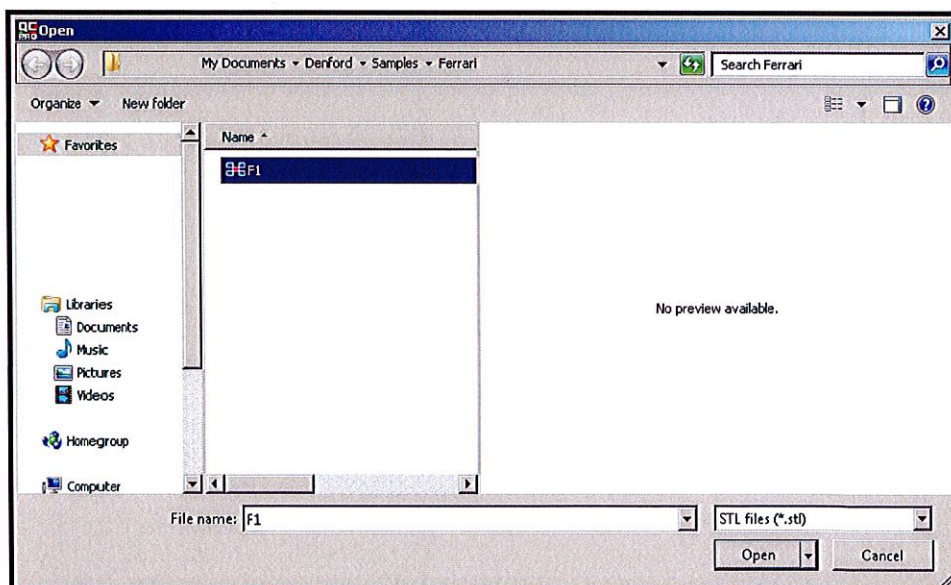
QuickCAM Pro is very easy to use, the main screen displays what is going on and the navigation panel on the right is how you select options and move around this wizard based program.

The left mouse button allows you to rotate the main display and the right mouse button allows you to zoom in and out.

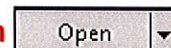


Opening your Model

Select the 3D Model button



Select the .STL file you wish to machine and click the open button



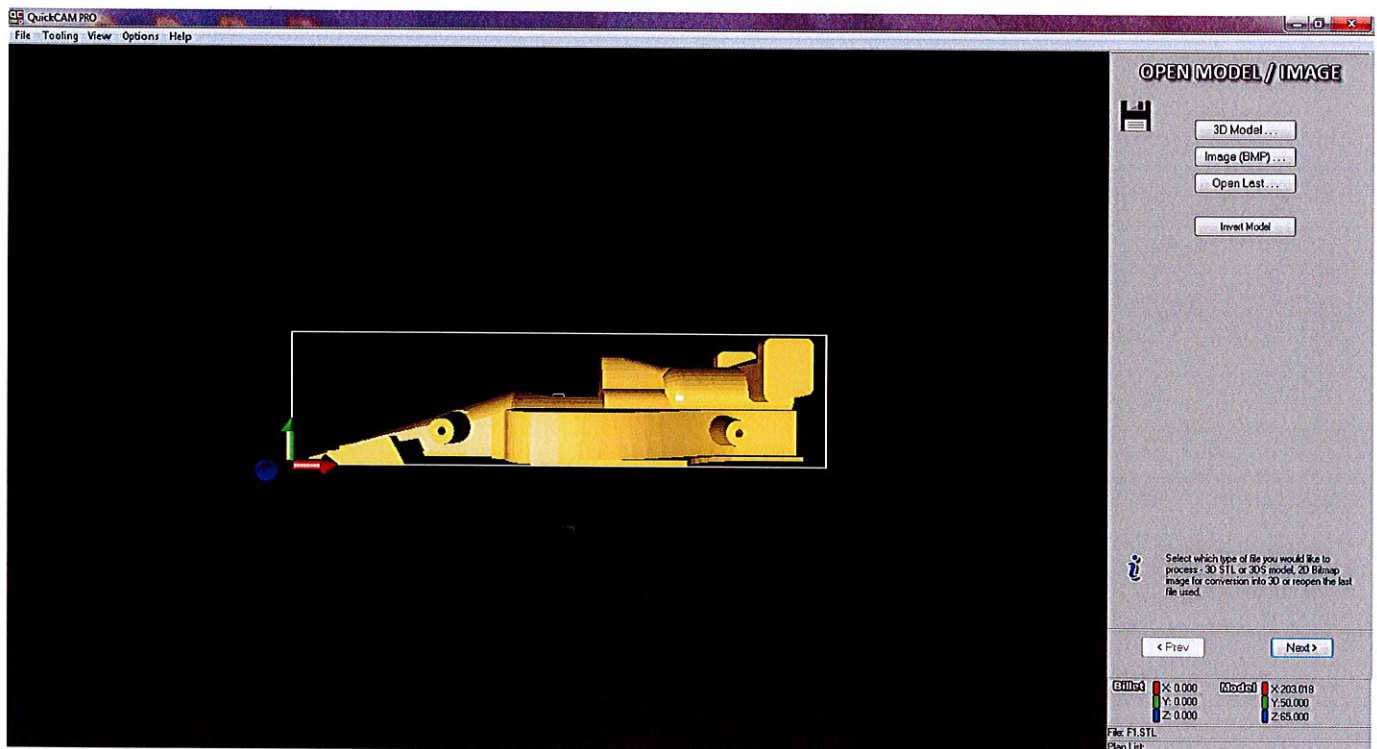
Your model will now be displayed in the main screen.

You can hold the left mouse button to rotate your model, holding the right mouse button zooms in and out.

A new button has appeared, this is the invert button



We do not use it for this tutorial.



Click the next button

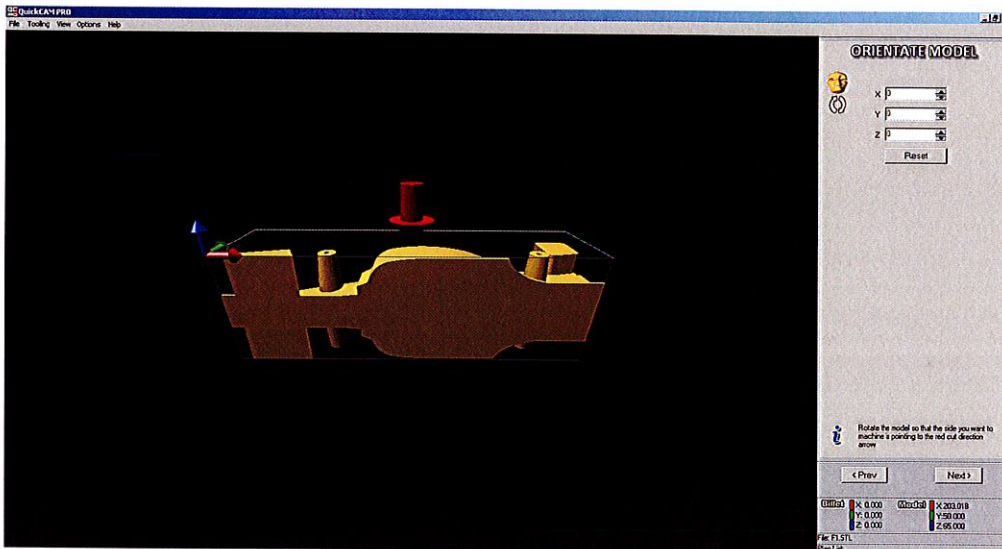


Orientate Model

There are a number of ways to orientate the model, there is no right or wrong way as long as the fixture in the machine is aligned in the same way.

For this tutorial we will orientate the model so that the cartridge hole is on the left and the bottom of the model is facing us so that we machine the right hand side of the car first.

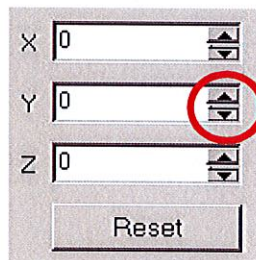
In the illustration below you can see a large red arrow has appeared in the main display, this represents the direction that the cutting tool will be coming from.



We need to rotate the model 180 degrees along the Y axis to orientate the model correctly.

Click on of the Y axis buttons twice

As you can see these buttons rotate the model in 90 degree increments

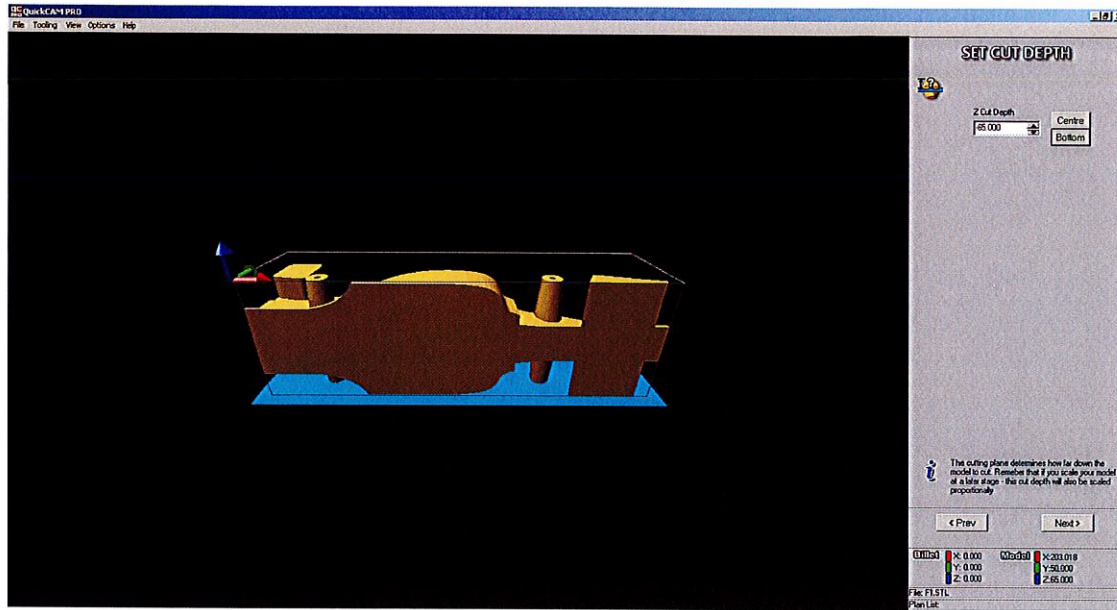


Whether or not the model will need rotating will depend on which planes you used when creating the model.

When your model is correctly orientated, click the Next button

Set Cut Depth

This screen allows you to set the cut depth



As we will be machining the car from the left and the right hand sides we could set this to the centre, but as we will be using a ball-nose cutter this would leave a ridge down the centre of the model.

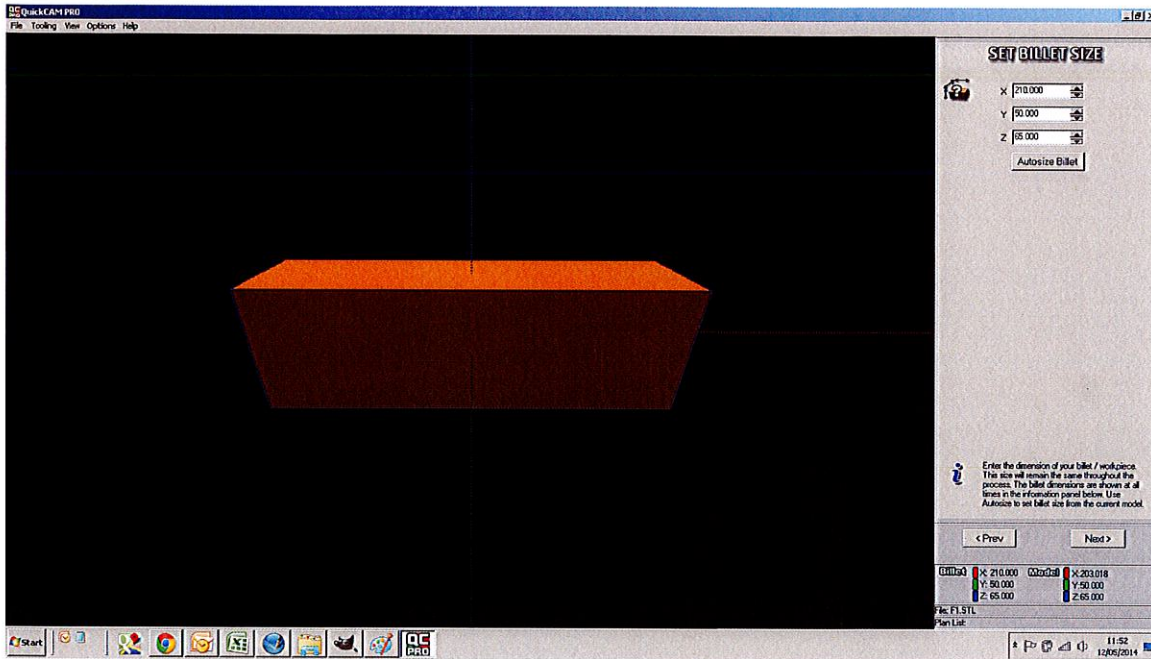
For this tutorial set the cut depth to the bottom and we will create a custom offset later in the tutorial.

Click the Bottom button

Click the Next button

Set Billet Size

This screen is where we set the size of the billet.



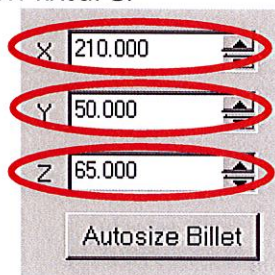
Whilst the physical balsa billet is 220mm x 50mm x 65mm, we cannot use this full size as part of the billet is lost to the aluminium fixture.

Click in the X dialogue box and type 210

Click in the Y dialogue box and type 50

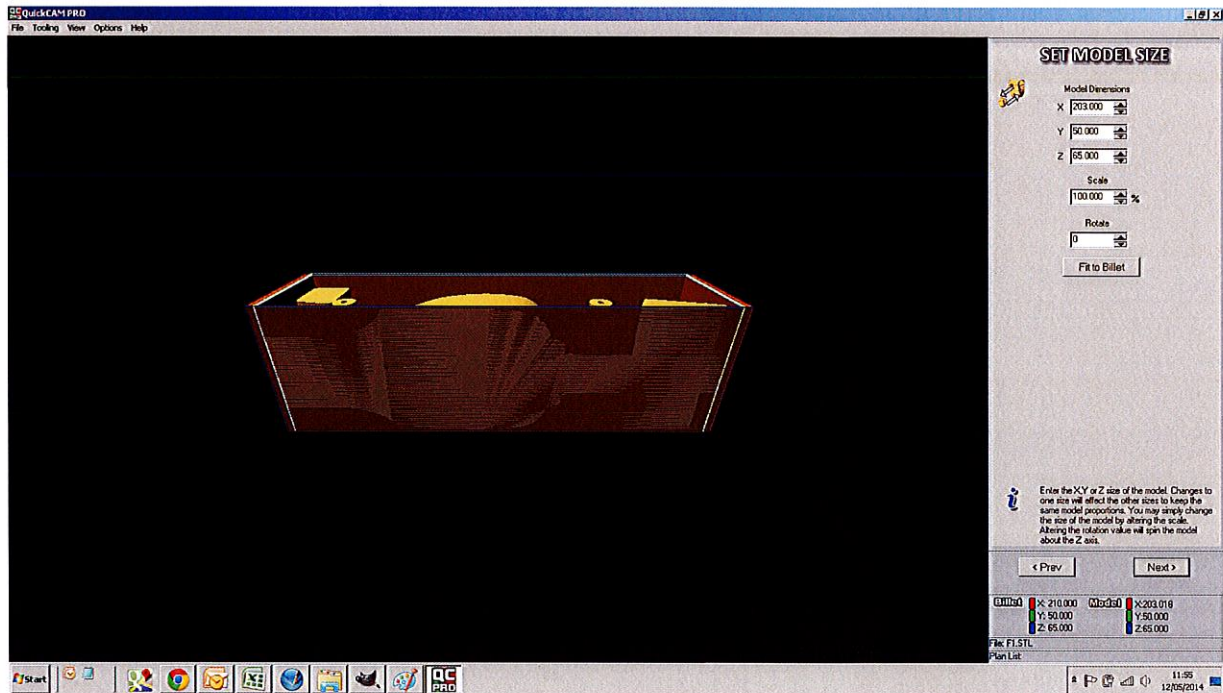
Click in the Z dialogue box and type 65

Click the Next button



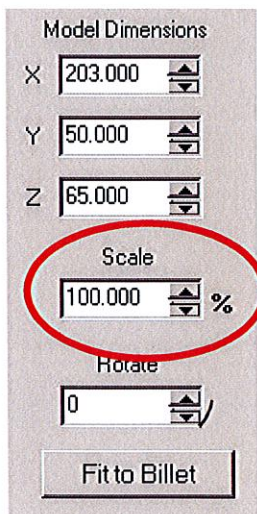
Set Model Size

This screen allows you to set the size of the model.



Having designed your model to a certain size you should cut it out the same size.

Check that the scale is set to 100%

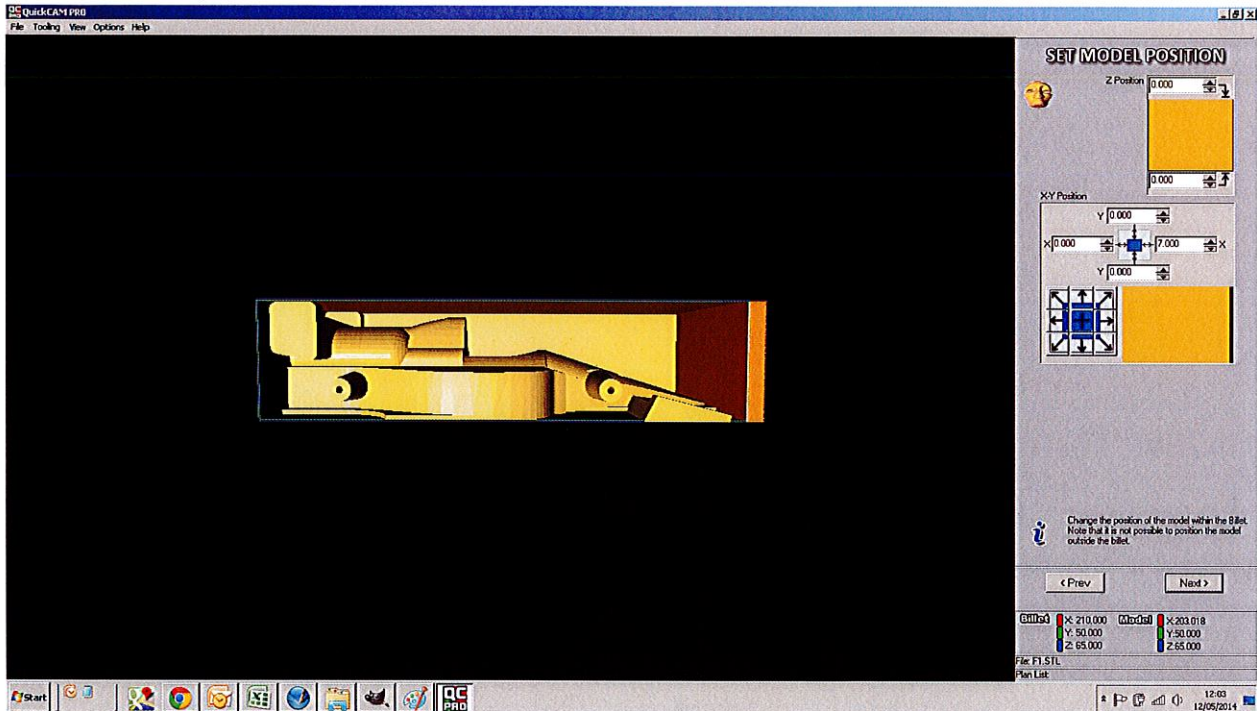


Click the Next button



Set Model Position

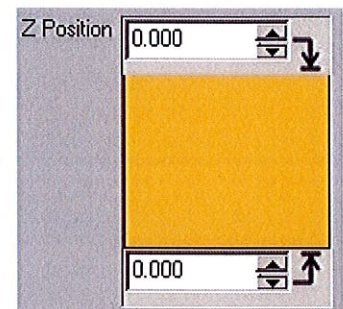
This screen is where you set the position of your model within the billet.



It is very important to get this correct as the cartridge hole is already in the billet and has an aluminium post inserted into it, getting the model position wrong may cause damage to the fixture and possibly break a tool.

The Z position is up and down but as your model is on its side it is best to think of this as moving the model left and right. As the cartridge hole is in the centre the model should be in the centre.

Ensure that the values in both of the Z dialogue boxes are equal



The X position moves the model left or right, as the cartridge hole is on the left the model should be moved as far to the left as possible.

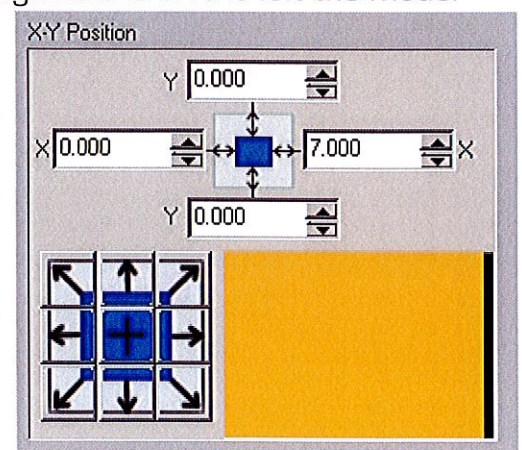
Ensure that the value in the left X dialogue box reads 0

The Y position controls where the base of the model is, as the balsa blank has the tether line guide already machined in it the model should line up with it.

Ensure that the bottom Y value reads 0

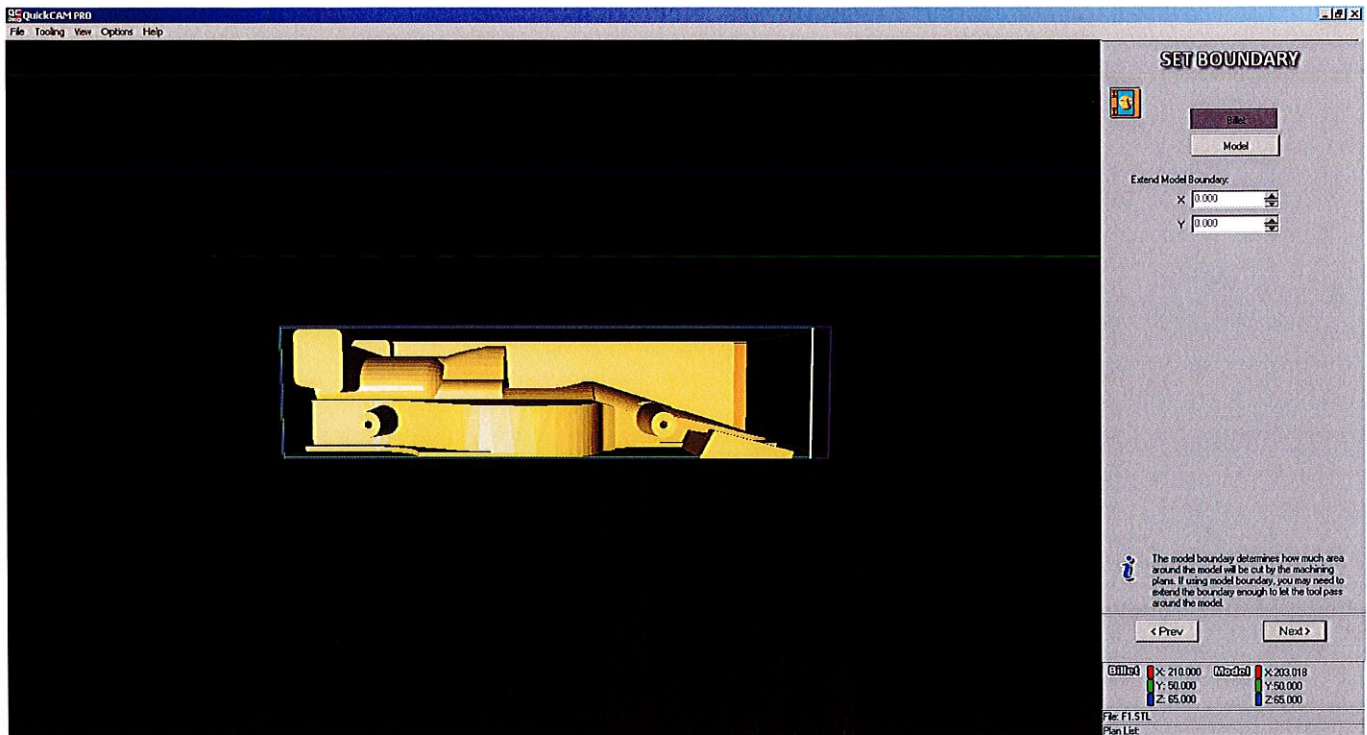
This model is the same size as the billet in the Y and Z directions making it easier to position.

Click the Next button Next >



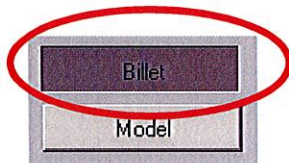
Set Boundary

This screen is where you can set the boundary.



For this tutorial we will be using a custom offset so we will set the boundary to be the same as the billet.

Click the Billet button

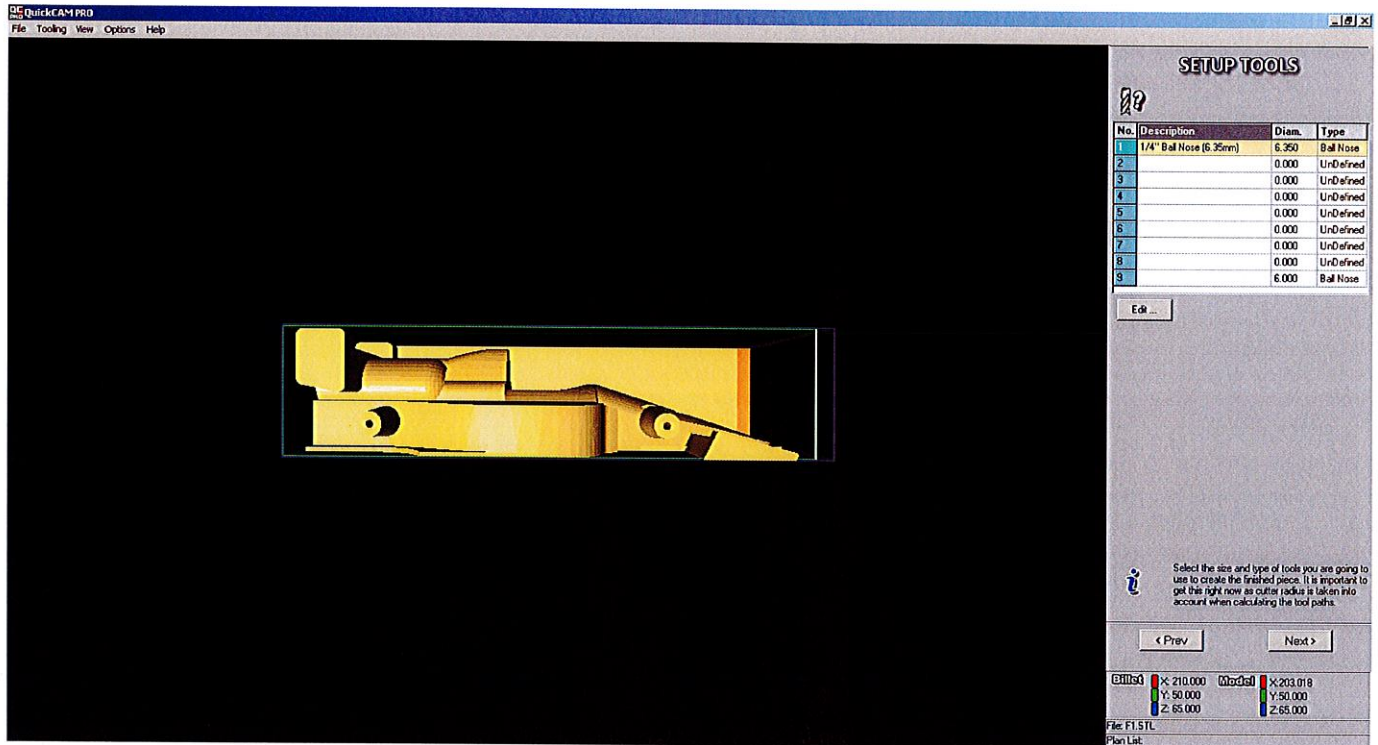


Click the Next button



Setup Tools

Manufacture of the F1 in Schools cars is best done with the 1/4" (6.35mm) Long series Ball-nose cutter as it has a 40mm flute and will have about 50mm of length sticking out from the spindle nut. Using this cutter should prevent any clearance issues, the last thing you want to do is run the spindle nut into either your billet or the F1 fixture. The screen below is where you set-up tools.



This screen takes the tooling information from VR Milling V5, as long as you have set the 1/4" Ball-nose in VR Milling V5 it should be showing here.

Click on the 1/4" (6.35mm) Ball-nose

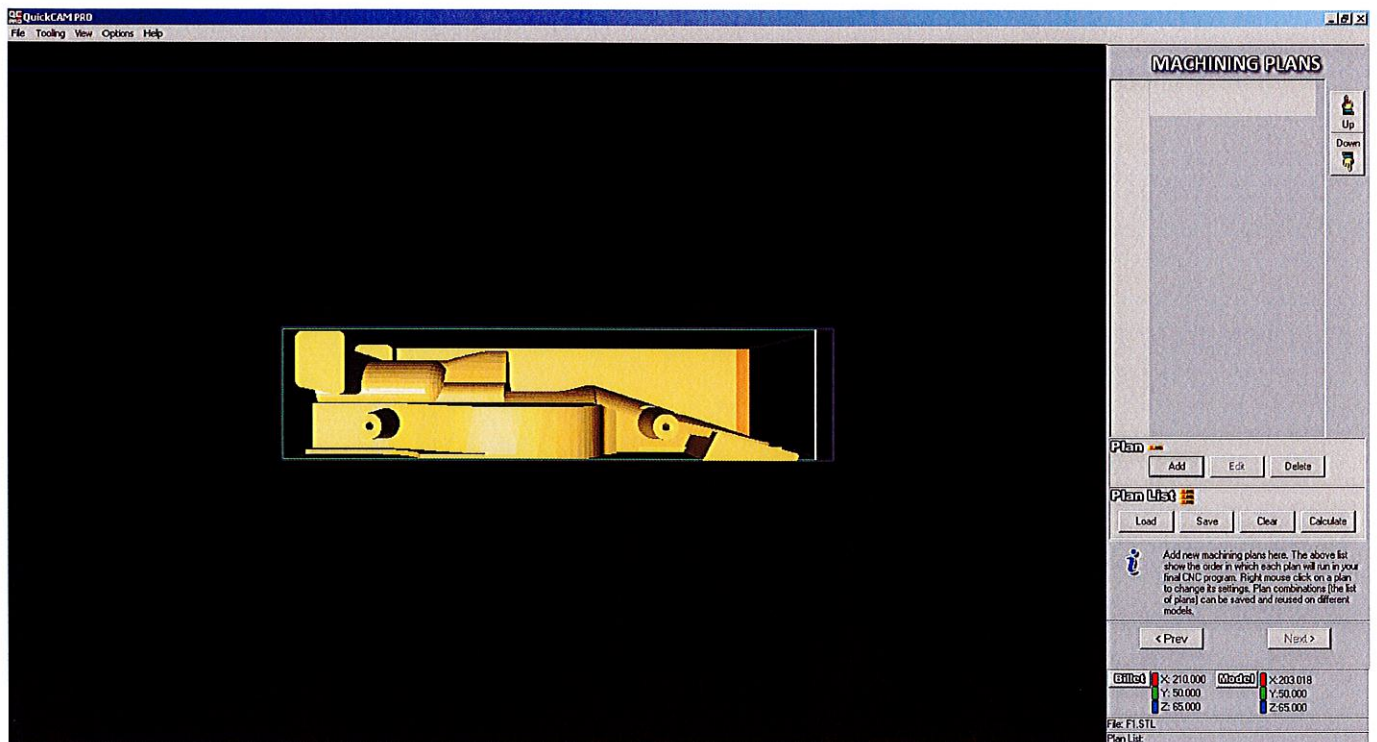
The tool number should highlight in light blue

Click the next button

Next >

Machining Plans

The screen below is where you create your machining plans having already instructed QuickCAM Pro on the size of your billet and the position and orientation of your model within it.



Click the Add button

Add

The window below will pop up.



Here you have a choice of 3 roughing plans, 6 finishing plans, and 3 fine finishing plans. For this tutorial we are going to use a Raster roughing and a Raster finishing plan.

Click the Raster Roughing button



Raster Roughing

The window below will appear, this is where you set the parameters for Raster roughing.

Edit parameters for the new plan

Description:

| Tool Data | | Machining Boundary | |
|--|----------------------------------|-------------------------|---------|
| Tool: | T:1 - D:6.350mm - 1/4" Ball Nose | X Minimum | 210.000 |
| Step Over: | 5.080 mm <-> 80.000 % | Y Minimum | 50.000 |
| <input checked="" type="checkbox"/> Create vertical step overs | | Z Minimum | 0.000 |
| Step Down: | 19.000 | Set Boundary to | |
| <input type="checkbox"/> Adaptive Stepdown | | Billet Model Custom ... | |
| Feedrate: | 5000.000 | | |
| Spindle Speed: | 23000 | | |

General Machining

Safe Height: 5.000 Raster Angle: 270

Finishing Amount: 1.000 Ramp In Radius: 3.000

Use contact area only ☐ Parallel pencil count: 5

Cut Direction:
☐ One Way
☒ Bi-Directional
☐ Down Mill
☐ Up Mill

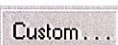
OK Cancel

Enter the details shown below

Raster Roughing Parameters

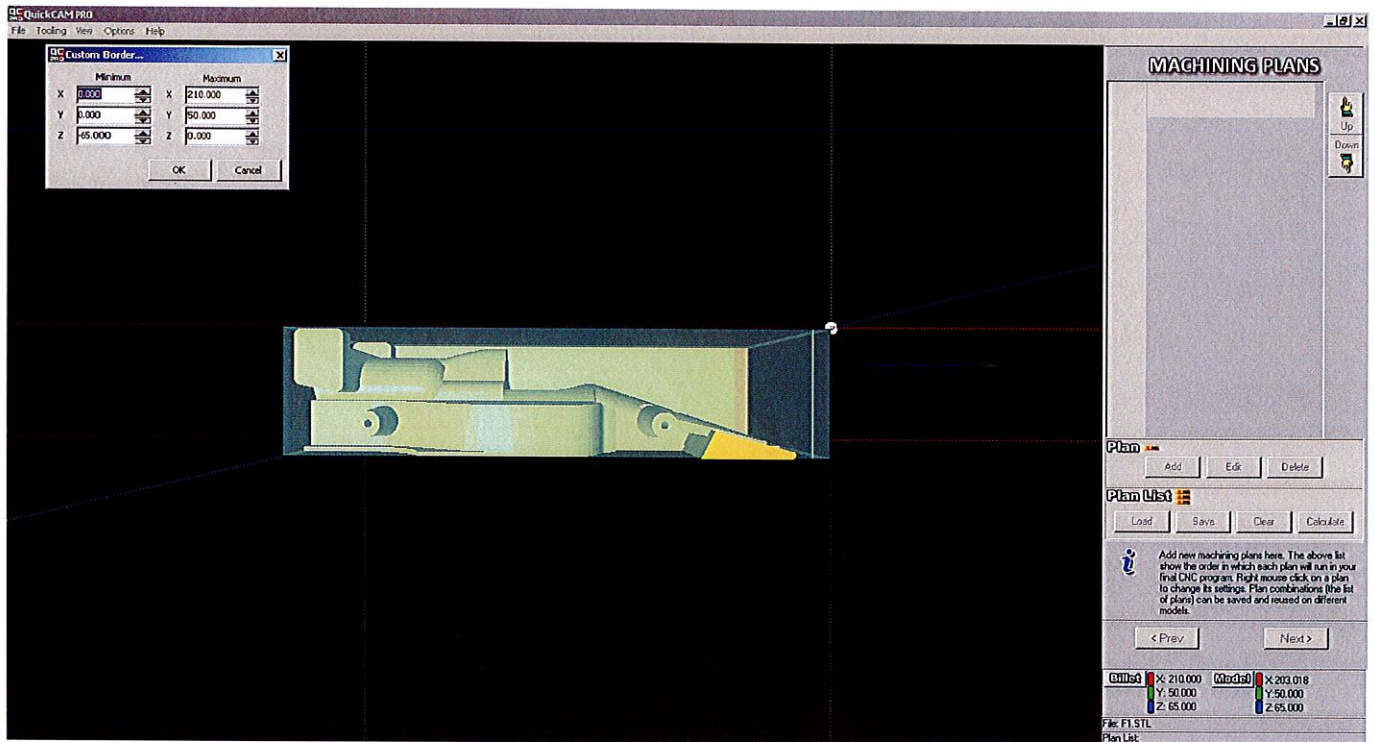
| Tool Data | | |
|--|----------------|--|
| Tool | 1/4" Ballnose | This should already be selected |
| Step Over | 80% | This is a percentage of the tool diameter, it wants to be high to remove material quickly |
| Step Down | 19mm | Step down for balsa is 300% of the tool diameter |
| Feedrate | 5000mm/s | Feedrate for balsa is 5000mm/s |
| Spindle Speed | 23000rpm | Spindle speed for balsa is 23000rpm |
| General Machining | | |
| Safe Height | 5mm | This is the height above the billet the cutter moves to when not cutting, 5mm should miss the fixture |
| Finishing Amount | 1mm | To get a good finish some material needs to be left for the finishing plan, this will leave 1mm all over the model |
| Raster Angle | 270 | You should raster accross the grain, 270 degree will start on the left where the cartridge hole is. As your model likely comes to a point it is not a good idea to start on the right as it may break away when machining the 2nd side |
| Ramp in Radius | 3 | CNC tools are designed to cut sideways and not straight down, to get to the desired cutting height the tool moves down in a spiral motion and this is the radius of that spiral |
| Parallel pencil count | N/A | This option is for fine finishing only and will be greyed out here |
| Cut Direction | Bi-Directional | When rastering from front to back this will cut in both directions |
| Machining Boundary | | |
| Enter all other parameters first then follow the instruction below | | |

Click the Custom button



Creating a Custom Border

A custom border window will appear and the main display will change so that your model has a shaded box over it as shown below



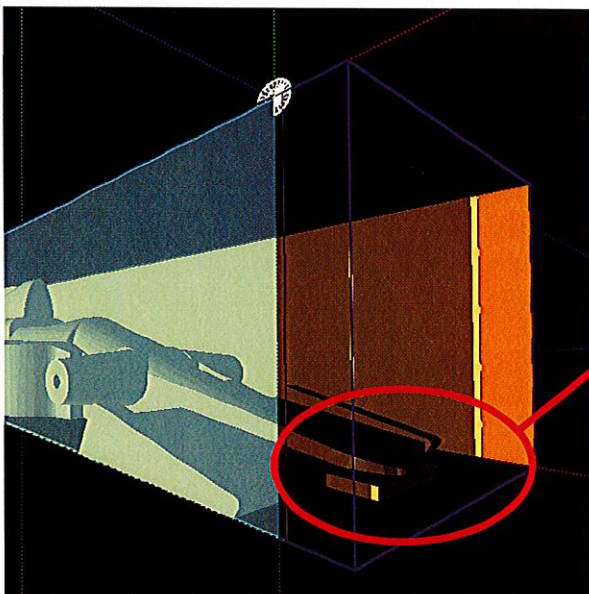
The shaded area is the area that will be cut with this machining plan.

X Minimum

Do not change this from 0, increasing it will miss part of your model, decreasing it may cause the tool to hit the aluminium post which is inserted in the cartridge hole.

X Maximum

This should be the same length as your model, modify your model before exporting the .STL to include a tail-stock so that it will not break when making the 2nd side of the model, as can be seen in the image below.



Tailstock modelled into the nose of the model to prevent it from breaking away during machining. X Maximum has been reduced so part of the model protrudes from the shaded border, this ensures the tailstock will not be parted off.

Y Minimum

As you are rastering in the Y direction it is a good idea to extend this boundary by at least the tool diameter so that the tool is accelerating / decelerating / and changing direction in fresh air. Make this -8mm.

Y Maximum

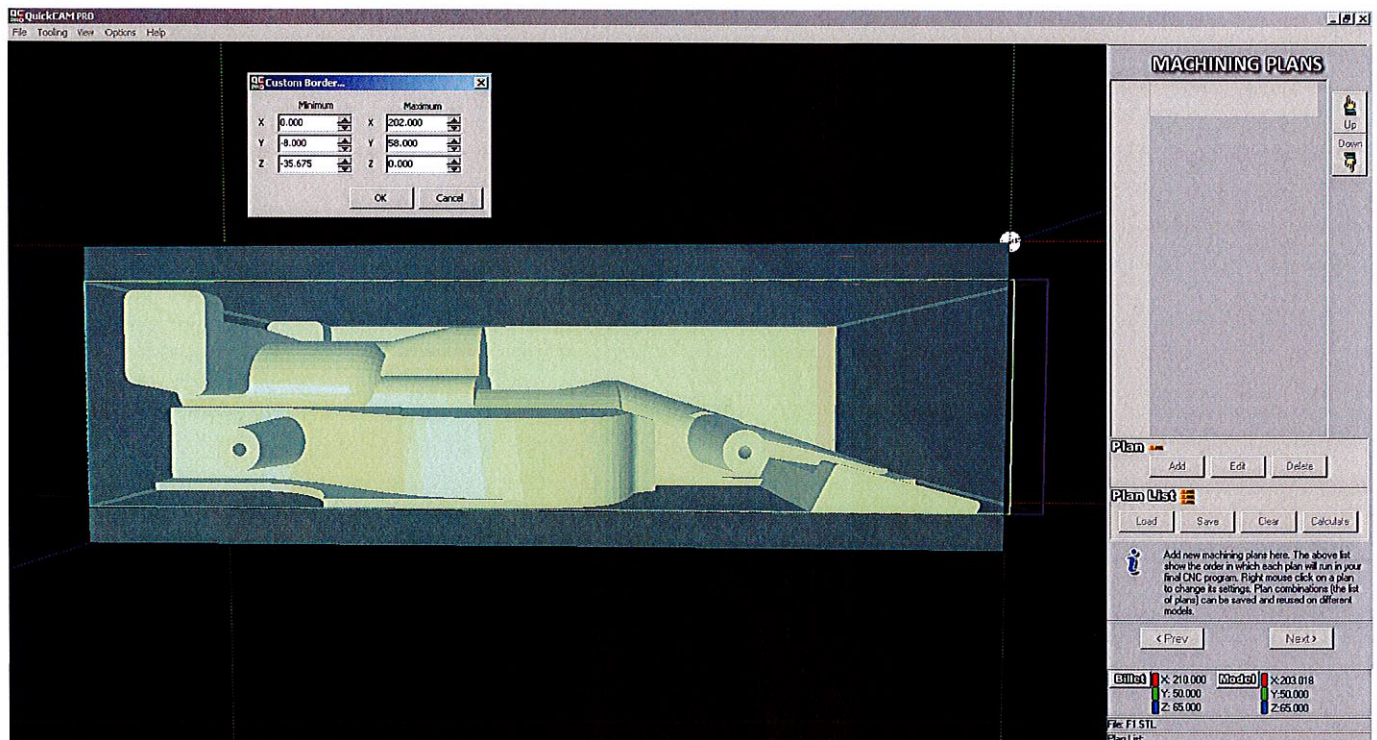
As you are rastering in the Y direction it is a good idea to extend this boundary by at least the tool diameter so that the tool is accelerating / decelerating / and changing direction in fresh air. Make this 58mm.

Z Minimum

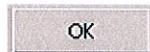
As you are cutting from both sides you want to cut down to the centreline of the billet which is 32.5mm, but as you are using a 1/4" (6.35mm) Ball-nose you need to go beyond the centreline by the tools radius so make this -35.675mm.

Z Maximum

This is the top of the billet so should be 0mm



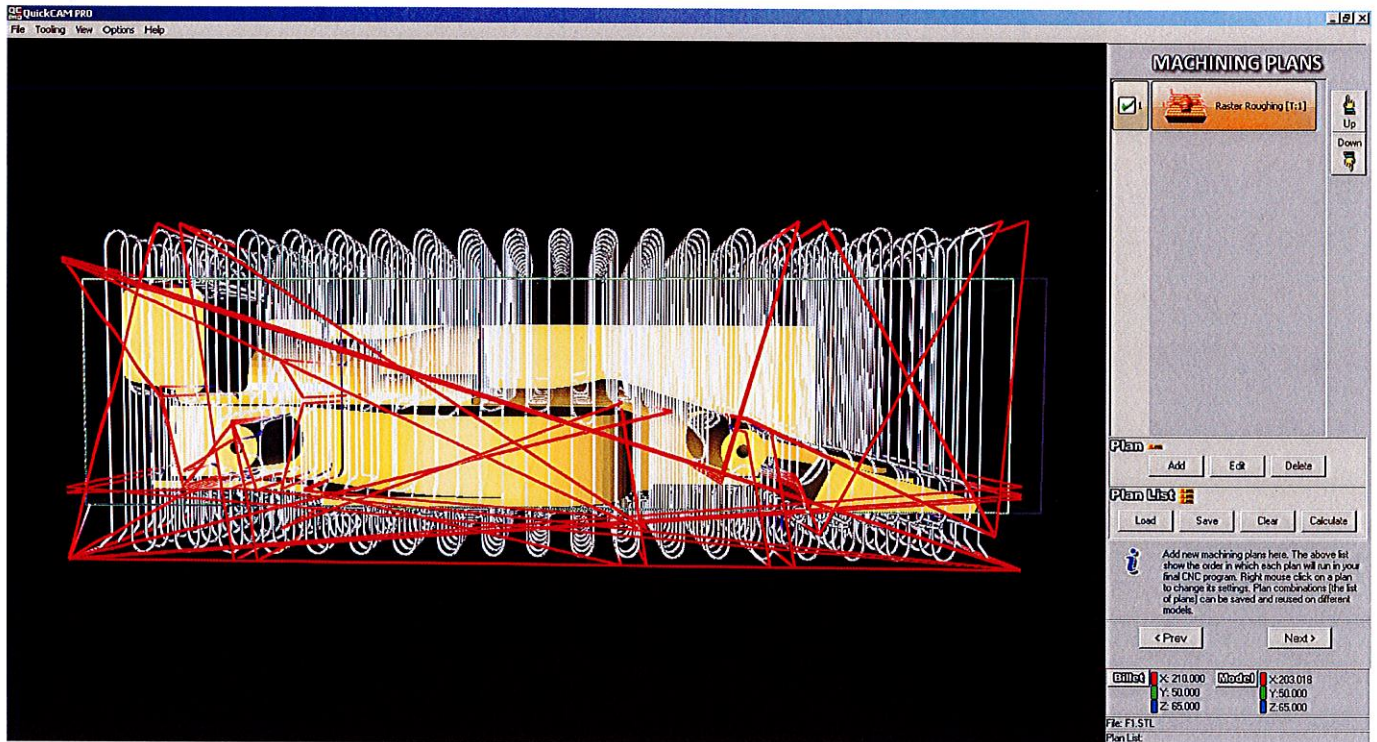
Click the OK button



QuickCAM Pro will now calculate the Raster Roughing plan using the parameters you have entered.

Depending on the speed of your PC this may take some time.

On completion your screen should look like the image below.

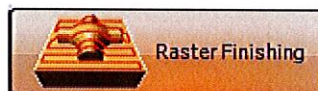


You are now ready to add a finishing plan.

Click the Add button

Add

Click the Raster Finishing button



Raster Finishing

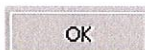
The window below will appear, this is where you set the parameters for Raster Finishing.

Enter the details shown below

Raster Finishing Parameters

| Tool Data | | |
|--|----------------|--|
| Tool | 1/4" Ballnose | This should already be selected |
| Step Over | 5% | This is a percentage of the tool diameter, it wants to be low to give a good finish. Between 20% and 5% is recommended, this is a trade off between quality and time. |
| Step Down | N/A | This will be greyed out as it is a finishing plan |
| Feedrate | 5000mm/s | Feedrate for balsa is 5000mm/s |
| Spindle Speed | 23000rpm | Spindle speed for balsa is 23000rpm |
| General Machining | | |
| Safe Height | 5mm | This is the height above the billet the cutter moves to when not cutting, 5mm should miss the fixture |
| Finishing Amount | 0mm | This is the finishing plan so set this to 0mm |
| Raster Angle | 270 | You should raster accross the grain, 270 degree will start on the left where the cartridge hole is. As your model likely comes to a point it is not a good idea to start on the right as it may break away when machining the 2nd side |
| Ramp in Radius | 3 | CNC tools are designed to cut sideways and not straight down, to get to the desired cutting height the tool moves down in a spiral motion and this is the radius of that spiral |
| Parallel pencil count | N/A | This option is for fine finishing only and will be greyed out here |
| Cut Direction | Bi-Directional | When rastering from front to back this will cut in both directions |
| Machining Boundary | | |
| By default the machining boundary settings here will be the same as you used for the raster roughing, no need to change these. After filling in parameters above, follow instructions below. | | |

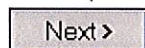
Click the OK button



Like the Raster Roughing this may also take some time to calculate depending on the speed of your PC.

Once the calculation has completed.

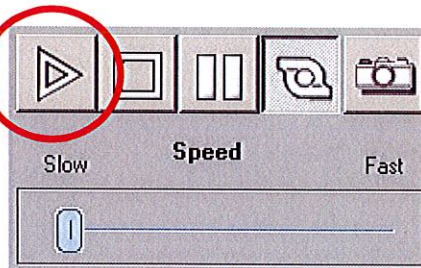
Click the Next button



Toolpath Simulation

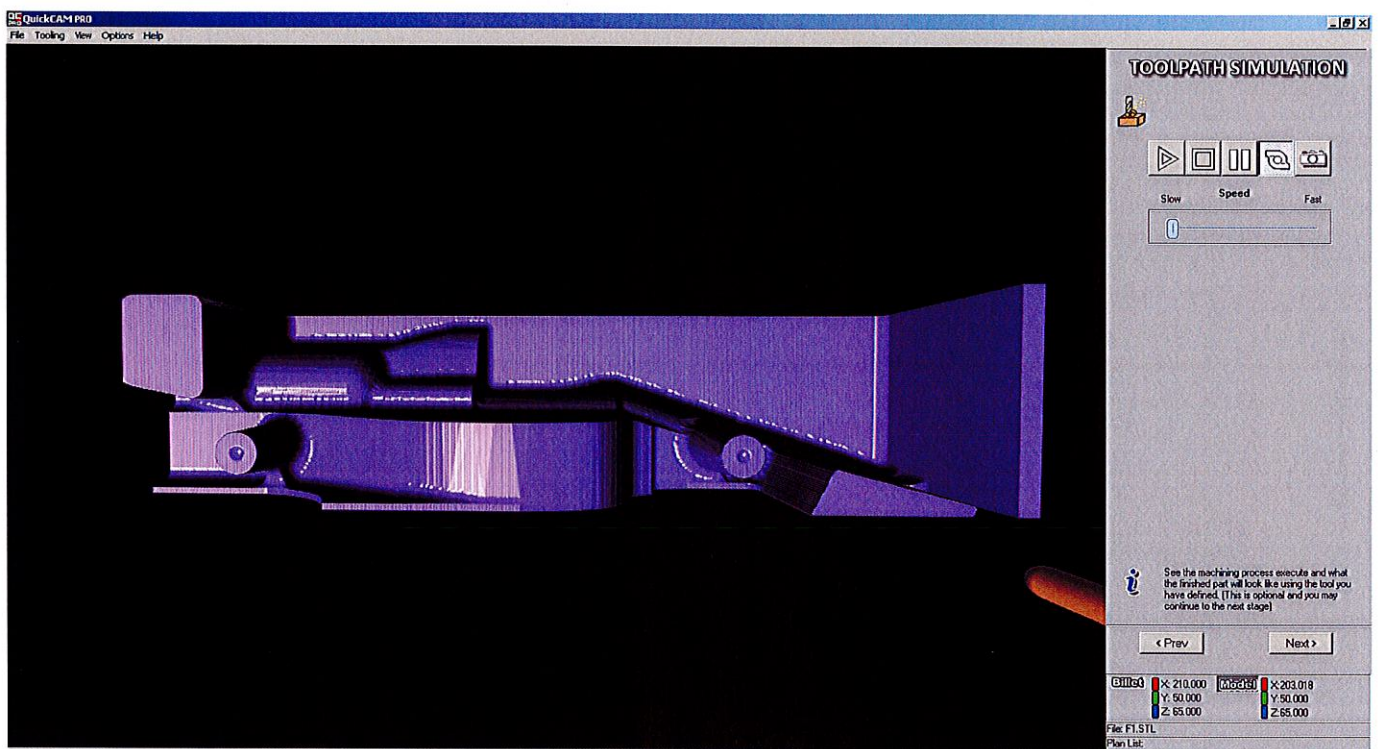
The Navigation panel on the right of your screen now has the video control buttons shown below

Click to Play simulation



Click the Play button to run a simulation of your toolpath

It should look something like the one image below.

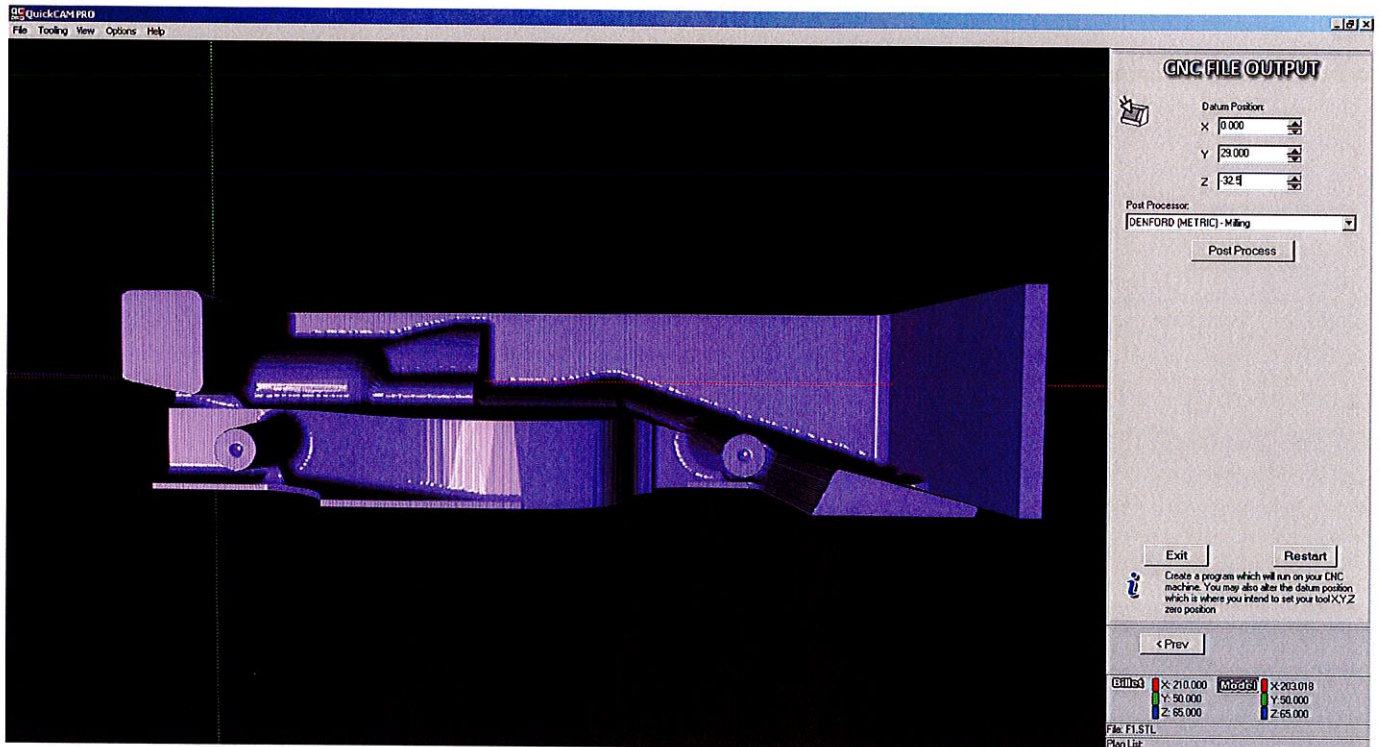


Click the Next button



CNC File Output

This is the final screen where we create the CNC file which is a .FNC file.



Setting the DATUM

For the F1 in Schools models we set the DATUM as the axis of rotation which is in this case the centre of the cartridge hole.

Set the DATUM to the values below

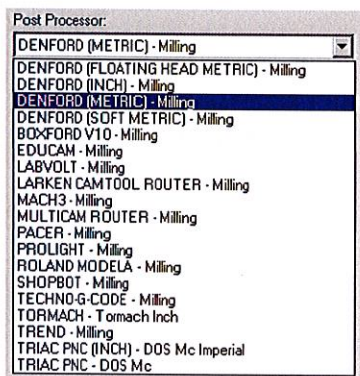
X0

Y29

Z-32.5

Post Processor

QuickCAM Pro includes a number of Post Processors to enable you to create programs for makes of CNC machines.



*For Denford Mills and
Routers select Denford
(Metric) - Milling*

Select Denford (Metric) - Milling

Click the Post Process button

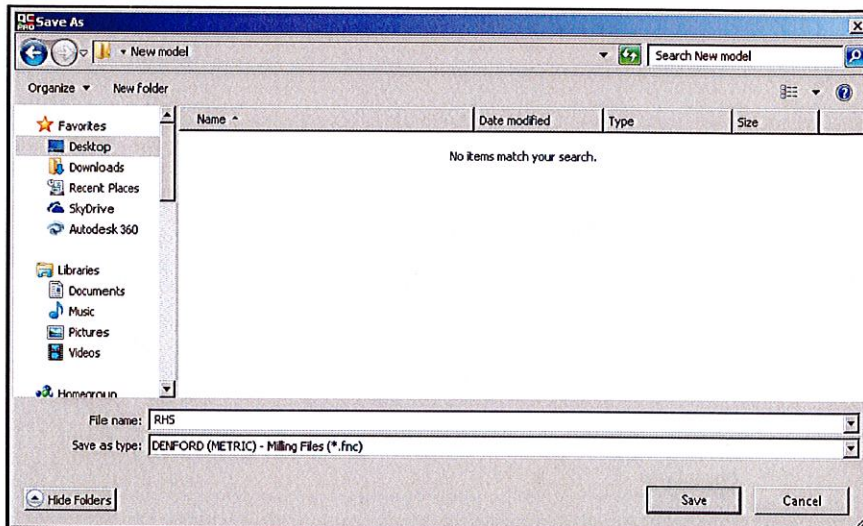


Saving the CNC File

A "Save As" dialogue box will have popped up.

As you will be machining your model from at least 2 sides it is a good idea to create a new folder with the name of your model, as you can see from the image below I have created a folder called "New Model".

How you save the file depends on which fixture you are using.



F1 in Schools Car Manufacturing Fixture

You have just created the toolpath for the right hand side of your model so name this file **RHS**

Type **"RHS"**

Click the **Save** button



Wait while VR Milling V5 opens

Your CNC file is now showing in the editor window, we are going to make some changes.

Highlight line 1 and change it to the text below

(File: **LHS.fnc**

Hit the Enter button to create a new line

Type **"M71"**

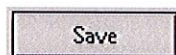
M71 is a miscellaneous function which mirrors the Y axis

From the Toolbar select >File>Save As

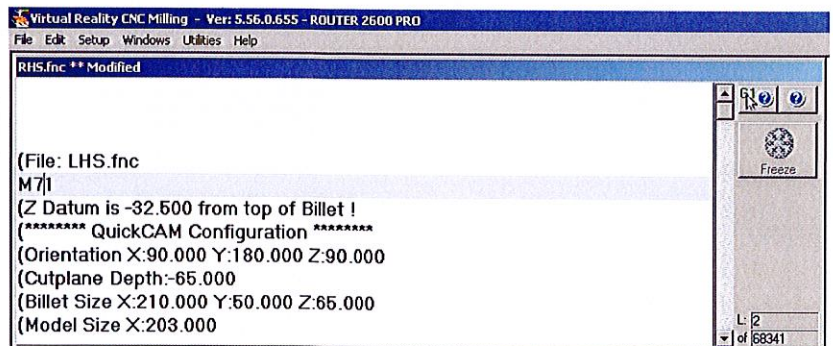
Save the file as **LHS**

Type **"LHS"**

Click the **Save** button



You have now created the Right and Left programs for your model and are ready to start machining



4th Axis F1 in Schools Car Manufacturing Conversion Kit

Follow the instructions for the F1 in Schools Car Manufacturing fixture

Open the folder which contains the files RHS.fnc and LHS.fnc

Rename RHS.fnc to 0001.fnc

Rename LHS.fnc to 0002.fnc

We now need to create a subcall routine which will automatically rotate the 4th axis and call the programs 001.fnc and 0002.fnc

In VR Milling V5 you need to create a new file

From the Toolbar select >File>New

Type the following:

M70

G00 A90

M98 P0001

G00 A270

M98 P0002

G00 A360

M70 is another miscellaneous function, it mirrors the X axis. This is required as on the 4th axis the cartridge hole is on the right hand side.

G00 A90 instructs the 4th axis to turn 90 degrees

M98 P0001 calls program 0001.fnc and executes it

G00 A270 instructs the 4th axis to turn a further 180 degrees

M98 P0002 calls program 0002.fnc and executes it

G00 A360 returns the 4th axis to the start position

Save this file in the same folder as program 0001.fnc and program 0002.fnc

Save this file as

Subcall.fnc

This is the file which you will run when using the 4th axis to machine an F1 in Schools billet.

Machining the F1 in Schools Billet

If using the 4th Axis go to page 29, the instructions from pages 25 to 28 are for the F1 in Schools Car Manufacturing Fixture only.

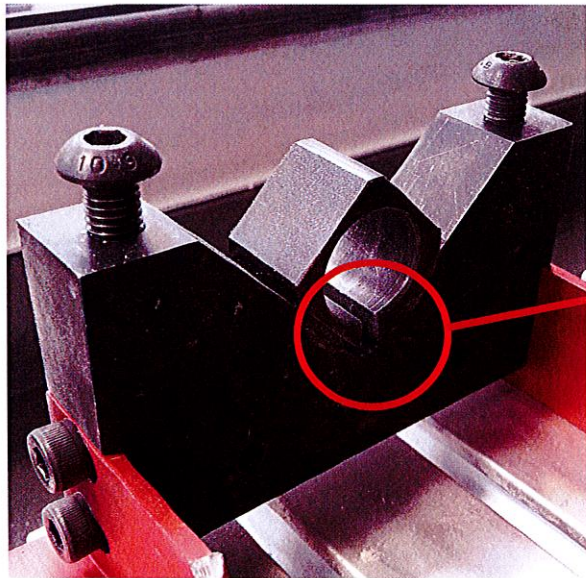


F1 in Schools Car Manufacturing Fixture

The billet should be positioned in the machine as shown in the image below.

Note that the tether line guide slot is facing you, this is set up for the right hand side to be machined

When tightening the bolts circled in the image above always tighten the right hand side before the left to prevent the billet from being twisted.



Ensure that this cutout is at the bottom. As the bolts are tightened onto the aluminium bar that goes over this bracket the cutout closes up and secures the aluminium post which is inserted into the cartridge hole.

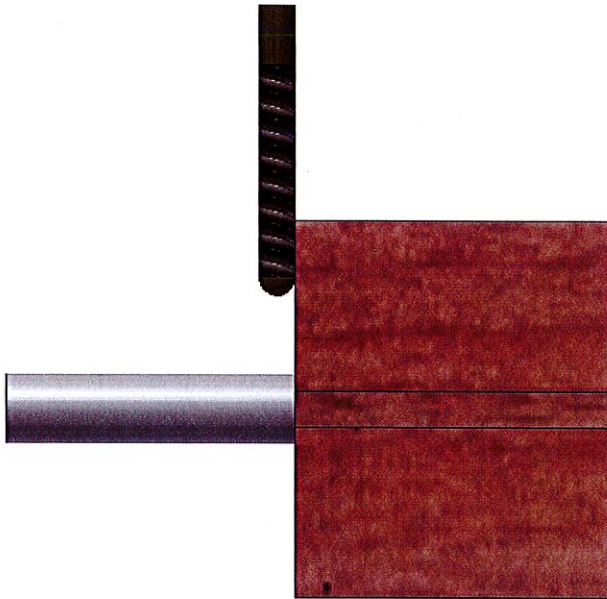
On the left hand side the bar which is inserted into the cartridge hole has an aluminium block around it with a cutout, ensure the cutout is to the bottom as shown in the image below.

Set the datum to the left hand side of the billet with Y and Z on the centreline of the aluminium bar as shown on the next page.

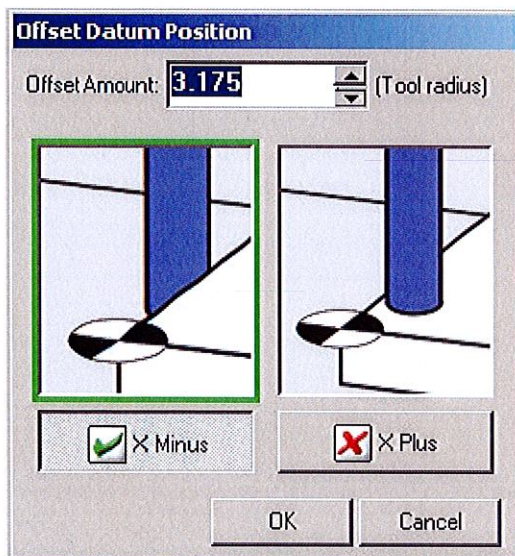
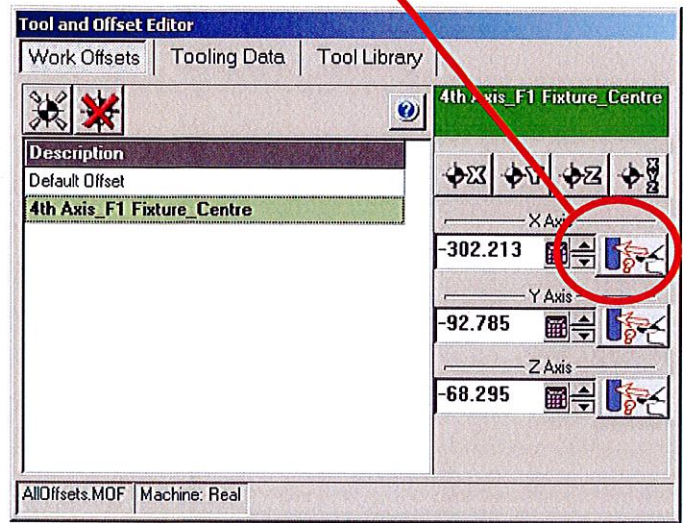
Setting the DATUM

X Axis

Touch the tool onto the left hand side of the billet as shown in the image below

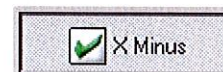


In the Tool and Offset Editor window select the X axis datum offset button

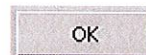


Type the value shown below into the offset amount
3.175

Click the X Minus button



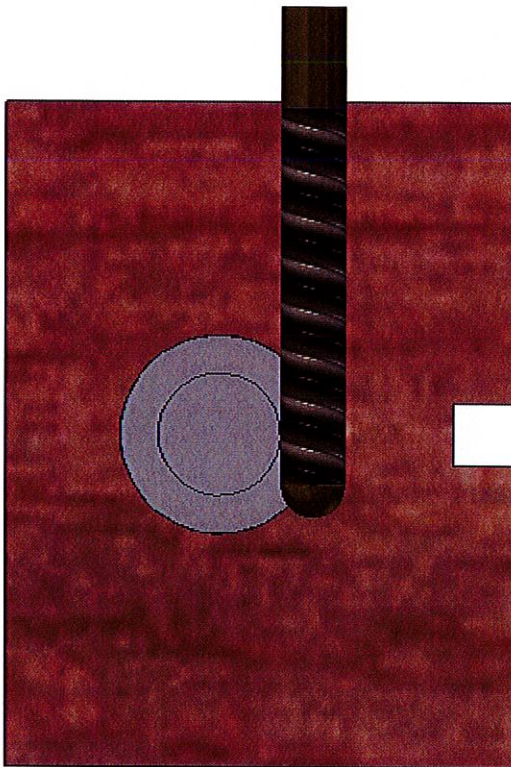
Click the OK button



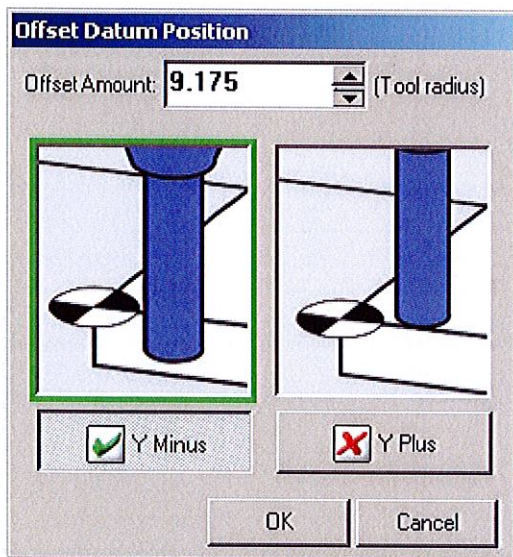
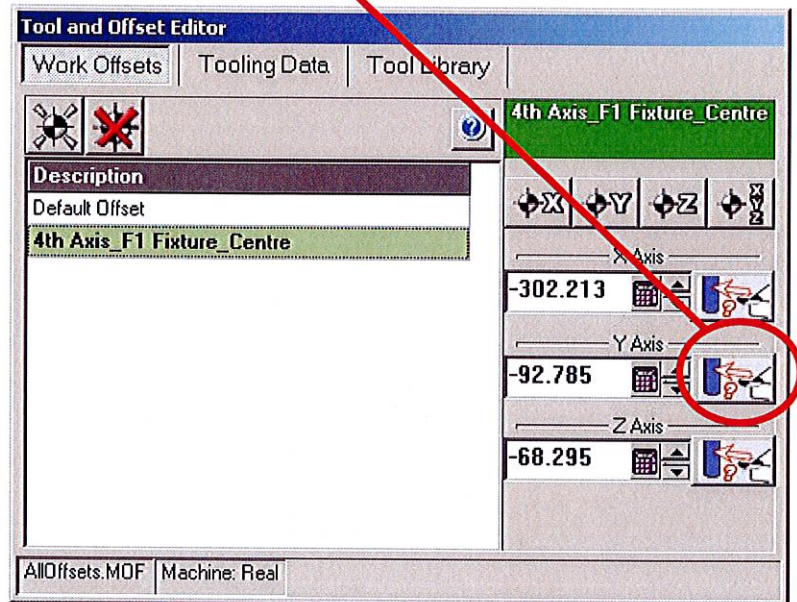
You have now set the X axis

Y Axis

Touch the tool onto the front of the aluminium bar as shown in the image below



In the Tool and Offset Editor window select the Y axis datum offset button



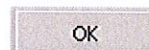
Type the value shown below into the offset amount.
9.175

This is the radius of the tool and the radius of the bar

Click the Y Minus button



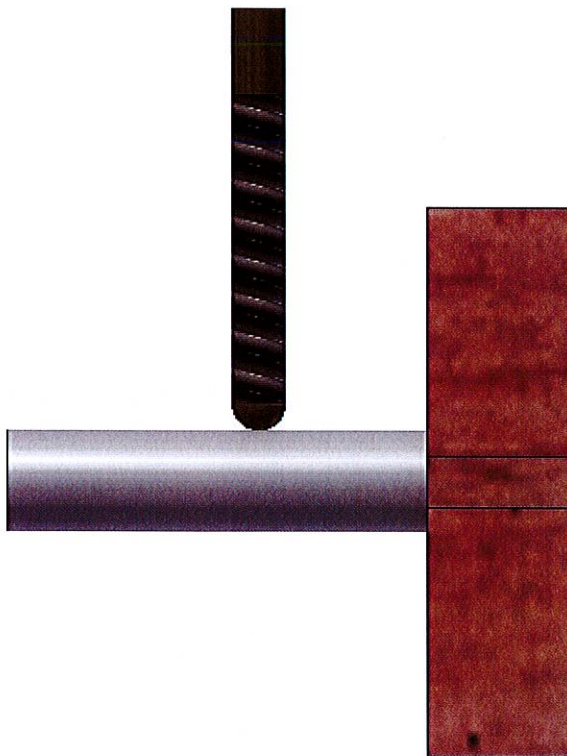
Click the OK button



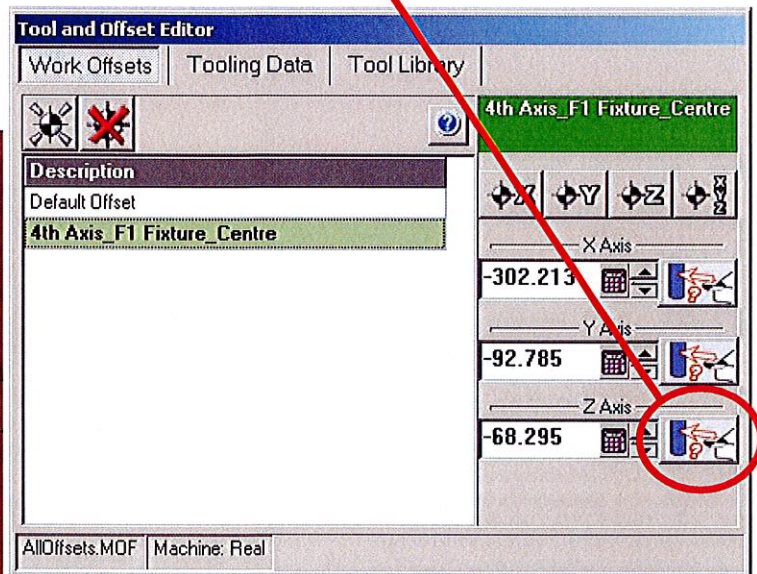
You have now set the Y axis

Z Axis

Touch the tool onto the top of the aluminium bar as shown in the image below.



In the Tool and Offset Editor window select the Z axis datum offset button



To do this the Y axis must be at 0

Go to the MDI tab in the Control Panel

Type "Y0"

Press the Start button

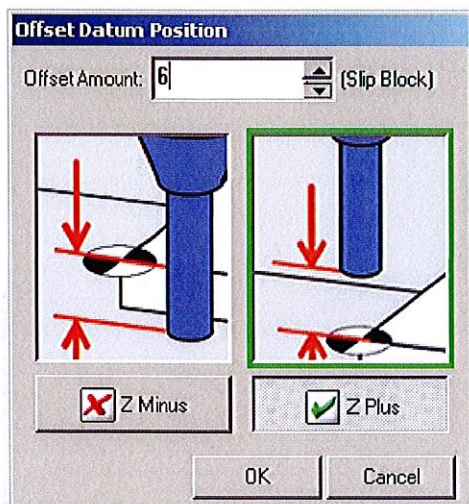
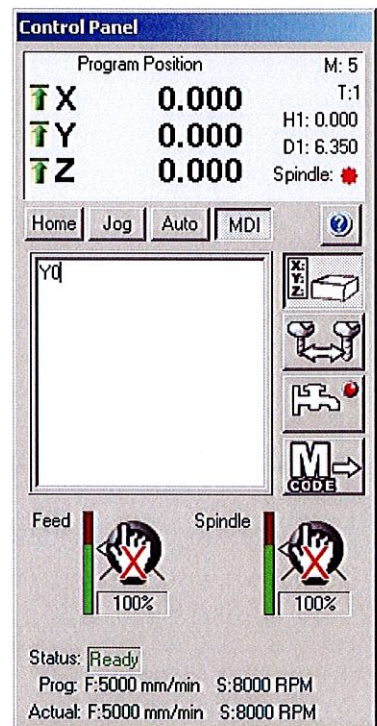


Go to the jog tab and lower the tool onto the top of the bar

Type the value shown below into the offset amount.

6

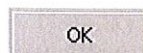
This is the radius of the bar



Click the Z Plus button



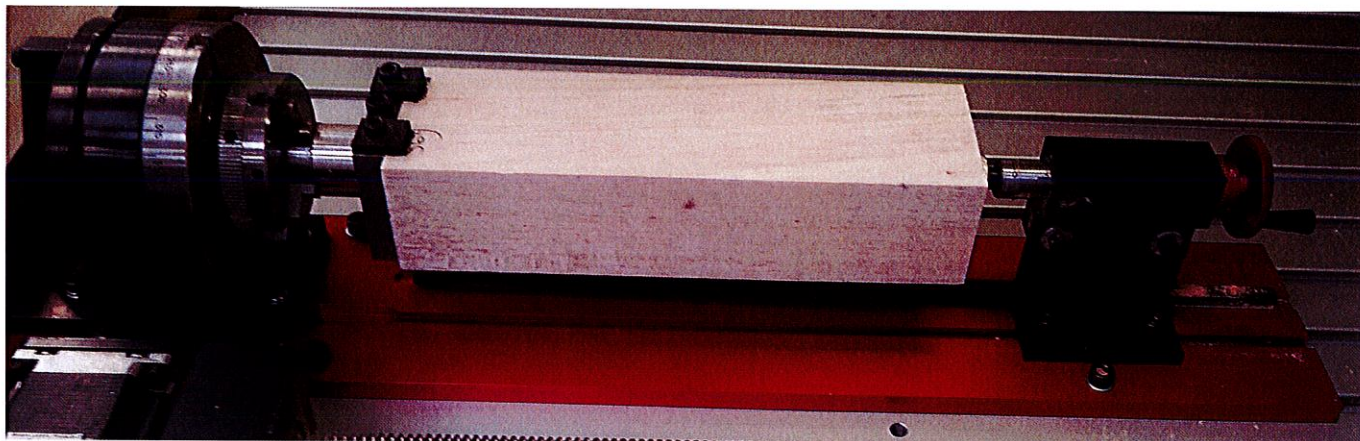
Click the OK button



You have now set the Z axis and can run the program RHS.fnc, when this is finished simply rotate the billet and run the program LHS.fnc

4th Axis F1 in Schools Conversion Kit

The billet should be positioned in the machine as shown in the image below.

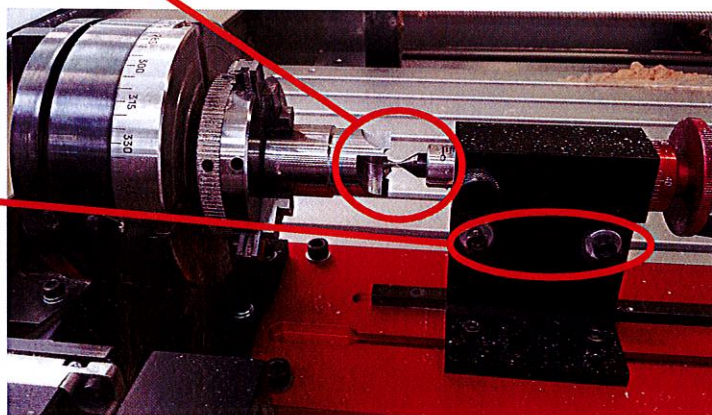


Note that the tether line guide slot is at the bottom closest to the bed of the machine and the cartridge hole is on the right, the cartridge hole should have the aluminium cartridge fitted into it and this mates up to the tail-stock of the 4th axis.

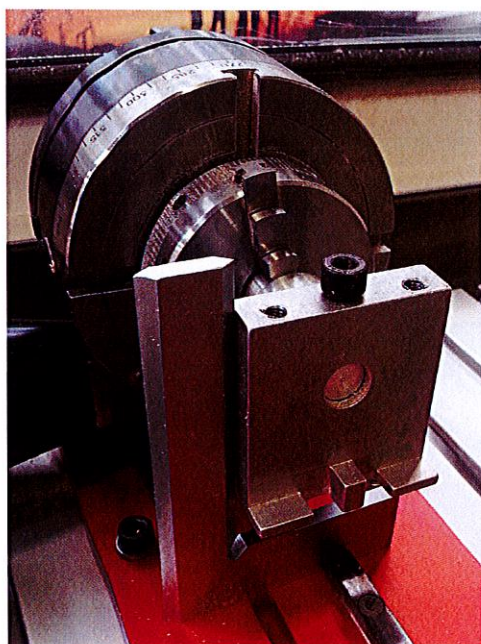


Aluminium cartridge inserted into the cartridge hole in the billet. Note the hole in the centre, this locates onto the 4th axis tail-stock.

The tail-stock must be aligned with the chuck of the 4th axis. To do this fit the spiked drive into the 4th axis and slide the tail-stock up to it, adjust the 4th axis so that the centre point of the drive and the point from the tail-stock align with each other.



Use these bolts to loosen the tail-stock in order to align it with the chuck.



The aluminium block which holds the billet fixes into the chuck of the 4th axis.

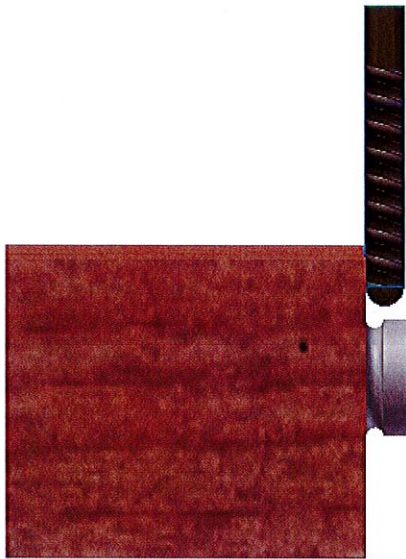
The 4th axis does not have a datum switch, this means that whatever position it is in when you connect to the router is taken as 0 degrees.

Use an engineers square to set the aluminium block so that it is parallel to the bed of the machine and then tighten the chuck on the 4th axis.

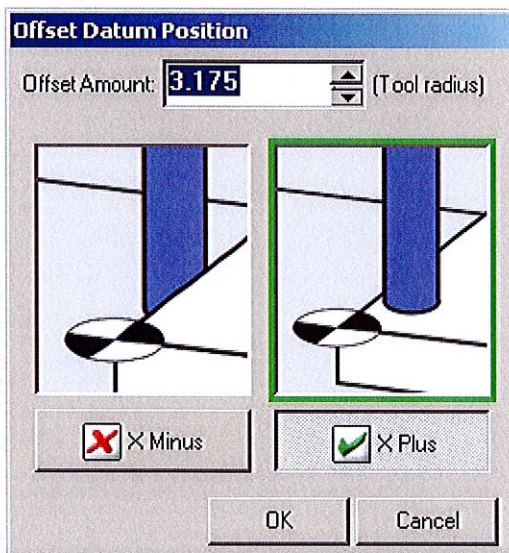
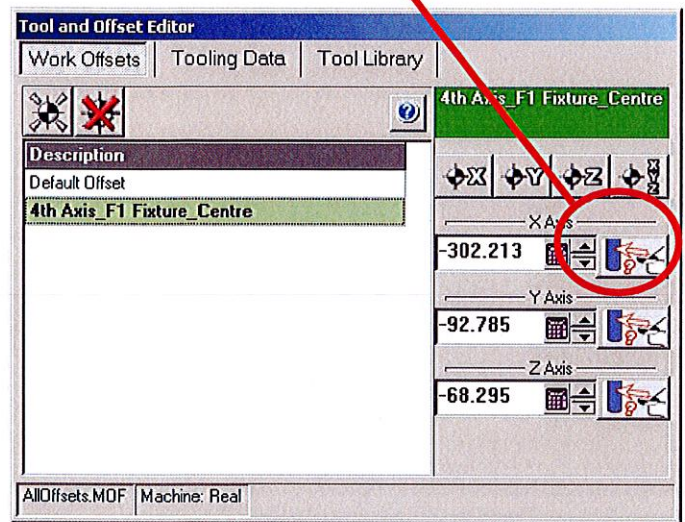
Setting the DATUM

X Axis

Touch the tool onto the right hand side of the billet as shown in the image below



In the Tool and Offset Editor window select the X axis datum



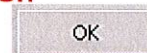
offset button

Type the value shown below into the offset amount
3.175

Click the X Plus button

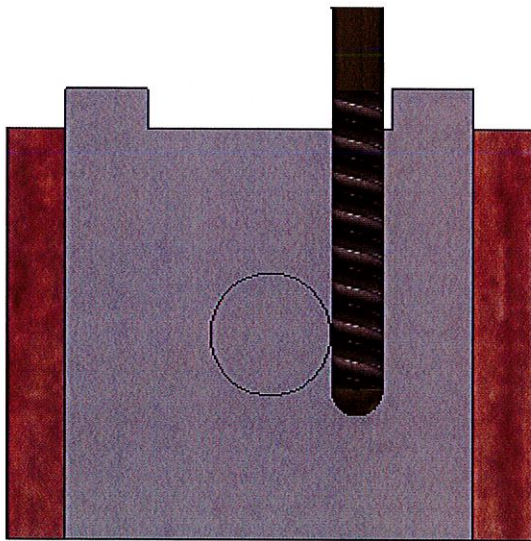
Click the OK button

You have now set the X axis

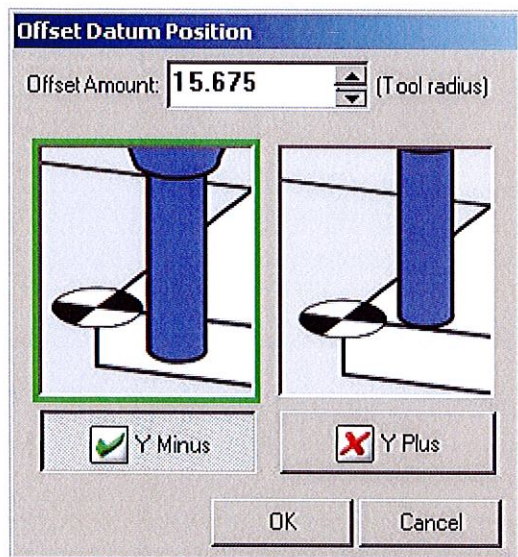
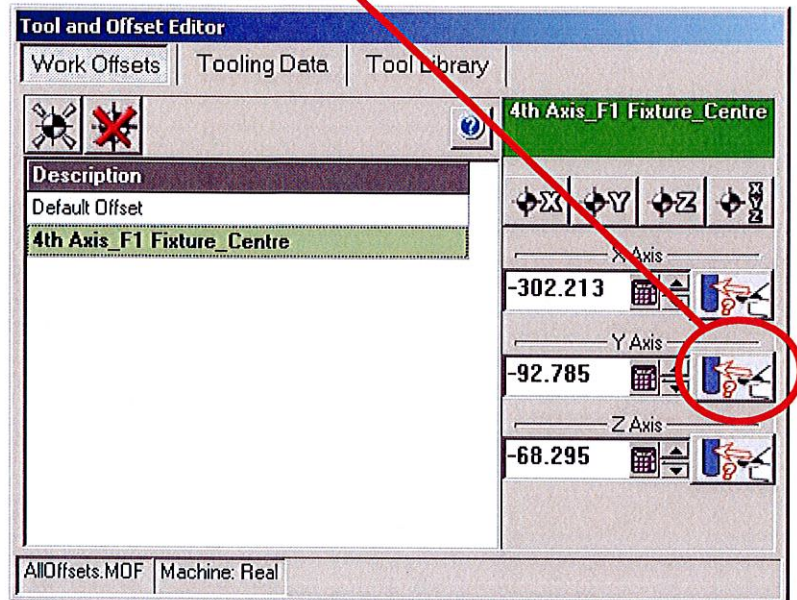


Y Axis

Touch the tool onto the front of the aluminium bar as shown in the image below



In the Tool and Offset Editor window select the Y axis datum offset button



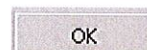
Type the value shown below into the offset amount.
15.675

This is the radius of the tool and the radius of the bar behind the aluminium block which holds the left hand side of the billet

Click the Y Minus button

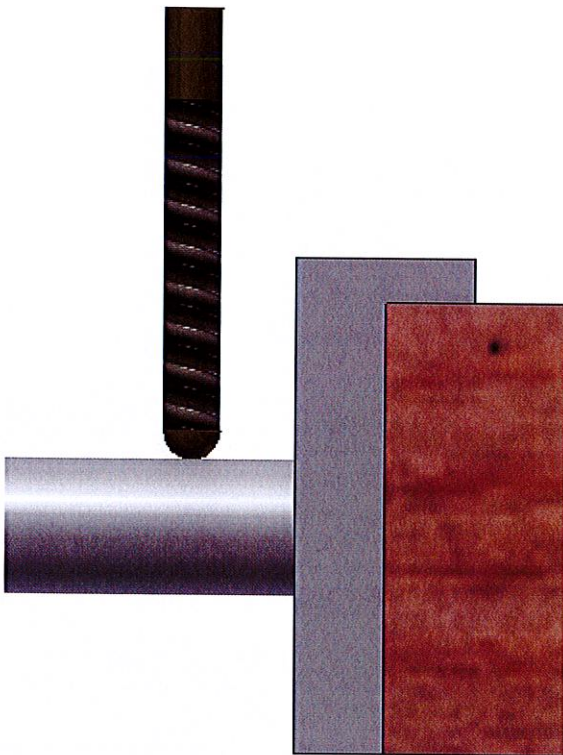


Click the OK button

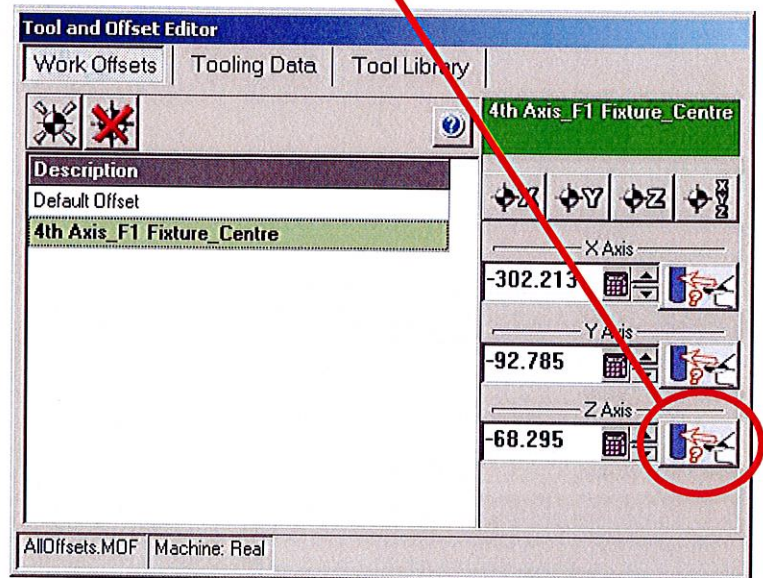


Z Axis

Touch the tool onto the top of the aluminium bar as shown in the image below.



In the Tool and Offset Editor window select the Z axis datum offset button



To do this the Y axis must be at 0

Go to the MDI tab in the Control Panel

Type "Y0"

Press the Start button

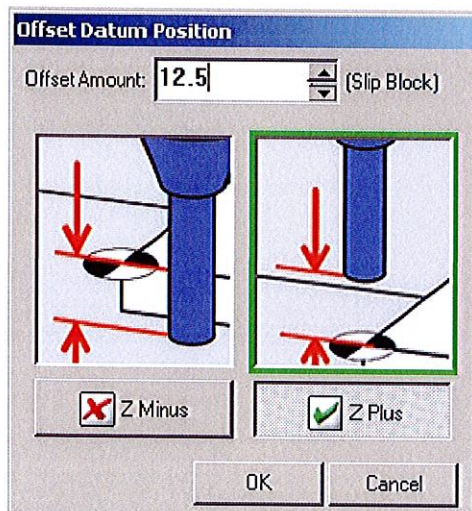


Go to the jog tab and lower the tool onto the top of the bar

Type the value shown below into the offset amount.

12.5

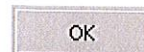
This is the radius of the bar



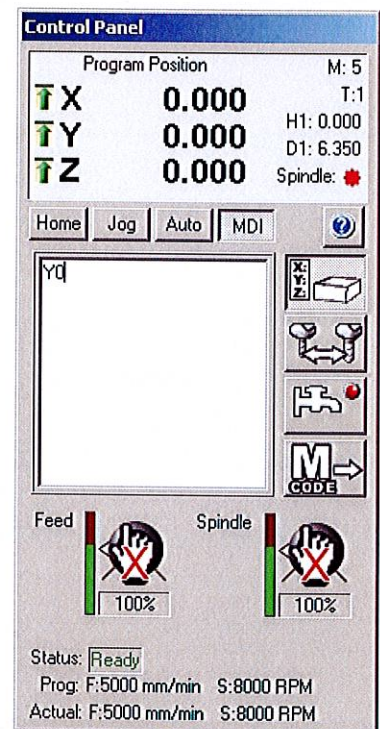
Click the Z Plus button



Click the OK button



You have now set the Z axis and can run the program Subcall.fnc which will automatically rotate the 4th axis and execute program 0001.fnc and 0002.fnc



Running the Program

F1 in Schools Car Manufacturing Fixture

Open the "RHS.fnc" file that you created on page 23 of this guide.

4th Axis F1 in Schools Conversion Kit

Open the "Subcall.fnc" file that you created on page 24 of this guide.

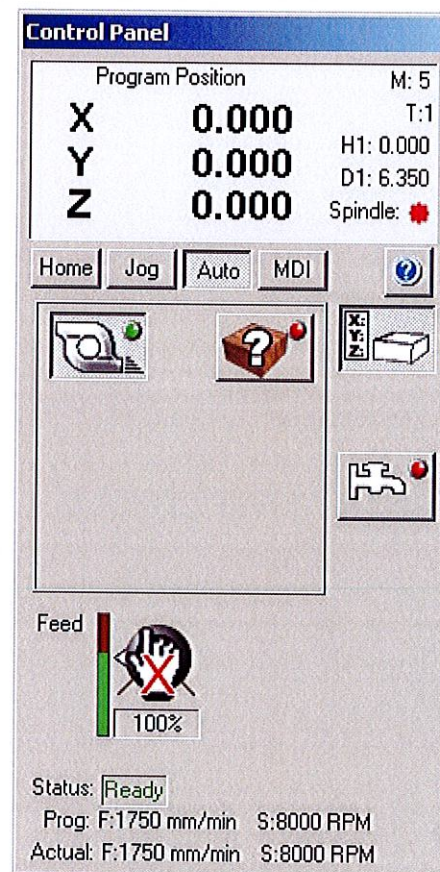
Running the Program

On the Control Panel, ensure that you are in Auto mode

Be sure that Turbo Mode is turned on

Make sure that Material Override is turned off

Chek that the Feed Rate Override on the front of the router is set to 100%



With the file control buttons select Stop, Rewind, then Start



Whilst you could just press Start, the above method is safer as it will ensure that you do not start a program part way through which could cause damage to the fixture and the tool.

F1 in Schools Car Manufacturing Fixture

When the first side has finished turn the billet over, instructions for fixing the billet are on page 25

4th Axis F1 in Schools Conversion Kit

When the program has finished remove the finshed design



F1 Consumables

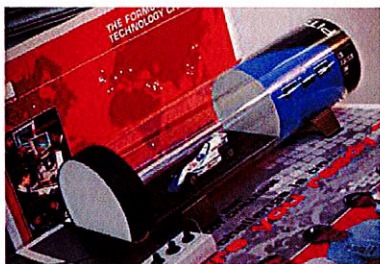
F1 IN SCHOOLS EQUIPMENT & CONSUMABLES



Decal Stickers
Decal Stickers
(pack of 25 sheets)

Product Code

NF1009



TEST

Smoke Tunnel Including Fog Maestro Smoke Generator

A harmless smoke-like vapour passes through the Smoke Tunnel demonstrating airflow around the object.

N13277



Fog Maestro Smoke Generator

Fog Maestro Smoke Generator inc. 1 litre of Fog Fluid (Generator can be used with the Smoke Tunnel or Scout Wind Tunnel).

N25100

1 Litre of Fog Fluid

N56805



Scout Wind Tunnel

A wind tunnel specifically designed to measure frontal drag on F1 cars. It is 1240mm in length and features a powerful motor that draws air through at approx 40mph. Includes 1 Bottle of Manometer Oil.

N24761

Replacement Bottle of Manometer Oil.

N59108



RACE

Elevated Racetrack

25 Metre Track
(includes 11 sections and 12 legs).

N22049

A selection of these products
can be purchased online at



iSupply3D.com
3D Printing
Rapid Prototyping Supplies

Product Code



F1 Race System

Designed for use with the Elevated Racetrack, the F1 Race System includes:
1 x start gate, 1 x finish gate, 2 x launch triggers, 2 x launchers, 1 x power supply, 1 x control box and Race Time Management Software.

N32483



Track Banners

F1 in Schools Banners for use with Elevated Racetrack, featuring chequered flag borders and F1 logo (complete with velcro to attach to track)

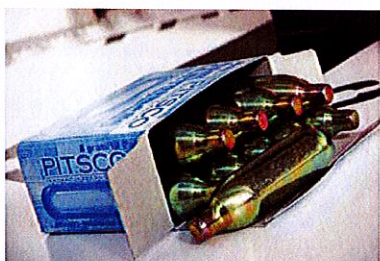
NPB002



Test Cartridges

8 Gram Test Cartridges for Long Track (pack of 360). (for test only. NOT suitable for competition).

B103002A



Competition Cartridges

8 Gram Competition Cartridges for Long Track (pack of 120).

N53337

4 Gram Competition Cartridges for Short Track (pack of 120).

N53338



Deceleration Towels

Set of 2 deceleration towels. (Used to stop the cars at the end of the track.)

N18060

denfordata.com/bb/

On-Line Technical Forum

TECHNICAL SUPPORT AVAILABLE 24 HOURS A DAY, 7 DAYS A WEEK

Denford's Technical Forum is a free of charge on-line technical support service that is available to Denford customers 24 hours a day, 7 days a week.

"The technical forum has provided a wealth of information and support for our 20-year-old Denford CNC machine, in fact just as good as the support we receive for our brand new CNC Router!"



Denford's On-Line Technical Forum is a free of charge service that can be accessed 24 hours a day, 7 days a week.

The On-Line Technical Forum is available to Denford customers, old and new, and it couldn't be easier to use. Just visit <http://www.denfordata.com/bb/> and register on line.....it's that simple.

Denford's On-Line Technical Forum opens up the traditional communication channels that can restrict customer and technical support, due to availability of staff, teaching commitments or different time zones.

A multitude of topics relating to Denford machines and software (both new and old) are covered within the forum, which is simple to search, and easy to use.

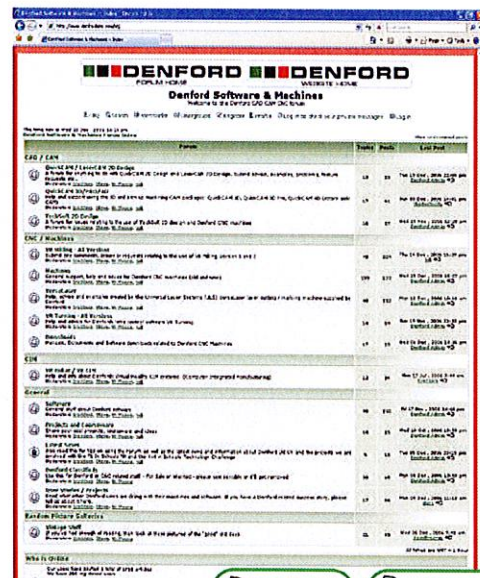
Denford's Technical Team and Denford customers from around the world regularly log on to the forum to offer support and advice and, most importantly, post a solution for all to see.

As well as offering comprehensive technical support, Denford's On-Line Technical Forum enables customers to share ideas and projects with other users. Media such as teaching material, project work, PDF's, images, drawings and text documents are easily attached to messages for all users to view and comment on.

You can also read the latest Denford news before anyone else, and keep track of machine and software upgrades, some of which can be downloaded direct from the Technical Forum web site.

The On-Line Technical Forum has proved to be hugely popular with customers. One recent user posted a note to inform us that the Technical Forum has "provided a wealth of information and support for our 20-year-old Denford CNC machine, in fact just as good as the support we receive for our brand new CNC Router!"

Of course the traditional methods of phone and email are still available, but try out this new service by simply logging on to www.denfordata.com/bb/ and register.



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DENFORD
T: +44(0)1484 728000

F: +44(0)1484 728100 Email: info@denford.co.uk
Denford Limited, Armitage Road, Brighouse, West Yorkshire HD6 1QF, England