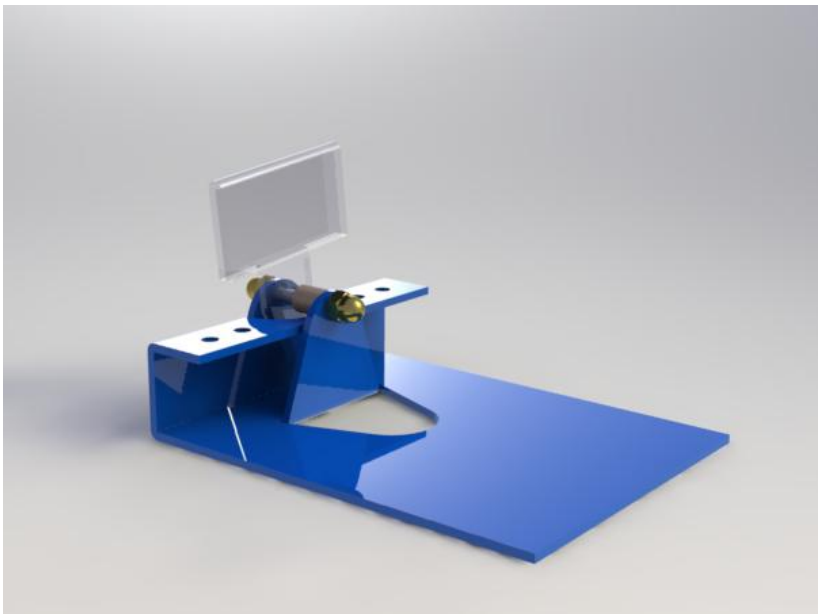
Executive Toy project – 2D Manufacture



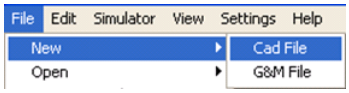
Prerequisite ‘Flat pattern_Exectutive Toy_Base’ drawn and saved as “DXF” file from SolidWorks

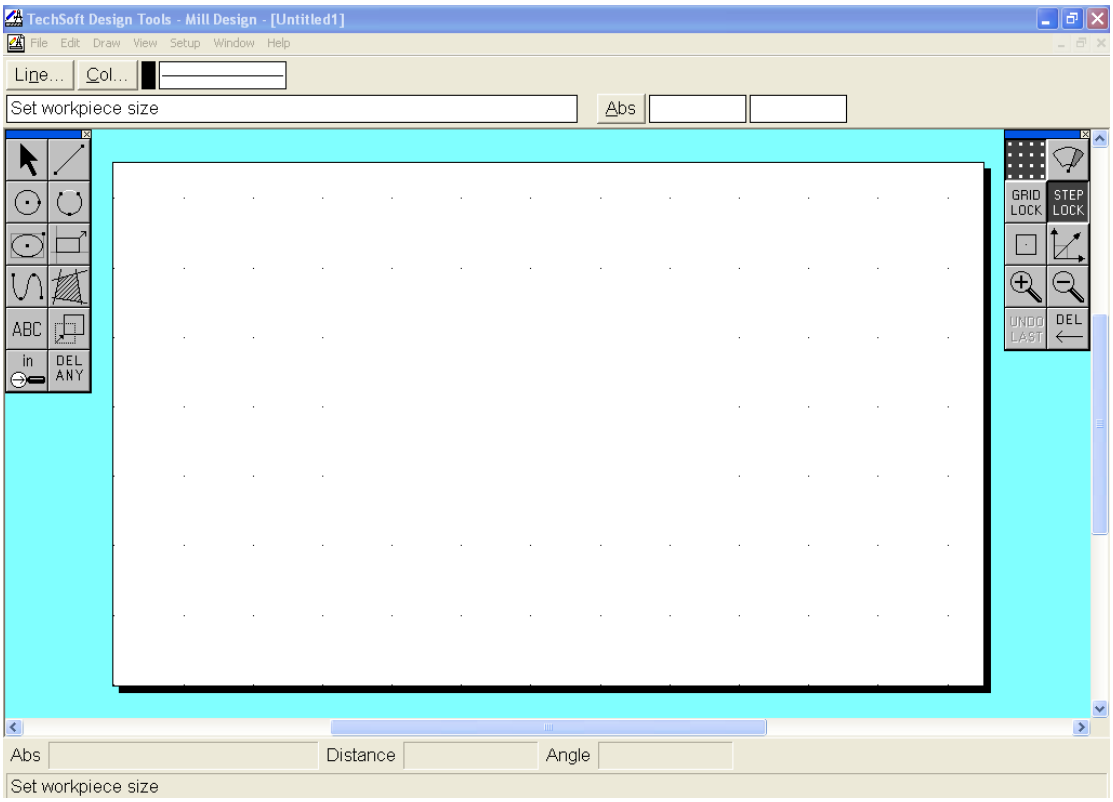
Focus of the Lesson On completion of this exercise you will have completed:

- Setup work piece constraints
- Import “DXF” file
- Configure work piece for machining
- Set up Tools
- Output to Router for manufacture

Import a CAD File in TechSoft 2D Design

Select **File** from the menu toolbar, next select **New**, and **CAD File.**





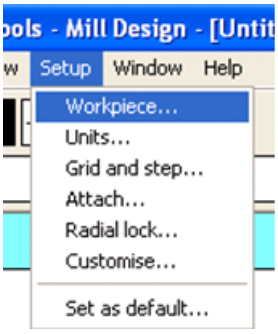
This will open TechSoft Design Tools software. Again for this exercise we will be importing SolidWorks CAD files for manufacture.

Set the Workpiece

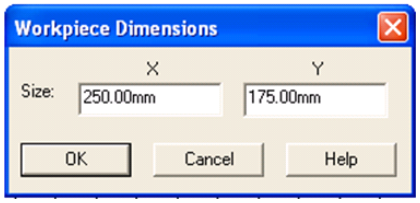
The white rectangle in the centre of the screen is the outline of the workpiece. This must be changed to the size of the material piece you intend to use.

Note: The workpiece is not the size of the CAD file, it is the size of the piece of material that you intend to cut the shape out of.

Select **Setup** from the Menu toolbar, then select **Workpiece**.



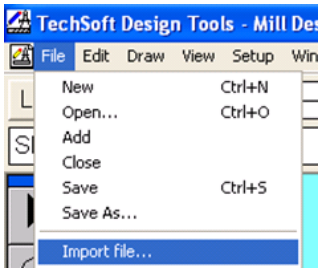
A popup menu will appear where you are asked to input the **Workpiece Dimensions**. The dimensions are as shown, refer to the machine if you are unsure of which is direction is X or Y. Select **OK**.



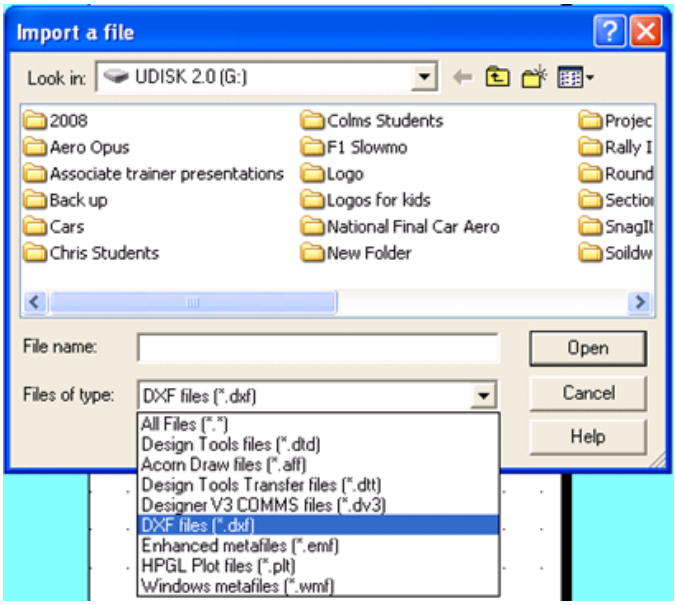
The white rectangle in the centre of the screen will change to the size of the work.

Importing Files

Select **File** from the **Menu Toolbar,** scroll down to **Import File.**



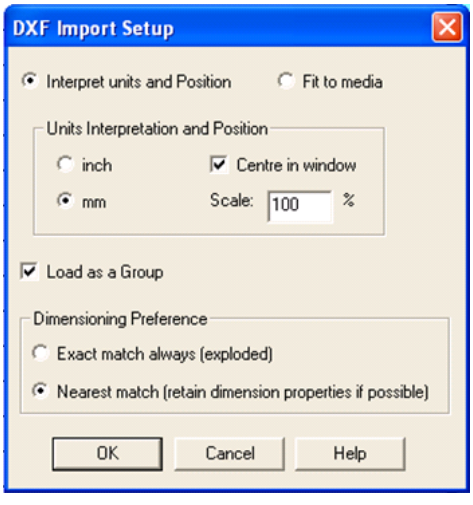
A popup menu will appear from which you must chose the file location. The type of file that we require is a **.DXF file**. Select the drop down arrow to the right of the box for **File of type:** This will produce a drop down menu from which you can select **DXF Files.** Find the file **Flat pattern - Exec Toy Base.DXF** and select **Open.**



A DXF Import Setup menu will appear.

Change the settings to the options shown.

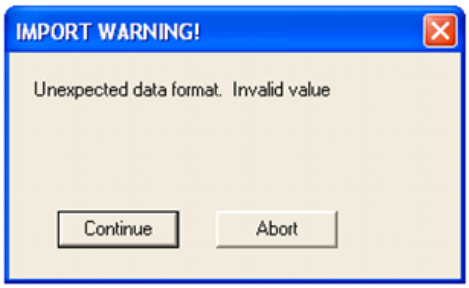
Select **OK.**



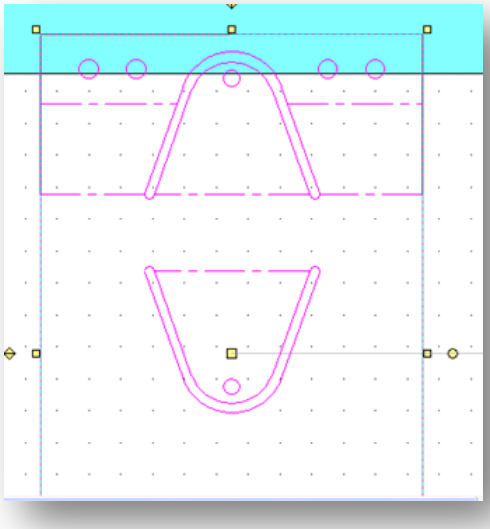
An **Import Warning** window will now show up

Origins of DXF

The DXF file format was originally launched in 1982 with Autodesk's first version of AutoCAD. It however can be read and manipulated in over 50 different CAD and graphics packages. DXF files exported from SolidWorks may contain warnings as these files are not original Autodesk files. These warnings can be ignored. Select **Continue**.

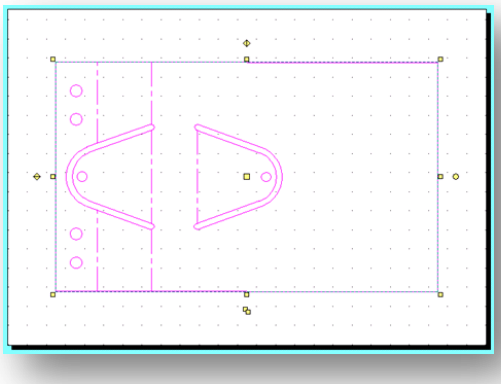


The outline of the component should now be imported into the TechSoft Software.



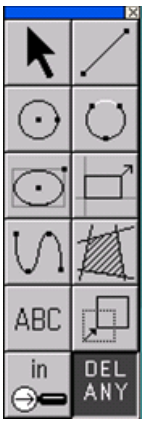
The CAD file is orientated the wrong way. To rotate it around, simply click on one of the yellow nodes and twist the drawing into a new orientation.

The new orientation should now look like this.



Delete Bend lines

The next step is to delete the bend lines using the **Trim Command**



To select the **Trim Command,** click on the **DEL ANY** icon on the **Draw Toolbar**. A pop put menu will appear.

Select the last option 

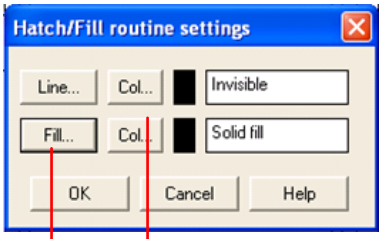
Trim Command.

Use the cursor to point and click to delete the bend lines.

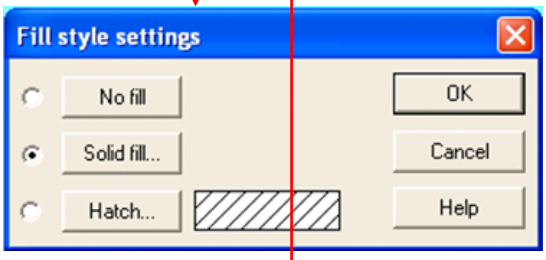
Hatch/ Fill Command

From the Draw Toolbar select the **Hatch Command** 

This will launch the Hatch/ Fill settings window. Select the **Fill... button.**



The **Fill Style Settings** window will now appear. Select **Solid fill…** and select **OK**.

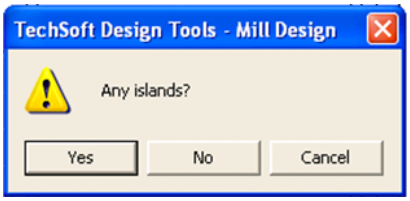


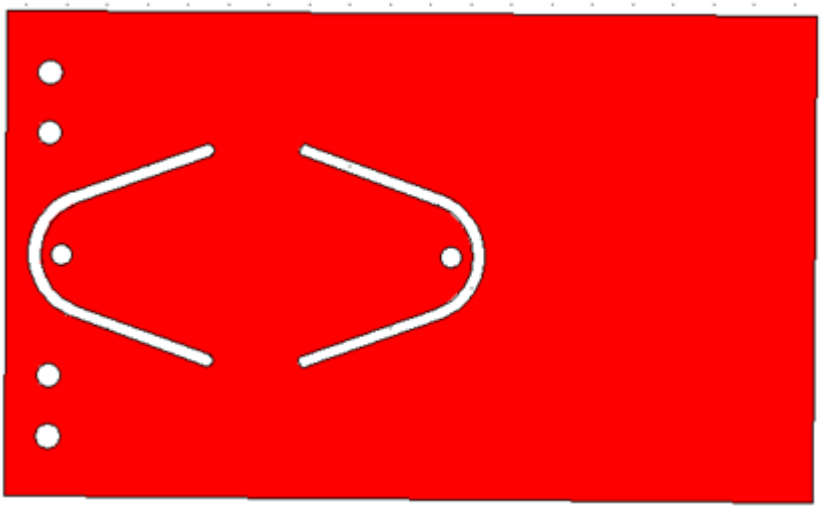
Select the **Col… button,** this will launch the Fill Colour Window. This is where you can define the solid fill colour you are going to assign to your object. This can be any colour on the palette except black. Red is usually the most visible. **Select Red** and click **OK**.

This will return you back to the **Hatch/ Fill routine Settings window**.

A pointed finger cursor will appear.
Using this click on the area to be removed.

A warning window will appear asking are there any islands in the profile. For this exercise there are a number. Using the pointed finger cursor, click on the entities shown in white below.



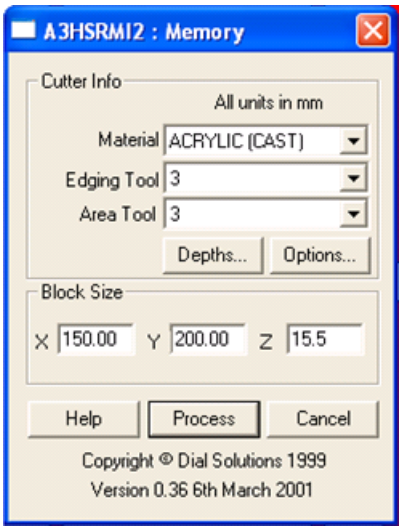


This is what the component will look like when cut out. The white area will be removed by the router bit.

To Mill

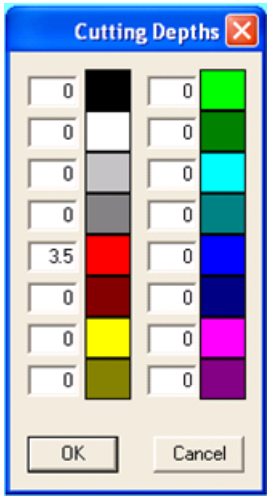
Now that the software knows where the router should cut, the program needs to be sent to the machine itself. Select **File** from the **Menu Toolbar** and **To Mill.**

Click on the downward facing arrow to the right of the selection boxes to launch the different options. Set the **Material** to Acrylic (Cast). As we are using a 3 mm tool, set the **Edging Tool** and **Area Tool** to 3.



Using a vernier calliper measure the distance from the bed to the top of the acrylic sheet. Type this distance into the Z input box.

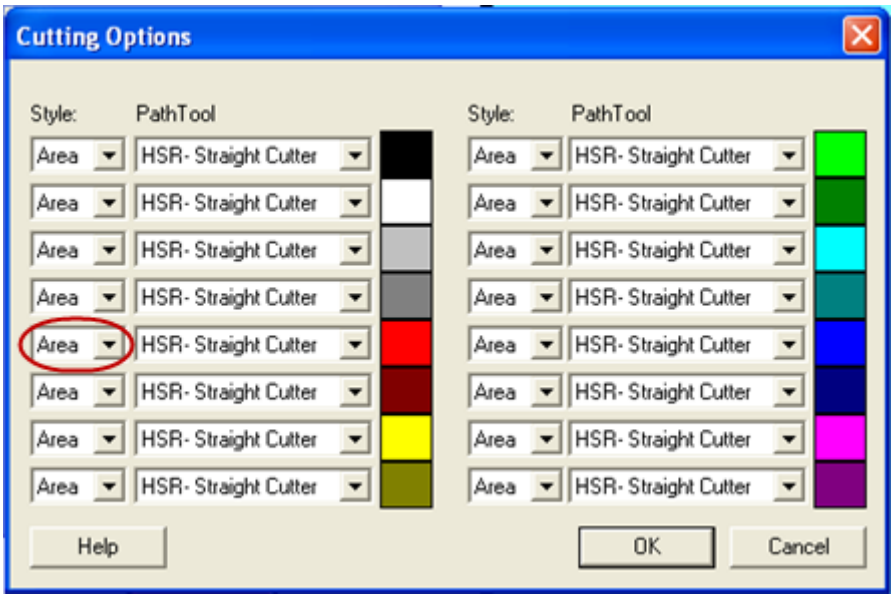
Now select the **Depths** button in the middle of the dialogue window. This will launch another window called **Cutting Depths**. As we selected the Solid Hatch colour to red, we need to set the depth of cut to red. The depth of cut will need to be greater than the thickness of the material.



Set the Cutting Depth of Red to 3.5.

Click on **OK**

Now select the **Options** button, this is located beside the **Depths** button.

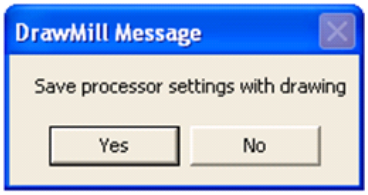


Click on the **Area** drop down menu beside the red fill colour. This will present you with a number of options. Select **Outside**, this will instruct the router to mill anything to the outside of the hatched area.

Select **OK**.

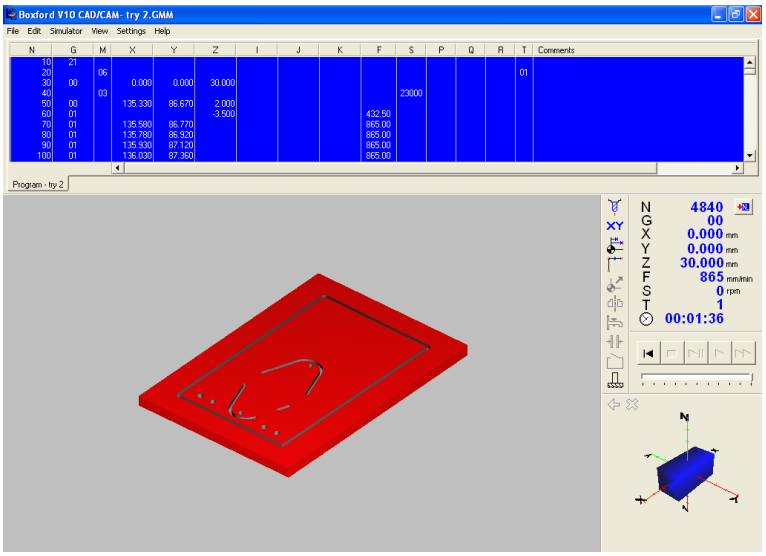
Now select the **Process** button on the A3HSRMI2: Memory window

This will open up a new window asking you to save processor settings.



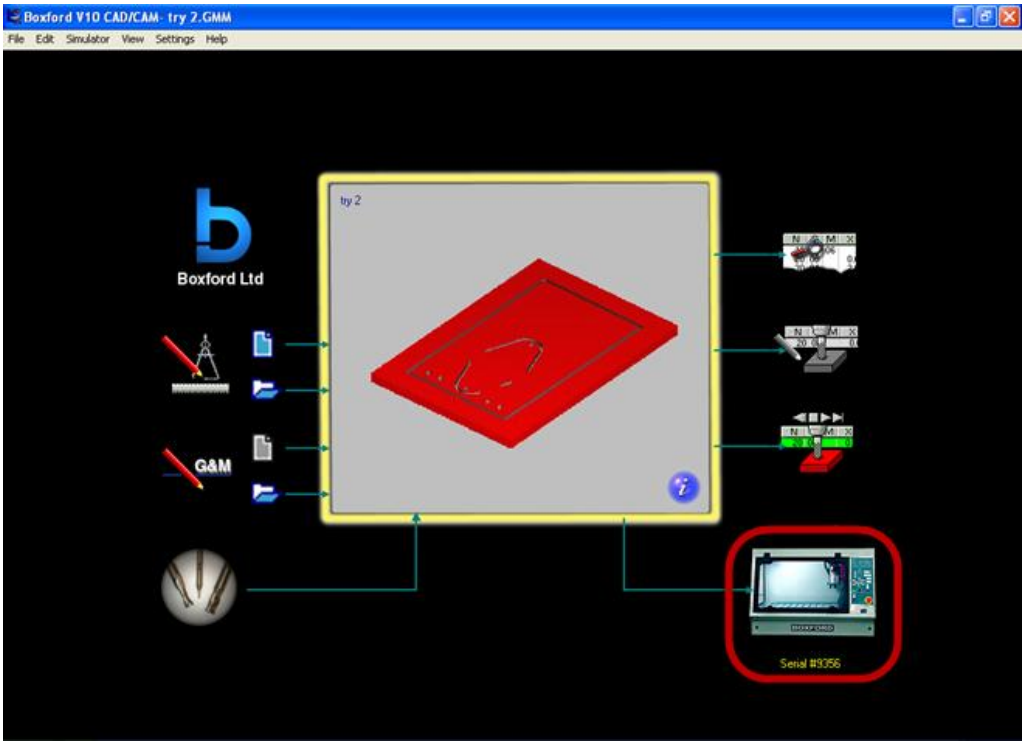
Click **Yes**

The router software will launch. The tool path will be simulated as shown.



When the simulation of the cut part is finished close the window by clicking on the close icon in the top right hand corner  of the screen

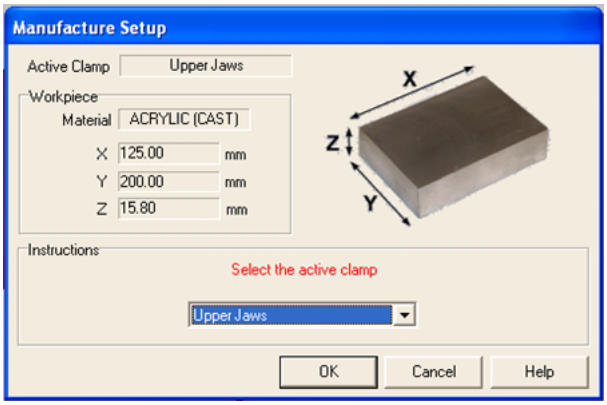
Select the Machine icon in the bottom right hand corner of the screen.



Manufacture Setup

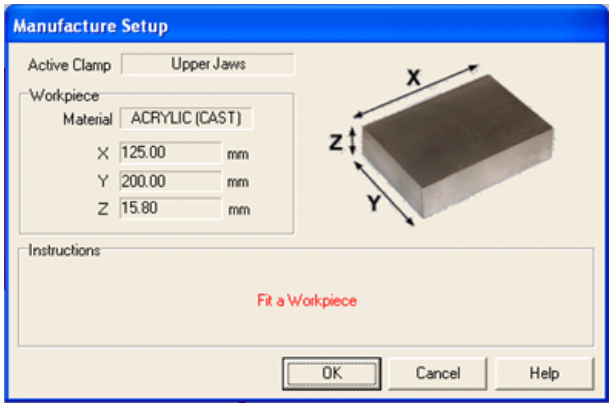
We must select a clamp type now. The type we will be using is the upper jaws, which in essence means the acrylic is attached to a sacrificial board and secured to the table.

Select **OK**



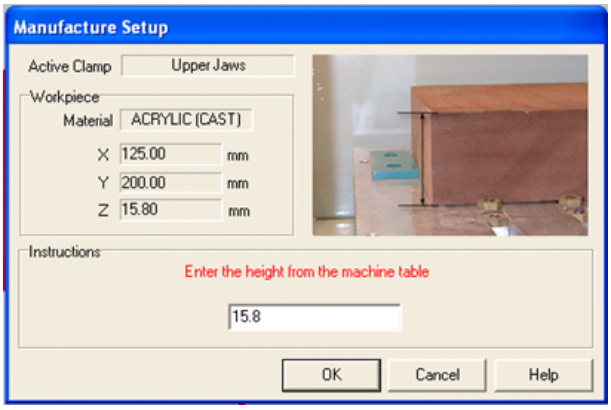
Ensure the workpiece is fitted securely.

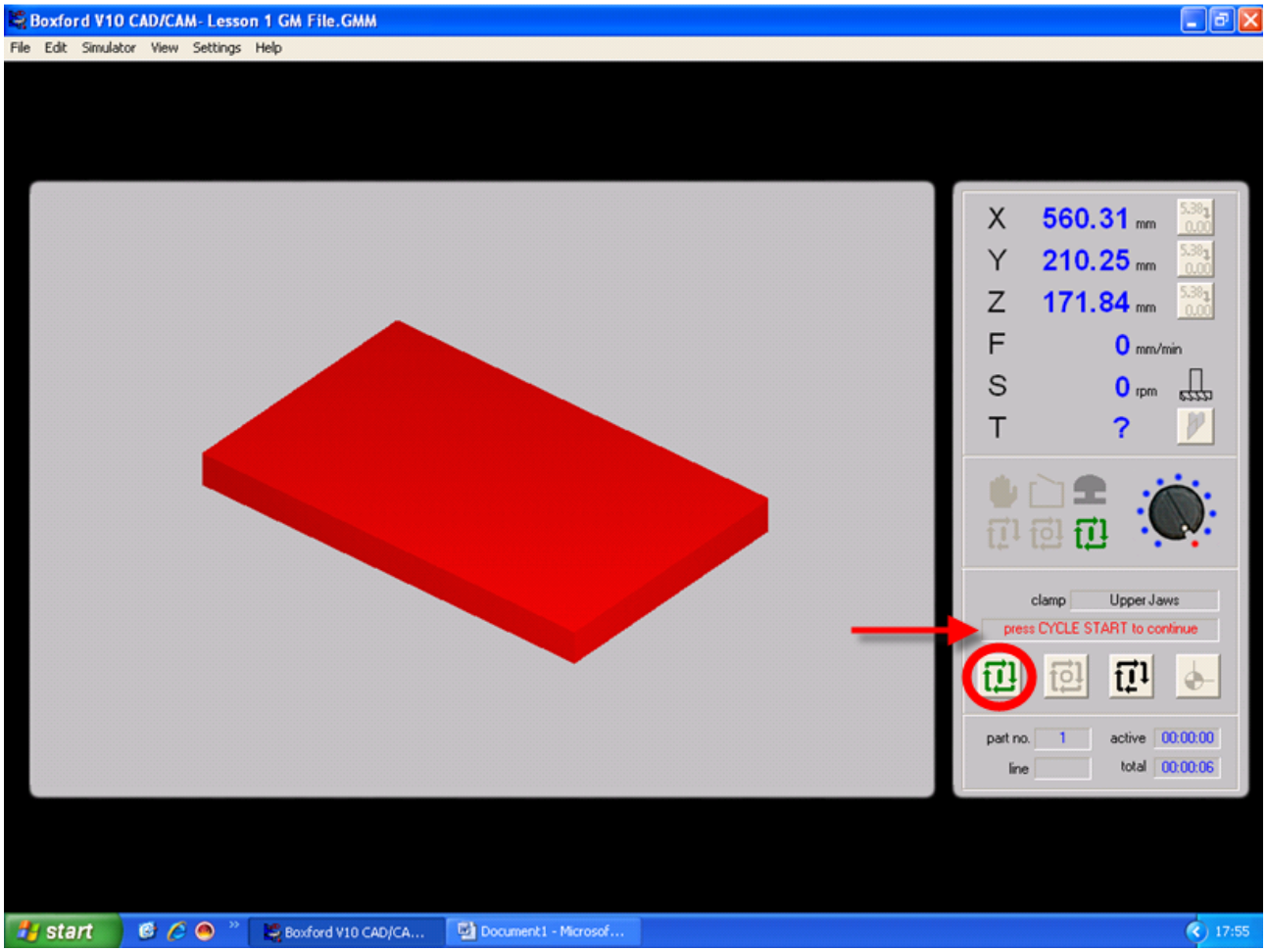
Click **OK**.



Set Height

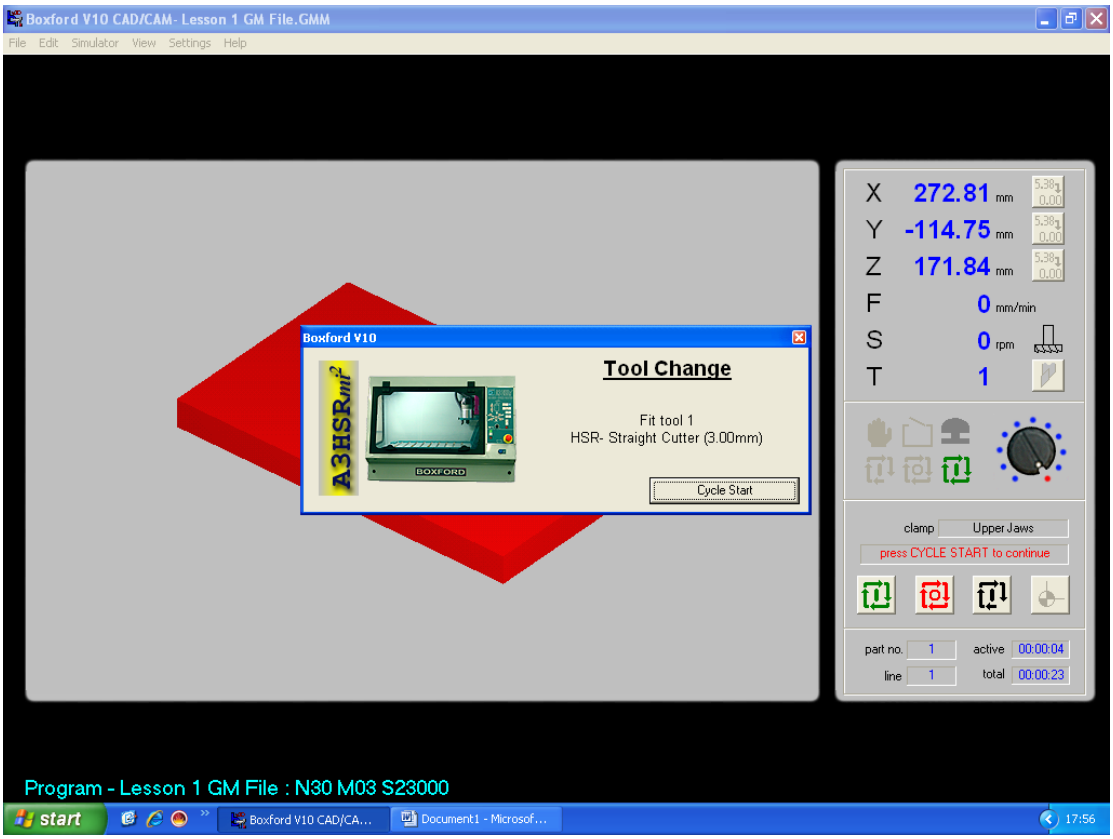
Again the computer is looking for the height of the work piece above the table. The computer will not allow a value less than that already specified. Add 0.01mm to the distance already specified and click **OK.**





Select the **Cycle Start**

Fit Tool If you have not fitted the tool already, fit it now, then **Press Cycle** start again.



The machine should start to machine the piece