

Copyright© 2012 Product Development Inc Intellectual Property

Please do not post or reuse content in this document partially or in whole in any other documents or internet websites.

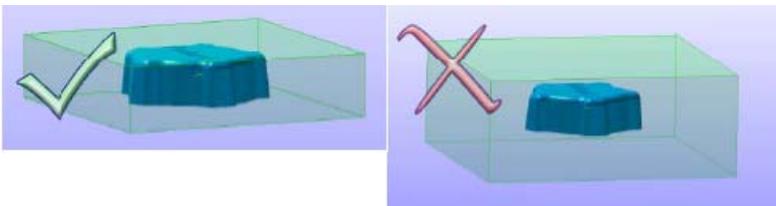
## SRP PLAYER CUTTING TIPS and TRICKS

Rev0

Use this document to help save you time and effort when using SRP Player.

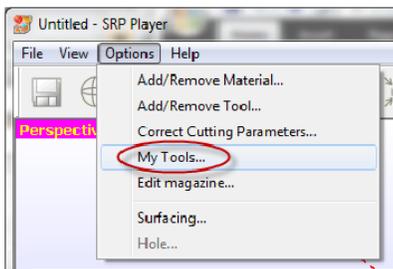
### Material Size

The complexity of a part, its size, and the material being cut will dictate how long it will take to cut on a machine. If your part is really small / thin, then you want to choose a material that is similar in size and not too much thicker. The closer the thickness is to the actual part size the faster the machine will cut out the part. For example if your part was 1/8" thick and you cut it out of 1" thick material it would have to cut 3 times as much material to make your part. This will make the cutting time 3 times as long.

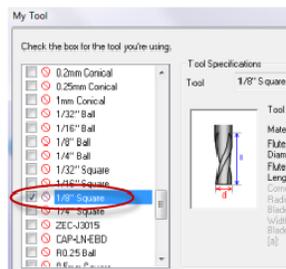


### Cutting Speed vs. Tool Size

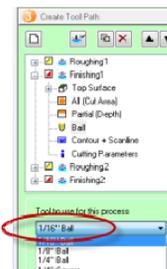
The selection of which tool you use when cutting out your model will make a big difference in how long it takes to make your model. Always use the biggest tool that you have that can do the job and get the features cut. Sometimes you will use larger tools to do most of the work and then come back in with a smaller tool to finish the small features. Always select the largest tool you want to use first in **My Tools**, and turn off the other tools, before you start going through the 5 steps. Then go back to **My Tools** at **Step 3** and turn on the additional tools you want to use, than change the tool path to use the tool you want. If you do not do this (keep multiple tools selected in **My Tools**) then on **Step 2** when you select **Better surface finish** it picks the smallest tool and when you select the **Faster cutting time** it selects the largest cutting tool. By selecting your tools first or at least knowing to use the largest tool first you avoid having to do other things later in the setup, like adjust margin size so you can use a larger tool, when the software at first picked a smaller tool.



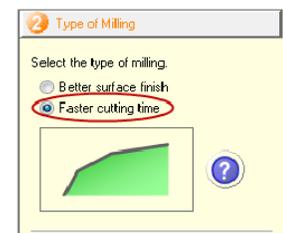
Go To My Tools



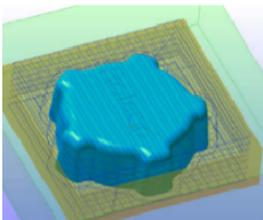
Select the Largest Tool  
Turn the others Tools Off



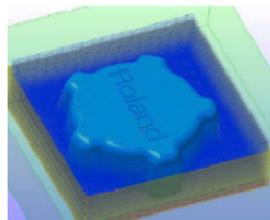
Add Small Tools Step 3  
Change Tool in Toolpath



Choose Faster Cutting Time  
This Picks Largest Tool in My Tools



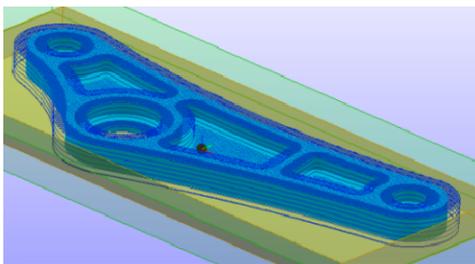
Large Tool  
Less Cutting



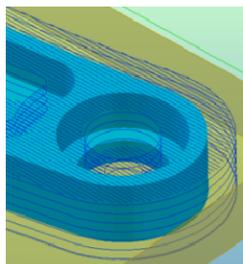
Small Tool  
More Cutting

### Faster Cutting and Better Surface Finish on 3D Parts

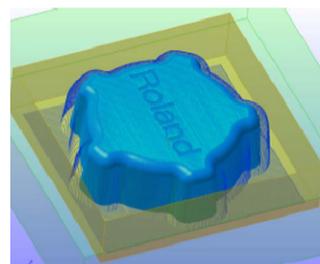
SRP Player is very unique in the way that it cuts out a part. On the finishing pass for every part the software makes 2 Finishing passes by default. One pass is called a scan line cut and the other is called a contour cut. The scan line goes over all the flat surfaces and the contour goes around all the vertical surfaces. This type of finishing works great if your part has 2 1/2 d geometry like the rocker arm below. But if you have a model that is a 3d shape, the contour line functions will create what looks like a water line on your part as it moves down. Some say it also looks like the grain in wood. This is because of the contour part of the finishing pass, as the tool moves down and completes the contour pass it leaves a single line on the side of a 3d surface. You can turn off the contour cutting on any finishing pass and only have the SRP Player calculate the tool path with scan lines. For a 3d part this give you a better surface finish and also a faster cutting time because it does not have to make an additional pass. When choosing the Scan Line you can select which way the tool path will go, it is set in x direction as the default. You would change this if the part had more of a curve over the part in a y direction then in the x like the example below. By having the tool move over the curve and not alongside it you will get a better surface finish. You can read more about scan lines and contour lines in the SRP Player **Help** file it has additional pictures to clarify the settings even further.



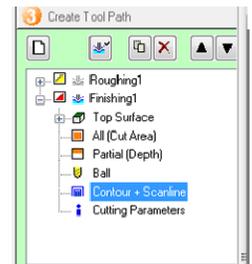
2 1/2 D Part  
Both Contour and Scan Lines



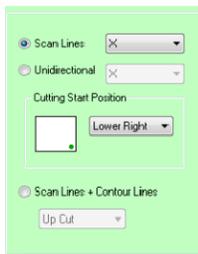
2 1/2 D Part  
Closer Look at Toolpath



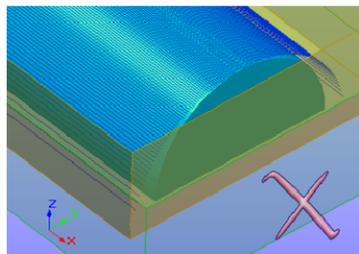
3D Part  
Scan Lines Only



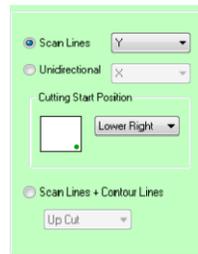
Tool Path Setting  
Contour + Scan Lines



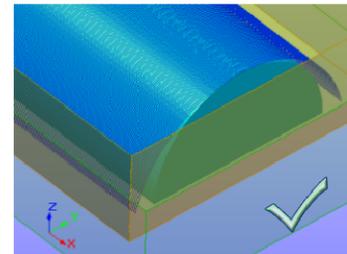
Tool Path Setting  
Scan Lines X Direction



Tool Path on Curved Surface  
Scan Lines X Direction



Tool Path Setting  
Scan Lines Y Direction



Tool Path on Curved Surface  
Scan Lines Y Direction

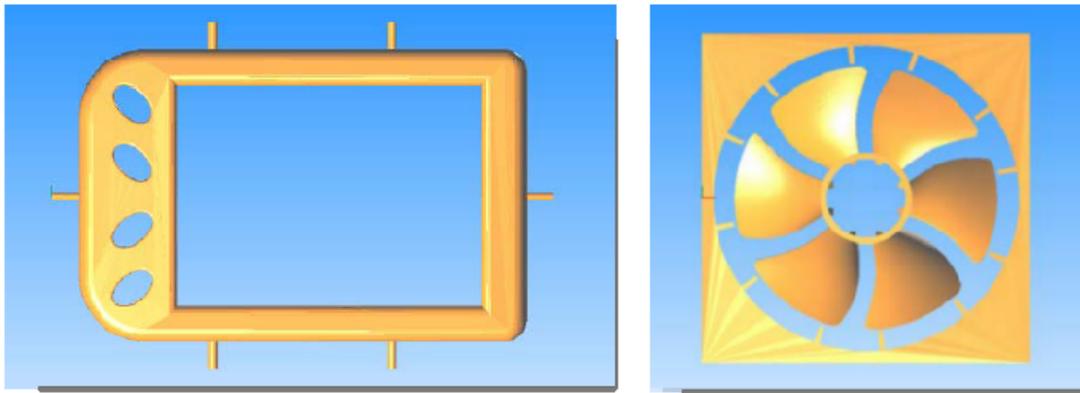
### Which Side to Cut First?

It is best to always cut the side that requires the highest accuracy first. For example if you have a part that you are making that will have a close fit with another part then cut the side that will be mated to the other part first. The first side that is cut will always be the most accurate because it is supported by the rest of the material. This is also true if you have a part that needs a really high quality surface finish. Rough and Finish that side first then do the backside that way the part has the most support while cutting the side that needed the quality surface finish.

### Supports for Your Part

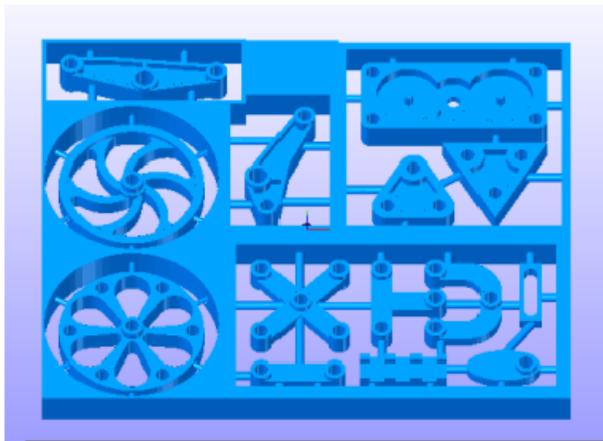
To hold your part from falling out when doing multisided cutting you will add supports. SRP Player gives you the ability to add supports, but the limitation is that it will only add 4 supports one for each side of the model. Sometimes you will need to add more supports to your model to support thin walls or small features. For these models we recommend that you create the supports in your CAD software. When creating supports the length of the support is based on the size of tool you plan to use to rough with, for example when using a 1/8" tool then the support needs to be .15 long, it must be longer than the diameter of the tool to give the tool room to move back and forth, If you made them exactly 1/8" then the tool would not cut alongside the part. See the tip below about **Tool Size vs Feature Size**.

It is best to always put a support on all 4 sides this will automatically set the margin for the top and bottom roughing and finishing, if you do not add them to all 4 sides then you will have to go in and add extra margin. This is covered in the SRP Player training video. When you have a round part or odd shaped part, if you will model the extra material around the model then the machine will not have to rough all the extra material that forms the square cutting zone. See the fan example below. You can read more about supports in the Support Tabs document.



### Multiple parts at the same time

It is best to prepare multiple parts to be cut in your cad software. Just bring all the parts into a single session or assembly and then add the supports and bridges between the parts. When completed save the multiple parts as a single STL file and bring into SRP Player. In the example below 14 parts were nested into a single cut. This saves you a lot of setup time. You have to only setup 1 part instead of 14. Also when you run over night you can take advantage of all that free time the machine would just be sitting there waiting.



**Small Features and Letters**

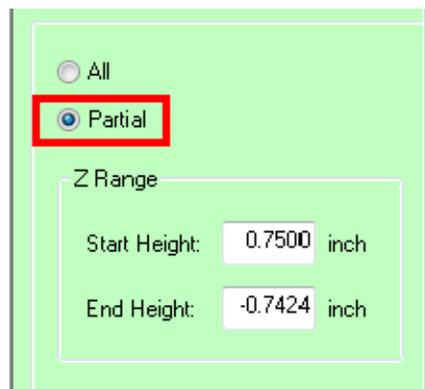
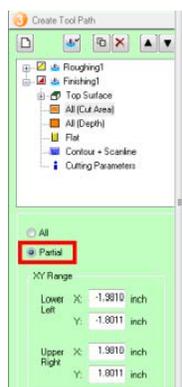
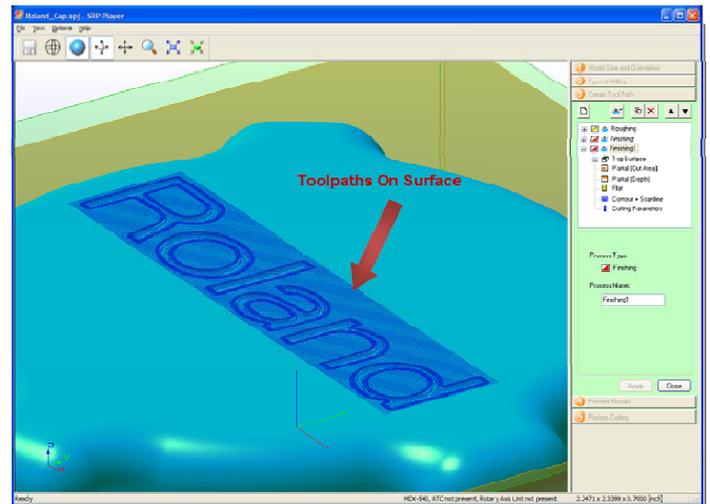
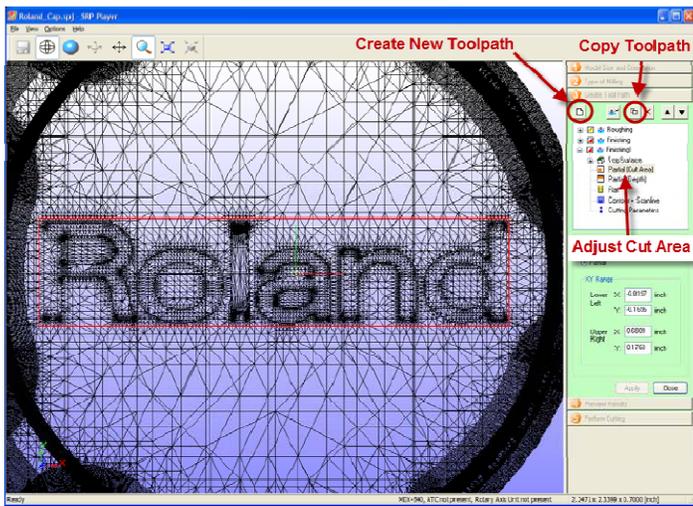
If you have small letters or small features on a part you will want to cut the rest of the part first with larger tools. Then use a smaller tool to cut out just a single feature. This also works with holes that are really small that the larger tool did not cut. You do not always have to use both a roughing and finishing when cutting the small features. It really has to do with which material you are cutting and how much depth the feature has. If you are using soft material and the hole depth is really shallow about 2x the diameter of the tool you will use to cut it out, you can use finishing only as we are in this example of these letters. If you are cutting a hard material or the feature is deeper then you first create a roughing tool path then a finishing tool path so you do not break your tool.

How this works.

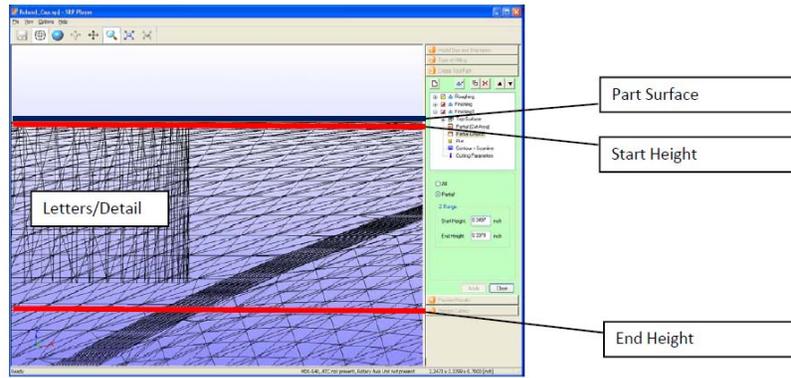
Create a new Finishing Tool Path or Copy one already created.

Adjust the **Cut Area** by dragging the red box to just around the feature you want to cut. In the picture here we are going to be cutting out the Roland Logo. So we bring the box in close to the logo. The red box defines the area that the tool is allowed to cut. We had to change the view from shaded to wireframe to see this feature. If you are unable to move the red box then you will need to select **Partial** the default will be **All**.

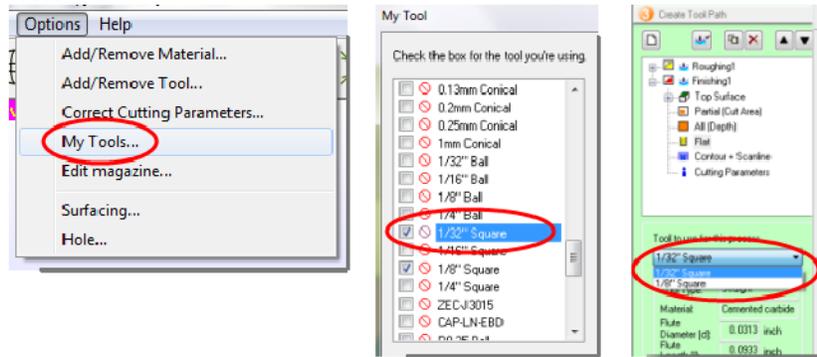
When you generate the tool path you will see that there are lines that show where the tool is going to cut. We actually don't want the tool to be re-cutting on the finished surface. We only want the tool to go down into the letters of the logo. This would be the same in the event we were cutting out holes. So we will have to go in and make adjustments to the depth.



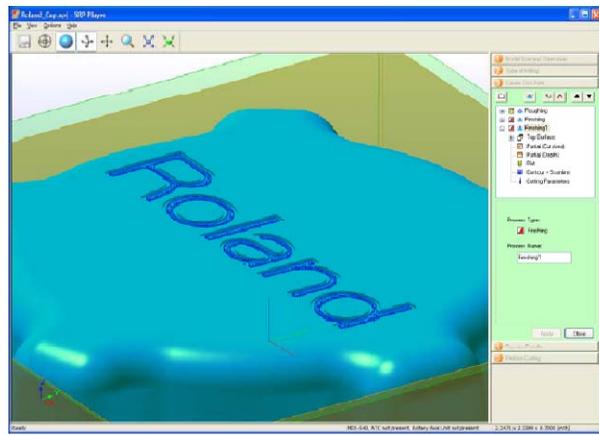
The **Depth** of cutting is defined by the *Start Height* and the *Finish Height*. We will need to adjust the *Start Height* to just below the surface of the part. It only needs to be below the surface a few thousandths of an inch. Since the tool path is constrained to the logo only. The *End Height* needs to be deeper than the feature we are cutting out.



After the **Depth** is correct we will set the cutting tool to the smaller tool we plan to use. If it does not show up in the list then turn it on in **My Tools**.

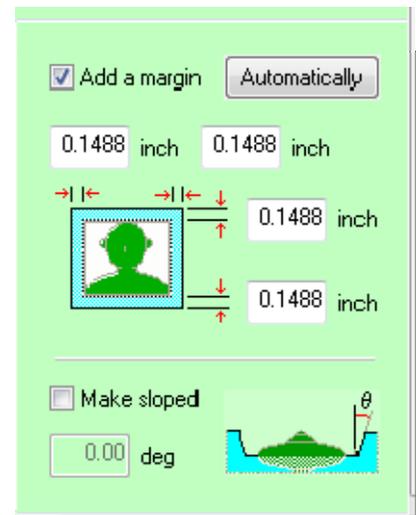
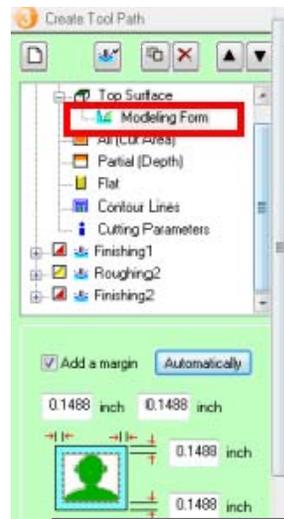
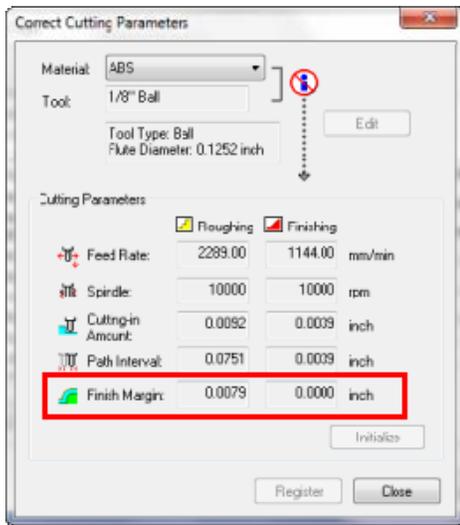


After we regenerate the tool path we will see that the tool path is limited to just the letters on the part, this is the way we want to cut out holes and small features with a smaller tool on our part.



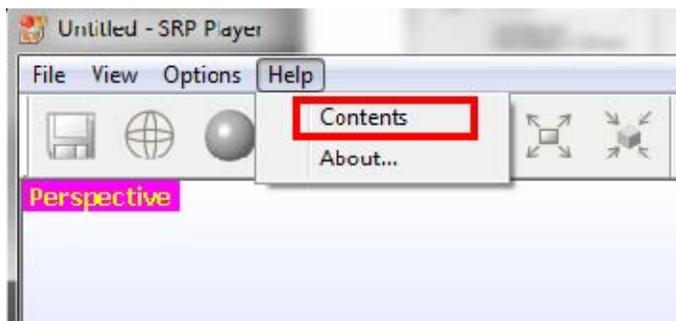
### Tool Size vs Feature Size

You might have learned already that if you create a 1/8" hole or slot that a 1/8" tool will not be able to go into the hole or feature. There are a couple of reasons why this happens. First in the roughing stage when the software is calculating the tool path it uses the finish margin that has been set. The finish margin is an extra amount of material that is left behind so that when the machine roughs out the part it never touches the finished surface. The roughing paths are usually more aggressive when cutting and if the tool touches the finish surface it could leave a mark that even after finishing would not be removed. So in the picture below the finish margin is .0079 which is a factory default so the 1/8" slot would be .125-.0079-.0079 since there are 2 walls that would be 0.1092 which is much smaller than a 1/8" tool. In addition to the finish margin the machine also needs to have room to move back and forth when cutting, so you need additional room besides just the finish margin. You can check the margin in **Modeling Form**, that SRP Player sets for the model, to see the exact amount needed for a 1/8" tool to cut into a slot. Below we see that it is 0.1488. So if you plan to use a 1/8" tool then slots or holes need to be 0.15 or bigger and if you plan to use a 1/4" tool slots or holes need to be 0.28 or bigger. If you plan to use a 1/16" tool the slots or hole needs to be .09 or bigger.



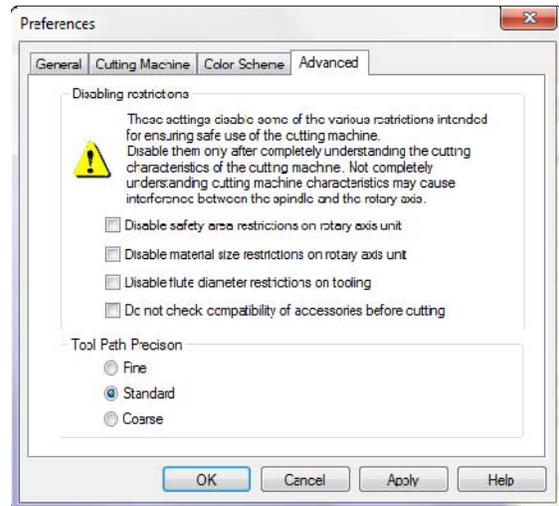
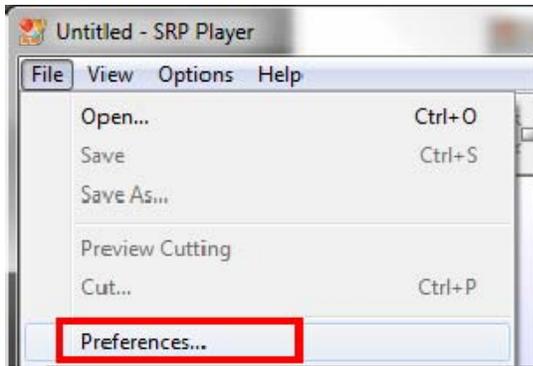
### SRP Player Help

SRP Player has a very good help file. There is a lot of information that has been added over the years. We highly recommend that you go through and read the help file. They have also included additional **Hints and Tips** in the **Help** that we did not cover here. If you start a project and run into an error of some sort, the **SRP Player Help** has the most extensive **Problems and Remedies** information to help you solve issues when cutting, see **If You Think There's a Problem** in the **Help** file.

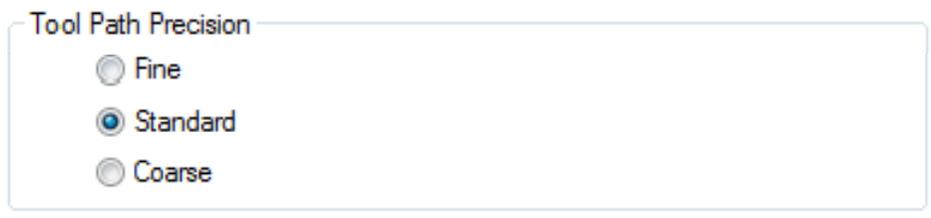


### Advanced Settings

SRP Player has a set of restrictions created for each machine and each accessory. So if for example you wanted to make a part that was a little larger than the boundaries on the machine the software would just create an error. In the **File>Preferences** there is some **Advanced** settings that allow you to turn off some of the restrictions. You can use these when you need to do something that just will not work otherwise. For example if you wanted to create a 4 sided cutting on a machine that did not have a rotary axis unit. You could turn on the rotary axis unit, and select **Do not check compatibility of accessories before cutting**. Then when you send the file to the machine it will not give you an error that the accessory is not installed. Of course you would have to manage the flipping of the part and only send cutting for one side at a time. You can read about the other **Advanced** settings in **Help**. They are somewhat self explanatory.

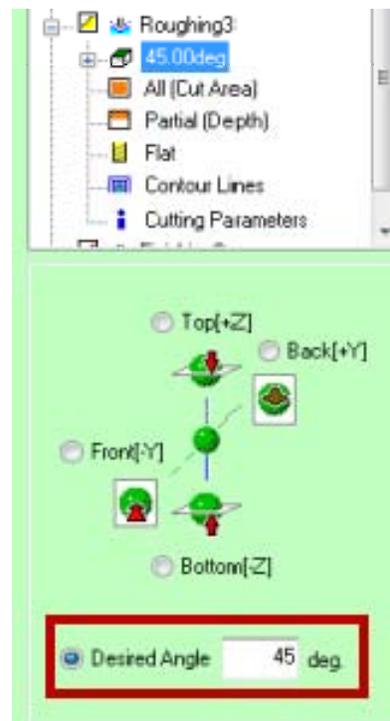
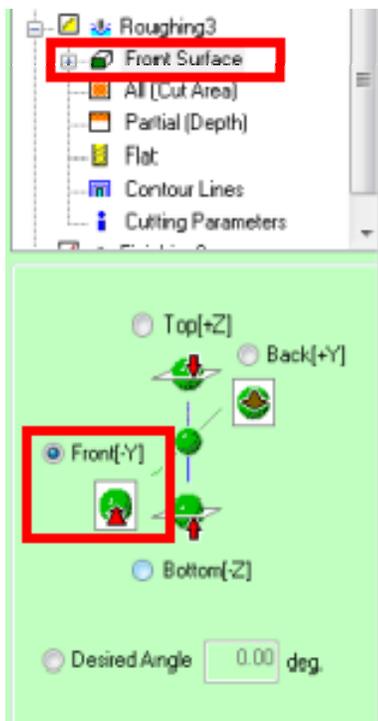
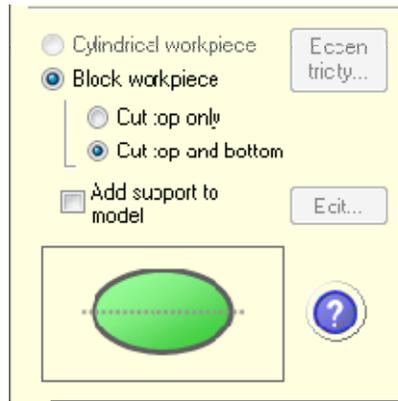


The other **Advanced** settings are **Tool Path Precision** settings. There are 3 settings the default is **Standard**. The **Tool Path Precision** setting tells the software if you would rather have it calculate the tool path really fast (**Coarse**) and are not too concerned about the detail of the part. Or if you would rather have more detail (**Fine**) and are not worried how long it takes for the tool paths to generate/calculate. Here is a little theory how it works. The machine moves in straight lines in RML mode. A curve is actually converted into very small straight lines. As an example let's say a curve created using **Coarse** has 100 segments or straight lines to make up the curve. When you change to **Standard** the number of segments will double and maybe even quadruple. We do not know the exact algorithm that was programmed but know this is how it works. So then the same curve would be made of 400 straight line segments. Now when you select **Fine** that curve is again quadrupled and made of 1600 segments. So the more segments the more detailed the part but also the more time it takes to calculate the tool path. We have found the default **Standard** setting is very good. When you have an extremely large STL file 10mb or more you want to use **Coarse** so it will calculate faster. The speed in which the tool path is calculated also has to do with the amount of computing power available. On a great computer it can calculate the **Fine** tool path faster than on a poor computer calculating the **Coarse** setting. It is best to stick with the **Standard** setting until you have a need to make a change.



**Cutting on the Rotary - Add Front and Back Cut and any other Angle**

When you are cutting on the Rotary Axis Unit the SRP Player will automatically setup a Top Cut and a Bottom Cut for you. It does this when you select **Cut top and bottom** on **Step 2**. To add additional cuts for Front and Back and at some other angle you have to go into the edit tool path and add additional tool paths. The easiest way is to copy one of the other Roughing and Finishing tool paths and then go in and change the direction of cut. To change the direction, select the item under the name of the tool path, for example **Top**. For the **Front** and **Back** you will then select one of these directions and for a different angle you will select the **Desired Angle** and put in the angle you would like to use. You will have to make sure and do this for both the roughing and finishing for each of those directions. If the Front and Back are grayed out it is because you have not turned on the Rotary Axis Unit.



### Output to file

When you are on **Step 5** and are ready to start cutting you have 2 options. You can send the cutting directly to the machine by selecting **Start Cutting...** This is what most people do and most of our training teaches you to do. This works fine but while the machine is cutting it ties up your SRP Player so you cannot do any additional work in the software. There is another option. There is a box on **Step 5** that says **Output to file**. If you select that box then select **Start Cutting...** the software will write out the tool paths to files. You can then send the tool paths to the machine using your V Panel. Based on which V Panel you are using MDX-15/20, MDX-40A, or MDX-540 the location to send the files to the machine are in different locations. Use the **Cut** command in the V Panel to send the files to the machine. Make sure to order the cut files correctly Roughing first and then Finishing.

5 Perform Cutting

Output the cutting data to the cutting machine and start cutting.

Start Cutting...

(Tool changing or other instructions may be displayed during milling. Please follow instructions when instructed to do so.)

Output to file

Tool List

Tool Name	L
1/8" Square	0.38

If you have any additional SRP Player Tips or Tricks you think should be included in the revised edition of this document please email them to [support@pdi3d.com](mailto:support@pdi3d.com).