

FUSION 360



Fusion 360

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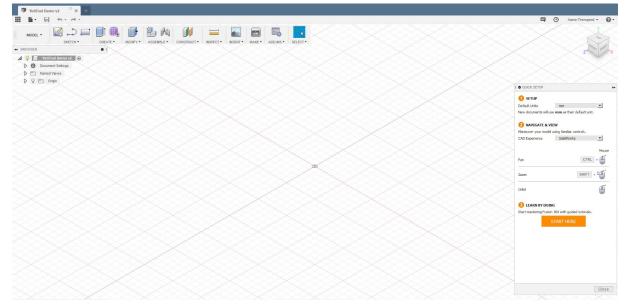
1 Introduction

This guide will show you some of the key features in Fusion 360 in order to create a file for SmartBench.

2 Navigation

2.1 Setup

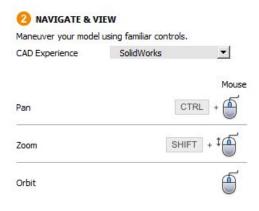
Using the help button in the top right corner, select Quick setup. Select the units you wish to use. For this example, we will be using mm.





2.2 Mouse Controls

By select the CAD experience drop down, we can adjust the mouse controls. We have selected to use the mouse controls that relate to SolidWorks.

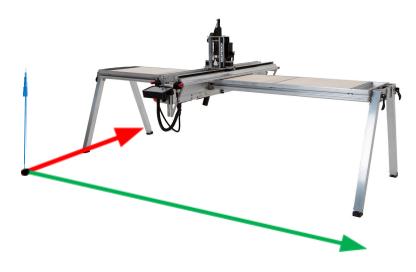


2.3 XYZ Axis

Fusion uses the standard XYZ axis setup. The navigation cube below can be used to quickly switch to your desired view.



We use the same XYZ axis on SmartBench detailed in the figure below



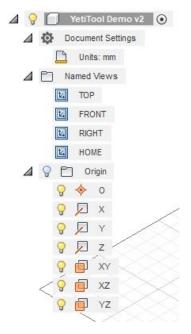


2.4 Keyboard Shortcuts

To find out about the keyboard shortcuts, please visit the link below https://www.autodesk.com/shortcuts/fusion-360

2.5 Model Tree

The model tree enables you to view different features of your model. As sketches and bodies are created, they can be seen here.



2.6 Timeline

The timeline will show you a workflow progression. We can use this to roll back to any feature during any time.





3 Model

3.1 Create a Sketch

We are first going to create a sketch. To do this, we will need to ensure we are in the DESIGN workspace.

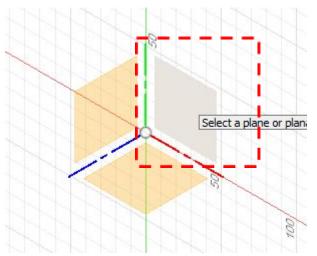


Click the icon on the right in the navigation panel to create a sketch.



3.2 Select a Plane

Then Select a plane to sketch on. We would suggest using the XY plane as this will make it easier when we come to the CAM stage.

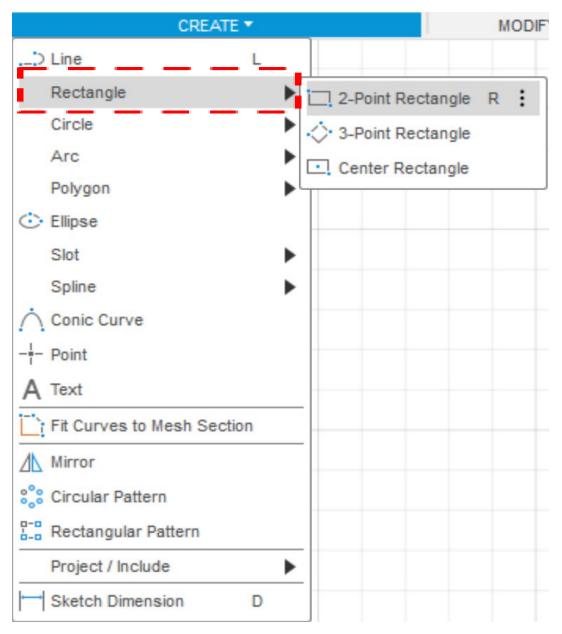






3.3 Drawing Tools

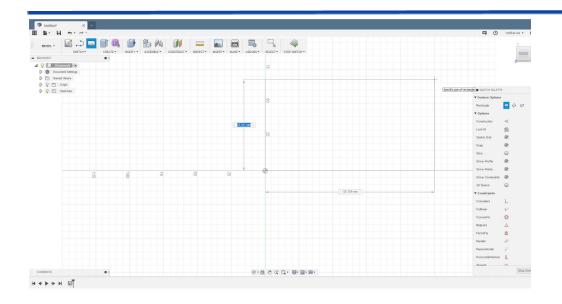
There are a number of different drawing tools available. For this example, we will use the rectangle tool.



3.4 Drawing a sketch

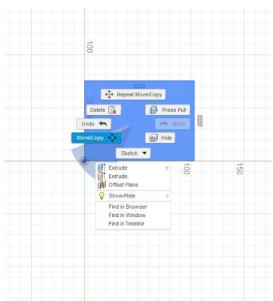
After selecting the Rectangle tool, click on the sketch plane to create a start point, and then move the mouse to create your desired shape. Clicking again will create and end point and your desired sketch.





3.5 Moving a Sketch

You can move and reposition a sketch by selecting the sketch you wish to move, Right click and selecting Move/Copy





3.6 Finishing a Sketch

SKETCH PALETTE	**
▼ Options	
Construction	∛
Look At	\
Sketch Grid	
Snap	
Slice	
Show Profile	
Show Points	
Show Dimensions	
Show Constraints	
Show Projected Geometries	
3D Sketch	
	Finish Sketch

4 Creating a body

This section will show you how to transform your 2D Sketch in a 3D Model called a body.

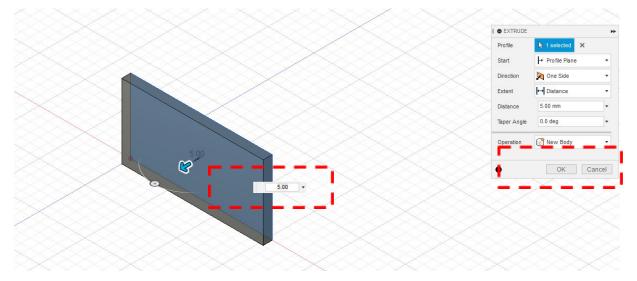
4.1 Tools

We are going to use the extrusion tool. Select the tool, and then select the sketch that you wish to extrude. You can also use the shortcut key "E".



CREATE *	MODIFY -
🔒 New Compone	ent
Derive	
Extrude	E
Revolve	
Sweep	
Loft	
🖾 Rib	
Web	
G Hole	Н
S Thread	
Box	~~~
Cylinder	
Sphere	
O Torus	
S Coil	
Pipe	
Pattern	+
Mirror	
Thicken	
Boundary Fill	
Create Form	~~~
Create Base F	eature
🕞 Create Mesh	
Create PCB	

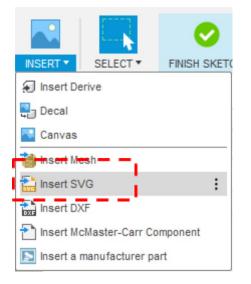
We can now select a distance to extrude the sketch too. We are going to extrude this by 5mm. Enter the amount and then click OK.



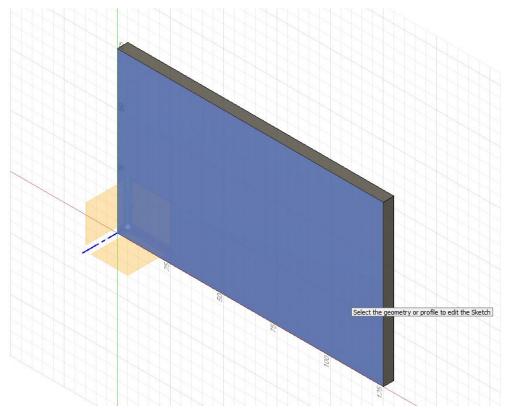


4.2 Inserting an SVG

We are now going to insert a logo onto our model, and then convert it to a model. You can insert an SVG as a sketch using the Insert > Insert SVG



We are then going to select the front face of the model that we created before

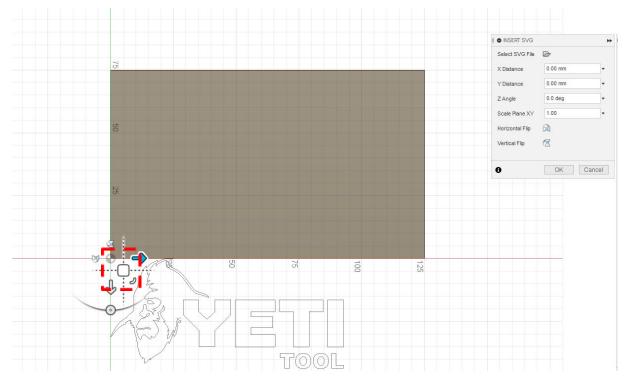




We then need to select and SVG file. To find out more about converting images into SVG, please see the downloads page on our website here – <u>www.yetitool.com/support/downloads</u>

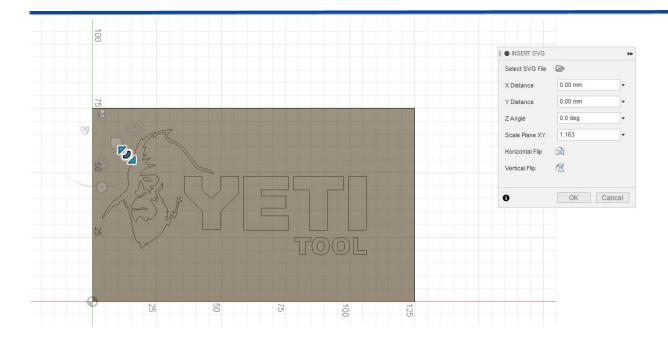
i <mark>l e i</mark> nsert sv	G	**
Select SVG F	ile 🗁	

Now we need to move our sketch into place by clicking, holding and dragging the small square.

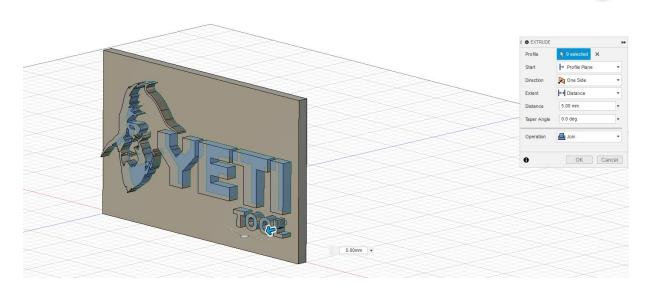


And then resize our SVG using the button below by clicking, holding and dragging the arc shaped button





We can then click OK. We are then going to follow the steps that we used before to extrude the sketch of the logo



5 Manufacture

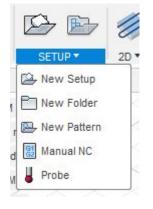
Now that you have created a 3D Model, we will need to switch to the manufacturing workspace within fusion. This can be found in the drop-down menu in the top left corner



DESIGN -
DESIGN
GENERATIVE DESIGN
RENDER
ANIMATION
SIMULATION
MANUFACTURE
DRAWING

5.1 Creating a Setup

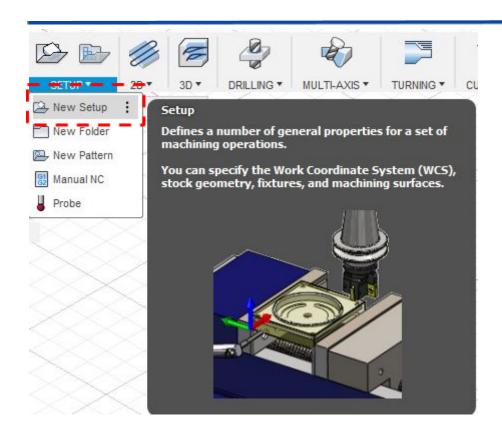
We will first start by creating a setup for our CAM programme.



5.1.1 Setup

Click "New Setup"

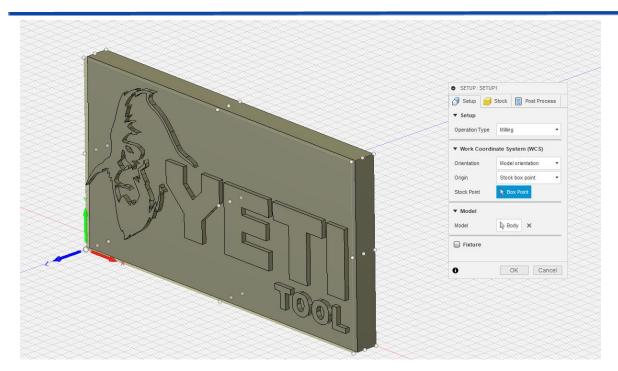




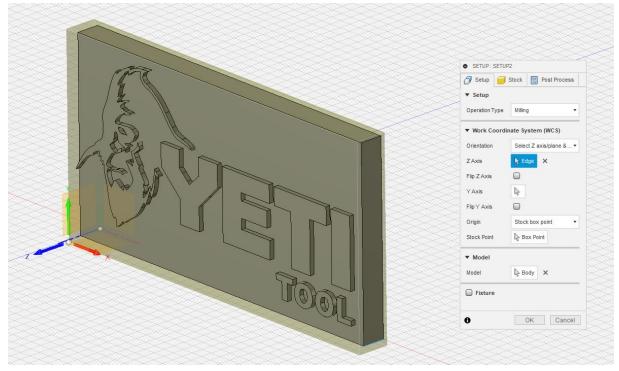
5.1.2 Stock

First, we need to set our stock box point. We can do this by setting the "Orientation" to "Model Orientation". We are going to set this to the corner of the model, ensuring that our Z Axis is the same orientation as the plunge direction of the spindle. We also need to set the longer side of the model as Y Axis.





If this needs to be changed, we can change the "Orientation" to "Select Z Axis/ Plane and Y Axis" and select the edges of the model that we wish to represent Z and Y.



Next, we need to set the stock offsets to 0mm



Setup 🗐 Stock	GI Post Proces	
J Setup	G2 POSt Proces	33
▼ Stock		
Mode	Relative size box	à
Stock Offset Mode	Add stock to sid	
Stock Side Offset	0 mm	•••
Stock Top Offset	0 mm	
Stock Bottom Offset	0 mm	1
Round Up to Nearest	0 mm	
 Dimensions 		
Width (X)	77.264 mm	
Depth (Y)	40.524 mm	
Height (Z)	6 mm	

5.2 2D Operations

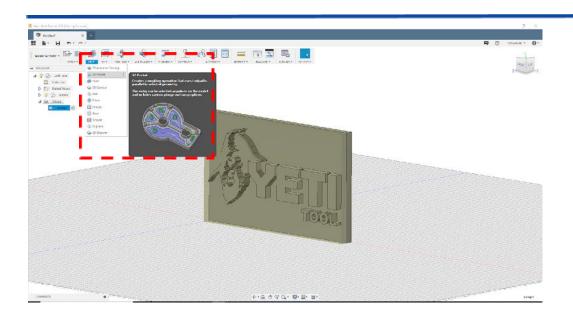
We are now going to select the correct 2D operation for the model we have created. In order to clear the material around our logo we are going to choose the "2D Pocket" operation.

Explanations of which 2D operation to use can be found by hovering on the operation name. Further information is available here:

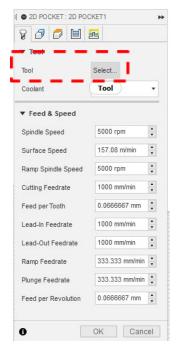
http://help.autodesk.com/view/fusion360/ENU/?guid=GUID20E579E7-B808-47D1-BF B2-14056A2B1CFE

5.2.1 2D Pocket Select 2D Pocket



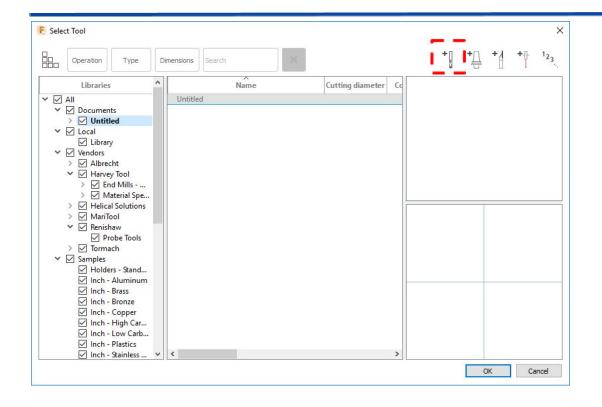


We now need to select the correct tool. For this we are going to use a 3mm Straight Flute which has a shoulder length of 10mm

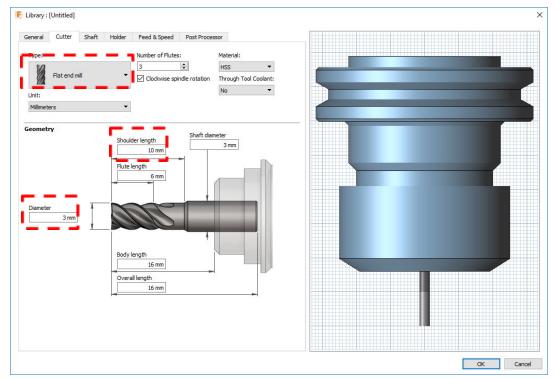


Now select "Add new tool"





Set the following options

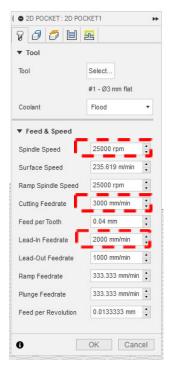


Click OK, and then OK again.

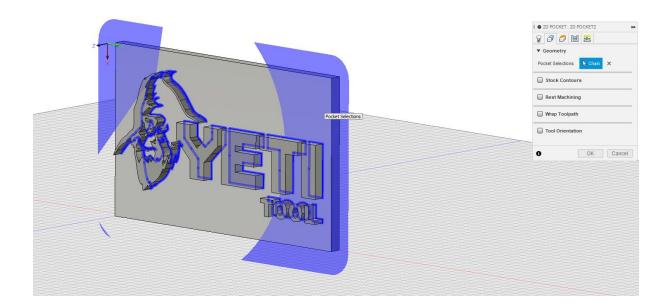


We then need to set the correct feeds and speeds. These vary depending on material, and you may need to use an online feeds and speeds calculator to ensure these are set correctly.

For this operation we will use the settings below



Now we need to select the Geometry to cut. We are going to select the pocket around our logo.





Next we need to ensure that we select both ways, and that we uncheck the box which says "Stock to leave"

STATES OF STATES	T2	**
8000		
▼ Passes		
Tolerance	0.1 mm	
Sideways Compensation	Left (climb mil •	
Minimum Cutting Radius	0 mm 🛟	
Finishing Passes		
Preserve Order		
Both Ways		
Maximum Stepover	2.85 mm 🛟	
Use Morphed Spiral Ma		
Allow Stepover Cusps		
Smoothing Deviation	0.1 mm	
Multiple Depths		
Stock to Leave		
Smoothing		
Feed Optimization		
0 0	K Cancel]

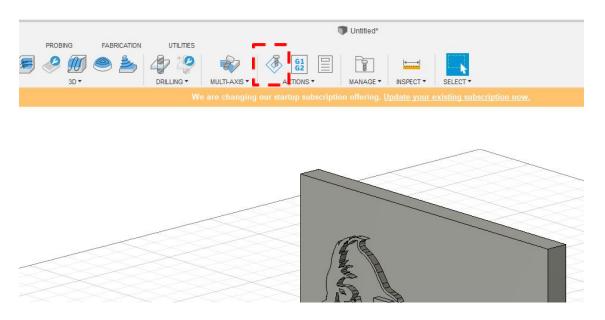
Click OK

Our toolpath will now be generated



5.3 Tool Path Simulation

We can now simulate our toolpath within fusion to ensure there are no errors



You will now be able to view a simulation of the toolpaths that you have generated.

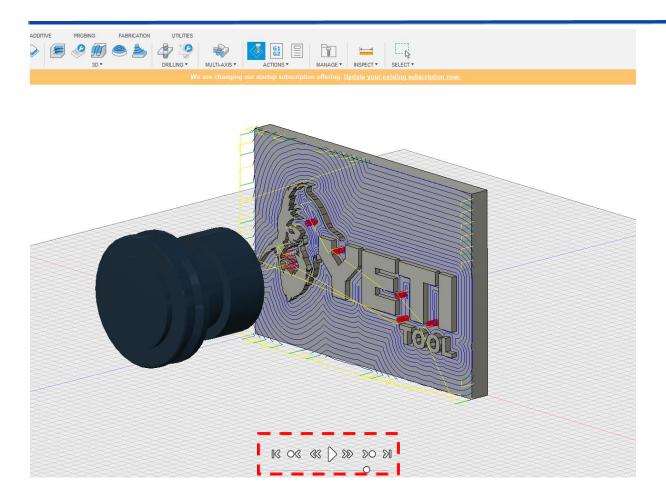
You can toggle to view or hide stock



Display	🖁 # Info	8# Statistics
Tool		
Tool	Ho	lder
Transparent		
Programmed	l Point 🔲	
Show points		olpath before pos

You can use the button along the bottom to play the simulation and adjust viewing speed





If there are any collisions, they will be shown in red in the progress bar at the bottom

6 Post Process

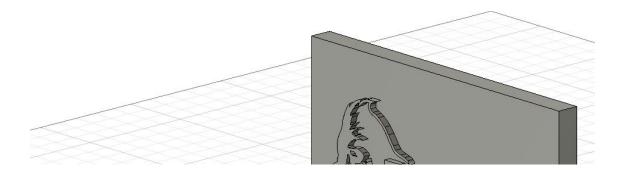
We can now post process our toolpath ready to send to SmartBench

6.1 Post Configuration

We need to post process our file using the GRBL post processor. Select Post process







We then need to search for GRBL

Configuration Folder					
C:\Users\ronth\AppData\Local\Autodesk\we	bdeploy\producti	on\27887f06	acbb684cb4	Setup	
Post_Configuration					
grbl	All	~	All vendors		~
Grbl / grbl		~	Open config		
Output folder				NC extension	8
C:\Users\ronth\AppData\Local\Fusion 360 C	AM\nc		Open folder	.nc	
Program name or number 1001	Proper	ty machine		Value Yes	^
Program comment	Write t	1		Yes	
-	Canua	ace number in	rement	1	
	Seque	ice number i		1	
	Start s	equence num	ber	10	
Unit	Start s Use se	equence num quence numb	ber ers	10 No	
Unit Document unit	Start s Use se Separa	equence num quence numb ate words with	ber ers	10 No Yes	
Document unit	Start s Use se Separa G28 Sa	equence num quence numb ate words with afe retracts	ber ers h space	10 No Yes Yes	
	Start s Use se Separa G28 Sa (Built-in	equence num quence numb ate words with afe retracts n) Allow helica	ber ers h space al moves	10 No Yes Yes Yes	
	Start s Use se Separa G28 Sa (Built-ir (Built-ir	equence num quence numb ate words with afe retracts n) Allow helica n) High feedra	ber ers h space al moves ate mapping	10 No Yes Yes Yes Preserve rapi	
Document unit	Start s Use se Separa G28 Sa (Built-ir (Built-ir	equence num quence numb ate words with afe retracts n) Allow helica	ber ers h space al moves ate mapping	10 No Yes Yes Yes	🗸



6.2 Saving a File

We can then select an output folder to save to as well as the filename extension. We need to use .nc or .gcode

We also need to ensure G28 safe retracts is set to no

Configuration Folder					
C: \Users\ronth\AppData\Local\Autodesk	\webdeploy\producti	ion\27887f0	6acbb684cb4	Setup	
Post Configuration					
grbl	All	~	All vendors		ŝ
Grbl / grbl		~	Open config		
Output folder				NC extension	ī
C:\Users\ronth\AppData\Local\Fusion 36	60 CAM\nc		Open folder	.nc	
Program settings 💻 💻 💻			75		-
Program settings Program name or number 1001	Proper Write t	ty machine		Value Yes	_
Program name or number 1001	Write	Alexander			-
Program name or number 1001	Write	machine	increment	Yes	-
Program name or number 1001	Write Write Seque Start s	machine tool list nce number sequence nu	mber	Yes Yes	
Program name or number 1001 Program comment	Write Write Seque Start s Use se	machine tool list nce number sequence nu equ <u>en</u> ce <u>nu</u> m	mber ibers	Yes Yes 1 10 No	
Program name or number 1001 Program comment	Write UVrite Seque Start s Use se	machine tool list nce number sequence nu equence num ate words wi	mber bers th space	Yes Yes 1 10 No Yes	
Program name or number 1001 Program comment Unit Document unit	Write 1 Write 2 Seque Start s Use se Separa G28 S	machine tool list nce number sequence num ate words wi Safe retrac	mber Ibers th space ts	Yes Yes 1 10 No Yes No	
Program name or number 1001 Program comment Unit Document unit Reorder to minimize tool changes	Write 1 Write 2 Seque Start s Use se Separa G28 S (bait-i	machine tool list nce number sequence num equence num ate words wi Safe retrac n) Allow helm	mber bers th space ts tai moves	Yes Yes 1 10 No Yes No Yes	
Program name or number 1001 Program comment Unit Document unit	Write 1 Write 2 Seque Start s Use se Separa G28 S (bait-i (Built-i	machine tool list nce number sequence num equence num ate words wi Safe retrac n) Allow helm	mber ibers th space ts cal moves rate mapping	Yes Yes 1 10 No Yes No	

Now click Post

7 File Transfer

We can now transfer our file to SmartBench using either USB or send the file over Wi-Fi. Please refer to the Easycut manual