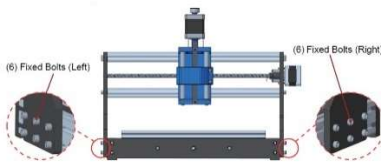
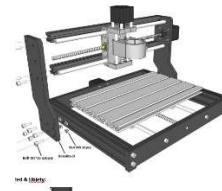


The sun has gone down again as I struggle with issues with my much modified 3018 router purchased from a discount retailer. There are many variants of the 3018, in fact so many with prices ranging from under \$200 to over \$2000, it is hard to imagine which is a poor guess or a best in class choice. So, with a dedicated Caveat Emptor spirit sitting on my shoulder, I purchased a 3018 of questionable heritage for under \$200.00. Immediately I have plans to get a more powerful spindle motor but I see that I must also be very aware of the spaghetti strength frames, wimpy wiring, soft bearing components, steel hardware from scrap metal dealers, and not to ignore the specifications measured in popsicles units. I jest on some things but I know that all products are made to a price point and for the most part, you get what you pay for. I acknowledge that I am not an expert, an award-winning author or omniscient so I hope that this article will help you find some greater enjoyment in building something with your CNC router.

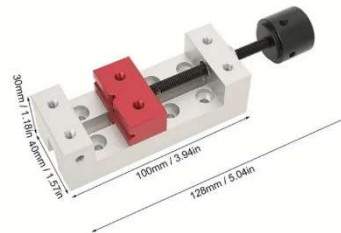
CNC3-3018Pro



Low priced box stock 3018



**My favourite vise**  
 This vise is well design and built. The backlash adjustment screw is in the red block. Very easy to mount either tags or of Dice repeatably.  
 The vise mounting screws are well placed to fit most bed types. Strongly suggest that the vise be cleaned and serviced before use. Prices can be found from \$25 to over \$40.



The learning curve on the 3018 was not that steep after all. After figuring out the assembly and except for the limit switches, it was not too confusing and progressed quickly. Limit switches are not really necessary as I will never try to

build something bigger than the platen table anyway and they are not really necessary for most things after you get use to using machine home and work positions. Machine position it where the limits of travel for all 3 Cartesian planes are. Simply put, X is left to right movement when facing the machine and Y is front to back and Z is up and down. The limit switch controls how far the spindle can move in any direction and to help ensure the router will be positioned at exactly the same spot every time the software starts a program. In the ideal world, a 3018 will be able to move 300mm in the X plane, 180mm on the Y plane and 40mm in the Z plane. Neither my 3018 or my 3030 have their respective dimension indicate their true size. The work position is where the piece that you are working on is secured.

First some fun and let's make something like a simple machinery tag that could be use as a key ring or a pets name tag. If you don't have any premade aluminum tags the you could use wooden disc from a craft store or just a small piece of dimensional wood. Alter the dimension to match your work piece. I have a nice little vise that is well design for the type of work that I intend to do.

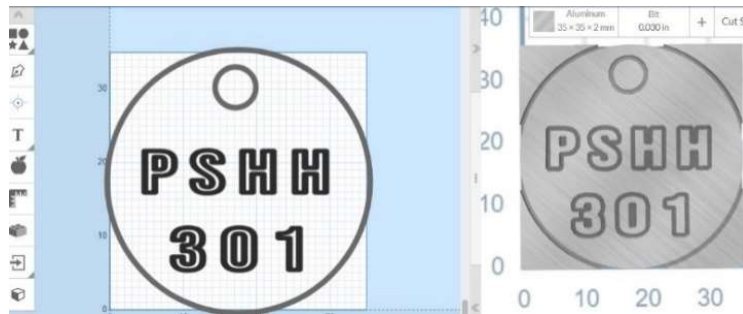
If we wanted to engrave a tag the first step is to set the size of the material, 35mm square and .08 mm thick. Set the location of the engraving using the edit tab. Draw a circle 35mm in diameter then left click on center to material. Draw

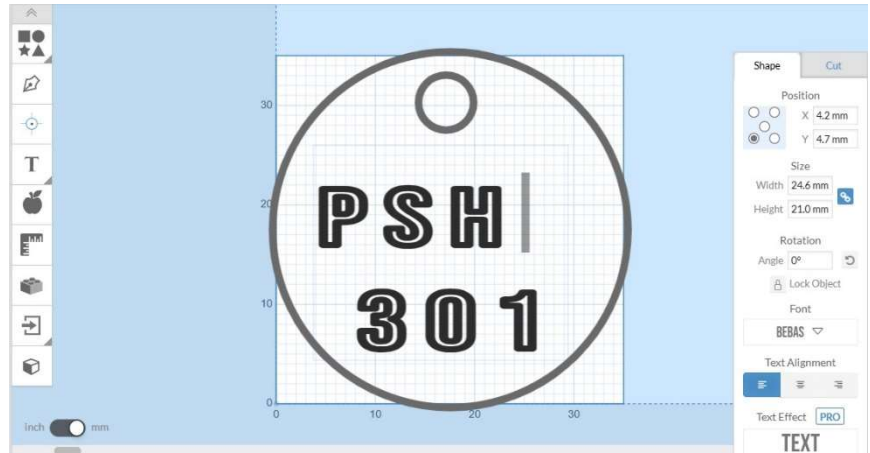
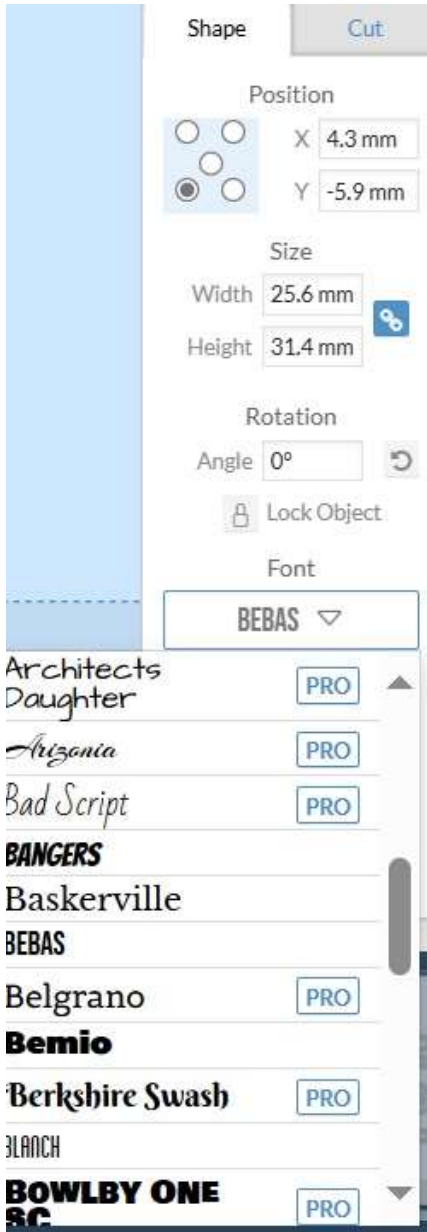
another circle and set its diameter to .188" and center to work piece. Use the up arrow to move the small circle up into what looks right. Set The inside of the circle to 35 mm and cut Setting set to Outside shape path. This is the tool offset setting. These circles are deleted as they are already pre punched and they act only as visual guides to position the text so they look correct.

The greyed out bar is the insertion point for the text. The type and size are set in this flyout window.

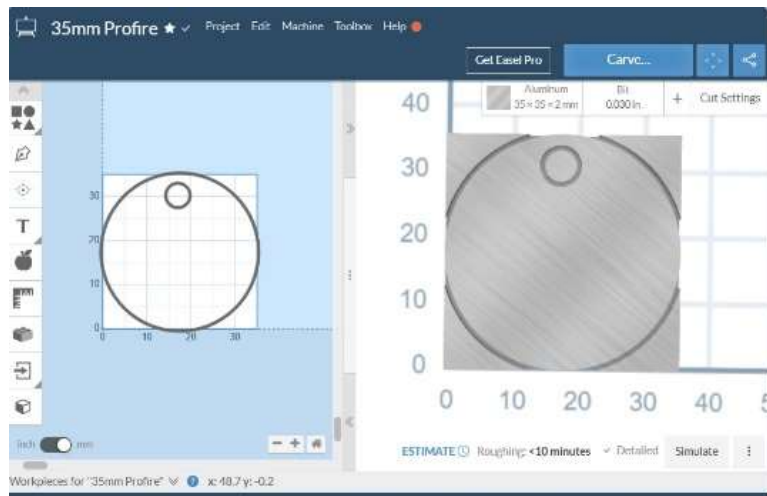
To Add text select the "T" button and select the style of text that you want to use as only text styles without a "PRO" by that font type can be chosen in the free version of easel.

Remember to set 00 position to the front left position by turning the machine on with the spindle just touching the work piece.

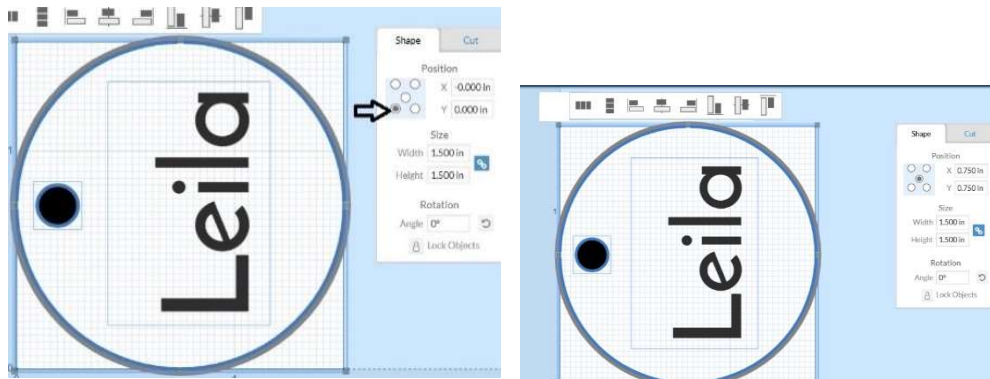




Notice that the second "H" is waiting to be entered in the above image.



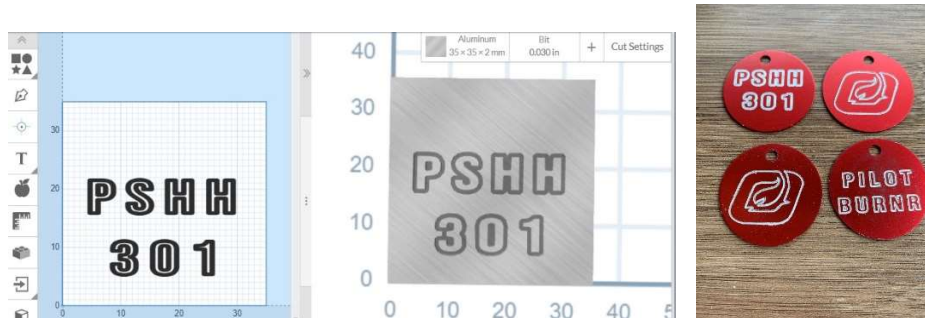
It's very important to take note of the location. This location will determine where cut dimensions and positions are determined from.



Notice the position text box displays for the X and Y coordinate differences when the middle button is active. Easel will always start the spindle at left front corner and not the position button.

The bottom left corner is set to 0,0 and while the other image is set to 0.750, 0.750. The free version the program will always choose the front left to start working as the start program position which is why the part position needs to be minded. The material size can be changed at any time which makes it very easy to center things with the "Center to Material" command while the center button is very handy for many things such as accurately positioning of components.

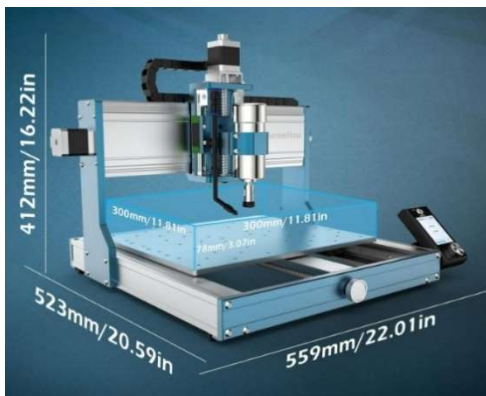
Samples - Aluminum machinery tags



Zooming out shows a light dotted section that show the maximum work space of the work and in light blue 00 is shown at 0 0, the starting point for the cut or engraving. The workpiece is shown in white. The dark lines give an indication of the depth of cut. The darker the colour the deeper the cut. 35mm are the workpiece limits and the machine limits are set in the "Machine" tab and the "Edit your Machine" button.

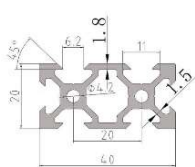
Enter the Genmitsu 3030-PROVer Max CNC router, it was launched in LAS VEGAS, Nov. 2, 2023. SainSmart, a leading provider of innovative CNC solutions, proudly announced the launch of this cutting-edge addition to their lineup.

I started seriously looking at the 3030 ProVer Max and the 3020 variants about 2 years ago about the same time that I got an inexpensive 3018 that I started was looking at improved accuracy components as my previous attempts to make this type of router by ordering specific parts such as 2020 and 2040 extrusions haven't been very successful. It was a lot like burning candles, lots of pungent smells going up in the smoke. I grew up in a 2d cad world and can visualize 3d in 2D format quite easily from isometric drawings since and I never had a machine that worked in 3D so there was no need to know more. So, I bought a low end 3018, the wiring on my 3018 looks very amateurish and messy on a shaky frame as it is mostly all after thoughts and the added limit switches were very, very troublesome.

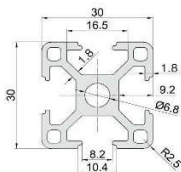


The big break though for me happen when I tried using a program called Easel on my 3018. It was so nice that I could run a CNC program from inside Easel and make changes and adjustments on the fly. I didn't have to save the program as a .text file and then convert to a .nc file and then run another program. Finally, I got to pick numbers out of my butt for feed and speeds to run it on Linux. Easel became my software of choice very quickly. This is what heaven must be like. Yes, I know that free Easel programs have some limitations but... As my confidence grew, several short comings of the way that I was doing became obvious. My 3018 Pro needed some serious upgrades to enable me to make the things with the accuracy that I wanted.

I had to decide that then the best solution was to upgrade the entire machine within my limited budget, it was either the 3020 ProVer weighing in at under 30 lbs., a 3040 ProVer or the Genmitsu 3030 ProVer Max weighing in at over 50 lbs. I am a strong believer that the more machinery mass the better for moving structures. I want to be spending my time making things not spending all of my time making things to make things. Now that I have the right kind of fixtures, vises and clamps for the jobs that I run I am getting more adventurous for my projects. After watching the 3030 pricing go from a high of over \$1200.00 (Cdn) to a low of under \$750.00 (Cdn) for the Genmitsu 3030 ProVer Max, I decided to bite the bullet and get one. Here is our tale of this journey.



2040 extrusion



3030 extrusion



Genmitsu 3030 "C" type of extrusion looks even stronger and with greater stability for the linear slides.

Which extrusion is stronger?

As I got closer to deciding on the Genmitsu 3030 ProVer Max, I started a conversation with the help desk at Sainsmart which is the retailer of Genmitsu products. They were clear and very helpful with their concise answers to my questions. After texting Cassie at Sainsmart many times on a wide variety of questions I knew that I wanted to deal with this company so the ordering details were made and a couple of days later a sale was completed by me. Heaven opened up and the sun rose.

The Genmitsu 3030 ProVer Max Router, some ER11 collets, an mdf spoil board, and a really nice set of low profile clamps which should be delivered on Tuesday after ordering them on Sunday night,

Any details about feeds and speeds that I describe work for me as I am a neophyte machinist (Router....er?) and I share these details with you in the hope that it'll ease your entrance into this activity. Genmitsu certainly makes strong well priced machinery and we are excited to use this amazing machine.

Delivery Day is nigh and my wife and daughters are excited to use our new CNC equipment!

Upon delivery the first thing that I noticed is the price, it was not for the amount that I thought it would be. This is the only major problem that I encountered. I ordered the products from Amazon Prime and order invoice shows a different price for the router but their pricing seems to changing frequently. I should have ordered directly from Genmitsu. Something else to watch.

So, the amount that I ended paying was over \$200 extra from Amazon Prime's lowest quote as shown on their website. I ended up paying just under \$1,000. Was it worth the difference? Is the machine as good as I am guessing. I'll let you know!

While waiting for the router to be delivered on Tuesday I got an emailed note saying the router was rescheduled and it's shipping details would be provided at a later date. Over a week later all the parts arrived at the door. A couple plastic ties are needed and some double sided tape are needed to complete the wiring in nice standards.



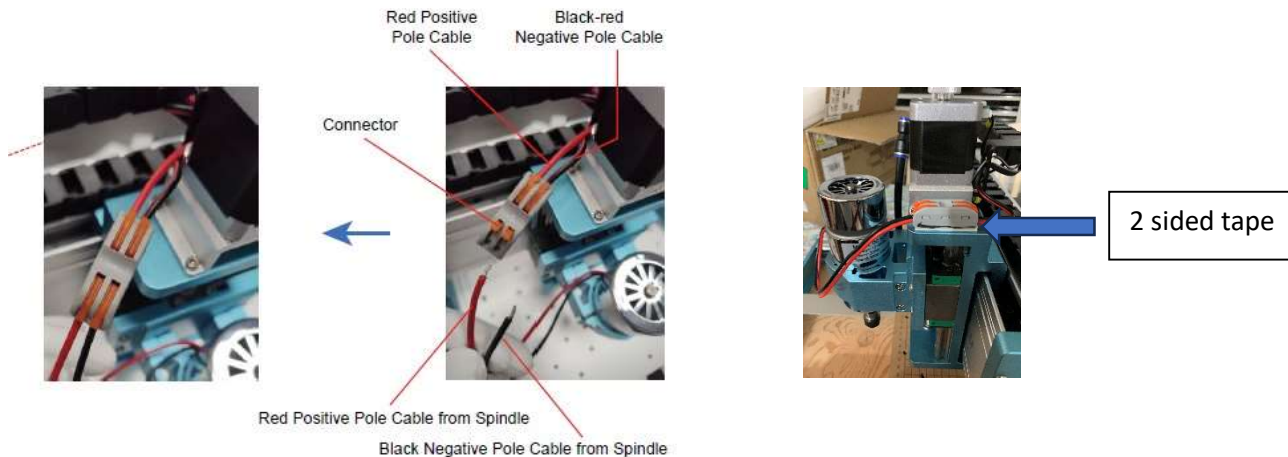
Cable tie wrap saddle type mounts

these flimsy connectors and lack of attaching point for this 4 legged wire spider. A small piece of double-sided tape under the spider solved one of these issues. To install these questionable wire clips, first the orange tab is rotated up as shown on the connector orange line below. The wires are installed with the orange tab fully rotated back 90 or so degrees. The pre soldered wires are colour matched and inserted into the hole and the tab was rotated down locking the wires in place. The wires were gently tugged to ensure that the wires were being firmly held. I checked the wiring tightness for the full travel of the spindle assembly.

The only real complaint that I had about the 3030's assembly worth mentioning was

these flimsy connectors and lack of attaching point for this 4 legged wire spider. A small piece of double-sided tape under the spider solved one of these issues. To install these questionable wire clips, first the orange tab is rotated up as shown on the connector orange line below. The wires are installed with the orange tab fully rotated back 90 or so degrees. The pre

There are 10 or so of these little cable tie clamps included to fix the cable sleeves to the wire bundles and into the cable mounts. Initially I found locations for 6 of them, Did I miss any? Did you?



connector

SainSmart was very quick in their attempts to try and resolve the all of my issues. They also offered to adjust the prices to meet or exceed the discounts offered on the internet. They responded very positively so I will be quick to give them a strong positive review. Now, it's on with the show. I grin a great smile or at least, a hearty grunt of great success as I end this part of this purchasing journey. I am now a proud owner of a Genmitsu 3030 ProVer Max.

#### Day 1 – Delivery and set up

Unpacking was very easy as all of the components are well supported in purpose built foam cages. I am adapting a MDF shelf/ desk unit to put the router on as well as associated stuff (including swarf) contained and the machines is still relatively easy to be transported. I want to have the setup to be easily setup of disassembled to transport.

Initial inspection of the attached labels showed that the driving voltage power supply is a multi tapped voltage transformer. Branch 1 is a 48 volt at 6 amp or about 288 watts and the other branch is 24 volt at 96 watts, I suspect that there is 5 or 3 voltage tap somewhere also.

I fired up my laptop which already has the driver CH340SER installed for my 3018 so I only had to change a couple of settings to reflect the different axis travels and power settings for the 3030. These programs drivers are under the tab drivers and Post Processors.

The next thing that I notice that the frame has 2 rock solid feeling extrusions (?) for the sides rather than the widely used 3030 hollow extrusions used on 3020s or 3030 wannabees and similar 30 something routers. Although a setting for the 48 v spindle motor isn't obvious, Genmitsu has assured me that the electronics default to 48v. I will check these settings later in the grbl. I feel that this 3030 is Genmitsu's Golden child and I am very surprised that Genmitsu didn't spend more time with the interface.

The wiring harnesses are done very well with my only source of complaint is the power connectors for the spindle. After learning how to hold my tongue in the exact right position solid connections were achieved. I will be changing these connectors out in the future after I get a more powerful spindle.

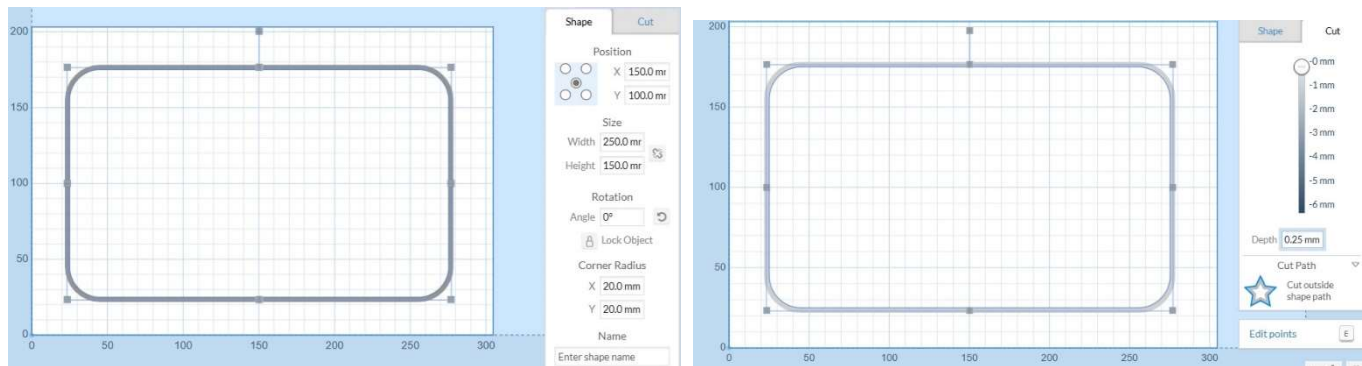
The next project was fitting their pre made spoil board which is very nice and should protect the table perfectly but isn't included in the packaging. A point of concern to me was that both the MDF and the aluminum platen are threaded making me think that the spoil board is going to be distorted if both sets of hole threads are engaged by a stud or bolt. I don't really want to remove all of the threaded inserts so I made a note to remind me to be aware, I will likely make a special spoil board just for using double sided tape or masking tape and CA glue. SainSmart's spoil board might have a good use, Hmmm, I will probably engrave cut some reference lines into this board to allow quick

alignment. But that is a tomorrow's project. I have been warned that MDF is not dimensional stable but I usually don't worry about the 10<sup>th</sup>s of a hundred thou.

With the boards powered up, this machine is now working with the basic setup as Genmitsu envisioned. Big sigh of relief.

Now that I had the router working it needed to be fine-tuned and this isn't really necessary on the 3030 ProVer Max, remember linear slides and ball screws unless you're that kind of exacting builder. I'm not but I do like the things that I try to make have the appearance of good workmanship. There are many how to videos on YouTube to look at if you're interested in improving your quality and this machine will deliver very high quality that might exceed your expectations and others.

For your own practice and peace of mind I suggest that you mount a spoil board and scale the drawing to fit the work piece.



I just did a quick test by drawing a rectangle and centering this box on the material size that you have already set. The box that I have drawn is 250mm by 150mm and .03 wide by 0.25mm deep. The bigger that this rectangle is the easier it is to see any errors in the movements. It is also centered at x=150, Y=100 with a 20 mm radius on both the X and Y axis. Both corner radii are set to 20mm. I have set the cut depth quite deep just in case the board is not parallel and perpendicular. I propose that you change the DOC to be just so the cutter will scratch the surface everywhere as that will help show how accurately the machine is moving.

A 15-degree V-bit is perfect but 30 or 45 degrees will do as well. The smaller the included angle the easier to make a good guess on 1/2 or 1/3 of a millimeter.

I encourage you to toggle through the "Cut paths" and watch how dimensions and positions values change for each setting.

After you are satisfied grab your favourite ruler or measuring device and check how the paired dimensions are compared to their partners.

Back to the task at hand.

Some of the lesser-known specifications for the 3030 ProVer Max as of March 2025.

The axis's are guided by dual HG15 linear rails on all 3 axis.

Spindle Power: The spindle motor uses 48VDC at 300W.

Stepper Motor Power: The NEMA 17 stepper motors used are rated at 1.68A, with 0.45Nm of torque.

Step size is set to 1\8 step. (giving 1600 steps for 1 rotation of the motor)  
 Stepper Holding Current: Yes, but unfortunately, the holding current for the stepper motors is not adjustable. Still, some is better than none and the chosen power level gives nice feed back from the motor.  
 Laser Power Consumption: The machine’s mainboard can support up to a 10W laser and using a 10W laser doesn’t significantly affect overall power consumption.  
 Grease Type & Maintenance: The grease (recommended by Genmitsu) is a fluorosilicone lubricant but SainSmart is recommending 3-IN-ONE oil on their website. <https://www.sainsmart.com/blogs/news/ultimate-guide-to-cnc-machine-maintenance>.

I am very partial to using a very thin application of Molykote white lithium grease or automatic transmission fluid. For reapplication, it is recommended that a thin coating of oil/ grease every few months or more often based on your usage.

Tuning or calculating your Machine movement as described by [GRBL](https://www.grbl.org/adjusting-steps-per-mm). <https://www.grbl.org/adjusting-steps-per-mm> may not be needed but it might be nice to know and build confidence in your equipment. The 3030 ProVer MAX comes complete with real ball screws , no acme threads, and quality linear rails, no flake covered springy rods, so checking these movements really are not necessary for this

machine. My 3030 is well inside the quoted tolerances of 0.05mm which makes me happy as I won’t have to worry about the tolerances for a while. If you want to check them then look at \$100, \$101, \$101 values for interest’s sake. And measure the spindle and platen movements.

It is usually NOT recommended that newbie users modify the GRBL settings, as they are optimized for the best performance and safety of the machine. But save a copy of the original source to enable an easy return to factory settings. That being said, seeing what grbl is actually doing is very nice. That being said, SainSmart has a webpage devoted to GRBL and its settings. <https://www.sainsmart.com/blogs/news/new-tutorial-tuning-your-grbl-cnc-settings>

Side Plate Material: The side plates are made from high-quality aluminum extrusion for enhanced strength and stability.

- [Edit your machine](#)
- [General Settings](#)
- [Machine Inspector](#)
- [Set up new machine PRO](#)
- [Drivers and Post Processors](#)

Setting up the Genmitsu ProVer Max 3030 before use I prefer to start with the the “Edit your machine” button.

The machine settings screen pops up so setting the dimensions of the work area in inches or millimeter by switching the toggle switch on the lower left bottom of the screen.

Unplug router and install V bit in spindle.  
 Plug in Router and turn on the controller.  
 Connect to internet. Open Easel. Left Mouse click on Project.  
 Left mouse click on Properties.

Type a name for your project – I suggest “project 1”, left click on “X” in top right corner or left click on “Close” after you save the settings.

Depending on who you bought your router from it probably included some 30 degree or 20 degree coated V bits so install one in the spindle. The "V" bit settings are not included in the free version of the Easel so use 0.100 for bit width when drawing as it visually shows if the cut material is getting too thin. You'll have to remember to switch the width back to 0.03 or some number in between when cutting depending on how deep the line will be. I general use a bit width starting at .05 and increase it by .005 as I go deeper.

A good starting point for Genmitsu 3030 ProVer Max for engraving anodized aluminum is:

Feed rate - 5 inch/min

Plunge rate - 5 inch/min

Depth of pass - .003

Motor speed - 12,000 rpm

Final Cut depth - .005" I try setting with my cheapest or most worn bits for testing products or materials.

Left click on the "Birch Plywood button and change the material listed in the drop down menu to the relevant material. I personally like to use "Plexiglas" (acrylic) type material as if your settings are too aggressive or too slow, it melts into a sticky blob. MDF and aluminum have too many really small particles in the air so I highly recommend the use of M30 masks at bare minimum. Tiny MDF dust and chips should remind you not to forget that other swarf can't be good for you either.

The starting point defaults you the front left corner of the material to be cut. This means that the table platen is all the way back and the spindle is on the left side.

Left click on "Machine" on the title bar.



and the Machine Settings pop up screen is shown.


Machine Settings ✕

Name  
3030 starting-config

Machine  
other

Serial Number

Work Area

 X 310 mm  
Y 256 mm

Spindle Controlled by  
Hardware

Spindle  
Other

Default Spindle Speed (RPM)  
30000

Accessories

Dust Shoe

Z Probe

Coolant

Configure Z Probe

Uninstall this machine

Cancel Save

Add the machine name to the button and adding the serial# is optional. Set the actual dimension of the mechanical work space available.

Sainsmart has assured me that their software automatically defaults to the correct setting, Advanced users can alter most of these setting in Grbl. Save the settings. The “Work Area” is defined by the limit switches so to get consistency in these machines is fairly easy as you set the home position and “0” X and Y axis.

Using the offline controller drive the platen table to the other pair of limit switches. Record the numbers and enter them into the Work Area.



These settings don't need to be changed until you get comfortable with how's and why's of the router and how it moves.

Safety Height is the height that the spindle moves up before the Z axis moves. Step Over is the amount that the

General Settings ✕

Hold up! Only modify these settings if you know what they mean. They apply to all machines used with Easel.

Safety Height 0.15 in Origin Safety Height 0.25 in

Step Over 40% V-Bit Detail Step Over 1%

Accessory Commands

Spindle Control [Go to Machine Settings](#)

Enable Repeat Carving

If you can't use the Easel Driver, you can download the g-code directly here. Also available under Project menu. [Download g-code](#)

Machine Inspector

spindle moves over to widen the cut called for on the drawing. Eg. If a 1/4" wide pocket was being made with a 1/8 wide endmill then the spindle would first cut a 1/8 slot and then move the spindle over 40% of 1/8" or .05" (0.123+.05 =.173, next spindle movement is another 0.05 giving total movement of 0.23, and a final movement of 0.02 making 4 passes to complete this operation.

Origin Safety height is the spindle height over the Z axis setting.  
V-bit Detail Step Over is only effective using the PRO versions

### Set up new machine **PRO**

These settings are only available to PRO users. "Free users can only have one setup in the program but all settings can be changed as needed. I use both my 3018 pro and my 3030 on my laptop. Takes a few minutes to switch the program to the correct settings but since I have one machine running off the SD card while the other machine is connector to the laptop.

### Drivers and Post Processors

allows for the Easel drivers to be downloaded and installed when needed. The Post Processors include FUSION 360 and VETRIC ASPIRE.

Before Setting the hard limits, I would strongly recommend that you fine tune the number of steps that are made to get a known movement on the platen. James Dean has a nice video on how to calibrate the number of steps per a unit of movement and I encourage you to follow his procedure. This step is not really needed as the 3030 ProVer Max is almost always within the stated parameters but If you would like to test...

[Calibrating your CNC axis and steps - Beginners guide](https://www.youtube.com/watch?v=nGwUf8uNWBu&list=PLINLrwlA2k237X-55XLI0L3h5Y6PzFFvw&index=2&t=407s)

<https://www.youtube.com/watch?v=nGwUf8uNWBu&list=PLINLrwlA2k237X-55XLI0L3h5Y6PzFFvw&index=2&t=407s>

Press the zero X and Y axis button on the off line controller. With that done move the all 3 axis until their limits switch are activated by the use of the off line controller. Their settings will be shown in the "Machine Settings"

### Home position setting.

The are a couple of ways to set this miss understood function. Its main purpose is to put the machine into a known position safe position so that no moving element will collide into any other element. Easel likes to put the spindle into the front left corner in the free version. This position is also known as 0,0,0 as all axis are at the start of the measuring system so both X and Y are at the front left corner of the machine. Easel Pro allows you to easily change the home position.

Easel has a few different ways to repeat carves or cuts. The easiest is to set repeat in the general screen. The second easiest is to push the carve button again after placing a duplicate work piece and/ or press the repeat last carve.

The screenshot shows the 'Keyboard Controls' section of the Easel software. It features a grid of directional buttons: a home button (house icon), X-axis buttons (+ and -), Y-axis buttons (+ and -), and Z-axis buttons (UP and DOWN). The current coordinates are displayed as X 0.000, Y 0.000, and Z 0.000. Below this is the 'Interval' section, which includes a unit selector (in/mm) and a table of interval values for X, Y, and Z axes. The '0.1' interval is selected for all axes. A 'Custom XY' field is set to '0.1 in'.

Interval	0.001	0.01	0.1	1
X	0.001	0.01	0.1	1
Y	0.001	0.01	0.1	1
Z	0.001	0.01	0.1	1

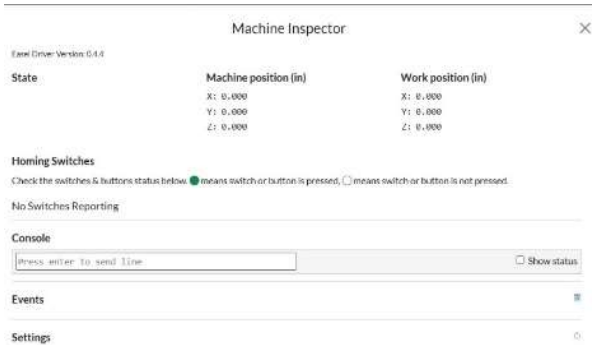
Custom XY: 0.1 in

Small routers use 3 of the home position sensors as limit switches to prevent the platen or table from crashing into hitting frame at the movement limit thus they are true limit switches. The other three switch are doing dual duty both limit and homing.

Get in the habit of zeroing the X and Y axis whenever you start using the machine or after any type of incident. Set the home position and the controller should show both the X and Y coordinates are zero. Then move the spindle to the desired work position.

The platen will travel first to the “Z” home position so the spindle is raised until the limit switch is activated. Next the “Y” and “X” motors travel to their home position. Zero the axis using the offline controller. There are several ways to set the home position or the work position depending whether you have the drawing homed to 0,0, or set to the edge of the material or set to some other machine setup.

As the bulk of the work that I do with the 3030 ProVer Max is either making dice or machinery tags. The easiest for me is to move the spindle to the desired XY position with the hand wheels and then turn the machine on. This sets the front left corner of my vise to be 0,0 leaving the Z position easy to figure out with the Z probe. If you are working off a program stored on a flash drive to set the Z position install the Z probe under the spindle and lower the spindle with the hand wheel until the indicator lamp is just turning on.



The easiest way is to use the custom movement setting on the keyboard control screen. Then move the Z axis down by the height of the sensor probe plate.

## Machine inspector display

The new style of Offline controller takes a little getting used to but it’s well worth the effort to becoming second nature to the controls. The silver dial knob rotates through the highlighted fields. The field “START PROJECT” initiates the program. The field “JOG step” is in very tiny print. XC MM which means the chosen axis will move in the selected direction for as long as the dial is pressed and releasing the button stops that stepper motor. That will get the spindle close to where it is supposed to be. The dial is then changed to allow greater positional precision using the +- buttons. One of the choices is XC—MM, which means that the stepper motor will rotate as long as the button is pressed.



Rotating the dial moves the thru the field until it reaches the return button where the dial must be rotated in the other direction to move backwards thru the screen.



The PROBE subroutine is easily selected as is the HOME and SPINDLE speed subroutines.

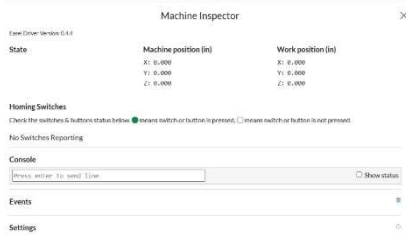
The power on or home screen gives the user two choices either the “Setting” screen or the “Prepare” screen. In the setting screen, users can fine tune the probing settings including probe speed, tool

height, Z axis rise height, 3 or 4 axis mode selection and language selection. I see no need to adjust the probe speed unless every millisecond counts for you.

The probe height is the measured height of the PUCK using calipers and the number entered. The “Z” Rise Height is the distance that the probe needs to clear any fixtures or clamps that might meet the spindle as it moves. A word of caution as if the amount that the spindle is raised to clearance height is greater than the remaining Z axis travel, it will error out! To correct the error the machine must be rehomed and the spindle position set back to its starting position.

Entering or moving to exact points such as the position “G01 X3 Y2 F200” can be done from this screen. The spindle moves 3 units to the right from home position and 2 units up from the Y Home position at the speed of 200 units. Please make sure that the movement could be either from HOME position, Last start position, or from the current spindle position. These units can be either inches or millimetres depending how the slide switch is positioned.

This point can be manually typed into the page “Machine Inspector” as the work position if you are not using “home” as your 0,0,0 start position or in the case of K.I.S.S. I normally use drawings made in easel and using the G code program within it. Home position is shown in the Machine inspector” screen.



## Machine inspector display

You will need to open Machine inspector” to send this grbl setting change.

**Press ctrl+shift+d** to open this page then under the “Console” header type the position that you want the spindle to move to or the change in the control settings.

If you set repeat to on, the router remembers the last machine start position by using the use last position button.

# BASIC OPERATIONS in Easel

## Prepare screen on GRBL controller

One of the impressive features of Easel is the ability to simulate a carve and to watch the machining take place virtually and to be able to slow the cutter down to ¼ speed. Changing the bit allows viewing as to what effect that change will have. Already the Genmitsu 3030 ProVer Max and Easel are near the top of my favourite tools.

To starting with a new drawing - Click on project.  
Let click on “new”.

### Left click on the Birch Plywood” button.

Choose your material from flyout. I prefer to use the acrylic screen for drawing as it has many colour combinations to allow the drafter to choose the best viewed colour combinations to be used while designing. The material will do some “magic” behind the scenes if you are not careful to set the material back to the actual material.

Set the desired dimensions of your work piece.

Be sure that the Enable tiling slide button is moved to no

Be sure to select “Front Left Corner” (the only setting that works with the free version if Easel)

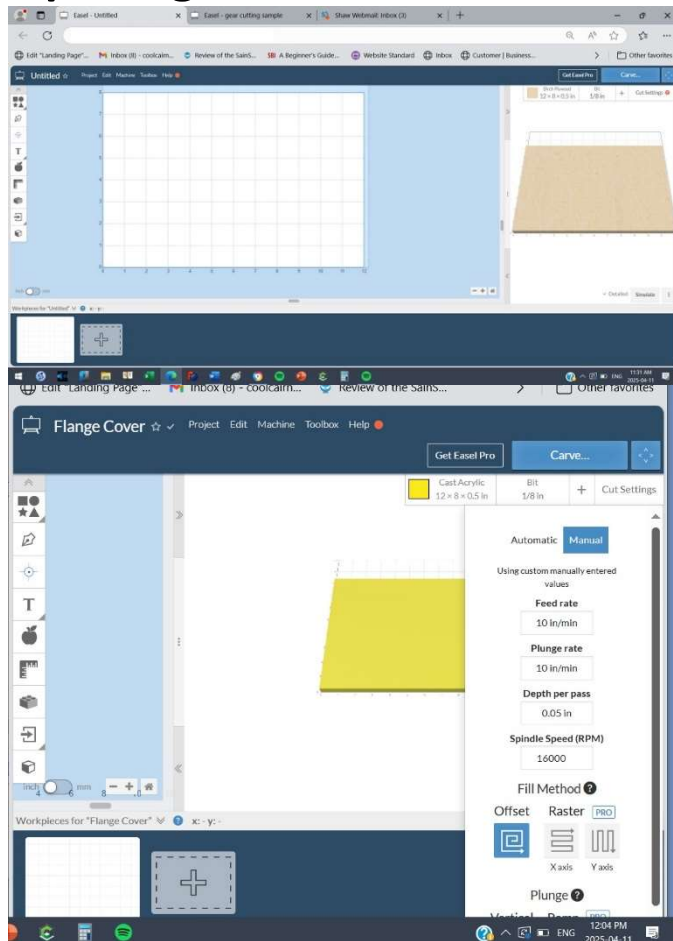
Choose the bit size, I would choose “Other” with a dimension of 0.100 inches for a “V” bit to start using this machine. Left click on Cut Settings and leave slide switch on “Automatic” until you are comfortable. This allows the router to think that it is smarter than you which is a great place to start from. I like starting with high spindle speeds and slow feed rates. Then raising the feed rate until the spindle doesn’t sound happy while cutting. You can increase speed and feeds up to 2X using the slider at top right position. Be sure to change these values in the “Cut settings” window if you tweak the settings for these types of machining operations.

My usual starting settings for the stock 300 watt spindle in 1/4” acrylic with a 20 degree V bit are:

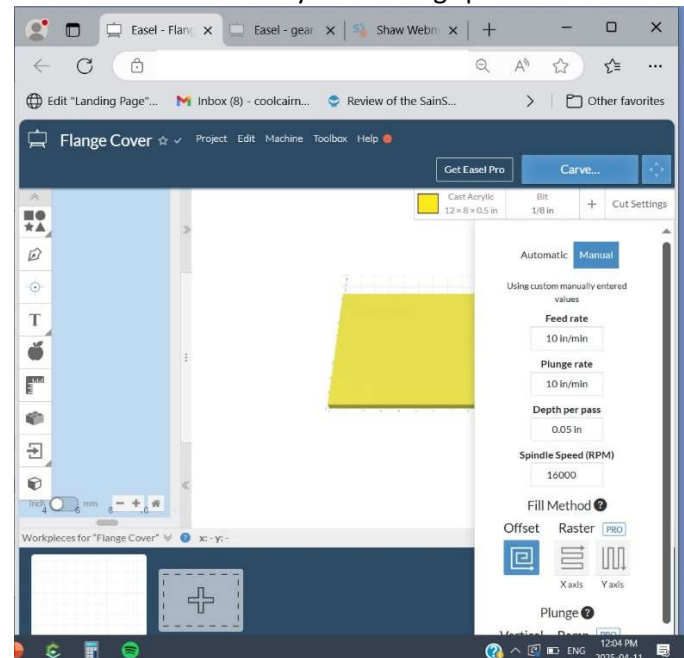
These are some more settings that are commonly promoted as a good place to start

bit	step down mm/m)	step over mm	feed	material
30 degree V bit	3 (0.118”)	.9mm	2200	hard wood
2 flute endmill 6 mm	1mm	1.7mm	1000	6061 aluminum
2 flute endmill 6 mm	1mm	1.7mm	800	brass
2 flute endmill 6 mm	.8mm	1.7mm	800	steel

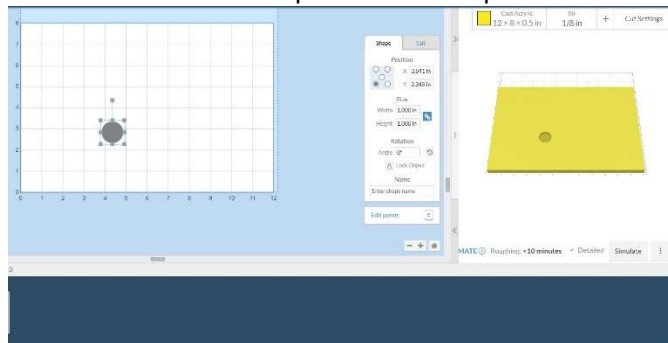
# Opening screen for EASEL and a more detailed project.



Left click on project, left click on Properties, enter your unique name for your project drawing. (Flange Cover). Left click on Birch Plywood and select both the material and the work piece dimensions. This example uses a piece of 4 by 4 by 1/2". Enter the bit size (1/8). Left click on "Cut Settings". Left Click on "Manual" and enter your starting speed and feeds.

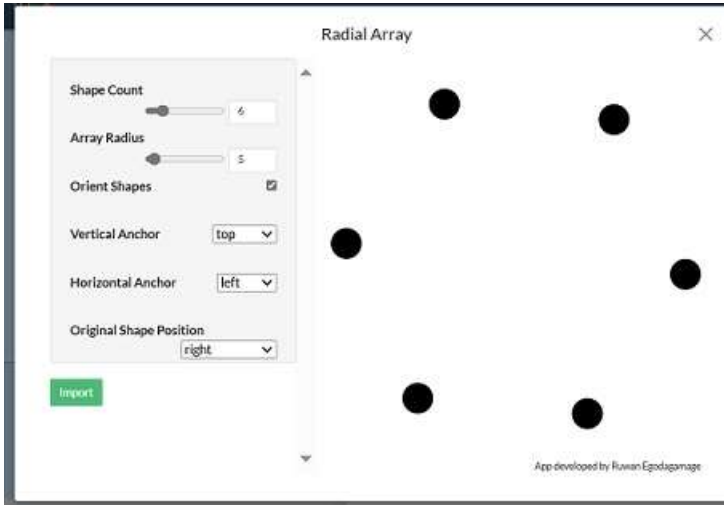


Choose the top button to open the drop-down screen and open the circle, triangle, star, and square shapes button. Left click on the circle button. The Shape / cut window is shown so you can set the circle size. You can lock the height and width button to keep dimensions equal. Set size to 1".



Left Click on "Cut" tab  
 Left click on "Cut Path" and change to "Cut outside shape path"  
 Left Click on Shape" tab.  
 Change "Position to center button.  
 Change "Y" Position to 2"  
 Left click on "Apps"

Left click on “Radial Array”



Change “Shape Count” to 7 and “Array Radius” to 1.75. Vertical Anchor set to “middle” Horizontal Anchor set to “left”, and Original Shape Position is set to “top”

Left click on Import button.

Visible is not really what we were hoping for but success is a couple of clicks away.

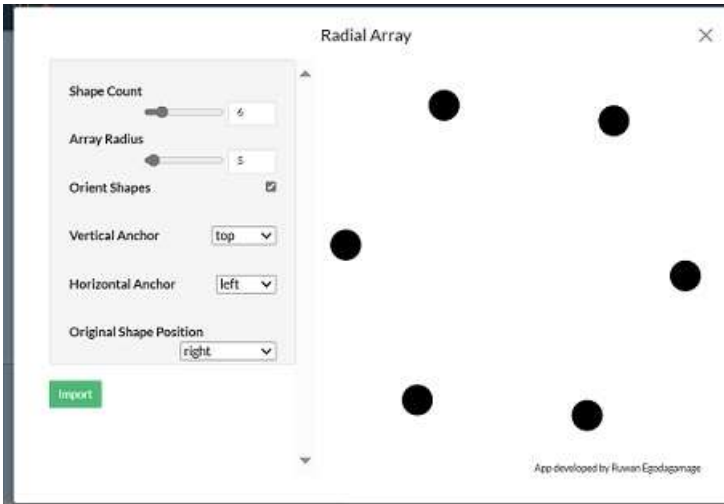
Change the bit size to 1/16” and while the array is still highlighted left click on “Edit” and scroll down to

“Center to material”.

Left click on the grey circle, the darkness of the line is indicator of its depth. Click on this circle. Switch tab to Cut. You can either use the “Center to “Material” or switch to the “Shape” tab and enter the XY position directly.

Highlight all objects and change bit size to 1/8.

Click on



# Radial Array



Shape Count  
7

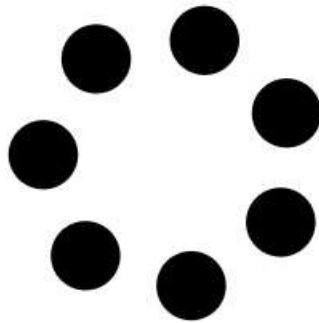
Array Radius  
1.75

Orient Shapes

Vertical Anchor  
middle

Horizontal Anchor  
left

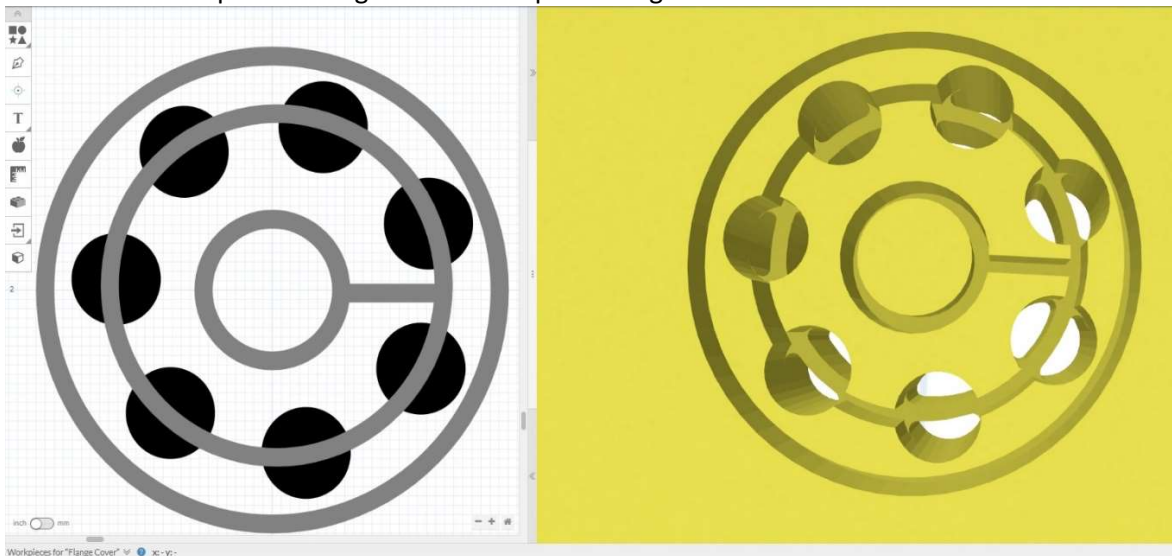
Original Shape Position  
top



App developed by Ruwan Egodagamage

Import

Here the finished part drawing - The interim plate design



There are many things that can be easily designed and built with Easel and for smaller routers, it is truly wonderful. All that you have to do is imagining things that will fit into your machines work envelope and get busy trying stuff.

One of my favourite things about this router and Easel is the ability to easily use both machine position and home positions. An example of this is to first home the spindle and then move it to the work start position. Proceed with the cutting for that work piece. Load in a new blank then move the spindle to the work location and make the piece. If all worked according to Holye on the previous part then click on use "Last position."

There is no doubt in my mind that the Genmitsu 3030 ProVer Max is the right machine for someone that wants to build "neat" things out of material harder than balsa wood without taking up all of the very limited available space in my basement shop.

[Easel](#) has a very good help section as well as a large [online group](#) to aid you with your projects. If need more help than a couple of minutes of looking and reading their help section just, send either Easel or Sainsmart a quick note depending if is a hardware or software issue. Unfortunately, I have trouble with joining or following this group as "facebook" interferes with some of my other programs.

A few of my friends and some of the model engineers that I know advised me not waste time and money on a very basic cheap router but now I realize that it was a very cheap education and the purchase of an inexpensive 3018 was the correct path for me to take. I am very pleased with my progress into this hobby and it is because I started out with the basic machine and found an easy software to use. I personally do not see why Easel does not get more respect and use by home shop machinists.

Was it worth the price difference and related costs to make this upgrade to a Genmitsu 3030ProVer Max? A resounding yes reverberates and echoes in my mind and best of all, my failed attempts scrap bin has never been so empty. I definitely have more talent than I sometimes think that I do.

I will mention that I may have unknowingly made some errors in this article but that will add some personalization and teaching moments to YOUR projects. I have still much to learn and many more projects to undertake.