

Milescraft 3D Pantograph

Review by Dean Bielanowski

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Part 1.



“To be honest, I half suspected the pantograph to be a bit of a pain in the backside to use just looking at it, but my suspicions have been rather wrong in this case. Priced at around AUD\$120-\$130, the 3D Router Pantograph is a good step up from Milescraft’s more basic Signcrafter kit. I would definitely recommend the pantograph if you are keen to try a little more sign making with a little less frustration.”



Always the Better Idea.

If you are into wooden sign making as a hobby, you will probably be familiar with some of the limitations of the sign making kits available on the market today that are marketed to the DIY or hobbyist woodworker. And this limitation lies in the fact that most sign kits come with only one or two sets of letters in a generic font. And it is tough to find different letter templates that will work with the kit.

Well, with the 3D Pantograph from Milescraft, this is no longer a problem. The amount and type of templates you can use is only limited by the number of fonts you can print from your desktop PC. And what's more, the 3D pantograph can also replicate 3D shapes and images. For this first part of the review, we will look at 2D routing with the pantograph. Let's take a closer look.

The 3D Pantograph

Some might be familiar with a pantograph from their school or childhood days. They were the in-thing in the craft world at one point in time, allowing crafters to copy an image onto paper or scale an image up or down simply by tracing it on one piece of paper using the pantograph, and on the other piece, the pencil or marker would recreate the image desired.

In these modern times, much of this craft has been converted to, and is achieved by use of CNC routers and other computer driven cutting tools, but the home hobbyist sign maker likely doesn't have, or would want to spend the many thousands of dollars needed for just a small CNC routing setup. The 3D Pantograph provides a cheaper, albeit less sophisticated option. But with care and practice, you can achieve excellent results that rival the computer driven tools.

Setup

The 3D Pantograph comes in a fair sized rectangular box and includes most items you will need to get started. You will have to supply a router to attach to the Pantograph (it accommodates routes with bases up to 6" diameter), as well as construct a mounting board and holding jig to hold your workpiece while the routing is taking place. A dimensioned diagram is supplied in the instructions to make this (You need to supply the material though - a couple boards (chipboard or ply works best) and half a dozen screws is all that is needed).

Installation is fairly straightforward, following the instruction sheet. A few text instructions would not have gone astray here to help avoid confusion on one or two of the steps as the whole instruction sheet is image guided only. Nonetheless, the installation is fairly straightforward and I only had one item put on incorrectly, which was easily reversed and corrected.

Once your pantograph is assembled and you have it sitting on your mounting board, you then have to square things off, basically so the router plate is sitting as flush as possible with the surface of your sign board piece. You will need to complete these steps each time if you use different thickness boards for your signs. If you use the same thickness, then you really only need to do this once, but an occasional check won't hurt either. Basically, with the router secured in the router plate, sit the plate on top of the board you are using for your sign.



The router pantograph set up and ready to go.



Only a small router is required for this type of work. My 1200w Ryobi handles it no problem.



The tracing arm/rod. The rounded plastic tip prevents the paper templates being damaged.

Now, obviously the “legs” of the pantograph will need to be touching the mounting board for support, so lower these to touch if required. Now you simply have to make sure the “arms” of the pantograph are sitting the same distance from your mounting board on each end. So the left arm (when viewed from the front) and the rear arm need to be level across their length. I just used a small ruler to check. Adjust the adjustable rear feet screws as required to level the arms out. This only takes a minute. Once done, have a quick peek at the underside of the router plate to ensure it is sitting flat on the sign board. Don’t worry if you are 0.00001” or even 0.005” high on one end. Just check by eye. If it looks flat, it is flat enough for the purpose.

OK, now you have to secure your sign board to the mounting board. No clamps are needed, which is good because these could get in the way of the pantograph arms. Instead, you basically wedge the board between two stop blocks that are added to the mounting board when you were constructing it (see photos). These plastic wedges work well and hold the board in place against the blocks.

Next you need to decide roughly where to place the printed letter sheets so you can trace them. Here you use your own judgment. There is no exact or correct spot. Basically, place a letter down on the board, and use the tracing rod to follow around the outside of the letters. Note the position of the router bit in the router (which is mounted in the router plate) and check you are not going to come too close to the edge of your sign board. Always cut your sign board to a larger size and then cut it down to final dimension later on. This provides a margin for error when using the Pantograph. However, once you have created a few signs, you will have a better idea of a closer dimension to cut your boards.

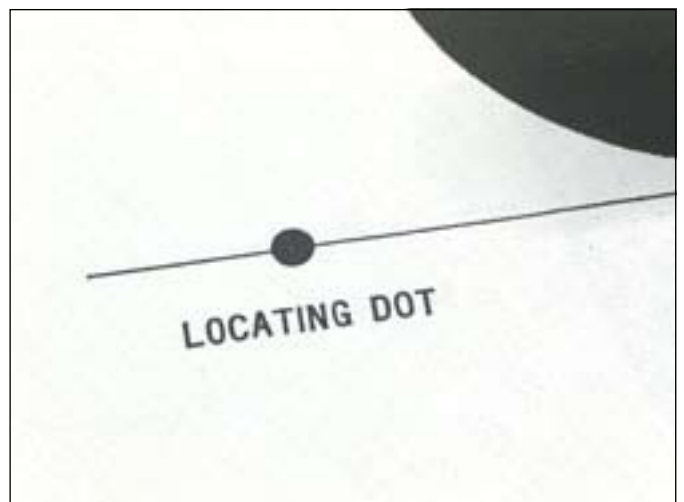
Now, each letter/number sheet of the set that comes with the tool (there are 4 font sets included) has two dots marked on them. One says “LOCATING DOT” and the other says “SPACING DOT”. Unfortunately the instructions don’t really say how these are used, and to be honest, I was stumped for a little while. But I did come up with a method for accurately spacing the characters that seemed to work well. Firstly, what I did was extend the line that these dots sit on onto my mounting board. So when I mount the next letter on the board, I can line it up pretty much in the exact same position and angle as the last sheet (see photo). Now, once the first letter is routed, I place the next letter in position, move the tracer rod so it is sitting on the Locating Dot on the next letter, then move the sign board across until the outer edge of the router bit is just shading the right edge of the routed letter on the board. Because the Locating Dot is spaced to the left of the letter on the sheet, when you move the router trace rod over to start the letter, it creates the required spacing you need. I hope I have explained that well enough. It’s one of those things that is hard to grasp unless you have it all in front of you so you can see how it all works with one another. Note that this is probably not the actual way to do it, but with lack of instruction in this area, you need to improvise. I also found that this method doesn’t require you to mark your sign board for spacing, and it seems to work just fine for me, so I’m sticking with it!



The only fixed part of the pantograph is the plastic pivot base. Note it also has a power cord retainer to keep your router power cord out of the way when in use.



The two plastic wedges are an extremely effective clamping system for the sign board.



The “Locating Dot” is on every letter template. I used this to help space the letters.

Using the Pantograph

So far I have only discussed the processes for routing in 2D... i.e. routing designs or making designs. The pantograph can do 3D as well, apparently, but I need to find a good 3D pattern to try and replicate with this tool, so the 3D part will be included later as a second part. For now, it's all 2D work. Also, I'll offer some advice of what not to do.. I guess you could call these newbie mistakes.

Ok, for my first ever sign using this Pantograph, I thought I'd go for something simple. A 3-letter sign for my son. His name is "Jay" so that would be a quick and simple sign. To complicate things, I chose the Oriental/Chinese style font from the set. Each letter sheet has the upper case/capital letter on one side, and the lower case on the other. Good thinking! So I went with upper case "J", then lower case "a" and "y".

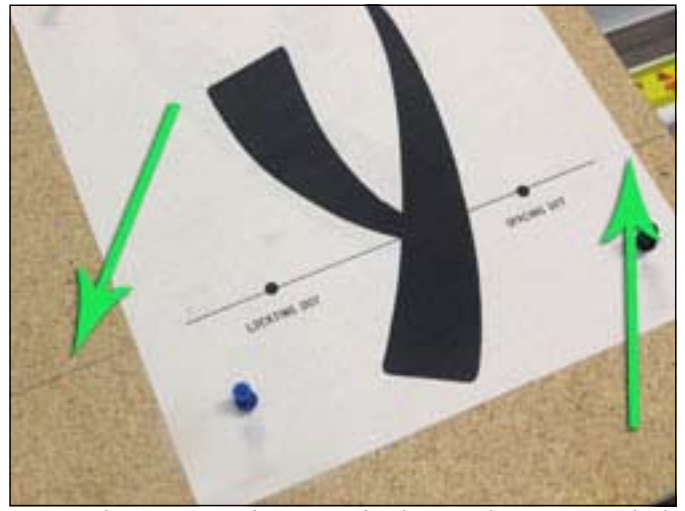
I set things up as per above. I used a standard straight cut bit, but I think a spiral cutting bit would work much better. I've got one on order now!

Now, to craft the "J" all you need to do is follow the outline around the letter on the sheet with the tracing point/rod. The router moves in the same manner as the tracer moves, so you can create the letter accurately. And of course, this means that virtually any letter, or design can be routed out too. You can even make your own letter sheets using your computer and whatever font you require. The options are almost unlimited!

But I digress... back to it. Note that the pantograph reduces the size of the letters by either 40%, 50% or 60% (this is adjustable) so the letters will be routed smaller than the letter size on the printed sheet. Letters can be routed from Simply trace around the outside of the letters. Now, my first "mistake" was to decide to have the outline of each letter run in the middle of the tracer rod tip. In fact, this has the effect of widening the letters a little, and in the case of the font I was using, made them a little less authentic. So always have the outside edge of the tracer rod tip running along or even a whicker inside the edge of the letter. I'll do this for sign attempt number two. Note that this effect can be exaggerated even more too depending on the diameter of the router bit you use. I used a 1/4" straight cut bit, and this would be the maximum you would probably want to use. However, different fonts may dictate different bit widths. For fonts with small points or lines, a smaller bit is necessary. For larger, block fonts with less detail, you could get away with a slightly wider bit etc etc.

Once you have all the edges routed, proceed to clean out the remainder of the material between the edges, if your font requires it. Again, in my haste and anticipation to see how well this tool worked, I didn't do this. I could have routed them out by hand later on, but its best and easiest to do this while the letter is mounted on the board and you are routing away.

With the "J" done, I switched to the lower case "a" sheet from the set, making sure I aligned both the letter sheet



Note the arrows showing the lines I have extended and marked on the mounting board. These help set up all letters in the correct position and orientation/angle.



The arms on the tracer part allow you quite good control to trace your template.



First attempt with the Oriental font. Note that I didn't rout out the middle of each letter. This can be done with the router later, but it is easier, as I found out, just to do it while you are routing the outlines. Nonetheless a good first effort! You can also see the "y" letter routed on the board and the template for the "y" in the photo above. A good match.

on the board, and moved the board over and reclamped it as per the above mentioned spacing process. Then just continue routing, first by plunging the router then locking it in the plunged position, then grasping the trace rod guide handles and working my way around the letter's edges. Same process for the "y".

With anticipation, I took the board out to check how it all went. And for a first go I was rather impressed. Apart from the widening issue mentioned above, which was entirely my fault, the letters came out really well. Naturally, how well depends on how steady you can trace the letters on the sheet using the trace rod, but it was easier than I had expected to be honest. You will get best results when you use more uniform lumber with regard to grain direction, because cranky grain will have a tendency to make the router and bit want to wander a little, so you have to be vigilant here.

I ended up chiseling out the middles of the matters on my first sign, because I should have routed out the middle parts while I was tracing the letters - lesson learnt - but you can see from the photo that although my errors are noticeable, the text came out quite well and is still very readable and functional. Also, my second sign effort, see photo, is much better, since I didn't make the mistakes I made the first time!

Now, to tackle the Script font, which will be a little trickier because the letters physically join and flow. I'll report back on this one later...

Finishing a Sign

There are many ways to finish a sign ready for hanging. Firstly, dimension the sign to final size once all the lettering has been taken care of. You might even profile the edge if you like. To get a good contrast of the letters, what most do is to paint the sign black (or a good contrasting color to the wood). Just splash or spray paint all over the sign face. You don't have to be neat here, but make sure there is a good coating in the letter relief. Once the paint is dry, just run the board through your surface planer at a shallow depth. This will skin the surface of the board and take any paint on the board surface away, leaving you with fresh wood on the board surface, and your relieved letters nice painted black (or whatever color you chose). Now just apply a clear protective coat suitable for where the sign will be mounted and you are done. Easy!

Pantograph vs Sign Making Kits

I have used other sign making kits where you have plastic letter templates that you rout using a guide bush. While these work ok, and do the job, you are limited to just the one or two letter front sets included in the kit. The Milecraft 3D router pantograph does not have this limitation. Also, I found that tracing the letters using the pantograph was just as easy, if not easier than trying to balance a router on top of a couple rails that other kits use to hold their letter templates. There is much more flexibility with the Pantograph. And, as you can see, you can get pretty good results from even your first attempt. Perfection will come with practice. Sure, this is not going to beat a CNC router, but do you know how much they cost? And then you have to often buy the software to use with them too. You are looking at many thousands... and more like tens of thousands for a CNC router off the shelf. The 3D Pantograph is a much cheaper option for the occasional user or home hobbyist woodworker not looking to make sign making their every day job.

Coming Soon; Part 2 - 3D Routing...



Here is a sign for my daughter Jessica. Note I have painted it black here, but more importantly, the letters were all routed out properly this time around.



The finishing process. The "Jessi" sign lettering is spray painted. The "Jay" sign was sprayed just like the "jessi" sign, but has now been run through the surface planer to remove the face paint leaving nice, sharp painted edge letters. Easy!