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As with all machinery, there are certain hazards involved with the operation and use. Using it with caution will considerably lessen the possibility of personal injury. However, if normal safety precautions are overlooked or ignored, personal injury to the operator may result. If you have any questions relative to the installation and operation, do not use the equipment until you have contacted your supplying distributor.

Read carefully before operating the machine.

1. Keep the working area clean and be sure adequate lighting is available.
2. Do not wear loose clothing, gloves, bracelets, necklaces or ornaments. Wear face, eye, respiratory and body protection devices as indicated for the operation or environment.
3. Be sure that the power is disconnected from the machine before tools are serviced or an attachment is to be fitted or removed.
4. Never leave the machine with the power on.
5. Do not use dull, gummy or cracked cutting tools.
6. Be sure that the keys and adjusting wrenches have been removed and all the nuts and bolts are secured.
Limited Warranty

New machines and accessories sold by Laguna Tools carry a one-year warranty effective from the date of shipping. Machines sold through dealers must be registered with Laguna Tools within 30 days of purchase to be covered by this warranty. Laguna Tools guarantees all new machines and accessories sold to be free of manufacturers’ defective workmanship, parts and materials. We will repair or replace, without charge, any parts determined by Laguna Tools, Inc. to be a manufacturer’s defect. We require that the defective item/part be returned to Laguna Tools with the complaint. Any machines returned to Laguna Tools must be returned with packaging in the same manner in which it was received. If a part or blade is being returned it must have adequate packaging to ensure no damage is received during shipping. In the event the item/part is determined to be damaged due to lack of maintenance, cleaning or misuse/abuse, the customer will be responsible for the cost to replace the item/part, plus all related shipping charges. This limited warranty does not apply to natural disasters, acts of terrorism, normal wear and tear, product failure due to lack of maintenance or cleaning, damage caused by accident, neglect, lack of or inadequate dust collection, misuse/abuse or damage caused where repair or alterations have been made or attempted by others.

Laguna Tools, Inc. is not responsible for additional tools or modifications sold or performed (other than from/by Laguna Tools, Inc.) on any Laguna Tools, Inc. machine. Warranty maybe voided upon the addition of such described tools and/or modifications, determined on a case-by-case basis.

Software purchased through Laguna Tools Inc. is not covered under this warranty and all technical support must be managed through the software provider. Software is non-refundable.

Normal user alignment, adjustment, tuning and machine settings are not covered by this warranty. It is the responsibility of the user to understand basic machinery operation, settings and procedures and to properly maintain the equipment in accordance with the standards provided by the manufacturer.

Parts, under warranty, are shipped at Laguna Tools, Inc.’s cost either by common carrier, FEDEX ground service or a similar method. Technical support to install replacement parts is primarily provided by phone, fax, e-mail or Laguna Tools Customer Support Website. The labor required to install replacement parts is the responsibility of the user.

Laguna Tools is not responsible for damage or loss caused by a freight company or other circumstances not in our control. All claims for loss or damaged goods must be notified to Laguna Tools within twenty-four hours of delivery. Please contact our Customer Service Department for more information.

Only new machines sold to the original owner are covered by this warranty. For warranty repair information, call 1-800-332-4094.
Notes concerning noise emission

Given that there exists a relationship between noise level and exposure times, it is not precise enough to determine the need for supplementary precautions. The factors affecting the true level of exposure to operators are clearly the amount of time exposed and the characteristics of the working environment, such as other sources of dust and noise - for example, adjacent machines - in other words, the level of ambient noise. It is possible that exposure level limits will vary from country to country.

| Specification Sheet |

<table>
<thead>
<tr>
<th></th>
<th>Swift 48” x 48”</th>
<th>Swift 48” x 96”</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Motor</strong></td>
<td>3 hp very quiet spindle</td>
<td>3 hp very quiet spindle</td>
</tr>
<tr>
<td><strong>Spindle</strong></td>
<td>1 or 3 Phase Industrial Induction Spindle, Liquid-Cooled</td>
<td>1 or 3 Phase Industrial Induction Spindle, Liquid-Cooled</td>
</tr>
<tr>
<td><strong>Spindle RPM</strong></td>
<td>5,000 - 24,000</td>
<td>5,000 - 24,000</td>
</tr>
<tr>
<td><strong>Controller</strong></td>
<td>HHC Standard Hand Held</td>
<td>HHC Standard Hand Held</td>
</tr>
<tr>
<td><strong>Dust chute diameter</strong></td>
<td>2 7/8” 4 inches With adaptor</td>
<td>2 7/8” 4 inches With adaptor</td>
</tr>
<tr>
<td><strong>Volts</strong></td>
<td>220V single phase / 30 amp</td>
<td>220V single phase / 30 amp</td>
</tr>
<tr>
<td><strong>Ball Screw Adjustable on all Axis</strong></td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Controller</strong></td>
<td>Laguna HHC Controller</td>
<td>Laguna HHC Controller</td>
</tr>
<tr>
<td><strong>Gantry Clearance</strong></td>
<td>8 inches</td>
<td>8 inches</td>
</tr>
<tr>
<td><strong>Machine Work Table</strong></td>
<td>T-Slot</td>
<td>T-Slot</td>
</tr>
<tr>
<td><strong>Z Axis</strong></td>
<td>Precision Ball Screw</td>
<td>Precision Ball Screw</td>
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<tr>
<td><strong>X and Y Axes</strong></td>
<td>Precision Helical Rack &amp; Pinion</td>
<td>Precision Helical Rack &amp; Pinion</td>
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<tr>
<td><strong>Machine Foot Print</strong></td>
<td>73”w x 80”l x 55”h</td>
<td>67”w x 120”l x 58”h</td>
</tr>
<tr>
<td><strong>Work Envelope</strong></td>
<td>48” x 48”</td>
<td>48” x 96”</td>
</tr>
</tbody>
</table>
Receiving Your CNC Router

Note. It is probable that your machine will be delivered by a third party. Before you unpack your new machine, you will need to first inspect the packing, invoice, and shipping documents supplied by the driver.

Ensure that there is no visible damage to the packing or the machine. You need to do this prior to the driver leaving. All damage must be noted on the delivery documents and signed by you and the delivery driver. You must then contact the seller, Laguna Tools within 24 hours.

Introduction to Your CNC Router

The CNC is designed to give you years of safe service. Read this owner’s manual in its entirety before assembly or use.

The advantage of the CNC machine is that it can, in most cases, fully machine the complete job without it being removed from the table so that you have finished parts of high accuracy that are totally repeatable.

It can also produce intricate carvings with the purchase of the relevant software. Nesting is also a valuable feature of CNC machining that saves on waste and costs.

It is possible to reduce the amount of different machines in the shop, as the CNC will perform multiple functions and is a must for cabinetmakers and serious woodworkers.
1. **Bed**
   The bed of the machine consists of a heavy steel frame and a “T -Slot” Table. The “T” slots are used to clamp the job or fixtures to the bed.

2. **Gantry**
   The gantry straddles the bed and carries the router spindle motion system. It is moved along the length of the bed by a precision ball screw system that is controlled by the machine controller.

3. **Router Spindle**
   The router spindle is moved along the gantry by a precision ball screw system that is controlled by the machine controller.

4. **Frame**
   The frame is a heavy welded construction that supports all the other parts of the machine.
5. Electrical control box
The electrical control box is located on the side of the machine in a dust-free enclosure.

6. Caterpillar track
The caterpillar track runs along the side of the machine in a trough and carries all the electrical cables and the spindle cooling tubes.

7. Water pump
The water pump provides coolant for the router spindle motor. Running the router spindle without the cooling pump running can lead to spindle-bearing failure.

Additional instructions for the use of the CNC
Like all machines, there is danger associated with the machine. Injury is frequently caused by lack of knowledge or familiarity. Use this machine with respect. If normal safety precautions are overlooked or ignored, serious personal injury may occur. As the CNC is under the control of the onboard machine controller, it is important that you are clear of the cutter when operating the machine.
What You Receive with CNC Router

- Spoil board clamps
- Cutters & collets
- Tools
- Dust shroud
- Controller cable
- Water pump
- Controller
Where To Locate Your CNC Router

Before you unpack your machine, select the area where you will use your machine. There are no hard-and-fast rules for its location, but below are a few guidelines.

1. There should be an area around the machine suitable for the length of wood that you will be machining.

2. Adequate lighting. The better the lighting, the more accurate and safely you will be able to work.

3. Solid floor. You should select a solid flat floor, preferably concrete or something similar.

4. Close to power source and dust collection.

Unpacking Your CNC Router

To unpack your machine, you will need tin snips, knife and a wrench.

1. Using the tin snips, cut the banding that is securing the machine to the Pallet (if fitted).

**WARNING: EXTREME CAUTION MUST BE USED BECAUSE THE BANDING WILL SPRING AND COULD CAUSE INJURY.**

2. Remove the box from the CNC machine if fitted and any other packaging material. The parts ordered with the machine will be packed on or inside the machine.

*Note.* The machine is heavy, and if you have any doubt about the described procedure, seek professional assistance. Do not attempt any procedure that you feel is unsafe or that you do not have the physical capability of achieving.
3. Use a fork lift with sufficient lifting capacity and forks that are long enough to reach the complete width of the machine.

4. Remove the securing bolts that attach the machine to the pallet (if fitted).

5. Approaching the machine from the side, lift the machine on the frame, taking care that there are no cables or pipes in the area of the forks.

6. Move the machine to the required position and lower gently to the floor.

7. Level the machine so that all the supporting feet are taking the weight of the machine and no rocking is taking place.

Assembly and Set-Up

**Assembling the controller**

*Note.* Never use a memory stick with a greater capacity than 8GB. If you do, it will crash your machine computer. It is strongly suggested that you purchase additional memory sticks and mark them for CNC machine use only.

Fit the cable to the controller and ensure that the screws are finger tight.

*Note.* The cable has plugs at both ends that are different. The plug with the screws fits into the controller. The other plug fits into the cabinet socket. Push the cable into the cabinet socket, and it will snap into position. Give the cable a light tug to ensure that the plug has snapped into position.
Fitting the Dust Hose

1. Fit the dust hose to the dust shroud and secure with the clamp. Ensure that it is tight, as it is very inconvenient to have it fall off during production.

2. Fit the shroud to the router head. Adjust the shroud so that the brushes are even with the tip of the router bits that you will be using. If it is too low, the brushes may drag on the job being cut and could be cut by the router bit. If it is too high and is not in contact with the job, suction may not be optimal. Once adjusted, clamp with the clamping allen screw.

3. Feed the dust hose through the dust hose support.

4. Fit the dust hose adaptor to the end of the dust hose and secure with the clamp. The adaptor allows a 4” hose to be connected to the machine.

5. The head of the machine will move across the complete table, and the dust hose will follow the head. If there is insufficient slack, the hose may break or damage the dust shroud. It is suggested that the hose is suspended from the ceiling of your shop with sufficient slack so that it will not restrict movement. It will also be out of the way and not cause a trip hazard.
**Electrical connections for the machine**

There are two electrical cables. One is the main power cable and has no plug fitted, as it will depend on your installation. Ensure that when installing the electrical supply to the machine, that 220v single phase is supplied. It is recommended that you use a 20 amp breaker.

**Note:** When wiring the machine to your electrical system, keep your cable as short as possible, and the cable should not be allowed to run along the floor, as this will cause a trip hazard.

The second cable has a female electrical socket for connection to the water pump.

**Note. A qualified electrician must carry out the electrical installation.**

**Connecting the water pipes to the machine**

There are two water tubes that come out of the caterpillar track. These are used to provide cooling for the liquid-cooled router spindle.

**Note:** Never run the motor without the cooling being connected or the motor could be damaged.
You will connect one to the water pump, and the other will be placed in the water container for the return water. It is not important which pipe is used as the return.

Fit the 90-degree connector to the pump.

Connect one of the pipes to the water pump by pushing into the 90-deg connector. Lightly pull on the pipe to ensure that it is connected correctly. Fill a container about ¾ full with clean water.

**Note:** You will need to provide a coolant tank with a minimum capacity of 5 gallons. If the shop temperature is high, the tank size will have to be larger. If your shop is likely to be subject to freezing temperatures, antifreeze must be added to the cooling water.

Lower the water pump into the container, ensuring that it is the correct way up (water inlet lowest) and place the water return pipe into the container. The logical position for the water container is just behind the controlbox close to the caterpillar track. Ensure that it is close to the machine, as you do not want to kick the container and spill the water.

Once the assembly is complete and the water pump electrical connection has been made (plug the pump into the machine water pump socket), lift the water return pipe up and check that the water is flowing. Place the lid onto the container to keep dust and dirt out of the container.

Check the container periodically, as the water will evaporate.

**Note:** If the spindle is run without cooling, it could be damaged and fail.

**Fitting the router bit into the router head**

**Note:** Before changing or fitting the router bit, always disconnect the power to the machine.

**Note.** Collets & spindle collet hole must be cleaned regularly. Ensure that the slots in the collets are free of sawdust, as sawdust builds up and will stop the collet compressing. If the collet or spindle hole are not clean, the router bit may not run true, and this will affect the performance of your machine.

1. Select a pointed router bit and its relevant collet.

2. Fit the collet into the spindle nut. Press the collet into the spindle nut until it snaps into place.
Note: The router bit must not be fitted into the collet until the collet has been fitted into the spindle nut. With the router bit fitted into the collet, the collet cannot compress and will snap into the spindle nut. The face of the collet and the face of the spindle nut will be close to flush.

Note: To remove the collet, hold the spindle nut and press the collet on the side. The collet will compress and pop out. Do not remove the collet while a cutter is fitted, as the collet will not compress and pop out.

3. Fit the spindle nut and collet assembly onto the spindle thread by hand.

4. Press the bit into the collet, but note that the flute of the router bit must not be inside the collet and should be a minimum of 1/16” outside the collet. Hold the router spindle with the supplied wrench and tighten the collet with a second wrench. Do not over tighten.

Note. Use this process for all other router bits that you need to fit, but you will have to change the collet if the shank of the router bit is a different size.

Types of router bits.
There are five basic types of router bits straight, up shear, down shear, combination (also called compression), and form tools (round over, ogee, etc.).

1. Straight Router Bits

These are the standard router bits that are commonly used with handheld routers and are readily available at home centers.

2. Up Shear Router Bits

These bits have flutes that are spiraled upward (a standard twist drill is an example of this type of bit). This bit design removes the chips from the kerf but has a tendency to chip the top surface, especially veneers or melamine surfaces.

Ball nose Router Bits are a variation of the up shear bit design but have a radiused end. These bits are typically used for 3D surfacing applications.

3. Down Shear Router Bits

These bits are similar to the up shear but with an opposite spiral that actually tends to pack the chips into the kerf. These bits prevent chipping the material surface, especially with veneers or melamine surfaces.
4. Combination (Compression) Router Bits

These bits combine the advantages of both up shear and down shear designs. The top section of the tool is down shear to prevent chipping the top surface of the material, and the lower part of the bit is up shear to prevent chipping the bottom surface of the material.

Combination Router Bits are the preferred configuration for machining veneered plywood as well as melamine surfaced product. A variation of the bit is called the “Mortising Compression” router bit. With this bit, the up shear portion of the bit is less than ¼” in length so that the bit can be used on ¼” veneered plywood and for dados.

5. Form Router Bits

Form Router Bits typically are available in standard profiles such as roundover, ogee, etc. Router bits that have a shape associated with them would be classified with this group

Controller Button Functions

Note: Controller may vary from that shown.

X+ / 1 = Moves the gantry in the X direction away from the home end of the bed.
Y+ / 2 = Moves the gantry in the Y direction away from the home end of the bed.
Z+ / 3 = Moves the router head in the Z (Up direction) away from the table surface.
XY-0 / 4 = Sets machine “Origin”.
X- / 5 = Moves the gantry in the X direction toward the home end of the bed.
Y- / 6 = Moves the router head in the Y direction toward the home end of the bed.
Z- / 7 = Moves the router head in the Z (Down direction) toward the table surface.
Z-0 / 8 = Used set the tool to the “Zero” surface (tool “touch-off”).
HOME / 9 = Causes the machine to move to the “Home” position, first in the Z axis, followed by X and then Y. (Home is a mechanically determined position using mechanical switches/sensors.)
HIGH/LOW / 0 = Toggles jogging speeds between High and Low ranges.
ONOFF/ = Turns the Router Spindle On and Off.
MENU / _ = Provides access to various setup features.
ORIGIN / OK = Used set accept commands (“On”). Origin causes machine to the machine’s “Origin”.

Controller may vary from that shown.
MODE = Toggles between the three jogging modes: Continuous, Step or Distance.
RUN PAUSE / DELETE = Used to load a program from either the USB drive or internal memory. While the program is running, causes the operation to “Pause”. STOP / CANCEL = Stops a running program. Also used to cancel commands.

Turning On The Machine

Note: Before you turn on the machine remove all tools and other objects from the machine table.

Release the emergency stop by twisting clockwise and it will pop out.

Press the green start button that will turn power on to the machine. Pressing the green button will also power the controller, and the display will light up. The screen will display “Go to Home.” Make sure that the table surface is clear of obstructions and press the green Origin/OK button. The router head will move to the home position on the table.

Note: Home is a mechanical position that is a constant that is determined by switches on each of the 3 axes. X+= Across (from left-to-right when standing in front of the machine). Y+ = Length (from front-to-back when standing in front of the machine). Z+= vertical (up).
By pressing HIGH LOW / 0 and MENU / - the display will change to AX=0, AY=0, and AZ=0. When the X, Y and Z have an A in front, this denotes that the dimensions displayed are in reference to the machine’s home position. When the X, Y and Z values are displayed with a number (1-9), this indicates the dimensional relationship of the machine from the machine “Origin.”

To Move The Router Head

There are 3 different methods of moving the router head.

1. Continuous mode. Press the mode button until Continuous is displayed. The display will show (bottom row of the screen) the changing location of the router head as it moves location. By holding X+ button down, the machine will move constantly until the button is released. This is the same for X-, Y+, Y-, Z+ and Z-. The “High/Low” button determines the speed of the jogging moves.
2. **Step mode.** Press the mode button until step is displayed. With step selected, each time X, or Y button is pressed, it will move the router head by 0.5mm in the high setting and 0.1mm in the low setting.

3. **Distance mode.** Pressing the mode button a third time and Distance is displayed. This allows you to input a position into the controller that you want the router spindle to move to, for example, if you want to move the router spindle 100 mm from the home position in the X and/or Y axis.

1. Press the mode button until Distance is displayed.
2. Type in 100 and press OK
3. Pressing the X+= button will now move the router 100mm in the X+ axis.

The router head also move the set distance in the X+, X-, Y+ and Y-, depending on the button that is pressed.

To move the router head in the Z axis press the Z+= / 3 (UP) or the Z-/ 7 button (DOWN).

By pressing any of the other X, Y or Z + or – buttons, the router head will move 100mm in the selected direction.

**Jogging the Speed**
You can select between a Low or High speed. By pressing the HIGH LOW / 0 button, you can toggle between the two speeds. The High speed jog setting is approximately 4 times the speed of Low speed jog setting.

**Setting the Work Envelope**

The Work Envelope is a volume that defines the movement limits of the router spindle. The X0, Y0 corner of the work envelope is determined by the machine’s Home Position. The X+ and Y+ limits of the work envelope are determined by the “Table Size: Settings (MENU/MACHINE SETUP/TABLE SIZE) and provide the “soft limits for the machine. The Table Size settings prevent the possibility of the spindle assembly/gantry from being jogged into the machine’s frame.

Ensure that the controller display is indicating the “Machine Coordinates.” Those numbers correspond to the machine’s Home position that is determined by physical limit switches.

Machine Coordinates are indicated on the screen by the designation “AX, AY, or AZ”. If the Machine Coordinates are not being displayed, depressing the HIGH/LOW and MENU buttons together will toggle between the machine coordinates and ORIGIN coordinates (e.g, 1-9).
1. Select Low Speed by pressing the HIGH LOW / 0 button. Select Continuous
by press the mode button until “Continuous” is displayed. The display will show
the position of the router head as it changes at the bottom of the display.
Move the router spindle to the home position by pressing the Home button.

2. Move the router head to the max X position by pressing X+ button until the
router spindle stops and note the displayed AX= value.

3. Press the Y+ button and hold until the router gantry stops moving; note the
displayed AY value.

4. Typically on the Laguna Swift 4 x 4 CNC machine, the work envelope will be
1300mm (51.181 in) x 1300mm (51.181 in) (work envelopes vary by machine
model).

5. Machining can only be performed if the tool path centerlines fall within the
work envelope.

If an error message is display while trying to execute a program indicating an
over travel error in one of the axes, executing the program would require that a
tool path fall outside of the machine’s Work Envelope. PLEASE NOTE THAT
THE SELECTION OF THE “ORIGIN” ALSO AFFECTS PLACEMENT OF THE
PROGRAM WITHIN THE WORK ENVELOPE.

Using a Sacrificial Board (Spoil board) on the Machine Table.

Spoil board preparation.

Note: Do not confuse flatness with bow. If the board is bowed, it may not stick
down. Never use a bowed board as a spoil board.

A popular method to fixture parts onto the Laguna Swift CNC table is to use a
spoil board attached to the machine table with double-sided tape (3M). The spoil
board should be a flat, smooth material such as ½” thick, melamine-covered
particle board or other smooth material. The parts to be machined can also be
attached to the melamine surface with doublestick tape.

Ideally, the spoil board needs to be positioned in the center of the machine’s
work envelope if possible to provide the greatest flexibility.
Using the design program that you have purchased for your machine, draw the
work envelope that corresponds to your machine (1300mm [51.181 in] x 1300mm
[51.181 in] for the Laguna Swift 4 x 4). The lower-left corner of the work envelope
is actually the machine’s home position (X0, Y0 in the drawing).
Then draw the spoil board, i.e., a 48" x 48" square and locate it in the center of the work envelope. Note the dimension that the corner of the square is from the home position. This will provide you the exact location of the spoilboard’s lower left corner. An easy way to set this position is to fit a pointed bit into the router spindle and jog the router spindle to the corner position based on the coordinates determined in the drawing and align the spoilboard with this position. (This procedure will also give you practice in jogging the router spindle to a required position.)

**Precautions Regarding Spoil Boards**

The spoil board is porous when the melamine has been cut through and will absorb moisture. As moisture is absorbed, the dimensions of the board will change. In general this will not be a problem, as the changes from day to day are not that great. Also the changes will, in general, be over the complete board. There are, however, exceptions. Your morning coffee can do a great deal of damage if spilt. If water etc is spilt, it will be absorbed into the board and make the board grow in that area. Do not allow the board to become wet. If an accident should happen, remove the board from the machine and allow to dry this may take several days. Replace the board with a new board. Once the board has completely dried, it may possible to skim the board and re-use it, but the likelihood is that it is scrap.

**Moving the Router Head to the Spoil Board Corner Position**

1. With the router head in the home position, drop the router bit to just above the spoil board top face as described earlier, (Z axis).

2. Use the distance command as described earlier (press mode, toggle through to distance) to set the X and Y position to 40.38mm.

3. Press X+.

4. Once the router head has stopped moving, press Y+.

5. The point of the router bit is now located over the point that the corner of the spoil board should be.

6. You may need to move the router bit lower so that it is closer to the top surface of the spoil board by pressing the Z-button.
7. Press the top right hand button XY-0 / 4. This will set the origin, and the machine has a new datum point, which will be the X=0 / Y=0 in your design program.

8. Move the spoil board so that the corner of the spoil board is directly under the point of the router bit.

9. Place tape around the corner of the spoil board on the bed of the machine. This will give you a position to place the double-sided tape that will be used to attach the spoil board to the bed of the machine.

10. Move the router head in the X direction with the continue function so that it is approximately at the end of the spoil board.

11. Move the spoil board so that it lines up with the point of the router bit.

12. Place tape on the bed of the machine at the edge of the spoil board.

13. Move the router head to the end of the machine furthest X and Y position. The router head will be out of the way and allow you to have access to the bed of the machine.

14. Remove the spoil board.

15. Clean the bed of the machine so that there is no dust or wood chips. Apply double-sided tape to the bed of the machine using the tape that you have just applied as reference. You need to apply three or four strips of double-sided tape to the bed of the machine with sufficient length so that the spoil board is attached along its complete length.

16. Clean the spoil board so that the surface will adhere to the double-sided tape.

17. Remove the backing from the double-sided tape.

18. With 2 people lift the spoil board over the table and lower so the reference tape that you applied to the bed of the machine aligns with the corner and edge of the spoil board.

19. Lower and press down so that the double-sided tape sticks to the spoil board. Do not worry if the spoil board is not perfectly aligned with the tape, as you will have to reset the home position.

The clamps can also be used to clamp the spoil board to the bed of the machine. This is not the recommended method. When using the clamps, place a piece of packing under the jacking bolt to protect the bed of the machine.
**Resetting the Origin Point**

1. Bring the router head to the origin point by pressing origin button.

2. Lower the router bit by pressing Z= so that it is just above the spoil board.
   
   **Note** the position of the tip of the router bit point, and you will probably find the origin point will have to be adjusted.

3. Jog the point over so that it lines up with the edge of the spoil board in the X axis.

4. Jog the point over so that it lines up with the edge of the spoil board in the Y axis.

5. Reset the origin point by pressing the top right hand button XY-0 / 4, which set the origin, and the machine has a new data point.

**Setting the Z Origin Point (tool touch off)**

The machine needs to know when the router bit is just touching the top of the spoil board. When you fit the router bit into the collet, the tip of the router bit will be at a different height above the spoil board and will have to be zeroed.

1. Fit a flat bottom router bit to the spindle.

2. Jog (Z) the tip of the tool down so that it is just above the top of the spoil board using the continue button.

3. Step down in slow mode [0.1mm 0.004” each time the button is pressed] while turning the router collet by hand in the reverse direction. As you feel pressure, stop jogging down.

   **Note.** Do not turn the router bit, as it is sharp and could cause injury.

4. Select the distance mode and enter 0.0254mm (0.0001”) Press Z+ (UP) and rotate the cutter in the reverse direction until the cutter is free to move and there is no drag. The cutter is now within 0.001” above the spoil board.

5. Once the router bit is at zero, press the Z-0 /8 button to set the zero point.

6. Jog the router bit up or press the origin button to move the router bit up and to the origin point.

**Loading a program into the machine.**

The controller has a USB slot located to the top.

1. Load your program into your USB drive.

2. Fit the USB into the USB slot in the controller.

3. Press the button RUN PAUSE/DELETE. The display will show U disc.

4. Press the OK button. This will load onto the screen what is in the USB drive.

5. Use the arrow keys to select the file that you need to load into the controller.

6. Select, then press OK button.
7. Once the code/program has been downloaded, the machine will start to operate.

**Note.** Ensure that you are clear of the machine, as the spindle will start to turn and could cause injury.

8. The router will just cut the surface of the spoil board the distance that you set in the design software, (we suggest 1.6mm [1/16”]) and cut the outline of the job. This will give you the location of the part on the spoil board.

**Fitting a Job to the Spoil Board**

You can use double-sided tape to attach the job to the spoil board. If you are using double-sided tape, ensure that the spoil board and the job are clean and do not have sawdust or chips, as this will affect the ability of the tape to hold the job securely. Only use the smallest amount of double-sided tape, as it will make it easier to remove the job once machined.

**Removing the Job from the Spoil Board**

Lever the job off the spoil board with a wide-blade putty knife or similar.

**Fitting the Job to the Table Using the T-slots**

You may find it convenient to clamp the job to the spoil board with the table clamps. This attachment method can only be used if the outside edges are not being machined. When using the clamps, place a piece of packing under the jacking bolt to protect the bed of the machine.
As with any machine, to ensure optimal performance, you must conduct regular maintenance.

**Daily Checks**

1. Clean the machine and lubricate unpainted surfaces with a Teflon lubricant. Wipe off any excess and buff with a dry polishing cloth. This will reduce the likelihood of rust forming.

2. Check cutter teeth for chips and dullness.

3. Generally inspect the machine for damage and loose or worn parts.

4. Collets and Spindle collet hole must be cleaned regularly. Ensure that the slots in the collets are free of sawdust as sawdust builds up and will stop the collet compressing. If the collet or spindle hole are not clean, the router bit may not run true, and this will affect the performance of your machine.

**Weekly Checks**

1. Clean the cutters.

2. Check cutter teeth for chips and dullness.

3. Generally inspect the machine for damage and loose or worn parts.

4. Check the dust extraction for blockages and any large bits that could cause blockages.

**Troubleshooting**

**Machine Will Not Start**

1. Check that the start switch is fully pressed in.

2. Check that the red stop switch is fully out.

3. Check that the electrical power cord is plugged into the power outlet.

4. Check that the electrical supply is on (reset the breaker).

5. With the power disconnected from the machine, check that wiring to the plus is correct. Check that the rubber insulation is stripped enough and is not causing a bad connection. Check that all the screws are tight.

**The Machine Will Not Stop**

This is a very rare occurrence, as the machine is designed to fail-safe. If it should occur and you cannot fix the fault, seek professional assistance. The machine must be disconnected from the power and never run until the fault has been rectified.

1. Internal breaker faulty. Replace the breaker.
Motor Tries To Start But Will Not Turn

1. With the power disconnected from the machine try to turn the spindle by hand. If the spindle will not turn, check the reason for the jamming.


3. Spindle run with out coolant. Replace the motor.

Motor Overheats

The motor is designed to run hot, but should it overheat, it has an internal thermal overload protector that will shut it down until the motor has cooled, and then it will reset automatically. If the motor overheats, wait until it has cooled and restart. If the motor shuts down consistently, check for the reason. Typical reasons are dull cutting tools, no water in the coolant tank, blockage in the coolant pipe and excessive ambient temperature.

Squeaking Noise

1. Check the bearings.

Spindle Slows Down During A Cut

1. Dull cutting tools. Replace the tool or have it resharpened.

2. Feeding the wood too fast. Slow down the feed rate.

Machine Vibrates

1. Machine not level on the floor. Re-level the machine ensuring that it has no movement.