The following describes how to assemble your DIY Desktop CNC Machine Limit Switches Kit:

<table>
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<th>Prep</th>
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| You will need a copy of the DIY Desktop CNC Machine Comprehensive Plans & Manual, a wire cutter (snips/side cutter), an X-acto knife or scalpel, a crosshead screwdriver, a 7/64” drill bit and drill, small cable ties (about 8), electrical tape, a soldering iron and solder.  

Optional items include a wire stripper and solder flux paste.  

When working with electronic components, always take the necessary precautions to avoid static electricity damage. |

<table>
<thead>
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<th>1 – Assemble Parts</th>
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<tr>
<td>Lay out your electronic parts. Press the switches into position on the mini circuit boards as indicated on the board in white print.</td>
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2

Solder the switch pins to the underside of the mini circuit board.

Repeat for all six limit switch mini circuit boards.

3

Using your wire cutters (or a sharp scissors) cut a section of two-core wire to the length required for your axis. Carefully split the ends, separating the two cores sufficiently that they can be pulled apart.

Separate the first inch or so of the cable, as shown in the picture.
4

Using your wire strippers, bare the ends of the wire. Using your soldering iron, tin the ends of the wire.

Dipping the ends of the bare wire in solder paste will help tinning them.

5

Insert the ends of the wire from the bottom through the two larger strain-relief holes in the board at the opposite end from the switch.

The tinned ends should be protruding through on the side of the switch.
6
Bend the wire ends so that the tinned ends push through the solder holes nearest the switch, as shown in the picture.
Solder the wire ends to the solder pads.

7
Using your wire cutters, snip off the protruding ends of the wires as close as possible to the solder pad.

8
Your finished limit switch should look like the one shown in the picture.
Repeat this process for the remaining limit switches.
9 – Attach to Machine

Using your carpenter’s square, mark a line on the inside of each gantry support upright level with the top of the Y carriage.

Your limit switch needs to be placed below that mark and in line with the Y carriage such that the edge of the Y carriage makes contact with the limit switch before reaching the gantry support upright.
10
Drill a 7/64” hole at least 1/8” below the mark you made in step 9.

11
Using the screw and plastic washer provided, attach the limit switch to the gantry support upright as shown.

The plastic washer goes between the screw head and the board.

Repeat for the opposite side of the Y axis.

12
The mounted limit switch should appear as shown in the pictures.
13 – X Axis

The X axis limit switches both attach to metal and therefore the surface they attach to must be insulated from the solder pads on the back of the mini circuit board.

Cut a section of electrical tape and stick it to the protruding face of the X stepper motor as shown in the pictures.
Using a sharp X-acto knife or scalpel, carefully trim the excess tape from around the motor.

Use the tip of the knife to remove a small circle of tape from the top mounting hole in the motor body, as shown in the pictures.

The trimmed insulation should appear as shown in the pictures.
Using the machine screw provided, thread the screw through the plastic washer, the limit switch board and into the top mounting hole of the stepper motor.

Carefully turn in the screw until snug and finger-tight. Do not over-tighten as that could drive the solder pads on the back of the mini circuit board through the insulation and into contact with the metal chassis.

Once mounted, the limit switch should appear as shown in the pictures.

You may loosen the screw to rotate the limit switch to get the best alignment with the edge of the X table.
16 – Z Axis

Position a limit switch on the inside edge of the Z axis rod mounting blocks, and mark the mounting hole location with a pencil, as shown in the pictures.

Do this for both ends of the Z carriage travel.

17

You will need to use either a compact drill, or the spindle provided in your MyDIYCNC kit to make mounting holes in the confined space.

Drill a 7/64" hole in both Z rod ends mounting blocks at the locations marked earlier. A small angle is acceptable on these holes.
18

Pass the mounting screw provided through a plastic washer provided and attach the limit switch assembly to the mounting hole.

Do this for both ends of the Z carriage travel.
Your Z axis limit switches should now look like those shown in the pictures.

**20 X – Axis Rear**

Position the final limit switch on the inside face of the rear chassis cross member, approximately half way between a rod and the threaded rod, as shown in the picture.

Position the assembly so that the switch is at the top and the cables pointing down, and place it with the bottom edge of the limit switch assembly is flush with the bottom edge of the cross member.

Mark the location of the mounting hole on the cross member.
21

You will need to use either a compact drill, or the spindle provided in your MyDIYCNC kit to make a mounting hole in the confined space.

Drill a 7/64” hole in the rear cross member at the location marked earlier. A small angle is acceptable on this holes.

22

Place a piece of electrical tape over the hole and covering a section of the rear cross member larger than the limit switch assembly, as shown in the picture.

Since you will be using the self-threading screw provided, there is no need to cut a hole in the electrical tape to expose the mounting hole, as you did in step 14.

23

Attach the limit switch to the rear cross member with the screw provided as shown in the picture.
24 Wiring

Make sure that you have the latest version of the MyDIYCNC Desktop CNC Machine Comprehensive Plans & Manual and can view the wiring diagram.

Bare the ends of the limit switch cables.

Take a moment to plan your cable routing and layout around your CNC machine. Lay the cables such that they end up at your electronics control box.

Take one wire from each limit switch, and twist them together. Tin the resulting combined ends. These will become the ground return line for each switch. If using heat-shrink tube to insulate the connection, now is the time to place that over the cable. Solder the combined ground lines to one of the free ground cores in your ribbon cable (connecting the cable to any pin from number 18 to 25 on the Db-25 connector). Insulate the connection.

For each axis, take the remaining two cables, twist the ends together and tin the combined end. Solder the combined ends for that axis to the corresponding ribbon cable core for that axis’ limit switch, as shown in the wiring diagram. Insulate the connections.
25 Test

Within your CNC application, make sure that it is configured for hardware limit switches, and that the pin assignments for each axis’ limit switch matches the connections you just made and the wiring diagram.

Your limit switches are “normally-open” (NO) switches that ground the connection when pressed. Therefore your CNC application should expect the limit switch channel to go “low) (go to ground) when triggered. If you find that the limit switches are registering as triggered even though they are not pressed, use your CNC app’s settings to invert the logic of the limit switches.

If your CNC app is set up correctly, pressing the limit switch on your CNC machine should instantly prompt a warning and halt operations. This is easy to test by pressing any one of the switches.

For technical support and additional resources, please login to your account at www.MyDIYCNC.com