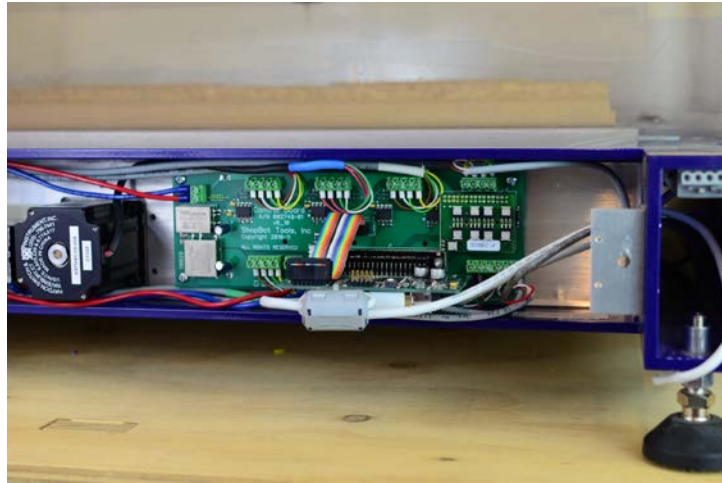


Desktop DT2418 Driver Service



Introduction

Like all ShopBot tools the Desktop DT2418 uses drivers to control the motors that move the tool along each axis. A driver is an electronic device that regulates the current used to power another device, in this case the linear movement motors. In general we've found the motors on the ShopBot Desktop to be very robust and rarely require replacement. More commonly, if a failure occurs, a driver or wiring is at fault.

This document will guide you through the steps to diagnose, adjust, and replace the Desktop drivers. Additionally, there is a section describing installation of an auxiliary driver for supplementary motors.

Tools needed

- #2 Phillips screwdriver
- Small Phillips screwdriver (for wire terminals if needed)
- Small straight blade screwdriver (for driver adjustment)
- 5/32" (4 mm) hex key
- 5/64" (2 mm) hex key
- Replacement driver (if needed) ShopBot Part 002780 Drive Gecko G250 X
- Magnifying glass (not required but helpful for driver adjustment)
- Flashlight or movable light source

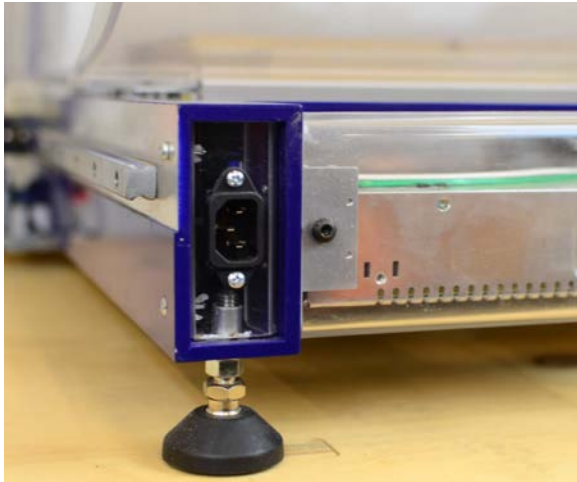
ShopBot Contact Info

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Section 1: Access electronics enclosure



Power off!

Turn off the main power switch and unplug the Desktop. The cord is removable from the rear of the tool allowing you to know at a glance that power is not connected.

Unplug the USB communication cord from your operating computer. If this is not done, a single light will stay on in the control box indicating 5 volt power from the USB.



Position the tool for electronics enclosure access.

The electronics enclosure is on the side of the Desktop opposite the power switch.

With a helper, position the Desktop so you can access the electronics enclosure comfortably.

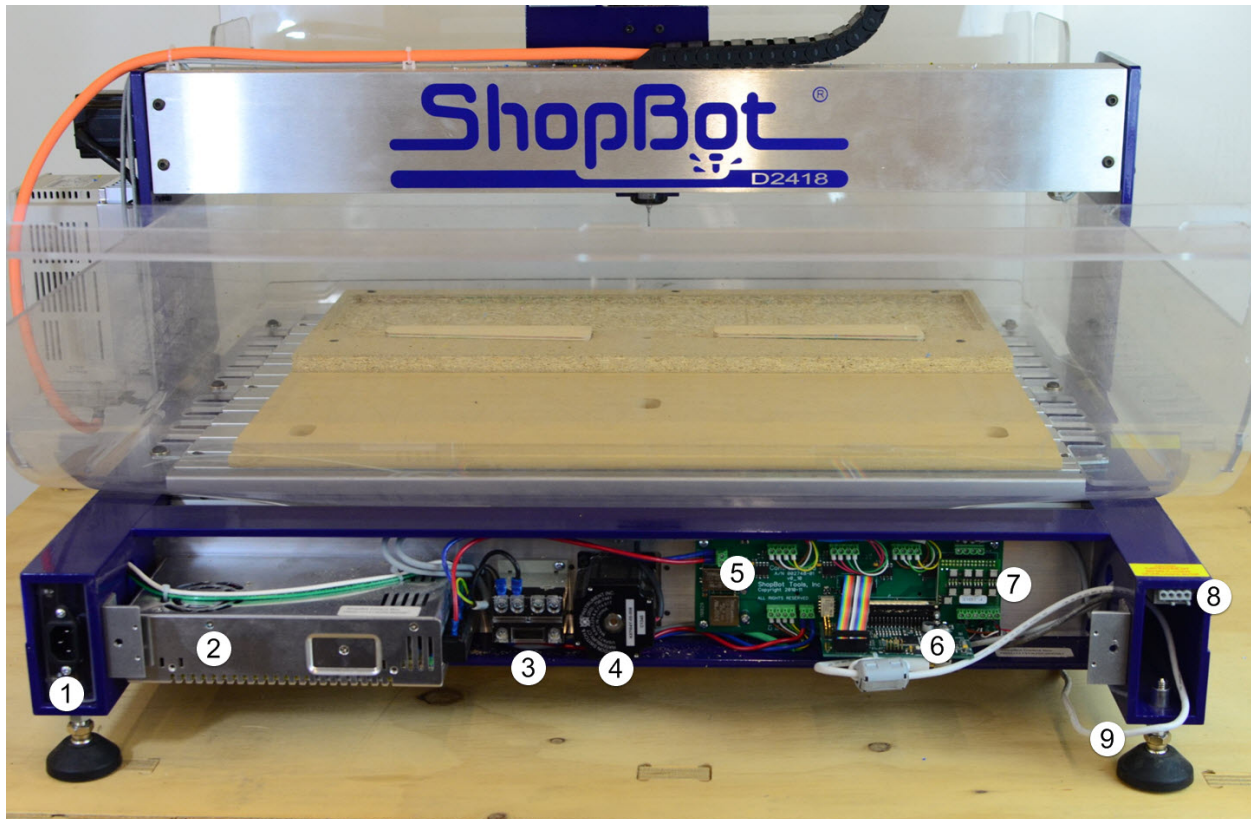


Remove the access panel

Remove the 5/16" (4 mm) screws on either side of the access panel.

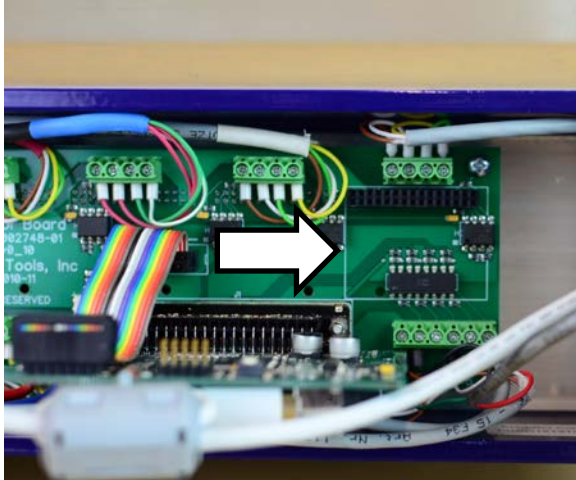
Pull the panel straight out, away from Desktop frame.

Section 2: Electronics enclosure layout



1. **Power input:** Power cable inserts here.
2. **Power supply:** Converts incoming 110 volt AC to 48 volt DC.
3. **Contactor:** Electrically operated switch to connect or interrupt cutting head power.
4. **Y axis motor:** Rotates a ball screw under the deck to move the Y axis.
5. **Control board:** Green board that coordinates all power and data inputs to operate the tool. The **drivers** are attached to the Desktop frame under the board.
6. **Control card:** Horizontal card that communicates with the operating software.
7. **Auxiliary driver:** Optional driver that controls a rotary indexer or vertical axis motor.
8. **Auxiliary motor port:** Optional connection to the auxiliary driver.
9. **USB cable:** Connects the Desktop control system with the operating computer software.

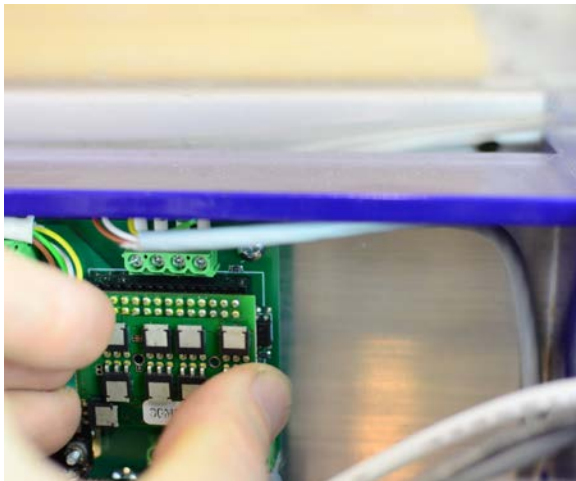
Section 3: Auxiliary driver installation



An auxiliary driver slot is available on the front face of the control board. The board has a white outline where the driver will be placed.

The green four-screw terminal above the auxiliary driver station is for wiring the accessory to the control board. Refer to the installation instructions for your accessory motor for wire color order.

Removing the control board, see section 4, will allow easiest access for inserting the required wires.

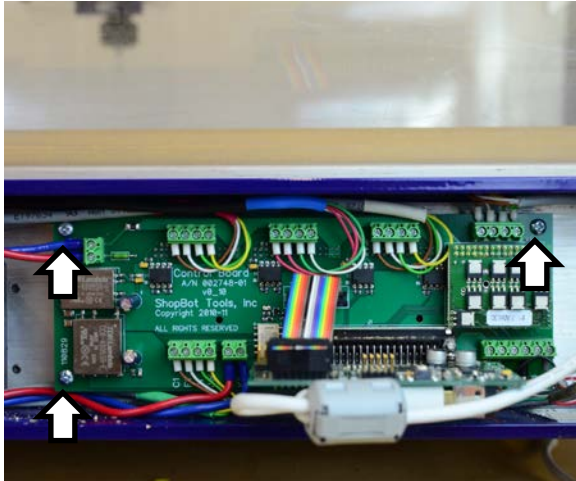


Before installation, refer to section 5 of this guide to adjust the driver.

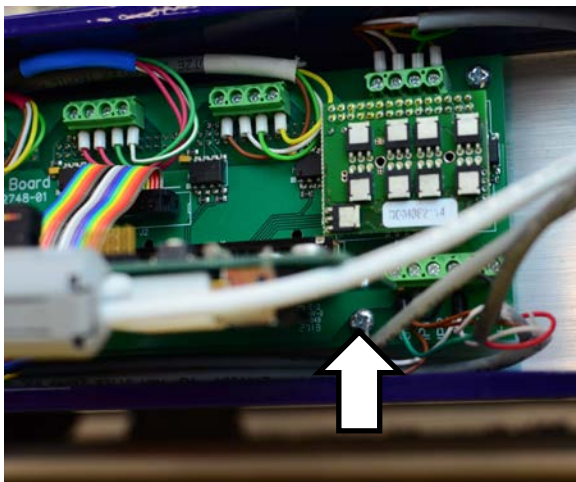
Adding a driver for an optional accessory is as simple as lining up the pins with the terminal on the right side of the board. Once lined up, press the driver pins firmly into the terminal.

Section 4: Remove the control board

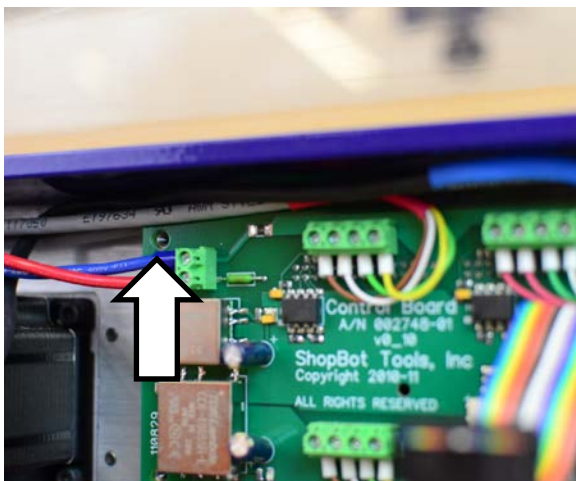
The three primary drivers are attached behind the control board. Accessing them requires removing 4 Phillips head screws and pulling the board away from the driver pins. You should not have to disconnect any wires to access the drivers.



Locate and remove the 4 Phillips screws securing the control board to the Desktop frame.



One of the screws is located under the horizontal control card and may be tricky to see from above.

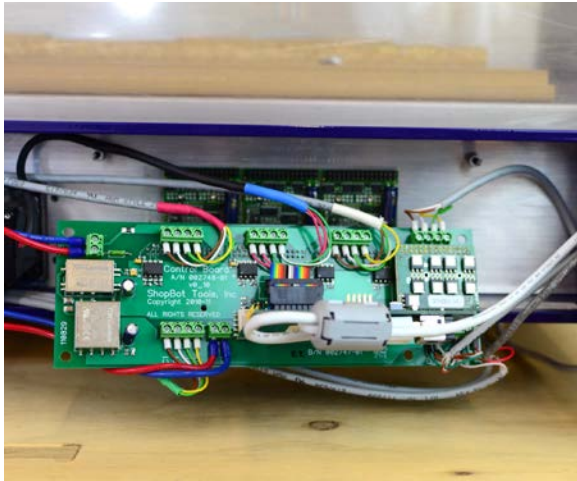


Notice that the screw threads are in line with each hole and that the board is flush against them. This will help with lining up the board during installation.



After the four screws are removed, the control board is held on only by the friction of the driver pins.

Gently pull on each side of the control board to pull it off the drivers. It may help to pull on one side at a time to rock the board off the pins.



No wires should need to be removed to access the drivers, but use caution so that no excessive strain is put on any wires.

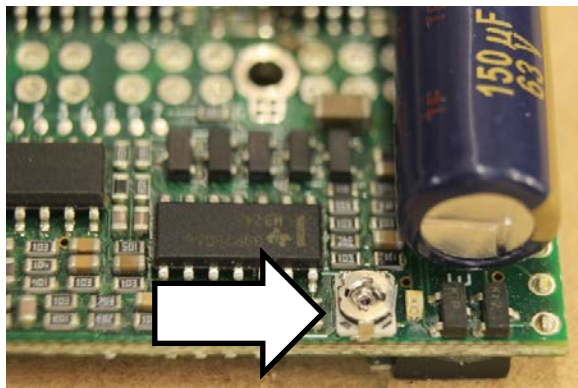
The control board can now be pulled gently out and down revealing the drivers attached to the frame.

Section 5: Driver adjustment

Current to each motor is controlled by a dedicated driver. If the driver is not adjusted properly, the motors may become noticeably hot. Some users may experience intermittent performance from the movement axes. If this is the case, the drivers need to be adjusted.

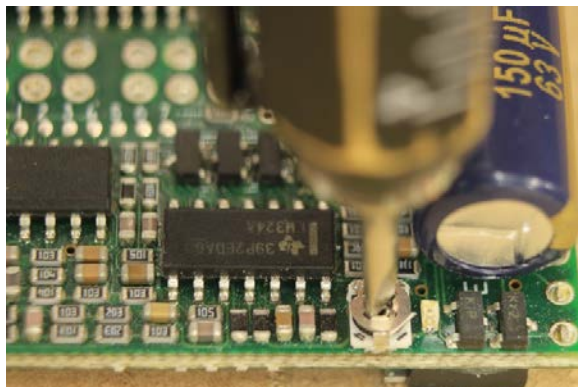
The drivers are adjusted using a small screwdriver. The potentiometer is a small silver circle beside the large capacitor on each driver.

Note: The pictures in this section were taken with the driver removed from the tool for clarity and ease of photography. You do **not** need to remove the driver from the tool for adjustment.



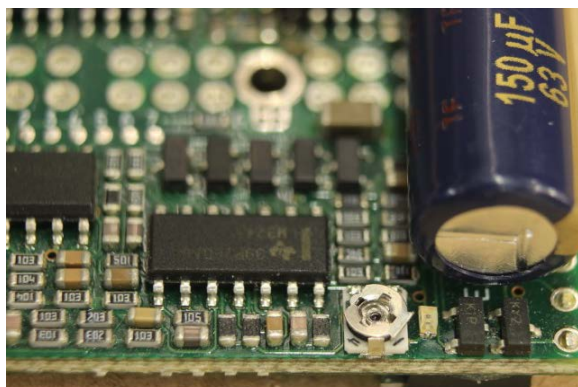
The potentiometer is located on the lower edge of each driver near the large blue capacitor. It is small enough that you will have difficulty seeing the components without magnification.

The dial has a pair of teeth which will engage a stationary stop tab depending on the direction it is turned.



Use a small flat blade screw driver to turn the dial **clockwise** until it contacts the stop tab.

Use care, as the tab can be damaged with too much force.



After reaching the stop, turn the dial back 1/16 of a turn (about 25 degrees). This is the optimal adjustment for the driver when used with the supplied motors.

The picture at left shows the ideal position for the adjustment dial.

Repeat these steps on all installed drivers.

Section 6: Identify failed drive

Driver failure is one possible reason for a motor failing to move. Before replacing a driver, other causes must be ruled out, and the specific drive must be identified. This section will help narrow down the options.

Identify the problem axis

Power the tool on and attempt to move each axis using the directional keypad. Which axis is not moving? Side to side (X axis), forward and back (Y axis), or up and down (Z axis)? Once this is identified, focus all problem solving efforts on this motor, cable, and driver combination.

Note: If all three axes are not working, there is likely another problem either with communication, software settings, or control power. Consult other technical guides or contact ShopBot Technical Support for help.

Check motor shaft

Each motor is connected to a ball screw shaft. It is possible for this connection to break, and if it does the motor will spin without the shaft moving. If the motor shaft is broken, contact ShopBot Technical Support to order a replacement.

Check motor wiring

Visually inspect the wiring for the problem axis motor. Look for snags, kinks, or damaged housing. Problem places can be near the wire carrier chain along the top of the tool and anywhere that tooling or other debris might snag on the wire. If you identify a damaged motor cable, contact ShopBot Technical Support to order a replacement.

Inspect the cable connections



Turn off and unplug the tool!

Open the electronics enclosure if it is not already. See section 1 of this guide for directions.

Identify the motor cable terminals on the control board. From left to right the terminals are for: X axis, Y axis, Z axis, and an auxiliary axis. Look for obvious loose wires at the terminals.

The cable terminals connect the motor cables to the motor drivers which are attached to the reverse side of the control board.

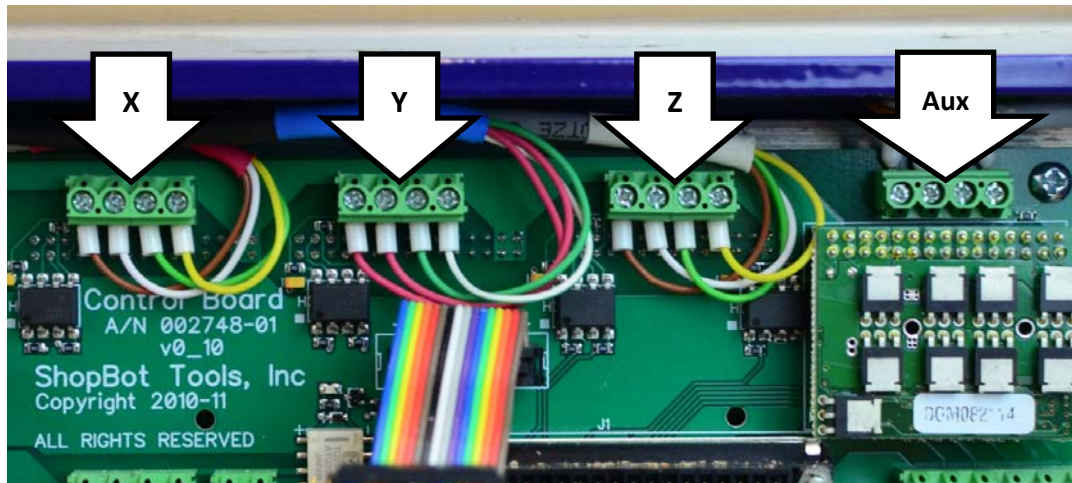
ShopBot Technical Support

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Email: support@shopbottools.com

Switch motor cable and driver combination

If the prior inspections have not identified a definite problem source, the motor cables should now be switched to definitively diagnose a faulty driver.



Turn off and unplug the tool!

Switching motor wires when the tool is powered can result in shock, injury, and/or damage to the tool.

Note the positions and order of the four wires coming from each motor cable. These orders are specific to each motor cable and will affect the operation of the motor. The picture above will likely match your tool configuration, but if not record the order prior to disconnecting any wires.

Identify the terminal for the problem axis.

Switch the wires between the problem axis and a known working (test) axis. Maintain the order of each set of cable wires no matter what terminal they will attach to.

After attaching all wires, plug in and power the tool on. Use the keypad control to test the movement along each axis. Note that the wires go to different terminals so the keys will activate different axes than normal.

If the suspected driver is faulty, the problem axis will have switched to the test axis.

If the problem axis still will not move, the problem is either in the wire or the motor. Contact ShopBot Technical Support for further troubleshooting instructions.

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Driver testing example

Note: This is one example of the driver testing procedure using the steps and information in this section. Your tool may present different symptoms or problem axes, but the testing steps will be similar.

The X axis is not working, and the tool will not move left and right. Physical inspections of the wires, and motors showed no faults.

The Y axis works, moving from front to back and will be the test axis.

The tool is turned off to protect the technician and the tool.

The X and Y axis cables are switched so that the X cable goes to the Y terminal, and the Y cable goes to the X terminal.

The tool is powered on and the keypad control is used to attempt moves along the X and Y axis.

The tool will not move along the Y axis, front to back. Then using the Y keypad the tool moves left and right, along the X axis.

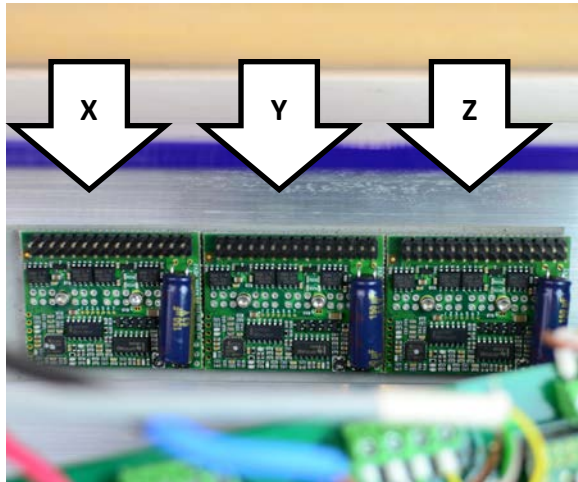
In this case the X driver is faulty. The motor wires should be returned to their original locations and the driver must be replaced.

Section 7: Driver replacement

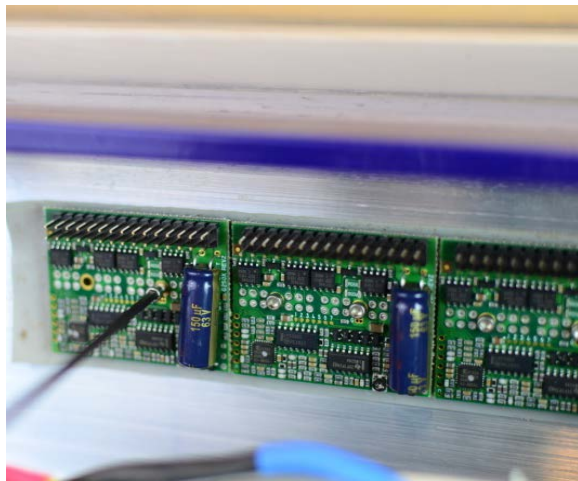
Sometimes a driver may receive an overcurrent resulting in a “blown” driver. This is usually caused by physically moving the tool quickly along one of its axes. The motor on that axis acts as a generator and creates an uncontrolled current in the driver. When this happens that axis will no longer move under machine control and the driver must be replaced.

Remove control board

Complete section 4 of this document before proceeding.



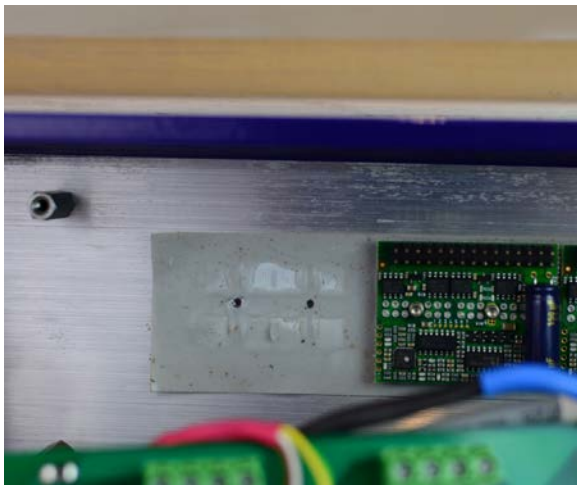
The three motor drivers are mounted to the Desktop frame behind the control board. Their order corresponds with the motor cable terminals on the control board.



After identifying the failed driver, remove the two 5/64” (2 mm) screws securing the driver to the frame.



The driver is now held in place by the grey thermal transfer tape on the Desktop frame. Gently pry the driver free from the tape to remove it.



Inspect the thermal transfer tape. It acts as an insulator to prevent short circuits from damaging the driver while allowing heat to dissipate to the Desktop frame.

Look for any burrs or holes that could allow the drive to directly contact the frame. Any short circuit will quickly show itself as another failed driver.

Replace the tape before driver installation if it is excessively damaged.



Line the replacement driver up with the screw holes and press it against the thermal tape.

Install the two screws using a 5/64" (2 mm) hex key.

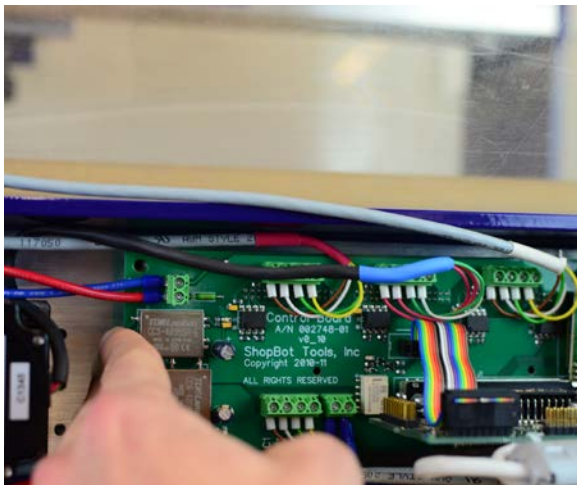
Section 8: Install control board



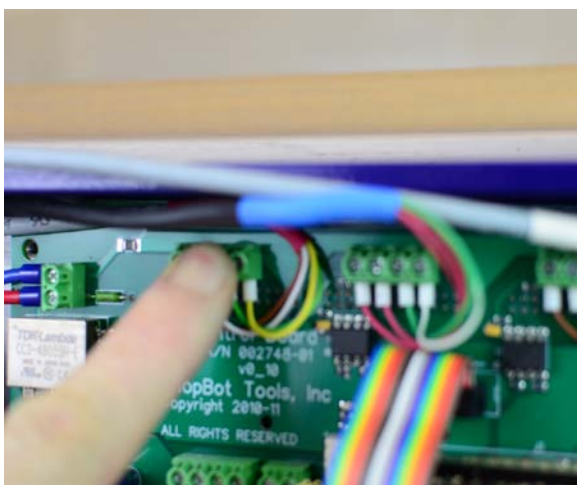
Control board installation is in reverse of removal.

Be sure to inspect all wire connections to ensure none are loose or kinked.

Organize the wires as needed to allow the board to fit approximately in position.



As noted during removal, line the control board screw holes with the threaded studs on the Desktop frame. Once lined up, gently press the board in to engage the driver pins.

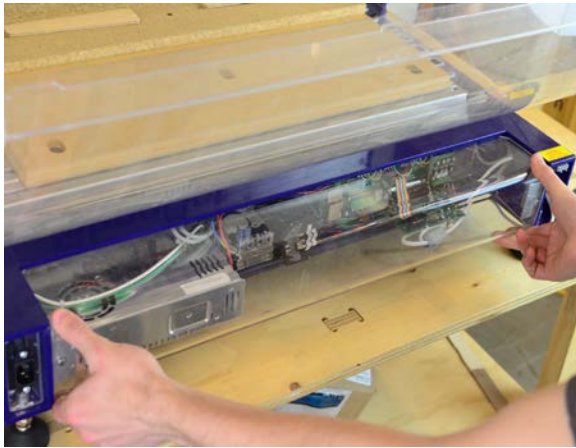


Press firmly over each drive pin location to seat the board on the drivers.



Secure each corner of the control board using the four Phillips head screws.

Section 9: Return to operation



Replace the access panel in reverse of installation. Take care that all wires are well organized and out of the way of the panel flanges.

Secure the panel using the two 5/16" (4 mm) screws.

Restore power and test

Visually inspect the Desktop to ensure all components have been restored to their original positions.

Plug in the tool and connect the USB cable to the operating computer.

Turn on the tool and test for movement using the keypad control interface in the ShopBot operating software.