

MINITRONICS V1.1 QUICK START GUIDE

Thank you for purchasing the Minitronics v1.1! This small guide will answer the basic questions on how to connect the board to your 3D printer. For more information visit the ReprapWorld.com product page. ReprapWorld.com may provide updates to the firmware, documentation and specifications. Please refer to the Minitronics page for the latest information.

Safety warnings

Do not exceed the recommended voltage for the board. With the SRC12v Jumper in place, the **maximum voltage rating for power input is 12V**. Without the jumper, the board can be powered with a maximum voltage of 24V. Also **do not** turn the stepper drivers while connected to the electronics, as this may result in high voltages running through the board.

The USB-connector is protected from shorts by a resettable fuse. The 12V inputs are protected by a **NON-resettable** fuse. Shorting the 12V line or reversing power polarization may cause the SMD fuses to burn out, requiring replacement of the fuses.

Do not unplug stepper motors from the board while powered. This may cause the stepper drivers to be damaged permanently. Before powering the stepper drivers adjust the current, see the section 'adjusting current'.

Use the fan included in the kit to cool the board. This increases the max current settings of the stepper drivers.

Features

The Minitronics board is designed to be an easy to use, compact and smart solution to fit 90% of the 3D-printers. Unlike the Megatronics, which targets at the advanced ranged of usages, the Minitronics is plug and plug, which will fit the needs of the average user better.

Atmega1281

Powerful Atmega1281 processor with 128 KB memory, running at 16Mhz

Thermistors

Two have pull up resistors to hook up thermistors directly. One has not, so you can hook up an external thermo couple pcb. Optionally you can solder the third 4k7 resistor to have three thermistors.

External SD card support

You can now hook up an external SD card pcb, so you can print directly from SD.

Four MOSFETs

The board has 3 regular MOSFETs and one MOSFET for the heated bed (10A)

Up to 5 stepper drivers with 1/32 step

The Minitronics has four on board stepper drivers. A fifth can be connected externally, using our External stepper driver board.

Preparing the board

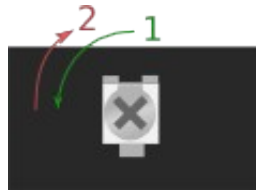
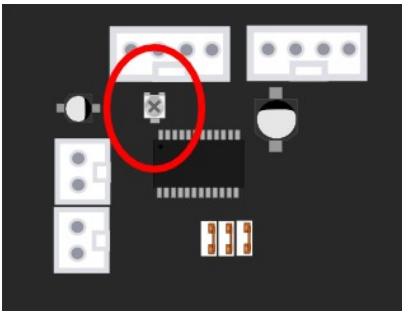
The board is supplied with a Marlin firmware. Because of the continued development and your specific needs, changes are you want to upload another firmware.

You need a special Arduino version as provided by us on our site. Look in the Software downloads section under service / support. Once downloaded and installed, you can select the Minitronics board from the menu and upload a sketch. Check the datasheet for port mappings and detailed technical information.

We also supply a pre-configured Marlin version, you only need to adjust the specific settings for your printer.

Adjusting current

Before powering the stepper drivers, be sure to adjust the current. The current determines the torque the stepper motors will deliver, but also causes heat. You can adjust the current by turning the trimpot for each stepper driver. DO NOT turn the trimpot with power enabled, this may cause permanent damage to the board.



Locate the trimpot next to the stepper driver. Turn it fully to the left (1) to disable the current. Then turn it about 45 degrees to the right (2). This should allow the axes to move. If you are losing steps during the print, you may need to increase the current a bit. If the stepper is shutting down while printing, the chip is probably getting hot. Decrease the current or add extra cooling to the board.

Testing the board

To test the functionality of the board, a test firmware is available from the product page. This firmware will help you test the board. **Disconnect everything except the USB cable to your computer.** Upload the test firmware to the board with Arduino, the blue debug LED should blink every second. By using the serial monitor in Arduino the board will provide an output like:

```
T1 1023 T2 1023
```

These values represent the resistance measured from t1 and t2. When you connect a thermistor to the pins, the corresponding value in the serial monitor should change to about 890.

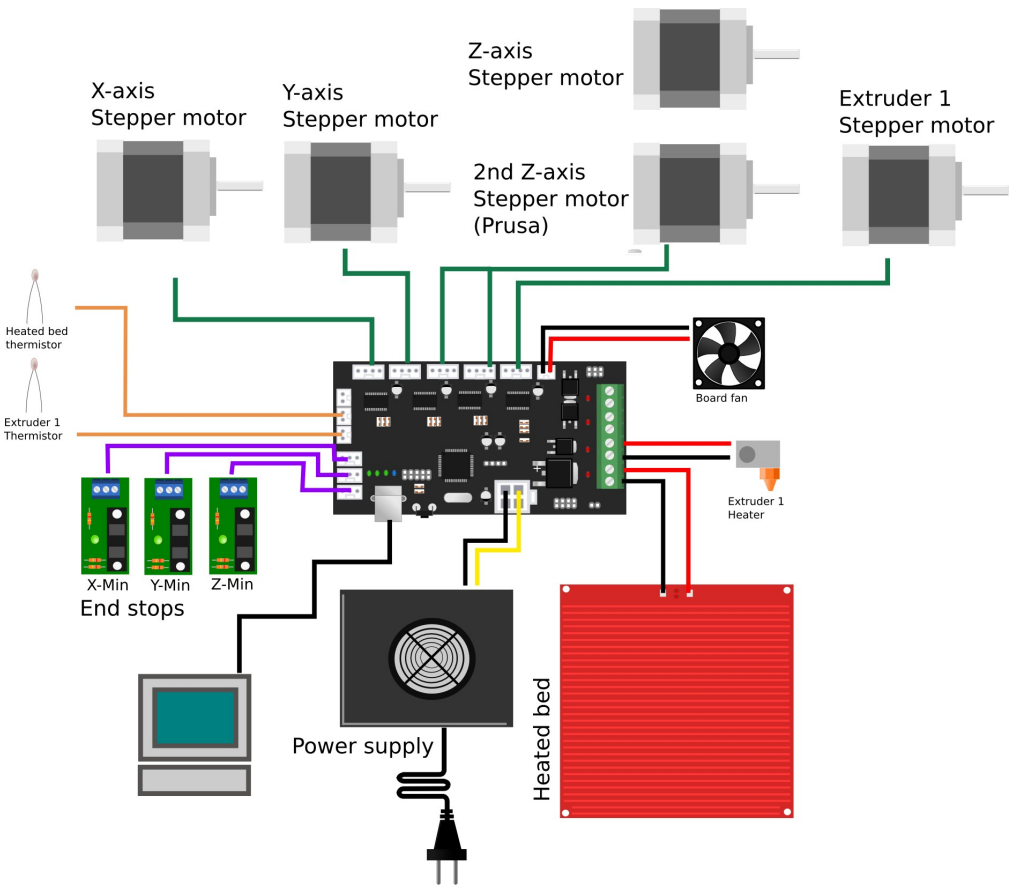
By connecting the 12V line, the MOSFETs should have power and their LEDs will blink in order. This verifies the MOSFETs and 12V power are OK.

Also the stepper motors should turn when connected, with the 12V lines and stepper wiring in place. They will turn a short time and switch direction.

These three tests will verify the basic functionality of the board.

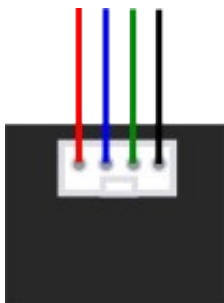
Quick Start

This paragraph will show you how to connect the board. This is just a basic example, your requirements may differ. There is a lot of community support available in the RepRap forums <http://forums.reprap.org>. By placing your questions there other users may benefit of the information too.



First connect your computer with a standard USB cable. The power LED should light up and the blue debug LED should blink once. The rxd and txd LEDs near the USB connector may blink fast for a short period.

Connect the stepper drivers to the designated connectors. You can connect up to 5 stepper motors, 1 for each axis, except for the Z-axis, which allows two stepper motors to be connected. Also an external stepper driver is supported, check the datasheet for more details. You can use the following order of colors, but if you reverse the connector, the stepper motor will just reverse.



The power supply should be connected to the board using the provided wire. Mind the polarization, the yellow wires should be +.

Connect the heated bed to HB, this terminal allows larger currents, up to 10A. The first extruder heater should be connected to E1. A second extruder can be connected to E2.

You can easily connect end stops to the board. There is support for 3 end stops. For opto end stops you will need the S(ignal), - and + pins. For mechanical end stops the S(ignal) and - pins are sufficient.

The thermistors for reading heated bed and extruder temperature can be connected to the thermistor pins. Polarization is not an issue here.

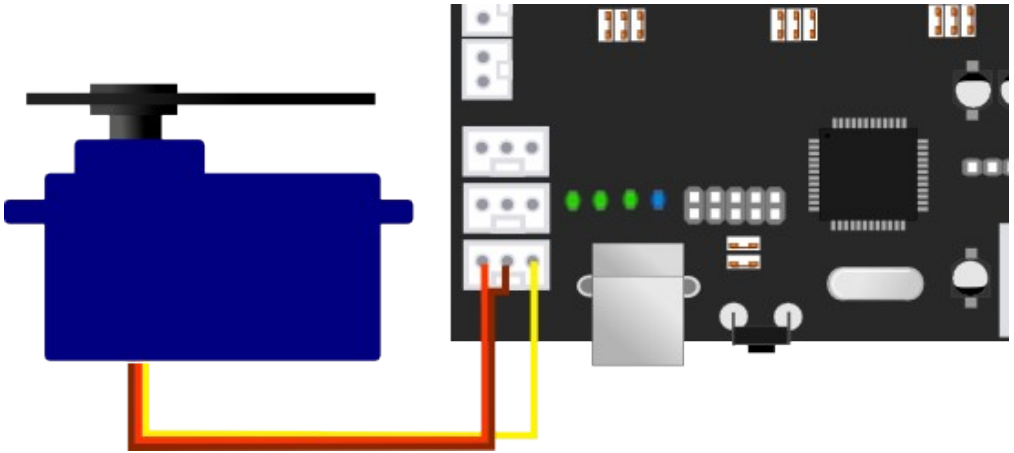
Advanced usage

Connecting a second extruder or third extruder

You can hook up another extruder using the external driver output. You won't be able to use the heated bed however, because the board has only support for 2 thermistors.

Connecting a servo motor

Some use cases for a servo include heated bed leveling or a nozzle sweep. Minitronics supports a servo using PWM on pin 6, also the Z axis end stop signal pin. So effectively this will replace the Z axis end stop, but that isn't required for bed leveling. If you do need a Z axis end stop, you can use a free digital I/O from the AUX header. Connect the servo like this:



Yellow is signal, which needs to be on pin S of the header. Brown is -, while orange is +5V. Note you can also draw 5v from a different power supply, in case you have more peripherals drawing power.

In marlin's configuration.h uncomment the line `#NUM_SERVOS 1`. After uploading send `M280 P0 S180` and then `M280 P0 S0` to test the servo.

Warranty

We provide a three months limited warranty on the board. You should verify the proper function of the board when it arrives, you may use the test firmware as described in the paragraph 'Testing the board'. When you have determined that the board is not functioning properly, please provide a detailed description of the problem including pictures (if applicable) to info@reprapworld.com. Make sure to include your order number.

Feedback

We love to hear feedback from our users. This way we can keep our boards the best option for the RepRap community. If you have ideas or comments, please feel free to drop an email to info@reprapworld.com.