

USB Charger Test Kit

Have you ever left your smart phone or tablet on to charge only to come back later and find it has hardly charged at all. Well, help is now at hand with the Tripplikit *USB Charger Test* module.

Features

- Fully automatic. Simply plug it into your charger.
- Microprocessor controlled.
- Displays charger's maximum output current from 200mA to 2A.
- Self test and faulty charger indications.
- Accepts micro and mini USB charging leads.
- Simple LED output.
- Simple assembly.
- Shipped from the UK.
- RoSH compliant and lead free.
- Double sided PCB with ground plane for noise immunity.
- Technical support – email tripplikit@chrispidd.com.

Operation

Simply plug the *USB Charger Test* module into your charger and it will measure how much current the charger can deliver and even report if the charger is faulty.

The *USB Charger Test* module tests the charger by drawing a steadily increasing amount of current from the charger until the charger voltage drops, indicating that it has reached its current limit. The current drawn from the charger is simply used to heat up the power transistor and its heat sink.

Note: The Heat Sink can become HOT! Please avoid touching it while the unit is in operation.

The best way to see the *USB Charger Test* module in action is to see the [You Tube](#) video here.

The *USB Charger Test* module operates in several stages.

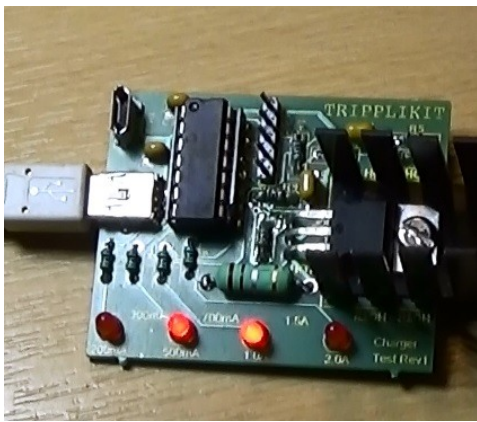
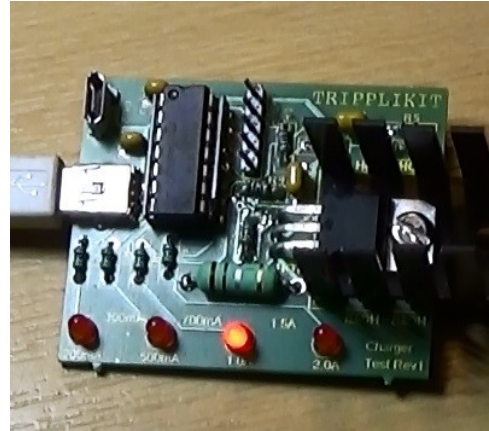
Stage 1 – Self Test

The LEDs each flash in quick succession to indicate the module is operating correctly and the charger is supplying the correct voltage.

Stage 2 – Current Measurement

The LEDs flash slowly indicating the test current being drawn. If one LED is flashing, the current being drawn is indicated near the edge of the board.

For example in the picture, the load current is 1.0A



If two LEDs are flashing, the current being drawn is indicated to the other side of the LEDs.

For example in the picture, the load current is 700mA

Stage 3 – Soak Test

Once the maximum current is reached the current is reduced by 15% and the charger is then soak tested for approximately 40 seconds. Here, one or two LEDs indicate the maximum output current the charger can deliver (as described above) but now the LEDs blink off.

Stage 4 – Final Display

Now the LEDs indicating the maximum current the charger can deliver are on continuously.

Fault Indication












If the charger is faulty, all four LEDs will flash quickly together.

Contact

If you have any questions on the Tripplikit *USB Charger Tester* please contact me on tripplikit@chrispidd.com or visit the Tripplikit web pages at chrispidd.com/tripplikit/

Kit Contents

The USB Charger Test kit consists of the PCB and the following components.

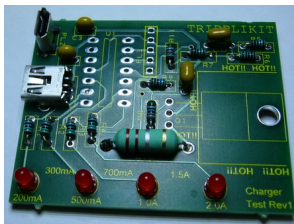
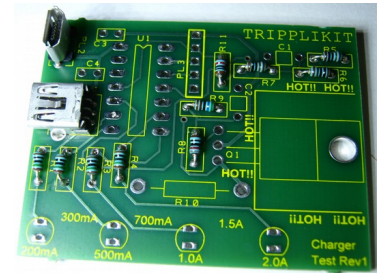
Component	Value	Image
C1 & C2	1uF	
C3 & C4	100nF	
LED1, LED2, LED3 & LED4	LED 3MM RED	 <p>Note the flat edge and the short lead (uppermost) denotes the cathode.</p>
Q1	BDX33C	
R1, R2, R3 & R4	150R	
R5, R6 & R7	1k	
R8	820R	
R9	5k6	
R10	R22	
R11	10k	
U1	PIC16F1824	

You will notice that the two USB sockets are already soldered onto the PCB. This is because the pins of these sockets are very delicate and could easily be damaged in the post.

Assembly

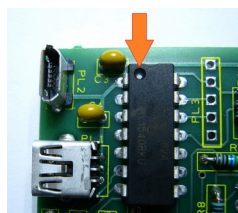
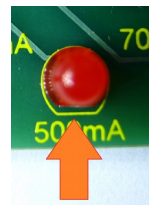
We suggest that you fit the components in the order described here as this has been found to be the easiest way.

First fit all the resistors except R10, the large current sense resistor.



Now fit the four capacitors and the large current sense resistor R10.

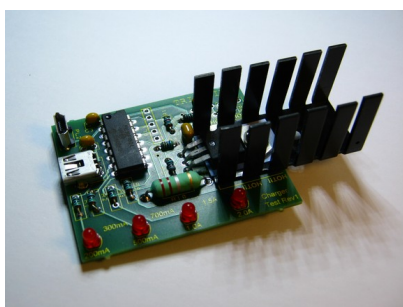
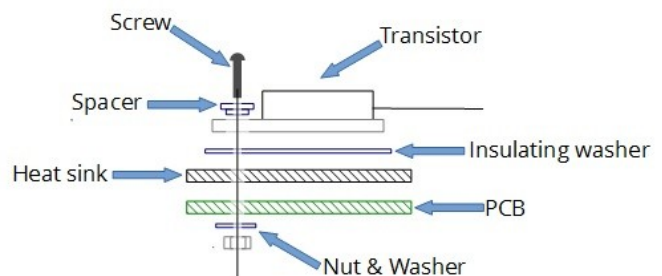
Next, fit the four LEDs with the flat on the LED lining up with the indicators on the PCB as arrowed.



Next, fit the micro-controller with its alignment arrow towards the edge of the PCB as shown in the picture.

This device is static sensitive so, when handling it, make sure you are grounded, for instance, using a wrist strap.

Finally fit the transistor and heat sink. Mount the transistor into the PCB but don't solder it yet. Put the heat sink in place and bend the transistor over. Screw the transistor and heat sink to the PCB using the insulating kit provided. See diagram:



Finally solder the transistor pins.

The completed unit should look like the one in the picture.

Circuit Diagram

