D.I.Y Digital Ammeter

Level: Beginner **AK-115**

ABRA Serving Industry & Education since 1990

Operation Guide

To use the product simply connect 5 volts into the DC5V Jumper cables. Please pay attention to polarity when connecting the unit.

Connect your signal input into the blue terminal blocks. Make sure that this connection is done to create a serial circuit.

Just like how you would use a normal ammeter, you are required to connect on of the inputs in the blue terminal block and set the output of the other terminal to the next component.

Assume when connecting that the ammeter is like a resistor, you connect the input of the component and the output goes to the next component.

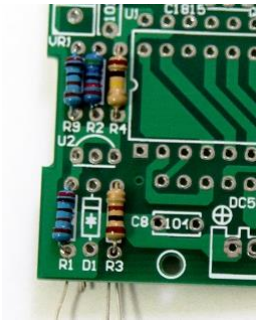
The potentiometer adjusts pin 36 and 35 on the ICL7107 by 100mV. Use it adjust your resolution if needed.

Parts List

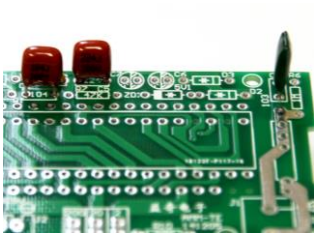
QTY	Description	Remarks | PCB Reference #
2	2kΩ ¼ Watt 1% Resistor	Red, Black, Black, Brown, Brown | R1, R9
1	56kΩ ¼ Watt 1% Resistor	Green, Blue, Black, Red, Brown | R2
1	1MΩ ¼ Watt 1% Resistor	Brown, Black, Black, Yellow, Brown | R6
1	0.1Ω 2 Watt 1% Resistor	Black, Brown, Black, Silver, Brown | R5
1	100Ω ¼ Watt 5% Resistor	Brown, Black, Brown, Gold | R3
1	270Ω ¼ Watt 5% Resistor	Red, Violet, Brown, Gold | R10
1	20kΩ ¼ Watt 5% Resistor	Red, Black, Orange, Gold | R8
1	47kΩ ¼ Watt 5% Resistor	Yellow, Violet, Orange, Gold | R7
1	100kΩ ¼ Watt 5% Resistor	Brown, Black, Yellow, Gold | R4
1	101p Monolithic Capacitor	Beige small capacitor with 101 written on it | C1
1	104p Monolithic Capacitor	Beige small capacitor with 104 written on it | C8
1	474p Monolithic Capacitor	Beige small capacitor with 474 written on it | C4
1	104p CBB Capacitor	Brown thick capacitor with 104 written on it | C2
1	224P CBB Capacitor	Brown thick capacitor with 224 written on it | C5
1	103p Dacron Capacitor	Green capacitor | C3
2	1oμF 25V Capacitor	Electrolytic, please place negative side with strip into shaded white | C6, C7
3	1N4148 Diode	Switching diode with thin body | D1, D2, D3
1	ST5V1 Diode	Voltage Regulator with thick body | ZD1
1	C1815 Transistor	NPN Transistor written C1815 | Q1
1	2.2mH Inductor	Looks like a green resistor, but isn't | L1
4	Seven Segment Display	Make sure the dot matches with the board | DS1, DS2, DS3, DS4
1	ICL7107 IC 40 pin	3-1/2 Digit LED Display and A/D Converter | U1
1	40 pin Socket	Low Profile socket, View manual on how to install onto board!
1	TL431A Shunt Regulator	Three-terminal Adjustable Regulator | U2
1	1kΩ Potentiometer	Multi-Turn Trimming Square Pot, screw must align to white corner cut | VR1
1	2 Pin Screw Terminal Block	The inputs are facing outwards when soldering | J1
1	2 pin Power Connector	Supply power 5v to this line and pay attention to polarity!
1	Custom PCB Board	70.6 * 39 mm
1	LCD Filter Panel	Preinstalled into housing. Shiny side out, matte side in.
1	LCD Housing	After soldering place unit in by pushing the side nubs away.
4	Screw	M1.7 * 6, screw board and housing together.

Soldering Instructions

Referring back to the parts list, solder in the resistors first by looking at the PCB Reference number and reading the resistor color bands. Leave the potentiometer for last.

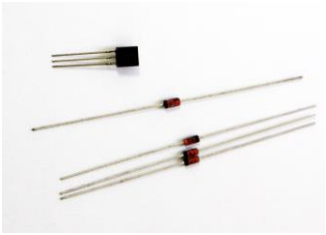


Note: When soldering you must see the white drawing of where the component goes, the lead or metal wire will go through the hole and on the back side you must solder it onto the pads. Thereafter it is recommended to trim the leads.



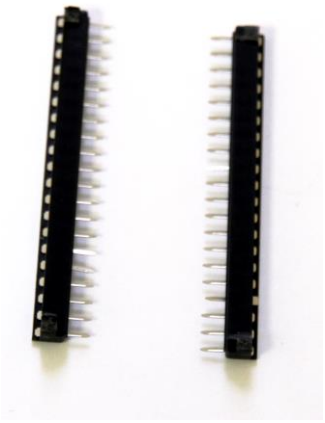
You may now do the same for the capacitors. However, when you get to the electrolytic capacitors that look like a mini black trash can, we recommend you pay very close attention to the polarity.

The white strip on the capacitor represents cathode. Plug that into the white shaded area on the board.



When you are soldering the diode please make sure you read the diode for the part number or alternatively you can view by the thickness of the diodes.

You can now solder the transistor and the 3 pin shunt regulator along with the inductor, terminal block and resistor.



Take the 40 pin holder and break the middle bridge to create two strips of 20 pins. Solder the bottom socket in and flip the board.

Place the Seven Segment Display and solder the display into place, make sure the dots match with the PCB mask.

Flip the board again and solder the remain top strip after you strip the pins from the seven segment display.

You may now place the IC onto the 40 pin socket ensuring that the dot on the IC is on the side where the potentiometer is located.

Before powering on please short the bottom two pads together under the number 2.