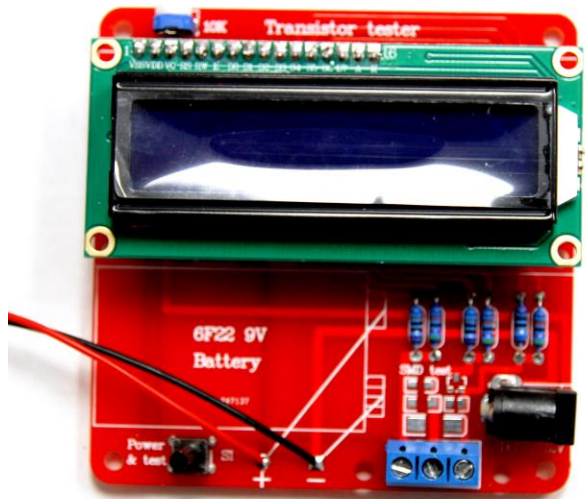


D.I.Y Multifunction LCR & ESR Tester

Level: Intermediate

AK-105



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Operation Guide

Turn on the Unit only after you have followed the soldering guide.

To calibrate the system (self-test), connect a cable into all three ports thus effectively shorting each one. You must press the power button and hold on to it within 2 seconds of powering on to enter config mode.

In config mode the system will begin self-testing, do not touch or remove the cables. When the system says "isolate probe" you can remove the three cables and immediately place a Ceramic capacitor value of 0.1uF to 20uF into pin 1 and pin 3. (Do not connect an Electrolytic Capacitor)

After the configuration is done you can connect any transistor, capacitors (including electrolytic), potentiometers, resistors, diodes, inductors and more into three ports in any order to test.

The unit will auto power off in 28 seconds after testing!

Parts List

QTY	Description	Remarks PCB Reference #
1	Custom PCB	Read soldering guide before soldering!
1	1602 Liquid Crystal Display	16 columns, 2 rows LCD LCD1602
1	Push Button with long shaft	See operation guide on how to use S1
1	Adjustable shunt Regulators	TL431AA IC TL431
1	PNP Transistor	S9012 IC 9012
2	NPN Transistor	S9014 IC 9014
1	Low Power LDO	7550-1 Low Drop Out IC 7550
1	2.1mm DC Barrel Jack	Recommend DC-930-2.1 DC5.5-12V
1	9V DC Battery Adapter	Plug only DC or Battery do not plug both 6F22
1	Three pin terminal block	Remember pinout for testing components 1 2 3
1	Female header 16 pin	This goes into the LCD LCD1602
1	Male Header 16 pin	This goes into the Board LCD1602
1	28 Pin IC Socket	Match the outline including the dip ATMEGA328
1	ATmega328P-Pu	Match the Dip to the socket ATMEGA328
2	¾ inch Brass Standoff	Support of LCD N/A
4	Generic Phillips Screws	Lock Screen onto board N/A
1	3mm LED	Longest wire or non-cut side is anode LED
1	8 MHz Crystal	All microcontrollers need a crystal 8M
2	10uF Polarized Capacitor	Pay attention to polarity – is cathode goes in white 10uF
2	22P Ceramic Capacitor	Dark small brown caps written 22 on them 22P
4	0.1uF Tantalum Capacitor	Light mid brown caps written 104 on them 104
1	0.01uF Tantalum Capacitor	Light mid brown caps written 103 on them 103
1	100K ¼ Watt Resistor	(Brown, Black, Black, Orange, Brown) 100K
2	3.3K ¼ Watt Resistor	(Orange, Orange, Black, Brown, Brown) 3K3
1	33K ¼ Watt Resistor	(Orange, Orange, Black, Red, Brown) 33K
1	220K ¼ Watt Resistor	(Red, Red, Black, Black, Brown) 220R
1	2.2K ¼ Watt Resistor	(Red, Red, Black, Brown, Brown) 2K2
2	27K ¼ Watt Resistor	(Red, Violet, Black, Red, Brown) 27K
3	470K ¼ Watt Resistor	(Yellow, Violet, Black, Orange, Brown) 470K
2	10K ¼ Watt Resistor	(Brown, Black, Black, Red, Brown) 10K
3	680K ¼ Watt Resistor	(Blue, Gray, Black, Black, Brown) 680
1	1nF Capacitor	1n100 1n

Soldering Instructions

Turn on the soldering iron and set the temperature to 280°C. Since this guide is created for intermediate users we expect you to understand to wet the tip of the soldering iron and clean any excess old solder or new solder off the tip.

Place the components onto the board and solder from the lowest overhead component that is the small component onto the board first.

Flip the board and bend the leads to ensure the component does not fall off, solder the component into place and cut the leads.

Continue in this order and solder all the components into place and trim all the excess leads. Refer back to the parts list if you don't know which component goes into the PCB.

Solder the female header to the Screen and the male header to the board. This allows you to remove the screen any time.

Plug the 9v battery and power on the unit without inserting the ATMEGA328P IC. Measure the voltage using a multi-meter from pin 7 and 22 on the IC socket holder. The voltage should be read as 5v, if you don't see any power press the switch!

Power down the unit by removing the battery and insert the IC, ensure the IC Dip matches with the socket and board. Insert the spacers into the screen bottom row to offer some spacing from the screen bending downwards (this is optional; you could leave the screen hanging).

You may now proceed to the Operation guide to calibrate the system.

Functions

Long press the power button upon start up before testing to get into selection.

Under selection mode you have the modes listed below, switch to another by pushing downwards and cycle to get the selection. Select the option by long pressing down. With the selection to change values count 1, 2 when pushing the switch in any direction and then let go.

Transistor: Will automatically test the transistor under any pin.

Frequency: Will measure the input waveform.

F-generator: Will generate a waveform. (pin 2 is output pin 3 is ground)

10-bit PWM: will generate a 10-bit square wave with adjustable duty cycle. (1% short press, 10% long press Pin 2 is output pin 3 is ground)

C+ESR@TP1:3: Is a capacitor ESR Tester using pin 1 and 3 only. From 2µF up to 50mF

Self-Test: Read the operation guide for calibration