Digital multimeter circuit using ICL7107

Mini Projects Meters & Detectors Admin February 15, 2015 14

Electronic Test equipments, ICL7107

This is Digital multimeter circuit using ICL7107. We can modify the dc digital meter circuit to smart full function multimeter, that versatile available. For example : measure DC voltage, AC DC Amp meter, AC Amp meter and as the Ohms meter etc.

Try to build this projects to use it really worth Fully enjoy

Special Feature
DC Voltage: 200mV, 2V, 20V, 200V, 2KV, 20KV
AC Voltage: 200mV, 2V, 20V, 200V, 2KV, 20KV
DC Amp: 200uA, 2mA, 20mA, 2A, 10A
AC Amp: 200uA, 2mA, 20mA, 2A, 10A
Ohms meter: 200, 2K, 20K, 200K, 2M, 20M

DC voltage measurement

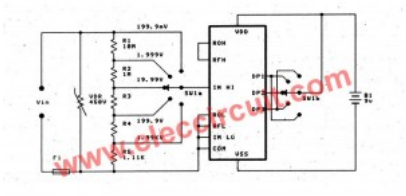


Figure 1 DC voltage measurement

In Figure 1 the schematic diagram of this project. Of course, the easiest way is used as the D voltage meter circuit.

The characteristics of the circuit That can measure voltages up to 200mV. We can be applie measure the voltage range higher. As circuit is shown in table 1

R1	R2	R3	R4	R5	INPUT Z.
9M	900K	90K	9K	1K	10M
10M	1M	100K	10K	1.11K	11.11M

Table 1 is shown in the resistance at various ranges.

Note: We may choose resistors in both formats. For the very high voltage measurement. It is necessary to use the external high voltage probe.

Note: R3=100K ; R4=10K

DC current measurement

Next take a look at the simple DC Ammeter circuit is Design appropriate determine the resistance in parallel with the input of the digital meter only.

The principle to calculate the resistance is The voltage caused by the flow of current across resistor in each range is maximum up to 200mV as show in Figure 2

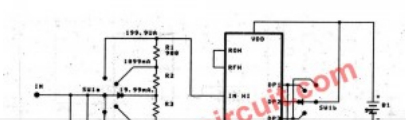


Figure 2 DC Ammeter circuit

In Figure 2 is a circuit that is designed to have a range of up to 5 range. For the high current measurement 2 Amperes, Should the input separately, because the contact of switch that ca not withstand currents.

Diode D1, D2, overload protection is provided for the input.

Note: R2= 90 ohms, R3= 9 ohms

AC voltage measurement

We can design the AC voltage measurement circuit. By add the AC to DC converter circuit th has the together relationship as show in Figure 3.

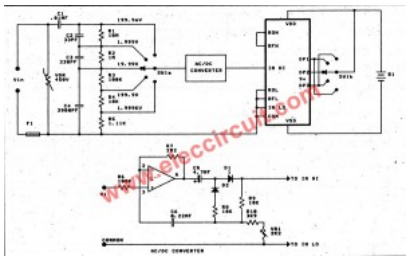


Figure 3 the AC voltmeter circuit

The AC voltage is measured to reduce voltage same the DC voltmeter circuit. Then fed to th to DC converter circuit by IC1 and accessories in Figure 3.

VR1 serves as a tune to the correct voltage reading.

AC current measurement

The same principle applies to the DC voltmeter circuit. We can be applied to the AC ammete adding the AC to DC converter before as show in Figure 4

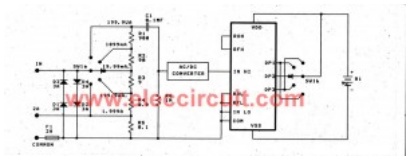


Figure 4 AC current measurement

Ohms meter

advantaged that our digital meter better the regular meter. The reading was accurate, and ca also be used to measure the resistance of 0.1 ohms or less, such as high as 10M easily, by t circuit connection as shown in Figure 5.

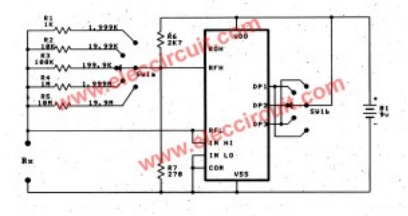
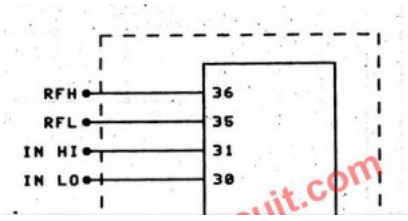


Figure 5 the ohms meter circuit



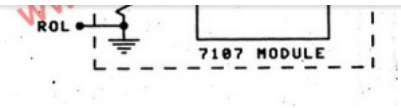


Figure 6 the ICL7107 module

The digital meter module in Figure 1-5 We have shown for the legs of the circuit ICL7107. Compared to the legs of the modules to Easy to write all the circuits. The ROH pin is the outp reference voltage at middle leg of the horseshoe-shaped resistor

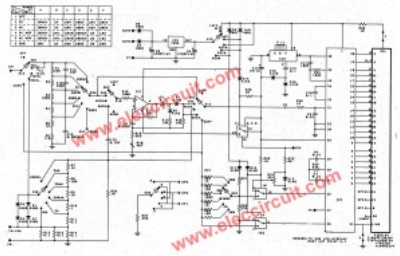


Figure 7 the full circuit diagram of digital multimeter

In Figure 7 is a circuit work perfectly by show PCB layout and the components as show in Fi 8, which can be used to create a user-friendly way.

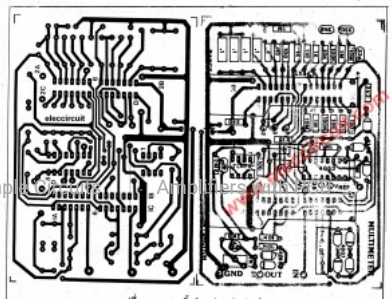


Figure 8 the pcb layout and components layout

Parts you will needs.

IC1____TL071__Operational Amplifiers – Op Amps JFET Input Low Noise
IC5____LM7805____Standard Regulator 5 Volt 1 Amp 3 Pin 3+ Tab TO-220
IC3____CD4049____CMOS Hex Inverting Buffer/Converter
IC2____CD4066___Quad Analog Switch/Multiplexer/Demultiplexer
IC4____ICL7107 or ICL7106____Analog to Digital Converter Single Dual Slope 0.003k SPS 3 1 Digit LED 40-Pin PDIP
LED 7 segment or LCD display
More Switches please read in text

Resistors tolerance: 1%

R1,R26_____10M 0.5 watts
R2,R25,R30,R33,R36,R38___1M 0.5 watts
R3,R15,R24_____100K 0.5 watts
R4,R19,R20,R23_____10K 0.5 watts
R5,R22_____1K 0.5 watts
R6_____110 ohms
R7_____1K 0.5 Watts
R8_____100 ohms 0.5 watts
R9_____10 ohms 0.5 watts
R10_____1 ohms 1 watts
R11,R12,R13,R14_____0.1 ohms 2 watts
R16_____3.3K 0.5 watts
R17,R27_____2.2K 0.5 watts
R21_____100 ohms 0.5 watts
R28_____270 ohms 0.5 watts

MKT capacitors
C14_____33pF 63V
C15_____330pF 63V
C16_____0.0039uF 63V
C11_____100pF 63V
C10_____0.1uF 63V
C9_____0.01uF 63V
C8_____0.47uF 63V
C7_____0.22uF 63V

Electrolytic capacitors
C5,C6_____470uF 16V
C13_____10uF 16V

Diodes
D1-D4_____1N5408
D7,D8,D9,D10_____1N4001
D5,D6,D11,D12,D13,D14,D15___1N4148

Switch see in circuit and PCB layout

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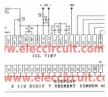
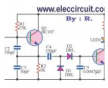

Digital voltmeter using ICL7107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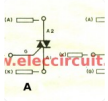
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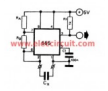
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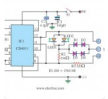
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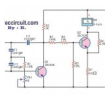
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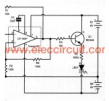
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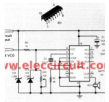
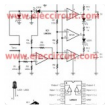

Universal tester circuit with VCO(voltage controlled oscilla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sorry I need more detail about this please help me brother send pdf or video to belsinben@Gmail.com

what is need of ic cd4049 in this circuit?

November 4, 2016 Sujata Made

Please send me EAGLE design(pcb design) and tell me more about power suppl used….email id:mesujatamade@gmail.com

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This circuit is awesome. I was planning on building a simple voltmeter but now I going to give this more complex version a try. Thanks!

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