

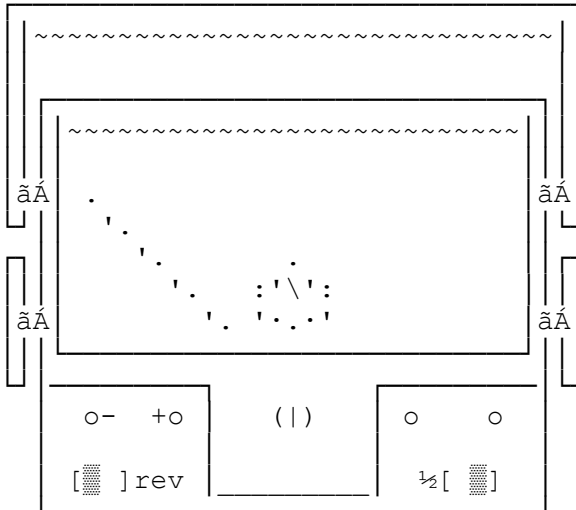
Lafayette 57 Range Multimeter

By G8MNY

(Corrections Jan 16)

(8 Bit ASCII graphics use code page 437 or 850, Terminal Font)

Model 99-5076



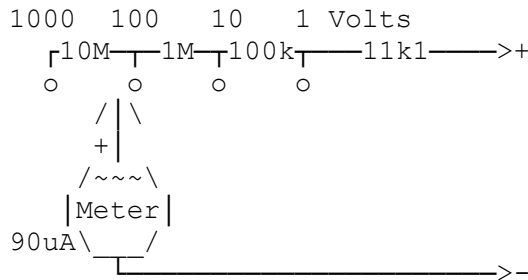
DC Volts	0.25	2.5	10	50	250	1000	@ 25k/V
	0.125	1.25	5	25	125	500	@ 50k/V
DC Amps	50uA	5mA	50mA	500mA	10A	@ Normal	
	25uA	2.5mA	25mA	240mA	5A	@ 2x	
AC Volts	3	10	50	250	1000	@ 2.5k/V	
	1.5	5	25	125	500	@ 5k/V	
	10x dB scales & DC isolated AC.						
Ohms	1/2 FSD	13	65	650	6k5	65k5	
Accuracy	DC 2%, AC 3%						

MULTI METER PRINCIPLES

DC VOLTS

To get a meter of just one sensitivity to do many ranges voltage multiplier resistors are used. Here the voltage drop across the meter is ignored, but it will affect the lowest 1V scale.

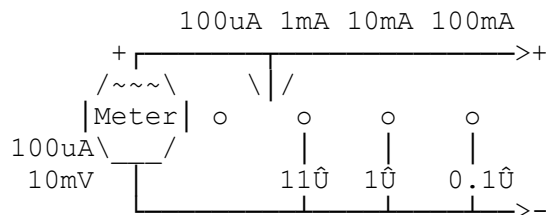
Series resistors are used to protect the switch more from high voltages.



Sensitivity is 11k1/V

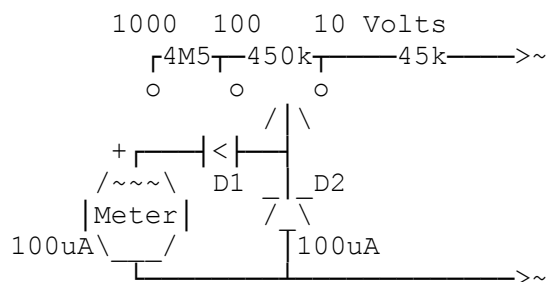
DC CURRENT

For current ranges shunts are put across the meter. Here the meter resistance is 100Ω so it has 10mV drop @ 100uA. The 1mA shunt here is corrected for the 100Ω meter load.



AC VOLTS

For AC a rectifier diode is used, & normally this alters the sensitivity, so a different multiplier arm the DC is used. In this circuit only half the current goes through the meter & the 1.1 AC sine wave form factor means that 2.2x meter current must flow. Only a 100mV is lost in the germanium diode D1, so the low voltage

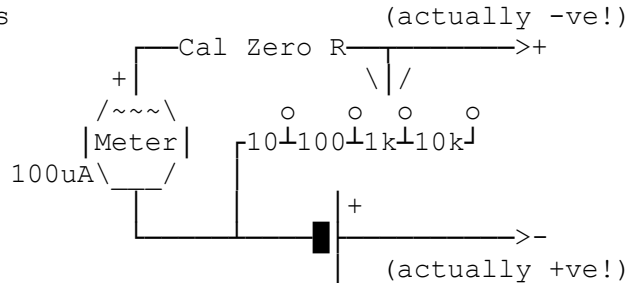


range can take this into account on the scale. D2 can be any type & protects the low voltage D1.

Sensitivity is 4k5/V.

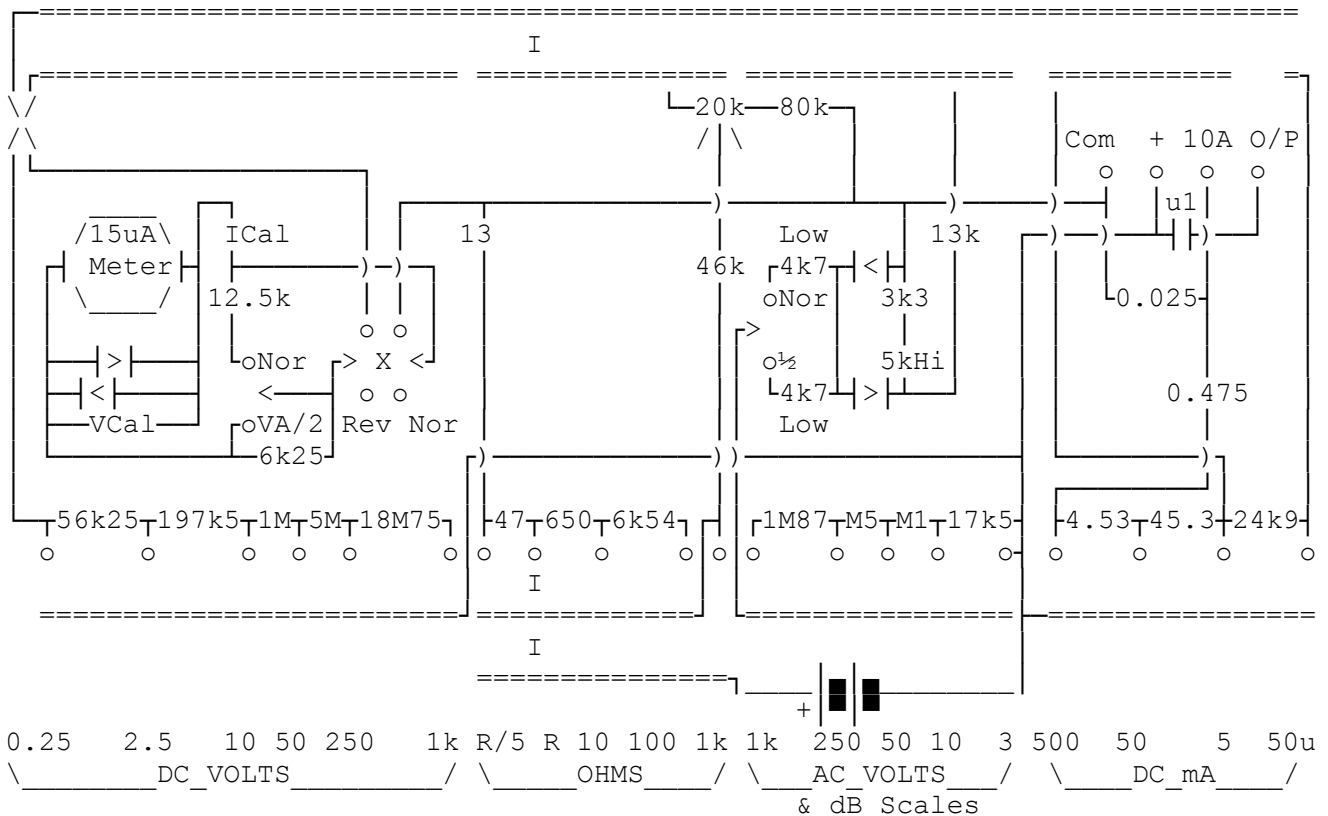
OHMS

Here a voltage source is put in series with the meter & a known resistance that set the half scale resistance & includes the meter load resistance. The higher the battery voltage the higher resistance that can be measured, but becomes a danger for sensitive electronics. The Cal zero R sets the meter sensitive to give full scale ZERO reading on shorting the probes depending the battery state.



Note that the battery internal resistance is added to the unknown resistance, & this affects the low range scale calibration! Also the probe polarity is reversed to that indicated & it is different than for digital meters!

ACTUAL MULTIMETER CIRCUIT



The configuration switching between modes & all the ranges is all done on just 1 large rotary switch with 3 bridging contacts (I) 5 wipers of 2 circuits.

Only 4 probe sockets are used, 2 extra for the high current (10A) & the DC isolated AC measurement.

Extra switches provide a meter reverse feature & a double sensitivity that doubles the number of meter ranges. (has no meaning on ohms!)

This meter's movement is a extremely sensitive @ 15uA for FSD, but not very accurate, so it is calibrated with an ICal & VCal presets at manufacture.

The AC ranges are calibrated with select on test resistors 2x "4k7 Low" & the "5k Hi" that accurately allows for the diode forward resistance loss & leakage.

Most of the resistors are special values made for the meter, & of course they are very accurate & stable 0.5% types.

See my tech buls on "Meter Movement Types", "Maplin Mains Meter 2000MU-UK", "Edgcume Peebles Megger & Low R", "Edgcume Peebles Earth Loop Z", "Car Dwell Angle & RPM Meter", & "Kelvin Varley Voltage Divider".

Why don't U send an interesting bul?

73 De John, G8MNY @ GB7CIP