RANGE DOUBLER

MODEL NO. C-7081GND

INSTRUCTION MANUAL

THE MODEL C-7081GND MULTITESTER

Model C-7081GND Multitester is a new idea in low priced test equipment. Since each AC or DC scale serves for two ranges, the Model C-7081GND actually has 46 (DC V: 12 range, AC V: 10 ranges, DC AMP: 10 ranges, OHMS: 4 ranges, Decibels: 10 ranges) effective ranges. It is a fine instrument for electronic hobbyists and amateurs, educational institutions, laboratories, and service establishments.

A single RANGE DOUBLER switch, labelled "V-A/2" and "V-Ω-A," controls 15 extra ranges. When the switch is in its "V-Ω-A" position, all meter scales are read directly. Sliding the RANGE DOUBLER switch to its V-A/2 position doubles sensitivity. Then all voltage and current readings are divided by two.

For instance, five volts on the ten volt range will swing the indicator needle to 50% of full deflection. When the RANGE DOUBLER switch is moved to its V-A/2 position, the needle will go to 100% deflection on the same voltage. But the ten-volt scale indication is now divided by two, so the actual reading is still five volts.

This range-doubling circuit is a valuable design improvement. Since all meter movements are most subject to error at the lower ends of their ranges, increasing deflection improves accuracy. Range-doubling in the Model C-7081GND enables its user to make most of this readings from the more accurate upper part of the meter scale.

Model C-7081GND features several design details rarely seen in the low-priced instrument field. A protective diode is wired across the meter movement. The diode does not conduct under normal operating conditions, but bypass excessive or wrongway current.

A permanently mounted handle on the Model C-7081GND can be turned around to the back as a support for bench work. The handle braces the multitester at an angle to the bench, greatly imoroving convenience and readability. The test leads are much longer than usually provided with small test instruments, and are fitted with extra-long test prods.

1. UNPACKING

Remove multitester, two "dry" cells, and set of test leads from carton.

Remove the case from the unit by taking out the two screws on the back. Install the two dry cells with polarities as marked by signs in bottom of battery compartment.

Place multitester on bench, face upward. Zero the movement by adjusting black slotted screw head on panel.

This completes preparation of the multitester for test and service work.

2. THE "OFF" SETTING.

The sensitive 15 μA movement of the Model C-7081GND can be damaged by rough motion. During shipping or any point-to-point transportation, the RANGE SWITCH should be in its OFF position. This shorts the movement, which is then relatively unaffected by motion. Whenever the multitester is not in use, its RANGE switch should be returned to the OFF position.

3. DC VOLTAGE MEASUREMENT.

Plug red test lead banana connector into labelled "V-Ω-A" and black test lead banana connector into jack labelled "−COM."

Set RANGE DOUBLER switch to "V-Ω-A".

If circuit voltage is unknown or possibly AC, turn RANGE switch to its 1000 VDC position.

If circuit voltage is roughly known, turn RANGE switch to a range greater than the circuit voltage.

Probe circuit with red test lead to positive and black to negative points in circuit. Make readings.

Choose lower ranges or use V-A/2 RANGE DOUBLER setting to obtain reading in upper half of meter scale.

4. DC CURRENT MEASUREMENT, UNDER 500 mA

Set RANGE DOUBLER switch to "V-Ω-A" position.

Turn RANGE switch to 500 mA scale.

Switch off electrical circuit to be tested.

Connect "V-Ω-A" jack through red test lead to positive circuit terminal.

Connect "−COM" jack through black test lead to negative circuit terminal.

Turn on circuit to make current reading.

Follow same procedure as DC voltage measurement in choosing lower ranges.

Turn off circuit before disconnecting multitester.

5. DC CURRENT MEASUREMENT, OVER 500 mA.

Same procedure as above, except two details:

Use "10A" jack for positive connection. "V-Ω-A" jack is not used.

Only the 500 mA RANGE setting is used.

6. AC VOLTAGE MEASUREMENT.

AC voltage measurement proceeds in the same way as DC voltage measurement, with these differences:

RANGE switch settings are in the ACV bracket.

There is no circuit polarity in AC voltage tests.

If the AC circuit carries an additional DC voltage, a series capacitor should be used to block the DC

from the multitester.

The ten and three volt AC scales are printed in red to emphasize their difference from the black printed AC/DC scales above them. The 1.5 VAC scale, used at a 3 VAC RANGE setting with the RANGE DOUBLER in its "V-A/2" position, is very nonlinear and is different from the 3VAC scale. This is the only range on the Model C-7081GND for which the RANGE DOUBLER SWITCH changes the scale to be read.

7. RESISTANCE MEASURMENT.

To measure resistance, plug in red and black test leads as for DC voltage measurement.

Set RANGE DOUBLER switch only at "V-Ω-A"

Turn RANGE switch to ohms range that should give a convenient reading of the expected resistance value.

Short the test leads, and observe meter needle swing upscale. Turn the red "ADJ" knob to set the meter needle on zero ohms. This is a full-scale deflection.

Apply test leads to component leads or circuit, and read resistance. Change range and re-zero if necessary. Convert reading using appropriate RANGE multiplier. For instance, a 150 reading on the x1000 range is actually 150,000 ohms.

Model C-7081GND will not harm conventional semiconductors in testing. It should be used carefully when checking IC's and circuits containing IC's, because these devices have extremely tiny semiconductor junctions.

8. DECIBELS MEASUREMENT.

To mesure power level in a 600Ω communications circuit, proceed as if measuring AC voltage. The resulting needle deflection is read on the decibels scale. Then a number corresponding to the RANGE switch setting is added to the scale reading to find the circuit power level in decibels.

For example, the voltage across a 600 ohms line is read as plus 4 db, using the 10-volt NORMAL setting of the RANGE DOUBLER switch. This could also be read as 8.4 VAC. The "ADD DB" chart on the meter face supplies a constant 17 db to be added to any measurement taken on the 10-volt NORMAL range. The power level in this circuit is plus 21.5 db.

The reference level for the Model C-7081GND decibel is the industry standard of 1 milliwatt, or 0.775 volts across 600 ohms. Since other power level standards are used sometimes, the above reading would often be given as plus 21.5 db.

Readings based on the 1 milliwatt into 600 ohms standard must be corrected if circuit or load impedances are different from 600 ohms. The correction for a 1200 ohm circuit would be minus 3 db; for an 8 ohm circuit, plus 18.8 db. For a full explanation of the decibel power measurement system, refer to a good audio or communications systems textbook.

MODEL C-7081GND TECHNICAL DATA

METER : 15 μA high sensitivity meter

DC Voltage : 12 Ranges

0.5~2.5~10~50~250~1000V at 25 KΩ /V

0.25 ~1.25~5~25~125~500V at 50 KΩ /V (V.A/2)

Accuracy : ±3% of full scale all DC ranges, except 0.25 ~2.5V, 500 and 1000V each ranges ±4%

AC Voltage : 10 Ranges

3 ~10~50~250~1000 V at 5 KΩ/V

1.5~5~25~125~500 V at 10 KΩ/V (V.A/2)

Decibels : −20~62 db in 10 AC Volt ranges.

Accuracy: ±3.5% of full scale all AC ranges, except 3 V, 500 and 1000V each ranges ±4%, 1.5V range ±5%

DC Current : 10 Ranges

50 μA ~5mA~50mA~500mA~10A

25μA~2.5mA~25mA ~250 mA~5A (V.A/2)

Accuracy : ±3% of full scale all DC AMP ranges, except 5A and 10A each ranges ±4%

Resistance : 4 Ranges

R×1 ~R×10~R×100~R×1K (100 ohms mid scale)

R×1 : 0 ~16 K ohms

R×10 : 0 ~160 K ohms

R×100 : 0 ~1.6M ohms

R×1 K : 0 ~16M ohms

Accuracy : ±3% of DC scale with full Battery.

Battery : "UM-3" 1.5 Volts (2 used)

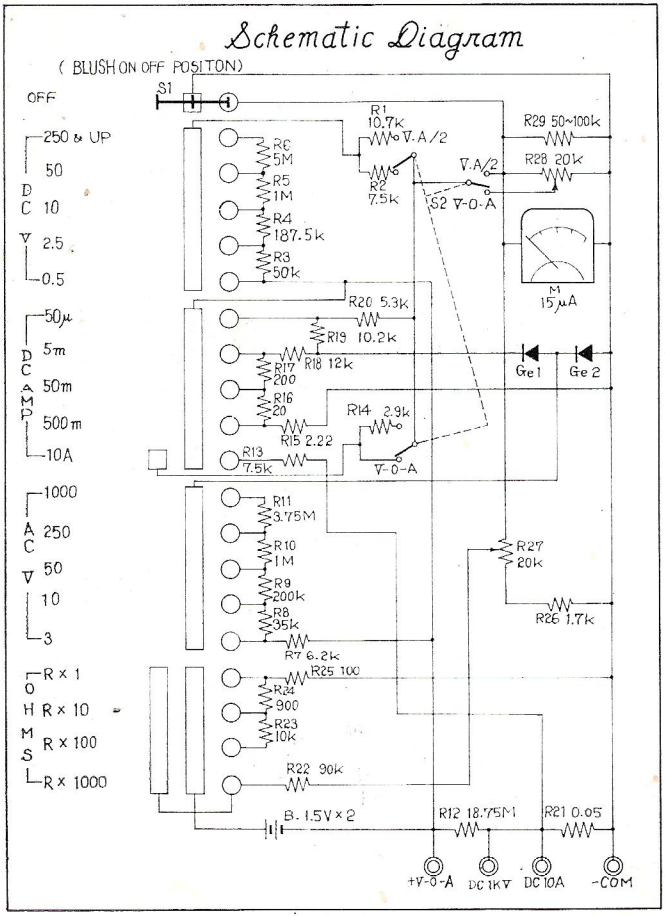
Slide Switch : VΩ-A ←→ V.A/2

Jacks : (+) VΩA, −COM, DC 10A, DC 1KV

Test leads : 1 pair (Black &Red) 31 inches long.

Size : 6½ "H×4¾ "W×2½ "D

When meter is "OFF" position, needle is dampened to prevent from damage is carring.



DRY CELLS

Replace dry cells with the following when necessary.

15V (W-10)

Eveready	504	or equivalent
Burgess	Y-10	
Ray-O-Vac	220	
Mallory	BA-332V	
RCA	VS-704	

1.5V (UM-3)

Eveready	515	or equivalent
Burgess	Z	
Ray-O-Vac	7R	
Mallory	M-15F	
RCA	VS-034	