

MICRONTA[®]

20,000 OHMS/VOLT MULTITESTER INSTRUCTION MANUAL



CAT. NO. 22-201U

CUSTOM MANUFACTURED FOR RADIO SHACK, A DIVISION OF TANDY CORPORATION

SPECIFICATIONS

Ranges:	18
DC Voltage	0-5-25-125-500-1000V (20,000 OHMS/V)
AC Voltage	0-10-50-250-1000V (10,000 OHMS/V)
DC Current	0-50 μ A, 0-250mA (250mV)
Resistance	0-2K-20K-2Meg (center scale 24)
Decibels	-20 to +62 dB in 4 ranges
Output	0-10-50-250-600 volts
Accuracy:	\pm 3% of full-scale, DC voltage and current \pm 4% of full-scale, AC voltage \pm 3% of scale length, Resistance
Sensitivity:	20,000 ohms/volt DC 10,000 ohms/volt AC
Meter Movement:	3" (7.6 cm), 3-color, mirrored scale, 37 μ A movement
Battery:	Requires one type "AA" penlight cell for Ohms function
Leads:	44" (110 cm) tip jack style
Size:	5-1/8" x 3-1/2" x 1-7/16" (13.0 x 9.0 x 3.7 cm) (HWD)
Weight:	7.5 ounces (212

WARNING: USE EXTREME CAUTION IN THE USE OF THIS DEVICE. IMPROPER USE OF THIS DEVICE CAN RESULT IN INJURY OR DEATH. FOLLOW ALL SAFEGUARDS SUGGESTED IN THE OWNER'S MANUAL IN ADDITION TO NORMAL SAFETY PRECAUTIONS IN DEALING WITH ELECTRICAL CIRCUITS. **DO NOT** USE THIS DEVICE IF YOU ARE UNFAMILIAR WITH ELECTRICAL CIRCUITS AND TESTING PROCEDURES.



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INTRODUCTION

This compact, sensitive Multitester is designed to measure AC and DC voltages, DC currents and resistance with accuracy and ease. The single knob function control is easy to use and read. The 3" (7.6 cm) sensitive meter incorporates a mirrored-scale for accurate readings and uses 3 colors for rapid scale identification. An "off" position is incorporated for meter protection during transit. Small and light, this instrument will provide many years of accurate voltage, current and resistance measurements.

HOW TO USE

The following special markings are designed to remind you of safety.

-  Refer to the following complete operating instructions.
-  To avoid electrical shock and/or instrument damage do not connect the common input terminal (— jack) to any source of more than 500 volts with respect to earth/ground.

Remove back cover and install one "AA" penlight cell (not supplied). We recommend our 23-582 or 23-552. Be sure to observe proper polarity. Close the cover. When you can't adjust the pointer to "0" on OHMS range, it's time for new battery. By the way, never leave a weak or dead battery in your unit. It may leak a damaging chemical (even "leak-proof" type). Also if you are not going to use your unit for a week or more, remove battery.

Notes: For most accurate readings, keep the meter laying flat on a non-metallic surface. Also, use a range setting that results in a reading in the upper 1/3rd of the meter scale.

Also, look at the scale from the point where the pointer and its reflection on the mirror come together: else the reading error due to parallax will result.

If the pointer does not normally rest exactly over the "0" at the left side of the scale, adjust the plastic screw in the lower center of the meter face to bring the needle to "0"

Always observe correct test lead polarity when making DC voltage and current measurements (Black into the \ominus COM and Red into the \oplus V- Ω -A or DC1000V jacks).

CAUTION: THE MAXIMUM INPUT LIMIT FOR VOLTAGE AND CURRENT MEASUREMENT BETWEEN \oplus V- Ω -A AND \ominus COM IS 1000V AC, 500V DC AND 250mA DC.

TEST LEADS

Use only the same type of test leads as are supplied with your unit. These test leads are rated for 1000 volts; replacements are available from your local Radio Shack store.

When not in use, always leave the Range switch in the "Off" position.

DC VOLTAGE MEASUREMENTS

WARNING ⚡ : USE EXTREME CARE WHEN MAKING MEASUREMENTS FOR HIGH VOLTAGE; DO NOT TOUCH TERMINALS OR PROBE ENDS.

1. Plug the test leads into the correct jacks (Black into \ominus COM and Red into \oplus V- Ω -A).
2. Set Range switch to one of the DCV positions; it is best to start at the top and work down.

If you're not certain about voltage level, start with 1000V range as noted on step 5 below.

3. Touch the test probe tips to the circuit under test; be sure to observe correct polarity.
4. Read the voltage on the black DC scales.
5. For voltages between 500 and 1000, set Range switch to 500 & 1K and plug the red test lead into the DC1000V jack.
USE EXTREME CARE WHEN USING TOP RANGES.

AC VOLTAGE MEASUREMENTS

WARNING ⚡ : USE EXTREME CARE WHEN MAKING MEASUREMENTS FOR HIGH VOLTAGE; DO NOT TOUCH TERMINALS OR PROBE ENDS.

1. Plug the test leads into the correct jacks.
2. Set Range switch to one of the ACV positions; it is best to start at the top and work down.
3. Touch the test probe tips to the circuit under test.
4. Read the voltage on the red AC scale. Follow the black numbers.

RESISTANCE MEASUREMENTS

Before taking any resistance measurements, disconnect power to the unit under test and discharge capacitors. It is best to remove batteries and unplug line cords.

WARNING: DO NOT APPLY VOLTAGE TO MEASURING TERMINAL WHILE RANGE SWITCH IS IN OHM POSITION.

1. Plug the test leads into the \ominus COM and \oplus V- Ω -A jacks.
2. Set Range switch to one of the OHMS positions; touch the test probe tips together and adjust the OHMS ADJUST control to bring the pointer to the "0" on the top (green) OHMS scale.
3. Now, touch the probe tips across the circuit or part under test.
4. Read the resistance on the green OHMS scale; use the proper multiplier to obtain the correct value (R "times" 1, 10, or 1000, depending on the position of the Range switch).

Notes: When you are unable to adjust the pointer to "0" on the OHMS scale, the battery must be replaced.

When measuring resistance, it is best to disconnect one side of the part under test (thus the remainder of the circuit will not interfere with the readings).

WARNING: TO AVOID ELECTRIC SHOCK, DISCONNECT MEASURING TERMINALS BEFORE REMOVING BATTERY. REPLACE ONLY WITH SAME TYPE BATTERY. OPEN CABINET ONLY WHEN REPLACING BATTERY. DO NOT TOUCH ANY INSIDE AREA OTHER THAN BATTERY.

Note for Testing Semiconductor Junctions: When attempting to identify cathode and anode ends or the type of transistor (PNP or NPN), the actual polarity of the tester's voltage is opposite of the lead colors. The red lead is the negative source. The black lead is positive.

DC CURRENT MEASUREMENTS

WARNING: DO NOT APPLY VOLTAGE TO MEASURING TERMINALS WHILE RANGE SWITCH IS IN CURRENT POSITION.

1. Plug the test leads into the correct jacks.
2. Set the Range switch to the 250m DCA position (250 milliamp). Always start at the top and work down.
3. Open up the circuit in which you want to measure current and connect the black lead to the negative side and the red lead to the positive side of the circuit.
4. Apply power to the circuit under test and read the current on the black DC scales.

DECIBEL MEASUREMENTS

1. Plug the test leads into the correct jacks.
2. Set Range switch to one of the ACV ranges.
3. For a Range switch setting of 10 ACV, read dB directly on the bottom scale in dB. For other settings of the Range switch, add the appropriate number of dB to the dB scale reading as noted on the chart at the lower right on the meter face.

Note: For absolute dB measurements, circuit impedance must be 600 ohms. $0 \text{ dB} = 1 \text{ milliwatt}$ dissipated in a 600 ohm impedance (equivalent to 0.775V across 600 ohms).

OUTPUT VOLTAGE MEASUREMENTS

1. To measure AC voltage in the presence of DC voltage, use the Output function. Connect the black lead to the \ominus COM jack and the red lead to the OUTPUT jack.
2. Set the Range switch to an ACV position and measure the voltage in the circuit.

Note: The Output function incorporates a DC blocking capacitor, rated at 600 volts. Thus, do not exceed the 600 volt rating when measuring Output voltages.

3. Read Output voltages on the same scales as for AC Voltage.

Note: When you are not using the multimeter, set the Range switch to the OFF position.

GOOD METER MEASUREMENT PRACTICES

There are some good general rules which apply to the use of electrical meters. Some are common-sense, some are safety precautions and some are just plain good habits to get into.

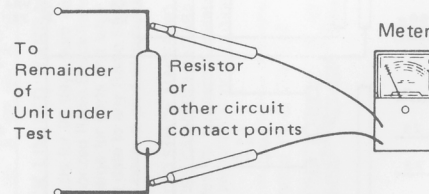
1. **CAUTION:** There is always the possibility of dangerous voltages being present in any piece of electrical/electronic equipment. Always use extreme caution when making measurements -- high voltage may appear at unexpected points in a suspected defective circuit.
2. When making measurements, never stand on a wet or damp floor. Do not work near (or on) any grounded metal object -- for example, a metal work table, metal water or gas pipes, metal electrical conduit. Accidental contact between the grounded metal object and the circuit under test can be lethal.
3. Always use only well insulated test leads. Never use test leads without insulated test prods. Never allow your fingers to touch the bare metal part of the test probes (or circuit points).
4. Never use test leads with frayed or broken insulation; voltages will appear at all exposed contact points on the leads.

5. Never attempt to measure voltages or currents above the specified maximum the meter is designed for; refer to Specifications section.
6. For safety's sake, disconnect leads as soon as you've completed measurements.
7. Always turn off the unit's power before connecting test leads. This is especially true when working on circuits with 100 or more volts.
8. Get into the habit of keeping one hand in your pocket when trouble-shooting any equipment containing high voltage circuitry.
9. You should remember that even a small shock can be dangerous, for your body's reaction to a minor shock can cause you to bump or fall against a higher voltage contact.
10. Discharge filter capacitors before connecting test leads; such capacitors can retain hazardous charges in units with high voltage circuits.
11. When making voltage and current measurements always start with the highest range available.
12. Never attempt to measure a voltage when the function is set to resistance or current (it may burn out the meter movement or other circuitry). Never attempt to measure current with the meter set for resistance.
13. Never attempt to measure AC voltages or current with the meter set to a DC mode (meter circuitry can be damaged).
14. Do not attempt to measure RF voltages with the Meter (it can be damaged, or at best the readings will be meaningless).
15. Do not expose your meter to moisture; avoid high humidity and excessive dust and dirt.

16. Avoid vibration or mechanical shock; the Meter might be damaged or its accuracy affected.
17. Avoid using meters in locations with high magnetic fields (inaccurate measurements can result).
18. Remember that voltage and resistance measurements are made with the Meter connected in parallel. Current measurements are made with the meter connected in series.

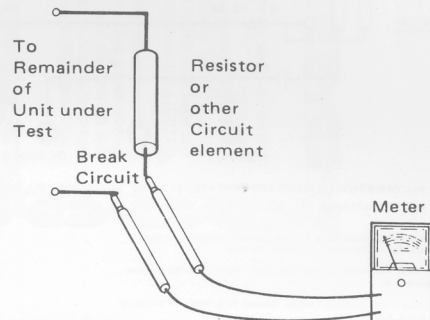
PARALLEL METER CONNECTION

For Voltage and Resistance measurements

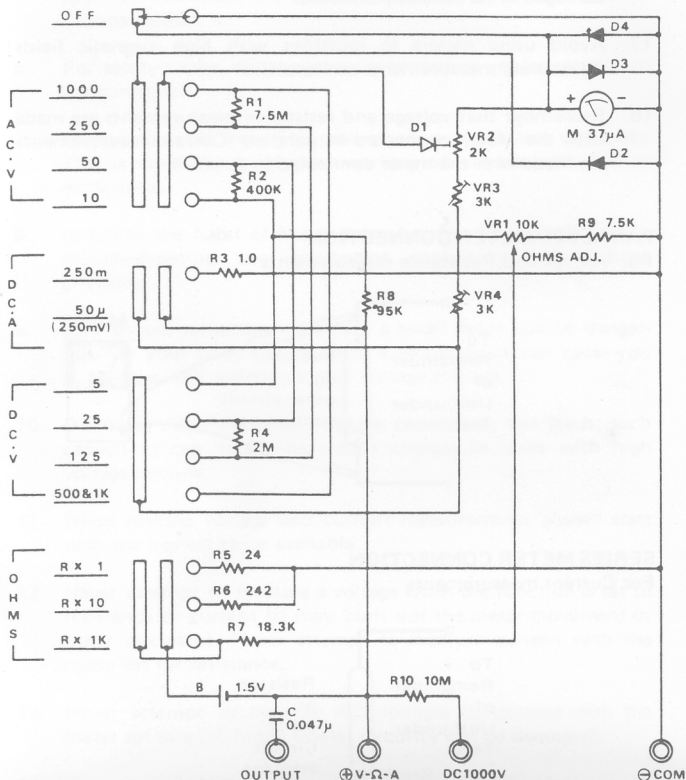


SERIES METER CONNECTION

For Current measurements



SCHEMATIC DIAGRAM



NOTE: (1) ALL RESISTANCE VALUES ARE INDICATED IN "OHM" (K = 10³ OHM, M = 10⁶ OHM)
(2) ALL CAPACITANCE VALUES ARE INDICATED IN "µF" (P = 10⁻⁹ F)

Schematic subject to change without notice. For most accurate Schematic (and parts) contact Radio Shack - National Parts Dept., Fort Worth, TX 76101

In UK, contact Tandy Electronics, National Parts Dept., Bilston Road Wednesbury West Midlands WS10 7 JN

In Australia, contact Tandy Australia Limited, National Parts Dept., 91 Kurrajong Avenue, Mount Druitt, N.S.W. 2770

RADIO SHACK LIMITED WARRANTY

This product is warranted against defects for 90 days from date of purchase from Radio Shack company-owned stores and authorized Radio Shack franchisees and dealers. Within this period, we will repair it without charge for parts and labor. Simply **bring your Radio Shack sales slip** as proof of purchase date to any Radio Shack store. Warranty does not cover transportation costs. Nor does it cover a product subjected to misuse or accidental damage.

EXCEPT AS PROVIDED HEREIN, RADIO SHACK MAKES NO WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Some states do not permit limitation or exclusion of implied warranties; therefore, the aforesaid limitation(s) or exclusion(s) may not apply to the purchaser.

This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

We Service What We Sell

SCHEMATIC DIAGRAM

RADIO SHACK
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