OUTBOARD CONSTANT-CURRENT SOURCE CONVERTS VTVM's DC FUNCTION TO

A LINEAR-SCALE OHMMETER

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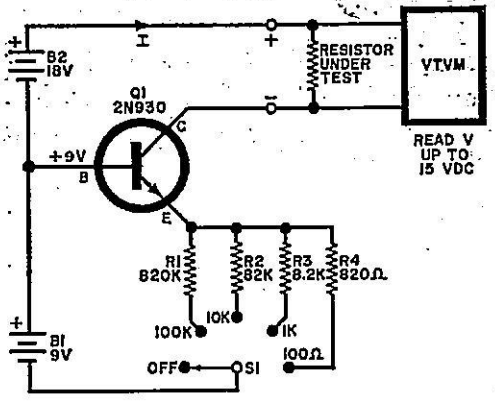
WHEN you use a VTVM to measure resistance, the conventional logarithmic scale can present interpretation difficulties that lead to gross inaccuracies if the meter pointer should fall in the crowded upper one-third of the scale. However, if the scale could be made linear, and thus easier to interpret, your reading accuracies will benefit greatly.



Test resistance value is equal to voltage drop across resistor times range multiplier of current source.

The constant-current circuit, shown here schematically, can be used with your VTVM to provide a linear-scale feature with ranges of 100, 1k, 10k, and 100k ohms. The ranges are interpreted on the linear scale of the dc voltage ranges and not on the usual log-type resistance scale. Nor do you need a conversion chart, nomograph, or formula to figure out the ohmic value of a resistor under test. You simply read the voltage indicated by the meter pointer and observe the range position of the switch in the constant-current circuit.

An example shows how this works. If you measure 4.8 volts across a test resistor and the add-on's range switch is in the 10k position, the resistance is 48,000 ohms (4.8 × 10,000 = 48,000). It's as simple as that.

Since the add-on allows measurements and comparisons at several current levels, diodes can be accurately matched with the constant-current source. You can even get a rough measurement of capacitance values (greater than 0.1 μF). To do this, apply the formula $C = (IT/V)$, where C is in farads, I is supply current in amperes (see table for multiplication factor to use), T is charging time in seconds, and V is measured voltage in volts. For example, if the constant-current source is set to 100k, the capacitance in microfarads is equal to the number of seconds required for the voltmeter to indicate 10 volts after the capacitor is connected. This is only a rough estimate of the capacitance value which will allow you to determine if a capacitor's value is "in the ballpark" of the stamped value.

MULTIPLICATION FACTORS

SCALE FACTOR (OHMS/VOLT)	RANGE CURRENT
100	10 mA
1k	1 mA
10k	0.1 mA
100k	0.01 mA

If you look at the circuit again, you will note that *S1* is set up so that you can connect a capacitor to the circuit before the circuit is switched on. Once the capacitor to be tested is connected to the constant-current source, use the sweep second hand on your watch to count ten seconds from the time the range switch is set into any appropriate operating position for the current source. ◈