

HEWLETT-PACKARD MODEL 400C VACUUM TUBE VOLTMETER DESCRIPTION

1. GENERAL

1.001 This addendum supplements Section 100-525-101, Issue 2.

1.002 This addendum is issued to restrict the use of the office milliwatt supply for calibrating the 400C voltmeter, to recommend the use of more modern calibrating equipment and to remove the restriction against grounding the voltmeter.

1.003 The following changes apply to Part 5 of the section:

(a) Paragraph 5.06, Page 5, subparagraphs (1) through (4) inclusive, are deleted and replaced by the following:

(1) Use an oscillator capable of delivering 1 milliwatt at 1000 cycles into a 600-ohm load. Any of the following is satisfactory for this purpose.

71B Milliwatt Reference Generator*

21A Transmission Measuring Set, oscillator portion**

Northeast TTS-4A Transmission Measuring Set, oscillator portion**

Hewlett-Packard 200- or 650-Type Oscillator**

KS-19353, L1 or L4 Oscillator**

* See item (2) below

** See item (3) below

Note: Do not use an outlet from the office milliwatt supply unless it is ascertained that there is an isolating transformer (repeating coil) in the outlet itself, or that there are no other grounds, ac or dc, intentional or unintentional, on any other part of the milliwatt distributing system. Since the 400C voltmeter has one input terminal grounded, the output of the milliwatt outlet will be in error when the voltmeter is connected to it if there is a ground on any other part of the system. For example, the calibrating circuit

for the 1W amplifier-rectifier shown in SD-59433-01 and similar circuits provides such a ground.

(2) If the 71B generator, or a milliwatt outlet meeting the above requirements is used, its output can be assumed to be 1 milliwatt if it has been calibrated with the 22A milliwatt reference meter in accordance with the procedures covered in the 103-series of practices. A 600-ohm $\pm 1\%$ resistor is connected across the input terminals of the voltmeter and these terminals are then connected to the output of the generator or outlet. The difference between the voltmeter reading and 0 dbm is the calibration error of the 400C voltmeter.

(3) If any of the other oscillators listed in (1) above is used, its output should be measured and adjusted to 1 milliwatt by means of a 600-ohm meter or transmission measuring set. Any of the following is satisfactory for this purpose.

22A Milliwatt Reference Meter

23A Transmission Measuring Set

21A Transmission Measuring Set

Northeast TTS-4A Transmission Measuring Set

With the exception of the 22A meter, the measuring set should have been calibrated prior to this use against an accurate source of 1 milliwatt. The 22A meter is calibrated in accordance with the instructions on the face of the meter. Connect the input of the 400C voltmeter in parallel with the 600-ohm meter or transmission measuring set and then connect the combination to the oscillator output. Adjust the oscillator until its output measures exactly 1 milliwatt on the meter or transmission measuring set. The difference between the voltmeter reading and 0 dbm is the calibration error of the 400C voltmeter.