

SECTION I

GENERAL INFORMATION

1-1. DESCRIPTION.

1-2. The Hewlett-Packard Model 654A Test Oscillator is an ideal general purpose signal source whenever a flat balanced or unbalanced test signal is required. Balanced outputs of 135 ohms, 150 ohms and 600 ohms have many uses in the communications industry. Automatic leveling, together with the expanded meter, make the 654A ideally suited to voltmeter calibration or to test frequency response of components during manufacture. The instrument is shown in Figure 1-1 and the specifications are listed in Table 1-1.

General information relating to the instrument is listed in Table 1-2. The information in Table 1-2 should not be considered specifications.

1-3. The Model 654A is a stable, low distortion sine-wave signal source with a flat frequency response of $\pm 0.5\%$ over the frequency range of 10 Hz to 10 MHz. The attenuators allow the signal to be adjusted in 1 dB and 10 dB steps from +10 dBm to -89 dBm, and the front panel AMPLITUDE control allows a continuous adjustment in level of ± 1 dB from the settings shown on the OUTPUT LEVEL attenuators. The flat frequency response is achieved by automatic leveling circuits within the 654A.

1-4. Five output impedances are available, selected by a front panel push-button control: these are 50 and 75 ohms unbalanced and 135, 150 and 600 ohms balanced. Balance is greater than 50 dB up to 1 MHz and greater than 40 dB up to 5 MHz.

1-5. The meter scale is expanded to indicate 0 dBm at center scale, with a total range of ± 1 dBm. The metering circuit monitors the signal level before the attenuators so that the meter indication is independent of the attenuator

settings; the meter indicates the signal level set by the front panel AMPLITUDE control. The output signal level into the load is the algebraic sum of the meter indication and the OUTPUT LEVEL attenuator settings.

1-6. An additional feature is the COUNTER OUTPUT rear panel BNC connector. This allows the Model 654A frequency to be continuously monitored by an electronic counter without interrupting measurements or affecting terminal balance.

1-7. SUPPLIED ACCESSORIES.

Rack mount kit: -hp- Part No. 5060-0775.

1-8. RECOMMENDED ACCESSORIES.

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| -hp- 11048C | 50 ohm Feedthrough Termination |
| -hp- 11094A | 75 ohm Feedthrough Termination |
| -hp- 11095A | 600 ohm Feedthrough Termination |
| -hp- 11143A | Balanced BNC to Alligator clip cable |

1-9. INSTRUMENT AND MANUAL IDENTIFICATION.

1-10. Hewlett-Packard uses a two-section serial number. The first section (prefix) identifies a series of instruments. The last section (suffix) identifies a particular instrument within the series. If a letter is included with the serial number, it identifies the country in which the instrument was manufactured. If the serial prefix of your instrument differs from the one on the title page of this manual, a change sheet will be supplied to make this manual compatible with newer instruments or the backdating information in Appendix C will adapt this manual to earlier instruments. All correspondence with Hewlett-Packard should include the complete serial number.

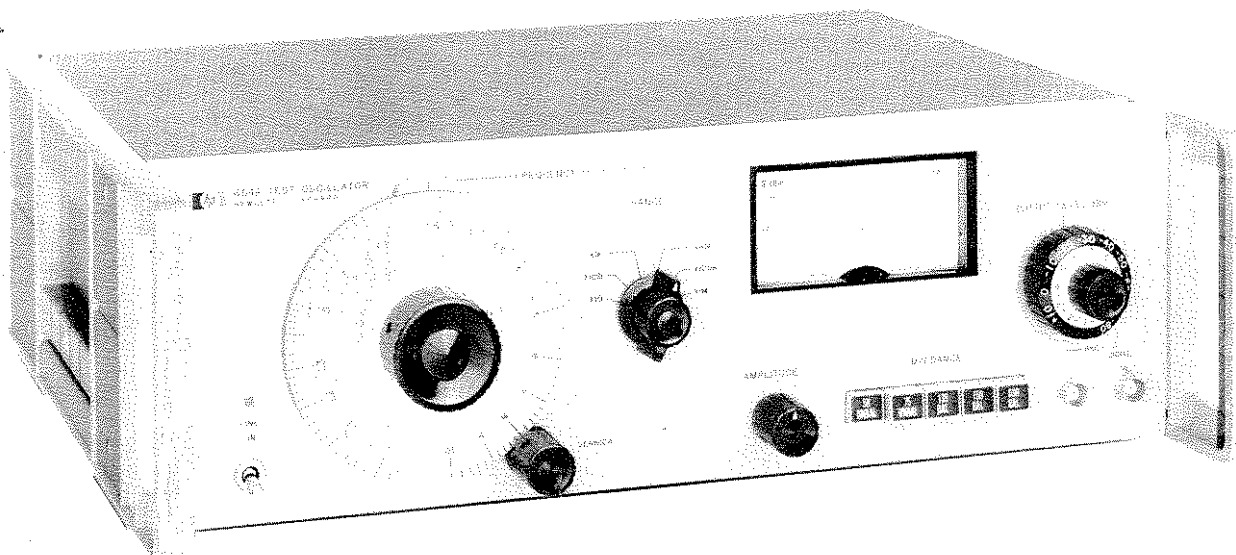


Figure 1-1. Model 654A Test Oscillator

Table 1-1. Specifications

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| <p>Frequency range: 10 Hz to 10 MHz in 6 bands.</p> <p>Frequency accuracy: 100 Hz (on X100 RANGE) to 5 MHz: $\pm 2\%$ 10 Hz to 100 Hz: $\pm 3\%$ 5 MHz to 10 MHz: $\pm 4\%$</p> <p>Level flatness(+10 dBm and 0 dBm): $\pm 0.5\%$ referenced to level at 1 kHz from 10 Hz to 10 MHz for unbalanced outputs, 10 Hz to 5 MHz for 135 ohm and 150 ohm outputs, and 10 Hz to 1 MHz for 600 ohm output.</p> <p>Attenuator</p> <p>Range: 99 dB in 10 dB and 1 dB steps.</p> <p>Accuracy: $\pm 1.5\%$ (0.15 dB) except $\pm 10\%$ (1 dB) at output levels below 60 dBm at frequencies greater than 300 kHz.</p> | <p>Amplitude control: greater than 2 dB.</p> <p>Amplitude accuracy: $\pm 1\%$ for 90 days (at 1 kHz, +10 dBm level with meter centered).</p> <p>Meter tracking: ± 0.05 dB.</p> <p>Balance (on balanced impedances) when measured by the procedure given in Paragraph 5-28: greater than 50 dB for frequencies from 10 Hz to 1 MHz, greater than 40 dB to 5 MHz.</p> <p>Distortion (THD) 10 Hz to 1 MHz: greater than 40 dB below fundamental. 1 MHz to 10 MHz: greater than 34 dB below fundamental.</p> <p>Hum and noise: greater than 70 dB down at full output.</p> |
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Table 1-2. General Information

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| <p>Output impedance: 50 ohm unbalanced, 75 ohm unbalanced, 135 ohm balanced, 150 ohm balanced and 600 ohm balanced.</p> <p>Output level: +11 dBm to -90 dBm, 10 dB and 1 dB steps with adjustable ± 1 dB meter range; calibrated for each impedance.</p> <p>Meter resolution: 0.02 dB.</p> | <p>Output connectors: BNC. Maximum voltage which can be applied to the output: less than ± 3 V peak.</p> <p>Counter output: greater than 0.1 V rms into 50 ohm, BNC connector.</p> <p>Operating temperature: 0°C to $+55^{\circ}\text{C}$ (32°F to 130°F).</p> <p>Power: 115 V or 230 V $\pm 10\%$, 48 Hz to 440 Hz, 30 W nominal, 35 W max.</p> |
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