SECTION I

GENERAL INFORMATION

1-1. INTRODUCTION.

1-2. This operating and service manual contains information required to install, operate, test, adjust, and service Hewlett-Packard Model 1311B. The manual part number is listed on the title page. Also listed on the title page of this manual is a Microfiche part number. This number can be used to order 4 x 6-inch microfilm transparencies of the manual. Each microfiche contains up to 96 photo-duplicates of the manual pages. The microfiche package also includes the latest Manual Changes supplement as well as a pertinent Service Note.

1-3. SPECIFICATIONS.

1-4. Instrument specifications are listed in table 1-1. These specifications are the performance standards or limits against which the instrument is tested. Table 1-2 lists supplemental characteristics. Supplemental characteristics are not specifications but are typical characteristics included as additional information for the user.

1-5. SAFETY CONSIDERATIONS.

1-6. This product is a Safety Class 1 instrument (provided with a protective earth terminal). The 1311B X-Y Display is equipped with a detachable, three-conductor power cord which, when plugged into an appropriate outlet, grounds the instrument through a separate pin. When operating the 1311B from a two-conductor adapter, preserve the safety feature by grounding the adapter lead.

1-7. Prior to operating or performing maintenance on the instrument become familiar with all safety markings and instructions. Read the Safety Considerations page at the front of this manual for general safety information.

1-8. INSTRUMENTS COVERED BY MANUAL.

1-9. Attached to the instrument is a serial number plate. The serial number is in the form: 0000A00000. It is in two parts; the first four digits and the letter are serial prefix and the last five digits are the suffix. The prefix is the same for all identical instruments; it changes only when a change is made to the instrument.The suffix however, is assigned sequentially and is different for each instrument. The contents of this manual apply to instruments with the serial number prefix(es) listed under SERIAL NUMBERS on the title page.

1-10. An instrument manufactured after the printing of this manual may have a serial number prefix that is not listed on the title page. This unlisted serial number prefix indicates the instrument is different from those described in this manual. The manual for this newer instrument is accompanied by a yellow Manual Change supplement. This supplement contains "change information" that explains how to adapt the manual to the newer instrument.

1-11. In addition to change information, the supplement may contain information for correcting errors in the manual. To keep this manual as current and accurate as possible, Hewlett-Packard recommends that you periodically request the latest Manual Change supplement. The supplement for this manual is identified with the manual print date and part number, both of which appear on the manual title page. Complementary copies of the supplement are available from Hewlett-Packard.

1-12. For Information concerning a serial number prefix that is not listed on the title page or in the Manual Change supplement, contact your nearest Hewlett-Packard office.

Table 1-1. Specifications

VERTICAL AND HORIZONTAL AMPLIFIERS

RISE TIME: <75 ns, 10% to 90% points for full screen deflection.

BANDWIDTH: dc to 5 MHz (3 dB down at 5 MHz) with 8.9 cm (3.5 in.) deflection.

SETTLING TIME: signal settles to within 1 spot diameter of final value in <500 ns for any on screen movements.

REPEATABILITY: <0.15% of full screen error in readdressing any point on screen from any point on screen.

CROSSTALK: <0.38 mm (<0.015 in.) with one input terminated in 50Ω and the other input driven by 1 V, 500 kHz signal.

DEFLECTION FACTOR: front panel adjustable through the range indicated below:

Vertical	Horizontal
from approx. 46.3 mV/cm (118 mV/in.) to 81 mV/cm (207 mV/in.)	from approx. 35.8 mV/cm (90 mV/in.) to 60.9 mV/cm (153 mV/in.)

Table 1-1. Specifications (Cont'd)

SPOT JITTER AND MOTION: 0.13 mm (0.005 in.) with X INPUT and Y INPUT disconnected.
POSITION: zero input can be set to any on-screen postion.
POLARITY: positive vertical input moves the beam up; positive horizontal input moves the beam right.
X-Y INPUT: rear panel BNC female connectors with floating shield.
X-Y INPUT IMPEDANCE: 50Ω, switchable to 10 kΩ shunted by 40 pF.
MAXIMUM INPUT: ±50 V (dc + peak ac) with 10 kΩ internal termination. ±5 V (dc + peak ac) with 50Ω internal termination.
LINEARITY: 1% of full scale display (along major axes).
DRIFT: 5.08 mm/hr (0.2 in./hr) first hour and 6.35 mm/hr (0.25 in./hr) in next 24 hours with covers installed.

Z-AXIS AMPLIFIER

RISE TIME: <25 ns.
SENSITIVITY: −1 V signal blanks trace; +1 V signal (INTENSITY at maximum) provides maximum intensity. Polarity may be reversed by changing internal lead connections.
Z-INPUT: rear panel BNC female connector with floating shield.
Z-INPUT IMPEDANCE: 50Ω switchable to 10 kΩ shunt by 60 pF.
TTL BLANKING: high state blanks CRT. (polarity reversible).
BINARY GRAY SHADE: 3 bit TTL level input providing 7 gray shades and blanking.
MAXIMUM INPUT: ±50 V (dc + peak ac) with 10 kΩ internal termination. ±5 V (dc + peak ac) with 50Ω internal termination.

Table 1-2. Supplemental Characteristics

CATHODE-RAY TUBE

VIEWING AREA: 36.5 cm (14 in.) diagonal, useable viewing area at least 20.3 cm (8 in.) vertical by 25.4 cm (10 in.) horizontal.
TYPE: post-accelerator, 28.5 kV accelerating potential, P31 aluminized phosphor is standard. Electrostatic focus and deflection.
SPOT SIZE: 0.43 mm (0.017 in.) at center of screen.
RESOLUTION: ≥24 lines/cm (61 lines/in.) center screen and ≥20 lines/cm (50 lines/in.) in the corners over a 20.3 x 25.4 cm (8x10 in.) viewing area.
BRIGHTNESS: at least 84 cd/m^2 (24.5 fl) measured at 2.54 mm/μs (0.1 in./μs), 60 Hz rate, with spot size of 0.5 mm (0.020 in.), P31 Phosphor.
X-RAY EMISSION: CRT emission <0.5 mR/hr; not measurable above background noise using Victoreen Model 440RF/C.
IMPLOSION PROTECTION: rim tension banding prevents implosive devacuation. (UL/IEC348).
PHOSPHOR PROTECTION: circuit detects absence of deflection signals and limits beam current.
HIGH VOLTAGE SHUTDOWN: senses over voltage condition and turns off high voltage.

GENERAL:

POWER: selectable to 100 Vac 120 Vac, 220 Vac, and 240 Vac +5% −10%, 48 Hz to 440 Hz, 185 VA maximum.

ENVIRONMENT:

ALTITUDE: 4600m (15000 ft) operating at 25° C 7600m (25000 ft) non-operating.
TEMPERATURE: 0° C to +55° C operating; −40° C to +70° C non-operating.
HUMIDITY: to 95% at 40° C.
VIBRATION: 10-55 Hz at .38 mm (0.015 in.) peak to peak excursion.
SHOCK: level 30g; duration 11 ms; shape 1/2 sine wave.
X, Y, and Z INPUT CONNECTORS: BNC type mounted on rear panel.
WEIGHT: net, 24.7 kg (54.5 lb); shipping 30 kg (66 lb).
DIMENSIONS: refer to figure 1-2 for complete details.

1-13. DESCRIPTION.

1-14. The HP Model 1311B is a large screen, high speed, computer graphic display designed for OEM system applications. The CRT has an aluminized P31 phosphor and a 100% usable viewing area.

1-15. SPECIAL FEATURES.

1-16. DYNAMIC FOCUS-ASTIGMATISM. Voltages proportional to the position of the CRT beam are applied to the focus and astigmatism elements fo the CRT. This causes spot size and shape to remain constant over the CRT viewing area. Focus is also corrected for changes in intensity level.

1-17 PHOSPHOR PROTECTION. A protection circuit senses slow or static deflection signals and limits beam intensity to prevent burning of the CRT phosphor and mesh.

1-18. INPUT MODIFICATIONS. The input circuits to the X, Y, and Z amplifiers are designed to permit easy modification for single ended or differential operation. Additionally, the input termination resistance and the input attenuation ratio for the X and Y amplifiers can be changed.