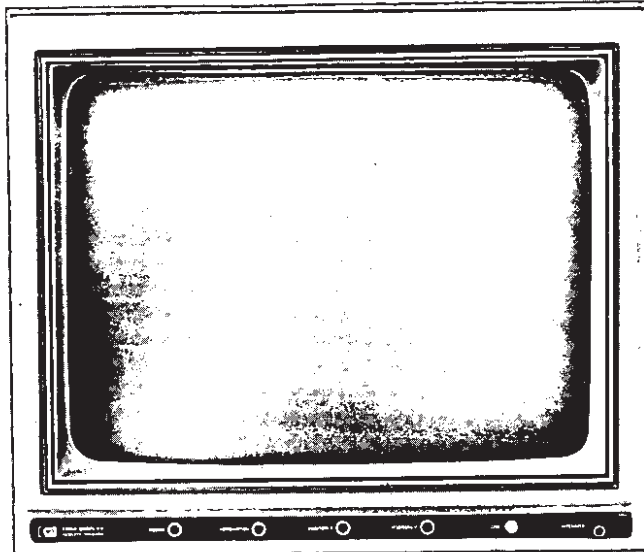


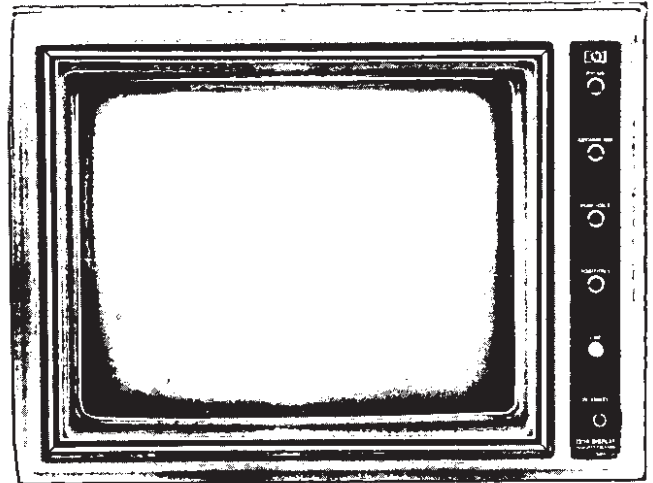
# CATHODE-RAY TUBE DISPLAYS

Large-screen computer graphic

Models 1310A and 1311A



1310A



1311A

## 1310A and 1311A Description

### Advanced display performance

Models 1310A and 1311A are directed beam, high speed 48.3 cm (19 in.) and 35.6 cm (14 in.) graphic displays with excellent dynamic performance that matches speeds with computer generated graphic information. The electrostatic CRT provides a crisp, small spot anywhere in the large quality area of the CRT. Also, the CRT has a rectangular shape and information can be written anywhere in this large viewing area. Bright, easy-to-see displays result from the 28.5 kV accelerating potential while X-ray emissions are unmeasurable, ensuring a safe operating environment.

### High writing speeds

Linear writing speed is 25.4 cm (10 in.) per microsecond which allows character strokes to be written in less than 100 nanoseconds. Maximum slew rate of the electronics is >254 cm (100 in.) per microsecond. The large-step jump and settle time is 1  $\mu$ s. This offers programming simplicity since characters and vectors can be plotted in random fashion from anywhere in the display area. A typical application of this high speed would be to plot a video signal on the display and write characters or vectors during the vertical retrace or blanking interval. Point plotting time for small steps is less than 200 ns per point; thus matrix type displays are written in minimal time.

### Electrostatic deflection

Electrostatic deflection replaces deflection coils needed by magnetic CRTs and the high powered circuits to drive the coils. The power consumption of these displays is a low 100 watts which eliminates noisy fans and over-sized mechanical cooling assemblies. Electrostatic deflection ends the need for major and minor deflection systems with multiple input connections. The single differential input for each axis significantly reduces the effects of common mode signals. Input RC is 10 k $\Omega$  shunted by <40 pF with switchable 50 ohm terminations available when required.

### Modular construction

Internal construction is modular, and very serviceable. Plug-in circuit cards reduce calibration or troubleshooting time.

These displays are supplied with open frame construction for

mounting in a standard 48.3 cm (19 in.) rack or in your custom designed enclosures. Covers and a tilt stand are available for free standing applications. Refer to Options and Accessories in the specifications for listings of the standard items that are available.

## 1310A and 1311A Specifications

### Vertical and horizontal amplifiers

**Rise time:** <75 ns, 10% to 90% points for full screen deflection or less.

**Bandwidth:** dc to 5 MHz (3 dB down at 5 MHz) with 8.9 cm (3.5 in.) deflection in 1311A and 12.7 cm (5 in.) deflection in 1310A.

**Phase shift:** <0.1° to 50 kHz and <1° to 250 kHz for full screen signals.

**Linear writing time:** <39.4 ns/cm (<100 ns/inch).

**Linear writing speed:** >25.4 cm/ $\mu$ s (>10 inches/ $\mu$ s).

**Diagonal settling time:** signal settles to within 1 spot diameter of final value in <500 ns for any on screen movements.

**Sequential point plotting time:** signal settles to within 0.254 mm (0.01 in.) of final value in <200 ns for any 2.54 mm (0.1 in.) step.

**Repeatability:** <0.15% of full screen error for re-addressing a point from any direction on screen.

**Crosstalk:** <0.381 mm (<0.015 in.) with one input shorted and the other input excited by 500 kHz.

### Deflection factor\*

	Vertical	Horizontal
1310A	1 volt for 27.9 cm (11 in.) deflection	1 volt for 38.1 cm (15 in.) deflection
1311A	1 volt for 21.6 cm (8½ in.) deflection	1 volt for 27.9 cm (11 in.) deflection

\*Horizontal and vertical deflection factors adjustable from front panel control with attenuation of 1.75:1.

**Spot jitter and motion:** <0.38 mm (<0.015 inch).

**Position:** zero input can be set to any on screen position.

**Polarity:** positive vertical input moves beam up; positive horizontal input moves beam right. Polarity can be reversed by changing internal lead connections.

**Input RC:** driven side 10 kΩ shunted by <40 pF. Shield input is 47 ohms to ground. This can be replaced with 10 kΩ for differential input. A switchable 50 ohm termination between shield and center-conductor is also provided.

**Maximum input:** ±50 V (dc + peak ac) with 10 kΩ internal termination; ±5 V (dc + peak ac) with 50 ohm internal termination.

**Linearity:** 1% of full scale display along major axes.

**Drift:** 1.27 mm/hour (0.05 inch/hour) and 2.54 mm (0.10 inch) in 24 hours with covers installed.

**Z-axis amplifier**

**Rise time:** <20 ns.

**Sensitivity:** 1 V provides full blanking or intensity.

**Input polarity:** internal switch selects polarity (switch is normally set so negative voltage unblanks signal).

**Gain adjust:** internally adjustable over 2.5:1 attenuation ratio.

**Balance:** internal adjustment provides ±1 V offset.

**Input RC:** approx. 10 kΩ shunted by approx. 60 pF. 50 ohm termination may be selected with internal switch.

**Maximum input:** ±50 V (dc + peak ac) with 10 kΩ internal termination; ±5 V (dc + peak ac) with 50 ohm internal termination.

**Cathode-ray tube**

**Viewing area:**

**Model 1310A (48.26 cm) (19 in.):** 27.94 cm high × 38.1 cm wide (11 × 15 in.).

**Model 1311A (35.56 cm) (14 in.):** 21.59 cm high, 27.94 cm wide (8½ × 11 in.).

**Type:** post-accelerator, 28.5 kV accelerating potential, P31 aluminized phosphor is standard (refer to options for other phosphors). Electrostatic focus and deflection.

**Resolution:**

**Model 1310A:** 20 lines/cm (50 lines/inch), shrinking raster method.

**Model 1311A:** 27 lines/cm (67 lines/inch), shrinking raster method.

**Spot size**

	Spot size in Quality Area	Size of Quality Area
1310A	0.5 mm (0.020 in.)	27.94 × 27.94 cm (11 × 11 in.)
1311A	0.38 mm (0.015 in.)	21.59 × 21.59 cm (8½ × 8½ in.)

**Brightness:** at least 50 foot-lamberts measured at 2.54 mm/μs (0.1 in./μs). 60 Hz rate, with spot size of 0.5 mm (0.020 in.) on 1310A and 0.38 mm (0.015 in.) on 1311A.

**Contrast ratio:** 4:1 or greater.

**X-ray emission:** CRT emission <0.05 mr/hr (not measurable in background noise with Victoreen Model 440RF/C).

**Implosion protection:** rim and tension banding prevents implosive devacuation.

**Phosphor protection:** circuit detects absence of deflection and limits beam current.

**General**

**X, Y, and Z input connectors:** BNC type mounted to rear panel.

**Weight**

**Model 1310A:** net, 24 kg (53 lb), with covers 26.8 kg (59 lb); shipping, 32.2 kg (71 lb).

**Model 1311A:** net, 18.1 kg (40 lb), with covers 20.4 kg (45 lb); shipping, 28.1 kg (62 lb).

**Dimensions:** dimensional drawings are too numerous for presentation in this catalog. Contact your local HP Field Engineer for a data sheet with these drawings.

**Power:** 115 V ac ±10% or 230 V ac ±10%, 48 Hz to 440 Hz, maximum power 115 VA.

**Operating environment:** temperature, 0 to +55°C (+32°F to +130°F); humidity, to 95% relative humidity at 40°C (104°F); altitude, to 4.6 km (15 000 ft); vibration, vibrated in three planes for 15 min. each with 0.254 mm (0.010 in.) excursion, 10 to 55 Hz.

**Accessories supplied:** rack mount adapter, front panel cover, one 0.75 A slow blow fuse for 230 V ac operation, one power cord, and one Operating and Service Manual.

**NOTICE TO USERS:** This instrument is designed and manufactured primarily for OEM systems applications. Therefore, without OPTION 003, the Top and Bottom Protective Covers are not provided and internal wiring connections of HAZARDOUS VOLTAGES ARE EXPOSED. Operator protection from these hazardous voltages must be provided by the purchaser and/or user of the instrument. If in doubt, ORDER OPTION 003.

**Options\***

**003:** top and bottom covers with tilt stand (rack mount adapter not supplied with Option 003 instruments).

**005:** form fitting neutral density contrast filter with anti-glare surface improves trace contrast for easier viewing.

**006:** form fitting blue contrast filter with anti-glare surface.

**604:** P4 aluminized phosphor in lieu of P31.

**607:** P7 aluminized phosphor in lieu of P31 with form fitting amber anti-glare contrast filter.

**639:** P39 aluminized phosphor in lieu of P31.

\*Special displays, such as round CRT's and different size CRTs, are available. Contact your local HP Field Engineer for information.

**Accessories**

**Cover kits:** top and bottom cover for field installation. For desk top operation, a tilt stand is required since the covers are not designed to support an instrument. Cover kit for 1310A is HP P/N 01310-68703, for 1311A HP P/N 01311-68703.

**Tilt stand kits:** provide field installation of tilt stand for stand alone operation. Kit for 1310A is HP P/N 01310-68702, for 1311A HP P/N 01311-68702.

**Rack mounting kits:** rack mounting adapters are supplied with standard instruments on initial order or may be ordered later as a kit. Rack mounting kit for the 1310A is HP P/N 01310-68701, for the 1311A HP P/N 01311-68701.

**Slide kits:** fixed slide kits are available for mounting the 1310A and 1311A Displays in a standard 19-inch (48.3 cm) rack. A pivoting slide kit is also available for the 1311A. Fixed slide kit for 1310A is HP P/N 01310-68704, for 1311A HP P/N 01311-68704. The pivoting slide kit for the 1311A is HP P/N 01311-68705.

**Model number and name** Price

(OEM discounts are available.)

1310A 48.26 cm (19-inch) Display \$3400

1311A 35.56 cm (14-inch) Display \$3100

Options for 1310A and 1311A:

Option 003: top and bottom covers/tilt stand \$105

Option 005: neutral density contrast filter for 1310A \$45

neutral density contrast filter for 1311A \$30

Option 006: blue contrast filter for 1310A \$45

blue contrast filter for 1311A \$30

Option 604: aluminized P4 phosphor N/C

Option 607: aluminized P7 phosphor add \$50

Option 639: aluminized P39 phosphor N/C

1310A Cover Kit HP P/N 01310-68703 \$100

1311A Cover Kit HP P/N 01311-68703 \$100

1310A Tilt-Stand Kit HP P/N 01310-68702 \$120

1311A Tilt-Stand Kit HP P/N 01311-68702 \$120

1310A Rack Mount Kit HP P/N 01310-68701 \$20

1311A Rack Mount Kit HP P/N 01311-68701 \$20

1310A Fixed Slide Kit HP P/N 01310-68704 \$200

1311A Fixed Slide Kit HP P/N 01311-68704 \$100

1311A Pivoting Slide Kit HP P/N 01311-68705 \$130