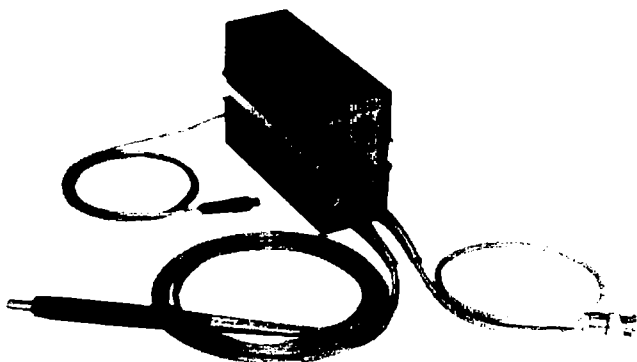


OSCILLOSCOPES & WAVEFORM ANALYZERS

Probes and Other Oscilloscope Accessories (cont.)



HP 1120A

HP 1120A 500 MHz Active Probe

For probing high source impedances at high frequencies, the HP 1120A 1:1 active probe provides a probe tip impedance of 100 k Ω shunted by approximately 3 pF at 100 MHz. When used with the 10:1 or 100:1 divider tips, the shunt capacitance is <1 pF at 100 MHz. The 50 Ω output provides the optimum impedance match and measurement accuracy for oscilloscopes, spectrum analyzers, counters, and network analyzers with 50 Ω inputs. Power is supplied by instruments with probe power jacks or the HP 1122A probe power supply.

HP 1120A Specifications

(measured with output connected to a 50 Ω load.)

Bandwidth: (measured from a terminated 50 Ω source) dc-coupled, dc to >500 MHz; ac-coupled, <1.5 kHz to >500 MHz.

Pulse response: (measured from a terminated 50 Ω source) transition time, <0.75 ns; perturbations, \pm 6% measured with 1 GHz sampler.

Dynamic range: \pm 0.5 V with \pm 5 V dc offset.

Noise: \approx 2.5 mV (measured tangentially).

Input RC: 100 k Ω , shunt capacitance \approx 3 pF at 100 MHz; with 10:1 or 100:1 dividers, shunt capacitance is <1 pF at 100 MHz.

Maximum input: \pm 80 V.

Weight: net, 1.8 kg (4 lb); shipping, 3.2 kg (7 lb).

Power: supplied by oscilloscopes with probe power jacks or an HP 1122A probe power supply.

Length: 1.2 m (4 ft) overall; with Option 001, 1.8 m (6 ft).

Accessories Furnished

HP 10241A 10:1 divider: increases input R to \approx 1 M Ω shunted by <1 pF at 100 MHz.

HP 10242A bandwidth limiter: reduces bandwidth to \approx 27 MHz shunted by \approx 6 pF and reduces gain <2%.

HP 10243A 100:1 divider: increases input R to \approx 1 M Ω shunted by <1 pF at 100 MHz.

Also included: slip-on hook tip, 6.4 cm (2.5 in) ground lead, spare probe tips, a slip-on BNC probe adapter.

HP 10034A Ground Lead Kit

The HP 10034A probe adapter kit consists of an assortment of 6-32 screw-on tips, and two ground lead cables that allow many methods of connecting the ground leads in a circuit. A 6-32 to slip-on adapter allows these tips to be used on HP 10004D-10006D, HP 10007B, HP 10008B, HP 10013A, HP 10014A, HP 10016B, and HP 1124A probes. The kit consists of one 15.2 cm (6 in) and one 30.5 cm (12 in) ground lead, one hook tip, one alligator tip, one pin tip, one tip for 0.6 mm (0.025 in) square pins, one banana tip, and one slip-on to 6-32 adapter.

Ordering Information

HP 1120A 500 MHz Active Probe
HP 1120A Opt 001, 1.8 m (6 ft) length
HP 10221A 50 Ω Probing Tee
HP 10034A Ground Lead Kit

Price
\$1200
add \$35
\$350
\$55

HP 10035A Probe Tip Kit

The tips in this kit are designed to be used with probes that accept a 6-32 screw-on tip that include: HP 10001A/B, HP 10002A/B, and HP 10003A. A slip-on to 6-32 adapter allows these tips to be used with other probes with pin tips. The adapter is supplied with HP 10004D through HP 10006D, HP 10014A, HP 10016B, HP 10020A probes and HP 10034A ground lead kit. The HP 10035A probe tip kit contains a pincer jaw, banana tip, pin tip, and spring tip.

HP 10036B Probe Tip Kit

The tips in this kit extend the usefulness of standard probes that accept slip-on tips, and the easy IC miniature probes. Included in the kit are two slip-on to 6-32 adapters and three bushing adapters that provide the flexibility to use the supplied tips with both types of probes. The adapters also allow use of other 6-32 probe tips with the probes. The HP 10036B includes an assortment of tips for the following: 2.0 mm (0.08 in) jack; 0.6 mm (0.025 in) and 1.14 mm (0.045 in) square pins; 1.0 mm-1.6 mm (0.040-0.062 in) diameter pin.

HP 10037B Probe Tip Kit

The HP 10037B probe tip kit contains six 0.64 mm (0.025 in) square female (white) tips for standard probes that accept slip-on tips, and the easy IC miniature probes. Also included are six bushings that adapt HP miniature probes to the supplied tips.

Miniature Probe Accessories

HP 10019A BNC to Square Pin Cable Assembly

The HP 10019A cable assembly is designed for connecting test equipment to 0.64 mm-0.76 mm (0.025 in-0.030 in) square pin signal nodes or to integrated circuits through the HP 10024A IC test clip. This adaptable cable assembly is primarily used as:

a) A signal pick-off device for applying circuit signals to the input of test equipment such as oscilloscopes and voltmeters. An application is checking voltages on computer back plane pins.

b) A signal insertion cable for inserting signals into suspected faulty circuits from power supplies, pulse generators, etc. Used in conjunction with the HP 10024A IC test clip, signals are easily inserted into the proper IC leads.

For applications requiring greater separation between the circuit nodes and the instrumentation, the HP 10019A may be extended by using a BNC to BNC adapter (HP P/N 1250-0080) and a 50 Ω test cable such as the 122 cm (48 in) When the test equipment hookup requires a dual banana plug, a BNC to Dual Banana Plug Adapter (HP P/N 1251-2277) is available.

HP 10017-67603 Coaxial Adapter Cable

HP P/N 10017-67603 is a 230 mm (9 in) 50 Ω slip-on adapter cable for miniature and standard HP probes that provides a coaxial interface to 0.64 mm (0.025 in) square pin circuit nodes. The cable is ideal for probing computer back planes as well as wire wrap terminals. HP P/N 10017-67604 miniature to standard probe adapter allows the cable to slip directly onto the HP easy IC miniature probe tip with the insulating barrel removed.

HP 10017-67604 Mini to Standard Probe Adapter

HP P/N 10017-67604 allows standard size slip-on probe tip accessories to be used with HP miniature probes. With the retractable insulating barrel removed from the miniature probe and replaced with the HP 10017-67604 adapter, the probe slides directly into the standard size probe tip accessories.

Ordering Information

HP 10035A Probe Tip Kit
HP 10036B Probe Tip Kit
HP 10037B Probe Tip Kit
HP 10019A Cable Assembly
HP 10017-67603 Coaxial Adapter Cable
HP 10017-67604 Mini to Standard Probe Adapter

Price
\$40
\$75
\$92
\$50
\$25
\$15

Miniature Probe Accessories

HP 10024A IC Test Clip

The HP 10024A IC test clip provides easy probing of dual in-line packages and includes four insulated circuit interface pins. Additional circuit interface pins are available (see Ordering Information) in packages of twelve pins. Each pin has a tip on each end so that probes such as those on HP logic analyzers can be connected for fast, functional checks of circuit operation.

HP 10036B and HP 10037B Probe Tip Kits

The HP 10036B and HP 10037B probe tip kits increase probing versatility with an assortment of 6-32 screw-on tips. Slip-on to 6-32 adapters are included for compatibility with the miniature probes.

HP 10028A Jumper Cable

The HP 10028A 50 Ω 610 mm (24 in) miniature probe/jumper cable is designed primarily for bypassing suspected faulty circuits in densely populated IC circuits. The basic tip on either end of the cable inserts directly into an HP 10024A IC test clip, allowing easy temporary connections between IC's without the danger of shorting between pins. The cable can also be used as a 50 Ω 1:1 probe to insert signals from an external source or as an input source to an external measuring device. For the latter use, probe tip to BNC adapter (HP P/N 1250-1454) is available.

Digital Trigger Probe

The HP 10250A (TTL) 4-bit trigger probe is a useful service, production, and design troubleshooting tool that offers digital pattern triggering to enhance the use of oscilloscopes, logic analyzers, and other test equipment. The four inputs may be switched to HI, LO, or OFF (don't care) for convenient selection of the trigger point. No separate power supply is needed because probe power is obtained from the circuit under test.

Probe Accessories

Terminations

HP 10100C: 50 Ω ±1% BNC male to BNC female feedthrough termination.

HP 10100B: 100 Ω ±2 Ω BNC male to BNC female feedthrough termination.

Standard Probe Tip Adapters

HP 10011B slip-on to BNC probe tip adapter: for probes HP 10004D, HP 10006D, HP 10007B, HP 10008B, HP 10013A, HP 10014A, HP 10016B, and HP 1124A.

HP 10229A hook tip adapter: retractable pincer tip provides firm connection to circuit nodes. Supplied with HP 1120A probe. Recommended accessory for HP 10020A resistive divider kit.

HP P/N 10004-89515 IC probe tip adapter: retractable pincers provide convenient connection to dual in-line packages for probes HP 10004D, HP 10006D, HP 10007B, HP 10008B, HP 10013A, HP 10014A, HP 10016B, and HP 1124A. Supplied with HP 10004D, HP 10005D, HP 10006D, HP 10014A, and HP 10016B.

Ordering Information

	Price
HP 10024A IC test clip for easy probing of dual in-line packages; includes 4 insulated circuit interface pins	\$20
HP 10024-69501 Interface Pin Kit for HP 10024A; includes 12 interface pins	\$30
HP 1250-1454 BNC-to-probe adapter permits the miniature probes to be connected to BNC connectors to maintain fast pulse response.	\$21
HP 10036B Probe Tip Kit	\$75
HP 10037B Probe Tip Kit	\$92
HP 10028A Jumper Cable	\$67
HP 10229A Retractable Hook Tip Adapter	\$15
HP 10004-69515 IC Probe Tip Adapter	\$12
HP 10011B BNC Probe Tip Adapter	\$12
HP 10100C 50 Ω Feedthrough Termination	\$25
HP 10100B 100 Ω (±2 Ω) Feedthrough Termination	\$65

Servicing and Viewing Accessories

Viewing Hoods

HP 10140A: collapsible viewing hood for HP 1700-series oscilloscopes.

Light Filters

HP 10173A: RFI filter and contrast screen for HP 1700-series oscilloscopes.

Blue light filter: HP P/N 01740-02701 for HP 1700-series oscilloscopes.

Rack Mount Slides and Adapters

HP 10491B rack mount adapter: adapts HP 1700-series oscilloscopes to standard 483 mm (19 in) rack; 222 mm (8¾ in) high, 540 mm (21¼ in) deep. Requires fixed slides (HP P/N 1490-0714) or pivoted slides (HP P/N 1490-0719) for slide mounting.

Front Panel Covers

HP P/N 5040-0516: provides front panel protection for HP 1700-series oscilloscopes.

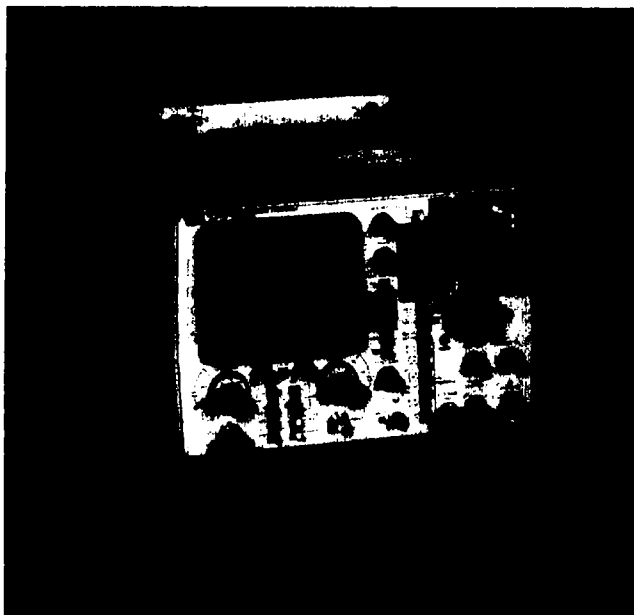
Ordering Information	Price
HP 10140A Viewing Hood for HP 1700-series (8 x 10 div.)	\$25
HP 10176A Viewing Hood for 12.7 cm (5 in) rectangular CRT	\$30
HP 10173A RFI Filter and Contrast Screen for HP 1700-series oscilloscopes (8 x div. CRT)	\$25
HP 5020-0530 Amber Plastic Filter or 12.7 cm (5 in) rectangular CRT	\$12
HP 5020-0567 Smoke Gray Plastic Filter for 12.7 cm (5 in) rectangular CRT	\$23.50
HP 5060-0548 Blue Plastic Filter for 12.7 cm (5 in) rectangular CRT	\$11
HP 01740-02701 Blue Light Filter for HP 1700-series oscilloscopes (8 x 10 div. CRT)	\$8.50
HP 10491B Rack Adapter for HP 1700-series oscilloscopes	\$230
HP 1490-0714 Fixed slides for HP 180, HP 181 rack-style oscilloscopes and HP 10491B	\$125
HP 1490-0719 Pivoted Slides for HP 180, HP 181 rack-style oscilloscopes and HP 10491B	\$185
HP 1490-0768 Slide Adapter, required for securing slides to HP 180, HP 181 rack-style oscilloscopes	\$150
HP 5040-0516 Front Panel Cover for HP 1700-series oscilloscopes.	\$13.50



OSCILLOSCOPES & WAVEFORM ANALYZERS

Probes and Other Oscilloscope Accessories (cont.)

Models 197B, 10023A, 10029A, 10367A



The HP 10029A TV/video sync retrofit kit can be added to any HP 1700-series oscilloscope except the HP 1726A for the display of composite video waveforms.

Video Sync Retrofit Kit for HP 1700 Series

Any HP 1700-series oscilloscope except the HP 1726A can easily display composite video waveforms with the addition of the HP 10029A retrofit kit module. Consisting of a user-installable module, the retrofit kit mounts on the instrument top cover. Power for the module is received from the instruments; no other internal modifications are required in the oscilloscope.

The HP 10029A module operates completely external to the oscilloscope — BNC cables provide the necessary connections. Composite video waveforms are input to the module providing a 75 Ω input for impedance matching to most video signal sources. A vertical output signal (video) provides a method for connecting the signal to the instrument's vertical input channel. With the trigger signals from the TV/video sync module and proper use of the oscilloscope's standard controls, specific portions of the composite video waveform can be selected for viewing.

Field selection is easily accomplished with one button, and a single line scan control on the module enables you to examine an individual horizontal line precisely.

Specifications

Input Impedance: 75 Ω \pm 3%. In TV clamp, ac-coupled with negative clamping to ground.

Maximum Input: 75 Ω or TV clamp mode, 5 V rms.

Outputs

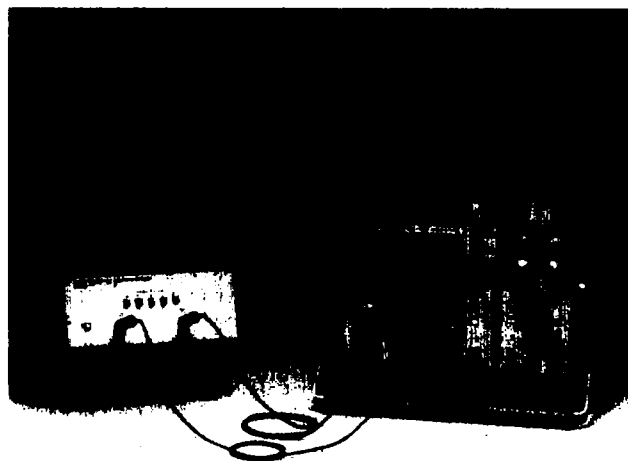
Main Trigger: 0.75 to <1 V square wave with main trigger slope (POS/NEG) selecting the alternate field in the frame.

Delayed Trigger: 0.75 to <1 V square wave. Delayed trigger slope selection must be set to NEG (with delayed sweep set in the "TRIG'D" mode) to engage single line scan.

TV Vertical: maintains minimum 20 MHz bandwidth.

Ordering Information

HP 10029A TV/Video Sync Retrofit Kit \$355



Combining the HP 1726A with the HP 10326A results in a complete solution for time interval measurement problems.

HP 10326A Time Interval Standard

The HP 10326A Time Interval Standard is a signal source that provides a dual-channel time interval reference. The two channels, OUTPUT and $\overline{\text{OUTPUT}}$, offer a selectable square wave output with waveform periods of 5, 10, 20, 50, or 100 nanoseconds. These output signals can be delivered to probe tips or BNC connectors with the HP 10326A's accessory kit.

The waveform period accuracy of any selected square wave output is \pm 5 picoseconds. This accuracy results from the purity of the crystal oscillator's frequency spectrum and the accuracy of the oscillator's frequency. Low subharmonic distortion permits short time intervals of a single period to be presented with a high degree of stability. Timing relationships between rising and falling edges in any combination are specified between output channels.

The waveform period accuracy and known timing relationships between edges of OUTPUT and $\overline{\text{OUTPUT}}$ are convenient signals to evaluate system performance. Low subharmonic distortion of output signals is ideal for calibration and other applications which require extremely stable waveforms for timing analysis.

Specifications (See data sheet No. 5953-3911 for complete details.)

Signal outputs: OUTPUT, $\overline{\text{OUTPUT}}$, Trig Out; Square Wave Period (selectable) 5 ns, 10 ns, 20 ns, 50 ns, 100 ns.

Rise Time (20–80%): OUTPUT, $\overline{\text{OUTPUT}}$ \leq 1.25 ns.

Operating Characteristics (typical values)

Square Wave Amplitude (OUTPUT, $\overline{\text{OUTPUT}}$, Trig Out) \approx 0.38 V p-p (fixed) into a 50 Ω load; warm-up time, 1 min.

General

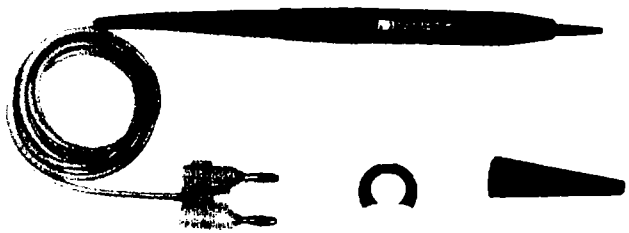
Weight: net, approx. 2.95 kg (6.5 lb); shipping, approx. 5.77 kg (12.7 lb).

Dimensions: 9.53 mm (3.75 in) high; 21.27 mm (8.375 in) wide; 27.94 mm (1.1 in) deep.

Accessories furnished: one BNC/probe adapter kit (HP P/N 10326-69501), one 2.3 m (7.5 ft) power cord, and one operating and service manual.

Ordering Information

HP 10326A Time Interval Standard \$2275
Option 001 - delete Accessory Kit less \$125



HP 10023A

HP 10023A Temperature Probe

The HP 10023A temperature probe provides fast, accurate temperature measurements in a variety of thermal design, diagnostic, and testing applications. Surface temperatures are read directly in degrees Celsius on multimeters (DMM) having an input impedance of ≥ 10 megohms. A pencil-like probe tip easily accesses small components and a press-to-read switch make measurements easy; just press the button, touch the surface to be measured, and read its temperature directly on the DMM.

The probe is a self-contained temperature-to-voltage transducer with a forward-biased diode chip bonded to a small ceramic substrate in the probe tip. A calibrated, linear output of 1 mV/ $^{\circ}$ C is assured by individually characterizing each diode in a precision thermal reference bath. An integrated circuit resistor network is then laser trimmed to match each diode to its electronic compensation circuit.

The entire electronics assembly, including the battery, is packaged in the probe barrel. A standard dual banana plug output connector provides universal readout through most digital voltmeters including the built-in DMMs on HP's Option 034/035, 1700-series oscilloscopes.

10023A Specifications

Electrical

Measurement range: -55° C to $+150^{\circ}$ C.

Output: 1 mV/ $^{\circ}$ C.

Short term repeatability: $\pm 0.3^{\circ}$ C (minimum of 48 hrs).

Accuracy: $\pm 2^{\circ}$ C from 0° C to 100° C, decreasing linearly to $+2^{\circ}$ C, -4° C at -55° C and $+4^{\circ}$ C, -2° C at $+150^{\circ}$ C.

Maximum voltage at tip: 600 V (dc + peak ac).

Tip capacitance to ground: approx. 0.5 pF.

Thermal response: < 3 s to settle within 2° C of final reading (liquid measurement) for a 100° C temperature change.

DMM Input R: ≥ 10 M Ω .

General

Operating environment probe tip to approx 13 mm (0.5 in) from probe tip: temperature, -55° C to $+150^{\circ}$ C; altitude, to 4600 m (15,000 ft); vibration, vibrated in three planes for 15 min each with 0.38 mm (0.015 in) excursion, 10 to 55 Hz.

Operating environment (probe body): temperature, 0° C to 60° C (battery limitation); humidity (non-condensing), to 95% relative humidity at $+40^{\circ}$ C, altitude and vibration same as those for probe tip.

Overall length: approx 1.4 m (53 in).

Weight: net, 85 g (3 oz). Shipping, 312 g (11 oz).

Battery life: approx 50 hr (varies with ambient temperature).

Low battery indication: probe output indicates approx -70° C on DMM. First indication of a low battery condition is a decreasing indication of 1° to 2° C/min with probe tip at a constant temperature.

Accessories supplied: one replacement battery (HP 1420-0256), one sliding lock collar (HP 10023-23201), and one probe tip cover (HP 00547-40005).

Replacement batteries: batteries may be purchased locally using the following part numbers, RAY-O-VAC[®], RS 312-G or T-312-G; DURACELL[®] 10L125; or batteries with similar specifications.

*RAY-O-VAC is a registered trademark of ESB, Inc.

*DURACELL is a registered trademark of P. R. Mallory & CO.

Ordering Information

HP 10023A Temperature Probe

HP 10023-60001 Replacement Tip, includes pre-calibrated tip and matching compensation network

Price

\$275

\$85

HP 197B Camera

The HP 197B is a versatile, general-purpose instrument for cathodray tube photographic recording. The camera features lift-off mounting and swing-away hinging by pressing a single latch release button. Interchangeable film backs enable capture of CRT display information on a complete spectrum of Polaroid[®] or conventional sheet, pack, or roll film. All controls are located outside of the camera for easy reading and fast adjustment during setup. A low-angle viewing port provides a direct view of the display through a flexible facemask while the camera is in the photographic position.

Camera Mounting

On initial order, the HP 197B can be configured, with different camera adapters, to mount directly on a variety of instruments. Each camera adapter is attached to the camera body with a piano hinge and is an integral part of the camera. The HP 197B includes an HP 10376A adapter that directly interfaces to HP 1700-series oscilloscopes with 8 x 10 division CRTs. The HP 197B option 002 includes an HP 10378A adapter that directly interfaces to HP 180-series oscilloscopes. Model 197B Option 006 includes an HP 10375A adapter which directly interfaces with the majority of HP small-screen CRT displays.

By using camera bezel adapters, various camera configurations can be adapted to other instruments not directly compatible with the camera adapter. For mounting a variety of cameras to instruments both current and those no longer in production, refer to the HP 197B Camera Data Sheet. Copies of the 197B Data Sheet can be obtained from your local HP field office or by writing: Inquiries Manager, Hewlett-Packard Company, 1820 Embarcadero Road, Palo Alto, California 94303.

*Registered Trademark of Polaroid, Inc.

*Registered Trademark of Graflex, Inc.

HP 197B Characteristics

Reduction ratio: continuously adjustable from 1:1 to 1:0.7. Reference scale provided on focus plate.

Lens: 75 mm, f/1.9 high transmission lens; aperture, f/1.9 to f/16.

Shutter speeds: 1/30, 1/15, 1/8, 1/4, 1/2, 1, 2, 4 seconds, Time and Bulb; shutter has a sync contact closure output for triggering external equipment and an input jack for remote operation.

Camera back: 83 mm x 108 mm (3.25 in x 4.25 in) Polaroid[®] pack back.

Mounting: lift on/off mounting with positive lock, swing-away hinging to left.

Viewing: low-angle, direct viewing through a flexible facemask.

Shutter open indicator: illuminated whenever shutter is open.

Ultraviolet illumination: light source and lens filter provide graticule illumination and photographic speed enhancement.

Focus: adjustable with lock; split-image focusing plate provided.

Size: 267 H x 194 W x 356 mm D (10.5 in x 7.6 in x 14 in).

Weight: net, 4.5 kg (10 lb); shipping, 7.3 kg (16 lb).

Power: switch selectable 115 Vac $\pm 10\%$ or 230 Vac $\pm 10\%$, 48 to 66 Hz*, 10 VA max.

Accessories furnished: comb. split image focusing plate reduction ratio scale, 2.3 m (7.5 ft) power cord, and instruction manual.

Ordering Information

	Price
HP 197B Camera	\$1495
001: deletes ultraviolet illumination feature	less \$50
002: replaces HP 197B adapter with HP 10378A adapter.	N/C
006: replaces HP 197B adapter with HP 10375A adapter.	N/C
007: meets UL listing requirements for medical and dental electronic equipment.	add \$15
009: Camera Bezel Adapter for HP 1745A and HP 1746A oscilloscopes.	add \$20
910: additional manual	add \$6.10
10367A Camera Bezel Adapter for HP 182T	\$102
Ultraviolet Light Kit (P/N 00197-69507) for field installation of ultraviolet illumination feature.	\$190

*Camera operates from 48 to 440 Hz, but does not meet the ac line to chassis leakage requirements of UL 544 listing above 66 Hz.