

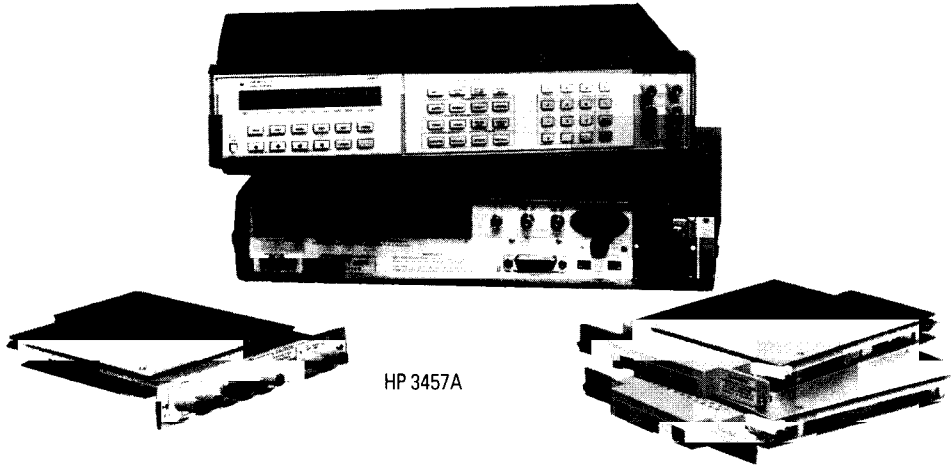
# DIGITAL MULTIMETERS/DIGITAL VOLTMETERS

## 3½- to 6½-Digit DMM with Extended Resolution to 7½ Digits

### HP 3457A

- Over 1,350 readings/sec at 3½ digits
- Seven functions: dcV, acV, dcl, acl, Ω, frequency and period

- Three plug-in multiplexer options
- DC sensitivity to 10 nanovolts
- Outstanding combination of performance and price



HP 3457A



### HP 3457A Digital Multimeter

The HP 3457A has seven functions with 3½ to 6½ digits of resolution, extendable to 7½ digits. Reading rates vary from 1 reading every 2 seconds to 1350 rds/s. The best dc volts accuracy is 5 ppm. The input of the HP 3457A can be expanded to ten channels with either of the optional plug-in multiplexer assemblies. In bench operation, the front panel is extremely flexible and comprehensive. In systems, the Hewlett-Packard Interface Bus (HP-IB) is standard.

### Powerful Measurement Management

The HP 3457A combines superb analog measuring capability with powerful measurement management. More than 3,000 readings or entire measurement sequences can be stored in the HP 3457A. The present digital multimeter (DMM) setup can also be stored in the non-volatile memory for convenient reconfiguration.

Math functions include PASS/FAIL limit testing, NULL, SCALE, THERMISTOR linearization, and others. Total electronic calibration makes it easy to maintain performance.

### System Features

The HP 3457A has all the features you've come to expect, plus more to make interfacing to your computer easy—features like flexible formatting to ASCII, 16-bit binary, or 32-bit binary data and buffer memory. In addition, you'll find the VOLTMETER COMPLETE output and EXTERNAL TRIGGER input signals ideal for synchronizing other instruments with the HP 3457A. Finally, programmable front-rear terminal switching lets you measure two separate inputs without a scanner.

### Three Rear-Panel Plug-In Options

One of three optional assemblies may be used with the HP 3457A. The HP 44491A armature relay multiplexer assembly offers eight 2-wire channels and two current/actuator channels. For higher speed scanning, the HP 44492A reed relay multiplexer assembly offers ten 2-wire channels. And, for measurement of voltages up to 1414 V peak, the HP 44497A high voltage assembly offers 1000:1 attenuator input (channel 1) for the high voltage measurements.

### Abbreviated Technical Specifications

#### DC Voltage (90-day, $T_{cal} \pm 5^\circ C$ )

Range	Maximum reading	Best 6½-digit accuracy $\pm$ (% rdg + cnts)*		
		% of reading	Count error	Input resistance
30 mV	30.30000 mV	0.0040	365	>10 GΩ
300 mV	303.0000 mV	0.0025	39	>10 GΩ
3 V	3.030000 V	0.0017	6	>10 GΩ
30 V	30.30000 V	0.0035	19	10 MΩ $\pm$ 1%
300 V	303.0000 V	0.0050	6	10 MΩ $\pm$ 1%

\*After 1-hr. warm-up, with integration time of 100 power line cycles (PLC).  $T_{cal}$  is the temperature of the calibration environment between 18° and 28° C.

### True rms AC V and (ac + dc)V

Bandwidth: 20 Hz to 1 MHz  
 Crest Factor: 3.5:1 at full scale  
 Common Mode Rejection:  
 (1 kΩ unbalanced in LO):  
 > 76 dB, dc to 60 Hz

### 90 day Accuracy

Range	Maximum reading	(100 Hz to 20 kHz) best 5½-digit accuracy $\pm$ (% rdg + cnts)			Input impedance	
		AC coupled % of reading	count error	DC coupled % of reading		count error
30 mV	32.50000 mV	0.13	116	0.17	364	1MΩ $\pm$ 1% shunted by <90 pf
300 mV	325.0000 mV	0.13	116	0.17	364	
3 V	3.250000 V	0.13	116	0.17	364	
30 V	32.50000 V	0.13	116	0.17	364	
300 V	303.0000 V	0.19	116	0.23	364	

Accuracy specified for sine wave inputs, >10% of range. dc component <10% of ac component after 2-hour warmup and within one week of autocal. Integration time is 10 PLC. ac band set to <400Hz.

### 2-and 4-wire Resistance (90 day accuracy)

Range	Maximum reading	Best 6½-digit accuracy $\pm$ (% rdg + cnts)			Current output
		% of reading	Count error		
30 Ω	30.30000 Ω	0.0065	315		1 mA
300 Ω	303.0000 Ω	0.0045	34		1 mA
3 kΩ	3.030000 Ω	0.0035	6		1 mA
30 kΩ	30.30000 kΩ	0.0035	6		100 μA
300 kΩ	303.0000 kΩ	0.0040	7		10 μA
3 MΩ	3.030000 MΩ	0.0055	12		1 μA
30 MΩ	30.30000 MΩ	0.025	80		100 nA
300 MΩ	303.0000 MΩ	1.6	1000		100 nA
3 GΩ	3.030000 GΩ	16.0	1000		100 nA

For 2-wire Ω, add 200 mΩ to count error specifications. After 1-hr warmup with integration time of 100 power line cycles (PLC).  $T_{cal}$  is the temperature of the calibration environment between 18° and 28° C. For 2-wire Ω only, accuracy is specified following autocal (ACAL), under stable conditions ( $\pm 1^\circ C$ ).

**Common Mode Rejection (dB):** 1 k  $\Omega$  unbalanced in low lead; dc ECMR 140 dB; ac ECMR: <1PLC, 76 dB; ac ECMR >1 PLC, 156 dB for 50, 60 Hz  $\pm$  .08%

**Memory:** 6235 available bytes that can be partitioned into three segments: one devoted to storing measurements, one devoted to storing measurement subprograms, and one devoted to storing instrument states.

**Math Functions:** The HP 3547A performs the following math functions on measurements: NULL, SCALE, OFFSET, RMS FILTER, SINGLE POLE FILTER, THERMISTOR LINEARIZATION, DB, DBM, % ERROR, PASS/FAIL, LIMIT TESTING, and STATISTICS. Two math functions may be used at one time.

## General Specifications

**Operating Temperature:** 0° to 55° C

**Warm up Time:** One hour to all specifications except where noted

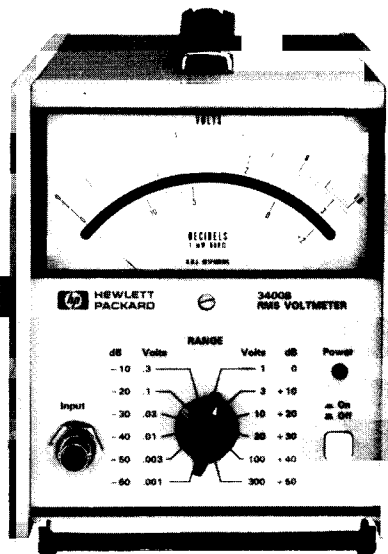
**Humidity Range:** 95% RH, 0° to 40° C

**Storage Temperature:** -40° to +75° C

**Power:** 100/120/220/240 V  $\pm$  10%, 48 Hz to 66 Hz, 220 V,  $\pm$  10%, 48 Hz to 66Hz. Fused at .2A (115 V) or 0.08 A (230 V) <30 V A.

**Size:** 89 mm H (without removable feet) x 425 mm W x 292 mm D (3.5 in x 16.75 in x 11.5 in). Height (with removable feet): 100 mm (4 in). Allow 75 mm (3 in) additional depth for wiring.

**Weight:** Net, 5.05 kg (11.1 lb); shipping, 9.3 kg (20.5 lb)



## Plug-in Options

### HP 44491A Armature Relay Multiplexer Assembly Input

**Characteristics:** Eight 2-wire armature relay channels and two current/actuator channels. Maximum voltage (terminal-to-terminal or terminal-to-chassis) 250 V rms. Maximum current (per channel) 1.0 A dc or ac rms. Thermal offset <3  $\mu$ V. Closed channel resistance (end of relay life) <2  $\Omega$ . Maximum switching and measurement speed 33 channels/second.

### HP 44492A Reed Relay Multiplexer Assembly Input

**Characteristics:** Ten 2-wire reed relay channels. Maximum voltage (terminal-to-terminal or terminal-to-chassis) 125 V peak. Thermal offset <3  $\mu$ V. Closed channel resistance (end of relay life) <4  $\Omega$ . Specified for <100 kHz ac volts and frequency operation. Maximum switching and measurement speed 300 channels/second.

### HP 44497A High-Voltage Attenuator Assembly Input

**Characteristics:** Two relay channels, channel 1 devoted to high-voltage measurements. Maximum high-to-low voltage of 1000 volts dc or ac rms. Maximum low-to-earth voltage of 350 V peak. Nondestructive overload voltage of 1700 V peak, 1200 volts dc. Attenuator accuracy to be added to HP 3457A range and function accuracy for total accuracy.

DC	0.030% of reading
20 Hz to 1 kHz	2.8% of reading
1 kHz to 10 kHz	12% of reading

Note: One-year accuracy applies to  $T_{cal} \pm 5\%$ , NPLC = 1 or greater. Specifications are for low-to-earth voltage less than 0.1 times high-to-earth voltage.

## Ordering Information

	Price
HP 3457A Multimeter	\$3,390
*HP 44491A Armature Relay Multiplexer Assembly	\$570
*HP 44492A Reed Relay Multiplexer Assembly	\$570
*HP 44497A High-Voltage Attenuator Assembly	\$570
Opt 907 Front Handle Kit (5061-1170)	+\$71
Opt 908 Rack Flange Kit (5061-1168)	+\$41
<b>Accessories</b>	
HP 44493A Screw Terminal Connector for HP 44491A (includes strain relief and housing)	\$71
HP 44494A Screw Terminal Connector for HP 44492A (includes strain relief and housing)	\$71
HP 44414A Four Thermistor Pack	\$71

\* Plug-in options may be ordered and shipped separately without an HP 3457A mainframe. Unless otherwise specified, optional plug-in assemblies will be shipped with the HP 3457A mainframe.

## HP 3400B Multimeter

The HP 3400B is a true rms analog voltmeter that replaces in form, fit and function the HP 3400A. Specifications of the HP 3400A and HP 3400B are identical except the HP 3400B measures to 20 MHz. Six-decade frequency coverage makes the HP 3400A extremely flexible for audio and RF measurements up to 20 MHz and permits the measurement of broadband noise and fast rise-time pulses.

Pulses or other nonsinusoids with crest factors up to 10:1 can be measured full scale. Plots of measured data and higher resolution measurements can be produced by connecting a DMM to the convenient rear-panel dc output that produces a linear 0 to 1 volt output proportional to the meter deflection.

## Abbreviated Specifications

**Voltage Range:** 1 mV to 300 V full scale, 12 ranges

**dB Range:** -72 to +52 dBm (0dBm = 1 mW into 600 $\Omega$ )

**Frequency Range:** 10 Hz to 20 MHz

**Response:** Responds to the rms value (heating value) of the input signal for all waveforms

**Meter Accuracy:** % of full scale (20° to 30° C)

10 Hz	50 Hz	1 MHz	2 MHz	3 MHz	20 MHz
5%	1%	2%	3%	5%	

**AC to DC Converter Accuracy:** % of full scale (20° to 30° C)\*

10 Hz	50 Hz	1 MHz	2 MHz	3 MHz	20 MHz
5%	0.75%	2%	3%	5%	

\* Temperature coefficient: 0.1% from 0 to 20° and 30° to 55° C

**Crest Factor** (ratio of peak to rms amplitude of input signal):

10:1 at full scale

**Input Impedance:** 0.001 V to 0.3 V range: 10 M $\Omega$  shunted by <50 pF;

1.0 V to 300 V range: 10 M $\Omega$  shunted by <20 pF, ac coupled input

**Input Floor Noise:** <10 $\mu$  V

**Output:** Negative 1 V dc into open circuit at full-scale deflection, proportional to meter deflection from 10 to 100% of full scale. 1 mA max.; nominal source impedance is 1 k  $\Omega$ . Output noise is <1mV rms.

**Accessories Furnished:** 10110B adapter, BNC-to-dual banana jack

## Ordering Information

HP 3400B RMS Voltmeter  
 Opt 001 Expanded dB scale, placed on top  
 Rear terminals in parallel with front terminals and linear log scale uppermost on the meter face are available on special order.

**Price**  
 \$2,540  
 +\$61