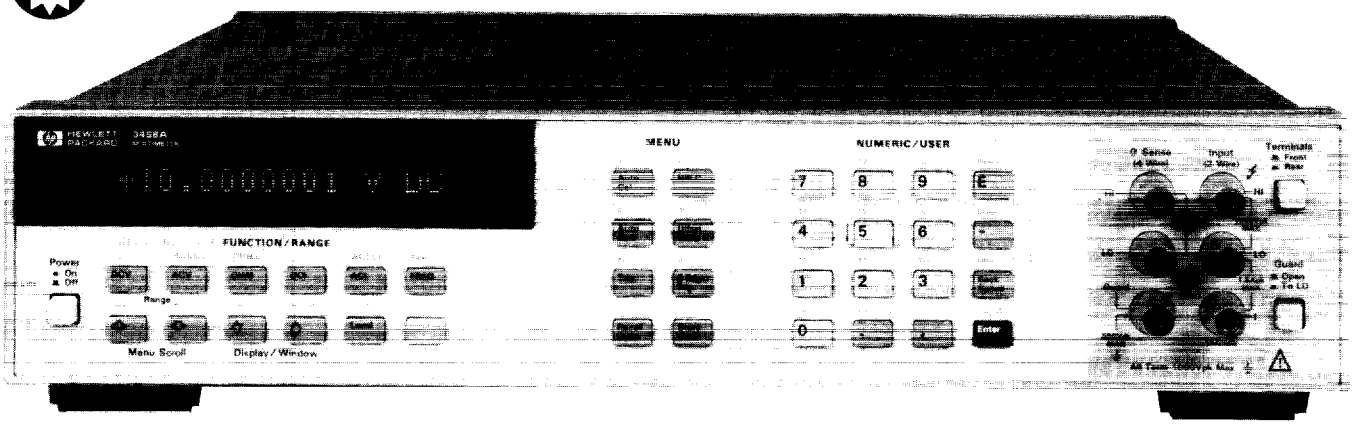
DIGITAL MULTIMETERS

A System Multimeter with Both High Speed and High Accuracy

Model 3458A



Model 3458A

The HP 3458A multimeter shatters long-standing performance barriers of speed and accuracy on the production test floor, in R&D, and in the calibration lab. The HP 3458A is simply the fastest, most flexible, and most accurate multimeter ever offered by Hewlett-Packard. In your system or on the bench, the HP 3458A saves you time and money with unprecedented test system throughput and accuracy, seven function measurement flexibility, and low cost of ownership.

Select a reading rate of 100,000 readings per second for maximal test throughput. Or achieve highest levels of precision with up to 8½ digits of measurement resolution and 0.1 part per million transfer accuracy. Add to this, programming compatibility through the Hewlett-Packard Multimeter Language (HPML) and the HP 3458A's simplicity of operation and you have the ideal multimeter for your most demanding applications.

High Test System Throughput

Faster Testing
- Up to 100,000 readings/sec
- Internal test setups >200/sec
- Programmable integration times from 500 ns to 1 sec

Greater Test Yield
- More accuracy for tighter test margins
- Up to 8½ digits resolution

Longer Up-Time
- Two-source (10V, 100kΩ) calibration, including ac
- Self-adjusting, self-verfying auto-calibration for all functions and ranges, including ac

High Resolution Digitizing

Greater Waveform Resolution and Accuracy
- 16 bits at 100,000 samples/sec
- 18 bits at 50,000 samples/sec
- 12 MHz bandwidth
- Timing resolution to 10 ns
- Less than 100 ps time jitter
- Over 75,000 reading internal memory

Flexible Digitizing Software
- Powerful, easy-to-use analysis software for HP 9000 Series 200/300 Computers
- Subprograms for waveform acquisition, data transfer, FFT, IFT, and data presentation

Calibration Lab Precision

Superb Transfer Measurements
- 8½ digits resolution
- 0.1 ppm dc Volts linearity
- 0.1 ppm dc Volts transfer capability
- 0.01 ppm rms internal noise

Extraordinary Accuracy
- 0.6 ppm for 24 hours in dc Volts
- 2.2 ppm for 24 hours in Ohms
- 100 ppm mid-band ac Volts
- 8 ppm (4 ppm optional) per year voltage reference stability

HP 3458A Multimeter Performance Features

dc Volts
- 5 ranges: 0.1 V to 1000 V
- 8½ to 4½ digit resolution
- Up to 100,000 readings/sec (4½ digits)
- Maximum sensitivity: 10 nV
- 0.6 ppm 24 hour accuracy
- 8 ppm (4 ppm optional)/year voltage reference stability

Ohms
- 9 ranges: 10Ω to 1GΩ
- Two-wire and four-wire Ohms with offset compensation
- Up to 50,000 readings/sec (5½ digits)
- Maximum Sensitivity: 10μΩ
- 2.2 ppm 24 hour accuracy

ac Volts
- 6 ranges: 10 mV to 1000 V
- 1 Hz to 10 MHz bandwidth
- Up to 50 readings/sec with all readings to specified accuracy
- Choice of sampling or analog true rms techniques
- 100 ppm best accuracy

dc Current
- 8 ranges: 100 nA to 1 A
- Up to 3,500 readings/sec (5½ digits)
- Maximum sensitivity: 1 pA
- 13 ppm 24 hour accuracy

ac Current
- 5 ranges: 100 μA to 1 A
- 10 Hz to 100 kHz bandwidth
- Up to 50 readings/sec
- 500 ppm 24 hour accuracy

Frequency and Period
- Voltage or current ranges
- Frequency: 1 Hz to 10 MHz
- Period: 100 ns to 1 sec
- 0.01% accuracy
- ac or dc coupled

DC Voltage				Accuracy		Transfer Accuracy	
Range	Full Scale	Maximum Resolution	Input Impedance	1 Year (ppm of Reading + ppm of Range)	Conditions	10 Min Tref ±0.5°C (ppm of Reading +ppm of Range)	Conditions
100 mV	120.00000	10 nV	10 GΩ	9 + 10	• Specifications for NPLC 100 within 24 hours and ±1°C of last ACAL; TCAL +5°C.	0.5 + 0.5	• NPLC = 100 • Following 4 hour warm-up. Full scale to 10% of full scale.
1 V	1.20000000	10 nV	10 GΩ	8 + 1	• For High stability (Option 002) subtract 1.5 ppm of Reading from 90 day, and 4 ppm of Reading from 1 or 2 year accuracy.	0.3 + 0.1	• Measurements on the 1000 V range are within 5% of the initial measurement value and following measurement setting.
10 V	12.0000000	100 nV	10 GΩ	8 + 0.2	• Add 2 ppm of reading additional error for HP factory traceability of 10 V dc to US NBS. Traceability error is the absolute error relative to National Standards associated with the source of last external calibration.	0.05 + 0.05	• Tref is the starting ambient temperature.
100 V	120.000000	1 μV	10 MΩ ±1%	10 + 0.3		0.5 + 0.1	• Measurements are made on a fixed range using accepted metrology practices.
1000 V	1050.00000	10 μV	10 MΩ ±1%	10 + 0.1		1.5 + 0.05	

Noise Rejection (dB)[1]

	AC NMR[2]	AC ECMR	DC ECMR
NPLC <1	0	90	140
NPLC ≥1	60	150	140
NPLC ≥10	60	150	140
NPLC ≥100	70	160	140
NPLC = 1000	80	170	140

[1]Applies for 1 kΩ unbalance in the LO lead and ±0.1% of the line frequency currently set for LFREQ.
[2]For line frequency ±1%, ACNMR is 40 dB for NPLC ≥1, or 80 dB for NPLC ≥ 100. For line frequency ±5%, ACNMR is 65 dB for NPLC ≥100.

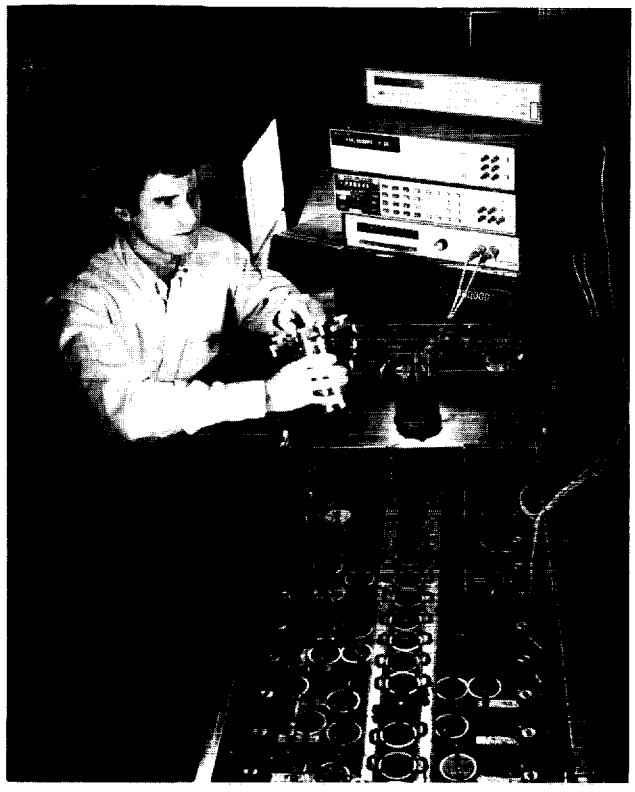
Maximum Input

	Rated Input	Non-Destructive
HI to LO	±1000 V pk	±1200 V pk
LO to Guard	±100 V pk	±350 V pk
Guard to Earth	±500 V pk	±1000 V pk

Resistance

Accuracy Four-Wire Ohms[1]		
Range	One Year (ppm of Reading + ppm of Range)	Conditions
10 Ω	15 + 5	• NPLC 200; OCOMP ON
100 Ω	12 + 5	• Within 24 hours and ±1°C of last ACAL; Tcal ±5°C.
1 kΩ	10 + 0.5	
10 kΩ	10 + 0.5	
100 kΩ	10 + 0.5	• Add 3 ppm of reading additional error for HP factory traceability of 10 kΩ to US NBS. Traceability is the absolute error relative to National Standards associated with the source of last external calibration.
1 MΩ	15 + 2	
10 MΩ	50 + 10	
100 MΩ	500 + 10	
1 GΩ	0.5% + 10	

[1]Two-Wire Ohms Accuracy
Add 250 MΩ to the four-wire ohms accuracy.



DIGITAL MULTIMETERS

A System Multimeter with Both High Speed and Accuracy (Cont'd)

Model 3458A

AC Voltage (Synchronously Sub-sampled Mode) — **Accuracy**

Range	Full Scale	Maximum Resolution	Input Impedance	24 hr to 2 Year 40 Hz to 1 kHz (% of Reading + % of Range)	Conditions
10 mV	12.00000	10 nV	1 MΩ ±15% with <140 pF	0.02 + 0.011	• Specifications apply full scale to 10% of full scale, DC <10% of AC, sine wave input, crest factor = 1.4. Within 24 hours and ±1°C of last ACAL. • Peak (AC + DC) input limited to 5 x full scale for all ranges in ACV function. • Add 2 ppm of reading additional error for HP factory traceability of 10 V DC to US NBS.
100 mV	120.0000	100 nV	1 MΩ ±15% with <140 pF	0.007 +0.002	
1 V	1.200000	1 μV	1 MΩ ±15% with <140 pF	0.007 + 0.002	
10 V	12.00000	10 μV	1 MΩ ±2% with <140 pF	0.007 + 0.002	
100 V	120.0000	100 μV	1 MΩ ±2% with <140 pF	0.02 + 0.002	
1000 V	1050.000	1 mV	1 MΩ ±2% with <140 pF	0.04 + 0.002	

Maximum Input

	Rated Input	Non-Destructive
HI to LO	±1000 V pk	±1200 V pk
LO to Guard	±200 V pk	±350 V pk
Guard to Earth	±500 V pk	±1000 V pk
Volt-Hz Product	1×10^8	

Front/Rear Panel Description

Display
- Bright, easy-to-read, vacuum flourescent display
- 16 character alpha-numeric display to easily read data, messages, and commands

Standard Function/Range Keys
- Simple to use, for bench measurements of dcV, acV, Ohms, current frequency and period
- Select autorange or manual ranging

Menu Command Keys
- Immediate access to eight common commands
- Shifted keys allow simple access to complete command menu

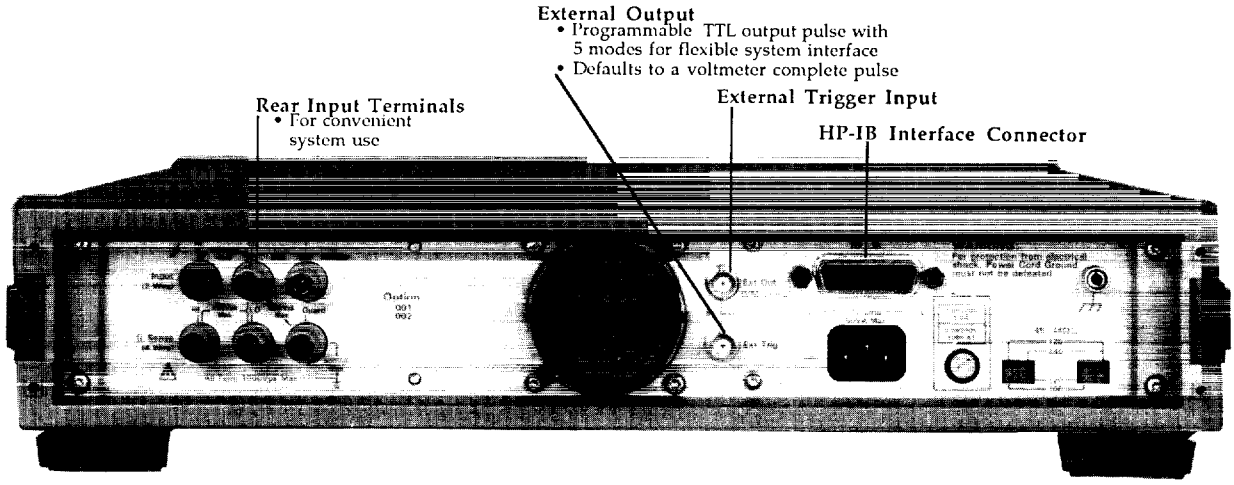
Numeric/User Keys
- Numeric entry for constants and measurement parameters
- Shifted keys (f0 through f9) access up to ten user-defined setups.

Volts/Ohms/Ratio Terminals
- Gold-plated tellurium copper for minimum thermal emf
- 2-wire or 4-wire Ohms measurements
- dc/dc or ac/dc ratio inputs

Current Measurement Terminals
- Easy fuse replacement with fuseholder built into terminal

Guard Terminal and Switch
- For maximum common mode noise rejection

Front-Rear Terminal Switch
- Position selects front or rear measurement terminals



Throughput

Maximum Reading Rates
- 100,000 readings/sec at 4½ digits (16 bits)
- 50,000 readings/sec at 5½ digits
- 6,000 readings/sec at 6½ digits
- 60 readings/sec at 7½ digits
- 6 readings/sec at 8½ digits

Measurement System Speed
- 100,000 readings/sec over HP-IB or with internal memory
- 110 autoranges/sec
- 200 function or range changes/sec
- Post-processed math from internal memory

Ordering Information

	Price
HP 3458A Multimeter (with HP-IB, 20k bytes reading memory, and 8 ppm stability)	$5900
Option 001 Extended Reading Memory (Expands total to 148k bytes)	$500
Option 002 High Stability (4 ppm/year) Reference	$800
Option 005 Waveform Analysis Library for HP Series 300 Computers with BASIC 4.0 or greater	$400
Option W30 Two additional years Return-to-HP hardware support	$160
Option 907 Front Handle Kit	$51
Option 908 Rack Flange Kit	$31
Option 909 Rack Flange Kit (with handles)	$73