

# Agilent 3458A Multimeter

Data Sheet

Shatters

performance barriers

of speed and

accuracy!



**Agilent Technologies**

Innovating the HP Way

# Performance Highlights

## dc Volts

- 5 ranges: 0.1 V to 1000 V
- 8.5 to 4.5 digit resolution
- Up to 100,000 readings/sec (4.5 digits)
- Maximum sensitivity: 10 nV
- 0.6 ppm 24 hour accuracy
- 8 ppm (4 ppm optional) / year voltage reference stability

## Ohms

- 9 ranges: 10  $\Omega$  to 1 G $\Omega$
- Two-wire and four-wire Ohms with offset compensation
- Up to 50,000 readings/sec (5.5 digits)
- Maximum Sensitivity: 10  $\mu\Omega$
- 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 1,350 readings/sec (5.5 digits)
- Maximum sensitivity: 1 pA
- 14 ppm 24 hour accuracy

## ac Current

- 5 ranges: 100  $\mu$ A to 1 A
- 10 Hz to 100 kHz bandwidth
- Up to 50 readings/sec
- 500 ppm 24 hour accuracy

## Frequency and Period

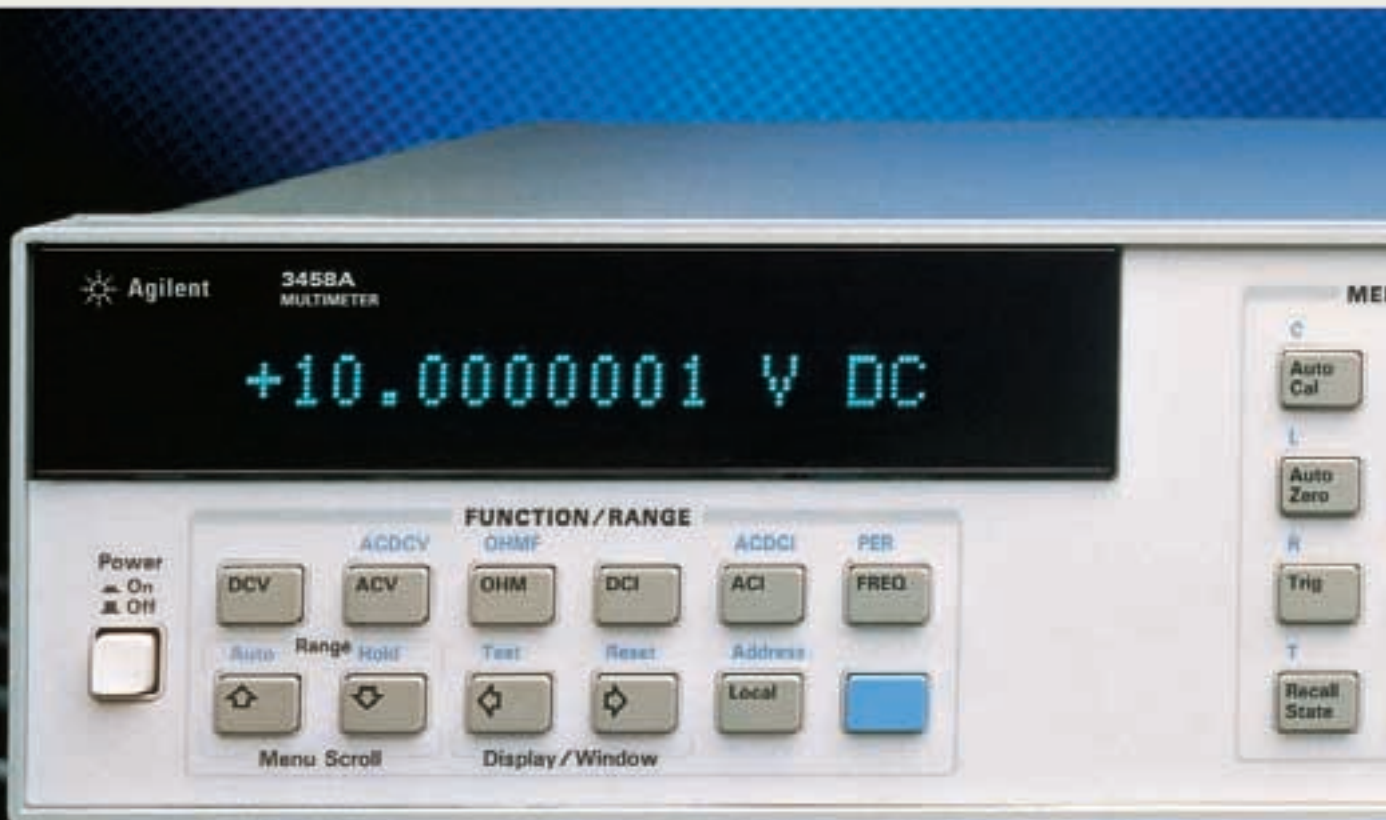
- Voltage or current ranges
- Frequency: 1 Hz to 10 MHz
- Period: 100 ns to 1 sec
- 0.01% accuracy
- ac or dc coupled

## Maximum Speeds

- 100,000 readings/sec at 4.5 digits (16 bits)
- 50,000 readings/sec at 5.5 digits
- 6,000 readings/sec at 6.5 digits
- 60 readings/sec at 7.5 digits
- 6 readings/sec at 8.5 digits

## Measurement Set-Up Speed

- 100,000 readings/sec over GPIB\* or with internal memory
- 110 autoranges/sec
- 340 function or range changes/sec
- Post-processed math from internal memory



# Access speed and accuracy through a powerful, convenient front panel.

## Display

- Bright, easy-to-read, vacuum fluorescent 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

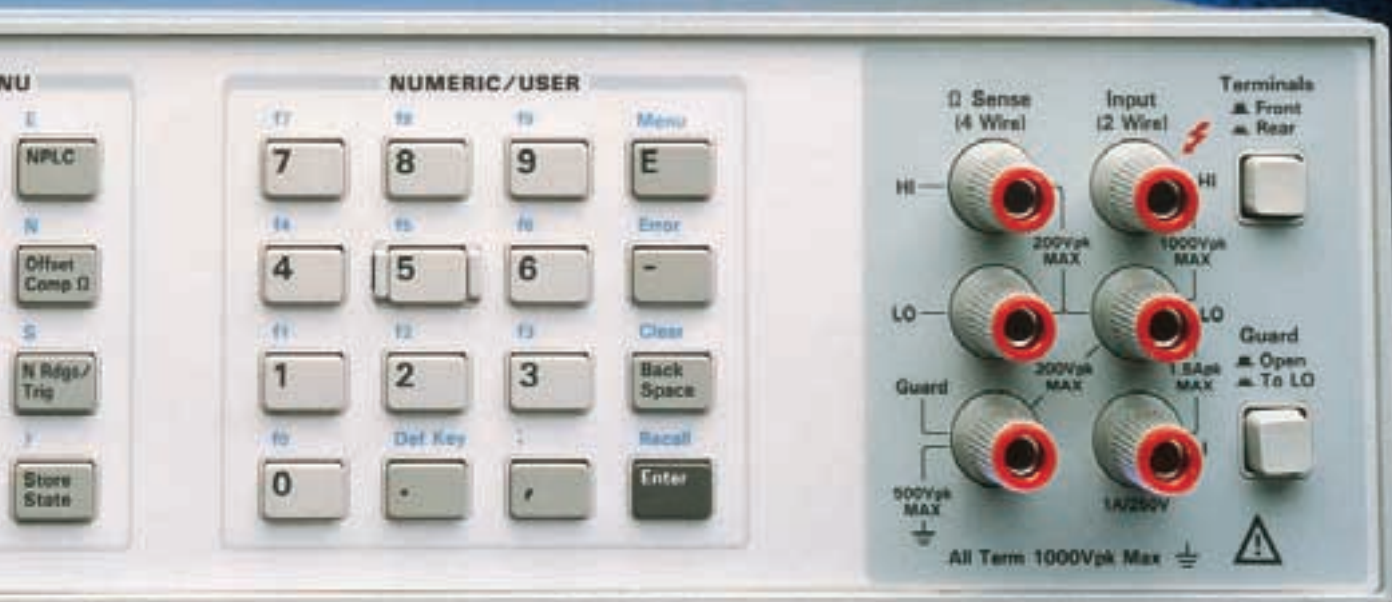
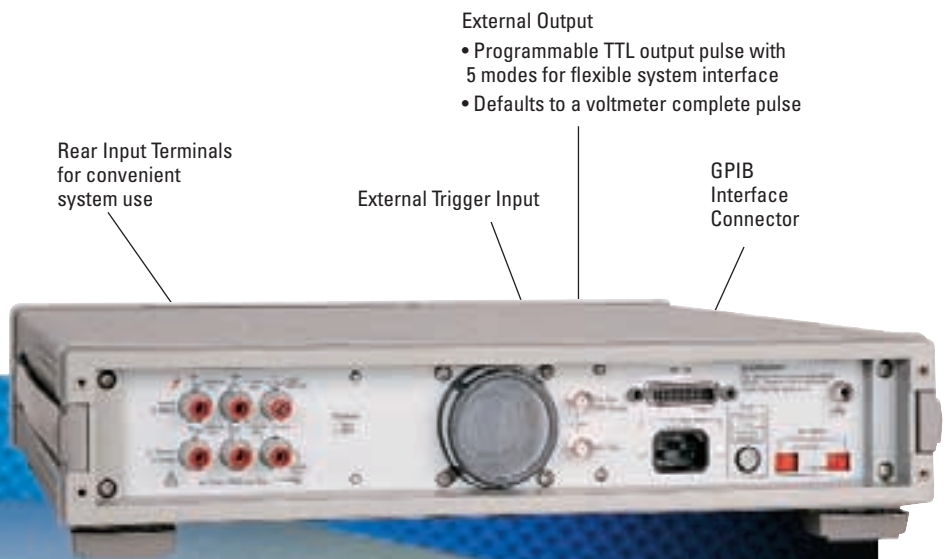
- Easy fuse replacement with fuse holder built into terminal

## Guard Terminal and Switch

- For maximum common mode noise rejection

## Front-Rear Terminal Switch

- Position selects front or rear measurement terminals





# The 3458A Multimeter for:

## High test system throughput

### Faster testing

- Up to 100,000 readings/sec
- Internal test setups > 340/sec
- Programmable integration times from 500 ns to 1 sec

### Greater test yield

- More accuracy for tighter test margins
- Up to 8.5 digits resolution

### Longer up-time

- Two-source (10 V, 10 k $\Omega$ ) calibration, including ac
- Self-adjusting, self-verifying auto-calibration for all functions and ranges, including ac



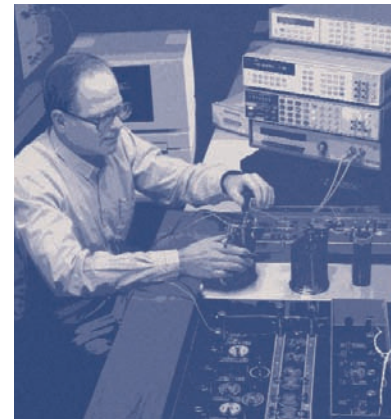
## Calibration lab precision

### Superb transfer measurements

- 8.5 digits resolution
- 0.1 ppm dc Volts linearity
- 0.1 ppm dc Volts transfer capability
- 0.01 ppm rms internal noise

### Extraordinary accuracy

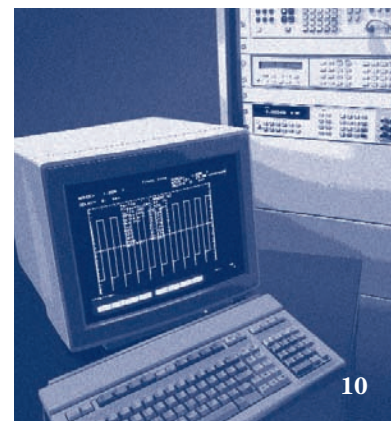
- 0.6 ppm for 24 hours in dc Volts
- 2.2 ppm for 24 hours in Ohms
- 100 ppm mid-band ac Volts
- 8 ppm (4 ppm optional) per year voltage reference stability



## High resolution digitizing

### Greater waveform resolution and accuracy

- 16 to 24 bits resolution
- 100,000 to 0.2 samples/sec
- 12 MHz bandwidth
- Timing resolution to 10 ns
- Less than 100 ps time jitter
- Over 75,000 reading internal memory



## Section 11 / General Specifications

### Operating Environment

0°C to 55°C

### Operating Humidity Range

up to 95% RH at 40°C

### Physical Characteristics

88.9 mm H x 425.5 mm W x 502.9 mm D

Net Weight: 12 kg (26.5 lbs)

Shipping Weight 14.8 kg (32.5 lbs)

### IEEE-4888 Interface

Complies with the following:

IEEE-488.1 Interface Standard

IEEE-728 Codes/Formats Standard

HPML (Multimeter Language)

### Storage Temperature

-40°C to + 75°C

### Warm-Up Time

4 Hours to published specifications

### Power Requirements

100/120 V, 220/240 V  $\pm$ 10%

48-66 Hz, 360-420 Hz automatically sensed

< 30 W, < 80 VA (peak)

Fused: 1.5 @ 115 V or 0.5 A @230 V

### Designed in Accordance with

Safety: IEC 348, UL1244, CSA

EMI:FTZ 1046, FCC part 15-J

Classification: Classified under MIL-T-28800D as Type III, Class 5, Style E, and Color R.

### Warranty Period

One year

### Input Terminals

Gold-plated Tellurium Copper

### Included with 3458A

Test Lead Set (34118B)

Power Cord

Operating Manual (P/N 03458-90004)

Calibration Manual (P/N 03458-90016)

Assembly Level Repair Manual (P/N 03458-90010)

Quick Reference Guide (P/N 03458-90005)

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### Field Installation Kits

	Part Number
Option 001      Extended Reading Memory	03458-87901
Option 002      High Stability Reference	03458-80002
Extra Keyboard Overlays (5 each)	03458-84303

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### Available Documentation

	Part Number
Product Note 3458A-1: Optimizing Throughput and Reading Rate	5953-7058
Product Note 3458A-2: High Resolution Digitizing with the 3458A	5953-7059
Product Note 3458A-3: Electronic Calibration of the 3458A	5953-7060
Extra Manual Set	03458-90100

## More High Performance Multimeters to Meet Your Needs

*Agilent offers a full line of affordable, high performance DMMs from 3.5 digit Handhelds to the 8.5 digit 3458A. Please consult your T&M catalog or contact the nearest Agilent Technologies sales office for more information.*

### 34401A Multimeter

- 6.5 digits of resolution
- 15 ppm basic 24-hr accuracy
- 11 measurement functions
- 1,000 readings per second
- GPIB and RS-232 standard

#### **The new standard in price/performance**

If you are looking for an affordable, high performance DMM, look no further. The 34401A brings you all the performance you expect from Agilent Technologies, but at a price that will surprise you.

#### **Uncompromised performance**

The 34401A combines a powerful measurement engine with an advanced feature set. The results are impressive: 6.5 digits of resolution, 1,000 readings per second, 11 measurement functions, standard GPIB and RS-232, built-in limit test, and room for 512 readings in volatile memory. The 34401A is at home either on your bench or in your test system.

#### **Affordable workhorse**

By leveraging 3458A measurement technology, replacing piles of discrete chips with custom ICs, and by designing for manufacturability, we have eliminated costs without sacrificing reliability. The 34401A has a proven track record, with tens of thousands of units in the field today and an actual MTBF of over 150,000 hours. With numbers like that, chances are you'll retire before it does.

**6.5 digit accuracy at a 5.5 digit price... the 34401A Multimeter**



## 34420A Nanovolt/Micro-ohm meter

- 7.5 digits of resolution
- 100 pV/100 nΩ of sensitivity
- 8 nVpp noise
- Built-in two channel dcV scanner
- ITS-90 temperature, including SPRTs

### Take the uncertainty out of your low-level measurements

When every nanovolt counts, look to the 34420A for its low-noise, accuracy, and reliability. Low-noise input amplifiers and a highly tuned input protection scheme bring reading noise down to 8 nVpp—half that of other nanovolt meters in its class. Now add 100 pV/100 nΩ of sensitivity, 2 ppm basic 24-hr dcV accuracy, and 7.5 digits of resolution, and you've got accurate, repeatable measurements you can rely on month after month.

### More measurements for your money

Most existing nanovoltmeters measure only nanovolts. However, the 34420A provides a more complete solution for meeting your low-level needs. We've added a high precision current source to enable resistance measurements from 100 nΩ to 1 MΩ, all without the hassle and expense of an external supply. We've also included ITS-90 conversion routines so you can read thermocouples, thermistors, and RTDs—even SPRTs—directly in degrees. And if that isn't enough, a built-in two channel scanner allows automated dcV ratio and difference measurements. Better still, the 34420A offers all this functionality for less than what you are used to paying for nanovolt-only products.



Nanovolt performance  
at a Microvolt price...  
the 34420A  
Nanovolt/Micro-Ohm Meter