

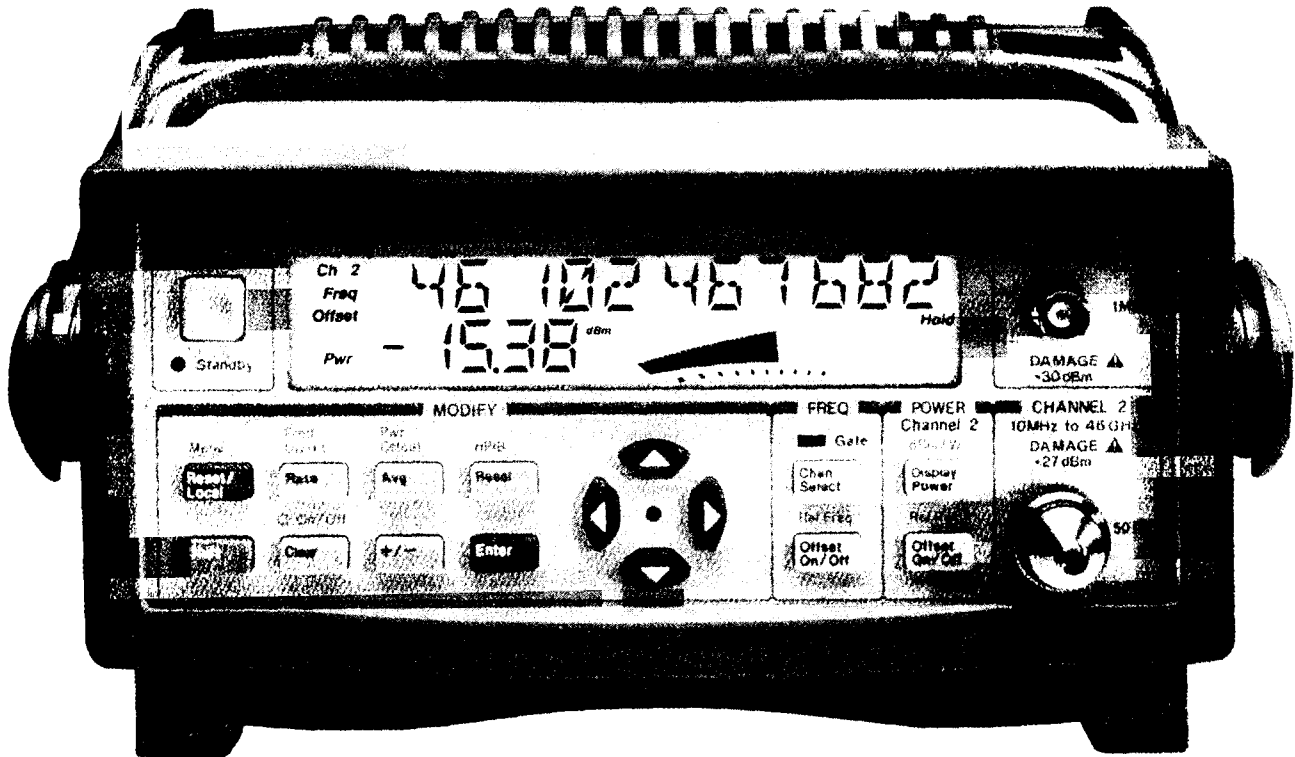
# Electronic Counters

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## CW Microwave Counters with Power Measurement

HP 53150A  
HP 53151A  
HP 53152A

- Ultra wide range, single input (from 50 MHz up to 46 GHz)
- Simultaneous frequency and power measurement with analog peaking indicator
- Fully programmable via HP-IB and RS-232 standard
- Lightweight with optional battery



HP 53152A

### HP 53150A, 53151A, 53152A Microwave Counters



The HP 53150 series represent a total re-thinking of microwave counters: innovative designs that offer no-compromise performance and quality while attaining true portability. The HP 53150A, 53151A, and 53152A measure both frequency and power over the frequency ranges of 20 GHz, 26.5 GHz, and 46 GHz, respectively, and feature a single, extremely wideband microwave input (50 MHz up to 46 GHz).

#### No Compromise Performance

Utilizing a unique single board design with low phase noise PLL circuitry, the HP 53150 series offers exceptional sensitivity, excellent power measurement accuracy and repeatability as well as fast acquisition times and full programmability. Performance equals or surpasses the industry standard HP 5350 series in virtually every aspect in a package that is less than half the weight and size.

#### Frequency and Power Measurements with a Single Connection

The heart of the HP 53150 series is an advanced sampler design that integrates a separate zero bias Schottky diode for the accurate measurement of input power. This allows the convenient measurement of both frequency and power with a single connection. The unique cable-loss-compensation feature yields accuracies and repeatabilities that rival power meters with diode sensors. Best of all, since the frequency of the test signal is measured simultaneously, the diode's frequency response is automatically adjusted for. And like the latest in diode sensors, deviation from square law is also compensated for.

#### Functionality Without Clutter

The HP 53150 series offers a clean, uncluttered front panel with a minimum of push buttons. Despite their simple appearance, these counters retain all the powerful functions one expects in precision instrumentation, with such useful functions as: measurement averaging, arbitrary as well as nulling offsets for both frequency and power, display of power in either dBm or Watts and full control of resolution, sampling rate, and HP-IB address plus extensive self-diagnostics.

#### Field Tough but Ready for Benchtop or ATE Applications

The HP 53150 series is as comfortable in the field as in the laboratory. The rugged case with an integrated tilting handle can tolerate the vibration and shock expected in field use. For easy transportation, a soft carrying case is also available. The "see anywhere" backlit LCD display ensures visibility in all environments, from dark to full sunlight. And in situations where AC is unavailable, the internal, replaceable camcorder batteries provide over 2.5 hours of continuous operation. Alternatively, the unit can be powered from an external 11-18 VDC source.

For benchtop and ATE applications, the HP 53150 series delivers full functionality and high measurement speed along with fully programmable RS-232 interface and high speed HP-IB (SCPI compliant) as standard. In addition, these counters are compatible with standard HP rackmount hardware.

HP 53150A  
HP 53151A  
HP 53152A

### HP 53150 Series Abridged Measurement Specifications and Characteristics

All measurement specifications are over the full signal ranges of channels 1 and 2. For full specifications, please call your HP representative and request a Product Overview for the HP 53150 series microwave counters.

#### Input Characteristics

	Input 1 (1 MΩ)	Input 2 (50 Ω)
<b>Frequency Range</b>		
53150A	10 Hz to 125 MHz	.05–20 GHz
53151A	10 Hz to 125 MHz	.05–26.5 GHz
53152A	10 Hz to 125 MHz	.05–46 GHz
<b>Sensitivity</b>		<b>53150/51</b> <b>53152</b>
<30 Hz	40 mV	—
to 125 MHz	25 mV	—
<250 MHz	—	-20 dBm    -20 dBm
to 12.4 GHz	—	-33 dBm    -33 dBm
to 18 GHz	—	-33 dBm    -30 dBm
to 20 GHz	—	-29 dBm    -27 dBm
to 26.5 GHz	—	-25 dBm (151)    -27 dBm
to 40 GHz	—	—    -23 dBm
to 46 GHz	—	—    -17 dBm
<b>Maximum Input</b>	2 V <sub>rms</sub>	+5 dBm, < 2 GHz +13 dBm, > 2 GHz
<b>Damage Level</b>	5 V <sub>rms</sub> to 120 Vp	+27 dBm
<b>Coupling</b>	AC	AC

#### Channel 1

**Resolution:** Selectable 1 Hz to 1 MHz  
**Connector:** BNC female  
**Low Pass Filter:** 50 kHz, selectable

#### Channel 2

**Resolution:** Selectable 1 Hz to 1 MHz  
**Acquisition Time:** 100 ms to 140 ms  
**Gate Time:** 1/Resolution  
**FM Tolerance:** 20 MHz p-p max. @ 10 MHz rate to 26.5 GHz;  
12 MHz p-p max. @ 10 MHz rate to 46 GHz  
**AM Tolerance:** Any depth/rate within dynamic range of input  
**Amplitude Discrimination** (above 250 MHz): 20 dB typ. for greater than 75 MHz separation; 10 dB typ. for less than 75 MHz separation  
**Connector:** 3.5 mm SMA compatible (HP 53150A/53151A);  
2.92 mm Planar Crown (HP 53152A)

#### Power Measurement

**Range:** Counter sensitivity to +7 dBm  
**Units:** dBm or milliwatts/microwatts  
**Resolution:** 0.01 dB

**Accuracy\*** (0 to -20 dBm):

	53150/51	53152
< 12.4 GHz	±1.5 dB	±1.0 dB
to 20 GHz	±1.5 dB	±1.5 dB
to 26.5 GHz	±2.0 dB (151)	±1.5 dB
to 46 GHz	—	±2.0 dB

\*At channel two input connector

#### General

**Display:** Backlit LCD  
**Sample Rate:** User-selectable Fast, Medium, Slow or Hold  
**Programming:** HP-IB and RS-232C, SCPI compatible  
**Math Functions**

**Offset:** Last reading and/or entered offset to reading for either power or frequency  
**Averaging:** 1 to 99 measurement running average  
**Cable Loss Compensation:** Offsets power reading via linear interpolation of up to 10 user-entered frequency attenuations  
**Save and Recall:** Up to 9 complete instrument setups may be saved and later recalled  
**Sleep Mode** (battery option only): Automatically activated if no input is present for 5 minutes

#### Power Requirements

75 VA max. (25 W typ.)  
90–132 VAC; 50, 60, 400 Hz  
216–264 VAC; 50, 60 Hz  
11–18 VDC; 2A max.; battery option only

#### Battery (option):

**Type:** VHS camcorder, sealed lead acid (2 each)  
**Charge Time:** 8 hours in unit  
**Capacity:** 2.5 hours minimum at 25° C

#### Timebase:

	TCX0 (std)	Option 001
Aging Rate	1 x 10 <sup>-7</sup> /mo	5 x 10 <sup>-6</sup> /day
Short Term (1 sec. avg.)	1 x 10 <sup>-4</sup>	2 x 10 <sup>-6</sup>
Temperature (0–55°C)	<1 x 10 <sup>-4</sup>	<3 x 10 <sup>-4</sup>

**Accessories Furnished:** Power cord and operating, programming, and service manuals

**Size:** 213 mm W x 88.5 mm H x 300 mm D

**Weight:** 4 kg without battery option; 6.4 kg with battery option

#### Ordering Information

**HP 53150A** 20 GHz Counter    \$6,250  
**HP 53151A** 26.5 GHz Counter    \$7,450  
**HP 53152A** 46 GHz Counter    \$14,500

#### Options

**Opt 001** Oven Timebase    \$950  
**Opt 002** Battery/DC Input    \$950  
**Opt 007** Soft Carrying Case    \$175  
**Opt 1CM** Rack Mounting Kit    \$75  
**Opt W30** 3-Yr. Return Repair Service    Starts at \$165  
**Opt W50** 5-Yr. Return Repair Service    Starts at \$325

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