Complete Coverage in Electronic Test Instrumentation

Oscillators, voltmeters, generators, analyzers, amplifiers—frequency measuring, microwave coaxial or waveguide equipment—whatever your measuring needs, there’s a precision-built *hp* instrument for the job. The *hp* line, world’s most complete, includes over 200 tested and proved equipments for all types of measurement. Each gives you engineering economies of fast, accurate measurement, broad applicability, dependability, trouble-free service. Each has the traditional *hp* “family characteristics” of simple operation, minimum adjustment, independence of line voltage or tube changes, generous overload protection and highest quality design and construction. On these pages you’ll find brief details of major *hp* instruments. For complete information, see your *hp* representative, or write factory direct.

**-hp- 200 SERIES AUDIO OSCILLATORS**

Now four basic *hp*-oscillators have been redesigned into two compact, lightweight instruments offering wider frequency range, more operating simplicity, highest accuracy and stability. New Models 200AB and 200CD replace Models 200A through 200D, retain the time-tested RC circuits that insure constant output, low distortion; require no zero set. In addition to these general test instruments, *hp*- continues to offer Model 202D for sub-audio, audio, supersonic and carrier tests; and Model 2001, a spread-scale oscillator for interpolation or where frequency must be known precisely.

**-hp- 650A TEST OSCILLATOR**

Highly stable, wide band (10 cps to 10 mc) multi-purpose test oscillator for audio, supersonic, video, and rf measurements. Output variable 50 μv to 3 v. Frequency response flat ± 1 db. Output impedance 600 ohms, or 6 ohms with voltage divider. $475.00.

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**Data subject to change without notice. Prices f.o.b. factory.**

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### **Oscillators — Signal Generators**

**.01 to 10,000,000 cps**

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Primary Uses</th>
<th>Frequency Range</th>
<th>Output</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>hp- 200AB</em></td>
<td>Audio tests</td>
<td>20 cps to 40 kc</td>
<td>5 watts 24.5 v</td>
<td>$170.00</td>
</tr>
<tr>
<td><em>hp- 200CD</em></td>
<td>Audio, ultrasonic tests</td>
<td>5 cps to 400 kc</td>
<td>150 mws 200 v</td>
<td>$150.00</td>
</tr>
<tr>
<td><em>hp- 200M</em></td>
<td>Carrier current, telephone tests</td>
<td>60 cps to 600 kc</td>
<td>10 mw 1 v</td>
<td>$250.00</td>
</tr>
<tr>
<td><em>hp- 9001</em></td>
<td>Interpolation and frequency measurements</td>
<td>6 cps to 6 kc</td>
<td>100 mw 100 v</td>
<td>$225.00</td>
</tr>
<tr>
<td><em>hp- 2013</em></td>
<td>High quality audio tests</td>
<td>20 cps to 20 kc</td>
<td>5 watts 24.5 v</td>
<td>$250.00</td>
</tr>
<tr>
<td><em>hp- 202A</em></td>
<td>Low frequency measurements</td>
<td>.01 cps to 1 kc</td>
<td>20 mw 100 v</td>
<td>$450.00</td>
</tr>
<tr>
<td><em>hp- 202B</em></td>
<td>Low frequency measurements</td>
<td>15 cps to 50 kc</td>
<td>100 mw 10 v</td>
<td>$350.00</td>
</tr>
<tr>
<td><em>hp- 202D</em></td>
<td>Low frequency measurements</td>
<td>2 cps to 70 kc</td>
<td>100 mw 10 v</td>
<td>$275.00</td>
</tr>
<tr>
<td><em>hp- 204A</em></td>
<td>Portable, battery operated</td>
<td>2 cps to 20 kc</td>
<td>2.5 mw 5 v</td>
<td>$175.00</td>
</tr>
<tr>
<td><em>hp- 205A</em></td>
<td>High power audio tests</td>
<td>20 cps to 20 kc</td>
<td>5 watts</td>
<td>$390.00</td>
</tr>
<tr>
<td><em>hp- 255AG</em></td>
<td>High power tests, gain measurements</td>
<td>20 cps to 20 kc</td>
<td>5 watts</td>
<td>$425.00</td>
</tr>
<tr>
<td><em>hp- 205AM</em></td>
<td>High power oscillator tests</td>
<td>1 kc to 100 kc</td>
<td>5 watts</td>
<td>$525.00</td>
</tr>
<tr>
<td><em>hp- 206A</em></td>
<td>High quality, high accuracy audio tests</td>
<td>20 cps to 20 kc</td>
<td>+13 dbm</td>
<td>$550.00</td>
</tr>
<tr>
<td><em>hp- 220A</em></td>
<td>Carrier test oscillator</td>
<td>35 cps to 35 kc</td>
<td>+14 dbm 600 ohms</td>
<td>$275.00</td>
</tr>
<tr>
<td><em>hp- 233A</em></td>
<td>Carrier test oscillator</td>
<td>50 cps to 500 kc</td>
<td>2 v 600 ohms</td>
<td>$475.00</td>
</tr>
<tr>
<td><em>hp- 234A</em></td>
<td>Carrier test oscillator</td>
<td>160 cps to 160 kc</td>
<td>+14 dbm 600 ohms</td>
<td>$300.00</td>
</tr>
<tr>
<td><em>hp- 650A</em></td>
<td>Wide range video tests</td>
<td>10 cps to 1 mc</td>
<td>35 mw 3 v</td>
<td>$475.00</td>
</tr>
</tbody>
</table>

*Open circuit. Internal impedance 600 ohms.*
-hp- Vacuum Tube Voltmeters — 2 to 700,000,000 cps

**-hp- 410B Vacuum Tube Voltmeter**

Wide range, flat response ±1 db, 20 cps to 700 mc. Convenient, simple to use, occupies minimum bench space. Handy compartment for probe and leads. Diode probe places approximately 1.5 µfd capacity across circuit under test. This, plus high shunt impedance (10 megohms at low frequencies) means circuits under test are not disturbed, and true voltage readings are assured. Also measures dc voltage to 1,000 volts and resistances to 500 megohms. $245.00.

**-hp- 410B Audio, rf, VHF measurements; dc voltages; resistances 20 cps to 700 mc 1 to 300 v 7 ranges 10 megohms 1.5 µfd shunt 245.00.**

- hp- Voltmeter Accessories (not listed) include voltage dividers, connectors, shunts and multipliers to extend the useful range of your equipment.

- hp- Signal Generators — 10 to 10,000 mc

**-hp- 618B Signal Generator**

3,800 to 7,600 mc. Provides a 1 mw signal into a 50-ohm coaxial load (zero dbm). Output attenuator directly calibrated in dbm and volts, reduces output level to less than 100 dbm. Frequency dial directly calibrated, accuracy 1/2 of 1%. Repellor voltage automatically tracked. No adjustment during operation. CW, pulsed or fm output. Internal square wave modulation. $2,250.00.

**-hp- 618B 3,800 to 7,600 mc Pulse, CW or Square wave modulation 2,250.00.**

- hp- Generators — 10 to 10,000 mc

**-hp- Distortion, Wave Form Analyzers — 20 cps to 20 kc**

**-hp- 330B Distortion Analyzer**

Measures distortion as low as 0.1% at any frequency, 20 cps to 20 kc. Measures noise voltages as low as 100 µv. High sensitivity, high stability, broad applicability for broadcast, laboratory or production problems. Wide band 20 db gain input amplifier. Built-in vacuum tube voltmeter usable separately. $395.00.

**-hp- 330B 30 to 16 kc Variable selectivity, measuring range 1 mv to 200 v 6025.00.**

**FM, AM-FM Models**


**Square Wave Generator**

- hp- 210A Transient and frequency response 20 cps to 10 kc 0.1 v to 1 v into 50 ohm load. 0.1 v to 1 v into 50 ohm load. 0.1 v to 1 v into 50 ohm load. 0.1 v to 1 v into 50 ohm load. 500 ohm impedance. 140.00.

Data subject to change without notice. Prices f.o.b. factory,

HEWLETT - PACKARD COMPLETE COVERAGE
-hp- 430B MICROWAVE POWER METER

No computations! Provides instantaneous, automatic power readings direct in db or mw at all frequencies for which there are suitable bolometer mounts. For CW measurements, uses either 1/100 amp. fuse or Sperry 821 barretter. Also measures CW or pulsed power with negative coefficient thermistor. Operates with -hp- 475B or 476A Bolometer Mounts; also 485B Detector Mounts. $250.00.

-HP- 803A VHF BRIDGE

Gives fast, direct readings of any impedance between 50 and 500 mc. Measures by sampling electric and magnetic fields in transmission line. Usable for comparative measurements 5 to 700 mc. Impedance range 2 to 2,000 ohms. Phase angle -90° to +90°, at 52 mc and above. Also measures SWR, % reflected power, VHF system flatness. $495.00.

-HP- 809B UNIVERSAL PROBE CARRIAGE

Convenient, all-purpose -hp- 809B carriage operates with 6 different -hp- slotted sections, waveguide and coaxial. Mounts sections covering frequencies 3,000 to 18,000 mc—sections interchangeable in 30 seconds! Precision-built carriage calibrated in mm to 0.1 mm; dial gauge may be mounted. Operates with -hp- 442B Broad Band Probe and -hp- 440A Coaxial Detector in combination; or with -hp- 444A, Untuned Probe (See preceding page for probe details.) -hp- 809B, $160.00.

-HP- 809A/B Slotted Sections, -hp- 810B, for mounting in 809B carriage, is a flanged waveguide section with accurately machined slot tapered at ends to minimize reflection. Available in 5 waveguide bands, 3.5 to 18.0 kmc. -hp- 8810A, complete slotted section assembly including probe carriage. Available for 2.6 to 3.95 kmc band only. (See table on preceding page for data, prices.)
-hp- 1000 SECONDARY FREQUENCY STANDARD

Swift, sure frequency comparison, new convenience in standardizing with minimum external equipment. 100 μsec time markers, built-in oscilloscope, sine or rectangular 1/1,000,000. Performs most functions of expensive primary standards in audio, rf or supersonic ranges. $600.00.

- hp- 335 FM, TV MONITORS

Precision frequency and modulation meters providing reliable, accurate monitoring of transmitters over long periods of time. No adjustment during operation, no preset F.C.C. approved. 100: 1 divider for operation.

Model 335B, 88 to 108 mc, for FM only. 335C, for aural monitoring TV Channels 2 thru 6. 335D, same except for Channels 7 thru 13. See table for prices.

- hp- 524A FREQUENCY COUNTER

Measures instantly, automatically, presents results directly—determines any frequency from 0.01 cps to 10 mc. This one instrument combines functions of a frequency standard, interpolating meter and detector. Outstandingly simple operation, easily used by non-technical personnel. Just connect unknown to input terminal, and exact frequency appears automatically on front panel. Result is presented repetitively or may be “held” by depressing “manual” button.

Time of count can be adjusted to 10, 1, .1, .01, or .001 seconds. Accuracy of measurement ± 1 count ± crystal stability (2/1,000,000 per week). For low frequency study, instrument measures duration of one low frequency cycle in microseconds, based on a 10 cycle sample. Accuracy 0.5%. External higher-accuracy standards usable if desired. Minimum voltage of unknown, 1 volt peak. $2,000.00.

Data subject to change without notice. Prices f.o.b. factory.

**-hp- Frequency Measuring and Monitoring Equipment**

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Primary Uses</th>
<th>Frequency Range</th>
<th>Characteristics</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>-hp- 100C</td>
<td>Audio, supersonic</td>
<td>100 kc, 10 kc</td>
<td>Accurate within ± .001%</td>
<td>$450.00</td>
</tr>
<tr>
<td>Secondary Standard</td>
<td>1 kc, 100 cps</td>
<td></td>
<td>Sine or rectangular output.</td>
<td></td>
</tr>
<tr>
<td>-hp- 335B</td>
<td>FM broadcast status</td>
<td>88 to 108 mc</td>
<td>Stability 1,000,000 (short-term)</td>
<td>$925.00</td>
</tr>
<tr>
<td>Frequency Monitor</td>
<td></td>
<td></td>
<td>Sine or rectangular output.</td>
<td></td>
</tr>
<tr>
<td>-hp- 335C</td>
<td>TV station signal</td>
<td>59.75 to 87.75 mc</td>
<td>Frequency deviation = ± 3 kc; accuracy = ± 0.001%; modulation 0 to 100 kc</td>
<td>$915.00</td>
</tr>
<tr>
<td>Frequency Monitor</td>
<td></td>
<td></td>
<td>Modulation 0 to 33.3 kc</td>
<td></td>
</tr>
<tr>
<td>-hp- 335D</td>
<td>TV station signal</td>
<td>179.75 to 215.75 mc</td>
<td>Frequency deviation = ± 3 kc; accuracy = ± 0.001%; modulation 0 to 33.3 kc</td>
<td>$915.00</td>
</tr>
<tr>
<td>Frequency Monitor</td>
<td></td>
<td></td>
<td>Modulation 0 to 33.3 kc</td>
<td></td>
</tr>
<tr>
<td>-hp- 336A</td>
<td>Communication service</td>
<td>30 to 175 mc</td>
<td>Frequency deviation = ± 15 kc; accuracy = ± 0.001%; 6000 vs. 3,000,000 rpm</td>
<td>$300.00*</td>
</tr>
<tr>
<td>Frequency Monitor</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-hp- 337A</td>
<td>Communication service</td>
<td>30 to 175 mc</td>
<td>Same as 337A</td>
<td>$350.00*</td>
</tr>
<tr>
<td>Frequency Monitor</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-hp- 500A</td>
<td>Rapid frequency</td>
<td>10 cps to 30 kc</td>
<td>10 ranges = ± 2% accuracy, input 0.5 to 200 volts.</td>
<td>$210.00</td>
</tr>
<tr>
<td>Frequency Meter</td>
<td>Measurements of high</td>
<td>600 to 3,000,000</td>
<td>10 ranges = ± 2% accuracy, input 0.5 to 200 volts.</td>
<td>$300.00</td>
</tr>
<tr>
<td></td>
<td>speed machinery</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-hp- 501A</td>
<td>Same as 500A</td>
<td></td>
<td>Same as 500A except calibrated in nps.</td>
<td>$300.00</td>
</tr>
<tr>
<td>Electronic Tachometer</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-hp- 510A</td>
<td>Measure frequency</td>
<td>20 cps to 200 cps</td>
<td>Mixes two frequencies, delivers difference to -hp- 500A.</td>
<td>$200.00</td>
</tr>
<tr>
<td>Mixer</td>
<td>continuously with -hp-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>505A and 100 D/C</td>
<td>505A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-hp- 520A</td>
<td>For counting high-</td>
<td>100 counts to 2</td>
<td>1000 display for operation of low speed counters.</td>
<td>$600.00</td>
</tr>
<tr>
<td>Nuclear Scaler</td>
<td>rate pulses</td>
<td>10,000,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1 ppm counting rate</td>
<td></td>
</tr>
<tr>
<td>-hp- 524A</td>
<td>Frequency Counter</td>
<td>0.01 to 10 mc</td>
<td>Direct reading, no interpolation, accuracy about 1/1,000,000 / week.</td>
<td>$2,000.00</td>
</tr>
<tr>
<td>Frequency counted above 10,168,438 cps.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### -hp- Waveguide Test Equipment — 2.6 to 18 kmc

Basic, low-cost elements offer utmost flexibility for assembly of exact instrumentation required. Each unit covers entire range of its waveguide size. Simple, sturdy mechanical design; accurate, multi-purpose operation.

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Coaxial Type N Conn.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adapters, Waveguide to Coax</td>
<td>5281A 75.00</td>
</tr>
<tr>
<td>Cover to coax flange</td>
<td>5290A 40.00</td>
</tr>
<tr>
<td>Attenuators, Fixed 6, 10, 20 db</td>
<td>5370A 75.00</td>
</tr>
<tr>
<td>Flap, 25 db max.</td>
<td>5575A 75.00</td>
</tr>
</tbody>
</table>

Calibrated:

- **Detector Mounts**
  - 440A 565.00
  - 485A 5125.00
  - 5375A 75.00

- **Frequency Meters, Reaction**
  - 430A 5120.00
  - 475A 585.00
  - 575A 5120.00

- **Directional Couplers, Con-Grade, 20, 30 db**
  - 760A 5120.00
  - 775A 5120.00

- **Directional Couplers, Multi Hole, 10, 20 db**
  - 780A 5120.00
  - 795A 5120.00

- **Slotted Sections, Waveguide**
  - 850A 5120.00
  - 865A 5120.00

- **Waveguide Tees, Series**
  - 900A 5120.00
  - 915A 5120.00

- **Short**
  - 441A 5120.00
  - 485A 5120.00

- **Hybrid**
  - 442A 5120.00
  - 565A 5120.00

- **Transformers, Slide Screw**
  - 530A 5120.00

- **Terminations, Low Power**
  - 950A 5120.00

- **Terminations, High Power**
  - 975A 5120.00

- **Moving Load**
  - 591A 5120.00

- **Adjustable Short**
  - 592A 5120.00

- **Braid Band Probe**
  - 440A 5120.00

- **Braid Band Probe, Untuned**
  - 444A 5120.00

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Equipment below available for most waveguide bands. Table above shows data, prices.

### -hp- 281A Waveguide-Goax Adapters

For convenient transition between waveguide and coax systems. Each unit covers a full waveguide range with VSWR less than 1.25. Equipped with Type N connectors.

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### -hp- 750 Cross-Guide Couplers

Directional couplers offered in 2 models with coupling factors of 20 or 30 db ± 1.5 db over full range of a waveguide. VSWR less than 1.15; directivity approx. 20 db. Available as a 4-terminal network.

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### -hp- 485B Detector Mounts

To measure power over complete waveguide range in conjunction with -hp- 430B Power Meter and barretter. Also measures relative level, or detects rf energy using 1N21 or 1N23 crystal. Sensitive to single- or double-tuned probes. Frequency range: 2.6 to 18.0 kmc. Mounts in 809B Carriage. (See next page.)

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### -hp- 530A Frequency Meters

General-purpose reaction meter. Covers a complete waveguide frequency range. High Q resonant cavity tuned by plunger. Quick-reference chart converts micrometer reading to frequency. Accuracy 0.1%. No spurious modes or resonances.

### -hp- 870A Slide Screw Tuners

For flattening waveguide systems. The position and penetration of a probe is adjusted to set up a VSWR in the waveguide which is used to cancel existing VSWR in system. VSWR values up to 20 can be corrected with accuracy of 1.02 VSWR.

### -hp- 444A Untuned Probe

A 1N26 crystal plus small antenna in a convenient, easy-to-use housing. Variable penetration depth, no tuning required. Sensitivity equal to single- or double-tuned probes. Frequency range: 2.6 to 18.0 kmc. Mounts in 809B Carriage. (See next page.)

### -hp- 375A Flap Attenuators

Simplifies adjusting power level in waveguide. Attenuation is quickly adjustable 0 to 20 db. Approximate calibration. VSWR less than 1.15 after attenuation range. No leakage.

### -hp- 752 Multi-Hole Coupler

Directional couplers available in 2 models with coupling factors of 10 and 20 db ± 0.7 db over full range of a waveguide. VSWR better than 1.05. Directivity 40 db or better over entire range. Available as a 3-terminal network.

### -hp- 914A Moving Load

Low-reflection load covering full frequency range of guide. Load position variable at least 1/2 wavelength to reverse phase of reflection so that small residual reflections can be evaluated. Coefficient of reflection less than 1/2%.

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HEWLETT-PACKARD COMPLETE COVERAGE

www.HPARCHIVE.com
-hp- POWER SUPPLIES

- hp- 715A (illustrated) is a versatile source of regulated beam and reflector voltage for operating most test bench klystron tubes. Beam voltage 250 to 400 v, reflector voltage 0 to 900 v; 6.3 v filament. Internal, 1,000 cps square wave modulation, also 60 cps FM modulation, both on reflector voltage. $300.00.

- hp- 710A—Highly stable regulated dc supply, output variable 180 to 360 v at 75 ma, 6.3 v filament. Either terminal may be grounded. Total hum and noise less than 5 mv. $85.00.

- hp- 712A. Stabilized, variable power supply providing 0 to 500 v at 200 ma and 25% regulation. Also variable bias voltages, 0 to 150 v at 5 ma, and 6.3 v filament at 10 amps. Main supply completely metered. Either terminal may be grounded. Hum less than 8 mv. For laboratory, production or general use. $250.00.

- hp- 624A X-BAND TEST SET

High level, direct reading, portable test set simplifies lab or field work at frequencies 8,500 to 10,000 mc. Power output .223 v max. High stability attenuator reduces level by 10 db. May be pulsed or fm modulated. Separate section measures external rf power or measuring sensitivity and selectivity, tuning and power level of radar, gunfire and beacon systems. $2,250.00.

- hp- 623B SHF Test Set, like 624A but operates over frequencies determined by klystron installed. Six klystrons available (each with 300 mc bandwidth) for frequencies between 5,925 and 7,725 mc. Fm modulated. Includes 1,000 cps square wave modulator. $1,650.00 (with one Klystron).

- hp- 212A PULSE GENERATOR

Provides continuously variable, high power "fast pulses" of superior wave form. Combines broad general usefulness with 0.02 psec rise and decay time to meet requirements of radar, TV and nuclear work. Pulse width variable from 0.08 to 10 mc; minimum overshoot, 50 watt peak power (50 v to 50 ohms load). Low impedance means accurate pulses can be delivered at a distance from the instrument. Repetition rate variable 50 to 5,000 cps; controlled internally or externally. Synchronizing pulses available in advance of, or following, output pulse. $350.00.