



Oscillators, voltmeters, generators, analyzers, amplifiers—frequency counting, measuring and monitoring instruments, 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.

HEWLETT-PACKARD COMPANY
2758 PAGE MILL ROAD • PALO ALTO, CALIFORNIA, U.S.A.

Complete Coverage in Electronic Test Instrumentation

Oscillators—Signal Generators .01 to 10,000,000 cps

-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 out-

put, 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 200I, 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 30 μ v to 3 v. Frequency re-

sponse flat ± 1 db. Output impedance 600 ohms, or 6 ohms with voltage divider. \$475.00.

| Instrument | Primary Uses | Frequency Range | Output | Price |
|--------------------|--|-------------------|------------------|----------|
| <i>-hp-</i> 200A,B | Audio tests | 20 cps to 40 kc | 1 watt/24.5 v | \$120.00 |
| <i>-hp-</i> 200CD | Audio, ultrasonic tests | 5 cps to 600 kc | 160 mw/20 v * | 150.00 |
| <i>-hp-</i> 200H | Carrier current, telephone tests | 60 cps to 600 kc | 10 mw/1 v | 350.00 |
| <i>-hp-</i> 200I | Interpolation and frequency measurements | 6 cps to 6 kc | 100 mw/10 v | 225.00 |
| <i>-hp-</i> 201B | High quality audio tests | 20 cps to 20 kc | 3 w/42.5 v | 250.00 |
| <i>-hp-</i> 202A | Low frequency measurements | .01 cps to 1 kc | 20 mw/ 10 v | 450.00 |
| <i>-hp-</i> 202B | Low frequency measurements | 1/2 cps to 50 kc | 100 mw/10 v | 350.00 |
| <i>-hp-</i> 202D | Low frequency measurements | 2 cps to 70 kc | 100 mw/10 v | 275.00 |
| <i>-hp-</i> 204A | Portable, battery operated | 2 cps to 20 kc | 2.5 mw/5 v | 175.00 |
| <i>-hp-</i> 205A | High power audio tests | 20 cps to 20 kc | 5 watts | 390.00 |
| <i>-hp-</i> 205A,G | High power tests, gain measurements | 20 cps to 20 kc | 5 watts | 425.00 |
| <i>-hp-</i> 205A,H | High power supersonic tests | 1 kc to 100 kc | 5 watts | 550.00 |
| <i>-hp-</i> 206A | High quality, high accuracy audio tests | 20 cps to 20 kc | +15 dbm | 550.00 |
| <i>-hp-</i> 230A | Carrier test oscillator | 35 cps to 35 kc | +14 dbm/600 ohms | 275.00 |
| <i>-hp-</i> 233A | Carrier test oscillator | 50 cps to 500 kc | 3w/600 ohms | 475.00 |
| <i>-hp-</i> 234A | Carrier test oscillator | 160 cps to 160 kc | +14 dbm/600 ohms | 300.00 |
| <i>-hp-</i> 650A | Wide range video tests | 10 cps to 10 mc | 15 mw/3 v | 475.00 |

*Open circuit. Internal impedance 600 ohms.

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



Precision-built -hp- instruments for every

-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 $1.5 \mu\text{fd}$ 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.

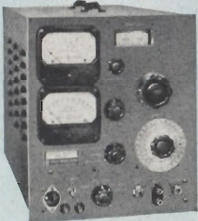
Also measures dc voltage to 1,000 volts and resistances to 500 megohms. \$245.00.

| Instrument | Primary Uses | Frequency Range | Voltage Range | Input Impedance | Price |
|------------|---|------------------|-----------------------------|--|----------|
| -hp- 400A | General purpose ac measurements | 10 cps to 1 mc | .005 to 300 v 9 ranges | 1 megohm 24 μfd shunt | \$185.00 |
| -hp- 400B | Low frequency ac measurements | 2 cps to 100 kc | .005 to 300 v 9 ranges | 10 megohms 24 μfd shunt | 195.00 |
| -hp- 400C | Wide range ac measurements. High sensitivity | 20 cps to 2 mc | .0001 to 300 v 12 ranges | 10 megohms 15 μfd shunt | 200.00 |
| -hp- 404A | Portable, battery operated | 2 cps to 50 kc | .0005 to 300 v 11 ranges | 10 megohms 20 μfd shunt | 185.00 |
| -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 10,800 mc

-hp- 612A SIGNAL GENERATOR



450 to 1,200 mc. Master oscillator-power amplifier generator for UHF-TV measurements including gain, selectivity, sensitivity, image rejection. Directly set and read; no charts, no interpolation. Low incidental fm, high-quality broad band video modulation to 5 mc.

May be modulated internally or externally, amplitude modulated or pulse modulated. (Good rf pulses 0.2 μsec or longer.) \$1,200.00.

| Instrument | Frequency Range | Characteristics | Price |
|------------|--------------------|---|-----------|
| -hp- 608A | 10 to 500 mc | Output 0.1 μv to 1 v into 50 ohm load. Pulse or CW modulation. Direct calibration. | \$ 850.00 |
| -hp- 612A | 450 to 1,200 mc | Output 0.1 μv to 0.5 v into 50 ohm load. Pulse, CW or amplitude modulation to 5 mc. Direct calibration. | 1,200.00 |
| -hp- 614A | 800 to 2,100 mc | Output 0.1 μv to 0.223 v into 50 ohm load. Pulse, CW or FM modulation. Direct calibration. | 1,950.00 |
| -hp- 616A | 1,800 to 4,000 mc | Output 0.1 μv to 0.223 v into 50 ohm load. Pulse, CW or FM modulation. Direct calibration. | 1,950.00 |
| -hp- 618B | 3,800 to 7,600 mc | Output 0.1 μv to 0.223 v into 50 ohm load. Pulse, CW, FM or Square wave modulation. Direct calibration. | 2,250.00 |
| -hp- 620A | 7,000 to 10,800 mc | Output 0.1 μv to 0.071 v into 50 ohm load. Pulse, CW, FM or Square wave modulation. Direct calibration. | 2,250.00 |
| -hp- 623B | 5,925 to 7,725 mc | Output 70 μv to 0.223 v into 50 ohm load. FM or Square wave modulation. Separate power meter and wave meter section. | 1,750.00 |
| -hp- 624B | 8,500 to 10,000 mc | Output 3.0 μv to 0.223 v into 50 ohm load. Pulse, FM or Square wave modulation. Separate power meter and wave meter section. | 2,250.00 |

-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.

FM, AM-FM MODELS

-hp- 330C, for FM broadcasters, includes VU meter meeting F.C.C. requirements. -hp- 330D, for AM-FM broadcasters, includes AM detector to rectify AM carrier, plus VU meter employed in model 330C. Model 330C, \$425.00. Model 330D, \$440.00.

| Instrument | Primary Uses | Frequency Range | Characteristics | Price |
|------------|----------------------------------|-----------------------------------|--|----------|
| -hp- 300A | Wave form analyzer | 30 cps to 16 kc | Variable selectivity; measuring range 1 mv to 500 v | \$625.00 |
| -hp- 320A | Measures total distortion | 400 cps and 5 kc | Requires external detector | 75.00 |
| -hp- 320B | Measures total distortion | 50, 100, 400 cps, 1, 5 and 7.5 kc | Same as above | 150.00 |
| -hp- 330B | Measures total audio distortion | 20 cps to 20 kc | Includes input amplifier, VTVM | 395.00 |
| -hp- 330C | For FM broadcast measurements | 20 cps to 20 kc | Special VU meter to meet F.C.C. requirements | 425.00 |
| -hp- 330D | For AM-FM broadcast measurements | 20 cps to 20 kc | AM detector and VU meter to meet F.C.C. requirements | 440.00 |

SQUARE WAVE GENERATOR

| | | | | |
|-----------|----------------------------------|-----------------|---|--------|
| -hp- 210A | Transient and frequency response | 20 cps to 10 kc | Output 50 v peak-to-peak 1,000 ohm impedance | 150.00 |
|-----------|----------------------------------|-----------------|---|--------|

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

Instruments for Complete Coverage



Microwave test instruments for coaxial & waveguide systems

-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

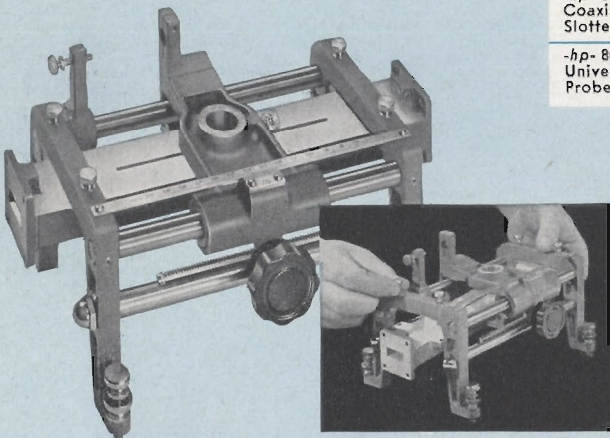
Sperry 821 barretter. Also measures CW or pulsed power with negative coefficient thermistor. Operates with *-hp-* 475B or 476A Bolometer Mounts; also 485B Detector Mounts. \$250.00.



-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

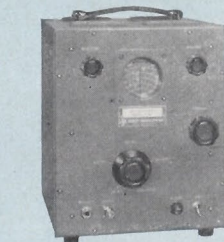
700 mc. Impedance range 2 to 2,000 ohms. Phase angle -90° to $+90^\circ$, at 52 mc and above. Also measures SWR, % reflected power, VHF system flatness. \$495.00.



-hp- 805A/B COAXIAL SLOTTED SECTION

Range 500 to 4,000 mc. High accuracy, high stability, negligible slope, minimum leakage. Exclusive parallel plane design, VSWR of basic section and connectors, 1.04. *-hp-* 805A, 50 ohms, Type N coax-connector. *-hp-* 805B, 46.3 ohms, for $\frac{7}{8}$ " rigid transmission lines. \$475.00.

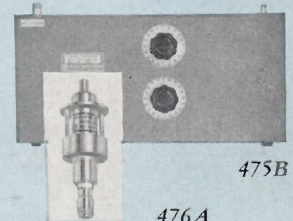
-hp- 806B Coaxial Slotted Section, 3,000 to 12,000 mc. For use with *-hp-* 809B carriage. Section and connector VSWR 1.04 to 8,000 mc. 50 ohm impedance, negligible slope. Type N connectors, \$200.00.



-hp- 417A VHF Detector for use with 803A Bridge; or general laboratory use. Super-regenerative receiver, 10 to 500 mc. 5 bands. Approx. 5 μ v sensitivity over entire band. Direct reading frequency control, thoroughly shielded. \$200.00.



-hp- 415A Standing Wave Indicator for all waveguide or coaxial slotted sections. Gives direct readings in VSWR or db. Single frequency operation; 300 to 2,000 cps. Low noise level, 0.3 μ v sensitivity, 60 db calib. attenuator. \$200.00.



-hp- 476A Universal Bolometer Mount measures rf power 10 to 1,000 mc. No tuning or adjustment. VSWR less than 1.15, 20 to 500 mc; 1.25, 10 to 1,000 mc. \$125.00. *-hp-* 475B Tunable Mount, continuous 1,000 to 4,000 mc. \$200.00.

| Instrument | Primary Uses | Frequency Range | Characteristics | Price |
|--|---|--|--|----------|
| <i>-hp-</i> 360A-D Low Pass Filters | Eliminates harmonic voltages from UHF systems | Cutoff frequencies A-700 mc. B-1,200 mc. C-2,200 mc. D-4,100 mc. | 50 db rejection at 1.2 cutoff freq. | \$ 50.00 |
| <i>-hp-</i> 415A Standing Wave Indicator | VSWR indicator or null indicator | 300 to 2,000 cps. Normal freq. 1,000 cps | 0 to 60 db attn. Max. sensitivity 0.3 μ v | 200.00 |
| <i>-hp-</i> 417A VHF Detector | VHF bridge detector (for <i>-hp-</i> 803A) | 10 to 500 mc | Approx. 5 μ v sensitivity | 200.00 |
| <i>-hp-</i> 430B Microwave Power Meter | Measurement of rf power | Depends on Bolometer mount | .01 to 10 mw \pm 5% accuracy | 250.00 |
| <i>-hp-</i> 475B Tunable Bolometer Mount | Measurement of rf power (with 430B) | 1,000 to 4,000 mc | Matches 50-ohm line to 100 or 200 ohms | 200.00 |
| <i>-hp-</i> 476A Universal Bolometer Mount | Measurement of rf power (with 430B) | 10 to 1,000 mc | No tuning required VSWR less than 1.25 | 125.00 |
| <i>-hp-</i> 803A VHF Bridge | Measurement of VHF impedance, VSWR | 50 to 500 mc | 2 to 2,000 ohms impedance -90° to $+90^\circ$ phase angle | 495.00 |
| <i>-hp-</i> 805A Coaxial Slotted Section | Measurement of VSWR | 500 to 4,000 mc | For Type N Connectors, flexible cables | 475.00 |
| <i>-hp-</i> 805B Coaxial Slotted Section | Same as above | Same as above | For rigid $\frac{7}{8}$ " RG44/U line | 475.00 |
| <i>-hp-</i> 806B Coaxial Slotted Section | Same as above (Mounts in 809B) | 3,000 to 12,000 mc | For Type N Connectors, flexible cables | 200.00 |
| <i>-hp-</i> 809B Universal Probe Carriage | Supports 806B section, also G, J, H, X and P 810 Waveguide sections | | Accepts 442B and 444A probes | 160.00 |

-hp- 809B UNIVERSAL PROBE CARRIAGE -hp- 810 WAVEGUIDE SLOTTED SECTIONS

Convenient, all-purpose *-hp-* 809B carriage operates with six different *-hp-* slotted sections, waveguide and coaxial. Mounts sections covering frequencies 3,000 to 18,000 mc—*sections interchange 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- 810A/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, 3.95 thru 18.0 kmc. *-hp-* S810A, 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.)

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

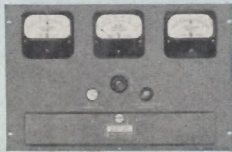
-hp- Frequency Measuring and Monitoring Equipment

-hp- 100D SECONDARY FREQUENCY STANDARD



Swift, sure frequency comparison, new convenience in standardizing with minimum external equipment. 100 μ sec time markers, built-in oscilloscope, sine or rectangular waves. Low output impedance; short-time stability 1/1,000,000. Performs most functions of expensive primary standards in audio, rf or supersonic ranges. \$600.00.

-hp- 335E TV MONITOR

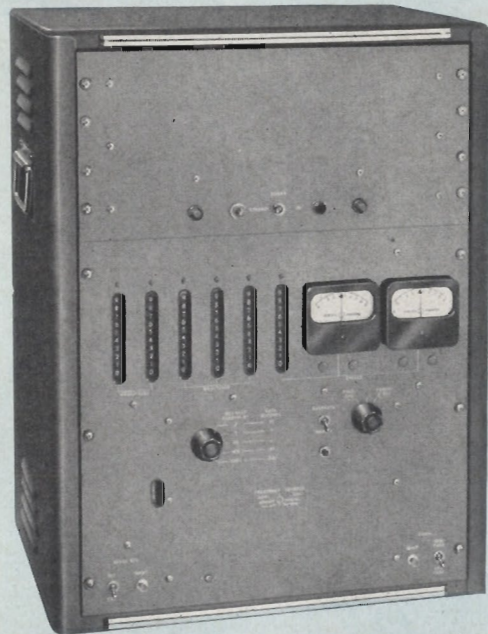


Channels 2 through 83. Exceeds F.C.C. requirements. Compact, only 12 $\frac{1}{4}$ " high, rack mounted. Low cost, all purpose, for visual and aural frequency monitoring, percentage aural modulation. Long-term dependability, precise accuracy, highest stability, no adjustment during operation. Forced ventilation, remote indication features. \$1,950.00.

-hp- 522B ELECTRONIC COUNTER



Compact, low cost, versatile instrument for frequency, period or time measurements. Range 10 cps to 100 kc. Reads direct in cps, kc, seconds or milliseconds. Count automatically reset, action repetitive. Stability of time base 5/1,000,000. Display length variable. Automatic illuminated decimal. Performs all functions without extra-cost modification. Easily used by untrained personnel. \$900.00.



| Instrument | Primary Uses | Frequency Range | Characteristics | Price |
|---------------------------------|---|---|---|-----------|
| -hp- 100C Secondary Standard | Audio, supersonic calibration | 100 kc, 10 kc, 1 kc, 100 cps | Accurate within $\pm .001\%$ Sine waves only | \$ 450.00 |
| -hp- 100D Secondary Standard | Frequency, time measurements | 100 kc, 10 kc, 1 kc, 100 cps, 10 cps | Stability 1/1,000,000 (short-time) Sine or rectangular output. Marker pips | 600.00 |
| -hp- 335B Frequency Monitor | FM broadcast station monitor | 88 to 108 mc | Frequency deviation ± 3 kc; accuracy $\pm .001\%$; modulation 0 to 100 kc | 935.00 |
| -hp- 335E TV Monitor | TV visual, aural and % mod. monitor | Channels 2 through 83 | Indicates visual, aural carrier frequency deviation, % modulation aural carrier | 1,950.00 |
| -hp- 500A Frequency Meter | Rapid frequency measurements | 10 cps to 50 kc | 10 ranges $\pm 2\%$ accuracy. Input 0.5 to 200 volts | 210.00 |
| -hp- 505A Electronic Tachometer | Measurements of high speed machinery | 600 to 3,000,000 rpm | 10 ranges $\pm 2\%$ accuracy | 300.00 |
| -hp- 505B Electronic Tachometer | Same as 505A | 10 to 50,000 rps | Same as 505A except calibrated in rps | 300.00 |
| -hp- 510A Mixer | Measure frequency continuously with -hp- 500A and 100 D/C | 20 cps to 200,000 cps | Mixes two frequencies, delivers difference to -hp- 500A | 200.00 |
| -hp- 512A Frequency Converter | Extends -hp- 524A range to 100 mc | 100 kc to 100 mc | Fast, direct readings of signals to 100 mc with 524A. No charts, interpolation. Min. input 0.01 v | 350.00 |
| -hp- 520A Decade Scaler | For counting high-rate pulses | Capacity 100 counts in 2 decades. 10,000,000 pps counting rate | 100:1 divider for operation of low speed scalars | 600.00 |
| -hp- 522A Electronic Counter | Wide-range frequency, period measurements | 10 cps to 100 kc | Frequency measuring gate time is 1 sec. or multiples; standard frequency counted for period measurement 100 kc | 775.00 |
| -hp- 522B Electronic Counter | Wide-range frequency, period, time interval measurements | 10 cps to 100 kc | Measures rate of occurrences 0.00001 to 100,000/sec.; time interval 10 μ sec to 27.8 hrs.; periods of frequency count 1/1,000, 1/100, 1/10, 1, 10 sec. and multiples. Direct readings in cps, kc, sec. and millisecc. | 900.00 |
| -hp- 524A Frequency Counter | Frequency, interval, time measurements | .01 cps to 10 mc | Direct reading, no interpolation, accuracy about 2/1,000,000/week | 2,000.00 |

Frequency measurement 0.01 cps to 100 mc . . . no computations or complex setups; usable by anyone!

-hp- 524A Frequency Counter. Measures instantly, automatically; presents results directly—determines any frequency 0.01 cps to 10 mc. Time of count 1/1,000, 1/100, 1/10, 1 or 10 seconds. Accuracy of measurement 2/1,000,000/week. For low frequency work, measures duration one cycle in μ sec, based on 10 cycle sample. Accuracy 0.03%. External standards usable if desired. Min. voltage of unknown, 1 v peak. Simple operation, easily used by untrained personnel. \$2,000.00.

-hp- 512A Frequency Converter. Operates with 524A Frequency Counter to extend counter's range from 10 mc to 100 mc. Makes possible fast, direct readings to 100 mc without interpolation, charts. Eliminates time-consuming setups, costly extra equipment. Operates *only* on 0.01 v input. Fundamental accuracy of -hp- 524A is maintained. \$350.00.

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-hp- Waveguide Test Equipment - 2.6 to 18 kmc

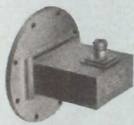
Basic, low-cost elements offer utmost flexibility for assembly of exact instrumentation required. Each unit covers entire range of its waveguide size. Simple, sturdy mechanical design; accurate, multi-purpose operation.

| Instrument | Coaxial Type N. Conn. | "S" 3" x 1 1/2" 2.6-3.95 kmc. | "G" 2" x 1" 3.95-5.85 kmc. | "J" 1 1/2" x 3/4" 5.85-8.2 kmc. | "H" 1 1/4" x 5/8" 7.05-10.0 kmc. | "X" 1" x 1/2" 8.2-12.4 kmc. | "P" .702" x .391" 12.4-18.0 kmc. |
|--|--------------------------|--|-------------------------------------|--|---|--------------------------------------|---|
| Adapters, Waveguide to Coax | | S281A \$75.00 | G281A \$55.00 | J281A \$50.00 | H281A \$45.00 | X281A \$35.00 | |
| Cover to choke flange | | S290A \$40.00 | G290A \$30.00 | J290A \$25.00 | H290A \$20.00 | X290A \$15.00 | P290A \$20.00 |
| Attenuators, Fixed 6, 10, 20 db | | S370 \$75.00 | G370 \$65.00 | J370 \$65.00 | H370 \$60.00 | X370 \$55.00 | P370 \$60.00 |
| Flap, 25 db max. | | S375A \$75.00 | G375A \$65.00 | J375A \$60.00 | H375A \$55.00 | X375A \$50.00 | P375A \$55.00 |
| Calibrated, precision | | S380A \$225.00 | | | | X382A \$250.00 | |
| Detector Mounts | 440A† \$85.00 | S485A‡ \$125.00 | G485B‡ \$95.00 | J485B‡ \$90.00 | H485B‡ \$85.00 | X485B‡ \$75.00 | |
| Frequency Meters, Reaction | | | | J530A \$120.00 | H530A \$120.00 | X530A \$120.00 | |
| Directional Couplers, Cross Guide: 20, 30 db | | S750 \$100.00 | G750 \$85.00 | J750 \$70.00 | H750 \$60.00 | X750 \$50.00 | |
| Directional Couplers, Multi Hole: 10, 20 db | | S752 \$210.00 | G752 \$170.00 | J752 \$140.00 | H752 \$120.00 | X752 \$100.00 | |
| Slotted Sections, Waveguide | | S810A* \$450.00 | G810B§ \$90.00 | J810B§ \$90.00 | H810B§ \$90.00 | X810B§ \$90.00 | P810B§ \$90.00 |
| Waveguide Tees, Series | | S840A \$60.00 | G840A \$50.00 | J840A \$40.00 | H840A \$35.00 | X840A \$30.00 | P840A \$35.00 |
| Shunt | | S841A \$60.00 | G841A \$50.00 | J841A \$40.00 | H841A \$35.00 | X841A \$30.00 | P841A \$35.00 |
| Hybrid | | S845A \$90.00 | G845A \$75.00 | J845A \$60.00 | H845A \$55.00 | X845A \$45.00 | P845A \$55.00 |
| Transformers, Slide Screw | | S870A \$150.00 | G870A \$140.00 | J870A \$135.00 | H870A \$130.00 | X870A \$125.00 | P870A \$130.00 |
| E-H | | S880A \$175.00 | G880A \$155.00 | J880A \$145.00 | H880A \$135.00 | X880A \$130.00 | P880A \$135.00 |
| Terminations, Low Power | | S910A \$45.00 | G910A \$40.00 | J910A \$35.00 | H910A \$30.00 | X910A \$25.00 | P910A \$30.00 |
| Terminations, High Power | | S912A \$125.00 | | | | X912A \$75.00 | |
| Moving Load | | S914A \$80.00 | G914A \$70.00 | J914A \$60.00 | H914A \$50.00 | X914A \$40.00 | P914A \$50.00 |
| Adjustable Shorts | | S920A \$80.00 | G920A \$70.00 | J920A \$65.00 | H920A \$60.00 | X920A \$50.00 | P920A \$55.00 |
| Broad Band Probe | 442B \$50.00 | | | All Frequencies | | | |
| Broad Band Probe, Untuned | 444A \$50.00 | | | All Frequencies | | | |

†For use with bolometer or crystal. ‡For use with bolometer only. *Complete assembly including carriage. §Mounts in 809B Carriage—See next page.

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

-hp- 281A WAVEGUIDE-COAX 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.

-hp- X382A PRECISION ATTENUATOR



Precision broad band attenuation to 50 db. Completely independent of frequency; phase shift constant all attenuations. Calibrated range 0 to 50 db, maximum error $\pm 2\%$ of db reading. Range 8,200 to 12,400 mc. VSWR less than 1.15 full range. Radical new design with rotating attenuator films.

-hp- 375A FLAP ATTENUATORS



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

-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.

-hp- 870A SLIDE SCREW TUNERS



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

-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- 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 if energy using 1N21 or 1N23 crystal. Semi-tuned by movable short to VSWR 1.25.

-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 for carriage details.)

-hp- 914A MOVING LOAD



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

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

Instruments for Complete Coverage



ELECTRONIC TEST INSTRUMENTS

Other -hp- precision instruments

-hp- POWER SUPPLIES

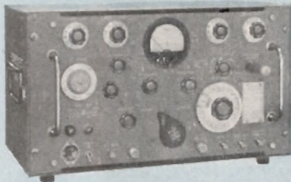


-hp- 715A (illustrated) is a versatile source of regulated beam and reflector voltage for operating most test bench klystron tubes. Beam voltage 250 to 400 v; reflector voltage 0 to 900 v; 6.3 v filament. Internal, 1,000 cps square wave modulation, also 60 cps fm modulation, both on reflector voltage. \$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 1/2% 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. Rf output .223 v max. High stability attenuator reduces level by 100 db. May be pulsed or fm modulated. Separate section

measures external rf power or external frequency. Ideal one-piece unit for 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. Three klystrons available (each with 600 mc band width) 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- AMPLIFIERS

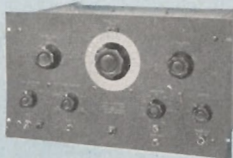


Complete instrumentation for distortion-free fast pulse measurement. **-hp- 460A Wide Band Amplifiers**, in cascade with **-hp- 460B Fast-Pulse Amplifiers** offer up to 90 db gain, 125 v open circuit output. This permits full deflection of 5XP CRT, or 2-inch deflection of 5CP tubes. Rise time 0.0026 μ sec; can amplify milli-microsecond pulses; gives over 100 mc bandwidth to your standard oscilloscope. 460A, \$185.00; 460B, \$225.00. Connecting cables, plugs, accessories—prices on request.

-hp- 450A Amplifier—general purpose instrument, 20 db or 40 db gain, for use wherever wide frequency range and high stability are needed. 10 cps to 1 mc. Negligible phase shift, no spurious responses. \$140.00.

-hp- 451A Bridging Amplifier. For connecting to high impedance circuits without disturbing circuits or affecting operating conditions. 83 megohms impedance probe readily connects to any point in circuit. Amplifier repeats this voltage accurately, without distortion, for operation of VTVM, distortion analyzer, oscilloscope, etc. Frequency 20 cps to 1 mc. \$100.00.

-hp- 212A PULSE GENERATOR



Provides continuously variable, high power "fast pulses" of superior wave form. Combines broad general usefulness with 0.02 μ sec rise and decay time to meet requirements of radar, TV and nuclear work. Pulse length variable 0.07 to 10 μ sec; 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 pps; controlled internally or externally. Synchronizing pulses available in advance of, or following, output pulse. \$550.00.

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