1960
(REVISED)
SHORT FORM CATALOG

HEWLETT-PACKARD COMPANY
PALO ALTO  CALIFORNIA
This revolutionary new sampling oscilloscope gives you fatigue-free viewing of repetitive short pulses requiring a bandwidth up to 1000 MC. The 3 db point is beyond 800 MC. A rise time of less than 0.45 nsec permits observation and measurement of fast phenomena. Bright, traces are provided even at repetition rates of 50 cps.

Dual Trace Amplifier
Model 187B Dual Trace Amplifier (plug-in) permits observation and comparison of two high speed phenomena simultaneously, or highly accurate time measurements. Both channels have independent sensitivity and positioning controls; may be used separately. Vertical sensitivity is 10 mv/cm to 200 mv/cm; vernier increases sensitivity to 3 mv/cm. Dynamic range is wide; 3 rvn to 2 v peak. New-design 100,000 ohm probes minimize circuit loading.

0.1 m/sec/cm to 100 m/sec/cm
Horizontal sweep speeds range from 0.1 nsec/cm (with expander) to 100 nsec/cm. Delayed sync pulse (on front panel) is available for triggering circuits under test. X-Y recorder output permits permanent records of high-speed phenomena. Other features: time and amplitude calibrators, beam finder, traditional panel arrangement.

Wide Variety of Accessories
A wide range of accessories is available for the 185A and 187B, including BNC adaptors, Type N adaptors, T connectors, capacitive and resistive dividers, coaxial loads, blocking capacitors, delay lines, sync take-offs, synchronizing trigger units—all designed to increase overall versatility of the scope and dual-trace plug-in.

Typical Measurements
Model 185A is particularly useful in measuring transistor response time, memory-unit and diode switching time, determining pulse jitter and analyzing and comparing millimicrosecond signal components. @ 185A, $2,000.00; @ 187B, $1,000.00.

NEW!

185A - dc to 1,000 MC

160B - dc to 15 MC

170A - dc to 30 MC

150A - dc to 10 MC

Model 150A is intended as the most broadly useful, convenient high quality 10 MC scope offered. A variety of plug-ins (see below) provide dual trace or differential input, or high amplification eliminating pre-amplifiers on input from most transducers.

Automatic Trigger
Sweep Range 0.02 μsec/cm to 15 sec/cm; 24 sweeps 0.1 μsec/cm to 5 sec/cm, 3% accuracy. Internal, line voltage or external triggering, pos. or neg. slopes. Has sweep magnifier, vernier; horizontal amplifier; sensitivity 200 mv/cm to 15 v/cm. Vertical amplifier dc to 10 MC, optimum transient response and rise time less than 0.035 μsec. Calibrating voltages, 1 KC square wave, 0.2 mv to 100 v peak, accuracy 3%. $1,300.00.

150A Accessories

154A Voltage/Current Dual Channel Amplifier (above) permits simultaneous measurement, observation of voltage and current. Current range is 1 ma/cm to 1 a/cm from 50 cps to 8 MC. Voltage range is 50 mv/cm to 20 v/cm from dc to 10 MC. $430.00. 153A Very High Gain Amplifier permits many measurements direct from transducer without preamplification. Maximum sensitivity is 1 mv/cm and bandpass is dc to 500 KC. $150.00. 152B Dual Trace Differential Amplifier switches electronically between A, B channels to provide simultaneous viewing of two voltages. Channels may be used separately or for differential input, dc to 10 MC. Maximum sensitivity is 50 mv/cm. $250.00. 151B High Gain Amplifier provides 5 mv/cm sensitivity, dc to 10 MC. $200.00.

Data subject to change without notice. Prices f. o. b. factory.
**quality oscilloscopes—dc to 1,000 MC!**

**130B/BR - dc to 300 KC**

Termed the finest low frequency oscilloscope ever offered, 130B/BR combine big scope performance and single dependability with 1 mv sensitivity and the convenience of "universal" automatic trigger, and direct reading simple controls.

**Similar X and Y amplifiers**

Models 130B/BR have similar horizontal and vertical amplifiers with sensitivity 1 mv/cm to 125 v/cm. Input circuits are balanced on the 6 most sensitive ranges; single ended input dc or ac coupled. 21 sweep times may be directly set, instrument sweeps 1 μsec/cm to 12.5 sec/cm, triggering is internally, by line power, or externally by 0.5 v or greater. Includes x 5 magnifier for all internal sweeps increasing fastest sweep time to 0.2 μsec/cm. 130B (cabinet) or 130BR (rack) $650.

**122A/AR - Dual Trace**

Model 122A/AR is a dual trace, 200 KC oscilloscope providing two separate traces for simultaneous study; single trace available when desired. Twin vertical amplifiers, alternate and chopped presentation, differential input, automatic syncing and x 5 sweep expansion. Ideal for direct comparison of filter, amplifier, output/input or with vibration testing apparatus.

**Sweeps 5 μsec/cm to 200 msec/cm**

15 calibrated sweeps; vernier extends slow sweep to 0.5 sec/cm, expander extends fast sweep to 1 μsec/cm. Automatic trigger; manual override sets trigger between + 10 and −10 v. Vertical amplifiers dc to 200 KC (dc coupled) or 2 cps to 200 KC (ac coupled). Sensitivity 10 mv/cm to 100 v/cm. Horizontal amplifier same bandwidth as vertical, sensitivity 0.1 v/cm to 100 v/cm. 122A (cabinet) or 122AR (rack mount), $675.00.

**120A/AR - dc to 200 KC**

Ideal for industrial or production line work as well as daily lab jobs, Model 120A/AR is outstanding in both value and "big scope" performance features. This instrument covers DC to 200 KC, has the universal trigger circuit. Also offers automatic synchronization on any internal or external voltage including line power.

**Sweeps 1 μsec/cm to 0.5 sec/cm**

Features include 15 calibrated sweeps in 1-2-5 sequence, sweep speeds range 5 μsec/cm to 0.5 sec/cm, "times-5" sweep expansion on all ranges, high sensitivity calibrated vertical amplifiers. All power supplies are regulated for steady, drift-free traces. Automatic trigger and base line. Bright, clear trace for photographic transients. Extra compact Model 120AR is only 7" high. Utmost dependability, rugged construction. 120A (cabinet) or 120AR (rack), $450.00.

**NEW! Low Capacity Probes**

**AC-1158 Oscilloscope Testmobile.** For oscilloscopes, 4" rubber tired wheels, heavy chrome tube construction, tilts scope to 30° in 7½° increments, folds for storage, shipping. $85.00.

**AC-21 series probes available for use with oscilloscopes include the AC-21A, 10:1 division, $30.00; AC-21C, 50:1 division, $30.00; AC-21F current probe, 1 mv/ma, $100.00; AC-21J, $9.00. Probes may be used with 120A, 122A, 130B, 150A, 160B and 170A oscilloscopes.**
Hewlett-Packard now offers 12 high quality, fast and accurate oscillators, each an exceptional value and each engineered to do a specific job best. Each incorporates the famous resistance-capacity circuit pioneered by @. This circuit makes possible instruments that are highly stable, wide range, compact and portable; instruments that are extremely simple to operate and require no tedious reset or adjustment during operation.

### 200CD Audio Oscillator

This wide range oscillator, 5 cps to 600 KC, spans the range from sub-sonic to radio frequencies, covered in five overlapping decade bands. Accurate frequency setting on the large easy-to-read dial is provided by 85 dial divisions. Distortion rating is less than 0.5% below 500 KC. Output waveform purity is independent of load. @ 200CD, $195.00

### 200AB Audio Oscillator

Useful for audio tests, the versatile @ 200AB Oscillator covers its range, 20 cps to 40 KC, in four overlapping decade bands. Like the @ 200CD it has highest stability and accurate tuning circuits. Low impedance operating levels plus superior insulation guarantee long years of trouble-free dependability. Operation is simple; just three controls; no zero setting necessary. @ 200AB, $165.00.

### 202A Function Generator

Compact, multi-purpose source of transient-free test voltages from 0.008 cps to 1,200 cps. Continuously variable through 5 bands; offers exceptional stability (within 1%) and distortion less than 1% to 100 cps. Sine, square or triangular waves may be selected by a front panel switch; the 30 volt output peak-to-peak is constant for all wave forms and over full frequency range. @ 202A, $550.00△.

### 650A Test Oscillator

Covering 10 cps to 10 MC, @ 650A is a highly stable, wide band instrument for audio, super-sonic, video and rf measurements. Output is flat within 1 db full range; voltage range is 0.00003 to 3 v. In addition to 600 ohm impedance, voltage divider provides a 6 ohm impedance. Distortion less than 1% to 100 KC. $550.00△.

### Distortion, Wave Form Analyzers – 20 cps to 50 KC

#### 302A Wave Analyzer

Completely transistorized, advanced instrument provides direct, accurate wave component measurement without calibration or stabilization. 20 cps to 50 KC, hum free, needs no warmup, very sharp acceptance circuits plus AFC. May be battery operated (18 to 28 volts). $1,800.00△.

**NEW!** @ AC-97C Sweep Drive

@ AC-97C motor accessory converts @ 302A to a sweep oscillator-tuned voltmeter for automatic frequency response measurements. Mounts on 302A or adjustable bench stand. Sweeps all or any part of the 367A range automatically; has fast sweep for covering frequency spectrum rapidly, slow sweep for high resolution plot. @ AC-97C, $275.00.

### Instrument Primary Uses Frequency Range Output Price

<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>-hp- 302A</td>
<td>Wave form analysis</td>
<td>20 cps to 50 KC</td>
<td>Direct reading, no</td>
<td>$1,800.00△</td>
</tr>
<tr>
<td>-hp- 330B</td>
<td>Measures total audio</td>
<td>20 cps to 20 KC</td>
<td>Includes input amplifier, VTVM</td>
<td>450.00△</td>
</tr>
<tr>
<td>-hp- 330C</td>
<td>For FM broadcast</td>
<td>20 cps to 20 KC</td>
<td>Special VU meter to</td>
<td>475.00△</td>
</tr>
<tr>
<td>-hp- 330D</td>
<td>For AM, FM broadcast</td>
<td>20 cps to 20 KC</td>
<td>AM detector and VU meter to meet F.C.C. requirements</td>
<td>525.00△</td>
</tr>
</tbody>
</table>

△ Rack mounted instruments $15.00 less.

www.HParchive.com
218AR Digital Delay Generator

219A Dual Trigger Unit
This plug-in drawer for 218AR supplies trigger pulses of positive polarity, 50 volts, 0.1 μsec rise time from a 50-ohm source. Pulse A occurs at T₀ or T₁, as selected by a switch; Pulse B is triggered at T₂.

219B Dual Pulse Unit
This plug-in drawer for 218AR produces two high-power pulses which are continuously adjustable in width, 0.2 to 5 μsec and in amplitude from 0 to 50 volts, positive or negative polarity. The leading edge of these pulses can be set to occur at the beginning or end of the selected time interval. Both pulses are brought out to separate front panel jacks but may be switched to a common jack with no change in level or output impedance.

219C Digital Pulse Duration Unit
This plug-in drawer for 218AR produces a high power output pulse whose delay and duration are digitally controlled. The pulse is available in both polarities simultaneously, and is continually adjustable in amplitude up to at least 15 volts from a 90-ohm source. It may also be obtained from a directly coupled 500-ohm source with an amplitude of at least 90 volts.

Square Wave and Pulse Generators

212A Pulse Generator
Provides continuously variable, high-power “fast pulses” of superior wave form. Combines broad general usefulness with 0.02 μsec rise and decay time to meet requirements of radar, TV and nuclear work. Pulse length variable 0.07 to 10 μsec; 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 pulse available in advance of, or following output pulse. $600.00 (cabinet), $585.00 (rack mount).

211A Square Wave Generator
Versatile, wide range instrument for testing oscilloscopes, networks, video and audio amplifier performance, modulating signal generators and measuring time constants. Offers simple control of electronic switches; is also convenient for indicating phase shift, frequency response, transient effects. Two separate outputs (a) 3.5 volts into 75 ohm circuit for TV work; (b) 27 volts into 600 ohm output for high level work. Output amplitudes independently controlled. Instrument operates free-running or externally synchronized with positive going pulse or sine wave of 5 volts minimum amplitude. $325.00 (cabinet), $330.00 (rack mount).

Model 218AR Digital Delay Generator is applicable to many types of timing measurements including calibrating the range-determining circuits of radar receivers, etc. The generator is built to rigid standards and is suitable for military use. It provides two precision time intervals or pulse delays, either of which are independently adjustable from 1 to 10,000 microseconds in 1 microsecond steps. These time intervals are accurate to within 0.1 microsecond ±0.001% of the selected value, and may be initiated from an internal multivibrator, 10 cps to 10 KC, or from an external rate generator, 0 cps to 10 KC. Total jitter does not exceed 0.02 microseconds in either case. The instrument also provides a 50-volt synchronizing output pulse at the beginning or end of a time interval, and a 1 microsecond timing comb output at the front panel.

No count ambiguity
A unique feature of the 218AR is its time base, a pulsed crystal controlled oscillator. The oscillator starts at T₀ and stops at the last output pulse. This eliminates the “plus-or-minus-1” count ambiguity of many counter circuits in such application.

Model 218AR is a completely self-contained instrument, requiring only one or more 219 series plug-ins to perform a broad variety of time and delay generation measurements. Simplicity and flexibility are increased by the large variety of output signals provided by the plug-in units. The instrument is particularly compact and well-designed; etched circuits and the use of plug-ins materially increase circuit accessibility.

The instrument’s power supplies are fully regulated to avoid effects of line voltage variations. It is available as 218AR, rack mount. $2,000.00.

WWW.HPARCHIVE.COM
**NEW! 411A 1 KMC Millivoltmeter**

Millivolt sensitivity and two easy-reading linear voltage scales in 1-to-3 ratio make the all-new 411A perhaps the most widely used voltmeter you have ever seen. Measure 10 μV to 10 v full scale, 500 KC to 1 KMC; get usable indications to 4 KMC. Db scale gives readings from –40 to +35 db for convenient gain measurement. Free probe tips meet all measurement requirements. Galvanometer recorder output. Unique photoelectric chopper gives new standard of noise-free, drift-free low voltage readings. 411A (with one probe tip), $450.00.

**425A Microvolt-Ammeter**

High sensitivity, high stability microvolt meter reading end scale voltages of 10 μV to 1 v in 11 ranges. Also reads currents of 10 μA to 3 mA in 18 steps, 1-3-10 sequence. Accuracy ±3% on all ranges. Drift is less than 4 μV per day referred to input terminals. Input impedance 1 megohm ± 3% on all voltage ranges. Instrument can also be used as a 100 db amplifier providing up to 1 v output from signals as small as 10 μV. Amplifier ac rejection is at least 3 db at 0.2 cps and 60 db at 60 cps and above. $500.00 (cabinet), $505.00 (rack).

**403A Transistorized AC Voltmeter**

Battery-operated, portable, weighs less than 5 lbs., transistorized, covers 1 cps to 1 MC and 100 μV to 300 v rms (max. full scale sensitivity 1 μV). Also reads db direct from –72 to +52 db. 400 hours battery life (6 mos. average use). Noise less than 30 KC, ±3% to 1 MC. Input impedance 2 megohms; 1 KMC; get usable indication even on all but lowest range. Accuracy ±3% to 500 KC, ±3% to 1 MC. Input impedance 2 megohms; high overload capacity. $275.00.

**405BR/CR Automatic DC Digital Voltmeter**

Literally “touch-and-read” measuring speed. Automatic range, polarity selection, covers 0.001 v to 1,000 v (accuracy ± 0.2% of reading ± 1 count). New novel circuitry provides a stability of readings virtually eliminating jitter in the last digit. Floating input, analog-to-digital conversion, and, on 405CR, digital recorder output and front panel switch to hold ranges. Just 7" high! 405BR, $850.00. 405CR, $925.00.

**428A Clip-On DC Milliammeter**

Radical approach to current measurements means no breaking leads, no dc connections, no soldering. "Current transformer" probe clamps around wire, measures by sampling magnetic field around the wire. Measures dc current in presence of strong ac. Covers 0.3 ma to 1 amp; accuracy ± 3%. $500.00 (cabinet), $505.00 (rack).

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**456A AC Current Probe**

Permits measurement of current on indicating meters such as 400D, 400H, 400L below or oscilloscopes. New "current" probe clamps around wire under test, needs no physical connection, does not load circuit. Range 1 ma to 2 amps peak, accuracy ± 1% at 1 KC, response ± 2%, 100 cps to 3 MC, ±5%, 60 cps to 4 MC, –3 db at greater than 20 MC. $190.00.

**410B Vacuum Tube Voltmeter**

All-purpose test instrument, range, 20 cps to 700 MC. Also serves as dc VTVM with 12 megohms resistance, or ohmmeter for measurements 0.2 ohms to 500 megohms. Input capacity 1.5 μF, 10 megohms input resistance. $245.00 (cabinet), $265.00 (rack).

**400 Series Voltmeters**

Offers three series 400 voltmeters, each covering 10 cps to 4 MC. 400D offers 2% accuracy, 0.001 v full scale, 0.6 μF, 10 megohms input resistance. 400D offers 1% accuracy 0.001 v, 10 megohms input resistance. 400L has true log voltage scale, 5" linear db scale, 100 db range ac, 100 db range dc. $375.00.

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**Instruments and Measurements**

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Primary Uses</th>
<th>Frequency Range</th>
<th>Voltage or Current Range</th>
<th>Input Impedance</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>-hp- 400D</td>
<td>Wide range ac measurements High sensitivity</td>
<td>10 cps to 4 MC</td>
<td>0.001 to 300 v 12 ranges</td>
<td>10 megohms 15 μF shunt</td>
<td>$250.00</td>
</tr>
<tr>
<td>-hp- 400H</td>
<td>High accuracy wide range measurements</td>
<td>10 cps to 4 MC</td>
<td>0.001 to 300 v 12 ranges</td>
<td>10 megohms 15 μF shunt</td>
<td>$325.00</td>
</tr>
<tr>
<td>-hp- 400L</td>
<td>Log voltages, linear db measurements</td>
<td>10 cps to 4 MC</td>
<td>0.001 to 300 v 12 ranges</td>
<td>10 megohms 15 μF shunt</td>
<td>$325.00</td>
</tr>
<tr>
<td>-hp- 403A</td>
<td>Battery-operated portable type, almost accurate, hum-free ac measurements</td>
<td>1 cps to 1 MC</td>
<td>0.001 to 300 v 12 ranges</td>
<td>2 megohms 40, 20 μF shunt</td>
<td>$275.00</td>
</tr>
<tr>
<td>-hp- 405</td>
<td>Direct, automatic voltage measurement, Recorder output, automatic polarity</td>
<td>dc</td>
<td>0.001 v to 1,000 v (accuracy ±0.2% of reading ± 1 count)</td>
<td>11 megohms to dc</td>
<td>See below</td>
</tr>
<tr>
<td>-hp- 410B</td>
<td>Audio, rf, VHF measurements, db voltages, resistances</td>
<td>dc/ac-20 cps to 700 MC</td>
<td>1.0 to 300 v 7 ranges</td>
<td>dc-12 megohms; ac-10 megohms/15 μF</td>
<td>$245.00</td>
</tr>
<tr>
<td>-hp- 411A</td>
<td>Millivolt, db readings to kilocycle range</td>
<td>5 KC to 1 KMC</td>
<td>10 mv to 1 v, 7 ranges</td>
<td>—</td>
<td>$450.00</td>
</tr>
<tr>
<td>-hp- 412A</td>
<td>Precision voltage, current resistance measurements</td>
<td>dc</td>
<td>1 mv to 1,000 v 1 μA to 1 amp</td>
<td>10 to 200 megohms, depending on range</td>
<td>$400.00</td>
</tr>
<tr>
<td>-hp- 425A</td>
<td>Read μv, μA, 100 db amplifier; medical, biological, physical, chemical</td>
<td>dc voltages as 100 db amplifier</td>
<td>10 μV to 1 v 11 ranges</td>
<td>1 megohm ± 3%</td>
<td>$500.00</td>
</tr>
<tr>
<td>-hp- 428A</td>
<td>Clip-on milliammeter eliminates direct connection, circuit loading</td>
<td>dc</td>
<td>0.3 ma to 1 amp, 6 steps, ±3% accuracy</td>
<td>—</td>
<td>$500.00</td>
</tr>
<tr>
<td>-hp- 456A</td>
<td>Current measurements on meters, scopes</td>
<td>60 cps to 4 MC</td>
<td>1 ma to 1 amp rms</td>
<td>—</td>
<td>$190.00</td>
</tr>
<tr>
<td>-hp- 738AR</td>
<td>Voltmeter Calibrator</td>
<td>dc pos. or neg. 400 cps sine wave</td>
<td>300 μv to 300 v</td>
<td>Works into 3 to 10 megohms</td>
<td>$875.00</td>
</tr>
<tr>
<td>-hp- 739AR</td>
<td>Frequency response test set</td>
<td>300 KC to 10 MC (*% cws with -hp- 205SR)</td>
<td>3 v output</td>
<td>—</td>
<td>$525.00</td>
</tr>
</tbody>
</table>

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**WWW.HPARCHIVE.COM**
6 PLUG-IN UNITS INCREASE FLEXIBILITY, USEFULNESS

**hp 524C Precision Electronic Counter**

Bright, big-number readout
Stability 3 parts in $10^8$ short-term
Direct, fast, automatic readings
Covers frequencies 10 cps to 500 MC*  
Measures time interval 1 μsec to 100 days
Measures period 0 cps to 100 KC
Resolution 0.1 microseconds
No calculation or complex setup
Easily used by non-technical personnel
High sensitivity, impedance, reliability

* With proper plug-ins.

**524C** permits you to buy only the basic counting facilities you need now—later on add inexpensive plug-ins to triple and quadruple the usefulness of your counter.

The basic **524C** reads frequency 10 cps to 10.1 MC over any of 5 selected intervals; period from 0 to 100 KC. Display time is variable, counts are automatically reset, action is repetitive, readings are direct without calculation or interpolation; an automatic illuminated decimal point is included.

The instrument is of highest quality throughout and employs a military design approach. **524C**, less plug-ins, $2,400.00 (cabinet); $2,375.00 (rack mount). **524C** also offers Model 524D, similar but with 8 vertical readout units, at lower price.

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<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- 524C Frequency Converter</td>
<td>Frequency, period measurements</td>
<td>10 cps to 10.1 MC (Freq.) 0 cps to 100 KC (Period)</td>
<td>Direct reading, no interpolation; stability 5/10 per wk</td>
<td>$2,400.00</td>
</tr>
<tr>
<td>-hp- 524D Frequency Counter</td>
<td>Frequency, period measurements</td>
<td>10 cps to 10.1 MC (Freq.) 0 cps to 100 KC (Period)</td>
<td>Direct reading, no interpolation; stability 5/10 per wk</td>
<td>$2,150.00</td>
</tr>
<tr>
<td>-hp- 525A Frequency Converter</td>
<td>Extends 524 range to 100 MC; increases basic sensitivity</td>
<td>100 KC to 220 MC</td>
<td>Accuracy same as basic counter; 0.1 v rms min. input</td>
<td>250.00</td>
</tr>
<tr>
<td>-hp- 525B Frequency Converter</td>
<td>Extends 524 range to 220 MC; high sensitivity</td>
<td>220 MC to 500 KC</td>
<td>Accuracy same as basic counter; 0.2 v rms min. input</td>
<td>300.00</td>
</tr>
<tr>
<td>-hp- 525C Frequency Converter</td>
<td>Extends 524 range to 500 MHz; high sensitivity</td>
<td>500 MHz to 10.1 MC</td>
<td>Accuracy same as basic counter; min. input: 20 mv rms, 50 KC to 10.1 MC; 100 mv rms, 100 to 500 MC</td>
<td>425.00</td>
</tr>
<tr>
<td>-hp- 526A Video Amplifier</td>
<td>Increases 524 sensitivity to 10 millivolts</td>
<td>10 cps to 10.1 MC</td>
<td>Accuracy same as basic counter; 10 mv rms min. input</td>
<td>200.00</td>
</tr>
<tr>
<td>-hp- 526B Time Interval Unit</td>
<td>Measures interval 1 μsec to 100 days</td>
<td>1 μsec to 10 sec</td>
<td>Accuracy ± 1 count ± 524 stability</td>
<td>200.00</td>
</tr>
<tr>
<td>-hp- 526C Period Multiplier</td>
<td>Period measurement</td>
<td>Extends range of 524 to measure 10,000 periods</td>
<td>Greater accuracy in period measurement</td>
<td>225.00</td>
</tr>
</tbody>
</table>

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## Rack mounted instrument $25.00 less.

WWW.HPARCHIVE.COM
NEW! @ 103AR Quartz Oscillator

Completely transistorized oscillator offering short term stability better than 2 parts in 10^9 averaged over 1 sec. intervals; long term stability, 5 parts in 10^10 per day. Provides 1 MC and 100 KC sine wave, output from low impedance source for distribution over 50-ohm systems. Furnishes separate 100 KC output for driving 113AR for time comparison measurements and generating time signals. $2,500.

@ 113AR Clock

Precision instrument for adjusting frequency standards, and comparing high stability oscillators and time signals with WWV, 10 gsec resolution (equals 1/10 stability over 24 hours). Provides essentially jitter-free 1 second tick output. Meets MIL-E-16400 for operation in extreme environment. Input voltage 0.5 to 5 v rms, 100 KC; input impedance 300 ohms. Transistorized; operates from 724AR Standby Power Supply or 24 v dc. $2,500.

@ 100E Frequency Standard

Stability of 5/10^9 is satisfactory in most applications formerly requiring primary standard. Multiple outputs include 6 sine and 4 pulse signals, plus timing comb. Includes built-in scope for Lissajou comparisons. Rated load 50 ohms at 1 MC and 100 KC; 5,000 ohms at lower frequencies. $925.00.

@ 500B/C Frequency Meters

Directly measures frequency of voltages 3 cps to 100 KC; expanded scale allows any 10% or 50% of range to be measured full scale. Sensitivity 0.2 v rms, 1 v peak for pulses. Input impedance 1 megohm with 40 pf shunt. 500A calibrated in cps, 500C calibrated in rpm. 500B/C, $300.00, (cabinet), $305.00 (rack mount).

@ 521 Industrial Counters

521 measure frequency, random events per unit of time; with transducers also measures rps, speed, weight, pressure, etc. 521A range 1 cps to 120 KC (4 places), accuracy ± 1 count ± accuracy of power line frequency (usually ± 0.5%), input min. 0.2 v rms; input attenuator adjusts sensitivity 0.2 to 100 v rms, input impedance 1 megohm with 50 pf shunt. 521C same as 521A except has crystal controlled time base and 5 places. 521D same as 521A except has in-line readout. 521E similar to 521C but has 5-place, in-line readout. 521G similar to 521A but measures to 1.2 MC (3 places). Prices: see above table.

@ 522 Electronic Counter

Compact, low cost, versatile instrument for frequency, period or time measurements. Measures frequency 10 cps to 120 KC, time interval 10 psec to 10^9 sec. Reads directly in cps, KC, seconds or milliseconds. Count automatically resets, action repetitive. Stability of time base 1/100,000/week. $915.00.

@ 523C/D Electronic Counters

All-purpose counter measuring frequency 10 cps to 1.2 MC, time interval 1 psec to 27.8 hours, period 0.00001 cps to 100 KC. Stability 2/1,000,000 per week. Results displayed in sec, msec, µsec or KC; automatic decimal. Display time variable 0.1 sec to 10 sec or indefinitely. Accuracy ± 1 count plus crystal stability, 5 gate times. Usable with 100 KC primary standard. Pulse output for Z-axis oscilloscope modulation. 523D similar but has neon numeral column readout. 523C $1,575.00; 523D, $1,310.00.
**Transfer Oscillator**

Measure frequency to 18.0 KMC quickly, easily, with electronic counter accuracy. Avoid guesswork, end “trial and error,” eliminate expensive setups. Measure on pulsed, AM, FM, CW and noisy circuits.

**New Mixers**

Just two instruments—Model 540B Transfer Oscillator and a 524 series electronic counter, (with plug-ins) are all the equipment you need to measure unknown frequencies up to 12.4 KMC swiftly and accurately. This simple, two instrument setup is particularly useful for quick CW and AM frequency measurement, FM center frequency and deviation checks, and frequency of high-noise signals. Frequencies of pulsed signals can be measured using an external oscilloscope. Overall accuracy is better than 10 times that of the best microwave wavemeters; and on clean CW signals, is about 1/1,000,000.

**Brief Specifications, 540B**

- Oscillator Freq. Range: 100 to 220 MC.
- Harmonic Freq. Range: Up to 12.4 KMC.
- Stability: Better than 0.002%/minute.
- Output: 2 volts into 50 ohms.
- Amplifier Gain: 40 db max. 1 v output.
- Oscilloscope: 100 cps to 200 KC; vert. sens. 5 mv rms/inch.
- Price: $850.00.

**560A/561B Digital Recorder, 570A/571B Digital Clock**

Model 560A, which operates from a single-line voltage coded decimal, is normally furnished with 6 plug-in comparators for 6-digit presentation; additional comparators may be plugged in at any time.

561B Digital Recorder requires 10-line coded decimal entry with separate connection for each position of each print wheel so that the instrument may be operated from the 405AR Digital Voltmeter, In-Line Frequency Counters or relays, stepping switches and beam switching tubes.

570A (shown installed) and 571B Digital Clocks mount in the left-hand side of 560A and 561B respectively, and add time-of-day information to other recorded data. These clocks can also control rate at which measurements are made.

In-Line, 6-place numeric readout; maximum 23 hours, 59 minutes, 59 seconds. Operates from internal or external time base.

Prices: 560A (with 6 comparators), $1,325.00; 561B, $1,150.00; 570A (fits 560A), $1,050.00; 571B (fits 561B), $950.00.

**NEW! 565A Digital Printer**

565A is a fast 11-column digital printer for use in custom systems. This compact printer can be driven by a wide variety of methods; is useful as an output device in computer and data handling systems, as well as other systems involving electronic counters, mechanical counters with electrical output, stepping switches, relays, beam switching tubes, other digital devices. Parallel data entry, prints 5 lines per second maximum. 565A, $640.00.

Δ Rack mounted instrument $15.00 less.

WWW.HPARCHIVE.COM
Microwave Impedance Measuring Equipment

**416A Ratio Meter**
Automatically combines forward and reverse signals and displays their ratio directly, irrespective of common amplitude variations. Contains rf power monitor indicating proper power level. Rear terminal signal available to operate oscilloscope or recorder. Suitable for single and swept frequency operation. $550.00.

**415B Standing Wave Indicator**
For all waveguide and coaxial slotted sections; gives readings in SWR or db. Single frequency operation; 315 to 2020 cps. Low noise level, 0.1 µv (full scale) sensitivity, 60 db. calib. attenuator. $200.00.

**803A vhf Bridge**
Provides direct impedance measurements in vhf range, 2 to 2,000 ohms impedance; 90° to 90° phase angle. Wide frequency range 52 to 500 MC; makes measurements down to 3 MC and up to 1,000 MC. Fast, simple to use. $900.00.

**417A vhf Detector**
Super-regenerative (AM) receiver covering all frequencies from 10 to 500 MC in 5 bands. Designed for use with 803A Bridge. 5 µv sensitivity full range. Single frequency control, reads direct in MC. $400.00.

**360 Low Pass Filters**
Low pass filters speed microwave measurements by eliminating harmonics, permitting transmission at single, known frequency only. Particularly necessary in slotted line, filter characteristic, receiver response, similar measurements. Table above gives cut-off frequencies; insertion loss not over 3 db; nominal impedance 50 ohms, $60.00. @ 360A, B, D. $50.00.

**809B/814B Universal Probe Carriages**
Models 809B and 814B are precision built mechanical assemblies operating, respectively, with 810B and 815B series slotted sections. Combination of the 809B carriage and 810 slotted sections covers 2.6 to 18.0 KMC. Combination of 814B carriage and 815B series sections covers 18.0 to 40.0 KMC. For prices see table above.

On either carriage, waveguides can be interchanged in seconds for real savings on engineering time. Only one probe is required for each carriage to cover full frequency range. Manufactures is of highest quality to assure positive mechanical positioning of interchangeable waveguides and precise installation of mating probes (see table, "Waveguide Test Equipment"). 809B has a vernier scale reading to 0.1 mm and is equipped for dial gauge mounting. 814B has a dial read directly to 0.01 mm.

**810B Slotted Sections.** 810B, for mounting in 809B carriage, is a flanged, waveguide section with accurately machined slot. Slot is tapered at ends to minimize reflection. Available in 7 waveguide bands, 3.95 through 18.0 KMC.

**815A.** Complete slotted section assembly including probe carriage. In 2.6 to 3.95 KMC (S-band) size only.

**815B Slotted Sections.** For mounting in 814B carriage. Available K and R bands, 18.0 to 40.0 KMC. These sections are accurately machined so that they are quickly and easily interchanged, and precisely positioned.

*For prices, see Waveguide Test Equipment table.*
Microwave Power Measuring Equipment

**hp 434A Calorimetric Power Meter**

Just connect and read powers 10 mw to 10 watts! Covers dc to 12.4 KMC. No barretter or thermistor needed. No external terminations or plumbing. Measures CW or pulsed power. Two simple controls.

434A Calorimetric Power Meter is factually, the fastest, easiest way yet devised to measure powers accurately from 10 milliwatts to 10 watts, dc to 12.4 kilomecycycles.

With the 434A, measurement is literally as simple as connecting to the 50 ohm, type N front panel terminal and reading power directly. Thus the instrument is particularly suited for use by non-technical people.

**Compact, self-contained**

434A fills the range between bolometer microwave power meters (such as the popular 430C, below) and conventional calorimeters for powers above 10 watts. But unlike previous cumbersome equipment suggested for its range, the hp 434A is compact, moderate in cost, completely self-contained, and needs no detectors or external plumbing whatsoever.

**Brief Specifications**

<table>
<thead>
<tr>
<th>Input Power Range: 7 ranges; full scale readings 0.01 to 10 watts.</th>
<th>Frequency Range: dc to 12.4 KMC.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dc Input Impedance: 50 ohms ± 5 ohms at input jack.</td>
<td>Input SWR: Less than 1.5 full range, less than 1.3 to 5 KMC.</td>
</tr>
<tr>
<td>Meter Response (full scale): Less than 5 seconds.</td>
<td>Controls: Zero Set, Meter Range.</td>
</tr>
<tr>
<td>Accuracy: Within 5% of full scale.</td>
<td>Price: $1,600.00 (cabinet); $1,585.00 (rack mount).</td>
</tr>
</tbody>
</table>

<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 430C Microwave Power Meter</td>
<td>Measurement of rf power</td>
<td>Depends on Bolometer Mount</td>
<td>0.02 to 10 mw ±5% accuracy</td>
<td>$ 250.00</td>
</tr>
<tr>
<td>hp 434A Calorimetric Power Meter</td>
<td>Measurement of rf power</td>
<td>dc to 12.4 KMC</td>
<td>Direct reading, no barretters, thermists or terminations; CW, pulsed</td>
<td>1,600.00</td>
</tr>
<tr>
<td>hp 476A Universal Bolometer Mount</td>
<td>Measurement of rf power (with 430B/C)</td>
<td>10 to 1,000 KMC</td>
<td>No tuning required; SWR less than 1.25</td>
<td>85.00</td>
</tr>
<tr>
<td>hp 477B Coaxial Thermistor Mount</td>
<td>Measurement of rf power (with 430C)</td>
<td>10 MC to 10 KMC</td>
<td>No tuning required; SWR less than 1.5</td>
<td>75.00</td>
</tr>
<tr>
<td>hp 485 Waveguide Detector Mount</td>
<td>Measurement of rf power</td>
<td>2,400 to 12,400 KMC</td>
<td>Full coverage of waveguide</td>
<td>See Table Waveguide Equipment</td>
</tr>
<tr>
<td>hp 487B Waveguide Thermistor Mount</td>
<td>Measurement of rf power</td>
<td>3,950 to 40,000 KMC</td>
<td>Full coverage, no tuning, 1.5 SWR except K/R487B 2.0</td>
<td>See Table Waveguide Equipment</td>
</tr>
<tr>
<td>hp 764D Dual Directional Coupler</td>
<td>Reflectometer and rf power measurements</td>
<td>216 to 450 KMC</td>
<td>Coupling attenuation* 20 db, directivity 30 db</td>
<td>160.00</td>
</tr>
<tr>
<td>hp 765D Dual Directional Coupler</td>
<td>Reflectometer and rf power measurements</td>
<td>450 to 945 KMC</td>
<td>Coupling attenuation* 20 db, directivity 30 db</td>
<td>160.00</td>
</tr>
<tr>
<td>hp 766D Dual Directional Coupler</td>
<td>Reflectometer and rf power measurements</td>
<td>940 to 1,975 KMC</td>
<td>Coupling attenuation* 20 db, directivity 30 db</td>
<td>150.00</td>
</tr>
<tr>
<td>hp 767D Dual Directional Coupler</td>
<td>Reflectometer and rf power measurements</td>
<td>1,900 to 4,000 KMC</td>
<td>Coupling attenuation* 20 db, directivity 25 db</td>
<td>150.00</td>
</tr>
</tbody>
</table>

*Power handling capacity all 764/767 series couplers 50 watts CW, 10 Kw peak.  
\(\Delta\) Rack mounted instrument $15.00 less.

**www.hparchive.com**
Basic, low-cost elements offer utmost flexibility for assembly of exact instrumentation required. Each unit covers entire range of its waveguide size. Careful engineering, simple, sturdy mechanical design, highest quality manufacture insures accurate, multi-purpose operation.

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Coaxial Type N Conn.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adapter, Waveguide to Coax</td>
<td>2.6 to 12.4 KMC</td>
</tr>
<tr>
<td>Cover to Coax Flange</td>
<td>2.6 to 12.4 KMC</td>
</tr>
<tr>
<td>Waveguide to Waveguide</td>
<td>2.6 to 12.4 KMC</td>
</tr>
</tbody>
</table>

Waveguide Test Equipment - 2.6 to 40.0 KMC

- Attenuation
- Space-saving design (see photo). Direct reading, one control tuning, high power handling X, M and P382A, see table above.

- Thermistor Meters
- Thermistor Meters (Fixed tuned) 4757 B $185 4485 B $170 4485 B $170

- Frequency Meters, Reactors

- Directional Coupler, Cross Guide 20 to 30 db, 2.6 to 40.0 KMC.
- Directional Couplers, Multi Hole, 3.1 to 20 db

- Slotted Sections, Waveguide

- Tuner, Slide Screw

- E - H

- Waveguide Shunt, Phase Shifter

- Terminations, Low Power 102A $35 102A $35 102A $35 102A $35 102A $35

- Terminations, High Power 102A $200 102A $200 102A $200 102A $200 102A $200

- Moving Lead 104A $120 104A $120 104A $120 104A $120 104A $120

- Standard Reflections

- Adjustable Shorts 102A $150 102A $150 102A $150 102A $150 102A $150

- Waveguide Sorthing Switch 2800 $50 2800 $50 2800 $50 2800 $50 2800 $50

- Harmonic Mixer 193A $150 2 to 12 KMC

- Broad Band Probe 442B $40

- Waveguide Clamps, Stands Model 24, stand, $3.00

- Model 25 clamps, $2.50 each, all bands

- For fast, accurate waveguide power measurements. Each unit covers full range of its waveguide frequency. No tuning needed, SWR 1.5 max., except K and R bands, SWR 2.0 max. Max. power 10 mw. Rugged construction, high temperature coefficient thermistors virtually eliminate burnout. For G, J, H, X, M, P, K and R bands. 3.95 to 40.0 KMC. $75.00 to $225.00.

- 282A Waveguide - Coax Adapters

- 478B Thermistor Meters

- 382A Precision Attenuators

- 420A/B Crystal Detectors

- 444A/444B Untuned Probes
hp Noise Measuring Equipment

hp 344AR Noise Figure Meter

This automatic, transistorized instrument reliably and continuously measures noise figure on operating radars. Its fast meter response lets you optimize noise figure during operation. Its high sensitivity (can be decoupled 20 db from transmitter line) minimizes system degradation and effectively extends radar range. High sensitivity also permits measuring high noise figures (to 40 db) such as those found in TWT’s.

The instrument is militarized for dependability in all environments.

Model 344AR is used with a remote modulator and noise source so that high voltage slip-rings or antennas are unnecessary. 1 MC bandwidth, 25 or 30 MC input, designed for pulse rep rates of 90 to 500 pps but usable with most jitter repetition systems.

Required gain between 344AR and noise source is 35 db ± 5 db. Input impedance is 75 ohms, return loss 20 db, 20 to 40 MC. Accuracy (excluding excess noise accuracy) is ± 0.5 db, 0 to 12 db; ± 1 db, 12 to 20 db. Simple front panel calibration, remote metering if desired. Optional alarms indicate noise figure above preset level, or failure in noise source current. @ 344AR, $1,600.00 (Approximately. Depends on options and modifications.)

hp 340B/342A Noise Figure Meters

General-purpose instruments making possible, in minutes, receiver and component alignment jobs that once took hours. Simplifies accurate alignment; encourages better maintenance; better performance.

340B automatically measures, continuously displays IF or rf amplifier noise figure at 30 or 60 MC; other freq. on order. $715.00 (cabinet); $700.00 (rack). 342A, similar, operates on 30, 60, 70, 105, 200 MC. 30 MC and 4 other frequencies between 38 and 200 MC on order. $815.00 (cabinet); $800.00 (rack). (Note: Models 340B, 342A and 344A not available in Western Europe).

hp 355A/B Attenuators – 0 to 132 db

Here are two 50 ohm attenuators providing, together, 0 to 132 db attenuation in 1 db steps from dc to 500 MC! 355A provides 0 to 12 db attenuation in 1 db steps; 355B provides 0 to 120 db attenuation in 10 db steps. One simple control for each attenuator; overall full range accuracy is ± 0.25 db for 355A. For 355B, accuracy is ± 1 db to 250 MC; ± 2 db to 500 MC. 355A or 355B, $125.00.

350 Attenuators

Basic bridged-T high accuracy attenuators (not pictured). 350A matches 500 ohm lines, 350B matches 600 ohms. Maximum 110 db attenuation in 1 db steps. 5 watts capacity, high accuracy, compact, low cost. 350A or 350B, $110.00.

More hp equipment, available for most waveguide frequencies

hp 485 Detector Mounts

Three basic series offered; 485A for S band (no tuning, 1.35 SWR, 821 element); 485B, for G, J, H, X bands (tunable, 1.25 SWR with barretter) full range. 1N23, 1N21 or 821 element); 485D for S, G, J bands (factory-installed 821 barretter). $75.00 to $185.00.

hp 532/536 Frequency Meters

@ 532 series, G, J, H, M, P, K, R bands (picted). Wide band, direct reading, no interpolation or charts. Comprises a high Q resonant cavity tuned by choke plunger; no sliding contacts. Transmits almost full power at resonance; resonance indicated by 1.5 db dip in output. Precision tuning mechanism; no back-lash. Also similar model for X-band. $175.00 to $325.00. @ 536A Coaxial Frequency Meter, 1 to 4 KMC, $500.00.

hp 752 Multi-Hole Couplers

Precision directional couplers available with coupling factors of 3, 10 and 20 db. Coupling accuracy ± 0.4 db except K, R bands which are ± 0.7 db. Directivity better than 40 db full range, coupling variation not over ± 0.5 db full range. Primary guide SWR less than 1.05. S, G, J, H, M, X, P, K, R bands, 2.6 to 40.0 KMC. $100.00 to $375.00.

WWW.HPARCHIVE.COM
Wide Band Amplifiers for Fast Circuit Work

**Traveling-Wave Tube Amplifiers**

- Offers Traveling-Wave Tube Amplifiers for all frequencies 2 to 12.4 KMC. # 490B, 492A and 494A are low level, high gain amplifiers with 30 and 25 dB gain; they offer amplitude, pulse, phase or FM modulation. # 491A is a high power traveling-wave tube amplifier having a rated output of 1 watt, 2 to 4 KMC. All amplifiers have exclusive helical coupling system, and employ encapsulated traveling-wave tubes that can be readily replaced. # 490B/491A, $1,400.00. # 492A, $1,500.00. 494A, $1,800.00.

- **# 466A ac Amplifier**

  General-purpose transistorized instrument amplifier offering standard gains of 20 and 40 db, ± 0.2 db at 1000 cps. Distortion less than 1%, 10 cps to 100 KC. Frequency response ± 0.5 db 10 cps to 1 MC, output 1.5 v rms across 1500 ohms, noise 75 µv rms, referred to input; input impedance less than 1 megohm with 20 ppf shunt. Battery powered, 150 hours operation; or ac driven. Weight just 3 lbs. $150.00. Specify battery or ac operation.

- **# 721A Power Supply**

  New power output capability, 0 to 60 volts at 0 to 2 amps, from this compact (3¾ high), dependable transistorized power supply. # 722AR supplies fully regulated dc output, continuously variable from 0 to 60 v. Ideal for safe transistor investigation, it has a three-terminal output for either positive or negative grounding. Special circuit limits output current to pre-set value, providing extra safety factor. Load regulation less than 5 mv change for 0 to 2 amp current change. Features front-panel monitor meters for voltage current, low power consumption, easy-to-use controls. $225.00.

- **Regulated and Klystron Power Supplies**

  NEW! # 722AR Transistorized Power Supply

  New, completely transistorized, compact, regulated supply. Output 0 to 50 v, continuously variable. 150 ma maximum output, output impedance less than 0.2 ohms. Regulation, no load to full load, 0.3% or 30 mv whichever is greater. Line voltage change of ± 10% causes output change of less than 0.3% or ± 15 mv, whichever is greater. Front panel switch limits maximum output current preventing damage to transistors, etc., from accidental overload. Reads ma, v direct. $145.00.

### Price

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Primary Use</th>
<th>Characteristics</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td># 460AR Wide Band Amplifiers, in cascade with # 460BR Fast Pulse Amplifiers, provide up to 90 db gain, 125 v open circuit. This permits direct connection to oscilloscope deflection plates. Rise time 0.003 µsec. Will amplify millimicrosecond pulses. Over 100 MC bandwidth for scopes. # 460AR, $225.00. # 460BR, $275.00.</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Primary Use</th>
<th>Characteristics</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td># 460A 450A Amplifier, Stabilized</td>
<td>General purpose lab amplifier</td>
<td>10 cps to 1,000,000 cps</td>
<td>20 and 40 db gain, frequency response ± 0.5 db</td>
</tr>
<tr>
<td># 460A 450AR Amplifier, Wide Band</td>
<td>Wide band, pulse amplification</td>
<td>20 KC to 120 MC</td>
<td>20 db gain, rise time 0.003 µsec</td>
</tr>
<tr>
<td># 460B 450BR Amplifier, Fast Pulse</td>
<td>Pulse amplification high output</td>
<td>20 KC to 120 MC</td>
<td>15 db gain, 125 peak volts</td>
</tr>
<tr>
<td># 460A 450A ac Amplifier</td>
<td>General purpose lab amplifier</td>
<td>10 cps to 1 MC</td>
<td>20, 40 db gain; freq. response ± 0.5 db</td>
</tr>
<tr>
<td># 460B 450B Traveling-Wave Tube Amplifier</td>
<td>Amplification throughout &quot;S&quot; band</td>
<td>24 to 4 KMC</td>
<td>30 db gain; max sec rise time; 10 mw output</td>
</tr>
<tr>
<td># 460A 460A 451A Traveling-Wave Tube Amplifier</td>
<td>High power &quot;S&quot; band amplification</td>
<td>24 to 4 KMC</td>
<td>30 db gain; max sec rise time; 1 watt output</td>
</tr>
<tr>
<td># 460B 452A Traveling-Wave Tube Amplifier</td>
<td>Amplification through most of &quot;G&quot; and &quot;J&quot; bands</td>
<td>4 to 8 KMC</td>
<td>30 db gain; max sec rise time; 10 mw output</td>
</tr>
<tr>
<td># 460A Traveling-Wave Tube Amplifier</td>
<td>Amplification through most of &quot;K&quot; band</td>
<td>7 to 12.4 KMC</td>
<td>25 db gain; max sec rise time; 5 mw output</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Primary Use</th>
<th>Characteristics</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td># 711A Laboratory Power Supply</td>
<td>General purpose regulated dc supply for lab and field use</td>
<td>0 to 500 volts @ 100 ma</td>
<td>$250.00</td>
</tr>
<tr>
<td># 712B Power Supply</td>
<td>Same as 711A</td>
<td>0 to 500 volts @ 200 ma</td>
<td>$250.00</td>
</tr>
<tr>
<td># 715A Klystron Power Supply</td>
<td>Regulated beam, reflector source for low power klystrons</td>
<td>250 to 400 volts @ 50 ma</td>
<td>$325.00</td>
</tr>
<tr>
<td># 721A Transistor Power Supply</td>
<td>Powering transistors, similar applications</td>
<td>0 to 30 v, 150 ma</td>
<td>$145.00</td>
</tr>
<tr>
<td># 722AR Transistorized Power Supply</td>
<td>Powering transistors, banks of tunnel diodes</td>
<td>0 to 60 v, 0 to 2 amps</td>
<td>$525.00</td>
</tr>
</tbody>
</table>

△ Rack mounted instruments $15.00 less.

### 711A/712B Power Supplies

High regulation is offered in both the # 711A and 712B, 0 to 500 v power supplies. The 711A features regulation 0.5% or 1.0 v, whichever is greater, no load to full load or on line voltages 110/230 v ± 10%. Less than 1.0 mv ripple, includes two 6.3 v ac 3 amp supplies. $250.00 (rack mount, $255.00). The 712B features regulation 50 mv no load to full load, 0.1 microsecond transient response. Furnishes 0 to 500 v, 200 ma supply and fixed -300 v tap providing a 50 ma, 300 to 800 v variable supply for klystron operation. $390.005.

WWW.HPARCHIVE.COM
**Signal Generators and Doublers—50 KC to 40 KMC**

NEW! Frequency Doublers to 40 KMC

Operating on harmonic generation principles, new 938A and 940A Frequency Doubler Sets provide output from 18 to 26.5 KMC and 26.5 to 40 KMC respectively. The Doublers can be driven by 626A or 628A Signal Generators, 686C and 687C Sweep Oscillators or by klystrons. The input signal may be CW, pulsed or swept; thus Doublers retain flexibility of driving instrument. Output approx. 0.5 to 1 mw with 628A Signal Generators; input power is 10 mw to 200 mw. Output monitor accuracy ± 1 or 2 db. 100 db attenuator accurate within ± 2% of reading or 0.2 db. 938A, $1,500.00. 940A, $1,500.00.

### 606A Standard Signal Generator

New, ultra-modern; 50 KC to 65 MC. Output 3 v full range, continuous attenuation to 0.1 μv. MO-PA circuit with full feedback loop provides constant output full range. Low distortion, broad modulating capabilities. Typical speed, ease of operation; occupies 1/4 bench space normally needed for generators of this frequency. $1,350.00.

### 608D vhf Signal Generator

10 to 420 MC. Highest stability. Low incidental FM or frequency drift. Calibrated output 0.1 μv to 0.5 v throughout range. Built-in crystal calibrator provides frequency check accurate within 0.001% each 1 and 5 MC. Master-oscillator, intermediate and output amplifier circuit design. Premium quality performance, direct calibration, ideal for aircraft communications equipment testing. $1,200.00.

### 608C vhf Signal Generator

High power (1 v max.) stable, accurate generator for lab or field use. 10 to 480 MC. Ideal for testing receivers, amplifiers, driving bridges, slotted lines, antennas. $1,100.00.

### 626A/628A shf Signal Generators

New instruments, bringing high power, wide range, convenience and accuracy 10 to 21 KMC range. Frequencies, output voltage directly set and read. Output 10 to 20 db better than previous spot-frequency sets SWR better than 1.2 at 0 dbm and lower. Internal pulse, FM or square wave modulation; also external pulsing or FM'ing. 626A, 10 to 15.5 KMC, $3,400.00. 628A, 15 to 21 KMC, $3,400.00.

### Swept Frequency Oscillators

**686C Electronic Sweep Oscillator**

Totally new kind of backward-wave device eliminating sweep motors, tuning plungers, range limitations, etc. Covers all or part of X-band with flexible, quiet electronic sweep. Simple to operate, direct reading, adjustable sweep width and rate, 10 mw output minimum, frequency sweep linear with time. Has slow sweep for recorders, fast for oscilloscope; single sweep manually started or externally triggered, external FM, AM modulation. Ultimate in X-band sweep oscillators. $2,900.00.

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