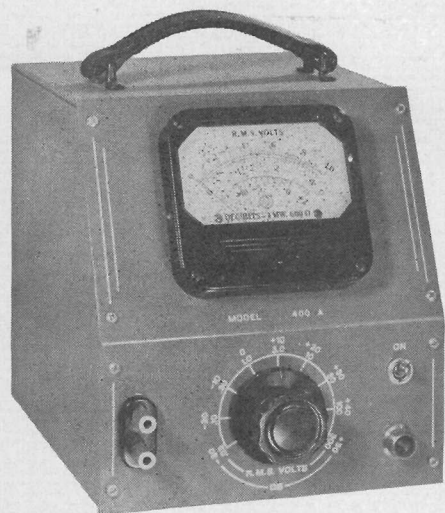




LABORATORY INSTRUMENTS OF SPEED AND ACCURACY

Standard -hp- instruments shown here are adaptable for making nearly every electronic measurement in the electronic field. Following is a brief description of a few of these instruments. Complete technical information will be sent—without obligation—on request. In addition, -hp- engineers are at your service to help solve special problems.



VACUUM TUBE VOLTMETER

-hp- Model 400A Vacuum Tube Voltmeter sets a new standard of performance for voltage measurements in the audio, supersonic, and lower radio frequency region. Measurements up to 1 megacycle with this instrument are as simple as measurements with the usual multi-range meter at d-c. Nine ranges give full-scale sensitivities from .030 to 300 volts. Ordinarily no precautions whatsoever are required; turn-over effect and waveform errors are minimized; there are no adjustments to make during operation; a large overload will not damage the instrument. The input impedance is 1 megohm so that most circuits will not be disturbed when their voltage is measured.



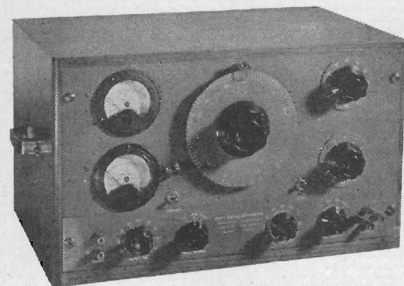
H-F VACUUM TUBE VOLTMETER

-hp- 410A High Frequency Vacuum Tube Voltmeter combines in one instrument an ac voltmeter covering frequencies from 20 cps to 700 mc, a dc voltmeter with 100 megohms input impedance, and an ohmmeter capable of measuring resistances from .2 ohms to 500 megohms. The special probe places a capacity of 1.3 uufd across the circuit under test. Input resistance for ac measurements is 6 megohms. Six voltage ranges provide full-scale sensitivities from 1 to 300 volts.



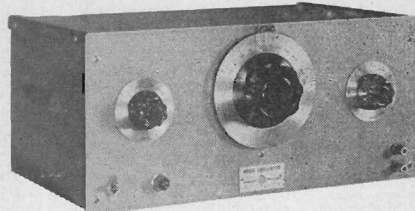
WIDE-BAND AMPLIFIER

-hp- 450A Amplifier is a new, versatile, wide-band amplifier designed for general laboratory or production use. It provides exceptional stability at 40 or 20 db gain, and gives new freedom from spurious responses. Low phase shift is assured by a straight-forward, resistance-coupled amplifier design, together with inverse feed back. Frequency response is flat within 1/2 db between 10 and 1,000,000 cps. Varying tube voltages or aging tubes have no appreciable effect on the gain or other characteristics. When used in conjunction with -hp- 400A Vacuum Tube Voltmeter, it increases voltmeter sensitivity 100 times.



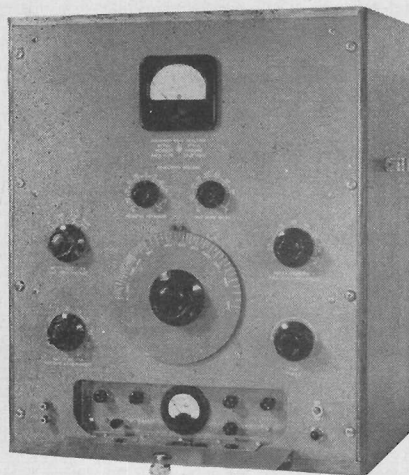
AUDIO SIGNAL GENERATORS

-hp- Audio Signal Generators are designed for time-saving performance. They are excellent for general laboratory applications because they supply a known voltage as well as a known frequency at the commonly used impedance levels. They are particularly suitable for gain measurements because no auxiliary apparatus is required. They provide an excellent source of voltage for distortion measurements because their waveform distortion is very small.



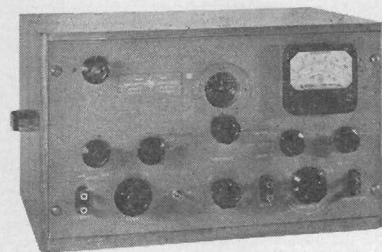
RESISTANCE-TUNED AUDIO OSCILLATORS

-hp- Resistance-Tuned Oscillators are suitable for almost every type of work. Their low distortion makes them particularly valuable in making distortion measurements on audio amplifiers, broadcast transmitters and other equipment. They provide an excellent source of voltage for accurate bridge measurements. The output is sufficient to drive signal generators and other equipment requiring considerable power. Their wide frequency range also makes them suitable for work in the supersonic region.



HARMONIC WAVE ANALYZER

-hp- Model 300A Harmonic Wave Analyzer is an excellent instrument for both laboratory and production work where accurate and rapid measurement of individual components of a complex wave is required. The maximum selectivity is sufficient for measurement of harmonics of frequencies as low as 30 cycles and it can be varied over a wide range. With this variable selectivity feature, measurements at higher frequencies can be made more rapidly, yet with no sacrifice in accuracy.



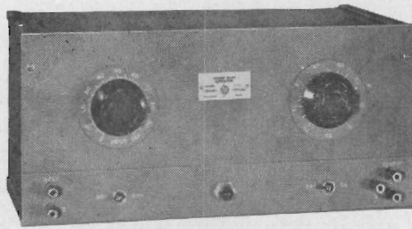
DISTORTION ANALYZER

This Model 330B Distortion Analyzer is -hp-'s newest, finest distortion measuring instrument. It is capable of measuring distortion at any frequency between 20 cps and 20,000 cps. It will make noise measurements of voltages as small as 100 microvolts. A linear r-f detector makes it possible to measure these characteristics directly from a modulated r-f carrier. The high sensitivity, stable accuracy and compactness of the 330B make it extremely valuable for broadcast, laboratory and production measurements.

ADDITIONAL INSTRUMENTS ON REVERSE SIDE OF PAGE

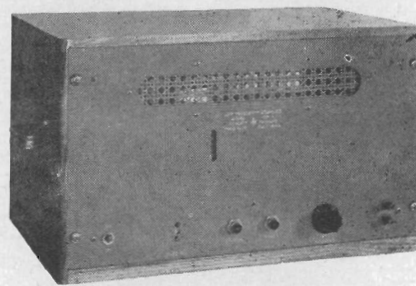


LABORATORY INSTRUMENTS OF SPEED AND ACCURACY



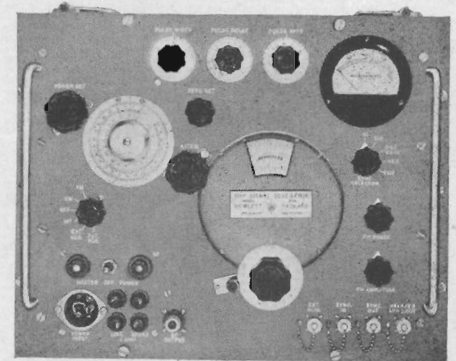
SQUARE WAVE GENERATOR

-hp- Model 210 Square Wave Generator provides a new approach to the problem of measuring the characteristics of audio-frequency equipment. One or two observations with this generator will check the frequency response of apparatus where heretofore a large number of observations were necessary. It will show up phase shift and transient effects, both of which are rather difficult to study by other methods.



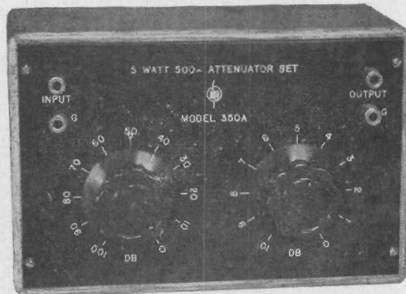
SECONDARY FREQUENCY STANDARD

-hp- Model 100 Low Frequency Standard provides a convenient and extremely useful source of four standard frequencies (100 cps, 1 kc, 10 kc, 100 kc) for accurate measurement purposes, for calibrating audio equipment and for various other work where great accuracy is required. It is useful in making accurate interpolation measurements at higher frequencies.



UHF SIGNAL GENERATOR

-hp- Model 616A UHF Signal Generator is the first instrument developed commercially which combines great operational speed, accuracy and ease of operation with a frequency range of 1800 mc to 4000 mc. R-f power is generated by a reflex klystron oscillator, and voltage adjustments during operation are eliminated by special *-hp-* automatic coupling device which causes oscillator repeller voltage to track frequency changes. The *-hp-* 616A features direct frequency and voltage control; c-w, f-m or pulsed output; plus wide variety of input and output delay and synchronization features.



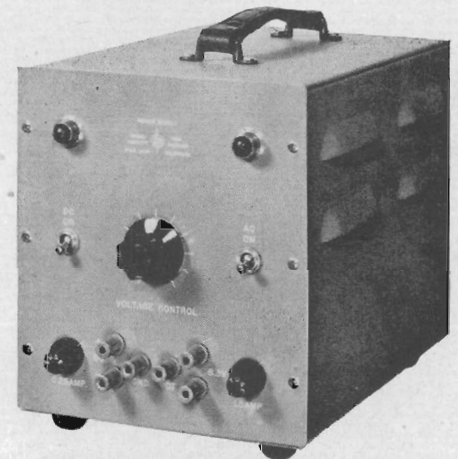
ATTENUATORS AND VOLTAGE DIVIDERS

-hp- Model 350 is a bridged-T attenuator consisting of one 100 db attenuator with 10 db steps and a 10 db attenuator having 1 db steps. Special construction is used to assure high frequency response. Inquiries pertaining to your particular attenuator or voltage divider problems will be given careful attention. The Model 350A operates on a 500-ohm impedance level while the 350B operates at a 600-ohm impedance level.



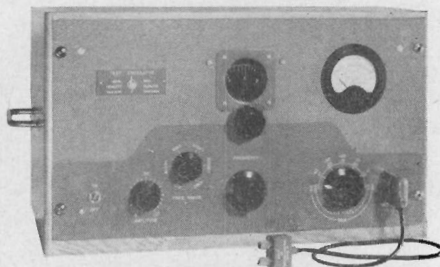
ELECTRONIC FREQUENCY METER

-hp- Model 500A Frequency Meter is designed to measure the frequency of an alternating voltage from 5 cps to 50 kc. It can be used to measure difference between two h-f signals. It is particularly suited to crystal grinding work where it can be used to measure the frequency deviation from the standard, quickly and accurately.



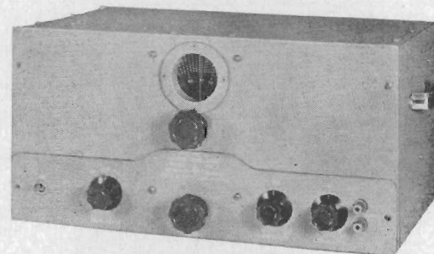
POWER SUPPLY UNIT

-hp- Model 710A Power Supply is an excellent source of d-c power for every laboratory and production department use. The power pack is designed for the utmost in flexibility, compactness, portability and economy. Output is continuously variable between 180 and 360 volts. The output voltage varies approximately 1 per cent with changes in load current up to 75 ma and with normal line variations. Noise and hum level is exceptionally low, and output unusually stable over a long period of time. Also contains auxiliary center-tapped 6.3 volt source providing 5 amperes of a-c.



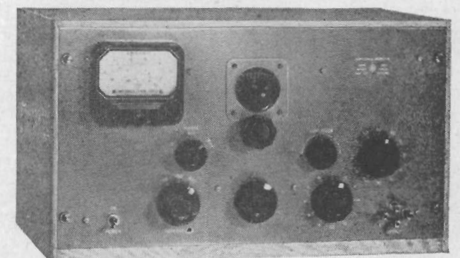
WIDE-BAND OSCILLATOR

-hp- Model 650A Resistance-tuned Oscillator is the first instrument of its kind that not only covers a frequency range of 10 cps to 10 mc, but brings to the r-f and video fields all the speed, ease and accuracy traditional in *-hp-* audio oscillators. This highly-stable, precision instrument provides output flat within ± 1 db from 10 cps to 10 mc, and a voltage range of .00003 to 3 volts. Output impedance is 600 ohms, or 6 ohms with 100 to 1 output voltage divider. Instrument includes built-in vacuum tube voltmeter and 50 db output attenuator.



PRECISION OSCILLATORS

-hp- Model 201B and *-hp-* Model 2001 are precision measuring instruments of utmost accuracy and latest design. The 201B spans a range from 20 cps to 20 kc in three bands; the 2001, a spread-scale oscillator, covers frequencies from 6 to 6000 cps in six bands. Both include a 6" main frequency tuning dial calibrated over 300 degrees, controlled directly or by 6-1 micro-drive. Both meet all requirements for measurement speed, accuracy, and purity of wave form. And both instruments incorporate *-hp-* family characteristics of no zero set, constant output, and great stability.



AUDIO SIGNAL GENERATOR

-hp- Model 206A Audio Signal Generator provides a highly-stable source of continuously variable a-f having a total distortion of less than 0.1% between 50 cps and 20 kc. Output meter monitors output voltage signal with accuracy of at least 0.2 db. Precision attenuators vary output signal level in 0.1 db steps over 111 db range. Flat frequency response and great accuracy of output voltage make this instrument ideal for FM transmitter and station maintenance work.

hp laboratory instruments
FOR SPEED AND ACCURACY

HEWLETT-PACKARD COMPANY

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