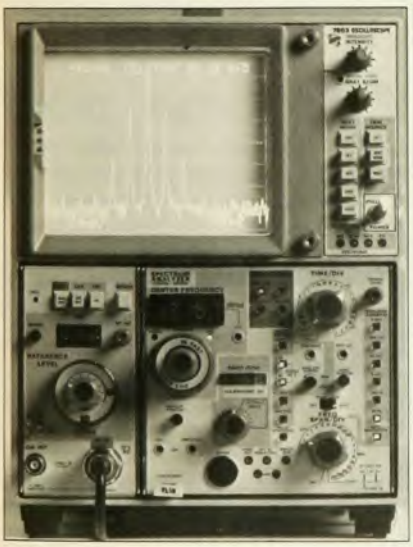
new products

The items listed have been selected from among those appearing concurrently in "New Instruments" or "New Materials and Components" in *Review of Scientific Instruments*. We gratefully acknowledge the cooperation of the editor of *RSI*, J. B. Horner Kuper, the associate editor for New Instruments, Joshua Stern, and the associate editor for New Materials and Components, R. K. Eby.

These descriptions are based on information supplied by the manufacturer and in some cases from independent sources. Neither *Review of Scientific Instruments* nor PHYSICS TODAY assume responsibility for their correctness.

Spectrum analyzer

The 7L18 microwave spectrum analyzer is a three-wide plug-in unit that fits any of the manufacturer's 7000 series oscilloscopes. With direct coaxial input, it will display the spectrum of signal energy from 1.5 to 18 GHz, and to at least 12.5 GHz with 30-Hz



resolution. With external waveguide mixers the frequency span extends to 60 GHz with response flatness specified at ±3 dB or better. The built-in preselector system is fully characterized so that the analyzer can be calibrated for absolute amplitude measurements up to 18 GHz. Stability, measured in terms of residual FM, is specified as 10 Hz or less up to 4.5 GHz, or approximately 4 parts in 10^8. Digital storage provides flicker-free displays at the slowest sweep speeds. A MOS split memory permits comparison of a reference with an existing spectrum, or a calculated display of the difference between two spectra. The storage circuitry also includes a maximum hold capability that allows monitoring of time changing or signal conditions. A microprocessor is employed to provide automatic resolution and sweep time/division modes that optimize the display and prevent operator errors. In the normal mode of operation, any combination of control settings that results in an uncalibrated display also turns on an 'uncalibrated' indicator light. By setting the frequency span to zero and using the calibrated time base, the instrument is converted, in effect, to a microwave receiver for time domain measurements.—*Tektronix, Inc., Box 500, Beaverton, OR 97077.*

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Zero expansion ceramic

Aremcolox 502-1300 is said to exhibit zero thermal expansion over a temperature range to 2200 °F. This permits use in high thermal shock applications such as water quenching from 2000 °F. It can be machined with conventional machine shop equipment using carbide-tipped tools. It requires no firing after machining. The material is available in rods, plates, and disks. Rods are available from 0.5- to 4-in. diameter; disks as large as 5-in. diameter × 0.5 in. thick; and plates 5.75-in. square × 0.5 in. thick.—*Aremco Products, Inc., P.O. Box 429, Ossining, NY 10562.*

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Power supplies

Designated Model No. APS 5-9, APS 5-12, and APS 5-18, the new units produce 5 V at 9 A, 5 V at 12 A, and 5 V at 18 A, respectively. Operating from an ac input line voltage of 115/230 V ± 10%, 47–63 Hz, the units exhibit a regulation accuracy of 0.0%

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new products

for 50% load changes and 0.05% for ±10% line changes. Ripple is 3 mV peak to peak. All the new models feature hermetically sealed metal enclosed integrated circuit regulators, Darlington transistors, and dual rectifiers in TO-3 packages. The filtering is accomplished by use of ten-year life computer grade electrolytic capacitors, potentiometers for voltage adjustment of ±5% are isolated types and all transformers are electrostatically shielded with grounding lug. Protection is provided for overload in the form of automatic current limiting; overvoltage protection is available as an option. All units have overshoot on turn on/turn off or during power failures, operate at full output up to 50°C with derating applicable up to 70°C and have a temperature coefficient of 0.02%/°C.—*Adtech Power, Inc., 1621 S. Sinclair, Anaheim, CA 92806.*

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Photomultiplier tube

A new photomultiplier tube for scintillation counting applications is said to feature excellent pulse height resolution and angular uniformity. The key element in the new device is a symmetrical venetian-blind dynode, which improves angular uniformity of response to off-axis photons. The new dynode, referred to as a "Gamma Target," replaces the planar slat venetian-blind first dynode, while dynodes #2 thru #10 are the same as those in conventional venetian-blind structure. Consequently, the new photomultiplier combines the features of the "Gamma Target" dynode with the reliability, gain stability, and other important performance characteristics of the well known venetian-blind tubes. These photomultipliers are available in 2-, 2.5-, 3-, 3.5-, and 5-in.-diam sizes, and in hexagonal shapes in a variety of sizes.—*S.R.C. Laboratories Inc., 1525 Kings Highway, Fairfield, CT 06430.*

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Surface analysis system

The model 550 ESCA/SAM incorporates a scanning electron gun, inside the electron energy analyzer, that permits scanning Auger and ESCA analysis to be performed on the same sample area at the same sample work station, so that extended analyses using both techniques can be carried out while maintaining vacuum integrity. The resulting data can be accurately correlated because the same area is analyzed by both techniques. The instrument offers count rates in ESCA mode approximately five times as great as previous models, with spatial resolution in Auger mode better than 5 μm. Energy resolution can be varied mechanically or electronically. Acces-

sories available for use with the instrument include a computer for data manipulation and a rapid turn-around, and a single sample introduction stage that can also serve as a sample pretreatment and reaction chamber. Accessories for SIMS and UPS can be added to the system to allow analysis of the same sample area with up to four separate surface techniques.—*Physical Electronics Industries, Inc., 6509 Flying Cloud Drive, Eden Prairie, MN 55343.*

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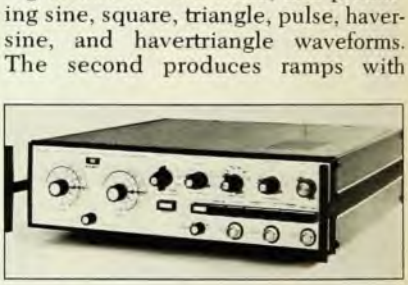
Function generator

The model 508 combines two generators. The main generator is a voltage controlled frequency generator covering 0.0001 Hz–5.5 MHz, and producing sine, square, triangle, pulse, haversine, and havertriangle waveforms. The second produces ramps with



periods from 10 μsec to 100 sec and is used for direct output and for sweeping, triggering, and gating the main generator. The latter may be swept up or down with the ramp generator, linearly up to 1000:1 or logarithmically up to 100 000:1. The start and stop frequencies may be set independently. The main generator frequency can also be swept manually, and the VCF input allows external control of frequency over the same ranges. Start and stop frequency dials can be used to provide 10-turn type resolution, single turn resolution with 1000:1 linear coverage, or single turn resolution with 100 000:1 log coverage. LED indicators, visible through the dials, indicate both the mode of operation and the frequency setting. The indicators flash on and off, indicating an improper combination, if the start and stop dials are set

in different modes. A voltage output proportional to frequency is provided for driving analog devices. Other features include: ±15 V variable and switchable dc offset; gate, trigger, pulse and burst modes; variable symmetry; variable start phase; 30 *V P-P* output (15 *V P-P* into 50 Ω); 80 *dB* attenuation; and sync outputs.—*Exact Electronics, 455 S.E. Second Street, Hillsboro, OR 97123.*

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Temperature controller

The model TCD-1200 digitally indicating temperature controller features a 3½-digit display reading directly in temperature units. A digital set point switch is provided. The instrument is available in several ranges between −100 and +1200 °C, using thermocouple sensors. In operation, the controller applies proportional power up to 6000 W to the user's electrical heater. Control accuracy is ±0.05 °C. The circuit includes cold junction compensation and thermocouple break projection. Automatic reset, automatic rate, and automatic current limit are available.—*Theall Engineering Company, Box 362, Oxford, PA 19363.*

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Density meter

The DMA46 calculating density meter contains a built-in electronic thermostat that controls temperature of the sample inside the measuring cell. Precision of temperature control is ±0.05 °C, allowing accuracy in density measurement of $\pm 1.10^{-4}$ g/cm³ with most fluids. Minimum sample size is 0.7 ml. The instrument comprises three systems housed together: a mechanical oscillator system, an electronic measuring system, and the electronic temperature control system. A semiconductor Peltier element controls cooling and heating; temperature is adjustable from 15° to 37 °C. An internal digital processor calculates density.—*Mettler Instrument Corporation, Box 100, Princeton, NJ 08540.*

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High impedance divider

A new 100-kV dc high-impedance resistive divider (Model HVD-100) is available. It provides a method for measuring high voltage with accuracy better than 0.5%. The divider is designed for use with differential voltmeters, digital voltmeters, or standard 100-μA/m movements. The 1000-MΩ input impedance is suitable for measuring high-voltage low-current sources, which would be overloaded by traditional lower impedance dividers. The unit is housed in a Lucite cylinder containing a series of selected, low-temperature-coefficient metal film resistors in a ladder configuration. Anti-corona terminations and two 10-in. toroidal high voltage bushings eliminate leakage due to corona, allowing voltage divider ratio integrity to be maintained up to 100 kV. Output taps are provided at 100, 10, and 1 V. The stability is 0.01% in 8 h and the calibration interval is 90 days.—*Spellman High Voltage Electronics Corp., 7 Fairchild Ave., Plainview, NY 11803.*

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New Literature

Electronic products—A 36-pp. Short Form Guide provides detailed technical specifications, application data, and prices for over 300 electronic products for precision measurement and control. Among the products described are A/D and D/A converters, V/F converters, sample-hold amplifiers, analog interface subsystems, data-acquisition subsystems, digital panel meters, operational, instrumentation, and isolation amplifiers, thin-film networks, and power supplies.—*Analog Devices, Inc., P.O. Box 280, Norwood, MA 02062.*

Mini amplifiers—A manufacturer's data sheet gives specifications for a new line of GaAs FET mini-amplifiers that have been designed specifically for high packaging density systems where the optimum performance with the smallest size is required. All utilize thin-film microstripline construction that assures highly reliable operation and performance under the environments of MIL-E-5400/MIL-E-16400. All are hermetically sealed to withstand high moisture contect conditions. They have been optimized for lowest noise figure and maximum power output, with special attention given to performance in severe environments. The frequency range covered is 4–12 GHz.—*The Narda Microwave Corp., 2900 Coronado Dr., Santa Clara, CA 95051.*

Oscilloscope applications—Application note 52A1.0, 12 pp., provides information on use of an oscilloscope for mechanical measurements, including oscilloscope capabilities and use, types of mechanical measurements where oscilloscopes are useful, transducer selection and installation, and a procedure for balancing rotating machinery.—*Tektronix Inc., Box 500, Beaverton, OR 97077.* □