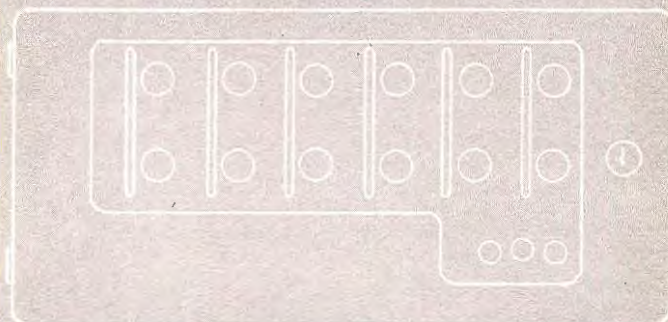
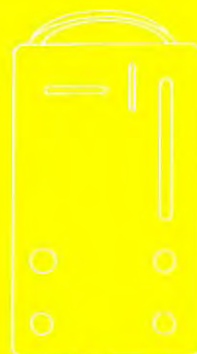
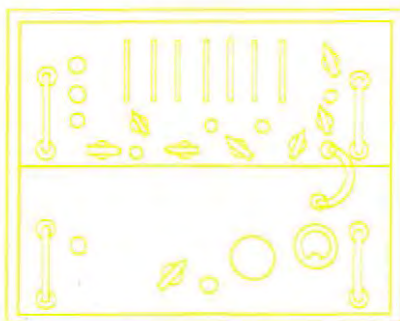
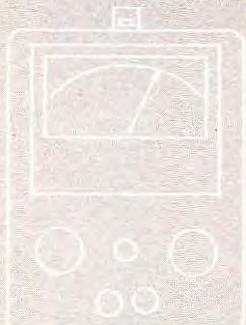


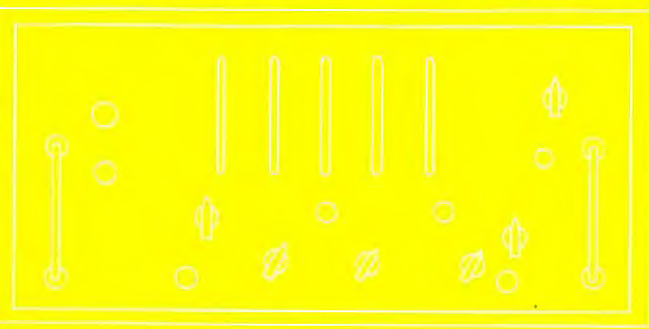
summer, 1957



short form catalog c-704



Berkeley digital and analog instrumentation



COUNTING, TIMING, FREQUENCY MEASURING EQUIPMENT

- EPUT® Meters • Universal EPUT® Meters • Frequency Measuring Equipment • Preset Counter Controllers • Time Interval Meters • Electronic Counters • Nuclear Scalers and Count Rate Meters • Digital Recorders • Inline Readouts • Transducers • Decimal Counting Units

SPECIAL AND GENERAL PURPOSE TEST INSTRUMENTS

- Expanded Scale Volt Meters • Expanded Scale Frequency Meters • Resistance Bridges • Double Pulse Generators

EASE* ANALOG COMPUTERS AND EASE* PRECISION COMPONENTS FOR CONTROL SYSTEMS

*T.M.

Beckman®

Berkeley Division

A Division of Beckman Instruments, Inc.

2200 Wright Avenue, Richmond, California

Phone LANDscape 6-7730 TWX Richmond 433

COUNTING, TIMING, FREQUENCY MEASURING EQUIPMENT

Beckman/Berkeley Division, now in its second decade, supplies industry and science throughout the world with two hundred types of electronic counting, control and computing equipment. An organization of highly skilled and experienced engineers, designers and production workers, Berkeley is equipped to mass produce a wide range of instruments for science and industry. Techniques for the mass production and assembly of high speed counters, timers and frequency measuring equipment originated at Berkeley.

Facilities at Berkeley are by no means limited to quantity production of standard type instruments. The Engineering Department conducts research development and product design operations in four major fields of electronic interest—counting,

timing, and frequency measuring equipment, analog computers, nuclear test instruments and special products.

Naturally this stress on research and development has resulted in important electronic "firsts" at Berkeley. Some of these include:

- The first 1,000,000 count per second events-per-unit-time meter (EPUT®)
- The original electronic decade unit (DCU)
- The first direct reading time interval meter for measuring time intervals to one microsecond.
- The first console style push-button analog computer (EASE*)
- The first direct reading frequency meter
- The first digital recorder with printed readout
- The first in-line, in-plane digital indicator
- The FERRISTOR*, miniature vacuum tube replacement

* EPUT® meters

Berkeley EPUT® Meters automatically count and display the number of events that occur during a precise time interval. Events may be any physical occurrences that can be represented by changing voltages occurring either regularly or at random rates to 1,000,000 per second.



New Model 5210 100 KC EPUT® Meter for industrial and field application. Light, small, portable. Simple to operate. Straightforward design and construction. Reliable. The 5200 Series use same DCUs as other Berkeley equipment.



7000 Series units may be used to measure frequency or period, and also as high speed electronic counters with manual on-off control. Model 7160 shown.

APPLICATIONS

Precision tachometry; measurement of pressure, flow, temperature, viscosity, velocity, frequency, frequency period; process control or data reduction systems; calibration of frequency generating equipment; measurement of any electrical, mechanical, optical or other physical event occurring during a precise time interval.

BRIEF SPECIFICATIONS	Model 5210	Model 7150	Model 7151	Model 7160	Model 7161	Model 7650
Count Capacity:	4 digits	5 digits	5 digits	6 digits	6 digits	5 digits
Count Rate:	0 cps to 100 KC	0 cps to 100 KC	0 cps to 100 KC	0 cps to 1 mc	0 cps to 1 mc	0-40,000 cps
Time Bases: (decade steps)	0.1 and 1 sec	10 μsec to 1 sec	Time Interval Generator	1 μsec to 1 sec	Time Interval Generator	0.1 to 10 sec
Binary coded output to drive digital printer	optional \$30.00 extra	yes	yes	yes	yes	yes
Price:	\$475.00	\$775.00	\$1195.00	\$995.00	\$1345.00	\$1495.00



New Models 7151 and 7161 Preset EPUT® Meters feature a variable time base. Time base dividers have been replaced by preset DCUs. In addition to specifications below, these instruments feature several unique operating functions: Totalize — divides frequency between 0 and 10 KC by any number from 1 to 10,000; TIG — generates frequencies from 0.1 to 10⁴ milliseconds.



Model 7650 Long Life Magnetic EPUT® Meter performs the same function as models described above. Uses Berkeley FERRISTORS* in all critical circuits to assure continuous-duty reliability. Ideally suited to industrial test applications such as jet and piston-engine test cells, etc. Has digital "count-down" time base for precise gating; no adjustment of time base required.

*T.M.

Universal EPUT® Meters

These truly universal instruments combine high-speed electronic counting with a precision time base in multi-purpose circuitry. They function as counters, timers, time-interval meters, EPUT® meters, frequency, frequency ratio or period meters, or as secondary frequency standards.

APPLICATIONS

Counting, time interval, events-per-unit time measurements for precision tochrometry, measurement of pressure, flow, frequency, velocity, viscosity, elasticity; timing relay, shutter action, etc. Measurement of unknown frequencies, frequency ratios, periods, etc.

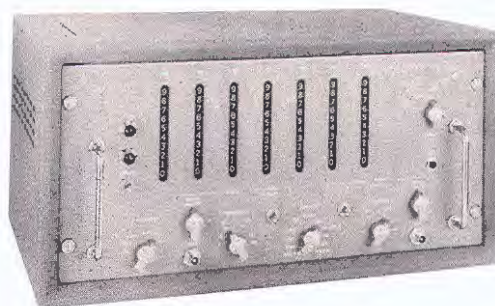


BRIEF SPECIFICATIONS	Model 5230	Model 7350	Model 7351	Model 7360	Model 7361
Ranges-Frequency:	0 cps to 100 kc	0 cps to 100 kc	0 cps to 100 kc	0 cps to 1 mc	0 cps to 1 mc
Time Interval:	100 μ sec to 10 ⁴ sec	10 μ sec to 10 ⁶ sec	10 μ sec to 10 ² sec	1 μ sec to 10 ⁷ sec	10 μ sec to 10 ³ sec
Period:	0 cps to 10 kc	0 cps to 100 kc	0 cps to 10 kc	0 cps to 1 mc	0 cps to 10 kc
Time Bases:	0.1 and 1 sec	10 μ sec to 10 sec	Time Interval Generator	1 μ sec to 10 sec	Time Interval Generator
Binary coded output information for driving digital recorder	\$30.00 extra	yes	yes	yes	yes
Price:	\$575.00	\$945.00	\$1295.00	\$1245.00	\$1445.00

New Model 5230 100 kc Universal EPUT® Meter for industrial and field application. Light, small, portable. Simple to operate. Straightforward design and construction. Reliable. The 5200 Series uses same DCUs as other Berkeley equipment.



New Models 7351 and 7361 Preset Universal EPUT® Meters features are similar to Models 7150 and 7160 with variable time base feature, etc. In addition, TIM and A/B functions are offered.



Model 7360 Universal EPUT® and Timer.

Frequency Measuring Equipment

Basic instrument is the Model 5571, capable of measuring frequencies from 0 cps to 42 mc. Addition of the Model 5580 UHF-VHF converter and suitable plug-ins extends the range to 515 mc; Model 5582B VHF converter with plug-ins extends the range to 1,005 mc. Results are displayed in direct-reading digital form. Unit will drive a Model 1452 digital printer to provide a complete frequency logging system in which results are printed on standard adding machine tape. Model 5571 is also a Universal EPUT® Meter with same specifications as Model 7360.



Model 5571 with 5580 converter and 5580 series plug-ins for frequencies to 515 mc. Model 5571 price, \$1825. Model 5580 converter, \$300.00. 5581 series plug-ins, \$125.00 to \$175.00 each. All are FCC-approved. Model 5571 shown.



New Model 905 WWV receiver is most convenient, reliable method of utilizing standard time and frequency broadcasts from NBS stations WWV and WWVH. Features: covers all six WWV and WWVH frequencies, crystal controlled, separate crystal for each channel, built-in audio filters. Price: \$525.00 (Rack) \$550.00 (Cabinet).

Complete frequency logging system for frequencies to 1,000 mc. Model 5571 (with 5582B converter and plug-ins), drives Model 1452 digital printer to record results automatically on adding machine tape, 905 WWV receiver.

* Time Interval Meters

Any event delineated by varying voltages may be timed. All models may be standardized against WWV or other external standards. Provisions are also made to measure period of input signals, use as a high-speed electronic counter, or frequency ratio meter.

APPLICATIONS

Timing of relays, shutters, solenoids, controls; ballistics research; measurement of viscosity, elasticity, velocity; accurate low frequency and period measurements, frequency ratio measurements, etc.

BRIEF SPECIFICATIONS	Model 5220	Model 7250	Model 7260
Range:	100 μ sec to 1 sec	10 μ sec to 1 sec	1 μ sec to 1 sec
Accuracy:	$\pm 100 \mu$ sec ± 1 part in 10^4	$\pm 10 \mu$ sec, ± 1 part in 10^5	$\pm 1 \mu$ sec, ± 1 part in 10^6
Input Requirements:	0.25v rms, 1 megohm dc-coupled.	0.1v rms, 10 megohms, ac or dc-coupled.	
Display Time:	Adjustable .05 to 5 sec.	Adjustable, 0.1 to 10 seconds (automatic reset). Manual reset also provided.	
Binary-coded output to drive Digital Printer	Optional \$30.00 extra	yes	yes
Price: (f.o.b. Factory)	\$475.00	\$595.00	\$830.00



New Model 5220 100 μ sec to 1 sec time interval meter for industrial and field applications.



Model 7250 Berkeley Time Interval Meters provide a direct digital reading of elapsed time between any two events, or the duration of a single event, in micro-second (Model 7260) or 10-microsecond increments.

* Electronic Counters



Model 5001 (125 cps) industrial type electronic counter for use where speed requirements are in excess of the limitations on mechanical registers (10 cps).

BRIEF SPECIFICATIONS	Model 5001	Model 5010	Model 7050	Model 7060
Counting Rate:	0-125 cps	0-10,000 cps	0-100KC	0-1 mc
Sensitivity:	0.5 volts peak	0.5 volts peak	0.1 volts rms.	0.1 volts rms
Binary coded output to drive Digital Printer	no	no	yes	yes
Price:	\$195.00	\$330.00	\$545.00	\$645.00



The Berkeley Industrial Counter, Model 5010 (10 KC), is a high-speed electronic counting instrument designed to fill general counting needs, where speed requirements are greatly in excess of those possible with mechanical counters.



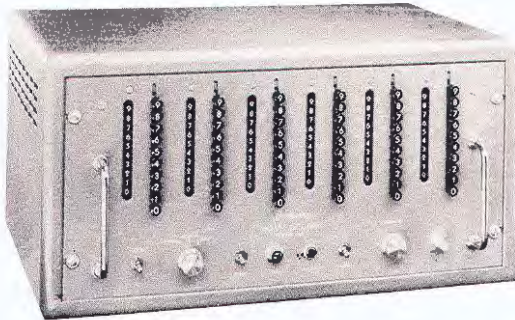
New Models 7050 (100 kc) and 7060 (1mc) gating counters offer both manual and electronic gating. Gate control signals may be of any frequency from d-c to maximum counting rate of the instrument with no input waveform restrictions. For use as frequency ratio meters, digital flow computers, slave EPUT® or time interval meters, high speed counters. Shown Model 7060.

Preset Counter-Controllers

Counts at rates to 40,000 cps, yields output signals at any desired preset total (or any two preset counts with dual preset models). Operates on input pulse of ± 1 volt peak, or more. Instantaneous reset to zero after final count. Reliable, simple to operate. Available in 2, 3, 4, 5, and 6-digit capacities. Long-life magnetic Model 5840 dual preset features FERRISTOR* circuitry for continuous-duty reliability. Typical applications: coil winding, automatic packaging, sorting to length, motor speed control.



Series 5840 long-life magnetic dual preset counter features FERRISTOR* circuitry; 4-digit, \$1115.00; 5-digit, \$1200.00; 6-digit, \$1295.00.



Series 5420 single preset models range in price from \$435.00 for 2-digit capacity to \$740.00 for 6-digit capacity. Dual preset Series 5440 range from \$650.00 (2-digit) to \$895.00 (6-digit).

Nuclear Scalers

Berkeley's long experience in counting techniques has been carried over to the nuclear field to produce a line of high quality scalars. Model 2025, basically a gated decimal counter, will count, store and record any phenomena occurring in a random fashion. It features automatic reset and start, uses DCUs instead of mechanical registers, and is designed for use with an electronic timer (Model 811) for increased accuracy.



BRIEF SPECIFICATIONS	
Model 2025	
Input:	Pulse Height discriminator with range +5 to +50 volts
Scaling Circuit:	Paired Pulse Resolution: Better than 1 μ sec
Integral Amplifiers:	Input Sensitivity: 1 millivolt \pm 20%
Controls:	Preset Count Selector — 100 to 4 million in 1-2-4 steps
Price:	\$950

BRIEF SPECIFICATIONS	
Model 2101	
Input Sensitivity:	0.25 volts
Resolving Time:	5 μ seconds
Reset:	Reset of register and counting units by single lever
Timer:	Indicates and times automatically to closest second up to 60 min. Accuracy \pm 0.2 sec
Price:	\$595.00



This scalar weighs only 24 pounds and offers maximum convenience for laboratory work and medical diagnosis. Can be used directly with G-M tubes and scintillation counters. Extremely reliable and simple to operate.

Digital Recorders, Inline Readouts & Transducers



MODEL 1452 DIGITAL PRINTER. Automatically and permanently records information from any Berkeley 5510, 5571 or 7000 Series instrument, prints data in digital form on standard adding machine tape from printer and scanner in one compact unit. May be modified to print "Time" or "Code" information simultaneously with data. Rack or bench mounted; available in up to 8 digits. One printout every 0.85 seconds. Price (6-digit), \$950.00.



MODEL 5916 IN-LINE READOUT. Large, illuminated in-line IN-PLANE figures reduce fatigue and error. Ideal for remote observation of data. Connects directly to any Berkeley 5510, 5571 or 7000 Series instrument. Presentation rate up to 15 per second; accepts binary voltages. Price \$775.00.

TRANSDUCERS. A large number of transducers especially designed for use with Berkeley counting, timing, and frequency measuring equipment are available. These include tachometer, pickups, photocells, and light sources. Specifications and technical description on request.

SPECIAL AND GENERAL PURPOSE TEST INSTRUMENTS

* Expanded Scale Voltmeter



Model 101R Rack Mount.

Model 101-50 expanded scale voltmeter. Featuring: $\pm 0.25\%$ accuracy, true rms reading, easy to read expanded scale, direct connection for 1 MA recorder. Brief Specifications: Accuracy— $\pm 0.25\%$ of input voltage; Voltage Indicated—True rms; Voltage Range—100-500 (50-250v); Frequency Range—50-2,000 cps; Scale Range—12v (6v); Price: \$360.00 (rack mounted \$400.00).

* Expanded Scale Frequency Meter

Expanded Scale Frequency Meters are designed for fast accurate monitoring of frequencies near 400 cps. They were originally intended for use in making production inspection measurements of the frequency regulation of motor and engine driven generating units, but many other applications where a record of frequency is desired have been found.



The Model 100 Transformation Ratio Meter is an RMS reading expanded scale voltmeter designed to read the primary and secondary voltages of synchros faster and easier than by conventional methods. The method of operation is ideally suited for production testing as well as for inspection of synchros and control transformers. Features: $\pm 0.2\%$ Accuracy; RMS Reading; Expanded Scale; Read Directly in % Deviation; Simple To Operate For Rapid Production Checks. Price \$400.00.

The Model 404 expanded scale frequency meter features Accuracy of $\pm \frac{1}{2}$ cycle, 1 MA Recorder Connection Provided; Expanded Scale for easy, error-free reading. Brief Specifications: Base Frequency—400 cps; Span— ± 25 cycles; Accuracy— $\pm \frac{1}{2}$ cycle; Price—\$330.00 (rack mount \$380.00).

* Wide Range Resistance Bridge

The Model 605 wide range resistance bridge provides a means for rapidly and easily checking resistances to a high degree of accuracy. Seven ranges for full scale resistance values are selectable by front panel push button switches. Features: 5 ohms to 100 megohms, push button operation, high accuracy, negligible drift.



Brief Specifications: Resistance Scales—100, 1K, 10K, 100K, 1M, 10M, 100M, Full Scale; Accuracy— $\pm 1.15\%$ of resistance measured $\pm .05\%$ Full Scale; Drift—Negligible after 30 minute warm-up; Batteries—1-45 Volt, 2-7½ Volt; Price—\$170.00.

* Berkeley Double Pulse Generators



Model 4904 Double Pulse Generator

BRIEF SPECIFICATIONS	Model 903	Model 4904
Pulse Width:	0.15 to 1.8 μ sec	0.3 to 10 μ sec
Rise Time:	0.035 μ sec	0.08 μ sec
Decay Time:	0.15 μ sec	0.26 μ sec
Pulse Spacing:	0 to 10 μ sec. Single control	0 to 100 μ sec. Coarse and fine adjustments
Price:	\$498.00	\$645.00

Produce paired or single pulses. Pulse amplitude, width, polarity, repetition rate and pulse-to-pulse spacing are independently adjustable. Outputs may be mixed internally or externally. Model 903 can be driven externally by pulses; Model 4904 by pulses or sine wave generators.

APPLICATIONS

Measurement of paired pulse resolution time of counting circuits. Measurement of rise time, decay time and transient response of pulse forming circuits, electronic switches, gates and wide band amplifiers. Calibration of input sensitivity of counting instruments. Frequency calibration of counting rate meters. Measurements of overload characteristics and dynamic range of pulse amplifiers. Delayed coincidence work.

BERKELEY EASE* COMPUTERS

New EASE* 1100 Series Analog Computers *



The 1100 Series introduces a digital output-input translator system (DO/IT) that uses punched tape to set up and check problems, taking much of the human element out of computing and saving hours of operating time. Other new features include automatic static or dynamic problem checking, complete pushbutton monitoring system, and a fully shielded, color-coded patch board. Patch bay capacity 2188 to 3,600 terminals.

A typical setup would include:

- ★ 100 dc amplifiers
- ★ 16 servos
- ★ 300 DO/IT controlled attenuators
- ★ 30 electronic multipliers
- ★ 250 spare terminals
- ★ Required number of trunk lines and terminals for limiters, biases, etc.

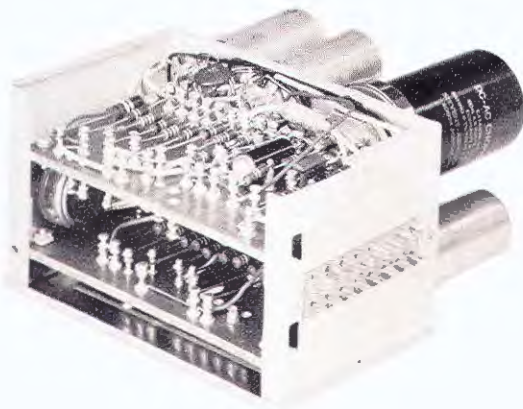
Computing resistors are maintained at an accuracy of better than .005% in a temperature controlled oven. Long-term accuracy of capacitors exceeds .05%. New servo-set potentiometer system permits adjustment of 50K Helipot precision potentiometers to an accuracy of better than 0.01% in less than 3 seconds average time.

EASE* Precision Components for Control Systems *

Model 1191 General Purpose Servo Multiplier

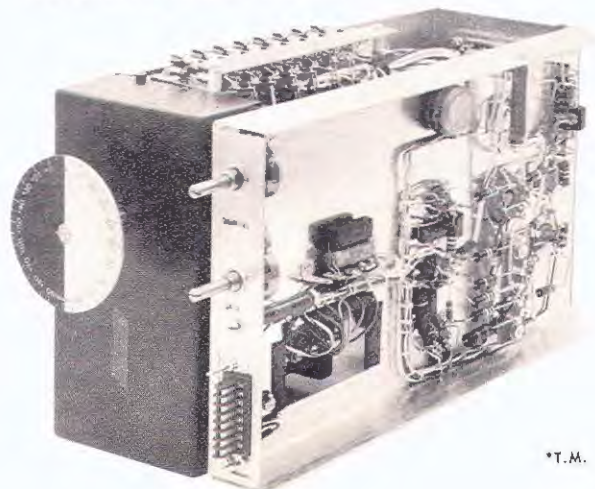
Up to five variables are multiplied by a sixth in the Model 1191 Servo Multiplier. One, two, or three of the five computing potentiometers can be supplied as sine-cosine resolvers. Amplifiers are removeable for ease of maintenance. The front panel contains servo gain and damping controls, as well as servo error light and a shaft position indicator.

No dither is employed, thus minimizing potentiometer wear. Selection of internal or external feedback reference is made through a relay. Servo Multipliers can also be supplied with such special features as a synchro or one extra potentiometer mounted on the potentiometer shaft, additional taps up to 33 total per potentiometer, and various non-linear resolvers.

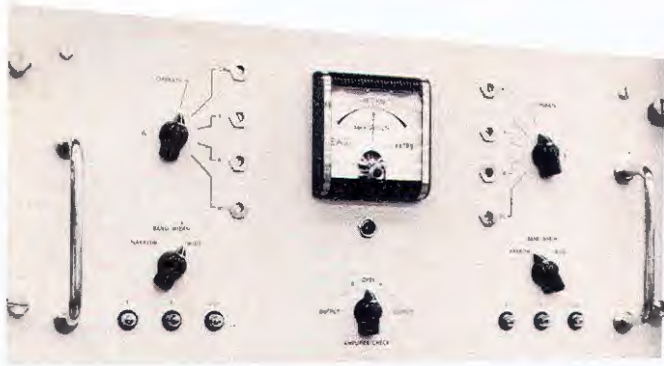


Model 1048B DC Amplifier

This new version of the Model 1048 amplifier, which has become a standard component for industry, features higher out-put current (better than 20 ma) and premium tubes with redesigned circuits for increased tube life.



*T.M.



Model 1157 High Accuracy Electronic Multiplier

Features .02% static accuracy on each of two independent products. Its chopper-stabilized amplifiers are available as inverters and its operation is switched by relay from multiplication to division. Two ranges are available—high accuracy, with a 10KC carrier, and wide band, with a 40KC carrier. This extends the usefulness of the multiplier well beyond the limitations imposed by a single compromise frequency carrier.

Specifications on other 1100 Series components and technical data on the complete computer are available on request. Prices on computer systems may be obtained by writing Sales Manager, Computer, Berkeley Division of Beckman Instruments, Inc., Richmond 3, California.

* Customer Services From Beckman/Berkeley

Technical information on all instruments and applications data will gladly be supplied on request. There is no charge or obligation for this service. All literature is prepared by a staff of technical writers who work closely with Berkeley research and applications engineers. Recent literature includes:

- Data File 110—FERRISTORS*, Their Use and Application
- Data File 111—How to Make Frequency Measurements
- Data File 112—How to Make Time Interval Measurements
- Data File 10—How to Make WWV Measurements
- Data File 123—Analog Computer Solutions for Feedback Control Systems

* Beckman/Berkeley Representatives

Berkeley's world-wide staff of factory trained engineering representatives work closely with our sales office and the customer. They help the customer set up newly-purchased equipment, acquaint personnel with its operation and application, and make sure that it stays

in operating order. The representative's job is not completed until he has "followed-up" to insure that the customer receives maximum use from his instruments. These men will be glad to give you personal assistance at any time. A list of Berkeley representatives follows.

ALBANY, NEW YORK

Edward A. Ossmann & Associates
16 Caveson Lane
Phone: Union 9-7081

ALBUQUERQUE, NEW MEXICO

V. T. Rupp Co.
8009 Bellamah, N.E.
Phone: Albuquerque 9-4621

ATLANTA 9, GEORGIA

Murphy & Cota
2110 Peachtree St., N.W.
Phone: Trinity 6-300

BINGHAMTON, N. Y.

Edward A. Ossmann & Associates
147 Front St., Vestal, N. Y.
Phone: Endicott 5-0296

BOSTON, MASSACHUSETTS

Broger Instrument Sales Co.
48 Pearl St., Brookline, Mass.
Phone: Beacon 2-4804

CHARLOTTE, NORTH CAROLINA

Murphy & Cota
2036 Norton Rd.
Phone: Edison 2-7356

CHICAGO 39, ILLINOIS

Ridgeway Engineering Assoc.
6100 W. North Ave.
Phone: Tuxedo 9-5715

CLEVELAND 28, OHIO

J. R. Dannemiller Assoc.
3955 Lee Road
Phone: Longacre 1-4567

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6815 Oriole Drive
Phone: Fleetwood 2-9918

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Gene Piety
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Phone: 8-3105

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KANSAS CITY 14, MO.

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Phone: Federal 8-0523

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Gawler-Knoop Co.
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Phone: Waverly 7-1820

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Phone: Belmont 4-9375

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