

# PRINTOUT

JOSEPH B. SIDOWSKI

## SERVICES

### Consulting and Computer Service

Daniel E. Bailey, University of Colorado, has announced the formation of Tryon-Bailey Associates, Inc., a consulting and computer service firm. Services include data analysis, custom programming, and statistical consulting. The firm advertises specialization in cluster analysis with the BC TRY System, an integrated package of computer programs for the analysis of multivariate data.

Tryon-Bailey Associates, Inc.  
728 10th Street  
Boulder, Colo. 80302  
(303) 442-6551

## PRODUCTS

### Waveform Generator

Data Royal Model F240A, when phase locked with a frequency standard, will produce sine, square, triangle, ramp, and offset sine waveforms with the frequency, accuracy, and stability of that standard. Triggered, gated, and external voltage control of frequency operation is available also. Sine-squared pulses may be generated in the triggered mode by using the offset sine waveform with trigger start/stop point set at the calibrated +90-deg or -90-deg position. Characteristics: 3 MHz frequency span; 0-360 deg phase lock capability; front panel phase meter; external ac and dc frequency control; sine, square, triangle, ramp, and offset sine outputs; solid-state design. Cost: \$805.00.

Data Royal Corporation  
8014 Armour Street  
San Diego, Calif. 92111  
(714) 279-4020

### Matrix Program Boards

CO-ORD Matrix Program Boards are composed of two to six decks of contacts bussed in parallel rows on .250 centers. The contact rows of one deck (input) are usually oriented perpendicular to the strips (rows) of the adjacent level (output). Model No. 63012-100 consists of a 10 x 10 array of holes in the front panel aligned with the coordinate intersection of the bussed strips on both decks to form a switching matrix. Transfer of inputs to outputs is accomplished by inserting a shorting pin into the desired hole location. CO-ORD provides 2-D CO-AX pins to introduce diodes and other components into the system. Matrix Program Board No. 63014-100 is 3¼ x 3¼ in. square. Program Board Kit BPS-1 consists of a 10 x 10 matrix board (63014-100), 10 shorting pins, and 10 CO-AX diode pins with 1N270's installed. Kit cost: \$27.00; without diodes, \$22.25.

The Miniature Matrix Program Board (0.100-in. center line) is 1.5 x 1.5 in. with a 10 x 10 array of holes. Front panels of these miniature units are available with silk-screened or engraved identification and with colored programming areas.

Color-coded pins and program masks can be used to further simplify program set up.

The Series 63030 switches offer a wide variety of binary coded outputs (BCD, BCO, 1224, etc.) in a compact package. Inserting a pin provides the desired binary output. Any number of decodes may be built into a single unit.

CO-ORD Switch  
Division of LVC Industries, Inc.  
102-48 43rd Avenue  
Corona, N.Y. 11368  
(212) 899-5588

### Time-Code Generators

Time-Code Generators may be obtained from the companies listed below.

Aritech Corp.  
Areo Space Research  
130 Lincoln St.  
Brighton, Mass. 02135

Astrodata, Inc.  
240 E. Palais Rd.  
Anaheim, Calif. 92805

Beckman Instruments, Inc.  
2200 Wright Ave.  
Richmond, Calif. 94804

Bulova Watch  
Electronics Division  
6120 Woodside Ave.  
Woodside, N.Y. 11377

Chrono-Log Corp.  
2583 W. Chester Pike  
Broomall, Pa. 19008

Data-Controls Systems, Inc.  
E. Liberty St.  
Danbury, Conn. 06810

Data Systems Division  
15000 Central Ave. S.E.  
Albuquerque, N.M. 87112

Datatron, Inc.  
1562 Reynolds St.  
Santa Ana, Calif. 92705

Datum, Inc.  
170 E. Liberty Ave.  
Anaheim, Calif. 92801

Di/An Controls, Inc.  
944 Dorchester Ave.  
Boston, Mass. 02125

Dynamic System Electronics  
1040 W. Alameda Dr.  
Tempe, Ariz. 85281

Dynamics Instruments Co.  
583 Monterey Pass Rd.  
Monterey Park, Calif. 91754

DynaPlex Division  
Teledyne Telemetry Co.  
Box 341  
Princeton, N.J. 08540

Flow Corp.  
127 Coolidge Hill Rd.  
Watertown, Mass. 02172

General Radio Co.  
300 Baker Ave.  
West Concord, Mass. 01781

Geotech, a Teledyne Co.  
3401 Shiloh Rd.  
Garland, Tex. 75040

The A. W. Haydon Co.  
232 N. Elm St.  
Waterbury, Conn. 06702

Information Instruments, Inc.  
62 Enterprise Dr.  
Ann Arbor, Mich. 48103

Instrumentation Technology Corp.  
18811 Napa St.  
Northridge, Calif. 91324

Intercontinental Instruments, Inc.  
500 Nuber Ave.  
Mt. Vernon, N.Y. 10550

Monitor Systems, Inc.  
401 Commerce Dr.  
Ft. Washington, Pa. 19034

Navigation Computer Corp.  
Valley Forge Industrial Park  
Norristown, Pa. 19400

Non Linear Systems, Inc.  
P.O. Box N  
Del Mar, Calif. 92014

PPM, Inc.  
7016 Euclid Ave.  
Cleveland, Ohio 44103

Paraban, Inc.  
12822 Yukon Ave.  
Hawthorne, Calif. 90250

Radiation, Inc.  
Control Division  
Box 430  
Melbourne, Fla. 32901

Solid State Electronics Corp.  
15321 Rayen St.  
Sepulveda, Calif. 91343

Systron-Donner Corp.  
888 Galindo St.  
Concord, Calif. 94520

#### CRT Display Converters

The PM 1001 enables a recorder to produce a large, precisely scaled plot of a CRT display. It takes signals directly from the CRT deflection plates and reduces them in speed (by a sampling technique) to drive an ordinary X-Y recorder and does not degrade oscilloscope performance. The converter reproduces repetitive CRT displays up to 50 MHz at repetition rates above 30/sec. Cost: \$590.00.

The Model PM 1005 has two additional features: (1) it reproduces CRT displays at repetition rates as low as one every 10 sec; and (2) it has a manual sweep allowing the sampling point and the X drive for an X-Y recorder to be controlled manually, moved backward or forward, or set at a fixed point on the CRT display. Cost: \$690.00.

Pacific Measurements, Inc.  
940 Industrial Ave.  
Palo Alto, Calif. 94303  
(415) 328-0300

#### DC Overvoltage Protector for Integrated Circuitry

Dynage Overvoltage Protector is designed for protection of voltage-sensitive loads. If an output overvoltage condition occurs, the protector will activate. When the output dc current limiting circuit of the power supply has a foldback characteristic, it protects the supply as well as the load. The unit is designed to absorb the energy stored in the system and to reduce the output voltage to 0.5 V. After a shutdown occurs, switching the input power off and then on will reenergize the system unless the cause was an internal failure of the supply itself. In this case, the protective fuse will have blown. This will insure minimum damage to the supply and no damage to the external circuitry. Modules are available from 4.0 to 80 A with voltage levels up to 100 V dc. Basic package size: 4-15/16 x 2-5/8 x 2 in. Price range: \$35-85.00.

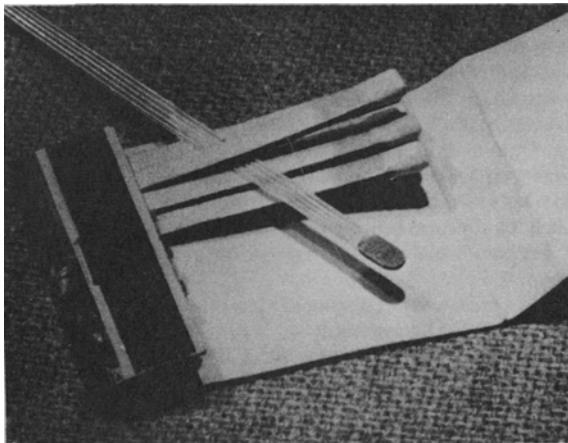
DYNAGE, Inc.  
1331 Blue Hills Ave.  
Bloomfield, Conn. 06002  
(203) 243-0315

#### Implantable Medical Transducers

Sensotec is advertising a new type of implantable pressure transducer. The transducers can be implanted with "hard" wire connections to instrumentations but with a vent system that eliminates the effects of barometer pressure changes on physiological readings.

Outputs on the various models range from 1.0 mV per 100 mmHg to 10 mV per 100 mmHg. Accuracies of the implantable transducers are typically within 0.5 mmHg and pressures as low as 5 mm of water can be recorded on most instrumentation.

The "wafer thin" models 7BW Series are less than 1 mm thick and can be used to measure force as well as pressures. Such applications as bite and prosthetic pressures can be easily read. All models use all-metal construction and have a maximum (100 megohms) electrical isolation.



#### **New-type Implantable Medical Transducer**

Robert E. Strickler, Sales Manager  
Sensotec Division of Scientific Advances, Inc.  
1400 Holly Ave.  
Columbus, Ohio 43212

#### **Logic Cards**

Logic cards of all types are manufactured and distributed by the following firms:

Avco Electronics Division  
2630 Glendale-Milford Rd.  
Cincinnati, Ohio 45241

Avtron Manufacturing, Inc.  
10409 Meech Ave.  
Cleveland, Ohio 44105

Cambridge Thermionic Corp.  
445 Concord Ave.  
Cambridge, Mass. 02138

Computer Logic Corp.  
1528 20th St.  
Santa Monica, Calif. 90404

Conductron-Ann Arbor  
3475 Plymouth Rd.  
Ann Arbor, Mich. 48105

Control Logic, Inc.  
3 Strathmore Rd.  
Natick, Mass. 01760

Data-Control Systems, Inc.  
E. Liberty St.  
Danbury, Conn. 06810

Data Systems Division  
15000 Central Ave. S.E.  
Albuquerque, N.M. 87112

Datascan, Inc.  
1111 Paulison Ave.  
Clifton, N.J. 07011

Di/An Controls, Inc.  
944 Dorchester Ave.  
Boston, Mass. 02125

Dietz Design, Inc.  
100 Electronics Pkwy.  
Belton, Mo. 64012

Digital Equipment Corp.  
146 Main St.  
Maynard, Mass. 01754

Digital Products  
335 W. 7th St.  
San Pedro, Calif. 90731

Electronics Modules Corp.  
P.O. Box 141  
Timonium, Md. 21093

Honeywell Test Instruments Division  
4800 E. Dry Creek Rd.  
Denver, Colo. 80217

Instrumentation Technology Corp.  
18811 Napa St.  
Northridge, Calif. 91324

Janus Controls Division/Tyco  
296 Newton St.  
Waltham, Mass. 02154

Kearfott Products, General Precision  
1150 McBride Ave.  
Little Falls, N.J. 07424

Leeds & Northrup Co.  
Sumneytown Pike  
North Wales, Pa. 19454

Monitor Systems, Inc.  
401 Commerce Dr.  
Ft. Washington, Pa. 19034

Navigation Computer Corp.  
Valley Forge Industrial Park  
Norristown, Pa. 19400

Optical Electronics, Inc.  
3150 E. 46th St.  
Tucson, Ariz. 85713

Pastoriza Electronics  
385 Elliot St.  
Newton Upper Falls, Mass. 02164

Plug-in Instruments, Inc.  
1416 Lebanon Rd.  
Nashville, Tenn. 37210

Post Electronic Products, Inc.  
12 Lothrop St.  
Beverly, Mass. 01915

Raytheon Co.  
Industrial Components Operation  
465 Centre St.  
Quincy, Mass. 02169

Republic Adv. Tech. Sys. Group  
9754 Deering Ave.  
Chatsworth, Calif. 91311

Republic Corp.  
Northridge Engineering  
18758 Bryant St.  
Northridge, Calif. 91324

The Roback Corp.  
1000 Buck Rd.  
Huntington Valley, Pa. 19006

Scientific Data Systems  
555 S. Aviation Blvd.  
El Segundo, Calif. 90245

Space & Tactical Systems Corp.  
1 Garfield Cir.  
Burlington, Mass. 01803

Systems Engineering Labs, Inc.  
P.O. Box 9148  
Fort Lauderdale, Fla. 33310

Tech. Services, Inc.  
BRS-Foringer  
5451 Holland Dr.  
Beltsville, Md. 20705

Tyco Instrument Division  
Tyco Labs  
16 Hickory Dr.  
Waltham, Mass. 02154

Weston-Transicoil  
Trooper Rd.  
Worcester, Pa. 19490

#### **Tubular Solenoids**

Dormeyer lists tubular solenoids of either the push or pull types, at 12 or 24 V dc. The solenoids are long-life, vary in size, and are available for constant, intermittent, and pulse duty (service).

Dormeyer Industries  
3418 No. Milwaukee Ave.  
Chicago, Ill. 60641

#### **Portable Data Logger**

The Data Logger is small and light-weight (20W x 18D x 8H in., and 45 lbs) with broad performance specifications. For instance, scanners are available with 1-, 2-, or 3-pole switching, with as few as 10 or as many as 1,000 inputs, and with scanning rates from 30 points/sec to 50,000 points/sec. Standard dc input ranges are 10 mV to 10 V, with differential inputs and high input impedance on all ranges. Analog-to-digital conversion times from 40  $\mu$ sec to 230 msec may be specified, with sample-and-hold a standard option. Output buffers are available for operating eight output devices, including paper tape punches, incremental and continuous magnetic tape recorders, card punches, teleprinters,

line printers, and computers. The Digital Data Logger accepts both high- and low-level analog signals. All ranges are very high impedance differential with high common mode rejection. Four types of scanners are available as are two types of A/D converters.

Each Digital Data Logger consists of the following: Scanner, with amplifier and display; Analog-to-Digital Converter, with display; Digital Clock, with display; Manual Data Entry, three digits; Output Buffer; Recording Device; Instrument Cabinet; Options as specified. Optional features include: crossbar scanner; random address input; sample and hold; signal conditioning; punched tape programming; pinboard and patchboard programming; keyboard data entry; digital data inputs; buffer storage, etc.

Control Equipment Corporation  
32 Kearney Rd.  
Needham Heights, Mass. 02194  
(617) 444-7550

#### **Universal Flip-Flop**

Digital Data Systems is marketing a Universal Flip-Flop module at \$38.00.

Digital Data Systems  
P.O. Box 26  
Chatsworth, Calif. 91311  
(213) 882-3356

#### **Activity Cage System**

Woodard Research Corporation advertises an activity cage system utilizing infrared. The principle of operation involves the interruption of a beam of infrared light by the animal and the converting of this interruption into a "count" by transistorized circuitry. "Counts" are accumulated by means of a six-digit Sedeco visual counter or a five-digit Elmeg printout driven directly without mechanical relays. The counter is mounted in a separate control panel, allowing the E to isolate the cages if desired.

Six infrared light beams are symmetrically located around a circular raceway in such a way that they require no focusing or adjustment. Each of the six beams with associated circuitry operates independently, so more than one animal may be placed in the unit at one time. "Dead" time of the counting mechanism is about 0.025 sec.

Size: Activity Cage—14½ x 14½ x 9-3/8 in.; Control Panel—8 x 6 x 8½ (visual), 9 x 8 x 12 (printout).

Prices: Standard units with Sedeco Counter, \$1,065.00. With Elmeg Printout Counter, \$1,740.00.

Parts Warranty: 90 days.

Woodard Research Corp.  
12310 Pinecrest Rd.  
Herndon, Va. 22070  
(703) 437-1600

#### **Low-Cost Graphic Computer Terminal**

A completely self-contained, desk-top information display system has been introduced by Tektronix, Inc. The Graphic Computer Terminal includes a display unit, a terminal control, a character generator, a keyboard, and an input/output interface. The display unit is an 11-in., direct-view, bistable storage tube that produces high-density alphanumeric and complex graphics without flicker or drift. The 6½ x 8½ in. screen accommodates up to 35 lines of alphanumeric characters with 80 symbols per line. This permits more than 2,800 characters to be displayed with excellent clarity. Resolution is equivalent to 400 x 300 line pairs. Stored information luminance level is at least 3 ft-L; contrast

ratio is at least 3:1. Stored information may be erased in 0.5 sec.

An average of up to 1,000 characters per second may be generated and stored on the display tube. The character generator provides a set of 94 printable characters. Characters under program control are 70 x 90 mils and 140 x 180 mils in size.

Two types of input/output interface are available. Type 4801 is for DEC PDP-8 series computers; Type 4802 interfaces with Bell System Type 201 and Type 202 data sets and other compatible acoustic modems or high speed data systems.

Price: Type T4002 terminal is \$8,000.00. Type 4801 DEC PDP-8 series interface with cable is \$585.00. Type 4802 with cable is \$515.00.

Tektronix, Inc.  
Beaverton, Oreg. 97005  
(503) 644-0161

#### Signal Averaging Computer

The new 1070 Signal Averaging Computer from Fabri-Tek features: 20  $\mu$ sec/address sweep speeds with 9-bit resolution decimal number CRT display of address and data values expandable memory; a variety of measurement plug-ins; and hardware interface to a general purpose computer. The Fabri-Tek 1070 memory contents can be transferred directly to a general purpose computer such as the PDP-8/L for further data collection. Price: starts at \$9,600.00 with two plug-in units.

Fabri-Tek Instruments, Inc.  
5225 Verona Rd.  
P.O. Box 4218  
Madison, Wis. 53711  
(608) 238-8476

#### Stepping Motors

Rapid-Syn's steppers have a series of solenoids arranged in a circle. These are excited one at a time, sequentially. The permanent magnet type (PM) is generally a large angle device, 45 to 180 deg per step. The variable reluctance type (VR) are usually 15 deg/step devices and have a rotor with teeth. VR types rely on the pure solenoid action of the soft iron teeth of the rotor and stator. The windings are generally three-phase although occasionally four-phase windings are used. If the rotor is toothed and it also contains a permanent magnetic field, it is labeled a Hybrid type. These units are small-angle, high-torque devices. The rotors are multitooth and the poles of the stator have multiple teeth.

Computer Devices  
1925 Burke Street  
Santa Fe Springs, Calif. 90670  
(213) 698-2595

#### Heath Sine-Square Wave Generator

The new IG-18 Heath Co. solid-state sine-square wave generator has eight output voltage ranges (0.003 to 10 V rms) with an external load of 10 K ohms, six output ranges (0.003 to 1 V rms, -62 to +22 dB) using the built-in 600-ohm load. The output range is continuously variable from 1 Hz to 100 kHz. From 10 Hz to 20 kHz sine-wave output has less than 0.1% distortion. Frequency range of the square wave section is 5 Hz to 100 kHz at 0.1, 1, and 10 V selected outputs. Price: \$67.50.

Heath Co.  
Benton Harbor, Mich. 49022

#### Test Probe

The Dyna-Flex three-point test probe allows you to make three

touch-to-test contacts simultaneously and, if desired, with one hand. Three spring-loaded needle-point tips tilt or swivel on ball points to permit adjustment automatically to spacings from 1/32 to 5/8 in. Three color-coded leads terminate in insulated alligator clips for connection to the test instrument. Price: \$12.95.

B & K Division  
Dynascan Corp.  
1801 W. Belle Plaine Ave.  
Chicago, Ill. 60613

#### Custom Cabinet Kits

Flexi-Cab cabinet kits consist of six panels and 12 vise-grip slides. The units can be assembled in minutes by joining the slides and panels and require no screws, rivets, or adhesives. Panels are vinyl-clad steel and the package contains a set of pressure-printed sensitive labels for identifying controls. Price: starts at \$2.98.

Bell Educational Labs, Div.  
Beltronix Systems, Inc.  
123 Marcus Blvd.  
Hauppauge, N.Y. 11787

#### New Stereo Headset

The new Clark/300 stereo headset has the following specs: Frequency Range, 20-17,000 Hz; Sensitivity, 1 mW input at 1000 cy produces 105 dB reference .0002 microbar; per earpiece, Max Power Input, 1 W/phone; Nominal Impedance, 8 ohms. Price: \$19.00.

David Clark Co., Inc.  
360 Franklin St.  
Worcester, Mass. 01601

## BRIEFS

#### SCC Model 660 Computer System Price Reduction

Scientific Control Corp. announces a plan for a price reduction of about 30% in the purchase price of the SCC Model 660 Computer System, a 24-bit system with 1.75  $\mu$ sec cycle time. The basic system consists of CPU with priority interrupt channel for error protect, hardware multiply/divide, adapter, 4,096-word memory module, IBM Selectric Typewriter, and high-speed paper tape reader and punch.

Scientific Control Corp.  
2510 Dempster St.  
Suite 102  
Des Plaines, Ill. 60016  
(312) 297-2470

#### Alphabetical Identification of Parts or Components in Circuit Drawings or Parts Lists

Some of the common letters used for identifying various components are listed below.

Battery—B, BT, or M  
Capacitor—C  
Coil—L  
Diode—D, CR, X, or XD  
Fuse—F  
Jack—J  
Lamp—B, I, M, NE  
Meter—M  
Microphone—MIC, or M

Plug—PL, or P  
 Power Rectifier—M, SR, X, or CR  
 Relay—K, RL, or R  
 Resistor—R  
 Socket—X, or S  
 Speaker—SP, SPK, S, or LS (loudspeaker)  
 Switch—SW, or S  
 Transformer—T  
 Transistor—TR, or X  
 Tube—V

#### Transistor Formulas

(1) Current Gain:  $A_i = \frac{\Delta I_c}{\Delta I_b}$  (with  $V_c$  constant).

$I_c$  = collector current;  $I_b$  = base current;  $V_c$  = collector voltage.

(2) Voltage Gain:  $A_c = \frac{\Delta V_c}{\Delta V_b}$  (with  $I_c$  constant).

$V_c$  = collector voltage;  $V_b$  = base voltage;  $I_c$  = collector current.

(3) Input Resistance:  $R_i = \frac{\Delta V_i}{\Delta I_i}$ .

$V_i$  = input voltage;  $\Delta I_i$  = input current.

(4) Output Resistance:  $R_o = \frac{\Delta V_o}{\Delta I_o}$ .

(5) Power gain:  $A_p = \frac{\Delta P_o}{\Delta P_i}$ .

$P_o$  = output power;  $P_i$  = input power.

(6) If we consider the current gain of the transistor common base to be alpha:

$$\alpha = \frac{\Delta I_c}{\Delta I_e} \text{ (with } V_c \text{ constant).}$$

$I_c$  = collector current;  $I_e$  = emitter current;  $V_c$  = collector voltage.

(7) Let beta refer to the current gain of the common emitter:

$$\beta = \frac{\Delta I_c}{\Delta I_b} \text{ (with } V_c \text{ constant).}$$

$I_c$  = collector current;  $I_b$  = base current;  $V_c$  = collector voltage.

#### An Inexpensive One-Way Viewer

A recent research problem at the Wisconsin Regional Primate Research Center required one-way viewing of isolated infant

monkeys. One-way glass provided unwanted reflections of the Ss' activities; a light spraying of the glass with flat black paint allowed some viewing but failed to eliminate the reflection problem completely. Cheesecloth and circuit board were tried and worked fairly well but were less than optimal for the particular viewing circumstance. Finally, a simple door-peeper was installed and fulfills our needs very well. The item is inexpensive (\$1.95 to \$2.95 each), requires a minimum amount of installation time, and is available at most hardware stores. It can be installed easily for viewing through partitions as thin as sheet metal or as thick as heavy doors. Inserting the viewer through a small rubber mount allows the O to position the peeper if the S moves up close and slightly to one side of the viewing scope—this is a blind spot for a fixed viewer. A small piece of fairly flexible red rubber mounted on a piece of metal was tried, but we finally settled on a small hard rubber vibration mount.

#### PDP-9 Statistics Package

STATPAC is a statistics package for use with the PDP-9 and PDP-9L computers. It consists of a collection of modular statistical programs written in FORTRAN. The package consists of five modules: control, input, descriptive statistics, stepwise linear regressions, and multiple linear regressions. Modules being considered for later packaging include: factor analysis, analysis of variance, discriminant analysis, and transformation capability.

Digital Equipment Corp.  
Maynard, Mass. 01754

#### DEC New Additions to Logic Module Line

The following new additions have been announced to the M-Series Logic Module line:

M133 Input NAND Gate: Price \$29.00.

M202 Triple J-K Flip-Flop: Price \$30.00 (contains three J-K flip-flops augmented by multiple input AND gates).

M623 Bus Driver: Price \$40.00 (contains 12 two-input AND gate bus drivers for driving positive input bus of PDP-8/I or PDP-8L computers).

M706 Teletype Receiver: Price \$175.00 (serial to parallel self-contained teletype code converter on a double height module).

M707 Teletype Transmitter: Price \$175.00 [includes all parallel-to-serial conversion, buffering, gating, and timing (excluding an external clock) necessary to transfer information in an asynchronous manner between a parallel binary device and a serial data line or teletype device].

M906 Cable Terminator: Price \$20.00 (18 load resistors clamped to prevent excursions beyond +3 V and ground. Presents load of 22.5 mA or 14 TTL unit load at ground).

Digital Equipment Corp.  
Maynard, Mass. 01754

#### Updated Price List

David Kopf Instruments has issued a new price list effective April 1969 covering the items in Catalog No. 680 (animal adaptors, manipulators, stereotaxic, etc.). Copies may be obtained from David Kopf Instruments, 7324 Elmo St. (P. O. Box 636), Tujunga, Calif. 91042, (213) 352-3274.