PRINTOUT

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PRODUCTS

PM Stepper Motor

The new Molon PM stepper motor is 2½ in. deep and 7/8 in. long with standard voltages of 6, 12, and 24 V. The simplest excitation mode uses a unipolar four-phase power supply. The motor's step angle is 7½ deg, torque is 4 oz-in. at 100 pps, static torque is 10 oz-in.

Molon Motor & Coil Corp.
3737 Industrial Ave.
Rolling Meadows, Ill. 60008

Small Condenser Microphone

Model 5336 TElectret condenser microphones are 0.280 in. square by 0.160 in. deep and are low cost. The microphones offer extended frequency response from 50-16,000 Hz and are completely sealed. An IC hybrid preamplifier is built into the unit. The mikes are powered by a permanent electric charge built into the diaphragm.

Thermo Electron Corp.
101 First Ave.
Waltham, Mass. 02154

Optical Switches

Opto-Switch is a solid state optoelectronic control switch. Sixteen models are available in four basic electrical configurations. Single- or dual-channel models are available with a choice of sensing gaps (0.06 or 0.2 in.). The units measure 0.4 x 0.4 x 0.5 in. Each switch contains a GaAs infrared LED and a photodetector in a plastic case. Designs include the following combinations of emitter and sensor circuitry: LED-phototransistor pair; LED-phototransistor plus amplifier; LED-photoDarlington transistor; and LED-phototransistor plus amplifier and Schmitt trigger. The latter packages can be used directly with TTL/DTL/MOS logic-level circuits. Price: approximately \$12.

Sensor Technology
21012 Lassen St.
Chatsworth, Calif. 91311

Fourier Transform Plug-in for Minis

The 306/MFFT performs Fourier transform-related operations including forward and inverse FFT, spectral magnitude, Hanning weighting, and complex multiplication. Plugged directly into a Data General NOVA 800, a 1024 real-sample time series can be Fourier transformed and the magnitude of the spectrum formed in 139 nsec. Time-domain-signal processing functions can be calculated at a rate of 2.8 microsec per multiply-accumulate. The 306/MFFT is also capable of performing hardware single-precision and some double-precision arithmetic. In the NOVA 800, the 306/MFFT card performs single-precision adds, subtracts, multiplies, divides, and square roots in 2.8 microsec per array element (equivalent to reducing cycle time from 800 to 150 nsec). Price: \$6,000.

Elsytec
212 Michael Dr.,
Syosset, N.Y. 11791

CRT Display Controller

The Model 5300 CRT display controller allows display of up to 3,200 upper case ASCII alphanumeric symbols on any standard high-quality NTSC-compatible video monitor. Characters are formed as a 7 x 5 dot matrix in a 10 x 6 dot field; standard format is 40 lines of 80 characters each. An optimal 32-character special symbol set uses the 10 x 6 dot-matrix area for drawing graphic symbols that include vertical and horizontal strokes. The display controller features an internal 2K x 16-bit MOS RAM accessible by the PDP-11 UNIBUS and the refresh logic. No CPU or bus overhead results from the continuous display refresh. Buffer behaves like the PDP-11 main memory. All PDP-11 instructions can operate on the displayed characters. Price: \$3,295, with graphics.

Tano Corp.
4521 W. Napoleon Ave.
Metairie, La. 70001

Subminiature Rotary Switch

The JMP series rotary switch plugs into a PC board.

The switch measures less than 0.3 in. in diam and less than 0.4 in. long. It weighs 1½ g. The switch has a 36-deg throw angle for 10 positions, 1 or 2 poles and bridging functions. A screwdriver-slotted shaft actuates the unit; a detent mechanism prevents accidental switch settings.

Janco Corp.
3111 Winona Ave.
Burbank, Calif. 91504

Microcomputer

The MPS-803 is a microcomputer using the 8008 CPU chip; it includes CPU, ROM, RAM, I/O together with DMA controls and interrupt capability. It is mounted on three 4.5 x 6.5 in. PC cards. The MPS-805 is a five-card version with more capability. Minimum versions of either system contain 256 words of ROM and 1,024 words of RAM. Price: \$920.

Pro-Log Corp.
852 Airport Rd.
Monterey, Calif. 93940

Intelligent CRT Terminal

The Intecolor 8000 is a 22 x 17.5 x 16 in. package containing CPU, refresh memory, and color CRT. The unit displays up to 2,000 characters in an 80-character x 25-line format and 64 standard ASCII characters in a 5 x 7 dot matrix.

Intelligent Systems Corp.
2405 Pine Forrest Dr.
Norcross, Ga. 30071

Factoring Counter/Timer

The 8100 series counter/timers reportedly count, totalize, or time and provide a direct or factored digital readout in the desired units of measure for the function being monitored. The 8110 is a programmable factoring counter that can read in any unit of rate measure; the 8120 is a programmable factoring totalizer that will accumulate the output of a pulse-producing transducer. Model 8130 programming factoring timer will measure time and give a direct reading. The units weigh 1 lb and require a standard mounting hole of 3.75 x 1.72 in. Price: \$275 each.

DigiTec
United Systems Corp.
918 Woodley Ave.
Dayton, Ohio 45403

Miniature Tape Drive

The Model 600 digital tape drive occupies 3½ x 7 in. of panel space and may be mounted in any plane. The unit uses the 3M data cartridge as the tape medium and is compatible with proposed ANSI and ECMA specifications. Digital data is recorded on ¼-in. tape in

up to four tracks, written at a density of 1,600 bits/in., phase encoded at 30 in./sec. This results in data-transfer rates of 48,000 bits/sec. The 600 operates at 90 in./sec in bidirectional search. Price: starts at \$300.

Quantex
200 Terminal Dr.
Plainview, N.Y. 11803

Chart Recorder (6 months)

The Model M chart recorder provides up to 6 months of recording without attention. Chart speeds available are 1/8, ¼, ½, and 1 in./h. The 1/8-in./h rate provides 6 months of recording on a 45-ft roll of 4-in.-wide pressure-sensitive paper. The recorder is driven by a battery-powered electronic clock with the battery rated for more than 1 year's operation before replacement. Price: \$580.

Impact-O-Graph Corp.
181 Northfield Rd.
Bedford, Ohio 44146

Motor Speed-Control Regulators

The new SGS-ATES linear IC dc motor speed-control regulators (Types TCA 900 and TCA 910) are designed to maintain a virtually constant motor speed, despite variations in supply voltage, ambient temperature, or load. The TCA 900 is primarily for use in battery-operated portable equipment; TCA 910 is intended for the higher voltages in line-operated equipment.

SGS-ATES Semiconductor Corp.
435 Newtonville Ave.
Newtonville, Mass. 02160

Two-Wire Transmitter for Various Sensors

Suitable for strain gages, thermocouples, thermistors, and other sensors, the LH0045 two-wire transmitter is designed to convert a voltage signal into a current and transmit the current down a twisted-pair line to a receiver. The IC's can be used for remote sensing applications, since the same twisted pair can serve to supply the device its dc operating voltage. The unit consists of a sensitive input amplifier, an output current source, and a reference to power the sensor bridge. It is offered in 12-pin TO-8 and 8-pin TO-3 packages.

National Semiconductor Corp.
2900 Semiconductor Dr.
Santa Clara, Calif. 95051

X-Y Digitizer

The 622 X-Y digitizer provides manual or automatic digitization of X-Y coordinates of information in a standard video signal. Update rate is 60 times/sec. Price: \$4,500.

Colorado Video, Inc.
Box 928
Boulder, Colo. 80302

Wireless Mini-Microphone

The Micro-Mini-Mike measures 1-7/8 x 1/2 x 5/8 in. and picks up and transmits sound, without wires, up to 450 ft, through any FM radio. Price: \$14.95, with battery.

AMC Sales
Dept. P
Box 610
Downey, Calif. 90247

Graphics Digitizer

The Model E241 generates X-Y coordinates with pressure from a ballpoint pen or similar stylus. The work area is 15 x 11 in., and the standard error is better than 0.02 in. Dual-digit displays show the X and Y coordinates. Interfaces are available.

Elographics
P.O. Box 388
Oak Ridge, Tex 37830

Photoelectric Optical Data Digitizer

With the Optical Data Digitizer (O.D.D.), a computer perceives visual data on-line as it determines what should be looked at and for how long. The O.D.D. creates the binary equivalent of a two-dimensional optical image and thus prepares it for immediate input for the computer. Having control over the O.D.D. scan along the X and Y coordinates enables the computer to select the size of each scanning step, choose the direction of the scan, determine the dwell time per element, all with random access capabilities. The computer can then perform computations and initiate procedures in accordance with the kind of data it receives. It can also sum, average, deconvolve, or format for tape entry.

A choice of image sensors is available. Using the Image Dissector, conversion takes place by scanning an electronic image emitted by a target across an aperture. Vidicon sensors, on the other hand, perform this function by holding the corresponding charge pattern on a target for subsequent readout by an electron beam. The deflection field of either type of sensor is provided by a scanning-function driver which receives its analog voltage input from a scanning-function decoder. This permits the digital output of the computer to be used in controlling the scanning pattern within the sensor.

Several software programs can be supplied as a basis for the software approach to image analysis. These basic programs are designed for the PDP-8E/TTY driving the O.D.D. The basic raster scan program allows control of the scanning raster. There is also a program for image content histogram display and a routine for target detection/tracking.

EMR Photoelectric
Box 44
Princeton, N.J. 08540

Modular Power Supplies

Suppliers of modular power supplies are listed below:

ACDC Electronics
Oceanside Industrial Park
Oceanside, Calif. 92054

Acopian Corp.
Easton, Pa. 18042

Amphenol CMS
2875 S. 25th Ave.
Broadview, Ill. 60153

Alton Data Corp.
223 Crescent St.
Waltham, Mass. 02154

Anadyne
12741 Los Nietos Rd.
Santa Fe Springs, Calif. 90670

Analog Devices, Inc.
Box 280
Norwood, Mass. 02062

Burr-Brown Research Corp.
International Airport Ind. Park
Tucson, Ariz. 85734

California Electronics Mfg. Co.
Box 555
Alamo, Calif. 94507

Computer Products, Inc.
1400 NW 70 St.
Ft Lauderdale, Fla. 33309

Datel Systems, Inc.
1020 Turnpike St.
Canton, Mass. 02021

Dynamic Measurements Corp.
6 Lowell Ave.
Winchester, Mass. 01890

Elcom Industries
Hanscom Field
Bedford, Mass. 01730

EEP Corp.
10180 W. Jefferson Blvd.
Culver City, Calif. 90230

Function Modules, Inc.
2441 Campus Dr.
Irvine, Calif. 92664

Instant Instruments, Inc.
306 River St.
Haverhill, Mass. 01830

Intronics
57 Chapel St.
Newton, Mass. 02158

Kenmark Development Group, Inc.
71 Mott Ave.
Inwood, N.Y. 11696

Lambda Electronics Corp.
515 Broad Hollow Rd.
Melville, N.Y. 11746

Mil Electronics, Inc.
176 Walker St.
Lowell, Mass. 01854

National Power Products
Box 292
Haverhill, Mass. 01830

National Semiconductor Corp.
2900 Semiconductor Dr.
Santa Clara, Calif. 95051

NJE Corp.
50 Culver Rd.
Dayton, N.J. 08810

Polytron Devices, Inc.
Box 398
Patterson, N.J. 07524

Power/Mate Corp.
514 River St.
Hackensack, N.J. 07601

Power Pack
1 St. John St.
Dover, N.H. 03820

Powertec, Inc.
9168 DeSoto Ave.
Chatsworth, Calif. 91311

Semiconductor Circuits, Inc.
306 River St.
Haverhill, Mass. 01830

Sorensen Co.
676 Island Pond Rd.
Manchester, N.H. 03103

Standard Power, Inc.
1400 S. Village Way
Santa Ana, Calif. 92705

Teledyne Philbrick
Allied Dr.
Dedham, Mass. 02026

Technetics, Inc.
Box 910
Boulder, Colo. 80302

Zeltex, Inc.
1000 Chalomar Rd.
Concord, Calif. 94518

Right-Angle Camera Viewer

The Laikin right-angle camera viewer for 16-mm motion picture cameras allows one to photograph inaccessible places. The camera and viewer are mounted on a bearing for continuous rotation. A shaft is provided with a 100:1 gear reduction. The lens has a 60-deg field of view. Focus: .5 in. to infinity. Price: \$3,000, with shipping case.

Laikin Optical Corp.
5630 Arbor Vitae St.
Los Angeles, Calif. 90045

Eye-Mark Recorder

The Eye-Mark recorder simultaneously and continuously records the Ss' discrete visual point of interest within his field of view. The head-mounted unit reflects an illuminated spot off the eyeball cornea which is superimposed into the field of view. Both field of view and the superimposed illuminated spot are then recorded on 16-mm motion picture film, closed-circuit TV, or visually observed. Fiber optics are used to keep the recording camera remote. The unit is lightweight and usually takes about 15 min or more to set up. Two basic models are available, a 30-deg type and a 60-deg type. With the 30-deg type, the field of view is advertised as approximately 22.7 deg vertical and 31.4 deg horizontal; for the 60-deg unit, it is 43.5 deg vertical and 60 deg horizontal. Tracking field: advertised as ± 10 deg around optical center line in 30-deg type and ± 20 deg in 60-deg type. Accuracy is approximately 2 deg within the above-given fields.

Instrumentation Marketing Corp.
820 S. Mariposa St.
Burbank, Calif. 91506

Physiological Feedback Monitors

Harvard Apparatus is advertising five biofeedback instruments. Available models are GSR (\$110), EEG (\$165), Pulse (\$135), EMG (\$185), and Differential Temperature (\$195). The units are designed "for student

investigation of autonomic functions." Feedback is audible.

Harvard Apparatus Co., Inc.
150 Dover Rd.
Millis, Mass. 02054

BRIEFS

Eye-Movement Directory

Richard A. Monty recently (May 1974) organized and edited "An interdisciplinary directory of scientists engaged in the study of eye movements." The directory lists names, addresses, phone numbers, educational background, and interests of approximately 100 scientists involved or interested in the study of eye movements and related processes. If you are interested in being listed in subsequent editions of the directory, please provide the information on the form provided on the inside back cover.

Request for Information: Social Science Research

The Russell Sage Foundation is funding a study of events and problems concerning the confidentiality of social science research sources and data. The study will analyze such issues as the confidentiality of survey research data, and the obligation of a scholar to reveal his or her research sources to other scholars.

The study is sponsored by the American Anthropological Association, the American Economic Association, the American Historical Association, the American Political Science Association, the American Psychological Association, the American Sociological Association, the Association of American Geographers, and the Association of American Law Schools.

The study will begin in February 1974 and end in December 1975.

Individuals and organizations are invited to send to the director of the study a statement of: (1) any events of which they have knowledge that have raised questions concerning the confidentiality of social science research sources and data, and (2) any problems they have encountered that have involved questions concerning the confidentiality of social science research sources and data. The statement should specify the time, the place, the individuals, the organizations, and the circumstances involved in the events and problems. Information provided in response to this request will be treated as confidential unless the individual providing the information consents to its release.

The statements will be used by the director and project board to select events and problems for further analysis.

Statements should be sent to the principal investigator:

James D. Carroll, Director
Department of Public Administration
200 Maxwell Hall
Syracuse University
Syracuse, N.Y. 13210
Telephone: (315) 423-2687

Intel Computer Chips

Intel has developed a more powerful version of the 4004 microprocessor chip, software-compatible with the 4004, and its first bipolar-LSI computer chips. This 6- or 7-chip set is expandable by two-bit increments to cover the entire middle-level computer range. Intel's bipolar chips are built with Schottky TTL technology. Cycle times are as low as 70 nsec, and among the chips in the set are microprogrammed control unit, an arithmetic register, a carry and look-ahead, and a priority-interrupt chip.

Computer Terminals

MTS, Inc. (Albuquerque, N.M. 87108) recently introduced its first computer terminal, the Comter 256 with an alphanumeric 32-character self-scan display; 256 characters can be stored with expandability to 1,024 characters. The unit has a built-in acoustic coupler; it also has a tape/record feature advertised as providing "virtually unlimited memory capacity." Price: \$595, including coupler.

Texas Instruments (Houston, Tex. 77001) has added the Model 735 to its line of portable Silent 700 electronic data terminals. The unit weighs less than 25 lbs and is packaged in a briefcase. Price: \$2,595.

Microprocessor

Information concerning microprocessor products may be obtained from the following companies:

American Microsystems, Inc.
3800 Homestead Rd.
Santa Clara, Calif. 95051

Applied Computing Technology
17961 Sky Park Circle
Irvine, Calif. 92707

Computer Automation, Inc.
895 W. 16th St.
Newport Beach, Calif. 92660

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

Fairchild Semiconductor
464 Ellis St.
Mountain View, Calif. 94040

General Automation
1055 S. East St.
Anaheim, Calif. 92805

Intel
3065 Bowers Ave.
Santa Clara, Calif. 95051

Intersil
10900 N. Tantau Ave.
Cupertino, Calif. 95014

Microsystems International, Ltd.
P.O. Box 3529
Station C
Ottawa, Canada K1Y 4J1

Monolithic Memories
1165 E. Arques Ave.
Sunnyvale, Calif. 94086

Mostek Corp.
1215 W. Crosby Rd.
Carrollton, Tex. 75006

Motorola Semiconductor Products
P.O. Box 20912
5005 E. McDowell Rd.
Phoenix, Ariz. 85036

National Semiconductor Corp.
2900 Semiconductor Dr.
Santa Clara, Calif. 95051

Pro-Log Corp.
852 Airport Rd.
Monterey, Calif. 93940

RCA Solid State Div.
Route 202
Somerville, N.J. 08876

Raytheon Semiconductor
350 Ellis St.
Mountain View, Calif. 94040

Rockwell Microelectronics Div.
P.O. Box 3669
3430 Miraloma Ave.
Anaheim, Calif. 92803

Signetics
811 E. Arques Ave.
Sunnyvale, Calif. 94086

Toshiba Transistor Works
1-Komukai
Toshiba-Cho
Kawasaki-Chi, Japan

Western Digital
Box 2180
19242 Red Hill Ave.
Newport Beach, Calif. 92663

Psychological Instruments

Testan recently issued a new catalog covering two kinds of products: a small number of environmental devices and a relatively complete listing of programming logic.

Testan
P.O. Box 267
Davis, Calif. 95616

Transdermal Stimulator

The Model 401 Transdermal Stimulator (Mentor Corp., 3104 W. Lake St., Minneapolis, Minn. 55416) is advertised as a device for transcutaneous electrical stimulation of peripheral sensory nerves. The device is used to relieve pain, according to the company announcement.

Force Platform

The Quartz Multi-Component Platform is a biomechanical device for the measure of force exerted by the human foot in three orthogonal directions; it locates the point of force application (x,y coordinates), and determines the free movement. Measurements are made while the S is standing, walking, or jumping. Operation of the platform is based on the piezoelectric principle, utilizing four three-component force transducer elements.

Kristal Instrument Corp.
2475 Grand Island Blvd.
Grand Island, N.Y. 14072

Portable Infusion Pump for Animals

The Sharp infusion pump is portable, requiring no external power source. Infusion rate is 5.0 cc/24 h $\pm$ 15%; reservoir capacity is 20 cc max; winding interval is 16 h. The unit weighs 1.3 lbs and measures 3-3/4 in. deep x 6-1/16 in. high x 2-1/8 in. deep.

Hycom, Inc. (distributor)
16841 Armstrong Ave.
Irvine, Calif. 92705

Do-It-Yourself-LSI "Minicomputer"

The Control Logic (Nine Tech Circle, Natick, Mass. 01760) L series allows the user to assemble a wide variety of "minicomputers" for digital applications. The series includes the following basic building blocks: a processing unit, memories, I/O functions, packaging, and prototyping accessories. The series consists of a set of 3 in. x 5 in. digital logic cards on which components are

partitioned. Typical listed prices: LCP-593 CPU (20-microsec instruction time, 8-bit parallel processor, input multiplexor, and state decoder) at \$195; LIO-594

I/O control, \$95; LRM-598 1,024-byte RAM, \$325; LDD-503 device address decoder (4-bit to 16-line), \$30; priority interrupt control, \$75; Teletype interface, \$85.

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NOTES

A simple interface to operate electromechanical equipment with digital logic

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In many laboratories using digital logic modules for the programming of behavioral experiments, it is frequently desirable to drive 28-V equipment, e.g., relays, lamps, counters, etc. While it is convenient to use factory-built transistorized driver units for these purposes, it is sometimes necessary because of economic and space restrictions (or specific operational requirements) to find an alternative means of operating these devices. For example, in order to use the standard Industrial Electronic Engineers (IEE) visual display readouts for the illumination of pigeon keys, it is sometimes necessary to use 12 drivers for each unit, 1 for each lamp. This can be somewhat cumbersome in terms of card-file space requirements, especially if a multiple-key chamber is used. Also, many laboratories represent both input and output sides of the drivers to AMP or MAC panels because the units are used for other purposes in different programs. Thus, the units require panel space and represent a possible source of programming errors because of the extra wiring involved.

We have found it very economical and convenient to build our driver units and to wire them directly to those devices normally used. The drivers are wired to counters so that only a single pin is needed on the AMP panel to represent the counter. For the IEE units, the input is represented on the panel and the output is wired directly to a terminal on a 12-pin Cinch-Jones plug. As a result, it

Fig. 1. A schematic of the device. The diode across the load may or may not be needed, depending on the type of load. See text for further details.

is necessary to use only 12 spaces on the panel to represent all of the elements of the IEE display and its plug connector to the chamber.

Our digital equipment operates on a -12-V-to-ground (GND) signal. It is necessary only to vary the resistor values slightly in order to operate on other voltage changes in different equipment. A schematic of the device appears in Fig. 1. The addition of GND to the input side causes the transistor to operate and apply GND to the 28-V device. When operated, the circuit applies about 4 V to the transistor base, well above the saturation voltage of about 1 V. A lack of input results in the driver's remaining in the off state. The resistors used are $\frac{1}{2}$ W and the diodes (in this case 1N2069s) may be those with a peak inverse voltage (PIV) in excess of 200 V. The diode across the load functions to suppress inductive loads such as relay coils; it is not needed when operating lamps.

The current-carrying capabilities of the driver with the 2N2714 transistor are sufficient to operate most lamps and counters, as well as low-current relays such as the Potter and Brumfield R10 series. Total cost of the unit is about \$1.75, and it is easily constructed. Reliability is very good, with no operation-induced failures in many thousands of operations occurring in the last 2 years in any of our units.

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