PRINTOUT

JOSEPH B. SIDOWSKI

EDITORIAL ANNOUNCEMENT

Beginning with this issue, a NOTES section has been added to PRINTOUT. Submitted short notes of acceptable quality will generally be printed in this section. Authors of notes will be cited on the cover page under the section heading; titles will not appear. Final page proof will be mailed from the Printer to the Editor and handled as part of PRINTOUT. Authors will receive reprint order forms only.

Services

Minicomputer Rental Plan

Varian Data Machines recently announced a lease plan in which computer and peripheral equipment can be rented for periods ranging from 4 months to 4 years. Plans cover the Varian Data 520/i and 620/i computers and peripherals.

Typical monthly payment plans:

620/i, 4K, 16-bit, with Teletype.
4 months—\$830/month (straight rental, including maintenance);
1 year—\$834/month (lease purchase);
4 years—\$362/month (lease purchase).

520/i, 4K bytes, with Teletype.
4 months—\$560/month (straight rental, including maintenance);
1 year—\$534/month (lease purchase);
4 years—\$231/month (lease purchase).

The three leasing plans are as follows:

(1) Rental Plan is designed for short-term projects. The plan requires a commitment of 4 months minimum and a rental rate as low as 5% of list price per month.

(2) Full Pay-Out Lease Plan is designed for users who wish ultimately to take title to the equipment, but are limited in capital funds. Lease periods are 1, 2, 3, or 4 years, with corresponding monthly rates of 10%, 5.5%, 4.0%, and 3.3% of list price. User takes title of the equipment at expiration of the lease period.

(3) Lease with Purchase Option is for investigators who wish to lease with a good possibility of eventually taking title to the equipment. Lease periods are for 1, 2, 3, or 4 years, with corresponding monthly rates of 6.0%, 4.4%, 3.3%, and 2.6% of list price.

Seventy per cent of lease revenues may be applied toward purchase at any time.

John Usher
Marketing Service Manager
Varian Data Machines
2722 Michelson Dr.
Irvine, Calif. 92664
(714) 833-2400

Instrument Rental Representatives

Continental Leasing Co., Inc., advertised as the world's largest renter of electronic instruments, announces the appointment of two offices in the Southeast: Technical Associates, Inc., P.O. Box 5583, Spartansburg, S.C. 29301, and Technical Associates, Inc., 2319 E. South St., Orlando, Fla. 32803.

Continental Leasing Co., Inc.
30 Park Ave.
Arlington, Mass. 02174

Equipment Rental

TELCO has announced a new rental program for a wide range of scientific and medical laboratory equipment. The *1-Year Renewable Plan* is as follows:

Monthly Rental (per \$10,000 cost): 1st year—\$380; 2nd year—\$300; 3rd year—\$300; 4th year—\$240; 5th year—\$204.

Minimal Rental Term: 1 year. Payments: Initial payments cover first and last month with a total of 13 during the minimum term.

Purchase Option: 50% of paid-in rentals may be credited toward purchase any time during first year.

Conversion: Any time the first year, the rental agreement may be converted to a 3-, 4-, or 5-year minimum term with applicable lower payments then applying.

Renewal: 1-year periods.

Rental programs are also available for computers.

Technical Equipment Leasing
Corporation
301 E. Erie St.
Chicago, Ill. 60611
(312) 944-1450

Products

Minicomputer

The FACOM-R is a 16-bit machine with 1.5-microsec cycle time and a 4K memory expandable to 32K. The computer has a maximum of 250 input-output unit addresses and an input-output rate of up to 800K bytes/sec. Options include a real-time clock, power-failure interrupt, typewriter, paper and magnetic tape reader/coders, line printer, disk file, CRT display, A/D converter, X-Y plotter, and optical mark reader. Price: \$10,000 for the 4K system.

FUJITSU LTD.

Liaison Office
680 Fifth Ave.
New York, N.Y. 10019
(212) 265-5360

Calculator Printer

The Model 9120 A calculator printer is for the HP 9100 series computing calculator. The device is capable of printing at 180 lines/min, utilizing seven tungsten print fingers that sweep across the width of the paper in vertical array. Short bursts of very low current are sent at the right instant to write characters. The operator can use pushbutton controls to choose printout of any or all three calculator registers exactly as they appear on the CRT display. Program instructions and locations are printed and the print command can be pushbutton or programmed as a single program step in the calculator. Price: \$975. Paper costs \$9.75 for three 250-ft rolls that print 45,000 lines.

Hewlett-Packard Co.
1501 Page Mill Rd.
Palo Alto, Calif. 94304
(415) 326-7000

Time-Sharing Minicomputer System

The MC232 is a basic 16K-word computer system that can support up to 32 simultaneous users operating from a variety of terminals. There is a provision for using a terminal as a desk calculator, adding machine, or as a programmable calculator. Only 7 terminals can be used simultaneously in the programming mode, so that the other 25 could be used as single desk calculators. The computer operates in both fixed and floating decimal modes

with 12-place accuracy. Programs are limited to only 250 instructions with the minimum system.

Although Basic is expected to be offered within a year, Mini-Tok is the only language presently available. Price: \$45,000 for the basic 16K MC232, with eight Teletype units.

Mini-Comp, Inc.
2 Mercer Rd.
Natick, Mass. 01760
(617) 235-5015

Transistor Amplifiers

Transistor amplifiers are marketed by the following firms:

Acrodyne Industries
666 Davisville Rd.
Willow Grove, Pa. 19090

Aertech Industries
815 Stewart Dr.
Sunnyvale, Calif. 94086

Airtron Division
Litton Industries
200 E. Hanover Ave.
Morris Plains, N.J. 07950

Ampar Division
Adams-Russell
39 Green St.
Waltham, Mass. 02154

Applied Research
76 S. Bayles Ave.
Port Washington, N.Y. 11050

Applied Technology
3410 Hillview Ave.
Palo Alto, Calif. 94304

Avantek
2981 Cooper Rd.
Santa Clara, Calif. 95051

California Microwave
1188 Elko Dr.
Sunnyvale, Calif. 94086

E & M Labs
5388 Sterling Center Dr.
West Lake Village, Calif. 91360

Electro/Data
3121 Benton St.
Garland, Tex. 75040

Fairchild Microwave Products
2513 Charleston Rd.
Mountain View, Calif. 94040

HRB-Singer
P.O. Box 60
State College, Pa. 16802

Hewlett-Packard
1501 Page Mill Rd.
Palo Alto, Calif. 94304

LEL Division, Varian
Akron St.
Copiague, N.Y. 11726

Micromega
4134 Del Rey Ave.
Venice, Calif. 90291

Microphase
35 River Rd.
Cos Cob, Conn. 06807

Micro State
152 Floral Ave.
Murray Hill, N.J. 07971

Microwave Power Devices
556 Peninsula Blvd.
Hempstead, N.Y. 11550

Microwave Products Group
115 Old Country Rd.
Carle Place, N.Y. 11514

Optimax
258 N. Main St.
Ambler, Pa. 19002

Pico Systems
202 Dominion Rd.
Vienna, Va. 22180

RCA Electronic Components
415 S. 5th St.
Harrison, N.J. 07029

RHG Electronics
94 Milbar Blvd.
Farmingdale, N.Y. 11735

Rantec
24003 Ventura Blvd.
Calabasas, Calif. 91302

Sanders Associates
P.O. Box 907
Nashua, N.H. 03060

SpaceKom
P.O. Box 235
Goleta, Calif. 93017

Texas Instruments
13500 N. Central Expressway
Dallas, Tex. 75231

Trak Microwave
4726 Kennedy Rd.
Tampa, Fla. 33614

Watkins-Johnson
3333 Hillview Ave.
Palo Alto, Calif. 94304

Mini-Probe

The Mini-Probe Model 101 is a miniature hand-held transistorized square-wave generator with an output voltage of +1.5 V at a frequency of 1 KHz. Advertised uses include testing transistors and diodes, providing transitions in logic circuits and debugging audio and RD circuits. Price: \$9.95.

Mini-Tron
P.O. Box 348
Feasterville, Pa. 19047

PDP-8 Tape Unit

An IBM-compatible magnetic-tape system is available, complete with controller, interface, and software for the PDP-8 computer. The system consists of a CEC 640 controller interface and an Ampex Model TMZ tape transport. It reads and writes 800 bpi, 7-track, IBM-compatible records. An optional 9-track system is also available.

A modified PAL-111 assembler accepts mnemonic input/output commands for the system, and computer-access transfer rate is 10K 12-bit words/sec at a tape speed of 24 in./sec. Available software includes monitor, setup, and tape diagnostic routines. System price: \$8,200.

Computer Equipment Corporation
Suite 214
3707 Rawlins
Dallas, Tex. 75219
(214) 522-3624

Shielded Chambers in Kit Form

Shielded chambers are available in kit form that consist of zinc-coated steel bonded to plywood, a magnetic area seal door, an electrical kit for filtered power outlets and a load center with circuit breakers, a grounding stud, lighting fixtures, conductive tape for points, and a ventilating kit. An 8 x 8 x 8 ft chamber costs approximately \$2,945.

Emerson & Cuming
869 Washington St.
Canton, Mass. 02021
(617) 828-3300

Numeric Indicators

Compact electroluminescent indicators feature four digits and a decimal on readout panels measuring less than 2 x 1/3 in. and weighing 6 g. Readable over a 150-deg viewing angle, the devices feature uniform brightness and no hot spots; standard 36-pin dual in-line plugs mate with Augat sockets. The sealed modules are compromises of electroluminescent, contrast-enhancement filters, and silicon-controlled rectifiers, permitting direct

interface with IC logic. Operating voltages: 115 V.

Sanders-Associates, Inc.
Daniel Webster Hwy. South
Nashua, N.H. 03060

Digital Annunciator

Digital Annunciator features a combination of alpha/numeric and numeric indicators using cold cathode display tubes. The alpha/numeric segment can display all letters of the alphabet, numerals 0-9 and several special characters, and can be driven directly from 13-bit T²L-volt logic. The numeric part has built-in decimal point indication and decodes and displays numerals 0-9 from standard 5-V 8421 BCD logic.

Instrument Displays, Inc.
18 Granite St.
Haverhill, Mass. 01830

Fiber Optic Readouts

Fiber optic readouts are available with either solid-state or incandescent light sources, featuring very high light intensity, low power operation, and extended life. The readouts utilize a high-intensity dot pattern. 1,000 ft-L may be obtained using low-power incandescent lamps. Series 900 may be furnished with "solid state" light-emitting diodes for the light sources.

Master Specialties Co.
1620 Monrovia
Costa Mesa, Calif. 92627

Memory Core System

The 480 Memory Core System is a 3-wire random-access storage unit with a capacity of 4,096 words by 18 bits or 8,192 words by 9 bits and sells in a range starting at less than \$2,000. Plug-in expansion permits a capacity of up to 16,384 words by 18 bits or 8,192 words by 36 bits. The system has full cycle and split cycle modes of operation and an access time of 350 nsec. Full cycle times are 900 nsec and a split cycle time of 900 nsec plus modify time.

Fabri-Tek, Inc.
5901 S. County Rd 18
Minneapolis, Minn. 55436

Decade Counter Kit

A decade counter kit is available for only \$13.95 from Display Electronics. The readout is made of molded nylon with spaces for 11 neon lamps that display the numbers 0 through 9 plus a decimal point. Counting is performed by four flip-flops contained in two integrated circuits. The 5-V logic level allows you to interface these

counters with other logic systems containing TTL, RTL, DTL, or transistor circuits. Clock input triggers on dc level so risetime of input is not critical.

The PS-1 Power Supply Kit contains two series-regulated power supplies on one PC board to furnish 5 V dc for integrated circuits and 105 V dc for neon lamps. Required input is 110 V ac 60 Hz. The 5-V dc supply has a current capability of 750 mA, with voltage regulation and low ripple. A trimmer resistor allows adjustment of the supply voltage. The PS-1 can supply 5 V dc to several decade counters plus the other logic normally used in a digital system. It can also drive the neon lamps in seven decades and a decimal point. PS-1 kit price: \$18.95.

Display Electronics
P. O. Box 1044
Littleton, Colo. 80120

Digital Comparator

The Model DC-3 Digital Comparator is priced from \$1,100 (8 bits); computer-compatible interface, 750 nsec, to 36 binary bits.

American Computer Technology, Inc.
8740 Shirley Ave.
Northridge, Calif. 91324
(213) 886-7440

Briefs

Name Change

The Biosystems Division of Whittaker Corporation (Pasadena, Calif.) has changed its name to DYNASCIENCES Corporation, a Whittaker subsidiary. Products include telemetry, transducers, and signal conditioners.

DYNASCIENCES Corporation
Biosystems Division
1020 S. Arroya Pkwy.
Pasadena, Calif. 91105
(213) 441-1163

New Address

Satham Instruments, Inc., has moved to 2230 Satham Blvd., Satham Industrial Park, Oxnard, Calif. 93030. Old address: 12401 W. Olympic Blvd., Los Angeles, Calif. 90064.

Intrusion Detection Device

Laser Systems Corporation, of Ann Arbor, Mich., is marketing a new electro-optical device with possible research applications. The unit consists of a tiny infrared transmitter, an infrared receiver, and an alarm control, and is designed to serve as an intrusion detection

device. The transmitter and receiver are disguised as electrical wall outlets and the components fit into standard wall outlet boxes. The transmitter, which uses a low-powered semiconductor diode as its infrared source, has a range of 75 ft. This beam projects across a room or open area to the receiver. The alarm control unit may be remotely located and can trigger an alarm or whatever other device one may wish to use, e.g., a recorder.

The system is insensitive to stray light or to the passage or dropping of any small object through the beam. It is powered by a set of 6-V batteries.

Computing Calculator

A desk-top computing calculator with MOS/LSI circuitry has been introduced by Cintra, of Mountain View, Calif.

The Cintra Scientist 909 allows the operator to write his equation directly on its keyboard and read out the answer as soon as he presses the "equals" key.

Dynamic range of the calculator is 200 decades with 10 significant figure accuracy. Answers are displayed on a Nixie readout to 10 figures plus illuminated notation and decimal point.

All functions are executed by a single key stroke. These include X^2 , $\sqrt{X}$, $\log X$, integer X , and others. The machine accepts data in any form—scientific notation, floating decimal point, or combinations thereof. It automatically keeps track of decimal point and exponent. Twenty-six storage registers are provided; 122 can be supplied optionally.

Cintra Physics International Co.
440 Logue Ave.
Mountain View, Calif. 94040

Varian Data Machines Users Group

VOICE has been organized to reduce redundant effort in the preparation of computer programs. With over 700 620/i's and R-620/i's installed in various parts of the world, the VOICE membership is expected to exceed 300 within the next 6 months.

VOICE
c/o Varian Data Machines
2722 Michelson Dr.
Irvine, Calif. 92664

Electronic Video Recording

EVR (Electronic Video Recording) is an inexpensive and convenient addition to TV playback technology. Any motion picture,

videotape, or live television presentation can be recorded on EVR, which stores pictures with sound for playback through a standard TV set. The film is dual tracked, with sound carried in parallel lines on a magnetic track together with two rows of visual frames. The film is miniaturized, but the reproduced image has sharper definition and clarity than conventional TV pictures. A cushion of air protects against damage by separating layers of pictures when stored in the cartridge. And the film has no sprocket holes.

The cartridge is 7 in. with a capacity of 750 ft of film, 8.75 mm wide—52 min of programming. A lead from the compact EVR player unit is attached by clips to the external terminals of the TV set and the film cartridge inserted. The TV set is turned to a nonbroadcasting channel and, upon pushing the starter button, the film automatically threads itself past an electronic sensor that converts film image to electrical impulses. The impulses are transmitted, along with the sound, into the TV set. The EVR player has controls for slow scanning of individual sequences; any frame can be frozen without film damage, flickering, dimming, or blur. There is little interference to contend with and no projector noise to distract the viewer.

EVR technology was developed at CBS Laboratories.

Watering Cup for Dogs

An automatic watering cup that is operating satisfactorily at the Purina Dog Care Center is being marketed commercially by Mr. Earl B. Johnson, Freehold, N.J. 07728. The cup is rustproof, has few moving parts, and, when attached properly, cannot be carried away by the dogs. Positive water pressure and a small valve inside the cup maintains a constant water level.

On Using the ASR-33 Teletype

When using the ASR-33 mechanical reader, uncoiled tape causes excessive wear of parts. If uncoiled tape must be used, wear can be reduced by putting a few drops of light oil on the reader fingers.

Teletype Corporation now has Modification Kit 185705 to allow use of fan-fold tape in the ASR-33 punch. An alternative method is to bend a paper clip to flatten out the fold as it enters the punch, because the uncoiled tape tends to swell with humidity and jam in the punch feed channel.

Service for Teletype users in the New York metropolitan area is available from

Teletypewriter Service Company, P.O. Box 1189 Morris Annex, Union, N.J. 17083 (201-289-1888). Repairs are available either on an hourly basis or by service contract. Leasing agreements are available with full service contracts and conversion kits to adapt ASR-33 units to Digital Equipment Corporation computers.

Eliot Shimoff
Psychology Research Laboratory
V.A. Hospital
Montrose, N.Y. 10548

Activity Meter

The ANIMEX Activity Meter employs the sensing ability of an inductive-capacitive circuit to measure the movements of small animals, mainly rats and mice. The following characteristics and advantages are advertised.

(1) One or several animals may be measured in their regular cage.

(2) Cages may be of glass, plastic, paper, Masonite, plywood, or wood (bottom of the cage must be of nonconductive material).

(3) Underlay, food, urine, or excrement do not influence the results of measurements.

(4) The unit operates independent of ambient light conditions.

(5) The ANIMEX S model allows for selective measurement. One or several animals may be measured with others in the cage by attaching a copper or silver loop to the abdomen of the selected S(s). A reversing switch can be used to measure

all animals in the cage, looped and nonlooped. So the activity of all can be compared with the experimentally treated.

All models have built-in counters as well as connections for external counters. ANIMEX may also be ordered with a printing counter. See Figure 1.

The inductive coils do not measure absolute values, only changes. An inductance, together with a variable capacitance, forms a resonant circuit which is fed from a high-frequency oscillator. When an animal approaches or moves away from a sensitive coil, there is a change in the current of the resonant circuit. Depending upon the sensitivity of the instrument, each change within any of the coils is amplified and serves to trigger the registering device.

T. H. Svensson and G. Thiemme have evaluated the instrument to measure motor activity of small animals. The work and report originate from the Department of Pharmacology, University of Goteborg, Sweden. The sensitivity and resolving power of the instrument were studied in relation to velocity and frequency of animal movements as a function of drug administration. Ss were female albino mice (NMRI strain) weighing 18-23 g and run in groups of three.

It was found that sensitivity decreased with distance. To achieve a wide recording span, the distance between the top of the box and the animals had to be short. The maximal impulse rate (number of passages per second) recorded without loss at the shortest test distance (10/2 mm) was about

Figure 1.

5/sec. Technically, the lower limit depended on velocity.

For 10 groups of three animals each, high initial activity lasted 15-20 min (decreasing from 500 to 300 counts per 10 min), following which it stabilized at a lower level for at least 20 min. Activity pattern was not significantly altered by a previous injection of saline, 0.9% 10 ml/kg, or by illumination during the first 20 min. Diurnal activity rhythm was not reflected in measured activity. D-amphetamine bitartrate (5 mg/kg) was injected I.P. to 15 mice in groups of 3. Motor activity registered at about 1,000 counts per 10 min for the first 10 min, declined to 700 counts at 80 min, then stayed fairly stable at 650-700 counts per 10-min period for the next 80 min. Control animals injected with saline registered a fairly steady 550-600 counts per 10 min over the 160-min session.

The initial effect of reserpine (2 mg/kg) was to drop activity from 450 counts per 10 min to zero over 160 min; blespharospasm developed 10-15 min after injection. After 20-30 h, activity increased and, at 40-50 h, moved up to near normal. Saline-injected mice registered approximately 550-600 counts per 10 min throughout.

ANIMEX is marketed by:

A. B. Farad
Nyborgsgränd 1
S-12634 Hagerstein
Sweden

unusual durability. Part of the system they describe includes a commercially available solenoid valve. Commercial valves are commonly quite expensive owing to their design specifications, which cover wide ranges of inlet pressures, fluid viscosities, and outlet port controls. In short, these valves often exceed the requirements of a low-pressure liquid-reward presentation system.

Figure 1 illustrates a valve that combines economy with both ease of construction and maintenance. The small amount of brass roundstock needed machines easily and provides ample durability. The materials and dimensions were chosen for a minimum of machining (the model illustrated required about 3 h work). Simplicity of the valve ports enables the use of the whole range of commonly used liquid rewards. Furthermore, since the low inlet pressure is opposed by the piston spring, positive sealing is ensured. The only conceivable maintenance required would involve cleaning the piston. This is easily accomplished by removing two nuts on the solenoid mounting bars (upper portion of figure). The valve in Fig. 1 is activated by an IMC SD770-2 24-V dc solenoid; however, any solenoid having a linear travel of between 1/16 and 1/4 in. will suffice.

The piston itself is 3/8-in. brass roundstock, lightly machined to slide fit the 5/16-in. center hole. The port end is turned down to 3/16 in. and tapered to a 90-deg cone. After the 1/8-in. inlet and

outlet ports have been drilled, the barrel is held in the headstock of the lathe and the piston is pushed gently against the inlet port with the tailstock. The rotation of the inlet port against the motionless 90-deg cone of the piston produces a small lip providing a good seal for the valve port. The other end of the piston is drilled and tapped to receive a headless 6-32 screw that connects the valve piston to the armature of the solenoid.

Into the inlet and outlet ports are soldered flared pieces of thin-walled brass tubing onto which are fitted lengths of polyethylene hose. An optional outlet port adjustment is provided by a 6-32 screw shown at the bottom of the figure.

Connecting the valve to the solenoid may be accomplished in a variety of ways. In the authors' model, two pieces of 1/8-in. bronze welding rod provided the mounting bars. These were threaded on one end to receive 6-32 nuts. The other ends were bent to 90-deg angles and soldered into holes drilled in the barrel of the valve. 8-32 spacer nuts were soldered to the rods and barrel near the top of the valve.

Prior to assembly, the valve piston is lightly lubricated with an inert stop-cock grease.

REFERENCE

POLIDORA, V. J., & MEYER, P. M. Simple devices for liquid reward delivery. *Journal of the Experimental Analysis of Behavior*, 1961, 4, 382.

Notes

A simple valve for liquid reward systems

M. H. KELLICUTT and M. I. BOISEN,
UNIVERSITY OF CALIFORNIA, Davis,
Calif. 95616

Gravity-fed liquid delivery fountains such as described by Polidora and Meyer (1961) have several advantages in liquid reward presentation. Among these are control over a wide range of possible amounts presented, simplicity, and

Fig. 1. A cross-sectional drawing of the valves' major construction details. The centrally located piston is shown connected to the solenoid piston in the upper part of the figure. Liquid enters the inlet port at the bottom and emerges from the outlet port at the left-hand side. The outlet port adjustment screw is shown in the lower left-hand corner of the figure.