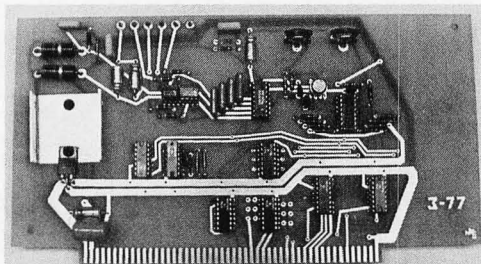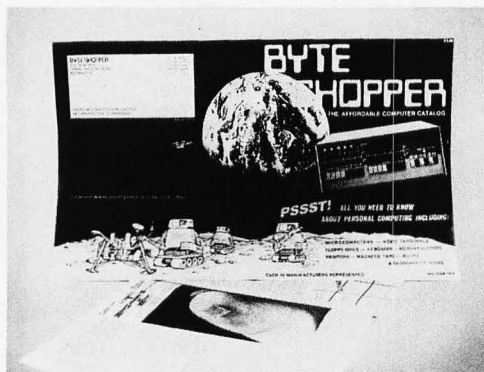# What's New?

A Self Refreshing 4 Channel Digital to Analog Converter

Pinnacle Products has announced a self-refreshing 4 channel digital to analog converter that is Altair bus compatible. Instructions are included for alternate connection to Digital Group Systems. Features include complete output port address decoding and a 3 state bus connection. The converter has eight bits of resolution and can be set to cover any range within −10 to 10 V. It oper-

The Noval 760 Operating Manual

Noval Inc, 8401 Aero Dr, San Diego CA 92123, (714) 277-8700, has completed the first edition of the *Noval 760 Operating Computer Operating Manual*. This 1 inch (2.5 cm) thick loose-leaf manual is available by itself for $20. The manual describes hardware characteristics of available modules, as well as the software of the firm's interactive assembly and editing system, BASIC interpreter, and utility routines.

This computer was developed by Gremlin Industries for in-house use as a design system for video arcade game and educational software, and should make an excellent option for many readers interested in graphics and complete systems with "turn key" characteristics. Use the manual alone if you want to investigate what this system package contains.■

Circle 647 on inquiry card.

ates at a rate of 50,000 conversions a second, updating the four sample and hold outputs from a scratch pad register. Circuit operation as seen from the computer is completely static; no software refresh or wait states are required. A 4 byte computer program is used to set up the unit.

The printed circuit board alone sells for $34. The complete kit is $69, and the assembled and tested board is $99. Contact Pinnacle Products, POB 3155, Talcottville CT 06066.■

Circle 646 on inquiry card.

A New Wire Dispenser-Stripper for Wire Wrap and Other Applications
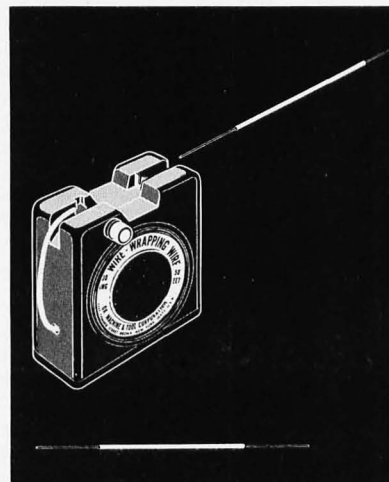
A new wire dispenser from OK Machine and Tool Company, 3455 Conner St, Bronx NY 10475, combines cutting and stripping ability in one unit. Wire is drawn out of the dispenser to the desired length, cut with the built-in plunger, and pulled through the stripping blades. Dispenser includes 50 feet (15 meters) of AWG 30 insulated solid copper wire available in four colors. People who use conventional wire wrap will find this to be an excellent addition to the tool kit. ■

Circle 648 on inquiry card.

A New Personal Computing Catalog

Sized at 11 by 14 inches (27.9 by 35.6 cm), the *Byte Shopper* catalog is hard to miss. Published by the Byte Shop of Arizona, 813 N Scottsdale Rd, Tempe AZ 85281, the new catalog describes a variety of microcomputers, video terminals, floppy disks and other personal computing items. A unique feature of the catalog is the tutorial information about personal computers, including a glossary of terms and short articles like: "What Can a Computer System Do?", "The Magic Bus" and "What Makes a Computer Smart?". The catalog is free for the asking.■

Circle 645 on inquiry card.

Data General Enters the Personal Computing Market

The Computer Store, a chain of retail personal computer outlets in the Northeast, has announced that they will be distributing the entire line of Data General's Micro-NOVA microcomputers, peripherals and software.

Free catalogs are now available from The Computer Store, 120 Cambridge St, Burlington MA 01803, which describe the full line of products, including expansion memories and interfaces; DOS, RTOS, BASIC, FORTRAN and development software; the DASHER matrix printer and the 6000 line of video terminals.■

Circle 649 on inquiry card.

A Timely Kit for HP-45 Owners

Egbert Electronics, 1514 S 320 East, Orem UT 84057, has announced a new kit to improve the accuracy of the stopwatch function on the HP-45 calculator. As most owners of the unit know by now, the HP-45 can be turned into a stopwatch by first pressing RCL, and then simultaneously pressing CHS, 7 and 8. The kit provides a quartz crystal to stabilize the internal oscillator, plus associated electronics. Kit price is $13. Egbert Electronics will do the installation for $23.■

Circle 653 on inquiry card.

Digital Equipment's Comments on the Heathkit H11

The following information was received from Digital Equipment Corporation, one party to the synergistic twosome of Heath Company and DEC.

Digital Equipment Corporation announced the signing of a multimillion dollar contract for LSI-11 microcomputers and related products by Heath Company, a subsidiary of Schlumberger, Ltd. The microcomputers, to be delivered over a 3 year period, will be incorporated into Heath's H11 computer

kits, which will be marketed primarily for hobby, personal and small business applications via Heath's 50 stores and mail order catalog. The contract includes a licensing arrangement providing use of assembly and higher level programming languages such as PAL-11, ED-11, FOCAL and BASIC with the H11 computer.

Digital's microcomputer forms the central element of each H11 computer. Each is a full computer on a board with the operating characteristics of a standard PDP-11 16 bit minicomputer. Currently there are over 10,000 LSI-11s in use in a variety of applications ranging from scoreboard animation to complex medical instrumentation.

The H11 represents the top of Heath's line of computer kits. It is priced at $1,295 and is scheduled for shipment this fall.

The LSI-11, unlike most other microcomputers, has a central processor with a full 16 bit word length. It comes with built-in memory of 4,096 word (8,192 byte) capacity. Console operations are microcoded so a terminal can be used for program control and debugging.

The instruction set of the LSI-11 is virtually identical to that of other PDP-11 computers, such as the PDP-11/34. Thus, sophisticated program development is achievable with the Heath H11.

Purchasers of the H11 will be eligible to join DECUS (the Digital Equipment Computer Users Society). DECUS functions as a clearing house for more than 28,000 members worldwide who wish to exchange programs and information. "DECUS holds special symposia and publishes a journal. The DECUS library contains over 800 programs designed for the PDP-11 family of computers, many of which were developed for or can run on the LSI-11," he said.

Circle 654 on inquiry card.

A New Bar Code Reader
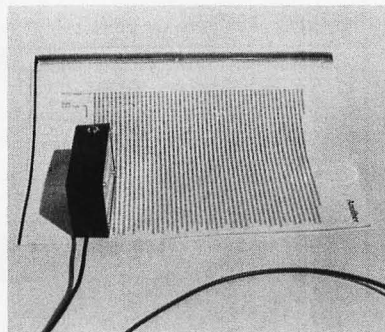
Here is one answer to the question, "Where can I buy a bar code reader to read the bar code listings published in BYTE?". Jeffersonville Engineering Co, 605 E 10th St, Jeffersonville IN 47130, phone (812) 288-8246, has announced its new bar code reader. Priced at $39.95, the unit outputs +5 V on a bar and 0 V on a space; timing and translation are software dependent. 6502 and 8080 software is said to be currently available for use with the unit.

The company can also print bar code versions of customers' software. Contact them for further details.■

Circle 655 on inquiry card.

A New Chip on the Block

We received an interesting preliminary product description for a television raster scan display controller recently, sent in by a gentleman at SMC Microsystems Corporation, 35 Marcus Blvd, Hauppauge NY 11787. The product involved is a 40 pin N-channel MOS LSI device called the CRT 5027 Video Timer-Controller.

This device will be of some interest to those homebrewers and designers who are interested in a minimum hassle path to a raster scan display (where minimum is relative to homebrewing the same logic out of SSI and MSI parts).

What this device does is establish all frame formatting, character scanning and sync timing for a video display (with the single exception of the dot address counter which cannot be practically implemented in MOS integrated circuits). The video display functions use seven 8 bit control registers connected to a bi-directional byte oriented data bus with appropriate select lines allowing easy integration in the typical microprocessor system. The boxes entitled "Operation" and "Additional Features" accompanying this note are copied from page 3 of the SMC document, and summarize the salient features of the product.

Persons interested in seriously pursuing homebrew (or commercial) designs with this device are advised to write SMC for a copy of the brochure. Who will be the first reader to homebrew a high resolution graphic display using this chip for timing, about 16 K bytes of memory, and a good black and white monitor? Find out when (sooner or later) the task is accomplished and a construction project is documented as an article.■

Circle 631 on inquiry card.

Operation

The design philosophy employed was to allow the device to interface effectively with either a microprocessor based or hardwire logic system. The device is programmed by the user in one of two ways; via the processor data bus as part of the system initialization routine, or during power up via a PROM tied on the data bus and addressed directly by the Row Select outputs of the chip. (See figure 4). Seven 8 bit words are required to fully program the chip. Bit assignments for these words are shown in Table 1. The information contained in these seven words consists of the following:

Horizontal Formatting:	
Characters/Data Row	A 3 bit code providing 8 mask programmable character lengths from 20 to 132. The standard device will be masked for the following character lengths: 20, 32, 40, 64, 72, 80, 96, and 132.
Horizontal Sync Delay	3 bits assigned providing up to 8 character times for generation of "front porch".
Horizontal Sync Width	4 bits assigned providing up to 16 character times for generation of horizontal sync width.
Horizontal Line Count	8 bits assigned providing up to 256 character times for total horizontal formatting.
Skew Bits	A 2 bit code providing from a 0 to 2 character skew between the horizontal address counter and the horizontal blank and sync signals to allow for retiming of video data prior to generation of composite video signal. The Cursor Video signal is also skewed as a function of this code.
Vertical Formatting:	
Interlaced/Non-interlaced	This bit provides for data presentation with odd/even field formatting for interlaced systems. It modifies the vertical timing counters as described below.
Scans/Frame	8 bits assigned, defined according to the following equations: Let $X = $ value of 8 assigned bits. 1) in interlaced mode—scans/frame = $2X + 513$. Therefore for 525 scans, program $X = 6$ (00000110). Vertical sync will occur precisely every 262.5 scans, thereby producing two interlaced fields. Range = 513 to 1023 scans/frame, odd counts only. 2) in non-interlaced mode—scans/frame = $2X + 256$. Therefore for 262 scans, program $X = 3$ (00000011). Range = 256 to 766 scans/frame, even counts only. In either mode, vertical sync width is fixed at three horizontal scans ($= 3H$).
Vertical Data Start	8 bits assigned providing scan line resolution in vertical data positioning with respect to vertical sync. The Data Row Counter is reset at vertical sync and will not begin counting until the scan line selected by these eight bits.
Data Rows/Frame	6 bits assigned providing up to 64 data rows per frame.
Last Data Row	6 bits to allow up or down scrolling via a preload defining the count of the last displayed data row.
Scans/Data Row	4 bits assigned providing up to 16 scan lines per data row.

Additional Features

Device Initialization:

Under microprocessor control—The device can be reset under system or program control by presenting a 0101 address on A0-3. The device will remain reset at the top of the even field page until a start command is executed by presenting a 0111 address on A0-3.

Via "Self Loading"—In a non-processor environment, the self loading sequence is effected by presenting and holding the 1111 address on A0-3, and is initiated by the receipt of the strobe pulse (DS). The 1111 address should be maintained long enough to insure that all seven registers have been loaded (in most applications under one millisecond). The timing sequence will begin one line scan after the 1111 address is removed. In processor based systems, self loading is initiated by presenting the 1110 address to the device. Self loading is terminated by presenting the start command to the device which also initiates the timing chain.

Scrolling—In addition to the Register 6 storage of the last displayed data row a "scroll" command (address 1101) presented to the device will increment the first displayed data row count to facilitate up scrolling in certain applications.