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MOS120 60 watt MOSFET Amplifier (8 ohms) \$ 79.95
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HY30 (15 watts RMS) \$25.95
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Attractive, rugged, professional 19" rack-mount cabinet for easy assembly of your ILP amplifier system. Amplifier modules (2 of) mount on pre-cut back panel. Power supply unit mounts inside chassis. Complete assembly and wiring is a breeze, taking about one hour! Specify which amplifier you will be using: HY120, HY200, HY400, MOS120, MOS200 or MOS400.

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COMPUTER BITS

Another Small Computer

If you've been considering picking up a small portable microcomputer system, take a look at the Attache from Otrona (2500 Central Ave, Boulder, CO. 303-444-2274).

This classy little system weighs less than 20 lb, fits in a half cubic foot, and offers the following features:

- A Z-80A processor
- A 5-in. CRT, that supports an 80x24 display plus raster-style dot graphics
- Two 180K-byte drives
- A full-sized, flip-down keyboard
- 64K bytes of RAM
- A direct memory processor to relieve the main processor from I/O duties
- Two multi-protocol ports
- CP/M; WordStar; BASIC-80; UCSD Pascal; Valet, an interrupt manager; and Charton, a plotting software package.

If all of that isn't enough, the Otrona folks have also included a clock/calendar and a sound synthesizer.

Should you want to pack it around with you, Otrona offers dc operation with battery and charger option, plus an accessory pouch for all the extra goodies. An optional full-sized video monitor and an Epson MX-80 printer may be attached.

If you're thinking that's a lot of stuff to come in a small box, you are right. More important, however, is that the box is designed right and has upgrade built in. Don't expect to pick this machine up cheap. It's in the under-\$4000 bracket, but worth every cent.

Software Tools. If these are in your game plan, contact Microsoft Consumer

Products, Bellevue WA, or drop into your local computer store to get information on a program called TASC. This 'tool' will take a source code written in Applesoft BASIC and compile it into machine code. The program not only compiles the code, thus speeding up execution, but uses a compression scheme to eliminate size restrictions usually found with compilers.

And, if you are looking for a documentation tool for your BASIC programs, call Phil Wellhof at BPS (203-853-6880) and ask about BPSXREF. This tidy program will produce a formatted program with an alphabetized list of program variables and functions where they are to be found. This package works with Microsoft's BASIC-80 ver 5.x, requires CP/M, and at least 48K of RAM. It's a \$124 package and might be worth the price if you are developing complex programs.

Computer Music? Fans of computer music who happen to own a Heath H-89 or H-8 system should give Skip Barron a yell at Mako Data Products (1441-B N. Red Gum, Anaheim, CA 92806. 714-632-8583) and ask about the PSGx2 Programmable Sound Generator. This board sells for \$125 for the H-89 version, \$225 for the H-8. Be sure to add \$5 for shipping.

The H-89 board fits neatly into one of the open slots on the right side of the motherboard (position P504) and sports four AY3-8910 programmable sound generator chips and a small speaker. Mako has included an extra miniature phono jack if you want to plug in a 6-in. magnet speaker.



Otrona's Attache portable computer system.

computers

There happens to be more to the board than just sound. Included are four 8-bit parallel I/O ports that can be used for adding game paddles or for coupling to a light-bulb system to pulsate in time with the music.

Interestingly, you can program this board with BASIC or assembly code. I recommend a combination of both, since you'll most likely want to change parameters quickly.

To help in getting acquainted with the board's operation quickly, Mako supplies a demo disk that guides you through the programming part, and a diskette of a computer piano.

If you're into writing game software, and want to add that extra touch, then add the sound generator board. If you are unsure of how to create the fancy programs, drop into your local Heath Electronic Center and join a HUG group. Many members have written some great programs that can be found on the HUG bulletin board (which is on MicroNet).

Interactive Data-Processing Systems. Thinking about setting up a complete interactive data-processing system and want everything to be compatible? Then consider the MicroPro International line of generic-type software that is designed for CP/M.

Included in this group are: WordStar 3.0, DataStar, and SuperSort. These packages are all designed to work in concert and provide full data-handling capability. WordStar for example, is the well-known word-processing system that incorporates a spelling dictionary (SpellStar) and merge operations in one package. This means you can develop letters and merge in the address information. In addition, by employing DataStar, which is a unique data-base management system, you can even create detailed reports or your own business journals.

DataStar is designed to function with any terminal employing X-Y addressing, and permits the creation of fill-in formats for data entry. Like WordStar, DataStar uses menus, displayed at the top of the screen, to assist in data entry or form design.

An interesting feature of DataStar is that it allows various data forms to be linked for a full-featured data base. For example, you can create an address file for companies, then a separate file for the products that these companies carry. You do this by defining a field to represent a link to the other data, and when used in conjunction with WordStar, print out the detailed report.

Because data is useless if not ordered in some way, SuperSort can be used to order the data in any useful manner. This program is callable from other languages and can become an integrated part of that super business system you're writing.

Surprisingly, you aren't limited to the MicroPro packages, but can combine them with other CP/M-compatible products such as BASIC, dBase II, or even Sorcim's SuperCalc electronic spread sheet. But MicroPro is offering enough flexibility so that you can stick with just their products if you prefer. Furthering this generic concept, MicroPro is also offering CalcStar, an electronic spread sheet that is fully compatible with other products in the line. This package, which should now be available in most computer stores, is priced at \$295, and provides the ability to perform sales forecasts, cash flow analysis, and complete control over complex numerical problems. If you are using an Apple II, the package is priced at \$195; the TRS-80 version is \$150. Like the rest of the packages, a screen menu is provided to aid in its use.

We've found that all the MicroPro packages are easy to use and quick to install, with the exception of CalcStar, which we haven't had a chance to look at closely. The DataStar program comes with an Install utility that provides a menu selection of various terminal types. Of course, ours, a Heath H-89, wasn't on the list, so we used the alternative method of installation.

The latter is unlike the one found with WordStar. Rather than taking you through each attribute with prompts, it's necessary to employ Digital Research's CP/M Dynamic Debugging Tool (DDT) and "patch" various areas in the code.

Although we were able to do this installation in about an hour, we felt that MicroPro didn't provide enough in-

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□ Disk version of Microsoft BASIC (requires Level B & 32k of RAM, floppy disk controller, 8" floppy disk drive) ... \$325 postpaid.

TEXT EDITOR/ASSEMBLER — The editor/ assembler is a software tool (a program) designed to simplify the task of writing programs. As your programs become longer and more complex, the assembler can save you many hours of program time. This software includes an editor program that enters the programs you write, makes changes, and saves the programs on cassettes. The assembler performs the clerical task of translating symbolic code into the computer-readable object code. The editor/ assembler program is available either in cassette or a ROM version.

□ Editor/Assembler (Cassette version; requires Level "B" and 8k (min.) of RAM — we suggest 16k "JAWS" — see above) ... \$59.95 plus \$2 P&L.

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NEED A POWER SUPPLY? Consider our AP-1. It can supply all the power you need for a fully expanded Explorer/85 (note: disk drives have their own power supply). Plus the AP-1 fits neatly into the attractive Explorer steel cabinet (see below).

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formation on the process. In our case, we happen to be familiar with the operation of DDT and understood what was necessary in performing the changes. However, it appears that the novice user would have some difficulty in getting the package to work.

One way around this is to have the store where you purchase the package install it for you. They supposedly know the machine and should have in-depth knowledge of the software packages they sell.

Because the MicroPro packages do take up a significant amount of room on a diskette, you might find that you don't have enough room for everything. If so, what you might consider doing is creating a diskette with the basics of WordStar, dropping off the messages, and avoid putting on a system. Of course, this means you must have at least a three-disk system for operation, but it is workable.

In respect to the size problem, we found that you can avoid a lot of problems with the H-89 by using the Magnolia Microsystems double-density board reviewed last month in this column. We found that we could put WordStar with MailMerge, and DataStar plus SuperSort on one 5.25-in. diskette, thus freeing up two other 5.25-in. drives, and one 8-in. drive for data. ♦

Computer Languages in Public Domain for CP/M

Compiled by Stan Veit

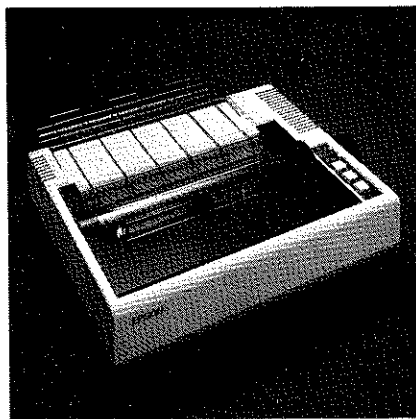
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Because seeing is believing.

Popular Electronics Tests



Ashton-Tate dBase II Computer Software

WITH ALL the new computers designed to improve productivity and ease handling of data, there has come a plethora of database managers. One such product is dBase II from Ashton-Tate. Designed to operate with systems employing Digital Research's CP/M, dBase II is referred to as a *relational* database management system.

Relational databases are made up of connections between data elements—a name/address file, for example. It is the job of the management system to recombine these elements in the database to form different relationships, and thus allow greater flexibility in the use of the data. The dBase II system does this in a number of ways.

Supporting the flexibility in handling data is an integral programming language dubbed Application Design Language (ADL), which exhibits many of the properties associated with Pascal and PLI. (It takes about two hours to become practiced in the use of ADL.) It enables you to quickly define input forms and various hardcopy output reports, perform batch operations, and

have full control over the data structure. It also allows screen control.

Databases created with dBase II can be used with other languages—BASIC, COBOL, and assembly, for example—without redefinition. In addition, the data can be used in concert with word processors, such as MicroPro's WordStar, for inserting names and addresses in letters. Even more exciting, the data can be shared with such software systems as Sorcim's SuperCalc, an electronic spreadsheet, simply by telling dBase II that the file being created is to be interchangeable.

Although the software package is designed to be compatible with numerous other languages and software systems, it can be used as a stand-alone system to create full business packages.

The Basic Package. The basic dBase package is offered in a variety of diskette sizes and formats, to accommodate the numerous microcomputers using CP/M. You can order the package in standard form on 8-in., single-density IBM-format diskettes, or 5.25-in., 10-

sector Heath/Zenith-compatible diskettes. The basic price for dBase II, which includes a two-part user manual and two diskettes, is \$700.

Ashton-Tate's two-diskette system is unique in that one diskette is a demo having all the dBase II facilities but supports only 15 records per file and a number of demonstration programs. With this method, you can try the package and return it for a full refund if you don't like it. Moreover, while using this limited version, you can create data structures that best meet your specific needs, all at no cost. If you decide that the product is what you want, you can open the sealed and coded systems diskette—but then the package is yours and cannot be returned.

Although dBase II in the standard version is designed to handle 65,535 records per database, you can purchase a \$350 version for the Apple II equipped with Microsoft's softcard that supports 5,000 records. This one is delivered in the same manner as the standard.

If you're thinking it might be wise to buy the less-expensive Apple version