

Interesting Items and BASIC Conversion.

SINCE Christmas is upon us, you just might be thinking about a little something electronic for yourself or one of the children. One item that you might consider is the 8085AT microcomputer system from Paccom. This single-board computer (SBC) is priced at \$299.95 completely built and tested, and a kit is \$249.95

What makes this SBC a worthwhile buy is that it can be used as a controller or a trainer. The unit comes with the 8085A Cookbook and the 8080/8085 Software Design Book 1 written by the dynamic trio of David Larsen, Jonathan Titus, and Christopher Titus. The trainer used in conjunction with these books will certainly strengthen your knowledge about 8- bit processor software design.

More on Modems. It seems that since I started keeping you abreast of happenings in system-to-system communication, more keeps coming. Specifically, modem manufacturers are sensitive to the needs of small-system owners and are offering a lot of performance for a relatively low price.

For example, I recently had the pleasure of visiting Dennis Hayes, president of Hayes Microcomputer Products. Dennis was one of the first to make a bus-oriented modem for S-100 systems. This unit, dubbed the Micromodem 100, is still available at \$399 with a microcoupler that eliminates the need for a separate Data Access Arrangement (DAA). Dennis advised me that although the trend is to unitized systems like the Apple, S-100 bus systems are still popular.

The Micromodem 100 isn't the big news though—the company's Micro-

112

modom II for the Apple II is. This \$379 unit includes a modem board that fits on the Apple bus, a microcoupler to attach it to the phone line, cables, and firmware on Read Only Memory (ROM). The ROM code is

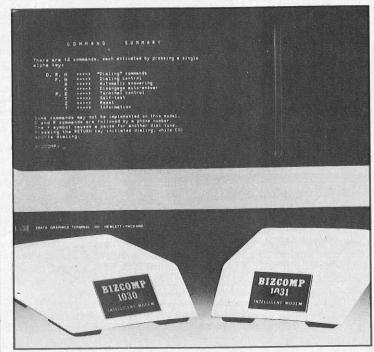
the most comprehensive manuals offered for any product today. In them, numerous subroutines are provided for functions such as answering a ringing phone and sending an acknowledgement tone, automotive dialing, and sending text data by phone. The entire package provides high quality at reasonable cost.

Bell system 103 compatibility

Hayes has further enhanced his

• Full duplex operation

As good as they are, the Hayes modems are system dependent and, consequently, leave the field open for competitors. One such company, Bizcomp, offers a series (1030) of intelli-



Flexible stand-alone intelligent modem series from BIZCOMP.

the secret to the power of the unit. It permits you to use your Apple in some very sophisticated communications operations. Among the many features of the Micromodem II are:

trainer.

- Auto answer
- Auto dial
- Auto data transfer

8085A

The 8085AT single-board computer from Paccom can be used as a controller or

gent modems designed to fit any computer with a serial interface. Prices for the Bizcomp units range from \$395 for the model 1030 to \$495 for the 1031.

The modems incorporate an 8-bit microprocessor and an on-board ROM to establish the interactive features of the unit. With any of the 1030 series you have auto answer, dial, Bell 103 compatibility, and a selection of baud rates from 110 to 300.

What's especially exciting is that you can have the intelligent interactive dialogue features with just a terminal and the Bizcomp modem-a computer isn't even required. According to Bizcomp, the idea is to provide a microprocessor modem system at low cost, while allowing a user the

RCA 1802 COSMAC CPU

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Plug in the GIANT BOARD to record and play back programs, edit and debug programs, communicate with remote devices and make things happen in the outside world. Add Kluge (prototyping) Board and you can use ELF II to solve special problems such as operating a complex alarm system or controlling a printing press. Add 4k RAM Boards to write longer programs, store more information and solve more sophisticated problems.

ELF II add ons already include the ELF II Light Pen and the amazing ELF-BUG Monitor – two extremely recent breakthroughs that have not yet been duplicated by any other manufacturer.

The ELF-BUG Monitor lets you debug programs with lightening speed because the key to debugging is to know what's inside the registers of the microproces sor. And, with the ELF-BUG Monitor, instead of single stepping through your programs, you can now display the entire contents of the registers on your T creen. You find out immediately what's going on and can make any necessary

The incredible ELF II Light Pen lets you write or draw anything you want on a Full Basic ROM \$149.95 plus \$2 p&h TV screen with just a wave of the "magic wand," Netronics has also introduced Cassette \$79.95 plus \$2 p&h the ELF II Color Graphics & Music System-more breakthroughs that ELF II owners were the first to enjoy!

Ultimately, ELF II understands only machine language—the fundamental coding required by all computers. But, to simplify your relationship with ELF II, we've introduced an ELF II Tiny BASIC that makes communicating with ELF II a Regardless of how minimal your computer background is now, you can learn to program an ELF II in almost no time at all. Our Short Course On Micropro- breeze.

cessor & Computer Programming—written in non-technical language—guides you Now Available! Text Editor, Assemble

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ELF II's Assembler translates assembly language programs into hexidecima In fact, not only will you now be able to use a personal computer creatively, machine code for ELF II use. The Assembler features mnemonic abbreviations you'll also be able to read magazines such as BYTE...INTERFACE AGE...POPU- rather than numerics so that the instructions on your programs are easier to LAR ELECTRONICS and PERSONAL COMPUTING and fully understand the read-this is a big help in catching errors.

erticles. And, you'll understand how to expand ELF II to give you the exact ELF II's Disassembler takes machine code programs and produces assembly capabilities you need!

Language source listings. This helps you understand the programs you are If you work with large computers, ELF II and the Short Course will help you working with...and improve them when required.

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either a 64 or 32 character by 16 line professional display for-mat with selectable baud rate, RS232-C or 20 ma, output, full cursor control and 75 ohm composite video output. The keyboard follows the standard typewriter configuration The keyboard follows the standard typewriter configuration and generates the entire 128 character ASCII upper/lower case set with 96 printable characters. Features include onboard regulators, selectable parity, shift lock key, alpha lock jumper, a drive capability of one TTY load, and the ability to mate directly with almost any computer, including the new Explorer/85 and ELF products by Netronics.

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flexibility of incorporating it into a computer.

Software can be written that uses the power of the modems in concert with that of a base computer. Since the modem has its own control and logic, the communications package can be written in any language you have running. This system looks ideal as an add-on for a Heath system, especially if you're setting up a storeand-forward message system.

Adding More Functions to an H-89. I know that many of you have the Heath H-89 microcomputer system, and have been looking for a variety of ways to upgrade it. Well, Magnolia Microsystems has the answer, especially if you're interested in adding a 10M-byte Winchester disk. Magnolia is offering the Corvus 112 10M-byte Winchester disk with intelligent controller and the MMS 89 interface board for \$5,350. The interface and patches to Digital Research's CP/M operating system are the value added by Magnolia.

The interface board consists of two parallel I/O ports for communicating with the Corvus controller and space for the existing serial ports used by the computer. (You simply move the components from your existing serial board to the Magnolia board.) The interface fits on the H-89 bus slot and requires no modifications that would void the Heath warranty. Magnolia recommends that you also purchase the PROM upgrade that puts memory at a zero base, thus permitting use of standard CP/M.

A Most Unbelievable "Magazine." Imagine the following: You sit down at your computer system, insert a disk, and try software projects others have done, as well as reading about new ideas. The "magazine," Micro Media, lets you really do this. For example, there's a convert BA-SIC that allows you to translate from one version to another (it doesn't work in all cases, though). Micro Media comes on disk for either the Heath H-89,. Radio Shack TRS-80, or Apple II micro-computer systems. The annual subscription rate is \$55. (If you want to nibble before you bite, you can order a single issue for \$11.95. Be sure to specify the system you have.)

So You Want to Convert a BASIC Program? I imagine that many of you from time to time have run across a program you just had to have run on your machine. But what do you do

when it's written in a version of BA-SIC that you don't have, or one that's somewhat obscure? (I started researching the problem about two years ago and, to date, have identified 111 versions of BASIC, 23 of which were developed by Microsoft.)

Translation from one version to another is more tedious than difficult, but it requires that you have the manuals that explain the use of the BA-SICs you are translating between, and an understanding of how the language works in the first place. In cases where it will work, an automatic translater such as that mentioned above is most convenient.

Hand translation is the next and most tedious method. For this, I'd suggest you get a copy of David Lein's The BASIC Handbook for reference. David provides information on many versions of BASIC and offers valuable translation tips.

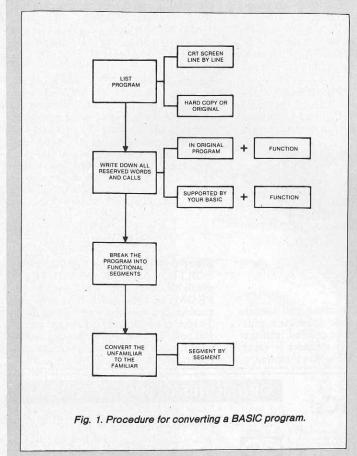
Assuming that you have assembled all of the required manuals and guides, your next step is to dive right in and go for it. Begin by taking a listing of the program. If you can get it into your machine, so much the better. Of course, there are versions of BASIC that won't permit this. Since each line is translated on insertion to a buffer, you'll get an error.

Once you have some form of listing to work from, follow the outline in Fig. 1, writing down functions and breaking the program into parts. The key is to translate on a routine-to-routine basis, rather than attacking the whole program at once. Thus you are essentially rewriting the program, using the original as an outline.

Most of the statements used in BA-SIC programs are fairly straightforward and can be used as originally written. The big problem occurs when translating disk I/O and graphics functions since virtually every machine handles these differently. In cases where disk operations and graphics are employed, your best bet is to break these out as subroutines, and write them in accordance with the specs of your BASIC. But remember, BASIC doesn't support mass storage I/O or graphics. These functions have been added over time and are considered extensions. They rely on the system monitor firmware and the operating system in order to work.

An interesting aspect of BASIC is that you can establish macro calls in the form of subroutines that can be defined to simulate a function not supported by your BASIC. Suppose you see a program written for the TRS-80, for example, and you have

just become the owner of a Mits 680b using the old Microsoft BASIC. Your goal is to make that program work as



MORE INFORMATION

For additional information about products and services mentioned here, contact the companies directly.

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Paccom 14905 N.E. 40th St. Redmond, WA 98052 800-426-6254 or 206-883-9200 it would on the TRS-80 (for this example no disk I/O is implied). Let's first look at the original program:

10 CLS 20 I = 0 30 FOR I = 1 to 25 40 PRINT "THIS IS A TEST" 50 NEXT I 60 END :REM CLEAR THE SCREEN :REM ZERO THE COUNTER :REM START LOOP :REM PRINT MSG TO CRT :REM INCREMENT COUNTER

Notice that the program is straightforward. Nothing fancy, but it won't run on the 680b! The first line will generate a syntax error, meaning that there is something in it that the BASIC in use doesn't understand—in this case, CLS. To the TRS-80, CLS is a special function that tells the system monitor: "Clear the screen by blanking all the available picture elements (pixels)."

The 680b operates with an external terminal that may or may not have a blanking feature and is separate from the internal operation of the computer. Accordingly, the terminal may not have a method of clearing the screen with a control character (which incidentally, would be easy). Instead, a counter much like the main program body is called for. Therefore, the new program will look like this:

10 GOSUB 100
20 I = 0
30 FOR I = 1 TO 25
40 PRINT "THIS IS A TEST"
50 NEXT I
60 END
100 FOR C = 1 to 16 :REM SCREEN HAS 16 LINES
110 PRINT :PRINT A BLANK LINE
120 NEXT C :INCREMENT THE COUNTER
130 RETURN :GO BACK WHERE YOU CAME FROM

The rest of the program stays the same, as it contains nothing not known to the 680b version of BASIC. In this case, both BASICs are of Microsoft design, which helps, since they are reasonably similar.

Now, here's something for you to do. Write a conversion program that will take the program in this example and translate it for some other machine, such as a Heath, Apple or an Atari 800. I'll show you a program that performs this translation in an upcoming issue, and how to convert an Apple graphics program to work on the Heath H-89 and Radio Shack TRS-80.

Should you, in the meantime, come up with a good idea on how to convert programs, send me a note, in care of the magazine. Or, if you have a program you want to convert and aren't sure what to do, let me know (enclose a stamped, self-addressed envelope); I probably can help. Those of you that are on the Micronet can reach me at ID [70003,133].