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**computers**

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 store-and-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 BASIC 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 BASIC 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 BASICs you are translating between, and an understanding of how the language works in the first place. In cases where it will work, an automatic translator 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 BASIC 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

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

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].

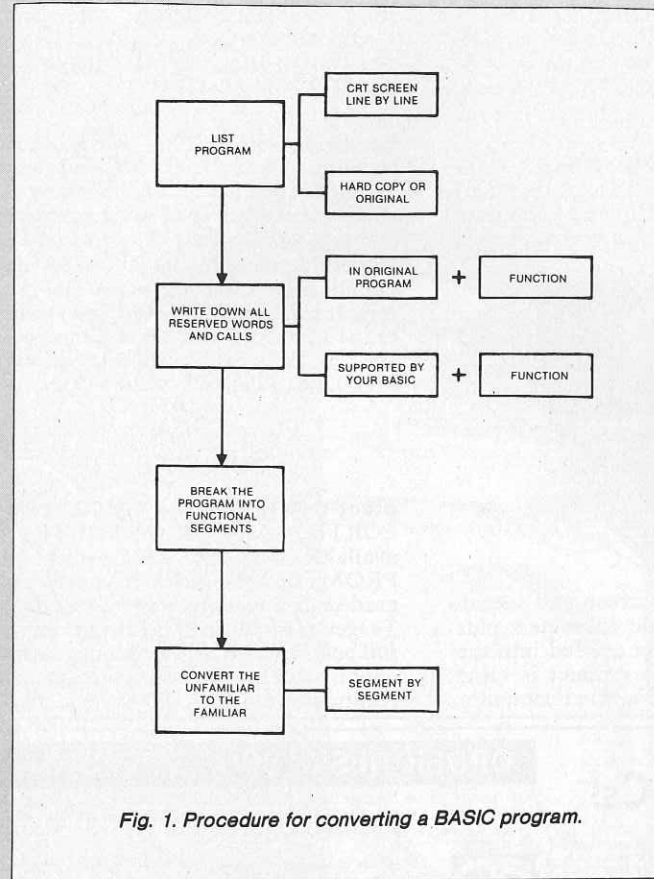


Fig. 1. Procedure for converting a BASIC program.

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