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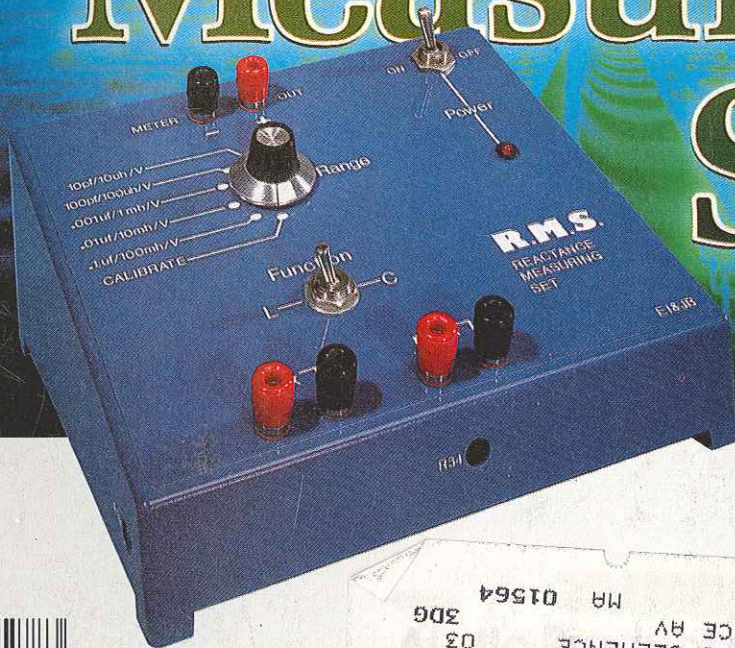
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Good Grief! More Conversion

IN THE last few issues, I have discussed conversion techniques for the BASIC language. As a result, I've received a number of letters in the mail and notes on MicroNet. Many of these asked about *The BASIC Handbook*, by Dr. David Lein, which I had mentioned in passing in a previous column. The book is 360 pages long and is very concise in its presentation of the various syntaxes used in numerous BASICs. You can obtain it from just about any B. Dalton Pickwick Bookstore or by contacting the publisher directly: Computer Publishing, 1050 Pioneer Way, Suite E, Dept. C-1, El Cajon, CA 92020 (Tel: 714-588-0996). The price is \$14.95 plus \$1.35 for mailing. When you write or call, be sure to give the department number.

Those of you who are really serious about doing BASIC translation will want to get a copy of: "Interdialect Translatability of the BASIC Programming Language," by Gerald L. Isaacs. This is ACT Technical Bulletin No. 11. Order it from the Research and Development Div., American College Testing Program, Box 168, Iowa City, IA 52440. Written in 1972, the Bulletin covers various concerns in translation. Two years ago, it cost \$4.50; but it may be more now, so write to them for the cost.

A letter of particular interest to me came from Harvey Cowell, of Angola, IN, who pointed out that he recognized the importance of conversion principles for the Apple and TRS-80 but felt cheated since nothing was said about the North Star system.

Harvey, your point is well taken. Systems like North Star did exist long before the others, and you deserve your due. So, here goes.

To Translate to North Star. The version of North Star BASIC to be discussed is Release 5, introduced at the end of 1978. Although numerous BASICs preceded North Star, this version became one of the more serious attempts that was made at designing a business-oriented language.

In its original form, North Star BASIC was an upgraded version of a Tiny BASIC published in *Dr. Dobbs Journal*. Gradually, this BASIC was upgraded to take advantage of the sophistication that

was built into the North Star operating system.

Some software experts consider North Star BASIC difficult and poorly structured. However, this may be the beauty of it. Although I'm a proponent of structured design of an application and, to a degree, of structured programming, I feel their constraints make them difficult for the novice to use. There are no such constraints with North Star.

An example of the power of the BASIC and good planning was demonstrated in a program called WHATSIT (Wow, How Did All That Stuff Get In There), developed by a company called Computer Headwear in early 1978. This particular program made extensive use of the ability of North Star BASIC to locate specific points in a record within a file and set pointers. Interestingly, WHATSIT proved that a very high-level data-base management system could be implemented on a microcomputer in BASIC.

Getting Down to Cases. The PRINT statement in North Star BASIC is an output function and works basically the same as in any BASIC. A program line such as:

PRINT "NORTH STAR BASIC"
will produce an output to the screen of: NORTH STAR BASIC. The double quotes are used to inform BASIC that this is a string expression.

Now if you want to drive the same message out to the printer, you must let North Star BASIC know that. To do this, you employ the use of the pound sign (#). For example, to output to the printer:

PRINT #1, "MESSAGE"
would cause the printer to print the message. If you leave out the device number, which can be from 0 to 7 (0 is usually the default), the output goes to the CRT.

The TRS-80 Level II BASIC uses LPRINT; for example, LPRINT "MESSAGE." If you typed PRINT #1, in the same BASIC, it would assume that you want to perform some input to disk buffer #1.

The eight possible devices you can communicate with on the North Star system include the disks and you can address them by device number. The number that you enter (0-7) represents the port address. (They call it the pseu-

do port since it only points to the actual port location in the memory map.) The way you emulate this in the TRS-80/Microsoft BASIC is to use the OUT function and an argument representing the value of the port in decimal. Thus OUT (26) would send data (one byte at a time) to the port designated by 26₁₀ (1A in hexadecimal).

North Star BASIC lets you perform this I/O without worrying about actual address or port designators.

A Way to POKE. The POKE function allows you to put information into memory. North Star has the same function but calls it FILL. Both POKE and FILL work the same way. You enter the function, a memory location, and the byte you want to put there. For example:
POKE 65535, A
and
FILL 65535, A

Both do the same thing—putting byte A into location 65535.

The inverse of POKE and FILL, is PEEK and EXAM. These functions allow you to examine at a given memory location. North Star uses the word EXAM to mean "let's look at a memory location." To convert this:

EXAM 65535, A
is equal to
PEEK 65535, A

Not all the functions are as easily understood or translated. For example, the North Star function TYP(e) allows you to determine what type of data item is going to be found in an open disk file. A numeric item would produce a 2, a string 1, and, if the end of the file is reached, a zero. This is a *disk* function and not a *real* function of BASIC—it is an *extension*. To use this function you have to decide what you are looking for. If you want to detect the end of file mark, you write:

IF TYPE (n) = 0 THEN xxx where n is the number of the open file and xxx is the line to branch to. If you are doing a *read* and you want to ensure that you are *reading* the right data into the correct variable (either string or numeric), then you can set up a test. For example:
10 IF TYP(1) = 1 THEN 20
20 READ #1, \$\$

This says: if the next data item on file #1 is a string, read it into the string variable \$\$. A numeric test is handled the

By Carl Warren

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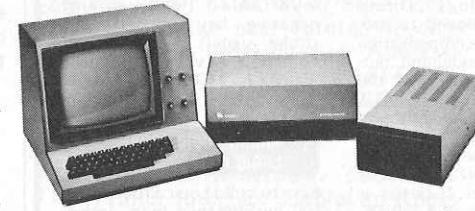
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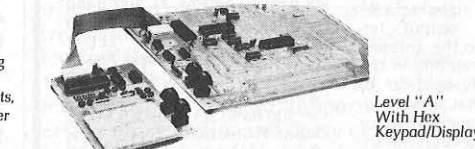
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same way. The problem associated with this is not so much converting it to another form, but trying to figure out when to replace a specific function in another BASIC with TYP. If you have a situation where you want to find the end of a file, you would have something like this in TRS-80/Microsoft BASIC:

```
10 OPEN "I", #1, "STUFF.DAT"
20 IF EOF(1) THEN 50
30 INPUT #1, A
40 . . . . .
50 . . . . .
```

What we are saying here is, if you detect an End of File Marker (EOF) which is a 1A, then go do something else on line 50. Otherwise, READ in the data. What the EOF does is return a (-1) if the end is reached and is true, or a (0) if data is available (false).

The EOF function is used with sequential files, and can't be used to detect the end in a random file. You do that by knowing how much you can put out on a disk then use LOF (Last Output File mark).

Testing for the data value, numeric or string, in TRS-80 BASIC isn't as simple as doing a TYP test in North Star. Here you have to be a little inventive. To demonstrate:

```
10 OPEN "O", 1, "STUFF.DAT"
20 PRINT #1, 1 : REM identify data as numeric
30 PRINT #1, N : REM output actual data
40 . . . . .
```

To input it again:

```
10 OPEN "I", 1, "STUFF.DAT"
20 INPUT #1, N : REM check for identifier
30 IF N = 1 THEN 50 : REM if numeric get rest
40 INPUT #1, NS : REM otherwise read alpha data
50 INPUT #1, D
```

What occurs is a simple test for a condition to determine whether or not the data was a string or numeric in nature. And, depending on the results, read it into the correct variable type. Unfortunately, this takes memory and is simplified using the TYP function.

By now it should be obvious that translation, while not trivial, can be achieved if you sit down and analyze the problem.



"In shutting down the machines, Mr Simms, you don't just pull the plug!"

COMPUTER SOURCES

By Leslie Solomon
Senior Technical Editor

Hardware

S-100/C Bus. The Model IOP I/O processor, used with the S-100 bus incorporates a Z-80A, 16K of RAM and up to 32K of PROM. It can be used stand-alone or as a satellite processor on the S-100 bus. It can also be used to interface the S-100 to peripherals via a new bus, called "C-bus," which operates independently of the S-100. To the host processor, the IOP appears as two output and two input ports, whose base addresses are switch selectable. The IOP can interrupt the host with a preprogrammed interrupt vector. A daisy-chain connector is used for prioritizing the interrupt. \$695. Address: Cromemco Inc., 280 Bernardo Ave., Mountain View, CA 94043 (Tel: 415-964-7400).

Multi-User I/O. The INO-288 Multi-User Serial I/O Board was designed for S-100 systems where up to 8 additional serial I/O ports are required. The device is also available with four channels expandable to 8. All ports are fully programmable, using the 8251A programmable communication interface. Each port supports RS-232C with full handshaking, and can operate asynchronously or synchronously with 16 selectable baud rates, and can be interrupt driven. \$435 for 4-channel version, \$715 for 8-channel version (less the personality boards). Address: Measurement Systems and Controls, 867 North Main St., Orange, CA 92668 (Tel: 714-633-4460).

Hardware Catalog. Called "The Engineers Guide to Microcomputing Packaging," this brochure covers plug-in prototype boards, racks, and accessories for S-100/IEEE 696, Apple II, Pet, Expandamem, Super-kim, STD bus, Motorola Exorciser, Rockwell AIM, TI980, DEC LSI-11, PDP-8, Heath H-11, Intel SBC 80, and National BLC Series 80. Address: Vector Electronic Co., 12460 Gladstone Ave., Sylmar, CA 91342 (Tel: 213-365-9661).

Low-Cost EPROM Programmer. One of the most useful items for any serious computer user is a means of permanently saving important programs. The low-cost EPROM Programmer kit consists of a finished pc board and full documentation. The completed programmer connects to a parallel port

and the programming verifies that the EPROM is erased and programmed with new data, checks that the data is correct, and allows transfer of data to system RAM. Documentation is available for 6800, 6809, 8080/8085/Z80, and 6502 in the near future. Specify processor when ordering. \$15. Address: Micro Technical Products, 814 W. Keating Ave., Mesa, AZ 85202 (Tel: 602-839-8902).

Apple Printer Interface. The Model 7728 Printer Interface enables an Apple II to operate the Integral Data Paper Tiger, Okidata Microline 80, Microtek MT-80P, MPI 88T, as well as Centronix printers. An on-board ROM provides all driver firmware. Users who choose to develop their own drivers may replace the ROM with RAM. The 7728 resides in any Apple slot, and supports the interface daisy chain, and daisy chain pass through. The interface includes an 8-bit data output bus, four status inputs, data strobe and acknowledge handshakes, and printer reset signal. \$119.95. Address: California Computer Systems, 250 Caribbean Dr., Sunnyvale, CA 94086 (Tel: 408-734-5811).

OS Light Pen. A deluxe version of the Lewis Computer System light pen kit features a coiled cord and Kwik-disconnect plug. It is designed for use with

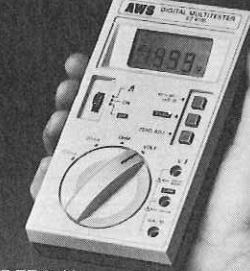


Ohio Scientific computer systems. \$29.95. Address: Faragher Associates, Inc., 7635 West Bluemound Rd., Milwaukee, WI 53213 (Tel: 800-558-0870).

Music Sweetener. This device is a low-pass filter designed to improve the quality of commercial and home-brew music synthesizers. It attenuates unwanted high-frequency sampling noise four times better than an audio system treble control. The device is connected between the music peripheral and the audio system. \$39.95 plus \$2 shipping/handling. Address: Newtech Computer Systems Inc., 230 Clinton St., Brooklyn, NY 11201 (Tel: 212-625-6220).

Atari Memory. The Mosaic 32K RAM Board can be used to add 32K of memory to both the Atari 400 and 800 systems. It enables the 400 owners to use disk drive. With the additional 32K of RAM, Atari owners can use disk

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