



February 1984

No. 16

TABLE OF CONTENTS

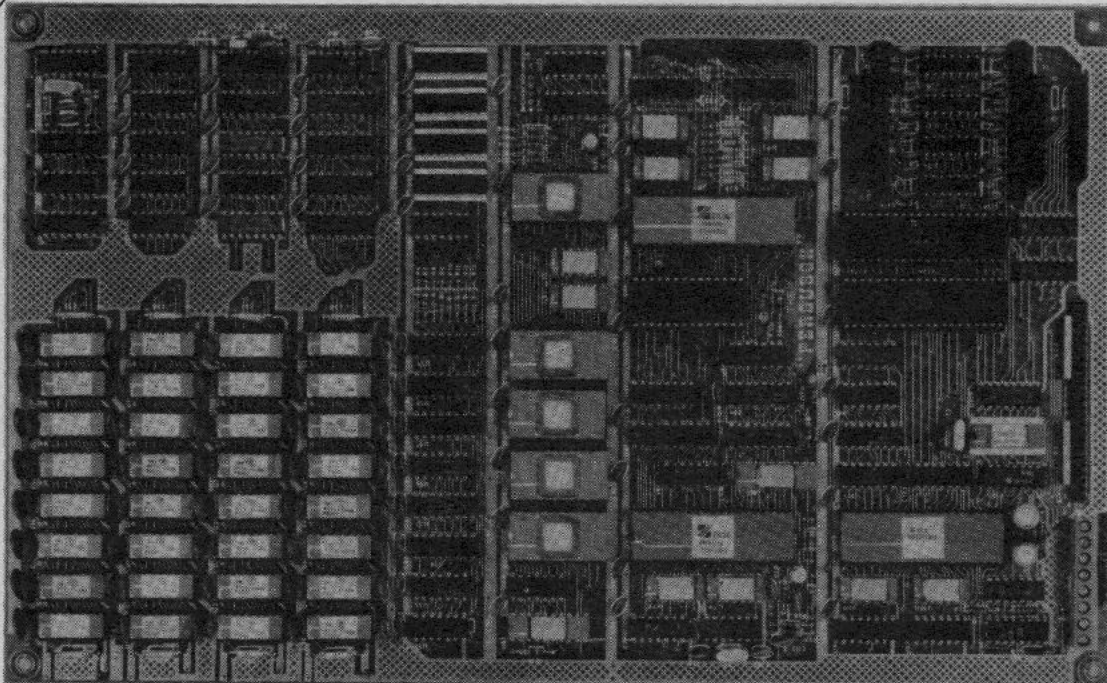
Extending MicroSphere's Color Graphics System	4
Double Density on the BB I	6
Interfacing the Microline to WordStar 3.30	8
KayPro Column	12
Slicer Column	18
SBasic	20
BB II: Modifying Andy Bakkers' Interface	25
FORTHwords	26
C'ing Clearly	28
Pascal Procedures	30
Xerox 820 Column	34
On Your Own	38
"Inside CP/M" Review	39
Using DBase II Down Under	40
Technical Tips	44

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MICRO CORNUCOPIA

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MICRO CORNUCOPIA

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Home Sweet Home



Change

Change has been no stranger to Micro C these last three years. That's right, we were madly putting together a promotional piece on Micro Cornucopia for the Computer Faire, exactly three years ago. We didn't know what the magazine would look like but that didn't keep us from promoting it.

Anyway, we have seen a lot of change over those three years. First came the magazines (we were hoping to be able to fill 16 pages), then the users disks appeared, followed shortly by my decision to leave Tektronix and the first SOG (celebrating the first anniversary of issue #1).

Immediately after the first SOG, we took 10 days vacation. We chose to vacation in Central Oregon and it was during that vacation that we decided to move Micro C from Portland, Oregon, to the Bend area. So we spent the last half of the vacation on a guided tour of vacant houses. Take my word for it, real estate agents are not cut out to be travel guides.

Finding the right house was a nightmare because we needed space for living and space for Micro C. After searching for three months we finally signed the papers on our house and started moving. In early November, 1982, we were actually here. Micro C was running a bit late, but we were settled in and we had lots of space (the whole daylight basement) for Micro C.

Well, in one year we went from two of us (Sandy and me) to five (Dana, Dorcas, and Alice). But five weren't enough and our basement was quickly becoming a compression chamber (as attendees to SOG 2 can attest).

So we purchased a small house in a commercial district for Micro C. It's a

neat feeling little place right on the edge of downtown. And we purchased it so we'd have space for two more people.

Eric, Text Co-processor

Our latest addition is Eric Belden. Eric has a bachelor's in math and a masters in journalism and he has been teaching computer literacy and math at our local community college. Eric is trying to fill the "One good person" spot. So far he feels he is in way over his head—which means he feels like the rest of us.

Eric will be receiving the article submissions and columns so I will have more time to handle the serious business of publishing (such as making sure the garbage gets picked up and someone cuts the grass). See "On Your Own" in this issue for more information about my plans.

Anyway, Eric will be handling scheduling of articles and he will be doing the initial editing. New submissions should be sent to his attention. (Don't forget to indicate which disk etc. you would like in return.)

Submissions

As long as we're on the subject, here are a few guidelines for submissions.

1. Over-explain everything. Show it step by step. It's a lot easier for us to cut than add. (And safer.)

2. Include illustrations, if appropriate. They don't have to be pretty—Sandy redraws practically everything—just make them clear.

3. We'd appreciate it if you'd send your submission on disk if it's longer than a page. Please include a printout just in case the disk gets zapped in the mail.

4. Fancy formatting (justification) makes the typesetter throw up (not a pretty sight). We can unformat WordStar files pretty easily but don't add any hyphens (soft or otherwise). We have to remove all hyphens by hand so please don't add them.

5. Please put your name, address, and phone number on the disk, in the disk, and on the printout. Let us know if you

(continued on page 48)

LETTERS

Dear Editor,

I would like to thank you all for creating such a fine periodical and offering such useful information on hardware and software (some with considerable price savings over the 7-11 type computer shops).

I purchased FlowCharter from Haven Tree Software Limited. It is a great package and a much needed tool for maintaining documentation on a software project. We all know how important flow charts are and how much of a pain in the backsides they are to produce and maintain.

The Bloodthirsty License Agreement and Honest Disclaimer for the package are worth a million.

Howy Kyrk
18100 SW Augusta
Aloha OR 97006

Dear Editor,

Wow! The gang at Micro Cornucopia is making the humble little Kaypro into one hot machine. First 5 MHz and now 800K per drive. Those PC clones better watch out.

There is one mod that many of us would love to see on the Kaypro and it's a 256K RAM disk. It ought to make PW swap files and TW work like a dream. I'm sure you'd have a lot of interest, especially from those of use who can't afford (and see little use for) a full-blown co-processor.

One question: will the PRO-Monitor ROMs (II, 4, and 8) work with the Uniform software and still enable the Kaypro to read and write disks formatted for other machines?

Mike Perry
6035 40th Ave NE
Seattle, WA 98115

Editor's note:

Check with MicroSphere (503-388-1194) on the schedule for the RAM-disk. Tony did the design and it's fancier than the one he did for the BB I. It will do self diagnostics and print buffering as well as acting as a RAM disk. They are working on making it support 512K as well as 256K and it will be pretty cheap because you provide the RAM. (Also check with them on the price for the unpopulated color graphics board.)

About Uniform: This program takes information from CP/M when it interfaces with drive A: so drive A: can be any type of drive (II, 4 or 8). Drive B:, however, must be correct for your version of Uniform. (So if you have Uniform for the II then drive B: has to be a single-sided 40 track model.)

Dear Editor,

I had a real problem soldering parts onto the Xerox 820 board I got from BG Micro. After I wrote to Billy about the problem I got a telephone call from him.

He apologized most profusely and thanked me for bringing the problem to his attention. It turns out that about half of his boards are nickel plated and he is now including a warning notice with the board. They can be soldered with a very hot iron but you have to avoid heating the joint too long or the solder will wick up into the socket. This happened on to me on 4 pins.

He impressed me as a responsible businessman who wanted to keep me as a customer.

Victor R. Frank
12450 Skyline Blvd.
Woodside CA 94062

Editor's note:

High quality circuit boards are sometimes plated with nickel before they are tinned. My guess is that someone simply forgot the tinning when they were manufacturing the boards.

Dear Editor,

I tried the Gilderfluke Z19 graphics converter in my Kaypro and pulled it out. It was not compatible with P.P.S software.

Al Paarmann
368 El Gaucho Rd.
Santa Barbara CA 93111

Editor's note:

I assume you are talking, Al, about Perfect software. Doug Mobley of Gilderfluke says that out of over 100 boards in use no one has had trouble with Perfect, at least not when running in the ADM-3A mode. (Perfect would have to be reconfigured for the H-19 terminal to run H-19 mode.) A few people have asked how to get graphics once they have installed the system. All they have to do is give the command to enter Heath mode.

Doug has added installation instructions for Wordstar 3.0 and 3.3 (distributed by Kaypro) so you can take advantage of Gilderfluke's reverse video and the fast reverse scroll. The board was designed in the

first place to run WordStar. The board is available for the Kaypro II and 4 and is \$175.

The only bug they've found is that the new board will barf if it sees an esc X or esc Y followed by a control character. It is, however, very unlikely that you'd need to enter such a sequence.

Kaypro II H19 Graphics Adapter \$175
Gilderfluke & Co
120 Midway Dr Space 013
Anaheim, CA 92805
714-776-2207

Dear Editor,

How do I get new schematics from Cal-Tex?

Wayne R. Olson
5342 Frost Point Circle SE
Prior Lake MN 55372

Editor's Note:

If you've already tried Bill Siegmund at Cal-Tex without success, try contacting Jim Ferguson at Ferguson engineering. See his ad in this issue for the address.

Dear Editor,

Could I have more information about your Kaypro ROM? I'm particularly interested in using it if it qualifies as the "fast monitor ROM" needed to do the 5 MHz modification.

I bought your C diskettes a few months back, and recently read the Kernighan/Ritchie text. Now I'm ready to give it a try only I don't want to create 60K object files that print "Hello, World," nor do I want to wait until I "grow with C" to make them smaller.

Could you give a few hints? Do I have to manually dissect the assembly routines to pull out the ones I need? Or do I need a macro assembler? Or what?

David Hillman
2006 NE Davis
Portland OR 97232

Editor's Note:

Yes, the monitor ROM we offer is a very fast part. You can use it to run 5 MHz.

Also, the version of the Small C II compiler that generates .ASM files does make them a bit large. We also have a version of this compiler that generates output for Microsoft's M80 and L80 assembler and linker. It generates smaller code. If you have that assembler package (about \$200 I think), send back your copy of K7 and ask for the M80 version.

However, if you really want to get into C you might check out the C compilers from Software Toolworks or Aztec C. Both advertise in Micro C.

Dear Editor,

My system BB I is still not stable even after a year (and me, a designer of sophisticated micro equipment). I don't have much time to debug it! It crashes reliably at room temperature (70 degrees F) until it warms up. I believed my problem was in the RAM chips and I replaced them with 64K chips. That didn't fix it.

Then I found I could make it run when I used freeze spray on a few chips so I replaced them. Now it's still as bad and the freeze spray no longer helps. So, I beat the shit out of it to see if it was a bad connection. It wasn't. I removed a few sockets and soldered parts in, that didn't help. (I'm using a linear power supply with line filters and a parallel keyboard.)

Has anyone else had a similar experience? (I've learned to live with it.) Great magazine, hope you keep it going. Byte is so big, it takes a week to find all the articles.

David Shaw

RR 3

Elgin, Ontario Canada

Editor's note:

This is an example of how much computers can teach us. You, for instance, are learning an invaluable skill and it's one that you should be able to market at top dollar.

You could teach seminars on "Learning to cope with an Incalculant Computer." I know dealers here in the Bend area who would purchase tickets for all their customers.

As for me, I don't have a clue. All three of our BB Is have been great. We've had trouble keeping more than one of our three BB IIs in service at any one time, however.

Dear Editor,

I would like to know how to program the character set EPROM for the Kaypro II.

John Whittaker

2151 McNab

Long Beach CA 90815

Editor's note:

See Issue #6 "Do it Yourself Character Set."

Dear Editor,

As a BB II user, I hope to see more articles and programs for its use. It seems the BB II does not share the popularity of the BB I and both will soon be replaced with 16 bit/32 bit machines. Keep doing the good job.

Hap Patterson

1714 Heritage Circle

Lynchburg VA 24502

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Dear Editor,

I have a Big Board I (called a Big Bore by my friends who have DMA chips). I plan to go Slicer and I was wondering if they will be coming up with PC-DOS/MS-DOS so we can develop systems for WANG-PC and IBM-PC on the Slicer.

Stefan Gunnarsson

Spangavagen 53

161 48 Bromma Sweden

Editor's Note:

Yes Stephen, the Slicer should make a very good development system for PC-DOS software as soon as the PC compatible board is finished. As for the Big Bore, I think your friends would be hard-pressed to tell much difference between a BB I with a winchester and a BB II on the same drive. We have two systems here, one with DMA and one without. Their benchmark times are very close. Very close.

Dear Editor,

Once again, I have to say how pleased I have been with the Kaypro disks I have received. The Crowe assembler works great, especially with my .PRN file printer.

Incidentally, I found a bug in the Crowe Assembler. It apparently has problems with decimal literals larger than 1000. To get around the problem, just enter these large values in hex.

By the way, I don't dare use ZCPR when I'm in Perfect writer because if I accidentally enter cntl-C, I get dumped back to the system and lose my text.

If you would like to pass on my thanks to the authors, here is my list of favorite "Micro-C, Kaypro Disk Software".

1. Adventure—I can't deny it first place.
2. D.COM
3. FMAP, UCAI, CAT—I love good documentation.

4. FINDBD54—Works like a champ on those Elephant and Maxell disks. For your information, I have yet to have a failure on a 3M disk. By the way, if you're ever asked to recommend bulk disks, I got 100 from ALF Copy Service in Denver.

5. CRC.COM—It makes me comfortable.

I sure look forward to each issue's arrival. You are really doing a great job.

Robert O. Berry

Canyon State Systems and Software

P.O. Box 86

Sedona AZ 86336

Editor's note:

Thanks for the note about the Crowe assembler. See the Kaypro column in this issue for the ZCPR fix.

Dear Editor,

Will the Co-Power 8088 board be available for the BB II soon? Also, which assemblers will assemble Russell Smith's CBIOS for the BB II? I would like to add an AM9511 math chip so I can run Pascal MT+ faster.

Inge Sanden

Nedre Blekkan

N-7062 Bjorkmyr Norway

Editor's note:

I doubt that SWP will be working on the BB II in the near future, they are scrambling to get versions out for the Morrow system and some others (I understand). It looks like Russell Smith has his hands full at SWP.

Russell used Microsoft's M80 assembler and L80 linker to generate the code for the BB II. I suggest that you use this package; it is very powerful and has become the standard of the industry.

(Letters continued on page 47)

Extending MicroSphere's Color Graphics System

By Dana Cotant

We don't often promote add-on boards for the computers we support but there is a local group that is producing a really nice color graphics board for the Kaypro II and 4, as well as the Big Board I.

The board is designed around the Texas Instruments 9918 video display processor (VDP). The 9918 has all the block graphics capabilities of most standard graphics systems plus it is capable of sprite graphics.

A sprite is an opaque image that can easily be manipulated by software control. To move the sprite only requires writing the x and y coordinates to the VDP. Moving images on a standard block graphics system requires removing the image from its present location and replotting it at its new location. This can be very cumbersome. The sprite graphics system is much faster and easier to program.

One thing very nice about this system is that you use an external color monitor for the graphics. This means you will have your original screen for such things as menus. Anyone who has worked with a graphics that swaps back and forth between two screen images (one for text and one for the graphics image) knows how time consuming and irritating it can be.

Programming the Color Graphics Board

The board comes with an impressive amount of software. One of the disks contains graphics editors which give you complete control over shapes, patterns and colors on the graphics screen. The other disk contains programming examples.

I have written some SBASIC programs for the board. The graphics procedures provided on this disk made the task a simple matter of writing the main loop.

The procedures included with the board take most of the burden out of graphics programming by providing the math routines necessary to do the basic graphics manipulation. By stringing the procedures together in different ways, sophisticated graphics programs are quite easy.

Here at Micro Cornucopia we have agreed to be the software exchange center for programs that run on the MicroS-

phere board. I am just finishing a disk that contains some very interesting programs.

A Joy Stick Interface

There is a joystick connection on the color board so I went to the local K-Mart and picked up a cheap generic version designed for the ATARI and VIC 20 (so any sticks for these machines should work with my software). The stick uses switch closures to tell the computer of the stick position. (In fact, this interface will not work with the older potentiometer based joy sticks unless you add a comparator to convert the stick's outputs to TTL levels.)

The stick I purchased has 6 connections on the 9-position plug. One of these is common, one is the fire button switch, and the other 4 are the direction switches. As the joy stick is moved, the direction pin on the plug that corresponds with the direction the stick is moved is tied to the common pin by a switch closure.

On my particular stick, diagonal positions are coded by closing two switches. For example, moving the stick to the position between up and right closes the up and right pins on the plug. If we decide to let the signals be active low, the interface design becomes obvious.

Using the programmable PIO to our best advantage, the hardware design is trivial. Each of the signal pins can be pulled up by 10K resistors and the common pin tied to ground.

Now, only the direction pins closed by the stick will be pulled low. Decoding the joy stick becomes a matter of determining which of the pins is low and translating it to a direction.

The only hardware needed to complete the interface is a connector, 5 10K resistors, and a bypass capacitor. The connector is usually called a 9-position subminiature D male connector. I found one at Radio Shack for \$1.99 (RS part #276-1537). It had solder type connections on the back side.

The color graphics board has provisions for a 14-pin socket for the joy stick connections, but it is just as easy to solder jumpers between the D connector and the solder pads where the socket would go. Using this method would also

save the price of two 14-pin sockets and a 14-pin dip jumper. If you're careful, you can build up the terminating network on the color board itself.

Selecting the VDP or the PIO

The VDP chip uses the same address as the B side of the PIO it is plugged into. If we want to add a joy stick, it will need to use the B side of the PIO as well.

The VDP does not really use the PIO (it is a port itself) so all we need do is provide a method of selecting between the PIO (when we want to read the stick) and the VDP (when we want to read and write to the graphics screen). The board has the necessary decoding circuits to select either the PIO or the VDP depending on the state of a single input. As shipped this line is tied high so that the VDP is always selected. To free this input, remove R1. One end of R1 was tied to 5V and the other end ran to an open solder pad (marked J2 pad 3 on the schematic). Attach a jumper wire to this pad.

The destination of the free end of this jumper depends on the system you have. Big board owners would probably use the user definable bit of the system port. Kaypro folks should use the unused B side of the general purpose PIO. The A side on the Kaypro is used for the printer port but the B side is simply brought out to solder pads E7-E14.

The user definable bit on the Big Board is bit 4 so let's use that bit on the Kaypro port as well. Add the free end of the jumper to E10 on the Kaypro or terminal 8 of the power connector (TB1) on the big board. Now when bit 4 on the port is high, the graphics chip is selected and when it is low the joy stick port is selected.

Software Drivers

There are several constants to be defined in order to write the port initialization software. I will use SBASIC for the examples here because it allows the use of long identifiers and can be easily translated to another structured language for those writing in C or Pascal. The constants are shown in Figure 1.

PIO Programming

If you are not familiar with PIO programming, some of the constants will

need some explanation.

We will be using both of the ports in the control mode (mode 3). In this mode the PIO is a bidirectional bit port. To set this mode, first you need to send 0CFh (mode3) to the control port of the PIO. The PIO will expect a second byte in this mode which will select which bits are to be inputs and which will be outputs.

A zero in a bit position will set that bit of the PIO as an output and a one will set it as an input. For the Big Board BITPORT, bit 3 is the only bit that is an input. It is used as a keyboard data available signal. So 4isoutput has a one in bit position 3. On the Kaypro, it really doesn't matter which bits we set to input since none of them are used on this port. The only important thing is to make sure there is a zero in bit position 4.

The first order of business is setting up the BITPORT so that we can use it to select between the VDP and the PIO.

```
procedure set_bit_port
    out BITCNTL, mode_3
    out BITCNTL, 4_is_output
end of set_bit_port
```

Now we will be able to select between the VDP chip and the PIO with the following procedure. The flag should be true to select the VDP chip or false to select the PIO (constants PIO = 0000h and VDP = 0ffffh can be used by the calling program as flags, e.g. portselect PIO would select the PIO).

```
procedure port_select ( flag = integer )
    var status = integer
    status = inp( BITPORT )
    IF ( flag ) THEN
        out BITPORT, status OR on_mask
    ELSE
        out BITPORT, status AND off_mask
    end of port_select
```

With this complete we may now initialize the joy stick port. This need only be done once at the beginning of the program. Notice that we use the portselect procedure to select the PIO before attempting to set it up for the joy stick. When we exit we will first turn the VDP back on.

```
procedure set_up_stick
    port_select PIO
    out Joy_Control, mode_3
    out Joy_Control, stick_bits
    out Joy_Port, 0E0h
    :REM this sets the unused bits
    :REM to ones for ease of decoding
```

```
port_select VDP
end of set_up_stick

Now read joy stick with the following:

procedure read_stick
    port_select PIO
    direction = inp ( Joy_Port )
    port_select VDP
end of read_stick
```

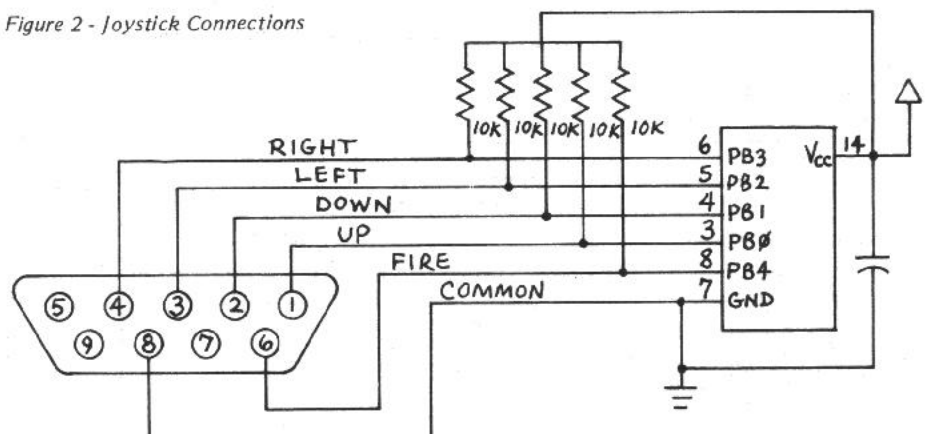
All that is left to do is decode the direction. The following hex values will be returned for each of directions listed:

UP	0FEh	RIGHT-UP	0F6h
DOWN	0FDh	RIGHT-DOWN	0F5h
LEFT	0FBh	LEFT-UP	0FAh
RIGHT	0F7h	LEFT-DOWN	0F9h

Figure 1 - Constants for SBASIC

Identifier	Meaning	Kaypro	Big Board
VDPDATA	Data port for VDP chip	30	10
VDPCTL	Control port for VDP	31	11
Joy_Port	Joy stick data port	30	10
Joy_Control	Joy stick control port	31	11
on_mask	Byte mask for selecting VDP	010h	010h
off_mask	Byte mask for selecting PIO	0EFh	0EFh
BITPORT	Port that controls select bit	00Ah	01Ch
BITCNTL	Control of BITDATA	00Bh	01Dh
mode_3	Byte that sets port as bitport	0CFh	0CFh
4_is_output	Byte that sets bit 4 as output	008h	008h
stick_bits	PIO bits used by joy stick	01Fh	01Fh

Figure 2 - Joystick Connections



If the fire button is pressed, the high nibble will become E hex. The directions can be decoded with a CASE statement or bit wise depending on the application.

New Disk

Kaypro disk K20 has the following graphics programs:

SKETCH.COM lets you move a pen around the screen under keyboard or joystick control. Lets you plot and unplot points at will and select any of 16 colors at the pen location. Includes source in SBASIC.

PACMAN.COM which is Don Britain's very realistic version of the arcade game with keyboard and joystick versions. Now it also works with the Kaypro keypad. Includes source in C for Aztec C from Manx.

Plus, this disk contains four new SBASIC procedures for the color graphics board. Procedures include: unplot, improved screen control, and joystick control.



Double Density on the BB I

By Robert Carroll

216 Oswego
Huntington Beach, CA 92648

This article is part design article and part review. Either way, it covers how you can get double density going on your BB I without paying double density prices.

Do It Yourself

This double density add-on can be built in one evening and you can run it single density with your present BB I CP/M until you get software for double density.

Even to run single density, however, you will need to make one change to your monitor (or patch it in RAM) if your drives will not handle a 3 ms step rate. You need to change RAM location FF6A (step rate) from 00H to 01H to go back to a 6 ms step rate.

And, once you go double density, your processor will need to be running at least 4 MHz. You can even use Trevor Marshall's 5 MHz modification (see Issue #11, page 14).

The 2795 disk controller is really three chips in one. After you put together the controller circuit, you can align it in about 10 minutes.

All you need is a 2 MHz clock (available on the BB) and +5V plus an oscilloscope and frequency counter. The scope (which can substitute for the counter) needs to be able to measure 200 ns.

I am using Jim Monesmith's software and PROM set. If you send Jim a disk with CP/M on it and two 2716-1s, he will incorporate his double density BIOS into your CP/M and he will burn his deluxe monitor into your ROMs. All this, including ZCPR and the source listings, for \$50.

Jim Monesmith
438 Patterson Rd
Dayton, OH 45419
513-298-6926 home

I've had his software package running here for a year without any trouble (outside of operator error).

To wire in the new socket, follow the wiring list in Figure 1.

Modifications to the Big Board

1. Remove and store U98.
2. Remove U104 and bend out pins 4, 5, 6, 8, 9, and 10 and reinstall it.

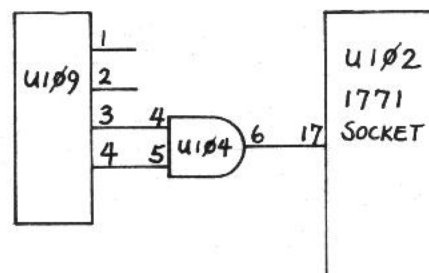
3. Jumper U102 pin 27 to U101 pin 6.
4. Cut trace running to U102 pin 37.
5. Jumper U102 pin 37 to TB1 pin 8 (PA4 DDSEL).

Alignment

1. Connect 2 MHz clock to pin 24.
2. Connect +5V to pin 21, return to pin 20.
3. Jumper pin 37 to ground and turn on supply.
4. Momentarily ground pin 19 (reset). Then jumper pin 22 to ground.
5. Attach scope to pin 31 and adjust 10K pot until the pulse width is 200 ns.
6. Attach scope to pin 29 and adjust 50K pot until the pulse width is 250 ns.
7. Connect frequency counter (or scope) to pin 16 and adjust variable capacitor to set frequency to 500 KHz.
8. Remove jumper from pin 37 and verify that the frequency on pin 16 becomes 250 KHz. (Pin 37 is the SD/DD switch.)
9. Disconnect power, clock, and pin 22 jumper.
10. Remove and store the 1771 and plug your new 40-pin header into the 1771's socket. (Make sure pin 1 is right.)
11. Now reconnect as in steps 1 through 4.
12. Note pin 22 must be high whenever the system is reset.

AstroTronics Board

If you prefer to save a little time and effort you can purchase the AstroTronics 2795 board, available for \$19 (bare board) or \$79 for the kit. The board is well laid out, but it would be nice if it were silk screened and solder masked. The documentation is clear but there is no parts list. John says a parts list is coming.



Wiring U104
(See Modifications to the BB, step 2)

Figure 1 - Wiring List for the 1771 Socket

1771 socket Pin#		2795 socket Pin#
1	-5V	1 (to 2795 pin 29)
2	WE	2
3	CS	3
4	RE	4
5	A0	5
6	A1	6
7	DAL 0	7
8	DAL 1	8
9	DAL 2	9
10	DAL 3	10
11	DAL 4	11
12	DAL 5	12
13	DAL 6	13
14	DAL 7	14
15	STEP/PH1	15
16	DIRC/PH2	16
17	PH3	17 (5"/8" SELECT)
18	3PM	18 RFW
19	MR	19
20	GND	20
21	+5V	21
22	TEST	22
23	HLT	40 HLT
(NOTE PIN DIFFERENCE)		
24	CLK	24
25	XTDS	25 SSO
26	FDCLK	26 VCO
27	FDDATA	27
28	HLD	28
29	TG43	29
30	WG	30
31	WD	31
32	READY	32
33	WF	33 WPW
34	TROO	34
35	IP	35
36	WPRT	36
37	DINT	37 DDSEL
38	DRQ	38
39	INTRQ	39
40	+12V	23 CHARGE PUMP

Connect together the pin from the 1771 socket with the pin from the 2795 socket wherever there is a "TO" in the above table. If there is no "TO" then the pins are not connected.

Parts List

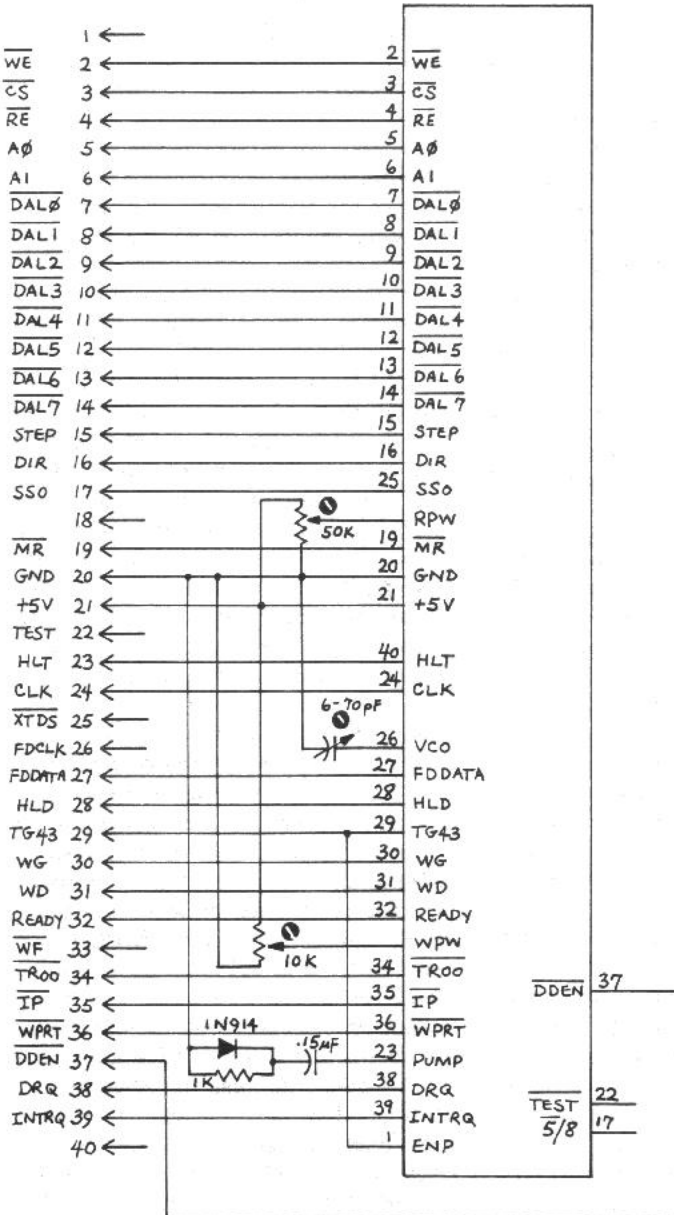
- 1 WD 2795 controller
- 1 40-pin DIP socket
- 1 10K trim pot
- 1 50K trim pot
- 1 1K 1/4 watt resistor
- 1 1N914 diode
- 1 5-60 pf variable cap.
- 1 .15 uf capacitor
- 1 .1 uf 25V bypass cap.



Wiring the 2795 into the 1771 Socket

WD 1771 SOCKET

WD 2795



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Interfacing the Microline to WordStar 3.30

By Mike Hirasuna

10528-C1 Cross Fox Lane
Columbia MD 21044

WordStar and the Okidata Microline 92 aren't bad together even when they are not properly interfaced. However, with a little help, they can do great things.

This combination was my first word processing system and I was quite pleased until I discovered everything I couldn't do: superscripts, subscripts, continuous underlining, enhanced printing, emphasized printing, correspondence quality, character width selection, and line spacing selection. However, all these were possible if my WordStar could just speak properly to my Microline.

The solution? Use WINSTALL (which comes with WordStar) to define the user patches. WINSTALL is self-explanatory and easy to use. What follows are some suggestions on how to use WINSTALL to interface WordStar to an Okidata Microline 92 printer.

Escape Sequence

Even though there are only four user patches, it is possible to define all of the important printer options. The trick is to define one of the user patches as just 1Bh, which is the hex code for ESC. Cntl-PE seems an obvious choice. The character which follows becomes the printer control character. The following is a brief list; there is a complete list in the printer's manual.

Printer Options

ESC 0	Data quality
ESC 1	Correspondence quality
ESC 2	User programmed
ESC 6	Use 6 l/inch
ESC 8	Use 8 l/inch
ESC C	Start cont underlining
ESC D	Stop cont underlining
ESC H	Enter enhanced print
ESC T	Enter emphasized print
ESC I	Enter normal print
ESC J	Start superscript
ESC K	Stop superscript
ESC L	Start subscript
ESC M	Stop subscript

Note: You must use capital letters where shown. Lower case letters have a different ASCII code (and besides they don't look as nice).

Character Pitch

Unfortunately, not all printer functions can be defined as an escape sequence. There are four control characters

which define character pitch. The hex codes for these controls are:

1C Hex	For 12 cpi
1D Hex	For 17 cpi
1E Hex	For 10 cpi
1F Hex	Double present width

Note: There is no command to undouble at the current pitch. The printer will automatically exit the double-width mode when a new pitch is specified.

Three of these controls can be defined with user patches. I use cntl-PR for 12 cpi, cntl-PQ for 17 cpi, and cntl-PW for double width. The control for 10 cpi will be explained below. The following is a summary of user patches:

cntl-PQ	1Dh	17 cpi	(sQueezed printing)
cntl-PW	1Fh	double width	(Width doubled)
cntl-PE	1Bh	ESC lead-in	(Escape sequence)
cntl-PR	1Ch	12 cpi	(Reduced printing)

The normal pitch, 10 cpi, can be set with the pitch controls, cntl-PA and cntl-PN. Both commands must be used for this function. WordStar will only issue the command sequence for cntl-PN if the last pitch control was a cntl-PA.

The alternate pitch mode, entered with cntl-PA, should not be used to print anything. In this mode, WordStar will issue the command sequence for cntl-PA at the start of every line, and issue the command sequence for cntl-PN at the end of every line.

These control sequences can be defined in the pitch control section of WINSTALL. The alternate pitch command sequence, cntl-PA, should be empty. The normal pitch command sequence, cntl-PN, should be 1Eh, for 10 cpi. When editing a document in WordStar, the normal pitch is invoked with cntl-PA cntl-PN. It is used to return from 12 cpi, 17 cpi, or double width modes.

Superscript and Subscript

Some of the printer functions may have alternate definitions. Superscript and subscript may be defined with their escape sequence or with the standard WordStar controls, cntl-PT for superscript and cntl-PV for subscript. These may be defined in the carriage roll section of WINSTALL.

The roll-up carriage sequence should be defined as ESC J. The roll-down carriage sequence should be defined as ESC L. These controls act as toggles. The first occurrence of cntl-PT will roll up the carriage; the second occurrence will roll down the carriage. The first occurrence of cntl-PV will roll down the carriage; the second occurrence will roll up the carriage.

Continuous Underlining

Since the Microline 92 does not use a two-color ribbon, the WordStar ribbon control, cntl-PY, can be used for continuous underlining. WordStar uses cntl-PY as a toggle to start and stop this function.

In WINSTALL, the cntl-PY function is defined in the ribbon selection section. The alternate selection control should be set as ESC C to start the underlining. The standard selection control should be set as ESC D to stop the underlining.

The ribbon selection control has one advantage over its equivalent escape sequence. When in the alternate selection, WordStar will automatically revert back, momentarily, to the standard section to print out headers and footers.

Double Strike and Boldface

One of the nicer features of the Microline 92 is the correspondence quality printout. There are, however, some anomalies. Enhanced or emphasized printing has no effect when you are in the correspondence mode. More importantly, correspondence mode cannot be used with the 17 cpi pitch (or its double width form).

This problem may be solved by using the double strike or the boldface controls in WordStar. Because the Microline 92 does not allow micro-spacing, there is no difference between the default double strike and the default boldface.

With WINSTALL, you can define boldface to be four overstrikes. This gives a sharp image which is almost as good as correspondence quality.

Page Offset

The WordStar default for text indentation is 8 characters. This means that it outputs 8 spaces at the start of every line. This can cause problems with the Okidata printer in an alternate pitch or in the

continuous underlining mode. The solution is to set WordStar's page offset to 0, and then use an escape sequence to tell the printer what indent you want.

The page offset can be defined with the PO dot command, but it is better to use WINSTALL to default the page offset to 0 in the "Menu of WordStar Features" section.

The left margin is defined with ESC % C N1 N2 N3, where the N's represent three decimal digits which define the print column. The first column is 001, and there are 12 columns to the standard character position. Hence, cntl-PE%C097 will define the left margin at column 97, which is equivalent to 8 character positions.

An easier way to set the left margin is with the initialization sequence defined in WINSTALL. The initialization sequence is sent at the start of every document printed by WordStar. It can be programmed to contain the escape sequence for setting the left margin at column 97. The left margin should be set back to column 1 with the reset sequence which is sent at the end of every document.

Clearing the Printer

The printer can be cleared with an 18h. The printer will return to the data mode, go to 10 cpi and 6 lpi, and stop any special printing feature. However, it will not affect the left margin or the down-line character set. The clear command should also be included in the initialization and reset sequences.

Command Summary

A summary of command sequences for standard WordStar controls is given below. Note that the initialization sequence has an additional command, 0Dh, which will return the carriage.

cntl-PA	empty	not used alone
cntl-PN	1Eh	cntl-PAcntl-PN starts 10 cpi
cntl-PY (alternate)	1Bh 43h	starts continuous underlining
cntl-PY (standard)	1Bh 44h	stops continuous underlining
cntl-PT	1Bh 4Ah	defines superscripts
cntl-PV	1Bh 4Ch	defines subscripts
Boldface:	4	
Page Offset:	0	
Initialization:	18h 0Dh 1Bh 25h 43h 30h 39h 37h	
reset:	18h 1Bh 25h 43h 30h 30h 31h	

Using PIP

Before installing these options, you may want to experiment with them. The Okidata manual suggests you write small BASIC programs to send the controls. There is an easier way.

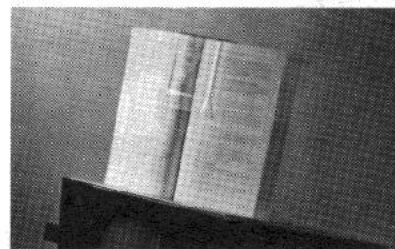
Using PIP, you can redirect the keyboard to the printer (LST:=CON:). The ASCII code of anything typed on the keyboard will be sent to the printer (except cntl-Z which is used to terminate the transmission). Fortunately, you don't usually need to send cntl-Z code (1Ah) to the printer.

The printer will not print until its line buffer is full or it receives a carriage return or line feed. If it is not obvious how to send the first 32 codes, the following table will help:

00h	cntl-@
01h	cntl-A
02h	cntl-B
03h	cntl-C
.	.
19h	cntl-Y
1Ah	cntl-Z
1Bh	cntl-[(or ESC)
1Ch	cntl-\
1Dh	cntl-]
1Eh	cntl-^ (i.e. control ^)
1Fh	cntl-- (i.e. control -)

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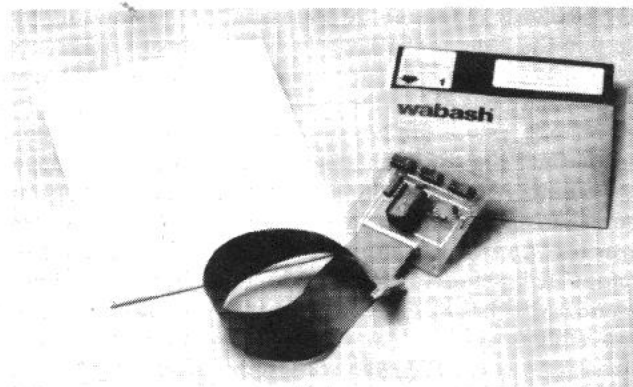
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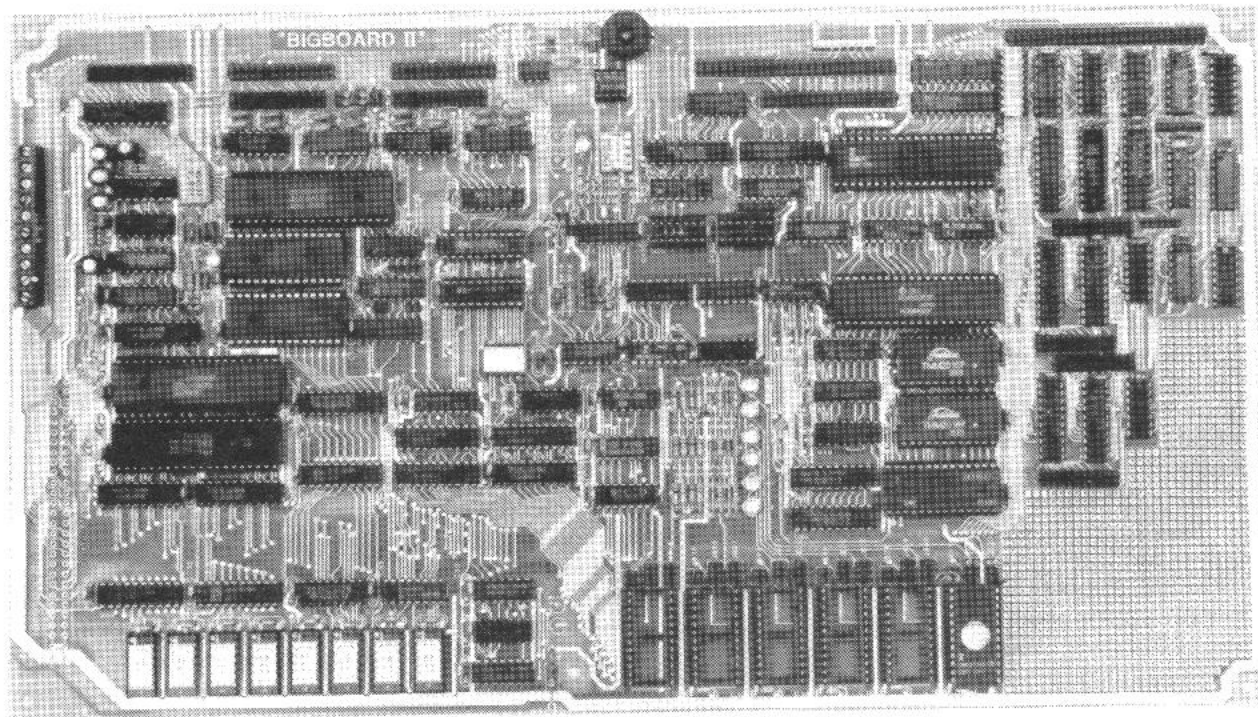
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Jim Ferguson, the designer of the "Big Board" distributed by Digital Research Computers, has produced a stunning new computer that Cal-Tex Computers has been shipping for a year. Called "Big Board II", it has the following features:

■ **4 MHz Z80-A CPU and Peripheral Chips**

The new Ferguson computer runs at 4 MHz. Its Monitor code is lean, uses Mode 2 interrupts, and makes good use of the Z80-A DMA chip.

■ **64K Dynamic RAM + 4K Static CRT RAM + 24K E(P)ROM or Static RAM**

"Big Board II" has three memory banks. The first memory bank has eight 4164 DRAMs that provide 60K of user space and 4K of monitor space. The second memory bank has two 2Kx8 SRAMs for the memory-mapped CRT display and space for six 2732As, 2Kx8 static RAMs, or pin-compatible EEPROMs. The third memory bank is for RAM or ROM added to the board via the STD bus. Whether bought as a bare board, an "unkit", or assembled and tested, it comes with a 2732 EPROM containing Russell Smith's superb Monitor.

■ **Multiple-Density Controller for SS/DS Floppy Disks**

The new Cal-Tex single-board computer has a multiple-density disk controller. It can use 1793 or 8877 controller chips since it generates the side signal with TTL parts. The board has two connectors for disk signals, one with 34 pins for 5.25" drives, the other with 50 pins for 8" drives.

■ **Vastly Improved CRT Display**

The new Ferguson SBC uses a 6845 CRT controller and SMC 8002 video attributes controller to produce a display rivaling the display of quality terminals. There are three display modes: Character, block graphics, and line graphics. The board emulates an ADM-31 with 24 lines of 80 characters formed by a 7x9 dot matrix.

■ **STD Bus**

The new Ferguson computer has an STD Bus port for easy system expansion.

■ **DMA**

The new Ferguson computer has a Z80-A DMA chip that will allow byte-wise data transfers at 500 Kbytes per second and bit-serial transfers via the Z80-A SIO at 880 Kbits per second with minimal processor overhead. When a hard-disk subsystem is added, the DMA chip makes impressive disk performance possible.

SIZE: 8.75" x 15.5"

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■ **"SASI" Interface for Winchester Disks**

Our "Big Board II" implements the Host portion of the "Shugart Associates Systems interface". Adding a Winchester disk drive is no harder than attaching a floppy-disk drive. A user simply 1) runs a fifty-conductor ribbon cable from a header on the board to a Xebec controller that costs only \$295 and implements the controller portion of the SASI interface, 2) cables the controller to a Seagate Technology ST-506 hard disk or one compatible with it, and 3) provides power for the controller-card and drive. Since our CBIOS contains code for communicating with hard-disks, that's all a user has to do to add a Winchester to a system!

■ **Two Synchronous/Asynchronous Serial Ports**

With a Z80-A SIO/O and a Z80-A CTC as a baud-rate generator, the new Ferguson computer has two full RS232-C ports. It autobauds on both.

■ **A Parallel Keyboard Port + Four Other Parallel Ports for User I/O**

The new Cal-Tex single-board computer has one parallel port for an ASCII keyboard and four others for user-defined I/O.

■ **Two Z80-A CTCs = Eight Programmable Counters/Timers**

The new Ferguson computer has two Z80-A CTCs. One is used to clock data into and out of the Z80-A SIO/O, while the other is for systems and applications use.

■ **PROM Programming Circuitry**

The new Cal-Tex SBC has circuitry for programming 2716s, 2732(A)s, or pin-compatible EEPROMs.

■ **CP/M 2.2****

CP/M with Russell Smith's CBIOS for the new Cal-Tex computer is available for \$150. The CBIOS is available separately for \$25.

*** The "unkit" is a fully-socketed, wave-soldered "Big Board II". It requires NO soldering. All an "unkit" purchaser must do is carefully insert the prime ICs we supply in the proper sockets and systematically proceed to bring up and test the board.**

**** CP/M is a registered trademark of Digital Research.**

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The Kaypro Column

By David Thompson

If you're wondering whether your Kaypro II is really 4, just wait. Kaypro Corp is changing things all around again. Only this time the Kaypro 4 and 10 will share the same processor board and the II will have a 4 board. OK?

The new Kaypro 4 uses the Kaypro 10 board and two non-Tandon half-wide drives. (Rumors are coming in that Tandon was sending its best drives to IBM and everyone else is getting the dregs so Kaypro is looking for a source of dependable units.)

The Kaypro II will have the original Kaypro 4 board and ROM. In fact, the present Kaypro II and 4 systems have a simple monitor sign-on that says "Kaypro" rather than Kaypro II or Kaypro 4. That way they can use the exact same board and ROM. The only thing you have to do to this version of the Kaypro II to turn it into a 4 is change the drives to double sided 48 tp units.

The new Kaypro 4 will actually have some features that the 10 won't have (at least for a while). It will have a new CTC timer and a modem built in. However, they aren't quite ready to ship the new 4. They are still cleaning up the software and the FCC has not yet certified that they pass the radiation restrictions.

Disk Alignment

I've been getting calls from dealers who have aligned Tandon drives down to a gnat's eyelash only to have them get strange again after they are re-installed in a Kaypro.

As I mentioned in a previous issue, the Tandon drives don't have much metal (mettle) so any stress you put on them when screwing them back into place will put them out of alignment.

Ideally, you would align them in place but that would be more difficult than doing dental work on an ant. So you have to take them out, align them, and then replace them as carefully as possible.

If you don't have a real alignment disk, find a factory distribution disk and then adjust the small concentric screw on the back of the drive until you have maximum output from the heads. Do this on track 13 hex (the middle track). After aligning on track 13, check tracks 0 and 27. If either 0 or 27 alignment is quite different than track 13 then you probably

have a warped frame and you might as well junk the drive.

You can use one of the disk utilities like DU.COM or our Kaypro diagnostic disk to get the the drive to step out to the proper track.

Morrow MD-11

I took a byte out of the Morrow MD-11 in Issue #14, page 21 and immediately got a nibble out of David Block, product manager for the 11.

I mentioned in #14 that their release didn't make sense because it inferred that they were not using a winchester controller. Well, it turns out that the Z80 is the winchester controller and it's the floppy controller (yep, no 1793 ...). In fact, he mentioned that there were only 3 LSI chips in the system, the Z80, an SIO and a DART (asynchronous version of the SIO).

Well, after he told me that, I was too stunned to speak hardly (so I spoke softly). Everyone else is plugging in a Western Digital floppy controller chip and winchester controller card and calling it good. Not Morrow.

Speed

It turns out that they are using a few TTL chips, a small CRC generator chip (to check for bad disk sectors) and the Z80 to transfer data from disk to memo-

ry. They force the Z80 to execute a NOP instruction (a NOP means No OPeration) which it does very quickly. The Z80 then increments the address lines to point to the next instruction. The Morrow folks force-feed it another NOP, and on and on for the number of bytes being read off the disk.

Meanwhile, the little TTL chips have taken over the data bus and are transferring data into memory at the addresses selected by the Z80. Using this process, it takes 1.6 us per byte (5 Megabits per second) to transfer data into memory. The average disk access time is 80 ms. Since they are running 128 K and CP/M 3.0, they are also buffering the directory in RAM and doing track reads any time they go to the disk.

When you think about the speed they are getting and the bucks they are saving by removing most of the big chips (have you tried to buy a winchester controller card lately?), the system looks mighty interesting.

Wanted Typing Tutor

I've been getting a number of calls from Kaypro folks about a typing training program. Look, they have really great ones for Apples, Commodores, Ataris and Timex's. How about the Kaypro? After all, this would be a perfect project for SBASIC.

Figure 1 - ZCPR Patch for Kaypro

Note <cr> stands for carriage return.

Now enter:

```
A>cntl-C (hit the "C" key while holding down the cntl key)
WARM BOOT
A>sysgen <cr> (it will ask you for source drive, answer A<cr>)
               (it will ask for destination or return, answer <cr>)
               (you have just put a copy of your system tracks into memory)

A>save 34 zcpm.com (now you have put the memory copy into xcpm.com on disk)

A>ddt zcpm.com (now we load it back in under ddt so we can modify it)
  DDT VERS 2.2
  NEXT PC
  2300 0100
-s0c7a<cr> (the "s" lets you directly set the contents of memory)
0C7A 21 00<cr> (the contents were "21" we'll change them to "00")
0C7B 38 .<cr> (enter a period to tell ddt we're through setting bytes here)
-s0c83<cr> (now we're going to set bytes beginning at "0c83")
0C83 18 00<cr> (replace the 18 with 00)
0C84 F3 00<cr> (replace the F3 with 00)
0C85 CD .<cr> (end the set)
-cntl-C (get out of ddt)

A>sysgen<cr> (it will ask for you source drive, answer <cr> only)
               (it will ask for destination drive, answer A<cr>)
               (then answer <cr> alone to exit system)
```

Probably the best way to start would be to try out a few of the programs on those other systems. I happen to like the Apple program that has ships approaching the star base. Each ship has a word on it and the length of the word and the difficulty of its letters are determined by your level of expertise. If a ship reaches your starbase, you lose. A ship disappears if you enter its word correctly but another ship immediately starts from the left edge of the screen to take its place.

The speed at which the ships move across the screen should be adjustable. The letters that are being typed should show up on the screen (reduces the temptation to look at the keyboard). The backspace key should delete characters and the user must hit the spacebar to end a word.

There are a number of differing views about the order in which people should learn the characters. One study indicates that people should learn all the letters under the index fingers first. Another indicates that they should learn words as soon as possible. So combining the two you would begin with "frtgbv" with the left hand and "juyhnm" with the right hand.

That doesn't give you too many words, but once you add the third fingers "edc" and "ik," you have many words to work with, including word endings like "ing" and "ed."

Software Technical Support

If you have questions about any of the Kaypro software (particularly SBASIC), try calling their software technical support group. The direct dial number is 619-481-3920. No guarantees, but they try.

ZCPR Fix

We've received some calls from people who have ZCPR (disk K9) and have found two problems. First, they can't use the numeric keypad and second, when they hit ctrl-C (when inside a text editor), they warm-boot out of the editor. (We've fixed the problem on the current disks.)

If you want to fix these problems, make up a disk with ZCPR in the system tracks (follow the instructions with disk K9 if you don't already have ZCPR in

your system), then add DDT.COM and SYSGEN.COM from your original Kaypro system disk. Put this disk in drive A: (See Figure 1 for the procedure.)

Now hit the reset button on the back of your Kaypro and after the reboot, you should have your keypad back.

Null Program

An empty file can be a lifesaver if you accidentally exited a program before saving the data. What you really want to do is be back in the program without writing over your work. With some programs, re-entering simply resets the data pointers so you don't save your data but it is worth a try. (See C'ing Clearly in this issue for another possible solution if this doesn't work.)

Anyway, if you find yourself back in the operating system when you'd rather be in the program, try this: (assuming you are on drive A:)

```
A>SAVE 0 REPEAT.COMcr>
A>REPEATcr>
```

What you are doing is creating an empty file and then telling CP/M to run that file. Of course, when CPM loads REPEAT, it loads nothing, then it jumps to memory location 100H where it assumes the code for REPEAT begins. Well, of course, the code for your previous program should still begin at 100H so you are off and running.

Shugart Floppy Drives

One of the types of drives that Kaypro particularly likes is the Shugart SA 455. Bill MacDonald has had some of these drives reading and writing for 4 days straight without a single disk error. He also mentioned that Panasonic is making these drives for Shugart.

"When we first tried the Shugart we found that it wasn't practical. You'd find out that it was on track 17 but the track 0 line was being driven true so the computer thought that the head was on track 0 and all kinds of strange things happened. The problem turned out to be a programming error in the drive's microprocessor," Bill said.

He noted that Shugart threw out all

(Kaypro Column continued next page)

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- o New BIOS remains reproducible with SYSGEN, COPYNEW, etc

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o Personal checks accepted for immediate shipment
o Please add 15% if remitting in Canadian funds
o Guaranteed satisfaction or complete refund

(Kaypro Column continued)

the buggy drives and now the little Tandons look great.

However, just lately, someone called him offering him a bunch of Panasonic drives (about 2000 of them). Of course they turned out to be the buggy ones. So, be careful about special offers on Panasonic and Shugart drives. If they are the buggy ones, they will work just fine on systems that ignore the track 0 line but they'll do strange things on a Kaypro.

Bill noted that the quality of mini floppy drives has been improving substantially and that the highest quality drives have been Japanese imports (sounds familiar doesn't it).

Kaypro Publications

The original Kaypro users group magazine is \$12 per year from Kaypro Users' Group, Box 100, Malverne, NY 11565.

People's Computer has started its own national Kaypro users group and if you send them \$8.00, they'll send you their newsletter for a year. You can reach them at Peoples Computer, PO Box 28360, Queens NY, 11428.

NWKUG (Northwest Kaypro Users

Group) has really done a good job putting together a newsletter for beginning users. And, they've been publishing as long as the Malverne based newsletter. Send \$10 for a year's subscription to NWKUG, PO Box 11, Portland, Or 97201.

The Spokane MicroComputers Users Group (SMUG) is aimed at CP/M users in general, but they have a very active Kaypro contingent. It's an interesting newsletter for \$12 per year. Contact them at PO Box 1753, Spokane, WA 99210.

"BASIC-K Magazine" is just a disk with a few Microsoft BASIC programs on it. They say you can use the programs as examples when you are doing your own MBASIC programming. However, after one look at the software, it was obvious to me that the programmer didn't want anyone figuring out what he was doing. The programs didn't do anything memorable either. The price is high (\$95 per year). You can contact them at 119 S 10th, Duncan, OK 73533.

And, of course, there is Profiles, the corporate rag from Kaypro. You are supposed to get a free year's subscription when you return your warranty card. This is a very nice looking magazine that

does justice to the system. However, they've had trouble with their mailing list. If you aren't getting it, write to them at PO Box N, Del Mar, CA 92014. (Don't call; writing seems to work better.)

Drives for the PRO-8

I just found out that you can get the TEAC model 55F quad density half-height drives for only \$215 each from National Diskon Corp. Their phone number is 415-490-7150. The TEACs draw about half the power of the Tandons and, like the CDC drives, they are supposed to be much better than Tandons.

I haven't ordered anything from Diskon yet so I can't endorse them, but at this price they might be worth a try. Plus, we are already working on a 4 drive version of the PRO-8 monitor.

Computer Components Unlimited has CDC quad density drives for \$219 each (at least they had about 100 left the last time I talked to them). I ordered a couple from them and they plugged right in. (Short the drive number you want and the M on the shunt.) head load relays so the heads aren't constantly riding on the disk. You can contact them at 1-800-847-1718. ■ ■ ■

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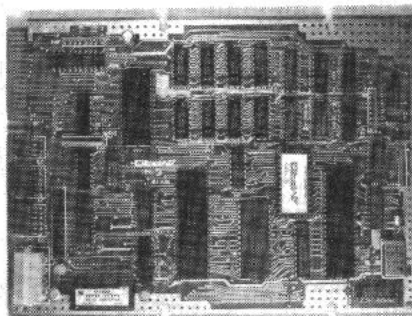
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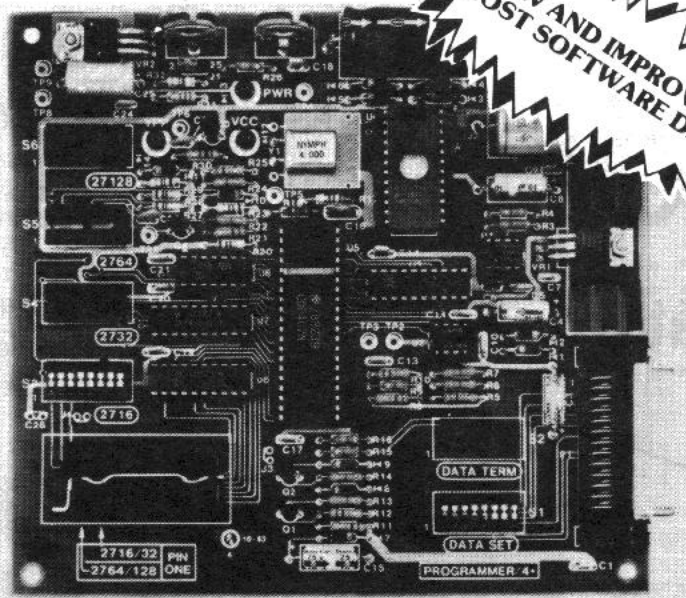
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Slicer Column

By Earl Hinrichs

245 Marshall St. NE
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Just a note on some things happening here. I have spent the last few days tracking down some undocumented features in the software. (Some people might call them bugs, but those of us who write software know better, right?)

BDOS Errors

The first time you select a hard disk after a boot, the system does a disk recalibration. If the disk operation is not completed in time, then the system times out with a BDOS select error. We do this to keep the system from hanging if there is no drive.

Since you can assume that your hard disk is always there, you could remove this check from the BIOS. On the latest EPROMS, I have replaced the recalibrate command with a test drive ready. This gives you the same information but is much faster.

SASI Port

We were running the SASI port with three wait states. On a 6 MHz Slicer, this is too long. Some experimentation showed that two wait states worked for both 6 MHz and 8 MHz.

You can change the wait states by changing a register in the 80186's peripheral control block. To change to two wait states, change the least significant bit of FFA2H and FFA6H (in the I/O space) to 0. The 80186 data sheet has the details. Also, in some of the early 1.3 EPROMS, the timer's time constant was not set. This can be fixed by outputting 9C40H (4000 decimal) to I/O location FF62H. Use 3000 decimal for a 6 MHz Slicer.

Winchester Controllers

I am now convinced that the Xebec controller is very slow. I have tried several different things to speed up the hard disk operation with very little luck. A number of folks who have used the Xebec on other systems tell me it is slow on theirs. In fact, I have been able to optimize floppy operations enough that the hard disk does not seem any faster than my 8" floppy.

I know that one Slicer owner is running an Adaptec controller and she says

(Slicer Column continued on page 18)

FLOWCHARTER

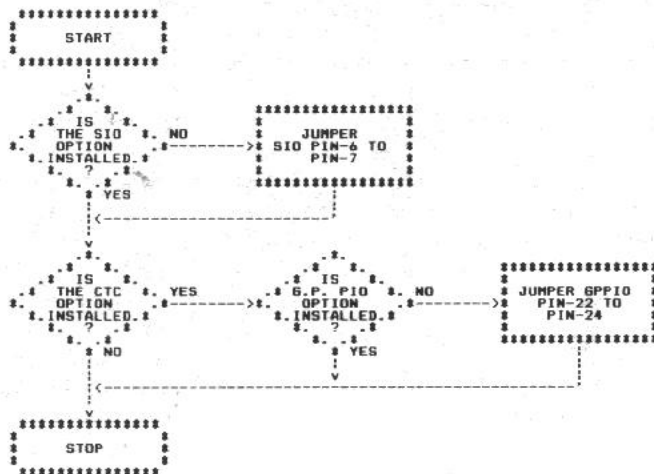
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★ BANKERS
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★ TECHNICAL WRITERS
★ CONSULTANTS
★ PROGRAMMERS
★ YOU

/* Flowchart showing which Big-Board I pins to
jumper depending on the installed I/O options */

```
T      START;
D      IS SIO OPTION INSTALLED ?;
IF     NO GOTO C; ELSE YES;
XA:    D      IS CTC OPTION INSTALLED ?;
IF     YES GOTO D; ELSE NO;
XB:    T      STOP;
        SKIP 1C;
XC:    P      JUMPER SIO PIN-6 TO PIN-7;
        GOTO A XB ET;
XD:    D      IS G.P. PIO OPTION INSTALLED ?;
IF     NO GOTO E;
IF     YES GOTO B XB ET;
        SKIP 2C;
XE:    P      JUMPER GPPIO PIN-22 TO PIN-24;
        GOTO B XB ET;
END;
```



Two years in the making! Doing what they thought couldn't be done on a micro! EasyFlow is a high-level language for producing neat, accurate flowcharts. You describe the flowchart using a simple command language; EasyFlow then produces a complete flowchart.

Not just for programmers! EasyFlow is for everyone needing flow type charts: engineers, executives, systems analysts, draftsmen, office managers, bankers, service people, technical writers, you name it - anyone who needs to be able to explain things in clear and understandable manner.

People have been using flow charts for a long time, for both programming and other uses. The problem is producing them: if you do them quickly by hand, they look awful; if you take your time they look better, but they take forever and are impossible to update or revise without starting over. Really good looking flowcharts require a typesetter, a draftsman and a lot of patience. With EasyFlow you can produce excellent flowcharts quickly, and then modify, correct and update them with very little effort.

EasyFlow is a lot like a high-level language; it accepts source statements, processes them and outputs an object file, but the object file is a flowchart instead of a program. To produce a flowchart you create a source file (using ED or whatever) that describes the flowchart. EasyFlow reads the source file, builds the flowchart in memory and then outputs it. The flowchart is normally output to disk, but it can be redirected to the console, punch or printer.

The EasyFlow command language has facilities for describing what shapes are to go where, what text is to go inside the shapes (centered in the shape automatically by EasyFlow), and the lines that are to connect the shapes. Input to EasyFlow is free-format in much the same manner as C programs, and each statement is terminated with a semicolon. Comments are indicated by "/*" and "*/"; comments can be nested, allowing you to "comment out" an entire section of source, even if it contains other comments.

The example above shows both the source text describing a simple flowchart and the actual flowchart produced. This particular flowchart explains how to setup the interrupt daisy chain jumpers on a Big-Board-I, for all possible combination of installed options. This is explained in the BB-I documentation, but the flowchart makes it a lot more clear.

EasyFlow works with just about any printer; some are better than others for producing flowcharts, but even a teletype can produce useful flowcharts. A "full sized" flowchart is five shapes wide, eleven shapes high, and requires a printer capable of printing at least 132 columns wide. Printers capable of 80 columns can print flowcharts three shapes wide. A "full sized" flowchart printed at ten characters per inch and eight lines per inch is thirteen inches wide and twenty inches high; reducing such a flowchart by 50% yields a standard-page sized chart. The example chart shown here was a full-sized chart that was reduced. Special printer programs are available for printers such as the MX80, MX100 and u92 which allow flowcharts to be produced on standard 8.5" x 11" paper directly.

EasyFlow comes equipped with twenty standard flowcharting shapes. User defined shapes can be easily added to cover just about any application - it is as simple as editing the EasyFlow configuration file which defines the shapes.

In addition to user definable shapes, EasyFlow allows user selected line drawing characters. The characters for "horizontal line", "vertical line", "upper left corner" and so on are user selectable. You can make your own choice and even take advantage of printers that have special line drawing characters available.

EasyFlow is written in Z80 assembly language and is fast and efficient. A rather large flowchart typically takes about ten seconds of computing time; the example chart shown here is very small, and took less than three seconds. Execution time will vary depending on CPU speed and the type of disk drive, but in any case it is quite fast. Since the source programs tend to be small (one hundred lines of source gets you a very full flowchart), and since EasyFlow needs only a single pass, disk I/O time tends to be modest. EasyFlow was developed on a 2.5MHz system with floppies, and it produces charts at a very respectable speed.

In addition to producing great flowcharts from perfect instructions, EasyFlow also produces meaningful error messages from imperfect instructions. A typical EasyFlow error message is:

```
046 INVALID EXIT-DIRECTION FOUND WHILE PROCESSING CELL B2.
IF NO GOTO BAFFY XV ET
?
```

The first line is an english-language error report that outlines, as clearly as is possible in one line, what the problem is and where we were in the flowchart when the problem was detected. The second line is the source text that EasyFlow was processing at the time. The third line (the question-mark) points to the exact word that was being processed. Every EasyFlow error message has a number (046 in this case) so that you can quickly look up a detailed explanation of an error in the Error Description Appendix of the manual. This explains, in detail, what the error is, why it might have occurred, and how to go about correcting it.

The EasyFlow manual is complete, and is designed for both novices and experienced users. For the novice it explains (in the correct order, starting from the beginning of the manual) how to install EasyFlow on your system, how to back up the distribution diskette, and how to produce your first flowchart using one of the included demo charts. This is followed by a tutorial that explains the use of EasyFlow through the use of examples. The source text of all the examples in the manual is included on the EasyFlow distribution diskette, giving you a starting point for experimentation. For more experienced users there is a detailed syntax and operation description of all the EasyFlow commands, a chapter on configuring EasyFlow to produce the best charts with your particular printer, the error appendix and a chapter on defining your own shapes.

EasyFlow runs on Z80 CP/M machines that have a TPA of 38K or more. EasyFlow is available on SSD 8" diskettes and KayPro format 5" diskettes. Other five inch formats: call.

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it is very fast. I have one here but have not written any drivers for it yet. Maybe it is time I got going. Meanwhile, if speed is super important, get one of the new memory boards. On a 512K Slicer, you can set up a 400K memory disk.

Speeding Up CPM86

Here is an interesting experiment which reveals something about CP/M. First, reset the Slicer while CP/M is running. This will put you in the monitor with CP/M still intact in memory. Then try this:

```
+G80:2500,2518
```

80:2500 is the CP/M cold start location. It is a good way to return to CP/M from the monitor without booting a disk. 2518 is the jump table location for the BIOS home disk function. So control will return to the monitor when CP/M tries to home the drive. After the sign-on message, in place of the familiar disk prompt, you'll see a '+'. Now type:

```
+T G,2518 &
```

Don't type return yet, let me explain this command. T is for trace; it displays the registers (like the X command) and executes one instruction. G,2518 says to start executing code at the present location but set a breakpoint at 2518. The & says repeat the command.

Putting all this together, CP/M will run normally, except that each time it calls the BIOS home disk function, the CPU registers are displayed. The point of doing this is to see how often CP/M is homing the drive.

You'd expect it to home the drive once on a cold boot perhaps, but that's about all since CP/M86 does not use the disk on a warm boot and the system is kept in a file rather than on track 0. There is nothing at all on track 0 that would interest CP/M86, but you'll find it homing the drive all the time. In fact, it'll home as many as ten times during one PIP!

OK, since our screen is getting filled with our register dumps let's reset the system again and enter:

```
+S80:2518
2518 CC C3
2519 E5 .
+G80:2500
```

This puts a return in the home disk entry in the jump table, then reboots CP/M. Now the BIOS will ignore the disk home requests. I have been running my CP/M just fine this way and it's, of course, a bit faster. Unless I find a situation where home is really needed, I am going to remove it from everything we ship. (Editor's note: I've heard you can't be too sentimental when you're an engineer, but a guy's home is his home.)

By the way, "&" (repeat) is a most underrated command. It is particularly useful when you are using an oscilloscope. Otto has some examples of this in the check-out procedures in the manual. Another interesting experiment is to watch how many times CP/M calls the BIOS read command and how often the BIOS actually reads. You will be surprised how many reads are eliminated by the track buffering.

One of these days I will add conditional branching to the repeat command so you could have it repeat for, say, 10 iterations or until something happened.

Floppy Drive Fix

When I changed the floppies' step rate from 6 ms to 3 ms they would do everything but boot. The problem was that during a restore the head would move out to track 0 and immediately step back in a track or two. Unfortunately, at 3 ms, the first step in was read as a step out by the drive, so I added a short delay to the restore and the problem went away. The problem didn't show up in regular operation since a seek was followed by a read or write so there was no quick change in direction.

Upgrade Policy

A major upgrade (from 1.2 to 1.3) costs \$25. We send a new set of EPROMs and a disk with the monitor source, the latest BIOS, and other utilities. We ask recipients to return their old disk and EPROMs. We then reuse them so we can keep the cost of upgrades to a minimum. There are many nice additions in the upgrade which make it one of the best bargains you'll see.

Figure 1 - Sieve Times for Slicer

Time to load Turbo from SSSD 8'' floppy	12 sec
Time to load SIEVE into TURBO	1 sec
Time to compile into .CMD file	.1 sec
Time to execute 10 iterations	6.2 sec
Bytes of code compiled	288
Bytes of data	8208
Bytes of stack/heap	62176

We do not make any money on the upgrades, but we want all Slicer owners to have the latest software (happy customers are our best advertising). So it is fine with us if a group of Slicer owners want to go in together and buy an upgrade and then make copies for themselves.

Bug Killing

When we released monitor 1.3 and BIOS 3.0, I was sure I had finally written perfect software. (Editor's note: That's how Earl spelled perfect, which goes to show you that even "perfect" isn't always perfect. Or whatever.)

Well, we are now shipping monitor 1.3E and BIOS 3.2. The differences are small (and I've mentioned most of them here) but the bugs can be annoying. So, if you will send in your EPROMs and \$10, we will burn them and send you a list of the changes. I wish we did not have to charge for this upgrade, but we can't afford to give it away.

Editor's note (again)

The following letter was addressed to Byte magazine but it got forwarded to Micro C, which is only right since we're the largest computer magazine in Central Oregon (as well as the only one).

Anyway, to paraphrase the letter, it appears that Turbo Pascal running on the Slicer is almost too fast to be any fun. See Figure 1 for proof.

The letter also mentioned that the Turbo test/demo program contains 1200 lines of code and it compiles into a .CMD file in 12 seconds.

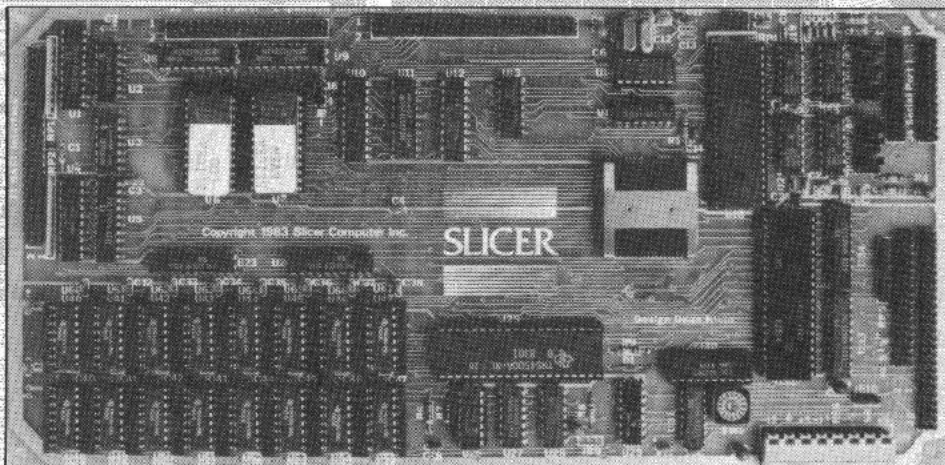
You can check these times against the benchmark figures for the Sieve of Eratosthenes program in the January 1983 Byte, page 283.

The information was actually passed on to Micro C by Otto Baade and came from a letter to Byte written by:

Edward Dayhoff
1618 Tilton Dr
Silver Spring MD 20902

■ ■ ■

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SBASIC Column

By Staff

Since we announced that Micro C was going to support SBASIC, we've been deluged by calls, cards, and letters—each writer feeling he is the lone SBASIC programmer. (And when he comments on the manual he sounds like the lone harranger). We haven't seen such interest since the Banks raised their loan rates.

Well, climb off your white horse, masked programmer, you're not alone. The following is an index, a better guide to SBASIC's trails than an Indian scout (Ohnystly!).

Of course, finding the information in the manual might not help much so we'll be taking the manual on in pieces. After using the manual, one reader noted, "There is no doubt in my mind that a beginner who could read the documentation and begin writing useful programs could get a PhD in Computer Science from MIT or Cal Tech without taking any course work."

The following index was constructed from the combined efforts of John Gruver and Rick Yount. Bill Boulton supplied the note on the CALL procedure.

Heeding the Call

In the older editions of the manual, the CALL statement is described on page 36 of Chapter 4, "Control Structures," paragraph 4.11, and in the appendix, in the Ap-Note dated June 1, 1980, "Merging and Using Assembly Language Routines."

The discussion of the CALL statement has all but vanished from the most recent manual, but the Ap-Note is still there, now on page 140. Study it!

For the enlightenment of those who don't have one of the old manuals, I here repeat the text of the explanation (this detailed explanation was replaced by three lines on page 128 of the new manual. Wonders will never cease).

"The following information and statement is for the experienced programmer used to working with assembly language routines. Sometimes a given task can best be accomplished using assembly language routines. Structured BASIC provides a method by which such routines can be invoked. The form of the statement is: CALL ([exp], [name1], [name2], [name3], [name4]), where [exp] is an integer expression that determines

what memory address is to be called, i.e., where in memory the routine is. The [name x] are integer variables whose values will be stored in the CPU registers according to the following format:"

[name1] HL register pair
[name2] DE register pair
[name3] BC register pair
[name4] Register A, PSW

"The second form of the statement is: CALL [exp]. This form is used to execute a routine without passing any arguments. [exp] is an integer expression that determines what memory address is to be called. This expression should not start with a left bracket. Both forms should use not more than 4 levels of stack space. If more is needed then the routine should set up its own stack, and when done restore BASIC's stack. Upon return from the subroutine the values of the registers are saved back into the integer variables given by [name x]. The subroutine is CALLED and should return control with a RET instruction."

■ ■ ■

INDEX FOR THE SBASIC MANUAL

! Reserved Character, 83
" Reserved Character, 15
Reserved Character, 37, 84
\$\$ Reserved Character, 85
% Reserved Character, 37
& Reserved Character, 83
() Reserved Character, 37
* Reserved Character, 84
** Reserved Character, 14, 84
**\$ Reserved Character, 85
+ Reserved Character, 14, 84
, reserved Character, 37, 84
- Reserved Character, 14, 84
/ Reserved Character, 14, 83
: Reserved Character, 37
; Reserved Character, 37
; Where Prohibited, 48
< Reserved Character, 14
= Reserved Character, 14
> Reserved Character, 14
E (Exponent), 14, 41
H (Hexadecimal Entry), 15, 16
[] Reserved Character, 37
^ Reserved Character, 14, 84
{ } Reserved Character, 37
~ Reserved Character, 37
\$CONSTANT, 124
\$END.MODULE, 125
\$INCLUDE, 125
\$LINES, 122
\$LIST, 126

\$LOADPT, 127
\$MODULE, 125
\$PAGE, 124
\$STACK, 126
\$TRACE, 122

A
ABS (RS), 39,114
Access to Data Files, 90
Address
 Array data, 49,50,140
 Error Code, 64
 File Address, 100,130,131
 File control block(fcb), 137,141
AND (Logical function), 14,39,55,56
 57,59

Application notes, 136-139
Arrays, 47-49,101,131,140
ASCII (S)/ASC(S), 39,114
ASCII, 34,37,39,43,45,77,88,89
 102-105, 114,117,118,136,138
ASCII files & channel #s, 102-105
Assembly language routines, 140-148
ATN (R), 39,114
Attaching and detaching files from
 a file channel, 93

B
BAD CHANNEL NUMBER (Error), 64
BASE (Storage), 39,47-50,64,100,130
 137,145

BASED (Storage) 39,47,50,64,100,130
 137,145
Base located area - See BASE
Based variables - see BASED
BASIC, 32
BAS File Extension, 3,4,36
BEGIN...END, 20,21,24,25,34,37,39,51
 52,65-67,70,128,145

Binary file, 136
Binary disk format, 96,105
Block structure, 20,21,24-26,33,34
 51-53,65,67,68

C
CALL (Machine Lang.), 39,128,140-148
CASE, 26,34,39,66-67,135
CCP, 136-138,140
CHAIN, 39,71-73,128,140
CHANNEL (BASIC I/O), 74,102-103
CHANNEL (DISK FILE), 90-105
CHAR (Variable type), 14,16,22,30,34
 41,44,46,48,49,69,76,77,100,107,140
 145,147
CHR (I)/CHR\$(I), 30,39,110,114
CLOSE, 39,95,97,134
Comma, 75,76,78,80,84,104,109,131
Commands (compilation), 122-127
COMMENT, 10,35,39-40,132,145
COM/COMMON (Storage area), 39,47-48
 50,53,130

Console, 39,74,79,103,121,131
 CNTL-C TRAP, 39,77,129
 Control Statements, 61
 <CONTROL> statements
 "R" 77
 "S" 27
 "T" 27
 "U" 77
 COS (R), 115
 CREATE (Disk File), 39,92,135

D
 D (Dummy device character), 102-103
 DATA, 39,88,89,128
 Data types, 34,41-44
 Data Storage Area, 45
 Defining logical functions, 58
 Determining expression type, 54
 Designating an I/O source, 74
 DELETE, 92,134
 Devices, I/O, 74
 DIM, 47-49, 51,100,130
 Disk Files, 90-105

E
 ECHO ON/OFF, 77,131
 ELSE (IF..THEN..ELSE), 34,39,67-68
 EOF (End of file) Not Implemented
 END, 20,21,24-26,29,300,34,37,39,40
 52,65-68,70,77,106,107,109-111,113
 131,132,133,135,144-146
 Equal Sign, 14,57
 EQV, 14,55,57,59
 ERROR Messages Table - Run Time, 64
 ERROR Statement, 63
 EXCAPE, 74,85
 EXECUTE, 39,71-73,128,136,137
 Exponential Notation, 85
 EXP (R), 115
 EXPRESSIONS, 54-60
 Extent, file 3, Required for Disk
 I/O but not alluded to in manual

F
 FCB (S)/FCB\$ (S), 39,115
 Features, 31
 FFIX (F), 115
 FILES Command, 90-105,134
 FINT (F), 115
 FIX (R), 115
 FIXED, 15,34,41,42,55
 Finding data struct at run-time, 49
 Filenames, 3
 FLOAT (See REAL)
 FLOAT.DOUBLE Same as REAL.DOUBLE
 FRE (I), 39,115
 FOR..NEXT..STEP, 27,28,39,68,97,135
 FUNCTION, 29,39,44,106-108,133,145
 Function, User Def. - See FUNCTION
 Functions, Intrinsic, 114-119

G
 Global Variables, 21,44,52
 GO (Appears in ASCII dump but not
 described), 39
 GOTO, 22,39,61-63,132
 GOSUB, 22,39,61,62,132

H
 HEX\$ (I), 116
 I
 IF..THEN..ELSE, 19,20,67,68,130
 IMP (Logical funct), 14,39,55,57,59
 INITIALIZE (Disk), 93,134
 INPUT, 7,8,11,17,18,19-23,29,30,39,
 74-77, 79,88,102-105,107,131
 INPUT/OUTPUT, 74-89
 INP (I), 39,116
 INSTR (I<S1,S2K), 39,116
 INT (R), 39,116
 INTEGER Variables Type, 14-17,19,20,
 21,24,27,29,30,34,39,41,43,45-47,49,
 50,52,55,56,69,76,78,96,100,107,113,
 116,133,145,147

L
 LEFT\$ (S,I), 39,116
 LEN (S), 39,116
 Line Numbers, 37
 LET (Statement), 6-13
 LOCATE, 39,48,49,100,130
 LOCATION, 39,49,100,131,145
 LOG(R) Natural Log Function, 39,116
 LOG10 (R) Appears in ASCII dump
 under DDT but not in manual
 Logical Functions, 14,57-60
 LPRINTER, 39,79,80,132

M
 Machine Language, 31,140-148
 MID\$ (S,I1,I2), 39,57,116
 Multiplication, 8,14,57

N
 NEXT See FOR..NEXT
 NOT, 14,39,55,57,59
 NUMERIC FIELDS, 83-88
 NUM\$ (R)/STR\$(R), 39,117

O
 OPEN (DISK FILES), 39,91-93,97,134
 OR (Logical OR), 14,39,55,57,59
 OUT, 39,129
 OUTPUT, PRINTING, 78-88
 OUTPUT, CONSOLE, 79
 OUTPUT, DISK FILES, 90-105
 OUTPUT, PORTS - See OUT

P
 PEEK (I), 39,117
 POKE (I1,I2), 39,129
 POS (I), 39,117
 Precedence, Table of, 14,57
 PRINT, 4-10,78,131
 PRINT USING, 81-88,131
 PROCEDURE, 30,44,109-113,133

R
 Random Files, 34,90-105,134,135
 READ, 39,89,93,94,98-100,129,134
 Reading Data, 88
 REAL Variable type, 14,41
 REAL.DOUBLE, 15,41
 RECORD. SEQUENTIAL, 39,129
 Recursion, 111-113
 Relational Symbols, 60
 REM/REMARK, 10,39,40,132
 RENAME, 39,92,134
 REPEAT..UNTIL, 24,39,65,129
 RESTORE, 39,89,129
 RETURN, 24,25,39,74,123,124,132
 RIGHT (S,I), 39,43,117
 RIGHT\$ (S,I), 39,43,117
 RND (RS), 39,117

S
 Save (CP/M), 140,148
 S-BASIC Files, 36
 S-BASIC Statements, 128-135
 Sequential Files, 90-105
 Serial Files - Same as Sequential Files
 SGN (R), 39,118
 SIN (R), 39,118
 SIZE (S), 39,118
 SPACE\$ (I)/SPC (I), 39,118
 SQR (R), 39,118
 Statements, 37,38,128-135
 STEP, 28,68
 STOP, 39,131
 Storage areas of disks, 90
 STRING (Variable), 39,41,43,118
 String Fields, 82
 Strings, 97
 String - Special Form, 57
 STRING\$(I1,I2)/STRING(I1,I2), 39,118
 System Load Map, 50

T
 TAB (I), 39,118
 TAN (R), 39,118
 TEXT, 39,80,81,131,132
 THEN - See IF..THEN..ELSE
 Tracing, 27,123,124
 Translator (Compiler), 32

V
 VAL (S), 39,119
 VAR, 14,39,45-53,130
 Variables, 14,39,45-56

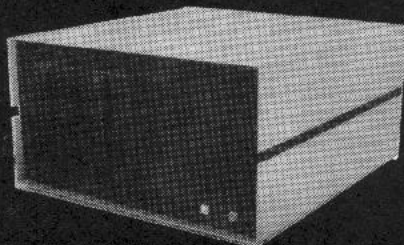
W
 WHILE..DO, 24,39,65,66,129
 WRITE, 39,94,100,134

X
 XLATE (S1,X2), 39,119
 XOR, 14,39,55,57-59

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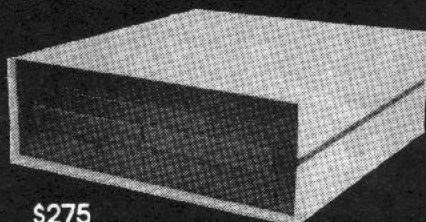
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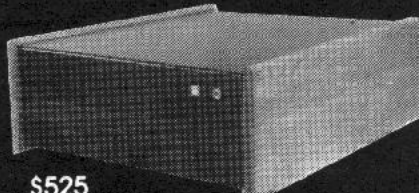
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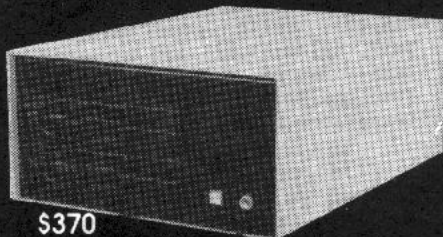
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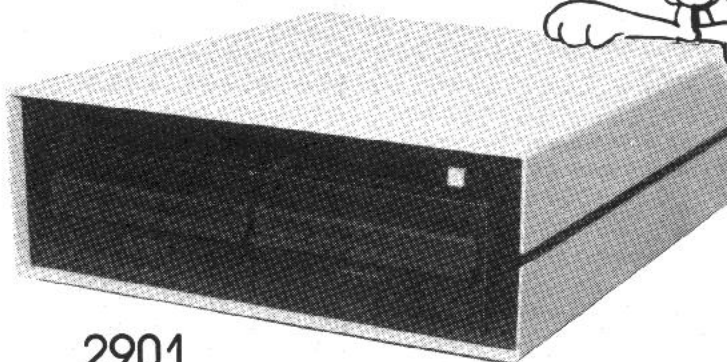
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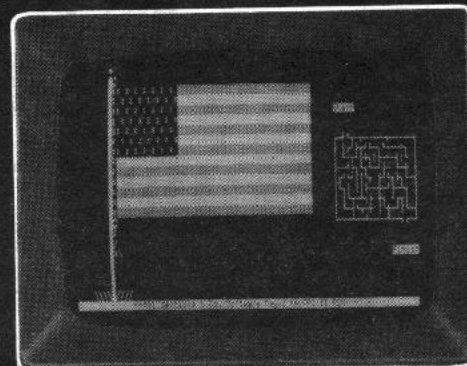
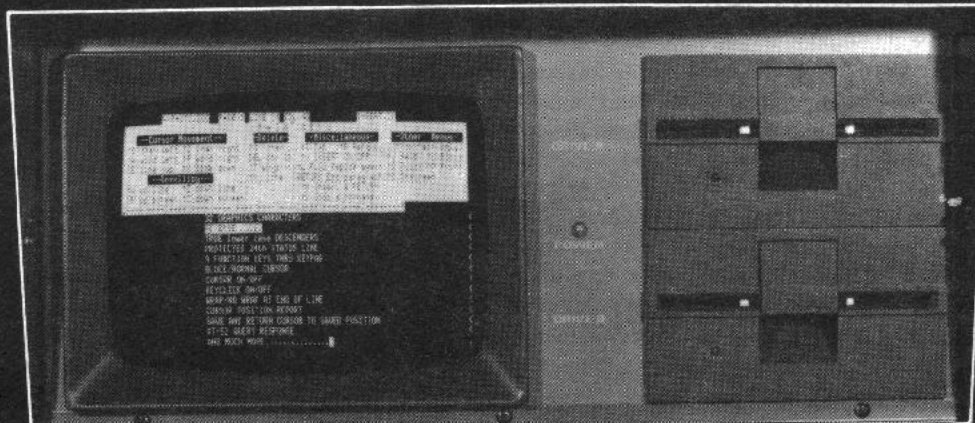
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BB II: Modifying Andy Bakker's Interface

By Frank Ten Thy

Phenix Company of California
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I just completed the modification on Andy Bakker's BB II drive interface for a mixed variety of 8" and 5" floppies. I encountered a few problems getting the system up and running which I would like to share with everyone making this attempt. Once these problems were corrected, the system worked beautifully.

The following jumpers are to be left out: JB4, JB8 and JB35. These are no longer required for the default to 8" drives. This is not mentioned in the procedure, and with the great anticipation of getting the system working, this may be overlooked.

Offsets

The CP/M that I received with my BB II has the -200H offset so it originates at E400. Bakker's AUTOBIOS expects it to be the standard CP/M which originates at E600 for a 59K system. Take your editor or word processor and change the base equation to look like this: ((MSIZE-20)*1024)-200H in AUTOBIOS.MAC if

you are one of the unfortunate people to have this CP/M. Next assemble the AUTOBIOS as shown in Figure 1.

You are probably wondering why I didn't patch my CP/M to be a standard CP/M.

I tried the patch in Micro C #9 and it would not work for me, so for now this will have to do. Also, I made a little change in the file MEMORY.MAC. However, every time you boot up, you would have to run the CONFIG program to set up your drives because the boot automatically resets all drives to 8".

Drive Defaults

In this file I changed the binary number so it would default to A=8 inch, B=8 inch, C=5 1/4 inch and D=8 inch. Look for the label typeflag:. You will find a binary number 00001111b.

Change to 00001011b
1=8 inch, ^ is Drive A
0=5 inch. ^ is drive B
 ^ is drive C
 ^ is drive D

This will set up your drives automatically so you don't have to run the CONFIG program after each boot.

Once everything was working, I reconfigured the 5 1/4" drive to read and write Eagle II disks. At the company where I work, we have several Eagles on which I need to download our existing 8" CP/M software. Andy's mod makes it much easier to do this downloading.

■ ■ ■

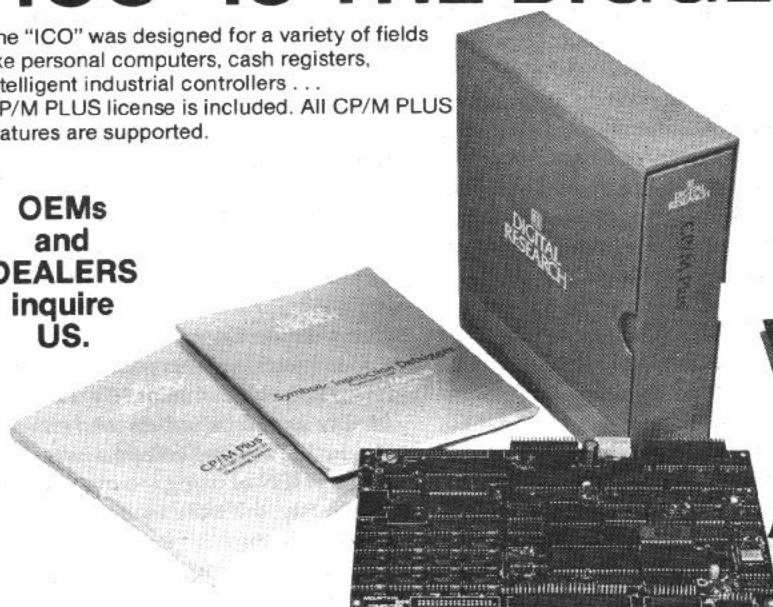
Figure 1 - Patch for Andy Bakker's Interface

```
A>80 =AUTOBIOS
A>L80
*/P:E300      59K MSIZE with -200H
*AUTOBIOS
*AUTOBIOS/X/N/E
DDT CPM59.COM
-M980,1F7F,4000
-F100,3FFF,0
-IAUTOBIOS.HEX
-R2600      New offset for 59K and
-M4000,55FF,1600      -200
-GO
A>SYSGEN8
RETURN
A RETURN
```

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This month's column starts a multi-part series entitled "Interfacing with Users." It is geared towards the individual or company wishing to market a FORTH-based product, but virtually all of the concepts discussed are also important for the home FORTH enthusiast. But first, a word from the vendors...

Native Mode Compilation

Laboratory Microsystems has introduced their native mode compiler for their FORTH systems. As I understand it, you first develop your application in your normal manner. You can then optimize specific high-level words by defining them with COMPILE: instead of ":" and then recompiling. They quote a six-times increase in speed over standard FORTH.

Is this true? I don't know, because I haven't used the new compiler. However, there are several ways of making any high level word faster, at the expense of memory space.

The easiest is to un-nest high level words. For example, if you define:

```
Where      : TEST ?KEY IF ECHO THEN ;  
           : ?KEY KEY 48 = ;  
           : ECHO 64 + EMIT ;
```

An un-nester would then expand TEST:

```
: TEST KEY 48 = IF 64 + EMIT THEN ;
```

Here every word mentioned in TEST is a primitive (containing only executable machine code). By removing the nesting, the colon-word run-time routine is not used, pointers are not stored on the return stack and TEST runs at the fastest possible FORTH speed.

The next step would be to have the compiler substitute the actual machine code embodied in KEY, EMIT, etc. and make TEST a "code" word requiring no action from the FORTH inner interpreter to execute.

However, the substituted machine code must be relocatable. For the 8080, all conditional branches are to absolute addresses, and the substitution would be very difficult indeed. The Z80 has some relative branch instructions, so if you took care and never used an absolute branch instruction anywhere in the FORTH kernel, you could build a native mode compiler for high-level words.

I would be interested in hearing from anyone who has used the compiler, both your experiences and any information you might be able to deduce about Laboratory Microsystem's method for producing speedy colon words.

Interfacing with Users

You make a spelling error, and FORTH spits the word back at you with a question mark. You try to dump memory—put the starting address on the stack but forget the count—now hundreds of numbers are scrolling up your screen. Sound familiar? If you've used FORTH at all, you've run across many more examples of good and bad error handling.

Error Handling

One of the biggest arguments in the FORTH community is over error handling. Should FORTH be smart, and warn or trap you every time it thinks you've made an error? Or should error handling be the responsibility of the user, so the FORTH can be compact and fast, and so that you can play tricks when you want to?

My feeling is this. The basic FORTH system needs some error handling, but it should be minimal. It should guard the programmer against common mistakes, like unpaired conditionals or dividing by zero, but not prevent the user from fully using his computer. For example, a common error with memory dump words like CDUMP is to interchange the arguments. The correct order is:

```
adr cnt CDUMP
```

But often you will enter:
cnt adr CDUMP

For large addresses, this second form will print for a long time! You might protect against this problem within CDUMP by making sure the top stack argument (count) is smaller than the next lower argument (address). However, this prevents you from performing long dumps or dumps at low addresses. In other words, be selective in your error handling in your basic system.

However, for an application program which will be sold or used heavily, you should add extensive error handling. Nothing turns the first-time user off

more quickly than seeing his \$200 program crashing the first time he miscounts the number of arguments! If possible, much of this extensive error processing should be switchable; a single flag that can turn it on or off.

Types of Errors

For the purposes of this column, I will divide errors into three categories: hardware, compilation, and execution.

System programmers like the 8088 and the 68000 because they can detect hardware errors. Just like mainframes, if you try to divide by zero, address nonexistent memory or execute an illegal opcode, the CPU recognizes your error and "traps" to an interrupt table.

Hopefully, either you or your operating system has placed an error handling routine in the table that informs the user of the error before aborting. Think I'm kidding? Divide 23 by 0 and see what happens! The Z80 could care less so you have to catch the error before it occurs.

To me, hardware errors should be fatal. In this case, the interpreter/compiler should output an error message and execute an ABORT sequence before asking for more input. There are classes of "fatal" though.

Where possible, use FORTH, not the underlying operating system, to trap the error. For example, a word fetch from an odd address with the 68000 results in a trap. CP/M-68K will service this error by aborting the current task. A FORTH user would then have to restart his session!

Compilation Errors

Compilation errors come in two varieties: fatal and nonfatal. An example of fatality would be unbalanced conditionals during a word compilation—forgetting a THEN or using too many BEGINs. Obviously, the word isn't going to work, so why continue?

A nonfatal error might be the redefinition of a word. FORTH should tell you, but keep on executing. You could be smarter than the compiler and want to redefine words. A good article on compiler security was written by George Shaw and is found in FORTH Dimensions, volume III, n1, page 15. It discusses the pros and cons of this topic and should be required reading.

Execution Errors

Execution errors occur when the user makes an incorrect entry—too few parameters, incorrect order, etc. Here FORTH might abort the program or ignore the problem.

Be reasonable, though, because: (1) you can't catch all the errors, (2) you might catch too many and reject a correct entry, (3) your program will get large and slow.

Hardware and compiler errors should be handled by the FORTH vendor. An execution error should be trapped by the application programmer.

Trapping Errors

The FIG error handling word set contains 4 definitions: WARNING, MESSAGE, ERROR and ?ERROR, defined below.

```
n MESSAGE
n is a message number. FORTH divides the
message number by 16 to yield a block
number and line number within the block,
with the 64-character line printed on
the console.

n ERROR
Calls MESSAGE and then aborts.

cc n ?ERROR
A truth flag (cc) is tested. If true,
ERROR is called; else the message number
is dropped and execution continued.

WARNING n
A user variable/flag that, if true,
allows the disk access to fetch the error
message; if false, only the message number
itself is printed.
```

I don't like ?ERROR for system error messages. A cryptic "257 ?ERROR" hidden in a word tells me nothing! The maximum size is a 64-character message and all messages must be duplicated in every disk (standalone) or file (captured). However, for those of you who prefer this method, we've left ?ERROR in UNIFORTH.

If we don't use ?ERROR, then what error handling method does UNIFORTH provide? Two new words are defined:

```
cc ABORT" ssss"
Test the truth flag on the stack top.
If true, issue the error message ssss
and abort execution. If false, bypass
the error message and continue.

n ARGS? t
Test the size of the stack to be sure at
least n arguments are present. If
sufficient arguments exist, leave a true
flag, otherwise leave a false flag.
```

ABORT" is now part of the FORTH-83 standard. A public domain version of the word can be found in the article by David Boulton, FORML Proceedings, 1981, page 161. Use it often during the development of an application. An extra kilobyte of error messages often makes a real difference to the user.

ARGS? can be used as a precursor to ABORT". It guards against forgetting an argument, but can be fooled if the stack has leftover values already on it. You can define ARGS? very simply with the word DEPTH.

An example of the use of these two error handling words is shown below.

```
: COPY ( blk1 blk2 --- ...copy one block to another)
2 ARGS? ABORT" Insufficient arguments"
SWAP BLOCK SWAP BUFFER B/BUF CMOVE UPDATE
SAVE-BUFFERS ;
```

Reader Survey—Floating Point

Just to get you involved in this column, I thought I would mention one of FORTH's problem areas and ask for your opinion.

In integer FORTH, all numbers are placed on one stack—the data or parameter stack. Easy argument passing is facilitated, and stack operators like ROT and SWAP give you the power to change argument order.

Problems arise when numbers are larger than a single stack cell, (usually 16 bits). A double precision integer is 32 bits. If a single precision value is underneath a double precision value on the stack, you must use the word ROT to bring the 16-bit value to the stack top instead of the usual SWAP.

The problem is further compounded if the floating-point data type is added. You can have single (32-bit) or double (64-bit) IEEE floating point numbers. Software floating point may follow these formats or may be 48-bit, as in some of Microsoft's languages, or even 80-bit (such as the 8087 temporary real).

One option is to divide data types into separate stacks. Then you wouldn't be aware of the internal size of the floating-point number or worry about having to rotate DO-LOOP limits ahead of double precision integers before entering a loop.

Therefore, FORTH systems tend to be divided into two camps: those who use a single, common stack for all data types

and those who use a separate stack for each data type (at least dividing integers and floating-point numbers).

Note that there are pros and cons for either method. For example, a single stack is conceptually easier and requires fewer pointers so you can use processor registers for these pointers. On the other hand, a separate floating-point stack would allow a FORTH system to use the stack built into the 8087 numeric processor or to use 48-bit internal floating-point, converting to 32-bit only for storage and retrieval.

My question to you is: Which camp do you feel should be the standard in future

FORTH releases? Think carefully and mail your choice to me, indicating, if possible, which factors influenced your decision.

Next Month

I will continue the User series with a discussion about menus and form generation. Your replies to the survey will be evaluated. We will also cover FORTH on the Slicer and on the SBS Z8000.

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C'ing Clearly

Column by Tony Ozrelic

6708 Melrose
Los Angeles CA 90038

Oh No! Not Again! Yes, it seems that your intrepid columnist has once again screwed up—but first, a little background:

I maintain a mailing list for my chiropractor in exchange for treatments. That is, I have my wife type the names in (on a good day, she can do 90 wpm) and I process them (that is, I tell the computer to process them). Having typed in about two hours worth of names, my wife was ready to have the files saved, and I was anxious to get back to work.

I saved the file, and when I called up the directory to see how big it was, XDIR told me it was right around zero kbytes long.

After I stopped screaming, I looked at the amount of space left over on the disk—4 Kbytes. No wonder it couldn't save a 20 Kbyte file. There wasn't room for it!

Ugh. Now, how does one go about saving 2 hours of typing? After I calmed down I began to think.

The first thing I did was save all of memory by typing:

save 255 beverly

This saved all 64k of ram into a file named BEVERLY (I used another disk which had room on it this time). Next, I loaded my ramdisk with my trusty Q/C C compiler and associated program development tools and started typing in a program that would, eventually, skim all the ASCII text from BEVERLY and put it in a text file, which I could edit to recover the original text. The program SKIM.C is the result of my labors. To use SKIM, I just said:

skim beverly beverly.txt

SKIM read all the text and dumped it into the text file called beverly.txt. Twenty minutes later (after editing), I had my wife's original file.

Here's how SKIM works: first, the two filenames are picked up from the CP/M command line and used to open the files. If one of the files does not open properly, we complain about it and exit to CP/M. If all is well, we then examine the file character by character, looking for regular ASCII text and the standard formatting characters such as tabs, carriage returns, and line feeds. This is done by istext(c),

Figure 1 - SKIM.C

```
/*      skim - skim ascii characters from file      */
#include      "qstdio.h"

/*      syntax is

      skim ramfile textfile

      where ramfile is the name of the file the machines' memory is
      saved in
      and textfile is the name of the file you want the skimmed text
      saved in
*/

main(argc,argv)
int argc;
char *argv[];
{
    char c;
    int col;
    FILE *ramfile,*textfile;

    /*      open input and output files      */

    ramfile=fopen(argv[1],"rb");
    textfile=fopen(argv[2],"w");

    /*      complain and exit to CP/M if we can't open the files      */

    if(ramfile==NULL) cantopen(argv[1]);
    if(textfile==NULL) cantopen(argv[2]);

    /*      read file character by character and send good ones to
      a regular file      */

    while((c=getc(ramfile))!=EOF) {
        if(istext(c)) { /*good char? */
            col++;
            if(c!='\n') { /*yes, keep it */
                putc(c,textfile);
                putchar(c);
            }

            /* the following code trims lines to <80 chars
            so my editor doesn't blow up */
            if(col>=78 || c=='\n') {
                col=0;
                putc('\n',textfile);
                putchar('\n');
            }
        }
    }

    fclose(ramfile);
    fclose(textfile);
}

/*      istext - is it regular ascii text?      */

istext(c)
char c;
{
    /* is it a tab, linefeed, or carriage return? */

    if(c=='\t' || c=='\n' || c=='\r') return c;

    /* is it a printable ascii character? */

    else if(c>=' ' && c<='~') return c;

    /* none of the above, so return with a zero */
    else return 0;
}
```


which returns the character if it likes it or a zero if the character isn't up to spec.

The good character is then put in the text file and echoed to the screen, and we fetch another character until we get to the end of the file. We then close both files and go back to CP/M.

More Details

Note that this type of program works well with editors that maintain text in an orderly fashion in memory. If your editor spreads text all over memory or intersperses text with weird characters, this technique may not work too well (but it's better than typing it all over again, so why not give it a try?).

What comes out is a standard CP/M text file. Your editor still may throw up if `istext()` removed some special characters that your editor needs. If so, you'll need to find out which characters it needs and then add them to the `istext()` function.

For those using other C compilers, please note that the input file (ramfile) is opened as a binary file, not a text file.

The reason is that CP/M text files contain a control-Z to flag the end of the file. Since we are trying to skim a file that may be loaded with control-Z's, we have to open the file so that we can read each and every character up to the end of the file without fainting at the sight of a control-Z.

Potential Problems

Other compilers may not let you open a binary file, so you may have to use the lower-level functions `open()` and `read()` to read the file properly.

Also, my homebrew editor does not like lines of text longer than 80 characters, so I included a bit of code to cut off lines to this length. This was not too successful, but at least it worked well enough to allow me to edit my file.

Coming Up

I have just gotten my 512 by 480 bit-mapped graphics board up and running. I am busily trying to write some software for it so I can play games and do some CAD (Computer Aided Design) work. More information about that project in the next issue.



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Pascal Procedures

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This column is a review of a new native code PASCAL compiler, Turbo Pascal, from Borland International. The product is available for CP/M 80 and 86 and MS/DOS.

I have used both JRT Pascal (JRT Systems) and Pascal/MT+ (Digital Research) regularly and have evaluated Pascal/M (Sorcim) in detail. All of these Pascal implementations are complete and useful for any application for which Pascal is appropriate. The Turbo package, however, is such a significant improvement that this column may sound like advertising copy.

I first saw an ad for this package in the November 1983 issue of Microsystems. The gentleman I spoke to at Borland's main office was very knowledgeable about the product. Based on his answers, I placed an order. Four weeks later the Pascal arrived. The turnaround was slow because they were waiting to get manuals back from the printer.

This review will be limited to the CP/M 80 version, but most of the information will apply to the 16-bit versions as well.

Turbo System Overview

Borland has produced a fast, efficient, complete and convenient Pascal system which is a joy to use. The package includes:

1. The integrated editor-compiler.
2. Terminal installation utility.
3. Program listing utility.
4. Demo spreadsheet package (source).
5. Reference manual (254 pages).

Turbo is a Pascal SYSTEM which operates within the CP/M environment. Those familiar with UCSD Pascal will find many similarities with Turbo. When bringing up the system, you specify a "work" file (normally a Pascal source file) which becomes the default for the single character commands Edit, Compile, Run or Save. If the work file is an "include" module, the Main command is used to specify the parent source program.

Turbo is set up for efficient program development. The file type of .PAS is assumed unless specified. If the current work file had not been compiled before the Run command is given, the compiler

will be automatically invoked.

The eXecute command allows other programs to be run from within the Turbo system. For instance, if you find that a needed source module is not on a current disk, PIP can be run with the eXecute command to transfer the file, after which the Turbo system and the current work file will be reloaded.

The Dir command accepts the standard "wild card" ambiguous file references and also lists available disk space.

The Option command lets you specify compiler parameters.

Through appropriate selection of Work file, Main file and Options—programs can be compiled memory to memory, memory to disk (.COM file output), disk to memory or disk to disk. For advanced applications you can specify low-level parameters such as the absolute location of code and data within memory.

The Editor

The built-in editor is a WordStar compatible full-screen editor. Default commands for cursor movement, delete and insert, and block and control commands are identical to those for Wordstar. Also, commands can be fully customized with the terminal installation program.

The actions of a few commands have been optimized for writing Pascal source. For instance, a tab (cntl-I) moves the cursor to the position below the beginning of the next word on the line above. This makes indentation and column alignment convenient.

The Compiler

The compiler is a "standard" Pascal compiler with few exceptions and many extensions. When Turbo locates syntax errors, it invokes the editor and positions the cursor at the error. If you had the compiler include the optional error messages, you will get a description of the error as well as the error number. If you need more information, you can go to the manual.

Speed

Compilation is fast! The demo program provided with the system (a mini spreadsheet, 1262 source lines) compiles disk to disk in 74 seconds on a 4MHz

Kaypro 4. (Editor's note: The demo program compiles in 12 seconds on the Slicer—see the Slicer Column for more details.) Small programs which can be compiled memory to memory will compile in seconds.

Run-time errors can be located in the SOURCE! Run-time error messages include the value of the program counter; this value is then used as a parameter in the Find option. Once the error is located, the editor is called and the cursor points to the error.

The numerous extensions aside, Turbo has only six deviations from the Pascal standard. Lack of GET and PUT are the most significant (READ and WRITE have been extended), procedures may not be used as parameters to procedures, and NEW, MARK and RELEASE rather than NEW and DISPOSE are used to control dynamic variables.

There are nine compiler directives. These give you control over parameters like run-time index checking, user interrupts and recursive code generation. Their actions and consequences are fully explained in the manual.

As an example, if user interrupts are enabled, the user will be able to stop the program with a cntl-C at any time. However, in this mode execution will be significantly slower.

Extensions

Turbo has all the extensions the other compilers have, plus:

1. Up to 127 significant characters in identifiers.
2. Hex input with the \$ prefix.
3. Variable type BYTE unsigned 8-bit integer subrange.
4. Dynamic strings—Though you must specify maximum length, full range of string handling procedures/functions, strings can be concatenated with '+', plus you get STR (which converts a number to a character string) and VAL (which converts a string to a numeric value).

5. The declaration part of a program is free-form. Although standard Pascal specifies that the LABEL, CONST, TYPE, VAR and PROCEDURE/FUNCTION declaration parts of a program may occur zero or one time and only in

(Pascal Procedures continued on page 32)

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	Turbo Pascal	IBM Pascal	Pascal MT +
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Disk Space 16 bit 8 bit	33K w editor! 28K w editor!	300K + editor Not Available	225K + editor 168K + editor
8 and 16 bit	YES	NO	YES
built-in editor	YES	NO	NO
Generate object code	YES	YES	YES
One pass native code compiler	YES	NO	NO
Locates Run Time errors directly in source code	YES	NO	NO

Benchmark data based on EightQueens in "Algorithms + Data Structures - Programs" by N. Wirth, run on an IBM PC.

Turbo Pascal is a trademark of Borland International. MT + is a trademark of MT MicroSystems. IBM is a trademark of International Business Machines.

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that order, Turbo allows them in any order and any number of times, so it's convenient to use a library of source modules.

6. Pi (11 digits) is a pre-defined constant.

7. Arithmetic as well as logical (boolean) AND, OR, NOT and XOR and the bit manipulation operators SHR and SHL (shift right and shift left).

8. Else clause in the CASE statement.

9. Typed constants. This is unique to Turbo and extremely handy. Though declared in the CONST portion of the program, typed constants are really initialized variables and can be used as such. No more long sequences of assignment statements to give variables their default or initial values.

10. Random access file I/O is implemented with SEEK to position to a specific record. The FILEPOS function returns the current position of the file pointer. ERASE, RENAME and FILESIZE are built in. TEXT files are fully supported as are untyped files with BLOCKREAD and BLOCKWRITE.

11. There are no less than 8 pre-defined TEXT files (including the default INPUT and OUTPUT). To output to the printer, just write to the pre-defined file LST.

12. Turbo includes nine terminal-related procedure/functions. Their actions are defined by the terminal installation program and thus are customized to your system.

13. FRAC returns the fractional part of a real number, HI and LO return the high and low order bytes of an integer, and SWAP exchanges the high and low order bytes of an integer.

14. RANDOM returns a random real number between 0 and 1 and RANDOM(I) returns a random integer between 0 and I.

15. Variables can be declared as ABSOLUTE, i.e., located at a defined memory location. This is useful for shared variables when CHAINing programs.

16. The MEM and PORT arrays (type BYTE) allow direct access to RAM and I/O devices.

17. Pointers can be assigned to integers with ORD and be assigned with PTR.

18. EXTERNAL procedure/functions are supported, with full parameter passing.

19. Other programs can be CHAINED with common variables (shared globals and absolute) or EXECUTED.

20. Machine language subroutines can be entered in the Pascal source with the INLINE statement.

21. Direct BIOS and BDOS calls are supported with parameters passed in and returned from the registers.

22. The heap pointer (dynamic variable management), recursion stack pointer and even the hardware stack pointer (!) are accessible from Pascal.

Documentation

The Turbo documentation is as complete and well-organized as I have seen for any software product. The bound (softcover) manual has both a detailed table of contents and a complete index.

The installation and use of Turbo and its editor are detailed in the first section.

This is followed by information on the portions of the package common to all three implementations and operating system dependent portions. There are separate sections for CP/M 80 and the 16-bit versions.

The final portion of the manual is a quick-reference summary of all the features.

There are few typos in the manual. Some errors and omissions are detailed in an update file included on the distribution disk. Overall, EVERYTHING necessary for use of the package is explained with reasonable clarity and detail. There are even instructions on how to translate the error message file into other languages!

"Gut level" details such as memory utilization, data format in memory, stack structure for parameter passing and the like are all explained. They even go into detail on going beyond the normal uses of standard Pascal.

Performance

Although my timing methods weren't precise (I used a sweep second hand), I did run some benchmarks. It's obvious that Turbo code executes faster than either Pascal/MT+ or JRT Pascal. See the Figures for my results.

Limitations

The most significant limitations to Turbo are related to the 64K address space of the Z80. Source code files which are larger

than available RAM can NOT be edited or compiled with Turbo, nor can single programs larger than RAM be executed. However, there are ways around this.

Large source files can be split into fragments small enough to edit, then \$Included in the compile. The include facility, coupled with the free-form declaration part of Turbo programs, makes the generation and use of a library of source modules convenient and very practical.

If the object code is too large to compile to memory, a simple command sends the output to an executable .COM file. Large programs can be compiled as a number of smaller programs which can then be CHAINED for execution. Chain modules contain only program code, no runtime library, and thus use less disk space. Since chained programs can share variables, the lack of an overlay mechanism is not a serious problem.

Criticisms

I found it difficult to find anything significant to criticize in the package. There are, however, a few nitpicking details that can be mentioned.

1. I would have preferred a 3-ring binder for the documentation (This is obviously a personal preference).

2. The listing utility (TLIST.COM) does not use form feeds for pagination, and at least two printers lost track and got out of synchronization with page boundaries.

3. There is no default length for dynamic strings, the maximum length must be declared.

4. There is no way to override returning to the editor when compile time errors are encountered. At times it would be convenient to scan the entire source for errors before invoking the editor.

Conclusions

As a standard Pascal, Turbo is without question one of the most cost effective purchases you can make. There are enough extensions and built-in facilities to make the package as useful as 'C' for even low-level work while much more convenient to use.

I would not hesitate to recommend the package to anyone either currently using Pascal or interested in learning the language.

Turbo Pascal is available from:

Borland International
4807 Scotts Valley Dr.
Scotts Valley, CA 95066
(408) 438-8400 (Office)
(800) 227-2400 X 968 (Orders only)



PASCAL ILLUSTRATIONS

TABLE 1

	Turbo	MT+	JRT
Accuracy (digits)	<=11	<=6	<=14
Range	1E+/-38	1E+/-18	1E+/-63

TABLE 2

Program	Turbo	MT+	JRT
Sieve	23s.	23s.	375s.
Fptest	<1s.	3s.	2s.
Tstlog	2s.	6s.	18s.
Ttsin	1.5s.	6s.	5s.

All tests run on 4MHz Kaypro, timing from bell to bell. For Turbo, compile times memory to memory were <1 sec. for all four test programs; for MT+, compile & link times were less than 2 min.; and for JRT, compiles were in the 40 sec. range. Default compiler options were used in all cases.

Listing 1

```

program sieve;
const
  size = 8190;
var
  flags : array [0..size] of boolean;
  i,prime,k,count,iter : integer;
begin
  writeln('10 Iterations',chr(7));
  for iter := 1 to 10 do begin
    count := 0;
    for i := 0 to size do flags[i] := true;
    for i := 0 to size do
      if flags[i] then begin
        prime := i+1;
        {writeln (prime);}
        k := i + prime;
        while k <= size do begin
          flags[k] := false;
          k := k + prime
        end;
        count := count +1
      end;
    end;
    writeln (count,' primes.',chr(7));
  end.

```

The Sieve of Eratosthenes from Byte, Jan. 1983. This program tests general execution speed of a language without using any arithmetic beyond integer addition.

```

PROGRAM FPTEST;
VAR I: INTEGER;
    X: REAL;

BEGIN
  WRITELN(chr(7));
  X:=(1.0E-04)/3.0;
  FOR I:=1 TO 30 DO
    BEGIN
      WRITE(' x=',X);
      X:=0.1*X;
      WRITELN(' x=',X);
      X:=0.1*X;
    END;
  WRITELN (chr(7));
END.

```

This program, from "Pascal Programs for Scientists and Engineers" by Alan R. Miller, (Sybex 1981) tests the speed, range and accuracy of floating point calculations.

Listing 3

```

program test_log;
var
  i : integer;
  x,y : real;

{JRT only, add these statements
function ln(x:real):real;extern;
function exp(x:real):real;extern;}

begin
  {To insure that loading of external procedures is not
  included in the timing, add these statements for JRT
  x := ln(1.0);
  x := exp(1.0);}

  x := (1.0E-4)/0.3;
  WRITELN (chr(7));
  for i := 1 to 20 do
    begin
      y := ln(x);
      writeln('x=',x,' ln=',y,' exp(ln)=',exp(y));
      x := 0.5*x;
    end;
  WRITELN (chr(7));
end.

```

Tests the accuracy of floating point calculations.
exp(ln(x)) should = x. From Miller.

Listing 4

```

program ttsin;
var
  i : integer;
  x : real;

{For JRT add the following statement
function sin(x):real;extern; }

begin
  {for timing accuracy add this statement for JRT
  x := sin(1.0);}

  WRITELN(chr(7));
  x := (1.0E-4)/0.3;
  for i := 1 to 40 do
    begin
      writeln('x = ',x,' sin = ',sin(x));
      x := 0.1 * x;
    end;
  WRITELN(chr(7));
end.

```

Tests the sin function. From Miller.

It seems like everytime you see a Z80, you find someone trying to patch an 8088 board onto it. Well, it turns out that the new Xerox 16/8 is an add-on board modification to their 820-II and it comes with 128K of RAM (another 128K is optional) along with CP/M 80, CP/M 86, and MS-DOS.

In fact, from the outside, it looks like Xerox just stuck in an SWP board and called the whole thing an IBM. Actually, they didn't.

Friends at Xerox have told me that the company seriously considered using the SWP 8088 co-processor, with its internal 16-bit and external 8-bit I/O, but decided instead to use a real 16-bit 8086. (Xerox does offer an 8088 board in Europe but not here.)

Anyway, it looks like Xerox may be planning to incorporate one of the standard busses into their system and though no one is really saying which buss it will be, they aren't denying that it might be

the S-100 (it ain't no school bus, that's for sure). They are also looking at high-res color graphics. I'll let you know when I get more information.

Cheap Parts.

One of the best sources for Xerox parts, believe it or not, is Xerox! Many manufacturers have discount outlets and the outlet for Xerox is:

Xerox Manufacturing Outlet
1341 W. Mockingbird
MS 503
Dallas, TX 75247
(214) 960-3367

The people are friendly and shipping is excellent on phone orders with a VISA or MasterCard card. However, if you must mail an order in, use a certified check. No COD's.

Be sure to put the "MS 503" in the address; it's very important! Minimum order is around \$10. See Figure 1 for some

of the fantastic deals I have seen there. Many may still be available.

From time to time I have seen Shugart 800, 801, 850 and 851 at excellent prices here also, but you have to move fast.

If you are just starting out, be sure to ask about their complete component sets (drives, monitor, board, cables, etc). Also, ask about CP/M. I have heard that they have a lot of 2.2 versions lying around with beautiful binders and lots of utilities along with CBIOS source.

More Cheap Parts

EPIC Sales
POB 401471
132 Walnut Plano Center
Garland, TX 75040
(214) 272-5724

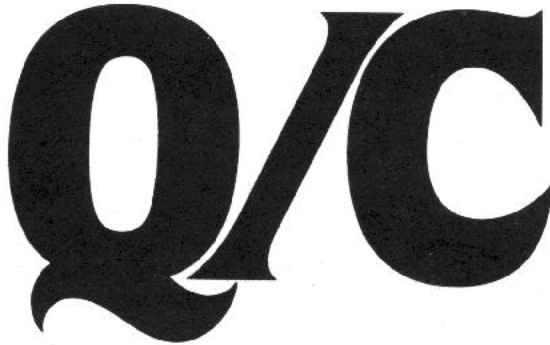
EPIC seems to have a lot of the same stuff that the Xerox Outlet has. They also have disk controller chips, RAM (200ns 4164's @ \$5.00 each), ROM and other goodies.

I know that Bob at EPIC is working on a less-than-\$1000 package to give 820 people a hard-disk, interface, and BIOS. How much less, I don't know, but I have seen 5Mbyte drives as low as 380.00. I'll keep you posted on the special deals that I see from time to time.



Figure 1 - Example Prices at the Xerox Outlet

820 Mother Boards Assembled and Working	300.00
820-II Mother Boards (that's right 820-II) they tell me most are working but untested good luck. but for the money . . .	350.00
Display/Processor Power Supply, enough for 2 5-1/4 drives and monitor (XEROX powers 5-1/4's through cable)	75.00
DS/DD 5-1/4" Shugarts W/Case & Cable	400.00
5-1/4" Disk Drive Case only	10.00
5-1/4 Disk Drive Cable assembly. For 8" use a tiny screwdriver to remove contacts from AMP 36 pin edge card connector and plug contacts into AMP 50 pin edge card connector (AMP PN# 1-583717). Works great !	5.00
Motorola Monitors I suspect these are out of the 860 line, as it includes power, chassis, & documentation	50.00
820 MAXISWITCH keyboards	25.00
820 cable assemblies saves chasing connectors	2.00-8.00



For only \$95, Q/C is a ready-to-use C compiler for CP/M. You get complete source code for the compiler and over 75 library functions. Q/C is upward compatible with UNIX Version 7 C, but doesn't support long integers, float, parameterized #defines, and bit fields.

- Full source code for compiler and library.
- No license fees for object code.
- Z80 version takes advantage of Z80 instructions.
- Excellent support for assembly language and ROMs.
- Q/C is standard. Good portability to UNIX.

Version 3.2 of Q/C has many new features: structure initialization, faster runtime routines, faster compilation, and improved ROM support. Yes, Q/C has casts, typedef, sizeof, and function typing. The Q/C User's Manual is available for \$20 (applies toward purchase). VISA and MasterCard welcome.

**THE CODE
WORKS**

5266 Hollister
Suite 224
Santa Barbara, CA 93111
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Q/C, CP/M, Z80, and UNIX are trademarks of Quality Computer Systems, Digital Research, Zilog, Inc., and Bell Laboratories respectively.

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Micro Cornucopia . .

KayPro Disk K1 Modem software

This disk is absolutely priceless if you will be using a modem to communicate with bulletin boards, other micros or mainframes.

MODEMPAT.COM: Menu selection of baud rate, bits/character, stop bits, & parity for serial port.

MODEM7.COM: Very popular MODEM 7 configured for KayPro.

MODEM7+.COM: This is MODEM7 & MODEMPAT combined - you can communicate with anything!

KMDM795.COM: Super-version of MODEM7 set up for KayPro.

TERM.MAC: Commented disassembly of the TERM program you get with your KayPro so you can configure it for any interface.

SQ/USQ.COM: Programs to squeeze and unsqueeze files for faster transfer.

KayPro Disk K2 Utilities

Really oodles of spiffy little (and big) programs to help you get full use of your KayPro.

ZESOURCE.COM: A true Zilog format disassembler for 8080 and Z80 object(.COM) files. Now you can turn .COM files into .MAC files.

UNERA.COM: Simply enter "UNERA" followed by the name of the file you just erased and presto, the erased file is back! A lifesaver.

FINDBD54.COM: Checks an entire disk, reports bad sectors, and then creates a special file containing those sectors. You save a bundle on disks.

CAT2: This a group of programs which create and maintain a single directory of all the programs you have on all your disks. Even keeps track of which programs are backed up and which aren't.

UNSPPOOL.COM: Use your KayPro II and print files at the same time. Doesn't slow down system response!

DUMPX, DU-77, COMPARE, SUPERSUB, FORMFEED, DIR-DUMP, . . . and all have documentation on disk.

KayPro Disk K3 Games

PACMAN.COM: Despite the KayPro's lack of graphics, this one looks and plays amazingly like the real thing! Keep it hidden.

ZCHESS.COM: Chess with a 1-6 level look ahead.

OTHELLO.COM: You learn it in minutes, master it in years.

BIO.COM: Generates custom graphic biorhythm.

MM.COM: Master Mind.

WUMPUS.COM: Classic wumpus hunting.

KayPro Disk K4 Adventure

This disk contains one 191K game, Adventure.

ADV.COM: This is the latest, greatest, most cussed adventure ever devised by half-mortals. This is the 550-point version so the cave is greatly expanded and the creatures are much smarter.

KayPro Disk K5 MX-80 Graphics

A complete MX-80 graphics package including example files.

KayPro Disk K6 Word Processing Utilities

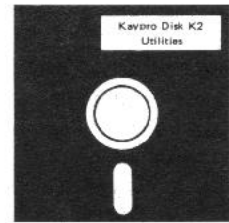
A powerful line oriented text editor that looks like Unix's EX, plus a scad of text utilities written in C which handles pretty printing, shortening a file, multiple space output, add tabs, remove trailing whitespace, and more. Also includes **ROFF.COM** a very neat text formatter.

KayPro Disk K7 Small C Version 2 Compiler

This is a greatly extended version of Ron Cain's Small C compiler. Version 2 has more expressions and larger library, true subset of Unix C. Disk contains compiler, documentation, and library — everything you need.

KAYPRO USERS DISKS for KayPro II, 4 and 10

\$12⁰⁰ each



The following are full disks of software assembled specifically for the KayPro. Each program has a .DOC (documentation) file and many come with source.

KayPro Disk K8 Small C Version 2 Source

This disk contains the source (written in Small C) of the Small C version 2 compiler. Get K8 if you want to try extending the compiler. (You must have K7.)

KayPro Disk K9 ZCPR

ZCPR: The big news on this disk is the self-installing version ZCPR available only from Micro C. Once you have ZCPR in your CP/M, you'll never go back to straight CP/M! For instance, ZCPR searches drive A for any program not found on drive B, so, even an empty disk in drive B appears to contain every program on A. It's great for text editors, compilers, etc. Plus many more new features to make CP/M easier to live with. In fact, Digital Research incorporated many features of ZCPR into CP/M 3.0. Works on KayPro II and 4.

PASSWORD: Lets you encrypt and decrypt your precious files. Includes source.

EX14: a super replacement for SUBMIT. Plus many more: **TREK, FIX, FIND, SNOOPY, ALIENS** and **DIF2**.

KayPro Disk K10 Assemblers

We've received a lot of requests for a Z80 assembler. So Dana put in some long hours getting the Crowe Z80 assembler to run on the KayPro (and every other Z80 machine).

CROWECPM: This is a first class Z80 assembler. We use this assembler daily (and we included its source). Takes standard Zilog mnemonics.

LASM: This is a more powerful version of the ASM assembler you received with the KayPro. This will link multiple programs together at assembly time.

PRINTPRN: This program makes it easy to print the listing files generated by the Crowe assembler.

KayPro Disk K11 Library & Checkbook Programs

CHECKS: This has been a very popular group of programs. Categorizes checks so you can keep track which are tax deductible and which get charged to which projects. Includes source and excellent example check files. Very powerful.

LIBR: This is a complete set of library routines which let you group files into a single file called a library. Then CP/M sees them as a single program, but with the library routines, you can list them out separately, run them separately, or divide them up again. Almost like a unix environment.

DISPLAY, VLIST, PGLST: Additional screen and print utilities.

KayPro Disk K12 FORTH

Yep, this is FORTH, one of the most unique, most extendable languages known, and for a paltry \$12.00. This disk contains not just one FORTH, but two, along with an editor, decompiler and 8080 assembler! The editor even uses the cursor control keys.

FORTH: This is true fig-FORTH.

KFORTH: A very nicely extended version of fig-FORTH.

PLUS, all the rest of the FORTH goodies. (Forth Heaven!)

KayPro Disk K13 Source of fig-FORTH

All this disk contains is the 40K ASM source of fig-FORTH with the hooks in place for the KayPro. This disk is for FORTH hackers who just can't leave anything alone. (Look, you probably have faults, too.) The source of FORTH is here because there isn't room on K12. This is the only disk that isn't stuffed.

KayPro Disk K14 Smartmodem Programs

This is the disk for you if you have a Smartmodem compatible modem. With this disk you can communicate with anything but a recalcitrant spouse. Handles goodies like autodial along with multiple directories.

SMODEMK: Smartmodem program set up for the KayPro (and source).

XMODEM: Lets you remotely control your KayPro from a distant computer.

KAYTERM: This is the information you need to run or write modem software on the KayPro.

KayPro Disk K15 Hard Disk Utilities

This disk is for the KayPro 10 or any KayPro with a Winchester drive. With these routines you can not only backup files (with printed directories of the backup disks), you can also break up large files. The backed-up files are not encoded (as they are with KayPro's backup routine) so you can access them on any system.

KayPro Disk K16 Pascal Compiler

This is a real Pascal compiler. It supports only a subset of the language (no records, pointers, booleans, reals or complex) but it generates a real .COM file. Everything is on this disk: the compiler, its source, example programs and documentation.

KayPro Disk K17 Z80 Tools

This is for those of you who are into Z80 assembly language.

XLATE.COM: A very good 8080 to Z80 translation routine.

DASM.COM: An easier to use version of ZZSOURCE (the Z80 disassembler). This full disk includes source and documentation for both routines.

NEW!

KayPro Disk K18 System Diagnostics

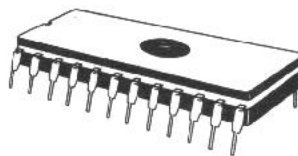
Just as we finished editing the routines on this disk, we received a copy of KayPro's diagnostic disk. The memory test, drive exercise, and drive alignment routines on this disk are more powerful than KayPro's versions. (Plus, it's only \$12!) Setup for KayPro II and 4.

NEW!

KayPro Disk K19 Prowriter Graphics

This is a complete Prowriter graphics package written by the same Micro C subscriber who wrote the MX-80 graphics package. Plot points, lines, circles, boxes, and more. Examples, documentation, and more.

. We have something special for your Kaypro!



Pro-8 ROM Package

The PRO-8 package from Micro Cornucopia upgrades your KayPro 4 to a KayPro 8 with 784K bytes (96 directory entries) per Tandon 100-4 (or equivalent) quad-density drive. Plus, you can select your own cursor character (and change it at will).

The package includes the new PRO-8 monitor ROM, a disk of formatters and copiers, and printed instructions. (We even tell you how to turn your KayPro II into a KayPro 4.) All you add is one or two double-sided double-density (390K), or double-sided quad-density (784K) drives. You get over 1.5 Megabytes on a two-drive quad-density system!

This new system can read, write, and format KayPro II and KayPro 4 disks as well as KayPro 8 disks. And it recognizes each disk type automatically!

All this for only **\$49⁹⁵!**

Watch Micro Cornucopia for more KayPro compatibles.

Call or write for information on the other KayPro II and 4 ROMs from Micro Cornucopia.

ROMs from Micro Cornucopia

There are two ROMs in each Kaypro, a monitor ROM and a character ROM. The Monitor ROM supplies information for the Z80 processor on such things as how to get information from the disk drives, and which character to use as a cursor. The character ROM works entirely in the video circuit and it determines what the characters look like on the screen (for instance, does the "f" have a high, small cross bar, or a lower, longer one of the Micro C character ROM). When you speed up your Kaypro, you are speeding up the processor clock so you have to use a monitor ROM that will also run at the higher speed. You are not changing the video clock when you speed up the Kaypro so you don't need to change the character ROM (unless you want the nicer looking character set). Since the monitor ROM tells the processor how to do disk accesses you are going to have to change that ROM in order to upgrade to larger drives.

Pro-Monitor II for Kaypro II

1. This ROM is a fast part so you can run 4 or 5 MHz with your Kaypro II.
2. It gives you a non-blinking block cursor (much less irritating), though you can specify a standard blinking underline if prefer it.
3. It does faster disk accesses (even if you don't speed up your system).
4. It throws away null characters (those little asterisks that sometimes garbage the screen during data communications).
5. Includes complete printed instructions for simple plug-in installation. (takes 5 minutes).

Pro-Monitor 4 for Kaypro 4

This ROM does everything the Pro-Monitor II does, only it's for a Kaypro 4. Though the ROM that comes in your Kaypro 4 will run 4 or 5 MHz (unlike the ROM that comes in the II), this ROM also gives you:

1. Non-blinking block cursor.
2. Faster disk accesses.
3. Throws away null characters.
4. Complete printed instructions for simple plug-in installation (takes 5 minutes).

Pro-Monitor 8 package for Kaypro 4

This ROM package does everything the Pro-Monitor II and 4 do (it will run at 5 MHz, ignores nulls, has the fast disk accesses). In fact, even if you will be using your original 191K or 390K drives for now, you can use this ROM package. The Pro-Monitor 8 features include:

1. You get 784K per disk with quad density (96 tpi, double sided) Tandon 100-4 (or equivalent) drives.
2. You can use any combination of Tandon 100-1 (Kaypro II), 100-2 (Kaypro 4), or 100-4 drives as drives A and B.
3. You can boot from any disk with normal system tracks (Kaypro II, Kaypro 4, or Kaypro 8). The disk needs no modification.
4. You can choose any character (including space) as a cursor and you can choose to make the character blink or not blink. Plus, you can change the cursor at will.
5. You get a disk which contains a new copy routine for copying and formatting 784K disks, and a drive diagnostic routine for checking out the quad density drives.
6. You get complete printed instructions for installation of ROM and drives (takes 10 to 15 minutes, including drives).
7. The installation requires no cuts or jumpers, everything simply plugs into a Kaypro 4. (If you have a Kaypro II, see the modification article in Micro C issue 15 to turn your II into a 4.)

Pro-Character ROM (for Kaypro II and 4)

The character ROM gives you a nicer looking character set. Kaypros have come with two different character ROMs, the early character ROMs had a rotten g, y, q, f, and t as well as commas and semi-colons that were hard to tell from periods and colons. On the newer systems (manufactured since Sept 83) half of the characters (notably the g) have been improved, but they haven't gone all the way.

Also, many of the older character ROMs were poor quality parts so they generated snow as information scrolled up the screen. This white flecky snow disappears when you install a Pro-Character ROM.

The character ROM comes in two flavors:

1. The standard Greek Pro-Character has the nicer character set plus the standard Kaypro Greek characters.
 2. The Clean Pro-Character has the nicer character set but no Greek characters. This is the ROM for people who get strange Greek characters on the screen when interfacing with Mainframe systems.
 3. Complete printed instructions for simple plug-in installation (takes 5 minutes).
- Note: These ROMs will not work in the KayPro 10 or the latest KayPro 4 with graphics (it contains the KayPro 10 board). We are working on new ROMs for these systems.

Prices:

Pro-Monitor II	29.95
Pro-Monitor 4	29.95
Pro-Monitor 8 (package)	49.95
Pro-Character (either Greek or Clean)	29.95
Pro-Set II (Pro-Monitor II & Pro-Character)	55.00
Pro-Set 4 (Pro-Monitor 4 & Pro-Character)	55.00
Pro-Set 8 (Pro-Monitor 8 package & Pro-Character)	70.00

KayPro II Schematic Package

This is a complete schematic of the KayPro, logically laid out on a single 24" x 36" sheet — no more searching to see where a signal goes or comes from. Even the unused gates are shown.

It's drawn in positive logic, lines are labeled, and we've tossed in hours and hours of careful checking for accuracy. Then we added a **Theory of Operation** that's keyed to the schematic.

\$20⁰⁰

Micro Cornucopia

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On Your Own

By David Thompson

I've been very guilty of bias in this column and so I'm taking this opportunity to set the record straight.

I have suggested (numerous times) that you do your own thing, start your own business as a consultant or whatever, and then reap the rewards of your effort.

Well, that's just fine, except for two things. First, if you don't make it, you'll have put in a lot of time and effort for little more than an education (which isn't necessarily all bad but wasn't exactly what you were hoping for).

Second, if you do succeed, you may well find that your success takes you away from what you really enjoy doing.

Micro C

Let's take Micro C as an example. It's been more successful than I had hoped it might be. We have over 4,000 subscribers (and who knows how many people read each copy). Subscriptions and advertising are paying for the printing, typesetting, and postage. Disks and ROMs are paying for the building, insurance, heat, help, and our time.

I started Micro C because I enjoyed building the Big Board and because I really enjoyed writing. At least I enjoyed writing when I felt like I was talking directly with my reader. (I always felt that was the purpose of writing.)

You see, after spending a couple of years on the city desk for a daily paper and a couple more years writing technical manuals for Tektronix (before moving over into engineering), I found that I felt stifled writing to their specifications. (What they called training was little more than teaching me the dimensions of their straightjacket.)

If you have ever seen a Tektronix manual, you'll know immediately that it was written by an inhuman object (a committee) for an inhuman object (an engineer). As manuals go, they aren't bad but you wouldn't take one to bed with you. (On the other hand, you probably wouldn't take a scope to bed with you either.)

Anyway, I started Micro C because I loved computers and because I wanted to write without the straightjacket. Well, now I spend about five percent of my time writing and another five percent working on computers.

The rest of the time I'm answering questions on the phone, ordering supplies, filing, cleaning off my desk (and I still don't do it often enough), writing ads, writing replies to subscribers, making sure we have the right unemployment insurance, fire insurance, workman's comp insurance, and generally doing all the other little and big things that have to be done to keep the business going.

I've always had the feeling that "in about six months" things would ease up, the long days would turn into something resembling eight hours, and the six- and seven-day weeks would eventually become five-day weeks.

Well, in three years it hasn't gotten much easier. What I'm doing is different now that Alice and Dorcas are taking and shipping orders and Dana is doing most of the hardware and software work (sigh). Plus, Eric is now keeping track of articles and deadlines. That should be a real help. Anyway, there is always a lot more to be done than I can possibly get done, and it doesn't seem to get better.

Don't get me wrong, Micro C is a real kick and a real education. I've enjoyed learning about business and I like to try things and see how you respond.

And, I really enjoy the SOG because it gives me a chance to see you and share some very special time. The synergy generated at the SOG is absolutely incredible, so it's the high point of my year. When you consider the amount of energy that 100 like-minded people can bring to one place, try to imagine what it must be like to be in the center of a network of over 4000.

The point I'm trying to make is that when you go out on your own, you are starting on a journey that could take you a long way. It could force you to travel long hours over arduous routes with no visible destination. The payoffs can be great, and they can come in a multitude of ways, but the emotional and physical costs can be substantial. Be aware of them before you leap in.

If you would rather not learn business and advertising, and writing, and customer relations, and promotion, and all the things that go into making a business work; if you would rather have a 40-hour week and a real vacation; and if you val-

ue security; then you'd better think seriously before jumping out on your own.

But then, it might all be worth it. It's even possible that you too might need to write without a straightjacket.

Turn in a Friend

Now that Eric Belden has joined Micro C (assistant editor and kitchen help), I'm going to get a chance to do something I've been wanting to do for a long time.

You see, I'd like to spend some time with the people who are moving and shaking in our end of the computer world, people who are surviving with a computer, hardware and software designers and writers. I'd like to get to know the famous early computer people like Ward Christianson, Leor Zolman, and Don Lancaster. If you know people who are doing great things with single board systems or who are just really interesting philosophers, designers, etc., whose ideas are way beyond mere mortals, then let me know.

I plan to take a camera and a pad (I know, I know, but no one has come up with a notebook-sized portable that meets my needs yet), so I can put them in Micro C (generally in this column).

I'm very excited about this. I think it will be a chance for all of us to get a real feel for the people who are working at the edges of this great technology.

So, if you know the whereabouts of any of these people please call or drop me a line. Include as much information as you can as well your name and phone number.

■ ■ ■

1984 West Coast Computer Faire

The Computer Faire people have tentatively scheduled a Micro C meeting for Saturday afternoon, March 24th. See the Faire schedule for confirmation of the meeting and for the exact time and place.

We are not having a booth at the Faire this year. I will, however, be in and out of the MicroSphere booth (No. 18) on Saturday.

David Thompson

Inside CP/M

Review by John S Allen

40 Rugg Road
Allston, MA 02134

Inside CP/M

By David E Cortesi

Holt Rinehart and Winston

572 pages

Micro Cornucopia has already reviewed three other books on CP/M (see issue #1, page 5), and most readers probably already have one of these. So why buy a new book which costs \$26.00?

I bought *Inside CP/M* the first time I saw it in my local bookstore. You see, the day before, I'd tried to automate my disk initialization using a SUBMIT file. All I got was a brief disk access and a return to CP/M. None of my other books were any help.

Nuts and Bolts Information

When I opened *Inside CP/M*, the first page I turned to—quite by accident—explained exactly why SUBMIT and XSUB would not work in my application.

"XSUB sets up the monitor to answer line input requests with a line from the submitted file. It does nothing for byte input requests, for which the monitor continues to come to the terminal. It is somewhat of an adventure to discover which commands use line input..."

This book is chock full of such valuable inside information. Cortesi has evidently exhaustively tested all CP/M functions and commands and describes their idiosyncracies, not just how they are supposed to function. If you are doing CP/M systems programming, this book will help you avoid many, many pitfalls.

Beginners Too

But this book is not just for experienced programmer. It starts out with a tutorial for beginners and the information is very thorough without talking down to the reader. Plus it is organized such that you don't have to refer ahead to something that hasn't yet been covered.

The transition from user material to systems material is done via several short assembly language listings. These listings also introduce you to other aspects of CP/M such as assemblers and they introduce you to methods for generating screen displays.

Writing Style

Cortesi's style is a model of clarity. This is the first computer book I find myself picking up just because I enjoy the prose. (It has the same urbane, witty, gentle style as *Micro C*.)

Plus, Comments On Other Topics

I've got a request for those of you who have done multiple modifications to your systems. Which mods work together? What happens if you do a commercial double density upgrade and one of the 256K mods. Which 256K mod works with what software? Do keyboard translations routines interfere with use of other programs? Which programs?

Please let *Micro C* know so we can come up with a table of compatibles/incompatibles.

Also, I'd like to mention that the CBIOS on user disk 2 and 9 is really excellent! My Shugarts sounded like ma-

chine guns while loading Wordstar text file before I installed this routine. Plus, the parallel print driver works fine.

ZCPR is another winner. The only problem with it is that the paging goes too far if any of the lines are longer than 80 characters.

FORMAT4 crashes into PFM when finished and FORMAT5 works like a charm on blank disks but is very slow on previously formatted disks.

XMON is really strange. It translates all keyboard inputs to upper case (including punctuation). Does anyone know what is happening?

■ ■ ■

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Using dBase II Down Under

By Jim Reid

81 Parriwi Road
Mosman, Australia NSW 2088

In 1981 I was attending a machinery exhibition in Los Angeles. I wanted to locate a database package and had been given a brief specification and a couple of names in California.

Most of my time had been spent doing battle with telephones that answer back, swallow coins as well as the best slot machines, or spit coins at me when I was crazy enough to insert the wrong amount. Then, of course there was the horror of horrors when I was able to supply the operator with the name of the corporation I wished to contact but did not know the area code. (If I had known the area code I wouldn't have needed to bother her in the first place.)

My search eventually led me to Software Distributors. The lass I met there must have realized I was a harmless Australian who wasn't trying to steal the software secrets of the United States and had not even taken the prescribed university course in reading a phone book. Anyway, she took pity on me and suggested I should explore this new package they had just received.

I was familiar with the hardware of micros but my programming experience was limited to small subroutines in assembly language.

dBaseII

I was first introduced to dBaseII by George Tate in 1981 (in an apartment house garage on Robinson Street).

I purchased the manual and returned home. No one in Australia had even heard of it and the general thought was that Condor was the way to go. I had previously purchased the Condor manual and after thoroughly examining both, felt that dBaseII had more to offer. So I bit the bullet and ordered my package.

We take a big chance when we order programs by post. There is no guarantee that we will receive what we order, and the lines of communication from Down Under are long, with no legal redress. Further, our customs is very aggressive and insists that we pay 35% import duty on the invoice cost of discs plus a further 20% sales tax (which amounts to 67%).

At the same time, I ordered my original Big Board from a nameless (hopeless) Australian agent and waited with bated

breath for it all to arrive. I eventually received the Big Board together with CP/M and soon found that I needed a great deal of help getting started with CP/M.

This may seem a little off the track in an article dealing with Database systems, but I feel it is essential to inform you fully of my limited ability so that you may gauge the ease with which I can use dBaseII.

My main occupation is microcomputer consultant. Since learning to use dBase I have written many specific use programs for use in analysing clients' problems. I have used it mainly in writing front end programs to prepare data to be processed later by the traditional accounting programs. I have also, however, completed a sales management and automatic quote system, and a complete job estimate and cost analysis program for the printing industry. This printing package will be put into service using the Runtime package in the next few weeks.

My initial version was 2.02. I then updated to 2.3 and now have a 2.4 for evaluation. I suspect that this evaluation copy may have some bugs as it does not perform programs previously written using version 2.02 as fast nor with the same degree of reliability as previous versions. Unfortunately programs must run under 2.4, particularly memory files, in order to compile them using the db-code package. Also, I did find that some conditionals that work effectively using dBaseII give syntax error messages under Runtime. See Figure 1.

These may seem like small changes, however, they increase the number of

disk accesses and slow program execution. In addition, there is the time to locate the problems.

A major improvement for Australian and European users has been the option to input dates in the DD/MM/YY. format or MM/DD/YY as is standard in most American software. This can be specified at the time of installation in version 2.4.

See Figure 2 for the new commands.

Without doubt the most major fault I have found has been the inability to delete temporary files which are created by combining data from a primary and secondary file. See Figure 3 for listing.

However, now you have to remove TEMPMEMO when exiting the program with the instruction:

QUIT TO 'ERA TEMPMEMO.MEM'

I have been a registered user of dBaseII since the early days and my serial number is 1871. However, not once have I been advised of an update or potential problem, and in fact many letters I sent to them are still unanswered. They even managed to lose my bank draft for the purchase of the runtime package and only found it when I arrived on their doorstep with a receipt from the bank.

I feel these problems are a great shame since the program has great potential and will ultimately be one of the programming standards. No doubt they are manifestations of the classic rapid growth syndrome and will eventually be rectified. I look forward to the day when this happens as I am sure my faith in this product will eventually be rewarded.

■ ■ ■

```
USE B:JOBCOST
COPY STRUCTURE TO INVREPT FIELDS CUSTNAME, JOBDESCR, JOBNO, ESTPHLAB, ;
ESTSTLAB, ESTPRLAB, ESTFILAB, ESTINLAB, ACTPHLAB, ACTSTLAB, ;
ACTPRLAB, ACTFILAB, ACTINLAB, ACTOFLAB, ESTPHMAT, ESTSTMAT, ESTPRMAT, ;
ESTFIMAT, ESTINMAT, ESTOKMAT, SUBCONT, FREIGHT, SALEREP, INVNUMB, ;
INVDAT, INVPRICE, SALETAX, PROFIT, MARKUP, PRINTED
```

Had to be changed to:

```
USE B:JOBCOST
COPY STRUCTURE TO INVREPT
```

And the following line:

```
USE INVREPT
APPEND FROM B:JOBCOST FOR INVNUMB < > ' ' .AND. INVNUMB > '&MINVTEMP'
```

Had to be changed to:

```
USE INVREPT
APPEND FROM B:JOBCOST FOR INVNUMB < > ' '
DELETE FOR INVNUMB < '&MINVTEMP'
```

Figure 1 -
Modifying Conditionals
for dBase II Runtime

Figure 2 - New DBase II Commands

New commands:

HELP - user aid command
 REINDEX - rebuild index file
 TEXT - display multiple lines of text, terminated by ENDTEXT

Supplemented Commands:

APPEND, INSERT, EDIT, CREATE - can use a format file for screen control
 BROWSE - can be given a list of fields to work with
 DISPLAY STATUS - shows databases/indexes in use and SET settings
 READ & REPLACE - can be directed to NOT update indexes via NOUPDATE
 RELEASE - can release subsets of memory variables
 RESTORE - can restore additively to existing memory variables
 SAVE - can save subsets of memory variables
 SET RAW ON - eliminates extra spaces in DISPLAY and ? commands
 UPDATE - replace clause can have WITH phrases

Figure 3 - Getting Around DBase II Delete Problems

```
USE TIMEWEEK
COPY STRUCTURE TO B:NEWWEEK
USE B:THISWEEK
SORT ON JOBNO TO B:WEKESORT
USE
* DELETE FILE B:NEWWEEK (WORKS OK HERE)
SELECT PRIMARY
USE B:NEWWEEK
SELECT SECONDARY
USE B:WEKESORT
DO WHILE .NOT. EOF
SELECT PRIMARY
APPEND BLANK
REPLACE P.JOBNO WITH S.JOBNO
IF S.SECTION= '1'
REPLACE ACTPHLAB WITH S.HOURCHRG
ENDIF
IF S.SECTION= '2'
REPLACE ACTSTLAB WITH S.HOURCHRG
ENDIF
IF S.SECTION= '3'
REPLACE ACTPRLAB WITH S.HOURCHRG
ENDIF
IF S.SECTION= '4'
REPLACE ACTFILAB WITH S.HOURCHRG
ENDIF
IF S.SECTION= '5'
REPLACE ACTINLAB WITH S.HOURCHRG
ENDIF
IF S.SECTION= '6'
REPLACE ACTOFLAB WITH S.HOURCHRG
ENDIF of
SELECT SECONDARY
SKIP
IF EOF
ERASE
? ' UPDATING FILES '
ENDIF eof
ENDDO
USE (this should normally close all files)
* DELETE FILE B:NEWWEEK (THIS GIVES FILE CURRENTLY OPEN MESSAGE)

I spoke with Ashton Tate while in Los Angeles they suggested the
following fix which does work,

SAVE TO TEMPMEMO
CLEAR
USE
DELETE FILE B:NEWWEEK
RESTORE FROM TEMPMEMO
```

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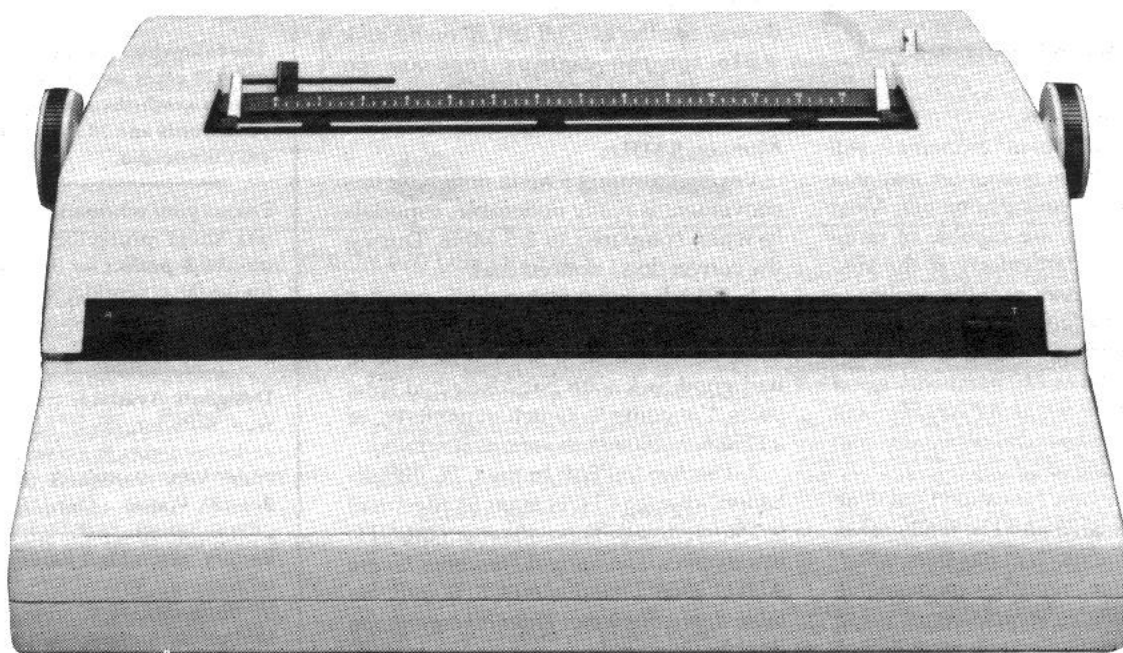
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TECHNICAL TIPS

Pushing Your Modem

The price of 1200 baud modems is still a bit steep but there is another way you can cut down on your phone bill. Most 300 baud modems are capable of more than 300 baud, particularly if the distance is not too great, or if the quality of the connection is good. Some modems, for example the S-100 PMMI modem can be pushed as fast as 710 baud with good results. External modems usually will not support this speed, but we can still do better than 300 baud.

I'm using the new Novation J-cat. The cost was about \$125 and I'm really satisfied with it. The modem has been absolutely reliable for 2 months now, and I've yet to have a single reception error using MODEM7. Definitely an improvement over the acoustic coupled modem it is replacing.

Now for the trick. The Novation will also work perfectly at 450 baud. You're probably wondering, "How do I get 450 baud?" The 8116 Baud rate generator can only put out 300 or 600 baud. 450 baud takes a few tricks.

The 8116 outputs a clock that is 16X the actual clock rate, the Z80-SIO is then programmed with a divide by 16 (register 4 is set up with 044H). If we instead program the 8116 for 1800 baud, and then set up the Z80-SIO for divide by 64 the outcome is 1800/4 or (you guessed it...) 450 baud. To do this, modify the initialization routine in MODEM7 to send an 0C4H to register 4, and a 08H to the baud rate generator (see MODEM-45.COM for a port B version). (Note, this same port A information also applies directly to the Kaypro.)

The advantage is 50% faster transfers over the phone. Many of the standard dial ups will recognize 450 baud (especially those based on S-100 PMMI modems). See the RCPMLIST.27 on BB disk #B16 for the dialups that are so equipped.

More on 5 MHz:

I'm also running 5 MHz now. The improvement is really noticeable, especially when compared to 2.5 MHz. During the conversion I noticed that:

1. 2716-1's are barely making it at 5 MHz. They will often not restart the computer once they are warm. I have had good luck with hand-selected Intel parts. I'm going to switch to using 1/2 of a 2732A-2 (200 ns) as soon as it arrives.

2. Patches to PFM: In the CTC initialization, change F119H from 93 (decimal) to 186 (decimal). This will return the CTC interrupts to the normal 1/second. In the AUTO BAUD routine (F0CBH) shift the table down one byte. This will correct the doubled clock rate.

3. Use a Z80-B. "A" parts for the SIO/PIO/CTC seem to work fine.

4. If you're using the EZ-Prommer, remember to adjust the pulse timing or you'll underburn all of your proms.

5. Forget PACMAN. It's just too quick!

Gary Kaufman
2001 Hamilton St. Box 87
Philadelphia, PA 19130
(215) 496-0687

Modem Warning

We've gotten some feedback on the Anchor Signalman modems. Their signal output appears to be significantly lower than other direct-connect modems. Therefore, if you are having trouble communicating with bulletin boards and you have a Signalman, you might just try a new modem.

Dave Thompson

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- 4-Two disk formatters
- 5-Modem 7
- 6-Othello
- 7-Serial print routine-Port B

USERS DISK #2

- 1-Two single disk drive copy programs, both with source
- 2-Crowe Z80 Assembler source
- 3-New Crowe.COM file, debugged version
- 4-New CBIOS with parallel print driver & other extensions for CP/M 1.4 & 2.2
- 5-Disk mapper with source

USERS DISK #3

- 1-EPROM burning software for BB 1
- 2-Reset bit 7 (unWordStar a file)
- 3-Disk file CRC checker
- 4-New fast copy program & source
- 5-DU77, disk inspector/editor
- 6-FINDBAD, isolates bad disk sectors
- 7-Print fancy page headings

USERS DISK #4

- 1-CBIOS, custom bios for Tandon drives
- 2-ZCPR, dynamite CCP checks drive A for missing .COM files; improved commands
- 3-ZCPRBLOC, identifies CCP location

USERS DISK #5

- 1-CAT, disk cataloging routines
- 2-Modem 7 for Port A
- 3-Modem 7 for Port B
- 4-PACMAN, the arcade game
- 5-FAST, buffers the disk to speed up assemblies
- 6-NOLOCK, removes BB 1 shift lock
- 7-VERIFY, cleanup & verify a flaky disk
- 8-DUMPIX, enhanced for BB 1
- 9-UNLOAD, create .HEX file from .COM file

USERS DISK #6

- 1-REZ, 8080/Z80 disassembler, TDL mnemonics
- 2-PRINTPRN, prints Crowe listings
- 3-RUNPAC, run-time utility package for 8080 assembly language programs. Has 51 functions. Includes source which assembles under ASM.

USERS DISK #7

- 1-CHNGPFM, PFM monitor mods
- 2-TERM, terminal routines let you set up BB as simple terminal, as a file receiver, or as a file sender
- 3-Checkbook balancing package
- 4-Disk Utilities - copy to memory, from memory, and dump.

USERS DISK #8

- 1-BDSCIO, custom BDSC I/O for BB 1 (both .h and .c)
- 2-YAM, Yet Another Modem program in source & .COM form. Turns BB into paging intelligent terminal, complete with printer interface, baud rates to 9600.
- 3-ROFF, text formatter
- 4-SIGNS, prints large block letters

USERS DISK #9

- 1-ADVENTURE, expanded 550 pt version
- 2-Keybaord translation program
- 3-CBIOS, serial & parallel printer interface
- 4-EPROM programming package for BB II, for 2732s only

USERS DISK #10 - Lots of Disk Utilities

- 1-REBOOT, sets up the CP/M auto load
- 2-SWEEP, directory/file transfer routine
- 3-A, Lets BB I recognize a double sided drive as one drive with 494K of usable space
- 4-FIX, super disk utility, does everything, much easier to use than DU77
- 5-Compare files routine
- 6-UNERA, retrieve erased files
- 7-FIND, check all drives on system for a file
- 8-MENU, menu program for CP/M
- 9-NEWCAT, enhanced disk catalog program
- 10-Single drive copy program that does track by track copies rather than file by file

USERS DISK #11 - Printer Utilities

- 1-Microline 92 printer routine
- 2-Graphics display package for MX-80 with Graftrax, very fancy
- 3-Epson MX80 setup for BB 1 with 59.5K CP/M
- 4-Epson MX8 setup for any CP/M, lets you set print modes
- 5-Micro Tek print driver, Ports A & B

USERS DISK #12 - Games for BB I

- 1-ALIENS, a fast, exciting arcade game
- 2-ZCHESS, chess with a 1-6 level look ahead
- 3-MASTERMIND, match wits with the computer
- 4-BIO, Biorhythm charts complete with graphics on the BB I
- 5-LIFE, so fast it's real animation!
- 6-CRAPPS, see how much you'd lose in Vegas
- 7-WUMPUS, a caver's delight, kill the Wumpus or be killed
- 8-PRESSUP, similar to Othello
- 9-Games, 7 games in one program, includes blackjack, maze and animal

USERS DISK #13 - General Utilities, BB 1

- 1-ZZSOURCE, disassembles to real Zilog mnemonics
- 2-EX14, superset of submit or supersub
- 3-MOVPATCH, lets you use MOVECPM on other copies of CP/M
- 4-XMON, 3K expanded BB I monitor, use in ROM or as overlay
- 5-CURSOR, prompts you for cursor char you want
- 6-UMPIRE, very fancy RAM test
- 7-ZSIDFIX, display improvement for ZSID
- 8-PIPPAT, modify PIP so you can reset system from within PIP
- 9-@, Lets you use the BB as a calculator, including HEX
- 10-SORT, sort package written in C80.

USERS DISK #14 - BB II Software

- 1-PRO32, latest 2732 reader & programmer
- 2-SMODEM2, lets BB II talk to Hayes Smartmodem
- 3-GRAPDEMO, demonstrates BB II graphics (in BASIC)
- 4-ATTRTEST, demonstrates BB II graphics (in JRT Pascal)
- 5-INITSIO, initializes port B for 300 or 1200 baud
- 6-MENU, displays menu of .COM files, enter number to run file
- 7-SETCLK, sets realtime clock built into BB II
- 8-PRINT2, modified print which accesses BB II clock
- 9-BOX, draws a thin line box on screen determined by HL and BC
- 10-ALIENS, space invaders arcade game
- 11-LISTSET, printer interface, auto-enables RTS, ignores DCD.

USERS DISK #15 - Word Processing

- 1-EDIT, very fancy line editor similar to EX (Unix). Includes help menu, programmable key, and full manual on disk.
- 2-TED, simple minded line editor, easy to learn & use. Very fast.
- 3-TTYPE, typing training program written in BASIC
- 4-TINYPLAN, very simple-minded spreadsheet. Whets your appetite for a fancy one.
- 5-C80 Text Utilities
- 6-CHOP, cuts off file after N bytes
- 7-ENTAB, replace spaces with tabs where possible
- 8-MS, double or triple spaces a file to output
- 9-RTW, removes trailing spaces from file
- 10-TRUNC, truncates each line to specified length
- 11-WRAP, wraps at column 80, plus pretty pretty printing, page #s...

USERS DISK #16 - BB I Modem Software

- 1-RCPM27, list of U.S. bulletin boards
- 2-SMODEM, interfaces BB I with Hayes Smartmodem
- 3-PLINK66, easy to use with non-CP/M host, for port A
- 4-BBPAT, menu selection of BAUD rate, bits/char, parity, & stop bits
- 5-MODEM 7+, Modem 7 plus BBPAT, lets you talk to anything from port A

USERS DISK #17 - Small C version 2
SMALLC2, this substantially expanded version of Small C now includes for, goto, label, switch (case); external declarations; new preprocessor commands; expanded I/O includes redirection; initializers; plus 12 new expressions. The I/O and runtime libraries have been greatly expanded (including printf). Source & documentation on one full disk.

USERS DISK #18 - FORTH

IFORTH, this is Idaho FORTH which can be burned into ROM or loaded from disk. It replaces the PFM monitor & handles all the monitor functions. See issue #11 FORTH column for more info about IFORTH and this disk.

USERS DISK #19 - BB I Double Density
New BB1 Monitor, BIOS, character ROM, Winchester Interface, ZCPR, and formatter from Trevor Marshall. See BB I expansion article in issue #11.

USERS DISK #20 - Assemblers
CROWEASM: This is the Crowe assembler modified so that it runs on any CP/M system (including the BB I, BB II, Xerox...). Includes .COM Z80 and .DOC files.

LASM: This assembler is similar to the ASM that comes with CP/M except that it can link files at assembly time.

PRINTPRN: Print routine for CROWEASM .PRN files.

LIBRARY: Utilities which let you combine many files into one, then you can run, type, or extrace any file within the larger system.

USERS DISK #21 - Winchester Utilities
BACKUP: Helps you back-up the winchester onto multiple floppies. Creates a catalog of the files on each disk and includes the date of the latest backup. Will not back-up an unchanged file more than once. Plus many more super features.

FLOPCOPY: Lets you make floppy copies (with only one floppy drive) by using the winchester as a buffer.

BIGBURST: Backs up a very large winchester file onto multiple floppies. Joins the copies to recreate the original file.

MULTICOPY: Use this like PIP but it prompts you to change disks. Accepts ambiguous file names.

MDIR: Displays files in all user areas on selected drive. Many features.

MAKE, MOVE: PIP-like utilities that make it easy to move files between user areas.

SWEEP: The famous disk cleanup and transfer routine that does just about everything you can do with TYPE, ERA, DIR, and PIP.

UNSQ: This is the latest, greatest file unsqueezer. Enter UNSQ *,* and it will check every file on the disk. All squeezed files will be unsqueezed.

8" Users Disks

\$15.00 each

OTHER GOODIES

Screen Editor in Small C \$39.00

A simple but full-function screen text editor plus a text formatter, all written in Small C by Edward Ream. This package includes the editor and formatter .COM files setup for the Big Board, Small C itself, and source code for all. With the documentation this is over 400K on a floppy disk. Edward is selling this package for \$50, you can buy it from us for \$39 (and Ed gets a royalty). Where else can you get an editor, a formatter, a C compiler, and source for all, for under \$40?

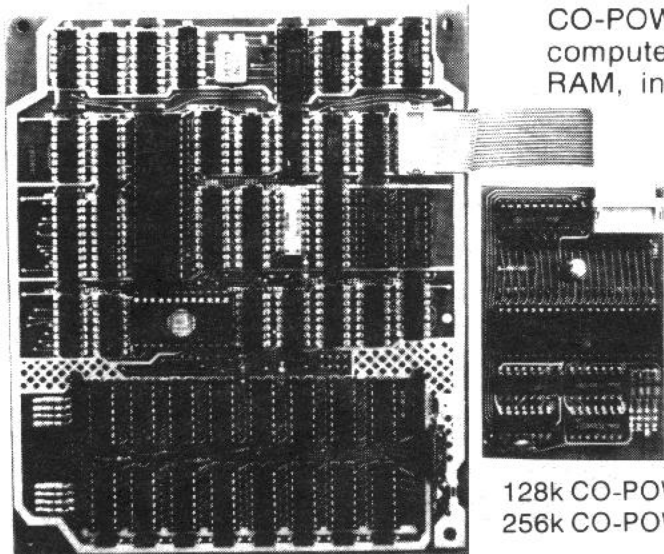
More ROMs: Fast monitor ROMs for speed freaks and our famous 'better than Texas' character ROM (V2.3) for screen freaks.

Fast Monitor ROM BB1 \$29.95

Deluxe Character ROM BB1 or

KayPro \$29.95

SWP's CO-POWER-88 makes Z80, CP/M microcomputers IBM-PC compatible!



CO-POWER-88 is a 16-bit 8088 coprocessor for Z80 CP/M computers. Both versions of CO-POWER-88, 128k and 256k RAM, include both CP/M-86 and MSDOS, complete with IBM-PC compatibility. A facility for transferring data files between CP/M and MSDOS is included.

Simple commands move system control between the Z80 and 8088 processors. CO-POWER-88's RAM can be used in CP/M as a RAM drive! Currently available for Kaypro, Bigboard, Zorba, Xerox, Access Matrix, Televideo, and ATR8000 computers.

128k CO-POWER-88 and MSDOS	\$400.00
256k CO-POWER-88 and MSDOS	\$500.00

ATR8000: SWP's \$499.95 CP/M Computer

SWP's ATR8000 is a 64k RAM, Z80A, 4 MHz computer that includes double density CP/M 2.2. The ATR8000 runs up to four disk drives that are any mixture of size (5 1/4" and 8"), type (single-sided and double-sided), and density (single, double and quad). The ATR8000 has an RS-232 port for a modem or serial printer and includes software for both. There's also a parallel port with a parallel printer driver. The ATR8000 interfaces to an RS-232 terminal or to an ATARI home computer. Software includes a program that allows the ATR8000 to use CP/M disks from other computers. The ATR8000 can be upgraded to also run CP/M-86 and MSDOS by adding CO-POWER-88.

Bigboard Dual Density

We've just released a new version!

Hardware

- A daughter board that plugs into the 1771 socket. With this board the system employs automatic density select.
- Instructions tell how to run 5 1/4" drives. A 50-34 pin disk drive adapter board is included with 5 1/4" disk orders.

Price: \$149.95

Software V#061983

- One 8" version includes the code to make a 60k double density CP/M for:
 8" SS 2.5 MHz 8" DS 2.5 MHz
 8" SS 4 MHz 8" DS 4 MHz
 5 1/4" SS 2.5 MHz
- Printer drivers are built-in, selectable in the IOBYTE.
- Easy to change port parameters.

- 8" SSDD disk storage is 674k; DS is twice as much! 5 1/4" is 183k.
- Includes DDINIT for SD and DD initializing and DDSYSGEN for DD sysgening.
- Special features have been added including a deluxe pause, screen print and clock.
- Source code is available for \$25 after you sign a disclosure agreement.

For orders: We accept MasterCard, Visa, money orders or checks. Shipping charges and applicable taxes will be added. Call or write for delivery time.

Trademarks: CO-POWER-88, ATR8000, SWP, Inc, Z80, Zilog, CP/M, CP/M-86, Digital Research, Inc, IBM-PC, IBM, MSDOS, Microsoft. Prices and specifications subject to change without notice.

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(We used to be Software Publishers, Inc.)

LETTERS

Dear Editor,

I speeded-up my Kaypro a few weeks ago and I am much happier with it. I installed an SGS brand Z80-B and monitor ROM and have been able to get the system to run dependably at 4 MHz but I get garbage on the screen at 5. The 4 MHz is great (in fact, I haven't found a single program that won't work with it) but I'd like to try 5, what should I do? (Also, does the speed-up work on a Kaypro 4?)

Matthew Kesner

6345 Lochmoor Drive
San Diego CA 92120

Editor's note:

I'd check out the monitor ROM. We were getting very good AMD 2716-1s for a long time, but lately the quality of even these parts has not been up to 5 MHz (at least not all the parts make it). So, we've modified the code and are burning it into 2732As which are faster (and considerably more expensive and harder to find). These 2732s for the Kaypro II plug right into the 2716 socket with no wiring changes required.

Yes you can do the speed up modification to the Kaypro 4. In fact, the monitor ROM in the Kaypro 4 is already capable of 5 MHz so you only need to change the Z80 to a Z80B and do the wiring changes.

Dear Editor,

I would like to know how IOBYTE is incorporated into BIOS.

Dennis W. Juve

2935 6th St.
Marion IA 52302

Editor's note:

It isn't on the Big Board. In fact, IOBYTE is one of those little features of CP/M that few folks know about. Perhaps someone could write up a short thing on this mysterious object.

Dear Editor,

I have to run my Kaypro on 12V dc when I'm home in Gold Hill, Oregon. I don't have store-bought power so I have to make do with a water wheel and batteries. I'm not sure about the disk drives, are they ac or dc?

I wrote to Kaypro about using a 110V inverter that generates square waves. They said NO! So now I'm trying to build up a sine wave inverter. One problem is that running the inverter for hours will really drain my batteries. Any suggestions?

Gary Stookey

215 Josselyn Ln
Woodside, CA 94062

Editor's note:

Your drives are DC. In fact, all you need for any Kaypro (II, 4, or 10) is +12V, +5V, and -12V. The supply in the Kaypro II and 4 can supply about 6 amps of +5V (although the system uses only about 3 amps) and about 3 amps of +12V for the drives. You only need about 0.1 amp of -12V. The Kaypro 10 needs a couple more amps of +12V during winches-ter start up.

The +5V should be regulated to within 0.25V of 5V, the +12V should be within 0.6V of 12V, and the -12V should be within a volt.

If you keep your batteries charged to +13.4V or higher you should be able to put a large 3-terminal regulator in series and get it to regulate (use a TO-3 case and a good heat sink). You can use another series pass regulator circuit to get +5V but you'll be losing quite a bit of efficiency doing it this way.

You'll need an extra battery for the -12V or you can add a small switcher to generate it.

A complete switching dc to dc supply would be the most efficient but also the most expensive. Perhaps someone in the group would like to design an inexpensive version and sell any special parts.

You don't say how much of your time you spend in Gold Hill or what you do there but I'd really appreciate it if you could fill us in.

Dear Editor,

I'm working on a SASI interface and I/O expansion port for the BBI. The interface will drive a Xebec controller and IMI 15 MB drive. It will also drive the Xebec 1401 controller for multi-format 8" and 5" floppies. This means, of course, a new monitor and BIOS. I hope to get an article in about this project.

David Bell

609 Craig Ave
Campbell, CA 95008

Editor's Note:

Wow!

■ ■ ■

BUSINESS COMPUTERS ASSOCIATES BBI SOFTWARE

BB SPOOL

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Do you wait for your printer, then your computer, and then your printer? BB SPOOL is a one-page (3K) spooler that lets you overlap waiting time, cutting job time nearly in half. BB SPOOL resides in upper memory and lets you use your application program normally. If output is longer than 3K, BB SPOOL will wait. Easy to install; for serial ports you select the "null" characters sent after LF. IOBYTE not required. Interfaces with BIOS LST:.

SCREEN PRINTER with BB TYPEWRITER

\$19⁹⁵

Now you can print the contents of your display screen without disrupting it. Print split-screen displays generated by your spreadsheet program or any of your application program displays. SCREEN PRINTER resides in upper memory allowing normal use of application programs. Any display you want to save, SCREEN PRINTER will send it to your printer. Easy to install; you select the control character which invokes it. As part of SCREEN PRINTER you get BB TYPEWRITER, which lets you type directly to your display. Auto LF with CR; scrolling is locked out so no information is lost. You select the control characters for ON and OFF during installation. BIOS LST: used.

GET BOTH TOGETHER

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Get both BB SPOOL and SCREEN PRINTER with BB TYPEWRITER in one integrated package. Lets you spool the screen print function.



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For BBI only 8"SSSD Check or COD
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(607) 723-0279 5-10 PM EST

(continued from page 1)

don't want us to publish your phone number.

6. Wanted: articles and reviews on D/A and A/D interfaces, new single board systems, inexpensive new assemblers and compilers, music synthesizer interfaces, speech recognition, multiprocessing, multiprocessors, multitasking, new operating systems and system ideas, and new processors (to name a few).

7. And that's about it unless I think of something else.

The SOG

We are less than 6 months away from the annual SOG (July 26-29) so it is not too early to start throwing things into a suitcase. (Just the bare essentials like disk drives, Z80 boards, waterwings, and the spare 5V supply.)

This year's SOG (Semi-Official Get-together) should be as laid back as last year's even though there will, no doubt, be more attendees (meaning you).

Like last year, there will be food tables set up for your potluck contributions (that way we will be able to eat our way through two solid days of computer mania). If possible, bring regional specialties. If bringing food is particularly inconvenient, you can contribute spare change to the food pot.

Saturday evening we'll have an informal western cookout catered by an informal western cook (who else). During the dinner, we'll also present some very special awards to some very special people. (That got some chuckles around the office.) We're open to any contributions to the awards chest, serious and otherwise.

I think you'll find the awards quite interesting. With your help, we'll present an award (in absentia we hope) for the worst new software package of the year and for the most inscrutable documentation (this award should make interesting, though painful, reading). I will also be giving out awards to some notable individuals for their past (mis)deeds (should lead to some interesting acceptance speeches).

White Water Rafting (Thursday)

Of course we'll have white water rafting again this year. In fact you'll have your choice of a full day of rafting or the 2½ hour trip.

The full day includes transportation, a box lunch, and dinner afterward (everyone will be together for the dinner). This is 14 miles of class 4 white water. Everyone gets to paddle and each boat has a professional guide (safe but exciting).

The 2½ hour trip is the same event that made such a splash at the last SOG (see Issue #13). It includes the dinner and transportation.

Of course you may also opt for dinner only.

We have rented the fish hatchery (a large log structure in Bend's Shevlin Park) for all four days (Thursday through Sunday) and that is where the trips will begin and end. So if you have family members who won't be rafting, there'll be a very pleasant place for them (with supervision for the young ones). In fact, they might not even miss you.

Note that both raft trips are through protected scenic areas so the number of people who can raft these waters on any one day is strictly controlled. Those of you who have your heart set on a raft trip (particularly the full day trip) should get your reservations in as soon as possible.

Thursday is also setup day for people who have brought goodies to demonstrate. We'll have tables and plenty of power (especially if Ron Anderson makes it again) on the main floor for demonstrations. There'll be room upstairs for two meetings at a time.

Friday and Saturday

This is the official part of the SOG. These are the two days of equipment demonstrations, swap meet, talks and meetings. There will be meetings for Big Board I, Big Board II, Slicer, Xerox, Kaypro, and amateur radio enthusiasts so you will have a chance to share problems and solutions no matter what you're interested in.

Rex Buddenberg mentioned that we ought to have the Slicer folks bring a bunch of boards and tools. You'll be able to build your own Slicer right at the SOG. The boards are so compact that people could finish one in an hour or two, and then the Slicer folks could fire it up right there.

I called Otto and he was very excited about the idea. Stay tuned for further developments. We'll no doubt get to play with some of the very exciting new boards from Slicer at the same time. (Be sure to call Slicer for more details if you are interested.)

We're going to put up a bulletin board (a wooden one) where you can post buy and sell messages as well as information requests. (In fact, if you can't attend the

SOG but want something posted, just send it in on a postcard size piece of paper and we'll take care of it.) Plus, I asked Trevor Marshall to bring along his portable bulletin board. Hopefully, I'll be able to coerce the local phone company into installing a line for the event. Then those of you who can't be here in body can be here in baud. (And think of all the happy sysops you could talk to.) More on this as it develops.

Sunday Sightseeing

We'll collect again at the hatchery for a last look at the equipment and then we'll break up into groups for guided hiking and sightseeing.

All the details aren't worked out, but there are more interesting things to do here than any one person could do in a lifetime.

For instance, Bend is in the center of one of the most varied geological areas in the U.S. There has been very dramatic and recent volcanic activity here as well as older (pre-8080) formations. You can explore great lava flows or try your hand at professional caliber rock climbing (several of last year's attendees went climbing during their stay). You can see the Metolius River appear full blown from a large hole in the ground and you can watch a large waterfall plunge forever into a small crystal pool that never fills and has no obvious outlet. (The water is as icy cold as the ghostly white fog which enfolds the great evergreens.)

You see, Bend is located right on the dividing line between the Cascades and the high desert. On the eastern edge of town the ground cover is mostly sagebrush and juniper. The western edge is dominated by tall puzzle-bark pines. Going west means going up and since the lowest spot in Bend is already at 3500 feet, you don't have to go up much to be really up.

Bend is less than 30 minutes drive from some very beautiful day hikes in the rugged, high cascades wilderness. You can hike trails that wind through alpine meadows kept moist and green by great glaciers.

Or, if hiking is not your cup of tea, you can (assuming it is open) take a drive over the MacKenzie pass. Some years it is blocked by snow well into July. Even at the end of July, there'll be spring flowers just beginning to peep out from beneath the melting snow. Bring your camera.

Actually, I'm planning these Sunday tours so I'll get a chance to get out into the mountains myself. I love it here but Micro C (and the SOG) keep me pretty much chained to my Big Board.

Families

Yes, yes, yes! Bring the whole tribe! The SOG is not just for those of us who are terminally freaked on computers (or just freaked at our terminals). This is a chance for the other halves (and the smaller halves) to get together and plot major campaigns aimed at waylaying your attention during the coming year.

Plus, if you equip your other half with a tape recorder, you'll get a chance to hear presentations that you would have otherwise missed.

Taxes

Let there be no mistake, however, this is a technical conference in the highest sense. This is a chance for you to rub shoulders (an ancient engineering custom) with some of the top designers in the single board systems world. You'll get a chance to hear some of these folks discuss their new projects and you'll get a chance to see some of these projects in action. You'll even get a chance to present your own ideas and projects (get in touch right away): the feedback (not to mention appreciation) should be invaluable. (Plus, we'll love you!)

There is no question that your employer should be sending your whole family to this great event. But barring that, you certainly should be able to write off the expenses. Check with your tax advisor, I'm sure you'll be delightfully surprised.

Prices (please preregister)

Thursday

All day white water raft trip
plus lunch and dinner \$65.00

2½ hour white water raft trip
plus dinner \$25.00

Evening dinner only
(with the rafters) \$10.00

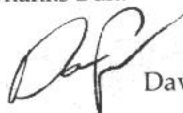
Saturday

Evening western cookout
(followed by awards) \$10.00

Not So Anonymous

Daniel Haney called to say that he is the person who turned me on to using tri-flow and tri-flon to lubricate disk drives. He also mentioned that he is now running an RBBS. It is 300 and 1200 baud, 8 bits per character, no parity, one stop bit, (the standard configuration) and the number is 703-759-6627.

After all this, he said he'd be sending more drive information, this time on paper. Thanks Dan.



David J. Thompson

\$29.95 SpellSys

Are you signing your name with an X
because spelling doesn't come easily?

Then you need SpellSys!

With this full-feature package, you can write prose with the pros. SpellSys features a 42,000 word dictionary and all the bells and whistles of those expensive checkers—including rhyming, crossword search, letter unscrambling, etc.

SpellSys is made up of a group of individual programs which you can use together or separately. With SpellSys you can setup and maintain your own custom dictionary (in addition to the main dictionary). These are real dictionaries, not hash tables, so you edit or remove words from your own dictionary at will.

microgroup

IT'S EASY TO USE!

Just enter "SPELLSYS", select which disks you'll use, and file you're checking. Then SpellSys takes over. Everything is self-prompting—so sit back and relax.

Word Review Operations

- C .. show Context in file
- L .. Lookup word in dictionary
- M .. Misspelled (correct file to....)
- D .. put in user Dictionary
- I .. Ignore
- N .. Next word
- P .. Previous word
- E .. Exit review
- ? .. (or any other key) displays menu

ORDER AT NO RISK!

Check out the manual and if you don't agree that SpellSys is a super bargain, just return the package with the disk unopened within 30 days and we'll refund your money.

SPELLSYS \$29.95 ppd. in US & Can
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Requires 32K CP/M*

Formats: 8" SS SD or
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SAVE WEAR AND TEAR ON YOUR DISK DRIVES AND FLOPPIES WITH THE MODEL 3801 ALL SOLID STATE RELAY. SMALL ENOUGH TO FIT EASILY INSIDE YOUR DISK DRIVE, THE 3801 CAN BE INSTALLED IN MINUTES. YOUR BIG BOARD WILL THEN TURN YOUR DRIVES ON AND OFF AUTOMATICALLY AS THEY ARE NEEDED.

- FEATURES -

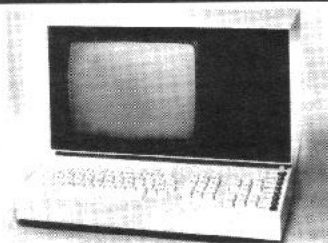
- * SMALL SIZE - 1.75 X 1.48 X 0.35
- * FAST INSTALLATION - DIAGRAM INCLUDED
- * ZERO CROSSING - ELIMINATES ALL SWITCHING NOISE
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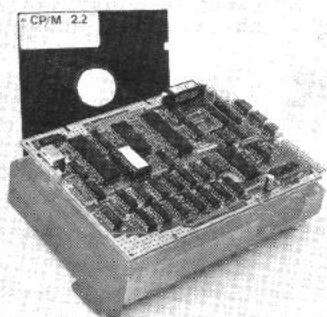
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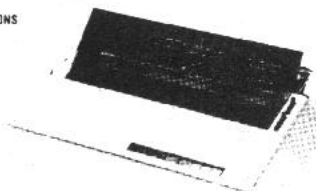
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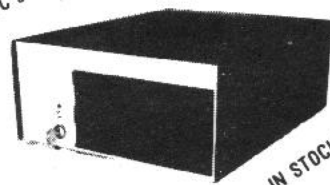
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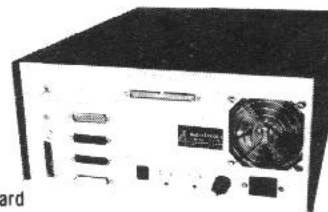
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CP/M 86 DISKS

DISK 86-1 — Disk Utilities
D.CMD/A86, SD.CMD/A86, XDIR.CMD/A86: Three extended directory programs. Each does it differently, so we included all three.
FILE-EXT.CMD/A86: Disk status program with good display format.
PAGE.CMD/A86: A text paging program. Displays 24 lines at a time.
PRINT.CMD/A86: File printing routine. Puts a header at the top of each page along with page number and file name.
MUCHTEXT.CMD/A86: Counts words and lines in a text file.
ERQ.CMD/A86: Selective file erase program. Displays all selected files and then asks you one at a time for a Y/N.
INUSE.CMD/A86: Prints "In Use" on your terminal and asks for a password. It will not release the console until you enter the password.
FINDBAD.CMD/A86: Finds and collects bad sectors on a disk. If there are no bad sectors, information on the disk is unaltered.

Disk 86-2 — DU and Modem Programs
DU.V75.CMD/A86/DOC: This is the popular disk utility from CP/M 80. It lets you read, write, and modify disk sectors.
MODEM4.CMD/A86: This is a modem program set up for the Slicer. This program includes a built-in help file.
MODEM7SL.CMD/A86/DOC: No modem disk would be complete without this standard. This is modem 7 set up for the Slicer. It displays a menu when it is called.

Disk 86-3 — Small C
C86.CMD: This is the original Small C compiler which appeared in Dr Dobbs Journal in 1980. It runs under CPM-86 and generates 8086 source for the ASM86 assembler.
C86.COM: This is the C86 compiler which runs under CPM-80. This 8080 program produces 8086 assembly language.
C86LIB.A86: This is the C86 I/O library.
SMALLC86.DOC: Documentation on Small C.
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Plus, there are a number of demonstration files and ENTAB (insert tabs in place of spaces) and DETAB (replace tabs with spaces) programs all written in Small C.

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Your Fortune in the Microcomputer Business \$26.45 (US, Can, Mex)
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This is the best, most complete collection of "working for yourself" information I've found (and I've heard nothing but good comments from those who have received it). This two-volume set is perfect for those times when you need a break from monitor watching.

Inside CP/M \$27.95 (US, Can, Mex)
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This is one of the best books on CP/M. It covers the whole spectrum of users from novice to guru. There are a few books that include more programming examples but none work better for the whole range of users and this book is perfect for reference use. Micro C's copy of Inside CP/M is showing definite signs of overuse.

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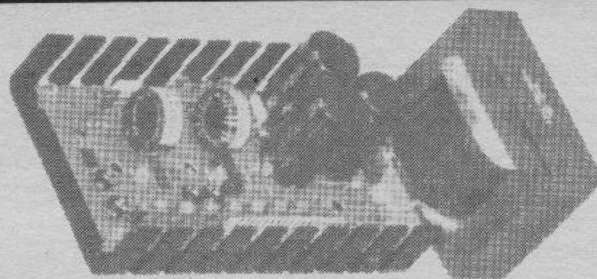
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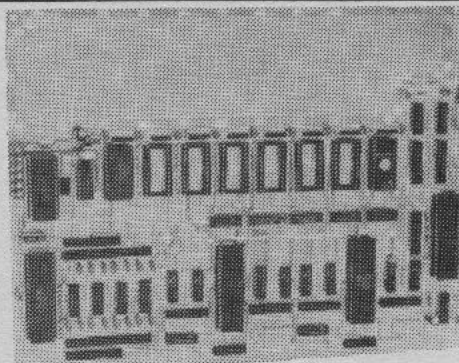
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