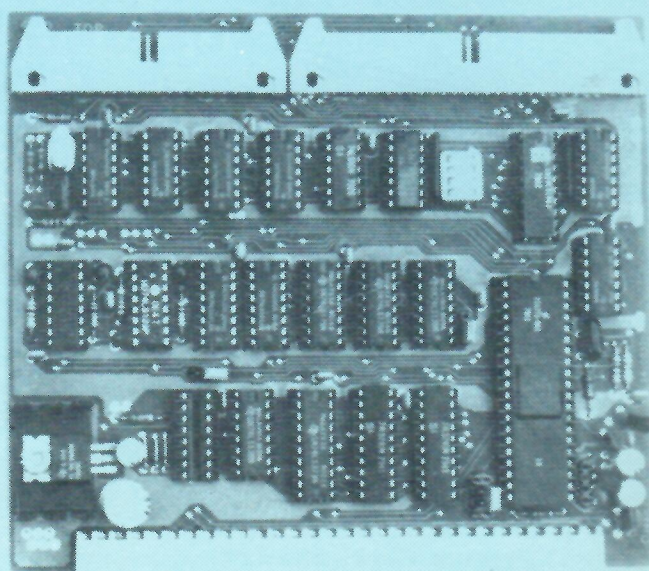
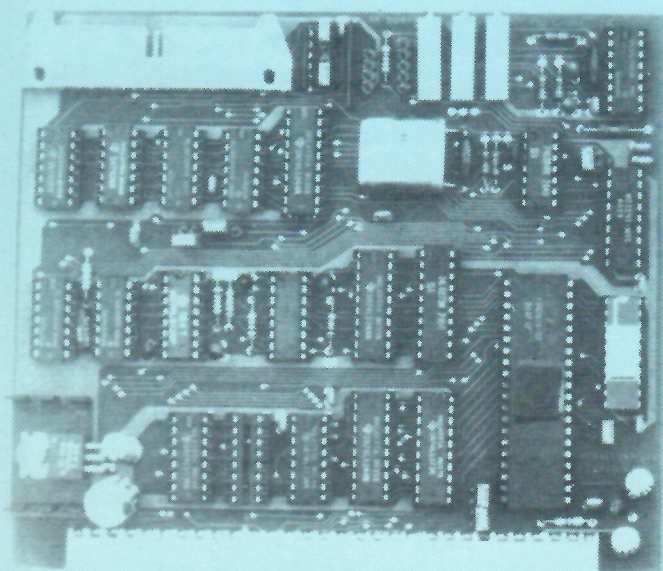
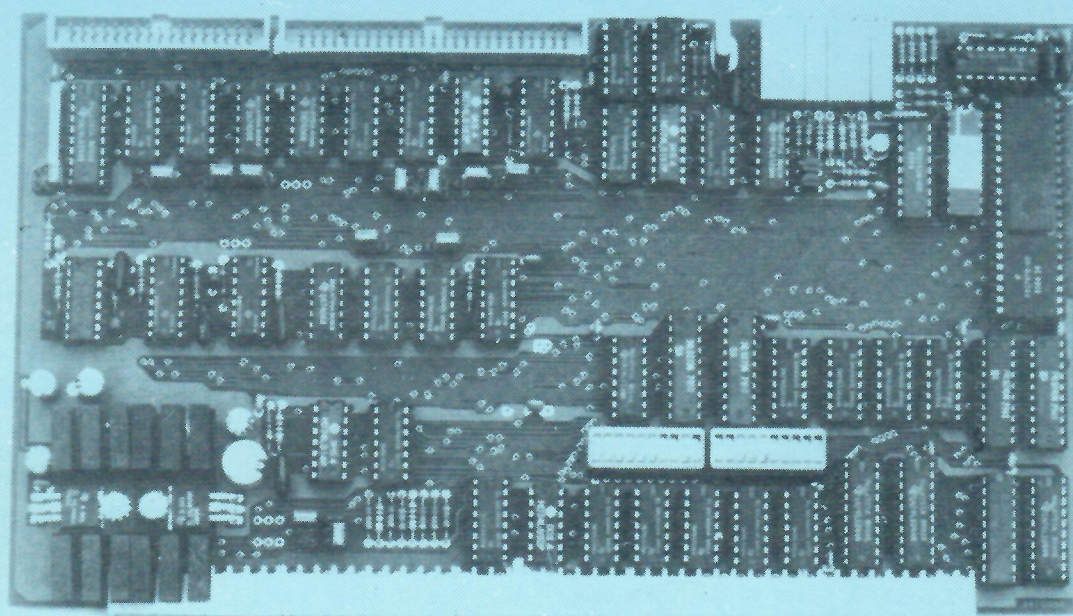


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for 6800 and 6809 users





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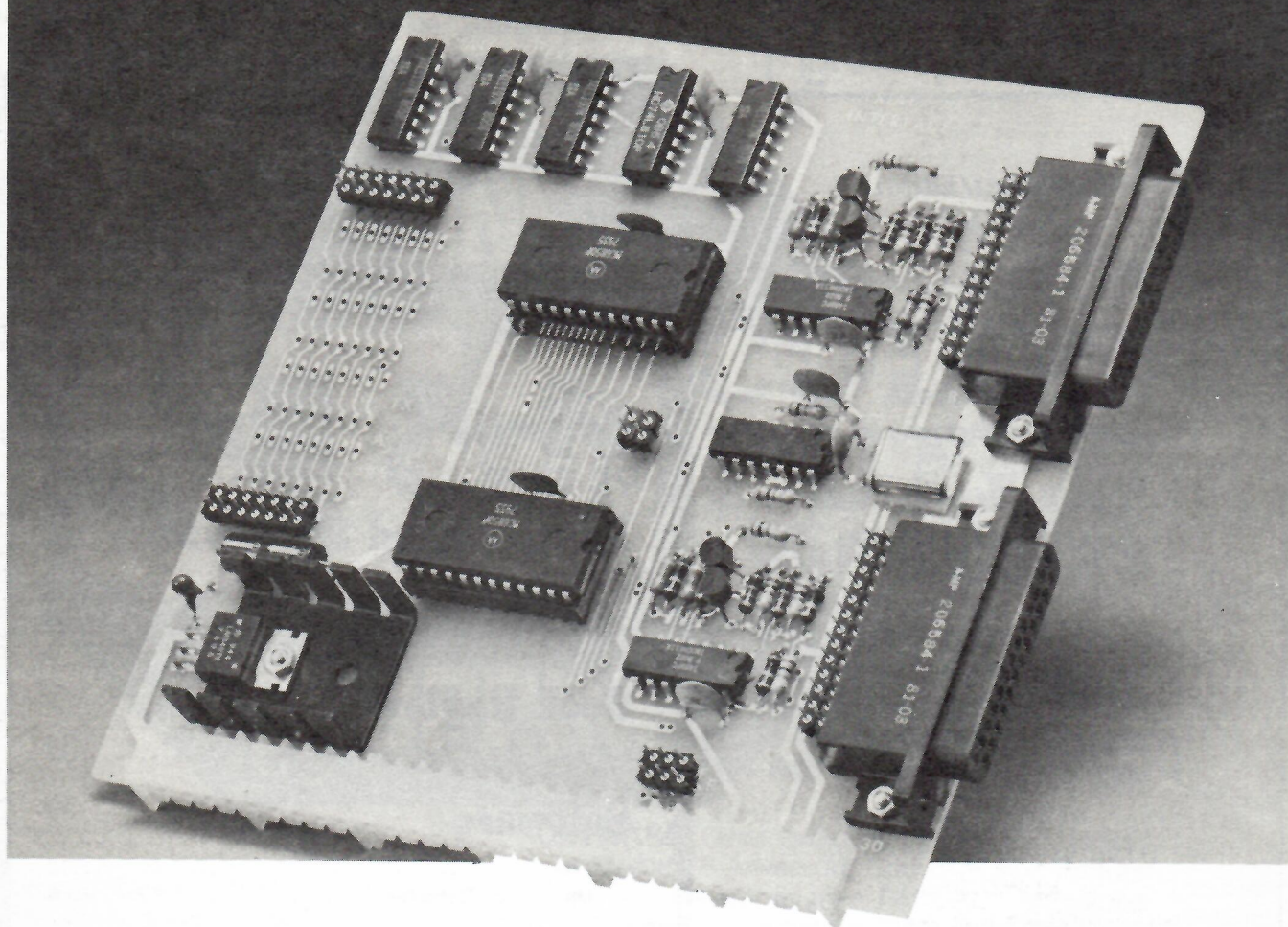
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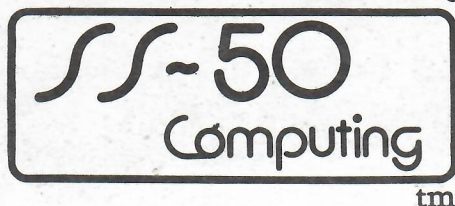
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state

zip

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ON THE COVER.. Three GIMIX disk controller boards. On top you see the GIMIX DMA Controller for 5 and 8 inch drives. On the bottom left is the Double Density Disk Controller, with the 5/8 Disk Controller Board on the right. For information, see the Gimix Ad on the back cover.

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PLEASE forgive this issue for being late [again]...Just when we were getting caught-up, Myrphy's Law caught up to us. The typesetter broke down, and it took over 40 days to get the part from the manufacturer. We have now lengthened all expiration dates by two issues, except for the new subscribers. That should make-up for the problems caused to you.

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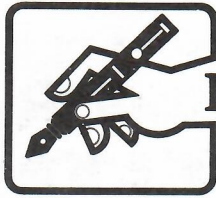
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EDITORIAL

by Ken Orme

If you are not aware, we have passed another point in SS-50 Bus history. For the second time we have seen the last of the SWTPC Computer kits. First it was the 6800 (no longer built or supported by Southwest Technical Products). Now it is the 6809 kit that is no longer sold. This is not to infer however, that they don't produce the 6809 in an assembled version.

I'm sure the reasons for the decision were all considered in depth before coming to the final conclusion, and there may be many reasons other than those I mention here. However, the main reason (as I was told by Dan Meyer at SWTPC) is due to the fact that Southwest did not want to go through all the problems of an FCC type approval for their "hobby" computers. A kit is considered a hobby computer. I don't blame them for not wanting to go through that.

However, one facet of no longer producing a particular product is that sometimes has a detrimental effect on selling future

products. People lose faith if something they buy suddenly no longer is available or no longer is supported by the manufacturer.

Another facet deals with the fact that Southwest Technical no longer is trying to sell to the "Hobbyist" market. That, by itself, may not be a problem to business, but how many sales will be lost to small business and industry by no longer trying to reach the hobby market? It seems many people tend to purchase computers for their business based on what they are familiar with on a hobby level. There are many SWTPC 6800's in school and industrial uses because of that one fact.

Still another facet of this is dropping one image and obtaining another. Since SWTPC has been in the hobby field for so long, it may take some time before the "business only" side of Southwest Technical catches on with the general public.

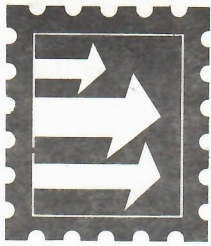
Conversely, some of the other SS-50 bus systems started out as business or industrial systems and

have not only a good number of years in this area behind them, but have a good reputation as a business system going already.

Many people feel that we owe a great deal to Southwest Technical for coming out with the 6800 and getting most of us started. I can see that point clearly. However, I still feel that SWTPC owes a lot to the hobbyist, too! Without those that bought the kits (the hobbyist) SWTPC would not be able to produce the systems that they are selling now. In fact, without the hobbyist, I feel the SWTPC Computer would not have survived. It took the combined efforts of engineers and consumers to get the systems "debugged" and to run properly. Just ask someone who bought the early systems if you don't believe me.

I feel that there is room for both markets for computers based on the SS-50 bus. It's true that the SS-50 hobby market is not the biggest in the industry, but it is still a good market. The hobbyist has been loyal for many years. I hope that favor can be repaid.

[SS-50]



LETTERS

Dear Editor,

I need sources for software and help. Your newsletter is very helpful.

A. Lucas
Laguna Hills, CA

Dear Editor,

I would like to see more information on SSB and less on FLEX.

Ronald Baxter
Hayward, CA

We will be bringing more software for all machines and operating systems. It seems like the biggest problem comes from getting people to submit articles. After all, it is quite a chore to do the articles for everything. I suppose the reason FLEX is seen more often is that there are more people who have FLEX at this time.

Editor

Dear Editor:

Enclosed is my subscription for SS-50. I recently reviewed your magazine while purchasing a monitor "Humbug" from Star Kits. Your magazine looks great. Also I think your readers should know how superb Pete Stark of Star-Kits handled my inquiry.

Being only 15 miles away, he invited me over to try out his "Humbug". Well after trying it out, there was little doubt that it is head and shoulders over the one I was using. This monitor

"Humbug" will perform so many tasks and quickly (too). It will do hex dumps, ASCII dumps, find 1 - 2 - or 3 bytes, boot my DOS, move memory, compare memory and others. The best ones are a built-in disassembler and single stepping with each step listing all registers. Great for machine code programming.

To top all this it is menu fed for us oldies with poor memories. I think anyone doing serious programming should use Humbug.

R. Scappatura
New York

We received a letter some time ago from Richard G. Cagle with regard to his patch to move SWTPC disk BASIC from Mini-FLEX to FLEX 2.0. He offers to do you a service by providing a copy of the article he wrote, the source code, and a binary code all for just sending him a formatted disk with appropriate return postage, or a cash equivalent. The disk to send should be a 5¼ FLEX 2.0 formatted disk.

Anyone wishing to take advantage of this generous offer should contact Richard at: 11103 Sagepark Lane, Houston, TX 77089.

Editor

Dear Editor:

I have for sale: SWTP CT-64 Terminal with 9 inch video monitor. RS-232 interface, up to 1200 baud, all options installed. Works fine. \$150.

Congratulations on the new format...looks good!

Paul Pennington
2912 Palmetto Drive
Martinez, GA 30907
[404] 860-2934

Dear Editor,

Thank you for your response in the "OS9 Exchange" Sept/Oct issue to my recent letter. I am interested in learning as much as I can about OS9, as it appears to be a very good operating system.

However, you seem to have misinterpreted my third question, the one about adapting OS9 for non-standard peripherals. While your reply to this question was informative, I was really asking if Microware supplies instructions for writing I/O drivers and incorporating them into the system. (I am a fairly competent assembly language programmer.) If my present plans for my eventual 6809 system continue to be valid, my terminal and printer will be at non-standard port addresses and will have a non-standard protocol for "talking" to the computer. Even my disk drive(s), when I get one or more, are likely to be at non-standard port addresses.

One sometimes useful capability of an operating system to automatically read commands from a file after being "booted". (The name of this file would have to be built into the initialization sequence.) When all commands in the file have been executed, or if the user aborts this process, or if the file is not present, the terminal would then be used for command input. This capability could be used for issuing an appropriate TMODE command for the terminal, or for automatically starting an application program, or for some other purpose. (There may be other ways of accomplishing this function.)

As for the problem you mentioned of getting your printer to work with its "Inverted" busy/ready bit, I was reading an OS9 manual last April and I remember something about a device table which contains infor-

(Continued on page 20)

ANOTHER

"OPEN DOOR" DETECTOR

Leo Taylor
18 Ridge Court West
West Haven, CT 06516

I'd like to contribute to the on-going series in *SS-50 Computing* called 'Open Door Patch'. This series is based on patches to FLEX disk drivers by William Hart and others to use the software to allow the disk to spin up to speed when accessed and to detect if a disk is in place.

I was enthusiastic about the patch when I read it in the Nov-Dec issue and after adding it to my FLEX source I was pleased to see it works as claimed. My enthusiasm waned when I noticed my file read speed had dropped. A few tests revealed the speed reduction to be 2:1 for mini-floppies and 3:1 for 8 inch disks. I soon found out why.

FORMATTING

FLEX formats a disk with the sectors interleaved. This interleaving is done by NEWDISK and is transparent to the user. I've dug rather deep into FLEX formatting since I have written my own Universal Disk Formatter program that allows me to alter the interleaving. The 'open Door Patch' destroys all the speed

improvement that the interleaving accomplished. The patch requires that the disk revolve past the index hole after every sector so FLEX can no longer load two or three sectors per revolution. This is a fairly high price to pay for a DRIVE NOT READY error.

What is needed is a method to determine if a drive is ready that requires zero time. Software is not the answer since all drives must indicate ready status at once if you are going to access more than one drive in a program. The only way I can imagine doing this is with a hardware circuit per drive. Though not as easy as a software approach, hardware would be a 'no compromise' solution.

I set out to find the ideal design: two ICs maximum, fast acting, delay on startup, no foil cuts to drive, etc. I found the circuit didn't exist. The drive ready indicator used in eight inch drives was not acceptable since it didn't expect the drive to have motor control. My Shugart 800s will continue to indicate READY when the motor is unplugged! The only option was to design my own card.

THE CIRCUIT

The enclosed circuit will do the trick. It uses only two ICs, both of which can be ordered from most mail order dealers (Shugart uses these ICs in their drives). The board taps signals from the drive, but does not cut into any foils, thus not affecting the resale value of the drive. One board must be made for each drive, so I designed a small PC board so all my 6800 friends could take advantage of the circuit.

The ready signal is generated by a re-triggerable one-shot. The time delay is set to slightly over the period of the index pulses.

The drive will indicate ready only when index pulses are present and repeating at full speed. The delay for motor speed-up is supplied by a second timer which is set for about ½ second. This delay only occurs when the motor starts up. The circuit output is wire ORed with the remaining drives and connected to the controller. The F&D controller I use has the needed inverter to connect the ready signal to the 1771 IC.

delay when the head NEEDS loading whereas read delayed 10 msec before every sector. With these drivers you can read SWTP fast disk format (used by 2 MHZ systems) at about 1.3 MHZ. Recent versions of NEWDISK had an unannounced sector interleaving change which makes the disk load very slowly (just like 'Open Door Patch'.

I will supply a copy of the driver to anyone who will send me a disk (5¼ or 8 inch single-sided, single-density) as well as an assortment of other utilities I've written, such as my disk formatter.

As a guide for testing disk speed, a normal TSC FLEX-2 disk driver should read a 100 sector text file in 14 seconds using the command: List FILENAME 9999. Be sure to use a freshly initialized disk. If you measure 30 seconds, you are only reading 1 sector per revolution. A SWTP fast format disk can be read in 12 seconds.

[illegible]

```

** DISK DRIVER FOR ACCUMULATOR I/O
** CONTROLLERS SUCH AS SWTP MF68 OR
** F&D MDI-1. THIS DRIVER HAS THE
** ADDITIONAL LOGIC FOR SELECTING THE
** TYPE OF DRIVE (5/8), OPERATION WITH
** 8 INCH DRIVES AT 1.25 MHZ, AND OPER-
** ATION WITH FAST FORMAT DISKS AT 1.3
** MHZ. HEAD STEPPING RATE IS SET UP FOR
** 20 MSEC ON 5 INCH (10 MSEC ON 8 INCH)
** WHICH IS ACCEPTABLE FOR SA-400/SA-800.

```

```

8014
* ADDRESS EQUATES
*
DRVREG EQU 8014
CONTROLLER REGISTERS

```


8015	TYPREG	EQU	\$8015	USED BY F&D
8018	COMREG	EQU	\$8018	
8019	TRKREG	EQU	\$8019	
801A	SECREG	EQU	\$801A	
801B	DATREG	EQU	\$801B	
AC34	FBFLAG	EQU	\$AC34	BACKGROUND/BACKGROUND
AD00	COLDS	EQU	\$AD00	

* JUMP TABLE MUST BE LOCATED HERE
 * FOR OPERATION WITH FLEX-2. FOR
 * 6809 MOVE THE TABLE TO \$DE00.

BE80	ORG	\$BE80	
BE80 7E	BE 07	READ	JMP
BE83 7E	BE 07	WRITE	JMP
BE86 7E	BE 33	VERIFY	WRITE1
BE89 7E	BE 43	RESTOR	VRIFY1
BE8C 7E	BE 59	DRIVE	RESTR1
BE8F 7E	BE 98	CHECK	DRIVE1
BE92 7E	BE 98	GCHECK	GCHEK1
BE95 00		DRIVEN	JMP
BE96 00		FCB	0
BE97 00	00	TEMPX	0

CURRENT DRIVE NUMBER

* TRACK TABLE STORES HEAD POSITION (TRACK)
 * FOR EACH DRIVE WHEN NOT BEING ACCESSED.

BE99 00	TRKTB	FCB	0	0
BE9A 00		FCB	0	1
BE9B 00		FCB	0	2
BE9C 00		FCB	0	3
BE9D 00		FCB	0	4
BE9E 00		FCB	0	5
BE9F 00		FCB	0	6
BEA0 00		FCB	0	7
BEA1 00		FCB	0	8
BEA2 00		FCB	0	9

* AUTO-CONFIGURE BLOCK OF ADDRESSES
 * FOR 6809 USE PROPER VECTORS

BEA3 E1	AC	INVECT	FDB	\$E1AC	
BEA5 E1	D1	OUTVEC	FDB	\$E1D1	
BEA7 80	04	ACIA	FDB	\$8004	
BEA9 80	10	TIMER	FDB	\$8010	
BEAB A0	00	IRQ	FDB	\$A000	
BEAD A0	12	SWI	FDB	\$A012	
BEAF E0	D0	MONITR	FDB	\$E0D0	
BEA1 A0	48	PCV	FDB	\$A048	

+++ CLOCK +++

* DRIVE TYPE TABLE
 * USED FOR F&D CONTROLLER

BEB3 00	DRVTYP	FCB	0	0
BEB4 00		FCB	0	1
BEB5 90		FCB	\$90	2

BF1F 08	INX	LDA B	COMREG
BF20 F6	80 18	WRITE4	
BF23 C5	02	BIT B	#2
BF25 26	F3	BNE	WRITE3
BF27 C5	01	BIT B	#1
BF29 26	F5	BNE	WRITE4
BF2B 09	DEX		
BF2C 8D	C4	BSR	WAIT
BF2E C5	5C	BIT B	#5C
BF30 01		CLINT	
BF31 0E		CL1	
BF32 39		RTS	

* VERIFY LAST SECTOR WITH DUMMY READ

BF33 86	8C	VRIFY1	LDA A	#8C
BF35 7D	AC 34	TST	FBFLAG	
BF38 27	01	BEQ	VRIFY2	
BF3A 3F		SWI		
BF3B 01		VRIFY2	NOP	
BF3C 0F		SEI		
BF3D 8D	AE	BSR	DOCOM	
BF3F C5	18	BIT B	#18	
BF41 20	ED	BRA	CLINT	

* RESTORE TO TRACK ZERO

BF43 8D	14	RESTR1	BSR	DRIVE1
BF45 86	0A	LDA A	#8A	
BF47 8D	A4	BSR	DOCOM	
BF49 C5	80	BIT B	#80	
BF4B 26	08	BNE	RESTR3	
BF4D C5	40	BIT B	#40	
BF4F 27	02	BEQ	RESTR2	
BF51 C6	0B	LDA B	#8B	
BF53 0C		RESTR2	CLC	
BF54 39		RTS		

FLAG WRITE PROTECT

BF55 C6	0F	RESTR3	LDA B	#8F
BF57 0D		SEC		
BF58 39		RTS		

FLAG NO DRIVE

* SELECT DRIVE FROM FCB

BF59 FF	BE 97	DRIVE1	STX	TEMPX
BF5C A6	03	LDA A	3. X	
BF5E 81	03	CMP A	#3	
BF60 23	01	BLS	UNDER3	
BF62 4F		CLR A		
BF63 B7	80 14	UNDER3	STA A	DRVREG
BF66 8D	3F	BSR	COUNTUP	
BF68 F6	80 19	LDA B	TRKREG	
BF6B E7	00	STA B	0, X	
BF6D B7	BE 95	STA A	DRIVEN	
BF70 8D	35	BSR	COUNTUP	
BF72 A6	1A	LDA A	\$1A, X	

MAX DRIVE NUMBER

>3 BECOMES ZERO

SELECT DRIVE

TRACK TBL OF OLD DRIVE

SAVE OLD TRACK REGISTER

SAVE DRIVE NUMBER

DRIVE TYPE


```

BEB6 90          FCB  $90          3

* READ SECTOR
* READ1
BEB7 8D 28      BSR  SEEK
BEB9 86 88      LDA  A  #88
BEBB 7D AC 34   TST  FBFLAG
BEBC 27 01      BEQ  READ2
BECO 3F         SWI
BEC1 01         NOP
BEC2 0F         SETI
BEC3 B7 80 18   STA  A  COMREG
BEC4 8D 38      BSR  DELAY
BEC5 20 06      BRA  READ4

BEC6 B6 80 1B   READ3  LDA  A  DATREG
BEC7 A7 00      STA  A  O. X
BECF 08         INX
BED0 F6 80 18   READ4  LDA  B  COMREG
BED3 C5 02      BIT  B  #2
BED5 26 F3      BNE  READ3
BED7 C5 01      BIT  B  #1
BED9 26 F5      BNE  READ4

BEDB 8D 15      BSR  WAIT
BEDD C5 1C      BIT  B  #1C
BEDF 20 4F      BRA  CLRINT

* SEEK TRACK A SECTOR B
*
BEE1 B7 80 1B   SEEK   STA  A  DATREG
BEE4 8D 1A      BSR  DELAY
BEE6 F7 80 1A   STA  B  SECNEG
BEE9 8D 15      BSR  DELAY
BEEB 86 1A      LDA  A  #1A
BEED B7 80 18   DDCOM  STA  A  COMREG
BEF0 8D 0E      BSR  DELAY

* WAIT UNTIL READY
*
BEF2 7D AC 34   WAIT   TST  FBFLAG
BEF5 27 01      BEQ  WAIT2
BEF7 3F         SWI
BEF8 F6 80 18   WAIT2  LDA  B  COMREG
BEFB C5 01      BIT  B  #1
BEFD 26 F3      BNE  WAIT
BEFF 39         RTS

* WASTE TIME FOR COMMAND TO TAKE
*
BF00 8D 00      DELAY  BSR  DELAY2
BF02 8D 00      DELAY2 BSR  DELAY3
BF04 8D 00      DELAY3 BSR  DELAY4
BF06 39         DELAY4 RTS

```

```

BF74 B7 80 15   STA  A  TYPREG
BF77 A6 00      LDA  A  O. X
BF79 B7 80 19   STA  A  TRKREG
BF7C BD BF 00   JSR  DELAY
BF7F CE 10 00   LDX  #1000
BF82 B6 80 19   WAITRD LDA  A  TRKREG
BF85 5F         CLR  B
BF86 BD BE E1   JSR  SEEK
BF89 F6 80 18   LDA  B  COMREG
BF8C 2A 14      BPL  ISRDY
BF8E 09         DEX
BF8F 26 F1      BNE  WAITRDY
BF91 FE BE 97   NOTRDY LDX  TEMPX
BF94 C6 80      LDA  B  #80
BF96 0D         SEC
BF97 39         RTS

* CHECK DRIVE READY
* ANY DRIVE CAN SKIPPED BY DRIVE SCAN
* CURRENTLY SET TO SKIP DRIVE >3
*
BF98 A6 03      QCHEK1 LDA  A  3, X
BF9A 81 04      CMP  A  #4
BF9C 24 F3      BHS  NOTRDY
BF9E 8D B9      BSR  DRIVE1
BFA0 25 EF      BCS  NOTRDY
BFA2 FE BE 97   ISRDY  LDX  TEMPX
BFA5 0C         CLC
BFA6 39         RTS

BFA7 CE BE 98   COUNTUP LDX  #TRKTBL-1
BFAA F6 BE 95   COUNT  LDA  B  DRIVEN
BFAD 08         INX
BFAE 5A         DEC  B
BFAF 2A FC      BPL  COUNT
BFB1 39         RTS

END  COLD
NO ERROR(S) DETECTED

```

GET TRACK
TRACK OF NEW DRIVE
+++ DELAY FOR MOTOR +++
DUMMY SECTOR
GET STATUS

DRIVE 4 NEVER READY
SELECT
HARDWARE

FLEX DISK DRIVER

8-30-81 TSC ASSEMBLER PAGE

SYMBOL TABLE:

ACTA	BEA7	CHECK	BE8F	CLRINT	BF30	COLDS	AD00	COMREG	8018
COUNT	BFAD	COUNTU	BEA7	DATREG	801B	DELAY	BF00	DELAY2	BF02
DELAY3	BF04	DELAY4	BF06	DDCOM	BEED	DRIVE	BEBC	DRIVE1	BF59
DRIVEN	BE95	DRVREG	8014	DRVTP	BEB3	FBFLAG	AC34	INVECT	BEA3
IRQ	BEAB	ISRDY	BEA2	MONITR	BEAF	NOTRDY	BF91	OUTVEC	BEA6
PCV	BEB1	QCHEK	BE92	QCHEK1	BF98	READ	BE80	READ1	BEF7
READ2	BE01	READ3	BECA	READ4	BED0	RESTOR	BE89	RESTR1	BF43
RESTR2	BF53	RESTR3	BF55	SECREG	801A	SEEK	BE01	SMI	BEAD
TEMPX	BE97	TIMER	BEA9	TRKREG	8019	TRKTBL	BE99	TYPREG	8015
UNDER3	BF63	VERIFY	BE86	VRIFY1	BF33	VRIFY2	BF3B	WAIT	BEF2
WAIT2	BEF8	WAITRD	BF82	WRITE	BE83	WRITE1	BF07	WRITE2	BF11
WRITE3	BF1A	WRITE4	BF20	WRITES	BF1D				

[SS-50]

MAGIC SPELL REVIEW

by Ken Orme

One of the things that I have needed for a long time is a spelling checker. I'm sure that most of you have noticed a few spelling errors in almost everything written or published. Some are "typographical" errors put there when things were typeset and others probably came about through neglect. Still, we don't claim to be the most perfect publication out of all the computer magazines like one magazine has. But, the means now exists where we can all produce more correct copy. This comes from *Magic Spell* (tm) from Star-Kits. *Magic Spell* is a program designed to check text files for spelling and typographical errors. It is an extremely useful program for anyone doing writing and/or word processing.

When we received our copy of *Magic Spell* several months ago, I had no idea how the program would handle so many formats of text files. After all, there are several different types of text editors and processors each one

with a slightly different set of codes on the disk. Well, after using the program for some time now, I dare say it will do a nice job with any text file in FLEX.

Briefly, *Magic Spell* compares each word in your text file against a dictionary file and prints out every word which does not appear in the dictionary. As you might realize, even a dictionary file with over 10,000 words (as this one has) will not be able to contain every word that you may use. Therefore, you have several other options rather than just have the program run.

The first option is to ignore the questionable word. If *Magic Spell* comes upon a word that is not in the dictionary, it will ask what you would like to do with the displayed word. If you type "I" it will then ignore that word and not print it or mark it. This is especially important if you have many words that are technical in nature or abbreviations that are used and you know that they are correct as written. After you type an I, *Magic Spell* goes on to the

next word.

Another option that is available is "M", to mark the word that is displayed. If you are certain the word is misspelled, or if you are not sure, this will probably be the thing to use. If you want it marked, it will also mark the source file with three asterisks after the incorrect word. This makes it easy to find with almost any editor available. If you would like *Magic Spell* to change the word for you in the text, there is an option for that, too. When this part of the option is selected, you will type in the correct word, rather than having the program get something out of context. And as I explain later, some of the text is printed on the screen so that you may see the word in context.

The third option is to type an "A" which means to add the word to the dictionary so that it will be there in the future. This is one of the best parts of the *Magic Spell* program. It allows you build your dictionary to the point where you have almost all the "unique"

words for your future use. This feature also allows you to add names and other words or abbreviations that are often used.

The fourth option is the fast mark option. It will allow you to mark all the words automatically without other prompts. This makes it a fast method to send questionable words to the printer, or if you want to "walk away" while it works, you can do so. Needless to say, this option uses the "F" to select it.

A fifth option is "Q", to quit and return to the DOS.

The thing that I like most about *Magic Spell*, is the fact that it does *not* make the corrections in the text for you, unless you choose to have it do so. It lets you know of probable errors and can mark them for you, but gives you the choice of making the actual corrections in the text of doing it for you. Why do I like this part of the package? Mainly because I use several different editors, and with a few of them it would make some difference in line length to have extra letters placed on a line, which in turn may not justify properly. Also, there are times when the context must be changed when an error is spotted, not just the word itself changed. *Magic Spell* does print out the previous three or four lines of text up to and including the word that is questionable so that you can see it in context and help you decide what to do.

As far as using *Magic Spell* is concerned, it is very straight forward and easy to operate. We have found it to be one of the easier programs to learn. It reminds me of some of the more lengthy utility programs such as *FORMAT* or *NEWDISK*. There are a few things to remember, but almost everything is given in the prompts.

The manual is very good as far as information on how to run the

program. It also includes examples that you can try on your machine. The manual includes information on how to output the words to the printer (for those not familiar with that), and information on reassembling the source code (which comes with it).

That is another nice feature about *Magic Spell*: the source code comes with the program. This allows you the opportunity to run the program on the 6800 or the 6809 and make different versions for different disk operating systems. One thing to remember, however, is that the source is not position independent. So those who wish to run it on OS-9 or UniFLEX will either have to rewrite the source or wait until it comes out on OS-9.

All the error messages are printed out so that you don't have to look up each one in the manual. Most errors that are serious will be fatal to the program, and will return to DOS. The more simple ones are those where you may forget to give the input file name, or where the file is not on the disk, etc.

Here are a few other things that you should know to see if this program will fit your needs. The words in the text file are allowed up to 31 characters. Anything longer is truncated. Hyphens at the end of the line are ignored, and the word is compared as though it were not hyphenated.

Peter Stark also makes the manual very comprehensive by including pages dealing with the source text file with more specific information on selecting "all" words or "selected" words to compare to the dictionary, and file name specifications. There is a lot of information on the dictionary file itself: how it is prepared, edited, etc. This section is extremely informative for those with limited disk size or those who may want to cut the

dictionary down for other reasons. Also, information on how to expand the dictionary size are included. One method given is to remove the end of file marker from the dictionary, and use a second or third disk to continue the dictionary. Then by adding the end of file marker to the end of the last disk, you will be able to have more than one disk for the dictionary. The one thing that is cautioned, however, is that the words must be in correct order whenever they are placed in the dictionary file.

The program is very powerful especially for the price. It is very seldom that you can find a program where the 10,000 plus word dictionary and the program are purchased for the price of this one, not alone a second program for another processor and the source code. And it all is less than \$90.00. There were only a couple of mistakes in the first dictionary files that went out, and since have been corrected. That is the only problem that I know of, since it has been running for us without a problem.

Since we received the *Magic Spell* program, Peter Stark has also come out with an expanded version of it for more serious applications. This version contains a 75,000 word dictionary and is designed for 6809 systems only. This version sells for less than \$240.00. The regular version of *Magic Spell* that we review here runs on both the 6800 and 6809 machines using FLEX, 6000 Mini-FLEX, and PERCOM systems. The OS-9 and SSB versions are being finished and will be available soon.

I feel that *Magic Spell* is a superior product and is just what you need if you do word processing, writing, or use your computer for other business applications where spelling is a factor.

[SS-50]

A 6809 "LIFE" Program

By Douglas Beck

The "Life" program is an interesting exercise in programming as well as being very interesting to watch perform on the CRT. This version was created some years ago by persons unknown, and fixed up to run under FLEX 9.0 when I got the 6809 CPU. In its present form it is not position independent. After considerable work, I finally arrived at the conclusion that independence was not worth the effort. A machine so occupied was not likely to be doing anything else.

The main features of this implementation are first, it is fast. Generations have to be delayed between displays to permit time to look at the pattern. Second, it does not depend on anyone's clone

of Mikbug to operate. If you have FLEX 9, that is enough, and is where the interface to the outside world should occur anyway. So many otherwise useful programs are cluttered by references to someone's very special ROM. These gadgets could be and should be replaced by operating system references or by constructing a library file that may be referenced by a LIB call in the Assembler.

Adaptation to your own system will require modification of the code at line 121 and again at line 127 to substitute the appropriate characters to control the "Clear screen" and "cursor home" function on your terminal or video display board.

Running the program, once it is debugged involves invoking it as a command file. The program will prompt for entry of any character from the keyboard, after which it will clear the screen and begin creating display generations. Each key will cause a different initial generation to be created via the subroutine RAND. For starters, the "space" key will create a pattern that will run well over 400 generations. For the user's edification, a generation counter and population counter have been included at the top of the display.

There are no other special hardware requirements other than a minimum FLEX system and dumb terminal. I hope you enjoy the program as much as I have.

LIFE

* "Life" game, a loose adaptation
* by Doug Beck
Los Altos, CA

ORG 0
LIFE LBRA RAN
VN FCB 1 Version 1

* Vectors

CRLF FDB \$CD24
PRIB FDB \$CD3C
OUTCH FDB \$CD18
INCH FDB \$CD15
PDATA FDB \$CD1E
PLDATA FDB \$CE84
WARMS FDB \$CD03

* Constants

MASK FCB \$00000011
BLNK FCC ' '
MARK FCC '#'
TIME FCB 1
ROWLEN FCB 64-1
COLLEN FCB 16-1
OFFS FCB \$10
BASE FDB TABLE
HEXEND EQU 10000,1000,100,10,1

* Variables

RND RMB 2
GENERN RMB 2
POPULN RMB 2
ADDR RMB 2
COUNT RMB 1
X0 RMB 1
X1 RMB 1
Y0 RMB 1
Y1 RMB 1
DX RMB 1
DY RMB 1
YES RMB 1
DIGIT RMB 1
TABLE RMB 4096
TABLE1 RMB 4096
ENDTAB EQU *

TIMEOUT LOOP
times thru inner loop

inner timing loop

* TIME

LDA PSHS A

W0 LDX \$FFFF

W1 LEAX -1,X

BNE W1

PULS A

DECA W0

BNE RTS

0000 16 2044
0000 01
0004 CD24
0008 CD3C
000C CD18
0010 CD15
0014 CD1E
0018 CE84
001C CD03

0012 07
0013 20
0014 23
0015 01
0016 3F
0017 0F
0018 10
0019 0336
001B 2710 03E8 0025

0025
0027
0029
002B
002D
002E
002F
0030
0031
0032
0033
0034
0035
1036

0025
0027
0029
002B
002D
002E
002F
0030
0031
0032
0033
0034
0035
1036

2036 96 15
2038 34 02
203A 8E 0FFF
203D 30 1F
203F 26 FC
2041 35 02
2043 4A
2044 26 F2
2046 39

2133 2A
2135 86
2137 AD 9F 0008
2138 96 16
213D 97 2E
213F 0A 2F
2141 2A D8
2143 AD 9F 0004
2147 30 8D 00F3
2148 AD 9F 000E
214F 17 FEE4

F0 49
F8 9F 0008
2E 16
2F 2E
D8 2F
9F 0004
8D 00F3
9F 000E
FEE4

2152 8E 0000
2155 9F 29
2157 9F 2E
2159 0F 34

215B 96 2E
215D D6 2F
215F 17 008C
2162 A6 84
2164 97 34
2166 8D 4E

2168 96 2D
216A 81 03
216C 27 09
216E 81 02
2170 26 04
2172 0D 34
2174 26 01
2176 4F
2177 97 2D
2179 27 06
217B 9E 29
217D 30 01
217F 9F 29
2181 96 19
2183 98 18
2185 97 19
2187 96 2E
2189 D6 2F
218B 8D 61
218D 96 2D
218F A7 84
2191 96 19
2193 90 18
2195 97 19
2197 96 2E
2199 4C
219A 97 2E
219C 91 16
219E 23 B9
21A0 0F 2E
21A2 D6 2F

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216C 27 09
216E 81 02
2170 26 04
2172 0D 34
2174 26 01
2176 4F
2177 97 2D
2179 27 06
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217F 9F 29
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2174 26 01
2176 4F
2177 97 2D
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217D 30 01
217F 9F 29
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2185 97 19
2187 96 2E
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2195 97 19
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216E 81 02
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2172 0D 34
2174 26 01
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217F 9F 29
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2197 96 2E
2199 4C
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219C 91 16
219E 23 B9
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21A2 D6 2F

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2157 9F 2E
2159 0F 34

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2195 97 19
2197 96 2E
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219A 97 2E
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21A0 0F 2E
21A2 D6 2F

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215B 96 2E
215D D6 2F
215F 17 008C
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2168 96 2D
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2187 96 2E
2189 D6 2F
218B 8D 61
218D 96 2D
218F A7 84
2191 96 19
2193 90 18
2195 97 19
2197 96 2E
2199 4C
219A 97 2E
219C 91 16
219E 23 B9
21A0 0F 2E
21A2 D6 2F

print right margin

TSTCEL
#1

BPL
LDA

JSR
LDA

STA
X0

DEC
Y0

BPL
RLOOP

JSR
LINE,PCR

JSR
+PLDATA+

LBSR
WAIT

* NEXT

LDS
X0

STX
X0

CLR
YES

* See if cell occupied this genrn

LDA
X0

LDB
Y0

LBSR
CADDR

LDA
X

STA
YES

BSR
CELL

start with zero populn

#0
POPULN

STX
X0

CLR
YES

* See if cell occupied this genrn

LDA
X0

LDB
Y0

LBSR
CADDR

LDA
X

STA
YES

BSR
CELL

* Check neighbor count + yes

LDA
COUNT

CMPA
#3

BEQ
SET

CMPA
#2

BNE
CLR

TST
YES

BNE
SET

CLR
CLR

SET
SET

check count of neighbors
to determine whether
to retain cell

COUNT
NONE

LDX
POPULN

LEAX
1,X

STX
POPULN

LDA
BASE

ADDA
OFFS

STA
BASE

LDA
X0

LDB
Y0

BSR
CADDR

LDA
COUNT

STA
X

SUBA
BASE

STA
BASE

LDA
X0

INCA

STA
X0

CMPA
ROWLEN

BLS
COMP

CLR
X0

print lower border


```

2047 8D 02AD RAN EQU LEAS * STACK, PCR Gen random 0th genern
2048 8D 52 0233 LEAS INIT
2049 30 8D 0233 LEAX ASK, PCR
2050 9F 000C JSR +PDATA+ Ask for seed
2051 9F 000A JSR +INCH+ set it from kbd
2052 9F 000A JSR RND RND begin randomize
2053 97 25 STA EORA
2054 98 04 STA RND+1
2055 97 26 JSR +CRLF+ store rnd marks in table
2056 9F 0004 LDA X0
2057 9F 0004 LDA Y0
2058 97 2F LDB CADDR
2059 97 2F LBSR +X
2060 9F 0184 CLR RAND
2061 9F 84 BSR NEXT
2062 9F 1C BEQ NEXT
2063 9F 02 INC +X
2064 9F 02 INC X0
2065 9F 02 LDA INCA
2066 9F 02 STA STA
2067 9F 02 CMPA BLE R1
2068 9F 02 BSR RAND
2069 9F 02 CLR X0
2070 9F 02 LDB Y0
2071 9F 02 STB INCB
2072 9F 02 CMPB BLS R1
2073 9F 02 BRA START
2074 9F 02 LDA RND
2075 9F 02 ASLA
2076 9F 02 EORA
2077 9F 02 ASLA
2078 9F 02 ROL
2079 9F 02 LDA RND+1
2080 9F 02 ANDA
2081 9F 02 BEQ RSET
2082 9F 02 CLRA
2083 9F 02 COMA
2084 9F 02 RTS
2085 9F 02 EQU LEAS * #0 GENERN generation zero
2086 9F 02 STX STX X0
2087 9F 02 LEAX 1,X POPULN population at least 1
2088 9F 02 STX STX #10
2089 9F 02 LDA LDA
2090 9F 02 STA STA OFFS

```

```

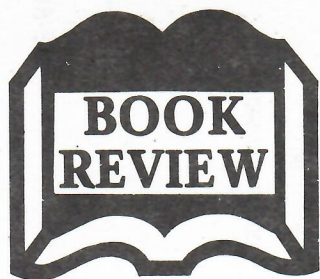
21A4 5C 2F INCB Y0
21A5 D7 17 STB COLLEN
21A7 D1 17 CMPB COMP
21A9 23 AE BLS COMP
21AB 96 19 LDA BASE
21AD 98 18 ADDA OFFS
21AF 97 19 STA BASE
21B1 00 18 NEG OFFS
21B3 16 FF19 LBRA RUN
21B5 8E FFFF EQU *
21B9 9F 32 LDX #-1
21BB 0F 2D STX DX
21BD 8D 1E CLR COUNT
21BE 0C 32 BSR NEIGHB
21C1 27 14 INC DX
21C3 86 02 BEQ TST1
21C5 91 32 LDA #2
21C7 26 F4 CMPA DX
21C9 86 FF LDB BNE LOOP
21CB 97 32 STA #-1
21CD 96 33 LDA DX
21CF 4C 33 INCA
21D0 97 33 STA DY
21D2 81 02 CMPA #2
21D4 26 E7 BNE LOOP
21D6 39 RTS
21D7 0D 33 TST DY
21D9 26 E2 BNE LOOP
21DB 20 E2 BRA LOOP1
21DD 96 2E EQU *
21DF 98 32 LDA X0
21E1 D6 2F ADDA DX
21E3 D8 33 LDB Y0
21E5 8D 07 ADDB DY
21E7 6D 84 BSR CADDR
21E9 27 02 TST ,X
21EB 0C 2D BEQ N1
21ED 39 INC COUNT
21EE 97 30 EQU *
21F0 D4 17 STA STA
21F2 D7 31 ANDB ANDB
21F4 96 15 STB Y1
21F6 08 30 LDA LDA
21F8 48 ASLA ASLA

```


20AE 30	8D DF84	LEAX	TABLE,PCR	21F9 2A	FB	C2	C1
20B2 9F	19	STX	BASE	21FB 47			BPL
20B4 31	8D EF7E	LEAY	TABLE1,PCR	21FC 25	06		ASRA
20B8 34	20	PSHS	Y	21FE 07	31		BCS
20BA 6F	80	CLR	,X+	2200 06	30		ASR
20BC AC	E4	CMPL	,S	2202 20	F7		RDR
20BE 26	FA	BNE	ILP1	2204 96	30	C3	BRA
20C0 32	62	LEAS	2,S	2206 D6	31		LDA
20C2 39		RTS		2208 98	1A		LDB
				220A D9	19		ADDA
20C3 86	1B	LDA	#1B	220C 97	2C		ADCB
20C5 AD	9F 0008	JSR	↑OUTCH+	220E D7	28		STA
20C9 86	4B	LDA	#'K	2210 9E	2B		STB
20CB AD	9F 0008	JSR	↑OUTCH+	2212 39			LDX
							RTS
20CF 86	1B	EQU	*	2213 EC	84	*	,X
20D1 AD	9F 0008	LDA	#1B	2215 30	8D	POP	HEXBCD,PCR
20D5 86	4B	JSR	↑OUTCH+	2219 31	8D	DE02	HEXEND,PCR
20D7 AD	9F 0008	LDA	#'H	221D 34	20	FE	Y
20DB 30	8D DF48	JSR	↑OUTCH+	221F 0F	35		DIGIT
20DF 17	0131	LEAX	GENERN,PCR	2221 0C	35		DIGIT
20E2 86	20	LBSR	POP	2223 A3	84		,X
20E4 AD	9F 0008	LDA	#20	2225 24	FA		FE
20E8 AD	9F 0008	JSR	↑OUTCH+	2227 E3	84		,X
20EC 30	8D DF39	LEAX	POPULN,PCR	2229 34	02		FE
20F0 17	0120	LBSR	POP	222B 96	35		A
20F3 AD	9F 0004	JSR	↑CRLF+	222D 88	2F		DIGIT
20F7 9E	27	LDX	GENERN	222F AD	9F 0008		#2F
20F9 30	01	LEAX	1,X	2233 35	02		A
20FB 9F	27	STX	GENERN	2235 30	02		PULS
20FD 8E	0000	LDX	#0	2237 AC	E4		LEAX
2100 9C	29	CMPL	POPULN	2239 26	E4		,S
2102 26	04	BNE	CONT	223B 32	62		FB
2104 6E	9F 0010	JMP	↑WARM5+	223D 39			2,S
							RTS
2108 9E	15	LDX	ROWLEN	223E 20	2B	* LINE	FCC
210A 9F	2E	STX	X0	2260 2D	2D		FCC
210C 30	8D 012E	LEAX	LINE,PCR	2280 0D	0A 00 04		FCB
2110 AD	9F 000E	JSR	↑PLDATA+			*	TEXT
2114 4F		CLRA					
2115 5F		CLRB					
2116 17	00D5	LBSR	CADDR				MACRO
2119 20	04	BRA	FIRST				FCC
211B AD	9F 0004	JSR	↑CRLF+				FCB
211F 86	49	LDA	#'I				ENDM
2121 AD	9F 0008	JSR	↑OUTCH+	2284		*	TEXT
2125 96	13	LDA	BLNK			*	"TYPE
2127 6D	80	TST	,X+				"SOMETHING!"
2129 27	02	BEQ	PRINT				ROOM FOR STACK
212B 96	14	LDA	MARK				100
212D AD	9F 0008	JSR	↑OUTCH+				* LIFE
2131 0A	2E	DEC	X0				END

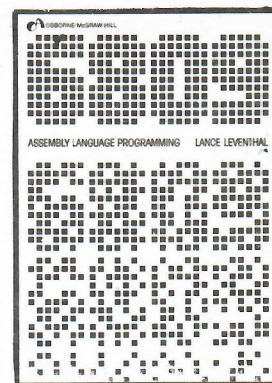
0 ERROR(S) DETECTED

[SS-50]



6809 ASSEMBLY LANGUAGE PROGRAMMING

Lance A. Leventhal
Osborne/McGraw-Hill



Review by Gary Manning

Having read several of Dr. Leventhal's books and even using a few as college texts, I have greatly appreciated his deep understanding of computer hardware and software. Occasionally though, I have felt that he was a bit too assuming on the reader's background. With this book however, I feel that the author has done a very good job of covering the subject thoroughly enough for the novice, and yet move quickly enough to keep the interest of those with programming experience.

The book has 21 chapters divided among four sections of from three to six chapters each, a fifth section on the instruction set, and five appendices. A comprehensive index is also included. The sections include:

Section I

Fundamental Concepts
3 chapters - 82 pages

An introduction to computer languages, a discussion on assemblers, and an introduction to the 6809, its machine structure, instruction set, and addressing modes.

Section II

Introductory Problems
6 chapters - 138 pages

Discusses problem solving and introduces simple load and store programs. Then advances through loops, coding and code conversion, arithmetic problems, and tables and lists.

Section III

Advanced Topics
6 chapters - 101 pages

Discusses subroutines, parameter passing, interrupts, and contains about 60 pages on using the 6820 PIA and 6850 ACIA.

Section IV

Software Development
6 chapters - 101 pages

Includes problem definition, program design, debugging, testing, and maintenance and redesign. These discussions are informative yet concise and explain some advantages and disadvantages of the various techniques presented.

Section V

6809 Instruction Set
75 pages

Detailed information about each instruction.

Appendices

A. Summary of the 6809 instruction set. 18 pages.

B. Summary of 6809 indexed and indirect addressing modes.

C. 6809 Instruction codes, memory requirements, and execution times. 4 pages.

D. 6809 instruction object codes in numerical order. 6 pages.

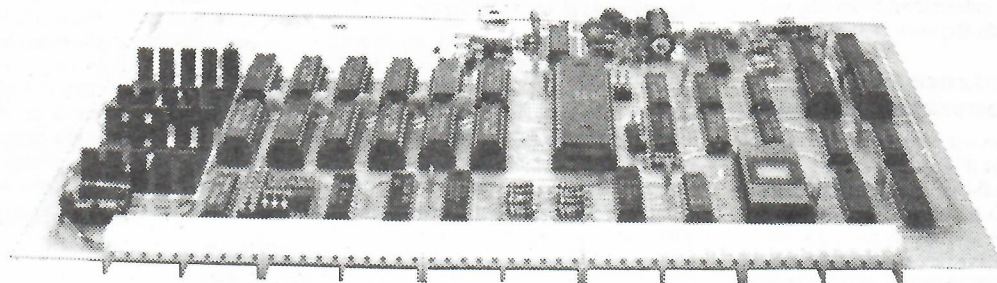
E. 6809 post bytes in numerical order. 1 Page.

The book has been printed with boldface type to present the material and lightface type to expand upon it. Another feature that I like is that the programming examples (there are 65 of them) are interesting and in many cases, even useful. This enhances the value of the book as a reference as well as a tutorial text. Also, the problems are explained clearly and are not so difficult that they become frustrating. I have found the book to be very useful and highly recommend it to anyone who does assembly language programming, or would like to learn.

[SS-50]

Now! Color for Your...

SYSTEM-50



Introducing COLORAMA-50™ Percom's SS-50 Bus Color VDG

Introductory
Price

\$219.95

featuring...

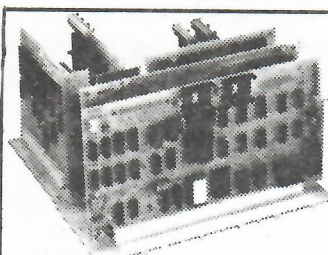
Eleven display formats including 8-color semigraphics, 4-color graphics, 2-color high density graphics and 2-color alphanumerics.

Moreover, two- and four-color displays may be switched between primary and complementary color sets under software control or from the keyboard.

Full graphic resolutions range from 64 x 64 picture elements to 256 x 192 picture elements.

Instant display control: The COLORAMA-50™ is memory mapped: your MPU has direct, instant access to display RAM and display control registers.

Low-cost Modulator Option for Color TV Interface: The COLORAMA-50™ provides for installation of an inexpensive RF modulator such as Radio Shack PN 277-122 for operation using a color TV.



**SS-50 Bus
Department Store**

Nobody supports the
SS-50 bus like Percom:

- ✓ SS-50 Bus/Single-Board Computers with I/O ports & memory
- ✓ Static and Dynamic RAM cards — memory expansion kits
- ✓ LFD-400/800 1-, 2- and 3-drive mini-disk systems
- ✓ Color and monochrome memory-mapped display controllers
- ✓ Extendable 7-slot SS-50 bus motherboards
- ✓ Versatile prototyping boards: SS-50 and SS-30 bus
- ✓ Field-proven software: monitors, operating systems, drivers, editors, assemblers, debuggers and HLLs.

- **Mix in Sound:** With the optional modulator installed, you can complement your colorful displays with software-controlled audio.
- **Extended Addressing:** The COLORAMA-50™ is compatible with the SS-50A bus and the extended-address SS-50C bus. Map the board into any of the sixteen 64-Kbyte banks of the 1-Mbyte SS-50C address space. The COLORAMA-50™ card "defaults" to the first (lowest) bank for the SS-50A bus.
- **Cassette I/O Option:** Add a few inexpensive components to the on-card circuitry provided and use an audio cassette for program/data storage.
- **Provision for On-Card Firmware:** Put your display operating system, cassette control program, etc. right on the COLORAMA-50™ card in a 2516 (5-volt 2716) EPROM. Resides in the top 2-Kbyte of the card memory space.
- **Operating Software:** Included in the comprehensive users manual is a listing of a display operating system and cassette controller that may be implemented as a callable subroutine function from BASIC or existing operating systems. The programs are optionally available in a plug-in ROM for just \$69.95.

System Requirements

The COLORAMA-50™ is pin- and outline-compatible with the Percom System-50™ bus, the SS-50A (SS-50) bus and the SS-50C bus. The composite video-sync signal output will directly drive a color (or BW) video monitor. The output may be modulated for operation with a standard (NTSC) TV set. A modulator is not included. The COLORAMA-50™ card occupies 8-Kbytes of memory in the upper half of a 64-Kbyte memory space. Included on-card is 1-Kbyte of display RAM which will accommodate alphanumeric displays, semigraphic displays and two low-density full-graphic displays. For the higher density graphic displays, additional display RAM is required. The optional RAM ICs may be installed on the card.

For quality Percom SS-50 bus products, see your nearby authorized Percom dealer. To order direct, call toll-free, **1-800-527-1592**. Prices and specifications subject to change without notice. Prices do not include shipping and handling.

PERCOM DATA COMPANY, INC.
11220 PAGEMILL RD. DALLAS, TX 75243
(214) 340-7081

Toll-Free Order Number: **1-800-527-1222**

PERCOM

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Does timesharing on a small system make sense?

It does with OS-9 Level One!

Now two (or more) acts can share your microcomputer stage. You will no longer have to walk away from your computer while it is busy running a long program. Because OS-9 is a multitasking operating system, you can be running a BASIC program while editing a PASCAL program, for example. This lets you make more efficient use of your time and your system, even if you only use one terminal. If your application requires multiple, independent terminals, one OS-9 system can do the work of several single-user systems.

The convenience of an advanced operating system

Sophistication does not require complexity. Many OS-9 users say that it is actually easier to use than the older 6800-type operating systems. Consider how easy it is to run multiple programs: to run a program you just type its name and hit 'return.' To run a program as a separate job, you type its name, an '&' character, then hit return. The program runs as usual, but OS-9 comes back immediately and is ready for your next command. Simple commands let you see each program's status, set its priority, or abort it.

The file management system has fast, byte-addressable random-and sequential-access files. The tree-structured multiple directory system lets you create separate disk directories for each user, project, or application. Command line I/O file redirection means you specify what device and/or files a program will use when you run it, not when you write it.

Efficiency and hardware versatility

No other operating system can run on such a broad range of hardware: the overall RAM requirement for Level One is 32K to 56K RAM. Memory utilization is superlative because OS-9 lets multiple tasks "share" the same reentrant program. For example, if two users run BASIC $\emptyset$ 9, only one "copy" is actually loaded into memory. The Level Two version of OS-9 can utilize up to a megabyte of memory on systems having memory management hardware (both versions come with complete timesharing support).

OS-9's device independent I/O system can handle almost any number and combination of I/O devices: five or

eight inch diskettes, winchester disks, disk cartridges, serial and parallel ports, memory-mapped video displays, and more. Microware offers a large selection of "stock" device interface software modules, or you can create your own: all the information you need is in the manuals.

Excellent support and documentation

Each OS-9 package comes with a User's Manual and a System Programmer's Manual that cover every aspect of OS-9. If you have special requirements, you can even purchase the Source Code for most of OS-9 and related software. At Microware we take pride in offering the best customer support in the business. Technical advice and assistance by phone, mail or telex is available during all business hours.

Superb software tools

In addition to BASIC $\emptyset$ 9, Microware offers: PASCAL, Interactive Assembler, Macro Text Editor, Stylograph, Word Processor, Interactive Debugger, and coming soon, COBOL, and C language compilers.



BASIC $\emptyset$ 9 has a dual personality. One craves meat-and-potatoes BASIC. The other prefers Programme ala Pascal.

Some people say BASIC $\emptyset$ 9 is really a PASCAL in disguise, others say it's still BASIC. You'll understand this delightful dilemma when you look at both versions of the "bubble sort" program shown below: both can be run by BASIC $\emptyset$ 9. The program on top is unstructured and hard to understand, but it's traditional BASIC. The program on the bottom is well-structured and easy to follow, a virtue of PASCAL. With BASIC $\emptyset$ 9 you can program either way, or mix the best of both. It's like getting two languages for the price of one.

SORT AN ARRAY IN ASCENDING SEQUENCE	
90	DIM A(5)
100	I=5
110	IF I=1 THEN 200
120	FOR J=1 TO I-1
130	IF A(J)<=A(J+1) THEN 170
140	T=A(J+1)
150	A(J+1)=A(J)
160	A(J)=T
170	NEXT J
180	I=I-1
190	GOTO 110
200	RETURN
DIM array(5)	
outer=5	
WHILE outer>1 DO	
outer=outer-1	
FOR inner=1 TO outer	
IF array(inner)>=array(inner+1) THEN	
temp=array(inner+1)	
array(inner+1)=array(inner)	
array(inner)=temp	
ENDIF	
NEXT inner	
ENDWHILE	
RETURN	

Makes programs better

BASIC $\emptyset$ 9 has five kinds of loop structures: WHILE...DO, REPEAT...UNTIL, LOOP...ENDLOOP, FOR...NEXT and IF...THEN...ELSE. If one of the five built-in data types (byte, integer, real, string, and boolean) doesn't suit the problem, you can make a new one of your liking with the TYPE statement. Need a tree, linked list, or symbol table? Complex non-rectangular data structures using any combination of data types are easy to define. Modular programming breaks down large programs to smaller, more manageable elements. BASIC $\emptyset$ 9 or machine language recursion plus parameter passing to any other BASIC $\emptyset$ 9 or machine language procedure. There is a complete set of statements for device-independent sequential or random I/O, plus a superlative PRINT USING system.

Makes programs faster

No full-feature BASIC for any 8-bit microprocessor is faster than BASIC $\emptyset$ 9, because it is an interactive compiler. As each program line is entered, it is instantly compiled to a smaller, faster form. Because BASIC $\emptyset$ 9 automatically converts programs back to original "source" form for listing, it is as friendly and easy-to-use as traditional interpreter BASICS. Each procedure can be independently compiled to position-independent, reentrant, ROMable format. Microware developed a new ultra-fast 9-digit-accuracy floating point math system just for BASIC $\emptyset$ 9. And if that's still not fast enough, there's BYTE and INTEGER arithmetic.

Features that make programs easier to write

The compiler is integrated with a

full-feature string AND line-number oriented text editor. If you make a mistake, BASIC $\emptyset$ 9 tells you instantly. String-oriented commands such as search, change, change all occurrences, delete, and insert can be used on programs with or without line numbers. There's an automatic line renumbering function too.

Features that make programs easy to test

Debugging often takes longer than writing a program. That's why BASIC $\emptyset$ 9's integral high-level debugger sets it apart from all other compiled OR interpretive languages. The TRACE command shows you each statement executed in BASIC form, plus the result of any expression evaluation. STEP lets you run one or more statements at a time. LET and PRINT allow you to examine or change the values of variables, by name. STATE lists procedure calling order. And there are nine other debug commands. If you need to correct a program, you can edit, recompile, and rerun it in seconds.

Microware software is available for most popular 6809 computer systems.

Write or call for our free catalog. We accept phone orders and MasterCard and VISA orders.

OS-9 is a trademark of Microware. BASIC $\emptyset$ 9 is a trademark of Microware and Motorola.

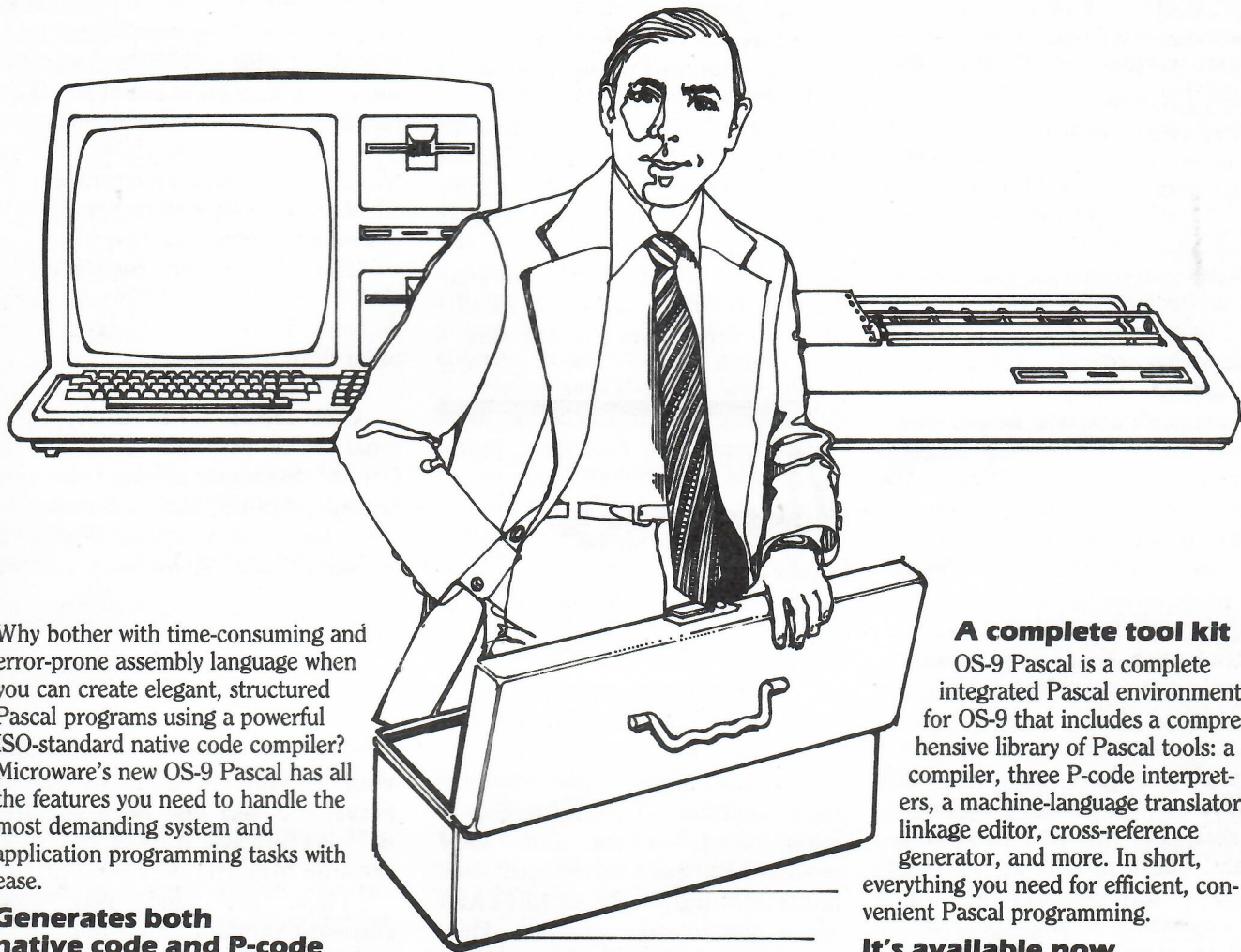


MICROWARE[®]

Microware Systems Corporation
5835 Grand Ave., Des Moines, IA 50312
(515) 279-8844 Telex 910-520-2535

OS-9 PASCAL™

A New Programming Tool For Experts



Why bother with time-consuming and error-prone assembly language when you can create elegant, structured Pascal programs using a powerful ISO-standard native code compiler? Microware's new OS-9 Pascal has all the features you need to handle the most demanding system and application programming tasks with ease.

Generates both native code and P-code

With OS-9 Pascal you don't have to make that difficult choice between easy-to-use P-code Pascal or fast native-code Pascal. You can compile your Pascal program to pure 6809 assembly language source code. OS-9 Pascal performs extensive local and global code optimization which results in incredibly fast and compact machine language programs. Or if you prefer, OS-9 Pascal can generate P-code for interpretive execution to simplify program debugging and testing. There's also a Virtual Memory P-code Interpreter that can run huge Pascal programs that other microcomputers can't touch. In fact, you can run programs using any combination of P-code, compiled machine language, or handwritten assembly language procedures.

ISO Standard Pascal Plus

OS-9 Pascal conforms to the ISO industry standard for Pascal, so you are assured of portability to or from any other computer that uses standard Pascal. OS-9 Pascal protects your software investment and gives you access to a vast body of existing Pascal software. Beyond the standard, we've added natural extensions to OS-9 Pascal to make it even more versatile, such as: relaxed identifier syntax; separate procedure compilation; random access file and interactive I/O; bitwise logical operators; run-time error handling; and much more. And because it runs under OS-9, it is inherently multiuser and multi-tasking.

A complete tool kit

OS-9 Pascal is a complete integrated Pascal environment for OS-9 that includes a comprehensive library of Pascal tools: a compiler, three P-code interpreters, a machine-language translator, linkage editor, cross-reference generator, and more. In short, everything you need for efficient, convenient Pascal programming.

It's available now

OS-9 Pascal is now available *off-the-shelf* in all OS-9 disk formats. It can be used on any disk-based 6809 computer running OS-9 Level One or Level Two. Each OS-9 Pascal package includes the compiler, machine language translator, P-code interpreters, run-time support packages, linkage editor, demonstration programs, and a comprehensive 120-page User's Manual.

Write or call for our free catalog. We accept phone orders and MasterCard and VISA orders.

OS-9 Pascal and OS-9 are trademarks of Microware.



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(Continued from page 5)

rmation about each device. Among other things this table contains, for each device, a byte indicating which bit(s) is the busy/ready bit and another byte indicating whether "ready" is a 1 or a 0.

Changing this latter byte may be all that is required to get your printer working.

Jim Howell
5472 Playa Del Rey
San Jose, CA 95123

Dear Jim,

I appreciate the letter, since I didn't answer all of your questions in the other article. I hope that this answer, along with the OS9 Exchange column will help.

Microware does not supply "instructions" for writing I/O drivers, and does not even supply source unless you purchase it. The one thing that you should remember, however, is that almost all of the existing software may be changed with the debug program to run the terminal, etc. to non-standard I/O addresses. The TMODE command is easily used to modify where the terminal resides and the protocol defaults. I'm sure that you will be able to perform these modifications once you have a copy that you can boot-up with. It may be that a standard system will have to be used to bring up the original version, and then make a modified "master" for you to use from then on.

As far as the file to automatically read commands from, this is already available and running with the "STARTUP" file. In fact, one disk I use boots up with BASIC09 as part of the "boot" and the modified modules along with it. At present, I don't use a particular application program often enough to boot directly into that, but it

surely is possible. The TMODE modifications or other module updates are possible to be loaded in with the STARTUP file or a new bootable disk may be made to include the newest modules as part of the boot.

We have received the source for the printer module to see if anything can be done to make the printer work, but so far, even with a lot of help from Microware we have not solved the printer hang-up. I can now make it print a line by pressing the feed button [which dumps the buffer], but it will not print by itself yet. We have come to the conclusion that the printer may need the modification, rather than the software.

Editor



New Products

30M BYTE 8-INCH WINCHESTER DRIVE

Smoke Signal Broadcasting, manufacturers of computer systems based on the 6800/6809 processors, has introduced the latest addition to the CHIEFTAIN Series of computer systems. Designated the CHIEFTAIN 98W30 - this newest addition to the higher end of Smoke Signal Broadcasting's business computer line houses a 30 Megabyte 8-inch Winchester Disk Drive.

The new systems, the CHIEFTAIN 98W30, is configured around the state-of-the-art 6809 microprocessor allowing programs to run at twice the speed of any other similar system. The excellent accuracy and speed of this 30 Megabyte drive, along with the DCB-4A Double Density Contro-

ller Board lends the CHIEFTAIN 98W30 a truly industry-standard title.

A wide range of programs are available for the CHIEFTAIN 98W30, including OS-9 Level I and Level II Multi-user, Multi-tasking Operating System. A standard CHIEFTAIN 98W30 incorporates 32K of RAM - expandable up to 1 Megabyte for specific requirements such as OS-9 Level II. The CHIEFTAIN 98W30 supports an 8-inch floppy disk drive for 1 Megabyte of back-up storage. A 20 Megabyte tape streamer option is also available.

The List Price for the CHIEFTAIN 98W30 is \$9995.00 and delivery is 30 to 45 days from order date.

CONTACT: Jim Allday, National Sales Manager or Deborah Conrad, Manager, Dealer Sales and Support, Smoke Signal Broadcasting, 31336 Via Colinas, Westlake Village, Ca. Telephone: (213) 889-9340.

SOFTWARE VENDOR DIRECTORY

The 5th Edition of the Software Vendor Directory by Micro-Serve, Inc. has just been published. As always it is a complete revision from the previous edition.

There are now over 1500 software vendors listed (Edition 4 had 1001). There are now 9000 software products listed (Edition 4 had 4000). There are 250 software categories listed (Edition 4 had 200). There are 110 hardware and operating system vendors indexed (Edition 4 had 80).

There are no game applications listed in the Directory. Product listings are limited to systems software, (operating systems, compilers, languages, data base managers, development tools, utilities, etc.) applications, (industry, business, professional, scientific, edu-

cational, etc.) plus catalogs books, and systems which support graphics, sound and plotters.

There are four sections to the Software Vendors Directory.

Edition 5 of the Software Vendor Directory is available at \$57.95 per copy or at \$100.00 for Edition 5 plus Editions 6 & 7 in March and October 1982 under the Subscription Service Plan.

Orders are accepted by telephone (914) 358-1340 or by writing to:

MICRO-SERVE, INC.
P.O. Box 482
NYACK, NEW YORK 10960

SING 'N STEREO

Speech Systems, manufacturer of the *Speak 'N Sing 1* and the *Speak 'N Sing 2* speech synthesizers, is proud to announce the *Sing 'N Stereo* music and sound effects synthesizer. Each channel features an 8 bit D/A converter, separate tone and volume controls, a low pass audio filter, and an on-board audio power amplifier that easily drives an external speaker.

Supplied software includes single and four voice music selections as well as several sound effects. Also included is a music compiler that allows one to easily develop single voice music. Available separately is a four voice stereo music compiler. The *Sing 'N Stereo* sound effects and music synthesizer is priced at \$69.95 and the ME-1 four voice stereo music compiler is available for \$39.95. All software is available in FLEX 2.0 or 9.0 formats and comes on 5¼ or 8 inch disks.

For further information call or write: Speech Systems, 38 W 255 Deerpath Road, Batavia, IL 60510, (312) 879-6880.

PRICES REDUCED

Harold Mauch, president of Percom Data Company, today announced major price reductions in the company's System-50 modules and devices.

Percom System-50 products are compatible with the SS-50 bus, a 50 pin bus supported by several manufacturers and used widely for 6800 and 6809 based personal computers.

Mauch said the new low prices are the result of decreasing chip prices and Percom's capacity for volume component purchases.

Mauch said the new low prices allow a person to get started in computing with an expandable, bus-oriented system for less than the cost of many one-board computers.

The SBC/9, a single-board computer/System-50 MPU card, now sells for \$139.95. The SBC/9 sold for \$199.95 before the new price announcement.

Percom's system-50 video display controllers, the *Electric Window* for black and white displays and the *Colorama-50* for color displays, have each been reduced \$80.00 to \$169.95 and \$139.95, respectively.

A Percom LFD mini-disk system, which includes four-drive controller, disk-operating system, the drive mechanism itself, inter-connecting cable and documentation, is now \$459.95, a reduction of \$140.00.

Prices of most other System-50 products, including memory cards, have also been substantially reduced.

Percom System-50 hardware, software and accessories may be ordered directly from Percom. The toll-free order number is 1-800-527-1222.

COMPUTERWARE'S PAC ATTACK

Computerware introduces its PAC ATTACK game on cassette for the Radio Shack Color Computer.

Computerware brings the fun of the arcades to your Color Computer with the new PAC ATTACK game. Three little muggers chase your man relentlessly around a maddening maze as you furiously try to build up points. This game's great graphics and sound effects offer continuous action at three levels of difficulty for computer buffs of all ages.

PAC ATTACK costs only \$24.95 plus \$2.00 SIH and is available directly from Computerware at Box 668, 1472 Encinitas Blvd., Encinitas, Ca. 92024, (714) - 436-3512.

COLOR COMPUTER BOARD

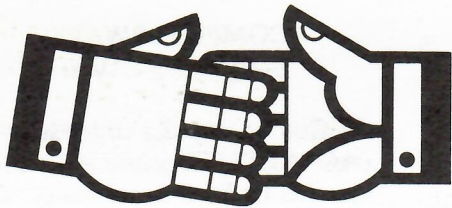
Computerware has introduced a new board that expands the memory of the Radio Shack Color Computer from 16K to 32K.

Computerware's 16 PLUS BOARD does not require soldering, plugs in easily, and fits neatly under the RF shield cover inside the computer. Complete installation instructions are included with the board.

Computerware's exclusive design allows the graphics display to reside anywhere within the 32K of memory. No software modifications are required for existing software and the 16 PLUS makes your Color Computer completely compatible with the anticipated disk systems.

The 16 PLUS BOARD costs only \$84.95 plus \$2.00 SIH and is available directly from Computerware at Box 668, 1472 Encinitas Blvd., Encinitas, CA 92024, phone (714) 436-3512.

[SS-50]



OS-9 EXCHANGE

By Ken Orme and Gary Manning

In a recent issue, we talked about BASIC09 and covered some of the features, timings and other phases. We will cover the random files this time, since most of the work that we have done has been with them.

BASIC09 has both sequential and random access files available. In order to use them, you must first CREATE a file. This BASIC allows you to create files with the word CREATE. The one thing that makes OS-9 slightly different from other BASIC's in the file department, is the use of a single file type that may be accessed either sequentially or at random. The files are expanded automatically by the PRINT, WRITE or PUT statements.

As with almost all other file handlers, you must OPEN an OS-9 file before you read or write from it. There are essentially three access modes to choose from; READ, WRITE, or UPDATE. Since the first two are self-explained, the last one means that it may be used to either READ or WRITE.

Since we are talking mostly about the random-access features of BASIC09, about all we need to remind you of with the sequential portion of the system is that it is about the same as all other sequential systems as far as access and handling are concerned.

However, data is stored in

sequential files in ASCII form with a carriage return as the record delimiter after each WRITE command. Data is retrieved from a sequential file by the READ command which returns a variable length record from the current file pointer to the next carriage return. The SEEK command is used to change the value of the file pointer and is usually only used with sequential files to perform the equivalent of a "rewind" (SEEK#path, 0). Since data in sequential files is stored in ASCII, it tends to be large and transfer is more slowly than in random files which use binary representation.

Data can be stored in random files as structures, elements of structures, or bytes. Since computing the size of complex data structures can be very error-prone, a function called SIZE can be used which returns the size of any structure, array or variable. SIZE can be used in conjunction with SEEK to locate a specific record. SEEK#path,(N-1) ☆ SIZE(names) would set the file pointer to the Nth record of a file called "Names". Data is written to a random file with the PUT statement and read by the GET statement. Since I/O devices are treated as files, files on magnetic media may be printed or displayed and updated via file transfers to or from the appropriate I/O device. Another nice feature is that as long

as there is available RAM, open files (or at least as much as will fit) will be kept in RAM until they are closed. This helps to avoid the mechanical wear and time delays of having to access the disk or tape for each read or write to a file.

The user's guide gives fairly good examples of the syntax and how to use the files. As with most manuals, this area leaves a little bit to be desired, however. The access to a random file is very fast as we have seen on program reading random files and displaying them at about 6 per second. Staying away from the "linked list" form of random access speeds things up and is very reliable.

OS9 VERIFY REPORT

Last issue I mentioned that the verify utility in version 1.1 may not be functioning properly. As it turns out, it was my thinking that was not functioning properly. I tried to use the verify the same way as version 1.0. However, the main difference is that verify assumes the standard input (terminal) and the standard output (terminal) unless modified. In order to verify a file named TEST and have it output to a file called TEST1, the following command should be entered: VERIFY TEST TEST1 U. The "U" tells verify to automatically update the file

CRC and header before writing the new file. Since the last article, we have used VERIFY many, many times and had it function properly. One of the things that had us thinking it wasn't working is in version 1.0 you could verify a module in memory. With version 1.1 you must have the module saved first. The way to update or modify a module is to use Debug to modify it, save the module on disk, then use verify to update the program. You will most likely have to use the ATTR (attribute) command to change the file so you can execute it. Also, in order to insure that the newest version of a module is used is to change the version number (byte \$07) to a higher one. Then once the latest version is loaded into memory, it will be the one that will run, rather than the older version.

Interactive Debugger

Without the Debugger, those of you who desire to change or modify programs will feel as though you are handicapped. The Debugger is worth purchasing for anyone who works with OS9 more than casually. In a nutshell, it may be used for memory access, testing machine language programs, verifying memory and other such memory access tasks. It becomes for OS9 what a monitor program does for other disk operating systems.

One nice feature of OS9 is that the programs have prompts that let you know which one you are in. The Debugger is no exception, using "DB:" as the prompt. As with other programs, you may use upper or lower case characters. One of the most powerful features is the ability to interpret expressions. Most expressions may be written similar to those used in BASIC, with a few special operators and operands unique to the Debugger.

The operators available include addition, subtraction, multiplication, division, logical AND, logical OR, negate, and logical NOT. There are some special names for registers: Accumulator A, Accumulator B, Double Accumulator, X Register, Y Register, U Register, Direct Page Register, Stack Pointer, Program Counter, and the Condition Codes Register. Also used and a necessary part of the Debugger is "Dot", represented by ".". Dot is simply the debugger's current working address in memory. Typing "." will cause the current value of dot and the contents of that address to be displayed. Typing just a return increments Dot and prints its new value. To decrement dot, simply type a minus sign and a return, which decrements dot one step at a time. To change dot, you need only to type a period followed by an expression which is the new value of dot. To change the value in the memory location of dot, simply type an equals sign followed by an expression. The expression is evaluated and then the value of the expression is stored in dot. Also, if dot is changed, the last value of dot is saved and may be displayed by typing two periods.

The calculator mode may be entered by typing a space, followed by the expression to be calculated. In this mode, you may look at memory without changing dot, simulate 6809 indexed or indexed-indirect instructions. Conversion from decimal to hexadecimal, binary to hexadecimal and back may also be performed.

The register command allows you to examine one or all registers and change the register contents.

The breakpoint command allows you to set breakpoint addresses or to kill them.

Most programmers enjoy commands to display blocks of memory so that the program or

module may be displayed on the terminal or printer. Debug allows this function much like a monitor program. That is, by typing M followed by the starting and the ending addresses, the memory is displayed on screen with the hexadecimal values first and then the ASCII equivalent to the right. Two other commands are also quite useful. The search memory feature allows you to look for a one or two-byte value, beginning at your current (dot) location to the ending address specified. The third command performs a "walking bit" memory test between the addresses you specify. Any bit failing the test will be displayed.

There are several OS9 related commands available with the L or LINK command being the nicest one. With it, you are able to link to the module you specify in the command line. This saves a lot of time trying to find the module by simply advancing "dot" through memory. The dollar sign tells the Debugger to pass the rest of the command line to the shell, allowing such things as directory listing and utility programs to be run, returning to the debugger afterward. Also, by typing a \$ and then a return, you go back to the shell until an escape is entered, which then returns you to the debug program.

The execute command allows you to combine the debugger with a program, and even allows program execution by typing a "G".

Overall, there is little that the Debugger lacks in capability. About the only thing I really miss is a disassembler. It could be part of the Debugger or a separate module, but would be a nice addition. If you purchase OS9, you will surely want and need the Debug program.

[SS-50]

WHERE HAVE ALL THE COMPUTER KITS GONE?

by Harold Mauch

I like to visit computer stores and listen to the questions of customers.

Some ask about a common fruit; others ask about the health of a deceased gentleman from Fort Worth.

A few ask for a computer they can build themselves.

"I'm sorry," they're told, "but we don't carry kits any more. Too much hassle."

"If you like to experiment, we have a gee-whiz dandy Chroma Dazzler that can speak 16 languages, maintain 32,768 recipes, schedule 65,536 appointments and balance your checkbook.

And you don't even have to know how to program. We're offering this little gem today for just \$1,999.99, and that includes disk storage."

Just \$1,999.99?

Many a computerist bought a SWTP or other SS-50

computer because of the processor. Or because they enjoy building kits. But I suspect more than a few bought kits because it was the one way they could afford to own a computer. No doubt there's a substantial market for computer kits. So why aren't there more computer kit manufacturers?

I think I know the answer.

The fine efforts of SWTP notwithstanding, much System-50 hardware and software came out of the spare bedrooms, garages and basements of fledgling, but determined entrepreneurs.

Let's suppose you want to become just such an entrepreneur, and in the process maybe we'll find the answer to the question about the scarcity of kit vendors.

You decide to get into the computer kit business. Why kits? Well, you can't afford to start up an assembly operation. Besides, you honestly want to give prospective customers the lowest price possible. A

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GENERAL INTEREST

Double-Density Adapter for System-50

Many people have asked if our double-density adapter, which we developed for the TRS-80☆ computer, could be used with the SS-50 bus disk controller. Unfortunately, it is *not* a simple plug-in-and-run situation for either the Percom or SWTP controller. However, the Doubler, as the Percom TRS-80☆ double-density adapter is called, can be easily connected to the older Smoke Signal controller. Dale French, one of our System-50 technical specialists, is working out the details for connecting the DOUBLER™ modifications along with the OS-9 driver in the next issue of the Peripheral.

price 15% above cost seems reasonable.

Design through hardware prototyping is easy. After all, you are a senior designer -- at TI no less. You do a little fine-tuning of the design and get prototypes made. Now the fun begins.

A small ad in Byte and a small stock of kit parts wipes out most of the family savings. You confidently reassure your wife, however, and together you wait for the orders to roll in.

Meanwhile, you hawk a few kits to members of the local computer club. And spend the next several weeks solving their individual problems -- cold solder joints, wrong capacitor polarities and owner design "Improvements" that don't work.

Finally your ad appears in Byte. You soar like an eagle. (Hon, we're gonna be rich!)

You resist the urge to buy up all the new Byte magazines at the local computer store, limiting yourself to a mere 10 copies. Of course mother back in Toledo gets one. (Look Ma, I've got my own business!)

The Byte ad makes you an instant expert, so naturally you're invited to give a demo at the next computer club meeting. Is this the beginning of fame?

By now the ad has been out a week. You've had a few callers (keep that damn dog quiet while I'm on the phone!), and a few people have written for more information. (More information? Good grief, the ad copy took two days to write and gives everything but the length of the heat sink bolts.)

Never mind. You take the Byte ad, and with the help of your wife's thesaurus, grind out a data sheet. You include specifications for the heat sink fastener.

Before long the postman is delivering your bills in a basket: an invoice for the data sheet printing, a Byte invoice for the next ad insertion, a phone bill that infuriates your wife (Hon, call the phone company, I know I didn't make *that* many long-distance phone calls.), and so on.

Your boss at TI is beginning to make snide remarks about the lagging status of your work project. But these are trifles compared to the next bomb?: a design flaw in the kit! (Oh, my God! How can I face the computer club again.)

You design out the flaw but can't ship because the new IC for the fix isn't available. The complaints begin. "Wherein hell's my kit -- you promised it four weeks ago."

One irate customer wants his money back. Another demands to know why the users manual doesn't explain how to use the product with his home brew 4004 machine. Both promise scathing letters to Byte, the Better Business Bureau and their congressmen. (God, my gut aches.)

The new ICs finally arrive. Your wife calls you at work to tell you the UPS driver won't take a personal check. (Cashier's check or money order, please.)

You tell the boss that son #2 seems to be having an attack of appendicitis, and must be rushed to the hospital. Then you rush to the bank, withdraw \$475 from the wife's Christmas Club account and race to the house. Wife suspects, but you jump back in the car before the questions start. Back at work you tell the boss it was a false alarm, "The little nipper just ate too many fresh cherries, heh, heh."

More than a few long-distance callers, saying they weren't about to buy a pig-in-a-poke, want to know the whereabouts of dealers in their area. So you decide to line up dealers.

The first dealer doesn't have the courtesy to say goodbye when you suggest a dealer cost of 5% off retail. Neither does the second dealer, the third, etc. You soon learn that retailers expect--indeed need-- a 35% mark up. Or thereabouts.

You call an old college friend, one who switched from engineering to a business major, and plead your case. After he stops laughing (why did I tell him we price at 15% above costs), and after discussing cash flow and return on investment, he offers to help -- for a piece of the action. (Maybe these business majors are really the smart ones after all?)

At any rate you raise the price and start calling dealers again. Now the price is OK, but the dealers won't carry kits: too much hassle. (No fools, these dealers.) So willy-nilly, you get into the business of assembling electronic modules. You start slow. Boy, do you start slow -- one employee, an ex-TI assembler needing part time work, a soldering iron and flux, a solder sucker and a few hand tools. The lady assembler is competent: her only question concerns getting paid. Nothing serious.

In the unlikely event (as you tell yourself) that you can't "meet payroll," you decide to seek a bank loan. Bankers make unsecured loans about as often as smog-free days occur in Los Angeles, so you pledge your car, the house, a quart of blood and a pound of flesh--but get the loan.

You meet the payroll, i.e., you pay the lady assembler. She smiles, looks at the check, frowns, shrugs and disappears forever. You're out of the assembly business.

It's time, you decide, to sit down and take a real hard look at the business. You call a buddy, a fellow industrialist of kindred interests, and together do a (sound of bugles, roll of drums) COST ANALYSIS. All things considered -- parts bagging errors, solder bridges, troubleshooting over the telephone and letters, letters -- you conclude that...

Kits cost more!

And that, weary reader, is the bottom line. It costs more to produce, market and support kits (with the

emphasis on support) than it costs to produce and sell assembled and tested units.

It is enlightening, in this respect, to compare the price of a Heathkit color TV kit to the price of a comparable RCA, Magnavox or Quasar set. There's little difference. Yet, the customer will always insist that kits be priced substantially lower.

Unfortunately -- for those of us who would rather build a kit -- few kit suppliers become very successful. And it appears that we will be getting those few kits that are available from a UPS delivery man, after placing a long-distance call that's answered from a phone in a bedroom or garage.

OF INTEREST -- Harold Mauch, president of Percom Data Company, recently announced that Percom and Access Unlimited, a computer retailer, have agreed to join in a cooperative venture which will make Access Unlimited a retailer of Percom System-50 (SS-50) products.

Access Unlimited is a Richardson, Texas-based mail-order and direct sales retailer of computer equipment, software and parts.

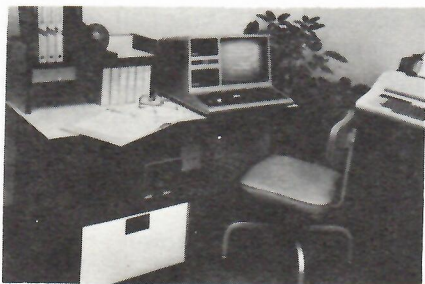
Manufacturers and software vendors other than Percom also will be contacted.

The program calls for Access to become one of the largest, if not the largest, integrated, full-line source of 680X products for the sophisticated System-50 market place.

Interested suppliers can reach Access Unlimited at:
401 N. Central Expressway #600
Richardson, Texas 75080
(214) 690-0206

NEW PRODUCTS

Although this section usually features new System-50 hardware and software products, in this issue we would like to mention two computing "Accessory" items that we have carried for only a short time but which are proving to be very popular.



System Desk, Printer Stand --Custom-designed to Percom specifications, this system of low-cost computer

furniture organizes your computer station into a compact, convenient arrangement of accessories and peripherals.

☆ Furniture quality styling and finish.

☆ Modular design lets you customize to particular needs.

☆ Units knock down for shipment -- delivery is right to your door.

☆ Snap-locking fasteners -- no tools required for reassembly.

System Desk

The under-desk module accommodates either one or two drawers, and can be located either to the right or to the left. The drawers, which are on ball-bearing rollers, have a full-width opening in the rear for equipment cabling.

The riser shelf can be used to support a display unit, hold reference manuals, etc. The riser also can be positioned either to the left or to the right.

Printer Stand

The under-desk module plays a dual role, serving either as the desk bay or, with an optional top added, as a printer stand. With the top in place, the printer stand and desk are the same height.

Specifications --The desk is 48" wide, 24" deep and 26-1/2" high (typing height). The riser is 23" wide and 11" deep. The riser shelf can be at 7-1/2" or 11" above the desk top. The desk bay inside dimensions are 16" wide by 16" deep by 10 1/2" clearance height. The printer stand (under-desk module with top in place) is 24" wide by 24" deep by 26-1/2" high. Finish is wood and durable plastic laminate.

To order or for additional literature, call toll-free 1-800-527-1222.



Microline 80 Printer

No other serial dot-matrix printer has so many features for the price:

- ☆ Prints upper and lower case characters in standard-condensed- and double-width faces.
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- ☆ Handles cut sheets, roll paper and fan-fold pin-feed stock. Optional snap-on tractors are available for other forms.
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☆ The Microline 80 is rugged (cast aluminum base), lightweight, quiet and dependable. And **inexpensive**.

To order or for additional literature, call toll-free 1-800-527-1222.

Editors Note-

A supplement to the Peripheral is available from Percom Data Company. The supplement includes more specific information - - for example, additional notes on product improvement and maintenance. This supplement may be obtained from Percom by calling our toll-free order number, 1-800-527-1222. From within Texas, call (214) 340-7081.

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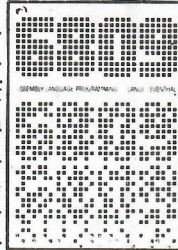
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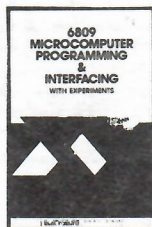
6809 Assembly Language Programming

This book presents a thorough introduction to assembly language programming and a complete discussion of the 6809 instruction set. It starts at a very basic level and builds into actual programming techniques, I/O structures, and hardware interfaces. By Lance Leventhal. 530 pages. Order No. 357 \$16.99



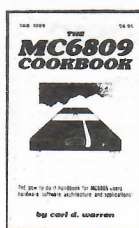
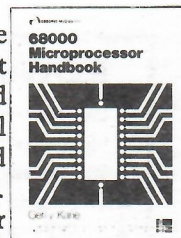
6809 Microcomputer Programming and Interfacing/Experiments

This book is written to give sound information on how to program and interface the 6809-the high performance 8-bit microprocessor. It contains seven chapters and four appendices and is valuable as a "cookbook" aid when working with the 6809. By Andrew Staugaard, Jr. - 304 pages - Order No. 21798 \$13.95



68000 Microprocessor Handbook

This handbook gives a complete comprehensive picture of the 16 bit 68000 microprocessor, its timing, and special features. Also, several practical application problems and discussed and it is compared to other 16 bit devices. By Adam Osborne - 220 pages. Order No. 411 \$6.99



MC6809 Cookbook

This cookbook explains the basic operation of the 6809 and the 6809E microprocessors. Everything from the timing and clock information to the instruction set are covered. By Carl D. Warren - Order No. 1209 \$6.95

Orders should include title and order no., along with check, m.o., or VISA -Master Card info. - Mail to: SS-50 Computing Bookstore, P.O. Box 398, Garland, UT 84312. Include \$1.50 per book for shipping and handling. Please allow for personal checks to clear. Sorry, no COD's. Foreign orders should include \$7.00 per book shipping.

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This version is designed for "tty" printers but is otherwise identical to version two. It does not support specialty characteristics such as superscript, subscript, incremental printing, and proportional printing.

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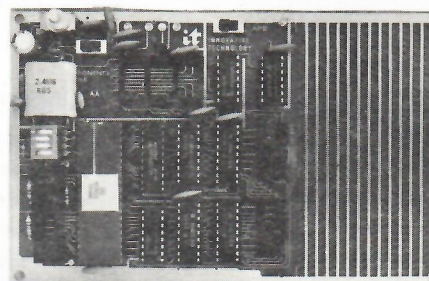
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6809

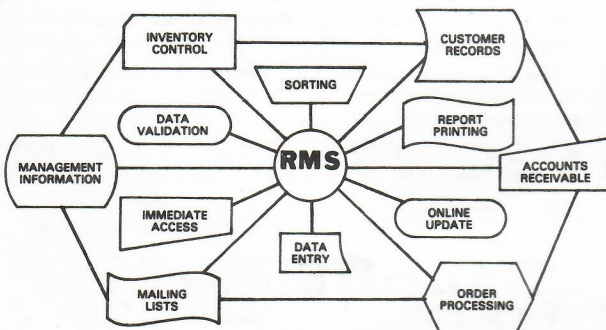
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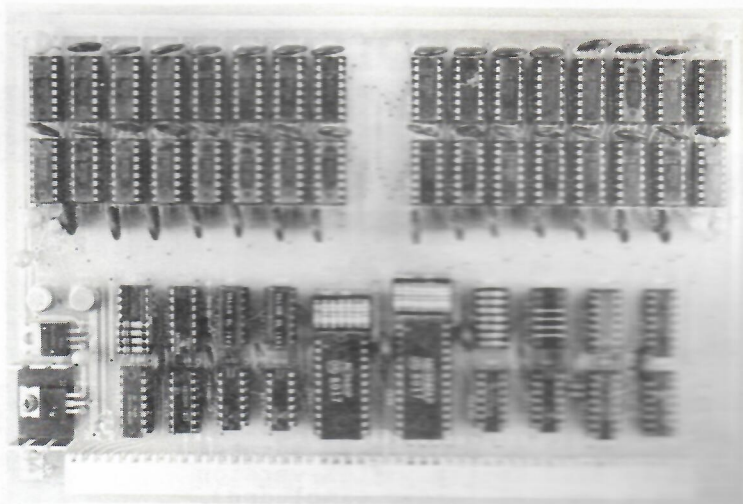
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C COMPILER FOR 6809

Based on SMALL-C as published in Dr. Dobbs by Ron Cain. Transported to DOS69D by Allan Batteiger, adapted to FLEX by Bill Knight. FLEX version requires a special loader (included). Current plans are to produce a full C in three steps: Ver. 1.0 available now; ver. 2.0 - 2nd Q/82; ver. 3.0 - 4th Q/82. Prices to be announced. Liberal upgrade policy. User's guide, binary for compiler, and source for run-time library. 48K system recommended.

For FLEX 9.0 (with loader) \$52.50
For DOS69D \$47.50

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RLOAD for FLEX 9.0 \$17.50

FIG-FORTH FOR FLEX 9.0

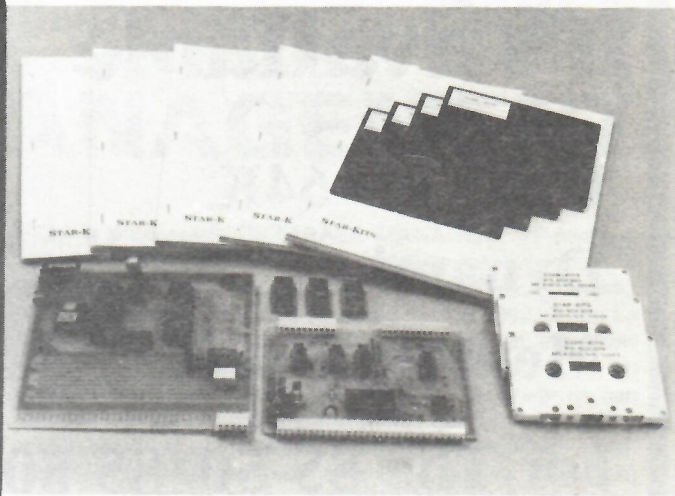
FIG does not supply machine-readable source to their otherwise excellent package. Two disks - (1) Source in FLEX format, (2) FORTH editor published in Forth Dimensions, ('screen' disk). Supplied without comments, except for a few minor bug fixes. Intended to supplement, not replace, the FIG-supplied documentation. Saves about 10 hours of typing. SSB version to be announced.

FORTH for FLEX 9.0 (2 disks) \$19.50

These programs normally supplied on 5" disk. For 8", add \$2.00 per disk. Prices good until February '82. Shipping and handling included. Texas residents: add \$0.25 sales tax per 5" disk, \$0.35 per 8" disk. Specify operating system and disk size. Visa and MasterCard prices 5% higher. Allow 4 weeks for check. Please do not send cash through the mail.

DOS69D is a trademark of Smoke Signal Broadcasting. FLEX is a trademark of Technical Systems Consultants. FIG stands for the FORTH Interest Group.

STAR-KITS



6800 HARDWARE

SBC-02 single board computer uses 6802 with RAM, ROM, I/O. Ideal controller, intelligent interface, and more. Printed circuit board is \$25, complete controller kit \$75, wired and tested \$150. Also available: HUMBUG (see below), Basic in ROM, etc.

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6800 AND 6809 SOFTWARE

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6800 CROSS-ASSEMBLER written in Basic. Assemble 6800/6802 programs on your new 6809 (or your 370 at work!). Available on 5" disk, KC cassette, or TRS-80 Level II cassette for \$9.95.

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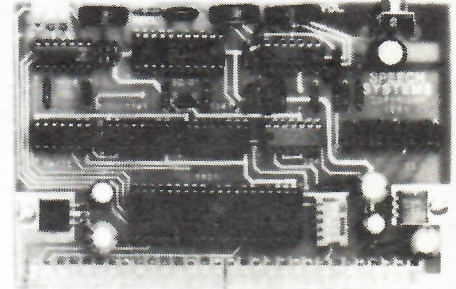
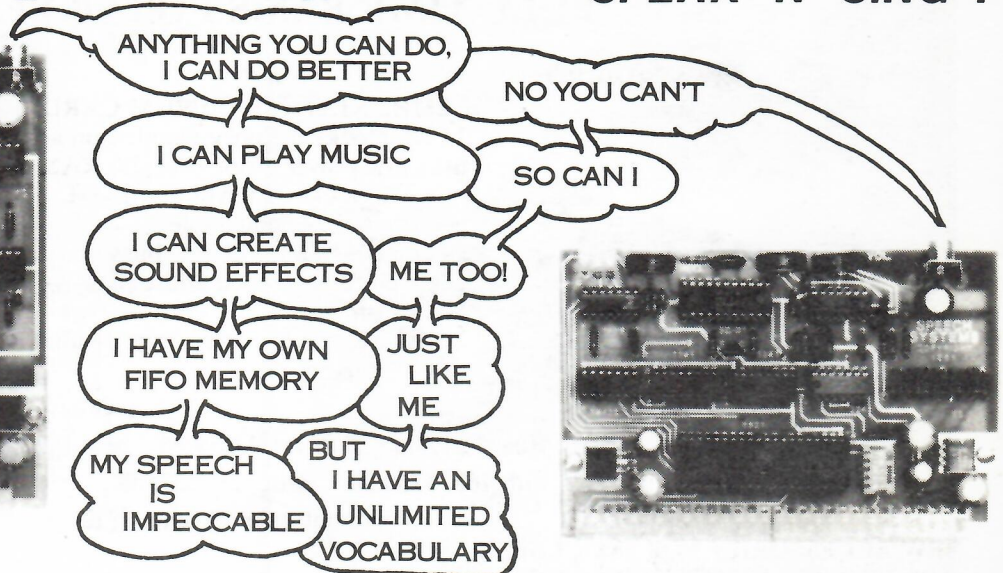
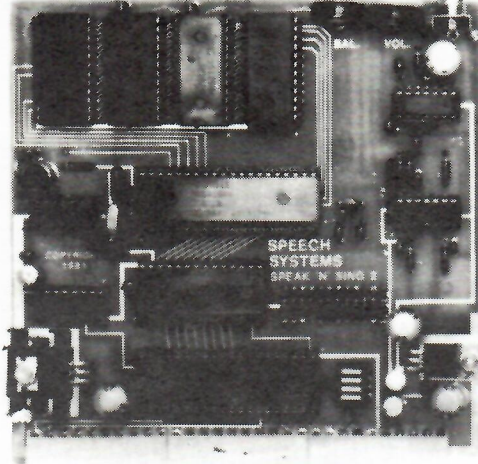
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The SPEAK 'N' SING 1 uses a special large scale integrated circuit, the SC-01 by VOTRAX, to reproduce any one of 64 phonemes at 4 inflections. These phonemes allow one to reproduce any word in English as well as many other languages. Typically only 5 or 6 phonemes are needed for each word. Supplied software includes a powerful speech editor with a preprogrammed 800+ word vocabulary.

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THREE	SIXTEEN	THOUSAND	40MS WAIT	ERROR	IN	MILE	PLEASE	SPEED	C	P
FOUR	SEVENTEEN	MILLION	80MS WAIT	FEET	INCHES	MILLI	PLUS	STAR	D	Q
FIVE	EIGHTEEN	ZERO	160MS WAIT	FLOW	IS	MINUS	POINT	START	E	R
SIX	NINETEEN	AGAIN	320MS WAIT	FUEL	IT	MINUTE	POUND	STOP	F	S
SEVEN	TWENTY	AMPERE	CENTI	GALLON	KILO	NEAR	PULSES	THAN	G	T
EIGHT	THIRTY	AND	CHECK	GO	LEFT	NUMBER	RATE	THE	H	U
NINE	FORTY	AT	COMMA	GRAM	LESS	OF	RE	TIME	I	V
TEN	FIFTY	CANCEL	CONTROL	GREAT	LESSER	OFF	READY	TRY	J	W
ELEVEN	SIXTY	CASE	DANGER	GREATER	LIMIT	ON	RIGHT	UP	K	X
TWELVE	SEVENTY	CENT	DEGREE	HAVE	LOW	OUT	SS	VOLT	L	Y
THIRTEEN	EIGHTY	400Hz	DOLLAR	HIGH	LOWER	OVER	SECOND	WEIGHT	M	Z

Write for information on additional word sets.

THE GOOD NEWS

SS-2 SPEAK 'N' SING 2 assembled, tested, manual, disk.	\$239.95	SS-1 SPEAK 'N' SING 1 assembled, tested, manual, disk.	\$219.95
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SF-22 More software (Games, Sound Effects, Music)	\$29.95	SF-2 More Software (Games, Sound Effects, Music)	\$29.95

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Adds a symbol cross reference assembly option to the Percom assembler (base & DIXIE-modified versions). Source code supplied on disk. Manual.

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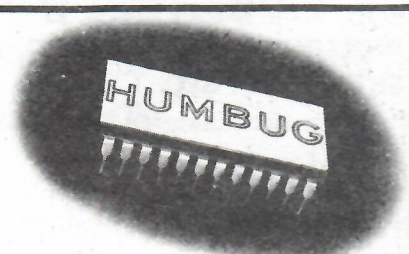
HUMBUG provides full I/O control from the keyboard. Turn a printer port on and off; enable a user-written port; pause when the screen is full; even turn off your main terminal output and let the program run without being slowed down by output. A printer spooling feature provides a 1K RAM buffer for your printer, and overlaps printing with processing for greater speed. But there is more.

HUMBUG can support your video board. That and a keyboard can replace an expensive terminal, and provide greater speed and versatility as well. Allows simple cursor control, cursor read, and screen read too. But there is more.

HUMBUG is available for 6800, 6802, and 6809 CPU boards made by SWTP, Gimix, Percom, and Star-Kits. It supports a serial terminal, or video boards made by Percom, Thomas, or F&D. It comes in either 2708 or 2716 EPROMs, and in either 2K, 3K or 4K versions, at prices ranging from \$40 to \$75 which include a full manual and full source code. There are several versions, depending on your hardware configuration, and it's a good idea to get our catalog and HUMBUG spec sheet first. If you want it real fast, call us up any evening with a 300-baud modem and LIST HUMBUG.DAT on our computerized bulletin board. While you're at it, feel free to leave a message for other 68xx users on the system or even place an order.

STAR-KITS

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6809 Relocating Recursive Macro Assembler & Loader/Linker with text editor

- Runs on 6809 system (in as little as 32k)
- Interactive or non-interactive (batch) mode
- Supports relocatable and absolute code
- Can assembler 6800 & 6801 source and generate 6809 object
- CROSS ASSEMBLER MODE—can assemble 6800 & 6801 source and generate 6800 & 6801 object
- 8 character global and local labels
- 76 English error messages
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- Program sectioning (ASECT, CSECT, or PSECT)
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Powerful Macro Capabilities

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MASM 6809 ----- \$ 250.00

User's Manual Only (about 200 pages—refundable)—
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A version of the above assembler which generates ABSOLUTE code is also available

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The above software is available on 5 or 8 inch FLEX* disks, prices include one year maintenance (single CPU). Even if you already own an assembler you should seriously consider ordering these powerful tools.

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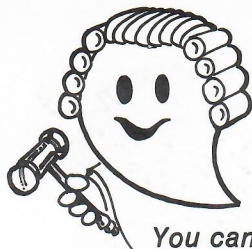
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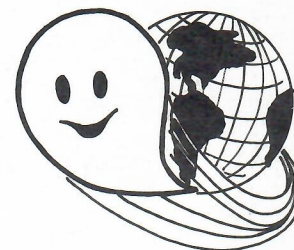
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