

July/Aug 1981

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SS-50 Computing

for 6800 and 6809 users



- RMS Review
- BASIC09
- UPICKEM Game
- DIXIE Review



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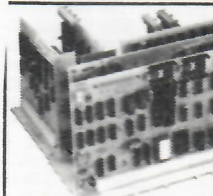
Eleven display format color graphics, 2-color alphanumeric.

Moreover, two- and between primary and ware control or from the

Full graphic resolution to 256 x 192 picture elements

Instant display control mapped; your MPU has and display control reg

Low-cost Modulator (COLORAMA-50™) provides RF modulator such as F using a color TV.

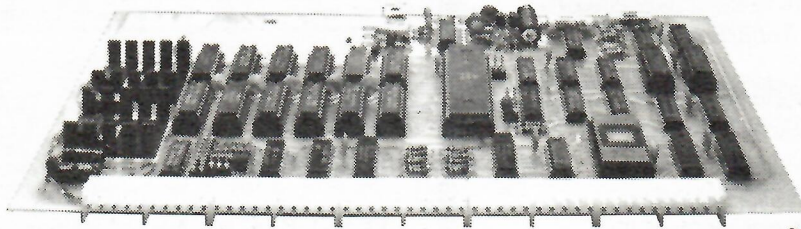


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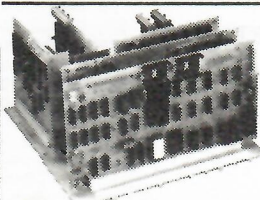
Eleven display formats including 8-color semigraphics, 4-color graphics, 2-color high density graphics and 2-color alphanumerics.

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System Requirements

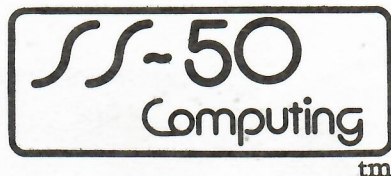
The COLORAMA-50™ is pin- and outline-compatible with the Percom System-50™ bus, the SS-50A (SS-50) bus and the SS-50C bus. The composite video-sync signal output will directly drive a color (or BW) video monitor. The output may be modulated for operation with a standard (NTSC) TV set. A modulator is 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.

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COVER PHOTO - The new Chieftain 9822 Computer from Smoke Signal Broadcasting. Photo courtesy SSB.

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Why

The Products. Since 1977, we've developing and manufacturing — and associated products — the 6800 and 6809, and the SS-50/SS-50C Bus.

Our **CHIEFTAIN** Series covers a range over a broad span of fulfill any capacity need. The is a 5¼-inch dual drive/dual density system with 32K RAM (expandable at only \$3495.00).

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Prices. SSB does not sacrifice of computers are not expensive computers you can buy!

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CHIEFTAIN 522	
CHIEFTAIN 9622	
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M-16-X (16K RAM)	
M-24-X (24K RAM)	
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MICROPRODUCT BULLETIN

Why SSB?

Let's face it, some of you just don't know who Smoke Signal Broadcasting is and what we provide for the 6800, 6809 and SS-50 user. This bulletin will be the first in a monthly series appearing in this magazine, and for starters we'd like for you to get familiar with us.

The Products. Since 1977, we've been designing, developing and manufacturing microcomputers — and associated products — based on Motorola's 6800 and 6809, and configured to the SS-50/SS-50C Bus.

Our **CHIEFTAIN** Series of microcomputers range over a broad span of configurations to fulfill any capacity need. The **CHIEFTAIN 522** is a 5¼-inch dual drive/dual density 6800-based system with 32K RAM (expandable). It's priced at only \$3495.00.

The 9624 is a dual 5¼-inch octodensity 6809-based system with 1.5 Mbytes of disk storage, priced at only \$4025.00.

A **CHIEFTAIN 9622** is the dual 8-inch double-sided dual density computer system, taking full advantage of the 6809, priced at a mere \$4675.00. Eight-inch Winchester computer

systems are also available in either 10 Mbyte (98W10) or 30 Mbyte (98W30) storage configurations.

The Hardware. All of our boards and complete systems are **Madurancs Certified** to completely assure you of the latest in industry-standard and state-of-the-art technology. Our DCB-4 Double Density Controller Board (\$449.00) became the Standard Controller Board for the 6800 and 6809, handling up to four 5¼-inch and four 8-inch drives simultaneously. Smoke Signal provides the most innovative solutions for the 6800/6809 SS-50 Bus structure that money can buy.

The Software. Five operating systems (including FLEX and OS-9 Multi-User) are running on

the **CHIEFTAIN** Series with NO configuration problems. SSB DOS68D and DOS69D (each \$75.00) were developed in-house and have become leading standard operating systems.

Smoke Signal provides Business Application Software to fulfill all vertical needs of the businessperson who is automating.

Our systems software, in conjunction with our DOS, will accomplish any task from text editing and processing up to our Super MACRO-ASSEMBLER that will produce code for every Motorola 6800/6809 family of processors available.

OS-9 Level One and Level Two are the new multi-user and multi-tasking operating systems that will make the 6809 reach the highest potential. COBOL, FORTRAN, Random File BASIC, Pascal, FORTH, and SDRASIC (compiler) are all available for the **CHIEFTAIN**.

Convince Yourself:

Prices. SSB does not sacrifice quality for low cost. The **CHIEFTAIN** Series of computers are not expensive, yet are the absolute best 6800 or 6809 computers you can buy!

SOME OF OUR PRODUCTS:

CHIEFTAIN 522	\$3495.00
CHIEFTAIN 9622	3625.00
CHIEFTAIN 9624	4025.00
CHIEFTAIN 822	4575.00
CHIEFTAIN 9622	4675.00
CHIEFTAIN 98W10	8995.00
CHIEFTAIN 98W30	9995.00
M-16-X (16K RAM)	299.00
M-24-X (24K RAM)	439.00
M-32-X (32K RAM)	539.00
DCB-4 (includes DOS)	449.00
VDB-1 Video Board	395.00
LMB-1 Motherboard	229.00
SSB DOS (68D or 69D)	75.00

All CHIEFTAINS come standard with 32K of RAM; Two Serial I/O Ports; SSB DOS68D or 69D; two disk drives; 6800 or 6809 CPU; a DCB-4; cables; power supply and LMB-1 Motherboard. All connectors are gold-plated. You receive complete and accurate manuals with every product.

Smoke Signal Broadcasting provides support. We will stand behind every product that goes out the door, and you can hold us to that. We realize that this is a time when other manufacturers are playing number games, and forgetting quality for the sake of quantity. Ask any SSB user about our factory support. If that doesn't convince you, **nothing** will!

Why Smoke Signal Broadcasting? Because we're the best. We produce state-of-the-art 6800 and 6809 products for the SS-50 Bus that are not headaches ... that will not require carrying a screwdriver around ... and that are efficient, fast, productive and reliable computers.

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Challenge~
Convince
Yourself

☐ Please send more information about the **CHIEFTAIN** Series, and associated products.

☐ I'm almost convinced. Please send specific information on (model number) _____

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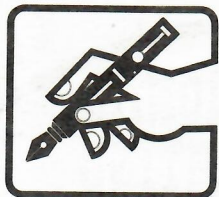
Name _____

Company _____

Address _____

City _____ State _____ Zip _____

☐ I'm convinced. Please have a salesperson call:
Phone (_____) _____



EDITORIAL

by Ken Orme

SURVEY STATISTICS

We have been asked many times about the breakdown of statistics gathered from the subscription form. With a good sample in, we can at least tell you what was put on the cards. These statistics may not agree with some of the others, but we do get a good cross-section of people.

As with any survey, there may be portions that are not as accurate as we would like, simply because those filling out the cards either filled in only part of the information, or some of the information changed soon after. Also, some of the readers have several systems and there generally is room for only one.

Anyway, here are the values. Most are rounded-off rather than having a lot of trailing numbers take up the space.

MAINFRAMES

Mainframe Computer Systems:

Southwest Technical Products comes in first with about 75 percent. Smoke Signal Broadcasting comes in second with about 11 percent. Gimix mainframes run third with about 8 percent. Midwest Scientific is fourth with about 6 percent.

This is without the "all in one" type computers. There are about 5 percent TRS-80C (6809) owners and 1.5 percent who own tano. When these figures are included with the mainframe statistics, the mainframe percentages should be reduced slightly.

SINGLE-BOARDS

There are some statistics that don't show up easily in this section. Not very many indicated if an "add-on" CPU board was used, such as the PERCOM SBC/9 and the SWTPC 6809 CPU board. Also, there are a few of the readers that own a single-board computer without a mainframe or housing. The best information we have is that about 20 percent of the upgrade (from 6800 to 6809 CPU) were from the add-on boards. I'm sure things will swing more this way as time goes on.

The 6800 vs 6809 microprocessor battle favors the 6800 with about 60 percent with that CPU and 40 percent with the 6809.

DISK SYSTEMS

There are more disk system owners out there than tape system owners, by a margin of 81 percent to 19 percent. Out of the tape systems, JPC leads with about 50 percent of the systems.

SWTPC is next with 30 percent, and the remainder is made up of Exatron Stringy Floppy, PERCOM, and homebrew systems, all quite evenly divided.

Out of the disk operating systems, FLEX from Technical Systems Consultants leads with 54 percent. The second most popular DOS is from PERCOM with about 20 percent.

Third is Smoke Signal with 16 percent. OS-9 from Microware comes in with about 5 percent. MSI has about 4 percent, and TSC's UniFLEX shows up with about 1 percent. Before jumping up and down, remember that these numbers are not broken down between 6800 and 6809 DOS. Therefore, OS-9 and UniFLEX are at a disadvantage, since they are 6809 only.

TERMINALS

There are really too many different brands and models of printers and modems to comment, but in the

terminal category Zenith Z-19) wins out with about 13 percent. Next comes the Zenith Z-19) with the numbers. (most of them made about 13 percent was next with CT-82 comes in. The rest included Televideo, DEC

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If for no statistics will help your fellow reader you may get a trends. As an example numbers of 6809 greater than a year because (generally aren't too many offered today. With a computer, I need someone that is someone who have the is worth it when

Other indications people are buying machines than buying kits being offered experimentation to software and I

From the numbers have sold, it appears are determined to language.

Well, I hope something here more understand gather the information card. When renew please take we may gather accurately as possible

Don't feel slight was not mentioned articles appearing need to get articles with the systems others.

terminal category, the SWTPC CT-64 wins out with about 24 percent using it. Next comes the Heathkit H-19 (or Zenith Z-19) with about 19 percent of the numbers. The SWTPC CT-1024 (most of them modified) was third with about 13 percent. The Soroc IQ-120 was next with 11 percent. SWTPC CT-82 comes in with about 10 percent. The rest include ADM-3, Hazeltine, Televideo, DEC, and many others.

SUMMARY

If for no other reason, these statistics will help you realize what your fellow readers are using. Also, you may get a feel for the current trends. As an example, I find that the numbers of 6809 machines are much greater than a year ago. I'm sure this is because (generally speaking) there aren't too many 6800 machines being offered today. Whenever I recommend a computer, I recommend the 6809 to someone that is starting out. Those of you who have the 6800, the "upgrade" is worth it when you get ready.

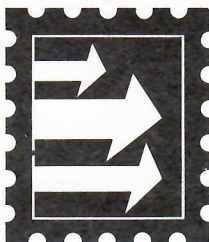
Other indications are that more people are buying the ready-built machines than before. There are still kits being offered, but maybe the experimentation is going from hardware to software and I/O stuff.

From the number of 6809 books we have sold, it appears that many of you are determined to learn 6809 assembly language.

Well, I hope that you can see something here that gives you a little more understanding of why we try to gather the information on the subscription card. When you subscribe or renew please take time to fill it out so we may gather the information as accurately as possible.

Don't feel slighted if your computer was not mentioned, or if there are no articles appearing on your system. We need to get articles from those of you with the systems to share them with others.

[SS-50]



Letters

Dear Editor,

I was glad to see your reviews of Smoke Signal Broadcasting hardware and software, and the Computerware software. I have been working with micros for some time now and have had experience with almost everything offered by SWTPC and SSB. I have also had experience with much of the software offered by TSC and Computerware. I started with the SSB disk system because they were first, but the introduction of TSC fast BASIC prompted a new look at them. You see, I am a techno-freak; I like having a faster basic than the S-100 types. Also the SWTPC S09 was the first 09 system on the market and of course used FLEX. I use both FLEX and the SSB DOS and have used UniFLEX also. My first choice remains SSB.

The reasons are many and varied, and may not be meaningful to anyone else. I will try to explain, though. Hardware is the first reason.

We all remember the read problems with the SWTPC 5 inch controller card. The DMAF-2 will hang up unless you change the controller chip to a 1791B-02. SWTPC seems to not admit to the problem, and, in any case, you buy your own chip. The first SSB DCB-4 boards would occasionally hang while copying 5 to 8 inch disks. Just send the board back - they would fix it. Or I could, using the patch they provided. I have used unmodified SSB hardware to read both FLEX 5 and 8 inch disks, and UniFLEX disks. This works using either the SSB low level disk drivers directly or the normal calls through the DOS. Try that with your DMAF-2 and FLEX.

[cont on page 31]

A REVIEW OF RMS

RECORD MANAGEMENT SYSTEM

Have you ever wanted to be able to take care of inventory control, customer records, accounts receivable, order processing, mailing lists, and management information with the same set of programs? And along with it have extra features such as sorting, report writing, online update, easy data entry, immediate access, and built-in data validation? Well, even if you haven't thought about it, it is here and available with the RMS Record Management System from Washington Computer Services.

Let's face it, RMS is a complete Database Management System for the 6809 computer. It consists of a set of five machine language programs that allow a large number of applications to be realized from them. In fact, the number of applications is really only limited by your ability to think of ways to use RMS. And RMS allows you to have access to the data with program written in BASIC or other languages.

The user actually sets up the format under which the data is to be stored, thereby allowing customization without any programming knowledge. Once the format is determined and a Dictionary file with the information is created, you have most of the things

done that you need to use the system. RMS can then provide a properly formatted disk file on which to store the data, data entry in a form fill-out manner on the CRT, quick data access for lookup or modification, and a way to change the format of the data as requirements change. You may also have reports printed to your specifications once you have created the short files specifying what needs to be printed.

The five RMS programs are:

RMSNEW - Used to create and format new RMS data files to your needs.

RMS EDITOR - For inputting, modifying, and displaying data in the file. This uses a form on the screen with items specified by you. You may then fill-in the form or call information from the file to be filled-in.

REPORT - This is used to create printed output from the RMS data file. You have control over what is printed, along with the format it is printed in. This has many nice built-in features to help in the creation of finished reports.

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INDEX - This program creates Index files which allow the Editor or Report programs to be shown in a desired order.

RMSCOPY - This can be used to copy a file when it needs to be changed as far as internal structure is concerned. It can also be used to merge files or "post" one file to another.

In addition to the five programs, the disk also contains a few sample files to get you acquainted with the system. We found that the best way to really see what to do is to run the samples first, and then try to build your own sample program group. You should do this with a small file first, so that you understand the procedures rather than waiting for a large formatting operation.

RECORDS, RECORDS

A section in the manual on data storage under RMS gives a very good concept about the files, records, and fields. You may have two records in one - that is a Primary record and a Secondary record. This really allows you to set up two different record structures, if necessary. Reasons for this could be to have a primary record for each customer and a secondary record for each invoice for that customer, or perhaps a primary record for each student and a secondary record for each class taken. Others may be for clients/calls, patients/visits, employees/pay information, and ledger entry/-detail item. Also, the use of a key Field is mentioned as to the method to call up the record quickly. This section should be read and understood before you attempt to create your own files.

The record layout is actually accomplished by creating the record dictionary along with deciding how many records may be needed. The section on "Getting Started with RMS"

is excellent for giving you an overview of what you will need to do with other parts of the manual adding details later on. The first thing is to decide what information is to be placed in a primary record. Then an eight letter (or less) Field Name is chosen. This could be NAME, ADDRESS, PHONE, COMPUTER, and EXDATE for a computer club bulletin, as an example. RMS then allows you to determine the characteristics of each field from a choice of four: Alphanumeric, Numeric, Money, and Date. The maximum length of each is something you must also decide. Then a prompt message is chosen for each field. When these decisions have been made, a screen form is automatically constructed from the information given.

The Dictionary file is created with the build command from OS-9, FLEX, or UniFLEX. An editor must be used to make corrections to the Dictionary file after it has been created, unless you want to start over again.

THE RMSNEW UTILITY

The RMSNEW Utility is used to format the data disk according to the needs of the file. You need to specify the record length and the number of records to be stored in the file. RMS uses hash coding and allows record sizes of 12, 16, 19, 26, 34, 40, 61, 82, 124, and 250 bytes. Since none of these sizes will fit most needs, it shouldn't be much of a problem. Of course, you can pick a record size larger than you actually require, but not one smaller than you need. The number of records allowed is 16,383 maximum, and limited by the disk size and density. With hash coding techniques, you should pick a number about 25% larger than required to allow the program to work rapidly.

Entering data into the file (after it is formatted) is easily done. Simply call in the file and it will put a form on the screen. You then only need to enter the information required on each line of

the form, hitting return to move you to the next field, or some of the other control characters for other cursor movements. After the form is filled out, simply press the INSERT (if you have one) or the proper control character and it will be saved in the file. An audible beep, (three of them) lets you know the form was saved. To change an existing record, simply fill in the Key field on the form and press the appropriate key (or keys) and the record is brought to the screen. Then simply move to the proper field and fill in the correct information. To save the new information, press the XMIT key or the proper control character.

The program checks for validation in each of the fields as you require. This means that if a zip is to be filled in, a minimum of five characters (numbers) may be the requirement for validation. In the event that the record field or fields have been filled out incorrectly, an error message is flashed on the screen when you attempt to save the record, and the record is not saved until things are correct. The validation requirements are part of the dictionary file and are optional.

ALTERING THE PROGRAM

Since we have mentioned the various keys and control characters, you should know that you may alter the program to use the correct keys for your particular terminal, or change them to use control characters. The manual describes clearly how to accomplish the task.

If you would rather have a "hard" copy of the information in the file, a report file may be created to do the task. The file along with the proper printer initialization and output routines (that are with your disk operating system) will do several things. Here is a list of them:

Produce a title page in front of the body of the report.

Produce a wrap-up page after the body of the report.

Process the records either in physical order (default) or a chosen order driven by an index file.

Adjust to any page size or special form layout.

Automatic skipping over page perforations.

Select exclusions or inclusions of records for the report.

May select new page for each primary or secondary record (either, neither, or both).

Print any number of lines for each record (primary or secondary).

Automatic page overflow headers, with any amount allowed.

End of record group summary.

Automatic record counting by group or by file.

Automatic totaling of numeric and money fields available as file totals or subtotals.

Option for current date and page number.

User specification of exact format for each line.

An example of a print line given in the report writer would be:

P NAME @ 1 ADDRESS @ 32 ;

This example means the report writer will print out the information contained in the field NAME starting with column 1, and then print the information from the field ADDRESS starting with column 32. This allows a lot of flexibility in formatting, yet the file is simple and quick to build. There are other parts of the report writer besides the "P" for PRINT. An "H", as an example, means a line for a page header, and could be used to print a heading line on each page.

UTILITIES FOR ALL USES

The INDEX utility is primarily used to create an index file for you that will

help in the sorting example, with a name you would need zip code order. A created to do this
+++INDEX M
ZIP

This would create an index file named with the program will key off the file record, starting There are other things which we won't say.

RMSCOPY is a record, from one another. This all into an empty file already has record two. For the notes, a regular be used. The RMSCOPY utility ion file may be different dictionary design moved to the new rules.

RMS COM

Included in the dealing with the with other languages explains the form has some explanation It even gives you changing the hasl you desire. The ideas on how to a BASIC including coding algorithm

One of the manual gives an e ion explained in SAMPLE files m takes you step-l process and lets y disk. This allows the process so tha you are ready applications.

help in the sorting of records. As an example, with a newsletter of any size, you would need to print labels in zipcode order. An index file could be created to do this with the command:

```
+++INDEX MAILING ZIPCODE  
ZIP
```

This would call INDEX to create an index file named ZIPCODE to be used with the program MAILING, and it will key off the field named ZIP in each record, starting with the smallest. There are other things that can be done which we won't spend time on here.

RMSCOPY is used to copy record by record, from one RMS data file to another. This allows a file to be copied into an empty file or into a file that already has records in it, merging the two. For the normal backup requirements, a regular COPY utility should be used. The nice feature of the RMSCOPY utility is that the destination file may be different in size or in the dictionary designation, and yet can be moved to the new one obeying certain rules.

RMS COMPATIBILITY

Included in the manual is a section dealing with the compatibility of RMS with other languages and utilities. It explains the format of RMS files and has some explanation on hash coding. It even gives you some information on changing the hash coding algorithm if you desire. There are examples and ideas on how to access RMS files from BASIC including a listing of the hash coding algorithm in BASIC.

One of the best parts of the manual gives an example RMS application explained in detail. It uses the SAMPLE files mentioned earlier. It takes you step-by-step through the process and lets you try the files on the disk. This allows you to "see and do" the process so that it will be easy when you are ready to write your own applications.

IN CONCLUSION

Overall we are very impressed with the package. There is one thing that could be stressed a bit more relating to the Key field. The manual doesn't mention clearly that this field must be unique. The problem here is that a suggestion of a name for the key is given. When a name is used, it is very likely that more than one person will have the same name in a large file. In that event, RMS will not write the second record with the same Key field. Anyway, you find it out by trying various keys.

Although RMS is designed to be changed to fit the terminal in use, we felt that too much stress is given to the CT-82 terminal. RMS is set-up for the CT-82 as it comes. There are only two places where you may use two character control sequences (such as escape sequences) and many of the newer "state-of-the-art" terminals use escape sequences to do much of the control work. If it were possible to use two character sequences in each case, many of the "special function" keys could be used on other terminals. Besides, most of the SS-50 users don't have the CT-82. (Our statistics show only 10 percent have the CT-82).

One of the best features of RMS is the fact that it is a machine language program, not BASIC-bound like many of the others. That means speed is excellent and it really helps to make RMS very powerful. You can obtain RMS in FLEX, UniFLEX, and OS-9 formats at the present time. It seems that whatever you need in the area of applications, RMS can be a big help. For those interested in OEM and quantity pricing, Washington Computer Services offers everything from the single end user license to the unlimited object distribution license including the source code. For further information, contact Washington Computer Services, 3028 Silvern Lane, Bellingham, WA 98225, (206) 734-8248 and see the ad in this issue.

[SS-50]

UPICKEM.CMD

*A mind reading program
for 6800 computers*

by Ernest Steve Watson
11701 St. Charles Blvd.
Little Rock, Arkansas 72211

You didn't know that your 6800 computer could be programmed to read minds, did you? Mine can, or at least that is what I had my family believing for awhile.

The assembled listing set forth below will simulate that activity. It's based on an old card trick in which rows and columns of playing cards are laid down. The "player" picks out a card, but tells the "dealer" only the column in which the card is located. The cards are redealt and the player again identifies the column in which the chosen card is located. The dealer then tells the player the card which he chose.

How? The cards in the column first identified are gathered together by the

dealer and then dealt as a row in the second deal. The second identification by the player of the column containing the card also identifies the card chosen.

As written, the program may be assembled as either a FLEX 2.0 (tm) or MiniFLEX (tm) program. MiniFLEX entry points are shown immediately after comparable FLEX 2.0 locations.

Since this program is not disk interactive, it can easily be adapted to a tape-based system by those wishing to do so. The author will be glad to assist anyone having difficulty in adapting the program to his system.

(tm) FLEX 2.0 and MiniFLEX are trademarks of Technical Systems Consultants, P.O. Box 2570, West Lafayette, IN 47906

NAM UPICKEM.CMD

*A GAME WHERE THE COMPUTER READS YOUR MIND
*WRITTEN FOR FLEX 2.0 AND MINIFLEX

AD24	PCRLF	EQU	\$AD24	/\$711E
AD15	GETCHR	EQU	\$AD15	/\$710F
AD1E	PSTRNG	EQU	\$AD1E	/\$7118
AD03	WARMS	EQU	\$AD03	/\$7103
AD18	PUTCHR	EQU	\$AD18	/\$7112
1000		ORG	\$1000	
1000 20 0A	START	BRA	RSTART	
1002 01	VN	FCB	1	
1003	FLAG1	RMB	1	
1004	FLAG2	RMB	1	
1005	FLAG3	RMB	1	
1006	MEM1	RMB	2	
1008	MEM2	RMB	2	
100A	MEM3	RMB	2	

100C 7F 10 03
100F 7F 10 04
1012 7F 10 05
1015 7F 10 06
1018 7F 10 07
101B 7F 10 08
101E 7F 10 09
1021 7F 10 0A
1024 7F 10 0B
1027 BD 10 BE

102A CE 12 C1
102D BD AD 1E
1030 BD AD 24
1033 CE 12 9B
1036 BD AD 1E
1039 CE 12 71
103C BD AD 1E
103F CE 12 5E
1042 BD AD 1E
1045 BD AD 24

1048 CE 12 4E
104B BD AD 1E
104E CE 12 3E
1051 BD AD 1E
1054 CE 12 2E
1057 BD AD 1E
105A BD AD 24

105D BD AD 15
1060 81 30
1062 27 0C
1064 81 31
1066 27 1D
1068 81 32
106A 27 13
106C 81 33
106E 27 09
1070 CE 12 12
1073 BD AD 1E
1076 7E 10 5D
1079 BD 10 BE
107C 7E 10 AD
107F BD 10 BE
1082 7E 10 9C

100C	7F	10	03	RSTART	CLR	FLAG1	
100F	7F	10	04		CLR	FLAG2	
1012	7F	10	05		CLR	FLAG3	
1015	7F	10	06		CLR	MEM1	
1018	7F	10	07		CLR	MEM1+1	
101B	7F	10	08		CLR	MEM2	
101E	7F	10	09		CLR	MEM2+1	
1021	7F	10	0A		CLR	MEM3	
1024	7F	10	0B		CLR	MEM3+1	
1027	BD	10	BE		JSR	CLRSCR	CLEAR SCREEN

*PRINT INSTRUCTIONS FOR GAME

102A	CE	12	C1	LDX	#MSSG1
102D	BD	AD	1E	JSR	PSTRNG
1030	BD	AD	24	JSR	PCRLF
1033	CE	12	9B	LDX	#MSSG2
1036	BD	AD	1E	JSR	PSTRNG
1039	CE	12	71	LDX	#MSSG3
103C	BD	AD	1E	JSR	PSTRNG
103F	CE	12	5E	LDX	#MSSG4
1042	BD	AD	1E	JSR	PSTRNG
1045	BD	AD	24	JSR	PCRLF

*PRINT THREE ROWS OF FIGURES

1048	CE	12	4E	LDX	#ROW1	PRINT FIRST ROW
104B	BD	AD	1E	JSR	PSTRNG	OF THREE COLUMNS
104E	CE	12	3E	LDX	#ROW2	
1051	BD	AD	1E	JSR	PSTRNG	
1054	CE	12	2E	LDX	#ROW3	
1057	BD	AD	1E	JSR	PSTRNG	
105A	BD	AD	24	JSR	PCRLF	

*GET KEYBOARD INPUT IDENTIFYING COLUMN
*CONTAINING THE NUMBER CHOSEN

105D	BD	AD	15	RET1	JSR	GETCHR	GET NUMBER OF COLUMN
1060	81	30			CMP A	#\$30	IF LESS THAN ONE, PRINT
1062	27	0C			BEQ	ERR	ERR MSSG.
1064	81	31			CMP A	#\$31	
1066	27	1D			BEQ	GORND1	
1068	81	32			CMP A	#\$32	
106A	27	13			BEQ	GORND2	
106C	81	33			CMP A	#\$33	
106E	27	09			BEQ	GORND3	
1070	CE	12	12	ERR	LDX	#ERR1	
1073	BD	AD	1E		JSR	PSTRNG	
1076	7E	10	5D		JMP	RET1	
1079	BD	10	BE	GORND3	JSR	CLRSCR	CLEAR FOR NEXT PRINT
107C	7E	10	AD		JMP	COL3	
107F	BD	10	BE	GORND2	JSR	CLRSCR	
1082	7E	10	9C		JMP	COL2	


```

1085 BD 10 BE GORND1 JSR CLRSCR
1088 7E 10 8B JMP COL1
108B 73 10 03 COL1 COM FLAG1

```

*PRINT EACH COLUMN AS A NEW ROW
*AND TEST FOR IDENTIFIED COLUMN

```

108E CE 12 02 NEXT1 LDX #COL1M PRINT COLUMN 1 AS ROW 1
1091 BD AD 1E JSR PSTRNG
1094 7D 10 04 TST FLAG2
1097 27 06 BEQ NEXT2
1099 7E 10 C8 JMP LDMEM
109C 73 10 04 COL2 COM FLAG2
109F CE 11 F2 NEXT2 LDX #COL2M DITTO
10A2 BD AD 1E JSR PSTRNG
10A5 7D 10 05 TST FLAG3
10A8 27 06 BEQ NEXT3
10AA 7E 10 C8 JMP LDMEM
10AD 73 10 05 COL3 COM FLAG3
10B0 CE 11 E2 NEXT3 LDX #COL3M DITTO
10B3 BD AD 1E JSR PSTRNG
10B6 7D 10 03 TST FLAG1
10B9 27 03 BEQ NEXT1
10BB 7E 10 C8 JMP LDMEM
10BE CE 10 C5 CLRSCR LDX #CLRMSG
10C1 BD AD 1E JSR PSTRNG
10C4 39 RTS
10C5 10 CLRMSG FCB $10,$16,4
10C6 16 04

```

*SAVE IDENTIFIED COLUMN FOR LATER USE

```

10C8 7D 10 03 LDMEM TST FLAG1
10CB 26 08 BNE LOAD1
10CD 7D 10 04 TST FLAG2
10D0 26 1A BNE LOAD2
10D2 7E 11 08 JMP LOAD3
10D5 86 32 LOAD1 LDA A #'2
10D7 B7 10 06 STA A MEM1
10DA 86 38 LDA A #'8
10DC B7 10 08 STA A MEM2
10DF 86 31 LDA A #'1
10E1 B7 10 0A STA A MEM3
10E4 36 34 LDA A #'4
10E6 B7 10 0B STA A MEM3+1
10E9 7E 11 21 JMP GORND4
10EC 86 34 LOAD2 LDA A #'4
10EE B7 10 06 STA A MEM1
10F1 86 31 LDA A #'1
10F3 B7 10 08 STA A MEM2
10F6 86 30 LDA A #'0
10F8 B7 10 09 STA A MEM2+1

```

```

10FB 86 31
10FD B7 10 0A
1100 86 36
1102 B7 10 0B
1105 7E 11 21
1108 86 36
110A B7 10 06
110D 86 31
110F B7 10 08
1112 86 32
1114 B7 10 09
1117 86 31
1119 B7 10 0A
111C 86 38
111E B7 10 0B
1121 BD AD 24
1124 CE 11 BE
1127 BD AD 1E

```

```

112A BD AD 15
112D 81 30
112F 27 0C
1131 81 31
1133 27 11
1135 81 32
1137 27 22
1139 81 33
113B 27 33
113D CE 11 A0
1140 BD AD 1E
1143 7E 11 2A

```

```

1146 CE 11 85
1149 BD AD 1E
114C B6 10 06
114F BD AD 18
1152 B6 10 07
1155 BD AD 18
1158 7E AD 03
115B CE 11 85
115E BD AD 1E
1161 B6 10 08
1164 BD AD 18
1167 B6 10 09
116A BD AD 18
116D 7E AD 03
1170 CE 11 85

```


10FB	86	31		LDA	A	#'1
10FD	B7	10	0A	STA	A	MEM3
1100	86	36		LDA	A	#'6
1102	B7	10	0B	STA	A	MEM3+1
1105	7E	11	21	JMP		GORND4
1108	86	36	LOAD3	LDA	A	#'6
110A	B7	10	06	STA	A	MEM1
110D	86	31		LDA	A	#'1
110F	B7	10	08	STA	A	MEM2
1112	86	32		LDA	A	#'2
1114	B7	10	09	STA	A	MEM2+1
1117	86	31		LDA	A	#'1
1119	B7	10	0A	STA	A	MEM3
111C	86	38		LDA	A	#'8
111E	B7	10	0B	STA	A	MEM3+1
1121	BD	AD	24	GORND4	JSR	PCRLF
1124	CE	11	BE	LDX		#MSSG5
1127	BD	AD	1E	JSR		PSTRNG

*ASK FOR IDENTIFICATION OF NEXT COLUMN
 *WHICH WILL PINPOINT THE NUMBER CHOSEN

112A	BD	AD	15	RET2	JSR	GETCHR
112D	81	30		CMP	A	#\$30
112F	27	0C		BEQ		ERRE
1131	81	31		CMP	A	#\$31
1133	27	11		BEQ		ANS1
1135	81	32		CMP	A	#\$32
1137	27	22		BEQ		ANS2
1139	81	33		CMP	A	#\$33
113B	27	33		BEQ		ANS3
113D	CE	11	A0	ERRE	LDX	#ERR2
1140	BD	AD	1E		JSR	PSTRNG
1143	7E	11	2A		JMP	RET2

*PRINT OUT THE ANSWER

1146	CE	11	85	ANS1	LDX	#ANSWER
1149	BD	AD	1E		JSR	PSTRNG
114C	B6	10	06		LDA	A
114F	BD	AD	18		JSR	PUTCHR
1152	B6	10	07		LDA	A
1155	BD	AD	18		JSR	PUTCHR
1158	7E	AD	03		JMP	WARMS
115B	CE	11	85	ANS2	LDX	#ANSWER
115E	BD	AD	1E		JSR	PSTRNG
1161	B6	10	08		LDA	A
1164	BD	AD	18		JSR	PUTCHR
1167	B6	10	09		LDA	A
116A	BD	AD	18		JSR	PUTCHR
116D	7E	AD	03		JMP	WARMS
1170	CE	11	85	ANS3	LDX	#ANSWER

1173	BD	AD	1E		JSR	PSTRNG	
1176	B6	10	0A		LDA	A	MEM3
1179	BD	AD	18		JSR		PUTCHR
117C	B6	10	0B		LDA	A	MEM3+1
117F	BD	AD	18		JSR		PUTCHR
1182	7E	AD	03		JMP		WARMS
1185	54			ANSWER	FCC		'THE NUMBER YOU CHOSE WAS '
1186	48	45	20	4E 55 4D			
118C	42	45	52	20 59 4F			
1192	55	20	43	48 4F 53			
1198	45	20	57	41 53 20			
119E	20						
119F	04				FCB	4	
11A0	45			ERR2	FCC		'ENTER ONLY NUMBERS FROM 1-3.'
11A1	4E	54	45	52 20 4F			
11A7	4E	4C	59	20 4E 55			
11AD	4D	42	45	52 53 20			
11B3	46	52	4F	4D 20 31			
11B9	2D	33	2E	22			
11BD	04				FCB	4	
11BE	57			MSSG5	FCC		'WHICH COLUMN IS YOUR NUMBER IN NOW?'
11BF	48	49	43	48 20 43			
11C5	4F	4C	55	4D 4E 20			
11CB	49	53	20	59 4F 55			
11D1	52	20	4E	55 4D 42			
11D7	45	52	20	49 4E 20			
11DD	4E	4F	57	3F			
11E1	04				FCB	4	
11E2	20			COL3M	FCC		' 6 12 18'
11E3	20	20	20	36 20 20			
11E9	20	31	32	20 20 20			
11EF	31	38					
11F1	04				FCB	4	
11F2	20			COL2M	FCC		' 4 10 16'
11F3	20	20	20	34 20 20			
11F9	20	31	30	20 20 20			
11FF	31	36					
1201	04				FCB	4	
1202	20			COL1M	FCC		' 2 8 14'
1203	20	20	20	32 20 20			
1209	20	2C	38	20 20 20			
120F	31	34					
1211	04				FCB	4	
1212	45			ERR1	FCC		'ENTER NUMBERS FROM 1-3 ONLY'
1213	4E	54	45	52 20 4E			
1219	55	4D	42	45 52 53			
121F	20	46	52	4F 4D 20			
1225	31	2D	33	20 4F 4E			
122B	4C	59					
122D	04				FCB	4	
122E	20			ROW3	FCC		' 14 16 18'

122F	20	20	31
1235	20	31	36
123B	31	38	
123D	04		
123E	20		
123F	20	20	20
1245	20	31	30
124B	31	32	
124D	04		
124E	20		
124F	20	20	20
1255	20	20	34
125B	20	36	
125D	04		
125E	46		
125F	52	4F	4D
1265	45	20	4B
126B	4F	41	52
1270	04		
1271	42		
1272	45	4C	
1274	4F	57	20
127A	20	45	4E
1280	20	54	48
1286	55	4D	42
128C	4F	46	20
1292	54	20	43
1298	4D	4E	
129A	04		
129B	50		
129C	49	43	4B
12A2	4E	55	4D
12A8	20	46	52
12AE	4F	4E	45
12B4	20	54	48
12BA	4F	4C	55
12C0	04		
12C1	54		
12C2	48	49	53
12C8	4F	47	52
12CE	57	49	4C
12D4	45	41	44
12DA	55	52	20
12E0	44		
12E1	04		

NO ERROR(S) D

122F	20	20	31	34	20	20				
1235	20	31	36	20	20	20				
123B	31	38								
123D	04						FCB	4		
123E	20		ROW2				FCC	'	8	10 12'
123F	20	20	20	38	20	20				
1245	20	31	30	20	20	20				
124B	31	32								
124D	04						FCB	4		
124E	20		ROW1				FCC	'	2	4 6'
124F	20	20	20	32	20	20				
1255	20	20	34	20	20	20				
125B	20	36								
125D	04						FCB	4		
125E	46		MSSG4				FCC	'	FROM THE KEYBOARD.'	
125F	52	4F	4D	20	54	48				
1265	45	20	4B	45	59	42				
126B	4F	41	52	44	2E					
1270	04						FCB	4		
1271	42		MSSG3				FCC	'	BELOW AND ENTER THE NUMBER OF THAT COLUMN'	
1272	45	4C								
1274	4F	57	20	41	4E	44				
127A	20	45	4E	54	45	52				
1280	20	54	48	45	20	4E				
1286	55	4D	42	45	52	20				
128C	4F	46	20	54	48	41				
1292	54	20	43	4F	4C	55				
1298	4D	4E								
129A	04						FCB	4		
129B	50		MSSG2				FCC	'	PICK A NUMBER FROM ONE OF THE COLUMNS'	
129C	49	43	4B	20	41	20				
12A2	4E	55	4D	42	45	52				
12A8	20	46	52	4F	4D	20				
12AE	4F	4E	45	20	4F	46				
12B4	20	54	48	45	20	43				
12BA	4F	4C	55	4D	4E	53				
12C0	04						FCB	4		
12C1	54		MSSG1				FCC	'	THIS PROGRAM WILL READ YOUR MIND'	
12C2	48	49	53	20	50	52				
12C8	4F	47	52	41	4D	20				
12CE	57	49	4C	4C	20	52				
12D4	45	41	44	20	59	4F				
12DA	55	52	20	4D	49	4E				
12E0	44									
12E1	04						FCB	4		
							END		START	

NO ERROR(S) DETECTED

[SS-50]

BASIC09

By Gary Manning

Since the advent of the microprocessor, both hardware and software have gone through an evolutionary process which seems to have improved both areas. However, most BASICs seemed to reach a plateau and stay there until Microware and Motorola together gave us BASIC09. It is a very enhanced BASIC language that runs extremely fast and yet it will accept and execute most PASCAL programs with only minor modification. It includes procedure, control and data structures that make it good for many applications.

BASIC09 consists of a system executive, text editor, multi-pass compiler, run-time interpreter, and a high-level interactive debugger. Each contribute to the overall software system, making it one of the best packages available. While using BASIC09 you are in one of four modes: Command, Edit, Execute, and Debug. These I'll explain briefly.

OPERATING MODES

The command mode is what the program comes up in. From this mode you can go to the edit or execute mode, communicate with OS-9, list and modify the procedure directory, and

load or save procedures. The term "procedure" is usually synonymous with "program" but may also designate a "module" or portion of a program. All commands can be typed in either upper or lower case, followed by a carriage return.

The edit mode is entered by typing "E" (or "e") and a procedure name. The directory is then searched and if no procedure by that name is found, a new one is created. If the procedure does exist, then its first line is displayed. If no name is given, the current procedure (the one that was edited, run, listed, or loaded last) will be entered. This is a very handy feature in my opinion. If no current procedure exists and no name given, a procedure with the name "program" is created. While in the edit mode you may write or modify procedures under the line-oriented editor. Some of the commands are: increment or decrement the line pointer, string search, change, list, renumber, quit, and insert. The first character on a line is the editor command, with the rest of the line to the carriage return being the operand. Lines are entered by first typing a space. A carriage return without a command increments the line pointer by one.

The editor is somewhat interactive

in that after each compiler translates "I-code" form which is 30 percent smaller. This allows the editor to find syntax errors immediately. When an error is found, the line is pointed to with an arrow and an error code. (This is a feature.) When you leave the edit mode, the editor performs another entire procedure. When syntax errors with multiple lines such as misnested loops, and labels are reported, and the I-code address where the error occurred.

The execution mode is entered by typing the run command. The name is usually in command, otherwise the procedure is executed. The mode terminates when a statement is executed at the highest level procedure "end". As with BASIC09 does not terminate a statement, however, it can be terminated by going into the debugger with a debug command.

The debug mode mentioned above executes a pause in the program. In debug mode the procedure is "suspended". You can use debug commands to trace mode (using line numbers), examine variables, list the nesting order of procedures, or execute OS-9. Also a step-execute mode stepping one or more lines. You may then continue or terminate the program.

BASIC09 DATA

There are five data files allowed with BASIC09.

in that after each line is entered, a compiler translates it into an internal "I-code" form which is usually about 30 percent smaller than regular text. This allows the editor to report most syntax errors immediately. If an error is found, the line is output with an up arrow pointing to the error and giving an error code. (I really like this feature.) When you finish editing and leave the edit mode, the compiler performs another two passes over the entire procedure. At this time, any syntax errors which extend over multiple lines such as unterminated or misnested loops, and missing variables or labels are reported by an error code and the I-code address where the error occurred.

The execution mode is entered by typing the run command. A procedure name is usually included with the run command, otherwise the current procedure is executed. The execution mode terminates when a "stop" statement is executed or when the highest level procedure executes an "end". As with most BASICs, BASIC09 does not require an "end" statement, however. The program may also be terminated by a "bug" causing it to go into the debug mode or by using a debug command. (control C).

The debug mode is entered as mentioned above or when a procedure executes a pause statement. In this mode the procedure being run is "suspended". You may now use the debug commands to enter or exit the trace mode (using statement instead of line numbers), examine or change variables, list the procedure, determine the nesting order of the calling routines, or execute OS-9 "Shell" programs. Also a step-execute command allows stepping one or more lines at a time. You may then continue execution, or terminate the program.

BASIC09 DATA AND VARIABLES

There are five basic variable types allowed with BASIC09: Integer, Real,

String, Byte, and Boolean. Complex structures are also available as vectors of the previously defined types. Arrays may be of up to three dimensions and can be of any type (including complex). Variables are "typed" by the DIM statement such as: DIM var, var1:BYTE: var2:INTERGER

If no type is specified, the type REAL is assigned to a variable. Integer variables are two bytes wide (16 bit) and hold a signed numeric value in the range -32768 through +32767. They may also be represented as Hex values \$0000 to \$FFFF. Real variables are stored in a five byte exponent-times-mantissa format. The exponent ranges from $2.938735877 \times 10^{-32}$ (2^{-128}) to $1.701411835 \times 10^{38}$ (2^{127}) as powers of 2. The mantissa ranges from 0.5 to .9999999995 in steps of about 5×10^{-10} .

String variables are variable length or null and are identified by the appended dollar sign (name\$=JOE) or by the DIM statement. The default maximum length for a string is 32 characters but may be shortened or increased by the DIM statement. The maximum allowable length for a string is not covered in the manual, but seems to be limited only by the amount of memory installed. Strings longer than the allotted size will be truncated on the right with no error indicated.

Byte variables are stored in 8 bits internally. They represent an unsigned integer from 0 through 255. Their main advantage is their use of less storage than integer or real since they are converted to the appropriate type for computation.

Boolean variables may have only one of two values, true or false. They are used mainly as logical flags which indicate the outcome of a comparison.

The numeric data types Byte, Integer, and Real are converted to conformable types for computation automatically at compile time and also at run time when necessary. This removes the need for fix and float operations.

Complex data structures can be thought of as a one-dimension array whose elements may be of any previously defined data type. For example, suppose you wanted to inventory 200 parts. A data type called PARTS could be defined which has a 12 Character descriptor, an interger part number, an interger number on hand, and a 10 character manufacturer. It could be set up this way:

```
TYPE = Parts = Dese(12):String; PNUM,
num-on-hand:Interger;Mfg(10):String
These can be stored in an array called
inventory. The BASIC09 complex data
structures are quite similar to those in
PASCAL, so a good PASCAL instruction
book would be helpful to those wishing
to learn more.
```

Variables are local to the procedure where they are defined unless they are passed as parameters to lower procedures. Even then they may have a different name in the lower procedure. This is possible because variable storage is allocated at the time the procedure is invoked which saves memory space and allows recursion. Parameters may be passed "by reference" meaning the lower procedure may change their value, or they may be passed "by value" meaning the lower procedures may use them, but not change them.

CONTROL STRUCTURES

The BASIC09 control structures include some very much needed additions to microcomputer software. These include: While...Do...Endwhile, Repeat...Until, Loop...Endloop, and Exitif...Endexit. The "normal" BASIC "For...Next" and "If...Then...Else" are included, but add the "Endif" with them. These structures allow the programmer to write structured code similar to block structured languages such as ALGOL and PASCAL.

The While..Do loop evaluates a boolean expression before executing the body of the loop. If the expression is false then the next statement after the

Endwhile is executed and the loop is ignored. With the Repeat...Until loop on the otherhand, the body of the loop is executed first, then a boolean expression is evaluated to determine if the loop is to be repeated. The Loop..Endloop repeats forever except when used with an ExitIf...Then...Else ...EndExit. This allows leaving the loop at one or more places in the middle. The ExitIf can be used with any looping structure.

The Goto, GoSub, and On/Goto statements are still available, but for most cases shouldn't be necessary. One exception may be the On Error/Goto statement. One bad thing about using a Goto statement is that you must then use line numbers (which are optional anyway). The use of line numbers becomes cumbersome, make the procedures larger and make the procedures run slower. If you must use them, only number the lines that require a label.

```
0000 DIM a,b,c,d:INTEGER
0013 WHILE a>b OR c<d DO
0028 REPEAT
002A a:=a+c
0036 IF b>a THEN
0043 IF d=b THEN
0050 d:=b*c
005C ELSE
0060 a:=5
0067 b:=9
006E ENDIF
0070 ELSE
0074 c:=6
007B d:=8
0082 WHILE d>c DO
008F c:=c-1
009A ENDWHILE
009E a:=7
00A5 ENDIF
00A7 UNTIL a>b OR c>d
00B0 ENDWHILE
00BF END
```

One feature of control structures that I am impressed with and have not seen on larger systems is automatic indentation of all control structures which extend over each nesting of a

structure on a p example) This is debugging and a teachers and other the listing of a pr

This BASIC output with a I ment. The fo somewhat similar They are R(R I[Interger), H(He and B[Boolean). followed by a field tells how many will occupy. A right justification Between the v "Using", a path may be included t output to any file expression may b output may be re only the variable.

A good set of for Trig, general functions. Also, ators are more (BASICs.

BENCHMARK

I found that B/ even though it is piled. As you memory and di format, rather tl form. The speed to the fact that B/ take advantage of set, rather than BASIC.

```
PROCEDURE B
0000 F
0009 F
001C M
0027 F
PROCEDURE B
0000 F
0009 F
0011 50
0020
0031
0038
```


structure on a program listing. (See example) This is extremely helpful in debugging and also tends to impress teachers and others who have to go over the listing of a program.

This BASIC supports formatted output with a PRINT USING statement. The format directives are somewhat similar to the FORTRAN IV. They are R(Real), E(Exponential), I(Integer), H(Hexadecimal), S(String), and B(Boolean). Each identifier is followed by a field width number which tells how many columns the output will occupy. Also, left, center, or right justification may be specified. Between the words "Print" and "Using", a path number expression may be included to allow redirection of output to any file or device. And, the expression may be a variable so that output may be redirected by changing only the variable.

A good set of intrinsics is provided for Trig, general math, and logical functions. Also, the string manipulators are more complete than many BASICs.

BENCHMARK TIMINGS

I found that BASIC09 runs very fast, even though it is really just semi-compiled. As you recall, it resides in memory and disk in an "I" code format, rather than a true compiled form. The speed is probably attributed to the fact that BASIC09 was written to take advantage of the 6809 instruction set, rather than re-assembling a 6800 BASIC.

PROCEDURE BM1

```
0000 PRINT "START"
0009 FOR k:=1 TO 1000
001C NEXT k
0027 PRINT "end"
```

PROCEDURE BM2

```
0000 PRINT "START"
0009 k=0
0011 50 k=k+1
0020 IF k<1000 THEN 50
0031 PRINT "END"
0038 END
```

PROCEDURE BM3

```
0000 PRINT "START"
0009 k:=0
0011 50 k:=k+1
0020 a:=k/k*k*k-k
0038 IF k<1000 THEN 50
0049 PRINT "END"
0050 END
```

PROCEDURE BM4

```
0000 PRINT "START"
0009 k=0
0011 50 k=k+1
0020 a=k/2*k+4-5
0038 IF k<1000 THEN 50
0049 PRINT "END"
0050 END
```

PROCEDURE BM5

```
0000 PRINT "start"
0009 k:=0
0011 50 k:=k+1
0020 a:=k/2*k+4-5
0038 GOSUB 80
003C IF k<1000 THEN 50
004D PRINT "end"
0054 END
0056 80 RETURN
```

PROCEDURE BM6

```
0000 PRINT "START"
0009 k:=0
0011 DIM M(5)
001B 50 k:=k+1
002A a:=k/2*k+4-5
0042 GOSUB 80
0046 FOR I:=1 TO 5
0058 NEXT I
0063 IF k<1000 THEN 50
0074 PRINT "END"
007B END
007D 80 RETURN
```

PROCEDURE BM7

```
0000 PRINT "START"
0009 k:=0
0011 DIM M(5)
001B 50 k:=k+1
002A a:=k/2*k+4-5
0042 GOSUB 80
0046 FOR I:=1 TO 5
0058 M(I):=a
0065 NEXT I
0070 IF k<1000 THEN 50
0081 PRINT "END"
0088 END
008A 80 RETURN
```


The benchmarks are re-printed here from the seven KILOBAUD magazine benchmarks published a few years ago. The benchmarks are only given as a reference, since all the other BASIC reviews in SS-50 Newsletter and SS-50 Computing have been based on them. Since you may be interested in comparisons, the BASICs from TSC are compared as well as Computerware Software Systems 6809 Random Basic. Speed is not always the most important factor of a language, but in some cases is very necessary. Here are the comparisons:

		TSC	TSC	
	BASIC09	BASIC	XBASIC	CSS
BM1	01.0	01.0	01.5	04.0
BM2	02.0	03.5	04.5	07.0
BM3	04.7	10.0	20.5	23.0
BM4	06.0	10.0	23.0	26.0
BM5	06.3	11.0	24.0	26.5
BM6	11.4	17.0	31.0	44.0
BM7	17.0	27.0	42.0	57.0

It was interesting to note that with benchmark 7 using repeat or while/do control statements, it ran a little slower at 17.8 seconds. The advantage is that the newer control statements are somewhat easier to write and use in many cases.

Another quick comment with regard to timesharing. As with OS-9 (which was reviewed last time), BASIC09 may be timeshared with just the addition of another terminal and necessary I/O port. When BASIC09 has been loaded in memory by one user, the second user will be running the same BASIC09, but with different memory for program space. This saves making room for the language for each user and the program for each user. Of course, timesharing is really time-slicing in this situation and when we ran benchmark number seven with two terminals at the same baud rate and with the same priority, it took about 35 seconds for the programs to finish. That means the switching and management only required about 1 second out of the total run time. Not bad at all.

PERSONAL IMPRESSIONS

I have used version 1.0 for about five months now, and 1.1 for a couple of weeks. There were a few problems with version 1.0, but 1.1 has taken care of the ones the staff found. I haven't used version 1.1 enough at this point to have found any new ones. By the way, we have found the people at Microware to be very helpful with any problems we had.

Perhaps it sounds like I have nothing but praise for BASIC09. That's probably because I have never been a great fan of BASIC. In the past, I forced myself to use it to get familiar with it, and because it was the only high-level language available for most micros. But now, BASIC09 gives me many of the features of the big machines running ALGOL and PASCAL (plus some extras) on the 6809 system. I even prefer it to FORTRAN 77 for most things. In short, it's BASIC the way that BASIC should have been in the first place.

One philosophy of Microware with OS-9 and BASIC09 was to be able to exploit mass marketed firmware. I suspect that soon you will see special application programs available in ROMs which BASIC09 can automatically identify, link to and run. You can make your own by "packing" a procedure, which performs an extra pass by the compiler and produces a module of code that is compact and cannot be "de-compiled" the same way the I-code can. These modules could be placed on system libraries whose possible uses are great!

I have been impressed by this BASIC since I first read the manuals. Others must be impressed also, since many vendors are adapting it and OS-9 to their equipment.

The next issue will cover more on BASIC09 with a look at the file handlers and other information.

[SS-50]

A Disk E

The Percom 1 priced disk system. The DOS (Disk Operating System) supplied on a pair of full 8K of Read/Write needed to operate the disk, a jump disk controller card. The LFD-400 provides a reason for home system drives can be added.

The LFD-400 operating system is a simple DOS with memory image file MPX+, is linked allows file names, files, blank disk of files and s

DIXIE

A Disk Executive for the PERCOM LFD-400

by Dennis Doonan
c/o Graphics I
345 Main Street
Racine, Wisconsin 53403

The Percom LFD-400 is a reasonably priced disk system for SS-50 computers. The DOS (Disk Operating System) is supplied on a pair of 2708 EPROMs. A full 8K of Read/Write memory is not needed to operate the system. To boot the disk, a jump to the address of the disk controller card is all that is needed. The LFD-400 is convenient and provides a reasonable amount of power for home system users. Additional drives can be added at any time.

The LFD-400 is supplied with two operating systems. MINIDOS is a simple DOS which saves and loads memory image files. The second DOS, MPX+, is linked to MINIDOS. It allows file names rather than numbered files, blank disk initialization, a catalog of files and several other features.

Utilities are loaded into memory only when they are needed.

Percom includes patches to use existing software. These include SWTP 8K BASIC and CORES, TSC Editor, Assembler and Text Processor. The patches use MINIDOS and do not allow named files. The drive number, sector and track must be specified for saves and loads. It is easy to over-write existing files. To keep a named file in the catalog, a dummy file must be created with MPX+ . The desired file is then saved to the disk location of the dummy file. Percom's Super BASIC, at least, uses MPX+ and supports named files for programs and data.

One of the inconvenient aspects of MPX+ is its sequential use of disk space. When a new file is added to a

disk, it is placed after the last file in the catalog. This allows fast saves and loads. When a file is deleted, the available disk space is only regained by using the PACK utility. This compresses the files and eliminates empty sectors. There is always a chance that the disk will crash. Percom recommends copying the disk before it is PACKed. On a single drive system this is time consuming and inconvenient.

Until Blue Hat Software (Box 4127, Flint, MI 48504) introduced DIXIE, LFD-400 users had to face some inconvenience.

DIXIE is a powerful disk executive for the Percom LFD-400 system. It is a replacement EPROM for the MPX+ DOS and three disks of source and object files, utilities and patches to use Percom, TSC and SWTP software. The documentation is clear and detailed. Cost is only \$60.00 (plus \$2.00 shipping).

If your system can use MPX+, it can use DIXIE. It is booted by jumping to the Percom controller card at \$C000.

Hardware conversion requires changing a single 2708 EPROM. A DIXIE disk is then initialized and MPX+ software is converted. MPX-DIX will perform the necessary conversion to the disk directory. Each DOS can read the others files, but neither can read the other's catalog.

MPX+ files can also be manually converted. The MPX+ file is loaded, DIXIE patches applied (if needed), and the resulting file is saved with the DIXIE save command.

DIXIE source files are compatible with the Percom TouchUp editor and Symbolic Assembler (with or without the DIXIE patches). Object files are in Motorola ASCII-HEX and are loaded with HEXLDR.

DIXIE source files are included for DIXIE, Filecopy (single and dual drive), INITDISK, NEWLABEL (changes the disk label on existing disks), a print directory routine, and the MPX+ to DIXIE conversion. Patches are

included for Percom Super BASIC, Touch Up, Assembler and HEXLDR, the TSC Editor and Assembler, and SWTP 8K BASIC.

What does DIXIE have to offer?

Plenty! DIXIE uses dynamic allocation of disk space. If space is available on the middle of the disk, DIXIE will use it. No space is wasted and the disk need not be PACKed.

There are 13 single-letter commands. These create the catalog and file name, rename the catalog or file, save and load files, protect or unprotect files, print the catalog, ask the disk for its name and available space, run a file or jump to a specified address.

DIXIE's file organization is structured. Catalog and file names can be up to 12 characters with up to 14 catalogs and 45 files per disk. Multiple catalogs allow files to be kept in user defined groups. BASIC programs, text files, data files and disk utilities can use their own catalogs. If a catalog is not specified, the file becomes a "quick-access" file that is called by name only. The Files command lists the directory of catalogs or the files in a specified catalog.

DIXIE uses all 10 sectors of track 0. When INITDISK is used, track 0 is initialized and a ¼K transient driver is loaded. This resided on the disk and conserves EPROM space. Track 0 contains a sector map and a disk label. These 10 sectors contain a memory image file which is manipulated by DIXIE. The directory contains a sector map, disk label, descriptor and the transient driver.

Each word of the sector map corresponds to a disk sector. When the word = 0, the sector is available. If the sector is used, the word contains the number of the file using the corresponding sector. The Save command uses this information to allow dynamic allocation of disk space. While it does slow the save operation, it allows all of the empty disk space to be used.

The transient parameters and call EPROM. The of DIXIE can be char re-writing the tran want the R (releas be called by 'RELE it is a simple m source code of t reassemble it an driver.

The software 1 the available progr asks for a file nam number.

The Touch Up versatile and has ands. INput an specified by nar number. A disk feature is added t Attempting to wri will result in an single drive syste disks are change possible to write wrong file. This when ROLLing th for memory. T now displays t information for command allows be executed from will list the files This saves exc re-entering the names or list the

The Percom A a comment line to of the listing. S names are also assembly listing.

MPXDIX conv a DIXIE disk by The MPX+ direct disk, the disk is the DIXIE director the MPX+ direct

Dynamic file : power of Super BA expanded if an EO during a write.

The transient driver sets the parameters and calls the routines in the EPROM. The operator commands of DIXIE can be changed by modifying or re-writing the transient driver. If you want the R (release a file) command to be called by 'RELEASE' rather than 'R', it is a simple matter to modify the source code of the transient driver, reassemble it and use the modified driver.

The software patches add power to the available programs. HEXLDR now asks for a file name rather than a DSSS number.

The Touch Up editor becomes more versatile and has several new commands. INput and OUTput files are specified by named files or DSSS number. A disk and file verification feature is added to all I/O command. Attempting to write to the wrong disk will result in an error message. On a single drive system, especially when disks are changed, it is no longer possible to write to or read from the wrong file. This is especially useful when ROLLing through files too large for memory. The Status command now displays the disk and file information for each file. The 'J' command allows DIXIE commands to be executed from the editor. 'JF TXT' will list the files in the catalog TXT. This saves excessive leaving and re-entering the editor to create file names or list the catalog.

The Percom Assembler patch allows a comment line to be printed at the top of the listing. Source and object file names are also included on the assembly listing.

MPXDIX converts a MPX+ disk to a DIXIE disk by modifying track 0. The MPX+ directory is copied from the disk, the disk is DIXIE initialized and the DIXIE directory is constructed from the MPX+ directory now in memory.

Dynamic file allocation adds to the power of Super BASIC. A named file is expanded if an EOF (end of file) is found during a write. Files can only be

reduced with the FCOPY utility. When a named file is deleted, its sectors are written with EOTs. Named null files (empty files) are assigned a number of sectors designated by the FILESZ command. It allocates FILESZ * 3 sectors to the file. To save a long file, it is best to open the file and expand it. The following command line will create a file named TEST and give it 30 sectors:

```
'FILESZ=10: DIXIE "C TEST":  
OPEN #10, "TEST": CLOSE #10'
```

During a write operation, DIXIE uses available sectors starting at the outside track of the disk and works to the center. Writing a long file is faster than FLEX which uses available sectors as they are released.

DIXIE adds power and versatility at a reasonable price. Anyone with a large number of MPX+ files and programs need not worry about conversion. It is well worth the time and money spent.

[SS-50]

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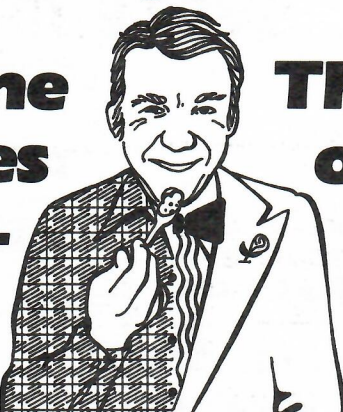


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BASIC09™ has a dual personality.

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craves **other**
meat-and- **prefers**
potatoes **Programme**
BASIC. **ala Pascal.**

Some people say BASIC09 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 BASIC09. 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 BASIC09 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

BASIC09 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. BASIC09 lets you create independent program modules called "procedures" with local variables for recursion plus parameter passing to any other BASIC09 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 BASIC09, because it is an interactive compiler. As each program line is entered, it is instantly compiled to a smaller, faster form. Because BASIC09 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 BASIC09. 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, BASIC09 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 BASIC09'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. Source listings and yearly maintenance update service are sold separately for most programs.

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Microware Systems Corporation
5835 Grand, Des Moines, Ia 50312
(515) 279-8844 TWX 910-520-2535

Do
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**It does
with
OS-9™
Level O**

Now two (or more) acts can share a microcomputer stage. You will not have to walk away from your computer while it is busy running a long program. Because OS-9 is a multitasking system, you can be running a BASIC program while editing a PASCAL program. This lets you make maximum use of your time and your system. If you only use one terminal. If you require multiple, independent terminals, one OS-9 system can do several single-user systems.

The convenience of an advanced operating system

Sophistication does not require complexity. Many OS-9 users say that it is easier to use than the older 6809 operating systems. Consider how to run multiple programs: to run a program just type its name and hit the 'enter' key. To run a program as a separate job, type its name, an '@' character, then the program name. The program runs as usual, but comes back immediately and is ready for your next command. Simple control lets you see each program's status, priority, or abort it.

The file management system lets you access byte-addressable random-and-access files. The tree-structured directory system lets you create disk directories for each user, 1

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 BASIC09, 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 BASIC09, Microware® offers: an Interactive Assembler, Macro Text Editor, Stylograph Word Processor, Interactive Debugger, and coming soon, COBOL, PASCAL and C language compilers.

Microware® software is available for most popular 6809 computer systems. Source listings and yearly maintenance update service are sold separately for most programs.

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MARK DATA "ADVENTURE" GAMES

A challenge was made in the Nov-Dec issue to come up with more games and other types of software for the 6800 and 6809. Not that our challenge spurred the interest, but there have been several new games for the SS-50 bus computers within recent months. One such company is Mark Data Products of Mission Viejo, California. They have two games currently for sale - Calixto Island Adventure and Black Sanctum Adventure.

The two are similar in the respect that they both are "adventure" type games and have an object to them such as finding treasure, but they are different in many other respects.

Calixto Island is both interesting and yet challenging. You are on the trail of a stolen museum treasure, and as the name implies will end up going to Calixto Island for the hunt. There are many obstacles to overcome in order to end up with the treasure, and a few humorous situations along with them.

As with most adventure games, you are given a description and you need to

piece the puzzle together to get the "treasure". Many times you have to take things with you and other times you must examine things closely to see hints and clues. You "command" the computer to do your bidding using a verb and noun. As an example, you may type "GO DOOR" to get to (or through) a door. This allows much more flexibility than the smaller games that allow only North, South, East, West, Up and Down as the choices.

Black Sanctum is more of a challenge, and requires some real contemplation and "hunting" to carry out the challenge. The main reason for being harder is that your only knowledge of what to do lies in the question, "Can you destroy the evil that lurks at St. Sebastian...?". Therefore, you must not only destroy the evil to win, but you must also find out where the evil is, what it is, and what to do to prevent yourself from becoming a part of it.

The games are loaded very quickly, since they are binary files. This also means that they run very fast. Any adventure game that uses BASIC to run them are fast enough, but take longer to

load, require more
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Mark Data Products
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Smoke Signal Broa
both 6800 and 6809

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some cases, and "I
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load, require more memory and are easier to "cheat" at since you can see most of the game in a simple listing. Mark Data Products games allow you to save the game at any point so that you may think your way out of a tight situation. They can allow you to eliminate some of the tricky things to do in order to come up with the proper ending. Some of the other things we like include the section that tells you how to adapt the game to your system. By the way, the only thing we needed to do here was to change the "home-up and erase" characters to make the game look better. It worked "as-is", but the changes make a difference. There are four characters allowed for the home-up and erase function. The games are available on 5¼ inch FLEX format and Smoke Signal Broadcasting Format for both 6800 and 6809 systems.

SUGGESTIONS

There are a few things that we felt needed a little improvement, but of course these are our opinions and not something all of you would agree with. One thing all of us noticed when we first started playing the game deals with the verbs allowed (or disallowed). A typical problem occurs in both games when you want to go from one floor to another and use the stairs. Using "Climb Stairs" is acceptable but "Go Upstairs" isn't. It does allow "Go Downstairs" and "Go Down", however. Then when using a ladder to go to a lower floor you can't use "Go Down" or "Down Ladder", only "Climb Ladder" will allow you to go down. And to top it off "Go Up" will work when you're at the bottom. Maybe we are being too critical, or maybe that is part of the author's method to make the game a challenge, but we felt it should be brought up. One other thing that is different -- The verb "Read" will not be allowed in some cases, and "Look" must be used instead. Maybe it's just what we are

used to, but our preference is to make most of the verbs that are similar acceptable to the game. Paul Orme (age 14) discovered that in several places you may "Take" certain objects that are quite impossible to lift...such as a "Clearing in the trees", a "shack" and other things that we won't mention as they could give away parts of the game.

There are reasons why more verbs sometimes cannot be allowed, mainly the problem of memory, and this may be the case here, but we mention it mainly to relieve some of the frustration of the players.

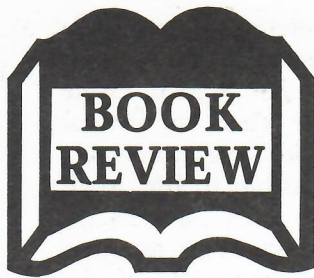
OVERALL VIEW

Overall the games are really good. And for those of you who enjoy reading mystery stories, yet have never played an adventure game, you will have to purchase these! The only bad thing is after you have discovered the "secrets" to the game, most of the challenge is removed.

We have a suggestion with regard to that problem: Why not have a "random game generator" that will set up a random game with some objects out of place, you in the middle of the wrong place, and the challenge to finish the game from that point. Since these games are able to save the "current game" in less than one sector on the disk, there wouldn't be too much involved. Just a thought.

Have some adventure...Try the challenge of Mark Data Products' Calixto Island Adventure and Black Sanctum Adventure. We think you will be as happy as those who have tried the games here have been. The price is \$24.95 each or both for only \$39.95. More games are coming soon, and versions for the TRS-80C Color Computer are promised. For further information contact: Mark Data Products, 23802 Barquilla, Mission Viejo, CA 92691.

[SS-50]



Microcomputer Experimentation With The Motorola MEK 6800D2

By Ken Orme

Lance A. Leventhal
Prentice-Hall, Inc., 1981, 438 pages

For the 6800 user, experiments have been part of the "way of life" from the beginning. It seems that even though the 6800 is far more advanced than many give it credit for, and even though it has some excellent systems hardware and software, the 6800 has been a means of experimentation and use because of its low cost, ease of utilization, and its power to compete with other microprocessors. Leventhal covers experimental training with an emphasis on design of industrial controllers using the MEK 6800D2 Microcomputer from Motorola.

The chapters are actually lab experiments, complete in and of themselves with purpose, parts required, and reference materials. They also contain what you should learn, terms, problems and a summary. Because of its design, it is a natural for those who teach and have a need for a lab manual designed around the MEK 6800D2.

Leventhal assumes no prior experience with a computer and has excellent instructions in the use of the MEK board from reset to changing memory and running the program. Even the experiments are numbered to help you learn. They start with zero and go to F.

Mr. Leventhal mentions in his preface that the book is not heavy in details of the 6800 microprocessor or in assembly language, but the reference books listed in each chapter should help anyone who wants the extra inform-

ation. By itself, the text is sufficient for the use it was intended and requires nothing more than the hardware to carry out the experiments.

Before any more is said, please understand that the ideas and problems given to be used with the MEK 6800D2 (with the JBUG monitor) may be used with any 6800 microprocessor and monitor with a little ingenuity and testing. There are a few that require specific JBUG routines and some that need a little more equipment to make easy use of them, but on the whole they can be tried and tested with almost any system.

The sixteen chapters everything from introducing the MEK to writing and running simple programs to using data arrays and input/output. In fact, Leventhal covers both the PIA and the ACIA very thoroughly with everything from basic requirements to the handshaking methods. Interrupts and timing methods are extensively covered for a book of experimentation. Designing and debugging programs are always important, and he gives the reasons and explanations for using some of the debugging tools, such as breakpoints and single stepping. With an average of about 25 pages per chapter, the reader is given a good background as quickly as possible and then set to work on some problems requiring a little thought and reason.

In order to appreciate this book, you probably will either have to be interested in how to set-up and design I/O and peripheral controls or interest-

ed in the machine a these tasks. The language is required 6800D2, but the hex input so the beginning work quickly and y goes on internally microprocessor.

Leventhal comm features of the 68 includes the fact the addressed just lik locations and may l memory. But he reader of differences be taken.

The diagrams well, and help the r happening. And, th with the text for the making it quite ea Typos are not a r this book as can be : editions and it appo did indeed test the book, and they appo We tried many o SWTPC 6800 micro everything in order.

One of the ver makes this book a g comes from the problems given w sections. This allo used as a self-teac with the microcomp

If you are intere experiments using y or just interested in cessor "talks" to ot an excellent book.

extensive background areas with enough i it useful for every microprocessor. Fc the MEK 6800D: mandatory reading i about the system. Leventhal, "This r the control of syste with a more advanc the future.

ed in the machine and how it performs these tasks. The use of machine language is required to use the MEK 6800D2, but the hex keypad helps with input so the beginning student can still work quickly and yet understand what goes on internally with the 6800 microprocessor.

Leventhal communicates the nice features of the 6800 very well, and includes the fact that PIA I/O ports are addressed just like other memory locations and may be written to like a memory. But he also reminds the reader of differences and precautions to be taken.

The diagrams are designed very well, and help the reader to see what is happening. And, the diagrams stay up with the text for the most part, thereby making it quite easy on the reader. Typos are not a major problem with this book as can be a problem with first editions and it appears that Leventhal did indeed test the problems in the book, and they appear to be excellent. We tried many of them using the SWTPC 6800 microcomputer and found everything in order.

One of the very nice things that makes this book a good one for learning comes from the hits and sample problems given with each of the sections. This allows the book to be used as a self-teaching device (along with the microcomputer).

If you are interested in doing a few experiments using your microcomputer or just interested in how the microprocessor "talks" to other devices, this is an excellent book. It does not require extensive background, yet covers the areas with enough information to make it useful for everyone with a 6800 microprocessor. For individuals with the MEK 6800D2, it is almost mandatory reading if you want to learn about the system. And to quote Leventhal, "This manual emphasizes the control of systems with software", with a more advanced text promised in the future.

[SS-50]

[cont. from page 5]

Software is the second reason. Computerware BASIC is slower than TSC BASIC, but is often easier to use. Disk file access is easier, as is hardcopy output. The error trapping is also better. For example, when doing benchmarks, I use the tape control outputs of the CT-82 terminal to turn a timer on and off. CHR\$ does this from a program, and control/ Q, etc. from the keyboard. The CHR\$ method works in both cases, but the control characters from the keyboard cause TSC BASIC to self modify either or both BASIC and the program. Although TSC wrote the editor sold by SSB, I much prefer the SSB implementation where backup files are deleted AFTER completion of editing instead of before. You then have something left when the car takes down the nearby utility pole. (True experience - twice in the last year, in fact.)

Support, which was mentioned earlier, is the last reason. In an effort to get the best of both worlds, I purchased the version of FLEX2 that runs on SSB hardware. The provided MOVE utility caused no end of problems and FLEX would do strange things. The official position of TSC was that there were no problems. Since the problems went away after I wrote new disk drivers, TSC is technically correct; FLEX works, but their disk drivers did not. Some of the UniFLEX troubles I have experienced are due to SWTPC and some due to TSC. It is hard to tell who is liable and when since the hardware is SWTPC and the software seems to be a product of both. The UniFLEX installation at the local college crashes several times a day with 4-5 users. You need more memory, says TSC. We put in 256K.

Still crashes. You need a hard disk, says TSC. We hooked up a 16 Meg hard disk. The formatter did not work. got a new formatter, which worked, but it still crashed. We hooked up a 40 Meg hard disk. I could read and write,

but not from the disk. More formatter problems, says TSC, but SWTPC wrote it; talk to them. Yeah, I know the formatter does not work, says SWTPC, but we will send you one that may. Well, the 40 Meg is running formatted as a 16 Meg, the system still crashes, and it has been three weeks and I do not have a working 40 Meg formatter. The real irony is that the 40 Meg hard disk is not available for use with FLEX; only UniFLEX. SSB, on the other hand, has never failed to provide help any time of the day.

Carl Kreider
Goshen, IN

Dear Mr. Kreider,

I guess that I should have left this one alone, because everyone has their own ideas about what makes a good DOS, monitor, high level language, etc. However, I must reply to a few comments.

The EDITOR you use from TSC must be different than the one I own. It seems that the backup file [singular] is deleted before editing begins, but...the regular [.TXT] file is renamed to .BAK immediately after the deletion, and before the file to be edited is loaded into memory. The only time I have had a problem is when it is a new file and I haven't saved anything yet. That is a problem with all volatile memory. Therefore, the only time I can see where the problem would exist, is in the few [2 or 3] seconds right after the "Delete backup file Y/N?" prompt occurs.

I will agree with you that some manufacturers and dealer/distributors give better support than others. Unfortunately, most of us have to find it out the hard way.

I can say that I find good and bad in every operating system, language, and program I have ever seen. However, I am sure that each of us may have a different reason why something is good or bad.

Editor



New Products

HUMBUG Monitor Available

Our HUMBUG Monitor is now available for the Percom SBC/9 Single Board Computer, thereby making this CPU board compatible with FLEX as well as other popular software.

HUMBUG contains all the standard functions and I/O routines of other monitors. But it also includes other functions to make life easier:

- ☆☆ Multiple breakpoints
- ☆☆ Single-stepping
- ☆☆ Memory dump, search, fill and change
- ☆☆ Disk boot, tape punch and load
- ☆☆ Memory test and memory move
- ☆☆ Register examine
- ☆☆ Program halt from keyboard

HUMBUG also provides I/O port control, an ABORT function to stop wayward programs and print a register dump, and optional output via a video board.

With this latest version, HUMBUG is now available for 6800, 6802, and 6809 CPU boards made by Gimix, Percom, SWTP, and Star-Kits, and for video boards made by Percom and Thomas. New versions are being developed for other hardware combinations as well. For information send for catalog or call Star-Kits at (914) 241-0287. Turn on your 300-baud modem if you call in the late evening and LIST HUMBUG.DAT.

New Multi-User C Enhances Compu

Smoke Signal E
manufacturers of the 680
CHIEFTAIN Series
tems, announce the
Level I and OS-9 L
Multi-tasking Opera
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OS-9 Level I
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Debugger, a Macro
Stylograph Word Prc
also available, as w
and source listings.

For further inf
Smoke Signal Broad
Colinas, Westlake
(213) 889-9340.

New Multi-User Operating System Enhances Computer System Line

Smoke Signal Broadcasting, manufacturers of the 6800 and 6809 based CHIEFTAIN Series of computer systems, announce the availability of OS-9 Level I and OS-9 Level II Multi-user, Multi-tasking Operating System. OS-9 Levels I and II, developed by Microware Systems Corp. in Des Moines, Iowa, run on all of the CHIEFTAIN 6809 based computer systems.

OS-9 Level I runs on a CHIEFTAIN 6809 computer with 64KB of RAM and will support 1 - 4 users simultaneously. OS-9 Level II includes memory management hardware and accesses up to 1 full Megabyte of RAM. OS-9 Level II is for larger applications and supports 8 - 16 users simultaneously. Both Level I and Level II come standard with complete multi-tasking capabilities and all will support software for interactive time-sharing applications.

The CHIEFTAIN 6809 computer systems can now accept and execute interactive commands from user terminals; and do complicated functions such as I/O redirection, memory allocations, and multi-tasking, all by running the OS-9 Operating System.

Another feature is a unified I/O structure that is interrupt driven and hardware independent. *Smoke Signal Broadcasting* offers OS-9 Levels I and II as well as the high-level languages supported. BASIC 09; PASCAL Compiler; COBOL.

OS-9 Level I and Level II are modeled after the respected UNIX operating system developed by Bell Telephone Labs. The price is \$195.00 for OS-9 Level I; Level II is listed at \$495.00. A Mnemonic Interactive Debugger, a Macro Text Editor, and Stylograph Word Processing System are also available, as well as maintenance and source listings.

For further information contact: *Smoke Signal Broadcasting*, 31336 Via Colinas, Westlake Village, CA 91361, (213) 889-9340.

W5YI REPORTS...

AMRAD/ARRL SPONSOR CONFERENCE ON HAM COMPUTER NETWORKING

The American Radio Relay League is sponsoring a conference on *Amateur Radio Computer Networking* on October 16, 1981, at the National Bureau of Standards, Gaithersburg, MD. The purpose of the conference is to explore the possibilities of an integrated amateur computer network using HF, VHF and satellite packet radio as the primary transmission means. The network would consist of radio amateurs in both the U.S. and Canada and would provide means of servicing the public by handling third party traffic. *Papers are sought on both technical and operational topics* including: network structure, protocols, message handling, equipment design and selection, software, integration with the National Traffic System, interconnection with Computerized Bulletin Board Systems and other topics. This event will be hosted by the Amateur Radio Research and Development Corp. (AMRAD) and by the Radio Amateur Satellite Corp. (AMSAT) whose annual meeting will be held on October 17 at the nearby Goddard Space Flight Center. *Those wishing to present papers should send a letter of intent to:* Paul L. Rinaldo, W4RI; President, AMRAD; 1524 Springvale Ave.; McLean, VA 22101 before August 15, 1981.

[This information from the W5YI Report, P.O. Box #10101, Dallas, TX 75207]

DualPurpose Checks fom NEBS

A new series of checks for computer users is available from Nebs Computer Forms.

These 9022 Checks are designed to be used for either Payroll or Accounts Payable. The stub portion is blank except for the customer's name and the

consecutive check number (either or both of these can be deleted if desired).

Like other Nebs Computer Forms, these are available in quantities as low as 500 for \$29.95. Prices include printing the customer's name and address, bank name and number, consecutive numbering and micr code line.

Fast response is assured by the Nebs policy of shipping all orders within 6 working days.

For samples, order forms and flyer, phone toll free 1-800-225-9550, or write Nebs Computer Forms, 78 Hollis Street, Groton, MA 01450.

6809 PASCAL COMPILER DEBUTS

Technical Systems Consultants, Inc. has announced the availability of a 6809 Native-code Pascal Compiler for operation under the 6809 FLEXtm and UniFLEXtm operating systems. The compiler produces 6809 assembly language source mnemonics which are assembled into object code. This native-code results in faster program execution speeds than common 'P-code' interpreter Pascals. The compiler supports nearly all of the Jensen and Wirth Pascal specifications plus additional features related to the operating system. The compiler supports: both integer and floating point math with up to 16.8 digits of accuracy, scientific functions, variable names unique to 160 characters, sets of up to 128 elements, dynamic storage allocation and deallocation, pointer types, true file I/O using file buffer pointers, sequential files, packed and unpacked record and array types, parameter passing from the command line to the Pascal program, and the ability to call other Pascal programs. The UniFLEX version supports random access files. Additional operating system dependent routines exist for both the FLEX and UniFLEX versions of the compiler. It comes with a user's manual, a copy of the *Pascal User Manual and Report*, by

Jensen and Wirth, the compiler and run-time object code programs, and several example programs. The version for UniFLEX includes a special systems run-time package that allows Pascal programs to make direct calls to operating system routines. The FLEX version sells for \$200.00. A single cpu licence for the UniFLEX version costs \$300.00 and includes one year of maintenance. Contact Technical Systems Consultants, Inc., P.O. Box 2570, West Lafayette, IN 47906, (317) 463-2502.

Computerware Color Invaders

Computerware introduces its Color Invaders on cassette for the Radio Shack Color Computer.

You are at the controls of the Color Computer Space Tank, firing at stellar ships and invading critters. Invading ships burst in air with explosive noise. Alien critters march across the screen dropping bombs and screaming as life is zapped from their fried little bodies. Fun?? Yeah!!

With brilliant color, dynamic sound and fast action, Color Invaders offers a continuous source of excitement to all players. Each of the eight levels of play present additional complications keeping the beginner going and the experts challenged.

Color Invaders is available in two versions:

Invaders-PP requires 16K and the Power Pack....\$19.95

Invaders-16 requires 16K (not the Power Pack)\$24.95

Both are available directly from Computerware at Box 668, 1472 Encinitas Blvd., Encinitas, Ca. 92024, (714) 436-3512.

(cont on page 44)



Garland, Texas

N

One day last week, I poked his head in my door and said, "I wanna see something today?"

I was pretty well blindsided that whole morning with a surprise visit. I didn't know whether I was surprised or delighted at the intrusion or delighted at the fact that it wasn't a difficult decision.

I followed Tim to our main building where he was working on systems. Tim and Barr are circuit designers, sharing a stockroom. Now it's a mess of layouts, prior projects was the only

CONT

Mind-Blowing Color G

Speech Patch for Supe

Electric Crayon Alarm

The ELECTRIC CRAYO

Text to Speech with SF

Patch for General Leds

Super BASIC Adapted

New Products.....

Mind-Blowing Color Graphics

by Harold Mauch
President, Percom Data Company

One day last week, Tim McKee of our staff poked his head in my office and asked, "You wanna see something that will make your day?"

I was pretty well blitzed after spending the whole morning with an architect reviewing plans for our new 30,000 square-foot building; I didn't know whether to be annoyed at Tim's intrusion or delighted at a chance to escape. It wasn't a difficult decision.

I followed Tim to an unexplored corner of our main building where he designs 680X systems. Tim and Barney, one of our printed circuit designers, share what was once a stockroom. Now it's a mass of equipment and a mess of layouts, printouts and listings. A blackboard with a status chart of long-forgotten projects was the only item in the room that

showed any semblance of order. Before I could query Tim about one of the projects, he brought up his system.

On a color monitor, perched on a stack of dog-eared listings, appeared expanding, shimmering circles -- framed circles, exploding circles, rotating circles, tension circles. Tim's mesmerizing psychedelics sent the mind reeling -- in circles, of course.

Finally, I realized that Tim had just described the system hardware: "...our Colorama card, an SBC/9, one of our M24SS static RAM cards..." And now was explaining how he could generate such dazzling animated displays: "Because display memory is in the processor map, update speed and animation detail are limited only by the processor itself. Which, with a 6809, is quite fast."

About this time somebody bumped Tim's bench. The monitor teetered. "Watch out!" I exclaimed. Tim, grinning sheepishly, steadied the stack of listings and went on.

"I'm using ASCII commands so the display is not as fast as direct memory commands, but the program interface is simpler. A circle is defined by setting its center coordinates in memory, then computing the circle X and Y points using the Pythagorean theorem. This approach is faster than a trig function and each calculation locates eight points. The shimmer effect happens because points overlap as the algorithm draws the circle -- eight points at a time."

I told Tim to clear up the software a bit (a bit?) if necessary, and we'd make his program available through the LFD Users Group. Wistfully, I headed back to my office, to the architect's plans and to other mundane pursuits.

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SPEECH PATCH FOR SUPER BASIC

by Tim McKee

Ed. Note: The last issue of the "Peripheral" introduced the subject of speech generation using a Texas Instruments' SPEAK & SPELL equipped with a Percom SPEAK-2-ME-2 [tm] adapter.

The listing given in this issue will allow you to patch Percom Super BASIC, version 1.0x, for speech. The pi function and tape commands have been eliminated.

New Function

SP 20 LET A=SP

When line 20 is executed, it will return A equal to the current status of the SPEAK & SPELL:

- A=0 when not speaking
- A=1 for speech in progress

New Commands

S(20 S(1000)

Line 20 will "speak" the word at address 1000 of the SPEAK & SPELL vocabulary. If the delay command, D(, was used previously, a delay will follow and then execution will continue.

W(20 W(1000)

Line 20 will "speak" the word at address 1000 of the SPEAK & SPELL vocabulary, wait for the word to end and then continue.

D(20 D(25)

Line 20 will set the delay associated with the S(command to 25. The delay is set in 0.1 millisecond increments. The delay is reset to zero after each S(command.

SL 20 SL

Line 20 will cause the next word to be spoken at half speed (slow speech).

NOTES

1. The address of words are *not* the same as those given in the SPEAK-2-ME-2 (tm) users manual. The addresses can be obtained with the following program:

```
10 INPUT "OLD VALUE ",O
20 IF O<0 LET O=65536+O
30 LET A=INT(O/256)
40 LET B=O-(256*A)
50 PRINT "NEW VALUE ";A+(256*B)
60 W( A+(256*B) )
70 GOTO 10
```

2. New words may be formed by setting the delay with the D(command, outputting the beginning of one word using the S(command, allowing the first part of the word to be spoken and then outputting another word.

	NAM	SPEECH	PATCH FOR SUPER BASIC 1.00
(8000)	PIA EQU	\$8000	
(8000)	PIADTA EQU	PIA	
(8001)	PIACTA EQU	PIA+1	
(8002)	PIADTB EQU	PIA+2	
(8003)	PIACTB EQU	PIA+3	
(003C)	CA2HI EQU	\$3C	
(0034)	CA2LO EQU	\$34	
(237F)	NUMPAR EQU	\$237F	
(0ADE)	DCBIN2 EQU	\$ADE	
(19C4)	CLRNUM EQU	\$19C4	
(0059)	NUMSTK EQU	\$59	
(1FCF)	DATA EQU	\$1FCF	
(0238)	ORG	\$238	PATCH BASIC FUNCTION TABLE
0238 53	FCC	'SP'	REPLACE FUNCTION 'PI'
023A 00	FCB	0	
023B 2F AE	FDB	SPKFNC	
(0371)	ORG	\$371	PATCH BASIC COMMAND TABLE
0371 53	FCB	'S,',(,0	SPEAK WORD AND DELAY IF REQUESTED
0374 2F 00	FDB	SPK	

Percom PERIPHERAL
P2

0376 57
0379 2F 12
037B 44
037E 2F 7E
0380 53
0383 2F A6

(2F00)

2F00 8D 1D SPK
2F02 FE 2FD0
2F05 27 15
2F07 C6 10 SPK1
2F09 5A SPK2
2F0A 26 FD
2F0C 09
2F0D 26 F8
2F0F 4F
2F10 20 72
*RESET DELAY T
2F12 8D 0B SPKW
2F14 8D 2FC4
2F17 B6 8002 SPKW
2F1A 2A FB
2F1C 7E 1FCF SPKX
2F1F 8D 237F SPKI
2F22 8D 0ADE
2F25 37
2F26 36
2F27 30
2F28 7D 2FD2
2F29 27 06
2F2D 4F
2F2E B7 2FD2
2F31 8D 60
2F33 7D 2FCE SPEA
2F36 26 21
2F38 7F 8001
2F39 7F 8003
2F3E 86 FF
2F40 B7 8000
2F43 7F 8002
2F46 86 3C
2F48 B7 8001
2F49 B7 8003
2F4E C6 05
2F50 4F SPEA
2F51 8D 40
2F53 5A
2F54 26 FA
2F56 7C 2FCE
2F59 C6 05 SPEA
2F5B 4F SPEA
2F5C 37
2F5D C6 04

0376 57	FCB	'W,'(,0 SPEAK WORD AND WAIT TILL FINISHED
0379 2F 12	FDB	SPKWT
037B 44	FCB	'D,'(,0 SET DELAY FOR NEXT 'S(' COMMAND
037E 2F 7E	FDB	SPKD
0380 53	FCB	'S,'L,0 SET SLOW SPEECH MODE
0383 2F A6	FDB	SPKSLW

(2F00)	ORG	\$2F00	UNUSED SPACE
2F00 8D 1D	SPK	BSR	SPKIT
2F02 FE 2FD0		LDX	DELAY
2F05 27 15		BEQ	SPKX
2F07 C6 10	SPK1	LDA B	#16
2F09 5A	SPK2	DEC B	
2F0A 26 FD		BNE	SPK2
2F0C 09		DEX	
2F0D 26 F8		BNE	SPK1
2F0F 4F		CLR A	
2F10 20 72		BRA	SPKDX
*RESET DELAY TO 0 AND RETURN			
2F12 8D 0B	SPKWT	BSR	SPKIT
2F14 BD 2FC4		JSR	STSSTR
2F17 B6 8002	SPKW1	LDA A	PIADTB
2F1A 2A FB		BPL	SPKW1
2F1C 7E 1FCF	SPKX	JMP	DATA
2F1F BD 237F	SPKIT	JSR	NUMPAR
2F22 BD 0ADE		JSR	DCBIN2
2F25 37		PSH B	
2F26 36		PSH A	
2F27 30		TSX	
2F28 7D 2FD2		TST	STSACT
2F2B 27 06		BEQ	SPEAK4
2F2D 4F		CLR A	
2F2E B7 2FD2		STA A	STSACT
2F31 8D 60		BSR	STROBE
2F33 7D 2FCE	SPEAK4	TST	INIT
2F36 26 21		BNE	SPEAK6
2F38 7F 8001		CLR	PIACTA
2F3B 7F 8003		CLR	PIACTB
2F3E 86 FF		LDA A	#\$FF
2F40 B7 8000		STA A	PIADTA
2F43 7F 8002		CLR	PIADTB
2F46 86 3C		LDA A	#CA2HI
2F48 B7 8001		STA A	PIACTA
2F4B B7 8003		STA A	PIACTB
2F4E C6 05		LDA B	#5
2F50 4F	SPEAK5	CLR A	
2F51 8D 40		BSR	STROBE
2F53 5A		DEC B	
2F54 26 FA		BNE	SPEAK5
2F56 7C 2FCE		INC	INIT
2F59 C6 05	SPEAK6	LDA B	#5
2F5B 4F	SPEAK7	CLR A	
2F5C 37		PSH B	
2F5D C6 04		LDA B	#4
2F5F 64 00	SPEAK8	LSR	0,X
2F61 66 01		ROR	1,X
2F63 46		ROR A	
2F64 5A		DEC B	
2F65 26 F8		BNE	SPEAK8
2F67 33		PUL B	
2F68 8D 23		BSR	OUTDIG
2F6A 5A		DEC B	
2F6B 26 EE		BNE	SPEAK7
2F6D 86 80		LDA A	#\$80
2F6F 8D 22		BSR	STROBE
2F71 B6 2FCF		LDA A	SPEED
2F74 8D 1D		BSR	STROBE
2F76 31		INS	
2F77 31		INS	
2F78 86 A0		LDA A	#\$A0
2F7A B7 2FCF		STA A	SPEED
2F7D 39		RTS	
2F7E BD 237F	SPKD	JSR	NUMPAR
2F81 BD 0ADE		JSR	DCBIN2
2F84 B7 2FD0	SPKDX	STA A	DELAY
2F87 F7 2FD1		STA B	DELAY+1
2F8A 7E 1FCF		JMP	DATA
2F8D 36	OUTDIG	PSH A	
2F8E 86 20		LDA A	#\$20
2F90 8D 01		BSR	STROBE
2F92 32		PUL A	
2F93 43	STROBE	COM A	
2F94 B7 8000		STA A	PIADTA
2F97 86 34		LDA A	#CA2LO
2F99 B7 8001		STA A	PIACTA
2F9C 36		PSH A	
2F9D 32		PUL A	
2F9E 36		PSH A	
2F9F 32		PUL A	
2FA0 86 3C		LDA A	#CA2HI
2FA2 B7 8001		STA A	PIACTA
2FA5 39		RTS	
2FA6 86 60	SPKSLW	LDA A	#\$60
2FA8 B7 2FCF		STA A	SPEED
2FAB 7E 1FCF		JMP	DATA

Percom PERIPHERAL


```

2FAE 7D 2FD2 SPKFNC TST STSACT
2FB1 26 02 BNE STATS1
2FB3 8D 0F BSR STSSTR
2FB5 BD 19C4 STATS1 JSR CLRNUM
2FB8 DE 59 LDX NUMSTK
2FBA B6 8002 LDA A PIADTB
2FBD 2B 04 BMI SPKFNX
2FBF 6C 00 INC 0,X
2FC1 6C 06 INC 6,X
2FC3 39 SPKFNX RTS

```

```

2FC4 86 E0 STSSTR LDA A ##E0
2FC6 B7 2FD2 STA A STSACT
2FC9 8D C8 BSR STROBE
2FCB 4F CLR A
2FCC 20 C5 BRA STROBE

```

```

2FCE 00 INIT FCB 0
2FCF A0 SPEED FCB $A0
2FD0 00 00 DELAY FDB 0
2FD2 00 STSACT FCB 0
END

```

00 ERROR(S) DETECTED

ELECTRIC CRAYON [tm] ALARM CONTROLLER

by Sam Campbell

The ELECTRIC CRAYON is more than just a low-cost peripheral for adding color to a computer. Possibly because it was introduced before its time, little is really known about the CRAYON'S capabilities. As Tim McKee showed in his article, the ELECTRIC CRAYON is a self-contained control computer with built-in color graphics capability. It has many applications. Here's an alarm system that I have implemented with an ELECTRIC CRAYON.

Alarm systems do not have to be complicated, so why a computer-controlled alarm? The answer is speed. And improved security -- a computer-controlled alarm can be hard to detect. A computer alarm needn't be expensive. An ELECTRIC CRAYON, which is ideal for this application, costs about \$250.00, including the necessary display RAM. Only a few other components are required: 1-Kbyte of program RAM and 1-Kbyte of EPROM, which are accommodated by the ELECTRIC

CRAYON, a 6821 PIA chip to activate the CRAYON's auxiliary port and, of course, cabling.

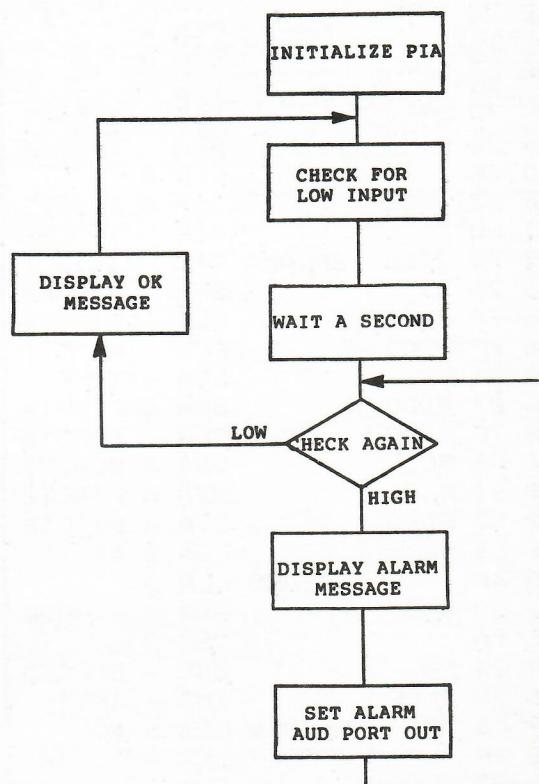
The sensor devices, reed switches, are readily available, simple to install and easy to connect. For a door sensor, the switch magnet is attached to the door. If the door is closed, the switch is closed. Window sensors can be similarly installed.

A possible set up is to use one bit for all sensors of a room, the sensors being connected in series. Alternatively, an entire house could be monitored using one large loop, leaving all the remaining 15 bits free for other chores -- to control the lighting in rooms, for example.

A program flow chart for operating this alarm system is given below. The code should be in EPROM. Since the ELECTRIC CRAYON color graphics operating system, EGOS(tm), includes a program loading function (Motorola S1-S9 format), the alarm program could be loaded into and executed from RAM.

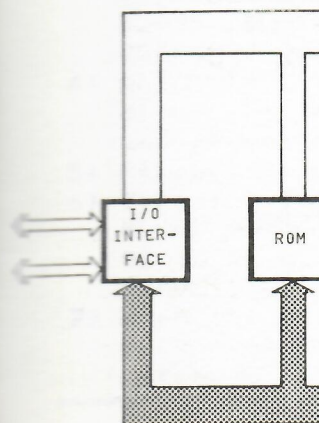
Hopefully, this short article shows how easily and inexpensively the ELECTRIC CRAYON can be put to work in useful applications. You have probably thought of a dozen or so already.

ALARM SENSOR PROGRAM FLOW CHART



Percom makes a pro aware of, the ELECTRIC CRAYON(tm) is shown in its exciting possibilities for functional block diagrams. The ELECTRIC CRAYON 6802 microprocessor computer in its own right of the 6802 MPU is operations as directed parallel port. The 6802 on a section of memory 6847 Color Video Display same color chip that is used in the Color Computer.

The 6847 can generate resolution of 256 X 1 (pixels) in two sets of two pixels in two sets of lower-density graphic memory are a mixed alphanumeric and a full semigraphic. The 6847 is conducted produces either composite-modulated signal on TV



The ELECTRIC CRAYON utilized. Most of the TR ELECTRIC CRAYON(tm) graphics generator. It more:

☆ Using the second interface adapter, the E

The ELECTRIC CRAYON [tm]

by Tim McKee

Percom makes a product you may not be aware of, the ELECTRIC CRAYON (tm). Promoted primarily to the TRS-80☆ computer market, the ELECTRIC CRAYON(tm) also has exciting possibilities for the 680X owner. A functional block diagram of the ELECTRIC CRAYON(tm) is shown in the figure below.

The ELECTRIC CRAYON(tm) has its own 6802 microprocessor and therefore is a computer in its own right. The only function of the 6802 MPU is to perform video operations as directed by the input from a parallel port. The 6802 performs its operations on a section of memory that it shares with a 6847 Color Video Display Generator IC, the same color chip that is used in the Radio Shack Color Computer.

The 6847 can generate a display with an X-Y resolution of 256 X 192 pictures elements (pixels) in two sets of two colors, or 128 X 192 pixels in two sets of four colors. Other lower-density graphic modes are available, as are a mixed alphanumeric-semigraphic mode and a full semigraphic mode. The output of the 6847 is conducted to a modulator that produces either composite video or an rf-modulated signal on TV channel 3 (NTSC).

can be connected to a keyboard -- either unencoded or encoded -- and used as an intelligent, programmable color graphics data terminal.

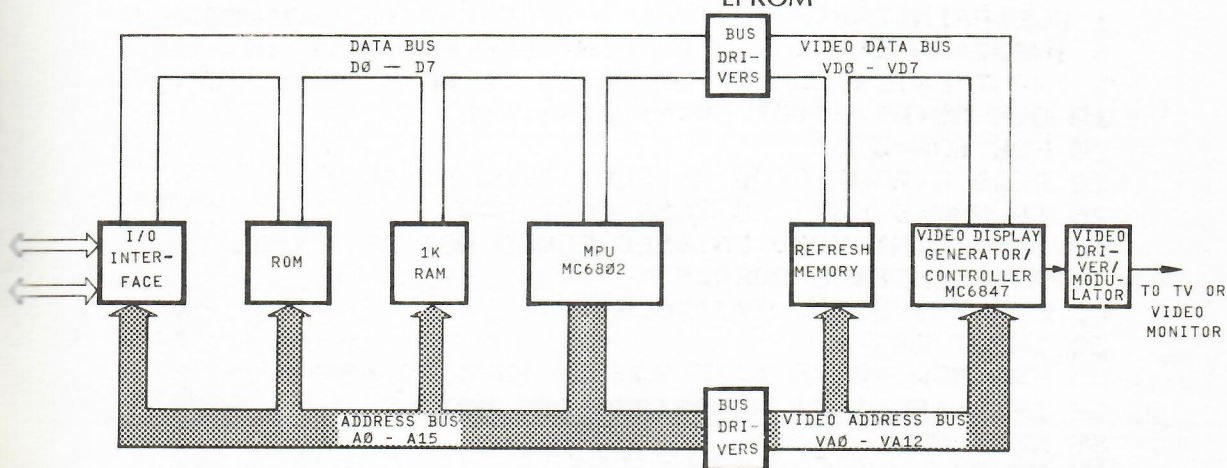
☆ Connecting a keyboard, as mentioned above, the ELECTRIC CRAYON(tm) becomes a low-cost "single-board computer" which can be used for teaching computers in schools. Most computers used for tutorial applications have only two hex LED digits for output; the ELECTRIC CRAYON(tm), however, has a 16 X 32 character display capability.

☆ The ELECTRIC CRAYON can be used in a stand-alone mode, sensing inputs -- from a burglar alarm, for example -- and processing these inputs to initiate a warning response.

The ELECTRIC CRAYON(tm) is now equipped with an improved graphics operating system, EGOS, which is fast and easy to interface to.

EGOS features:

- ☆ Vector table to commonly used routines
- ☆ Automatic look-ahead for extension EPROM



The ELECTRIC CRAYON(tm) has yet to be fully utilized. Most of the TRS-80☆ owners use the ELECTRIC CRAYON(tm) strictly as a color graphics generator. It can do much, much more:

☆ Using the second PIA (peripheral interface adapter), the ELECTRIC CRAYON(tm)

- ☆ Ability to accommodate a second command table
- ☆ Input routine vectoring
- ☆ Interrupt vectoring

The EGOS inherent commands provide the following functions:

Set display mode

Set display color
 Draw horizontal line
 Draw vertical line
 Set one point
 Erase screen
 Invert colors
 Load a Motorola S1-S9 file

I feel it will take the 680X hobbyist to exploit the full capabilities of the ELECTRIC CRAYON(tm).

Text-to-Speech with SPEAK-2-ME-2 [tm]

by Sam Campbell

The subject of text-to-speech capability using our SPEAK-2-ME-2 comes up at every micro show I attend.

SPEAK-2-ME-2 has no text-to-speech capability -- at least not directly. The program given below, however, generates text-to-

speech. I think of it as a data base, or a word base, that can be used to easily piece sentences together. Although written in Micro Soft BASIC, it can be easily adapted for other BASICs.

Words are stored as data -- using read-data statements -- in an array whose length is set by variable D in line six. Line five sets sentence length and the length of the speech array. When a word is typed, the arrays are checked to see if the word is in the word base; if it is not, an error message is displayed and you can try again.

For example, suppose you enter FOR. It is not in the word base, but FOUR is. Therefore, you could enter FOUR on the retry.

When only one word is to be entered as data, enter the word first and enter a 0 second.

Speak & Spell has about a 3,000-word vocabulary to use as a base. And since our Advanced Speech Driver program can create new words from the Speak & Spell word list, your data base can be extended almost indefinitely. I would suggest entering a base only of commonly used words, since this should be adequate for most purposes.

```
0 REM** PROGRAM IS PROPERTY OF E. (SAM) CAMPBELL.
AND IS OFFERED AS A GIFT. IF MORE THAN ONE WORD
HAS THE SAME SOUND ENTER THE OTHER WORDS AS NEW
LINE. IF ONLY ONE WORD IS ENTERED, PUT A
ZERO(0) AS THE SECOND DATA.
1 CLS:PRINTTAB(20);"TYPE-2-SPEECH-2":CLEAR1000
5 INPUT"ENTER LENGTH OF SENTENCE DESIRED.";N
6 INPUT"ENTER NUMBER OF WORDS TO BE STORED.";D
10 DIM A$(D),B$(D),C$(N),C(N),A(D)
20 FOR ROW=0TOD
22 READ A(ROW):READ A$(ROW):READ B$(ROW)
25 IF ROW=D GOTO 50 ELSE NEXT ROW
45 CLS:PRINT"WORD ENTERED COULD NOT BE FOUND.
START SENTENCE OVER."
46 FOR T=1TO500:NEXTT:CLS
50 INPUT D$
55 FOR ROW =0 TO D:IF ROW IS >D GOTO 45
58 IF A$(ROW)=D$ OR B$(ROW)=D$ GOTO60
59 NEXT ROW
60 R=R+1
65 C$(R)=D$:C(R)=A(ROW)
66 IF R=N GOTO 100 ELSE GOTO50
100 INPUT"ENTER TO SPEAK";X
101 CLS
110 FOR S=1TO N+1:IF S=N+1GOTO132
111 PRINTC(S),C$(S)
120 Z=USR2(C(S))
```

Percom PERIPHERAL
P6

```
130 NEXTS
132 CLS:F
GOTO100
133 CLS:F
IFX=1 CLS
250 ' INTE
255 REM**
260 DATA
270 DATA
271 DATA
```

Patch

The following patch submitted by Gary Da wrote our fine Gen 6800/LFD systems.

The first patch r Accounts program to

- 1) Load and sta
- 2) Remove the k
General Led
- 3) Type the fol
#LOAD 1080
#1612 OPEN #
#1614 FOR F=
#1616 PRINT
#1618 CLOSE
#SAVE 1080
#LOAD 1300
#2035 IF C1=
#SAVE 1300
- 4) When the Dr:
disk from th
and store th
- 5) Place your (
- 6) Type the fo
#LOAD 1300
#2035 IF C1=
#SAVE 1300
- 7) When the Dr:
disk from th
patch.

SUPER

The following pat BASIC (ver 2.0) for Micro Systems' 960C provided by Lt. Col. A Box 70, E. Sullivan, Colonel.

ADDRESS
0152-0153


```

130 NEXTS
132 CLS:PRINT@900,"SAY AGAIN":INPUTX:IF X=1 CLS:
GOTO100
133 CLS:PRINT@900,"ENTER NEW WORDS":INPUTX:
IFX=1 CLS :R=0:GOTO50 ELSE CLS:GOTO1
250 'INTERNAL WORD LIST 2
255 REM** ENTER DATA WORD HERE ***
260 DATA -29429 :DATA 0,ZERO
270 DATA -1781 :DATA ONE,WON
271 DATA -1781:DATA 1,1

```

Patch for GENERAL LEDGER program

The following patch and procedures were submitted by Gary Davis. Gary designed and wrote our fine General Ledger System for 6800/LFD systems.

The first patch modifies the Charge of Accounts program to correct a bug in the End

of Month program, and the second patch modifies the End of Month program itself. The modification allows the user to run the EOM program without changing the accounting month.

- 1) Load and start Super Basic.
 - 2) Remove the Write Protect tab from the ORIGINAL General Ledger disk and insert it in drive 1.
 - 3) Type the following :


```

#LOAD 1080
#1612 OPEN #10,F0+2
#1614 FOR F=1 TO 3:FOR J=1 TO 7:PRINT #10,F(F,J):NEXT J:NEXT F
#1616 PRINT #10,L$(1),L$(2),LO
#1618 CLOSE #10
#SAVE 1080
#LOAD 1300
#2035 IF C1=Z1 THEN 2200
#SAVE 1300

```
 - 4) When the Drive Activity light turns off, remove the disk from the drive, replace the Write Protect tab, and store the disk.
 - 5) Place your CURRENT Master disk in drive 1.
 - 6) Type the following :


```

#LOAD 1300
#2035 IF C1=Z1 THEN 2200
#SAVE 1300

```
 - 7) When the Drive Activity light turns off, remove the disk from the drive and you are finished with this patch.
-

SUPER BASIC ADAPTED FOR CMS 9600

The following patches for adapting Super BASIC (ver 2.0) for operation with Creative Micro Systems' 9600 (6802-processor) were provided by Lt. Col. Anthony J. Gasbarre, P.O. Box 70, E. Sullivan, NH 03445. Thank you, Colonel.

0154-0155
015B

F7B6
16

The code at 015B is for SYSMON 1.1 (8 bits, 1 stop bit, - by 64)

ADDRESS
0152-0153

CODE
F81C

Colonel Gasbarre used the following configuration:

Percom PERIPHERAL
P7

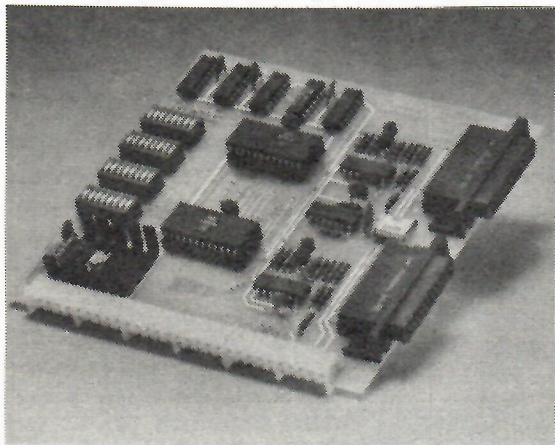
ADDRESS	CHANNEL	TYPE CODE	BASE ADDRESS	TYPE
016D	0	00	0000	-
0170	1	00	E3C0	Control Port (ACIA)
0173	2	00	E3CB	ACIA
0176	3	00	0000	-
0179	4	01	E3D0	PIA
017C	5	01	E3D8	PIA
017F	6	00	0000	-
0182	7	00	0000	-

Colonel Gasbarre made suggestions on ways to clarify the Reconfiguration section of the Super BASIC users manual, and also said he was

entirely satisfied with Super BASIC -- that it was "great".

NEW PRODUCTS

We introduce new products for SYSTEM-50 computers several times a year. Our latest is a dual asynchronous serial communications interface module for the 30-pin bus. This SIO card packs more features per dollar than any we have seen.



Features:

- Available with or without an optional on-card bit-rate generator (BRG). The BRG may be used to produce transmit/receive clock rates, thereby freeing up to five pins on the system bus for other use -- such as extended One Megabyte addressing.
- Compatible with both the older and newer versions of the System-30 bus.
- Design permits control of serial to parallel and parallel to serial data conversion, parity generation and verification, and modem control -- with minimal software overhead.
- Output signals of each channel are current-limited for protection against a short-circuit load.
- Transmit and receive rate of each channel may be individually selected. Moreover, the

transmit rate of a channel may be different from its receive rate. Data rate: 110, 300, 1200, 2400, 4800, 9600, and 19,200 bits/sec.

- Communications signals are compatible with RS-232-C standard levels. Clock signals are TTL compatible.

- Low price: Only \$59.95 without the optional bit-rate generator, only \$74.95 with the BRG components installed. Field upgrade BRG kit is only \$19.95.

Some thumbnail descriptions of other new products are set forth below. These briefs were prepared by Dale French of our technical staff.

M24SS Static RAM Card: A 24K-byte static RAM board organized into three independent 8K byte blocks. Works with either the standard SS-50 bus or the 1 Megabyte extended addressing bus. Comes assembled, burned-in and tested. Users manual includes source listing of diagnostic memory test. Also available in 8- and 16K byte configurations.

M48DSS Dynamic RAM Card: A low power 48K byte dynamic RAM board organized into three independent 16K byte blocks. Works with either the standard SS-50 bus or the 1 Megabyte extended addressing bus. Comes assembled, burned-in and tested. Users manual includes source listing of diagnostic memory test. Also available in 16- and 32K byte versions.

ColorRAMa-50: A memory-mapped color VDC board. Generates alphanumerics, semigraphic displays. Full graphic resolutions range from 64 x 64 pixels to 256 x 192 pixels. Displays in two, four or eight colors, depending on the display resolution. Two and four-color displays may be complemented. Board is

designed to act as a Shack modulator with one Kbyte of memory for alphanumeric data. Provides for low-density full graphics. Provides for low-cost manual includes source listing. Works with 1Megabyte bus. The ColorRAMa block of memory in byte address space additional RAM for modes.

The COLOR CONNECTION: card assembly which 6809-based TRS-80 SS-50 bus. The COLOR access to LFD-400 expansion, interfacing WINDOW, e.g.) to a BW display system, e SS-50 Bus Motherboard bus card that can also card for servicing fur

SS-30 Bus Motherboard: to eight 30-pin I/O c with PC board con required for applica motherboard for the

Since the last Per new 680X program including MPX/9, a 6 systems, and a 6809 BASIC.

To place an or literature, call our 1-800-527-1592. For information call (214

ED. NOTE

A supplement to this available from Perc supplement includes -- for example, ad improvement and 'short-form' product ment may be obtain our toll-free order From within Texa

TRADEMARKS APP: Percom Data Comp. ELECTRIC CRAYON, OW, LFD-400, LFD-1 SBC/9.

Tandy Radio Shack

designed to accomodate a low cost Radio Shack modulator for TV set display. Comes with one Kbyte of display RAM which provides for alphanumeric, semigraphics and two low-density full graphic display formats. Also provides for 2K byte EPROM. Cassette I/O provides for low-cost file storage. Users manual includes source listing of display OS. Works with 1Megabyte extended addressing bus. The ColoRAMa-50 occupies an 8K byte block of memory in the upper half of a 64K byte address space. Board accomodates additional RAM for higher density display modes.

The COLOR CONNECTION: A cable/circuit card assembly which is used to adapt the 6809-based TRS-80 Color Computer to the SS-50 bus. The COLOR CONNECTION allows access to LFD-400 mini-disk storage, RAM expansion, interfacing (via the ELECTRIC WINDOW, e.g.) to a word-processing quality BW display system, etc.

SS-50 Bus Motherboard: A seven-slot system bus card that can also be used as an extender card for servicing function cards.

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Since the last Peripheral was issued, many new 680X programs have been released, including MPX/9, a 6809 DOS for our LFD disk systems, and a 6809 version of Percom Super BASIC.

To place an order or request product literature, call our toll-free order number, 1-800-527-1592. For additional technical information call (214) 272-3421.

ED. NOTE

A supplement to this issue of the Peripheral is available from Percom Data Company. The supplement includes more specific information -- for example, additional notes on product improvement and maintenance -- and a 'short-form' product price list. This supplement may be obtained from Percom by calling our toll-free order number, 1-800-527-1592. From within Texas, call [214] 272-3421.

TRADEMARKS APPEARING IN THIS ISSUE:

Percom Data Company, Inc.: ColoRAMa-50, ELECTRIC CRAYON, EGOS, ELECTRIC WINDOW, LFD-400, LFD-800, MPX/9, PSYMON and SBC/9.

Tandy Radio Shack Corp.: TRS-80

SS-50 Bookstore

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.

[cont. from page 34]

OS-9 PASCAL LANGUAGE COMPILER

OS-9 PASCAL is a full implementation of the PASCAL programming language for use on any of a wide variety of 6809-based computers which utilize Microware's OS-9 Multitasking Operating System. The compiler has the ability to produce either assembly-language source code output OR "P-code" which can be executed by an interpreter with powerful high-level symbolic debugging capabilities.

Features

- ☆ Full PASCAL implementation, conforms to proposed ISO standards.
- ☆ Generates optimized native code and/or P-code
- ☆ Uses Microware's proprietary ultra-fast 9 digit floating-point math
- ☆ Sequential AND random file access plus OS-9 device independent I/O
- ☆ Enhanced character and string manipulation capabilities
- ☆ Multi-level code optimization in-

cluding compile-time constant expression evaluation and range checking.

☆ Compile-time options for control of program listing, error checking, memory allocation, and acceptance on non-standard enhancements.

☆ Compatible with BASIC09 file structures and OS-9 memory modules.

☆ Extensive standard procedure and function library.

The OS-9 PASCAL package consists of the PASCAL compiler, three P-code interpreters (standard, symbolic debug, and virtual memory versions), and an optimizing translator which converts P-code to assembly-language source code files for input to the OS-9 Interactive Assembler and the OS-9 Macro Text Editor.

The complete package is priced at \$400 and available on all standard OS-9 floppy or hard disk formats.

For further information contact: Microware Systems Corp., 5835 Grand Ave., P.O. Box 4865, Des Moines, Iowa 50304, (515)279-8844.

[SS-50]

SOFTWARE FOR PERCOM LFD-400

DIXIE a complete DOS package \$60

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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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(ALL PROGRAMS PROVIDED)

SUPER SLEUTH Disassembler System
—runs on 6800/1/9, analyzes 6800/1
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—automatic labels, optional FCB, FC
—input binary file from disk or from
—memory changes to program thru
—output disk file may be source or
—commands from menu or from and
—generates FLEX* and user-defined
—includes assembler language XRE
—contact SMOKE or CER-COMP for

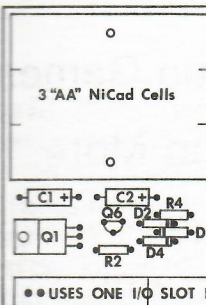
Z80/8080/8085 Disassembler (Similar)
—runs on 6800/1/9, analyzes Z-80/8

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—macro sets for TSC 6809 Macro A:

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* FULLY DOCUMENTED: instruction
of sample software (automaticall
time-of-day to assembly listing
display on top line of CRT). E

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SOFTWARE DEPARTMENT

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—memory changes to program thru full-screen editor
—output disk file may be source or new binary file
—commands from menu or from and to disk file
—generates FLEX* and user-defined names
—includes assembler language XREF program
—contact SMOKE or CER-COMP for non-FLEX* systems

Z-80/8080/8085 Disassembler (Similar to SLEUTH) \$ 99.00
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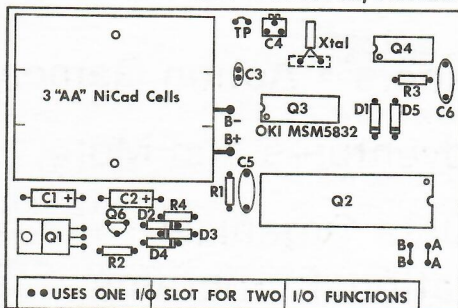
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* FULLY DOCUMENTED: instructions; diagrams; theory; more than 20 pages of sample software (automatically puts date in Flex2/9[®] date buffer, adds time-of-day to assembly listings, maintains constant, current time+date display on top line of CRT). Batteries not included. All IC's socketed.

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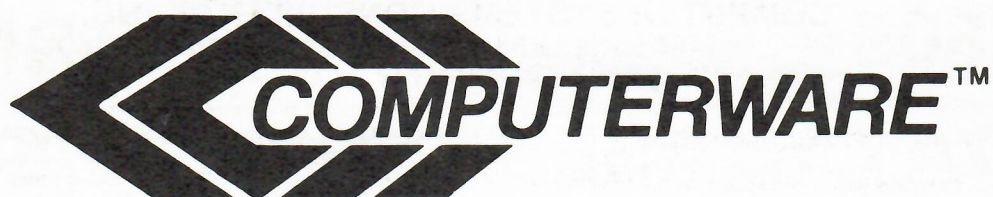
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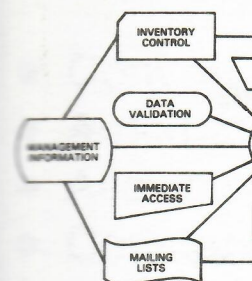
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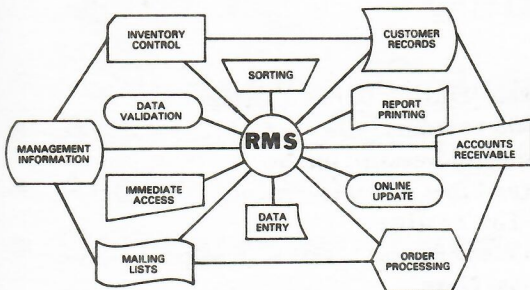
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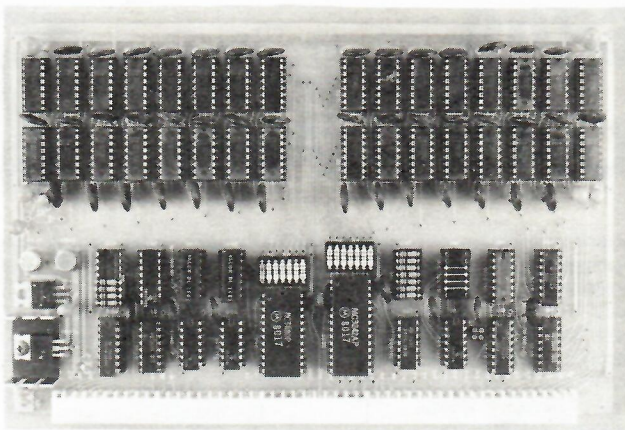
The initial version is for systems using the SWTP MP-09 CPU board and less than 64K of RAM; it does not support the DMF-2 disk. (Alternate versions available, including video-based versions). The price of \$75 includes two ROMs, complete manual, and either full, commented source listing or source code on disk — you choose!

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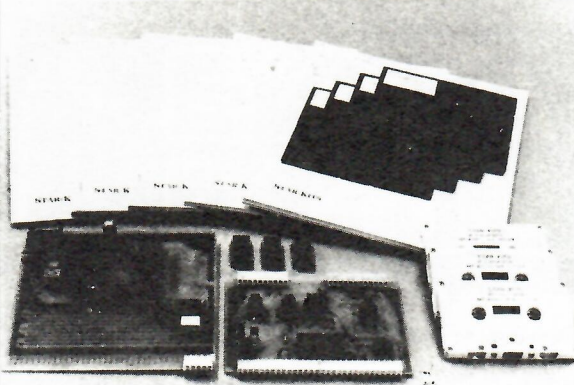
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6800 HARDWARE

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CT-PS serial parallel interface card. ACIA-type interface for RS-232C terminal and or a parallel keyboard. Makes keyboard look like a terminal with absolutely no program patching. Ideal for video board based systems. Bare board \$20, complete kit \$55, wired \$100.

6800 FIRMWARE

HUMB-BUG monitor. Totally MIKBUG compatible, plus single-stepping, multiple breakpoints, formatted memory dumps, multiple port control and more. "Fantastic!" say our customers. 2K version \$40 on 2708 or 2716 EPROM with source listing. Alternate versions, including video board versions available.

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6800 SOFTWARE

BASIC UTILITY PACKAGE rennumbers, pretty-prints, prints variable and transfer indexes, compares, shortens Basic programs. On Percom or miniFlex* disk for \$30.

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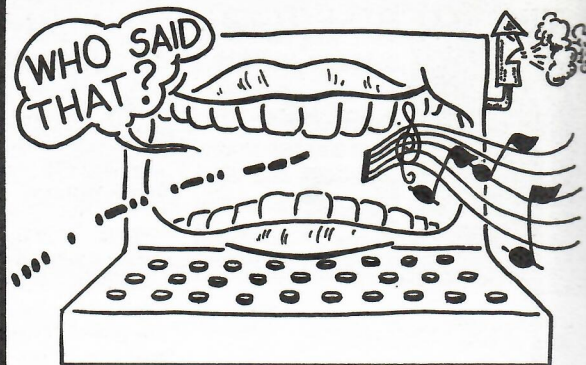
6800 CROSS-ASSEMBLER written in Basic. Assemble 6800/6802 programs on your new 6809 (or your 370 at work!). Available on 5" disk, KC cassette, or TRS-80 Level II cassette for \$9.95.

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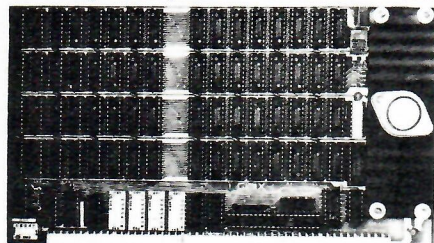
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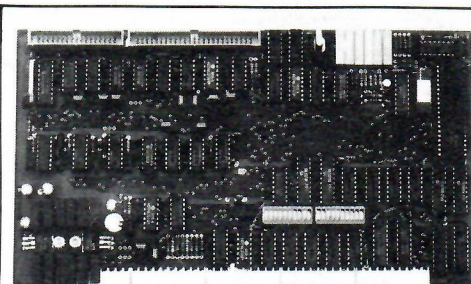
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