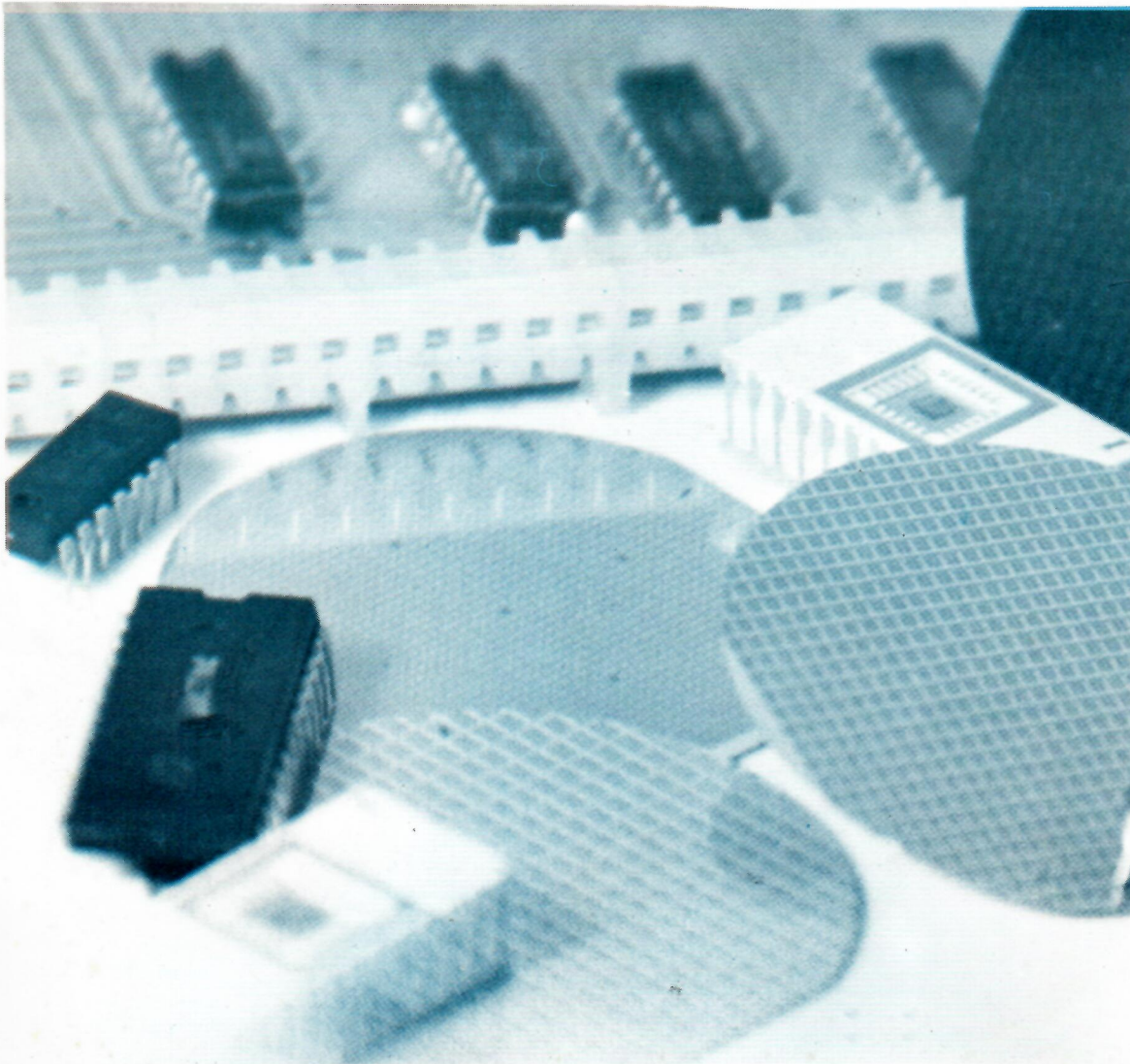


Jan-Feb 1980

SS-50 Newsletter

FOR 6800 AND 6809 USERS

- *TSC BASIC Review*
- *A BASIC Assembler*
- *The DS-68*



The Source for 6800/6809 Software

Technical Systems Consultants, Inc. is The Source for your 6800/6809 systems software needs. From FLEX™, the standard disk operating system of the 680X family, to Sort/Merge, your systems requirements can be filled with the highest quality software in the industry. Nowhere else can you find such variety from a single source. Here are some of the most popular:

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BASIC	65	65
BASIC Precompiler	40	40
FLEX Sort/Merge	75	75
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These packages are available on either 8" or 5" soft-sectored FLEX diskettes (5" 6800 is FLEX 2.0). Price includes user's manual and object code diskette. Certain programs are available on cassette. Contact Technical Systems Consultants for pricing. All orders should include 3 percent for postage and handling (8 percent on foreign orders). Master Charge and Visa are welcome.

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Editorial

By Ken Orme, Editor

Welcome to the *SS-50 Newsletter*. Although we have had a few delays in production, we hope that you are well rewarded for your wait. We are sure that the newsletter will provide some of the needed documentation that will keep your system going and up-to-date. We will provide helps for the SS-50 user to keep up with products, software ideas and fixes both from readers and from industry.

One of the surveys that has been taken on "who owns what" indicates that there are more 6800 users out there than most people realize, even the 6800 users themselves. It is starting to look better for us as SS-50 types when you thumb through the magazines and see *several* ads for SS-50 bus equipment and software, compared to two or three ads a year or so ago.

We welcome all users of the SS-50 or SS-50C busses to submit articles and "fixes" to help others keep informed of what you are doing. Software is really helpful since many of the good programs that are available for other micro-processors are not yet available to us. Please keep your letters or articles neat, and if possible type them. For listings, we would prefer them straight off your printer. We will do our best to get your information into the newsletter.

Since this is a newsletter, we will try to keep up on the *news* from industry, from dealers, and from the software houses. We invite news releases from these sources to help keep you informed.

We also invite your questions, and will do our best to answer them in our question and answer column.

Since the SS-50 bus was introduced to the people who worked on computers as a hobby, we will offer a good selection of tips on hardware modification and design for those of you who still like to get out the soldering pencil.

Ideas on earning money from your equipment will be welcomed, and we will pass along ideas on that subject as often as possible. It's much nicer if your system can help pay the bills instead of creating more bills to pay.

We welcome your ideas and suggestions, and hope that you will tell your friends about the SS-50 newsletter. It's through you that we can make the newsletter benefit all of us.

Letters

I would like to have a sample of your SS-50 Newsletter. I am running SWTP with MF68 disk and am interested in business software.

I have quite a bit that I have written and would like to swap or swap ideas.

W. L. King
310 S. Heyward
Bishopville, SC 29010

We are publishing your address so interested readers may contact you. We would also be interested in publishing your software or ideas in the newsletter.

Upon purchasing from TSC, we hope you would be able to use programs with a line numbering system. The text many nice features. Changing a word time it appears. Deleting a word, lines is easily accomplished by inserting a new existing ones.

We discovered that the line numbering

BUS
FIRST CL

name you select and
NEW FILE:
1.00 =

BASIC ASSEMBLER

A BASIC Translator For Use With TSC's Editor

Upon purchasing the text editor from TSC, we hoped that with it we would be able to write our basic programs with a method of auto-line numbering and save a lot of time. The text editor does have many nice features, such as changing a word or variable each time it appears in the program. Deleting a word, line, or group of lines is easily accomplished, as is inserting a new line between existing ones.

We discovered, to our dismay, that the line numbers which are supplied by the editor are deleted automatically before the tape or disk is saved. So, our attempt to use the auto-numbering feature of the editor had failed.

After some thinking, we decided to write a program to translate a file saved without line numbers using the TSC editor into a Basic file.

The program we wrote will generate a Basic program from a text file and take care of numbering and any re-sequencing as part of the translation. Additionally, it will allow the use of labels in the place of line numbers. It is presently designed to be used with FLEX 2.0 and TSC's BASIC.

In order to use the translator, a text editor file is created. Using FLEX 2.0 you would type:

+ + + **EDIT**,filename

This will create a file of the name you select and show:

NEW FILE:

1.00 =

You then proceed to write your program using the general rules and syntax of Basic with the following exceptions:

- 1- No line numbers need to be put in front of the statements unless needed to reference that line elsewhere (in a GOTO ...)
- 2- Labels or numbers may be used for line referencing. If a label is used, it must be 2, 3, or 4 letters in length.
- 3- If no label or number is used, a space *must* be inserted at the first of each line.
- 4- When using THEN and ELSE, labels must be *numbers only*.
- 5- To conserve memory, spaces may be omitted *except* around the number or label. Also, a space is required right after the number or label when used at the beginning of a line.

When you've finished writing your program you end with a "##" sign:

35.00 = #

You may then edit the program as necessary, using the commands as outlined in TSC's manual. For those of you who are not familiar with the features of the editor, it includes : A CHANGE command, a DELETE command, an INSERT command, a RENUMBER directive, a FIND directive, a COPY directive, a MOVE directive and a REPLACE directive. These features make the EDITOR a very nice way to write programs.

```

STRT PRINT " THIS IS A NUMBER GUESSING G
AME. I'LL THINK"
PRINT "OF A NUMBER BETWEEN 1 AND ANY LI
MIT YOU WANT."
PRINT "THEN YOU HAVE TO GUESS WHAT IT I
S ."
PRINT
155 PRINT "WHAT LIMIT DO YOU WANT (TYPE
A '0' TO END)"
INPUT L
PRINT
LET L1=INT(L*RND(0))+1)
IF L=0 THEN END
THINK PRINT "I'M THINKING OF A NUMBER BET
WEEN 1 AND ";L
LET G=1
PRINT "NOW YOU TRY TO GUESS WHAT IT IS"

LET M=INT(L*RND(0))+1)
20 INPUT N
IF N=0 THEN NEW
GOSUB 70
GOTO STRT
NEW IF N=M THEN 50
LET G=G+1
IF N>M THEN 40
PRINT " TOO LOW. GUESS AGAIN. "
GOTO 20
40 PRINT " TOO HIGH H. GUESS AGAIN. "
GOTO 20
50 PRINT "THAT'S IT!! YOU GOT IT IN ";G;
" TRIES. "
IF G<L1 THEN 58
IF G=L1 THEN 60
PRINT "YOU SHOULD HAVE BEEN ABLE TO GET
IT IN ONLY ";L1;" TRIES. "
GOTO 65
58 PRINT "VERY" ;
60 PRINT " GOOD "
65 GOSUB 70
INPUT "DO YOU WANT TO TRY AGAIN WITH TH
E SAME LIMIT",G$
IF LEFT$(G$,1)="Y" THEN GOTO THINK
GOTO 155
70 FOR H=1 TO 5
PRINT
NEXT H
RETURN
END

```

GUESS.TXT before translation

When all editing is done and the program is ready, you just type **STOP**. The file will be saved to disk and the FLEX prompt will appear. To translate your program into one that will load correctly in Basic, you call the translator program using the command:
+++ BASICASM, filename, st#, inc
the filename defaults to .TXT, the starting line number to 10, and the

```

10 PRINT " THIS IS A NUMBER GUESSING GAM
E. I'LL THINK"
20 PRINT "OF A NUMBER BETWEEN 1 AND ANY
LIMIT YOU WANT."
30 PRINT "THEN YOU HAVE TO GUESS WHAT IT
IS ."
40 PRINT
50 PRINT "WHAT LIMIT DO YOU WANT (TYPE A
'0' TO END)"
60 INPUT L
70 PRINT
80 LET L1=INT(L*RND(0))+1)
90 IF L=0 THEN END
100 PRINT "I'M THINKING OF A NUMBER BETH
EEN 1 AND ";L
110 LET G=1
120 PRINT "NOW YOU TRY TO GUESS WHAT IT
IS"
130 LET M=INT(L*RND(0))+1)
140 INPUT N
150 IF N=0 THEN NEW
160 GOSUB 360
170 GOTO 10
180 IF N=M THEN 250
190 LET G=G+1
200 IF N>M THEN 230
210 PRINT " TOO LOW. GUESS AGAIN. "
220 GOTO 140
230 PRINT " TOO HIGH H. GUESS AGAIN. "
240 GOTO 140
250 PRINT "THAT'S IT!! YOU GOT IT IN ";G;
" TRIES. "
260 IF G<L1 THEN 300
270 IF G=L1 THEN 310
280 PRINT "YOU SHOULD HAVE BEEN ABLE TO G
ET IT IN ONLY ";L1;" TRIES. "
290 GOTO 320
300 PRINT "VERY" ;
310 PRINT " GOOD "
320 GOSUB 360
330 INPUT "DO YOU WANT TO TRY AGAIN WITH
THE SAME LIMIT",G$
340 IF LEFT$(G$,1)="Y" THEN GOTO 100
350 GOTO 50
360 FOR H=1 TO 5
370 PRINT
380 NEXT H
390 RETURN
400 END

```

GUESS.BAS after translation

numbering increment to 10.

If you did everything properly, the file will be created as filename.BAS, and it may be run in Basic as usual.

If you have errors in the format of the text file, you will get an error message for each line in which an error occurred. The most common errors are "LABEL NOT FOUND", and "SYNTAX ERROR", both of

which are often improper spacing label. The error listed along with that was assigned translator. As ar left the start numbers at 10 ar line 160, then it is text file. You c editor to make co text file and ru again. Once you text editor, you writing your progr only takes a few s learn the syntax ar Basic translator. the SS-50 Newsle the source listing of how it works.

We are presentl version for those of cassette tape syste write and let us k interested in the c By sending us a determine how mu is for cassette re systems, hardware :

A FLEX 2.0 disk the source and objec is available for \$10 Newsletter, Box 40 84321. Request t disk. Due to the must request prepa No COD's please.

PLEASE M

The SS-50 N

When Requestin
From Our A

which are often associated with improper spacing before or after the label. The error message will be listed along with the line number that was assigned to that line by the translator. As an example, if you left the start and increment numbers at 10 and the error is in line 160, then it is in line 16 of the text file. You can then use the editor to make corrections to your text file and run the translator again. Once you get used to the text editor, you will really enjoy writing your programs this way. It only takes a few short programs to learn the syntax and start using the Basic translator. The next issue of the *SS-50 Newsletter* will contain the source listing and a discussion of how it works.

We are presently working on a version for those of you who have a cassette tape system only. Please write and let us know if you are interested in the cassette version. By sending us a note, we can determine how much interest there is for cassette related operating systems, hardware and software.

A FLEX 2.0 disk containing both the source and object of BASICASM is available for \$10.00 from SS-50 Newsletter, Box 402, Logan, Utah 84321. Request the BASICASM disk. Due to the low price we must request prepaid orders only. No COD's please.

[SS-50]

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The SS-50 Newsletter

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Interrupt Timer

Build It Yourself and Save!

An interrupt timer board can be expensive for what it really does. Here's a timer that can be built for less than \$10 complete and only takes about an hour.

The heart of the timer is the MM5369 Programmable oscillator-divider IC along with a 3.57 MHz crystal. A complete kit of parts is available from Digital Research (of Texas) or Poly Packs for about \$5.00. The kit from Poly Packs does not have a circuit board, but otherwise the kits are very similar in content and construction. The kit should be built following the instructions given with it. After the kit is built and tested, you may use it for an interrupt timer by connecting the output from the timer to connection C1 on the "b" side of a parallel I/O board plugged into port#4. At least this is one method of connection to your computer. Power for the tiny timer may be pulled off from the parallel board itself making the connections very easy.

We will have more specific information on the interrupt timer in a future article. One thing for sure, it does beat the price tag of some of the interrupt timers designed specifically for the SS-50 bus.

[SS-50]

*Poly Packs, P.O. Box 942, South
Lynnfield, Mass. 01940*

*Digital Research [of Texas] P.O.
Box 401247, Garland, Texas 75041*

TSC BASIC

Review on a Fast Basic With a Couple of Surprises!

After seeing the ad for the new 6800 BASIC from TSC, we were very excited. The ad claimed from two to ten times faster than other popular BASICS, with increases up to 75 times! After waiting about 90 seconds per generation on a LIFE program, we were anxious to at least try the BASIC. The ad we saw was for the cassette version of the BASIC. We wanted, however, to wait for the disk version as it would fit our needs better.

Another month or two and the waiting was over. TSC had the BASIC out as promised and our order arrived in a couple of weeks. The version that we ordered was for FLEX 2.0. The manual mentioned that it would take 20K of memory in order to run it (BASIC occupies Hex 0020 - 35FF). The manual is correct when it says that...In fact we would recommend at least 30K if you are going to do some larger programs. One of the things that you should know, though, is that with this BASIC a program runs more efficiently as well as faster. That means you use less RAM memory than with some other BASICS.

Now down to the BASIC itself. TSC has an interpreter that features over 50 Functions and Commands including IF/THEN/ELSE construct. It is fast, but uses six digit floating math. Some of the other features include unlimited string length, and two dimensional arrays. The FLEX 2.0 version also has random file capabilities in addition to the sequential files that come

with the Mini-FLEX. An additional feature that makes the BASIC nice, is the RENUMBER routine that is included with the FLEX 2.0 version. It will renumber your BASIC program replacing line numbers with the new starting value of your choosing, incrementing with the value you choose. The routine is called directly from BASIC even though it is a FLEX routine. (It is called with the "+" command.)

The statements included with TSC's BASIC are:

```
CHAIN CLOSE DATA DEF DIM
END EXEC FIELD FOR GET
GOSUB GOTO IF INPUT
INPUT LINE KILL LET LSET
NEXT ON ERROR ON GOSUB
ON GOTO OPEN POKE PRINT
PUT READ REM RENAME
RESTORE RESUME RETURN
RSET STOP
```

Commands include:

```
+ CLEAR COMPILE CONT
EXIT FLEX LIST LOAD
NEW RUN SAVE
```

The Functions for BASIC are:

```
ABS ASC ATN CHR$ COS
CVTF$ CVT$F ERL ERR
EXP HEX INT LEFT$ LEN
LOG MID$ PEEK PI POS PTR
RIGHT$ RND SGN SIN SPC
SQR STR$ TAB TAN VAL
```

The operators consist of:

```
+ * ^ < = <= -
/ ** > <> >= AND
OR NOT
```

The only dis BASIC that we 1 that it has only accuracy. (Actual accurate to seven printed out.) Th under most use scientific or bus should be note many of the "mi the same accu applications, the not present any p

The fact that it variables makes seem to find use many other B/ which help to interchangeability 0 (zero) as an arr allowed.

Logical operat and 'OR' are also BASIC, along wi relational operat concatenated wit and relational of tion with strings variables.

The COMPILI programs to the form which in mo than the standa form. The comp faster and seem programs that are needing any furth

The + comm that the rest of th to FLEX. This, feature of the r allows most of th directly from BA need to transfer back to BASIC

Some other poi statements are ERROR GOTO st useful. IF/THEN is helpful for sor

The only disadvantage to the BASIC that we found was the fact that it has only six decimal digit accuracy. (Actually, it is internally accurate to seven, with six digits printed out.) This is not a problem under most uses, but can be for scientific or business purposes. It should be noted, however, that many of the "mini's" are limited to the same accuracy. For most applications, the accuracy should not present any problems.

The fact that it can use two letter variables makes us happy, as we seem to find uses for them. Also, many other BASICS use them, which help to make program interchangeability easier. The use of Ø (zero) as an array subscript is also allowed.

Logical operators 'AND', 'NOT' and 'OR' are also part of TSC's 6800 BASIC, along with the traditional relational operators. Strings can be concatenated with the + operator, and relational operators will function with strings as well as other variables.

The COMPILE command saves programs to the disk in a compiled form which in most cases is smaller than the standard BASIC saved form. The compiled programs load faster and seem to be ideal for programs that are 'finished' and not needing any further changes.

The + command tells BASIC that the rest of the line after it goes to FLEX. This, to us, is the best feature of the new BASIC as it allows most of the FLEX operations directly from BASIC without the need to transfer to FLEX and then back to BASIC.

Some other points...Implied LET statements are allowed. ON ERROR GOTO statements are very useful. IF/THEN/ELSE construct is helpful for some programs as it

makes many of them shorter. Another nice feature is line numbers up to 32767 instead of the (sometimes) limiting number of 9999. Multiple lines may be used with either the : or the \ as a delimiter. Strings may be quoted with a " on both sides or a ' on both sides (with the other one useable as part of the string). String length, array size and nesting are limited only by the amount of user memory. The input buffer will permit up to 127 characters to be entered before an error is produced.

The mathematical functions have a few extras, such as the SPC(I) function which is used with a print statement to print "I" spaces. There is a PI function which returns the value of Pi. And a PTR(I) returns the address of the variable "I". The HEX function allows hexadecimal number representation or conversion to be used. Of course, the other standard BASIC functions are included as well. And by the way, the ** may be used the same as the ^ (up arrow) for exponentiation.

As part of our review, we wanted to check out the claim for the "fastest floating point BASIC interpreter for any micro..".

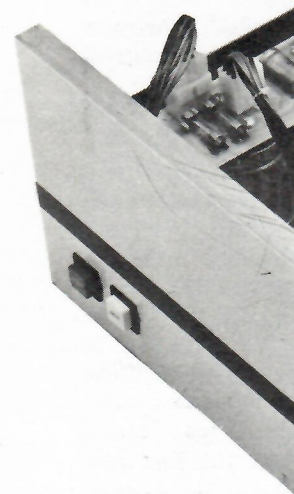
We did our tests against those that have been called *Kilobaud's* benchmark programs. They are made up of seven timing programs that work with practically every BASIC ever written. The results of the tests are as follows:

Benchmark #1	1 sec.
Benchmark #2	3.5 sec.
Benchmark #3	10 sec.
Benchmark #4	10 sec.
Benchmark #5	11 sec.
Benchmark #6	17 sec.
Benchmark #7	27 sec.

WE H

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Modular plug-in construction filters and a 25 AMP rectifier bridge fan is standard equipment. All connections to the power line are beneath the safety shield.



PROCESSOR

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PERIPHERALS— The wide range 80 and 132 column), IBM Elec systems and a 16 megabyte hard

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69/K Computer Kit with 8K
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69/56 Assembled Computer



As you can see by the times, they are much faster than 14.9, 24.7, 96.1, 105.3, 109.8, 174.1, and 204.5 seconds for the same benchmark with SWTPC's BASIC. We are *not* saying that the SWTPC BASIC is bad, just slow. Dr. Chuck Adams recently tested G2-BASIC which is written by Microsoft and used eight different benchmarks to test it. Here are the results of the tests that we did, along with G2 BASIC on a 6800 machine:

Benchmark 1 - TSC 10, G2 14.3, Pet 14.5, and Northstar 12 sec.

Benchmark 2 - TSC 109, G2 181, Pet 190, Northstar 137 sec.

Benchmark 3 - TSC 12, G2 32.75, Pet 37, Northstar 21 sec.

Benchmark 4 - TSC 10, G2 18.5, Pet 20, Northstar 15 sec.

Benchmark 5 - TSC 10, G2 14.3, Pet 14, Northstar 12 sec.

Benchmark 6 - TSC 36, G2 98.5, Pet 106, Northstar 51 sec.

Benchmark 8 - TSC 1, G2 2.7, Pet 2, and Northstar 4 sec.

Benchmark 9 - TSC 10, G2 14.3, Pet 14.5, Northstar 12 sec.

The TSC BASIC was running on a SWTPC mainframe with 32K of memory and dual disks, the Pet used was Commodore's 16K version with full-size keyboard, and the Northstar used was a 4 Mz. version using Northstar BASIC, with 32K memory and dual disks. The benchmarks and the information on the G2 BASIC came from an article in July 1979 '68' *Micro Journal*.

With the FLEX 2.0 version of TSC BASIC, you have three types of files available...Sequential, virtual arrays and Record I/O. When you purchase the Mini-FLEX version,

you get sequential files only, as Mini-FLEX does *not* support random access files. The CVT(convert) Function is used with Record I/O files to convert variables to strings or vice-versa. This function is different from the STR\$ and VAL functions.

There are several things left out of the instruction manual that we found when "picking apart" TSC's BASIC. One of the best things for people who use PRINT a lot: You may use ? to replace the word PRINT. When you key it in, it appears as ?, but when listed it says, "PRINT". Some *ads* we read mentioned TRACE commands, but the *manual* didn't. The BASIC *does* have TRACE commands...TR ON for trace on and TR OFF for trace off. This function sometimes helps in debugging programs. A very useful function that was left out of the manual will let you know how many free bytes of user memory are still available. To use this command, just type ?FRE(0). Again, you are using ? to replace the word PRINT. The BASIC will respond with the number of bytes in decimal. You will wonder why TSC ever left this last command out of the manual...Type in T[^]@ and hit return. (Press Control C to get out of this one.)

We're not going to reveal the command result, but those of you with the BASIC, try it!

From our use of the BASIC, we discovered that this version (along with FLEX 2.0) is very exciting to a 6800 owner. In fact, we're glad that we purchased it because of its many features, as well as the increase in speed. We recommend it highly!

[SS-50]

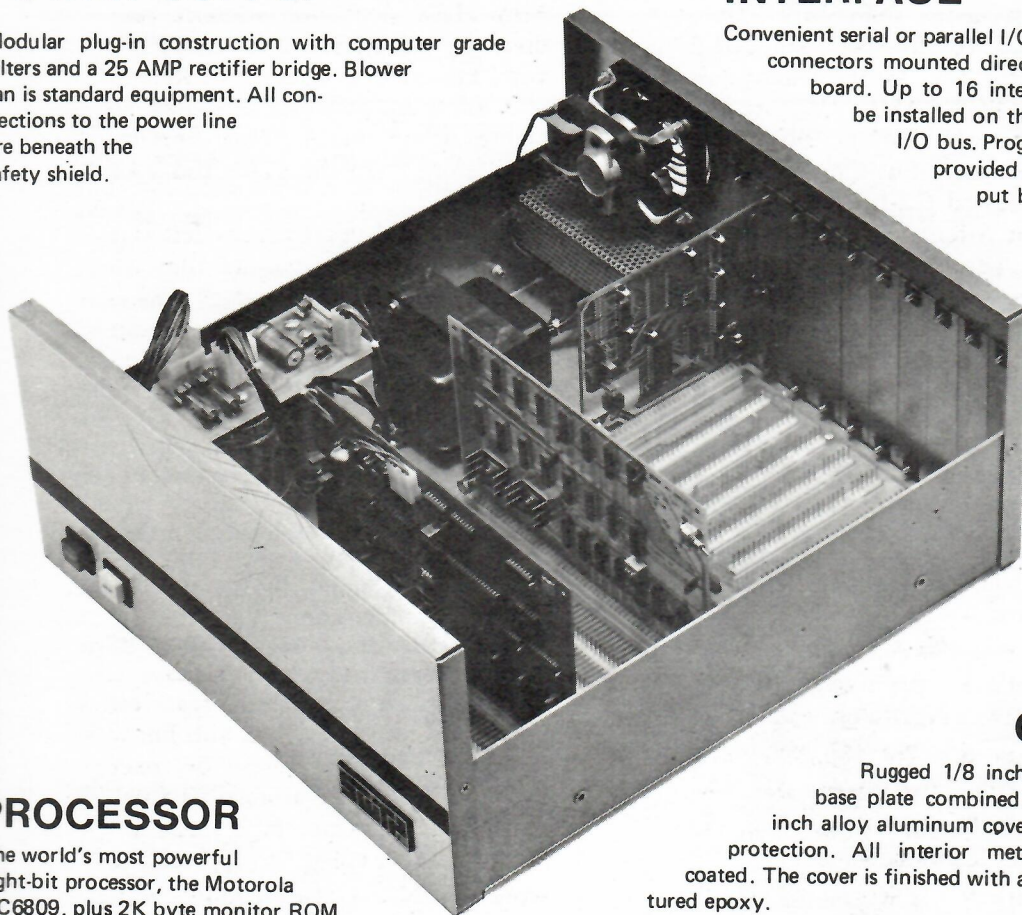
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CABINET

Rugged 1/8 inch alloy aluminum base plate combined with a solid 1/8 inch alloy aluminum cover for unsurpassed protection. All interior metal is conversion coated. The cover is finished with a super tough textured epoxy.

MEMORY— You can purchase the computer with either 8K bytes of RAM memory (expandable to 56K), or with the full 56K. The efficient, cool running dynamic memory used in this system is designed and manufactured for us by "Motorola Memory Systems Inc."

PERIPHERALS— The wide range of peripheral hardware that is supported by the 6809 includes: dot matrix printers (both 80 and 132 column), IBM Electronic 50 typewriter, daisy wheel printers, 5-inch floppy disk system, 8-inch floppy disk systems and a 16 megabyte hard disk.

SOFTWARE— The amount of software support available for the 6809 is incredible when you consider that it was first introduced in June, 1979. In addition to the FLEX9 operating system, we have a Text Editor, Mnemonic Assembler, Debug, Sort-Merge, BASIC, Extended BASIC, MultiUser BASIC, FORTRAN, PASCAL and PILOT.

69/K Computer Kit with 8K bytes of memory	\$ 495.00
69/A Assembled Computer with 8K bytes of memory	\$ 595.00
69/56 Assembled Computer with 56K bytes of memory	\$1,495.00



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(512) 344-0241

THE DS-68 DIGISECTOR

Computer Portraits For the 6800

The DS-68 is a video digitizer which accepts video as input and converts the video into digital data. The DS-68 will resolve 256 x 256 elements with up to 64 levels of grey scale.

We purchased our DS-68 in May of 1978 and have paid for our entire system by using it as a computer portrait system. We were fortunate to own a Centronics 102A printer, so the only items we had to purchase to do computer portraits were a 10 line-per-inch kit for our printer, a video camera, and a heat press (for heat-transferring portraits from paper to T-shirts, etc.)



A computer Portrait from the DS-68

The DS-68 comes with a software listing to do portraits using a Malibu Design Group printer. We converted the software for use with our Centronics and enhanced the software so we could add titles at the bottom and have the option of printing the picture in reverse (so it would be normal when it was transferred to a T-shirt.)

The DS-68 is very easy to hook up. All that is required is to plug it

into any I/O slot and to attach the video input from your camera and the output to a video monitor. The output appears the same as the input with an intensified cursor located at the point which is currently being digitized. The only adjustments are a brightness control and a width control.

The DS-68 is different from some other digitizers in that you tell it the address of the point you wish to digitize and then read in the value for that point. Other digitizers, notably those used in portrait systems, save the entire picture to memory in one quick transfer. This does place the DS-68 at a slight disadvantage when doing computer portraits, because the subject has to hold still for about 1 second. You also can not view the frozen picture from memory with only the DS-68. The random access scanning does, however, have some major advantages in other applications of the DS-68.

We have had no problems in the operation of our DS-68. It is well constructed and has many applications from computer portraits to character recognition. We have had fun using ours, and have also made pretty good money selling computer portraits.

With a little imagination, ideas like fast-scan to slow-scan TV conversion are possible by adding a Motorola 6845 CRT Controller to the circuit. This would allow sending pictures over phone lines or via Ham Radio and allow saving portraits on your disk system.

For more information on the DS-68 digisector contact The Micro Works, PO Box 1110, Del Mar, CA 92014. (714) 942-2400.

[SS-50]

SEA

There are many memory boards in fact that it was offer 8K of memory board. There are problems with the does a fine job at RAM into a system.

One of the thin board a little hard the fact that it on blocks. That can problem to those memory boards in three.

The other problem serious, but can just a little tin soldering pencil, care of it. The switches for address and all goes well address anything board just will not unless the modification the board. The here is not the on board to work in the memory, but the addressing in the 1 so you will be able way up to 64K manual.

The first thing the proper corner the work on. This pictorial and can words "Seals Electronics bottom right-hand board (foil side). shown with the " should be careful

SEALS MEMORY MODIFICATION

You Too Can Go Above 32K!

There are many Seals 68 KSC memory boards in use due to the fact that it was one of the first to offer 8K of memory all on one board. There are some minor problems with the board, but it still does a fine job at adding some more RAM into a system.

One of the things that makes the board a little hard to work with is the fact that it only switches in 8K blocks. That can cause a little problem to those who have 4K memory boards in groups of one or three.

The other problem is more serious, but can be "fixed" with just a little time and the old soldering pencil, and you can take care of it. The board has DIP switches for addressing the memory and all goes well until you try to address anything above 32K. The board just will not work above 32K unless the modifications are done to the board. The modification given here is not the only way to get the board to work in the higher range of memory, but the fix will not hinder addressing in the lower range either so you will be able to address all the way up to 64K as stated in the manual.

The first thing to do is to locate the proper corner of the board to do the work on. This is shown in the pictorial and can be located by the words "Seals Electronics" near the bottom right-hand corner of the board (foil side). The three foils shown with the "X" on each side should be carefully cut. The

pictorial shows the proper places which are as follows: IC #68 - cut the path between pin 6 and the thru-board connector (which winds up at IC #66 - pin 2). IC #66 - cut the foil between pin 1 and ground. And on IC #65 - cut the foil going to pin 4 from the DIP switch. Again, make sure the cuts are clean and be very careful so you do not cut the paths nearby.

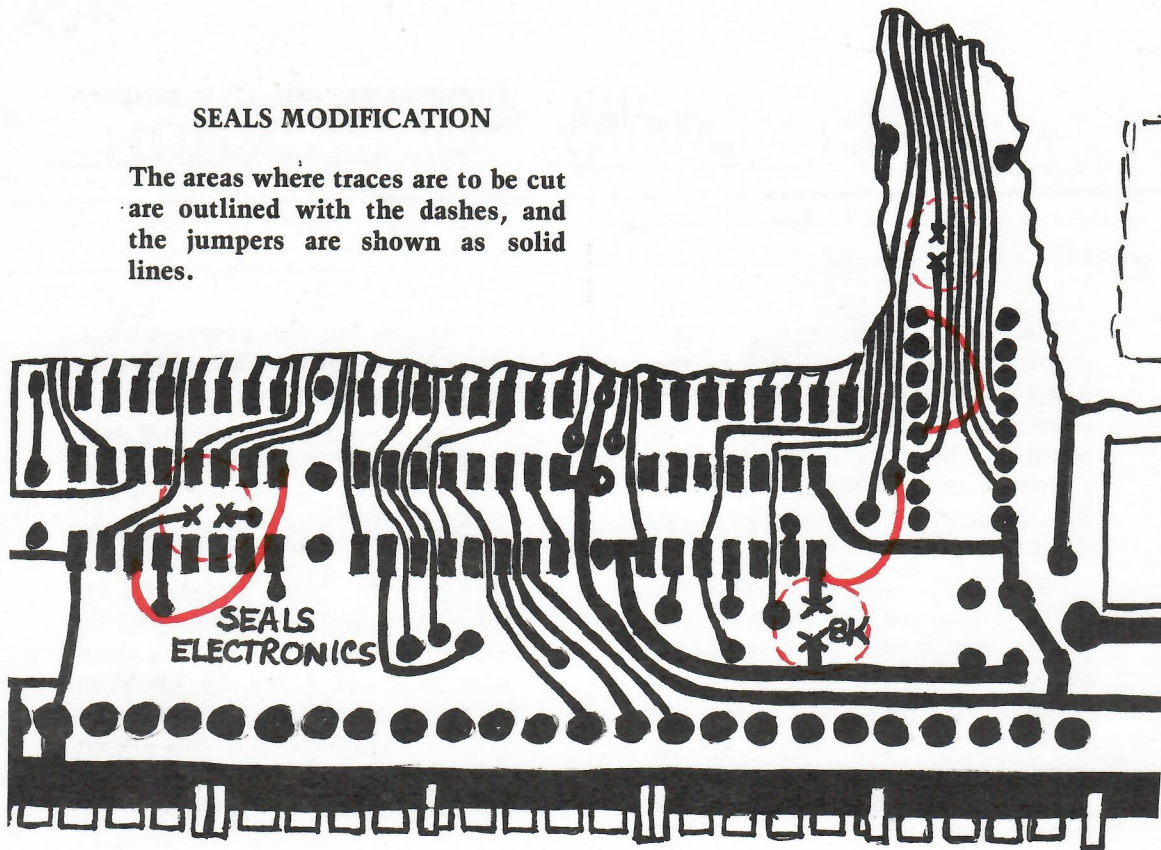
The next part of the fix involves jumpering in the three places as shown in the pictorial. They are as follows: IC #68 - Jumper from pin 6 to pin 16. IC #66 - Jumper from pin 1 to the path coming from DIP switch #7. (This is the pad located between pins 2 & 3 on IC 65.) And on IC #65 - Jumper from pin 4 to pin 8. Again, be very careful so you do not bridge any places with solder.

Now, if everything went well and you did the proper things, you just need to test out the board. *The one thing to remember after making this modification is that DIP switch number eight should remain in the off position no matter what switch settings in the manual are assigned.* All other switches should be set as instructed in the manual. We found that this change worked very well for placing an 8K block up high enough for FLEX 2.0 to boot (40 to 48K). We hope that this fix will help some of you to get the full address range out of your 68-KSC.

[SS-50]

SEALS MODIFICATION

The areas where traces are to be cut are outlined with the dashes, and the jumpers are shown as solid lines.



MiniFLEX Software Discontinued

Technical Systems Consultants have announced that they are discontinuing the MiniFLEX software which is the original version of FLEX supplied by SWTPc for the MF-68 floppy disk system. The reason for the change is that the new FLEX 2.0 is presently being supported, due to the improvements and the compatibility with the 8" FLEX which is distributed by SWTPc and the FLEX which all other systems run. FLEX is available for almost all 6800 systems at the present, with the remaining few that are not available coming along shortly. Of course, the 6809 FLEX is also compatible with FLEX 2.0, so FLEX will be supported for a long time to come.

FLEX is a trademark of Technical Systems Consultants, Inc.

The Motorola MC68000

Motorola has announced sample quantities of their MC68000 16-bit microprocessor. The MEX68KDM Design Module is immediately available for those wishing to design MC68000 based systems and for a standalone microcomputer when powered by the appropriate supply and suitable peripherals. Cross Macro Assemblers are ready for the EXORciser (tm) in either the 6800 version or the 6809 version, the IBM370 and the PDP-11.

Production is being expanded rapidly, with production quantities becoming available this year.

EXORciser is a trademark of Motorola Inc.

New P1



ELECTRONIC

Severe AC surges, noises a valent in man installations. The designed to cu electrical problem

Incorporating spike suppressor features 3 ind filtered 3-prong A Super Isolator car 1875 watt load, capable of handlin

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Circle

SMOKE !

Smoke Signal announced their Writer video disp SS-50 bus. It feat CRT controller ch an 80 by 24 displa contains 128 cha upper and lowe graphic characters is optional for a 2

Other feature include reversed intensity, protect cursor addressing

New Products



ELECTRONIC SPECIALISTS

Severe AC power line spikes, surges, noises and hash are prevalent in many microprocessor installations. The *Super Isolator* is designed to curb these severe electrical problems.

Incorporating heavy duty surge/spike suppressors, this device features 3 individually dual-Pi filtered 3-prong AC sockets. The *Super Isolator* can accommodate an 1875 watt load, with each socket capable of handling 1000 watts.

For more information contact Electronic Specialists, Inc., 171 South Main Street, Natick, MA 01760, (617) 655-1532.

Circle No. 53

SMOKE SIGNAL

Smoke Signal Broadcasting has announced their VDB-1 *Smoke Writer* video display board for the SS-50 bus. It features the MC6845 CRT controller chip which controls an 80 by 24 display. A 2K EPROM contains 128 characters, including upper and lower case, and 32 graphic characters. A 4K EPROM is optional for a 256 character set.

Other features of the VDB-1 include reversed video, reduced intensity, protected fields, direct cursor addressing, programmable

display rates, and a 2K memory-mapped video RAM.

For further information contact Smoke Signal Broadcasting, 31336 Via Colinas, Westlake Village, CA 91361.

Circle No. 51

10 Megabyte Disk Available

Software Dynamics announces a 10 megabyte Winchester disk drive for Motorola EXORcisor systems. With a capacity of 19,000 512 byte sectors the *STORAGE DEMON* (tm) is compatible with both EXORcisor I and EXORcisor II.

The operating system includes the interrupt-driven *SDOS*. *SDOS* features keyboard typeahead, automatic disk read-ahead and sector pooling, and dynamic files with random access to the byte. Other software available includes the powerful SD Business BASIC Compiler with 10 digit arithmetic, IF-THEN-ELSE, file I/O, and many other fine features. For further information write to: Software Dynamics, 2111G W. Crescent Ave., Anaheim, Calif. 92801

Circle No. 72

MICROWARE AND 6809

Microware is entering the 6809 software field with some help in development from Motorola. Their BASIC-09 is said to be an incremental compiler which partially translates each line as it is entered, thereby helping to catch those syntax errors before the program is run. Other programs and software are available or in the process of development. Contact Microware, 5835 Grand Ave., P.O. Box 4865, Des Moines, IA 50304 (515) 279-8844.

Circle No. 70

continued on page 16



TRACER: A 6800 DEBUGGING PROGRAM

by Robert D. Grappel and Jack E. Hemenway

This guide is designed for the programmer requiring good debugging devices. Included are tracer program notes and complete source listings. Also included is a humorous but tutorial account of the origins of tracer programming on the 6800 system. 24 pp

B-114 \$6.00

SUPERWUMPUS

by Jack Emmerichs

This is an exciting and fun computer game. It tells you how to go about setting up unusual data structures, and is an outstanding book in the realm of computer games. SUPERWUMPUS comes with complete source listings in both 6800 assembly language and in BASIC. 56 pp

B-115 \$6.00

TINY ASSEMBLER 6800 VERSION 3.1

by Jack Emmerichs

This tiny assembler will prove to be a valuable programming aid. It is one of the most completely documented books available in this area. Included is a updated version of the user's guide, the source, object and bar code formats for both versions 3.0 and 3.1. 74 pp

B-123 \$9.00

LINK 68: AN M6800 LINKING LOADER

by Robert D. Grappel and Jack E. Hemenway

This book explains the linking loader system. This system allows separately translated relocatable object modules to be loaded and linked together to form a single executable load module and to relocate modules in memory. In addition to source code, there is a detailed description and flow charts of major routines. 64 pp

B-120 \$8.00

RA6800ML: AN M6800 RELOCATABLE MACRO ASSEMBLER

by Jack E. Hemenway

This book provides the necessary background for coding programs in the 6800 assembly language, as well as covering the operations of the assembler for better understanding.

The assembler can produce a program listing, a sorted symbol table listing, and relocatable object code. 184 pp

B-122 \$25.00

USING AND PROGRAMMING THE 6800/6802

by Chuck Adams

This introductory book begins with a simple block diagram of the computer, and moves on to I/O and other topics. 200 pp

B-105 \$7.95

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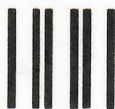
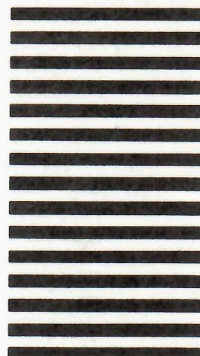
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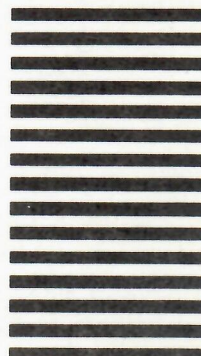
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by Don Peters

This monitor debugger is extremely versatile. Commands include changing the content, setting interrupts, testing a program range for bad memory, changing the display of numbers, etc. 8 B-121

games. SUPERWUMPUS comes with complete source listings in both 6800 assembly language and in BASIC. 56 pp B-115 \$6.00

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by Dave Gardner

Learn about BASIC. This book includes more than 70 memory addresses mapped in MSI and SWTP 6800 BASICs, plus 30 custom assembled alterations. Included is an implied GOTO routine, FOR-NEXT-THEN loops and more.

B-106 **\$14.95**

CHEAP VIDEO COOKBOOK

by Don Lancaster

A complete guide to low-cost alphanumeric and graphic microprocessor based video displays. It contains details on a seven IC circuit that enables you to get words, op-codes and graphics out of your computer and into a TV set. 288 pp

B-107 **\$5.95**

TV TYPEWRITER COOKBOOK

by Don Lancaster

An in-depth coverage of TV typewriters, this book includes principles of operation, system design, memories, color graphics, cursor and update circuitry, also keyboards and encoders. 336 pp

B-108 **\$9.95**

**MONDEB: AN ADVANCED M6800
MONITOR DEBUGGER**

by Don Peters

This monitor debugging device is extremely versatile. Some of the commands include displaying and changing the contents of registers, setting interrupts for debugging, testing a programmable memory range for bad memory locations, changing the display and input base of numbers, etc. 88 pp

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**THE 6800 MICROPROCESSOR:
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by Lance Leventhal

This introduction to the 6800 microprocessor includes 15 exercises emphasizing the use of the microcomputer as a controller which responds to inputs and prepares suitable outputs. 112 pp

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The implementation of sequential and combinational logic using assembly language with the 6800 is covered in this book. 300 pp

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MICROPROCESSOR**

by Elmer Poe

This book will acquaint you with the 6800, guiding you through the writing and running of a variety of programs. 176 pp

B-104 **\$6.95**

TO ORDER

Use the order card, or write your order on a sheet of paper, being sure to include your check or complete credit card info and send to: SS-50 Bookstore, Box 402, Logan, Utah 84321

New Products

GIMIX

Gimix is now shipping their systems and mainframes with a new motherboard featuring full compatibility with the SS-50C (6809) bus as well as the SS-50 bus. The motherboard features schmidt trigger buffers on all address, data, and control signals as well as selection of 4, 8, or 16 decoded addresses per I/O slot.

An I/O block is addressable to the selected number of addresses per slot with 32, 64, or 128 byte boundaries. With their DIP socket header, connection of up to five external baud rates is possible, with nine baud rates, from 75 to 9600 baud, being generated on-board.

An optional slow I/O circuit which generates a "stretched" clock cycle when accessed is available to allow 1 MHz I/O cards to be used with a 6809 CPU running at 2 MHz.

For further information contact Gimix, Inc., 1337 West 37th Place, Chicago, IL 60609, (312) 927-5510.

Circle No. 52

The FLEX[tm] Newsletter

Technical Systems Consultants publish The FLEX Newsletter on an irregular basis of about 4 per year. It is available from TSC, Box 2574 W. Lafayette, In. 47906 for \$4.00 per year. The contents deal with FLEX news, software problems and fixes and various tips and ideas on using FLEX and other software on your system.

I am having trouble booting my MF-68 floppy system. It either hangs up the computer after the 'D' or returns to the monitor.

Need Help in Houston

Try examining location \$8018, then store a \$0B there, wait for the head to load, then type 'D'. This will allow the motor to come to speed and the head to find track zero before booting.

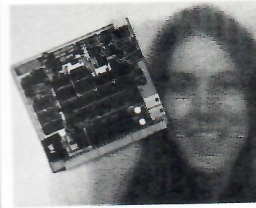
We are planning to setup a Computer Bulletin Board System for use primarily by 6800 users. This system would allow you to call our computer over the phone line and leave messages for other users, to obtain software directly from our machine, to place orders for anything we sell, or to leave notes on items for publication in the Newsletter.

We are presently working on the software to allow code files to be passed back and forth, and will feature them in future issues. We hope to have the message portion of the system working by the time this issue goes to press. To use the system you will need a modem and a terminal running at 110 or 300 baud. The number will be (801) 753-6800.

For more information on CBBS systems, we suggest you look in the January and February 1980 issues of *Kilobaud* magazine. [SS-50]

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A BASIC ASSEMBLER - PART II
1200 BAUD WITH YOUR AC-30
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CBBS SOFTWARE
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DS-68 DIGISECTOR

INNOVAT

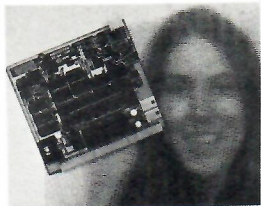
DS-68 DIGISECTOR is a digitizer featuring 256 x 256 levels of grey scale, as fast as 3 microseconds per pixel (NTSC) or non-interlaced input. Use it for computer graphics, precision scan conversion... with a professional tool at a price.

B-08 2708 EPROM PROM that fits in the 6800's LED indicator provides programming voltage generated by quality Textool socket allow effortless PROM programming. See the Owner's Manual.

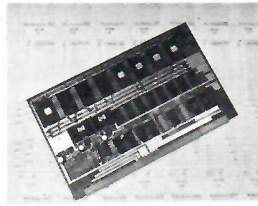
U2708 utility for test copying 2708s in EPROM.

PSB-08 PROM SYSTEM speed, low-power RAM EPROMs, both DIP-switchable. Any 8K boundary in select feature allows you to use any unused 1K block in RAM. This permits memory contiguous user RAM.

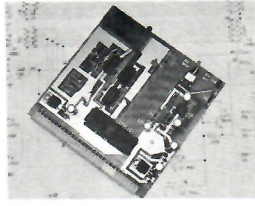
THE MICRO
WORKS



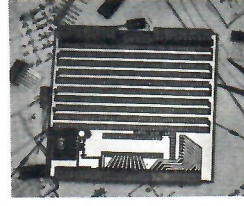
DS-68 DIGISECTOR



PSB-08 PROM SYSTEM BOARD



B-08 EPROM PROGRAMMER



UIO UNIVERSAL I/O BOARD

INNOVATIVE PRODUCTS FOR 6800 USERS

DS-68 DIGISECTOR is a random access video digitizer featuring 256×256 picture element scan and 64 levels of grey scale, with conversion times as low as 3 microseconds per pixel. It accepts either interlaced (NTSC) or non-interlaced (industrial) video input. Use it for computer portraiture, moving target indicators, precision security systems, fast to slow scan conversion...with clever software, the Digi-sector can read just about anything. Truly a professional tool at a price you can afford. \$169.95

B-08 2708 EPROM PROGRAMMER is a compact unit that fits in the 6800's I/O slot. A safety switch and LED indicator provide control over the high programming voltage generated on board. An Industrial quality Textool socket and extended board height allow effortless PROM insertion and retrieval. Fully commented source listings of U2708 is included in the Owner's Manual. \$99.95

U2708 utility for testing, burning, verifying and copying 2708s in EPROM. \$29.95

PSB-08 PROM SYSTEM BOARD features 1K of high speed, low-power RAM and space for up to 8 2708 EPROMs, both DIP-switch addressable to start on any 8K boundary in memory. The exclusive I/O select feature allows you to move I/O locations up to any unused 1K block in the EPROM memory space. This permits memory expansion to a full 56K of contiguous user RAM. \$119.95

DM-85 DISK MIXER is an add-on board for the Smoke Signal Broadcasting BFD-68A Disk Controller which allows operation of both 8" and 5" drives. Controller mode (8" or 5") is selected on a drive-by-drive basis, so any mix of 5" and 8" drives is allowable. The $2" \times 3"$ PC board mounts inconspicuously on the back of the BFD-68A. Its operation is completely transparent to software. An oscilloscope is required for the setup procedure. Kit Price: \$39.95

M6809 EMULATOR is a machine language program that will emulate all of the functions of the Motorola 6809 third generation microprocessor. Developed for use on any 6800 system, the program allows software development and debugging. The 3K byte program is complete with a 6809 mini-monitor and single-step trace routines. Fully commented source listing included. Specify Smoke Signal Broadcasting or FLEXTM disk, or KCS cassette. \$49.95

UIO UNIVERSAL I/O BOARD helps you with your custom interfaces. It has space for a 40-pin wire wrap socket into which you may plug any of Motorola's 40 or 24-pin interface chips. All data and control lines are connected to the appropriate edge connector pins. All other bus connections are brought out to a 16-pin socket pad. +5 volt regulator and all Molex connectors are provided; regulated +5 and ground are bused among the locations for up to 35 14-pin ICs. \$24.95

THE **MICRO
WORKS**

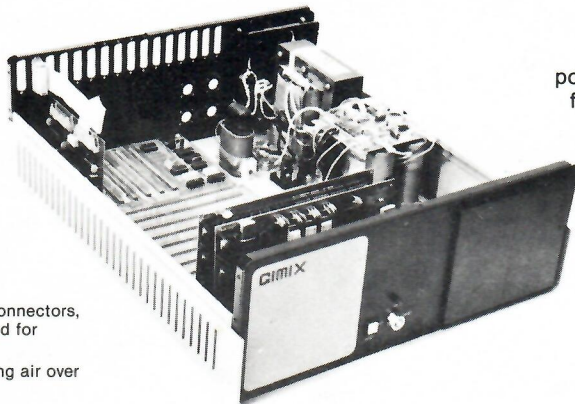
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Mainframe: includes chassis power supply switches, fan and mother board **\$748.19**

16K Systems from \$1294.29

Includes: Mainframe cabinet, mother board, power supply, fan, CPU, 16K static RAM, and choice of I/O card.

- Holds 2 5 1/4 disk drives (not included)
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- Reset - can be locked out
- Optional filler plates (when no drives are used)

CABINET

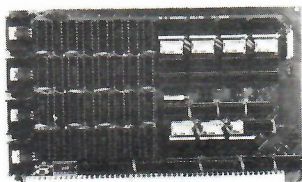
Heavyweight aluminum painted inside and out in grey and black baked enamel finish. Size: 18" wide x 21" deep x 7" high.

MOTHER BOARD

Hardware reconfigurable to give you the utmost versatility for use with various SS 50 bus software packages. Gold plated pins to insure long lasting electrical contact for protection against corrosion. Fifteen 50 pin slots plus eight DIP-switch addressable 30 pin I/O slots configurable to 4 or 8 decoded addresses. The fully buffered I/O block is addressable by DIP-switch to any 32 or 64 byte boundary and can also be disabled. UD1 and UD2 of the 50 pin bus can be strapped to UD3 and UD4 of the 30 pin bus. A fully shielded, (.090" thick), double sided P.C. board with noise reducing ground lines on the bottom side that separate all data, address, and signal lines, and a full ground plane on the top side. A 14 position clamping terminal block for all power and other external connections eliminates soldering, crimping or forming of wires.

POWER SUPPLY

Designed to power a fully loaded system plus two 5 1/4" disk drives - and keep running at constant voltage outputs even under adverse A.C. power input conditions. It consists of: A 550 VA Ferro-resonant constant voltage transformer, over 16 pounds of brute force custom designed for GIMIX to GIMIX' specs, an A.C. resonant capacitor, 3 D.C. filter capacitors, and GIMIX' unique filter assembly board that sits on top of the filter capacitors and includes individual fuses for each output, bleeder resistors, and a clamping terminal block for easy wiring connections. Almost a Quarter-farad of D.C. Filtering. Brown-out and over-voltage insurance: Supplies 8V at 25 Amps, + 15 Volts at 5 Amps and - 15 Volts at 5 Amps from A.C. input voltages ranging from 90 to 140 Volts.



Memories...

16K Static RAM Boards for the SS-50 Bus \$298.13

- Gold bus connectors
- Individual Addressing, Write Protect, and Enable/Disable for each Block
- 4 separate 4K Blocks

As above with Sockets and Software control features **368.16**

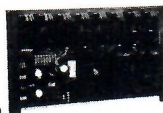
All GIMIX memory boards are assembled, Burnt-In for 2 weeks, and tested at 2 MHz

8K PROM BOARD \$98.34

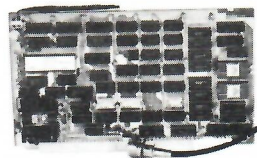
- Holds eight 2708 or 2708-compatible ROMS.
- DIP-switch addressable to any 8K boundary
- Gold Bus Connectors

2708s \$7.90 each

Add \$10. handling charge on orders under \$200.



SS 50 BUS 80 X 24 VIDEO BOARD



Deluxe Version \$458.76

Other Video Boards from \$198.71

With hardware scrolling, x-y addressable cursor and multiple character generators. It includes a TMS 2716 EPROM that contains a full 128 upper and lower case ASCII character set with true descenders; plus a socket for another TMS 2716 for an optional 128 character set; plus 2K of RAM for user-defined programmable character sets. This gives the user the ability to create his own hieroglyphics, alphabet, graphic elements, etc., and store them on PROM, disk, or tape. The user can choose and intermix 384 different characters from any or all of the character generators and display up to 256 at one time, normally or inversely, and at full or half intensity, at any location on the screen. Contiguous 8x10 character cells permit solid lines and connecting patterns with user definable graphic elements.

It is addressable to any 2K boundary. GHOSTable addressing allows multiple boards at the same address, making it ideal for multi-user applications. The available software includes a GIMIXBUG video based 3K ROM monitor, stand alone driver routines, and a program to create user defined characters.

Phone, write or see your dealer for complete brochure and price list.

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