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# MICRO JOURNAL

# '68'

**VOLUME II ISSUE 8 • Devoted to the 68XX User • August 1980**  
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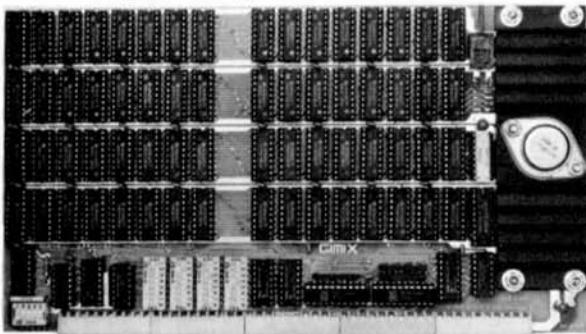
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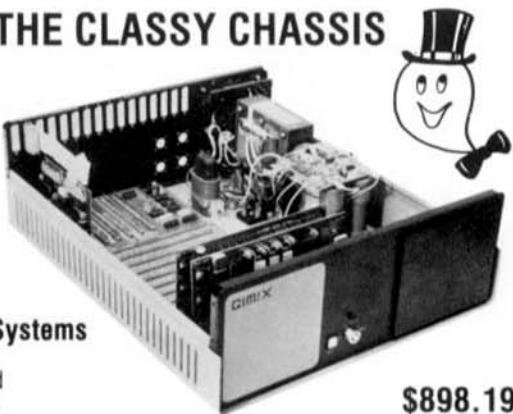
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All software is currently available on FLEX<sup>TM</sup> 2.0.5" disks or MSI FLEX<sup>TM</sup> 1.0.8" hard sectored disks. The package includes a users manual, the disk with object code AND FULLY COMMENTED SOURCE LISTING, a programming manual with information about the program and hints for changes, and where applicable example programs. 6809 versions being worked on now will utilize the 6809 architecture and be fully position independent. VISA and MC accepted. SOURCE TCF339

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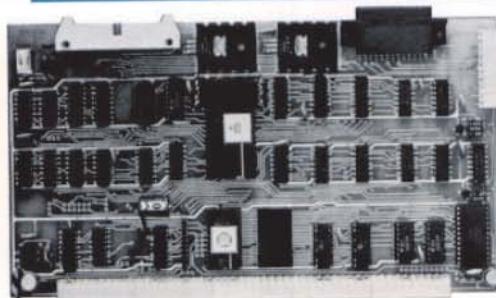
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- Costs only \$199.95 with PSYMON™ and comprehensive users manual that includes source listing of PSYMON™.

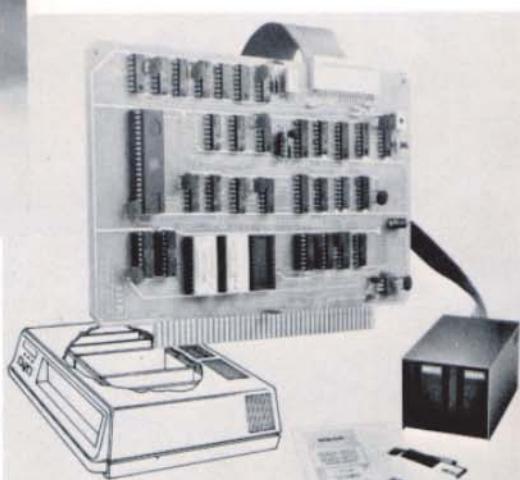
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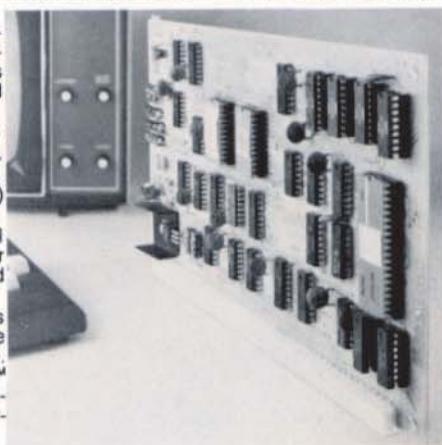
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## NEW PROD-RUMORS-ETC

Coming soon (maybe 6 months or less) are some new disk systems and other useful hardware (and software) for the S50 bus. Also some recently arrived new products that although not completely evaluated, we feel deserve mention now. More on some of them later.

First I had hoped to give you an early peek at some of the new disk systems, mainly OS9 and UNIFLEX. We have set up two 6809 computers, one for each system. They both have dual density double sided 8" disk drives and access to the SWTPC CDS-1 hard-disk system. Each is equipped with a SWTPC CT-82 terminal. However, we have neither inhouse yet and so hopefully by next month I can report some initial reaction to these new and powerful systems.

We have received this week a new 256X256 video graphics board from the Hazelwood Computer Systems (see ad this issue). This board is of excellent quality and we are preparing a review of it for a coming issue. I ran it on one of our 09 systems when it arrived and am impressed with the ease of operation, it is the most simple to use graphic board that I have tested. The quality is commercial and the output to a Sanyo 9" monitor is glitch and splatter free.

We would not recommend the LEEDEX Video-100 monitor for this application. We have had considerable problems with ours (after two trips back for repair) and now do not use it at all. The scan in both directions is of poor quality and ours is for sale. For quality and useable display I would recommend some other brand of video monitor!

The programs we ran in machine language were fast in execution and simple (!) to use. We were able to do queso-3D pictures right off the bat by simple modifications to the sample programs furnished with the board. Some pictures next month if our film turns out ok. Also the BASIC (TSC) programs furnished, 'Sinewave and Limacon', although not as fast in execution as machine code, open up some interesting applications.

Also we received a couple of excellent word processing packages. From Micropi (see ad this issue) came their new 'BLITZ' editor. A simple to use and adequate editor for many applications. BLITZ is a true 'window' editor and handles files of unlimited size. All corrections to characters are made at cursor position and the results are immediate. BLITZ uses the features of the SWTPC CT-82 terminal to accomplish cursor control, as well as scrolling back and forth thru the file. While BLITZ does not support 'global' operations, it can be easily learned and makes an excellent editor for simple text editing.

From SONEX SYSTEMS comes the 'STYLUS' word editor and output formatter. This is the first package that we have used that is completely a self contained, one program, editor and formatter with printer drives.

STYLUS is a full feature text editing system. The text displayed is always shown as the final justified output as will appear in the printed form. Global block copies and moves are available. Global searches and 'finds' are also available to the user. Hyphens are possible for none proportional output drivers. Page locations are automatic and the operator always knows where the text is located in respect to the remainder of the file. Insertion and deletions are immediately reflected on the CRT screen and text is automatically expanded or constricted as editing progresses.

8

A bundle/unbundle command allows immediate view of the results of any operation; that is, it allows formatting commands to appear or disappear at operator command. Underlining, subscripting and boldface operations are possible. Tabs both vertical and horizontal as well as center, left or right justification are operator controlled. With the proportional drivers incremental spacing commands are callable.

STYLUS is FLEX™ compatible and programs prepared by STYLUS can be used by the TSC BASIC's and assembler. Boiler-plate type documents are a snap with this software. Printer output can either be direct or to a spooling file for later call.

STYLUS requires about 18K of memory and versions for both serial and memory mapped terminals are available from Sonex Systems.

They report that updates will be available to registered users for a modest fee. Current versions are available for QUME, Diablo, NEC or regular TTY type printer devices. Full cursor and scrolling features are supported.

The version received uses a TTY driver and does not do proportional spacing, however, we are due the proportional drives for the QUME Sprint 3 and 5 daisy wheel printers and will give a more detailed report, when received.

For additional information contact:  
SONEX SYSTEMS, Box 238, Williamsville, NY 14221,  
716-634-2466.

Also received from Micropi is their new record management system RMS. RMS is an extensive data base management system. It can be used for accounting, business record keeping, management information systems, customer or personal records, inventory, customized date entry, online data retrieval and update and printed reports. RMS can be customized with very little effort or programming knowledge. RMS files can be accessed and used by BASIC or other languages.

RMS allows user determination of data storage format, values and size of data files and records and if necessary, limits or restrictions to the possible values.

RMS supports a DICTIONARY of data files and types. Once these are created by the user the following are automatically available. Creation of a disk file formatted to store the data. Online data entry in a 'form fill-out' to the CRT. Online data access for lookup or modification. Creation of printed reports to the users specifications. Formats may be later changed as conditions require.

RMS consist of the following utilities and programs. RMSNEW - formatter for data to the users needs. RMS EDITOR - used to input, modify or display data in a file. REPORT - creates printed reports from RMS data files, facilities are included to allow users control of the final printed form. INDEX - a program to allow creation of one or more index files which in turn can drive the RMS EDITOR or REPORT programs in user required order for display, modification and printing. RMSCOPY - copies a file when it needs modification, also it can merge or post one file to another.

RMS is convenient and easy to use. No extensive programming experience is required and the operation allows functions found on larger and more expensive computers.

RMS as furnished runs on 6809 machines using the  
'68 Micro Journal

CT-82 SWTPC terminal and other X Y addressed terminals. FLEX™ for the 6809 is required as the disk system.

An infusion of new disk systems seem to be in the offering. SWTPC has the prototype running of a new 5" double sided, double density, double track disk system for 6809 systems. Capacity will be on the order of 2800 sectors per disk at 256 bytes per sector. The price will be somewhat higher than the present MF-69 system, but byte for byte it should be an excellent buy. More on this after we get one.

From GIMIX comes word that they are now beginning to ship their new 6809 CPU card (see page 48). I understand that the backlog of orders is fierce so if interested better get that order in. And NO, as of this writing we have not received ours so cannot tell you much more until we get one up and running. Also from GIMIX soon should be four disk controller boards. The larger (50 pin slot) is a DMA type controller that will handle 4 5" drives and 4 8" drives as well as a hard disk. In addition will be three 30 pin resident disk controller boards. Two will handle 5 or 8 inch drives, one will handle 5 inch only. One complete and tested will be on the order of \$200.00 and the other less the 1771 will be somewhat less (in an burned-in but untested state). Look for GIMIX ads to give more details.

From Sirius of Knoxville, Tennessee is rumored a new 8 inch double drive disk system. The complete package with 2 8" double sided double density disk drives, power supplies and enclosure with controller board and cable will be on the order of \$1,600.00 or so they told us at the recent Atlanta show. They claim that it will run on any S50 bus system in a standard configuration. Watch for coming Sirius ads concerning this disk system and their complete Fort program for the 6809.

A new S50 publication is now being offered by SS-50 Newsletter, PO Box 402, Logan, Utah 84321. The format is typeset 25 to 30 pages 6 3/4 by 10 inches. It is scheduled to be published every other month. I thought you might like to know.

#### OUR ADVERTISERS

Since the first we have attempted to 'shoot straight' with you the readers. There are some advertisers that we have not allowed, that are advertising in other magazines. Despite the fact that we could use the revenue, I felt that it would not be honest on our part to accept advertising from companies who do not live up to normal business ethics. Especially if we accept their money to tell you about products and services that DO NOT perform as advertised. I know that from time to time some of our advertisers receive complaints. Many of them are justified, many are not. When informed we follow up on all complaints received from you the readers. Last year we spent more than \$1,000.00 on telephone calls to responsible persons, at various advertisers, running down complaints and trying to get solutions and answers. For the vast majority of them we succeeded. In a few isolated cases we could not accomplish any satisfactory results. Some of these were due to errors on the advertisers part and some due to a lack of technical understanding on the part of the user. Most were problems of communication. Some concerned complaints that the equipment did not work after making some non-factory modification. Most all equipment makers will not and can not (for technical reasons) support their equipment or even attempt to repair it if it has had major or even minor modifications made. Assuming of course, that the modifications were not factory approved modifications. It should be understood

that if you want a non-standard configuration in your system, it may work, but from there on you are on your own.

Some of the problems were because of parts shipment delays and other non-controllable factors. Certainly it is easy to say that they should have planned ahead. Maybe they should have, but even the biggies got caught in the most recent parts shortage. We know of not one of 'OUR' advertisers who did not come through, as parts and personnel were able. Some were slow, far too slow, but no one who has ordered from one of our advertisers paid out good money and received nothing in return, at least not to my knowledge and I personally see and follow up on each case that is brought to our attention.

We have had a few instances of users who have returned supposedly faulty equipment or other purchased objects for repair or update. We receive calls daily from readers who state that they have just received such and such, and it does not work, or has serious problems. In many cases (where we allow it to be advertised) we have found that the problem was not wholly with the product but also with some part of the system, many times non-factory approved modifications. Yet in a few instances the user was never satisfied and to the best of my personal knowledge the vendor refunded upon return of the product. To the best of my knowledge every product or service advertised in 68 Micro Journal is as advertised.

I feel a deep sense of responsibility in what our advertisers say to you OUR reader. In EVERY case we either test a product or consult with some one who is knowledgeable and has used the product, before we accept their advertising. In a few instances we have required that an advertiser drop out his advertising until he gets things a bit smoother. For older vendors who have been around for most of the micro era we accept written reports from other users, from new companies we normally require a look-see. Sometimes they do not pass muster the first time around, but most have come back with workable and worthwhile products.

We are not POLICE, we have a difficult time in trying to make everybody happy. Sometimes we don't, but we honestly try.

Our advertising policy is simple; the product or service MUST PERFORM AS ADVERTISED! If it is a poor or lousy product and the advertiser advertises it as such, I would allow it. So far none have accepted that offer.

Our lab attempts to rate products fairly. Most of the ratings have been AAA, the best we give (which does not imply that it is the best made). The reason that so many have good rating is very simple. The bad ones do not get published. We hope that the rejected advertiser will go back and get the act straight. This way we all gain, we the user get a better product and the vendor gets another chance. The ones that do not shape up are not published, as long as they do not attempt to sell it to our readers, thru any media. We would rather use our limited space to tell you about good products, rather than ones you can or would not want to use.

We now believe that we are reaching a majority of 6800 and 6809 users. Also a large national rating service indicates this also. Which brings us to another point. When you purchase a product or contact an advertiser, let them know that you read 68 Micro Journal. The ADVERTISERS make it all possible. Due to the relatively small number of us as compared to some other bus or make, our per unit cost to produce 68 Micro Journal is more than we now

receive for subscriptions and even less for the thousands that are going out on newsstands each month. The difference is paid for by the advertisers. Without them you would still have nothing in the way of articles for the 68XX series of computers or the fifty bus. Just look back over the past three years. We know for a positive fact that some of the others only run 6800 articles (many of them old and outdated),

because many of you have switched over to 68 Micro Journal only.

This brings up a hard and real economical fact of life. The 68XX community would be hard pressed at this point in supporting two 68XX magazines. IN fact if there were two 68 Micro Journals, splitting evenly the advertising that is available, neither one would survive. We simply do not have the numbers.

I feel that we are printing and distributing 68 Micro Journal as economically as possible. We do all our own work except mailing. Not even BYTE, KB or the others do that, in so far as we know. Always the best way dollar wise is inhouse production, we do.

So here is the point PLEASE let those advertisers who have supported 68 Micro Journal (and you) know that you appreciate it. We know that some of them are still advertising in other magazines. For the most part they reach markets (other magazines) we do not cover. That is the way that it should be for they are reaching readers who do not read 68 Micro Journal, and we want them to expand and prosper. For as they do, so do all of us. So let our advertisers know if you appreciate having your own magazine, not cluttered with articles and other matter not faintly related to the 68XX series of devices or the S50 bus. Things are going good now, lets keep it that way and hope it can even get bigger and better. You, our readers will make the decision. Please let me know your feelings on these matters. Think back!

DMW

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## READTEST

An English Text Analysis Program

This month we review READTEST, a 6800 assembly language program offered by the Frank Hogg Dental Laboratory, 130 Midtown Plaza, 700 East Water Street, Syracuse, New York, 13210.

READTEST is just over 6K long and will run fine in an 8K machine. However, at least 12K is preferred. It sells for \$39.95.

We decided to look at an applications program this month because we sincerely believe that without useful applications programs our microcomputers are nothing more than expensive toys. With the proper applications programs however, they can do almost anything imaginable and become indispensable.

### BACKGROUND

READTEST is based on readability research performed by Dr. Rudolf Flesch. Flesch is the author of "The Art of Clear Thinking," "The Art of Readable Writing," and "The Art of Plain Talk." The program READTEST is based on the theories presented in the latter. The book is definitely required

reading for persons interested in improving their verbal communications skills.

The original statistical readability formula was published in Dr. Flesch's Ph.D. dissertation. The paper was very successful and many businesses and government agencies began to use Flesch's formula.

However the paper itself, being a dissertation, was not the most readable book in the world. This embarrassed Flesch, and he rewrote the dissertation. The result was "The Art of Plain Talk."

It should be noted here that even Flesch realized that his formula was not a magic formula for good writing. It is merely a yardstick with which you can gage your progress. You will find however, even if you are already an experienced writer, that READTEST will help keep you honest when you start rambling.

### WHAT IS READTEST?

The goal of the program READTEST is to help you write so that people find it easy to understand what you mean.

Almost every book that promises to teach you how to write will tell you to use simple and ordinary words. The same books will tell you to keep your sentences short. Most of them however, fail to define simple, ordinary and short, etc., and often don't follow their own advice.

READTEST implements Flesch's theory that the closer a word is to its root, the easier it is to understand. It checks the number of common prefixes and suffixes used in your sentences and grades you accordingly. It also gives you credit for using a lot of familiar personal words that have high appeal.

But, just what is READTEST? What will it do for you?

READTEST is a must for all writers. It is a tremendous tool for students and writing instructors. And, it helps experienced writers keep a running check on the readability of their prose.

READTEST reads plain English text from a standard FLEX disk file. It then reports the number of lines, words, sentences, personal words, affixes, and average sentence length. This information helps pinpoint trouble areas that make your prose harder to read and understand.

After providing these individual reports, READTEST computes an overall index and tells what it means. You learn the grade level of the person most likely to read and understand your copy. Then, you receive a report which indicates the type of publication that would be most likely to buy your story. This will help you hit your target market, assuming of course that you are also on target with your subject matter.

### FEATURES

Here are some of READTEST's major features.

READTEST tells you how many words you have written.

READTEST tells you how many sentences you have used in your prose. The number of words and sentences is used to compute the average sentence

length. This is one of the key factors in readability. The shorter the sentence, the easier it is to understand.

READTEST checks to see how many times you have used key personal words. People relate to these words and they make your prose much easier to digest. The more of these words you use, the higher your score and the lower the grade level of those who can understand it.

READTEST counts the number of names (proper nouns) used in your writing. This number is added to the number of key personal words to determine the total number of personal references. The more you use, the higher your human interest score.

READTEST counts the number of affixes used in your writing. The less you use, the higher your score.

The meaning of a root word is almost always obvious. However, when you stick a prefix in front of it, a suffix on the end of it, and sometimes another affix somewhere in the middle, you tend to confuse and slow down the reader.

Affixes are bad. READTEST tells you if you used too many.

READTEST looks forward when counting prefixes and backwards when counting suffixes. If a match fails, READTEST immediately moves to the next word. This results in a time saving of approximately 20 per cent.

READTEST rates your text as: very difficult, difficult, fairly difficult, average, fairly easy, easy or very easy to read.

READTEST also classifies your prose as: dramatic, highly interesting, interesting, mildly interesting, or dull.

READTEST contains nearly 200 common affixes and 75 common personal words in its tables.

READTEST is written in assembly language which gives it the speed necessary to evaluate every word in a large text file. It would take more than a half hour to do the same evaluation of a 1,500 word story with a BASIC readability program.

And, READTEST's comprehensive reports make it easy to pinpoint readability problems in your writing. READTEST is completely impartial and will uncover bad habits and trends in the prose of pros as well as that of the beginner.

#### DEFINITIONS

In order to make the operation of READTEST easier to understand we must first define the items it counts.

The number of WORDS is determined by counting the number of spaces in the text file being evaluated.

The number of SENTENCES is found by counting the occurrence of periods, colons, exclamation points and question marks. Some readability researchers also count the semi-colon as a sentence since it often denotes the end of a thought. READTEST does not implement that feature however.

The number of NAMES (proper nouns) is determined by searching for words that begin with a capital letter. For example, Kansas would be counted as a proper noun.

Two exceptions have been built into READTEST's algorithm. The first word in a sentence is not counted as a proper noun since it is always capitalized in standard English text. Also a pair of words that starts with a capital letter, i.e., President Carter or Kansas University, is counted as one proper noun.

The number of personal words and affixes is determined by loading the entire text file into memory and searching it against two tables. Every time a match is found, the appropriate counter is incremented.

The AVERAGE SENTENCE LENGTH is computed by dividing the number of words by the number of sentences. Also computed, but not printed in numerical form in the report is the percentage of personal words and affixes.

#### HARDWARE REQUIREMENTS

READTEST loads into memory from \$0020 to \$17CD. All available memory between \$17CD and the address stored in FLEX's MEMEND is used for a buffer to locate and find personal words and affixes.

READTEST does not require a large amount of memory to read and analyze long text files however, because it is written to work in segments if an entire file will not fit in memory.

READTEST expects the input from the file to contain both upper and lowercase letters. This allows it to identify and count proper nouns because they are capitalized. This count eventually leads to a computation which determines how interesting the text is to the average reader.

#### FLEX COMPATIBILITY

READTEST.CMD is a standard FLEXtm command file and can be executed by typing READTEST FILENAME.

READTEST defaults to a .TXT extension on the work drive. Other extensions and drive numbers may be used however, if they are explicitly defined in the command line. Example: READTEST Z:GOODWRDS.BAK.

All of READTEST's input and output is made through calls to FLEX's GETCHR (\$AD15), PUTCHR (\$AD18), PSTRNG (\$AD1E) or PCRLF (\$AD24) routines. Therefore, if you are using the FLEX operating system you should not have any problems.

READTEST will read any standard FLEX .TXT file. And, you don't have to worry about the text processor command lines interfering with your count. READTEST looks for these commands and ignores them.

#### A WORD ABOUT SPEED

Readability testing was once a very tedious process. Companies hired paraprofessionals to manually count words, sentences, and proper nouns, etc., in several 100 word samples from every chapter of long textbooks. They slowly went crazy.

This program reads every word in your file and calculates an overall performance rating, not an average. However, you must be patient when you first run READTEST. It takes approximately three minutes to analyze the copy from a typical 2,500 word magazine article.

If you think that's slow, I challenge you to pull out a book and count everything READTEST counts

In a 100 words sample. You'll find it takes at least five minutes. After timing your own counting, let READTEST work on a small 100 word file. In about a second, you'll have a report.

#### HOW TO GET THE MOST OUT OF THE PROGRAM

After reading a readability report from READTEST, seriously try to improve your score. You'll find that your writing will be much easier to read after a few tries. You may never become a Hemingway, but, the effectiveness of your written communications should increase a hundred fold.

#### SUMMARY

READTEST is a serious application of the 6800 microcomputer. It comes on a disk with the object code, an extremely well documented source file and a help file which gives enough information to let you run it before reading the instruction manual. A sample data file is also included on the disk to allow the user to check the operation of READTEST immediately.

A 15-page users manual is supplied with the package. It is extremely detailed and covers subjects ranging from an explanation of readability testing to the design of the program. Key routines in READTEST are also explained in detail in the manual.

Anyone that wants to improve his writing ability should give READTEST a try. As the user's manual says in the last two paragraphs, "Writing for any practical purpose is difficult and elusive. READTEST is one more tool which can help you communicate effectively."

#### READABILITY REPORT FOR TESTER:

Number of lines = 14  
Number of words = 245  
Number of sentences = 3  
Number of proper nouns = 15

Number of personal words = 3  
Number of affixes = 143  
Average sentence length = 81  
Based on the average sentence length your rating is: VERY DIFFICULT  
Based on the number of affixes your rating is: VERY DIFFICULT  
Based on the number of personal words, your rating is: INTERESTING; similar to material found in the digests.

Your overall readability index is: 1042  
This means your story is . . .  
VERY DIFFICULT READING. Your potential audience would include only four and a half percent of the population. The story would probably only be read by college graduates and would be published in a scientific journal.

Hopefully, you are pleased with your rating. If not, why not rewrite the story in an effort to communicate more effectively. Think short words, short sentences, and short paragraphs. Do not be discouraged. Writing for any practical purpose is a difficult and elusive art. Remember, Ernest Hemingway often spent eight hours writing four or five hundred words.

In the final determination of the benefits to be provided to the United States of America by the government of the United Kingdom in return for aid furnished under the act of Congress of March 11, 1941, the terms and conditions thereof shall be such as not to burden commerce between the two countries

but to promote mutually advantageous economic relations between them and the betterment of worldwide economic relations. To that end, they shall include provision for agreed action by the United States of America the United Kingdom, open to participation by all the countries of like mind, directed to the expansion by appropriate international and domestic measures of production, employment, and the exchange and consumption of goods, which are the material foundations of the liberty and welfare of all peoples; to the elimination of all forms of discriminatory treatment in international commerce, and to the reduction of tariffs and other trade barriers and in general to the attainment of all the economic objectives set forth in the joint declaration made on August 12, 1941, by the President of the United States of America and the Prime Minister of the United Kingdom. At an early convenient date, conversations shall be begun between the two governments with a view to determining in the light of governing economic conditions the best means of attaining the above stated objectives by their own agreed action and of seeking the agreed action of other like minded governments.

Having just edited the article on READTEST, curios got the best of me so I ran READTEST on my ramblings under NEW PRODUCTS and RUMORS, this issue. The file on disk is RUMORAUG.TXT. Unedited here is my rating. Paperback fiction; huh!!!

#### READABILITY REPORT FOR RUMORAUG:

Number of lines = 333  
Number of words = 2713  
Number of sentences = 173  
Number of proper nouns = 85

Number of personal words = 50  
Number of affixes = 832  
Average sentence length = 15  
Based on the average sentence length your rating is: FAIRLY EASY

Based on the number of affixes your rating is: VERY EASY  
Based on the number of personal words, your rating is: MILDLY INTERESTING; similar to material found in trade journals.

Your overall readability index is: 139  
This means your story is . . .  
EASY READING. A fifth grader can understand it. Eighty-six percent of the population can handle it. It is similar to material found in paperback fiction.

Hopefully, you are pleased with your rating. If not, why not rewrite the story in an effort to communicate more effectively. Think short words, short sentences, and short paragraphs. Do not be discouraged. Writing for any practical purpose is a difficult and elusive art. Remember, Ernest Hemingway often spent eight hours writing four or five hundred words.

Aw to heck with it, I am going to run it just the way it is, paperback or no paperback, BOY!!!!

DMW

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PLEASE NOTE: Effective the 15th of September 1980, due to sharp cost increases, the subscription prices of 68 Micro Journal will increase as follows. The new rates will be; one year subscription \$18.50 - two year subscription \$32.50 - three year subscription \$48.50.

We have held off hoping things would level out but they just keep going up, so we must pass along these increases. If prices ever start down, so will our rates. All subscriptions and renewals received after the above date should be for the above amounts.

## FLEX USER NOTES

Ronald W. Anderson  
3540 Sturbridge Court  
Ann Arbor, MI 48105

Continued from last month (July '80) with additional listing omitted from a previous column of FLEX USER NOTES, by Ron Anderson.

### OTHER NEWS

I've been working on a floating point math package for use in my work, though the effort has been on my own time. I've gotten it working quite well, and when the 6809 board arrived, it seemed reasonable to try to convert as a test to see if the new instruction set would make for more efficient programming. So far, I've managed to reduce the original 1500 byte program by over 250 bytes, and I'm still working at it. The savings were mainly due to the fact that the math package uses a stack and reverse Polish notation. Such handling of math is very efficient in terms of instructions needed to do an operation but a great deal of INDEX and STACK POINTER manipulation is necessary. In the '09, all the pointer swapping went away. The biggest savings were realized by the fact that the stack pointer may also be used as an index pointer. That means that you can push a floating point variable on the stack and work on the successive bytes of it, addressing by means of 0,S; 1,S; etc. I've not even tried to do the multiply by taking advantage of the 8 by 8 bit multiply of the '09. This can be used to do a 16 by 16 bit multiply by doing four multiplies and two adds, and it may be extended to further precision as well.

By the time I'm done, the package will probably be just over (unfortunately for EPROM use) 1 K. The reverse Polish notation lends itself to a simple "compiler" that can read an equation expressed in notation identical to that of most BASIC interpreters, and generate a list of instructions for the math package. I've written such a "compiler" in BASIC and again in A/BASIC for my math package, and it works quite well, allowing equations in the program to be translated to a source listing for the assembler by the "Math Compiler". If there is enough interest in this, we will pursue the subject over a period of several months in this column,

resulting in the publication of a working floating point package with a compiler to generate math instructions, and the necessary I/O routines to convert between ASCII and floating point binary representations. A Binary math is desirable for speed and simplicity, but the conversion routines take about as much code as the math routines. Perhaps we can all learn a great deal about such packages by looking at conversion routines and output formatting. Figure 1 is a listing of a source and a compiled and assembled section of code for the math package. You will note that the equation remains as a comment, and that I have flagged the compiler with a \*MATH \* statement that is deleted by the compiler. If you are interested in pursuing this further, please drop me a card or letter. If the response shows more than a few interested readers, we will set into the detail of this over several issues of '88 Micro Journal.

For my original subscribers, I had published a set of programs for modem operation using a "C" interface on port 0. These have been reworked to use with a serial interface on that port. The programs include TERMEM which makes your system look like a terminal to a CBBS or another system, and keeps all the information transmitted in memory with provision to save it to a disk at the end of the communication. TERMEM also allows you to echo or not. When two users talk via modem, one may echo and the other not, and full duplex operation is maintained. The two programs M.CMD, and MODEM.SYS work just like P.CMD and PRINT.SYS to allow you to use any of the FLEX utilities such as LIST, PR, CAT, DIR, ASM, etc, and switch the output to the modem. In all the programs all output to the modem is also output to the terminal. You must be running your terminal at at least 2400 baud and preferably 9600 to use these programs. The serial port version is presented here. If you want a copy of the "C" interface version, send me \$1.00 to cover reproduction cost and postage, and I'll send you a listing. This is an ideal way to turn a "useless" old "C" interface into something useful. You will need to cut one foil and make one connection on the circuit board to remove the "hardware" echo of the "C" interface.

Well, that's about all for this time. I would be grateful for some responses from readers as to the material presented and desires for future columns, though I'm certain we can't please everyone.

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12 * FOR EXAMPLE NO1 WILL DUMP 0100-01FF
13 * AFTER A PAGE IS DUMPED, ENTER F TO CONTINUE
14 * FORWARD; B TO BACK UP A PAGE, NXX TO GO TO PAGE XX
15 * O E TO EXIT TO DOS.
16 *
17 * BY RON ANDERSON
18 * 3540 STURBRIDGE CT.
19 * ANN ARBOR MI 48105
20 * 313 995-1636
21 *
22 *
23 *
24 OPT PAG
25
26 * SYSTEM EQUATES
27
28
29
30
31
32
33
34 * SYSTEM EQUATES
35
36 C003 WARMS EDU <CD03 WARMSTART FOR DOS
37 CB40 FCB EQU <CB40 SYSTEM FCB
38 CD42 GETHEX EQU <CD42 GET 1-4 DIGIT HEX NO. IN X
39 D406 FNS EDU <D406 FILE MANAGEMENT SYSTEM
40 CC1B OFFSET EDU <CC1B HEX OFFSET ADDED TO LOAD ADDRESS
41 CC08 SYSDRV EDU <CC08 SYSTEM DRIVE NUMBER
42 CD20 GETFIL EDU <CD20
43 CD3F RPTERR EDU <CD3F
44 D403 FNCLS EDU <D403
45 CD30 LOAD EDU <CD30
46 *
47 C100 ORG <C100 NORMAL UTILITY
48 C100 20 01 START BRA BEGIN
49 C102 61 VER FCB 1 VERSION NUMBER OF UTILITY
50 C103 8E CB40 BEGIN LDX #FCB
51 C104 BD C020 JSR GETFIL
52 C105 BD C008 LDXA #SYSDRV
53 C106 BD C00B LDXA #CC08
54 C107 A7 03 STA 3+X SET DRIVE TO SYSTEM
55 C108 BE CB40 LDX #FCB
56 C111 BD 50 LDXA #P
57 C113 A7 0C STA 12+X
58 C115 BD 49 LDXA #I
59 C117 A7 0D STA 13+X
60 C119 BD 43 LDXA #C
61 C118 A7 0E STA 14+X EXT .PIC FOR POSITION INDEPENDENT CODE
62 C119 BD 01 LDXA #I OPEN FOR READ CODE
63 C11F A7 84 STA 0+X
64 C121 BD D406 JSR FNS
65 C124 26 13 RNE ERROR
66 C126 BD FF LDXA #FFF
67 C128 A7 88 3B STA 59+X SPACE COMPRESSION FLAG OFF
68 C128 BD C042 JSR GETHEX GET OFFSET FROM LINE BUFFER
69 C126 BF CC1B STX OFFSET PUT IN OFFSET LOCATIONS
70 C131 BD C030 JSR LOAD
71 C134 BE CC1B LDX OFFSET
72 C137 A7 84 JMP 9+X JUMP TO FIRST ADDRESS OF PROGRAM
73 C139 BD C03F ERROR JSR RPTERR
74 C13C BD B403 JSR FNCLS
75 C13F 7E CD03 END START
76
77 NAM MOVE
78 TTL MOVE A BLOCK OF MEMORY
79 *
80 * MOVE A BLOCK OF MEMORY.
81 *
82 * THIS IS POSITION INDEPENDENT CODE
83 * IT MAY BE LOADED ANYWHERE IN MEMORY USING THE
84 * LOGO UTILITY, AS! LOGO,MOVE&0400,BEGAD,ENDAD,NOVAD
85 * WILL LOAD IT AT $4000 SINCE IT IS ORG'ED BY DEFAULT
86 * AT ZERO, LOGO WILL JUMP TO THE LOAD ADDRESS.
87
88 CD42 GETHEX EQU <CD42
89 CD03 WARMS EDU <CD03
90 *
91 0000 20 03 START BRA BEGIN
92 0002 61 VER FCB 1
93 0003 ENBAD RMB 2
94 0005 BD C042 BEGIN JSR GETHEX GET BEGAD
95 0008 1F 12 TFR X,Y FROM ADDRESS BEGAD NOW IN Y
96 000A BD C042 JSR GETHEX GET ENBAD
97 000D 34 01 INX
98 000F AF BC F1 STX ENBAD,PCR
99 0012 BD C042 JSR GETHEX GET TOADD IN X
100 0015 A6 A9 LOOP LDXA #Y+
101 0017 A7 80 STA 12+X
102 0019 10AC BC E6 CMPY ENBAD,PCR
103 001D 26 F6 RNE LOOP
104 001F 7E CD03 END START
105 NAM DUMP
106 TTL HEX-ASCII DUMP FLEX09
107 *
108 0099 009B 009C 009D
109 009F BD 0F 0C
110 00A1 25 0C
111 00A3 48
112 00A4 48
113 00A5 48
114 00A6 48
115 00A7 1F 89
116 00A8 34 04 ABEO
117 00A9 39
118 00B0 BD CD15
119 00B3 80 30
120 00B5 28 11
121 00B7 31 09
122 00B9 2F 0A
123 00B9 91 11
124 00BD 2B 09
125 00BF 81 16
126 00C1 2E 05
127 00C3 80 07
128 00C5 IC FE
129 00C7 39
130 00C9 1A 01
131 00CA 39
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SCIENTIFIC FUNCTIONS FOR PASCAL          3-14-80      PAGE 1

PROGRAM SCIPKG;

(* SCIENTIFIC FUNCTIONS ****)
(* IF YOU USE THIS PACKAGE IN A PROGRAM, THE FOLLOWING CONSTANT
AND VARIABLE DECLARATIONS MUST BE MADE AT THE START OF YOUR
PROGRAM SO THEY ARE GLOBAL FOR ALL OF THE FUNCTIONS AND
PROCEDURES HERE. *)

CONST
  PI=3.14159265;
  ERROR=1.0E-8;

VAR
  ANGLE : REAL;
  NUMBER : REAL;
  X,Y,R,THETA : REAL;

(* INFINITE SERIES SUM CALCULATIONS FOR SINE ****)

FUNCTION SINE(X : REAL) : REAL;
BEGIN
  TERM,SUM,X2 : REAL;
  N : INTEGER;
  SUM:= X; TERM:= X; X2:= -SIN(X); N:=2;
  REPEAT
    TERM:= TERM * X2 / (N * (N+1));
    N:= N+2;
    SUM:= SUM + TERM;
  UNTIL ABS(TERM) < ERROR;
  SINE:= SUM;
END;

(* SINE FUNCTION ****)

FUNCTION SIN (X:REAL) : REAL;
VAR
  MINUS : BOOLEAN;
BEGIN
(* MAKE X POSITIVE IF NEGATIVE *)
  WHILE X < 0 DO
  BEGIN
    X:= X + 2 * PI;
  END;
(* REDUCE POSITIVE X TO 2 PI OR LESS *)
  WHILE X > 2*PI DO
  BEGIN
    X:= X - 2 * PI;
  END;
(* NOW REDUCE TO PI OR LESS AND SET SIGN FLAG *)
  IF X > PI THEN
  BEGIN
    X:= X - PI;
    MINUS:=TRUE;
  END
  ELSE MINUS:= FALSE;
  IF MINUS THEN
    SIN:= -SINE(X)
  ELSE
    SIN:= SINE(X);
END;

(* FOR COSINE: ADJUST X BY PI/2 AND USE SINE ****)

FUNCTION COS (X:REAL) : REAL;
BEGIN
  X:= X+PI/2;
  COS:= SIN(X);
END;

(* TANGENT EQUALS SIN/COS ****)

FUNCTION TAN (X: REAL) : REAL;
BEGIN
  TAN:=SIN(X)/COS(X);
END;

(* ARCTANGENT USING SERIES ****)

FUNCTION ATN(X : REAL) : REAL;
CONST
  A5=-0.052048;
  A4=0.27023;
  A3=-0.45613;
  A2=0.025174;
  A1=0.99817;
  A0=0.67726E-5;
  RECIPROCAL : BOOLEAN;
  RESULT : REAL;
BEGIN
  IF X > 1 THEN
  BEGIN
    X:= 1/X;
    RECIPROCAL:=TRUE;
  END
  ELSE RECIPROCAL:= FALSE;
  IF X < 0 THEN
    RESULT:=A0+X*(A1+X*(A2+X*(A3+X*(A4+X*A5))));
  ELSE RESULT := 0;
  IF RECIPROCAL THEN
    ATN:= PI/2-RESULT
  ELSE ATN:=RESULT;
END;

(* SQUARE ROOT USING NEWTON'S METHOD ****)

FUNCTION SQRT (N : REAL) : REAL;
LABEL 10;
VAR
  OLD,NEW : REAL;
BEGIN
  OLD:= 3; NEW:= 0;
  IF N=0 THEN GOTO 10 (* TRAP SQRT ZERO TO AVOID DIVIDE BY ZERO IN TEST *)
  NEW:=3; (*SET UP FOR LOOP*)
  REPEAT
    OLD:= NEW;
    NEW:=(N/OLD+OLD)/2;
  UNTIL ABS(NEW - OLD) / NEW < ERROR;
  10 : SQRT:= NEW;
END;

(* EXPONENTIAL FUNCTION EX ****)

FUNCTION EXP (X : REAL) : REAL;
VAR
  TERM,SUM : REAL;
  N : INTEGER;
BEGIN
  N:=1; TERM:=1; SUM:=1.0;
  REPEAT
    TERM:= TERM * X/N;
    SUM:= SUM + TERM;
    N:= N+1;
  UNTIL ABS(TERM/SUM) < ERROR;
  EXP:= SUM;
END;

(* LOG TO THE BASE E OPTIMIZED BY NARROWING RANGE TO THAT
OF FAST CONVERGENCE OF THE SERIES EXPANSION ****)

FUNCTION LOG(X : REAL) : REAL;
LABEL 20;
CONST
  LOG10=2.30258509;
VAR
  N : INTEGER;
  SUM,N,TERM : REAL;
BEGIN
(* ADJUST NUMBER TO BETWEEN .15 AND 1.5 *)
  N:=0;
  WHILE X>1.5 DO (* ADJUST LARGE NUMBERS *)
  BEGIN
    X:= X/10;
    N:= N+1;
  END;
  WHILE X<0.15 DO (* ADJUST SMALL NUMBERS *)
  BEGIN
    X:= X * 10;
    N:= N-1;
  END;
  IF X < 0.475 THEN
  BEGIN
    X:=X*3.16227766 (* SQUARE ROOT OF 10 *)
    N:=N-0.5;
  END;
  SUM:=0; TERM:= X-1; N:=1;
  IF TERM=0 THEN GOTO 20 (* TRAP ZERO *)
  REPEAT
    SUM:= SUM + TERM/N;
    TERM:= TERM*(X-1);
    N:=N+1;
  UNTIL ABS (TERM / ((N-1) * SUM)) < ERROR;
  20 : LOG:= SUM + N * LOG10
END;

(* RECTANGULAR TO POLAR CONVERSION ****)

PROCEDURE POLAR (X,Y : REAL);
BEGIN
  R:=SQRT(SQR(X)+SQR(Y));
  THETA:=ATN(ABS(Y/X));
  IF (X<0) AND (Y>0) THEN
    THETA:= PI - THETA;
  IF (X<0) AND (Y<0) THEN
    THETA:= PI + THETA;
  IF (X>0) AND (Y<0) THEN
    THETA:= 2*PI - THETA;
END;

(* POLAR TO RECTANGULAR (CARTESIAN) CONVERSION ****)

PROCEDURE CART (R,THETA : REAL);
BEGIN
  X:= R * COS(THETA);
  Y:= R * SIN(THETA);
END;

(* DEGREE TO RADIAN CONVERSION FUNCTION ****)

FUNCTION DEGREEX (X : REAL) : REAL;

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BEGIN
    DEGREE:= X * 180/PI
END;
(* RADIAN TO DEGREE CONVERSION FUNCTION ****)
FUNCTION RADIAN (X : REAL) : REAL;
BEGIN
    RADIANS:= X * PI/180
END;
(* TEST PROGRAM FOR SCI FUNCTIONS STARTS HERE *)
BEGIN
    NUMBER:=1.0;
    WHILE NUMBER<0 DO
        BEGIN
            WRITE (*"INPUT NUMBER FOR SQUARE ROOT FUNCTION *");
            READ (NUMBER);
            IF NUMBER < 0 THEN
                BEGIN
                    NUMBER:= ABS(NUMBER);
                    WRITE (*"Imaginary Result");
                END;
            WRITELN;
            NUMBER:= SQR(NUMBER);
            WRITELN (*"THE SQUARE ROOT IS " +NUMBER : 30:6);
            WRITELN; WRITELN;
            WRITE (*"INPUT ANGLE IN DEGREES FOR TRIG FUNCTIONS *");
            READ (ANGLE);
            WRITELN;
            ANGLE:= RADIANS(ANGLE); (* CONVERT TO RADIANS *)
            WRITELN (*"SINE IS " +SIN(ANGLE) :15:6);
            WRITELN (*"COS IS " +COS(ANGLE) :15:6);
            WRITELN (*"TAN IS " +TAN(ANGLE) :15:6);
            WRITELN; WRITELN;
            WRITE (*"INPUT NUMBER FOR EIX *");
            READ (NUMBER);
            WRITELN;
            NUMBER:= EXP(NUMBER);
            WRITELN (*"EIX IS " +NUMBER :15:6);
            WRITELN; WRITELN;
            WRITE (*"INPUT TANGENT FOR ARCTAN FUNCTION *");
            READ (NUMBER);
            WRITELN;
            ANGLE:= ATN(NUMBER);
            ANGLE:= DEGREE(ANGLE); (* CONVERT TO DEGREES *)
            WRITELN (*"ANGLE IS "+ANGLE :15:5+" DEGREES");
            WRITELN; WRITELN;
            WRITE (*"INPUT NUMBER FOR LOG FUNCTION *");
            READ (NUMBER);
            WRITELN;
            NUMBER:= LOG(NUMBER);
            WRITELN (*"LOG IS "+NUMBER : 15:6);
            WRITELN; WRITELN;
            WRITE (*"INPUT X,Y FOR POLAR CONVERSION *");
            READ (X,Y);
            WRITELN;
            POLAR (X,Y);
            THETA:= DEGREE(THETA);
            WRITELN (R :12:6, " AT "+,THETA :12:6, " DEGREES.");
            WRITELN; WRITELN;
            WRITE (*"INPUT R,THETA (DEGREES) FOR RECTANGULAR CONVERSION *");
            READ (R,THETA);
            THETA:= RADIANT(THETA);
            WRITELN;
            CART(R,THETA);
            WRITELN (*"X=" +X19:6+ " Y=" +Y19:6);
            WRITELN; WRITELN;
            WRITE (*"INPUT 1 TO CONTINUE, 0 TO EXIT *");
            READ (NUMBER);
        END;
END;
TEST PROGRAM FOR MATH COMPILER

```

\* DEFINE MATH PACKAGE ENTRY  
\*  
\* MATH EQU \$1000  
\*  
\* MATH \*  
RESULT = THREE / FIVE \* PI;  
END;

COMPILED SOURCE FOR ASSEMBLER

```

MVM TEST
TTL DUMMY MATH PROGRAM FOR TEST OF COMPILER
OPT PAG
PAG
* DEFINE OP CODES FOR MATH PACKAGE
* NOTE THAT IN THIS EXAMPLE ONLY CODES REQUIRED ARE
* DEFINED HERE
*  

PSH EQU 0
FML EQU $6
FDV EQU $8
STR EQU $12
*  

* DEFINE VARIABLE LOCATIONS IN PROGRAM
*  

THREE EQU $100
FIVE EQU $104 ADDRESSES OF VARIABLES IN MEMORY
PI EQU $108
RESULT EQU $200
*  

*  

* DEFINE MATH PACKAGE ENTRY
*  

* MATH EQU $1000
*  

*  

* RESULT = THREE / FIVE * PI;  

*  

JSR MATH
FCB PSH ENTER VARIABLE ON STACK
FDB THREE
FCB PSH ENTER VARIABLE ON STACK
FDB FIVE
FCB FDV FLOATING POINT DIVINE
FCB PSH ENTER VARIABLE ON STACK
FDB PI
FCB FML FLOATING POINT MULTIPLY
FCB STR SAVE RESULT
FDB RESULT RESULT LOCATION
END

```

DUMMY MATH PROGRAM FOR TEST OF C

```

5      *
6      * DEFINE OP CODES FOR MATH PACKAGE
7      * NOTE THAT IN THIS EXAMPLE ONLY CODES REQUIRED ARE
8      * DEFINED HERE
9      *
10     0000   PSH   EQU   0
11     0006   FML   EQU   $6
12     0008   FDV   EQU   $8
13     0012   STR   EQU   $12
14     *
15     * DEFINE VARIABLE LOCATIONS IN PROGRAM
16     *
17     0100   THREE  EQU   $100
18     0104   FIVE   EQU   $104   ADDRESSES OF VARIABLES IN MEMORY
19     0108   PI     EQU   $108
20     0200   RESULT  EQU   $200
21     *
22     *
23     * DEFINE MATH PACKAGE ENTRY
24     *
25     1000   MATH   EQU   $1000
26     *
27     * RESULT = THREE / FIVE * PI;
28     *
29     *
30     0000  RD 10 00   JSR   MATH
31     0003 00   FCB   PSH   ENTER VARIABLE ON STACK
32     0004 01 00   FDB   THREE
33     0006 00   FCB   PSH   ENTER VARIABLE ON STACK
34     0007 01 04   FDB   FIVE
35     0009 08   FCB   FDV   FLOATING POINT DIVIDE
36     0009 04   FCB   PSH   ENTER VARIABLE ON STACK
37     0008 01 08   FDB   PI
38     0008 06   FCB   FML   FLOATING POINT MULTIPLY
39     000E 12   FCB   STR   SAVE RESULT
40     000F 02 00   FDB   RESULT RESULT LOCATION
41     *

```

NO ERROR(S) DETECTED

MODEM INPUT AS A DISK TEXT FILE

```

5      *
6      *
7      * TERMEN OPENS A DISK FILE SPECIFIED IN THE COMMAND LINE AND
8      * INPUTS ALL INPUT FROM THE MODEM (INCLUDING THE ECHO OF YOUR
9      * COMMANDS INPUT FROM YOUR TERMINAL) TO MEMORY. WHEN YOU TYPE
10     *
11     *
12     * TERMEN COMES UP IN THE NO-ECHO MODE. IF YOU WANT TO SWITCH
13     *
14     *
15     * EXAMPLE: TERMEN,TEST
16     *
17     * THIS WILL OPEN A FILE TEST.TXT ON THE WORKING DRIVE AND SAVE
18     *
19     *
20     *
21     * EQUATES

```

```

22
23 0000 BEGMEM EQU $000
24 7FFF ENDMEM EQU $7FFF ALTER THIS TO REFLECT YOUR SYSTEM MEMORY END.
25
26 8000 PORT0 EQU $8000
27 8004 PORT1 EQU $8004
28
29 A840 FCB EQU $A840 FLEX2 EQUATES
30 A00C PORECH EQU $A00C SWTRUG EQUATE
31 A003 WARMS EQU $A003
32 A015 GETCHR EQU $A015
33 A01E PSTRNG EQU $A01E
34 A024 PCRLF EQU $A024
35 A02D GETFIL EQU $A02D
36 A033 SETEXT EQU $A033
37 A03F RPTERR EQU $A03F
38
39 B403 FMSCLS EQU $B403
40 B406 FMS EQU $B406
41
42 A100 ORG $A100 FLEX UTILITY SPACE
43
44 A100 20 05 TERM BRA TERM2
45 A102 01 VN FCB 1
46 A103 BEGADR RMB 2
47 A105 ENDADR RMB 2
48
49 A107 CE AB 40 TERM2 LDX #FCB
50 A108 BD AD 20 JSR GETFIL GET FILE SPEC FROM COMMAND LINE
51 A10B 24 07 BCC TERM3 IF NO ERROR
52 A10F B6 15 LDA A #21
53 A111 A7 01 STA A 1,X
54 A113 7E A1 F9 JMP ERROR
55
56 A116 CE AB 40 TERM3 LDX #FCB
57
58 A119 B6 01 LDA A #1
59 A11B PD AD 33 JSR SETEXT TO .TXT
60 A11E CE AB 40 OPEN LDX #FCB
61 A121 B6 02 LDA A #2 OPEN FOR WRITE
62 A123 A7 00 STA A 0,X
63 A125 BD B4 06 JSR FMS
64 A128 27 03 BEQ ACINIT
65 A12A 7E A1 F3 JMP FILERR
66
67 A12D CE B0 00 ACINIT LDX #PORT0
68 A130 B6 03 LDA A #3
69 A132 CA 15 LDA B #115
70 A134 A7 00 STA A 0,X RESET ACIA
71 A136 E7 00 STA B 0,X SET UP CONTROL BITS
72 A138 A6 01 LDA A 1,X CLEAR RECEIVE BUFFER
73
74 A13A CE A2 85 LDX #MSG4 READY MESSAGE
75 A13B BD AD 1E JSR PSTRNG
76 A140 BD AD 24 JSR PCRLF
77 A143 CE 00 00 LDX #BEGMEM
78 A146 FF A1 03 STX BEGADR
79 A149 FF A1 05 STX ENDADR
80 A14C 7F A0 0C CLR PORECH
81 A14F F3 A0 0C TERMEC CDR PORECH INITIALIZE OFF
82
83 * MAIN INPUT LOOP HERE
84
85 A152 CE B0 00 TSTMDB LDX #PORT0
86 A155 E6 00 LDA B 0,X
87 A157 54 LSR B
88 A158 24 1B BCC TSTTRM TEST FOR RECEIVE BUFFER FULL
89
90 A15A A4 01 LDA A 1,X HAVE CHARACTER FROM MODEM
91 A15B CE 90 04 LDX #PORT1
92 A15F BD A1 9A JSR DUTCHR OUTPUT TO TERMINAL
93 A162 BD A1 A3 JSR MEMORY PUT IN MEMORY
94 A165 24 03 BCC MDRI
95 A167 7E A1 B9 JMP MEMOV
96 A16A 7D A0 0C MDRI TST PORECH ECHO ON?
97 A16B 28 06 BNE TSTMDB
98 A16F CE 80 00 LDX #PORT0 SET UP ECHO
99 A172 BD A1 9A JSR DUTCHR GO DO IT
100
101 A175 CE 80 04 TSTMDB LDX #PORT1 SEE IF RECEIVE BUFFER FULL
102 A178 E6 00 LDA B 0,X
103 A17A 54 LSR B
104 A17B 24 05 BCC TSTMDB GO AROUND AGAIN IF NO CHARACTER
105
106 A17D A6 01 LDA A 1,X
107 A17F B1 1B CMP A #1B IS IT ESCAPE ?
108 A181 27 3C BEQ EXIT
109
110 A183 B1 05 CMP A #5 IS IT 1E ?
111 A185 27 C8 BEQ TERMEC GO CHANGE ECHO MODE
112
113 A1B2 CE B0 00 LDX #PORT0
114 A1B4 BD A1 9A JSR DUTCHR OUTPUT TO MODEM
115 A1B8 7D A0 0C TST PORECH
116 A1B9 26 C0 BNE TSTMDB
117
118 A1B2 CE B0 04 LDX #PORT1
119 A1B5 BD A1 9A JSR DUTCHR ECHO
120 A1B8 20 B6 BRA TSTMDB
121
122 * SUBROUTINES
123
124 A19A E6 00 DUTCHR LDA B 0,X
125 A19C 54 LSR B
126 A192 54 LSR B
127 A19E 24 FA BCC DUTCHR WAIT FOR TRANSMIT BUFFER EMPTY
128 A1A0 A7 01 STA A 1,X OUTPUT IT
129 A1A2 39 RTS
130
131 A1A3 FE A1 05 MEMORY LOX ENDADR
132 A1A6 B1 08 CMP A #88 BACKSPACE?
133 A1A8 27 06 BEQ MEM1
134
135 A1AA A7 00 STA A 0,X
136 A1AC 0B INX
137 A1AD FF A1 05 STX ENDADR
138 A1B0 BC 7F FF MEM1 CPX ENOMEM
139 A1B3 27 02 BEQ MEM2
140 A1B5 0C CLC
141 A1B6 39 RTS
142 A1B7 0D MEM2 SEC
143 A1B8 39 RTS
144
145 A1B9 CE A2 31 MEMOV LDX #MSG1
146 A1B9 BD AD 1E JSR PSTRNG
147 A1BF FE A1 03 EXIT LDX BEGADR
148 A1C2 BC A1 05 CPX ENDADR
149 A1C5 27 20 BEQ CLOSE
150
151 A1C7 A6 00 SAVE LDA A 0,X
152 A1C9 0B TMX
153 A1CA B4 7F AND A #7F
154 A1CC B1 20 CMP A #20
155 A1CE 24 04 BCC SAVE1
156 A1D0 B1 0D CMP A #10D
157 A1D2 26 0E BNE SAVE2
158 A1D4 FF A1 03 SAVE1 STX BEGADR
159 A1D7 CE AB 40 LDY #FCB
160 A1D9 BD B4 06 JSR FMS
161 A1D9 26 1A BNE ERROR
162 A1D9 FE A1 03 LDX BEGADR
163 A1E2 BC A1 05 SAVE2 CPX ENDADR
164 A1E5 26 E0 BNE SAVE
165
166 A1E7 CE AB 40 CLOSE LDX #FCB
167 A1E8 B4 04 LDA A #4
168 A1E9 A7 00 STA A 0,X
169 A1E9 BD B4 06 JSR FMS
170 A1F1 27 0C BEQ EXITE
171 A1F3 A6 01 FILERR LDA A 1,X
172 A1F5 B1 03 CMP A #3
173 A1F7 27 0C BEQ ASKDEL
174
175 A1F9 BD AD 3F ERROR JSR RPTERR
176 A1F9 BD B4 03 JSR FMSCLS
177 A1FF 7F A0 0C EXITE CLR PORECH
178 A202 7E AD 03 JMP WARMS
179
180 A205 CE A2 53 ASKDEL LDX #MSG2
181 A208 BD 1C BSR ASK
182 A20A 26 F3 BNE EXITE
183
184 A20C CE A2 76 LDX #MSG3
185 A20F BD 15 BSR ASK
186 A211 26 EC BNE EXITE
187
188 A213 CE AB 40 LDY #FCB
189 A214 B4 0C LDA A #12
190 A218 A7 00 STA A 0,X
191 A21A BD B4 06 JSR FMS
192 A21D 26 DA BNE ERROR
193 A21F A6 24 LDA A 36,X
194 A221 A7 04 STA A 4,X
195 A223 7E A1 1E JMP OPEN OPEN NEW FILE
196
197 A226 BD AD 1E ASK JSR PSTRNG
198 A229 BD AD 15 JSR GETCHR
199 A229 BD B4 5F AND A #5F
200 A22E B1 59 CMP A #1Y
201 A230 39 RTS
202 A231 4D MSG1 FCC 'MEMORY OVERFLOW SOME DATA LOST ! '
203 A232 04 FCB 4
204 A233 4D MSG2 FCC 'MAY THE EXISTING FILE BE DELETED ? '
205 A237 04 FCB 4
206 A276 41 MSG3 FCC 'ARE YOU SURE ? '
207 A284 04 FCB 4
208 A285 52 MSG4 FCC 'READY FOR MODEM INPUT '
209 A298 04 FCB 4
210
211 END TERM
212
213 NO ERROR(S) DETECTED
214
215 MODEM COMMAND FILE
216
217 5 #
218 6 #
219 7 #
220 8 #
221 9 #
222 10 #
223 11 #
224 12 #
225 13 #
226 14 #
227 15 #
228 16 #
229 17 #
230 18 #
231 19 #
232 20 #
233 21 #
234 22 #
235 23 #
236 24 #
237 25 #
238 26 #
239 27 #
240 28 #
241
242 * THIS M.CMD FILE IS USED LIKE THE P.CMD FILE. IT LOADS THE
243 * MODEM.SYS FILE AND ALLOWS OUTPUT TO THE MODEM AND TO THE TERMINAL
244 * AN RS-232 INTERFACE. #1 ALSO SWITCHES OUTPUT TO THE TERMINAL
245 * SO THAT THE LISTING TO THE MODEM MAY BE OBSERVED.
246
247 * TYPICAL USE WOULD BE M-LIST,TEXT,TEXT,I ... THIS WOULD
248 * OUTPUT THE FILE TEXT.TEXT,I TO THE MODEM AND TO THE TERMINAL
249 * ON PORT 1.
250 * THE EXTENSION DEFAULTS TO .TXT AND THE DRIVE TO "WORKING"
251
252 * EQUATES
253 18 AC11 LASTER EQU $AC11 LAST TERMINATOR
254 19 AC09 PAUSE EQU $AC09 PAUSE FLAG FOR TERMINAL OUTPUT
255 20 AB1E PSTRNG EQU $AB1E PRINT A STRING POINTED AT BY X
256 21 B403 FMSCLS EQU $B403 CLOSE ALL OPEN FILES
257 22 A003 WARMS EQU $A003 WARNSTART FOR FLEX
258 23 AC02 EDLCHR EQU $AC02 END OF LINE CHARACTER
259 24 B406 FMS EQU $B406 FILE MANAGEMENT SYSTEM CALL
260 25 A840 FCB EQU $A840 FILE CONTROL BLOCK
261 26 A030 LOAD EQU $A030 LOAD A BINARY FILE
262 27 A006 RENTER EQU $A006 RE ENTER FLEX
263 28 A03F RPTERR EQU $A03F REPORT ERROR ROUTINE

```

```

29 B000 PORT0 EDU $B000
30 B004 PORT1 EDU $B004
31
32 A100 ORG $A100
33
34 A100 20 01 START BRA BEGIN
35 A102 01 VER FCB 1
36 A103 B6 AC 11 BEGIN LDA A LASTTER LAST TERMINATOR
37 A106 B1 00 CMP A #$0D WAS IT CR?
38 A108 27 38 BEQ ERROR IF SO, SYNTAX ERROR
39 A10A B1 AC 02 CMP A EOLCHR WAS IT END OF LINE?
40 A10D 27 33 BEQ ERROR IF SO, ERROR
41 A10F 7F AC 09 CLR PAUSE DISABLE PAUSE FEATURE FOR MODEM OUTPUT
42 A112 CE A8 40 LDX #FCB
43 A115 B6 01 LDA A #1 OPEN FOR READ CODE
44 A117 A7 00 STA A 0xX OPEN FOR READ
45 A119 BD B4 06 JSR FNS DO IT
46 A11C 26 0D BNE GETER ERROR ROUTINE
47 A11E B6 FF LDA A #$FF
48 A120 A7 38 STA A 59AX SPACE COMPRESSION FLAG
49 A122 BD AD 30 JSR LOAD LOAD MODEM.SYS FILE
50 A125 BD B1 75 JSR ACINIT
51 A128 7E AD 06 GETER LDA A 1:X BACK TO FLEX
52 A129 A6 01 JMP RENTER GET THE ERROR CODE
53 A12B B1 04 CMP A #4 WAS IT NO SUCH FILE?
54 A12F 26 08 BNE RPTJMP
55 A131 CE A1 47 LDX #SYSER NO SUCH FILE MESSAGE
56 A134 BD AD 1E P1 JSR PSTRNG PRINT MESSAGE
57 A137 20 03 BRA EXIT

```

#### MODEM COMMAND FILE

```

58 A13P BD AB 3F RPTJMP JSR RPTERR CLOSE ALL FILES ON ERROR
59 A13C BD B4 03 EXIT JSR FNSCLS
60 A13F 7E AD 03 JMP WARNS
61 A142 CE A1 5B ERROR LDX #ERSMG
62 A145 20 ED BRA P1 PRINT MESSAGE
63 A147 22 SYSER FCC /*MODEM.SYS* NOT FOUND/
64 A15C 04 FCB 4
65 A15B 43 ERSMG FCC /COMMAND MUST FOLLOW "M"/
66 A174 04 FCB 4
67
68 A175 B6 03 ACINIT LDA A #3
69 A177 C5 15 LDA B #115 2 STOP BITS
70 A179 B7 B0 00 STA A PORT0
71 A17C F7 B0 00 STA B PORT1
72 A17F B6 B0 01 LDA A PORT0+1
73 A182 39 RTS
74 AB44 ORG FCB+4
75
76 * LOAD FCB WITH MODEM.SYS FILE SPEC
77
78 AB44 4B FCC /MODEM/
79 AB49 00 00 FDB 0
80 AB4B 00 FCB 0
81 AB4C 53 FCC /SYS/
82
83 END START

```

NO ERROR(S) DETECTED

#### OUTPUT ROUTINE FOR MODEM

```

5
6
7 * THIS PROGRAM, MODEM.SYS, IS AN ALTERNATE OUTPUT ROUTINE
8 * TO PUTCHR, THAT OUTPUTS THE CHARACTER IN THE A ACCUMULATOR
9 * TO PORTS 0 AND 1, BOTH AS MP-5 ACIA INTERFACES AT THE SET
10 * BAUD RATES.
11 * ITS USE WILL BE TO ALLOW OUTPUT TO THE MODEM FOR UTILITIES
12 * SUCH AS CATS LIST, ETC.
13 *
14 * THE SYNTAX IS:
15 *
16 * M:LIST,FILENAME
17 *
18 * THIS PROGRAM IS LOADED BY THE M.CMD FILE WHICH ALSO INITIALIZES
19 * THE ACIA AT PORT 0,
20 *
21 *
22 * EQUATES
23 AD10 OUTJMP EQU $AD10 OUTPUT CHARACTER VECTOR IN FLEX2
24 B000 PORT0 EQU $B000
25 B004 PORT1 EQU $B004
26
27 AD10
28 AD10 A5 B2 ORG OUTJMP
29 FDB MOUTCR SET JUMP TO THIS ROUTINE
30 A5B0 ORG $A5B0 NEAR TOP OF UTILITY AREA
31
32 A5B0 XTEMP RMB 2
33
34 A5B2 FF A5 B0 MOUTCR STX XTEMP SAVE X
35 A5B3 37 PSH B SAVE REGISTERS
36 A5B6 CE B0 04 LDX #PORT1
37 A5B9 BD B0 04 BSR ACIOUT
38 A5B8 CE B0 00 LDX #PORT0
39 A5B8 BD B0 05 BSR ACIOUT
40 A590 33 PUL B RESTORE REGISTERS
41 A591 FE A5 B0 LDX XTEMP
42 A594 39 RTS
43
44 * ACIA OUTPUT SUBROUTINE
45
46 A595 E6 00 ACIOUT LDA B 0xX
47 A597 57 ASR B
48 A598 57 ASR B
49 A599 24 FA BCC ACIOUT WAIT FOR TRANSMIT BUFFER EMPTY
50 A598 A7 01 STA A 1:X
51 A59D 39 RTS
52
53 END

```

NO ERROR(S) DETECTED

## FORM FEEDLESS PRINTER ROUTINE

THE ARTICLE 'PRINT.SYS FOR A FORM FEEDLESS PRINTER' BY KEN STAMM IN THE JANUARY ISSUE WAS A WELCOME SOLUTION TO A SMALL PROBLEM THAT MANY FLEX USERS, INCLUDING MYSELF, HAD RUN INTO. I AM USING AN OLD ASR-33 TELETYPE AS A PRINTER ON MY DRAFI SYSTEM AND UP UNTIL NOW MY SOLUTION TO THE FORM FEED PROBLEM WAS TO PRINT DUMMY FILES CONTAINING ONLY LINE FEEDS BETWEEN EACH FILE IN THE PRINT QUEUE. KEN'S IDEA OF HOW TO LET THE MACHINE DO THE WORK WAS MOST APPRECIATED.

AFTER EXAMINING THE PROGRAM IN SOME DETAIL, I WONDERED IF THERE WAS A WAY AROUND THE ONLY DRAWBACK - THAT OF HAVING TO USE A PORTION OF THE USER MEMORY FOR PART OF THE DRIVER. IF THE PROGRAM COULD BE COMPRESSED TO FIT INTO THE 56 BYTE SPACE ALLOCATED BY TSC FOR THE PRINTER DRIVER, IT WOULD BE SAFELY OUT OF THE WAY OF ALL OTHER PROGRAMS.

IN ORDER TO WORK WITH FLEX, ANY PRINTER DRIVER MUST MAINTAIN THREE ENTRY POINTS - SACC0 FOR THE INITIALIZATION ROUTINE, SACC8 FOR A PRINTER READY CHECK, AND SACC4 FOR OUTPUTTING ONE CHARACTER. ALTHOUGH FLEX CAN EASILY BE MODIFIED TO USE OTHER ENTRY POINTS, IT IS BEST TO LEAVE IT ALONE AND MAKE THE DRIVER COMPATABLE. REDUCING KEN'S PROGRAM FROM 89 BYTES TO FIT INTO THE SCANTY DRIVER SPACE WHILE RETAINING THE THREE ORIGINAL ENTRY POINTS PROVED TO BE QUITE A CHALLENGE.

AFTER A GREAT DEAL OF SQUEEZING, GRUNTING, PACKING AND CHEATING, THE PROGRAM SHOWN HERE SEEKS TO DO THE TRICK. THE CODE MAY SEEM QUITE MIXED UP, BUT FLOW-CHARTING IT HELPS TO MAKE SENSE OUT OF THE MADNESS. (REFER TO KEN'S ARTICLE FOR AN EXCELLENT DESCRIPTION OF THE PROBLEM AND THE SOLUTION.)

ENTRY TO THE CHARACTER OUTPUT POINT (SACC4) FIRST CHECKS TO SEE IF THE CURRENT CHARACTER IS A FORM FEED (\$OC). IF NOT, THE ROUTINE 'OUT' IS ENTERED, PRINTING THE CHARACTER AND UPDATING THE LINE COUNT IF THE CHARACTER IS A LINE FEED. THE RTS AT 'RTN' RETURNS CONTROL TO THE CALLING PROGRAM AT THIS POINT.

IF THE CHARACTER RECEIVED IS A FORM FEED, IT IS CONVERTED INTO A LINE FEED AND THE ROUTINE 'OUT' IS CALLED AS A SUBROUTINE WITHIN A LOOP. THE LOOP CONTINUES TO CALL 'OUT' UNTIL THE PROPER NUMBER OF LINE FEEDS ARE PRINTED. THE CARRY SERVES AS A FLAG TO ALLOW THE LOOP TO BE EXITED. NOTE THAT THE 'CMPA' AT SACC4 WILL CLEAR THE CARRY FLAG AFTER EACH LINE FEED IS PRINTED. WHEN THE LINE COUNT IS FINALLY DECREMENTED TO ZERO AND RESET, THE 'SEC' INSTRUCTION TRIGGERS AN EXIT FROM THE LOOP. THE DRIVER THEN EXITS THROUGH THE 'PCHK' ROUTINE (WHICH DOES NOTHING HERE BUT SAVE ONE BYTE OF CODE).

I'M AFRAID I HAD TO LEAVE OUT KEN'S DESIRABLE PARITY STRIPPING BEFORE THE CHARACTER TESTS, BUT A CHECK OF THE SOFTWARE I HAVE WHICH WOULD USE THIS DRIVER INDICATED THIS WOULD CREATE NO PROBLEMS. WHO WILL BE THE FIRST TO SQUEEZE TWO MORE BYTES OUT OF THE PROGRAM AND PUT BACK THE PARITY STRIPPING?

```

* PRINT.SYS DRIVER FOR DRAFI FLEX 1.0
* FOR ACIA ON PORT #0
*
* WILL DECODE FORM FEED - $OC
* DERIVED FROM PROGRAM BY KEN STAMM
* '68' MICRO, JANUARY 1980, PAGE 34
*
* SET PAGSIZ TO NUMBER OF LINES/PAGE
* JOHN K. JORDAN
* 103 ELLIOTT CIRCLE
* OAK RIDGE, TN. 37830
* JAN. 80
*
* ACIA EQU $8000 ACIA ADDRESS
* PAGSIZ EQU 66 NUMBER OF LINES/PAGE
ACCO
* ORG SACC0
*
* INITIALIZE ACIA INTERFACE
ACCO 86 03 PINIT LDA A #3
ACCO B7 B0 00 STA A ACIA
ACCS 86 11 LDA A #$11
ACCT B7 B0 00 STA A ACIA
*
ACCA 86 42 RESET LDA A #PAGSIZ RESET LINE COUNT
ACCC B7 AC D1 STA A LINCNT
ACCF 0D SEC SET FLAG FOR LOOP CHECK
ACD0 39 RTS
*
ACDI LINCNT RMB 1 LINE COUNT (REMAINING)
ACD2 86 0A PLF LDA A #$0A PRINT LINE FEEDS
ACD4 8D 12 LOOP BSR OUT
ACD6 24 FC BCC LOOP RETURN THRU PCHK
*
* PRINTER READY CHECK
ACD8 37 PCHK PSH B
ACD9 F6 B0 00 LDA B ACIA GET STATUS BIT
ACDC 56 ROR B ROTATE INTO BIT 7
ACDD 56 ROR B
ACDE 56 ROR B
ACDF 33 PUL B
ACE0 39 RTS
*
* OUTPUT ONE CHARACTER TO PRINTER
ACE1 27 E7 CKRST BEQ RESET RESET LINE COUNT
ACE3 39 RTN RTS
*
* OUTPUT ONE CHARACTER TO PRINTER
ACEA B1 0C POUT CMP A #$0C IS IT A FORM FEED?
ACE6 27 EA BEQ PLF YES GO PRINT LINE FEEDS

```

```

ACES      OUT    EQU    *      PRINT CHARACTER
ACES 8D EE   BSR    PCHK   WAIT TILL PRINTER READY
ACEA 2A FC   BPL    OUT
ACCE 87 80 01 STA A ACIA+1  WRITE CHARACTER
ACCF 81 0A   CHP A #80A  WAS CHR. A LINE FEED?
ACFI 86 F0   BNE    RTN    NO, RETURN; ELSE...
ACF3 7A AC D1 DECNT  DEC    LINCNT DECREMENT LINE COUNT
ACF6 20 E9   BRA    CKRST  GO RESET IF NEEDED
.*          END

```

NO ERROR(S) DETECTED

#### SYMBOL TABLE:

ACIA	6000	CKRST	ACE1	DECNT	ACF3	LINCNT	ACD1	LJOP	ACD4
OUT	ACEB	PAGSIZ	0042	PCHK	ACD8	PINIT	ACCO	PLF	ACD2
POUT	ACEA	RESET	ACCA	RTN	ACE3				

## COMMUNICATIONS PROGRAM MODEM

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Interest in Computer Bulletin Boards is growing and is likely to continue to grow since it provides an interesting by-product to the hobby of home computer programming and use. Many computers require separate terminals which can readily be connected to a modem and used to access a bulletin board; however, this is often a nuisance involving disconnecting the terminal from the computer and possibly losing the use of a printer or other peripheral device.

The accompanying listing is of a 6800 assembly language program for a computer with a serial port (Port 1) for the terminal and another serial port (Port 2) for connection to a modem. The bit rate should be fixed at 300 baud for Port 2, but may be any rate compatible with the computer and terminal for Port 1.

The minimum system required to use the program is a terminal, a computer, and a modem. The modem I have found useful is the Pennwhistle 103 which serves as an interface device for the recording of cassette tapes as well as for use as an acoustic-coupled modem to communicate with distant computers by telephone lines.

The program is commented, but a few additional comments may be helpful. Lines 0100 through 0107 reset the ACIA's by transmitting 03 to each device. Lines 0109 through 0110 set both devices for the most commonly used protocol: 7 Bits of data, Even Parity, and 1 Stop Bit. Lines 010F-0113 and 0125-0129 ping-pong until data is either available from the terminal or incoming through the modem. If data is coming from the terminal, it is transmitted by lines 0115 through 0123. If information is available from the modem, lines 0128 through 0135 send it to the terminal.

This section also looks for a "BREAK" character which I arbitrarily selected as HEX 1F. Upon receipt of this character, the ACIA is sent the value of 61 which it interprets as the command to shift and hold the audio frequency until a reset command is received. After a brief delay, the program is re-INITiated, the ACIA is reset, and normal operation is resumed. This activity just described is performed by lines 0137 through 013E.

In addition to performing a useful function, the program is an interesting example displaying the versatility and convenience of the 6800 Asynchronous Communications Interface Adapter (ACIA).

```

LOCH B1 B2 B3
0000 >=====
0000 >* RS-232 COMMUNICATIONS ROUTINE FOR THE *
0000 >* SWTP 6800 COMPUTER *
0000 >*
0000 >=====
0000 >* DEFINITIONS:
0000 >*
0004 >P1CR EQU #8004 PORT 1 CONTROL AND STATUS REGISTERS
0005 >P1DR EQU #8005 PORT 1 DATA REGISTER
0006 >P2CR EQU #8008 PORT 2 CONTROL AND STATUS REGISTERS
0009 >P2DR EQU #8009 PORT 2 DATA REGISTER
E2C2 >DELA EQU #E2C2 SWTBUG DELAY SUBROUTINE
0000 >*
0000 >* PROGRAM:
0100 >*
0100 > ORG $100
0100 >*
0100 C6 03 >INIT LDAB #3 TO RESET ACIA'S
0102 CE 88 04 > LDX #F1CR SET INDEX TO PORT 1
0105 E7 00 > STAB 0,X RESET PORT 1
0107 E7 04 > STAB 4,X RESET PORT 2
0109 86 49 > LDAB #849 TO CONFIGURE ACIA'S TO 7B+EP+1SB
010B 87 00 > STAR 0,X CONFIGURE PORT 1
010B 87 04 > STAR 4,X CONFIGURE PORT 2
010F 86 01 > R1 LDAB #1 PREPARE TO CHECK PORT 1 FOR DATA
0111 A4 00 > ANDB 0,X ANY DATA FROM PORT 1?
0113 27 10 > BEQ R2 IF NOT, CHECK PORT 2
0115 A6 01 > LDAB 1,X IF SO, LOAD DATA IN ACC A
0117 81 1F > CMPR #81F IS IT THE BREAK (<-->) CHARACTER?
0119 27 1C > BEQ BRK IF SO, GO BREAK PORT 2
011B C6 02 > T2 LDAB #2 IF NOT, PREPARE TO TRANSMIT
011D E4 04 > ANDB 4,X IS PORT 2 READY TO SEND?
011F 27 FR > BEQ T2 IF NOT, CHECK AGAIN
0121 A7 05 > STAR 5,X IF SO, SEND DATA OUT PORT 2
0123 20 ER > BRA R1 AND GO CHECK PORT 1 FOR MORE DATA
0125 86 01 > R2 LDAB #1 PREPARE TO CHECK PORT 2 FOR DATA
0127 A4 04 > ANDB 4,X ANY DATA FROM PORT 2?
0129 27 E4 > BEQ R1 IF NOT, LOOK AT PORT 1.
012B A6 05 > LDAB 5,X IF SO, LOAD DATA IN ACC A
012D C6 02 > T1 LDAB #2 PREPARE TO TRANSMIT
012F E4 00 > ANDB 0,X IS PORT 1 READY TO TRANSMIT?
0131 27 FR > BEQ T1 IF NOT, CHECK AGAIN
0133 A7 01 > STAR 1,X IF SO, SEND DATA OUT PORT 1
0135 20 EE > BRA R2 AND GO CHECK PORT 2 FOR MORE DATA
0137 86 61 > BRK LDAB #861 PREPARE TO BREAK PORT 2
0139 A7 04 > STAR 4,X BREAK PORT 2
013B 8D E2 C2 > JSR DELA WAIT A BIT . . .
013E 20 C0 > BRA INIT AND START OVER
0140 > END

```

## DOCUMENT (TSC BASIC)

BY: Richard G. Cagle  
Applevalley Day School, Inc.  
11103 Sagepark Ln  
Houston, TX, 77089

The following program is a document preparation program, written in TSC Extended Basic, but should also be compatible with TSC Integer Basic. Some of the advanced features of TSC Extended were not used. This program was written for Gilbert G. Olsen and Associates, Inc., Financial Consultants, and is published with their permission. It is intended for use with a terminal in the scroll mode, with FLEX pause active. Provisions are made for two different printers, defined by their PRINT.SYS driver routines. PRINT.SYS can be a small 40 col printer for scratch work and PRINT2.SYS for a large printer, suitable for final document printing.

#### THE PROGRAM CAN BE USED TO:

- (1) Prepare a formal document such as a deed of trust (example below), or bill of sale, or any other document that is created normally by retyping a form with unique data inserted where needed. The program obtains the boilerplate data from a specially formatted disk file and receives inputs from the keyboard.
- (2) Or can be used to prepare one with changes in the boilerplate.
- (3) Or can be used to create a whole new document boilerplate and save it on disk....
- (4) Any document of any type in the proper disk format can be processed.
- (5) A disk file record can be made of any final document for archive.

NO CALCULATIONS ARE DONE...

It uses a disk file, (for example TRUST.DAT below), which is specially formatted. The disk file is read by the program one string at a time. If the text is part of the 'Boilerplate' it is stored in a string array. When a '///' marker is read from the file, the rest of the string is printed (but not stored) as a prompt. Then the program gets an input from the keyboard. Other special markers used are:

**\$\$=skip to a new line(or para)**

SSSS=and of document

~~-----end of document-----~~  
\$\$ and \$\$\$ markers are always at the beginning of a line, or on separate lines. None of the markers can be imbedded in the middle of a string. However, when using the program to generate your files, it will take care of this automatically.

The first line of a document is interpreted as the title and it will be underlined as part of the program. Any other underlining must be done as part of the document.

The use of 'RETURN' at the end of your inputting has two different effects depending on the mode that you are in. Referring to the modes in the program, if you are in mode(4) creating a new document you will have to hit 'RETURN' twice to exit the data entry loop. If you are in (1) or (2) modes, 'RETURN' means you have finished with the answer to the prompt, unless you have gotten wordy and typed more than two lines.

The program has its own logic to prevent line foldover in the middle of a word, therefore `ttyset width` should be set to zero for use. Line 16, variable `Q1=79` may need to be changed if your printer is not an 80 column printer. Set `Q1` to the number of columns you desire or the max number less one.

RICHARD G. EAGLE  
11103 SHOEPARK LN  
HOUSTON, TX, 77089

**BASIC SOURCE LISTING**

TRUST.DAT (RAM) FILE LISTING

99 THIS DEED made this  
//DAVIE, 1st/3rd  
dev of  
//, (March/December)  
//YEAR 1 (1980, 1990)  
, by and between  
//NAMES  
//Donald P. Maddox and Marilyn Y. Olsen,  
//TRUSTEE NAME  
99 WITNESSETH, that the said  
MADDUX, DONALD P., GENERAL  
MORTGAGE to the said trustees  
the following property, in the County of  
//COUNTY  
State of Virginia, to wit:  
99  
//PROPERTY DESCRIPTION  
99 IN TRUST TO secure to the  
holder the sum of the amount of a  
certain promissory note bearing  
---intentionally abbreviated---  
- payable to OILBERT G.  
OLSEN ASSOCIATES, INC., or  
99  
99  
99 WITNESS THE FOLLOWING  
SIGNATURE AND SEAL:  
99  
99  
99  
99  
99 STATE OF VIRGINIA  
99 COUNTY OF FAIRFAX  
99  
99 In  
A Notary Public in and for the  
State of Virginia, County of  
Fairfax, certify that  
  
whose name(s) signed to the  
foresaid deed dated  
, acknowledged their  
signatures before me this  
day of  
1979.  
99  
99  
99  
99  
99  
99  
99 My commission expires:

## PASS PARMs FLEX TO BASIC

```
100 REM PASS PARAMETER'S FROM THE COMMAND LINE IN FLEX TO BASIC.  
110 REM  
120 REM This little routine will take a parameter from  
130 REM the command line of FLEX and pass it to BASIC as A$ !!!  
140 REM  
150 REM The syntax is:  
160 REM
```

```

170 REM +++BASIC<basic file spec>,<parameter>
180 REM
181 REM Where 'basic file spec' is the program with this routine
182 REM in it and 'parameter' is the information you want to
183 REM send to it. If 'parameter' is missing the routine will
184 REM tell you by testing the length of A$.
185 REM
186 REM Frank Hoss
187 REM Frank Hoss Dental Laboratory
188 REM 700 East Water Street
189 REM 130 Midtown Plaza
190 REM Syracuse New York 13210
191 REM 315-474-7856
192 REM
193 REM
194 REM
195 REM
196 REM
197 REM
198 REM
199 REM
200 REM
201 REM
202 REM
203 REM
204 REM
205 REM
206 REM
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303 REM
304 REM
305 REM
306 REM
307 REM
308 REM
309 REM
310 REM
311 REM
312 REM
313 REM
314 REM
315 REM
316 REM
317 REM
318 REM
319 REM
320 CC= HEX("AC1B") \REM FLEX current character
321 EL= PEEK(HEX("AC02"))\REM FLEX end of line character
322 CR= HEX("0D") \REM Carriage Return
323 GT= HEX("AD27") \REM FLEX GETCH subroutine
324 DPOKE HEX("24"), GT \REM Set the USR function to the FLEX
325 REM GETCH subroutine.
326 REM
327 REM Call GETCH which will set the next
328 REM character from the line buffer and
329 REM put it in CURRENT CHARACTER.
330 AX=USR(1) \REM
331 REM Then check to see if it's the end.
332 REM
333 IF PEEK(CC)=EL OR PEEK(CC)=CR GOTO 530
334 REM Now build up A$ with the parameter.
335 REM
336 AS=A$+CHR$(PEEK(CC))\GOTO 410
337 REM See if A$ has anything in it.
338 REM
339 IF LEN(A$)<1 GOTO 560 ELSE GOTO 600
340 REM
341 REM
342 PRINT" THERE WAS NO PARAMETER IN THE COMMAND LINE ! ! "
343 GOTO 610
344 REM
345 PRINT "YOUR PARAMETER IS "IAS
346 END

```

## A FAST 8 CHANNEL 10 BIT A/D CONVERTER

Dick Zimmer  
1116 Westover  
College Station, TX 77840

As more and more emphasis is being placed on the environment, ecology, and natural resources the micro computer is becoming the perfect tool for both personal and organized research in these and other areas. With proper interfacing to the outside world, the micro can consume great quantities of data unattended, process it, and present the results in human digestible form as a summary report with the right software. Whether your application would be a pet solar panel design or race car tuning, believable results are not obtained simply because they come out of a computer, but because of high quality, high resolution interfacing. This article describes just such an interface in the form of an eight-channel, ten-bit, high-speed analog to digital converter designed to plug into a SS-50 I/O slot. Even though cost was considered in the design and kept to a reasonable level, this is not a low budget system where accuracy is traded for cost. These types of converters do indeed have their place and should be considered for certain applications, but not serious research where high precision and resolution is required.

### HARDWARE

Before you turn the page, I might mention the cost (in parts) for the complete A/D board is about \$60.00 for the 10 bit version. The design of the A/D board is straightforward with the heart of the board being a relatively new Analog Devices AD571, a ten-bit successive approximation A/D converter. This great little I.C. is fast with a typical conversion time of 25 us or 40,000 conversions per second, with a built in voltage reference, clock, comparator, output buffers, and a full scale calibration accuracy of  $\pm 0.3\%$  without external trims; what could be simpler?

The circuit was designed to plug into the I/O bus of SWTPC 6800 with no system modifications. The complete circuit is shown in Figure 1 and could either be built up on a wire wrap board, such as available from Smoke Signal Broadcasting, or a printed circuit board as did the author, Figure 2.

The design is straightforward with a 6821 PIA doing the work of inter-

facing the 571 to the data bus. Since the 571 is a ten-bit device, a resolution of 1 part in 1024, all of the A and two bits of the B register are used to transfer the data bits. If reduced resolution can be tolerated, 1 part in 256, only the A side would need to be used for eight bit data. This would not only produce a saving in software, but also in cash since Analog Devices came out with the AD570 which maintains all the specifications of the 571 but with only an eight bit output at a cost of \$22.50 each compared to \$37.50 for the AD571JD. The only different pin numbers to be used with the 570 are associated with the data lines which are circled in the diagram and PIA  $B_0$  AND  $B_1$  lines should be left open. Before selecting the eight bit configuration the intended application and future applications should be carefully considered as to required resolution. For example, if temperature is to be measured up to  $212^\circ F$  the output would take  $1^\circ F$  steps and be accurate to  $\pm 1^\circ F$  or  $\pm 1$  LSB. Personally I believe the difference in price is small compared to the ten-bit capability.

The high order nibble of the PIA B register is used to select the desired data channel by means of the Analog Devices AD7501 analog multiplexer. The inputs to the multiplexer are semi-protected by current limiting resistors, but could still be zapped by higher than maximum input voltages which are nominally  $\pm 15$  VDC. The output of the 7501 is buffered by a high speed LM310 follower since the 571 has a relatively low input impedance of about 5K ohms. Do not try to substitute a 741 or 301, their slew rate is too slow to allow channel switching. The optional jumper between pins 15 and 16 of the 571 determines the input levels and polarities. With the jumper installed the input will be set to 0 to  $\pm 10$  volt range, and with the jumper removed the input has a  $\pm 5$  volt range with an offset binary output code. A programmable gain amp could have been included, but for the sake of simplicity input conditioning is handled externally. A sample hold, which is normally used in successive conversion converters, has also been omitted from this system since the conversion time is very short compared to typical slew rates which will be discussed later. All power is supplied to the board from the bus connector with the  $\pm 12$  volts clamped by zeners to compensate for the not-too-stable SWTPC  $\pm 12$  volt power supply. The analog and digital commons should be connected at the AD571 only to prevent ground loops as shown in Figure 1.

### SOFTWARE

Operation of the A/D board is fairly simple if one has mastered the mysteries of the 6821. A conversion cycle is initiated when the PIA CB2 line is brought from a high to a low state. The CBI input line acts as a conversion complete indicator by going from high to low. This transition can either set a flag (BIT 7 in PIABC) or cause an interrupt if so programmed. BIT 7 must be reset by doing a dummy read of PIABD. Listing 1 is CONVERT which is one example of software providing channel selection, conversion, and data handling with the board plugged in I/O PORT 7. Even though this program has not been optimized for speed (initializes PIA each loop) it produces only a 75 us overhead in addition to the 25 us conversion time which should be adequate for most applications. The example listing was written to fit at the high end of 16K to be a BASIC program for Basic but could easily be relocated. Prior to executing CONVERT the required channel number, between 0 and 7, is loaded into CHANL either by a BASIC poke or from an assembly program. CONVERT is then executed by a JSR or a BASIC USR jump. The PIA is setup, the multiplexer channel number selected and a conversion pulse is sent to the AD571. A loop is then entered testing for the 571 data ready line to return low, typically 25 us later. PIA data registers A and B then contain the ten data bits from the output of the 571. The channel number also appears in data register B and must be stripped off before B data is valid. The eight low order bytes are placed in LODATA and the two high order bytes are placed in HIDATA prior to a RTS. Listing 2 is a program to check out the board for proper operation. CONVRT needs to be loaded as in Listing 1 prior to running TESTIT. After starting the program at \$0100 the channel number desired is typed in (0-7) and the converted data is outputted, in hex, between 0000 and 03FF.

### USE

The main program could read DATA directly from the PIA to shorten CONVERT a few more bytes along with initializing the PIA just once. In Basic it is a simple matter to recombine the high and low order bytes by doing two peeks then multiplying the high order byte by 256 and adding it to the low order byte. This results in an integer between 0 and 1023 which is then multiplied by a constant to yield engineering units. If high speed digitizing is required, while using Basic, another USR program would need to be created to execute CONVERT and place the results directly and sequentially in RAM for later processing by using peeks.

As with all A/D converters the maximum input data frequency should be limited to a percentage of the sample rate for accurate reproduction. A rule of thumb is about 20% or in other words the sample rate should be 5 times the maximum input frequency. Based on the example program, the maximum sample rate would be about 10,000 conversions per second or a maximum data frequency of 2KHZ which should be lowpass filtered if higher frequencies could be expected.

Several of these A/D boards are currently in use in research laboratories collecting not only large amounts of data in a short amount of time, but reliable data. One of these A/D boards is also an integral component in a 6800 system performing environmental studies in the author's home by sensing temperatures, air conditioner usage and solar radiation. Hopefully this A/D will open up many applications previously requiring more costly components to achieve the required speed, resolution, or accuracy.

#### 8 Channel - 10 Bit A/D Converter Subroutine, Convrt

3F00	00	CHANL	CHANNEL NUMBER
3F01	00	HIDATA	HIGH ORDER BYTE
3F02	00	LODATA	LOW ORDER BYTE
3F03	36	CONVRT	PSHA SAVE A
3F04	7F 801C	CLR \$ 801C	SETUP PIA A
3F07	86 04	LDA A #\$04	ALL INPUTS
3F09	87 801D	STA A \$801D	
3F0C	86 F0	LDA A #\$F0	SETUP PIA B
3F0E	87 801E	STA A \$801E	HALF INPUTS
3F11	86 3C	LDA A #\$3C	HALF OUTPUTS
3F13	87 801F	STA A \$801F	
3F16	86 3F00	LDA A CHANL	GET CHANNEL NO.
3F19	48	ASL	SHIFT TO HIGH-
3F1A	48	ASL	NIBBLE
3F1B	48	ASL	
3F1C	48	ASL	
3F1D	B7 801E	STA A \$801E	SEND CH# TO MUX
3F20	86 34	LDA A #\$3C	SET CONVERT -
3F22	B7 801F	STA A \$801F	LINE HI
3F25	7D 801F	TST \$801F	IS CONV. DONE
3F28	2A FB	BPL LOOP	NO-LOOP
3F2A	B6 801C	LDA A \$801C	GET LOW DATA BITS
3F2D	B7 3F02	STA A LODATA	SAVE
3F30	B6 801E	LDA A \$801E	GET HI DATA BITS
3F33	84 03	AND A #\$03	STRIP OFF CH#
3F35	B7 3F01	STA A HIDATA	SAVE
3F38	32	PUL A	GET 'A' BACK
3F39	39	RTS	RETURN

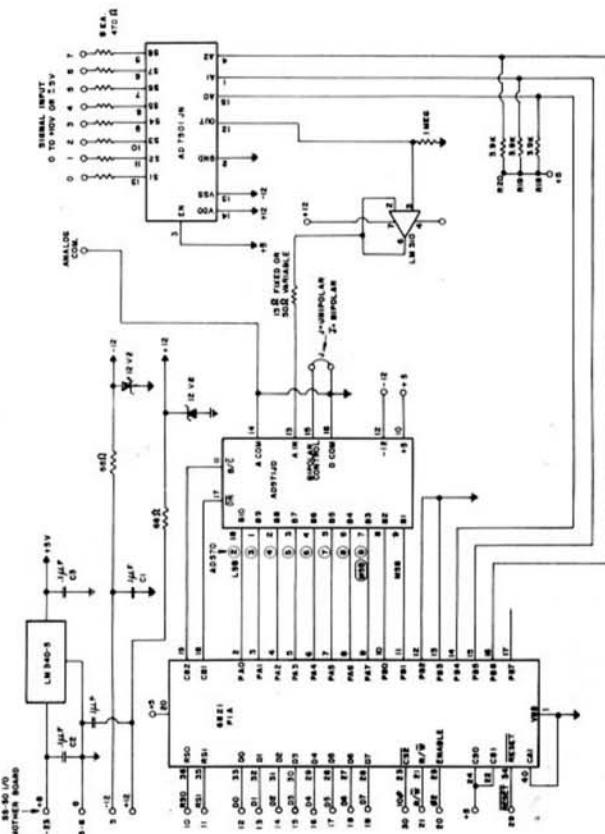
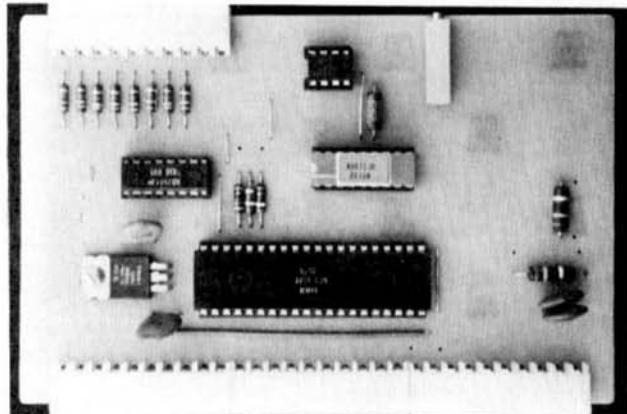
#### A/D Test Program, TESTIT

```

0100 CE 3F01      TESTIT    LDX #3F01      Point To Data Loc.
0103 86 0D        LDA A #'CR      Output CR/LF
0105 BD E1D1      JSR OUTEE
0108 86 0A        LDA A #'LF
010A BD E1D1      JSR OUTEE
010D BD E0AA      JSR INHEX     Input Ch. #
0110 B7 3F00      STA A CHANL   Select Ch. #
0113 86 20        LDA A #'SP      Output a Space
0115 BD E1D1      JSR OUTEE
0118 BD 3F03      JSR CONVRT   Digitize
011B BD E0C8      JSR OUTAHS   Print Data In Hex
011E 20 EO        BRA TESTIT   Do Again

```

Start TESTIT at \$0100 with CONVRT loaded.  
Type in channel number, 0 to 7.  
Converter output will be displayed in hex, between \$0000 and \$03FF



## JPC PROGRAMMABLE CLOCK KIT

JPC Products Company has announced a new addition to their product line, the CK-7 programmable clock board. The CK-7 is a self contained hardware clock, except for the optional backup power supply.

The board plugs into the thirty pin buss and contains a crystal oscillator and a clock chip which requires no attention from the system processor, except for setting the time or polling the board to read the time. Use of the optional external power supply enables the clock board to keep the time even though the computer is turned off. All that is required to read the time after the computer has

been turned off is calling the initialization routine for the port which contains the board and a call to the read time routine. Software is provided to set and read the clock in assembly language and a read time routine in BASIC. Since my system is a 6809 I had to reassemble the program for the 09.

Also since there are several calls to routines such as OUT2HEX, OUTHEX, and IN2HEX which are unique to SWTBUG type monitors, these routines had to be cross-assembled to the 09 system. While I was at it, I was able to make the whole program fully relocatable, although the original program only contained one fixed reference. The CK-7 will also provide programmable interrupts to the system at intervals of 1/60 sec, 1 sec, 10 sec, 1 min, 10 min, and 1 hr.

The board which was sent for evaluation was factory assembled. When the accuracy was checked it was within one second in two days without any tweaking of the oscillator. The circuit board has plated through holes and is of good quality. I feel that the CK-7 would be a valuable addition to any 68XX system.

A lab rating of AAA. Information on the CK-7 may be obtained from:

JPC PRODUCTS CO.  
P.O. BOX 5615  
ALBUQUERQUE, N.M. 87185  
505 294-4623

Ed's Note: The following listings are provided for those who have the kit and have upgraded to the 6809 and need 6809 code for the system. The following two programs are not offered as examples of good 6809 programming. They are rehashed from the 6800 code furnished by JPC. However; they do work and will get you going. We would request that if any of your have routines for this kit please let us know, and we will pass them along for the rest of our readers, who are using this board.

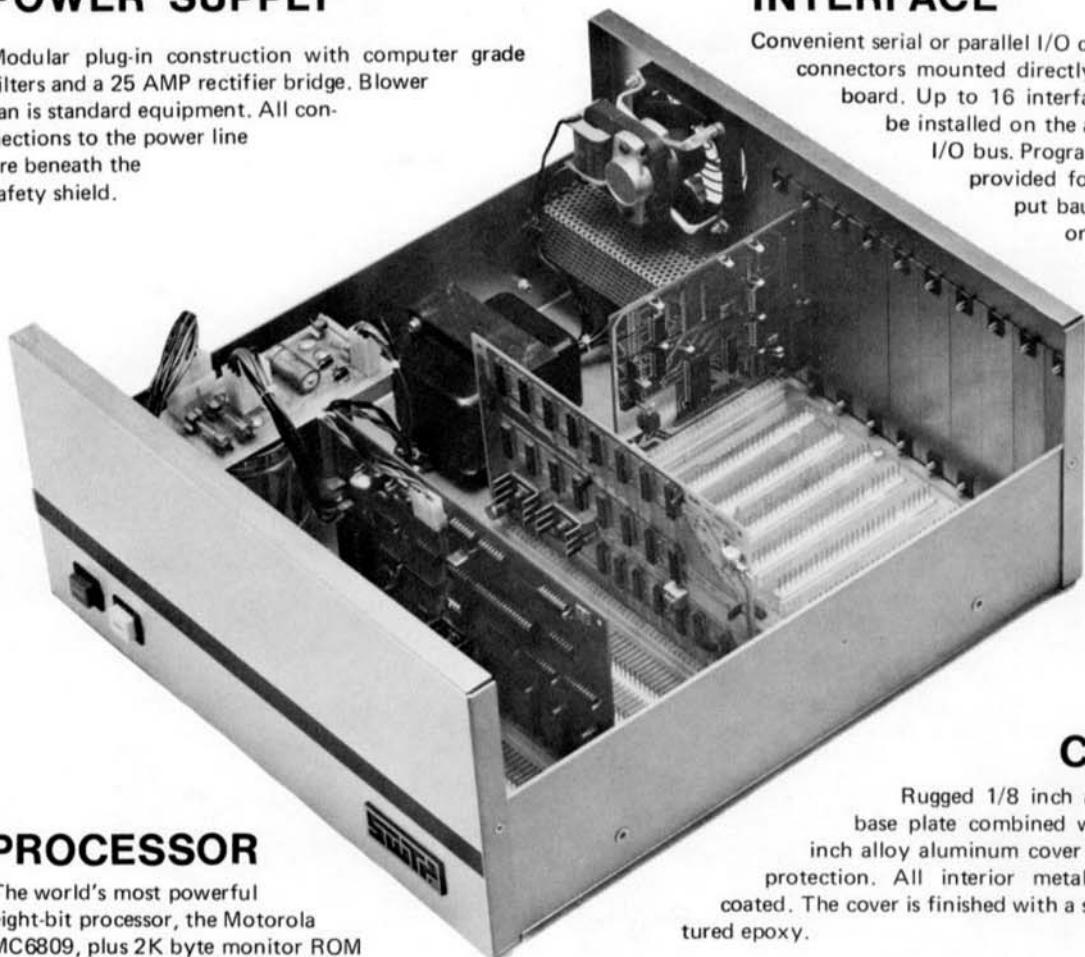
-----

10 REM CLOCK ROUTINE	45 005F 26 FB		BNE	TSE2
20 REM LINE 9180 'END' SHOULD BE CHANGED	46 0061 86 12		LDA	#\$12
30 REM TO GOSUB AND CALL BY USING PROGRAM	47 0063 B7 E00A		STA	PRTB
40 P1=57352: C1=57353: REM PORT A	48 0066 8D 4A	TSE3	BSR	TIME
50 P2=57354: C2=57355: REM PORT B	49 0068 30 8D 013B		LEAX	HOUR,PCR
60 POKE C1,0:POKE C2,0	50 006C AE 84		LDX	X
70 POKE P1,0:POKE P2,28	51 006E AC 8D 0133		CPX	SETN,PCR
80 POKE C1,4:POKE C2,4	52 0072 26 F2		BNE	TSE3
90 REM T(3) MUST BE JUMPED OVER EACH TIME	53 0074 86 03		LDA	#\$03
100 REM THIS ROUTINE IS CALLED DURING EACH	54 0076 B7 E00A		STA	PRTB
110 REM PROGRAM - EXCEPT FOR THE INITIAL	55 0079 86 2B		LDA	#1+
120 REM CALL TO THIS ROUTINE!!!!	56 007B AD 9F F80A		JSR	[PASC]
130 REM OTHERWISE AN ERROR #43 WILL OCCUR	57 007F AD 9F F806		JSR	[GASC]
140 REM OR SOME OTHER ERROR NUMBER!!!!!!	58 0083 8D 19	TIMEO	BSR	INIT
150 REM THE BEST IS TO MOVE IT TO THE TOP OF	59 0085 8D 03		BSR	TDIS
160 REM PROGRAM SO THAT IT IS ONLY CALLED ONCE.	60 0087 7E CD03		JMP	FLEX
170 DIM T(3)	61 008A 8E 0199	TDIS	LDX	#MSG
180 DATA 28,12,20,16,8,24	62 008D AD 9F F810		JSR	[PSTG]
190 FOR I% = 1 TO 3	63 0091 8D 1F		BSR	TIME
200 READ X: GOSUB 310	64 0093 30 8D 0110		LEAX	HOUR,PCR
210 Z% = Y%	65 0097 17 00EF		LBSR	PHX2
220 READ X: GOSUB 310	66 009A 17 00F4		LBSR	PHEX
230 T(I%) = 10 * Z% + Y%	67 009D 39		RTS	
240 NEXT I%	68 009E 7F E009	INIT	CLR	CTLA
250 M\$ = "AM"	69 00A1 7F E00B		CLR	CTLB
260 IF T(1) > 12 THEN T(1) = T(1) - 12: M\$ = "PM"	70 00A4 86 1C		LDA	#\$1C
270 PRINT #0, "TIME:";	71 00A6 B7 E00A		STA	PRTB
280 PRINT #0, T(1); ":"; T(2); T(3); M\$	72 00A9 86 04		LDA	#04
290 REM CHANGE 'END' TO RETURN IN PROGRAM	73 00AB B7 E009		STA	CTLA
300 RESTORE: END	74 00AE B7 E00B		STA	CTLB
310 POKE P2,X	75 00B1 39		RTS	
320 Y% = PEEK(P1)	76 00B2 6F 8D 00F4	TIME	CLR	FLAG,PCR
330 Y% = Y% - 240	77 00B6 86 18		LDA	#\$18
340 RETURN	78 00B8 8D 4A		BSR	DG1T

# WE HAVE A 6809 FOR YOU

## POWER SUPPLY

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



## PROCESSOR

The world's most powerful eight-bit processor, the Motorola MC6809, plus 2K byte monitor ROM that is 2716 EPROM compatible and full buffering on all output lines. Built-in multiuser capability, just add I/O cards to operate a multi-terminal system.

**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

## INTERFACE

Convenient serial or parallel I/O cards have DB-25 connectors mounted directly on the circuit board. Up to 16 interface devices may be installed on the address decoded I/O bus. Programming strips are provided for input and output baud rate selection on each port. All outputs are fully buffered.

## 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.



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# OFTEN FIRST - ALWAYS THE BEST

When we introduced the "S" system last year we knew that we were ahead of the industry. We didn't realize just how far.

## WE KNEW THE NEEDS—

When we began designing the S/09 computer, we knew that the normal eight-bit microprocessor system was not adequate for any but the smallest, single user business applications. What was worse there was little that could be done to expand the capabilities of the system if the customer needed it. There is nothing much worse to a business customer than a "dead end" system.

## MEMORY IS THE KEY—

Obviously a business system should be able to operate with multiple terminals if needed. It should also be able to do a variety of jobs; not just data processing, but also word processing and computer aided instruction. With a system limited to 64K bytes of memory addresses such a system is just not practical. The amount of user memory available to each terminal is too small for useful work.

## HOW DO YOU GET IT—

The common solution to this problem is called bank switching. This process is similar to a selector switch that turns on the bank of memory that you want to work with. This, however, has a few problems. It is inefficient, therefore expensive, plus being slow. It is also extremely clumsy when data must be exchanged between two different programs. Besides with all this you still cannot use more than 64K of memory for any one program. So what is the alternative?

## DO IT RIGHT—

The alternative is an address bus with more than the normal 16 bits found on eight-bit microprocessors. By using 20 address bits you can, for instance, address up to a million memory locations directly.

This way you have access to any part of memory at any time without any intermediate processes. Program interaction is now no problem at all.

## SOFTWARE MUST MATCH—

So far we have a computer system with a large memory capacity and the ability to operate with many terminals, but this is not enough. You need an operating system just as sophisticated as the

hardware to complete the job. It must be a multi-tasking (therefore multiuser) operating system and it must be fast if it is to be useful with multiterminal systems. UniFLEX® fills these requirements and more. It also has multiple directories, log-in and password features. UniFLEX® was patterned after UNIX™, which is one of the most highly regarded operating systems around.

## PERIPHERALS TOO—

To complete the system we offer our smart terminals, and a variety of disk systems. We have everything from a 390K byte floppy to a 40 Meg/byte Winchester drive. All peripherals are compatible and so you can start with a small single terminal system and upgrade if necessary to a fully expanded system—16 terminals, 768 bytes of RAM memory and 96 Meg/bytes of disk storage.

## GET THE WHOLE STORY—

If you are planning to install, or sell business systems you should get our information package on the most versatile and cost effective system on the market, the S/09. You can get a 128K system (less printer) for a little over \$5,000.00.

\*UNIX is a Trademark of Bell Laboratories.

## SYSTEM SOFTWARE

Languages	Operating Systems
Assembler	FLEX*
BASIC	UniFLEX
FORTRAN	
Pascal	
PILOT	
Word Processing	
	Word Processing Editor
	Text Processor
Data Processing	
General Ledger	
Accounts Receivable	
Accounts Payable	
Payroll	
Jobcost	
Inventory	
Mail List	
Utilities	
	Debug Package
	Sort-Merge
	Diagnostics

\*Supplied with over 40 utilities



SOUTHWEST TECHNICAL PRODUCTS CORPORATION

219 W. RAPSODY

SAN ANTONIO, TEXAS 78216

(512) 344-0241

79	00BA	81	F9		CMPA	#\$F9	159	0172	2F	0A	BLE	IN1HG
80	00BC	26	04		BNE	TIM2	160	0174	81	11	CMPA	#\$11
81	00BE	6C	8D	00E8	INC	FLAG,PCR	161	0176	2B	D7	BMI	ERROR
82	00C2	86	1C	TIM2	LDA	#\$1C	162	0178	81	16	CMPA	#\$16
83	00C4	8D	3E		BSR	DGIT	163	017A	2E	D3	BGT	ERROR
84	00C6	1F	894D		TAB		164	017C	80	07	SUBA	#7
85	00C9	86	0C		LDA	#\$OC	165	017E	39		IN1HG	RTS
86	00CB	8D	37		BSR	DGIT	166	017F	A6	84	OUT2H	LDA 0,X
87	00CD	8D	4B		BSR	PACK	167	0181	8D	CF	OUT2HA	BSR OUTHL
88	00CF	A7	8D	00D4	STA	HOUR,PCR	168	0183	A6	84	LDA	0,X
89	00D3	86	14		LDA	#\$14	169	0185	30	01	INX	
90	00D5	8D	2D		BSR	DGIT	170	0187	20	CD	BRA	OUTHR
91	00D7	1F	894D		TAB		171	0189	8D	F4	PHX2	BSR OUT2H
92	00DA	86	10		LDA	#\$10	172	018B	86	3A	LDA	#1:
93	00DC	8D	26		BSR	DGIT	173	018D	AD	9F F80A	JSR	[PASC]
94	00DE	8D	3A		BSR	PACK	174	0191	8D	EC	PHEX	BSR OUT2H
95	00EO	A7	8D	00C4	STA	MINU,PCR	175	0193	86	20	OUTS	LDA #\$20
96	00E4	86	08		LDA	#\$08	176	0195	6E	9F F80A	JMP	[PASC]
97	00E6	8D	1C		BSR	DGIT	177	0199	54	69 60 65	MSG	FCC /Time -> /
98	00E8	1F	894D		TAB		190D	20	2D	3E 20		
99	00EB	86	18		LDA	#\$18	178	01A1	04		FCB	4
100	00ED	8D	15		BSR	DGIT	179	01A2			XHI	RMB 1
101	00EF	6D	8D	00B7	TST	FLAG,PCR	180	01A3			XLOW	RMB 1
102	00F3	27	04		BEQ	TIM3	181	01A4			CKSM	RMB 1
103	00F5	81	F9		CMPA	#\$F9	182	01A5			SETN	RMB 2
104	00F7	26	B9		BNE	TIME	183	01A7			HOUR	RMB 1
105	00F9	8D	1F	TIM3	BSR	PACK	184	01A8			MINU	RMB 1
106	00FB	AE	8D	00A8	LDX	HOUR,PCR	185	01A9			SECN	RMB 1
107	00FF	A7	8D	00A6	STA	SECN,PCR	186	01AA			FLAG	RMB 1
108	0103	39			RTS		187				END	TIME0
109	0104	34	04	DGIT	PSHB							
110	0106	F6	E00A		LDB	PRTB						
111	0109	C4	E3		ANDB	#\$E3						
112	010B	34	04 ABE0		ABA							
113	010F	B7	E00A		STA	PRTB						
114	0112	35	04		PULB							
115	0114	B6	E008		LDA	PRTA						
116	0117	84	OF		ANDA	#\$0F						
117	0119	39			RTS							
118	011A	58		PACK	ASLB							
119	011B	58			ASLB							
120	011C	58			ASLB							
121	011D	58			ASLB							
122	011E	34	04 ABE0		ABA							
123	0122	39			RTS							
124	0123	8D	0F	BADR	BSR	BYTE						
125	0125	A7	8D 0079		STA	XHI,PCR						
126	0129	8D	09		BSR	BYTE						
127	012B	A7	8D 0074		STA	XLOW,PCR						
128	012F	AE	8D 006F		LDX	XHI,PCR						
129	0133	39			RTS							
130	0134	8D	32	BYTE	BSR	INHEX						
131	0136	48		BYTE1	ASLA							
132	0137	48			ASLA							
133	0138	48			ASLA							
134	0139	48			ASLA							
135	013A	1F	894D		TAB							
136	013D	8D	29		BSR	INHEX						
137	013F	34	04 ABE0		ABA							
138	0143	1F	894D		TAB							
139	0146	EB	8D 005A		ADD8	CKSM,PCR						
140	014A	E7	8D 0056		STB	CKSM,PCR						
141	014E	39			RTS							
142	014F	7E	CD03	ERROR	JMP	FLEX						
143	0152	44		OUTHRL	LSRA							
144	0153	44			LSRA							
145	0154	44			LSRA							
146	0155	44			LSRA							
147	0156	84	OF	OUTHRL	ANDA	#\$F						
148	0158	8B	30		ADD8	#\$30						
149	015A	81	39		CMPA	#\$39						
150	015C	23	02		BLS	OUT						
151	015E	20	04		BRA	NOTOUT						
152	0160	6E	9F F80A	OUT	JMP	[PASC]						
153	0164	8B	07	NOTOUT	ADD8	#\$7						
154	0166	20	F8		BRA	OUT						
155	0168	AD	9F F806	INHEX	JSR	[GASC]						
156	016C	80	30	INHEX1	SUBA	#\$30						
157	016E	2B	DF		BMI	ERROR						
158	0170	81	09		CMPA	#\$9						

Hans- Georg Hunger  
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W. Germany

Emden, 8. 4. 1980

#### Programming 2708's with SWTP MP-R EPROM- Programmer

When I bought the SWTP MP-R EPROM-programmer in 1979 I hoped that the 2716 EPROMS would soon become cheaper. But this was an error, in Germany the 2716's cost at the moment approximately 45 €, while you can buy the 2708's for about 9 - 10 €. There is quite a difference between these prices and so I decided to program 2708's with the MP-R.

##### 1. The hardware

If you want to do the same you need three power supplies. 5V is granted and the +12V too. You have to generate the -5V with a zener-diode or a -5V regulator by the -12V supply. The rest (see figure 1) is easily done by supplying 2 IC's,

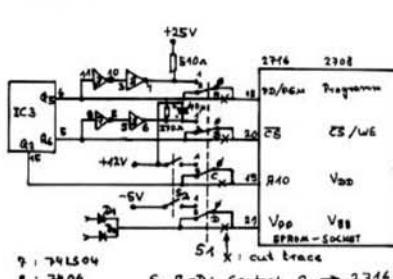


Figure 1

Only 4 pins of the 2708 have a different meaning as the 2716: Pin 18, 19, 20 and 21. Pin 18 is pulsed with 5V by Q<sub>5</sub> of IC 3. The 2708 must have 25V pulses (switched by IC 8). Pin 19 (A10) must get V<sub>DD</sub> (+12V) by switch S1C. When Q<sub>6</sub> of IC 3 selects the 2716 Pin 20 with 0, the IC 8 (Pin 6) does the same. But when programming a 2708, there must be a

+12V level. Q<sub>6</sub> puts out a 5V level and the O.C. of IC 8 switches +12V to 2708 pin 20. Pin 21 of the 2708 must have V<sub>BB</sub> (-5V). This is done by switch S<sub>1D</sub>. The +12V and the -5V supply must be switched by hand with S<sub>2</sub>, when the EPROM is inserted into the socket and must be switched off before removing it.

### 2. The software

Following memory locations you must change in the MF-R software:

```
04BE BD 0C 00 CHNG1 JSR EP#8-1
04C1 01 01 01
04C4 01 01
```

0037 003 FF 2708's capacity is only 1 KByte

Location 056E contains the software program pulse length. The program pulse to the 2708-EPROM should not be longer than 1 ms. So change data at 056E to 8 0075 (1 Megacycle) or, if you are running your computer with lower speed, to 8 0043 (614400 Kilocycles).

Then add a short program which sends 125 programming loops to each address of the 2708.

```
0C00 86 7D EP#8-1 LDAA #8 7D
0C02 B7 A8 02 STAA A#02 LOOPCT
0C05 CE 05 52 EP#8-2 LDX #0552
0C08 DP 35 STX dir.
0C0A BD 05 0A JSR
0C0D 7A A8 02 DEC A#02
0C10 26 F3 BNE EP#8-2
0C12 39 RTS
```

Routine EP#8-1 should be placed in a higher memory range (see location 04BE), if you want to change the BASE ADDRESS of the DATA TABLE.

With these changes you can program 2708's without any problem by using the MF-R software. The programming time is 3:40 minutes by a speed of 614400 Kilocycles.

*L.-J. Gagné*



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NOTICE OF UPDATES AVAILABLE June 10, 1980

- The original DECOPI module, contained in SYSTEM LIBRARY of releases prior to April 1980 will not work, as it is 6800 code instead of 6809. The new 6809 version is available to customers who mail in their serialized release diskette to CSI. CSI will bear the cost of postage one-way only, back to the customer. Please include a note describing the desired update.
- The interpreter (SYSTEM,INTERP) has undergone some subtle changes having to do with error linkage to DECOPI above and returns from assembly-language procedures. It will be replaced under the terms described above.
- The standard release BIOS now includes a driver for the CDS Marksman 20 M byte "Winchester" drive as vol. #12. Marksman owners may obtain one of these new drivers free by mailing a blank disk, either 5 1/4" or 8" to CSI.
- USER GROUP diskette drivers are available along with a utility DIRLIP which flips the byte-sex of the directory on the USER GROUP diskette. The format is actually RD-11, with 128-byte sectors. As implemented currently it is very slow on the DMAF-2 owing to sector buffering. It is available for \$20.00 prepaid by check or Mastercard/Visa.

### USER GROUP INFORMATION

Reprints of all available information about Jim Gagne's group are included in this mailing with the hope that 6809 users will avail themselves of the new activity. There is every reason to believe that Jim Gagne's offerings will mushroom in number in the near future, since 6809/Z-80 users have been using UCSD Pascal (TM) heavily for a long time. We 6809 people are the new kids on the block and the UCSD GROUP is perhaps our first real opportunity to take advantage of the wealth of 8080, Z-80, LSI-11, etc. effort that has been and is still being expended. Pascal 6809 users are encouraged to contact Jim Gagne directly to purchase diskettes.

*David M. Allen*  
David M. Allen, Director  
Micromodels Division

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68 Micro Journal  
P.O. Box 849  
Hixson, TN 37343

Douglas K. Beck  
995 Lundy Lane  
Los Altos, CA 94022

Dear Sirs:

I am enclosing for your consideration a review of the TSC BASIC Precompiler. The LIFE game example is a high level implementation of the 5 page assembly language monitor submitted earlier and then recalled for rework. This one at least works and is considerably more understandable. I hope the interspersing of tutorial comments in the program is understandable. The Precompiler makes it possible to write Pascal type statements with vanilla BASIC.

Keep up the good work there. The magazine usually yields at least one good idea each time, and that is a whole lot more than you can say for most.

Very truly yours,

*Douglas K. Beck*

Douglas K. Beck

### REVIEW OF TSC BASIC PRECOMPILER

Enumerate the things you dislike about entering BASIC programs. Endless line numbers, cryptic initials for names, limited line length for a few. Now consider the TSC BASIC Precompiler. This relatively unusual service program takes the TSC BASIC interpreter and elevates it to near parity with its lately arrived, much heralded kin.

A sample program capable of running the LIFE game was composed using the Precompiler. It demonstrates most of the features of the program. First, variables are named by alphanumeric strings, which makes the code readable. You do not have to guess at the intent anywhere. There are no line numbers, all transfer points are identified by alphanumeric labels. Second, you are not restricted to a one-to-one physical line to logical line relationship. Logical lines may be up to 255 characters long and may reside on a number of physical lines broken by a (backslash)(cr) terminator. This feature makes it simple to write the constructs that are required in structured programming. Third, the process of writing a program is facilitated by being able to concentrate on the algorithm rather than how to write it down. The sample program may be verified for correctness by observing that all constructs are a "sequence", "alternation" (IF-THEN-ELSE), or a DO-WHILE loop. The algorithm may be faulty but the program is correct.

The Precompiler runs under FLEX 2.0 and permits titling, subtitling, print control, paging, suppression of reference numbers, suppression of object file creation and auto-delete of existing object file. A facility for calling library includes rounds off the package, which is available for either the single precision or extended version BASIC.

The TSC BASIC Precompiler appears to be a significant advance in the area of program entry routines. The ability to forget line numbering, too short labels and too short lines for the desired construct will mean better programs in shorter times for most programmers.

Dou Beck  
995 Lundy Lane  
Los Altos, CA 94022

May 16, 1980

```
* PROGRAM TO PLAY "LIFE"
* and demonstrate the TSC BASIC Precompiler
/* remarks may be freely inserted at any point
* must start in column one, unless they are the
* last statement in a multiple statement logical line
/* They need not begin with an *, any character not a letter,
* number or underscore will do.
*
* The two arrays may be dimensioned to fit your memory
* and display capabilities.
*
DIM PATTERNONE$(11,41)
DIM PATTERNTWO$(11,41)
* INITIALIZE THE ARRAY
FOR I=1 TO 10
FOR J=1 TO 40
*
* Logical lines may fit on a number of physical lines
* Provided the physical line is terminated by a backslash.
*
IF RND(0) < 0.5 THEN PATTERNTWO$(I,J) = "*"
ELSE PATTERNTWO$(I,J) = " "
NEXT J
NEXT I
* SET GENERATION COUNT
COUNT=1
* START PATTERN PRINTOUT
LINE PRINT#1,PRINT#1,PRINT "GENERATION",COUNT
FOR I=1 TO 10
FOR J=1 TO 40
PATTERNTWO$(I,J) = PATTERNTWO$(I,J)
PRINT PATTERNONE$(I,J)
NEXT J
PRINT
NEXT I
* CALCULATE NEXT GENERATION
FOR I1=1 TO 10
FOR J1=1 TO 40
NEIGHBORS = 0
FOR I2= I1-1 TO I1+1
FOR J2= J1-1 TO J1+1
IF PATTERNONE$(I2,J2) = "*" THEN NEIGHBORS = NEIGHBORS+1
NEXT J2
NEXT I2
*
```

```

+ CELL WITH 2 OR THREE NEIGHBORS SURVIVES
+ CELL WITH < 2 OR >3 NEIGHBORS DIES
+ CELL WITH 3 NEIGHBORS CREATES NEW CELL
+
+ This is a nested IF-THEN-ELSE statement spread over three
+ physical lines to improve readability.
+
IF PATTERNONE$([I], [J]) = " " THEN \
    IF NEIGHBORS = 3 THEN PATTERNTWO$([I], [J]) = "#\n" \
+
+ NOTE, A CELL COUNTS ITSELF AS A NEIGHBOR
+
IF NEIGHBORS < 3 OR NEIGHBORS > 4 THEN PATTERNTWO$([I], [J]) = "#\n" \
    ELSE PATTERNTWO$([I], [J]) = "#\n"
+
+ The underscore may be used to improve readability of long names.
+
END_OF_LOOP NEXT J1
NEXT I1
+BUMP GENERATION COUNTER
COUNT = COUNT+1
IF COUNT <= 100 THEN LIFE ELSE STOP
END

```

TOTAL ERRORS = 0

## TSC BASIC TO PERCOM DOS

by Robert Streckfus  
Dick Zimmer

This patch was developed at T.T.I. Proving Ground, Texas A&M University to allow the use of TSC 6800 Basic with a Dual Percom Disk System, providing much faster test data processing than with Percom's Super Basic. Unlike Super Basic's support of disk data files this patch only provides for saving and loading of basic programs using named (not numbered) disk files. To implement the patch, first load TSC's 6800 Basic (AP68-11) by means of the KC standard cassette supplied. The patch in Listing 1 is then entered from location \$06F6 to \$0835. After making the patch save the entire program, for future use from \$0020 to \$2980.

This patch replaces cassette tape operations and the programs aren't stored in a complicated encoded form as they are for tape. Programs with incompatible format will not be loaded and a syntax error will be displayed (Error #52), any program in memory will remain unchanged. Saving or loading errors encountered by the MPX DOS will produce MPX error messages. When a save command has been completed a disk directory line will be displayed to indicate the location of the program on the disk.

In the following description, optional parameters are in bracket enclosures [...] and slashes (/) separate options. At least one space is required to separate optional parameters. One and only one space must separate the command and the name. Naming requirements are the same as those for the MPX DOS. The save and load formats are:

```

SAVE NAME [1/2/3] [E]
LOAD NAME [1/2/3]
[1/2/3] Disk drive number - Default is #
[E] Program will run after loading - Default will return
A 'READY' prompt after loading

```

Example:

```

SAVE TEST      Saves the current basic program on disk #1 with the name
               'test'
SAVE TEST 2 E   Saves the current basic program on disk #2 with the name
               'test' to start running after loading
LOAD TEST      Loads the program named 'test' from drive #1
LOAD TEST 2     Loads the program named 'test' from drive #2

```

## TSC C/BASIC DISK PATCH

### PERCOM 6800 ASSEMBLER PAGE 1

```

NAM TSC      C/BASIC DISK PATCH
*****
*THIS PATCH FOR TSC CASSETTE BASIC *
*ALLUS PROGRAMS TO BE SAVED OR *
*LOADED WITH THE MPX DISK OS   *
*****
*****TSC BASIC LINKAGES*****
(0155) READY EQU $0155
(01E9) EXEC EQU $01E9
(0903) SYNTAX EQU $0903
*MPX SCRATCHPAD
(A066) DIRTEM EQU $A066
(A068) KXTFIL EQU $A068
(A040) LINPTR EQU $A040
(A0AC) DRVMUH EQU $A0AC
(A0B2) REGADD EQU $A0B2
(A0AF) ENBADD EQU $A0AF
(A0B1) XFRADD EQU $A0B1
(A0B3) DIR EQU $A0B3
*MPX LINKAGES
(000D) POSTAN EQU $000D
(C01B) LOBFIL EQU $C01B
(C01E) ERROR EQU $C01E
(C31F) PRTEXC EQU $C31F
(C343) CRLF EQU $C343
(C4BD) SEARCH EQU $C4BD
(C554) SAVE EQU $C554
(C707) PRSEC EQU $C707
(C71C) PRTADD EQU $C71C
(C780) *BIRNDR EQU $C780
*BIRNDR(TM) LINKAGES
(E191) OUTEEE EQU $E191
(E07E) PDATA EQU $E07E
(E0CC) OUTS EQU $E0CC
*SAVE PATCH

```

```

(06F6)          ORG $06F6
06F6 A6 00    LSTA  LDA A 0,X    \
06F8 26 02    BHE  LSTB    \
06FA 86 20    LDA A $920   \
06FC BD E1B1  LSTB  JSR OUTEEE \
06FF 09    INX    \
0700 5A    DEC B    \
0701 24 F3    BHE  LSTA    \
0703 BD C707  JSR PRTEXC   PRINT DIRECTORY INFORMATION
0706 BD E0CC  JSR OUTS    \
0709 BD C71C  JSR PRTADD  \
070C FF A046  STX DIRTEM \
070F BD C343  JSR CRLF   \
0712 DE 4046  LDIX DIRTEM \
0715 7E 0155  JMP READY  \
0718 01    NOP    \
0719 CE 0000  LDIX NO    \
071C FF A048  STX KXTFIL SET FLAG
071F DE 59    LDIX $0059 GET PROGRAM START
0721 FF A048  STX REGADD \
0724 DE 97    LDIX $0097 GET PROGRAM END
0726 09    INX    \
0727 96 93    LDA A $0093 \
0729 A7 00    STA A 0,X    \
0729 09    INX    \
072C 96 94    LDA A $0094 1 STORE POINTERS
072E A7 00    STA A 0,X    \
0730 09    INX    \
0731 96 68    LDA A $0068 \
0733 A7 00    STA A 0,X    \
0735 09    INX    \
0736 96 69    LDA A $0069 \
0738 A7 00    STA A 0,X    \
073A FF A04F  STX ENBADD \
073B BE 7C    LDIX $007C POINT TO INPUT BUFFER
073F 09    INX    \
0740 FF A040  STX LINPTR PUT POINTER IN MPX
0743 86 40    LDA A $840 DEFAULT TO DRIVE #
0745 87 A0AC  STA A DRVMUH \
0748 86 01    LDA A $901 \
074A 87 A0B1  STA A XFRADD 1 DEFAULT TO LOAD READY
074D 86 55    LDA A $955 \
074F 87 A0B2  STA A XFRADD+1 \
0752 BD 0782  JSR SFN \
0755 BB 07    BSR SKPS \
0757 B1 00    CMP A $900 \
0759 27 27    BEQ S \
075B 20 08    BRA C01 \
075D 08    SKP INX \
075E A6 00    SKPSF LDA A 0,X \
0760 B1 20    CMP A $920 \
0762 27 F9    BEQ SKP \
0764 39    RTS \
0765 B1 31    C01 CMP A $9'1 CHECK FOR DRIVE #
0767 27 09    BEQ C1 LOOK FOR NEXT CHARACTER
0769 B1 32    CMP A $9'2 CHECK FOR DRIVE #
076B 26 09    BNE C2 \
076D 86 80    LDA A $880 SELECT DRIVE #
076F 87 A0AC  STA A DRVMUH \
0772 BD E9    C1 BSR SKP \
0774 B1 00    CMP A $900 \
0776 27 04    BEQ S \
0778 B1 45    C2 CMP A $9'E CHECK FOR LOAD EXECUTE
077A 26 22    BNE NO \
077C CE 01E9  LDX HEXEC \
077E FF A0B1  STX XFRADD \
0782 BD C554  S JSR SAVE SAVE IT
0785 24 06    BCC END \
0787 BD C01E  JSR ERROR \
078A 7E 0155  JMP READY \
078B CE C780  END LDIX $D1RDR \
0790 BD E07E  JSR PDATA \
0793 BD C343  JSR CRLF \
0796 FE A046  LDIX DIRTEM \
0799 C6 06    LDA B $6 \
079B 7E 04F6  JMP LSTA \
079E 7E 0903  KG JMP SYNTAX \
07A1 01    NOP \
07A2 01    NOP \
07A3 01    NOP \
07A4 DE 7C    LDIX $007C POINT TO INPUT BUFFER
07A6 09    INX    \
07A7 FF A040  STX LINPTR PUT POINTER IN MPX
07A8 B6 40    LDA A $840 DEFAULT TO DRIVE #
07AC B7 A0AC  STA A DRVMUH \
07AF 20 15    BRA C4 \
07B1 08    LS INX \
07B2 A6 00    SFN LDA A 0,X \
07B4 B1 00    CMP A $900 \
07B6 26 09    BNE C5 \
07B8 86 20    LDA A $820 1 SKIP OVER FILENAME
07B9 A7 00    STA A 0,X \
07BC B6 09    LDA A $900 \
07BE A7 01    STA A 1,X \
07C0 39    RTS \
07C1 B1 20    C5 CMP A $920 \
07C3 26 EC    BNE L5 \
07C5 39    RTS \
07C6 BD EA    C6 BSR SFN \
07C8 BD 075E  JSR SKPS \
07CB B1 00    CMP A $900 \
07CB 27 0F    BEQ C4 \
07CF B1 32    CMP A $9'2 CHECK FOR DRIVE #
07D1 26 07    BNE C7 \
07D3 B6 80    LDA A $880 SELECT DRIVE #
07D5 B7 A0AC  STA A DRVMUH \
07D8 20 04    BRA C4 \
07D9 B1 31    C7 CMP A $9'1 \
07DC 26 55    BNE $800D \
07DE BD C499  C4 JSR SEARCH FIND NAME IN DIRECTORY
07E1 24 06    BCC C3 \
07E3 BD C01E  JSR ERROR \
07E6 7E 0155  JMP READY \
07E9 EE 00    C3 LDIX 0,X \
07EB DF 01    STX $0001 STORE TRKSEC \
07ED CE FFFF  LDIX $FFFF \
07F0 DF 14    STX $0016 STORE ALTADD \
07F2 FE A046  LDIX DIRTEM LOOK AT DIRECTORY \
07F5 C6 0E    LDA B $80E \
07F7 0B 08    L4 INX ADD 14 TO INDEX REGISTER

```

67FB 5A DEC B :  
 67FF 26 FC BNE L4 :  
 67FB A6 00 LDA A 0,X \:  
 67FD B1 01 CMP A #1 :  
 67FF 24 32 BNE #000B : CHECK FOR LOAD READY  
 6801 A6 01 LDA A 1,X : OR LOAD EXECUTE  
 6803 B1 55 CMP A #155 :  
 6805 27 04 BEQ L :  
 6807 B1 E9 CMP A #9EY :  
 6809 26 28 BNE #000D /:  
 680B BD C01B L JSR LD0FIL LOAD IT  
 680E 24 04 BCC CB :  
 6810 BD C01E JSR ERROR :  
 6813 7E 0155 JMP READY :  
 6814 DE 14 CB LDW 40014 GET ENDING ADDRESS :  
 6818 09 DEX \ :  
 6819 A6 00 LDA A 0,X :  
 681B 97 69 STA A #0049 :  
 681D 09 DEX :  
 681E A6 00 LDA A 0,X :  
 6820 97 6B STA A #004B \ :  
 6822 09 DEX : RESTORE POINTERS :  
 6823 46 00 LDA A 0,X /:  
 6825 97 74 STA A #0094 :  
 6827 09 DEX :  
 6828 A6 00 LDA A 0,X :  
 682A 97 73 STA A #0093 :  
 682C 09 DEX :  
 682D BF 97 STX #0097 /:  
 682F DE 00 LDX POSTAM GET STARTING ADDRESS :  
 6831 6E 00 JMP 0,X JUMP TO IT  
 6833 7E 0903 HGOOB JMP SYNTAX  
 END  
 00 ERROR(S) DETECTED

**Don Williams**  
 68 Micro Journal  
 301B Hamill Road  
 Hixson, TN 37343

Dear Don,  
 I have a complaint about the May 1980 issue of the Micro Journal: on page 18 you published only part of the listings for the SETVER command I contributed which makes it useless. You also left out the listing for the SHOWV command entirely without which the SETVER command (even if you had shown the entire listing) would still be useless. If you have misplaced the rest of the listing let me know and I will send another copy if you so desire.

I also have a few comments on Dale Puckett's article describing SSB Version 5.1. Regarding his complaint about having to type "N" after the "HONEST?" prompt in the FORMAT program, I would think that anyone purchasing a new software product would read the manual before they started poking buttons. I don't have version 5 yet, but at least I know that these details are well documented in my version 4 manual. Regarding the "unhandy" (on his terminal) use of the colon (:) in the file specification syntax, I would like to see it stay with the colon. This syntax by the way is the same as used in DEC's RT-11 operating system. In case you've never noticed the whole 6800 series of processors have many similarities in structure with the PDP-11 series, including assembly language mnemonics.

Speaking of operating systems, I have found it to be an amazing "coincidence" (?) that after the early versions of SSB DOS were in use an operating system named FLEX appeared with nearly identical structure and operation right down to the method of using File Control Blocks and operating system calls for file service. FLEX has many enhancements over the old SSB versions, but I find the random file handling in the later SSB versions (version 4 on) more comprehensive and convenient with byte positioning and random file expansion. If however, you do all your file handling via BASIC and stock programs (such as editors etc.) you would probably not appreciate the difference. At any rate with the release of SSB version 5 DOS the two (FLEX and SSB) are nearly the same operating system and converting programs from one to the other should be an easy task provided you have the necessary documentation for both systems.

In closing I would like to say that I am generally quite pleased with the '80 Micro Journal. I like having all the articles and advertisements of interest to the 6800 user concentrated instead of having to search through tons of junk articles in other magazines.

Sincerely,  
 Dan Johnson  
 7655 SW. Cedarcrest St.  
 Portland, OR 97223

HAL/6800 1.21 0000 SETV SET VERSION  
 13-MAY-80 16103134# Page 28 Form 1

```

441 NAM SETV
451 WITH WI-80
671
68: #####  

69: #SET VERSION HEADER IN BINARY RUN FILE
70: #SETV,<INPUT-FILE>,<HEADER MESSAGE>
71: #
72: #(Tack <HEADER MESSAGE> onto beginning of <INPUT-FILE>
73: # message can be viewed with SHOWV command.
74: #####  

75: #VERSION 1.0 13-OCT-79
76: # Dan Johnson
77: # 7655 SW Cedarcrest St.
78: # Portland, OR 97223
79: #####  

80:
6080 81: ORG $6080
82:
6080 2013 83: START BRA SETV
6082 CE6088 84: ILLFN LDW #ILLMES
6085 7E729D 85: JMP ZDIE
6088 49AC4C20 86: ILLMES FCC /ILL FILESPEC/
608C 44494C45
6099 33504543
  
```

6094 00 87: FCB 0

6095 CE6199 90: SETV LDX #FCB1 GET INPUT FILE NAME
 6098 BD7291 91: JSR ZFLSPC
 609B 25E5 92: PCS ILLFN
 609D B6619B 93: LDA A XUN+FCB1 GET UNIT #
 60A0 B72641 94: STA A XUN+FCB2 COPY TO OUTPUT FCB
 95: #OPEN FILES
 60A3 CE6199 97: LDX #FCB1
 60A6 B604 98: LDA A #0004R
 60A8 A700 99: STA A XFC:X SET FOR READ
 60A8 BD7784 100: JSR DFH OPEN INPUT FILE
 60A8 2706 101: BEQ OK
 102:
 60AF BD72A9 103: ABORT JSR ZTYPDE DISPLAY ERROR MESSAGE
 60B2 7E7283 104: JMP ZWARMS
 105:
 60B5 B605 106: OK LDA A #00SREAD
 60B7 A700 107: STA A XFC:X SET FCB FOR READ
 108:
 60B9 CE623F 109: LDX #FCB2
 60BC B601 110: LDA A #00S04W SET FOR WRITE
 60BE A700 111: STA A XFC:X
 60C0 B602 112: LDA A #2 BINARY FILE TYPE
 60C2 A70C 113: STA A XFT:X
 60C4 BD7784 114: JBR DFH OPEN OUTPUT FILE
 60C7 26E6 115: BNE ABORT IF ERROR
 116:
 60C9 B602 117: LDA A #00SRIT
 60CB A700 118: STA A XFC:X
 119:
 60CD CE623F 120: LDX #FCB2 (OUTPUT FILE)
 60D0 BD7297 121: PUTVER JSR ZDNCHR GET CHARACTER
 60D3 B100 122: CMP A #00D CRT
 60D5 2711 123: BEQ GETBYT
 60D7 B142 124: CMP A #'B IS IT U/C 'B'
 60D9 2602 125: BNE NOTB
 60DB B820 126: ADD A #0020 MAKE IT LOWER CASE TO AVOID
 60DB B147 127: NOTB CMP A #'G IS IT U/C 'G'?
 60DF 2602 128: BNE NOTG
 60E1 B820 129: ADD A #0020 MAKE IT LOWER CASE
 60E3 BD7784 130: NOTG JSR DFH WRITE THE BYTE
 60E6 20E8 131: BRA PUTVER
 132:
 133: #COPY THE INPUT FILE TO OUTPUT
 134: #(OMIT PADDING NULLS ON END AND BETWEEN RECORDS)
 60E8 CE6199 135: GETBYT LDX #FCB1
 60E8 BD7784 136: JBR DFH READ BYTE
 60E8 2708 137: BEQ CHKBYT IF NO ERROR
 60F0 A601 138: LDA A XES:X ELSE GET ERROR CODE
 60F2 B104 139: CMP A #6 EDFT
 60F4 2748 140: BEQ DONE DO EXIT
 60F6 BD72A9 141: JBR ZTYPDE ELSE REPORT ERROR
 60F9 2043 142: BRA DONE AND EXIT
 143:
 60F8 FE6193 144: CHKBYT LDX COUNT CHECK TRANSFER COUNT
 60F8 2706 145: BEQ CHNK2 IF ZERO GO SEE WHAT THIS BY
 6100 09 146: DEX
 6101 FF6193 147: STX COUNT
 6104 2020 148: PUTBYT AND WRITE BYTE TO OUTPUT FI
 149:
 6106 7D6192 150: CHK2 TST FLAG START OF RECORD FLAG
 6109 2711 151: BEQ NOTCNT THIS IS NOT THE DATA BYTE C
 610B 34 152: PSH A #4 ADJUST CNT
 610C B804 153: ADDA STA A COUNT+1 SAVE ADJUSTED COUNT
 610E B76194 154: INC COUNT
 6111 2403 155: BCC NOCY
 6113 7C6193 156: INC COUNT
 6116 32 157: NOCY PUL A
 6117 7C6192 158: CLR FLAG CLEAR THE FLAG
 611A 2017 159: BRA PUTBYT WRITE DATA BYTE CNT
 160:
 611C B147 161: NOTCNT CMP A #'0 TRANSFER ADDR RECORD
 611E 2607 162: BNE NOC
 6120 C602 163: LDA B #2 SET UP COUNT
 6122 F76194 164: STA B COUNT+1
 6125 200C 165: BRA PUTBYT WRITE IT
 6127 B142 166: NOC CMP A #'0 START OF RECORD?
 6129 2605 167: BNE NOC
 612B 7C6192 168: INC FLAG SET FLAG
 612E 2003 169: BRA PUTBYT WRITE IT
 6130 4D 170: TST A NOB IS IT AN INTER-RECORD NULL?
 6131 2785 171: BEQ GETBYT IF SO...SKIP IT
 172:
 6133 CE623F 173: PUTBYT LDX #FCB2 WRITE BYTE TO OUTPUT FILE
 6136 BD7784 174: JBR DFH LOOP IF NO ERROR
 6139 27AD 175: BEQ GETBYT
 613B BD72A9 176: JBR ZTYPDE
 177:
 613E CE6199 178: DONE LDX #FCB1 CLOSE INPUT FILE
 6141 B606 179: LDA A #0SRC
 6143 A700 180: STA A OX
 6145 BD7784 181: JSR DFH
 6148 2703 182: BEQ DONE2
 614A BD72A9 183: JBR ZTYPDE CLOSE OUTPUT FILE
 614D CE623F 184: DONE2 LDX #FCB2
 6150 B603 185: LDA A #0SNC
 6152 A700 186: STA A OX
 6154 BD7784 187: JSR DFH
 6157 2704 188: BEQ DELETE
 6159 BD72A9 189: ABORT2 JSR ZTYPDE
 615C 7E7283 190: HADEIT JMP ZWARMS ALL FINISHED
 191:
 616B C609 192: #DELETE INPUT FILE
 616D FE6195 193: DELETE LDX #FCB1
 6170 A600 194: LDA A #0DEL
 6172 08 195: STA A XFC:X
 6173 FF6195 196: JSR DFH
 6176 FE6197 197: LDX PTR2
 6179 26EE 198: STA A OX
 617B 08 199: INX PTR1 NAME LENGTH
 617D FE6195 200: MOVNM LDA B #9 POINTER TO INPUT FILE NAME
 617F A600 201: LDA A OX
 6182 08 202: INX PTR1 MOVE
 6173 FE6195 203: STX PTR1 INPUT-FILE
 6176 FE6197 204: LDX PTR2
 6179 2600 205: STA A OX
 617B 08 206: INX PTR1 POINTER TO OUTPUT FILE FCB

```

617C FF6197 207: STX PTR2 CNT 60A3 A601 90: LDA A XES,X GET ERROR CODE
617F 5A 208: DEC B BNE HOUNAM 60A5 B106 91: CMP A #6 IS IT EOF?
6180 24E8 209: BNE 0X DON'T MESS WITH FCB 60A7 2712 92: BEQ DONE
6182 6F00 210: CLR WHEN RENAMING 60A9 BD72A9 93: JSR ZTYPDE ELSE REPORT ERROR
6182 CE623F 211: LDH #FCB2 60AC 200D 94: BRA DONE AND EXIT
6187 6608 212: LDA A #0REN 60AE B142 95: BRA DONE
6189 A700 213: STA A XFC,X 60B0 2709 96: READOK CMP A #8 IS IT START OF RECORD?
618B BD7786 214: JSR DFM IF ERROR 60B2 8147 97: BEQ DONE IF SO DONE
618E 26C9 215: BNE ABORT2 IF OK (ALL DONE) 60B4 2705 98: CMP A #0 IS IT A TAT?
6190 20CA 216: BRA MADEIT 60B6 BD7286 100: BEQ DONE
217: 60B8 20E3 101: JSR OUTEEE MUST BE HEADER MESSAGE..
218: 60B9 102: BRA GETVER SD PRINT AND LOOP
6192 00 219: FLAG FCB 0 103:
6193 0000 220: COUNT FDB 0 104: #CLOSE INPUT FILE AND EXIT
6195 619C 221: PTR1 FDB FCB1+XFN 60BB CE60E5 105: DONE LDX #FCB1
6197 626C 222: PTR2 FDB FCB2+45 NEW NAME PTR FOR 60BE B606 106: LDA A #0SRC
RENAME 60C0 A700 107: STA A XFC,X
6199 0046 224: FCB1 RMB 166 60C2 BD7786 108: JSR DFM CLOSE FILE
623F 000000 225: FCB2 0:0.0 60C5 2703 109: BEQ EXIT IF NO CLOSE ERROR
6242 33455456 226: FCC /SETV/ TEMPORARY FILE NAME 60C7 BD72A9 110: JSR ZTYPDE ELSE REPORT ERROR
6246 0000 227: FCB 0 60CA 7E7283 111: EXIT JMP ZWARMS EXIT
6248 544D50 228: FCC /TMP/ 60CD CE60D3 113: ILLFN LDX #MESS
000F 229: RPT 15 60D0 7E7290 114: JMP ZDIE PRINT MESSAGE AND ABORT
624B 00 230: FCB 0 60D3 494C4C45 115: MESS FCC /ILLEGAL FILE-SPEC/
624D 00 60E4 00 117: FCB 0
624F 00 60E5 0046 118: FCB1 RMB 166
6250 00
6251 00
6252 00
6253 00
6254 00
6255 00
6256 00
6257 00
6258 00
6259 00
625A 008B 231: RMB 139
232:
233:
234: FINISH EQU #
235: LENGTH EQU FINISH-START
236:
237: END

```

When developing programs with a floppy disk system you invariably find after a time that you have several copies of your object program distributed over several disks. These are often slightly different versions of the same program and it isn't always easy to tell which version is where. To solve this problem I developed the following two commands for SSB DDS68 (developed on version 4.2). The first "SETVER" is used to set a version message into an object file (any file you can use the GET or RUN or FIND commands on including '\*' command files). The second "SHOWV" is used to show the version message.

#### SETVER works as follows:

SETVER<input file-spec><output file-spec>

The input file will be copied to the output file. Before the copy is initiated the prompt "VERSION HEADER" appears on the console...enter a line

(e.g. VER 1.0 16-AUG-79) I use a version number and the date but any message can be used. This message is copied to the output file and then the input file is copied to the output file. If the header message contained any upper case 'B's' or 'G's' these will be converted to lower case to prevent them from being recognized as object code record marks. (Object files in SSB DDS are stored in the MINIBUG II binary record format which uses a '\*' or 'G' to indicate a start of record similar to how 'S1' or 'S9' are used in the MINIBUG hex format. The SETVER command also does one other thing as it copies the object file it eliminates any null characters between records. These null characters can be present when the input file was created by APPENDING several smaller object files together. Thus under these circumstances it is possible for the output file to be shorter than the input file. Since the input and output files cannot have the same file-name, you will probably want to use the RENAME command to end up with the proper output file-name.

SHOWV is used to show the version message installed by the SETVER command. Syntax:

SHOWV<file-spec>

SHOWV simply displays on the console as ASCII all of the specified file until a 'B' or 'G' is encountered in the file which indicates the start of the object code.

Both of these commands could be easily adapted for use with FLEX if you keep in mind that FLEX uses a different object record format than SSB, and adapt accordingly.

HAL/6800 1.2: 0000 SHOWV SHOW VERSION MESSAGE  
13-MAY-80 14:20:10:1 Page 1 Form 1

```

1: WITH WI=80
55: =====
66: #SHOW VERSION HEADER MESSAGE OF RUN FILE
67: #SYNTAX: SHOWV<FILE-SPEC>
68: =====
69:
6080 70: ORG $6080
71:
6080 72: START EQU #
73: SHOWV LDX #FCB1 GET INPUT FILE-NAME
6083 BD7291 74: JSR ZFLBPC
6086 2545 75: BCS ILLFN IF NO GOOD
76:
6088 CE60E5 77: LDX #FCB1
6088 B604 78: LDA A #0SO4R
608D A700 79: STA A XFC,X SET UP FOR OPEN
608F BD7786 80: JSR DFM OPEN FOR READ
6092 2706 81: BEQ OK
6094 BD7249 82: ABORT JSR ZTYPDE PRINT ERROR MESSAGE
6097 7E7283 83: JMP ZWARMS ABORT PROGRAM
84:
609A B605 85: OK LDA A #0BREAD SET FCB FOR READD
609C A700 86: STA A XFC,X
87:
609E BD7786 88: GETVER JSR DFM READ A BYTE FROM FILE
60A1 2708 89: BEQ READOK IF NO READ ERROR

```



Southwest Technical Products Corporation  
219 W. Rhapsody  
San Antonio, Texas 78216

June 18, 1980

#### NEWSLETTER #5

We are ready to begin accepting orders for UniFLEX®. First shipments should go out during the first part of July. If you need a multitasking operating system for commercial or educational applications, this is it. For the first time there is software that takes advantage of the capabilities of the 6809 and the S/09. We will be offering UniFLEX as a package that will consist of the UniFLEX operating system, a compatible editor and assembler, plus a UniBUG monitor, and a year's maintenance. All copies will have serial numbers and be registered to the purchaser. Support will include updates and a newsletter. No support whatsoever will be provided unless your system is registered. The package price is \$495.00.

Multi-column printing is now available for the Flex 9 operating system. This utility is used to format an output stream into multiple columns for output onto a printer. The optional specifications in this utility may be used to change five values in the program. These are number of columns, page width, page length, truncate length and column width. Default values for these are used if no specifications are given in the command. The MC utility loads into the utility command space at \$C100. The parameters are processed and a page buffer is allocated from the top of available user memory. Note that the reserved printer area is not used, hence the MC command cannot be used from BASIC. Once the page buffer has been initialized, the actual Multi-column buffering routines are relocated to reside immediately below the buffer, and the end of memory pointer is updated. MC is available on either a five, or eight-inch floppy disk for \$19.95.

Users of the MF-88, or MF89 floppy disk system that have Wangco, Siemens or Tandon drives can speed up the track access time of the system by changing the track step rate in FLEX.SYS. This is done by changing the following two bytes using the FIX.CMD in your DOS. Remember, you must RE-LINK FLEX.SYS after using FIX.CMD.

Location	From	To
DEE5	OB	OB
DEB2	1B	19

Do not make these changes if you are running Shugart, or Pertec drives.

A Source Program Filter (SPFI) is now available to aid in the conversion of assembled programs from unlabelled Motorola-compatible format to a format suitable for input to the SWTPC optimizing assembler. Rigorous syntax checking is performed along with certain mnemonic transformations. SPF is available either with the Optimizing Assembler, or separately on five or eight-inch floppy disk for \$19.95.

```

0001 REM *** BIT BUCKET FILLER
0002 REM *** RICHARD G. CAGLE
0003 REM *** APPLEVALLEY DAY SCHOOL
0004 REM *** 11103 SAGEPARK LN
0005 REM *** HOUSTON, TX, 77089
0006 REM
0010 PRINT "TEST OF RECURSIVENESS"
0020 I=0
0025 INPUT "DEPTH OF TEST", A
0030 GOSUB 1000
0040 PRINT "RECURSIVE TO AT LEAST", A
0050 STOP
1000 I=I+1
1010 PRINT "OK AT I="; I

```

```
1015 IF I=KA THEN GOSUB 1000
1020 I=I-1
1030 PRINT "RETURNING ON I="; I
1040 RETURN
```

RUNNING PROGRAM:

```
TEST OF RECURSIVENESS
HOW DEEP DO YOU WANT TO TEST ?4
OK AT I=1
OK AT I=2
OK AT I=3
RETURNING ON I=3
RETURNING ON I=2
RETURNING ON I=1
RETURNING ON I=0
RECURSIVE TO GREATER THAN      4
```

28 May 1980

#### HAM RADIO NET FOR 6800

Dear Don Williams,

I would like to inform you of the status of 6800/6809 amateur radio interest nets which I discussed in an open letter to the Journal a few months ago. From this letter I have received letters from all over the US and as far away as Europe and the Far East.

Since my last letter to the 6800 Micro Journal, the net size has been growing. The net was organized to exchange ideas, software and to help others with software and hardware problems. This has proven to be extremely helpful for those stations outside of the continental US where magazines like the 68 Micro Journal can take up to 2 months for delivery.

Our group meets on Sundays (Calif.) on 14250 KHZ at 01:00 GMT (Summer) or 02:00 GMT (Winter). The QRM is very bad at this hour and we look for the clearest frequency near 14250. After our group starts the band seems to clear up after the first hour.

Look for the following stations: HP1XAW, K500U, 9Y4JW, 9Y4RB, J6LOV; they are regulars. Numerous stations check into the net. A recent visitor to our net has been Dave Shirk, KB9JN, president of TSC. This net is proving to be an excellent way to find out what is happening in the 6800 world.

Another frequency to look for 6800/6809

users is on 21260 KHZ at 01:00/ 02:00 GMT on Fridays and Saturdays (Calif.). The following stations are regulars: VK3UM, VK2AIT, VK4XV, and K6AEP. We have been experimenting with ASCII RTTY. Our goal is to determine an optimum data rate and bit pattern to try and exchange software over amateur radio.

For amateur stations in the South Pacific wishing to meet with other 6800/6809 users, there is a local net that meets at 09:30 AM on Saturday and Sundays Eastern Australian Time. This net meets on 7140 Khz or 14160 Khz depending on band conditions. Most of the active stations are on the east coast of Australia. The net's goal is to help other stations with software and hardware problems.

I hope this letter has been of some help to stations wishing to make contact with other 6800 users via amateur radio. I would like to hear from other amateurs who are aware of other 6800 computer interest nets on amateur radio.

Sincerely,

*Clay Abrams*

Clay Abrams, K6AEP  
1758 Comstock Lane  
San Jose, CA 95124  
USA

#### 6800 DOUBLE DENSITY 8 INCH DISK SYSTEMS

Received recently from TSC is their new 6800 double-density FLEX™ for the 6800. For the users still using 6800 (and there are many) this is a welcome addition. We are aware of many who still use the 6800, because of expensive (to have written) applications software they use in their operation. The advantage of double over single density is 100%.

There is however a catch; first the new FLEX™ will not work with the older DMAF-1 SWTPC controller board (it uses a single density 1771 controller IC), this means that a newer DMAF-2 controller board will have to be purchased from SWTPC (price \$395.00 assembled). Second, the 6800 version of DISKBUG will have to have a little help or be redone on a 2716 and used on the MPA2 6800 CPU card. If you have EPROM already in this allocated area some changes are in order.

TSC will make the new DD FLEX™ available to any user who can furnish proof of purchase of 8 inch FLEX™, editor and assembler for \$40.00. All other must pay the normal price of \$90.00. The requirements for using the 8 inch boot in DISKBUG with the new DD FLEX™ is as follows:



#### IMPORTANT NOTE REGARDING 6800 DOUBLE-DENSITY FLEX™

The enclosed version of 6800 FLEX will execute with either the SWTPc DMAF-1 or DMAF-2 controller card. When used with the DMAF-1 controller, it is only capable of single-density recording. When used with the DMAF-2 controller, it is capable of double-density, but will require a proper ROM boot routine. The ROM boot routine found in SWTPc's DISKBUG monitor for 6800 attempts to read one sector from the disk. DISKBUG was written for the DMAF-1 before the DMAF-2 ever came into existence. When used with the DMAF-2 it so happens that the DISKBUG boot attempts to read in double-density mode. On standard FLEX disks, the boot sector is always recorded in single-density. This means that the enclosed disk will not directly boot in a 6800 system with DISKBUG and a DMAF-2 controller. There are three ways to get around this problem:

- 1) Modify the DMAF-2 controller such that it always runs in single-density no matter what the software requests. This means, of course, that you will not be able to run double-density, but if double-density is not required, it may be the simplest solution. This modification may be made to the DMAF-2 board on the bottom side by cutting the trace leading to pin 16 of IC29. The trace which is no longer connected to IC29 should be tied to +5 volts through a pull-up resistor. If you require a more detailed description of this modification, contact Southwest Technical Products.
- 2) If using the DISKBUG monitor, it is possible to boot up with the DMAF-2 board unmodified by replacing part of the ROM boot routine with 10 bytes of code in RAM. These 10 bytes may be placed anywhere in memory. The bytes are as follows:

C6 01 F7 90 22 C6 DE 7E E2 C7

Now to boot up FLEX, simply jump to the location where the above code is stored. For example, if the 10 bytes listed were placed at \$1000, you would simply enter the command "J 1000".

- 3) A third possibility is to burn an entirely new ROM boot routine which selects single-density for reading the sector.



#### PRESS RELEASE

MICROPI announces BLITZ, a screen oriented text editor for the SWTP CT-82 terminal. It is available for the 6800 or 6809 and runs under TSC's FLEX. Unlike conventional editors, BLITZ has no commands to learn or remember. Each action is invoked by pushing the appropriately marked special function key. The screen becomes a window to the text file. The window can be moved up or down in the text with the SCROLL UP and SCROLL DOWN keys. The arrow keys can be used to move the cursor to the desired position within any line. Text modifications can be made by simply overtyping the old data with the new. The screen immediately reflects all changes and shows the text as it currently exists. To remove characters from a line the DELETE key is used. Each time it is pushed, the character under the cursor disappears and the rest of the line moves left to close the gap. Alternatively, to insert new text in a line the INSERT key causes the text to open up to make room for the text by moving the rest of the line right. Adding to the end of the text is as easy as typing each new line followed by a RETURN.

In general, editing with BLITZ is so intuitively simple, that it can be used immediately by virtually anyone. But it also has some more advanced features for the experienced user. BLITZ is great for programming or word processing.

BLITZ is distributed in object code for the 6800 or 6809 on 5 or 8 inch diskette. The single machine object code license is \$80. Source code is available to users wishing to enhance BLITZ for their own use for \$100.

Larry Kheriaty  
MICROPI  
2445 Nugent  
Lummi Island, Wa. 98262

**Don Williams**  
**'68' Micro Journal**  
**P.O. Box 849**  
**3018 Hamill Road**  
**Hixson, Tennessee 37343**

Dear Don,

I would like to inform your readers of a company that makes excellent products

and has friendly people especially the president.

In December of 79 I started looking for a memory card I could afford. Before giving my money away, I laid out some expectations of what this memory board should do. The memory board should have: low power consumption, extended addressing, assembled if possible, static memory, and upward compatibility to the SS-50C bus using the 6809 microprocessor. All of the information below was published except for Smoke Signal at the time of this writing.

Surprisingly enough there are four companies that make a 16k (16,384 memory locations) or larger memory board. These companies are: Gimix, Smoke Signal Broadcasting, Digital Research:Computers, and Digital Service and Design. I will give details about each board and then make my choice. For each company I picked the largest amount of memory available on one board.

Gimix sells 16K, 24K, or 32K on one board. The board comes assembled and is tested and burnt in for two weeks. Total current consumption is under two amps for a full 32K. The board can be broken down into 8K blocks and addressed on 8K boundaries. The board also has four extra address lines for extended addressing of up to one megabyte, a megabyte is one million bytes. The board is compatible with the old SS-50 bus or the newer SS-50C buss. The board also uses gold connectors for high reliability. The best features of this board are the expandability of 32K and the low power consumption for 32K (32,768 memory locations).

The Smoke Signal board at the time of this writing was not available but the information below I obtained by telephone. Also no documentation was available either. Details of the board are sketchy but the board will be sold in a 24K (24,576 memory locations) or a 32K version. Both boards will be unsocketed and tested for a maximum of six days. Both boards use the 4044 4K x 1 chip.

The Digital Research board is a 16K board that comes either in a kit or assembled form. The board uses under two amps for 16K. The board is double sided, silk screened and uses gold connectors.

This particular board does not allow for expansion above 16K. The board uses the 2114 1K x 4 chip. One of the more interesting things about the board is the regulators are at the top of the board rather than at the side or bottom as on other boards. The board is addressable on 16K boundaries only (ie. 16,24K or 32K).

The last board is a 16K board made by Digital Service and Design. This board does not come assembled or tested, but only as a bare board. The board uses the standard 2114 1K x 4 or TMS 4045 1K x 4 chip. The board can be independently addressed for two 8K blocks. Current consumption is about 3.5 amps for 16K. The average price for building this board would be about \$300. Of course the price depends on where the chips are bought. If a user compared the price of building this board with parts compared to an assembled and tested board, the user might find that the assembled board is a better buy. In addition, after the board is assembled it must be tested and burnt in to assure reliability.

So which one is the best for the requirements at the beginning of the letter? The four boards break down into two groups. The first group are Digital Research and Digital Service and Design. The boards hold a maximum of 16K and draw more current than either the Gimix or Smoke Signal board. Also the boards are upgradable to the new SS-500 bus but do not have extended addressing. Extended addressing allows the computer to address sixteen different 64K memory locations. The second group are Gimix and Smoke Signal. Both of these boards hold more than 16K, have low power consumption and extended addressing.

Gimix was my choice because of power consumption, static memory, smaller size available for purchase, expandability, and reliability. Static memory, for example removes the worry of such things as refresh, timing windows and other horrors of dynamic memory. Since Gimix does a two week burn in plus the time for testing, the return rate of the board is almost zero. Since I bought my board in January, four other boards have been purchased here in the Las Vegas area. There has not been one complaint yet from any of the four boards or the users of the boards and there probably will not be any complaints.

When I did purchase my board in January at the Consumer Electronics Show, I was skeptical that the board would work. But when I took the board home and plugged it in, the board ran fine. The next day I returned to the show and reported my results, Richard Don of Gimix was not a bit surprised. I was skeptical that the board would work because this was the first memory board I had bought assembled and tested.

Therefore before purchasing more memory for your SS-50 bus machine, consider a Gimix board as the best choice now and in the future.

TOM MATTINGLY  
1005 ESSEX DR.W.  
LAS VEGAS,NV. 89107

TO: Don Williams                            May 26, 1980  
Subject: Applevalley Software

This letter is in response to your request for information.

Applevalley Day School was founded in 1974 by my wife. It operates out of a small, old, house in a residential neighborhood in Houston, TX. I keep the books in my spare time. Several years ago, I bought a SWTPC 6800. Since no business s/w was available, I wrote my own. Over the years, it has been used, debugged, and improved. The software has been effective in processing payroll, deposits, keeping customer payment records, general ledger and checkbook balancing. I have taken our running s/w and added a comprehensive manual and offered it for sale at very reasonable rates.

The software is useful to any small service business. Although we use a 'CASH' accounting method, it should be useable for other methods. It has liberal operator prompting to lead an semi-untrained operator thru them. A tutorial is supplied, to assist and explain as the programs are run the first time against our 'dummy' data. The programs are guaranteed to run.

The small businessman who wants to program his own unique programs will find my programs a good starting point as the hard part, the interrelated file structure, has been done. And the source listings in the 86 page manual have been annotated with tips on how to fit in special needs. The programs run in FLEX 2(9) or MINI-FLEX using Basics compatible with SWTPC Disk Basic Ver 3.0 or 3.5 such as Basic 0935 For 6809 (\$59.95 from Omni-Tronics 1897 Rt33, Concord Square, Hamilton SQ, NJ, 08690 )

My software is easily adapted to any system, it works well, and is supported. All prospective customers are provided a brochure with details on the programs.

Richard G. Cagle  
Applevalley Day School, Inc.  
11103 Sagepark Ln  
Houston, TX, 77089  
Phone 713-481-3586 (after 6 pm)

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#### OS-9™ LEVEL ONE OPERATING SYSTEM

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BASIC 09 is a trademark of Motorola. OS-9 is a trademark of Motorola and Microware®. UNIX is a trademark of Bell Telephone Laboratories.

Most software is available on ROM, diskette and tape in versions for many popular 6809 computers. Source listings and yearly maintenance/update service are sold separately for most programs.

\*Specify manufacturer and type of CPU and I/O controllers. Contact Microware® for specific availability.



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SBM-1 Bare Board and Doc. \$37.50 plus \$2.50 s/h

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#### 680X DISASSEMBLER PACKAGE (with source) \$50.00

This package runs on the 6800 under FLEX 2 and SMOKE DOS68 and 6809 under FLEX 9. It processes 6800, 6801, and 6809 object code in memory or on disk, producing a source file, on disk, with labels, instructions, FCC's, FCB's, and FDB's, ready to re-assemble. Since input disk files are not loaded into memory, any program may be processed. All multiple ORG's are resolved and memory classification is supported, to improve the generated source. A display feature allows the viewing of the resolved object file. Two HELP files provide quick or detailed assistance. Auxiliary programs assist in the renaming of labels and provide cross-reference listings.

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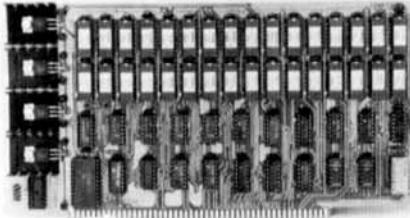
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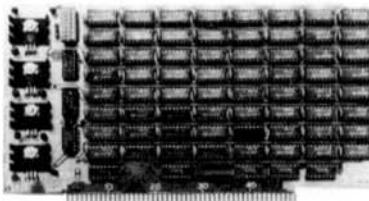
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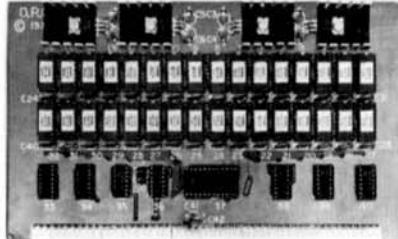
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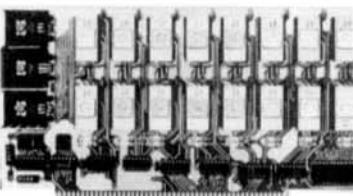
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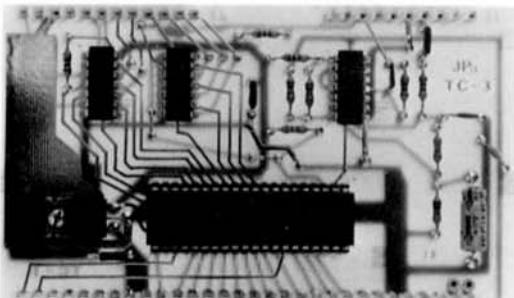
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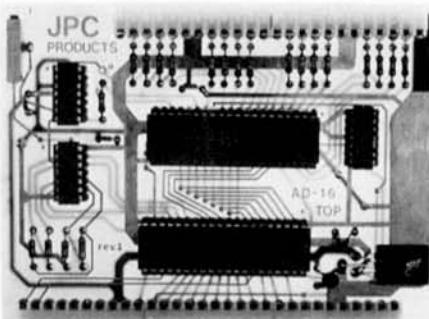
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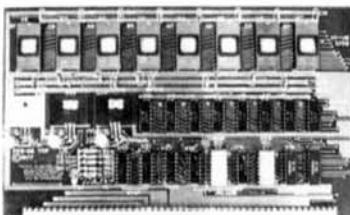
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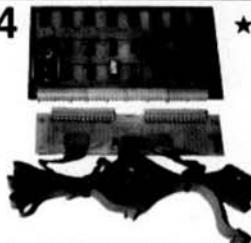
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- \*Add memory 1K at a time, using low cost 2114's
- \*The Memory Card is available three ways
  - Asm. & tested, socketed with all 16K \$295.00
  - Asm. & tested, socketed for 16K, with 1K \$129.00
  - Bare card and Documentation \$ 44.00

\*\* SPECIAL: \$242.00 VALUE FOR ONLY \$175.00 \*\*

- A set of our bare cards to build a small system
- Consists of 8-Slot Backplane/Motherboard,
- Super CPU, Video Ram, 16K Memory, 10 Port
- Parallel I/O, Wire Wrap Prototype Card, and
- Documentation for each of the above

\*\* OUR SS-50 LINE-UP \*\*

- All Thomas Instrumentation's assembled cards are burned in at 150°F and fully tested
- All cards come with full documentation including software source listings where appropriate
- Bare card price does not include edge connectors
  - Super CPU asm. with monitor source but without 2K-2708's EPROM monitor \$195.00
  - Monitor in two 2708's EPROMS \$ 29.00
  - CPU bare card, doc., & source \$ 49.00
  - Video ram asm. 7X9 char. 64X16 line \$169.00
  - Video ram bare card, doc., & source \$ 45.00
  - Parallel I/O asm. 100 I/O lines includes 5 PIAs for 10 ports \$110.00
  - Parallel I/O bare card & doc. \$ 35.00
  - Wire-Wrap/Prototype bare card \$ 29.00

\*\* NEW PRODUCT LINES \*\*

- NEW RCA sealed Keyboards
  - Model 611 \$ 85.00
  - Model 601 \$ 65.00
  - CPU Cable \$ 10.00
  - Leedex Monitor \$139.00

\*\* NEW BACKPLANES/MOTHERBOARDS \*\*

- The following cards are extra thick (3/32)
  - 16 Position SS-50 \$80.00
  - 12 Position SS-50 \$60.00
  - 8 Position SS-50 \$40.00
  - 4 Position SS-50 \$20.00
  - 8 Position SS-30 \$39.00
- SS-50 to SS-30 Transition card will be available next month
- Connectors for the above cards are separate, SS-50 take 5 for each pos., SS-30 take 3 each backplanes take males, main cards take females
  - Males Tin \$0.40ea. Gold \$1.60ea.
  - Females Tin \$0.50ea. Gold \$1.60ea.

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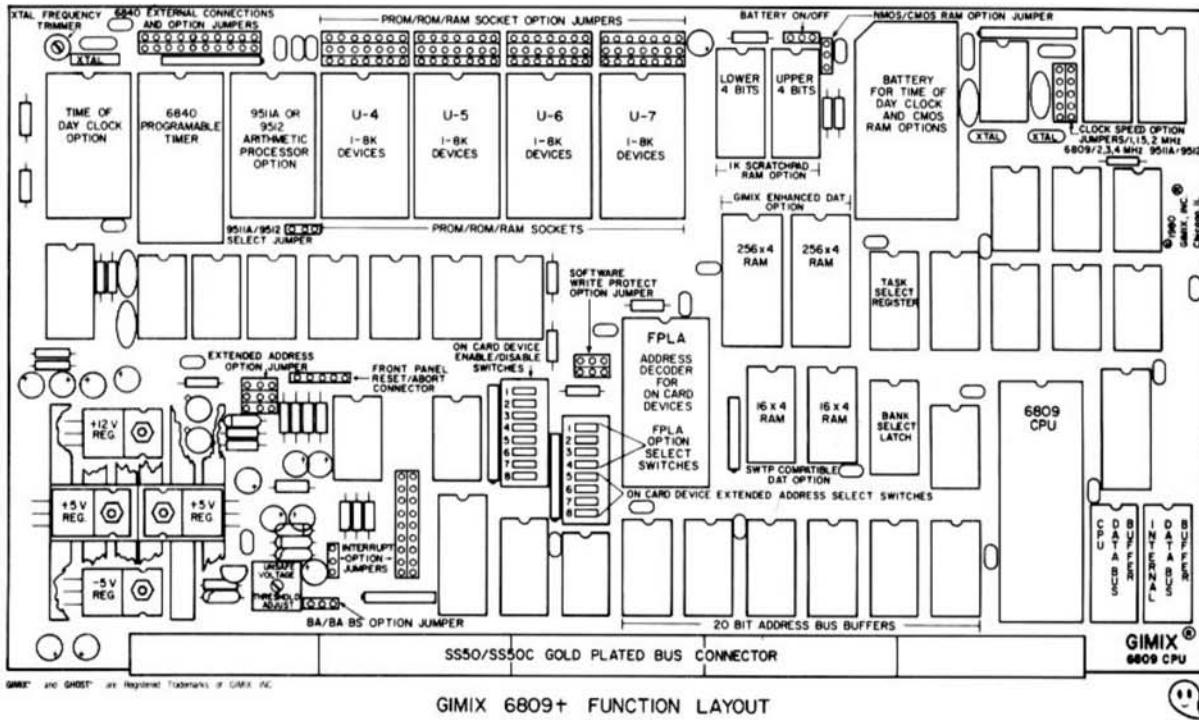
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# GIMIX PROUDLY PRESENTS!!!



GIMIX 6809+ FUNCTION LAYOUT

## SS50C 6809 CPU

The 6809 CPU card will be available in a standard version and our **6809 PLUS** version that is fully socketed to allow adding options at anytime.

- + A 6840 timer package that provides 3 independent 16 bit counters is included on all **6809 PLUS** cards.
- + A 9511 or 9512 Arithmetic Processors option with its own independent crystal that allows you to use 2, 3, or 4 MHz parts in any combination with the 6809 running at 1, 1.5, or 2 MHZ.
- + 1K of scratchpad RAM
- + A Time of Day Clock option with battery back-up. With this option you can also substitute 1K of CMOS RAM that will also be battery backed up.
- + User selectable processor speeds without having to change the crystal.

32K of PROM, ROM or RAM. Both versions have 4 sockets that can each hold from 1K to 8K parts. Single or multiple voltage parts can be used on the **PLUS** version. The standard version only allows the use of single voltage parts.

All on board devices and options can use extended addressing so that they will only respond to that page to which they are set.

The card is double buffered and allows versatility in the use of software and memory address control disciplines. Please note that this card does **not** have an on board baud rate generator, and must be used in systems where baud rates (if needed) are provided elsewhere in the system.

**GIMIX INC.**

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# SS-50 MEETS UCSD PASCAL

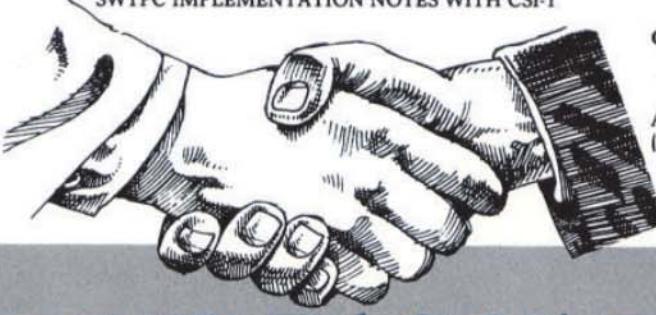
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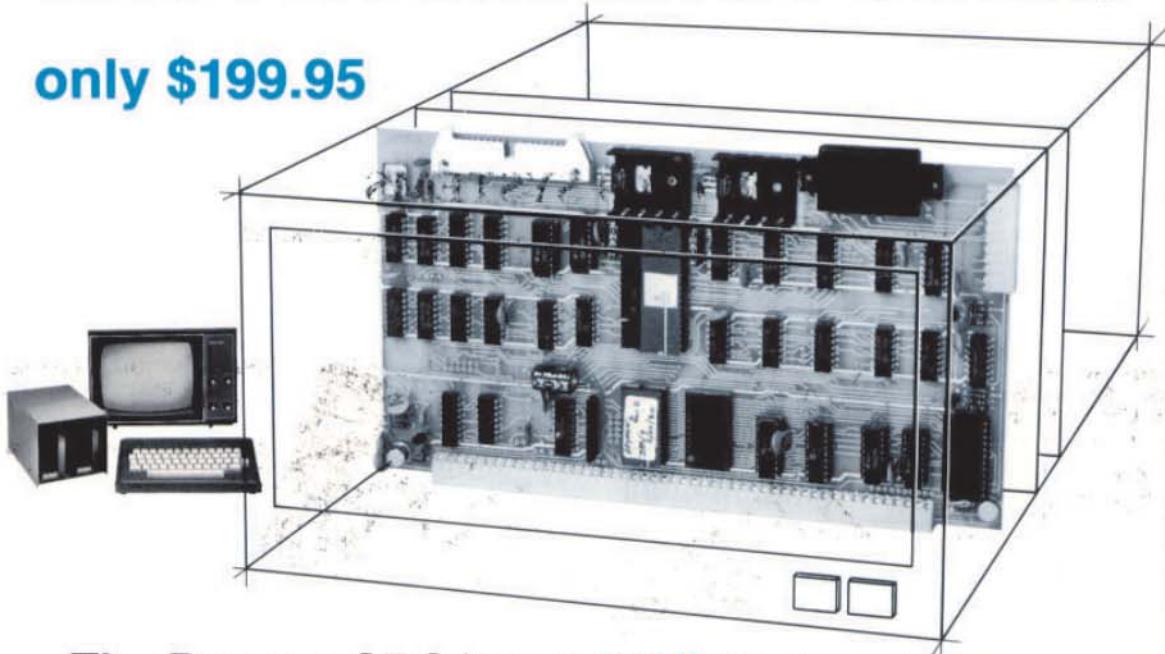
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### The Percom SBC/9™: A "10" By Any Measure.

Available with either the new, powerful 6809 µP or an optional 6800-software-compatible 6802, here are 10 beautiful reasons why the Percom SBC/9™ is not just another runner-up MPU/Single-Board-Computer card.

- ① SS-50 bus direct, plug-in-compatible upgrade MPU. Requires no modification of the system bus, I/O or memory.
- ② Full-capability stand-alone single-board computer. Accommodates a 6809 microprocessor or optional 6802 microprocessor without modification.
- ③ On-card 1 K ROM monitor "auto-links" to optional second 1 K PROM — if installed. Second PROM may be used to easily extend or modify the primary monitor command set.
- ④ Eight-bit parallel port is multi-address extension of system bus. Accommodates an exceptional variety of peripheral devices ranging from game paddles and keyboards to memory management modules. Connector is optional.
- ⑤ Serial port includes a full-range selectable bit rate generator. Optional subminiature 'D' connector provides RS-232 compatibility.
- ⑥ Extendable addressing via SS-50 bus baud lines to 1 Mbyte. Extendable addressing to 16 Mbytes or more through the parallel "super port."
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- ⑨ ROM circuit may be jumper-wired for single- or triple-voltage 2716 EPROM.
- ⑩ On-card power regulators simplify power supply design by minimizing regulation demands.

Plug the SBC/9™ into your SS-50 system bus, and just that easily you've upgraded to the new super-fast super-powerful 6809 MPU with such programming amenities as 10 addressing modes, 16-bit instructions, auto-increment/auto-decrement and position-independent code. Plus, you now have extended addressing capability, and operation under control of PSYMON™, the most powerful and flexible 1K ROM 6809 operating system yet written.

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And with PSYMON™, I/O is easily directed to any peripheral device — even a disk system — through a Device Control Block table located

in memory. This allows you to leave the details of I/O software to the separate I/O device drivers.

A PSYMON™ ROM is included free with the purchase of an SBC/9™. The Users Manual includes a source listing.

The 1 Kbyte ROM monitor for the SBC/9™ 6802 option includes a primary set of typical 6800-compatible monitor commands. As for PSYMON™, the commands are easily extended or modified.

Products are available at Percom dealers nationwide. Call toll-free, 1-800-527-1592, for the address of your nearest dealer, or to order direct. Prices and specifications subject to change without notice.

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