the printed circuit

General Un-Meeting Summary

*When the power returned after the ice storm, our computer
gave us a file overflow signal. Since this seemed impos-
sible, we dumped the file to the printer with the result,
which has been recopied only for clarity, since following
the dump pieces of burning plastic were scattered on the
printout.*

Dec.32,1978------------Aledo-Forney Metroplex meeting of
computers and their keepers, combined--rescheduled--sixth
Tuesday and Tday minus root 1--meeting in combination to
honor the arrival of 7BB [11110111011]. The first order
of business was that of decorating the meeting place. The
production of teletype paper was progressing slowly when
C5532 arrived with a friend who worked as a highspeed
print controller for a 370. A bit of the brew as passed
around and all were nearly buried under the festive green
and white shredded mass. When the friend (whose name seems
to be lost due to parity error, his not ours)whispers some-
thing in the ear of the well-built tape drive that had
been merely watching to this point, an earthy confetti of
brown was added, much of it streaming from the highest
fixtures, which all applauded. I regret to report that
quite early in the meeting all of the SWTC 6800 had slid
under the table due to 12 volt failure. The speech that
grandpa Altair had planned was lost when he temporarily
stored it in dynamic RAM while mixing a drink by a new
recipe he was sharing with a computer in Tucson which was
still sober. Young Joe PET went down trying to retype
with stiff fingers. It was decided, in the failing moments
that in the future, all meetings would be held with the
Computer Hobbyist Group-North Texas on the first and third
Saturdays. Further, I resolved to ask that future meetings
not be canceled for tests or ice--we can match the mailmen!

—Mike Firth

6800 Users Group Report

The Dallas-Fort Worth 6800 Users Group met on December 20
1978 at the usual location of Tektronix in Farmers Branch.
A room-filling crown of 30 or so people showed up, includ-
ing many new members. We hope they enjoyed themselves and
come back next month.

Dr. Brian Johnson explained the evolution of the opera-
ting system he developed, from a replacement for the well-
known (and not-so-well-liked) MIKBUG (tm) monitor to an
almost omniscient operating system with powers and abili-
ties exceeding those of many maxicomputers. (It cannot leap
over buildings without a special peripheral.) His system
is called INDEX which stands for INterrupt Driven EXecutive
after the most powerful feature of the system, that of
handling all peripherals on an interupt basis. This means
that he can type in one command while the computer is pro-
cessing the previous one, or type in a bunch of commands
and each one will get processed when the CPU gets around to
it. This is possible because of separate I/O drivers for
each peripheral which are powerful enough and simple enough
to use that the application program doesn't have to know
or care about any of the hardware characteristics of the
peripherals, which makes for very flexible software.

The disk file manager is more sophisticated than any
other that I know of. All disk space is dynamically aloca-
ted so a file never overflows unless the disk overflows.If
you edit a file, the old copy is saved and the new version
is put in a separate file, with an automatically updated
"version number". Very handy for people like me who can't
remember which file has the "debugged "copy of the program.
He also has a number of handy utilities to, for example,
"backup" all the files to another disk, copying only those
whose version number is greater than the version of that
file on the other disk. Thus copying only those files that
were changed. It is so powerful that you can use the copy
utility to type from the keyboard to the printer, using the
built-in text editing features such as backspace so you have
an instant correcting typewriter.

The next meeting, on January 18, will be a show and tell.
Bring your new Christmas presents to show off, or the soft-
ware you wrote while the kids were breaking all their new
toys. (Or while the power was off during the ice storm.)

—Gary Davis

TRS-80 Users Group Report

At our only December meeting, Mike Stanton gave us an
in depth review of the desirable features of a Word Process-
ing system. Mike has used various commercial machines in
his printing business. To give us a an idea of what to
look for, the Electric Pencil program written by Michael
Shrayer was demonstrated for reference purposes.

Two 25 inch B&W video monitors mounted in the class-
room were hooked up to the TRS-80. The large letters on
the screen were easily readable from a distance up to 20
feet.

"Building a hardwired Modem" is the topic to be pre-
sented at the February 13th meeting. John Horton, an
Electrical Engineering major at UTA, will tell how he
built a hardwire modem for use with his TRS-80.

"Computers in the Classroom", the topic originally
planned for the January 9th meeting has been rescheduled
to the fourth Tuesday, February 27th. Due to a misunder-
standing, our speaker missed the January meeting. The wait
should be worthwhile, however. Bill Gattis from the
Foundation for Quality Education will demonstrate the
programs they have prepared for teaching mathematics to
grades 1 to 8. These programs have been designed to
follow the baseline curriculum for mathematics used in
Texas schools.

A voice synthesizer attached to a TRS-80 and a video
disk recorder used for program and graphic storage will
also be shown. These items are being developed for use
in the Dallas Independent School District.

The TRS-80 Users Group meets on the second and fourth
Tuesdays of the month at the University of Texas at Arling-
ton. The meetings start at 7:00pm in room B87 of Texas
Hall. A North Dallas meeting of TRS-80 users is held at
the News Texan Publishing Inc., 4880 Alpha Rd, on the
iird Thursdays at 7:00pm.

—Doug Kilgore

6502 Users Group

As most of you are aware, the January meeting of the 6502 Users Group was frozen out in the ice storm. Besides, no one had called to indicate an interest.

We will try once again in February, meeting at 11:30 at the site of the UTD meeting on the first Saturday. We will probably meet in the room across the hall if a class is in the regular spot.

Please call if you have any interest. We will try to have an AIM and a VIM on hand. Whether or not those are on hand I will have my rig with video display, extra memory and, hopefully,my working Selectric. I am prepared to deal with two basic topics: hardware interfacing using the 6820 chip and programming in machine language. If you have an interest in either or these or want to suggest something else, please call. (Mike Firth, 214-827-7734, mornings or late evenings to about 11:30 are best.)

APPLE, PET owners. you are welcome to share our sessions to learn about the guts of your machine if you wish.

6502-APPLE
If you are interested in buying an Apple computer, you may want to look on the activities of the Apple Corps, which meets at Greenhill School (14255 Midway Rd, North of LBJ) on the second Saturday of the month at 2 p.m.

Just for an example, the January meeting included a forum on Building and Maintaining Disc Files, a continuation of a seminar on Apple Electronics Made Easy, and a potpourri of topics including: Lower case display; Package development, a word about text editors, and new product announcements.

—Mike Firth

Merits of Memory Boards

If you're thinking of purchasing an 8K, 16K or 32K memory board in the near future, have you carefully compared the options available on the various boards, as well as, the options not available? If price is you're only criteria, you could be mightly disappointed with that "bargain. For example, suppose I bought a bare 32K board at a good price and that I want to put only 4 or 8K of memory chips on the board initially. Also, let's suppose that I have several 4K boards plus an 8K board already in my system. After I obtain a 32K board I discover that the board can be addressed only at two locations---0000 and 32K. If I address it at 0000 with only 4 or 8K of memory on it, then I have a large gap of memory that I cannot fill with my exisitng 4K and 8K boards. Bad news there!

I cannot address it at 32K because I have a floppy disk controller with ROM at F400 hex and my EROM monitor resides at C000 hex. Now, if I had looked for a board with options of disabling 4K, 8K or 16K blocks, I could disable the unused memory blocks and make use the 4K and/or 8K boards. Further, if the 32K board had consisted of four 8K blocks of memory with each block being capable of being addressed on any 4K boundary, then I would be in business. I could buy memory chips in increments of 4K and address the board at 0000 with no problem in using the other memory boards concurrently.

Similiar options should be evaluated for the 8K and 16K memory boards. Division of 2K blocks on 8K boards would be a nice feature. For 16K boards at least 4K blocks should be consisered as necessary. Some 8K memory boards are addressable on 8K boundaries only. Again the problem exists is being able to use my 4K boards effectively. Say that I have three 4K boards addressed at 0000, 1000, and 2000 hex. Now I purchase an 8K board that is addressable only on 8K boundaries; 0000, 2000, 4000,6000, etc. If I want my memory to be consecutive, I cannot address the 8K board at 3000, so I must readdress the 4K boards (or at least one of them). The situation is further complicated when my jumpers are soldered in. I must then go to some trouble trouble just to accomodate the new 8K board. When the 8K board is made up of two independently addressable 4K blocks I can fill in any 4K gaps between the ROM and PROM areas in memory.

The best procedure is to closely evaluate your system requirements especially with regard to partitioning memory. And for some of the added features that are available with some of the newer design memory boards. Block disabling, using an output port may be useful. Also, memory protect may be a useless feature in many cases. It does add additional complexity in debugging a board. You may find that some boards have traded off some features for others due mainly to the available board space. Anybody know what, if any added features exist on that 32K 2102 memory board that has been advertised (or was it a 16K board)?

For some "for what it's worth" tips based upon some of my experiences (some of them extremely frustrating ones).

1. Never use extremely fine solder when soldering sockets onto a circuit board. The fine solder (28 to 26 gage) forms minute droplets when melted and will wick up into the socket pins, even though the sockets have the so-called anti-wicking features.

2. Never use "super glue" or any other type of thin glue to attach sockets to a wire-wrap or circuit board. I tried some of it and it stuck just fine, but it wicked into the sockets so badly that I could not have inserted the chips with a hammer!

—Lannie Walker

Calendar

January

Thurs 18th 7:00 pm NORTH DALLAS TRS-80 GROUP
News-Texas Publishing Company
4880 Alpha Road, Dallas
Program swap

7:30 pm 6800 USERS GROUP
Tektronix Building
4455 Sigma Road, Farmers Barnch
Topic: "Show and Tell"

Sat 20th 10:00 am TRS-80 USERS GROUP
Academic Computing Center,
U. Texas at Arlington *

1:00 pm ARLINGTON GENERAL MEETING
Geoscience Building,
U. Texas at Arlington *
Topic: "How To Make Money From
Your Hobby - part 1"

Tue 23rd 7:00 pm TRS-80 USERS GROUP
Computing Center, UTA *
Topic: "Inventory Control in a
Retail Store"

Thur 25th ASSOCIATION FOR COMPUTING MACHINERY
(ACM) MEETING
Tour at Baylor Medical Center
Topic: "Minis and Micros in
Patient Care Monitoring"
call Gary Davis (214)691-6762
for time

February

Sat 3rd 11:30 am 6502 USERS GROUP
at Richardson meeting site *

1:00 pm RICHARDSON GENERAL MEETING
Green Center, U. Texas at Dallas *
Topic: "Interfacing the Apple
Computer to a Laser and Other
Multi-Media Devices"
by Alden Gaw of Project Imagery,
producers of the laser light
shows at Richland College

Sat 10th 2:00 pm APPLE CORPS
Greenhill School
14255 Midway Road, Dallas

Tue 13th 7:00 pm TRS-80 USERS GROUP
Computer Center, UTA *
Topic: "Building a Modem"

Thur 15th 7:00 pm NORTH DALLAS TRS-80 GROUP
News-Texan Publishing Company
4880 Alpha Road, Dallas

Sat 17th 10:00 am TRS-80 USERS GROUP
Computer Center, UTA *

1:00 pm ARLINGTON GENERAL MEETING
Geoscience Building, UTA *
Topic: "How To Make Money From
Your Hobby - part 2,
Copyrighting Software"

Tue 27th 7:00 pm TRS-80 USERS GROUP
Computer Center, UTA
Topic: "Computers In The Classroom
(trying again)"

* See the maps on the back cover for help in
finding the location.

Community Bulletin Board

A computer generated bulletin board is available
for use by calling 214-641-8759. This is not a
metro number, therefore, it will be long distance
for some of you in the metroplex.

The bulletin board is the effort of Ric Martin,
one of the original TCGH-NT members, and is now the
operator of the Arlington Micro Store. The system
is base upon the original work done by Ward Christ-
insen from up in Chicago. And in point of fact
uses the same software.

You may use (call-up) the bulletin board if you
have an acoustic coupler (and terminal) that oper-
ates on either 110 or 300 baud, and is compatible
with Bell 103 standards. The system responds with
help information to let you know what is necessary
to leave messages or inquire about particular mes-
sage content on file. It is suggested that you
read the Byte (Nov. '78) article for details of the
system operation.

—**Bill Fuller**

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Special Interest Groups

*Apple Corps: Contact Bobbie Ferrel, (214) 661-1211,
ex. 34. The Apple Corps meets on the second Saturday
of each month at 2:00 pm at Greenhill School.

*Digital Group Users Group: Contact Otto Banks,
(metro) 267-5113 (evenings) or Jon L. Rosser, (214)
381-7171 ex. 44 or (214) 341-5703.

*PDP-11™, Pascal/Algol, and Text Processing Interest
Groups: Contact Neil Ferguson, (817) 387-0612
(evenings). I wonder if we couldn't organize a
languages special interest group to include those
given above plus languages such as Lisp and Forth
(excellent for small systems).

*6800 and SWTPC Users Group: Meets every third
Thursday at 7:30 p.m. in the Tektronix Building on
Sigma Lane in Farmers Branch. Contact Gary Davis,
(214) 350-5228, Bill Holcombe, (metro) 268-0096, or
Jim Stutsman.

*6502 Users Group: Contact Mike Firth, (214)
827-7734. The 6502 Users Group meets on the first
Saturday of each month at 11:30 am at UTD prior to
the regular TCHG-NT Richardson meeting.

*Sol Users Group: Contact Ron Jones, P. O. Box T,
Sherman, Tx 75090.

*TI9900 Users Group: Contact Charles Shelor, (817)
292-6299 or Ralph Miller, (817) 838-6687.

*PET Users Group: Contact Ron Williamson, (214)
690-9700, 823 Edgefield, Richardson.

*TRS-80 User Group: Contact Doug Kilgore, 803 James,
Richardson, Tx 75080; or call at (214) 231-8539.
Meets twice monthly on Tuesday nights, 7 p.m. at UTA
in the Academic Computer Center in the basement of
Davis Hall (see map on back cover).

Be sure to contact The Printed Circuit regarding any
user group news, meeting dates, or information
changes. New user groups are invited to list in this
column. As it is a public service of TCHG-NT,
membership as an individual or a group is not
required to list user group information.

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Interfacing the TRS-80 To the S-100 Bus
(Preliminary Considerations)
Continued from last month

PSYNC

One of the more important Command/Control signals used on the S-100 bus is the processor synchronization signal (PSYNC). The primary purpose of this signal is to indicate the beginning of each machine cycle. It is during PSYNC time that the status signals are sent out on the data bus. Since the status information in most cases needs to be present for a complete machine cycle (i.e. more than one T-state), PSYNC is used to strobe the latch (register) where the status information is stored.

PSYNC (which is an 8080 signal) is still retained in the proposed IEEE S-100 standard without change. However, a new signal, Status Strobe, has been defined which appears during PSYNC time. The Interface Age (Aug. '78) article by K.A. Elmquist indicates that Status Strobe (STSTB) is "the 8080 clock signal Ø1.....redefined". Elmquist further states that when STSTB and PSYNC are anded together it "indicates the earliest moment that status may be sampled from the status bus and that address may be sampled from the address bus".

The Z-80 does not have a processor sync signal, consequently neither does the TRS-80. Other than strobing the status data into a latch, PSYNC is used to synchronize processor timing with a peripheral board. Some disk controllers use it while all memory or PROM boards use it when wait states are used.

The above is simply a leadin to why the signal is important for the S-100 and why it should be provided in a TRS-80 to S-100 interface. Another important requirement is that PSYNC be consistent with the bus specifications as defined. Presently, that definition is as shown in Figure 6 for a 2Mhz clock.
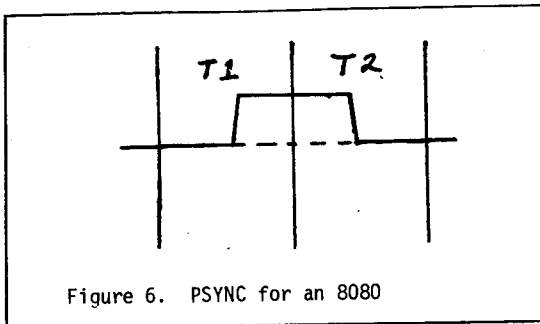

Figure 6. PSYNC for an 8080

Various methods have been attempted to simulate this signal. Whether one method is "better" than another depends upon what boards you want to use in your system that require PSYNC. Figure 7 shows three approaches.

CONCLUSIONS AND COMMENTS

When this article was begun a few months ago, the intent was an exercise by the author to see what would be involved in interfacing the TRS-80 to the S-100 bus. In that time period, bus definitions have been changed by the proposed standard. Some of these have been covered as the article developed, others have not. Some hedging on a particular circuit design approach was taken because an analysis of why an approach was taken was not verifiable from existing information, and time to analyse the workings of the circuit was not available.

The information given is not complete enough to proceed with a full-blown design for an interface. It simply is as the original title states: "Preliminary Considerations". Coming to an end of the exercise, what recommendations do I have regarding a TRS-80 to S-100 interface? Well, if I were doing it, I would look for an existing Z-80 (or 8080) CPU board which does a good job of simulating the S-100 signals and attempt interfacing along the multi-processing route. Much of the decision you make should be based upon your projected needs. If time (for processing) is critical a direct interface may be the only approach. However, if you can live with some delay(human/machine interface time), an RS232 link to the S-100 may be fine. A reliable DMA would also be an approach to consider. Whatever the approach, let us all know.
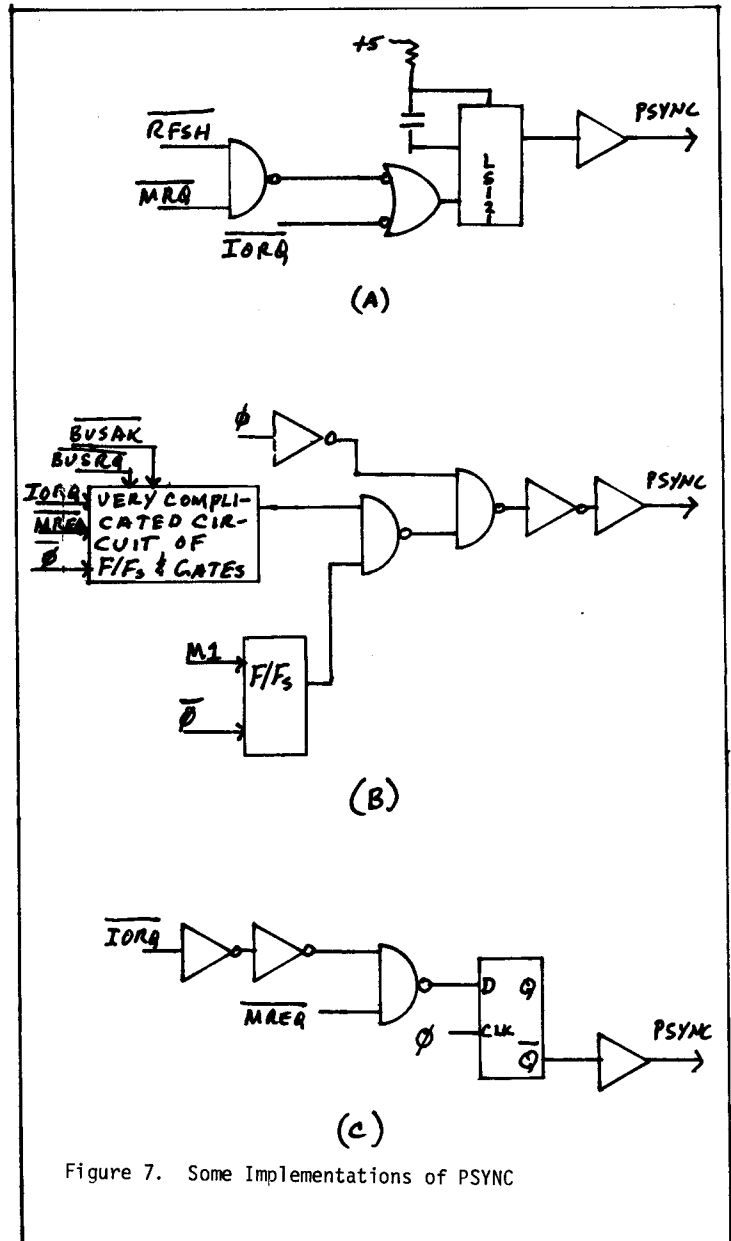
—Bill Fuller

Figure 7. Some Implementations of PSYNC

Improvements

for the SSM 2P+2S Board

The Solid State Music I/O-4 board has some neat features which make it a versatile I/O board for the S-100 bus. Two UARTs with baud rate selections and RS232 circuits allow for a wide range of terminal connections.

However, two improvements will let you increase its versatility. Presently, the board has baud rates on the low-end counter chain for 110 and 55 baud. It is at this point that improvements are to be made. The first change is for those who want a Baudot (5-level) capability, while the second change has to do with the Selectric rate discussed in the SSM documentation.

The two modifications require the addition of another counter (74LS193) which may be installed in one of the on-board unused sockets. The added counter could be avoided but this forces a deletion of the 110 baud rate when the existing circuitry is modified.

To obtain the 45 baud required by the Model 15 TTY existing circuitry is used with two connections and one etch cut. Figure 1 shows the details for the modification. Basically, what was done was to figure out how to obtain 45 baud from the existing counters. Knowing that 1200 baud equals 19.231 Khz was the starting point. From this we determined that:

$$(19,231 \div 16) \div 13 \div 2 = 46.225 \text{ baud}$$

1200 baud	divider	divider
	(74LS193)	(7474)

Now, IC U31 could have been changed to a divide by 13 rather than the present divide by 11, but this would have changed the 110 baud to 92.45. Not a very good trade, if you still want a 33 TTY operation.

By the way SSM uses this approach in their documentation to obtain a 133.5 baud for the Selectric interface, except U31 is changed to divide by 9 instead of 11. This too, fouls up the 110 baud. To make the Selectric modification: wire the new 74LS193 just like U31 in its present configuration, except connect pin 1 to pin 4 (not pin 15 as shown); cut the etch between header pin 10 and U33, pin 5; and jumper from pin 7 of the new IC to header pin 10.

While neither baud is exact, the error is less than 1%; hardly noticable by a mechanical device of that sort. Speaking of errors the baud rate Header is either W3 or W4. Schematic sheet 2 of 2 shows it as both.
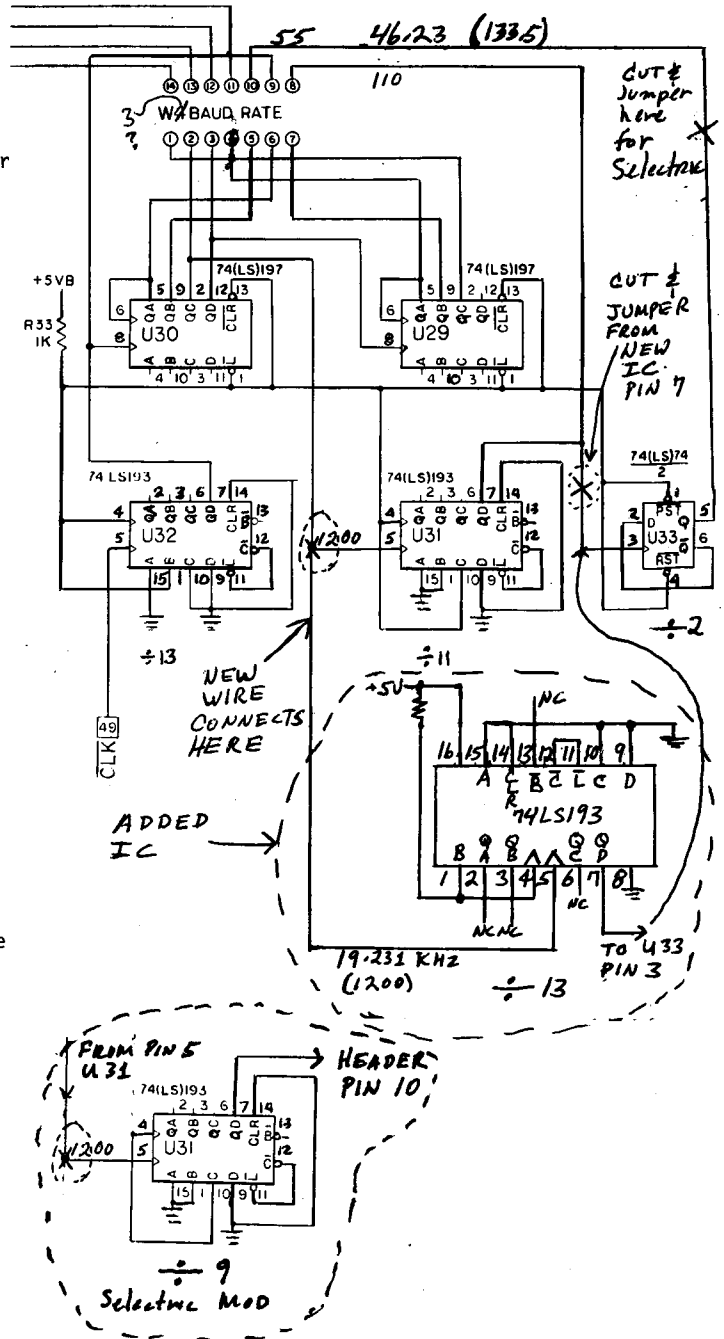
—Lannie Walker
and Bill Fuller

Figure 1. Modification of Baud Rates.

SEMI-SILLY

Rondure currently has several shelves of taperecorders that they are selling for $2 each. These things have been modified with a funny little interface cable coming out the side, a very strong flat magnet on the bottom and an endless loop tape on a post in the middle. For another $2 on the next aisle over is the chassis that goes on the other end of the cable, which might be power supply or controller, with a nicad battery pack, several capacitors and some terminal strips worth the $2.

I bought two of each, mostly because I have some experiments related to using some recorder motors and heads. Don't see how to beat the price.   mike firth.

HEAT SINKS

If you are building your own power supplies and your regulators run anywhere near the limits, you will have to provide heat sinks. Buying new heat sinks can run you 75¢ to $1.50 depending on the size and shape. I have gotten several TO-3 style heat sinks for 12.5 to 25¢ by buying broken circuit boards at Rondure. I assume they are available other places. Rondure boards are 25 and 50¢ on a junk table in the back and usually are discrete circuit boards with the heatsinks used with power transistors. You may even get a few useful resistors and capacitors in the price.   (Mike Firth)

This is the first of a series of articles by the author for the Dallas-Ft.Worth 6800 Users Group on benchmarking various programs on microprocessors. At the present time we're not interested in comparing instructions at the machine level (I'm not promising anything for later either) but how various BASIC's were implemented and how well programs perform on timing considerations. Timings were performed on systems available to the author or friends of the author.

The first published article to consider timing of various BASIC interpreters and compilers was in "KILOBAUD", June 1977, Issue 6, written by T.Rugg and P.Feldman. A follow up article appeared in the October 1977 "KILOBAUD" and the reader is asked to refer to them for details.

Some of the benchmarks used were really too short to be accurately timed and have been increased to get better timing accuracy. Also, several runs were made to check the times recorded. All times are "as is", i.e. no adjustments were made for differences in clock speeds, wait states, etc. The 6800 benchmarks were made on my system with a 1.8432 MHZ crystal so that the ACIA would be correctly clocked at higher baud rates. this means that the 6800 was running with a clock frequency of 0.9216 MHZ (1.8432 divided by two) whereas the earlier systems are running at about 900 KHZ to allow MIKBUG a chance to get close to generating the right baud rate on input/output operations. The timings for the 8080, CSS and SWTPc V2.0 were done with a clock speed of 2.0 MHZ.

I used a Heathkit Model GB-1201 Delux Digital Stopwatch for my timings and some of the MITS runs. No error adjustments have been made for human response time, thus an error of 0.2 or 0.3 seconds may occur. For this reason, I have used relatively long programs to reduce the overall error.

Historically, the MITS 3.2 and 4.0 Extended BASIC Programs were written by Microsoft of Alburqueque, N. M. They also wrote the Commodore BASIC under a royalty agreement with MOS Technology and Commodore. The 6800 BASIC was written by Dr. Stan Swanson, Bryan Fisher, Frank Dunn, and myself. It occupies almost 8000 bytes of memory, whereas MITS 3.2 and 4.0 take approximately 12K and 16K respectively. The CSS-BASIC was written by Computerware Software Services, Encinitas, Calif. The CSS-BASIC is available in 8K PROM version or other 10K versions which support Sequential and Random Disk Files for the Smoke Signal Broadcasting System. I don't know about the Commodore, but I think it takes 8K of ROM. The 6800 BASIC can also be placed in ROM, but the MITS (or Microsoft) BASICs cannot be run in ROM, since they modify object code internally.

Enough of that, on to the programs.

The first is to look at a simple loop for the overhead involved in just counting.

```
400 K=0
500 K=K+1
600 IF K<10000 THEN 500
700 PRINT "END OF JOB"
800 END
```

Times were started as the RETURN key was depressed on the terminal after typing RUN, and timing stopped when the first letter of "END OF JOB" occured on the display. The times looked like ....

8080 MITS V3.2	103.8 SECONDS
8080 MITS V4.0	74.2 SECONDS
COMMODORE	106.3 SECONDS
SWTPC V2.0	116.4 SECONDS
6800 BASIC	56.1 SECONDS
6800 MITS V3.2	95.0 SECONDS
CSS FILE BASIC	74.0 SECONDS
HP-9830	150.6 SECONDS

NOW WATCH IT .... DON'T MAKE ANY ASSUMPTIONS YET.

First, both MITS and Commodore allow the data to be INTEGER. "6800 BASIC" does all arithmetic in floating point (that's why it doesn't require as much room, plus some other reasons to be discussed in later articles). The overhead to do the compare and branch must be great in the others.

Next program

```
100 FOR K=1 TO 10000
110 NEXT K
120 PRINT "END OF JOB"
130 STOP
140 END
```

Times were ..... **27.**

8080 MITS V4.0	20.2 SECONDS
COMMODORE	14.4 SECONDS
SWTPC V2.0	70.4 SECONDS
6800 BASIC	18.0 SECONDS
6800 mits v3.2	14.0 seconds
css file basic	38.0 seconds
hp-9830	47.1 seconds

(Continued next month)

—Dr. Chuck Adams

————————————————————————

It's Obvious

It is obvious that if you use a socket for a TO-3 regulator and fail to bolt the regulator into the socket no regulation will be done, because the bolt makes the ground connection from the TO-3 to the terminal on the back of the socket.

It is also obvious that a negative regulator, just because it looks like the positive one, doesn't have input, output and ground in the same order. If you think they are, then welcome to the fried regulator club.

****

Its obvious when checking out a new board that you may wonder if there might be a short under a socket soldered to the board. I destroyed a number of sockets before I learned, thanks to Henry Lynn, that many types of IC sockits can be removed for inspection underneath without destroying the socket itself. I cna inspect the circuit board underneath most of the sockets on my boards by taking a small screwdriver or knife and gently prying all around the perimeter of the socket until it pops off, leaving the pins exposed and unbent.

If you are not sure whether or not a socket can be removed in this manner, take an identical socket and solder it to an old PC board, then try to remove the plastic part as described above. If it works then you are all set. The socket can be reinstalled over the pins by putting it in place over the pins, and then gently pressing down on it with your fingers.

Be sure, however, that the socket is placed exactly over the pins to avoid some ot the pins being bent when you press down on the socket. (Lannie Walker)

Those of you who enjoy writing computer games have probably used the INKEY$ function to liven up a game. Having a game stop to accept a player's input detracts from the realism.

I have a technique I'd like to share with you that is an improvement over INKEY$ for certain uses. For illustration, I'll write a program to control the speed of a car. We'll use the 'A' key to accelerate and the 'S' key to slow the car.

```
5 CLS
10 A$=INKEY$
20 IF A$="" THEN 10
30 IF A$="A" THEN V=V+1
40 IF A$="S" THEN V=V-1
50 PRINT @ 576,V;"M.P.H.  "
60 GOTO 10
```

Enter the program and RUN it. Use the 'A' key to accelerate to 55. What? You say your finger is getting tired of pressing & releasing the key? Make the following changes to the program.

```
10 B= PEEK(14337)
20 C= PEEK(14340)
30 IF B AND 2 THEN V=V+1
40 IF C AND 8 THEN V=V-1
```

RUN the program and hold the 'A' key down. Hey! Let go before you get a ticket!

KEYBOARD MEMORY MAP

MEMORY ADDRESS	BIT 0	BIT 1	BIT 2	BIT 3	BIT 4	BIT 5	BIT 6	BIT 7
14337	@	A	B	C	D	E	F	G
14338	H	I	J	K	L	M	N	O
14340	P	Q	R	S	T	U	V	W
14344	X	Y	Z					
14352	0	1	2	3	4	5	6	7
14368	8	9	:	;	,	-	.	/
14400	ENT	CLR	BRK	↑	↓	←	→	SPA
14464	SHIFT							

Refer to the above diagram. When 14337 was PEEKed at, if 'A' was pressed then BIT 1 was set and B became 2↑2=4. If 'S' was pressed when 14340 was PEEKed at, then BIT 3 was set and C became 2↑3 =4. For an explanation of lines 30 and 40 refer to page 8/10 in the Level II manual.

Suggested uses: add steering to the car, simulate an airplane, move a "pencil" to draw pictures on the screen, aim a gun, ...

Michael Andreas

Extra! Read All About It!

The News Texan Inc, a publishing company which prints newspapers for many of the suburban newspapers in the Dallas area is using the TRS-80 for text editing and photo-typesetting. A reporter types his story into a TRS-80 with an expansion interface and one disk drive attached. A lower case modification has been made to the computer. With special software written by Dan Thornsberry, codes for running the company's phototypesetter can be generated on the TRS-80.

A disk with the commands and text is carried to the production room where another TRS-80 is interfaced to an IBM 1130 computer which drives the phototypesetter. Camera ready copy is produced.

Plans for additional computers to be placed in the newsrooms of each of the suburban papers are under way. Stories can be sent from the local newsroom on the delivery truck or phoned into the printing plant and recorded on another TRS-80 by using the RS232 adapter and a modem.

A program swap meeting is held at the News Texan on the third Thursday of the month. For information on the evening meeting,contact Dan Thornsberry at 661-8100.

DEADLINE

Anything to be published in the February issue must be received by SATURDAY, FEBRUARY 3

(the day of the Richardson meeting)
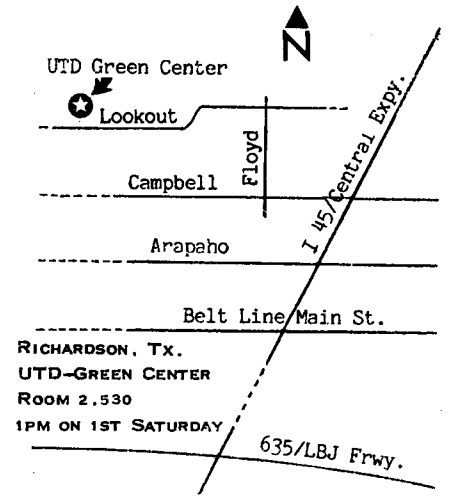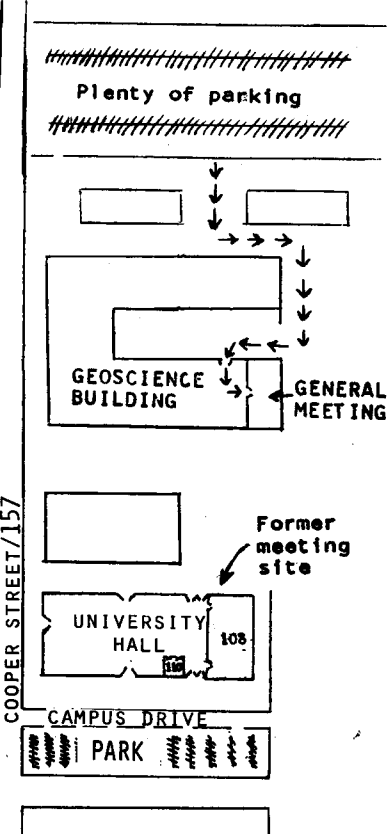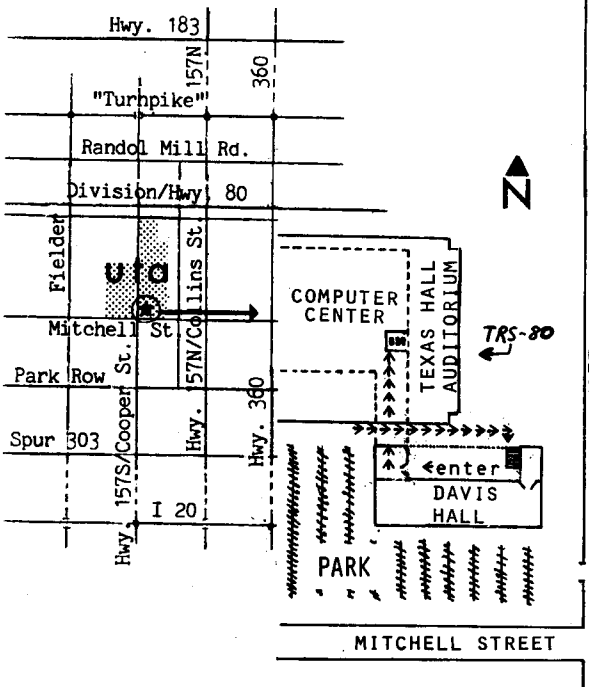
Map 1 (Arlington / UTA area)

Hwy. 183
157N
360
"Turnpike"
Randol Mill Rd.
Division/Hwy. 80
Fielder
UTA
Mitchell St.
157N/Collins St.
Park Row
Spur 303
157S/Cooper St.
Hwy. 360
I 20
N
COMPUTER CENTER
TEXAS HALL AUDITORIUM
TRS-80
enter
DAVIS HALL
PARK
MITCHELL STREET
COOPER STREET/157

Map 2 (Campus)

Plenty of parking
N
GEOSCIENCE BUILDING
GENERAL MEETING
Former meeting site
UNIVERSITY HALL 108
CAMPUS DRIVE
PARK

Map 3 (Richardson / UTD)

N
UTD Green Center
Lookout
Campbell
Floyd
Arapaho
I 45/Central Expy.
Belt Line/Main St.
635/LBJ Frwy.

RICHARDSON, TX.
UTD-GREEN CENTER
ROOM 2.530
1PM ON 1ST SATURDAY

FIRST CLASS
a
publication

Neil

Ran out of Dec. Issue.
Will send copy of S-100 Bull
of the Dec Issue.

TIME DATED MATERIAL
MAILED ON