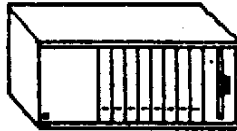


THE BREAD BOARD



Non Profit Organization
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OFFICIAL NEWLETTER OF THE
TIDEWATER 99/4 USER GROUP INC.
Post Office Box 1935
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TI-99/4A

JULY 1986
VOL 5 No.7

*A Non-Profit Virginia Corporation
dedicated to educating and
enlightening TI-99/4 users
to the full potential
of home computing.*

DALLAS TI HOME COMPUTER
1221 MOSSWOOD
IRVING, TX 75061

Return Requested

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NEWSLETTER EDITOR Ken McLaurin 497-7188

IN THIS ISSUE

MEETING NOTICE: *The Southside Chapter meets every first and third Tuesday of each month at E.C.P.I. (Electronic Computer Programming Institute) located at 3661 East Virginia Beach Blvd. at Ingleside Ave. Educational classes start at 6:30 pm in room 206 followed by the regular meeting and discussion groups at 7:30 pm. For July, circle the 1st and 15th on your calendars for meeting nights.*

The Peninsula Chapter meets every second Tuesday of each month at Warwick High School, 51 Copeland Lane, Room 220-22. Formal meetings begin at 7:30 pm, with informal discussion before and after the meeting. Library is open to members during informal sessions. For July, the regular scheduled meeting is July 8th.

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A WORD ABOUT YOUR ADDRESS LABEL

If there is an asterick before your name, your membership dues are due. If there are two astericks, you are seriously in arrears. Three astericks, and your mailing label went in the trash instead of on your newsletter. Please keep your membership current.

PUBLICATION NOTICE:

THE BREAD BOARD is published monthly by the officers of THE TIDEWATER 99/4 USERS GROUP for distribution free to its members only. There are no subscription fees and not available for sale. Entered as third class postage at Grafton, Va. under permit No 61. Reviews of products are the opinion of the contributing individual and may not reflect the views of the group, or its officers. A favorable review is not an endorsement, nor does the group, its officers and/or editors assume any liability for omissions or unfavorable reviews. Contrasting opinions are solicited and will be published if acceptable. Any rebuttal or contrasting view received and deemed unacceptable or not published due to space requirements, etc., will be acknowledged in the newsletter with information on how to obtain a copy (usually a return addressed envelope with proper postage.) Contributions in the form of reviews, articles, short original or public domain programs and/or classified items should be submitted to any club officer at any regular meeting (or within one week thereafter) for publication in the next newsletter.

PROGRAM NOTICE

Our program for the July 8th meeting will be a demonstration of Miller Graphics' Gram Kracker by Ken Woodcock. Our May Newsletter had an article about the Gram Kracker on page 5 and a video tape was shown about it at the May meeting. Now we are actually going to see what TI users all over the country are raving about. It saves the contents of any module to disk, cassette, ram disk or hard disk, stores approximately 15 modules on one double sided double density disk, allows programming in the TI proprietary Graphics Programming Language, and as they say, much, much more.

PRESIDENTS NOTES: This month we have a new situation. As you know from last month's newsletter and meeting, Don Andrews has resigned from handling the newsletter and as Vice President of the Peninsula Chapter. Although, he had good reasons for doing this - the hassle of composing the newsletter without material that should have been supplied on time by officers (myself included), the travel to the peninsula from Gloucester to the printer, the York Library, where we fold and label the newsletters, and the post office for mailing them, my inattention to our PO box, and Don's health problems - we will certainly miss him in these capacities. Don, I want to express on behalf of the Peninsula Chapter our thanks and appreciation for these and a great many other services you have rendered the Chapter. Our bylaws empower the chapter president to appoint a successor for any officer who resigns. Consequently, I have appointed Vic Vogelsang and he has agreed to serve the remainder of this year as vice president. Congratulations Vic! The job of composing the newsletter has been shifted back to the Southside Chapter and my conversations with Ken Woodcock assure me that this problem is being handled well. More on this later. Our treasurer, Brad Long, is back in the hospital. This time he is in the Capitol Hill Hospital in Washington, DC room 3110. We all wish you will soon be well, Brad.

For the Program this month (July 8) Ken Woodcock will bring his Gram Kracker and show what can be done with it.

I have been looking over our roster. We have 21 paid-up members and 40 who are behind on their dues. If all the 40 would pay their dues our chapter would be able to operate without any trouble for the rest of the year. This is crucial to our continued existence. In case some one missed it, I am going to say it again in capital letters: **IF YOU HAVENT PAID YOUR DUES SINCE JULY 1985, THEY ARE NOW DUE, PAYABLE AND NEEDED.** PLEASE MAIL THEM TO PO BOX 1935, NEWPORT NEWS, VA 23601 OR BRING THEM TO THE JULY 8TH MEETING. IF YOU DO NOT PAY YOUR DUES, WE WILL HAVE TO STOP MAILING YOU THIS NEWSLETTER. CHECKS MAY BE MADE OUT TO PENINSULA 99ERS USER GROUP OR TO PENINSULA CHAPTER, TIDENATER 99/4 USER GROUP, INC. MY MOST SINCERE THANKS, IF

YOU DO THIS IMMEDIATELY.

Jim Trant

VICE PRESIDENT'S NOTES: I want to thank Jim and the members for the chance as Vice President. We have a lot of challenges ahead of us. We will be asking more of the members. We need support to continue our operations. You do not have to be a computer expert to provide leadership or just plain support. Make this group your group. Please contact me about what your needs are. I have just received a letter from TI They still maintain a list of user's groups and asked for an update.

Vic Vogelsang.

SECRETARY'S REPORT: The June meeting was held on the tenth. The President, Jim Trant, opened the meeting at 7:30 p.m. with one visitor, Don Braddy, and seven members present.

The Vice-president, Don Andrews, then made several announcements. He had a large layout of information pertaining to home banking with your TI and a modem. He had several catalogs for ordering software and information. The information Don had was a continuation and supplementation of an article by Don in the June newsletter. Don's final announcement was that he had to resign as Vice-president because of personal reasons.

Trant then took the floor to say that he and Don had discussed his resignation at length, but it was just too much for Don to handle from his Gloucester County residence. Don will continue to help where and when he can. Trant then announced that he had contacted Vic Vogelsang and he had agreed to fill the position of Vice-President.

Much discussion centered around the get-together we had Saturday May 24. It was agreed that it was a big success and everyone enjoyed it. The next get-together should be held in Norfolk.

The meeting was then turned over to the program, which was conducted by Barry Ensley. He discussed Assembly Language and how to use it when you are not an Assembly Language writer. He started off by demonstrating the time savings of running a program in Assembly Language compared to running it in Basic. Debugging Assembly Language can be at times trying but Barry gave some helpful suggestions.

The meeting was adjourned at approximately 8:40 p.m.
Earl H. Andrews

TREASURER'S REPORT:

Reported Last Month . . .	\$123.61
Income (Dues)	30.00
Expenditures	71.00

Cash on Hand	\$82.61

for Brad Long
by Jim Trant



2 Locations To Serve You

Oyster Point Development
11824 Fishing Point Drive
Newport News, VA 23606
804-873-6705

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Grafton, VA 23082
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* SOUTHSIDE CHAPTER NEWS *

July Agenda

Southside Educational Sessions

July 1st:

FORTH will be the topic with particular emphasis on the use of variables, constants and other DATA structures.

July 15th:

Extended BASIC classes continue highlighted by a lecture on the use of sound by Mac MacAllister.

See you there!

Billy Denny

Vice President for Operations

REPORT FROM THE SEC/TREAS

The second meeting of the month was held on June 17, 1986. The training portion was presented by the VP for Operations, Billy Denny. The lecture and demonstration explored the use of the SPEECH SYNTHESIZER using the resident vocabulary of the Extended Basic Module. The use of CALL SAY and CALL SPGET was explained and, as always, the presentation was both informative and entertaining. The use of Extended Basic will be further explored in forthcoming meetings.

Following a short break, Ken Woodcock, in the absence of the President Mark, continued with the regular meeting. A booth has been reserved for our use at the upcoming AMATEUR RADIO AND COMPUTER SHOW. We have been informed, however, that there will be NO REDUCED TICKET PRICES. Since the date is not until August, additional information will be given later.

A discussion about future issues of our Newsletter revolved around both the financial and content areas. Various members will be contributing articles and reports from now on and the WANT ADS/FOR SALE section will be revived. Some previous issues carried ads by members listing hardware and/or software for sale. Also items wanted were listed. So if you have anything for this column, give us a list at the meeting, or send to me at the address below.

Ken then demonstrated one of the newer FREEMWARE programs, FUNLWRITER V3.1, a very excellent program out of Funnelweb Farms in Australia. It's uses and features are so comprehensive that a complete explanation will require a separate article. Perhaps Ken will prepare such an article for a future issue. Ken's previous review/demonstration at an earlier meeting covered DISK MANAGER 99. Those of you unable to attend our meetings are missing out on some super info.

Our treasurers report will be very brief. Mark Gerlach has just completed the setup of a new SouthSide checking account, leaving the old account as the

Corporate Account. Since this has involved some transfer of monies, a complete accounting will be given later. Meanwhile, CHECK YOUR MAILING LABEL. If an asterisk appears before your name, PLEASE PAY YOUR DUES. We recognize an oversight - my address was not listed. This is now being corrected, so please send your Southside Dues to: RICHARD HANSON Sec/treas, 2473 TULLIBEE DR, NORFOLK, VA 23518. That's all for now. See you at the meetings!! Dick Hanson, Sec/treas

THE LIBRARIANS

Mac and Cathy MacAllister

The library is a FREE library based on the principles laid down by Andrew Carnegie. It is available for use by all members of the TIDEWATER 99/4 USERS GROUP. TAKE ADVANTAGE OF THIS BENEFIT.

At the present time there are approximately 1400 programs available to you. These programs are cataloged in sections titled: EDUCATION, GAMES, GRAPHICS, MATH, MUSIC, PROGRAMING AIDS, and UTILITIES. There is no copywrite material retained in the library. Freeware programs are included.

We are continually adding to the inventory. Since this is your library you should be contributing programs to it. If you have modified a program in some manner such as by adding directions or improving its operation give it to the library too.

We are presently comparing the contents of our catalog to the Peninsula Groups catalog with the intention of adding all the programs we do not have to our library. This will take a little time. Be patient.

Cathy and I take the Library catalog to each meeting for the members to review. To obtain copies of programs or disks just list them on a piece of paper and give it, along with sufficient quantity of blank disks to record what you want, to us at the meeting. We can copy programs to SS/SD, SS/DD, DS/SD, or DS/DD. Due to personal time constraints we do not conduct library business by mail. We have also found it unproductive to try to copy programs on meeting nights.

It is my intent to include in the newsletter, a list of the programs added to the library since the last newsletter edition. I will also try to include a synopsis of some library programs.

If you have any suggestion on how to improve the library feel free to give them. Any complaints will be taken as a volunteering to be the Librarian.

D. E. MACALLISTER

NOTICE

A BOARD of DIRECTORS meeting will be held

on July 8 at 6pm at Warwick High School Room 206. This is the normal meeting site for the Peninsula Chapter. Everyone is invited.

TI RS232 Configuration

One of the major advantages of the Home Computer over other PC's is the number of standard ports available, particularly the capacity for four standard serial ports which is unheard of with most computers. Many users are not taking full advantage of this capability due to the stigma of having to send a functional RS232 Card to TI for "PERMANENT MODIFICATION".

The required modification is not really permanent except in the fact that it does require that a component of the card be unsoldered and relocated as TI did not provide a strapping block to facilitate the change as CorComp did on their clone.

The TI-RS232 card may be field modified for Pri/Sec operation by moving resistor R5 at the base of U15 between the upper normal position indicated by the component outline for primary operation and the lower un-outlined position at PTH1 for secondary use.

This procedure can be infinitely reversed although a strapping arrangement would provide better protection for the circuit components if frequent changes were anticipated.

John MacLeod

I was just reading an article in the JUNE ROM newsletter (Users Group of Orange County) by Adrian Robinson in which he discussed a DISK SWEEPER program written in CONSOLE BASIC. The program, authored by Steve Patterson, appeared in MICROPENDIUM and while it does work, Adrian modified it so that only one pass is required (instead of 5 or more). The modified version appears below. It will delete all unprotected files from a disk in drive #1 but is very slow compared to the SWEEP DISK option of DM-1000.

```
100 !<DISK SWEEPER>
110 CALL CLEAR
120 PRINT " SWEEP DISK
(Y/N)?" : : : :
130 CALL KEY(3,K,B)
140 IF K=7B THEN 260
150 IF K<>B9 THEN 130
160 OPEN #1:"DSK1.",RELATIVE
INTERNAL INPUT
170 R=1
180 INPUT #1,REC R:A$,T
190 IF A$="" THEN 250
200 IF T<0 THEN 230
210 DELETE "DSK1."&A$
220 GOTO 180
230 R=R+1
240 GOTO 180
250 CLOSE #1
```

ERROR TRAPPING

We have talked here before about making your programs 'user proof'. No matter what the user does, your program should have a defense. A while back I covered one area of vulnerability - when the user inputs something from the keyboard. This month the subject is error trapping.

Say, for example, that the program must access a disk file to run. Fred Klutz, your program's user, puts the wrong disk in the drive (or doesn't put any disk in). What happens? Well, your program opens a disk file and the Disk Controller goes to the specified drive to look for the file. When it doesn't find it, program execution stops, an error message appears on the screen and any data held in memory is virtually lost.

There is a way around this. Two XB commands can let you decide what happens when an error occurs: ON ERROR nnn and CALL ERR().

The default condition for ON ERROR is ON ERROR STOP. This means that if an error occurs, program execution stops and an error message is displayed. The alternative is ON ERROR nnn, where 'nnn' is a line number. With this, when an error occurs, program execution transfers to the specified line number.

I do not fully understand error trapping. I can use it but I don't understand it. Once you get the hang of error trapping, try intentionally causing an error with TRACE active. You will see that the computer does not exactly go to the error instructions even though it follows them.

Here is an example of how ON ERROR works:

```
200 INPUT "File Name: ";A$
210 ON ERROR 500 :: OPEN #1:
"DSK1.";A$
```

....Program Continues....

```
500 ! Error Instructions
510 PRINT "Could not find DS
K1.";A$
520 ON ERROR 540 :: CLOSE #1
530 ON ERROR STOP :: RETURN
200
540 RETURN 530
```

Fearless Fred inputs a bogus file name in line 200. We set the error trap in line 210. Our 4A tries to open a file in line 210 but can't find it. Control transfers to line 500.

First we tell Fearless Fred that the file name was bad. Then we try and close the file. The code may seem odd, but it

works. Sometimes, if you don't close the file an error will occur when you re-OPEN it but closing the file will also cause an error. So we put in an ON ERROR before closing the file just in case.

You have three options with RETURN in an ON ERROR routine. RETURN by itself will send you back to the instruction that caused the error. RETURN NEXT will return you to the very next instruction. And RETURN nnn will return you to line number nnn. These RETURN's do not work with GOSUB.

ON ERROR executes like a GOSUB. You could end the error language with a GOTO but you would create a pending RETURN that eats memory just as it does if GOSUB is not followed by RETURN. It could cause a problem if you use GOSUB later in the program!

Why the ON ERROR STOP in line 530, you ask. Well, once an ON ERROR nnn is triggered by an error, error control reverts back to ON ERROR STOP. However, I never know if the CLOSE #1 will cause an error condition and I don't want the ON ERROR 540 to be active after the file is closed, so I override it just to be safe.

Back to program flow. We had an error when opening the file, we told the user, we closed the file and we returned back to asking for a file name. The process starts over. If Fearless Fred inputs a good file name, our program can continue. Anticipating a problem, we reset the error trap in line 210.

There is another tool you can use after ON ERROR has transferred control to error trapping language. It is CALL ERR(A,B,C,D). Look it up in your XB manual. It can tell you the error type, the line number in which the error occurred and the file number associated with the error if it is an I/O error. This information can be quite valuable in deciding what to do with an error.

A couple words of caution. First, do not add error trapping language to your program until you have completely debugged it. Otherwise, other errors in the program will be very difficult to locate.

Second, your TI executes ON ERROR STOP until you give it other instructions. In our sample program above, an error before line 210 would not trigger the error trapping language in line 500. Also, the ON ERROR 500 remains in effect until an error occurs or you execute another ON ERROR statement. This means that if an error occurs anywhere after line 210, the error message, "Could not find . . ." will appear even if it is not appropriate.

If you have more questions, just as when all else fails, read the manual -- it does give good information about XB.

FROM MIKE DODD OF THE K-TOWN 99'ERS
 A ROUTINE TO ADD A PAUSE KEY TO "NIGHT MISSION"

```

10 CALL MAGNIFY(3):: CALL SCREEN(2):: GOTO 30 :: CALL
   SE ::
CALL KEY :: CALL JOYST :: CALL SOUND :: CALL PEEK ::
CALL HCHAR
  :: CALL VCHAR
  20 X,Y,V1,YY,V,T :: CALL LOAD :: CALL POSITION ::
CALL PATTERN
  :: CALL SPRITE :: CALL BELSPRITE :: CALL COINC ::
CALL MOTION ::
CALL LOCATE
32 CALL PEEK(8198,T):: IF T<>170 THEN CALL INIT
37 CALL LOAD(-31806,16)
375 CALL PAUSE
465 CALL PAUSE
625 CALL PAUSE
985 CALL PAUSE
1075 CALL PAUSE
1175 :0P+
1180 SUB PAUSE :: CALL KEY(3,K,S):: IF K<>00 THEN
SUBEXIT ELSE
  CALL LOAD(-31806,120)
  1190 CALL KEY(3,K,S):: IF K<>32 THEN CALL
  KEY(1,K,S):: IF K<>18
  THEN 1190
  1193 CALL KEY(3,K,S):: IF S THEN 1193
  1197 CALL KEY(1,K,S):: IF S THEN 1197
  1200 CALL LOAD(-31806,16):: SUBEND

```

```

100 REM *****
110 REM PROGRAM TO LEARN
120 REM ERROR VALUES
130 REM By Chick De Marti
140 REM *****
150 CALL CLEAR
160 ON ERROR 380
170 REM *****
180 REM ERRORS BEGIN ON 200
190 REM *****
200 REM CALL SCREEN(18)
210 REM CALL HCHAR(2,2,200,10)
220 REM CALL HCHAR(28,2,42,10)
230 REM GOSUB 1500
240 REM NEXT Y
250 REM RETURN
260 REM PRINT #5:"NO GOOD"
270 REM CLOSE #5
280 REM X=VAL("D")
290 REM I FORGOT PRINT
300 FOR I=1 TO 4
310 READ A
320 NEXT I
330 DATA 110,120,130
340 DATA THIS IS A TEST
350 REM *****
360 REM ERROR MSG, ROUTINE
370 REM *****
380 CALL ERR(CODE,TYPE,S,LINE)
390 PRINT "CODE ERROR";CODE;"IN LINE";LINE
400 PRINT
410 RETURN 420

```

NOTE:
 To run this program, either choose the line with the error you wish to examine and remove the REM... or try leaving off the REMs on lines 200 to 230 and lines 260 to 290. Also make these changes:
 410 CALL KEY(0,K,S)
 420 IF S=0 THEN 410
 430 RETURN NEXT

```

180 ! Extended Basic Memory
110 ! Dump to Printer
120 !
130 ! Use decimal values
140 ! ranging 0 to 65535
150 !
160 ! Program dumps HEX and
170 ! ASCII to printer.
180 !
190 ! LOW MEMORY RAM
200 ! 8192 to 16383
210 !
220 ! J.Floyd Mid-America 99
230 ! Users Group
240 !
250 ! P.O. Box 2585
260 ! Shawnee Mission, KS
270 ! 66201
280 !
290 !>THIS PROGRAM IS PUBLIC
300 !>DOMAIN. NOT FREEMWARE,
310 !>NOT FAIRWARE!! Please
320 !>distribute freely. The
330 !>author only asks that
340 !>his name remain in one
350 !>Remark statement.....
360 !
370 CALL CLEAR :: DIM B(16),
  B$(16)
380 INPUT "DECIMAL START ADD
  R:";START :: IF START<0 OR S
  TART>65528 THEN 380

```

```

390 INPUT "DECIMAL STOP ADDR
  ":FINISH :: IF FINISH<START
  OR FINISH>65536 THEN 390
400 OPEN #2:"PI0",VARIABLE 9
  6
410 IF START>32767 THEN STAR
  T=START-65536
420 IF FINISH>32767 THEN FIN
  ISH=FINISH-65536
430 FOR A=START TO FINISH ST
  EP 16
440 CALL PEEK(A,B(0),B(1),B(
  2),B(3),B(4),B(5),B(6),B(7),
  B(8),B(9),B(10),B(11),B(12),
  B(13),B(14),B(15))
450 IF A<0 THEN D=A+65536 EL
  SE D=A
460 C=D :: GOSUB 570 :: PRIN
  T #2:ADDR#;
470 FOR X=0 TO 15
480 C=B(X) :: GOSUB 530 :: PR
  INT #2:B$(X);
490 NEXT X :: PRINT #2:" ";
500 FOR X=0 TO 15
510 IF B(X)<32 OR B(X)>126 T
  HEN B(X)=42
520 PRINT #2:CHR$(B(X));
530 NEXT X :: PRINT #2 :: NE
  XT A
540 CLOSE #2 :: STOP
550 IF C<256 THEN H22=C :: F
  =F+1 :: GOTO 590

```

```

560 IF C<256 THEN H22=C :: F
  =F+1 :: GOTO 590
570 H1=C/4096 :: H11=(H1-INT
  (C/4096))*4096 :: IF INT(H1)
  >9 THEN H5=INT(H1) :: GOSUB 6
  50 :: H1%=H5% ELSE H1%=STR$(
  INT(H1))
580 H2=INT(H11)/256 :: H22=(
  H2-INT(H11/256))*256 :: IF I
  NT(H2)>9 THEN H5=INT(H2) ::
  GOSUB 650 :: H2%=H5% ELSE H2
  %=STR$(INT(H2))
590 H3=INT(H22)/16 :: H33=(H
  3-INT(H22/16))*16 :: IF INT(
  H3)>9 THEN H5=INT(H3) :: GOSU
  B 650 :: H3%=H5% ELSE H3%=ST
  R$(INT(H3))
600 H4=INT(H33) :: IF INT(H4)
  >9 THEN H5=INT(H4) :: GOSUB 6
  50 :: H4%=H5% ELSE H4%=STR$(
  INT(H4))
610 IF F=1 THEN B$(X)=" "&H
  3%&H4% :: GOTO 640
620 IF F=2 THEN F=0 :: B$(X)
  =H3%&H4% :: GOTO 640
630 ADDR#=" "&H1%&H2%&H3%&H4
  %:" "
640 RETURN
650 H5%=SEG$( "ABCDEF",H5-9,1
  ) :: RETURN

```

32K Internal Memory Expansion

New member Dan Risinger was recently in the awkward position of being configured with a console, P-Box, 32k card and an after market drive and controller which did not provide for daisy chaining and was thus prohibited from utilizing his drive and memory at the same time. His most effective options to remedy this situation were to attempt to adapt his aftermarket controller to the expansion system bus or accept an offer from Computer Clinic to trade his P-Box and 32K Card plus \$25.00 for a stand alone 32K memory.

With the technical support of Ken Woodcock I was able to cure Dan's problem at "no cost" by fabricating a 32K internal memory expansion for his console which allows him to use full memory programs and his aftermarket drive simultaneously and with less power consumption than the conventional system would require.

The internal expansion was modeled after Ken's working prototype and the schematics provided by Bernie Elsner Phil West of "AB-USERS OF PERTH, WESTERN AUSTRALIA". Being unable to locate a strip board long enough to accommodate four 14 pin DIP sockets I began to assemble the unit on a Radio Shack 67-181 landed board with all four sockets in parallel. Although this configuration was extremely compact, any failure during assembly would have required disassembly to the point of failure and may have become a nightmare beyond two failures for which reason I abandoned this board and resorted to a custom drilled PB Electronics ZB-2S Blob Board.

At seventy one parallel lands the ZB-2S was more than adequate to accommodate the four sockets in series and was well worth the extra time required to drill the lands which was done with precision tip cleaning bits to a much finer tolerance than the landed board could provide. Belden solid colored hook-up wire was used to fabricate the bus and all connectors thus reducing the possibility of crosstalk errors and virtually eliminating any possibility of mismatching. All bus connectors were uniformly cut at two and one half inches.

The completed board was mounted to the upper motherboard radiation shield with four 5/8" X 8-32 bolts. Spacing was provided by two 8-32 Hex nuts on each lug in order to assure adequate clearance from the shield. This method was used instead of adhesive pads in order to facilitate servicing if it should be required in the future.

All possible required connections were taken from the cartridge port in order to reduce the possibility of damage to the motherboard components. Final assembly at this point was done with the port connector clamped in place to the shield with two Pony clamps and resulted in an extremely stable unit due to the rigidity of the solid wire.

The four chip selects and DBIN which had to be taken directly from the system board were tedious but manageable. Pin one of the port connector was removed and load and reset circuits were added before the unit was reassembled to further enhance Dan's capabilities.

John MacLeod

EDITORS NOTE:

We plan to publish the instructions for this project in the coming issues of the BREAD BOARD. The basic diagrams and instructions consume 6 pages with several more containing supporting information. We may spread it out over several issues or perhaps produce one large insert. If you have an immediate need, please feel free to contact me (Ken Woodcock) or John MacLeod at the user group meeting or by mail at the address on page one of the newsletter. Incidentally, with the withdrawal of Don Andrews from the newsletter preparation scene, and the present heavy personal workload of our newsletter editor Ken McLaurin, I have temporarily assumed the roll of newsletter editor. If my schedule permitted, I would gladly make this permanent but I'm afraid it doesn't. My thanks to John MacLeod, Mac MacAllister, Dick Hanson Billy Denny for their support and to Joe Randall for providing the TIBBS for article transfers. Also, thanks to the Peninsula members, Jim Trant + others.