

ISSUE # 12  
DECEMBER  
1989



FOR THE RECORD

by Ed Bittner  
Recording Secretary

This report of the West Penn 99'ers November meeting deals with the past, present, and future. Firstly, the report is well past the due date, secondly, if John Willforth has the presence of mind (absent most of the time) he will get back at me, and lastly, I will finish this report within the next hour and a half. The election went smoothly and the results are reported elsewhere in this newsletter.

The meeting opened promptly at 7:15 PM. Being both a party night and election night, Bob Sadusky volunteered to order the pizza, ( I'm still not sure of his motives, see below ), while Scott Coleman fended off an attack from a not so unruly but quite persistent person who questioned our purpose ( Good Job Scott ). As the meeting proceeded, Gene Kelly passed a sign up sheet to accompany our letter to the "Computer Stopper". The election went off without a hitch in that all of the offices (except the librarian) had but one person seeking office (sort of "Old Eastern European" style elections). The librarians race, however, was close with Bob Sadusky (Yep, Bob from above) won. Congradulations Bob!

Gary Taylor reoported that the Chicago Show was "just beautiful", with two dozen, or so, vendors, including all the "BIGGIES". Mickey told us that her cassette book is now at the typeset stage, getting ready for printing. John Willforth, editor extraordinar, requested that he desires OUR membership to submit articles to OUR newsletter. Gene Kelly quickly responded that he will have a series on the BBS. Others seemed mildly receptive. Let's see who produces. The raffle offered Copyholder II, Music Pro, and Witches Brew which were demonstrated after the raffle. Rattlesnake Bend and Bolderdash were also entertaining.

A Holiday Wish,

It is the time to be merry,  
and have plenty of cheer,  
for most are in good spirits,  
at this time of the year,

but watch what you are doing,  
as debts will surely accrue,  
because this time next month,  
your club Dues are Due !!



Cheerfully,  
Scoops Bittner

WEST PENN 99'ERS CLUB INFORMATION

TREASURER'S REPORT FOR NOV. 27, '89

NEXT MEETING DATE: DECEMBER 19, 1989  
 MEETING LOCATION: ST. STEPHEN'S  
 BYZANTINE CATHOLIC  
 CHURCH  
 JUST OFF ROUTE 30  
 BETHEL ROAD, NORWIN  
 TIME OF MEETING: 7:00 P.M.

LIST OF WEST PENN OFFICERS FOR 1989

PRESIDENT: MICKEY 335-0163  
 VICE PRESIDENT: SCOTT 523-3754  
 TREASURER: LYNN 835-4304  
 RECORDING SEC: ED 864-4924  
 CORRESPONDING SEC: GENE 829-0469  
 LIBRARIAN: BOB 863-5672  
 NEWSLETTER EDITOR: JOHN 527-6656

GENERAL ITINERARY OF THE CLUB'S MEETING

6:45 P.M. DOORS OPEN  
 7:00 P.M. GENERAL MEETING  
 7:45 P.M. DEMOS AND NEW INFO  
 8:45 P.M. HARDWARE & PRINTERS  
 8:45 P.M. INTRO TO ASSEMBLY  
 8:45 P.M. INTRO TO TI-BASE  
 8:45 P.M. USING YOUR CASSETTE  
 11:00 P.M. DOORS CLOSE

MEETING HIGHLIGHTS FOR THIS MONTH

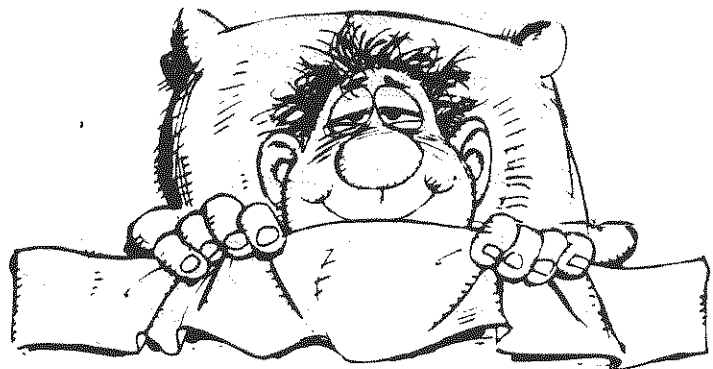
LATEST T.I. NEWS AND SOFTWARE DISCOUNTS  
 "CHRISTMAS PRESENTS" FROM SANTA TO ALL!  
 "PICASSO PUBLISHER" DEMO BY GARY TAYLOR  
 WEST PENN "LIBRARY DEMO" BY BOB SADUSKY  
 LATEST SOFTWARE DEMOS BY JOHN WILLFORTH

RENEW YOUR MEMBERSHIP DUES!

\$15.00 PER YEAR FOR INDIVIDUAL / FAMILY  
 \$10.00 PER YEAR FOR JUST THE NEWSLETTER

FROM LYNN GARDNER

* * * * *			
* 11/21 CASH ON HAND	\$	50.00	*
* LIBRARY SALES		14.00	*
* MICROPENDIUMS		32.50	*
* DISKS & CASES		76.30	*
* RAFFLE		32.00	*
* DUES		30.00	*
* TOTAL	\$	234.80	*
* 11/27 DEPOSIT	-	184.80	*
* 11/27 CASH ON HAND	\$	50.00	*
* * * * *			*
* 10/18 BANK BALANCE	\$	1237.57	*
* 10/19 DISK ORDER	-	352.00	*
* 11/21 POSTAGE (JOHN)	-	65.50	*
* 11/22 MICROPENDIUM	-	37.50	*
* 10/19 INTEREST	+	4.72	*
* 11/17 INTEREST	+	4.45	*
* 11/27 DEPOSIT	+	184.80	*
* BALANCE	\$	976.54	*
* * * * *			*
* TOTAL CASH BALANCE	\$	1026.54	*
* * * * *			*



WHERE WOULD THE WEST PENN 99'ERS BE IF ON A COLD, SNOWY DECEMBER 19TH MICKEY, SCOTT, LYNN, ED, GENE, BOB, AND I STAYED HOME? MAYBE..... SOMEBODY WOULD COME. SEE YOU THERE!

**PUG ANNOUNCES ADVENTURE SIG ON BBS**

The Pittsburgh User Group is proud to announce the inclusion of a new Adventure Sig on its BBS. The Sig will be hosted by Mickey Schmitt, author of The Adventure Reference Guide and co-author of Oliver's Twist. Also offering assistance on adventures will be Lynn Gardner, co-author of Oliver's Twist and author of Zoom Flume.

The BBS will offer both Fairware and Public Domain Adventure Games on the download section of the BBS on a monthly basis, with new adventure games being added on the first day of each month. Both text adventures and graphics-type adventures will be promoted and all adventurers are encouraged to join in on the conversations on the Adventure Message Base.

The PUG Bulletin Board operates at 300/1200/2400 Baud at 8, N, 1, 24 hrs a day, seven days a week. Phone (412) 824-6779.

**INTERNAL PCB SPECIAL FOR JANUARY;**

**INSTALLATION OF YOUR EX-BASIC MODULE IN TO YOUR COMPUTER FOR ONLY \$50.00. THIS INCLUDES EVERYTHING, EVEN RETURN SHIPPING IN THE USA. 3 DAY TURNAROUND WITH PREPAID ORDERS. OTHER CIRCUITS ALSO INSTALLED AT ADDITIONAL COST.**

**OFFER END JANUARY 31 1989. SEND YOUR WORKING EXTENDED BASIC MODULE AND YOUR WORKING COMPUTER TO:**

**ERIC ZENO                      PITTSBURGH, PA  
414 HIGHLAND RD.              15235**

THE RED BOOK BY TONY LEWIS IS AVAILABLE FROM EITHER HE OR L.L. CONNOR ENTERPRISES OF IN. THE BOOK WAS ADVERTISED IN LAST MONTH'S WP99 AS WELL AS THE MICROPENDIUM. INCLUDES A DISK OF UTILITIES, AND COSTS \$21.95 ICLUDES S/H. Write: TONY LEWIS, 409 DROLMOND, RALEIGH, NC 27615. THE MANUAL IS CALLED THE INTERFACE/DESIGN GUIDE FOR THE TI 99/4A PERIPHERALS.

**TIME TO RENEW YOUR WEST PENN 99'ER MEMBERSHIP**

- \* THE DUES ARE \$15.00 ( JAN. 1 TO DEC. 31) FOR A FULL FAMILY MEMBERSHIP.
- \* THE DUES ARE \$10.00 ( JAN. 1 TO DEC. 31) FOR AN ASSOCIATE MEMBERSHIP (NEWSLETTER ONLY)
- \* MEMBERSHIP AFTER JULY 1 OF A YEAR REQUIRES ONE HALF DUES PAID FOR THAT YEAR.
- \* PAY YOUR DUES TO THE TREASURER, LYNN GARDNER, AT THE MEETINGS, OR BY MAILING TO 642 LOIS DRIVE, PITTSBURGH, PA 15236. PLEASE DO NOT MAIL YOUR DUES TO ME! (JOHN WILLFORTH) I HAVE TO PACK THEM UP AND THEN FORWARD THEM TO HER. AREA FOR FAILURE AND ERROR, AS WELL AS ADDITIONAL COST. THANKS.

**GENIE OFFERS PAGE PRO FILE SECTION!.....**

GENIE, A TELECOMMUNICATIONS SERVICE OFFERED BY GENERAL ELECTRIC, HAS RECENTLY BEGUN OFFERING A SPECIAL ARE JUST FOR PAGE PRO 99 USERS. IF YOU ARE A GENIE SUBSCRIBER, YOU CAN GAIN ACCESS TO THIS AREA BY SENDING YOUR NAME AND ID TO C.BOBBITT VIA GENIE MAIL (PAGE 200)

**TI ARTIST PLUS.....**

NORM ROKKE DEMONSTRATED TI ARTIST PLUS AND I WAS IMPRESSED, WITH WHAT ENHANCEMENTS HAVE BEEN ADDED TO THE PACKAGE. THE PROGRAM IS AVAILABLE FROM TEXAMENTS 53 CENTER STREET, PATCHOGUE, NY 11772 OFFICE: (516)475-3480 BBS: (516)475-6463

NEWEST "BOOT" AVAILABLE FROM: MIAMI USERS GROUP % YVETTE MCKENZIE, 6755 TAMAMI CANAL ROAD, MIAMI, FL 33126 AT \$7.95. THIS PROGRAM WILL GIVE YOU WHO DON'T HAVE THE HRD THE SAME ADVANTAGES THAT THE FAMOUS "MENU" PROGRAM GIVES THE HRD OWNERS. YOU CAN VIEW A FILE, CATALOG A DISK, RUN A PROGRAM, ACCESS ANY PROGRAM ON ANY DRIVE, RUN XBASIC PROGRAMS OVER 42SECTORS, AND PRINT ANY FILE OR DISK CATALOG.

**GOAL LINE FOOTBALL BY BAKER SOFTWARE.....**

LINKAGE  
TURBO CHALLENGE 2056 8301 STEVENSON AVENUE  
RECON MISSION #17-EA SACRAMENTO, CA 95828  
BASKETBALL-----EA ALL REQUIRE 32K & Disk  
ANY 3-\$10. 5-\$15. +\$1. S/H

GOAL LINE FOOTBALL, LINKAGE, AND TURBO CHALLENGE REQUIRE EXTENDED BASIC.

120 ORIGINAL PROGRAMS \$1.00 EACH, 18 FULL COLLECTION DISKS \$5. EACH, 3 NUT & BOLTS DISKS REDUCED TO \$10. EACH. SEND \$1.(REFUNDABLE) FOR TIGERCUB CATALOG. 309 DISKS OF PUBLIC DOMAIN AND FAIRWARE, \$1.50 EACH. SEND SASE FOR LIST OR \$1. REFUNDABLE FOR CATALOG TO: TI-PD, 156 COLLINGWOOD AVENUE, WHITEHALL, OH 43213

## HARDWARE TIPS

**The Extended Basic Cartridge:** If you have an Extended Basic Cartridge that has gone bad for some reason, this info may help. I killed my Ex Basic recently. While soldering some new "pieces parts" on my console main board, I crossed some wires. "I'm always in a hurry." When I turned the power on I already had the Ex Basic in the Grom Port. "Mistake!!!" I fed some current directly back into the Cartridge and zapped it. After a severe anxiety attack, and real depression, I thought, "HEY, this is the beginning of another project." Well, the project has been about two months in the making and I'm ready to let you all know the results. Extended Basic Cartridges are fixable and the parts may not cost a lot, depending on how bad you crashed it and if you can solder. One other consideration is this. If you have to replace all the chips in the cartridge it will cost around thirty dollars. You can probably pick up a used cartridge for around twenty. Since I'm out to put some mileage on my new soldering iron these things never bothered me. So, lets go. NOTE: You're doing this at your own risk. If you have any problem arising from this article, I don't want to hear about it.

Try to open the cartridge as neatly as possible. You can glue it back together later, but it would be better if the original snaps worked. When you get the PC board out you'll see eight chips.

There are two piggyback chips at one end of the board you won't see unless you have to unsolder them. The next thing to do is check the PC board and every solder joint to make sure that all the connections are good. If you find a cracked line or a poorly soldered leg on one of the chips, repairing it may solve all your problems. If we haven't accidentally found the problem so far, we'll move on to the heavier stuff. There should be a 74LS00 and a 74LS74 at one end of the board. If you are lucky, replacing these will put you back in business. Just de-solder them, pick up two new ones at your local electronics supply, (they should cost less than fifty cents each), and solder the new chips back in. Then without bothering with the cartridge case, plug the board back into the console and see how lucky you are. In my case this was no help at all. The next step in this project is to replace the two large

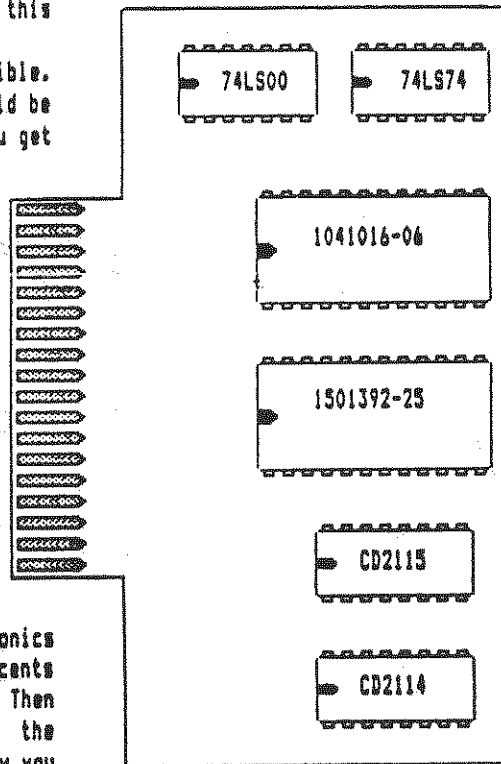
chips on the board. These are ROM chips and appear to be quick to fail in any adverse situation (static charge, etc.). The chip closest to the 74LS74 is listed as ROM,EXT.BASIC part number 1041016-0006, and the one next to it is ROM,EXT.BASIC part number 1501392-0025. Their prices are \$6.80 and \$5.60 respectively. These parts and others can be ordered from TI by calling (806)741-2265 or (806)741-2268. These are not toll free numbers. Replacing these two chips fixed my problem, and after doing a small amount of investigation, plus analyzing my own situation, it is my uneducated guess that replacing these four chips will fix the cartridge in at least 80% of the cases. I put a substantial charge of current back through the cartridge and did not hurt the piggyback GROM chips at the other end

of the board. So, replace the two large ROM chips and see if the cartridge works. I really hope it worked because we are now passing into the area where it would have been cheaper to pick up a good used Ex-Basic for \$20.00. If it still doesn't work, it's time to replace the GROMS. They are available from TI at the same phone number and they sell for \$3.60 each. The they are tied together if one has been damaged they are probably all damaged. Toward the ROM, the top GROM is 2115, this is TI GROM,EXT.BASIC 1015960-3115. The one it is piggybacked over is 2122 (TI GROM,EXT.BASIC 1015960-1122). The top GROM next to it is 2114 (TI GROM,EXT.BASIC 1015960-1114), and the chip it is piggybacking is 2113 (TI GROM,EXT.BASIC 1015960-1113). If you are replacing the GROM chips, I recommend you do them all at once. If you try to add in one new chip at a time to isolate the problem, the soldering and desoldering could damage your new chips and you'll never find the problem. The resistor, and capacitors you see scattered around the printed circuit board will practically never fail, so don't worry about replacing that stuff. Here are some tips for electronic work. Use a low power soldering iron (15 Watt). Hold chips or a PC Board by the edges, like a photograph. Try to not put your fingerprints all

over the circuits or chip legs. Do not wear clothing that has caused you to get a static shock from the refrigerator door in the past. There is a notch or mark at one end of a chip to designate pin one, or the chip direction. Be sure you do not put a chip in backwards. Whenever you remove chips from a PC board use a vacuum type desoldering tool to remove all the solder around the chip legs. "There have been times when I desoldered a leg, resoldered it, and then desoldered it again, in order to get a clean desolder job." Use long-nose pliers to wiggle and loosen every chip leg. If the legs are not all free and you pry the chip off the board, you will damage the board. The chip should be loose enough to almost pick it off with your fingers. When soldering any electronic part, do not heat the part with your iron, and feed in the solder, this will over heat the chips. You should keep your iron clean. Hold the iron in one hand and the solder roll in

the other, with the item to be soldered on the table in front of you. Putting the end of the solder roll against the hot iron, accumulate a very small drop of molten solder on the end of the iron (don't do this directly over your project, place the iron against the part to be soldered for one or two seconds or until you see the molten solder flow around the wires or parts to be soldered. Do not hold the iron against the parts you are soldering any longer than necessary, and do not reheat a chip leg over and over. If you must replace the piggyback ROM chips, squeeze the legs of the top chip together until they fit tightly over the bottom chip, and then solder the chips together first. At that point solder the pair of chips to the board.

Have fun. Marty.



MYARC 9640 GENEVE  
BY GARY TAYLOR  
NUMBER THREE

WHEN YOU PURCHASE A GENEVE IT WILL INCLUDE SEVERAL DISKETTES CONTAINING SOFTWARE. THE PRACTICE OF INCLUDING SOFTWARE WITH THE COMPUTER IS CALLED BUNDLING. IT IS A COMMON PRACTICE FOR COMPUTER RETAILERS TO INCLUDE SOFTWARE WITH A NEW COMPUTER IN ORDER TO MAKE IT AS PRODUCTIVE AS POSSIBLE FROM THE MINUTE YOU BUY IT. FOR EXAMPLE, RADIO SHACK OFFERS THEIR "DESKMATE" PACKAGE WITH ANY TANDY COMPUTER. IT INCLUDES A SPREADSHEET, A WORD PROCESSOR, COMMUNICATIONS, AND A DATABASE PROGRAM ALL ROLLED INTO ONE. I AM SURE YOU CAN STILL REMEMBER WHEN YOU FIRST BOUGHT YOUR TI-99/4A, YOU RACED HOME WITH YOUR NEW COMPUTER AND OPENED THE BOX AND FOUND THAT YOU HAD TO WRITE YOUR OWN PROGRAMS FOR IT JUST TO MAKE IT DO ANYTHING WORTHWHILE. WOULDN'T IT HAVE BEEN GREAT IF TEXAS INSTRUMENTS HAD GIVEN YOU A SPREADSHEET AND A WORD PROCESSOR WHEN YOU BOUGHT YOUR TI?

THE FIRST PIECE OF SOFTWARE YOU GET IS M-DOS, THE OPERATING SYSTEM THAT I WROTE ABOUT LAST TIME. NOT ALL MACHINES COME AUTOMATICALLY WITH AN OPERATING SYSTEM. FOR EXAMPLE, IF YOU WERE TO BUY A CLONE YOU MAY HAVE TO SPEND AS MUCH AS 100 DOLLARS JUST FOR THE OPERATING SYSTEM. OPERATING SYSTEMS ARE CONSTANTLY BEING UPDATED AND M-DOS IS NO EXCEPTION. AS BUGS ARE FOUND OR NEW FEATURES ADDED A NEW VERSION IS CREATED. THE LATEST VERSION NUMBER IS 1.14F FOR FLOPPY SUPPORT AND .96H FOR HARD DISK SUPPORT.

THE SECOND PIECE OF SOFTWARE THAT COMES WITH THE GENEVE IS GPL. THIS STANDS FOR GRAPHIC PROGRAMING LANGUAGE AND IS THE CODE RESPONSIBLE FOR SIMULATING THE TI-99/4A. THE LATEST VERSION IS 1.04. WHEN IT IS LOADED IT WILL DISPLAY A SCREEN FOR YOU TO ENTER THE NAME OF THE CARTRIDGE MODULE YOU WANT TO LOAD. THE GENEVE DOES NOT HAVE A CARTRIDGE SLOT, SO ALL OF YOUR MODULES MUST BE COPIED TO DISKETTE BEFORE THEY CAN BE RUN ON THE GENEVE. ONCE YOU HAVE LOADED A CARTRIDGE THE COMPUTER HAS THE LOOK AND FEEL OF THE TI. PRESSING ANY KEY WILL DISPLAY THE FAMILIAR COLOR BARS AND A SUBSEQUENT KEY PRESS WILL PRODUCE THE MENU WITH TI CONSOLE BASIC AS THE FIRST CHOICE AND THE CARTRIDGE YOU JUST LOADED AS THE SECOND CHOICE.

IN ORDER TO GET YOUR MODULES ONTO DISKETTE, MYARC HAS PROVIDED A "CARTRIDGE SAVER" PROGRAM WHICH WILL READ THE PROGRAM IN THE MODULE AND COPY IT TO DISKETTE. I FOUND THIS TO BE A LABORIOUS AND TIME CONSUMING TASK. THE STEPS TO SAVE A MODULE ARE: INSERT THE E/A MODULE, RUN THE CS PROGRAM, REMOVE THE E/A MODULE VERY CAREFULLY, COVER PIN ONE OF THE MODULE YOU WANT TO SAVE BEFORE INSERTING IT INTO THE CARTRIDGE SLOT (OTHERWISE THE COMPUTER WILL RESET ITSELF), INSERT A FORMATTED BLANK DISKETTE IN DSK1, AND PRESS

ENTER. THE PROGRAM WORKS FINE AND DOES SAVE THE CARTRIDGE TO DISKETTE. THE FORMAT IS PROGRAM IMAGE OF 34 SECTORS EACH. THESE FILES CAN NOT BE LOADED BACK INTO THE TI-99/4A WITHOUT A GRAM KRACKER, OR GRAMULATOR, OR P-GRAM CARD. THIS PROCEDURE MUST BE REPEATED AGAIN FOR EACH MODULE. BEGINNING WITH INSERTING THE E/A MODULE, I FOUND THAT A WIDGET IS ESSENTIAL FOR EFFICIENTLY SAVING CARTRIDGES.

THE NEXT PIECE OF SOFTWARE IS MY-WORD, A TI-WRITER CLONE. IT TAKES ADVANTAGE OF THE LARGER MEMORY OF THE GENEVE ALLOWS FOR CREATION OF LARGER TEXT FILES. IT ALSO DISPLAYS TEXT IN 80 COLUMNS AND HOLDS BOTH THE EDITOR AND FORMATTER IN MEMORY AT THE SAME TIME. YOU CAN EVEN PRINT THROUGH THE FORMATTER RIGHT FROM MEMORY WITHOUT FIRST SAVING YOUR TEXT TO DISK. THERE ARE EVEN HELP SCREEN THAT CAN BE CALLED UP QUICKLY FROM MEMORY.

ALSO INCLUDED ARE FILES WHICH ENHANCE THE DISPLAY OF MULTIPLAN TO 80 COLUMNS. THEY DO NOT GIVE YOU MULTIPLAN. JUST THE FILES THAT REPLACE SOME OF THE MODULES YOU WILL HAVE WHEN YOU SAVE YOUR OWN COPY OF MULTIPLAN TO DISK WITH THE CARTRIDGE SAVER PROGRAM.

A NEW BASIC CALLED ADVANCED BASIC IS ALSO INCLUDED. ADVANCED BASIC WAS NOT RELEASED WHEN I BOUGHT MY GENEVE AND HAS ONLY RECENTLY BEEN FINISHED. THE FINAL VERSION IS TO BE RELEASED 3.0 AND WILL BE SENT TO ALL REGISTERED OWNERS IN THE NEAR FUTURE. FOR SOFTWARE THAT HAS BEEN PROMISED AND UNDER DEVELOPMENT, MYARC HAS BEEN UPLOADING BETA TEST COPIES TO THE MAJOR BULLETIN BOARDS LIKE GENIE AND COMPUSERVE. IF YOU DO NOT WANT TO WAIT FOR THEM TO MAIL THE SOFTWARE TO YOU THE LATEST VERSION SHOULD BE AVAILABLE FOR DOWNLOADING.

THE FINAL PIECE OF SOFTWARE THAT HAS BEEN PROMISED AND NOT DELIVERED IS THE "PASCAL RUNTIME ROUTINES". THIS PROGRAM WILL ALLOW YOU TO RUN ANY UCSD PASCAL PROGRAM WRITTEN. THIS IS NOT A COMPILER OR A PROGRAM DEVELOPMENT TOOL. BUT IT WOULD GIVE YOU ACCESS TO A LARGE LIBRARY OF PROFESSIONAL SOFTWARE ALREADY WRITTEN AND READY TO GO. IT WAS RUMORED THAT IT WOULD BE RELEASED AT THE CHICAGO FAIRE BUT IT WAS NOT.

RECENTLY, MYARC HAS BEEN SELLING THE GENEVE AT A REDUCED PRICE AND HAVE INCLUDED THE MOUSE AND THEIR DRAWING PROGRAM CALLED MY-ART. MY-ART WAS SELLING FOR 125 DOLLARS WHEN I PURCHASED MY GENEVE AND I DID NOT BUY IT, SO I CAN NOT COMMENT ON ITS WORTH.

NEXT MONTH I WILL BE DISCUSSING THE GRAPHICS CAPABILITIES AND THE MONITORS THAT WILL SUPPORT THE GENEVE.

BEAUTIFUL TI CLOCK BY JOE EKL.... WILL BE AVAILABLE AT THE DECEMBER MEETING. I'M NOT SURE ABOUT ALL THE DETAILS, BUT JOE INDICATES THAT ALL WHO COME TO THE MEETING WILL BE GIVEN A CHANCE AT NO COST ( LIKE A CHRISTMAS PRESENT) TO GET THIS ONE CLOCK. YOU ALL KNOW WHAT KIND OF WORK JOE DOES. THIS IS A ONE-OF-A-KIND. I KNOW THAT WE ALL APPRECIATE JOE'S CONTRIBUTIONS IN PAST YEARS TO THE CLUB.

## FORTH PROGRAMMING: SPEEDING UP FLOATING POINT USING MULTI-ENTRY ASSEMBLY ROUTINES

by Scott Coleman

Using floating point numbers in the Forth language is much simpler than I thought it would be, but anyone who has tried it knows it is SLOW! If you have been bothered by this, or are curious about mixing assembly with Forth, read on. Everybody else can use this article to cure insomnia.

Looking at the definitions on screen 45 of the original Forth disk, you see that an awful lot of work is involved in just getting arguments in and out of FAC and ARG. This is an elegant piece of Forth programming, but this is really a job for machine language. I wrote new definitions for FDUP, FDROP, FOVER, FSWAP, F!, F@, and FAC>ARG. I added three words, F@>FAC, F@>ARG, and FAC>F! that move arguments between memory and FAC ARG directly, bypassing the stack. These can save time when performing a sequence of operations.

The assembler listing shows that the words are interwoven, meaning that seven of the words use the same block of instructions after FDUP for moving a floating point number. Note that these must be coded with relative JMP instructions rather than absolute Branches, because you don't know in advance where the code will be loaded in the dictionary. Note also that this is written to be coded as one monolithic block of machine language...there is no room for Forth dictionary headers. There is no law that says the code for a machine language word has to follow its header in the dictionary.

The Forth listing shows how I loaded this mess. I copied the floating point screens (45 to 50) to another disk because the new definitions didn't fit. If you were determined, you could probably squeeze screens 45-48 together and make room instead (try deleting comments). After creating a header for FDUP with the word CODE, all the machine language is entered. Every location that is a new Forth word is marked by using HERE to save the address on the stack. Then the rest of the words are defined (in reverse order) by using HERE 2-! to move the entry point addresses from the stack to the CFA (code field address).

There are two more definitions that may come in handy: floating point versions of VARIABLE and CONSTANT. They define a 4-word block and initialize it with a floating point number. To use the integer value on the stack these words would be:

```
: FPUAR ( n --- ) <BUILDS S->F HERE F! 8 ALLOT DOES> ;  
: FPCONST ( n --- ) <BUILDS S->F HERE F! 8 ALLOT DOES> F@ ;  
Usage: 0 FPUAR X 5 FPCONST FIVE
```

To use floating point values instead would look like this:

```
: FPUAR ( --- ) <BUILDS [COMPILE] >F HERE F! 8 ALLOT DOES> ;  
: FPCONST ( --- ) <BUILDS [COMPILE] >F HERE F! 8 ALLOT DOES> F@ ;  
Usage: FPUAR X 123.456 FPCONST E 2.718281828
```

I hope this has been enlightening.

CONTINUED ON PAGE 7

```

0001 * FLOATING-POINT UTILITIES FOR FORTH
0002 * S Coleman 2/89 U1.0
0003 *
0004 * Registers 0-6 available for use
0005 * R9 = SP = Parameter stack
0006 * R11 = Subroutine linkage (BL & RT)
0007 * R14 = RP = Return stack
0008 * R15 = Return address
0009 *
  
```

```

0010      0009 SP      EQU  9
0011      *
0012 0000 C049 FDUP   MOV  SP,R1
0013 0002 0229 ENT1   AI   SP,-8
0014      0004 FFF8
0014 0006 C089 ENT2   MOV  SP,R2
0015 0008 CCB1 ENT3   MOV  *R1+,*R2+
0016 000A CCB1      MOV  *R1+,*R2+
0017 000C CCB1      MOV  *R1+,*R2+
0018 000E C491      MOV  *R1,*R2
0019 0010 045F      B    *R15
0020      *
0021 0012 0229 FDROP  AI   SP,8
0022      0014 0008
0022 0016 045F      B    *R15
0023      *
0024 0018 C049 FOVER  MOV  SP,R1
0025 001A 0221      AI   R1,8
0026      001C 0008
0026 001E 10F1      JMP  ENT1
0027      *
0028 0020 C049 FSWAP  MOV  SP,R1
0029 0022 C0F1      MOV  *R1+,R3
0030 0024 C131      MOV  *R1+,R4
0031 0026 C171      MOV  *R1+,R5
0032 0028 C1B1      MOV  *R1+,R6
0033 002A C089      MOV  SP,R2
0034 002C CCB1      MOV  *R1+,*R2+
0035 002E CCB1      MOV  *R1+,*R2+
0036 0030 CCB1      MOV  *R1+,*R2+
0037 0032 CC91      MOV  *R1,*R2+
0038 0034 CC83      MOV  R3,*R2+
0039 0036 CC84      MOV  R4,*R2+
0040 0038 CC85      MOV  R5,*R2+
0041 003A C486      MOV  R6,*R2
0042 003C 045F      B    *R15
0043      *
0044 003E C079 FSTOR  MOV  *SP+,R1
0045 0040 CC79      MOV  *SP+,*R1+
0046 0042 CC79      MOV  *SP+,*R1+
0047 0044 CC79      MOV  *SP+,*R1+
0048 0046 C479      MOV  *SP+,*R1
0049 0048 045F      B    *R15
0050      *
0051 004A C059 FLOAD  MOV  *SP,R1
0052 004C 0229      AI   SP,-6
0053      004E FFFA
0053 0050 10DA      JMP  ENT2
0054      *
0055 0052 0201 FACARG LI  R1,>834A  FAC>ARG
  
```

WESTINGHOUSE  
R&D CENTER



"WE HAD A POWER FAILURE. THE COMPUTERS WENT OUT, AND SCOTT HAD TO THINK FOR HIMSELF."

move top 4 words to registers

move next 4 words to stack top

move data from registers



Fortunately the computer virus did no harm to our records. It was immediately devoured by all the bugs in our programming.  
 From PARIS 99er News, Aug '91

99/4 ASSEMBLER  
Version 1.2

```

0054 834A
0056 0056 0202      LI   R2,>835C
      0058 835C
0057 005A 10D6      JMP  ENT3
0058      *
0059 005C 0202  GETFAC LI   R2,>834A      F@>FAC
      005E 834A
0060 0060 C079      MOV  *SP+,R1
0061 0062 10D2      JMP  ENT3
0062      *
0063 0064 0202  GETARG LI   R2,>835C      F@>ARG
      0066 835C
0064 0068 C079      MOV  *SP+,R1
0065 006A 10CE      JMP  ENT3
0066      *
0067 006C 0201  PUTFAC LI   R1,>834A      FAC>F!
      006E 834A
0068 0070 C0B9      MOV  *SP+,R2
0069 0072 10CA      JMP  ENT3
0070      END
0000 Errors

```

## SCR #15

```

0 ( FLOATING POINT <4 WORD> STACK ROUTINES FEB89 ESC)
1 0 CLOAD PI BASE->R DECIMAL 33 R->BASE CLOAD RANDOMIZE
2 BASE->R HEX
3 CODE FDUP ( Code for 10 words; Entries saved on stack )
4 C049 , 229 , FFF8 , C0B9 , CCB1 , CCB1 , CCB1 , C491 , 45F ,
5 HERE 229 , 8 , 45F , HERE C049 , 221 , 8 , 10F1 , HERE C049 ,
6 C0F1 , C131 , C171 , C1B1 , C0B9 , CCB1 , CCB1 , CCB1 , CC91 ,
7 CC83 , CC84 , CC85 , C486 , 45F , HERE C079 , CC79 , CC79 ,
8 CC79 , C479 , 45F , HERE C059 , 229 , FFFA , 10DA , HERE 201 ,
9 834A , 202 , 835C , 10D6 , HERE 202 , 834A , C079 , 10D2 ,
10 HERE 202 , 835C , C079 , 10CE , HERE 201 , 834A , C0B9 , 10CA ,
11 CODE FAC>F! HERE 2- !          CODE F@>ARG HERE 2- !
12 CODE F@>FAC HERE 2- !          CODE FAC>ARG HERE 2- !
13 CODE F@ HERE 2- ! CODE F! HERE 2- ! CODE FSWAP HERE 2- !
14 CODE FOVER HERE 2- !          CODE FDROP HERE 2- !
15 R->BASE -->

```

## SCR #16

```

0 ( FLOATING POINT ARITHMETIC WORDS FEB89 ESC)
1 BASE->R HEX
2
3
4
5
6
7
8 834A CONSTANT FAC 835C CONSTANT ARG
9 : >FAC FAC F! ; : >ARG ARG F! ; : FAC> FAC F@ ;
10 : SEIFL >FAC >ARG ;
11 : FADD 0600 C SYSTEM ; : FSUB 0700 C SYSTEM ;
12 : FMUL 0800 C SYSTEM ; : FDIU 0900 C SYSTEM ;
13
14
15 R->BASE -->

```



SCR #17

```

0 ( FLOATING POINT ARITHMETIC ROUTINES 12JUL82 LCT)
1 BASE->R HEX
2 : F+ SETFL FADD FAC> ;
3 : F- SETFL FSUB FAC> ;
4 : F* SETFL FMUL FAC> ;
5 : F/ SETFL FDIU FAC> ;
6 : S->FAC FAC ! 2300 C SYSTEM ;
7 : FAC->S 1200 C SYSTEM FAC @ ;
8
9 : F->S >FAC FAC->S ;
10 : S->F S->FAC FAC> ;
11 DECIMAL
12 : FRND 3 0 DD 100 RND 100 RND 256 * + LOOP
13 100 RND 16128 + ;
14
15 R->BASE -->

```

II FORTH --- a fig-FORTH extension

- THE END -

TICOFF NEWSLETTER RECEIVED.... I JUST RECENTLY RECEIVED THE ANNOUNCEMENT OF THE TICOFF IN MARCH. CAN SPRING BE FAR BEHIND? DATE: SATURDAY MARCH 17, 1990, PLACE: ROSELLE PARK HIGH SCHOOL, TIME: 9:00 TO 4:00 185 W. WEBSTER AVE. ROSELLE PARK, NJ EXIT 137 OF THE NJ GARDEN STATE PARKWAY. ADMISSION IS \$5.00 SUPPORTING THE T.I.-99/4A, I.B.M. AND MS/DOS COMPATIBLES. FOR MORE INFORMATION CALL: (201) 241-4550 OR BBS (201)241-8902 BIGGER THAN EVER! 1989 HAD A PAID GATE OF 925! TICOFF 1989 NETTED \$4000. FOR THE RPHS STUDENT SCHOLARSHIP FUND.

FREE USER GROUP TABLES FOR BONA FIDE USERS GROUPS GETTING APPLICATION IN BY FEBRUARY 15, AND ALL UG MEMBERS INCLUDING THOSE MANNING TABLES WILL BE CHARGED ADMISSION. (PAID TABLES WILL RECEIVE TWO FREE PASSES.)

FREE LUNCHEON MEETING FOR USERS GROUP PRESIDENTS.

SPEAKERS AND SEMINARS TO BE PRESENTED.

THE SWAP SHOP WILL BE RUN BY TICOFF WHICH WILL ACCEPT FOR SALE ONLY ORIGINAL (NO COPIES) SOFTWARE FOR RESALE AT A 10% COMMISSION (MAX. \$30. ON LARGE ITEM) GOING TO TICOFF.

INCLUDED FOR SALE WILL BE HARDWARE, COMPUTER BOOKS, SOFTWARE, ETC.

GRAND PRIZE GIVEN TO THE HOLDERS OF TWO PAID ADMISSION TICKETS WILL BE TWO NEW STAR NX1000 PRINTERS. NICE HUH! YOU NEED NOT BE PRESENT TO WIN, BUT YOU MUST ATTEND AND DEPOSIT FOR THE DRAWING.

FREE SOFTWARE WITH PREPAID TICKET ORDERS. SEND YOUR CHECK FOR \$5. FOR EACH TICKET NEEDED TO: TICOFF 1990 % ROSELLE PARK HIGH SCHOOL, 185 WEST WEBSTER AVENUE, ROSELLE PARK, NJ 07204 ATTN: ROBERT GUELLNITZ - COORDINATOR, YOU WILL RECEIVE YOUR TICKET AND A COUPON GOOD FOR ONE DISK OF YOUR CHOICE FROM THEIR PUBLIC DOMAIN, FREWARE, OR FAIRWARE LIBRARY.

HOTEL ARRANGEMENTS HAVE NOT BEEN FINALIZED YET, BUT I'M SURE THAT WHEN YOU ORDER TICKETS THAT YOU WILL RECEIVE INFORMATION ABOUT ACCOMODATIONS.

INFORMATION IS AVAILABLE AS YOU NEED IT FROM THE TICOFF BBS (201) 241-8902 300/1200 BAUD.

VENDORS AND USERS GROUPS WILL BE GIVEN FREE AD SPACE ON THE BBS.

OR CALL: AFTER 6:00 P.M. BOB GUELLNITZ (201)382-5963 OR ART BYERS (914) 528-5402.

PLEASE EXCUSE THE FAILURE ON MY PART TO FOLLOW THROUGH WITH ANOTHER PRINTER ARTICLE AS WELL AS THE SCHEMATICS THAT I ALLUDED TO IN THE NOVEMBER ISSUE. TIME AND SPACE HAVE NOT BEEN ON MY SIDE THIS MONTH. I RECEIVED ALOT OF INTEREST IN LAST MONTHS ARTICLE AND WITH THAT AS FUEL, I EXPECT TO CONTINUE A LITTLE LONGER DEALING WITH COMMANDS FOR THE PRINTER. YOU ARE INVITED TO GIVE ME IDEAS IN THIS AREA THAT WE CAN SHARE WITH OTHERS. PLEASE DOCUMENT THEM RATHER THAN PRESENTING THEM TO ME IN THE MIDDLE OF THE MEETING ON THE 19TH. J.F.W.

THE PROGRAM BELOW WAS LISTED IN 28 COLUMN MODE USING SUPER EXTENDED BASIC FROM THE ACTUAL RUNNING PROGRAM. THERE ARE NO ERRORS. YOU SHOULD FEEL CONFIDENT, THAT IF IT DOESN'T RUN, YOU DID A BOBO. MUSIC AND GRAPHICS WILL AD TO HOLIDAY ENJOYMENT OF YOUR TI. WATCH THE SPACING.

LISTING

```
100 ! SNOOPYXMAS
    By Bill Christensen,
    18 Corte Encina, Moraga, CA
    94556, Ph: 415-283-1655.
    Changes: Ollie Hebert, 1987
110 DATA 3,2,16,2,16,2,16,2,
2,16,9,2,16,3,9,16,16,2,2,16
2,16,2,16,0103070F1F3F7FFF8
0C0E0F0F8FCFEFFFFFFFFFFF
FFF
120 CALL DELSPRITE(ALL):: CA
LL CLEAR :: CALL SCREEN(2)::
CALL CHARSET :: CALL MAGNIF
Y(1)! Also UPPER CASE only,
all for RUN ALL sequencing.
130 CALL COLOR(13,9,3):: Q=0
:: R=12 :: GOTO 140 :: CALL
CHAR :: CALL SOUND :: C$=""
:: I,J,K,L,M=P :: 10P-
140 FOR I=1 TO R :: READ J,K
:: CALL COLOR(I,J,K):: NEXT
I :: FOR I=36 TO 128 STEP 4
:: READ C$ :: CALL CHAR(I,C
$):: NEXT I :: RANDOMIZE
150 DISPLAY AT(3,10):: j
    j " %$% "
    j " %$% "
    j " %$% "
```

```
160 DISPLAY AT(Q,5):: j ;TAB(
17):: "%PQPQ%":TAB(R):: j %$
%$% HI j b$%$%
%$%: JK! = %PQPQPQ
%$%: " ML(@()) %$%$%
170 DISPLAY AT(13,4):: "LL(@AB
CD+ d$%$%$%$%$%: " NL@((E
F, %PQPQPQPQ%: " DIG.( (-
/ %$%$%: " h("01234
5 f$%$%$%$%$%$%
180 DISPLAY AT(17,4):: "i? 6^
789 %PQPQPQPQPQ%:TAB(9):: ;
< %$%$%:TAB(Q):: "kl
mn 'abcdefedcba':TAB(Q):: o
(pg %$%$%
190 DISPLAY AT(21,7):: "rstuvw
%$%:TAB(Q):: x(yz(
%$% " :: FOR I=P TO 17 :: FOR
J=P TO 3 :: READ K,L,M :: C
ALL SOUND(K,L,P,M,P)
200 NEXT J :: J=RND*R+4.4 ::
CALL COLOR(13,J,3):: NEXT I
:: CALL SOUND(K,L,30):: CAL
L SOUND(K,L,30):: RUN "DSK1.
LOAD"
210 DATA FFFFFFFF0F
8FCFFFFFFF0000000080C0E
0E0F0F0F8FCFCFC.FCF8F8F8
F0F0FFFBFBFB7EFD81FFFFFFF7
F7FBFBFD8E0C0C08000C0E
```

```
220 DATA FFFFFFFF7F00EFE
FF3FCFFFFFF1FFFFFF03FFFFFFF
FFFFC10E0C0800,03070F0F0F0F0
703E0C0F8F8F8F8F8F8F8F8F8F8
1010000000000000071F7F
230 DATA 070F1F3FFFFFFF0F
EFCECC0C08000FFFFFFF0C
F7FBFBFD8E0C03FFF.FE0F0F0F0F
7FFFFFF80C0E0F0F8FCFEFFFFF
FEFCFEF4B0FFFFFFF7F6
240 DATA 0102040810204080000
C1E3E3E3C18001C3C7C7C7830000
000000000070F1F1F.0000000000
E0F0F8F0F07030000000000F8F8F8
F000000000E0F0F8FCFEFFFFF
250 DATA 00000000071F3FFF000
0000080FCFEFF000000010F1F3F7
F00010FFFFFFF.FFFFFFFF
FFFFFF7F7F7F7F7F7F7F7F7F7F
7F3F1F1F0F0F0707030301
260 DATA A050A85A2B150B07050
A152AD4A0D0A, FFEFCF0F0E0C
080FFFFFFF8500000000FFFFF
FFF,1038545454604400183C7E56
6AFF10202A1C7F1C2A0000001818
7E18182442
270 DATA 182C564A762C1800183
C427E423C00001828180808492A1
C003C7E7E7E7E3C.FAF0908000C0
8000800000C08080F8F9FFFFEBC9
F7C9EBFFFFFFEFCFCFC
280 DATA 000000000201F00000
0000000003FC000000003078387A
FF0F0F0F0E0C08088,0000000001
0103073F3F7F7F7F7F7F7F00C1
FFFFFFF1C3E0E0E0E0E0E0E0E0E0E0
290 DATA 00040404020100000F1
F0F0703FF0000FFFFFFF201
0FFFFFFF1F0F,FFFEF8E080
808080000001080404040080482
412121212107834121111111111
```

```
300 DATA F6EED6F8D8E6F6FE5F6
F573F374F5F7F4F0F1F0F0F03030
0,03070F0F0F0F0703C0E0F0F0F0
F0E0C,300,294,370,300,330,20
000,900,220,294
310 DATA 300,330,20000,300,2
94,370,300,392,20000,1200,33
0,440,300,330,494,300,554,7
000,600,440,587,600,440,554
320 DATA 600,392,494,1200,37
0,440,300,294,494,300,554,33
0,600,587,440,600,554,370,60
0,392,494,600,440,20000
330 DATA 600,294,494,600,392
,554,600,370,587,600,370,440
,600,330,392,1200,294,370,30
0,277,370,600,330,20000
340 DATA 900,220,294,300,330
,20000,300,294,370,300,392,2
0000,1200,330,440,300,330,49
4,300,554,20000,600,440,587
350 DATA 600,554,20000,600,3
92,494,1200,370,440,300,294,
494,300,330,554,600,440,587,
600,370,554,600,392,494
360 DATA 600,440,20000,600,3
92,494,600,392,554,600,370,5
87,600,440,20000,600,330,392
,1200,294,370,300,277,370
370 DATA 300,330,20000,900,2
20,294,300,330,20000,300,294
370,300,392,20000,1200,277,
440,300,370,587,300,554,2000
0
380 DATA 1200,392,494,600,39
2,494,1500,370,440,600,370,5
87,600,370,554,600,392,494,6
00,370,440,600,494,370
390 DATA 600,392,554,600,370
,587,600,440,587,600,330,392
,1200,294,370,
```

WEST PENN 99 'ERS

% JOHN F. WILLFORTH  
R. D. #1 BOX 73A  
JEANNETTE, PA  
15644

ISSUE NUMBER 12  
DECEMBER-1989



MICKEY SCHMITT  
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MERRY CHRISTMAS!