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TITLE: Using the Apple II for Graphics Output from VAX FARANT

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USING THE APPLE II FOR GRAPHICS OUTPUT FROM VAX FARANT

Stowe Keller

I. Introduction

FARANT, a program developed by Dan L. Fenstermacher and described in

EDIR No. 217, serves as an aid in microwave circuit design. It has been

implemented on the HP-9845A desktop computer and the VAX 11. The HP-9845A

offers the FARANT user graphics output capability, whereas the VAX does not.

However, the user may need the much higher execution speed of the VAX and

still have graphics output. This report describes a method of downloading

FARANT results to an Apple II microcomputer for producing graphic results

offline.

This report assumes that the user is familiar with EDIR No. 217, and

the intents and purposes of FARANT. The user should also be familiar with

the process of logging onto the VAX and using BASIC, as well as using an

Apple II microcomputer.

The "terminal" often referred to in this report is an Apple II Plus

microcomputer, CRT display, disk drive, graphics and text printer, and

Micromodem II/Microcoupler interface connected to a telephone jack. A

commercially available program, "ASCII Express II" from Southwestern Data

Systems, is used to provide the controlling software for treating the Apple II

as a terminal. The Apple II is also used as a stand-alone computer.

II. Using the Apple II as a Terminal

With a properly configured Apple II system, power up the system with

the NRAO "ASCII Express II" disk in the disk drive, and wait for the disk to

stop spinning and the "COMMAND MENU" to appear. Type "D" ("DIAL A SYSTEM"), and type "F1" in response to "NUMBER TO DIAL?" "F1" has been previously defined on the NRAO disks as being the extension number of the VAX. The screen should clear and a white cursor should appear; hit the "RETURN" key and enter a valid name and password when asked to do so. After log-in, the user may enter his basic code to utilize the FARANT subroutines. (The user is referred to EDIR No. 217 for further instruction on FARANT.) Where appropriate, sub-routine SPLOT may be used to save off data in a file that can be downloaded to an Apple II and manipulated for graphic output.

III. Subroutine SPLOT in VAX FARANT

The HP-9845A subroutine SPLOT has been adapted for use on the VAX with an Apple II as a terminal. VAX SPLOT has the format: Call SPLOT (I, J, TITLE$, FILENAME$). The data is converted to S-parameters if necessary. I, J are the subscripts of the S-parameter to be plotted (1 or 2); TITLE$ may be a null string or a string of ASCII characters that will be treated as a title of the plot; and FILENAME$ contains the name of the data file that this data will be saved under.

The subroutine will format and output the data from the database into a file that can be downloaded to the Apple, and manipulated on the Apple into a graphics image.

IV. Transferring a VAX File to the Apple Disk

After executing a FARANT analysis (as described in EDIR No. 217), the user must then download the data generated by SPLOT onto the Apple. The following describes the downloading process:

1) Exit terminal mode by typing the "ESC" key three times; this should put you in the "SUB COMMAND MENU."

2) Type "M" for "MAIN MENU." This should put you in the "COMMAND MENU."

3) Type "R" for "RECEIVE A FILE (DOWNLOAD)."

   A) For "MASTER OR SLAVE MODE?", hit "RETURN" key.

   B) For "WHAT COMMAND TO SEND?", enter: "TYP" followed by a space, followed by the file name, followed by '.;' and hit "RETURN" key. Example: "TYP TESTPLOT.;"

   C) For "ACKNOWLEDGE STRING?", hit "RETURN" key.

   D) If there are any additional questions, respond by hitting the "RETURN" key.

4) The screen should clear, and the Apple will transmit the command entered in 3B; the VAX should respond with a series of numbers. The cursor now appears as a blinking white block. The Apple is now copying this data into memory.

5) When the VAX is finished transmitting the data file, the DCL prompt "$" should appear. Type control-E to exit download; the cursor will switch from blinking white block to non-blinking.

6) The downloaded data must now be saved to disk:

   A) Hit "ESC" key three times to reach the "SUB COMMAND MENU."

   B) Type "P" for "PUT FILE TO DISK." (At this point, the user may wish to switch disks.) Type in a unique name, and the downloaded data will be saved to disk.

7) After the data is saved to disk, the "COMMAND MENU" should appear. To log off:

   A) Type "B" to enter "SUB COMMAND MENU."

   B) Type "B" to begin terminal mode.

   C) You may then log off the VAX.

   D) Hit "ESC" key three times to reach "SUB COMMAND MENU."

   E) Type "H" to "HANG UP PHONE."

8) To end terminal program:

    A) Type "M" for "MAIN MENU."

    B) Type "E" to end program. The screen should clear, and "]" should

        appear as a prompt with a blinking white cursor.

                    V.   Using Plotter Program on Apple

        Insert a disk containing the plotter program, and type "EXEC PLOTTER."
After the program and its associated utilities are loaded, two lines of commands
should appear at the bottom of the screen in inverse; type the first letter of
the command to execute it.

    1. G)ET FILE - This command will ask you for the data file to be

        retrieved from disk. Be certain that you have the proper disk in

        the disk drive.

    2. B)ORDER - This will draw a graphic border with tic marks around the

        screen.

    3. C)LEAR - Clears the graphics screen but retains any data loaded from

        disk. This command must be used before plotting.

    4. L)OAD - Loads a previously stored graphic image from disk. Intended

        for retrieving a background image, such as a Smith chart.

    5. P)LOT - Plots the data previously loaded in from disk. The first

        plot after a C)LEAR will allow the user to change plotting limits.

        Subsequent P)LOTS without an intervening C)LEAR will use the same

        graphic limits as the first P)LOT. The user will be able to modify

        labelling and titling options in both cases.

    6. H)ARD COPY - Prints the current graphics image on the printer.

7. T)YPE LABEL - Allows the user to enter text characters on the graphics

image. The cursor is a non-blinking rectangle, initially in the

center of the screen. Control-S will cause subsequent characters to

appear in lower case; control-A will revert to upper case mode.

Hitting the "ESC" key once will allow subsequent I, J, K or M key

presses to move the cursor around the screen without overwriting

the graphic image. (I=Up, J=Left, K=Right, M=Down.) Any non-I,J,K,M

key will exit this cursor-movement-mode, and allow entry of additional

text. To exit text entry, type control-X.

8. V)IEW - This command toggles between graphics display and text display.

9. E)XIT - Exit plotter program.

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SPLOT            7-MAY-1982 09:43

10 SUB SPLOT(I,J,TITLE$,FILENAME$)
20 !WRITES DATA TO FILE SUITABLE FOR DOWNLOADING TO APPLE & PLOTTING
30 COM NOGO%,Z0,F,DBNUM%,DB(101%,18%)
40 IF DB(51%,1%)<>4 THEN CALL PRT(-4,0)
50 C%=2-(I>1)*4-(J>1)*2   !COL. OF DATABASE WITH REAL PART OF S(I,J); NEGATIVE LO
GIC
60 !MUST FIND XLOW,XHIGH,YLOW,YHIGH
70 XLOW=9E+30\ XHIGH=-9E30\ YLOW=9E+30\ YHIGH=-9E+30
80 FOR R% = 1% TO DBNUM%
90      IF DB(R%,C%)<XLOW THEN XLOW=DB(R%,C%)
100     IF DB(R%,C%)>XHIGH THEN XHIGH=DB(R%,C%)
110     IF DB(R%,C%+1%)<YLOW THEN YLOW=DB(R%,C%+1%)
120     IF DB(R%,C%+1%)>YHIGH THEN YHIGH=DB(R%,C%+1%)
130 NEXT R%
140 OPEN FILENAME$ AS FILE #1
150 PRINT #1,XLOW;",";XHIGH;",";YLOW;",";YHIGH
160 PRINT #1,DBNUM%
170 FOR R% = 1% TO DBNUM%
180     PRINT #1,DB(R%,C%);",";DB(R%,C%+1%)
190 NEXT R%
200 PRINT #1,TITLE$
210 CLOSE #1
220 SUBEND

Ready
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