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TITLE:    FARANT 3.0 ON THE HP9816 COMPUTER

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# FARANT 3.0 ON THE HP9816 COMPUTER

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### I. Introduction

Since EDIR No. 250[1] was published on this same subject, Hewlett-Packard has issued a new BASIC 3.0 System Disc and associated discs containing various BINary files and BASIC 3.0 programs. A complete set of new instruction books was also issued. This note will describe the arrangements that have been made in Charlottesville to use this major update. Some of the improvements that it offers in user programming will be mentioned.

### II. Getting Started in BASIC 3.0

As in BASIC 2.0, the computer finds and LOADs the BASIC 3.0 System Disc at power-on, and the drive containing this disc becomes the default drive. But unlike BASIC 2.0, the BINary programs required for full capability -- CLOCK, GRAPH, MAT, etc. -- have not been issued in one Extended BASIC file, to be supplied to the computer by a single LOAD command. Instead, one can select and LOAD separately any of the 13 Driver BIN Files and any of the 13 Language Extensions BIN Files. In fact, there is no way to collect all of the selected BIN programs in one file and to LOAD that file by EXECuting, for example, the command

LOAD BIN "AP3_0"

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[1]John Granlund, "FARANT on the HP9816 Computer," NRAO Electronics Division Internal Report No. 250, July 1984.

The following seem appropriate for RUNning FARANT:

| Driver BIN Files | Language Extensions BIN Files | | |
|---|---|---|---|
| CRTA | CLOCK | IO | PDEV |
| DISC | GRAPH | KBD | |
| HPIB | ERR | MAT | |

It is clearly asking too much of the user if he is expected to EXECute commands to LOAD each of these files every time he turns on the computer to RUN FARANT! A feature of BASIC 3.0 helps to eliminate the need for most of this typing: After BASIC 3.0 has been LOADed from the System Disc, that disc is searched for a program called AUTOST, and this autostart –– or "hello" –– program is RUN if it is found. FARANT 3.0 has been arranged to use AUTOST and its continuations to LOAD the above BIN files, to prompt the user to set the TIMEDATE clock, and to LOAD FARKEY and FARANT, but SUBprograms from a LIBRARY and from the user's version of FARAFT are not LOADed. One result of these changes is that the FARANT mainline program is shortened to the same four steps that it used in HP9845 BASIC.

A difficulty with BASIC 3.0 is that both of the Driver BIN files CRTA and CRTB –– and no others –– are LOADed from the System Disc. CRTB –– for bit-mapped CRT displays –– is not wanted and uses program memory. It is not possible to SCRATCH just one BIN file; however, the command SCRATCH BIN removes all BIN files except the driver for the CRT being used: in this case, CRTA. But since SCRATCH BIN cannot be EXECuted by a RUNning program, and since it also SCRATCHes any program in program memory, the user is left with no program in a computer of very limited capability.

AUTOST on the BASIC 3.0 System Disc advises the user to insert the FARANT 3.0 disc, to press ENTER when ready, and next to LOAD and RUN CONFIG, its continuation on the latter disc. Finally, using the OUTPUT 2 statement, AUTOST PAUSEs itself and EXECutes SCRATCH BIN.

CONFIG LOADs the chosen BIN files from the FARANT 3.0 disc and finally LOADs and RUNs ELF, its continuation. It may be noted that two BIN files on the FARANT 3.0 disc, MS and XREF, are not LOADed. These are not required, but are occasionally very useful. A feature of BASIC 3.0 is that these -- or other -- BIN files can be LOADed at any time without destroying the user's program or its variables.

ELF prompts the user in setting the TIMEDATE clock, it LOADs typing-aid keys from FARKEY, and it LOADs FARANT 3.0 to overwrite ELF, without RUNning FARANT.


III.  Changes in BASIC 3.0 from BASIC 2.0

Considerable improvement has been made in the BIN file GRAPH of BASIC 3.0. The pen is no longer left down after LABELing, so the plotting loop from SUB Mplot

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FOR R = 1 TO Count

    PLOT Dat(R,1),Dat(R,14)

    LABEL "T"

    PLOT Dat(R,1),Dat(R,14)

NEXT R
```

works as one would expect. Graphs are now plotted not only all the way to the CLIP limits, but also start from the CLIP limits as the curve enters the specified plotting area. This makes Smith chart blowups much more presentable. In some

cases, BASIC 2.0 would not accept the statement PLOT X,Y and would insist on PLOT X,Y,1 instead if X and Y got to be extensive expressions. BASIC 3.0 seems always to recognize the default PLOT statement.

The HP9816 CRT has always been capable of printing with "enhancements" -- the underline, inverse video, flashing, and combinations of these. BASIC 3.0 now offers a way to turn these on and off! However, the turn-on and turn-off commands for the CRT are not recognized by the HP2673A printer, and the printer's turn-on, turn-off commands are not recognized by the CRT. If a program segment may be printed by either printer, at the user's discretion, it is still wise not to use enhancements.

The WIDTH statement, recognized by the BIN file IO, almost eliminates the need for SUB Vectprt. The statement or command

PRINTER IS 701;WIDTH 75

names the HP2673A as the printer and instructs the _computer_ to treat it as a 75-column printer. Thus even with the HP2673A programmed to print 75-column lines with the "line wrap around" option, specifying WIDTH 75 eliminates the wrap around. "PRINT X(*);" now produces equally neat results with the 80-column CRT and with the 75-column printer. SUB Vectprt has been retained, however, because it is arranged to use a specified number of significant figures in printing the elements of a vector and also to print the leading comment A$ all on one line and the trailing comment B$ on one line.

The user may well be surprised by the message

WARNING: PROG contains BIN with invalid revision

that results when he LOADs -- but not LOADSUB -- a file written in BASIC 2.0

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into an HP9816 prepared for BASIC 3.0. If he investigates this message by LOADing

BIN "MS" from the FARANT 3.0 disc, returning the disc containing the file in

question to the disc drive, and EXECuting

CAT "name of file in question" ,

he will discover that the BASIC 2.0 file contains the BINary program PHYREC.

PHYREC was used to manipulate "physical records" in BASIC 2.0, was probably

never needed for FARANT, and is "not supported" by BASIC 3.0. It used up program

memory, but much worse, it used that same space in the STOREage of each user-

generated program file on disc!

In updating his files for BASIC 3.0, the user may wish to remove the PENUP

statements that are no longer needed, simplify the default PLOT statements,

and add ";WIDTH 75" whenever specifying the HP2673A printer. If he LOADs his

files one by one with BASIC 3.0 in effect and then STOREs them, he will find

that less disc space is required with PHYREC no longer STOREd.