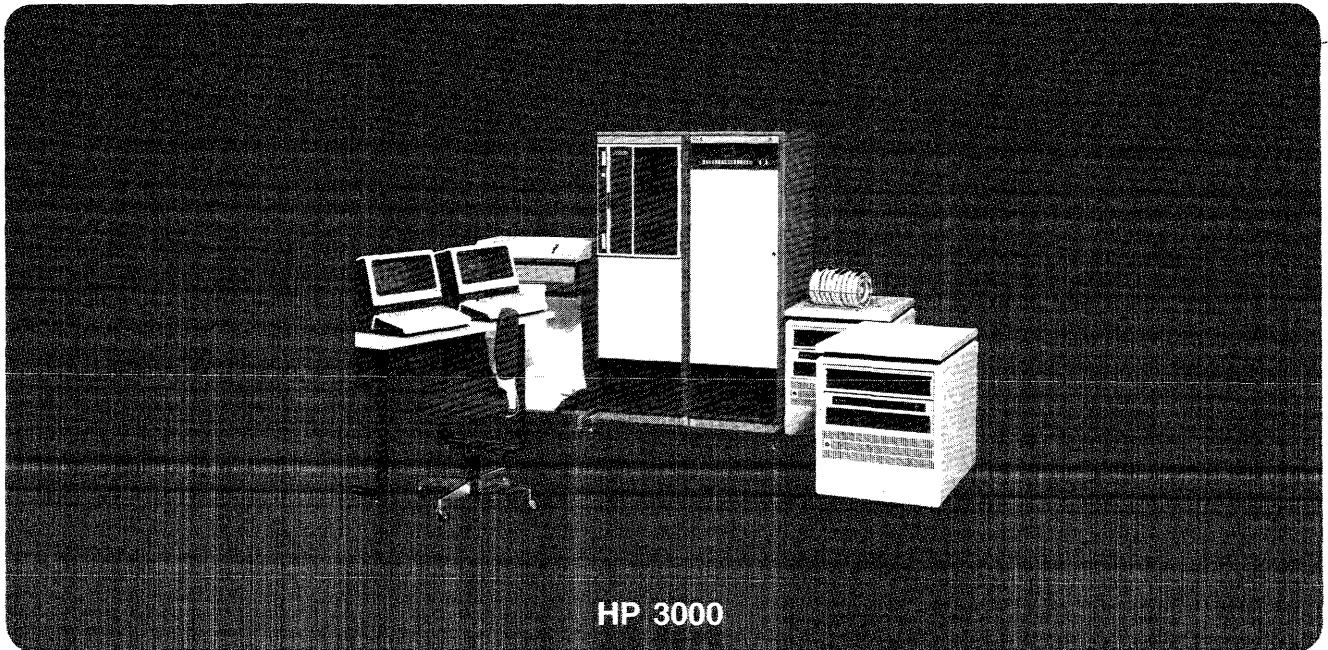
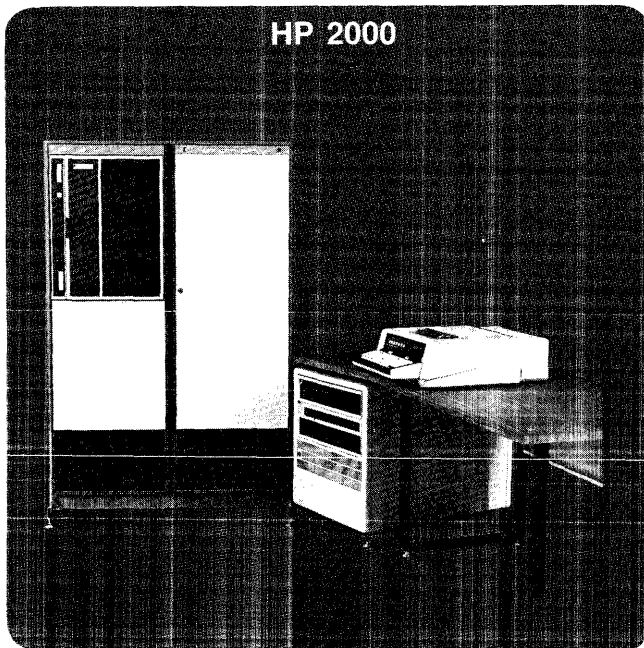


computer systems

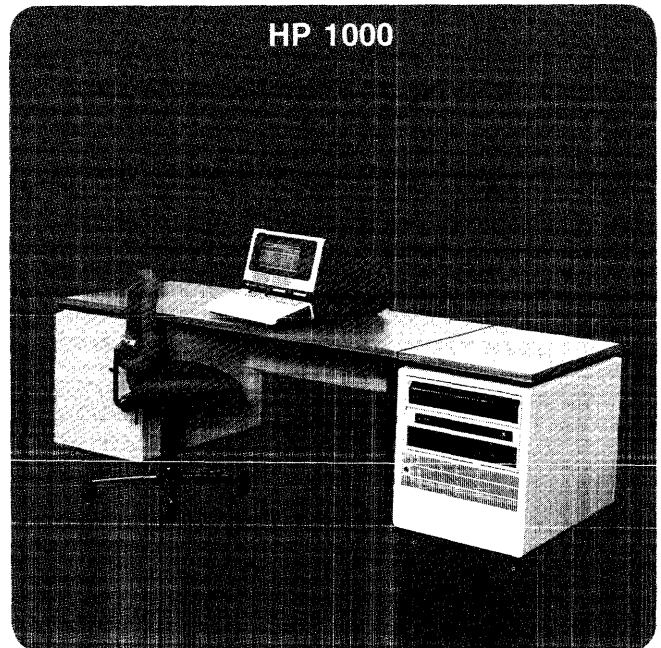
# COMMUNICATOR



HP 3000

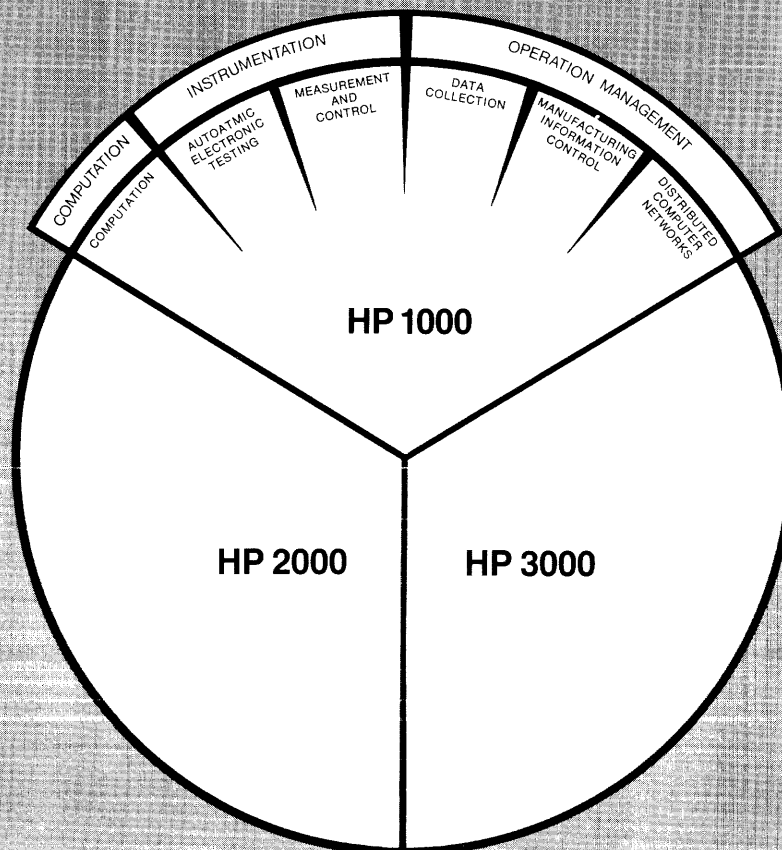


HP 2000



HP 1000

## HP 1000 Computer Systems



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## editor's note

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This issue of the **COMMUNICATOR** features the new Hewlett-Packard 1000 Computer System introduced in October, 1976. This fast and powerful small computer system provides new user capabilities and incorporates recent computer advances setting a new price/performance standard in its class. The feature article introduces the HP 1000, outlining the Data Base Management capabilities, the key features, and the wide range of applications.

Concurrent with the introduction of the HP 1000, the **COMMUNICATOR** will now contain a section titled *ABOUT THE HP 1000*. This replaces the 9600/9700 title, reflecting an increase in the scope of HP Systems covered in this section.

The preparation of this issue of the **COMMUNICATOR** also coincides with the introduction in October, 1976 of revised software for the HP 2000 Operating System. New system capabilities provided by the software revision are summarized in the section *ABOUT THE HP 2000*.

The *3000 Bulletin* section describes the restructuring of General Systems Division training centers and the announcement of a Phone-In Consulting Service. These bulletins, of interest to all HP 3000 users, will describe the expanded role of support services.

With the start of the new fiscal and calendar year, General Systems Division of Hewlett-Packard is reviewing the contents and purpose of the **COMMUNICATOR** and its usefulness to our customers.

Please contact the editor if you have new ideas or can suggest changes in the content or format of the **COMMUNI-**

**CATOR** which will foster the creation of a quality publication that meets the informational needs of HP Computer Systems users.

Address your correspondence to:

Editor Janis Andrews  
Computer Systems Communicator  
HP General Systems Division  
5303 Stevens Creek Blvd.  
Santa Clara, CA 95050

You may also contact the appropriate divisional technical editors as follows:

- HP 1000 System (9600/9700)  
Gary Gubitz  
HP Data Systems Division  
11000 Wolfe Road  
Cupertino, CA 95014
- HP 2000 Computer System  
Dan Jorgenson  
HP General Systems Division  
5303 Stevens Creek Blvd.  
Santa Clara, CA 95050
- HP 3000 Computer System  
Janis Andrews  
HP General Systems Division  
5303 Stevens Creek Blvd.  
Santa Clara, CA 95050

# contents

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## ABOUT THE HP 1000

(formerly HP 9600)

### Software Tips

|                                                                     |     |
|---------------------------------------------------------------------|-----|
| Image 1000 . . . . .                                                | 497 |
| HP-IB TREKIE . . . . .                                              | 499 |
| Microprogrammed Sort Routine<br>Reduces Program Execution . . . . . | 501 |
| Hints on Effective Use of RTE Software . . . . .                    | 503 |
| Caution On Defining 7905 Subchannels for<br>RTE-II/III . . . . .    | 505 |
| Know Your RTE, Part 5 . . . . .                                     | 506 |

### Software Samantha . . . . . 509

### Bulletins . . . . . 510

|                                                                    |     |
|--------------------------------------------------------------------|-----|
| HP 9600/9700 Systems And Software Upgrades<br>To HP 1000 . . . . . |     |
| New Releases From The 2100/21MX . . . . .                          | 510 |
| Contributed Library . . . . .                                      | 510 |
| Interim Training Schedule . . . . .                                | 514 |

### Software Updates

|                                           |     |
|-------------------------------------------|-----|
| Software Module Numbers: 92001B . . . . . | 514 |
| Software Module Numbers: 92060B . . . . . | 517 |
| RTE Drivers . . . . .                     | 518 |
| DOS-IIIB Modules . . . . .                | 518 |

### Documentation . . . . . 519

### Training Schedule . . . . . 523

## FEATURE ARTICLE

|                                   |     |
|-----------------------------------|-----|
| Introducing The HP 1000 . . . . . | 526 |
|-----------------------------------|-----|

## ABOUT THE HP 2000

### Software Tips

|                                           |     |
|-------------------------------------------|-----|
| HP Computer Systems EDITOR/2000 . . . . . | 530 |
|-------------------------------------------|-----|

### Bulletins

|                                                                          |     |
|--------------------------------------------------------------------------|-----|
| New System Name . . . . .                                                | 532 |
| New Ordering Procedures For The Computer<br>Curriculum Project . . . . . | 533 |

### Revisions To September, 1976 Communicator

|                   |     |
|-------------------|-----|
| Article . . . . . | 533 |
|-------------------|-----|

### Software Updates

#### Latest Software Revision To The 2000

|                                           |     |
|-------------------------------------------|-----|
| Operating System: Revision 1638 . . . . . | 533 |
|-------------------------------------------|-----|

### Documentation . . . . . 537

### Training Schedules . . . . . 539

## ABOUT THE HP 3000

### Software Tips

|                                                                                     |     |
|-------------------------------------------------------------------------------------|-----|
| COBOL VERSION C Released . . . . .                                                  | 540 |
| 3000 Series II Terminal Tips . . . . .                                              | 541 |
| How To Build An Interface Between COBOL<br>And Any MPE Intrinsic From SPL . . . . . | 542 |
| Journey From An Abort Message To A<br>Line Of Source Code . . . . .                 | 545 |

### Bulletins . . . . . 551

|                                         |     |
|-----------------------------------------|-----|
| Technical Centers Established . . . . . | 551 |
| CX Updates . . . . .                    | 552 |

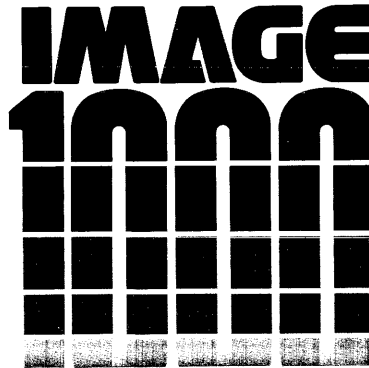
### Software Updates

|                                                  |     |
|--------------------------------------------------|-----|
| MPE I, HP 32000C.00.13 . . . . .                 | 553 |
| MPE II, HP 32002A.00.04 . . . . .                | 553 |
| BASIC/3000, HP 32101B.00.04 . . . . .            | 554 |
| COBOL/3000, HP 32213B.02.02 . . . . .            | 559 |
| COBOL/3000, HP 32213C.01.00 . . . . .            | 560 |
| Compiler Library/3000, HP 32211C.04.04 . . . . . | 560 |
| Compiler Library/3000, HP 32211D.00.04 . . . . . | 560 |
| DEL/3000, HP 32206A.01.01 . . . . .              | 560 |
| EDITOR/3000, HP 32201A.05.01 . . . . .           | 560 |
| FORTTRAN/3000, HP 32102B.00.04 . . . . .         | 561 |
| RPG/3000, HP 32104A.02.08 . . . . .              | 562 |

### Documentation . . . . . 562

### Training Schedule . . . . . 565

# software tips



## IMAGE 1000

Paul McGillicuddy  
HP Data Systems

This article will suggest some programming hints for IMAGE. The basic assumption is that the IMAGE application will be segmented and therefore, the segments should contain the most optimum code.

### STEP 1 First determining the size of your partition.

- a. IMAGE will need room for the DCB of the File Manager. This will be a maximum of 1632 (which allows 6 Data Sets to be opened at one time with a buffer size of 256 words) or a minimum of 144 (which allows only 1 Data Set to be opened at a time with a buffer size of 128 words).
- b. IMAGE also needs room for the root file. Its size can be computed as follows:  

$$55 + (\# \text{ of Data Sets} * 16) + (\# \text{ of items} * 5) + (\# \text{ of items} + 2 * \text{Path Count} + 1)$$

- c. The space left is available for your program (main and segments). It is possible to determine how large a program can be by subtracting the above requirements from your partition size. Be sure to leave some area for future growth.

### STEP 2 Determine the structure of the main program and its segments.

- a. The main program should contain code that will be used most often. For example, a general prompting message to the user about his next function. It should not contain prompts to the user about the Data Base name, security code, etc., since this is done only once.
- b. The segments should allow for some future expansion. With this in mind, determine the size of the largest segment. Remember that subroutine calls (direct or implied by a FORTRAN statement) are loaded as part of the main if they are called in both a main and a segment.

The following is an outline summarizing the above points:

### MAIN PROGRAM

```

100  ASSIGN 100 TO IRET
      CALL EXEC (8,ISEG)
      CONTINUE
      .
      .
C    .
C    DUMMY CALL TO LOAD DBBUF IN MAIN
C
200  CALL AIDCB
      END

```

*Using the ASSIGN allows a return to the main program from a segment. ISEG in this case will be INFOD. IRET must be COMMON.*

*AIDCB allows DBINT and DBOPN to be called in a segment.*

about the HP 1000

## SEGMENT 1

```

      PROGRAM INFOD(5,90)
C
C      PROGRAM TO GET INFORMATION ABOUT THE DATA BASE
C
      COMMON ICBUF(20)
      DIMENSION IBASE(3),ILEVL(3),ISEG(3)
      EQUIVALENCE (ICBUF(4),IBASE(1)),(ICBUF(7),ISCOD),
1 (ICBUF(16),ILEVL(1)),(ICBUF(19),IMODE),
2 (ICBUF( 1),LU)
      DATA ISEG/2HIN,2HOP,2HD /
      WRITE(LU,100)
100  FORMAT("DATA BASE NAME = ?<")
      READ(LU,200)IBASE
200  FORMAT(3A2)
      WRITE(LU,300)
300  FORMAT("SECURITY CODE = ?<")
      READ(LU,*)ISCOD
      WRITE(LU,400)
400  FORMAT("LEVEL WORD = ?<")
      READ(LU,200)ILEVL
      WRITE(LU,500)
500  FORMAT("ACCESS MODE = ?<")
      READ(LU,*)IMODE
      CALL EXEC (8,ISEG)
      END

```

*This segment prompts the user about the data base. COMMON is used to pass the answers to the next segment.*

← suppress carriage return, linefeed

## SEGMENT 2

```

      PROGRAM INOPD(5,90)
C
C      SEGMENT TO INITIALIZE AND OPEN THE DATA BASE
C
      COMMON ICBUF(20)
      DIMENSION IBASE(3),ILIST(4),ISTAT(4),ILEVL(3),ISEG(3)
      EQUIVALENCE (ICBUF(4),IBASE(1)),(ICBUF(7),ISCOD),
1 (ICBUF(8),ILIST(1)),(ICBUF(12),ISTAT(1)),(ICBUF(16),
2 ILEVL(1)),(ICBUF(19),IMODE),(ICBUF( 1),LU)
      DATA ISEG/2HCA,2HLC,2HQ /
      ILIST(1)= 1
      ILIST(2) = 2HCA
      ILIST(3) = 2HLC
      ILIST(4) = 2HQ
C
C      INITIALIZE THE DATA BASE
C
100  CALL DBINT(IBASE,ISCOD,ILIST,ISTAT)
      IF (ISTAT.NE.0) CALL DBERR(1,ISTAT)
C
C      OPEN THE DATA BASE
C
300  CALL DBOPN(IBASE,ILEVL,ISCOD,IMODE,ISTAT)
      IF (ISTAT.NE.0) CALL DBERR(2,ISTAT)
500  CALL EXEC (8,ISEG)
      END

```

*Because COMMON cannot be initialized at compile time, a DATA statement cannot be used to initialize ILIST. CALCQ is the largest segment in the program and is the only segment name required by DBINT.*

*DBERR is a status checking routine. It passes a number representing the current call to allow easier debugging.*

An alternative to this method would be to have the Data Base Name, etc., and the largest segment name in a disc file that is read in by a segment to initialize the program's variables.

#### SEGMENT 3 to N

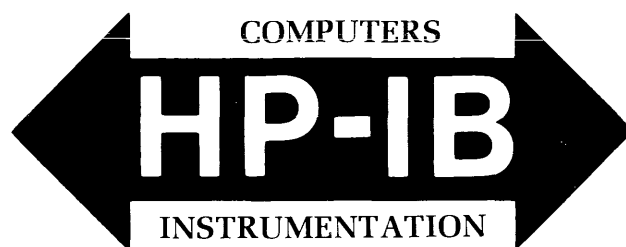
These segments perform the functions of the application.

The largest should be 80% of the room left in the partition.

#### SEGMENT N + 1

This last segment does the close.

*If any of these segments require a return to the main they can execute a : GO TO IRST, assuming they have a variable IRST in the corresponding position of the main.*



## HP-IB TREKIE

### Performance Analysis Article #1

Now that the HP-IB scheme for interfacing digital equipment is known to the electronic world, the following series of articles titled

#### "HP-IB TREKIE"

will deal with common and useful things to do with an HP-IB system. The initial thrust and series of articles will deal with performance studies on different areas of HP-IB applications. The intent of these first six articles will be to analyze "WORST-CASE" conditions so the user will have a good idea of how far to push an HP-IB system. It is also intended to give realistic data on system configuration and operation. So, stay tuned to the **COMMUNICATOR**. There's a whole lot of interesting and surprising things to come in the HP-IB area. As one current HP-IB user commented, the term 'bus' really stands for

B BEFORE  
U  
S OFFERED

To begin our trip down the HP-IB path, let's summarize all the topics to be covered in this and future issues of the **COMMUNICATOR**:

|                |                                                         |
|----------------|---------------------------------------------------------|
| THIS ISSUE :   | HP-CABLE PARAMETERS & DEVICE LOAD CONSIDERATIONS        |
| NEXT ISSUE :   | BUS TOPOLOGY & HANDSHAKE ANALYSIS (DON'T MISS THIS ONE) |
| NEXT ISSUE +1: | OPEN COLLECTOR DELAY CONSIDERATIONS                     |
| NEXT ISSUE +2: | POWERED-OFF DEVICE CONSIDERATIONS                       |
| NEXT ISSUE +3: | DATA SETTling TIMES & DAV GLITCH                        |
| NEXT ISSUE +4: | SUMMARY                                                 |

### CABLE PARAMETERS: A LOOK AT CABLE DISTANCE CONSIDERATIONS

The purpose of this article and ones to come is to present a selective and condensed version of a performance study conducted by Hewlett-Packard at Data Systems Division in August 1976 titled "HP-IB WORST-CASE ANALYSIS." Its purpose was to arrive at suggested system guidelines for optimizing HP-IB performance under worst case conditions. Since the HP-IB is essentially new from the applications end of Data Systems Division, it is hoped that these articles will prove to be useful for the HP-IB user in configuring and/or designing a system. It is also hoped that some clarification will arise from these discussions regarding any mysterious "HP-IB IF'S" concerning instrument clusters.

If you've had a difficult time interpreting the IEEE-488-1975 specification (especially if you're a software cat), then these articles might help eliminate any fear and/or preconceived misconceptions about the BUS. All in all, the terminology and illustrated diagrams have been kept simple and uncluttered with the normal rhetoric that seems to always accompany such discussions. I hope you will enjoy our articles as much as we have by putting them all together. If you have any questions regarding anything mentioned, please take time to write the editor so a quick reply can be initiated. We look forward to receiving your comments on our articles.

I would also like to take time to mention that any articles which you feel would be useful to other users will be taken with enthusiasm and considered for publication. Since you are our most valuable resource, we consider it a compliment when you write us.

The worst-case data used for the calculations and tests were derived from the HP-IB specifications as given in IEEE-488-1975, which will be hereafter referenced as "THE STANDARD".

Since the standard specifies only the maximum capacitance of a single signal line in the cable, the worst-case cable parameters are based on measurements of existing cable assemblies. Three measurement techniques were used in this study:

1. Direct measurement of inductance and capacitance using a 4260A RLC meter.
2. Propagation delay times over a long cable section using a dual-trace oscilloscope.
3. Characteristic impedance by resistor selection at the ends of a moderate-length cable and observing reflections on the oscilloscope.

The cable consisted of multiple 3-foot and 6-foot sections, HP parts 10631A and 10631B. The results were as follows:

MEASURED INDUCTANCE: 0.16 microhenry per foot  
 MEASURED CAPACITANCE: 40 picofarads per foot  
 MEASURED DELAY: 2.13 nanoseconds per foot  
 MEASURED IMPEDANCE: 65-75 ohms

The results of the three measurements agreed rather well as for an ideal transmission line, the delay and characteristic impedance are given by

$$T = \sqrt{LC} \quad Z = \sqrt{\frac{L}{C}}$$

The measured inductance and capacitance thus predict the following values:

$$T = \sqrt{(0.16 \times 10^{-6} \times 40 \times 10^{-12})} = 2.53 \text{ nsec/foot}$$

$$Z_0 = \sqrt{(0.16 \times 10^{-6} / 40 \times 10^{-12})} = 63.2 \text{ ohms}$$

Based on this correlation and the relative confidence placed in the measurement techniques, the typical values are assumed to be

$$L = 0.147 \text{ microhenry per foot} = 0.482 \text{ ohms per meter}$$

$$C = 40 \text{ picofarads per foot} = 131 \text{ pf per meter}$$

$$T = 2.42 \text{ nanoseconds per foot} = 7.95 \text{ ns per meter}$$

You might note that the standard allows 150 PF per meter of cable as the worst-case capacitance, but the worst-case inductance is not specified. Using the ratio of typical capacitance to worst-case capacitance as a rough indicator, the worst-case inductance was assumed to be 0.6 microhenry per meter and the resulting worst-case delay becomes 9.5 NSEC per meter. Watch out for this! Since the HP-IB is an industry standard, any company peddling IB-compatible products does so at the risk of answering to any design deficiencies in the product and/or deviations from the standard.

## DEVICE LOAD CONSIDERATIONS

There are really two things to consider: capacitance and

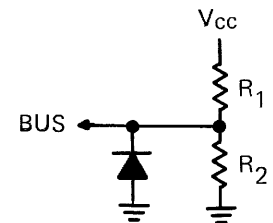
resistive termination. In the area of capacitance, the standard permits a device capacitance of 100 PF on each signal line. Since this capacitance is expected to have a significant effect on the rise times of the open-collector handshake lines (RFD and DAC) and also the cable delay derived above, measurements were taken on a few existing HP-IB devices to determine whether 100 PF is a reasonable value. The measurement apparatus consisted of an open-collector driver with resistive pull-up, allowing the R-C time constant to be computed from the exponential waveform on the signal line in question. Results with a 9871A Printer, 59303 D/A Converter, and 3495A Scanner indicate that 100 PF is an unreasonable high value since all three devices responded with capacitances well within 50 PF. As a result, 50 PF is assumed to be the worst-case device capacitance.

The standard resistive termination requires each device to terminate each signal line with a resistive load as is specified by a region on a voltage-current graph in IEEE-4888 specification. Since the equivalent resistance will be greater than about a thousand OHMS, its main effect on system performance will be to help determine the rise time of the open-collector signal lines. Therefore, the worst-case resistance is one which provides the minimum current to charge up the cable and device capacitances. Since the standard permits this minimum current to be arbitrarily small in the region between 0.4 volts and 2.5 volts, this means that the open collector rise times could be arbitrarily long. While such a situation probably will not occur, the standard would make some mention of it.

For the purposes of this study, the worst-case resistance is assumed to be defined by the straight line between the two points

0.4V, 1.3 ma  
 and 2.5V, 0 ma

The equivalent circuit would be



It might be noted that this circuit would actually occur if a high input impedance receiver circuit were used. The resistor values may be found by solving for the current onto the signal line with

$$V_{cc} = 4.75 \text{ volts}$$

Thus,

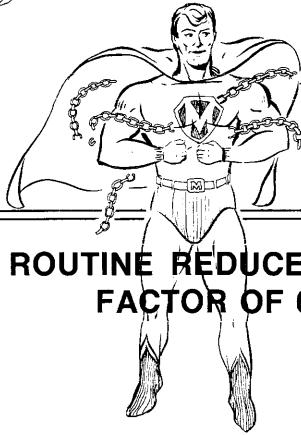
$$\text{at } 0.4 \text{ volts: } 1.3 = \frac{4.75 - 0.4}{R_1} - \frac{0.4}{R_2}$$

$$\text{at } 2.5 \text{ volts: } 0 = \frac{4.75 - 2.5}{R_1} - \frac{2.5}{R_2}$$

The resulting worst-case values are  $R_1 = 3.07K$  and  $R_2 = 3.41K$ .

In the next issue, typical device configurations will be discussed along with speed guidelines and specific device time requirements.

# MICROPROGRAMMING



about the HP 1000

## MICROPROGRAMMED SORT ROUTINE REDUCES PROGRAM EXECUTION TIME BY FACTOR OF 6

Gary Gubitz  
HP Data Systems

:RU,ASORT,1,5000  
START OF SORT  
END OF SORT

ASSEMBLY LANGUAGE SORT  
WITH 5000 NUMBERS

|        | Hours | Minutes | Seconds |                                          |
|--------|-------|---------|---------|------------------------------------------|
| STOP:  | 8     | 29      | 11.26   | } 19 sec. on 21MX M<br>11 sec. on 21MX E |
| START: | 8     | 28      | 52.35   |                                          |

:RU,MSORT,1,5000  
START OF SORT  
END OF SORT

MICROPROGRAMMED SORT  
WITH 5000 NUMBERS

|        | Hours | Minutes | Seconds |                                             |
|--------|-------|---------|---------|---------------------------------------------|
| STOP:  | 8     | 29      | 38.95   | } 2.2 sec. on 21MX M<br>1.75 sec. on 21MX E |
| START: | 8     | 29      | 36.69   |                                             |

Are you looking for a better way to accomplish your applications program tasks? Have you used all the programming methods you can think of to make your library sub-routines run as efficiently as possible in your Real Time Executive (RTE) operating system environment? Well then, maybe it's time to look into Microprogramming.

What is Microprogramming? Primarily, Microprogramming is the modification of and/or addition to the computer instruction set without hardware redesign so that you may have the advantage of executing selected main memory programs at the fastest possible rate available in the computer.

In other words, Microprogramming allows you to increase the horsepower available from your computer without having to upgrade processing units.

Why Microprogramming? Because Microprograms and Microprogramming techniques can be used to:

1. Reduce program execution time:
  - Many instruction fetches are eliminated.
  - Multiple operations can occur during a single microinstruction.
  - The microinstruction word width (24 bits) provides a larger instruction repertoire than available with the Assembler word width (16 bits).
  - Many more registers and functions at the microinstruction level are available to you than to the assembly level or high level language programmer.
2. Implement customized computer instructions:
  - Special arithmetic instructions (double integer, decimal, etc).
  - Emulation.

### WHAT TYPES OF APPLICATIONS CAN BE MICROPROGRAMMED?

- Sort Routines (e.g., BUBBLE, SHELL, RADIX-EXCHANGE, and QUICKSORT).
- High-Speed or specialized input/output transfer operations.
- Table searches (e.g., sequential, binary, and link-list).
- Transcendental functions (e.g., sine, square root, and logs).
- Fast fourier transforms (FFT).
- and many, many more!

Once it is determined that Microprogramming can make your operation a more efficient one, the question then becomes, "What should be microprogrammed?" What is

needed is some method of determining what to micro-program. Let us take a look at one such method.

In the Hewlett-Packard Contributed Library, there exists a program that performs an activity profile generation under RTE on any program(s) you desire to analyze. The idea behind this is to determine where your application program is spending most of its time, and then, once isolated, these areas become the candidates for Microprogramming. A sample output from an activity profile generation follows: [Note: We monitored a program called TRIG].

Activity profile generation for TRIG

Memory Analyzed From 50000B To 51374B.

51 Memory Cells, each 00017B long;

0 activity cells not listed.

| LOCATIONS   | INTERRUPTS | % USAGE | CUMULATIVE<br>% USAGE |
|-------------|------------|---------|-----------------------|
| UNDER       | 1.         | .02     | .02                   |
| 50000-50016 | 124.       | 2.54    | 2.56                  |
| 50036-50054 | 171.       | 3.50    | 6.06                  |
| 50606-50624 | 213.       | 4.36    | 10.42                 |
| 50625-50643 | 145.       | 2.97    | 13.39                 |
| 50644-50662 | 306.       | 6.27    | 19.66                 |
| 50663-50701 | 84.        | 1.72    | 21.38                 |
| 50702-50720 | 4.         | .08     | 21.46                 |
| 50757-50775 | 261.       | 5.34    | 26.80                 |
| 50776-51014 | 258.       | 5.28    | 32.08                 |
| 51015-50133 | 504.       | 10.32   | 42.40                 |
| 50134-51052 | 429.       | 8.78    | 51.19                 |
| 51053-51071 | 204.       | 4.18    | 55.36                 |
| 51072-51110 | 56.        | 1.15    | 56.51                 |
| 51130-51146 | 98.        | 2.01    | 58.52                 |
| 51147-51165 | 65.        | 1.33    | 59.85                 |
| 51166-51204 | 100.       | 2.05    | 61.90                 |
| 51205-51223 | 796.       | 16.30   | 78.19                 |
| 51224-51242 | 812.       | 16.63   | 94.82                 |
| 51262-51300 | 61.        | 1.25    | 96.07                 |
| 51301-51317 | 46.        | .94     | 97.01                 |
| 51320-51336 | 105.       | 2.15    | 99.16                 |
| 51337-51355 | 16.        | .33     | 99.49                 |
| 51356-51374 | 25.        | .51     | 100.00                |
| OVER        |            | .00     | 100.00                |

Total Samples = 4884.

Execution Time = 48.84 seconds

Sampling Frequency = 100. per second

| Program | Relative CPU % Utilization | Samples |
|---------|----------------------------|---------|
| TRIG    | 100.0                      | 4884.   |

By taking the output from this activity profile generation, and comparing the % usage column with the load map of the program being monitored (TRIG in this case), one can easily determine the candidates for Microprogramming (the boxed items).

The capabilities and potential application areas for Micro-programming exist, what is needed is a tool to enable \*YOU\*, the user, easy access to these capabilities.

### The RTE Microprogramming Package is that Tool!

The RTE Microprogramming package allows the user to take full advantage, with relative ease, of the Microprogramming capabilities of our Hewlett-Packard 21MX M-Series and 21MX E-Series computers, and our most widely used operating systems, RTE II/III.

### The features of the Microprogramming package are:

- On-line operation in RTE-II/III systems.
- Cross reference generator for simplified program development.
- Microdebug editor for interactive program editing and checkout.
- Operator entered breakpoints.
- Full writable control store support, including driver, load utilities, and load verification routines.
- Dynamic writable control store overlay utilities.
- Software support for both 256 and 1024 word writable control store.
- Prom tape generator for outputting production micro-code on (punched) prom "BURN" tapes in formats most commonly used by vendors.

Remember \*\* Hewlett-Packard \*\* has a complete Micro-programming package!

- **HARDWARE** Writable Control Store  
Ability to Utilize Prom Chips
- **SOFTWARE** Microdebug Editor  
Microassembler  
WLOAD (WCS Utility)  
DVR36 (WCS Driver)  
PTGEN (PROM Mask Tape Generator)  
MXREF (Cross-Reference Generator)
- **TRAINING** 4 Day Applications Course
- **SUPPORT** Local and Central

**INTERESTED? For more information concerning the RTE Microprogramming package contact your local Hewlett-Packard representative.**

In future issues we will continue to write informative material about Microprogramming. After all, we are here to help you solve problems. If you have any suggestions for topics, let us know.

WRITE TO: MICROPROGRAMMING  
c/o Communicator H-P 1000 Group  
Hewlett-Packard Data Systems Division  
11000 Wolfe Road  
Cupertino, Ca. 95014

## HINTS ON EFFECTIVE USE OF RTE SOFTWARE

*Jim Bridges*  
*HP Data Systems*

Experienced users have discovered several techniques which not only make more effective use of disc space but also tend to make changes to a system self-documenting. The techniques have evolved over a period of years and have been passed along verbally. It is believed that this is the first time they have appeared in any publication distributed outside of Hewlett-Packard.

The term "RTE" will generally mean RTE II (92001A) or RTE III (92060A) but many of the concepts expressed are applicable to the original RTE (2300E) as well. Extensive use is made of the file management package (FMP) and so they do not apply to very minimal systems. The assumption is made that the system may have several programs added after generation and that the system supports several users. The system may also have several ports operating under the multi-terminal monitor (MTM).

The techniques will be presented serially, in the same order that they would be used in the life of a system.

## SYSTEM GENERATION

1. Add a program called SYSON to the system at the time of generation. This program is designed to be the "start-up" program, i.e., scheduled automatically at boot-up. Usually this program is referenced during the parameter entry phase by adding 80 to the type. For example:

### SYSON,82,50

which makes SYSON a foreground disc resident program with priority 50. The type (2) is added to 80 to give 82.

The many different SYSON programs all have one feature in common: at one point they schedule FMGR and pass to it the file name WELCOM. A typical WELCOM file will be presented later. A sample SYSON program is:

```
PROGRAM SYSON
DIMENSION NAME (3)
DATA NAME/2HFM,2HGR,2H /
C SCHEDULE FMGR WITHOUT WAIT IN QUEUE:
GO TO WELCOM FILE
CALL EXEC (24,NAME,2HWE,2HLC,
2HOM,0,0)
END
END$
```

2. Obtain the system generation map in machine readable form. With the off-line generator, this may be accomplished by using a CRT as the console and the list device and echoing the questions and answers on a high speed punch. Later, this tape will be stored in a file called "SYSTM for reference.

## FIRST BOOT-UP

When the system is booted the first time, the message

### FMGR 002

requests initialization of the FMP area of logical unit #2 (LU 2). If LU 3 is not zero, a similar message will be given for LU 3. After LU 2 and 3 are initialized, the message

### FMGR -006

indicates, in this case, that the WELCOM file has not been found. The name of this file was passed to FMGR by SYSON. Now is the time to create the WELCOM file. The sample WELCOM file assumes that there are two MTM terminals (LU 7 and LU 9).

```
:SV,1                (Inhibit command echo)
:DU,HELLO:RT:2,1      (Dump a message indicating
:DU,HELLO:RT:2,7      system start-up)
:DU,HELLO:RT:2,9
::*COPY,FMGR,FM07.    (Make copies of FMGR for LU 7
::*COPY,FMGR,FM09.    and 9)
::*COPY,EDITR,ED07.   (Make copies of EDITR for LU 7
::*COPY,EDITR,ED09.   and 9)
:PU,FILL02:RT:2       (Purge dummy files to control
:PU,FILL03:RT:3       available space on LU 2 and 3)
::*PACK              (Pack files on LU 2 and 3)
:CR,FILL02:RT:2:4:-1  (Create dummy files to protect
:CR,FILL03:RT:3:4:-1  space on LU 2 and 3)
:DU,READY:RT:2,1
:DU,READY:RT:2,7      (Tell users that we're ready
:CN,7,20B             and enable their terminals)
:DU,READY:RT:2,9
:CN,9,20B
:SV,0
:EX
```

Many points are illustrated in this sample WELCOM file:

1. Reference is made to auxiliary files HELLO, READY, \*COPY and \*PACK. HELLO and READY message files are tailored to whims of the composer. \*COPY and \*PACK are more specific:

```
:RN,1G:RT:2,2G      (This is the *COPY file)
:RP,2G              (An ID segment is given to
:RN,2G:RT:2,1G      the new file and the origi-
::                  nal file name is restored)

:PK,2               (This is the *PACK file)
:PK,3
::
```

One might wonder why the pack commands are put in a separate file. The reason is that the WELCOM file itself might be moved during the packing. A WELCOM file could cross sector boundaries after the appearance of the pack commands. In this case, succeeding commands might be read from the wrong area of the disc. But, by taking the pack commands from a small file (\*PACK) which fits in a single sector and then returning to the WELCOM file, the WELCOM file is accessed from its new location (if moved).

2. The WELCOM file expects FMGR and EDITR to be saved in type 6 files of the same name. A copy of each is made for each MTM terminal by the convention that the first two characters of the name are retained, the second two characters match the LU of terminal and the last two characters are ". ".
3. LU 2 and 3 are initialized so that their cartridge numbers are 2 and 3 respectively.
4. Files with universal meaning (such as FMGR, EDITR, WELCOM) are protected from inadvertent destruction by a "universal security code" of RT (first two characters of RTE).
5. Dummy "fill" files are used to control the use of space on LU 2 and 3. This is done because a type 6 file can be given an ID segment only if it is on LU 2 or 3. Also, because space on LU 2 and 3 is recorded in the track assignment table (TAT), it is not truly "general purpose". Any file which could reside on another disc subchannel should reside on another disc subchannel.

When the WELCOM file has been created, the next step is to store the generation map in a file called "SYSTM. For example:

```
:ST,5,"SYSTM:RT:2::-1
```

Since the map is usually a large file, it may be desirable to put it on an LU other than 2 or 3, especially a peripheral disc subchannel that can be backed up on magnetic tape.

Mount and initialize the peripheral disc subchannels. If the system has enough disc space and there are several MTM terminals, it is a good idea to "logically associate" each terminal with a specific subchannel. For example, put an identifying tag on each terminal which tells the user of that terminal which disc LU he should use. There is nothing to actually prevent him from using another LU, but if each user agrees to the rules, interference between users can be minimized.

Re-boot the system to test out the WELCOM file. If all is well, then individual users can begin work. However there are some other conventions they should agree to use in adding programs.

## FILE NAMING CONVENTIONS

If all agree to use a convention for naming files, it is much easier to examine the contents of a disc. This will be true even if you are the creator of the files because, as time goes on your memory dims. A convention in wide use is to attach significance to the first character of a file name as follows:

| First char | Meaning                                          |
|------------|--------------------------------------------------|
| &          | Source code for a program                        |
| %          | Binary relocatable object code                   |
| !          | Binary absolute object code                      |
| /          | Set-up file with FMGR commands                   |
| \          | Clean-up file with FMGR commands                 |
| "          | Documentation or information file                |
| *          | General purpose transfer file with FMGR commands |

A file name which begins with a letter is either a type 6, the WELCOM file (or a file used by WELCOM) or a temporary file. Temporary files should not appear on LU 2 or 3. The WELCOM file (and any files it uses) and type 6 files should always be on LU 2 or 3 and should have security codes.

It is useful to be able to tag different revisions of the same program. There are two good ways to do this:

1. Identify source and relocatable binary which is in the development stage by alternate first characters in the name. Typically, \$ is used as an alternate for source and # is used as an alternate for relocatable binary. The use of & and % would indicate the "debugged" software.
2. Identify the file with a date code by making use of the record length field in the NAMR. The record length is required only for type 2 files. It is optional for type 3 and above. It is recorded in the directory entry and listed when the command to list the directory entry (:LI,<namr>,D) is given. The record length is limited to 4 decimal digits. For example,

```
:CR,&SOURC::15:4:48:1005
```

creates a source file (type 4) of 48 blocks on CR 15 with a record length of 1005. FMP will not use the record length (type 4 files have variable record length) but I can choose that it mean the month and day. In this case, that would be 10/05 (October 5).

The EDITR program does not pass the record length to FMP so source files created by EDITR will have to be stored in the file to make use of this feature. For example:

```
:ST,&SRC1::15,&SRC2::15:-1:1005
:PU,&SRC1::15
:RN,&SRC2::15,&SRC1
```

## ADDING PROGRAMS TO THE SYSTEMS

There are two ways to add programs to the system. One is to make them permanent additions. The other is to make them temporary and to save them in type 6 files. There are four major reasons why the latter approach is recommended:

1. It conserves ID segments. The program may be purged after the type 6 file is established. This releases the ID segment for use. Many type 6 files may, in sequence, reuse the same ID segments.
2. It conserves disc space. Programs added by the on-line LOADR program always begin on sector zero of a previously unused track. Each segment will begin on the first even-numbered sector following the main or the last-loaded segment. However, type 6 files begin at the next unused even-numbered sector in the FMP area. Type 6 files are also packed (the same as other file types) by the :PK command.
3. It keeps the amount of scratch area constant. Initially, the scratch area is the space between the last track reported used by the generator and the last track on LU 3 — excluding the FMP area on both LU 2 and 3. Space for programs added on-line are taken from the scratch area — diminishing this valuable resource. Scratch tracks are required for program swapping, LS and LG areas and are temporarily assigned to executing programs requesting disc tracks.
4. Programs which are saved in type 6 files may be re-named and used from several different terminals. The overhead for each terminal is an ID segment in memory and swap tracks for each active copy.

To assist in adding programs on-line (saving them in type 6 files), a general purpose transfer file called \*SP is created as follows:

```
:PU,FILL02:RT:2
:SP,1G:RT:2
:OF,1G
:CR,FILL02:RT:2:4:-1
::
```

For example, let's assume the FORTRAN IV compiler (24177-60001) is added on-line rather than generated into the system. The compiler has four segments. After the LOADR has loaded FORTRAN as a temporary program, do the following:

```
::*SP,FTN4      (Build type 6 files for FORTRAN IV and
:*SP,F4.0        its four segments)
:*SP,F4.1
:*SP,F4.2
:*SP,F4.3
```

Then create a set-up file and a clean-up file.

The set-up file, following the name convention is, /FTN4

```
:RP,FTN4      (Build ID segments for FORTRAN IV)
:RP,F4.0
:RP,F4.1
:RP,F4.2
:RP,F4.3
::
```

The clean-up file, following the name convention, is \FTN4

```
:RP,,FTN4      (Release ID segments for future use)
:RP,,F4.0
:RP,,F4.1
:RP,,F4.2
:RP,,F4.3
::
```

This concludes the discussion of helpful techniques in using and maintaining an RTE system. Please let me know if you have any suggestions to add. I will publish them in follow-up articles with appropriate thanks to contributors.

## CAUTION ON DEFINING 7905 SUBCHANNELS FOR RTE-II/III

*Jim Bridges*  
*HP Data Systems*

The generators for RTE II (92001A/92001B) and RTE III (92060A/92060B) do not check for certain user errors in defining 7905 subchannels. These errors can result in one or more tracks "shared" by different subchannels. The consequences can be catastrophic. The following example makes the point:

| #<br>TRKS | FIRST<br>CYL # | HEAD | #<br>SURFACES | UNIT | #<br>SPARES |
|-----------|----------------|------|---------------|------|-------------|
| 255       | 0              | 2    | 1             | 0    | 4           |
| 150       | 259            | 2    | 1             | 0    | 2           |
| 400       | 0              | 0    | 2             | 0    | 11          |
| 400       | 205            | 1    | 2             | 0    | 11          |

Subchannel 3 starts on head 1 and uses *two* surfaces. The generator *increments* the head number to determine the heads to use for the two surfaces. Thus, subchannel 3 uses heads 1 and 2. But this means that subchannel 3 and sub-

channel 1 have tracks 205 through 259 and head 2 in common! The generator assumes that any application of the disc is valid and so this is not flagged as an error. But if subchannels 1 and 3 are used for FMP files (or the system and FMP files) files may be lost or the system destroyed by itself.

The next update to the system manuals will clarify the method used by the generator so that future readers may avoid this trap.

## KNOW YOUR RTE — PART 5

by Mr. RTE

This is the fifth of a series of articles in the **Communicator** dealing with the inner works of HP's RTE systems. These articles go into some detail on how the system works; therefore, you should have already read and become familiar with the material in the RTE reference manual to your system.

Last time we finished up tracing a command through \$MESS. We now have enough of the system within our grasp to attempt an I/O request. An I/O request is made by a program doing a JSB EXEC. EXEC is below the memory protect fence so the JSB to EXEC will cause a memory protect violation. This causes an interrupt to select code 5. Trap cell 5 contains a JSB to \$CIC in RTIOC. \$CIC saves the calling programs registers, identifies the interrupting select code and if not 5 clears its flag. \$CIC then sets up the privileged interrupt system if the privileged option was chosen at generation.

At this point \$CIC further catalogs the interrupting select code as follows:

1. If it is 5 go to \$RQST in EXEC
2. If it is the time base generator, go to \$CLCK in RTIME
3. If in the interrupt table then either:
  - a. If entry is  $> 0$ , it is an EQT address — set it up and go to the driver at C.XX
  - b. If entry is  $< 0$  then it is the negative of the ID segment address of a program to schedule.
  - c. If entry is 0 print ILL INT XX and return to the point of interrupt.
4. If none of the above, print ILL INT XX and return to the point of interrupt

In the case we are tracing (an I/O call), the system goes to \$RQST in EXEC. \$RQST reads the violation register, sets it as the current point of suspension, checks for a dynamic memory error (RTE-III) and for parity error (Halt 5, B= violation address). If these tests fail, then the violating instruction is tested for the following:

1. It must be a JSB or JSB,I.
2. The target address must be EXEC, \$LIBR or \$LIBX or the target address must be in the resident library.

If either of these fail, a MP error is reported and the program is aborted by calling \$ERMG. We will digress at this point to discuss \$ERMG.

\$ERMG is entered with the 4 character ASCII error message in the A and B registers. For example A might = IO and B = 01 to report error IO01 XXXXX AAAA where XXXXX is the current executing programs name (from the ID segment pointed to by XEQT on the base page) and AAAA is that programs current point of suspension (XSUSP,I on the base page). After the message is set up, but before it is sent, a check is made to see if the B-register portion of the error code is a double blank. If it is not a double blank, the programs status word is checked to see if Bit 15 (the NA bit) is set. If this bit is set, it means the program has made a No-Abort EXEC call. (We will see how the bit gets set below). If the NA bit is set and B  $\neq$  double blank, then the programs A and B registers are set to the error code (A and B at entry to \$ERMS), its point of suspension is decremented and the program is scheduled by calling \$LIST. \$ERMS then returns.

In the case where B=double blank (e.g., MP, RQ, DM) or the NA bit is zero, the error message is sent to the system console via \$SYMG in RTIOC. The message indicates why, who and where. The \$ERMS routine then calls \$ABRT (see part 4) which generates the XXXXX ABORTED message. \$ERMS then returns to its caller.

If we have a good JSB EXEC the system uses the return address from the EXEC call to calculate the number of parameters in the call. It will abort the program with an RQ error if:

1. There is less than 1 or more than 9 parameters
2. If a parameter address links through either A or B

If these tests pass a check is made to see if the sign bit is set on the request code. If it is the NA bit is set in the programs status word, the return address is incremented and the sign bit is cleared in the request code. Most EXEC request processors don't even know about the abort return option as this code and the code in \$ERMS do all the work. This request code is put in RQP1 on the base page so that we can modify it without changing the users copy. All other parameters are left as DEF's on the base page. Any unsupplied parameters have their DEF's set to zero on the base page.

Next the system checks for a legal request code and aborts the program with an RQ error if it is illegal.

The system then indexes into a parameter bit map which identifies which parameter, for each request code, the system may store into. Each of these parameters is checked to see if the supplied address is above the current memory protect fence. If not the program is aborted with an RQ00 error. If the parameter is to be altered but is not supplied, the system ignores the error at this point. If it is truly an error, the processor for that request will report it.

After these checks the I/O request we started with is dispatched to \$IORQ in RTIOC.

\$IORQ first picks up the LU, then checks the batch flag (BA in word 21 of the callers ID-segment). If the batch flag is set, the LU switch table is scanned to find the current LU in the 'from' side of the table. If found the LU is translated. After a possible translation, the LU is checked to see if it exists (i.e., is less than LUMAX on the base page). By holding this check until after the transform we allow a batch program to use an LU greater than LUMAX. The batch flag is set by FMGR in its own ID-segment and is propagated by the system whenever it schedules a program with wait so even the lowest son will have the batch bit set if it is part of a JOB.

If the LU equals 0 or if it points to EQT 0, RTIOC sets up a dummy EQT in RTIOC itself. This dummy EQT has a select code of zero so a two-word status request can identify it. In addition to the status words EQT1 and EQT6 are needed by the system, thus the system uses 4 words to put together a 15 word dummy EQT.

If the EQT is real \$CVEQ is called to set it up. At this point the status request (request code=13) is split out. We will not cover the status request in any more detail in this series.

At this point a check is made to see if the EQT or the LU is down. If it is, the first temporary word in the callers ID segment is set to 4 and the program is put in the 3 list (\$LIST) and RTIOC exists to \$XEQ.

When any device is upped, the programs in the 3 list with their first temporary word set to 4 will be rescheduled, but for now, the program is suspended and swappable.

Control requests; i.e., request codes 3 or 19 (by this point you should have observed that class request codes are just 20 octal more than standard I/O requests — not by accident) are handled next. The control requests are fairly straight forward and we won't do more than say the dynamic status request is never buffered. This allows you to get the status after all the other stuff queued on the device has been done and to get it even if the device is buffered.

For other I/O requests the system checks for at least 3 parameters and for standard READ and GET requests that

the buffer does not extend beyond the end of memory (IO04 if it does). If the device is a disc (driver type code=30,31,32 or 33) and the request is a CLASS request, the program is aborted (IO02). If the LU is 2 or 3 (i.e., system discs) there are 2 or 3 pages of assembly language tests that are done to make sure the access is legal. We will not detail these here. For non-disc I/O, if the user has set bit 12 (X-bit) he is supplying two buffers (see your RTE manual). The system assumes that this buffer will not be modified so no write protect checks are done on it but if the bit says it is supplied then there must be 5 parameters (IO01). At this point the LU lock flag is checked. If the LU is locked to some other program the current program is put into the 3 list (\$LIST) to wait for the RN (resource number) associated with the LU lock. If the LU is locked to the current caller the system sets up to link the request as if it had the lowest possible priority (77777B) and to set the priority of the request itself to 1 (i.e., as high as possible). The reason for this is that if you're doing a block of I/O requests to a locked device, you want the requests to come out in the order they are made, but if there are requests from some prior user already queued on the device when the lock was granted you don't want to get ahead of his requests. This is insured by linking at the lowest possible priority. On the other hand you don't want some other user to get ahead of your final requests just because you unlocked the device before all the I/O in its buffer was completed. This is insured by giving the request itself the highest priority.

After some class I/O checks the system checks if the buffer limit has been exceeded. If the requesters priority is lower than 40 or the device is not buffered this check is not made. The device queue is checked and the number of words of buffer memory in it is summed. If the limit is exceeded the caller is suspended with his XTEMP word pointing to the EQT. When the device works the buffer down to the lower limit he will be rescheduled and will remake the I/O request.

At this point we rejoin the disc I/O, which is not checked for LU lock conditions. If the device is buffered and the request is for write or control, or if a class I/O request, then memory allocation is attempted. If there is no memory available now the program will be memory suspended to wait for memory. If there will never be any memory the system attempts to queue the request as unbuffered — see below. If memory is available the I/O request is set up in the buffer obtained — including a buffer move and if the X-bit is set the addition buffer is also moved. The request is then linked (using LINK an internal subroutine) on the EQT and control is given to \$XEQ which will return to the user, or if no I/O is active on the device the internal subroutine DRIVR is called and then control is given to \$XEQ.

For unbuffered requests (including those that could not be buffered as discussed above), the system checks the RE bit in word 21 of the callers ID-segment. If this bit is set the

caller is one or more levels deep in a re-entrant subroutine. If this is the case, the I/O buffer may be in that subroutine's Temporary Data Block (TDB). If this is true and if, while the I/O is in progress, the subroutine is reentered the system would have to move a TDB while it was in use for I/O. In order to avoid this possibility, RTIOC calls \$REIO in the EXEC module. This subroutine is passed the buffer address and checks to see if it lies within a TDB owned by the current program. If it does an attempt at memory allocation is made (\$ALC). If there is no memory now but there will be at some time later (remember \$ALC knows this), the program is memory suspended and \$REIO exits to \$XEQ instead of returning. If there will never be enough memory \$REIO just returns to RTIOC. If memory is available the TDB containing the buffer is moved to system memory. This information must be passed back to RTIOC so that it knows where the buffer is.

This is complicated in RTE-III by the fact that it is possible that the actual buffer address has not changed even though the buffer has been moved to the system map. In the RTE-III this information must be known to correctly map the system when the I/O device interrupts so the entry point \$MVBFI is set non-zero to indicate that the buffer was moved. RTIOC also calls \$REIO to move the second buffer if the X-bit is set. It is important to realize that both buffers must be in the same map or it will be impossible to correctly map the system for the driver. Also swapping is done based on the primary buffer address only — so if a second buffer is supplied it must be in the same status as the first buffer. The system can handle these buffers in two different TDB's but not one in and one out.

We will defer the details of reentrant subprogram management until a later article.

After \$REIO returns RTIOC finishes set up of the user's ID segment, calls \$LIST to I/O suspend the caller, and calls the internal subroutine LINK to link the request on the EQT. If the EQT shows the device is busy, control is passed to \$XEQ at this point.

## DRIVR

If the device is not busy RTIOC calls DRIVR to start the I/O. DRIVR is an internal subroutine in RTIOC. DRIVR allocates a DCPC channel, if required, sets up the device EQT with the request data and calls the device driver to start the I/O. After the device driver returns to DRIVR it returns. If DCPC channel is required but not available the DCPC wait count is incremented and the EQT is put in DCPC wait status. DRIVR also has a not ready return which causes RTIOC to print the not ready message and to requeue all requests as follows:

1. Standard I/O. The caller is put in the general wait list (\$LIST) until the device is upped.

2. Class, buffered and system I/O. The requests are queued on the LU which is put down.

## Dummy EQ or LU

If a request is made at LU 0 or on an LU which is unassigned (points to EQT # 0) the system treats the request as a dummy request by a) not calling DRIVR and b) by returning a completion indication with as many words transferred as requested.

This concludes our discussion of the I/O request. Next time we intend to cover a time base tick. We have covered most of the core resident system so far so we are looking for more topics. If you have any suggestions please send them to us.

## Letters for Mr. RTE:

It seems we have some very scrutinizing readers:

Dear Mr. RTE,

In your Slow Boot article in Issue #8, May, 1976, of the Communicator, on page 377 Column E, I have found what I think may be an error. For DVR 31 — paper tape —, the boot-extension JMP-sys-loc should read X7505 rather than X7605.

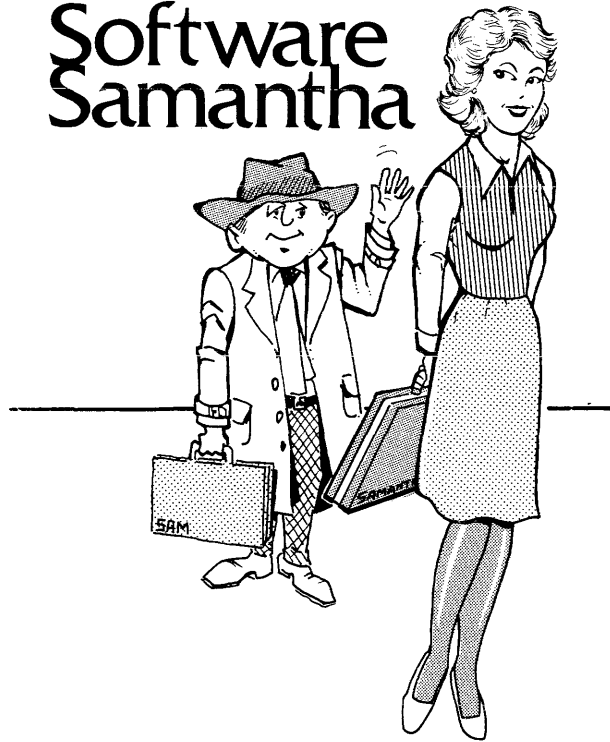
Del Kittendorf  
HP Orlando

Dear Del,

You're right! Thank you.

Mr. RTE

# Software Samantha



We would like to welcome to the **Communicator** the new 1000 (9600) system troubleshooter, Software Samantha, who is ready and willing to tackle problems or questions you may have with your 1000/9600 system. Samantha will respond to all letters sent in, the best of those being chosen for print. Also from time to time, she will share with you her insights in how to get the most out of your system.

The following is the first part of a letter addressed to Samantha's predecessor, Sam. The sender suggested a possible solution to the question below, that of saving the parameters in common area which is not swapped out with the overlay. Samantha will present a solution to the question of how to use any set of subroutines in an overlay segment and not lose parameters in the swap.

DEAR SAM,

If the plotter calls are to be added to Multi-User Real Time BASIC, RTE must be generated with at least 7503 octal words of foreground disc resident area to accommodate the 92409-60001 Rev C 7210A Plotter Library. This large foreground reduces the amount of background available for BASIC and BASIC programs. The Multi-User Manual (92060-90016 CHG 1) explains on page 14-6 how to load the overlay in background but it doesn't work because the PLTLU(LU) is wiped out as soon as BASIC is swapped back into background and before the plotter is commanded to move.

Bill Otto  
DRSMI-RRS  
Army Missile Command  
Huntsville, Alabama

DEAR BILL,

I would first like to state that the problem is cleared up in revision D of 92409-60001. However, I will take this opportunity to explain the reason the problem occurred and how it may be avoided in revision C. I will address the general question of how one can use any arbitrary set of subroutines in an overlay segment which is swapped in and out of memory. This becomes a problem only if parameters are initialized by one subroutine call and must later be used by other subroutines in the overlay.

The following example will demonstrate the problem and the solution. Below is the assembly language code for two subroutines to be placed in a background overlay which will be assumed to swap in and out of memory, perhaps exchanging places with BASIC. The routine SETUP places a value in a location within the overlay. Later, the contents of the location are retrieved by calling LOOK.

```
ASMB,R,L
      NAM  SETUP
      ENT  SETUP,LOOK
      EXT  .ENTR
PARM  BSS  1
SETUP  NOP
      JSB  .ENTR
      DEF  PARM
      LDA  PARM,I
      STA  FLAG
      JMP  SETUP,I
FLAG  DEC  0
P1    BSS  1
LOOK  NOP
      JSB  .ENTR
      DEF  P1
      LDA  FLAG
      STA  P1,I
      JMP  LOOK,I
      END
      ENDS
```

The problem which BASIC must handle is this: if the overlay is swapped out between the time SETUP is called and the time LOOK is called, the value stored by SETUP will be lost if a fresh copy of the overlay is brought into memory. This may be avoided if the overlay terminates saving resources. When the overlay is accessed again, it is merely re-scheduled instead of reloaded. Execution will then begin at the code immediately following the exit sequence instead of the primary entry point.

When a set of routines are written to be BASIC callable they normally include a call to another routine called RSFLG if they are saving parameters for later use. The

about the HP 1000

routine RSFLG is found in the relocatable library 24998-16001 (any rev), or 24248-60001 rev C. RSFLG sets a flag which is examined by BASIC to determine the method of exit. If RSFLG has been called within the overlay, the flag is set and the termination is made saving resources.

If RSFLG is not called by any subroutines in the overlay, it is still possible to make the overlay terminate saving resources. This is done by defining the routine RSFLG in the branch and mnemonic table itself. RSFLG must be called from the BASIC program before any other calls are made to subroutines in that overlay. For example, consider the code below:

```
10 CALL RSFLG
20 CALL SETUP(10)
30 CALL LOOK(X)
40 PRINT "X="; X
50 END
```

The branch and mnemonic table could be set up as follows:

```
BTBL, MTBL, TRFL, ID=A
SETUP(I), OV=0, ENT=SETUP
LOOK(IV), OV=0, ENT=LOOK
RSFLG, OV=0, ENT=RSFLG
```

The transfer file, TRFL, will be created by default to produce an overlay in the foreground area. It must be edited so that the overlay is generated as a background program. If the system is RTE II this will be sufficient to guarantee swapping between BASIC and the overlay. If it is RTE III, both BASIC and the overlay may have to be assigned to the same partition to demonstrate the problem. To see the difference between saving resources and "normal" termination, remove line 10 in the sample BASIC program. The result of line 40 will be "X= 0" instead of "X= 10".

If you have any questions, suggestions, or comments about your 1000 (9600) system, please address them to:

Software Samantha  
c/o Communicator 1000 (9600) Group  
HP Data Systems Division  
11000 Wolfe Road  
Cupertino, CA. 95014

## bulletins

### HP 9600/9700 SYSTEMS AND SOFTWARE UPGRADES TO HP 1000

*Dave Borton*  
*HP Data Systems*

The introduction of the HP 1000 Computer Systems provides a new way to get RTE based systems. This new way includes the existing product capabilities of RTE-II and RTE-III as well as measurement and control. Measurement and control is now available as a computer system (HP 1000 for disc based systems and HP 9640A for memory based systems) plus a measurement and control front-end. For instance, a 9603A is now orderable as an HP 1000 plus a 9603R measurement and control subsystem with an option for local operation. Therefore, all 9600 and 9700 systems except the 9640A will be removed from HP's price list on November 1 with the capabilities replaced by the 1000.

The HP 1000 includes many new software capabilities that are available to existing installations. Included is support for 2644A's and 2645A-007 CRT's with tape minicartridges as a system console plus on-line system generation and disc backup utilities for both the 5 and 15 megabyte discs. This new software is available with RTE-II and RTE-III and will

be distributed in November to those installations signed up for the software subscription service. For other installations, the new software is available as upgrade kits. For RTE-II upgrades, order 92001B option 001 plus option 030 for 7900 5 Mbyte cartridges. For RTE-III upgrades, order 92060B option 001 plus either option 030 (7900) or 031 (7905). Both upgrades are available for \$500.00 (U.S.).

### NEW RELEASES FROM THE 2100/21MX CONTRIBUTED LIBRARY

*Melanie Van Vliet*  
*HP Data Systems Division*

This article serves as an update for the 2100/21MX Contributed Library Program Catalog (22999-90040).

The new contributed programs listed below are now available. Contact your local HP sales office to order Contributed Library material, or (if you are in the U.S.) you can use the Direct Mail Order form at the back of the **COMMUNICATOR**.

#### 22682-18921 FILE TRANSFER BETWEEN RTE AND DOS-M/III

This program provides the capability of transferring files between RTE and DOS-M or DOS-III systems. The program will

run under RTE-I, RTE-II, or RTE-III. A DOS-M or DOS-III disc must be placed into a peripheral disc subchannel. Files may then be transferred from RTE to the DOS-M/III disc, or vice versa. Source, relocatable, or binary files may be transferred. In the RTE host system, files handled may reside in the File Manager, on LS tracks, or on LG tracks. In the DOS-M/III system on the peripherals disc subchannel, files in the system or user areas may be handled.

| Order Number | Option | Price   |
|--------------|--------|---------|
| 22682-18921  | PT     | \$30.00 |
| 22682-13321  | Cass   | 35.00   |

#### 22682-18922 DOS-M/III FILE DIRECTORY LISTING FROM RTE ENVIRONMENT

This program provides the capability of listing the directory of a DOS-M or DOS-III disc pack from within an RTE environment. The program will run under RTE-I, RTE-II, or RTE-III. The DOS-M or DOS-III disc whose directory listing is desired is placed into a peripheral disc subchannel. The DOS-M/III directory listing generated by this program is identical with the directory listings generated by DOS-M or DOS-III. The system directory and user directory may both be listed.

Hardware requirements are RTE-I, II, or III and associated peripherals, at least 24k of core, and a disc drive having one or more RTE peripheral subchannels.

| Order Number | Option | Price   |
|--------------|--------|---------|
| 22682-18922  | PT     | \$20.00 |

#### 22682-18923 DVR37-DOS DRIVER FOR ASCII BUS (HP 59310A)

This driver (DVR37) operates under the control of the I/O control module of the DOS execute.

This driver is responsible for:

1. Controlling input and output data transmission with the device(s) connected on the ASCII Bus Line via HP 59310A I/O card.

2. Outputting the Control Word which is used to select the operating modes and Bus functions that the Bus I/O card is to perform.

| Order Number | Option | Price   |
|--------------|--------|---------|
| 22682-18923  | PT     | \$25.00 |

#### 22682-18924 DOS-III FILE SAVER

This program is capable of saving purged files and files whose boundaries are not the same in the user directory as they are actually on the disc.

This is a flexible file saving program which resides on disc within the Hewlett-Packard DOS-III system. The program when called into core is able to "save" purged files or files whose boundaries are not the same in the user directory as they are actually on the disc. For added protection of the user files, a security code is incorporated into the program along with a no echo input feature after the program has been called into core.

| Order Number | Option | Price   |
|--------------|--------|---------|
| 22682-18924  | PT     | \$10.00 |

#### 22682-18925 TAPE-TO-TAPE COPY, SINGLE DRIVE MAG TAPE

A single drive mag tape copy utility for DOS-M and DOS-III. This program will copy HP FORTRAN generated tapes using only a single mag tape drive and the disc. It is a file oriented program that can take as input many files from many different tapes, in any order, and put them out on a fresh tape.

| Order Number | Option | Price   |
|--------------|--------|---------|
| 22682-18925  | PT     | \$10.00 |

#### 22682-18926 UTDMP - UNIVERSAL MAG TAPE DUMP

This program provides a formatted dump of mag tape data. The data may be in any format and the block size may be of any practical length.

The program is conversational in obtaining the information needed for a job. (Dumps are on a per-file basis.)

The program gives both an octal and an alphanumeric representation of the data in a convenient form.

UTDMP — Main Program  
RECRD — Subroutines

| Order Number | Option | Price   |
|--------------|--------|---------|
| 22682-18926  | PT     | \$10.00 |

#### 22682-18927 **SIMPLEX — LINEAR PROGRAMMING FOR DOS-III**

This program solves linear programming problems by using the Simplex or Dantzig method. The program minimizes an objective function subject to up to 100 constraints with no more than 1000 variables (real + artificial + slack); the program needs as data the first tableaux of the method getting to the optimal solution.

The program can maximize problems if the objective function of the mathematical model is multiplied by -1.

| Order Number | Option | Price   |
|--------------|--------|---------|
| 22682-18927  | PT     | \$10.00 |

#### 22682-10928 **APPLICATIONS DATA MANAGEMENT FOR HP RTE FMGR COMPUTER SYSTEMS (ADM-RTE)**

ADM is a file management and information retrieval system. The system has the following capabilities:

1. Record definition by data element.
2. File accessing methods;
  - a. sequential
  - b. binary search
  - c. hash index
3. Record Retrieval by;
  - a. relative record number
  - b. key value
  - c. conditional key value
  - d. cross reference index
4. Report formatting
5. Data base utility functions
6. Sort

| Order Number | Option               | Price    |
|--------------|----------------------|----------|
| 22682-10928  | 800 BPI<br>Mag Tape  | \$275.00 |
| 22682-11928  | 1600 BPI<br>Mag Tape | 275.00   |
| 22682-13328  | Cass                 | 325.00   |

#### 22682-18929 **RTE DRIVER PACKAGE FOR XYNETICS & CALCOMP PLOTTERS**

This program package includes the .RTE DRIVER FOR XYNETICS AND CALCOMP PLOTTERS (DVP10) and XYNETICS PLOTTER ROUTINES.

The driver allows Xynetics 1100, 1200, & 2000 series plotters equipped with SG-50 slope generators to operate as standard system peripheral equipment. Standard EXEC calls may be made to output data and check status of plotter. Standard system features such as buffered output, equipment timeout, etc., are available. This driver allows programmable pen color changes with automatic offsetting so that all colors line up. The driver also supports CALCOMP 560 series incremental plotters. Type of plotter to be used is specified by subchannel at system generation time. Plotter Routines (XYNETICS) — PLOT module replaces PLOT portion of standard HP plotter library. These routines format data for the XYNETICS flatbed plotters, mod 1100, 1200 & 2000 equipped with SG50 slope generators and HP interfaces. Each line drawn requires 8 words of data. Routine updates current pen coordinates, handles pen up/down commands, and new origin commands same as standard PLOT module. This is a utility subroutine, type 7, to be appended to users program which generates data. A test program is supplied to verify correct operation. The test program draws a simple geometric pattern using all four pen colors and plots a few symbols.

Hardware requirements — Xynetics Flat-bed Plotter 1100, 1200, 2000 SG-50 slope generator C65A/21 HPIN interface card for HP 2100 computer P/N 102708. HP interface cable P/N 103018B. 4-pen in-line marker P/N WA40B. HP 12566B I/O card: W1 = A; W2 = C; W3 = B; W4 = B; W9 = A; W5-8 disconnect HP RTE system.

| Part Number | Option | Price   |
|-------------|--------|---------|
| 22682-18929 | PT     | \$30.00 |
| 22682-13329 | Cass   | 75.00   |

## 22682-18930 SYSTEM MAINTENANCE UTILITY (SMUT)

This routine allows, the RTE II or III user to perform useful disc and memory related functions for both 7900 and 7905 discs. The routine uses several system intrinsics, and can run in a 5k or 12k environment. It has a built in calculator for performing arithmetic and bit manipulation calculations. The following capabilities are offered by the routine:

1. display and alter memory
2. replace, copy, sum, and initialize blocks of memory
3. display and alter any disc
4. modify corresponding disc by address memory
5. list symbolic contents of track assignment table
6. list address of all system tables
7. list entire EQT, LU, INT, and IO tables
8. list contents of any programs ID segment
9. list compact table of HP-IB device talk/listen addresses
10. interrogate the BUS

A comprehensive users guide with numerous hints for effective utilization accompanies the program.

| Order Number | Option | Price   |
|--------------|--------|---------|
| 22682-18930  | PT     | \$30.00 |
| 22682-13330  | CASS   | 70.00   |

**WARNING** — The main thrust of this program is to give the user full and complete control of an RTE system. Thus, some commands can have disastrous effects if not used correctly. The author and Hewlett-Packard will assume no responsibility for the effects of improper use.

The following programs have had revisions.

## 22681-18932 RTE MULTIPLEXER DRIVER (12920A)

This routine is an Input/Output Driver (DVR52) which operates under control of the Real Time Executive (RTE) Operating system. Data transmission is possible with any EIA RS-232 compatible terminal connected to this interface. Speed detection is possible at speeds of 10, 15, 30, 60, 120 and 240 characters per second. This driver does not use the full capability of the Modem Control Card. This routine is a privileged driver and is compatible with the RTE, RTE-C, RTE-II, and RTE-III Operating Systems.

| Order Number | Option | Price   |
|--------------|--------|---------|
| 22681-18932  | PT     | \$20.00 |
| 22681-13332  | Cass   | 35.00   |

## 22293-18900 OCTAL ASSEMBLY PROCESSOR & UTILITY SYSTEM (REV. C) (OCTAPUS-C)

Octopus-C performs all the functions of Octopus-B (Assembly and inverse assembly, paper tape punching, loading and verifying, and memory searching). In addition it provides the capability to handle EAU instructions, to reverse the skip sense of ASG instructions, to do an inverse assembly of a binary tape without loading it, and to relocate sections of core either on-line or by the production of a binary tape.

| Order Number | Option | Price   |
|--------------|--------|---------|
| 22293-18900  | PT     | \$20.00 |

*The following programs have been "Withdrawn" from the Contributed Library. They are no longer available.*

*Documentation on these programs can be obtained only upon special request made to the 2100/21MX Contributed Library Manager.*

| ORDER NUMBER | TITLE              |
|--------------|--------------------|
| 22682-10906  | ON-TOP DEMO        |
| 22682-11906  |                    |
| 22681-18963  | TODS-C DISC EDITOR |

## INTERIM TRAINING SCHEDULE

Jane Seligson  
HP Data Systems

Because of the heavy demand for certain DS courses, the training schedule is being released prior to normal distribution in the Computer Systems Group Course Schedule.

These dates are firm and reservations are being taken to fill them.

Also two of the most popular training manuals have been extensively redone and carry new part numbers. If you want one, use the new number. They are the RTE II/III Student Workbook (# 22999-90101), priced at \$16.00, and Batch Spool Monitor (# 22999-90102) priced at \$15.00.

# software updates

Listed below are the software parts and manuals which are shipped when 92001B (RTE-II) is ordered (or is included in an order).

## SOFTWARE MODULE NUMBERS: 92001B

| Software<br>Module Number | Module<br>File Name | Module<br>Descriptor           | Part Numbers   |             |             |
|---------------------------|---------------------|--------------------------------|----------------|-------------|-------------|
|                           |                     |                                | Mini-Cartridge | 7900 Disc   | 7905 Disc   |
| 02607-16004               | IS4L07              | 24K SIO LINE PRINTER DRIVER    | 92001-13305    | 92001-13001 | 92001-13101 |
| 09601-16021               | %DVR15              | RTE 7261A DRIVER               | 92062-13301    | 92001-13001 | 92001-13101 |
| 12970-16004               | IS4MT1              | 24K SIO MAG. TAPE DRIVER       | 92001-13305    | 92001-13001 | 92001-13101 |
| 20747-60001               | %DVR30              | RTE FIXED HEAD DISC DRIVER     | 92062-13301    | 92001-13001 | 92001-13101 |
| 20808-60001               | %CAL10              | CAL. PLOTTER DRIVER            | 92062-13301    | 92001-13001 | 92001-13101 |
| 20810-60001               | %CALIB              | CAL. PLOTTER LIBRARY           | 92062-13301    | 92001-13001 | 92001-13101 |
| 20875-60001               | %1FTN               | FORTTRAN MAIN CONTROL          | 92060-13308    | 92001-13001 | 92001-13101 |
| 20875-60002               | %2FTN               | FORTTRAN PASS 1                | 92060-13308    | 92001-13001 | 92001-13101 |
| 20875-60003               | %3FTN               | FORTTRAN PASS 2                | 92060-13308    | 92001-13001 | 92001-13101 |
| 20875-60004               | %4FTN               | FORTTRAN PASS 3                | 92060-13308    | 92001-13001 | 92001-13101 |
| 20875-60005               | %5FTN               | FORTTRAN PASS 4                | 92060-13308    | 92001-13001 | 92001-13101 |
| 24129-60001               | %ALGOL              | RTE/DOS ALGOL PART 1           | 92060-13305    | 92001-13001 | 92001-13101 |
| 24129-60002               | %ALGL1              | RTE/DOS ALGOL PART 2           | 92060-13305    | 92001-13001 | 92001-13101 |
| 24153-60001               | %FF.N               | RTE/DOS FORMATTER              | 92060-13303    | 92001-13001 | 92001-13101 |
| 24170-60001               | %1FTN4              | RTE/DOS FORTRAN IV PART 1      | 92060-13306    | 92001-13001 | 92001-13101 |
| 24170-60002               | %2FTN4              | RTE/DOS FORTRAN IV PART 2      | 92060-13306    | 92001-13001 | 92001-13101 |
| 24170-60003               | %3FTN4              | RTE/DOS FORTRAN IV PART 3      | 92060-13306    | 92001-13001 | 92001-13101 |
| 24177-60001               | %1FFT4              | RTE/DOS FAST FORTRAN IV PART 1 | 92060-13307    | 92001-13001 | 92001-13101 |
| 24177-60002               | %2FFT4              | RTE/DOS FAST FORTRAN IV PART 2 | 92060-13307    | 92001-13001 | 92001-13101 |
| 24998-16001               | %RLIB1              | RTE/DOS LIBRARY PART 1         | 92060-13302    | 92001-13001 | 92001-13101 |
| 24998-16001               | %RLIB2              | RTE/DOS LIBRARY PART 2         | 92060-13302    | 92001-13001 | 92001-13101 |
| 24998-60002               | %FF4.N              | FORTTRAN IV FORMATTER          | 92060-13303    | 92001-13001 | 92001-13101 |
| 25117-60499               | %DVR24              | RTE 7970 7T MAG. TAPE DRIVER   | 92062-13301    | 92001-13001 | 92001-13101 |
| 29013-60001               | %DVR31              | RTE 7900A DISC DRIVER          | 92062-13301    | 92001-13001 | 92001-13101 |
| 29028-60002               | %DVR12              | RTE 2767A DRIVER               | 92062-13301    | 92001-13001 | 92001-13101 |
| 29029-60001               | %DVR00              | RTE TTY/PUNCH/PHOTO READER     | 92062-13301    | 92001-13001 | 92001-13101 |
| 29030-60001               | %DVR11              | RTE 2892A CARD READER DRIVER   | 92062-13301    | 92001-13001 | 92001-13101 |
| 29100-60017               | IS4LP               | 24K SIO LINE PRINTER           | 92001-13305    | 92001-13001 | 92001-13101 |
| 29100-60018               | IS4SYD              | 24K SIO SYSTEM DUMP            | 92001-13305    | 92001-13001 | 92001-13101 |
| 29100-60019               | IS4PHR              | 24K SIO PHOTO READER           | 92001-13305    | 92001-13001 | 92001-13101 |
| 29100-60020               | IS4PUN              | 24K SIO TAPE PUNCH             | 92001-13305    | 92001-13001 | 92001-13101 |
| 29100-60022               | IS4L67              | 24K SIO 2767 LINE PRINTER      | 92001-13305    | 92001-13001 | 92001-13101 |
| 29100-60023               | IS4MT2              | 24K SIO 7970 MAG. TAPE         | 92001-13305    | 92001-13001 | 92001-13101 |
| 29100-60049               | IS4MT3              | 24K SIO MAG. TAPE              | 92001-13305    | 92001-13001 | 92001-13101 |
| 29100-60050               | IS4TER              | 24K SIO TERMINAL PRINTER       | 92001-13305    | 92001-13001 | 92001-13101 |
| 59310-16002               | %1DV37              | RTE HP-IB WITHOUT SRQ          | 92062-13301    | 92001-13001 | 92001-13101 |
| 59310-16003               | %2DV37              | RTE HP-IB WITH SRQ             | 92062-13301    | 92001-13001 | 92001-13101 |
| 59310-16004               | %HPIB               | HP-IB DEVICE SUBROUTINE        | 92062-13301    | 92001-13001 | 92001-13101 |
| 72008-60001               | %1DV10              | COMP. 7210A PLOTTER DRIVER     | 92062-13301    | 92001-13001 | 92001-13101 |
| 72009-60001               | %2DV10              | MIN. 7210A PLOTTER DRIVER      | 92062-13301    | 92001-13001 | 92001-13101 |
| 91200-16001               | %DVA13              | 91200A DRIVER                  | 92062-13301    | 92001-13301 | 92001-13101 |

| Software<br>Module Number | Module<br>File Name | Module<br>Descriptor            | Part Numbers   |             |             |
|---------------------------|---------------------|---------------------------------|----------------|-------------|-------------|
|                           |                     |                                 | Mini-Cartridge | 7900 Disc   | 7905 Disc   |
| 91200-16002               | %TVLIB              | 91200A VIDEO MONITOR LIBRARY    | 92062-13301    | 92001-13001 | 92001-13101 |
| 91200-16004               | %TVVER              | 91200A TV INTERFACE VERIFIER    | 92062-13301    | 92001-13001 | 92001-13101 |
| 92001-16002               | %LDR2               | RTE LOADER                      | 92001-13301    | 92001-13001 | 92001-13101 |
| 92001-16003               | %MTM                | MULT. TERMINAL MONITOR          | 92001-13301    | 92001-13001 | 92001-13101 |
| 92001-16004               | %2DP43              | POWER FAILURE DRIVER            | 92001-13301    | 92001-13001 | 92001-13101 |
| 92001-16005               | %SYLIB              | RTE SYSTEM LIBRARY              | 92001-13301    | 92001-13001 | 92001-13101 |
| 92001-16012               | %CR2SY              | CORE RESIDENT OPERATING SYS.    | 92001-13301    | 92001-13001 | 92001-13101 |
| 92001-16013               | %2GN00              | RTE-II 7900 OFF-LINE GEN.       | 92001-13303    | 92001-13001 | 92001-13101 |
| 92001-16014               | %AUTOR              | AUTO RESTART PROGRAM            | 92001-13302    | 92001-13001 | 92001-13101 |
| 92001-16018               | %2GNFH              | RTE-II FIXED HEAD DISC GEN.     | 92001-13306    | 92001-13001 | 92001-13101 |
| 92001-16020               | %DVA12              | 2607/10/13/14/17/18 DRIVER      | 92062-13301    | 92001-13001 | 92001-13101 |
| 92001-16026               | %2GN05              | RTE-II 7905 OFF-LINE GEN.       | 92001-13303    | 92001-13001 | 92001-13101 |
| 92001-16027               | %4DV05              | RTE 2640A/2644A DRIVER          | 92062-13301    | 92001-13001 | 92001-13101 |
| 92001-16028               | %0DV05              | RTE 2640A DRIVER                | 92062-13301    | 92001-13001 | 92001-13101 |
| 92001-16029               | %\$CMD2             | RTE-II COMMAND PROGRAM          | 92001-13301    | 92001-13001 | 92001-13101 |
| 92001-16030               | %WHZT2              | RTE-II WHZAT PROGRAM            | 92001-13302    | 92001-13001 | 92001-13101 |
| 92001-16031               | %RT2G1              | RTE-II ON-LINE GENERATOR PART 1 | 92001-13304    | 92001-13001 | 92001-13101 |
| 92001-16031               | %RT2G2              | RTE-II ON-LINE GENERATOR PART 2 | 92001-13304    | 92001-13001 | 92001-13101 |
| 92001-18014               | %&AUTOR             | AUTO RESTART SOURCE             | 92001-13302    | 92001-13001 | 92001-13101 |
| 92002-12001               | %BMPG1              | BATCH MONITOR PROGRAM PART 1    | 92002-13301    | 92001-13001 | 92001-13101 |
| 92002-12002               | %BMPG2              | BATCH MONITOR PROGRAM PART 2    | 92002-13301    | 92001-13001 | 92001-13101 |
| 92002-12001               | %BMPG3              | BATCH MONITOR PROGRAM PART 3    | 92002-13301    | 92001-13001 | 92001-13101 |
| 92002-12002               | %2SPO1              | RTE-II SPOOL MONITOR PART 1     | 92002-13303    | 92001-13001 | 92001-13101 |
| 92002-12002               | %2SPO2              | RTE-II SPOOL MONITOR PART 2     | 92002-13303    | 92001-13001 | 92001-13101 |
| 92002-16006               | %BMLIB              | BATCH LIBRARY                   | 92002-13302    | 92001-13001 | 92001-13101 |
| 92002-16010               | %EDITR              | RTE EDITOR                      | 92002-13302    | 92001-13001 | 92001-13101 |
| 92060-12004               | %ASMB               | RTE ASSEMBLER                   | 92060-13304    | 92001-13001 | 92001-13101 |
| 92060-16028               | %XREF               | CROSS REFERENCE                 | 92060-13304    | 92001-13001 | 92001-13101 |
| 92060-16031               | %DVR32              | RTE 7905A DISC DRIVER           | 92062-13301    | 92001-13001 | 92001-13101 |
| 92060-16038               | %SWTCH              | RTE-II SWITCH PROGRAM           | 92001-13304    | 92001-13001 | 92001-13101 |
| 92060-16039               | %SAVE               | SAVE PROGRAM                    | 92060-13309    | 92001-13001 | 92001-13101 |
| 92060-16040               | %RESTR              | RESTORE PROGRAM                 | 92060-13309    | 92001-13001 | 92001-13101 |
| 92060-16041               | %VERIFY             | DISC VERIFY PROGRAM             | 92060-13309    | 92001-13001 | 92001-13101 |
| 92060-16042               | %COPY               | DISC COPY PROGRAM               | 92060-13309    | 92001-13001 | 92001-13101 |
| 92060-16043               | %DBKLB              | DISK BACK UP LIBRARY            | 92060-13309    | 92001-13001 | 92001-13101 |
| 92060-16044               | %!DSK BK            | OFF-LINE DISK BACK UP           | 92060-13309    | 92001-13001 | 92001-13101 |
| 92060-16045               | %RDNAM              | READ NAMR PROGRAM               | 92001-13302    | 92001-13001 | 92001-13101 |
| 92060-18046               | %&UPDAT             | UPDATE TRANSFER FILE            | 92001-13302    | 92001-13001 | 92001-13101 |
| 92060-18047               | %&PKDIS             | PACK DISC TRANSFER FILE         | 92001-13302    | 92001-13001 | 92001-13101 |
| 92202-16001               | %DVR23              | RTE 7970 9T MAG. TAPE DRIVER    | 92062-13301    | 92001-13001 | 92001-13101 |

**MANUAL NUMBERS: 92001B**

| Part Number                                                                                       | Part Description                                                                                                           | Manual Type                   |
|---------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| 92001-93003                                                                                       | RTE-II PART # CAT                                                                                                          | Hardware                      |
| 92001-93001<br>92060-90012                                                                        | RTE-II MANUAL<br>RTE NEW USERS GUIDE                                                                                       | Software Operating System     |
| 5951-1369<br>5951-1374<br>5951-1376<br>5951-1390                                                  | MAN-INTRODUCTION<br>M-SIO SYS CONFG<br>M-BBL/BBDL/BMDL<br>MAN-STO SUBSYS.                                                  | Software Operating Procedures |
| 02116-9015<br>02116-9072<br>24998-90001<br>5951-1321<br>92060-90005<br>92060-90017<br>92060-90020 | MNL-FORTRAN<br>MNL-ALGOL<br>MNL-RTE/DOS LIBR<br>MNL-FORTRAN IV<br>ASSEMBLY MANUAL<br>RTE UTILS MNL #1<br>ON-LINE GEN MNL 1 | Language and Programming      |

| Part Number                                                                                           | Part Description                                                                                                   | Manual Type    |
|-------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|----------------|
| 02116-91760<br>02762-90002<br>12653-90004<br>12970-90901<br>12987-90006<br>13022-90010<br>13029-90010 | M-2600 SIO PRGM<br>M-2762/2615 SIO<br>MNL-SIO DR<br>MANUAL<br>MNL-SIO LP DRVR<br>M-7970B SIO DR<br>MNL-7970 7T SIO | Small Programs |
| 92060-90010                                                                                           | MNL POCKET GUIDE                                                                                                   | Pocket Guide   |

Listed below are the software parts and manuals which are shipped when 92060B (RTE-III) is ordered (or is included in an order).

## SOFTWARE MODULE NUMBERS: 92060B

| Software<br>Module Number | Module<br>File Name | Module<br>Descriptor           | Part Numbers   |             |             |
|---------------------------|---------------------|--------------------------------|----------------|-------------|-------------|
|                           |                     |                                | Mini-Cartridge | 7900 Disc   | 7905 Disc   |
| 02607-16004               | IS4L07              | 24K SIO LINE PRINTER DRIVER    | 92001-13305    | 92060-13001 | 92060-13101 |
| 09601-16021               | %DVR15              | RTE 7261A DRIVER               | 92062-13301    | 92060-13001 | 92060-13101 |
| 12970-16004               | IS4MT1              | 24K SIO MAG. TAPE DRIVER       | 92001-13305    | 92060-13001 | 92060-13101 |
| 20747-60001               | %DVR30              | RTE FIXED HEAD DISC DRIVER     | 92062-13301    | 92060-13001 | 92060-13101 |
| 20808-60001               | %CAL10              | CAL. PLOTTER DRIVER            | 92062-13301    | 92060-13001 | 92060-13101 |
| 20810-60001               | %CALIB              | CAL. PLOTTER LIBRARY           | 92062-13301    | 92060-13001 | 92060-13101 |
| 20875-60001               | %1FTN               | FORTTRAN MAIN CONTROL          | 92060-13308    | 92060-13001 | 92060-13101 |
| 20875-60002               | %2FTN               | FORTTRAN PASS 1                | 92060-13308    | 92060-13001 | 92060-13101 |
| 20875-60003               | %3FTN               | FORTTRAN PASS 2                | 92060-13308    | 92060-13001 | 92060-13101 |
| 20875-60004               | %4FTN               | FORTTRAN PASS 3                | 92060-13308    | 92060-13001 | 92060-13101 |
| 20875-60005               | %5FTN               | FORTTRAN PASS 4                | 92060-13308    | 92060-13001 | 92060-13101 |
| 24129-60001               | %ALGOL              | RTE/DOS ALGOL PART 1           | 92060-13305    | 92060-13001 | 92060-13101 |
| 24129-60002               | %ALGL1              | RTE/DOS ALGOL PART 2           | 92060-13305    | 92060-13001 | 92060-13101 |
| 24153-60001               | %FF.N               | RTE/DOS FORMATTER              | 92060-13303    | 92060-13001 | 92060-13101 |
| 24170-60001               | %1FTN4              | RTE/DOS FORTRAN IV PART 1      | 92060-13306    | 92060-13001 | 92060-13101 |
| 24170-60002               | %2FTN4              | RTE/DOS FORTRAN IV PART 2      | 92060-13306    | 92060-13001 | 92060-13101 |
| 24170-60003               | %3FTN4              | RTE/DOS FORTRAN IV PART 3      | 92060-13306    | 92060-13001 | 92060-13101 |
| 24177-60001               | %1FFT4              | RTE/DOS FAST FORTRAN IV PART 1 | 92060-13307    | 92060-13001 | 92060-13101 |
| 24177-60002               | %2FFT4              | RTE/DOS FAST FORTRAN IV PART 2 | 92060-13307    | 92060-13001 | 92060-13101 |
| 24998-16001               | %RLIB1              | RTE/DOS LIBRARY PART 1         | 92060-13302    | 92060-13001 | 92060-13101 |
| 24998-16001               | %RLIB2              | RTE/DOS LIBRARY PART 2         | 92060-13302    | 92060-13001 | 92060-13101 |
| 24998-16002               | %FF4.N              | FORTTRAN IV FORMATTER          | 92060-13303    | 92060-13001 | 92060-13101 |
| 25117-60499               | %DVR24              | RTE 7970 7T MAG. TAPE DRIVER   | 92062-13301    | 92060-13001 | 92060-13101 |
| 29013-60001               | %DVR31              | RTE 7900A DISC DRIVER          | 92062-13301    | 92060-13001 | 92060-13101 |
| 29028-60002               | %DVR12              | RTE 2767A DRIVER               | 92062-13301    | 92060-13001 | 92060-13101 |
| 29029-60001               | %DVR00              | RTE TTY/PUNCH/PHOTO READER     | 92062-13301    | 92060-13001 | 92060-13101 |
| 29030-60001               | %DVR11              | RTE 2892A CARD READER DRIVER   | 92062-13301    | 92060-13001 | 92060-13101 |
| 29100-60017               | IS4LP               | 24K SIO LINE PRINTER           | 92001-13305    | 92060-13001 | 92060-13101 |
| 29100-60018               | IS4SYD              | 24K SIO SYSTEM DUMP            | 92001-13305    | 92060-13001 | 92060-13101 |
| 29100-60019               | IS4PHR              | 24K SIO PHOTO READER           | 92001-13305    | 92060-13001 | 92060-13101 |
| 29100-60020               | IS4PUN              | 24K SIO TAPE PUNCH             | 92001-13305    | 92060-13001 | 92060-13101 |
| 29100-60022               | IS4L67              | 24K SIO 2767 LINE PRINTER      | 92001-13005    | 92060-13001 | 92060-13101 |
| 29100-60023               | IS4MT2              | 24K SIO 7970 MAG. TAPE         | 92001-13305    | 92060-13001 | 92060-13101 |
| 29100-60049               | IS4MT3              | 24K SIO MAG. TAPE              | 92001-13305    | 9206 13001  | 92060-13101 |
| 29100-60050               | IS4TER              | 24K SIO TERMINAL PRINTER       | 92001-13305    | 92060-13001 | 92060-13101 |
| 59310-16002               | %1DV37              | RTE HP-IB WITHOUT SRQ          | 92062-13301    | 92060-13001 | 92060-13101 |
| 59310-16003               | %2DV37              | RTE HP-IB WITH SRQ             | 92062-13301    | 92060-13001 | 92060-13101 |
| 59310-16004               | %HPIB               | HP-IB DEVICE SUBROUTINE        | 92062-13301    | 92060-13001 | 92060-13101 |
| 72008-60001               | %1DV10              | COMP. 7210A PLOTTER DRIVER     | 92062-13301    | 92060-13001 | 92060-13101 |
| 72009-60001               | %2DV10              | MIN. 7210A PLOTTER DRIVER      | 92062-13301    | 92060-13001 | 92060-13101 |
| 91200-16001               | %DVA13              | 91200A DRIVER                  | 92062-13301    | 92060-13001 | 92060-13101 |
| 91200-16002               | %TVLIB              | 91200A VIDEO MONITOR LIBRARY   | 92062-13301    | 92060-13001 | 92060-13101 |
| 91200-16004               | %TVVER              | 91200A TV INTERFACE VERIFIER   | 92062-13301    | 92060-13001 | 92060-13101 |
| 92001-16003               | %MTM                | MULT. TERMINAL MONITOR         | 92060-13301    | 92060-13001 | 92060-13101 |

| Software<br>Module Number | Module<br>File Name | Module<br>Descriptor             | Part Numbers   |             |             |
|---------------------------|---------------------|----------------------------------|----------------|-------------|-------------|
|                           |                     |                                  | Mini-Cartridge | 7900 Disc   | 7905 Disc   |
| 92001-16005               | %SYLIB              | RTE SYSTEM LIBRARY               | 92060-13301    | 92060-13001 | 92060-13101 |
| 92001-16014               | %AUTOR              | AUTO RESTART PROGRAM             | 92060-13310    | 92060-13001 | 92060-13101 |
| 92001-16020               | %DVA12              | 2607/10/13/14/17/18 DRIVER       | 92062-13301    | 92060-13001 | 92060-13101 |
| 92001-16027               | %4DV05              | RTE 2640A/2644A DRIVER           | 92062-13301    | 92060-13001 | 92060-13101 |
| 92001-16028               | %0DV05              | RTE 2640A DRIVER                 | 92062-13301    | 92060-13001 | 92060-13101 |
| 92001-18014               | &AUTOR              | AUTO RESTART PROGRAM SOURCE      | 92060-13310    | 92060-13001 | 92060-13101 |
| 92002-12001               | %BMPG1              | BATCH MONITOR PROGRAM PART 1     | 92002-13301    | 92060-13001 | 92060-13101 |
| 92002-12001               | %BMPG2              | BATCH MONITOR PROGRAM PART 2     | 92002-13301    | 92060-13001 | 92060-13101 |
| 92002-12001               | %BMPG3              | BATCH MONITOR PROGRAM PART 3     | 92002-13301    | 92060-13001 | 92060-13101 |
| 92002-16006               | %BMLIB              | BATCH LIBRARY                    | 92002-13302    | 92060-13001 | 92060-13101 |
| 92002-16010               | %EDITR              | RTE EDITOR                       | 92002-13302    | 92060-13001 | 92060-13101 |
| 92060-12001               | %3SPO1              | RTE-III SPOOL MONITOR PART 1     | 92060-13313    | 92060-13001 | 92060-13101 |
| 92060-12001               | %3SPO2              | RTE-III SPOOL MONITOR PART 2     | 92060-13313    | 92060-13001 | 92060-13101 |
| 92060-12003               | %CR3SY              | MEMORY RESIDENT SYSTEM           | 92060-13301    | 92060-13001 | 92060-13101 |
| 92060-12004               | %ASMB               | RTE ASSEMBLER                    | 92060-13304    | 92060-13001 | 92060-13101 |
| 92060-16001               | %3DP43              | POWER FAILURE DRIVER             | 92060-13301    | 92060-13001 | 92060-13101 |
| 92060-16004               | %LDR3               | RTE-III LOADER                   | 92060-13301    | 92060-13001 | 92060-13101 |
| 92060-16006               | %WHZT3              | RTE-III WHZAT PROGRAM            | 92060-13310    | 92060-13001 | 92060-13101 |
| 92060-16028               | %XREF               | CROSS REFERENCE                  | 92060-13304    | 92060-13001 | 92060-13101 |
| 92060-16029               | !3GN00              | 7900 RTE-III GENERATOR           | 92060-13311    | 92060-13001 | 92060-13101 |
| 92060-16031               | %DVR32              | RTE 7905A DISC DRIVER            | 92062-13301    | 92060-13001 | 92060-13101 |
| 92060-16032               | !3GN05              | 7905 RTE-III GENERATOR           | 92060-13311    | 92060-13001 | 92060-13101 |
| 92060-16035               | %\$PVMP             | \$PVMP                           | 92060-13301    | 92060-13001 | 92060-13101 |
| 92060-16036               | %SCMD3              | RTE-III COMMAND PROGRAM          | 92060-13301    | 92060-13001 | 92060-13101 |
| 92060-16037               | %RT3G1              | RTE-III ON-LINE GENERATOR PART 1 | 92060-13312    | 92060-13001 | 92060-13101 |
| 92060-16037               | %RT3G2              | RTE-III ON-LINE GENERATOR PART 2 | 92060-13312    | 92060-13001 | 92060-13101 |
| 92060-16038               | %SWTCH              | RTE-III SWITCH PROGRAM           | 92060-13312    | 92060-13001 | 92060-13101 |
| 92060-16039               | %SAVE               | SAVE PROGRAM                     | 92060-13309    | 92060-13001 | 92060-13101 |
| 92060-16040               | %RESTR              | RESTORE PROGRAM                  | 92060-13309    | 92060-13001 | 92060-13101 |
| 92060-16041               | %VERFY              | DISC VERIFY PROGRAM              | 92060-13309    | 92060-13001 | 92060-13101 |
| 92060-16042               | %COPY               | DISC COPY PROGRAM                | 92060-13309    | 92060-13001 | 92060-13101 |
| 92060-16043               | %DBKLB              | DISK BACK UP LIBRARY             | 92060-13309    | 92060-13001 | 92060-13101 |
| 92060-16044               | !DSK BK             | OFF LINE DISK BACK UP            | 92060-13309    | 92060-13001 | 92060-13101 |
| 92060-16045               | %RDNAM              | READ NAMR PROGRAM                | 92060-13310    | 92060-13001 | 92060-13101 |
| 92060-18046               | &UPDAT              | UPDATE TRANSFER FILE             | 92060-13310    | 92060-13001 | 92060-13101 |
| 92060-18047               | &PKDIS              | PACK DISK TRANSFER FILE          | 92060-13310    | 92060-13001 | 92060-13101 |
| 92202-16001               | %DVR23              | RTE 7470 9T MAG. TAPE DRIVER     | 92062-13301    | 92060-13001 | 92060-13101 |

**MANUAL NUMBERS: 92060B**

| Part Number                                                                                       | Part Description                                                                                                           | Manual Type                   |
|---------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| 92060-90004<br>92060-90012                                                                        | RTE-III MANUAL<br>RTE NEW USERS GUIDE                                                                                      | Software Operating System     |
| 5951-1369<br>5951-1374<br>5951-1376<br>5951-1390                                                  | MAN-INTRODUCTION<br>M-SIO SYS CONFG<br>M-BBL/BBDL/BMDL<br>MAN-SIO SUBSYS.                                                  | Software Operating Procedures |
| 02116-9015<br>02116-9072<br>24998-90001<br>5951-1321<br>92060-90005<br>92060-90017<br>92060-90020 | MNL-FORTRAN<br>MNL-ALGOL<br>MNL-RTE/DOS LIBR<br>MNL-FORTRAN IV<br>ASSEMBLY MANUAL<br>RTE UTILS MNL #1<br>ON-LINE GEN MNL 1 | Language and Programming      |
| 02116-91760<br>02762-90002<br>12653-90004<br>12970-90901<br>12987-90006                           | M-2600 SIO PRGM<br>M-2762/2615 SIO<br>MNL-SIO DR<br>MANUAL<br>MNL-SIO LP DRVR                                              | Small Programs                |

| Part Number                | Part Description                  | Manual Type              |
|----------------------------|-----------------------------------|--------------------------|
| 13022-90010<br>13029-90010 | M-7970B SIO DR<br>MNL-7970 7T SIO | Small Programs Continued |
| 92060-90019                | RTE III PT # CAT                  | Miscellaneous            |
| 92060-90010                | MNL POCKET GUIDE                  | Pocket Guide             |

## RTE DRIVERS

Following is a list of the drivers available for RTE systems.

### RTE DRIVERS

| Software<br>Module Number | Module<br>File Name | Module<br>Descriptor         | Part Numbers   |           |           |
|---------------------------|---------------------|------------------------------|----------------|-----------|-----------|
|                           |                     |                              | Mini-Cartridge | 7900 Disc | 7905 Disc |
| 09601-16021               | %DVR15              | RTE 7261A DRIVER             | 92062-13301    |           |           |
| 20747-60001               | %DVR30              | RTE FIXED HEAD DISC DRIVER   | 92062-13301    |           |           |
| 20808-60001               | %CAL10              | CAL. PLOTTER DRIVER          | 92062-13301    |           |           |
| 20810-60001               | %CALIB              | CAL. PLOTTER LIBRARY         | 92062-13301    |           |           |
| 25117-60499               | %DVR24              | RTE 7970 7T MAG. TAPE DRIVER | 92062-13301    |           |           |
| 29013-60001               | %DVR31              | RTE 7900A DISC DRIVER        | 92062-13301    |           |           |
| 29028-60002               | %DVR12              | RTE 2767A DRIVER             | 92062-13301    |           |           |
| 29029-60001               | %DVR00              | RTE TTY/PUNCH/PHOTO READER   | 92062-13301    |           |           |
| 29030-60001               | %DVR11              | RTE 2892A CARD READER DRIVER | 92062-13301    |           |           |
| 59310-16002               | %1DV37              | RTE HP-IB WITHOUT SRQ        | 92062-13301    |           |           |
| 59310-16003               | %2DV37              | RTE HP-IB WITH SRQ           | 92062-13301    |           |           |
| 59310-16004               | %HPIB               | HP-IB DEVICE SUBROUTINE      | 92062-13301    |           |           |
| 72008-60001               | %1DV10              | COMP. 7210A PLOTTER DRIVER   | 92062-13301    |           |           |
| 72009-60001               | %2DV10              | MIN. 7210A PLOTTER DRIVER    | 92062-13301    |           |           |
| 91200-16001               | %DVA13              | 91200A DRIVER                | 92062-13301    |           |           |
| 91200-16002               | %TVLIB              | 91200A VIDEO MONITOR LIBRARY | 92062-13301    |           |           |
| 91200-16004               | %TVVER              | 91200A TV INTERFACE VERIFIER | 92062-13301    |           |           |
| 92001-16020               | %DVA12              | 2607/10/13/14/17/18 DRIVER   | 92062-13301    |           |           |
| 92001-16027               | %4DV05              | RTE 2640A/2644A DRIVER       | 92062-13301    |           |           |
| 92001-16028               | %0DV05              | RTE 2640A DRIVER             | 92062-13301    |           |           |
| 92060-16031               | %DVR32              | RTE 7905A DISC DRIVER        | 92062-13301    |           |           |
| 92202-16001               | %DVR23              | RTE 7470 9T MAG. TAPE DRIVER | 92062-13301    |           |           |

## DOS-IIIB MODULES

The Index below indicates the modules available for DOS-IIIB systems, HP 24307B, date code 1523.

This Index relates the names of the relocatable modules to the part numbers of the equivalent paper tapes and indicates the purpose of the modules. Modules not specifically designated for the 2100A/S or for the 21MX computers are to be used on either.

| NAME   | PART<br>NUMBER | REV  | DESCRIPTION                   |
|--------|----------------|------|-------------------------------|
| DISCH  | 24307-16069    | 1523 | DISC MONITOR                  |
| \$EXMD | 24307-16070    | 1523 | EXEC MODULES                  |
| DVR00  | 20985-60001    | 1516 | TTY-LIKE CONSOLE/<br>TERMINAL |
| DVR01  | 20987-60001    | 1419 | PAPER TAPE READER             |
| DVR02  | 20989-60001    | 1419 | PAPER TAPE PUNCH              |

|       |             |      |                                           |
|-------|-------------|------|-------------------------------------------|
| DVR05 | 24157-60001 | 1419 | TTY-LIKE CONSOLE                          |
| DVR15 | 24307-16017 | 1446 | 7261A MARK SENSE<br>CARD READER           |
| D2892 | 24272-60001 | 1419 | 2892B CARD READER<br>(DVR11)              |
| D2767 | 24168-60001 | 1419 | 2767A LINE PRINTER<br>(DVR12)             |
| D26XX | 24307-16011 | 1446 | DVR12 FOR 2607, 2610,<br>2614, 2613, 2618 |
| DVR23 | 13024-60001 | 1446 | 7970B/E MAG TAPE                          |
| DVR26 | 24307-16018 | 1507 | 2762A/B AND 2615A<br>CONSOLE              |
| DVR30 | 24307-16073 | 1523 | DISC BATCH DRIVER                         |
| DVR31 | 24156-60001 | 1419 | 7900/7901 DISC                            |
| DVR67 | 24341-60001 | 1419 | 12889A HI SPD SERIAL<br>IF                |
| DVR70 | 24307-16009 | 1446 | DVR70 FOR 12618A<br>SYNC INTERFACE        |
| DVR71 | 24307-16013 | 1515 | 12967A SYNC MODEM<br>IF                   |
| DVR72 | 24350-16001 | 1523 | 12587B ASYNC DATA<br>SET IF               |

| NAME   | PART NUMBER | REV  | DESCRIPTION                     |
|--------|-------------|------|---------------------------------|
| DVR73  | 24377-16001 | 1523 | 12920A/B MULTIPLEXOR            |
| DVR74  | 24307-16014 | 1515 | 12966A/12968A ASYNCH IF         |
| EFMP   | 24309-60002 | 1523 | EXT FILE MGR EXEC MODULES       |
|        | 24309-60003 | 1523 | EXT FILE MGR UTILITIES          |
| JOBPR  | 24307-16071 | 1523 | JOB PROCESSOR                   |
| RLODR  | 24307-16072 | 1523 | RELOCATING/LINKING LOADER       |
| ASMB   | 24307-16006 | 1419 | 2100/21MX ASSEMBLER             |
| .FTN4  | 24170-60001 | C    | FORTAN IV COMPILER              |
|        | 24170-60002 | C    |                                 |
|        | 24170-60003 | C    |                                 |
| FTN4   | 24177-60001 | 1442 | FORTAN IV COMPILER (10K AREA)   |
|        | -60002      | 1442 |                                 |
| ALGOL  | 24129-60001 | C    | ALGOL COMPILER                  |
|        | 24129-60002 | C    |                                 |
| XREF   | 24223-60001 | 1523 | 2100/21MX CROSS REF TABLE GEN   |
| F4D.N  | 24152-60001 | C    | RELO SUBRLIBR FTN4              |
| F2E.N  | 24151-60001 | D    | RELO SUBR LIBR (EAU)            |
| F2F.N  | 24248-60001 | B    | RELO SUBR LIBR (FP)             |
| FFP.N  | 12907-16001 | A    | 2100A/S FFP SUBR LIBRARY        |
| \$SETP | 12907-16002 | 1350 | 2100A/S FFP SUBR \$SETP         |
| ATD01  | 24381-16001 | 1503 | ASYNCH TERMINAL DRIVER No. 1    |
| ATD02  | 24307-16012 | 1442 | ASYNCH TERMINALL DRIVER No. 2   |
| PMT01  | 24307-16008 | 1438 | PAGE MODE TERMINAL DRIVER No. 1 |
| PMT02  | 24307-16016 | 1503 | PAGE MODE TERMINAL DRIVER No. 2 |
| SLC    | 24307-16010 | 1438 | SYNCHRONOUS LINE CONTROL DRIVER |
| DVR33  | 24278-60001 | 1419 | 2100/21MX WCS DRIVER            |
| MASMB  | 24332-60001 | 1419 | 2100A/S WCS MICRO ASSEMBLER     |
| WCSUT  | 24333-60001 | A    | 2100/21MX MICRO UTILITIES       |
| MDEBUG | 24334-60001 | 1419 | 2100A/S WCS MICRO DEBUG EDITR   |
| XASMB  | 12978-16001 | 1437 | 21MX WCS MICRO ASSEMBLER        |
| XDEBUG | 12978-16002 | 1437 | 21MX WCS MICRO DEBUG EDITOR     |
| FFP.X  | 12977-16001 | 1451 | 21MX FFP SUBR LIBRARY           |
| XSETP  | 12977-16002 | 1451 | 21MX FFP SUBR \$SETP            |



# documentation

The following tables list currently available customer manuals for Data Systems Division products. This list supersedes the list in the last issue of the **Communicator**.

The most recent changes to the tables are indicated for easy reference. Prices are subject to change without notice.

Copies of manuals and updates can be obtained from your local Sales and Service office. The address and telephone number of the office nearest to you are listed in the back of all customer manuals.

Update packages are free of charge. If you require an update package only, send your request to:

Software/Publications Distribution  
11000 Wolfe Road  
Cupertino, Ca. 95014

Customers in the U.S. may also order directly by mail. Simply list the name and part number of the manual(s) you need on the Corporate Parts Center form supplied at the back of the **Communicator**.

A few words about documentation terms:

**New** A new manual refers only to the first printing of a manual. When first printed, a manual is assigned a part number.

**Revised** A revised manual is a printing of an existing manual which incorporates new and/or changed information in its contents. For example, a manual is revised when an update package is incorporated into the manual: the manual gets a new print date and the update package disappears. Note that a revision to a manual effectively obsoletes the previous version of the manual.

**Update** An update package is a supplement to an existing manual which contains new and/or changed information. Updates are issued when information must get to customers, yet it is inappropriate to issue a revised manual. An update has no part number; it is automatically included when you order the manual with which it is associated.

about the HP 1000

## 9600/9700 SYSTEMS MANUALS

| PART<br>NUMBER | MANUAL TITLE                                                                                               | PRICE   | DATE   | UPDATE |
|----------------|------------------------------------------------------------------------------------------------------------|---------|--------|--------|
| 02313-93002    | RTE 2313B Analog-Digital Interface Subsystem Operating and Service Manual                                  | \$30.00 | 8/76   |        |
| 02320-93002    | RTE System Driver DVR76 for HP 2320A Low Speed Data Acquisition Subsystem Programming and Operating Manual | 1.00    | 8/74   |        |
| 02321-93001    | RTE System Driver DVR74 for HP 2321A Low Speed Data Acquisition Subsystem Programming and Operating Manual | 1.00    | 8/74   |        |
| 09600-93010    | RTE System DVR11 for HP 2892A Card Reader Programming and Operating Manual                                 | 1.00    | 8/74   |        |
| 09600-93015    | 91200A TV Interface Kit; Programming and Operating Manual                                                  | 4.50    | 7/75   | 1/76   |
| 09601-93007    | RTE Device Subroutine for HP 5327A/B-H48 Counter                                                           | 2.50    | 12/74  |        |
| 09601-93009    | RTE Device Subroutine for HP 5326A-H18 Counter                                                             | 2.50    | 12/74  |        |
| 09601-93014    | RTE System Driver DVR15 Mark Sense Card Reader Programming and Operating Manual                            | 1.00    | 2/76*O |        |
| 09601-93015    | RTE for 40-bit Output Register #12556B                                                                     | 1.00    | 10/74  |        |
| 09603-93001    | 9603A/9604A Control System and Scientific Measurement Operating and Service Manual                         | 7.50    | 5/76   |        |
| 09610-93003    | ISA FORTRAN Extension Package Reference Manual                                                             | 4.50    | 7/76*R |        |
| 09611-90009    | 9611A Operating 406 Industrial Measurement and Control System                                              | .25     | 4/75   |        |
| 09611-90010    | HP 6940A/B Multiprogrammer Verification Manual                                                             | 4.50    | 8/75   |        |
| 12604-93002    | RTE DVR40 for 12604B Data Source Interface                                                                 | 1.00    | 8/74   |        |
| 12665-93001    | RTE System Driver DVR65 for HP 12771A Computer Serial Interface Kit                                        | 1.00    | 8/74   |        |
| 12989-99001    | RTE System Driver DVA15 for Card Reader Punch Subsystem 2894                                               | 1.00    | 1/75   | 5/76   |
| 24998-90001    | DOS/RTE Relocatable Library Reference Manual                                                               | 10.00   | 3/76   |        |
| 25117-93003    | RTE System Driver DVR24 for HP 7970 Series Digital Magnetic Tape Unit                                      | 1.00    | 8/74   |        |
| 29003-93001    | RTE System Driver DVR66 for HP 12772A Coupler Modem Interface Kit Programming and Operating Manual         | 1.00    | 8/74   |        |
| 29003-93003    | RTE System Driver DVR66 for HP 12770A Coupler Serial Interface Kit Programming and Operating Manual        | 1.00    | 8/74   |        |
| 29009-93001    | RTE System Driver DVR62 for HP 2313B Subsystem                                                             | 2.50    | 8/74   |        |
| 29013-90001    | DVR31 RTE Moving Head Driver                                                                               | 10.00   | 2/73   |        |
| 29014-90001    | Moving Head Real-Time System Generator                                                                     | 20.00   | 4/72*O |        |
| 29015-90001    | Fixed Head Real-Time System Generator                                                                      | 15.00   | 4/72   |        |
| 29016-90002    | RTE Scheduler                                                                                              | 50.00   | 9/72   |        |
| 29016-90003    | Real-Time Input/Output Control                                                                             | 50.00   | 12/73  |        |
| 29022-90001    | Real-Time Relocating Loader                                                                                | 10.00   | 6/73*O |        |
| 29028-95001    | RTE HP 2610A/2614A Line Printer Driver                                                                     | 1.50    | 8/73   |        |
| 29029-91001    | Real-Time Executive Multiple-Device System Control Device (DVR00) Program Listing                          | 10.00   | 9/72   |        |
| 29029-95001    | Real-Time Executive System Driver DVR00 for Multiple Device System Control Small Programs Manual           | 1.50    | 11/75  |        |
| 29033-98000    | Real-Time Executive-File Manager System                                                                    | 10.00   | 3/73*O |        |
| 29100-93001    | RTE System Driver DVR40 (29100-60041) for HP 12604B Data Source Interface Programming and Operating Manual | 1.00    | 8/76*R |        |
| 29100-93003    | RTE System Driver DVR61 for HP 6940A, 6941A Bidirectional Multiprogrammer Programming and Operating Manual | 4.50    | 3/76   |        |

\*O = Obsolete Manual

\*R = Revised Manual

| PART NUMBER | MANUAL TITLE                                                                                       | PRICE   | DATE    | UPDATE |
|-------------|----------------------------------------------------------------------------------------------------|---------|---------|--------|
| 29101-93001 | RTE Core-Based Software System Users Manual                                                        | \$10.00 | 1/76* R |        |
| 29102-93001 | RTE BASIC Software System Programming and Operating Manual                                         | 10.00   | 3/74    | 8/75   |
| 29103-93001 | RTE System Cross Loader; Programming and Operating Manual                                          | 2.50    | 3/75    | 11/75  |
| 91060-93005 | RTE Driver for X-Y Display Storage Subsystem (HP Model 1331C-016) Programming and Operating Manual | 1.00    | 8/74    |        |
| 91062-93003 | Real-Time Executive System Driver for DVM/Scanner Subsystem                                        | 9.00    | 8/74    |        |
| 92001-90015 | RTE DVR05 for 264X Terminals                                                                       | 2.00    | 9/76* R |        |
| 92001-93001 | RTE-II Software System Programming and Operating Manual                                            | 10.00   | 7/76* R | 5/76   |
| 92060-90004 | RTE-III Software System Programming and Operating Manual                                           | 12.00   | 7/76* R |        |
| 92060-90005 | RTE Assembler Reference Manual                                                                     | 7.00    | 1/76    |        |
| 92060-90009 | RTE-III General Information Manual                                                                 | 4.00    | 2/76    |        |
| 92060-90010 | RTE Batch/Spool Monitor and Operating System Pocket Guide                                          | 3.00    | 10/75   |        |
| 92060-90012 | RTE: A Guide for New Users                                                                         | 6.50    | 7/76* R |        |
| 92060-90013 | Batch-Spool Monitor Reference Manual                                                               | 9.50    | 7/76* R |        |
| 92060-90014 | RTE Interactive Editor Reference Manual                                                            | 6.00    | 3/76    |        |
| 92060-90016 | Multi-User Real-Time BASIC Reference Manual                                                        | 12.00   | 10/75   | 12/75  |
| 92060-90017 | RTE Utility Programs                                                                               | 3.00    | 7/76* N |        |
| 92060-90020 | RTE On-Line Generator                                                                              | 15.00   | 7/76* N | 9/76   |
| 92063-90001 | IMAGE/1000 Data Base Management System Reference Manual                                            | 9.00    | 6/76    |        |
| 92200-93001 | RTE System Driver DVR12 for HP 2607A Line Printer Programming and Operating Manual                 | 1.00    | 3/74    |        |
| 92200-93005 | Real-Time Executive Operating System Drivers and Device Subroutine Manual                          | 5.00    | 7/76* R |        |
| 92202-93001 | RTE System Driver DVR23 for HP 7970 Series Digital Mag Tape Units Programming and Operating Manual | 1.00    | 8/74    |        |
| 93005-93005 | Thermal Line Printer Subsystem for Driver DVR00 (RTE)                                              | 2.50    | 12/74   |        |
| 93513-90002 | RTE System Driver DVA76-DVR40 for 2801 Quartz Thermometer System                                   | 1.50    | 4/75    |        |

## SOFTWARE NUMBERING CATALOG MANUALS

| PART NUMBER | MANUAL TITLE                      | PRICE   | DATE    | UPDATE |
|-------------|-----------------------------------|---------|---------|--------|
| 92060-90019 | 92060B Software Numbering Catalog | \$ 1.50 | 7/76* N |        |
| 92001-93003 | 92001B Software Numbering Catalog | 1.50    | 7/76* N |        |
| 92002-93003 | 92002A Software Numbering Catalog | 1.50    | 7/76* N |        |
| 91705-93003 | 91705A Software Numbering Catalog | 1.00    | 7/76* N |        |
| 92413-90001 | 92413A Software Numbering Catalog | 1.00    | 7/76* N |        |
| 91780-93004 | 91780A Software Numbering Catalog | 1.00    | 7/76* N |        |
| 92062-90001 | 92062A Software Numbering Catalog | 1.00    | 7/76* N |        |
| 92101-90001 | 92101A Software Numbering Catalog | 1.00    | 7/76* N |        |
| 92409-93002 | 92409A Software Numbering Catalog | 1.00    | 7/76* N |        |
| 92400-93003 | 92400A Software Numbering Catalog | 1.00    | 7/76* N |        |
| 91703-93003 | 91703A Software Numbering Catalog | 1.00    | 7/76* N |        |
| 91704-93003 | 91704A Software Numbering Catalog | 1.00    | 7/76* N |        |
| 91700-93005 | 91700A Software Numbering Catalog | 1.00    | 7/76* N |        |
| 92063-90003 | 92063A Software Numbering Catalog | 1.00    | 9/76* N |        |
| 92066-90001 | 92066A Software Numbering Catalog | 1.00    | 9/76* N |        |

\* N = New Manual

R = Revised Manual

## SOFTWARE INPUT/OUTPUT SYSTEM MANUALS

| PART NUMBER | MANUAL TITLE                                                       | PRICE   | DATE  | UPDATE |
|-------------|--------------------------------------------------------------------|---------|-------|--------|
| 02116-91760 | Teleprinter Driver (LP Compatible) Manual                          | \$ 1.00 | 8/73  | 1/73   |
| 02762-90002 | HP 2762A Terminal Printer Driver                                   | 1.00    | 5/73  |        |
| 02892-90003 | HP 2892A Card Reader Driver                                        | 1.50    | 6/72  |        |
| 12602-90022 | Mark Sense Card Reader Drivers                                     | 1.00    | 6/70  |        |
| 12653-90004 | HP 2767 Line Printer Driver                                        | 1.00    | 9/70  |        |
| 12845-90005 | HP 2610A/2614A Line Printer Driver                                 | 1.00    | 2/74  |        |
| 12987-90006 | HP 2607 Line Printer Driver                                        | 5.00    | 11/73 |        |
| 13022-90010 | HP 7970 Magnetic Tape Unit Driver                                  | 1.00    | 2/72  |        |
| 13029-90010 | Magnetic Tape Driver (7-Track)                                     | 1.00    | 2/72  |        |
| 5950-9276   | SIO Drum-Disc                                                      | 1.00    | 2/70  |        |
| 5951-1374   | Software Input/Output System Configuration                         | 1.00    | 7/74  |        |
| 5951-1390   | Subsystem Operation                                                | 2.00    | 2/76  |        |
| 59310-90063 | RTE DVR37 459310 B. Interface Bus Programming and Operating Manual | 3.50    | 5/76  |        |

## BASIC CONTROL SYSTEM MANUALS

| PART NUMBER | MANUAL TITLE                                                   | PRICE   | DATE     | UPDATE |
|-------------|----------------------------------------------------------------|---------|----------|--------|
| 02022-90014 | Magnetic Tape Reformatting System Support Utilities            | \$ 1.50 | 1/74     | 5/76   |
| 02100-90129 | HP 2100 Microassembler Coding Form                             | 3.00    |          |        |
| 02100-90140 | Decimal String Arithmetic Routines                             | 5.00    | 10/73    |        |
| 02100-90200 | Loader/Loader Reference Manual                                 | 2.00    | 5/76     |        |
| 02108-90008 | Microprogramming 21MX Computers Reference Manual               | 6.50    | 2/76     |        |
| 02116-9017  | Basic Control System Manual                                    | 8.50    | 12/71    |        |
| 02116-9072  | ALGOL for HP 2000 Computers Reference Manual                   | 10.00   | 2/76 * R |        |
| 02116-91751 | Prepare Tape System                                            | 2.50    | 8/74     |        |
| 02116-91752 | Magnetic Tape System                                           | 6.00    | 6/71     |        |
| 02116-91780 | 2100 Series Relocatable Subroutines                            | 11.00   | 12/74    |        |
| 02762-90003 | HP 2762A Terminal Printer Driver                               | 1.00    | 5/73     |        |
| 02892-90004 | HP 2892A Card Reader Driver                                    | 1.50    | 6/72     |        |
| 12602-90021 | Mark Sense Drivers                                             | 1.00    | 6/70     |        |
| 12653-90005 | HP 2767 Line Printer Driver                                    | 1.00    | 10/70    |        |
| 12845-90004 | HP 2610A/2614A Line Printer Driver                             | 1.00    | 6/72     | 6/72   |
| 12987-90008 | HP 2607 Line Printer Driver                                    | 5.00    | 12/73    |        |
| 13023-90010 | HP 7970 Magnetic Tape Unit Driver                              | 1.00    | 5/74     |        |
| 13026-90010 | Magnetic Tape Driver (7-Track without DMA)                     | 1.00    | 5/71     |        |
| 13027-90010 | Magnetic Tape Driver (7-Track with DMA)                        | 1.00    | 5/71     |        |
| 5951-1371   | HP 2100 Front Panel Procedures                                 | 1.00    | 8/73     |        |
| 5951-1376   | Basic Binary Loader/Disc Loader, Basic Moving-Head Disc Loader | 2.50    | 4/76     |        |
| 5951-1391   | Basic Control System                                           | 1.50    | 10/74    |        |
| 5951-1392   | Magnetic Tape System                                           | 1.00    | 7/71     |        |

\* R = Revised Manual

## DISC OPERATING SYSTEM MANUALS

| PART NUMBER | MANUAL TITLE                                            | PRICE   | DATE  | UPDATE |
|-------------|---------------------------------------------------------|---------|-------|--------|
| 02767-00007 | DOS/RTE 2767 Line Printer Driver                        | \$ 1.00 | 12/70 | 3/76   |
| 12560-90023 | DOS RTE and BCS Calcomp Plotter Drivers                 | 1.50    | 10/75 |        |
| 12602-90023 | DOS/RTE Mark Sense Drivers Kit 12602B                   | 1.00    | 8/70  |        |
| 12908-90004 | HP 12908 Writable Control Store Driver                  | 1.00    | 2/75  |        |
| 24307-90006 | DOS-III Reference Manual                                | 20.00   | 1/76  |        |
| 24307-90012 | DOS-III Data Communications Drivers                     | 7.50    | 4/76  |        |
| 24307-90018 | DOS-III Pocket Guide                                    | 3.50    | 12/75 |        |
| 24307-90022 | DOS-III Terminal Printer Driver                         | 1.00    | 1/75  |        |
| 24307-90073 | DOS-III Standard Drivers                                | 6.00    | 1/75  |        |
| 24376-90001 | IMAGE/2000 Data Base Management System Reference Manual | 11.00   | 8/75  |        |
| 5951-1366   | Cross Reference Table Generator                         | 1.00    | 8/74  |        |
| 5951-1381   | DOS-M/2000C Timeshared BASIC File Handler               | 1.00    | 5/71  |        |
| 5951-1394   | 2000C File Interface for DOS-M                          | 1.00    | 6/71  |        |

## LANGUAGE MANUALS

| PART NUMBER | MANUAL TITLE                                    | PRICE   | DATE   | UPDATE |
|-------------|-------------------------------------------------|---------|--------|--------|
| 02116-9014  | HP Assembler Manual                             | \$ 6.50 | 8/75   | 11/75  |
| 02116-9015  | HP FORTRAN Manual                               | 5.00    | 3/74   |        |
| 02116-9016  | Symbolic Editor                                 | 4.50    | 2/74   |        |
| 02116-9072  | ALGOL Reference Manual                          | 10.00   | 2/76   |        |
| 12907-90010 | Implementing the HP 2100 Fast FORTRAN Processor | 1.00    | 7/76*R |        |
| 24307-90014 | DOS-III Assembler Reference Manual              | 8.00    | 7/74   |        |
| 92060-90005 | RTE Assembler Reference Manual                  | 7.00    | 1/76   |        |
| 5951-1321   | HP FORTRAN IV Reference Manual                  | 6.00    | 12/75  |        |

\*R = Revised Manual

# training schedule

The schedule for customer training courses on Data Systems Division products has been expanded to include courses offered at our European training centers. Listed below are courses offered in the U.S. and in Europe during the period November, 1976 through April, 1977.

You can also obtain a copy of the training schedule from your local HP sales office. A European course schedule is available through the sales offices in Europe; a U.S. schedule through U.S. sales offices.

\*Prices quoted are for courses at the two U.S. training centers only. For prices of courses at European training centers please consult your local HP Sales Office.

## Registration

Requests for enrollment in any of the above courses should be made through your local HP representative. He will supply the Training Registrar at the appropriate location

with the course number, dates, and requested motel reservations. Enrollments are acknowledged by a written confirmation indicating the Training Course, time of class, location and accommodations reserved.

## Accommodations

Students provide their own transportation, meals and lodging. The Training Registrar will be pleased to assist in securing motel reservations at the time of registration.

## Cancellations

In the event you are unable to attend a class for which you are registered please notify the Training Center Registrar immediately in order that we may offer your seat to another student.

## Training Center Addresses

## Cupertino

11000 Wolfe Road  
Cupertino, California 95014  
(408) 257-7000

## Rockville

4 Choke Cherry Road  
Rockville, Maryland 20850  
(301) 948-6370

## Boise

P. O. Box 15  
15 N. Phillippi Street  
Boise, Idaho 83707  
(208) 376-6000  
TWX: 910-970-5784

## Boblingen

Kundenschulung  
Herrenbergerstrasse 110  
D-7030 Böblingen, Wurttemberg  
Tel: (07031) 667-1  
Telex: 07265739  
Cable: HEPAG

## Winnersh

King Street Lane  
GB-Winnersh, Wokingham  
Berks RG11 5 AR  
Tel: Wokingham 784774  
Cable: Hewpie London  
Telex: 847178 9

## Grenoble

5, avenue Raymond-Chanas  
38320 Eybens  
Tel: (76) 25-81-41  
Telex: 980124

## Milan

Via Amerigo Vespucci, 2  
I-20124 Milan  
Tel: (2) 62 51  
Cable: HEWPACKIT Milano  
Telex: 32046

## Madrid

Jerez No 3  
E-Madrid 16  
Tel: (1) 458 26 00  
Telex: 23515 hpe

## Stockholm

Enighetsvägen 1-3, Fack  
S-161 20 Bromma 20  
Tel: (08) 730 05 50  
Cable: MEASUREMENTS  
Stockholm  
Telex: 10721

| TITLE         |                 |        | TRAINING COURSE RATES AND CENTER LOCATION |                                               |              |           |          |          |       |        |           |                 |
|---------------|-----------------|--------|-------------------------------------------|-----------------------------------------------|--------------|-----------|----------|----------|-------|--------|-----------|-----------------|
| Course Number | Length          | Price  | Cupertino                                 | Rockville                                     | Boise        | Boblingen | Winnersh | Grenoble | Milan | Madrid | Stockholm | Amsterdam/Brus. |
| 22940A        | 2100 Maint.     |        | 1/17<br>3/14<br>4/11                      |                                               |              |           |          |          |       |        |           |                 |
|               | 10 days         | \$1000 |                                           |                                               |              |           |          |          |       |        |           |                 |
| 22941A        | 21MX Maint.     |        | 12/6<br>1/3<br>2/28                       |                                               |              |           |          |          |       |        |           |                 |
|               | 5 days          | 500    |                                           |                                               |              |           |          |          |       |        |           |                 |
| 22942A        | 7900 Maint.     |        | 12/13<br>1/10<br>3/28                     |                                               |              |           |          |          |       |        |           | 11/22           |
|               | 5 days          | 500    |                                           |                                               |              |           |          |          |       |        |           |                 |
| 22943A        | 7970B Maint.    |        |                                           |                                               | 3/7<br>4/25  |           |          |          |       |        |           | 11/29           |
|               | 5 days          | 600    |                                           |                                               |              |           |          |          |       |        |           |                 |
| 22944A        | 7970E Maint.    |        |                                           |                                               | 1/31<br>4/18 |           |          |          |       |        |           |                 |
|               | 5 days          | 600    |                                           |                                               |              |           |          |          |       |        |           |                 |
| 22945A        | 7905 Maint.     |        | 11/1<br>1/31<br>3/7<br>4/25               |                                               |              |           |          |          |       |        |           | 12/13           |
|               | 5 days          | 500    |                                           |                                               |              |           |          |          |       |        |           |                 |
| 22950A        | 2100 Ser. Assm. |        | 11/15<br>12/6<br>1/3<br>1/31<br>2/28      | 11/1<br>11/29<br>1/17<br>1/31<br>3/14<br>4/25 |              | 12/13     | 12/6     | 11/22    | 11/29 |        | 11/22     | 11/22           |
|               | 5 days          | 500    |                                           |                                               |              |           |          |          |       |        |           |                 |
| 22952A        | DOS III B       |        | 11/1                                      |                                               |              |           |          |          |       |        |           | 12/13           |
|               | 5 days          | 500    |                                           |                                               |              |           |          |          |       |        |           |                 |

| Course Number | Length                        | Price | Cupertino                                                                                                                                     | Rockville                                           | Boise | Boblingen                  | Winnersh                 | Grenoble                  | Milan | Madrid | Stockholm                 | Amsterdam/<br>Brus. |
|---------------|-------------------------------|-------|-----------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|-------|----------------------------|--------------------------|---------------------------|-------|--------|---------------------------|---------------------|
| 22953A        | 2100 Image                    |       |                                                                                                                                               |                                                     |       |                            |                          |                           |       |        |                           |                     |
|               | 3 days                        | 300   |                                                                                                                                               |                                                     |       |                            |                          |                           |       |        |                           |                     |
| 22959A        | Assembler/21MX                |       | 12/6                                                                                                                                          |                                                     |       |                            |                          |                           |       |        |                           |                     |
|               | 5 days                        | 500   | 1/3<br>1/31<br>2/28<br>3/21<br>4/11                                                                                                           |                                                     |       |                            |                          |                           |       |        |                           |                     |
| 22960A        | 21MX Mic. Prog.               |       | 12/13                                                                                                                                         |                                                     |       |                            |                          |                           |       |        |                           |                     |
|               | 5 days                        | 500   | 2/7<br>3/28                                                                                                                                   |                                                     |       |                            |                          |                           |       |        |                           |                     |
| 22965B        | RTE-II/III                    |       | 11/8                                                                                                                                          | 11/8                                                |       | * { 11/22 }<br>* { 11/29 } | * { 1/10 }<br>* { 1/17 } | * { 11/29 }<br>* { 12/6 } |       |        | * { 11/22 }<br>* { 12/6 } |                     |
|               | 10 days                       | 1000  | * { 1/3 }<br>* { 1/10 }<br>* { 1/10 }<br>* { 1/17 }<br>* { 1/17 }<br>* { 1/24 }<br>* { 1/31 }<br>* { 2/7 }<br>* { 2/7 }<br>* { 2/14 }<br>2/28 | 11/29<br>1/3<br>1/24<br>2/7<br>2/28<br>3/21<br>4/11 |       |                            |                          |                           |       |        |                           |                     |
| 22968A        | Measurement & control         |       | 12/13                                                                                                                                         | 12/20                                               |       |                            |                          |                           |       |        |                           |                     |
|               | 2 days                        | 200   |                                                                                                                                               |                                                     |       |                            |                          |                           |       |        |                           |                     |
| 22969A        | Distb. Sys.                   |       | 12/13                                                                                                                                         |                                                     |       |                            |                          | 11/15                     |       |        |                           |                     |
|               | 5 days                        | 500   | 1/17<br>2/14<br>3/28                                                                                                                          |                                                     |       |                            |                          |                           |       |        |                           |                     |
| 22977A        | Image/DBMS 1000               |       | 11/8                                                                                                                                          | 1/17                                                |       |                            |                          |                           |       |        |                           |                     |
|               | 5 days                        | 500   | 1/24<br>3/21<br>4/25                                                                                                                          | 4/25                                                |       |                            |                          |                           |       |        |                           |                     |
| 22978         | TCS                           |       | 11/15                                                                                                                                         |                                                     |       |                            |                          |                           |       |        |                           |                     |
|               | 2 days                        | 200   |                                                                                                                                               |                                                     |       |                            |                          |                           |       |        |                           |                     |
| 22979A        | Real/Time Multiterminal Basic |       | 12/15<br>2/23<br>4/4                                                                                                                          | 11/22                                               |       |                            |                          |                           |       |        | 12/13                     |                     |
|               | 3 days                        | 300   |                                                                                                                                               |                                                     |       |                            |                          |                           |       |        |                           |                     |
| 22980A        | HPIB Multicomputer Bus Basic  |       | 1/24<br>3/14<br>4/25                                                                                                                          |                                                     |       |                            |                          |                           |       |        |                           |                     |
|               | 3 days                        | 300   |                                                                                                                                               |                                                     |       |                            |                          |                           |       |        |                           |                     |
| 22981A        | HPIB Programming Under RTE    |       | 1/27<br>3/17<br>4/28                                                                                                                          |                                                     |       |                            |                          |                           |       |        |                           |                     |
|               | 2 days                        | 200   |                                                                                                                                               |                                                     |       |                            |                          |                           |       |        |                           |                     |

NOTE: Dates within brackets are starting dates for week 1 and week 2 of the RTE course. In some cases there is a break between the two weeks of the class. Course 22977A, IMAGE/DBMS 1000 replaces 22953A (2100 IMAGE); the new class adds additional material and extends the training from 3 to 5 days.

# introducing the HP 1000



**Figure 1. The new HP 1000 Model 30 system**

The introduction of the Hewlett-Packard 1000 Computer System is one of those fortunate occasions where a number of computer advances arrive concurrently and are able to be utilized within a single new computer system. Significant contributions embodied within the HP 1000 computer system include a very fast new processor, and a fast and flexible new CRT terminal that serves as the system console and convenient machine/human interface to HP's new IMAGE/1000 data base management software. Plus, the system's contemporary and attractive desk styling is a welcome addition to office environments.

Beyond these new capabilities, the HP 1000 builds on previous contributions such as HP's complete computer network software, the Hewlett-Packard Interface Bus

(HP-IB) for control of automated instrument systems, HP's efficient and proven Real Time operating systems, and the fastest cartridge disc memory on the market.

The effect is an exceptionally fast and powerful small computer system that both OEM's and end users with computer experience can easily use as a tool to implement a wide range of applications. The HP 1000 is especially well suited to computation, instrumentation, and operations management applications that demand high performance. And because its increased performance is priced five to ten per cent below previous HP small computer systems, the HP 1000 sets a new price/performance standard in its class. Figures 1 and 2 are the HP 1000 model 30 and 80 systems.



Figure 2. The new HP 1000 Model 80 system

## DATA BASE MANAGEMENT WITH THE HP 1000

The combination of an HP 1000 and IMAGE/1000, Hewlett-Packard's new data base management software, provides a new entry level for data base management applications. For \$61,200 Hewlett-Packard provides a complete set of tools that allows better management of manufacturing and design information. IMAGE/1000 assists in organizing a company's individual data files into a single data base so that relevant information is available to those who need it, when they need it. IMAGE/1000 utilizes a logical and easy-to understand structure that makes the construction of a data base a straight-forward task. IMAGE automatically links together related information and reduces redundant data. Users can have multi-terminal, multi-program access to the data base for concurrent and interactive retrieval and reporting of information.

Using IMAGE/1000 doesn't require programming skills.

Non-technical people can access the data base with QUERY, a "free form" inquiry language. By merely typing simple, English-like commands on a terminal, an authorized operator can retrieve, enter, modify or delete data.

With QUERY, a user can quickly find any record in the data base by a "key value", such as a name, customer account or part number. There's no need to know the address of the data, or to search sequentially through record after record.

QUERY is especially useful in generating impromptu reports and getting answers to one-time, "what if" questions. For example, "what if there were a change in the styling of a product's design?" "How would material requirements and lead and delivery times be affected?" Access to an IMAGE data base can provide immediate answers to such questions. Special formatting features such as forms, titles, page and column headings, data sorting by categories, sub-totals, totals and averages all contribute to readable, understandable reports.

## HP 1000 FEATURES

**A new sprint speed computer** is the nucleus of each HP 1000 System. It provides the important performance necessary for multi-programming, multi-user application environments. The new processor executes most instructions 60% — 100% faster and performs floating point operations 250% faster than its predecessor.

**Processor growth power** is built into each HP 1000 in a number of ways. First, a variety of peripheral and software options enable users to upgrade from the smallest HP 1000 model to the largest as their requirements expand. Next, fast, low cost, semi-conductor, main memory capacity of up to 608k bytes is twice that of comparable systems. And the HP 1000's new processor uses a very high performance control processor, or "computer within a computer," that enables a user to increase computational horsepower almost at will. A simple terminal oriented language and editor can be used to create and load small routines, or even entire applications or operating systems into the control processor's large address space for faster execution. One HP implementation of this concept increases FORTRAN performance from 2 to 20 times over the non-microcoded execution. The HP 1000 is a computer that strenuously resists being obsoleted by demands for more processing speed.

**Advanced Display.** The 1000 System also takes advantage of the innovations in the fast new 9600 baud, high resolution screen HP 2645 Display Station. Pocket sized mini-cartridges can be used for convenient storage of programs close to your heart, or for real time logging of data entry transactions on the dual cartridges.

The 2645's "Soft Keys" can be programmed to automatically enter multiple keystroke sequences.

With a single stroke of a user defined "Soft Key," you can load or compile a program, query a data base, or monitor the status of multiple tasks. (Refer to figure 3.)

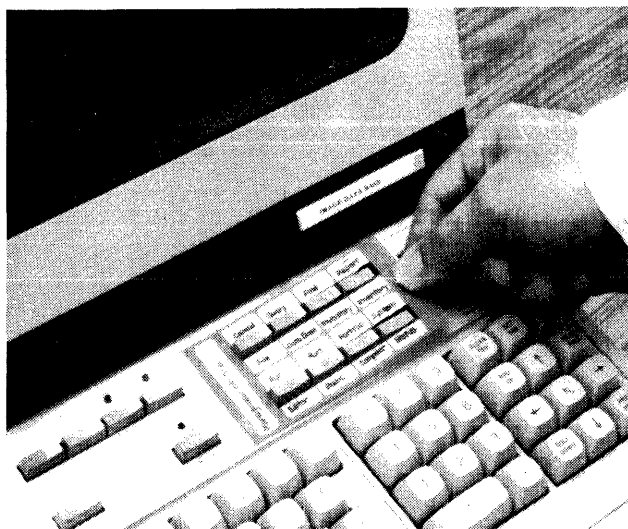


Figure 3. The 2645's Soft Keys

**Multi-Talented Operating System.** The HP 1000 System has a voracious appetite for many different applications because its power can be applied in many ways. The HP 1000 operating system orchestrates interactive program development from multiple terminals concurrently with batch processing. Multi-lingual programming — in FORTRAN, ALGOL, HP Assembly and Multi-User Real-Time BASIC — allows users to communicate with the system in the language that best suits their requirements.

**Rapid Access Disc.** The performance demands of disc active applications, such as data base management and multi-terminal applications, are met with latest track-follower disc technology and the micro-processor based control unit of the system's HP 7905 Disc. The HP 1000's disc storage capacity of up to 120m bytes allows the construction of a data base large enough to serve most small to medium-sized organizations.

**Standard Instrument Connection.** Thanks to the Hewlett-Packard Interface Bus (HP-IB\*) the HP 1000 can be put to work in nearly any kind of automated electronic or electrical testing measurement and control applications. With an HP-IB interface kit, the HP 1000 can control multiple clusters of instruments, each consisting of up to 14 HP-IB compatible instruments. More than 100 HP-IB interfaceable measurement and test instruments are now available from Hewlett-Packard and other instrument manufacturers.

**Network Connections.** If you use more than one computer within your organization, linking these "islands of automation" can give you more complete control of your operations and significantly greater flexibility in collecting and managing information. Peripheral costs can be shared, data can be managed centrally, and system availability improved through the use of networks.

\*The Hewlett-Packard interface Bus (HP-IB) is HP's implementation of IEEE Standard 488 and identical ANSI Standard MC1.1, "Digital Interface for Programmable Instrumentation".

## APPLICATIONS IN COMPUTATION

Either of the smaller 1000 Systems, Model 30 (desk-style) or 31 (in upright cabinets) would be an appropriate choice as the main computation resource of a medium-size engineering design facility. Like all 1000's, these are programmable in BASIC, FORTRAN, ALGOL, and HP Assembly languages. As many as four terminals can be active, developing separate new programs, while the system is also executing other programs. Especially in the lab, new micro-software, and dynamically-available new micro-control space will enhance computing operations. Typical jobs would include computer-aided design projects, artwork development, personal programs, and product simulation. The system could, at the same time, serve such administrative needs as critical-path project management, cost control, and analysis and development of standard costs, specifications, and bills of materials.

## APPLICATIONS IN INSTRUMENTATION

With new speed, and available HP instrument-control hardware and software, the 1000 System offers advantages as controller of instrument clusters or automatic test stations.

The HP catalog now lists more than 40 standard products that are programmable via the HP Interface Bus (Hewlett-Packard's implementation of IEEE Standard 488). These include counters, digital multimeters, printers, scanners, network and spectrum analyzers, synthesizers and tape recorders. 22 other manufacturers now offer bus-programmable products. Standard plug-in interface cards will interconnect the 1000 System as controller of one or more clusters of off-the-shelf HP-IB instruments, forming automated systems of endless variety.

The 1000 System is also suitable as a controller of measurement and control systems such as the HP 9611R, in harsh industrial environments.

## APPLICATIONS IN OPERATIONS MANAGEMENT

1000 Systems offer new solutions to operations-management problems that arise in many manufacturing organizations.

Used in a typical manufacturing department, to get the parts explosion under control and achieve efficient shop floor control, one of the larger 80 or 81 models, with stan-

dard IMAGE/1000 data-base management software, disc, tape, and printer can readily give the manufacturing administrator improved control over inventory, materials, planning, and production scheduling. With networking software it can also deliver edited, up-to-date reports to other data centers. With the speed of all 1000's, the larger capacity of Models 80 and 81 makes them attractive as central controller of a network of similar machines.

Any 1000 System will serve well in a data collection system, deriving information from multiple, dispersed data-entry devices for a manufacturing data base.

This well-balanced combination of HP 1000 computer system power, and IMAGE/1000 information-handling usefulness makes dynamic, user-oriented information handling a reality at an exceptionally low cost. An HP 1000 data base management system can be dedicated to a single department or to an entire company. Or several data base management systems can be linked in network, allowing each local data base to be shared by users throughout the network. Prices for complete data base management systems from Hewlett-Packard start at \$61,200.

Four basic HP 1000 system models priced from \$33,500 to \$62,200, make the HP 1000 the lowest cost member of the Hewlett-Packard family of major computer systems. HP 1000, an ideal starter system for experienced OEM's and end users, is followed by the HP 2000 Timesharing and the powerful multi-programming, multi-lingual HP 3000 Series II.

# The HP 1000 for Computation, Instrumentation, and Operations Management Applications

# software tips

## HP COMPUTER SYSTEMS EDITOR/2000

Dan Jorgenson  
HP General Systems

EDITOR/2000, the new Text Editor and Formatter for the 2000 Computer System was introduced in September, 1976.

It can be used to prepare and manipulate textual material, typically contracts, proposals, technical manuals, specifications and legal documents. Special facilities are provided to edit the images of source language programs, such as BASIC programs, to be executed locally on an HP 2000 System, or COBOL programs, to be compiled and executed on a host computer via remote job entry. Source programs for other host programming languages (e.g., FORTRAN, PL1, etc.), also may be locally edited on the HP 2000 for remote job entry to host systems.

The new Editor provides the user with the following features:

- One command changes all occurrences of a word or character string to another word or string.
- Lines can be inserted, deleted, moved, copied, replaced, modified, renumbered, filled and justified.
- Extensive formatting options to set margins, print headings, adjust spacing, automate paging operations, and facilitate hyphenation of words.
- Automatic margin control carries text to the next line when it extends beyond a margin.
- Lines may be added or modified in any order desired.
- Files can be used to store EDITOR/2000 commands to be executed in unattended mode.
- Files can be created and developed from a terminal; text can be added, inserted, merged and replaced from a terminal or data file.
- Utilizes visual display features of HP 2640 series terminals.
- Permits document storage, retrieval and update using tape cartridges of the HP 2644 terminal.
- All editing is performed in an intermediate file and copied into a permanent TEXT file upon command.
- Special editing environments for BASIC and COBOL source programs.
- EXPLAIN command displays descriptions that define the use of each command.

## EDITING TEXT — AN EXAMPLE

The simplicity and ease of using EDITOR/2000 is illustrated in the following example:

### 1. Typing-In The Rough Draft

The rough draft may be typed into the system as fast as desired. The typist need not worry about the loss of data beyond margin settings, centering headings, numbering pages, etc.

The following example illustrates the typical use of a few commands to edit and format text.

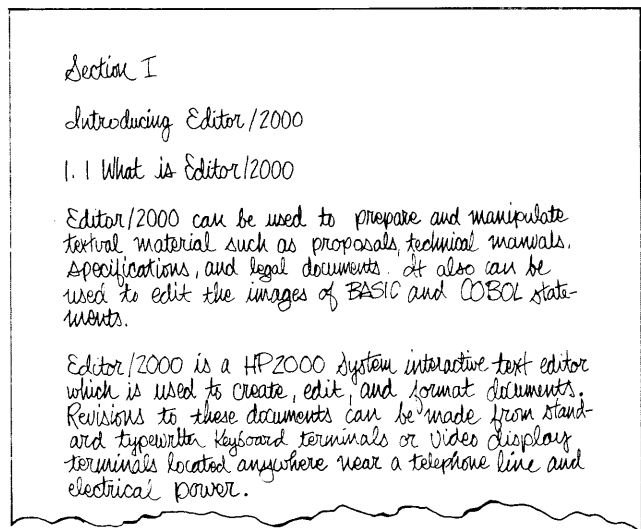


Figure 1. Rough draft, unedited

By typing the Command: SET AUTOMARGIN = ON, EDITOR/2000 will automatically fold lines of text that exceed the boundaries of the margin, onto subsequent lines. As text is typed, it is stored on the HP 2000 Computer System. It can be listed at any time on a terminal printer or line printer to produce a draft for revisions. EDITOR/2000 assigns reference line numbers at the left margin of the text, to identify portions of the text for the editing process.

```

1  SECTION I
2
3  INTRODUCING EDITOR/2000
4
5  1.1 What is EDITOR/2000?
6
7  EDITOR/2000 can be used to prepare and manipulate
8  textual material such as proposals, technical
9  manuals, specifications, and legal documents. It
10 also can be used to edit the images of BASIC and
11 COBOL statements.
12
13 EDITOR/2000 is a HP 2000 System interactive text
14 editor which is used to create, edit, and format
15 documents. Revisions to these documents can be
16 made from standard typewriter keyboard terminals
17 or video display terminals located anywhere near a
18 telephone line and electrical power.
19

```

Figure 2. First typed copy

## 2. Revising the Text

```

1  SECTION I
2
3  INTRODUCING EDITOR/2000
4
5  1.1 What is EDITOR/2000?
6
7  EDITOR/2000 can be used to prepare and manipulate
8  textual material such as proposals, technical
9  manuals, specifications, and legal documents. It
10 also can be used to edit the images of BASIC and
11 COBOL statements.
12
13 EDITOR/2000 is a HP 2000 System interactive text
14 editor which is used to create, edit, and format
15 documents. Revisions to these documents can be
16 made easily from standard typewriter keyboard terminals
17 or video display terminals located anywhere near a
18 telephone line and electrical power.
19

```

*Center* (circled around lines 1-3)

*programs* (circled around line 11)

*Hewlett-Packard* (circled around line 13)

*MOVE* (arrow pointing to line 19)

Figure 3. Edit marks on the first typed copy

The following commands are used to make the revisions to the document in figure 3. The typist's input has been shaded.

1. Change HP to Hewlett-Packard in line 13:

>change "HP" to "Hewlett-Packard" in 13

```

13 EDITOR/2000 is a Hewlett-Packard 2000 System
   interactive text

```

2. Insert the word "easily" before the word "from" in line 16:

>insert 16("from")

```

16 made from standard typewriter keyboard terminals
   :easily

```

```

16 made easily from standard typewriter keyboard
   terminals

```

3. Replace the contents of line 11:

>replace 11

```

11 COBOL statements.

```

```

11 :COBOL programs.

```

4. Move the first paragraph:

>move 7:12 to 20

```

1  SECTION I
2
3  INTRODUCING EDITOR/2000
4
5  1.1 What is EDITOR/2000?
6
13 EDITOR/2000 is a Hewlett-Packard 2000 System
13 interactive text
14 editor which is used to create, edit, and format
15 documents. Revisions to these documents can be
16 made easily from standard typewriter keyboard terminals
17 or video display terminals located anywhere near a
18 telephone line and electrical power.
19
20 EDITOR/2000 can be used to prepare and manipulate
21 textual material such as proposals, technical
22 manuals, specifications, and legal documents. It
23 also can be used to edit the images of BASIC and
24 COBOL programs.

```

Figure 4. Revised copy

## 3. Formatting the Text

Revisions to the format of the text are made easily and quickly with the following commands. The typist's input has been shaded.

1. Set the right margin to 45 and enable hyphenation for the filling operation:

>set rbound=45,hyphenation=on

```

RBOUND =      45

```

```

HYPHENATION= ON

```

2. Fill each line with as many words as possible within the margins:

>fill 13:last

Hyphenate the following words:

```

cre ate

```

```

vi deo

```

```

manip ulate

```

3. Justify the contents of the paragraphs:

>justify 13:last

4. Center the headings on lines one and three:

>center 1,3

#### 4. Producing the Final Copy

By specifying a variety of format options in a LIST command, the typist can produce a final copy with titled and numbered pages, specific margin settings, and line spacing.

Issuing the LIST command:

>listq all,paginate,to printer

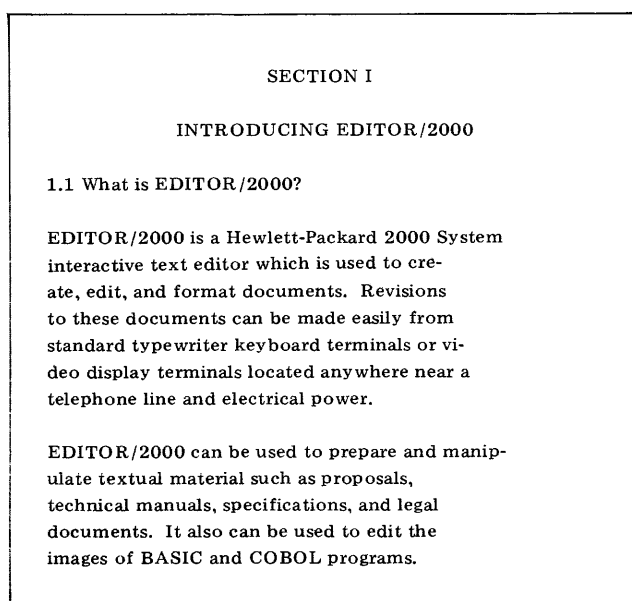


Figure 5. Final copy

By using the LIST command after the revisions have been made, the typist can immediately print an updated copy of the draft at the system line printer, a remote terminal printer, or CRT display.

## TAKING ADVANTAGE OF HP 2640 SERIES TERMINALS

EDITOR/2000 takes advantage of the visual display features of the HP 2640 Series CRT terminals and mini cartridges of the HP 2644 terminal in the following ways:

1. Characters which exceed the right margin when the AUTOMARGIN feature is not being used, will appear on the screen with an inverse video (white) background. Characters appearing in inverse video will be discarded by EDITOR/2000.

2. Setting and clearing tabs through EDITOR/2000 will automatically set and clear the tabbing mechanism in the 2640.

3. When using the AUTOMARGIN feature, characters which exceed the right margin will automatically appear on the next line.

4. Inserted characters automatically appear in the displayed line.

5. Documents may be prepared off-line using mini tape cartridges in the HP 2644. On command, EDITOR/2000 will transfer the document from the tape cartridge to the WORK file and automatically place the text within special margins.

6. Edited documents can be easily stored on the mini tape cartridges and later restored to an EDITOR/2000 WORK file.

## SYSTEM REQUIREMENTS

EDITOR/2000 can be used with any HP 2000 System configured with the HP 2000 Operating System (HP 22687A) Revision 1628 or higher.

## DOCUMENTATION SUPPLIED

EDITOR/2000 Reference Manual (22701-90001)

## ORDERING INFORMATION

|              |                                                                                          |
|--------------|------------------------------------------------------------------------------------------|
| HP 22701A    | EDITOR/2000 source code supplied on 800 bpi, 9-track magnetic tape, includes the manual. |
| HP 22701-100 | Same as above, except supplied on 1600 bpi, 9-track magnetic tape.                       |

Please contact your local HP representative for ordering details and prices.

# bulletins

## NEW SYSTEM NAME

The current name of the system **HP 2000 Access System** will be changed to **HP 2000 Computer System**. This naming convention was effective with the announcement of new prices and configurations for the HP 2000 Computer System (model no. 19700B) in October 1976. The word **Access** has served its purpose well in describing the HP 2000, and has helped to project an exciting image of

"getting easy access to computing power". This image certainly applies to the new HP 2000 Computer System (19700B). Its new software capabilities further expand and refine this concept.

Other naming convention changes are listed below:

**Language Processor:** old name — 2000/Access BASIC  
new name — 2000 BASIC

**Operating System:** old name — 2000 Access Operating System  
new name — 2000 Operating System

## NEW ORDERING PROCEDURES FOR THE COMPUTER CURRICULUM PROJECT

*Chris Doerr*  
HP General Systems

HP's Computer-Based Educational Materials (formerly known as the Computer Curriculum Project) are no longer available from HP — they must now be ordered from:

Scientific Press  
Stanford Barn  
Palo Alto, CA 94304  
(415)322-5221

This arrangement was instituted to greatly streamline ordering procedures for customers, and to speed up the turnaround time. Some of the titles include:

Conversational Statistics  
Interactive Forecasting  
Cases in Computer and Model-Assisted Marketing: Planning  
Cases in Computer and Model-Assisted Marketing: Data Analysis  
Air Pollution  
Computer Graphics  
INQUIR Reference Manual  
COBOL 2000 Workbook

Also included are a series of mathematics enrichment supplements, physics booklets, and social science workbooks.

For a catalog of available books or to place an order, write or call Mr. Paul Kelly at the above address.

## REVISIONS TO SEPTEMBER, 1976 COMMUNICATOR ARTICLE

*Tom Aguirre*  
HP General Systems

Please note the following revision to the 2000 Software Update section in the September, 1976 Communicator. Programs CIS500 and CIS503 on page 447 should be deleted.

# software updates

## LATEST SOFTWARE REVISION TO THE 2000 OPERATING SYSTEM: REVISION 1638

*Scott Guthrie*  
*Dan Jorgenson*  
HP General Systems

The article describes new capabilities and problems corrected in revision 1638 of the 2000 Operating System (22678A) released in October, 1976. Also included in this article is a guide to taking system cold dumps.

## NEW CAPABILITIES

### 9600 bps. Synchronous Communication

The synchronous data communication transfer rate used for RJE and 2000 system to 2000 system applications range upward to 9600 bps. It was formerly limited to 4800 bps. However, when using the new Hewlett-Packard serial link terminal (discussed in the next section) concurrently with RJE and 2000 to 2000 communications the transfer rate should be limited to 4800 bps.

### Support for HP Serial Link Terminal

The Hewlett-Packard serial link terminal subsystem (HP 92900A) is now supported as a transaction-oriented input/output device attached to the Communications processor of the HP 2000 Computer System. This subsystem consists of an HP 40280A computer interface card, one HP 3070A Serial Link Terminal cabling, diagnostics, and user reference documentation. Additional terminals may be supported by this interface in a hard-wired, multidrop fashion.

The HP 3070A terminal is a compact desk top terminal (see figure 1) with a 16 digit numeric display, 10 digit numeric keypad, special function keys, and 15 prompting lights. Up to 31 3070A terminals may be connected to an HP 2000 Computer System through a single shielded, twisted pair cable up to 4 kilometers long (2.5 miles). Additionally up to 32 interactive terminals may be attached through the HP 2000's two 16 channel multiplexors. The capability of the 3070A can be extended by the addition of any of our one-hundred HP-IB\* compatible measurement instruments and peripherals currently available.

\*The HP-IB is Hewlett-Packard's implementation of the IEEE STD 488-1975 "Digital interface for programmable instrumentation".



**Figure 1. HP 3070A Terminal**

The software driver for the 3070A is included in revision 1638 and may be configured into the communication processor during system generation. The terminal is treated as an ASCII file device and controlled through BASIC language programs.

Applications for this terminal in manufacturing companies include time-keeping, inventory control, materials movement, production testing, and order processing. Many functionally similar applications exist within non-manufacturing organizations such as insurance companies, banks, and hospitals.

Please contact your HP representative for further information on the HP 3070A Serial Link Terminal.

## PROBLEMS CORRECTED IN REVISION 1638

### I/O Processor

1. Repeated power failures could cause the I/O processor to crash.
2. Possible port lockouts after an ANNOUNCE, SLEEP, or HIBERNATE Commands.
3. Data Communications/RJE Facility:
  - a. The IOP would crash if multiple print streams were retrieved from an RJE JOB LISTER (JL)
  - b. The 11-7-8 punch was translated incorrectly during CDC RJE.
  - c. "Data Check" errors caused by internal timing constraints while operating 9600 bps communications links have been eliminated in almost all circumstances. Systems operating HP 3070 link

terminal subsystems will experience unacceptable error rates with RJE communications above 4800 bps.

- d. During 2000 to 2000 communications, CTL's to a remote lineprinter were not handled correctly.
- e. Systems with an HP 2894 card reader/punch could experience erratic operations.
4. Lower case characters are shifted to upper case instead of blanks for printing on the HP 2767 line printer.
5. Operation of dial-up ports on a 16 port system was unpredictable.
6. Parity bits were not ignored ("stripped") on paper tapes that were punched or read in the "No Parity" mode.
7. Several characters were translated incorrectly on Call/360 terminals.
8. The IOP could crash in very heavily loaded systems when using RJE and/or multiple ASCII File devices.

### System Processor

1. Mat read statement did not read array elements from strings in ASCII files correctly.
2. Arguments for the PAUSE statement must be less than 32,768. No error was indicated for arguments in the range of 32,768 to 65,535. The manual specifies incorrect ranges (Manual not corrected in this release).

## PROBLEMS KNOWN BUT NOT YET CORRECTED

1. The processors in the system are susceptible to static electricity. This is a common reason that systems become unresponsive (i.e., "Ports Lock Up"). A hardware revision is available to reduce this problem. All normal procedures to minimize static electricity around the system are strongly recommended.
2. The system does not support print positions 133 through 136 on the HP 2613, HP 2617 and HP 2618 lineprinters. (To be corrected in the next release).
3. Often, the system does not report to the user or to the console that a lineprinter went "off-line" for any reason while printing. (To be corrected in the next release).
4. RJE output from CDC hosts does not support print positions 133 through 136. (To be corrected in the next release).
5. Dial up ports are enabled inappropriately if a power failure occurs while the system is in the SLEEP state. (To be corrected in the next release).

## DOCUMENTATION

New updates to the Basic Reference and Operator's Manual based on the features of revision 1638 have been printed. These updates can be obtained by specifying the following information:

Manual Update #2 (including #1), dated 9/76 to HP 2000 Basic Reference Manual, Second Edition, 5/76, Manual Number 22687-90001.

Manual Update #2 (includes #1), dated 9/76 to HP 2000 Operator's Manual, Second Edition 5/76, Manual Number 22687-90005.

## OBTAINING REVISION 1638

Customers under warranty or service contract will receive Revision 1638 at no cost including one copy each of the manual updates. Customers not under warranty or service contract that wish to order Revision 1638 should contact their local HP representative for ordering details.

## HP 2000 COLD DUMP PROCEDURES

In the past, there has been some misunderstanding of the system problem reporting procedure involving cold dumps. It is the purpose of this section to clarify this procedure. Good cold dumps are essential in diagnosing software problems.

### The Cold Dump Routine

The cold dump routine is a memory-resident program designed to assist in preserving information necessary to identify the cause of software failures. Correct usage minimizes system down-time because the routine captures

essential data for subsequent off-line analysis. This feature allows recovery procedures to proceed in parallel with the fault diagnosis. Note that the cold dump routine generally is not useful for diagnosing hardware problems.

If software failures occur, it is important to record as much information as possible about the state of the system before the failure. A special report form provides space for data pertinent to the cold dump procedure; for example, register contents, time of failure, and anomalous circumstances preceding the failure. A sample Cold Dump Report is included in Appendix H of the HP 2000/Access Operator's Manual. Always fill out the report completely as part of the cold dump procedure.

If the system fails, halt codes may be displayed in the display register of the processors. In Appendix B, tables B-1 and B-2 list the halt codes, their meanings, and possible corrective action. When these halts require using the cold dump routine, follow the flowchart attached to set the system up for a successful dump.

### NOTE

*A cold dump is not useful if either the main processor or I/O processor parity light is ON (indicating a parity error occurred). If this happens, contact your HP customer engineer and then consult section 5 or System Recovery Procedures in the Operator's Manual.*

If a problem with normal system operation is encountered, perform the following procedure:

*(See page 536 for Logic Diagram)*



# documentation

The following tables list currently available customer manuals for HP 2000 Systems products. This list supersedes the list in the last issue of the **Communicator**.

The most recent changes to the tables are indicated for easy reference. Prices are subject to change without notice.

Copies of manuals and updates can be obtained from your local Sales and Service office. The address and telephone number of the office nearest to you are listed in the back of all customer manuals.

Update packages are free of charge. If you require an update package complete the Update Order Form in the back of the **Communicator** and mail the form to:

Software/Publications Distribution  
5303 Stevens Creek Blvd.  
Santa Clara, CA. 95050

Customers in the U.S. may also order directly by mail. Simply list the name and part number of the manual(s) you need on the Corporate Parts Center form supplied at the back of the **Communicator**.

A few words about documentation terms:

- New** A new manual refers only to the first printing of a manual. When first printed, a manual is assigned a part number.
- Revised** A revised manual is a printing of an existing manual which incorporates new and/or changed information in its contents. For example, a manual is revised when an update package is incorporated into the manual: the manual gets a new print date and the update package disappears. Note that a revision to a manual effectively obsoletes the previous version of the manual.
- Update** An update package is a supplement to an existing manual which contains new and/or changed information. Updates are issued when information must get to customers, yet it is inappropriate to issue a revised manual. An update has no part number; it is automatically included when you order the manual with which it is associated.

| PART NUMBER | 2000 E | 2000 F | HP 2000 | MANUAL TITLE                                                             | PRICE <sup>†</sup> | PUBLICATION DATE | CURRENT UPDATE |
|-------------|--------|--------|---------|--------------------------------------------------------------------------|--------------------|------------------|----------------|
| 02000-90055 |        | X      |         | 2000C/2000F IDF Author's Manual                                          | \$ 8.50            | 1/73             | 8/74           |
| 02000-90080 |        | X      |         | 2000E to 2000F Conversion Guide                                          | 1.00               | 4/76             |                |
| 19665-90001 |        |        | X       | 2000/F to 2000 Computer System Upgrade Kit and Conversion Program Manual | 2.00               | 8/76             |                |
| 19665-90002 |        |        | X       | 2000/F to 2000 Computer System Educational Application Upgrades          | 1.00               | 2/76             |                |
| 22687-90001 |        |        | X       | 2000 BASIC Reference Manual                                              | 10.00              | 5/76             | 9/76           |
| 22687-90005 |        |        | X       | 2000 Operator's Manual                                                   | 10.00              | 5/76             | 9/76           |
| 22687-90007 |        |        | X       | 2000 System Operator's Pocket Guide                                      | 1.50               | 5/76             |                |
| 22687-90003 |        |        | X       | BASIC Pocket Guide                                                       | 1.50               | 10/76 *R         |                |
| 02000-90048 | X      |        |         | BASIC/2000 Level E Reference Manual, Timeshared                          | 10.00              | 9/75             |                |
| 02000-90049 | X      |        |         | BASIC/2000 Level E System Operator's Manual, Timeshared                  | 5.00               | 9/74             | 8/75           |
| 5952-4490   | X      |        |         | BASIC/2000 Level E Pocket Guide, Timeshared                              | 0.15               | 10/74            |                |
| 02000-90073 |        | X      |         | BASIC/2000 Level F Reference Manual, Timeshared                          | 7.50               | 12/75            |                |
| 02000-90074 |        | X      |         | BASIC/2000 Level F System Operator's Manual, Timeshared                  | 10.00              | 8/76             |                |
| 5952-4491   |        | X      |         | BASIC/2000 Level F Pocket Guide, Timeshared                              | 0.15               | 8/75             |                |
| 24387-90001 |        | X      |         | Basic Analysis and Mapping Program Manual                                | 18.00              | 6/74             | 5/75           |
| 24387-90002 |        | X      |         | Basic Analysis and Mapping Program Pocket Guide                          | 1.00               | 6/74             |                |
| 24384-90001 |        | X      | X       | College Information System — System Overview                             | 5.00               | 6/74             | 9/76           |
| 24384-90003 |        | X      | X       | College Information System Reference Manual                              | 19.00              | 9/75             | 9/76           |
| 24384-90005 |        | X      | X       | College Information System — Technical Manual                            | 95.00              | 5/75             |                |
| 24383-90001 |        | X      |         | Course Writing Facility Reference Manual                                 | 15.00              | 5/74             |                |
| 22692-90001 |        |        | X       | Course Writing Facility Reference Manual                                 | 16.50              | 12/75            |                |

| PART<br>NUMBER | 2000 E | 2000 F | HP 2000 | MANUAL TITLE                                                           | PRICE <sup>†</sup> | PUBLICATION<br>DATE | CURRENT<br>UPDATE |
|----------------|--------|--------|---------|------------------------------------------------------------------------|--------------------|---------------------|-------------------|
| 5951-1381      |        | X      |         | DOS-M/2000C Timeshared BASIC File Handler                              | 1.00               | 5/71                |                   |
| 22701-90001    |        |        | X       | EDITOR/2000 Reference Manual                                           | 7.00               | 9/76                |                   |
| 20352-90001    |        | X      |         | Educational Budget and Accounting System –<br>System Overview          | 10.00              | 6/74                |                   |
| 20352-90002    |        | X      |         | Educational Budget and Accounting System –<br>Reference Manual         | 10.00              | 3/75                | 4/76              |
| 20352-90003    |        | X      |         | Educational Budget and Accounting System –<br>Technical Manual         | 75.00              | 3/75                |                   |
| 20353-90001    |        | X      |         | Educational Payroll System – System Overview                           | 3.50               | 10/74               |                   |
| 22700-90001    |        |        | X       | FCOPY/2000 Reference Manual                                            | 4.50               | 1/76                |                   |
| 22693-90003    |        |        | X       | HP MATH Curriculum Guide                                               | 17.50              | 7/75                |                   |
| 22693-90002    |        |        | X       | HP MATH Proctor's Manual                                               | 6.50               | 7/75                |                   |
| 22693-90001    |        |        | X       | HP MATH Teacher's Handbook                                             | 5.50               | 7/75                |                   |
| 20310-90007    | X      |        |         | HP MATH Curriculum Guide                                               | 20.00              | 7/74                |                   |
| 20310-90005    | X      |        |         | HP MATH Proctor's Manual                                               | 5.00               | 9/74                |                   |
| 20310-90001    | X      |        |         | HP MATH Teacher's Handbook                                             | 5.00               | 9/75                |                   |
| 22691-90003    |        |        | X       | Instructional Dialogue Facility Author's Manual                        | 13.00              | 9/75                |                   |
| 22691-90004    |        |        | X       | Instructional Dialogue Facility Author's<br>Pocket Guide               | 3.00               | 9/75                |                   |
| 22691-90002    |        |        | X       | Instructional Dialogue Facility Course<br>Developer's                  | 5.00               | 9/75                |                   |
| 22691-90001    |        |        | X       | Instructional Dialogue Facility Proctor's Manual                       | 6.00               | 9/75                |                   |
| 20309-90005    | X      |        |         | Instructional Dialogue Facility Author's<br>Pocket Guide               | 3.50               | 10/74               |                   |
| 20309-90003    | X      |        |         | Instructional Dialogue Facility Course<br>Developer's Manual           | 6.00               | 8/74                |                   |
| 20309-90001    | X      |        |         | Instructional Dialogue Facility Proctor's Manual                       | 10.00              | 9/74                |                   |
| 22690-90001    |        |        | X       | Instructional Management Facility Proctor's<br>Manual                  | 6.50               | 9/75                |                   |
| 22690-90002    |        |        | X       | Instructional Management Facility System<br>Manager's Reference Manual | 4.50               | 9/75                |                   |
| 20308-90001    |        |        | X       | Instructional Management Facility Proctor's<br>Manual                  | 7.00               | 9/74                |                   |
| 20308-90003    |        | X      |         | Instructional Management Facility System<br>Manager's Manual           | 5.00               | 10/74               |                   |
| 22687-90009    |        |        | X       | Learning Timeshare BASIC                                               | 3.50               | 5/76                |                   |
| 20243-90001    |        |        | X       | Source Data Entry/2000 Reference Manual                                | 5.00               | 2/76                |                   |
| 20240-90001    |        |        | X       | Telecommunications Supervisory Package/2000<br>Manager's Manual        | 5.00               | 1/76                |                   |
| 20240-90002    |        |        | X       | Telecommunications Supervisory Package/2000<br>User's Manual           | 3.50               | 1/76                |                   |
| 20311-90001    |        | X      |         | Timeshared Graphics for Tektronix Terminals                            | 7.00               | 8/74                |                   |
| 20311-90003    |        | X      |         | Timeshared Graphics Plotting Package                                   | 5.00               | 8/74                |                   |

\*N = New Manual (Refer to the Bulletin section)

\*R = Revised Manual

† Prices listed are subject to change without notice.

# training schedule

The schedule for customer training courses on General Systems Division Products is outlined below and in the HP 3000 section of this publication. Included here are 2000 courses for the 3 month period, November, 1976 through January, 1977.

## GENERAL SYSTEMS DIVISION COURSE SCHEDULE

### Course Dates and Training Center Location

| COURSE NUMBER | COURSE TITLE | LENGTH | PRICE | WESTERN TECHNICAL CENTER – SANTA CLARA | EASTERN TECHNICAL CENTER – ROCKVILLE |
|---------------|--------------|--------|-------|----------------------------------------|--------------------------------------|
| 22973A        | 2000 User    | 5 days | \$500 | 1/24/77<br>3/7/77                      | Scheduled upon sufficient demand.    |

### Registration

Requests for enrollment in any of the above courses should be made through your local HP Sales Office. Your Sales Representative will supply the Training Registrar at the appropriate location with the course number, dates, and requested motel reservations. Enrollments are acknowledged by a written confirmation indicating the training course, time of class, location and accommodations reserved.

### Accommodations

Students provide their own transportation, meals, and lodging. The Training Registrar will be pleased to assist in securing motel reservations at the time your Sales Office requests a registration.

### Cancellations

In the event you are unable to attend a class for which you are registered, please notify the Training Center Registrar immediately in order that we may offer your seat to another student. To avoid paying for a reservation which you do not use, we must receive notification of your cancellation no later than one week before the class begins.

| EASTERN TECHNICAL CENTER                                            | WESTERN TECHNICAL CENTER                                                 |
|---------------------------------------------------------------------|--------------------------------------------------------------------------|
| Hewlett-Packard<br>4 Choke Cherry Road<br>Rockville, Maryland 20850 | Hewlett-Packard<br>5303 Stevens Creek Blvd.<br>Santa Clara, Calif. 95050 |

# software tips

## COBOL VERSION C RELEASED (32213C)

John Page  
General Systems

For HP System users who want to offload some COBOL work from a big mainframe to a local 3000, one more barrier has been knocked down. Now with COBOL Version C customers with large 370 programs, for example, will now find their conversion task eased by an order of magnitude.

COBOL/3000 Version C differs from Version B in the way the compiler's internal symbol table is handled. In the old version, this table would overflow on programs more than about 3000 lines in length (or even less if the program had a large number of symbols), causing a compile-time abort which was very difficult to get around. In fact, the only viable solution was to break up the program into sub-programs and compile them separately — a very painful job.

Version C has a symbol table which extends itself onto disc when it gets too large, *effectively eliminating program size restrictions*.

## COMPATIBILITY

Apart from the change described above, there are no differences between Version B & C. It will run on both Series I (CX) and Series II.

## PERFORMANCE

Due to the fact that some extra code had to be added to the compiler, it now takes up slightly more space in memory. On the Series II this has caused the compiler to take about 10% longer to compile a program than the B Version.

On the Series I it will take between 40 and 100% longer. *For this reason the standard COBOL for a CX will remain Version B.* However, in order to provide Series I customers with the capability to compile the occasional large program, they will be provided with the Version C in addition to B compilers, but it will be accessible through the :RUN command. In summary:

|           | VERSION B  | VERSION C          |
|-----------|------------|--------------------|
| Series I  | :COBOL     | :RUN COBOLC. . . * |
| Series II | Not Needed | :COBOL             |

## MAINTENANCE

Both Version B & C will be maintained until further notice (Version A has already been obsoleted).

## Run COBOLC. PUB.SYS COMMAND

An alternative way to call the COBOL compiler is by using the :RUN command. Before using the :RUN command, you must use file equations for the files normally specified on the :COBOL command. The format file designators are:

|         |                       |
|---------|-----------------------|
| COBTEXT | ( <i>textfile</i> )   |
| COBLIST | ( <i>listfile</i> )   |
| COBUSL  | ( <i>uslfile</i> )    |
| COBMAST | ( <i>masterfile</i> ) |
| COBNEW  | ( <i>newfile</i> )    |

Thus, to compile from the file MYSOURCE and send the listing to the line printer, you would use

```
:FILE COBTEXT=MYSOURCE
:FILE COBLIST;DEV=LP
```

before using the :RUN command.

Additionally, you must specify a PARAM=*parameternum* parameter on the :RUN command to indicate which files are present unless the default values are used. The value is between 0 and 31 as shown on the following table. Basically, the low order five bits in *parameternum* represent the five files which can be specified as shown below:

| 11      | 12         | 13      | 14       | 15       |
|---------|------------|---------|----------|----------|
| newfile | masterfile | uslfile | listfile | textfile |

For example, to invoke the compiler with the *textfile* and *listfile* present, you would use the command:

```
:RUN COBOLC.PUB.SYS;PARAM=3
```

## PARAM Values

| PARAMETERNUM | FILES PRESENT                      |
|--------------|------------------------------------|
| 0            | None                               |
| 1            | <i>textfile</i>                    |
| 2            | <i>listfile</i>                    |
| 3            | <i>listfile, textfile</i>          |
| 4            | <i>uslfile</i>                     |
| 5            | <i>uslfile, textfile</i>           |
| 6            | <i>uslfile, listfile</i>           |
| 7            | <i>uslfile, listfile, textfile</i> |
| 8            | <i>masterfile</i>                  |

|    |                                                         |
|----|---------------------------------------------------------|
| 9  | <i>masterfile, textfile</i>                             |
| 10 | <i>masterfile, listfile</i>                             |
| 11 | <i>masterfile, listfile, textfile</i>                   |
| 12 | <i>masterfile, uslfile</i>                              |
| 13 | <i>masterfile, uslfile, textfile</i>                    |
| 14 | <i>masterfile, uslfile, listfile</i>                    |
| 15 | <i>masterfile, uslfile, listfile, textfile</i>          |
| 16 | <i>newfile</i>                                          |
| 17 | <i>newfile, textfile</i>                                |
| 18 | <i>newfile, listfile</i>                                |
| 19 | <i>newfile, listfile, textfile</i>                      |
| 20 | <i>newfile, uslfile</i>                                 |
| 21 | <i>newfile, uslfile, textfile</i>                       |
| 22 | <i>newfile, uslfile, listfile</i>                       |
| 23 | <i>newfile, uslfile, listfile, textfile</i>             |
| 24 | <i>newfile, masterfile</i>                              |
| 25 | <i>newfile, masterfile, textfile</i>                    |
| 26 | <i>newfile, masterfile, listfile</i>                    |
| 27 | <i>newfile, masterfile, listfile, textfile</i>          |
| 28 | <i>newfile, masterfile, uslfile</i>                     |
| 29 | <i>newfile, masterfile, uslfile, textfile</i>           |
| 30 | <i>newfile, masterfile, uslfile, listfile</i>           |
| 31 | <i>newfile, masterfile, uslfile, listfile, textfile</i> |

## 3000 SERIES II TERMINAL TIPS

*Rita Williams*

*HP General Systems*

Below is a matrix of terminal types, representative terminals, and delay characters at various speeds. This matrix is provided to aid users who must use terminals other than the ones listed below. With this information, such users can select the termtype most *likely* to succeed!

### FOR HARDWIRED TERMINALS

Given: the system's default terminal is type 10, user wants to log on a terminal other than type 10 using TERM = parameter of :HELLO. If terminal doesn't respond to initial carriage return, control-F followed by carriage return should get the system to respond with the prompt.

### FOR TERMINALS ON MODEMS

The Series II support group suggests configuring these terminals as term type 0. This will allow any supported terminal type to enter HELLO with TERM - parm - without using control-F as above.

| Termtype | Representative Terminal              | Delay Characters (LF, CR)**   |      |      |      |      |     | Character Echoed on Control-H |
|----------|--------------------------------------|-------------------------------|------|------|------|------|-----|-------------------------------|
|          |                                      | Speed (Characters per Second) |      |      |      |      |     |                               |
|          |                                      | 10                            | 15   | 30   | 60   | 120  | 240 |                               |
| 0        | ASR 33                               | 0,1                           |      |      |      |      |     | \                             |
| 1        | ASR 37                               |                               | 0,2  |      |      |      |     | LF                            |
| 2        | ASR 35                               | 0,1                           |      |      |      |      |     | \                             |
| 3        | Execuport                            | 0,1                           | 0,3  | 0,5  |      |      |     | LF                            |
| 4        | Datapoint                            | 0,0                           | 4,0  | 4,0  | 4,0  | 4,0  | 4,0 | EM<br>(control-Y)             |
| 5        | Memorex 1240                         | 1,10                          | 1,10 | 1,25 | 3,45 |      |     | LF                            |
| 6        | Terminet                             | 3,0                           | 5,0  | 10,0 |      | 35,0 |     | LF                            |
| 9        | MiniBee                              | 0,0                           | 4,0  | 4,0  | 4,0  | 4,0  | 4,0 | null                          |
| *10      | HP2640/44                            | 0,0                           | 0,0  | 0,0  | 0,0  | 0,0  | 0,0 | null                          |
| *11      | HP2640/44<br>full "enter"<br>service | 0,0                           | 0,0  | 0,0  | 0,0  | 0,0  | 0,0 | null                          |
|          | undefined                            | 0,1                           | 4,0  | 4,0  | 4,0  | 4,0  | 4,0 | \                             |

\*See appropriate terminal manual to determine output delays required when moving cursor.

\*\*Line Feed, Carriage Return

## HOW TO BUILD AN INTERFACE BETWEEN COBOL AND ANY MPE INTRINSIC FROM SPL

Terry Von Gease  
HP General Systems

There are few (if any) MPE Intrinsics callable directly from COBOL. This is due to the way COBOL sends parameters (in the USING clause) and the way the various MPE Intrinsics expect to receive them.

Some MPE Intrinsics are "Option Variable". This means that some of the parameters are optional. When an option variable procedure is called one or more extra words will be passed along with the parameters to indicate which parameters are present. The extra word, or words, are passed, one word for each 16 possible parameters. Bits are set on or off to indicate which parameters are present and which are not. The bits in the extra word, or words, correspond to the actual parameter list on a one for one basis from right to left. When calling an option variable intrinsic it is the responsibility of the calling process to provide this additional information. SPL handles this automatically, however, COBOL will not provide the proper data so any option variable intrinsic cannot be called directly from COBOL.

Also many of the MPE Intrinsics are "Typed Procedures". A Typed Procedure returns a value (either one, two, or four words) that is independent of any passed parameters. This is a value generated by the procedure itself. For example, assume that we have an SPL program that is going to call the MPE Intrinsic BINARY. This intrinsic will convert a byte array containing ASCII numeric characters for a specified length to a one word integer and return this integer as the value of the intrinsic. For this example assume that we have a byte array called BUFFER that contains the character string "1234", we have a one word integer called LENGTH that contains the number 4 (4 characters in BUFFER), and we have another one word integer called RESULT which will be used to contain the result. The actual call to BINARY would look like this . . . . .

```
RESULT:=BINARY(BUFFER,LENGTH);
```

Note that the "!=" is SPL for "replaced by", a single "=" means something else.

In this case the value of the integer RESULT is replaced by the binary numeric value of the character string BUFFER. COBOL has no way of coping with this returned value so this MPE Intrinsic is useless to us on that basis alone. (Not to mention what it does to the stack internally).

Another feature of many MPE Intrinsics is the use of the Condition Code to indicate the result of a call to a particular intrinsic. In the BINARY example above the condition code would be set to < (less than) if the character string

contained one or more non-numeric characters (except a leading minus in this case), a > (greater than) if the result was beyond the capacity of a one word integer (less than -32768 or greater than +32767), or = (equal) if the call functioned properly and the returned value in RESULT is valid. In SPL it is a simple matter to interrogate the condition code after a call, we simply say . . . . .

```
IF < THEN . . .    (if the condition code is less than)
IF > THEN . . .    (if the condition code is greater than)
IF = THEN . . .    (if the condition code is equal)
IF < > THEN . . .  (if the condition code is not equal)
IF < = THEN . . .  (if the condition code is less than or equal)
IF > = THEN . . .  (if the condition code is greater than or equal)
```

What follows the THEN statement in each case is code for whatever you want to do if the statement is true.

Since COBOL has no way of interrogating the condition code we would have no way of knowing whether or not the call to BINARY worked properly even if we could call BINARY directly.

Furthermore, if we examine the description of the BINARY intrinsic in the *MPE Intrinsics Manual* we find that not only is BINARY a procedure that sets the condition code but the character string parameter must be a byte array passed by reference (COBOL passes word arrays by reference, so that's out) and the length parameter is a one word integer (so far so good) passed by value (so we lose here also).

The difference between a reference and a value parameter is this: When a reference parameter is used the ADDRESS of the parameter is passed; when a value parameter is used the actual value of the parameter is passed. In the case of our call to BINARY, the address of the byte array BUFFER and the binary value 4 are passed. Let's take a look and see what actually happened when we called BINARY . . . . .

We know (or we should know) that we have something called a stack for our program. The stack contains all of the data area for our program and is referenced by the STACK or S register (there are other references but S is all we need to consider for this example).

When the SPL compiler encounters the call to BINARY it generates code which does the following:

1. SPL interrogates the MPE Intrinsic file to determine the various characteristics of BINARY.
2. SPL notices that this procedure will return a one word integer value. To accommodate this a zero is loaded onto the stack and the S register is incremented by 1.
3. SPL sees that the first parameter is by reference so

it places a one word address of the first variable specified (BUFFER in this case) on the stack and the S register is incremented by 1.

4. SPL sees that the next parameter is passed by value so it places the value of the specified parameter (LENGTH in this case) on the stack and the S register is incremented by 1.
5. SPL sees that all of the parameters have been taken care of so it generates a PCAL machine instruction for BINARY.
6. PCAL places 4 more words on the stack and increments the S register by 4. These 4 words are referred to as a "Stack Marker" and contain all of the information needed to return to the proper place in the calling program.
7. PCAL does whatever is necessary to make BINARY present in the system and transfers control to it.
8. BINARY does whatever it is that BINARY's do. One of the things that it will do for sure is place the result value back down in the stack in the location of the first word that SPL placed there.
9. BINARY exits. When this happens all of the passed parameters (both of them in this case) and the 4 word stack marker are removed from the stack and the S register is decremented by the proper value (6 in this case). Note that the first location that was for the returned value is NOT removed from the stack. The condition code is set and control returns to the proper place in the calling program.
10. SPL remembers that this procedure will return a one word value so it removes it from the stack and places it in RESULT. The S register is now decremented by 1.
11. We are now back at the start of the next sequential instruction from where we left and the stack is back to what it was before the call to BINARY. The pot's right.

All of this may or may not make any sense at this time but it does serve to point out what we must do to get at any MPE Intrinsic from COBOL. We must construct an interface to resolve the parameter types, return variables, and the condition code. At this time a few words about COBOL data types may well be in order . . . .

1. Any field included in a USING clause **MUST** be located on a word boundary. This is easily accomplished by defining everything that may be used as a parameter at an 01 or 77 level. If this proves annoy-

ing then word alignment may be insured by using the SYNC clause or merely by insuring that there is ALWAYS an EVEN number of bytes between parameters (this method is not recommended).

2. COBOL keeps numeric data in four forms:
  - A. The display numeric form of PIC S9(3). All this is a string of ASCII numeric characters.
  - B. The edited numeric form of PIC ZZZZZ. This is still a string of ASCII characters.
  - C. The COMPUTATIONAL-3 form of PIC S9(3) COMP-3. This, of course, is packed decimal information with 2 digits per byte except for the last byte which contains 1 digit and the sign.
  - D. The COMPUTATIONAL form of PIC S9(3) COMP. This is numeric data in integer form. COBOL uses no floating point data, all binary numeric data is kept in one to three word integers. 4 or less digits are one word, from 4 to 9 digits are two words, and greater than 9 digits are four words.

Generally only numerical data of type COMPUTATIONAL will be of any use to us for passing numbers. And of the COMPUTATIONAL types only the one and two word integers will be used.

Now let us define and construct an interface so COBOL may call BINARY. The simplest way to do this is to write the calling program in COBOL and then write the interface in SPL.

The portions of the COBOL program doing the calling should look something like this . . .

In the working-storage section . . . .

```
01 BUFFER PIC X(4).
01 LENGTH PIC S9(4) COMP.
01 RESULT PIC S9(4) COMP.
01 COND-CODE PIC S9(4) COMP.
```

In the procedure division . . . (assume that the COBOL program has moved "1234" to BUFFER and 4 to LENGTH) . . . .

```
CALL "CBINARY" USING BUFFER, LENGTH,
COND-CODE, RESULT.
```

Note that we have called our procedure CBINARY and we have included a couple of extra parameters, as you surely must have guessed, to contain the condition code and the result value.

The SPL interface will have to look something like this . . .

```

1.  $CONTROL SUBPROGRAM
2.  BEGIN
3.  PROCEDURE CBINARY(BUFFER,LENGTH,
    COND' CODE,RESULT);
4.  ARRAY BUFFER;
5.  INTEGER LENGTH,COND'CODE,RESULT;
6.  BEGIN
7.    BYTE ARRAY BBUFFER(*)=BUFFER;
8.    INTRINSIC BINARY;
9.    RESULT:=BINARY(BBUFFER,LENGTH);
10.   IF < THEN COND'CODE:=-1 ELSE IF > THEN
    COND'CODE:=1 ELSE COND'CODE:=0;
11. END;
12. END.
```

Note that the line numbers are NOT used for SPL but only included so we may reference each line for discussion . . .

- Line 1: This puts the compiler into SUBPROGRAM mode.
- Line 2: All SPL programs of any sort must start with a BEGIN statement.
- Line 3: This declares the procedure and all of its parameters to the compiler.
- Line 4: Each of the parameters included in the procedure declaration (line 3) must now be described. Since COBOL always passes word pointers by reference we declare BUFFER to a word array.
- Line 5: The rest of the parameters are declared as integers since we have described them to COBOL as one word integers. Note that we had to change the name of COND-CODE slightly since SPL does not allow the use of hyphen. In fact the only special character SPL allows in names is the apostrophe.
- Line 6: Like the program itself, each procedure must start with a BEGIN statement.
- Line 7: This is a local data declaration and is the heart of the whole interface. We have declared a byte array that shares the same storage location as the word array BUFFER. We call this "Equivalencing" the two arrays. Byte arrays may always be equivalenced to word arrays but never word arrays to byte arrays since there is no certainty of having a byte array begin on a word boundary. We could gain or lose a leading byte.

Line 8: This declares that BINARY can be found in the MPE Intrinsic file.

Line 9: This is the actual call to BINARY. Note that we used the parameters LENGTH and RESULT just as they were passed but we had to use the equivalenced array BBUFFER for the string parameter. When SPL encounters the LENGTH parameter, even though this parameter was passed by reference, it will take the data found at the address that was passed. In other words, SPL will always resolve value parameters whether the value parameter is a literal or a variable. If, due to some oraculation, we knew that there were exactly four characters contained in BUFFER (or BBUFFER since both of these are really two references to the same thing) we could have called BINARY thusly . . . . .

```
RESULT:=BINARY(BBUFFER,4);
```

In this case the SPL compiler would have immediately placed the binary value four on the stack rather than have gone to the storage location LENGTH and used what it found there. The results would have been identical in either case.

Line 10: This takes care of the condition code. The passed parameter COND-CODE is set to -1 if the condition code was <, +1 if the condition code was >, or 0 if the condition code was =.

Line 11: This terminates the procedure.

Line 12: This terminates the program.

Now that we have written the source for both the COBOL main program and the SPL subprogram we can compile all of this into one USL file and PREP it into a runnable PROGRAM file. To do this always make sure that all of the non-COBOL source is compiled first, then compile the COBOL source. This is because of the way COBOL must link things up internally.

What we have done is resolve any required byte arrays by declaring a local byte array that is equivalenced to the passed word array, included an extra parameter from COBOL to handle the return value, and included an extra parameter to represent the condition code. If a particular System intrinsic does not return a value then that parameter can be omitted. Likewise, if the condition code does not matter to you then there is no need to include a parameter for it either.

In any case the outline for the SPL interface must look like . . .

**\$CONTROL SUBPROGRAM****BEGIN****PROCEDURE** name your procedure and state its parameter list in parentheses;**ARRAY** declare any arrays for future equivalencing here;**INTEGER** declare any single word integers here;**DOUBLE** declare any integers with 4 to 9 digits here;**BEGIN**    **BYTE ARRAY** name of local byte array (\*)=name of passed word array;    **INTRINSIC** names of the System Intrinsics that you want to call;

call the System Intrinsic;

set up the condition code;

**END;****END.**

This all looks quite complicated but be assured after the first time you'll love it.

We have not covered all of the possibilities here. We have only tried, through a representative sample, to show what generally must take place for an interface to function properly. Perhaps one important factor that was not brought

out is that any number of interface procedures can be contained in one SPL source file. Merely stick them in between the main **BEGIN/END** pair like this . . .

**\$CONTROL SUBPROGRAM****BEGIN****PROCEDURE** first procedure;**BEGIN**

code for first procedure;

**END;****PROCEDURE** next procedure;**BEGIN**

code for this procedure;

**END;**

and so on . . .

**END.**

And there you are.

## JOURNEY FROM AN ABORT MESSAGE TO A LINE OF SOURCE CODE

*Madeline Lombaerde*  
*HP General Systems*

A key element in isolating program problems (user or subsystem) is the proper interpretation of an abort message. This note deals with the principal methods for going from an abort message back to the line of source code where the abort occurred. The examples for FORTRAN and BASIC compiled programs use the methods that apply to SPL as well.

While it may seem as if the same methods can be applied directly to COBOL, there are certain conventions used by COBOL that are hidden from the user and significantly complicate the search for a program bug when the methods

in this note are used. Therefore, the recommended procedure for debugging COBOL for now is to put in tracing **DISPLAY** statements, e.g., at the beginning of each paragraph and/or section. As for RPG, built-in debugging features should be used.

The following examples will show you two compiled programs and the steps required to identify the location of an error in the source code of each program when given an abort message.

**NOTE**

*The figures in EXAMPLES 1 and 2 have been edited. Only data directly pertinent to the discussion of the examples is included.*

Example 1 is a program (ABCINFO) compiled using FORTRAN A (figures 1A and 1B) and FORTRAN B (figures 2A and 2B).

### Example 1: FORTRAN A and B

While running program ABCINFO, the following abort message occurs:

```
ABORT :SOLDPASS...%0.%13
PROGRAM ERROR #24: BOUNDS VIOLATION
```

The program PMAP is:

PROGRAM FILE SNEWPASS.HLBOOK.MAL

|                |     |      |       |     |  |
|----------------|-----|------|-------|-----|--|
| ABC1           | 0   |      |       |     |  |
| NAME           | STT | CODE | ENTRY | SEG |  |
| ABCSETUP       | 1   | 0    | 0     |     |  |
| SEGMENT LENGTH |     | 20   |       |     |  |
| ABCO           | 1   |      |       |     |  |
| NAME           | STT | CODE | ENTRY | SEG |  |
| ABCINFO        | 1   | 0    | 11    |     |  |
| ABCSETUP       | 2   |      |       | 0   |  |
| TFORM'         | 3   |      |       | ?   |  |
| FMTINII'       | 4   |      |       | ?   |  |
| TERMINATE'     | 5   |      |       | ?   |  |
| IIO'           | 6   |      |       | ?   |  |
| AIIO'          | 7   |      |       | ?   |  |
| SEGMENT LENGTH |     | 110  |       |     |  |

|              |              |                |           |               |     |
|--------------|--------------|----------------|-----------|---------------|-----|
| PRIMARY DB   | 0            | INITIAL STACK  | 1440      | CAPABILITY    | 600 |
| SECONDARY DB | 3            | INITIAL DL     | 0         | TOTAL CODE    | 130 |
| TOTAL DB     | 3            | MAXIMUM DATA   | 11610     | TOTAL RECORDS | 6   |
| ELAPSED TIME | 00:00:02.134 | PROCESSOR TIME | 00:00.446 |               |     |

The source was compiled using Fortran A with the \$CONTROL options of LABEL and MAP. Using Fortran B, \$CONTROL LOCATION was used. See figures 1 and 2.

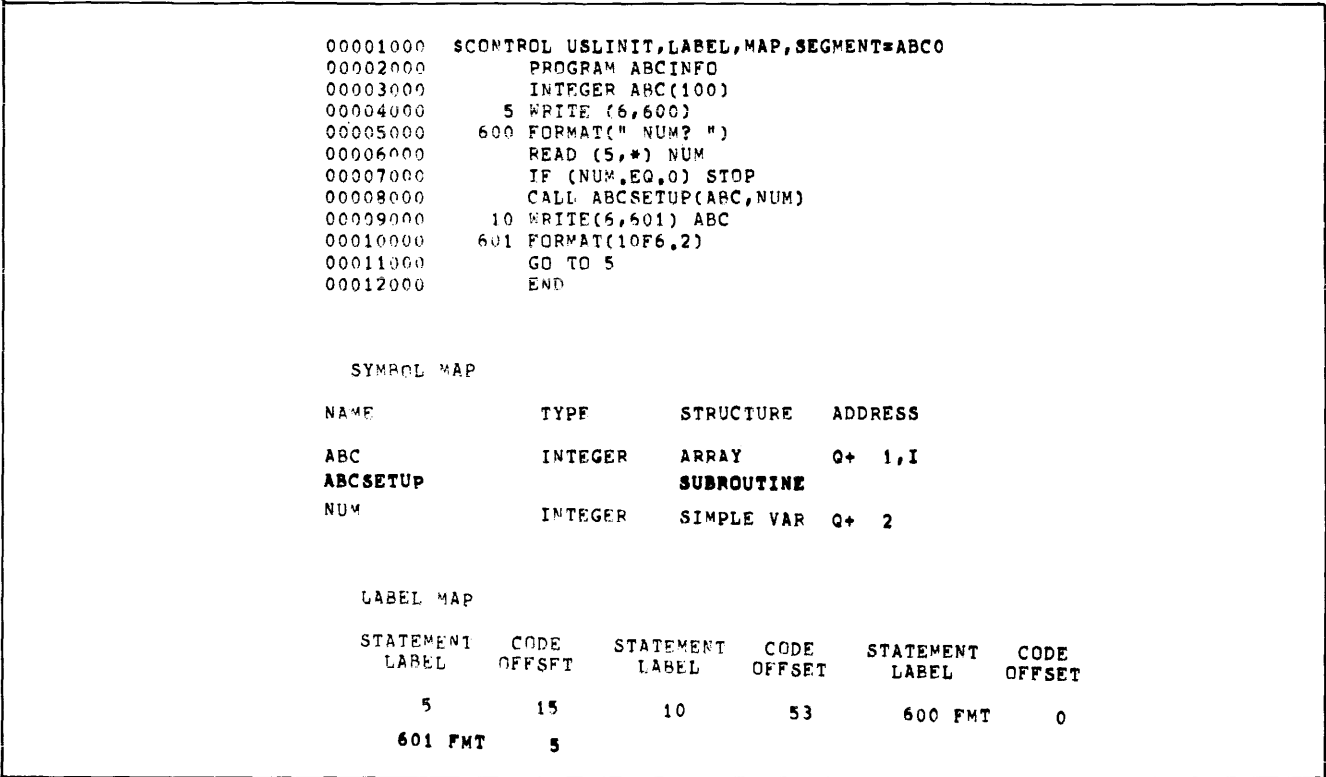


Figure 1A.

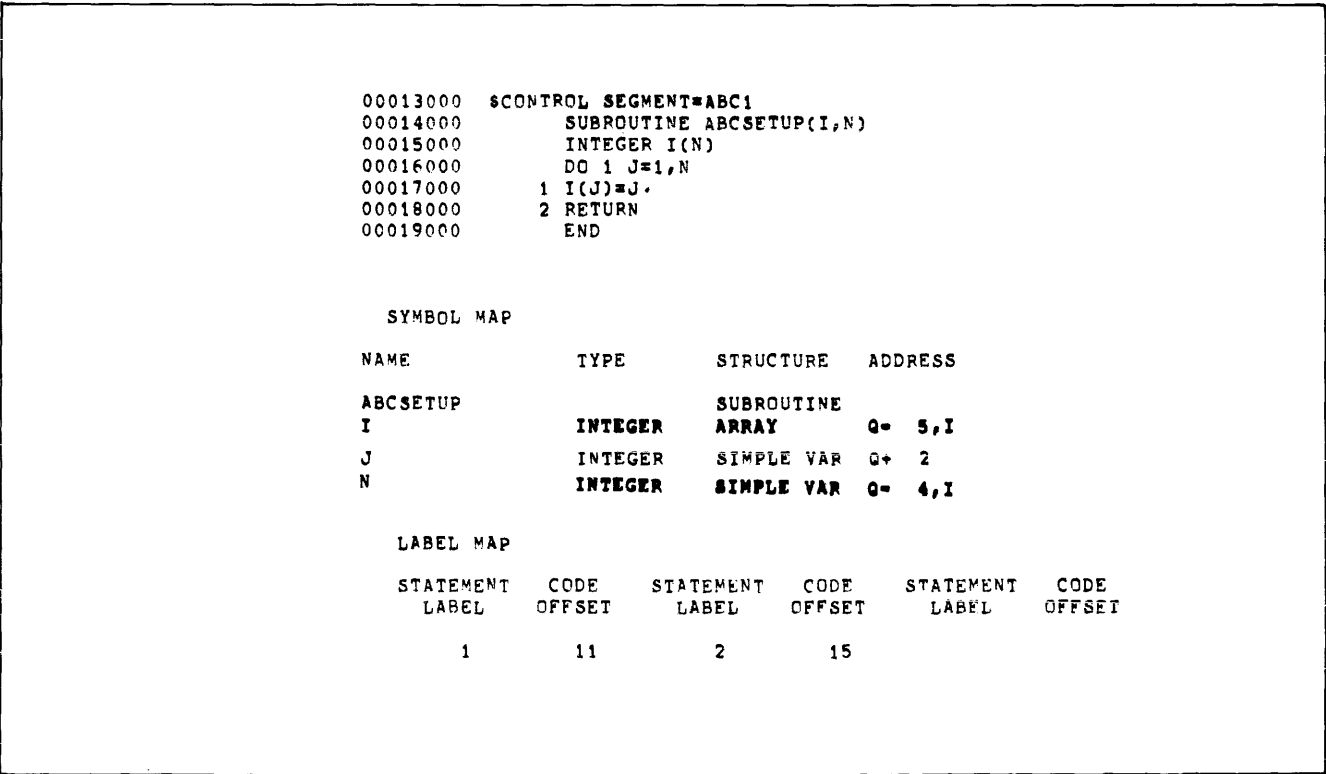


Figure 1B.

PAGE 0001 HP32102B.00.00 FORTRAN/3000 (C) HEWLETT-PACKARD CO. 1976

```

00001000  SCONTROL USLINIT,LABEL,MAP,SEGMENT=ABC0,LOCATION
00015  00002000      PROGRAM ABCINFO
00015  00003000      INTEGER ABC(100)
00015  00004000      5 WRITE (6,600)
00032  00005000      600 FORMAT(" NUM? ")
00032  00006000      READ (5,*) NUM
00043  00007000      IF (NUM.EQ.0) STOP
00047  00008000      CALL ABCSETUP(ABC,NUM)
00053  00009000      10 WRITE(6,601) ABC
00074  00010000      601 FORMAT(10F6.2)
00074  00011000      GO TO 5
00075  00012000      END

```

#### SYMBOL MAP

| NAME     | TYPE    | STRUCTURE  | ADDRESS |
|----------|---------|------------|---------|
| ABC      | INTEGER | ARRAY      | Q+ 1,I  |
| NUM      | INTEGER | SIMPLE VAR | Q+ 2    |
| ABCSETUP |         | SUBROUTINE |         |

#### LABEL MAP

| STATEMENT<br>LABEL | CODE<br>OFFSET | STATEMENT<br>LABEL | CODE<br>OFFSET | STATEMENT<br>LABEL | CODE<br>OFFSET |
|--------------------|----------------|--------------------|----------------|--------------------|----------------|
| 5                  | 15             | 10                 | 53             | 600 FMT            | 0              |
| 601 FMT            | 5              |                    |                |                    |                |

Figure 2A.

PAGE 0002 HEWLETT-PACKARD 32102B.00.00 FORTRAN/3000

```

00004  00013000  SCONTROL SEGMENT=ABC1
00004  00014000      SUBROUTINE ABCSETUP(I,N)
00004  00015000      INTEGER I(N)
00004  00016000      DO 1 J=1,N
00011  00017000      1 I(J)=J
00015  00018000      2 RETURN
00016  00019000      END

```

#### SYMBOL MAP

| NAME     | TYPE    | STRUCTURE  | ADDRESS |
|----------|---------|------------|---------|
| ABCSETUP |         | SUBROUTINE |         |
| J        | INTEGER | SIMPLE VAR | Q+ 2    |
| I        | INTEGER | ARRAY      | Q- 5,I  |
| N        | INTEGER | SIMPLE VAR | Q- 4,I  |

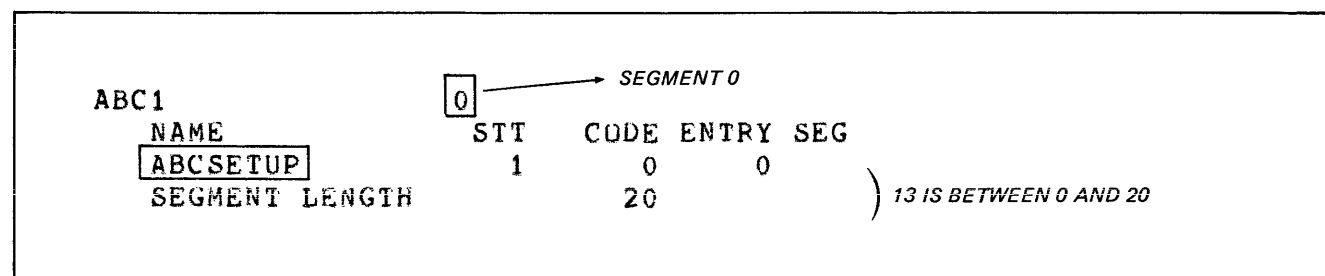
#### LABEL MAP

| STATEMENT<br>LABEL | CODE<br>OFFSET | STATEMENT<br>LABEL | CODE<br>OFFSET |
|--------------------|----------------|--------------------|----------------|
| 1                  | 11             | 2                  | 15             |

Figure 2B.

The place to start is at the PMAP.

1. Find the name of the program unit in the segment %0 whose code begins before location %13 and whose last code location is greater than %13.



Now we know the abort is in the subroutine ABCSETUP.

Next,

2. Calculate the relative program unit offset (RPUO) as follows:

RPUO=Abort location – start of code

From this formula, our RPUO for this example is

$$\%13 - \%0 = \%13$$

3. Now go to the compiler listing of ABCSETUP.
  - a. Fortran A (Fig. 1b): Locate the statement label whose offset is less than %13 but such that the offset for the next label in the source code is greater than %13.

The abort occurred between line 17 (stmt 1) and line 18 (stmt 2).

- b. Fortran B (Fig. 2b): Locate the statement whose relative code offset is less than %13 such that the offset for the very next statement is greater than %13.

The abort occurred while trying to execute this statement.

A bounds violation indicates that an attempt was made to address a location outside of the code or data statement. To check why the loop was going out of bounds, the user should check the data for NUM making sure that it is less than 100. If the data is OK, DEBUG can be used to check the value of J at the time of the abort (do a :SETDUMP and then check Q+2 in ABCSETUP).

Example 2 is a program (ABCBSC) compiled using BASIC.

### Example 2: BASICOMP

While running program ABCBSC, the following abort message occurs:

ABORT :\$OLDPASS,...%0.%367:SYSL,%154.%3741  
PROGRAM ERROR #24: BOUNDS VIOLATION

The program PMAP is

PROGRAM FILE \$NEWPASS.HLBOOK.MAL

| SEG | NAME       | STT | CODE | ENTRY | SEG |
|-----|------------|-----|------|-------|-----|
|     | B'LLBL     |     | 0    | 0     |     |
|     | B'ABORT    |     |      |       |     |
|     | TERMINATE  | 12  |      |       | ?   |
|     | NOECHO     | 3   | 233  | 236   |     |
|     | ABCBSC     | 4   | 242  | 242   |     |
|     | B'INPUTNUM | 13  |      |       | ?   |
|     | B'TERMIO   | 14  |      |       | ?   |

Example 2: BASICOMP (Continued)

|                |              |                |           |
|----------------|--------------|----------------|-----------|
| B'PRINTNUM     | 15           |                | ?         |
| B'STOP         | 16           |                | ?         |
| B'ABORTPLUSNUM | 17           |                | ?         |
| SEGMENT LENGTH | 424          |                |           |
| PRIMARY DB     | 17           | INITIAL STACK  | 1440      |
| SECONDARY DB   | 424          | INITIAL DL     | 0         |
| TOTAL DB       | 443          | MAXIMUM DATA   | 11610     |
| ELAPSED TIME   | 00:00:03.708 | PROCESSOR TIME | 00:00.621 |
|                |              | CAPABILITY     | 600       |
|                |              | TOTAL CODE     | 424       |
|                |              | TOTAL RECORDS  | 11        |

The Basic Fast Save file was compiled with \$CONTROL SOURCE,LABEL,MAP

```
PAGE 0001      HEWLETT-PACKARD 32103B,P0.01(4WD)  BASICOMP
```

```
$CONTROL USLINIT,SOURCE,MAP,LABEL
$COMPILE ABCBSC
  10 DIM A(50)
  20 INPUT "I=",I
  30 IF I=0 THEN STOP
  40 FOR J=1 TO I
  50   A[J]=J
  60 NEXT J
  70 PRINT (FOR J=1 TO I,A[J])
  80 GOTO 20
```

SYMBOL MAP

ABCBSC

| NAME | TYPE | STRUCTURE  | ADDRESS |
|------|------|------------|---------|
| A    | REAL | ARRAY      | Q+ 4,I  |
| I    | REAL | SIMPLE VAR | Q+ 5    |
| J    | REAL | SIMPLE VAR | Q+ 7    |

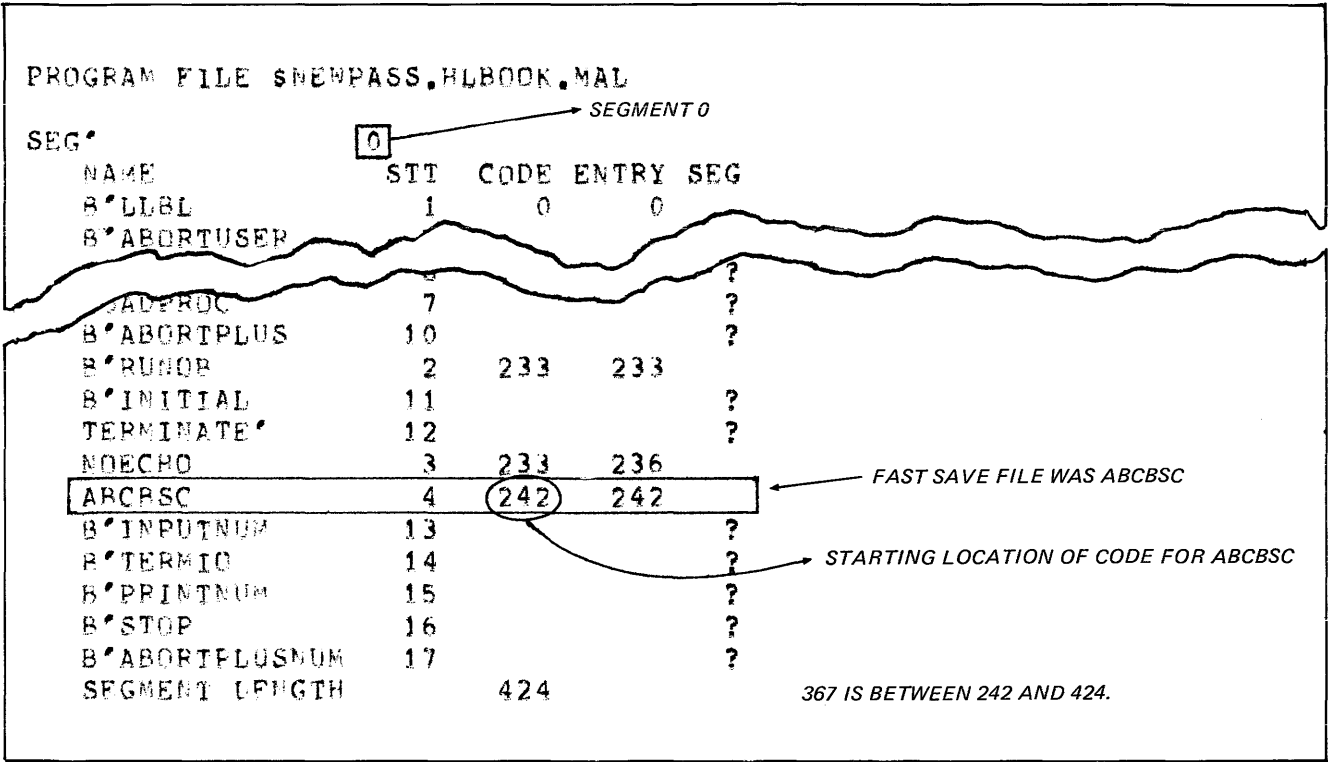
  

|                |             |          |       |          |       |          |     |
|----------------|-------------|----------|-------|----------|-------|----------|-----|
| LABEL MAP      | ENTRY POINT | 0        | STACK | 111      |       |          |     |
| LABEL LOCATION | LABEL       | LOCATION | LABEL | LOCATION | LABEL | LOCATION |     |
| 10= 20         | 41          | 20       | 41    | 30       | 54    | 40       | 61  |
| 50             | 73          | 60       | 100   | 70       | 106   | 80= 20   | 136 |

Figure 3

Again, start with the PMAP:

- 1. Locate the program unit in Segment zero whose code begins before location %367 and whose last code location is greater than %367. This is in segment %0. The reason we go to %0.%367 instead of to location %154.%3741 is because this library (SL.PUB.SYS) routine is called at location %0.%367 and probably received bad data to begin with.



2. Now we know that the abort occurred in ABCBSC and we can calculate the RPUO as before:

RPUE=Abort location – start of code

RPUE=%367 – %242 = %125

3. Now go to the compiler listing (Fig. 3): look for the statement whose starting location is less than %125 but such that the next sequential statement has a beginning location greater than %125.

The abort occurred during execution of statement 70. The data for I should be checked to assure that the value of I is less than or equal to 50.

# bulletins

## TECHNICAL CENTERS ESTABLISHED

Paul Myhre  
HP General Systems

Effective November 1, 1976, the two GSD North American Customer Training Centers will be re-named Technical Centers. The Western Technical Center, (WTC) in Santa Clara, CA, and the Eastern Technical Center (ETC) in Rockville, MD, have been established to assure quality support services for their customers. The significance of the one-word change is that instead of being devoted solely to professional computer training at the Centers, their role will be expanded to include other support services, and customer training at the customer's site.

## CUSTOMER TRAINING AT THE TECHNICAL CENTER

For most customers, this is the most economical method of training their staff. This is also the preferred and most efficient method for HP to train customers. Additional classes have been added to meet the increased demand for 3000 training and to bring the course availability down to 4 – 6 weeks.

## CUSTOMER TRAINING AT THE CUSTOMER'S FACILITY

The WTC Staff will provide HP 3000 Comprehensive Introduction and System Management and Operation courses at the customer's site in Western North America. The ETC staff will provide the same courses for the Eastern North America customers.

The local Systems Engineers will continue to teach the one- and two-day courses on-site.

## CX UPDATES

*Mary Eicher*  
*HP General Systems*

If you have an HP 3000 CX System and are confused about updates, this issue of the **Communicator** is for you. We have separated CX and Series II information so that it is now easier for you to determine which manuals and which updates apply to your system. If you have an HP 3000 CX System read down the *left* side of the documentation lists; if you have a Series II System read down the *right* side of the list.

In the future we shall convert more of the existing manuals for use with either a CX or Series II System. Updates to these manuals will be listed in the documentation section of the **Communicator** under the system to which they apply.

# software updates

Each issue of the **Communicator** provides you with information pertinent to the status of 3000 software products including the latest software changes and enhancements.

The 3000 software updates described in this issue relate to the following products:

| PRODUCT                  | 3000<br>SERIES I | 3000<br>SERIES II | NUMBER | UPDATE<br>AND<br>FIX LEVEL | MIT TAPE<br>DATE CODE |
|--------------------------|------------------|-------------------|--------|----------------------------|-----------------------|
| MPE I                    | X                |                   | 32000C | 00.13                      | 1636                  |
| MPE II                   |                  | X                 | 32002A | 00.04                      | 1640                  |
| BASIC/3000               | X                | X                 | 32101B | 00.04                      | 1640                  |
| COBOL/3000               | X                |                   | 32213B | 02.02                      | 1640                  |
| COBOL/3000               | X                | X                 | 32213C | 01.00                      | 1634                  |
| Compiler<br>Library/3000 | X                |                   | 32211C | 04.04                      | 1640                  |
| Compiler<br>Library/3000 |                  | X                 | 32211D | 00.04                      | 1640                  |
| DEL/3000                 |                  | X                 | 32206A | 01.01                      | 1640                  |
| EDITOR                   | X                | X                 | 32201A | 05.01                      | 1640                  |
| Fortran/3000             | X                | X                 | 32102B | 00.04                      | 1640                  |
| RPG/3000                 | X                | X                 | 32104A | 02.08                      | 1640                  |

Where changes in documentation are indicated, updates to the appropriate manuals will be printed. This information is provided simply as a temporary measure.

## MPE 32000C.00.13 AND MPE 32002A.00.04

This article describes MPE 32000C.00.13 and MPE 32002A.00.04 as incorporated into the 3000 Series I and 3000 Series II MIT tapes date coded 1636 and 1640. The information in the article is organized as follows.

1. Modules modified for MPEI C.00.13 and MPEII A.00.04
2. Supported Utility Module changes for MPEII A.00.04
3. List of problems solved in MPEI C.00.13 and MPEII A.00.04
4. Enhancements to MPEII A.00.04
5. Known problems in MPEII A.00.04

| 1A MODULE CHANGES |    | C.00.XX |   |   | MPE C.00.13 |   |   |   |   |   |    |    |    |    |
|-------------------|----|---------|---|---|-------------|---|---|---|---|---|----|----|----|----|
| MODULE            |    | 1       | 2 | 3 | 4           | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| INITIAL           | 0  | X       |   | X | X           |   |   | X | X | X | X  | X  | X  | X  |
| SYSDUMP           | 1  | X       | X | X |             |   | X |   | X | X |    |    | X  |    |
| SEGPROC           | 2  | X       | X |   |             |   | X |   |   | X | X  |    |    |    |
| SEG DVR           | 3  |         |   |   |             |   |   |   |   |   |    |    | X  |    |
| DISPATCH          | 4  |         |   | X |             |   | X |   |   |   | X  | X  | X  |    |
| LOAD              | 5  |         | X |   |             |   |   |   |   |   |    |    | X  |    |
| MAPP              | 6  |         |   |   |             | X |   |   |   |   |    |    |    |    |
| UCOP              | 7  | X       |   |   |             |   |   |   |   |   |    |    |    |    |
| DEVREC            | 8  |         |   |   |             |   |   |   |   |   |    |    |    |    |
| PROGEN            | 9  | X       |   |   |             |   |   |   | X | X | X  |    | X  |    |
| IMIN              | 10 |         |   |   |             | X |   | X |   |   | X  | X  |    | X  |
| EXIN              | 11 | X       | X | X |             | X | X | X |   | X |    | X  |    |    |
| LOG               | 12 | X       |   |   |             |   |   |   |   |   | X  |    |    |    |
| IOPTRD0           | 13 |         |   |   |             |   |   |   |   |   |    |    |    |    |
| IOPTPH0           | 14 |         |   |   |             |   | X |   | X |   |    |    |    |    |
| IOPL0T0           | 15 |         |   |   |             |   |   |   |   |   |    |    |    |    |
| IOMDISK0          | 16 |         |   | X |             |   |   | X | X | X |    |    |    |    |
| IOFDISK0          | 17 |         |   | X |             |   |   | X | X |   |    |    |    |    |
| IOTAPE0           | 18 |         |   |   | X           |   |   |   | X |   |    |    |    |    |
| IOLPRT0           | 19 |         |   |   |             |   |   |   |   |   |    |    | X  | X  |
| IOCDRD0           | 20 |         | X |   |             |   | X |   |   |   |    |    |    |    |
| IOCLTTY0          | 21 |         |   |   |             |   |   |   |   |   |    |    |    |    |
| IOTERM0           | 22 |         |   |   |             |   |   |   |   |   |    | X  |    |    |
| IOCDPN0           | 23 |         |   |   |             |   |   |   |   |   |    |    |    |    |
| IOPRPN0           | 24 |         |   |   |             | X | X |   |   |   |    | X  | X  |    |
| IOREM0            | 25 |         |   |   |             |   |   |   |   |   |    |    |    |    |
| IOBSC0            | 26 |         |   |   |             |   |   |   |   |   |    |    |    |    |
| IOMDISK1          | 27 | X       |   | X |             |   |   | X | X | X | X  |    |    |    |
| PFAIL             | 30 |         |   | X | X           | X |   |   |   |   |    |    |    |    |
| FILESYS           | 50 | X       | X | X | X           | X | X | X | X | X | X  | X  | X  | X  |
| COMM' INT         | 51 | X       |   | X |             |   | X |   |   |   |    | X  | X  |    |
| STORE/RESTORE     | 52 |         |   | X | X           |   |   | X | X | X |    |    | X  |    |
| DIRC              | 53 |         |   |   |             |   |   |   |   | X |    |    |    | X  |
| ALLOCATE          | 54 |         | X |   | X           |   |   |   | X |   |    | X  | X  |    |
| DISKSPC           | 55 | X       |   |   |             |   |   |   |   |   |    |    |    |    |
| MMCORER           | 56 |         |   |   |             |   | X |   | X |   |    | X  |    |    |
| MMDISK R          | 57 |         |   |   |             |   |   |   |   |   |    | X  |    |    |
| ABORTRAP          | 58 |         |   |   |             |   | X | X |   | X |    | X  |    | X  |
| MESSAGE           | 59 |         |   |   |             |   |   | X |   | X | X  | X  |    |    |
| CROUTINE          | 60 |         |   | X | X           |   |   |   |   | X | X  | X  |    |    |
| IOUTILITY         | 61 | X       |   | X | X           |   |   | X | X | X | X  |    |    |    |
| TTYINT            | 62 |         | X | X | X           |   |   | X |   | X |    |    |    |    |
| PCREATE           | 63 | X       |   |   |             |   |   |   |   |   |    |    |    |    |
| MORGUE            | 64 |         |   | X |             |   |   |   |   | X | X  |    |    |    |
| PROCMail          | 65 |         |   |   |             |   |   |   |   |   |    |    |    |    |
| PINT              | 66 |         |   |   |             |   | X |   | X | X |    | X  |    |    |
| DATASEG           | 67 | X       |   |   |             |   |   |   |   | X |    |    |    |    |
| IOPM              | 68 |         | X |   |             | X |   |   |   |   |    | X  | X  |    |
| CHECKER           | 69 |         |   |   |             |   |   |   |   |   |    |    |    |    |
| UTILITY           | 70 | X       | X | X |             | X |   |   |   |   | X  |    |    | X  |
| SEGUTIL           | 71 | X       |   | X |             |   |   | X |   | X |    |    | X  |    |
| LOADER1           | 72 |         | X | X |             |   |   |   | X |   | X  |    |    |    |

| 1A MODULE CHANGES |    | C.00.XX |   | MPE C.00.13 (continued) |   |   |   |   |   |   |    |    |    |    |
|-------------------|----|---------|---|-------------------------|---|---|---|---|---|---|----|----|----|----|
| MODULE            |    | 1       | 2 | 3                       | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| RINS              | 73 |         |   |                         |   |   | X |   |   |   |    |    | X  |    |
| JOBTABLE          | 74 | X       |   |                         |   |   |   |   |   |   |    |    |    |    |
| DEBUG             | 75 | X       |   |                         |   |   |   |   |   |   |    |    |    |    |
| NURSERY           | 76 |         |   | X                       |   |   |   |   |   |   |    |    |    |    |
| SYSDPLY           | 77 |         |   |                         |   |   | X |   |   |   |    |    |    | X  |
| FIRMWARESIM       | 78 | X       |   |                         |   |   |   |   |   | X | X  | X  |    |    |
| SPOOLING          | 79 |         |   | X                       | X |   |   | X | X | X | X  | X  |    |    |
| SPOOLCOMS         | 80 | X       |   |                         |   |   | X |   | X |   | X  |    | X  |    |
| MESSAGE CAT       | —  |         |   | X                       |   |   | X | X | X | X | X  |    | X  | X  |

| 1B. MODULE CHANGES |    | A.00.XX |   |   |   |
|--------------------|----|---------|---|---|---|
| MODULE             |    | 1       | 2 | 3 | 4 |
| INITIAL            | 0  |         | X | X | X |
| SYSDUMP            | 1  |         | X | X | X |
| SEGPROC            | 2  |         | X |   |   |
| SEG DVR            | 3  |         | X |   |   |
| DISPATCH           | 4  |         | X |   |   |
| LOAD               | 5  |         | X |   |   |
| UCOP               | 7  |         | X |   | X |
| DEVREC             | 8  |         |   |   | X |
| PROGEN             | 9  |         | X | X | X |
| ININ               | 10 |         |   |   | X |
| MEMLOGP            | 11 |         | X |   | X |
| LOG                | 12 |         |   |   | X |
| IOPTRD0            | 13 |         | X | X |   |
| IOPTRN0            | 14 |         | X | X | X |
| IOPLOT0            | 15 |         |   |   |   |
| IOMDISC0           | 16 |         |   |   |   |
| IOFDISC0           | 17 |         |   |   |   |
| IOTAPE0            | 18 |         |   |   |   |
| IOLPRT0            | 19 |         | X |   | X |
| IOCDRD0            | 20 |         |   |   |   |
| IOTERM0            | 22 |         | X | X | X |
| IOPRPN0            | 24 |         |   |   |   |
| IOREM0             | 25 |         |   |   |   |
| IOMDISC1           | 27 |         |   |   |   |
| PFAIL              | 30 |         |   |   | X |
| FILESYS            | 50 |         | X | X | X |
| COMM'INT           | 51 |         |   | X | X |
| STORT/RESTORE      | 52 |         |   |   |   |
| DIRC               | 53 |         |   |   |   |
| ALLOCATE           | 54 |         |   |   |   |
| DISCSPC            | 55 |         |   |   |   |
| MMCORE             | 56 |         |   |   | X |
| MMDISK R           | 57 |         | X | X | X |
| ABORTTRAP          | 58 |         | X |   |   |
| MESSAGE            | 59 |         |   |   | X |
| CROUTINE           | 60 |         |   |   |   |
| NRIO               | 62 |         | X | X |   |

| 1.B MODULE CHANGES (Continued) |    |   |   |   |   |
|--------------------------------|----|---|---|---|---|
| MODULE                         |    | 1 | 2 | 3 | 4 |
| PCREATE                        | 63 |   | X |   |   |
| MORGUE                         | 64 |   |   |   |   |
| PROCMAIL                       | 65 |   |   |   |   |
| PINT                           | 66 |   | X |   |   |
| DATASEG                        | 67 |   | X |   | X |
| CRIO                           | 68 |   | X | X | X |
| CHECKER                        | 69 |   |   |   |   |
| UTILITY                        | 70 |   |   |   | X |
| SEGUTIL                        | 71 |   | X |   |   |
| LOADER1                        | 72 |   | X |   |   |
| RINS                           | 73 | X |   | X |   |
| JOBTABLE                       | 74 |   |   |   |   |
| DEBUG                          | 75 |   |   |   | X |
| NURSERY                        | 76 |   |   |   | X |
| STKDUMP                        | 77 |   |   |   |   |
| FIRMWARESIM                    | 78 |   |   |   |   |
| SPOOLING                       | 79 |   |   |   |   |
| SPOOLCOMS                      | 80 |   |   |   |   |
| MESSAGE CAT                    | —  |   |   |   |   |

## 2. SUPPORTED UTILITY MODULE CHANGES FOR MPEII A.00.04

| MODULE   |  | 1 | 2 | 3 | 4 |
|----------|--|---|---|---|---|
| DISKEDT2 |  |   |   |   |   |
| DPAN2    |  |   | X | X | X |
| FREE2    |  |   |   |   |   |
| LISRDIR2 |  |   |   |   |   |
| LISTEQ2  |  |   |   |   |   |
| LISTLOG2 |  |   | X | X |   |
| PATCH2   |  |   |   |   |   |
| MEMLOGAN |  |   |   |   |   |
| MEMTIME  |  |   |   |   |   |
| SADUTIL  |  |   |   |   |   |
| SLPATCH  |  |   |   |   |   |

**3A. PROBLEMS SOLVED IN MPE C.00.13**

- a. In some cases, disc space for the system disc was not being returned to the system during system initialization. This could result in the "OUT-OF-SYSTEM-DISC" situation. This has been corrected.
- b. The parameter at Q+1 of the internal interrupt procedure parity error was being destroyed while scanning memory for the memory location in question. Thus losing the exact cause (data, memory, or system) of the interrupt.
- c. The line printer driver IOLPRT0 has been modified to enable some previously disabled line printer dependent interrupts.
- d. A check, during file opening, for valid serial output device types has been corrected to include the card reader punch, type 37.
- e. The condition code from the procedure DIRECSETFLAG was not being returned properly in one obscure case. This has been corrected.
- f. A stack adjustment for traps resulting from regular decimal FIRMWARESIM was not being properly performed. This has been corrected.
- g. Form feeds to some CRTS will erase the screen. To preserve pertinent displayed information during some aborts, page ejects for stack dump headings will be suppressed to terminals when running from a session.
- h. Input arguments to the intrinsic binary of 65536, 65537, 65538, and 65539 will now return overflow.

**3B. PROBLEMS SOLVED IN MPEII A.00.04**

- a. The 2892 card reader can now be spooled in.
- b. The GETPRIORITY intrinsic can now be called with the last PIN in the PCB.
- c. You can no longer free a RIN that does not belong to your process.
- d. Under certain conditions, Control Y was causing a stack overflow problem that has now been resolved.
- e. The CTRANSLATE intrinsic now returns condition codes CCE/CCG.
- f. The BINARY intrinsic now returns condition code CCG for 65536 through 65539.
- g. :EOD now terminates :DATA stream when the terminal is opened for I/O access.
- h. Column binary read is now allowed with the 2892 card reader.
- i. The paper tape punch will no longer truncate the odd byte in binary mode while using system buffers.
- j. Opening more than 4 extra data segments per process will work now.

- k. SYSDUMP was modified to handle 0 to 63 code segments per process.
- l. A deadlock was resolved where a SON process was trying to access a resource that the FATHER process had.
- m. MEMLOGP and LOG can not be run without SM and PM capabilities. It should not be run even if you have this capability unless you want to lock out your terminal.
- n. DISABLE/ENABLE has been added to SYSIOPROC. This fixes a problem of SYSIOPROC occasionally not servicing a request.
- o. A SF124 will now occur if a call is made to RELDASEG with a DST# <= %63.
- p. When getting space in virtual memory, INITIAL now cuts back the stack properly avoiding a potential stack overflow.
- q. Fixed problem which caused certain errors to display the wrong error message.
- r. Debug has been fixed such that "E@" now closes list file and "B@" now displays correct LCST#.
- s. Open MEMLOG has been modified to zero both MEMLOG file records when creating new MEMLOG file.
- t. The line printer driver has been modified to correct a situation where a "SPOOLEE I/O ERROR" could be caused by toggling the ON LINE/OFF LINE switch.
- u. Two no-memory related problems were resolved. Unblocked I/O requests now retry, and ZSIZE/stack overflow situations are handled correctly now.
- v. LOAD has been modified such that system modules prepared in a normal mode cannot be accessed by any user.

For example: users cannot :RUN LOAD.PUB. SYS  
or other system files.

**4. ENHANCEMENTS TO MPEII A.00.04**

- a. The :APL command has been added. This command causes the APL subsystem to be invoked, if it is present in PUB.SYS. It has no parameters.
- b. PFAIL now calls initialization PLABEL in DLT on auto restart.
- c. **COMMAND LOGON FACILITY**  
The special requirements of APL terminals have resulted in a minor, but useful, enhancement to MPE II. The primary problem was that APL uses a couple of special encodings to support its unique character sets. When a user on one of the terminals logged on and off, garbage messages would be produced by MPE. The solution chosen was to have the Command Inter-

preter detect the character sets and translate the garbaged messages into the appropriate APL encoding. At the request of the APL project, the scheme was further enhanced such that the APL subsystem was entered immediately upon logon, without user intervention, and the user was logged off immediately upon exiting the subsystem. It was seen that this feature could be of value to others besides APL users and so was generalized into the following scheme.

Two types of logon are available to inter-active users:

Normal: HELLO *user.account* — etc. —

New: (*cicommand*) *user.account* — etc. —

Where *cicommand* is any legal CI command string. DEVREC validates the user, passes the character string contained within the parentheses to the CI which then executes the command. The CI, immediately upon resuming control, performs a logoff. All outputs from the CI are listed to the terminal as usual. If one of the special APL character sets is detected, that subsystem is notified through an appropriate parm value.

#### Special Rules and Restrictions:

1. Break is enabled.
2. Users who log on using one of the special APL character sets will only be allowed to invoke the APL subsystem.
3. Commands which would normally cause an end of file, such as :HELLO, :BYE, :JOB, :DATA, :EOF, :EOJ, will not be recognized and the session will be immediately logged off.
4. Leading and trailing blanks will be suppressed.
5. This is only allowed from sessions, not jobs.
6. The special logon sequence is not recognized within sessions or jobs, as, for example, :HELLO is.

#### EXAMPLES OF USE

```
:(SHOWJOB) MANAGER.SYS
:(LISTF.2) BOB.TP
:(APL) JEUNG.LANG,OUAD
```

Potentially very useful is the following

```
:(RUN FCOPY.PUB.SYS)
OLSON.FIELD.SUPPORT,HP32102
<<logon message followed by FCOPY header
followed by
> <<FCOPY prompt. Now hit break>>
:FILE LP;DEV=FASTLP
:RESUME
READ PENDING
FROM=XYZ;TO=*LP
EXIT
```

```
<<logoff message>>
:(STREAM) BOB.XYZ
>!JOB XXX,BOB.TP
>ISPL A,B,C,D,E
>IEOJ
#J1234
>:
<<logoff message>>
```

## 5A. KNOWN PROBLEMS IN MPE C.00.13

- a. Closing a tape file with no rewind is not implemented.
- b. FSPACE spaces tape files by blocks rather than by records.
- c. Chained SIOS on magnetic tape do not perform correctly, causing transfer of blocks larger than 4096 words to fail if the record format is variable or undefined.
- d. The character “:” is treated as an EOF on \$STDINX.
- e. The commands: LISTACCT, LISTGROUP, and LISTUSER can lock the directory indefinitely if the output is written to magnetic tape and the tape is not ready.
- f. If the FORMSG parameter of FOPEN begins on an odd byte boundary, the preceding byte is also printed.
- g. Lower case :EOD is not recognized as an end-of-file on data accepting devices.
- h. Issuing a :DEALLOCATE command for a non-existent program file returns an error 217. The error should be error 217,52. The 52 is the file system error number returned from FCHECK.
- i. Debug break points cannot be set in dynamically loaded procedures except by specifying the physical CST numbers.
- j. When DPAN finds that the PCB table has been filled, it prints the erroneous messages “INVALID FIRST UNASSIGNED ENTRY” and “INVALID BACKWARD SUBQUEUE POINTER” even though there is no error in the PCB.
- k. When the maximum number of open SPOOFLES is not sufficient to handle all spooling requirements, spooled jobs may cause endless numbers of null list files to be generated. This bug manifests itself as multiple \$STDLIST files for a single job, each producing only a header and trailer. If the line printer is spooled, this results in many null SPOOFLES, each using four sectors of disc space. If the line printer is not spooled, these null SPOOFLES will begin printing immediately unless the printer is not ready. In this case, the system will crash due to an IOQ overflow. If an open SPOOFLE is closed during this resource allocation loop, the job may be launched normally.

In this case, the last SPOOFLE for \$STDLIST will be the true job listing.

This bug can be overcome by increasing the maximum number of open SPOOFLES. The recommended value is 20, but a more exact figure can be found by examining the usage of your system. Each initial allocation (FOPEN) of a spooled device uses one open spoofle. When the file is closed (FCLOSE), the spoofle becomes unopened.

For example:

A session's single access to a spooled line printer requires one opened SPOOFLE; a spooled job requires at least two, one for \$STDIN and one for \$TDLIST. Each additional access to a file of device class LP requires an additional open SPOOFLE.

One indication that the limit is being reached is allocation failures for spooled devices.

## 5B. KNOWN PROBLEMS IN MPEII A.00.04

### SYSTEM FAILURE TYPE:

- a. SF130 — Memory manager loses a MTAB entry. If enough are lost a SF130 will occur.
- b. SF311 — "Abort while critical". Occurs when a code segment or memory links are getting destroyed.
- c. SF30 — Under a very heavy load, one can get an SF30 while switching Log files.
- d. SF206 — "Invalid LDEV for ATTACHIO". This is an intermittent problem with very little data.

### FUNCTIONAL FAILURE TYPE:

- 1. A session with an outstanding READ cannot be aborted until reception of a carriage return.
- 2. A call to XARITRAP after a call with an illegal PLABEL returns garbage to OLDLABEL.
- 3. Enabling of logging record 8 is supposed to lower default OUTPRI to 8.

## BASIC/3000, HP 32101B.00.04

This article describes BASIC/3000, HP 32101B.00.04 as incorporated in the 3000 Series I and Series II MIT tape date coded 1640.

### PROBLEMS CORRECTED IN BASIC/3000:

- 1. Specifying "END" on a file PRINT statement to an ASCII device which cannot write an end-of-file (e.g., \$STDLIST) resulted in a superfluous error message.
- 2. If an I/O error occurred on a binary file when executing the "END" function on a file PRINT statement, an incorrect error message was given.
- 3. After reporting a file I/O error (e.g., end-of-file), the file was sometimes not closed.
- 4. I/O errors (e.g., end-of-file) occurring when writing to binary files were not reported in a timely manner because detection of these errors was deferred until some I/O to a different record in the same file was detected. This has been fixed for files with fixed- and undefined-length records; however, no fix is possible for files with variable-length records. Note that this problem does not affect reading from a binary file or any I/O to ASCII files (regardless of the record type) since the physical I/O in these cases coincides with the logical I/O.

Note that the user can utilize the LIN function to control when the physical write occurs to binary files with variable-length records. Thus, the programmer can force the physical write to coincide with the last logical write to a record and thereby force detection of file errors in a timely manner.

The problem cannot be fixed for writes to binary files with variable-length records without altering the results of I/O to binary files or without reinstating a restriction imposed by BASIC prior to version B.0.3, to wit: the BASIC program could not access records beyond the physical record limit. Since MPE permits the number of logical records to exceed the physical record limit, BASIC cannot anticipate the end-of-file when performing some logical I/O to the file. Consequently, detection of the end-of-file is deferred until the physical write to the file, caused by accessing another record in the file or by closing the file.

## KNOWN PROBLEMS IN BASIC/3000:

- 1. The interpreter aborts with a stack underflow when control-Y is typed in certain circumstances. This occurs most often when printing the FREQ table. The problem may also arise in some cases when INVOKing or using the ABORT, CALLS or FILES commands in BREAK-mode. [BP #1396]

Work-around (for BREAK-mode commands): Type control-Y and set a breakpoint at the next statement to be executed. Then enter the GO or RESUME command. When you break at the next statement, it will then be safe to use any BREAK-mode commands.

**COBOL/3000, HP 32213B.02.02**

This article describes COBOL/3000, HP 32213B.02.02 as incorporated in the 3000 Series I MIT tape date coded 1640.

**PROBLEMS CORRECTED IN BASIC/3000:**

1. A GO TO statement to the first paragraph in a sub-program did not work properly.
2. A RENAMES clause was erroneously being detected as an error if there were any OCCURS clauses in the record. Now only the following OCCURS clause conditions are errors in RENAMES clauses:
  - a. The item being renamed is subordinate to an OCCURS clause.
  - b. The item being renamed contains an OCCURS clause.
  - c. The item being renamed has a subordinate item containing an OCCURS clause.
3. An illegal RENAMES clause sometimes caused the compiler to loop or abort.
4. Compiling into a non-empty USL file which was built with more than 2040 records sometimes caused the USL file to be initialized even though \$CONTROL USLINIT was not specified.
5. Compiling a subprogram containing secondary entry points with parameters into a non-empty USL file did not inactivate previous entry points with the same name.
6. Compiling programs into a non-empty USL file sometimes caused the compiler to loop. This problem usually occurred only when secondary entry points were present in the program being compiled.
7. The construct IF A=B AND (C+D>0) caused an extra word to be deleted from the stack at run time.
8. Producing a symbol table map (\$CONTROL MAP) for a Data Division with several hundred items with the same level number subordinate to the same item caused a stack overflow.
9. Illegal duplicate paragraph names caused the compiler to loop.
10. Using a COMP-3 item as a subscript did not work properly.
11. Moving numeric data into an alphanumeric field (PIC X) in a table did not work properly.
12. The COBTEMP file filled up during compilation, thereby aborting the compiler.

**CHANGES MADE IN THE COMPILER LIBRARY FOR COBOL, HP 32211C.04.03:**

The following problem has been fixed in the COBOL Library version 4.03:

A SEARCH ALL statement could occasionally find a match just after the end of the table being searched.

The following enhancement has been added to the COBOL Library in version 4.03:

Files assigned to terminals can now be opened for I-O providing a :FILE command specifying ACC=INOUT has been executed. This capability does not apply to \$STDIN or \$STDLIST.

**COBOL/3000, HP 32213C.01.00**

This article describes COBOL/3000, HP 32213C.01.00 as incorporated in the 3000 Series I and Series II MIT tape date coded 1634.

This is the initial release of the COBOLC compiler. The compiler is basically the same as the COBOLB compiler except that it can compile larger programs. The Symbol Table will be extended to disc as soon as it gets too large for available memory.

The generated code is the same as for the COBOLB compiler.

The COBOLC.01.00 compiler is at the same level as the COBOLB.02.01 compiler except for the following additional corrections:

1. Multiply defined symbols are now correctly diagnosed. They could result in looping of the COBOLB compiler.
2. MOVE of numeric items to alphanumeric table elements are now correctly executed.

The following internal files are used in the compiler:

1. COBTEMP.  
File existed in COBOLB compiler. It passes intermediate code to the code generating phase.  
Record size=128 words, file size/no.of extents=default.
2. COBSTAB.  
Contains symbols-part of Symbol Table. It exists with COBDTAB, only if the Symbol Table is extended to disc. Record size=256 words, file size=512, no. of extents=16. In general the file con-

tains 240 records. Any additional records are added one at a time when needed.

3. COBDTAB.  
Contains data-part of Symbol Table. It exists with COBSTAB, only if the Symbol Table is extended to disc. Record size=1024 words, file size=128, number of extents=16. In general the file contains less than 32 records. Any additional records are added one at a time when needed.

### KNOWN ERRORS IN COBOL/3000:

1. GO TO or PERFORM first paragraph in a subprogram without sections may cause Bounds Violation at object time.
2. Certain invalid RENAMES may cause Bounds Violation at compile time.

### COMPILER LIBRARY/3000, HP 32211C.04.04

This article describes Compiler Library/3000, HP 32211C.04.04 as incorporated in the 3000 Series I MIT tape date coded 1640. (This version of the Compiler Library only supports three word long floating-point operations.)

### PROBLEM CORRECTED IN THE COMPILER LIBRARY/3000:

A bug was introduced in version C.00.02 such that when a write was made of a length greater than the logical record length of the output file, the FORTRAN formatter went into an infinite loop. This problem in version C.04.03 was fixed in this version:

### COMPILER LIBRARY/3000, HP 32211D.00.04

This article describes Compiler Library/3000, HP 32211D.00.04 as incorporated in the 3000 Series II MIT tape date coded 1640. (This version of the Compiler Library only supports four word long floating-point operations.)

### PROBLEM CORRECTED IN COMPILER LIBRARY/3000:

A bug was introduced in version D.00.02 such that when a record was written which was longer than the logical record length of the output file, the FORTRAN Formatter went into an infinite loop. This has been corrected.

### DEL/3000, HP 32206A.01.01

This article describes DEL/3000, HP 32206A.01.01, as incorporated in the 3000 Series II MIT tape date coded 1640.

### PROBLEMS CORRECTED IN DEL/3000:

1. A bug has been removed from the procedure READTERM, it no longer destroys the byte beyond the end of the input buffer.
2. The procedure GETFORM will now return an error code of -4 if the users buffer length is less than 64. Prior to this change GETFORM did not return the form definition if the buffer length was less than 64, but it did not notify the program of this condition.
3. FORMAIN'T's form modification procedure has been changed: a form being modified will no longer be lost when the form modification is interrupted.
4. The procedure NEXTEDIT will now return all edits specified for the last field of a form. Prior to this fix it would only return 1 edit description for the last field of a form.

### EDITOR/3000, HP 32201A.05.01

This article describes EDITOR/3000, HP 32201A.05.01, as incorporated in the 3000 Series I and Series II MIT tape date coded 1640.

### PROBLEMS CORRECTED IN EDITOR/ 3000:

1. The token FIRST used as a column position indicator, e.g., (FIRST), will indicate the first non-blank character of an incumbent record.
2. The token LAST used as a column position indicator, e.g., (LAST), will indicate the last non-blank character of an incumbent record, rather than the first evaluation of a column position within a range.
3. These commands are now indicated as invalid: NO, NOTQ, OQ, ORQ, PQ, PROCEDUREQ, SQ, SETQ, TQ, TEXTQ, UQ, USEQ, VQ, VERIFYQ, WQ, WHILEQ, XQ, XPLAINQ.  
These commands had never been valid, in that the Q suffix had no meaning associated with it.
4. Variable length record files may be kept, texted, and joined. Note that SET variable must be used. Note also that the JOIN command will elide line number characters unless the UNN option is used.

5. The LEFT, RIGHT, and LENGTH values are now retained in files created by the KQ and KEEPPQ command, as well as in K files.
6. Error message 29, INVALID LINE NUMBER, now will display the record number associated with the error properly.
7. CHANGE command oldstrings with trailing blanks now will match with lines containing the oldstring at the end of a line.
8. CHANGE command inadvertent line deletion has been corrected. The objective is to delete those changed lines which become empty.
9. CHANGE command line deletion no longer deletes a portion of the line following.
10. The FIND command upper bound, whether in its implied form or in its explicitly stated form in a range, is now computed properly.
11. JOIN computation of available space has been corrected.
12. Keeping a file across accounts to an existing file will now result in an error. The KEEP file will not be purged. The command will not be executed. Note that in general when read access is granted it is generally possible otherwise to execute a programmatic purge of a file across accounts.
13. KEEPPQ or KQ to a file will now issue a warning message upon successful completion that the work file is undefined. The message will be output only in long mode, and not when short has been set.
14. KEEP file security testing has been refined such that only errors 92 and 93 are regarded as violations.
15. LIST command pointer setting at the conclusion of a range is now at the SET RIGHT value rather than at the physical end of the record.
16. MODIFY ALL may now be in either lower or upper case.
17. MODIFY command range list element parsing has been corrected.
18. PROCEDURE names may be in lower case as well as upper case.
19. PROCEDURE command range list element parsing has been corrected.
20. PROCEDURE command SL file identification is now emitted as an 'S', A 'P' OR A 'G' after the procedure name when error 35 is issued.
21. Q command without a delimited string will act as a line space.
22. SET SIZE is now defined as the number of lines of text needed in the work file instead of an absolute number of records.
23. SET SHORT will now inhibit echoing commands in jobs. Heretofore command echoing was inhibited by the SET SHORT only in WHILE command command blocks.
24. Text of a file created by a KEEPPQ or KQ command or a K file will issue a warning message that the text file is now the work file. This warning may be disabled by a SET SHORT.
25. VERIFY TIMES is now parsed without error.
26. XPLAIN JOIN and XPLAIN J will now produce identical results.

### OUTSTANDING PROBLEMS IN EDITOR/3000:

1. Use of the CONTROL Y during a modify is ambiguous: it may be interpreted to restart the process using the original line value; also, it may be interpreted to exit from the command.
2. Re-setting the SIZE value may inhibit texting a file in its entirety.
3. KEEP across accounts to a non-existent file will result in a file system security error.
4. Some SET parameters are at default values when WORK files (K FILES) are texted. This is also true of files created using the KEEPPQ or KQ command.

### FORTRAN/3000, HP 32102B.00.04

This article describes FORTRAN/3000, HP 32102B.00.04, as incorporated in the 3000 Series I and Series II MIT tape date coded 1640.

### PROBLEMS CORRECTED IN FORTRAN/3000:

1. Logical expressions which contained a type conversion of a logical expression from logical to integer through use of the intrinsic INT would have an erroneous BRE emitted.

For example, the statements

```
LOGICAL STATUS
IF (INT(STATUS).NE.0) STOP 1
```

would result in bad code.

2. The IO list in a DISPLAY statement could not start with a real, double precision or double integer constant. (BR807)
3. Fortran would not accept the initialization of both a real and a double integer constant in the same data statement.

4. String compares where the strings were of different lengths and were compared using the .EQ. operator always compared as equal, completely contrary to the definition in the manual.
5. The use of a parameter in a procedure call of the form /-nnn/, where nnn is a number between 1 and 255 caused the system intrinsic processor to be invoked accidentally. The problem always manifested itself as a bounds violation in the compiler near %0.%6072.
6. In certain circumstances, calling a system intrinsic through the SYSTEM INTRINSIC statement would result in the SEGMENTER detecting an error in the way the compiler handled the option variable mask of option variable system intrinsics.
2. (L) TESTN sometimes aborted with a bounds violation.
3. (C) A tag name that was defined in an RPG program was listed as an unresolved external at program load time.
4. (L) Multiple USWITCH records were not accepted.
5. (C) (L) Fetch overflow sometimes resulted in duplicate printing of overflow lines.
6. (L) RSAM update files did not properly do an update immediately following an ADD. The record just added was not updated.
7. (L) User switches did not work properly with IMAGE files.
8. (C) File translation tables supplied by the user gave invalid error messages and did not work properly.

## RPG/3000, HP 32104A.02.08

This article describes RPG/3000, HP 32104A.02.08, as incorporated in the 3000 Series I and Series II MIT tape date coded 1640.

## PROBLEMS CORRECTED IN RPG/3000:

Fixes for 02.08 (C) indicates a change to the compiler and (L) indicates a change to the library.

1. (C) An index used before it was defined resulted in incorrect code being generated.

# documentation

The following tables list currently available customer manuals for HP 3000 products. This list supersedes the list in the last issue of the **Communicator**.

The most recent changes to the tables are indicated for easy reference. Prices are subject to change without notice.

Copies of manuals and updates can be obtained from your local Sales and Service office. The address and telephone number of the office nearest to you are listed in the back of all customer manuals.

Update packages are free of charge. If you require an update package complete the Update Order Form in the back of the **Communicator** and mail the form to:

Software/Publications Distribution  
5303 Stevens Creek Blvd.  
Santa Clara, Ca. 95050

Customers in the U.S. may also order directly by mail. Simply list the name and part number of the manual(s) you

need on the Corporate Parts Center form supplied at the back of the **Communicator**.

A few words about documentation terms:

|         |                                                                                                                                                                                                                                                                                                                                                                                 |
|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| New     | A new manual refers only to the first printing of a manual. When first printed, a manual is assigned a part number.                                                                                                                                                                                                                                                             |
| Revised | A revised manual is a printing of an existing manual which incorporates new and/or changed information in its contents. For example, a manual is revised when an update package is incorporated into the manual: the manual gets a new print date and the update package disappears. Note that a revision to a manual effectively obsoletes the previous version of the manual. |
| Update  | An update package is a supplement to an existing manual which contains new and/or changed information. Updates are issued when information must get to customers, yet it is inappropriate to issue a revised manual. An update has no part number, it is automatically included when you order the manual with which it is associated.                                          |

## MPE/3000 MANUALS

| SERIES I (CX)    |        | MANUAL TITLE                                             | PART NUMBER | PRICE   | SERIES II        |                   |
|------------------|--------|----------------------------------------------------------|-------------|---------|------------------|-------------------|
| PUBLICATION DATE | UPDATE |                                                          |             |         | PUBLICATION DATE | UPDATE            |
| 1/75             | 10/75  | Console Operator's Guide                                 | 30000-90013 | \$ 7.00 | 6/76             |                   |
|                  |        | Console Operator's Guide, 32000C MPE/3000                | 32000-90004 | 7.00    |                  |                   |
|                  |        | Error Messages and Recovery Manual                       | 30000-90015 | 17.00   | 6/76             |                   |
| 11/73            |        | General Information Manual                               | 30000-90008 | 6.50    | 10/76*R          |                   |
|                  |        | General Information Manual, Multiprogramming Executive   | 03000-90096 | 4.00    |                  |                   |
|                  |        | HP 3000 CX to HP 3000 Series II Program Conversion Guide | 30000-90046 | 4.00    | 6/76             |                   |
|                  |        | Index to MPE Reference Documents                         | 30000-90045 | 5.50    | 6/76             |                   |
| 1/75             | 6/76   | MPE/3000 Reference Manual, 32000C                        | 32000-90002 | 19.50   |                  |                   |
|                  |        | MPE Commands Reference Manual                            | 30000-90009 | 12.50   | 6/76             |                   |
|                  |        | MPE Intrinsics Reference Manual                          | 30000-90010 | 15.00   | 6/76             |                   |
|                  |        | MPE Segmenter Reference Manual                           | 30000-90011 | 4.00    | 6/76             |                   |
|                  |        | MPE Debug/Stack Dump Reference Manual                    | 30000-90012 | 7.50    | 9/76             | 9/76 <sup>†</sup> |
|                  |        | MPE System Utilities Reference Manual                    | 30000-90044 | 5.00    | 6/76             |                   |
| 10/75            |        | MPE/3000 Operating System, System Utilities Manual       | 32000-90008 | 3.00    |                  |                   |
|                  |        | Software Pocket Guide                                    | 30000-90049 | 3.50    | 6/76             |                   |
| 7/75             |        | Software Pocket Guide, HP 3000                           | 03000-90126 | 3.50    |                  |                   |
|                  |        | System Manager/System Supervisor Manual                  | 30000-90014 | 10.00   | 6/76             | 9/76              |
| 10/75            |        | System Manager/System Supervisor Manual, 32000C MPE/3000 | 32000-90006 | 14.00   |                  |                   |
| 6/75             |        | Using the HP 3000: A Guide for the Terminal User         | 03000-90121 | 7.50    | 6/75             |                   |

\*R = Revised Manual

## LANGUAGE MANUALS

| SERIES I (CX)    |        | MANUAL TITLE                                                        | PART NUMBER | PRICE   | SERIES II        |                   |
|------------------|--------|---------------------------------------------------------------------|-------------|---------|------------------|-------------------|
| PUBLICATION DATE | UPDATE |                                                                     |             |         | PUBLICATION DATE | UPDATE            |
| 7/75             |        | BASIC Interpreter Reference Manual                                  | 30000-90026 | \$11.50 | 6/76             |                   |
|                  |        | BASIC/3000 Interpreter Reference Manual                             | 03000-90008 | 10.00   |                  |                   |
| 9/74             |        | BASIC/3000 Interpreter Pocket Guide                                 | 03000-90050 | 2.50    |                  |                   |
| 11/74            |        | BASIC/3000 Compiler Reference Manual                                | 32103-90001 | 3.50    | 11/74            | 6/76              |
| 11/72            |        | BASIC for Beginners                                                 | 03000-90025 | 5.50    | 11/72            |                   |
| 7/75             |        | COBOL/3000 Reference Manual                                         | 32213-90001 | 12.50   | 7/75             | 6/76              |
| 5/76             |        | Cross Assembler for 2100 Computers Reference and Application Manual | 03000-90047 | 12.00   | 5/76             |                   |
|                  |        | FORTTRAN Reference Manual                                           | 30000-90040 | 9.50    | 6/76             |                   |
| 3/76             |        | FORTTRAN/3000 Reference Manual                                      | 32102-90001 | 13.50   |                  |                   |
| 2/75             | 8/76   | RPG/3000 Compiler Reference and Application Manual                  | 32104-90001 | 16.50   | 2/75             | 8/76              |
| 4/75             |        | RPG Listing Analyzer                                                | 32104-90003 | 0.50    | 4/75             |                   |
| 11/73            |        | SPL/3000 Reference Manual                                           | 03000-90002 | 7.50    |                  |                   |
| 11/73            |        | SPL/3000 Textbook                                                   | 03000-90003 | 13.00   |                  |                   |
|                  |        | System Programming Language Reference Manual                        | 30000-90024 | 15.00   | 9/76             | 9/76 <sup>†</sup> |
|                  |        | System Programming Language Textbook                                | 30000-90025 | 11.00   | 6/76             | 9/76              |

<sup>†</sup> There are instances where a new edition of the manual and an update are both shown with the same date. The new edition incorporates all changes made in the update. If you already have the manual, order the update only; otherwise order the new edition.

## ADDITIONAL MANUALS

| SERIES I (CX)    |        | MANUAL TITLE                                                       | PART NUMBER | PRICE   | SERIES II        |        |
|------------------|--------|--------------------------------------------------------------------|-------------|---------|------------------|--------|
| PUBLICATION DATE | UPDATE |                                                                    |             |         | PUBLICATION DATE | UPDATE |
| 12/74            | 2/76   | 2780/3780 Emulator Reference Manual                                | 30000-90047 | \$ 8.50 | 6/76             |        |
|                  |        | 2780/3780 Emulator Subsystem Reference and Application Manual      | 30103-90001 | 10.00   |                  |        |
|                  |        | Compiler Library Reference Manual                                  | 30000-90028 | 12.00   | 6/76             |        |
| 2/76             |        | Compiler Library Reference Manual, HP 3000                         | 03000-90009 | 16.50   |                  |        |
|                  |        | Data Entry Library Manual                                          | 30000-90050 | 6.50    | 6/76             |        |
| 8/75             |        | EDIT/3000 Reference Manual                                         | 03000-90012 | 7.50    | 8/75             | 6/76   |
| 6/76             |        | FCOPY Reference Manual                                             | 03000-90064 | 6.00    | 6/76             |        |
| 6/76             |        | HP 2894A Card Reader Punch Operating and Programming Manual        | 30119-90009 | 7.00    | 6/76             |        |
| 10/74            |        | HP 3000 Cross Loader for HP 2100 Computer                          | 03000-90107 | 11.00   | 10/74            | 6/76   |
| 2/75             | 5/75   | IBM 1130/1800 to HP 3000 FORTRAN Conversion Guide                  | 36995-90013 | 6.00    |                  |        |
| 12/75            |        | IBM System/3 to HP 3000 Conversion Guide                           | 32104-90004 | 7.50    |                  |        |
|                  |        | IMAGE Data Base Management System Reference Manual                 | 30000-90041 | 4.50    | 6/76             |        |
| 3/76             |        | IMAGE/3000 Reference Manual                                        | 32215-90001 | 7.00    |                  |        |
|                  |        | Instruction Decoding Pocket Guide                                  | 30000-90057 | 1.00    | 6/76             |        |
|                  |        | Line Printer Operating and Programming Reference Manual            | 30209-90008 | 6.00    | 6/76             |        |
|                  |        | Machine Instruction Set Reference Manual                           | 30000-90022 | 7.00    | 6/76             |        |
|                  |        | Programmable Controller Reference and Application Manual           | 30000-90066 | 6.00    | 6/76             | 10/76  |
| 2/75             | 7/76   | Programmable Controller Reference and Application Manual           | 30300-90002 | 12.00   |                  |        |
|                  |        | QUERY Reference Manual                                             | 30000-90042 | 6.50    | 6/76             |        |
| 3/76             |        | QUERY/3000 Reference Manual                                        | 32216-90001 | 7.00    |                  |        |
|                  |        | Real-Time Programmable Controller Reference and Application Manual | 30000-90067 | 7.50    | 6/76             |        |
| 2/75             | 7/76   | Real-Time Programmable Controller Reference and Application Manual | 30301-90002 | 9.50    |                  |        |
|                  |        | Scientific Library Reference Manual                                | 30000-90027 | 5.00    | 6/76             |        |
| 7/75             |        | Scientific Library Reference Manual, HP 3000                       | 03000-90010 | 7.00    |                  |        |
|                  |        | Site Preparation Manual                                            | 30000-90016 | 6.00    | 6/76             | 10/76  |
|                  |        | Site Planning Workbook, HP Computer System                         | 30000-90017 | 10.00   | 6/76             |        |
| 8/76             |        | Sort/3000 Reference Manual                                         | 32214-90001 | 6.50    | 8/76             |        |
| 7/75             |        | Student Assignment System Reference Manual                         | 32901-90001 | 10.00   | 7/75             | 8/76   |
| 7/75             |        | Student Assignment System -- Technical Manual                      | 32901-90005 | 13.00   | 7/75             |        |
| 9/74             |        | Student Information System Reference Manual                        | 32900-90001 | 18.00   | 9/74             | 8/76   |
| 9/74             |        | Student Information System -- System Overview                      | 32900-90002 | 7.00    | 9/74             |        |
| 3/75             |        | Student Information System -- Technical Manual                     | 32900-90005 | 18.50   | 3/75             |        |
|                  |        | Systems Reference Manual                                           | 30000-90020 | 9.50    | 6/76             | 9/76   |
| 9/73             |        | Systems Reference Manual, HP 3000 Computer                         | 03000-90019 | 14.00   |                  |        |
| 6/76             |        | Trace/3000 Reference Manual                                        | 03000-90015 | 7.00    | 6/76             |        |

# training schedule

The schedule for customer training courses on General Systems Division products is outlined below, and in the 2000 section of this publication. Included here are HP 3000 software courses offered in the U.S. and in Europe for the period November 1976 through January 1977. You can also obtain a copy of the schedule from your local HP sales office. A European course schedule is available through the sales offices in Europe; a U.S. schedule through U.S. sales offices.

## Registration

Requests for enrollment in any of the courses should be made through your local HP Sales Office. Your Sales Representative will supply the Training Registrar at the appropriate location with the course number, dates, and requested motel reservations. Enrollments are acknowledged by a written confirmation indicating the training course, time of class, location and accommodations reserved.

### GENERAL SYSTEMS DIVISION COURSE SCHEDULE (U.S.)

| November 1976 - February 1977             |                                                 |         |       |                                                                                                |                                                                  |
|-------------------------------------------|-------------------------------------------------|---------|-------|------------------------------------------------------------------------------------------------|------------------------------------------------------------------|
| Course Dates and Training Center Location |                                                 |         |       |                                                                                                |                                                                  |
| NUMBER                                    | COURSE TITLE                                    | LENGTH  | PRICE | WESTERN<br>TECHNICAL<br>CENTER                                                                 | EASTERN<br>TECHNICAL<br>CENTER                                   |
| 22801A                                    | 3000 Series II, A Comprehensive Introduction    | 5 days  | \$500 | 12/13/76<br>1/03/76<br>1/17/77<br>1/31/77<br>2/14/77<br>2/28/77                                | 11/01/76<br>12/13/76<br>1/03/77<br>1/24/77<br>2/07/77<br>2/28/77 |
| 22802A                                    | 3000 Series II, System Management and Operation | 4 days  | 400   | 12/06/76<br>12/20/76<br>1/10/77<br>1/24/77<br>2/7/77<br>2/21/77                                | 11/08/76<br>12/20/76<br>1/10/77<br>1/31/77<br>2/14/77            |
| 22956A                                    | 3000 IMAGE                                      | 5 days  | 500   | 12/13/76<br>1/17/77<br>1/31/77<br>2/28/77                                                      | 11/15/76<br>1/17/77                                              |
| 22957A                                    | 3000 COBOL, Audio Self Study                    | 30 hrs. | 325   | These courses can be ordered using the Direct Mail Order form in the back of the Communicator. |                                                                  |
| 22958A                                    | 3000 BASIC, Audio Self Study                    | 30 hrs. | 325   |                                                                                                |                                                                  |

**Accommodations**

Students provide their own transportation, meals, and lodging. The Training Registrar will be pleased to assist in securing motel reservations at the time your Sales Office requests a registration.

**Cancellations**

In the event you are unable to attend a class for which you are registered, please notify the Training Center Registrar immediately in order that we may offer your seat to another student. To avoid paying for a reservation which you do not use, we must receive notification of your cancellation no later than one week before the class begins.

**GENERAL SYSTEMS DIVISION COURSE SCHEDULE (EUROPE)**

| November 1976 -- January 1977 |                                                 |        |                    |                     |                |                 |                     |
|-------------------------------|-------------------------------------------------|--------|--------------------|---------------------|----------------|-----------------|---------------------|
| COURSE NUMBER                 | COURSE TITLE                                    | LENGTH | FRANKFURT (GERMAN) | WINNERISH (ENGLISH) | ORSAY (FRENCH) | MILAN (ITALIAN) | STOCKHOLM (ENGLISH) |
| 22801A                        | 3000 Series II, A Comprehensive Introduction    | 5 days | 11/08<br>1/10      |                     | 1/10           |                 | 11/08<br>12/06      |
| 22802A                        | 3000 Series II, System Management and Operation | 4 days | 11/22<br>1/24      |                     | 1/17           | 11/08           | 11/15<br>12/13      |
| 22956A                        | 3000 IMAGE                                      | 5 days | 12/06              |                     | 11/15          | 12/13           |                     |

**Technical Center Addresses****UNITED STATES**

|                                                                                                                                                  |  |                                                                                                                                                                                                   |  |
|--------------------------------------------------------------------------------------------------------------------------------------------------|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <b>Eastern Technical Center</b><br>4 Choke Cherry Road<br>Rockville, Maryland 20850                                                              |  | <b>Western Technical Center</b><br>5303 Stevens Creek Blvd.<br>Santa Clara, California 95050                                                                                                      |  |
| <b>EUROPE</b>                                                                                                                                    |  |                                                                                                                                                                                                   |  |
| <b>Winnersh</b><br>King Street Lane<br>Winnersh, Wokingham<br>Berks RG11 5 AR<br>Tel: Wokingham 784774<br>Cable: Hewpie London<br>Tele: 847178 9 |  | <b>Orsay</b><br>Quartier de Courtaboeuf<br>Boite postale No. 6<br>F-91401-Orsay<br>France<br>Tel: (1) 907 78 25<br>Cable: HEWPACK Orsay<br>Telex: 60048                                           |  |
|                                                                                                                                                  |  | <b>Frankfurt</b><br>Vertriebzentrale Frankfurt<br>Berner Strasse 117<br>Postale 560 140<br>D-6000 Frankfurt 56<br>Tel: 0611 5004<br>Telex: (841) 04-13249, 04-13081<br>Cable: HEWPACKSA Frankfurt |  |
| <b>Milan</b><br>Via Amerigo Vespucci, 2<br>1-20124 Milan<br>Tel: (2) 62 51<br>Cable: HEWPACKIT Milano<br>Telex: 32046                            |  | <b>Stockholm</b><br>Enighetsvagen 1-3, Fack<br>S-162 20 Bromma 20<br>Tel: (08) 730 05 50<br>Cable: MEASUREMENTS<br>Stockholm Telex: 10721                                                         |  |

# subscription information

Annual subscriptions consisting of 6 issues are available as outlined below.

## I. CUSTOMERS WITH SOFTWARE MAINTENANCE AGREEMENTS OR SOFTWARE SUBSCRIPTION SERVICE AGREEMENTS (SOFTWARE SERVICE CONTRACT SUBSCRIPTIONS)

All Hewlett-Packard customers with Software Service Contracts are entitled to one BASE SUBSCRIPTION (1 copy per issue) at no additional charge. These customers may also buy ADDITIONAL SUBSCRIPTIONS whose purchase price is to be prorated against the remaining life of their Software Service Contract. A proration table appears on the ORDER FORM which is bound into this issue.

To receive a BASE SUBSCRIPTION at no charge as well as to purchase ADDITIONAL SUBSCRIPTIONS under the provisions of the Software Service Contract Program, complete the ORDER FORM and forward it to your local HP Sales and Service Office. Your local Customer Engineer will validate your order and mail it to the appropriate HP department.

| Rates:                         | U.S.A.   | NON-U.S.A. |
|--------------------------------|----------|------------|
| BASE SUBSCRIPTION              | NAC*     | NAC*       |
| ADDITIONAL SUBSCRIPTIONS (ea.) | \$12/yr. | **         |

- 1) ADDITIONAL SUBSCRIPTIONS must go to the same name and address as the BASE SUBSCRIPTION to qualify for the reduced rates.
- 2) ADDITIONAL SUBSCRIPTIONS ordered at a later date than the BASE SUBSCRIPTION must include, with the order form, a copy of the address label for proper identification.
- 3) Charges for ADDITIONAL SUBSCRIPTIONS will be prorated to expire with your Software Service Contract.
- 4) Orders for ADDITIONAL SUBSCRIPTIONS from a customer with a Software Service Contract will be verified by the Customer Engineer who will complete the "FOR HP USE ONLY" portion of the subscription form and direct the order to the appropriate HP department. The customer will be billed by his local HP Customer Engineering Department.

\*No Additional Charge (NAC)

\*\*Contact your local HP Customer Engineer for the price in the currency of your country.

## II. CUSTOMERS WITHOUT SOFTWARE MAINTENANCE AGREEMENTS OR SOFTWARE SUBSCRIPTION SERVICE AGREEMENTS (MAIL ORDER SUBSCRIPTIONS)

| Rates:                         | U.S.A.   | NON-U.S.A. |
|--------------------------------|----------|------------|
| BASE SUBSCRIPTION              | \$48/yr. | ***        |
| ADDITIONAL SUBSCRIPTIONS (ea.) | \$12/yr. | ***        |

- 1) ADDITIONAL SUBSCRIPTIONS must be ordered at the same time as the BASE SUBSCRIPTION and go to the same name and address as the BASE SUBSCRIPTION to qualify for the reduced rate.
- 2) The customer is to include payment (check, bank draft, money order, etc.) with the order. This is a Direct Mail Order procedure; please do not send a purchase order to HP.
- 3) Complete the ORDER FORM as directed and mail together with your payment to:

**Hewlett-Packard Co.  
Mail Order Dept.  
P.O. Drawer No. 20  
Mountain View, California 94043  
U.S.A..**

## SUBSCRIPTION CORRESPONDENCE

Address all correspondence relating to **COMMUNICATOR** subscriptions to:

**Subscription Service Manager  
Hewlett-Packard Company  
Mail Order Dept.  
P.O. Drawer No. 20  
Mountain View, California 94043  
U.S.A.**

\*\*\*The international customer is encouraged to also use HP's Direct Mail Order System by remitting a bank draft in U.S. dollars according to the order procedure outlines above. If the currency regulations in the customer's country disallow the purchase of bank drafts in American dollars, or if the customer does not have ready access to the required banking services, the customer may order subscriptions from the local HP Sales and Service Office through his Customer Engineer. The customer should contact his HP Office for the price of the subscription in the currency of his country then complete the ORDER FORM and forward it together with payment to his local HP Office.

**HEWLETT-PACKARD  
COMPUTER SYSTEMS COMMUNICATOR ORDER FORM**

**Please Print:**

Name \_\_\_\_\_ Title \_\_\_\_\_  
Company \_\_\_\_\_  
Street \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip Code \_\_\_\_\_  
Country \_\_\_\_\_

☐ MAIL ORDER SUBSCRIPTIONS

BASE SUBSCRIPTION \$ \_\_\_\_\_

\_\_\_\_\_ ADDITIONAL SUBSCRIPTION(S) \$ \_\_\_\_\_  
No.

TOTAL AMOUNT ENCLOSED \$ \_\_\_\_\_

☐ SOFTWARE SERVICE CONTRACT SUBSCRIPTIONS

BASE SUBSCRIPTION (NO ADDITIONAL CHARGE) NAC \_\_\_\_\_

\_\_\_\_\_ ADDITIONAL SUBSCRIPTION(S) \$ \_\_\_\_\_  
No.

TOTAL AMOUNT YOU WILL BE BILLED \$ \_\_\_\_\_

**FOR HP USE ONLY**

SUPPORT OFFICE NUMBER \_\_\_\_\_ ORDER DATE \_\_\_\_\_  
APPROVED BY \_\_\_\_\_ C.E. NUMBER \_\_\_\_\_  
SERVICE CONTRACT NUMBER \_\_\_\_\_ EXPIRATION DATE \_\_\_\_\_  
AUTHORIZED TOTAL NUMBER OF SUBSCRIPTIONS \_\_\_\_\_  
CUSTOMER'S HP OPERATING SYSTEM \_\_\_\_\_

Printed 4/76

**TABLE OF PRORATED \$ AMOUNT DUE PER ADDITIONAL SUBSCRIPTION**

(Use only for ordering ADDITIONAL SUBSCRIPTION(S) against an existing Software Service Contract)

| Months Remaining in Service Contract       |      |      |      |      |      |      |      |      |      |       |       |       |
|--------------------------------------------|------|------|------|------|------|------|------|------|------|-------|-------|-------|
|                                            | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10    | 11    | 12    |
| Cost of Each<br>ADDITIONAL<br>SUBSCRIPTION | 1.00 | 2.00 | 3.00 | 4.00 | 5.00 | 6.00 | 7.00 | 8.00 | 9.00 | 10.00 | 11.00 | 12.00 |

## INSTRUCTIONS FOR ORDERING COMMUNICATOR

All Hewlett-Packard customers with Software Service Contracts are entitled to one BASE SUBSCRIPTION (1 copy per issue) at no additional charge. These customers may also buy ADDITIONAL SUBSCRIPTIONS whose purchase price is to be prorated against the remaining life of their Software Service Contract.

Customers who do not have Software Service Contracts may purchase Mail-Order Subscriptions through HP's Direct Mail Order System.

---

### A. MAIL-ORDER SUBSCRIPTION(S)

1. Complete name and address portion of ORDER FORM.
  2. Compute amount due:
    - a) Annual Base Subscription (6 issues) \$ 48.00
    - b) \_\_\_\_\_ Additional Subscriptions\*  
@ \$12.00 ea. \$ \_\_\_\_\_

---

  - c) Total Order Amount (a + b) \$ \_\_\_\_\_
  - d) Transfer number of ADDITIONAL SUBSCRIPTIONS and all dollar amounts to ORDER FORM.
3. Mail check or bank draft with ORDER FORM to:

HEWLETT-PACKARD CO.  
MAIL ORDER DEPARTMENT  
P.O. DRAWER #20  
MOUNTAIN VIEW, CA. 94043  
U.S.A.

### B. SOFTWARE SERVICE CONTRACT SUBSCRIPTION(S)

1. Complete name and address portion of ORDER FORM.
  2. Compute amount due: (BASE SUBSCRIPTION is at no additional charge.)
    - a) Annual Base Subscription (6 issues) \$ 0.00
    - b) \_\_\_\_\_ Additional Subscriptions\*  
\$ \_\_\_\_\_

Prorate the dollar amount to make the ADDITIONAL SUBSCRIPTIONS EXPIRE WITH YOUR Software Service Contract. (SEE TABLE)

---

  - c) Total Order Amount (a + b) \$ \_\_\_\_\_
  - d) Transfer number of ADDITIONAL SUBSCRIPTIONS and all dollar amounts to ORDER FORM.
3. Forward ORDER FORM to your local HP Customer Engineering Representative. Your order will be approved and forwarded to the appropriate department. You will be billed for any ADDITIONAL SUBSCRIPTIONS by your local HP office.

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### C. SPECIAL INSTRUCTIONS FOR INTERNATIONAL CUSTOMERS

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1. International customers who do not have Software Service Contracts are encouraged to use HP's Direct Mail Order System by remitting a bank draft in U.S. dollars according to the ordering procedures outlined in Instruction A above. Optionally, international customers may purchase the **Communicator** through their local HP Sales and Service Office. The customer should contact his HP Office for the subscription prices in the currency of his country, then complete the Order Form and forward it together with payment to his local HP Customer Engineering Department.

1. International customers with Software Service Contracts should follow the ordering procedure outlined in Instruction B above. If the customer wishes to purchase ADDITIONAL SUBSCRIPTIONS, he should contact the local HP Office for the subscription price in the currency of his country, then submit the ORDER FORM. The customer will be billed for ADDITIONAL SUBSCRIPTIONS by his local HP Office.

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\*All ADDITIONAL SUBSCRIPTIONS will be sent to the same name and address as the BASE SUBSCRIPTION.

**HEWLETT-PACKARD  
COMPUTER SYSTEMS COMMUNICATOR ORDER FORM**

**Please Print:**

Name \_\_\_\_\_ Title \_\_\_\_\_  
Company \_\_\_\_\_  
Street \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip Code \_\_\_\_\_  
Country \_\_\_\_\_

☐ MAIL ORDER SUBSCRIPTIONS

BASE SUBSCRIPTION \$ \_\_\_\_\_

\_\_\_\_\_ ADDITIONAL SUBSCRIPTION(S) \$ \_\_\_\_\_  
No.

TOTAL AMOUNT ENCLOSED \$ \_\_\_\_\_

☐ SOFTWARE SERVICE CONTRACT SUBSCRIPTIONS

BASE SUBSCRIPTION (NO ADDITIONAL CHARGE) NAC \_\_\_\_\_

\_\_\_\_\_ ADDITIONAL SUBSCRIPTION(S) \$ \_\_\_\_\_  
No.

TOTAL AMOUNT YOU WILL BE BILLED \$ \_\_\_\_\_

**FOR HP USE ONLY**

SUPPORT OFFICE NUMBER \_\_\_\_\_ ORDER DATE \_\_\_\_\_  
APPROVED BY \_\_\_\_\_ C.E. NUMBER \_\_\_\_\_  
SERVICE CONTRACT NUMBER \_\_\_\_\_ EXPIRATION DATE \_\_\_\_\_  
AUTHORIZED TOTAL NUMBER OF SUBSCRIPTIONS \_\_\_\_\_  
CUSTOMER'S HP OPERATING SYSTEM \_\_\_\_\_

Printed 4/76

**TABLE OF PRORATED \$ AMOUNT DUE PER ADDITIONAL SUBSCRIPTION**

(Use only for ordering ADDITIONAL SUBSCRIPTION(S) against an existing Software Service Contract)

| Months Remaining in Service Contract       |      |      |      |      |      |      |      |      |      |       |       |       |
|--------------------------------------------|------|------|------|------|------|------|------|------|------|-------|-------|-------|
|                                            | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10    | 11    | 12    |
| Cost of Each<br>ADDITIONAL<br>SUBSCRIPTION | 1.00 | 2.00 | 3.00 | 4.00 | 5.00 | 6.00 | 7.00 | 8.00 | 9.00 | 10.00 | 11.00 | 12.00 |

## INSTRUCTIONS FOR ORDERING COMMUNICATOR

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Customers who do not have Software Service Contracts may purchase Mail-Order Subscriptions through HP's Direct Mail Order System.

---

### A. MAIL-ORDER SUBSCRIPTION(S)

1. Complete name and address portion of ORDER FORM.
2. Compute amount due:
  - a) Annual Base Subscription (6 issues) \$ 48.00
  - b) \_\_\_\_\_ Additional Subscriptions\*  
@ \$12.00 ea. \$ \_\_\_\_\_
  - c) Total Order Amount (a + b) \$ \_\_\_\_\_
  - d) Transfer number of ADDITIONAL SUBSCRIPTIONS and all dollar amounts to ORDER FORM.
3. Mail check or bank draft with ORDER FORM to:

HEWLETT-PACKARD CO.  
MAIL ORDER DEPARTMENT  
P.O. DRAWER #20  
MOUNTAIN VIEW, CA. 94043  
U.S.A.

### B. SOFTWARE SERVICE CONTRACT SUBSCRIPTION(S)

1. Complete name and address portion of ORDER FORM.
2. Compute amount due: (BASE SUBSCRIPTION is at no additional charge.)
  - a) Annual Base Subscription (6 issues) \$ 0.00
  - b) \_\_\_\_\_ Additional Subscriptions\*  
\$ \_\_\_\_\_

Prorate the dollar amount to make the ADDITIONAL SUBSCRIPTIONS EXPIRE WITH YOUR Software Service Contract. (SEE TABLE)

\_\_\_\_\_

  - c) Total Order Amount (a + b) \$ \_\_\_\_\_
  - d) Transfer number of ADDITIONAL SUBSCRIPTIONS and all dollar amounts to ORDER FORM.
3. Forward ORDER FORM to your local HP Customer Engineering Representative. Your order will be approved and forwarded to the appropriate department. You will be billed for any ADDITIONAL SUBSCRIPTIONS by your local HP office.

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### C. SPECIAL INSTRUCTIONS FOR INTERNATIONAL CUSTOMERS

---

1. International customers who do not have Software Service Contracts are encouraged to use HP's Direct Mail Order System by remitting a bank draft in U.S. dollars according to the ordering procedures outlined in Instruction A above. Optionally, international customers may purchase the **Communicator** through their local HP Sales and Service Office. The customer should contact his HP Office for the subscription prices in the currency of his country, then complete the Order Form and forward it together with payment to his local HP Customer Engineering Department.

1. International customers with Software Service Contracts should follow the ordering procedure outlined in Instruction B above. If the customer wishes to purchase ADDITIONAL SUBSCRIPTIONS, he should contact the local HP Office for the subscription price in the currency of his country, then submit the ORDER FORM. The customer will be billed for ADDITIONAL SUBSCRIPTIONS by his local HP Office.

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\* All ADDITIONAL SUBSCRIPTIONS will be sent to the same name and address as the BASE SUBSCRIPTION.

**NOTE: This order form cannot be used for ordering manuals. It is for replacement pages only.**



SOFTWARE/PUBLICATIONS DISTRIBUTION  
ORDER FORM

UPDATES TO 3000 AND 2000  
ACCESS LEVEL MANUALS ONLY

SHIP TO:

NAME \_\_\_\_\_

COMPANY \_\_\_\_\_

STREET \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP CODE \_\_\_\_\_

| MANUAL NAME | PART NUMBER | QUANTITY |
|-------------|-------------|----------|
|             |             |          |
|             |             |          |
|             |             |          |
|             |             |          |
|             |             |          |
|             |             |          |
|             |             |          |
|             |             |          |
|             |             |          |
|             |             |          |
|             |             |          |
|             |             |          |
|             |             |          |

*When completed, please  
mail this form to:*

*There is no charge for manual updates.*

HEWLETT-PACKARD  
SOFTWARE/PUBLICATIONS DISTRIBUTION  
5303 Stevens Creek Blvd.  
Santa Clara, CA 95050

**NOT TO BE USED FOR ORDERING COMMUNICATOR SUBSCRIPTIONS****CORPORATE PARTS CENTER****Direct Mail****Parts and Supplies Order Form**

SHIP TO:

NAME \_\_\_\_\_

COMPANY \_\_\_\_\_

STREET \_\_\_\_\_

CITY \_\_\_\_\_

STATE \_\_\_\_\_

CUSTOMER

REFERENCE # \_\_\_\_\_

TAXABLE\*? \_\_\_\_\_

ZIP CODE \_\_\_\_\_

| Item No. | Check Digit | Part No. | Qty. | Description | List Price Each | Extended Total |  |
|----------|-------------|----------|------|-------------|-----------------|----------------|--|
|          |             |          |      |             |                 |                |  |
|          |             |          |      |             |                 |                |  |
|          |             |          |      |             |                 |                |  |
|          |             |          |      |             |                 |                |  |
|          |             |          |      |             |                 |                |  |
|          |             |          |      |             |                 |                |  |
|          |             |          |      |             |                 |                |  |
|          |             |          |      |             |                 |                |  |
|          |             |          |      |             |                 |                |  |
|          |             |          |      |             |                 |                |  |

Special Instructions

Sub-total

\*Tax is verified by computer according to your ZIP CODE. If no sales tax is added, your state exemption number must be provided: # \_\_\_\_\_.

If not, your order may have to be returned.

Check or Money Order, made payable to Hewlett-Packard Company, must accompany order.

When completed, please mail this form with payment to:

**HEWLETT-PACKARD COMPANY**

Mail Order Department

P.O. Drawer #20

Mountain View, CA 94043

Phone: (415) 968-9200

Your State &amp; Local Sales Taxes\*

Handling Charge

TOTAL

1

50

*Most orders are shipped within 24 hours of receipt. Shipments to California, Oregon and Washington will be made via UPS. Other shipments will be sent Air Parcel Post, with the exception that shipments over 25 pounds will be made via truck. No Direct Mail Order can be shipped outside the U.S.*

Although every effort is made to insure the accuracy of the data presented in the **Communicator**, Hewlett-Packard cannot assume liability for the information contained herein.

Prices quoted apply only in U.S.A. If outside the U.S., contact your local sales and service office for prices in your country.

## direct mail order form

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