

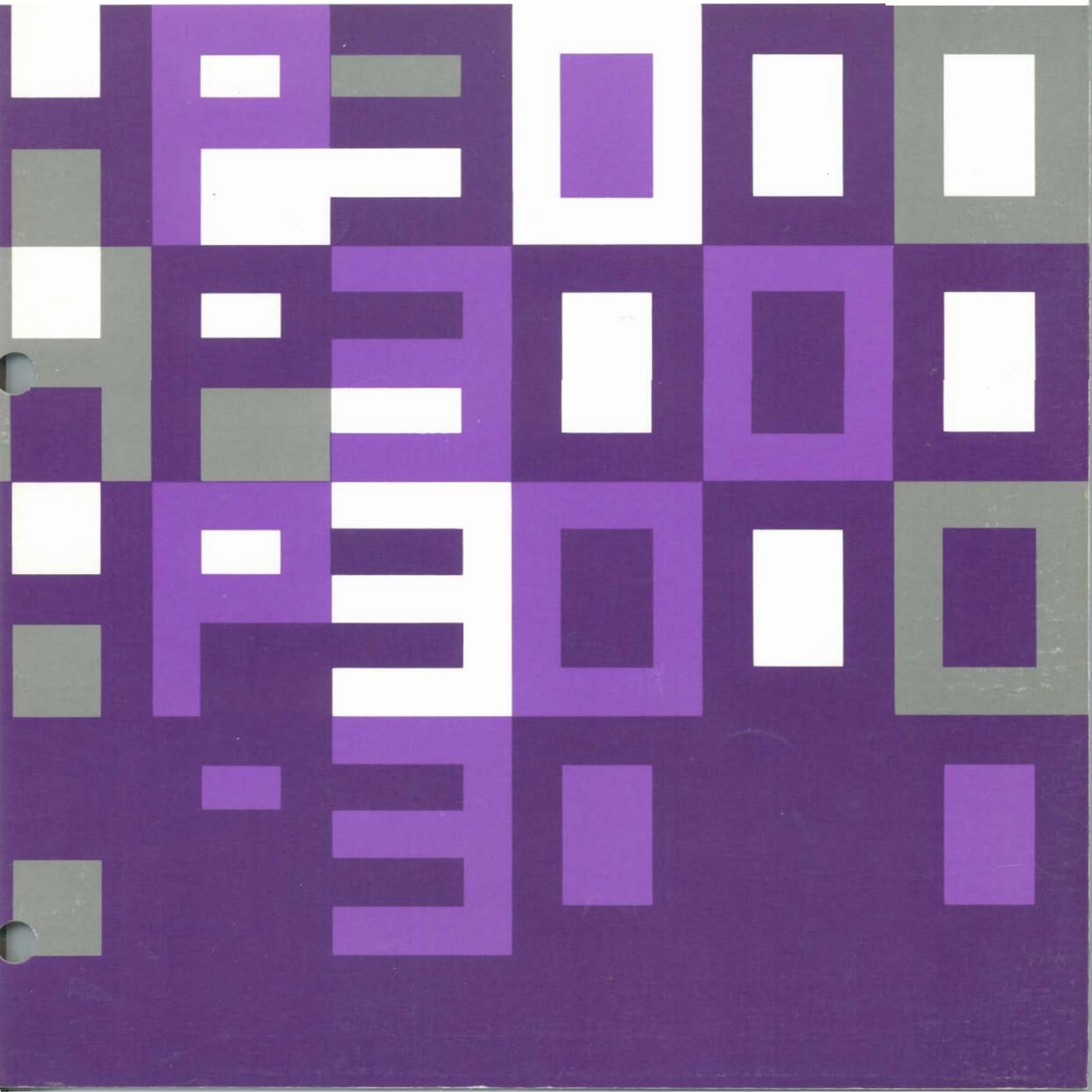
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Editor's Note

This issue of the COMMUNICATOR is unique in that the entire issue (exclusive of the covers), has been produced using the Text and Document Processor (TDP/3000) and the HP 2680A Laser Printing System along with the Interactive Formatting System (IFS/3000). (See "HP Laser Printer Now Merges Text and Graphics" on page 69). We at HP are pretty excited about the results and hope that you will enjoy this new issue.

There are many good articles, beginning with "Introducing CIPER/3000 and the HP 2608S Printer", and finishing up with a tear-out "Datacommunications Troubleshooting Guide", and an update for Appendix C of your Console Operator's Guide. In between, you will find an article describing the MIT process, the Multiple Access Selector, the Application Program Sampler, and many enhancements to the operating system itself.

Note that the articles covering new products and enhancements are in lieu of MPE manual updates for this MIT. This material will be included in the next set of manual updates which will be distributed with the next software update, the "Quality" MIT.

The Software Update section is back, along with the usual Catalog and Documentation sections, and the new Reader Comment Sheet at the very back.

Please continue to send us your comments on the COMMUNICATOR. We are happy to implement as many of your suggestions as we can in order to make this publication more useful to you, the customer.

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Introducing CIPER/3000 and the HP 2608S Printer

by Chuck Mayne and George R. O'Connor, Boise Division

CIPER, pronounced *sigh-per*, is an acronym which means Control of Intelligent PERipherals. This article explains the implementation of CIPER/3000. Within the scope of this design, you, the user, will be able to access features of the HP 2608S printer with relative ease.

The HP 2608S is a new printer which is similar in appearance to the HP 2608A printer. However, the similarity ends at physical appearance. The HP 2608S will support two Input/Output interfaces at initial release. These interfaces (each is a separate printed circuit board) are HPIB and Multi-Point Terminal Software (MTS) interfaces. Also, the new printer incorporates the CIPER design.

CIPER Design Goals

CIPER/3000 was designed with the following goals:

- o Data transportability through control functions embedded in user data. Data files are not restricted to any particular system.
- o Physical link independence. All device features are accessible to the user regardless of Input/Output interface. In some cases the operating system may restrict direct access to the device functions by use of a 'control mask' command which is known only to CIPER/3000 and the CIPER device (HP 2608S).
- o Ensure data integrity where the underlying physical link allows data checking.
- o Automatic job recovery for spooled jobs when device power fails or paper jams (printer specific). Error recovery for paper jams will start automatically after the system operator has corrected the paper problem and places the printer online. Recovery is physical page specific.

- o Minimal impact on current user programs and job streams.
- o Automated electronic VFC and left margin control without operator intervention. (However, the current :DOWNLOAD command can be used).
- o Job-to-job integrity and separation. Each user (or spoolfile is isolated from the features that were programmed in the device by the previous user. (There are several exceptions which will be covered later in this article.)
- o Two mode capability. The HP 2608S will support some prior printer defaults with a mode known as TRANSPARENT mode. In addition, to access features of the machine with control embedded in the data, the HP 2608S will support a mode known as FEATURE.
- o Remote access via the Multipoint Terminal Software (MTS). Offering full feature access including Spooled files and direct program control of the device. (This feature available in July, 1982).
- o System logging of the number of physical pages printed for all spoolfiles sent to the HP 2608S.

Hardware Requirements

CIPER/3000 will execute on MPE-IV (this release or later releases only). Specifically, CIPER will interface to a Series 30/33/40/44/64. In addition, remote printing will be supported on Series II/III/30/33/40/44/64 through the Multi-Point Terminal Software (MTS). CIPER requires one or more system disc devices (not private volumes) configured as class SPOOL (for spooling) and one or more real CIPER printers (currently 2608S is only device which supports CIPER) connected to the CPU through HP-IB or MTS.

RESTRICTION: CIPER/3000 and the HP 2608S are not supported on HP 3000 Series II or III directly. CIPER/3000 and the HP 2608S can only be accessed through the Multi Point Terminal Software (MTS) for these systems.

Input/Output Configuration

Before we can begin to explain how to configure the 2608S into an HP 3000 system, a discussion of the two mode capabilities is in order.

CIPER/3000 and the HP 2608S support two system default modes. These are FEATURE and TRANSPARENT access.

FEATURE access is a means for you, the user, to implement full control embedded in data to the HP 2608S. Controls consist of character controls (such as

backspace, shift-in, shift-out, vertical tab, etc.) as well as supported escape sequences. These controls are executed in the HP 2608S as commands to the printing mechanism. When the device is configured as FEATURE access default, CIPER will ensure this default state at the start of every print job. For supported escape sequences, see the HP 2608S Technical Reference Manual, HP part number 02608-90910.

TRANSPARENT access is a means for you, the user, to restrict data so that control characters and escape sequences embedded in the data are not executed; rather, they are printed as a part of the data stream just like any other printable character. This access will make the HP 2608S very similar to all other printers now supported on the HP 3000 systems. One note of difference for this mode occurs between the HP 2608S and the HP 2608A. The HP 2608S will not execute backspace, shift-in, or shift-out in the TRANSPARENT mode (it prints them as ordinary characters). The HP 2608A, however, does execute these control characters in the normal course of operation. (There are no selectable modes for the HP 2608A.)

Later in this article, we'll show how you can dynamically change the default mode for any one particular print job.

The I/O configuration for the HP 2608S is very similar to other printer devices. The device type is 32 (indicating printer). The device subtype is configured as:

<u>Subtype</u>	<u>Remarks</u>
9	FEATURE access system default.
13	TRANSPARENT access system default.

The record width is suggested to be 66 words (132 bytes). The HPIB driver name is HIOCIPRO.

The system default will then ensure that for normal printing jobs, the user will have the expected print results with no special effort.

The I/O configuration for the Multi Point Terminal Software (MTS) will be documented in the appropriate manual when support becomes available.

User Interface

Before proceeding, a short explanation of 'VFC' or 'VFU' is desirable.

In some printers, vertical tabulation is accomplished by inserting a loop of paper tape into the printer. This paper tape has holes punched in various columns to indicate when a particular vertical channel is to be slewed and stopped. These tapes are called VFC tapes or VFU tapes. The acronym stands for Vertical Format Control or Vertical Format Unit respectively.

Hewlett-Packard is using 'electronic VFC's' which are programmatically downloaded into the printer before a print job begins. In particular, the HP 2608A, and now the HP 2608S, use electronic downloadable VFC's.

Both the HP 2608A and 2608S printers have electronic left margin setting from the file created for environment loading. This feature allows the user to offset the beginning left column of each print line up to 16 spaces from the real left margin. In addition, the HP 2608S offers full left and right margin indentation through the use of escape sequences in the FEATURE mode.

MPE provides for the user to download VFC's to the HP 2608A through the use of the operator :DOWNLOAD command. With the release of the HP 2608S, the user can create VFC files and have them loaded into the HP 2608S through the use of a key parameter in the :FILE command, (ENV=) thus avoiding any operator intervention. Also, the current :DOWNLOAD command will be supported for the HP 2608S so that existing programs can execute without change.

Note, however, that the HP 2608A cannot use the key parameter in the :FILE command. It must continue to use the :DOWNLOAD command as explained in the Console Operators Guide, HP part number 32002-90004.

Interactive Interface

Within the standard VFC downloadable file are key parameters such as MARGIN= and VFC. An additional parameter (MODE=TRANSPARENT or FEATURE) has been added. The TRANSPARENT mode means that the HP 2608S will attempt to print all data including control codes and escape sequences. The FEATURE mode allows the user to send those controls and escape sequences to the HP 2608S and have them executed. If no MODE= key parameter is used, then the operating system will execute other key parameters, VFC loads, and then default back to the system default defined by device subtype.

Hewlett-Packard will furnish each HP 2608S owner with a Technical Reference Manual, part number 02608-90910, which explains the supported controls and escape sequences.

HP 2608S Environment File Specification of the :FILE Command

The FILE command in the MPE Commands Manual (HP part number 30000-90009, dated 1/81) is changed to include the use of environment files for the HP 2608S. The environment file for an HP 2608S is a standard ASCII file as created by the EDITOR subsystem, or TDP (and some unsupported user EDITORS). Specifically, the SYNTAX FOR DEVICESPEC and DEVICESPEC PARAMETERS is changed to reflect the capability of HP 2608S environments which contain VFC's, Margin settings, and possible TRANSPARENT/FEATURE access key words. The form is:

```
[
    ;Env = {*formaldesignator}
           {filereference }
]
```

environment

A compiled or ASCII disc file containing the specifications for a printed page, which are not part of the data. The specifications for the HP 2680 Laser Printing system may include the page size, the character font, forms, pictures and other printed requirements to be used in conjunction with IDS/3000 and IFS/3000. The specifications for the HP 2608S are contained in an ASCII file which can specify VFC, margin settings and printer mode. See the Console Operator's Guide (HP part number 32002-90004), chapter four, under FORMS MESSAGE (and discussion later in this article).

The environment files are in a form suitable for downloading for the intended specific device only.

For Example:

Create a file for a travel form via IDS/3000 and IFS/3000.

```
:FILE TRAVEL=TRADMIN.HPENV.HP2680A
:FILE LP;DEV=FASTLP;ENV= { *TRAVEL
                        { TRADMIN.HPENV.HP2680A }
```

See the IFS/3000 and IDS/3000 Manual for discussion on creating environment files for the HP 2680 printer.

To use a VFC and margin file called MYVFC created with any supported EDITOR and destined for the HP 2608S printer.

```
:FILE DLOADVFC=MYVFC.HPENV.HP2608S
:FILE LP;DEV=LP2608S;ENV={ *DLOADVFC
                        { MYVFC.HPENV.HP2608S }
```

The ;ENV parameter in the :FILE command takes precedence over that specified in an FOPEN.

If the environment keyword is specified and the **formaldesignator* or *filereference* is omitted, any environment file from FOPEN is ignored.

The whole purpose of using an environment file specification is to allow the user the job-to-job control of the HP 2608S printer without operator intervention.

HP 2608S Environment File Creation

In order for a given user to access the 2608S with the capability of using embedded control in the data, an extension to the VFC file was added. The Console Operator's Guide, HP part number 32002-90004 will be changed to include the new key word MODE with parameters TRANSPARENT or FEATURE. A description of the change follows:

HOW TO USE THE HP 2608A AND HP 2608S VFC, LEFT MARGIN, LINE SPACING AND PRINTER MODE FEATURES

If your system has an HP 2608A printer, you may receive a forms message requesting specific forms, and the Vertical Format Control (VFC) needed for printing a particular job/session.

If your system has an HP 2608S printer, you can create an environment file using the instructions below. In no case can an HP 2608A be accessed with environment files. Only the HP 2608S allows the user to directly control VFC, Left Margin, and printer mode.

To change the format to your HP 2608A printer, a user-created ASCII file may be :DOWNLOADED by the operator at run time. In addition, the HP 2608S will support existing programs (with certain reservations) which use the :DOWNLOAD command meant for an HP 2608A.

To change the format to your HP 2608S printer, a user-created ASCII file may be specified in the ENV= part of the :FILE command.

To create this ASCII file, the user would:

- o Create and store the EDITOR file.
- o Include in the application program a FORMS message (HP 2608A only) instructing you, the System operator, to download the file using a :DOWNLOAD command. For HP 2608S application programs, the user can specify a file equation (previously discussed above), with ENV= [filename].
- o At print time, send a FORMS message (HP 2608A only) instructing you to download the appropriate file and, if applicable, to set up special forms in the printer. Note: for the HP 2608S, the user may also include a FORMS message if special forms are to be used with the environment file.

The job will be printed and completed. For the HP 2608S, if a special FORMS message has been received and forms mounted, the next job output will ask you to remove the special forms. That is all that is needed for the HP 2608S.

For the HP 2608A, the job will be printed and completed. After all jobs requiring the currently downloaded VFC and margin have completed, you, as the

operator, simply remove the special forms (if any), and download a standard VFC, such as VFC8 or VFC6, or any other appropriate VFC and margin. (See examples which follow.)

The format of the EDITOR file consists of several 80 character records, which is illustrated below:

Record 1	MARGIN=nn	HP 2608A or HP2608S
Alternate Record 1/2	MODE= [TRANSPARENT] [FEATURE]	HP 2608S only. If no MARGIN setting required.
Alternate Record 1/2/3	VFC,x,y,zzzzzzzzzz	HP 2608A or HP2608S. Only if no MARGIN or MODE settings used.
Record(s)		The actual VFC records. See following examples.

Key:	
nn	= A number between 1 and 16 inclusive. Specifies position of left margin indentation.
x	= 6 or 8 or blank. Specifies print density in lines per inch. Default is 6 lines per inch.
y	= A number between 0 and 127 inclusive. Specifies number of lines (rows) in VFC pattern. If "0" is specified then the printer will reset its internal VFC to the default state. Note: all parameters are separated by commas.
z	= Comments to describe further the VFC file. Useful for documentation purposes.

Several examples are:

- o A standard VFC for 6 lines per inch.

```
          1111111
column  1234567890123456
```

VFC,6,0

- o A standard VFC for 8 lines per inch.

```
          1111111
column  1234567890123456
```

VFC,8,0

- o A standard VFC for 6 lines per inch with the MODE feature set to FEATURE access.

```
          1111111
column  1234567890123456
```

MODE=FEATURE
VFC,6,0

- o A standard VFC for 8 lines per inch with MODE feature set to TRANSPARENT access.

```
          1111111
column  1234567890123456
```

MODE=TRANSPARENT
VFC,8,0

- o A standard VFC for 6 lines per inch, left margin set to 6, and MODE set to FEATURE access.

```
          1111111
column  1234567890123456
```

MODE=FEATURE
MARGIN=6
VFC,6,0

- o The same example as above, with record 1 and 2 reversed.

```
          1111111
column  1234567890123456
```

```
MARGIN=6
MODE=FEATURE
VFC,6,0
```

- o A special VFC for 6 lines per inch setting the margin to 4, the MODE to FEATURE access, Channel 16 is the top of page and there are 66 lines per page.

```
          1111111
column  1234567890123456
```

```
MODE=FEATURE
MARGIN=6
VFC,6,66
```

```
(LINE 1 ) 1111100011111101
          0000000000000100
          0000000000001100
          0000000000010100
          1000000000001100
          0100000000000100
          0010000000011100
          0001000000000100
```

```
:
:
:
```

```
(LINE 66) 0000000000000000
```

The MODE key parameter can only be used with the HP 2608S. If the MODE parameter is :DOWNLOADED to an HP2608A, it will not cause an error condition; but will be ignored.

NOTE

The last key parameter allowed in the file is "VFC". The first record can be a string containing the keywords "MARGIN=," "MODE=," or "VFC." Ordinarily, you would specify 'MODE=' in the first record, then "MARGIN=" in the second record and lastly the "VFC" in the third record with the optional column punch information in following records. The "MARGIN=nn" record consists of a string where "nn" is between 1 and 16 inclusive. The "MODE=" record consists of a string with one of two parameters. The parameters are TRANSPARENT or FEATURE. If no "MODE=" key word is specified, then the HP 2608S (and all future CIPER devices) will use the default as specified by the system Input/Output configured SUBTYPE. The "VFC=" key word record identifies the following records of the file as a VFC image and contains a record of 80 bytes with the string "VFC" in columns 1 through 3. Column 5 contains either a 6, 8 or blank, indicating the number of lines per inch. (The default is 6 lines per inch.) Following the lines per inch is the number of print lines per page. This number must be between 0 and 127 inclusive. If "0" is specified then the printer resets its internal VFC to the default state. All parameters are separated by commas. A blank or a zero in a column indicates a 0 or no-punch; column 1 of the record corresponds to channel 1, column 2 is channel 2, and so on up to channel 16. Each record corresponds to a line position on the page.

See the Console Operators Guide (HP part number 32002-90004), tables 4-1, 4-2, and 4-3, for VFC rows and carriage control directives.

Programmatic Access Via FDEVICECONTROL Intrinsic

The calling user program in either the spooled or non-spooled (ie, a directly allocated or "HOT" device) state may use the HP 2608S with full FEATURE or TRANSPARENT capability for a given print job or part of some print job.

In order for any particular user program to obtain the non-default mode (default as set by I/O SUBTYPE configuration), the FDEVICECONTROL intrinsic should be used. The form of the new function of the intrinsic is:

FDEVICECONTROL

INTRINSIC NUMBER 53

Adds a variety of control directives to a spooled HP 2680 laser printer or an HP 2608S in the spooled or non-spooled state.

```
IV      LA      IV
FDEVICECONTROL (filenum, target, tcount,
IV      LV      LV
               controlcode, param1, param2,
I
               errnum);
```

Prior to this release, FDEVICECONTROL was used only to download character sets, forms and internal or control tables on the HP 2680A Laser Printer. The intrinsic can now be used to change the printer MODE settings for the HP 2608S printer and other CIPER devices. (The 2608S is the only CIPER device available at this time.)

PARAMETERS DESCRIPTION

filenum integer by value (required)

A word identifier supplying the file number. This value is obtained from FOPEN.

target logical array (required)

This array contains data to be passed to the 2680 Laser Printer only. It is not currently used when controlling the HP 2608S printer, yet must be provided to satisfy the intrinsic call.

tcount integer by value (required)

The length of *target* in words or, if the value is negative, in bytes. It is not currently used when controlling the HP 2608S printer, yet must be provided to satisfy the intrinsic call.

controlcode integer by value (required)

The code number of the operation to be performed.

param1, *param2* logical by value (required)

For each value of *controlcode*, there may be several possible values for *param1*, and *param2*, which define the operation in more detail.

errnum *integer (required)*

Errnum is set to zero if no error occurs. If FDEVICECONTROL detects a bounds violation on *errnum* (that is, an address outside the user's stack area), *errnum* is unchanged. Otherwise, *errnum* contains the File System error code.

For a complete discussion of all other FDEVICECONTROL functions, see the MPE Intrinsic Reference Manual (HP part number 30000-90010) pages 2-61A through 2-61I (manual change dated JUL 1981).

The following is the new *controlcode* added for the HP 2608S.

Controlcode = 146 Printer MODE selection

param1 = 0 Set TRANSPARENT mode.

param1 = 1 Set FEATURE access mode.

param2 Not used. Suggest set to zero.

The HP 2608S operates in two mode settings. The TRANSPARENT mode tells CIPER to print all control codes just as if they were ordinary characters. The FEATURE mode instructs the printer to execute control codes and supported escape sequences as commands.

The printer will stay in the mode set until either a new *Controlcode*=146, or the end of the print job. The printer reverts to the default setting as defined by the I/O configured SUBTYPE at the end of the print job.

errnum Zero is returned if no error. Decimal 134 (FSERR 134) is returned if *Controlcode* is out of range or *param1* is not zero or one. CCL is also set.

CONDITION CODES

CCE Request granted.

CCG Not returned by this intrinsic

CCL Request denied because an error occurred.

TEXT DISCUSSION

None.

Spooling and Printer Recovery

The HP 2608S *SPOOLED* CIPER printer is able to automatically recover print jobs in progress. Some System Operator or Associated Operator intervention may be required prior to automatic recovery.

The Automatic Recovery Technique

The CIPER implementation allows the SPOOLER process to automatically recover from unexpected events such as power fail or paper jams. It also will allow the System Operator or Associated Operator to back up or go forward "n" number of physical pages within the currently active print job. (See Operator Commands later in this article)

This technique of recovery is called check-point recovery.

CIPER/3000 keeps track of the actual physical page printed in the device by means of an environmental status block from the device. This status block is programmatically set to be returned by the device at every physical page or some "nth" physical page.

The environmental status block contains information which relates directly to the *SPOOLED* file. For example, it returns the actual physical page just printed, and other information such as the exact place some environment has been loaded into the device.

When some unexpected event occurs such as power fail or paper jam, CIPER informs the calling program with a specific return code for power fail or paper jam. CIPER then reads the environmental status to determine the last *COMPLETE* physical page printed. It next decides if an environment was present in the printer at the time of the event. If an environment was present, a backward search is made of the saved status blocks to determine when the environment was loaded. When found, the printer is instructed to "silent run." The file is re-sent including the environment. Printing resumes on the correct page.

Some examples are:

- o A spooled print job loaded an environment on physical page 22 and is now printing on page 50. Somewhere in the middle of page 50, the device power fails because someone tripped over the power cord. CIPER detects the power fail when the device is powered-on. It reads the status and sees that page 49 is the last good physical page. It searches backward through the saved status blocks and determines an environment was loaded after the start of page 22 but before page 23. It then tells the device to "silent run" for 28 pages and then proceeds to send the actual data (data is sent from the start of page 22). The HP 2608S then resumes printing when the actual data is received for page 50. Note that since page 50 was not fully printed, there was no checkpoint received for that page. Therefore, printing must start at the beginning of the page.

- o If there had been no environment in the previous example, it would be determined that page 50 had been in progress and no environment was necessary to set up the device. It will restart the print job (without silent running) right at the top of page 50. Again, since it doesn't know just where it was printing on page 50, it can only restart at the beginning of the page.
- o Now, suppose that instead of a power fail in the prior examples, the printer had paper jammed. CIPER knows that the environment was not lost on the paper jam, thus printing would resume at the start of page 50. Please note that if the HP 2608S has lost several pages which were reported as good status to CIPER, then those pages would not be recovered since there is no way to tell just how the paper jammed in the printer. In that case, the System Operator or Associated operator can use commands to instruct the SPOOLER to begin printing at some other point.

The Directly Allocated CIPER Device

Due to the sensitive nature of some printed material, it is necessary for some users to *know* exactly what is being printed and, in addition, that such material will not be duplicated in any way. (The spooled device may duplicate some part of a page on check point recovery.)

It is recommended that users who have such sensitive print material use the directly allocated device (non-spooled). This assures that the only way to duplicate any material is to re-run the entire print job from the start (should a power fail or paper jam occur). Accountability of sensitive printed matter can then be controlled directly by the user and the program.

Operator Commands

Certain System Operator or Associated Operator commands have an effect when using the HP 2608S printer. Those commands are ASSOCIATE, DISASSOCIATE, DOWNLOAD, RESUMESPOOL, and SUSPENDSPOOL. The following paragraphs discuss their use.

ASSOCIATE and DISASSOCIATE Commands

Since the HP 2608S printer may be remote via the Multi-Point Terminal Software (MTS), it is suggested that some local terminal be set up to act as the operators terminal for the device.

:ASSOCIATE

Gives a user operator control of a device.



SYNTAX

`:ASSOCIATE devclass`

PARAMETERS

devclass Name of a logical device class configured by SYSDUMP.

OPERATION

This command makes a user the controller (operator) of a device class. As such, the user may execute any valid operator command for a device in the device class and will receive the status messages for the devices in that device class.

The operator commands which are made available to users through the :ASSOCIATE command are:

:ABORTIO	:FOREIGN	:RESUMESPOOL
:ACCEPT	:GIVE	:SHOWCOM
:ALTSPoolFILE	:HEADON	:STARTSPool
:DELETESPoolFILE	:HEADOFF	:STOPSPool
:DOWN	:MPLINE	:SUSPENDSPool
:DOWNLOAD	:REFUSE	:TAKE
:DSCONTROL	:REPLY	:UP

The system manager must specify in a system file, ASOCIATE.PUB.SYS, which users may associate what devices. This file is created and maintained by the system manager through the system utility, ASOCTABL. A user may :ASSOCIATE a device only after the system manager has made the appropriate entries in ASOCIATE.PUB.SYS. Both the console operator and the user may :DISASSOCIATE a user from a device. In addition, a user implicitly disassociates a device when *logging off*.

EXAMPLE

```
:ASSOCIATE LP2608S
```

ADDITIONAL DISCUSSION

Console Operators Guide
HP part number 32002-90004

:DISASSOCIATE

Removes control of a device from the user.

SYNTAX

```
:DISASSOCIATE devclass
```

PARAMETERS

devclass Name of a logical device class configured by SYSDUMP.

OPERATION

This command counteracts a previously issued :ASSOCIATE command in that it removes the control of a device class from a user. The command may be issued by the console operator and by the user. The user implicitly disassociates a device when *logging off*.

EXAMPLE

```
:DISASSOCIATE LP2608S
```

ADDITIONAL DISCUSSION

Console Operators Guide
HP part number 32002-90004

DOWNLOAD command

In order to allow existing programs designed to be used with the HP 2608A printer, the new HP 2608S printer will support the operator :DOWNLOAD command.

It is not recommended that new programs being developed use the :DOWNLOAD command for the HP 2608S. There are some differences between the two printers.

First, the HP 2608A printer does not clear its environment between print jobs while the HP 2608S always clears the environment at the end of every print job. The implication can best be explained by an example. Suppose you have a string of print jobs. The first print job contains a request for a :DOWNLOAded VFC and the other print jobs expect the VFC to be in the printer when they are printed. The HP 2608A will print as expected, but the HP 2608S will clear the environment in the device after the first print job; thus the other print jobs will not print correctly.

If you were to use the :FILE command optional parameter (ENV=), and the HP 2608S is a spooled device, then you could print as many copies of the spoolfile as you

like. The environment is actually in the spoolfile and will be reloaded every time a copy is sent to the device. If some other user should complete a spoolfile while your copies are printing and the priority of the other file is higher, then that spoolfile will print between copies of your file and both files will print correctly.

If you had a string of print jobs and used the :FILE command optional parameter (ENV=), then every print job will print correctly even if other users are using the printer at the same time.

Note that modifying the :FILE command to add the ENV= parameter will not affect the actions of other existing HP printers (except the 2680A). Therefore, spoolfiles using an associated environment file are still compatible with and can be printed on other HP printers, for example, the 2608A, 2617A and 2619A.

Caution: If you use the :FILE command with the optional parameter (ENV=) and a special forms message is also required, then other spoolfiles which print between your string of print jobs may not print correctly. This is due to the special forms which are mounted for the string of print jobs.

:DOWNLOAD

Downloads format information to an HP 2608A or HP 2608S printer.

SYNTAX

```
:DOWNLOAD ldn    {,filename      }  
                {,MARGIN=nn    }
```

PARAMETERS

- ldn* The logical device number of the output device. This device must be the HP 2608A or HP 2608S printer.
- filename* The fully qualified name of a file containing the download control information and data.
- nn* The print position that the first byte of data will assume. This number can be between 1 and 16 inclusive. This parameter is overridden by a MARGIN record in the VFC (environment) file. Default at system start up is MARGIN=1.

NOTES

This command is for control of the HP 2608A and HP 2608S line printers only. The user will, in a forms message, indicate what forms and VFC (Vertical Format

Control) must be used for printing the job. All other printers (except HP 2680A Laser Printer) have a VFC which is a loop of tape inserted in the printer. The HP 2608A and HP 2608S have electronic VFC only.

The VFC image file (environment) can define the VFC to be loaded, margin settings and the number of print lines per form for both the HP 2608A and HP 2608S. In addition, the mode of operation can be specified for the HP 2608S only.

The number of print lines per form is limited to 127. See the environment file creation discussed earlier in this article.

EXAMPLES:

To respond to a forms message, enter:

```
10/12:32/22/FORMS: PLS LOAD VFC FILE VFC=VPAYCHK.PUB.ACCT
10/12:32/22/SP#14/LDEV# FOR #S16;OUTFILE ON 2608 (1)
```

```
:DOWNLOAD 6,VPAYCHK.PUB.ACCT
```

The left margin setting for the HP 2608S must also be set prior to the beginning of each job if the margin is not set to MARGIN=1. This is easily accomplished by using the :FILE command with the optional parameter (ENV=). The HP 2608A margin settings are permanent settings which do not change until a new :DOWNLOAD command is issued.

To set the left margin print position to column 4, as the installation defined default, enter:

```
:DOWNLOAD 6,MARGIN=4
```

The HP 2608S printer requires no action to reset its :DOWNLOADED environment to the original state. To reset the VFC environment in the HP 2608A to its original state, you must reference a file that contains default specifications (such as VFC6 in this example) by entering:

```
:DOWNLOAD 6,VFC6.PUB.SYS
```

RESUMESPOOL and SUSPENDSPOOL commands

The HP 2608S printer recovers automatically from paper jams. However, on occasion, the paper may jam in the printer and go undetected by either the printer or the System or Associated operator. The printer would then continue to print as if all conditions were normal, usually overprinting the same line of data many, many times. When the problem is detected by the operator, it is difficult to determine just where to try to resume the spooled job. Since CIPER/3000 has been receiving good page completion status blocks all along, the only way to

recover the print job is to restart the entire job or to back up some number of physical pages. For this reason, the operator should use the SUSPENDSPOOL command and then the RESUMESPOOL command to set the proper re-start of printing.

:SUSPENDSPOOL

SPOOLER process suspends output to spooled device, but output directed to logical device continues to go to spoolfiles.

SYNTAX

```
:SUSPENDSPOOL ldn [;FINISH]
```

PARAMETERS

ldn The logical device number of a particular device.

FINISH Causes a spooled device to continue to completion of the currently active spoolfile, and then suspend.

NOTES

The SPOOLER process will indicate to the operator that it has suspended with an appropriate console message.

EXAMPLES:

To cause logical device 6 (a line printer) to stop printing, enter:

```
:SUSPENDSPOOL 6
```

To cause logical device 6 (a line printer to print and stop when completed, enter:

```
:SUSPENDSPOOL 6;FINISH
```

NOTES

Obviously, if there had been a paper jam, one would not use the optional parameter FINISH because CIPER would just automatically continue the job (missing all of the overprinted material). After you have entered the command to SUSPENDSPOOL, the device will have to be placed online in order for CIPER to see the actual command (CIPER is itself waiting for the device to go online and cannot act on the SUSPENDSPOOL command until online status is received).

:RESUMESPOOL

Resumes suspended spooler output to a spooled device.

SYNTAX

```
:RESUMESPOOL ldn [ :BACK      { nnn FILES }  
                   :FORWARD   { nnn PAGES }  
                   :BEGINNING ]
```

PARAMETERS

- ldn* The logical device number of a spooled device.
- BACK Instructs the SPOOLER to backspace *nnn* FILES or PAGES and resume printing at that point. (See Notes.)
- FORWARD Instructs the SPOOLER to forwardspace *nnn* FILES or PAGES and resumes printing at that point. (See Notes.)
- BEGINNING Instructs the SPOOLER to resume printing at the beginning of the file which had previously been suspended.
- nnn* The number of FILES or PAGES to which you wish the SPOOLER to backspace or forwardspace when printing resumes.
- FILES A file is defined in a spoolfile wherever an FOPEN occurs. (See Notes.)
- PAGES The literal page (usually 60 lines or skip to channel 1), as output by the spooler to the printer.

NOTES

When attempting to use this command with the HP 2680A Laser Printer and the HP 2608S CIPER/3000 printer, the FILES option is meaningless and can **NOT** be used.

***** WARNING *****

The SPOOLER has been modified so that it will no longer purge spoolfile extents. This change is necessary in order that recovery can be attempted with intelligent devices. For those with limited disc space, spooled disc space management may become an extremely important factor.

If *ldn* is the only parameter used, the printer will resume printing at the beginning of the highest priority spoolfile.

When using the BACK parameter, if you instruct the SPOOLER to go BACK farther than the beginning of the spoolfile, an error message will be printed on the system console, and printing will resume at the beginning of the spoolfile.

When using the FORWARD parameter, if you instruct the spooler to go FORWARD beyond the end of the spoolfile, an error will be printed on the system console, the spoolfile will be deferred and the SPOOLER will be suspended automatically. A RESUMESPOOL command will be necessary to re-start the process.

When using the BACK or FORWARD parameters with FILES or PAGES, the spooler will not accept a *mm* count of zero. A zero count is treated as an error condition. The SPOOLER is not resumed at all. You will have to re-enter the command with FORWARD or BACK optional parameters with one or more PAGES or FILES. Alternatively, you can resume with no optional parameters which causes printing to resume at the beginning of the highest priority spoolfile (not necessarily on the spoolfile which was suspended).

CAUTION: The HP 2680A laser printer and the HP 2608S cannot use the FILES parameter. However, all other printers can use FILES parameter to go BACK or FORWARD in the spoolfile. The use of the FILES parameter is extremely complex and requires the operator to be very familiar with the SPOOK utility program in order to use it. We do **NOT** recommend use of the FILES parameter.

EXAMPLES:

To resume output to logical device 6 at the beginning of the file, enter:

:RESUMESPOOL 6;BEGINNING

To resume output to logical device number 6, and reprint the last eight pages (as in the case of a paper jam), enter:

:RESUMESPOOL 6;BACK 8 PAGES

To resume output to logical device 11 and print the next spoolfile with the highest priority (not necessarily the one which was suspended), enter:

:RESUMESPOOL 11

Error Reporting

Error and Warning Messages

The system catalog messages for CIPER/3000 devices are contained in message set number 28 (file CATALOG.PUB.SYS). The message number, text, and a description of each message is given below. All messages, with the exception of message #1, are generated by the CIPER/3000 logical driver (MPE module SOFTIO). Each message contains the logical device number of the peripheral the message relates to.

Ldev #*nnn* not ready; check cable connections. (CIPER1)

The not ready message is sent to the console by the appropriate data link driver (currently HPIB or MTS) if no response can be solicited from the device. A typical reason could be: interface cable not connected, device powered down, or address switch(es) set incorrectly.

Ldev #*nnn* has been powered up or reset. (CIPER2)

The power up message is reported anytime that the device has indicated, via a status report, that it has been powered up or otherwise reset.

Ldev #*nnn* has been placed off-line. (CIPER3)

The off-line message is displayed as a result of the device being placed off-line, regardless of the cause. If only this message is displayed, then someone probably pressed the on-line/off-line button on the device's front panel. If other error messages accompany the off-line message, the device placed itself off-line due to some error condition.

Ldev #*nnn* has been placed on-line. (CIPER4)

The on-line message is displayed as a result of someone placing the device on-line, via pressing the on-line/off-line switch on the device's front panel.

The only time the device will place itself on-line is if, when powering up, its non-volatile memory indicates that the device was on-line prior to the power fail.

Ldev #*nnn* reports out of paper; please check and correct if necessary. (CIPER5)

This message is displayed whenever the printing device runs out of paper. It should always be accompanied by the off-line message. The operator should then restore paper, align top-of-form, and place the printer on-line.

Ldev #*nnn* reports paper jam; please check and correct if necessary. (CIPER6)

This message is displayed when the printing device detects a paper jam. It should always be accompanied by the off-line message. The operator should correct the paper jam, and in the case of the spooled device, should "RESUMESPOOL" with the "BACK" parameter a sufficient number of pages to recover any pages printed but damaged during the paper jam.

Ldev #*nnn* reports platen open; please check and correct if necessary. (CIPER7)

This message is displayed if someone opens the platen while the printer is on-line. If the printer is actively printing at the time the platen is opened, some data may be lost. To correct the situation, the operator should close the platen and place the printer on-line. If device is spooled, automatic recovery will be performed.

Ldev #*nnn* reports ribbon error; please check and correct if necessary. (CIPER8)

The ribbon error is displayed if, while on-line and printing, the ribbon becomes dislodged from its normal position. In some printers, this could also indicate that the ribbon is exhausted and a new ribbon is required. The operator should correct the situation and place the printer on-line.

Ldev #*nnn* experienced self-test failure. Failure code = *NNN*. (CIPER9)

The self-test failure message is displayed whenever the device reports an unsuccessful self-test execution. In the case of an HP 2608S printer, the internal error code *NNN* is also displayed. This number should match the value displayed

on the HP 2608S front panel LED's. Refer to the HP 2608S Technical Reference Manual for the meaning of the error. After a self-test failure, the device must be reset to resume (or attempt to resume) normal operation.

The next nine messages relate to failures in the communication and control protocols used between the system and device. In each case, the error is one which the device has detected and reported to the system.

Ldev #*nnn* reports protocol error: illegal header length received. (CIPER10)

Ldev #*nnn* reports protocol error: record sequence error in record received. (CIPER11)

Ldev #*nnn* reports protocol error: incorrect creator of record received. (CIPER12)

Ldev #*nnn* reports protocol error: undefined command received. (CIPER13)

Ldev #*nnn* reports protocol error: undefined data type received. (CIPER14)

Ldev #*nnn* reports protocol error: illegal format number in environmental status block. (CIPER15)

Ldev #*nnn* reports protocol error: illegal block label length received. (CIPER17)

Ldev #*nnn* reports protocol error: transport service error. (CIPER18)

Ldev #*nnn* reports protocol error: data overrun from host. (CIPER19)

Ldev #*nnn* reports potential data loss. (CIPER20)

The data loss message is displayed whenever the device thinks some error condition has caused it to lose data. An example would be opening the platen while printing. As the platen is opened, the print hammers are lifted away from the paper, which could result in data not getting printed correctly. However, the

printer has no way of verifying exactly how much of the data is or is not printed correctly. It merely flags the potential loss, so the operator can verify the integrity of the job.

CIPER ldev #mm is being shut down due to an internal data integrity error. Access to device will be denied until a WARMSTART is performed. (CIPER30)

The shutdown message is displayed if the CIPER subsystem ever detects corruption of its internal control and data structures. The shutdown takes place when certain internal check words are incorrect. All subsequent calls to the device via CIPER/3000 are rejected. It is strongly suggested that the system be halted and a Soft Dump be performed. The only recourse to begin using the device is to WARMSTART the system to allow CIPER/3000 to re-initialize its data areas.

System Failures

CIPER/3000 has been assigned the System Failure numbers from 635 through 639. Currently, there is only one failure that could occur within CIPER. These messages will be added to the Console Operators Guide in Appendix C, table C-1. The form of the message is:

Table C-1. System Failure List (CIPER/3000 Internals)

Error	Module and Procure Name	Cause	Action
635	SOFTIO/ CPR'SHUTDOWN	Stack Data integrity loss on the callers stack while attempting to shutdown due to corruption of CIPER internal control or data. Refer to (CIPER30) error.	Perform a Soft Dump
636	Reserved		
637	Reserved		
638	Reserved		
639	Reserved		

Additional CST Entries for HP 3000 Series 64 Systems

by Sam Quezada, Computer Systems Division

A resegmented version of FOS is now available for HP 3000 Series 64 systems only, as an interim solution to the shortage of Code Segment Table (CST) entries within the system. This resegmented version of FOS is standard on all new Series 64 systems and is available for installed Series 64 systems.

All software that executes on HP 3000 systems is divided into segments so that each segment can more easily be brought into memory to be processed. Whenever a segment is active on the system, its location and status are kept in an entry in the CST. There are up to 192 entries that can be used for sharable software segments. MPE, KSAM, IMAGE, system segmented libraries, group segmented libraries and user segmented libraries that are either allocated or referenced by a program that is allocated or executing. By resegmenting, the number of entries that MPE, KSAM and IMAGE take up is reduced by approximately 38 entries. With the resegmented FOS (which makes available to the user additional CST entries), more user and subsystem software can be concurrently executed on the HP 3000 system.

Software support for the resegmented FOS will be the same as that for the standard version of FOS: Customer Support Service and Software Subscription Service. This resegmented version of FOS must be viewed as an interim means of facilitating additional CST entries, available and supported, until a permanent extension of the CST is developed. That permanent extension of the CST for the Series 64 is currently being developed and should be available within a year.

Users with installed Series 64 systems can receive the resegmented version of FOS with a new Master Installation Tape (MIT D.00.20). This resegmented software and its equivalent for the Series 30, 33, 40 and 44 (C.00.20), will be available for all subsequent MIT releases.

New HP Line Printer Offers Remote Mode

Editor's Note: The following article is an excerpt from an earlier press release.

Remote printing capabilities, as well as the addition of several new features, distinguish Hewlett-Packard's newest line printer, the 2608S, from its predecessor, the 2608A.

Although both print at 400 lines per minute, the 2608S offers two selectable print densities, improved forms handling, and is easier to use and service. Furthermore, improved reliability on the 2608S has resulted in an 18% monthly maintenance price reduction over the 2608A.

A major new feature, the optional multipoint interface, enables multiple users at remote sites to use a remote 2608S. Used with an HP 3000 and MTS/3000 software, this feature can be implemented via hardware or modems, and can work with a daisy chain configuration or access HP's factory data link. An Intelligent Network Processor, used for this remote mode, provides the added benefits of offloading the main CPU and ensuring data integrity by using multiple error checking methods for each block of data.

The 2608S offers a new high density print mode which increases dot density up to 40% per character while printing at 350 lpm. A standard 2608S is capable of supporting up to 16 character sets, has raster graphics printing capabilities, and can print double-sized character sets. A large block character set is also available as an option.

Several new features make the 2608S more convenient to use. A print-one-line button simplifies forms alignment. Physical forms lengths are easily selected from the operator panel, and a new, non-volatile memory retains information such as forms settings in the event of a power failure.

Other features include a paper jam detector, a pedestal stand, and an optional passive paper stacker. When used in a supported configuration, all features on the 2608S are accessible.

System Logging Enhancements for 2680A and 2608S Printers

by Guy Randazzo, Computer Systems Division

The MPE System Logging record format for Type 8, Spooler's Spoolfile Done Record, has been enhanced to include the following fields.

- (1) Subtype of printer used.
- (2) Number of physical pages consumed for the spoolfile.
- (3) Number of logical pages per physical page (due to environment files).

Both page counts will only apply to the 2680A Laser Printer (subtype 8), and the 2608S (subtypes 9 and 13). These numbers will be zero for any other printers because an accurate count of the numbers of pages printed cannot be made for other line printers.

The enhancement will enable users owning a 2680A or 2608S to keep an accurate count of pages consumed by individual accounts. If the user is running a timeshare system, then accounts can be billed for the pages consumed accordingly.

Extending the length of the record will not effect user applications currently accessing logfile records. The records are kept in variable length files and some of the records, like the console logging record, is variable itself. The largest current logging record allowed is 99 words. Therefore, extending the spooling record will not affect current applications since they will be reading much more than the extended size on every read.

The Spoolfile Done Record has been extended from 31 to 34 words in length. The added 32nd word contains the number of logical pages in bits 10 through 15. The number of physical pages is kept as a double word in words 33 and 34. Consult MPE IV System Manager/Supervisor Reference Manual, Part. No. 30000-90014 for a more detailed format of the record.

The MPE Utility LISTLOG2 has been modified to correctly read, format and output the new fields.

HP Operating System Enhancements Provide Additional Line Printer Capabilities

Editor's Note: The following article is an excerpt from an earlier press release.

Reduced system overhead, print job accounting, auto-recovery after powerfail, physical link independence and job separation/environment control are features of Hewlett-Packard's newest Operating System.

The new operating system introduces HP's CIPER (Control of Intelligent Peripherals) protocol which allows new generation HP-built line printers to operate with the above mentioned capabilities. The first printer announced with these capabilities is the 2608S line printer.

Using CIPER protocol, lower system overhead is achieved by blocking output to a printer in 1024-byte blocks. Job output accounting is achieved with spooler control to allow page count logging.

If a powerfail occurs, the CIPER protocol allows automatic recovery so no data loss occurs and no operator intervention is required.

Utilizing the operating system enhancements, the 2608S printer can be placed in a specific mode (e.g., graphics mode) without affecting previous or subsequent jobs. In addition, printer control codes can now be placed in the data stream. This allows application programs the ability to access special printer features independent of the type of interface and/or originating system.

These enhancements take a significant step forward in providing a powerful means to communicate with intelligent printers such as the 2608S printer.

Introducing the HP 2611A Line Printer

by Elizabeth Nash, Computer Systems Division

CSY and the Boise Division are pleased to announce the arrival of the HP2611A Line Printer. The 2611A replaces the 2617A, providing enhanced reliability as well as an excellent combination of print quality, forms handling capability, and performance features for commercial computer output applications.

Utilizing a 132-column, horizontal font (chain-type) print technology for high-quality print, the 2611A prints at 600 LPM using the 64-character ASCII set or at 430 LPM using the 96-character ASCII set. Throughput is further enhanced by the 40-inch-per-second paper slew speed.

In addition to the standard Gothic type face, the 2611A may be ordered with a 64- or 96-character Optical Character Recognition (OCR-B) type face. For special applications which require almost constant repetitive printing of a limited character set (e.g., numerals), a special heavy-duty character set option will prolong the chain life and preserve the high print quality.

The 2611A can handle single or multi-part forms (up to 6 parts) of widths from 3.5 inches to 19.5 inches and lengths from 0.5 inches to 18 inches. Two sets of 8 pin tractors engage the paper above and below the print area to control tension and ensure proper feeding. Both pairs of tractors may be simultaneously moved right or left with a single operator switch for proper horizontal registration. A built-in column indicator aids in the adjustment.

Infinite vertical positioning is possible via a paper engage clutch. A print-one-line switch allows one line at a time to be printed to precisely align forms quickly and easily.

Forms thickness adjustment enables the operator to achieve high print quality of a wide variety of forms. Special forms control may be programmed easily using the paper tape 12 channel VFU and operator-selectable 6 or 8 lines per inch control.

Paper jam detection will stop paper motion within two line advances. A paper puller prevents paper from jamming above the second tractor and aids in proper stacking on the paper receptacle shelf.

Built-in sensors detect an impending paper-out condition and allow the present page to complete printing prior to indicating paper-out. The 2611A also has an active ribbon tracking and de-skewing mechanism to prolong ribbon life.

For ease of maintenance, the 2611A has a built-in self-test capability with fault indicator lights. The special long-line interface to HP computers allows the 2611A to be located up to 500 feet from the computer.

Should the alarm light go on, indicating a possible loss of data, the operator can recover simply by setting the spoolfile back several pages.

The 2611A has the same interface with MPE as the HP2619A Line Printer and is thus supported on all current versions of MPE. The configuration data appears below. For Series 30,33,40,44 and 64 the data is the same as the configuration data for the 2619A. For the Series III, the data is the same as for the 2619A with the exception of the driver.

CONFIGURATION DATA FOR THE HP2611A

SERIES III

SERIES 30,33,40,
44, and 64

TYPE:	32	TYPE:	32
SUBTYPE:	2	SUBTYPE:	2
RECORD WIDTH:	66	RECORD WIDTH:	66
OUTPUT DEVICE:	0	OUTPUT DEVICE:	0
JOBS & SESSIONS:	NO	JOBS & SESSIONS:	NO
ACCEPT DATA:	NO	ACCEPT DATA:	NO
INTERACTIVE:	NO	INTERACTIVE:	NO
DUPLICATIVE:	NO	DUPLICATIVE:	NO
INITIALLY SPOOLED:	NO or YES	INITIALLY SPOOLED:	NO or YES
DRIVER NAME:	IOLPRT0	DRIVER NAME:	HIOLPRT2

With its combination of performance, print quality, and reliability features, the new HP2611A Line Printer produces excellent output in a wide variety of applications.

The HP3000 Software MIT Process

by Adrienne Frost and Carol Geiger, Computer Systems Division

How does HP distribute software? What exactly is a MIT? Is it different from an IT? What does the term "Delta MIT" mean? If you have been asking questions like these about HP 3000 software distribution -- you'll find the answers you're looking for here. This article is a general overview of the MIT process, and is designed to help you understand HP's approach to software distribution.

How does a software product get from the Factory to the Field?

Over the last few years, growth of the HP 3000 customer base has caused substantial growth in the HP manufacturing divisions and in the field support operations. As a result, HP business computer operation has divided up into multiple divisions. Each of the divisions has its own lab, product management, and marketing teams.

Releasing a new software product or an enhancement to existing software is an extensive process. Before any code is written, a planning stage occurs. First a document called an External Specification is drawn up. This document contains a description of the product features, a targeted completion date, and an estimate of the resources needed to complete the project. It also contains an assessment of what impact this product will have on other parts of MPE. Sometimes a seemingly simple enhancement will span several project teams and divisions.

Once this document is completed and the lab team is identified, product design and development begins. After development is complete, integration and testing begin. For a product enhancement, testing is done to determine if the enhancement works as specified and that it will not adversely affect the customers' operations. Compatibility is a number one objective. If this is a new product, more stringent testing occurs. When the product has successfully passed a number of quality assurance tests, it is installed at an alpha test site to determine its operation in a real world environment. Alpha test sites are usually internal sites within HP. The objective of the test is to give the product a good shakedown in a production environment. Since the communications loop is very strong between the lab team and the alpha test site, errors and omissions can be corrected and useful enhancements identified.

During the product's testing phase, Support is finalizing documentation and installation procedures. If appropriate, product management prepares a Field Training Manual on the new product. When all this is done, the product is signed off for "MR"--Manufacturing Release--which means it is shippable to customers.

A new product may be distributed on a Product Tape--a separate tape containing only that product, for use with an existing Installation Tape (IT). On

completion of the testing phase, the product tape goes through a manufacturing release and is subsequently sent to the Field Software Coordinator (FSC), where it is integrated into the next MIT--either a system MIT or Delta MIT for customer distribution. Product Tapes and ITs are then shipped from the factory to FSCs.

There are approximately 50 Field Software Coordinators worldwide. The FSC's job is largely one of coordination of the many IT's and product tapes that come from different Business Computer Group divisions. FSC's test out each new IT and product tape, often with local application software used in the area to ensure compatability, and then allow the System Engineer to install the new software at customer sites.

Who gets Involved in distributing ITs?

Briefly, distribution of a piece of software involves the following groups and tasks:

- Software Tracking & Reporting System (STARS) group
 - o Creation of Software Release Bulletin (SRB).
- Software Integration
 - o Creation and duplication of the Installation Tape (IT).
- Software Product Assurance
 - o Audit testing for certification and reliability of the system software.
- Support
 - o Development of FSC kit.
 - o Coordination of transfer of installation tape to Software Distribution.
 - o Creation of Installation Procedures.
 - o Creation of patch accounts to provide the FSC with critical bug fixes that did not get included in the IT.
- Software Distribution Center
 - o Distribution of tape to the Field Software Coordinators, including shipping, consolidation, and Customs Brokerage.
- FSCs
 - o Integration of software into a coordinated IT.
 - o Field testing and media conversion.
 - o Patch integration.
- SE/Customer
 - o Installation of the IT.

What kind of tapes do Field Software Coordinators receive from the factory?

By the time software gets to the Field Software Coordinator, it is in one of the following forms:

a) System IT/MIT

The Installation Tape (IT) contains the latest version of the operating system. The primary objective of the IT is the consolidation of the latest releases of Product Tapes, Product ITs, Delta ITs and enhancements into one Master Installation Tape (MIT). The MIT, by definition, is a combination of an IT and MMT, which contains software products, drivers and tools available on the HP 3000 (except MM/3000 and PM/3000).

b) Application MAT

The Master Application Tape (MAT) contains the latest version of all application software (except Data Communication products), which are marketed and supported by HP. The primary objective of the MAT tape is to introduce the latest application enhancements and consolidation of Product Tapes, Product ITs and past Delta ITs.

c) Product Tape

Product Tapes are designed to release new software products. The software on the Product Tape is designed to work with the current Field-released version of the operating system. The Product Tape will contain all tools and files necessary for installation on the existing system. The Product Tape procedure allows for independent distribution and installation for those customers purchasing the new product.

d) Product IT

This type of software release varies from the Product Tape depending on the extent of changes necessary. In the past, the Product IT has been associated with major new hardware product releases, where many different modules of the operating system, subsystems, or Data Communication products were enhanced to accommodate the new peripheral, system or product. At a later date, the Product IT will be consolidated into the System MIT.

e) Delta MIT

The Delta MIT, earlier named "Fix MIT", is a collection of patches, fixes and revised subsystem modules designed to eliminate current product problems. The Delta MIT is presently scheduled for release every sixty days. The Delta MIT is intended to be the primary vehicle for the distribution of fixes.

What is the "Master Maintenance Tape"?

The Master Maintenance Tape (MMT) contains diagnostic tools for use by SEs as well as the MPE maintenance files for source that has changed since the previous

release. The Field Software Coordinator receives the entire MPE source whenever there is a major change to MPE.

Does the same IT run on all HP 3000s?

No, there are three versions of each IT released. One version is developed for Series 30, 33, 40 and 44 HP-IB systems; the second is a resegmented version of this HP-IB IT for the Series 64, and the third is developed for the Series II and III parallel/differential systems.

Why does it take so long to get a bug fixed?

One of the major reasons for the time delay previously experienced in bug fixing was the method of software distribution via the MIT process. This process prolonged the time period between when a bug is reported and when the solution is distributed to the Field Software Coordinator by way of the next MIT. To address the need for timely response to fix a bug reported by our customer, the Delta MIT process was introduced. Delta MIT is targeted for release every 60 days and contains fixes and patches to resolve reported bugs.

What do the names and numbers of the ITs mean?

Product numbers for the ITs are designated in the following manner:

X.YY.ZZ = (Version.Update.Fix or V.U.F.)

X = Version

This character signifies a major new version of the operating system, e.g., "C" is used for MPE IV based ITs; "B" was used for MPE III based ITs.

YY= Update

These two numbers refer to major updates of the operating system.

ZZ= Fix

These two numbers refer to any set of minor updates or fixes. For example, the D-IT was C.00.02; the Delta-1 IT was C.00.04.

These identifiers are usually locally modified by the FSC to allow tracking of specific coordinated ITs and to allow the Field Support organization to identify software.

The *V.U.F.* modification code currently in use is as follows:

X = Version

Remains as the factory specifies.

YY= Update

The first position is changed to reflect a unique letter

that represents an area. For example, the FSC's in Neely Santa Clara and Sacramento use "P" for their code. The second position remains as the factory specifies.

ZZ= Fix

The first position is modified to reflect the level of patches in the software. For example, "A" would reflect a certain number of patches, "B" would reflect that the patch level was updated. The patch level indicators are not consistent world-wide, therefore, each area keeps track of what patches are contained in what level, locally. The second position remains as the factory specifies. This definition is valid up to, but not including, VUF C.00.10.

If you have any questions on the V.U.F. of an IT, contact your local FSC.

Another IT identification method is sometimes used when communicating with customer publications, such as the Communicator. This method consists of a four digit identification number. The first two digits refer to the number of years after 1960, and the second two digits refer to the week in the particular year in which the tape was planned to be released. For example, IT #2131, the D-IT, was originally slated for release in 1981 (21 years after 1960) and in the 31st week of the year.

How is a new IT installed?

With each IT sent to the Field Software Coordinator there is a copy of the Installation Procedure. The SE uses the Installation Tape and procedure in the FSC office or at the customer site to create a version of software that contains only the FOS (Fundamental Operating System) and subsystems paid for by the customer. This is called a customized IT or CIT. Then either the account SE/CE or Customer will install the customized IT.

Series II/III Software Update

MULTIPROGRAMMING EXECUTIVE OPERATING SYSTEM SERIES II/III

CONTENTS OF INSTALLATION TAPE DATE CODE '2226'

PRODUCTS WITH ASTERISKS ARE THE PRODUCT(S) UPDATED/CHANGED
 BY THIS M.I.T..

PRODUCT NAME	PRODUCT NUMBER	LEVEL	DATE CODE
*MPE	32033C	00	2226
*SEGMENTER	32050A	01	2220
SPL	32100A	08	2052
*BASIC	32101B	00	2220
*FORTRAN	32102B	01	2220
*BASIC COMPILER	32103B	00	2220
*RPG	32104A	05	2220
*APL/3000	32105A	01	2220
*HPWORD	32120A	00	2220
*PASCAL/3000	32106A	00	2220
BUILDINT	32150A	03	1623
*SAMPLER/3000	32180A	01	2220
*DS/3000	32190A	03	2220
MRJE	32192A	01	2202
MTS	32193A	03	2146
DISCCOPY	32199A	00	2052
*EDITOR	32201A	07	2220
*SCIENTIFIC LIBRARY	32205B	00	2220
DEL/3000	32206A	01	2011
KSAM/3000	32208A	03	2202
*V/3000	32209B	02	2220
*COMPILER LIBRARY	32211D	01	2220
*FCOPY	32212A	03	2220
*COBOL	32213C	02	2220
SORT/MERGE	32214C	02	2202
*IMAGE	32215B	03	2220
*QUERY	32216B	00	2220
*TRACE	32222A	03	2222
*IMF	32229A	01	2220
*DIAGNOSTICS	32231A	22	2220
*COBOL LIBRARY	32232A	00	2220
*COBOLII	32233A	00	2220
*OPT/3000	32238A	00	2226
DATA CAPTURE PROCEDURES	32243A	01	2028
*DICTIONARY/3000	32244A	00	2220
*TRANSACT/3000	32247A	00	2220
DSG/3000	32250A	00	2146
DIAGNOSTICS	32340A	21	2131
HPSLATE	32576A	00	2146

PRODUCT NAME	PRODUCT NUMBER	LEVEL	DATE CODE
TDP/3000	36578A	01	2131
IFS/3000	36580A	00	2131
IDS/3000	36581A	00	2131
PROG CONTROLLER 30300B/30361B-BCS	30361B	00	1621
PROG CONTROLLER 30301B/30361B-1-RTE	30361B	00	1701
RJE 2780/3780	30130E	01	2052

MPE 32002C.00.10: MPEIV CHANGE HISTORY

MODULES MODIFIED FOR VERSION C.00.00.XX

.00	.00 (cont.)	.01	.02
INITIAL	RINS	ININ	INITIAL
SYSDUMP	DEBUG	HIOTERMO	SYSDUMP
SEGPROC	FIRMSWAREIM	PFAIL	UCOP
SEG DVR	SPOOLING	HARDRES	DEVREC
LOAD	SPOOLCOMS	MORGUE	PROGEN
UCOP	PVSYS	SPOOLING	ININ
DEVREC	UDC	OPCOMMND	MEMLOGP
PROGEN	USER	LOGSEGO	IOPLOTO
ININ	HELPUSE	LOGSEG1	IOTAPE0
LOG	OPCOMMND	KERNELC	HIOPRTO
IOPTNO	SDISC	KERNELD	SDFLOAD
HIOTERMO	MEASIO	FILEIO	HIOTAPE0
IOMDISC1	LOGSEGO	INCLHARD	HIOMDSC1
PFAIL	LOGSEG1	CATALOG	HIOFLOP0
PVPROC	KERNELC		HIOTAPE1
VINIT	KERNELD		FILEACC
HIOTAPE0	MISCSEGC		COMM'INT
HIOLPRT0	MEASSEG		STORE/RESTORE
HIOMDSC1	FILEIO		ALLOCATE
HIOLPRT1	INCLPCB		HARDS
HIOFLOP0	INCLMEAS		NRIO
MAKECAT	INCLICS		MORGUE
FILEACC	INCLHARD		JOBTABLE
COMM'INT	CATALOG		SPOOLING
STORE/RESTORE	CICAT		SPOOLCOMS
ALLOCATE			OPCOMMND
HARDRES			LABSEG
ABORTDUMP			KERNELC
MESSAGE			MEASSEG
PROCSEG			FILEIO
NRIO			INCLHARD
PCREATE			CATALOG
MORGUE			CICAT
BIPC			
IPC			
CHECKER			
UTILITY			
SEGUTIL			
LOADER1			



MODULES MODIFIED FOR VERSION C.00.00.XX

.03	.04	.05	.06
UCOP	INITIAL	SEGPROC	INITIAL
DEVREC	SYSDUMP	SEGDVR	SYSDUMP
PROGEN	SEGPROC	HIOTEMO	DEVREC
ININ	SEGDVR	HARDRES	PROGEN
PFAIL	DEVREC	NRIO	ININ
FILEACC	PROGEN	CATALOG	PFAIL
ALLOCATE	ININ	CICAT	PVPROC
HARDRES	IOFDISCO		VINIT
ABORTDUMP	IOTERMO		SDFLOAD
MESSAGE	HIOTEMO		HIODMSC1
NRIO	IOMDISC1		HIOTAPO
PCREATE	HIOTAPE1		HIODSC2
MORGUE	COMM'INT		FILEACC
BIPC	STORE/RESTORE		COMM'INT
LOADER1	HARDRES		STORE/RESTORE
DEBUG	ABORTDUMP		ALLOCATE
NURSERY	MESSAGE		DFS
USER	NRIO		HARDRES
HELPUSE	UTILITY		MMDISK
OPCOMMND	SEGUTIL		ATPINIT
LOGSEGO	LOADER1		NRIO
LOGSEG1	NURSERY		LPMON
KERNELC	KERNELC		TERMON
FILEIO	KERNELD		UTILITY
CATALOG	MEASSEG		SPOOLCOMS
CICAT	INCLPCB		PVSY
	INCLHARD		OPCOMMAND
	INCLMSG		LABSEG
	CATALOG		SDISC
	CICAT		PDMANAGR
			LOGSEGO
			LOGSEG1
			KERNELD
			ATPDRIVR
			FILEIO
			INCLHARD
			INCLMSG
			INCLFREE
			INCLDFS1
			INCLDFS2
			INCDISC1
			SADTLRL
			CATALOG
			WCS

MODULES MODIFIED FOR VERSION C.00.00.XX

.07	.08	.10	.20
GUS	INITIAL	CATALOG	INCLMIFT
SYSDUMP	SYSDUMP	OPCOMMND	INCLVMC
	HIOTAPE0	MORGUE	LOADER
	ALLOCATE	COMM'INT	SEGDVR
	HARDRES	SPOOLCOM	FREE2
	CATALOG	ALLOCATE	DISKED2
	INCLHARD	SPOOLING	LISTDIR2
	INCLFREE	PROGEN	VINIT
	PVPROC	ININ	KERNELC
	VINIT	NRIO	KERNELD
	HIOTERM0	INCLHARD	INCLHARD
	CI	FILEACC	CATALOG
	HIOMDISC1	SADTLRL	HIOTAPE1
	UDC	INCLVUF	RESTORE
	SDISC	LISTEQ2	INITIAL
	LOGSEGO	SADUFIL	FILEACC
	FILEIO	DPAN4	HARDRES
	HIOMDSC2	KERNELD	MEASSEG
	ATPINIT	SPOOK	MEMTIMER
	LPMON	RECOVER2	MAKECAT
	TERMMON	PROCSEG	MESSAGE
	PDMANAGR	PVPROC	HIOLRPT2
	ATPDRIVR	FILEIO	HIOCIPRO
	HIOTERM1	LOGSEGO	SPOOLING
	HIOASLPO	LOGSEG1	FILEIO
	SDFLOAD	SEGPROC	SYSDUMP
	RESTORE	KERNELC	RECOVER2
	DPAN4	RESTORE	SPOOK
	FREE2	SYSDUMP	SEGPROC
	(NEW SOURCE	VINIT	HIOCIPRO
	ON MMT)	IPC	INCLDT
	HIOTAPE1	HIOLPRT2	INCLDLDTX
	KERNELC	SEGDVR	INCLXDD
	WCS	MEASSEG	INCLGBL
		HARDRES	INCLVDEV
		IOMDISC1	NRIO
		MEASIO	ALLOCATE
		INCLMIFT	DISKED2
		INCLMEAS	SADUFIL
		ASOCTABL	LISTLOG2
		DISKED2	LISTEQ2

MODULES MODIFIED FOR VERSION C.00.00.XX

.10 (cont.)

FREE2
IOCDPNO
LISTDIR2
LISTLOG2
PATCH
MEMLOGAN
MEMTIMER
SLPATCH
SPOOK
GUS
WCS

.20 (cont.)

LISTDIR2
GUS
OPCOMMND
DFS
SPOOLCOMS
SPOOLING
SOFTIO
HIOMDSC2
SDFGEN
SDFLOAD
DEBUG
MEASIO
CHECKER
FIRMWARE
SLPATCH

SYSTEM	LAST CHANGE NUMBER
B.00.00	0066
B.00.01	0134
B.00.02	0472
B.01.00	0789
B.01.01	1261
B.01.02	793-797,1283-1299,1400-1499
C.00.00	2056
C.00.01	2097
C.00.02	2730
C.00.03	2380
C.00.04	2873
C.00.05	4016
C.00.06	3689
C.00.08	3766
C.00.07	3727
C.00.10	4290
C.00.20	4441

NOTE: Each change made to MPE is now identified by a unique change number in columns 64/72 (eg <<00120>>). This matrix provides the range of the change numbers used to build each version of MPE.

HP-IB Software Update

MULTIPROGRAMMING EXECUTIVE OPERATING SYSTEM

SERIES 30/33/40/44/64

CONTENTS OF INSTALLATION TAPE DATE CODE '2226'

PRODUCTS WITH ASTERISKS ARE THE PRODUCT(S) UPDATED/CHANGED
BY THIS M.I.T..

PRODUCT NAME	PRODUCT NUMBER	LEVEL	DATE CODE
*MPE	32033C	00.20	2226
*SEGMENTER	32050A	01.07	2220
SPL	32100A	08.01	2052
*BASIC	32101B	00.18	2220
*FORTRAN	32102B	01.08	2220
*BASIC COMPILER	32103B	00.18	2220
*RPG	32104A	05.05	2220
*PASCAL/3000	32106A	00.03	2220
*HPWORD	32120A	00.01	2220
BUILDINT	32150A	03.01	1623
*SAMPLER/3000	32180A	01.00	2220
*DS/3000	32190A	03.04	2220
MRJE	32192A	01.D3	2202
MTS	32193A	03.07	2146
*ATP	32196C	00.01	2226
DISCCOPY	32199A	00.01	2052
*EDITOR	32201A	07.12	2220
*SCIENTIFIC LIBRARY	32205B	00.05	2220
DEL/3000	32206A	01.10	2011
KSAM/3000	32208A	03.04	2202
*V/3000	32209B	02.05	2220
*COMPILER LIBRARY	32211D	01.04	2220
*FCOPY	32212A	03.16	2220
*COBOL	32213C	02.10	2220
SORT/MERGE	32214C	02.07	2202
*IMAGE	32215B	03.05	2226
*QUERY	32216A	04.03	2220
*TRACE	32222A	03.04	2220
*IMF	32229A	01.03	2220
*DIAGNOSTICS	32231A	2207	2226
*COBOL LIBRARY	32232A	00.07	2220
*COBOLII	32233A	00.07	2220
*OPT/3000	32238A	00.05	2226
DATA CAPTURE PROCEDURES	32243A	01.00	2028
*DICTIONARY/3000	32244A	00.00	2220
*TRANSACT/3000	32150A	00.00	2220
DSG/3000	32250A	00.02	2146
DIAGNOSTICS	32340A	2132	2131
*DIAGNOSTICS	32342A	0000	2220

PRODUCT NAME	PRODUCT NUMBER	LEVEL	DATE CODE
HPSLATE	32576A	00.00	2146
*TDP/3000	36578A	02.02	2220
IFS/3000	36580A	00.01	2131
IDS/3000	36581A	00.01	2131
PROG CONTROLLER 30300B/30361B-BCS	30361B	00.00	1621
PROG CONTROLLER 30301B/30361B-1-RTE	30361B	00.02	1701
RJE 2780/3780	30130E	01.00	2052

MPE 32002C/D.00.20: MPEIV CHANGE HISTORY

 MODULES MODIFIED FOR VERSION C/D.00.00.XX

.00	.00 (cont.)	.01	.02
INITIAL	IPC	ININ	INITIAL
SYSDUMP	CHECKER	HIOTERMO	SYSDUMP
SEGPROC	UTILITY	PFAIL	UCOP
SEG DVR	SEGUTIL	HARDRES	DEVREC
LOAD	LOADER1	MORGUE	PROGEN
UCOP	RINS	SPOOLING	ININ
DEVREC	DEBUG	OPCOMMND	MEMLOGP
PROGEN	FIRMWARESIM	LOGSEGO	IOPLOT0
ININ	SPOOLING	LOGSEG1	IOTAPE0
LOG	SPOOLCOMS	KERNELC	HIOPRTO
IOPTPNO	PVSYS	KERNELD	SDFLOAD
IOTERMO	UDC	FILEIO	HIOTAPE0
HIOTERMO	USER	INCLHARD	HIOMDSC1
IOMDISC1	HELPUSER	CATALOG	HIOFLOP0
PFAIL	OPCOMMND		HIOTAPE1
PVPROC	SDISC		FILEACC
VINIT	MEASIO		COMM'INT
HIOTAPE0	LOGSEGO		STORE/RESTORE
HIOLPRT0	LOGSEG1		ALLOCATE
HIOMDSC1	KERNELC		HARDRES
HIOLPRT1	KERNELD		NRIO
HIOFLOP0	MISCSEGC		MORGUE
MAKECAT	MEASSEG		JOBTABLE
FILEACC	FILEIO		SPOOLING
COMM'INT	INCLPCB		SPOOLCOMS
STORE/RESTORE	INCLMEAS		OPCOMMND
ALLOCATE	INCLICS		LABSEG
HARDRES	INCLHARD		KERNELC
ABORTDUMP	CATALOG		MEASSEG
MESSAGE	CICAT		FILEIO
PROCSEG			INCLHARD
NRIO			CATALOG
PCREATE			CICAT
MORGUE			
BIPC			

MODULES MODIFIED FOR VERSION C/D.00.00.XX

.03	.04	.05	.06
UCOP	INITIAL	SEGPROC	INITIAL
DEVREC	SYSDUMP	SEG DVR	SYSDUMP
PROGEN	SEGPROC	HIOTEMO	DEVREC
ININ	SEG DVR	HARDRES	PROGEN
PFAIL	DEVREC	NRIO	ININ
FILEACC	PROGEN	CATALOG	PFAIL
ALLOCATE	ININ	CICAT	PVPROC
HARDRES	IOFDISCO		VINIT
ABORTDUMP	IOTERMO		SDFLOAD
MESSAGE	HIOTEMO		HIOMDSC1
NRIO	IOMDISC1		HIOCTAPO
PCREATE	HIOTAPE1		HIOMDSC2
MORGUE	COMM'INT		FILEACC
BIPC	STORE/RESTORE		COMM'INT
LOADER1	HARDRES		STORE/RESTORE
DEBUG	ABORTDUMP		ALLOCATE
NURSERY	MESSAGE		DFS
USER	NRIO		HARDRES
HELPUSE	UTILITY		MMDISKR
OPCOMMND	SEGUTIL		ATPINIT
LOGSEGO	LOADER1		NRIO
LOGSEG1	NURSERY		LPMON
KERNELC	KERNELC		TERMON
FILEIO	KERNELD		UTILITY
CATALOG	MEASSEG		SPOOLCOMS
CICAT	INCLPCB		PVSY
	INCLHARD		OPCOMMND
	INCLMSG		LABSEG
	CATALOG		SDISC
	CICAT		PDMANAGR
			LOGSEGO
			LOGSEG1
			KERNELD
			ATPDRIVR
			FILEIO
			INCLHARD
			INCLMSG
			INCLFREE
			INCLDFS1
			INCLDFS2
			INCDISC1
			INCDISC2
			SADTLRL
			CATALOG
			WCS

MODULES MODIFIED FOR VERSION C/D.00.00.XX

.07	.08	.10	.10 (cont.)
GUS	INITIAL	CATALOG	IOMDISC1
SYSDUMP	SYSDUMP	OPCOMMND	MEASIO
	FREE2	MORGUE	INCLMIFT
	(NEW SOURCE	COMM'INT	ASOCTABL
	ON MMT)	SPOOLCOM	INCLMEAS
	HIOCTAP0	ALLOCATE	DISKED2
	ALLOCATE	SPOOLING	FREE2
	HARDRES	PROGEN	IOCDPNO
	CATALOG	ININ	LISTDIR2
	INCLHARD	NRIO	LISTLOG2
	D326	INCLHARD	PATCH
	INCLFREE	FILEACC	MEMLOGAN
	PVPROC	SADTLRL	MEMTIMER
	VINIT	INCLVUF	SLPATCH
	HIOTERM0	LISTEQ2	SPOOK
	CI	SADUTIL	GUS
	HIOMDSC1	DPAN4	WCS
	UDC	KERNELD	
	SDISC	SPOOK	
	LOGSEG0	RECOVER2	
	FILEIO	PROCSEG	
	HIOMDSC2	PVPROC	
	SDFLOAD	FILEIO	
	RESTORE	LOGSEG0	
	DPAN4	LOGSEG1	
	HIOTAPE1	SEGPROC	
	KERNELC	KERNELC	
	WCS	RESTORE	
	ATPINIT	SYSDUMP	
	HIOTERM1	VINIT	
	HIOASLP0	IPC	
	LPMON	HIOLPRT2	
	TERMON	SEG DVR	
	ATPDRIVR	MEASSEG	
	PDMANAGR	HARDRES	
	GUS		
	SYSDUMP		

MODULES MODIFIED FOR VERSION C/D.00.00.XX

.20

INCLMIFT
INCLVMC
LOADER
SEG DVR
FREE2
DISKED2
LISTDIR2
VINIT
KERNELC
KERNELD
INCLHARD
CATALOG
HIOTAPE1
RESTORE
INITIAL
FILEACC
HARDRES
MEASSEG
MENTIMER
MAKECAT
MESSAGE
HIOLRPT2
HIOCIPRO
SPOOLING
FILEIO
SYSDUMP
RECOVER2
SPOOK
SEGPROC
HIOCIPRO
INCLDT
INCLDLDTX
INCLXDD
INCLGBL
INCLVDEV
NRIO
ALLOCATE
DISKEDT2
SADUTIL
LISTLOG2
LISTEQ2
LISTDIR2
GUS
OPCOMMND
DFS
SPOOLCOMS
SPOOLING
SOFTIO
HIOMDSC2

.20 (cont.)

SDFGEN
SDFLOAD
DEBUG
MEASIO
CHECKER
FIRMWARE
SLPATCH

SYSTEM	LAST CHANGE NUMBER
B.00.00	0066
B.00.01	0134
B.00.02	0472
B.01.00	0789
B.01.01	1261
B.01.02	793-797,1283-1299,1400-1499
C.00.00	2056
C.00.01	2097
C.00.02	2730
C.00.03	2380
C.00.04	2873
C.00.05	4016
C.00.06	3689
C.00.08	3766
C.00.07	3727
C.00.10	4290
C/D.00.20	4441

NOTE: Each change made to MPE is now identified by a unique change number in columns 64/72 (eg <<00120>>). This matrix provides the range of the change numbers used to build each version of MPE.

Expanded Peripheral Support on the Series 30, 33 and III

by Kathryn Hoshor, Computer Systems Division

Good news! Testing is complete and CSY is happy to announce that we are supporting the new 7911/12 and 7933H peripherals on the Series 30, 33, and III systems.

Series 30/33 and 30R/33R

The 7911/12P discs, the Integrated Cartridge Tape drive, and the 7933H disc drives are now supported on the Series 30, Series 33, Series 30R and Series 33R. Specifically, one (1) Integrated Cartridge Tape is supported on a dedicated GIC. In addition, a maximum of three (3) 7911P, 7912P or 7933H disc drives are supported in any combination. Only one of the 7911/12P drives may be ordered with the cartridge tape and option 001 is required for the second controller. When additional drives are purchased, option 140 must be specified to delete the tape.

DOES THIS MEAN YOU CAN REPLACE YOUR EXISTING DISC WITH ONE OF THESE NEW DISC DRIVES AND TAKE ADVANTAGE OF THE INTEGRATED CARTRIDGE TAPE FOR SYSTEM BACKUP?

NO! Please keep in mind that a cold load **CANNOT** be performed from the Integrated Cartridge Tape, the 7911/12P, or the 7933H disc drives on the Series 30/33 and 30R/33R. "Cold load" is defined as the following system operations: Warmstart, Coolstart, Update, Coldstart and/or Reload. This means that you may add these devices to your existing configuration, but you must keep your present tape drive** for MPE backups and partial backups of programs and user data, and you must keep your 7906M, 7920M, or 7925M disc drive as the primary system disc (LDEV 1).

In summary, the Integrated Cartridge Tape drive can be used for personal I/O (storing of complete files, programs, or user data) or for transporting software to other systems. The 7911/12 disc drives can be used as add-on discs within the "system domain". These drives, however, cannot be used for private volumes or as serial discs. The 7933H can be used as a "system domain" disc or as a private volume; it can also be used as a serial disc, although this may not be practical since the media is nonremovable.

** If you currently own a Series 30/33 or 30R/33R and you do not have a 1600 bpi magnetic tape drive or dedicated serial disc for system backup and wish to add a 7911/12 or 7933H disc drive to your present system, you must purchase either a 7970E, 7971A or 7976A tape drive or provide a 7906/20/25 as a dedicated serial disc.

HOW WILL THESE NEW DEVICES BE CONFIGURED ON MY SYSTEM?

The Series 30/33 and 30R/33R each support a maximum total of 8 disc drives. These discs must be attached to the same GIC and may be configured in any combination as long as the following rules are adhered to:

Device	Maximum Allowed
7906M, 7920M, 7925M	1
7906S, 7920S, 7925S	7
*7911P, 7912P, 7933H	3
TOTAL DISC DRIVES	8

*Maximum of one Integrated Cartridge Tape per system

No more than eight (8) devices (this does not include 7906/20/25 slaves) may be connected to the system disc GIC. It may be necessary, therefore, to purchase an additional GIC or to make certain tradeoffs on the Series 30, 33, 30R, and 33R where the Configuration Guide indicates that discs may share a GIC with other devices (such as INP's, Line Printers, and Flexible Discs). In addition, the 2608A Line Printer **CANNOT** be connected to the system disc GIC.

Finally, as mentioned above, the Integrated Cartridge Tape drive will require a dedicated GIC, regardless of how it will be used.

Series III and IIIR

The Series III and Series IIIR will support a maximum of four (4) add-on 7933H disc drives. Therefore the Series III/IIIR will now support a maximum of twelve (12) disc drives; one (1) 7920/25M disc, seven (7) 7920/25S discs, and four (4) 7933H discs. The 7933H drives will be fully supported as system domain discs or private volumes with the one exception that, like the Series 30/33, the 7933H **CANNOT** operate as the primary system disc (LDEV 1) on the Series III/IIIR. Therefore, it cannot be purchased to operate as the only disc on the system.

These 7933H drives must be configured through the HP-IB Interface Module. This interface, product number 30341A, or sometimes referred to as STARFISH, will support a maximum of eight (8) electrical device loads. The following table shows the only peripheral devices which are supported on the HP-IB Interface Module on the Series III/IIIR. The three devices shown may be configured in any combination provided the maximum device and HP-IB load specifications are not exceeded.

Device	Maximum Allowed of Each Device	HP-IB Electrical Device Loads
2680A	2	3 per device
7933H	4	1 " "
7976A	1	2 " "

Note: Maximum Devices = 5
Maximum "loads" = 8

The above information should be used to supplement the specifications and configuration rules in the HP 3000 Upgrades Configuration Guide and the Re-Marketed Systems Configuration Guide. You may want to clip this article and keep it with your configuration guides for later reference.

New PREP Command Parameters

by Jan Helmbolt, Computer Systems Division

The SEGMENTER has been changed in order to support the new HPTOOLSET subsystem. It now has the capability to generate Symbolic Item (SI) records and internal PMAP information records and copy them into program files. In order to support these changes, two new parameters have been added to the PREP command. These are:

NOSYM
FPMAP

The HPTOOLSET subsystem allows users to interactively debug programs without knowledge of specific memory locations and addresses. This is done via the HPTOOLSET Symbolic Debug option. Using \$CONTROL SYMDEBUG in the source file, you may specify when doing COBOLII compiles whether or not you want to use the symbolic debug option. (Default is symbolic debug OFF.) If you choose to use the symbolic debug option, SI header information will be placed in the USL file created by the compile. When the USL is PREP'd you may use these new PREP parameters to specify whether or not you want SI header information, and whether or not you want PMAP information in the program file. Both SI and PMAP information must be included in the program file to perform symbolic debugging. These new parameters work in the following way to control the SI header and PMAP information:

- 1) Neither NOSYM nor FPMAP are specified in the PREP command:
 - a. If SI headers were found in the USL file, then SI and PMAP information will be included in the program file after a successful PREP.
 - b. If no SI headers were found in the USL file (the user did not specify symbolic debug at compile time), no SI or PMAP information will be in the program file.
- 2) FPMAP option specified:

Example: PREP usl,progname;FPMAP

PMAP information will always be in the program file.

 - a. If SI header information is found in the USL, it will be included in the program file.
 - b. If no SI header information is found in the USL, it will not be included in the program file.
- 3) NOSYM option specified:

Example: PREP usl,progrname;NOSYM

No SI or PMAP information will be included in the program file regardless of what was specified at compile time. In other words, this option suppresses the SI and PMAP generation and can save file space. Note that if you specify this option, you will not be able to do symbolic debugging of the program file.

4) NOSYM and FPMAP specified:

Example: PREP usl,progrname;NOSYM;FPMAP

This option will cause the program file to have no SI information and always have PMAP information.

The default is that the program file is prepared to have both SI header and PMAP information if the Symbolic Debug option is specified when compiling. If you use the compile default of no Symbolic Debug and do not specify FPMAP when preparing the USL, no SI header or PMAP information will be placed in the program file.

The NOSYM and FPMAP parameters also apply to the SEGMENTER -PREP command in the same manner as the MPE PREP command.

New Process Information Intrinsic Now Available

by Larry Zeitman, Computer Systems Division

PROCINFO is a new MPE intrinsic which enables a standard user to access process-related information. This information was available previously only to privileged mode users. This intrinsic is patterned after the FFILEINFO and CREATEPROCESS intrinsics.

PROCINFO is supported on any hardware executing MPE IV. It is callable from any language and you will be able to find use for it in writing debug software, security checks, performance and measurement tools and interprocess communication software.

```
          I      I      IV      I      BA
PROCINFO (error1, error2, pin [, itemnum1, item1]
          [, itemnum2, item2]
          [, itemnum3, item3]
          [, itemnum4, item4]
          [, itemnum5, item5]
          [, itemnum6, item6]);
```

error1 *integer (required)*

An integer indicating the success or failure of the intrinsic call as described in table 1.

error2 *integer (required)*

An integer which supplies additional information concerning an error reported in *error1*. It is also defined in table 1.

pin *integer by value (required)*

An integer specifying the process identification number for which information is to be returned. A *pin* value of zero will return information about the calling process. Note that it is not compatible with GETPROCINFO.

itemnum *integer (optional)*

An integer containing the item number of an information option as defined in table 2. The user may request up to 6 options to be returned.

item *byte array (optional)*

Arrays (in the same order as the *itemnums*) of returned information as specified in table 2. The data type of the item depends on the item itself.

Condition codes returned:

CCE Successful - error codes set zero
CCG Not used
CCL Unsuccessful - error codes set accordingly

The parameters *error1*, *error2*, and *pin* are required. The *itemnum* and *item* parameters are optional. The actual number included depends upon the information desired. The *itemnums* and the *items* are paired such that the *n*th *itemnum* corresponds to the *n*th *item*. An *itemnum* contains the option number of the desired information. The information is returned in the corresponding *item* or is stored using the *item* element as a byte pointer, depending on the information desired.

Table 1: Error Codes Returned from PROCINFO

<i>error1</i> #	Meaning	<i>error2</i>
0	successful execution - no error	not used
1	insufficient capability to return request information	index of offending <i>itemnum</i>
3	required parameter address (other than <i>error1</i>) out of bounds	not used
4	address bounds violation while processing an option	index of offending <i>itemnum</i>
5	invalid <i>itemnumber</i>	index of offending <i>itemnum</i>
6	invalid <i>pin</i> number no information returned	not used
7	unassigned <i>pin</i> number	not used
8	unpaired <i>itemnum/item</i> parameters	index of offending <i>itemnum/item</i> pair

The process will abort if the *error1* parameter address is illegal or if the intrinsic is called in split stack mode.

If an error condition is detected while processing an information request, the index of the *itemnum* where the offending option was located is stored in *error2*.

Table 2: Information Options for PROCINFO

item #	information returned	item
0	signals end of item list	ignored
1	process identification number of calling process	integer where PIN will be returned
2	process identification number of the father of the specified process	integer where PIN will be returned
3	number of sons of the specified process (direct descendants)	integer where the number of sons will be returned
4	number of descendants (both indirect and direct) of the specified process	integer where the number of descendants will be returned
5	number of generations (number of levels in the process tree substructure) the specified process has including itself	integer where number of generations will be returned
6	process identification numbers of all sons (direct descendants)	integer array where son pins will be returned (see note 1)
7	process identification numbers of all descendants (both direct and indirect)	integer array where descendant pins will be returned (see note 1)
8	priority number in the master queue of the specified process	integer where the priority will be returned (same as word 1 of the GETPROCINFO intrinsic)
9	state and activation information of the specified process	logical where the information will be returned (same as word 2 of the GETPROCINFO intrinsic)
10	program name the specified process is currently executing	byte array where the fully qualified program name will be stored (see note 2)

Note 1: Some options return a variable number of PINs. In these cases "item" should be set by the calling process to an integer array where the PINs will be returned. The first word of the array should be set by the calling process to indicate the array size in words. PINs will be stored into the array, one pin per word, starting with the second word and continuing until the array is filled or all pins have been returned. If the array is not filled, the remaining unused locations will be zeroed. If the specified array size is not large enough, a condition code of CCL will be returned.

Note 2: The byte array for the program name must be a minimum of 28 bytes long. The name will be returned in the form of "f.g.a" where "f" will be the local file name, "g" will be the group name, and "a" will be the account name of the file containing the program that the specified process is currently executing. The name will be returned left-justified with the unused locations filled with blanks.

The following example will help illustrate the use of the PROCINFO intrinsic:

```
BEGIN <<procinfo example>>

EQUATE MAXSONS = 20,
      MAXDEPS = 30;

INTEGER ERROR1, ERROR2, PIN;

BYTE ARRAY PROGNAME (0:27);

INTEGER ITEMNUM1, ITEMNUM2, ITEMNUM3,
      ITEMNUM4, ITEMNUM5;
INTEGER PINNUM, NUMSONS, NUMDEPS;

BYTE ARRAY ITEMVAL1(*) = PINNUM,
      ITEMVAL2(*) = NUMSONS,
      ITEMVAL3(*) = NUMDEPS,
      ITEMVAL4(0:15),
      ITEMVAL5(0:15);
INTEGER ARRAY SONPINS (0:MAXSONS);
INTEGER ARRAY DEPPINS (0:MAXDEPS);
BYTE ARRAY BSONPINS(*) = SONPINS;
BYTE ARRAY BDEPPINS(*) = DEPPINS;

INTRINSIC PROCINFO;

PIN := 0;          <<seek information about ourselves>>
ITEMNUM1 := 1;    <<request our pin #>>
ITEMNUM2 := 3;    <<how many sons we have>>
ITEMNUM3 := 4;    <<how many descendants we have>>

PROCINFO (ERROR1, ERROR2, PIN, ITEMNUM1, ITEMVAL1,
          ITEMNUM2, ITEMVAL2,
          ITEMNUM3, ITEMVAL3);
```

```

IF <> THEN GO PROCERROR;

COMMENT Make sure we have enough array space;

IF NUMSONS > MAXSONS THEN GO TOO'MANY'SONS;
IF NUMDEPS > MAXDEPS THEN GO TOO'MANY'DEPN;

COMMENT We have enough space - fetch sons, dependants, program
      name, father pin and number of generations;

PIN := PINNUM);    <<still ask about ourselves>>
ITEMNUM1 := 6;    SONPINS(0) := MAXSONS + 1;
ITEMNUM2 := 7;    DEPPINS(0) := MAXDEPS + 1;
ITEMNUM3 := 10;
ITEMNUM4 := 2;
ITEMNUM5 := 5;

PROCINFO (ERROR1, ERROR2, PIN, ITEMNUM1, BSONPINS,
          ITEMNUM2, BDEPPINS,
          ITEMNUM3, PROGNAME,
          ITEMNUM4, ITEMVAL4,
          ITEMNUM5, ITEMVAL5);

IF <> THEN GO PROCERROR;
. . . .

PROCERROR:
  <<print message and error number>>

TOO'MANY'SONS:
TOO'MANY'DEPN:
  <<print increase array size message>>
  RETURN;

END. <<procinfo example>>

```

If the previous program was executed by pin 45 in the process tree of figure 1, the following information would be returned:

item number	information
1	45
3	2
4	5
6	22,34
7	30,21,38,22,34
10	PROCTEST.MITCHELL.OSE
2	12
5	3

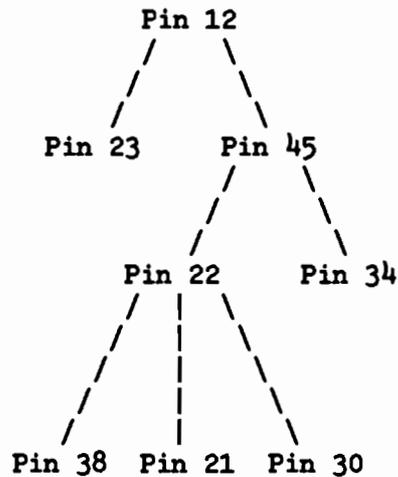


Figure 1

Security Specifications

If the calling process is executing in privileged mode, requests for information will be honored for any process, otherwise, requests will be honored as follows:

1. Complete information will be returned for sons of the calling process and for the calling process itself.
2. Information returned for indirect descendants and processes directly above the calling process will be limited to items two through seven and ten only.
3. Requests for information about processes not in the calling process' sub-tree or processes not directly above the calling process will be limited to item ten.

Process handling capability will also be required for any user mode call unless the calling process is requesting information about itself.

System Internal Errors: A New MPE Error-Handling Protocol

by Jon Cohen, Computer Systems Division

Background

Much of MPE's code is devoted to error checking and handling. Some errors are caused by the user (e.g. entering bad syntax for an MPE command), but some error conditions are recognized when MPE finds itself in an unexpected state (e.g. a process aborting while it is critical). For the unexpected state error, MPE typically causes a system failure. There are some cases of this error type for which a system failure is an inordinately drastic action. For these error conditions, a new *System Internal Error* protocol was developed for MPE.

System Internal Errors

Until recently, MPE developers did not have much choice of action when code detected an unexpected system state: the code had to call `SUDDENDEATH` which caused a system failure. There were two major reasons for this: 1) once an unexpected state was discovered, it could be dangerous to data integrity to allow the system to continue (unexpected states are often indications of other problems), and 2) the immediate halt and subsequent memory dump would hopefully give the MPE Operating Systems Lab enough information for correcting the cause of the problem.

In the C.00.20 MIT, a new, alternative error protocol was introduced for unexpected state error conditions for which a system failure was too drastic an action. This protocol is called the System Internal Error protocol, and with this MIT, there is only one error state presently handled with this protocol. This error condition is described below.

System Internal Printcaret Error

When a user enters an MPE command that contains a syntax error, MPE often tries to print a caret indicating the part of the command string in error. Handling of MPE command errors is done in a procedure called `CIERR`; it gets as parameters information that includes the error number and the position of the caret printing. `CIERR` fills a local buffer with blanks and then uses the caret position as an index into the local buffer for the positioning of the caret. Prior to the 2226 release, there was no bounds checking on the caret positioning; thus, a bad call to `CIERR` could cause the storage of a caret anywhere in the current memory bank. The consequences of the "flying caret" were often not immediately detectable.

In the C.00.20 MIT, bounds checking for this caret printing was installed into MPE. That part was straightforward, but the real issue was what should be done when a bad caret address was detected. After all, the bad call to `CIERR` should

be examined since the bad address could be an indication of other problems in that part of the system. On the other hand, the caret printing could be suppressed with little harm to the system (other than hidden problems that caused the bad call in the first place). It was decided that a system failure would be inappropriate, and the System Internal Error protocol was developed.

The following is a description of what will happen when a bad CIERR call is detected:

- 1) A system internal error message will be printed on the user's \$STDLIST device; this error states: SYSTEM INTERNAL PRINTCARET ERROR INTERCEPTED BEFORE DAMAGE.
- 2) The Status Register and the Delta-P value of the bad call are printed on the user's \$STDLIST.
- 3) The user is asked to forward this information to an HP Software Representative.

The user then receives the original error message and is allowed to continue.

Future Directions

The implementation of the System Internal Error protocol was designed to be general and extensible. Now that the protocol has been implemented, it would be straightforward to implement new calls for currently unhandled error conditions.

Software Interrupts

by Larry Zeitman, Computer Systems Division

IPC now supports software interrupts. The two primary advantages of software interrupts are that they are handled transparently to the process's mainline code and that they are given real time response by the target process. The software interrupt facility enables you to perform FREAD and FWRITE completion processing with your own interrupt procedures. A call to FREAD or FWRITE is necessary to initiate the I/O request. Both of these intrinsics will return control to your program as soon as the request has begun. When the operation completes, your program is trapped (or interrupted) to a procedure of your choice; this procedure performs whatever processing is necessary and then exits back to your mainline program.

Initially, software interrupts are disabled for your programs. To enable soft interrupts, use the FINTSTATE intrinsic with a value of TRUE, as follows:

```
VALUE:=FINTSTATE(TRUE);
```

The FINTSTATE intrinsic with a value of FALSE will inhibit soft interrupts. MPE will inhibit soft interrupts just before entering an interrupt procedure. This is done to prevent unwanted nesting of the interrupt procedures. Use the FINTEXT intrinsic to return from an interrupt procedure; it will reenables soft interrupts just before it exits.

```
PROCEDURE INTERRUPTPROC(FILENUM);  
  VALUE FILENUM;  
  INTEGER FILENUM;  
  BEGIN  
    .  
    .  
    .  
  FINTEXT;  
  END;
```

Software interrupts are automatically inhibited just before a CONTROL-Y trap procedure. The trap procedure may elect to allow soft interrupts by calling the FINTSTATE intrinsic. If it does not call FINTSTATE, the RESETCONTROL intrinsic will restore the process' interrupt state to its pre-CONTROL-Y value.

When you have enabled software interrupts for your program, you "arm" them for a particular file by specifying the interrupt procedure's plabel in an FCONTROL 48. Calling FCONTROL 48 with a parameter of zero will disarm the software interrupt mechanism so the file can be accessed in the normal manner.

NOTE

The FFILEINFO intrinsic may be used to return the plabel of the interrupt handler. FFILEINFO 49 will return the plabel as an integer value: if it returns a value of zero, no interrupt handler has been armed.

After an interrupt has been received, an IODONTWAIT must be issued against the file to complete the request. Your interrupt handling procedure will usually issue the IODONTWAIT before it handles the interrupt completion processing. Note that only message files allow soft interrupts.

No more than one uncompleted FREAD or FWRITE may be outstanding for a particular file. Any additional FREADs or FWRITEs will be rejected.

The interrupt will not occur while you are executing within MPE; that is, while you are processing an MPE intrinsic or procedure. Exceptions: the PAUSE, PAUSEX, and IOWAIT intrinsics will allow the interrupt. When the interrupt procedure exits, it reinvokes these intrinsics.

Software interrupts may not be used with remote files.

An uncompleted FREAD or FWRITE request may be aborted by issuing an FCONTROL 43 (abort nowait I/O).

Example Using Software Interrupts

This is an example of a multiprocess transaction system. There are three types of processes in the system:

Terminal processes. Each terminal has its own private terminal process. These processes perform some pre-editing of each transaction and then send it to the proper function process.

Function processes. These are "expert" in some particular aspect of the system; for example, one for payroll, one for accounts receivable, etc. They accept input from any of the terminal processes, using message files.

Supervisor process. There is only one supervisor process. It accepts commands from its terminal and then "forces" the appropriate terminal/function process to execute the command. Examples of the commands would be:

- o Report process status and/or run-time statistics.
- o Set checkpoints, change files, etc.
- o Enter DEBUG.
- o Terminate gracefully.

To get the attention of the target process, the supervisor process need only send information to the target process' "control" message file. The target

process has already enabled soft interrupts on the file, so the supervisor process' FWRITE will soft interrupt it.

This is a function/terminal process code fragment that enables soft interrupts:

```
CONTROLFILE:=FOPEN( ... );
INTADDRESS:=@INTHANDLER;
FCONTROL(CONTROLFILE,48,INTADDRESS);
IF <> THEN ERROR(CONTROLFILE);

FREAD(CONTROLFILE,DUMMY,CMDLEN);
IF <> THEN ERROR(CONTROLFILE);
FINTSTATE(TRUE);
```

This is a function/terminal process interrupt handler:

```
PROCEDURE INTHANDLER(FILENUM);
VALUE FILENUM;
INTEGER FILENUM;
BEGIN
  ARRAY CMD(0:CMDLEN),REPLY(0:REPLYLEN);
  INTEGER REPLYSIZE;

  IODONTWAIT(FILENUM,CMD);
  IF <> THEN ERROR(FILENUM);
  CASE CMD OF
    BEGIN      << PERFORM COMMAND, FORM REPLY >>
      .
      .
      .
    END;
  FWRITE(REPLYFILE,REPLY,REPLYSIZE,0);
  IF <> THEN ERROR(REPLYFILE);
  FINTEXTIT;
  END;      << INTHANDLER >>
```

NOTE

The validity of an interrupt procedure depends on the code domain of your code and executing mode (privileged or non-privileged) and on the code domain of the interrupt procedure and the mode (privileged or non-privileged). The code domains are:

```
PROG   (User program)
GSL    (Group SL)
PSL    (Public SL)
SSL    (System SL, non-MPE segments)
MPSSL  (System SL, MPE segments)
```

When the code of
the caller is:

Interrupt Procedure

Non-privileged in PROG, GSL, or PSL.	Must be non-privileged in PROG, GSL, or PSL.
Privileged in PROG, GSL, or PSL.	May be privileged or non-privileged in PROG, GSL, or PSL.
Privileged or non-privileged	May be in any non-MPESSL segment.

MPE Now Prompts for Password More Than Once

by Jan Helmbolt, Computer System Division

Currently with MPE, a user with passwords may log on to the system in two different manners. You can include any passwords in the logon string, such as:

```
:HELLO USER/PASS.ACCT/PASS,GROUP
```

Or, you may leave the password(s) out of the logon string and be prompted by MPE for any necessary passwords. If you include a bad password in the logon string, you and the console are notified, and you are given a colon prompt to enter the logon string again. If you are prompted for the password by MPE and enter an invalid password, the console is notified and no colon prompt is returned. You must hit carriage return for a new colon prompt to type in the logon string again. This latter case can cause problems if you are using a modem. If no prompt is returned, the line is dropped and the you must dial up again.

MPE will now prompt for passwords more than one time. If you are prompted for a password and enter an invalid password, you will be prompted for the password again. Including the initial prompt, you will be prompted a maximum of three times per password (i.e. user, group, and account) before the line is dropped or you must hit carriage return again to get a colon prompt to enter the HELLO string again. Each time you enter an invalid password, the console will be notified.

An example of a user entering a bad password three times would be:

```
:HELLO USER1.ACCT
ENTER USER PASSWORD: <badpass>

ENTER USER PASSWORD: <badpass>

ENTER USER PASSWORD: <badpass>

INCORRECT PASSWORD. (CIERR 1441)
```

HP Laser Printer Now Merges Text and Graphics

Editor's Note: The following article is an excerpt from an earlier press release.

With new graphics capabilities, the HP 2680 Laser Printer can now replace the traditional document-producing process with an electronic process which reduces turnaround time and simplifies the steps required. It also enhances word processing, with the addition of office graphics.

Especially useful for organizations that produce business reports and technical documents, these graphics capabilities eliminate the need for typesetting, paste-up, vendor printing, and collating. The HP 3000 Business Computer System is used to design graphics, combine them with text, and merge them both into a completed document which is then printed under the computer's control on the HP 2680 Laser Printer. The combination results in an integrated solution for document processing.

Creating Graphics for the Laser Printer

Three basic steps are involved in the electronic printing of text and graphics. The first, production of graphics, is made possible through the use of new graphics software packages. With this software, the user can produce illustrations such as graphs, organizational charts, flow charts or schematics which then can be merged with text, and printed on the laser printer.

Producing Text

The text portion of documents is produced using HP's TDP/3000 Text and Document Processing software. Text is entered into the system, edited and formatted with TDP/3000.

Merging Text and Graphics

The final stage, electronically merging text and graphics into a finished document, uses TDP/3000 software and the laser printer. Graphics can be sized and positioned on the page as the user wishes, while being merged with text to produce the final document -- all electronically. This is then printed by the HP 2680 Laser Printer which prints at 45 pages per minute.

"Documents can now be composed, formatted and illustrated in a much simpler electronic process. This new process saves turnaround time, produces the documents in-house, and enables users to print documents only as needed -- eliminating much of the waste that arises from storing out-of-date materials," says Charles Jepson, marketing manager of HP's Boise, Idaho division, which manufactures the laser printer.

This new text and graphics capability can also be used with HP's recently announced electronic mail package, HPMAIL. With this software, documents can be transmitted for printing on remotely located 2680 Laser Printers, eliminating the costs and delays of shipping hard copy output.

The following page is an example of output from the HP 2680 Laser Printer.

INTRODUCTION



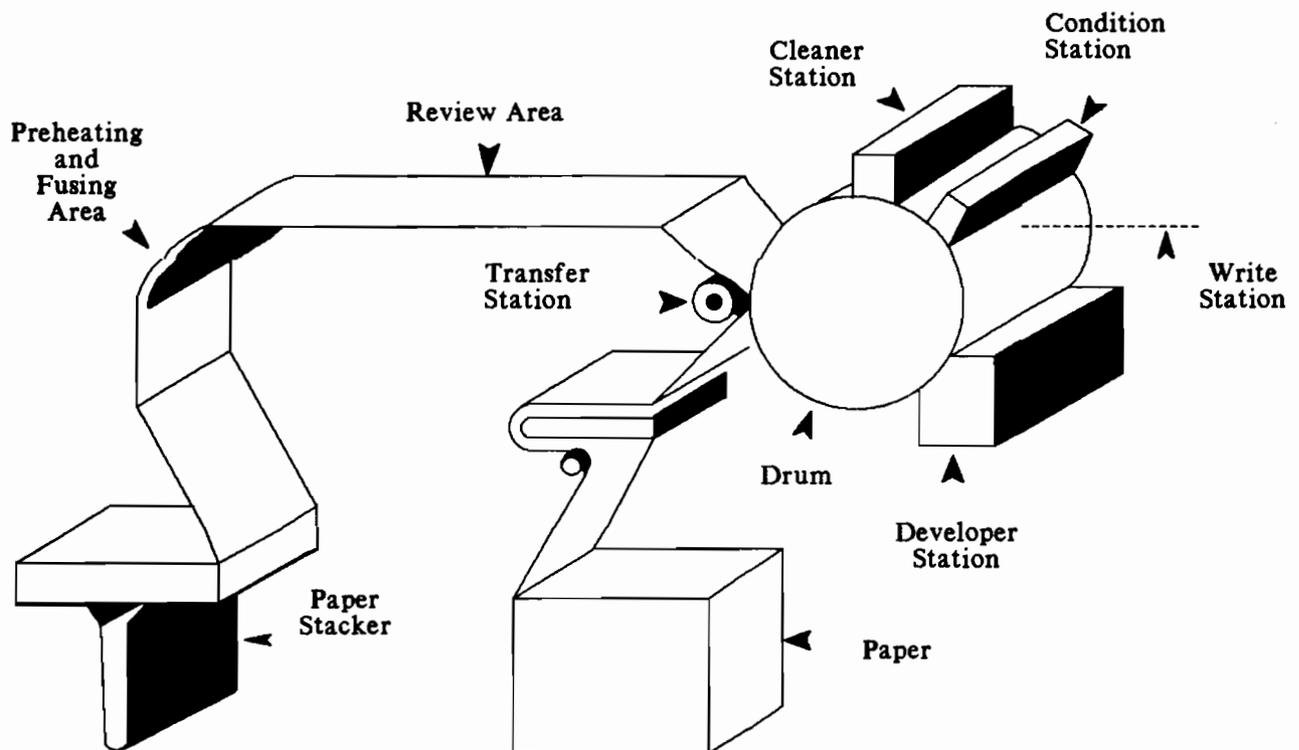
1-1. OVERVIEW

This publication outlines specifications for selecting continuous form paper appropriate for use in the HP 2680A Laser Printing System. These specifications are intended to ensure the highest quality and reliability of the 2680A and are not intended to recommend a specific brand of paper.

1-2. HP 2680A PRINTING PROCESS

The Hewlett-Packard 2680A Laser Printing System is the latest innovation in HP printer technology.

Using laser scan technology, the 2680A forms a toned image of the printed page on the surface of the photoconductive drum. This toned image is then transferred to the paper and passes through the review area. After the preheater conditions the paper, the fuser heats the toner enough to cause the toner to bond with the paper. The job is completed as the paper stacker automatically adjusts for the height of pages being printed. (For further details, refer to HP 2680A Operator's Preventative Maintenance Handbook, part number 02682-90912.)



The Drum rotation and paper path of a 2680 laser printer

Figure 1. 2680A Paper Path

Support of Dual 7976s Now Possible on HPIB Systems

by Jim Kochanowicz, Computer Systems Division

The Hewlett-Packard 7976A Magnetic Tape Drive provides high performance for the HP 3000 computer family. On Series 40, 44 and 64 systems, simultaneous use of two HP 7976As can now be supported. This article discusses the conditions under which support of two units can be provided.

In order to support two 7976s there must be at least 384K words of memory in the system to utilize the full capabilities of MPE IV. It must be stressed that this value represents the *minimum* value that is needed. It would be best to determine the memory needs of the system under current usage and add 64K words for each 7976 purchased. This extra memory is required by STORE/RESTORE or achieve high performance in backing up discs to the 7976.

It is not necessary for each 7976 to have its own GIC. A 7976 may share its GIC with the appropriate peripherals. Indeed, both 7976s can be on the same GIC, but for performance reasons it would be better if they were not. With two 7976 tape drives on the same GIC, the contention for channel resources would cause degradation of both tape units during simultaneous use of STORE/RESTORE.

The above considerations will give general guidelines for optimizing the use of two 7976 Magnetic Tape Drives.

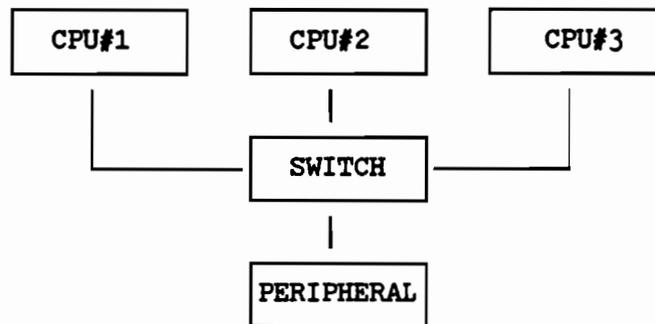
HP 26075A Multiple System Access Selector

by Adrienne Frost, Computer Systems Division

The HP 26075A Multiple System Access Selector ("Selector") is now available to support the HP 7976A and the HP 2680A peripherals only.

The Selector is a rotary switch that will allow up to three HP 3000 systems to share a single HP 7976A tape drive or HP 2680A Laser Printer. Any mix of HP 3000 systems, Series III, 30, 33, 40, 44 or 64 is supported by the Selector. The Selector does not require power and therefore must be manually reset by the system operator to provide access to each CPU.

MAXIMUM CONFIGURATION



System operator procedures are contained in the HP 26075A Multiple System Access Selector User Manual, HP part number 26075-90901, which is distributed with the Selector. Please do not attempt to install, operate or maintain your Selector without this manual.

New Product: Application Program SAMPLER

by Bruce Merenbloom, Computer Systems Division

Application Program SAMPLER/3000 (APS/3000) is an interactive performance tool for tuning application programs on the HP 3000. It monitors the execution of software and produces histograms showing the amount of CPU time spent by various programs, or portions of one monitored program. By studying these histograms, the user learns which areas of the software might need optimization.

In a typical application of this performance tool, the user runs and monitors software for a period of time, studies APS/3000's histograms, and learns which code consumes the most CPU time. He optimizes the code and repeats this process until he believes the software performance is acceptable.

APS/3000 will monitor the execution of a single program, or the multiple execution of one or more shared program files, so that the user can:

- * tune the software by finding the CPU execution time of each program file, process, segment, procedure, or address range.

Histograms can distinguish between direct CPU utilization (CPU time spent executing user code), and indirect CPU utilization (CPU time spent in system activity on behalf of user code).

APS/3000 also allows the user to: estimate the rate of transfers of control between segments for re-segmentation purposes, and determine the wait-time of program regions (time when the process is not active) to estimate turnaround times. APS/3000 offers histograms comparing the CPU execution times of each program file, process, segment, procedure, or address range in the sampled software. The relative length of bars on any histogram indicates the relative execution cost of the reported entities.

```

Processes
-----
pr1***** |
pr2***** |
pr3***     |
pr4***** |
-----

```

```

or

Program Files      Segments      Procedures      Addresses
-----
f1*****          s1*****          p1**           a1****
f2*****          s2**             p2*****       a2*****
f3*****          s3*              p3*****       a3**
f4*****          -----          p4*****       a4**
-----                               -----          a5*****
                                           a6*
                                           a7****
                                           -----

```

increasing detail -->

Conceptual view of increasingly detailed software cost analysis
available from APS/3000.

In this simplified example, program file f2 is found to use the most CPU time of the four active program files. Focusing on f3 shows that segment s1 is using the most CPU time of any segment in the program. Wanting to pinpoint the most costly code, the user narrows the analysis to a procedure within a segment, then an address range within the procedure.

Interaction with APS/3000 takes place within hierarchical command menus. Performance profiles (histograms) may be generated during software measurement, or samples may be logged in a disc file for later detailed analysis. Profiles can be sent to the screen or printer.

For more information, consult the APS/3000 Reference Manual and User Guide (32180-90001).

DSN/MRJE Enhancements

by Tom Keane, Information Networks Division

DSN/MRJE provides batch communication facilities for the HP3000. DSN/MRJE emulates the operation of a bisync conversational (multileaving) protocol with hosts supporting HASP, JES2, JES3, or ASP. The primary source of input is card images and output is either card or line printer image files.

Recent enhancements to the DSN/MRJE software have resulted in a product that is easier to operate and significantly more reliable.

New features that were added include the following:

- o MRJE need no longer run as a system process
- o Routing of solicited output to unsolicited devices
- o Infiles can be submitted in transparent mode
- o Autodial capability
- o Support of the environment file feature of the laser printer
- o Diagnosis of MRJE operational problems
- o Modifiable message file
- o Help facility
- o Performance measurement facility

DSN/MRJE Need No Longer Run as a System Process

DSN/MRJE monitor can be operated within a session or an MPE job. The purpose of this enhancement is to let MRJE use most of the features supplied by MPE instead of running as a system domain process. The design improves the usability of MRJE because file equations can now be issued to the files used by MRJE. Another benefit is that system failures can now be avoided when errors occur if MRJE is not running in a critical code section.

Routing of Solicited Output to Unsolicited Devices

Solicited host job output is routed to one of the unsolicited devices when the print or punch disposition of the job is zero (0).

Infiles Can Be Submitted in Transparent Mode

Any user with MRJE Manager Capability (OP) can submit a job in transparent mode. The transparent mode allows the Infiles to contain JOB cards and it treats these cards as data.

Autodial Capability

Users of DSN/MRJE will be able to have a circuit switched line connection made without operator intervention. DSN/MRJE will dial the phone number and perform the connection without querying the operator.

The applicable CCITT recommendation is V.25 and the applicable EIA Specification is RS-366.

Hardware and Software Requirements for Autodial Capability:

Hardware

1. INP Model 30020B.
2. Automatic Dialing Unit
 - a. Bell System 801C (touch tone).
3. Special Autodial Cable (HP30221G).

Software

1. INP download file CSDMRJE2.
2. CS version A.04.03, or later.
3. MPE IV

Remote LPS Support

Each LPS spoolfile must have an environment file associated with it. When a forms message is detected from the host, the current LPS spoolfile is closed and a new LPS spoolfile is opened with the form name of the environment file. If the environment file does not exist in the ENV.HP2680 group, a default environment file will be opened.

For further information on this enhancement a new DISTRIBUTED SYSTEMS NETWORK/MULTILEAVING REMOTE JOB ENTRY manual has been written. Do not attempt to use this enhancement until this manual and its pertinent information has been reviewed.

Part number 32192-90001
Printed in USA 3/82

Diagnosis of MRJE Operational Problems

The purpose of this design is to help system administrators identify and correct some problems that caused system failures or host failures and identify configurations that are in error.

Modifiable Message File

Most of the DSN/MRJE messages are contained in a message catalog file. This feature allows system managers to modify those messages to make them more understandable in their environment. This enhancement is especially useful in countries where English is not the native language.

Help Facility

The purpose of this enhancement is to make DSN/MRJE an easier product to use. Users can type "HELP" in the subsystem to obtain general instructions and information.

Performance Measurement Facility

The purpose of this design is to measure the turn-around time for a host output received by DSN/MRJE. The design also keeps track of job output, solicited or unsolicited, received by DSN/MRJE.

Use of ;INFO= Parameter In Compilers

by Dennis Handly, Information Networks Division

A new feature on the C.00.04 MIT, 2146, allows the passing of information to compilers. The extension to the current commands is of the following form:

```
:compiler  textfile, .... ;INFO="string"
```

Where the compiler can be: COBOL, SPL, FORTRAN, RPG, PASCAL, or BASICOMP. (This is equivalent to the :RUN x;INFO="string" command.)

The PASCAL compiler has its own format for the INFO string. See the PASCAL Reference Manual.

Versions A.00.05 of COBOLII, A.08.03 of SPL, and B.01.07 of FORTRAN have been enhanced to accept \$ commands from the INFO string. These three compilers all have a similar format for the INFO string. The format is as follows:

```
;INFO="$command1$command2$command3...."
```

The \$ must be the first character in the string and it is used to separate multiple commands. Note: if the number of commands is long enough, then "&" may have to be used to continue the INFO string. Some compilers may also allow the "&" character to continue the command from one \$ command to the next. This may be important, since each \$ command is limited in length to the same size as if they were in the source file.

```
;INFO="$command1&$continuation$command2"
```

The method for separating commands ignores quotes, so a \$ would not be possible within the \$PAGE or \$TITLE commands.

The \$ options can include CONTROL, PAGE, SET, IF and other commands depending on the compiler. See the appropriate manuals.

The way these records are identified on the compilation listing is similar for these compilers. The string "INFO=" is placed where the sequence numbers would usually be found.

To derive the most benefit from the INFO string, the following point should be kept in mind.

The INFO string is processed before any source. This includes any \$ commands in the source. Therefore do not put the default settings of any options in the source. Options like FILE= for FORTRAN or SUBPROGRAM for COBOL, which are needed for proper compilation should be the only \$ options in the source file.

This allows the INFO string to select options like NOLIST, MAP, BOUNDS or SUBPROGRAM(procedurename) (for SPL), uniquely for each compilation.

Several examples follow:

SUBPROGRAM compile certain modules.

```
:SPL file,usl,list;INFO="$CONTROL SUBPROGRAM(A*)$CONTROL & : NOLIST"
```

Compile with VERBS, BOUNDS and MAP for debugging.

```
:COBOL file,usl;INFO="$CONTROL BOUNDS,MAP,VERBS$SET X9=ON" (where COBOLII is in the file COBOL.PUB.SYS)
```

Select FREE format input to FORTRAN.

```
:FORTRAN file;INFO="$CONTROL FREE"
```

Define macros for COBOLII.

```
:COBOL file;INFO="$DEFINE %A=5#"
```

Self-Paced Learning Update

by Marguerite Hebert, Information Networks Division

In addition to the three existing self-paced courses: HP 3000: A Guided Tour (22835A, \$185); Learning COBOLII (22832A, \$475); and Using DSG/3000 Interactively (22833A, \$275), Information Networks Division (IND) now has three new courses available for ordering:

o USING HPWORD - is an introduction to the HPWORD word processing system; it teaches the features of HPWORD to anyone who will be using word processing as a regular part of their job (secretarial, clerical, administrative personnel). (22839A, \$250.)

o USING DICTIONARY/3000 - is an introduction to the HP data dictionary facility; it teaches how to define entries in the dictionary and how to create and maintain IMAGE/3000 data bases using Dictionary/3000. (22843A, \$500.)

o PROGRAMMING IN TRANSACT/3000 - is an introduction to the HP Transact/3000 Programming Language for experienced programmers; it teaches how to program in Transact/3000 and effective programming techniques. (22842A, \$750.)

"Programming in Transact/3000" and "Using Dictionary/3000" are preliminary versions; both will be updated and completed by September 1982. "Using HPWORD" is available now in its final form. Data sheets which completely describe each course are available from your local sales office.

All of these courses are designed for use by more than one student. Additional sets of the self-paced instructional booklets can be ordered with the following part numbers:

A Guided Tour booklets	- 22835-60001
Learning COBOLII	- 22832-60001
Using DSG/3000	- 22833-60001
Using HPWORD	- 22839-60002
Programming in Transact/3000	- 22842-60001
Using Dictionary/3000	- 22843-60001

These part numbers can be found on the box that contains the booklets.

You can also order these self-paced training courses and additional copies of the booklets through your local sales office or through Computer Supplies Division (see their Spring 1982 catalog for ordering information).

Documentation

The catalog of customer publications at the end of this section lists the currently available customer manuals for HP 3000 Computer Systems products. This list supersedes the catalogs in previous issues of the COMMUNICATOR.

Purchasing

Customers may purchase copies of new manuals, new editions and updates by either Direct Phone Order or by placing orders through their local HP Sales and Service Office.

The Direct Phone Order numbers are (800) 538-8787 (toll free) and, in California, (408) 738-4133 (collect). Calls should be made between 9:00 a.m. and 5:00 p.m. in the caller's time zone. Most orders will be shipped within 24 hours.

The addresses and telephone numbers of local HP Sales and Service Offices are listed in the back of all customer manuals.

Prices of HP documentation are subject to change without notice.

To obtain a manual update, the customer must purchase the manual to which it pertains. The latest edition of the manual, along with the update, will then be sent to the customer. If the customer has purchased Customer Support Service (CSS), Software Subscription Service (SSS), or Manual Update Service (MUS), they will automatically receive new editions and updates to the appropriate manuals.

Computer Documentation Index

The Spring 1981 Computer Documentation Index available from Hewlett-Packard includes manuals, binders and a variety of nonpromotional publications for HP computer systems (from the HP-85 through the HP 3000, and for terminals and peripherals, including plotters).

The Index is arranged "By Subject (model number)", which is useful when searching for documentation items where the specific part number is not known; and a "Numerical" listing which provides a fast way to find documentation when the part number is already known. Both listings include description, print date, latest update, and (U.S. Edition only) the current list price.

To receive a copy of this useful reference, please mail your request to:

Hewlett-Packard
Computer Supplies Operation
P.O. Box 60008
Sunnyvale, California 94008

Terms

A few words about documentation terms and procedures:

NEW The first printing of the first edition. When first printed, a manual is assigned a part number that is retained for the life of the manual.

UPDATE A supplement to an existing manual which contains new or changed information. Manual updates, which are issued between editions, contain additional or replacement pages to be merged into the manual by the customer.

Updates are generally issued at the same time Installation Tapes (ITs) are issued. However, THERE IS NO DIRECT CORRELATION BETWEEN SOFTWARE FIXES AND MANUAL UPDATES. Software enhancements that require documentation changes will be accompanied by manual updates, but software fixes and manual corrections may be made independently.

Updates are retroactively inclusive; that is, whenever successive updates are issued, the later update will contain the previous one(s). This means that you need obtain only the latest update to have all the information added or changed since the last printing of the manual.

Manual updates do not have part numbers. They are numbered sequentially from the time the last edition was issued.

NEW EDITION A complete revision of a manual; obsoletes all previous editions of the manual and its updates.

A new edition is issued when, due to the scope of the changes involved, it is impractical to issue a manual update.

The date on the title page and back cover of every manual is the printing date of the current edition. This date changes only when a new edition is published. A list of the dates of the manual's previous editions and updates (if any) is kept on the Printing History page of every manual. Publication of a new edition does not affect the part number of a manual.

If further updates are required, they are made to the new edition. The update numbers run sequentially, starting from the latest edition.

KEY

Manuals that are new or have changed since the last edition of this catalog are noted by an asterisk (*) in the leftmost column. An at sign (@) in the "Price" column indicates that the price of the manual was not available at the time the catalog was printed.

If the "V" (version) column contains a #, the manual is applicable to systems running MPE IV and to those running MPE C.

Manuals which apply to MPE C systems only are listed under "MPE C MANUALS".

SYSTEM MANUALS

Manual Title	V	Part Number	Price	Print- Date	Up- dated
Using the HP 3000: An Introduction to Inter- active Programming	#	03000-90121	10.00	4/79	
MPE Commands Reference Manual		30000-90009	16.75	1/81	11/81
MPE Intrinsic Reference Manual		30000-90010	19.25	1/81	11/81
MPE File System Reference Manual		30000-90236	@	12/81	
MPE Segmenter Reference Manual		30000-90011	3.50	2/77	
System Manager/System Supervisor Ref. Manual		30000-90014	17.20	2/81	12/81
MPE Debug/Stack Dump Reference Manual		30000-90012	5.60	9/76	10/80
Console Operator's Guide		32002-90004	17.50	5/81	11/81
Error Messages and Re- covery Manual		30000-90015	18.50	6/76	5/78
HP 3000 Computer System Machine Instruction Set		30000-90022	8.75	2/80	

Catalog

SYSTEM MANUALS (Continued)

Manual Title	V	Part Number	Price	Print- Date	Up- dated
MPE System Utilities Reference Manual		30000-90044	4.50	3/77	12/81
Index to MPE Reference Documents		30000-90045	4.00	5/81	
Software Pocket Guide		30000-90049	19.20	2/80	4/81
Using Files	#	30000-90102	15.50	4/78	

SUBSYSTEM MANUALS

Manual Title	V	Part Number	Price	Print Date	Up- dated
EDIT Reference Manual		03000-90012	7.25	8/80	
Trace Reference Manual	#	03000-90015	4.50	6/76	
FCOPY Reference Manual	#	03000-90064	4.75	7/80	
Scientific Library Reference Manual		30000-90027	6.65	6/76	2/77
Compiler Library Reference Manual		30000-90028	13.50	11/76	
Flexible Disccopy/3000		32199-90001	6.00	8/80	
SORT Reference Manual		32214-90002	13.16	9/81	

LANGUAGE MANUALS

Manual Title	V Part Number	Price	Print Date	Up-dated
BASIC for Beginners	# 03000-90025	6.00	11/72	
BASIC/3000 Pocket Guide	# 03000-90050	1.25	9/74	
System Programming Language Reference Manual	# 30000-90024	12.00	9/76	2/77
System Programming Language Textbook	# 30000-90025	11.50	6/76	1/77
BASIC Interpreter Manual	30000-90026	17.33	6/76	8/78
FORTRAN Reference Manual	30000-90040	13.00	6/76	5/79
SPL Pocket Guide	# 32100-90001	2.45	11/76	
FORTRAN Pocket Guide	# 32102-90002	5.00	5/79	
BASIC Compiler Reference Manual	# 32103-90001	3.00	11/74	6/76
RPG/3000 Compiler Reference Manual	# 32104-90001	49.70	2/77	5/80
RPG Utilities Reference Manual	32104-90006	15.05	10/81	
RPG Listing Analyzer	# 32104-90003	.88	2/77	
APL Reference Manual	32105-90002	35.00	1/79	
APL Pocket Guide	32105-90003	4.50	11/76	
PASCAL Reference Mnl.	32106-90001	44.78	2/81	
COBOL Reference Manual	# 32213-90001	12.00	7/75	1/79
Using COBOL: A Guide for the COBOL Programmer	# 32213-90003	13.00	3/78	
COBOL/II Reference Mnl.	32233-90001	19.00	12/79	7/80
COBOL/3000 to COBOL II/3000 Conversion Guide	32233-90005	3.95	12/79	
TRANSACT/3000 Reference	32247-90001	20.52	12/81	

Catalog

SOFTWARE PRODUCTS

Manual Title	V	Part Number	Price	Print Date	Up-dated
DSG/3000 Manual		32250-90001	24.00	1/80	
DSG/3000 Guide		32250-90002	4.25	1/80	
HPSLATE Reference Manual		36576-90001	@	8/81	
Using HPSLATE		36576-90002	@	8/81	
HPWORD Reference Guide		32120-90001	38.70	2/81	
HPWORD Quick Reference Guide		32120-90002	9.25	2/81	
IDS/CHAR Reference Manual		36581-90001	32.50	8/81	
IDS/FORM Reference Manual		36581-90002	30.00	8/81	
IFS/3000 Reference Manual		36580-90001	46.25	8/81	
TDP/3000 Reference Manual		36578-90001	30.00	4/81	
Using TDP/3000		36578-90002	30.00	1/80	
TDP/3000 Quick Reference Guide		36578-90003	12.00	1/80	

Catalog

DATA COMMUNICATIONS MANUALS

Manual Title	V	Part Number	Price	Print Date	Up-dated
DSN/RJE 2780/3780 Emulator Ref. Manual		30000-90047	12.75	2/82	
Communications Handbook		30000-90105	21.70	4/81	
DS/3000 Reference Manual		32190-90001	19.00	3/77	5/81
DS/3000 to DS/1000 Reference Manual for HP 3000 Users		32190-90005	9.70	1/82	
DSN/MRJE Multileaving Remote Job Entry Reference Manual		32192-90001	14.20	3/82	
DSN/MTS Multipoint Terminal Software Reference Manual		32193-90002	7.00	8/81	
DSN/IMF Interactive Mainframe Facility Reference Manual		32229-90001	18.69	9/81	
DSN/ATP On-Line Diagnostic Manual		30144-90003	4.30	2/82	

Catalog

MANUFACTURING APPLICATIONS MANUALS

Manual Title	V	Part Number	Price	Print Date	Up-dated
EDC/3000 User Reference Manual		32380-90001	20.00	3/78	4/79
EDC/3000 System Admin. Reference Manual		32380-90002	8.50	3/78	4/79
EDC/3000 Programmer's Reference Manual		32380-90003	20.00	3/78	
IOS/3000 User Reference Manual		32384-90001	25.00	3/78	
IOS/3000 System Admin. Reference Manual		32384-90002	11.00	3/78	
IOS/3000 Programmer's Reference Manual		32384-90003	41.50	3/78	
MRP/3000 User-Admin. Reference Manual		32388-90001	19.50	8/78	11/79
MRP/3000 Programmer's Reference Manual		32388-90002	13.00	9/78	
SPC/3000 User Reference Manual		32392-90001	11.00	4/79	
Materials Mgt/3000 Manual Set		32263A	165.00	7/80	
Master Production Scheduling and Rough Cut Resource Planning		32260-90001	17.00	7/80	
Maintaining Parts and Bills of Material		32260-90002	17.00	7/80	
Maintaining Routings and Workcenters		32260-90003	11.00	7/80	
Material Issues and Receipts		32260-90004	14.75	7/80	
Maintaining Work Orders		32260-90005	15.00	7/80	
Managing Inventory Balances		32260-90006	12.00	7/80	

Catalog

MANUFACTURING APPLICATIONS MANUALS (Continued)

Manual Title	V	Part Number	Price	Print- Date	Up- dated
Maintaining Purchase Orders		32260-90007	14.00	7/80	
Material Requirements Planning		32260-90008	7.25	7/80	
Standard Product Costing		32260-90009	8.00	7/80	2/81
System Customization		32260-90010	25.00	7/80	2/81
System Operation		32260-90011	8.00	7/80	
Production Mgt/3000 Manual Set (including keyboard overlays)		32270Z	193.50	7/81	
Defining the Shop		32270-90001	27.00	7/81	
Managing the Order		32270-90002	29.50	7/81	
Capacity Requirements Planning and Input/Output Analysis		32270-90003	21.00	7/81	
A User's Guide to the Data Capture Terminal		32270-90004	32.00	7/81	
System Customization		32270-90005	40.00	7/81	
System Operation		32270-90006	23.00	7/81	
Set of ten keyboard overlays (five for HP3075 & five for HP3076)		32270-60003	@	7/81	

Catalog

TRANSACTION PROCESSING MANUALS

Manual Title	V	Part Number	Price	Print Date	Up-dated
QUERY Reference Manual		30000-90042	14.00	1/81	
KSAM Reference Manual		30000-90079	14.50	5/79	<u>5/81</u>
HP V/3000 Ref. Manual		32209-90001	14.50	2/81	
HP V/3000 Entry Program		32209-90003	2.50	1/80	
Using HP V/3000		32209-90004	17.00	1/80	
IMAGE Data Base Management Reference Manual		32215-90003	17.28	9/79	<u>8/81</u>
DICTIONARY/3000 Reference Manual		32244-90001	20.60	12/81	

EDUCATIONAL APPLICATION MANUALS

Manual Title	V	Part Number	Price	Print Date	Up-dated
Student Information System Reference Mnl.	#	32900-90001	13.00	9/74	8/76
Student Information System Technical Mnl.	#	32900-90005	32.00	3/75	
Student Assignment System Reference Manual	#	32901-90001	15.50	8/78	
Student Assignment System Technical Manual	#	32901-90005	9.75	8/78	
College Information System Reference Mnl.	#	32902-90003	13.00	1/78	
College Information System Technical Mnl.	#	32902-90005	10.50	2/78	

Catalog

ADDITIONAL MANUALS

Manual Title	V	Part Number	Price	Print Date	Up-dated
HP 3000 Series System Support Log		03000-90117	20.00	2/80	
HP 3000 CX to HP 3000 Series II Program Conversion Guide		30000-90046	3.50	6/76	
Guide to a Successful Installation	#	30000-90135	7.00	12/79	
Technical Writer's Survival Kit		30000-90171	2.50	7/79	
HP 3000 Computer System Site Planning Set (Encompasses the 2 manuals below)		30000-60029	18.65	6/80	
HP 3000 Computer System Site Planning and Preparation Guide		30000-90206	5.75	6/80	9/80
HP 3000 Computer System Site Planning Wkb		30000-90207	9.75	6/80	
Series 33 Installation Manual		30070-90021	5.25	10/78	1/80
Series 30/33 Diagnostic Manual Set		30070-60068	110.00	7/80	
Series 30 Installation Manual		30080-90001	9.24	8/79	1/80
HP 2894A Card Reader Punch Operating Manual		30119-90009	11.50	10/76	
IBM System/3 to HP 3000 Conversion Guide	#	32104-90004	10.75	7/78	

Catalog

MPE C MANUALS

Manual Title	V Part Number	Price	Print Date	Up-dated
BASIC Interpreter Reference Manual	03000-90008	9.75	7/75	
Compiler Library Reference Manual	03000-90009	11.50	2/76	
Scientific Library Reference Manual	03000-90010	5.75	7/75	
Software Pocket Guide	03000-90126	4.60	7/78	
IMAGE Data Base Management Reference Manual	30000-90041	7.00	12/76	5/78
MPE Intrinsic Reference Manual	30000-90087	20.00	4/77	4/78
MPE Commands Ref. Mnl.	30000-90088	20.00	4/77	4/78
System Manager/System Supervisor Manual	30000-90089	12.50	4/77	4/78
Console Operator's Guide	30000-90090	11.00	4/77	4/78
General Information Manual (Series I)	30000-90091	9.25	4/77	
INDEX/3000 Reference Mnl	30000-90095	10.50	6/77	4/78
RJE/3000 (2780/3780 Emulator) Ref. Mnl. for Pre-Series II Systems	30130-90001	9.00	12/74	1/80
MPE System Utilities Reference Manual	32000-90008	2.05	10/75	
FORTRAN Reference Manual	32102-90001	10.00	3/76	
IBM 1130/1800 to HP 3000 FORTRAN Conversion Gd.	36995-90013	4.70	2/75	5/75
SORT Reference Manual	32214-90001	8.50	3/80	

Data Communications Troubleshooting Guide

By Pete Fratus, Information Networks Division

This is the Guide portion of a paper presented at the HP3000 International Users' Group Conference in San Antonio during March of 1982. In the paper, I stated that it would become a new section for the Communications Handbook. The Communicator is currently the most timely publication for this Guide to reach HP3000 users. A discussion of the symptomatic troubleshooting technique, which uses this Guide, appears in an article in Interact.

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THE BASICS

IN GENERAL, IT IS IMPORTANT TO HAVE

- o the version of MPE that is on the system,
- o the MPE I/O configuration,
- o what hardware is being used,
- o that the problem is not already listed in the Software Status Bulletin (SSB),
- o that the product is right for the application,
- o the SYMPTOMS of any operations that have been done, and
- o the results of any testing that has already been done.

FOR THE SPECIFIC DATA COMMUNICATIONS PRODUCTS

DSN/DS (Distributed System) it is important to have

- o Versions and fix levels of DS and CS of both sides from CSLIST and DSTEST,VERS
- o Accurate description of data comm network on both sides including controller switch settings and cable numbers
- o Pertinent console messages from both sides
- o Error messages reported to the user
- o TRACE with ALL parameter

DSN/IMF (Interactive Mainframe Facility) it is important to have

- o Version numbers of modules from CSLIST
- o IMF configuration file
- o Description of screen or print file on real device
- o Host type
- o TRACE with mask of %277 for BISYNC with HEX entry in CSDUMP
- o TRACE with mask of %77 for SDLC with HEX entry in CSDUMP

DSN/MRJE (Multileaving Remote Job Entry) it is important to have

- o Version numbers of modules from CSLIST
- o MRJE versions numbers from MRJECONTROL CHECK
- o MRJE configuration file
- o Copy of print banner (if applicable)
- o Copy of MRJE message file
- o Copy of console messages
- o Host type
- o TRACE with ALL parameter

DSN/MTS (Multipoint Terminal Software) it is important to have

- o Version number of MTS
- o Models of terminals and modems involved
- o Complete description of network hardware

THE BASICS

DSN/RJE (Remote Job Entry) it is important to have

- o Version number of CS from CSLIST or RJINFO
- o Version number of RJE
- o Listing of command file and/or console session
- o RJINFO list
- o Remote or host type
- o TRACE with ALL parameter

TERMIO (Terminal I/O) it is important to have

- o MPE version
- o TERMIO patches level applied
- o ATC, ADCC or ATP
- o 3-wire (RS-232-C), 5-wire (RS-422), or modem
- o Terminal models

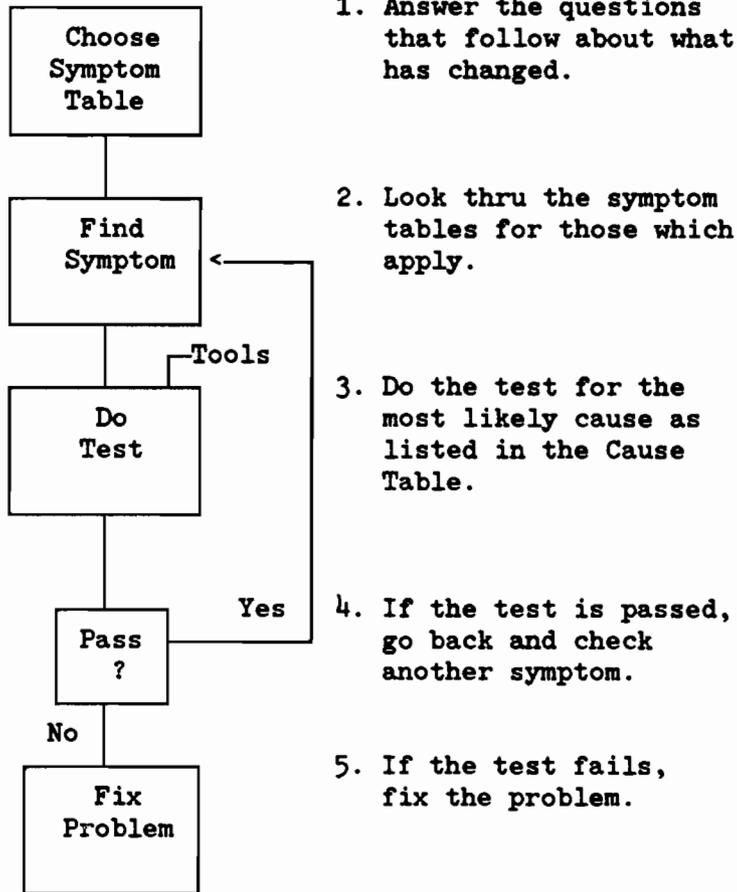
Modems it is important to have

- o Manufacturer
- o Model
- o Speed
- o Synchronous or asynchronous
- o Type of phone line or wire
- o Communications software



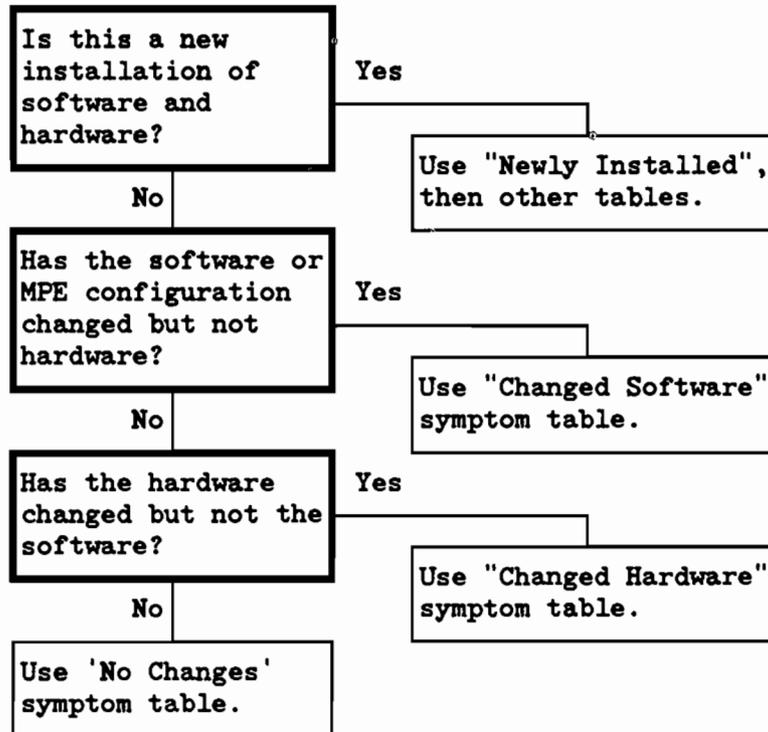
THE METHOD

Symptomatic Troubleshooting Flowchart



THE SYMPTOMS

Questions to help choose a Symptom Table



The symptom tables begin on the next page and are listed in the following order:

- Newly Installed
- Changed Software
- Changed Hardware
- No Changes

Page numbers for the symptom tables are listed in the Table of Contents.

THE SYMPTOMS Newly Installed

Newly Installed Symptom Table

(limited to symptoms encountered prior
to getting the line open)

MRJE	DSN/MRJE	MTS	DSN/MTS
CS	All subsystems	RJE	DSN/RJE
DS	DSN/DS	TERMIO	Terminal I/O
IMF	DSN/IMF		

Symptom	Possible Causes
DS console locked hung console system failures	software installation bad software installation bad software installation bad
IMF can't connect can't sign on printer problems screens don't work various problems	configuration files configuration files host compatibility screen design error configuration files request aborted by host application wrong, IMF is not a 3270 host configuration
MRJE aborts host shuts line line closes	MPE resource problem user written procedure line problem modem problems sign on procedure error host configuration line problems modem problems
MTS can't open line can't open MPMON CS117	software bad controller problem modem problem MPE resource problem INP switches wrong cable bad MPE configuration

THE SYMPTOMS Newly Installed

RJE aborts

host shuts line

host won't take input

line closes

no output

poor response

MPE resource problem
user written procedure
line problem
modem problems
sign on procedure error
host configuration
line problems
modem problems
sign on procedure
line problems
modem problems
host not sending data
sign on procedure
host busy
HP3000 busy
line problems

TERMIO

can only logon at one speed

can't logon

remote spooled printer problem

system failures
SF 700,701,704-6,709
SF 703,708,710

MPE configuration
terminal switches/configuration
MPE configuration
terminal switches/configuration
cable problem
controller problem
MPE configuration
printer switches
modem problems
cable problems
software installation bad
software installation bad
configuration bad

THE SYMPTOMS Changed Software

Changed Software Symptom Table

(same old hardware)

MRJE DSN/MRJE
CS All subsystems
DS DSN/DS
IMF DSN/IMF

MTS DSN/MTS
RJE DSN/RJE
TERMIO Terminal I/O

Symptom	Possible Causes
CS CSERR 6-7	software configuration
CSERR 8-10	configuration
CSERR 11-13	operator procedure
CSERR 14-19	configuration
CSERR 57-58	operator procedure
CSERR 153	operator procedure
CSERR 154	remote device
CSERR 156	hardware
CSERR 157-159	software
CSERR 158	remote device
CSERR 201	remote device
CSERR 203-204	operator procedure
CSERR 205-207	operator procedure
CSERR 207-209	hardware
CSERR 207-217	line problems
CSERR 212-214	modem problems
CSERR 217	remote device
DS DSCONTROL fails	hardware
DSCOPY aborts	software installation bad
line closes	software bad
poor response	improper installation
sessions hang	configuration
system failures	configuration
	DSMON bad
	programs not compatible with new MPE version
	software installation bad

THE SYMPTOMS Changed Software

IMF can't connect can't sign on printer problems screens don't work various problems	configuration files configuration files host compatibility screen design error configuration files request aborted by host application wrong, IMF is not a 3270 host configuration
MRJE can't open line can't sign on didn't get host number back job management doesn't work	software installation bad configuration file message modified, can't read job log corrupted didn't get host number back banner messed up configuration file corrupted RMT# changed or wrong new user commands user sign on procedure user sign on procedure host configuration changed out of disc space spooler space problem
MRJE user errors no input taken by host no output only one input or output set printer problems	
MTS can't open line poor response	software installation bad download file bad configuration file error software error MPE buffer size
RJE aborts can't sign on	MPE resource problem user written procedure sign on procedure
TERMIO can only logon at one speed can't change speed hang while running program	MPE configuration MPE configuration program busy program changed terminal configuration MPE configuration
remote spooled printer problems SF 700,701,705,706 SF 708	MPE configuration software installation bad configuration bad

THE SYMPTOMS Changed Hardware

Changed Hardware Symptom Table

(same software and configuration)

MRJE	DSN/MRJE	MTS	DSN/MTS
CS	All subsystems	RJE	DSN/RJE
DS	DSN/DS	TERMIO	Terminal I/O
IMF	DSN/IMF		

Symptom	Possible Causes
CS CSERR 84 through 109	hardware
CSERR 101-105	hardware
CSERR 117	hardware
CSERR 154	hardware
CSERR 207-209	hardware
CSERR 212-214	hardware
CSERR 217	hardware
DS line closes	modem problems
poor response	line problems
REMOTE HELLO fails	didn't change configuration
remote system shuts line	line problems
system failures	line problems
	configuration
IMF CSERR 117	hardware problem
host shuts line	hardware problem
poor response	MPE configuration error
MRJE	
can't open line	hardware problem
can't sign on	host configuration changed
didn't get host number back	hardware problem
host shuts line	line problems
line closes	line problems
poor response	line problems
MTS all but one remote	
drop is dead	line problem
	terminal problem
	modem problem
	terminal switches/configuration
can't logon	terminal switches/configuration
can't open line	controller problem
	modem problem
commands don't work	terminal switches/configuration
poor response	hardware problem
	line overloaded

THE SYMPTOMS Changed Hardware

RJE can't open line	controller problems
can't sign on	modem problems
host shuts line	host configuration
	modem problems
	modem problems
	line problems
line closes	host configuration
	line problems
no output	modem problems
poor response	line problems
	line problems
TERMIO	
can only logon at one speed	terminal switches/configuration
	MPE configuration
can't change speed	MPE configuration
can't logon	port hung
	port DOWNed, REFUSED
	terminal switches/configuration
hardwired worked, but modem won't work the same	port configured wrong
	modem problems
	line problems
	cable bad
remote spooled printer problems	modem problems
	line problems
	MPE configuration
	printer switches
SF 208 (HP-IB only)	noisy modems or lines
	using last port on main with modems
SF 209	noisy modems or lines
SF 211	ADCC hardware problem
SF 709,715	software bad
SF 708,710	configuration bad
SF 714-716	hardware problem

THE SYMPTOMS

No Changes

No Changes Symptom Table

MRJE DSN/MRJE
CS All subsystems
DS DSN/DS
IMF DSN/IMF

MPS DSN/MPS
RJE DSN/RJE
TERMIO Terminal I/O

Symptom	Possible Causes
CS CSERR 11-13	user
CSERR 57-58	user
CSERR 84 through 109	hardware
CSERR 101-105	hardware
CSERR 103	user
CSERR 153	user
CSERR 153	remote device
CSERR 154	hardware
CSERR 157-159	remote device
CSERR 158	user
CSERR 201	user
CSERR 203-204	remote device
CSERR 205-207	user
CSERR 207-209	hardware
CSERR 207-217	remote device
CSERR 212-214	hardware
CSERR 217	hardware

THE SYMPTOMS No Changes

DS console locked	terminal problem
DSLINe fails	MPE problem, not DS
DSCOPY aborts	line not open
DSCOPY fails	line open one way
	line errors
	user error
	wrong file type
	copy in wrong direction
hung session, can't abort	user errors
	PTOP program logic
	subsystem problem
	application program problem
line closes	line errors
NFT errors 101-110	resource errors
	internal software errors
poor response	line errors
REMOTE command fails	user errors
	MPE problems
	lack of psuedo-devices
remote system shuts line	line problems
	hardware failure
system failures	software problems
	missing patches or fixes
transfer only one way	remote configuration problem
IMF can't connect	line problems
can't sign on	configuration file
CS errors	other problems
CSERR 117	
host shuts line	
IMF errors	
line closes	
poor response	
printer problems	
system failures	

THE SYMPTOMS

No Changes

MRJE

can't get into console mode
can't sign on

didn't get host number back

host shuts line
job management doesn't work

line closes

MRJE console operator errors
MRJE user errors
no input taken by host
no output

only one input or output set
poor response

printer problems

someone else has console
host configuration changed
user signon procedure
configuration file
message modified, can't read
hardware problem
line problems
job log corrupted
didn't get host number back
banner messed up
configuration file corrupted
RMT# changed or wrong
line problems
host operator shut line
file system problems
user error
user sign on procedure
user sign on procedure
host went down
devices not open
user command error
host configuration changed
line problems
systems busy
out of disc space
file equation error
out of file space
spooler space problem
operator inhibited printouts
printer not ready

THE SYMPTOMS No Changes

MTS all but one remote dead is dead	line problem group DOWNed terminal problem modem problem
can't logon	terminal switches/configuration terminal switches/configuration user error
can't open line	MPE resource problem software installation bad download file bad modem problem
commands don't work	controller problem terminal switches/configuration user error
dead terminals, no response	line not open line problem modem problem
hung terminals	terminal switches/configuration program problem
line shuts	line problems modem problems
no polling on any terminals no polling on some terminals	line not OPENned terminals DOWNed line problems modem problems
polling, no prompts	terminal switches/configuration MPE resource problem system busy
polling, some prompts poor response	some terminals DOWNed configuration file error line overloaded software error terminal switches/configuration modem problems
read errors write errors	MPE buffer size line problem line problem

THE SYMPTOMS

No Changes

RJE aborts

can't sign on

host shuts line

line closes

no output

poor response

MPE resource problem

user written procedure

sign on procedure

host configuration

line problems

line problems

modem problems

sign on procedure error

host configuration

line problems

modem problems

host not sending data

line problems

host busy

HP3000 busy

line problems

TERMIO

can only logon at one speed

can't get back into block mode

can't logon

terminal switches/configuration

user hit break key

port hung

port DOWNed, REFUSEd

terminal switches/configuration

MPE resource problem

user procedure wrong

operator aborted session

BYE in UDC

session logged off

hang while running program

program busy

program changed terminal configuration

user changed term switches

terminal switches/configuration

hardwired worked; modem won't worked

modem problems

line problems

cable bad

remote spooled printer problems

modem problems

line problems

printer switches

program problem

printer status not checked

MPE resource problem (TBUFS)

SF 208 (HP-IB only)

noisy modems or lines

using last port on main with modems

SF 209

noisy modems or lines

SF 211

ADCC hardware problem

SF 714,716

hardware problem

SF 715

console hardware problem

THE CAUSES

Once the symptoms are found and the possible causes are determined, the next step is to check to see which one is really the problem. The problems can generally be put into four groups.

Usage problems are those arising from improper use of an otherwise working data communications network. For example:

- Using wrong parameters
- Giving wrong reply to dial message
- Using wrong controller

Protocol problems involve the software that handles the link such as the CS subsystem, CSSBSCO, or the INP. These usually indicate a software or hardware error in the DTE. They may be caused by the user.

Digital problems are in the interface between the DTE and the DCE such as cables, connectors, RS-232-C pin usage, or modem options.

Analog problems are usually called impairments and dwell within the transmission facility. Transmission line impairments come in two types, fortuitous and systematic. The former is relatively similar to an 'acute illness;' it comes up suddenly, goes away quickly, and may come back when ever it pleases. Not much can be done about them except to redial the connection and let someone else have the problem. Some categories of fortuitous impairments are:

- Noise - electrical disturbances
- Crosstalk - interference from another channel
- Echo - reflected signals
- Loss - drop in signal power
- Jitter - instability in frequency shifts

The other type of transmission line problems is systematic. These impairments, called distortion, can be corrected by conditioning the line. The are:

- Delay - frequencies arrive at different times
- Attenuation - loss of some frequencies

There are several important steps to checking these causes:

- o Verify the results - what really happened?
- o Verify the software and I/O configuration - coldloads and restores can cause accidental destruction of the I/O configuration or system software.
- o Actual protocol errors, where there is a bug, may require more extensive testing. If your software is up to date, CSDUMP may show the problem.
- o Test the data communications network.
- o Test the modems and DTE.

THE CAUSES

The following 'Cause Table' lists the possible causes of problems along with the type of cause and the tests used to check them out. Remember, some tests may be as simple as asking someone what they did or checking version numbers.

Cause Table

Cause	Test or Action
ADCC hardware problem	try another port run ADCC diagnostic
application program problem	check program
application wrong	IMF is not exactly a 3270
ATP problems	run ATPDSM
banner messed up	check banner and configuration file
BYE in UDC	examine UDC files
cable bad	check cable part number check cable continuity
configuration	check configuration
configuration file	check configuration file
configuration file corrupted	check configuration file restore configuration file
configuration file error	check configuration file
controller problem	run DSM
copy in wrong direction	check user procedures for attempts to copy wrong way
devices not open	check remote operator procedure
didn't change configuration	check configuration to be sure all changes were made
didn't get host number back	check host configuration
download file bad	restore from tape
DSMON bad	check version
file equation error	check user procedures
file system problems	check file error code
group DOWNed	check console log
hardware	run DSM run modem selftest run terminal selftest
hardware failure	run hardware diagnostics
hardware problem	run hardware diagnostics
host busy	retry later
host compatibility	check host specifications
host configuration	check configuration
host configuration changed	check changes in configuration
host not sending data	check host configuration for when host sends or terminates
host operator shut line	check remote operator procedure
host went down	call host operator
HP3000 busy	try again later
improper installation	check versions numbers reinstall software
INP switches	check switches for correct setting

THE CAUSES

internal software errors	check SSB
job log corrupted	reinstall or coldload software
lack of psuedo-devices	check job log
line not OPENned	clean out job log
line not open	check configuration
line open one way	add more devices
line overloaded	check operator procedure
line problem	check operator procedure
	check remote operator procedure
	check line traffic to speed ration
	run modem diagnostics
	run terminal data comm tests
	run DSM loopbacks
	run MPTEST over lines
message modified, can't read	check host specifications
missing patches or fixes	check patch list in SYS
modem problem	run modem diagnostic
	run terminal data comm test
	run DSM loopbacks
	run MPTEST over lines
MPE configuration	check configuration
MPE configuration error	check configuration
MPE problem, not DS	check SSB
MPE problem	check SSB
MPE resource problem	check configuration
MPE resource problem (TBUFS)	check configuration
new user commands	check user procedure
noisy lines	run modem selftests
	run modem remote tests
noisy modems	run modem selftests
	run modem remote tests
operator aborted session	check operator console log
operator inhibited printouts	do :SHOWOUT SP at console
operator procedure	check operator procedure
out of disc space	run FREE2
out of file space	do :LISTF,2 and run LISTEQ2
port DOWNed, REFUSED	do SHOWDEV
port configured wrong	check configuration
port hung	run TABLE
preferred buffer size	check configuration
(INP, HSI, SSLC)	
printer not ready	check printer
printer status not checked	check program
printer switches	check printer switches
program busy	wait program to complete I/O
	then check for hung terminal causes
program changed terminal	
configuration	check terminal switches/configuration
program problem	check program
program not compatible	
with new MPE	check SRB for changes to MPE
PTOP program logic	check program

THE CAUSES

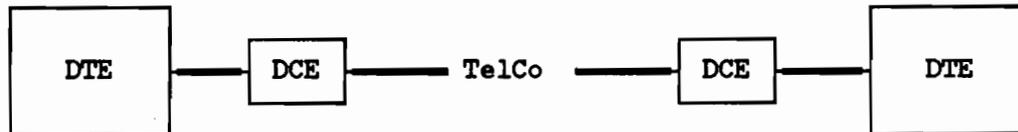
remote configuration problem	check remote configuration
remote device	check remote device hardware
request aborted by host	check remote operations
	rcheck user sign on procedure
	check line
resource errors	check system resources
RMT# changed or wrong	check job card
	check host configuration
screen design error	check screen design with original
sign on procedure	check user sign on procedure
software bad	coldload from known good tape
software error	check SSB, call PICS
software installation bad	check versions
	reinstall software
	check modems
	check line
software problems	check SSB, call PICS
some terminals DOWNed	check configuration file
	UP terminals
someone else has console	check user procedure
spooler space problem	do :SHOWOUT SP at console
	check configuration
subsystem problem	try on hardwired terminal
	check SSB
system busy	retry later
	check system usage
terminal problem	run terminal selftest
	run MPTEST
terminal switches/configuration	check terminal switches/configuration
terminals DOWNed	check configuration file
	UP terminals
user changed term switches	check terminal switches/configuration
	check user procedure
user command error	check user procedure
user error	check user procedure
user hit break key	check user procedure
user procedure wrong	check user procedure
user sign on procedure	check user procedure
	check job files
user written procedure	check changes to MPE procedures
using last port on main	check terminal connections to
	last port on each main
wrong file type	check user procedures for
	attempts to copy data bases

THE TOOLS

Usage Tools

Usage Tools

Usage test tools are usually commands or programs on the HP3000. The major use of these tools is to verify that the system management and users are using the system properly.



<-Usage->

<-Usage->

Verify user procedures

CSDUMP	Prints the data collected by the TRACE facility
TRACE	Records exactly what data went across the line
DSDUMP	Side by side trace of DS conversation
MPCONFIG	Will show the poll and downs lists
SHOWME	Shows version number of current MPE
EDITOR	Will list various job stream and UDC files
IMFMGR	Will list parameters for host access
LISTEQ2	Show file equations in effect

Examine software tables

FREE2	Shows free disc space
SHOWCOM	Shows current errors, retries and status of a line
TABLE	Will display terminal DIT and other table entries
CSDUMP	Will show how the line was opened
DPAN4	Shows all tables at time of memory dump

versions

CSLIST	Displays version numbers of CS modules
DSTEST,VERS	Displays version numbers of DS modules
MRJECONTROL,CHECK	Displays version numbers of MRJE modules
MPMON	Displays version number of MTS

configuration

SYSDUMP	Will show I/O configuration, table sizes
SYSINFO	Will show I/O configuration, table sizes
DSTEST,VERS	Shows DS MPE configuration

configuration files

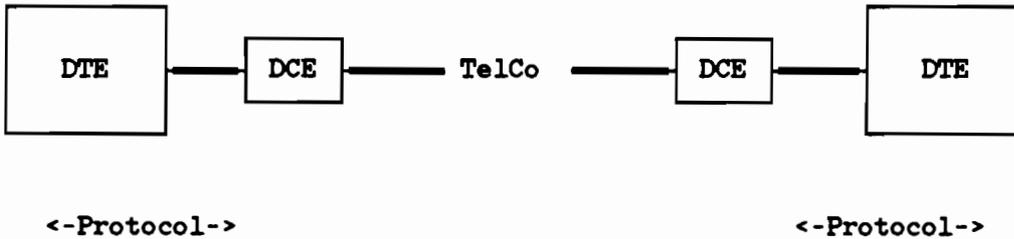
IMFMGR	Will display and verify configuration files
MPCONFIG	Will display configuration file

job card, files, logs, other

EDITOR	Will display job files and logs
SSB	Contains known problem information

Protocol Tools

Protocol test tools provide a means for finding the source of problems in the software that handles the link. They may simply check that the right software is on the system or collect the data for the factory to resolve the problem.



Check software versions
HP1640 Data Analyzer
CSDUMP
DSTEST,DIAG

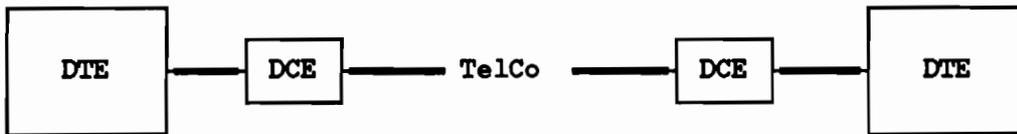
Verifies what protocol is being used
Displays protocol sequences
Traces what protocol is being used
Tests the DS protocol

THE TOOLS

Digital Tools

Digital Tools

Digital test tools are for testing the interface between the DTE and the DCE. They are usually devices or programs that test the hardware.



Controller software tests

DSM

Interconnect	Groups 1 and 5 test the INP processor and memory
Onboard	Groups 2, 3, 4 and 5 test the USART chips
Offboard	Groups 6 and 7 test the USART with cables or modems
INPDPAN	Processes the INP RAM dump showing protocol and errors
ATPDSM	Tests the ATP hardware and software

Cable tests

DSM loopback	Groups 6 and 7 test the INP with cables and modems
MPTEST	Will test the complete cabling network for MTS terminals
Breakout Box	Indicates which signals are passing through the cables
Multimeter	Used for continuity tests
Terminal data comm loopback	Test the cables attached to the terminals

Modem tests

Selftest	Hardware within the modem
Digital loopback	Digital interface connections
Analog loopback	Analog (TelCo) interface connections
Remote test	Modems as a set and the TelCo lines

Terminal tests

Selftest	Terminal hardware
Data comm board	Multipoint hardware within the terminal
Data comm loopback	Multipoint cable connections
MPTEST	Shows the strap setting and tests terminal I/O
Display functions	Shows what terminal is receiving
Monitor mode	Shows what is passing thru the communications interface
Driver mode	Polls other terminals without computer

Hardware diagnostics

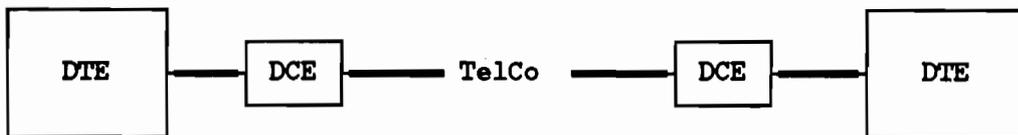
ADCC diagnostic	ADCC hardware
ATC diagnostic	ATC hardware
ATPDSM	ATP hardware
DSM	INP hardware
IOMAP	HP3000 HP-IB system hardware
SLEUTH	HP3000 Series II/III hardware
SSLC diagnostic	SSLC hardware
Data Link Tester	Shows the status of signals on the DATA LINK

THE TOOLS

Analog Tools

Analog Tools

Analog test tools provide the capability to examine the quality of the TelCo line or any privately owned transmission facility. They do this by sending data across the line which is read by another device on the other end or looped back to the originator.



<---Analog--->

Analog TelCo line tests

Noise and Loss

BERT (HP1645)

MPTEST

DSM Offboard

Modem remote test

Terminal driver mode

TIMS (HP4943,4935)

Terminal data comm

loopback

Test of TelCo line and modems

Extended test of TelCo line

Extended test of TelCo line

Pass/fail test of TelCo line

Extended test of TelCo line

Many extended tests of TelCo
line quality

Pass/fail test of TelCo line

TOOL DESCRIPTIONS

TOOL DESCRIPTIONS

This section includes an alphabetic list of tools. It tells what they do, when to use them, where to find them, and where they are documented.

ADCC diagnostic

It is a set of diagnostics for the ADCC including tests for the IMB handshake logic thru the RS-232-C cable. After loading from the tape, specific tests can be selected. It requires a loopback hood and at least one good ADCC is needed for the console.

Use it when a port is suspected and nothing else has helped

Find it on the DUS tape

Documented in the DIAGNOSTIC MANUAL SET, Vol. 2

ATC diagnostic

It is a set of offline diagnostics to verify the operation of the ATC ports. This simple test requires only the male-to-male cable that comes with your system.

Use it when a port is suspected and nothing else has helped

Find it on the Non-CPU Diagnostic tape

Documented in the ATC DIAGNOSTIC MANUAL

ATPDSM

It is a diagnostic program that provides corrective capabilities for the ATP through easy commands

Use it when a port appears to be stuck or the LEDs remain ON after the AIB self test

Find it in PUB.SYS

Documented in the ATP DIAGNOSTIC MANUAL

TOOL DESCRIPTIONS

BERT (HP1645)

It is a box for testing the quality of a phone line or modems by sending and receiving test data. One is placed on each end of the line or just one end with the other end in loopback

Use it when a line or modem problem is suspected or it is necessary to prove that one exists

Find it HP and other supplier catalogs as HP1645A, Red Box, BERTs

Documented in manuals supplied with device

Breakout Box

It is a small box which fits in between two RS-232-C cables that allows monitoring and patching of signals

Use it when there is doubt that a signal is getting through or a test is to be made prior to modifying a cable

Find it on the HP parts list or in the International Data Sciences catalog or other catalogs as breakout box, traffic light, etc.

Documented by instructions that come with it

CSDUMP

It is a program that analyzes the data collected by a TRACE process on one of the data communication lines. It expects to find the file CSTRACE.

Use it when there is any question as to what is going over the line or you want to determine what a user is sending. It is usually required for factory involvement.

Find it in PUB.SYS

Documented in RJE MANUAL and in Section I of the COMMUNICATIONS HANDBOOK

TOOL DESCRIPTIONS

CSLIST

It is an unsupported program to list the version, update and fix levels of the CS modules on the system

Use it when wrong software modules are suspected or you want to know what versions are on your system

Find it in PUB.SYS

Documented nowhere, just run it and answer yes

CSTRACE

It is the data file created by the TRACE process for an open line which contains a recent history of the data transmissions that have gone over the line

Use it when the subsystem in question is MTS, RJE or IMF; DS uses a file called DSTRCnnn and MRJE uses MRJETRCh

Find it in PUB.SYS

Documented in the RJE and DS manuals and in Section I of the COMMUNICATIONS HANDBOOK

Data Analyzer (HP1640)

It is a protocol analyzer device placed into the RS-232-C line to display the conversation between two devices or to simulate one of them. It also has the ability to trap timing conditions and sequences.

Use it when the TRACE process does not show the needed information in content or time frame, or the problem is on an asynchronous terminal connection

Find it in the HP catalog or at a local HP sales office

Documented in Section B of the COMMUNICATIONS HANDBOOK, the DATA CAPTURE MANUAL, the Operation Manual that comes with the device, and Application Notes 275

TOOL DESCRIPTIONS

DPAN4

It is a facility to analyze a memory dump tape. There is a job stream called DUMPJOB4 which collects additional data from the system such as the loadmap and I/O configuration.

Use it when any communications subsystem aborts or the system fails

Find it in PUB.SYS.

Documented in the SYSTEM UTILITIES MANUAL, SOFTWARE POCKET GUIDE

DSDUMP

It is a CSTRACE analyzer program specifically for DS traces. It prints the DS conversation on alternate sides of the page at the high level of DS protocol.

Use it when you are troubleshooting a DS problem and want to eliminate the bisync protocol of CS.

Find it in PUB.SYS

Documented in newer DS manuals and in data communications training materials for SEs

DSM Interconnect

It is the INP diagnostic and test tool Groups 1 thru 5 which do extensive tests of the INP processor and memory

Use it when the INP fails

Find it in PUB.SYS

Documented in the INP DIAGNOSTIC MANUAL supplied with the INP and in the help feature within the program

TOOL DESCRIPTIONS

DSM Offboard

It is the INP diagnostic and test tool Groups 6 and 7 which provide the capability to test the network external to the INP. It uses loopback connectors and modem loopbacks.

Use it when you want to test cables, modems, or a complete INP to INP connection

Find it in PUB.SYS

Documented in the INP DIAGNOSTIC MANUAL supplied with the INP and in the help feature within the program

DSM Onboard

It is the INP diagnostic and test tool Groups 2 thru 5 which test the boards USART and other data comm chips. It requires card edge loopback hoods.

Use it when the INP is suspect and the Interconnect tests have passed

Find it in PUB.SYS

Documented in the INP DIAGNOSTIC MANUAL supplied with the INP and in the help feature within the program

DSTEST

It is a program to list versions of DS modules, list the I/O configuration pertaining to DS, and provide online diagnostics over the DS line

Use it when DS software versions are suspected, you are in doubt about the configuration, or you want to test the line and software

Find it in PUB.SYS

Documented in the DS MANUAL

TOOL DESCRIPTIONS

Data Link Tester

It is a small device used to test the Data Link cable at a connector box for continuity and proper wiring

Use it when you are installing a Data Link to test your connections and when the data link cable is suspected

Find it in the Data Link Installation Kit and HP parts list

Documented in the DATA CAPTURE MANUAL

EDITOR

It is the text editing facility of MPE

Use it when you need to look at an ASCII file such as UDCs or job streams

Find it in PUB.SYS

Documented in the EDIT/3000 MANUAL

FREE2

It is a system utility to report on the current status of free disc space on the system

Use it when you are unsure of whether there is sufficient free disc space available to do your job

Find it in PUB.SYS

Documented in the SYSTEM UTILITIES MANUAL

IMFMGR

It is a command for the Interactive Mainframe Facility subsystem which provides the manager of the facility with control over its use and the capability to verify configuration files.

Use it when it is necessary to confirm the contents of a configuration file

Find it as :IMFMGR

Documented in the IMF MANUAL

TOOL DESCRIPTIONS

INPDPAN

It is an analyzer for the INP RAM dump. Except for 'status at time of failure,' reading these dumps is usually done by the factory.

Use it when the CS subsystem has created a RAM dump file for the INP and has notified the operator of its creation

Find it in PUB.SYS

Documented in Section I of the COMMUNICATIONS HANDBOOK and SE data comm training materials

IOMAP

It is a diagnostic to identify and checkout the basic I/O system hardware. This command driven program lists the hardware, channels and devices.

Use it when the exact I/O configuration is not known.

Find it on the DUS tape

Documented in the DIAGNOSTIC MANUAL SET

LISTEQ2

It is a program to list file equations and temporary files.

Use it when files don't seem to be going to the right place or in the right fashion.

Find it in PUB.SYS

Documented in the SYSTEM UTILITIES MANUAL

MPCONFIG

It is a program to list, change and create MTS configuration files.

Use it when you want to view the contents of a configuration file

Find it in PUB.SYS

Documented in the MTS MANUAL

TOOL DESCRIPTIONS

MPMON

It is the MTS line supervisor. Running it will display the version number.

Use it when the version of MTS is unknown

Find it in PUB.SYS

Documented in the MTS MANUAL

MPTEST

It is a testing facility for MTS lines and terminals. It will check terminal strap settings and perform read/write tests of the line, modems and terminals.

Use it when a new MTS line is installed to check the terminal straps or a line is not functioning properly.

Find it in PUB.SYS

Documented in the MTS MANUAL

MRJECONTROL

It is a console operator command used to control the MRJE line. The CHECK parameter will cause a list of version numbers to be listed.

Use it when the version numbers are unknown or are suspected of being wrong.

Find it as :MRJECONTROL

Documented in the MRJE MANUAL

Modem analog loopback

It is a modem capability to connect the analog output and input parts of the modem together to read whatever is written. This tests about 80% of the modem.

Use it when testing data terminal equipment without going over the TelCo line (local test) or the local modem.

Find it as a button or switch somewhere on the modem

Documented in the modem manual, Bell and HP modem tests are in Section B of the COMMUNICATIONS HANDBOOK

TOOL DESCRIPTIONS

Modem digital loopback

It is a modem capability to connect the digital output and input parts of the modem together to return whatever was received. This loopback is necessary to test a TelCo line and is set on the far end modem from either the computer or terminal.

Use it when when testing data communications equipment by going over the TelCo line (remote test).

Find it as a button or switch somewhere on the modem

Documented in the modem manual, Bell and HP modem tests are in Section B of the COMMUNICATIONS HANDBOOK

Modem remote test

It is a modem capability to send data to and receive it back from a remote modem. Some modems have the capability to tell the remote modem to go into loopback. It provides a pass/fail test of the hardware.

Use it when the TelCo line and modems are being tested independently of the data terminal equipment.

Find it as a switch or button on the modems

Documented in the modem manual, Bell and HP modem tests are in Section B of the COMMUNICATIONS HANDBOOK

Modem selftest

It is a modem pass/fail test. It will determine if the modem is functioning within specifications.

Use it when any time there is any doubt. Just push the button; it does the rest.

Find it as a switch or button on the modem

Documented in the modem manual, Bell and HP modem tests are in Section B of the COMMUNICATIONS HANDBOOK

TOOL DESCRIPTIONS

Multimeter

It is an electronic tool for testing volts and ohms. It can be used to test the continuity of a cable or connector when set to ohms.

Use it when cables or connections are suspected of being faulty

Find it in nearly any electronics store such as Radio Shack

Documented in the manual that comes with it. Some cables are documented in the DTD CABLING MANUAL and the COMMUNICATIONS HANDBOOK

SHOWCOM

It is a console operator command to display the statistics generated for a data comm line such as CS errors, timeouts and retries.

Use it when the line appears hung, an exceptional number of errors are being encountered, or the last CS error message for the line was lost.

Find it as :SHOWCOM XX;ERRORS

Documented in the CONSOLE OPERATOR'S GUIDE and the COMMUNICATIONS HANDBOOK

SHOWME

It is an MPE command to identify the session

Use it when the current version of MPE is needed

Find it as :SHOWME

Documented in the MPE COMMAND MANUAL

SLEUTH

It is a diagnostic programming language useful in determining the exact I/O configuration on Series II/III computers.

Use it when the exact I/O configuration is not known

Find it on the Non-CPU Diagnostic tape

Documented in the diagnostic manuals that come with the system

TOOL DESCRIPTIONS

SSB

It is the SOFTWARE STATUS BULLETIN, a publication containing a list of all known problems and enhancement requests. It may have the problem you are troubleshooting already listed with a fix or work around.

Use it when you first encounter the problem to see if it is already known.

Find it in the mail from your CSS or SSS contract

Documented in the GUIDE TO A SUCCESSFUL INSTALLATION



SSLC diagnostic

It is a diagnostic useful in testing the SSLC, cables and modems in the same manner as DSM for the INP. It requires loopback hoods and cable connectors or modem loopbacks.

Use it when the modems, TelCo lines, or SSLC are not functioning properly

Find it on the Non-CPU Diagnostic tape

Documented in the diagnostic manuals that come with the system

SYSDUMP

It is the MPE configurator. When used with \$NULL as the tape file designator, it provides a quick method of finding the exact configuration as MPE sees it.

Use it when the exact configuration is not known

Find it as :SYSDUMP

Documented in the CONSOLE OPERATOR'S GUIDE and SYSTEM MANAGER MANUAL

TOOL DESCRIPTIONS

SYSINFO

It is an contributed program that analyzes the MPE I/O configuration and lists it in parts or whole. It gives a nice analysis of how each controller and supervisor is used.

Use it when the configuration is not known

Find it usually in PUB.SYS

Documented with an internal help facility

TABLE

It is an unsupported program that lists terminal DITs and other tables used by MPE. It is command driven and is useful for examining DITs at a time when a terminal appears hung.

Use it when a terminal appears hung

Find it usually in PUB.SYS

Documented in TABLEDOC on some systems or ask PICS for it

Terminal data comm tests

It is a terminal resident test of the data comm board, cables, cable connections, modems and TelCo lines. The loopback hood and connectors come with the terminal. Modem loopbacks are also used.

Use it when any component of the MTS network is not functioning other than the computer.

Find it as sequences on the terminal keyboard

Documented in the terminal and MTS REFERENCE MANUALS

TOOL DESCRIPTIONS

Terminal display functions

It is a terminal capability to display all terminal escape sequences and functions rather than perform them. It is very useful in finding improper data being sent to terminals.

Use it when a terminal is hanging while receiving data

Find it as a key on the terminal keyboard

Documented in the terminal reference manual

Terminal driver mode

It is a capability of 2645 and 2626 terminals to poll other multipoint terminals over a line. It can be used to eliminate the computer from the list of possible problems.

Use it when you are trying to determine whether the problem lies in the computer or not, or you want to test the TelCo line

Find it as sequences on the terminal keyboard

Documented in the terminal reference manuals

Terminal monitor mode

It is a method of using the terminal to display the traffic on the MTS line.

Use it when information is needed about what polling is being done.

Find it as a key on the terminal keyboard

Documented in the terminal and MTS REFERENCE MANUALS

Terminal selftest

It is a pass/fail test of the terminal hardware.

Use it when a terminal is not functioning properly or other tests are to be done using a terminal

Find it as a key on the terminal keyboard

Documented in the terminal reference manuals

TOOL DESCRIPTIONS

TIMS (HP4943,4935)

It is a Transmission Impairment Test Set or similar device for analyzing the quality of a line or set of modems. It is a standard piece of TelCo equipment and is used by many companies with large data communications installations.

Use it when line quality is suspected as the cause of problems

Find it on the HP price list and in various catalogs

Documented in Telco manuals and accompanying literature

TRACE

It is a process created when the TRACE parameter is used with a communications subsystem

Use it when line activity is to be recorded to diagnose problems

Find it the Operator commands for DS, IMF, MRJE and MTS, or the RJLINE command of RJE

Documented in Section I of the Communications Handbook and in each subsystem reference manual

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Data Communications Testing, Hewlett-Packard Company, 1980

Data Communications Concepts, National Cash Register, 1978

Technical Aspects of Data Communication, J. E. McNamara,

Digital Equipment Corporation, 1977

Guidebook to: DATA COMMUNICATIONS, Hewlett-Packard Company, 1977

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Data Communications, November 1981

Various Hewlett-Packard HP3000 manuals including:

2780/3780 Emulator Reference Manual

DSN/MTS Reference Manual

DSN/DS Reference Manual

DSN/IMF Reference Manual

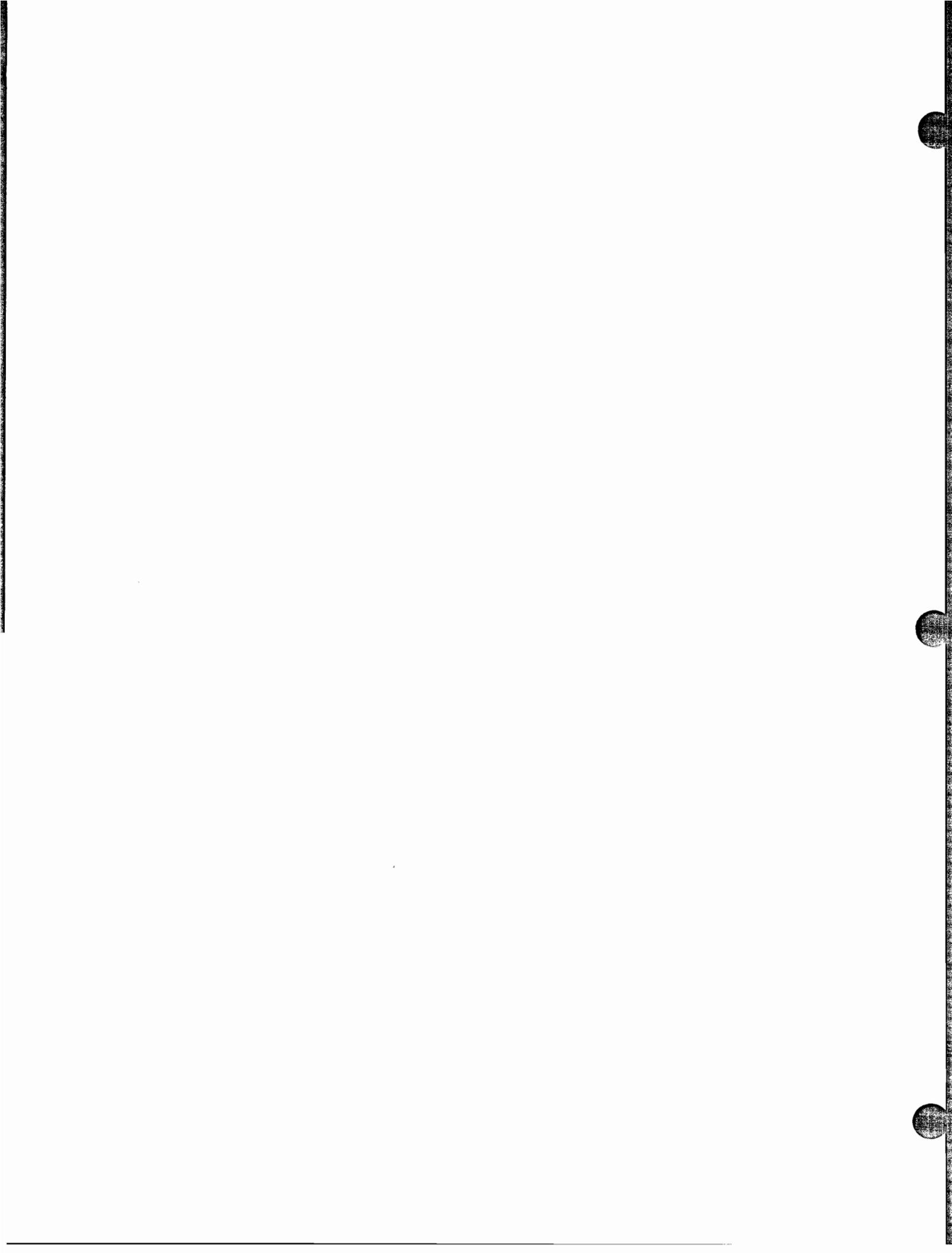
DSN/MRJE Reference Manual

System Error Messages and Recovery Manual

COMMUNICATIONS HANDBOOK

Diagnostic Manual Set

Various AT&T and Bell Technical References



ATP Generated System Failures

by Susan Thompson, Information Networks Division

The following pages constitute a temporary (pseudo) update for Appendix C of the HP 3000 Console Operator's Guide (HP part number 32002-90004). Note that system failures 700 through 716, which are generated by the Advanced Terminal Processor (ATP) software driver, have been added.

These pages have been prepared as a tear-out section so that you can insert them in the appropriate section of your Console Operator's Guide. The pages are numbered in the same way as an "official" update would be, with the preceding and following pages being replaced to accommodate the new material.

We hope that this additional material will prove useful to you until you receive the next official update to the Console Operator's Guide.

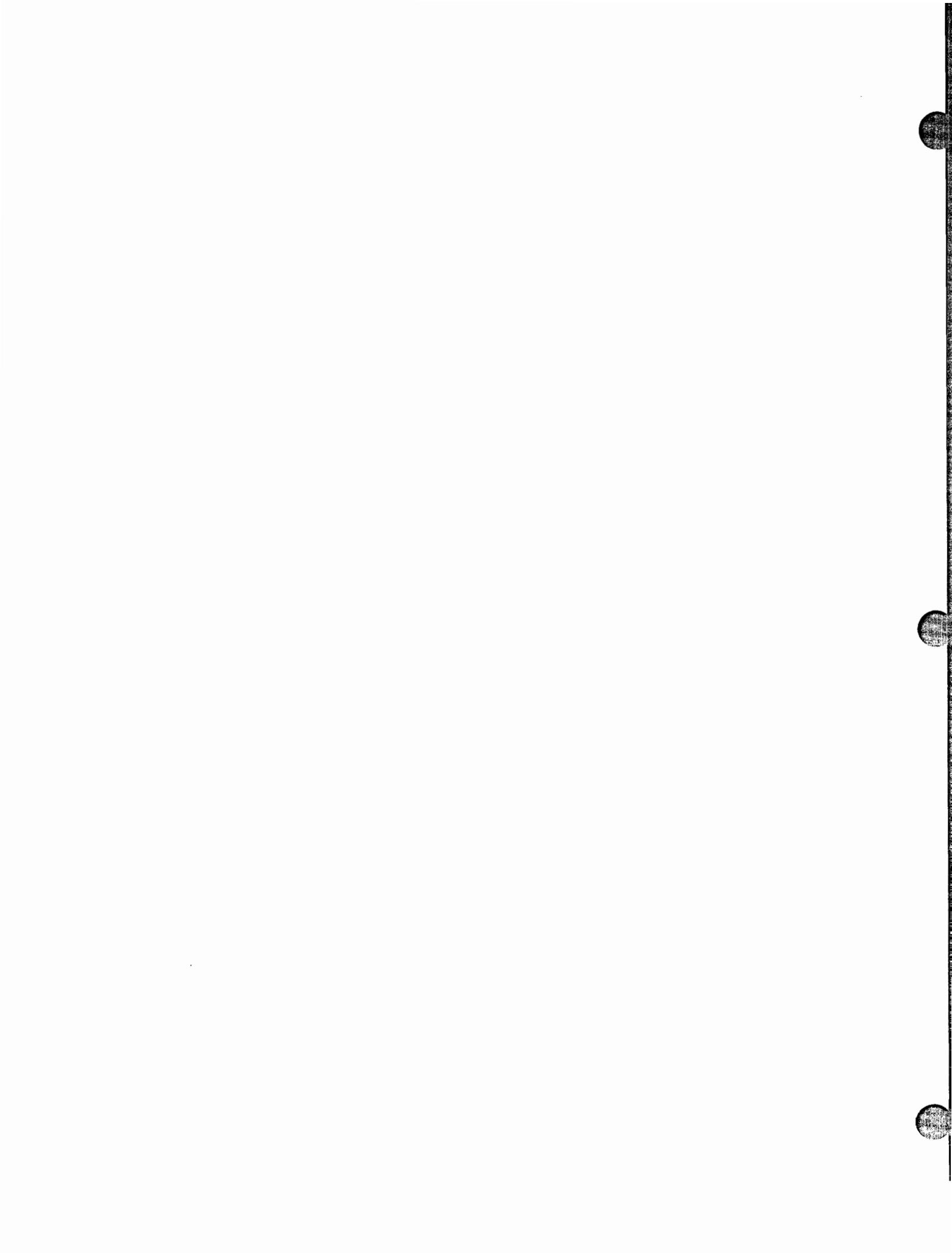


Table C-1. System Failure List (Kernel) (Continued)

ERROR NUMBER	MODULE/PROCEDURE NAME	CAUSE	ACTION
646-649		Currently unassigned	
650	KERNELC	Segment read disc I/O error	Perform a memory dump. Warmstart until INITIAL detects defective track.
651	KERNELC	Segment write disc I/O error	Perform a memory dump. Warmstart until INITIAL detects defective track.
652	KERNELC	Too many devices queued for a segment	Perform a memory dump. Warmstart the system.
653		Currently unassigned	
654	KERNELC	Attachio returned I/O error code to UPDATEDISCOPY	Perform a memory dump. Warmstart until INITIAL detects defective track.
655	KERNELC	I/O error when zeroing-out a swap region	Perform a memory dump. Warmstart until INITIAL detects defective track.
656-659		Currently unassigned	
660	HARDRES	Attempt to queue disc request that is already queued	Perform a memory dump. Warmstart the system.
661	HARDRES	Detection of integrity problem with disabling disc request	Perform a memory dump. Warmstart the system.
662	HARDRES	SIODM told to IOWAKE a process, but no PCB	Perform a memory dump. Warmstart the system.
663	HARDRES	Current request flag already set in next disc request selected for device	Perform a memory dump. Warmstart the system.
664-669		Currently unassigned	
680	KERNELC/KERNELD	Attempt to launch process with DB below DL	Perform a memory dump. Warmstart the system.
690	BIPC/IPC	Internal IPC problem	Perform a memory dump. Warmstart the system.

Table C-1. System Failure List (ATP) (Continued)

ERROR NUMBER	MODULE/PROCEDURE NAME	CAUSE	ACTION
700	ATPINIT	Cannot initialize or powerfail recover because DB is not SYSDB	Perform a memory dump. Warmstart the system, and send service request to local HP office.
701	ATPINIT	ATP subsystem cannot run on this system. (Will only happen if an IMB MIT is loaded on a Series II/III system).	Warmstart the system.
703	ATPINIT	Cannot initialize console I/O tables	Verify that console has been configured correctly. If so, perform a memory dump and warmstart the system. Send dump with service request to local HP office.
704	ATPINIT	Cannot allocate console (i.e., console has been initialized, but I/O function to console has failed).	Perform a memory dump and warmstart the system. Call your HP Service Engineer.
705	ATPINIT	Attempt to build the terminal data segment has failed	Reboot the system. If situation continues, perform a memory dump and call your HP Customer Engineer.
706	ATPINIT	Unable to load ATP software so the modules can be frozen and locked in memory	Update with the latest MIT. If problem persists, perform a memory dump and send with Service Request to local HP office.
708	ATPINIT	Cannot lock or freeze the extra data segment for ATP console due to insufficient memory	Reduce the number of ATP ports configured and/or reduce system resources (i.e., number of CSTs, DSTs, TBUFs).
709	ATPINIT	Bank 0 tables are unavailable	Perform a memory dump and warmstart the system. Submit dump with service request to local HP office.

Table C-1. System Failure List (ATP) (Continued)

ERROR NUMBER	MODULE/PROCEDURE NAME	CAUSE	ACTION
710	ATPINIT	Inconsistent information in I/O tables for a particular logical device.	Verify that the device type is appropriate for the driver configured. If okay, perform a memory dump and coldstart the system. If coldstart fails, call your HP Customer Engineer. Send dump with service request to local HP office.
711	PDMANAGR/RETURNLYNXBUF	Bad TBUF link pointer in returned TBUFs	Perform a memory dump and warmstart the system. If warmstart fails, call your HP Customer Engineer. Submit dump with service request to local HP office.
712	PDMANAGR/RETURNLYNXBUF	Bad TBUF head pointer to free list	Perform a memory dump and warmstart the system. If warmstart fails, call your HP Customer Engineer. Submit dump with service request to local HP office.
713	ATPINIT	Attachio returned error on I/O request for console during system initialization	Perform a memory dump and coldstart the system. If coldstart fails, call your HP Customer Engineer. Send dump with service request to local HP office.
714	ATPDRIVR	ATP hardware error detected by ATP subsystem	Perform a memory dump and call your HP Customer Engineer.
715	PDMANAGR/LYNXERROR	ATP failure on console access or possible console hardware problem	Verify that console is functioning properly. If so, perform a memory dump and warmstart the system. Send dump with service request to local HP office.
716	ATPDRIVR	Hardware failure outside of ATP subsystem (i.e., IMB, etc.)	Perform a memory dump and call your HP Customer Engineer.

Table C-1. System Failure List (ATP) (Continued)

ERROR NUMBER	MODULE/PROCEDURE NAME	CAUSE	ACTION
777	FILESYS/IOWAIT	CSIOWAIT missing	Reconfigure
800-899		Reserved for future product	

Table C-1. System Failure List (Datacomm Intrinsic) (Continued)

ERROR NUMBER	MODULE/PROCEDURE NAME	CAUSE	ACTION
900	COMSYS1/CSIOWAIT/ COMSYS4/CREAD/ CWRITE	I/O request no longer with caller's process	Perform a memory dump
902	COMSYS3/CSDRIVERLOCK	Unable to freeze or unfreeze segment in main memory	Perform a memory dump
903	COMSYS3/CDRIVERLOCK /CRELEASE' COMSYS5/CCONTROL /CPOLLIST COMSYS6/CDELETETRACE- AREA		
904	COMSYS5/CONTROL	Unable to increase data segment size	Perform a memory dump
905	COMSYS6/CDELETETRACE- AREA	Unable to decrease data segment	Perform a memory dump
906	COMSYS3/CDRIVERUNLOCK COMSYS6/CPOLLIST	Unable to unfreeze segment in main memory	Perform a memory dump
907	COMSYS3/CDRIVERUNLOCK	Unable to unlock segment in main memory	Perform a memory dump
909		Invalid pointer to pollist area	Perform a memory dump
910		Unable to find IOQ in CS table	Perform a memory dump.
911	FILEIO	IOWAIT to CS	Perform a memory dump.
912	DS/DSSEG1,DSSEG4	RFA buffer size less than zero	Perform a memory dump.
913	DS/IODS0	DSW and DSWR count disagree	Perform a memory dump
914	DS/IODS0,IODSTRM0	DS use count < 0	Perform a memory dump
915	DS/DSMON	Bad data and DEBUGON,3	Perform a memory dump
916	DS/DSMON	DEBUGON,3 and DS error	Perform a memory dump

Table C-1. System Failure List (Datacomm Intrinsic) (Continued)

ERROR NUMBER	MODULE/PROCEDURE NAME	CAUSE	ACTION
917	DS/DSEG2	Unable to locate DS line control block	Perform a memory dump
920	MRJE/IOMCONSO	Irrecoverable buffer state	Contact your HP representative
921	MRJE/IOMCONSO	Irrecoverable buffer state	Contact your HP representative

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- Are the articles technically accurate?
- Do they provide useful information?
- Are there topics you would like to see covered in future issues?

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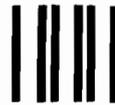
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