

DS/3000
DISTRIBUTED SYSTEMS
Section C

The *Communications Handbook* (obsolete part number 30000-90105) has been restructured to make it more widely available and more readily updated. The various sections of the handbook are now available in two ways:

1. Those sections pertinent to all datacomm products, including controller, modem, CS Trace and troubleshooting guides, are now combined and expanded into a separate handbook, the *Fundamental Data Communications Handbook* (5957-4634). This handbook is included with each new HP 3000 and as such is updated under operating system and software contracts. It can be separately ordered from CSO.
2. The product specific sections are now provided with each product for use as quick references and as such are updated under operating system, software and manual contracts for the products. These sections can also be separately ordered from CSO.

The DS/3000 section of the *Data Communications Handbook* is intended for use as a quick reference. It is not a set of product specifications. Refer to the appropriate reference manual for complete product, system, and component specifications.



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PRINTING HISTORY

New editions are complete revisions of the manual. Update packages, which are issued between editions, contain additional and replacement pages to be merged into the manual by the customer. The dates on the title page change only when a new edition or a new update is published. No information is incorporated into a reprinting unless it appears as a prior update; the edition does not change when an update is incorporated.

The software code printed alongside the date indicates the version level of the software product at the time the manual or update was issued. Many product updates and fixes do not require manual changes and, conversely, manual corrections may be done without accompanying product changes. Therefore, do not expect a one to one correspondence between product updates and manual updates.

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DSN/DS/3000 to 3000

SECTION

C

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REFERENCES

DSN/DS HP 3000 to HP 3000 User/Programmer Reference Manual (32189-90001)

DSN/DS HP 3000 to HP 3000 Network Administrator Manual (32189-90002)

DSN/X. 25 for the HP 3000 Reference Manual (32191-90001)

Software Pocket Guide (30000-90049)

MPE Intrinsic Reference Manual (30000-90010)

HP30360A Hardwired Serial Interface (HSI) Installation and Service Manual (30360-90001)

Intelligent Network Processor (INP) Manuals

HP30010A INP Installation and Service Manual (Series II/III: 30010-90001)

HP30020A INP Installation and Service Manual (Series 30,33,40,44: 30020-90001)

HP30020B INP Installation and Service Manual (Series 30,33,40,44,64,68: 30020-90005)

HP30010A/HP30020A/B INP Diagnostic Procedures Manual (30010-90002)

DSN/INP Handbook (10A: 30010-90006), (20A: 30020-90009), and (20B: 30020-90010)

DS/3000 COMMANDS

Controlling a Line from an Operator Console

The ASSOCIATE and ALLOW commands must be used to associate the user with a device and to permit specified users with CS capability to invoke this command from a terminal other than the console.

```
:DSCONTROL dsdevice [;function [;...function]]
```

where the parameter *function* has the following options:

```
[;CANCEL]

[;OPEN [ ,MASTER ] [ , [SPEED=] speed ] ]
[;SHUT [ ,SLAVE ] ]

[;TRACE [ ,ON [ [ALL] [ ,mask ] [ ,numentries ] [ ,WRAP ] [ ,filename ] ] ]
[ ,OFF ] ]

[;MON [ ,DS ] ]
[;MONOFF [ ,CS ] ]

[;COMP ]
[;NOCOMP ]

[;RETRY={DEFAULT }
        {count } ]
```

Parameters

<i>dsdevice</i>	Logical device number or device classname of DS device (IODS0 or IODSX).
OPEN	Establishes a communications link.
CANCEL	Applicable only to X.21. Cancels all queued outgoing call requests. CANCEL is executed before any other :DSCONTROL parameter.
SHUT	Initiates an orderly shutdown. To terminate all activity now, do an :ABORTIO <i>csdevice</i> and then :DSCONTROL <i>dsdevice</i> ;SHUT.

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MASTER	Allows local HP 3000 to process only outgoing requests across the DS line.
SLAVE	Allows local HP 3000 to process only incoming requests across the DS line. If neither MASTER nor SLAVE are specified, the default is to allow both outgoing and incoming requests.
<i>speed</i>	Transmission speed (characters/second). Parameter is effective only if SPEED CHANGEABLE is selected when system is configured, and only if clocking is provided by a device other than the modem.
TRACE	Allows CSTRACE to be activated or deactivated. The default is TRACE, OFF.
ON	Allows TRACE to be activated.
OFF	Allows TRACE to be deactivated.
ALL	Generates trace records for all line activity. If ALL is not specified, the trace record is written only when a transmission error occurs.
<i>mask</i>	Octal integer number preceded by percent sign (%nn). Default: %37
<i>numentries</i>	Decimal integer for maximum number of trace entries in a trace record (not greater than 248). Default:24. Maximum number of entries for an INP is 24.
WRAP	Causes trace entries that overflow the trace record (greater than <i>numentries</i>) to overlay the prior trace entries. Default: no wrap.
<i>filename</i>	Trace filename. The default file name is DSTRC:xxx.PUB.SYS, where xxx is the DS device ldev.
COMP	Establishes data compression as default on the line.
NOCOMP	Establishes no data compression as default on line.
MON	Provides MMSTAT entries for CS and DS in cold dump. Default is both kinds.
MOFF	Deactivates MMSTAT monitoring.
<i>count</i>	Controls the number of line driver attempts to send or to receive data. The count must be a positive integer <= 255. The default value is 15.
DEFAULT	The default value of RETRY counts is 15.

Once you have issued a DSCONTROL command, a SHOWDEV will display as follows:

:SHOWDEV <i>device</i>	:DSCONTROL <i>dsdevice</i>	
	OPEN	SHUT
related communication controller	UNAVAIL	AVAIL
<i>dsdevice</i>	AVAIL	UNAVAIL

Opening a Line from a User Terminal/Job

```
:DSLIN dsdevice
[;LINEBUF=bufferSize]
[;LOCID=localIDsequence]
[;REMID=remoteIDsequence1 [,remoteIDsequence2]...]
[;PHNUM=telephoneNumber]
[;EXCLUSIVE]
[;COMP]
[;NOCOMP]
[;QUIET]
[;OPEN]
```

Parameters

<i>dsdevice</i>	Device class name, logical device number, or a node name.
<i>bufferSize</i>	Decimal integer (size in words) of the DS/3000 line buffer. Default is the CS buffer size specified during system configuration.
<i>localIDsequence</i>	ASCII character string within quotation marks.
<i>remoteIDsequence</i>	Same format as <i>localIDsequence</i> .
<i>telephoneNumber</i>	Telephone number consisting of digits and dashes. Maximum length permitted (including both digits and dashes) is 20 characters.
EXCLUSIVE	Requests non-shared line use. Both CS and ND capabilities are required.
COMP	Overrides the current default and activates data compression. Sets mode of operation for subsequent DS/3000 activity for the user. See also :DSCONTROL.

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- NOCOMP** Overrides current default and deactivates data compression. See also :DSCONTROL.
- QUIET** This parameter causes the message that identifies the DS line number to be suppressed. Messages associated with subsequent REMOTE HELLO and REMOTE BYE commands will also be suppressed. (Optional parameter.)
- OPEN** Opens the DS line.

Defaults for *localIDsequence*, *remoteIDsequence*, and *telephoneNumber* are the values specified during HP 3000 I/O System configuration--if any values were specified.

Closing a Line from a User Terminal

Syntax

```
:DSLNE      { dsdevice
               dslineNumber
             } ;CLOSE
```

- dsdevice* Device class name, ldev, or node name.
- @ Specifies that all lines currently open should be closed.
- dslineNumber* The line number returned by a DSLINE...;OPEN. Enter #Ln.
- ;CLOSE Closes the specified line(s).

If no line identifier (*dsdevice*, @, or *dslineNumber*) is specified, DS/3000 closes the line most recently opened.

FILE COMMANDS FOR REMOTE FILES

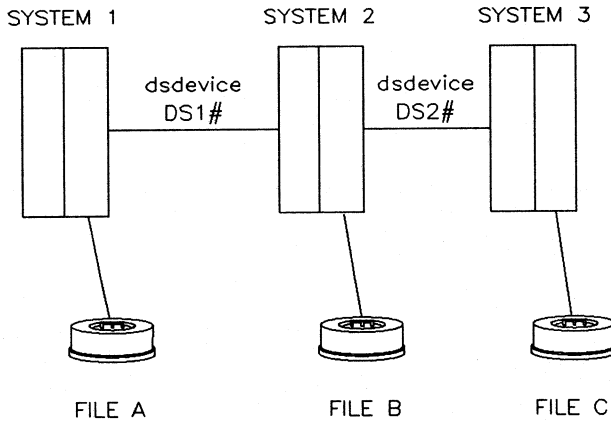


Figure C-1. File Commands for Remote Files.

Issue a file command on the local system (in Figure C-1, System 1) for a file resident on the first remote system (System 2):

```
:FILE name;DEV=dsdevice#device
```

Example:

```
:FILE B;DEV=DS1#DISC
```

Issue a file command on the local system for a file resident on the second remote system (in Figure C-1, System 3):

```
:FILE name;DEV=dsdevice#dsdevice#DISC
```

Example:

```
:FILE C;DEV=DS1#DS2# (Note that DISC is the default.)
```

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With a remote session established, issue a file command on remote system (System 2) to indicate file is resident on the original system (System 1):

```
:REMOTE FILE name;DEV=#
```

Example:

```
:REMOTE FILE A;DEV=#
```

Another way to specify a file on a second remote, system 3 is:

```
:FILE name;DEV=dsdevice#
```

```
:REMOTE FILE name;DEV=dsdevice#
```

Example:

```
:FILE B;DEV=DS1#
```

```
:REMOTE FILE B=C;DEV=DS2#
```

DS/3000 SPL PTOP INTRINICS

Program-to-Program Intrinsic Limitations

- The user main session process identification number (UMAIN PIN) is used for identification, thus providing a limit of one slave from each family tree per each DS line.
- The slave program cannot be opened back across a DS line. It must be opened in the *outgoing sense*.
- While a slave is opened, simultaneous remote file access (RFA) cannot take place within the family structure.
- SPL intrinsics are callable from SPL, PASCAL, and COBOL II.

Common Parameters

<i>bufsize</i>	integer by value. Size in words of the communications buffer that is to be established. Parameter defines the maximum number of words of data that can be transmitted by a PWRITE or PREAD intrinsic call. Default: Same size as the line buffer defined by the DSLINE command (LINEBUF=) for the first DSLINE issued to the dsdevice. Will never be smaller than 304 words. If no LINEBUF= is specified then the default configuration length is used.
<i>dsdevice</i>	byte array. Contains an ASCII character string terminated by a space. String must be the device class name or ldev used for the DS device.
<i>dsnum</i>	integer by value. The link identifier returned by the particular POPEN intrinsic call which initiated communication with the remote slave program.
<i>entryname</i>	byte array. Contains an ASCII character string terminated by a space. String is the name of the entry point (label) at which execution of the remote slave program is to begin. Default: Primary entry point.
<i>flags</i>	logical by value. Default value is zero, all flags off. Bit 0 is the most significant bit; bit 15 is the least significant. Bit(0:1) Not used. Bit(1:1) Q-63 to S-bit. If on, the portion of the stack from Q-63 to S is dumped. Bit(2:1) Q1 to S bit. If on, the portion of the stack from Q1 to S is dumped. Bit(3:1) DL to Q1 bit. If on, the portion of the stack from DL to Q1 is dumped. Bit(4:1) Should be set to zero.

Bit(5:2) STACKDUMP bits.

- 00 Enables only if enabled by father.
- 01 Enables unconditionally.
- 10 Same as 00.
- 11 Disables unconditionally for new process.

Bit(7:2) Should be set to zero.

Bit(9:1) NOCB bit.

Bit(10:2) LIBSEARCH bits.

- 00 System Library
- 01 Account Public, System Library

Bit(12:1) NOPRIV bit.

Bit(13:1) DEBUG bit, must be off (0).

Bit(14:1) LOADMAP bit.

Bit(15:1) (Always set on.)

icode integer. PCHECK returned code that specifies the completion status of the most recently executed DS/3000 intrinsic.

il integer. A word that has meaning only when a PREAD or PWRITE request is received from the remote master program.
For a PREAD request, *il* contains an integer specifying the number of words requested by the remote master program.
For a PWRITE request, *il* contains an integer specifying the number of words transmitted from the remote master program to the DS/3000 buffer.

ionumber integer. A word that has meaning only when the condition code CCG and an ifun of 5 are returned. In that case, *ionumber* contains the MPE File System file number associated with the completed I/O without wait request.

itag integer array. A twenty-word array used for transmitting and receiving tag fields. Format of the tag field is defined as part of the user's application.
Default: A tag field of all zeros is sent; the returned tag field (if any) is not available to the master program.

param integer by value. A word used to transfer control information to the new process. Any instruction in the outer block of code in the new process can access this information in location Q-4. The default value is zero.

programe byte array. Contains an ASCII character string terminated by a space. String is the name (with optional group and account names) of an MPE program file (residing on a disc connected to the remote HP 3000) containing the remote slave program.

stacksize integer by value. An integer (Z-Q) denoting the number of words assigned to the local stack area bounded by the initial Q and Z registers. **Default:** Same as that specified in the program file.

<i>dlsize</i>	integer (DB-DL) denoting number of words in user managed stack area bounded by DL and DB registers.
<i>maxdata</i>	integer by value. The maximum size allowed for the process' stack (Z-DL) area in words. When specified, this value overrides the one established at program-preparation time. Default: If not specified and not specified in program file either, MPE assumes the stack will remain the same size.
<i>target</i>	integer array (required for PREAD and PWRITE.) The array into which data received/transmitted to/from the remote slave program will be deposited.
<i>tcount</i>	integer by value. The requested number of words (if positive) or bytes (if negative) of data.

Condition Codes

CCE	Request accepted (by slave program) or completed successfully.
CCG	Request rejected (POPEN, PREAD, PWRITE, or PCONTROL) by slave.
CCL	Not returned (PCLOSE, ACCEPT, REJECT, PCHECK). Request denied; an error occurred. Issue a PCHECK to determine error. PCHECK request denied because <i>dsnum</i> was invalid.

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PTOP CALLS

HP 3000 Master

PCHECK

```
icode:=PCHECK(dsnum);
```

Note that *dsnum* is 0 if issued from a slave program. Refer to "DS Functional Errors" at the end of this section for the meaning of *icode*.

CCE	Request was successful
CCG	Not returned
CCL	Request denied. <i>dsnum</i> is invalid.

POPEN

```
dsnum:=POPEN(dsdevice,programe[itag][entryname][param]  
[flags][stacksize][dsize][maxdata][bufsize]);
```

PREAD

```
lgth:=PREAD(dsnum[target][tcount][itag]);
```

PWRITE

```
PWRITE(dsnum[target][tcount][itag]);
```

PCONTROL

```
PCONTROL(dsnum[[itag]]);
```

PCLOSE

```
PCLOSE(dsnum);
```

HP 3000 Slave**GET**

```
ifun:=GET([[itag]] [[il]] [[ionumber]]);
```

The GET intrinsic receives the next request from the remote master program and accepts an optional tag field (available in *itag*).

CCE	Request received successfully.
CCG	An IOWAIT (0) completed a file system I/O without wait, not DS I/O. The contents of <i>ionumber</i> identify the file.
CCL	Error. Use PCHECK.

When the GET intrinsic executes, it returns to the slave program a number (*ifun*) specifying what type of request was received from the remote master program, as follows:

ifun:

- 0 An error occurred. This value is returned only when the condition code CCL is also returned. Issue a PCHECK intrinsic call (with a *dsnum* parameter of zero) to determine what happened.
- 1 POPEN request received.
- 2 PREAD request received.
- 3 PWRITE request received.
- 4 PCONTROL request received.
- 5 This value is returned only when the condition code CCG is also returned. It indicates that a pending MPE File System I/O without wait request was completed (instead of a DS/3000 remote I/O request). *ionumber* contains the file number associated with the completed I/O request.

ACCEPT

```
ACCEPT([itag][target][tcount]);
```

CCE	Response transmitted successfully
CCG	Not returned
CCL	Error. Use PCHECK

REJECT

```
REJECT([itag]);
```

CCE	Request received successfully
CCG	Not returned
CCL	Error. Use FCHECK

DS/3000 COBOL PTOPI CALLS

Interface Conventions

Parameters in COBOL calling sequences can be:

Integer Picture 9 through 9(4) or Picture S(3) computational

Character string Picture X(n) or Picture A(n)

In the following calls, the parameters not specifically defined as character strings are assumed to be integers.

Common Parameters

Parameters whose use is the same for all procedures are:

<i>ccode</i>	The condition code returned by the PTOPI intrinsic: -1 is the same as CCL in an SPL intrinsic. 0 is the same as CCE in an SPL intrinsic. 1 is the same as CCG in an SPL intrinsic.
<i>dsnum</i>	The DS communication line number returned by CPOPEN.
<i>itag</i>	A 40-byte character field sent and received from the remote program.
<i>target</i>	The character field used for reading or writing data.
<i>tcoun</i>	The number of words or bytes to be read or written: A positive integer for words. A negative integer for bytes.

CPOPEN

The COBOL callable interface to POPEN.

```
CALL "CPOPEN" USING ccode,dsnum,dsdevice,progrname,itag,  
entryname,param,flag,stacksize,dsize,  
maxdata,bufferize
```

- dsdevice* A character field containing the device class or logical device number of the desired DS line.
- progrname* A character field containing the name (terminated by a space) of the remote slave program.
- entryname* The character field specifying the secondary entry point (or spaces) where the remote program will begin execution. *entryname* is ignored if the slave system is an RTE system.
- param* An integer value to be placed in Q-4 of the slave program. It is ignored if the slave system is an RTE system.
- flags* These are all MPE parameters used to specify program loading. They are ignored if the slave system is an RTE system. See the POPEN specifications for parameters in this section.
- stacksize*
- dsize*
- maxdata*
- bufferize* An integer specifying the maximum number of words which will be transferred by the PTOP intrinsic.

CPREAD

The COBOL callable interface to PREAD.

```
CALL "CPREAD" USING ccode,dsnum,length,target,tcount,itag
```

- length* The actual number of words or bytes (depending on the value of *tcount*) read into *target*.

CPWRITE

The COBOL callable interface to PWRITE.

```
CALL "CPWRITE" USING ccode,dsnum,target,tcount,itag
```

CPCONTROL

The COBOL callable interface to PCONTROL.

```
CALL "CPCONTROL" USING cocode,dsnun,itag
```

CPCLOSE

The COBOL callable interface to PCLOSE.

```
CALL "CPCLOSE" USING cocode,dsnum
```

CGET

The COBOL callable interface to GET.

```
CALL "CGET" USING cocode,ifun,itag,il,ionumber
```

ifun

The function number of the current pending PTOP operation. Refer to "PTOP Calls".

il

The number of words sent by a PWRITE or the number of words requested by a PREAD.

ionumber

The file number of a non-DS file which completed an I/O without wait.

CACCEPT

The COBOL callable interface to ACCEPT.

```
CALL "CACCEPT" USING cocode,itag,target,tcount
```

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CREJECT

The COBOL callable interface to REJECT.

```
CALL "CREJECT" USING cocode, itag
```

CPCHECK

The COBOL callable interface to PCHECK.

```
CALL "CPCHECK" USING cocode, dsnum, icode
```

icode An integer identifying the last error encountered.

Refer to "DS Functional Error Messages" at the end of this section for the meaning of *icode*.

DS/3000 BASIC PTOP CALLS

Interface Conventions

For each BASIC CALL statement, a parameter table constructed by BASIC contains the following:

1. The number of parameters.
2. A code word for each parameter, specifying data type and dimensioning.
3. A reference pointer to each parameter.

A BASIC/3000 slave program must be compiled and prepared (PREP). A master program can be compiled or run on the HP 3000 Interpreter.

Common Parameters

Parameters whose use is the same for all procedures are:

<i>ccode</i>	integer (required). The condition code returned by the PTOP intrinsic: -3 Not enough user stack for data transfer -2 Illegal calling parameter -1 CCL 0 CCE 1 CCG
<i>dsnum</i>	integer (required). The DS/3000 communication line number. Analogous to the OPEN file number.
<i>itag</i>	integer (optional). A 20-word array that is used to communicate tag fields. Its format is part of the user's application.
<i>parmlist</i>	(optional). A parameter list can consist of one parameter or multiple parameters separated by commas. A parameter can be any BASIC-supported data type.

NOTE

The same number of parameters must be specified on the master and slave and the data types must correspond.

CAUTION

NO WARNING OF INCOMPATIBILITY IS ISSUED BY BASIC.

Condition Codes

- CCE Request accepted (by slave program) or completed successfully.
- CCG Request rejected (POPEN, PREAD, PWRITE, or PCONTROL) by slave.
- CCL Not returned (PCLOSE, ACCEPT, REJECT, PCHECK). Request denied; an error occurred. Issue a PCHECK to determine error.
PCHECK request denied because *dsnum* was invalid.

BPOPEN

The BASIC callable interface to POPEN.

```
CALL BPOPEN(ccode,dsnum,dsdevice,progrname,
  {itag}, {entryname}, {param}, {flags}, {stacksize},
  {0}, {0}, {0}, {0}, {0},
  {dsize}, {maxdata}, buffsize)
  {0}, {0}
```

- dsdevice* string (required). The DS line class name or logical device number. The string must be terminated with a blank.
- progrname* string (required). The name of a remote slave program, terminated with a blank.
- entryname* string (optional). A secondary entry point into the slave program, terminated with a blank.
- param* integer (optional). The value placed in Q-4 of the slave program stack.
- flags* These are all MPE parameters used to control program loading. See the POPEN specifications for these parameters in this section.
- stacksize*
- maxdata*
- buffsize* integer (optional). The maximum number of words per PTOP transfer.

BPREAD

The BASIC callable interface to PREAD.

```
CALL BPREAD(ccode,dsnum,lgth, {itag}, param list)
  {0}
```

- lgth* integer (required). The number of words received in the transfer.

BPWRITE

The BASIC callable interface to BPWRITE.

```
CALL BPWRITE(cocode,dsnum, $\left\{ \begin{array}{l} \textit{itag} \\ 0 \end{array} \right\}$ ,param list)
```

BPCONTROL

The BASIC callable interface to PCONTROL.

```
CALL BPCONTROL(cocode,dsnum[ $\textit{itag}$ ])
```

BPCLOSE

The BASIC callable interface to PCLOSE.

```
CALL BPCLOSE(cocode,dsnum)
```

BGET

The BASIC callable interface to GET.

```
CALL BGET(cocode,ifun, $\left\{ \begin{array}{l} \textit{itag} \\ 0 \\ 0 \end{array} \right\}$ , $\left\{ \begin{array}{l} \textit{il} \\ 0 \end{array} \right\}$ , $\left\{ \begin{array}{l} \textit{ionumber} \\ 0 \end{array} \right\}$ )
```

- ifun* integer (required). The function code of the request issued by the remote master program.
- il* integer (required). The number of words sent by a BPWRITE or the number requested by a BPREAD.
- ionumber* integer (required). Valid if both *cocode*=1 and *ifun*=5. The file number of an I/O completed without wait.

BACCEPT

The BASIC callable interface to ACCEPT.

```
CALL BACCEPT(ccode,ifun, $\left. \begin{array}{l} \{i\}tag \\ 0 \end{array} \right\}$ ,param list)
```

BREJECT

The BASIC callable interface to REJECT.

```
CALL BREJECT( $\left[ \begin{array}{l} c \\ i \end{array} \right]$ code  $\left[ \begin{array}{l} i \\ t \end{array} \right]$ tag)
```

BPCHECK

The BASIC callable interface to PCHECK.

```
CALL BPCHECK( $\left[ \begin{array}{l} c \\ d \end{array} \right]$ code  $\left[ \begin{array}{l} d \\ s \end{array} \right]$ num  $\left[ \begin{array}{l} i \\ c \end{array} \right]$ ode)
```

Refer to "DS Functional Error Messages" at the end of this section for the meaning of *i*code.

NETWORK FILE TRANSFER

- Copies *disc* files within local system or across a DS line to an *adjacent* system.
- Uses intrinsics similar to PTOP intrinsics for transfers.
- Operates only in an *outgoing sense* depending on the node that originates DSCOPY: Given that A --> B --> C represents three systems with DS lines opened in the direction shown...if the originating node is the one on the left (A), you can DSCOPY between A <--> B or B <--> C but not between B <--> A or C <--> B.
- Single command, DSCOPY.
- Two intrinsics, DSCOPY and DSCOPYMSG.
- A job or session that issues a copy request cannot already have an executing DSCOPY process.
- References SE note 3000/181 and the *DS/3000 Reference Manual*.

To submit a series of transfer request, omit all of the source and target parameters to initiate Interactive Mode. Network file transfer prompts for input and, after transfer completes, prompts again for the next transfer request.

- For remote file transfers a line must be open.
- Target filename cannot already exist on the target system.
- Never break and :ABORT a DSCOPY operation. Use a **CONTROL**Y instead.
- Use an ampersand (&) as the last character in the DSCOPY command to continue the command to another line.
- Terminate interactive mode by typing // or **CONTROL**Y.

DSCOPY

Syntax

$$:DSCOPY \left[\text{source} \left[\left\{ \begin{array}{l} \text{TO} \\ ; \end{array} \right\} \right] \text{target} \right]$$

where the command syntax has the following meanings:

$$\text{source} \quad \text{--} \quad \text{sfile} \left[\begin{array}{l} \text{sdsdev} \left[\left\{ \begin{array}{l} , \\ \# \end{array} \right\} \right] \text{sdev} \end{array} \right]$$

$$\text{target} \quad \text{--} \quad \text{tfile} \left[\begin{array}{l} \text{tdsdev} \\ * \end{array} \right] \left[\left\{ \begin{array}{l} , \\ \# \end{array} \right\} \right] \text{tdev}$$

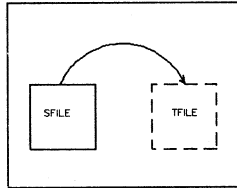
Parameters

- sfile** Required parameter. Identifies the file to be copied. The name can be in the following format:
- $$\text{sfile} [/\text{lockword}] [\text{.groupname}] [\text{.accountname}]$$
- sdsdev** Optional parameter. The class name or logical device number that was used to open the line to the remote computer where *sfile* resides. The default is the local system, where the transfer request was submitted.
- sdev** Optional parameter. The class name or logical device number of the disc where the *sfile* resides. Default is **DISC**.
- tfile** Optional parameter. Specifies the file to receive the data. The format is the same as for *sfile*. The default is a new file of the same filename as *sfile*, with the logon *groupname* and *accountname*. Security is set on for the *tfile*, even though the *sfile* may have been released.
- tdsdev** Optional parameter. The class name or logical device number that was used to open the line to the remote computer where the *tfile* will reside. The default is that DSCOPY copies the *sfile* to the local computer and assigns the same filename as the *sfile* name. If the source computer is the local system, this will cause a file system error because the file already exists.
- *** Means the target computer is also the source computer; i.e., the *tdsdev* is the same as the *dsdevice*.
- tdev** Optional parameter. The device class name or logical device number of the disc where the *tfile* should reside.

Network File Transfer Examples

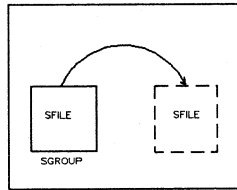
Local copy

:DSCOPY *sfile* TO *tfile* or :DSCOPY *sfile*;*tfile*



LOCAL

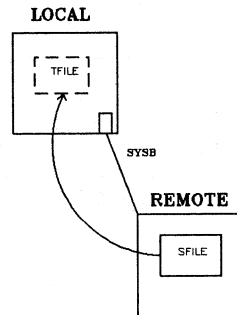
:DSCOPY *sfile.sgroup*



LOCAL

Remote-to-Local Copy

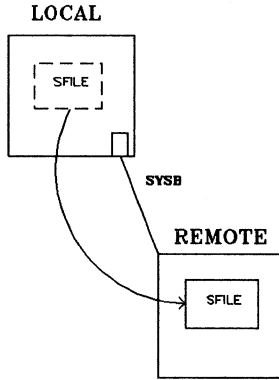
:DSCOPY *sfile*,SYSB;*tfile*



DSN/DS/3000 to 3000

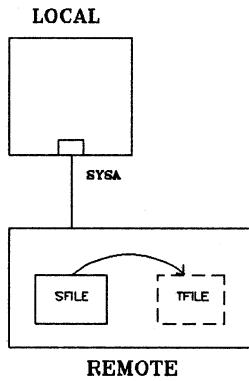
Local-to-Remote Copy

:DSCOPY *sfile* TO ,SYSB



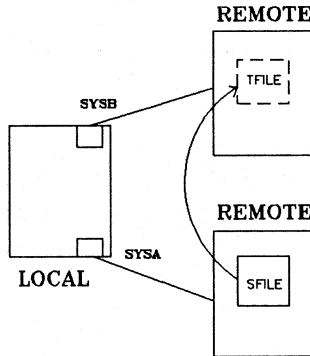
Remote Copy

DSCOPY *sfile*,SYSA TO *tfile*,*



Remote-to-Remote Copy

```
:DCOPY sfile,SYSA TO tfile,SYSB
```

**Network File Transfer Ininsics**

- Callable from SPL, COBOL, FORTRAN, BASIC, and PASCAL.
- All parameters are passed by reference.
- All parameters are required.
- All intrinsics are typeless procedure calls, and do not return
- Condition codes are not affected.
- Split-stack calls are prohibited.
- COBOL data types are:

Data Type	Data Description
numeric	PICTURE S9(4) COMP
alphanumeric	PIC X(n) or PIC A(n)
numeric array	PIC S9(4) COMP SYNCHRONIZED OCCURS n TIMES

DSCOPY

```
DSCOPY(opt,spec,result);
```

Parameters

opt This logical array controls the primary output, such as to \$STDLIST and specifies the type of copy operation.

										1	1	1	1	1	1
0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5
Reserved for future use. Must be 0.											N				

N Meaning

- 0 Single transaction. Primary output disabled.
- 1 Multiple transactions. Return after first unsuccessful transaction. Primary output disabled.
- 2 Multiple transactions. Return after all transactions have been attempted, or after an internal error occurs. Primary output disabled.
- 3 Reserved
- 4 Single transaction. Primary output enabled.
- 5 Multiple transactions. Return after first unsuccessful transaction. Primary output enabled.
- 6 Multiple transactions. Return after all transactions have been attempted, or after an internal error occurs. Primary output enabled.
- 7 Reserved.

spec This logical array should contain ASCII text terminated by an 8-bit binary zero. In the single transaction case, the syntax required is the same as for the DSCOPY command parameters. In the multiple transaction case, the array should contain only a zero. This will cause network file transfer to read the copy request from the DSCOPY file, for which the default is \$STDIN.

result A two-word logical array which contains the outcome of the intrinsic call.

- result*[0] A zero value indicates the copy operation was successful. Any other value represents an error as defined in the DSCOPY error messages.
- result*[1] The number of files that were successfully copied.

COBOL Calling Sequence

CALL "DSCOPY" USING *opt,spec,result*.

opt is a numeric data item.
spec is an alphanumeric data item.
result is a numeric array of two or more data items.

FORTRAN Calling Sequence

CALL DSCOPY (*opt,spec,result*)

opt is an INTEGER*2 variable.
spec is a character array.
result is an array of two or more INTEGER*2 variables.

BASIC Calling Sequence

CALL BDSCOPY (*O,s\$,r*)

O is a numeric variable.
s\$ is a string variable.
r is an array of two or more numeric variables.

DSCOPYMSG

DSCOPYMSG(*result*,*fnum*,*r*)

Parameters

- result* A two-word logical array *result* returned by the DSCOPY intrinsic. The information is passed to this procedure. *result* [0] equals 0 means that DSCOPY was successful.
- result* [0] not equal 0 means that an error occurred. Refer to DSCOPY error messages for the meaning.
- fnum* When this integer parameter is zero, the message associated with *result* is printed on \$STDLIST.
- When this parameter contains a file number returned by an FOPEN call, the message associated with *result* is written to that file.
- r* Integer result returned by this DSCOPYMSG call.
- r*=0 successful
- r*<>0 unsuccessful (See Error Messages)

COBOL Calling Sequence

CALL "DSCOPYMSG" USING *result*,*fnum*,*r*.

- result* is an array of two or more data times.
- fnum* is a numeric data item.
- r* is a numeric data item.

FORTRAN Calling Sequence

CALL DSCOPYMSG(*result*,*fnum*,*r*)

- result* is an array of two or more INTEGER*2 variables.
- fnum* is an INTEGER*2 variable.
- r* is an INTEGER*2 variable.

BASIC Calling Sequence

CALL BDSCOPYMSG(*r*,*f*,*r0*)

- r* is an array of two or more numeric variables.
- f* is an integer variable.
- r0* is an integer variable.

DSDUMP

DS/3000 trace files can be analyzed interactively with DSDUMP.

```
:RUN DSDUMP.PUB.SYS
```

The user is prompted for the name of the CSTRACE file and asked to select output destination (terminal or line printer). The user may then enter any of the DSDUMP commands. (Enter HELP for more information on DSDUMP commands.)

DSDUMP Commands

The following commands can be used with the DSDUMP program:

CLEAR	Resets all options to their default values.
DATA=	Places a limit on the number of words in the data section to be printed per frame.
DISPLAY	Shows the status of all commands and parameters.
ERRORS	To format only those requests whose completion entry has an error code not equal to zero.
EXIT	Terminates the program. This command may be used any time the user is prompted.
GO	To get out of the Command Interpreter and start the dump.
HELP	For an explanation of the commands. HELP does not accept any parameters. (Only allowed in a session.)
ONES	To include idle (-1) DS messages in the dump. The default is to exclude these messages. This command does not apply to X.25.
NEWDEV	To specify a new output device. (Only allowed in a session.)
NEWFILE RANGE	To change CSTRACE files. (Only allowed in a session.) To find the trace times of the first and last entries.
TIMES=	To format only those frames whose trace times are within the specified range.
TYPES=	To format only the specified type of DS messages. This command does not apply to X.25. The parameters for the TYPES= command are:
COMMANDS	Formats the REMOTE command, REMOTE HELLO, REMOTE BYE, control message, break message, RESUME message, ABORT message, KILLJOB message, and First Slave DSOPEN.
PTOP	Formats PREAD, PWRITE, PCONTROL, POPEN, PCLOSE, ACCEPT, and REJECT.
RFA	Formats RFA and IMAGE messages.
RTE	Formats RTE DS messages.

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QTOQ Formats QTOQ (NFT) DS messages.

TERMINAL Formats PRINT messages, READ and READX messages, and FCONTROLS to the terminal.

ENABLE ENABLE turns options on, and DISABLE turns options off. Otherwise, the syntax for these commands is identical.

DISABLE Options can be ENABLEd or DISABLEd using either = or ,. That is, DISABLE=PLINE and DISABLE,PLINE are identical.

Only one option is permitted for each ENABLE or DISABLE command. Additional options are flagged as errors.

The options for the ENABLE/DISABLE commands are:

PROMPT Prompt facility that asks the user, at the end of a full screen, whether or not to continue. Type n or N to stop. The program will return to the DSDUMP Command Interpreter. This command applies for interactive mode only.

PLINE Controls the printing of the line status after calling PRINTLINEINFO.

ASCII If enabled, ASCII format will be used whenever possible.

OCTAL As in ASCII, but using octal.

HEX As in ASCII, but using hexadecimal.

Options to control the level(s) of protocol to be displayed:

DEFAULT Using ENABLE=DEFAULT enables the following settings (explained in more detail below):

LEVEL2 LEVEL3 DS1 USERD PLINE ASCII OCTAL L3ALL
all settings with an L2 prefix except L2STN

DISABLE=DEFAULT is meaningless, and is ignored.

LEVEL2 The X.25 level 2 display. Use ENABLE to see it, and DISABLE if you do not wish to see it.

LEVEL3 The X.25 level 3 display. Use ENABLE to see it, and DISABLE if you do not wish to see it. Controls printing of the user data. The user data is contained in two areas: the first portion is contained in both the level 2 and level 3 display, while the remaining portion(s) is contained in the PRTX/PSTX entry(s). Thus, to see all of the user data, either level 2 or level 3 must be enabled. Otherwise, you would only see the last half of each display. For instance, to display level 3 and the user data, you could type the following:

DISABLE=LEVEL2
ENABLE=LEVEL3

```

DISABLE=L3ALL
ENABLE=L3DATA
GO

```

Or, to get the level 2 and user data display, you could type the following:

```

DISABLE=LEVEL3
DISABLE=L2ALL
ENABLE=L2CTX
ENABLE=LEVEL2
GO

```

Options to control defined subsets of Level 2 or Level 3 to be displayed:

L2ALL Controls the entire level 2 display. Its primary use is when you only wish to see a single command. For example, you may only want to see level 2 SABM requests. You would type in the following commands:

```

DISABLE=L2ALL
ENABLE=L2SABM
GO

```

L3ALL As in L2ALL, but for level 3.

L3HIGH Controls the printing of the following packet types:

Call	Call Confirm
Clear	Clear Conf
Interrupt	Interr Conf
RNR	Reset
Reset Con	Diagnostic
Reject	

L2SUP Controls level 2 supervisory calls (RNR, RR, and REJ). Options to control Level 2 entry types to be displayed:

L2CMP
L2CTX Controls the display of Level 2 Completion (PCMP) entries. Controls the display of Level 2 control text (PRCT and PSCT) entries. The information field of these frames contains the header information and the user data display for Level 3. You should enable this option when you are displaying any Level 3 information.

L2STN	Controls the display of Level 2 state transition (PSTN) entries. These entries make the trace file very long. HP suggests that you enable this option only upon request from your SE.
L2TXT	Controls the display of Level 2 PSTX and PRTX entries. Does not affect user data display. Options to control Level 2 frame types to be displayed:
L2DISC	Controls the display of Level 2 disconnect (DISC) frames.
L2DM	Controls the display of Level 2 Disconnect Mode (DM) frames.
L2FRMR	Controls the display of Level 2 Frame Reject (FRMR) frames.
L2REJ	Controls the display of Level 2 reject frames.
L2RNR	Controls the display of Level 2 Receive Not Ready (RNR) frames.
L2RR	Controls the display of Level 2 receive ready frames.
L2UA	Controls the display of Level 2 Unnumbered Acknowledge (UA) frames.
L2SABM	Controls the display of Level 2 Set Asynchronous Balanced Mode (SABM) frames. Options to control Level 3 packet types to be displayed:
L3INT	Controls the display of Level 3 interrupt packets.
L3CALL	Controls the display of Level 3 call request packets.
L3DATA	Controls the display of Level 3 data packets. These frames contain information and some of the user data display for Level 3.
L3RESET	Controls the display of Level 3 reset packets.

Several commands can be combined on one line if they are separated with a semicolon (;). All parameters for a command must be on the same line. When the PINS= command or the TYPES= command is entered several times, it does not cancel the previous command, but instead is added to the previous parameters. The PINS= command checks for duplicate PINs. A new TIMES= or DATA= command, however, does rewrite the previous command. If a colon (:) is typed in the first column of a line, that line is assumed to contain an MPE command. An End-of-File will initiate the dump. COMFILE is the formal designator for the command input file. The default designator is \$STDINX. The command file may be equated to \$NULL if no options are desired.

A sample file equation for the Command Interpreter is:

```
:FILE COMFILE=command file name
```

DSTEST

DS/3000 software and the physical connection between computers can be tested with DSTEST.

Configuration Verification:

:RUN DSTEST.PUB.SYS,CONFIG to display MPE I/O configuration and to verify that CS and DS devices are properly configured. Normal mode:

:RUN DSTEST.PUB.SYS,DIAG to enter a diagnostic mode, using PTOP for a line with 512 words blocks of all %177777.

DSLISIT

:RUN DSLISIT.PUB.SYS to obtain the version identification of each DS/3000 module installed on the system. The user must have read access to the component modules of DS in PUB.SYS.

DS/3000 COMMUNICATION LINE COPEN SPECIFICATIONS

COPEN and line specifications are provided for troubleshooting reference only.

See DSMON Code and Section 5, *Fundamental Data Communications Handbook* (5957-4634).

Parameter:	Setting:	Comment:
formaldesig	empty	prevents use of CLINE
device	ALDEV	device number or class
coptions	reference	comm options, below, and section 5.
aoptions	value parm	access options, below, and section 5.
aoptions	value parm	driver options, below, and section 5.
numbuffers	0	no buffering or queuing to be done.
buffsize	empty	not applicable. See numbuffers, above.
idlist	optional	may be specified.
suplist	empty	multipoint use only.
pollist	empty	multipoint use only.
dwldfile	empty	for INP.
yyy	empty	reserved for future use.
phonelist	optional	may be specified.
inspeed	0	
outspeed	0	
miscarray	specified	10,1,0,2,0,4,29,5,15,9,0 Master 10,1,0,2,0,4,21,5,15,9,0 Slave [Disable MMSTAT trace [Drive retires = 15,Master;15 [Line bid timeout = 29,Master;21,slave [Connect timeout disabled. [Local timeout disabled. See section 5.
drivername	0	Configured setting
ctraceinfo	0	

```

|0|1|2 3 4 5 6 7 8 9 0 1 2 3 4 5      ctraceinfo = 0
|0:0 0 0:0 0 0:0 0 0:0 0 0:0 0 0:0 0 0

```

```

|||                                   [Number of trace entries is driver dependent.
|||                                   [CS trace mask is driver dependent.
|||                                   [Trace entry fill type causes new entries to be discarded.
|||                                   [Trace on transmission errors only.

```


DS/3000 SYSTEM FAILURES

- 911 DSSEG1.MANAGEWRITECONV An invalid message class or stream type was discovered.
- 912 DSSEG1.MANAGEWRITECONV
DSSEG4.CSRFA(READRECORD)
DSSEG4.CXRFA(WRITECONTUREC)
An RFA buffer size was less than zero.
- 913 IODS0,DSW and DSWR counts disagree.
- 914 IODS0 IODSTRM0 The DS use count is negative.
- 915 DSMON,Bad data
- 916 DSMON,DEBUG on CS
- 917 DSSEG2.JOB DSLCB,addressing error;unable to locate DSLCB>
- 918 Virtual pin corresponding to a real pin not found.
- 919 Real pin corresponding to a virtual pin not found.
- 980 IOQ index not found in the DIT queue.
- 981 IOQ index too large.

DSCOPY ERROR MESSAGES

- 0 Succeeded.
- 1 Successfully initiated.
- 4 Unable to open transaction file. (NFERR 4)
- 5 Unable to open list file (DSCOPY). (NFERR 5)
- 6 IO error on transaction file.(NFERR 6)
- 7 Transaction record>200 chars long. (NFERR 7)
- 9 Temporary transaction file full. (NFERR 9)
- 10 Parameters imply conflicting modes. (NFERR 10)
- 11 Can't "RUN" copy process in this mode. (NFERR 11)
- 13 Unrecognized parameter. (NFERR 13)
- 14 Conflicting options have been specified. (NFERR 14)
- 16 Unimplemented feature. (NFERR 16)
- 17 Cannot contact remote node. (NFERR 17)
- 18 File system error on source file. (NFERR 18)
- 19 File system error on target file. (NFERR 19)
- 21 Illegal dsline name. (NFERR 21)
- 24 Unsupported standard device type. (NFERR 24)
- 25 Cannot find or open the source file. (NFERR 25)
- 26 Cannot create or open the target file. (NFERR 26)
- 27 Cannot contact remote system. (NFERR 27)
- 28 Source and target files cannot be accessed through remote file access. (NFERR 28)
- 29 Communication IO error. (NFERR 29)
- 30 Insufficient capabilities. (NFERR 30)
- 33 No source file was specified. (NFERR 33)
- 36 DS/3000 has not been installed on this system. (NFERR 36)
- 37 Remote system unable to use transparent mode. (NFERR 37)

- 38 Can't find the extra data segment, use the DSCOPY intrinsic to invoke NFT. (NFERR 38)
- 39 Invalid extra data segment contents,use the DSCOPY intrinsic to invoke NFT(NFERR 39)
- 40 Negotiations failed, no copy can be performed. (NFERR 40)
- 41 File transfer aborted. (NFERR 41)
- 42 Copy cancelled by user. (NFERR 42)

Intrinsic Error Returns

- 80 Bounds violation. (NFERR 80)
- 81 Split-stack mode calls not allowed. (NFERR 81)
- 82 First parameter value is out of range (-1:6). (NFERR 82)
- 83 Second parameter too short to contain version string. (NFERR 83)
- 84 NFT process is busy, can't start new transaction. (NFERR 84)
- 85 NFT process is not running. (NFERR 85)
- 86 Illegal BASIC calling sequence. (NFERR 86)

DSCOPY Internal Errors

- 101 Internal error on remote system. (NFERR 101)
- 102 Remote system NFT version is incompatible. (NFERR 102)
- 103 Internal-string storage overflow. (NFERR 103)
- 104 Unable to create temporary transaction file. (NFERR 104)
- 105 An unexpected message was received. (NFERR 105)
- 106 An illegal value was received in a message. (NFERR 107)
- 107 A message received in invalid format. (NFERR 107)
- 108 A required element was missing from a received message. (NFERR 108)
- 109 NFT process create failed. (NFERR 109)
- 110 Attempt to get extra data segment failed. (NFERR 110)

DS/3000 FUNCTIONAL ERROR MESSAGES

- 201 Remote Did Not Respond With The Correct Remote ID. (DSERR 201)
- 202 Specified Phone Number Is Invalid. (DSERR 202)
- 203 Remote ABORT/RESUME Not Valid When Doing Program-To-Program Communication. Use Local ABORT/RESUME. (DSWARN 203)
- 204 Unable To Allocate An Extra Data Segment For DS/3000. (DSERR 204)
- 205 Unable To Expand The DS/3000 Extra Data Segment. (DSERR 205)
- 206 Slave PTOF Function Issued From A Master Program. (DSERR 206)
- 207 Slave PTOF Function Out Of Sequence. (DSERR 207.)
- 208 Master PTOF Function Issued By A Slave Program. (DSERR 208)
- 209 Slave Program Does Not Exist Or Is Not A Program File. (DSERR 20)

- 210 Warning. Invalid MAXDATA Or DLSIZE For A Slave Program. System Defaults Used. (DSWARN 210)
- 211 Slave Issued A Reject To A Master PTOF Operation. (DSWARN 211)
- 212 File Number Returned From IOWAIT Is Not A DS Line Number. (DSWARN 212)
- 213 Exclusive Use Of A DS Line Requires Both ND And CS Capability. (DSWARN 213)
- 214 The Requested DS Line Has Not Been Opened With A User :DSLIME Command Or A Required :REMOTE HELLO Has Not Been Done. (DSERR 214)
- 215 The DSLIME Cannot Be Issued Back To The Master Computer. (DSERR 215)
- 216 Message Rejected By The Remote Computer. (DSERR 216)
- 217 Insufficient Amount Of User Stack Available. (DSERR 217)
- 218 Invalid PTOF Function Requested. (DSERR 218)
- 219 Multiple POPEN. Only One Master PTOF Operation Can Be Active On A DS Line. (DSERR 219)

- 220 Program Executing GET Was Not Created By POPEN. (DSERR 220)
- 221 Invalid DS Message Format. (Internal Ds Error) (DSERR 221)
- 222 Master PTOF Function Issued Prior To A POPEN. (DSERR 222)
- 223 Request To Transfer More Data Than Specified In The POPEN. (DSERR 223)

- 224 File Equations For A Remote File Constitute A Loop. (DSERR 224)
- 225 Cannot Issue POPEN To A Slave Session In BREAK Mode. (DSERR 225)
- 226 Slave Program Has Terminated Before Executing GET. (DSERR 226)
- 227 REMOTE HELLO Must Be Done To Initiate Remote Session (DSERR 227)
- 229 Too Many DS Users On The System. Cannot Obtain A Virtual Process. (DSERR 229)

- 231 Invalid Facility In Connection Request. (DSERR 231)
- 232 The Remote Computer Is Not Obtainable. (DSERR 232)
- 233 Virtual Circuit Is Not Available. (DSERR 233)
- 236 Communications Hardware Has Detected An Error. (DSERR 236)
- 237 Cannot Currently Gain Access To The Trace File. (DSERR 237)
- 238 Communications Interface Error. Internal Failure. (DSERR 238)
- 239 Communications Interface Error. Trace Malfunction. (DSERR 239)

- 240 The Local Communications Line Has Not Been Opened By The Operator. (DSERR 240)
- 241 The DS Line Is In Use Exclusively Or By Another Subsystem. (DSERR 241)
- 242 Internal DS Software Malfunction. (DSERR 242)
- 243 Remote or PDN Is Not Responding. (DSERR 243)
- 244 Communications Interface Error. Line Reset Occurred. (DSERR 244)
- 245 Communications Interface Error. Receive Timeout. (DSERR 245)
- 246 Communications Interface Error. Remote Disconnected. (DSERR 246)
- 247 Communications Interface Error. Local Timeout. (DSERR 247)
- 248 Communications Interface Error. Connect Timeout. (DSERR 248)
- 249 Communications Interface Error. Remote Rejected Connection. (DSERR 249)

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- 250 Communications Interface Error. Carrier Lost. (DSERR 250)
- 251 Communications Interface Error. The Local Data Set For The DS Line Went Not Ready. (DSERR 251)
- 252 Communications Interface Error. Hardware Failure. (DSERR 252)
- 253 Communications Interface Error. Negative Response To The Dial Response By The Operator. (DSERR 253)
- 254 Communications Interface Error. Invalid IO Configuration. (DSERR 254)
- 255 Communications Interface Error. Unanticipated Error Condition. (DSERR 255)

READER COMMENT SHEET

HP 3000 Computer Systems

DS/3000
Quick Reference

32189-90003 June 1984

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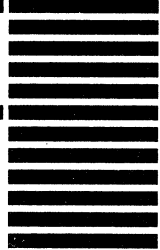
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R. Barbosa Rodrigues, 41-1 DT.
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Telex: 256123
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Telex: 44400 INST CO
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CM,E,M

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A

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CH,E

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Telex: 4510 ARENTA DR (RCA) P
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M

INDIA

Computer products are sold through
Blue Star Ltd. All computer repairs and
maintenance service is done through
Computer Maintenance Corp.

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A,CH** ,CM,CS** ,E

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Cable: BLUESTAR
A,M

Blue Star Ltd.
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Telex: 011-4093
Cable: FROSTBLUE
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Blue Star Ltd.
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Akrapuri, BORODA, 390 005
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A,M

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133 Kodambakkam High Road
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Blue Star Ltd.
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NEW DELHI 110 024
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Cable: BLUESTAR
A,CH** ,CM,CS** ,E,M

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PUNE 411 011
Tel: 22775
Cable: BLUE STAR
A

Blue Star Ltd.
2-2-47/1108 Bolarum Rd.
SECUNDERABAD 500 003
Tel: 72057
Telex: 0155-459
Cable: BLUEFROST
A,E

Blue Star Ltd.
T.C. 7/603 Poomina
Maruthankuzhi
TRIVANDRUM 695 013
Tel: 65799
Telex: 0884-259
Cable: BLUESTAR
E
Computer Maintenance Corporation
Ltd.
115, Sarojini Devi Road
SECUNDERABAD 500 003
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Arranged alphabetically by country

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BERCA Indonesia P.T.
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Antara Bldg., 17th Floor
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JAKARTA-PUSAT
Tel: 21-344-181
Telex: BERSAL IA
A,C,S,E,M

BERCA Indonesia P.T.
P.O. Box 174/SBY.
Jl. Kutei No. 11
SURABAYA
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Telex: 31146 BERSAL SB
Cable: BERSAL-SURABAYA
A*,E,M,P

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CH,CS

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A,CH,CM,CS,E,M,P
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Kilmore Road
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DUBLIN 5
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M

ISRAEL

Eidan Electronic Instrument Ltd.
P.O.Box 1270
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JERUSALEM 94467
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Telex: 25231 AB/PAKRD IL
A

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TEL-AVIV 67889
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CH,CM,CS,E,M,P

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C,P

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C,M

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I-80131 NAPOLI
I-16156 GENOVA PEGLI
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E,C

Hewlett-Packard Italiana S.p.A.
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A,CH,CM,CS,E,MS,P*

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CH,E

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Teknim Company Ltd.
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