HIPPI Test [5]

The HIPPI test detects and isolates faults in the ANSI High Performance Parallel Interface (HIPPI) communications link between a Cray Research I/O subsystem (IOS) and another computer system. The HIPPI test can be executed only from the Cray Research system. See Figure 28 for a diagram of the HIPPI test environment.

This chapter explains the execution of the HIPPI test. It covers the following topics:

- Getting started with the HIPPI test under UNICOS
- Execution examples
  - Test Mode menu execution example
  - Command program execution example
- HIPPI test menus
- HIPPI test commands
- Display full status (DFS) command output
- HIPPI test mode configurations
  - Cable loopback mode
  - Ultra adapter loopback mode
  - Software loopback mode, NSC PS8 or PS32
  - End-to-end mode

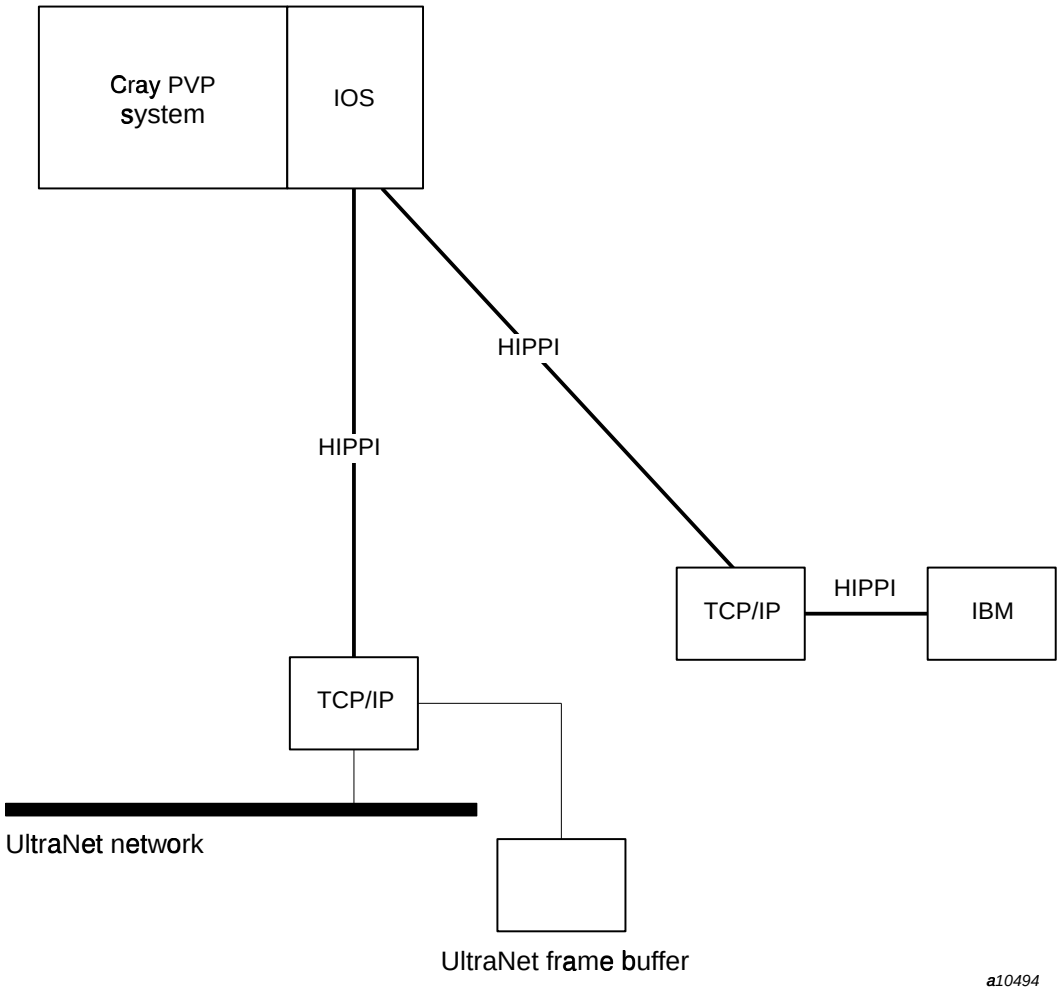

Figure 28. HIPPI test environment

5.1 Getting started with the HIPPI test under UNICOS

Before executing the HIPPI test, you must do the following:

1. Determine the UNICOS device path name(s) for the HIPPI channel(s). Unlike NSC or VME devices, a HIPPI device has separate drivers for the input and output channels. Therefore, a device path needs to be defined for both the input and output channels.

If your site follows standard device path naming conventions for HIPPI, you can determine the device path name by using the OLNET `ODPM` (HIPPI output channel) or `IDPM` (HIPPI input channel) command. These commands are available from the HIPPI Test Initial menu (see Section 5.4.1, page 155, for more information on these commands).

A typical HIPPI device path appears as follows:

`/dev/hippi`*C*`/`*IXX*
`/dev/hippi`*C*`/`*OXX*

C is the physical HIPPI channel, *I* is the input channel, *O* is the output channel, and *XX* is the logical channel number (zero for shared; nonzero for dedicated).

You can determine the device path name by using either of the following two methods:

- From the HIPPI Test Initial menu, you can select either `ODPM` or `IDPM`. The Device Path menu (`DPM`) command allows you to display and dynamically select a HIPPI device path (assuming that standard HIPPI device path naming conventions were used). See the `hippi`(4) man page for additional information about device path naming conventions.

  If more than one HIPPI channel is defined for your system, a menu option will be displayed, allowing you to choose one of the channels by selecting a major device or path. If only one channel is defined for your system (one major path), or if you have already selected a major path, a menu containing minor paths and statuses will be displayed. Select a path from this menu.

- Enter the following command at the UNICOS command line:

  ```
  ls -l /dev/hippi*
  ```

  As shown in Figure 29, this entry displays the HIPPI major and minor numbers (assuming that standard Cray Research naming conventions were used). By convention, a major number refers to the device type and its channel number, and a minor number refers to multiplexed software connections to that channel.

```
drwxr-xr-x 2 su            1088 Aug 29 1995.
drwxr-xr-x 15 su           5632 Apr 17 08:12 ..
crw-rw-rw-  1 su         7,  96 Aug 29  1995 i00
crw-rw-rw-  1 su         7,  97 Aug 29  1995 i01
crw-rw-rw-  1 su         7,  98 Aug 29  1995 i02
crw-rw-rw-  1 su         7,  99 Aug 29  1995 i03
crw-rw-rw-  1 su         7, 100 Aug 29  1995 i04
crw-rw-rw-  1 su         7, 101 Aug 29  1995 i05
crw-rw-rw-  1 su         7, 102 Aug 29  1995 i06
crw-rw-rw-  1 su         7, 103 Aug 29  1995 i07
crw-rw-rw-  1 su         7, 104 Aug 29  1995 i08
crw-rw-rw-  1 su         7, 105 Aug 29  1995 i09
crw-rw-rw-  1 su         7, 106 Aug 29  1995 i10
crw-rw-rw-  1 su         7, 107 Aug 29  1995 i11
crw-rw-rw-  1 su         7, 108 Aug 29  1995 i12
crw-rw-rw-  1 su         7, 109 Aug 29  1995 i13
crw-rw-rw-  1 su         7, 110 Aug 29  1995 i14
crw-rw-rw-  1 su         7, 111 Aug 29  1995 i15
crw-rw-rw-  1 su         7, 112 Mar 27 13:45 o00
crw-rw-rw-  1 su         7, 113 Mar 18 12:20 o01
crw-rw-rw-  1 su         7, 114 Feb 28 12:40 o02
crw-rw-rw-  1 su         7, 115 Oct 31 06:19 o03
crw-rw-rw-  1 su         7, 116 Oct 31 06:21 o04
crw-rw-rw-  1 su         7, 117 Aug 29  1995 o05
crw-rw-rw-  1 su         7, 118 Aug 29  1995 o06
crw-rw-rw-  1 su         7, 119 Aug 29  1995 o07
crw-rw-rw-  1 su         7, 120 Aug 29  1995 o08
crw-rw-rw-  1 su         7, 121 Aug 29  1995 o09
crw-rw-rw-  1 su         7, 122 Feb 28 11:27 o10
crw-rw-rw-  1 su         7, 123 Aug 29  1995 o11
crw-rw-rw-  1 su         7, 124 Aug 29  1995 o12
crw-rw-rw-  1 su         7, 125 Aug 29  1995 o13
crw-rw-rw-  1 su         7, 126 Aug 29  1995 o14
crw-rw-rw-  1 su         7, 127 Aug 29  1995 o15
```

Figure 29. HIPPI major and minor numbers

2. You must have read/write permission for the device path(s) used by OLNET. The permission field (in this case, `crw-rw-rw-`) in columns 1-10 is defined as follows:

Column 1	File type. Type `c` indicates a character special device.
Column 2-3	Read/write permission for the file owner. In this example, `rw` means that the file owner has read/write permission.
Column4	Execute (`x`) permission for the file owner. In this example, the dash (`-`) means that the file owner does not have execute permission.
Column 5-6	Read/write permission for the owner's group. `rw` means that the owner's group has read/write permission.
Column 7	Execute permission for the owner's group. The dash (`-`) means that the owner's group does not have execute permission.
Column 8-9	Read/write permission for all others. `rw` means that read/write permission is enabled for all others.
Column 10	Execute permission for all others. The dash (`-`) means that execute permission is not enabled for all others.

If columns 8 and 9 in the permission field for a device are `rw`, you can use the device in the HIPPI test. If columns 8 and 9 are not `rw`, look at columns 5 and 6.

If columns 5 and 6 are `rw`, and you are part of the owner's group, you can use the device.

If you are not part of the owner's group, ask your UNICOS system administrator either to change the file's permissions or to define a device path name value.

If you cannot find a device path name displayed in the device table, contact your UNICOS system administrator.

5.2 Execution examples

The HIPPI test can be executed in either shared or dedicated driver mode. Dedicated driver mode is enabled when you select minor number zero (`00`) when making a device path selection. Shared driver mode is enabled when you

select a nonzero minor number. See the following examples. (For the HIPPI test, the example would read `/dev/hippi5/o00`, and so on.)

Channel	Device path
Dedicated output channel	`/dev/hippi5/o00`
Shared output channel	`/dev/hippi5/o01`
	.
	.
	.
Shared output channel	`/dev/hippi5/o15`
Dedicated input channel	`/dev/hippi5/i00`
Shared input channel	`/dev/hippi5/i01`
	.
	.
	.
Shared input channel	`/dev/hippi5/i15`

In dedicated mode, the driver provides exclusive access to the HIPPI channel for the process that opened the device file. In shared mode, the driver provides nonexclusive access to the HIPPI channel for the process that opened the device file, allowing more than one process to use the channel. After a process has opened a dedicated channel, no other process can open a minor number. After a process has opened a shared path, no other process can open a dedicated path.

The following steps provide an example of HIPPI test execution:

1. Before cabling or other maintenance activities, you must ensure that the HIPPI channel is not in use by TCP/IP. You can determine this by entering the following command:

   ```
   netstat -i
   ```

   The following is sample output from a `netstat -i` command:

```
 Name     Mtu   Network   Address    Ipkts   Ierrs Opkts  Oerrs Collis
hy0      16432 sn1001-026  sn1001-016   94      0    18913  0     0
hy1*     16432 none        none         0       0    0      0     0
hy2      16432 sn1001-050  sn1001-050   0       0    0      44    0
hy3*     16432 none        none         0       0    0      0     0
hy4*     16432 none        none         0       0    0      0     0
hy5*     16432 none        none         0       0    0      0     0
hy6*     16432 none        none         0       0    0      0     0
hy7      16432 cray-hyp    sn1001       120205  0    78842  0     0
hy8*     16432 none        none         0       0    0      0     0
hy9*     16432 none        none         0       0    0      0     0
hy10*    16432 none        none         0       0    0      0     0
hy11*    16432 none        none         0       0    0      0     0
hippi0*  32880 none        none         0       0    0      0     0
hippi1*  32880 none        none         0       0    0      0     0
hippi2*  32880 none        none         0       0    0      0     0
hippi3*  32880 none        none         0       0    0      0     0
hippi4*  32880 none        none         0       0    0      0     0
hippi5*  32880 none        none         0       0    0      0     0
hippi6*  32880 none        none         0       0    0      0     0
hippi7*  32880 none        none         0       0    0      0     0
unet0*   32880 none        none         0       0    0      0     0
lo0      65535 loopback    localhost    634     0    634    0     0
```

When you look at the `hippi` entries, you find that the `Name` column displays a * next to the HIPPI entries that are not configured up by the network at this time. When the channel is in use, as can be seen for `hy2` (because it is not followed by a *), you must have your system administrator enter an `ifconfig`(8) command to disable access to the driver by TCP/IP.

2. Enter the following command on the UNICOS command line to run OLNET:

   ```
   /etc/diag/olnet
   ```

   After this command is executed, the Main menu for OLNET is displayed (your Main menu may vary, depending on the type of networks defined and your system type).

3. From the Main menu, enter `HI` to select the HIPPI test (you can enter OLNET commands in uppercase, lowercase, or a combination of the two; case is not significant to the OLNET program). The HIPPI Test Initial menu is displayed as shown here.

```
      ********** HIPPI TEST INITIAL MENU ***********


  HIPPI INITIAL MENU COMMANDS        Current Value (if applicable)
  ---------------------------        -----------------------------
   ODV  - HIPPI Output Device path ----------------->  undefined
   ODPM - Output Channel Device Path Menu
   IDV  - HIPPI Input Device path ------------------>  undefined
   IDPM - Input Channel Device Path Menu

   HELP - Get HELP information about this menu.

   TMM - Select the OLNET HIPPI Test Mode Menu.
   PROG - Select the OLNET HIPPI program menu.

   RT - Return to the OLNET Main menu.

Enter a command:
```

4. The HIPPI device path can be selected in one of two ways. You can enter `ODPM` or `IDPM` to select a device path for the output channel or input channel, respectively, or you can select the device paths by entering the following commands:

   ```
   odv,/dev/hippi0/o00
   idv,/dev/hippi/i00
   ```

   In this example, note that the `odv` entry selects the HIPPI output channel in dedicated mode, and the `idv` entry selects the HIPPI input channel in dedicated mode.

   The following shows HIPPI test output after the device paths have been selected:

```
      ********** HIPPI TEST INITIAL MENU ***********


  HIPPI INITIAL MENU COMMANDS        Current Value (if applicable)
  ---------------------------        -----------------------------
   ODV  - HIPPI Output Device path ----------------> /dev/hippi0/o01
   ODPM - Output Channel Device Path Menu
   IDV  - HIPPI Input Device path -----------------> /dev/hippi0/i01
   IDPM - Input Channel Device Path Menu

   HELP - Get HELP information about this menu.

   TMM - Select the OLNET HIPPI Test Mode Menu.
   PROG - Select the OLNET HIPPI program menu.

   RT - Return to the OLNET Main menu.

Enter a command:
```

5. At this point, you can either load the Test Mode menu (`TMM` command) or the Command Program menu (`PROG` command). Beginning users of the HIPPI test should use the Test Mode menu. After becoming more experienced with OLNET, you can use the more versatile, but also more difficult, Command Program menu.

5.2.1 Test Mode menu execution example

After the `TMM` command is entered, the following is displayed:

```
HIPPI Channel control:
  OCTL - Output(Flags = 01506)  ICTL - Input(Flags = 00506)

   Test Parameter Commands          Value
    ----------------------          -----
    PC - Pass count -------------->  1
    MP - Messages pass ----------->  10
    ML - Message length ---------->  100
    PT - Pattern type ------------>  ADDRESS
    TM - Test mode --------------->  Active mode
   Execute & miscellaneous commands
   --------------------------------
    HELP - Get HELP information about this menu.
    EX - Execute: Active mode for HIPPI.
    TR - HIPPI driver trace:  DISABLED
    RT - Return to the Initial Menu.

Enter a command:
```

1. Enter the `TM` command to select a test mode. A list of test mode options is displayed.

```
 The current test mode is: Active mode.
 Select one of the following or press <CR> to
   leave the value unchanged:

      Command        Description
      -------        ------------
        AM ------>   Active mode
        PM ------>   Passive mode
        AA ------>   Async active mode
        AP ------>   Async passive mode
        LBK ------>   Loopback mode

Enter a command:
```

2. This example shows how to execute the loopback test. Enter the `LBK` command to select the loopback mode test. (Alternatively, you could have

entered TM,LBK to bypass the list of test modes.) The following shows the updated Test Mode menu with loopback mode selected:

```
HIPPI Channel control:
  OCTL - Output(Flags = 01506)  ICTL - Input(Flags = 00506)

   Test Parameter Commands          Value
    ----------------------         -----
    PC - Pass count -------------->  1
    MP - Messages pass ----------->  10
    ML - Message length ---------->  100
    PT - Pattern type ------------>  ADDRESS
    TM - Test mode --------------->  Loopback mode
   Execute & miscellaneous commands
   -------------------------------
    HELP - Get HELP information about this menu.
    EX - Execute: Active mode for HIPPI.
    TR - HIPPI driver trace:  DISABLED
    RT - Return to the Initial Menu.

Enter a command:
```

3. Set up the proper testing configuration for loopback mode, as described in Section 5.6, page 166.
4. Modify test parameters such as pass count as needed.
5. Enter the EX command to execute loopback mode. The following output shows successful test execution:

```
Test passes have completed for
Loopback mode

Total bytes transmitted  = 800000
Total bytes received     = 800000

Elapsed time(hh:mm:ss)   = 00:00:01
Transfer rate  = 1600000 bytes/second

       Press <CR> to continue.
```

If the test or loopback configuration is not set up properly, an error will be displayed. The following output is displayed when the HIPPI I-field value is not set correctly as described in Section 5.6, page 166.

```
AN I/O REQUEST TO THE NETWORK DRIVER RETURNED AN ERROR
OLNET test mode = Loopback mode
Network operation requested by OLNET =   - loopback

OLNET Error detected: Write status error.
Driver ERRNO status indicates that the WRITE failed:
UNIX/UNICOS ERRNO number = 5: I/O error
HIPPI output channel device path:  /dev/hippi0/o02
HIPPI input channel device path:   /dev/hippi0/i02

OLNET test status at the time the failure was detected.
 Pass count = 1
 Message*   = 1
 Pattern type = ADDRESS
 Message length(bytes) = 800
 *  - Message number for the current pass count.
        DATE = Fri Dec 11 11:49:30 1995

             Press <CR> to continue.
```

5.2.2 Command Program menu execution example

After entering the PROG command, the following Command Program (Program Mode) menu is displayed:

```
 *** HIPPI COMMAND PROGRAM[PROGRAM MODE] ***

* STEP  1

HIPPI Channel control:
  OCTL - Output(Flags = 01506)   ICTL - Input(Flags = 00506)

SOE - Stop on error is: TRUE         TR - HIPPI driver trace is:
                                     DISABLED
HELP - Get HELP information          EDIT - Select EDIT MODE.
RT - Return to the INITIAL menu      ST - Set current step to n
DFS - Display full status for step n

Enter a command:
```

1. To load a canned program, go to the Edit Mode menu. The following is the Command Program (Edit Mode) menu.

```
 *** HIPPI COMMAND PROGRAM[EDIT MODE] ***

* STEP  1

 HELP - Get HELP information
 PROG - Return to PROGRAM MODE.
 RT - Return to PROGRAM MODE.
 ST - Set current step to n

 Enter a command:
```

2. You can now load your own program or load a canned test sequence. If the name of the canned sequence is known, enter it now. Otherwise, display a list of canned test sequences by entering the `HELP` command. The following menu is displayed when you enter `HELP`:

```
      *** EDIT MENU HELP ***

LIST EDIT MENU COMMANDS:
   LCS - List FEI CANNED TEST SEQUENCES.
   LEC - List EDIT PROGRAM commands.
   LPC - List PROGRAMMING commands.
   LIC - List INPUT CHANNEL PROGRAMMING commands.
   LOC - List OUTPUT CHANNEL PROGRAMMING commands.

Select one of the following:
 -  A command listed above to get a list of valid EDIT MENU commands.
 -  RT<CR> or just <CR> to return.

Enter a command:
```

3. Display a list of canned test sequences by entering the `LCS` command.

```
       CANNED TEST SEQUENCES

SEQUENCE      DESCRIPTION:
  CS1   Loopback Write-Read-compare 100 words of data.
  CS2   Loopback Write-Read-compare 10000 words of data.

Choose one of the following:
 -  Enter: HELP,<command> for help with that command.
 -  The command/sequence to enter in the program.
 -  <CR> to go back to the initial help display.

Enter a command:
```

4. Enter the `CS1` command to load canned test sequence 1. The Command Program (Edit Mode) menu appears as follows after `CS1` is loaded. (Alternatively, the `CS1` command could have been entered in step 2.)

```
 *** HIPPI COMMAND PROGRAM[EDIT MODE] ***

  step  1 WRT(100,ADDRESS) - Write 100 words ADDRESS pattern.
  step  2 RD(100) - Read 100 words.
  step  3 CMPD(1,2) - Compare Write/read data in steps 1 and 2 for
                      equality.
* STEP  4

 HELP - Get HELP information
 PROG - Return to PROGRAM MODE.
 RT - Return to PROGRAM MODE.
 ST - Set current step to n

 Enter a command:
```

5. Enter the RT command to return to the Command Program (Program Mode) menu to execute the loaded program.

```
 *** HIPPI COMMAND PROGRAM[PROGRAM MODE] ***

  step  1 WRT(100,ADDRESS) - Write 100 words ADDRESS pattern.
  step  2 RD(100) - Read 100 words.
* STEP  3 CMPD(1,2) - Compare Write/read data in steps 1 and 2 for
                      equality.
  step  4

 HIPPI Channel control:
   OCTL - Output(Flags = 01506)   ICTL - Input(Flags = 00506)

 SOE - Stop on error is: TRUE         TR - HIPPI driver trace is:
                                           DISABLED
 HELP - Get HELP information          EDIT - Select EDIT MODE.
 RT - Return to the INITIAL menu      ST - Set current step to n
 DFS - Display full status for step n

 Enter a command:
```

6. Set up the proper test configuration for loopback mode as described in Section 5.6, page 166.

7. Enter the EX command to execute loopback mode. The following output shows successful test execution:

```
  *** PROGRAM COMPLETED ***

Total program execution time =    0.0015 seconds
Program ended normally.
TIME = 11:09:19  DATE = 12/14/95

           Press <CR> to continue.
```

8. After pressing RETURN to return to the Command Program (Program Mode) menu, display data transfer statistics by entering the DRWS command.

```
 **** DATA TRANSFER STATISTICS ******

total bytes written = 800
total write time(seconds) = 0.000804
Write transfer rate = 995.0249 Kbytes/second

Total bytes read = 800
Total read time(seconds) = 0.000740
Read transfer rate = 1081.0811 Kbytes/second

Total message count:
  Total messages written = 1
  Total messages read = 1

           Press <CR> to continue.
```

The following is the error display for a test that failed because the remote logical path was not set correctly, as described in Section 5.6, page 166.

```
  **** PROGRAM COMPLETED ***

Total program execution time =    2.5565 seconds

The program was terminated due to an error.

Total message count:
  Total messages written = 1
  Total messages read = 0

TIME = 11:11:38 DATE = 12/14/95

           Press <CR> to continue.
```

After pressing RETURN to return to the Command Program (Program Mode) menu, notice that the commands in steps 2 and 3 indicate a failure.

```
 *** HIPPI COMMAND PROGRAM[PROGRAM MODE]

  step  1 WRT(100,ADDRESS) - Write 100 words ADDRESS pattern.
  step  2  **ERROR** RD(100) - Read 100 words.
* STEP  3  **ERROR** CMPD(1,2) - Compare Write/read data in steps 1
                                 and 2 for equality.
  step  4

 HIPPI Channel control:
   OCTL - Output(Flags = 01506)   ICTL - Input(Flags = 00506)

 SOE - Stop on error is: TRUE         TR - HIPPI driver trace is:
                                           DISABLED
 HELP - Get HELP information          EDIT - Select EDIT MODE.
 RT - Return to the INITIAL menu      ST - Set current step to n
 DFS - Display full status for step n

 Enter a command:
```

To obtain error information about a specific command, enter DFS,*n*, where *n* is a program step number. In this example, entering DFS,2 displays error information for step 2.

```
  **** PROGRAM LOOP FULL STEP STATUS. step number:

Status for command:  - Read 100 words
COMMAND EXECUTED AT: TIME = 11:11:36  DATE = 12/14/95
UNICOS ERRNO = 250: I/O request timeout
OLNET ERROR DETECTED = 615:  Read status error.
HIPPI ERROR: CHSTERR = 1105(8) -> Read request timeout

             *** READ STATISTICS ***
Bytes functioned = 800    Number of bytes actually READ = NONE
You may want to check the error statuses.

            Press <CR> to continue.
```

9. After you select the device paths, you can enter HIPPI program mode by entering **PROG** at the command line. The HIPPI Command Program (Program Mode) menu is displayed.

5.3 HIPPI test menus

The main HIPPI test menus are as follows:

- HIPPI Test Initial menu, which is used for defining the HIPPI device paths
- HIPPI Program Mode menu, which is used for executing a command program and displaying test results and/or error information
- HIPPI Edit Mode menu, which is used for writing and modifying the HIPPI command program
- HIPPI Test Mode menu, which is a user-friendly method of testing appropriate for the beginning user
- HIPPI Channel Control menus, which are used to display channel status and display or modify channel control

5.4 HIPPI test commands

The following sections describe the HIPPI test commands.

5.4.1 HIPPI Test Initial menu commands

Entering HI from the OLNET Main menu displays the HIPPI Test Initial menu. You define HIPPI device paths from this menu, which contains the following commands:

Command	Description
ODV	Specifies the HIPPI output device path. The device path can be opened in either dedicated driver mode (minor number is 0) or shared driver mode (minor number is nonzero).
IDV	Specifies the HIPPI input device path. The device path can be opened in either dedicated driver mode (minor number is 0) or shared driver mode (minor number is nonzero).
ODPM	Displays the Output Channel Device Path menu, which enables you to select and define HIPPI device paths dynamically. Device path status (busy, unavailable, and so on) is also displayed.
IDPM	Displays the Input Channel Device Path menu, which enables you to select and define HIPPI device paths dynamically. Device path status (busy, unavailable, and so on) is also displayed.
HELP	Provides help information about the HIPPI Test Initial menu. At this time, the available help information is limited.
PROG	Selects the HIPPI Program Mode menu.
RT	Returns to the OLNET Main menu. Any open device path is closed when the RT command is executed from the HIPPI Test Initial menu.
TMM	Selects the HIPPI Test Mode menu.

5.4.2 HIPPI Test Mode menu commands

Entering TMM from the HIPPI Test Initial menu displays the Test Mode menu. The following commands are available:

Command	Description
AR	Acknowledgment ratio (required for and applicable to asynchronous active-and-passive mode only). Indicates the number of messages sent by the active system before an acknowledgment message is returned by the passive system. AR is one of the following values:

mm: `1` Specifies that *mm* messages are sent by the asynchronous active system before the asynchronous passive system returns an acknowledgment message. For example, 100:1 specifies that 100 messages are sent by the asynchronous active system before the asynchronous passive system responds with an acknowledgment message. *mm* is a value in the range 1 through 4096.

mm: `0` Specifies no return acknowledgment (in effect, a write-only test by the asynchronous active system and a read-only test by the asynchronous passive system). *mm* is a value in the range 1 through 4096.

mm: `RN` Specifies a random acknowledgment ratio. *mm* indicates the upper range of random values for the acknowledgment ratio and must be a value in the range 1 through 4096.

For example, an acknowledgment ratio of 200:RN specifies that a random number of messages (from 1 through 200) is sent by the asynchronous active system before the asynchronous passive system responds with an acknowledgment message.

The default for `AR` is 3:1.

Caution: It is recommended that you not specify an AR value greater than 3:1 on a production network. A value greater than 3:1 can seriously impact network performance and result in adapter time-outs.

`CE` Tells OLNET to continue on error. Use the *errorfile* option to specify the file to which error output is written. These options do not appear on the HIPPI Test menus. The `CE` option must be placed between the `TMM` and `EX` options in a command-line string. See Section A.2.2, page 270, for more information.

`CM` Enables command-mode job execution (required for and applicable to command-mode execution only). `CM` also terminates incomplete or erroneous jobs, thereby preventing a hang condition in which the program waits for input.

`DP` Displays test information from various menus (interactive menu execution only).

errorfile Specifies the file to which error output is written. This option does not appear on the HIPPI Test menus. The *errorfile* option must be placed after the EX option in a command-line string. See Section A.2.2, page 270, for more information.

EX Executes the current test mode under the Test Mode menu system or the current program in the program system.

HELP Gets help for the current menu.

ML,*ml* Message length in 64-bit words. *ml* is a value in the range 1 through 125,000.

MP,*mp* Messages generated on each pass. *mp* is a value in the range 1 through 1,000,000. The default for *mp* is 10.

PROG Selects program mode from the Initial menu.

PT,*pt* Pattern type (in 64-bit words). *pt* is one of the following values:

Value	Pattern

AD	Address (default). This sequential address pattern is incremented in each 16-bit parcel of a 64-bit word, as in the following example:
	`000000 000001 000002 000003`
	`000004 000005 000006 000007`

AO	All 1's.
AP	All patterns. A new pattern is generated for each message sent and received. The patterns are processed in the following order: AD, AO, AZ, SO, SZ, RN, BT. OLNET builds a new pattern for each message, thereby requiring extra CPU cycles and possibly reducing the data rate (bytes/second).
AZ	All 0's.

BT	Bits. This pattern contains a random number of consecutive 1-bits randomly positioned within a 64-bit word, as in the following example:
	`000001 177770 000000 000000`
	`000000 000000 077770 000000`
	`177777 177777 177600 000000`
	`000000 000000 003777 177700`

The bits pattern is generated for each message sent and received, thereby increasing the total elapsed execution time.

RN — Random. A random pattern is generated for each message sent and received. OLNET builds a new pattern for each message, thereby requiring extra CPU cycles and possibly reducing the data rate (bytes/second).

SO — Sliding 1's. This is a 0's data pattern in which a 1-bit is circularly shifted through each 16-bit parcel, as in the following example:

```
000001 000002 000004 000010
000020 000040 000100 000200
```

SZ — Sliding 0's. This is a 1's data pattern in which a 0-bit is circularly shifted through each 16-bit parcel, as in the following example:

```
177776 177775 177773 177767
177757 177737 177677 177577
```

The default for *pt* is AD (address pattern).

RT — Returns to the previous menu.

TM,*tm* — Test mode. *tm* is one of the following values:

- AA — Asynchronous active
- AM — Synchronous active (default)
- AP — Asynchronous passive
- CL — Cray cable loopback
- PM — Synchronous passive

TMM — Selects the Test Mode menu (Cray Research system only).

5.4.3 HIPPI Command Program (Program Mode) menu commands

Entering PROG from the HIPPI Test Initial menu displays the HIPPI Program Mode menu. From this menu, you can execute an OLNET program and display test results and/or error information. The following commands are available:

Command	Description
DFS *n*	Displays test results and/or error information (full status) about a program command. For example, command DFS 1 displays the test status of the command in step number 1. See Section 5.5, page 164, for a description of DFS command output.
DMPN	Saves program step information to a user-specified file. DMPN saves the program steps as they appear in the Program Mode menu. The DMPN command is intended only for capturing the program image, which cannot be reloaded by the OLNET program. To save a program to be reloaded, use the SPF and LPF commands.
DMPNS	Saves program step information to a user-specified file. DMPNS saves the program steps and applicable status information. The DMPNS command is intended only for capturing the program image, which cannot be reloaded by the OLNET program. To save a program to be reloaded, use the SPF and LPF commands.
EDIT	Goes to the Edit Mode menu. From this menu, you can modify, load, and save HIPPI command programs.
EXP	Executes the program once.
EXPR *n*	Executes the program *n* times.
HELP	Provides help information about the Program Mode menu and commands. At this time, the available help information is limited.
ICTL	Displays the Input Channel Control menu, from which you can display and/or modify channel flag bits and display and/or modify channel control values. The channel flag bits for the input and output channels are displayed from the Program Mode menu.
OCTL	Displays the Output Channel Control menu, from which you can display and/or modify channel flag bits and display and/or modify channel control values. The channel flag bits for the input and output channels are displayed from the Program Mode menu.
RT	Goes to the HIPPI Test Initial menu.
SOE*n*	When the SOE (stop on error) flag is true (SOE 1), program execution terminates when an error occurs. When this flag is false (SOE 0), program execution continues after an error. To change the SOE value, enter SOE and follow the instructions provided.

ST*n*	Specifies the current step number (*n*), which marks the step with an asterisk (*). This command allows you to set the step for use with the EXS (execute single step) command.
TR*n*	Saves a trace of OLNET calls to the HIPPI driver. When the TR flag is true (TR 1) and the driver is called for the first time, you are prompted for the trace file name. The trace file information is cumulative for the OLNET session, so it is advisable to use caution when the TR flag is true to avoid creating extremely large trace files.

5.4.4 HIPPI Channel Control menu commands

The channel control bits have an additional status field located adjacent to the command. This status field is enclosed within brackets ([ ]) and contains a number that defines the position of the flag bit in the channel flags word. Note that the leftmost bit is the least significant. The status field also contains a user status field, which indicates that the bit can be modified (M) or is giving only status information (S).

The following commands are available:

Command	Description
CS[15,M]	Changes the state of the HIPPI driver to up or down. This control bit must be up to execute the OLNET test.
CT[14,S]	Indicates a HIPPI channel type.
DC[13,M]	Enables or disables the dropping of the connection after each packet. When enabled, this output channel control bit drops the HIPPI connection after the data transfer is complete. It has no effect on the input channel. This bit must be enabled for shared mode and disabled for dedicated mode.
DED[10,S]	Indicates whether or not the channel is dedicated or shared. See Section 5.1, page 138, for an explanation of dedicated and shared modes.
HDR[09,M]	Changes the user-to-send/receive header to yes or no. This control bit must be yes when the OLNET HIPPI test is executed in shared mode. The bit has no effect when the driver is dedicated.
IFLD[05,M]	Enables or disables the I-field in the first word of write data. When enabled, this control bit defines I-field data as the first word in the user data field.

IFV	Indicates the I-field value. The HIPPI I-field is 32 bits (option G4) of information that is sent from the source to the destination when a connection is established.
MSK	Indicates the I-field mask value. The I-field mask defines a bit mask for the input channel and performs a logical product of the input I-field value before comparing the I-field values. For diagnostic purposes, this mask is normally set to 0.
SFTO	Indicates the software time-out value. You can modify this value to set the amount of time an I/O request is to remain active before the driver times out. For example, if you set the software time-out to 5 seconds, are configured in loopback, and issue a read command, the read request will time out after 5 seconds if a corresponding write command has not been issued. The connection time-out (CTO) and software time-out (SFTO) values interact and override each other if one value is less than the other value.
LP	Indicates the current logical path value.
RLP	Indicates the remote logical path. This control bit is an output channel value only and is used to define a logical connection to the remote driver when the shared mode test is being executed.
RT	Returns to the Program Mode menu.
HELP	Provides help information about the Channel Control menu and commands.

5.4.5 HIPPI Command Program (Edit Mode) menu commands

Entering EDIT from the HIPPI Program Mode menu displays the Edit Mode menu. The following commands are available in edit mode:

Command	Description
CS1CS2	Loads canned program sequence 1 (CS1) or 2 (CS2). If a program has already been loaded, you are given the option to overwrite the existing program or abort the program load.
DELS *n x*	Deletes program steps *n* through *x*.
DLY *n*	Delays program execution for *n* seconds. *n* is specified in increments of seconds.
HELP	Provides help information about the Edit Mode menu and commands.

IAS *n*	Allows you to insert new commands after step number *n*. After the IAS command has been invoked, you remain in insert mode until a carriage return is entered without a command.
JBS *n x*	Jumps backward *x* times to step *n*. This command enables you to create a program loop or loops in a HIPPI program.
LPF	Reloads a program saved by the SPF (save program to a file) command.
NOP	No operation.
PROG	Goes to the Program Mode menu.
RT	Goes to the HIPPI Test Initial menu.
SPF	Allows you to save the current program to a user-named file so that you can reload the program with the LPF (load program from a file) command.
ST *n*	Specifies the current step number (*n*), which marks the step with an asterisk (*). This command allows you to set the program step number to *n*. This command is typically used if you want to replace the command in step *n*. Enter ST *n*, followed by a new command. This action replaces the old command.

5.4.6 Help commands

When you enter HELP from the HIPPI Program Mode menu, you are presented with the LPIC option, which is used to display the list of HIPPI user program control commands shown in this section, and the RT option, which returns to the HIPPI Program Mode menu.

DFS	Displays full status for step *n*
DMPN	Dumps program steps to a named file
DMPNS	Dumps program steps with full status to a named file
DRWS	Displays read and write statistics
EXP	Executes program
EXPR	Executes program *n* times
EXS	Executes a single step
HELP	Gets help information
RT	Returns to the HIPPI Program Mode menu
SOE	Stops on error

ST	Sets current step to *n*

When you enter HELP in edit mode, the following options are displayed:

LCS	Lists canned HIPPI program sequences. Entering LCS from the Edit Mode help screen displays the following canned program sequences:

CS1	Write + read + jump_backwards - 100 words
CS2	Write + read + compare_data + jump_backwards - 125,000 words

LEC	Lists program editing commands. Entering LEC from the Edit Mode help screen displays the following program editing commands:

ST	Sets current step to *n*
EDIT	Selects edit mode
IAS	Inserts command after step *n*
DELS	Deletes commands from step *n* to step *x*
SPF	Saves program to a file
LPF	Loads program from a file

LIC	Lists input channel programming commands. Entering LIC from the Edit Mode help screen displays the following input channel programming command:

RD	Reads *n* words

LOC	Lists output channel programming commands. Entering LOC from the Edit Mode help screen displays the following output channel programming command:

WRT	Writes *n* words of pattern *x*

LPC	Lists HIPPI programming commands. Entering LPC from the Edit Mode help screen displays the following programming commands:

NOP	No operation
DLY	Delays *n* seconds
JBS	Jumps backward step *n* *x* times
CMPD	Compares write and read data in steps s1 and s2 for equality
PROG	Selects program mode

RT	Goes to the Edit Mode menu.

5.5 Display full status (DFS) command output

The DFS *n* command from the HIPPI Program Mode menu displays test results and/or error information (full status) about a program command. For example, the DFS 1 command displays the test status of a command in step number 1. This section describes DFS command output.

The following is the output of the DFS command. Table 9 explains how to read the output.

```
**** PROGRAM STEP FULL STATUS ****

Status for command:  - Read 10000 words - Step number: 2
COMMAND EXECUTED AT: TIME = 16:14:01  DATE = 06/11/95
OLNET ERROR: OERR = 0 -> No error
UNICOS ERRNO: 0 -> Error 0
HIPPI ERROR: HERR = 0(8) -> ok status
HIPPI CHANNEL STATUS:
    CONNECTION TIMEOUT = 0(0.1 sec)   CUMULATIVE ERROR STATUS =
       000000(8)
    ERROR COUNT = 0
    CHANNEL STATUS REGISTER(bit 0 is leftmost bit) = 134030(8) =
      -> Bit 12: Parcel count exhausted interrupt
      -> Bit 11: End of packet interrupt
      -> Bit 4: Interconnect signal in status
      -> Bit 3: Request signal in status
      -> Bit 2: Connect signal out
      -> Bit 0: Buffers available status

             *** READ INFO ***'
Bytes functioned = 80000
Bytes actually read = 80000
Transfer time =   0.0035 seconds.   Transfer rate = 22730.3773
  Kbytes/second
```

Table 9. DFS output

Output	Description
`Status for command:  - READ 10000 words of ADDRESS - Step number:  2`	
	Program command and its step number within the program.
`COMMAND EXECUTED AT: TIME = 16:14:01 DATE = 06/11/95`	
	Time and date of command execution.
`OLNET ERROR: OERR = 0 -> No error`	
	Error code number defined by and known to the OLNET program. In the preceding example, the `OERR` error code of is defined as `No error`.
`UNICOS ERRNO: ERR = 0 -> Error 0`	
	Error code defined by and known to the UNICOS operating system. In the preceding example, the `ERR` error code of is defined as `Error 0` (or no error).
`HIPPI ERROR: HERR = 0 -> ok status`	
	Error code defined and returned by the HIPPI driver. In the preceding example, the `HERR` error code of 0 is defined as `ok status` (or no error).
`HIPPI CHANNEL STATUS:`	Status returned by the HIPPI driver.
`CONNECTION TIMEOUT = 0(0.1 sec)`	
	Connection time-out value. 0 means that the value equals the system default.
`CUMULATIVE ERROR STATUS = 000000(8)`	
	Number of errors that occurred during the transfer.
`ERROR COUNT = 0`	Number of times a channel parity or length/longitudinal redundancy checkword (LLRC) error occurred.
`CHANNEL STATUS REGISTER(bit 0 is leftmost bit) = 134030(8) =`	
`-> Bit 12:  Parcel count exhausted interrupt`	
`-> Bit 11:  End of packet interrupt`	
`-> Bit 4:  Interconnect signal in status`	
`-> Bit 3:  Request signal in status`	

Output	Description
`-> Bit 2:  Connect signal out`	
`-> Bit 0:  Buffers available status`	
	Octal value of the HIPPI channel status register, followed by a brief description for each bit that is set.
`Bytes functioned = 80000`	Number of bytes of data that the OLNET test requested be read to the HIPPI input channel. In the preceding example, OLNET requested that 80,000 bytes (10,000 words) of data be read.
`Bytes actually read = 80000`	Number of bytes actually read by the HIPPI driver.
`Transfer time = 0.0035 seconds.`	
	Time duration elapsed from the time a read request was made to the driver until the driver returned control to OLNET.
`Transfer rate = 22730.3773 Kbytes/second`	
	Data transfer rate as calculated in bytes transferred in relation to elapsed time.

5.6 HIPPI test mode configurations

In the FEI, NSC, and VME tests, a test mode is defined for each hardware configuration. In the HIPPI test, the various hardware configurations are all accessible from the same program.

The `CS1` command from the Edit Mode menu loads a canned test program that can be used to perform a test for the following HIPPI test configurations:

- Cable loopback mode
- Ultra adapter loopback mode
- Software loopback mode, NSC PS8 or PS32
- End-to-end mode

Before executing the HIPPI test, check to ensure that the output and input channel `IFLD` (I-field in first word of write data) flag bits are disabled. These bits can be disabled from the Output (`OCTL` command) and Input (`ICTL` command) Channel Control menus.

If you need to execute the HIPPI Command Program, or if your HIPPI channel is a shared channel, perform the following steps.

1. Determine the input channel's LP (logical path) number from the Input Channel Control menu by entering the `ICTL` command from the Program Mode or Test Mode menu.
2. Return to the Program Mode menu by entering the `RT` command.
3. Go to the Output Channel Control menu by entering the `OCTL` command.
4. Load the input channel's LP (logical path) number in the `RLP` (remote logical path) command as follows:

   `RLP,`*logical path number*

5. Return to the Program Mode menu by entering the `RT` command.

5.6.1 Cable loopback mode

This section describes how to execute cable loopback.

1. Disconnect the HIPPI channel cables from the downline device and install the loopback connector(s). One loopback cable (Cray Research part number 12726501) is required for the HIPPI channels.

   See the following figures for diagrams of the loopback configurations:

   - Figure 30, Cray PVP HIPPI cable loopback (Ultra); Figure 31, Cray PVP HIPPI cable loopback (NSC PS8); and Figure 32, Cray PVP IOS-E HIPPI cable loopback, 32- or 64-bit (NSC PS32).

     A standard cable can be used in place of a loopback cable, but the total length (input + output + loopback) of the cables should not exceed 25 meters.

     After installing the loopback cable(s), you are ready to execute the loopback test.

2. Execute the loopback test as follows:

   To execute the loopback test from the Test Mode menu, do the following from the HIPPI Test Initial menu:

   a. Enter the `TMM` command to select the Test Mode menu.

   b. Enter the `TM` command to get a list of test modes.

c. Enter `LBK` to select the cable loopback test. (Alternatively, you could have entered `TM,LBK` to bypass the list of available test modes.)

d. Modify test values such as pass count as needed.

e. Enter the `EX` command to execute the cable loopback test.

To execute the loopback test from command mode, do the following from the HIPPI Test Initial menu:

a. Enter the `PROG` command to select the Command Program menu.

b. Enter the `EDIT` command to load a command program.

c. Enter the `HELP` command.

d. Enter the `LCS` command to list the canned test sequences.

e. Select sequence `CS1` or `CS2`.

f. Enter the `RT` command to return to the Command Program (Program Mode) menu.

g. Enter `LBK` to select the cable loopback test. (Alternatively, you could have entered `TM,LBK` to bypass the list of available test modes.)

h. Modify test values such as pass count as needed.

i. Enter the `EX` command to execute the cable loopback test once, or enter the `EXPR,`*n* command, where *n* specifies the number of times to execute the program.

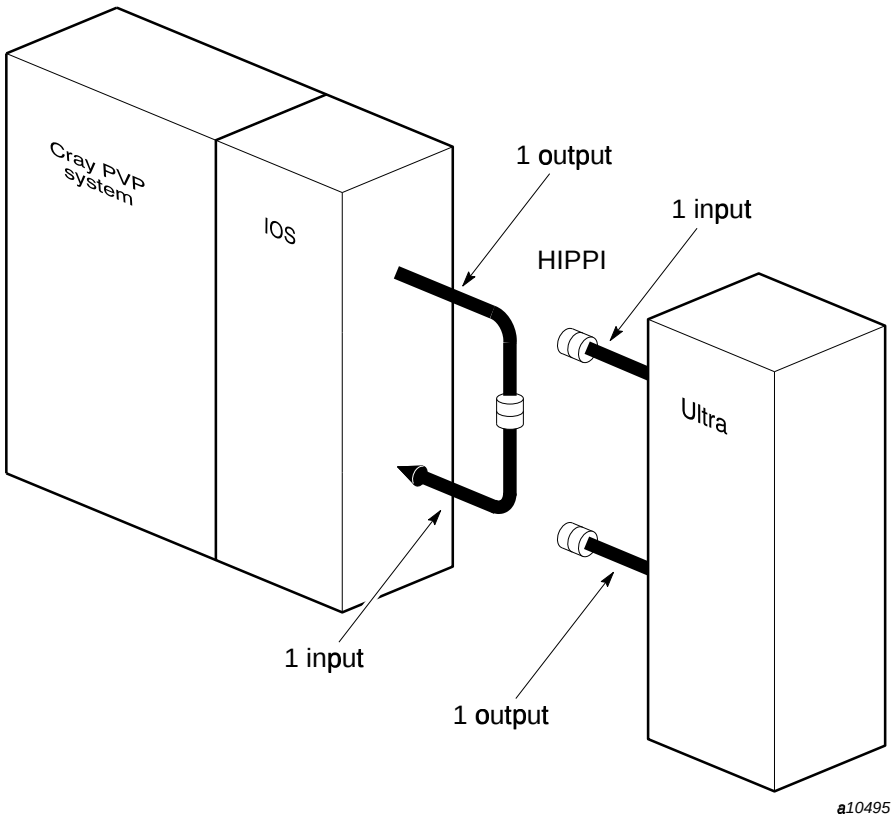

Figure 30. Cray PVP HIPPI cable loopback (Ultra)

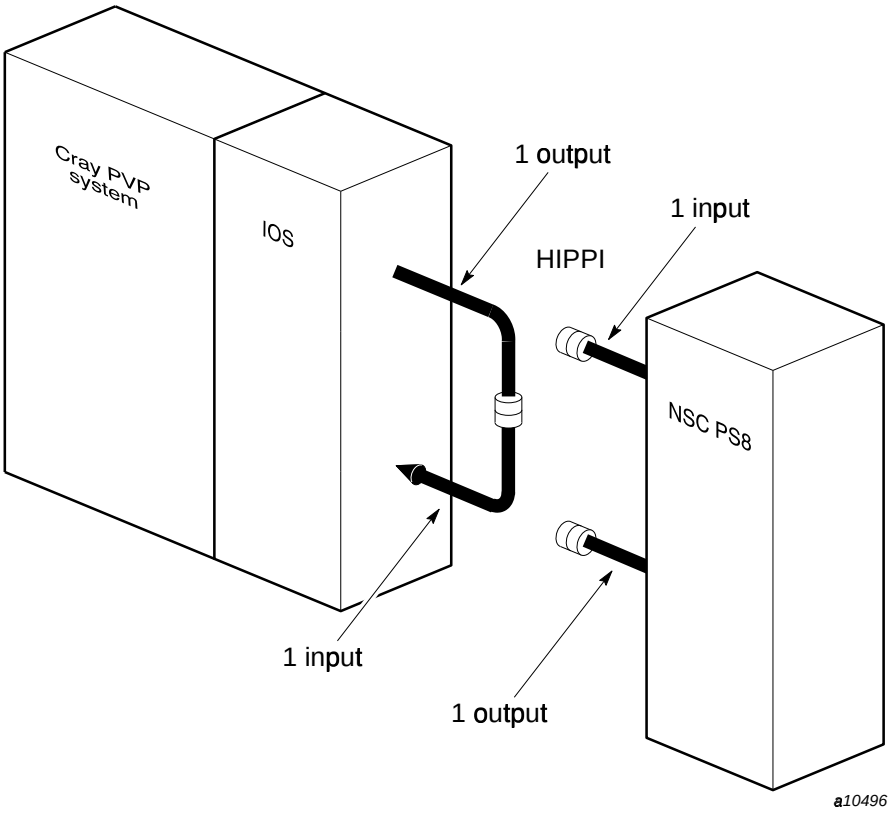

Figure 31. Cray PVP HIPPI cable loopback (NSC PS8)

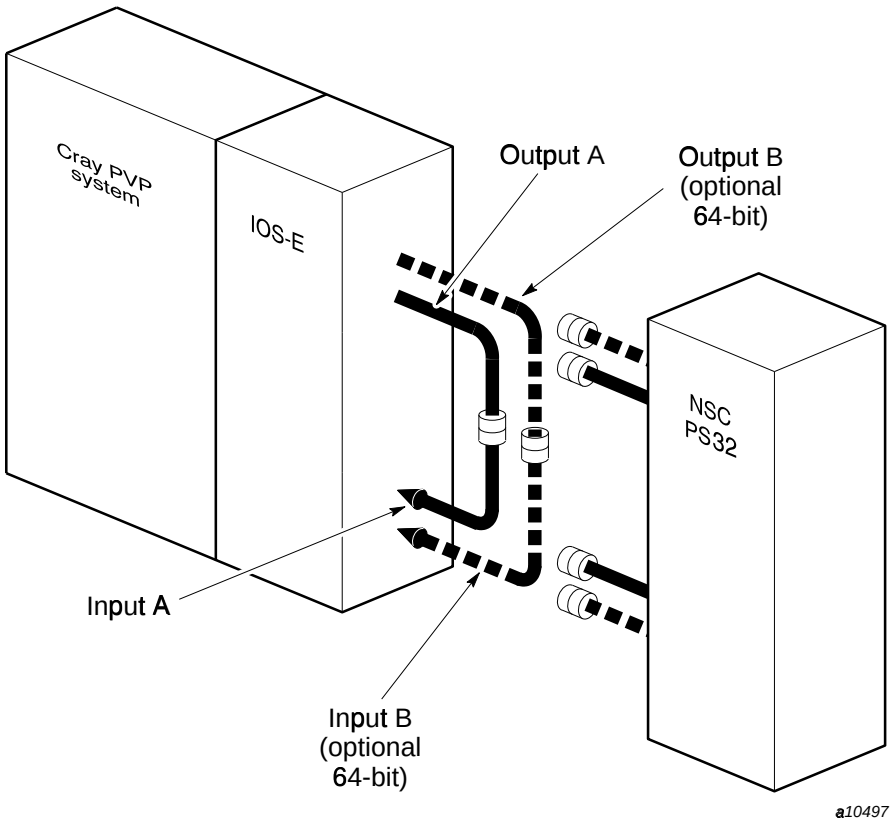

Figure 32. Cray PVP IOS-E HIPPI cable loopback, 32- or 64-bit (NSC PS32)

5.6.2 Ultra adapter loopback mode

Some configurations support adapter loopback testing. If the HIPPI channels are connected to an Ultra adapter, a loopback switch on the adapter allows a loopback test to be performed from the Cray Research mainframe to the downline adapter without the need to disconnect the channel cables. See Figure 33, page 173, which illustrates the Ultra HIPPI adapter (loopback switch).

1. After enabling the loopback switch, you are ready to execute the loopback test.

2. Execute the adapter loopback test as follows:

   To execute the adapter loopback test from the Test Mode menu, do the following from the HIPPI Test Initial menu:

a. Enter the `TMM` command to select the Test Mode menu.

b. Enter the `TM` command to get a list of test modes.

c. Enter `LBK` to select the adapter loopback test. (Alternatively, you could have entered `TM,LBK` to bypass the list of available test modes.)

d. Modify test values such as pass count as needed.

e. Perform software loopback testing as described in the next section.

f. Enter the `EX` command to execute the adapter loopback test.

To execute the adapter loopback test from command mode, do the following from the HIPPI Test Initial menu:

a. Enter the `PROG` command to select the Command Program menu.

b. Enter the `EDIT` command to load a command program.

c. Enter the `HELP` command.

d. Enter the `LCS` command to list the canned test sequences.

e. Select sequence `CS1` or `CS2`.

f. Enter the `RT` command to return to the Command Program (Program Mode) menu.

g. Enter `LBK` to select the adapter loopback test. (Alternatively, you could have entered `TM,LBK` to bypass the list of available test modes.)

h. Modify test values such as pass count as needed.

i. Enter the `EX` command to execute the adapter loopback test once.

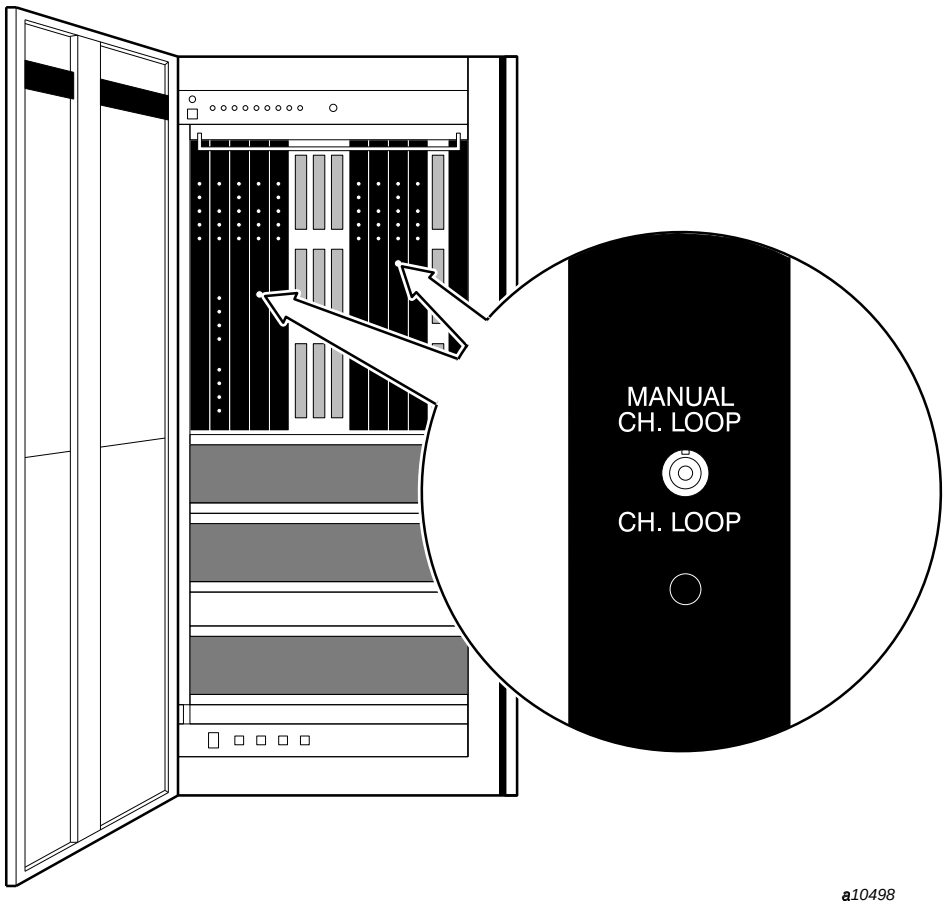

Figure 33. Ultra HIPPI adapter (loopback switch)

5.6.3 Software loopback mode, NSC PS8 or PS32

Software loopback testing can be performed if the HIPPI channels are connected to an NSC PS8 or NSC PS32 switch (see Figure 31, page 170, for PS8, or Figure 32, page 171, for PS32). The HIPPI I-field value selects the switch's port number. (See the description of `IFLD` in Section 5.4.4, page 160.) The subsequent HIPPI data packet is then routed to the selected port. If the I-field value is set to your switch's port number, the HIPPI data packets will be routed back to your system, thus providing a loopback test.

5.6.3.1 NSC PS8

When the adapter is viewed from the rear (see Figure 34, page 175), you can see eight ports (0 through 7). Each port has a HIPPI channel pair (input and output cable) associated with it. You can select these ports by loading the appropriate value in the HIPPI I-field. If you set the I-field value equal to your system's port number, the PS8 adapter will logically link the transmitters and receivers, thus performing a loopback test.

5.6.3.2 NSC PS32

The PS32 switch supports both 32- and 64-bit HIPPI modes. The PS32 switch interprets the I-field setting for port routing. When the I-field value bit 28 is 0, the HIPPI channel mode is 32-bit (800 Mbit). When the I-field value bit 28 is 1, the channel mode is 64-bit (1600 Mbit). For diagnostic purposes, you can define a 64-bit channel as 32-bit when the I-field bit is 0, thus bypassing a check of the upper 32 bits. Bits 0 through 27 define the PS32 port configuration. See your network administrator for definitions of your HIPPI connection's port bits.

Set the I-field value by using the `IFV` command from the Output Channel Control menu. For example, if your Cray Research system's HIPPI channel is connected to PS8 adapter port number 3, the following procedure enables software loopback:

1. From the Program Mode menu, enter the `OCTL` command.
2. Load an I-field value of 3.

   ```
   ifv,3
   ```

3. Set the I-field mask to 0.

   ```
   msk,0
   ```

4. Ensure that the output channel `IFLD` (I-field in the first word of write data) command is disabled.
5. Return to the Program Mode menu by entering the `RT` command.

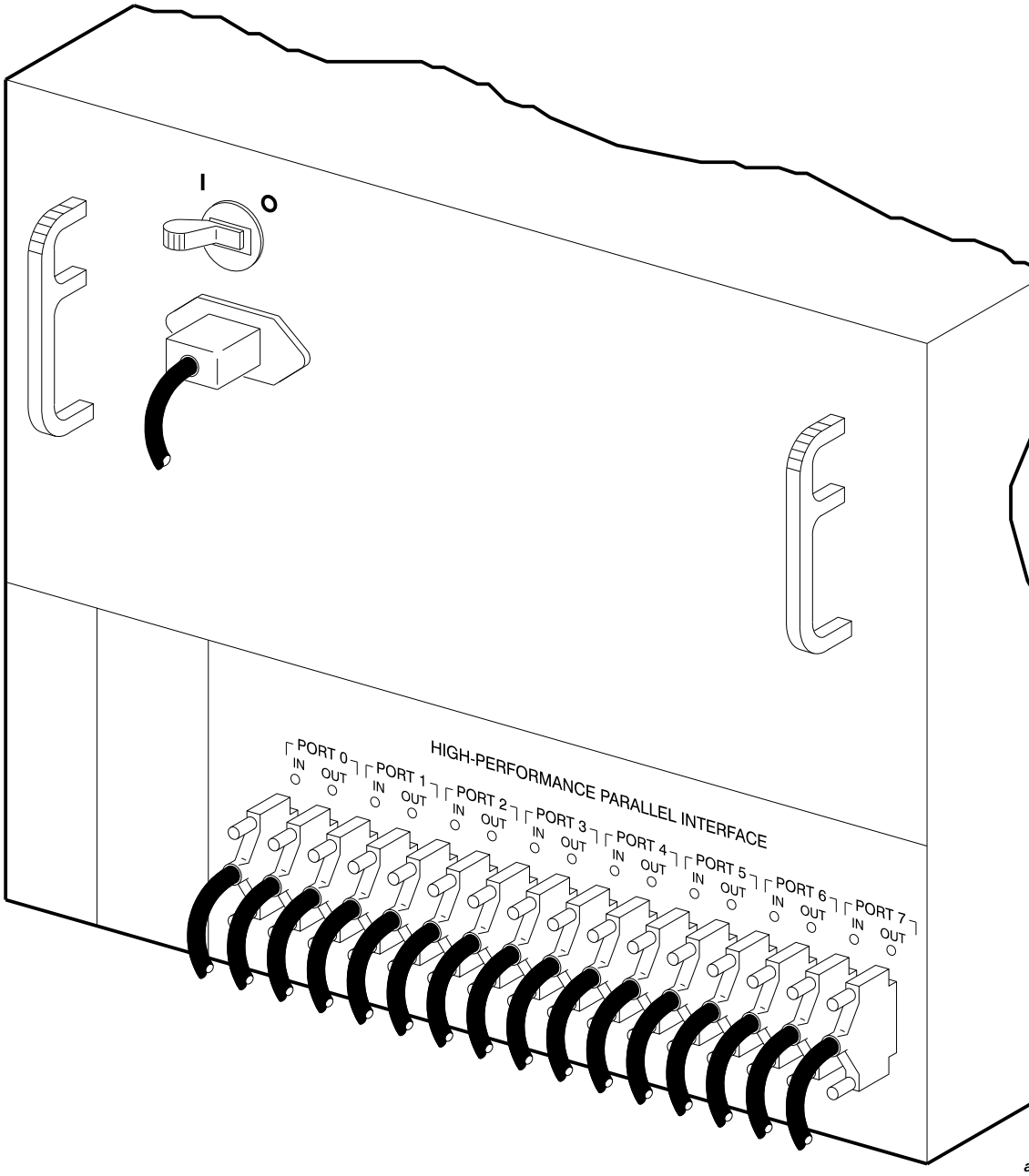

Figure 34. NSC PS8 switch

6. Go to the Input Channel Control menu by entering the `ICTL` command.
7. Set the input channel I-field mask to 0.

   ```
   msk,0
   ```

8. Ensure that the output channel `IFLD` (I-field in the first word of write data) command is disabled.
9. Return to the Program Mode menu by entering the `RT` command. You are now ready to execute the loopback test.

5.6.4 End-to-end mode

End-to-end mode is supported only if both systems are Cray Research systems. End-to-end mode can also be referred to as *synchronous active-and-passive mode* and *asynchronous active-and-passive mode*.

In synchronous active-and-passive mode (synchronous active mode is the default), either the Cray Research or the other system is assigned as active and the other as passive. The active system generates and sends synchronous messages to the passive system. In turn, the passive system generates and sends messages to the active system.

In asynchronous active-and-passive mode, either the Cray Research or the other system is assigned as active and the other as passive. Unlike synchronous active-and-passive mode, asynchronous mode allows you to assign a variable number of messages to be sent (by the asynchronous active system) before an acknowledgment message is returned (by the asynchronous passive system).

Note: Unless specified otherwise, the phrase *active-and-passive mode* refers to both synchronous and asynchronous active-and-passive modes.

Active-and-passive mode is used to verify or detect faults in the communications link between a Cray Research system and another system when the link consists of a HIPPI channel.

To execute active-and-passive mode, do the following:

1. Contact the operators for the Cray Research systems and let them know which HIPPI channels you want to test.
2. The operators for the Cray Research systems must enter the following command for the appropriate network driver:

   `ifconfig` *network* `down`

(Takes TCP/IP down)

3. After you initialize OLNET and access the Main menu, enter the `HI` command.
4. Choose the output device path with either the `ODV` or the `ODPM` command.
5. Choose the input device path with either the `IDV` or the `IDPM` command.
6. Enter the `TMM` command to go to the Test Mode menu.
7. Repeat steps 3 through 6 for the other Cray Research system.
8. Designate one system as active by setting the test mode to active (`TM,AM`) or asynchronous active (`TM,AA`). Then set the test mode for the other system to passive (`TM,PM`) or asynchronous passive (`TM,AP`).

   The following commands must be set to the same values for both the active and the passive systems:

`AR`	Acknowledgment ratio (asynchronous active-and-passive mode only)
`ML`	Data message length
`MP`	Messages per pass (active-and-passive mode only)
`PC`	Pass count
`PT`	Pattern type

   Modify any other command values from the HIPPI menu as necessary.
9. If the HIPPI connection includes an NSC PS8 or PS32 switch, set the I-field value to the target system's port number as described in Section 5.4.4, page 160.
10. If the HIPPI input and output device paths are shared, the output channel's remote logical path (`RLP`) must be set to the target system's input channel logical path (`LP`). See Section 5.4.4, page 160, for `LP` and `RLP` definitions. See `hippi`(4) for additional information on shared and dedicated channels.

    For example, assume that two Cray Research systems, system A and system B, have a HIPPI connection.

    a. On system A, enter the `ICTL` command from the OLNET Test Mode menu to select system A's Input Channel Control menu.

b. Under the `INPUT CHANNEL CONTROL VALUES` heading, look at the `LP` field to get the logical path number. For this example, assume that system A's `LP` value is 134.

c. On system B, enter the `OCTL` command from the OLNET Test Mode menu.

d. Set system B's `RLP` value to 134, which is system A's logical path number.

e. On system B, enter the `RT,ICTL` command to return to the Test Mode menu and select system B's Input Channel Control menu.

f. Under the `INPUT CHANNEL CONTROL VALUES` heading, look at the `LP` field to get the logical path number. For this example, assume that system B's `LP` value is 135.

g. On system A, enter the `RT,OCTL` command to return to the Test Mode menu and select system A's Output Channel Control menu.

h. Enter the `RT,OCTL` command to return to the Test Mode menu and select system A's Output Channel Control menu.

i. Set system A's `RLP` value to 135, which is system B's logical path number.

j. Enter the `RT` command on both system A and B to return to their Test Mode menus.

11. Enter `EX` from the HIPPI menu for the passive system to execute the HIPPI test.

    Note: Always start test execution from the passive system.

    The following informative message is then displayed:

```
Waiting for the first message.
PASSIVE MODE
```

    You have 5 minutes to start test execution from the active system before the program times out.

12. Enter `EX` from the HIPPI menu for the active computer system to execute the HIPPI test.

The following message is displayed on the active and passive systems during test execution:

```
OLNET mode test mode
Current pass count     n
Passes remaining       n
```

On test completion, the following message is displayed:

```
Test passes have completed for
test mode
Total bytes transmitted  = n
Total bytes received     = n
Elapsed time(hh:mm:ss)   = hh:mm:ss
Transfer rate            = nbytes/second
```

Press RETURN to return to the HIPPI menu. You can modify the command values and rerun the HIPPI test, or enter RT to return to the Main menu for OLNET.

13. Upon completion of testing, enter RT from the Test Mode menu.
14. Enter RT from the HIPPI test Initial menu. OLNET prompts you to restore the channel configuration. Respond to the prompt according to the menu directions.
15. Notify the operators for the Cray Research systems and let them know you have completed HIPPI testing.