FEI Test (FEI-1 and FOL-3) [2]

Note: The FEI test is not supported under the UNICOS 10.0 operating system.

The FEI test detects and isolates faults in the communications link between a Cray Research I/O subsystem (IOS) and an IBM computer system when the link consists of a Cray Research standard or data-streaming front-end interface (FEI-1), or a Cray Research FEI and fiber-optics link (FOL-3).

Note: A common misconception is that an IBM data-streaming FEI is called an *FEI-2*. To clarify, Cray Research does not manufacture an FEI-2. When this manual uses the term *FEI-1*, it includes both IBM data-streaming and IBM standard FEIs.

You can execute the FEI test from the IBM computer system. The test is executed during normal system network operations; however, because the FEI-1 is a point-to-point connection, the software path is dedicated.

This chapter explains the execution of the FEI-1 test under UNICOS, MVS, and VM systems. It covers the following topics:

- Getting started with the FEI-1 test under MVS or VM

- FEI-1 test menus (including IBM)

- FEI-1 test commands

- FEI-1 loopback mode

  - From an IBM system

  - From a Cray Research system

  - To an IBM system with an FOL-3

- FEI-1 end-to-end mode (active/passive mode)

- Cray cable loopback mode

- Figures

2.1 Getting started with the FEI-1 test under MVS or VM

Before executing the FEI test under MVS or VM, you must do the following:

1. Determine the FEI name for the connection to the FEI or FOL. The connection is called a *device name* for MVS (DN, *dn* command) or a *virtual address* (VA, *va* command) for VM. For VM, the virtual address and the real address must be the same. Contact your IBM system administrator to obtain the device name or virtual address.

2. Under VM only, obtain VM class-B privilege. You must have this privilege to vary and attach a real device under VM. Contact your VM system administrator to obtain this privilege, or contact your VM system operator to request that the FEI or FOL be attached to your VM user ID.

2.2 FEI-1 test menus

After you initialize OLNET and access the Main menu, as described in Section 1.2, page 2 and Section 1.3, page 4, enter FT from the Main menu to display the FEI menu under MVS or VM.

Figure 2, page 8 shows the FEI menu under MVS.

```
COMMAND                          VALUE
-------                          -----


PC - PASS COUNT                  1
MP - MESSAGES/PASS               10
ML - MSG LENGTH (CRAY WORDS)     100
PT - PATTERN TYPE                ADDRESS
TM - TEST MODE                   ACTIVE MODE
DN - DEVICE NAME                 NOT DEFINED


EXECUTE/EXIT COMMANDS
---------------------


EX - EXECUTE THE CURRENT FEI TEST MODE.
RT - RETURN TO THE MAIN MENU.
```

Figure 2. FEI-1 menu under MVS

Figure 3, page 9 shows the FEI menu under VM. The only difference between the two menus is that the FEI menu under MVS has a device name option (DN), and the FEI menu under VM has a virtual address option (VA).

```
COMMAND                         VALUE
-------                         -----


PC - PASS COUNT                 1
MP - MESSAGES/PASS              10
ML - MSG LENGTH (CRAY WORDS)    100
PT - PATTERN TYPE               ADDRESS
TM - TEST MODE                  ACTIVE MODE
VA - VIRTUAL ADDRESS            NOT DEFINED


EXECUTE/EXIT COMMANDS
---------------------


EX - EXECUTE THE CURRENT FEI TEST MODE.
RT - RETURN TO THE MAIN MENU.
```

Figure 3. FEI-1 menu under VM

2.3 FEI-1 test commands

The commands described in this section can be used for interactive menu execution, MVS command-mode jobs, and VM EXEC procedures. (This section describes menu execution only. Appendix A, page 267, describes the other methods of execution.)

FEI test commands are as follows (the commands are for execution under MVS and VM unless otherwise noted):

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 erroneous 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 FEI 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.

CFG   Modifies Cray Research IOS-E LOSP channel configuration. See np(4), mknod(8), and nconf(8) for additional information about IOS-E LOSP channel configuration. You must have super-user privilege to execute this command. The CFG subcommands are as follows:

            CDBE   Enables or disables the detection of double-bit errors by the LOSP driver.

            CMBE   Changes the controller mode. Options are 6-Mbyte mode, 12-Mbyte mode, or 12-Mbyte loopback mode. For FEI-1s, the controller mode should always be set to 6-Mbyte mode.

            DRVM   Changes the channel mode. Options are raw mode, message proper mode (FEI-3), parameter block (DX/N130), parameter block (Ultra LSC), parameter block (FEI-3 fy.c), link control protocol (LCP) - USCP (FEI-1, VAX-BI), or A-series NSC adapter. For system operation, the FEI-1 channel mode is LCP or USCP. For OLNET testing, the channel mode must be raw. If you try to test the FEI-1 and the channel mode is incorrect, an error will be displayed and testing will be terminated.

            ICHN   Changes or defines the current LOSP input and output channels. Options are input channels 30, 32, 34, or 36. The output channel (odd channel number) is assumed when the input channel is defined.

            INTO   Changes the input channel time-out value.

            OUTO   Changes the output channel time-out value.

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.

DN,*dn*   Device name of the FEI (MVS only; required). Contact your MVS system administrator to obtain the *dn* value.

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

DPM   The device path menu (DPM) command allows you to display and dynamically select an FEI-1 device path (assuming standard FEI-1

device path naming conventions were used). See `np(4)` for more information about device path naming conventions.)

After the `DPM` command executes and if more than one FEI-1 is connected to your system, a menu option is displayed that allows you to choose one of the adapters by selecting a major device path. If only one FEI-1 is connected to your system (one major path), or you have already selected a major path, a menu containing paths and statuses is displayed. You can select a path from this menu.

This command is valid for UNICOS systems only.

`DV,dv`   Device path name (UNICOS only; required). You must have read/write permission on the device path used by OLNET. Contact your system administrator to obtain these permissions, or have the administrator assign the device path name value.

The *dv* variable is case-sensitive. Enter *dv* exactly as it appears in the device table. See Section 2.1, page 7, for information on finding the device name used by OLNET.

`EDIT`   Creates and loads canned test sequences or modifies an existing program (IOS-E only). The `EDIT` subcommands are as follows:

`PROG`   Returns to the Program Mode menu.

`ST n`   Sets the current program step to step *n*.

`LCS`   Lists FEI canned test sequences. By entering one of the following subcommands from the Help menu, the canned test sequence is loaded and you are returned to the Edit menu:

`CS1` - Loopback write-read-compare 100 words of data

`CS2` - Loopback write-read-compare 10000 words of data

`DS1` - Data-streaming FEI internal, single-byte loopback sequence

`DS2` - Data-streaming FEI internal, double-byte loopback sequence

`DS3` - Data-streaming FEI external, single-byte loopback sequence

	DS4 - Data-streaming FEI external, double-byte loopback sequence
LEC	Lists edit program 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
LPC	Lists programming commands.
	NOP - No operation
	DLYS - Delays n seconds
	DLYU - Delays n microseconds
	JBS - Jumps backward step n for x times
	CMPD - Compares write/read data in steps n and $n1$ for equality
	PROG - Selects Program mode
LIC	Lists input channel programming commands.
	RD - Reads n words
	DSGSW - Gets data-streaming FEI special status word
LOC	Lists output channel programming commands.
	WRT - Writes n words of pattern x
	DSISBL - Function data-streaming (DS) FEI internal, single-byte loopback
	DSIDBL - Function data-streaming (DS) FEI internal, double-byte loopback
	DSESBL - Function data-streaming (DS) FEI external, single-byte loopback

	`DSEDBL` - Function data-streaming (DS) FEI external, double-byte loopback
errorfile	Specifies the file to which error output is written. This option does not appear on the FEI Test menu. 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.
`FT`	Calls the FEI test. This command executes the FEI test when the FEI driver is station on an IOS-E system. This command must be selected on both the Cray Research and IBM systems.
`FY`,*fy*	FEI type. *fy* is one of the following values:

`ID`	Cray Research data-streaming FEI (FEI-1)
`IS`	Cray Research standard FEI for IBM (FEI-1)
`FO`	Cray Research fiber-optics link (FOL-3)

The default for *fy* is `ID`.

`HELP`	Gets help for the current menu.
`LT`	Saves test information from various menus (interactive menu execution only).

- Under UNICOS or UNIX, you are prompted for the directory and file in which to save the test information.

- Under MVS, `NETOUT` is sent to the SYSOUT class specified in the OLNET CLIST.

- Under VM, `NETOUT` is saved under `FILE NETOUT A`.

If you return to the Main menu for OLNET, `NETOUT` is closed and will be overwritten during the next interactive OLNET session.

`ML`,*ml*	Message length in 64-bit words. The valid range for *ml* depends on `FY` and `TM` (FEI type and test mode, respectively). See Table 1.

Table 1. Message length

FY	ML	TM	ML default
IS	1-3	FL	You must set ML because the default value (100) exceeds the range.
FO	1-10	FL	See above.

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.

PC , *pc*   Pass count. *pc* is a value in the range 1 through 1,000,000. The default for *pc* is 1.

PROG   Selects program mode from the Initial menu (IOS-E only).

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

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).

TR   Enables or disables the capture of the driver call and associated information in a user-defined file (Cray Research system only).

VA,*va*   Virtual address for the real device for the FEI (VM only; required). To get the *va* value, contact your VM system administrator.

VM class-B privilege is required for varying and attaching a real device. Contact your VM system administrator to request this privilege, or contact your VM system operator to request that the device be attached to your VM user ID.

If you use the virtual address during the OLNET session and then exit the test, you must repeat the attachment procedure.

2.4 FEI-1 loopback mode

The OLNET program can test an FEI-1 in a loopback configuration to and from an IBM system or from a Cray Research system with an IOS-E. It can also test a fiber-optics link (FOL-3) in a loopback configuration to an IBM system. This section describes the program execution procedures for FEI loopback mode.

In FEI loopback mode, the front-end computer system generates and sends synchronous message transfers through external loopback connectors on the FEI. The messages are returned to the computer system from which they were generated without going through the other computer system in the link.

FEI loopback mode is used to detect and isolate faults in the following components of the communications link:

- Front-end system

- FEI

- Channels (IBM)

- Cables (IBM)

FEI loopback mode supports the following Cray Research FEI types:

- Cray Research data-streaming FEI (FEI-1) to an IBM computer system

- Cray Research standard FEI (FEI-1) to an IBM computer system

- Cray Research fiber-optics link (FOL-3) to an IBM computer system

2.4.1 FEI-1 loopback mode from an IBM system

To execute FEI loopback mode for external loopback testing (front-end system), do the following:

1. Contact the operators for the Cray Research and IBM systems and let them know which FEI you want to test. After taking the station down, the operator for the IBM computer system must enter one of the following commands at the IBM console to remove the FEI from system operation:

   v *fei-address*,offline

(MVS only)

`vary offline` *fei-address*

(VM only)

2. The operator for the Cray Research system must enter the following commands for the appropriate network driver:

   `sdaemon -k uscp`

   (Takes the station down)

3. Set the ONLINE/OFFLINE button on the Cray Research FEI operator's panel to the OFFLINE position (see Figure 4, page 33). For additional information on the panel, see the *Cray Data-streaming Interface Reference Manual*, publication HR-0079.

4. Disconnect the channel cables from the FEI drop cables at point A, and install a loopback connector, Cray Research part number 2061506. To locate loopback point A, see Figure 7, page 36.

5. Set the Cray Research data-streaming FEI maintenance panel switches as follows (see Figure 6, page 35):

Switch	Setting
DATA RATE	*Site-determined*
MODE	NORMAL
PARITY	ENABLE
PROTOCOL	*Site-determined*

6. Press the RESET button on the Cray Research data-streaming FEI maintenance panel to clear the FEI hardware.

7. Reset the ONLINE/OFFLINE button on the Cray Research FEI operator's panel to the ONLINE position (the green OFFLINE light goes off).

8. Initialize OLNET on the IBM computer system and access the Main menu, as described in Section 1.2, page 2, and Section 1.3, page 4.

9. After you initialize OLNET and access the Main menu, enter `FT` to display the FEI menu.

10. Set the FEI virtual address (VM only: enter `VA,`*va* from the FEI menu under VM), or specify the device name of the FEI (MVS only: enter `DN,`*dn* from the FEI menu under MVS).

11. Set the test mode to FEI loopback (`TM,FL`), the FEI type to Cray Research data-streaming (`FY,ID`), and the message length (`ML`) to 1, 2, or 3. Modify any other command values as necessary, and enter `EX` from the FEI menu under MVS or VM to execute the test.

    The following message is displayed on the IBM computer system during test execution:

    ```
    OLNET mode   --------------->  FEI LOOPBACK
    MODE
    Current pass count ------->  n
    Passes remaining --------->  n
    ```

    Note: If the test hangs, it generally indicates a fault in the FEI hardware. Set the ONLINE/OFFLINE button on the Cray Research FEI operator's panel to the OFFLINE position (the green OFFLINE light comes on). To clear the FEI hardware, press the RESET button on the Cray Research data-streaming FEI maintenance panel. Reset the ONLINE/OFFLINE button on the Cray Research FEI operator's panel to the ONLINE position (the green OFFLINE light goes off). If this does not clear the hang condition, you must do further testing (for example, execute the loopback test) to isolate the hardware fault in the communication link.

    On test completion, the following message is displayed:

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

Press `RETURN` to return to the FEI menu under MVS or VM. You can modify the command values and rerun the FEI test, or enter `RT` to return to the Main menu for OLNET.

To return the communication link to normal system operations, do the following:

1. Enter RT from the FEI menu under MVS or VM. Under MVS, this deallocates the device from OLNET. Under VM, this detaches the virtual address from your VM user ID.

2. Set the ONLINE/OFFLINE button on the Cray Research FEI operator's panel to the OFFLINE position (the green OFFLINE light comes on).

3. Reconnect all of the disconnected cables.

4. Clear the FEI hardware by resetting the Cray Research data-streaming FEI maintenance panel, as follows: set the mode switch to NORMAL, and press the RESET button.

5. Reset the ONLINE/OFFLINE button on the Cray Research FEI operator's panel to the ONLINE position (the green OFFLINE light goes off).

6. Enter one of the following commands to return the FEI to normal system operations.

   vary *fei-address*,online

   (MVS only)

   vary online *fei-address*

   (VM only)

2.4.2 FEI-1 (data-streaming or standard) loopback mode from a Cray Research system with an IOS-E

To execute FEI-1 loopback mode for internal (data-streaming only) or external loopback testing, do the following:

1. Contact the operators for the Cray Research and IBM systems and let them know which FEI you want to test. After taking the station down, the operator for the IBM system must enter one of the following commands at the IBM console to remove the FEI from system operation:

   v *fei-address*,offline

   (MVS only)

   vary offline *fei-address*

   (VM only)

2. The operator for the Cray Research system must enter the following command for the appropriate network driver:

```
sdaemon -k uscp
```

(Takes the station down)

3. Set the ONLINE/OFFLINE button on the Cray Research FEI operator's panel to the OFFLINE position (the green OFFLINE light comes on). See Figure 4, page 33. For additional information on the panel, see the *Cray Data-streaming Interface Reference Manual*, publication HR-0079.

4. Load OLNET on the Cray Research system.

5. Initialize OLNET on the IBM computer system and access the Main menu, as described in Section 1.2, page 2, and Section 1.3, page 4.

6. After you initialize OLNET and access the Main menu, enter `FT` to select the FEI test.

7. Choose the device path with the `DV`,*dv* or `DPM` command.

8. At this point, you can select the Test Mode menu by entering the `TMM` command, or you can select the Program Mode menu by entering the `PROG` command. The Test Mode menu is recommended for beginning OLNET users. After you become more experienced with OLNET execution, you may want to use the more versatile (but also more difficult) Program Mode menu.

   For Test Mode menu operation, do the following:

   a. Enter the `TMM` command from the Initial menu.

   b. Enter the `CFG` command to go to the Configuration menu.

   c. If needed, use the `DRVM` command to set the driver mode to `raw`.

   d. If needed, use the `CMDE` command to set the controller mode to `6 Mbyte` mode.

   e. Use the `TM` command to select the desired test mode. For a standard FEI, enter `CL`. For a data-streaming FEI, enter one of the following:

Command	Test type
DSISB	DS FEI internal, single-byte loopback (internal loopback)
DSIDB	DS FEI internal, double-byte loopback (internal loopback)

DSESB	DS FEI external, single-byte loopback (external loopback)
DSEDB	DS FEI external, double-byte loopback (external loopback)

For Program Mode menu operation, do the following:

a. Enter the PROG command from the Initial menu.

b. Enter the CFG command to go to the Configuration menu.

c. If needed, use the DRVM command to set the driver mode to raw.

d. If needed, use the CMDE command to set the controller mode to 6 Mbyte mode.

e. Use the RT command to go to the Program Mode menu.

f. Enter the EDIT command to load the FEI program.

g. Enter the HELP command.

h. Enter the LCS command to display a list of canned test sequences.

i. For a standard FEI, enter CL. For a data-streaming FEI, enter one of the following:

Command	Test type
DS1	Data-streaming FEI internal, single-byte loopback sequence
DS2	Data-streaming FEI internal, double-byte loopback sequence
DS3	Data-streaming FEI external, single-byte loopback sequence
DS4	Data-streaming FEI external, double-byte loopback sequence

After making a selection, the canned sequence is loaded and control is returned to the Program Mode menu edit mode. (If you want to write a new program or modify an existing program, see Appendix E, page 291.)

9. Enter either RT or PROG to return to the Program Mode menu to execute the program.

10. For a data-streaming FEI, set the maintenance panel switches as follows (see Figure 6, page 35):

Switch	Setting
DATA RATE	NORMAL
MODE	TEST
PARITY	NORMAL
PROTOCOL	*Site-determined*

For a standard FEI, set the maintenance panel switches as follows (see Figure 5, page 34):

Switch	Setting
BUS EXTENSION	*Site-determined*
DATA IN/DATA OUT	*Site-determined*
MODE	NORMAL
PARITY	ENABLE

11. For external loopback only, disconnect the channel cables from the FEI at point A (see Figure 8, page 37) and install the required loopback connectors. The Cray Research part numbers for the connectors are as follows:

Connector	Part number
J01 hbk	02198300
J02 hbk	02198300
J03 tag	01135300
J04 bus	01135200
J05 bus	01135200
J06 tag	01135300

12. Depress the FEI-1 reset button on the maintenance panel to enable the switch settings and clear the FEI hardware.

13. Modify other OLNET command values (such as pass count) as desired.

14. Enter the EX command to execute the selected test mode.

15. Upon completion of testing, do the following:

    a. Reconnect all disconnected cables.

b. Return the FEI maintenance panel switch settings to their normal positions.

c. Reset the OFFLINE/ONLINE button on the FEI maintenance panel to ONLINE.

d. Press the RESET button to enable the switch settings and clear the FEI hardware.

16. Enter `RT` from the Test Mode menu.

17. For Cray Research IOS-E systems, enter `RT` from the FEI test Initial menu. OLNET prompts you to restore the channel configuration. Respond to the prompt according to the menu directions.

18. Notify the operators for the Cray Research and IBM systems and let them know you have completed FEI testing.

2.4.3 Cray Research fiber-optics link (FOL-3) to an IBM system

A Cray Research fiber-optics link (FOL-3) allows external loopback (connector) testing only. To execute FEI loopback mode for external loopback testing (front-end computer system), do the following.

For additional information on the FOL-3, see the *FOL-3 Maintenance Manual*, publication CMM1102000.

1. Contact the operators for the Cray Research and IBM systems and let them know which FEI/FOL-3 you want to test. After taking the station down, the operator for the IBM system must enter one of the following commands at the IBM console to remove the FEI from system operation:

v *fei-address*,`offline`

(MVS only)

`vary offline` *fei-address*

(VM only)

2. The operator for the Cray Research system must enter the following command for the appropriate network driver:

`sdaemon -k uscp`

(Takes the station down)

3. Set the ONLINE/OFFLINE button on the Cray Research FEI operator's panel to the OFFLINE position (see Figure 4, page 33). For additional information on the panel, see the *Cray Data-streaming Interface Reference Manual*, publication HR-0079.

4. Perform the steps listed in a, b, or c, following, as appropriate to your test environment (to locate the loopback points, see Figure 9, page 38).

   a. Internal loopback mode (FO module testing: loopback point E):

       • Set the data select switch on the FO module to the OFF position.

       • Press the RESET button on the Cray Research data-streaming FEI maintenance panel to clear the FEI hardware (see Figure 6, page 35).

       • Set the test mode to FEI loopback (`TM,FL`) and the FEI type to Cray Research fiber-optics link (`FY,FO`).

   b. External loopback mode (FO cable connector: loopback point D):

       • Disconnect the FO cables between the FOL-3 pair.

       • Install the FO loopback cable, Cray Research part number 12025200.

       • Press the RESET button on the Cray Research data-streaming FEI maintenance panel to clear the FEI hardware.

       • Set the test mode to FEI loopback (`TM,FL`) and the FEI type to Cray Research fiber-optics link (`FY,FO`).

   c. External loopback mode (Cray Research cable connector: loopback point A):

       • Disconnect the channel cables from the FEI at point A.

       • Install the required loopback connector, Cray Research part number 2203405.

       • Press the RESET button on the Cray Research data-streaming FEI maintenance panel to clear the FEI hardware.

       • Set the test mode to FEI loopback (`TM,FL`) and the FEI type to Cray Research data-streaming (`FY,ID`).

5. Reset the ONLINE/OFFLINE button on the Cray Research FEI operator's panel to the ONLINE position (the green OFFLINE light goes off).

6. Load OLNET on the Cray Research system.

7. Initialize OLNET on the IBM computer system and access the Main menu, as described in Section 1.2, page 2, and Section 1.3, page 4.

8. After you initialize OLNET and access the Main menu, enter `FT` to select the FEI test.

9. Choose the device path with the `DV`,*dv* or `DPM` command.

10. At this point, you can select the Test Mode menu by entering the `TMM` command, or you can select the Program Mode menu by entering the `PROG` command. The Test Mode menu is recommended for beginning OLNET users. After you become more experienced with OLNET execution, you may want to use the more versatile (but also more difficult) Program Mode menu.

    For Test Mode menu operation, do the following:

    a. Enter the `TMM` command from the Initial menu.

    b. Enter the `CFG` command to go to the Configuration menu.

    c. If needed, use the `DRVM` command to set the driver mode to `raw`.

    d. If needed, use the `CMDE` command to set the controller mode to `6 Mbyte mode`.

    e. Use the `TM` command to select the `CL` test mode.

    For Program Mode menu operation, do the following:

    a. Enter the `PROG` command from the Initial menu.

    b. Enter the `CFG` command to go to the Configuration menu.

    c. If needed, use the `DRVM` command to set the driver mode to `raw`.

    d. If needed, use the `CMDE` command to set the controller mode to `6 Mbyte mode`.

    e. Use the `RT` command to go to the Program Mode menu.

    f. Enter the `EDIT` command to load the FEI program.

    g. Enter the `HELP` command.

    h. Enter the `LCS` command to display a list of canned test sequences.

    i. Enter `CL`. After making a selection, the canned sequence is loaded and control is returned to the Program Mode menu edit mode. (If you want

to write a new program or modify an existing program, see Appendix E, page 291.)

11. Enter either RT or PROG to return to the Program Mode menu to execute the program.

12. Set the maintenance panel switches as follows (see Figure 5, page 34):

Switch	Setting
BUS EXTENSION	*Site-determined*
DATA IN/DATA OUT	*Site-determined*
MODE	NORMAL
PARITY	ENABLE

13. For external loopback only, disconnect the channel cables from the FEI at point A (see Figure 8, page 37) and install the required loopback connectors. The Cray Research part numbers for the connectors are as follows:

Connector	Part Number
J01 hbk	02198300
J02 hbk	02198300
J03 tag	01135300
J04 bus	01135200
J05 bus	01135200
J06 tag	01135300

14. Press the FEI-1 RESET button on the maintenance panel to enable the switch settings and clear the FEI hardware.

15. Modify other OLNET command values (such as pass count) as desired.

16. Enter the EX command to execute the selected test mode.

17. Upon completion of testing, do the following:

   a. Reconnect all disconnected cables.

   b. Return the FEI maintenance panel switch settings to their normal positions.

   c. Reset the OFFLINE/ONLINE button on the FEI maintenance panel to ONLINE.

    d. Press the RESET button to enable the switch settings and clear the FEI hardware.

18. Enter `RT` from the Test Mode menu.

19. Enter `RT` from the FEI test Initial menu. OLNET prompts you to restore the channel configuration. Respond to the prompt according to the menu directions.

20. Notify the operators for the Cray Research and IBM systems and let them know you have completed FEI testing.

2.5 FEI-1 end-to-end mode

FEI-1 end-to-end mode is supported for Cray Research systems with an IOS-E to IBM MVS or VM operating systems. FEI-1 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 IBM system is assigned as active and the other as passive. The active computer 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 IBM 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 an IBM system when the link consists of an FEI-1.

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

1. Contact the operators for the IBM and Cray Research systems and let them know which FEI you want to test. After taking the station down, the operator for the IBM computer system must enter one of the following commands at the IBM console to remove the FEI from system operation:

   v *fei-address,*`offline`

(MVS only)

vary offline *fei-address*

(VM only)

2. The operator for the Cray Research computer system must enter the following command for the appropriate network driver:

sdaemon -k uscp

(Takes the station down)

3. After you initialize OLNET and access the Main menu, perform the following steps on the Cray Research system:

    a. Enter the `FT` command.

    b. Choose the device path with either the `DV` or `DPM` command.

    c. Enter the `TMM` command to go to the Test Mode menu.

4. On an IBM system, when you have loaded the OLNET Main menu, choose the `FT` command.

5. Designate one computer 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 computer 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 computer systems:

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

    Modify any other command values from the NSC menu as necessary.

6. Enter `EX` from the FEI menu for the passive computer system to execute the FEI test.

Note: Always start test execution from the passive computer 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.

7. Enter `EX` from the FEI menu for the active system to execute the FEI 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
```

Note: You can attempt to clear an error condition under MVS by reentering the device name (`DN` command) or under VM by reentering the virtual address (`VA` command). If this does not clear the error condition, you must do further testing to isolate the hardware fault in the communication link.

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           = n bytes/second
```

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

8. Upon completion of testing, press the FEI RESET button to clear the FEI hardware.

9. Enter `RT` from the Test Mode menu.

10. Enter `RT` from the FEI test Initial menu. OLNET prompts you to restore the channel configuration. Respond to the prompt according to the menu directions.

11. Notify the operators for the Cray Research and IBM systems and let them know you have completed FEI testing.
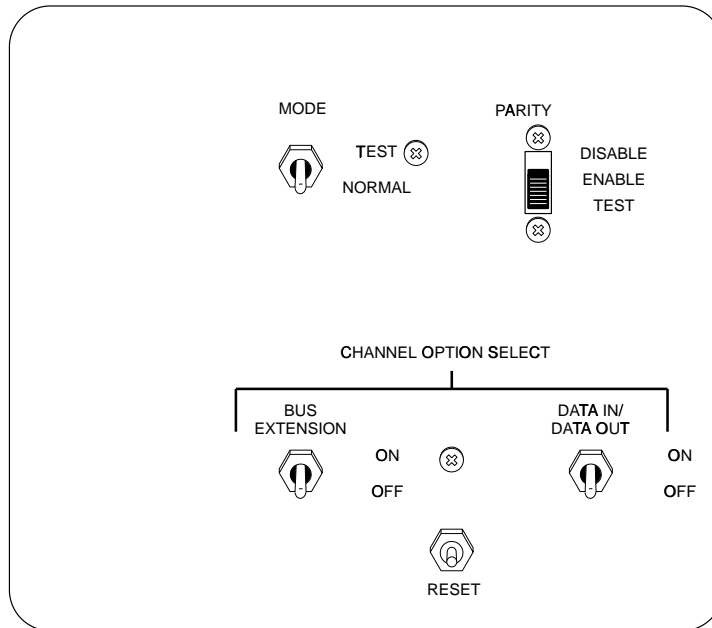
2.6 Cray cable loopback mode

Cray cable loopback mode is supported for Cray Research systems with an IOS-E.

1. Contact the operators for the IBM and Cray Research systems and let them know which Cray Research channel FEI connection you want to test. After taking the station down, the operator for the IBM system must enter one of the following commands at the IBM console to remove the FEI from system operation:

    v *fei-address*,`offline`

    (MVS only)

    `vary offline` *fei-address*

    (VM only)

2. The operator for the Cray Research computer system must enter the following command for the appropriate network driver:

    `sdaemon -k uscp`

    (Takes the station down)

3. After you initialize OLNET and access the Main menu, perform the following steps on the Cray Research system with an IOS-E:

    a.   Enter the `FT` command.

    b.   Choose the device path with either the `DV` or `DPM` command.

    c.   Enter the `TMM` command to go to the Test Mode menu.

4. Enter the `TM,CL` command to select cable loopback mode.

5. See Figure 11, page 40, and select the appropriate loopback point. Install a Cray Research cable loopback connector as shown in Table 2.

Table 2. Loopback connector selection

Testing	Disconnect	Cray Research loopback connector part number
Cray Research channel modules	Point A	2203405
Cray Research channel modules and 51-pin drop cables	Point B	2061506
Cray Research channel modules, 51-pin drop cables, and 61-pin data cables	Point C	2064803

6. Enter `EX` from the FEI menu to execute cable loopback.

7. Do the following for IOS-E systems:

   a. Enter the `CFG` command to go to the Configuration menu.

   b. If needed, use the `DRVM` command to set the driver mode to `raw`.

   c. If needed, use the `CMDE` command to set the controller mode to 6 `Mbyte mode`.

   d. Enter the `RT` command to return to the Test Mode menu.

8. Upon completion of testing, do the following:

   a. Reconnect all disconnected cables.

   b. Press the FEI RESET button to clear the FEI hardware.

9. Enter `RT` from the Test Mode menu.

10. For IOS-E systems, enter `RT` from the FEI test Initial menu. OLNET prompts you to restore the channel configuration. Respond to the prompt according to the menu directions.

11. Notify the operators for the Cray Research and IBM systems and let them know you have completed FEI testing.

2.7 Figures

This section contains the following figures:

OFFLINE ONLINE/OFFLINE LOGIC POWER MAINPOWER

ON OFF

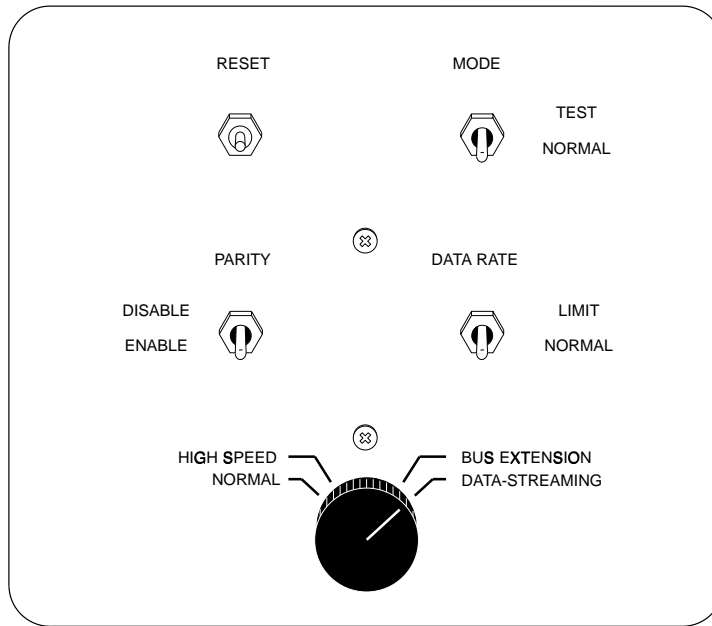*a10478*

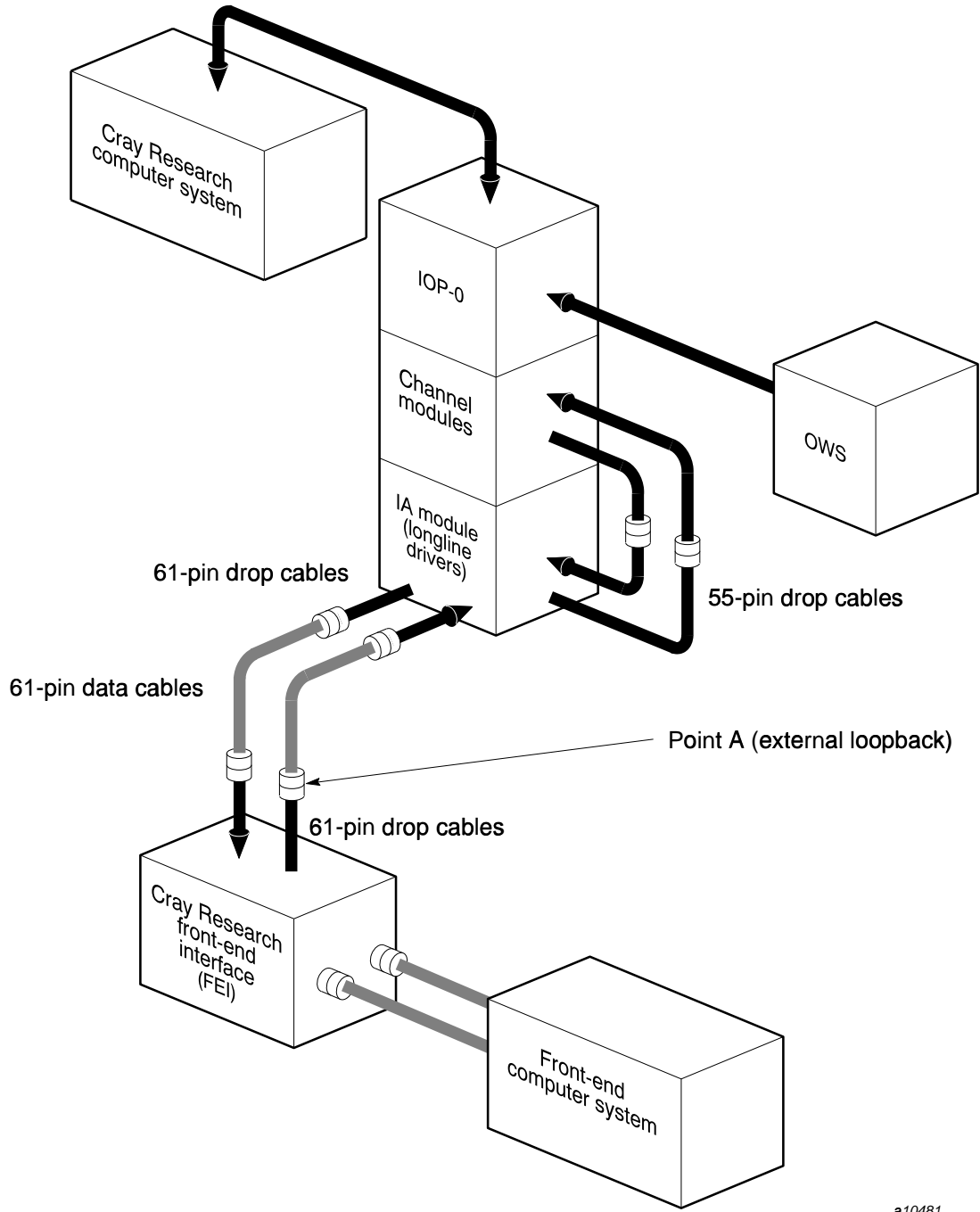Figure 4. Cray Research FEI operator's panel for an IBM system

Figure 5. Cray Research standard FEI maintenance panel for an IBM system

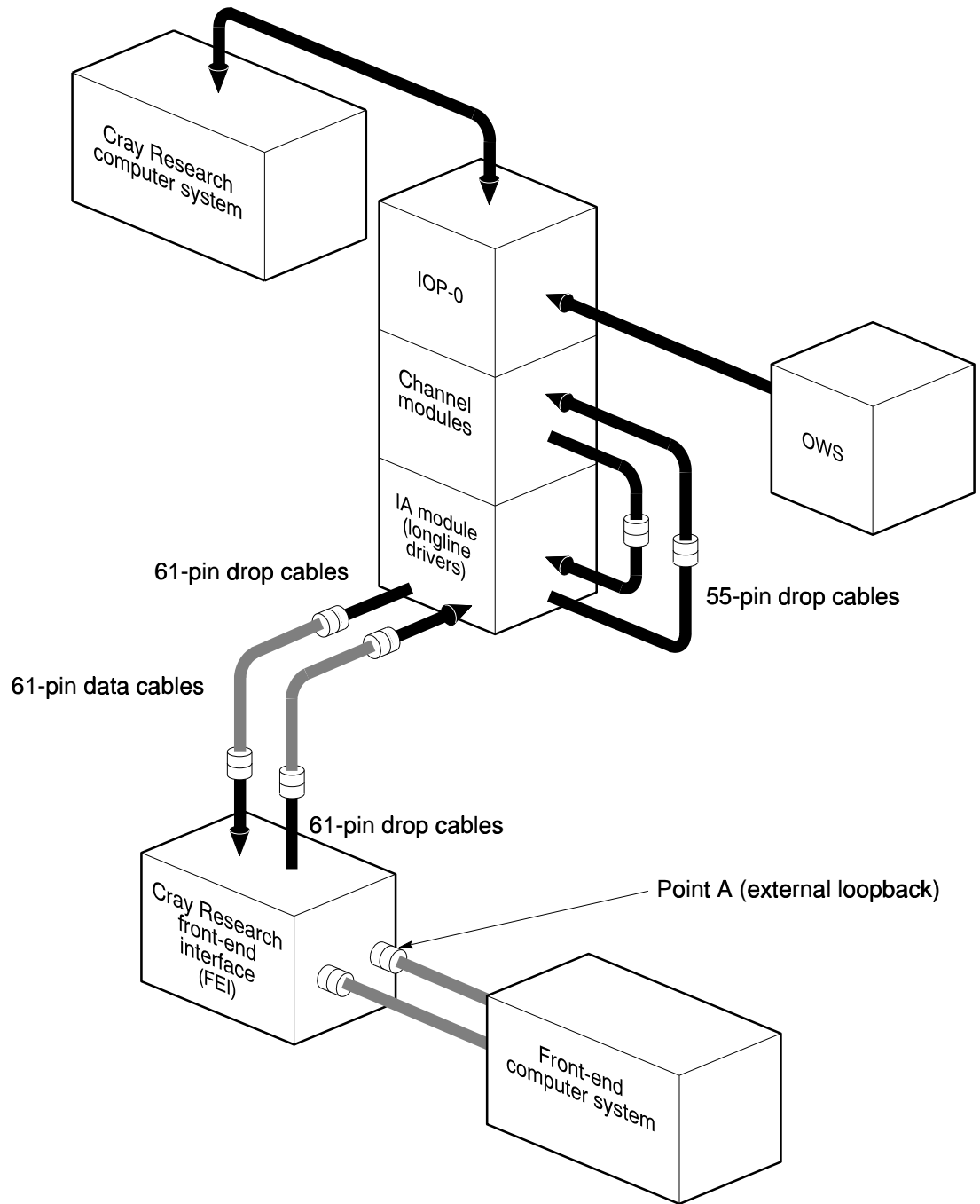*a10480*

Figure 6. Cray Research data-streaming FEI maintenance panel for an IBM
system

Figure 7. FEI loopback mode (front-end system)

a10481

Cray Research
computer system

IOP-0

Channel
modules

IA module
(longline
drivers)

OWS

61-pin drop cables

55-pin drop cables

61-pin data cables

61-pin drop cables

Point A (external loopback)

Cray Research
front-end
interface
(FEI)

Front-end
computer system

a10482

Figure 8. FEI loopback mode for a Cray Research standard FEI (Cray Research system)
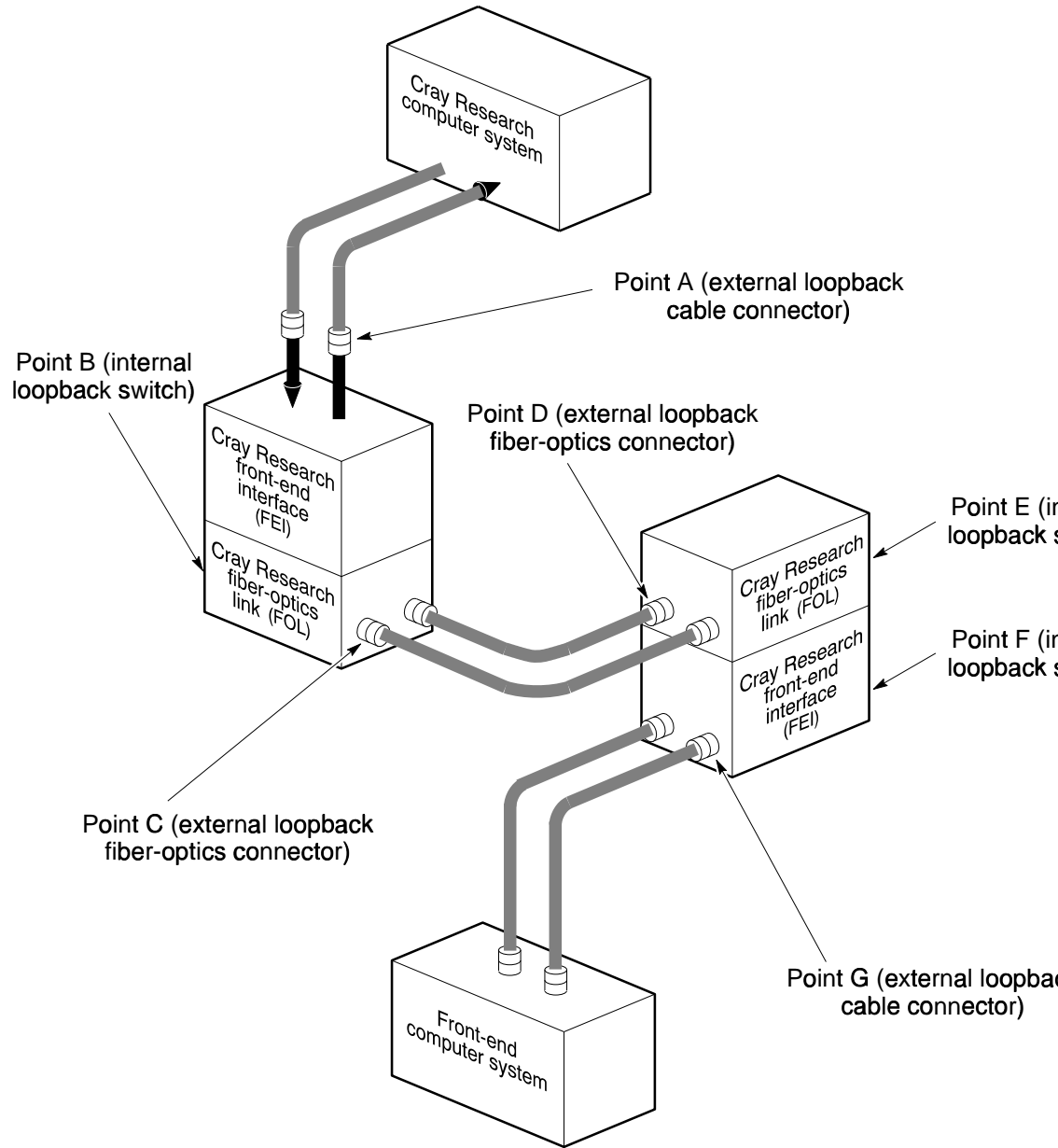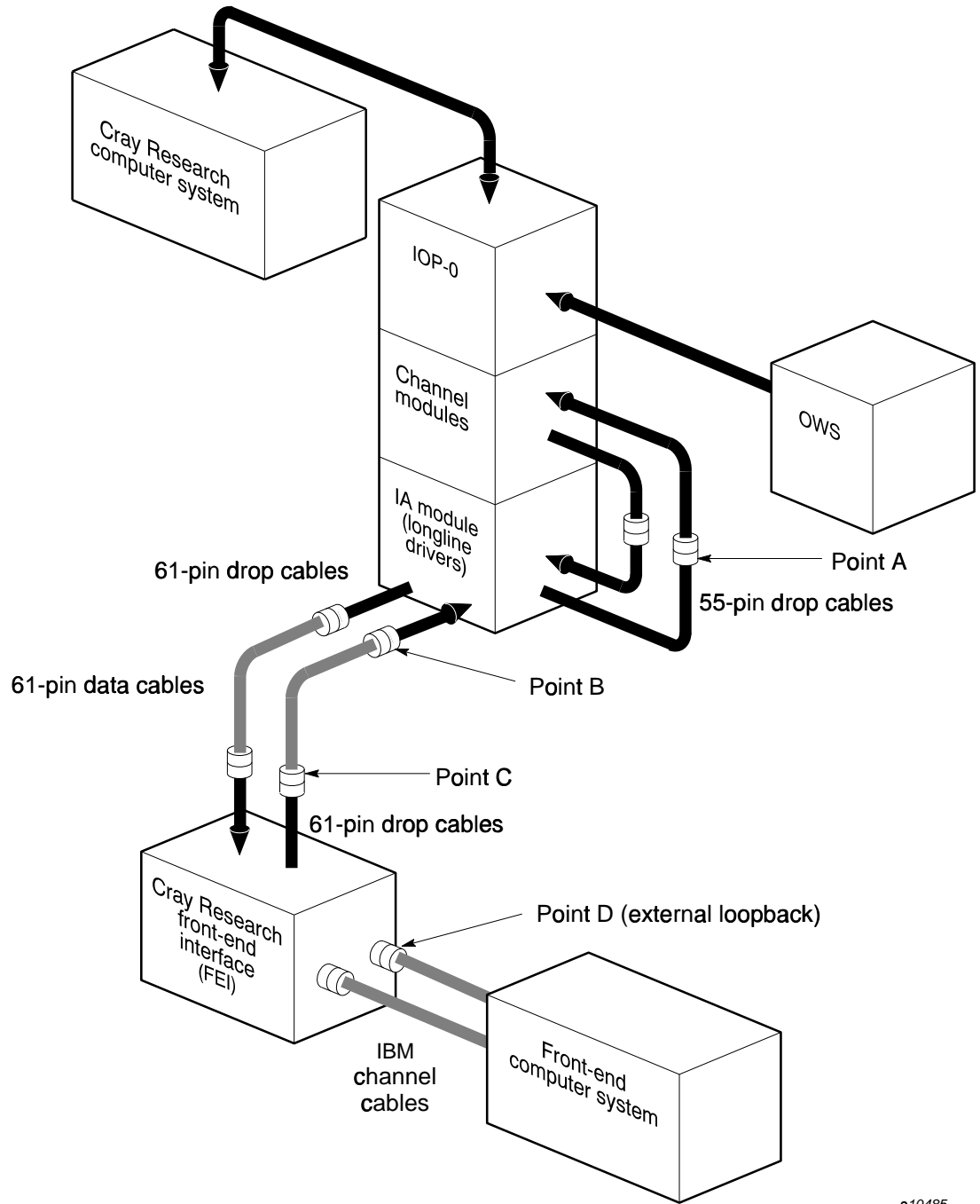
Figure 9. FEI loopback mode for a Cray Research fiber-optics link (FOL-3)
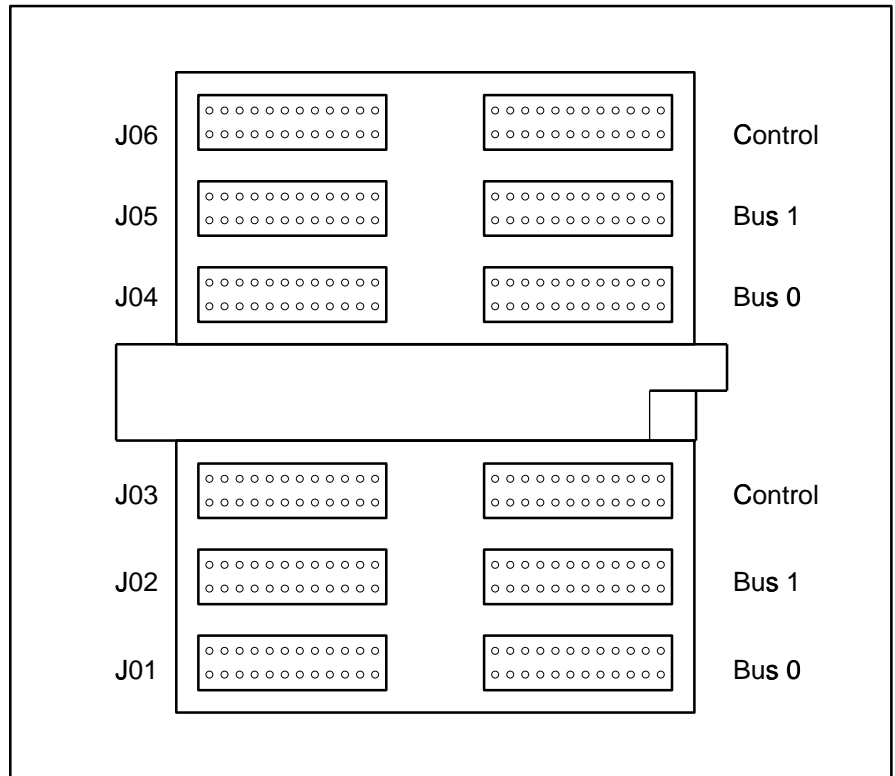
a10484

Figure 10. Cray Research FEI cable connector panel for an IBM system

Figure 11. FEI loopback mode for an FEI (Cray Research system side)