FD-2240A
6.3MB OPTICAL LINE TERMINATING MULTIPLEXER
MAINTENANCE TEST

1. GENERAL

1.01 This section is a cover sheet for the NEC America, Inc., FD-2240A 6.3MB Optical Line Terminating Multiplexer Maintenance Test. This section is reproduced with permission of NEC America, Inc., and is equivalent to NEC practice NECA 365-407-505, Issue 2.

1.02 Whenever this section is reissued the reason(s) for reissue will be listed in this paragraph.

1.03 This section provides instructions and procedures for testing which can be used to troubleshoot equipment and test overall operation.

1.04 If corrections are required in the attached document, use Form-3973 as described in Section 000-010-015.

1.05 If equipment design and/or manufacturing problems should occur, refer to Section SW 010-522-906 for procedures on filing an Engineering complaint.

2. ORDERING PROCEDURE

2.01 To order additional copies of this practice, use NECA 365-407-828SW as the section number.

3. REPAIR/RETURN

3.01 Malfunctioning units may be returned to NEC America, Inc., for repair.

Attachment: NEC America, Inc.
FD-2240A 6.3MB Optical Line
Terminating Multiplexer
Maintenance Test

NEC PRACTICE

NEC

NECA 365-407-505
Issue 2, December 1986

FD-2240A 6.3MB OPTICAL LINE TERMINATING MULTIPLEXER

MAINTENANCE TEST

NEC America, Inc.
Transmission Division

14040 Park Center Road
Herndon, Virginia 22071
Phone No: (703) 834-4000
Fax No: (703) 481-6904
Telex No: 899498
TWX No: 710-831-0639
Easylink No: 62939917

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6.3MB OPTICAL LINE TERMINATING MULTIPLEXER
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CONTENTS

Page

1. INTRODUCTION 2

2. OPTICAL OUTPUT POWER LEVEL CHECK 2

3. BIT ERROR RATE (BER) TEST 5
   A. Optical Interface 5
   B. DS2 Interface 6A

4. REMOTE LOOPBACK FUNCTION TEST 7
   A. Optical Interface 7
   B. DS2 Interface 9

ILLUSTRATION

Figure	Title	Page
2-1	Optical Output Power Level Test Setup	4
3-1	Bit Error Rate Test Setup With Optical Interface	5
3-2	Optical High Speed Line Back-to-Back Connection	6
3-3	Bit Error Rate Test Setup With DS2 Interface	6B
4-1	Remote Loopback Configuration With Optical Interface	8
4-2	Remote Loopback Configuration With DS2 Interface	10

TABLE

Table	Title	Page
2-1	Minimum Optical Output Power Level	3

1. INTRODUCTION

1.01 This practice provides instructions and procedures for testing which can be used to troubleshoot equipment and test overall operation. Additional tests for checking equipment operation are described in Installation Testing practice NECA 365-407-204.

1.02 Issue 2 of this practice supersedes Issue 1 of NECA 365-407-505. The practice provides expanded coverage and corrects errors and omissions in the superseded document.

1.03 Whenever this practice is reissued, the reason for reissue will be listed in this paragraph.

2. OPTICAL OUTPUT POWER LEVEL CHECK

2.01 The 6M OPT INF unit contains a LED or LD optical source. Table 2-1 lists the optical source and minimum optical output power level. Refer to Figure 2-1.

2.02 Use the following procedures to measure optical output power level:

(1) Open the shelf front cover to gain access to the optical connectors. Refer to Figure 2-1.

(2) Set ALM unit MAINT switch to ON position and CTRL unit SEL switch to switch redundant system online. Verify that all unit ON LINE LED are lit.

DANGER

- When connecting or disconnecting optical pigtail fiber or patch fiber cords, do not look into the cords. Laser radiation may be present even when equipment is turned off.

(3) Pull the offline 6M OPT INF unit halfway from the shelf and carefully disconnect the optical fiber cord from the optical output connector. Place a dust cap over the end of the disconnected fiber cord.

(4) Connect an optical power meter as shown in Figure 2-1.

(5) Insert the 6M OPT INF unit in the shelf.

(6) Observe the optical power meter reading. Verify that optical power level is in the value shown in Table 2-1.

(7) Disconnect the optical power meter and reconnect the optical fiber cord. Insert the unit in the shelf.

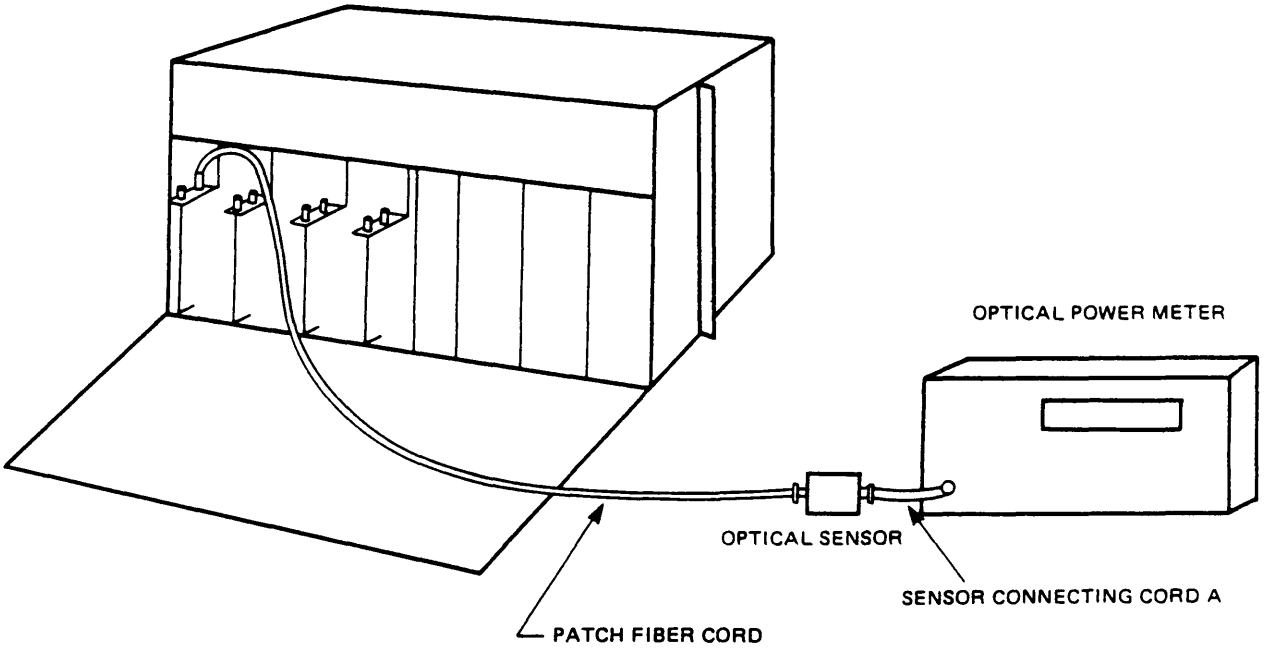
(8) Set MAINT switch to OFF and SEL switch to middle position.

(9) Repeat steps 2 through 8 to measure the optical output power level of the other 6M OPT INF units.

Table 2-1

Minimum Optical Output Power Level

CODE	MODE	OPTICAL SOURCE	POWER LEVEL (AVERAGE)
X0306E	Multimode	Long wavelength LED	≧-18.5 dBm
X0306F, F1	Single mode	Long wavelength LED	≧-35.0 dBm
X0307B	Multimode	Long wavelength LED	≧ 0 dBm
X0307C, C1	Single mode	Long wavelength LD	≧ -2.0 dBm



NOTE: 1. Fiber patch cord : NEC OD9470B3B03X (multi mode)
NEC OD9474B3B03X (single mode)

2. Optical power meter : Anritsu ML93A

3. Optical Sensor : Anritsu MA913A (long wavelength)

4. Sensor connecting cord A : Accessory of ML93A

Figure 2-1 Optical Output Power Level Test Setup

3. BIT ERROR RATE (BER) TEST

A. Optical Interface

3.01 The bit error rate test is performed by connecting the equipment high speed (6.312 Mb/s) input and output back-to-back in loopback configuration. Once the high speed loopback is established, a BER test set is utilized to check the BER at the low speed level. Figure 3-1 shows the BER test setup.

3.02 Use the following procedures to check BER in redundant configuration:

(1) Set ALM unit MAINT switch to ON position and CTRL unit SEL switch to place system to be checked online.

DANGER

- When connecting or disconnecting optical pigtail fiber or patch fiber cords, do not look into the cords. Laser radiation may be present even when the equipment is turned off.

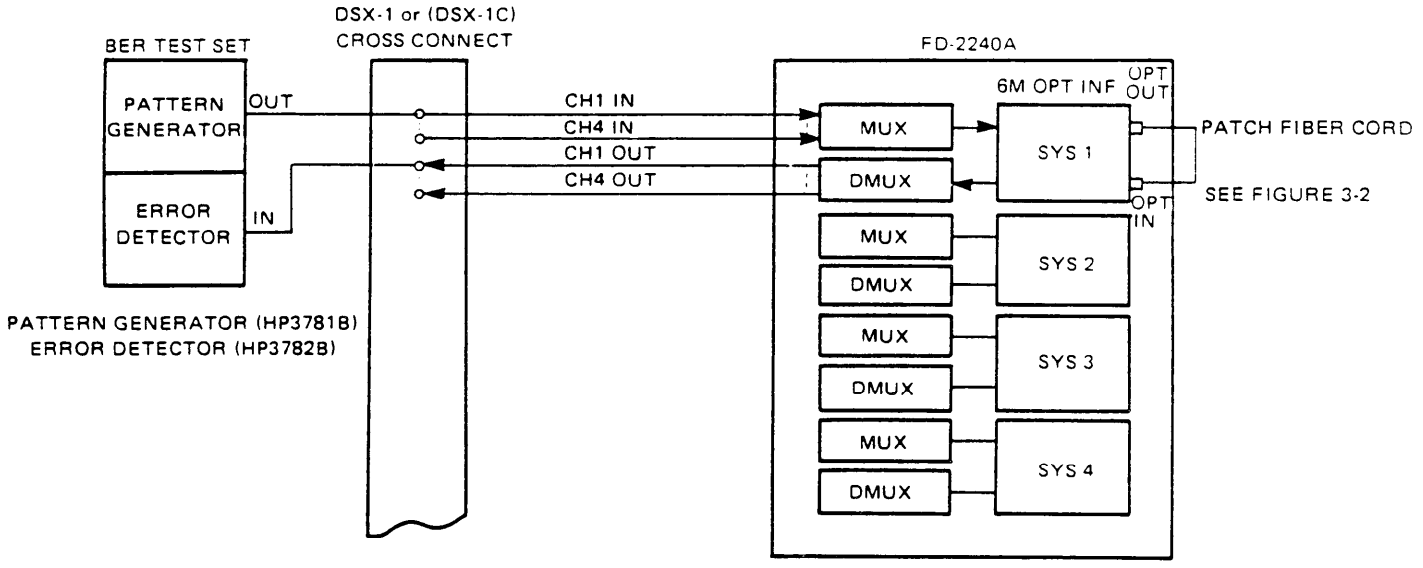


Figure 3-1 Bit Error Rate Test Setup with Optical Interface

(2) Pull the offline 6M OPT INF unit halfway from the shelf and disconnect optical fiber cords. Establish loopback by connecting a patch fiber cord (Figure 3-2) and insert the unit in the shelf.

(3) As shown in Figure 3-1, connect the output of pattern generator and input of error detector to DS1 or DS1C channel to be tested at DSX-1 or DSX-1C crossconnect.

(4) Input the DS1 or DS1C digital signal and PN pattern, mark density 1/2 from pattern generator.

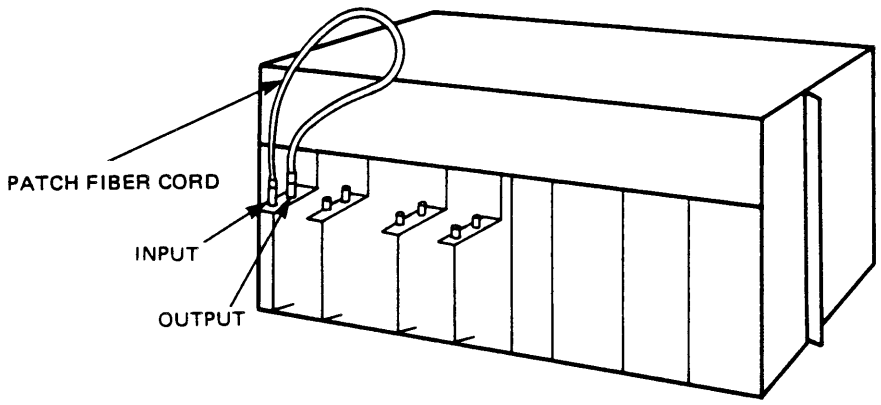
(5) Monitor the BER on error detector and verify that there is no error for 5 minutes.

(6) Repeat Steps 1 through 5 for remaining channels and systems.

(7) Disconnect test equipment and reconnect cables.

(8) Pull the 6M OPT INF unit halfway from the shelf and disconnect the fiber patch cord. Reconnect optical fiber cords to the connectors and insert unit in the shelf.

(9) Set MAINT switch to OFF and restore SEL switch to middle position.



OPTICAL HIGH SPEED LOOPBACK

Figure 3-2 Optical High Speed Line Back-to-Back Connection

B. DS2 Interface

3.03 The bit error rate test is performed by connecting the equipment high speed (6.312 Mb/s) input and output back-to-back in loopback configuration. Once the high speed loopback is established, a BER test set is utilized to check the BER at the low speed level. Figure 3-3 shows the BER test setup.

3.04 Use the following procedures to check BER in redundant configuration:

(1) Set ALM unit MAINT switch to ON position and CTRL unit SEL switch to place system to be checked online.

(2) Disconnect DS2 Bipolar inputs and outputs at the DSX-2 cross-connect and connect them back-to-back as shown in Fig. 3-3.

(3) As shown in Figure 3-3, connect the output of pattern generator and input or error detector to DS1 or DS1C channel to be tested at DSX-1 or DSX-1C crossconnect.

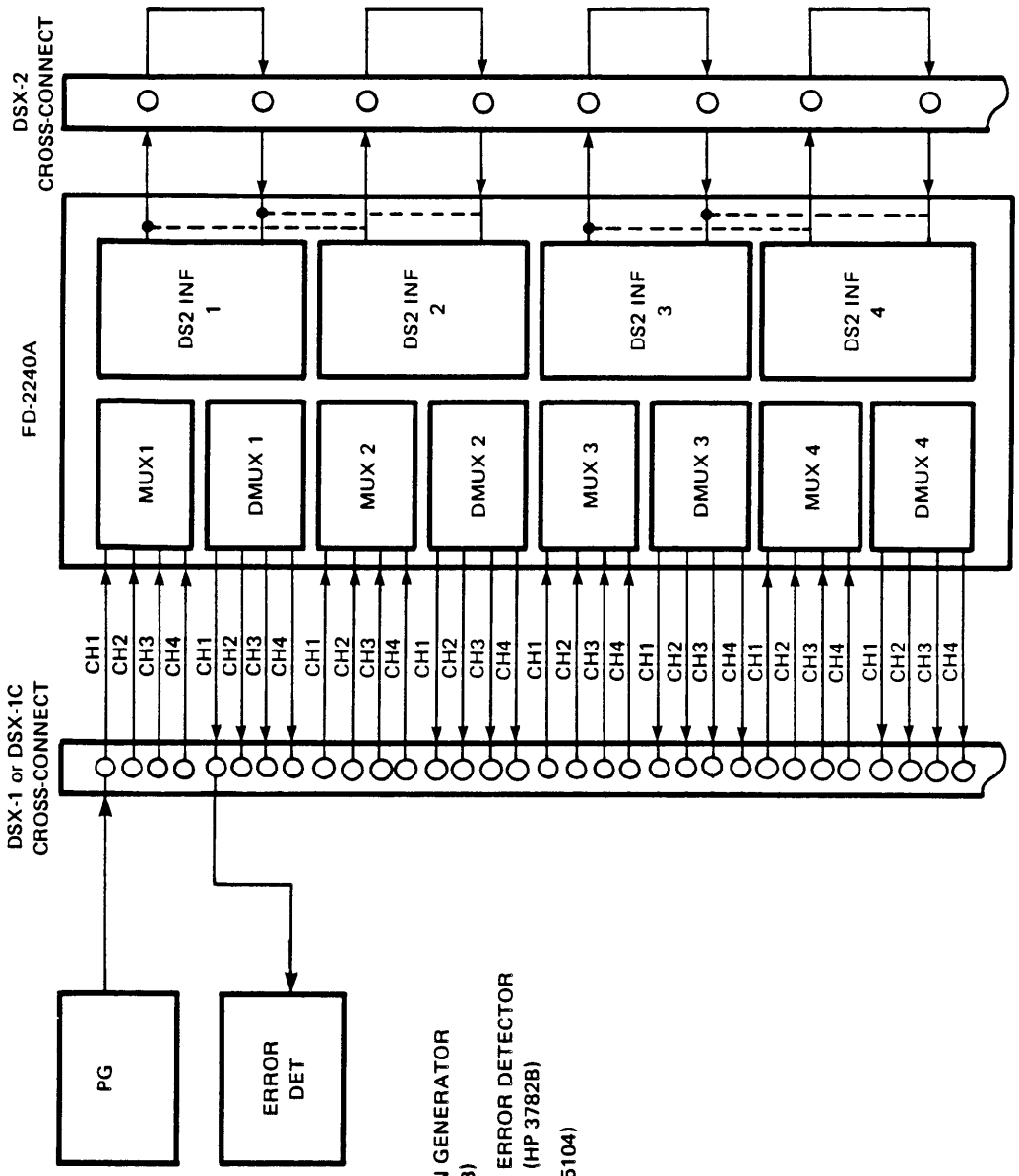
(4) Input the DS1 or DS1C digital signal and PN pattern, make density 1/2 from pattern generator.

(5) Monitor the BER on error detector and verify that there is no error for 5 minutes.

(6) Repeat Step 1 through 5 for remaining channels and systems.

(7) Disconnect test equipment and reconnect cables.

(8) Set MAINT switch to OFF and restore SEL switch to middle position.



♦ Figure 3-3 Bit Error Rate Test Setup with DS2 Interface ♦

4. REMOTE LOOPBACK FUNCTION TEST

A. ◗Optical Interface◖

4.01 The FD-2240A has a remote loopback (RLB) function at DS1 and 6.3MB optical levels which is used to test and monitor the optical fiber lines and equipment at remote station.

4.02 Use the following procedures to operate the 6M OPT INF unit RLB switch for high speed (6.3MB optical) level and MUX unit RLB switch for low speed (DS1) level.

(1) Set ALM unit MAINT switch to ON position and CTRL unit SEL switch to place system to be looped back online.

(2) As shown in Figure 4-1, connect the test equipment at DSX-1 or DSX-1C crossconnect and input the pulse pattern PN mark density 1/2 from pattern generator (PG).

(3) At high speed level, set the 6M OPT INF unit RLB switch to ON position to send a loopback command to remote station. RLB SET LED on this unit is lit. When loopback command is detected at the remote station, the 6M OPT INF unit RLB DET LED is lit to indicate establishment of loopback circuitry. Thus, the signal is looped back in this circuitry. At low speed level, set the MUX unit RLB switch to ON for channel to be tested. Loopback circuitry is established with indication that local MUX unit RLB SET LED and remote DMUX unit RLB DET LED are lit.

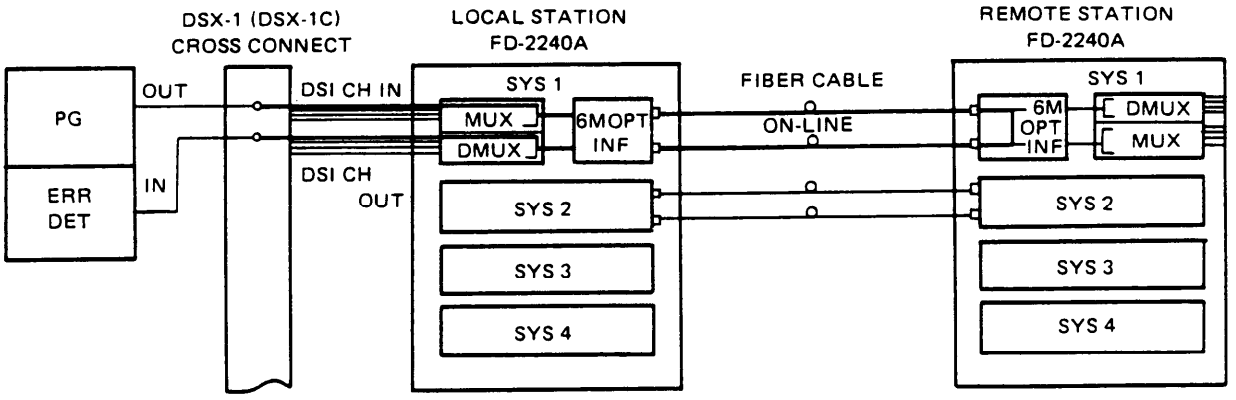
(4) No error should be recorded for 25 minutes, when measured by ERR DET.

(5) Set RLB switch to OFF. The local RLB SET LED and remote RLB DET LED go out.

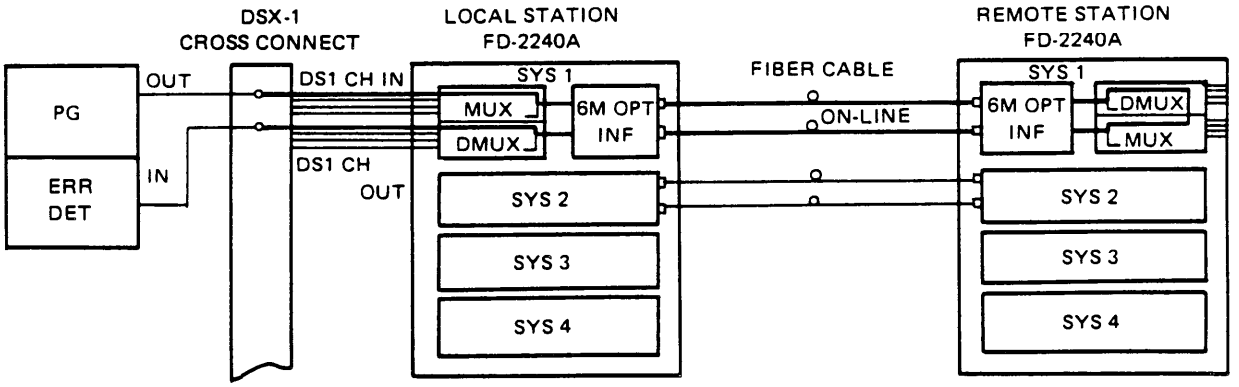
◗(6) Repeat steps 1 through 5 for remaining channels and systems.◖

(7) Disconnect the test equipment and restore connections at the crossconnect.

(8) Set MAINT switch to OFF and SEL switch to middle position.



(A) High Speed Level Remote Loopback



PG : Pattern Generator
ERR DET : Error Detector

(B) DSI Level Remote Loopback

◗ Figure 4-1 Remote Loopback Configuration with Optical Interface ◖

B. DS2 Interface

4.03 The FD-2240A has a remote loopback (RLB) function at DS1 level which is used to test and monitor the DS2 bipolar line and equipment at remote station.

4.04 Use the following procedure to operate the MUX unit RLB switch for low speed (DS1) level.

(1) Set ALM unit MAINT switch to ON position and CTRL unit SEL switch to place systems to be looped back on-line.

(2) As shown in Fig. 4-2, connect the test equipment at DSX-1 or DSX-1C cross-connect and input the pulse pattern PN mark density 1/2 from pattern generator (PG).

(3) Set the MUX unit RLB switch to ON for channel to be tested. Loopback circuit is established with indication that local MUX unit RLB SET LED and remote DMUX unit RLB DET LED are lit.

(4) No error should be recorded for 25 minutes, when measured by ERROR DET.

(5) Set RLB switch to OFF. The local RLB SET LED and remote RLB DET LED go out.

(6) Repeat steps 1 through 5 for remaining channels and systems.

(7) Disconnect the test equipment are restore connections at the DSX-1 or DSX-1C cross-connect.

(8) Set the MAINT switch to OFF and SEL switch to middle position.

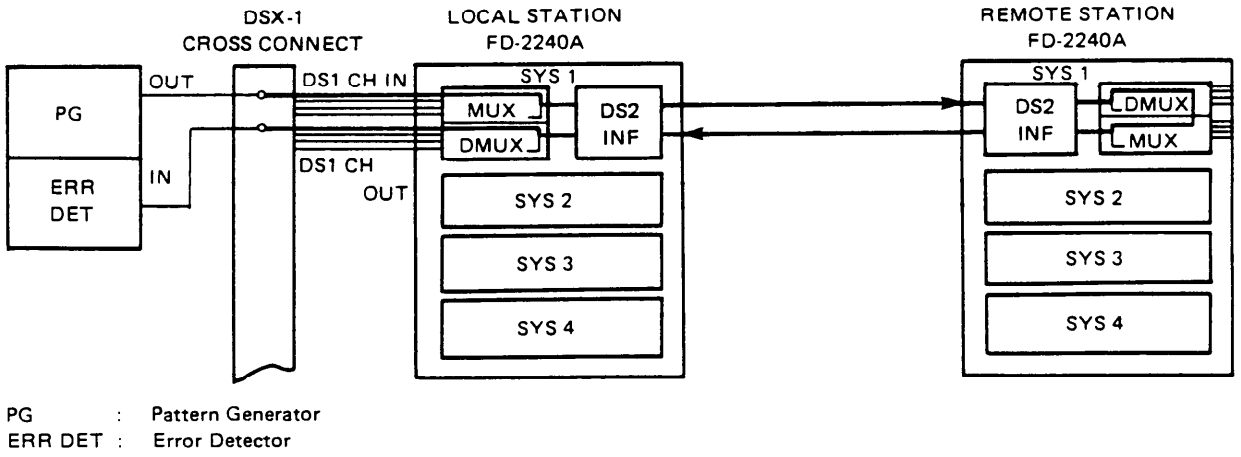


Figure 4-2 Remote Loopback Configuration with DS2 Interface