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NEAX® 2400 IPX

Fusion Network System Manual

OCTOBER, 2000

NEC America, Inc.

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Fusion Network System Manual

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LIST OF TABLES

This page is for your notes.

CHAPTER 1 INTRODUCTION

1. General

This manual covers the installation of the Fusion system.

2. How to Follow This Manual

This manual consists of the following chapters:

- CHAPTER 1 (INTRODUCTION)

  Explains how to use this manual.

- CHAPTER 2 (GENERAL)

  Outlines the Fusion system configuration and lists available service features.

- CHAPTER 3 (SYSTEM CONFIGURATION)

  Explains the hardware configuration of the Fusion system.

- CHAPTER 4 (INSTALLATION)

  Consists of the following topics:

  - Static Cautions
  - Switch Settings (PA-M96, PA-FCHA, PA-24DTR)

- CHAPTER 5 (DATA PROGRAMMING)

  Provides basic data assignment procedures using the following examples:

  - Installing a new Fusion network
  - Upgrading a CCIS network

- CHAPTER 6 (POST INSTALLATION TEST)

  Explains how to perform installation tests, focusing on the Fusion link connection test.

- CHAPTER 7 (TROUBLESHOOTING)

  Explains Fusion-related system messages and the repair procedures.

3. Related Manuals

For installation of the Fusion system, the following manuals are required:

- NEAX2400 IPX Circuit Card Manual
- NEAX2400 IPX Installation Manual
- NEAX2400 IPX Office Data Specification

To use this manual, the reader should have sufficient knowledge of the installation of both the CCIS No. 7 and the ACIS systems. For more information on these systems, refer to the related manuals.

CHAPTER 2 GENERAL

1. What is Fusion and its Advantages

The main advantages of the Fusion network are as follows:

1.1 Improved Inter-Office Service Features

The Fusion system can eliminate the constraints normally associated with network services that are offered using Common Channel Inter-Office Signaling (CCIS).

1.2 Use of Telephone Numbers

A Fusion system allows you to use telephone numbers in addition to the existing station numbers. (In the remainder of this manual, the existing station numbers are referred to as Physical Station Numbers.) Fusion service features are activated when a telephone number is dialed. The telephone number, which can be assigned on a station basis, is a unique number on a Fusion network. If required, numbering plan data, which is identical to that of an existing station number, can be used to maintain consistency of the numbering plan. When this plan is adopted, you can use the same numbering plan data after introducing the Fusion system. Figure 2-1 illustrates the use of telephone numbers in the Fusion network.

Note: *A maximum of 16 digits can be used as a telephone number.*

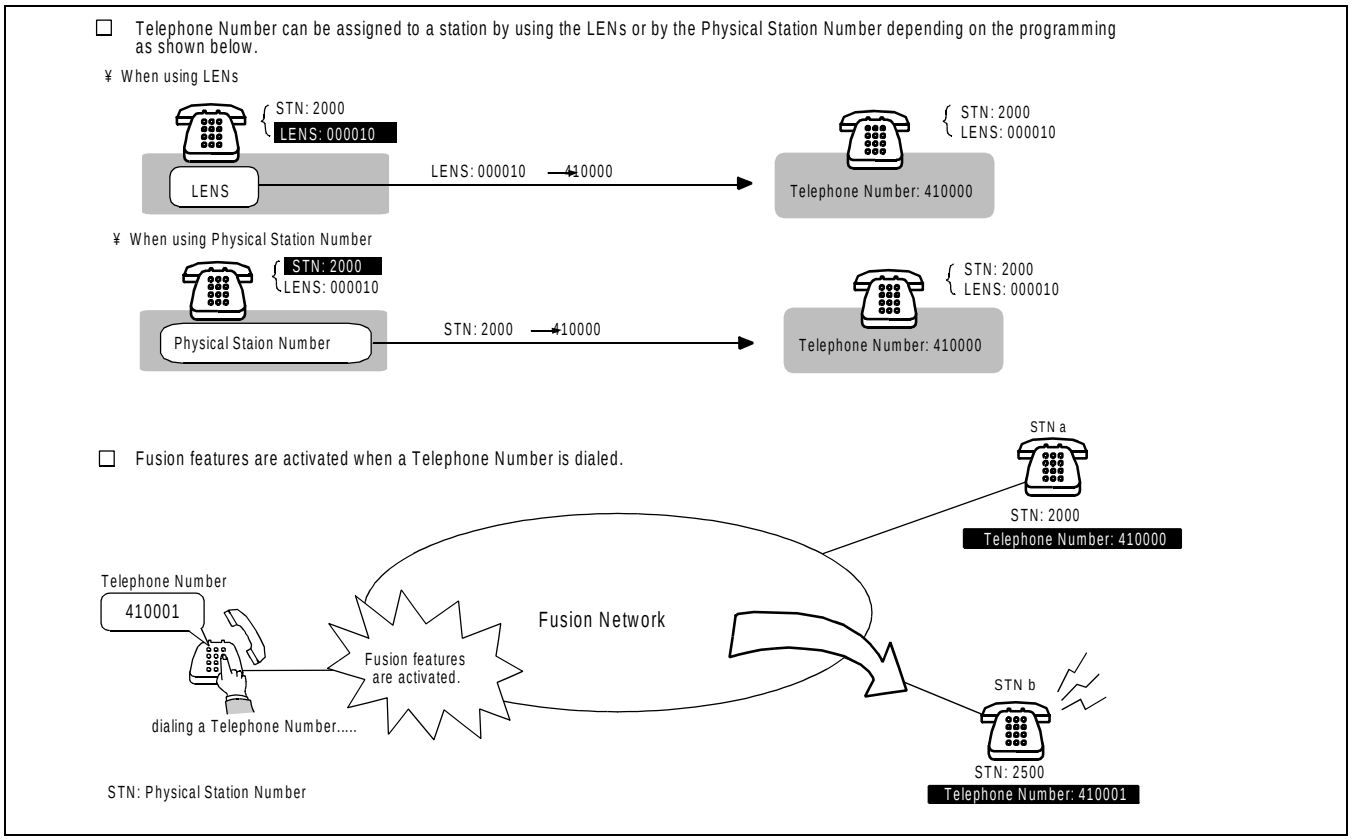
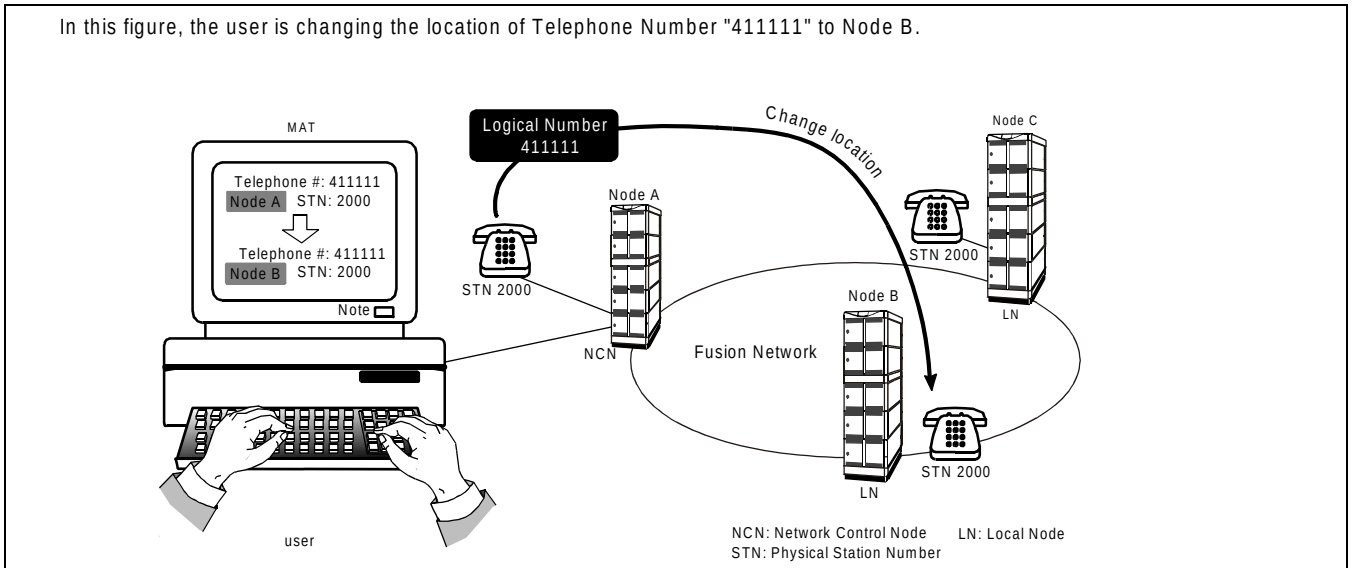


Figure 2-1 Telephone Number

2. Free Numbering

A telephone number can be assigned to a desired station on the Fusion network with the simple command operation shown in Figure 2-2.

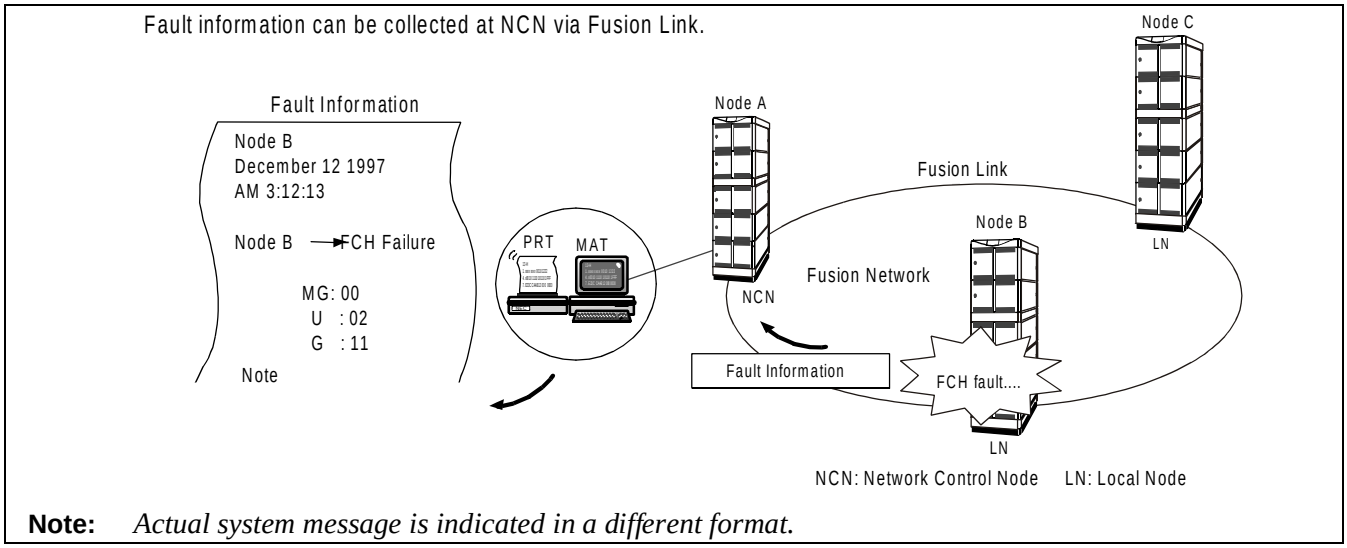


Note: *The AlGSN command is used for assigning Telephone Numbers. See 5.6 "Assignment of Telephone Numbers" for more details.*

Figure 2-2 Free Location

2.1 Centralized Maintenance Administration Terminal (MAT)

A Fusion network has one Network Control Node (NCN) and Local Nodes (LNs). The NCN has the Centralized-MAT, which runs on Windows 95/NT. The MAT can collect fault information from all nodes on the network. The NCN has Network Data Memory, which stores the data related to the network level. The telephone numbers, for example, can be changed with the Centralized-MAT at the NCN. The MAT also allows the user to manage network-level office data. Refer to Figure 2-3



Note: *Actual system message is indicated in a different format.*

Figure 2-3 Centralized MAT on Fusion Network

3. Fusion System Configuration

The Fusion system can be configured in the following two ways. Figure 2-4 shows a Fusion system with Fusion Call Control Handler (FCH) cards.

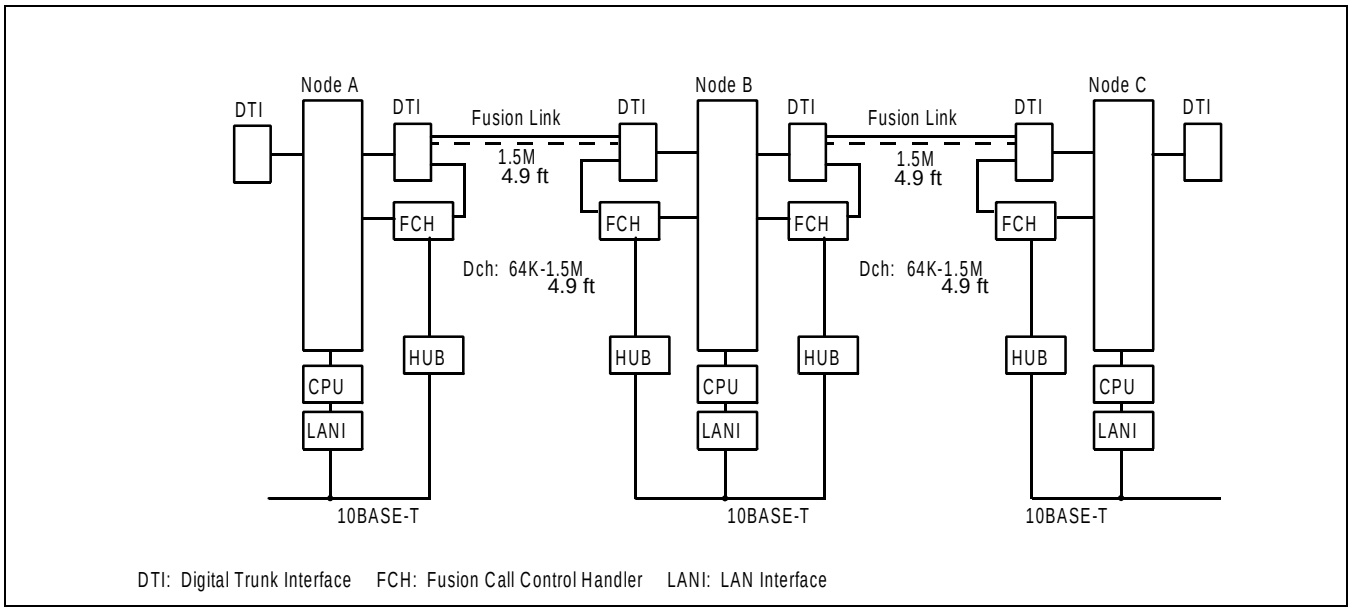


Figure 2-4 Fusion System Configuration (with FCH)

Figure 2-5 shows a Fusion system without Fusion Call Control Handler (FCH) cards.

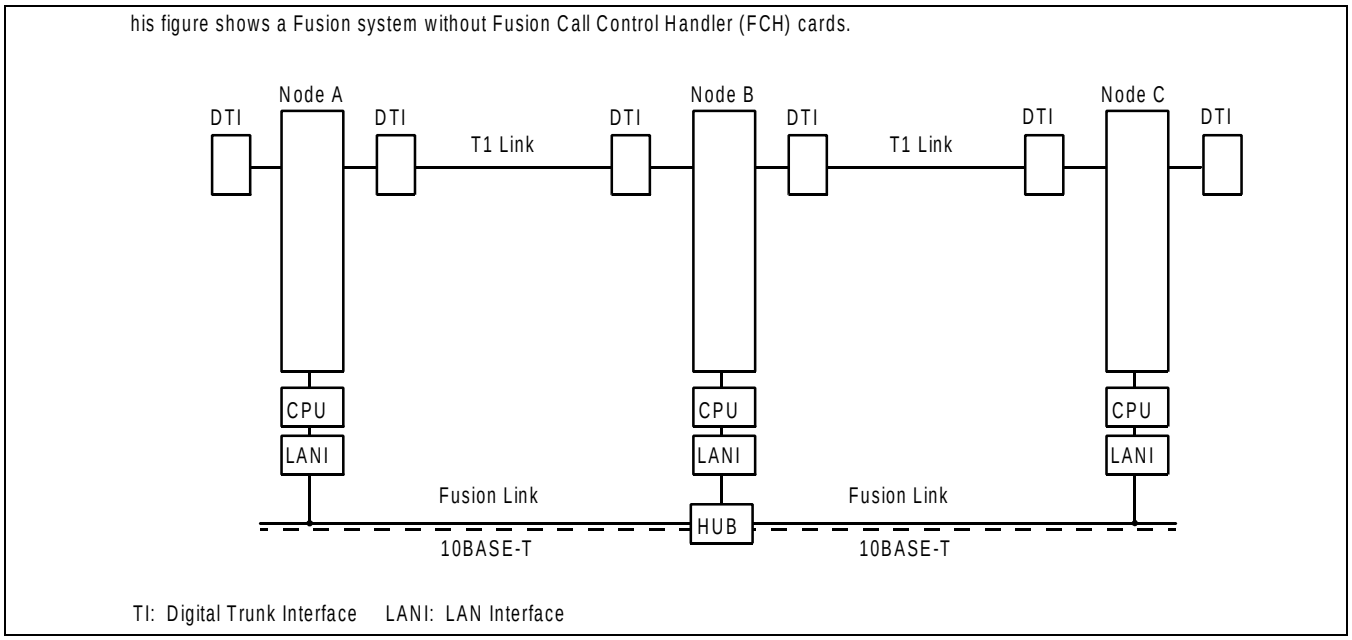


Figure 2-5 Fusion System Configuration (without FCH)

4. Node

A Fusion network consists of the following types of nodes:

- Network Control Node

  The Network Control Node, which must be assigned on a Fusion network, manages other nodes on the network. This node has the Centralized-MAT to collect fault information from other nodes on the network. Multiple nodes cannot be assigned as a Network Control Node.

- Local Node

  All nodes other than the Network Control Node are called Local Nodes. Fault information generated at a Local Node is sent to the Network Control Node via a Fusion link, allowing the Network Control Node to collect the fault information. A Fusion network can have a maximum of 16 nodes on the network. See Figure 2-6.

Note: *The actual number of nodes varies with system configurations.*

- Center Node (for Centralized Billing - Fusion)

  This node collects the billing information from other nodes as well as the self-node. For this reason, the node is called Center Node for Centralized Billing - Fusion. Multiple Center Nodes can be assigned on the network by specifying the polling destinations, which can be set by the ASYDL command - SYS 1 Indexes 608 through 639. At the Center Node, the user can select “polling destinations” by setting 1 to the FPC of the corresponding nodes. For more information, see the NEAX2400 IPX Office Data Specification.

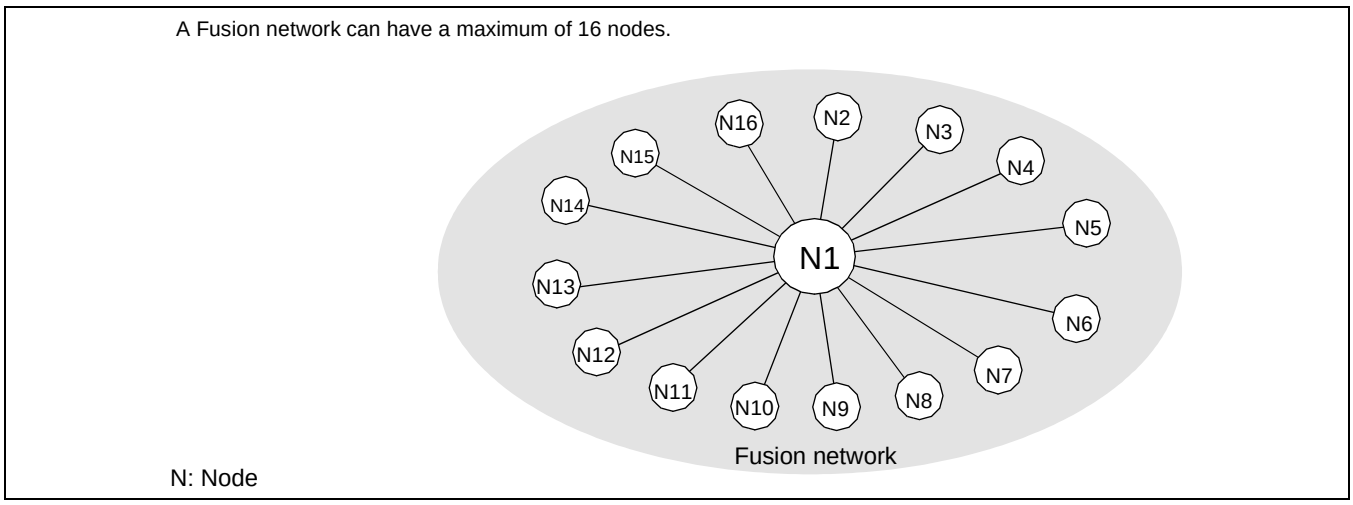


Figure 2-6 Maximum System Configuration

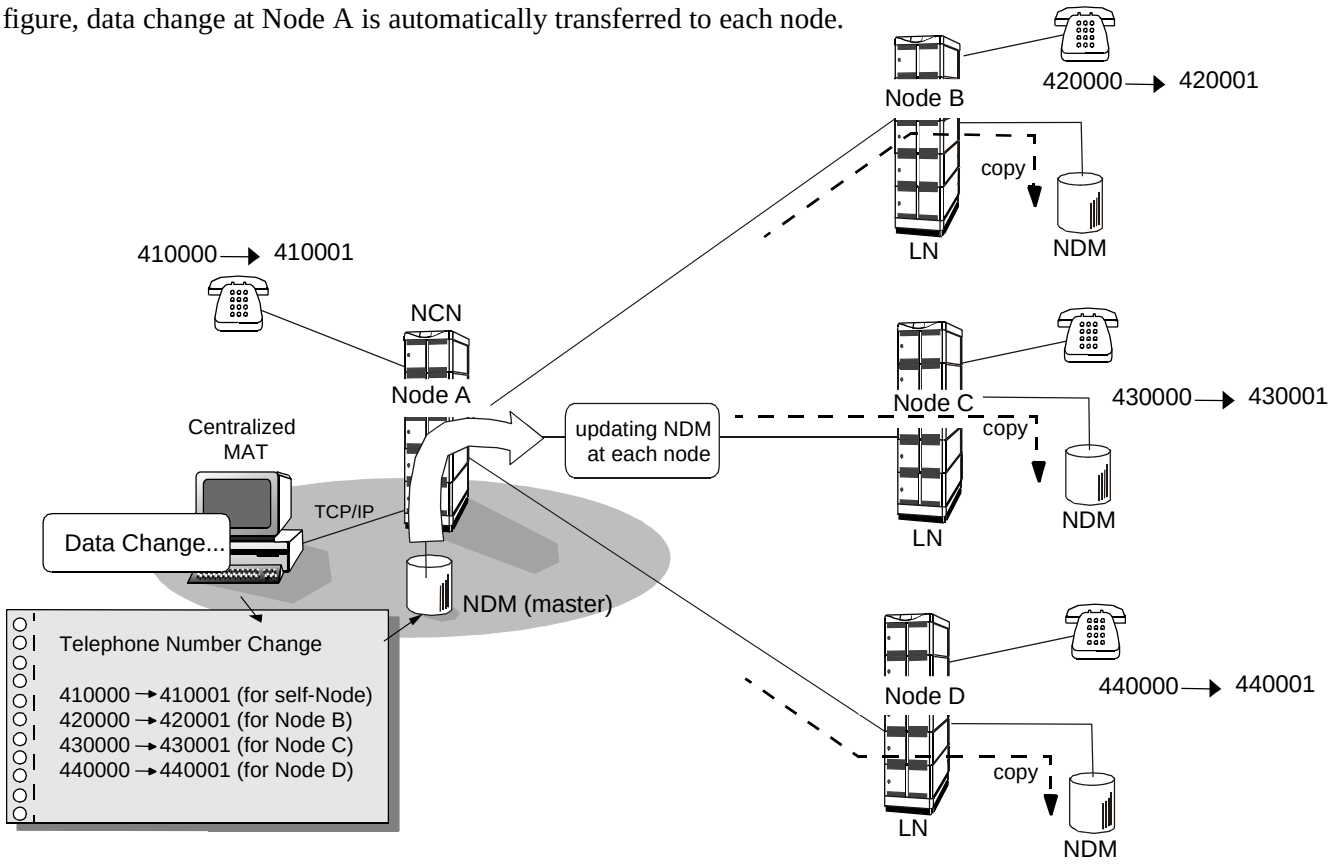
5. Data Memory Configuration

Each node on a Fusion network has the following three kinds of Data Memory:

- Data Memory (DM)
- Local Data Memory (LDM)
- Network Data Memory (NDM) - Programmable only by the NCN.

When the contents of the NDM are changed at NCN, the new data is automatically copied to the NDM of each node. The NDM of the NCN functions as primary memory. Figure 2-7 shows how a telephone number change is performed in a Fusion network.

When telephone numbers are changed, the change at the NCN will affect all nodes on the network. In this figure, data change at Node A is automatically transferred to each node.



Note: *The data must be manually transferred with the CBCN command when the Fusion system is configured for the first time or the system is once initialized at the NCN.*

Figure 2-7 Network Data Memory

When the NDM (primary) is modified, the new data is automatically copied. See Figure 2-8

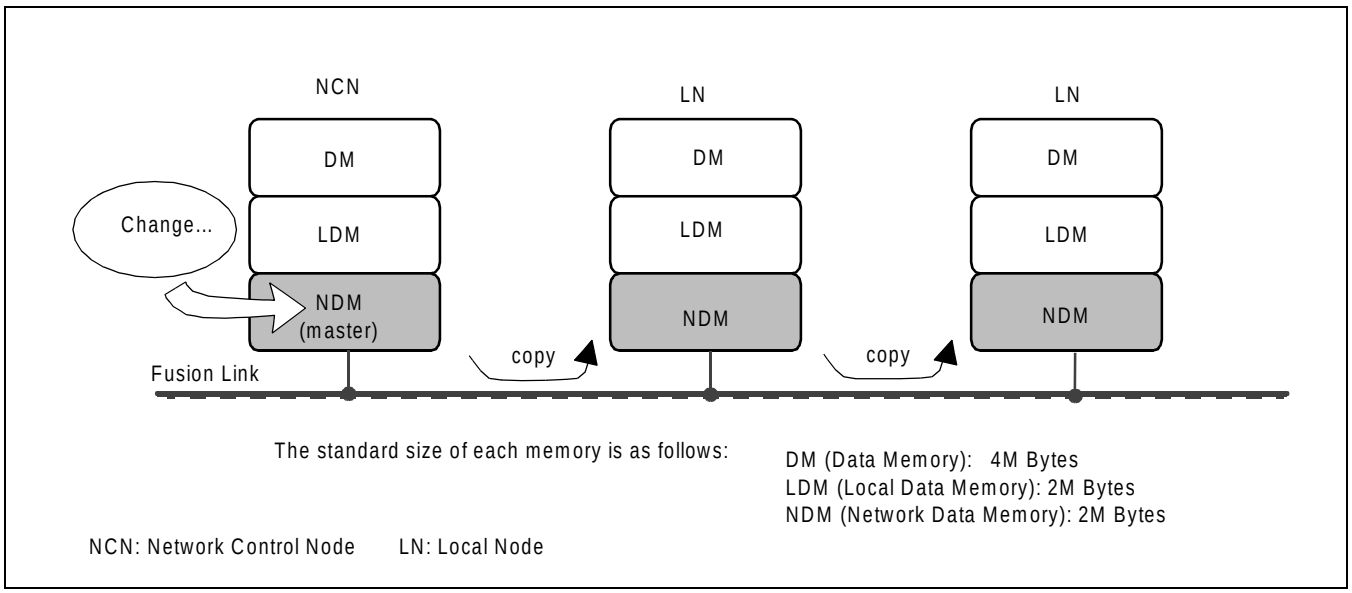


Figure 2-8 Network Data Memory Copy

6. Fusion Network Examples

Figure 2-9 and Figure 2-10 show examples of Fusion networks. When incorporating the Fusion system with the existing CCIS network, connect all nodes via CCIS links.

Note: *To connect a CCIS network and Fusion network, use STNs and TELNs respectively.*

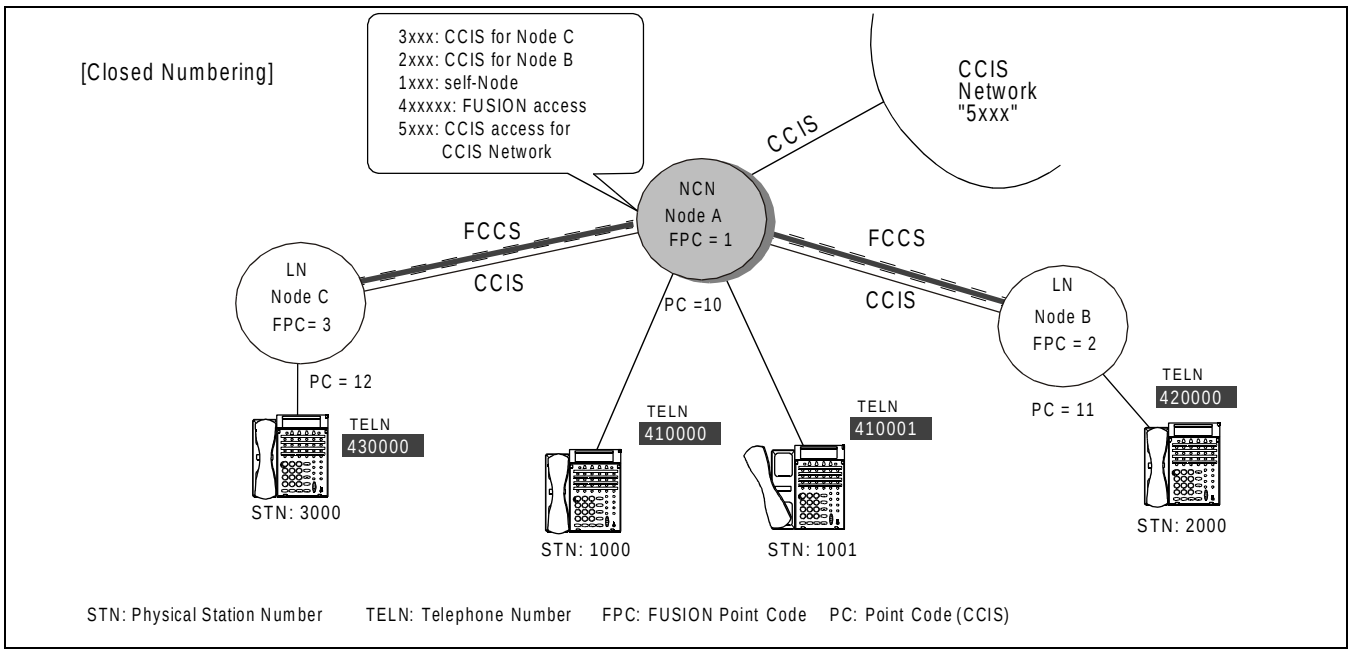


Figure 2-9 Closed Numbering Fusion-CCIS Network

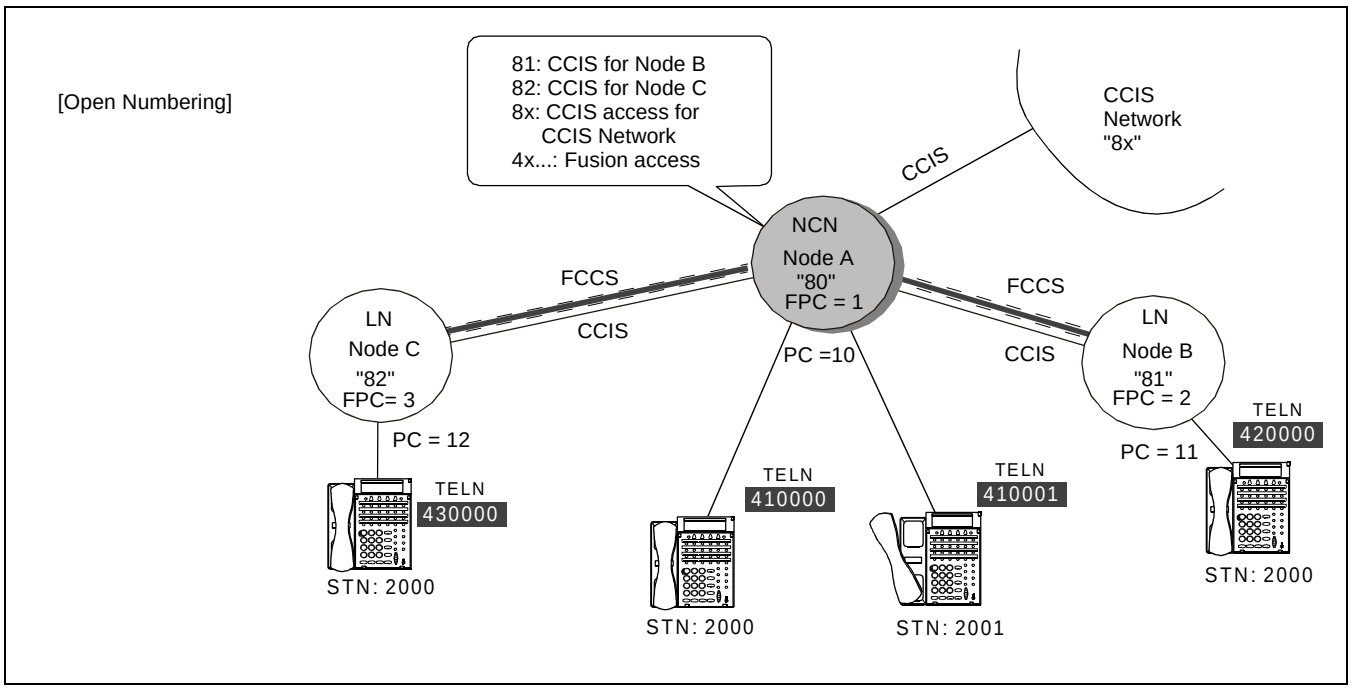


Figure 2-10 Open Numbering Fusion-CCIS Network

[conditions for telephone number digits]
When incorporating the Fusion system with the CCIS network, consider the conditions in Table 2-1 as to the available telephone number digits.

Telephone Number Composition		Display		Inter-Office Service	MCI	SMDR	
		D^{term}	ATTCON/ DESKCON			CCIS	Fusion
4 digits or less	**Note**	×	×	×	×	×	×
4~8digits	**Note**	×	-	×	-	×	×
9 digits or more	**Note**	-	-	-	-	-	×

Table 2-1 Available Telephone Number Digits

×: Available -: Not available

Note: *When the network is Open Numbering, the "digits" in the table above must be the number of "office code digits + telephone number digits".*

7. Tandem Connections via Fusion Link

Tandem connections via FCCS-ACIS can be established. In Figure 2-11, STN (A) can place a tandem call via FCCS-ACIS.

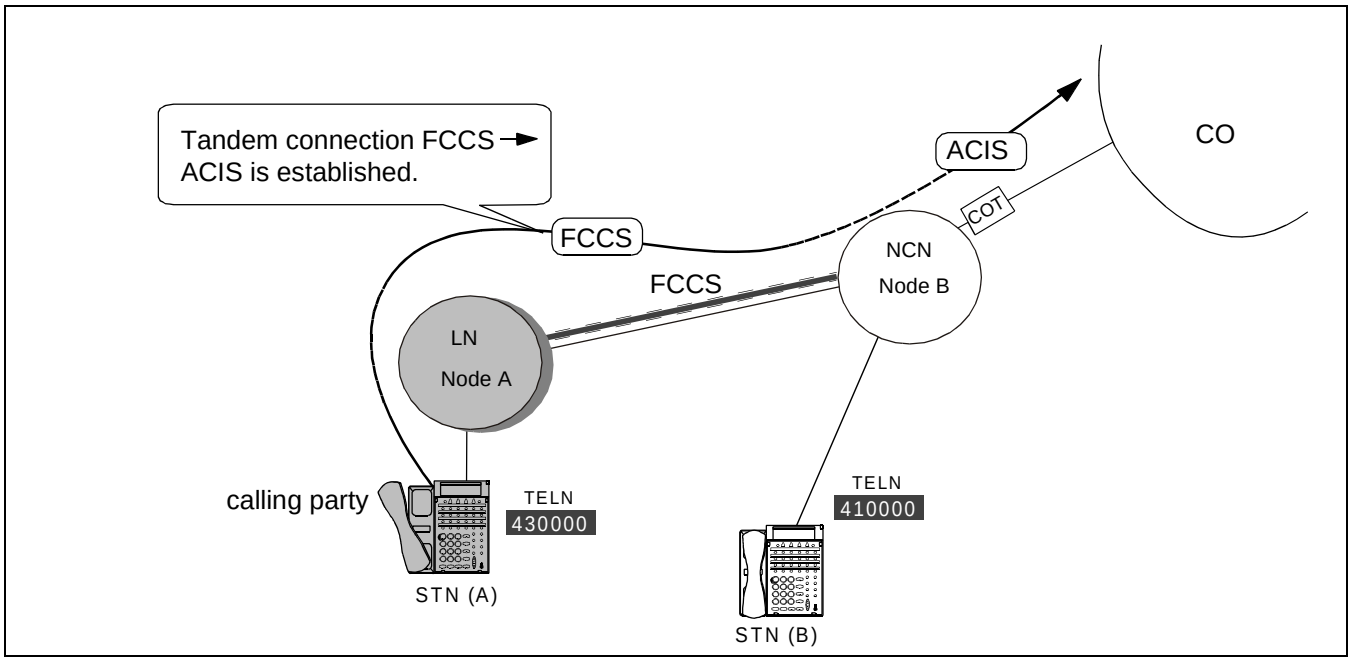


Figure 2-11 Tandem Connections via Fusion Link

CHAPTER 3 SYSTEM CONFIGURATION

Fusion systems can be divided into the following two types:

- Fusion system with FCH
- Fusion system without FCH

Note: *FCH (Fusion Call Control Handler) :PA-FCHA*

This chapter explains the system configuration of each Fusion system.

1. FUSION System without FCH

An example system configuration of Fusion system which does not use a DTI to carry D-channel is shown below. In this configuration, Fusion link is established between nodes via Ethernet. The DTI card carries B-channels only in this example. See Figure 3-1 below.

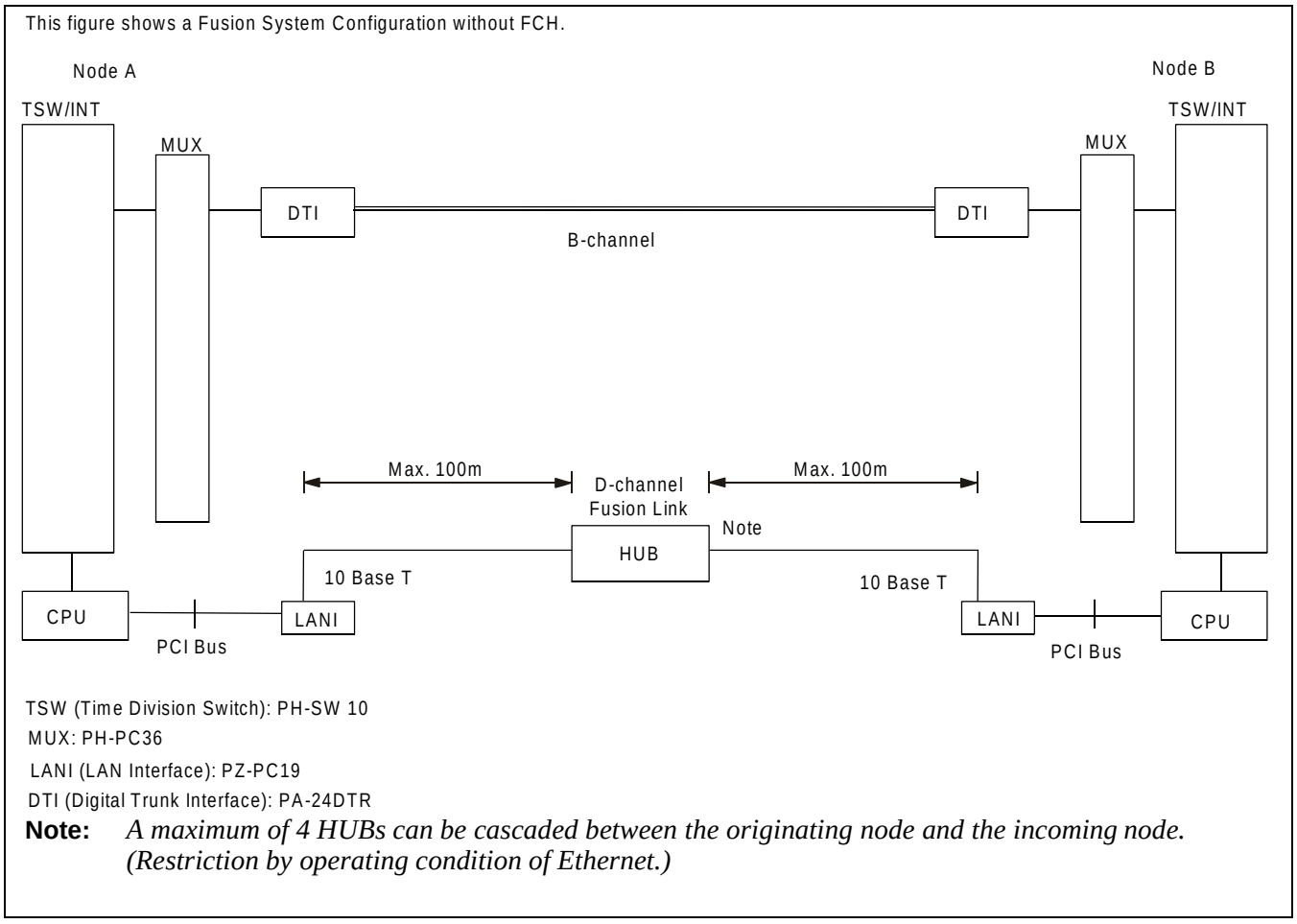


Figure 3-1 FUSION System Configuration without FCH

2. Fusion System with FCH

2.1 System Configuration

A sample system configuration of Fusion system which uses a DTI to carry D-channel is shown below. In this configuration, Fusion link is established between nodes via the T1 link. See Figure 3-2 below.

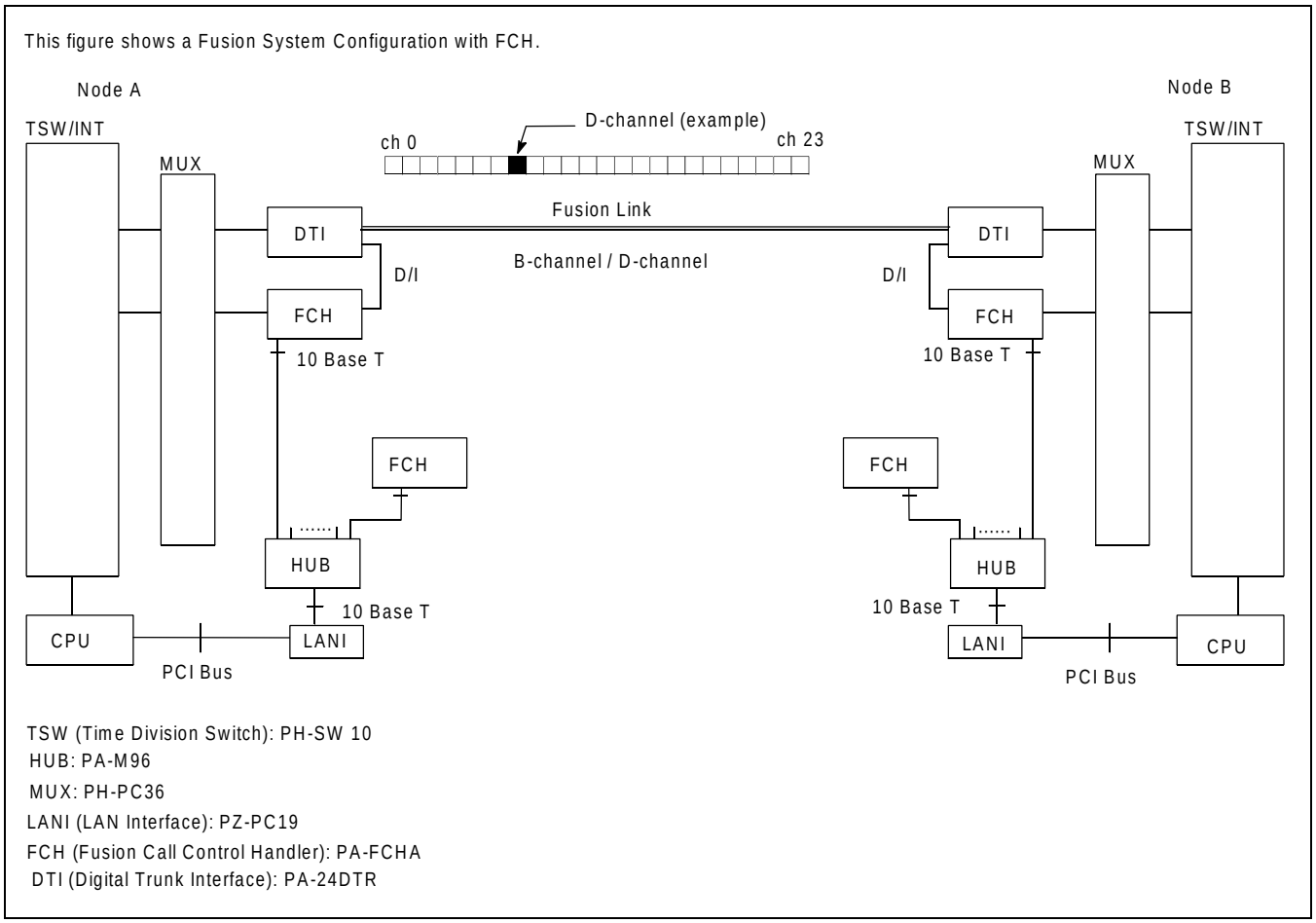


Figure 3-2 Fusion System Configuration with FCH

Note: *When a direct connection is added to the existing Fusion system with FCH card between the two nodes, it is required to execute Make Busy operation (MB Key ON/OFF) on the FCH cards to prevent from packet loop.*

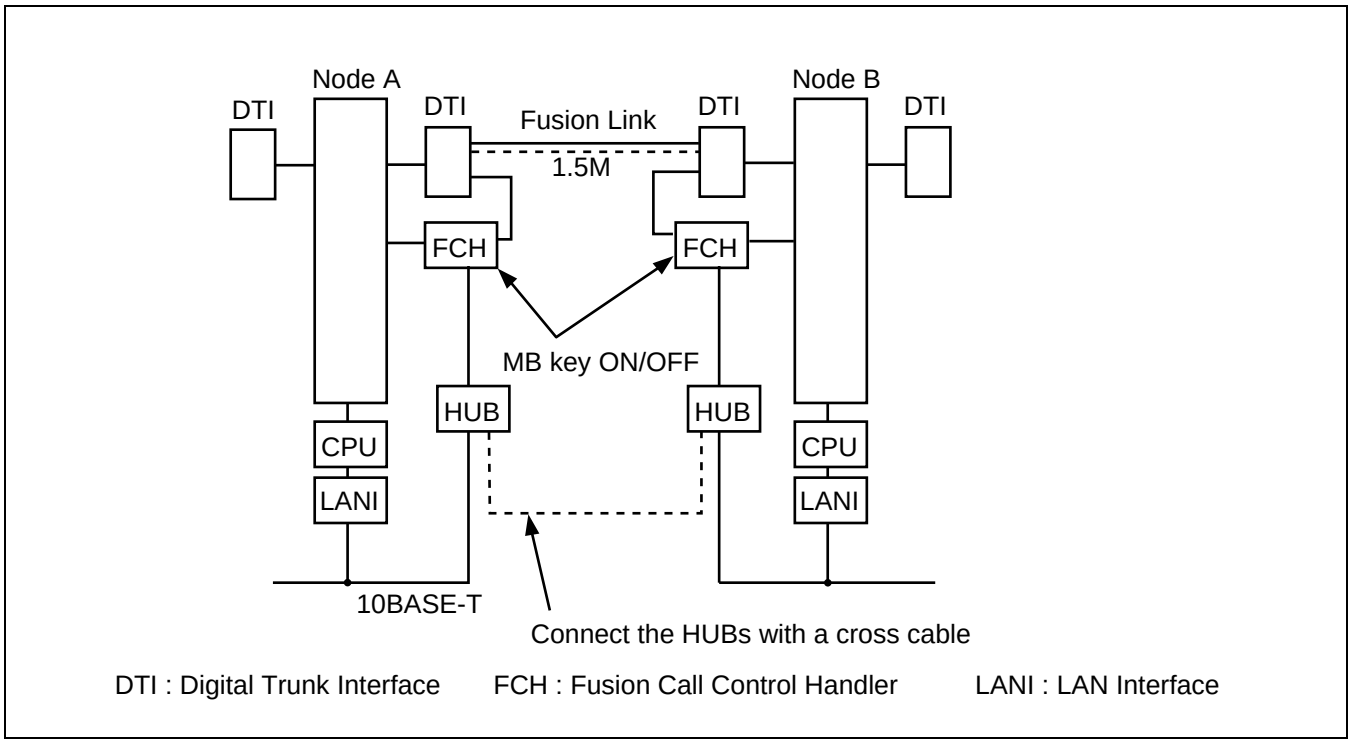


Figure 3-3 Add a Direct Connection to Fusion System with FCH

On other occasions for adding direct connection (connect cross cable between the HUBs) to the Fusion network consists of multiple nodes, also perform the MB key ON/OFF operation on just a single FCH card to prevent from packet loop. See Figure 3-3

When the system applies dual configuration, MB Key ON/OFF operation is to be executed to an FCH card on each #A/#B side.

2.2 Redundancy of FUSION Link

FCH (PA-FCHA) card handles a Fusion link, occupying one time slot of a frame by D/I function equipped on the DTI card. In terms of redundancy, Fusion system (with FCH) can have one of the following configurations.

- Redundant Configuration (LANI, HUB, FCH, and DTI)
- Redundant Configuration (HUB, FCH, and DTI)
- Redundant Configuration (FCH and DTI)
- Non Redundant Configuration

Figure 3-4 shows LANI, HUB, FCH, and DTI in a fully redundant configuration.

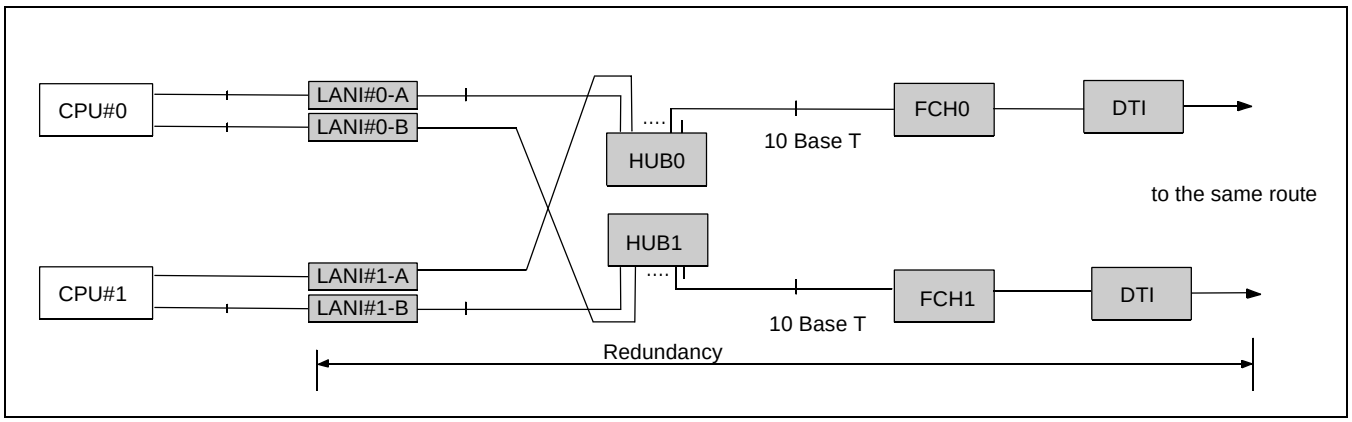


Figure 3-4 Redundant Configuration (LANI, HUB, FCH, and DTI)

Figure 3-5 shows HUB, FCH, and DTI in a redundant configuration.

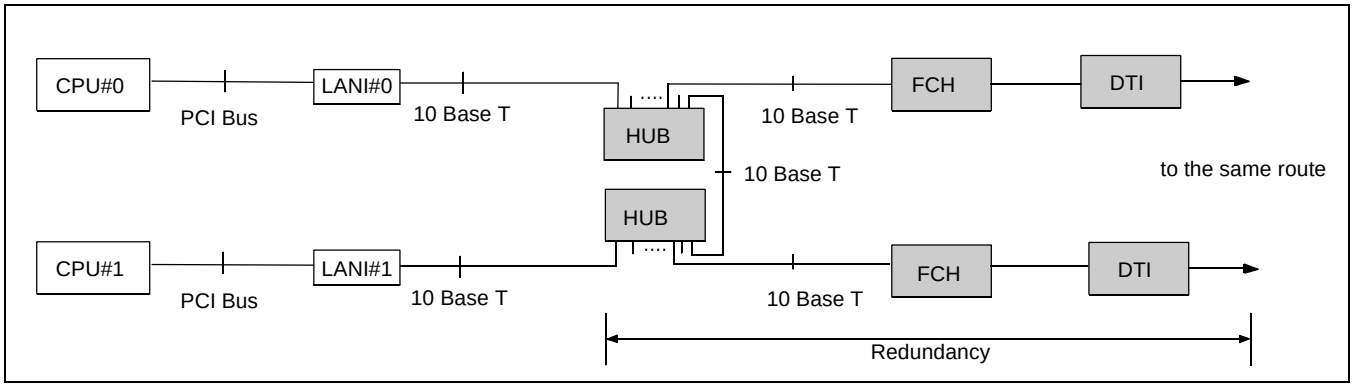


Figure 3-5 Redundant Configuration (HUB, FCH, and DTI)

Figure 3-6 shows FCH and DTI in a redundant configuration.

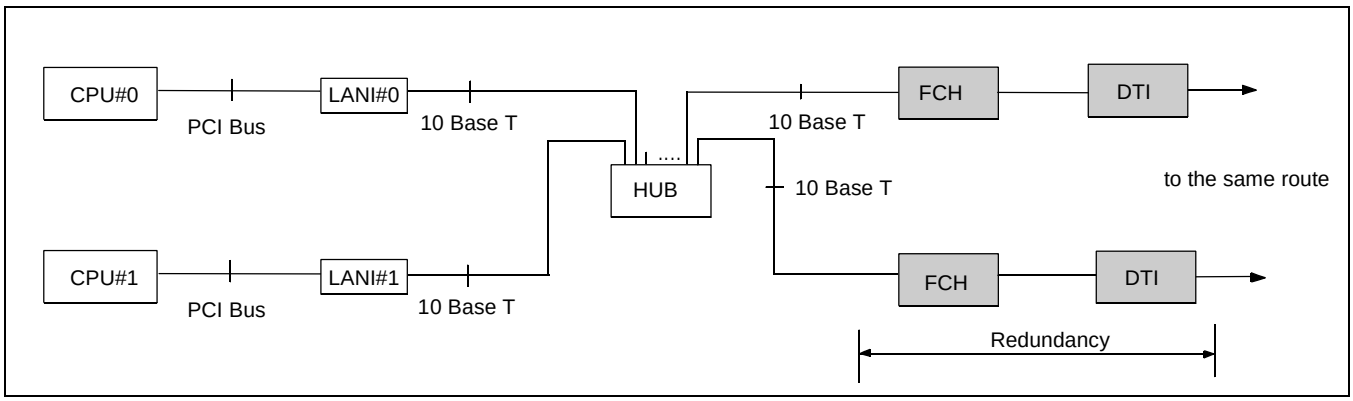


Figure 3-6 Redundant Configuration (FCH and DTI)

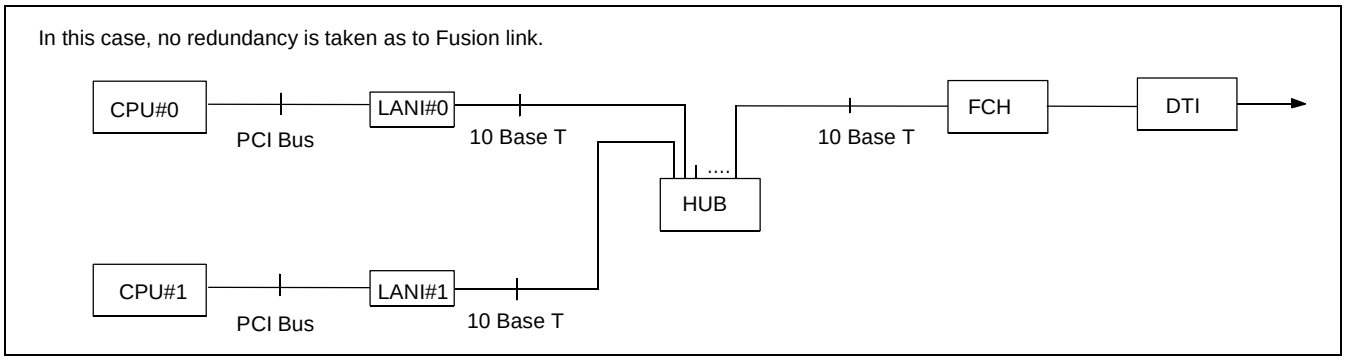


Figure 3-7 Non-Redundant Configuration

Note: *Be sure that the system configurations shown below are not available. The Node composed of dual-HUB system cannot apply to the opposite side against a Node with single-HUB configuration.*

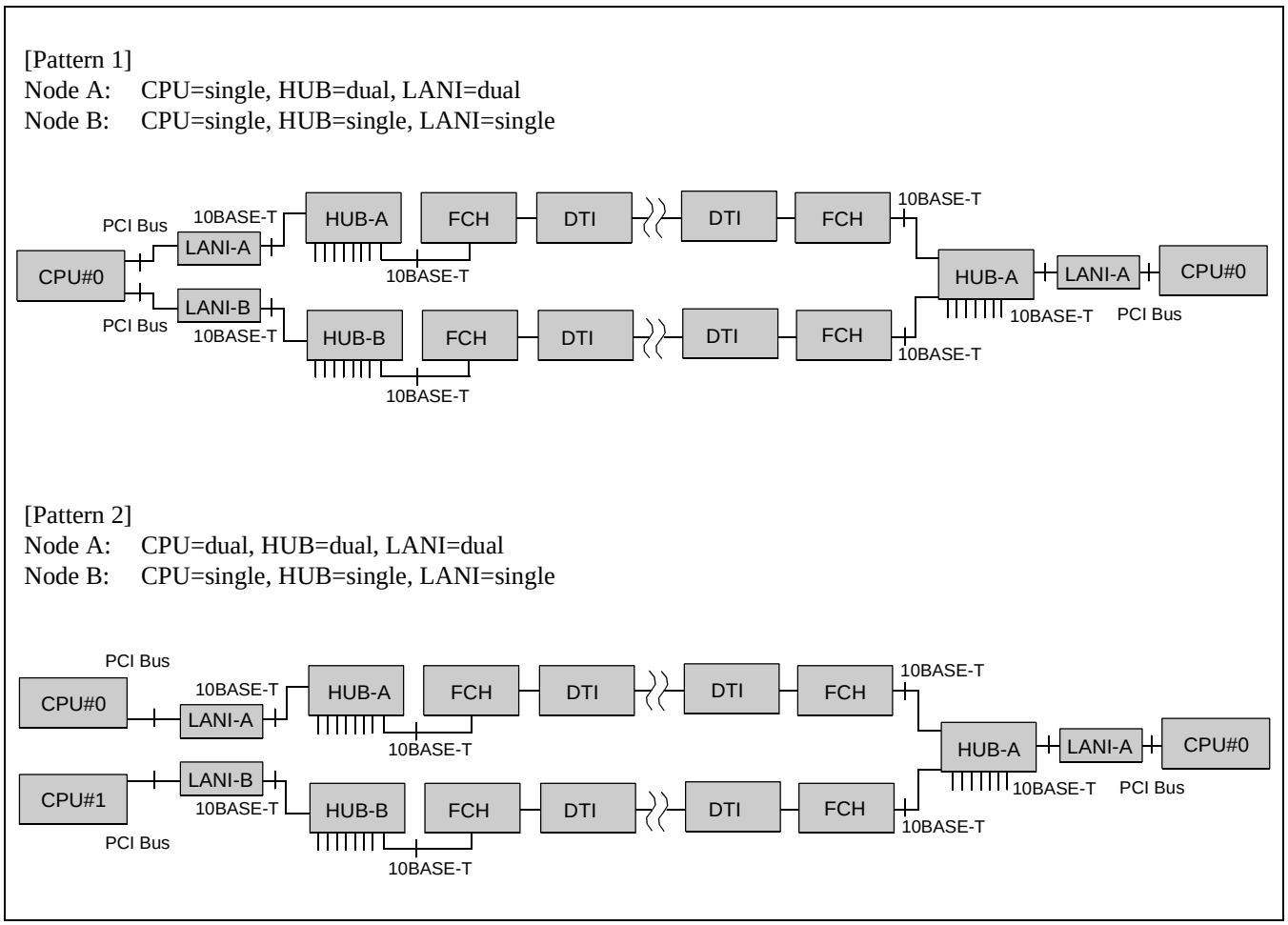


Figure 3-8 Unavailable System Configurations

3. System Considerations

3.1 Fusion Network Conditions

This section explains conditions when designing a Fusion network. In the following diagram, a Fusion Link is printed in a thick line while a CCIS link is printed in a dotted line.

Condition 1: The maximum number of nodes on a Fusion network is sixteen (16) nodes.

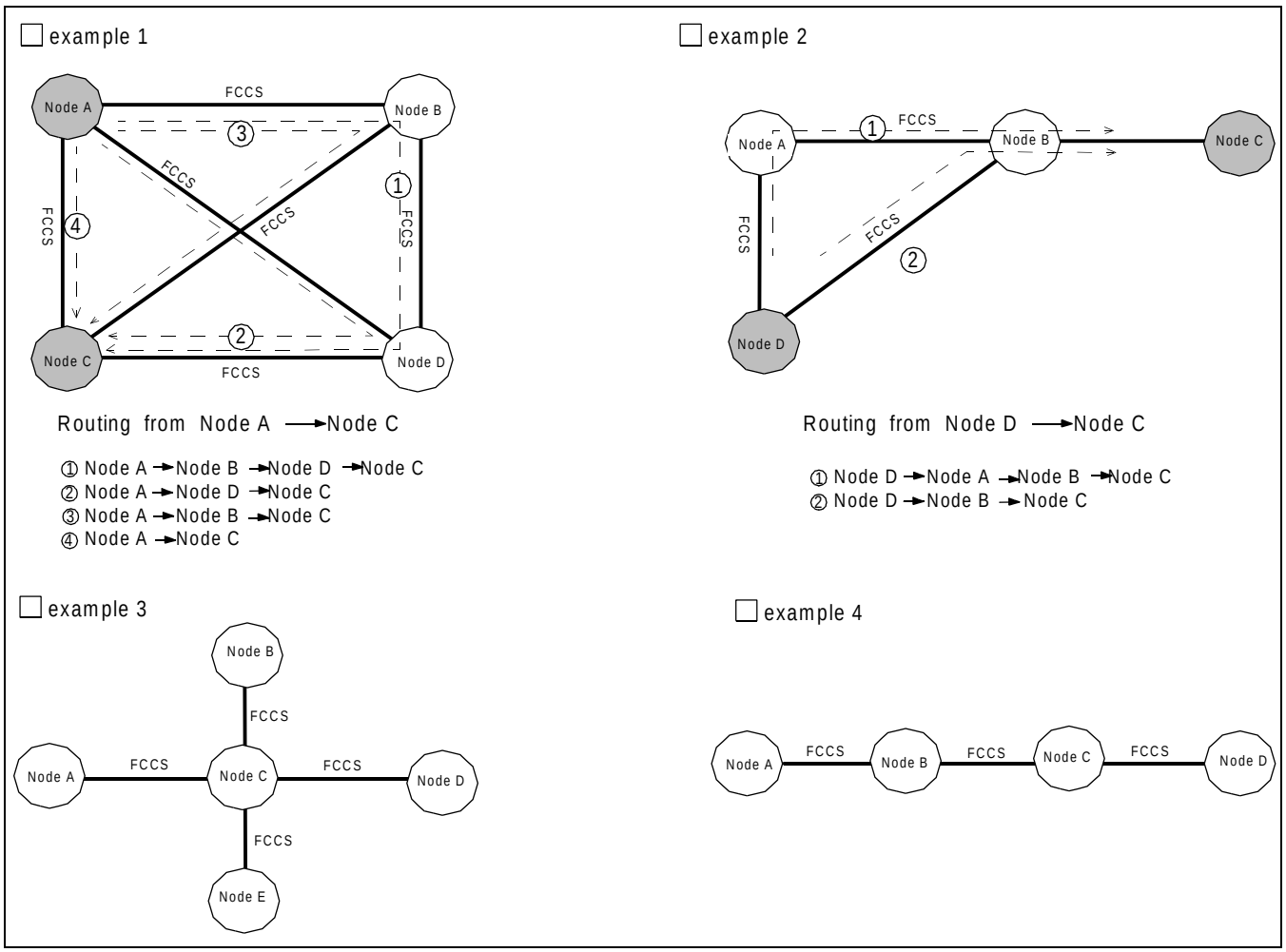


Figure 3-9 Fusion Network Topologies

Condition 2: A maximum of four (4) Non ACD nodes can be connected as tandem nodes with 1D channel.

- 64k (1D-channel) will support 4 nodes
- 128k (2D-channels) will support 5 nodes
- 256k (4D-channels) will support 6 nodes

See Figure 3-10.

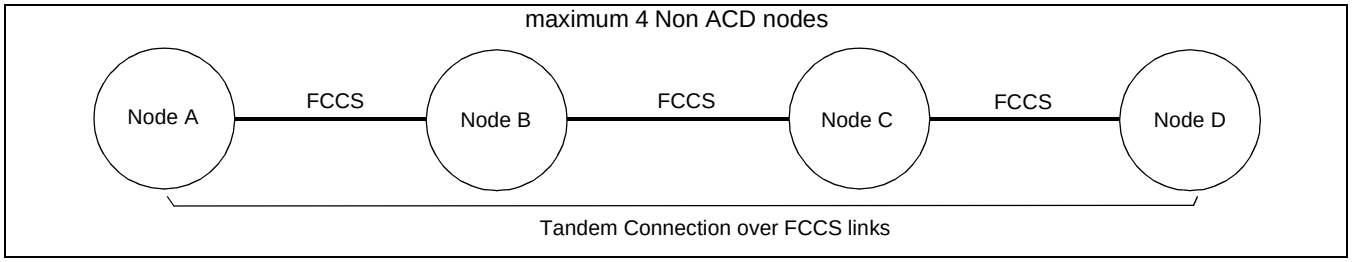


Figure 3-10 Fusion Tandem Connections

Condition 3: The available connection-route number ranges from 1 to 1023.

Condition 4: The available connection-trunk number of each route ranges from 1 to 4095.

See Figure 3-11.

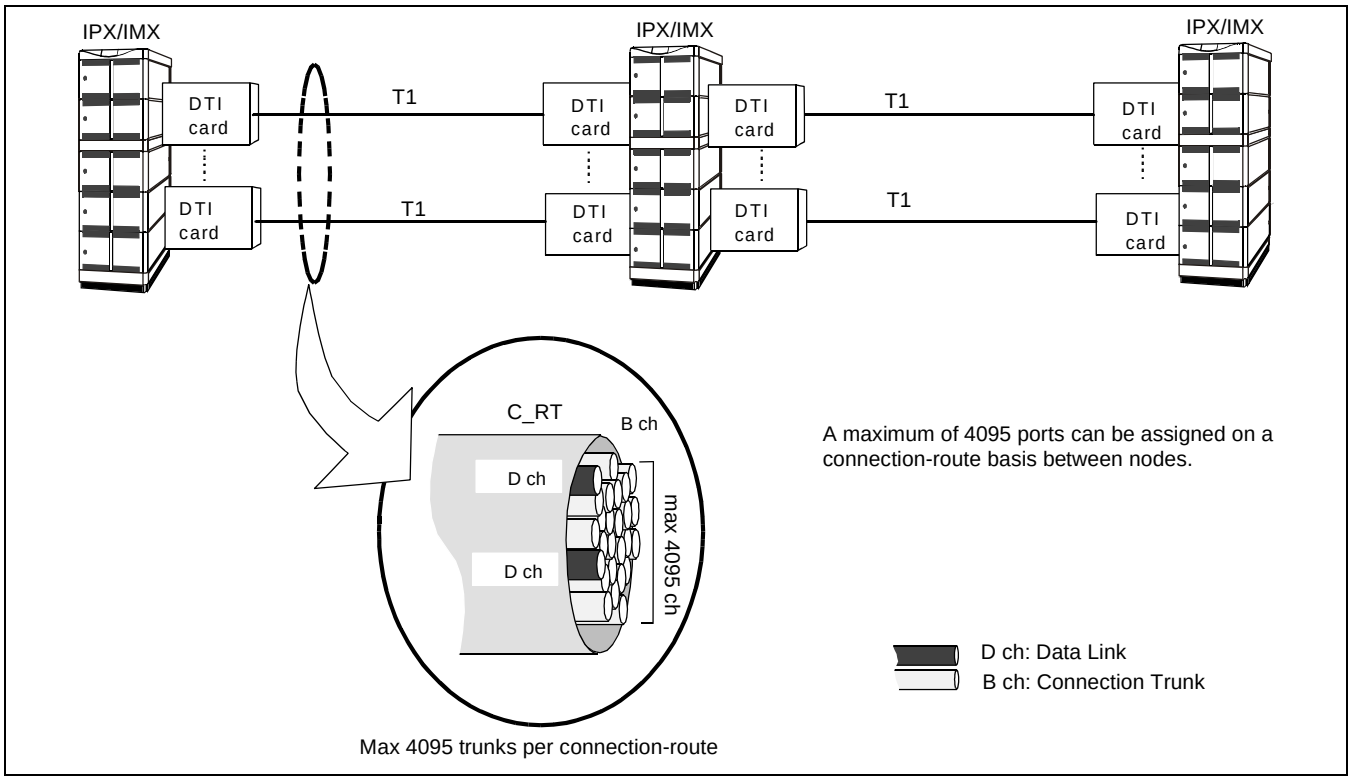


Figure 3-11 Maximum Number of Ports between Nodes

Condition 5: Up to eight (8) routes can be assigned as alternate routes for a connection trunk.

See Figure 3-12.

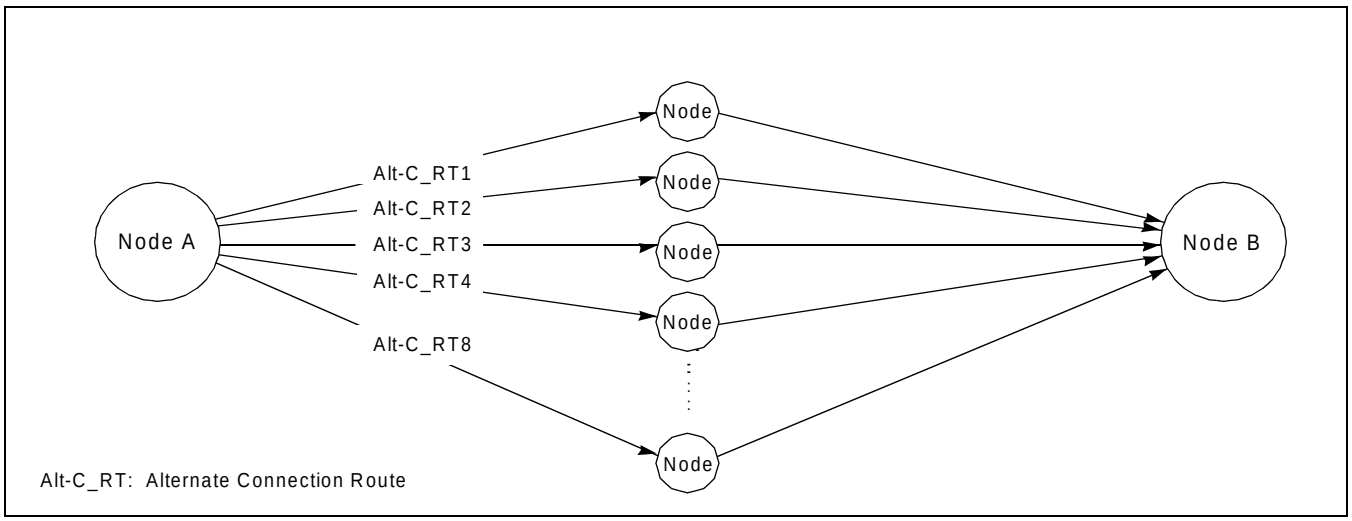


Figure 3-12 Connection Trunk Alternate Routing

Condition 6: Connection trunks and the Fusion data link must be assigned on an "associated" basis.

See Figure 3-13.

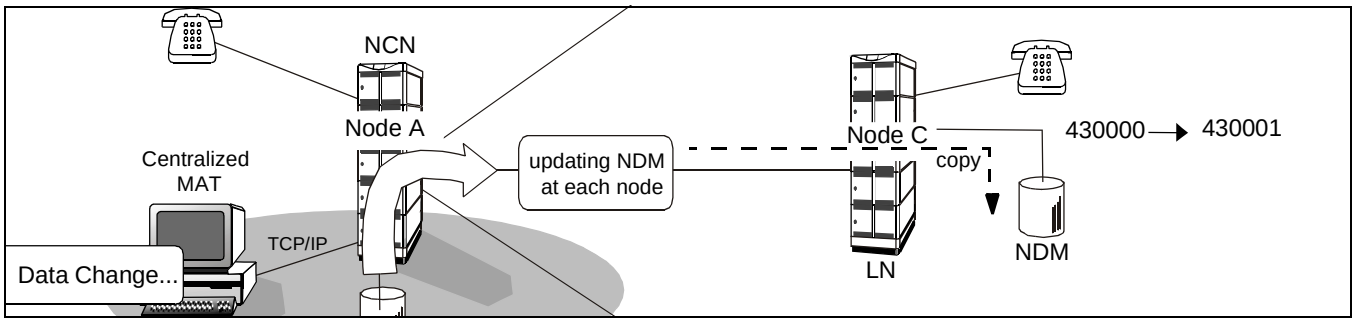


Figure 3-13 Fusion Network on an Associated Basis

Condition 7: One Fusion data link must be assigned on each T1 link.

Condition 8: A maximum of eight (8) data links can be used for a connection trunk for redundancy.

Condition 9: The maximum data link speed is “1.5 Mbps.”

Condition 10: Connection Trunks (B ch) conform to the following specifications:

- Existing external trunk cannot be used as alternate routes for connection trunks.
- Billing information on connection trunks cannot be output.
- Under the following conditions, “connection trunk seizure NG” will occur:

  Data Link Failure

  Connection Trunk all busy

  LANI (built-in) - FCH failure
- Connection test for connection trunks is not provided.
- Nailed Down connection is not provided for connection trunks.
- PAD value for connection trunks is fixed to 0 db.
- Echo canceller (EC) / MPC control is not provided.
- Nailed Down connection is not provided for connection trunks.

Condition 11: If a “layer 2 failure” occurs, the connections are released.

Condition 12: When fusion links and CCIS links coexist on a Fusion network, the following conditions should be considered:

A Fusion link may be used as a CCIS link through data programming. In this instance, if the other node accommodates a dedicated CCIS card, CCIS will not work even if the self-node accommodates a Fusion-Link-Card. Therefore, the same Fusion-Link-Card must be accommodated at both nodes. Figure 3-15 shows an example of CCIS-FUSION networks.

3.2 Centralized Billing - Fusion (Polling Method)

This section explains the conditions of Centralized Billing - Fusion, focusing on when CCIS links are involved. To use this feature, select Center Node(s) on the Fusion network. See Figure 3-14.

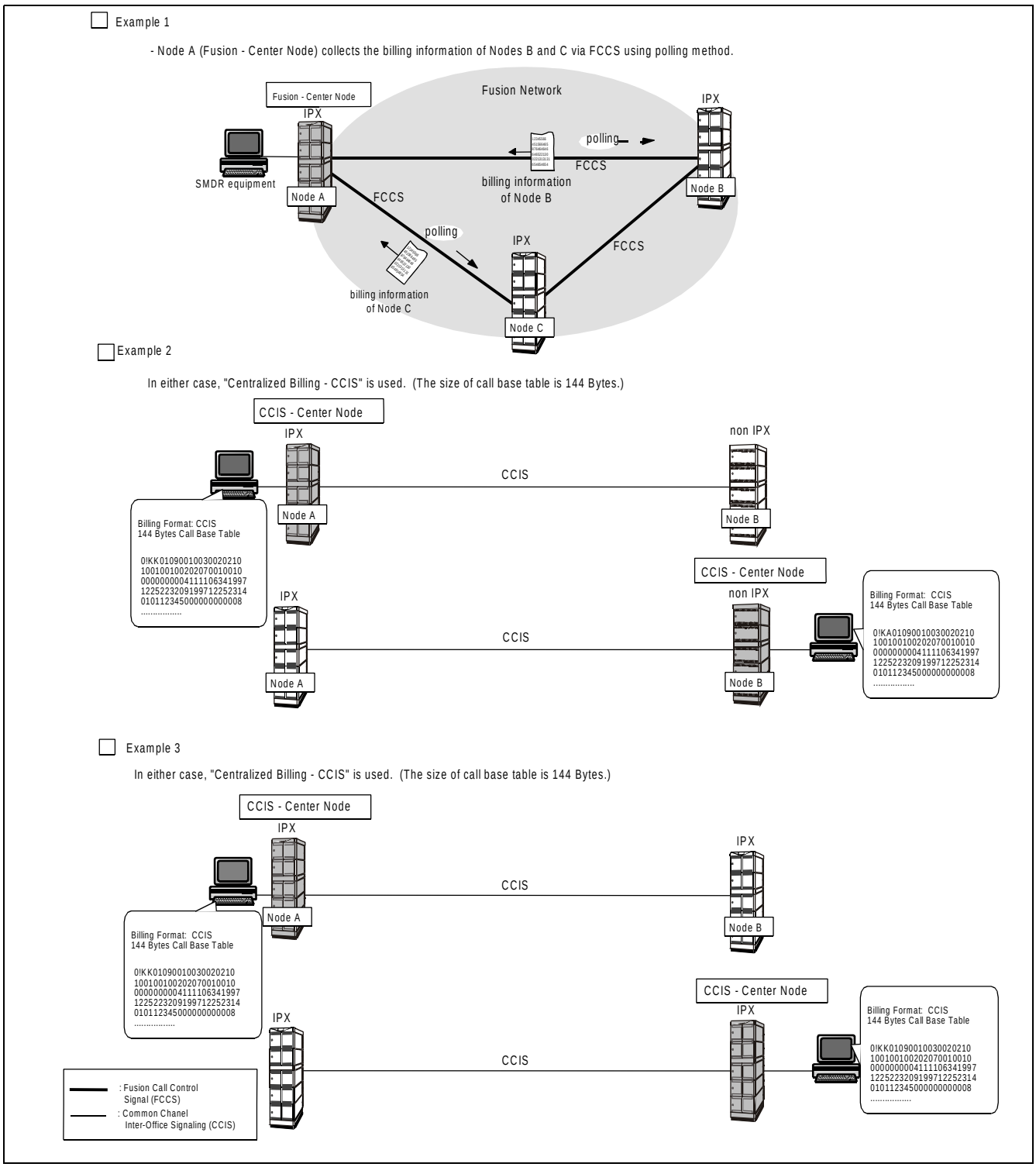
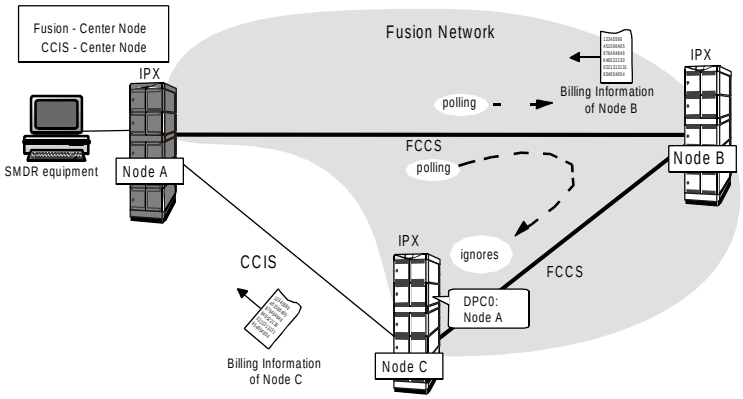


Figure 3-14 Centralized Billing - Fusion (1/3)

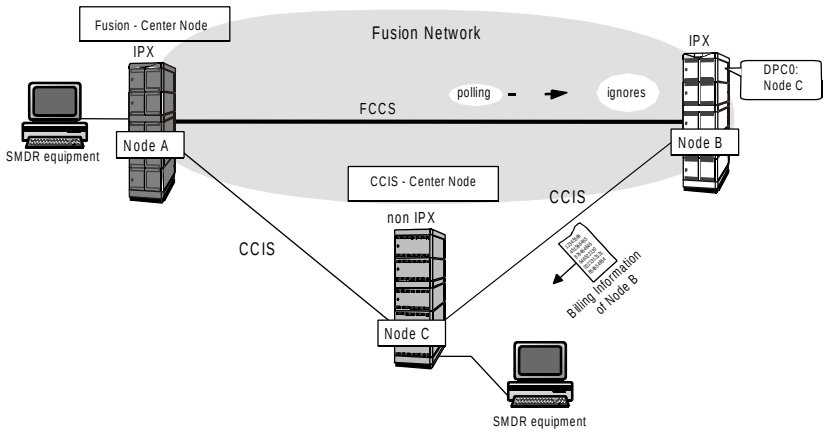
- Example 4

¥ Node A tries to collect the billing information of Node B, and Node C via FCCS using polling method.
(Node A cannot collect the billing information of Node C via FCCS.)
¥ Node C sends the billing information via CCIS, ignoring polling from Node A.
¥ Node C deletes the self-Point Code (CCIS) when requiring to send billing information for polling from Node A.



- Example 5

¥ Node A tries to collect the billing information of Node B via FCCS using polling method.
(Node A cannot collect the billing information of Node B via FCCS.)
¥ Node B sends the billing information to Node C via CCIS, ignoring polling from Node A.
¥ Node B deletes the self-Point Code (CCIS) when requiring to send billing information for polling from Node A.



- Example 6

¥ Node A collects the billing information of Node B and Node C via FCCS using polling method.
¥ Node A sends the billing information of Node A, Node B, and Node C.

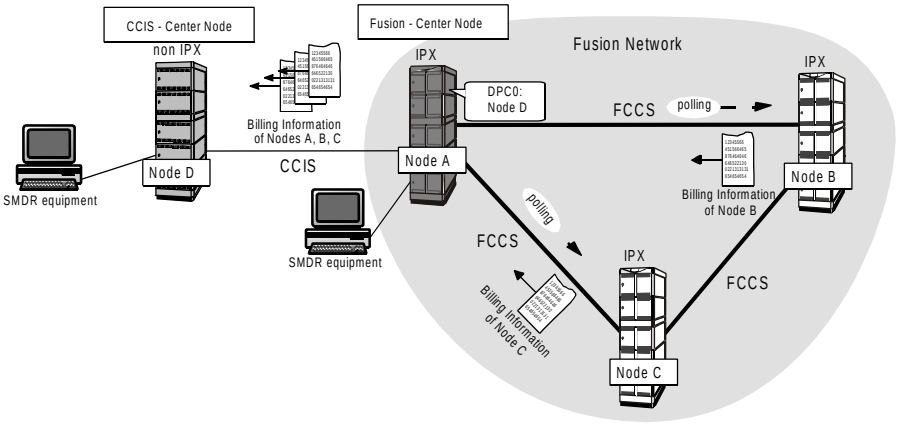
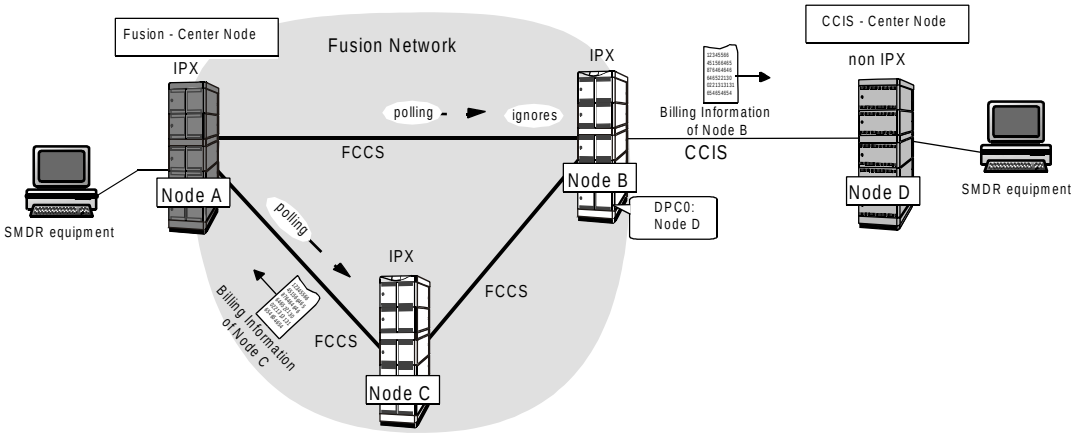


Figure 3-14 Centralized Billing - Fusion (2/3)

- Example 7

¥ Node A collects billing information of Node B and Node C via FCCS by polling method.
(Billing information of Node B cannot be collected.)
¥ Node B sends billing information to Node D via CCIS, ignoring polling from Node A.
¥ Node B deletes the self-Node Point Code (CCIS) when Node B wants to send billing information.



- Example 8

¥ Node A collects the billing information of Node B, Node C, and Node D which are stored in Node B and Node C by polling method.
¥ Node D sends billing information to Node B.

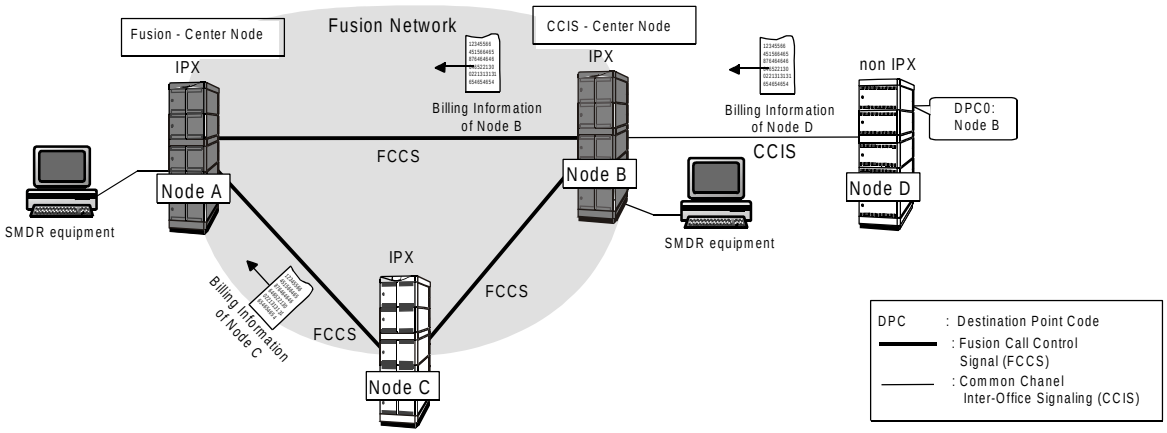


Figure 3-14 Centralized Billing - Fusion (3/3)

3.3 Centralized Management Report-Fusion

For collection of fault information in a Fusion network, the Centralized Management Report-Fusion is used. This feature provides automatic reporting of fault occurrence from Local Nodes to Center Node. Figure 3-15 shows service conditions for this feature.

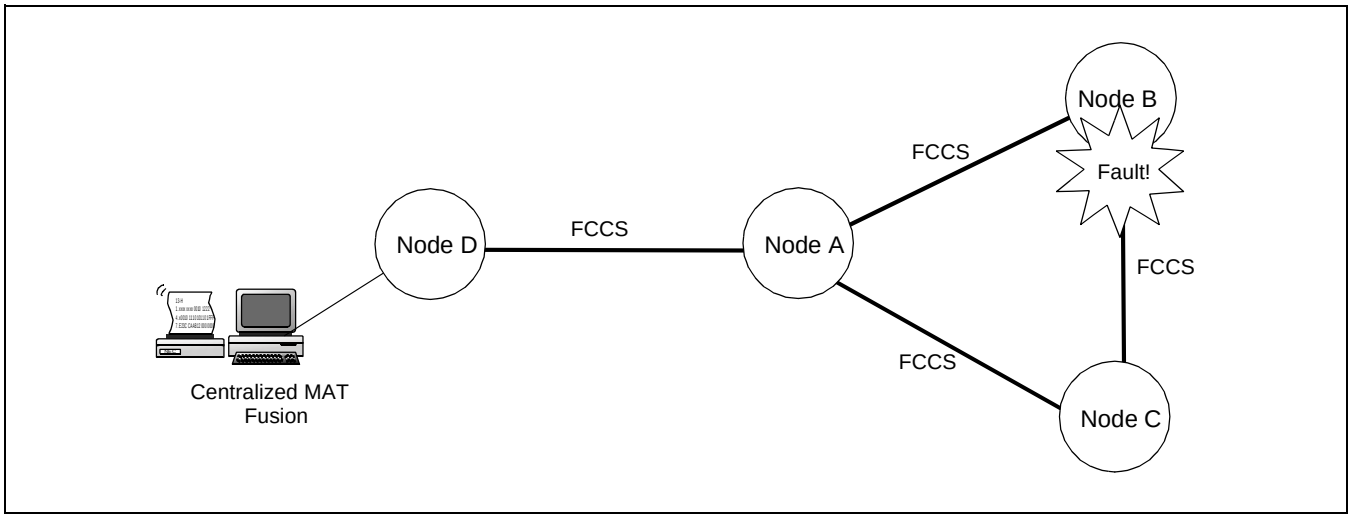


Figure 3-15 Centralized Management Report-Fusion

- Center Node for Centralized Management Report-Fusion is specified in the following system data: ASYDL, SYS1, Index 532 (FPC of Center Node for Centralized Management Report-Fusion).
- At Center Node, system messages received from the other nodes are stored in the buffer memory for Centralized Management Report-Fusion.
- The MAT connected to Center Node polls only the self-node.
- Office Name (ASYD, Index 96 through 115) is used for identification of each node.
- When a system message printer is connected to a node other than Center Node, system messages sent to Center Node are also output to the system message printer.
- When a system message has been sent to Center Node, the message is regarded as an old message.
- When the system fails transmission of a system message to Center Node, retry operation is executed. When the retry operation also fails, transmission is aborted, and the message is sent together with the next system message.

The following explains service conditions for the network including both FCCS and CCIS links.

Example: 1 When the network comprises FCCS and CCIS links (See Figure 3-16.)

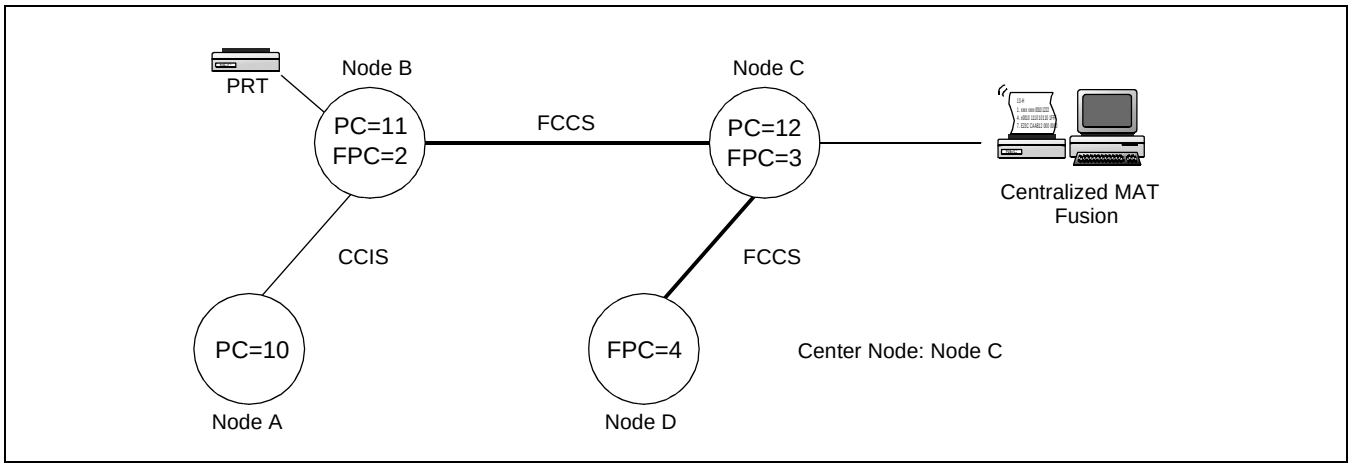


Figure 3-16 Centralized Management Report-Fusion (Example 1)

Node A: To send system messages to Node C via Office B, assign Point Code of Node C (12) to ASYD, SYS 1, Indexes 184 and 185.

Node B: To send system messages to Node C, assign Fusion Point Code of Node C (3) to ASYDL, SYS1, Index 532. When this system data is assigned, system messages received from Node A are also transferred to Node C. However, when data is not assigned (0), system messages received from Node A are ignored and not transferred to Node C.

System messages received from Node A are not output to the system message printer connected to Node B.

Node C: Received system messages are stored in the memory area for Centralized Management Report-Fusion.

Node D: To send system messages to Node C, assign Fusion Point Code of Node C (3) to ASYDL, SYS1, Index 532.

Example: 2 When both FCCS and CCIS links are established between two nodes (See Figure 3-17).

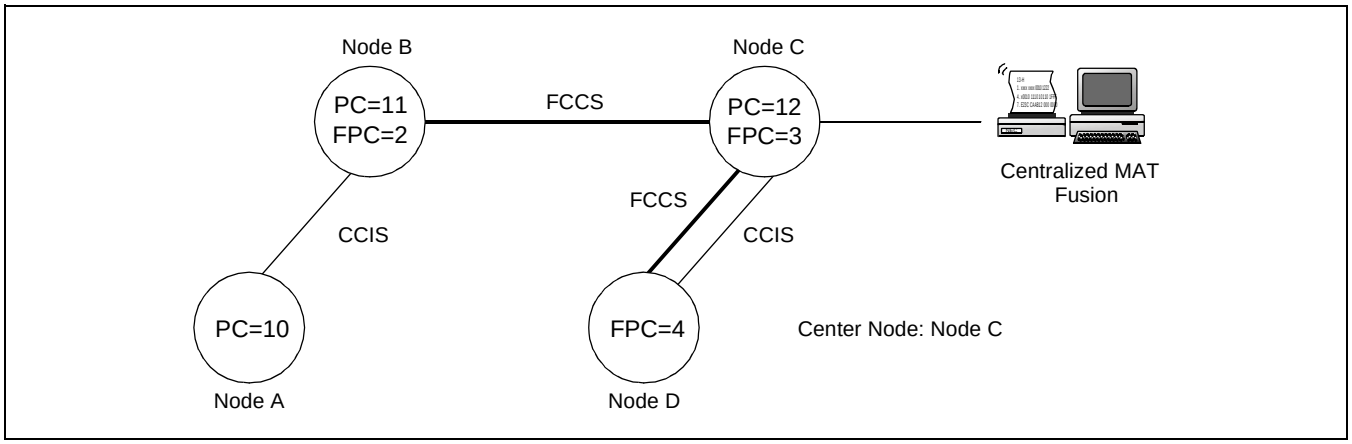


Figure 3-17 Centralized Management Report-Fusion (Example 2)

Node A/B/C:Refer to **Example 1** on the previous page.

Node D: When Point Code of Node C (12) is assigned to ASYD, SYS 1, Indexes 184 and 185, System messages are sent to Node C with use of CCIS. When this system data is not assigned (0), and Fusion Point Code of Node C (3) is assigned to ASYDL, SYS 1, Index 532, system messages are sent to Node C using FCCS.

Example: 3 When a node is linked with LAN interface (See Figure 3-18.)

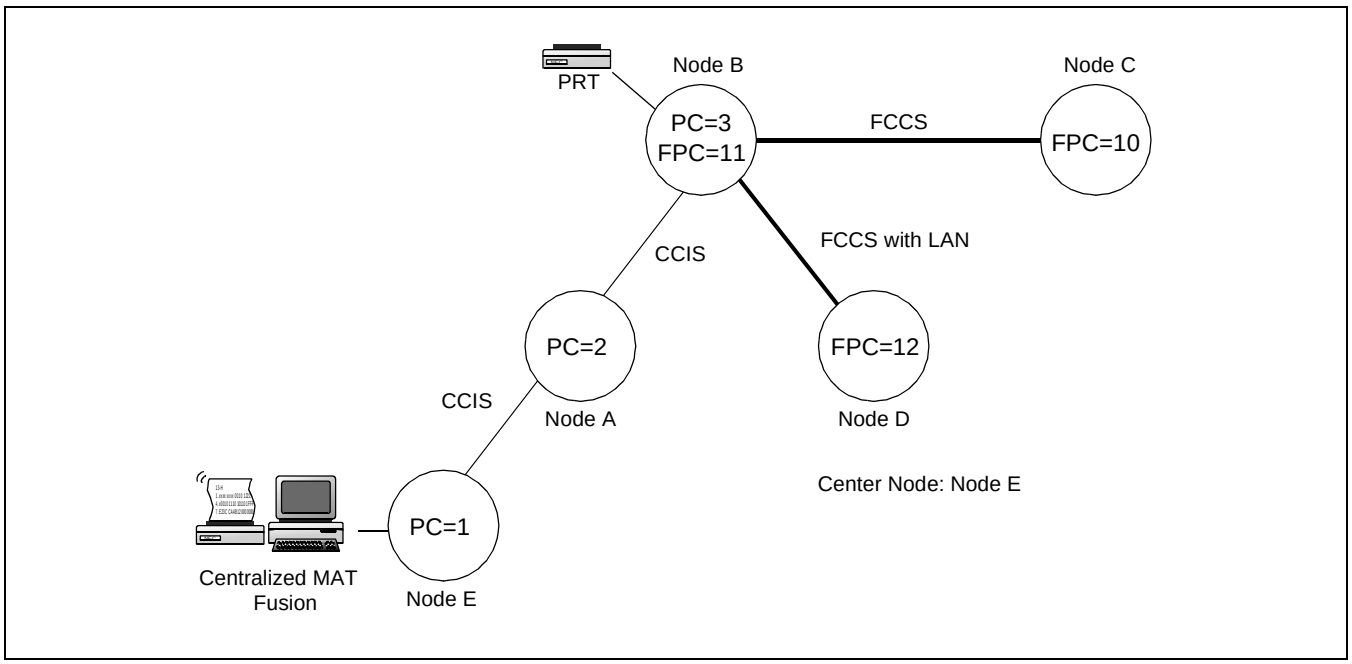


Figure 3-18 Centralized Management Report-Fusion (Example 3)

Node A: To send system messages to Node E, assign Point Code of Node C (1) to ASYD, SYS 1, Indexes 184 and 185.

Node B: To send system messages to Node E, assign Point Code of Node C (1) to ASYD, SYS1, Indexes 184 and 185. When this system data is assigned, system messages received from Nodes C and D are also transferred to Node E. However, when this data is not assigned (0), system messages received from Nodes C and D are ignored and not transferred to Node E.

System messages received from Nodes C and D are not output to the system message printer connected to Node B.

Node C/D: To send system messages to Node E via Node B and Node A, assign Fusion Point Code of Node B (11) to ASYDL, SYS 1, Index 532.

Node E: Received system messages are stored in the memory area for Centralized Management Report-Fusion.

3.4 Fusion Attendant/Desk Console

3.4.1 Operator Call

The user can place an operator call from each node by assigning the access code using the ASPAL/ ASPAN command, which allows the user to specify an appropriate node on the Fusion network by entering the FPC. In this example, a station user at Node B can call up an operator at Node C or Node E by dialing “90” or “91.” See Figure 3-19.

Note 1: *Regarding the following data (Waiting Call Display data), be sure to develop the unified data at each node:*
ASYD, SYS2, INDEX 8
ASYD, SYS2, INDEX 9

Note 2: *When the connection routes (C_RT) are all busy, the operator call becomes in Night ATT mode.*

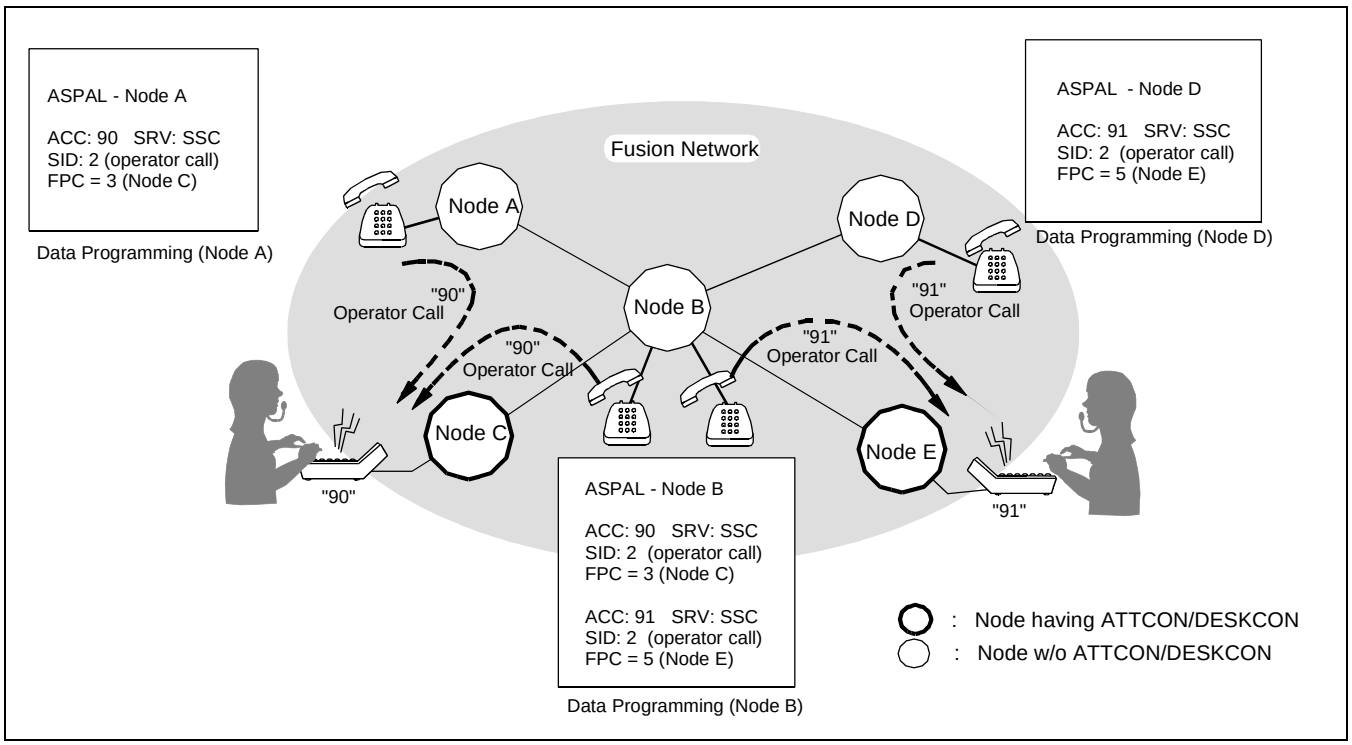


Figure 3-19 Operator Calls on a Fusion Network

3.4.2 Central Office Incoming Call (Ring Down)

Each node can specify a terminating node for Ring Down calls using the system data. In this example, Node A and Node D specify Node C and Node E as the terminating node respectively. The terminating node is assigned with use of the ASYDL command (SYS 1, Index 640). Note that self-FPC is assigned at the terminating node. See Figure 3-20.

Note 1: *When assigning the data regarding the call termination to ATT, be sure to develop the unified data at each node.*

Note 2: *Terminating node cannot be assigned differently at each tenant (TN).*

Note 3: *When the connection routes (C_RT) are all busy, any attempted call via C.O. Line is not connected to the ATT. As a result, the calling party is provided with the ringback tone, and even when a C_RT later becomes idle, the ringback tone connection is still maintained, and the C.O. call does not terminate to the ATT.*

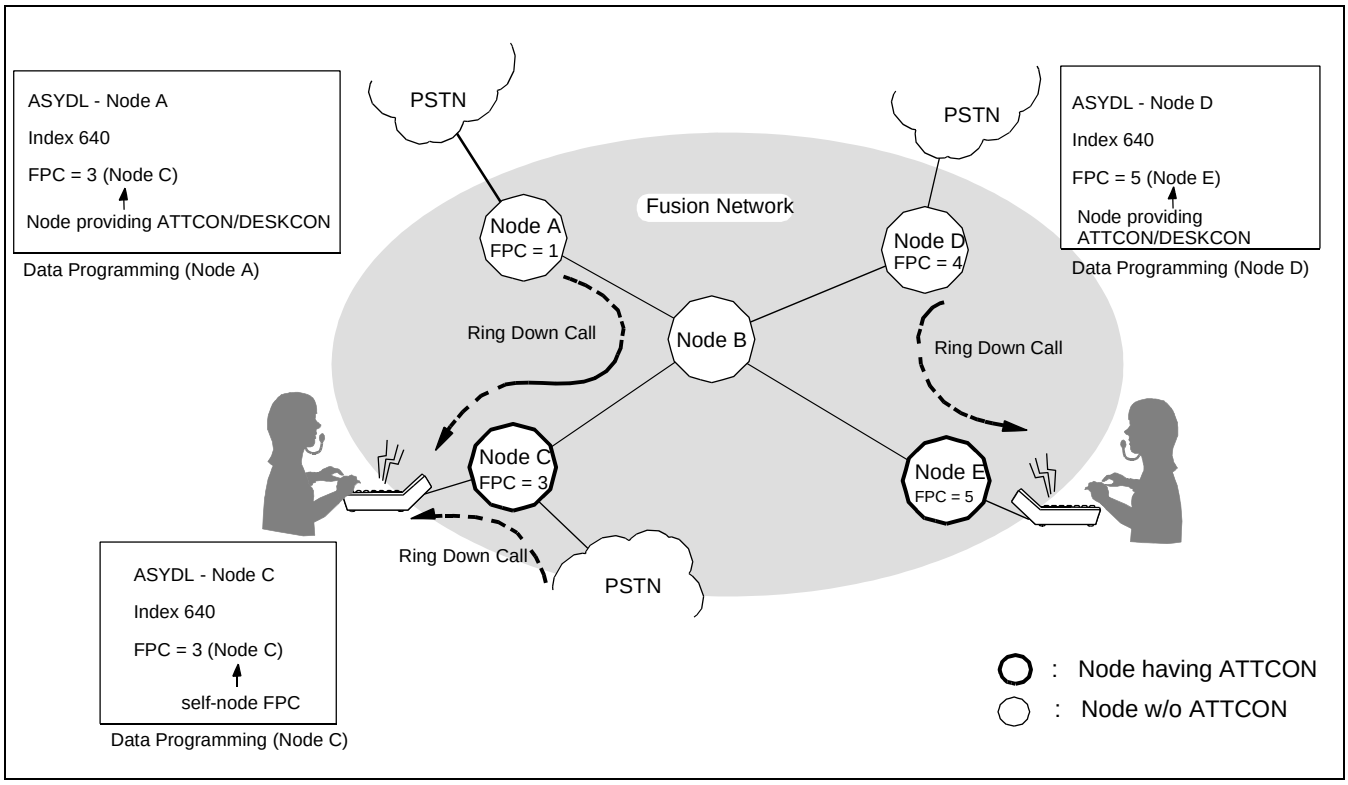


Figure 3-20 Ring Down Calls on a Fusion Network

3.4.3 Day/Night Change

Day/Night information is transferred from an ATTCON/DESKCON to predetermined nodes. In this example, Node C specifies Node A and Node B as destination nodes by assigning FPCs 1 and 2 in Indexes 704-735. Node A and Node B specify Node C as a terminating node for Ring Down calls from PSTN by assigning FPC 3 in Index 640. Node E specifies Node D as a destination. See Figure 3-21.

Note 1: *When assigning ATTCON/DESKCON on the Fusion network, be sure to develop the unified System Data at each node.*

Note 2: *Terminating node cannot be assigned differently at each tenant (TN).*

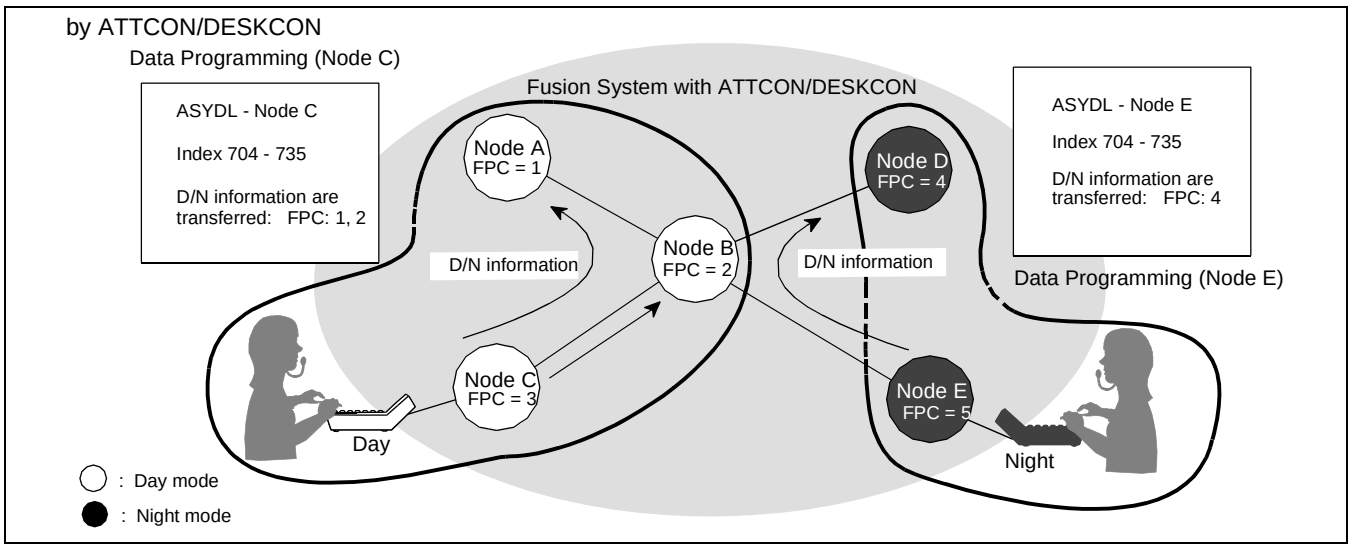


Figure 3-21 Day/Night Information Transfer by ATTCON/DESKCON

When an ATTCON/DESKCON is not provided on the Fusion network, Day/Night information is effective for a node accommodating an external key box. See Figure 3-22.

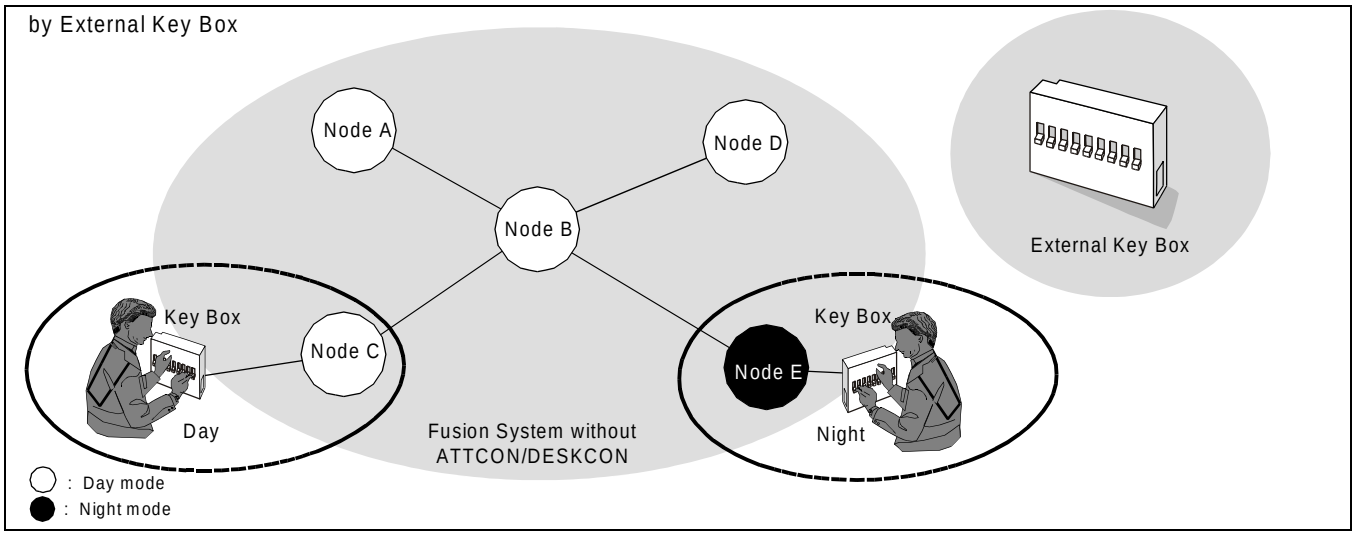


Figure 3-22 Day/Night Information Transfer

This page is for your notes.

CHAPTER 4 INSTALLATION

This chapter covers the installation of the Fusion system. The following topics are covered:

- How to set switches on the following circuit cards:

  PA-M96 (HUB)

  PA-FCHA (FCH)

  PA-24DTR (DTI)

- How to mount the circuit cards
- How to run the 10 BASE-T cables

1. Anti-Static Caution

This manual provides Static Caution indicators when describing work involving static-sensitive components. When performing work accompanied by this mark, be sure to use the anti-static kit. Figure 4-1 shows the Static Caution indicator.

Figure 4-1 Static Caution Indicator

Figure 4-2 shows the anti-static kit that is provided and how to use it. Use the kit when handling static-sensitive components such as circuit cards and cables.

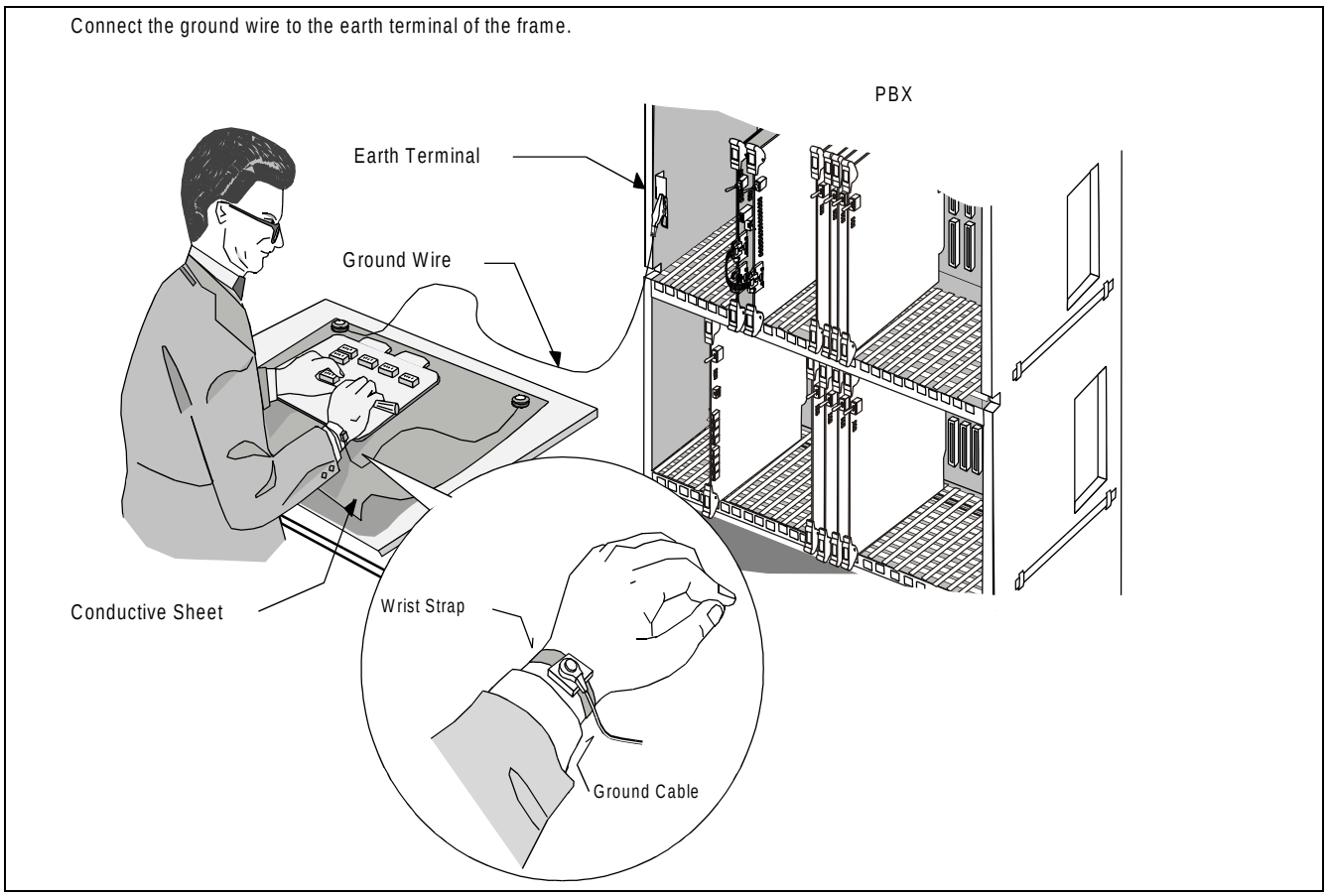


Figure 4-2 How to Use the Anti-static Kit

1.1 Circuit Cards Required

Depending on the system type, the following circuit cards are required for installation of the Fusion system. See Figure 4-3.

- Fusion with FCH

  HUB (PA-M96)

  FCH (PA-FCHA)

  DTI (PA-24DTR)

- Fusion without FCH

  DTI (PA-24DTR)

  HUB (PA-M96)

Before starting installation, make sure that all necessary cards are at your site.

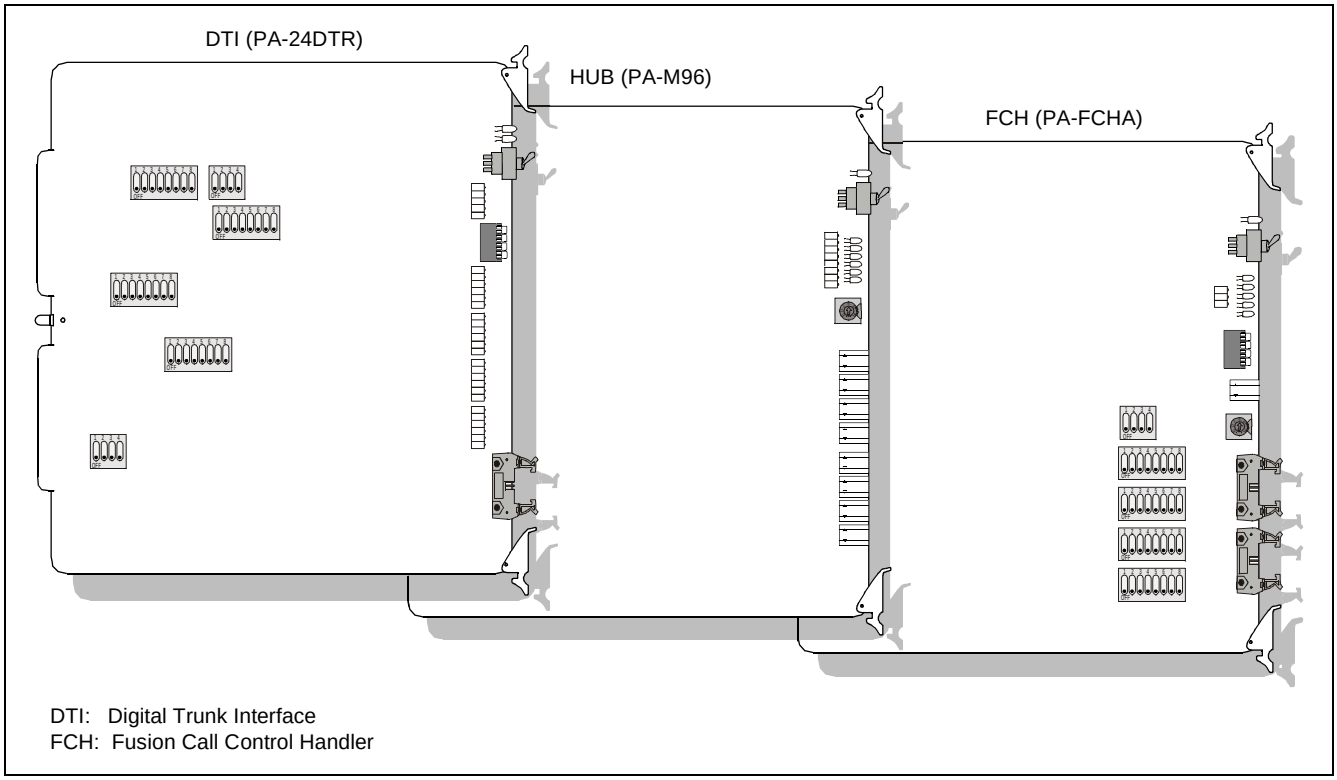
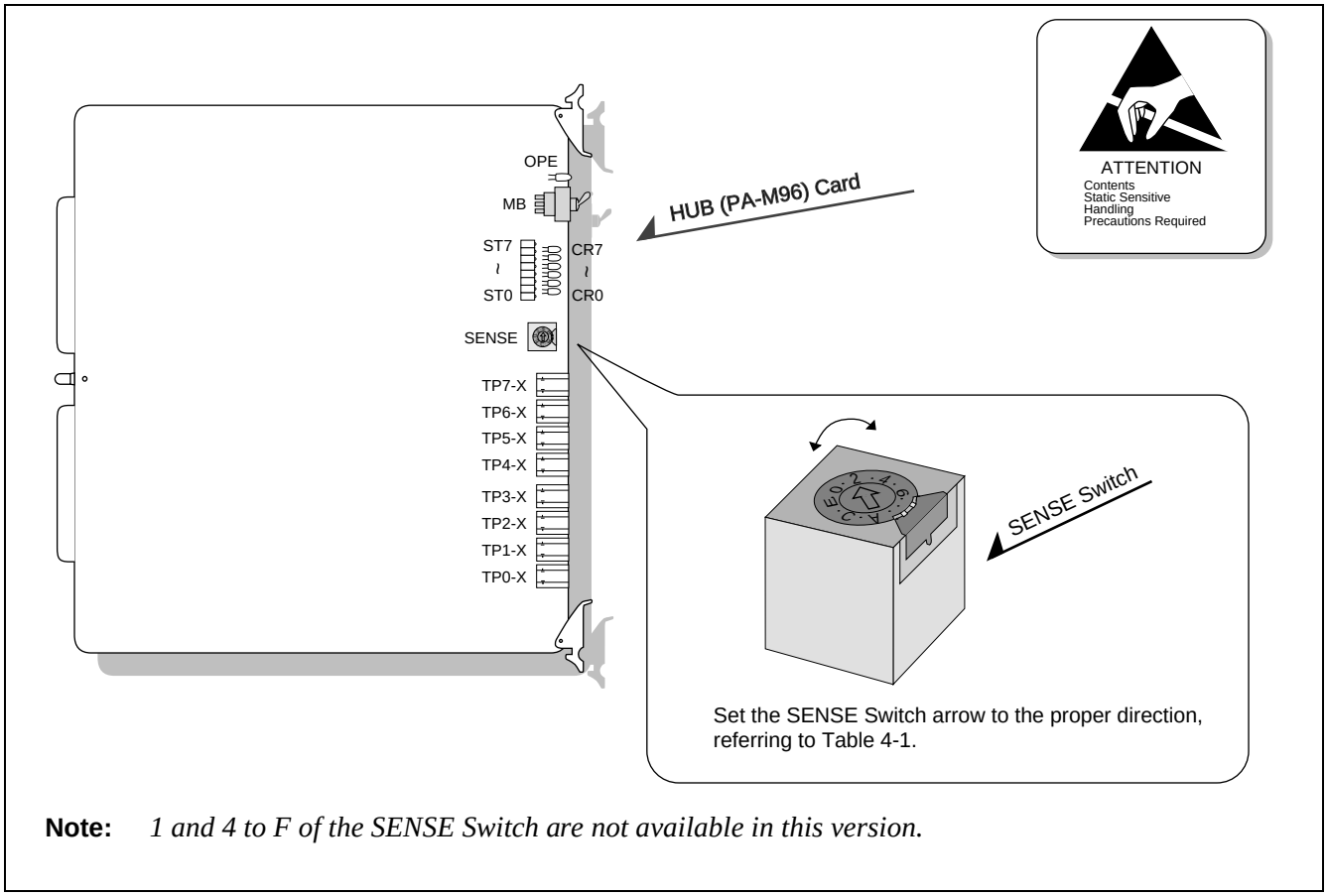


Figure 4-3 Circuit Cards for Fusion

2. Key Setting on Circuit Cards

2.1 PA-M96 (HUB)

After referring to Figure 4-4 and Table 4-1, set the SEL switch on the HUB (PA-M96) card(s).



Note: *1 and 4 to F of the SENSE Switch are not available in this version.*

Figure 4-4 Switch Setting on HUB (PA-M96) Card

Table 4-1 SENSE Switch Setting

SWITCH NAME	SETTING	STANDARD SETTING	DESCRIPTION
SENSE 	0		Polarity indication on the STn lamps for TPn-Xports.
	1		Not used.
	2	×	TPn-X ports operate as a repeater HUB. (Standard setting)
	3		Data-Packet-Collision indication on the STn lamps for TPn-X ports.
	4-F		Not used.

2.2 PA-FCHA (FCH)

Set the switches on the FCH (PA-FCHA) card(s) by referring to Figure 4-5, Table 4-2, and Table 4-3 . This card has DIP switches, whose key settings determine the time slots of the Fusion link. In Figure 4-5, CH3 is designated as the D/I channel in an example.

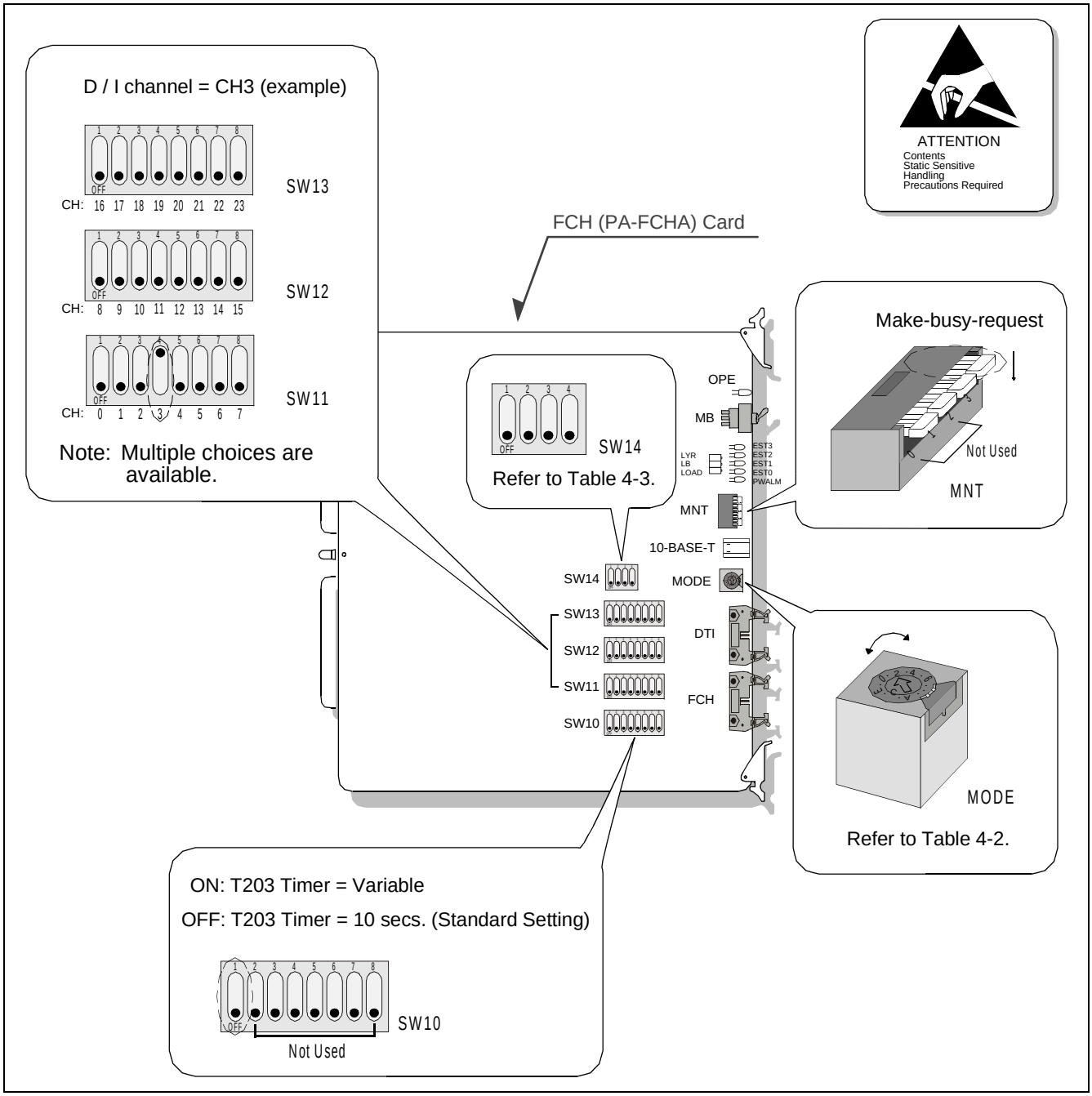


Figure 4-5 Switch Setting on FCH (PA-FCHA) Card

Table 4-2 MODE Switch Setting

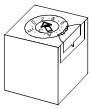
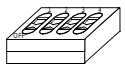
SWITCH NAME	SETTING	STANDARD SETTING	DESCRIPTION
MODE 	0-7		Not used
	8	×	Standard setting (When the DTI is connected with the card's front cable)
	9		Fusion link test mode (When the DTI is connected with the card's front cable)
	A-F		Not used

Table 4-3 DIP Switch (SW14) Setting

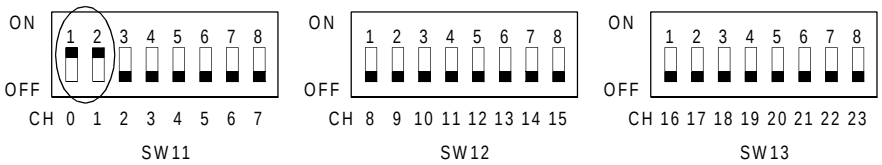
SWITCH NAME	SWITCH NUMBER	SETTING	STANDARD SETTING	DESCRIPTION
SW14 	1	ON	×	Positive logic for the D/I CONT
		OFF		Negative logic for the D/I CONT
	2 **Note 1**	ON	×	The fusion data link speed inserted onto the T1 interface **Note 3**
		OFF		
	3 **Note 1**	ON	×	
		OFF		
	4	ON		LAPD signal link performs as "network."
		OFF		LAPD signal link performs as "user."

SW14-2	SW14-3	SPEED (Note 2)
ON	ON	64Kbps × n (1~24)
ON	OFF	48Kbps × n (1~24)
OFF	ON	56Kbps × n (1~24)
OFF	OFF	Not used

Note 1: *64Kbps is used for T1 or E1 interface.*
56Kbps is used for T1 interface with bit stealing.
48Kbps is used for T1 interface with both bit stealing and Zero Code Suppression (or Bit 7 Stuffing).

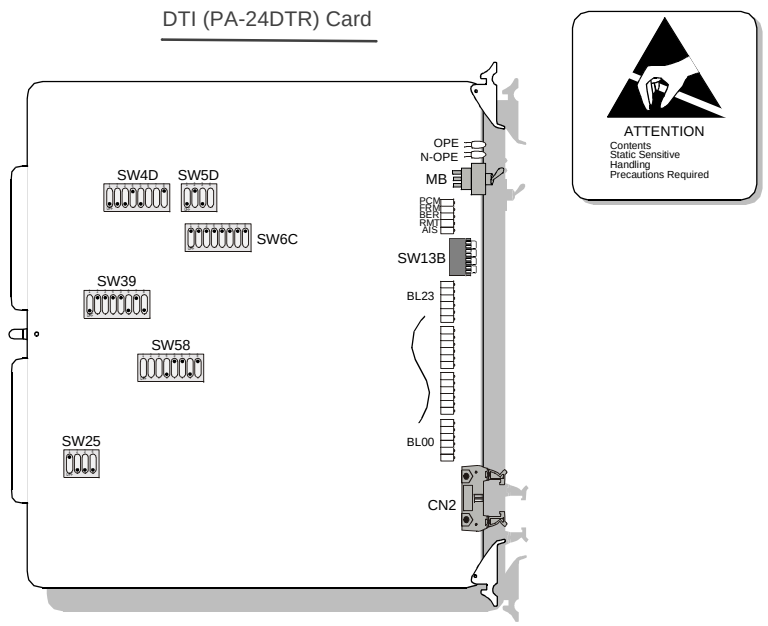
Note 2: *When n is bigger than 1, Time Slot Sequence Integrity (TSSI) must be guaranteed at the network side.*

Note 3: *The following is an example key setting when n = 2.*
SW11-1 = ON
SW11-2 = ON



2.3 PA-24DTR (DTI)

There are two types of the PA-24DTR (DTI) card as shown below. Refer to Figure 4-6 and Table 4-4 to set each switch to the proper positions.



Note: *Dots printed in DIP switches represent the standard settings.*

Figure 4-6 Switch Locations on DTI (PA-24DTR) Card

Table 4-4 Switch Setting Patterns for the DTI Card

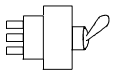
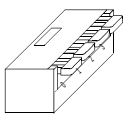
SWITCH NAME	SWITCH NUMBER	SETTING	STANDARD SETTING	MEANING
MB 		UP		Circuit card make busy
		DOWN	×	Circuit card make busy cancel
SW13B 	0	ON		Internal Loopback: Set
		OFF	×	Internal Loopback: Cancel
	1	ON		External Loopback: Set
		OFF	×	External Loopback: Cancel
	2	ON		Payload Loopback: Set
		OFF	×	Payload Loopback: Cancel
	3	ON		All Channel Make Busy: Set **Note**
		OFF	×	All Channel Make Busy: Cancel

Table 4-4 Switch Setting Patterns for the DTI Card (Continued)

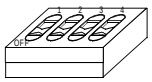
SWITCH NAME	SWITCH NUMBER	SETTING	STANDARD SETTING	MEANING
SW4D 	1	ON		Transmission Signal A Logic: Negative
		OFF	×	Transmission Signal A Logic: Positive
	2	ON		Receiving Signal A Logic: Negative
		OFF	×	Receiving Signal A Logic: Positive
	3	ON		RMT Alarm Sending: Not to be sent out
		OFF	×	RMT Alarm Sending: To be sent out
	4	ON	×	Simultaneous Seizure Supervision: Not to be controlled
		OFF		Simultaneous Seizure Supervision: To be controlled
	5	ON		Data Link Control: MOS
		OFF	×	Data Link Control: BOS
	6	ON		Multiframe Selection: 12-Multiframe
		OFF		Multiframe Selection: 24-Multiframe
	7	ON		Signal Selection: AMI (Alternate Mark Inversion)
		OFF		Signal Selection: B8ZS (Bipolar with 8 Zeros Substitution)
	8	ON	×	Fixed
SW25 	1	ON	×	Impedance setting: 100 Ω
		OFF		Impedance setting: 110 Ω
	2	ON		Transformer at Middle Point – Transmission: Ground
		OFF	×	Transformer at Middle Point – Transmission: Open
	3	ON		Transformer at Middle Point Receive: Ground
		OFF	×	Transformer at Middle Point Receive: Open
	4	ON		Idle Code: To be sent out
		OFF	×	Idle Code: Not to be sent out

Table 4-4 Switch Setting Patterns for the DTI Card (Continued)

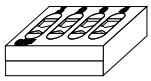
<table>
<tr><th>SWITCH NAME</th><th>SWITCH NUMBER</th><th>SETTING</th><th>STANDARD SETTING</th><th>MEANING</th></tr>
<tr><td rowspan="16">SW39
  </td><td rowspan="2">1</td><td>ON</td><td></td><td rowspan="5"><table><tr><th>SW39-1</th><th>SW39-2</th><th>PAD CONTROL</th></tr><tr><td>ON</td><td>ON</td><td>Both directions</td></tr><tr><td>OFF</td><td>ON</td><td>Receiving only</td></tr><tr><td>ON</td><td>OFF</td><td>Sending only</td></tr><tr><td>OFF</td><td>OFF</td><td>ARTD is fixed</td></tr></table></td></tr>
<tr><td>OFF</td><td>×</td></tr>
<tr><td rowspan="2">2</td><td>ON</td><td>×</td></tr>
<tr><td>OFF</td><td></td></tr>
<tr><td rowspan="2">3</td><td>ON</td><td>×</td><td rowspan="5"><table><tr><th>SW39-3</th><th>SW39-4</th><th>DATA PAD</th></tr><tr><td>ON</td><td>ON</td><td>64K</td></tr><tr><td>OFF</td><td>ON</td><td>56K</td></tr><tr><td>ON</td><td>OFF</td><td>48K</td></tr><tr><td>OFF</td><td>OFF</td><td>64K INV.</td></tr></table></td></tr>
<tr><td>OFF</td><td></td></tr>
<tr><td rowspan="2">4</td><td>ON</td><td>×</td></tr>
<tr><td>OFF</td><td></td></tr>
<tr><td rowspan="2">5</td><td>ON</td><td>×</td><td rowspan="5"><table><tr><th>SW39-5</th><th>SW39-6</th><th>T SIG CONTROL</th></tr><tr><td>ON</td><td>ON</td><td>ABCD</td></tr><tr><td>OFF</td><td>ON</td><td>ABAB</td></tr><tr><td>ON</td><td>OFF</td><td>Bit steal is inhibited</td></tr><tr><td>OFF</td><td>OFF</td><td>AAAA</td></tr></table></td></tr>
<tr><td>OFF</td><td></td></tr>
<tr><td rowspan="2">6</td><td>ON</td><td></td></tr>
<tr><td>OFF</td><td>×</td></tr>
<tr><td rowspan="2">7</td><td>ON</td><td>×</td><td rowspan="5"><table><tr><th>SW39-7</th><th>SW39-8</th><th>R SIG CONTROL</th></tr><tr><td>ON</td><td>ON</td><td>ABCD</td></tr><tr><td>OFF</td><td>ON</td><td>ABAB</td></tr><tr><td>ON</td><td>OFF</td><td>Bit steal is inhibited</td></tr><tr><td>OFF</td><td>OFF</td><td>AAAA</td></tr></table></td></tr>
<tr><td>OFF</td><td></td></tr>
<tr><td rowspan="2">8</td><td>ON</td><td></td></tr>
<tr><td>OFF</td><td>×</td></tr>
</table>

Table 4-4 Switch Setting Patterns for the DTI Card (Continued)

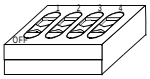
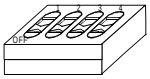
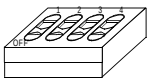
<table>
<tr><th>SWITCH NAME</th><th>SWITCH NUMBER</th><th>SETTING</th><th>STANDARD SETTING</th><th>MEANING</th></tr>
<tr><td rowspan="8">SW6C
  </td><td>1</td><td>ON</td><td>×</td><td>Fixed</td></tr>
<tr><td>2</td><td>ON</td><td>×</td><td>Fixed</td></tr>
<tr><td>3</td><td>ON</td><td>×</td><td>Fixed</td></tr>
<tr><td>4</td><td>ON</td><td>×</td><td>Fixed</td></tr>
<tr><td>5</td><td>ON</td><td>×</td><td>Fixed</td></tr>
<tr><td>6</td><td>ON</td><td>×</td><td>Fixed</td></tr>
<tr><td>7</td><td>ON</td><td>×</td><td>Fixed</td></tr>
<tr><td>8</td><td>ON</td><td>×</td><td>Fixed</td></tr>
<tr><td rowspan="10">SW58
  </td><td rowspan="2">1</td><td>ON</td><td></td><td rowspan="2">Equalizer Setting
<table><tr><th>SW 58-1</th><th>SW 58-2</th><th>SW 58-3</th><th>DISTANCE</th></tr><tr><td>ON</td><td>ON</td><td>ON</td><td>0 - 131 ft.
(0 - 040 m)</td></tr><tr><td>ON</td><td>ON</td><td>OFF</td><td>131 - 262 ft.
(40 - 080 m)</td></tr><tr><td>ON</td><td>OFF</td><td>ON</td><td>262 - 393 ft.
(80 - 120 m)</td></tr><tr><td>ON</td><td>OFF</td><td>OFF</td><td>393 - 524 ft.
(120 - 160 m)</td></tr><tr><td>OFF</td><td>ON</td><td>ON</td><td>524 - 656 ft.
(160 - 200 m)</td></tr><tr><td colspan="3">Other Combinations</td><td>Not Allowed</td></tr></table></td></tr>
<tr><td>OFF</td><td></td></tr>
<tr><td rowspan="2">2</td><td>ON</td><td></td></tr>
<tr><td>OFF</td><td></td></tr>
<tr><td rowspan="2">3</td><td>ON</td><td></td></tr>
<tr><td>OFF</td><td></td></tr>
<tr><td rowspan="2">4</td><td>ON</td><td></td><td rowspan="2">PAD Pattern Selection
<table><tr><th>SW 58-4</th><th>SW 58-5</th><th>SW 58-6</th><th>PAD PATTERN</th></tr><tr><td>OFF</td><td>ON</td><td>ON</td><td>PAD Pattern 1</td></tr><tr><td>OFF</td><td>ON</td><td>OFF</td><td>PAD Pattern 2</td></tr><tr><td>ON</td><td>OFF</td><td>ON</td><td>A→μ Loss
(Bothway)</td></tr><tr><td>ON</td><td>OFF</td><td>OFF</td><td>A→μ Loss (Receive)</td></tr><tr><td>OFF</td><td>OFF</td><td>ON</td><td>μ→A Loss
(Bothway)</td></tr><tr><td>OFF</td><td>OFF</td><td>OFF</td><td>μ→A Loss (Receive)</td></tr><tr><td colspan="3">Other Combinations</td><td>Not Allowed</td></tr></table>Note: When setting this key, refer to Digital PAD Setting Table (Table 4-5).</td></tr>
<tr><td>OFF</td><td>×</td></tr>
<tr><td rowspan="2">5</td><td>ON</td><td>×</td></tr>
<tr><td>OFF</td><td></td></tr>
<tr><td rowspan="2">6</td><td>ON</td><td>×</td></tr>
<tr><td>OFF</td><td></td></tr>
<tr><td rowspan="2">7</td><td>ON</td><td></td><td rowspan="2">Alarm Sending when this circuit card is in N-OPE state.</td></tr>
<tr><td>OFF</td><td>×</td></tr>
<tr><td rowspan="2">8</td><td>ON</td><td>×</td></tr>
<tr><td>OFF</td><td></td></tr>
</table>

Table 4-4 Switch Setting Patterns for the DTI Card (Continued)

SWITCH NAME	SWITCH NUMBER	SETTING	STANDARD SETTING	MEANING
SW5D 	1	ON		Digital PAD ROM selection: Special specification
		OFF	×	Digital PAD ROM selection: Standard specification
	2	ON	×	LAYER2 signal logic: Positive
		OFF		LAYER2 signal logic: Negative
	3	ON		Line fault is not notified to the upper CPU
		OFF	×	Line fault is notified to the upper CPU
	4	ON		Zero Code Suppression is not provided

Note: *This switch setting is applicable for a system that adopts Associated Channel Interoffice Signalling (ACIS).*

2.4 Digital PAD Setting

The PA-24DTR card is equipped with a mask ROM in which the following typical PAD patterns have been already written. PAD value is determined with the selection of a desired PAD pattern, which can be done by key setting of the SW 58 (elements 4, 5, 6) on the card, and programming of the PAD data by the ARTD command - CDN = 30 (PAD). Refer to Table 4-5 for the PAD patterns and ARTD data.

Table 4-5 Digital Pad Setting

PAD DATA ARTD CDN= 30	PAD Pattern [dB] (Selected by key setting)											
	PAD Pattern 1		PAD Pattern 2		A→μ Loss (Bothway)		A→μ Loss (Receive)		μ→A Loss (Bothway)		μ→A Loss (Receive)	
	SEND	RECEIVE	SEND	RECEIVE	SEND	RECEIVE	SEND	RECEIVE	SEND	RECEIVE	SEND	RECEIVE
1	2	2	-3 **Note**	3	0	0	0	0	0	0	0	0
2	4	4	3	3	4	4	0	4	4	4	0	4
3	6	6	0	6	6	6	0	12	6	6	0	12
4	8	8	3	9	8	8	0	8	8	8	0	8
5	Key setting of SW 39-3,4 correspond to PAD values. (Regardless of PAD patterns)											
7	0	0	0	0	Through	Through	Through	Through	Through	Through	Through	Through

Note: *Stands for 3[dB] GAIN.*

3. Mounting Circuit Cards in PIM

3.1 Mounting HUB (PA-M96) in a PIM

Mount the HUB (PA-M96) card in an appropriate slot of a PIM as shown in Figure 4-7. When the MAT is connected via a HUB card, be sure to use a dedicated HUB for the Fusion link.

Note: *HUB (PA-M96) can be mounted anywhere in a PIM of any IMG stack. However, if your system is 1-IMG type, mount the HUB in PIM0.*

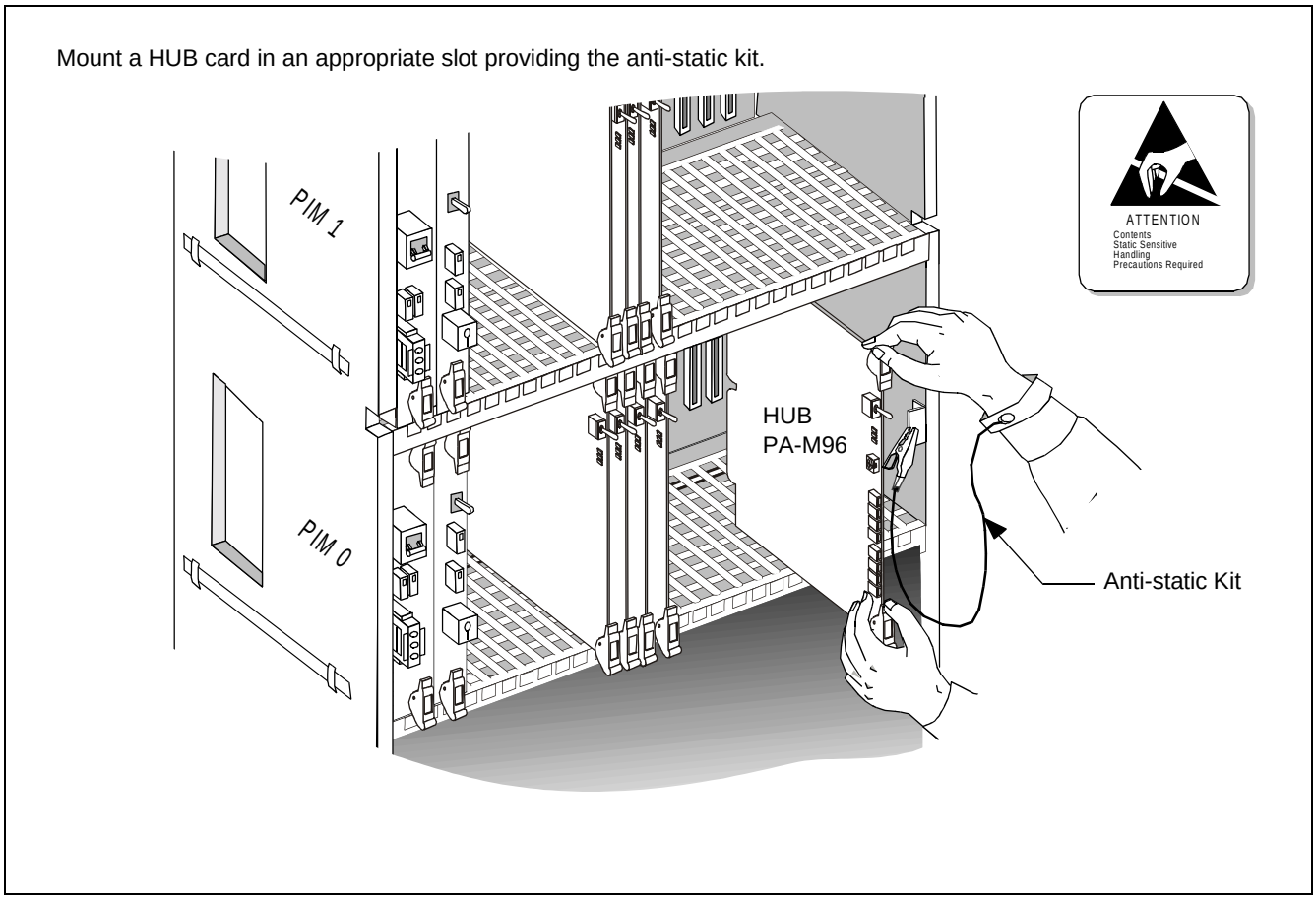


Figure 4-7 Mounting HUB Card in PIM 0

3.2 Mounting FCH (PA-FCHA) and DTI (PA-24DTR) Cards

Mount the FCH (PA-FCHA) and the DTI (PA-24DTR) card in appropriate slots in a PIM. Mount the two cards in adjacent slots since these cards must be connected on the front connectors. Figure 4-8 shows an example with the FCH and DTI cards mounted in PIM 1.

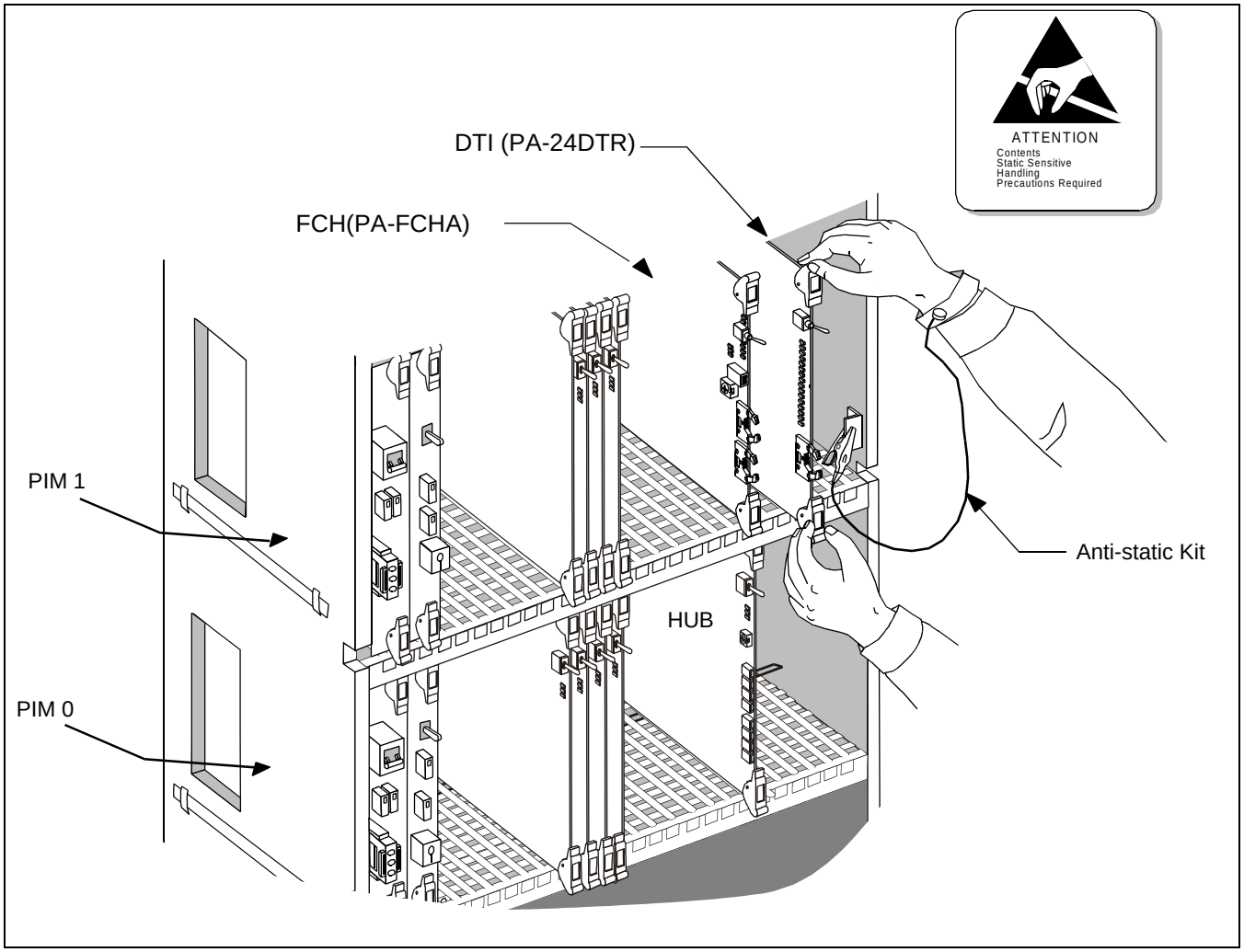


Figure 4-8 Mounting FCH and DTI Cards

4. Connecting Cables

4.1 Connecting DTI-FCH Front Cables

Connect the furnished front cable to the connectors on the DTI and FCH cards. Use DTI and CN2 connectors on the FCH and DTI cards respectively. Since an FCH card is equipped with one Handler circuit, a maximum of five FCH cards can be connected to a DTI card. (See Figure 4-9.) However, if a DCH card is also cascaded, a maximum of three FCH cards can be added to the DTI card. (DCH is equipped with two Handler circuits per card.)

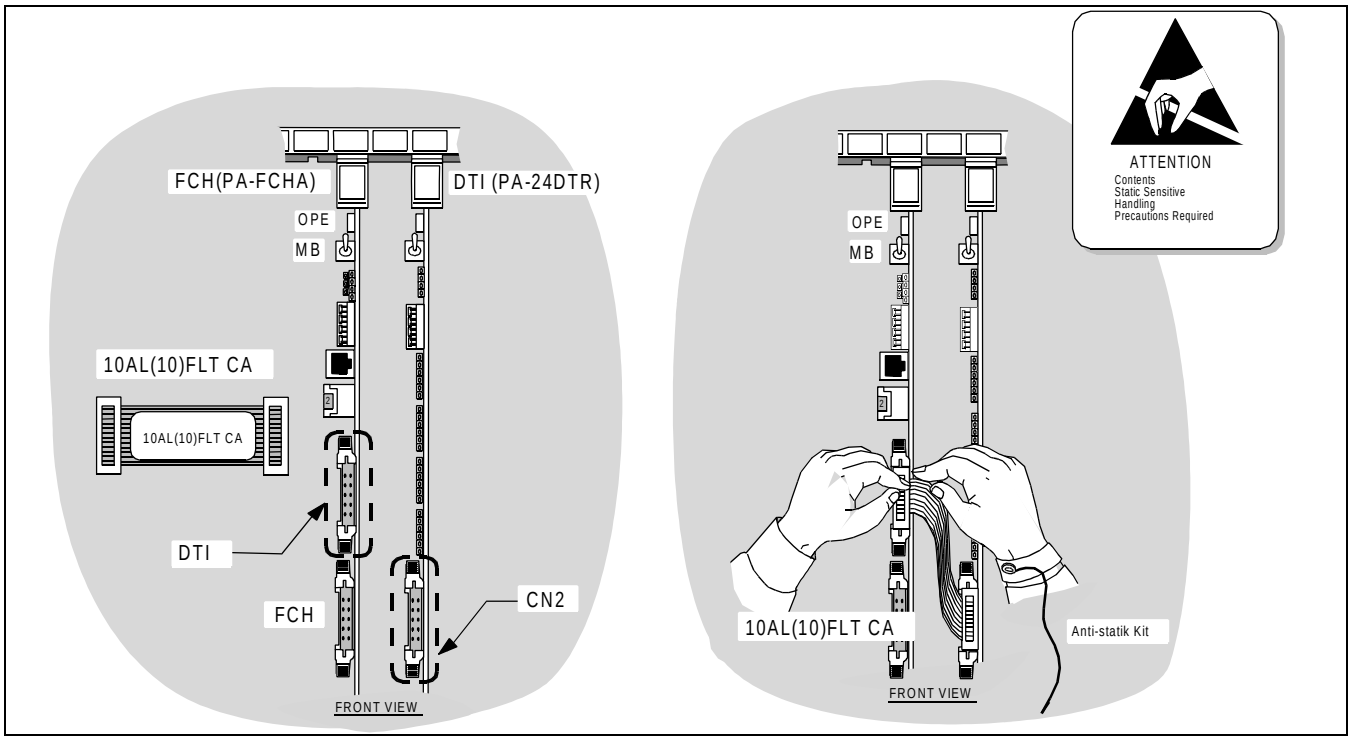


Figure 4-9 Connecting Front Cables

Since a maximum of five Handler circuits can be used, five FCH cards can be cascaded. Figure 4-10 shows an example where three FCH cards are cascaded.

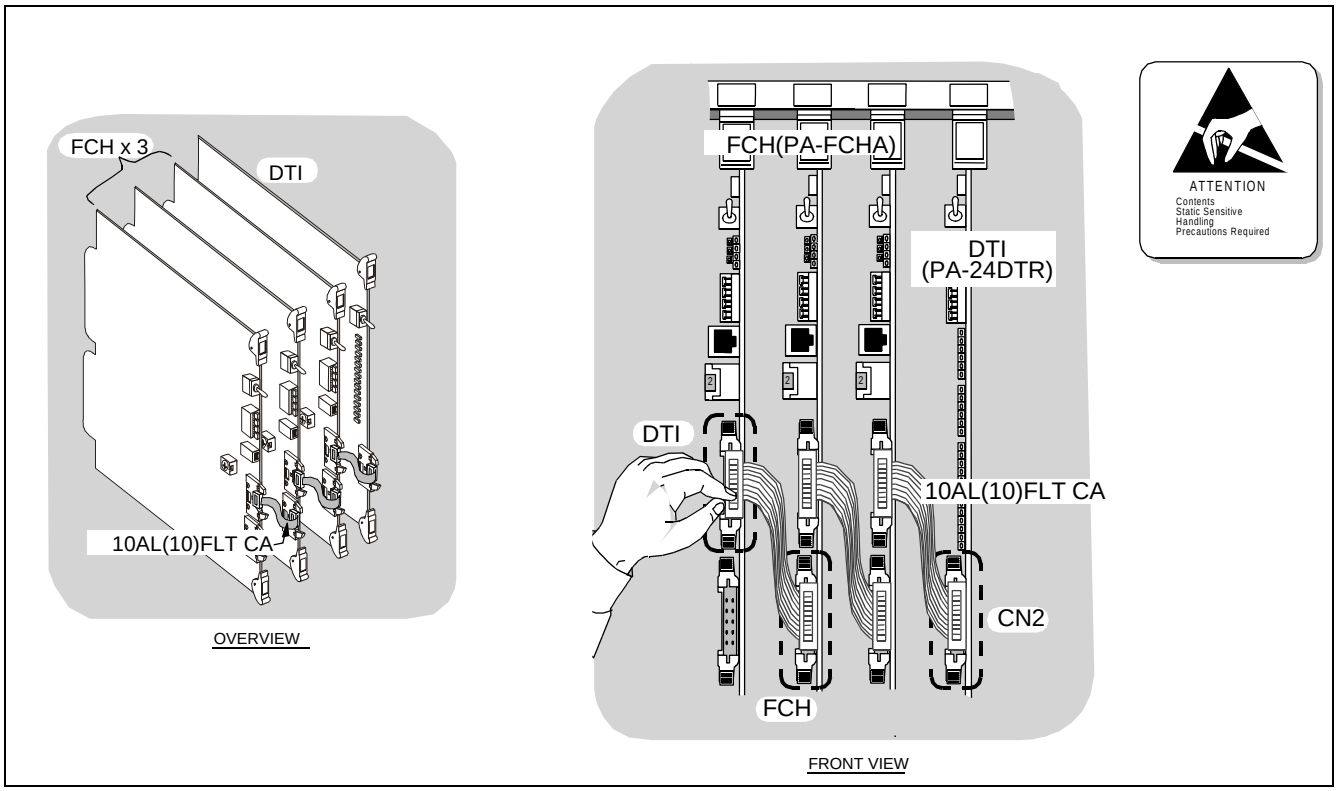
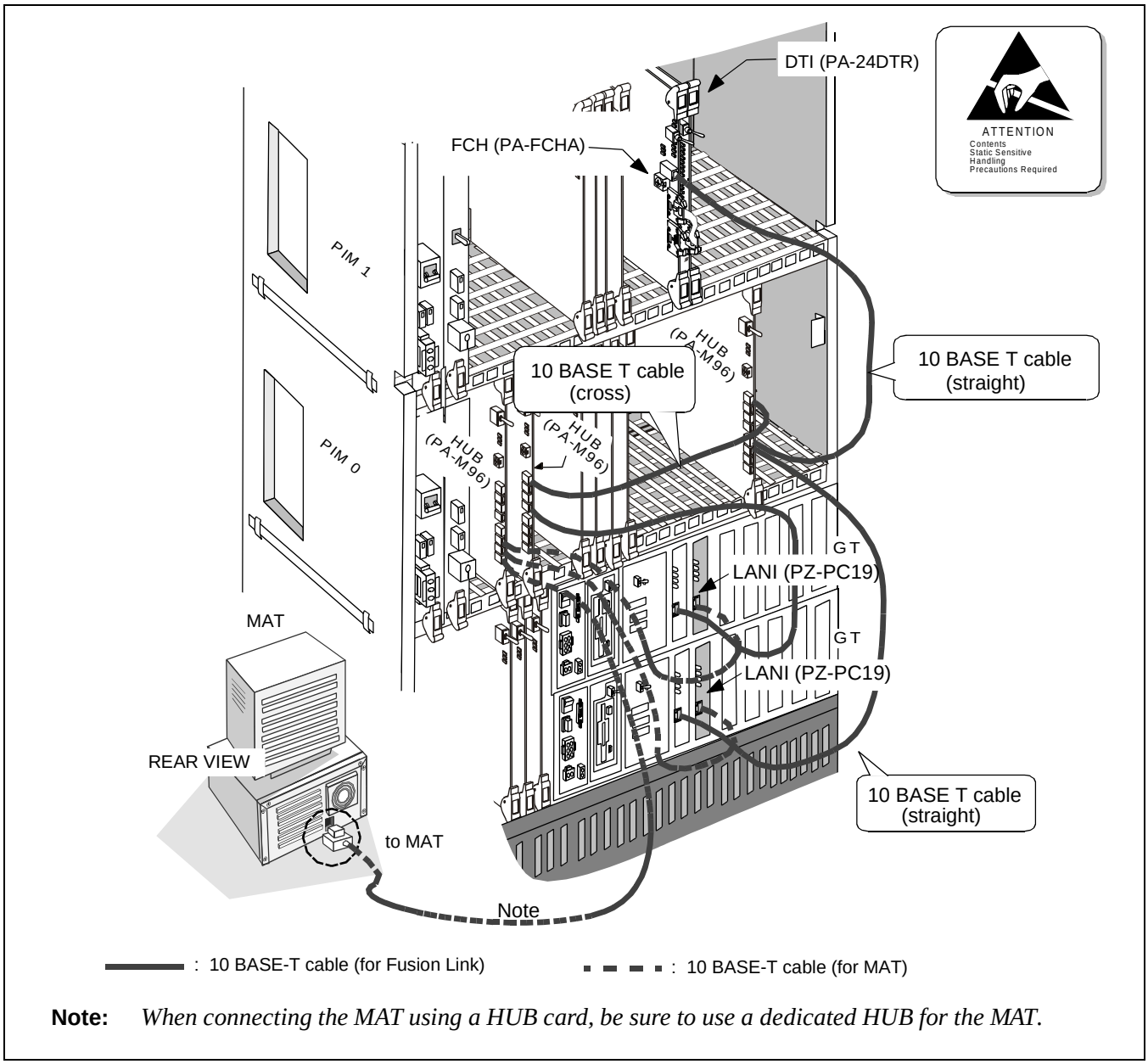


Figure 4-10 FCH Cascade Connections

4.2 Connecting 10 BASE-T Cables

Figure 4-11 shows sample cable connections, where HUB (PA-M96) cards are provided in a dual configuration and the FCH (PA-FCHA) card is located in PIM 1 (1-IMG system/IMG0). When HUB cards are provided in a dual configuration, the two HUB cards must be connected on each front edge connector with a 10 BASE-T cross cable. However, when dual LANIs (LANI-A and LANI-B) are used for each CPU, the cross cable connection between HUBs for FCH#0 and #1 is not necessary.

Note: *The Ethernet cables shown in the examples in this section are NOT available from NEC. The customer must provide these cables, depending on the system configuration. See "Chapter 6 Connecting 10 BASE-T Cables."*



Note: *When connecting the MAT using a HUB card, be sure to use a dedicated HUB for the MAT.*

Figure 4-11 Overall 10 BASE-T Connections

4.3 10 BASE-T Connection Procedure

The pattern for 10 BASE-T cable connections may vary, depending on the system configuration (such as the number of IMG stacks or the mounting location/number of the FCH/HUB cards, etc.). According to your system configuration, connect necessary Ethernet cables:

4.3.1 Procedure for 1-IMG System

If your system is 1-IMG type, the 10 BASE-T connection should use either of the following cables:

1. Cable unit specified as SR1201 ETIF CAU-n

2. Cables, other than those of SR1201 ETIF CAU-n, that are provided by the user

Based on the cable type, perform the following:

4.3.2 When using cable unit SR1201 ETIF CAU-n

1. Referring to Figure 4-13 through Figure 4-15, connect the 10 BASE-T straight cables, between the LANI (PZ-PC19) and HUB (PA-M96) cards, and between the HUB and FCH (PA-FCHA) cards. If the HUB is in a dual configuration, also connect the 10 BASE-T cross cable between HUB#0 and HUB#1.

   When dual LANIs are used in both Slot 00 and 03 of CPR#0/CPR#1, be sure to use at least two HUB cards. Use one HUB for the internal LANI (in Slot 00), and use the other HUB for external LANI (in Slot 03). If FCH is also in a dual configuration, the 10 BASE-T cross connection between the two HUBs is not required.

2. If your system needs more FCH (PA-FCHA) and/or HUB (PA-M96) cards, provide the required Ethernet connection(s) for the added card(s) using the following cables:

- When adding FCH card in PIM0: UTP CTG5 ST CA-D
- When adding HUB card in PIM0: UTP CTG5 CRS CA-D
- When adding FCH card in PIM1: UTP CTG5 ST CA-K
- When adding HUB card in PIM1: UTP CTG5 CRS CA-K
- When adding FCH card in PIM2: UTP CTG5 ST CA-M
- When adding HUB card in PIM2: UTP CTG5 CRS CA-M
- When adding FCH card in PIM3: UTP CTG5 ST CA-N
- When adding HUB card in PIM3: UTP CTG5 CRS CA-N

Note: *The cables cited above and used in Figure 4-13 through Figure 4-15 are for the 1-IMG system only and are not available in the 4-IMG/IMX-U system.*

4.3.3 When not using the cable unit SR1201 ETIF CAU-n

When your system doesn't use the cable unit classified as SR1201 ETIF CAU-n, perform the 10 BASE-T connections as instructed below:

1. Depending on your system configuration, connect the 10 BASE-T straight cable(s) between the HUB (PA-M96) and LANI (PZ-PC19) cards. Use the cable UTP CTG5 ST CA-O, which must be provided by the user.

   When a single LANI is used for each CPR (Slot 00 only), and the HUB is in a dual configuration, connect HUB#0 to LANI#0 and HUB#1 to LANI#1, using two 10 BASE-T cables.

   When dual LANIs are used in both Slot 00 and 03 of CPR#0/CPR#1, use at least two HUB cards as separate 10 BASE-T connection terminals: One HUB for the internal LANI (LANI-A in Slot 00 of each CPR) and the other for the external LANI (LANI-B: in Slot 03 of each CPR).

2. When HUB is in a dual configuration, connect the 10 BASE-T cross cable between the HUB cards. Use the cable UTP CTG5 CRS CA-F, which must be provided by the user.

   When using more than two HUB cards, connect the cross cable(s) for the remaining HUB cards, except the HUB card used for the MAT connection.

3. Connect the 10 BASE-T straight cable(s) between the HUB and FCH (PA-FCHA) cards. Use the following cables, which must be provided by the user.

   UTP CTG5 ST CA-F:When the HUB and FCH are in the same PIM (PIM0)

   UTP CTG5 ST CA-O:When the HUB and FCH are in different PIMs

   When FCH is in a dual configuration, connect FCH#0 to the HUB#0 side, and FCH#1 to the HUB#1 side.

4.3.4 Procedure for 4-IMG System

When your system is 4-IMG type, the procedure for 10 BASE-T connection is as follows. Because the HUB (PA-M96) can be mounted anywhere in a PIM of any IMG, the Ethernet cables must be arranged by the user, depending on the system configuration.

1. Depending on your system configuration, connect the 10 BASE-T straight cable(s) between the HUB (PA-M96) and LANI (PZ-PC19) cards. Use the following cables, prepared by the user:

   UTP CTG5 ST CA-O:When the HUB and LANI are in the same IMG (IMG0)

   UTP CTG5 ST CA-X:When the HUB and LANI are in different IMGs

   When a single LANI is used for each CPR (Slot 00 only), and the HUB is in a dual configuration, connect HUB#0 and HUB#1 to LANI#1 using two 10 BASE-T cables.

When dual LANIs are used in both Slot 00 and 03 of CPR#0/CPR#1, be sure to use at least two HUB cards as separate 10 BASE-T connection terminals. Use one HUB for the internal LANI (LANI-A: in Slot 00 of each CPR), and use the other for the external LANI (LANI-B in Slot 03 of each CPR).

2. When the HUB is in a dual configuration, connect the 10 BASE-T cross cable between the HUB cards. Use the following cables, which are provided by the user.

   UTP CTG5 CRS CA-F:When the HUB and HUB are in the same PIM

   UTP CTG5 CRS CA-O:When the HUB and HUB are in different PIMs but in the same IMG

   UTP CTG5 CRS CA-X:When the HUB and HUB are in different IMG stacks

   When using more than two HUB cards, also connect the cross cable(s) for the remaining HUB card(s), except the HUB for the MAT connection.

   This step is not necessary when your system uses dual LANIs for CPU#0/CPU#1 and FCH is also in a dual configuration.

3. Connect the 10 BASE-T straight cable(s) between the HUB and FCH (PA-FCHA) cards. Use the following cable, which must be provided by the user.

   UTP CTG5 ST CA-F:When the HUB and FCH are in the same PIM

   UTP CTG5 ST CA-O:When the HUB and FCH are in different PIMs but in the same IMG

   UTP CTG5 ST CA-X**:**When the HUB and FCH are in different IMG stacks

   When FCH is in a dual configuration, connect FCH#0 to the HUB#0 side and FCH#1 to the HUB#1 side.

4.3.5 Procedure for IPX-U and IMX-U Systems

When your system is the IPX-U or IMX-U type (configured to a maximum of 4 Local Nodes + 1ISW), the procedure for the 10 BASE-T connection is as follows. Because this system already has a Fusion link via the HUB (PA-M96) cards, this section gives details related only to the connection between the HUB and FCH (PA-FCHA) cards.

1. Refer to the NEAX2400 IPX Installation Manual (IMX-U Type) or the NEAX2400 IMX Installation Manual (IMX-U Type) to make sure that the necessary 10 BASE-T (both straight and cross) connections between the ISW and each LN (Local Node) are all securely provided.

2. Connect the 10 BASE-T straight cable(s) between the HUB (PA-M96) and FCH (PA-FCHA) cards. Use the following cable, which must be provided by the user.

   UTP CTG5 ST CA-F:When the HUB and FCH are in the same PIM

   UTP CTG5 ST CA-O:When the HUB and FCH are in different PIMs but in the same IMG

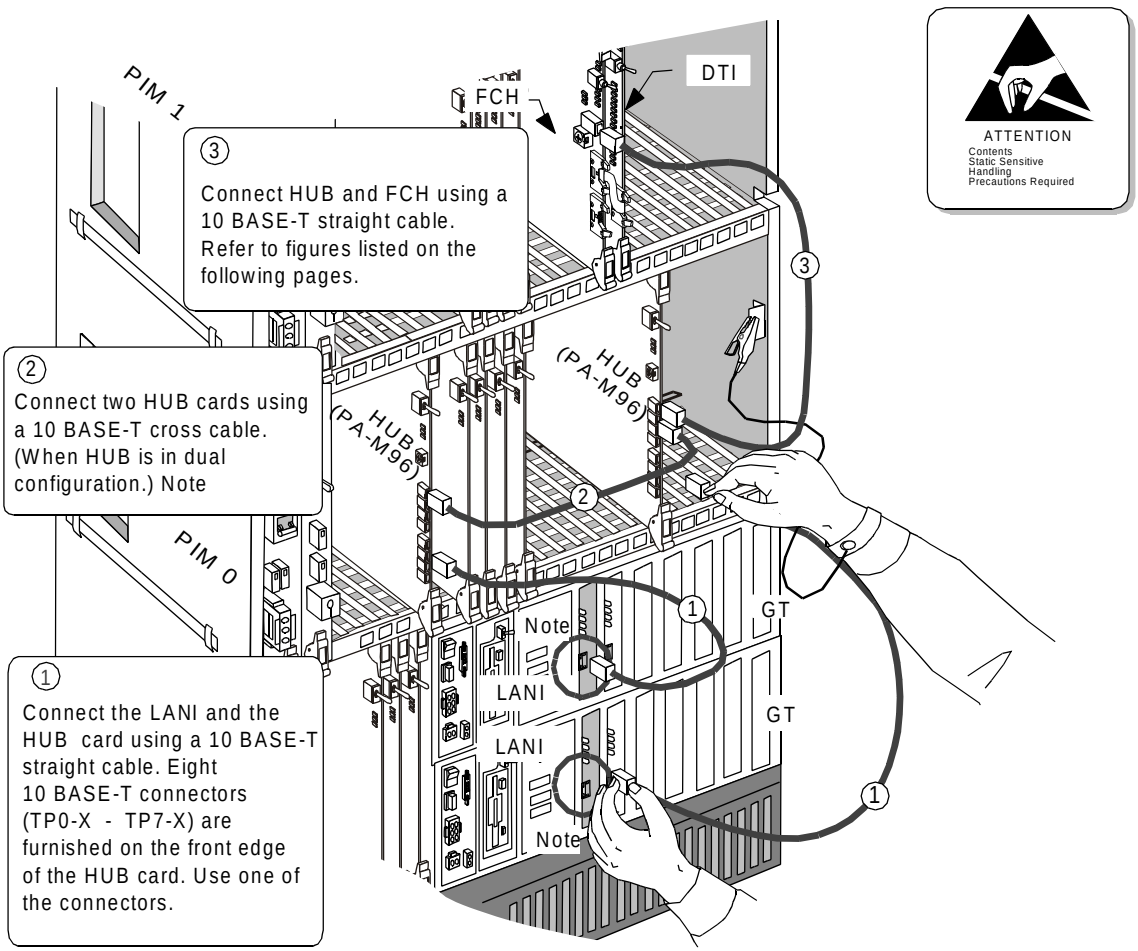
   UTP CTG5 ST CA-X:When the HUB and FCH are in different IMG stacks but in the same LN

   UTP CTG5 ST CA-A0:When the HUB and FCH are in different LNs

When dual FCH is provided for the HUB dedicated to each internal LANI card (LANI-A: in Slot 00 of each CPR), connect FCH#0 to HUB#0 and FCH#1 to HUB#1.

When your system also uses the external LANI cards (LANI-B in Slot 03 of each CPR), prepare another set of FCH cards for the HUB dedicated to the external LANI cards. Then, if the FCH is in dual configuration, connect one FCH to the HUB for No. 0 system of the external LANI, and the other to the HUB for the No. 1 system of the external LANI.

Figure 4-12 shows an example of a HUB in a dual configuration and the FCH card mounted in PIM 1 of the 1 IMG system.



Note: *This step can be skipped when dual LANIs (LANI-A and LANI-B) are used for each CPU and FCH is provided in a dual configuration.*

Figure 4-12 Connecting 10 BASE-T Cables (example)

Figure 4-13 shows some typical examples where 10 BASE-T cables are connected to the FCH card(s) mounted in PIM0 of 1-IMG system, under the conditions in Table 4-6:

Table 4-6 Connection of 10 BASE-T Cables to FCH Card(s) in PIM0 of 1-IMG

	Configuration of CPU	Configuration of LAN	Used Cable Unit (Note 1, Note 2)	Number of HUB/ FCH
Pattern 1	Single	Single	SR1201 ETIF CAU-A × 1	HUB× 1, FCH× 1
Pattern 2	Dual	Single	SR1201 ETIF CAU-A × 1 SR1201 ETIF CAU-DA × 1	HUB× 2, FCH× 2
Pattern 3	Single	Dual	SR1201 ETIF CAU-A × 2	HUB× 2, FCH× 2
Pattern 4	Dual	Dual	SR1201 ETIF CAU-A × 2 SR1201 ETIF CAU-DA × 2	HUB× 2, FCH× 2

Note 1: *Cables Contained in each cable unit are as follows:*
SR1201 ETIF CAU-A: UTP CTG5 ST CA-D, UTP CTG5 ST CA-J
SR1201 ETIF CAU-DA: UTP CTG5 ST CA-D, UTP CTG5 ST CA-J, UTP CTG5 CRS CA-F

Note 2: *The cables cited in Figure 4-13 can be used in the 1-IMG system only.*

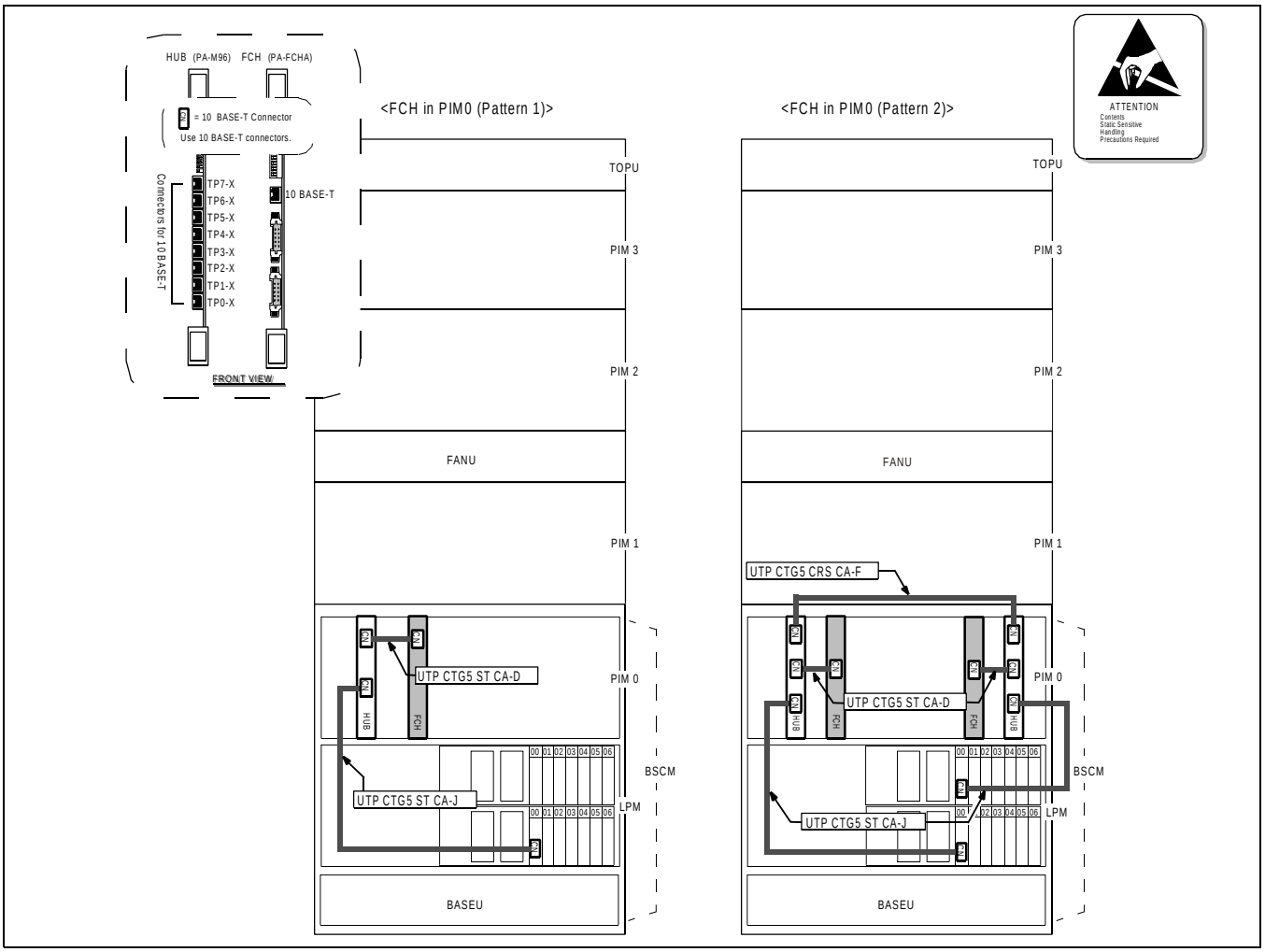
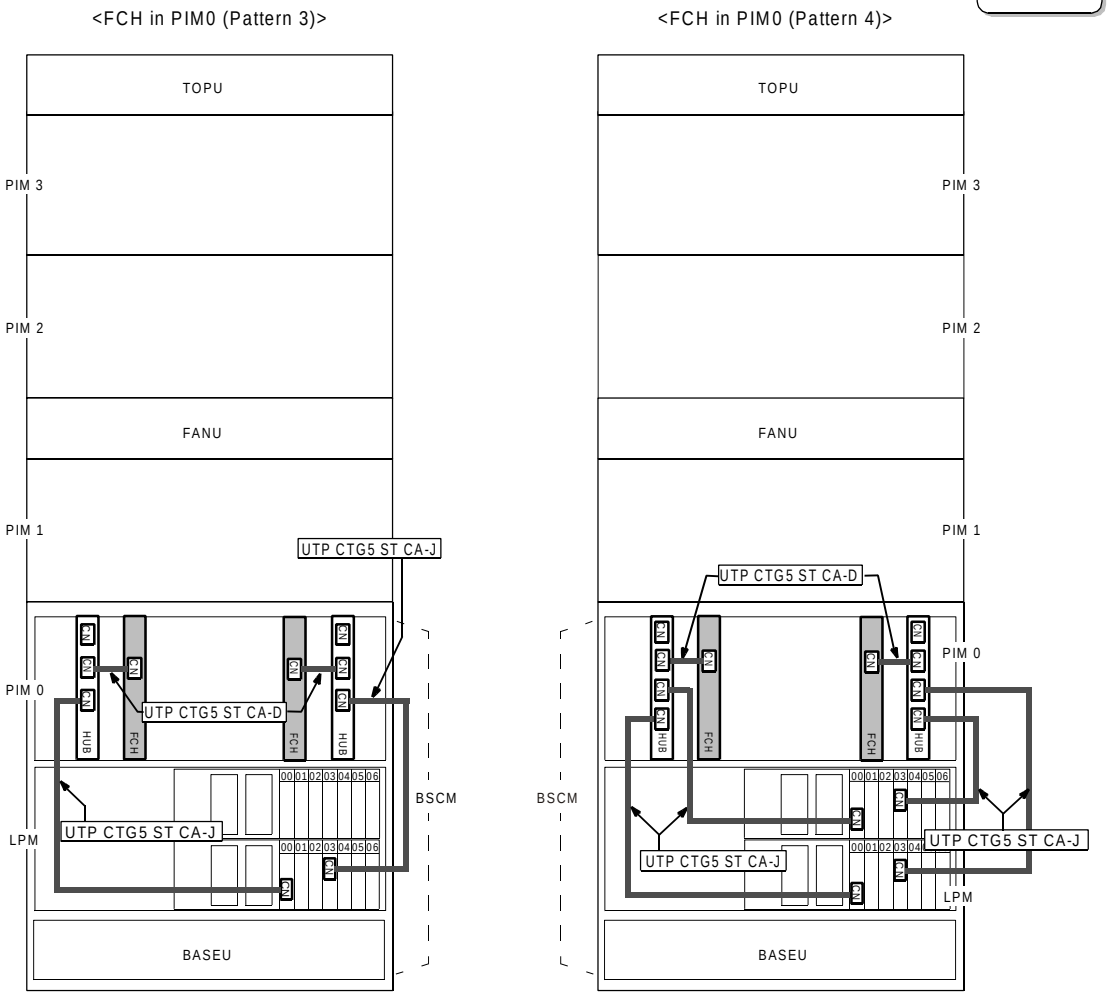


Figure 4-13 Examples of Ethernet Cable Connection-FCH in PIM0 (1-IMG System) (1/2)



Note: *When dual LANIs are used in both slot 00 and 03 of OPR (Pattern 3 or 4), be sure to use at least two HUB cards: One HUB for internal LANI (in slot 00) and the other for external LANI (in slot 03). However, if this is the case, and FCH is also in a dual configuration, the 10 BASE-T "cross" connection between the HUBs is not required.*

Figure 4-13 Examples of Ethernet Cable Connection-FCH in PIM0 (1-IMG System) (2/2)

Figure 4-14 shows some typical examples where 10 BASE-T cables are connected to the FCH card(s) mounted in PIM1 of 1-IMG system, under the conditions in Table 4-7:

Table 4-7 Connection of 10 BASE-T Cables to FCH Card(s) in PIM1 of 1-IMG

	Configuration of CPU	Configuration of LAN	Used Cable Unit (Note 1, Note 2)	Number of HUB/ FCH
Pattern 1	Single	Single	SR1201 ETIF CAU-B × 1	HUB× 1, FCH× 1
Pattern 2	Dual	Single	SR1201 ETIF CAU-B × 1 SR1201 ETIF CAU-DB × 1	HUB× 2, FCH× 2
Pattern 3	Single	Dual	SR1201 ETIF CAU-B × 2	HUB× 2, FCH× 2
Pattern 4	Dual	Dual	SR1201 ETIF CAU-B × 2 SR1201 ETIF CAU-DB × 2	HUB× 2, FCH× 2

Note 1: *Cables contained in each cable unit are as follows:*
SR1201 ETIF CAU-B: UTP CTG5 ST CA-K, UTP CTG5 ST CA-J
SR1201 ETIF CAU-DB: UTP CTG5 ST CA-I, UTP CTG5 ST CA-J, UTP CTG5 CRS CA-F

Note 2: *The cables cited in Figure 4-14 can be used in the 1-IMG system only.*

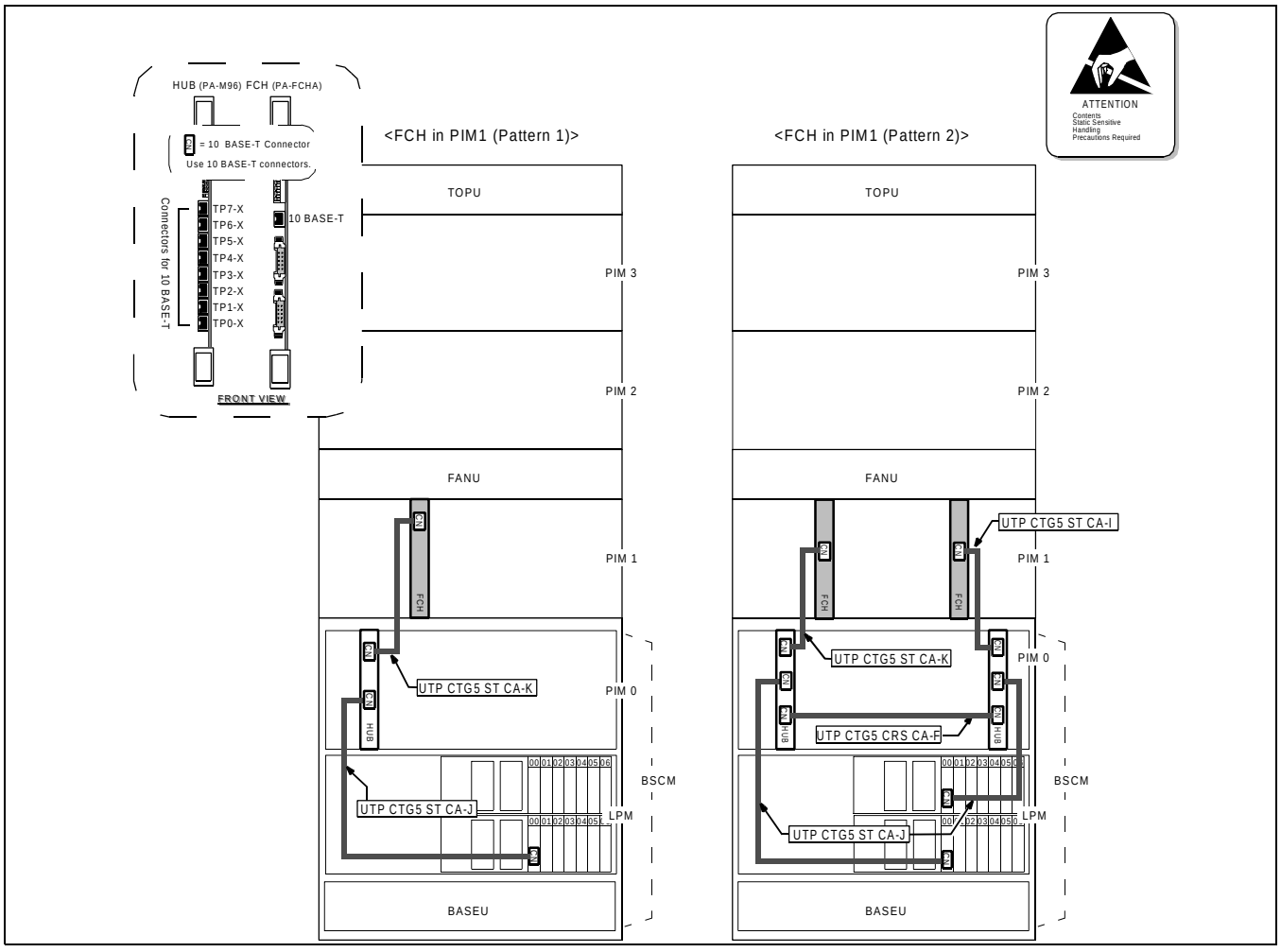


Figure 4-14 Examples of Ethernet Cable Connection-FCH in PIM1 (1-IMG System)

Figure 4-15 shows some typical examples where 10 BASE-T cables are connected to the FCH card(s) mounted in PIM2 of 1-IMG system, under the conditions in Table 4-8:

Table 4-8 Connection of 10 BASE-T Cables to FCH Card(s) in PIM2 of 1-IMG

	Configuration of CPU	Configuration of LAN	Used Cable Unit (Note 1, Note 2)	Number of HUB/ FCH
Pattern 1	Single	Single	SR1201 ETIF CAU-C × 1	HUB× 1, FCH× 1
Pattern 2	Dual	Single	SR1201 ETIF CAU-C × 1 SR1201 ETIF CAU-DC × 1	HUB× 2, FCH× 2
Pattern 3	Single	Dual	SR1201 ETIF CAU-C × 2	HUB× 2, FCH× 2
Pattern 4	Dual	Dual	SR1201 ETIF CAU-C × 2 SR1201 ETIF CAU-DC × 2	HUB× 2, FCH× 2

Note 1: *Cables contained in each cable unit are as follows:*
SR1201 ETIF CAU-C: UTP CTG5 ST CA-M, UTP CTG5 ST CA-J
SR1201 ETIF CAU-DC: UTP CTG5 ST CA-K, UTP CTG5 ST CA-J, UTP CTG5 CRS CA-F

Note 2: *The cables cited in Figure 4-15 can be used in the 1-IMG system only.*

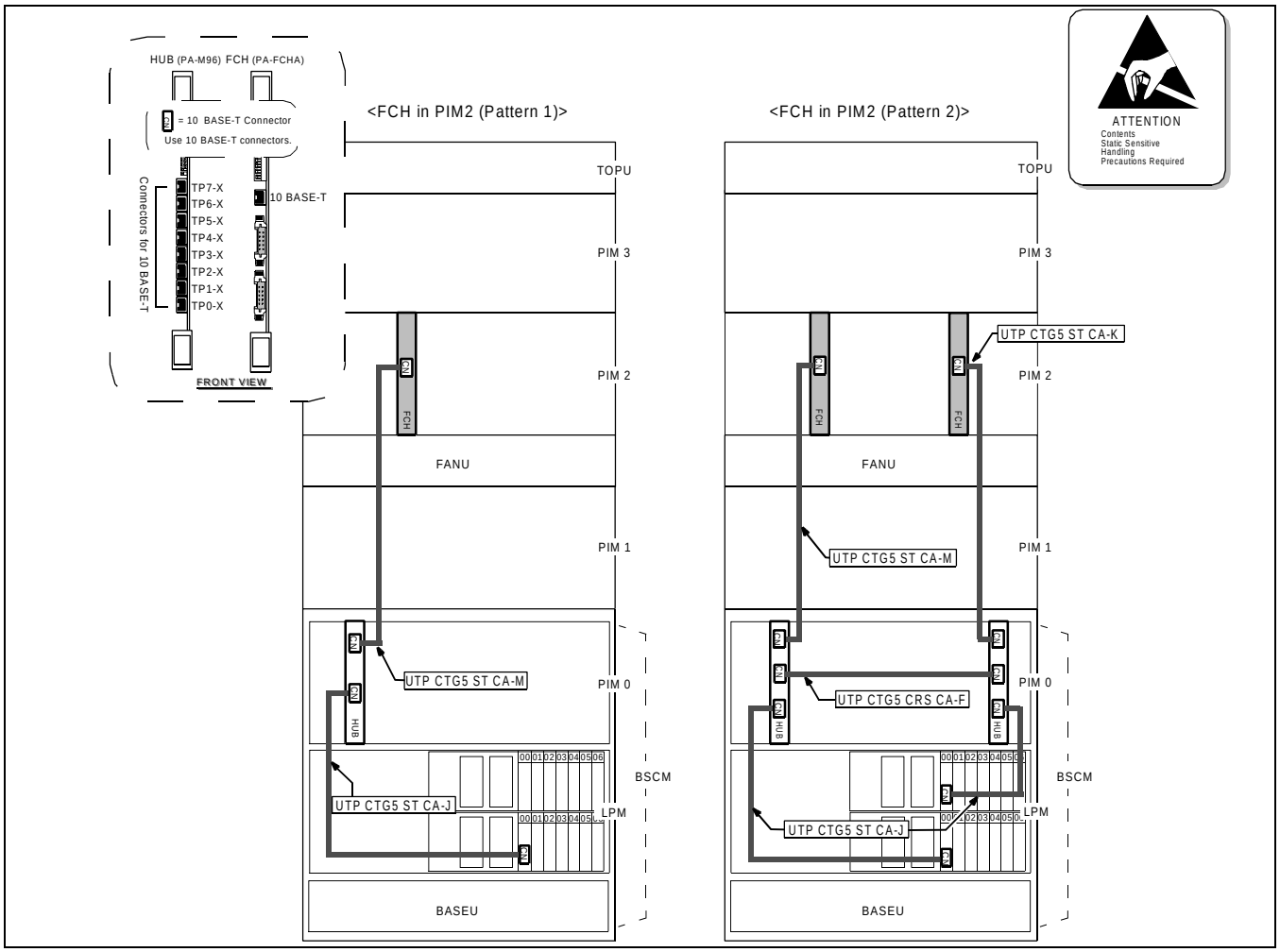
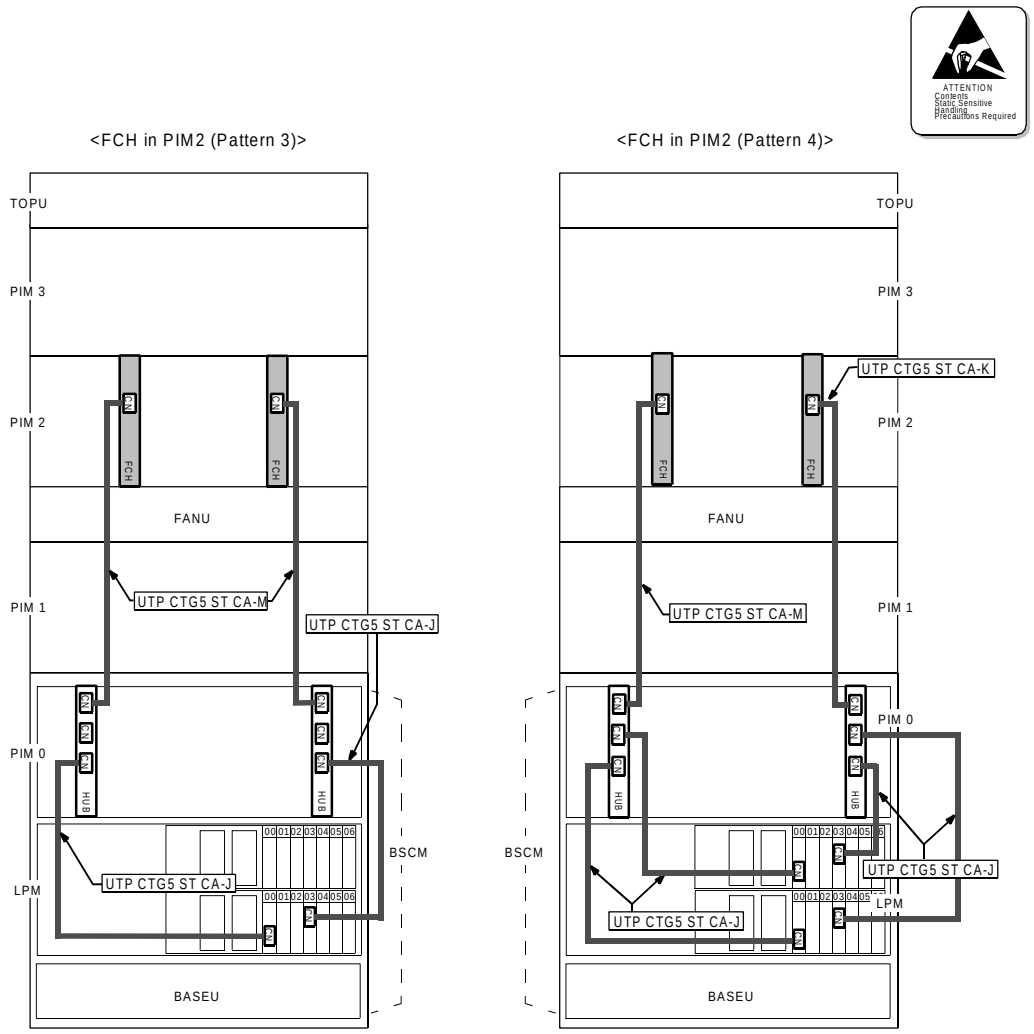


Figure 4-15 Examples of Ethernet Cable Connection-FCH in PIM2 (1-IMG System) (1/2)



Note: *When dual LANIs are used in both Slot 00 and 03 of CPR(Pattern 3 or 4), be sure to use at least two HUB cards: One HUB for internal LANI (in Slot 00) and the other for external LANI (in Slot 03). However, if this is the case, and FCH is also in a dual configuration, the 10 BASE-T "cross" connection between the HUBs is not required.*

Figure 4-15 Examples of Ethernet Cable Connection-FCH in PIM2 (1-IMG System) (2/2)

Figure 4-16 shows some typical examples where 10 BASE-T cables are connected to the FCH card(s) mounted in PIM3 of 1-IMG system, under the following conditions:

Table 4-9 Connection of 10 BASE-T Cables to FCH Card(s) in PIM3 of 1-IMG

	Configuration of CPU	Configuration of LAN	Used Cable Unit (Note 1, Note 2)	Number of HUB/ FCH
Pattern 1	Single	Single	SR1201 ETIF CAU-D × 1	HUB× 1, FCH× 1
Pattern 2	Dual	Single	SR1201 ETIF CAU-D × 1 SR1201 ETIF CAU-DD × 1	HUB× 2, FCH× 2
Pattern 3	Single	Dual	SR1201 ETIF CAU-D × 2	HUB× 2, FCH× 2
Pattern 4	Dual	Dual	SR1201 ETIF CAU-D × 2 SR1201 ETIF CAU-DD × 2	HUB× 2, FCH× 2

Note 1: *Cables contained in each cable unit are as follows:*
SR1201 ETIF CAU-D: UTP CTG5 ST CA-N, UTP CTG5 ST CA-J
SR1201 ETIF CAU-DD: UTP CTG5 ST CA-L, UTP CTG5 ST CA-J, UTP CTG5 CRS CA-F

Note 2: *The cables cited in Figure 4-16 can be used in the 1-IMG system only.*

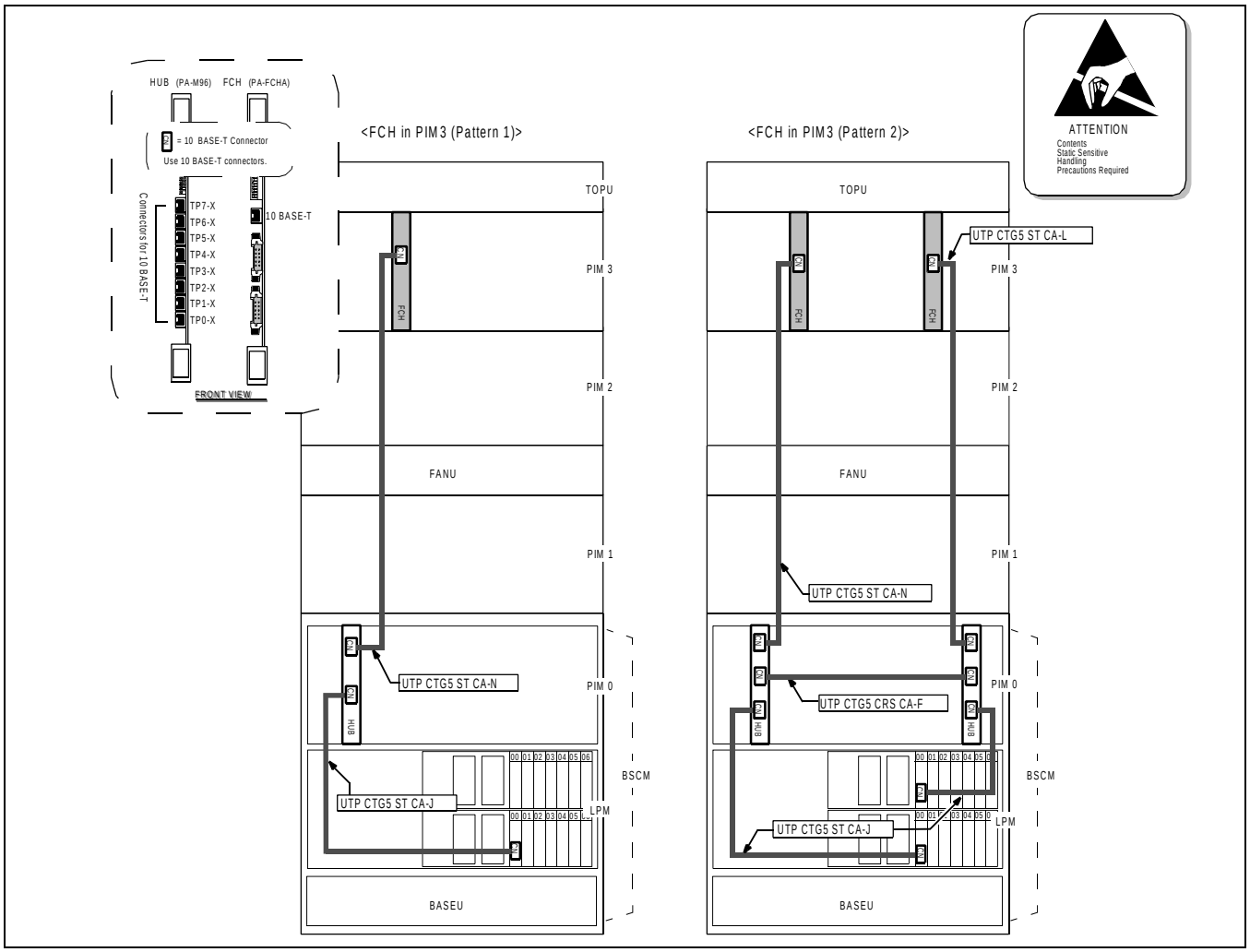
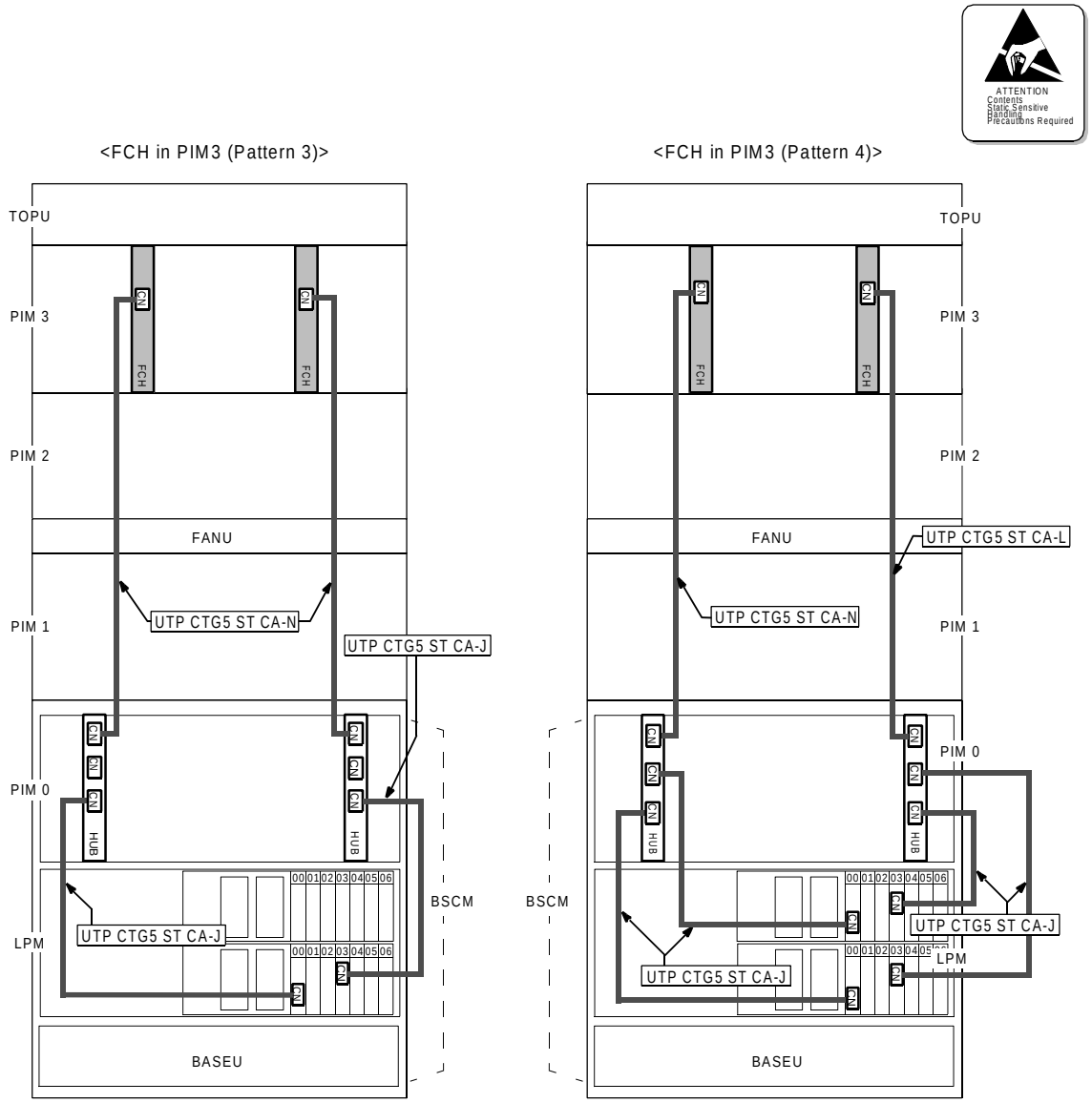


Figure 4-16 Examples of Ethernet Cable Connection-FCH in PIM3 (1-IMG System) (1/2)



Note: *When dual LANIs are used in both Slot 00 and 03 of CPR (Pattern 3 or 4), be sure to use at least two HUB cards: One HUB for internal LANI (in Slot 00) and the other for external LANI (in Slot 03). However, if this is the case, and FCH is also in a dual configuration, the 10 BASE-T "cross" connection between the HUBs is not required.*

Figure 4-16 Examples of Ethernet Cable Connection-FCH in PIM3 (1-IMG System) (2/2)

This page is for your notes.

CHAPTER 5 DATA PROGRAMMING

This chapter explains how to set Fusion network data, using the following data categories:

- System Data
- Numbering Plan Data
- Station Data
- Fusion Link Data

Figure 5-1 shows the overall data programming procedure:

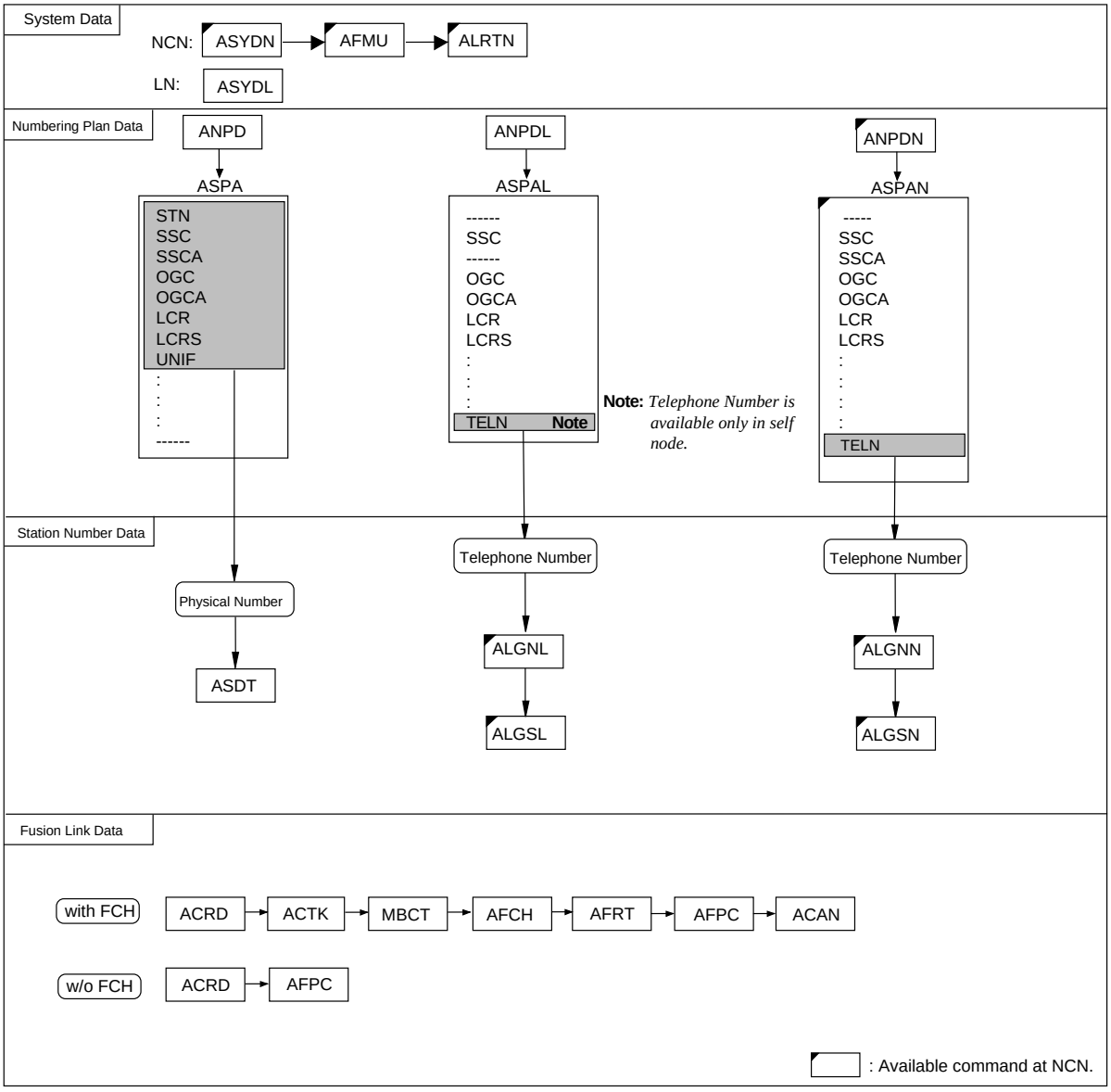


Figure 5-1 Data Programming Flow Chart

1. Network Data Programming Summary

This section provides a summary of the data programming of Fusion systems.

1.1 Brand-new Fusion Network

To install the Fusion network as a brand-new system, follow the overall data programming procedure below.

1.1.1 System Data

- Decide an NCN and LN on the network.
- Assign System Data for each node. Use the ASYDN command for the NCN and the ASYDL command for all nodes. The system data includes the size of LDM, NDM, Fusion Point Code (FPC), etc.

Note: *The data becomes effective by executing "Non-Load Initial" after setting the FPC.*

- Assign unit data using the AFMU command for each node that exists on the network. Note that the AFMU command is available at NCN only.
- Assign Logical Route Numbers for all routes (external trunk) on the network using the ALRTN command. Note that the ALRTN command is available at NCN only.

1.1.2 Numbering Plan Data

- ANPDN → ASPAN (for NCN only): Assign numbering plan data for telephone number.
- ANPDL → ASPAL (for NCN and LN): Assign numbering plan data for Service Codes, Trunk Access Codes, etc., other than STN (physical station) and TELN.
- ANPD → ASPA (for NCN and LN): Assign numbering plan data for Physical Station Number using STN.

Note: *The Numbering Plan data for the LDM and/or NDM cannot use separate Tenant Numbers (TN), so be sure to assign the following data on the ASYDL command.*

- *ASYDL command, SYS1, INDEX 800*
  b1 = 1 (ASPAL command tenant data table development on LDM = Common)
  b2 = 1 (ANPDL command tenant data table development on LDM = Common)

1.1.3 Station Numbering

- Assign Telephone and/or Physical Station Numbers using the following command:
  ALGNN → ALGSN: Assign telephone number on the network. (NCN only)
  ASDT: Assign Physical Number for each node as required. (available for NCN and LN)

1.1.4 Fusion Link Data

- Assign the Fusion link data using the following commands:
  Fusion with FCH:ACRD → ACTK → ACAN → MBCT → AFCH → AFPC → AFRT
  Fusion w/o FCH:ACRD → ACTK → ACAN → MBCT → AFPC

1.2 Upgrading a CCIS Network

To install the Fusion system to an existing CCIS network, follow the overall programming procedure below:

1.2.1 System Data

- Decide an NCN and LN on the network.
- Assign System Data for each node. Use the ASYDN command for NCN and the ASYDL command for LN. The system data includes the size of LDM, NDM, Fusion Point Code (FPC), etc.

Note: *The data becomes effective by executing "Non-Load Initial" after setting the FPC.*

- Assign unit data using the AFMU command for each node that exists on the network. Note the AFMU command is available at NCN only.
- Assign Logical Route Numbers of all routes (external trunk) on the network using the ALRTN command. Note that the ALRTN command is available at NCN only.

1.2.2 Numbering Plan Data

- ANPDN → ASPAN (for NCN only): Assign numbering plan data for telephone number.
- When "Operator Call" or "Priority Call (ATT)" is used on the Fusion network, replace the existing numbering plan data for these features using the ANPDL and ASPAL commands.

Note: *The Numbering Plan data for the LDM and/or NDM cannot use separate Tenant Numbers (TN), so be sure to assign the following data on the ASYDL command.*

- *ASYDL command, SYS1, INDEX 800*
  b1 = 1 (ASPAL command tenant data table development on LDM = Common)
  b2 = 1 (ANPDL command tenant data table development on LDM = Common)

1.2.3 Station Numbering

- Assign telephone numbers using the following commands:
  ALGNN → ALGSN: Assign telephone number at network level. (NCN only)

1.2.4 Fusion Link Data

- Assign the Fusion link data using the following commands:
  Fusion with FCH: ACRD → ACTK → ACAN → MBCT → AFCH → AFPC → AFRT
  Fusion w/o FCH: ACRD → ACTK → ACAN → MBCT → AFPC

Note: *When the Fusion system is incorporated in an existing CCIS network, all nodes must be linked via CCIS on the network.*

If there are any nodes linked via ACIS alone, add the CCIS link before installing the Fusion link. (See Figure 5-2.) Refer to CCIS-related manuals for more detailed information.

1.3 Fusion Link Data

- *Assign the Fusion link data using the following commands:*

  Fusion with FCH: ACRD → ACTK → MBCT → AFCH → AFRT → AFPC → ACAN

  Fusion w/o FCH: ACRD → AFPC

Note: *When the Fusion system is incorporated in an existing CCIS network, all nodes must be linked via CCIS on the network.*

If there are any nodes linked via ACIS alone, add the CCIS link before installating the Fusion link. (See Figure 5-2 below.) Refer to CCIS-related manuals for more detailed information.

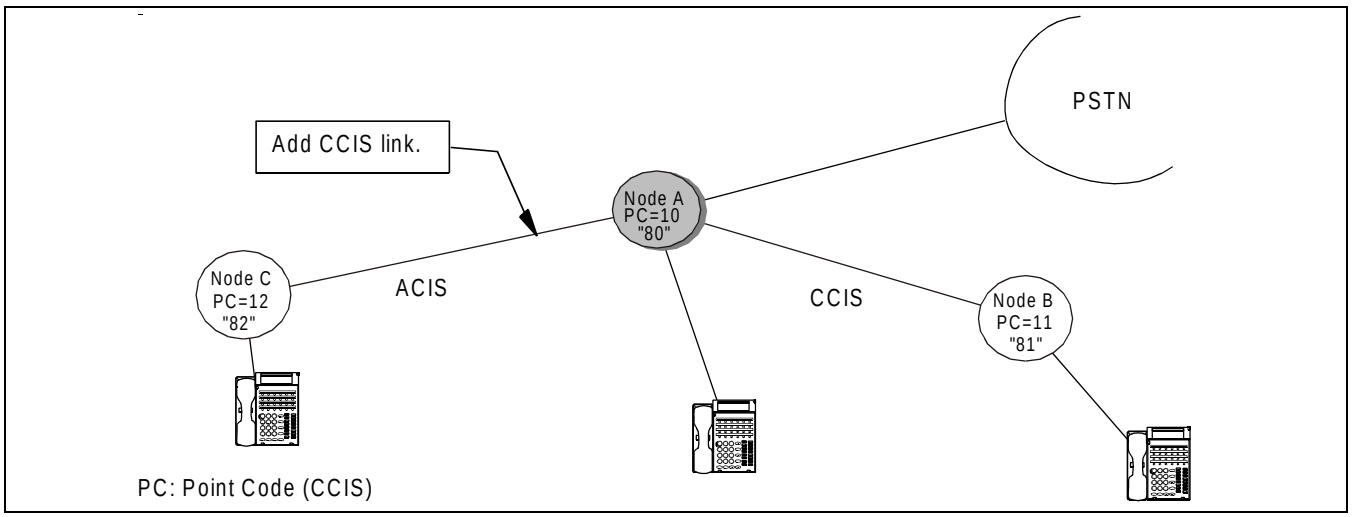


Figure 5-2 Fusion-CCIS Network

Figure 5-3 shows how to upgrade an existing CCIS network, focusing on the Numbering Plan. The example data setting assumes the existing network uses this particular numbering. For more detailed information on how to assign telephone numbers, see Assignment of Telephone Numbers.

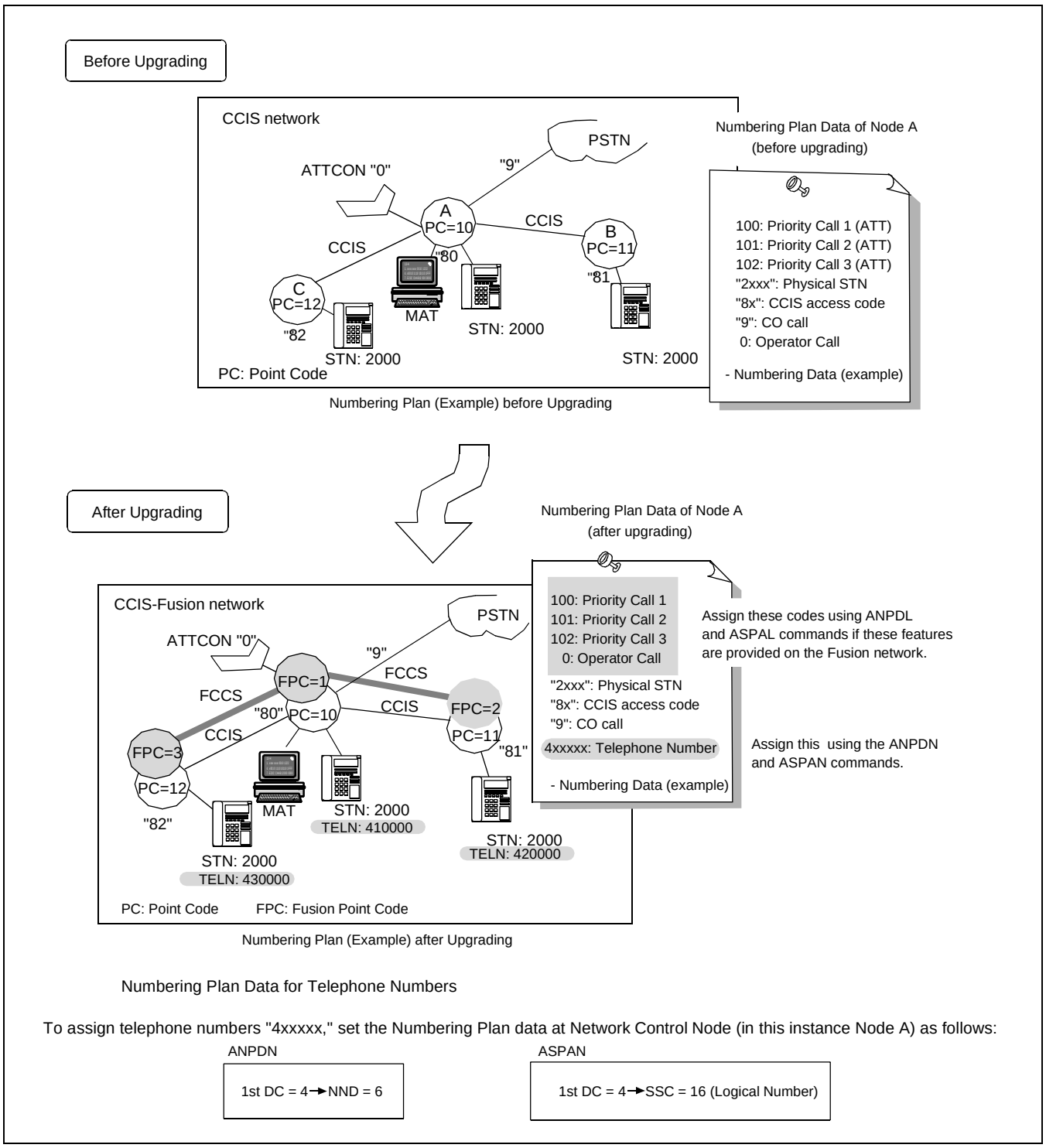
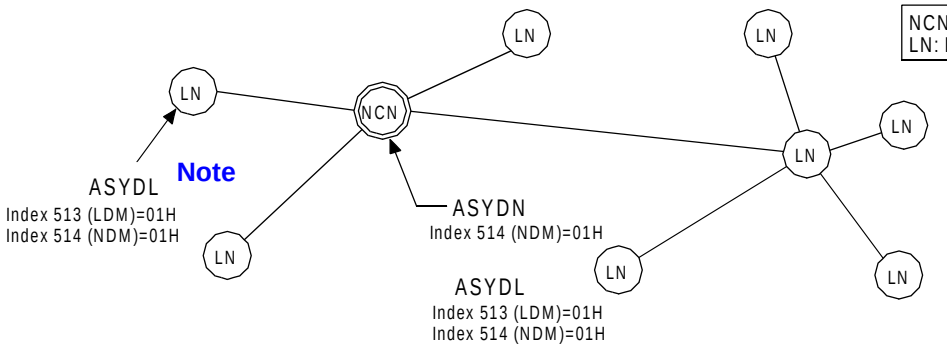


Figure 5-3 How to Upgrade the Numbering Plan Data of an Existing CCIS Network

2. Assignment of System Data

STEP 1: ASYDL and ASYDN

Assign the number of data memory blocks for the Network Data Memory (NDM) and the Local Data Memory (LDM). Use the ASYDN command for the NCN. Use the ASYDL command for all nodes. Figure 5-4 shows ASYDL Indexes 513 and 514 as an example.



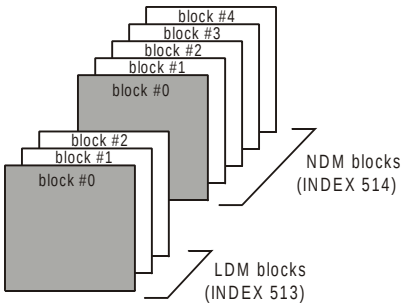
Note: *ASYDL must be assigned at each node on the network.*

Figure 5-4 Assignment of Memory Block

(1) Assign the following data to all nodes.

- ASYDL, Index 513 Local Data Memory (LDM) usage
  Assign 1 for bit(s) corresponding to the data memory block to be used as Local Data Memory (LDM).
  Assign 01H for systems having 2M-LDM.
- ASYDL, Index 514 Network Data Memory (NDM) usage
  Assign 1 for bit(s) corresponding to the data memory block to be used as Network Data Memory (NDM).
  Assign 01H for systems having 2M-NDM.
  Allowable memory block of LDM and NDM assigned by ASYD are shown in Figure 5-5.

Each bit corresponds to one block having 2M Bytes.



Relationship between Bit and Block Number

INDEX	Bit (Setting)	Meaning
513 (LDM)	0 (1)	Memory Block #0
	1 (0) Note	Memory Block #1
	2 (0) Note	Memory Block #2
	3 (0)	Not used
	4 (0)	
	5 (0)	
	6 (0)	
	7 (0)	
514 (NDM)	0 (1)	Memory Block #0
	1 (0) Note	Memory Block #1
	2 (0) Note	Memory Block #2
	3 (0) Note	Memory Block #3
	4 (0) Note	Memory Block #4
	5 (0)	Not used
	6 (0)	
	7 (0)	

Note: These bits are normally assigned as "0" (i.e. "01H" is normally set for both INDEX 513 and 514). The flagging of the bit(s) is possible but only if your system should use the bit-corresponding Memory Block(s) for some reason.

Figure 5-5 LDM and NDM Allocation (ASYDL)

(2) Assign the data to NCN only.

- ASYDN, Index 514 Network Data Memory (NDM) usage
  Assign 1 for bit(s) corresponding to the data memory block to be used as Network Data Memory (NDM).
  Assign 01H for systems having 2M-DM.

STEP 2: ASYDL
Assign the self-Fusion Point Code (self-FPC) at each node. FPC ranges from 1 to 253. Use the ASYDL command. (Index 512 b0-b7)

- Index 512 self-Fusion Point Code
  Assign a unique FPC for each node.

  Figure 5-6 shows an example of FPC assignment.

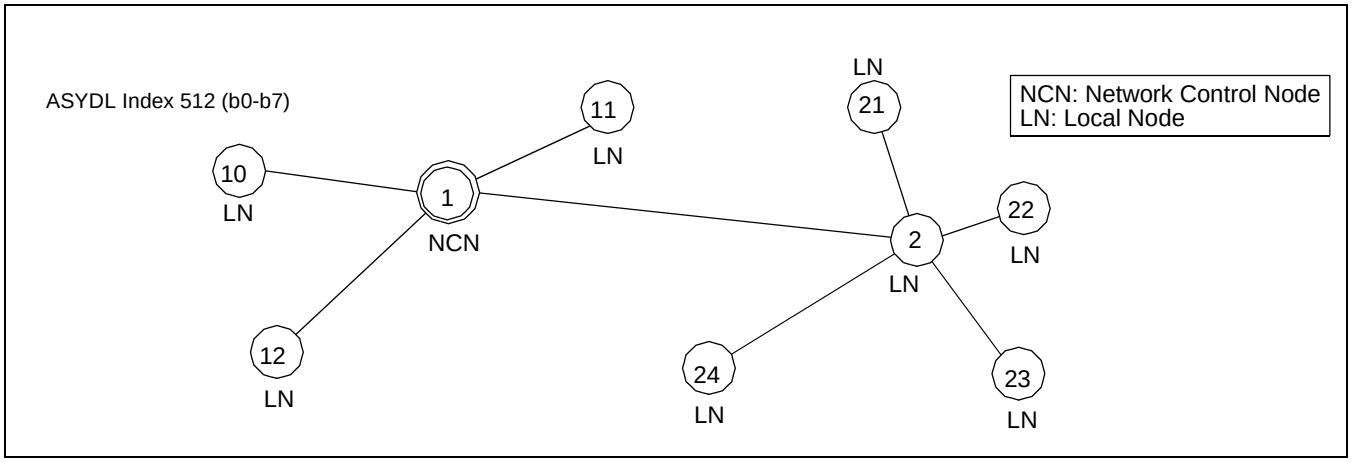


Figure 5-6 Self-FPC Assignment

STEP 3: ASYDL
Assign the data of DP (Dial Pulse) relay broadcasting to Fusion Link using the ASYDL command (Index 527, b4): 0/1=DP relay broadcasting is invalid/valid.**Note**

Note: *Provided that the DP (10 or 20 pps) is set in the Signal Selecting for Outgoing C.O./Tie Line calls, assign this data to bit4=1 (DP relay broadcasting is valid) when a call is originated at the node which doesn't accommodate C.O./Tie Line Trunk. The listed conditions for DTI circuit card have to be followed:*

- *Firmware*
  PA-24DTR SP3010: Issue 11 or later
- *When PA-24DTR circuit card is used, turn the SW13/6C No.8 switch to OFF.*

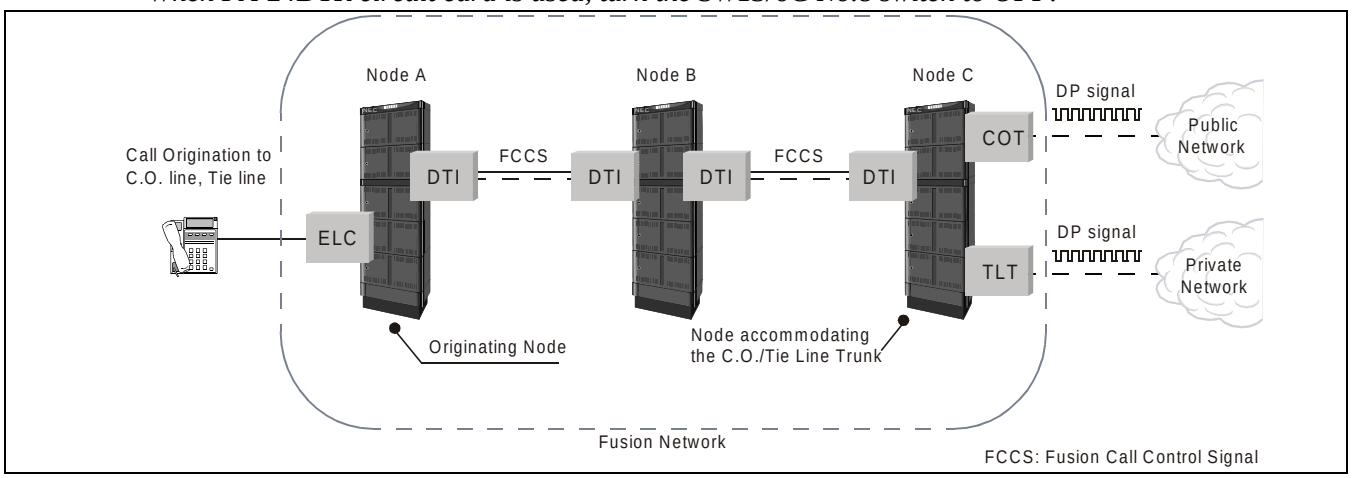


Figure 5-7 DP Signal Relay Broadcasting over Fusion Link (example)

STEP 4: ASYDL and ASYDN

Assign other system data using the ASYDL/ASYDN command.

When Timing Start is used, assign the following data.

Index 161 b6 : 0/1=-/Timing Start using "#" code

b7 : 0/1=-/Timing Start using "*" code

Index 170 b4 : 0/1=Timing Start out of Service/Timing Start in Service **Note 1**

Index 640 Fusion Point Code (FPC) of node providing ATTCON **Note 2**

Index 704~735 (ASYDL)
FPC of the node to which ATTCON transfers the Day/Night changeover information. **Note 3**

Assign FPC of a terminating node for House Phone, Off-Hook Alarm and Ring Down (IC) calls from PSTN. Day/Night information is transferred from the terminating node.

Note 1: *When Timing Start is in service, Called Sub Address for ISDN Network cannot be dialed.*

Note 2: *This data is necessary at each node. Assign the self-FPC at the terminating node.*

Note 3: *This data is necessary at the node providing ATTCON.*

Index 800

For ASYDL
b0 : 0/1 = ALGNL, ALGSL on a UGN (TN) basis/-
b1 : 0/1 = ASPAL on a TN basis/-
b2 : 0/1 = ANPDL on a TN basis/-
b4 : 0/1 = AFRSL, ASTPL, AUNEL on a TN basis/-
b5 : 0/1 = ASTPL on a TN basis/-
b7 : 0/1 = AAEDL on a TN basis/-

For ASYDN
b0 : 0/1 = ALGNN, ALGSN on a UGN (TN) basis/-
b1 : 0/1 = ASPAN on a TN basis/-
b2 : 0/1 = ANPDN on a TN basis/-
b4 : 0/1 = AFRSN, ASTPN on a TN basis/-
b5 : 0/1 = ASTPN on a TN basis/-
b6 : 0/1 = ARSCN on a TN basis/-
b7 : 0/1 = AAEDN on a TN basis/-

When “different numbering development on a TN basis” is not required, set the above bits. Figure 5-8 shows the display of the ASYDN command Index 514 as an example.

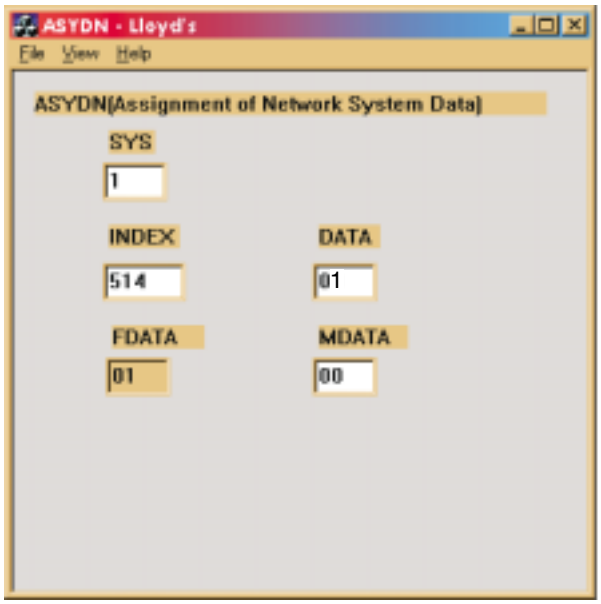


Figure 5-8 ASYDN Command Display (Example)

Note 4: *Be sure to execute “Non-Load Initial” after setting the FPC data. The assigned FPC becomes effective by this operation.*

3. Assignment of FPC and MG and UNIT into Network

3.1 AFMU

Assign the module accommodation data by giving Module Group Number and Unit Number on an FPC basis. This data is necessary to allocate unique Network ID (NID) to each MG/UNIT of the whole Fusion network nodes.

Note: *This data can be set at the NCN only. A unique NID is assigned to each MG/UNIT automatically by entering the AFMU data.*

- *When the Fusion network is configured for the first time:*
  Enter the AFMU command data for all the Fusion network nodes (FPCs). Then, a unique NID is assigned automatically to each MG/UNIT in the assigned order.
- *When the Fusion network is already configured and a module/unit is to be expanded:*
  Enter the AFMU command data related to the expanded module/unit. Then, a unique NID number, next to the last existing NID number, is automatically assigned to the expanded module/unit.

Figure 5-9 shows an example data assignment for this particular network.

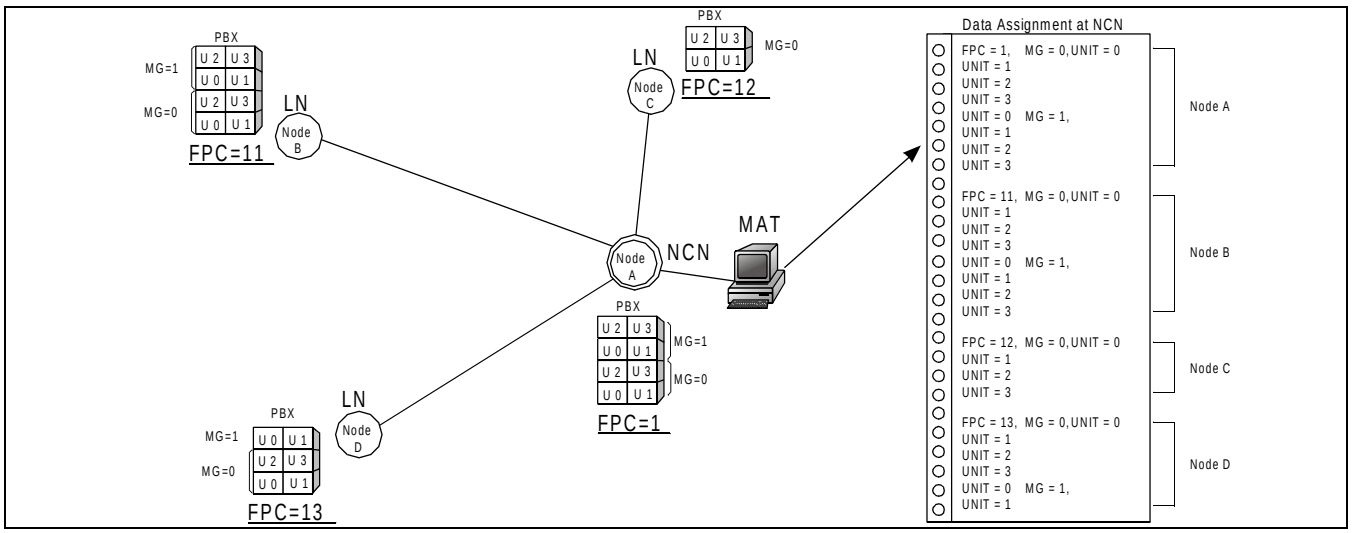
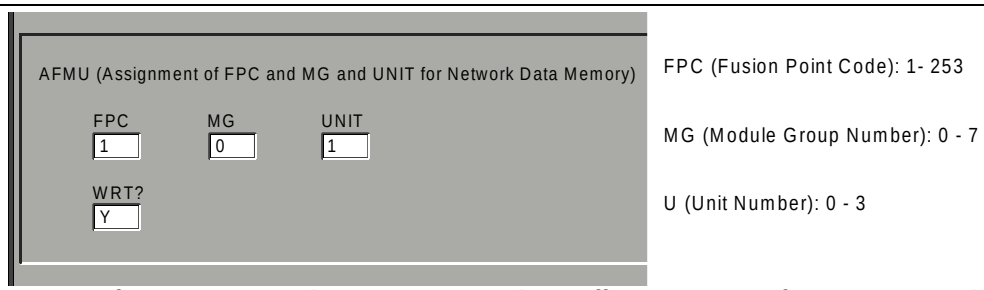


Figure 5-9 Assignment of Module Accommodation Data

The AFMU command display should look similar to Figure 5-10.



Note: *For more information on each parameter, see the "Office Data Specification" manual.*

Figure 5-10 AFMU Command Display

4. Assignment of Logical RT in Network DM (NDM)

4.1 ALRTN/ARTKN

Use this command to assign Logical Route Numbers to all external trunks used on a Fusion network. Assign unique telephone numbers to the whole route for external trunks on the network (including COT, DAT, Dummy Route, etc.) using this command. The data can be set at the NCN only and should be set for every external route in every node. Refer to Figure 5-11.

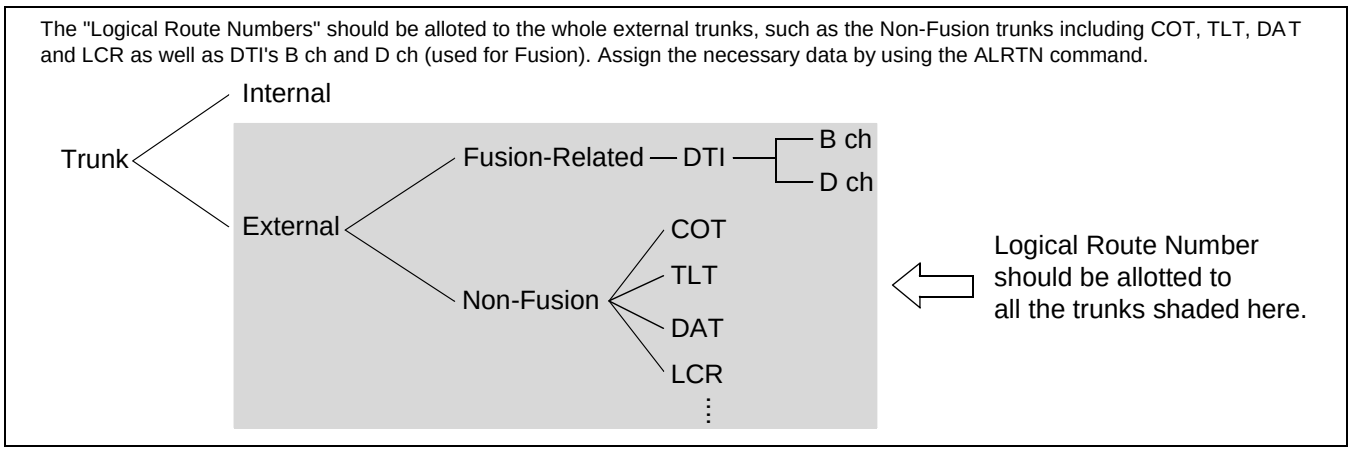


Figure 5-11 Telephone Number Required

Figure 5-12 shows an example data assignment of this “Logical Route” data.

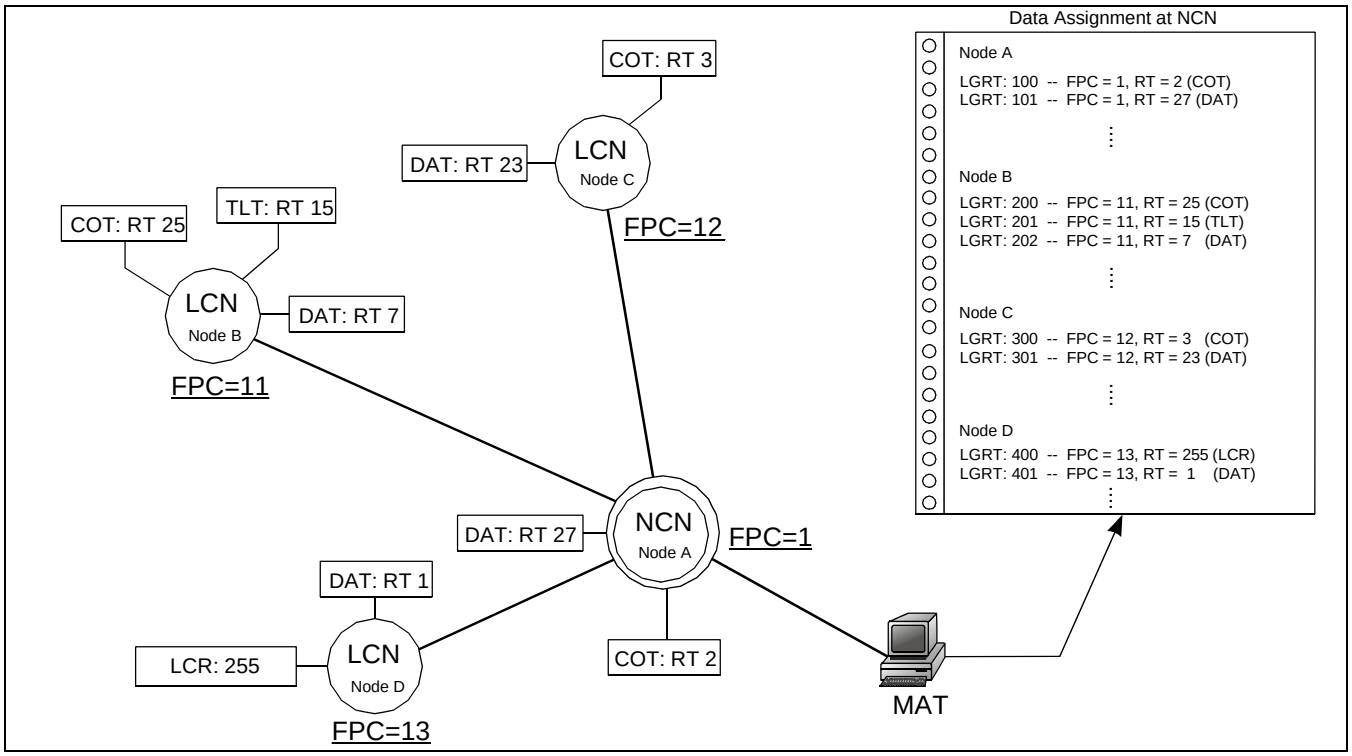


Figure 5-12 Assignment of Logical Route Number

The ALRTN command display should look similar to Figure 5-13:

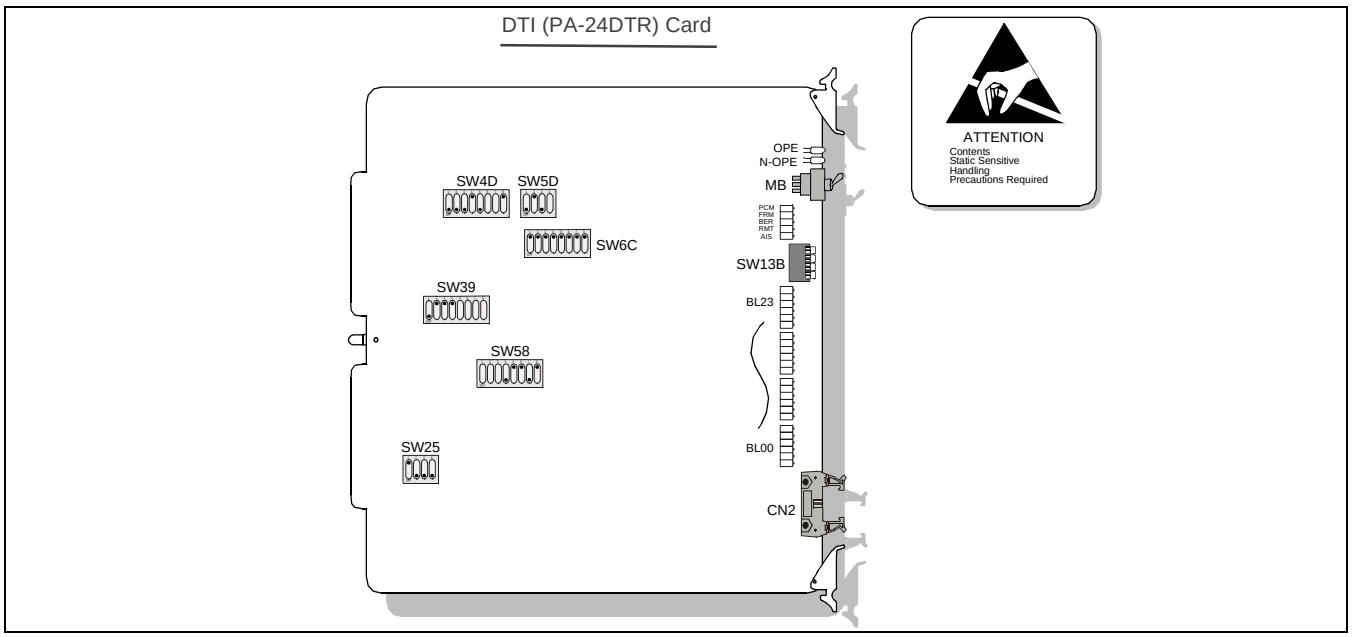


Figure 5-13 ALRTN Command Display

5. Assignment of Numbering Data for Telephone Numbers

STEP 1: ANPDN

Make a telephone numbering plan on the network. The explanation is given here on the assumption that the network adopts the numbering plan shown in Figure 5-14. Therefore, modify the data assignment explained here when you assign the data on your network.

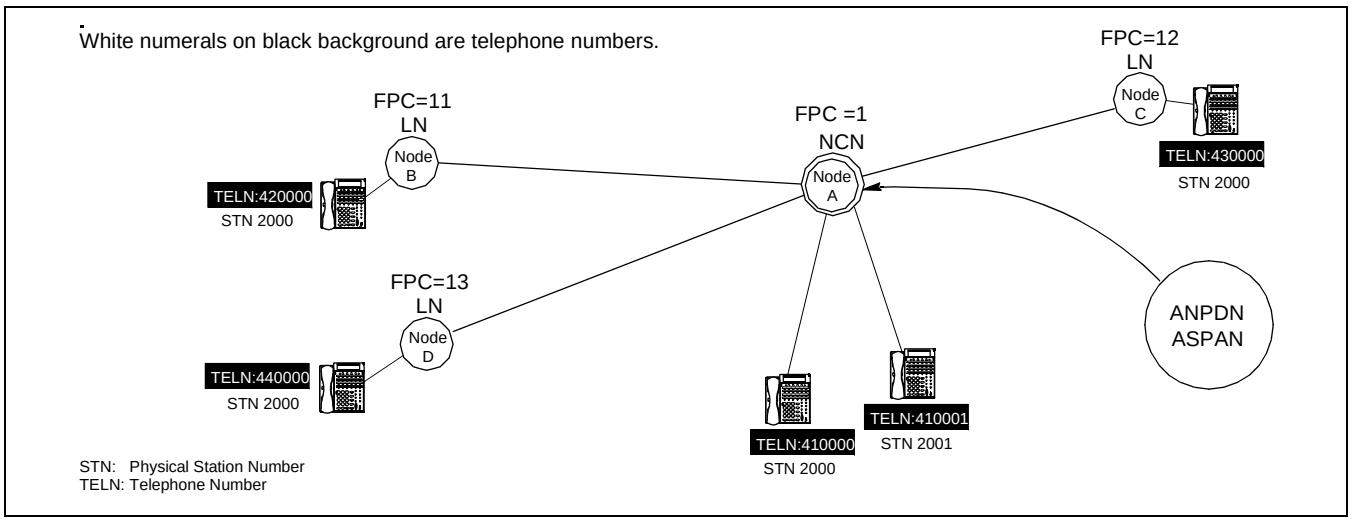


Figure 5-14 Telephone Number Allocation

STEP 2: ANPDN

Assign Pre-translation Data for the telephone numbers planned in Step 1 using the ANPDN command at NCN. Figure 5-15 shows the data setting for ANPDN.

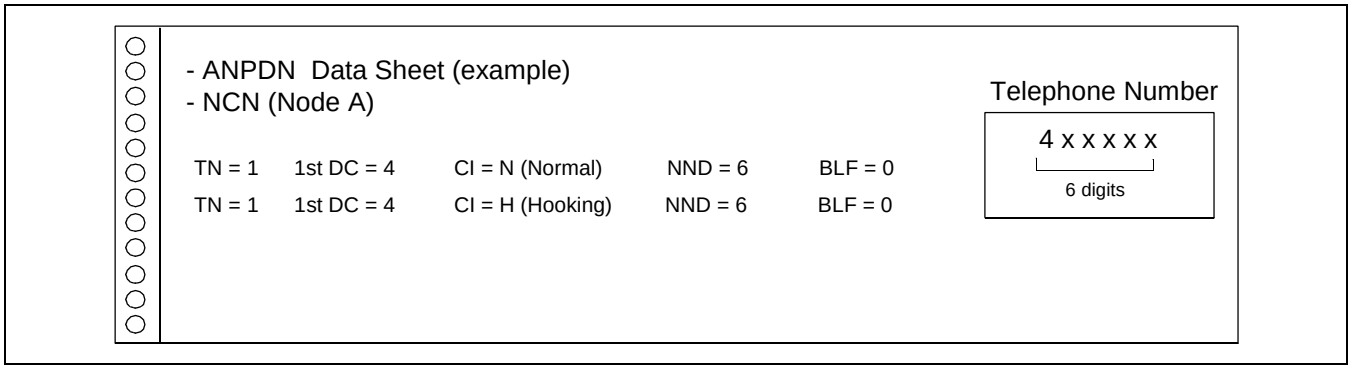


Figure 5-15 ANPDN Sample Data Sheet

The ANPDN command display should look similar to Figure 5-16:

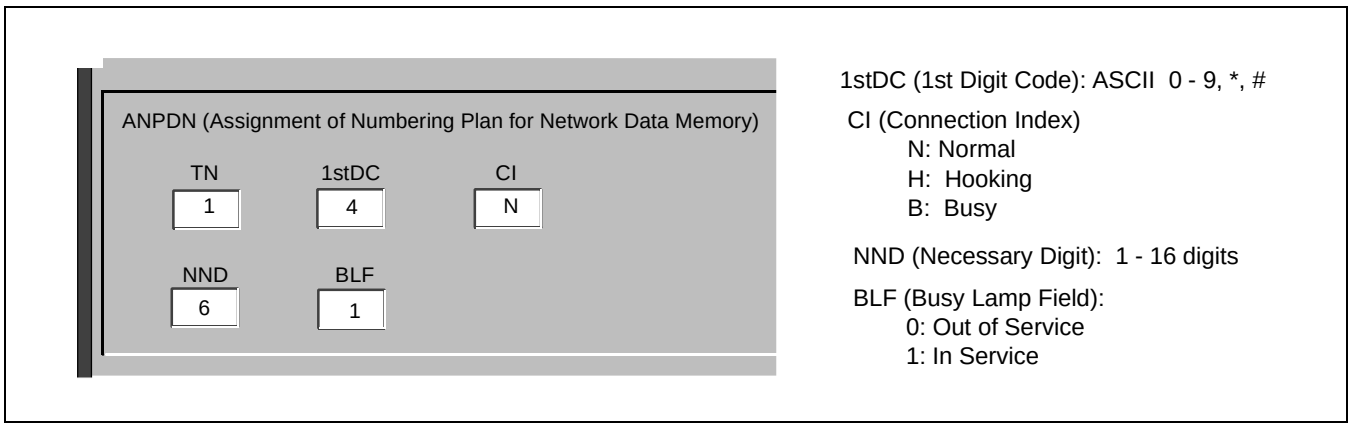


Figure 5-16 ANPDN Command Display

Note: *Perform the Numbering Plan data setting by using ANPD command as assigned by ANPDN command.*

STEP 3: ASPAN

Assign special access code data for the telephone numbers using the ASPAN command. SRV=TELN is the data for telephone numbers. Figure 5-17 and Figure 5-18 show a sample data sheet and command display for ASPAN.

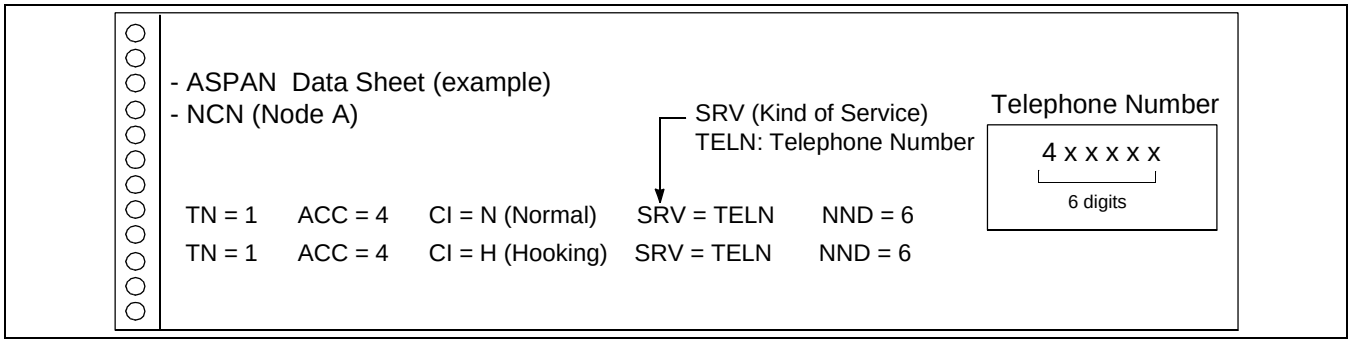
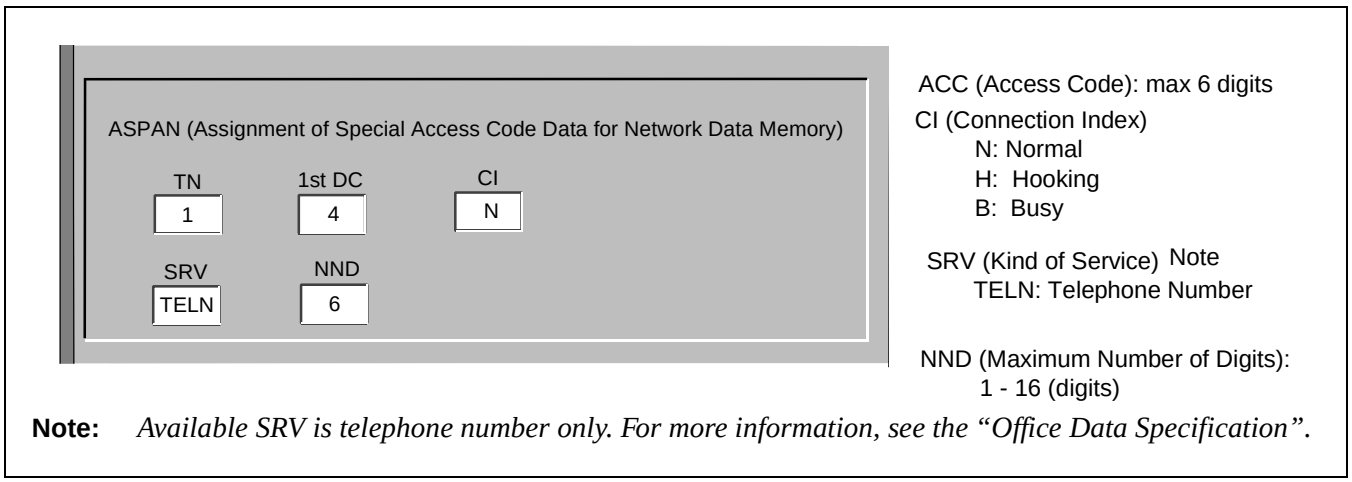


Figure 5-17 ASPAN Sample Data Sheet



Note: *Available SRV is telephone number only. For more information, see the "Office Data Specification".*

Figure 5-18 ASPAN Command Display

Note: *The Numbering Plan data for the LDM and/or NDM cannot use separate Tenant Numbers (TN), so be sure to assign the following data on the ASYDL command.*

- *ASYDL command, SYS1, INDEX 800*
  b1 = 1 (ASPAL command tenant data table development on LDM = Common)
  b2 = 1 (ANPDL command tenant data table development on LDM = Common)

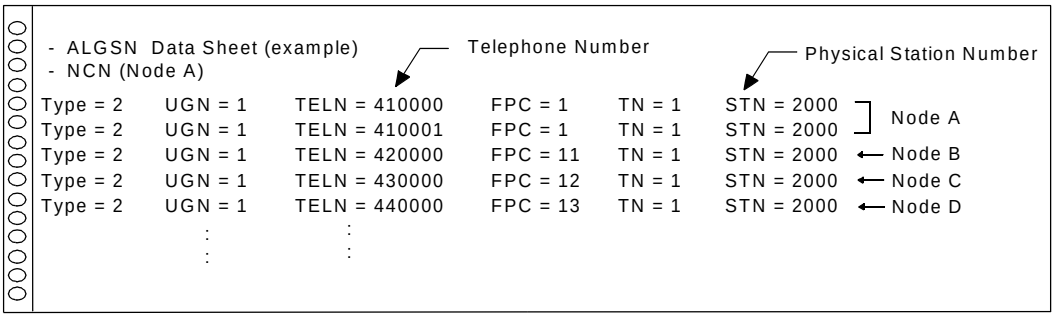
6. Assignment of Telephone Numbers

This section explains how to program telephone numbers. To program telephone numbers, use ALGSN command. A telephone number can be assigned to a station with the use of the LENs or the Physical Station Number depending on programming.

Note: *The Fusion link must be operational before telephone numbers can be programmed in the Fusion network.*

COMMAND: ALGSN/ATSTN

Assign telephone numbers to Physical Station Number (Type 2) or to physical LENS (Type 1) using the ALGSN/ATSTN command. Figure 5-19 and Figure 5-20 show an example data sheet-Type 2 and the command display for ALGSN.



Note: *This data is an example of telephone numbers assigned by the ALGSN command.*

Figure 5-19 ALGSN Data Sheet (Example)

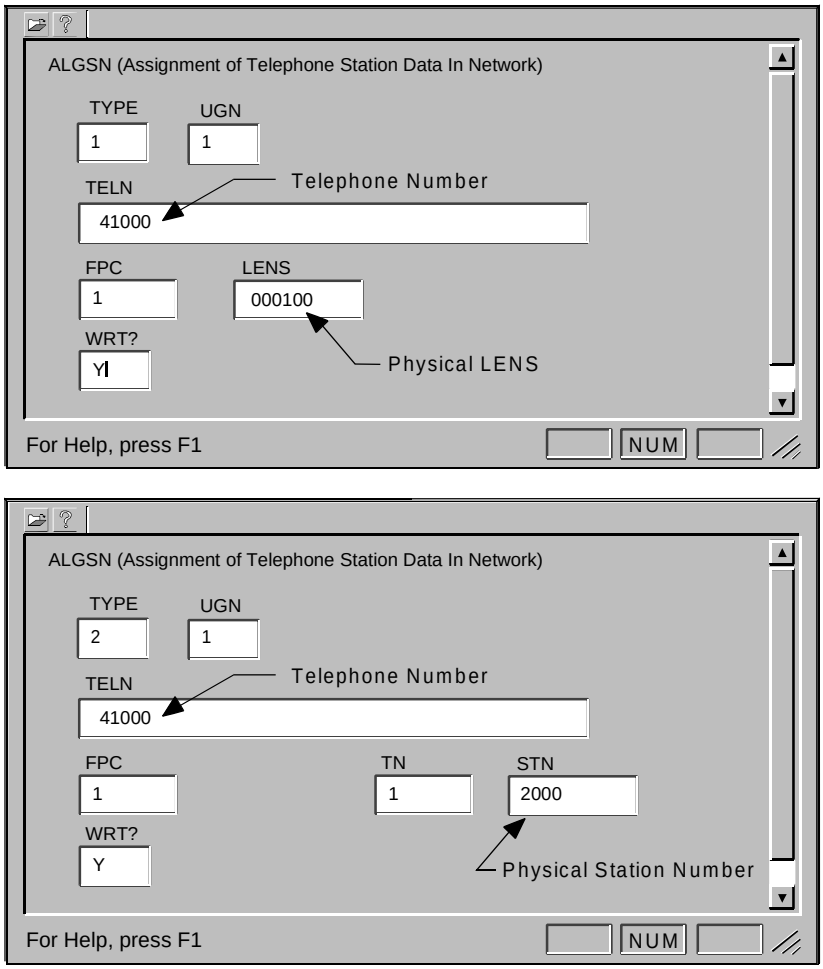


Figure 5-20 ALGSN Command Display (Example)

6.1 Assignment of Connection Route/Trunk Data

STEP 1: ACRD

Using the ACRD command, assign the connection route data of Fusion link. The data must be assigned for both B-channel and D-channel. Assign appropriate data referring to Table 5-1.
Figure 5-21 shows an example of route numbers for B-ch and D-ch.

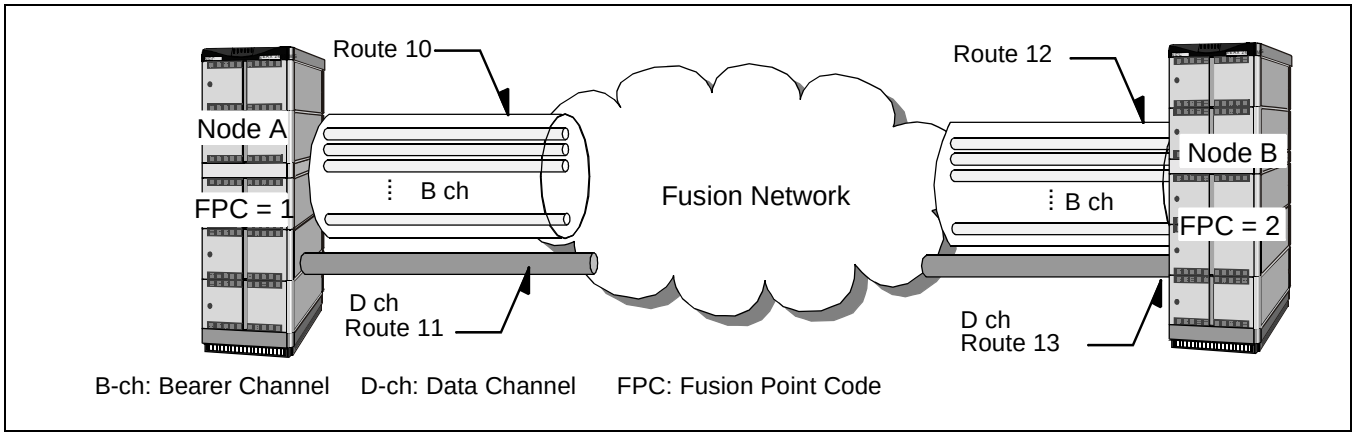


Figure 5-21 B-ch and D-ch (Example)

The ACRD command display should look similar to Figure 5-22.

This figure shows an example of data setting for a B-ch route.

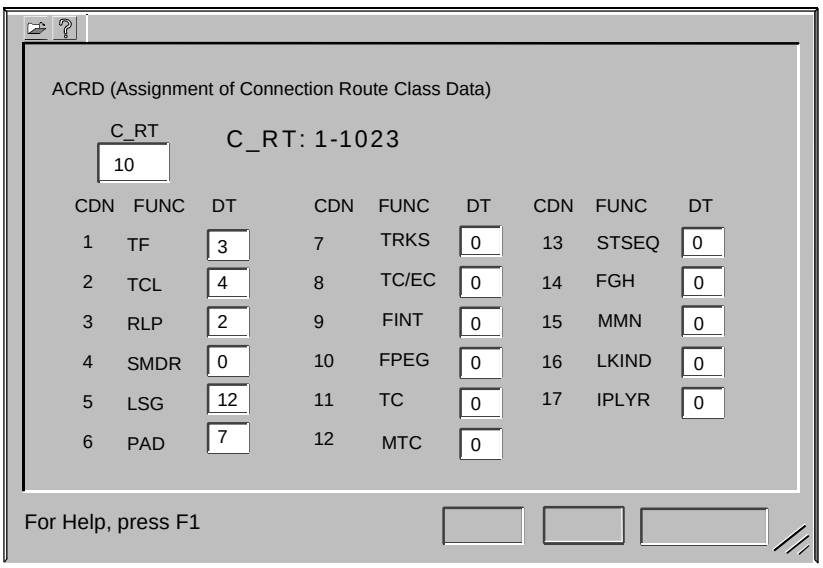


Figure 5-22 ACRD Command Display (Example)

Table 5-1 Route Class Data Assignment

CDN		Node A		Node B		Description
type		B-channel	D-channel	B-channel	D-channel	
RT		C_RT: 10	C_RT: 11	C_RT: 12	C_RT: 13	
1	TF	3	3	3	3	Trunk Kind 3: Bothway (fixed)
2	TCL	4	4	4	4	Trunk Class: 4 (fixed)
3	RLP	2	2	2	2	Release Method: Assign 2-First Party Release.
4	SMDR	0	0	0	0	Assign 0.
5	LSG	12	13	12	13	B-ch: 12, D-ch: 13
6	PAD					
7	TRKS	0 (1)	0	0 (1)	0	0: FIFO (1: LIFO)
8	TC/EC					
9	FINT	0	0	0	0	Fusion Interface Kind: Assign 0.
10	FPEG	0	0	0	0	Fusion Trunk Peg Count: Assign 0.
11	TC	0	0	0	0	Timer Class
12	MTC	0	0	0	0	Timer Counter: Status Enquiry: 0 0/1=-/cancel
13	STSEQ	0	0	0	0	
14	FGH	0	0	0	0	Assign 0.
15	MMN					

CDN 1: Trunk Kind
0-2: -
3: Bothway Trunk

CDN 2: TCL (Trunk Class)
0-3: -
4: Fusion Trunk
5-31: -

CDN 3: RLP (Release Pattern)
0: Calling Party Release
1: -
2: First Party Release
3: -

CDN 4: SMDR (SMDR for station-to-station call)
Assign 0.

CDN 5: LSG (Line Signal)
12: B channel for No.7 CCIS/ISDN
13: D channel for No.7 CCIS/ISDN

CDN 6: PAD **Note**
0: Depending Key Setting of Circuit Card
1: Send 8 dB, Receive 0 dB
2: Send 4 dB, Receive 4 dB
3: Send 8 dB, Receive 12 dB
4: Send 8 dB, Receive 8 dB
5-6: -
7: 0 dB

Note: *When PAD data is assigned by AFPD command, AFPD data takes precedence over this data. For more information on AFPD command, see the "Office Data Specification."*

CDN 7: TRKS (Trunk Select)
0: FIFO
1: LIFO

CDN 8: TC/EC
0: No MPC/EC
1: EC
2: MPC
3: -

CDN 9: FINT (Fusion Interface Kind)
0: Fusion
1-15: Not used

CDN 10: FPEG (Fusion Trunk Peg Count)
Assign 0.

CDN 11: TC (Timer Class)
0: -
1: 1 sec.
2: 2 sec.
3: 8 sec.
4: 20 sec.
5-7: -

CDN 12: MTC (Miscellaneous Timer Counter)

CDN 13: STSEQ (Status Enquiry)
0: -
1: cancel

CDN 14: FGH (Fusion Gateway Handler)
Assign 0.

CDN 15: MMN (Kind of Multiple Equipment)
0: TDM
1: MM-Node
2-3: -

CDN 16: Fusion Link
0: via DTI
1: via ISW
2: Fusion over IP (Router)
3-15: Not used

CDN 17: IPLYR (Voice over IP)
0: DTI interface 1.5 Mbps
1: DTI interface 2.0 Mbps

STEP 2: ACTK

Assign the connection trunk data of both B-channel and D-channel using the ACTK command. Assign the Connection Equipment Number (C_LENS) referring to Figure 5-23 through Figure 5-26. The ACTK command display should look similar to Figure 5-23.

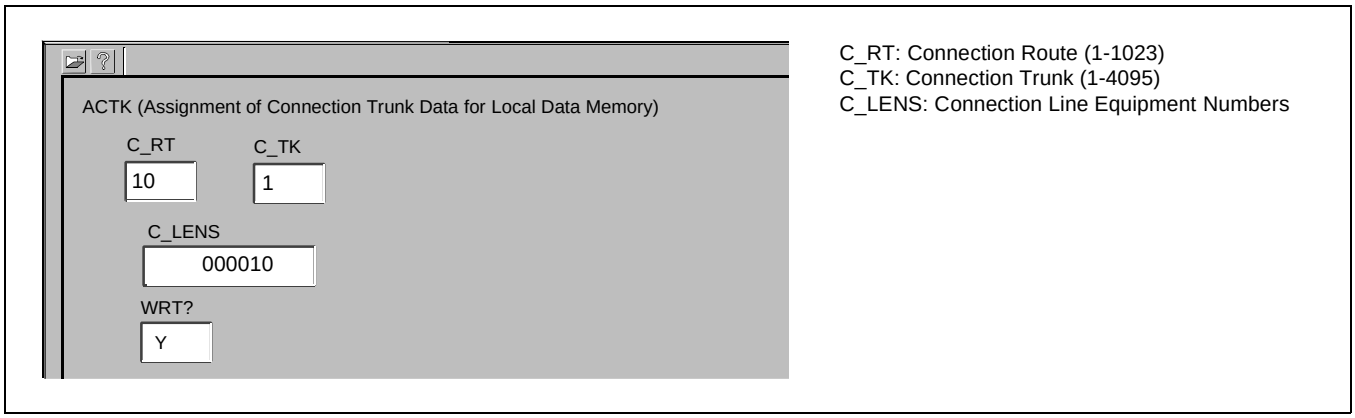


Figure 5-23 ACTK Command Display (example)

The mounting location of the FCH, DTI cards can be classified into the following two types:
Regular Density Slot (16-port slot) -See Figure 5-24.
High Density Slot (32-port slot) -See Figure 5-25 and Figure 5-26.

6.1.1 When FCH is mounted in a Extended Density Slot

If the FCH is to be mounted in the Extended Density Slot, the connection trunk should be assigned as shown in the figures below. If the card's mounting location is in any of the Slot Nos. 04, 06, 08, or 15, 17, 19, the following extended Group should be used for the Dch trunk: G27, 29, or 31. Figure 5-24 shows an example where the cards are mounted in density Slots 04 or 05.

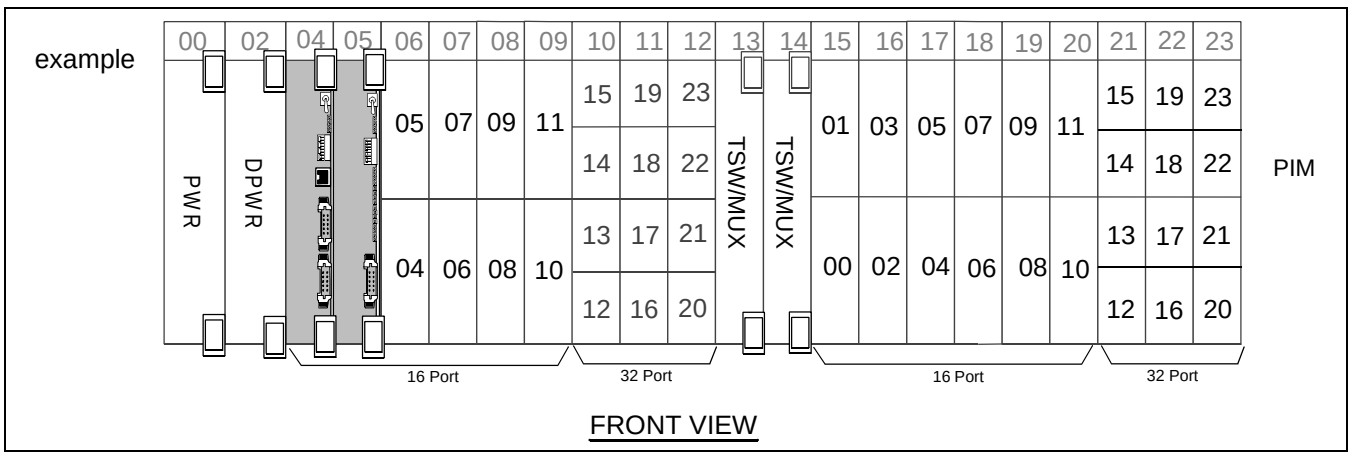
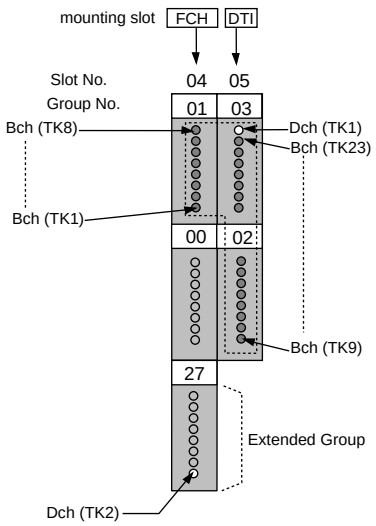


Figure 5-24 Mounting FCH and DTI Cards in Regular Density Slots

Table 5-2 Data Programming Sheet for Regular Density Slot

C_RT (1-1023)	C_TK(1-4095)	C_LENS						Time Slot Allocation
		MG		U	G		LV	
10 (B-ch)	1	0	0	0	0	1	0	Example  Specify Dch -TS by setting switch on FCH.
	2	0	0	0	0	1	1	
	3	0	0	0	0	1	2	
	4	0	0	0	0	1	3	
	5	0	0	0	0	1	4	
	6	0	0	0	0	1	5	
	7	0	0	0	0	1	6	
	8	0	0	0	0	1	7	
	9	0	0	0	0	2	0	
	10	0	0	0	0	2	1	
	11	0	0	0	0	2	2	
	12	0	0	0	0	2	3	
	13	0	0	0	0	2	4	
	14	0	0	0	0	2	5	
	15	0	0	0	0	2	6	
	16	0	0	0	0	2	7	
	17	0	0	0	0	3	0	
	18	0	0	0	0	3	1	
	19	0	0	0	0	3	2	
	20	0	0	0	0	3	3	
	21	0	0	0	0	3	4	
	22	0	0	0	0	3	5	
	23	0	0	0	0	3	6	
11 (D-ch)	1	0	0	0	0	3	7	
	2	0	0	0	2	7	0	

6.1.2 When FCH is Mounted in a High Density Slot

If the FCH is to be mounted in the High Density Slot, the connection trunk data should be assigned as shown in Figure 5-25. Figure 5-25 shows when these cards are mounted in Slots 11 and 12.

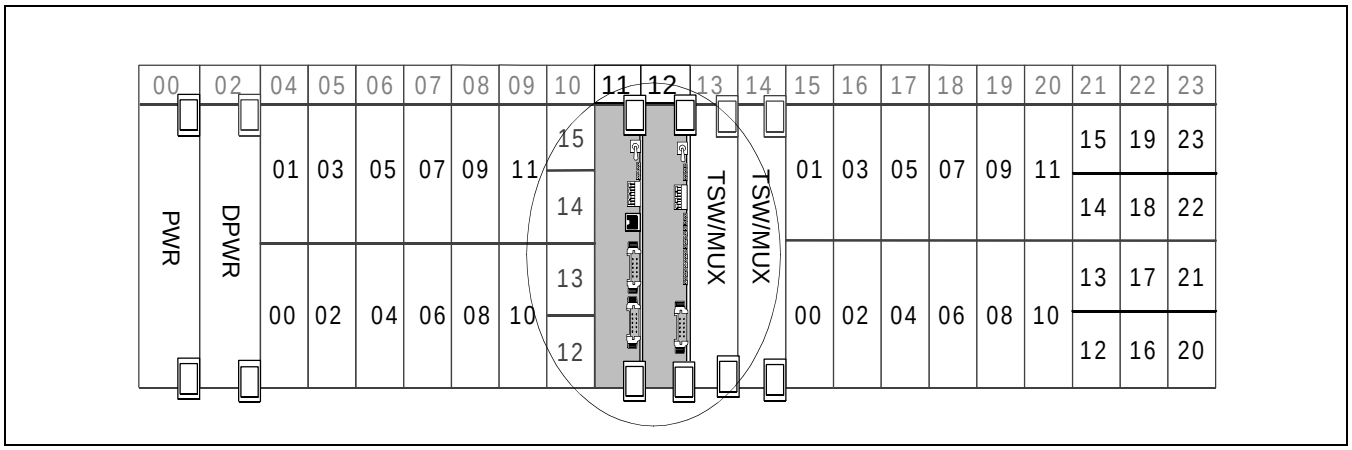


Figure 5-25 Mounting FCH and DTI Cards in High-Density Slots

When the DTI cards are mounted in a double density slot, the C_LEN data for the FCH and DTI cards are assigned as follows in Figure 5-26.

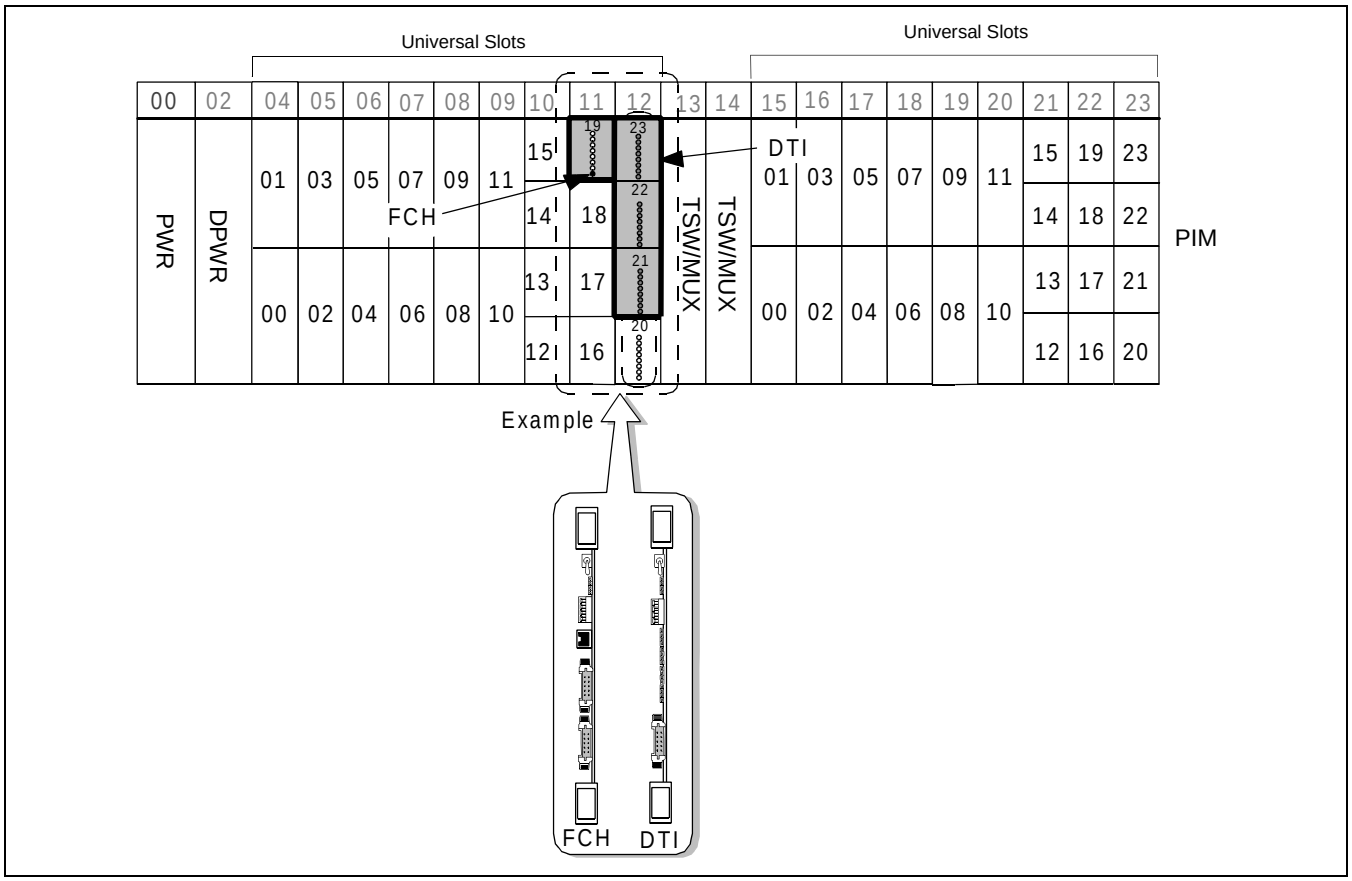
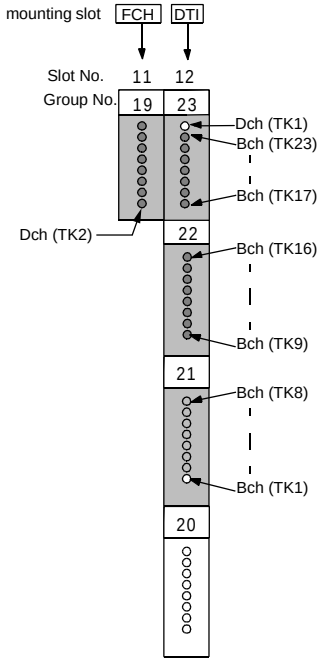


Figure 5-26 How to Assign C_LEN Data (Type 2)

Table 5-3 Data Programming Sheet for High Density Slot

C_RT (1-1023)	C_TK (1-4095)	C_LENS						Time Slot Allocation
		MG		U	G		LV	
10 (B-ch)	1	0	0	0	2	1	0	
	2	0	0	0	2	1	1	
	3	0	0	0	2	1	2	
	4	0	0	0	2	1	3	
	5	0	0	0	2	1	4	
	6	0	0	0	2	1	5	
	7	0	0	0	2	1	6	
	8	0	0	0	2	1	7	
	9	0	0	0	2	2	0	
	10	0	0	0	2	2	1	
	11	0	0	0	2	2	2	
	12	0	0	0	2	2	3	
	13	0	0	0	2	2	4	
	14	0	0	0	2	2	5	
	15	0	0	0	2	2	6	
	16	0	0	0	2	2	7	
	17	0	0	0	2	3	0	
	18	0	0	0	2	3	1	
	19	0	0	0	2	3	2	
	20	0	0	0	2	3	3	
	21	0	0	0	2	3	4	
	22	0	0	0	2	3	5	
	23	0	0	0	2	3	6	
11 (D-ch)	1	0	0	0	2	3	7	
	2	0	0	0	1	9	0	

STEP 3: MBCT

Unbusy the connection trunk data assigned in the previous step using MBCT (Make Busy of Connection Trunk) command. This step is required for both B-channel and D-channel trunk. The MBCT command should look similar to Figure 5-27.

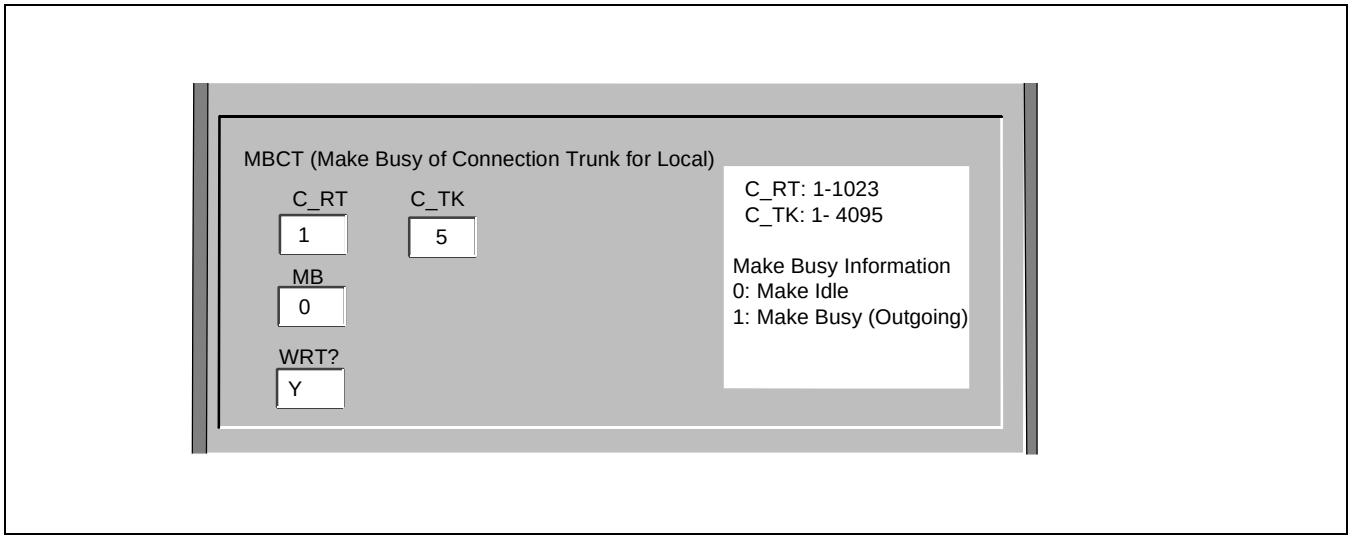


Figure 5-27 MBCT Command Display

7. Assignment of FCH Related Data

STEP 1: For Fusion with FCH only:

- Assign FCH Number on an FCH (PA-FCHA) circuit card basis.
- The FCH Number must conform to the following conditions:
  - *FCH Number range must be between 1 and 255.*
  - *At the network level, the same FCH Numbers can be assigned. However, they must be unique at the node level.*

Figure 5-28 shows a sample data assignment when FCH cards are located in the PIM 0 slot 4 and PIM 2 slot 11.

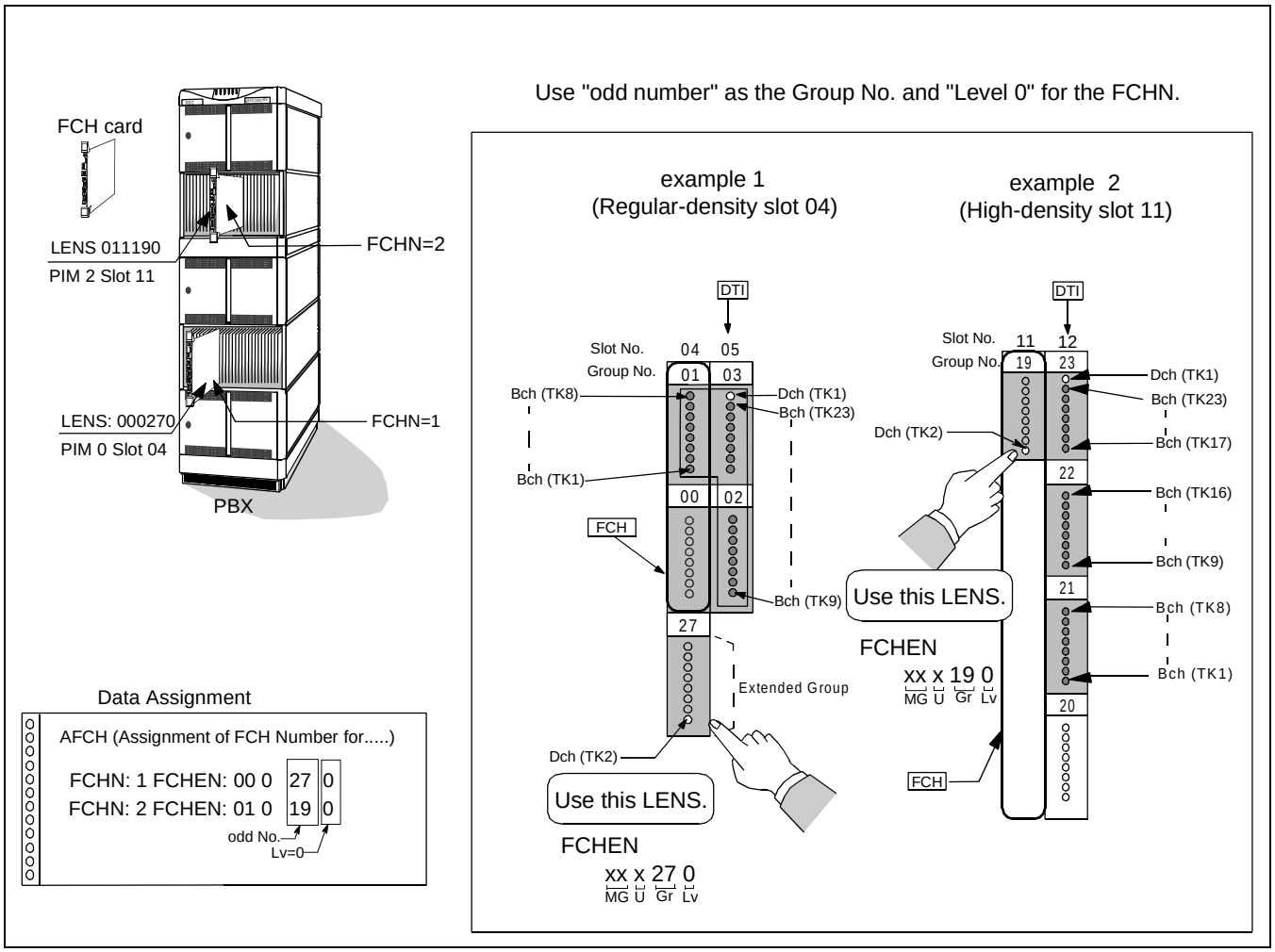
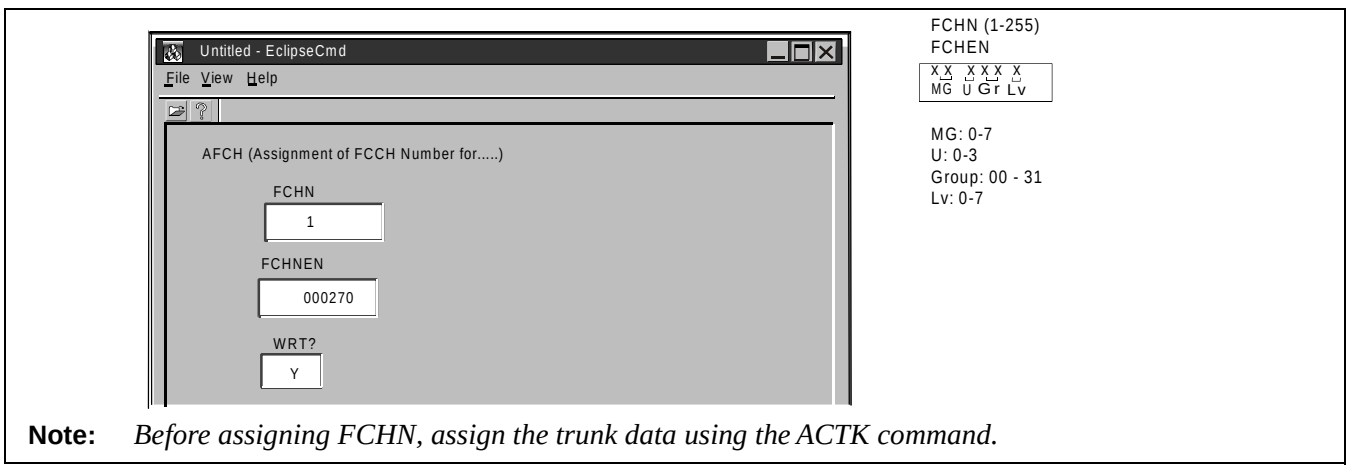


Figure 5-28 Assignment of FCH Number

The AFCH command display should look similar to Figure 5-29.



Note: *Before assigning FCHN, assign the trunk data using the ACTK command.*

Figure 5-29 AFCH Command Display (example)

STEP 2: AFRT (FUSION with FCH only)
Assign connection route numbers as shown below by using the AFRT command.

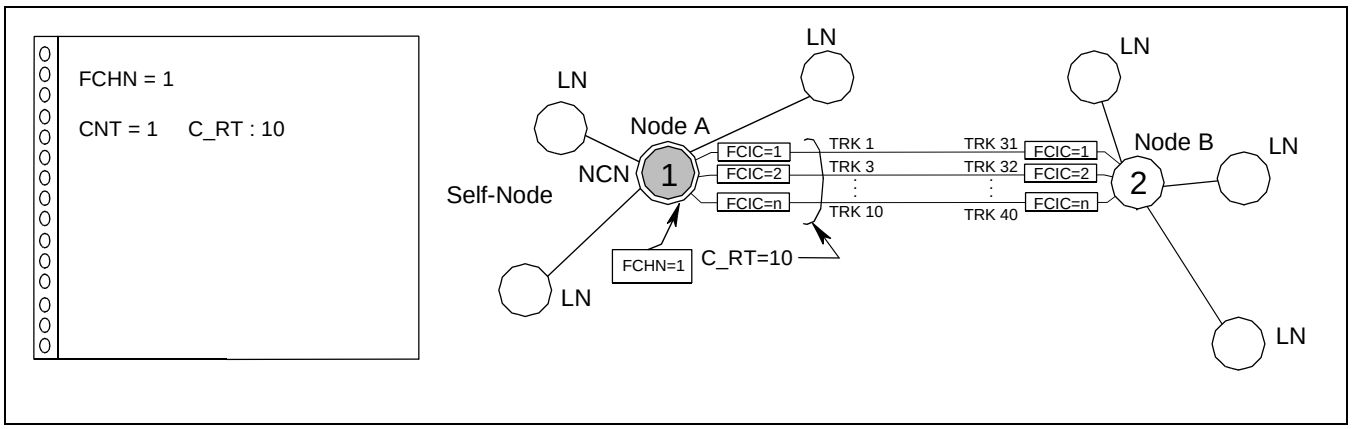


Figure 5-30 AFRT Sample Data Sheet

The AFRT command display should look similar to Figure 5-31.

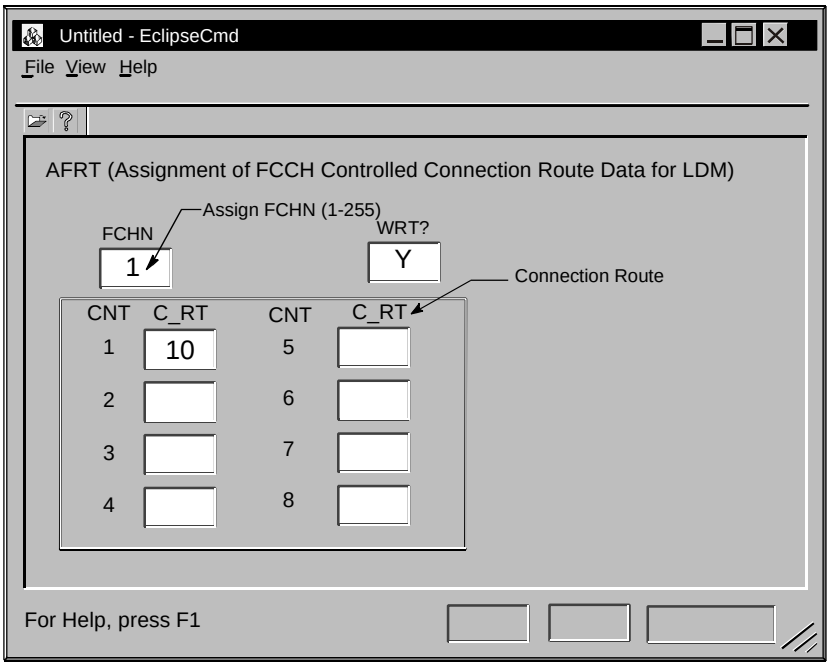
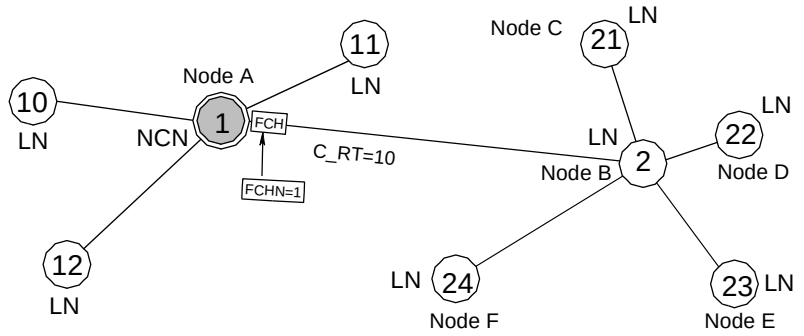


Figure 5-31 AFRT Command Display

STEP 3: AFPC

Assign routing data for Fusion link using the AFPC command. A maximum of 8 connection_routes and FCHN/FPCN can be assigned on a node basis. The list box labeled FCCH on the AFPC command determines the network configuration type between self-node and the intermediate node. Assign "0" for "Fusion System without FCH" and "1" for "Fusion System with FCH." In case FCCH=1, enter FCCH number for intermediate node to FCHN/FPCN parameter, and in case FCCH=0, enter the FPC number of the intermediate node to FCHN/FPCN parameter. In this step, the explanation is given using the following network as an example.

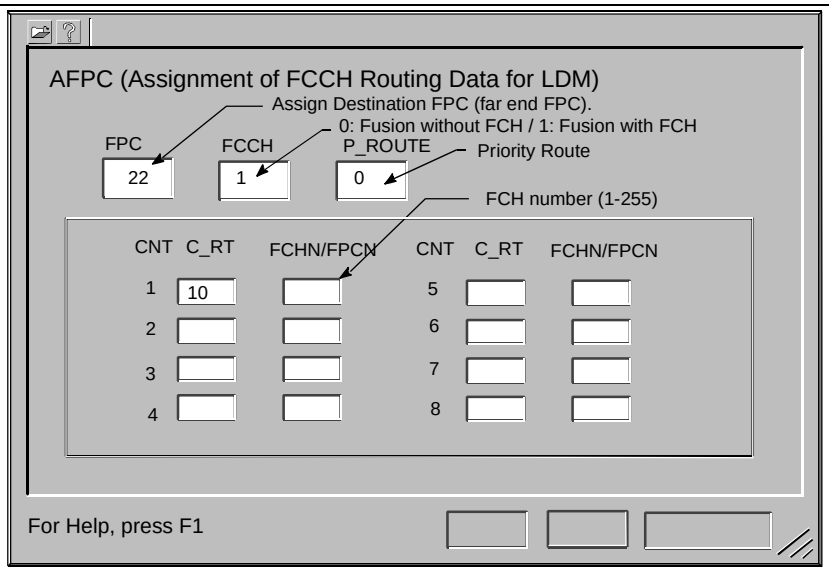
his figure shows an example of Fusion network. Each number in the circle stands for Fusion Point Code (FPC).



NCN: Network Control Node
LN: Local Node

Figure 5-32 Fusion Network (example)

The AFPC command display (Fusion with FCH) should look similar to Figure 5-33:



Note: *"USE_GATE" data is automatically assigned.*

Figure 5-33 AFPC Command Display (example)

WARNING: The AFPC command affects communications between nodes, and according to conditions, it might be unable to communicate between the nodes. Operate the MAT directly connected to each node as the need to modify the data setting.

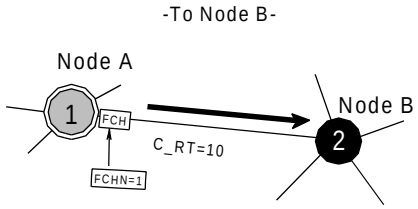
This table shows a sample data sheet for Node A on the fusion network with FCH. Assign the data for all nodes including the nodes which are not directly connected on the network. (i.e.Node C, Node D.....)

☐AFPC (at Node A) - Fusion with FCH

Node B

FPC 2(to Node B) FCCH 1(with FCH)

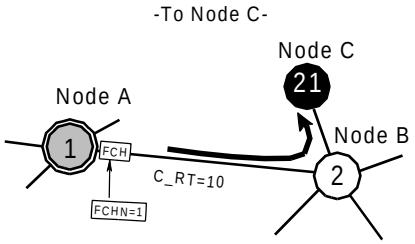
CNT	C_RT	FCHN
1	10	1



Node C

FPC 21(to Node C) FCCH 1(with FCH)

CNT	C_RT	FCHN
1	10	1



Assign all nodes' data in the same manner.

This table shows a sample data sheet for Node A on the fusion network without FCH. Assign the data for all nodes including the nodes which are not directly connected on the network. (i.e.Node C, Node D.....)

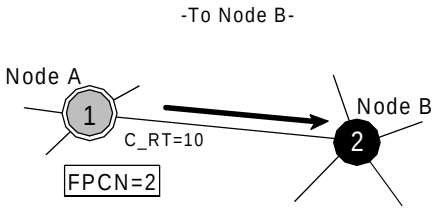
☐AFPC (at Node A) - Fusion without FCH

Node B

FPC 2(to Node B) FCCH 0(without FCH)

CNT	C_RT	FPCN
1	10	2

Assign adjacent Node's FPC

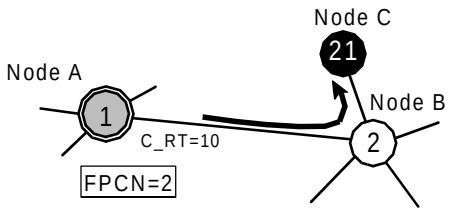


Node C ← Assign destination (far end) Node's FPC

FPC 21 (to Node C) FCCH 0 (without FCH0)

CNT	C_RT	FPCN
1	10	2

Assign adjacent Node's FPC



Assign all nodes' data in the same manner.

Figure 5-34 AFPC Sample Data Sheet

Note: *When one Fusion Network take the configuration with FCH and without FCH together, it is necessary to assign the routing data using both AFPC and AETH command. An example data assignment is shown in Figure 5-35.*

AFPC/AETH (at Node A) - Fusion with FCH & Fusion without FCH is both configured in One Network Control

* This example shows the data assignment having the priority to the connection between Node A and Node C with FCH card.

① To Node C directly with FCH

AETH

FPC: 3 (FPC Number of Node C)

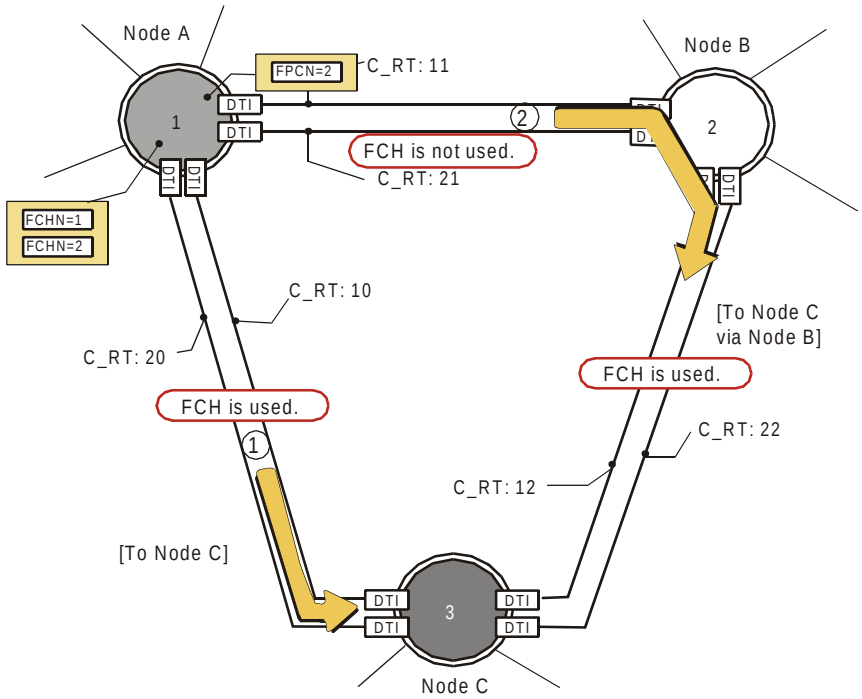
C_RT	FCHN	DST_IP	NEXT_IP
10	1	0	0
20	2	0	0

② To Node C via Node B

AFPC

FPC: 3 (FPC Number of Node C)
FCCH: 0 (FCH card is not used)
P_ROUTE: 1

CNT	C_RT	FPCN
1	11	2
2	21	2



Note: *"USE_GATE" data is automatically assigned.*

Figure 5-35 AFPC/AETH Sample Data Assignment

STEP 4: ACAN
Assign the Fusion Connection Index Code (FCIC) and the LENs on an adjacent FPC basis. Figure 5-36 shows a sample data sheet for Node A.

Note: *It is not necessary to assign the same number as trunk and FCIC. However, FCIC numbers between adjacent nodes must be identical.*

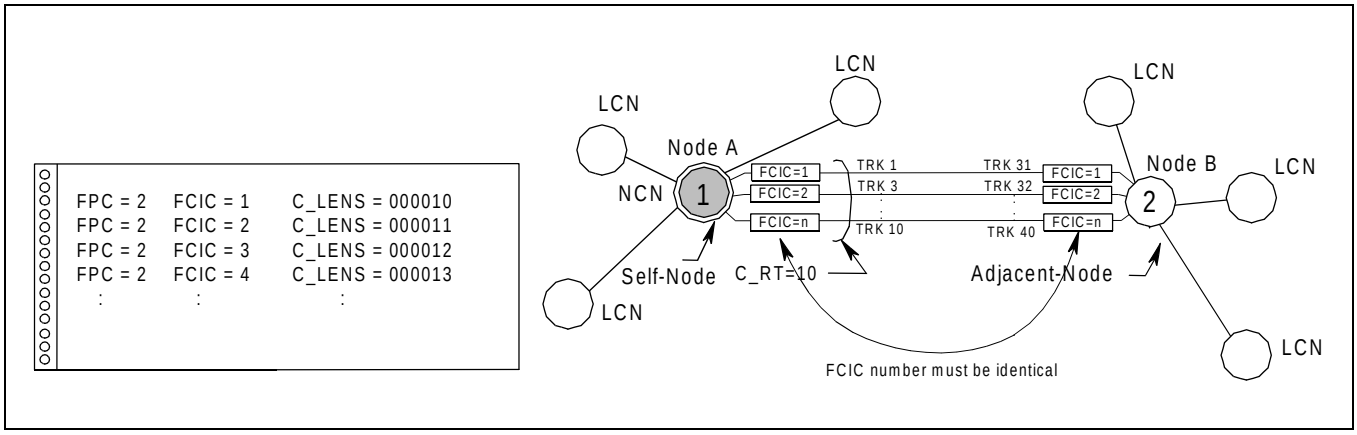


Figure 5-36 ACAN Sample Data Sheet

The ACAN command display should look similar to Figure 5-37.

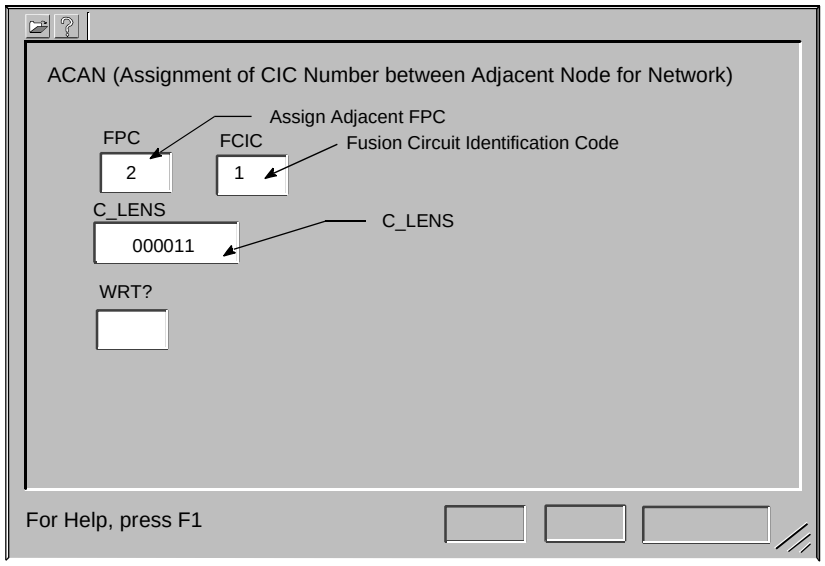
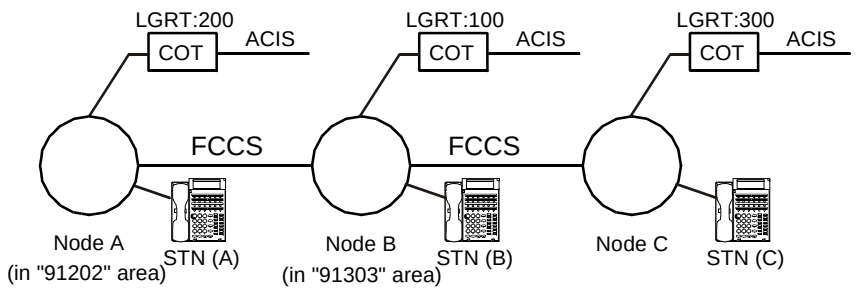


Figure 5-37 ACAN Command Display (example)

7.1 Assignment of Access Code for Tandem Connection via FCCS - ACIS

Tandem connection via FCCS - ACIS link can be established. With use of LDM, appropriate routing data for each node can be assigned as shown in Figure 5-38.



	Logical route to be seized		
Access code	**STN (A)**	**STN (B)**	**STN (C)**
9-1-202	LGRT: 200	1st LGRT: 200 2nd LGRT: 100	1st LGRT: 200 2nd LGRT: 100 3rd LGRT: 300
9-1-303	1st LGRT: 100 2nd LGRT: 200	LGRT: 100	1st LGRT: 100 2nd LGRT: 200 3rd LGRT: 300

Figure 5-38 Assignment of Routing Data Using LDM

Note: *When the related data is assigned to DM, outgoing connection is available only for external routes in self node (i.e. FCCS - ACIS link cannot be established).*

To initiate seizure of an external trunk, use one of four methods - OGC, OGCA, LCR, LCRS. (See the following sections).

7.1.1 OGC

A procedure for assigning the OGC access code is explained in Figure 5-39.

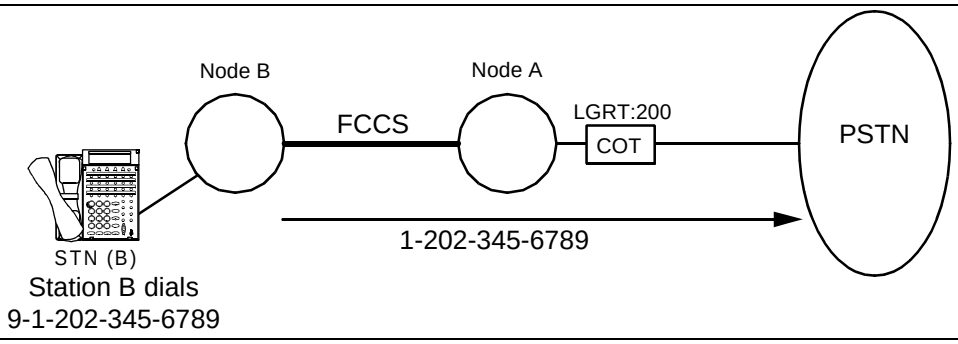


Figure 5-39 Example of OGC

STEP 1: ANPDN/ANPDL **Note**
Assign the first digit of the OGC access code. When the access code is common to all nodes, use the ANPDN command. When the access code is assigned for each node, use the ANPDL command.
1st DC=9 CI=N (Normal)NND=1
1st DC=9 CI=H (Hooking)NND=1

STEP 2: ASPAN/ASPAL **Note**
Assign the OGC access code. When the access code is common to all nodes, use the ASPAN command. When the access code is assigned for each node, use the ASPAL command.
ACC=9 CI=N (Normal) SRV=OGCLGRT=200
ACC=9 CI=H (Hooking)SRV=OGCLGRT=200

STEP 3: ANNDL/AMND
Assign the necessary number of digits using the ANNDL or the AMND command depending on the route data.

- When the ARTD command OSGS is 2 (Second Dial Tone), use the ANNDL (Necessary Digits Data) command.

RT=200 OG NND=12

- When the ARTD command OSGS is 4/6/7 (Sender Immediate Start/Sender Delay Dial Start/ Sender Wink Start), use the AMND command.

DC=9 MND=12

STEP 4: ARSCN
Assign the Route Restriction Class (RSC) that allows RRIs for the external trunk route. The same route restriction data must be assigned for each node.

Note: *When entering the data in STEP 1 and STEP 2, do not mix the commands for LDM and NDM. Write the data on the same data memory as shown below:*

- *When writing the data on the LDM:* ***ANPDL*** *(STEP 1)* → ***ASPAL*** *(STEP 2)*
- *When writing the data on the NDM:* ***ANPDN*** *(STEP 1)* → ***ASPAN*** *(STEP 2)*

7.1.2 OGCA

A procedure for assigning OGCA access code is explained in Figure 5-40.

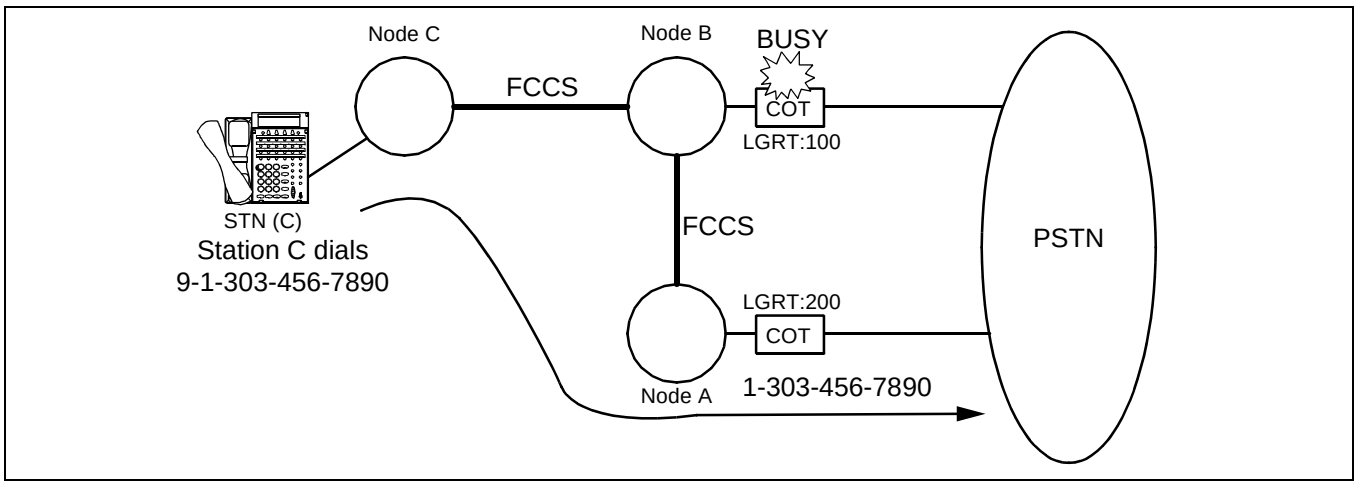


Figure 5-40 Example of OGCA

STEP 1: ANPDN/ANPDL **Note**
Assign the first digit of the OGCA access code. When the access code is common to all nodes, use the ANPDN command. When the access code is assigned for each node, use the ANPDL command.
1st DC=9 CI=N (Normal) NND=1
1st DC=9 CI=H (Hooking)NND=1

STEP 2: ASPAN/ASPAL **Note**
Assign the OGCA access code. When the access code is common to all nodes, use the ASPAN command. When the access code is assigned for each node, use the ASPAL command.
ACC=9 CI=N (Normal) SRV=OGCACOUNT=21st LGRT=1002nd LGRT=200
ACC=9 CI=H (Hooking) SRV=OGCACOUNT=21st LGRT=1002nd LGRT=200

Note: *When entering the data in STEP 1 and STEP 2, do not mix the commands for LDM and NDM. Write the data on the same data memory as shown below:*

- *When writing the data on the LDM:* ***ANPDL*** *(STEP 1)* → ***ASPAL*** *(STEP 2)*
- *When writing the data on the NDM:* ***ANPDN*** *(STEP 1)* → ***ASPAN*** *(STEP 2)*

STEP 3: ANNDL/AMND
Assign the necessary number of digits using the ANNDL or the AMND command depending on the route data.

- When the ARTD command OSGS is 2 (Second Dial Tone), use the ANNDL (Necessary Digits Data) command.

RT=100 OG NND=12
RT=200 OG NND=12

- When the ARTD command OSGS is 4/6/7 (Sender Immediate Start/Sender Delay Dial Start/ Sender Wink Start), use the AMND command.

DC=9 MND=12

STEP 4: ARSCN
Assign the Route Restriction Class (RSC) that allows RRIs for the external trunk route. The same route restriction data must be assigned for each node.

7.1.3 LCR/LCRS

A procedure for assigning LCR/LCRS access code is explained in Figure 5-41.

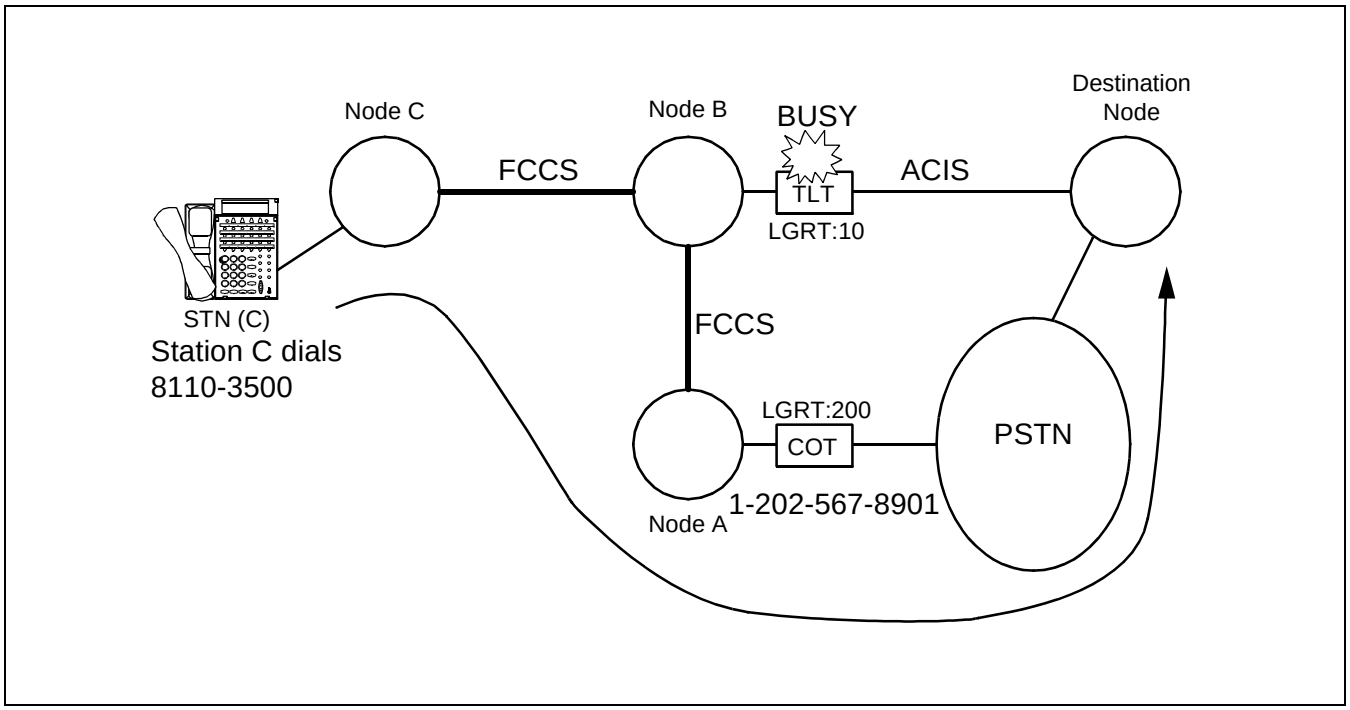


Figure 5-41 Example of LCR/LCRS

STEP 1: ANPDN/ANPDL **Note**
Assign the first digit of the LCR/LCRS access code. When the access code is common to all nodes, use the ANPDN command. When the access code is assigned for each node, use the ANPDL command.
TN=1 1st DC=8 CI=N (Normal)NND=1
TN=1 1st DC=8 CI=H (Hooking)NND=1

STEP 2: ASPAN/ASPAL **Note**
Assign the LCR/LCRS access code for a dummy route number. When the access code is common to all nodes, use the ASPAN command. When the access code is assigned for each node, use the ASPAL command.
ACC=8 CI=N (Normal) SRV=LCR/LCRSLGRT=Dummy route number
ACC=8 CI=H (Hooking) SRV=LCR/LCRSLGRT=Dummy route number

STEP 3: AMND
Using AMND, assign the Maximum Necessary Digits to be received by Register (ORT) circuit.
DC=8110 MND=8

STEP 4: ARNPL
Using ARNPL, assign the access code for each external trunk route but not for a dummy route.
RT=10 ACC=8
RT=200 ACC=9

Note: *When entering the data in STEP 1, 2, 6, 7, and 8, do not mix the commands for LDM and NDM. Write the data on the same data memory as shown below:*

- *When writing the data on the LDM:*

  ANPDL → ***ASPAL***→ ***AFRSL***→***AOPRL***→***AADCL***

  (STEP 1)(STEP 2) (STEP 6) (STEP 7)(STEP8)

- *When writing the data on the NDM:*

  ANPDN → ***ASPAN***→ ***AFRSN***→***AOPRN***→***AADCN***

  (STEP 1)(STEP 2) (STEP 6) (STEP 7)(STEP8)

STEP 5: ARTD/ARTDN
Using ARTD, assign the following CDN data for the dummy route number. **Note 1**

CDN 6 (TCL)=1 or 4 (depending on requirement)

CDN 7 (L/T)=1

CDN 13 (AC)=1

The other CDNs may be left default (data 0) for the dummy route.

STEP 6: AFRSL/AFRSN **Note 2**
Using AFRSL, assign the Number Pattern Code (NPC) and the Outgoing Route Selection Pattern Number (OPR) for the dummy route number.

LGRT=Dummy route numberNPC=8110OPR=1

STEP 7: AOPRL/AOPRN **Note 2**

Using AOPRL, assign the external route number to OPR assigned in the AFRSL command.

TDPTN=0 OPR=1 RA=0E=1LGRT=10SKIP=4 PNL=0 OVFT=0

PRSC=0

TDPTN=0 OPR=1 RA=1E=0LGRT=200SKIP=8 PNL=128 OVFT=0

PRSC=0

STEP 8: AADCL/AADCN **Note 2**
Using AADCL, assign the additional Digit Code to PNL assigned in the AOPRL command.

PNL=128

DC=12025678901

STEP 9: ARSCN

Using ARSCN, assign the Route Restriction Class (RSC) that allows RRIs for the external trunk route. The same route restriction data must be assigned for each node.

Note 1: *The dummy route must be assigned to all nodes (including a node that does not have external routes).*

Note 2: *When entering the data in STEP 1, 2, 6, 7, and 8, do not mix the commands for LDM and NDM. Write the data on the same data memory as shown below:*

- *When writing the data on the LDM:*

  ANPDL → ***ASPAL***→ ***AFRSL→AOPRL→AADCL***

  (STEP 1)(STEP 2) (STEP 6) (STEP 7)(STEP8)

- *When writing the data on the NDM:*

  ANPDN → ***ASPAN***→ ***AFRSN→AOPRN→AADCN***

  (STEP 1)(STEP 2) (STEP 6) (STEP 7)(STEP8)

7.2 Data Assignment for 52M-SDH Interface

This section explains the Fusion Connection with 52M-SDH interface. Figure 5-42 explains the connection pattern.

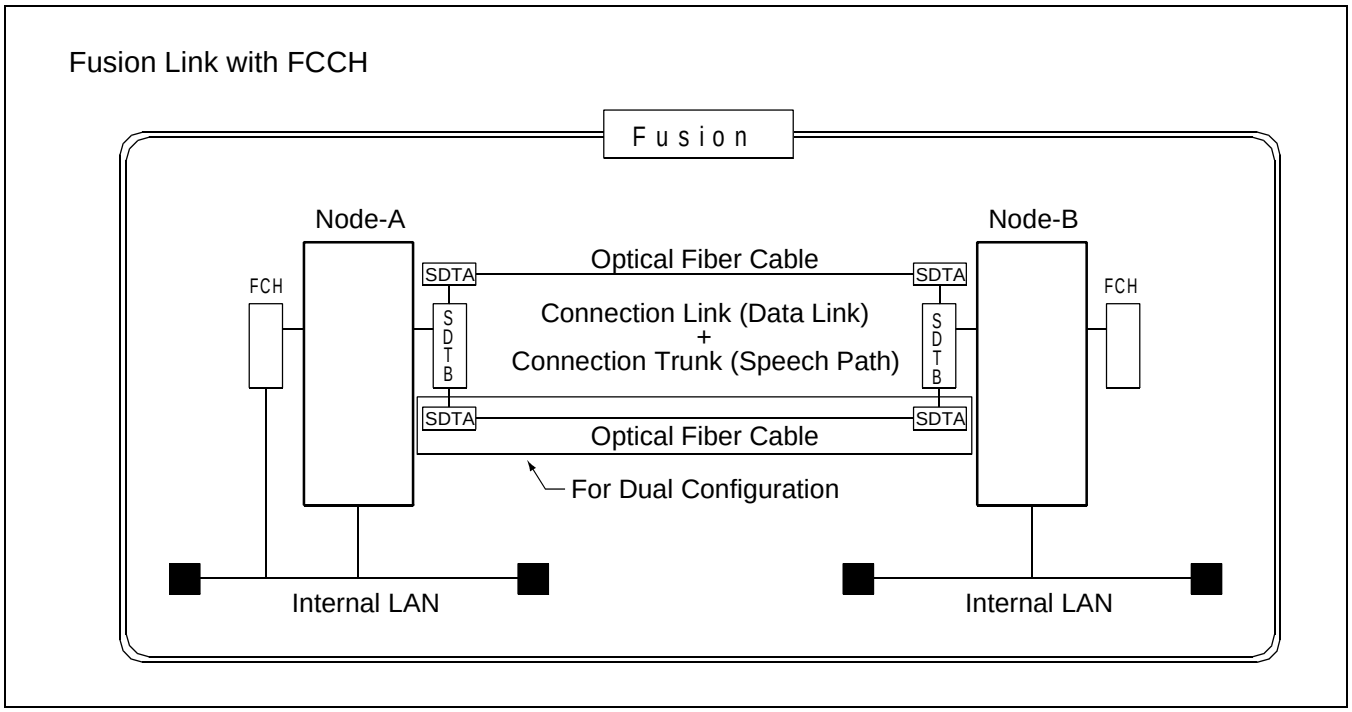


Figure 5-42 Fusion Connection with 52M-SDH Interface

Specifications for the SDH data setting are described below.

1. When FCCS and CCIS links are used together in the network, a different route number must be assigned to each Connection Trunk (B-ch), Connection link (D-ch), Speech Line for CCIS, and Signal Line for CCIS. Figure 5-43 provides an example.

○ Available

Network	Route	Route Number
FCCS	Connection Trunk	RT=10
	Connection Link	RT=11
CCIS	Speech Line	RT=20
	Signal Line	RT=21

X Not Available

Network	Route	Route Number
FCCS	Connection Trunk	RT=10
	Connection Link	RT=11
CCIS	Speech Line	RT=10
	Signal Line	RT=11

Note: *The same route number cannot be used for a different route.*

Figure 5-43 Assignment of Different Route Numbers for FCCS and CCIS Links (example)

2. System data (SYS1, INDEX 531) must be assigned prior to the trunk data assignment for the SDT.

3. When the SDT card is used to replace the DTI card, and the trunk data has already been assigned for the DTI, perform the circuit card initialization after setting system data.

4. When Connection links to the SDT card are being assigned, a maximum of 512kbps (8ch) TS (Time slot) can be used as Connection link (data link). Assignment order of TSs used for Connection link between SDT and FCH must be identical. Any TS can be used for Connection link.

7.2.1 Data Programming

STEP 1: ASYDL
Designate the MG accommodating the SDT circuit card.
b0-b7 Assign “1” to the bit number corresponding to the mounted MG number.

Note: *SDT can be mounted in the odd MG only.*

STEP 2: ACRD
Assign the Connection Route Class data.

- Connection trunk (for Voice)

  C_RT: 10

  TF=3 TCL=4 RLP=2 LSG=12

- Connection link (for Data)

  C_RT: 11

  TCL=4 LSG=13

STEP 3: ACTK
Assign the Connection Trunk data for B-ch and D-ch.

Example: (When using 512kbps (8ch) TS as Connection link)

- Connection trunk (B-ch)

  C_RT: 10 TK: 1-664 CLENS: LEN for the SDT

- Connection link (D-ch)

  C_RT: 11 TK: 1-8 CLENS: LEN for the FCH

  C_RT: 11 TK: 9-16 CLENS: LEN for the SDT

Note: *Set the switch on the FCH card depending on the transmission speed.*

See "CHAPTER 4 INSTALLATION" for more information on switch settings.

STEP 4: AFCH
Assign the FCCH number for each FCCH.

FCHN: 2 (FCCH number) FCHEN: LEN of FCCH

STEP 5: AFPC
Assign the FCCS routing data.

FPC: 1 (FPC of the adjacent node) FCCH: 1 (with FCCH)

CRT: 10 FCHN: 2

STEP 6: ACAN
Assign the CIC number to the connection trunk.

FPC: 1 FCIC: 1-664 CLENS: LEN of the connection trunk

STEP 7: AFRT
Assign the FCCH Controlled Connection Route data.

FCHN: 2 CRT: 10

STEP 8: AFPC
Assign the FCCS routing data.

FPC: 1 (FPC of the adjacent node)FCCH: 1 (with FCCH)

CRT: 10 FCHN: 2

STEP 9: ACAN
Assign the CIC number to the connection trunk.

FPC: 1 FCIC: 1-664 CLENS: LEN of the connection trunk

STEP 10: AFCD
Assign NAILED DOWN CONNECTION for the connection link established between FCCH and SDT.

LENS-A: LEN of SDT EAD-A: 07 (pad off)

LENS-B: LEN of FCCH EAD-B: 07 (pad off)

7.3 Flexible Routing - Fusion

A Fusion trunk call can be routed via “non-Fusion” trunk (C.O. or Tie Line), if the Fusion trunks are all busy or Data Link Failure occurs at the FCH card, etc.

☐ Service Conditions

a. This feature may be activated when the Fusion trunks are all busy or FCCS Link Failure (Layer 2 down) occurs at the FCH card.

b. This feature is available when the called party is an analog station, Dterm or ISDN terminal. (When the called party is wireless terminal or DAT/Paging Trunk, the feature is not activated.)

c. Use LCR/LCRS for this feature.

d. The access code of this feature (ACC: max. 24 digits) is assigned by the AFRFL command.

e. When the selected “non-Fusion” trunks (LCR/LCRS) are also busy, route selection is performed according to the LCR/LCRS table. The same is performed when the selection encounters a Fusion trunk “busy” again.

STEP 1: Basic Data
Make sure that the following data has been already assigned for the Fusion network.
Flexible Route Numbering Plan Data (LCR/LCRS data)
Station-to-Station connection data

STEP 2: AFRFL
Assign Flexible Route data (tenant number, destination node FPC and feature access code) by the AFRFL command.
TN: Tenant Number of the Calling Party.
FPC: Fusion Point Code of the destination node.
ACC: Access Code for Flexible Routing (to C.O. or Tie Line), the same number assigned by ASPA command for LCR/LCRS.

7.4 Network Data Programming for Tandem Connection via "FCCS" - "CCIS"

To establish CCIS services between FPC1 (PC1) and PC3 via FCCS - CCIS link, it is required to perform the following data assignment at FPC1 (PC1) node as explained.

The example data setting is shown using Figure 5-44, on condition that CCIS link data has already been assigned between FPC2 (PC2) and PC3 nodes.

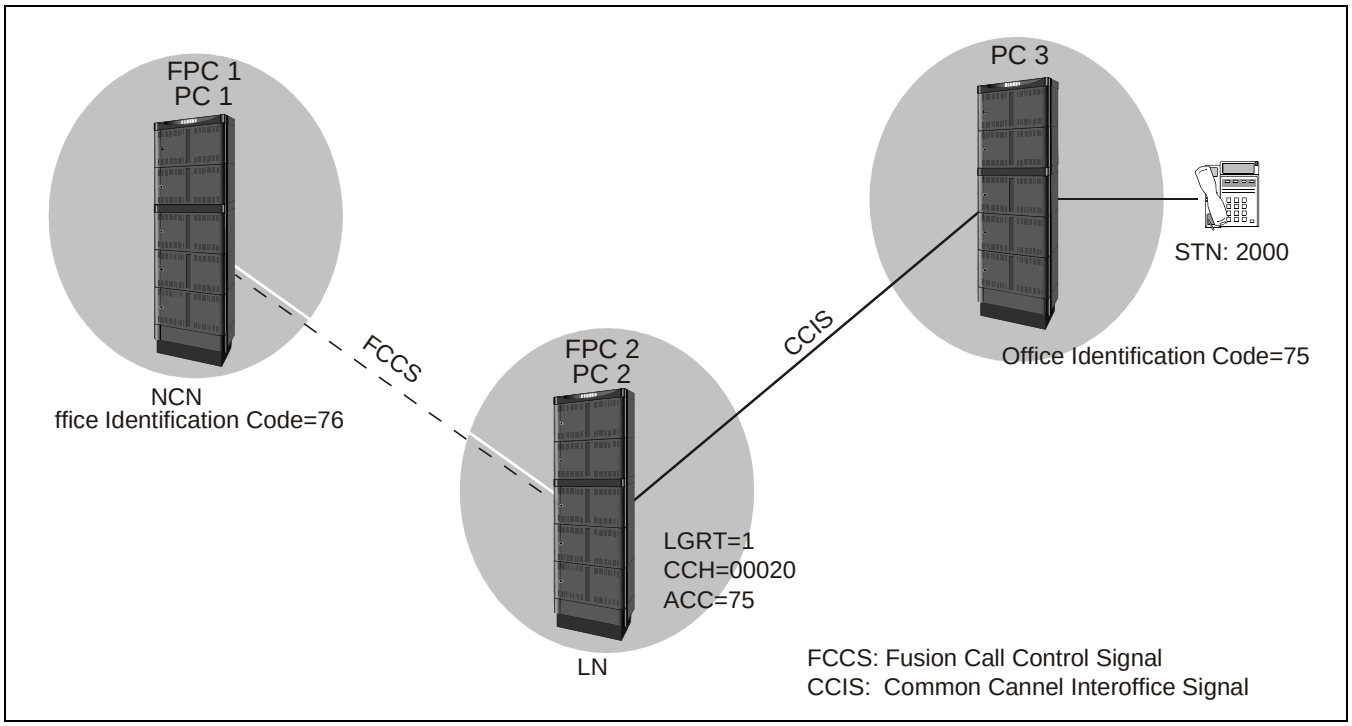


Figure 5-44 FCCS - CCIS Coexisting Network

The following data setting must be assigned at FPC1 (PC1) node in the example.

STEP 1: ASYD

☐ Assign the OPC (Originating Point Code) within the range 1-16383.

Index 180, 181:
Ex.) OPC=16

	b5						b0
Index 181		0	0	0	0	0	0

	b7						b0
Index 180	0	0	0	1	0	0	0	0

☐ Miscellaneous Data

Index 186:

b6 must be assigned as “1 (CCIS is in service).” The remaining data should be determined depending on the customer’s requirements.

STEP 2: ANPDL/ANPDN
Assign the first digit and NND (Number of Necessary digit) of the LCR access code.
1st DC=7 CI=N (Normal)/H (Hooking)NND=2

STEP 3: ASPAL/ASPAN
Assign the dummy route number to the LCR access code.
ACC=75 SRV=LCRLGRT=Dummy route number

STEP 4: AMND
Assign MND (Maximum Necessary Digits) including the access code
DC=752 MND=6

STEP 5: ARNPL
Assign the access code to the logical route of speech path. It is not required to assign this data to the logical route of signal controlling channel and dummy route.
LGRT=1 ACC=75

STEP 6: ARNP
Enter "RT=0" for the self-office code (self-office identification code) in Open Numbering Network. This number is used when Called Number Display for SMDR/Dterm/Desk Console, or CCIS services, such as Call Back - CCIS/Message Reminder - CCIS/Message Waiting Lamp - CCIS, are provided in this network.
RT=0 ACC=76

STEP 7: AFRSL/AFRSN
Assign Number Pattern Code (NPC), including the access code for LCR, and the Outgoing Route Selection Pattern (OPR) for the dummy route number.
LGRT=Dummy route numberNPC=75 OPR=75

STEP 8: AOPRL/AOPRN
Assign the LCR routing pattern for the Outgoing Route Selection Pattern Routing (OPR) number. The actual router selection pattern and the conditions are designated in this command.
TDPTN=0 OPR=1 LGRT=1SKIP=0

STEP 9: ADPCL
Assign the destination PC (Point Code) on speech channel route (Logical Route) basis.
LGRT=1 PC=3

STEP 10: ACSCL
Assign the CSC Group Number (CSCG) for designating the Dch and the location of the CCH, in cooperation with the FPC of the node that is connected to CCIS link.

CSCG 2-254(n)	CICG	FPC	LENS of CCH		
			MG	U	G
2 (Basic/ Primary Route)	0	2	00	0	20
	1	2	00	0	20
	2	2	00	0	20
	3	2	00	0	20
	4	2	00	0	20
	5	2	00	0	20
	6	2	00	0	20
	7	2	00	0	20

CSCG 2-255(n+1)	CICG	FPC	LENS of CCH		
			MG	U	G
3 (Alternate Route)	0	2	00	0	20
	1	2	00	0	20
	2	2	00	0	20
	3	2	00	0	20
	4	2	00	0	20
	5	2	00	0	20
	6	2	00	0	20
	7	2	00	0	20

STEP 11: ACIC1
Assign the data to establish the relation between Point Code of the destination node and CSCG (CSC Group) of the Basic Route.
Enter the Destination PC assigned by the ADPCL command, and CSCG number of the Basic Route (even number) assigned by the ACSCL command. It is not necessary to assign the CSC group number of the Alternate Route here.
PC=3 CSCG=2

7.5 FCCS Link via Internet/Intranet

The system can exchange the FCCS data via the Internet/Intranet. As shown below, an FCCS Link can be established by using the following features:

- *External Router*
- *Fusion over IP*

7.5.1 External Router

This feature allows the system to exchange the FCCS data via the Internet/Ethernet. For this feature, an FCCS link is connected to an external router.

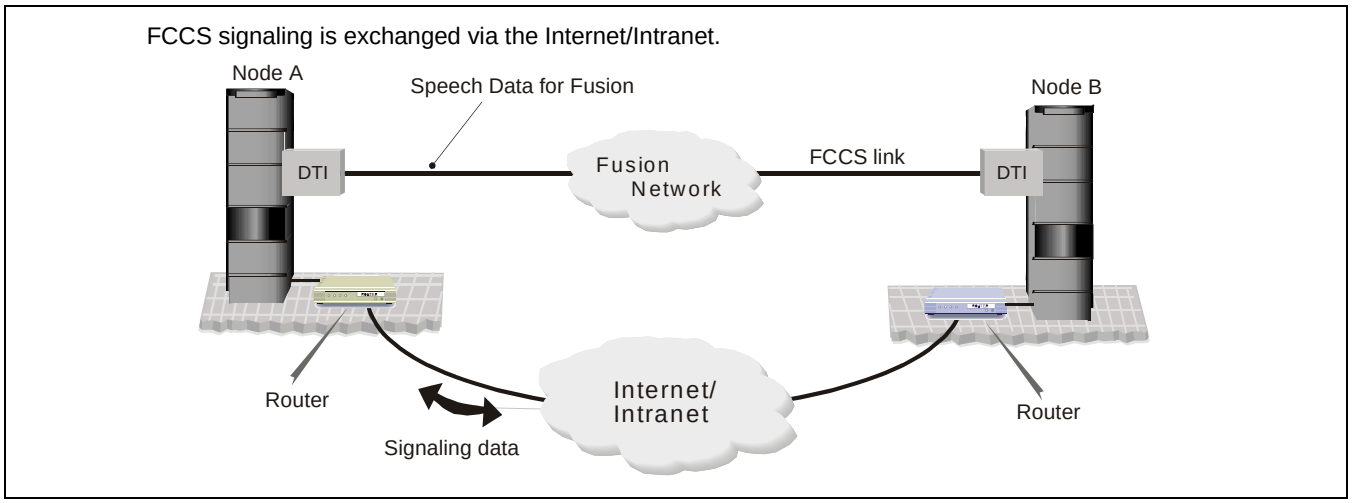


Figure 5-45 External Router - Overview

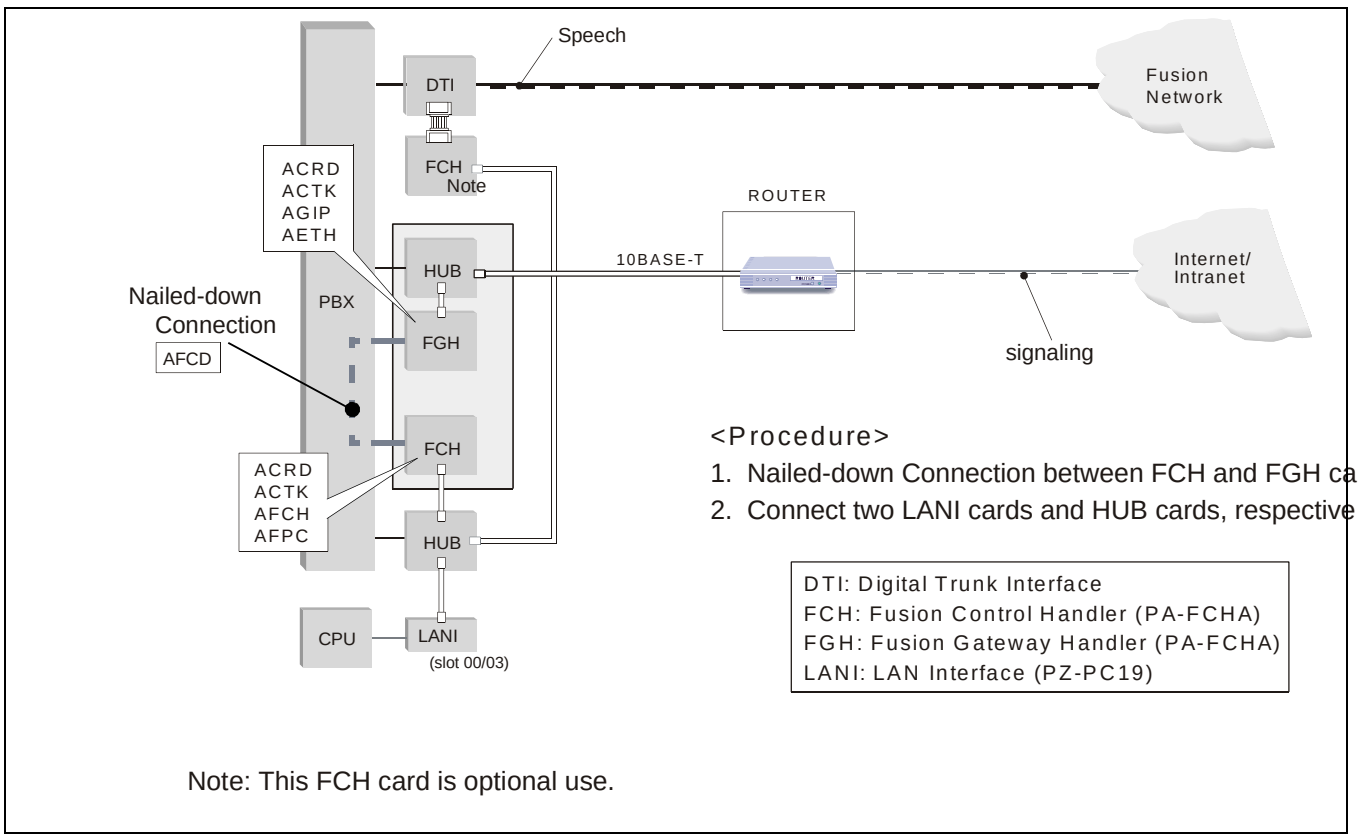


Figure 5-46 Hardware Connections for External Router

Switch Setting on FCH/FGH Cards:
Set the switches on the FCH/FGH (PA-FCHA) cards as shown below.

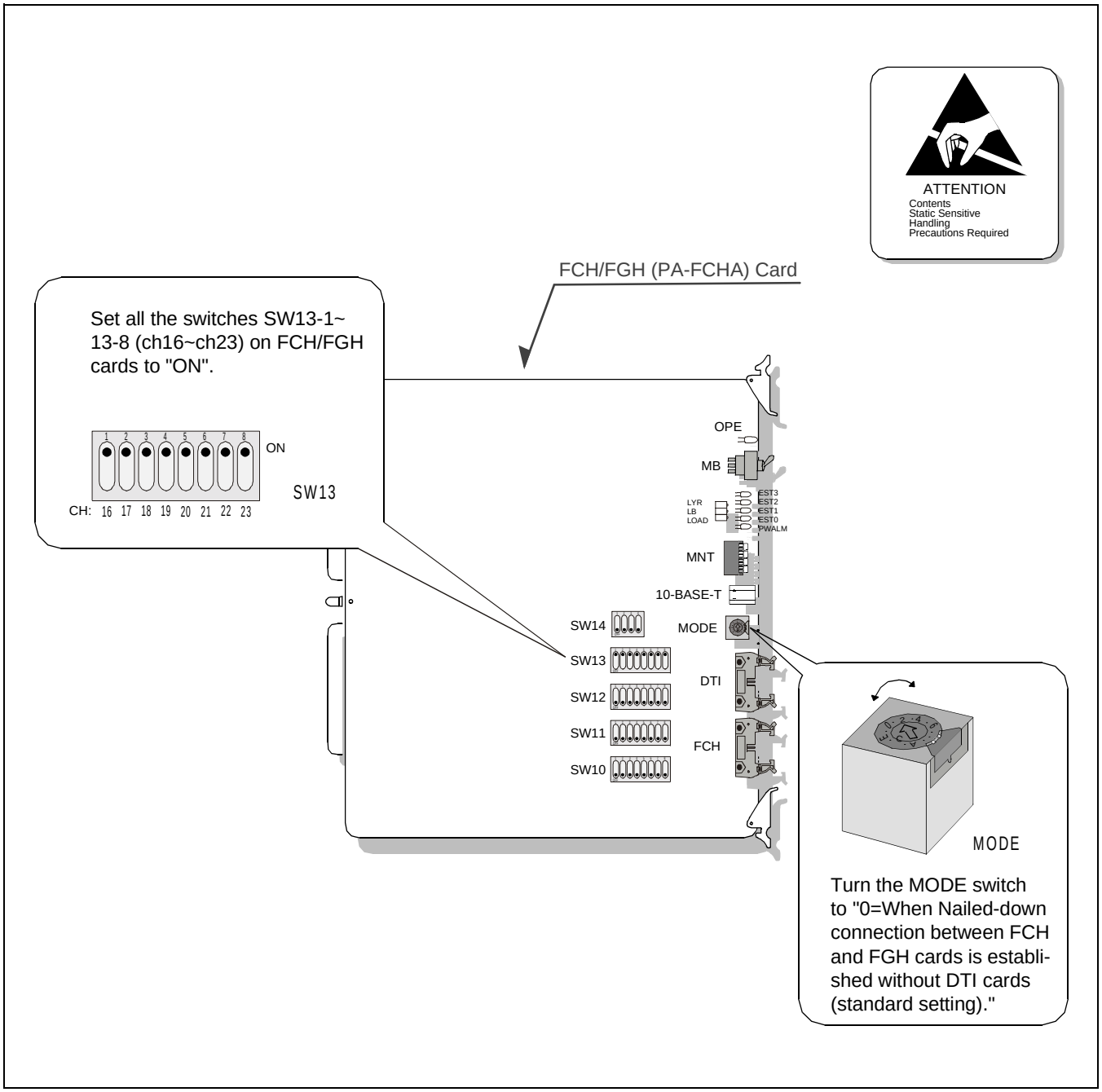
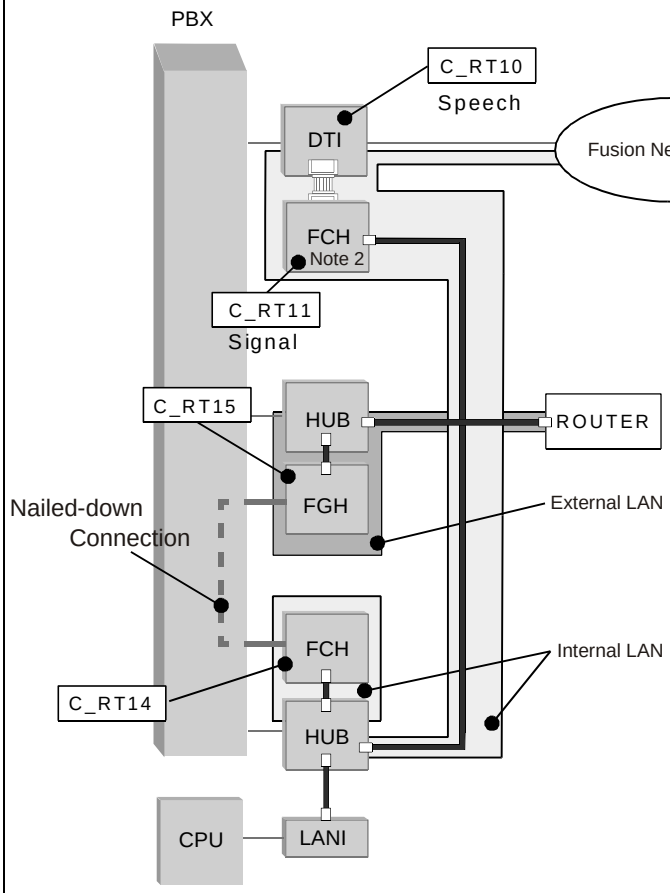


Figure 5-47 Switch Setting on FCH/FGH (PA-FCHA) Card

STEP 1: ACRD
Assign Route Class Data of Speech Route, FCH, FGH routes, respectively. A sample data assignment is shown below.
See 6.1 Assignment of Connection Route/Trunk Data for more detailed information.



Sample Data Assignment

Type		Speech	FCCH	FCCH	FGH
CDN \ RT		10	11	14	15
1	TF	3	3	3	3
2	TCL	4	4	4	4
3	RLP	2	2	2	2
4	SMDR	0	0	0	0
5	LSG	12	13	13	13
6	PAD	7	7	7	7
7	TRKS	0(1)	0	0	0
8	TC/EC				
9	FINT	0	0	0	0
10	FPEG	0	0	0	0
11	TC	0	0	0	0
12	MTC	0	0	0	0
13	STSEQ	0	0	0	0
14	FGH	0	0	0	1
15	MMN				
16	LKIND	2	0	0	0

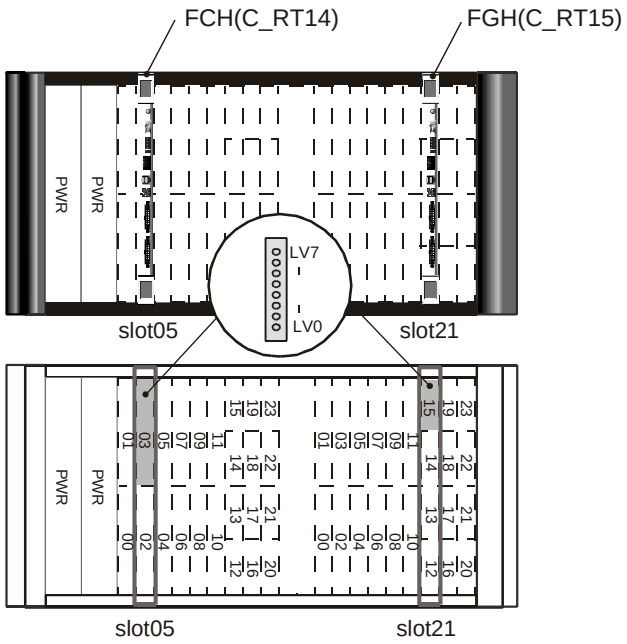
Note 1: This data setting is an example.
Note 2: This FCH card is optional use.

Figure 5-48 Connection Route Class Data Sample

STEP 2: ACTK

Assign the connection trunk data of DTI, FCH, and FGH cards, using the ACTK command. When assigning FCH, FGH trunk data, eight trunks must be set. A sample data assignment of FCH, FGH card is as follows.

hen FCH and FGH cards are mounted in the following slots with the specified C_RT numbers, ata setting is as follows.



	C_RT (1-1023)	C_TK (1-4095)	C_LENS MG 00-07	U 0-3	G 00-23	L 0-7
FCH(C_RT14)	14	1	00	0	03	0
	14	2	00	0	03	1
	14	3	00	0	03	2
	14	4	00	0	03	3
	14	5	00	0	03	4
	14	6	00	0	03	5
	14	7	00	0	03	6
	14	8	00	0	03	7
FGH(C_RT15)	15	1	00	1	15	0
	15	2	00	1	15	1
	15	3	00	1	15	2
	15	4	00	1	15	3
	15	5	00	1	15	4
	15	6	00	1	15	5
	15	7	00	1	15	6
	15	8	00	1	15	7

Figure 5-49 Sample Data Assignment (ACTK)

STEP 3: MBCT

Unbusy the connection trunk data assigned in the previous steps, by using the MBCT command. This is required for FCH, FGH trunks as well as speech channels.

STEP 4: ASYD
Assign the system data for nailed-down connection between FCH and FGH cards.
SYS1, Index60, b4=1 (Nailed-down connection: In service)

STEP 5: AFCD
Assign the detailed data related to nailed-down connection between FCH and FGH cards.

When FCH and FGH cards are mounted in slot05 and slot21 respectively (as show in Figure 5-49, sample data assignment of the ACTK command), data setting is as follows.

LENS-A					LENS-B				
MG 00-07	U 0-3	G 00-23	Lv 0-7	EAD-A	MG 00-07	U 0-3	G 00-23	Lv 0-7	EAD-B
0,0	0	0,3	0	00	0,0	1	1,5	0	00
0,0	0	0,3	1	00	0,0	1	1,5	1	00
0,0	0	0,3	2	00	0,0	1	1,5	2	00
0,0	0	0,3	3	00	0,0	1	1,5	3	00
0,0	0	0,3	4	00	0,0	1	1,5	4	00
0,0	0	0,3	5	00	0,0	1	1,5	5	00
0,0	0	0,3	6	00	0,0	1	1,5	6	00
0,0	0	0,3	7	00	0,0	1	1,5	7	00
FCH					FGH				

Note: *Assign all the data for FCH/FGH LENS (Lv0-Lv7).*

Figure 5-50 Sample Data Assignment (AFCD)

STEP 6: AFCH

Assign FCH number on an FCH circuit card basis. In the following example, FCHN=1 is assigned for the FCH circuit card. For the FGH card, FCHN assignment is not necessary.

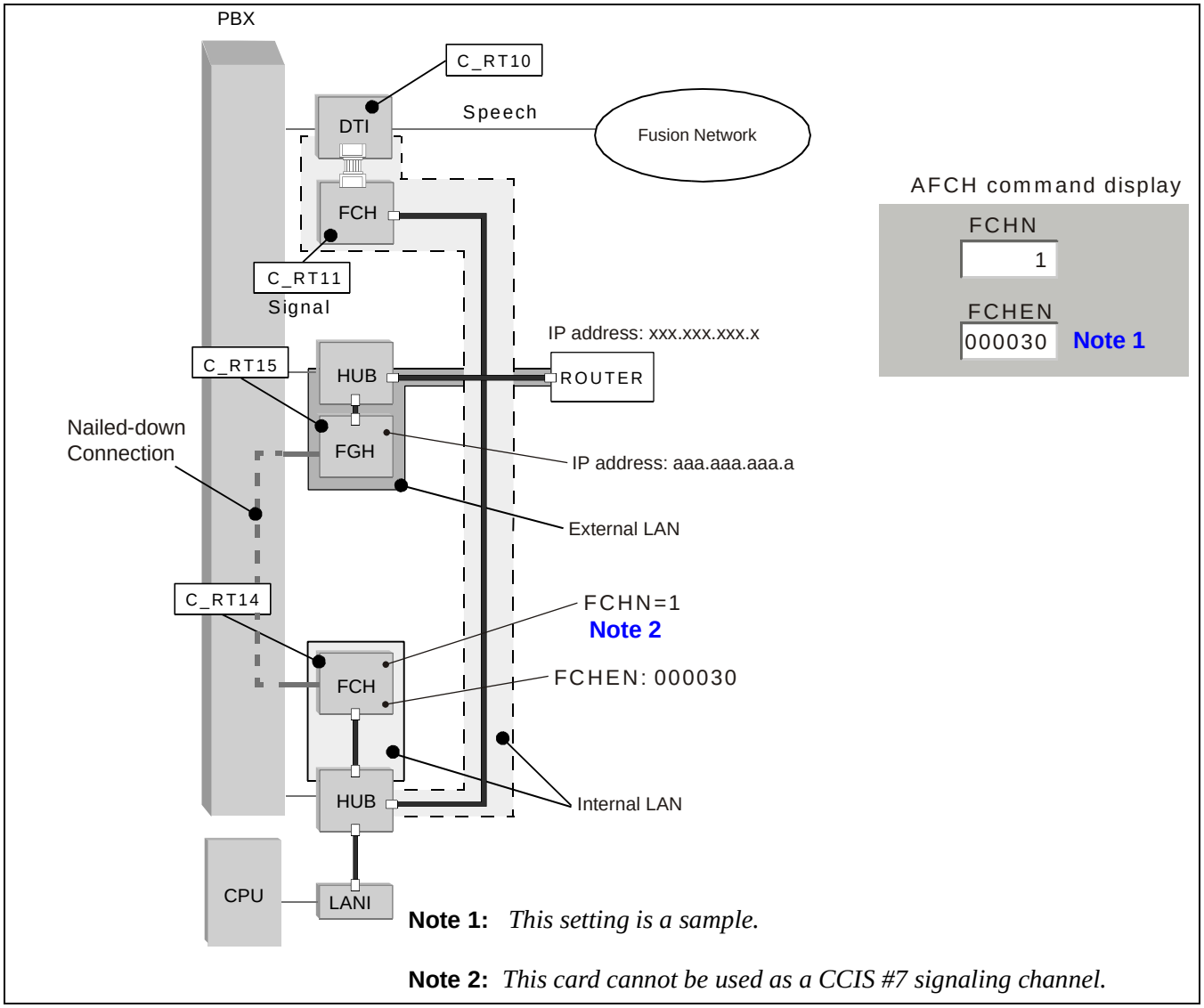


Figure 5-51 Assignment of FCHN (example)

STEP 7: AGIP

Assign IP addresses of FGH card and its connected router.
LENS (Line Equipment Number): Assign the LENS data of FGH card.
KIND (Kind of Selection): Select “FGH”.
FGH_IP (FGH IP Address): Assign IP address of the FGH card.
DG_IP (Default Gateway IP address): Assign IP address of the router.
NETMSK (Net Mask): Assign IP address of the Net Mask.
CONTTYP (Voice Channel Control Type): Select “Server”.
LINK_NUM (Qsig-Prime Link Number) : Assign the number (1-32) of interfaces for speech (=total DTI card number).
ARP (ARP Frame Type): Select “DIX”.

CSLINK_NUM (Client /Server Connection Max. Number): Assign “16 line (default)”.

STEP 8: AFPC

Assign internal LAN routing data.
FPC (Fusion Point Code): Assign FPC number (1-253) of the Destination Node.
FCCH: Assign “1”.
C_RT (Connection Router): 1-1023
FCHN/FPCN (FCH/FPC Number): Assign the FCH Number, specified in STEP 6.
P_ROUTE (Priority Route): 0/1 = FCCH/FGH
Example data assignment is shown in Figures 5-50 and 5-51:

FPC	FCCH
11	1

CNT	1	2
C_RT	10	10
FCHN (FCH Number)	1	1
P_ROUTE	1	1

FPC	FCCH
12	1

CNT	1	2
C_RT	10	10
FCHN (FCH Number)	1	1
P_ROUTE	1	1

A total of 8 routings (CNT=1-8) must be assigned. When alternative routing is not required, assign the same routing data for each CNT.

Figure 5-52 Sample Data Assignment (AFPC)

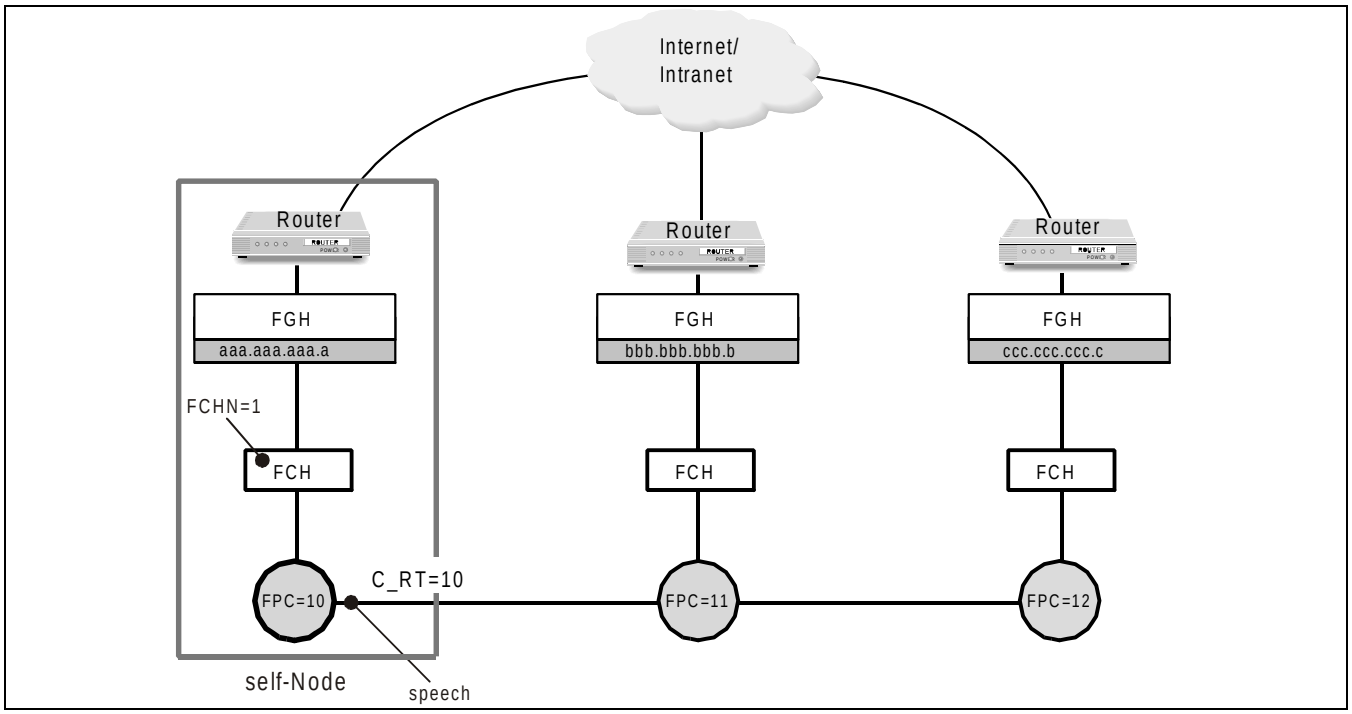


Figure 5-53 Internal LAN Routing Data Assignment Image (example)

STEP 9: AETH

Assign the external router routing data.
FPC (Fusion Point Code): Assign FPC number (1-253) of the Destination Node.
FCHN (FCH Number): Assign the FCH Number, specified in STEP 6.
C_RT (Connection Route): 1-1023
DST_IP (Destination IP Address): Assign FGH IP address of the Destination Node.
NEXT_IP (Next IP Address): Assign FGH IP address of the Next Node (Node to be passed to).
Example data assignment is shown in Figures 5-52 and 5-53.

FPC	11

CNT	1	2
C_RT	10	
FCHN (FCH Number)	1	
DST_IP	bbb.bbb.bbb.b	
NEXT_IP	bbb.bbb.bbb.b	

FPC	12

CNT	1	2
C_RT	10	
FCHN (FCH Number)	1	
DST_IP	ccc.ccc.ccc.c	
NEXT_IP	bbb.bbb.bbb.b	

A maximum of 8 routings are available.

Figure 5-52 Sample Data Assignment (AETH)

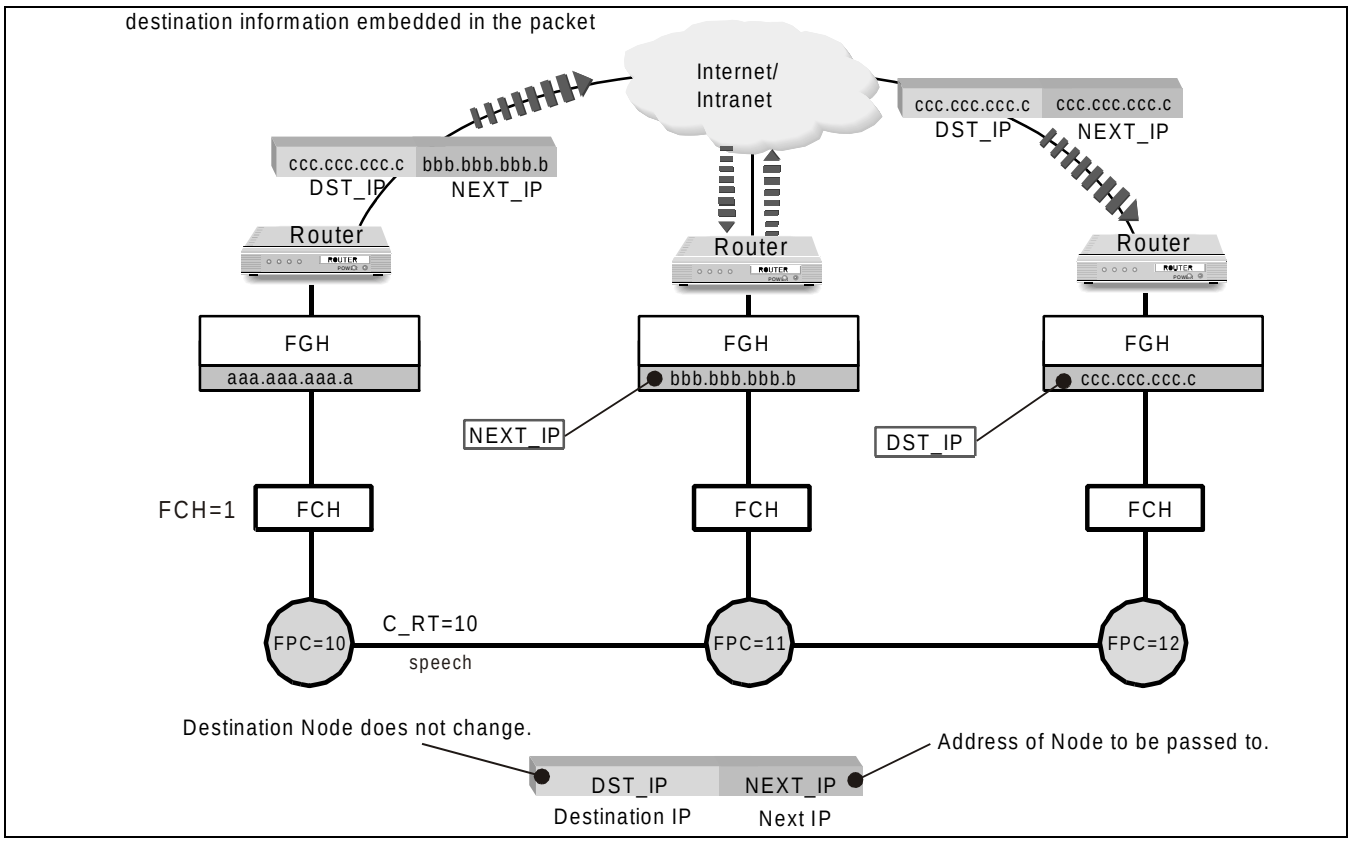


Figure 5-54 How to Assign Destination IP and Next IP

STEP 10: ACAN

Assign the Fusion Connection Index Code (FCIC) for the Next Node.
FPC (Fusion Point Code): Assign FPC number of the Next Node (Node to be passed to).
FCIC (Fusion Connection Index Code): Assign Fusion CIC of the Next Node (Node to be passed to).
C_LENS (Connection_LENS): Assign DTI LENS data (Bch data), specified in STEP 2.

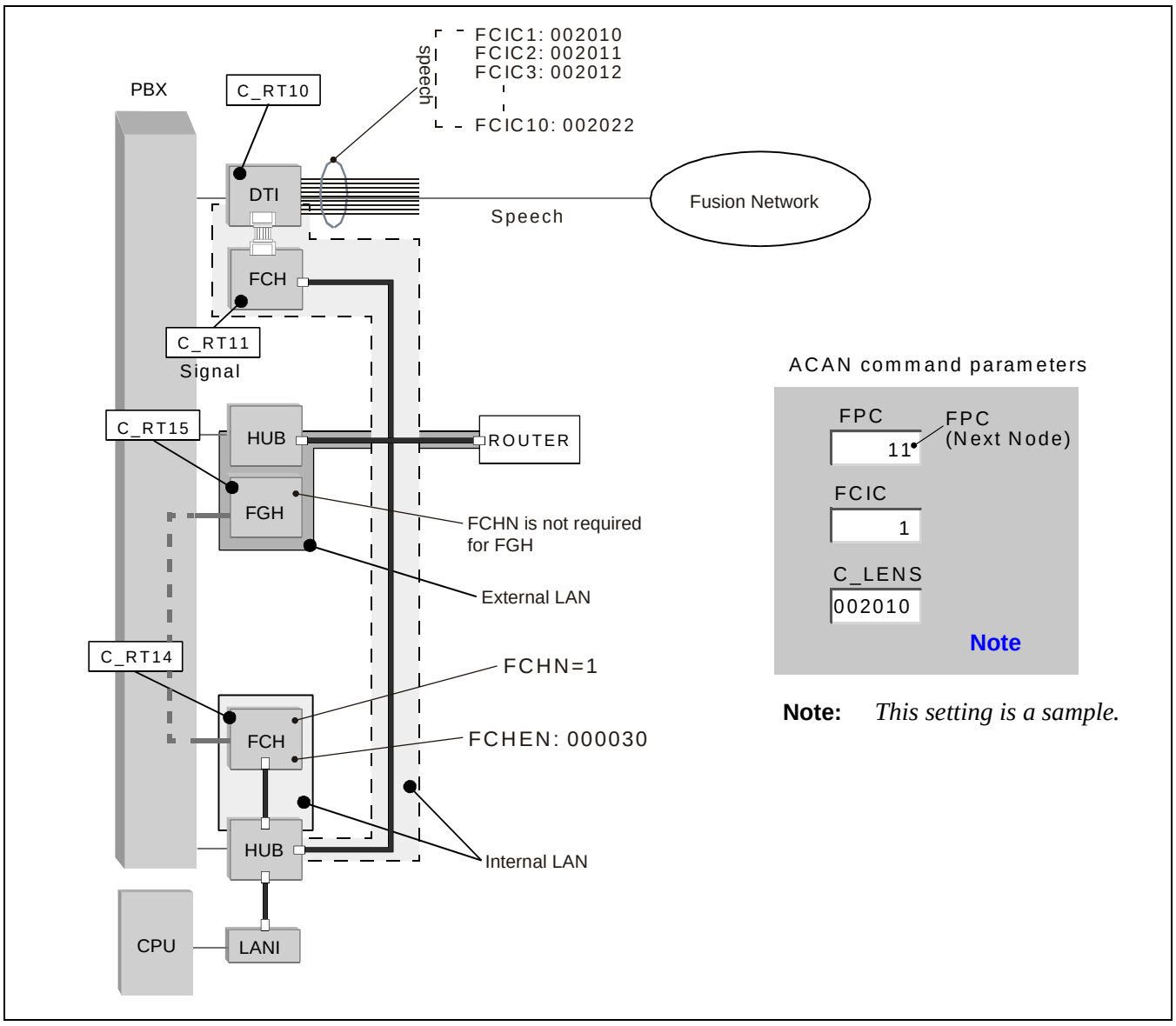


Figure 5-55 Sample Data Assignment (ACAN)

7.5.2 Fusion over IP

This feature allows the system to exchange both speech and FCCS signaling over Internet/Intranet. To establish/release a call, Q-sig is used between the system and the router.

Fusion network is realized via the Internet/Intranet.

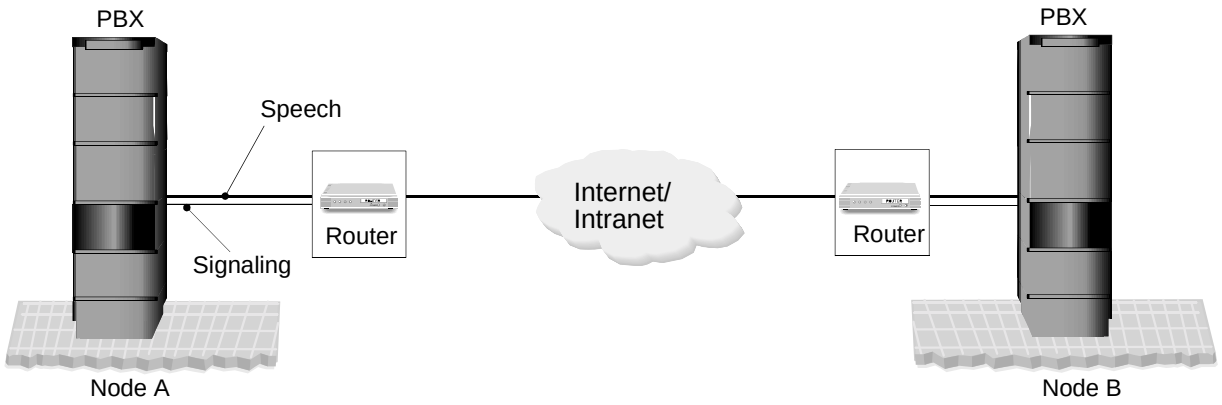
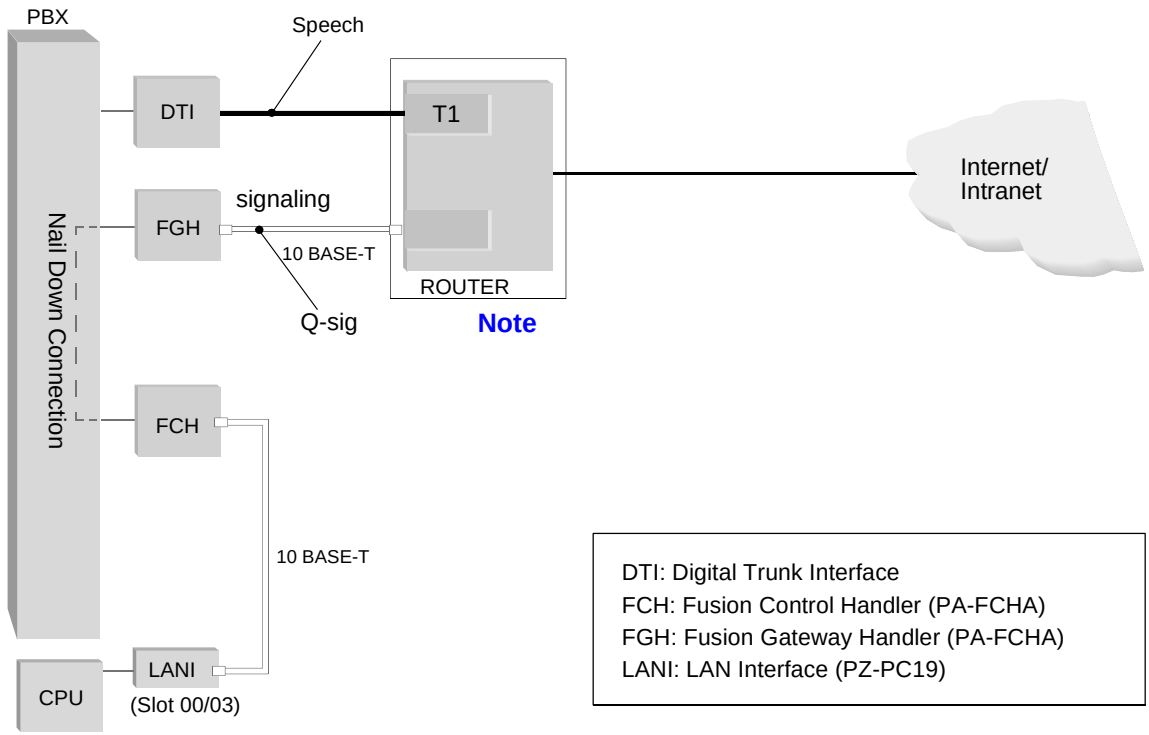


Figure 5-56 Fusion over IP - Overview

The following circuit cards are required for this feature.

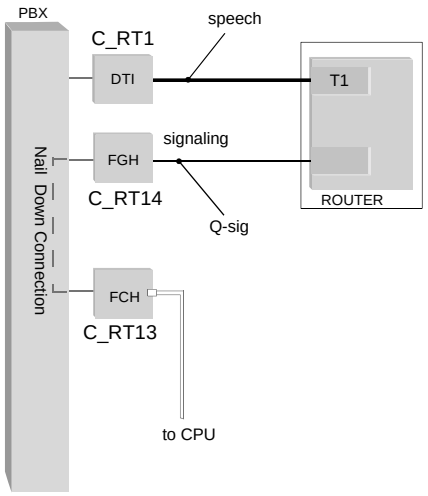


Note: *Use Router of Cisco Systems, Inc. for this feature.*

Figure 5-57 Hardware Connections for Fusion over IP

STEP 1: ACRD

Assign Route Class Data of Speech Route, FCH, FGH routes, respectively. A sample data assignment is shown below.



Type		Speech	FCCH	FGH
CDN \ C_RT		1	13	14
1	TF	3	3	3
2	TCL	4	4	4
3	RLP	2	2	2
4	SMDR	0	0	0
5	LSG	12	13	13
6	PAD	7	7	7
7	TRKS	0(1)	0	0
8	TC/EC			
9	FINT	0	0	0
10	FPEG	0	0	0
11	TC	0	0	0
12	MTC	0	0	0
13	STSEQ	0	0	0
14	FGH	0	0	1
15	MMN			
16	LKIND	2	0	0

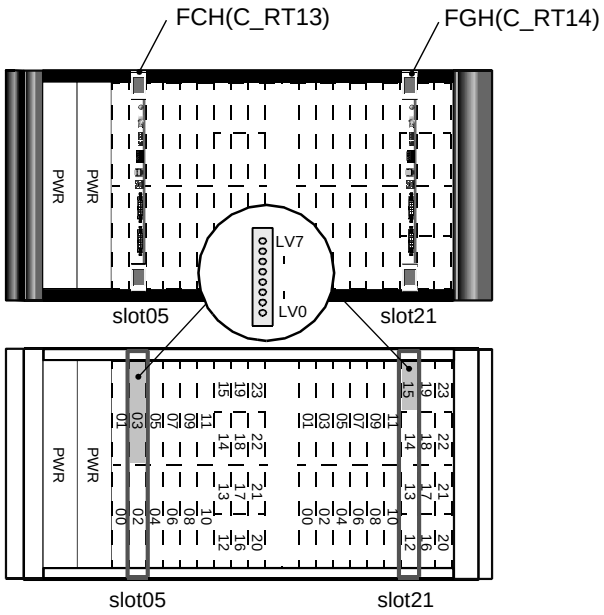
Note: *This data setting is an example.*

Figure 5-58 Sample Data Assignment (ACRD)

STEP 2: ACTK

Assign the connection trunk data of DTI, FCH, and FGH cards, using the ACTK command. When assigning FCH, FGH trunk data, eight trunks must be set. A sample data assignment of FCH, FGH card is as follows.

When FCH and FGH cards are mounted in the following slots with the specified C_RT numbers, data setting is as follows:



	C_RT (1-1023)	C_TK (1-4095)	C_LENS MG 00-07	U 0-3	G 00-23	L 0-7
FCH(C_RT13)	13	1	00	0	03	0
	13	2	00	0	03	1
	13	3	00	0	03	2
	13	4	00	0	03	3
	13	5	00	0	03	4
	13	6	00	0	03	5
	13	7	00	0	03	6
	13	8	00	0	03	7
FGH(C_RT14)	14	1	00	1	15	0
	14	2	00	1	15	1
	14	3	00	1	15	2
	14	4	00	1	15	3
	14	5	00	1	15	4
	14	6	00	1	15	5
	14	7	00	1	15	6
	14	8	00	1	15	7

Figure 5-59 Sample Data Assignment (ACTK)

STEP 3: MBCT

Unbusy the connection trunk data assigned in the previous step, by using the MBCT command. This is required for FCH, FGH trunks as well as speech channels.

STEP 4: AFCH

Assign FCH number on an FCH circuit card basis. In the following example, FCHN=1 is assigned for the FCH circuit card. For the FGH card, FCHN assignment is not necessary.

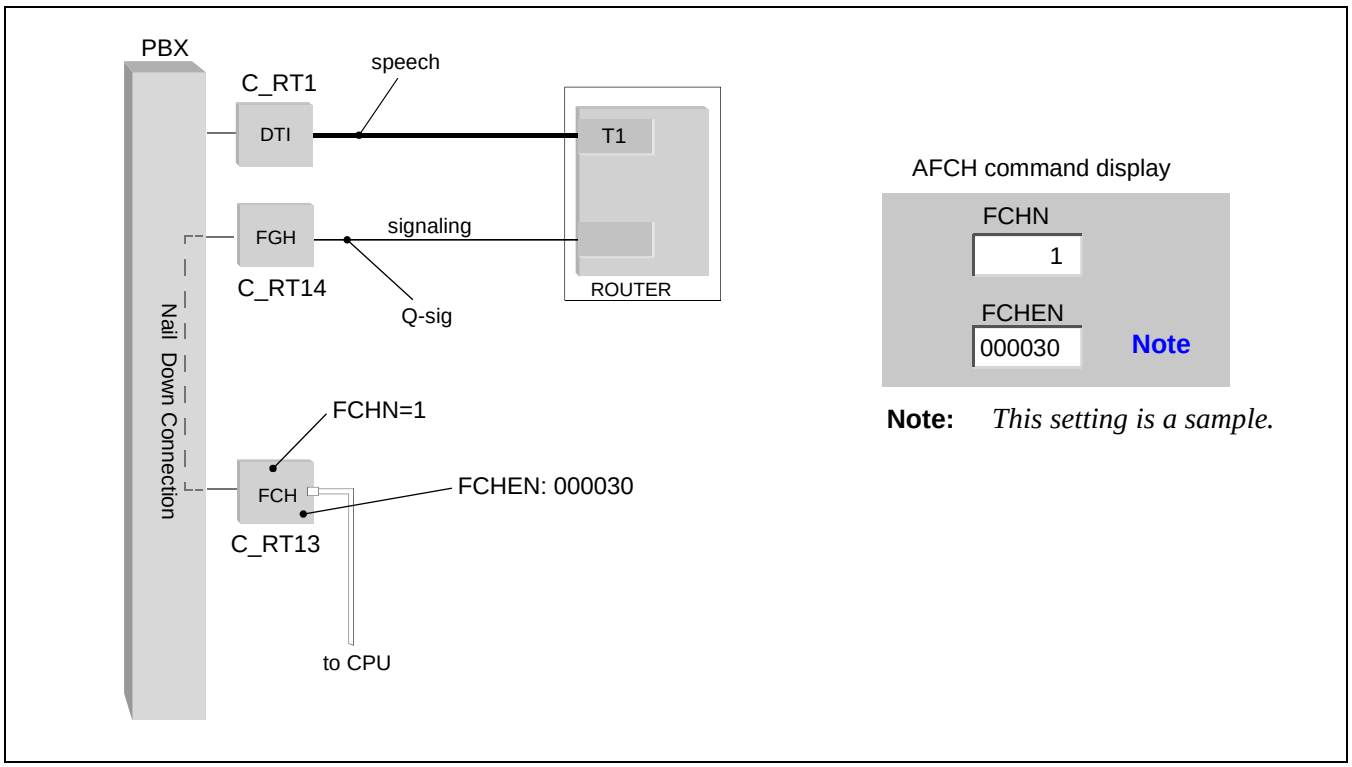


Figure 5-60 Assignment of FCHN (example)

STEP 5: AETH

Assign the FCCS routing data, when external router is used by specifying IP address.
FPC (Fusion Point Code): Assign FPC number (1 - 253) of the Destination Node.
FCHN (FCH Number): Assign the FCH Number, specified in STEP 4.
C_RT (Connection Route): 1 - 1023
DST_IP (Destination IP Address): Assign FGH IP address of the Destination Node.
NEXT_IP (Next IP Address): Assign FGH IP address of the Next Node (Node to be passed to).

Example data assignment is shown in Figure 5-61 and Figure 5-62.

FPC	11

CNT	1	2
C_RT	1	
FCHN (FCH Number)	1	
DST_IP	bbb.bbb.bbb.b	
NEXT_IP	bbb.bbb.bbb.b	

FPC	12

CNT	1	2
C_RT	1	
FCHN (FCH Number)	1	
DST_IP	ccc.ccc.ccc.c	
NEXT_IP	bbb.bbb.bbb.b	

A maximum of 8 routings are available.

Figure 5-61 Sample Data Assignment (AETH)

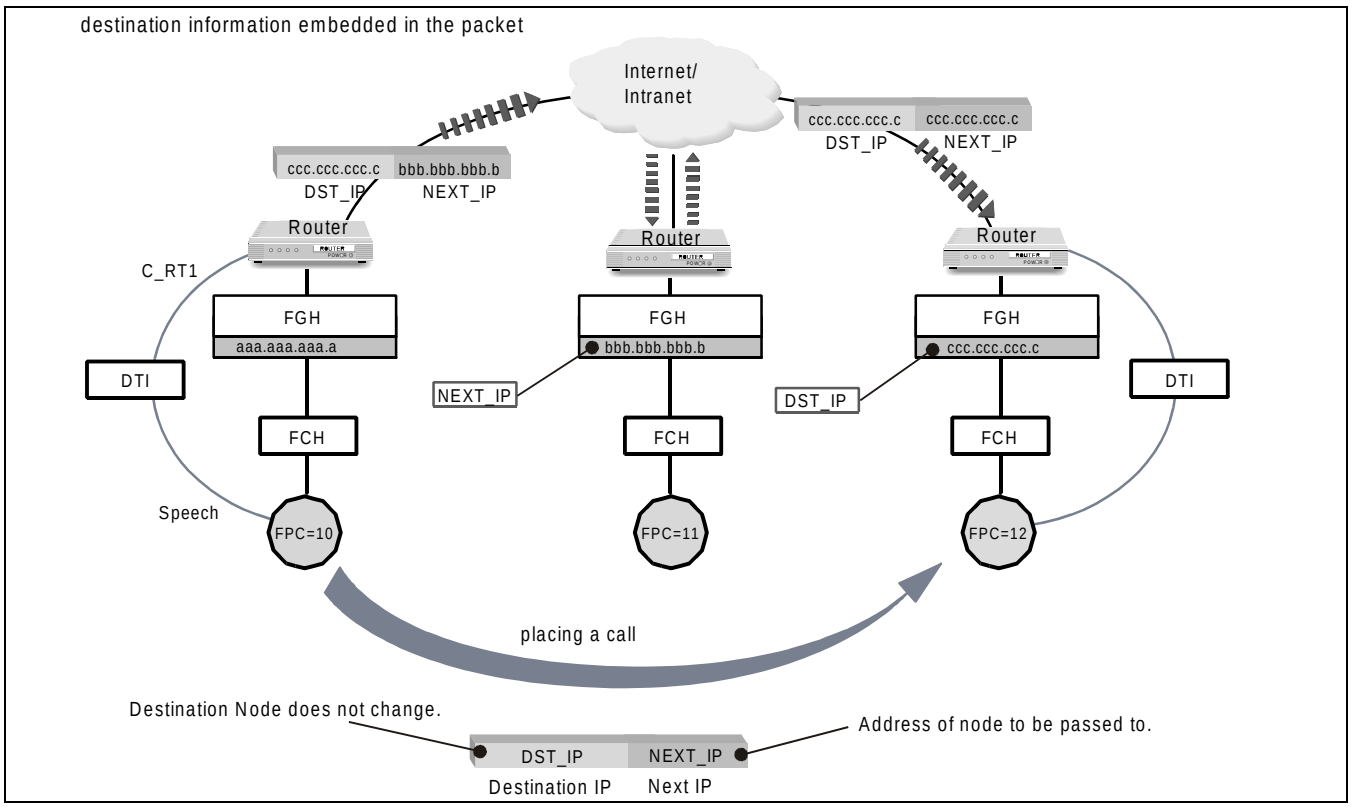


Figure 5-62 How to Assign Destination IP and Next IP

STEP 6: ACAN

Assign the Fusion Connection Index Code (FCIC) for the Next Node.
FPC (Fusion Point Code): Assign FPC number of the Self-node.
FCIC (Fusion Connection Index Code): Assign Fusion CIC of the Self-node.
C_LENS (Connection_LENS): Assign DTI LENS data (Bch data), specified in STEP 2.

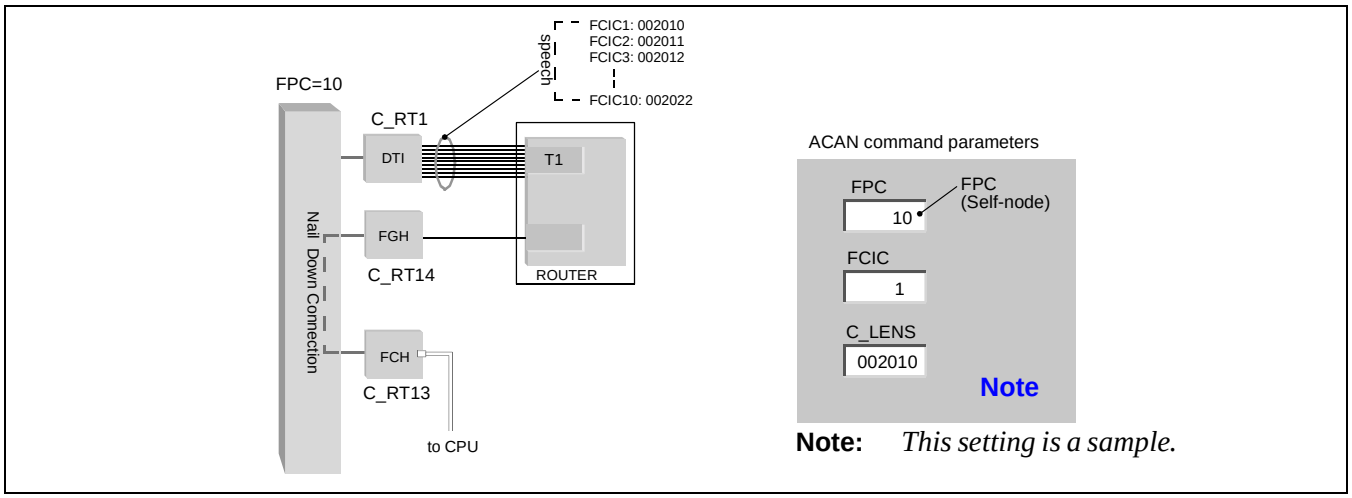


Figure 5-63 Sample Data Assignment (ACAN)

STEP 7: AFRT

Set Connection Route Numbers of the Speech Channels for the FCHN which was assigned in STEP 4.
FCHN (FCH Number): Assign FCHN, specified in STEP 4.
C_RT (Connection Route): Assign Connection Route of the Speech Channels, specified in STEP 1.

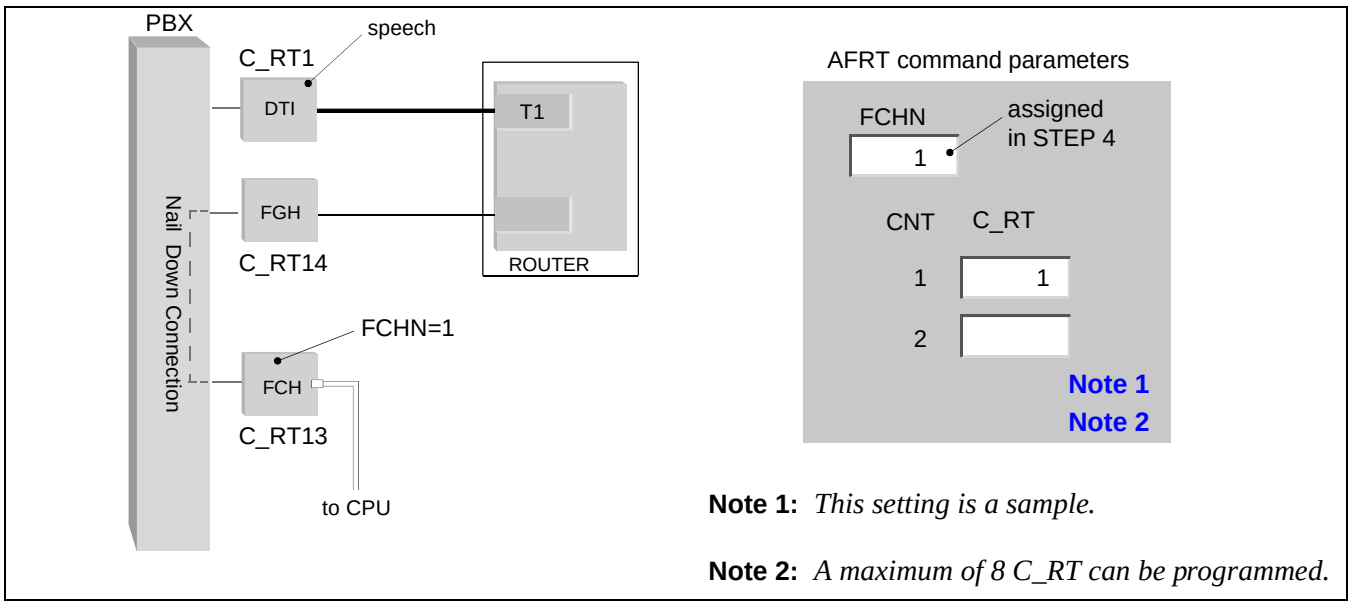


Figure 5-64 Sample Data Assignment (AFRT)

STEP 8: AGIP

Assign IP addresses of FGH card and its connected router.
LENS (Line Equipment Number): Assign the LENs data of FGH card.
KIND (Kind of Selection): Select “FGH”.
FGH_IP (FGH IP Address): Assign IP address of the FGH card.
DG_IP (Default Gateway IP Address): Assign IP address of the router.
NETMSK (Net Mask): Assign IP address of the Net Mask.
CONTTYP (Voice Channel Control Type): Select “Server”.
LINK_NUM (Qsig-Prime Link Number): Assign the number (1 - 32) of interfaces for speech (= total DTI card number).
ARP (ARP Frame Type): Select “DIX”.
CSLINK_NUM (Client/Server Connection Max. Number): Assign “16 line (default)”.

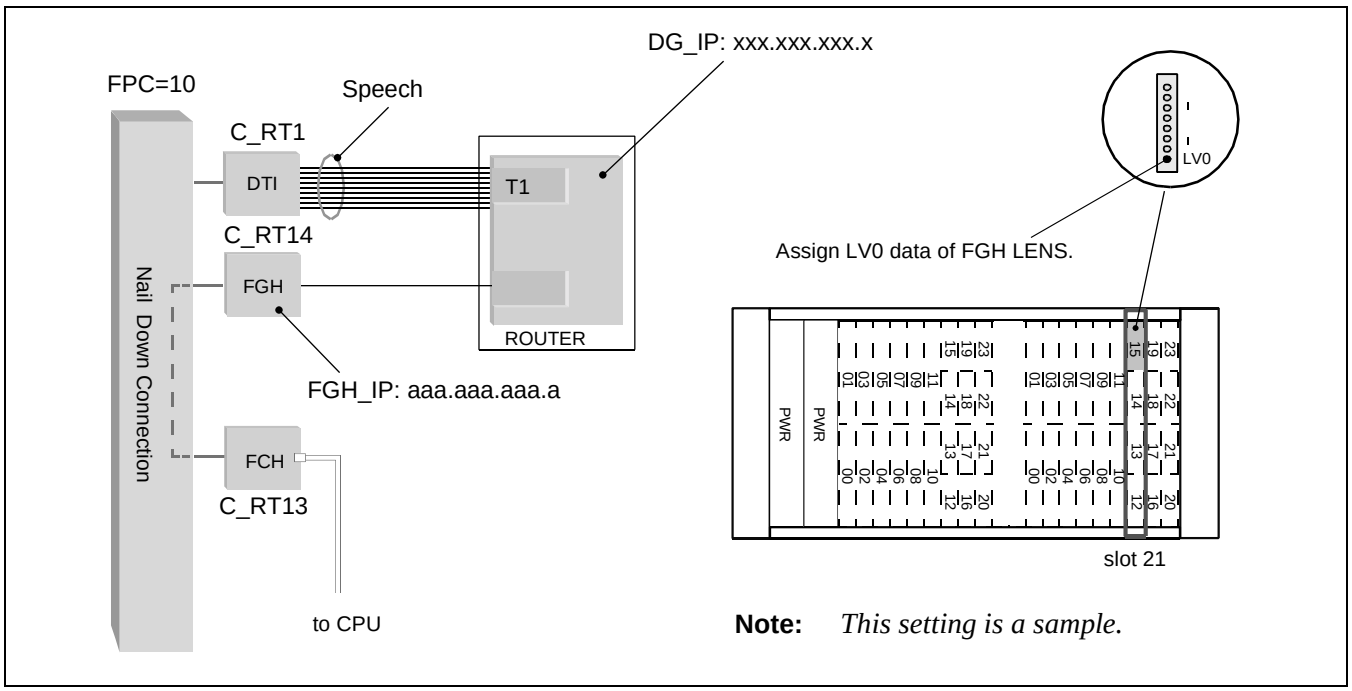


Figure 5-65 Sample Data Assignment (AGIP)

STEP 9: AFIP

Assign the Fusion over IP data for controlling Speech Channels between PBX and router.
FCHN (FCH Number): Assign FCHN specified in STEP 4.
FGHEN (FGH Equipment Number): Assign LV0 data of FGH LENs.
LENS (Equipment Number of Qsig-Prime B channel): Assign basic LENS of the Speech Channels. **Note 1**

RT-ACC (Router Access Number): Assign the Router Access Number (max. 16 digits).

Note: *Assign "LENS" and "RT_ACC" corresponding to the router port.*

Note 1: *Assign the "Basic LENS data" of the Speech Channels (1st LEN of the HW block where the DTI card is mounted).*

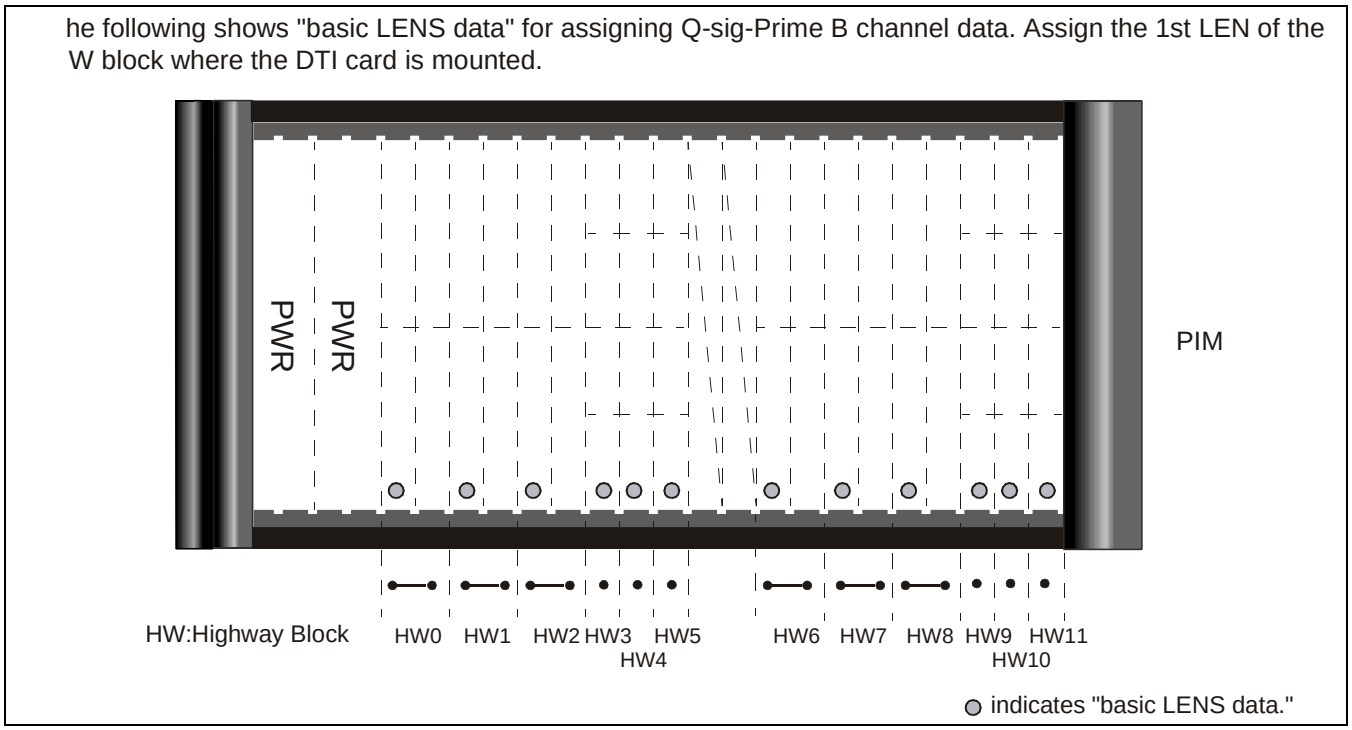


Figure 5-66 "Basic LENS Data" Assignment of Speech Channels (AFIP)

STEP 10: ASYD

Assign the data for nailed-down connection between FCH and FGH cards.
SYS 1, Index 60, b4 = 1 (Nailed-down connection: In service)

STEP 11: AFCD

Assign the detailed nailed-down connection data.
LENS-A: Assign the LENS data of FCH card.
EAD-A: Assign “0”.
LENS-B: Assign the LENS data of FGH card.
EAD-B: Assign “0”.

Note: *Assign all the data for FCH/FGH LENS (LV0-LV7).*

8. Office Data Sheets

8.1 Data Sheet for AFMUPL

FUSION POINT CODE (FPC) 1-253	MODULE GROUP (MG) 0/1	UNIT 0-3	REMARKS
	0	0	
		1	
	1		
	0	0	
		1	
	1		
	0	0	
		1	
	1		
	0	0	
		1	
	1		

8.2 Data Sheet for ALRTN

LOGICAL ROUTE NUMBER (LGRT) 1-899	FUSION POINT CODE (FPC) 1-253	EXTERNAL ROUTE NUMBER (RT) 1-255	REMARKS

8.3 Data Sheet for ANPD/ANPDL/ANDPN

TENANT NUMBER (TN)	1ST DIGIT (1ST DC)	CONNECTION STATUS INDEX (CI)	BUSY LAMP FIELD (BLF)

8.4 Data Sheet for ASPA/ASPAL

TENANT NUMBER (TN)	ACCESS CODE (ACC) MAX. 6 DIGITS	CONNECTION STATUS INDEX (CI) 1/2		KIND OF SERVICE (SRV)	ANNOUNCEMENT TENANT NUMBER (TN) 1-125	ANNOUNCEMENT EQUIPMENT NUMBER (EQP) 122-125	REMARKS
		N	Normal	10			
		H	Hooking				
		N	Normal	10			
		H	Hooking				
		N	Normal	10			
		H	Hooking				
		N	Normal	10			
		H	Hooking				
		N	Normal	10			
		H	Hooking				
		N	Normal	10			
		H	Hooking				
		N	Normal	10			
		H	Hooking				
		N	Normal	10			
		H	Hooking				
		N	Normal	10			
		H	Hooking				
		N	Normal	10			
		H	Hooking				
		N	Normal	10			
		H	Hooking				
		N	Normal	10			
		2	Hooking				
		N	Normal	10			
		H	Hooking				
		N	Normal	10			
		H	Hooking				
		N	Normal	10			
		H	Hooking				
		N	Normal	10			
		H	Hooking				
		N	Normal	10			
		H	Hooking				
		N	Normal	10			
		H	Hooking				
		N	Normal	10			
		H	Hooking				

8.5 Data Sheet for ALGNL

USER GROUP NUMBER (UGN)	LOGICAL STATION NUMBER (LSTN) MAX. 16 DIGITS	REMARKS

8.6 Data Sheet for ALGSL (TYPE1)

TYPE	UGN	LSTN	LENS	REMARKS
1	1			
1	1			
1	1			
1	1			
1	1			
1	1			
1	1			
1	1			
1	1			
1	1			
1	1			
1	1			
1	1			
1	1			
1	1			
1	1			
1	1			
1	1			
1	1			
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1	1			
1	1			
1	1			
1	1			
1	1			
1	1			
1	1			
1	1			
1	1			
1	1			
1	1			
1	1			

8.7 Data Sheet for ALGSL (TYPE2)

TYPE	UGN	LSTN	TN	LENS	REMARKS
2	1				
2	1				
2	1				
2	1				
2	1				
2	1				
2	1				
2	1				
2	1				
2	1				
2	1				
2	1				
2	1				
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2	1				
2	1				

8.8 Data Sheet for ASDT

TENANT NUMBER (TN)	STATION NUMBER (STN)	LINE EQUIPMENT NUMBER (LENS)				TELEPHONE EQUIPMENT CLASS (TEC) 1-31	ROUTE RESTRICTION CLASS (RSC) 0-15	SERVICE FEATURE CLASS (SFC) 0-15	REMARKS
		MG	U	G	LV				

8.9 Data Sheet for ACRD

CDN	CONNECTION RT No. (C_RT) 1-1023 / FUNCTION (FUNC)						
1	TF - Type of Trunk 0-2 = - 3 = Bothway Trunk (BWT)	3	3	3	3	3	3
2	TCL - Trunk Class (Fixed “4”) 0-3 = - 4 = Fusion Trunk 5-31 = -	4	4	4	4	4	4
3	RLP - Trunk Release Pattern (Fixed “2”) 0-1 = - 2 = First party Release 3 = -	2	2	2	2	2	2
4	SMDR - Detailed Billing Information (Fixed “0”) 0 = SMDR is out of service 1 = SMDR is in service	0	0	0	0	0	0
5	LSG - Line Signal 0-11 = - 12 = B-channel 13 = D-channel 14, 15 = -						
6	PAD - PAD control (Fixed “7”) 0=0bB (Default) 1 = Send 8bD, Receive 0dB 2 = Send 4dB, Receive 4dB 3 = Send 8dB, Receive 12dB 4 = Send 8dB, Receive 8dB 5 - 6 = - 7 = 0dB	0	0	0	0	0	0
7	TRKS - Trunk Selection Sequence 0 = LIFO 1 = FIFO	0	0	0	0	0	0
8	TC/EC (Fixed “0”) 0 = No MPC/EC 1 = EC 2 = MPC 3 = Not used	0	0	0	0	0	0
9	FINT - Fusion Interface Specification 0 = Fusion standard 1-15 = -	0	0	0	0	0	0

CDN	CONNECTION RT No. (C_RT) 1-1023 / FUNCTION (FUNC)						
10	FPEG - Fusion-PEG (Fixed “0”) 0 = Nothing of FUSION-PEG 1 = Exist of FUSION-PEG	0	0	0	0	0	0
11	TC - Timer Class (Fixed “0”) 1 = 1 sec. 2 = 2 sec. 3 = 8 sec. 4 = 30 sec.	0	0	0	0	0	0
12	MTC - Miscellaneous Timer Counter (Fixed “0”) Timer value = (TC) × (MTC)	0	0	0	0	0	0
13	STSEQ - Status ENQ (Fixed “0”) Fusion link status check 0 = Available 1 = Unavailable	0	0	0	0	0	0
14	FGH - Fusion Gateway Handler (Fixed “0”)	0	0	0	0	0	0
15	MMN - Kind of Multiple Equipment 0 = TDM 1 = MM - Node 2 - 3 = -	0	0	0	0	0	0

8.10 Data Sheet for ACTK

CONNECTION ROUTE NUMBER (C_RT) 1-1023	CONNECTION TRUNK NUMBER (C_TK) 1-4095	CONNECTION EQUIPMENT NUMBER (C_LENS)	REMARKS

8.11 Data Sheet for AFCH

FCCH NUMBER (FCHN) 1-255	LENS OF FCCH (FCHEN)				REMARKS
	MG	U	G	L	
1				0	
2				0	
3				0	
4				0	
5				0	
6				0	
7				0	
8				0	
9				0	
10				0	
11				0	
12				0	
13				0	
14				0	
15				0	
16				0	
17				0	
18				0	
19				0	
20				0	
21				0	
22				0	
23				0	
24				0	
25				0	
26				0	
27				0	
28				0	
29				0	
30				0	
31				0	
32				0	
33				0	

FCCH NUMBER (FCHN) 1-255	LENS OF FCCH (FCHEN)				REMARKS
	MG	U	G	L	
34				0	
35				0	
36				0	
37				0	
38				0	
39				0	
40				0	
41				0	
42				0	
43				0	

8.12 Data Sheet for AFPC

FUSION POINT CODE (FPC) 1-253	FCCH USE OR NOT USE (FCCH) 0/1	GATEWAY FUNCTION USE (USE_GATE) 0/1 Note	PRIORITY ROUTE (P_ROUTE) 0/1

	1	2	3	4	5	6	7	8
CONNECTION ROUTE (C_RT) 1-1023								
FCCH NUMBER/FUSION POINT CODE NUMBER (FCHN/FPCN) 1-255/1-253								

FUSION POINT CODE (FPC) 1-253	FCCH USE OR NOT USE (FCCH) 0/1	GATEWAY FUNCTION USE (USE_GATE) 0/1 Note	PRIORITY ROUTE (P_ROUTE) 0/1

	1	2	3	4	5	6	7	8
CONNECTION ROUTE (C_RT) 1-1023								
FCCH NUMBER/FUSION POINT CODE NUMBER (FCHN/FPCN) 1-255/1-253								

FUSION POINT CODE (FPC) 1-253	FCCH USE OR NOT USE (FCCH) 0/1	GATEWAY FUNCTION USE (USE_GATE) 0/1 Note	PRIORITY ROUTE (P_ROUTE) 0/1

	1	2	3	4	5	6	7	8
CONNECTION ROUTE (C_RT) 1-1023								
FCCH NUMBER/FUSION POINT CODE NUMBER (FCHN/FPCN) 1-255/1-253								

Note: *“USE_GATE” data is automatically set and this parameter won’t appear on the MAT display.*

FUSION POINT CODE (FPC) 1-253	FCCH USE OR NOT USE (FCCH) 0/1	GATEWAY FUNCTION USE (USE_GATE) 0/1 Note	PRIORITY ROUTE (P_ROUTE) 0/1

	1	2	3	4	5	6	7	8
CONNECTION ROUTE (C_RT) 1-1023								
FCCH NUMBER/FUSION POINT CODE NUMBER (FCHN/FPCN) 1-255/1-253								

8.13 Data Sheet for ACAN

FUSION POINT CODE (FPC) 1-253	FUSION CIC NUMBER (FCIC) 1-4095	CONNECTION EQUIPMENT NUMBER (C_LENS)	REMARKS

8.14 Data Sheet for AFRT

FCCH NUMBER (FCHN) 1-255	CONNECTION ROUTE (C_RT) 1-1023							
	1	2	3	4	5	6	7	8

8.15 Data Sheet for AFRFL

TN	FPC (1-253)	ACC MAX. 24 digits

8.16 Data Sheet for AETH

DESTINATION FPC (FPC) 1-253	GATEWAY USING FLAG (USE_GATE) 0/1 Note	FCCH NUMBER (FCHN) 1-255	CONNECTION ROUTE (C_RT) 1-1023	DESTINATION IP ADDRESS (DST_IP)	NEXT IP ADDRESS (NEXT_IP)

Note: *"USE_GATE" data is automatically set and this parameter won't appear on the MAT display.*

8.17 Data Sheet for AGIP

a.) When "KIND=FGH" is selected

KIND OF SELECTION (KIND)	LINE EQUIPMENT NUMBER OF FGH (FCHEN)	FGH IP ADDRESS (FGH_IP)	IP ADDRESS FOR DEFAULT GATEWAY (DG_IP)	FRAME TYPE OF ARP (ARP)	VOICE CHANNEL CONTROL TYPE (CONT-TYP)	QSIG-PRIME LINK NUMBER (LINK_NUM) 0-32	CLIENT/ SERVER CONNECTION MAX. NUMBER (CSLINK_NUM)	NET MASK (NETMSK)

b.) When "KIND=IPTRK (CCIS/FCCS)" is selected (Continued)

KIND OF SELECTION (KIND)	LINE EQUIPMENT NUMBER OF IPTRK (IPTEN)	IPTRK IP ADDRESS (IPTK_IP)	IP ADDRESS FOR DEFAULT GATEWAY (DG_IP)	FRAME TYPE OF ARP (ARP)	THE MAXIMUM LINK NUMBER OF CLIENT (CLINK_NUM)	THE MAXIMUM LINK NUMBER OF SERVER (SLINK_NUM)

b.) When "KIND=IPTRK (CCIS/FCCS)" is selected (Continued)

NET MASK (NETMSK)	KIND OF MULT CONNECTION (MULT)	IP ADDRESS OF DESTINATION IPTRUK (DST_IP)	QoS DATA FOR SIGNAL ROUTE (QoS 1) 0-7	QoS DATA FOR SPEECH PATH (QoS 2) 0-7	NETWORK ID (NETID) 0-15

8.18 Data Sheet for AFIP

FCH NUMBER (FCHN)	LINE EQUIPMENT NUMBER OF FGH (FGHEN)				LINE EQUIPMENT NUMBER OF QSIG-PRIME Bch (LENS)				ROUTER ACCESS NUMBER (RT_ACC) Max. 16 digits
	MG	U	G	LV	MG	U	G	LV	

This page is for your notes.

CHAPTER 6 POST INSTALLATION TEST

This chapter covers how to perform installation tests focusing on the Fusion Call Control Signal (denoted in the remainder of this manual as FCCS) connections, after hardware installation and data assignment. This chapter describes the following tests:

- How to Check Fusion Link by LEDs on an FCH Card
- Repair Procedure When LED Indicates Abnormality
- FCCS Network Connection Test
- FCCS Alternate Routing Test
- Fusion and Non-Fusion Connection Test

At the end of this chapter, the Fusion Link Test Sheet is attached. Photocopy the sheet to record the test results.

Figure 6-1 illustrates the network numbering that is used in this chapter to explain the installation tests.

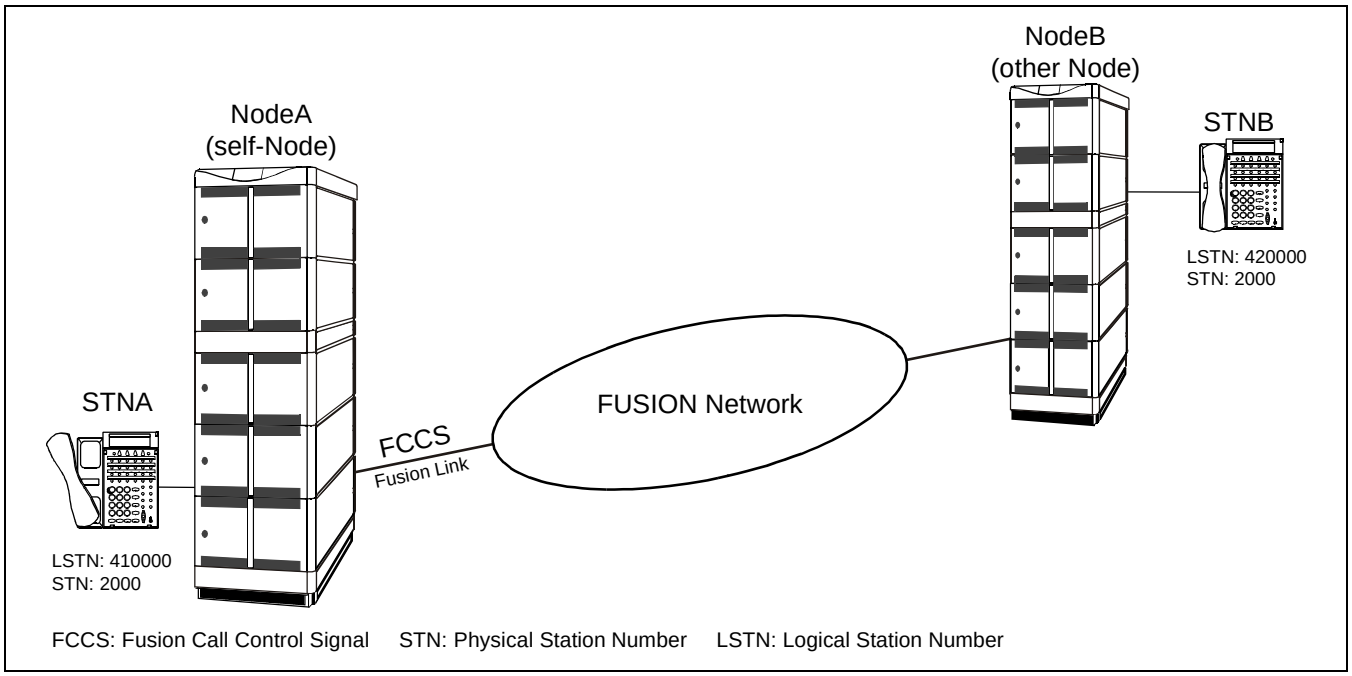


Figure 6-1 Fusion Network

Note: *The Individual Trunk Access feature is not available for Fusion Trunks. To seize a specific Fusion Trunk, use the MBCT command to make busy trunks which are not being tested. This command leaves the Fusion trunk to be tested in an idle state.*

1. How to Check Fusion Link by LEDs on FCH Card

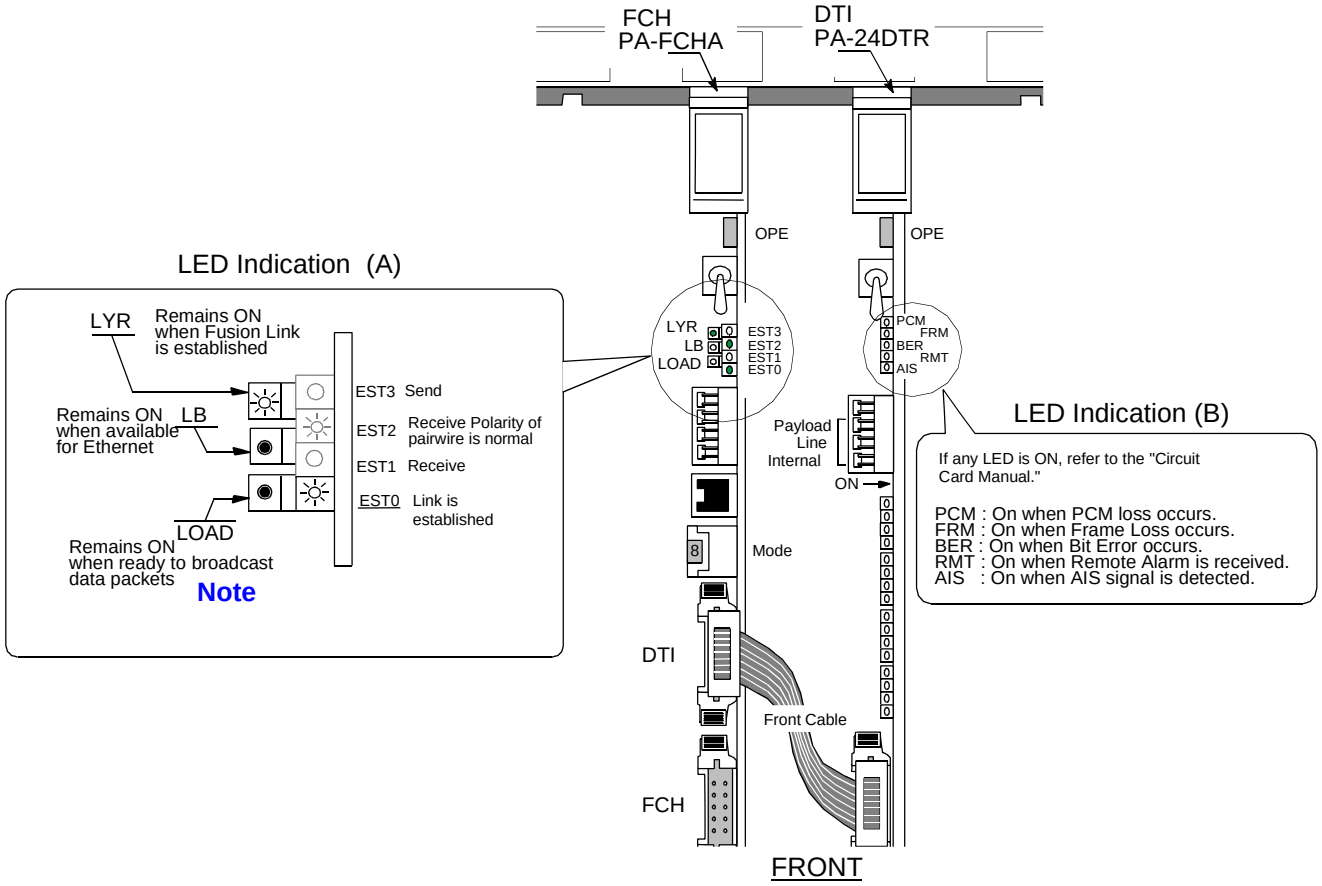
Before performing the Fusion link test, be sure to check the Fusion Link LEDs. Refer to Figure 6-2 for the LED indications. When the Fusion link is established, the LYR lamp lights green on the FCH (PA-FCHA) circuit card. However, if it remains off, the layer 2 (Link Layer) is not established. If this is the case, follow the repair procedure listed below.

1.1 How to check LYR LED

1. Confirm the LYR LED lights green on the front edge of the FCH (PA-FCHA) circuit card. (See "LED Indication (A)" in Figure 6-2.) When the LED lights green, the fusion link is established.
2. Make sure that any alarm LED is not ON (red/yellow). (See LED Indication (B) in Figure 6-2.)

   When all alarm LEDs are OFF, the DTI (PA-24DTR) card is in normal operation.

   If any abnormal state is detected, please see the NEAX2400 IPX Circuit Card Manual.



Note: *When the FCH is a Root Bridge, the LOAD LED remains ON.*

When the FCH is Backup Bridge, the LOAD LED flashes (60INT).

Figure 6-2 LED Indications on Fusion Link Related Circuit Cards

2. Repair Procedure When LED Indicates Abnormality

If the LED indication appears abnormal, check the following items again:

2.1 Front Cable

Make sure that front cable 10AL (10) FLT CA is securely inserted into the connectors.

- FCH (PA-FCHA) switch setting

  Make sure that the following keys are set properly:

  - Dch TS designation (0ch - 23ch: SW11, SW12, SW13)
  - Data Link Signal Logic (positive/negative: SW14-1)
  - Fusion Data Link Speed (48/56/64 kbps: SW14-2, 3)
  - LAPD Signal Link (user/network: SW14-4)

- 24DTI (PA-24DTR) switch setting

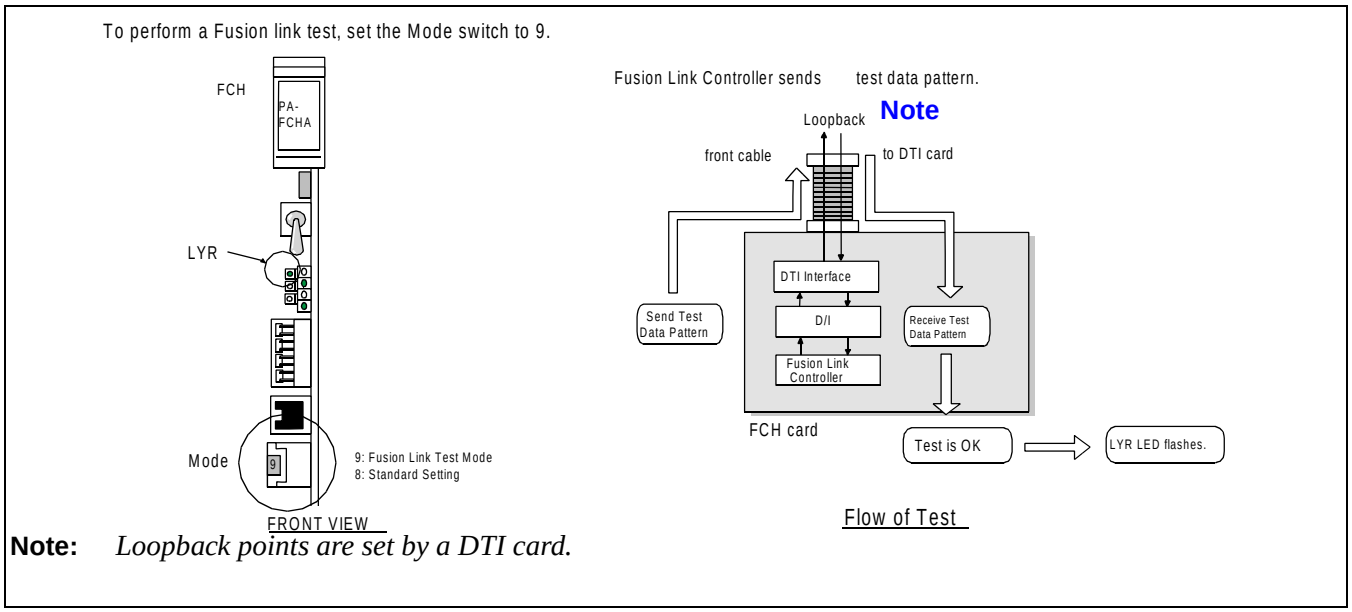
  Make sure that the keys are properly set on the card. See the NEAX2400 IPX Circuit Card Manual.

If the Fusion link is not established with this repair procedure, perform the Fusion Link Test.

2.2 How to Perform the Fusion Link Test

2.2.1 Fusion Link Test Mode Setting

To set the FCH card in Fusion Link Test Mode, set the Mode Switch to 9. Initialize the FCH card using the MB key. When the Mode is 9, the Fusion Link Controller on the FCH card sends a test data pattern. When the same pattern is received again, the PM activates the LYR LED, flashing the LED at 60-INT to indicate that the test result is OK. Figure 6-3 illustrates the Fusion Link Test Mode.



Note: *Loopback points are set by a DTI card.*

Figure 6-3 Fusion Link Test Mode

Note: *Be sure to initialize the FCH (PA-FCHA) card after changing the setting of the Mode Switch.*

2.2.2 Loopback Point Designation

The DTI card can be set at one of the following loopback points:

1. Internal Loopback

   All 24 B-channels sent from the TSW are looped back to the TSW at Interface on the card. At this time, the adjacent node detects AIS signals. (See ① in Figure 6-4.)

2. Line Loopback

   All 24 B-channels sent from the line are looped back to the line at Line Interface on the card. (See ② in Figure 6-4.)

3. Payload Loopback

   All 24 B-channels sent from the line are looped back to the line at Speech Path Control Block on the card. (See ③ in Figure 6-4.)

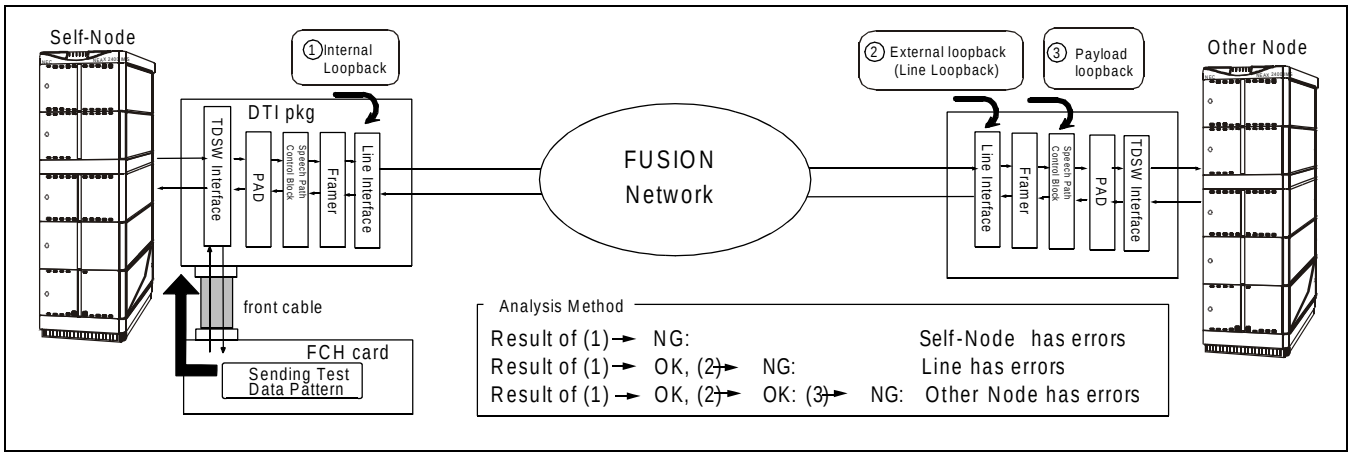
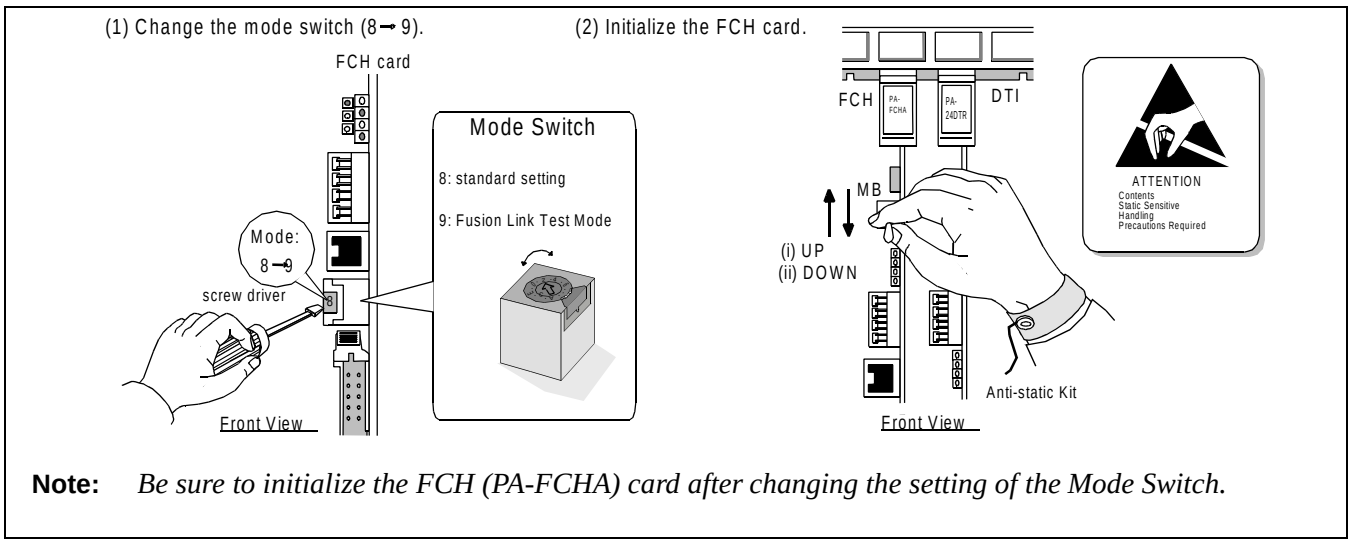


Figure 6-4 Loopback Points of DTI Card

2.3 Test Procedure

STEP 1: Set the MODE switch to 9 (Fusion Link Test) from 8 (standard setting) on the FCH card, and initialize the circuit card by turning the MB switch ON→OFF. Refer to Figure 6-5.



Note: *Be sure to initialize the FCH (PA-FCHA) card after changing the setting of the Mode Switch.*

Figure 6-5 How to Set the Fusion Link Test Mode

STEP 2: Select an appropriate loopback point by setting the switch (SW01/SW13B). Refer to Figure 6-6.

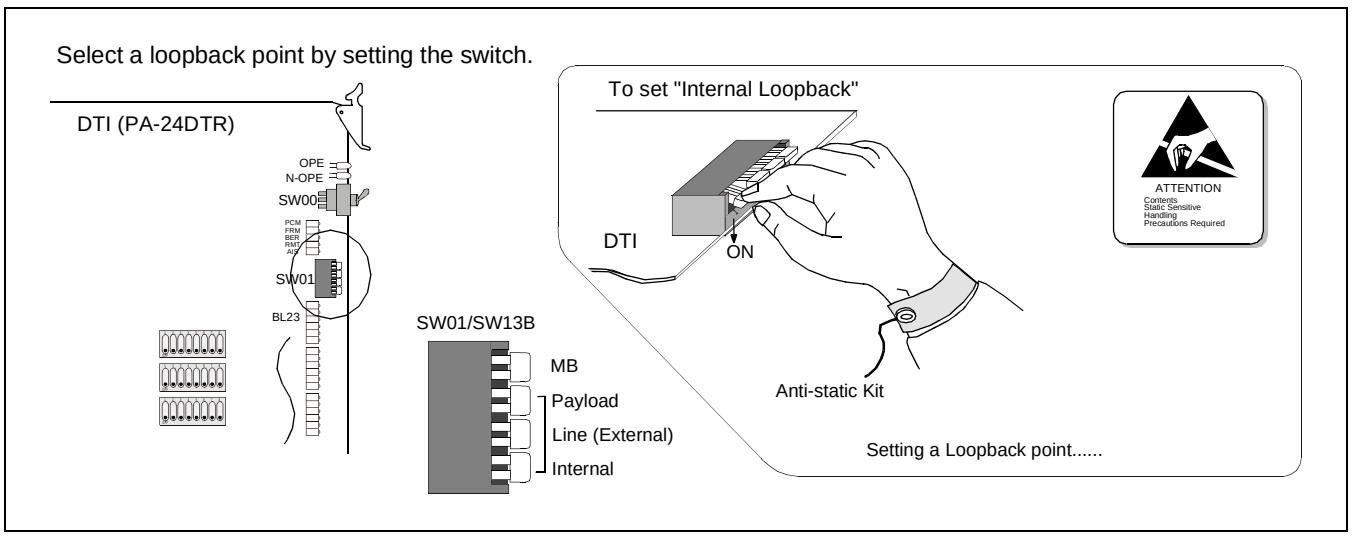
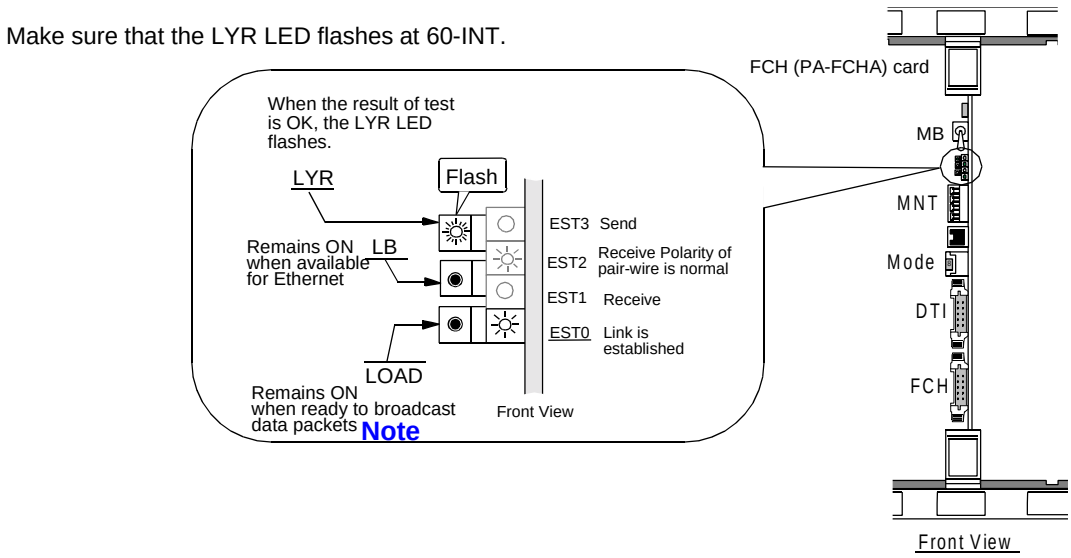


Figure 6-6 Loopback Point Designation

STEP 3: When the LYR LED flashes at 60-INT, the loopback in the block specified in Step 2 is OK. Refer to Figure 6-7.



Note: *When the FCH is a "Root Bridge", the LOAD LED remains ON.*

Figure 6-7 Fusion Link-Test Results

STEP 4: Return Mode to 8 (standard setting) when the test is complete.

STEP 5: Initialize the FCH (PA-FCHA) card using the MB switch.

Note: *Be sure to initialize the FCH (PA-FCHA) card after changing the setting of the Mode Switch.*

3. FCCS Network Connection Test

This section explains how to perform the following connection tests within the Fusion network:

- Station-to-Station Connection Test (via FCCS)
- ATTCON Connection Test (via FCCS)
- Line (LC, ELC, DLC card) Connection Test (via FCCS)
- 3-party Conference Trunk Function Test (via FCCS)

3.1 Station-to-Station Connection Test (via FCCS)

Perform the station-to-station connection test by following the procedures below and by referring to Figure 6-8:

3.1.1 FCCS Call Origination Test

Check ☐

STEP 1: Using the MBCT command, make busy all trunks in the route except the trunk to be tested.

STEP 2: Lift the handset of STN A in Node A.

STEP 3: Dial a telephone number (STN B) that belongs to another node.

STEP 4: The call terminates on STN B.

STEP 5: Confirm the speech condition is sufficient (no noise, not one-way speech, etc.).

STEP 6: Replace the handset of STN A.

STEP 7: Repeat the above steps for all Fusion links.

3.1.2 FCCS Call Termination Test

Check ☐

STEP 1: Using the MBCT command, make busy all trunks in the origination route except the trunk to be tested at Node B.

STEP 2: Lift the handset of STN B in Node B.

STEP 3: Dial a telephone number (STN A) that belongs to the self-node.

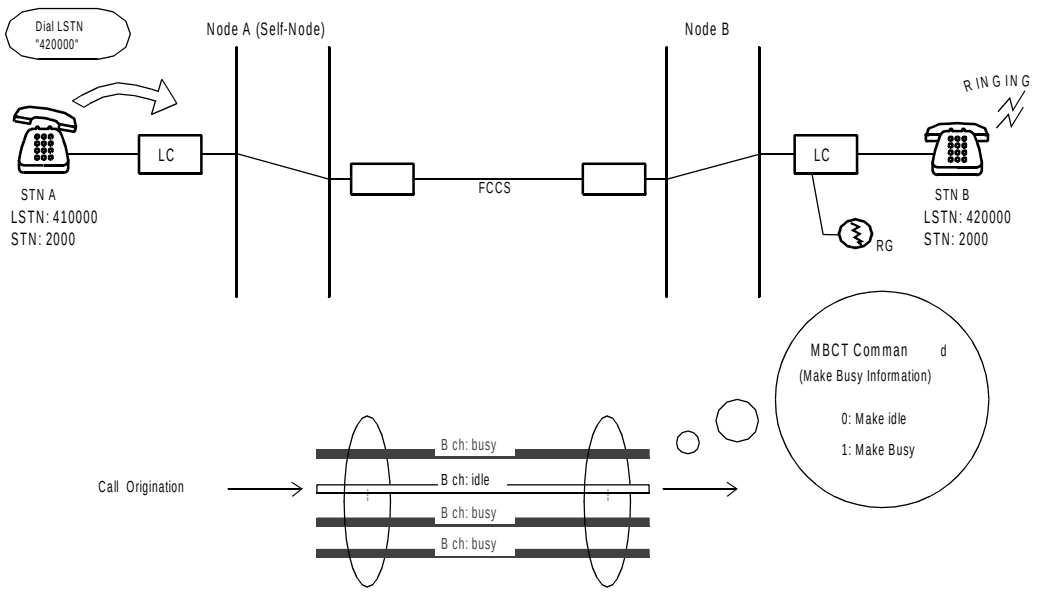
STEP 4: The call terminates on STN A.

STEP 5: Confirm the speech condition is sufficient (no noise, not one-way speech, etc.).

STEP 6: Replace the handset of STN B.

STEP 7: Repeat the above steps for all Fusion links

.



Note: *Using the MBCT command, make busy all B-channels in the route except the trunk to be tested.*

Figure 6-8 Station-to-Station Connection Test (origination) via FCCS

3.2 ATTCON Connection Test (via FCCS)

Perform the ATTCON connection test by following the procedures below and by referring to Figure 6-9:

3.2.1 ATTCON Call Origination Test

Check ☐

STEP 1: Dial the operator access code (normally “0”), from STN A in Node A.

STEP 2: Confirm that the ATT lamp flashes and ringer sounds at each ATTCON in Node B.

STEP 3: Answer the call by pressing the ATND key.

STEP 4: Confirm the speech condition is sufficient (no noise, not one-party speech, etc.).

STEP 5: Release the call by pressing the CANCEL key.

STEP 6: Replace the handset of STN A in Node A.

3.2.2 ATTCON Call Termination Test

Check ☐

STEP 1: Press a LOOP key on an ATTCON in Node B.

STEP 2: Dial the telephone number of STN A.

STEP 3: Confirm the ringer sounds properly at STN A.

STEP 4: Answer the call and confirm the speech condition is sufficient (no noise, not one-way speech, etc.).

STEP 5: The operator at the ATTCON releases the call by pressing the CANCEL key.

STEP 6: Replace the handset of STN A in Node A.

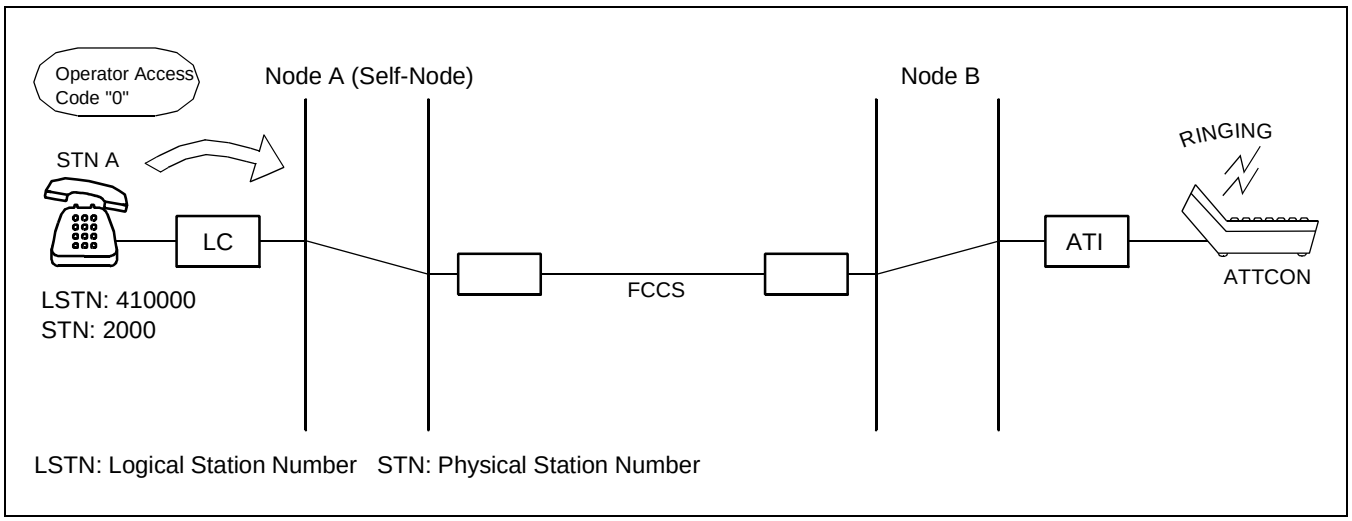


Figure 6-9 ATTCON Connection Test (origination) via FCCS

3.3 Line (LC, ELC, DLC Card) Connection Test (via FCCS)

Perform the Line (LC, ELC, DLC Card) connection test by following the procedures below and by referring to Figure 6-10:

3.3.1 Line Origination Test: Confirmation of Physical/Telephone STN Number

Check ☐

STEP 1: Connect the line circuit card to be tested to a telephone set in Node A (self-Node).

STEP 2: Lift the handset of STN A and confirm dial tone.

STEP 3: Place a call to an ATTCON or D^{term} in Node B.

STEP 4: Answer the call and confirm the speech condition and Physical/Telephone (station) number of the calling station.

STEP 5: Release the call.

3.3.2 Line Termination Test: Confirmation of Telephone STN Number

Check ☐

STEP 1: Place a call from ATTCON/D^{term} in Node B using the telephone number of STN A.

STEP 2: Answer the call.

STEP 3: Confirm the number dialed and that the telephone number of STN A are the same on the display of the ATTCON/D^{term}.

STEP 4: Release the call.

3.3.3 Line Connection Test: Case of Hot Line/House Phone Involved

Check ☐

STEP 1: The Station to be tested goes off-hook and confirms ringback tone.

STEP 2: Check whether the call is routed to the predetermined station/ATTCON.

STEP 3: Answer the calls and confirm the speech condition.

STEP 4: Release the call.

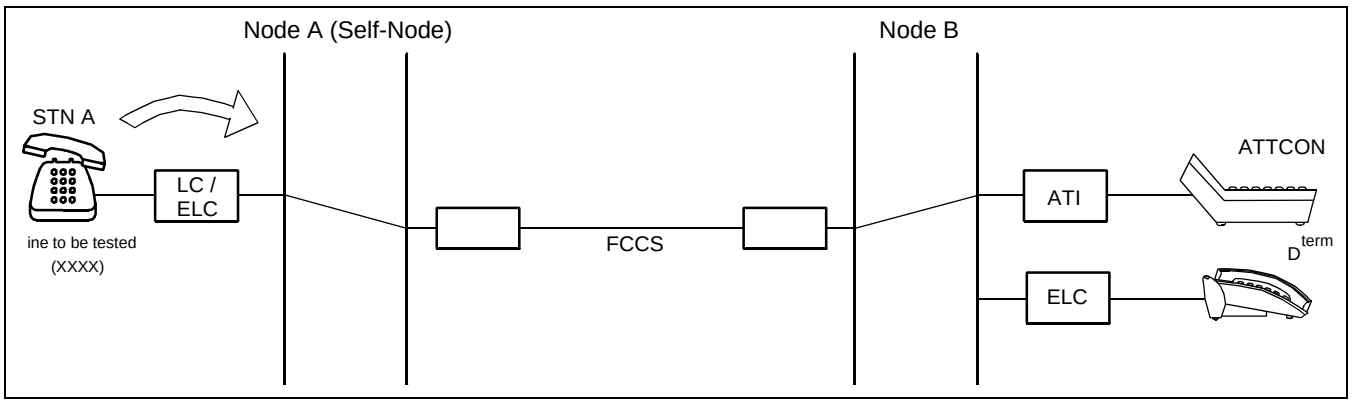


Figure 6-10 Line Connection Test (origination) via FCCS

3.4 3-party Conference Trunk Function Test (via FCCS)

Perform the 3-party conference trunk function test by following the procedures below and by referring to Figure 6-11:

STEP 1: Using the MBTK Command, make busy all 3-party Conference Trunk (CFTs) except the trunk to be tested.

STEP 2: Establish a station-to-station connection between STNs A and B in self-node (Node A). Check ☐

STEP 3: STN A goes to Switch Hook Flash (SHF), and after hearing special dial tone, dials the telephone number of STN C in other node (Node B).

STEP 4: STN C answers the call.

STEP 5: STN A, after a brief talk with STN C, makes a SHF, and confirms that a three-way connection has been set up.

STEP 6: Release the call.

STEP 7: Repeat the above steps for all CFTs.

STEP 8: Using the MBTK command, cancel the make-busy status of the trunk.

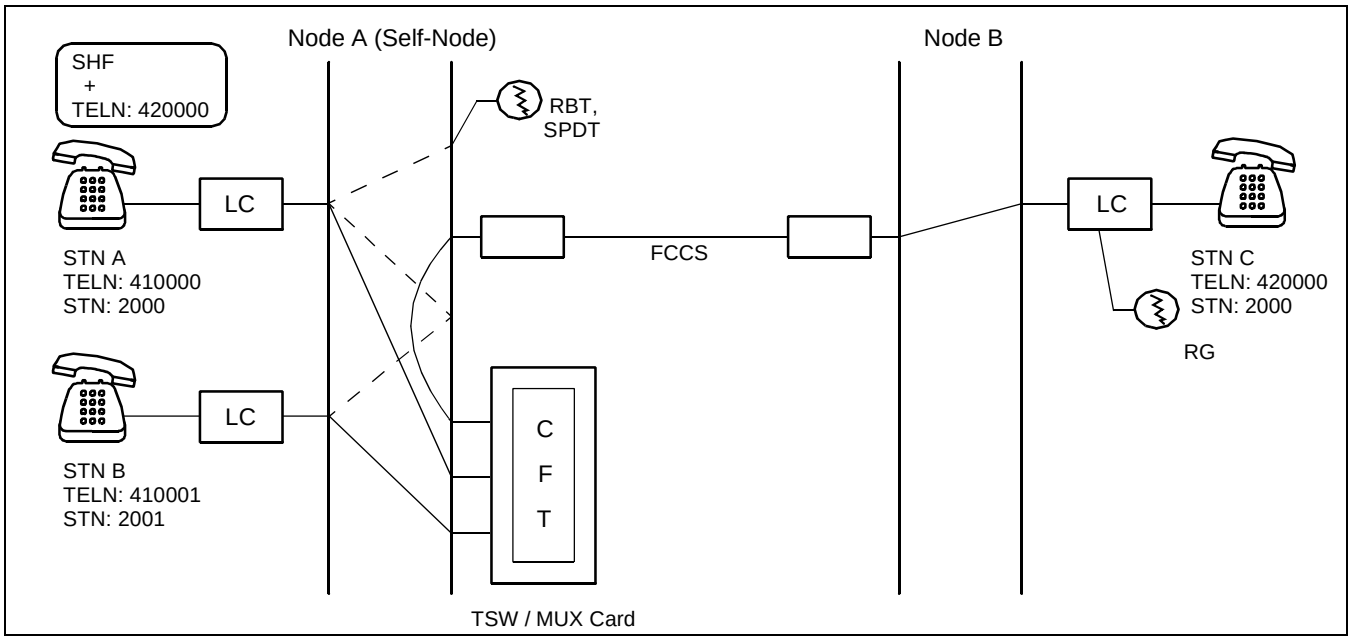


Figure 6-11 3-party Conference Trunk Function Test via FCCS

Note: *When a station activates this feature, CFT in Self-Node is used. In this case, CFT in Node A is used.*

3.5 FCCS Alternate Routing Test

This section explains how to perform the test for Fusion-link alternate routing. Following the procedures below and referring to Figure 6-12, make sure that the connection and alternate routing to all FCCS lines are normal and correctly established.

3.5.1 Primary Route Trunk Test

Check ☐

STEP 1: Using the MBCT command, make busy all trunks in the primary route except the trunk to be tested.

STEP 2: Lift the handset of STN A in self-node (Node A).

STEP 3: Dial the telephone number of STN B that belongs to other node (STN B).

STEP 4: Confirm the speech condition is sufficient (no noise, not one-way speech, etc.).

STEP 5: Replace the handset of STN A.

STEP 6: Make idle all the trunks that were placed in make-busy state in STEP 1.

3.5.2 Alternate Route Trunk Test

Check ☐

STEP 1: Using the MBCT command, make busy all trunks in the primary route.

STEP 2: Using the MBCT command, make busy all trunks in the alternate route except the trunk to be tested.

STEP 3: Lift the handset of STN A.

STEP 4: Dial the telephone number of STN B.

STEP 5: Confirm the speech condition is sufficient (no noise, not one-way speech, etc.).

STEP 6: Replace the handset of STN A.

STEP 7: Make idle all the trunks that were placed in make-busy state in STEP 1 and STEP 2.

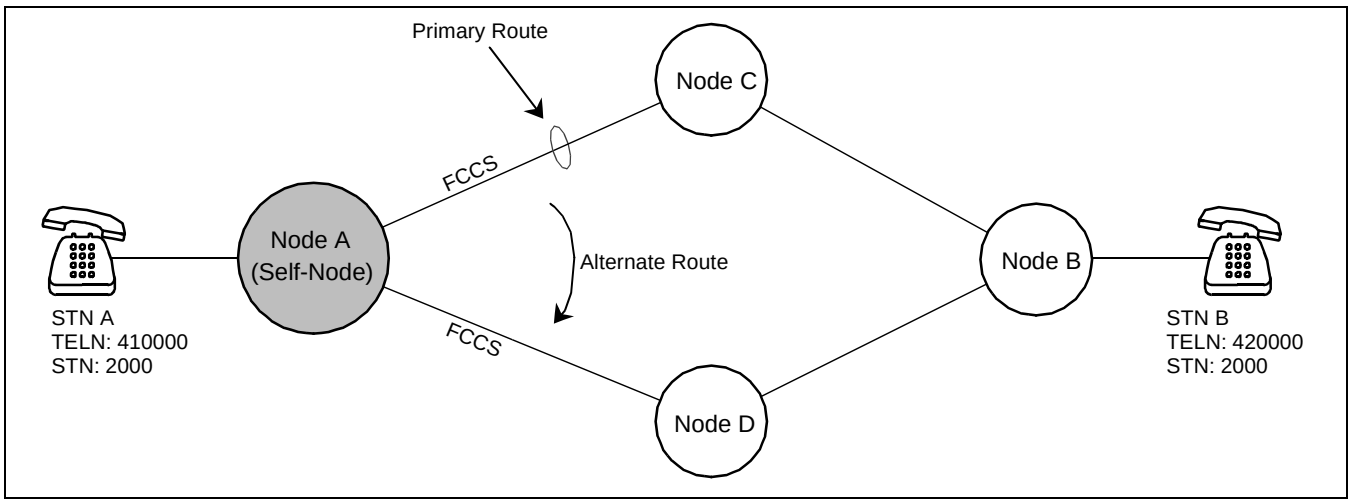


Figure 6-12 FCCS Alternate Routing Test

4. Fusion and Non-Fusion Connection Tests

Use the following procedures and refer to Figure 6-13 to perform the connection test between the FCCS and non-Fusion Common Channel Interoffice Signaling (CCIS) or Associated Channel Interoffice Signaling (ACIS):

4.1 When Seizing a Trunk from a Station

Check ☐

STEP 1: Using the MAT command, make busy all trunks in the route except the trunk to be tested.

STEP 2: Station A in self-node (Node A) dials the Physical Station Number for Station B in Node C.

STEP 3: The call terminates to Station B via FCCS and non-FCCS.

STEP 4: Confirm the speech condition is sufficient (no noise, not one-way speech, etc.).

STEP 5: Replace the handset of STN A.

STEP 6: Repeat the above steps for all Fusion links.

4.2 When Seizing a Trunk from an ATTCON

Check ☐

STEP 1: The operator at the ATTCON in self-node (Node A) dials Physical Station Number for Station B in Node C.

STEP 2: The call terminates to Station B via FCCS and non-FCCS.

STEP 3: Confirm the speech condition is sufficient (no noise, not one-way speech, etc.)

STEP 4: The operator at the ATTCON releases the call by pressing the CANCEL key.

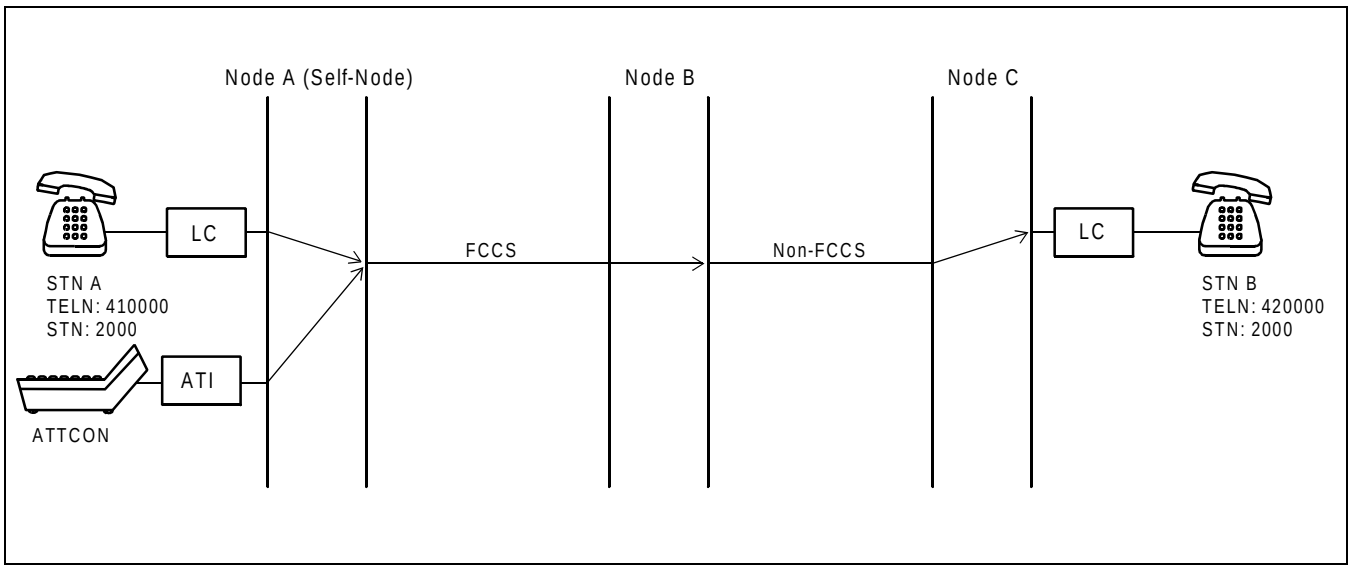


Figure 6-13 CCIS-FCCS Outgoing Call Test

5. SDT Card Loopback Test

The patterns for loopback test, which can be set by the SDT card, are as follows:

1. Local Loopback

   Loopback tests are performed only on the SDT card at the self-node.

2. Remote Loopback

   Loopback tests are performed between different nodes. The result of this test can be confirmed not at the self-node, but at the distant node.

Figure 6-14 illustrates the loopback points of the SDT card.

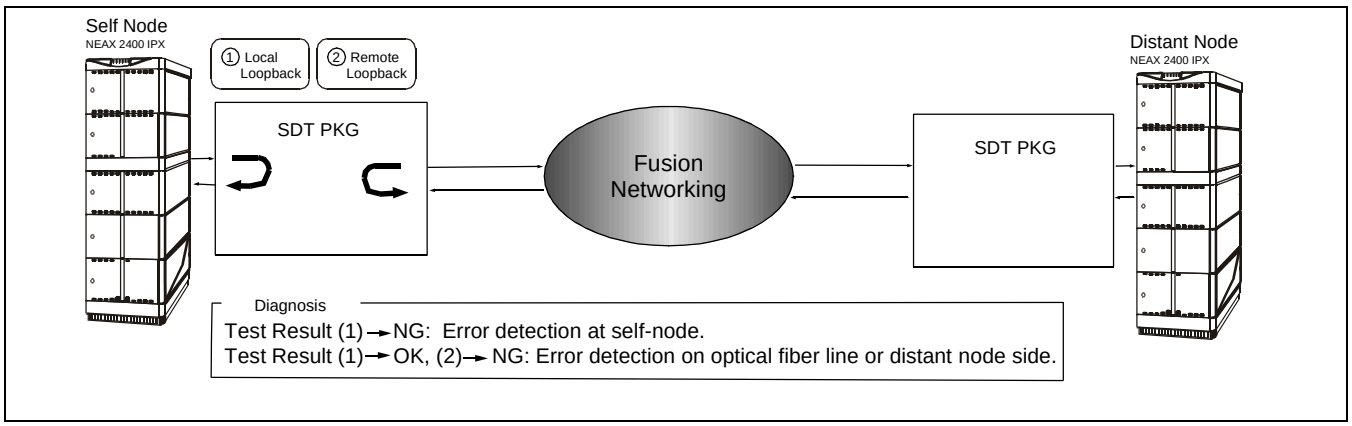


Figure 6-14 Loopback Points of SDT Card

- Test Procedure

STEP 1: Designate the loopback test pattern by setting the P-SW key on the SDT (PA-SDTA) card. Refer to Figure 6-15.

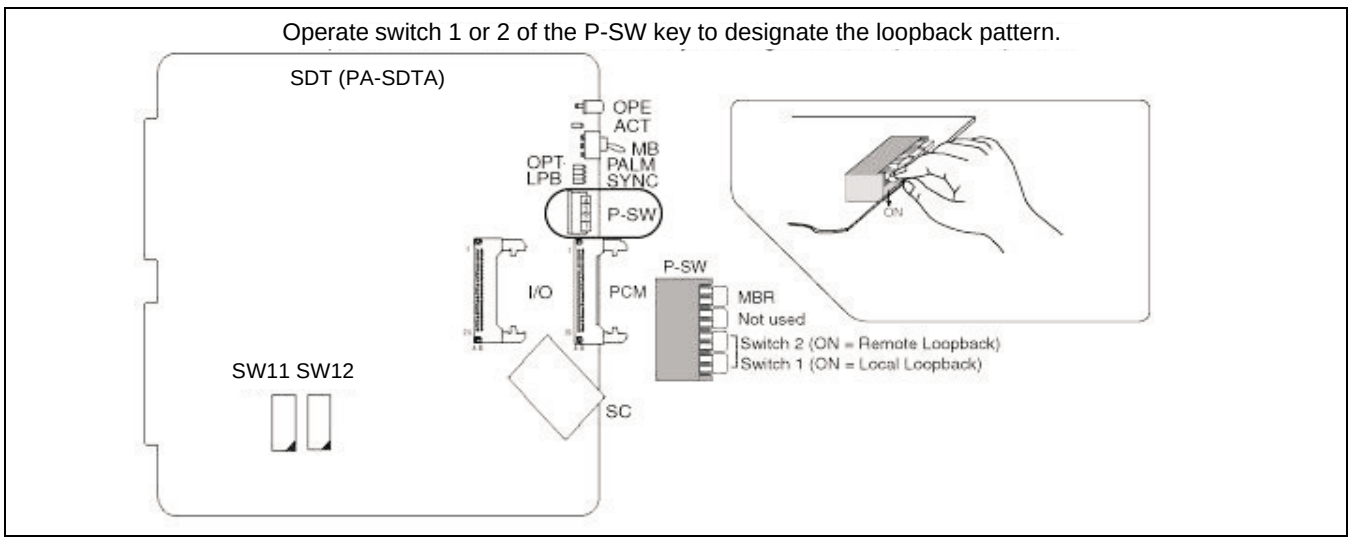


Figure 6-15 Loopback Setting by P-SW keyon PA-SDTA Card

STEP 2: Make sure that the “LPB” lamp on the PA-SDTA card, or the “SYCxx” lamp on the PA-SDTB card lights steady-green.

STEP 2.5: When the loopback pattern is “local loopback,” confirm that the “OPT” and “SYNC” lamps are both OFF on the PA-SDTA card.
(“OPT” and “SYNC” lamps are OFF = Result of loopback test is fine)

STEP 3: Return the key settings of the P-SW key (on PA-SDTA card: see Figure 6-15) to the original position.

CHAPTER 7 TROUBLESHOOTING

This chapter explains the Fusion-related system messages that may be displayed, together with procedures on how to repair the indicated failure. If the message is displayed, follow the procedure described in each system message. For more information on the other system messages, see the NEAX2400 IPX System Operations and Maintenance Manual.

1. List of Fusion-related System Messages

Table 7-1 List of Fusion-related System Messages

No.	System Message		Remarks
1	3-B	PM C-level Infinite Loop (Permanent)	
2	3-C	PM C-level Infinite Loop (Temporary)	
3	3-D	PM Lockup Failure (Permanent)	
4	3-E	PM Lockup Failure (Temporary)	
5	13-H	Signaling Link Failure (Permanent)	
6	13-I	Signaling Link Failure (Temporary)	
7	13-J	Signaling Link Failure (Recovery)	
8	23-S	FCH Failure Notification (Detection)	
9	23-T	FCH Fault Notification (Recovery)	
10	23-U	FCH Status Information	
11	23-W	FCH Alternate Routing Start Notification	
12	23-X	FCH Alternate Routing End Notification	

Figure 7-1 shows a sample system configuration. The number of cards and cables may vary depending on the system.

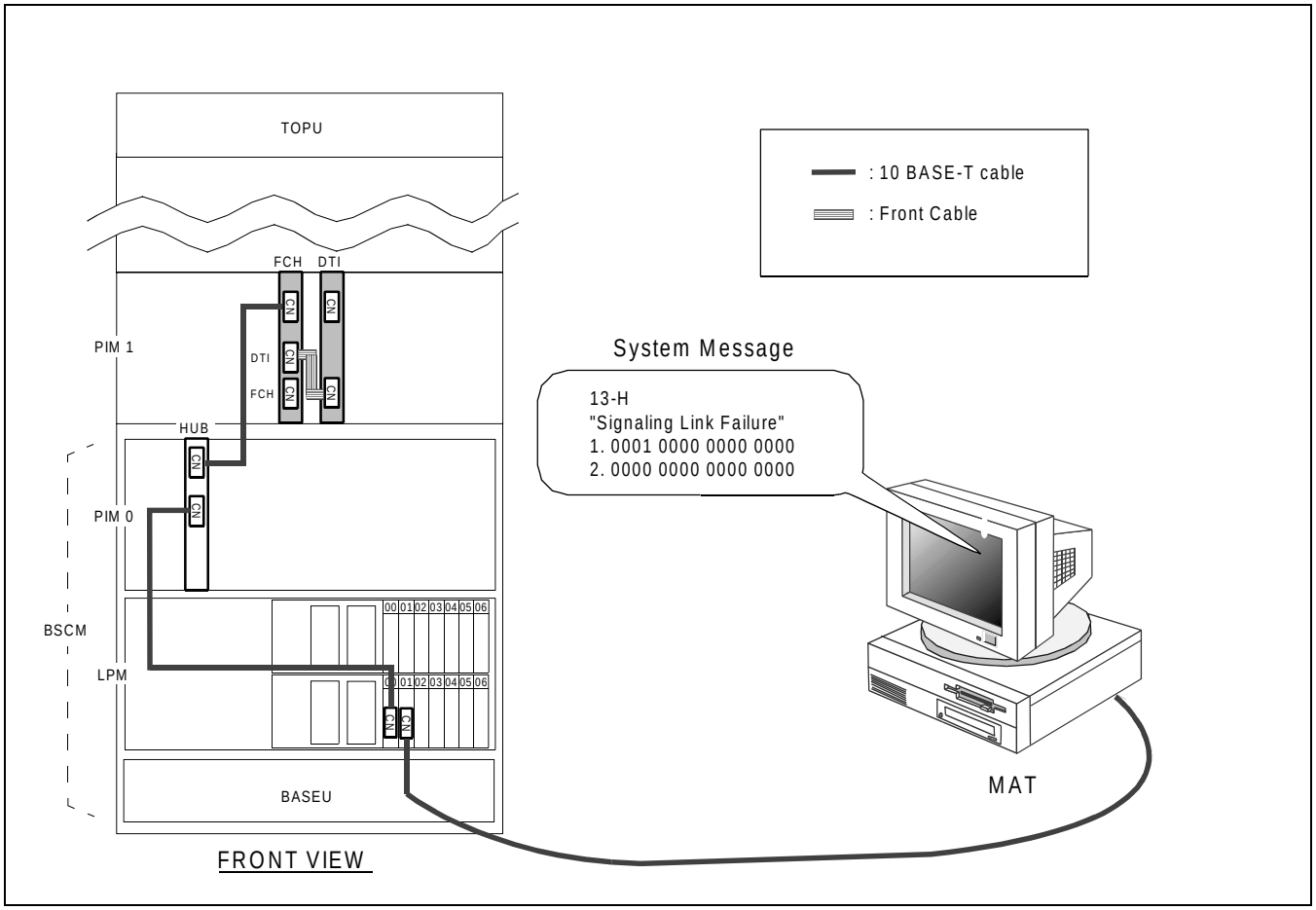


Figure 7-1 Related Hardware

2. 3-B PM C-level Infinite Loop (Permanent)

This message is displayed when a C-level program abnormal state has been detected as permanent. When the abnormal state is detected by the Port Microprocessor (PM) on an FCH card, the PM places the card into make-busy status. If the failure occurs more than 15 times an hour, the system judges the failure as permanent, issuing 3-B system message. Refer to Figure 7-2.

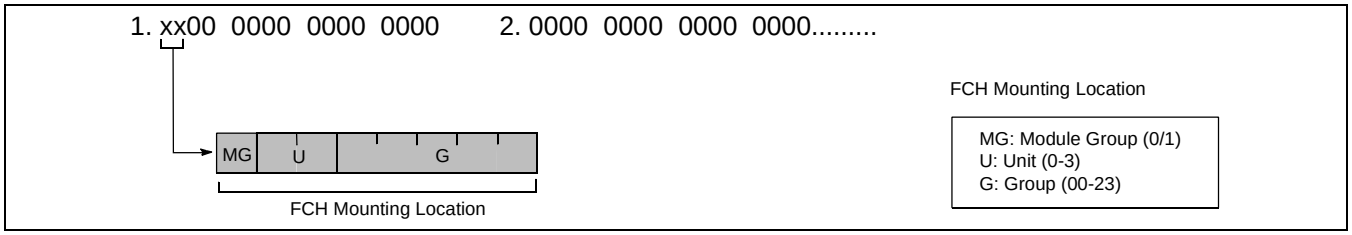


Figure 7-2 3-B PM C-level Infinite Loop (Permanent)

2.1 Repair Procedure

STEP 1: Initialize the indicated FCH (PA-FCHA) card using the MB key. (MB key: Down→ Up → Down). Refer to Figure 7-3.

When the LED on the FCH card lights green and the related system messages are not displayed, monitor the system for a while. Otherwise move to STEP 2.

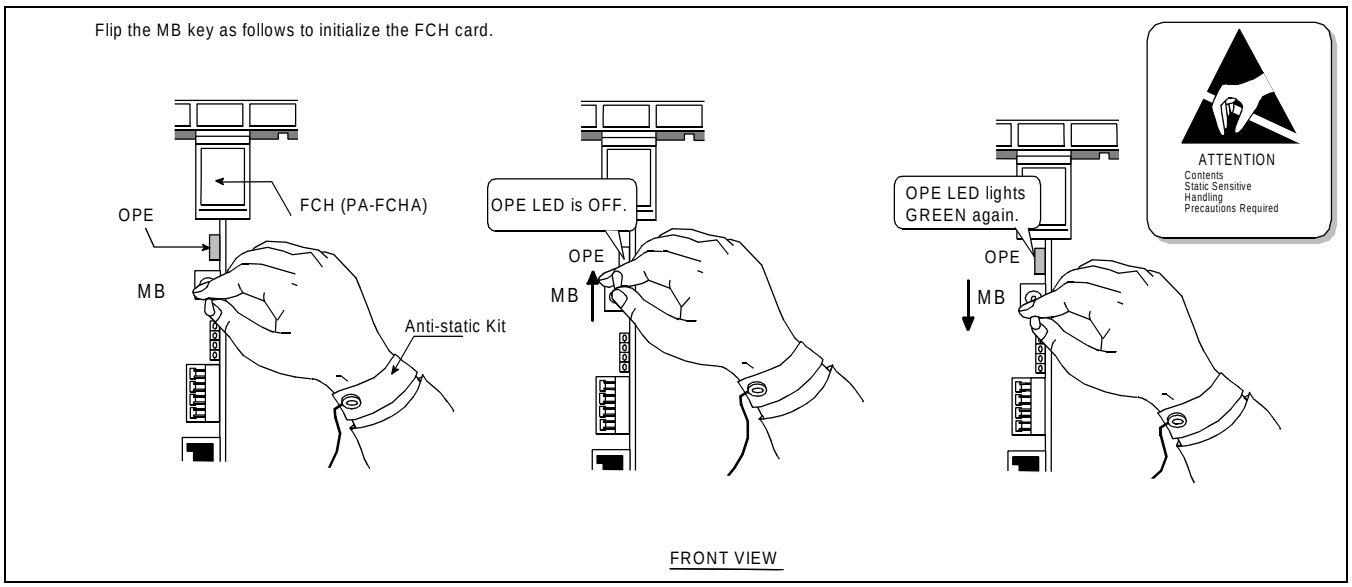
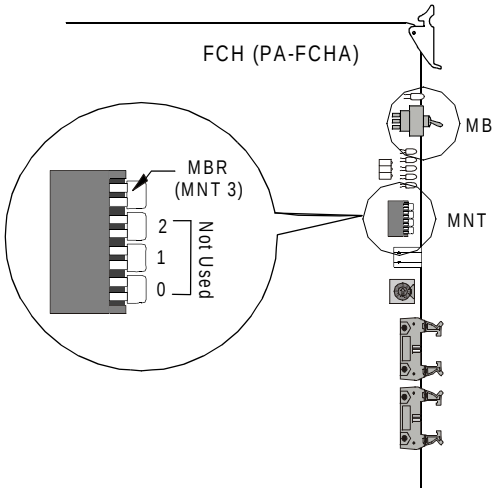


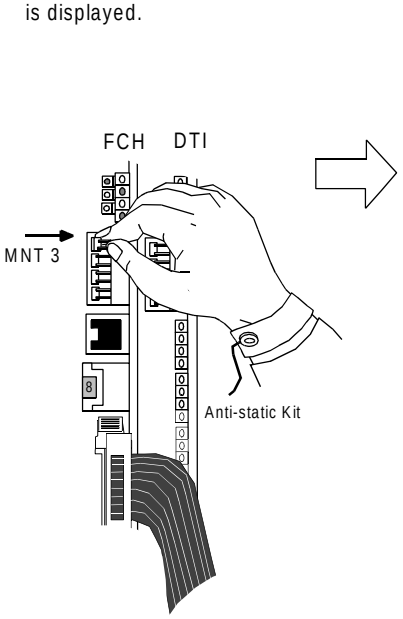
Figure 7-3 How to Initialize the FCH (PA-FCHA) Card

STEP 2: Replace the FCH card, following the procedure listed in Figure 7-4 “How to Replace the FCH (PA-FCHA) card.”

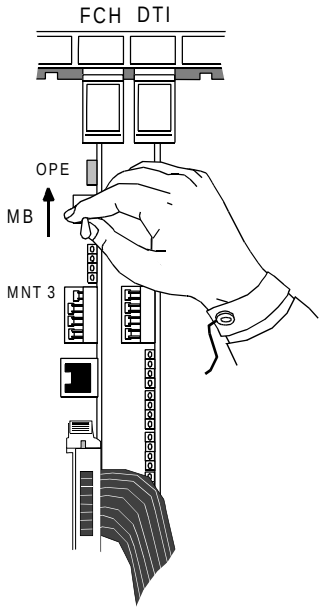
[How to Replace FCH card]

1) Provide the anti-static kit.
2) Turn ON the MNT 3 switch. (make-busy-request)
3) Make sure that system message (23-W) "FCH Alternate Routing (Start)" is displayed.
4) Turn the MB key upward. (make-busy)
5) Disconnect the front cable from the FCH card with care.
6) Extract the FCH card from the slot.
7) Set key settings on the new FCH card.
8) Turn ON the MNT 3 switch on the new FCH card. (make-busy-request)
9) Turn the MB key upward on the new FCH card.
10) Mount the new FCH card in the same slot.
11) Connect the disconnected front cable again with care.
12) Turn the MB key downward.
13) Check the "OPE" lamp lights green.
14) Turn OFF the MNT 3 switch. (make idle)
15) Make sure that system message (23-X) "FCH Alternate Routing (Stop)" is displayed.

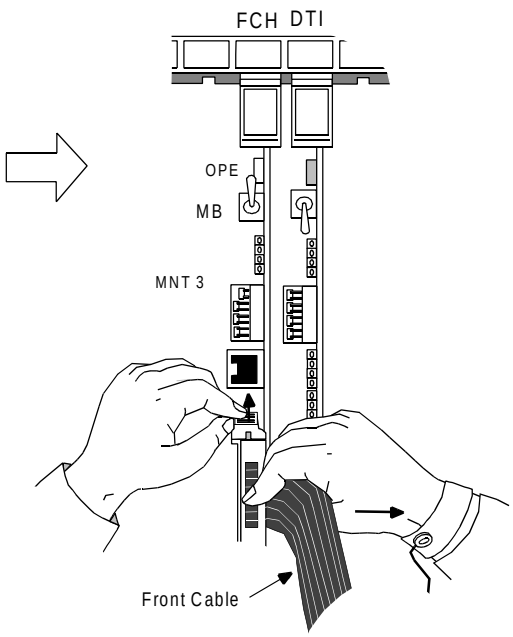




MBR key operation



MB key operation



Cable Disconnection

Figure 7-4 How to Replace the FCH (PA-FCHA) Card

3. 3-C PM C-level Infinite Loop (Temporary)

This message is displayed when the C-level program has been detected as abnormal by the Port Microprocessor (PM) mounted on the FCH (PA-FCHA) card. In this instance, the system performs an appropriate restart (B-monitor/Initial restart) according to the frequency of the failures. Refer to Figure 7-5. If the frequency exceeds 15 times an hour, it is judged as permanent. See "3-B PM C-level Infinite Loop (Permanent)".

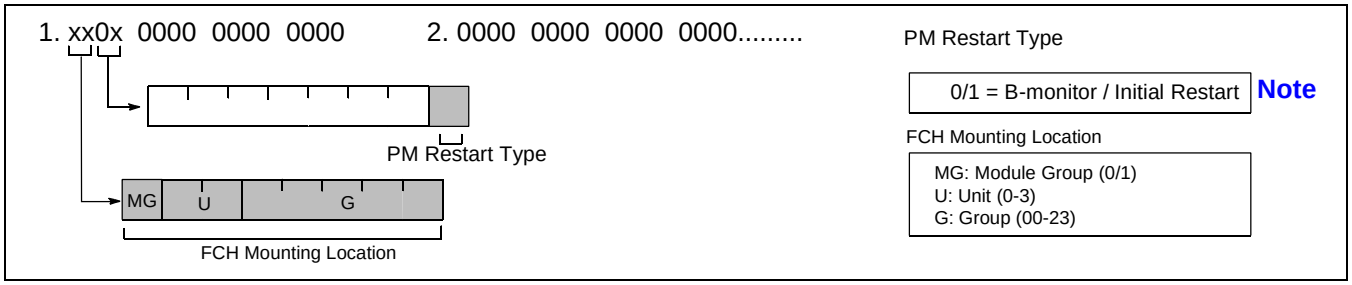


Figure 7-5 3-C PM C-level Infinite Loop (Temporary)

Note: *B-monitor Restart: Ports whose link has already been established remain connected, while ports processing a call-origination may be released.*

Initial Restart: All ports on the circuit card are force released to be placed in idle state.

3.1 Repair Procedure

STEP 1: If the 3-C message has been displayed only once or twice, monitor the failure for a while. Otherwise, move to STEP 2.

STEP 2: Initialize the indicated FCH (PA-FCHA) card using the MB key. See Figure 7-3 “How to Initialize the FCH (PA-FCHA) card.”

When the LED on the FCH card lights green, and the related system messages are not displayed, monitor the system for a while. Otherwise move to STEP 3.

STEP 3: Replace the FCH card, following the procedure listed in Figure 7-4 “How to Replace FCH (PA-FCHA) card.”

4. 3-D PM Lockup Failure (Permanent)

The CPU sends diagnosis data at periodic intervals to the Port Microprocessor (PM) on FCH (PA-FCHA) cards to monitor the PM. If the CPU cannot receive the return data within a predetermined time, the system displays the data in Figure 7-6. When the failure is detected more than 15 times per hour, the failure is judged as permanent. Otherwise, 3-E PM Lockup Failure (Temporary) is displayed.

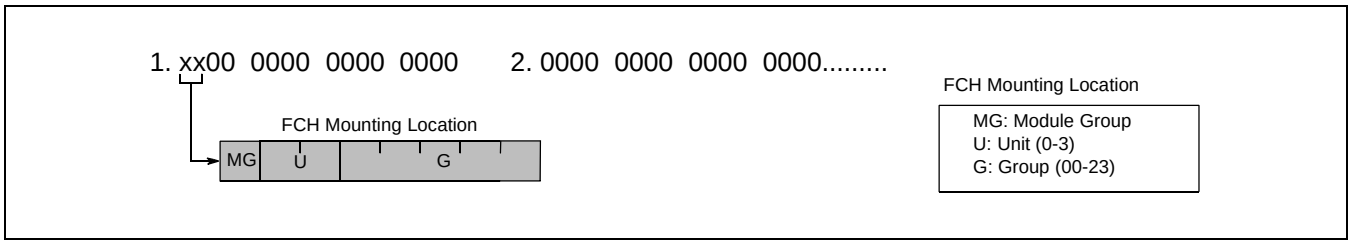


Figure 7-6 3-D PM Lockup Failure (Permanent)

4.1 Repair Procedure

STEP 1: Make sure that station-to-station connections can be established in the PIM containing the indicated FCH (PA-FCHA) card.

If the station-to-station connections cannot be established, the PIM is faulty. Repair the PIM. Otherwise, move to STEP 2.

STEP 2: Initialize the FCH card using the MB key. See Figure 7-3 "How to Initialize FCH (PA-FCHA) Card."

When the LED lights green and no system message related to this failure displays again, monitor the system for a while. Otherwise, move to STEP 3.

STEP 3: Replace the FCH card. Refer to Figure 7-4 "How to Replace FCH (PA-FCHA) Card."

5. 3-E PM Lockup Failure (Temporary)

The CPU sends diagnosis data at periodic intervals to the Port Microprocessor (PM) on the FCH (PA-FCHA) cards to monitor the PM. If the CPU cannot receive the return data within a predetermined time, the system displays the data in Figure 7-7. When the failure is detected more than 15 times per hour, the failure is judged as permanent. Otherwise, 3-E "PM Lockup Failure (Temporary)" is displayed.

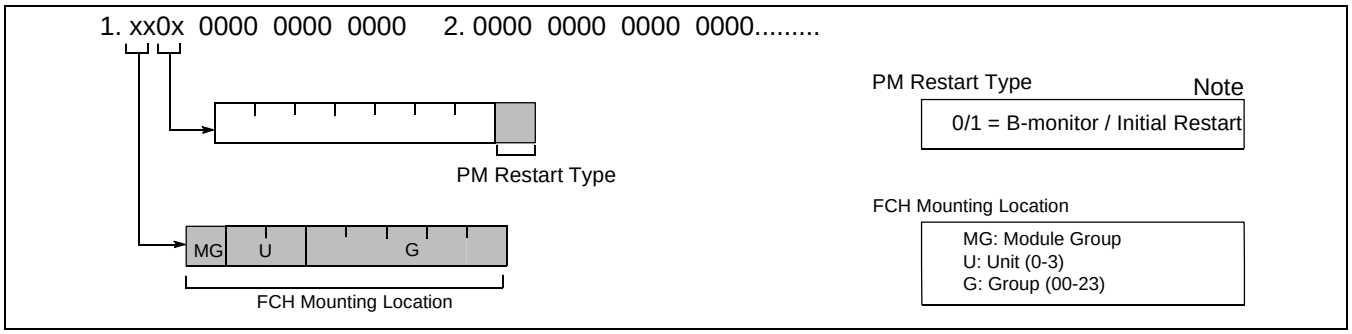


Figure 7-7 3-E PM Lockup Failure (Temporary)

Note: *B-monitor Restart: Ports whose link have already been established remain connected, while ports processing a call-origination may be released.*

Initial Restart: All ports on the circuit card are force released to be placed in idle state.

5.1 Repair Procedure

STEP 1: If this system message has been displayed only once or twice, monitor the failure for a while. Otherwise, move to STEP 2.

STEP 2: Initialize the FCH (PA-FCHA) card using the MB key. See Figure 7-3 "How to Initialize FCH Card."

If this message is not displayed anymore, monitor the FCH card for a while. Otherwise, move to STEP 3.

STEP 3: Replace the FCH card, referring to Figure 7-4 "How to Replace FCH (PA-FCHA) Card."

6. 13-H/I/J Signaling Link Failure (Permanent)/(Temporary)/(Recovery)

Figure 7-8 illustrates the message that is displayed when the Fusion link (D-ch) has a failure. If the failure occurs frequently, the system displays 13-H Signaling Link Failure (Permanent). The shaded area Figure 7-9 explains this message.

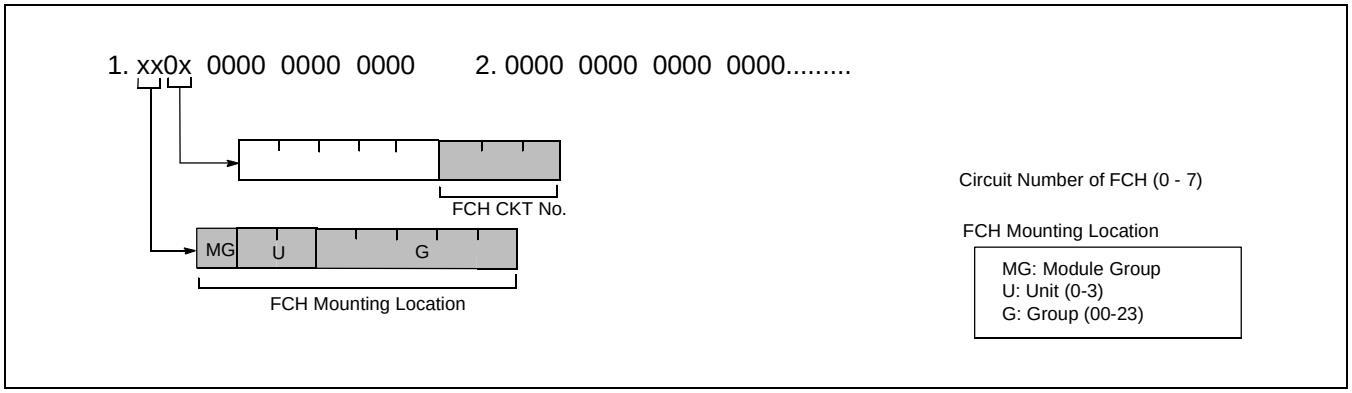


Figure 7-8 13-H/13-I/13-J Signaling Link Failure System Message

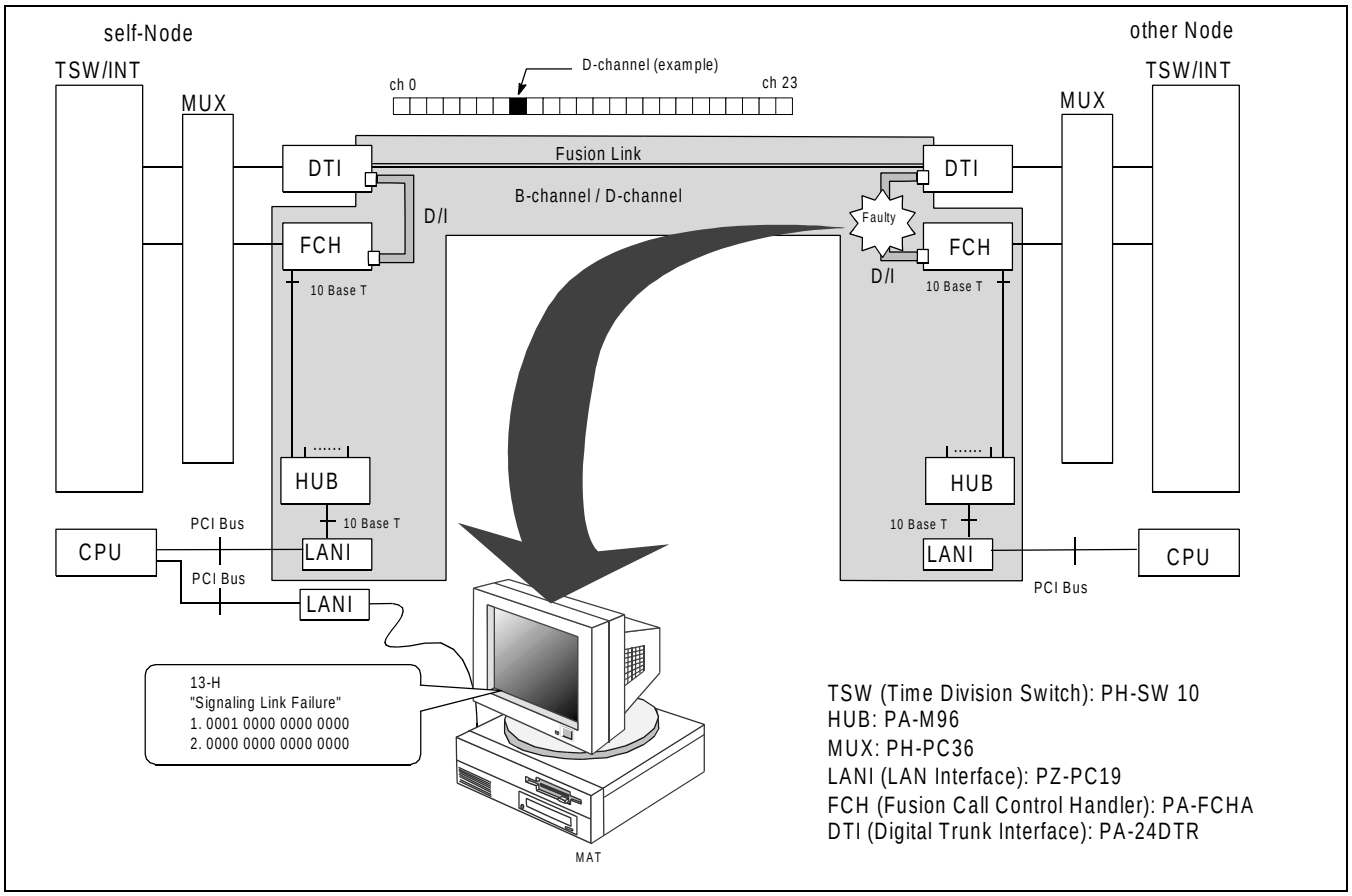


Figure 7-9 Fusion Link (Signaling Link) Failure

6.1 Repair Procedure

- 13-H (Permanent)

STEP 1: Make sure that the front cable is securely inserted. See Figure 7-10.

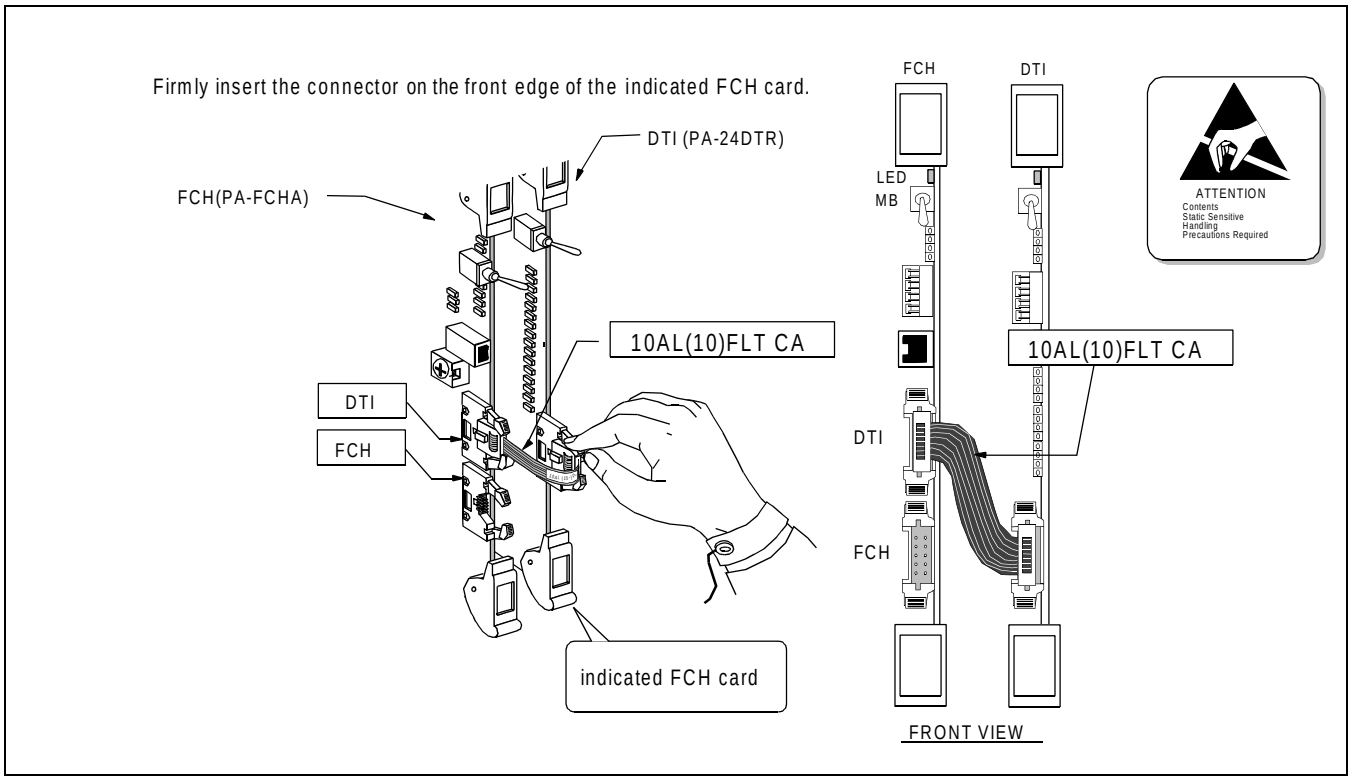


Figure 7-10 FCH-DTI Connection

STEP 2: Initialize the indicated FCH (PA-FCHA) card using the MB key. (MB key: Down→ Up → Down)

See Figure 7-3. When the LED on the FCH card lights green and the related system messages are not displayed anymore, monitor the system for a while. Otherwise, move to STEP 3.

STEP 3: Replace the FCH card, following the procedure in Figure 7-4. If the failure exists after card replacement, move to STEP 4.

STEP 4: Replace the front cable labeled 10AL (10) FLT CA, since the cable is suspected as faulty.

6.2 Repair Procedure

- 13-I (Temporary)

STEP 1: Make sure that the front cable is securely inserted. (See Figure 7-10.)

STEP 2: If this message has been displayed once or twice, monitor the failure for a while. Otherwise, move to STEP 3.

STEP 3: If 13-J (Recovery) has been displayed after this message, monitor the failure for a while. Otherwise, move to STEP 4.

STEP 4: Initialize the indicated FCH (PA-FCHA) card using the MB key. (MB key: Down → Up → Down)

See Figure 7-3. When the LED on the FCH card lights green and the related system messages are not displayed any more, monitor the system for a while. Otherwise, move to STEP 5.

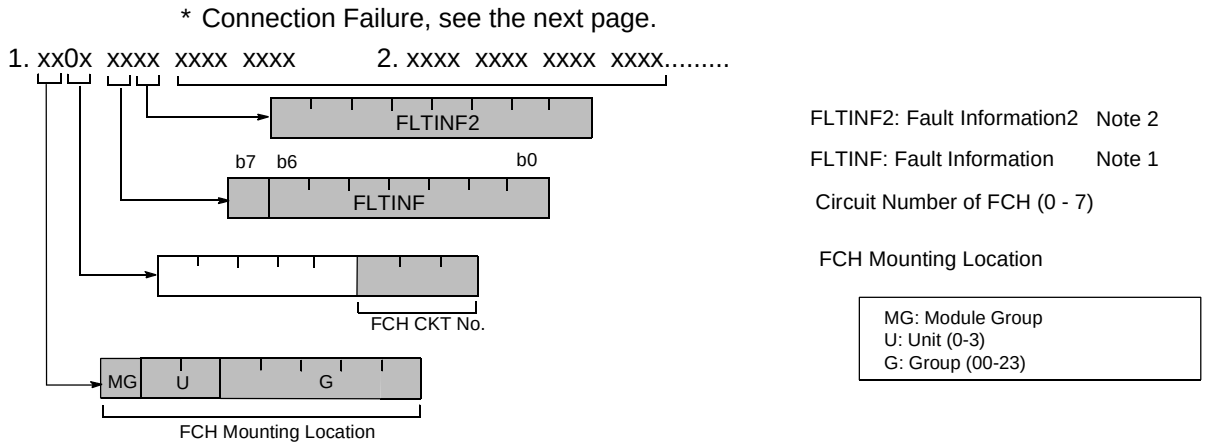
STEP 5: Replace the FCH card, following the procedure listed in Figure 7-4. If the failure exists after the card replacement, move to STEP 6.

STEP 6: Replace the front cable labeled 10AL (10) FLT CA, since the cable is suspected as faulty.

7. 23-S FCH Failure Notification (Detection)

This message is displayed when the FCH (PA-FCHA) card is faulty due to the phenomenons such as an ETHER controller initial failure.

The message is displayed in the following format. If this message is displayed, check the related ETHER cables, following the procedure listed on the next page.



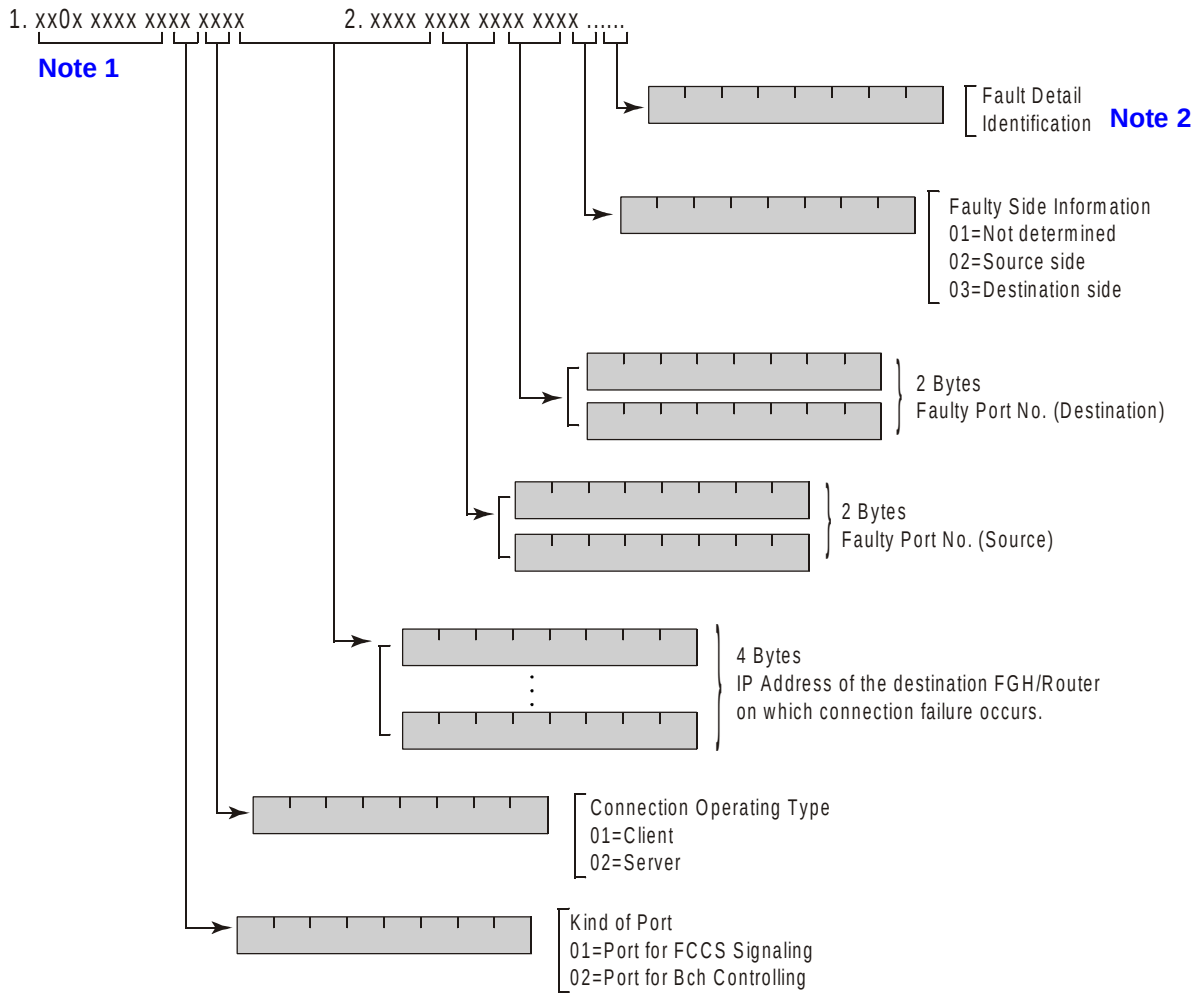
ote 1: FLTINF (Fault Information) consists of the following:
b0-b6
01H: ETHER Controller Initial NG (If this is indicated, replace the FCH (PA-FCHA) card)
02H: ETHER Link Failure
03H: Connection Failure

b7
Kind of Circuit Card (This information is valid when b0-b6=03H: Connection Failure only)
0: FCCH/IPTRK
1: FGH

ote 2: FLTINF2 (Fault Information) consists of the following:
01H: Configuration Error
02H: ETHER Controller Reset Invalid
03H: ETHER Controller Initial NG
04H: MAC Address NG
This information is valid when FLTINF=01H: ETHER Controller Initial only

*The detailed fault information for 03H indication is explained on the next page.

Figure 7-11 23-S FCH Failure Notification



Note 1: *Refer to the previous page for this information.*

Note 2: *Failure Detail Identification consists of the following:*

02=TCP Link Error
Probable causes are:

- *KEEP ALIVE packet time out*
- *CP packet sending failure*
- *ST packet receiving*
- *CMP (Information unable to reach the destination) receiving*
- *CMP (Parameter irregular information) receiving*

11=Receiving Packet Error 1 (Sending/Receiving of User Information is started; however, Time Out occurs because the sending/receiving have not completed within the determined time period.
12=Receiving Packet Error 2 (When User Header Information included in receiving packet is searched, but "Not-found" state continues over the determined time period.
13=Receiving Packet Error 3 (Time out occurs because User data following the User Header Information has not received completely within the determined time period.

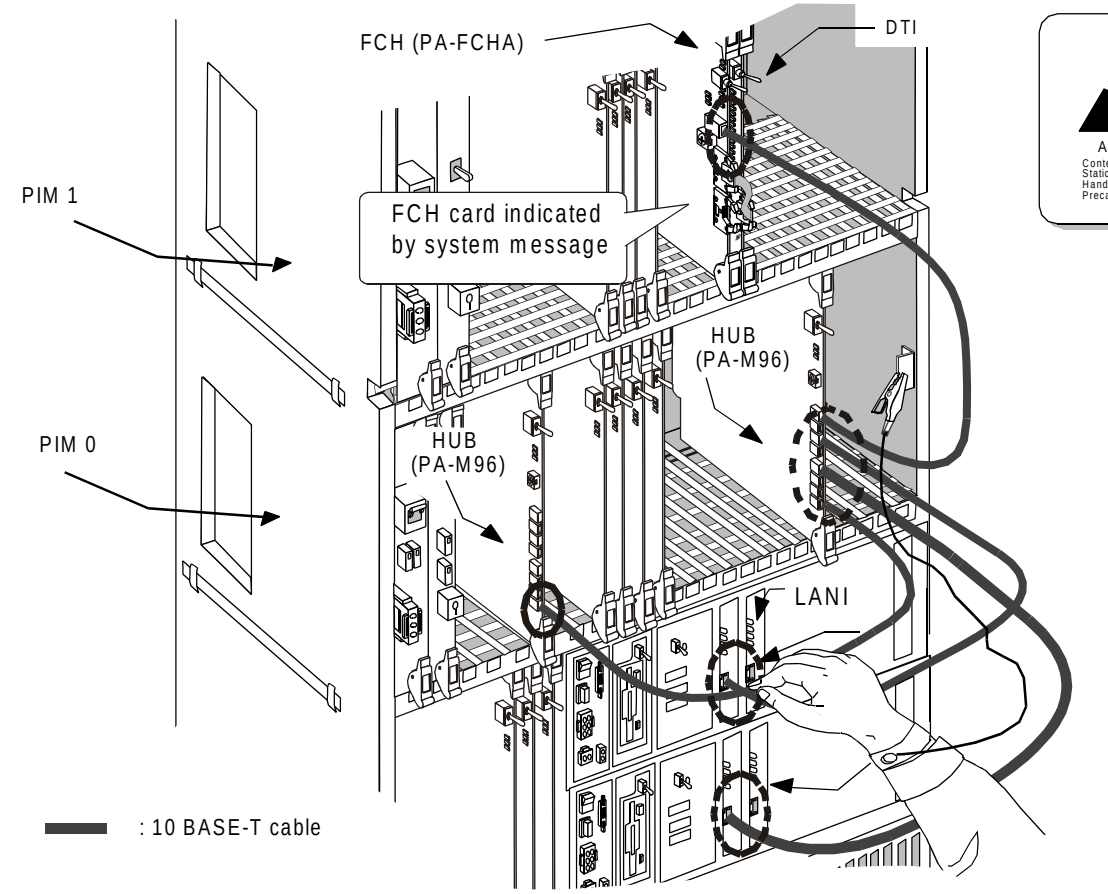
Figure 7-11 23-S FCH Failure Notification (Continued)

7.1 Repair Procedure

STEP 1: Make sure that the related Ethernet cables are securely inserted into the connectors. See Figure 7-12. If not, securely insert the cable and confirm whether System Message 23-T FCH Fault Recovery Notification is displayed as the result of cable insertion. If no fault is found in this step, move to STEP 2.

STEP 2: The following equipment is suspected to be faulty. Check for each item:

- Ethernet cables (10 BASE-T cables) ← See Figure 7-13 "How to Check 10 BASE-T cables."
- HUB (PA-M96) ← See Figure 7-14 "How to Replace HUB (PA-M96) card."
- FCH (PA-FCHA) ← See Figure 7-4 "How to Replace FCH (PA-FCHA) card."



Note: *10 BASE-T cable connections may differ depending on system configuration.*

Figure 7-12 10 BASE-T Cable Connection Check

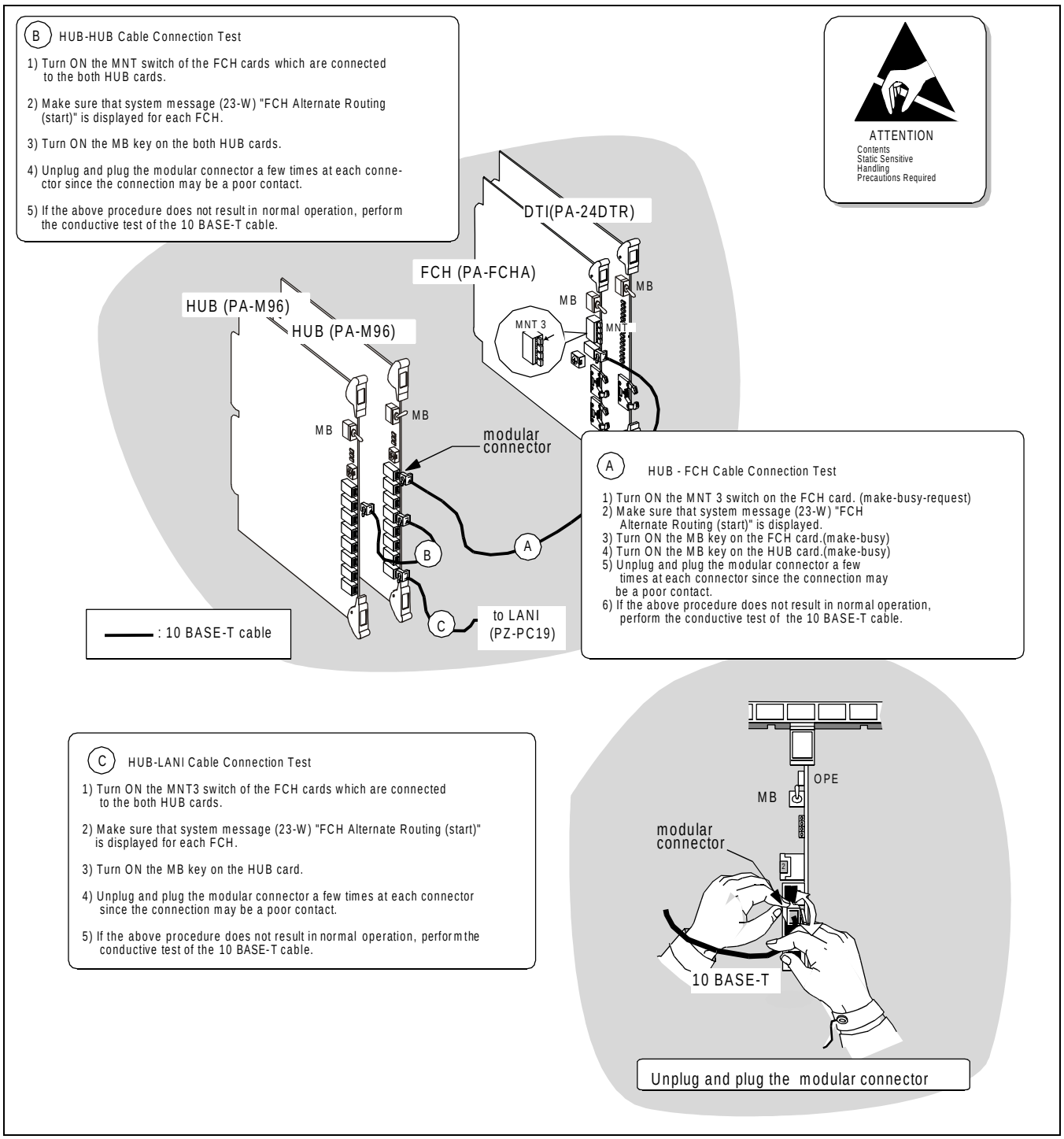


Figure 7-13 How to Check 10 BASE-T Cables

WARNING: **When a HUB card is placed in make-busy, all BASE-T interfaces connected to the HUB card become inoperative.**

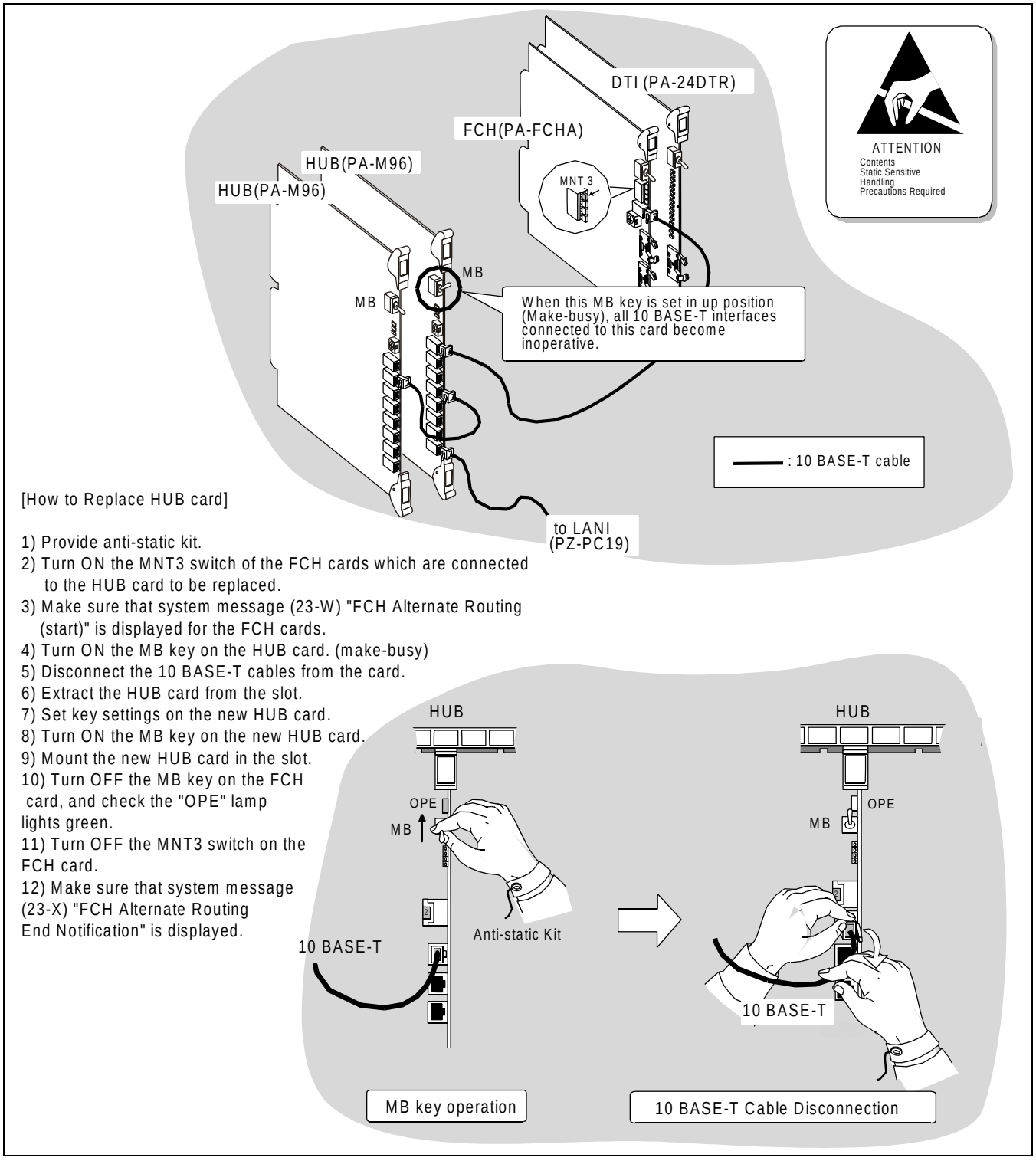
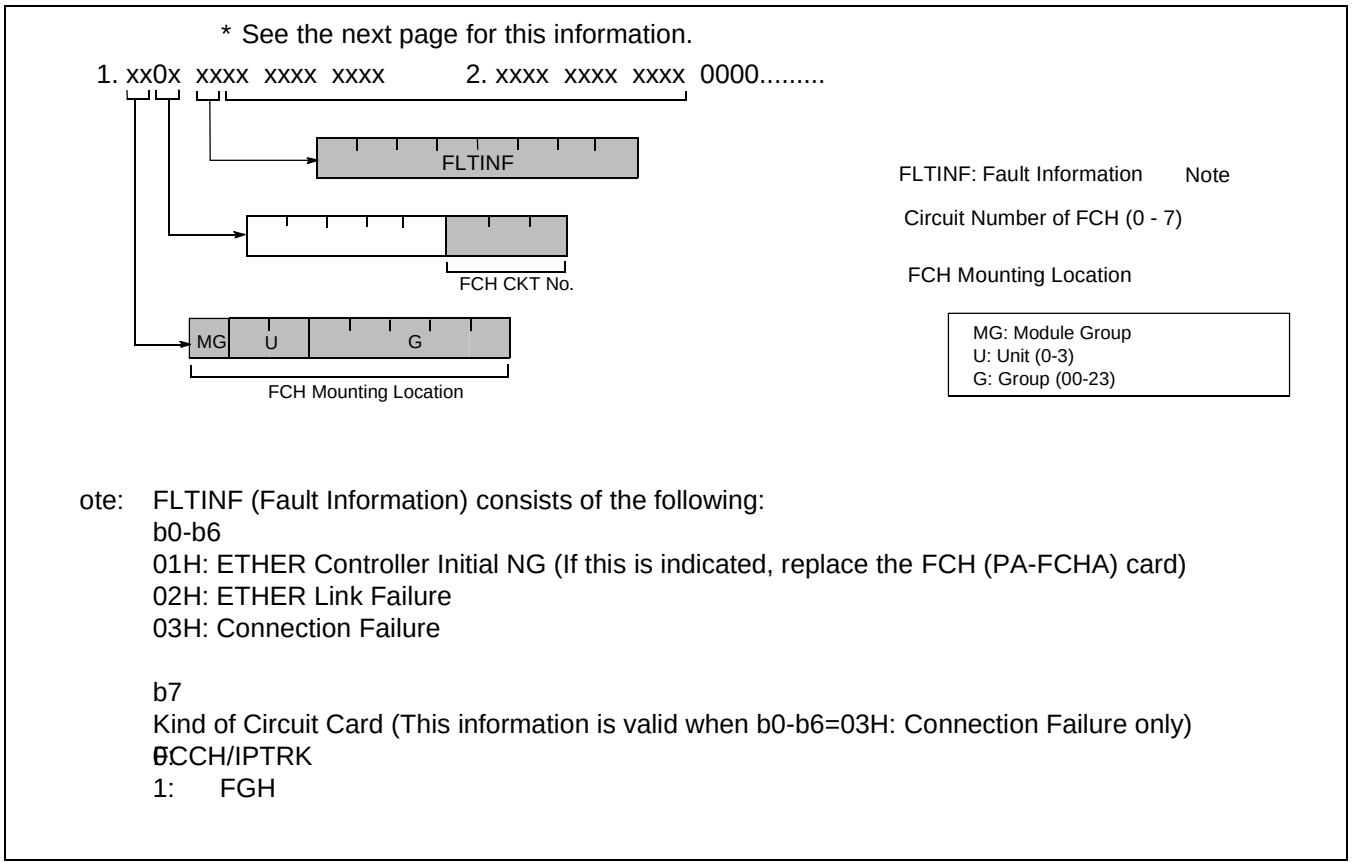


Figure 7-14 How to Replace HUB (PA-M96) Card

WARNING: **When a HUB card is placed in make-busy, all BASE-T interfaces connected to the HUB card become inoperative.**

8. 23-T FCH Fault Notification (Recovery)

This message is displayed when the FCH (PA-FCHA) card which was detected as faulty is recovered. The message is displayed in the following format.



ote: FLTINF (Fault Information) consists of the following:
b0-b6
01H: ETHER Controller Initial NG (If this is indicated, replace the FCH (PA-FCHA) card)
02H: ETHER Link Failure
03H: Connection Failure

b7
Kind of Circuit Card (This information is valid when b0-b6=03H: Connection Failure only)
0: FCCH/IPTRK
1: FGH

Figure 7-15 23-T FCCH Fault Recovery Notification

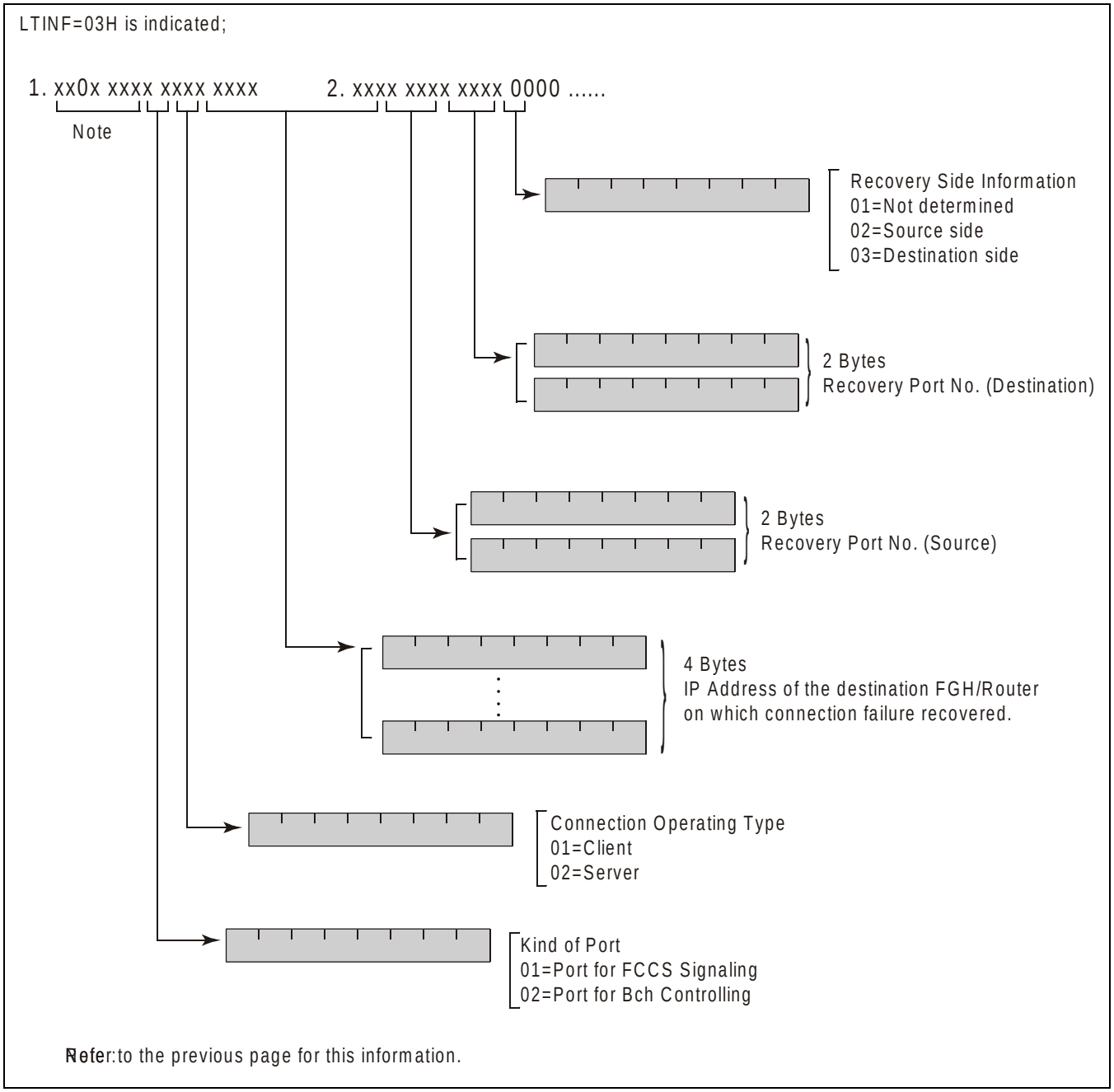
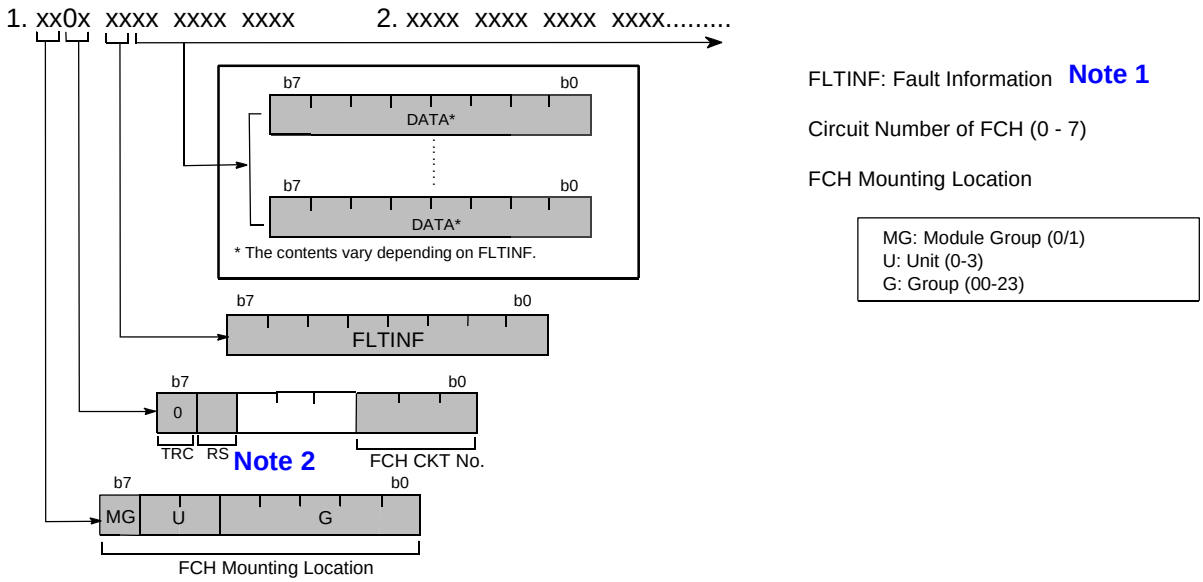


Figure 7-15 23-T FCCH Fault Recovery Notification (Continued)

9. 23-U FCH Status Information

Figure 7-16 illustrates the general format of the message that is displayed when the status change of FCH (PA-FCHA) card is detected, which includes “FCH Initial Setting Failure,” “ETHER Transfer Failure.” When this message is displayed, follow the procedure explained on a fault information basis.



Note 1: *FLTINF (Fault Information) consists of the following:*

OOH:	*Initial Setting Failure Notification*
18H	*Spanning Tree Abnormal Answer Notification*
1DH	*ETHER Transfer Failure Notification*
1EH	*Spanning Tree Generation End Notification*
1FH	*Spanning Tree Generation Start Notification*
85H	*Check Sum Verify Failure Notification*

Note 2: *When TRC = 1, the subsequent data indicates "Date Information" + "Primitive Contents"*

** The detailed fault information is explained on the following pages.*

Figure 7-16 23-U FCCH Status Information

9.1 FLTINF = 00H Initial Setting Failure

Figure 7-17 illustrates the message that is displayed when the Ethernet Controller Initial Setting ends in failure.

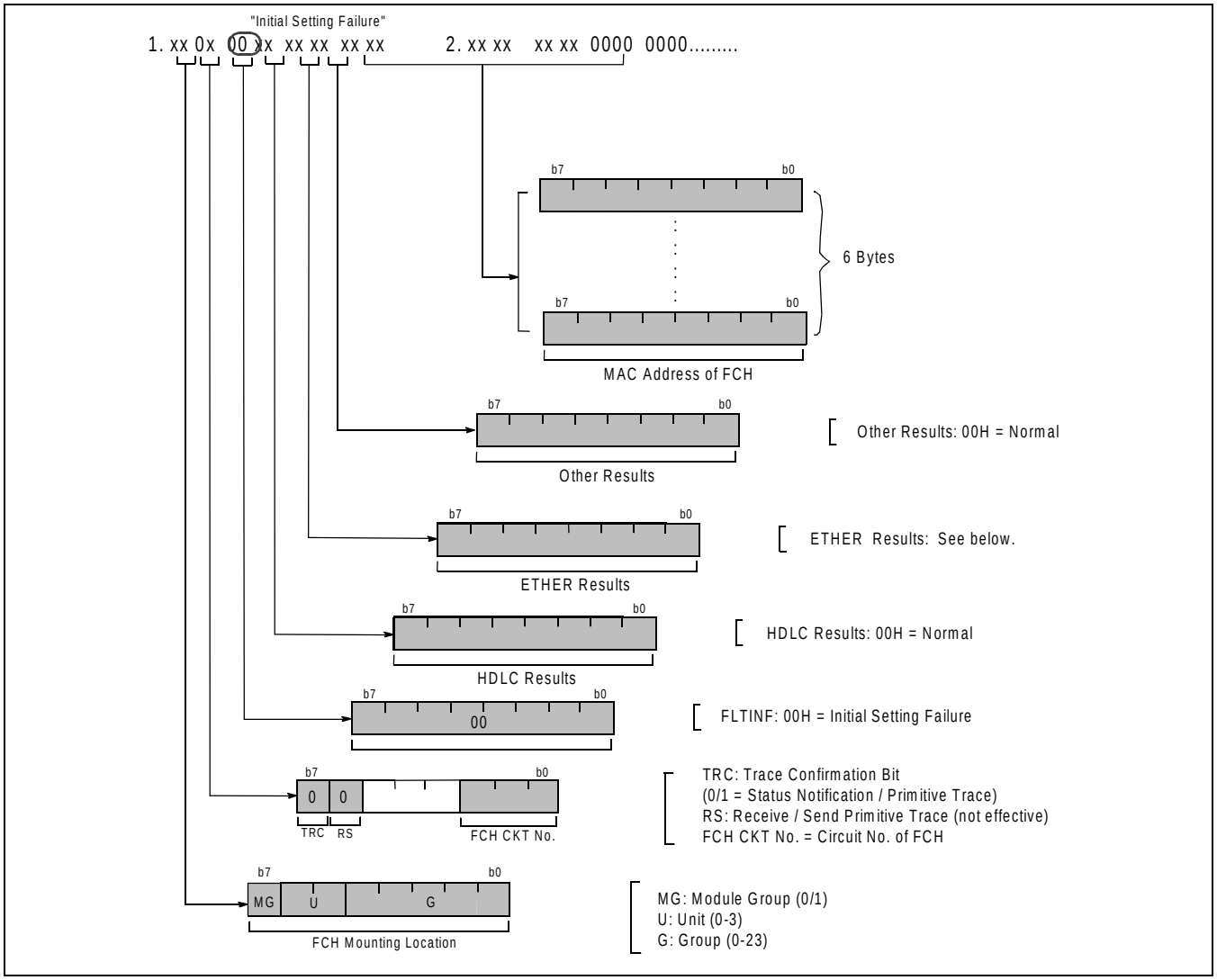


Figure 7-17 23-U FCCH Status Notification - Initial Setting Failure

ETHER Results

00H: Normal

01H: ETHER Controller Reset Impossible

02H: Configuration Error

03H: ETHER Controller Initial NG

04H: ETHER Controller Initial NG

9.2 FLTINF = 18H Spanning Tree Abnormal Answer

Figure 7-18 illustrates the message that is displayed when Spanning Tree Abnormal Answer is detected.

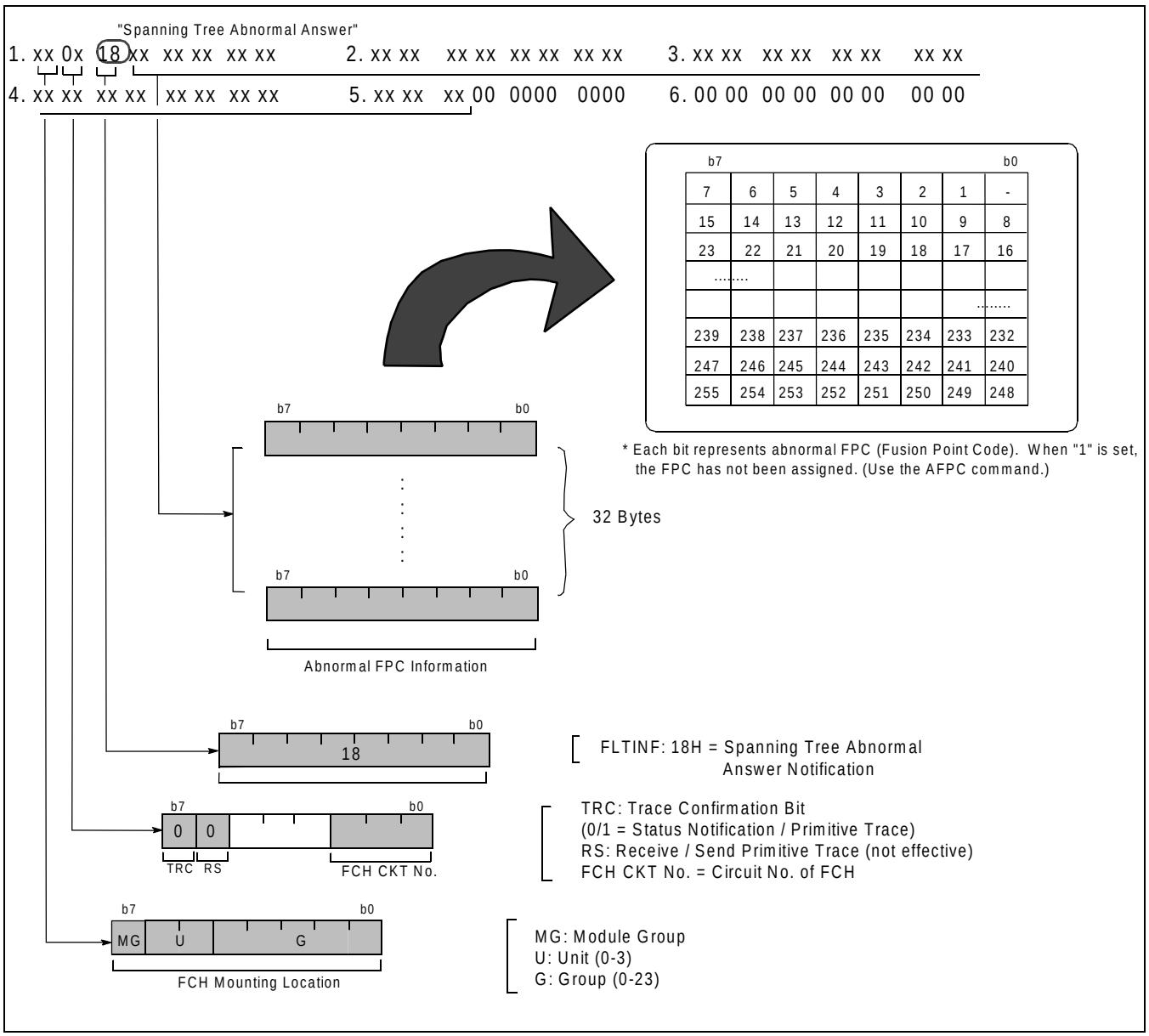


Figure 7-18 23-U FCCH Status Notification - Spanning Tree Abnormal Answer

9.2.1 Repair Procedure

A Fusion Point Code (FPC) is assigned with the AFPC command. If any FPC data has not been assigned properly, the Spanning Tree Abnormal Answer message in Figure 7-19 is displayed. Make sure that the indicated FPC data is properly assigned.

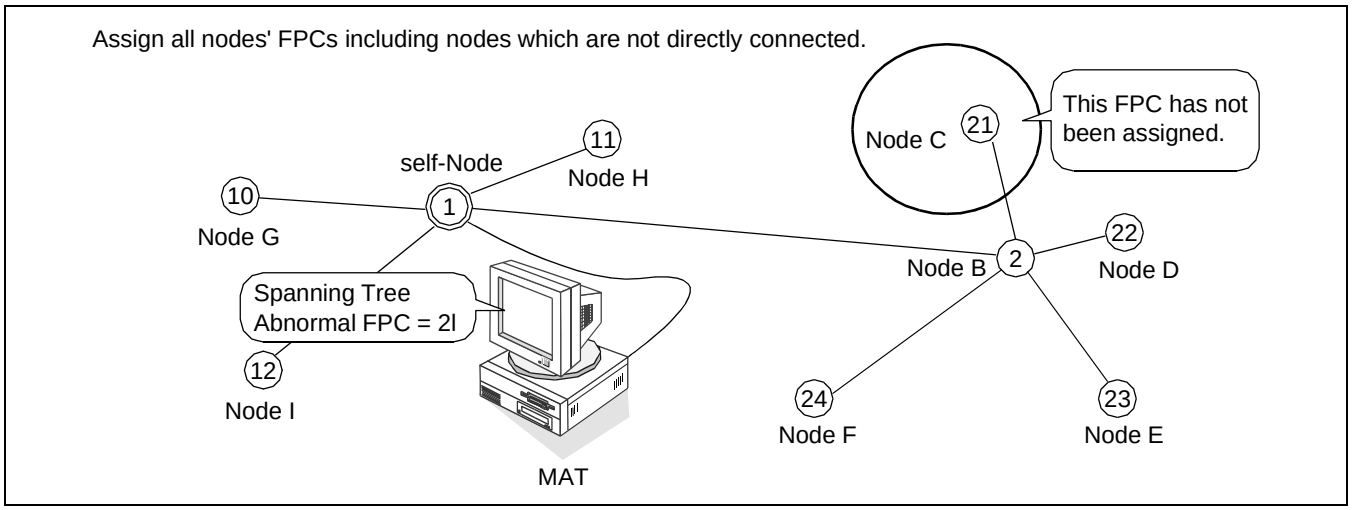


Figure 7-19 Spanning Tree Abnormal Answer

9.3 FLTINF = 1DH ETHER Transfer Failure

Figure 7-20 illustrates the message that is displayed when an FCH card discards an abnormal Ethernet packet (i.e. abnormal IP address destination) that was received from another node on the network.

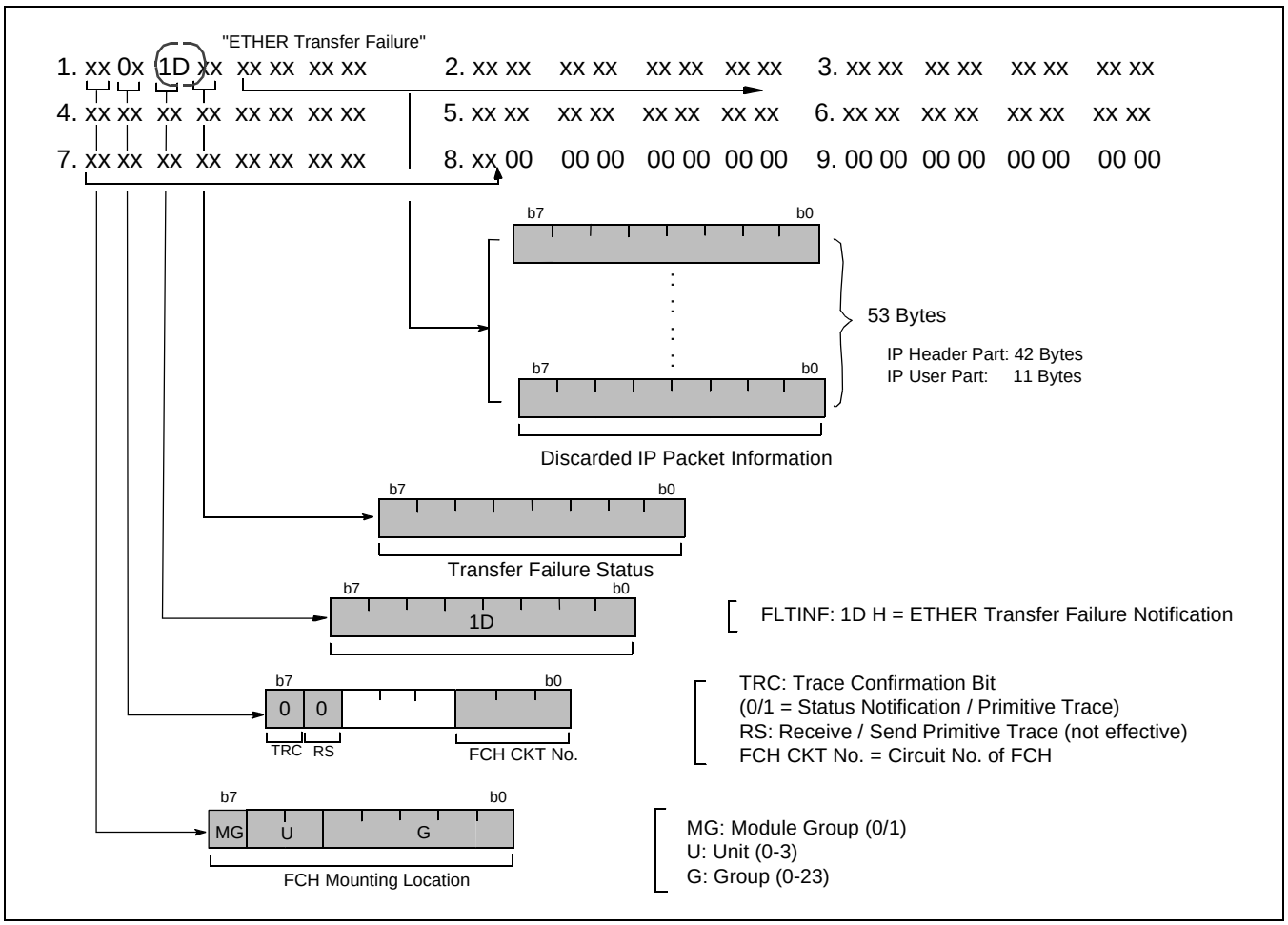


Figure 7-20 23-U ETHER Transfer Failure

9.4 FLTINF = 1EH Spanning Tree Generation End

Figure 7-21 illustrates the message that is displayed when Spanning Tree Generation is complete.

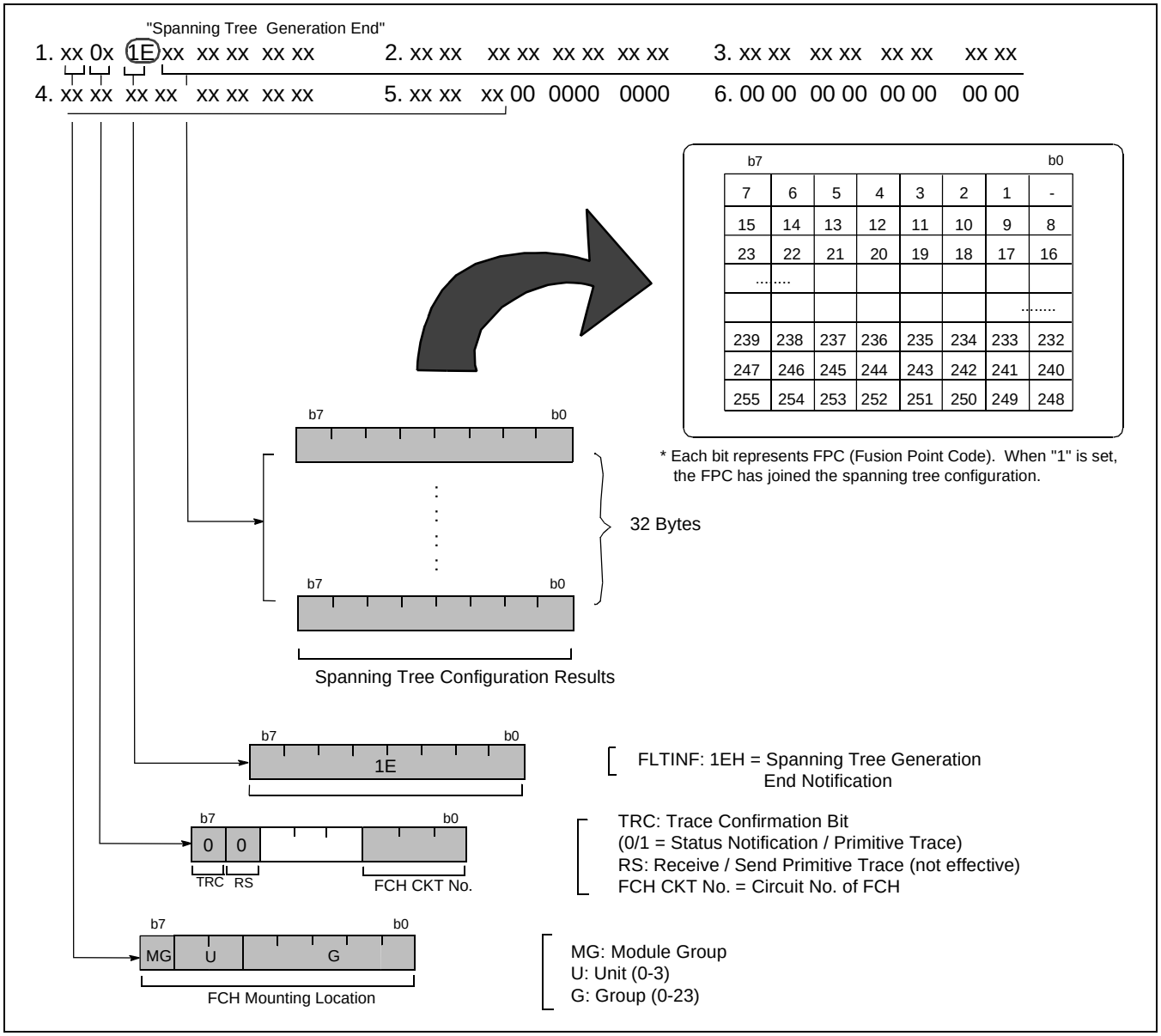


Figure 7-21 23-U FCCH Status Notification - Spanning Tree Generation End

9.5 FLTINF = 1FH Spanning Tree Generation Start

Figure 7-22 illustrates the message that is displayed when Spanning Tree Generation starts.

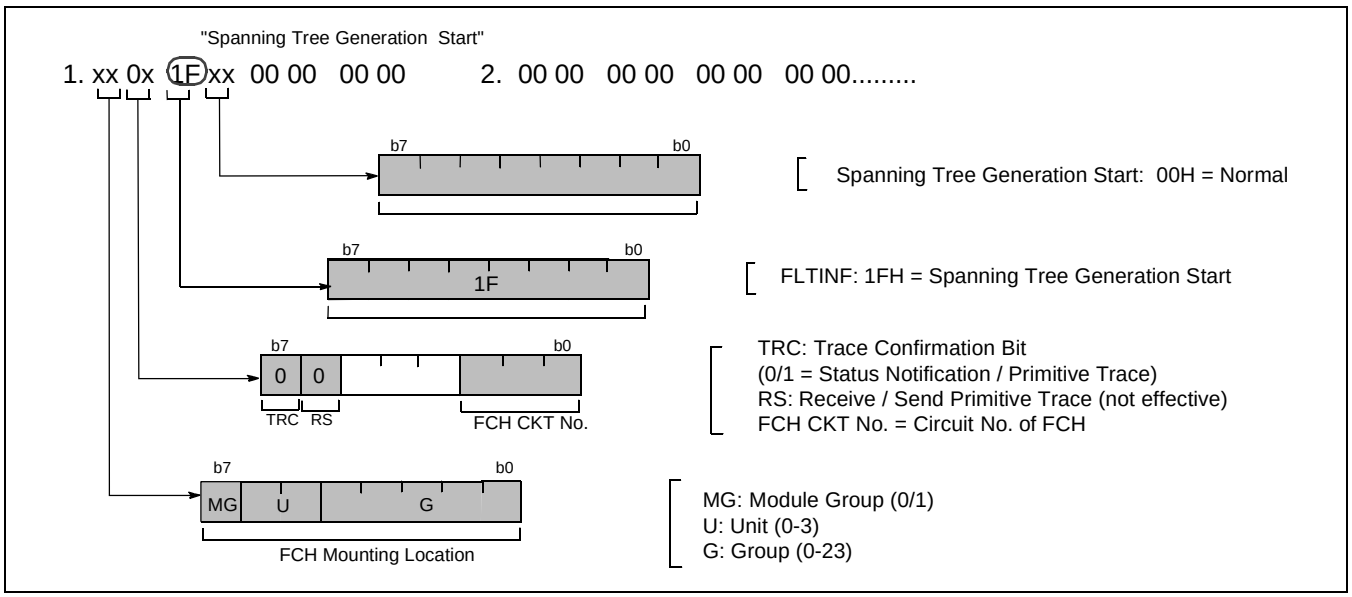


Figure 7-22 23-U FCCH Status Notification - Spanning Tree Generation

9.6 FLTINF = 85H Checksum Verification Failure

Figure 7-23 illustrates the message that is displayed when Checksum verification has resulted in failure between the PBX and the firmware.

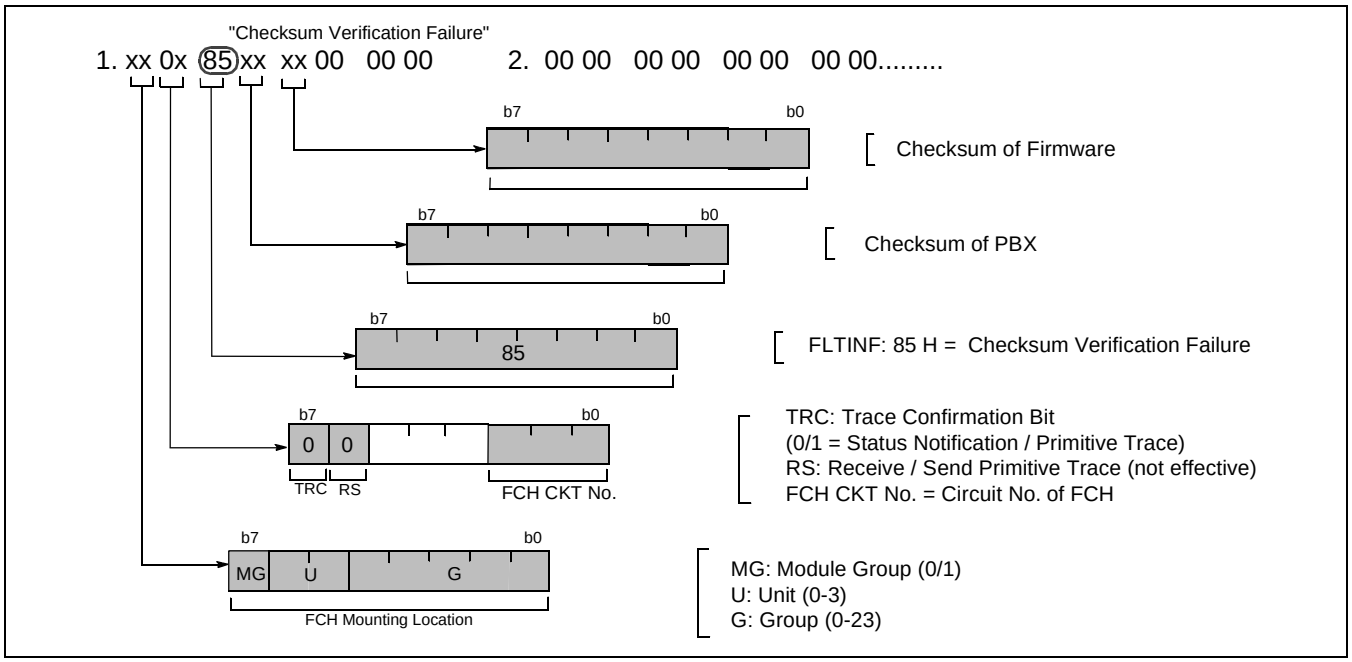


Figure 7-23 23-U FCCH Status Notification - Checksum Verification Failure

10. 23-W FCH Alternate Routing Start Notification

Figure 7-24 illustrates the message that is displayed when the indicated FCH card of self-Node becomes inoperative. This message is also displayed when the card is placed in make-busy status by MNT 3 switch operation or when the FCH of the adjacent node becomes inoperative.

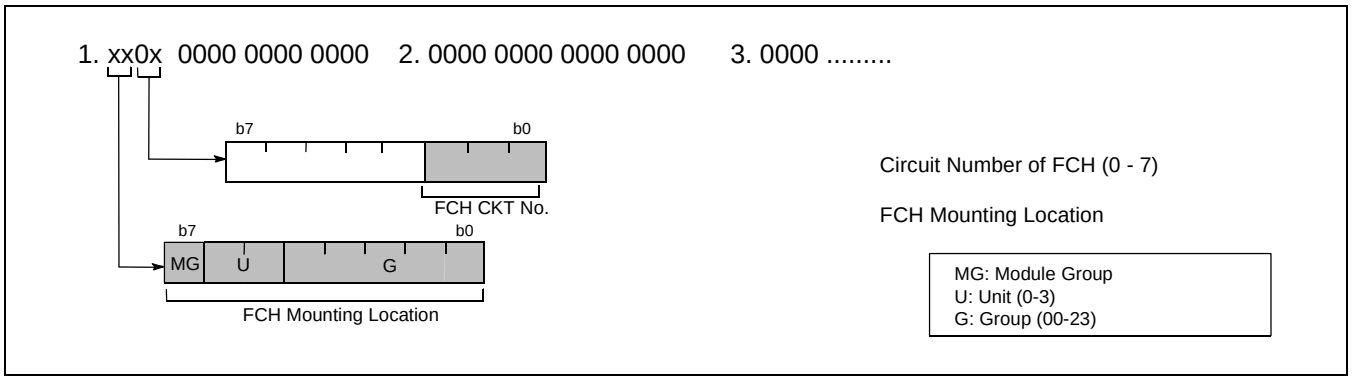


Figure 7-24 23-W FCCH Alternate Routing Start Notification

11. 23-X FCH Alternate Routing End Notification

Figure 7-25 illustrates the message that is displayed when an inoperative FCH card of self-Node resumes its operation. Therefore, when the card is placed in make-idle status by MNT 3 switch operation, this message is also displayed.

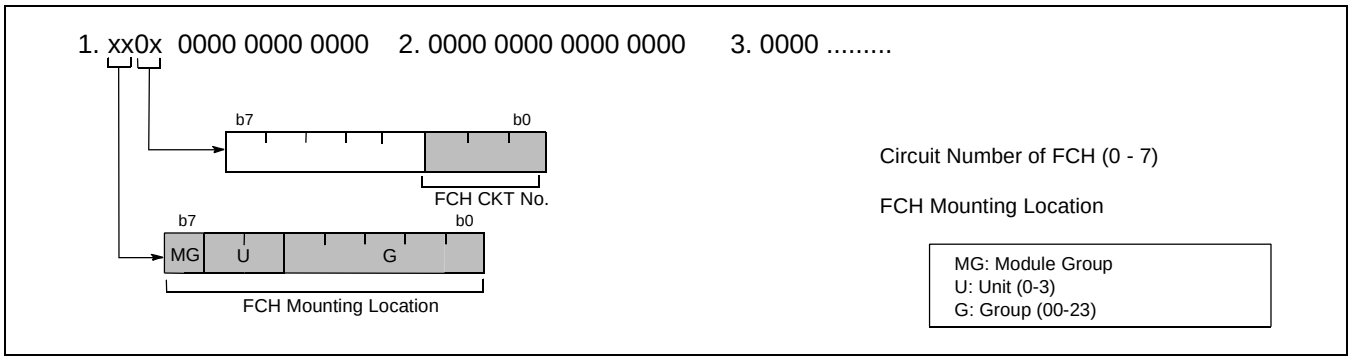


Figure 7-25 23-X FCCH Alternate Routing End Notification