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Internet Protocol eXchange

No.7 CCIS System Manual

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NEC Corporation

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BEFORE THE USE OF THIS MANUAL

1. FOR SAFETY USE

Here explains the safety use for the customer, which prevents danger to the life and damage to the property accidentally. The following are symbols and their meanings. Please read the following carefully before using this manual.

SYMBOLS	DESCRIPTION
DANGER	This symbol indicates danger. You might be involved in a situation that could cause deadly and bodily injury if you take wrong action.
WARNING	This symbol indicates warning. You might be involved in a situation that could cause bodily injury and serious system fault if you take wrong action.
ATTENTION	This symbol indicates attention. The system might not acheive its performance or lead to the system stall if you take wrong action.

This telephone system is designed for use in the country NEC provides and can not be used in any other country.

If system-down, malfunction, defects, and external factors (such as electricity failure) cause profit loss indirectly, NEC does not take any responsibilities for the profit loss.

We pay careful attention to making this manual, however, when you find mistakes on this manual, notify to NEC.

Contact the supplier or the service technician if the system needs repairs and installation.

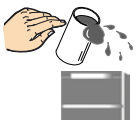
Please read all the manuals related to your system carefully.

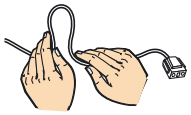
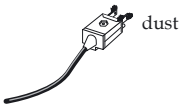
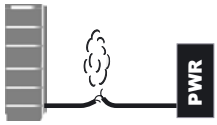
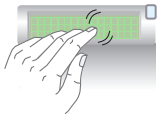
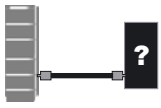
2. NOTICE WHEN USED

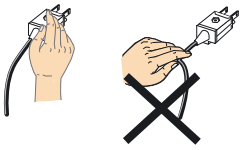
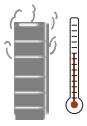
2.1 Consideration of PBX, Power-related Equipment and Peripheral Equipment

This item describes the consideration before using PBX, the power-related equipment, and the peripheral equipment (such as console, MDF, DAU, telephone, PC, printer, etc).

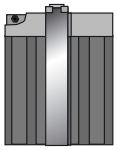
Preserve the following:

DANGER	
	When the system gives off smoke or burning smell, it might cause a fire, an electric shock, or a failure if the system keeps operating. Turn off the power and confirm the smoke disappears, and then contact supplier.
	If equipment (such as PBX, Main Power, cabinet, and peripheral equipment) fall down and be broken, turn off the power, and then contact the supplier.
	If the inside of PBX or Main Power is wet by liquid such as water, turn off the power. It might cause a fire, an electric shock, or a failure if the system keeps operating.
	Do not touch the internal parts of Main Power for the purpose of disassembly and remodeling. It might cause a fire, an electric shock, or a failure. (NEC does not take any responsibilities if the system or the equipment is disassembled or remodeled.)
	Do not put any container (such as vase, cup, and cosmetics) on Main Power and peripheral equipment. It might cause a fire, an electric shock, or a failure.

DANGER	
	Do not damage, remake, forcefully bend, forcefully extract, nor forcefully twist an electric code and a wiring to/from PBX, Main Power and peripheral equipment. It might cause a fire, an electric shock, or a failure. If the wiring is damaged, ask the supplier to fix it.
	Insert the electric plug into the outlet properly. Confirm no dust is on the blade of plug; it might cause a fire.
	Do not use other than the power designated when installed.
	Do not try to fix or move Main Power by yourselves without the supplier or service technician's help. Please ask them when the repair or the movement is necessary.
	Do not put any metal or combustible object into a vent of PBX, Main Power, and the peripheral equipment. If the object is in those equipment, turn off the power and ask the supplier. It might cause a fire, an electric shock, or a failure if the system keeps operating.
	Be careful of using the display part which the peripheral equipment has. In the case of liquid crystal, the liquid is leaked and causes harm to human body and systems.
	Before connecting customer-provided equipment (such as the other company products) with NEC products such as PBX and peripheral equipment, ask the supplier and make sure your equipment is compatible with NEC product. If it is not confirmed, do not connect them. It might cause a fire or an electric shock.

WARNING	
	Fix the equipment. Do not put any object on PBX and Main Power; it might be dangerous if the object should fall down.
	When plugging off a plug, be sure to grip the plug and extract it. If you grip the code and extract it, it might cause a fire and an electric shock.
	If a fault is considered as the lightening cause, ask the supplier.
	Other than fulfilling the appropriate humidity and temperature, it is necessary to consider the maintenance operation and the all-time ventilation in non-loading operation during day-off and night. For example, when the height above floor is 1 m (3.281 feet), the temperature should be from 20 to 25 °C (68 to 77 °F) and the humidity should be more or less 50 %.

WARNING



Be careful of using a battery as following:

Rechargeable lead battery is used as the emergency battery of PBX. Check the back-up for an electricity failure.

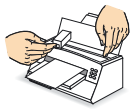
Battery electrolyte is harmful to human body. If the battery electrolyte is put on the cloth, clean it using enough amount of water.

Do not cause the battery short intentionally. Do not put it near fire or put it into fire. Do not damage it, such as disassembly, falling, and impact.

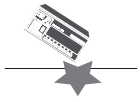
The battery life varies depending on the surroundings. The battery life is approximately three years. If the battery is used outside with high temperature, the battery life is shortened to approximately one year.

If not replacing terminal or dead battery, the PBX system will not work in case such as power failure. Besides it might cause smoking or fire due to leaking battery electrolyte. Perform the periodic diagnosis surely. Note that the battery is one of periodic replacement parts whose cost are charged to the customer. We recommend you to make a contract with supplier or service technician about the routine maintenance.

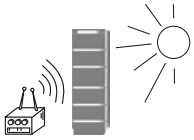
Do not touch the peripheral equipment by wet hand. Do not wet the peripheral equipment.



Do not touch the ink head and the internal of the printer. When replacing the ink ribbon or the paper, make sure it is cool enough.



Do not drop nor impact the peripheral equipment. It might cause a failure.

ATTENTION	
Thinner	Do not use benzine, thinner, and alcohol for cleaning. When it is difficult to clean dust and dirt, put weaken neutral detergent onto a cloth, and give the cloth a wiring. Clean dust and dirt with the cloth, and rub them with a dry cloth.
	Do not place equipment in the following: Locations which receive direct sunlight Locations where the moisture exceeds the allowed level Locations which might be wet with water, oil, and chemicals Locations which is particularly low in temperature (such as an ice compartment) Locations which receive the electric wave or the magnetism from TV and (two-way) radio Locations which receive the illegal electric wave Note that the life of PBX and Main Power is shorten if placed in the location affected by much of hydrogen sulfide or salt, such as seaside area.

2.2 Notice Regarding Lightenning Strikes

WARNING	
	It is necessary to take proper procedures to avoid damage to the PBX caused by local lightening strikes and other electrical surges. As for grounding conductors, there needs to be two-type grounding conductors; one is below 10 Ω (Type 1) and the other is below 100 Ω (Type 2). In particular, the Type 1 is used for the electronics circuit installment, therefore, it must be used as isolated system to keep from electricity difference caused by lightening strikes. The Type 1 is used when connecting the FE of PBX, the PE of Main Power, MDF, etc. Extract the ground terminal (grounding electrode of three terminals) from the earth board same with that of the main equipment. The ground terminal attached with AC100V plug outlet is used for MAT, printer, MODEM, and measurement machine for maintenance.

2.3 Periodic Repair Parts and Disposables

ATTENTION	
	Replace the periodic repair parts such as fan, battery, backup battery, HD, fuse, and display. If not change the parts and past the periodic term, sudden traffic fault might lead to the whole system failure and damaging. Replace the disposables such as ink ribbon, FD, recording paper, and headset. We recommend you to make a contract for the maintenance service.

This page is for your notes.

NEAX2400 IPX
Internet Protocol eXchange
No.7 CCIS System Manual

TABLE OF CONTENTS

Page

CHAPTER 1 INTRODUCTION 1
1.GENERAL 1
2.HOW TO FOLLOW THE MANUAL 1
2.1 Configuration of the No. 7 CCIS System Manual 1

CHAPTER 2 GENERAL INFORMATION FOR CCIS 2
1.GENERAL 2
2.DESCRIPTION OF CCIS 2
3.SYSTEM CONFIGURATION 4
3.1 Outline 4
4.NETWORK CONFIGURATION 6
4.1 Types of Network 8
4.2 Examples of Network Configuration 9
4.2.1 Main-Satellite Configuration 9
4.2.2 Campus Configuration 10
4.2.3 Main-Remote Configuration 11
4.3 CCIS Network Modes 12
4.3.1 Associated Mode 12
4.3.2 Quasi-Associated Mode 13
4.4 CCIS Network Redundancy 13
5.DIGITAL NETWORK AND NETWORK SYNCHRONIZATION 14
5.1 Outline 14
5.2 Office Rank 16
5.2.1 Source Office 16
5.2.2 Sub-Source Office 17
5.2.3 Receiver Office and Local Receiver Office 18
5.3 Clock Pulses from M-OSC/EXT. OSC and Connection with PLO/OSC 19
5.4 Clocks Extracted from DTI and Connection of PLO/TSW 20
5.5 Automatic Clock Route Changeover 22
5.5.1 Automatic Route Changeover on Fault to M-OSC/EXT. OSC of Input Clock Route 22
5.5.2 Automatic Route Changeover on Fault to DTI of Input Clock Route 22
6.NETWORK THROUGH FCCS GROUPS AND NEAX2000 IPS Internet Protocol Server 25
6.1 Network Configuration 25
6.2 Conditions for Network Establishment 26
6.3 FCCS Group (FUG) 27
6.4 Interactions 28

CHAPTER 3 SWITCH SETTING SHEETS 29
1.GENERAL 29
2.LIST OF CIRCUIT CARDS 29

TABLE OF CONTENTS (CONTINUED)

Page

CHAPTER 4 INSTALLATION PROCEDURE 30
1.GENERAL 30
2.PRECAUTIONS ON INSTALLATION 30
3.INSTALLATION PROCEDURE 32
3.1 General Flow of Installation Procedure 32
3.2 Setting of Switch Positions and Mounting of the Circuit Cards 33
3.3 Cable Termination and Cross Connection from the MDF to the DSU 35
3.4 Front Cable Connection between DTI and CCH 43
3.5 Cable Running from PBX to the MODEM for Analog CCIS Line 44

CHAPTER 5 INSTALLATION TEST PROCEDURE 49
1.GENERAL 49
2.INSTALLATION TEST PROCEDURE 49
2.1 Overall Test for CCIS Line 49
2.1.1 Overall Test of CCIS Tie Line Outgoing Call 50
2.1.2 Overall Test of CCIS Tie Line Incoming Call 52
2.1.3 Test of Connection and Alternate Routing to All Tie Lines 53
2.1.4 Test of Tandem Connection to Tie Line 55
2.1.5 PAD Setting 57
2.2 CCIS Service Feature Functional Test 58
2.2.1 Test of Interoffice Station to Station Connection 59
2.2.2 Test of Outgoing Call Connection to Tie Line Trunk 60
2.2.3 Test of Transfer Services 61
2.2.4 Test of Services from ATTCON 62
2.2.5 Test of other Services 63
3.TEST RESULT REPORT 64
3.1 CCIS Service Feature Functional Test 64
3.1.1 Test of Interoffice Station to Station Connection 64
3.1.2 Test of Outgoing Call Connection to Tie Line Trunk 64
3.1.3 Test of Transfer Services 64
3.1.4 Test of Services from ATTCON 65
3.1.5 Test of Other Services 65

CHAPTER 6 BASIC DATA ASSIGNMENT 66
1.GENERAL 66
2.DATA ASSIGNMENT 67
2.1 Port Allocation and Related Command 67
2.2 Basic Data Assignment Procedure 68
2.3 FCCS Data Assignment Procedure 76

CHAPTER 7 CCIS SERVICE FEATURES 81
1.GENERAL 81

CHAPTER 8 MAINTENANCE PROCEDURE 84
1.GENERAL 84
2.SYSTEM MESSAGES 84
2.1 The Relationship between System Messages and Lamp Indications 85

TABLE OF CONTENTS (CONTINUED)

Page

2.2 Technical Terms for Explaining Message Detail Data 86
2.2.1 Circuit Card Mounting Information 87
2.3 How to Proceed with Diagnostic Work from System Message 89
2.4 System Messages 91
3.CCIS (Common Channel Interoffice Signaling) Line Fault 114
3.1 Check Point 114
3.2 CCIS Line Control 114
3.3 Fault Repair Procedure for Digital CCIS Line 115
3.4 Fault Repair Procedure for Analog CCIS Line 116
4.CCIS LINE OPERATING MODE CONTROL 118
5.INSERTION/EXTRACTION OF CIRCUIT CARDS 119
5.1 CCH Circuit Card 119
5.2 DTI Circuit Card 120
5.3 CCT Circuit Card 121
5.4 PLO/OSC Circuit Card 122

This page is for your notes.

CHAPTER 1 INTRODUCTION

1. GENERAL

This manual describes the installation procedures, maintenance, etc. for connecting No. 7 CCIS (Common Channel Interoffice Signaling) lines to the PBX.
The configuration of this manual is described in Section 2: “HOW TO FOLLOW THE MANUAL” of this chapter.

2. HOW TO FOLLOW THE MANUAL

2.1 Configuration of the No. 7 CCIS System Manual

Table 1-1 Configuration of the No. 7 CCIS System Manual

CHAPTER	TITLE	DESCRIPTION
1	INTRODUCTION	Describes the No. 7 CCIS System Manual and how to use it.
2	GENERAL INFORMATION FOR CCIS	Describes the specification and configuration of the PBX.
3	SWITCH SETTING SHEETS	Describes the switch setting for each circuit card.
4	INSTALLATION PROCEDURE	Describes how to connect CCIS lines to the PBX.
5	INSTALLATION TEST PROCEDURE	Describes the PBX installation test procedure for CCIS.
6	BASIC DATA ASSIGNMENT	Describes the basic data assignment for establishing CCIS link.
7	CCIS SERVICE FEATURES	Describes the functions, operating procedure, and office data assignment procedure for each CCIS service feature.
8	MAINTENANCE PROCEDURE	Describes the PBX maintenance procedure for CCIS.

Note: *Because the system name varies depending on the country to be provided, each system is described as follows in this manual.*

CHAPTER 2 GENERAL INFORMATION FOR CCIS

1. GENERAL

This chapter describes the functional outline of CCIS, hardware required for CCIS, and service features which can be provided by CCIS.

2. DESCRIPTION OF CCIS

The modular architecture and wide range of voice and data features available with the digital PBX's have been developed with emphasis on continued enhancement within a single PBX. In order to meet the growing demand for further enhancement on a network level, NEC developed a networking system employing Common Channel Interoffice Signaling (CCIS). The CCIS system links together individual PBX systems (nodes) to form a transparent voice and data network which acts as a single large PBX, even though terminals within the network are, in fact, connected to different PBX's. Common Channel Interoffice Signaling (CCIS) derives its name from the fact that a signaling channel (link), separate from voice and data channels, is provided between nodes for the sole purpose of signal exchange. This signaling link is used in common by all voice and data links for exchange of information relating to addressing (e.g. dialed digits, calling/called number); supervisory functions (e.g. call setup and termination); and network accounting and management (e.g. centralized billing and fault reporting.) This is unlike conventional tie line networks which exchange signaling information over the same links as are for voice transmission (Associated Channel Interoffice Signaling.)
The block diagrams in Figure 2-1 and 2-2 illustrate the difference between Common Channel Interoffice Signalling (CCIS) and Associated Channel (In-band) Interoffice Signaling (ACIS).

Figure 2-1 Associated Channel (In-Band) Interoffice Signaling

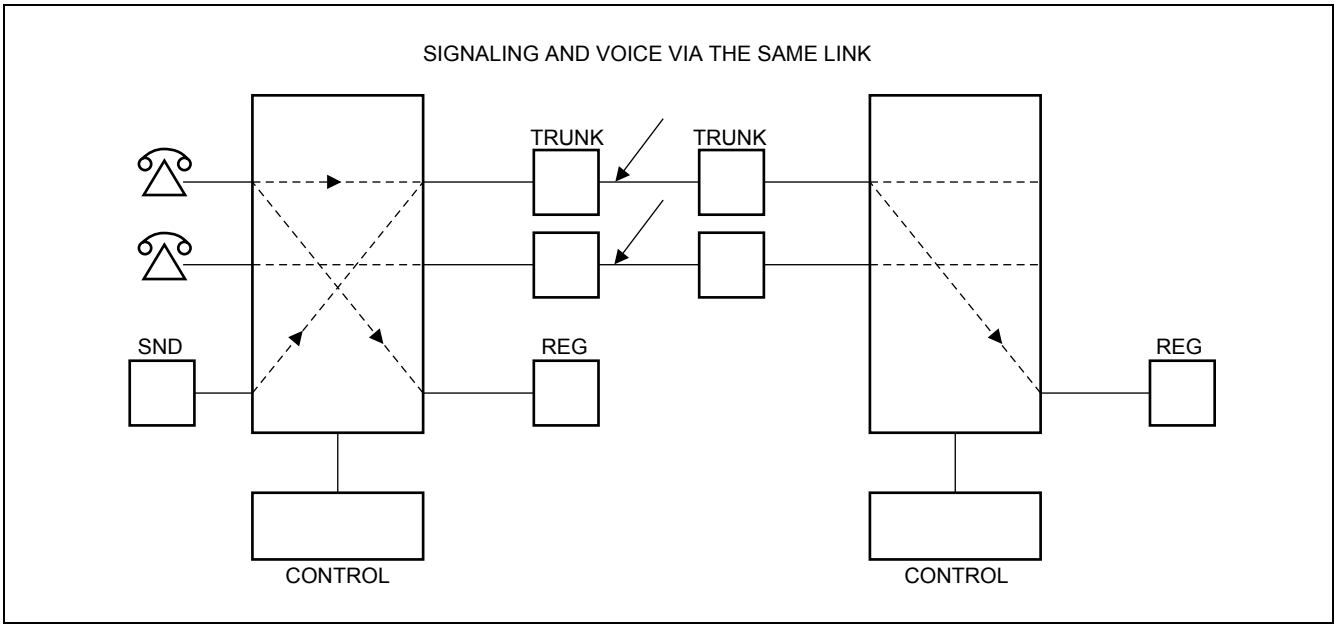
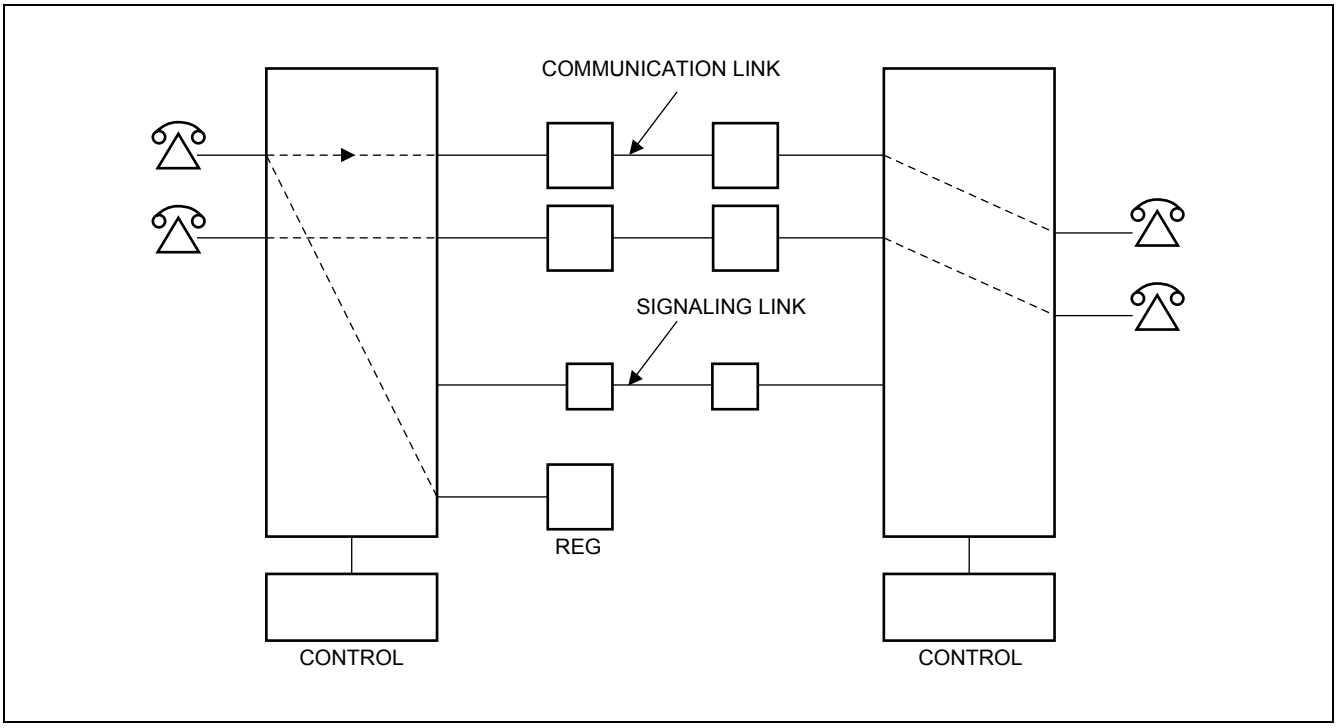


Figure 2-2 Common Channel Interoffice Signaling



Some advantages of the separate signaling link provided by CCIS are:

(a) Network Transparency

Because CCIS allows data relating to service features and station/trunk status to be exchanged between nodes at a high rate of speed (64 Kbps), service is provided to all users as though the CCIS network was a single PBX.

(b) Centralized Facilities

Centralized Management: Fault messages from all nodes can be directed to one centralized (management) node.

Centralized Billing: Billing information for all nodes in the network can be processed at one central location.

Centralized Attendant Service: It is not necessary in a CCIS network to have an Attendant Console at each node in the network. Attendant services can be provided to multiple nodes from one or more central location(s).

(c) Better Utilization of Trunking Facilities

Because network signaling is carried over separate signaling links, more efficient use can be made for network trunks (reduced call holding time, reduced connection time, etc.). In another word, the number of trunk circuits, which required to provide a specified traffic capacity, can be reduced.

(d) Network Reliability

Alternate Routing provides the CCIS network with maximum reliability. If the signaling link between two nodes should fail, signaling is sent over an alternate route, via another node, without loss of service. Directly-connected redundant links can also be provided to assure the reliability of the network.

(e) Reduction in Personnel

Because management, cost accounting, and services, such as Attendant operation, can be centralized, the number of people necessary to administer the network can be reduced.

(f) Reduced Hardware

Signaling over a common channel; better utilization of trunking facilities; and centralized management and services all result in a vast reduction in hardware when a CCIS network, rather than a conventional Tie line network, is used.

3. SYSTEM CONFIGURATION

3.1 Outline

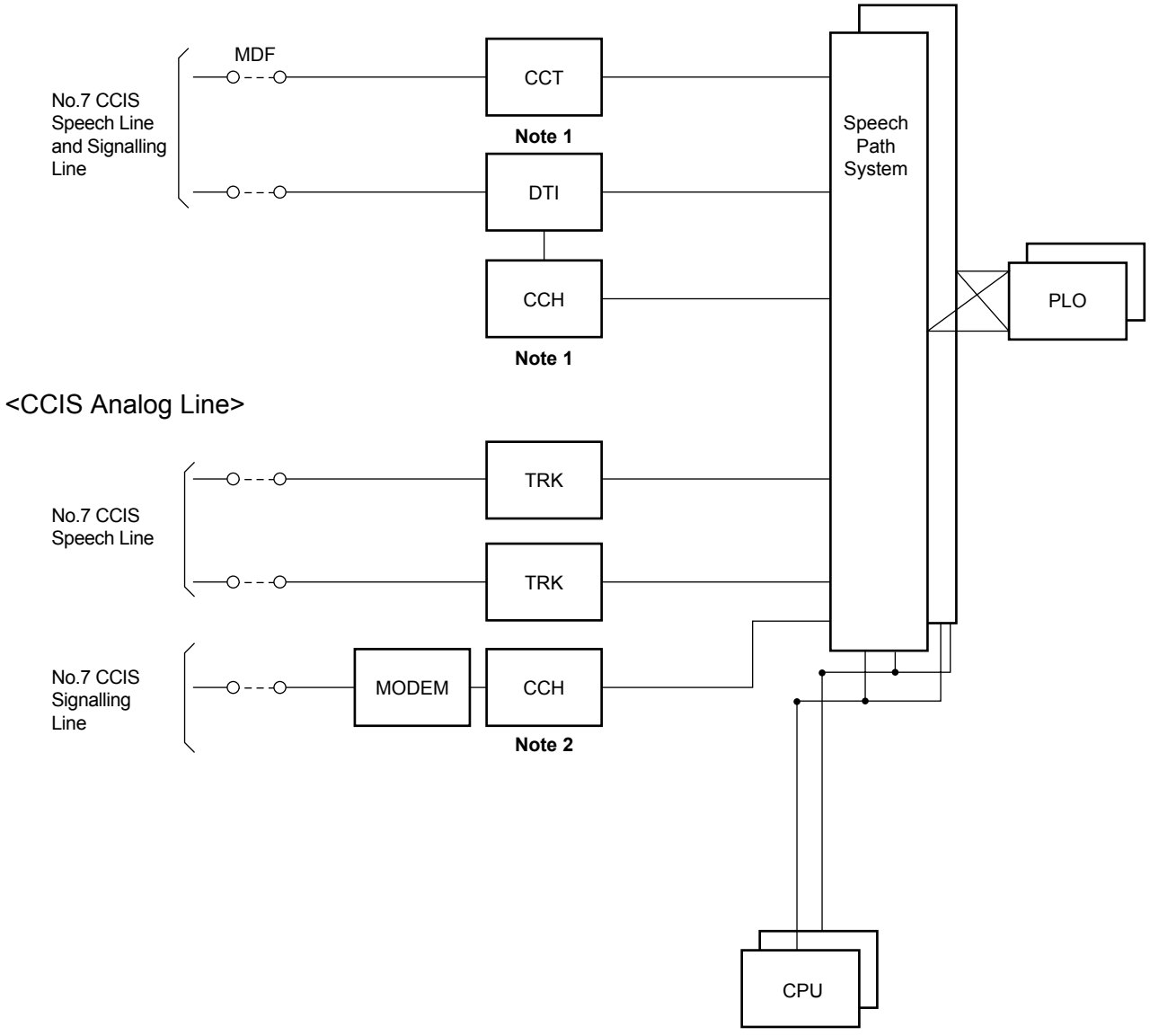
This Section describes the hardware configuration and its specification, the names of interface equipment and other related subjects. Figure 2-3 shows No. 7 hardware configuration, respectively. The control signal circuit used for CCIS is classified into the digital circuit and analog circuit. The CCH card can be used for both digital and analog control signal circuit and the CCT card is used for digital one. CCH sends control signals to and receives from the distant office. Also, for network synchronization, PLO/OSC or TSW (Phase Lock Oscillator/Oscillator or Time Division Switch) are used.
For the analog control signal circuit, CCH circuit card is used with MODEM.

Table 2-1 shows the CCIS interface specifications and their applications.

Table 2-1 CCIS Interface Specifications

TYPE OF FACILITY	SIGNALING RATE	INTERFACE SPECIFICATION	INTERFACE EQUIPMENT	APPLICATION
Voice Frequency Circuit	4.8 kbps	RS-232C, V. 24, V. 28	MODEM V27 or equivalent	Used for a CCIS Tie Line (4ODT) Network.
1.544 Mbps	48-64 kbps	T1-D3	T1 Channel	Used with T1 (24DTI) lines.
2.048 Mbps	64 kbps	E1	E1 Channel	Used with E1 (30 DTI) lines.
AT&T IS DDS	56 kbps	V. 35, V. 28/V.11	NEC DCP DSU or equivalent	Used if network has extensive Tie Lines, with heavy traffic conditions, and AT&T IS Digital Data Service is available.

Figure 2-3 Hardware Configuration of No. 7 CCIS System



Note 1: *When using one channel of the DTI as the Control Link.*
Note 2: *When using Analog MODEM as the Control Link.*

4. NETWORK CONFIGURATION

With application of No. 7 CCIS added to the PBX, a network of multiple functions as if it were a single PBX. Since calls can be freely transferred between one PBX and another, most of the existing station services can be applied to inter-PBX call connections.

Further, using the CENTRALIZED BILLING-CCIS service and the CENTRALIZED SYSTEM MANAGEMENT REPORT-CCIS service, billing information and fault information can be processed at one center point instead of processing at each PBX concerned.
Figure 2-4 shows an example of PBX interoffice network for CCIS Digital Line, and Figure 2-5 shows an example of network configuration for CCIS Analog Line.

Figure 2-4 Example of Network Configuration for CCIS Digital Line

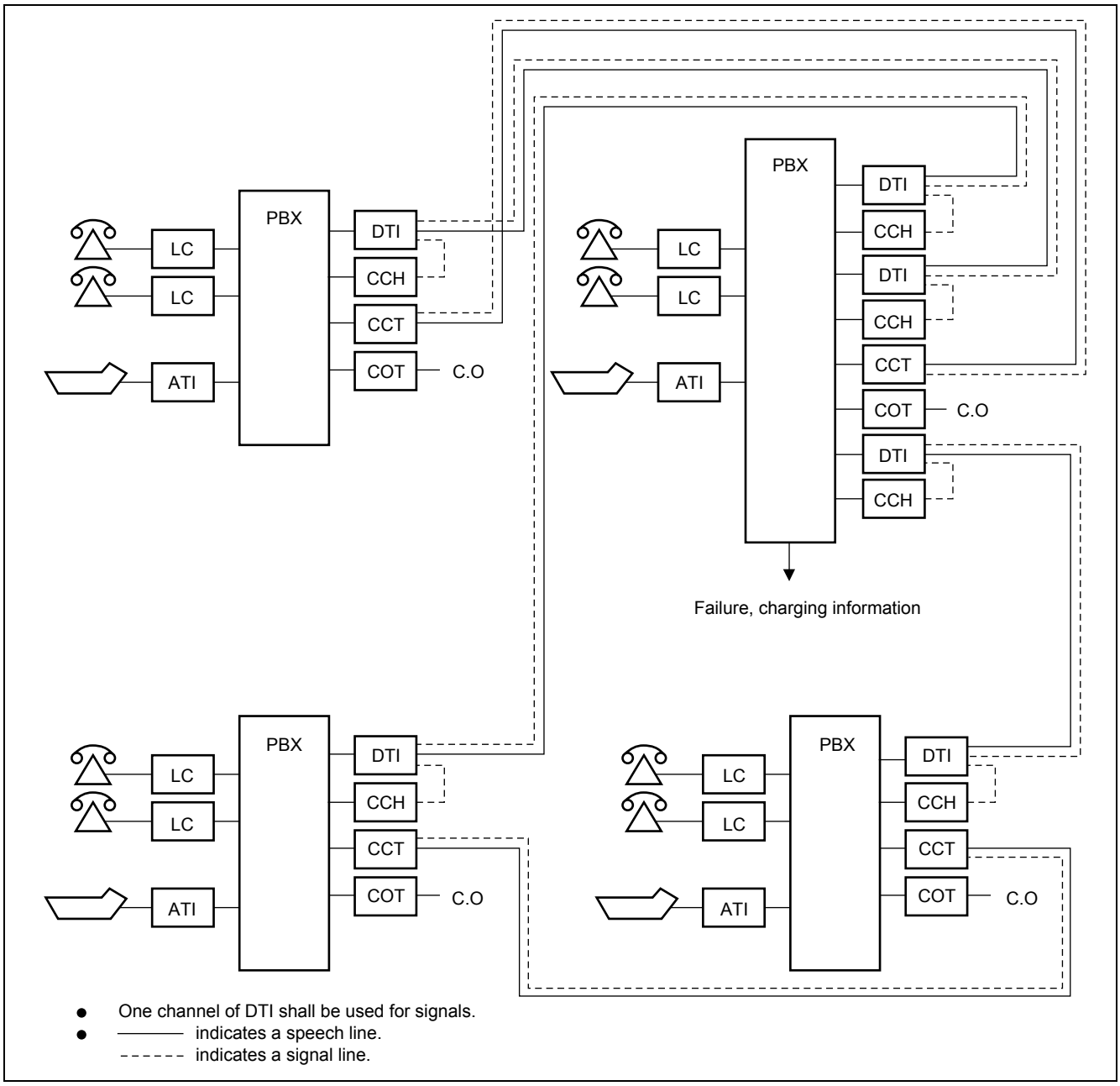
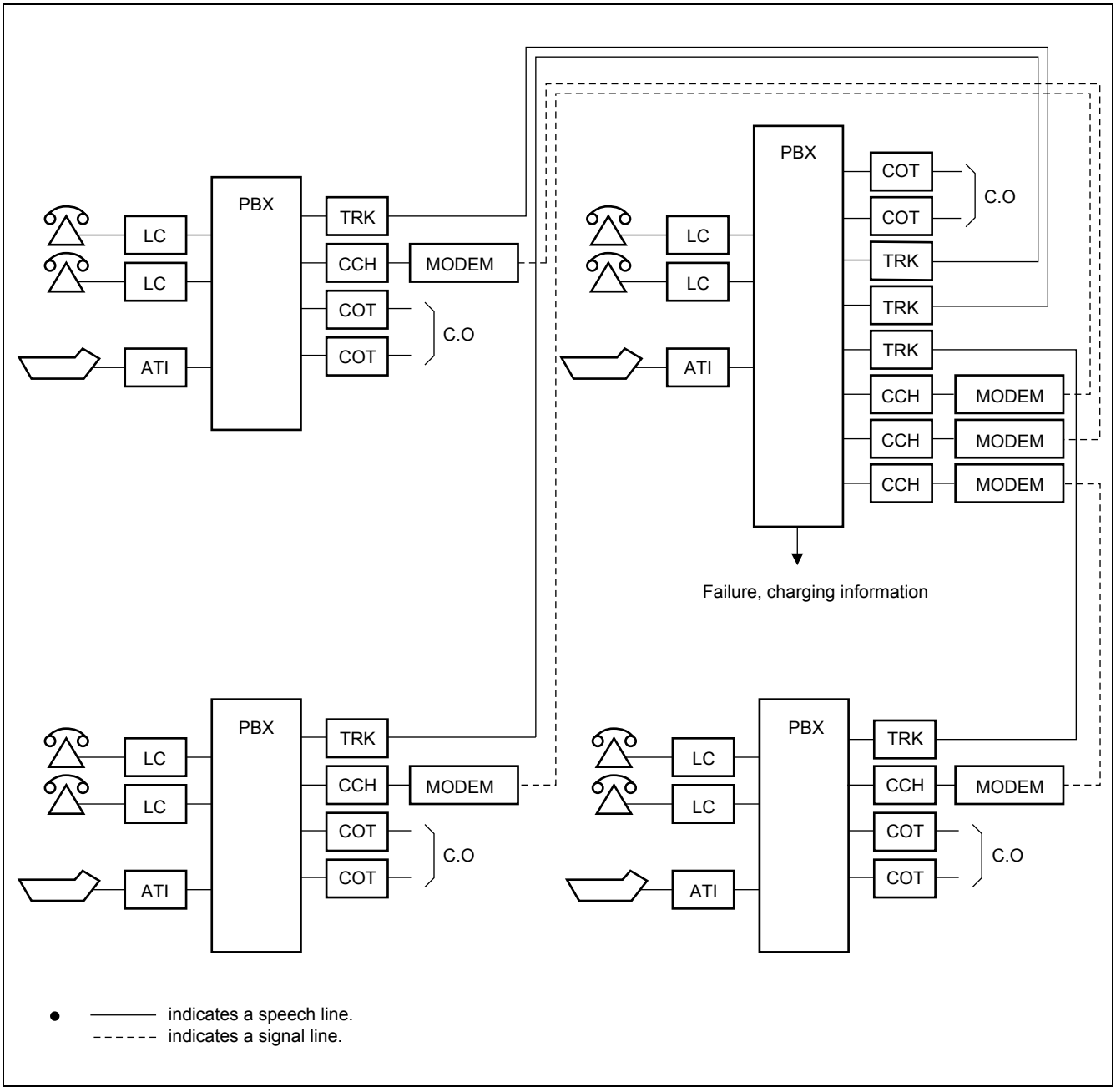


Figure 2-5 Example of Network Configuration for CCIS Analog Line



4.1 Types of Network

CCIS networks can be divided into the following types, depending upon the numbering plan used:
Main-Satellite Networks
Main-Remote/Campus Networks

Both networks provide uniformity of services throughout the CCIS network, and, because of numbering plan flexibility, station users are not conscious of the distance between nodes.

☐ Main/Satellite Network:
In this type of network, offices are connected by means of a numbering plan consisting of a three-digit office code, which denotes the location, and four-digit station numbers. An example of a Main/Satellite Network is shown in Figure 2-6.

☐ Main-Remote/Campus Network:
In these types of networks, offices are connected by means of a numbering plan consisting of four or five digit station numbers. The first one or two digit(s) of these station numbers are used to denote the location. An example of a Main-Campus Network is shown in Figure 2-7. Figure 2-8 shows an example of a Main-Remote Network. In this network, a part of the Main Office is installed as a Remote Office at a nearby site, either within or outside the premises of the Main Office. An advantage of this network is that it requires far less cabling than would be necessary if stations were connected to a single PBX. Network numbering specifications are summarized in Table 2-2.

Table 2-2 Network Specifications

TYPE OF NETWORK:	MAIN-SATELLITE NETWORK	MAIN-REMOTE/CAMPUS NETWORK	REMARKS
NUMBERING PLAN:	Office Code: Three digits Sta. No.:Four digits	Office Code: First one or two digits of Station Number. Sta. No.: Max. five digits	
ACCESS METHOD	8-XXX-XXXX Sta. No. Office Code Access Code	XXXXX Sta. No. Office Code	
NETWORK SIZE:	Large (Nationwide)	Small (PBX Premises)/ Medium (Local Area)	

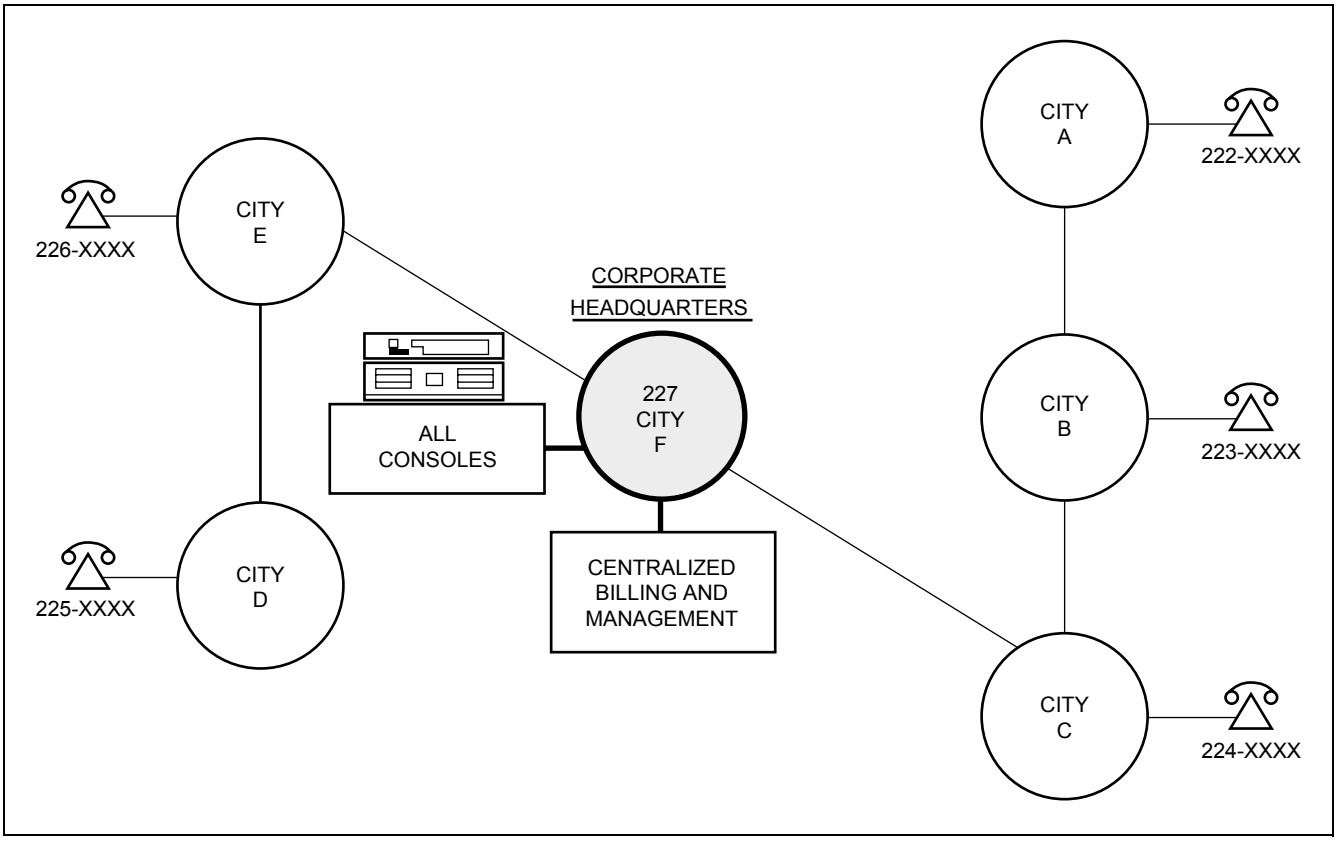
4.2 Examples of Network Configuration

4.2.1 Main-Satellite Configuration

Figure 2-6 shows an example of a Main/Satellite configuration for a nationwide corporate network. This type of network results in cost savings and increased efficiency by providing:

- Leased lines versus toll lines.
- Centralized Attendant Service.
- One central location for call accounting.
- A central MAT (Maintenance Administration Terminal) for network management, control and remote maintenance.
- Seven-digit on-net numbering.
- Feature transparency.

Figure 2-6 Nationwide Corporation

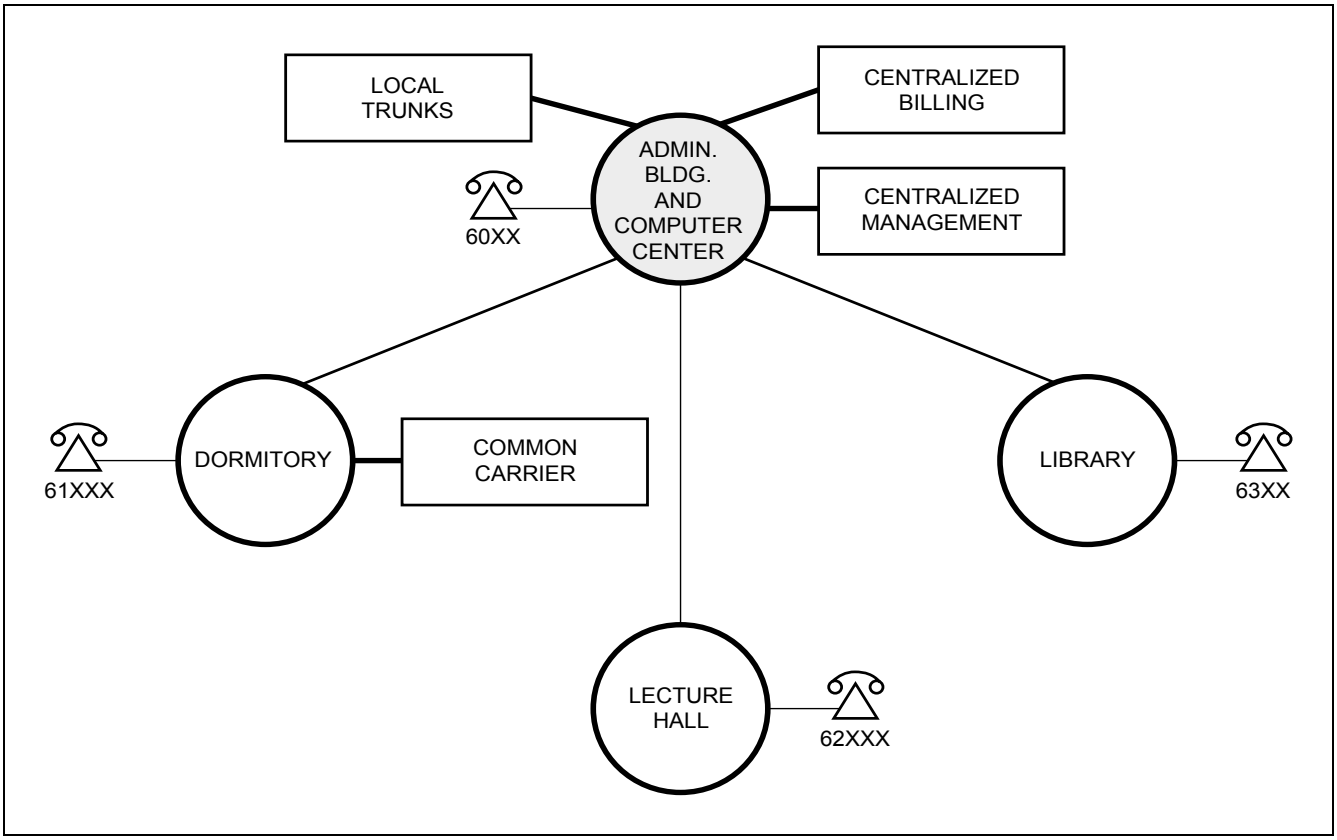


4.2.2 Campus Configuration

Figure 2-7 shows an example of a Campus network. This type of network provides:

- A uniform numbering plan: the first one or two digit(s) of the station number indicate(s) the location. In this numbering plan, four and/or five-digit station numbering can be used.
- Network access to Common Carrier services.
- Centralized Attendant service and network maintenance.

Figure 2-7 University/Campus Environment

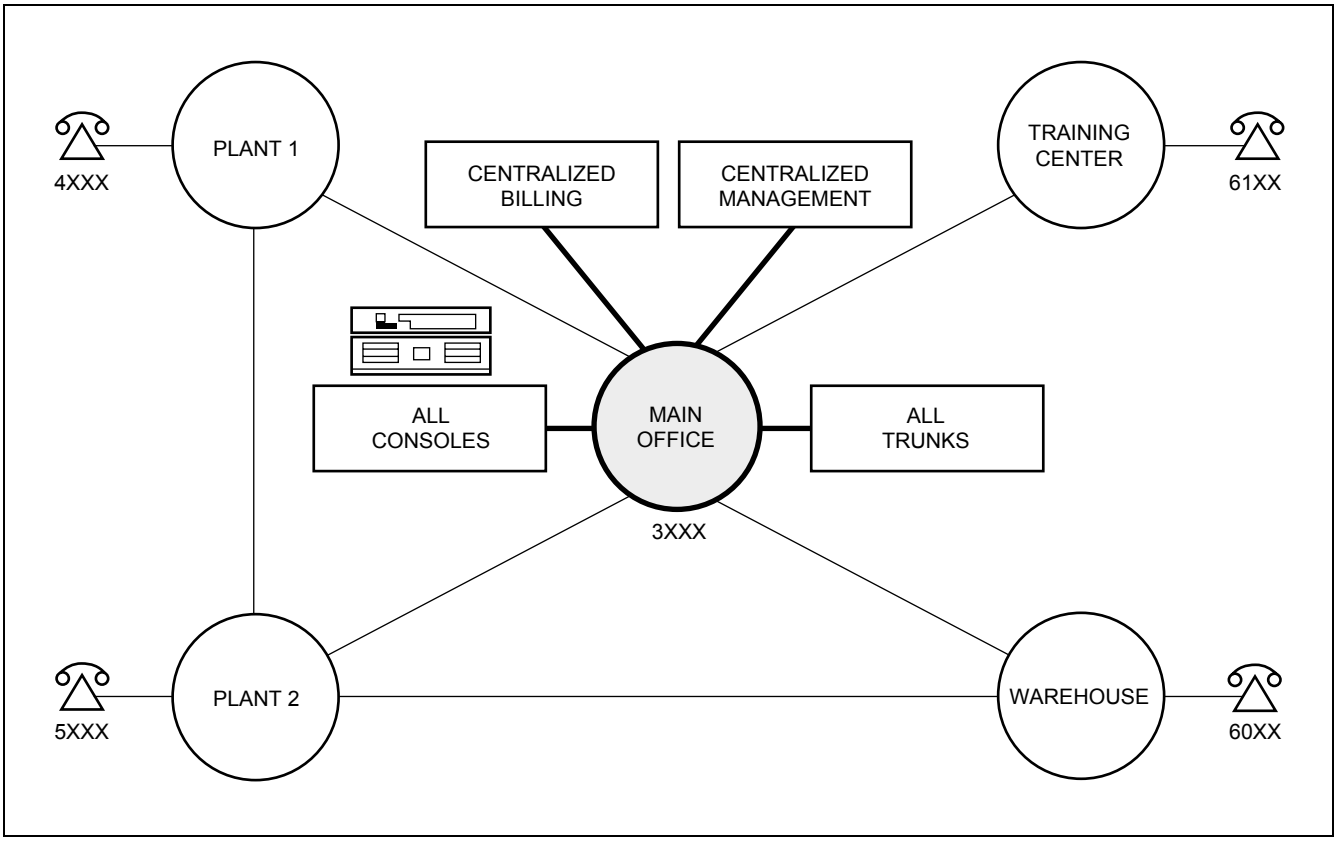


4.2.3 Main-Remote Configuration

Figure 2-8 shows an example of a Main/Remote configuration for a manufacturing/plant environment. This type of network provides the following advantages:

- A central trunk location for trunking efficiency.
- Centralized management capability.
- Centralized attendant service.
- Centralized billing for inter-departmental accounting.
- Four digit inter-building and intra-city numbering.
- Feature transparency.
- Reduced calling.

Figure 2-8 Manufacturing/Plant Environment



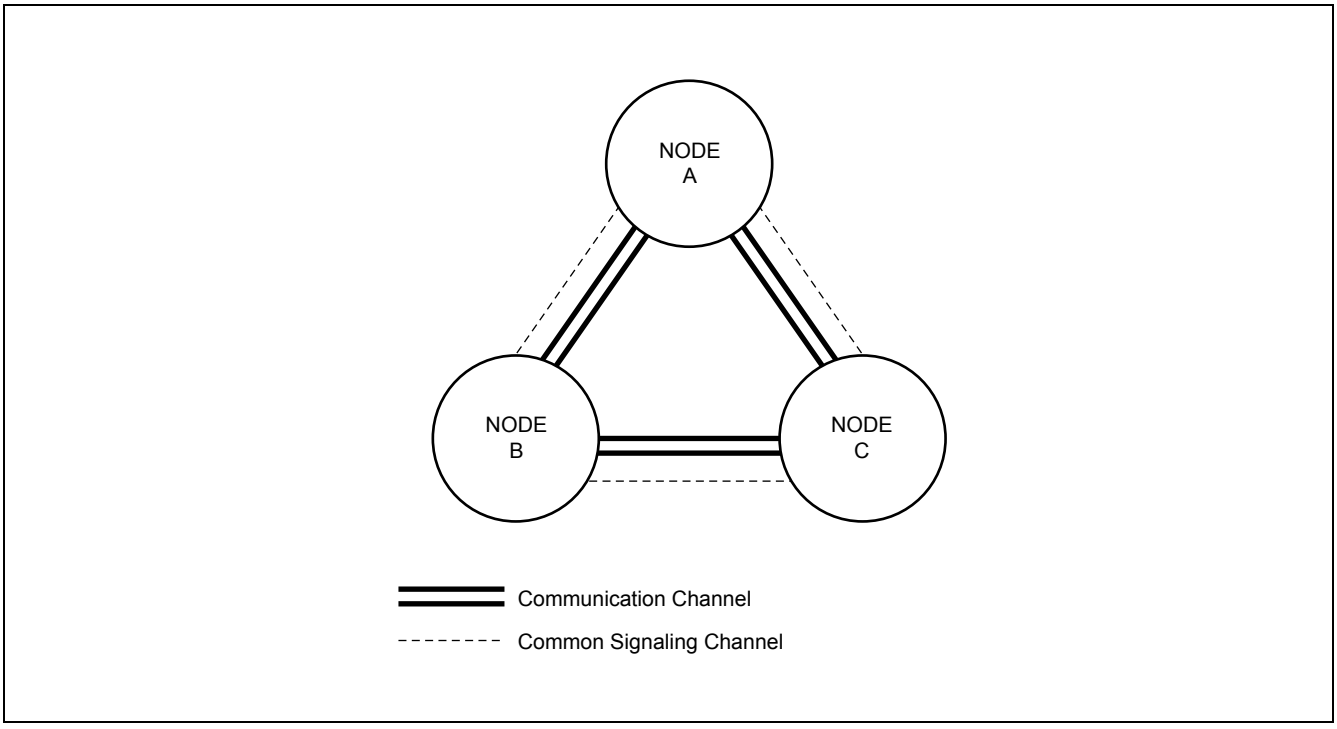
4.3 CCIS Network Modes

The signaling channels of a CCIS network can be connected in one of two ways: Associated Mode or Quasi-Associated Mode.

4.3.1 Associated Mode

An Associated Mode network is configured with a signaling channel (data link) between all nodes in the network. Signaling functions for all inter-node calls are carried over these dedicated signaling channels. In an Associated Mode Network, if one of the signaling links should fail, signaling can easily be rerouted via another node. An example of an Associated Mode network is shown in Figure 2-9 below.

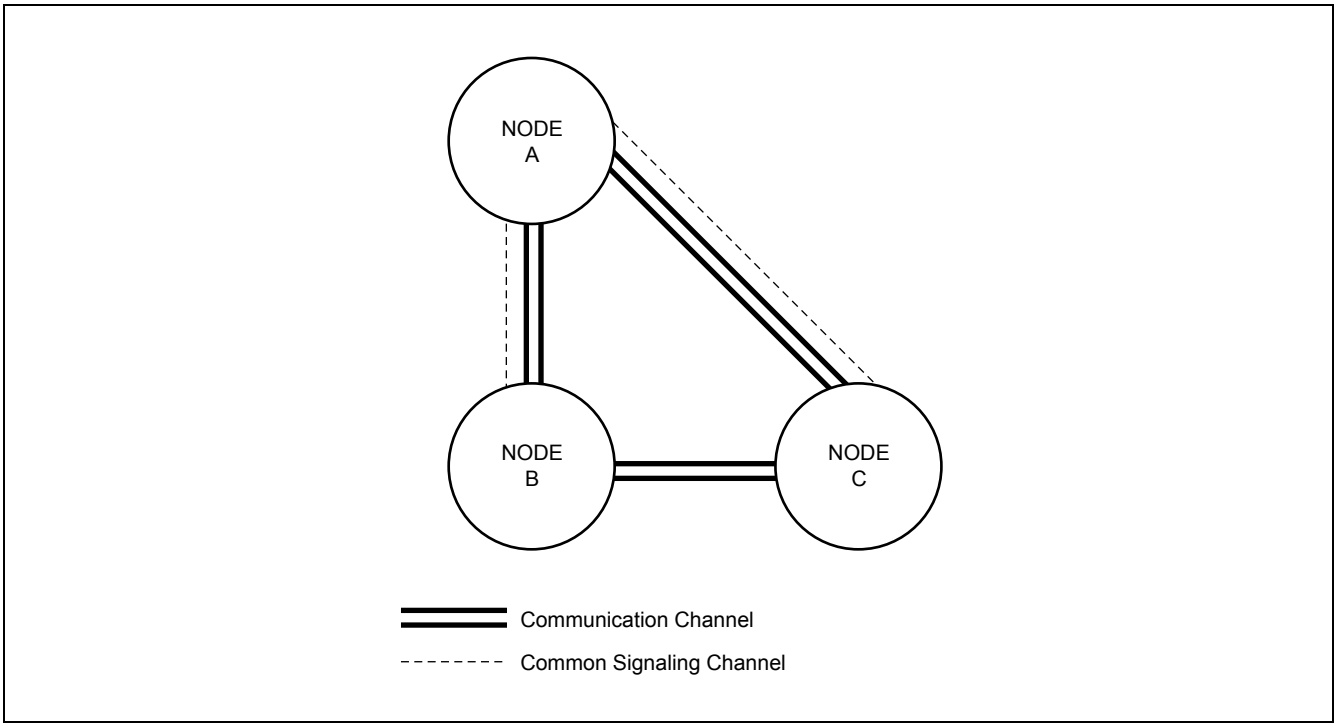
Figure 2-9 Associated Mode Network



4.3.2 Quasi-Associated Mode

In Figure 2-10 below, nodes A and B, and A and C are connected in the Associated Mode. Nodes B and C are connected in the Quasi-Associated Mode.
In this configuration, signaling data between nodes B and C is routed via node A, while the communication channels are established directly between nodes B and C. This type of network reduces the hardware necessary to establish the signaling links.

Figure 2-10 Quasi-Associated Mode Network



4.4 CCIS Network Redundancy

To provide maximum network reliability, two levels of redundancy are provided for the signaling links.

(1) Signaling Channel Redundancy

Redundancy of the inter-node signaling links is provided directly between the nodes by adding one more link than is necessary for the signaling traffic. This is the N+1 method. If one link fails, signaling is automatically routed via an alternate link.

(2) Alternate Signaling Path Redundancy

An alternate method of providing network signaling redundancy is to configure the network so that an alternate path is provided between the nodes.
In the network shown in Figure 2-9, if the signaling link(s) directly connecting nodes B and C should fail, the signaling would automatically be reconnected via node A without loss of service. (Node A would be designated as the Signaling Transfer Point [STP]).

5. DIGITAL NETWORK AND NETWORK SYNCHRONIZATION

5.1 Outline

To set up a digital network, it is necessary to establish clock level synchronization among the offices composing the network.
Among various kinds of synchronizing methods, the PBX is using Receiver synchronization as the standard method.
As for the office ranks, there are the following four kinds:

- Source Office
- Sub-Source Office
- Receiver Office
- Local Receiver Office

Refer to Table 2-3 for synchronization method at network-level.
For types of PBX applicable for each office hierarchy, refer to Table 2-4.

Table 2-3 Office Ranks and Kind of Oscillator

OSC / OFFICE RANK	M-OSC (Note 2)	EXT. OSC (Note 1)	PLO/OSC (High Precision Oscillator)	PLO/TSW (Subordinate Oscillator)	REMARKS
Source Office	×	—	—	—	
Sub-Source Office	—	×	×	—	
Receiver office	—	—	×	×	
Local Receiver Office	—	—	—	×	

×: Applicable —: Not Applicable

The clock precision is as follows.
M-OSC ≧ EXT. OSC ≧ High precision - PLO/OSC ≧ Subordinate - PLO/TSW

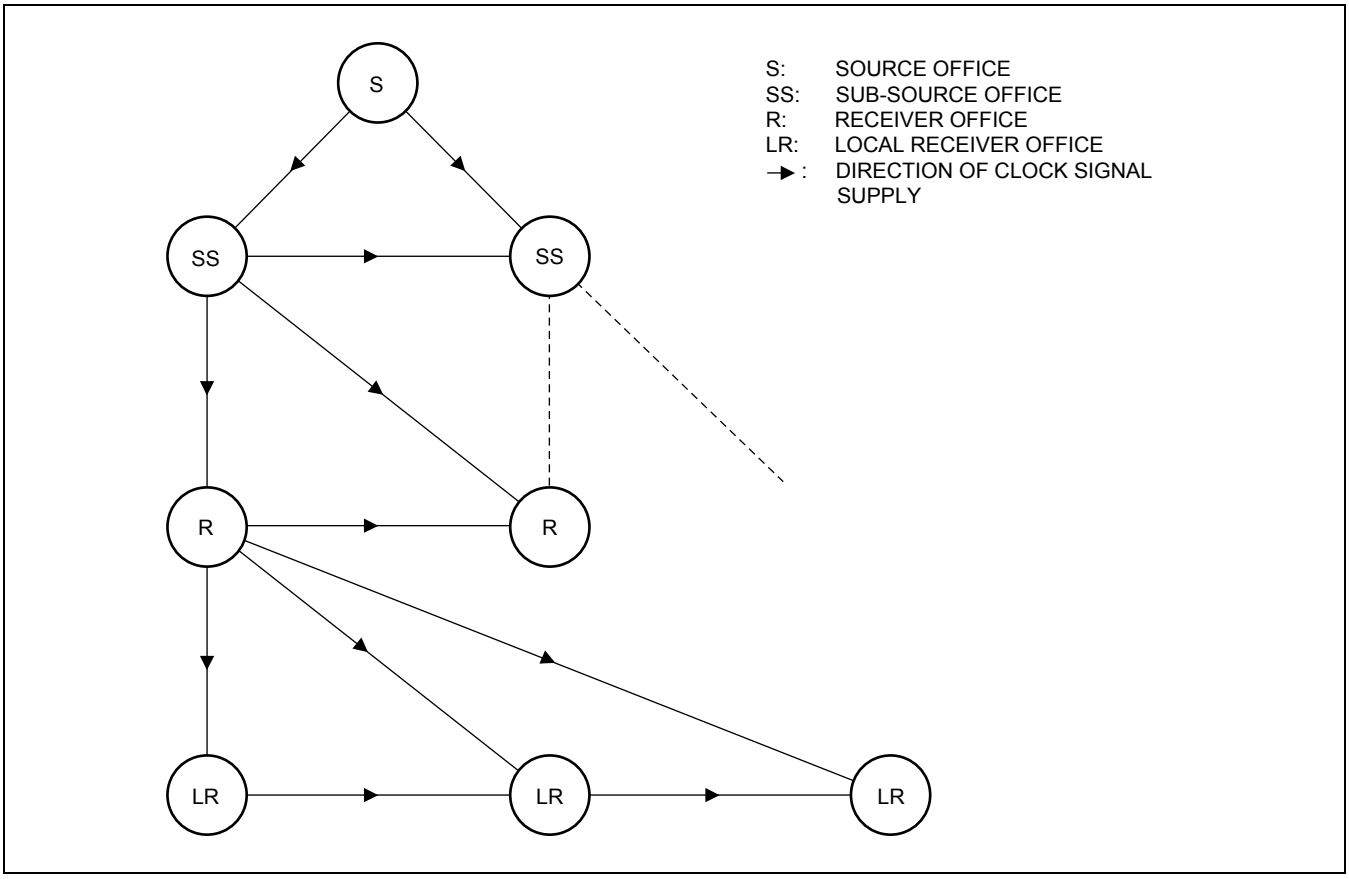
Note 1: *M-OSC (Master Oscillator) and EXT. OSC (External Oscillator <for back up>) is not to be furnished by NEC.*

Note 2: *High Precision Oscillator - PLO (PH-CK17) / OSC (PA-CK14)*
Subordinate Oscillator - PLO (PH-CK16) / TSW (PH-SW10)
For the 1-IMG system, the OSC/TSW card is used in place of PLO.

Table 2-4 Office Hierarchy and PBX

SYSTEM / OFFICE RANK	Single System	Dual System	REMARKS
Source Office	—	×	
Sub-Source Office	—	×	
Receiver office	×	×	
Local Receiver Office	×	×	

×: Applicable —: Not Applicable



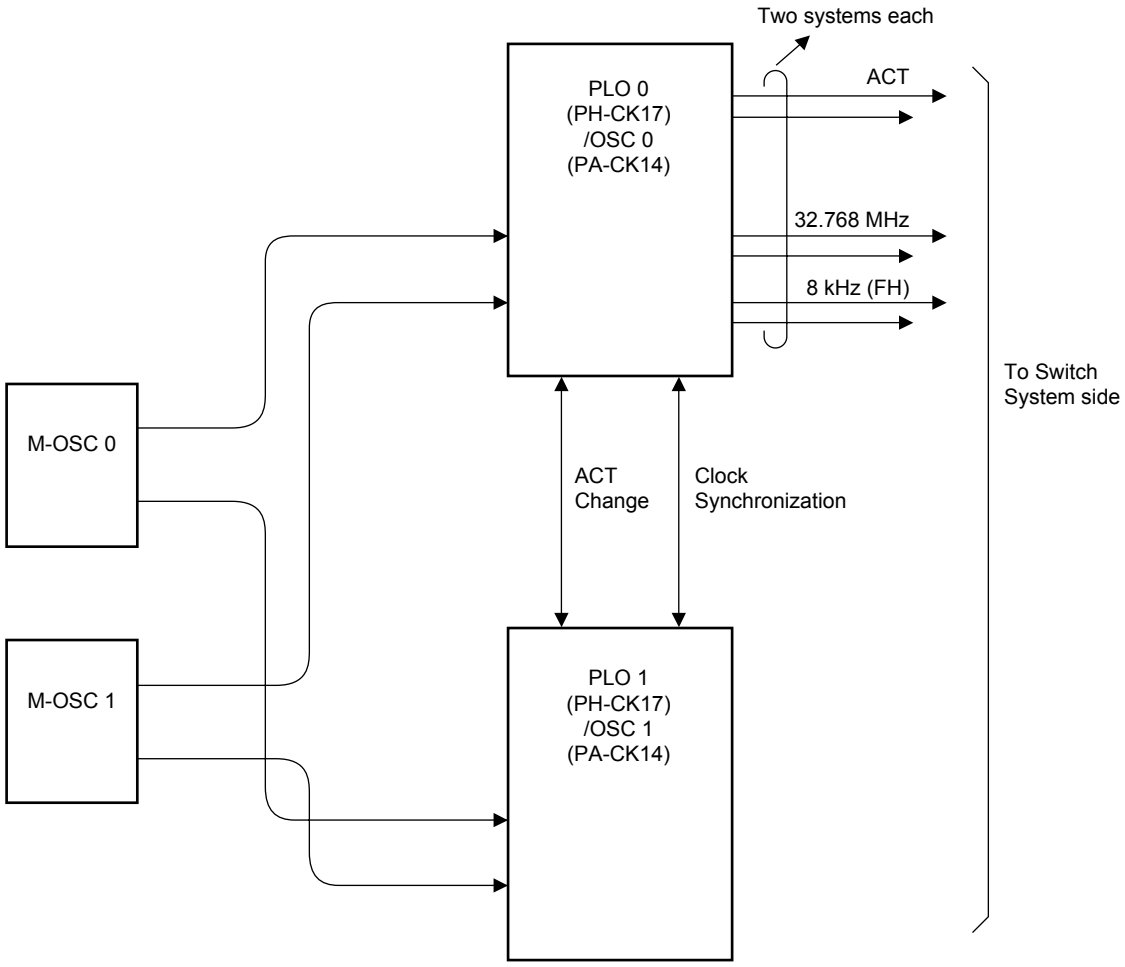
5.2 Office Rank

5.2.1 Source Office

The Source Office supplies clock pulses generated by the M-OSC in the self office to the PLO/OSC (High Precision Oscillator) in the self office.
Figure 2-11 shows the clock supply routes.

Figure 2-11 Clock Supply Routes

This figure shows an example of the clock supply routes when the PLO0 is in ACT side.



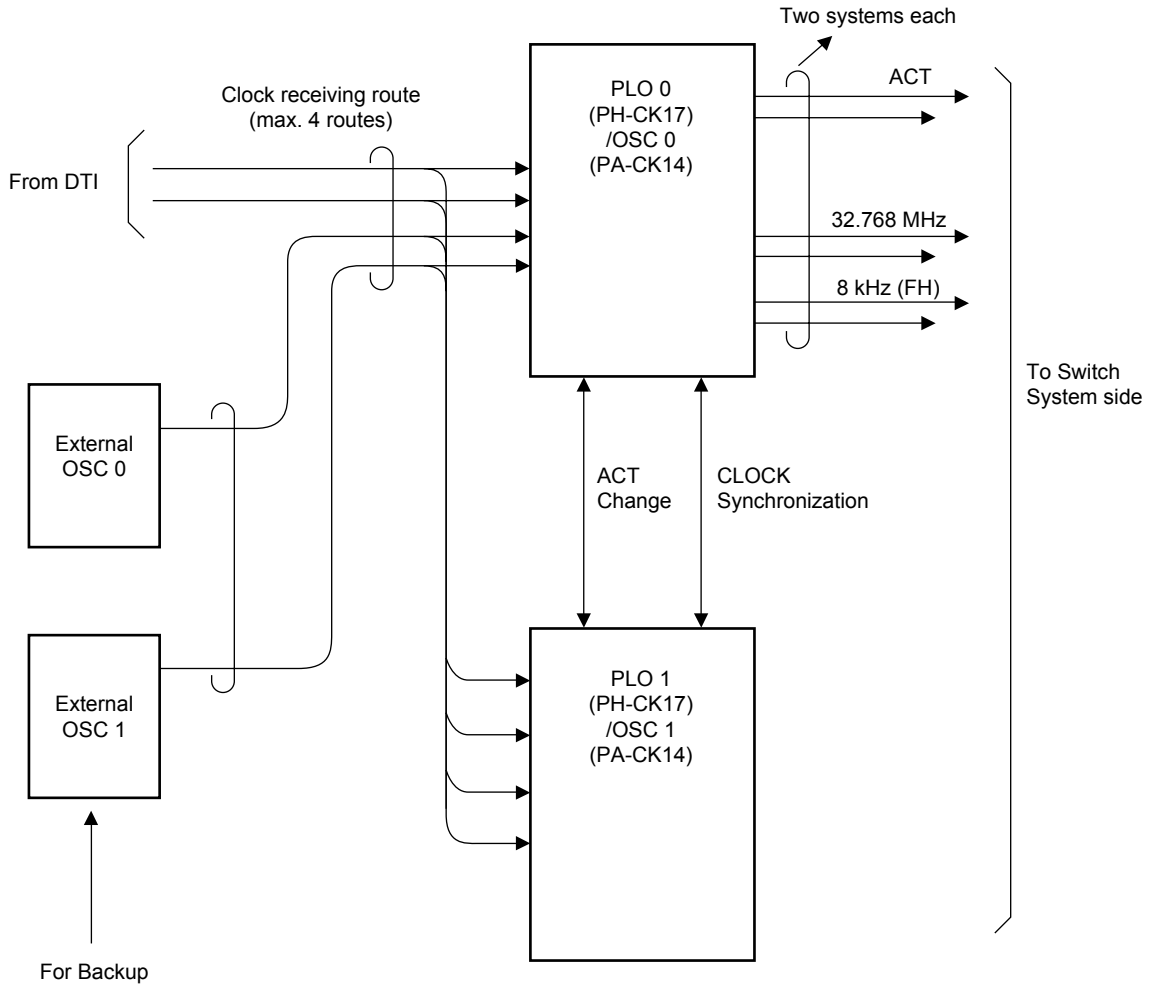
Note: *For 1-IMG system, the OSC (PA-CK14) card is used. For 4-IMG system, PLO (PH-CK17) card is used.*

5.2.2 Sub-Source Office

The Sub-Source Office extracts carrier clocks (24DTI: 1.544 MHz/30DTI: 2.048 MHz) from the DTI opposing to the Source Office and supplies them to the PLO/OSC (High Precision Oscillator) in the user office.
In preparation for complete clock down from the Source Office, the Sub-Source Office is provided with external oscillators (EXT. OSC) for backup. Figure 2-12 shows the routes for carrier clock extraction and for backup clocks.

Figure 2-12 Clock Extraction and Backup Routes

This figure shows an example of the clock supply routes when the PLO0 is in ACT side.



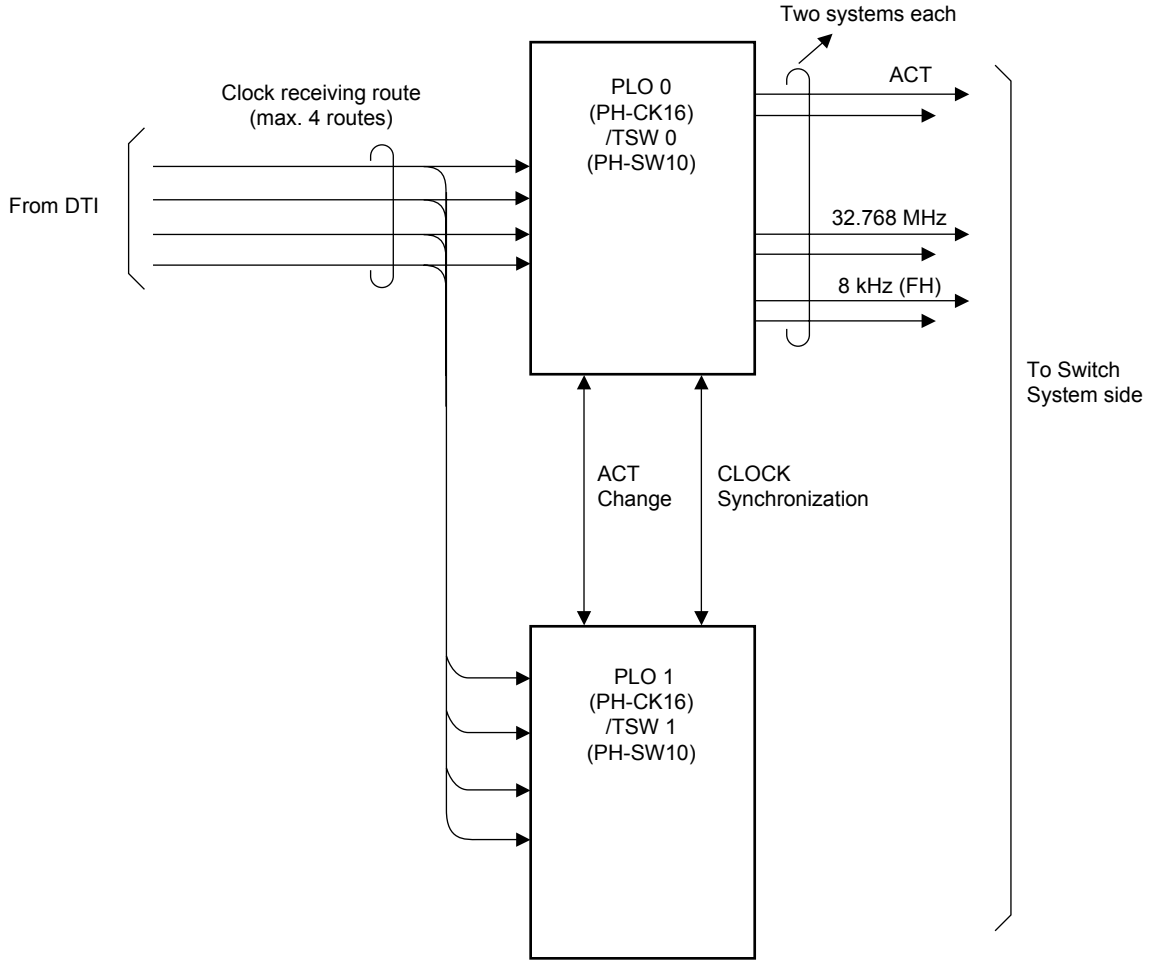
Note: *The OSC (PA-CK14) card is used for the 1-IMG system only.*
The PLO (PH-CK17) card is used for the 4-IMG system.

5.2.3 Receiver Office and Local Receiver Office

For connecting the DTI (Digital Trunk Interface) of the user office to the DTI of a higher-ranking office, the user office must establish clock synchronization with the higher-ranking office concerned.
A Receiver Office or a Local Receiver Office extracts carrier clocks (24DTI: 1.544 MHz/30DTI: 2.048 MHz) from the DTI opposing to the higher-ranking office and establishes clock synchronization with the higher-ranking office by supplying the extracted carrier clocks to the PLO/TSW (Subordinate oscillator) in the user office.
Figure 2-13 shows the routes for clock extraction.

Figure 2-13 Routes for Extracted Clocks

This figure shows an example of the clock supply routes when PLO0/TSW0 is in ACT side.

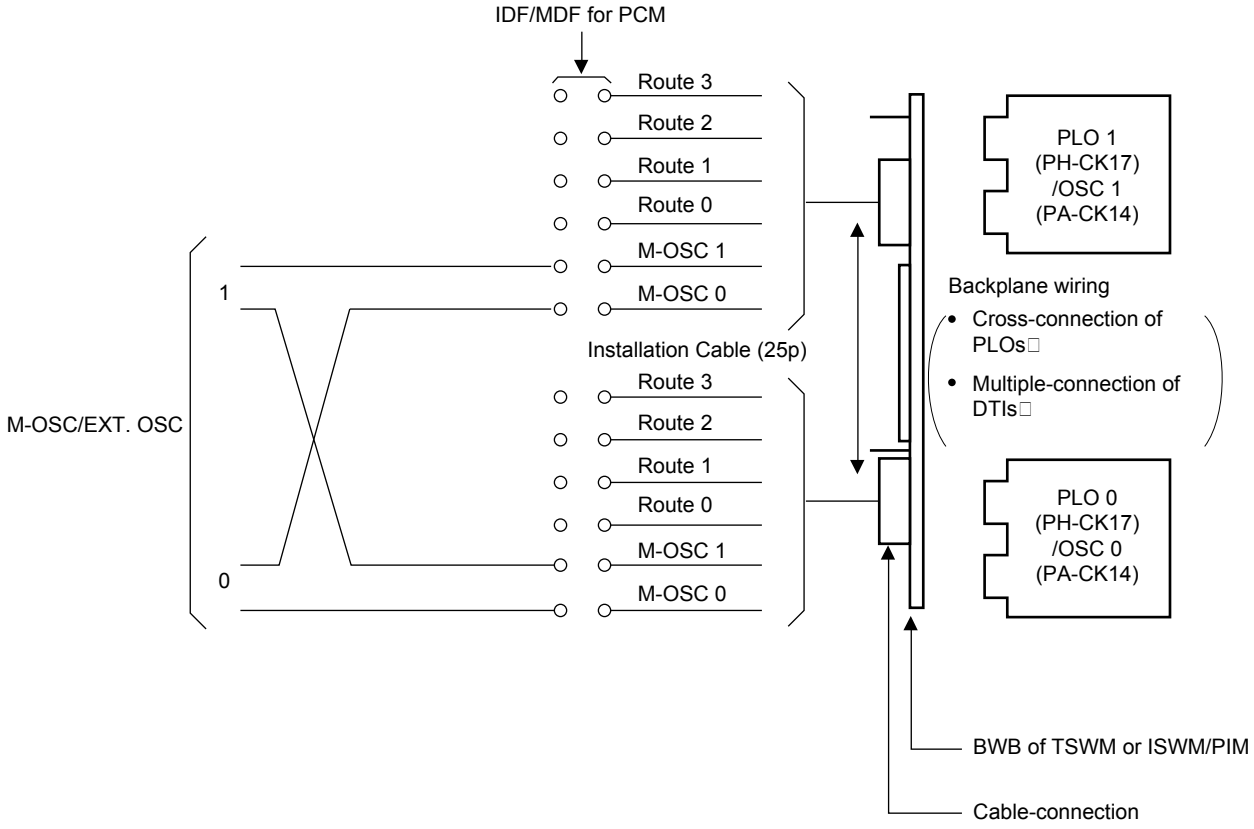


Note: *The TSW (PH-SW10) card is used for the 1-IMG system only.*
The PLO (PH-CK16) card is used for the 4-IMG system.

5.3 Clock Pulses from M-OSC/EXT. OSC and Connection with PLO/OSC

Two clock pulses from the M-OSC/EXT. OSC can be supplied to each PLO/OSC.
Figure 2-14 shows the diagram of connection between the M-OSC and the PLO/OSC.

Figure 2-14 Diagram of Connections between M-OSC and PLO/OSC

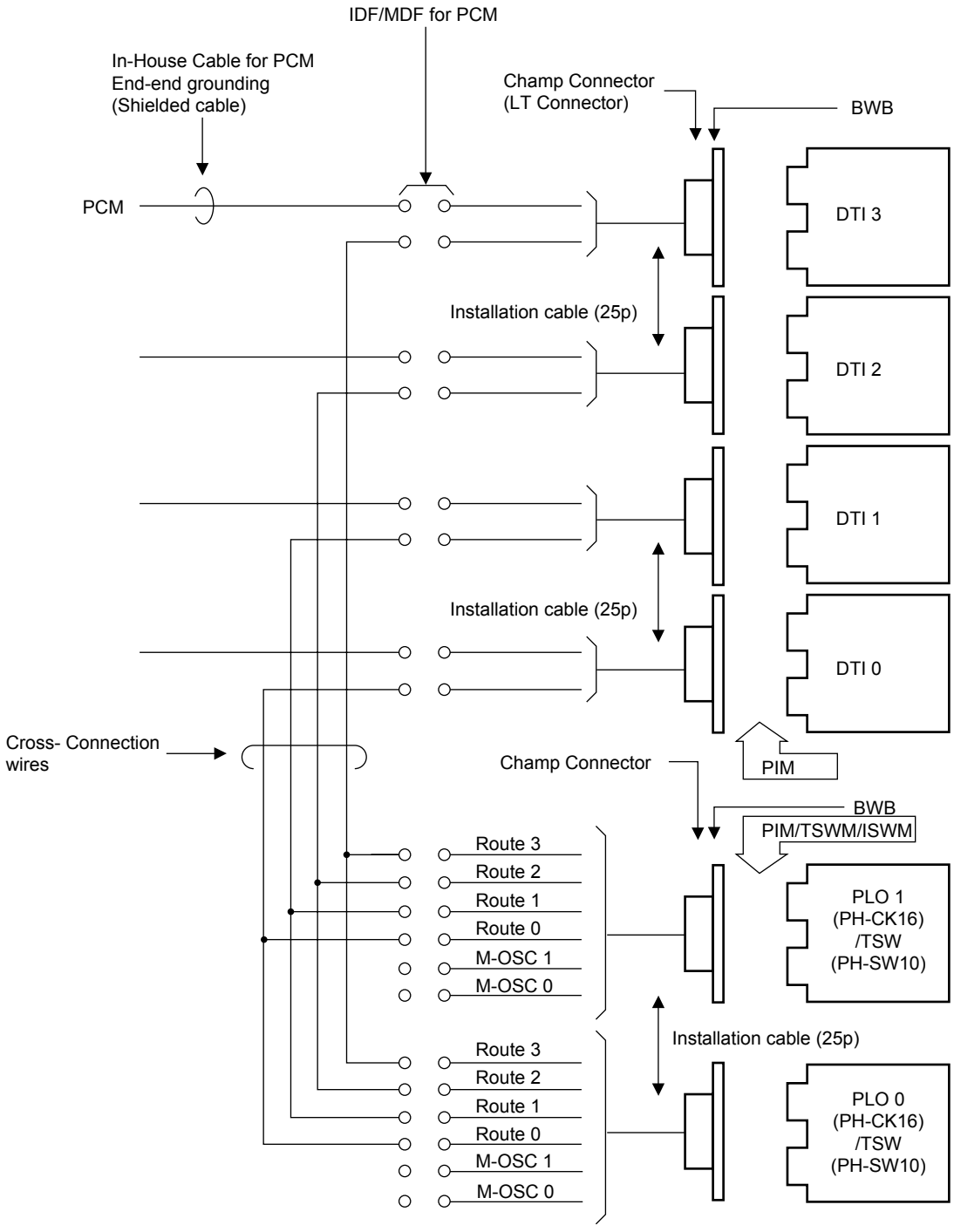


Note: *The OSC (PA-CK14) card is used for the 1-IMG system only.*
The PLO (PH-CK17) card is used for the 4-IMG system.

5.4 Clocks Extracted from DTI and Connection of PLO/TSW

Extracted clocks for a maximum four routes can be supplied to the PLO/TSW. The priority among the four routes is Route 0, 1, 2, and 3 in an ascending order.
To supply extracted clocks to the PLO/TSW, the Champ-connector cable extending from the DTI and the Champ-connector cable extending from the PLO/TSW are brought into the IDF/MDF for the PCM, where they are to be connected with each other.
Figure 2-15 shows the diagram of connections between the PLO/TSW and the DTI.

Figure 2-15 Diagram of Connections between PLO/TSW and DTI



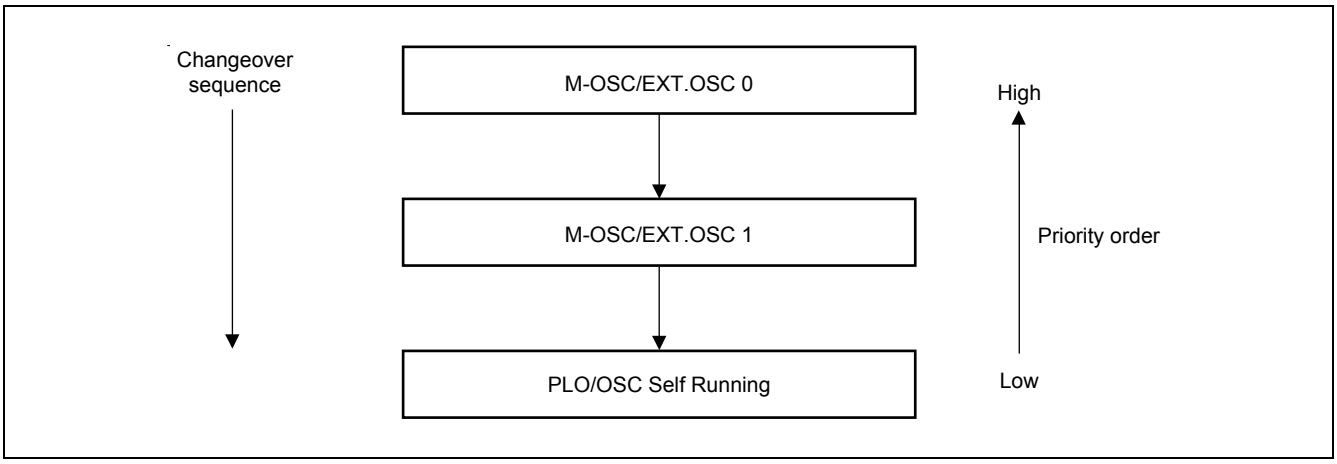
Note: *The TSW (PH-SW10) card is used for the 1-IMG system only.*
The PLO (PH-CK16) card is used for the 4-IMG system.

5.5 Automatic Clock Route Changeover

5.5.1 Automatic Route Changeover on Fault to M-OSC/EXT. OSC of Input Clock Route

Priority order for automatic route changeover on fault occurrence to the M-OSC/EXT. OSC which are supplying clocks is shown in Figure 2-16.

Figure 2-16 Route Automatic Changeover Priority Order (DCS connection)



5.5.2 Automatic Route Changeover on Fault to DTI of Input Clock Route

Priority order for automatic route changeover on fault occurrence to the DTI which is extracting clocks is shown in Figure 2-17.

Figure 2-17 Route Automatic Changeover Priority Order (DTI connection)

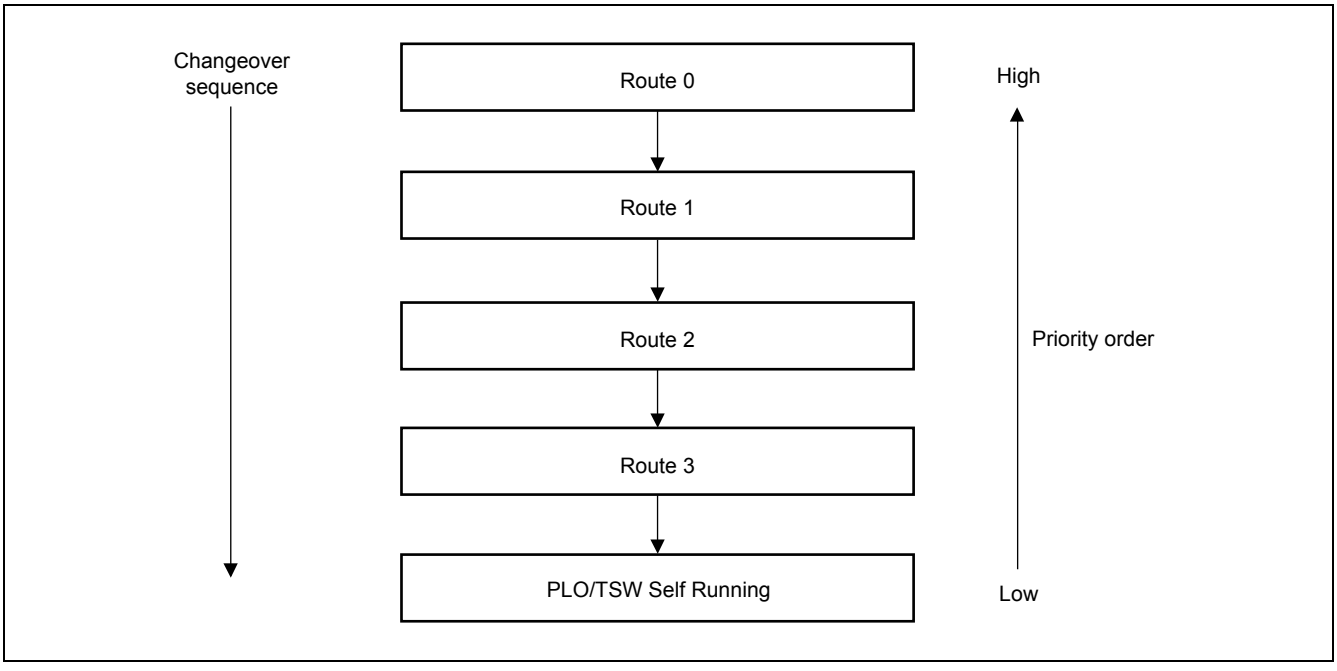


Table 2-5 shows the algorithm for changeover of input clocks from the DTI. The Table shows how the PLO selects a specific route for input clocks according to the input clock status of four routes, thus establishing clock synchronization. For example, in a case where Route 1, which has been selected due to a fault occurrence to clock input Route 0, has also become faulty, Table 2-5 should be looked up as follows:

STEP 1: Look at Route 1 block under "Selected Route Before changeover" (the current input clock route) column.

STEP 2: Under "Each Route Input Clock Status" column, look for the block which shows that only Routes 0 and 1 are faulty.

STEP 3: Under "Route To Be Selected After Changeover" column located at the right extremity of the Table, Route 2 is indicated in the block corresponding to the block found in Step 2.

If a route of which priority order is higher than the current route has been restored to normal, the route is changed over to that specific route.

Table 2-5 Algorithm of Changeover of Input Clocks from DTI

SELECTED ROUTE BEFORE CHANGEOVER	EACH ROUTE INPUT CLOCK STATUS (Note)				ROUTE TO BE SELECTED AFTER CHANGEOVER	REMARKS
	ROUTE 0	ROUTE 1	ROUTE 2	ROUTE 3		
Route 0	—	×	*	*	Route 1	
	—	—	×	*	Route 2	
	—	—	—	×	Route 3	
	—	—	—	—	PLO/TSW Self Running	
Route 1	×	*	*	*	Route 0	
	—	—	×	*	Route 2	
	—	—	—	×	Route 3	
	—	—	—	—	PLO/TSW Self Running	
Route 2	×	*	*	*	Route 0	
	—	×	*	*	Route 1	
	—	—	—	×	Route 3	
	—	—	—	—	PLO/TSW Self Running	
Route 3	×	*	*	*	Route 0	
	—	×	*	*	Route 1	
	—	—	×	*	Route 2	
	—	—	—	—	PLO/TSW Self Running	

Note: *Priority order is Route 0, 1, 2, and 3 in an ascending order.*
- *× : Normal*
- *— : Fault (Clock Down, etc.)*
- ** : Normal or Faulty*
- *When power for the PLO/TSW is turned on, Route 0 is selected.*

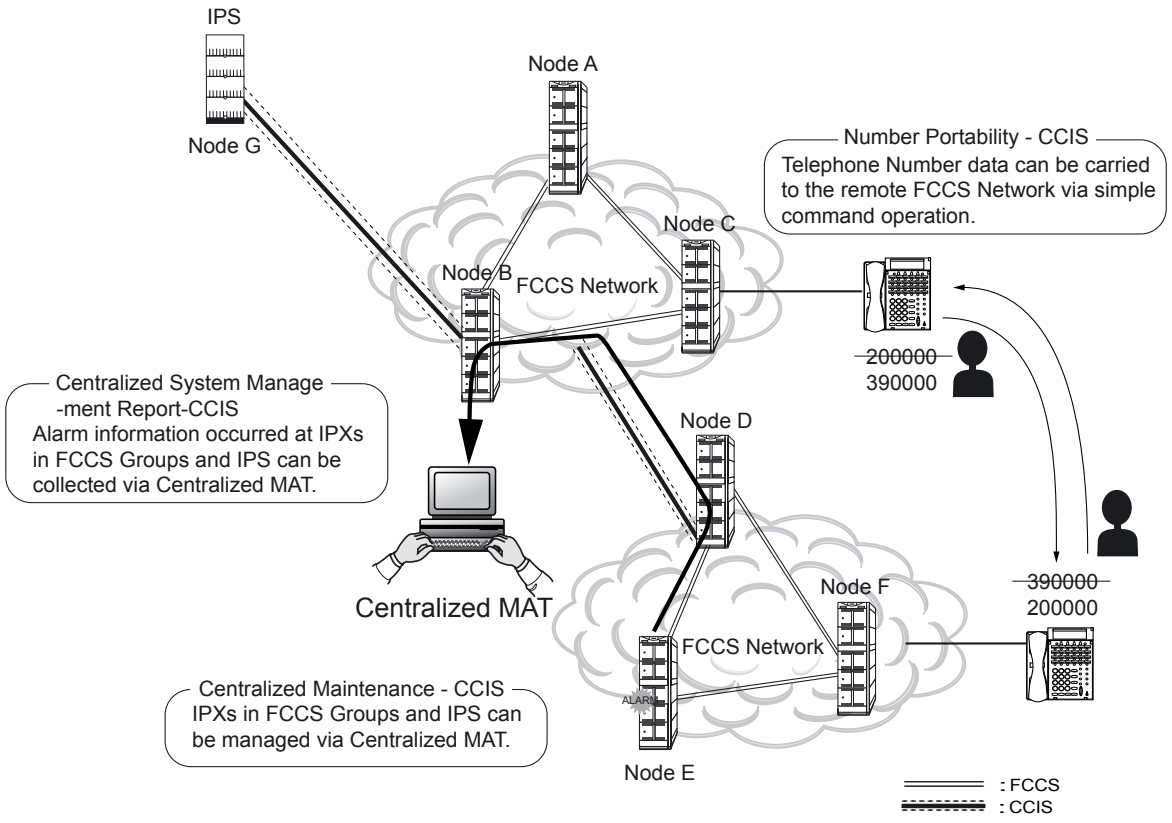
6. NETWORK THROUGH FCCS GROUPS AND NEAX2000 IPS Internet Protocol Server

6.1 Network Configuration

The network through multiple FCCS Networks (FCCS Groups) and NEAX2000 IPS Internet Protocol Server system can be realized to manage the telephone number data in those systems altogether and to centralize functions in the network.

** FCCS Group: network where multiple NEAX2400 IPXs are connected via FCCS link.*
** In this section, NEAX 2400 IPX system is described as IPX and NEAX2000 IPS Internet Protocol Server system is described as IPS.*

This figure shows an example of centralized functions activation.



1. The following table shows the network type classification.

TYPE	CONNECTION TYPE		A MAXIMUM NUMBER OF TELEPHONE NUMBER	SERVICE	
	IPX - IPX	IPS - IPX		IPX - IPX	IPS - IPX
1	FCCS	CCIS	120,000	FCCS service	CCIS service
2	CCIS	CCIS	120,000	CCIS service	CCIS service

IPX: NEAX 2400 IPX IPS: NEAX 2000 IPS Internet Protocol Server

For these network types, the following services are realized or enhanced.
Number Portability - CCIS [N-46]
Centralized Maintenance - CCIS [C-167]
Centralized Billing - CCIS [C-55]
Centralized System Management Report - CCIS [C-57]
Message Center Interface - CCIS [C-67]
For availability of the other services in this network, see “Feature and Specifications Manual”.

2. There are two connection types for the network.
   a.) IPS - IPX connection
   b.) IPX - IPX connection

6.2 Conditions for Network Establishment

- IPS - IPX
  1. Additional IPS cannot be connected to IPS that has already been connected with IPX. (Only one SPAN is allowed for IPX-IPS connection.)
  2. A maximum number of routes and that of nodes for the IPS system are given by subtracting the number of routes (LGRT) used for the IPX system from 899 (maximum number of routes in an FCCS group).

Note: *This condition is applied to the IPX side. The IPS system may accommodate up to 255 nodes (including IPX) because the maximum number of Point Codes (PCs) assigned at IPS system is 255.*

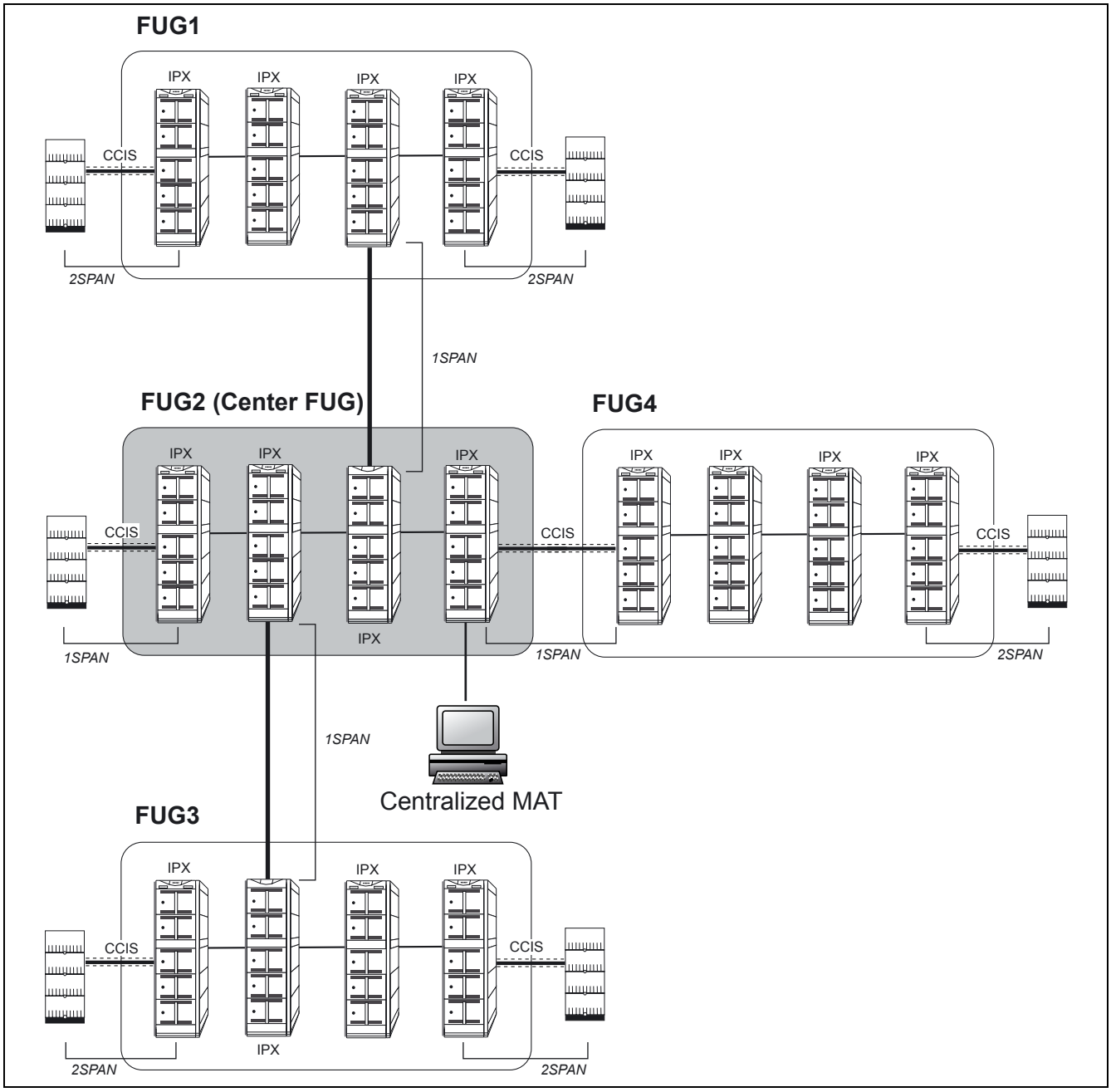
3. When a signal route is deleted, another signal route can be shared with multiple routes (the voice route is required per route). However, when the network is established using EVENT BASED-CCIS (For details, ISDN System Data Design Manual), the signal route is required per route.

- IPX - IPX
  1. The maximum number of nodes per FCCS group is 253.
  2. The maximum number of routes assigned in each FCCS group is 899.
  3. An individual NCN and NDM exist in each FCCS group.

6.3 FCCS Group (FUG)

1. Since multiple FCCS networks are connected in the network, FCCS network group number is required to distinguish each FCCS network from others. An FCCS network group is called FCCS group (FUG), and a maximum of 4 FUGs can be connected in the network.
2. A center FUG should be specified from among multiple FUGs in the network. It is the sole node allowed assigning and deleting telephone numbers within the self FUG and the others.
3. The network consists of FUGs and NEAX2000IPS systems within the range of 2 SPANs from the center FUG and within the range of 4 SPANs from end to end.

NETWORK CONFIGURATION



6.4 Interactions

1. PS Roaming and Hand-over services cannot be activated in the network. To execute Roaming service, the Q.931a line should be connected exclusively.
2. The OAI/ACD service in the network is executed on the same condition in the normal CCIS network.
3. ISDN transmitting information (16-digit caller number service. Attribute information notification service (BC, LLC, HLC) and Calling sub-address transfer service) assigned by ARTD, CDN98: CI = 1 can be transmitted for the IPX to IPX connection only.
4. Broad Band (N × 64kbps tranfer rate) is available for the IPX to IPX connection only.
5. ATTENDANT CONSOLE [A-3] (see Feature Programming Manual) service is available only if the attendant console in the IPX is used.

CHAPTER 3 SWITCH SETTING SHEETS

1. GENERAL

This chapter shows switch setting on the individual circuit cards used in the basic CCIS network (not including circuit cards related to Network through FCCS Groups and NEAX2000 IPS). These sheets are used when setting the switches on the circuit cards during system installation.
The contents of the Switch Setting for each circuit card contains of the following information.

- Mounting slot(s) in the related Module
- Location of switches and switch setting positions
- Note(s) pertaining to switch positions

2. LIST OF CIRCUIT CARDS

Table 3-1 is the list of Circuit Cards required for CCIS features.
Please refer to "Circuit Card Manual" for more information.

Table 3-1 List of Circuit Cards for CCIS

SYMBOL	CIRCUIT CARD	REMARKS
CCH	PA-2CCHA	For Digital/Analog CCIS Line
CCT	PA-24CCTA	For Digital CCIS Line (1.544 Mb/s)
	PA-30CCTB	For Digital CCIS Line (2.048 Mb/s)
DTI	PA-DTA/PA-24DTR	For Digital CCIS Line (1.544 Mb/s)
	PA-30DTS	For Digital CCIS Line (2.048 Mb/s)
OSC	PA-CK14	Oscillator (High precision oscillator for the 1-IMG system)
TSW	PH-SW10	Time Division Switch (Subordinate oscillator for the 1-IMG system)
PLO	PH-CK16	Subordinate Oscillator (for the 4-IMG system)
	PH-CK17	High Precision Oscillator (for the 4-IMG system)

CHAPTER 4 INSTALLATION PROCEDURE

1. GENERAL

This chapter explains the installation procedure for connecting the PBX and the CCIS line. The scope of the installation procedure explained in this manual is shown in Figure 4-1. For procedures not explained in this manual, refer to the Installation Manual:

2. PRECAUTIONS ON INSTALLATION

This manual provides “Static Caution” indicators (Figure 4-2) on pages where work involving static-sensitive components is described.

Figure 4-1 Scope of the Installation Procedure

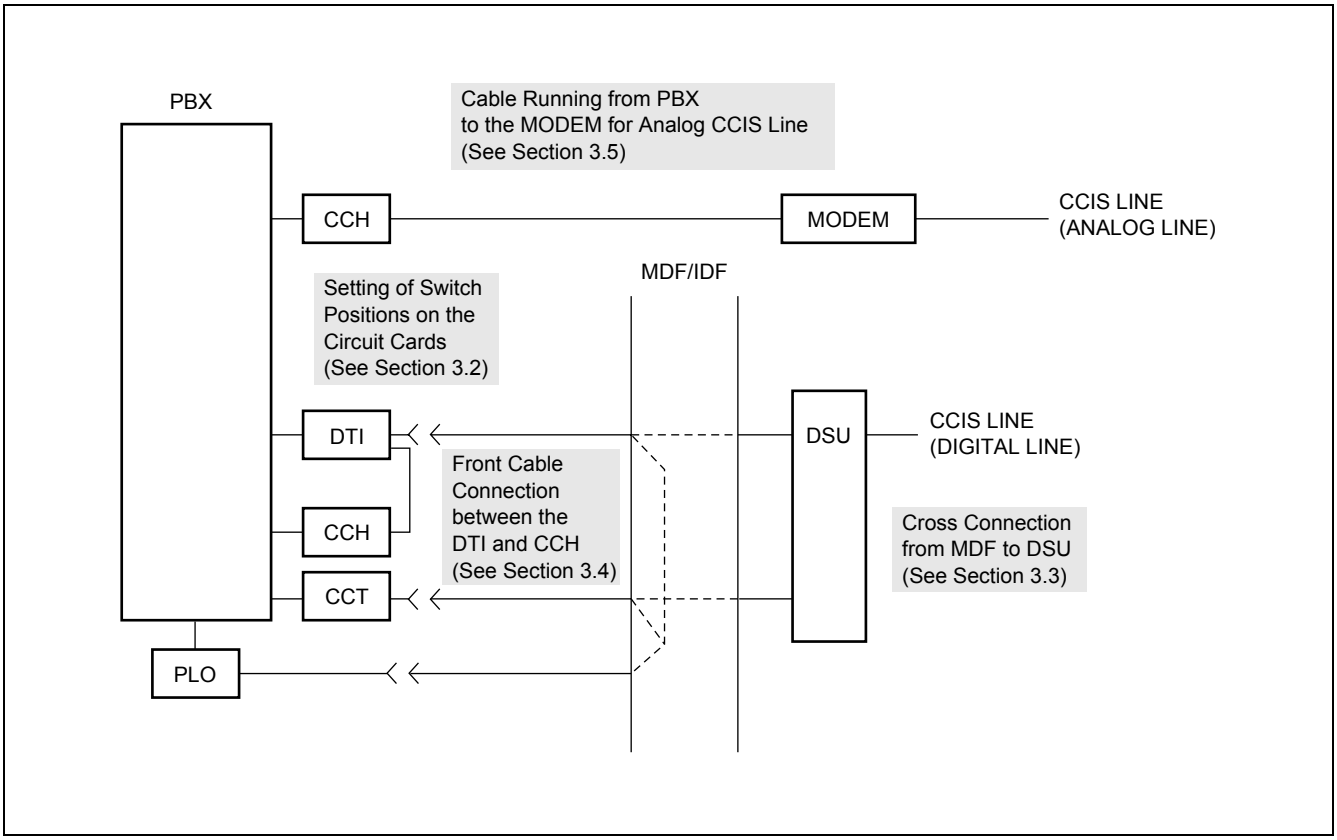
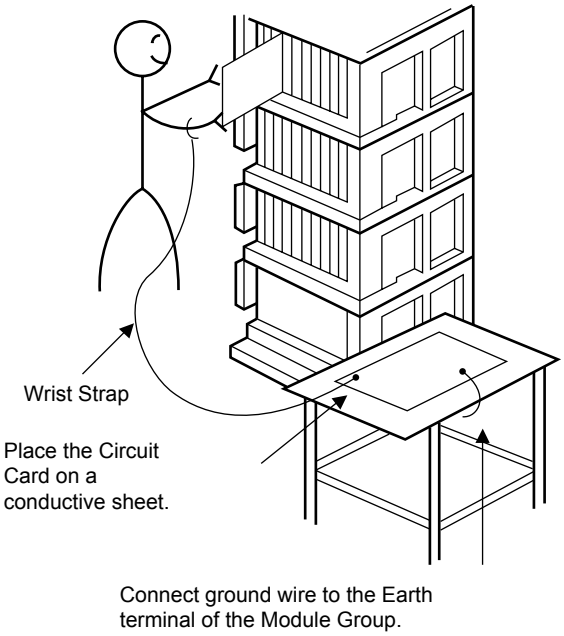


Figure 4-2 Static Caution Indication

The 3M Model 8012 Portable Field Service Kit (Figure 4-3) is recommended as an effective countermeasure against static electricity. The kit is available from NEC.

Figure 4-3 3M Model 8012 PORTABLE FIELD SERVICE KIT



3. INSTALLATION PROCEDURE

3.1 General Flow of Installation Procedure

This section describes installation procedure divided into installation procedure items shown in Figure 4-1. The work flow and the reference paragraphs are shown below.

- For Digital CCIS Line

START

Setting of switch positions and mounting of the circuit cards.	Refer to paragraph 3.2: "Setting of Switch Positions and Mounting of the Circuit Cards".
Cable running from the PBX to the MDF.	Refer to "Cable Running from the PBX to MDF, ATTCON, MAT, and SMDR" of the Installation Manual.
Cable termination and cross connection from the MDF to the DSU.	Refer to paragraph 3.3: "Cable Termination and Cross Connection from the MDF to the DSU".
Front cable connection between DTI and CCH.	Refer to Figure 4-12 "Front Cable Connections between DTI/CCT and CCH".

END

- For Analog CCIS Line

START

Setting of switch positions and mounting of the CCH card.	Refer to paragraph 3.2: "Setting of Switch Positions and Mounting of the Circuit Cards".
Cable Running from the PBX to the MODEM for Analog CCIS Line.	Refer to paragraph 3.5: "Cable Running from PBX to the MODEM for Analog CCIS Line".

END

3.2 Setting of Switch Positions and Mounting of the Circuit Cards

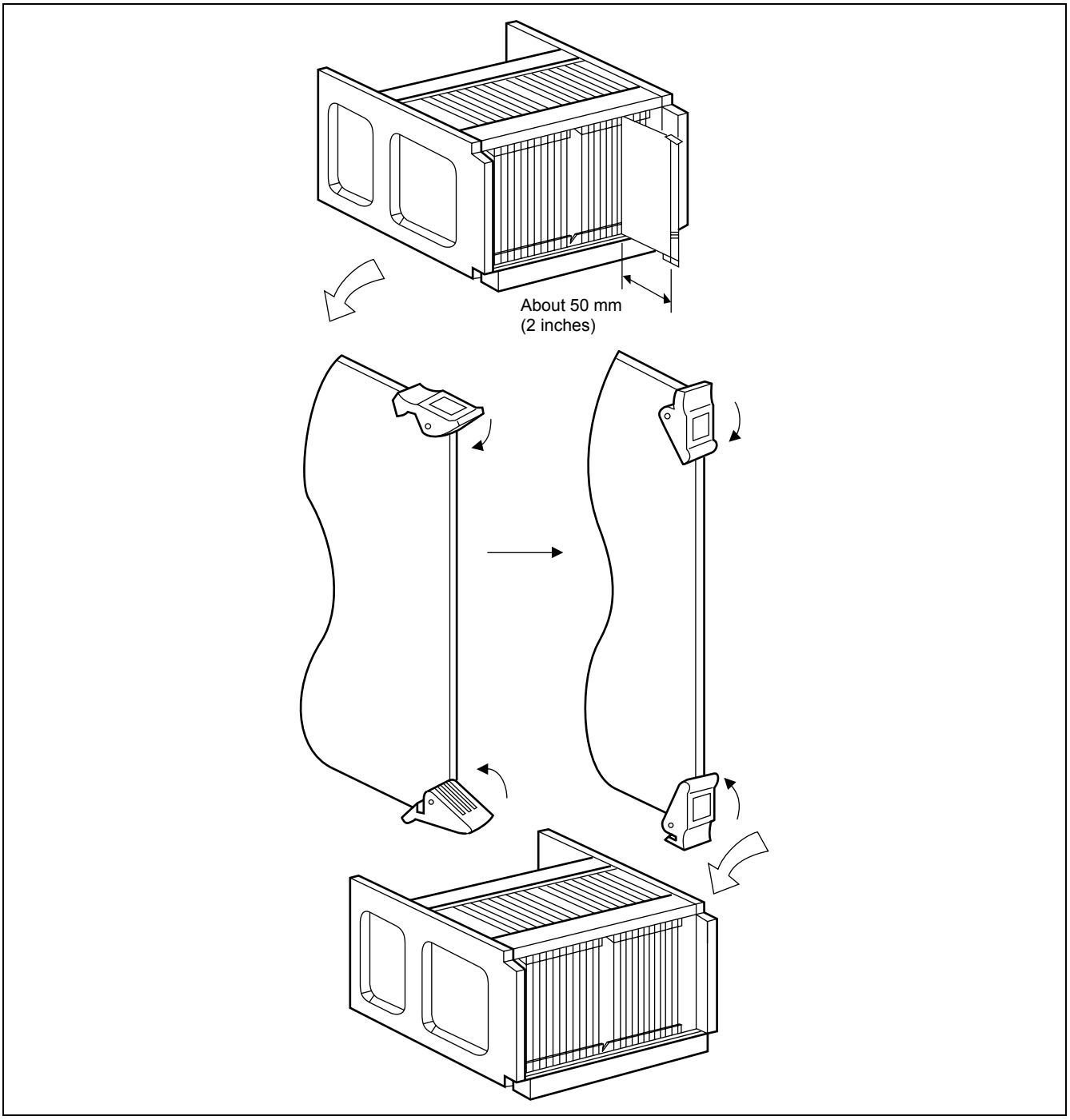
The setting of switch positions and mounting of circuit cards should be performed according to the flowchart below.

START

- Unpack the circuit cards.
  - Unpack each circuit card and remove it from the polyethylene bag.
- Clean the connector portion of the circuit cards.
  - Wipe the connector portion clean using a soft cloth moistened with pure trichloroethylene or methanol (medical alcohol). Make sure that no lint or dust remains on the connector after cleaning.
  - Circuit cards which are already mounted should be extracted and cleaned as per the above instructions.
- Confirm the mounting positions of the circuit cards.
  - Confirm the mounting position of each circuit card by referring to the Module Face Layout of the Circuit Card Manual.
  - Confirm that the color code of the card puller tab coincides with that of the card mounting slot.
  - Confirm the slot number on the module. Slot numbers are indicated at the top of each module, and range from 00 to 23.
- Perform switch setting.
  - Set the required switches according to the Switch Setting Sheets in CHAPTER 3.
- Mount the circuit cards.
  - After the switches have been set, insert the card in the module. Refer to Figure 4-4.

END

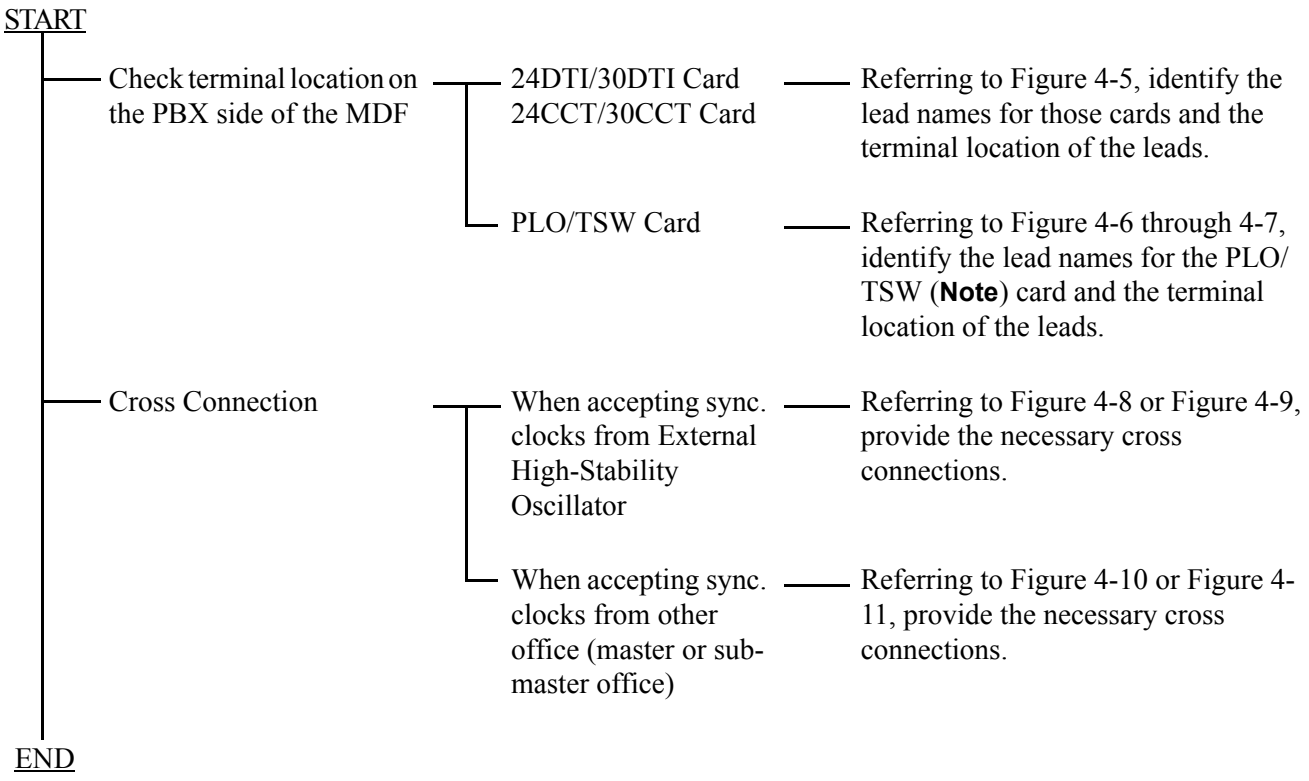
Figure 4-4 Circuit Card Mounting (Partial Insertion)



3.3 Cable Termination and Cross Connection from the MDF to the DSU

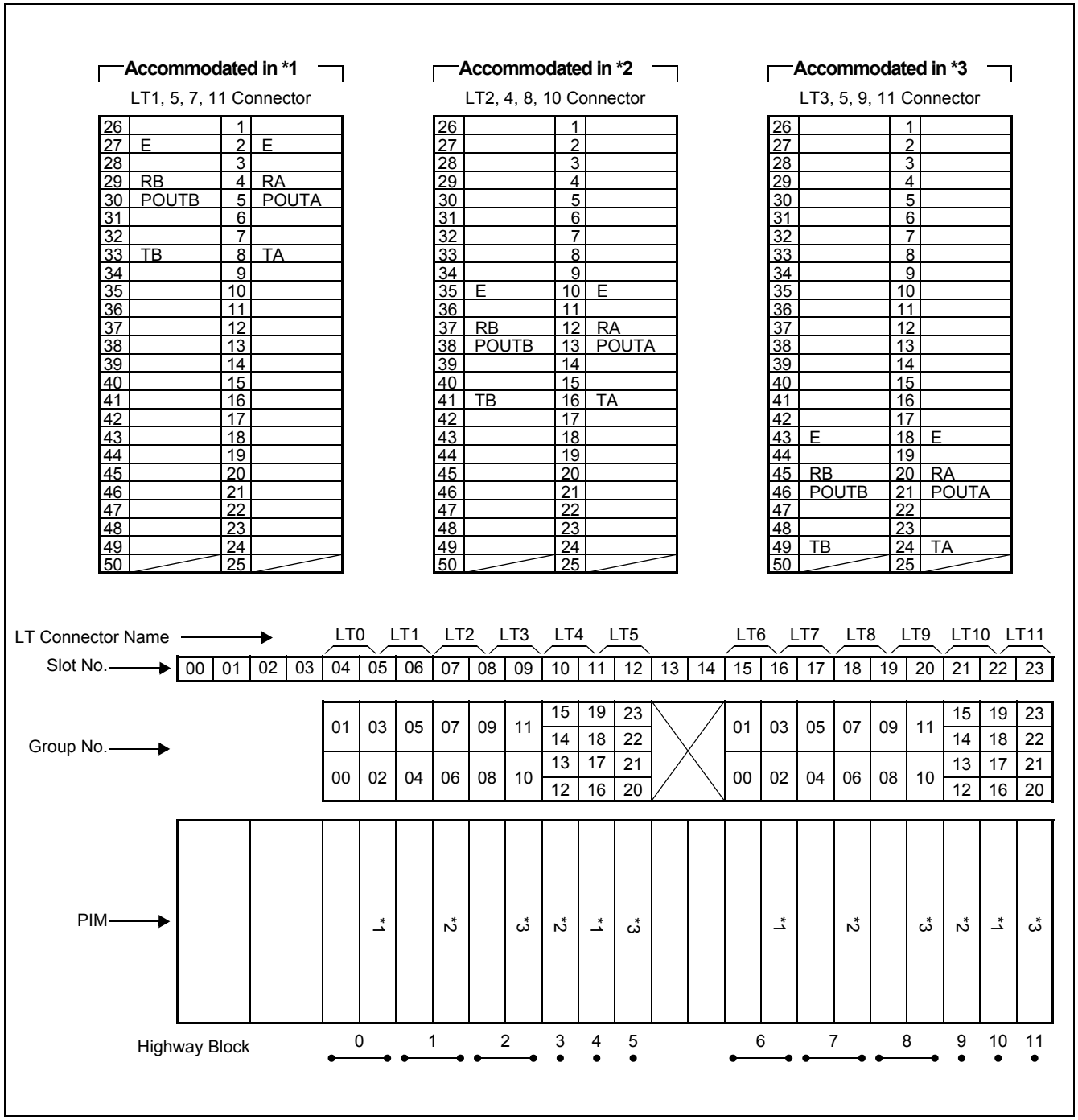
Cable termination and cross connection from the MDF to the DSU should be performed according to the flowchart below:

Note: *Provide the necessary cross connections at the MDF by using copper of 0.5 mm diameter (24AWG). Dual core twisted wire is used for speech path, and single-core wire is used for control. It is recommended that wires of different colors be used for trunks, station lines, etc., so that they can easily be distinguished.*



Note: *For the 1-IMG system: the Phase Lock Oscillator function equipped with TSW card can be used for Digital Interface, and while the OSC (PA-CK14) card is used when the system requires a high precision oscillator.*

Figure 4-5 LT Connector Leads Accommodation for DTI/CCT



	Accommodated in *1			Accommodated in *2				Accommodated in *3			
	LT1, 5, 7, 11 Connector			LT2, 4, 8, 10 Connector				LT3, 5, 9, 11 Connector			
26		1		26		1		26		1	
27	E	2	E	27		2		27		2	
28		3		28		3		28		3	
29	RB	4	RA	29		4		29		4	
30	POUTB	5	POUTA	30		5		30		5	
31		6		31		6		31		6	
32		7		32		7		32		7	
33	TB	8	TA	33		8		33		8	
34		9		34		9		34		9	
35		10		35	E	10	E	35		10	
36		11		36		11		36		11	
37		12		37	RB	12	RA	37		12	
38		13		38	POUTB	13	POUTA	38		13	
39		14		39		14		39		14	
40		15		40		15		40		15	
41		16		41	TB	16	TA	41		16	
42		17		42		17		42		17	
43		18		43		18		43	E	18	E
44		19		44		19		44		19	
45		20		45		20		45	RB	20	RA
46		21		46		21		46	POUTB	21	POUTA
47		22		47		22		47		22	
48		23		48		23		48		23	
49		24		49		24		49	TB	24	TA
50		25		50		25		50		25	

Group No.																							
	01	03	05	07	09	11	15	19	23					01	03	05	07	09	11	15	19	23	
							14	18	22											14	18	22	
	00	02	04	06	08	10	13	17	21					00	02	04	06	08	10	13	17	21	
							12	16	20											12	16	20	

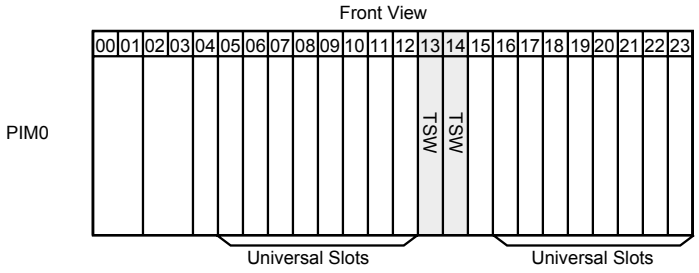
PIM			*1	*2	*3	*2	*1	*3			*1	*2	*3	*2	*1	*3

Figure 4-6 PLO Pin Assignments for Receiving Clock (1-IMG System)

Since PLO circuit is equipped with TSW card, PLO input leads appear on the LT connector labeled PLO.

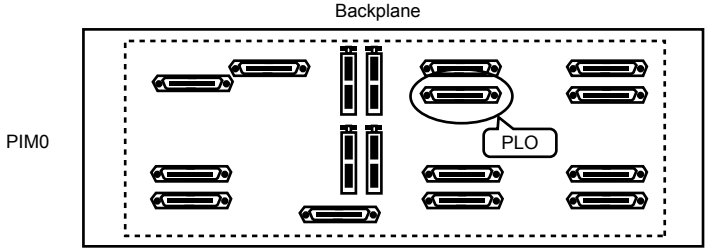
• TSW mounting slots

TSW card is mounted in slots 13 and 14 of PIM0.



• LT cable connector

Connect an LT cable to the connector labeled "PLO" on PIM0 backplane.



• PLO connector Pin Assignment

Pins are assigned as follows on "PLO" connector. When clock is distributed from a digital interface, use one pair of "DIUxxx" leads among a maximum of 4 inputs. DIU leads have the following precedence: DIU0xx(High) → DIU3xx(Low). On the contrary, to receive clock from an external high-stability osillator, use "DCSxx" leads.

for receiveing clock from a High-Stability Oscillator

for PLO equipped with TSW #0 →

PIN No.	LEAD NAME	PIN No.	LEAD NAME
26	DCSB0	1	DCSA0
27	DIU0B0	2	DIU0A0
28	DIU1B0	3	DIU1A0
29	DIU2B0	4	DIU2A0
30	DIU3B0	5	DIU3A0
31	SYN0B0	6	SYN0A0
32	SYN1B0	7	SYN1A0
33		8	

for PLO equipped with TSW #1 →

40		15	
41		16	
42	DCSB1	17	DCSA1
43	DIU0B1	18	DIU0A1
44	DIU1B1	19	DIU1A1
45	DIU2B1	20	DIU2A1
46	DIU3B1	21	DIU3A1
47	SYN0B1	22	SYN0A1
48	SYN1B1	23	SYN1A1
49		24	
50		25	

PLO Connector

for distributing clock from a digital interface

for PLO equipped with TSW #0 →

PIN No.	LEAD NAME	PIN No.	LEAD NAME
26	DCSB0	1	DCSA0
27	DIU0B0	2	DIU0A0
28	DIU1B0	3	DIU1A0
29	DIU2B0	4	DIU2A0
30	DIU3B0	5	DIU3A0
31	SYN0B0	6	SYN0A0
32	SYN1B0	7	SYN1A0
33		8	

for PLO equipped with TSW #1 →

40		15	
41		16	
42	DCSB1	17	DCSA1
43	DIU0B1	18	DIU0A1
44	DIU1B1	19	DIU1A1
45	DIU2B1	20	DIU2A1
46	DIU3B1	21	DIU3A1
47	SYN0B1	22	SYN0A1
48	SYN1B1	23	SYN1A1
49		24	
50		25	

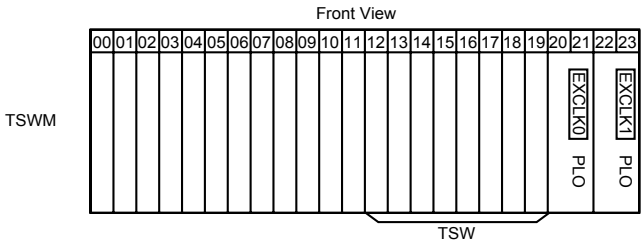
PLO Connector

Figure 4-7 PLO Pin Assignment for Receiving Clock (4-IMG System)

PLO input leads appear on the LT connectors labeled EXCLK0 and EXCLK1.

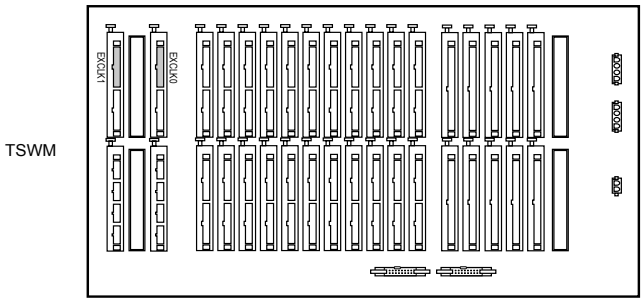
• PLO mounting slots

PLO card is mounted in slots 21 and 23 of TSWM.



• LT cable connectors

Connect LT cables to the connectors labeled "EXCLK0" and "EXCLK1" on the TSWM backplane.



• EXCLK0/EXCLK1 connector Pin Assignment

Pins are assigned as follows on "EXCLK0/EXCLK1" connector. When clock is distributed from a digital interface, use one pair of "DIUxxx" leads among a maximum of 4 inputs. DIU leads have the following precedence: DIU0xx(High) → DIU3xx(Low). On the contrary, to receive clock from an external high-stability osillator, use "DCSxx" leads.

34PH EXCLK CA-A Cable Lead Accommodation

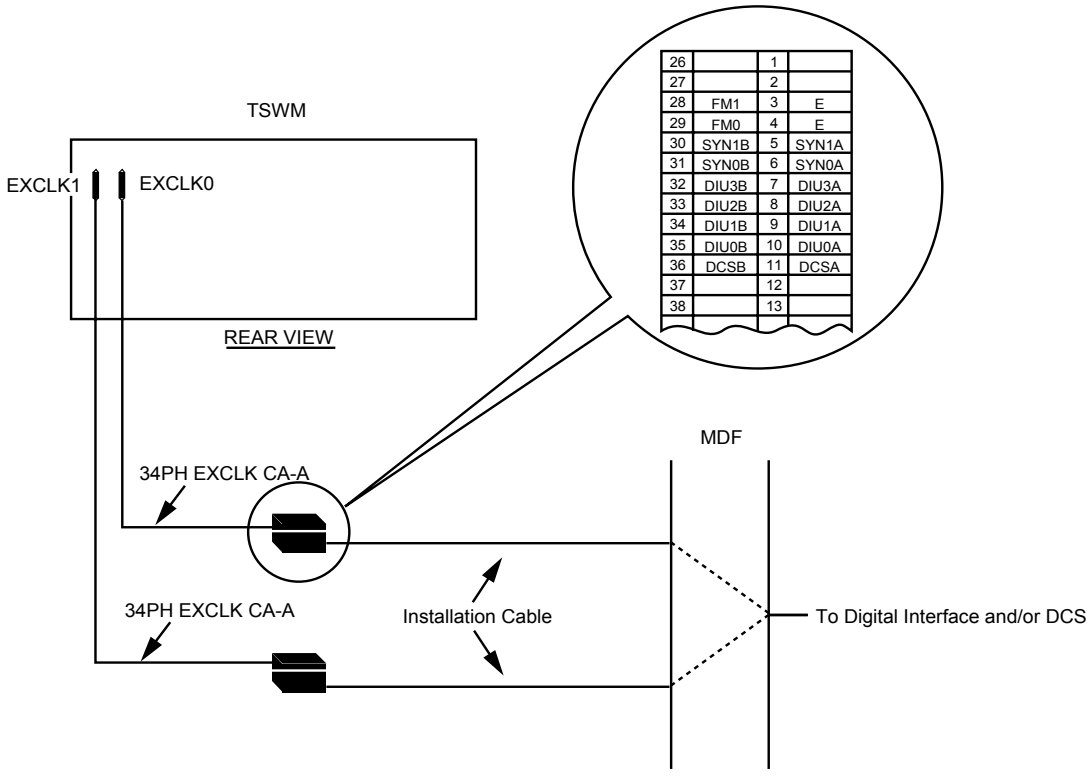


Figure 4-8 Cable Connection Diagram for Accepting Synchronization Clocks from an External High-Stability Oscillator (TSW)

• Cable Connection Diagram

Provide the following wirings at the MDF. The following connection diagram shows an example where the system has the TSW cards in a dual configuration.

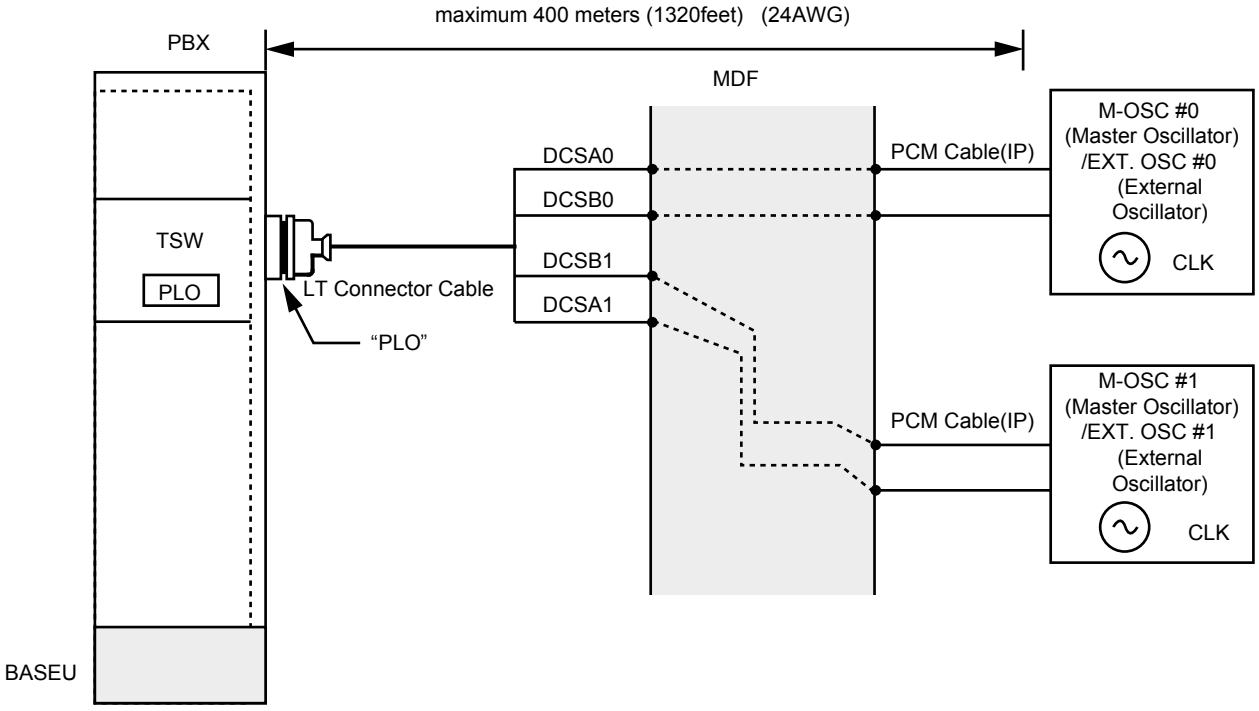
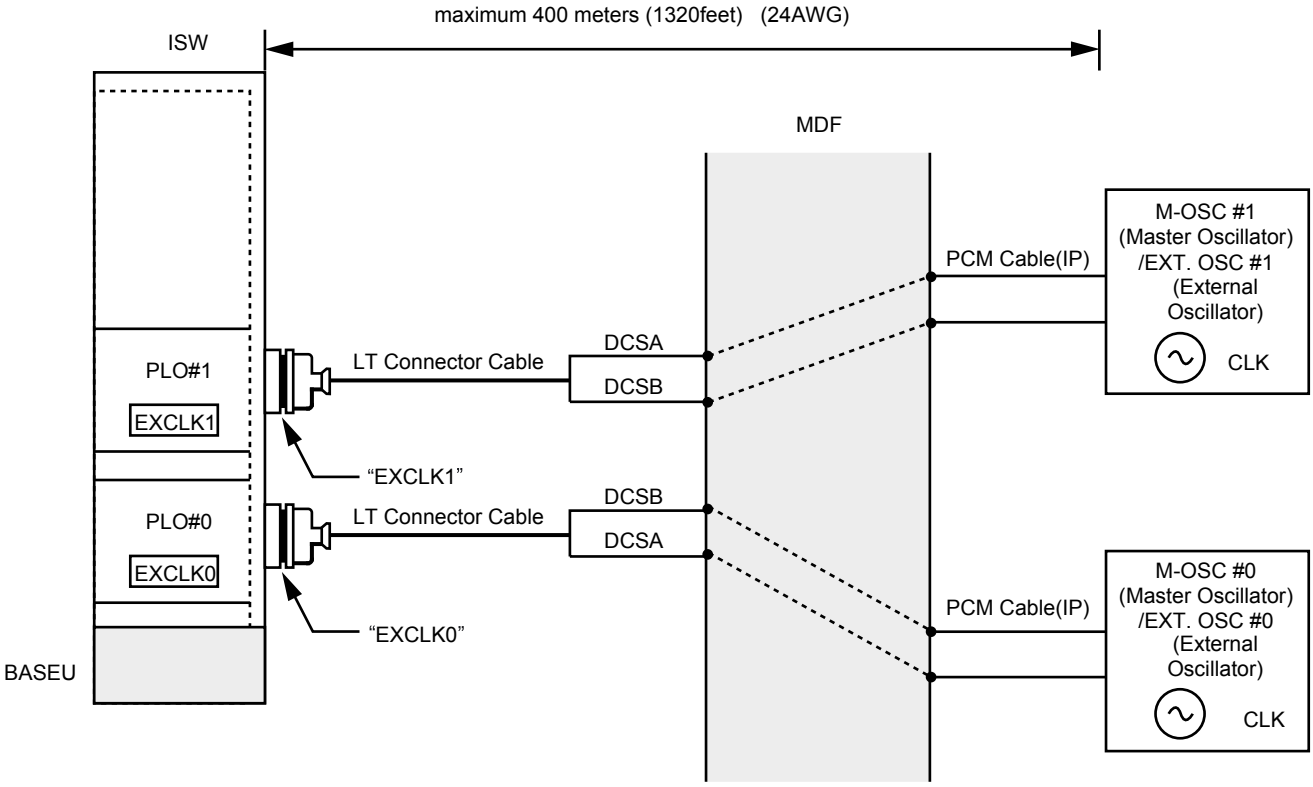


Figure 4-9 Cable Connection Diagram for Accepting Synchronization Clocks from an External High-Stability Oscillator (PLO)

• Cable Connection Diagram

Provide the following wirings at the MDF. The following connection diagram shows an example where the system has the PLO cards in a dual configuration.

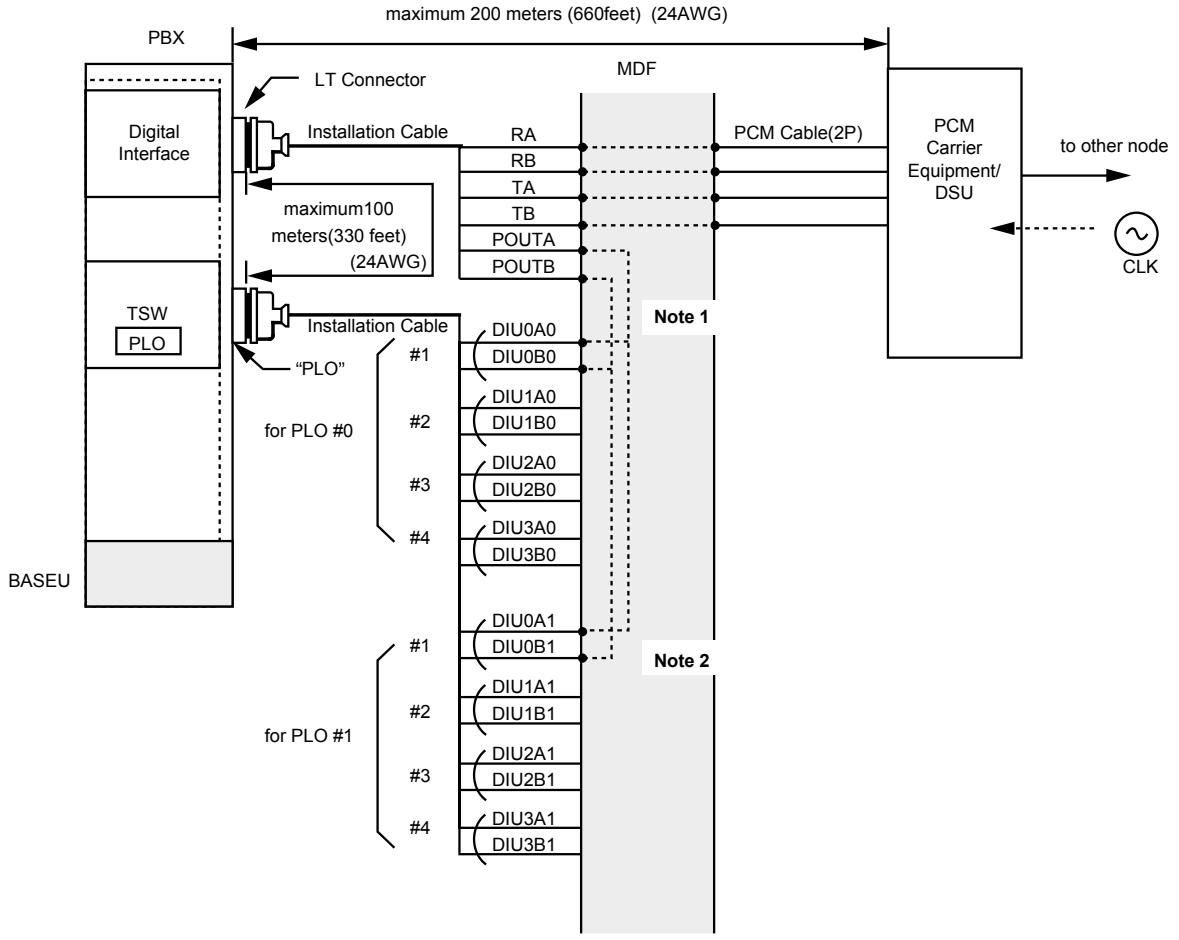


Note: *This diagram shows connections for a system having dual PLOs.*

Figure 4-10 Cable Connection Diagram for Receiving Clock from a Digital Interface (TSW)

• Cable Connection Diagram

Perform the following wirings at the MDF. The following connection diagram shows an example where the Digital Trunk POUT leads are used as the 1st clock distribution route.



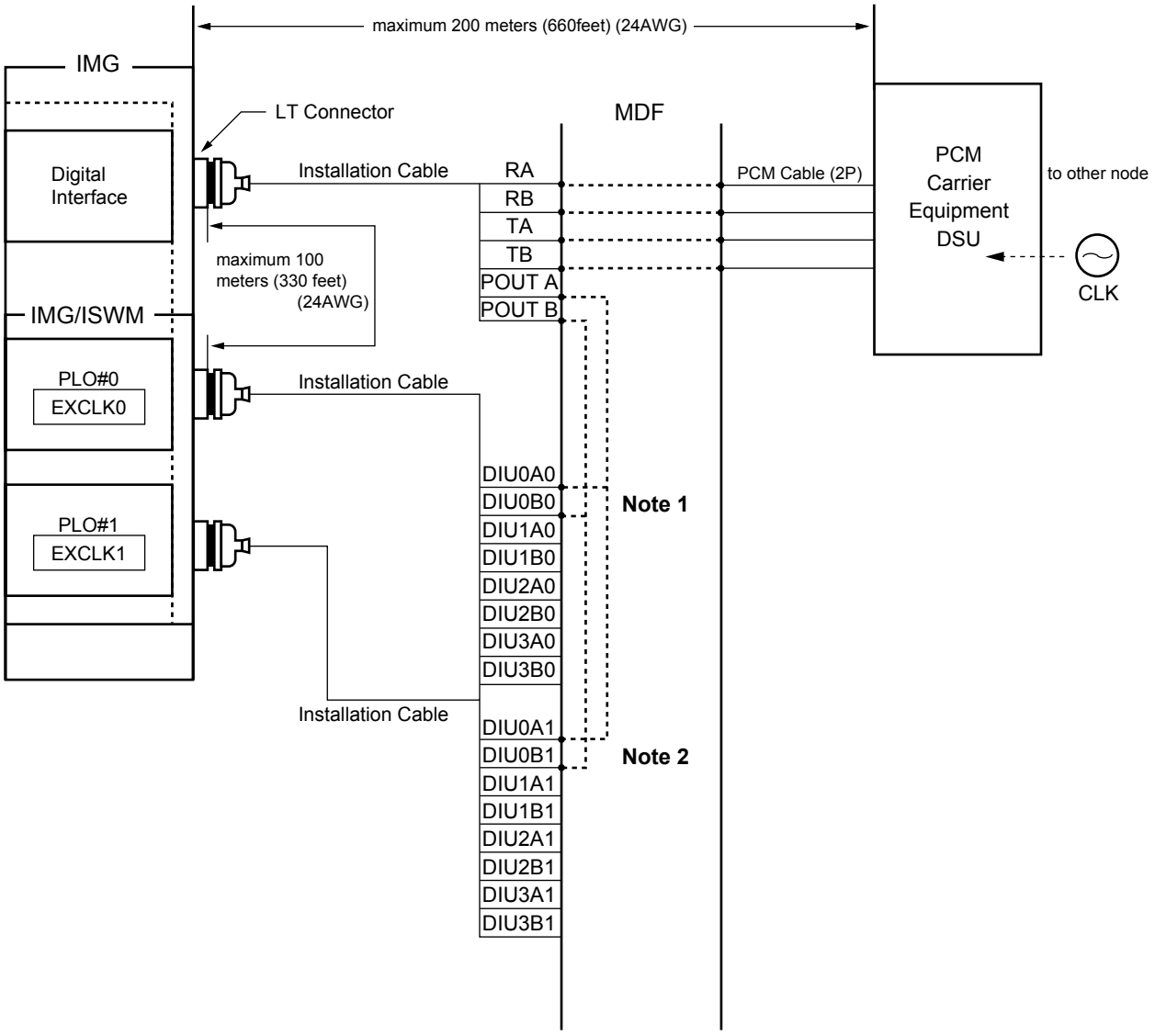
Note 1: *PLO has a maximum of 4 inputs. DIU0xx leads are used for the 1st clock distribution routs. Thus, DIU3xx leads are used for the 4th. The first input has the highest priority.*

Note 2: *This connection is required for a dual-TSW system.*

Figure 4-11 Cable Connection Diagram for Receiving Clock from a Digital Interface (PLO)

• Cable Connection Diagram

This figure shows an example of distributing clock from a digital interface. This example also assumes that the Digital Trunk POUT leads are used as the 1st clock distribution route.

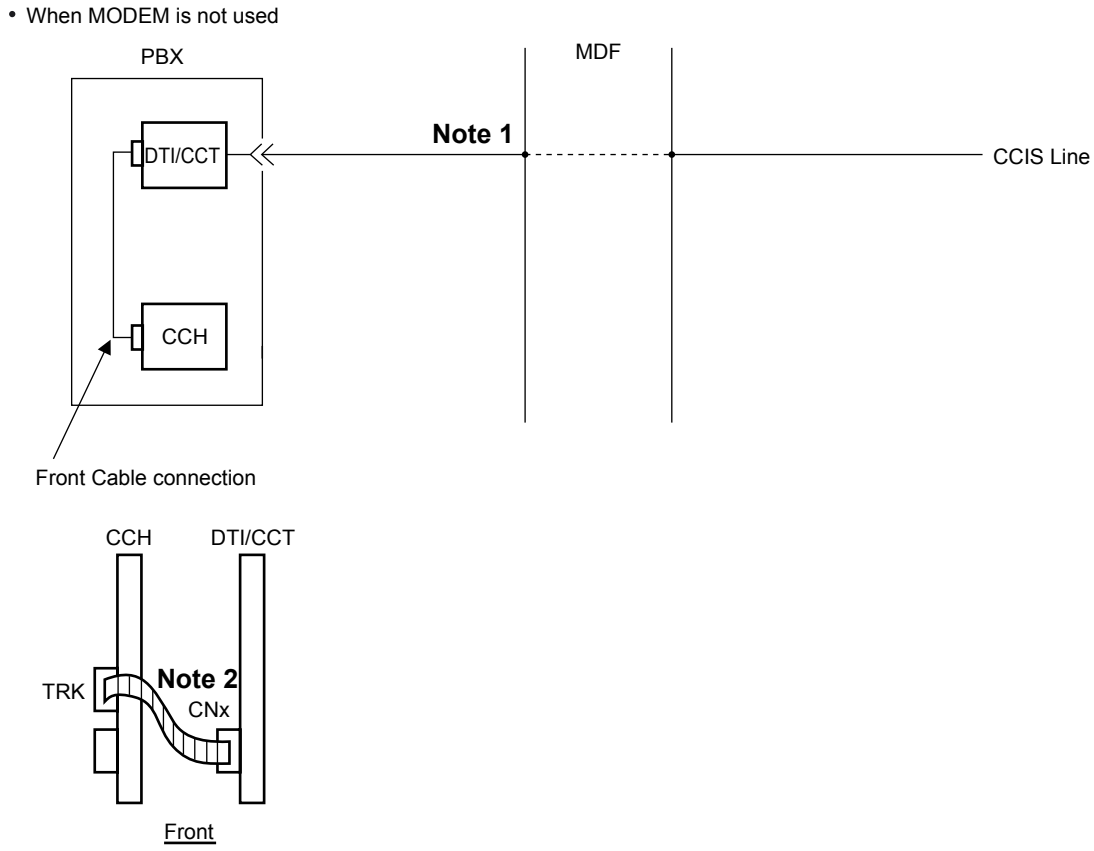


Note 1: *PLO has a maximum of 4 inputs. DIU0xx leads are used for the 1st clock distribution routes. Thus, DIU3xx leads are used for the 4th. The first input has the highest priority.*

Note 2: *The connection is required for a dual PLO system.*

3.4 Front Cable Connection between DTI and CCH

Figure 4-12 Front Cable Connections between DTI/CCT and CCH



Note 1: *For cross connections between DTI and CCIS Line, refer to Figure 4-10 and 4-11.*
Note 2: *The connector name varies depending on the card.*

3.5 Cable Running from PBX to the MODEM for Analog CCIS Line

START

- By referring to Figure 4-15 through 4-16, confirm the connector name on the PIM backplane, then connect the installation cable (25P) to the LT connector.
- Connect the MODEM which is connected to analog CCIS line to the installation cable.

END

Figure 4-13 Connection of MODEM Cables for Analog CCIS Line

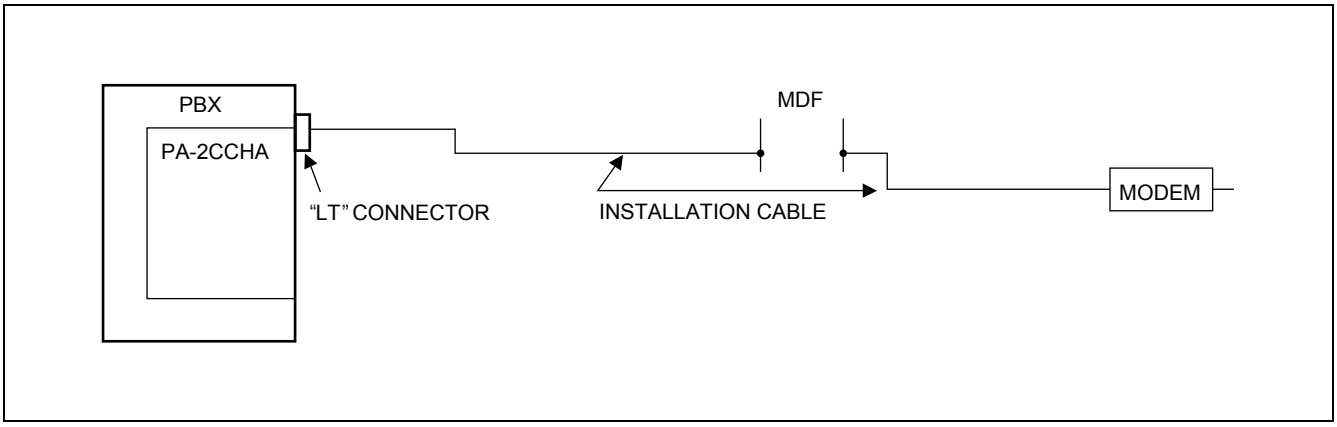
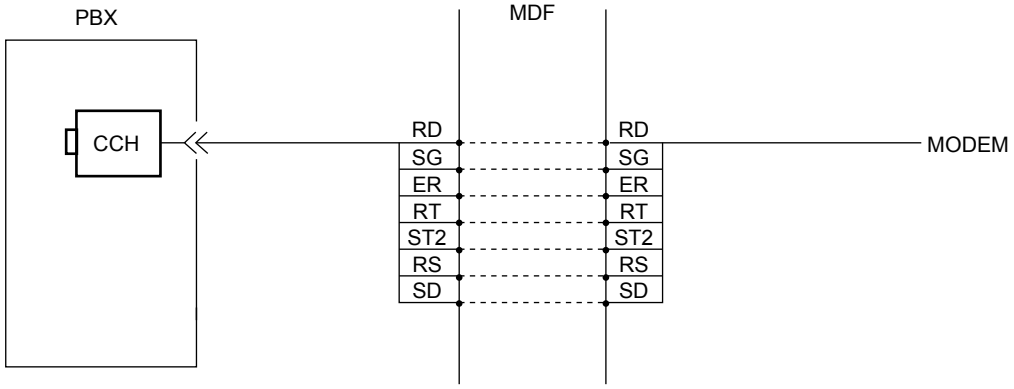


Figure 4-14 Connecting Route Diagram for CCH

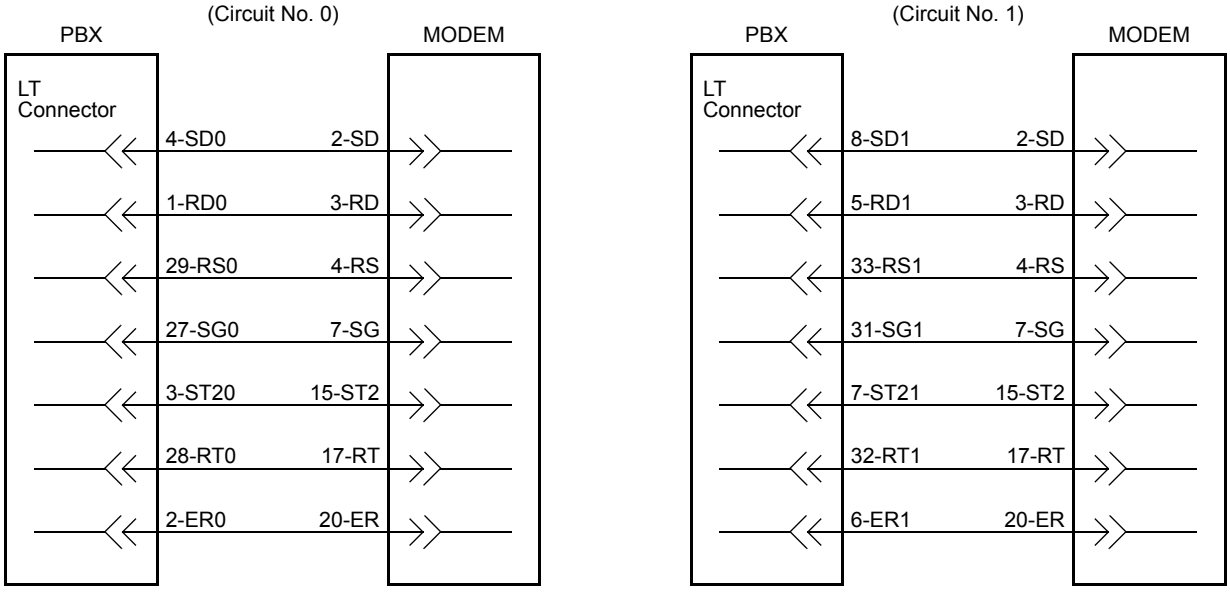
- When MODEM is used



- Cable length is maximum 15 meters (50 feet).
  The MODEM to be used is a synchronous MODEM of 2400, 4800, or 9600 bps, and the communication method is limited to 4-wire full duplex communications.

Figure 4-15 Connection between PBX and MODEM

(a) Cable Connection when Accommodated in *1 (Refer to Figure 4-16)



(b) Cable Connection when Accommodated in *2 (Refer to Figure 4-16)

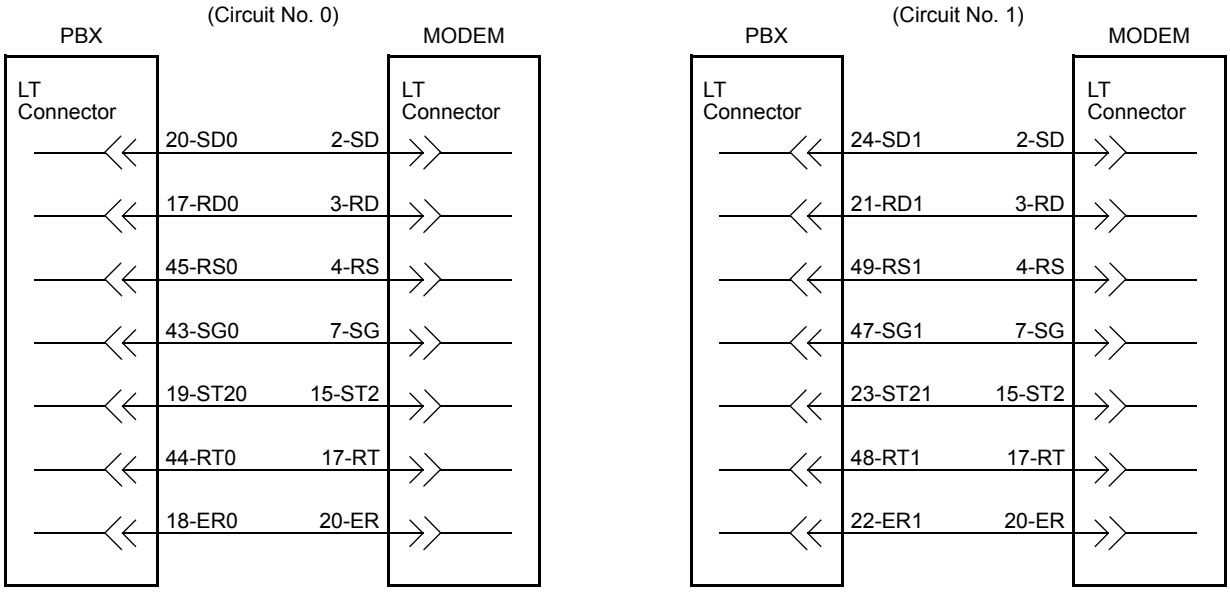


Figure 4-15 Connection between PBX and MODEM (Continued)

(c) Cable Connection when Accommodated in *3. (Refer to Figure 4-16)

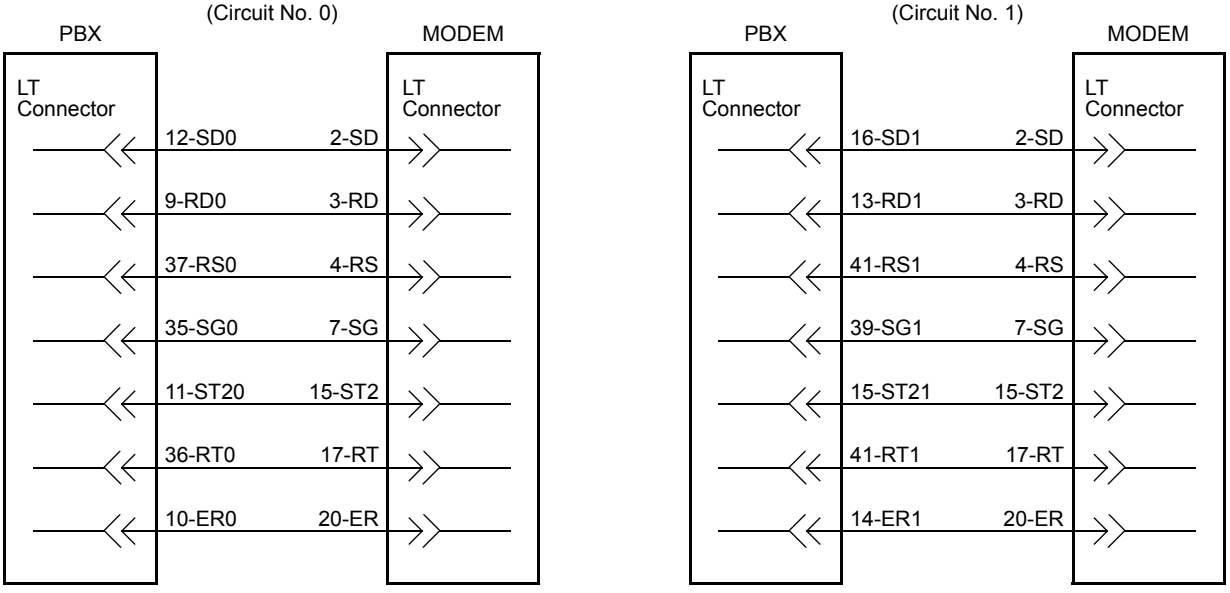
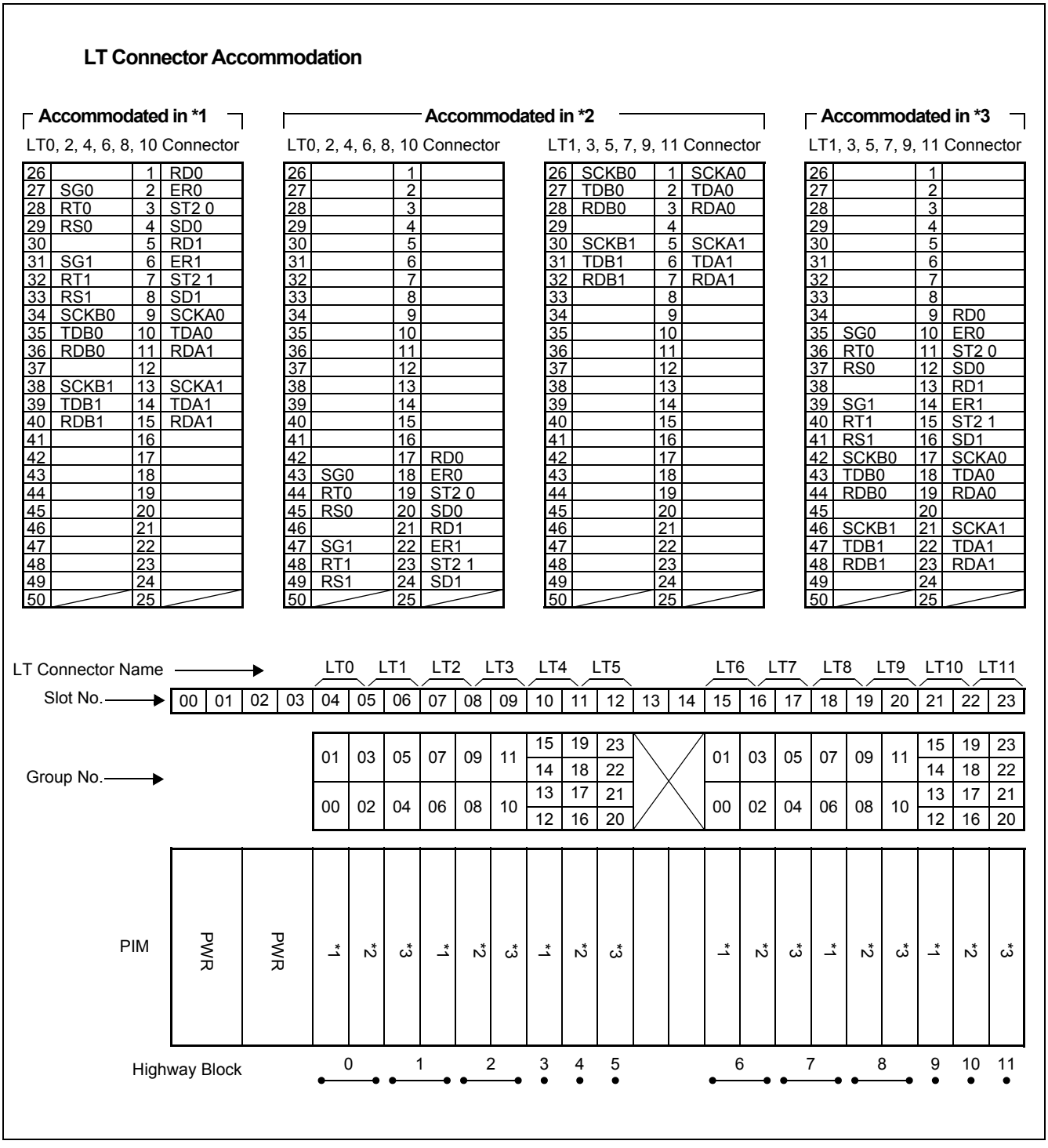


Figure 4-16 LT Connector Leads Accommodation for 2CCH



26		1	RD0
27	SG0	2	ER0
28	RT0	3	ST2 0
29	RS0	4	SD0
30		5	RD1
31	SG1	6	ER1
32	RT1	7	ST2 1
33	RS1	8	SD1
34	SCKB0	9	SCKA0
35	TDB0	10	TDA0
36	RDB0	11	RDA1
37		12	
38	SCKB1	13	SCKA1
39	TDB1	14	TDA1
40	RDB1	15	RDA1
41		16	
42		17	
43		18	
44		19	
45		20	
46		21	
47		22	
48		23	
49		24	
50		25	

26		1	
27		2	
28		3	
29		4	
30		5	
31		6	
32		7	
33		8	
34		9	
35		10	
36		11	
37		12	
38		13	
39		14	
40		15	
41		16	
42		17	RD0
43	SG0	18	ER0
44	RT0	19	ST2 0
45	RS0	20	SD0
46		21	RD1
47	SG1	22	ER1
48	RT1	23	ST2 1
49	RS1	24	SD1
50		25	

26	SCKB0	1	SCKA0
27	TDB0	2	TDA0
28	RDB0	3	RDA0
29		4	
30	SCKB1	5	SCKA1
31	TDB1	6	TDA1
32	RDB1	7	RDA1
33		8	
34		9	
35		10	
36		11	
37		12	
38		13	
39		14	
40		15	
41		16	
42		17	
43		18	
44		19	
45		20	
46		21	
47		22	
48		23	
49		24	
50		25	

26		1	
27		2	
28		3	
29		4	
30		5	
31		6	
32		7	
33		8	
34		9	RD0
35	SG0	10	ER0
36	RT0	11	ST2 0
37	RS0	12	SD0
38		13	RD1
39	SG1	14	ER1
40	RT1	15	ST2 1
41	RS1	16	SD1
42	SCKB0	17	SCKA0
43	TDB0	18	TDA0
44	RDB0	19	RDA0
45		20	
46	SCKB1	21	SCKA1
47	TDB1	22	TDA1
48	RDB1	23	RDA1
49		24	
50		25	

CHAPTER 5 INSTALLATION TEST PROCEDURE

1. GENERAL

This chapter describes the installation tests that are performed after system start up and after the office data has been assigned. The following test procedure are covered.

- Overall Test for CCIS Line
- CCIS Service Feature Functional Test

2. INSTALLATION TEST PROCEDURE

2.1 Overall Test for CCIS Line

Tests are to be performed to check CCIS Lines by connecting them to a trunk on an individual basis.
The speech path conditions (speech level, presence of noise, one-way speech, no speech, etc.) over the connection to the distant office will be checked. Release of the trunk used will also be checked.

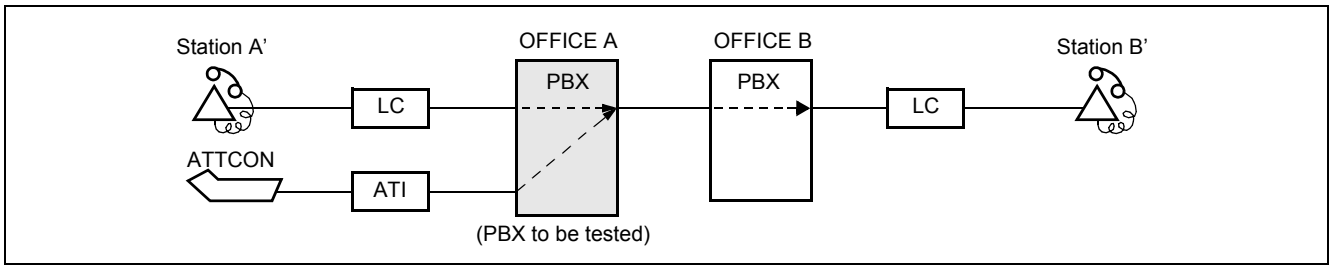
- Overall Test Procedure

START

Overall Test of CCIS Tie Line Outgoing Call:	Paragraph 2.1.1
Overall Test of CCIS Tie Line Incoming Call:	Paragraph 2.1.2
Test of Connection and Alternate Routing to All Tie Lines:	Paragraph 2.1.3
Test of Tandem Connection to Tie Line:	Paragraph 2.1.4
PAD Setting:	Paragraph 2.1.5

END

2.1.1 Overall Test of CCIS Tie Line Outgoing Call



START

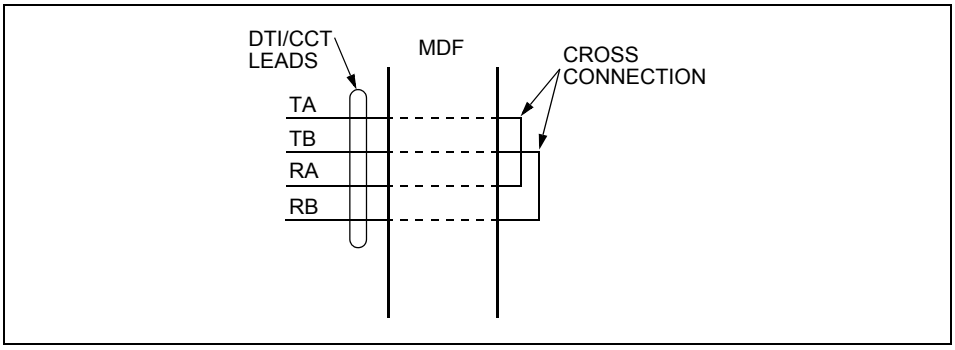
- Seizure of trunk to be tested
  - When seizing from a station
    - Place the trunk to be tested into idle state, and make busy all other trunks.
    - Station A' dials the number for station B' in the B Office.
  - When seizing from an ATTCON
    - An ATTCON sets up the connection with a specific trunk designated by Individual Trunk Access for CCIS TRK service and dials the number for Station B' in the B Office.
- Call termination to Station B' in the B Office
  - The call terminates to Station B' via a CCIS Tie Line.
- Check of speech conditions
  - After the call has been answered at the ATTCON, check the speech conditions including speech level, presence of noise and one-way speech state.
- Release
- When all CCIS Tie Line Trunks have been checked and a fault has been detected
  - Perform fault localization procedure when a fault has occurred to CCIS Tie Line (See Procedure A)
  - If the distant office is faulty, make a request to the distant office for repair.

END

(Procedure A)

START

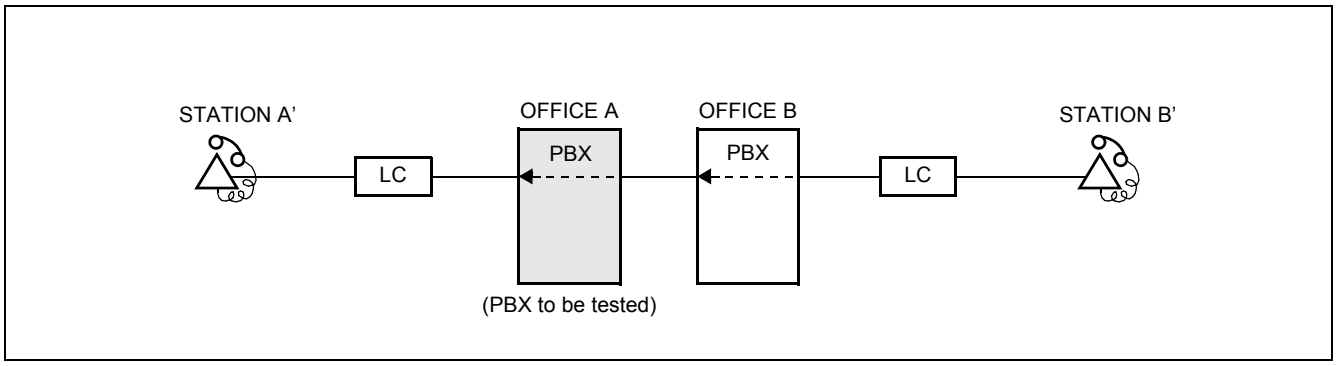
- A DTI/CCT is in use as the speech lines of No. 7 CCIS.
  - On the DTI/CCT card, set its MB switch UP.
  - In any office other than the Clock Master Office, disconnect the DTI cable connector at the DTI side (Back place of the PIM)
    - PLO alarm is generated, but ignore it.
    - The PLO starts running by itself.
  - Make the following connection at the MDF using a paired wire.



  - The DTI does not recover. (CCH/CCT Link Failure may occur, but ignore it.)
    - System message “3-J” is not displayed.
    - The DTI/CCT is faulty.
  - The DTI recovered. (CCH/CCT Link Failure may occur, but ignore it.)
    - System message “3-J” is not displayed.
    - The DTI/CCT is normal.
    - Call the distant office and ask for repair.
- An analog trunk is in use as the speech lines of No. 7 CCIS.
  - Remove the cross connection wires and disconnect them from the external line side.
  - Connect a telephone set to the trunk accommodating terminals concerned on the MDF, and talk with the caller.
    - Normal — Call the Distant Office and ask for repair.
    - Abnormal — Replace the trunk card with a spare card.

END

2.1.2 Overall Test of CCIS Tie Line Incoming Call



START

Seizure of trunk to be tested	Place the trunk to be tested into idle state, and make busy all other trunks.
Termination of incoming call to station A' in the self office	An incoming call from the distant office terminates to Station A'.
Check of speech	After the call has been answered at Station A', check the speech conditions including speech level, presence of noise and one-way speech state.
Release	
When all CCIS Tie Line Trunks have been checked and a fault has been detected	Perform fault localization procedure when a fault has occurred to CCIS Tie Line. (See Procedure A of Paragraph 2.1.1) If the distant office is faulty, make a request to the distant office for repair.

END

2.1.3 Test of Connection and Alternate Routing to All Tie Lines

START

- Test the trunks in the primary route one at a time
  - Make busy all trunks in the primary route except the trunk to be tested.
  - Station “A” calls Station “B” via the primary route.
  - After Station “B” answers, check the normality of the speech condition including the speech level, presence of noise, and one-way speech.
  - Release.
- Make all the trunks in the primary route busy.
- Test the trunks in the alternate route one at a time.
  - Make busy all trunks in the alternate route except the trunk to be tested.
  - Station “A” calls Station “B” via the alternate route.
  - After Station “B” answers, check the normality of the speech condition including the speech level, presence of noise, and one-way speech.
  - Release.
- Cancel the Make Busy condition of the trunks.

END

Figure 5-1 Combination of Tie Line Network and Public Network

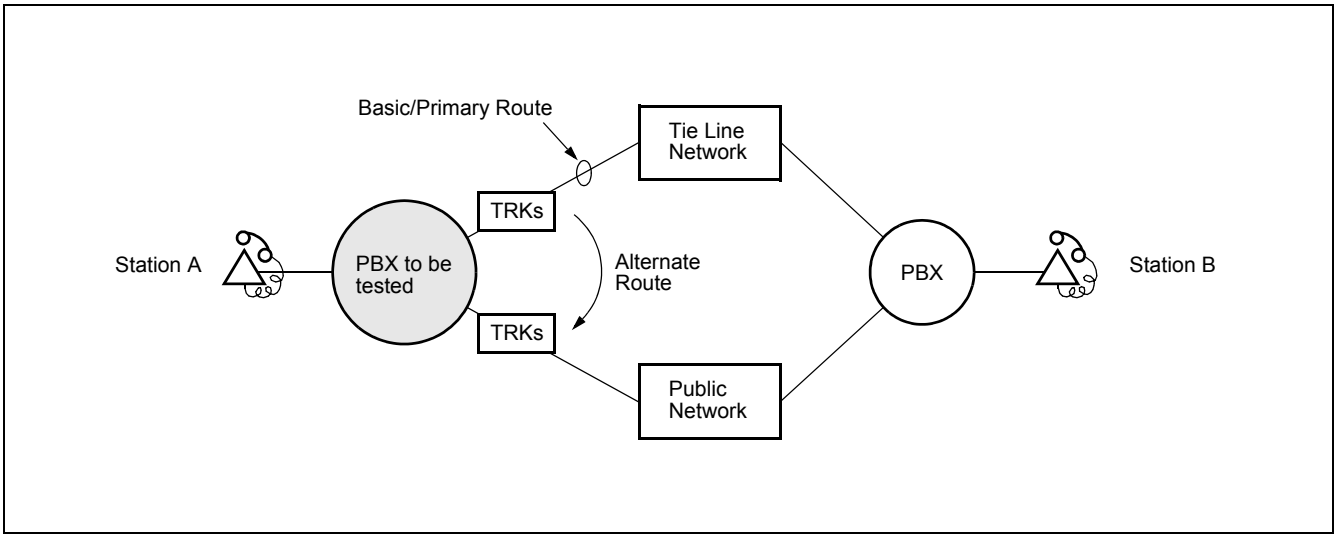
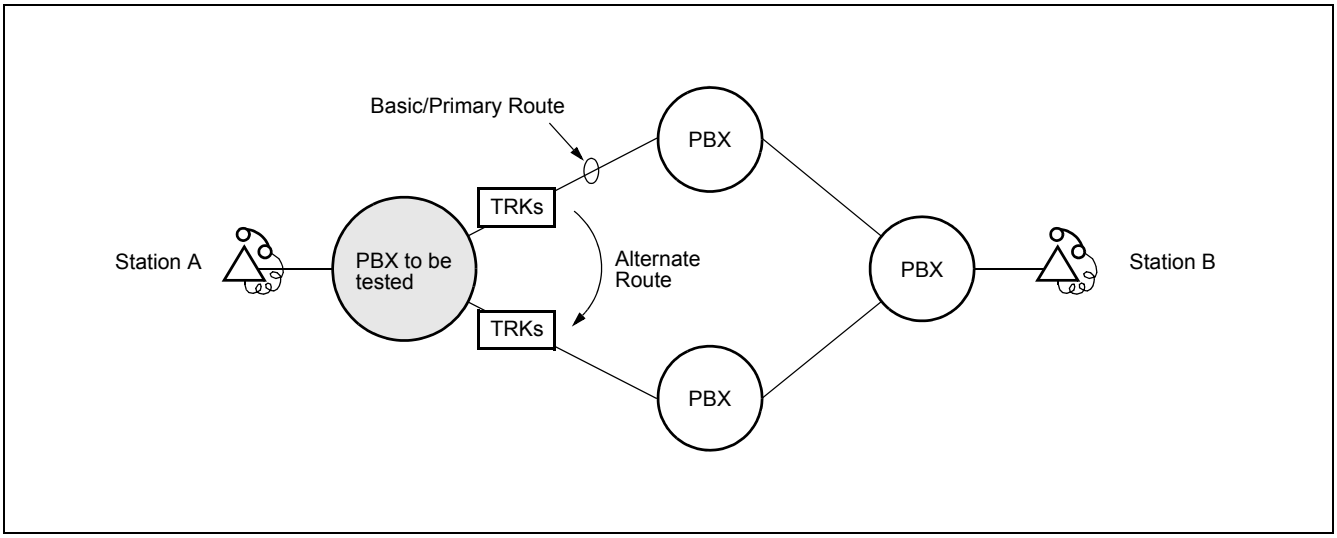
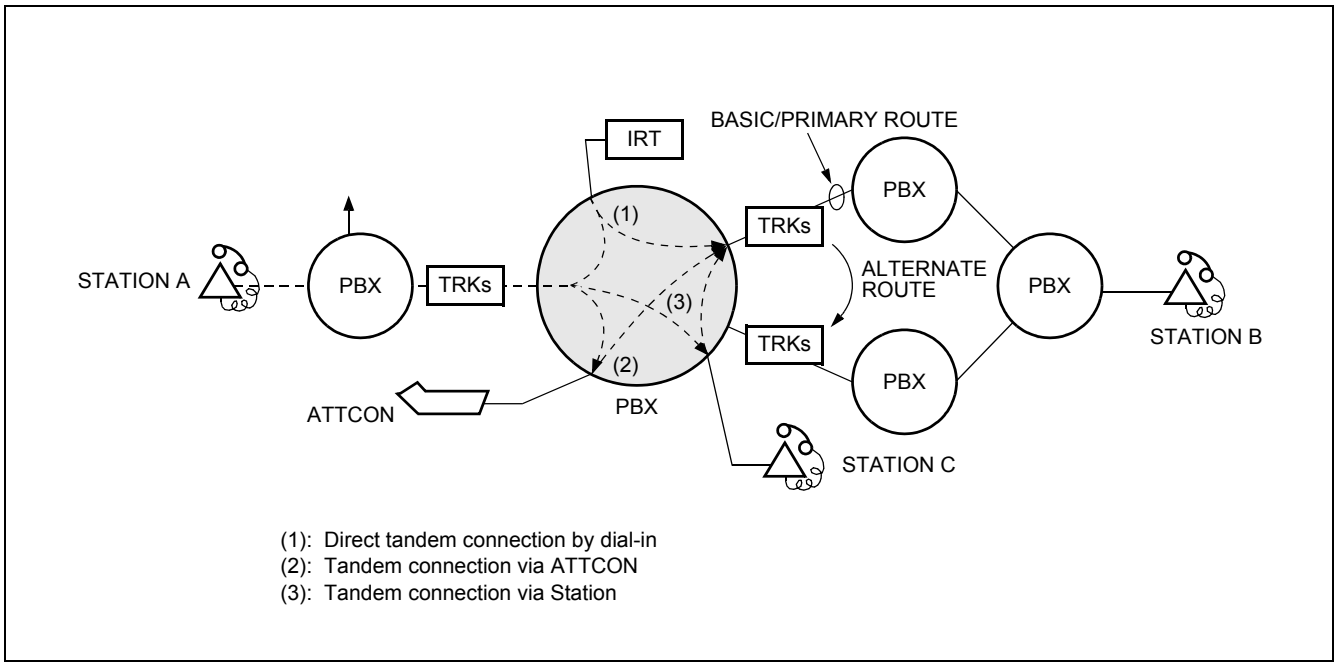


Figure 5-2 Tie Line Network



2.1.4 Test of Tandem Connection to Tie Line

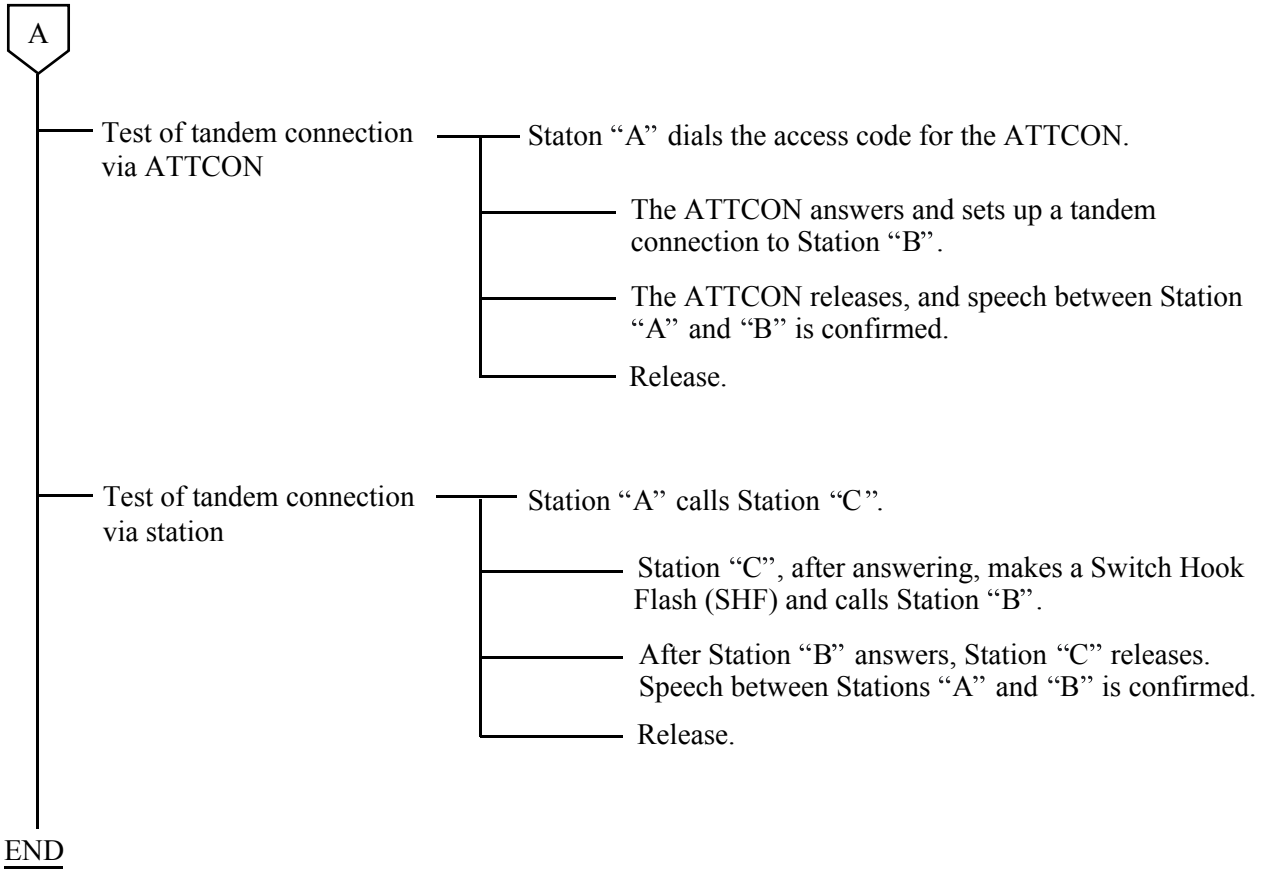
Figure 5-3 Test of Tandem Connection to Tie Line



START

- Test of direct dial-in tandem connection
  - Test of Basic/Primary Route
    - Station “A” calls Station “B”.
    - Confirm speech between Stations “A” and “B”.
    - Release.
  - Test of Alternate Route.
    - Make busy all the trunks in the primary route.
    - Station “A” calls Station “B”.
    - Confirm speech between Stations “A” and “B”.
    - Release.
    - Make idle all the trunks.

A


A
Test of tandem connection via ATTCON
Staton “A” dials the access code for the ATTCON.
The ATTCON answers and sets up a tandem connection to Station “B”.
The ATTCON releases, and speech between Station “A” and “B” is confirmed.
Release.
Test of tandem connection via station
Station “A” calls Station “C”.
Station “C”, after answering, makes a Switch Hook Flash (SHF) and calls Station “B”.
After Station “B” answers, Station “C” releases. Speech between Stations “A” and “B” is confirmed.
Release.
END

2.1.5 PAD Setting

When setting up a No.7 CCIS Network, PAD setting differs from that in the case of analog network.

(a) For an outgoing call to/incoming call from a Tie Line:

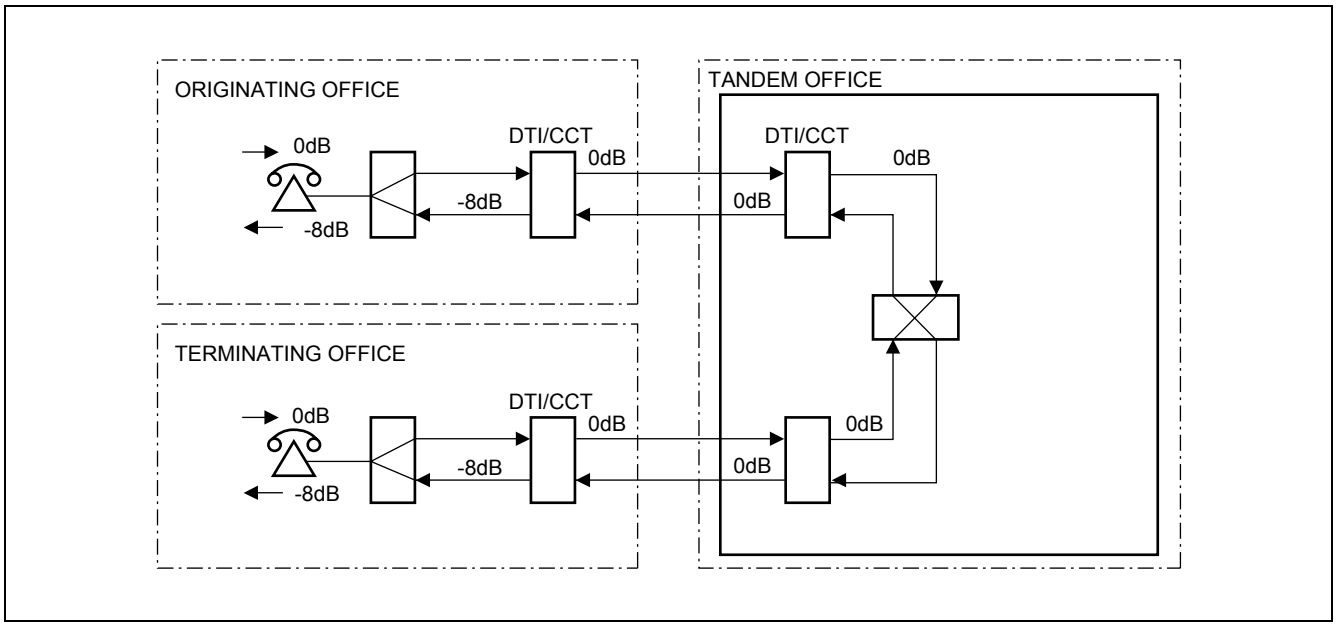
- Via “ARTD” command (CDN=30) or by switch setting on the circuit card (DTI/CCT).

(b) For a tandem Tie Line connection:

- Via “APAD” command or switch setting on the circuit card

<EXAMPLE>
At both the originating and terminating offices, 0 dB is set to the outgoing side and 8 dB is set to the terminating of the DTI/CCT route via “ARTD” command or switch settings.
At the tandem office, 0 dB is set for both the terminating and originating sides of each DTI/CCT route via “APAD” command.
This arrangement is shown in Figure 5-4.

Figure 5-4 Example of PAD Setting for CCIS



2.2 CCIS Service Feature Functional Test

The purpose of this test is to verify that CCIS service features are programmed and operate as per the Job Specification.
For the operating procedure pertaining to each service feature, refer to CHAPTER 7: “List of Service Features for CCIS (1/2)”.

- CCIS Service Feature Functional Test Procedure

START

- Test of Interoffice Station to Station Connection: Paragraph 2.2.1
- Test of Outgoing Call Connection to Tie Line Trunk: Paragraph 2.2.2
- Test of Transfer Services: Paragraph 2.2.3
- Test of Services from ATTCON: Paragraph 2.2.4
- Test of other Services: Paragraph 2.2.5

END

2.2.1 Test of Interoffice Station to Station Connection

Test Outline:

Tests are to be performed on interoffice station to station connection and on normal operations of various system services.

START

- Trunk Line Check — No. 7 CCIS Line ☐☐
- Busy Line Service Check — Step Call-CCIS (S-59) ☐☐
- Bridge-In Service Check — Call Back-CCIS (C-44) ☐☐
  - Executive Right-of-Way-CCIS (E-8) ☐☐
- Ring Back Tone Check — Voice Call-CCIS (V-7) ☐☐
- Ringing Check — Distinctive Ringing-CCIS (D-75) ☐☐

END

2.2.2 Test of Outgoing Call Connection to Tie Line Trunk

Test Outline:

Tests are to be performed to determine whether outgoing trunk connections to each route, restriction of connections services when all trunks are busy, etc. operate as specified.

START

- All Trunk Busy Service Check —— Outgoing Trunk Queuing-CCIS (O-12) ☐☐
- SMDS Service Check —— Centralized Billing-CCIS (C-55) ☐☐
- Centralized Management Service Check —— Centralized System Management Report-CCIS (C-57) ☐☐

END

2.2.3 Test of Transfer Services

Test Outline:

Tests are to be performed on interoffice transfer services when the call has encountered line busy or when the call has not been answered.

START

- Transfer Service Check
  - Call Transfer-All Calls-CCIS (C-50) ☐☐
- Call Forwarding Service Check
  - Call Forwarding-All Calls-CCIS (C-45) ☐☐
  - Call Forwarding-Busy Line-CCIS (C-46) ☐☐
  - Call Forwarding-Don't Answer-CCIS (C-47) ☐☐
  - Call Forwarding Assignment-Attendant-CCIS (C-94) ☐☐

END

2.2.4 Test of Services from ATTCON

Test Outline:

Tests are to be performed on the functions of the Attendant Console (ATTCON) and various interoffice services to be provided via the ATTCON.

START

- Call Termination to ATTCON Check
  - Attendant Camp-on with Tone Indication-CCIS (A-45) ☐☐
  - Serial Call-CCIS (S-52) ☐☐
  - Busy Verification-CCIS (B-9) ☐☐
- Information Display on ATTCON Check
  - Calling Number Display-CCIS (C-52) ☐☐
- Night Service Check
  - Direct-In-Termination-CCIS (D-74) ☐☐
  - Night Connection-Fixed-CCIS (N-15) ☐☐
  - Centralized Day/Night Mode Change-CCIS (C-56) ☐☐
  - LDN Night Connection-CCIS (L-29) ☐☐
- Other Service Check
  - Individual TRK Access-CCIS (I-19) ☐☐

END

2.2.5 Test of other Services

Test Outline:

Tests are to be performed on various kinds of interoffice services when D^{term}, etc. are used.

START

- Message Reminder-CCIS (M-34) ☐☐
- Message Waiting Lamp Setting-Attendant-CCIS (M-35) ☐☐
- Message Waiting Lamp Setting-Station-CCIS (M-36) ☐☐
- Data Line Service —— Data Communication-CCIS (D-41) ☐☐

END

3. TEST RESULT REPORT

3.1 CCIS Service Feature Functional Test

3.1.1 Test of Interoffice Station to Station Connection

SERVICE FEATURE		SPECIAL ACCESS CODE	PROVIDED	CHECK	REMARKS
Line Check	No.7 CCIS Line				
Busy Line Service Check	Step Call-CCIS (S-59)				
Bridge-In Service Check	Call Back-CCIS (C-44)				
	Executive Right of Way-CCIS (E-8)				
Ring Back Tone Check	Voice Call-CCIS (V-7)				
Ringing Check	Distinctive Ringing-CCIS (D-75)				

3.1.2 Test of Outgoing Call Connection to Tie Line Trunk

SERVICE FEATURE		SPECIAL ACCESS CODE	PROVIDED	CHECK	REMARKS
All Trunk Busy Service Check	Outgoing Trunk Queuing-CCIS (O-12)				
SMDS Service Check	Centralized Billing-CCIS (C-55)				
Centralized Management Service Check	Centralized System Management Report-CCIS (C-57)				

3.1.3 Test of Transfer Services

SERVICE FEATURE		SPECIAL ACCESS CODE	PROVIDED	CHECK	REMARKS
Transfer Service Check	Call Transfer-All Calls-CCIS (C-50)				
	Call Forwarding-All Calls-CCIS (C-45)				

SERVICE FEATURE		SPECIAL ACCESS CODE	PROVIDED	CHECK	REMARKS
Call Forwarding Service Check	Call Forwarding-Busy Line-CCIS (C-46)				
	Call Forwarding-Don't Answer-CCIS (C-47)				
	Call Forwarding Assignment-Attendant-CCIS (C-94)				

3.1.4 Test of Services from ATTCON

SERVICE FEATURE		SPECIAL ACCESS CODE	PROVIDED	CHECK	REMARKS
ATTCON Call Termination Check	Attendant Camp-on with Tone Indications-CCIS (A-45)				
	Serial Call-CCIS (S-52)				
	Busy Verification-CCIS (B-9)				
ATTCON Display Function Check	Calling Number Display-CCIS (C-52)				
Night Service Check	Direct-In Termination-CCIS (D-74)				
	Night-Connection-Fixed-CCIS (N-15)				
	Centralized Day/Night Mode Change CCIS (C-56)				
	LDN Night Connection-CCIS (L-29)				
Other Service Check	Individual Trunk Access-CCIS (I-19)				

3.1.5 Test of Other Services

SERVICE FEATURE		SPECIAL ACCESS CODE	PROVIDED	CHECK	REMARKS
Message Reminder-CCIS (M-34)					
Message Waiting Lamp Setting-Attendant-CCIS (M-35)					
Message Waiting Lamp Setting-Station-CCIS (M-36)					
Data Line Service	Data Communication-CCIS (D-41)				

CHAPTER 6 BASIC DATA ASSIGNMENT

1. GENERAL

This chapter explains how to program office data which are necessary for establishing a CCIS Tie Line Connection. For easy understanding, office data programming is explained using an example of a CCIS network in this chapter. Accordingly, when programming data at your site, some minor data modifications may be unavoidable. For other features associated with CCIS, see CHAPTER 7 “List of Service Features for CCIS (1/2)”.

☐ 24CCT/30CCT

This circuit card provides an interface between 24/30 trunks and the PBX at 1.544/2.048 Mbit/s. Being equipped with a Common Channel Handler (CCH), this circuit card can be used as an interface for a Common Channel Inter-office Signaling (CCIS) network.

☐ 2CCH

This circuit card provides two Common Channel Handlers (CCH). By using together with 24DTI/30DTI to establish the digital CCIS line or used as an interface for the analog CCIS.

☐ 24DTI/30DTI

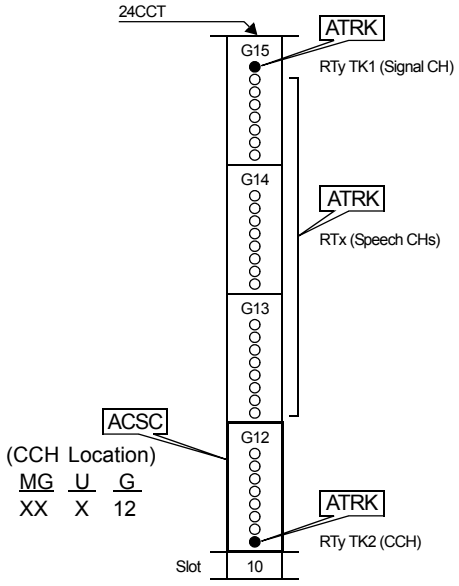
This circuit card provides an interface for a digital CCIS line, using together with the 2CCH card.

2. DATA ASSIGNMENT

2.1 Port Allocation and Related Command

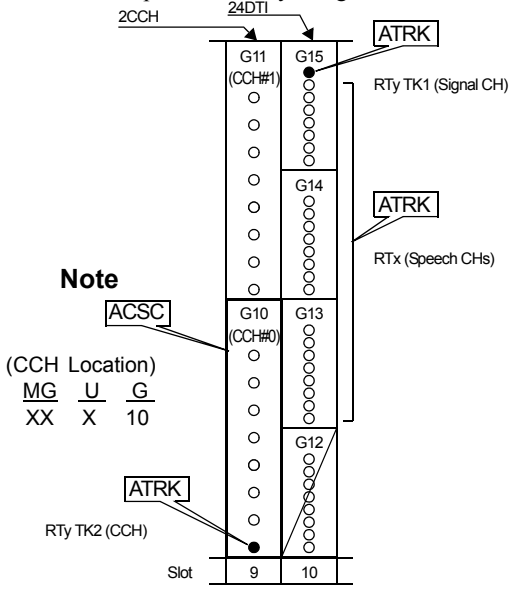
(Reference 1)

- 24CCT is mounted in slot 10 (PIM).
- Last TS (CH) is used for CCIS signal CH.
- RTx = Speech CH, RTy = Signal CH.



(Reference 2)

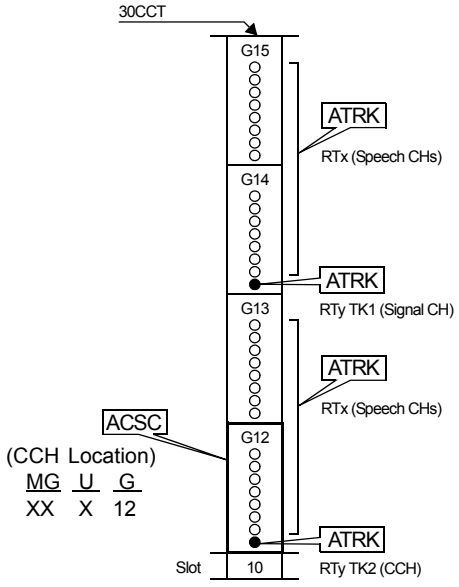
- 24DTI is mounted in slot 10 (PIM).
- 2CCH is mounted in slot 9 (PIM).
- Last TS (CH) is used for CCIS signal CH.
- RTx = Speech CH, RTy = Signal CH.



Note: *Only one CCH (CCH#0/CCH#1) can be assigned. This example is applicable when CCH#0 is used.*

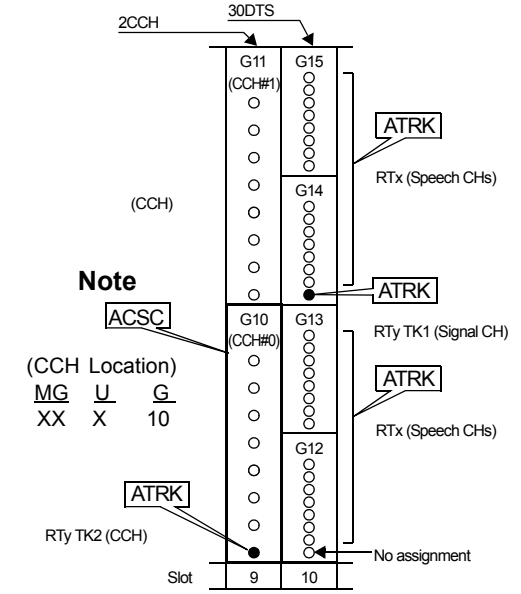
(Reference 3)

- 30CCT is mounted in slot 10 (PIM).
- TS16 is used for CCIS signal CH.
- RTx = Speech CH, RTy = Signal CH.



(Reference 4)

- 30DTI is mounted in slot 10 (PIM).
- 2CCH is mounted in slot 9 (PIM).
- TS16 is used for CCIS signal CH.
- RTx = Speech CH, RTy = Signal CH.



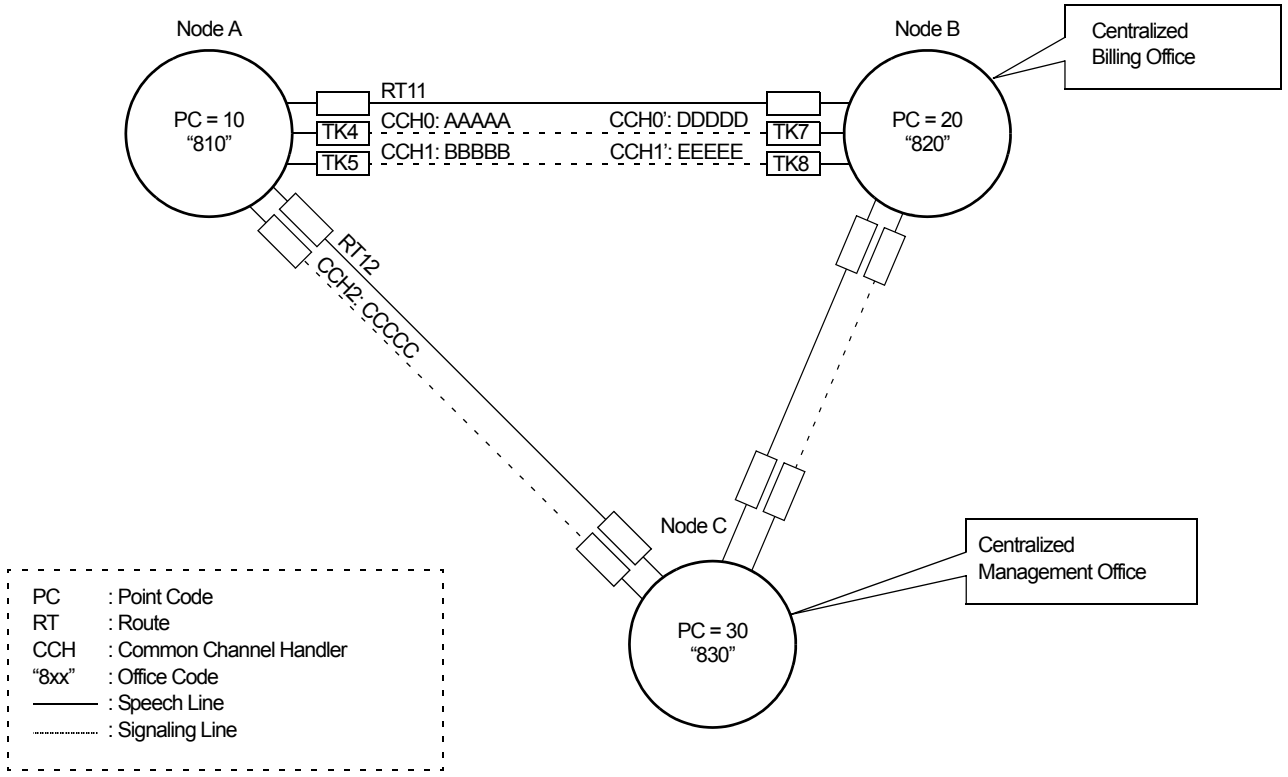
Note: *Only one CCH (CCH#0/CCH#1) can be assigned. This example is applicable when CCH#0 is used.*

2.2 Basic Data Assignment Procedure

This section explains "How to program necessary data associated with a CCIS network" using the following example. Note that Node A is your office.

Figure 6-1 Example of a CCIS Network

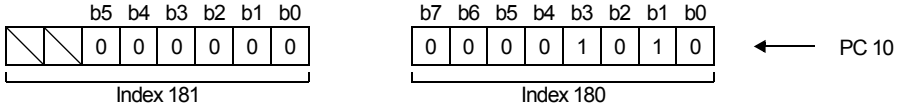
- In this figure, five letters such as AAAAA, represent mounting location of CCT card or CCH card.



STEP 1:	Point Code & Miscellaneous Data Assignment	COMMAND NAME
		ASYD

☐ Since Point Code is used to identify each office in a CCIS network, any identical PCs are not allowed in the same network. The following three kinds of point codes may be programmed in the system. The first PC, Originating Point Code (OPC), is mandatory. The remaining two Point Codes can be assigned as required.
- Originating Point Code (OPC): assigned by Indexes 180 and 181.
- Centralized Billing Point Code (DPC 0): assigned by Indexes 182 and 183.
- Centralized Management Point Code (DPC 1): assigned by Indexes 184 and 185.

1) Originating Point Code (OPC):
The OPC is a self-office code, which should be assigned without exception. 14 bits can be used for specifying OPC. Note that available PC ranges from 1 to 16367 (PCs16368~16383 are used for Loop Back Test). Node A whose OPC is 10, for example, should be assigned as follows.



2) Centralized Billing Point Code (DPC 0): **Note 1**
The DPC 0 is used when billing information of the PBX (Node A) should be sent to the Centralized Billing Office. When DPC 0 is assigned as "20", for example, billing information of Node A can be obtained at Node B whose PC is 20. When this Centralized Billing feature is not necessary, skip these Indexes.

Note 1: *Assign DPC 0 = 00 Hex to Centralized Billing Office.*

3) Centralized Management Point Code (DPC 1): **Note 2**
The DPC 1 is used when system messages of the PBX (Node A) should be transmitted to the Centralized Management Center, from which all PBXs in the network can be managed. When DPC 1 is assigned as "30", for example, system messages can be automatically sent to Node C whose PC is 30 in this case.

Note 2: *Assign DPC 1 = 00 Hex to Centralized Management Office.*

☐ Miscellaneous Data

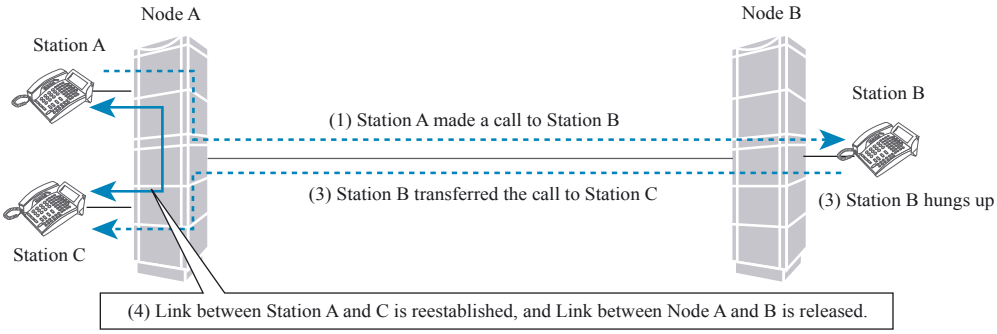
1) Index 186:
b6 must be assigned as 1 (CCIS is in service). The remaining data should be determined depending on customer's requirements.

b7	b6	b5	b4	b3	b2	b1	b0	
0	1	0	1	0	0	1	1	← Example (Index 186)

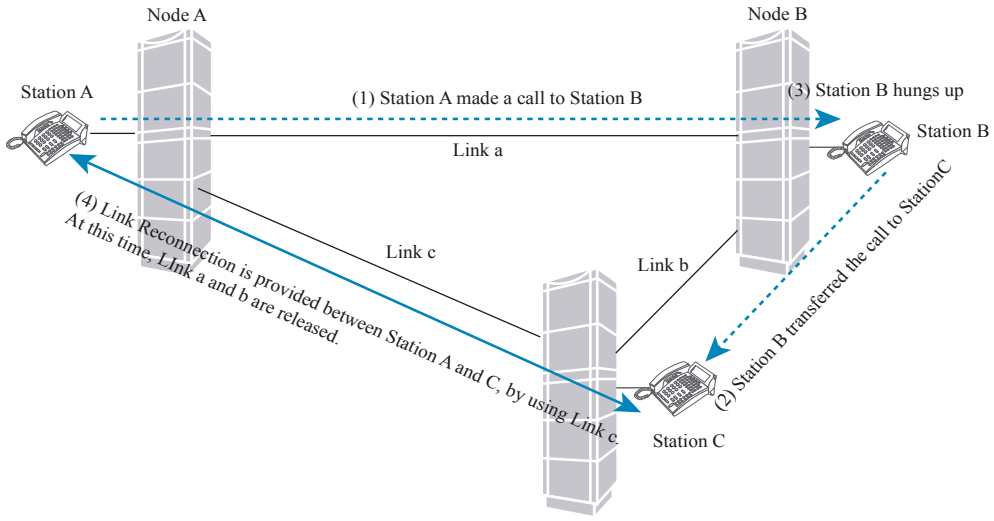
b0: 0/1 = CCIS Link Reconnection is not available/available.
When either of the two parties that are engaged in a Station-to-Station/Station-to-Trunk/Trunk-to-Trunk connection via CCIS link transfers the call to another station, CCIS Link Reconnection will be provided. By establishing new link after the call transfer, the most proper routing can be provided for the two parties which are eventually connected. **Note 3, Note 4**

In the following cases, Link Reconnection is provided:

Exmaple 1:
1. A call between Station A and B is established.
2. Station B transfers the call to Station C.
3. After connecting to Station C, Station B hungs up.
4. Link between Station A and C is reestablished. At this time Link between Node A and B is released.



Exmaple 2:
1. A call between Station A and Station B is established.
2. Station B transfers the call to Station C.
3. After connecting to Station C, Station B hungs up.
4. Link c (between Station A and C) is reestablished. at this time, Link a and b are released.

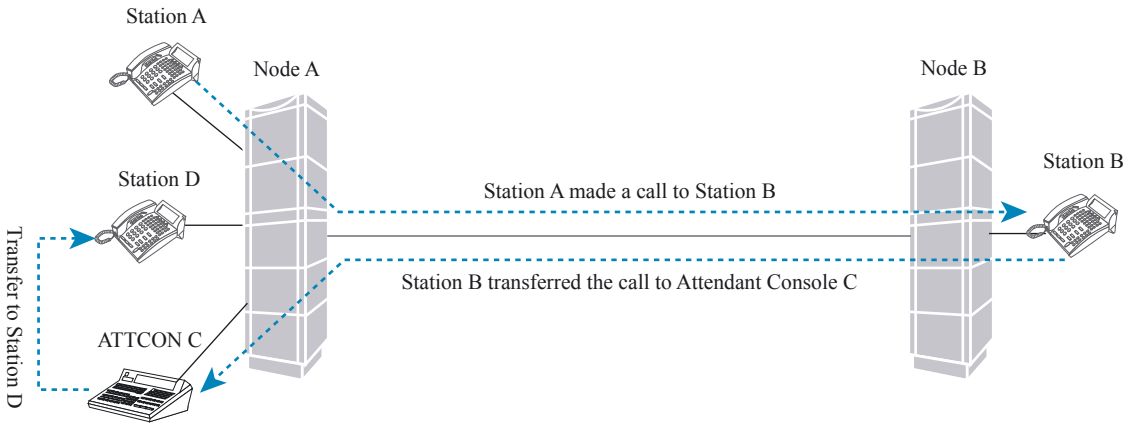


Note 3: *When either of the two parties that are eventually connected (after a call transfer) is ATTCON, Link Reconnection cannot be provided. (At this point, even if the ATTCON transfers the call to a station in the same node and Station-to-Station connection is established, this function is not available.) In addition, this function is not provided when either of the two parties that are eventually connected has a held party.*

In the following case, Link Reconnection is not provided:

Example 3:

1. A call between Station A and Station B is established.
2. Station B transfers the call to ATTCON C.
3. After connecting to ATTCON C, Station B is released.
4. At this time, Link between Station A and ATTCON C is not reestablished.
5. ATTCON C transfers the call to Station D.
6. After connecting to Station D, ATTCON C is released.
7. Link Reconnection (between Station A and D) is not provided.



Note 4: *In case a call is connected to the announcement trunks used for Delay Announcement-UCD service and ACD Delay Announcement service, Link Reconnection function is not provided. (At this time, if the call is eventually connected to UCD station/ACD agent position after the UCD station/ACD agent position becomes idle state, this function is provided.)*

2) Index 187:Assign 00 Hex always.

STEP 2:	Route Data Assignment	COMMAND NAME
		ARTD

☐ Assign the following three routes for this feature:

- Speech Path Route (Traffic Route)
- Signaling Route
- Dummy Route (Flag Route).

Assign each route data in accordance with the table shown below. Note that data assignment in this table is a typical example.

ROUTE	CDN												
	2	**4**	**5**	**6**	**7**	**8**	**13**	**15**	**28**	**30**	**43**	**49**	**50**
Speech	2	2	3	4	1	2	0	12	1	0	1	0/1	1
Signaling	2	2	0	4	1	0	0	13	0	7	0	0	0
Dummy	0	0	0	4	1	0	1	0	0	0	0	0	0

The other data than above should be set "0" (default data).

STEP 3:	Numbering Plan Data	COMMAND NAME
		ANPD & ASPA

☐ Assign Numbering Plan Data referring to the following example using the ANPD command.

TN: 1 1st DC: 8 CI: N/H NND: 3 BLF 0

☐ Assign Special Access Code, using the ASPA command referring to the following example. Note that "LCR" must be selected in the ASPA command to activate CCIS features.

(for accessing Node B)

TN: 1	ACC: 820	CI: N/H	SRV: LCR
RT: 31	2nd DT: 0	AH: 0	SUB: 0

(for accessing Node C)

TN: 1	ACC: 830	CI: N/H	SRV: LCR
RT: 31	2nd DT: 0	AH: 0	SUB: 0

Note: *In this example, RT31 is dummy route.*

☐ Assign Reverse Numbering Plan Data using ARNP command. This assignment is required for speech path route only (not for a signalling route number and a dummy route number). In the Open Numbering Network, office code of the Self-node (including ACC for the originating call) must be assigned to RT0. The number of digits for office code must be identical in the network. This data is used for originating office code display on SMDR, D^{term}, DESK CONSOLE/ATT and so on.

☐ In addition to these commands, other commands related to "LCR" such as AFRS, AUNE, AOPR and AMND are required. For more detailed information on the LCR feature, see the "Feature Programming Manual".

STEP 4:	Restriction Data	COMMAND NAME
		ARSC & ARRC

☐ Assign route restriction data as to the already assigned route as required.

STEP 5:	Assignment of Trunk Data	COMMAND NAME
		ATRK & MBTK

☐ Assign trunk(s) to desired LENs using the ATRK command. In this instance, the MBTK command is not required for the signaling trunk.

Note: *See 2.1 "Port Allocation and Related Command".*

STEP 6:	Assignment of DPC	COMMAND NAME
		ADPC

☐ Assign the associated PC on an RT (for speech path) number basis. In the case of the example illustrated in Figure 6-1, appropriate data is as follows.

RT	PC
11	20
12	30

STEP 7:	Assignment of Common Channel Signaling Controller (CSC)	COMMAND NAME
		ACSC

☐ Assign the location of the CCH using the ACSC command. The following is sample data assignment. In this sample, Node A is equipped with three DTI cards. Note that if the system employs one CCIS link, enter the same data in CSCG130 and CSCG131.

CSCG	MG	U	G	CICG	
130 (Basic/ Primary Route)	AA	A	AA	0	← CCH 0
	BB	B	BB	1	
	BB	B	BB	2	
	BB	B	BB	3	
	BB	B	BB	4	← CCH 1
	BB	B	BB	5	
	BB	B	BB	6	
	BB	B	BB	7	

CSCG	MG	U	G	CICG	
131 (Alternate Route)	CC	C	CC	0	
	CC	C	CC	1	
	CC	C	CC	2	
	CC	C	CC	3	← CCH 2
	CC	C	CC	4	
	CC	C	CC	5	
	CC	C	CC	6	
	CC	C	CC	7	

Note 1: *In the case of actual data entry, enter corresponding LEN numbers instead of letters such as "AAAAA".*
Note 2: *Refer to 2.1 "Port Allocation and Related Command".*

STEP 8:	Assignment of Circuit Identification Code1	COMMAND NAME
		ACIC1

☐ Assign the CSCG for Basic/Primary Route. The odd numbered CSCG for Alternate Route assignment.

PC	CSCG
20	130

STEP 9:	Assignment of Circuit Identification Code2	COMMAND NAME
		ACIC2

☐ Assign Circuit Identification Codes (CICs), which correspond to "trunk" number. Although trunk number and the CIC number may not be identical, the same CIC number must be given to one speech line between two nodes as illustrated in Figure 6-2.

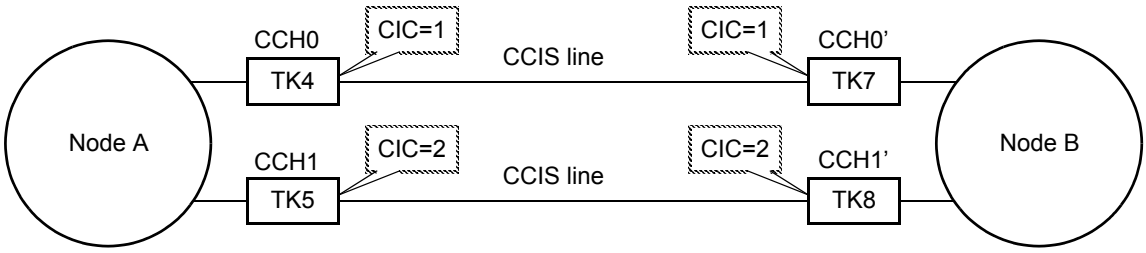
PC	CIC	LEN					
20	1	X	X	X	X	X	X
	2	X	X	X	X	X	X
	N	X	X	X	X	X	X

Relationship between CICG and CIC

CICG	CIC (1 ~ 999)					
0		8	16	24	–	992
1	1	9	17	25	–	993
2	2	10	18	26	–	994
3	3	11	19	27	–	995
4	4	12	20	28	–	996
5	5	13	21	29	–	997
6	6	14	22	30	–	998
7	7	15	23	31	–	999

Figure 6-2 CIC Number Assignment

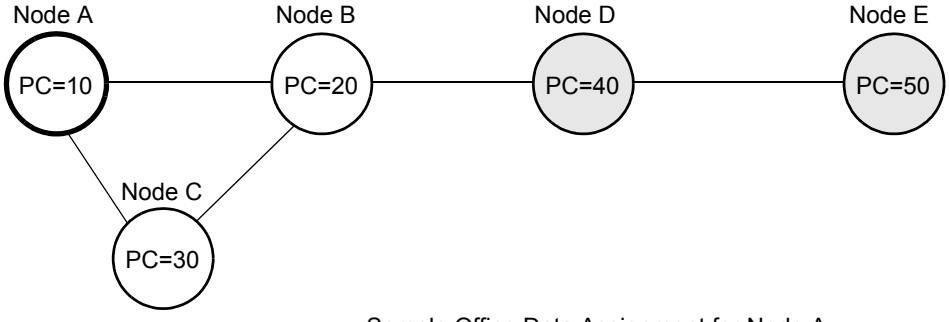
The CIC number must be identical between two nodes as shown below.



☐ When your network includes a tandem connection, be sure to assign PCs of the all nodes in the network. As Figure 6-3 "Example of a CCIS Network (Tandem)" shows, assign PCs 40 and 50 in addition to that of Node B (PC=20), which is directly connected to Node A.

Figure 6-3 Example of a CCIS Network (Tandem)

A sample office data assignment sheet for Node A is as follows.



Sample Office Data Assignment for Node A

ACIC/ACIC2 command →

PC	CSCG	CIC	LEN
20	130	1	xxxxxx
(for Node B)		2	xxxxxx
		≀	≀
		N	xxxxxx
40	130	1	–
(for Node D)		2	–
		≀	≀
		N	–
50	130	1	–
(for Node E)		2	–

Note

Note: *Press the "SPACE" bar to skip LEN and press the "RETURN" key.*

2.3 FCCS Data Assignment Procedure

This section explains the basic data assignment to be required when CCIS services are activated in an FCCS Network. Feature and Specifications Manual shows the CCIS services allowed in an FCCS Network. See "FCCS Network System Manual" and "Office Data Specification Manual" for details.

Note: *This data setting is necessary for the following services since they may be provided to FCCS system.*
- *CENTRALIZED MAINTENANCE-CCIS [C-167]*
- *NUMBER PORTABILITY-CCIS [N-46]*

For details of this feature, see "Feature Programming Manual".

When the above features are used, there are conditions of FCCS data assignment as described below.

1. When connecting the stand-alone PBX, non-FCCS system, with another FCCS Group (FUG) or NEAX2000IPS,
   (a) The system must be the NCN.
   (b) The system is programmed as the FCCS Network configured by one NCN only.
   (c) Use the NDM of the system to program the network data.
2. When connecting the NEAX2400IPX system and the NEAX2000IPS system, CIC (Circuit Identification Code) =1 should always be assigned using ACIC2 command.
3. Common Channel Handler (CCH) location of the Common Channel Signaling Controller Group (CSCG) data (CCH location per CSCG) must be programmed against each PC of the connected IPX or IPS system using ACSCL command.
4. PCs (Point Codes) in the network through FUGs and IPS are programmed as unique (All PCs used in the network are different).
   For the system to be connected with the next system via CCIS link or the large sized network, this assignment is basically recommended.
5. The CCH to be used is selected as follows.
   ① when the call is processed using the speech line (Bch), the outgoing/incoming route (Logical Route: LRT) decides CCH.
   LRT → PC → CSCG → CCH
   ② when the call is processed without speech line (Bch) - inter-office service such as CALL BACK, MESSAGE WAITING service, MCI, etc., the called party's number or PC of the destination decides CCH.
   (a) the called party's number → LRT → PC → CSCG → CCH
   (b) PC → CSCG → CCH
   ③ when logging into IPS or IPX in the remote FUG from the Centralized-MAT, PC of the node to be logged in decides CCH.
   (a) IPS
   PC → CSCG → CCH
   (b) IPX in Remote FUG
   FUG + FPC → PC → CSCG → CCH
   *FUG and FPC to be designated for logged-in node are converted automatically within the system.

Note that the data to be required varies depending on the node.

(a) Node providing CCIS trunk

See the basic data assignment procedure in the previous section

STEP 1: **ASYD** - Assign the unique PC for the self-node (OPC).
STEP 2: **ARTD** - Assign the CCIS route data.
STEP 3: **ATRK** - Assign the CCIS trunk data.
STEP 4: **MBTC** - Assign IDLE status of trunks by designating Route Number and Trunk Number.
STEP 5: **ADPC** - Assign the destination PC (Point Code) on RT (for speech path) number basis for all the nodes in the network.
STEP 6: **ACSC** - Assign the location of the CCH in CSCG (Common Channel Signaling Controller Group).
STEP 7: **ACIC1** - Assign CSCG for Basic/Primary Route. The odd numbered CSCG for Alternate Route assignment.
STEP 8: **ACIC2** - Assign CICs (Circuit Identification Codes) corresponding to trunk number. Although trunk number and the CIC may not be identical, the same CIC must be given to one speech line between two nodes. Be sure to assign PCs of all nodes in the network corresponding to ADPC/ACIC1 command.

Note 1: *When connecting the NEAX2400IPX system and the NEAX2000IPS system, CIC (Circuit Identification Code) =1 should always be assigned using ACIC2 command.*

STEP 9: **ARNPL** - Assign the access code for LCR/LCRS as assigned in ASPAN associated with the logical routes for each external trunk assigned in ARTD/ ARTDN command.
STEP 10: **AMND** - Assign the number of necessary digits to be received by the Register (ORT/IRT) circuit.

Note 2: *The MND is the total number of ACC + Telephone Number.*

(b) Node using the CCIS trunk in the remote node via FCCS line

STEP 1: **ASYD** - Assign the unique PC of self-node (OPC).
STEP 2: **ADPCL** - Assign the destination Point Code (PC) on LGRT (for speech path) number basis for all the nodes in the network.
STEP 3: **ACSCL** - Assign the location of the CCH and FPC of the node which accommodates CCIS trunk in CSCG (Common Channel Signaling Controller Group) for all nodes in the network.

Note 1: *CSCG no. assigned in ACSC is not available.*

STEP 4: **ACIC1** - Assign the CSCG for Basic/Primary Route. The odd numbered CSCG for Alternate Route assignment.
STEP 5: **ARNPL** - Assign the access code for LCR/LCRS as assigned in ASPAN associated with the logical routes for each external trunk assigned in ARTD/ ARTDN command.
STEP 6: **AMND** - Assign the number of necessary digits to be received by the Register (ORT/IRT) circuit.

Note 2: *The MND is the total number of ACC + Telephone Number.*

(c) NCN (Network Controlling Node)

STEP 1: **ALRTN** - Assign the Logical Route Numbers to all external trunks used in the network. Assign unique Logical Route Numbers to the whole routes for external trunks on the network (including COT, DAT, dummy route, etc.) using this command. When the network accommodating multiple FCCS Networks (FUGs) and/or NEAX7400ICS M100IMX is established, the data must be set at the NCN in each FUG and is to be set for every external route in all the nodes.

STEP 2: **ARSCN** - Assign route restriction information according to the Route Restriction Class (RSC) of the Logical Route Number in the network.

STEP 3: **ANPDN** - Assign the minimum number of digits needed to determine the service (Telephone Number) which is required to the first digit received (pre-translation).

STEP 4: **ASPAN** - Assign the special access code. Assign Abbreviated Digit Code (ADC) for connected FUGs using AEADN command.

STEP 5: **AFRSN** - Assign the NPC (Number Pattern Code) and OPR (Outgoing Route Selection Number) for dummy route number.

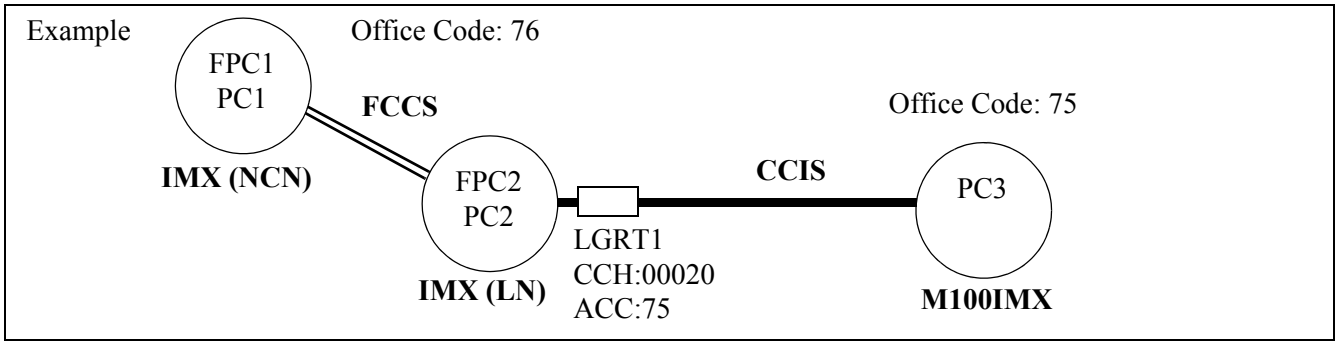
STEP 6: **AOPRN** - Assign the routes and in what order these routes will be selected corresponding to the data assigned by AFRSN command.

STEP 7: **ARNPL** - Assign the access code for LCR/LCRS as assigned in ASPAN associated with the logical routes for each external trunk assigned in ARTD/ ARTDN command.

STEP 8: **AMND** - Assign the number of necessary digits to be received by the Register (ORT/IRT) circuit.

Note 2: *The MND is the total number of ACC + Telephone Number.*

Data Assignment of Network through FCCS Groups and NEAX7400ICS M100IMX
When CCH in the remote node is used via CCIS line, the data assignment shown below is required for inter-office service.



In the example figure, FPC1(PC1) must be set the following data for inter-office service activated between FPC1(PC1) and PC3 (provided that CCIS data assignment is already programmed at FPC2(PC2) and PC3).

STEP 1: **ADPCL** - Assign PC for each speech path (Logical Route).
Example: LGRT=1, PC3

STEP 2: **ACSCL** - Assign the location of CCH in CSCG (Common Channel Signaling Controller Group) and FPC node where accommodates CCH.

- Basic/Primary Route

CSCG (2-254: even number)	GROUP (CIC Group No.)	FPC	COMMON CHANNEL SIGNALING CONTROLLER LENS (CCH)		
			MG	U	G
2	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

- Alternate Route

CSCG (2-254: odd number)	GROUP (CIC Group No.)	FPC	COMMON CHANNEL SIGNALING CONTROLLER LENS (CCH)		
			MG	U	G
3	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 3: **ACIC1** - Allocate CSCG no. against the remote node in the network.
Assign the point code assigned in ADPCL in PC parameter and CSCG no. (even number) for basic route assigned in ACSCL to CSCG parameter.
*CSCG no. for alternate route assignment is not necessary.
Example: PC=3, CSCG=2

STEP 4: **ARNPL** - Assign the access code for speech route (Logical Route)
*The assignment for signal route and dummy route is not necessary.
Example: LGRT=1, ACC=75

STEP 5: **ARNP** -Assign the self-office code to RT0 in the open numbering network.
This number is used for Calling number identification on SMDR, D^{term}, DESK CONSOLE, ATTENDANT CONSOLE, and inter-office services.
Example: RT=0, ACC=76

CHAPTER 7 CCIS SERVICE FEATURES

1. GENERAL

Table 7-1 shows the list of CCIS service features. As for details of service features which are shown in Table 7-1, refer to "Feature Programming Manual" that explains each service feature by the following items.

- General Description
- Operating Procedure
- Service Conditions
- Interactions
- Programming

(1) General Description

(2) Operating Procedure

This item explains the procedure to be followed for receiving a specific service feature concerned. When testing a service feature, perform installation test work steps by referring to this item.

(3) Service Conditions

This item explains the functional outline of a specific service feature concerned and the matter of caution (hardware requirements, etc.) related to performance of that service feature. It is recommended that these items be referred to for more extensive knowledge of the service feature concerned.

(4) Interactions

This item explains the service conditions or hardware requirements when using together with other service features.

(5) Programming

This item explains the procedure of assigning various kinds of data required for performance of a specific service feature concerned. When recording necessary data into Data Programming Sheets provided in the "Office Data Specifications", make data entry by referring to this item.

Table 7-1 List of Service Features for CCIS (1/2)

SERVICE CODE No.	SERVICE FUNCTION NAME	REMARKS
A-45	Attendant Camp-On with Tone Indication - CCIS	
A-46	Attendant Controlled Conference - CCIS	
A-71	Automatic Recall - CCIS	
A-87	Automatic Number Identification (ANI) - CCIS	**Note**
A-126	ANI - CCIS (16 digit)	**Note**
B-9	Busy Verification - CCIS	
B-10	Brokerage Hotline - CCIS	
C-44	Call Back - CCIS	
C-45	Call Forwarding - All Calls - CCIS	
C-46	Call Forwarding - Busy Line - CCIS	
C-47	Call Forwarding - Don't Answer - CCIS	
C-48	Call Forwarding - Intercept - CCIS	
C-49	Call Forwarding - Override - CCIS	
C-50	Call Transfer - All Calls - CCIS	
C-51	Called Station Status Display - CCIS	
C-52	Calling/Called Number Display - CCIS	
C-53	Call Processing Indication - CCIS	
C-54	Call Transfer - Attendant - CCIS	
C-55	Centralized Billing - CCIS	
C-56	Centralized Day/Night Mode Change - CCIS	
C-57	Centralized System Management Report - CCIS	
C-58	Consultation Hold - All Calls - CCIS	
C-94	Call Forwarding Assignment - Attendant - CCIS	
C-163	CCIS Networking via IP	
C-167	Centralized Maintenance - CCIS	
D-70	Deluxe Traveling Class Mark - CCIS	
D-71	Dial Access to Attendant - CCIS	
D-72	Digital Display - Station - CCIS	
D-73	Digital Display - Trunk - CCIS	
D-74	Direct-In - Termination - CCIS	
D-75	Distinctive Ringing - CCIS	
D-76D	Do not Disturb - D^{term} - CCIS	
D-91	Dialed Number Display - Recall - CCIS	**Note**
D-93D	Dual Hold D^{term} - CCIS	
E-8	Executive Right-of-Way - CCIS	
E-9	Elapsed Time Dispaly - CCIS	
E-20	E911 - ANI Unified Number of Digits - CCIS	**Note**
F-12	Flexible Numbering of Stations - CCIS	
H-10D	Hands-Free Answerback - D^{term} - CCIS	
H-11	House Phone - CCIS	
H-12	Hotline - CCIS	

Note: *This feature is available in North America only.*

Table 7-1 List of Service Features for CCIS (2/2)

SERVICE CODE No.	SERVICE FUNCTION NAME	REMARKS
I-16	Incoming Call Identification - CCIS	
I-17	Individual Attendant Access - CCIS	
I-18	Inter-Position Transfer - CCIS	
I-19	Individual Trunk Access - CCIS	
L-25	Look Ahead Routing - CCIS	**Note 1**
L-29	LDN Night Connection - CCIS	
M-34	Message Reminder - CCIS	
M-34D	Message Reminder -D^{term} - CCIS	
M-35	Message Waiting Lamp Setting - Attendant - CCIS	
M-36	Message Waiting Lamp Setting - Station - CCIS	
M-37	Miscellaneous Trunk Access - CCIS	
M-38	Miscellaneous Trunk Restriction - CCIS	
M-40	Multiple Call Forwarding - All Calls - CCIS	
M-41	Multiple Call Forwarding - Busy Line - CCIS	
M-42	Multiple Call Forwarding - Don’t Answer - CCIS	
M-43	Multiple Console Operation - CCIS	
M-67	Message Center Interface - CCIS	
N-15	Night Connection - Fixed - CCIS	
N-16	Night Connection - Flexible - CCIS	
N-36	Name Display - OAI - CCIS	**Note 2**
N-37	Name Display - System - CCIS	
N-38	Node Number Suppression - CCIS	**Note 2**
N-46	Number Portability - CCIS	
O-11	Off-Hook Queuing - CCIS	
O-12	Outgoing Trunk Queuing - CCIS	
P-28	Paging Access - CCIS	
R-22	Restriction from Outgoing Calls - CCIS	
S-52	Serial Call - CCIS	
S-53D	Service Display - D^{term} - CCIS	
S-55	Single-Digit Station Calling - CCIS	
S-56	Station-Controlled Conference - CCIS	
S-57	Station-to-Station Calling - CCIS	
S-58	Station-to-Station Calling -Operator Assistance - CCIS	
S-59	Step Call - CCIS	
S-73	Supervisory Call - CCIS	
T-26	Toll Restriction - 3/6-digit - CCIS	
T-27	Trunk Answer from Any Station - CCIS	
U-5	Uniform Numbering Plan - CCIS	
V-7	Voice Call - CCIS	

Note 1: *This feature is available in North America only.*
Note 2: *This feature is not available in North America.*

CHAPTER 8 MAINTENANCE PROCEDURE

1. GENERAL

This chapter describes the system messages related to basic CCIS Network (not including messages related to Network through FCCS Groups and NEAX2000IPS, procedures for CCIS Line operating mode control, and procedures for extracting/inserting the circuit cards for CCIS while the system is in service. For other matters, refer to the System Operation and Maintenance Manual.

2. SYSTEM MESSAGES

System messages are displayed during routine diagnosis, system operation status controlling and fault occurrences. This paragraph explains the following items for each system message related to CCIS:

(1) Meaning
(2) Related System Message
(3) Example of Printout
(4) Message Detail Data **Note 1**
(5) Diagnostic Work **Note 2**

For those system messages which are not explained in this chapter, refer to the System Operation and Maintenance Manual.

Note 1: *Paragraph 2.2: "Technical Terms for Explaining Message Detail Data" explains technical terms used in the explanation.*

Note 2: *Paragraph 2.3: "How to Proceed with Diagnostic Work from System Message" explains how to perform diagnosis.*

2.1 The Relationship between System Messages and Lamp Indications

When the system has detected a fault, the corresponding system message is displayed, at the same time, the related lamp on the TOPU.

Table 8-1 shows the relationship between system messages and default lamp indications.

Table 8-1 System Messages and Lamp Indications on TOPU

SYSTEM MESSAGE		LAMP ON THE TOPU			
No.	**NAME**	**MJ**	**MN**	**SUP**	**PWR**
13-A	CCH Clock Failure			×	
13-B	CCH C-Level Infinite Loop (Permanent)			×	
13-C	CCH C-Level Infinite Loop (Temporary)			×	
13-D	CCH Lock Up Failure (Permanent)			×	
13-E	CCH Lock Up Failure (Temporary)			×	
13-F	CCH B-Level Infinite Loop (Permanent)			×	
13-G	CCH B-Level Infinite Loop (Temporary)			×	
13-H	CCS Link Failure (Permanent)			×	
13-I	CCS Link Failure (Temporary)				
13-J	Restoration from CCS Link Failure				
13-K	CCH Reset Interrupt Failure			×	
17-A	CCH MBR Key Turn ON				
17-B	CCH MBR Key Turn OFF				

Note: ×*: Default Lamp Indication.*

2.2 Technical Terms for Explaining Message Detail Data

Some technical terms are used to explain the detail data in each system message and circuit card information. Some technical terms and the circuit card mounting information, which are used in common to explain the various system message, are shown below.

Phase 1 Restart Processing Execution

All the processing being executed is suspended, and the system operations are allowed to restart from the monitor program without any hardware controlling involved. More specifically, the processing on calls being handled by the programs are abandoned, and all the connections already established are maintained.

Phase 3 Restart Processing Execution

By initializing each PM (Line/Trunk circuit card), the following processes are executed:

- Forcibly releasing the calls connected with the initialized Lines/Trunks.
- Releasing the related links.

Data for Analysis by NEC Engineers

These message detail data are used by NEC engineers when analyzing faults, and thus they are not used in ordinary fault repair works.

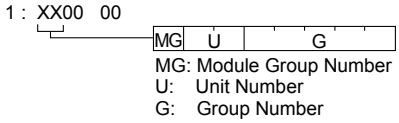
When a fault is complicated one, the data are used when reporting the fault to NEC or when NEC engineers inquire about the fault.

2.2.1 Circuit Card Mounting Information

(1) Circuit Card Mounting Information

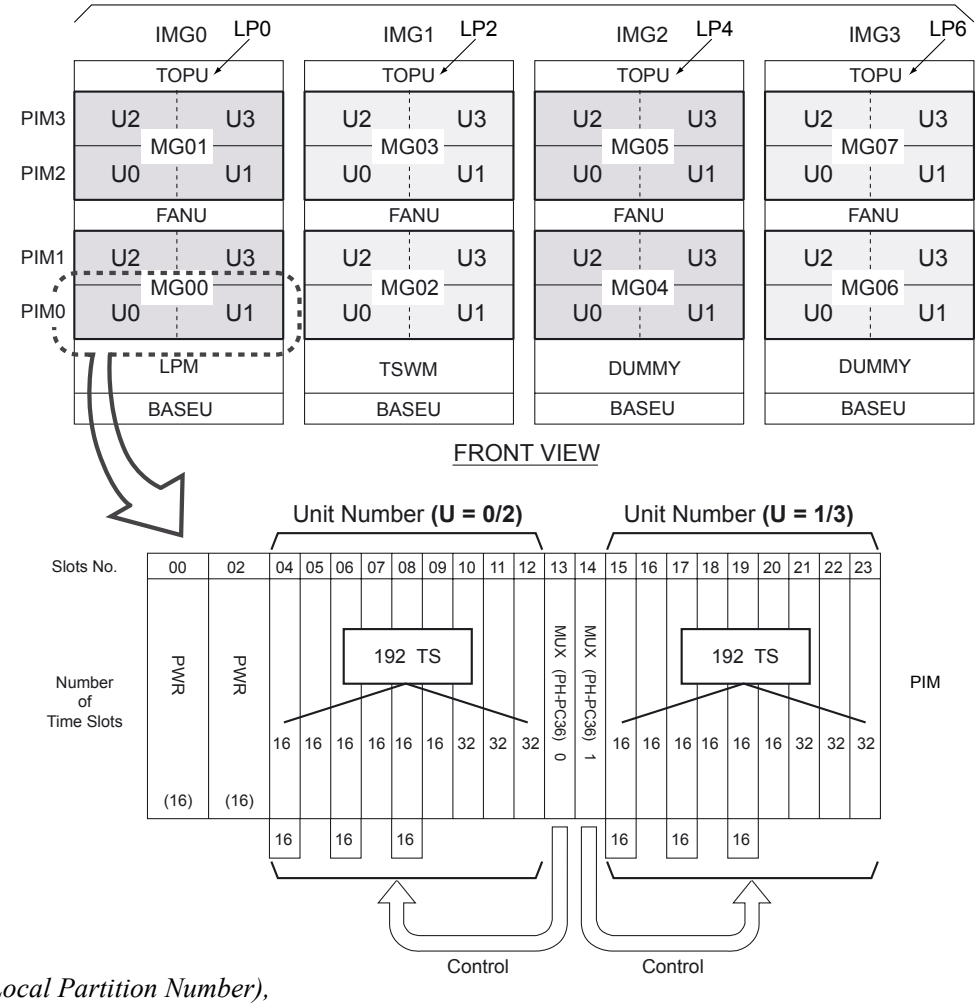
Accommodated location information of each circuit card is described by a hexadecimal number.

Figure 8-1 Circuit Card Mounting Location (1/2)



(a) MG and Unit configuration

1-IMG/4-IMG system



Note: *LP (Local Partition Number),*
MG (Module Group Number)
U (Unit Number)

Figure 8-1 Circuit Card Mounting Location (2/2)

(b) Group Configuration

PIM

					LINE/TRUNK										LINE/TRUNK								
SLOT No.	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
GROUP No.					01	03	05	07	09	11	15	19	23			01	03	05	07	09	11	15	19	23
											14	18	22									14	18	22
					00	02	04	06	08	10	13	17	21			00	02	04	06	08	10	13	17	21
											12	16	20									12	16	20
					UNIT = 0, 2											UNIT = 1, 3								

2.3 How to Proceed with Diagnostic Work from System Message

The diagnostic procedure after seeing a system message is illustrated in Figure 8-2. Judge whether the fault status coincides with the indicated status, following the sequence beginning with START.

STEP 1: Judge whether the fault coincides with the fault status (1).

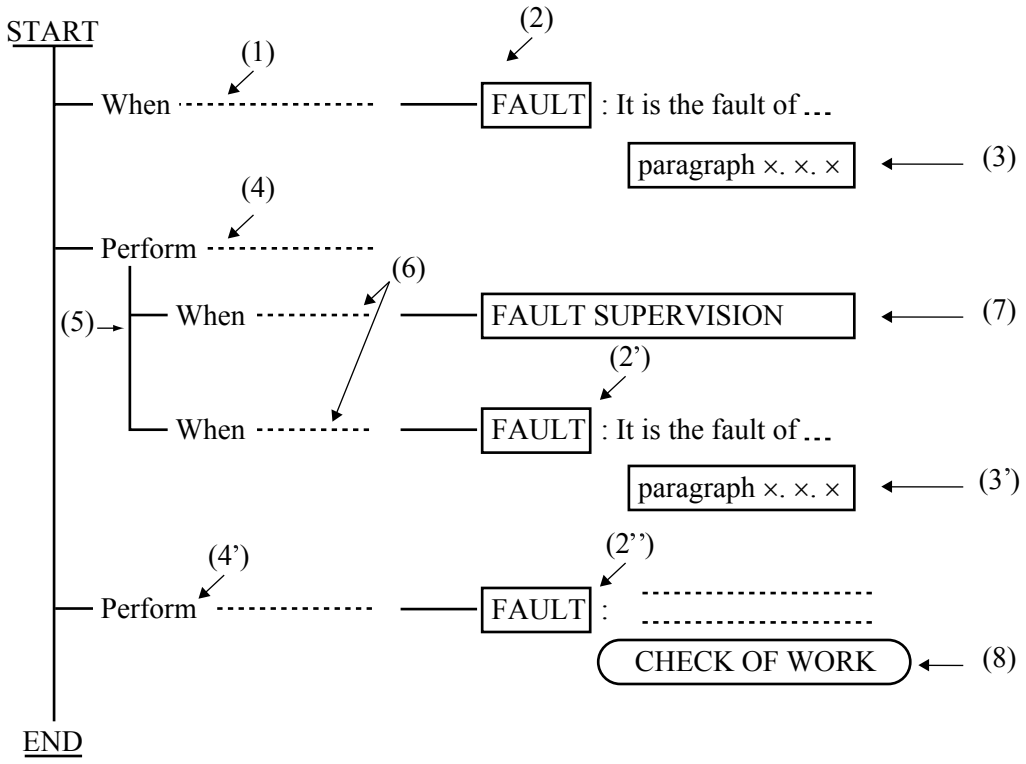
STEP 2: If the fault status does coincide, the fault is indicated by (2). Repair the fault according to paragraph ×. ×. × as shown by (3). Otherwise, proceed to (4).

STEP 3: Perform the work indicated by (4).
The result of the work (4) is broken down as indicated by (5).

STEP 4: Make a judgment as to whether the result of work (4) coincides with the status indicated by (6).
If so, the fault is indicated either by (7) or by (2'). If not, proceed to the next step.

STEP 5: Perform the work indicated by (4'), and if the result of the work is the same as the status indicated, the fault is indicated by (2'').
If the fault repair work indicated by (2'') affects another normal line, recheck the work as indicated by (8).

Figure 8-2 Example of Diagnostic Work Items and Symbols



Note:
(1): Judgment of faulty status
(2): When the fault status coincides with the indication, the cause for the fault is indicated.
(3): Operating items for diagnosis
(4): When the operating method is unknown, refer to the Operations and Maintenance Manual.
(5): Branching as the result of the operation (4)
(6): Judgment of the status as the result of the operation
(7): If, as a result of a fault diagnosis, the faulty condition cannot be reproduced and is judged to be temporary, this information is displayed.
In this case, clear the indicated alarm and the system message using the RALM command and place the system under supervision to see if the same fault recurs.
(8): While a fault repair is in progress, perform various operations such as system changeover, initialization, etc. When such operations are performed, they affect the normally operating station lines, attendant consoles, trunks, etc. in the form of momentary disconnection, speech interruption, forced release of calls in progress, etc.
By comparing the urgency of the required fault repair with the above-mentioned effects on the lines, trunks, etc., determine the proper timing for performing the necessary recovery work.

2.4 System Messages

"13-A": CCH Clock Failure

(1) Meaning

The system message "13-A" indicates that, a clock down failure has occurred to the CCH circuit. When this system message is indicated, the related CCH/CCT circuit card is placed into make-busy state.

(2) Related System Message

None

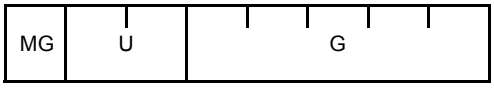
(3) Example of Printout

```
SYSTEM MESSAGE 13-A [SUP]          CCH CLOCK FAILURE

 NEC TOKYO                         MAY 14 10:30

 LP00-0-ACT

1: 0100 0000 0000 0000   2: 0000 0000 0000 0000   3: 0000 0000 0000 0000
4: 0000 0000 0000 0000   5: 0000 0000 0000 0000   6: 0000 0000 0000 0000
7: 0000 0000 0000 0000   8: 0000 0000 0000 0000   9: 0000 0000 0000 0000
```

(4) Message Detail Data

1: XX 00
*a

*a: Accommodated location of the CCH detected the failure.
(Refer to paragraph 2.2.1)



MG: Module Group
U: Unit
G: Group

(5) Diagnostic Work
Refer to Paragraphs 3.3 or 3.4.

"13-B": CCH C-Level Infinite Loop Failure. (Permanent)

(1) Meaning

The system message "13-B" indicates that C-level infinite loop (**Note**) of the PM (Port Microprocessor) within the CCH/CCT circuit card has occurred more than 15 times within an hour. When this fault has occurred, the specific PM is placed into make-busy state and restarted. (The fault counter is "0" at the beginning of every one hour.)

Note: *This is a state in which the C-Level Monitor Program (the program which detects off-hook/on-hook related to lines/trunks) repeats a specific routine. The number of times to be repeated is counted by the error-counter corresponding to the CPU.*

(2) Related System Message

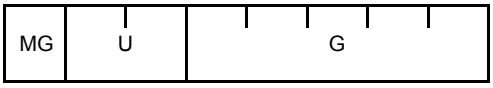
When the C-level infinite loop failure occurs less than 16 times, the Phase 1 restart or Phase 3 restart is executed at the specific PM of CCH/CCT card and the system message "13-C" is output.

(3) Example of Printout

```
SYSTEM MESSAGE 13-B [SUP]        CCH C-LEVEL INFINITE LOOP FAILURE (PERMANENT)

 NEC TOKYO                       MAY 14 10:30

 LP00-0-ACT

1: XX00  0000 0000 0000    2: 0000 0000 0000 0000    3: 0000 0000 0000 0000
   (a)
4: 0000 0000 0000 0000     5: 0000 0000 0000 0000    6: 0000 0000 0000 0000
7: 0000 0000 0000 0000     8: 0000 0000 0000 0000    9: 0000 0000 0000 0000
```

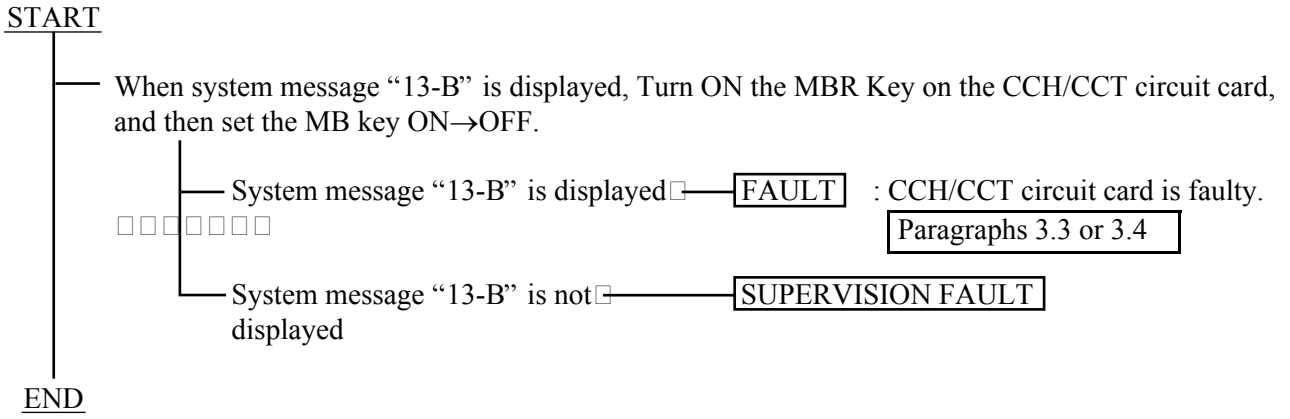
(4) Message Detail Data

(a) Accommodated location of the CCH detected the failure.
(Refer to paragraph 2.2.1)



MG: Module Group
U: Unit
G: Group

(5) Diagnostic Work



"13-C": CCH C-Level Infinite Loop Failure (Temporary)

(1) Meaning

The system message "13-C" indicates that C-level infinite loop for PM (Port Microprocessor) within a CCH/CCT circuit card has occurred less than 16 times within an hour. When the number of the fault occurrence time is less than 8, the Phase 1 restart is executed.

If the number of fault occurrence time is 8 to 16, the Phase 3 restart is executed.

(2) Related System Message

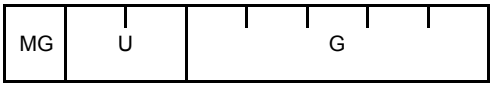
When the C-level infinite loop failure occurs more than 15 times, the specific PM of CCH/CCT is placed into make-busy state and the system message "13-B" is output.

(3) Example of Printout

```
SYSTEM MESSAGE 13-C [SUP]        CCH C-LEVEL INFINITE LOOP FAILURE (TEMPORARY)

 NEC TOKYO                       MAY 14 10:30

 LP00-0-ACT

1: XX00  0000 0000 0000    2: 0000 0000 0000 0000    3: 0000 0000 0000 0000
   (a)
4: 0000 0000 0000 0000     5: 0000 0000 0000 0000    6: 0000 0000 0000 0000
7: 0000 0000 0000 0000     8: 0000 0000 0000 0000    9: 0000 0000 0000 0000
```

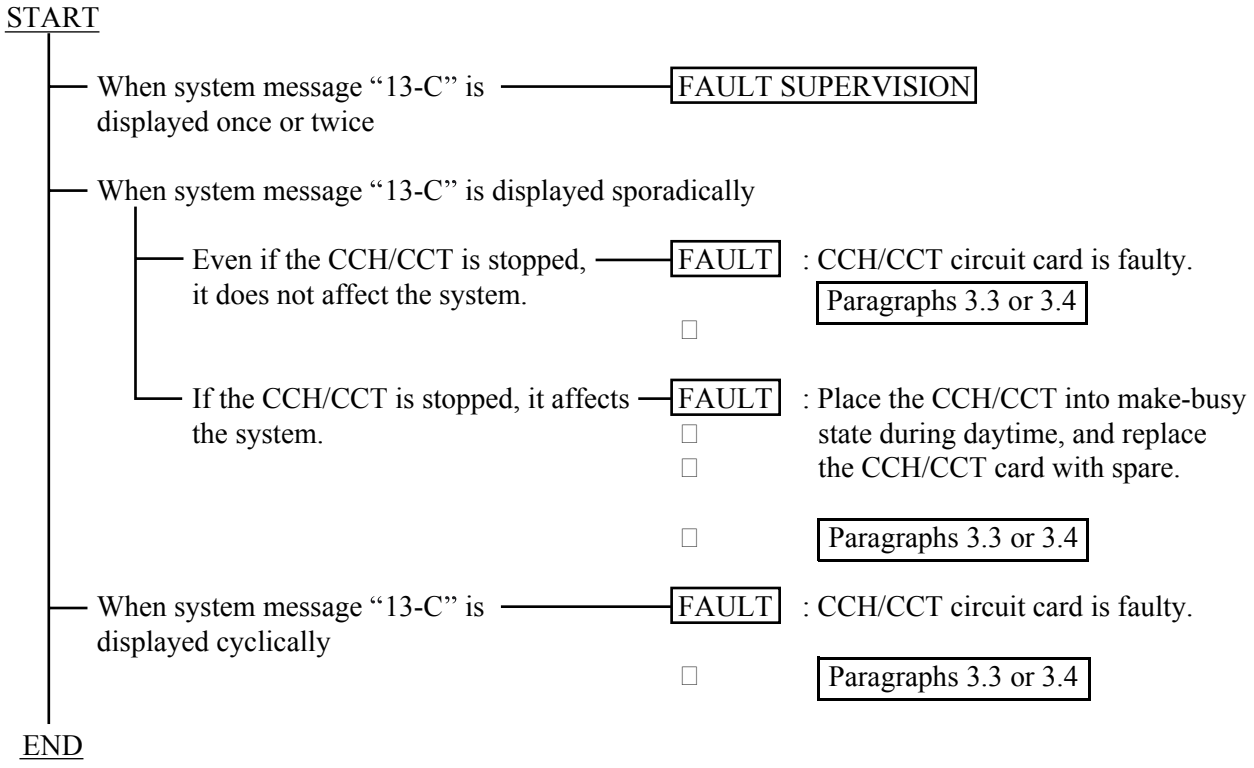
(4) Message Detail Data

(a) Accommodated location of the CCH detected the fault.
(Refer to paragraph 2.2.1)



MG: Module Group
U: Unit
G: Group

(5) Diagnostic Work



"13-D": CCH Lock Up Failure (Permanent)

(1) Meaning

The system message "13-D" indicates that a PM (Port Microprocessor) of CCH/CCT card did not send CPU card an answer and this has occurred more than 15 times within an hour. When this fault has occurred, the specific PM is placed into make-busy state and restarted.

Note: *The CPU transmits the Routine (cyclic) diagnostic command to all the PM's at a predetermined cycle. Each PM upon receiving the Routine (cyclic) diagnostic command from the CPU, returns an answer to the CPU within a predetermined timing. The CPU checks the normality of the PM upon receiving an answer.*

(2) Related System Message

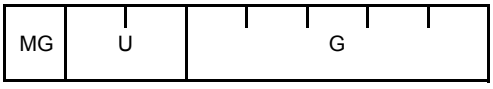
When the PM Lock Up Failure occurs less than 16 times within an hour, the Phase 1 restart or Phase 3 restart is executed at the specific PM and the system message "13-E" is output.

(3) Example of Printout

```
SYSTEM MESSAGE 13-D [SUP]          CCH LOCK UP FAILURE (PERMANENT)

 NEC TOKYO                         MAY 14 10:30

 LP00-0-ACT

1: XX00  0000 0000 0000    2: 0000 0000 0000 0000    3: 0000 0000 0000 0000
   (a)
4: 0000 0000 0000 0000     5: 0000 0000 0000 0000    6: 0000 0000 0000 0000
7: 0000 0000 0000 0000     8: 0000 0000 0000 0000    9: 0000 0000 0000 0000
```

(4) Message Detail Data

(a) Accommodated location of the CCH detected fault.
(Refer to paragraph 2.2.1)



MG: Module Group
U: Unit
G: Group

(5) Diagnostic Work

START

When one CCH/CCT circuit card is faulty, Trun ON the MBR key on the card, and then set the MB key ON→OFF.

When system message "13-D" is not displayed. → FAULT SUPERVISION

When system message "13-D" is displayed. → FAULT : CCH/CCT circuit card is faulty.

Paragraphs 3.3 or 3.4

END

"13-E": CCH Lock Up Failure (Temporary)

(1) Meaning

The system message "13-E" indicates that a PM (Port Microprocessor) of CCH/CCT card did not send CPU an answer and this has occurred less than 16 times within an hour. When the number of fault occurrence time is less than 8, the Phase 1 restart is executed. If the number of the fault occurrence time is 8 to 16, the Phase 3 restart is executed.

Note: *The CPU transmits the Routine (cyclic) diagnostic command to all the PM's at a predetermined cycle. Each PM upon receiving the Routine (cyclic) diagnostic command from the CPU, returns an answer to the CPU within a predetermined timing. The CPU checks the normality of the PM upon receiving an answer.*

(2) Related System Message

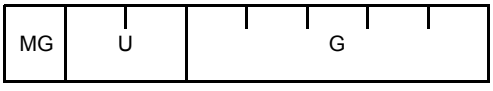
When the PM Lock Up Failure occurs more than 15 times, the specific PM of CCH/CCT card is placed into make-busy state and the system message "13-D" is output.

(3) Example of Printout

```
SYSTEM MESSAGE 13-E [SUP]          CCH LOCK UP FAILURE (TEMPORARY)

 NEC TOKYO                         MAY 14 10:30

 LP00-0-ACT

1: XX00 0000 0000 0000   2: 0000 0000 0000 0000   3: 0000 0000 0000 0000
   (a)
4: 0000 0000 0000 0000   5: 0000 0000 0000 0000   6: 0000 0000 0000 0000
7: 0000 0000 0000 0000   8: 0000 0000 0000 0000   9: 0000 0000 0000 0000
```

(4) Message Detail Data

(a) Accommodated location of the CCH detected the fault.
(Refer to paragraph 2.2.1)



MG: Module Group
U: Unit
G: Group

(5) Diagnostic Work

START

- When lock up fault occurs only once or twice. → FAULT SUPERVISION
- If the lock up fault occurs sporadically; flip the MBR switch of the CCH circuit card to UP → DOWN.
  - When system message "13-E" is displayed → FAULT : CCH/CCT circuit card is faulty.
    → Paragraphs 3.3 or 3.4
  - When system message "13-E" is not displayed → FAULT SUPERVISION
- When the lock up fault occurs cyclically → FAULT : CCH/CCT circuit card is faulty.
  →
  → Paragraphs 3.3 or 3.4

END

"13-F": CCH B-Level Infinite Loop Failure (Permanent)

(1) Meaning

The system message "13-F" indicates that B-level infinite loop (**Note**) of the PM (Port Microprocessor) within the CCH/CCT circuit card has occurred more than 15 times within an hour. When this fault has occurred, the specific PM is placed into make-busy state and restarted. (The fault counter is reset to "0" at every hour.)

Note: *This is such a state in which the C-Level Monitor Program (the program which detects off-hook/on-hook related to lines/trunks) repeats a specific routine. The number of repeated times is counted by the error counter corresponding to the CPU.*

(2) Related System Message

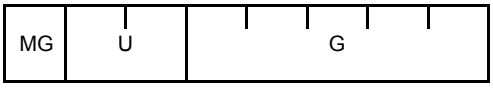
When the B-level infinite loop failure occurs less than 16 times, the Phase 1 restart or Phase 3 restart is executed at the specific PM and the system message "13-G" is output.

(3) Example of Printout

```
SYSTEM MESSAGE 13-F [SUP]          CCH B-LEVEL INFINITE LOOP FAILURE (PERMANENT)

 NEC TOKYO                         MAY 14 10:30

 LP00-0-ACT

1: XX00 0000 0000 0000   2: 0000 0000 0000 0000   3: 0000 0000 0000 0000
   (a)
4: 0000 0000 0000 0000   5: 0000 0000 0000 0000   6: 0000 0000 0000 0000
7: 0000 0000 0000 0000   8: 0000 0000 0000 0000   9: 0000 0000 0000 0000
```

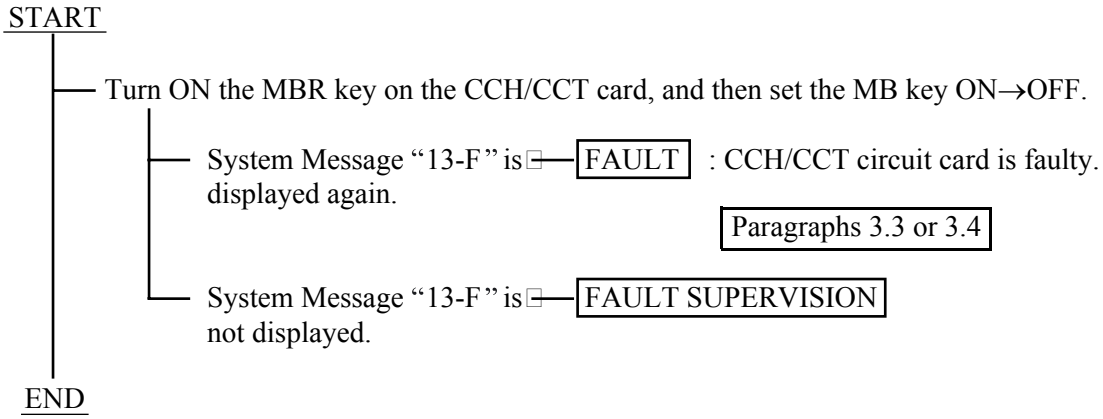
(4) Message Detail Data

(a) Accommodated location of the CCH detected the fault.
(Refer to paragraph 2.2.1)



MG: Module Group
U: Unit
G: Group

(5) Diagnostic Work



"13-G": CCH B-Level Infinite Loop Failure (Temporary)

(1) Meaning

The system message "13-G" indicates that B-level Infinite loop for PM (Port Microprocessor) within a CCH/ CCT circuit card has occurred less than 16 times within an hour.

(2) Related System Message

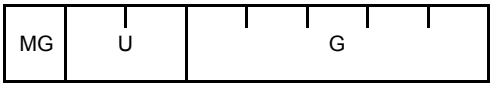
When the B-level infinite loop failure occurs more than 15 times, the specific PM is placed into make-busy state and the system message "13-F" is output.

(3) Example of Printout

```
SYSTEM MESSAGE 13-G [SUP]        CCH B-LEVEL INFINITE LOOP FAILURE (TEMPORARY)

 NEC TOKYO                       MAY 14 10:30

 LP00-0-ACT

1: XX00 0000 0000 0000   2: 0000 0000 0000 0000   3: 0000 0000 0000 0000
   (a)
4: 0000 0000 0000 0000   5: 0000 0000 0000 0000   6: 0000 0000 0000 0000
7: 0000 0000 0000 0000   8: 0000 0000 0000 0000   9: 0000 0000 0000 0000
```

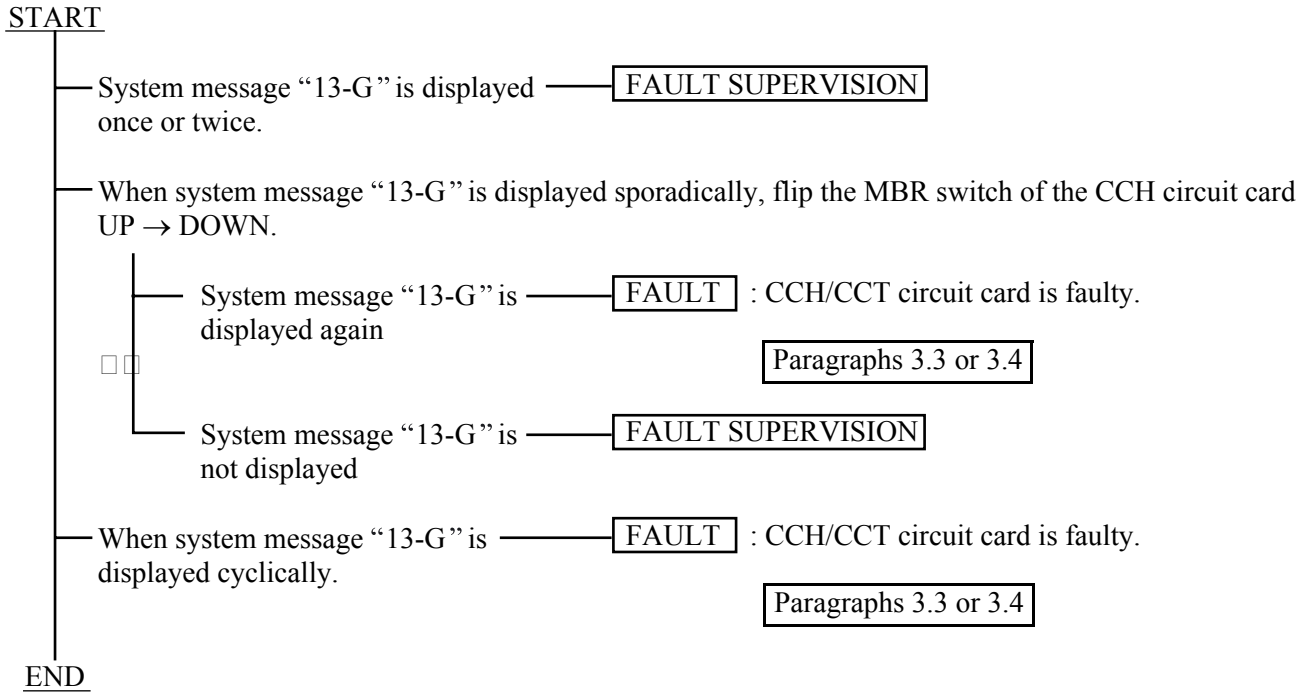
(4) Message Detail Data

(a) Accommodated location of the CCH detected the fault.
(Refer to paragraph 2.2.1)



MG: Module Group
U: Unit
G: Group

(5) Diagnostic Work



"13-H": CCS Link Failure (Permanent)

(1) Meaning

The system message "13-H" indicates that a failure has occurred many times to a common channel signaling link and the link has been placed into make-busy state.

(2) Related System Message

When the failure is a temporary one, the system message "13-I" is output. If the failure of CCIS link restores to normal, "13-J" is output.

Figure 8-3 Digital CCIS Line

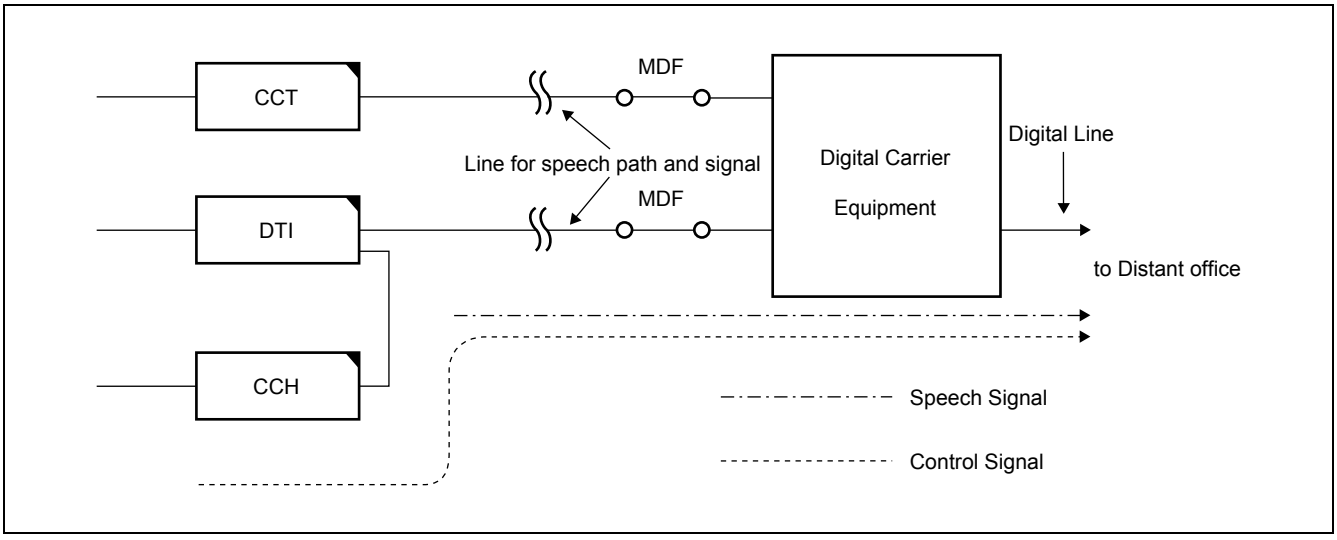
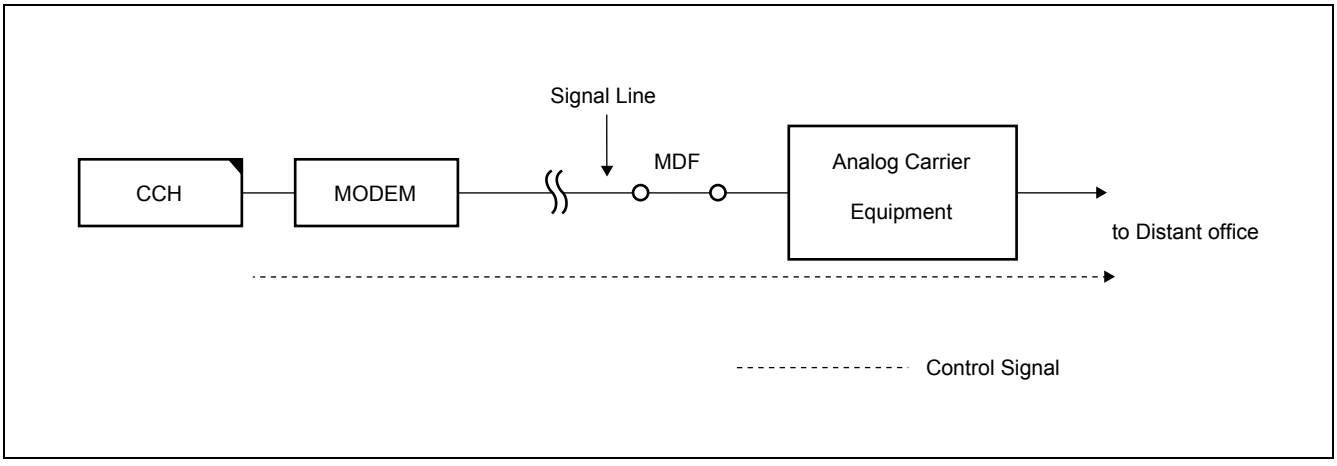


Figure 8-4 Analog CCIS Line

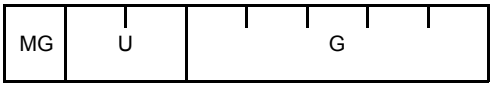


(3) Example of Printout

```
SYSTEM MESSAGE 13-H [SUP]          CCS LINK FAILURE (PERMANENT)

 NEC TOKYO                         MAY 14 10:30

 LP00-0-ACT

1: XX XX XX00 0000 0000   2: 0000 0000 0000 0000   3: 0000 0000 0000 0000
   (a) (b) (c)
4: 0000 0000 0000 0000    5: 0000 0000 0000 0000   6: 0000 0000 0000 0000
7: 0000 0000 0000 0000    8: 0000 0000 0000 0000   9: 0000 0000 0000 0000
```

(4) Message Detail Data

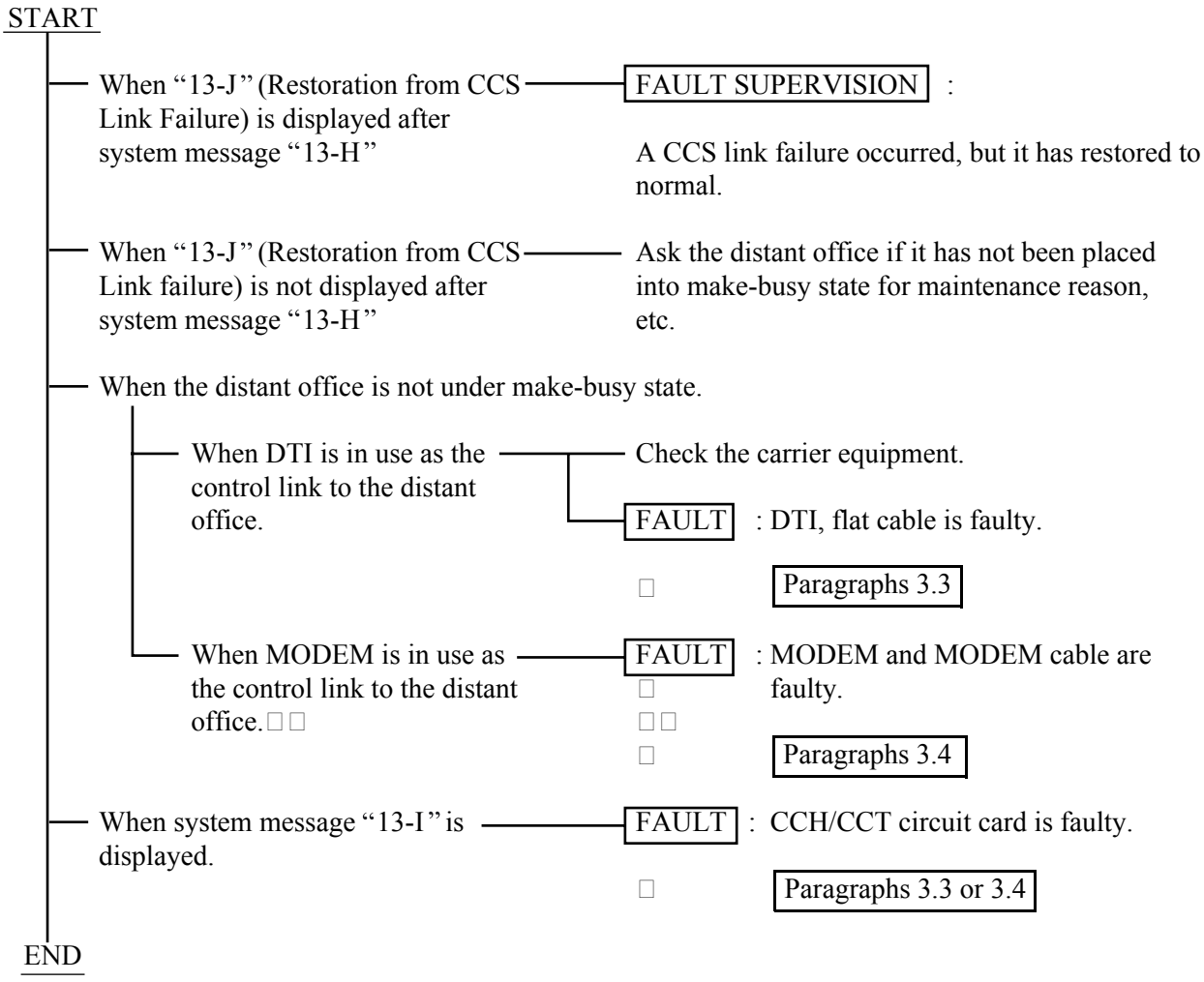
(a) Accommodated location of the CCH detected the failure.
(Refer to paragraph 2.2.1)



MG: Module Group
U: Unit
G: Group

(b),(c) Data for Analysis by NEC Engineers.

(5) Diagnostic Work



"13-I": CCS Link Failure (Temporary)

(1) Meaning

The system message "13-I" indicates that a failure has occurred to a common channel signaling link temporarily.

(2) Related System Message

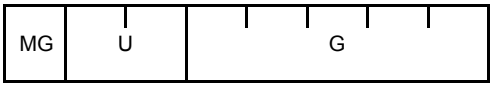
If the fault lasts longer than a predetermined duration, the system message "13-H" is indicated. If the fault of CCIS link restores to normal, "13-J" is indicated.

(3) Example of Printout

```
SYSTEM MESSAGE 13-I [NON]          CCS LINK FAILURE (TEMPORARY)

 NEC TOKYO                         MAY 14 10:30

 LP00-0-ACT

1: XX XX XX00 0000 0000   2: 0000 0000 0000 0000   3: 0000 0000 0000 0000
   (a) (b) (c)
```

(4) Example of Printout

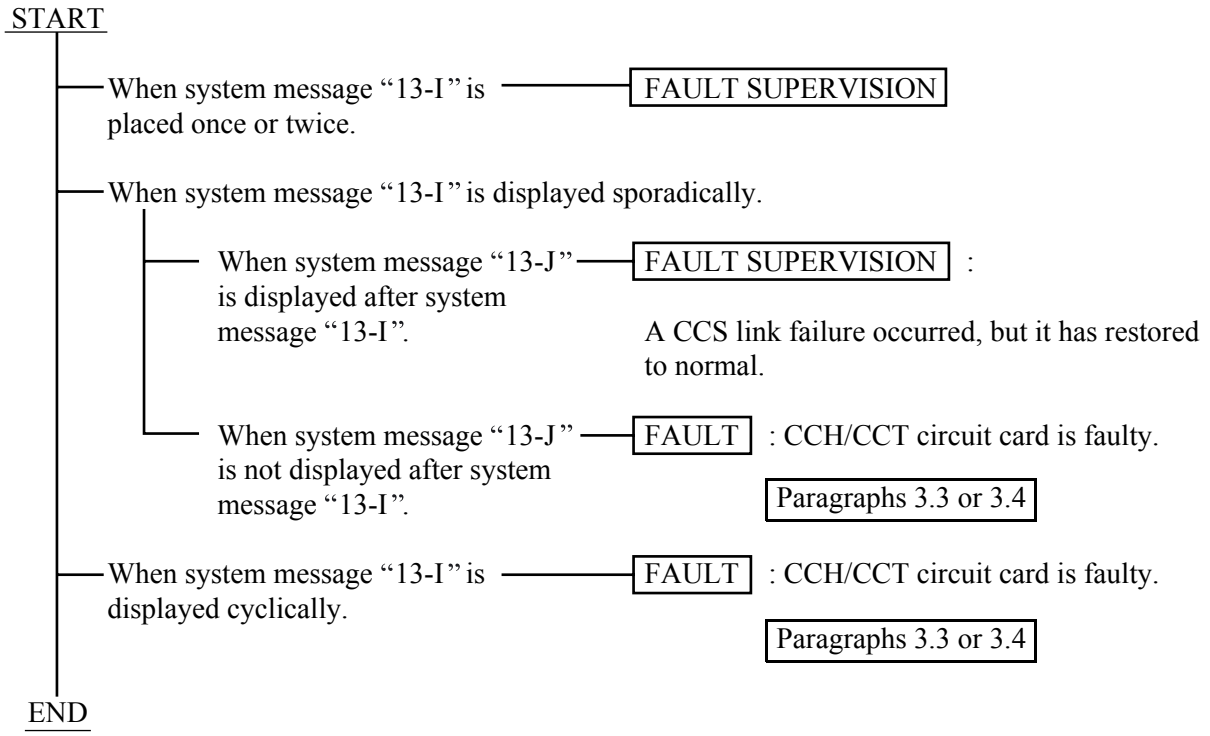
(a) Accommodated location of the CCH detected the fault.
(Refer to paragraph 2.2.1)



MG: Module Group
U: Unit
G: Group

(b),(c) Data for Analysis by NEC Engineers.

(5) Diagnostic Work



"13-J": Restoration from CCS Link Failure

(1) Meaning

The system message "13-J" indicates that the faults pertaining to CCIS Link restores to normal.

(2) Related System Message

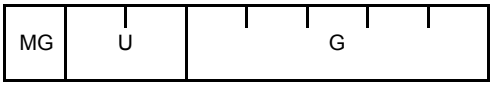
This system message is displayed when a fault indicated by System Message "13-I" or "13-H" has been repaired.

(3) Example of Printout

```
SYSTEM MESSAGE 13-J [NON]          RESTORATION FROM CCS LINK FAILURE

 NEC TOKYO                         MAY 14 10:30

 LP00-0-ACT

1: XX XX 0000 0000 0000   2: 0000 0000 0000 0000   3: 0000 0000 0000 0000
   (a) (b)
4: 0000 0000 0000 0000    5: 0000 0000 0000 0000   6: 0000 0000 0000 0000
7: 0000 0000 0000 0000    8: 0000 0000 0000 0000   9: 0000 0000 0000 0000
```

(4) Example of Printout

(a) Accommodated location of the CCH detected the fault.
(Refer to paragraph 2.2.1)



MG: Module Group
U: Unit
G: Group

(b) Data for Analysis by NEC Engineers.

"13-K": CCH Reset Interrupt Failure

(1) Meaning

The system message "13-K" indicates that a fault occurred to the PM (Port Microprocessor) within the CCH/CCT circuit card and the restart processing is executed.

Note: *This message is also displayed when the CCH/CCT circuit card has been reset.*

(2) Related System Message

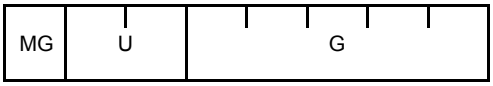
None

(3) Example of Printout

```
SYSTEM MESSAGE 13-K [SUP]          CCH RESET INTERRUPT FAILURE

 NEC TOKYO                         MAY 14 10:30

 LP00-0-ACT

1: XX00 0000 0000 0000   2: 0000 0000 0000 0000   3: 0000 0000 0000 0000
   (a)
4: 0000 0000 0000 0000   5: 0000 0000 0000 0000   6: 0000 0000 0000 0000
7: 0000 0000 0000 0000   8: 0000 0000 0000 0000   9: 0000 0000 0000 0000
```

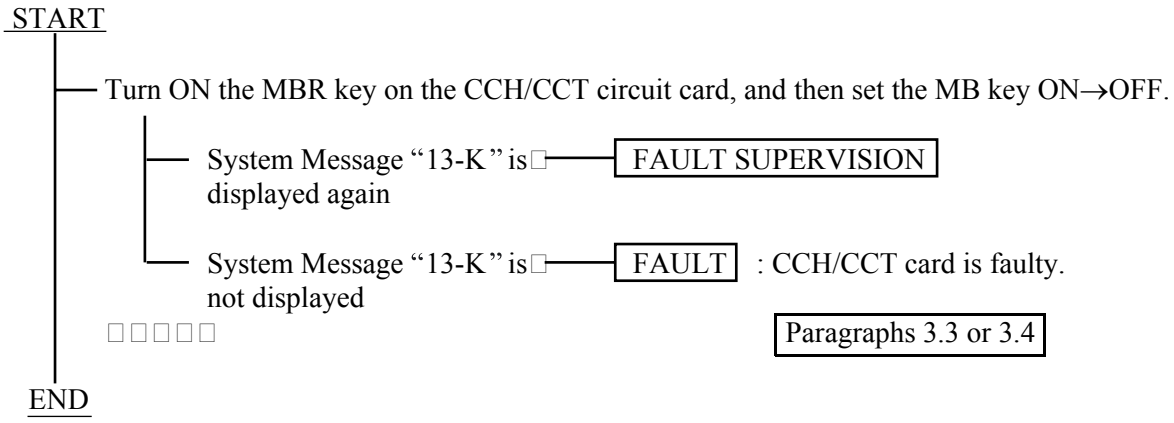
(4) Message Detail Data

(a) Accommodated location of the CCH detected the fault.
(Refer to paragraph 2.2.1)



MG: Module Group
U: Unit
G: Group

(5) Diagnostic Work



7-A": CCH MBR Key Turn ON

(1) Meaning

The system message "17-A" indicates that a MBR (Make Busy Request) switch on the CCH/CCT card has been set Up.

(2) Related System Message

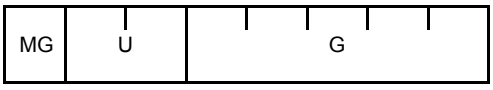
If the position of MBR switch of a CCH/CCT card has changed from Up to Down, the system "17-B" is output.

(3) Example of Printout

```
SYSTEM MESSAGE 17-A [NON]          CCH MBR KEY TURN ON

 NEC TOKYO                         MAY 14 10:30

 LP00-0-ACT

1: XX XX 0000 0000 0000   2: 0000 0000 0000 0000   3: 0000 0000 0000 0000
   (a) (b)
4: 0000 0000 0000 0000    5: 0000 0000 0000 0000   6: 0000 0000 0000 0000
7: 0000 0000 0000 0000    8: 0000 0000 0000 0000   9: 0000 0000 0000 0000
```

(4) Message Detail Data

(a) Accommodated location of the CCH circuit in make busy request.
(Refer to paragraph 2.2.1)



MG: Module Group
U: Unit
G: Group

(b) Data for Analysis by NEC Engineers.

"17-B": CCH MBR Key Turn OFF

(1) Meaning

The system message "17-B" indicates that a MBR switch on the CCH/CCT card has been set Down.

(2) Related System Message

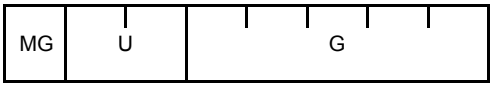
If the position of MBR switch of a CCH/CCT card has changed from Down to Up, the system message "17-A" is output.

(3) Example of Printout

```
SYSTEM MESSAGE 17-B [NON]          CCH MBR KEY TURN OFF

 NEC TOKYO                         MAY 14 10:30

 LP00-0-ACT

1: XXXX 0000 0000 0000   2: 0000 0000 0000 0000   3: 0000 0000 0000 0000
   (a) (b)
4: 0000 0000 0000 0000   5: 0000 0000 0000 0000   6: 0000 0000 0000 0000
7: 0000 0000 0000 0000   8: 0000 0000 0000 0000   9: 0000 0000 0000 0000
```

(4) Message Detail Data

(a) Accommodated location of the CCH circuit detected make busy request cancel.
(Refer to paragraph 2.2.1)



MG: Module Group
U: Unit
G: Group

(b) Data for Analysis by NEC Engineers.

3. CCIS (Common Channel Interoffice Signaling) Line Fault

This paragraph explains the fault repair procedure when any of the faults shown in Table 8-1 occur to a specific CCIS line.

3.1 Check Point

When repairing a CCIS Line fault, consider the following:

(1) Check alarm lamps on the CCH or CCT circuit card

(2) By referring to Figure 8-5, check the cable connection.

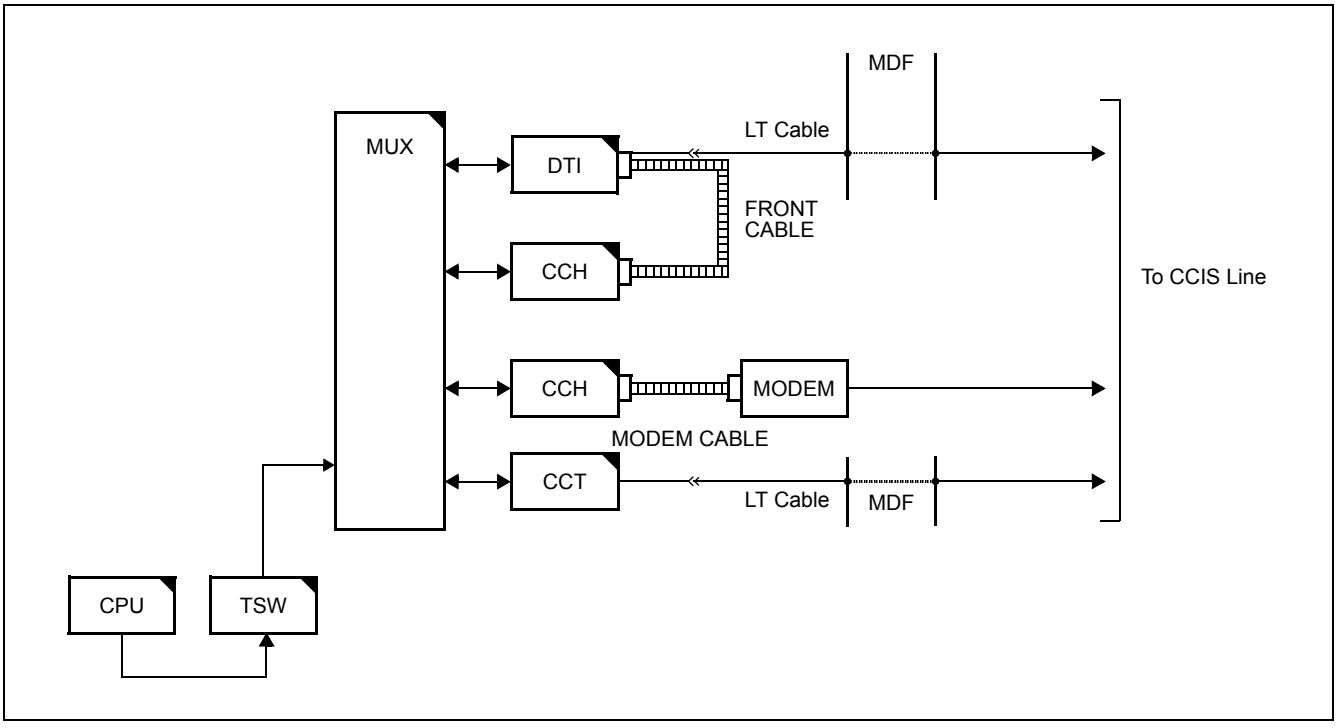
3.2 CCIS Line Control

The CCH within the CCH/CCT circuit card controls the signal link of the interoffice common channel signaling system and transmits/receives call processing information.

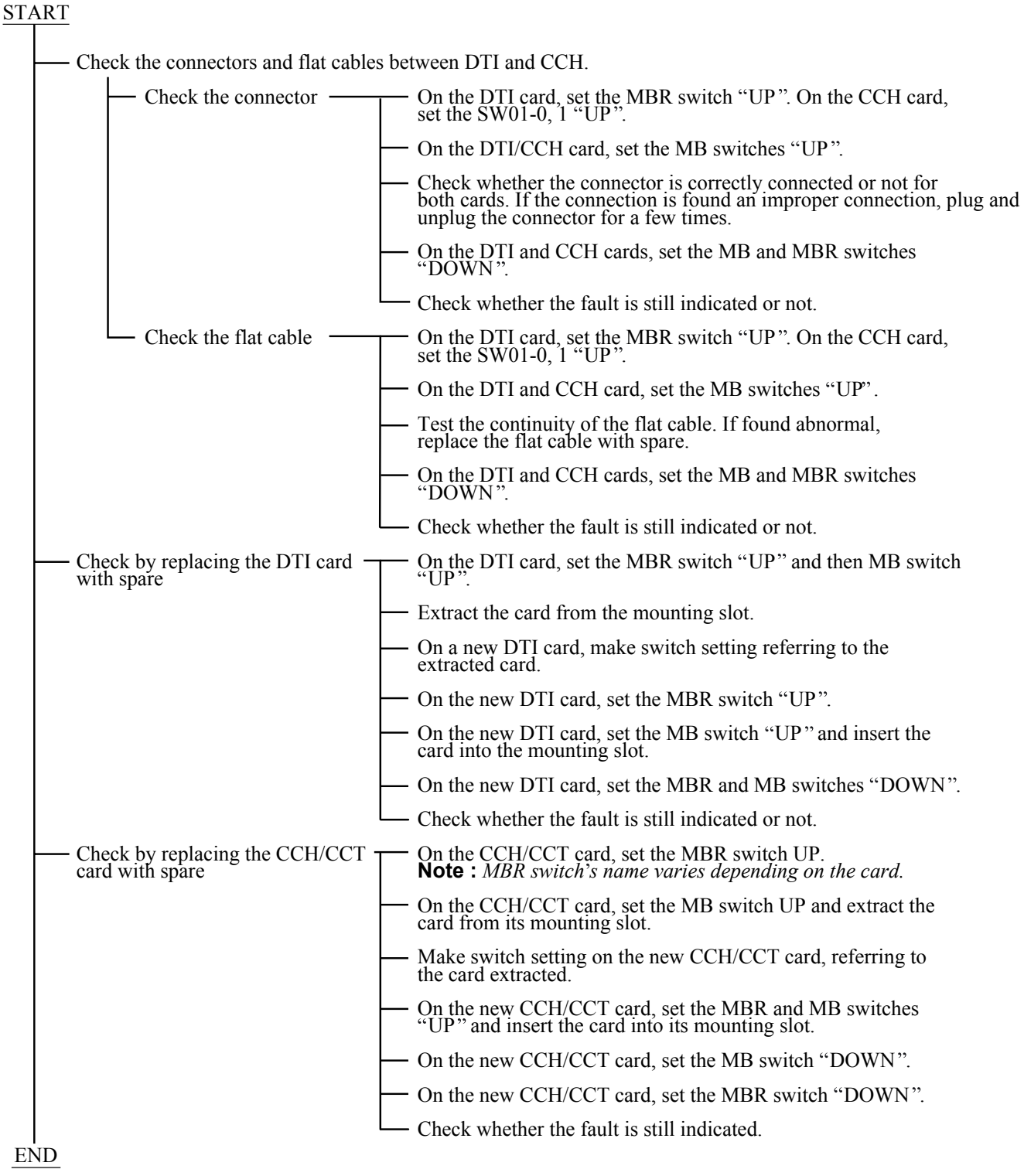
The signal link controls to send/receive the call processing information.

The call processing information is converted into No. 7 signal format for channel 1 (any channel) of the DTI before being transmitted to a distant office.

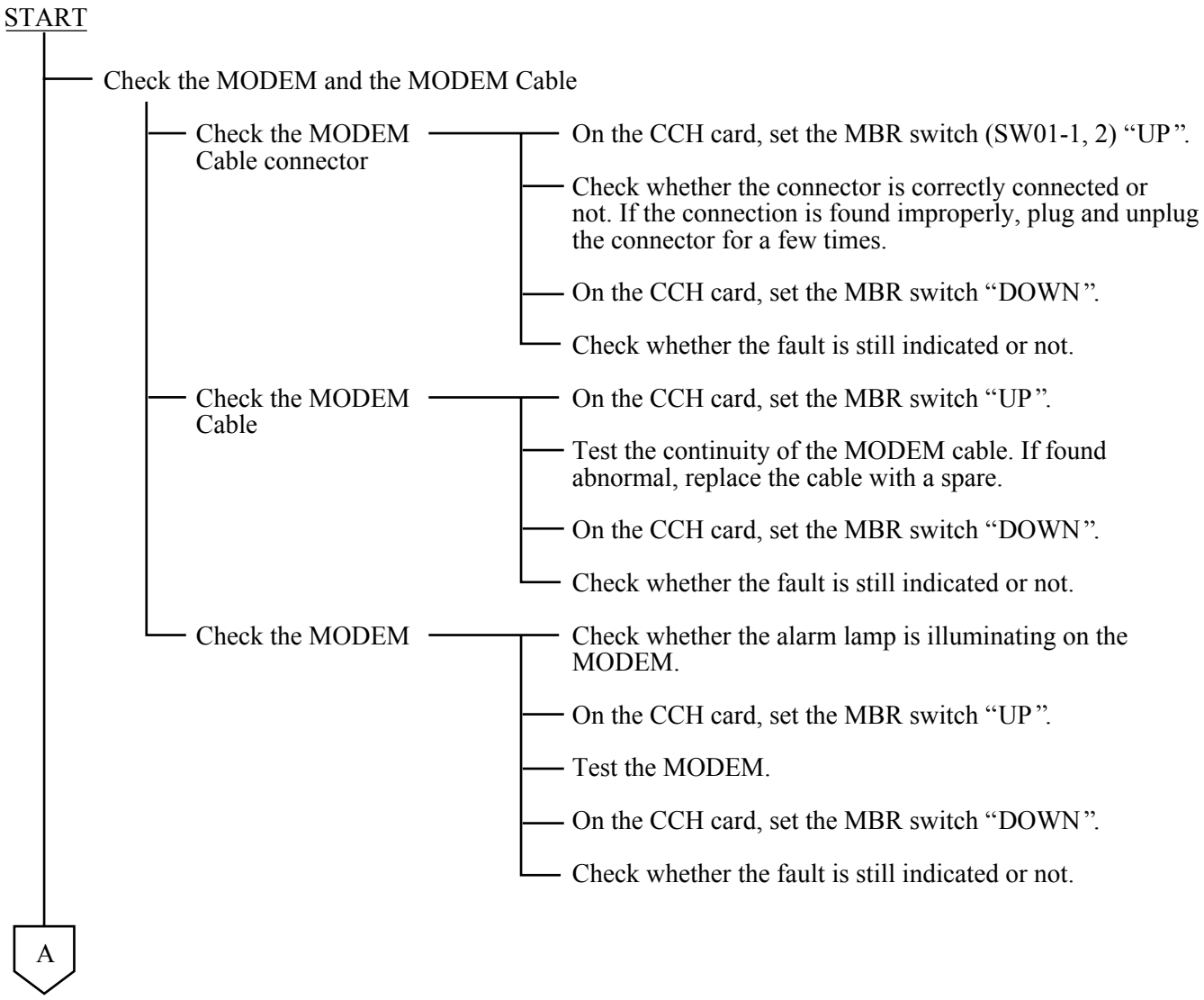
Figure 8-5 Controlling the CCIS Line

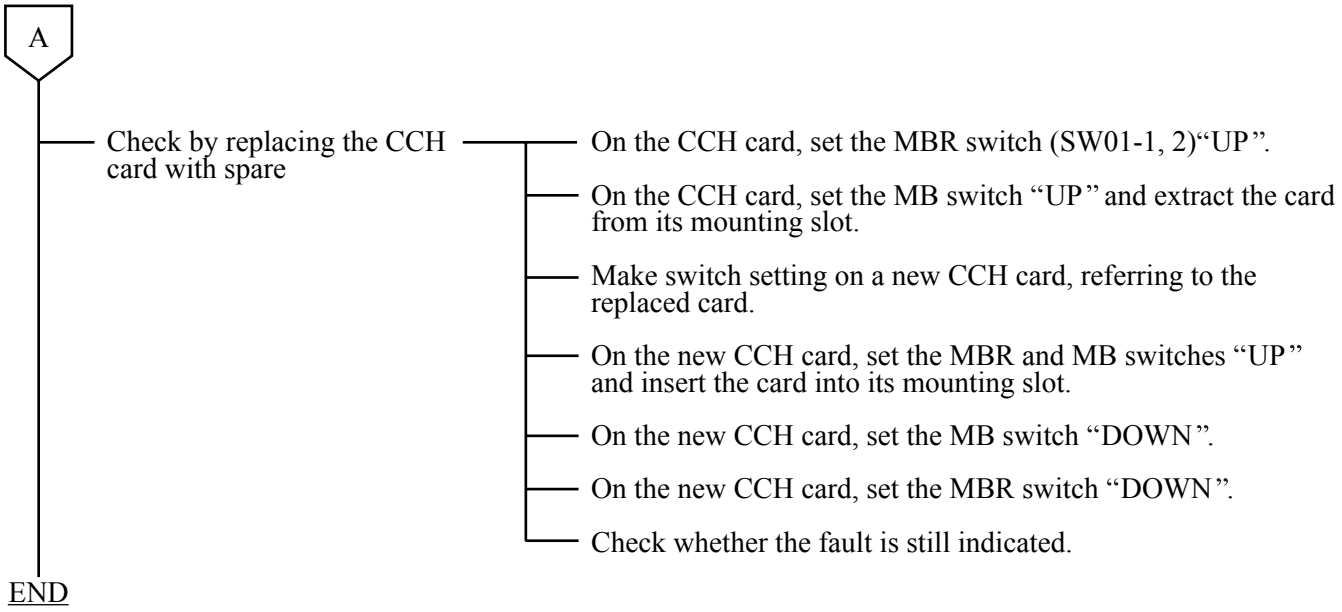


3.3 Fault Repair Procedure for Digital CCIS Line



3.4 Fault Repair Procedure for Analog CCIS Line




A
Check by replacing the CCH card with spare
On the CCH card, set the MBR switch (SW01-1, 2)“UP”.
On the CCH card, set the MB switch “UP” and extract the card from its mounting slot.
Make switch setting on a new CCH card, referring to the replaced card.
On the new CCH card, set the MBR and MB switches “UP” and insert the card into its mounting slot.
On the new CCH card, set the MB switch “DOWN”.
On the new CCH card, set the MBR switch “DOWN”.
Check whether the fault is still indicated.
END

4. CCIS LINE OPERATING MODE CONTROL

This Section describes the Make Busy/Make Busy Cancel procedure and the Reinitialization procedure for CCH circuit.

CCIS Line Operating Mode Control

- Make Busy/Make Busy Cancel of CCH
  - Command "CCSE": Make Busy/Make Busy Cancel for a CCH circuit (not including speech path cannels).
  - "MBR" switch : Make Busy/Make Busy Cancel for a CCH circuit (not including speech path cannels).
  - "MB" switch : Make Busy/Make Busy Cancel for a CCH/CCT circuit card.

    Note : *The MBR switch's name varies depending on the card.*
- Reinitialization of CCH Circuit Card
  - MBR Switch operation on CCH circuit card.
  - Set the MB switch "UP" and confirm that the OPE lamp goes out.
  - About 3 seconds later, set the MB switch "DOWN" and confirm that the OPE lamp illuminates.

5. INSERTION/EXTRACTION OF CIRCUIT CARDS

This paragraph explains the procedure for inserting CCH, DTI, CCT and PLO/OSC circuit cards into their mounting slots and extracting them while the system is in On-Line mode.

5.1 CCH Circuit Card

(1) Procedure for Extraction:

START

- Set the MBR switch (SW01-0, 1) of the CCH card "UP".
- Set the MB switch of the CCH card "UP".
- The OPE lamp (green) goes out and the N-OPE lamp (red) illuminates on the CCH card.
- When the CCH card is connected with the DTI card via the front cable, remove the front cable from the CCH card.
- Extract the CCH card from its mounting slot.

END

(2) Procedure for Insertion:

START

- Set the MBR switch (SW01-0, 1) and MB switch of the CCH card "UP".
- Insert the CCH card into its mounting slot.
- When the CCH card is connected with the DTI card, connect the front cable referring to CHAPTER 4 "INSTALLATION PROCEDURE".
- Set the MB switch of the CCH card "DOWN".
- Set the MBR switch of the CCH card "DOWN".
- The OPE lamp of the CCH card illuminates.

END

5.2 DTI Circuit Card

(1) Procedure for Extraction:

START

- Set the MBR switch (SW01-0, 1) "UP" on the CCH card connected via the front cable with the DTI card.
- Set the MB switch "UP" on the CCH card.
- The OPE lamp (green) goes out and N-OPE lamp (red) illuminates on the CCH card.
- Set the MB switch "UP" on the DTI card.
- The OPE lamp (green) goes out and the N-OPE lamp (red) illuminates on the DTI card.
- Remove the front cable of the DTI card.
- Extract the DTI card from its mounting slot.

END

(2) Procedure for Insertion:

START

- Set the MB switch of the DTI card "UP".
- Insert the DTI card into its mounting slot.
- Connect the front cable between DTI and CCH card.
- Set the MB switch of the DTI circuit card "DOWN".
- The OPE lamp of the DTI card illuminates.
- Set the MB and MBR switch on the CCH card "DOWN".
- Confirm that the OPE lamp (green) illuminates on the CCH card connected with the DTI card via the front cable.

END

5.3 CCT Circuit Card

(1) Procedure for Extraction:

START

- Set the MBR switch of the CCT card "UP".
  Note : *As for the 24 CCT card, set the SW01/13B-1, 2 "UP".*
- Set the MB switch of the CCT card "UP".
- The OPE lamp (green) goes out and the N-OPE lamp (red) illuminates on the CCT card.
- Extract the CCT card from its mounting slot.

END

(2) Procedure for Insertion:

START

- Set the MBR switch and MB switch on the CCT card "UP".
  Note : *As for the 24 CCT card, set the SW01/13B-1, 2 "UP" as MBR switch set.*
- Insert the CCT card into its mounting slot.
- Set the MBR switch and MB switch on the CCT card "DOWN".
- The OPE lamp on the CCT card illuminates.

END

5.4 PLO/OSC Circuit Card

(1) Procedure for Extraction:

START

- Set the MB switch of the PLO/OSC card UP.
- The OPE/CLKOUT lamp (green) goes out.
- Extract the PLO/OSC card from its mounting slot.

END

(2) Procedure for Insertion:

START

- Set the MB switch of the PLO/OSC card “UP”.
- Insert the PLO/OSC card into its mounting slot.
- Set the MB switch of the PLO/OSC card “DOWN”.
- The OPE/CLKOUT lamp (green) illuminates.

END

PAGE No.	ISSUE No.							
	1	2	3	4	5	6	7	8
PL-1	1	2						
PL-2	1	2						
PL-3	1	2						
PL-4	1	2						
PL-5	1	2						
PL-6	1	2						
PL-7	1	2						
PL-8	1	2						
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ii	1	2						
iii	1	2						
Blank	1	2						
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PAGE No.	ISSUE No.							
	1	2	3	4	5	6	7	8
27	1	2						
28	1	2						
29	1	2						
30	1	2						
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64	1	2						

ISSUE 1		ISSUE 2		ISSUE 3		ISSUE 4	
DATE	MAY, 2002	DATE	AUGUST, 2002	DATE		DATE	
ISSUE 5		ISSUE 6		ISSUE 7		ISSUE 8	
DATE		DATE		DATE		DATE	

NEAX2400 IPX Internet Protocol eXchange
No.7 CCIS System Manual

Revision Sheets 1/2

ND-71762(E)

PAGE No.	ISSUE No.							
	1	2	3	4	5	6	7	8
65	1	2						
66	1	2						
67	1	2						
68	1	2						
69	1	2						
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100	1	2						
101	1	2						
102	1	2						

PAGE No.	ISSUE No.							
	1	2	3	4	5	6	7	8
103	1	2						
104	1	2						
105	1	2						
106	1	2						
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121		2						
122		2						

ISSUE 1		ISSUE 2		ISSUE 3		ISSUE 4	
DATE	MAY, 2002	DATE	AUGUST, 2002	DATE		DATE	
ISSUE 5		ISSUE 6		ISSUE 7		ISSUE 8	
DATE		DATE		DATE		DATE	

NEAX2400 IPX Internet Protocol eXchange
No.7 CCIS System Manual

Revision Sheets 2/2

ND-71762(E)