NEC

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ISSUE 1
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NEAX® 2400 IPX

Installation Manual (IPX-U Type)

OCTOBER, 2000

NEC America, Inc.

LIABILITY DISCLAIMER

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(IPX-U Type)

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SAFETY CONSIDERATIONS

IMPORTANT — SAVE THESE INSTRUCTIONS

(1) Never install telephone wiring during a lightning storm.

(2) Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.

(3) Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.

(4) Use caution when installing or moving telephone lines.

When using your telephone equipment, basic safety precautions should always be followed to reduce the risk of fire, electric shock and injury, including the following:

(5) Read and understand all instructions.

(6) Follow all warnings and instructions marked on the product.

(7) Disconnect this product from the power source before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.

(8) Do not use this product near water; for example, under water pipes near a bath tub, sink, or laundry tub, in a wet basement, or near a swimming pool.

(9) Do not place this product on an unstable cart, stand, or table. The product may fall, causing serious damage to the product.

(10) Slots and openings in the cabinet and the back or bottom are provided for ventilation, to protect it from overheating. These openings must not be blocked or covered. The openings should never be blocked by placing the product on a bed, sofa, rug, or other similar surface. This product should never be placed near or over a radiator or heat register. This product should not be placed in a built-in installation unless proper ventilation is provided.

(11) This product should be operated only from the type of power source indicated on the marking label. If you are not sure of the type of power source available, consult with your local power company.

(12) Do not overload wall outlets and extension cords as this can result in the risk of fire or electric shock.

(13) Never push objects of any kind into this product through cabinet slots as they may touch dangerous voltage points or short out parts that could result in a risk of fire or electric shock. Never spill liquid of any kind on the product.

(14) To reduce the risk of electric shock, do not disassemble this product, but take it to a qualified serviceman when some service or repair work is required. Opening or removing covers may expose you to dangerous voltages or other risks. Incorrect reassembly can cause electric shock when the appliance is subsequently used.

(15) Unplug this product from the wall outlet and refer servicing to qualified service personnel under the following conditions:

(a) When the power supply cord or plug is damaged or frayed.

(b) If liquid has been spilled into the product.

(c) If the product has been exposed to rain or water.

(d) If the product does not operate normally by following the operating instructions. Adjust only those controls, that are covered by the operating instructions because improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the product to normal operation.

(e) If the product has been dropped or the cabinet has been damaged.

(f) If the product exhibits a distinct change in performance.

(16) Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electric shock from lightning.

(17) Do not use the telephone to report a gas leak in the vicinity of the leak.

REGULATORY INFORMATION

1. REGULATORY REQUIREMENTS

The Federal Communications Commission (FCC) has established rules that permit the NEAX2400 IPX to be directly connected to the telephone network. A jack is provided on party lines or coin lines.

The telephone company may make changes in its technical operations and procedures. If such changes affect the compatibility or use of the NEAX2400 IPX, the telephone company is required to give adequate notice of the changes.

This equipment complies with the requirements in Part 15 of FCC Rules for a Class A computing device. Operation of this equipment in a residential area may cause unacceptable interference to radio and TV reception requiring the operator to take whatever steps are necessary to correct this interference.

2. FCC PART 15 REQUIREMENTS

In compliance with FCC Part 15 Rules, the following statement is provided:

> WARNING
>
> This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

3. FCC PART 68 REGISTRATION

3.1 Company Notification

Before installing the NEAX2400 IPX to the telephone network, the telephone company must be provided with the following:

- Your telephone number
- The FCC registration numbers:

	JAPAN	USA
• PBX:	AY5JPN-74906-PF-E	AY5USA-74905-PF-E
• Hybrid:	AY5JPN-74904-MF-E	AY5USA-74913-MF-E

The Ringer Equivalence Number is 2.1B; the required USOC jacks are RJ21X, RJ2EX, and RJ2GX.

3.2 Service Requirements

In the event of equipment malfunction, all repairs will be performed by NEC or an authorized distributor of NEC. It is the responsibility of users requiring service to report the need for service to NEC or to one of their authorized distributors.

If the equipment causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. If advance notice is not practical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.

The telephone company may make changes in its facilities, equipment, operations, or procedures that affect the operation of the equipment. If this happens, the telephone company will provide advance notice in order for you to make necessary modifications in order to maintain uninterrupted service.

If trouble is experienced with this equipment, please contact NEC America, Inc.'s Oregon plant at (503) 648-5000 for repair and/or warranty information. If the trouble is causing harm to the telephone network, the telephone company may request that you remove the equipment from the network until the problem is resolved.

NO REPAIRS CAN BE DONE BY THE CUSTOMER.

3.3 Location of FCC Compliance Labels

Labels stating the NEAX2400 IPX FCC registration number and compliance with FCC Parts 15 and 68 are attached to the Base Unit. If the unit is in a table-top configuration, the labels are located on the side of the enclosure. The appearance of the labels is as shown below:

COMPLIES WITH PART 68 FCC RULES	
NEAX2400 IMS-IP	
FCC registration numbers:	AY5USA-74905-PF-E AY5USA-74913-MF-E
Ringer Equivalence:	2.1B
NEC NEC America Made In U.S.A.	

4. DIRECT-INWARD DIALING (DID) CALLS

Allowing this equipment to be operated in such a manner as to not provide for proper answer supervision is a violation of Part 68 of the FCC's rules.

PROPER ANSWER SUPERVISION IS WHEN:

(a) This equipment returns answer supervision to the PSTN when DID calls are:

- Answered by the called station
- Answered by the attendant

- Routed to a recorded announcement that can be administered by the CPE user
- Routed to a dial prompt

(b) This equipment returns answer supervision on all DID calls forwarded to the PSTN. Permissible exceptions are:

- A call is unanswered
- A busy tone is received
- A reorder tone is received.

EQUAL ACCESS REQUIREMENTS

This equipment is capable of providing users access to interstate providers of operator services through the use of access codes. Modification of this equipment by call aggregators to block access dialing codes is a violation of the Telephone Operator Consumers Act of 1990.

5. REGULATORY INFORMATION ON SINGLE-LINE ANALOG TELEPHONES

NEC single-line telephones comply with Part 68 of FCC Rules. On the bottom of the equipment is a label that states, among other information, the FCC registration number and ringer equivalence number (REN) for the equipment. If requested, this information should be provided to the telephone company.

The equipment uses the following USOC jacks: RJ11C.

The equipment should be used only behind a PBX or KTS. The REN is used to determine the quantity of devices that may be connected to the telephone line. Excessive RENs on the telephone line may result in the devices not ringing in response to an incoming call. In most, but not all, areas, the sum of RENs should not exceed five (5.0). To be certain of the number of devices that may be connected to the line as determined by the total RENs, contact the telephone company to determine the maximum REN for the calling area.

6. HEARING AID COMPATIBILITY

The D^{term} terminals provided for the NEAX2400 IPX are hearing aid compatible. FCC rules prohibit the use of non-hearing aid compatible telephones.

NEC-type single-line telephone sets used in conjunction with the NEAX2400 IPX are hearing aid compatible. If other than NEC-type single-line telephone sets are to be used with this system, ensure that these are hearing aid compatible.

CAUTION: The use of a monitoring, recording or listening device to eavesdrop, monitor, retrieve or record telephone conversations or other sound activities, whether or not contemporaneous with its transmission, may be illegal in certain circumstances under federal or state laws. Legal advice should be sought prior to implementing any practice that monitors or records any telephone conversation. Some federal and state laws require some form of notification to all parties to the telephone conversation, such as using a beep tone or other notification methods or require the consent of all parties to the telephone conversation, prior to monitoring or recording a telephone conversation. Some of these laws incorporate strict penalties.

7. INDUSTRY CANADA CS-03

Certification number: 140 5452A

Ringer Equivalence Number: 2.1

NOTICE: The Industry Canada label identifies certified equipment. The certification means that the equipment meets certain telecommunications network protective operational and safety requirements. The department does not guarantee the equipment will operate to the user's satisfaction.

Before installing the equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the company's inside wiring associated with a single line individual service may be extended by means of a certified connector assembly (telephone extension cord). The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or installations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request that the user disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines, and internal metallic water pipe system, if present, are connected together. This protection may be particularly important in rural areas.

CAUTION: Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

NOTICE: The "Ringer Equivalence Number" assigned to each terminal device provides an indication of the maximum number of terminals allowed to be connected to a telephone interface. The termination on an interface may consist of any combination of devices subject only to the requirement that the sum of the Ringer Equivalence Numbers of all the devices does not exceed 5.

8. SAFETY LISTING/CERTIFICATIONS

This equipment has been listed by Underwriters Laboratories and found to comply with all the applicable requirements of the standard for telephone equipment U.L. 1459. This equipment complies with Canadian Standards Association standard C 22.2 No. 225.

8.1 Safety Considerations

When using your telephone equipment, basic safety precautions should always be followed to reduce the risk of fire, electric shock and injury, including the following:

1. Never install telephone wiring during a lightning storm.
2. Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.
3. Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
4. Use caution when installing or modifying telephone lines.

NOTICE: Also follow the precautionary items listed under "Safety Considerations" on the previous pages.

CHAPTER 1 INTRODUCTION

1. GENERAL

During the period from equipment carry-in of the system till it is placed in service, the following must be performed:

- Installation of the system and its peripheral equipment
- System startup
- Installation test
- Miscellaneous jobs

This manual explains how to proceed with these activities, and related precautions. It is recommended that the installer thoroughly read Section 2., "HOW TO FOLLOW THE MANUAL" before engaging in any phase of the installation.

Note: *This manual assumes that the reader has sufficient knowledge on the FCCS network service, because the system to be installed can be in service via the FCCS link, established within the system.*
For this reason, if more information is required, also refer to the "Fusion Network System Manual."

2. HOW TO FOLLOW THE MANUAL

2.1 Outline

1. The work required to be performed is divided into the following five chapters. Basically, the work is performed in the order of these chapters:
   - Chapter 2, INSTALLATION DESIGN

     This chapter explains installation design and preparation of the required installation materials.
   - Chapter 3, INSTALLATION PROCEDURE

     This chapter explains the procedures pertaining to equipment carry-in, installation, power supply (cabling, wiring), etc., of the system, and also explains the installation procedures concerning peripheral equipment (MDF, Rectifier, Terminal Equipment).
   - Chapter 4, SYSTEM STARTUP

     This chapter explains the procedures for initial power-on and office data entry upon completion of the system installation.
   - Chapter 5, INSTALLATION TEST PROCEDURE

     This chapter explains the test procedures to be performed, upon completion of the system startup, to determine:
     - If the system operates as directed by the office data.
     - Whether reinitialization or system changeover can be performed.
     - Whether the interface with the associated distant office is normal.
   - Chapter 6, FAULT RECOVERY DURING TESTS

     This chapter explains the recovery procedure which the installer needs to follow in case of a fault occurrence while engaging in work pertaining to system startup and basic connections.

- Chapter 7, WORK AFTER INSTALLATION TESTS
  This chapter explains various kinds of work and site cleaning, etc., which must be performed after completion of installation tests so that the system can be cut over normally.

2.2 How to Follow NAPs

This manual categorizes the work contents of installation, system startup and installation tests into detailed work items, and an NEC Action Procedure (NAP) number is assigned to each of such work item.

The following shows how to interpret a NAP number.

NAP- XXX-XXX

Serial Number (000-999) **Note**

Work Category Number

200: Installation
215: System Startup, Installation Test, Fault Recovery

Note: *It is recommended to perform NAPs in sequential order by serial numbers.*

Figure 1-1 shows an example of an NAP.

NAP- 200-004	NAP Number
Sheet 3/3	Sheet Number of NAP
Installation of the Base Unit	Title of NAP

2. INSTALLING THE BASE UNIT USING A SPECIAL STAND

START

- Securing the Base Unit — Secure the Base Unit onto the special stand per Figure 3-11.
- Level Check — Check the level of the Base Unit. If necessary, adjust the level by inserting spacers beneath the Base Unit.

END

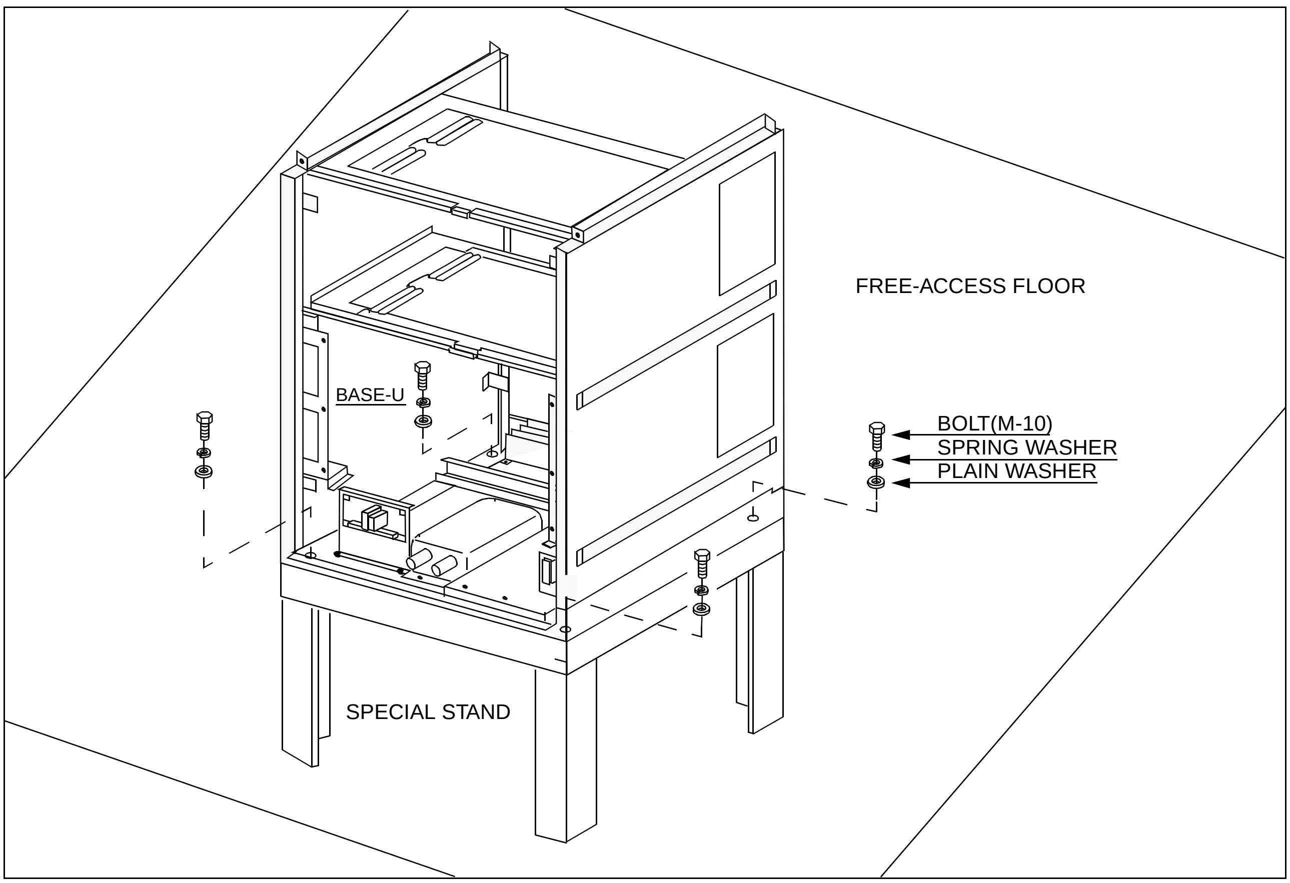


Figure 1-1 Example of NAP

2.3 How To Follow Trees

This manual explains performance of a predetermined procedure (work contents covered in each NAP) in a "Tree" format as shown in Figure 1-2. Before engaging in the intended work, be sure to understand the work contents by tracing the given tree.

START

- On the MDF, make temporary cross connections between the Trunk for Direct-In Termination (DIT) and an LC.
- C.O. Line Incoming Call — Station "B" dials the number of LC "C" (Station "C").
- Incoming Call to Station via DIT Trunk
  - The call terminates to Station "A"; Station "A" rings.
  - Confirm that the ringing is distinct from that of an intra-office call or ordinary C.O. call.
    - The ringing signal for Direct-In Termination calls can be the same as that used for C.O. calls if the related Office Data is assigned.

      System Data SYS1, INDEX 72, SYS3, INDEX 0, and parameter DR of Command "ARTD."
- Answer and Talk
  - Station "A" goes off-hook.
  - Station "A" and "B" talk with each other.
- Release — Station "A" and "B" both go on-hook.
- Remove the temporary cross connections.

END

Figure 1-2 Example of a Tree

Figure 1-3 Static Caution Indication

This manual provides “Static Caution” indicators (see Figure 1-3) on pages where work involving static-sensitive components is described.

The 3M® Model 8012 Portable Field Service Kit, shown in Figure 1-4, is recommended as an effective countermeasure against static electricity.

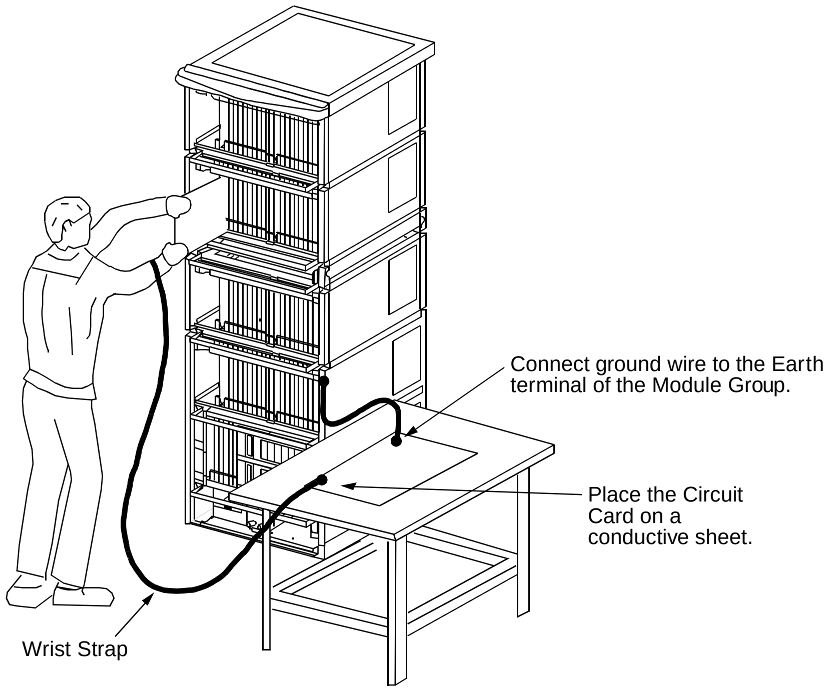


Figure 1-4 3M® Model 8012 Portable Field Service Kit

Note: *3M® is a registered trademark of Minnesota Mining and Manufacturing, Inc.*

2.4 Figure and Table Numbers

Each figure and table within this manual is numbered as shown below.

1. Figures and tables in NAP

Figure XXX-X

- X: Serial number of figures in each NAP
- XXX: Serial number (000-999) of the NAP in which the Figure exists.

2. Other figures and tables

Table X-X

- X (second): Serial number of table in each chapter
- X (first): Number of the chapter in which the Table exists.

2.5 Essential/Critical Information

To prevent accidents or equipment damage from occurring while work is being performed, each manual provides **WARNING**, **CAUTION**, and **Note** indications to draw the technician's attention to specific matters.

1. Meaning

WARNING: Personal injury may result if the warning is not heeded.

CAUTION: Damage to the equipment and/or the system may result if the caution is not heeded.

Note: Indicates an item which requires special attention.

2. Locations of Indicators

WARNING and **CAUTION** indications are located at the top of the page. **Notes** are included as part of the work procedures on the page.

CHAPTER 2 INSTALLATION DESIGN

1. GENERAL

This chapter provides information pertaining to installation design and preparation of the required installation materials. The following topics are discussed:

- Environmental Requirements
- Floor Space
- Floor Load Requirements
- Equipment Room Requirements
- Power Supply Requirements
- MDF Requirements
- Installation Tools
- System Accommodation
- Installation Cables

2. ENVIRONMENTAL REQUIREMENTS

The PBX is sensitive to rises in temperature and humidity, as a computer is. Air conditioning may be required, depending on the installation environment. The following paragraphs address the following environmental conditions.

- Temperature and Humidity
- Heat Generation from Switching Equipment

2.1 Temperature and Humidity

Table 2-1 shows the environmental conditions required in the switching equipment room.

If the switching system is operated in an environment that does not meet these specifications, the reliability of the switching equipment may be impaired. Improper operating conditions can cause circuit boards, etc., to deteriorate. Therefore, to enable the equipment to operate for the extent of its expected lifetime, careful consideration must be given to the location of the equipment, and to proper ventilation and air conditioning.

If no equipment is provided to remove the heat generated by the system, or if the temperature or humidity fluctuates repeatedly, the system's electronic parts can be adversely affected. Such conditions will promote corrosion of metal parts and deterioration of insulation, thereby lowering the overall reliability of the system.

Table 2-1 Temperature and Humidity

		TEMPERATURE	RELATIVE HUMIDITY	REMARKS
During Operations	Normal Operations	5°C ~ 30°C (41°F ~ 86°F)	15% ~ 65%	
	Short Period*	0°C ~ 40°C (32°F ~ 104°F)	15% ~ 90%	
During Storage & In Transit		-18°C ~ 50°C (0°F ~ 122°F)	8% ~ 90%	
Temperature Change		Maximum 5°C/30 Min. (9°F /30 Min.)		

Note: * *A short period means a period not exceeding three consecutive days (72 hours) or 15 days (360 hours) in a year.*

2.2 Heat Generation from Switching Equipment

Figure 2-1 shows heat generation from the switching equipment with respect to current consumption.

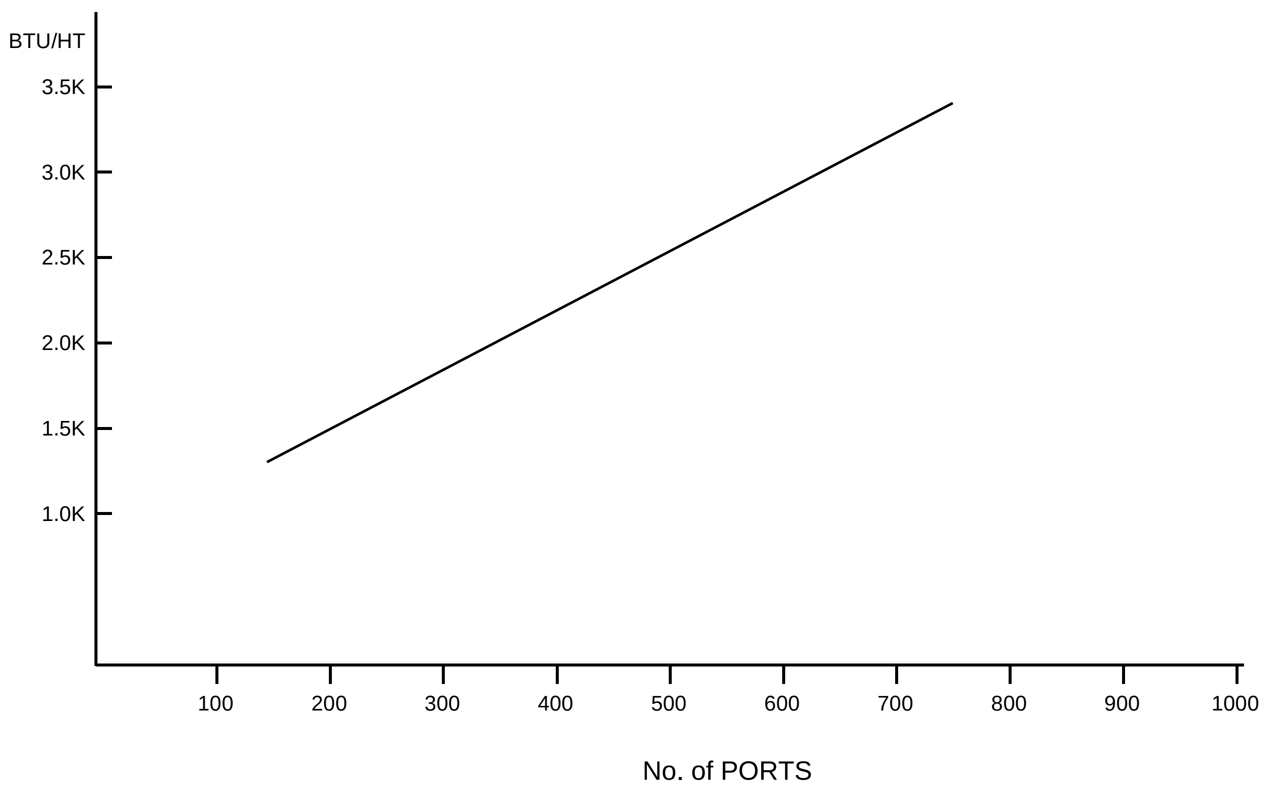


Figure 2-1 Heat Generation from Switching Equipment for the PBX

3. FLOOR SPACE

1. The PBX requires floor space for the following system equipment:
   - Switching Equipment (Module Group)
   - Maintenance Administration Terminal (MAT)
   - MDF
   - Rectifier
   - Batteries
   - Attendant Console
2. The required floor space for the various equipment rooms is as follows.
   - Switching Equipment Room: For installing the Module Group, MAT, MDF and Rectifier
   - Battery Room: For installing Batteries
   - Operator Room: For installing an Attendant Console with desk and chair
3. Equipment Room: Free Access Floor or Computer Floor

4. FLOOR LOAD REQUIREMENTS

Required floor capacities are as follows:

- Switching Equipment Room: More than 3430 Pa (0.49 pounds per square inch)
- Operator Room: More than 2940 Pa (0.43 pounds per square inch)

5. EQUIPMENT ROOM REQUIREMENTS

The following floor conditions should be considered prior to installation:

5.1 Floor Surface

1. Switching Equipment Room
   - The maximum difference in floor level at each point within the room should be less than +5mm (0.2 inch).
   - An elevated-type floor such as Free Access floor or computer room floor should be constructed.
2. Battery Room
   - It is recommended that the floor have a slope (1/1000) and drain at the end of the slope.
   - The floor surface should be made of acid-resistant materials.

5.2 Wall

1. Switching Equipment Room
   - A Concrete wall is necessary so that cable racks can be installed (unless a free-access floor is used).
   - It is recommended that the walls be painted so that the wall materials do not generate dust, etc.
   - The maximum difference in level at the wall surface should be less than +5 mm (0.2 inch).

5.3 Ceiling

1. Switching Equipment Room
   - The required ceiling height is more than 2.3 meters (7.5 feet).

5.4 Lighting Facilities

1. Switching Equipment Room
   - Fluorescent lamps are recommended.
   - No less than 200 lux at the floor level is necessary.
2. Operator Room
   - Fluorescent lamps are recommended.
   - No less than 200 lux at the floor level is necessary.
3. Battery Room
   - Anti-explosion type lamps must be utilized.
   - No less than 150 lux at the floor level is necessary.

6. POWER SUPPLY REQUIREMENTS

6.1 Main Source Power

The PBX requires an operating power of -48 V DC ±5 V DC. This DC operating power is supplied from the rectifier which receives AC power from the commercial AC power source. For greater system reliability, it is recommended that the PBX be supplied with backup DC operating power for a predetermined duration from the batteries installed as the auxiliary power supply source.

The batteries for the PBX must be connected in parallel with the -48 V DC output of the rectifier. Also, when installing batteries, an EMF panel must be placed in-line (series) with the input -48 V DC supplied to the PBX. This panel is necessary when changing the state of the rectifier from float to equalize and vice versa.

Note 1: *When the rectifier is in the equalize state (charging the batteries), the output DC voltage should be 1.5 to 2 volts higher than the float voltage. For example: the voltages for floating and equalizing are listed below:*

Float: 50.5 V DC
Equalize: 52 V DC (Refer to **Note 2.***)*

Note 2: *The Equalize voltage is 1.5 to 2 V higher when an EMF panel (Diode Drop) is used. When an EMF panel is not provided, the Float and Equalize Voltage must be the same (50.5 V).*

Note 3: *The main source power is AC input.*

Note 4: *Noise present in the -48 V output from the rectifier should be less than 5 mV.*

6.2 Current Consumption

The PBX operates on -48 V ±5 V DC which is supplied from external power equipment (the rectifier and the battery).

Various DC voltages required within the system are provided by the DC-DC converter in each module. The DC-DC converter, upon receiving the -48 V DC source power, converts it into various DC voltages and supplies them to the associated circuits.

Figure 2-2 shows the current consumption of the PBX.

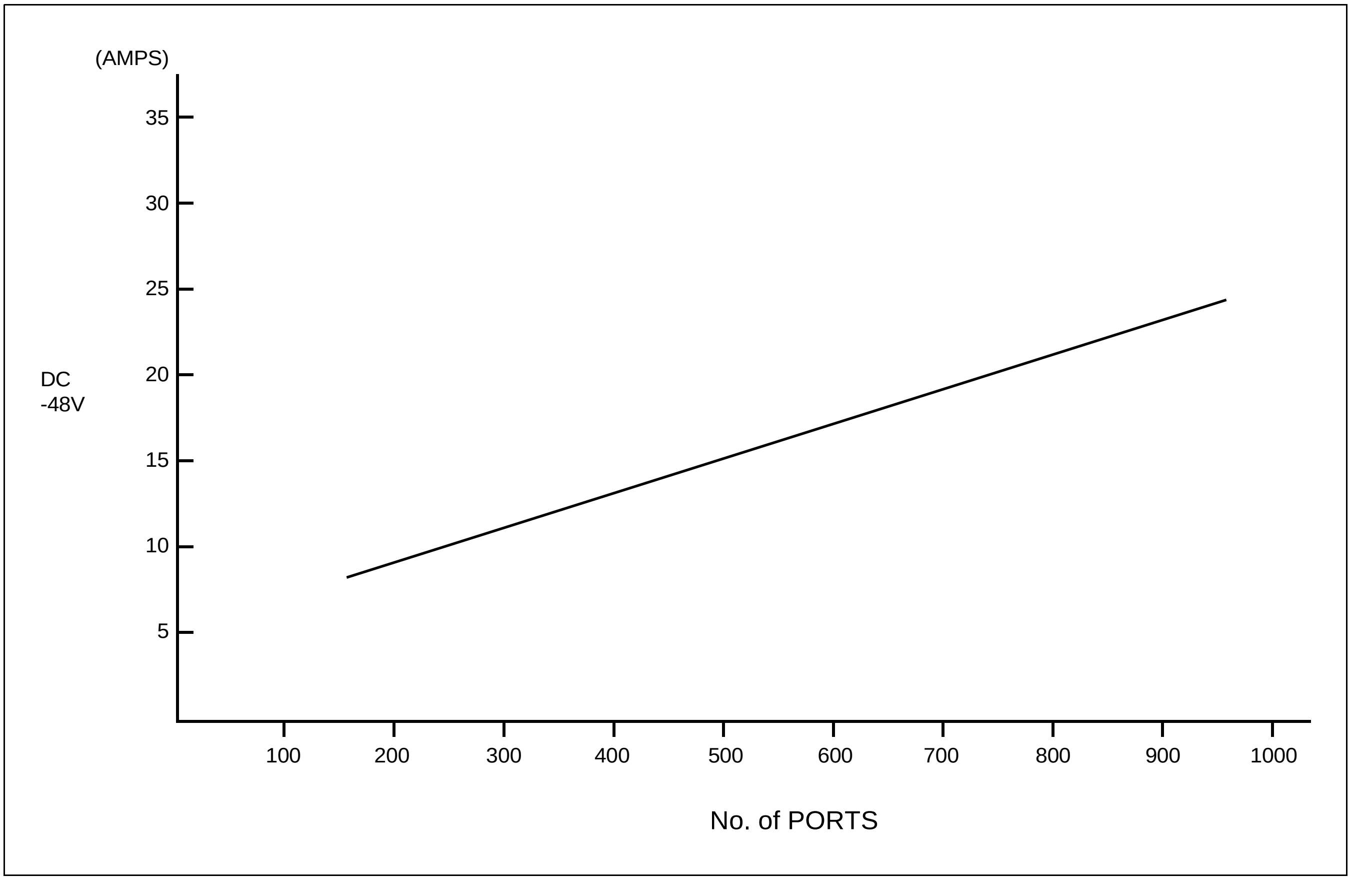


Figure 2-2 Current Consumption of the PBX

6.3 Power Distribution Box Requirements

The Power Distribution Box (PDB) should be installed with the following considerations:

1. The AC power source service outlet and the fuse for the junction box should be provided independently of any equipment other than the switching equipment.
2. A warning notice should be attached to be PDB circuit breaker so that it will not be turned off accidentally.
3. The Power Distribution Box should be installed at a location that is easy to reach.
4. The Power Distribution Box should be installed at a location where the connecting cables extending to the switching equipment will not be broken accidentally.
5. The PDB cables should be run in such a way that they do not hamper the technician performing the installation.
6. The Personal Computer (MAT) must have a separate AC service outlet.

6.4 Grounding

System grounding must have a specific ground resistance and AC noise level, and is to be connected to a predetermined terminal in the PBX.

1. Standard grounding requirements are shown below.
   - Communication grounding: Less than 1 ohm
   - Security ground for Module Group: Less than 1 ohm
   - Grounding for the line protector of the MDF: Less than 0.1 ohms

Note: *The AC ripple of various types of grounding should be less than 1/2 V-pp.*

7. MDF REQUIREMENTS

Either a self-standing or wall-mounted type MDF can be used. The MDF must be equipped with the following types of terminal blocks.

- Arrester board for C.O. lines and external lines
- Test spring terminals for localization tests
- Local Block terminals

The number of terminals is to be determined according to the circuit configuration of the PBX and the number of local lines.

8. INSTALLATION TOOLS

Table 2-2 shows the tools used in a typical system installation.

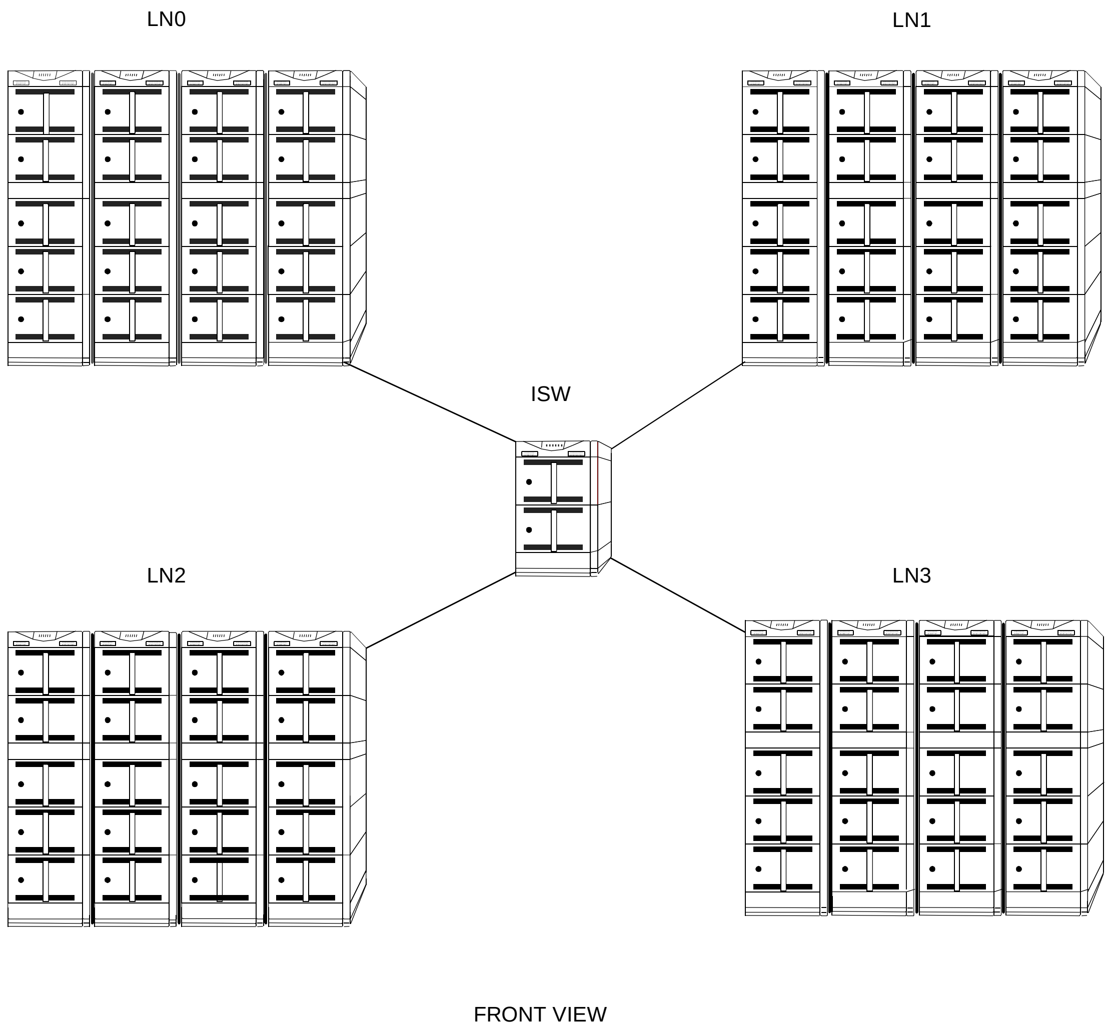
Table 2-2 Typical Installation Tools

FUNCTION	TOOLS		PURPOSE
Marking	• Steel Tape Measure • L-Square • Iron Square • Iron Level	• Center Punch • Step Ladder • Scriber	For Leveling and Marking Plumb Line
Drilling	• Electric Drill • Electric Vibration Drill • Hammer • Point Drill • Drill Bit for Concrete	• Concrete Chisel • Drill Bit for Metal • Power Cable Drum • Extension Cable	Drilling
Module Group and Rack Installation	• Plump Bob • Jigsaw • Hacksaw Frame • Hacksaw Blade • Flat File • Half Round File • Set File • Adjustable Angle Wrench	• Frame Cart • Cutter • Set Wrench • Socket Wrench Set • Step Ladder • Phillips Screwdriver • Screwdriver • Plastic Hammer	Module Group and Rack Installation
Power Cable Installation	• Clamping Tool (for End Terminal, Branch Terminal)	• Phillips Screwdriver • Screwdriver • Cutter	Power Cable Installation
Miscellaneous	• Circuit Tester • Pocket Measure • Scissors • Wire Clipper • Cable Cutter • Nipper • Wire Stripper • Round Nose Pliers • Non-Metallic Stick • Solder-Helper • Solder Sucker • IC ClipMini Test Probe	• Telephone Set • Working Lamp • Wrapping Tool • Unwrapping Tool • Soldering Iron • Soldering Iron Stand • Connector Clamping Tool • Logic Checker and Counter • Pen Light • Precision Screwdriver (+)(-) • IC Buzzer • Tweezer • Portable Field Service Kit	

9. SYSTEM CONFIGURATION

This Section explains the configuration of the NEAX2400 IPX IPX-U system.

This figure shows an example of the fully expanded system.



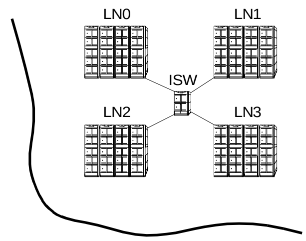
ISW: Inter-node Switch LN: Local Node

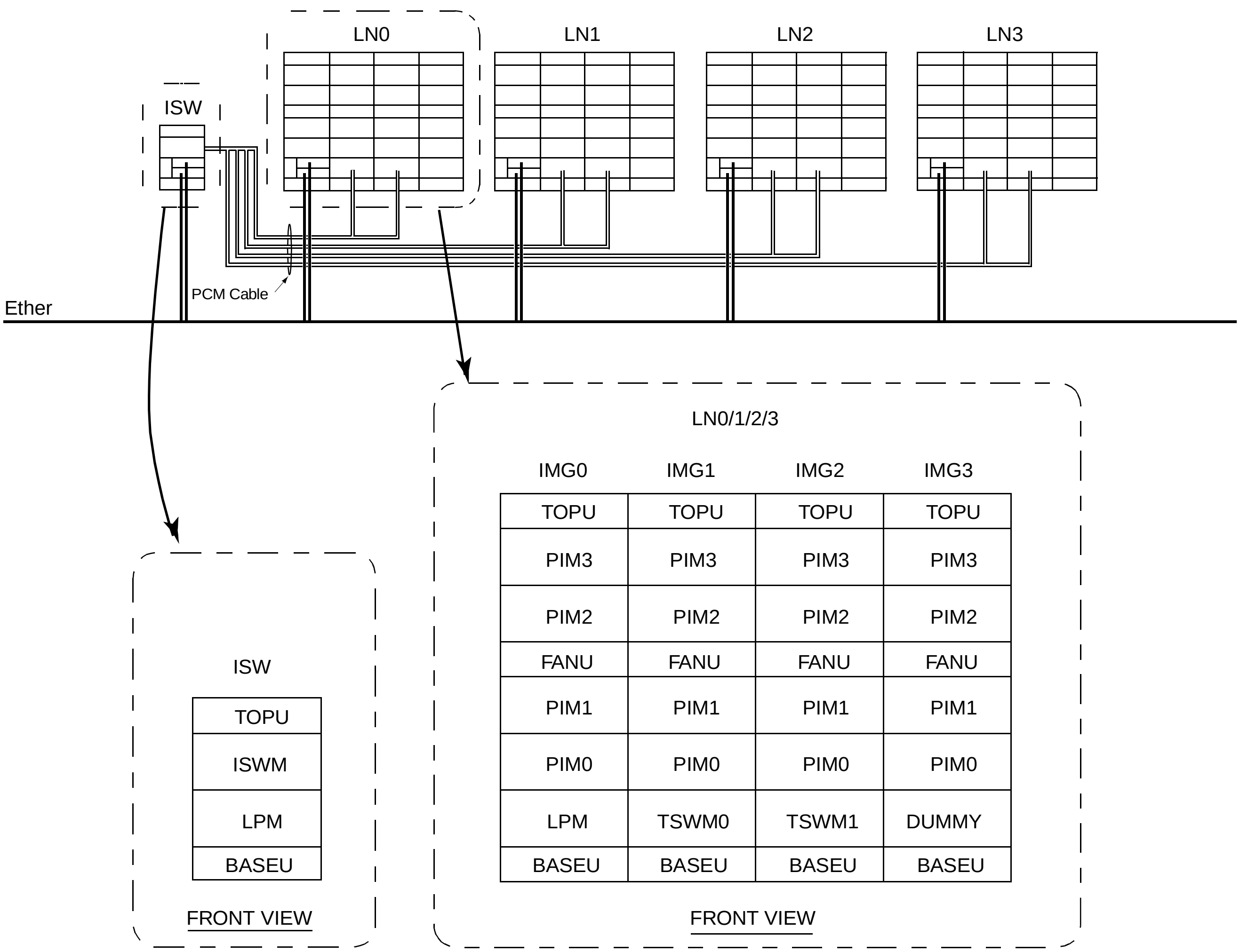
Figure 2-3 NEAX2400 IPX IPX-U

9.1 Configuration of the System and Module Accommodations

As shown in the figures below, the NEAX2400 IPX IPX-U system (referred to in the remainder of this manual as “the system”) is configured by a single Inter-node Switch (ISW) and a maximum of four Local Nodes (LNs). The ISW and LNs are connected via the Fusion link, with Ether and physical PCM cables connected each other.

This figure provides an overall image of system configuration.
As illustrated, a two-module ISW and maximum four (4) Local Nodes compose a single network system via the FCCS link.

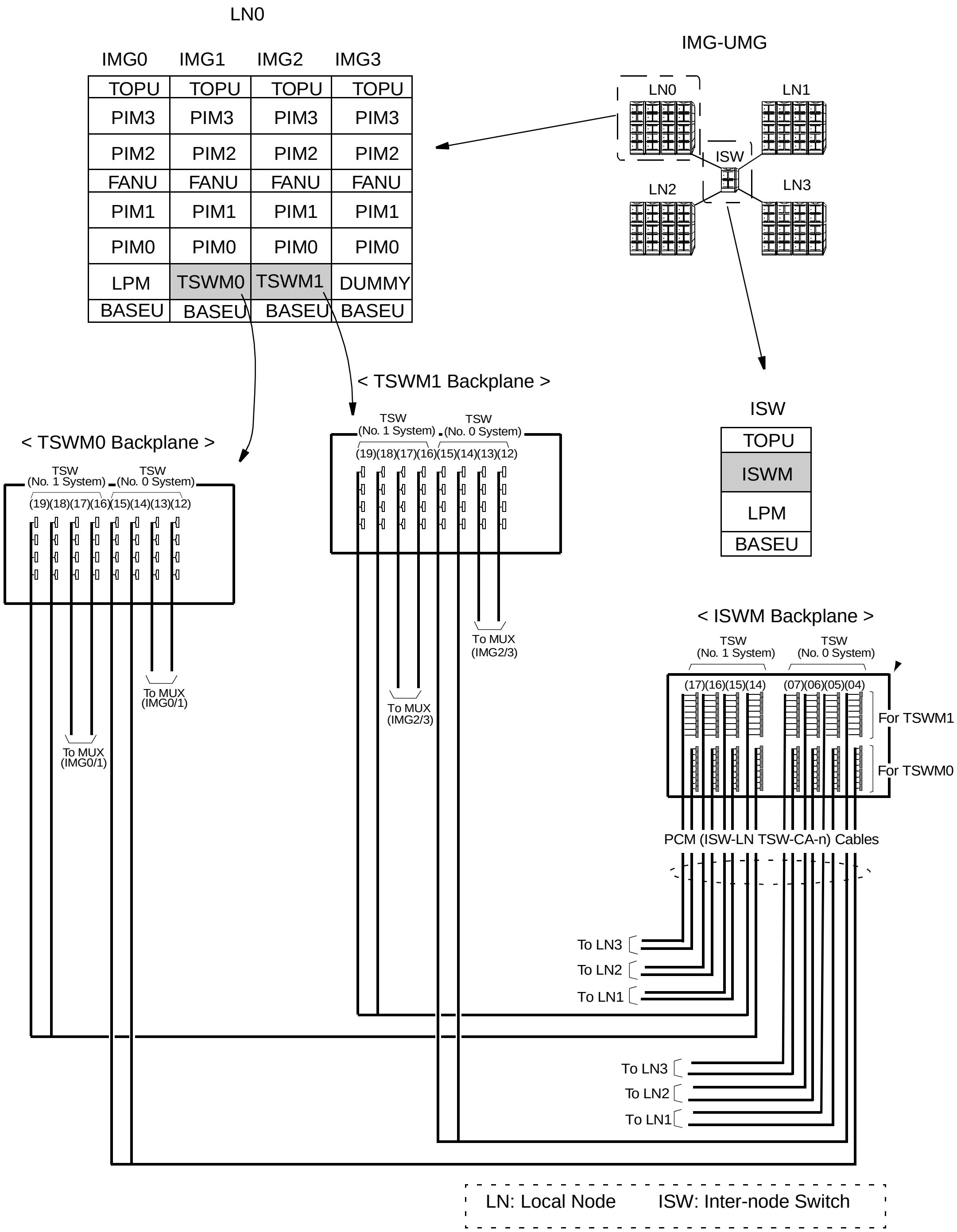




ISW:	Inter-node Switch	LPM:	Local Processor Module	PIM:	Port Interface Module
LN:	Local Node	TSWM:	Time Division Switch Module	FANU:	Fan Unit
TOPU:	Top Unit	ISWM:	Inter-node Switch Module	BASEU:	Base Unit

Figure 2-4 System Configuration

[Details on PCM Cable Connections between ISW and LNs]



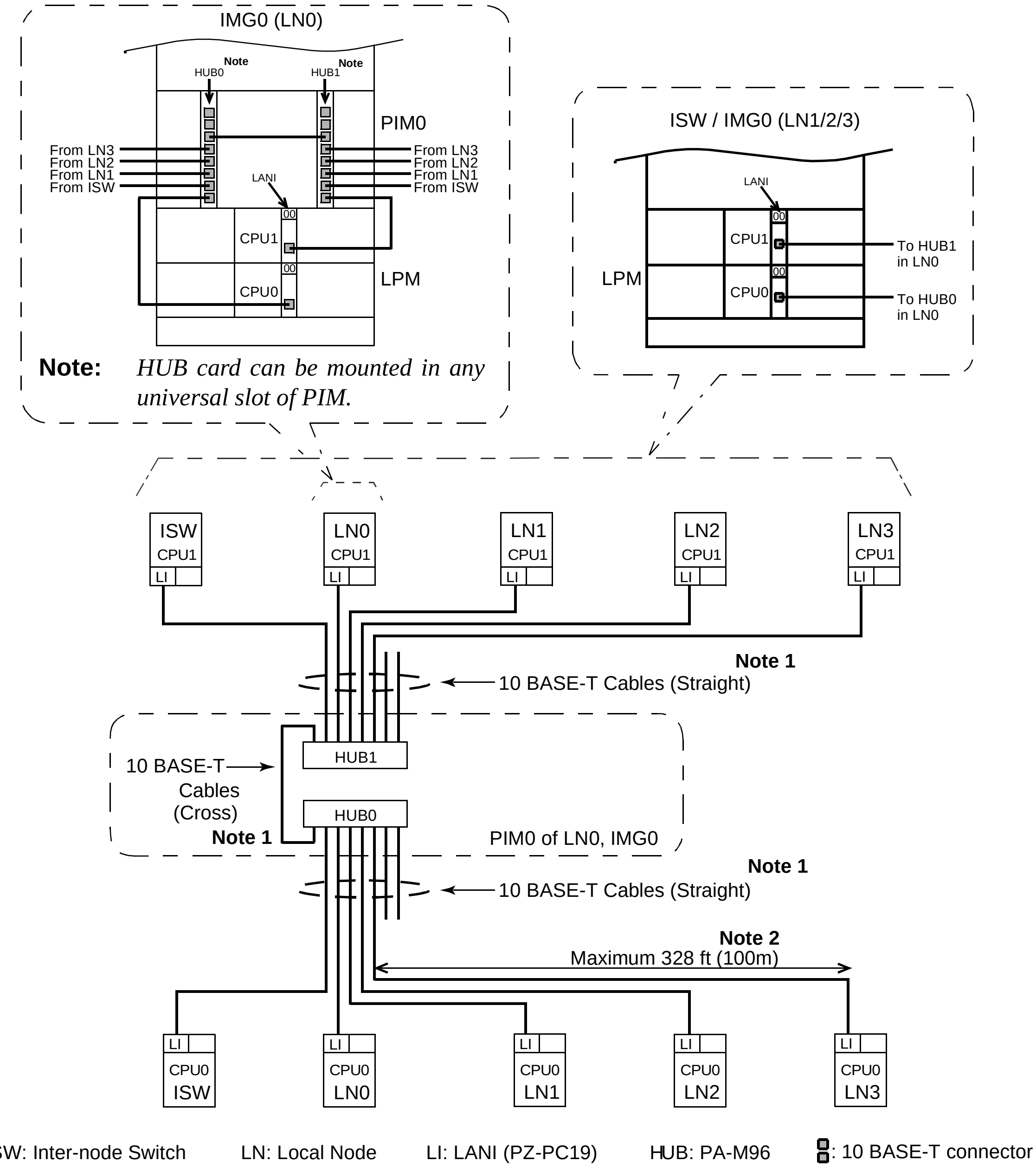
Note 1: *For actual cable runnings, see NAP-200-010 in Chapter 3.*

Note 2: *The maximum distance of these PCM connections must be within 32 feet (10m).*

Figure 2-5 Details on PCM Cable Connections between ISW and LNs

[Details on Ether Cable Connections]

ISW and each LN can achieve a Fusion link by physically connecting themselves via the 10 BASE-T cables. This figure shows an example where the CPR-accommodated LANI cards (internal LANI: PCI slot 00) are mutually connected via HUB0/HUB1 (PA-M96) cards in PIM0 of LN0, IMG0 (HUB0 for CPU0 of all nodes, HUB1 for CPU1 of all nodes).

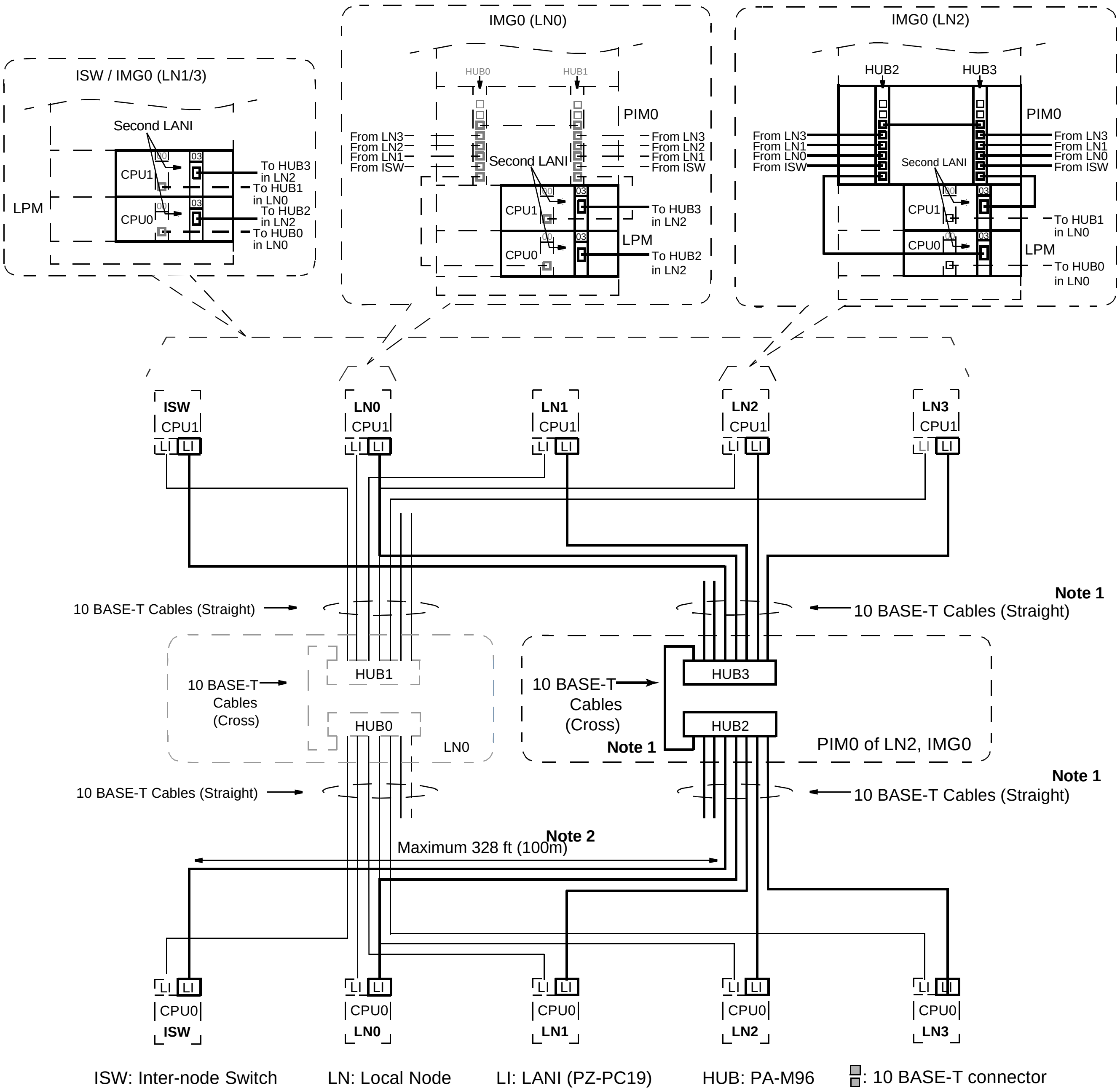


Note 1: *For actual 10 BASE-T connections, see NAP-200-010 in CHAPTER 3.*

Note 2: *The mutual 10 BASE-T (Ether) connections must be within 328 feet (100m) in their distance. If the distance is longer (e.g., FCCS link is provided also with other distant IPX and/or IMX node(s)), use FCH (PA-FCHA) card as a protocol converter for the Fusion-link data. For more details, refer to the "Fusion Network System Manual."*

Figure 2-6 Details on Ether Cable Connections (Establishment of Fusion Link) (1/2)

[Details on Ether Cable Connections: When Dual LANIs are used for each CPU]
When dual LANIs are used for each CPU, the whole second LANIs (external LANI: PCI slot 03) must also be connected in addition to the first LANIs explained on the previous page. This figure shows an example where the second LANIs are connected to the additional HUB2/HUB3 (PA-M96) cards in PIM0 of LN2, IMG0 (HUB2 for CPU0 of all nodes, HUB3 for CPU1 of all nodes).

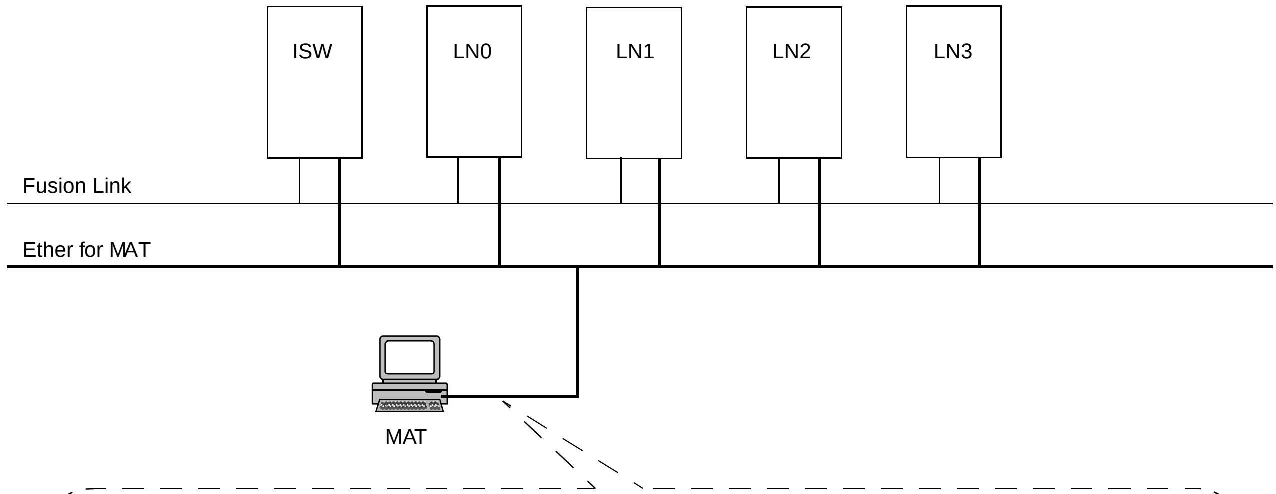


Note 1: *For actual 10 BASE-T connections, see NAP-200-010 in Chapter 3.*

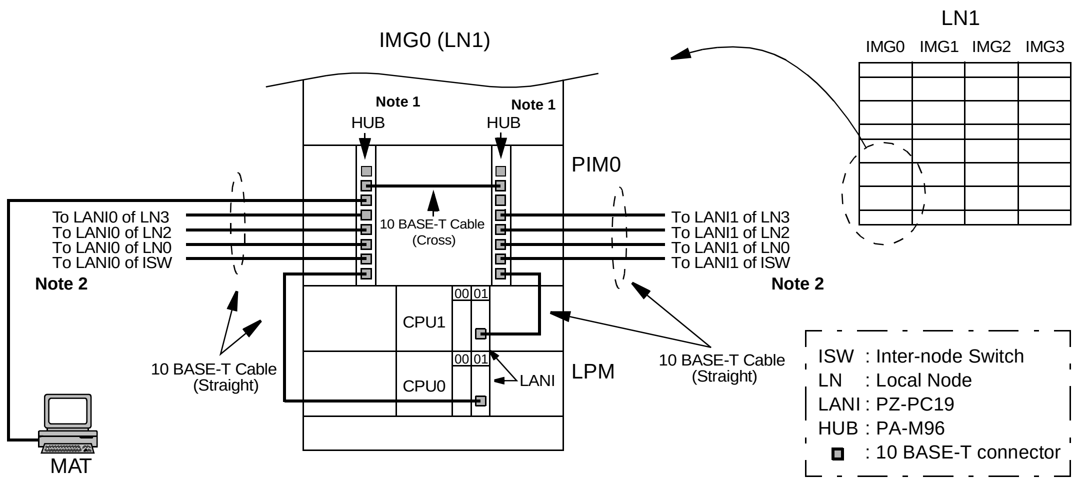
Note 2: *The mutual 10 BASE-T (Ether) connections must be within 328 feet (100m) in their distance. If the distance is longer (e.g., FCCS link is provided also with other distant IPX and/or IMX node(s)), use FCH (PA-FCHA) card as a protocol converter for the FCCS-link data. For more details, refer to the "Fusion Network System Manual."*

Figure 2-6 Details on Ether Cable Connections (Establishment of Fusion Link) (2/2)

[Details on Ether Cable Connections: When using MAT via Ethernet]
The IPX-U system can use both the IOC (PH-IO24) card or the CPR-accommodated LANI (PZ-PC19) card as an interface for the connection to a MAT. This example shows a MAT connected via the LANI card in PCI slot 01 of each LN/ISW.



This figure is an example where a MAT is connected to LN1 via the 10 BASE-T cables (Ethernet). As seen from this, the MAT, a single terminal connected to the Ether, can control the whole system status, thus capable of a single-point entry to each LN and ISW.



Note 1: *When connecting the MAT this way, be sure to use dedicated HUB (PA-M96) card(s) for this connection.*

Note 2: *Because ISW has no universal slot for external HUB cards, connect the 10 BASE-T cables (from the ISW) to MAT-dedicated HUB card in any of the LNs (LN0 - LN3). In this example, the cables are connected to HUB in LN1.*

Note 1: *For details on the MAT installation procedure, refer to NAP-200-016 in Chapter 3.*

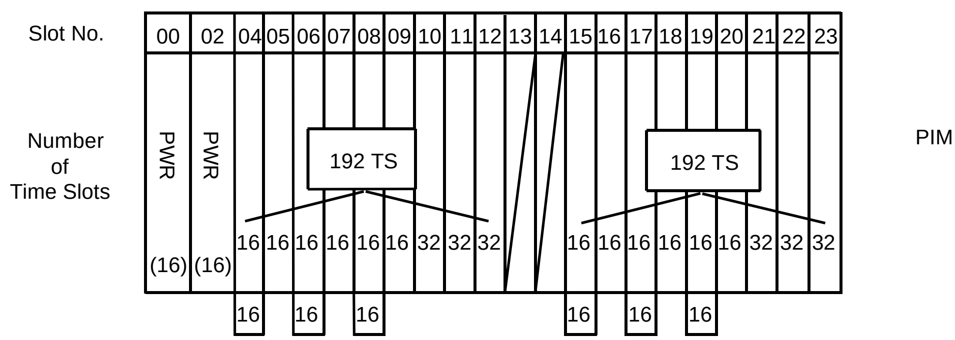
Note 2: *The LANI card for MAT connection is accommodated in PCI slot No. 01 of each CPR.*

Figure 2-7 Details on Ether Cable Connections (Using MAT via Ethernet)

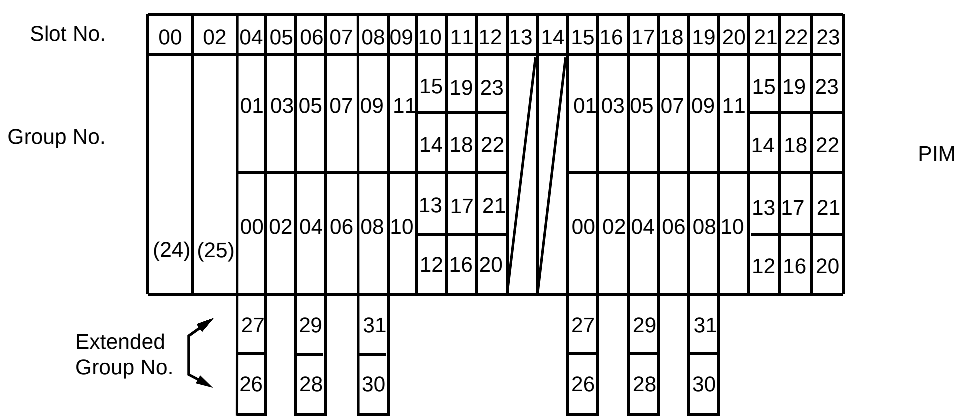
Table 2-3 Condition for Configuration

UNIT NAME		CONDITIONS	REMARKS
FANU (Fan Unit)	ISW	Mounted in TOPU	
	LN IMG0, 1, 2, 3 (Two PIMs or less)	Mounted in TOPU	
	LN IMG0, 1, 2, 3 (Three PIMs or less)	Mounted between the 2nd PIM and the 3rd PIM	
2nd NFILU (Noise Filter)	ISW	Mounted in BASEU	
	LN IMG0, 1, 2, 3 (Two PIMs of less)	Not required	
	LN IMG0, 1, 2, 3 (Three or more PIMs)	Mounted in BASEU	
TOPU (Top Unit)	ISW	Equipped with PZ-DK227 (Key) and PZ-DK223 (DSP) Cards	
	LN IMG0, 1, 2, 3	Equipped with PZ-DK222 (Key) and PZ-DK223 (DSP) Cards	

Time Slots are allocated as follows for a PIM.

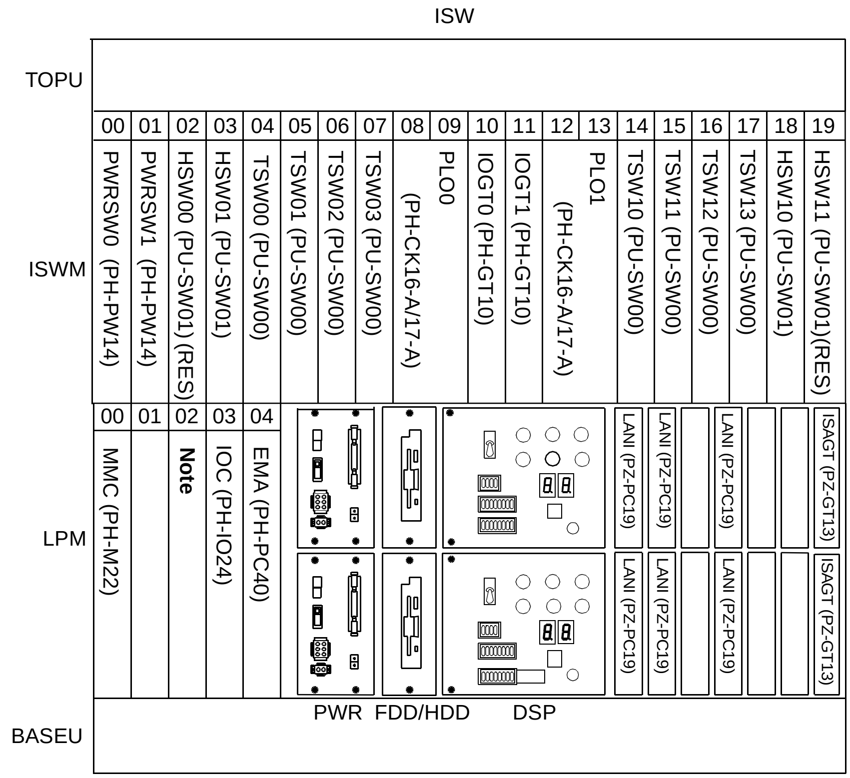


Group Numbers are allocated as follows for a PIM.



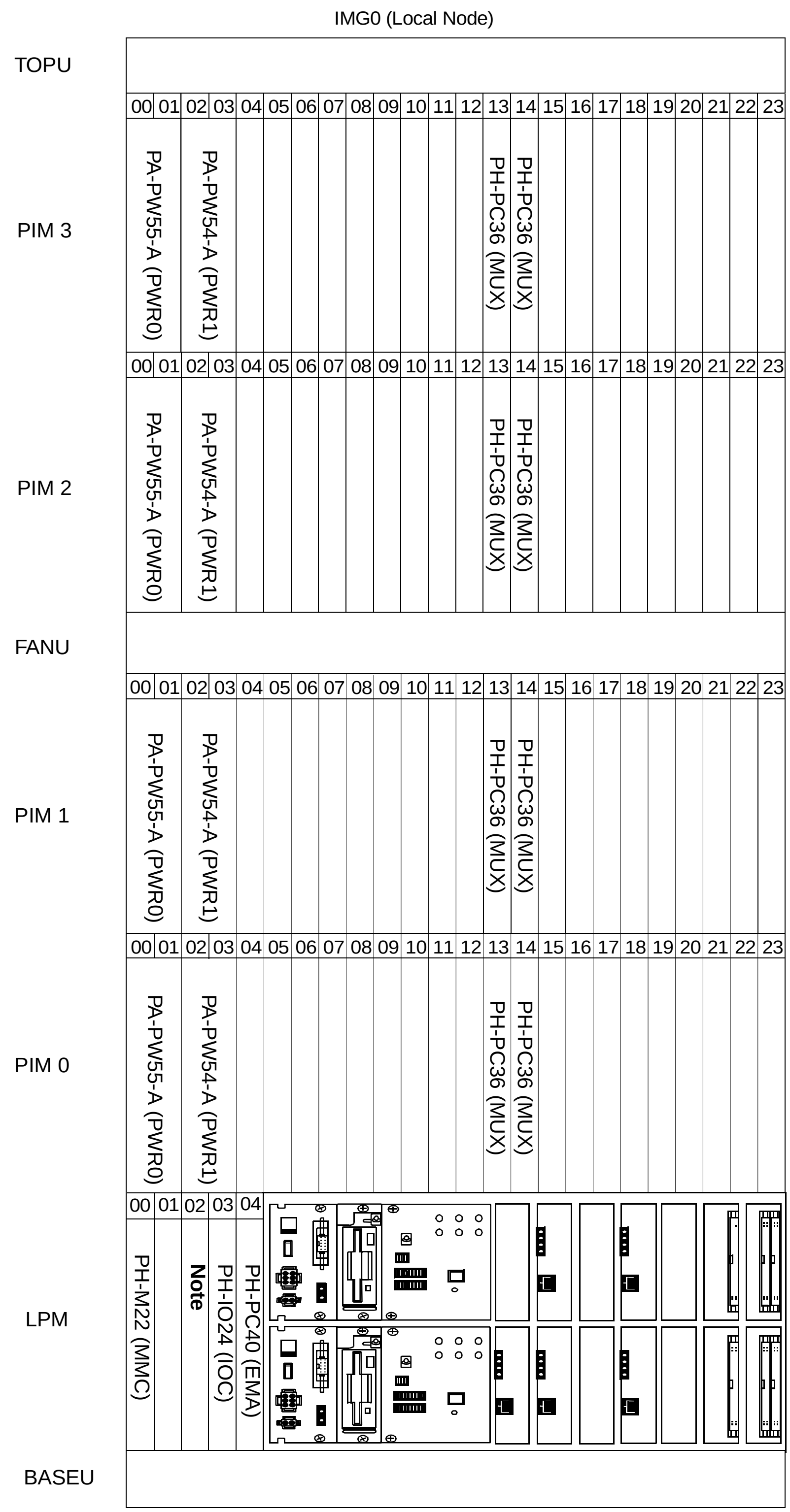
Note: *Extended Group No. can be used by FCH(PA-FCHA) card. For more detailed information, see the "Fusion Network System Manual."*

Figure 2-8 Time Slot, Group Number Assignment



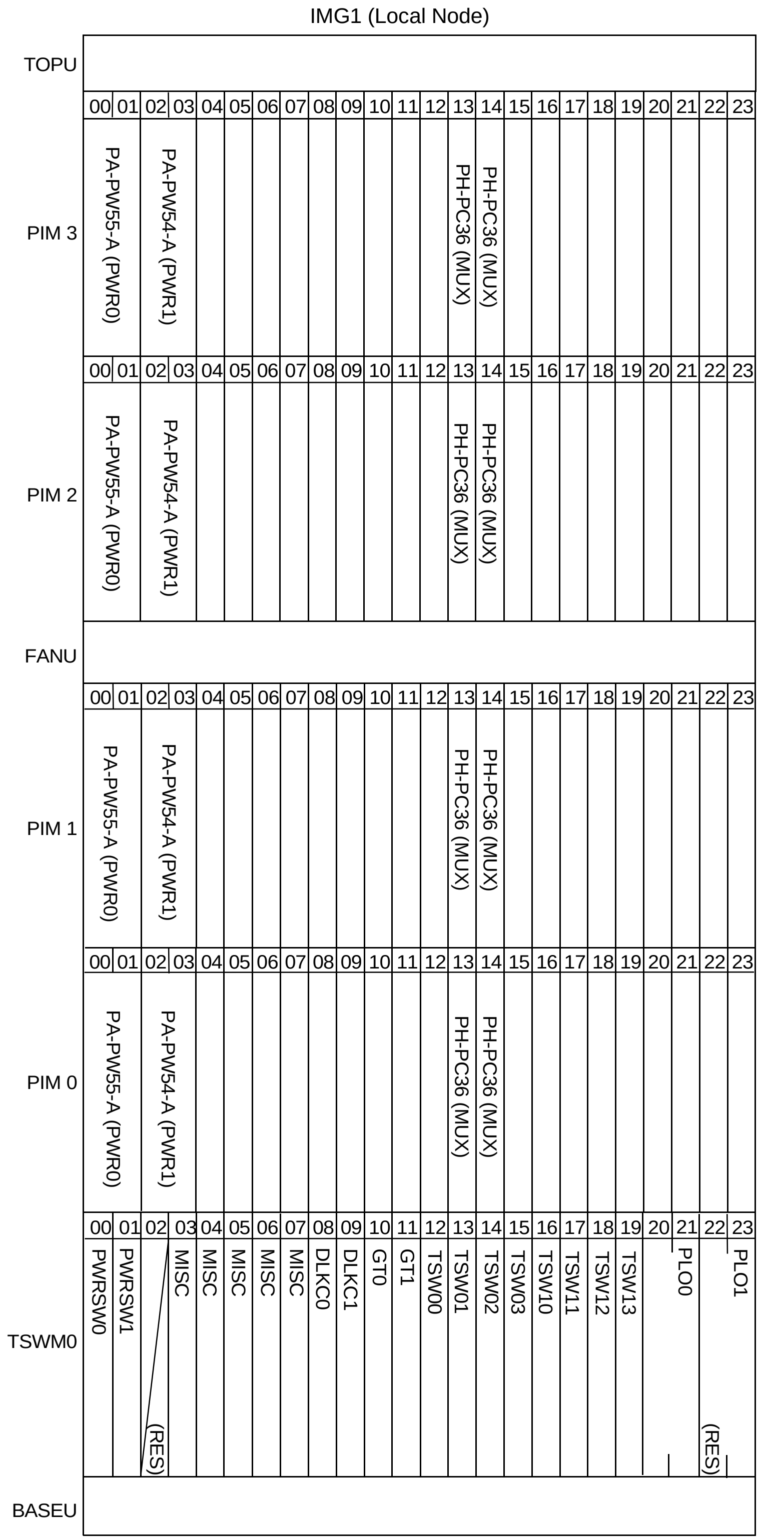
Note: *The 2nd IOC card (optional) may be mounted in this slot.*

Figure 2-9 Face Layout of ISW



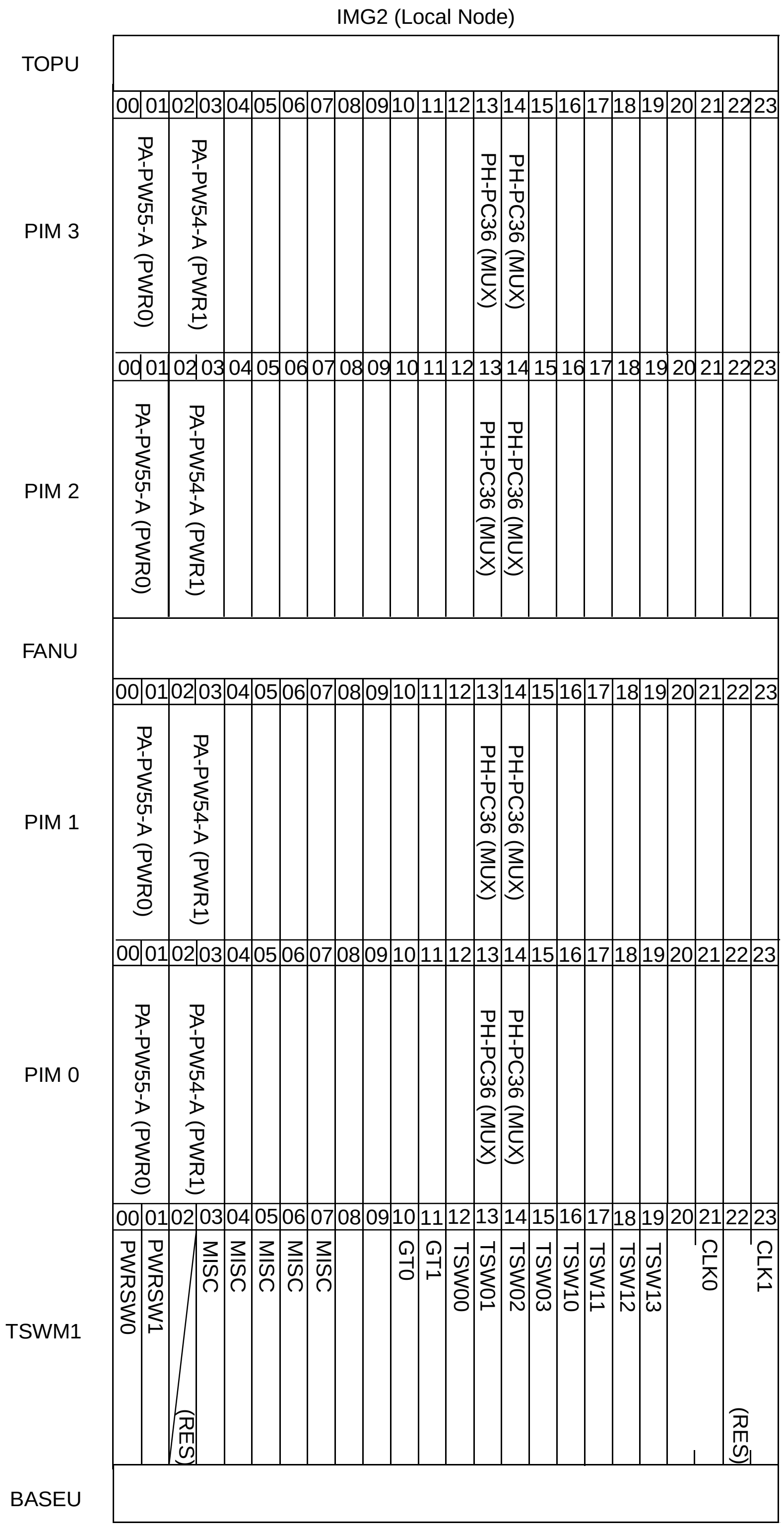
Note: *The 2nd IOC card (optional) may be mounted in this slot.*

Figure 2-10 Face Layout of IMG0 (Local Node)



Note: *No circuit card is mounted in Slot 02 of TSWM0.*

Figure 2-11 Face Layout of IMG1 (Local Node)



Note: *No circuit card is mounted in Slot 02, 08, 09 of TSWM1.*

Figure 2-12 Face Layout of IMG2 (Local Node)

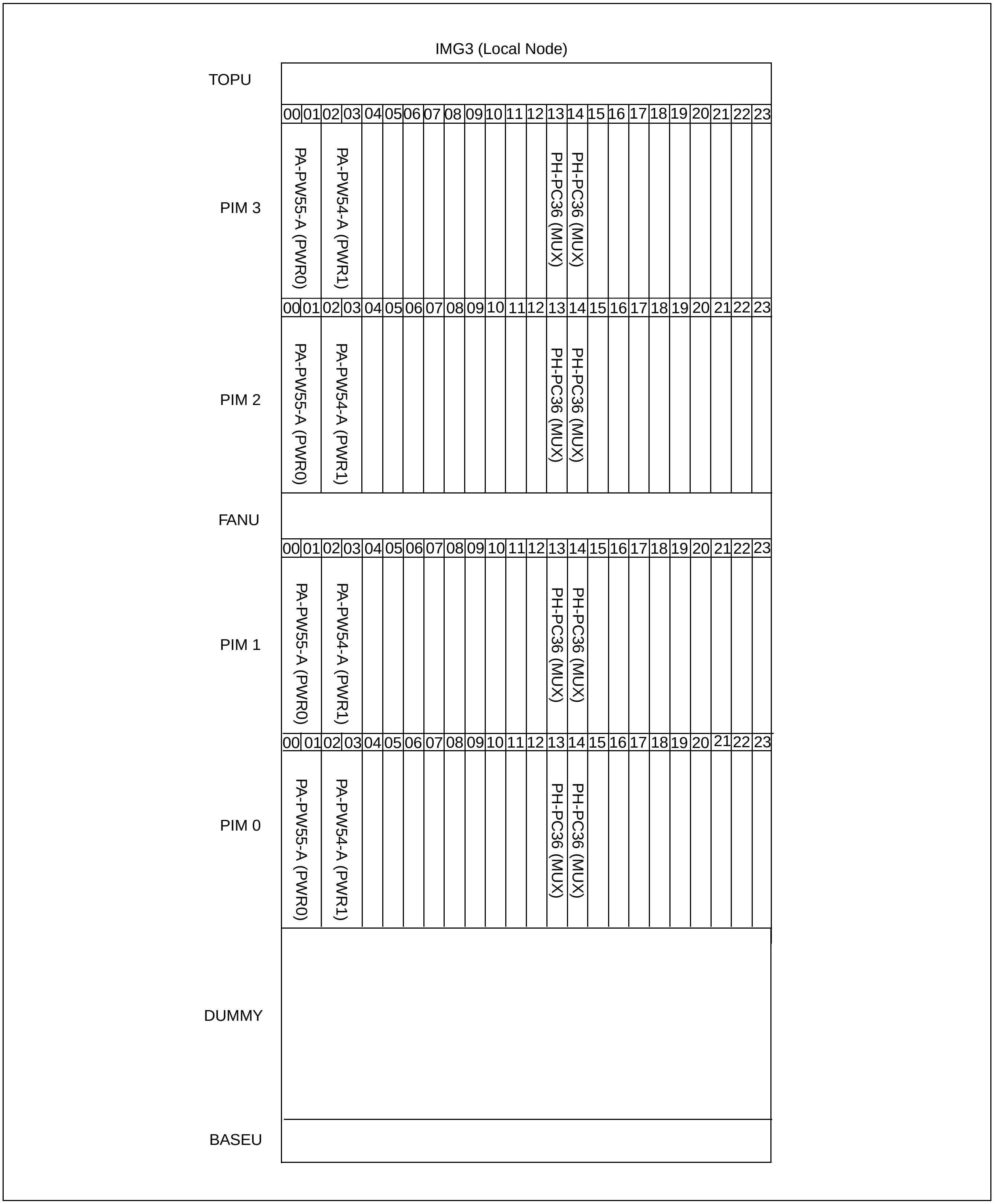
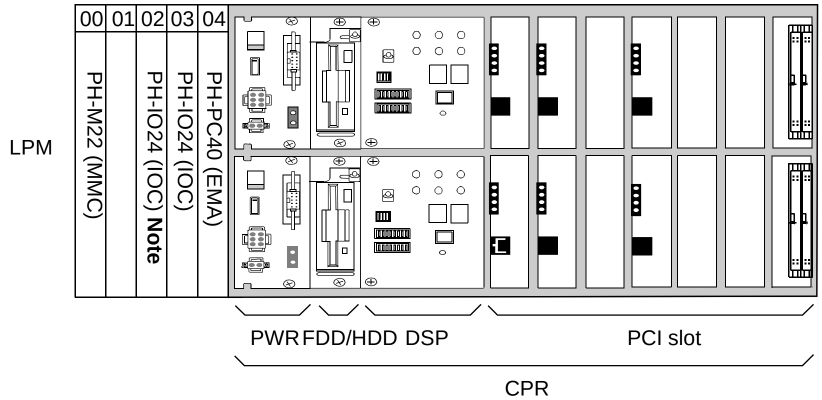


Figure 2-13 Face Layout of IMG3 (Local Node)

9.2 Circuit Card Locations

This section explains the main function of controlling circuit cards on a module basis. For more detailed information on each card, please refer to the “Circuit Card Manual”.



Note: *This IOC card is optional.*

Figure 2-14 Controlling Circuit Cards in LPM (ISW)

Table 2-4 Controlling Circuit Cards in LPM (ISW)

Slot No.	Circuit Card	Symbol	Function, Mounting Conditions
00	PH-M22	MMC	This circuit card offers the function of detecting MJ/MN alarm messages in the system and sending out the information to EMA. In addition, this card has the function to collect the information on TOP KEY.
(02), 03	PH-IO24	IOC (Input/Output Controller)	This circuit card supplies the system with a serial interface, which conforms to RS-232C, between the ISW and external equipment such as the MAT, SMDR, and MCI. One card is equipped with four I/O ports.
04	PH-PC40	EMA (Emergency Alarm Controller)	This card detects various kinds of alarms which might occur in the system, and sends out the information of the detected alarm to the circuits concerned. In addition, this card has the following functions: • Active/stand-by changeover function
CPR (Central Processor Rack)			CPR consists of the following components: • CPU Board: Includes the Main Processor Unit (MPU), flash ROM, 200 Mhz (clock), and 256 MB Random Access Memory (RAM). In addition, the board is equipped with ISAGT (PZ-GT13) card, and LANI (PZ-PC19) cards. • DSP: Equipped with switches and 7-seg. LEDs on the panel. • FDD/HDD: Floppy Disk Drive (FDD) and Hard Disk Drive (HDD) • PWR: Supplies the operation power to the LPM

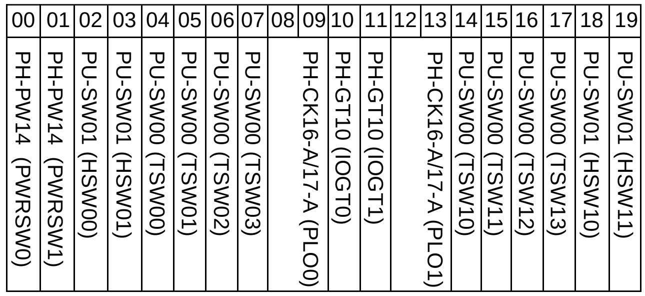
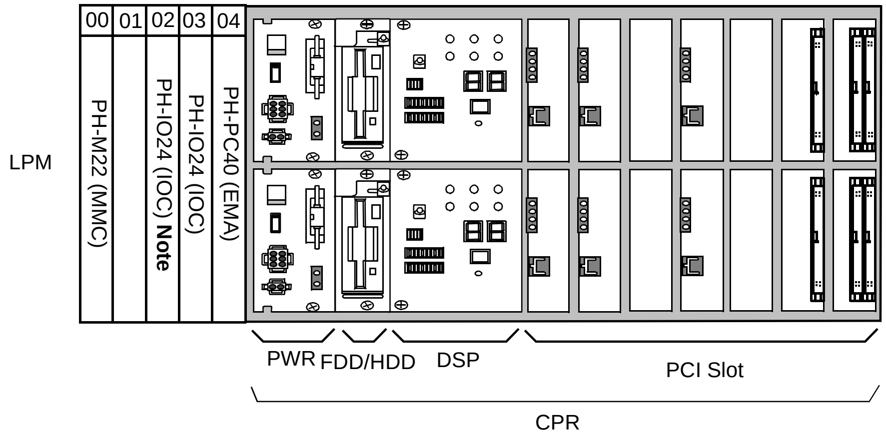


Figure 2-15 Controlling Circuit Cards in ISWM

Table 2-5 Controlling Circuit Cards in ISWM

Slot No.	Circuit Card	Symbol	Function, Mounting Conditions
00, 01	PH-PW14	PWRSW	This circuit card supplies operating power to circuit cards accommodated in the ISWM.
02, 03 18, 19	PU-SW01	HSW	This circuit card provides the function of Space Division Switch between HW in 3-step time division switching. CPU controls the function via GT.
04-07, 14-17	PU-SW00	TSW	This circuit card supplies the Time Division Switch (TSW) and INT function for the system. The card replaces the time slot PCM signal from LN. The combination of maximum 4-card TSW and 2-card HSW provides 32, 768ch switching for the system.
09, 13	PH-CK16-A	PLO	This circuit card, used with a direct digital interface circuit card, sets up network synchronization with the network concerned. With this circuit card, the IPX-U system can be a clock subordinate office of the digital network.
09, 13	PH-CK17-A	PLO	This circuit card, used with a direct digital interface circuit card, sets up network synchronization with the network concerned. Since this circuit card provides high precision base clock oscillator, the IPX-U system can be a clock source office of the digital network.
10, 11	PH-GT10	IOGT	This circuit card functions as a connection to ISAGT and each package in ISW. And it transfers the order from CPU board to each TSW I/O bus or packages.



Note: *This IOC card is optional.*

Figure 2-16 Controlling Circuit Cards in LPM (LN)

Table 2-6 Controlling Circuit Cards in LPM (LN)

Slot No.	Circuit Card	Symbol	Function, Mounting Conditions
00	PH-M22	MMC	This circuit card offers the function of detecting MJ/MN alarm messages in the system and sending out the information to EMA. In addition, this card has the function to collect the information on TOP KEY.
(02), 03	PH-IO24	IOC (Input/Output Controller)	This circuit card supplies the system with a serial interface, which conforms to RS-232C, between the node external equipment such as the MAT, SMDR, and MCI. One card is equipped with eight I/O ports.
04	PH-PC40	EMA (Emergency Alarm Controller)	This card detects various kinds of alarms which might occur in the system, and sends out the information of the detected alarm to the circuits concerned. In addition, this card has the following functions: • Active/stand-by changeover function
CPR (Central Processor Rack)			CPR consists of the following components. • CPU Board: Includes the Main Processor Unit (MPU), flash ROM, 200 Mhz (clock), and 256 MB-Random Access Memory (RAM). In addition, the board is equipped with ISAGT (PZ-GT13 for TSWM0 and PZ-GT20 for TSWM1) cards, and LANI (PZ-PC19) cards. • DSP: Equipped with switches and 7-seg LEDs on the panel. • FDD/HDD: Floppy Disk Drive (FDD) and Hard Disk Drive (HDD) • PWR: Supplies the operating power to the LPM.

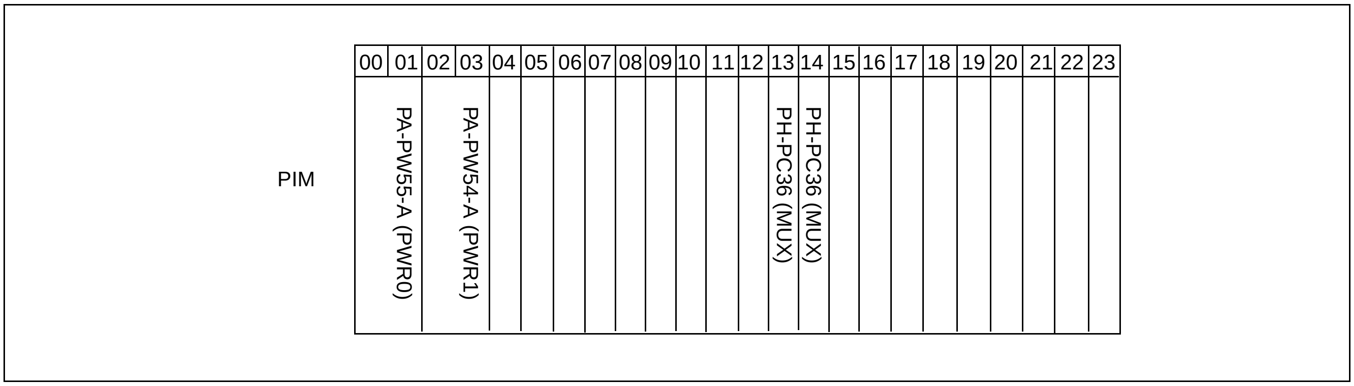


Figure 2-17 Controlling Circuit Cards in PIM

Table 2-7 Controlling Circuit Cards in PIM

Slot No.	Circuit Card	Symbol	Functions, Mounting Conditions
01	PA-PW55-A	PWR	This circuit card supplies operating power to circuit cards accommodated in the PIM.
03	PA-PW54-A	DPWR	This circuit card supplies operating power to circuit cards accommodated in the PIM.
13, 14	PH-PC36	MUX	This circuit card is an interface card for mounting line circuits and/or trunks. Between the CPR and the Port Microprocessor (PM) of the line/ trunk circuit, this card provides an interface for multiplexing/de-multiplexing of voice Pulse Code Modulation (PCM) information and digital data information.

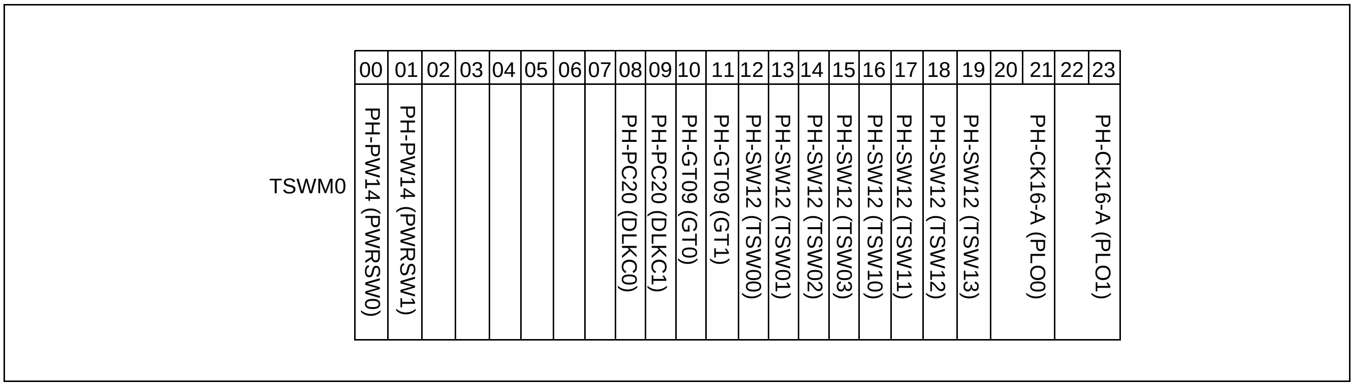


Figure 2-18 Controlling Circuit Cards in TSWM0

Table 2-8 Controlling Circuit Cards in TSWM0

Slot No.	Circuit Card	Symbol	Functions, Mounting Conditions
00, 01	PH-PW14	PWRSW	This circuit card supplies operating power to circuit cards accommodated in the TSWM.
08, 09	PH-PC20	DLKC	This circuit card provides the Attendant Consoles (ATTs) with information such as ATT call termination/answer/release (abandoned call) via the Data Link which is established in the TSW card. In addition, station idle/busy information is sent to the ATTs via the same Data Link.
10, 11	PH-GT09	GT	This circuit card permits the CPU to directly control the TSW, PLO, DLKC, and MISC circuit cards via TSW I/O Bus and MISC I/O Bus.
12-19	PH-SW12	TSW	This circuit card supplies the Time Division Switch (TSW) and INT function for the system. The TSW capacity is 8192×2048 TS (time slots) for each card, while performing the switching under the following conditions: • TSW00 (or 10) for MUX in IMG0 • TSW01 (or 11) for MUX in IMG1 • TSW02 (or 12) for connections between TSW00 (or 10) and ISW • TSW03 (or 13) for connections between TSW01 (or 11) and ISW
21, 23	PH-CK16-A	PLO	This circuit card, used with a direct digital interface circuit card, sets up network synchronization with the network concerned. With this circuit card, the belonging Local Node can be a clock subordinate office of the digital network.

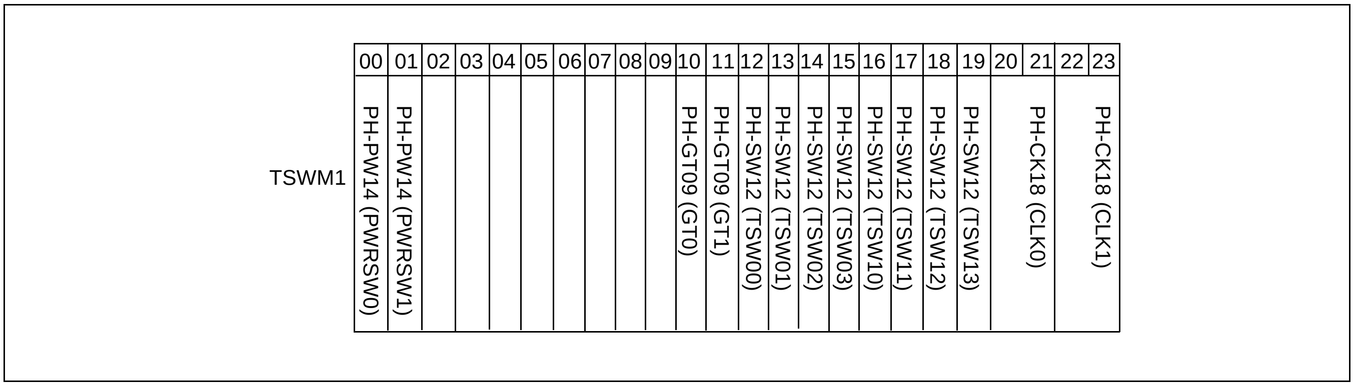


Figure 2-19 Controlling Circuit Cards in TSWM1

Table 2-9 Controlling Circuit Cards in TSWM1

Slot No.	Circuit Card	Symbol	Functions, Mounting Conditions
00, 01	PH-PW14	PWRSW	This circuit card supplies operating power to circuit cards accommodated in the TSWM.
10, 11	PH-GT09	GT	This circuit card permits the CPU to directly control the TSW, PLO, DLKC, and MISC circuit cards via TSW I/O Bus and MISC I/O Bus.
12-19	PH-SW12	TSW	This circuit card supplies the Time Division Switch (TSW) and INT function for the system. The TSW capacity is 8192×2048 TS (time slots) for each card, while performing the switching under the following conditions: • TSW00 (or 10) for MUX in IMG2 • TSW01 (or 11) for MUX in IMG3 • TSW02 (or 12) for connections between TSW00 (or 10) and ISW • TSW03 (or 13) for connections between TSW01 (or 11) and ISW
21, 23	PH-CK18	CLK	This circuit card functions as a relay to 32MHz clock, 8KHz FH and Holding on Music provided by the PLO package mounted in TSWM0, to TSW cards mounted in TSWM1.

9.3 Assignment of Network Control Node

The IPX-U system can be in service by dialing a telephone number assigned for each station at a Network Control Node (NCN). Because these network-level data (NDM data) can be assigned via the MAT dedicated to the NCN only, designate any of the following nodes as this network data manager (NCN):

- One of the Local Nodes (LN), excepting for the ISW, within the IPX-U system
- One of the belonging Fusion nodes outside the IPX-U system

For more details, refer to the figures on the next pages.

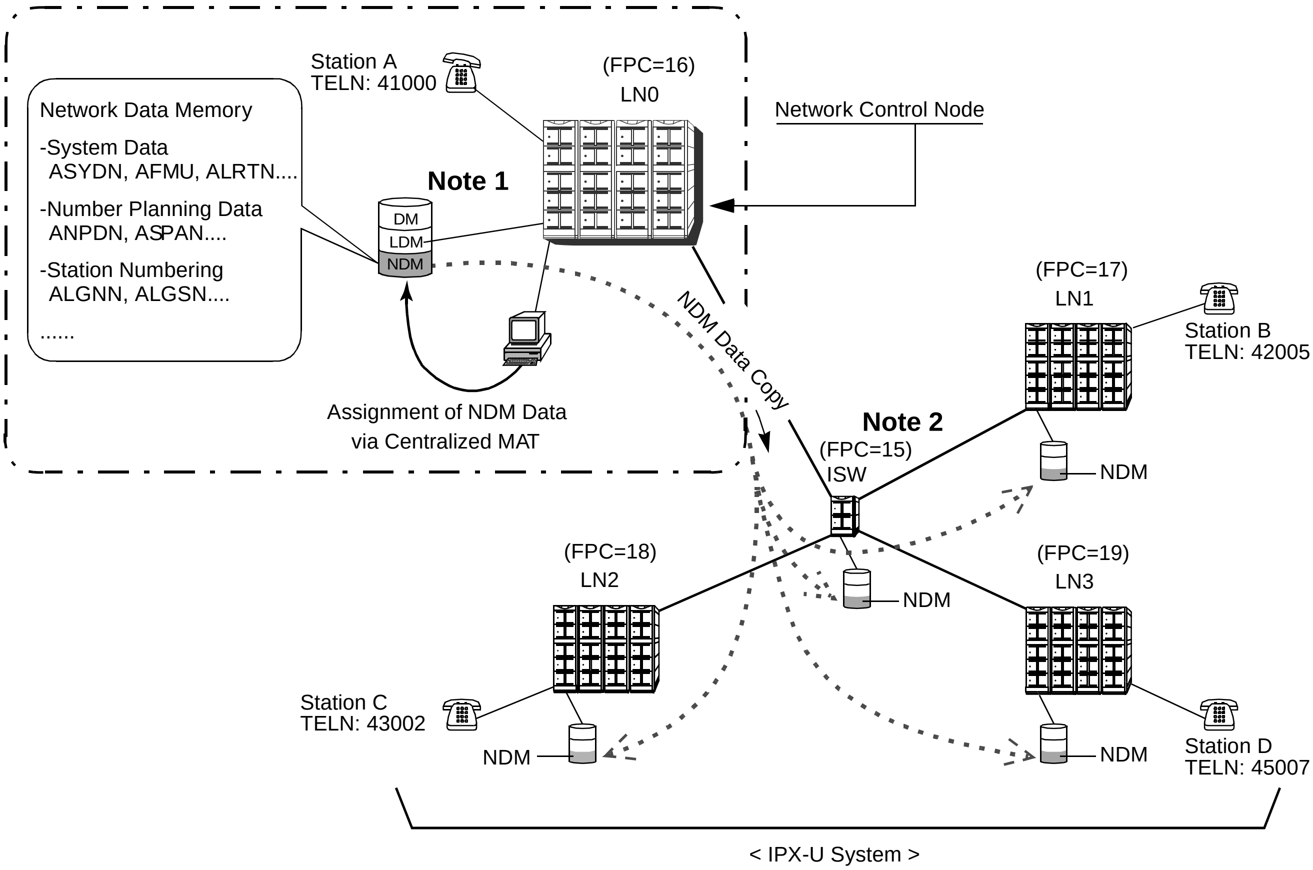
Note 1: *Within the IPX-U system, the NCN can be designated only from the Local Nodes (LN0-LN3). The ISW cannot be assigned as the NCN.*

Note 2: *On a FCCS network, assign only one NCN. Multiple nodes cannot be assigned as the NCN.*

Because the Fusion link can be established either independently within the system (IPX-U) or jointly with other outside IPX and/or IMX series, the assignment of NCN can differ, depending on the network configuration.

[Pattern 1] When the system has a FCCS link independent of other systems

If the system has a FCCS link only within the system (i.e. no FCCS link is established with other IPX and/or IMX series), an NCN must be assigned from any of the existing Local Nodes, excepting the ISW. In this example, LN0 is assigned as the NCN.



ISW : Inter-node Switch	DM : Data Memory	FPC : Fusion Point Code
LN : Local Node	LDM: Local Data Memory	TELN: Telephone Number
NCN: Network Control Node	NDM: Network Data Memory	MAT : Maintenance Administration Terminal

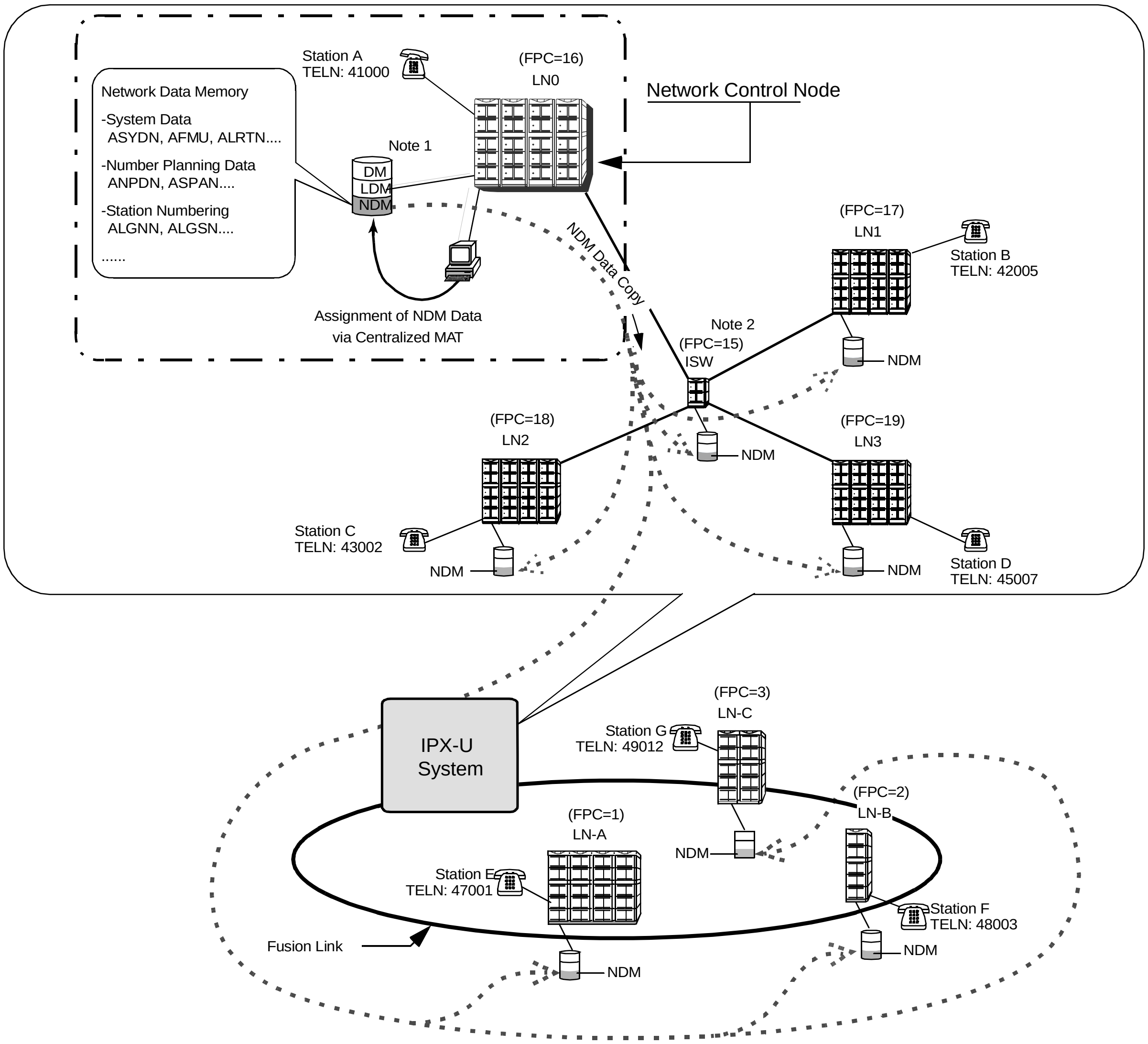
Note 1: *The network-level data (NDM data) can be assigned only at the NCN. However, other node-level data (LDM data) must also be assigned at each node (including ISW), depending on the requirements. For more details, refer to NAP-200-020 in Chapter 4 or the "Fusion Network System Manual."*

Note 2: *When the system is operated, the function to be performed by the ISW is only to provide the PCM time slot switching between each Local Node (LN0 - LN3). However, a Fusion Point Code (FPC) must be assigned for the ISW as well as for other Local Nodes, using the ASYDL command.*

Figure 2-20 Example of NCN Assignment (1/3)

[Pattern 2] When the system has a FCCS link with other IPX and/or IMX series and an NCN exists within the system

If the system has a FCCS link with other IPX and/or IMX series (i.e. the FCCS nodes also exist outside the system), an NCN can be assigned from either Local Nodes outside the system or the Local Nodes inside the system. In this example, LN0 of the IPX-U system is designated as the NCN.



ISW : Inter-node Switch	DM : Data Memory	FPC : Fusion Point Code
LN : Local Node	LDM : Local Data Memory	TELN : Telephone Number
NCN : Network Control Node	NDM : Network Data Memory	MAT : Maintenance Administration Terminal

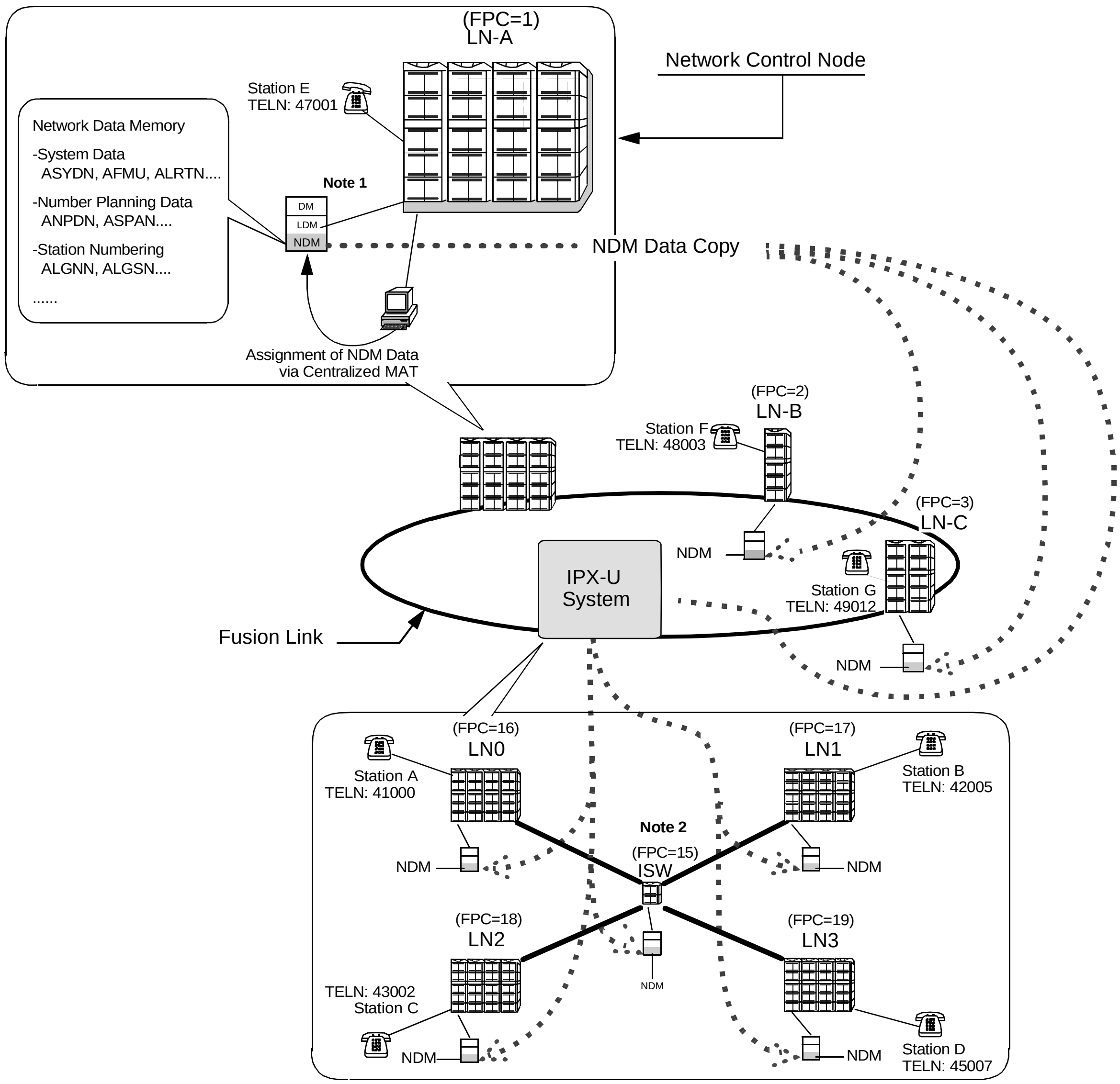
Note 1: *The network-level data (NDM data) can be assigned only at the NCN. However, other node-level data (LDM data) must also be assigned at each node (including ISW), depending on the requirements. For more details, refer to NAP-200-020 in Chapter 4 or the "Fusion Network System Manual."*

Note 2: *When the system is operated, the function to be performed by the ISW is only to provide the PCM time slot switching between each Local Node (LN0 - LN3). However, a Fusion Point Code (FPC) must be assigned for*

Figure 2-20 Example of NCN Assignment (2/3)

[Pattern 3] When the system has a FCCS link with other IPX and/or IMX series and an NCN exists outside the system

If the system has a FCCS link with other IPX and/or IMX series (i.e. the FCCS nodes also exist outside the system), an NCN can be assigned from either the Local Nodes outside the system or Local Nodes inside the system. In this example, LN-A (NEAX2400 IPX series, 4-IMG type) outside the system is designated as the NCN.



ISW : Inter-node Switch	DM : Data Memory	FPC : Fusion Point Code
LN : Local Node	LDM: Local Data Memory	TELN: Telephone Number
NCN: Network Control Node	NDM: Network Data Memory	MAT : Maintenance Administration Terminal

Note 1: *The network-level data (NDM data) can be assigned only at the NCN. However, other node-level data (LDM data) must also be assigned at each node (including ISW), depending on the requirements. For more details, refer to NAP-200-020 in Chapter 4 or the "Fusion Network System Manual."*

Note 2: *When the system is operated, the function to be performed by the ISW is only to provide the PCM time slot switching between each Local Node (LN0 - LN3). However, a Fusion Point Code (FPC) must be assigned for the ISW along with other Local Nodes, by using the ASYDL command.*

Figure 2-20 Example of NCN Assignment (3/3)

9.4 Preparation of Trunking Diagram

Prepare the trunking diagram according to the customer's specifications. Since there are different kinds of switching offices such as a single office, network offices, etc. are involved, the trunking diagram must be prepared as per the customer's specifications.

9.5 Preparation of Module Group Face Layout and Port Accommodation Diagram

When mounting of various circuit cards in the PBX have been finalized, the installation company concerned should prepare the module group face layout and port accommodation diagram.

9.6 Preparation of Circuit Card Switch Setting Sheets

With respect to the circuit cards to be mounted in the PBX, prepare the circuit card switch setting sheets. Some of the circuit cards may not properly operate by the initial switch settings arranged at the factory before shipping or may not meet the customer's specifications. By referring to the Circuit Card Manual denote the switch settings in the Switch Setting Sheets provided in the explanations of each of the circuit cards. Make the switch setting entries with respect to all the circuit cards.
It should be remembered that use of a circuit card varies with the switch setting on that card.

10. INSTALLATION CABLES

The following installation cables are required for the PBX:

- DC Power Cable: For connections between the Rectifier and battery and between the Rectifier and the PBX
- AC Power Cable: For supplying AC source power to the Rectifier
- Ground Cable: Communication, Security and Line Protector grounding
- 25P Shielded Cable with CHAMP (Amphenol) connector at one end: For connections between the MDF and the PBX
- 25P Shielded Cable with CHAMP (Amphenol) connector at both ends: For connections between the MAT and the PBX, and between peripheral equipment and the PBX.
- House Cable: For connections between terminals (telephone sets, etc.) and the MDF
- Cables for C.O. lines and Tie Lines
- Others: For connections between Alarm Indicators and the MDF

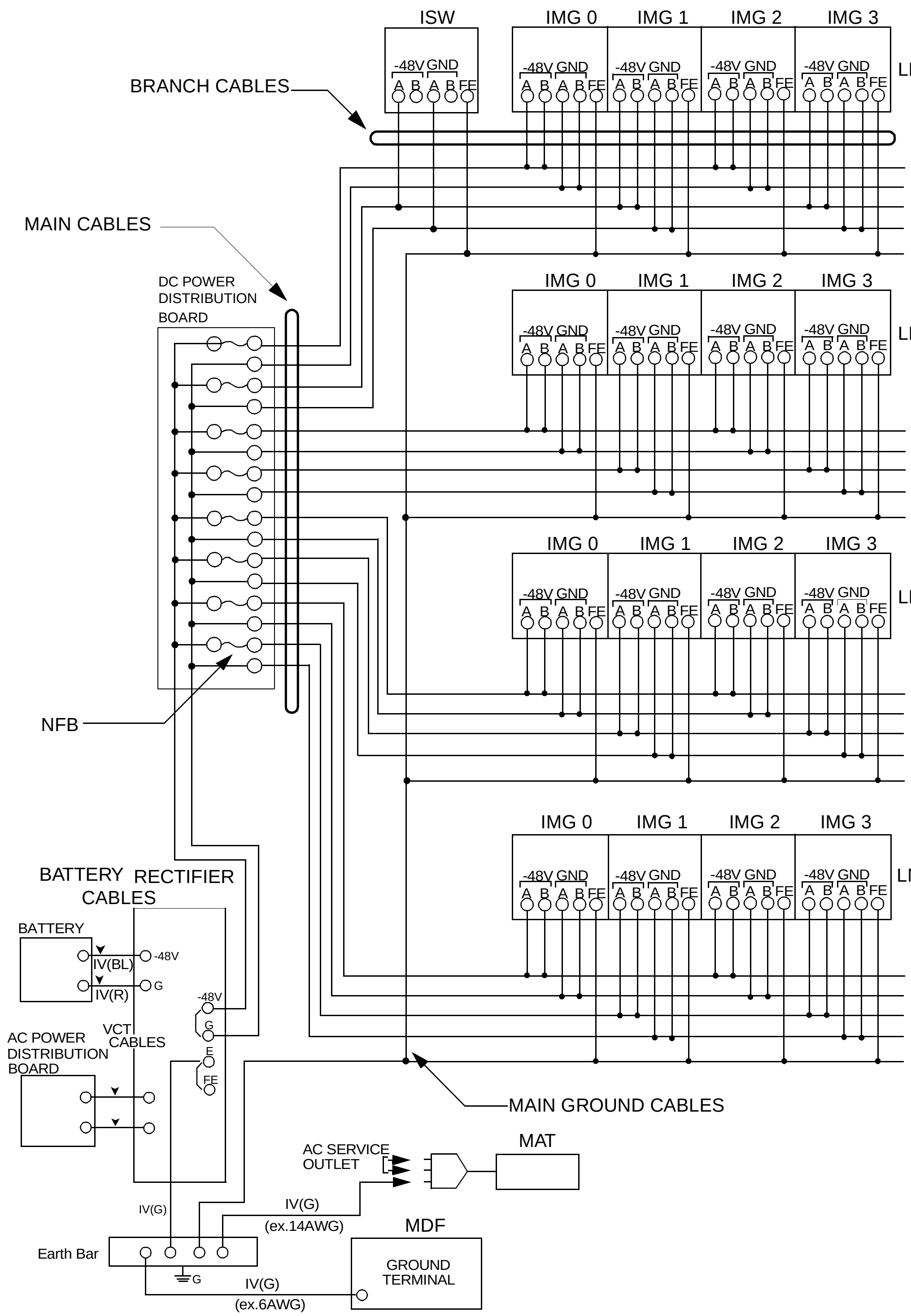
10.1 AC Input, DC Power, and Ground Cables

1. For AC input cable, VCT (Polyvinyl Chloride Cabtyre Cable) should be used. However, if shielding is necessary, as is the case when the AC input cable is to be installed in parallel with a low-voltage power cable, etc., be sure to use VCT-S (Shielded Polyvinyl Chloride Cabtyre Cable).

2. For the power receiving terminals of the PBX, -48 V and G terminals are provided in dual (A side and B side). For two PIMs or less, the DC main power cable is connected only to A side terminals. For three PIMs or more, the cable is branched out. A side supplies power to LPM/TSWM/ISWM, PIM0 and PIM1, and B side to PIM2 and PIM3.

3. For the main ground cable, an IV or CV cable of more than $14mm^2$ (6 AWG) is to be used. (See Figure 2-21).

   As the security ground cable for the MAT and externally installed equipment, IV cable of $2mm^2$ (14 AWG) is to be used. For the ground cable for the line protector of the MDF, an IV cable of $14mm^2$ (6 AWG) is to be used.



Note 1: *Do not make a multiple connection across "A" terminal and "B" terminal of -48V. Likewise, do not make a multiple connection across "A" terminal and "B" terminal of GND.*

Note 2: *It is recommended that each -48 V lead from the PBX be connected to a separate circuit breaker at the rectifier.*

Figure 2-21 DC Main Power Cable and Main Ground Cable

Table 2-10 Clamp Terminal Shape and Purpose

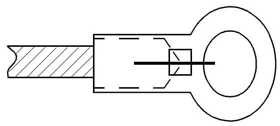
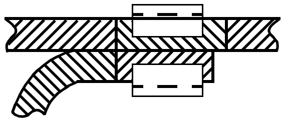
TYPE	SHAPE	PURPOSE	REMARKS
A		End terminal	
T		Branching or extension of power cable	

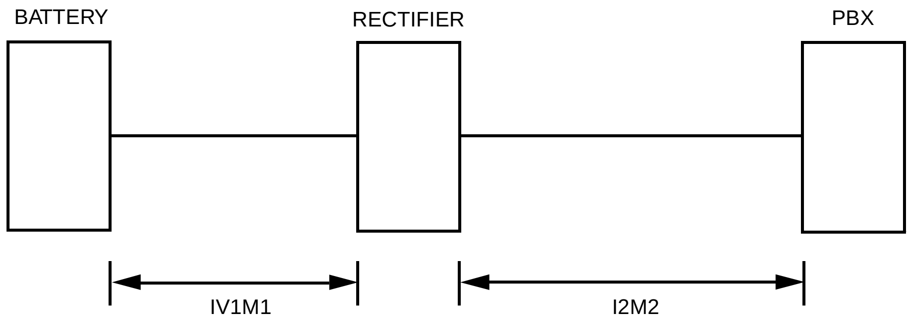
Table 2-11 Selection of T-Type Clamp Terminal

MAIN \ BRANCH	14 AWG/ 2 mm^2	12 AWG/ 3.5 mm^2	10 AWG/ 5.5 mm^2	8 AWG/ 8 mm^2	6 AWG/ 14 mm^2	CURRENT	REMARKS
10 AWG	*T-20	*T-20	*T-20	-	-	51A	
8 AWG	*T-20	*T-20	*T-20	T-20	-	63 A	
6 AWG	T-20	T-20	T-20	T-26	T-44	90 A	
3 AWG	T-26	T-26	T-44	T-44	T-44	115A	
2 AWG	*T-44	T-44	T-44	T-44	T-44	139A	
1 AWG	*T-44	*T-44	T-44	T-66	T-60	162A	
1ø	*T-60	T-60	T-60	T-60	T-76	190A	
2ø	*T-76	T-76	T-76	T-76	T-76	217A	
3ø	*T-98	*T-98	*T-98	T-98	T-98	257A	
4ø	*T-122	*T-122	*T-122	*T-122	T-122	298A	
250 mcm	*T-154	*T-154	*T-154	T-154	T-154	344A	
300 mcm	*T-154	*T-190	*T-190	*T-190	T-190	395A	
400 mcm	*T-240	*T-240	*T-240	*T-240	T-240	439A	

Note: *Selection of T-Type Clamp Terminal*
The asterisk (*) in Table 2-11 indicates that an auxiliary conductor is needed when using a main power wire and a branch power wire of a thinner diameter, and the clamp terminal of the type indicated in the selected columns.

Table 2-12 Clamping Tool

*TOOL TYPE	APPLICABLE CROSS SECTION OF WIRE (mm^2)	ACCESSORIES	REMARKS
No. 1	0.25 ~ 6.64		Manual type For A and C type terminal
No. 2	6.64 ~ 10.25		
No. 9	6.64 ~ 42.42	Convex die 2 pieces	Handle type hydraulic tool For A, C, D, type terminal
No. 10	6.64 ~ 117.02	Convex die 4 Convex die 8	
No. 11	Same as above	Same as above	Pedal type hydraulic tool For all terminal types No. 11 and No. 12 tool are used with No. 13.
No. 12	117.02 ~ 325	Convex die 4 Convex die 4	
No. 13		Rubber hose	
No. 15	14 ~ 122	Convex die 7 pairs	Handle type hydraulic tool For T type terminal
No. 16	123 ~ 365	Convex die 5 pairs	Use with No. 13 for T type terminal



$$S = \frac{0.018x(I1M1+I2M2)}{V}$$

where,

S : Sectional area required (mm^2)
I1 : Maximum current passing between battery and rectifier
M1 : Two-way cable length between battery and rectifier
I2 : Maximum current passing between rectifier and PBX
M2 : Two-way cable length between rectifier and PBX
V : Voltage drop

Figure 2-22 Calculation Method for Sectional Area

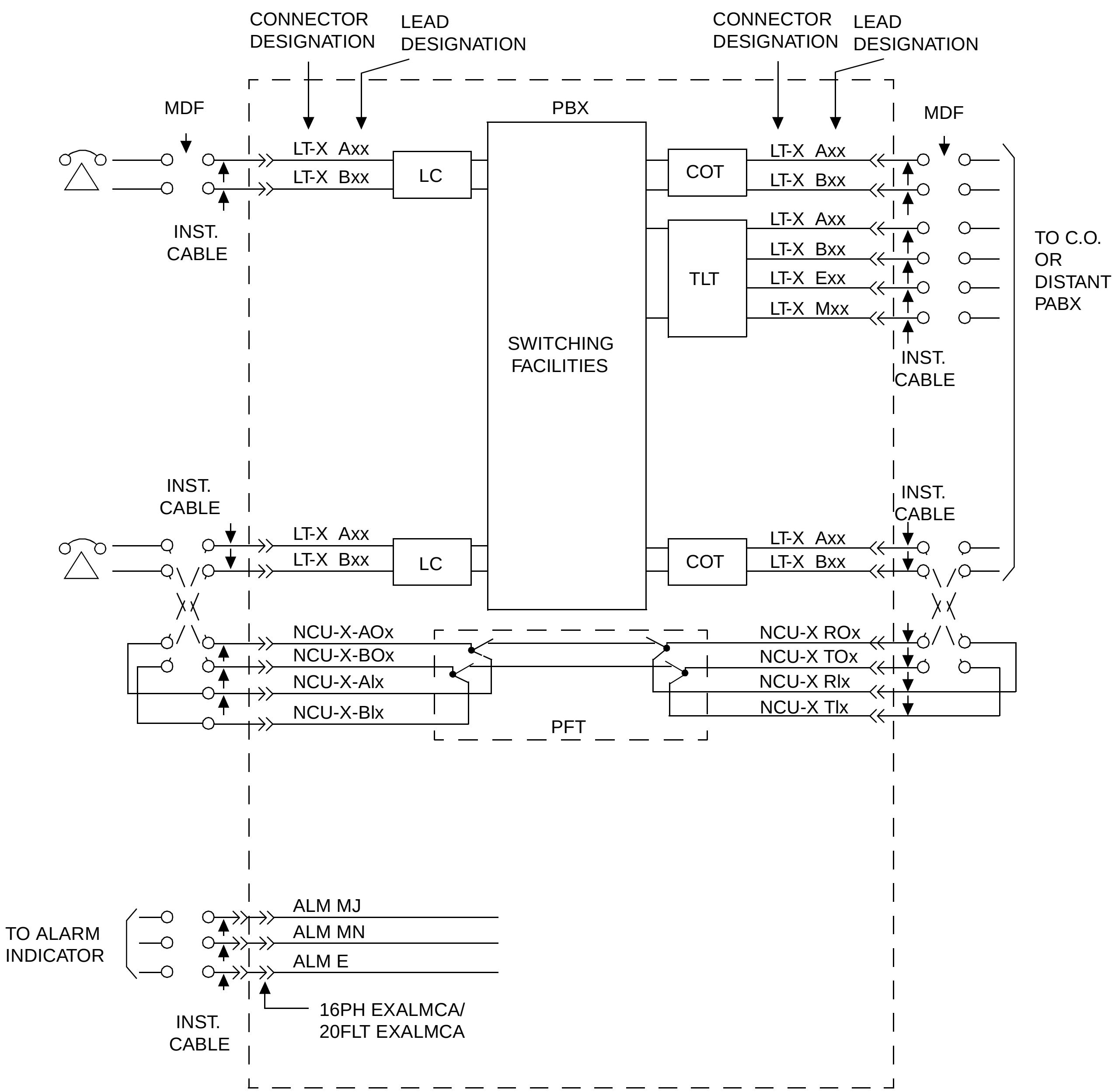
10.2 Cables between the PBX and MDF

With respect to lines, trunks, and NCU (PFT), 25P shielded the PBX and the MDF are connected using cables with a CHAMP (Amphenol) connector at one end.

Table 2-13 shows the procedure for calculating the required number of cables. Figure 2-23 also shows an outline of cable connections from the Module Group to the outside.

Table 2-13 Calculating the Number of Cables

CABLE NAME	CALCULATION	SUB TOTAL
LT Cable	Number of PIMs × 12	
NCU Cable	Number of PFT Circuit Cards × 2	
68PH EXMISC CA	One cable	
ODT Cable	Number of TLT circuit cards × 1	
	TOTAL	



Note 1: *Legend ⟵: Male CONNECTOR ≻—: Female CONNECTOR*

Note 2: *⟵○ or ○⟶ in the above drawing indicates the CONNECTOR ended cable to be connected between module connector and MDF.*

Figure 2-23 Outline of Cables from Module Group to the Outside

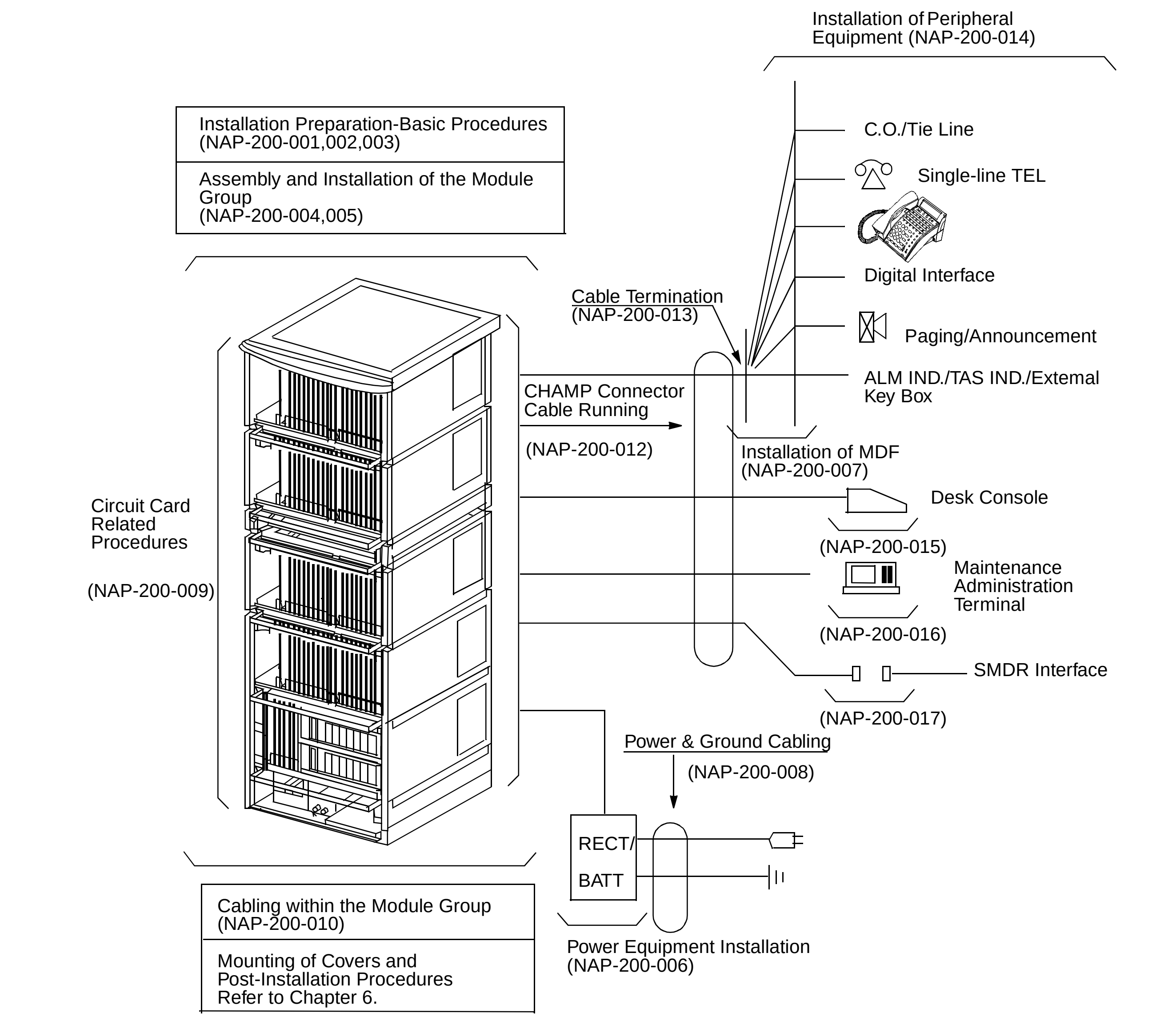
This page is for your notes.

CHAPTER 3 INSTALLATION PROCEDURE

1. GENERAL

This chapter explains the procedures for installing the PBX, the Maintenance Administration Terminal (MAT), Desk Consoles, and various types of terminal equipment (single line telephones, D^{term}s, Data Modules, etc.). The procedures explained in this chapter are shown in Figure 3-1.

Before beginning the installation, thoroughly read Section 2., "PRECAUTIONS BEFORE BEGINNING INSTALLATION" and observe the precautions while performing the installation.



Note: *Work procedures are explained in detail in each NAP. Refer to the procedures by number (NAP-200-XXX).*

Figure 3-1 Scope of Installation Procedure

2. PRECAUTIONS BEFORE BEGINNING INSTALLATION

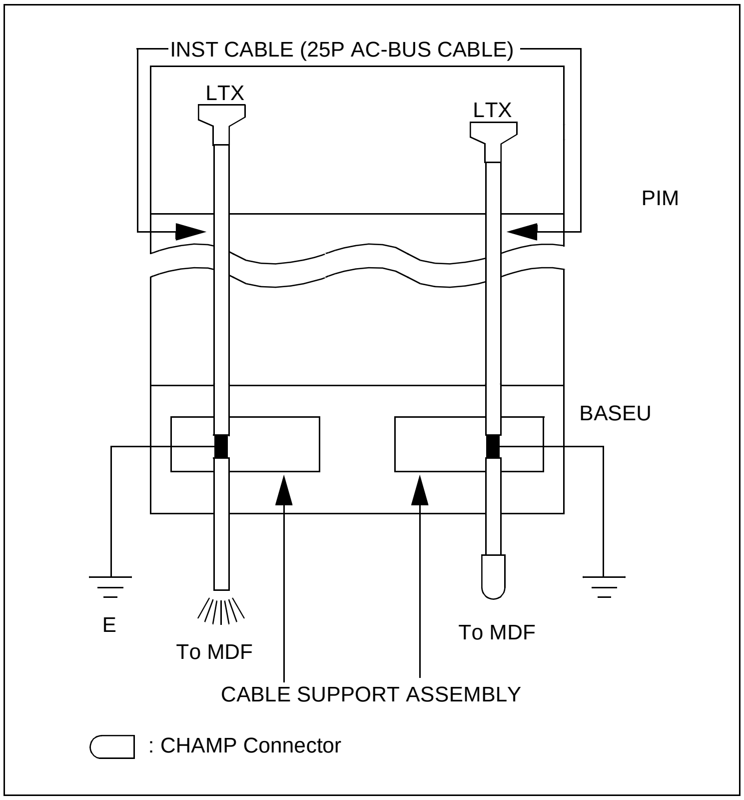
Outline

1. Before beginning the installation, check to see if the installation requirements (grounding, the quantity and kind of installation cables, etc.) are all present by referring to Chapter 2 of this manual.

2. For a standard installation, the system is installed on a free-access floor, so no explanations are provided pertaining to cable racks and cable ducts.

3. The PBX is connected to the MDF by use of 25-pair shielded cables as the installation cables. Each of these installation cables is grounded at the cable support assembly of the BASEU as shown below. By this arrangement, noise radiation from each cable is prevented.

   For the installation method, refer to NAP-200-012: "Cable Running from the PBX to MDF, ATTCON, MAT and SMDR".



4. As the cable to be run between the PBX and the Rectifier, use a CV cable (600 V Crosslinked Polyethylene Insulated PVC Sheathed Cable) as the circumstance permits. Compared with an ordinary IV cable (600 V PVC Insulated Cable) the CV cable is stronger because of its thicker cover. Thus, it is suitable to run along the free-access floor where it is difficult to protect the cable from damage.

   Also, for easy identification of different cables, use cables of different colors as follows:

   - –48 V: Blue (White)
   - GND: Red (Black)
   - E: Green

Note: *The color shown in ( ) is applicable to the UL Specification.*

3. INSTALLATION PROCEDURE

The flowchart in Figure 3-2 shows the steps of the installation procedure. Each step is assigned a NAP number. NAP-200-001 through NAP-200-017 follow Figure 3-2. These NAPs should be followed sequentially when performing the installation. Individual steps, such as installation of SMDR, can be performed independently by referring to the corresponding NAP.

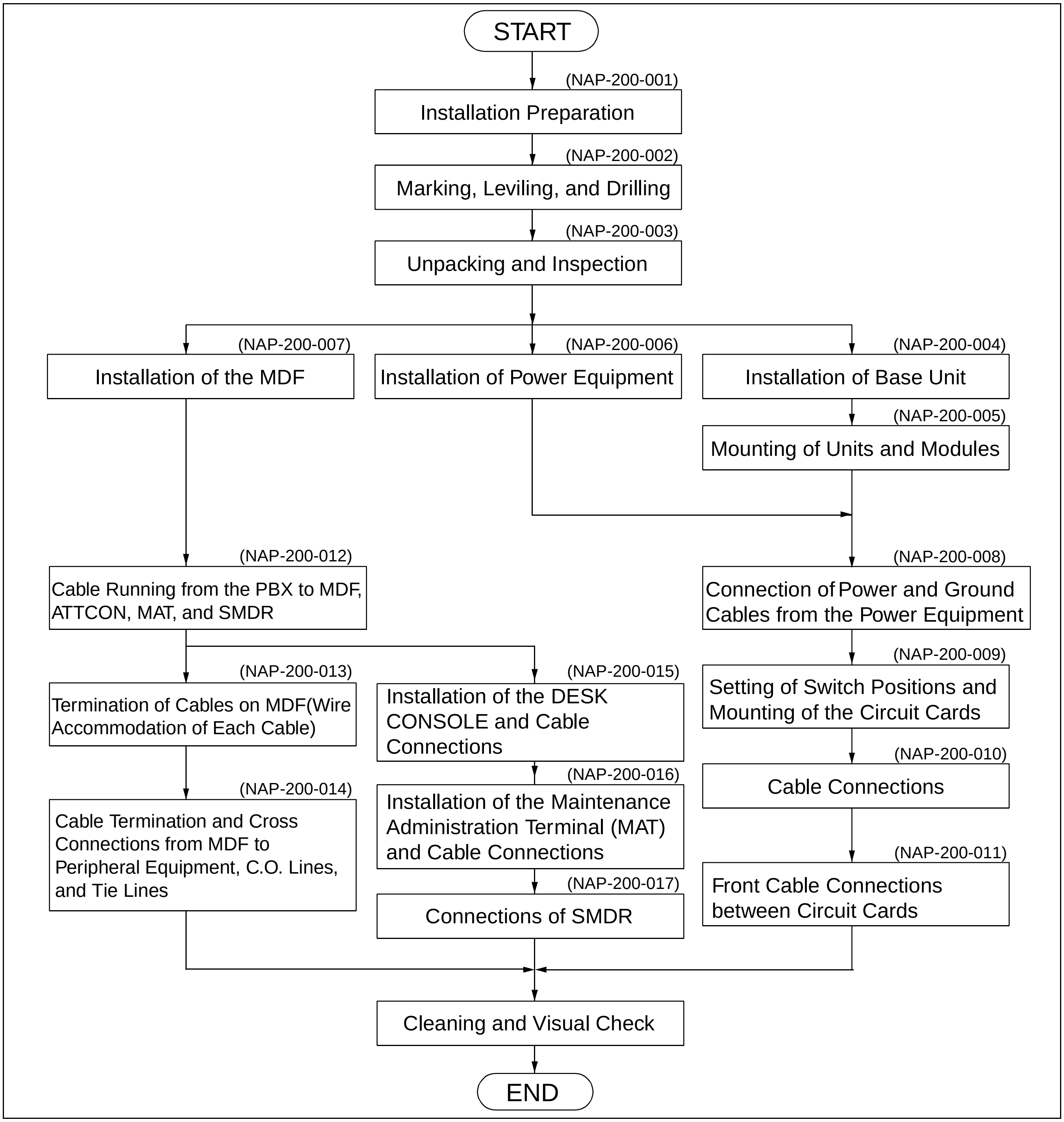


Figure 3-2 Installation Procedure

NAP-200-001
Sheet 1/2
Installation Preparation

This NAP explains the following work items:

- Confirmation of Equipment Locations
- Confirmation of Floor Layout
- Confirmation of Power and Ground Supply
- Check of Quantity of Equipment Packages

Note 1: *Confirmation procedures are discussed in Chapter 2 of this manual.*

Note 2: *Be sure to correct any abnormal conditions encountered during installation preparation (missing hardware, floor not level, etc.) before proceeding to the next step.*

START

- Confirmation of Equipment Locations
  - Environmental — Confirmation of temperature and humidity.
  - Floor Space
  - Floor Load
  - Equipment Room
    - Floor surface
    - Wall
    - Ceiling
    - Lighting facilities
- According to the floor layout, confirm that the equipment locations are appropriate. **Note 2**
  - Improper Locations:
    - An open aisle or place where sprinklers are provided.
    - A place where there is a water pipeline.
    - A place where there is a pipeline generating heat and an exhaust for such heat.
    - A location near an exhaust port for corrosive fumes or gas generated from a facility machine.
    - A location near a copying machine or apparatus which dissipates heat.
    - A location where the switch will be exposed to direct sunlight.
    - A location near a kitchen facility, etc., from which vapor is generated.
    - A high EMI environment; for example, a location near an elevator motor or X-ray equipment.

B

A

NAP-200-001
Sheet 2/2
Installation Preparation

A

B

Proper Locations:

- A dry and clean place.
- A place that is well ventilated.
- A sufficiently illuminated room. (200 lux at floor level).
- A location around which there are no obstructing objects, thus allowing easy maintenance.
- A place where C.O. lines can be brought in, or local cables can be brought up to the MDF easily.
- A place where communication and security ground can be obtained as required

Confirmation of Power and Ground Supply

- Confirm AC voltage and current capacity.
- Confirm that a Circuit Breaker (NFB) is provided exclusively for the system.
- Confirm that ground terminals are provided separately from those of the power supply system.

Check the Quantity of Packages

- Check the quantity of packages to see if there is a discrepancy with the Packing List.
- If any equipment is missing, report it to the supplier immediately.

END

NAP-200-002
Sheet 1/7
Marking, Leveling, and Drilling

This NAP explains the procedures for marking, drilling and other necessary work when the PBX is to be installed on a free-access floor by either one of the following three methods.

- Securing the PBX directly onto the floor
- Securing the PBX with the special stand
- Securing the PBX with the floor elevation

This NAP also explains the procedures for marking, leveling and drilling for MDF, Power Equipment, and Peripheral Equipment (See Section 4).

Note: *Kinds of Anchor Bolts*
Various types of anchor bolts are available; the type of bolt to be used depends on the application. Sleeve expansion-type anchor bolts are generally preferred for the PBX installation. Table 002-1 shows anchor bolt specifications.

Table 002-1 Specification of Anchor Bolts-Sleeve Expansion Type

SCREW	SLEEVE	BOLT LENGTH		SLEEVE LENGTH		DRILL DIA.	DRILLING DEPTH		MAXIMUM THICKNESS OF ITEM TO BE FIXED	APPLICATION	COMPONENTS
		mm	inch	mm	inch		mm	inch			
M10	Ø17.3	50	2	38	1.5	Ø17.5	50	2	15 mm/0.6 in	For concrete	Bolts, Washers, Nuts
		70	2.8	58	2.3		70	2.8		Concrete + Mortar (20 mm/0.8 in thick)	
		80	3.1	68	2.7		80	3.1		Concrete + Mortar (30 mm/1.2 in thick)	

* *Pull out Strength = 1,900 Kg (4185 lb.)*
[Concrete Strength = more than 20,580,000 Pa (2,984 lb./sq. in.)]

NAP-200-002
Sheet 2/7
Marking, Leveling, and Drilling

1. WHEN SECURING THE PBX DIRECTLY ONTO THE FLOOR

START

Marking	While referring to Figure 002-1, mark the holes for the anchor bolts of the base unit.
Drilling	Drill holes at the locations marked for the base unit.
Cutting of Free-Access Floor	Referring to Figure 002-2, cut the free-access floor at the marked cable locations by using a jigsaw.
Leveling	Measure the level of the surface of the free-access floor.
	When it is not level, adjust the support of the free-access floor until it is level.

END

NAP-200-002
Sheet 3/7
Marking, Leveling, and Drilling

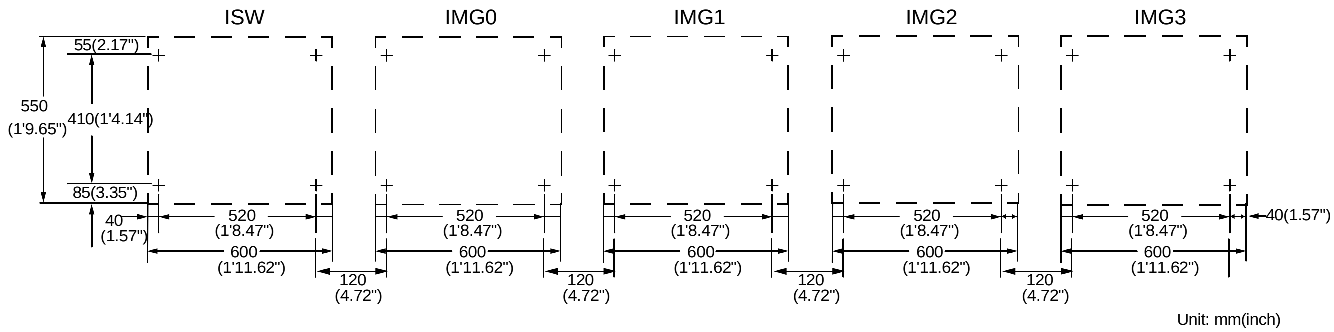


Figure 002-1 Locations of Base Unit Securing Holes

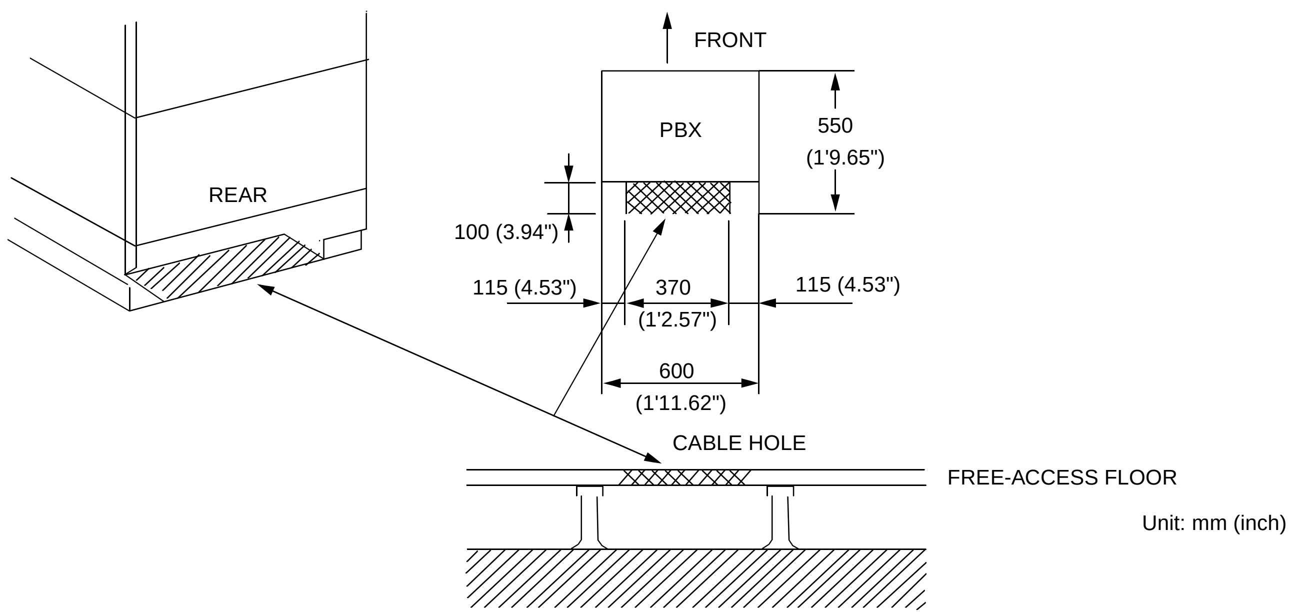


Figure 002-2 Cable Hole on a Free-Access or Computer Floor

2. WHEN SECURING THE PBX WITH THE SPECIALSTAND

START

Marking and Drilling of Special Stand	Drill the Special Stand for securing the PBX. (See Figure 002-3.)
Marking, Drilling and Cutting of Free-Access Floor	Mark, drill, and cut the free-access floor according to the size of the special stand to be used.
Installing the Special Stand	Secure the special stand onto the floor. (See Figure 002-4.)
Level Check	Check the level of the special stand. If necessary, adjust the level by inserting spacers beneath the stand.

END

NAP-200-002
Sheet 5/7
Marking, Leveling, and Drilling

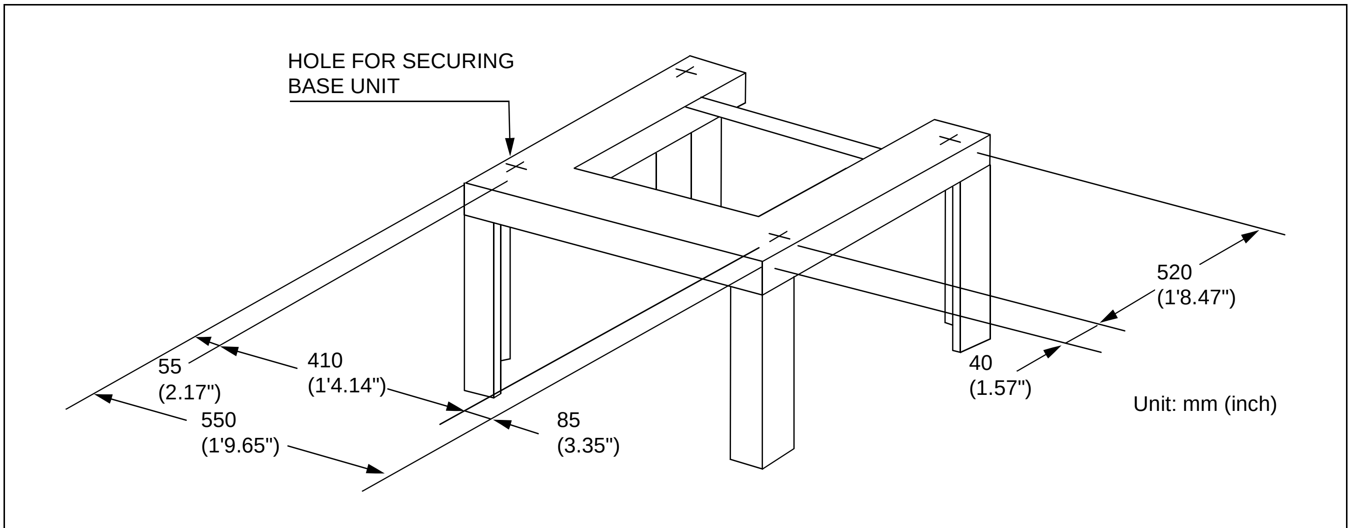


Figure 002-3 Example of Special Stand

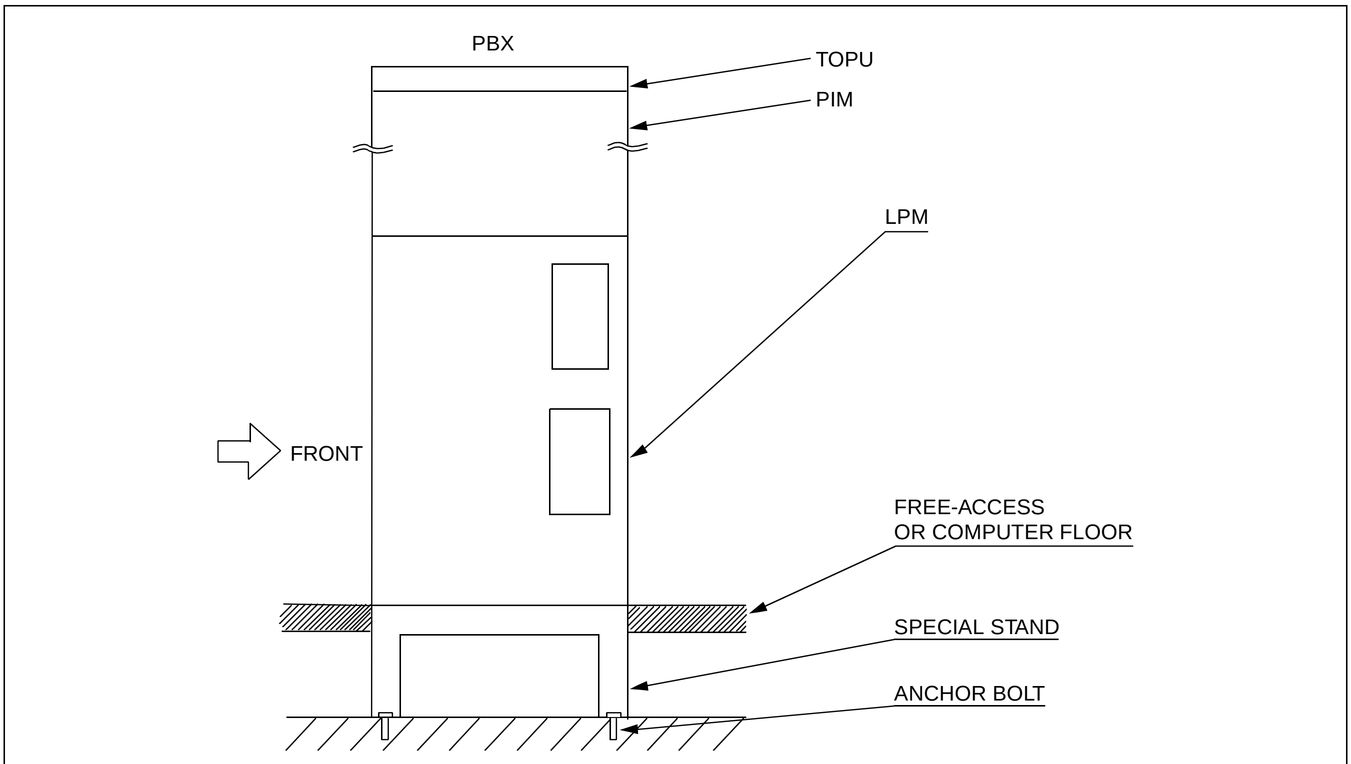


Figure 002-4 Special Stand Installation Method

NAP-200-002
Sheet 6/7
Marking, Leveling, and Drilling

3. WHEN SECURING THE PBX WITH FLOOR ELEVATIONS

START

- Installing the Floor Elevation — Secure the Floor Elevation to the concrete floor. (See Figure 002-5.)
- Marking — Mark the locations of the anchor bolt holes for the Base Unit. (See Figure 002-1.)
- Drilling — Drill holes in the marked locations.
- Cutting of Free-Access Floor — Cut the Free-Access Floor with a jigsaw. (See Figure 002-2.)

END

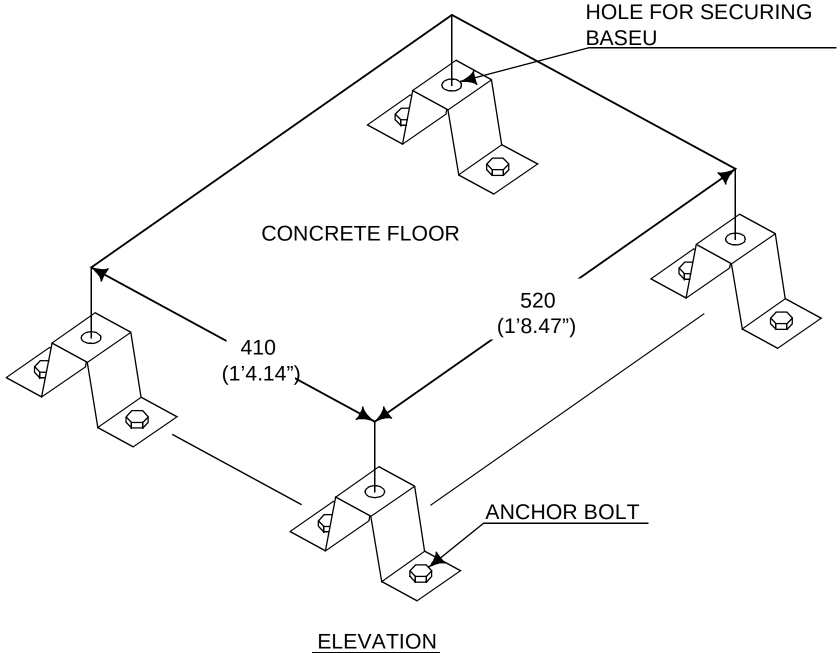
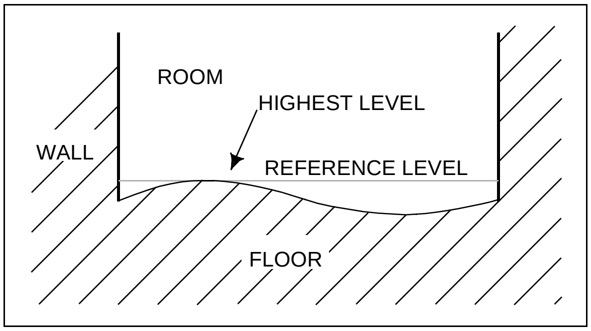


Figure 002-5 Example of Elevation

4. MARKING, LEVELING AND DRILLING FOR MDF, POWER EQUIPMENT, AND PERIPHERAL EQUIPMENT

START

- Leveling — Measure the level of floor surface and determine the reference level.



- Marking — Mark the holes for securing equipment.
  - Power Equipment
  - MDF
  - Peripheral Equipment
- Drilling
  - Drill holes locations marked for power equipment, MDF, and peripheral equipment.
  - Secure the anchor bolts to the floor. (Embed nuts and sleeves)
  - Remove the anchor bolts temporarily. (Remove anchor bolts and washers)

END

NAP-200-003	
Sheet 1/2	
Unpacking and Inspection	

CAUTION: Equipment may be damaged if not handled properly during unpacking and inspection.

This NAP explains the procedure for unpacking and inspection.

Note 1: *If any equipment is missing or damaged, report it to the supplier immediately.*

Note 2: *Save all packing materials and boxes so that they can be used to return damaged equipment to the supplier.*

1. UNPACKING

START

- Quantity check — Check the quantity of packages received against the Packing List.
- Check for external damage — Check the packaging for external damage.
- Carry-In — Carry the packages containing the Module Group into the switching equipment room.
- Unpacking **Note 2** — Module Group, Modules, and Units
  - Covers
  - Circuit Cards
  - Desk Console
  - Cables

END

CAUTION: Equipment may be damaged if not handled properly during unpacking and inspection.

2. INSPECTION

START

- Visually Inspect Modules and Units
  - Overall distortion.
  - Scratches or dents on the surface.
  - Distortion of shelves.
  - Cracks to connectors on the backplane.
  - Broken or bent pins on the backplane.
- Circuit Cards [Provide protection from static electricity.]
  - Scratches and cracks.
  - Loose wires and parts.
  - Damage to card puller tabs.
- Desk Console and MAT
  - Scratches and dents on the body.
  - Damaged to keys and lamps.

END

NAP-200-004
Sheet 1/3
Installation of the Base Unit

This NAP explains the procedure for securing the Base Unit onto the floor directly, or using special stand.

1. INSTALLING THE BASE UNIT DIRECTLY ONTO THE FLOOR

START

- Securing the Base Unit
  - Secure the Base Unit onto the floor as per Figures 004-1 and 004-2.
  - When the floor elevation is in use, secure the Base Unit by referring to Figures 004-1 and 004-3.
- Level Check
  - Check the level of the Base Unit. If necessary, adjust the level by inserting spacers beneath the Base Unit.

END

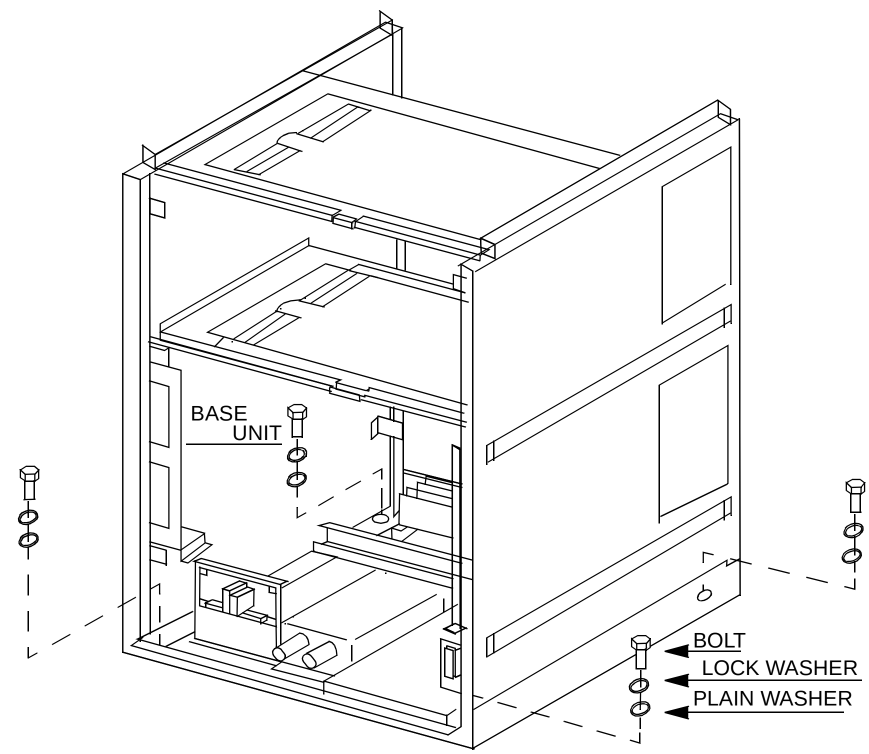


Figure 004-1 Mounting the Base Unit on an Ordinary Floor

NAP-200-004
Sheet 2/3
Installation of the Base Unit

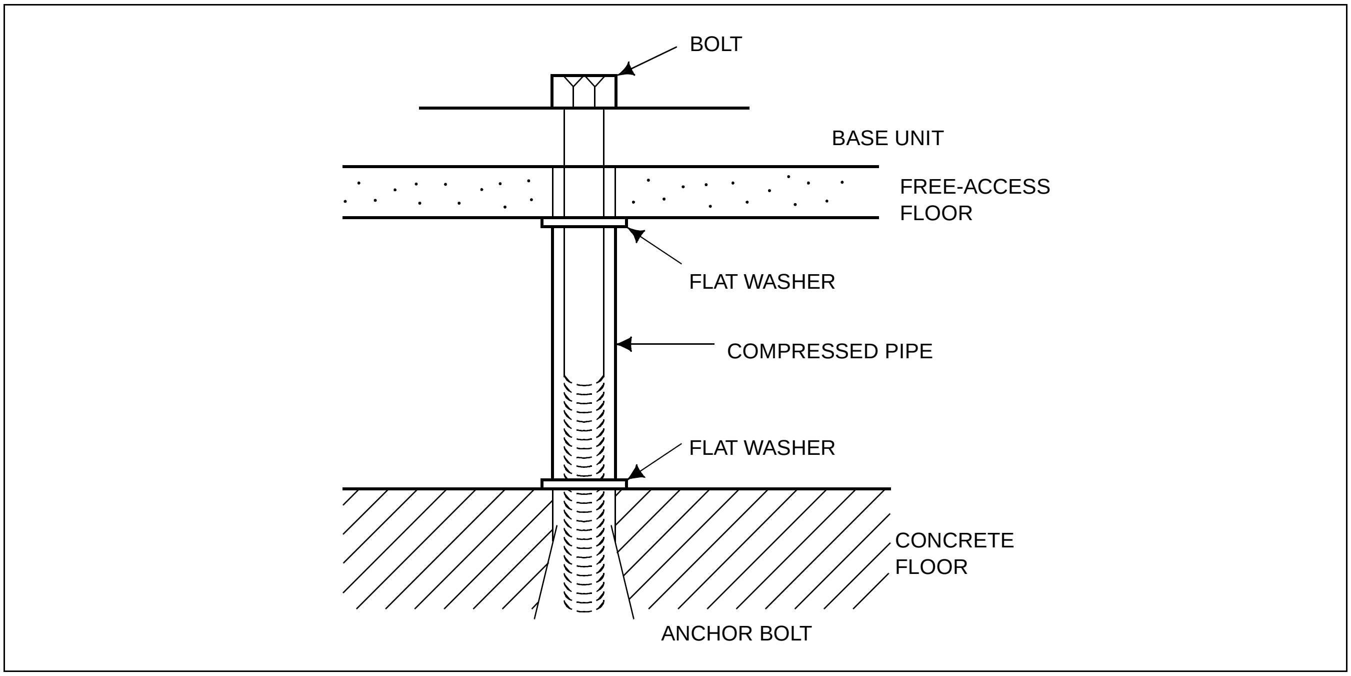


Figure 004-2 Mounting the Base Unit on a Free-Access or Computer Floor

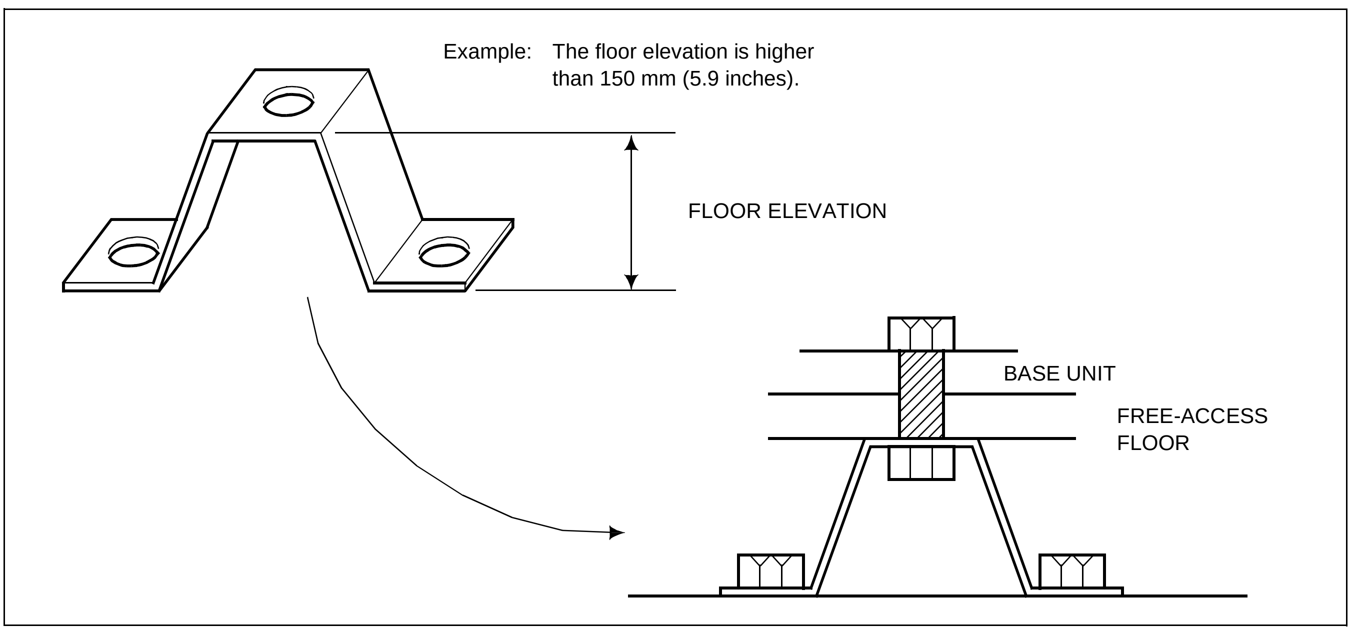


Figure 004-3 Mounting the Base Unit on a Free-Access or Computer Floor via Elevation

2. INSTALLING THE BASE UNIT USING A SPECIAL STAND

START

- Securing the Base Unit — Secure the Base Unit onto the special stand per Figure 004-4.
- Level Check — Check the level of the Base Unit. If necessary, adjust the level by inserting spacers beneath the Base Unit.

END

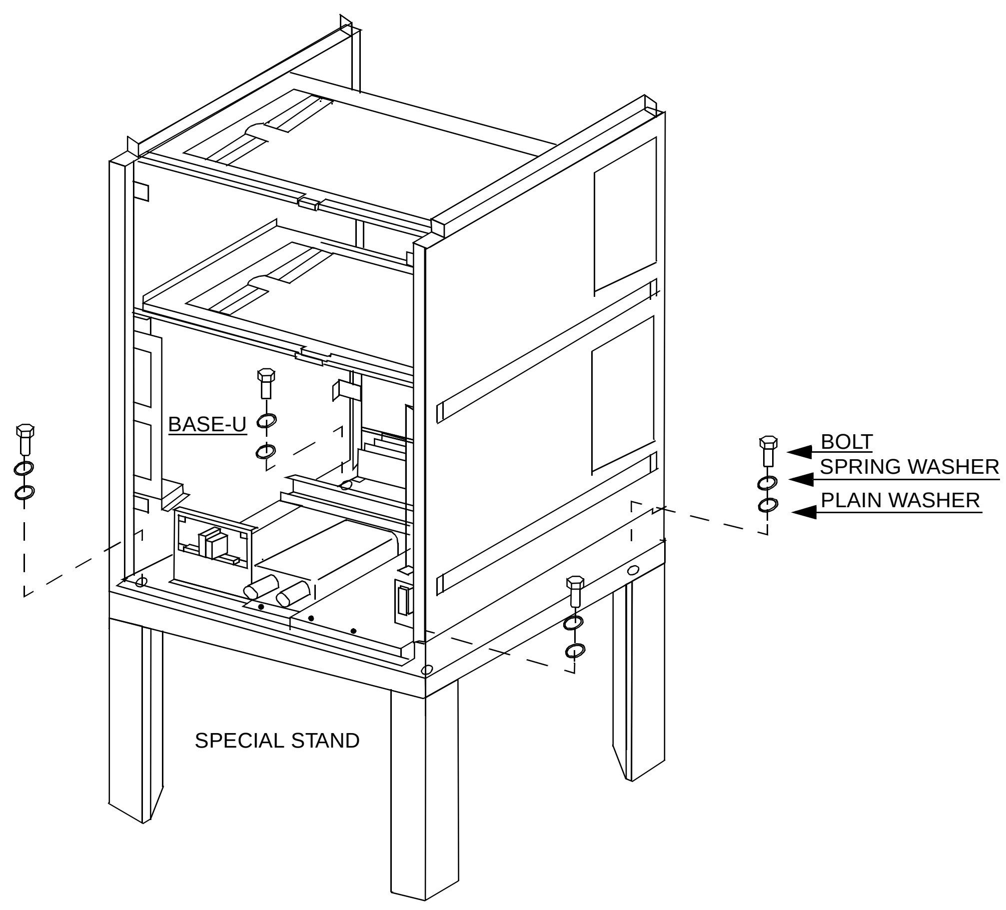


Figure 004-4 Setting the BASEU via Special Stand

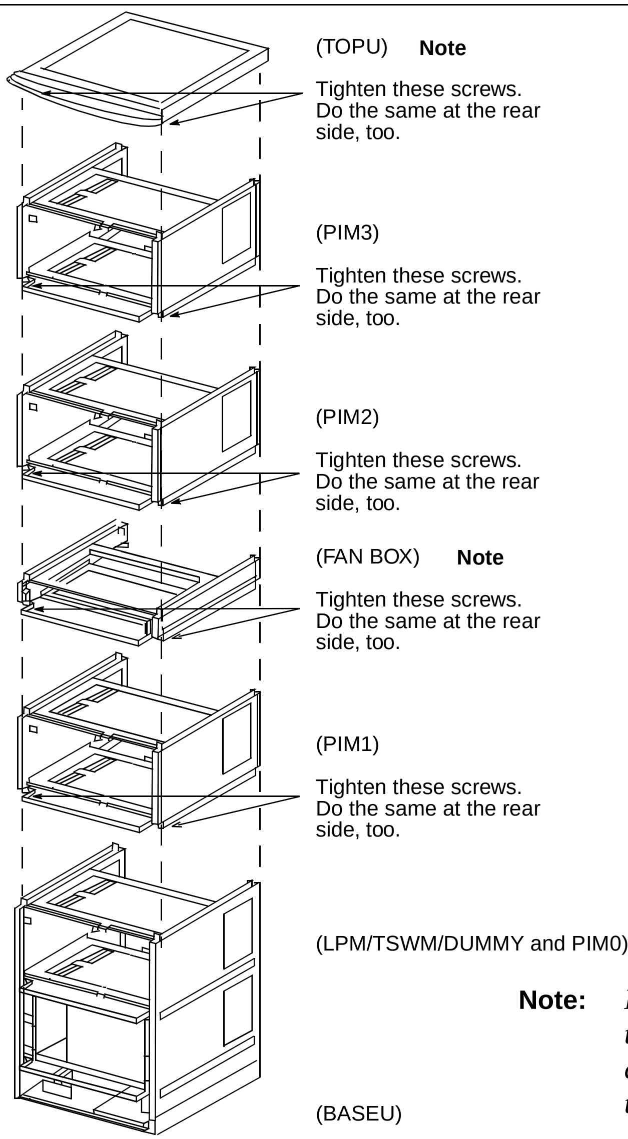
NAP-200-005
Sheet 1/16
Mounting of Units and Modules

1. MOUNTING OF UNITS AND MODULES

START

— Mounting of Modules, FANU, and TOPU. ________ Mount modules, FAN BOX and TOPU for each cabinet referring to Figure 005-1.

END



Note: *Fan Unit (FANU) is mounted either on the TOPU or inside the FAN BOX. For detailed procedures, refer to Section 2 of this NAP.*

Figure 005-1 Procedure for Mounting Units and Modules

NAP-200-005
Sheet 2/16
Mounting of Units and Modules

2. INSTALLATION OF FANU

Location of FANU (PZ-M369 and three electronic FANs) is shown in Figure 005-2. Depending on your system configuration, mount the FANU in the proper position.

The mounting location of FANU differs, depending on the module configuration of each cabinet. When the cabinet consists of a total of two PIMs or less, the FANU is mounted on the TOPU. Otherwise, the FANU is housed in the dedicated FAN BOX in the center of the cabinet.

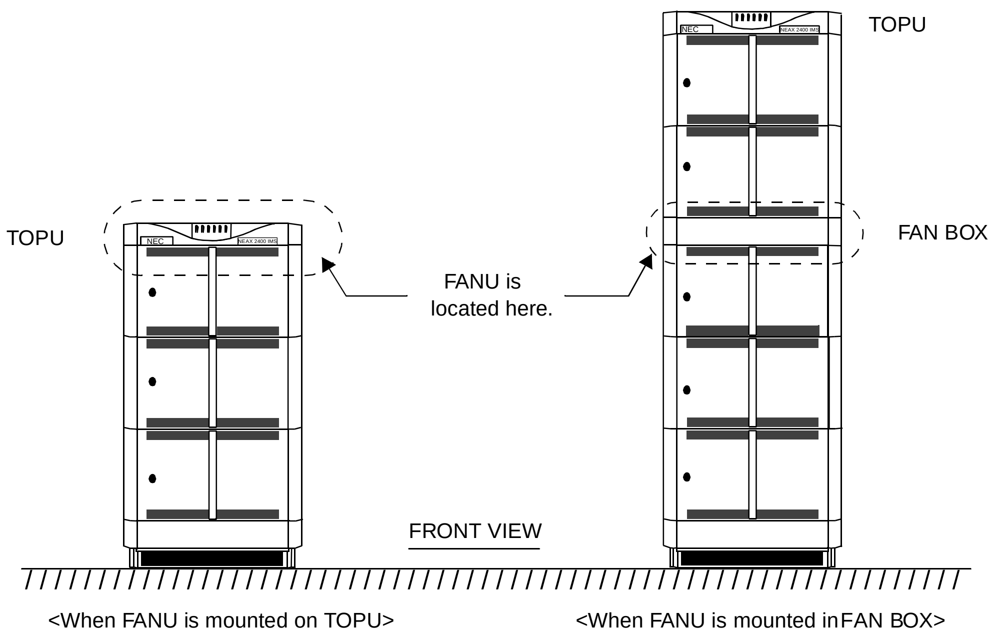


Figure 005-2 Locations of FANU

NAP-200-005
Sheet 3/16
Mounting of Units and Modules

[Procedure for FANU on the TOPU]

When any IMG is configured by two PIMs or less, the FANU is mounted as shown in Figure 005-3. Because the FANU is already mounted on the TOPU of the cabinet, perform Step 4 through Step 7 only, excepting a special case (Step 1 through Step 3 are not required in the normal cases).

STEP 1 : Referring to Figure 005-3, mount the three FANs onto the FAN Mounting Plate. Then, fasten every four screws.

STEP 2 : Accommodate the FAN Mounting Plate (tipped with three FANs) onto the TOPU.
Then, tighten the four screws (refer to Figure 005-3).

STEP 3 : Mount the PZ-M369 onto the TOPU. Then, fasten the two screws (also refer to Figure 005-3).

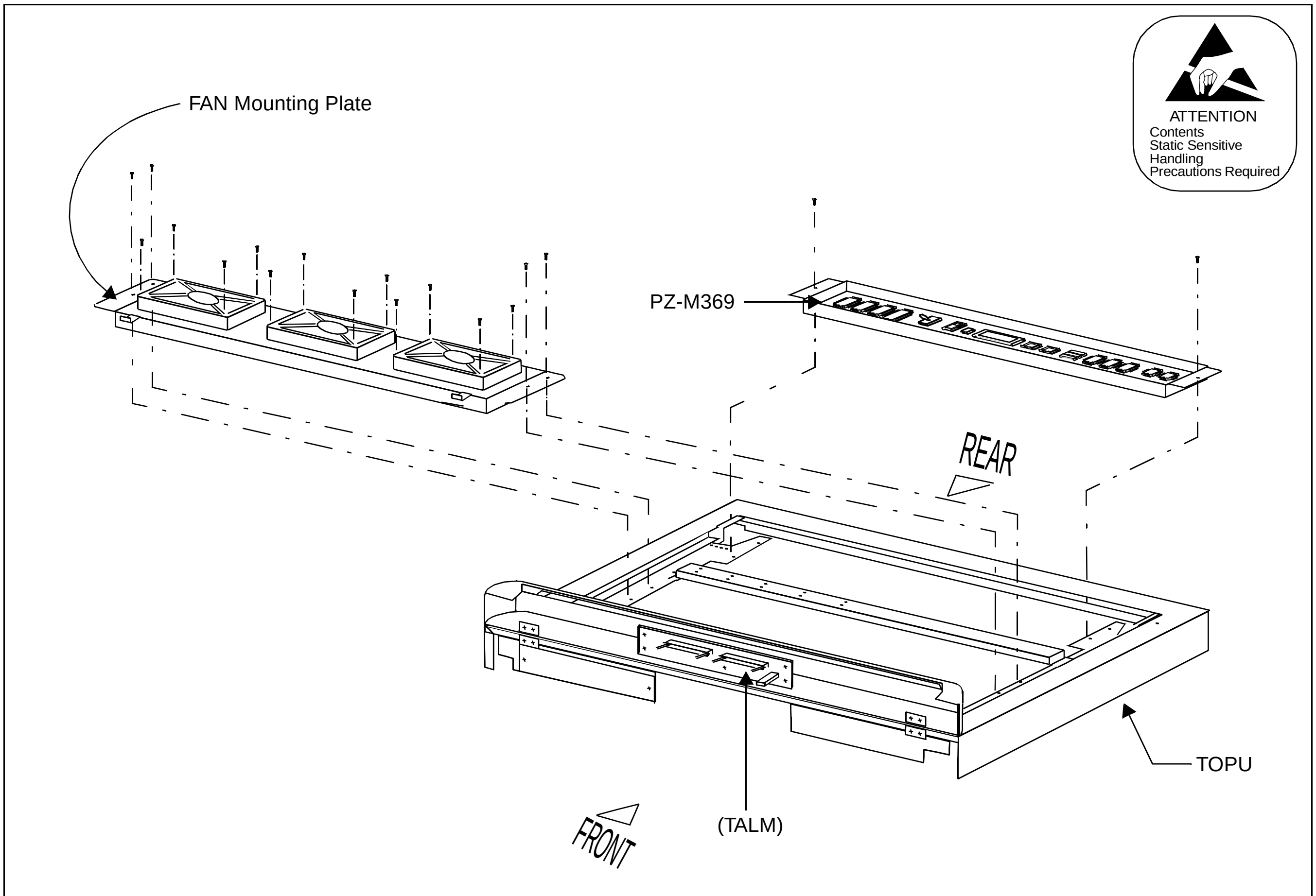
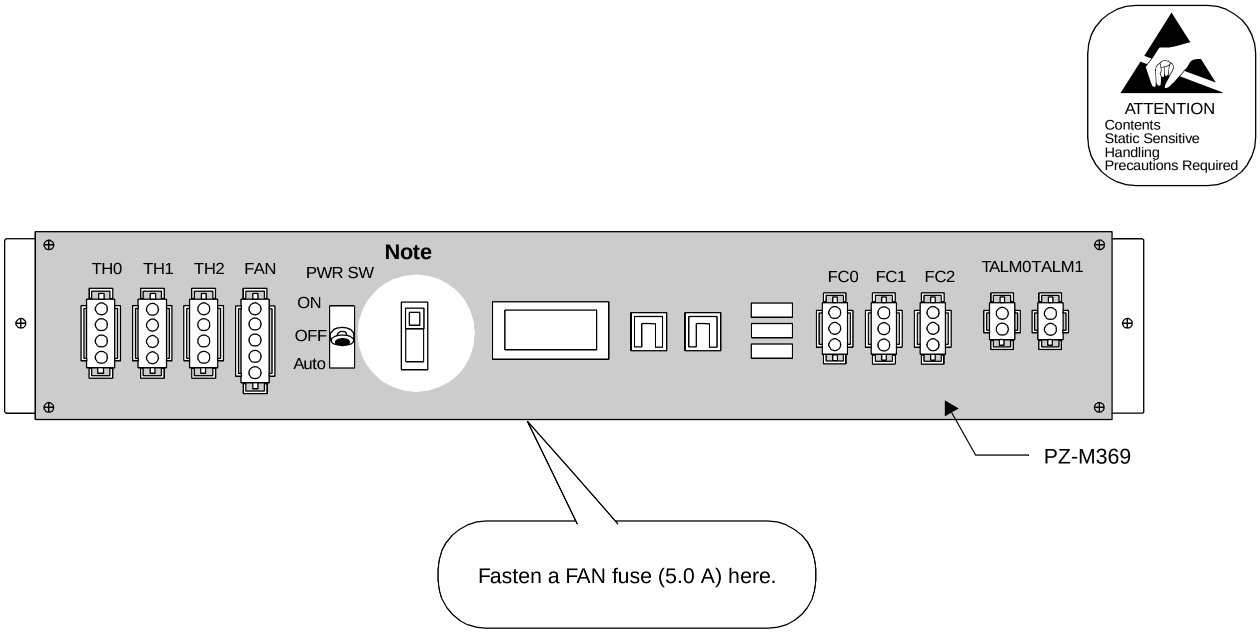


Figure 005-3 Mounting of FANU (on TOPU)

NAP-200-005
Sheet 4/16
Mounting of Units and Modules

STEP 4 : Fix a FAN fuse (5.0 A) onto the PZ-M369.



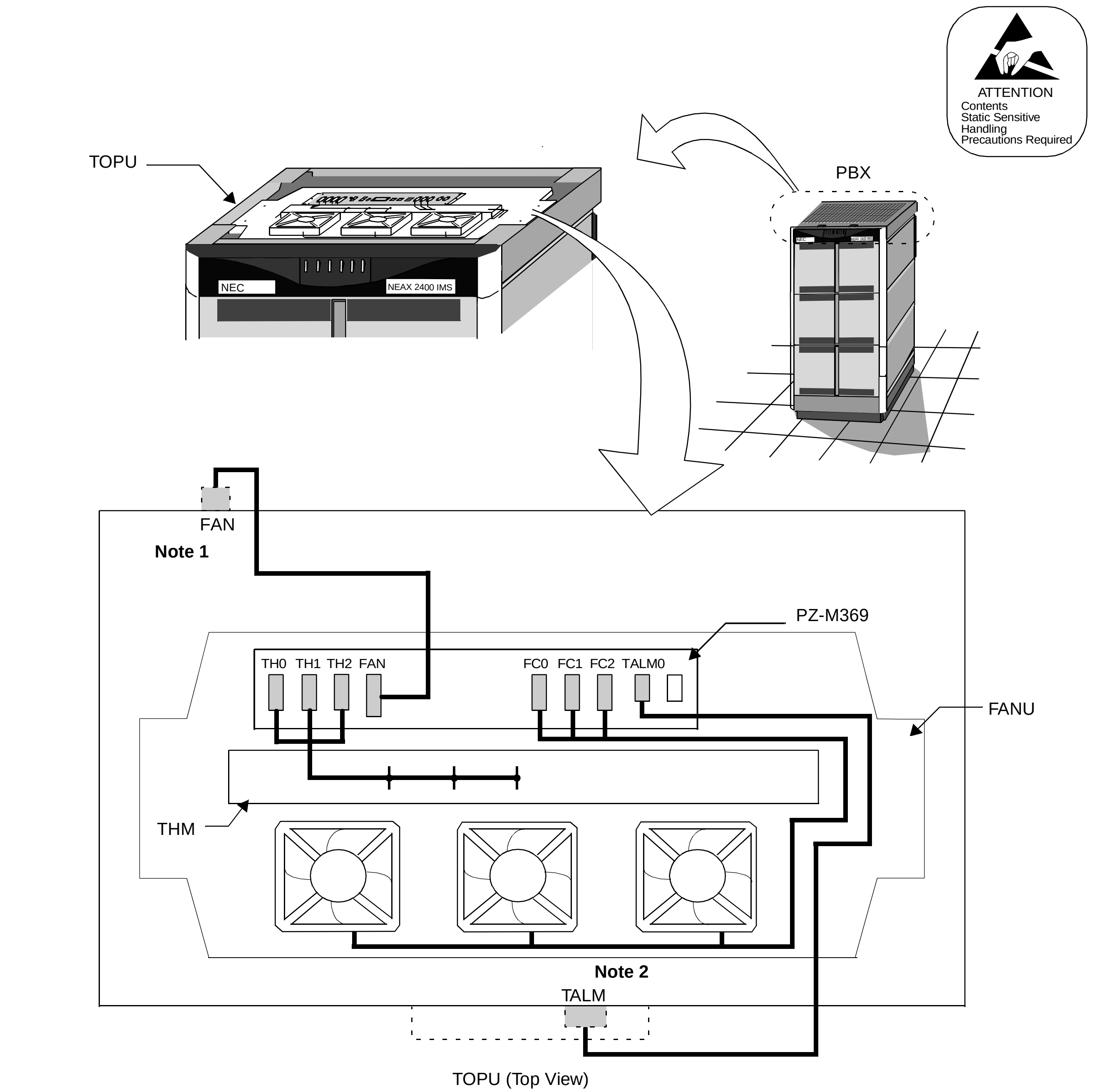
Note: *Heat run test of the FANU is shown in Chapter 4: "SYSTEM STARTUP". Therefore, keep the PWR SW key to the center position (=OFF), still at this time.*

Figure 005-4 Attachment of FAN Fuse (PZ-M369)

STEP 5 : Connect the FAN cables as shown in Figures 005-5 and 005-6.

STEP 6 : Lastly, attach the Top Cover onto the TOPU of the cabinet. Then, fasten the four screws (refer to Figure 005-7).

Note: *The procedures, Step 4 through Step 6, must be performed at each PBX cabinet adopting 1-PIM or 2-PIM configuration.*



Note 1: *For details on the FAN connecor (PIM backplane), refer to Figure 005-6.*
Note 2: *For details on the TALM connector (TOPU panel), refer to Figure 005-3.*

Figure 005-5 Cable Connections for FANU on TOPU

NAP-200-005
Sheet 6/16
Mounting of Units and Modules

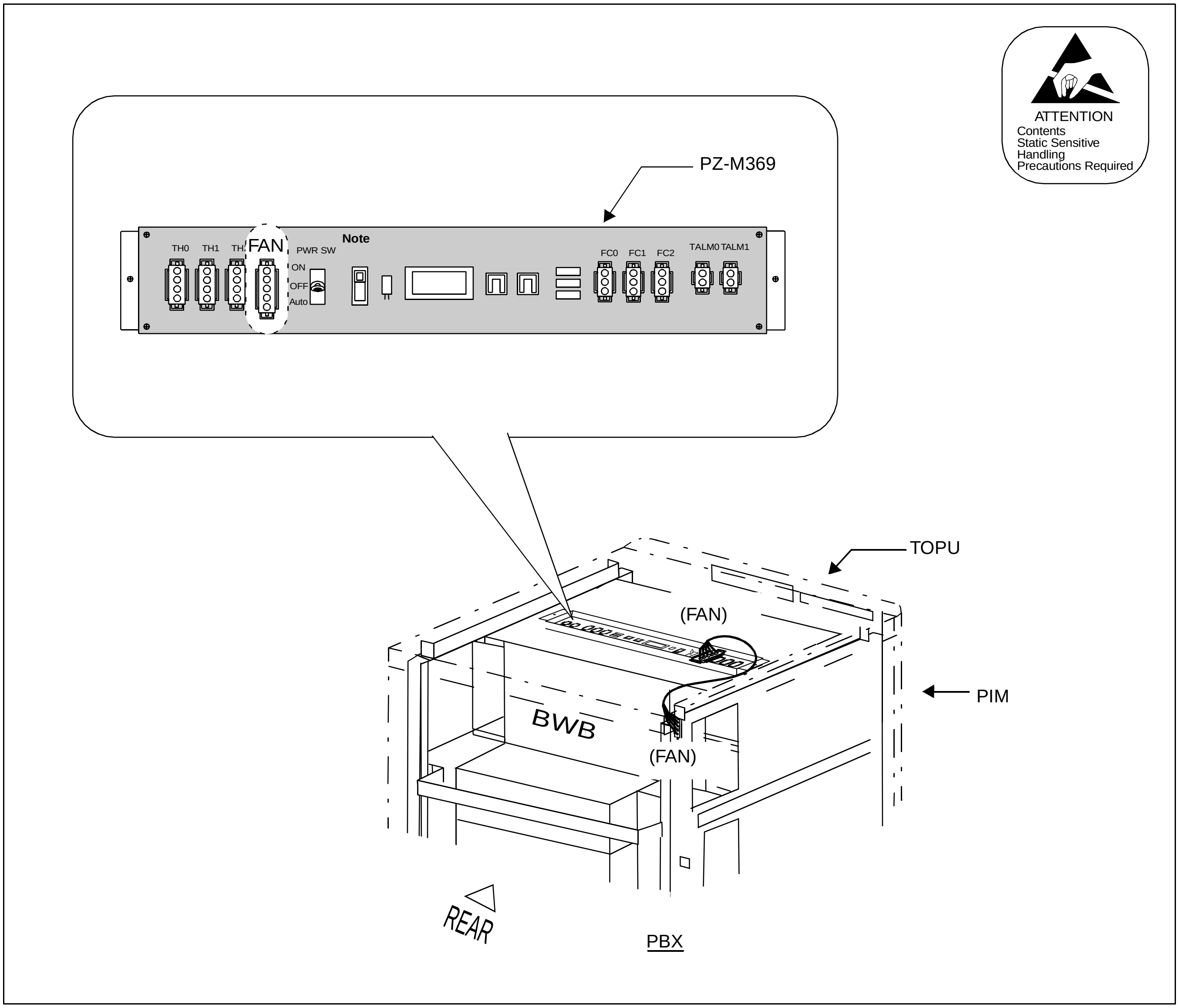


Figure 005-6 Connection of “FAN” Connector Cable (TOPU-PIM)

NAP-200-005
Sheet 7/16
Mounting of Units and Modules

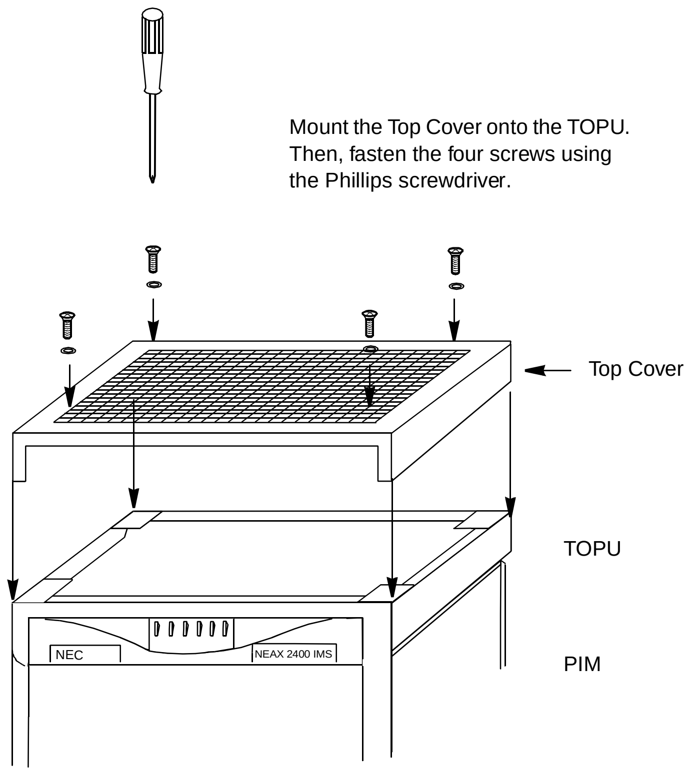


Figure 005-7 Attachment of the Top Cover

[Procedure for FANU in the FAN BOX]

When any IMG is configured by three or four PIMs, the FANU must be accommodated within the FAN BOX in the center of the cabinet. Because the FANU is originally mounted on the TOPU as shown in Figure 005-3, relocate the FANU into the dedicated FAN BOX per the Steps below:

STEP 7 : Referring to Figure 005-3, remove the FANU from the TOPU.

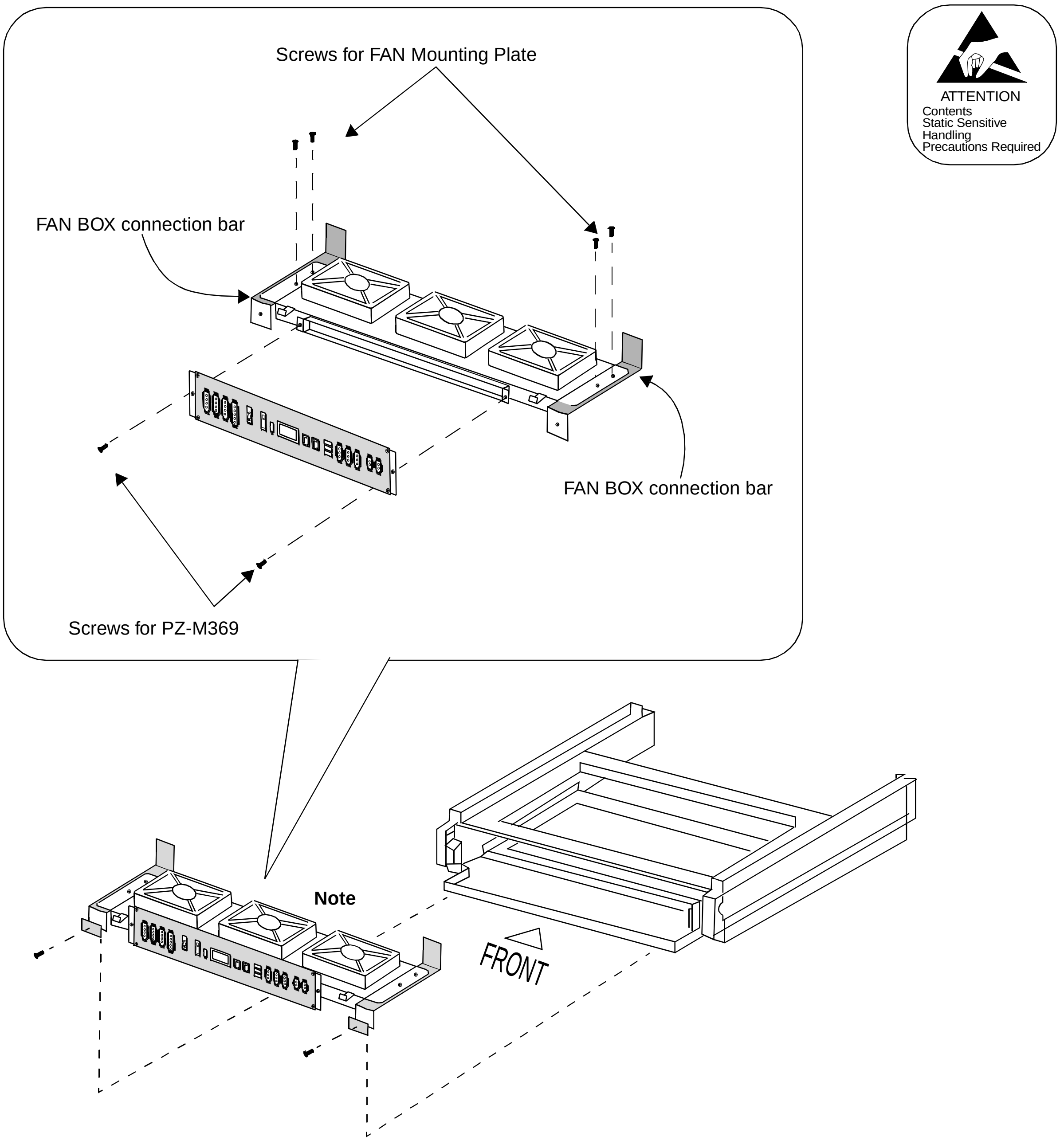
- Remove the two screws fastening the PZ-M369. Then, lift away the PZ-M369.
- Remove the four screws fastening the FAN Mounting Plate (tipped with three FANs). Then, lift away the FAN Mounting Plate.

Note: *Retain the removed screws.*

STEP 8 : Fasten the PZ-M369 and FAN Mounting Plate onto the FAN BOX connection bar (refer to Figure 005-8). Use two screws (for the PZ-M369) and four screws (for the FAN Mounting Plate) retained in Step 1.

STEP 9 : Connect the FAN cables for “FC0,” “FC1” and “FC2” connectors on the PZ-M369. Refer to Figure 005-9.

STEP 10 : Insert the FANU, prepared in Step 1 through Step 3, into the FAN BOX. Then, secure the FANU with the two screws (refer to Figure 005-8).



Note: *Before inserting the FANU into the FAN BOX, connect the FAN cables for "FC0", "FC1" and "FC2" connectors on the PZ-M369. Refer to Figure 005-9 on the next page.*

Figure 005-8 Relocation of FANU and Insertion into FAN BOX

NAP-200-005
Sheet 10/16
Mounting of Units and Modules

Before installing the FANU into the FAN BOX, connect FAN cables as shown below.

ATTENTION
Contents
Static Sensitive
Handling
Precautions Required

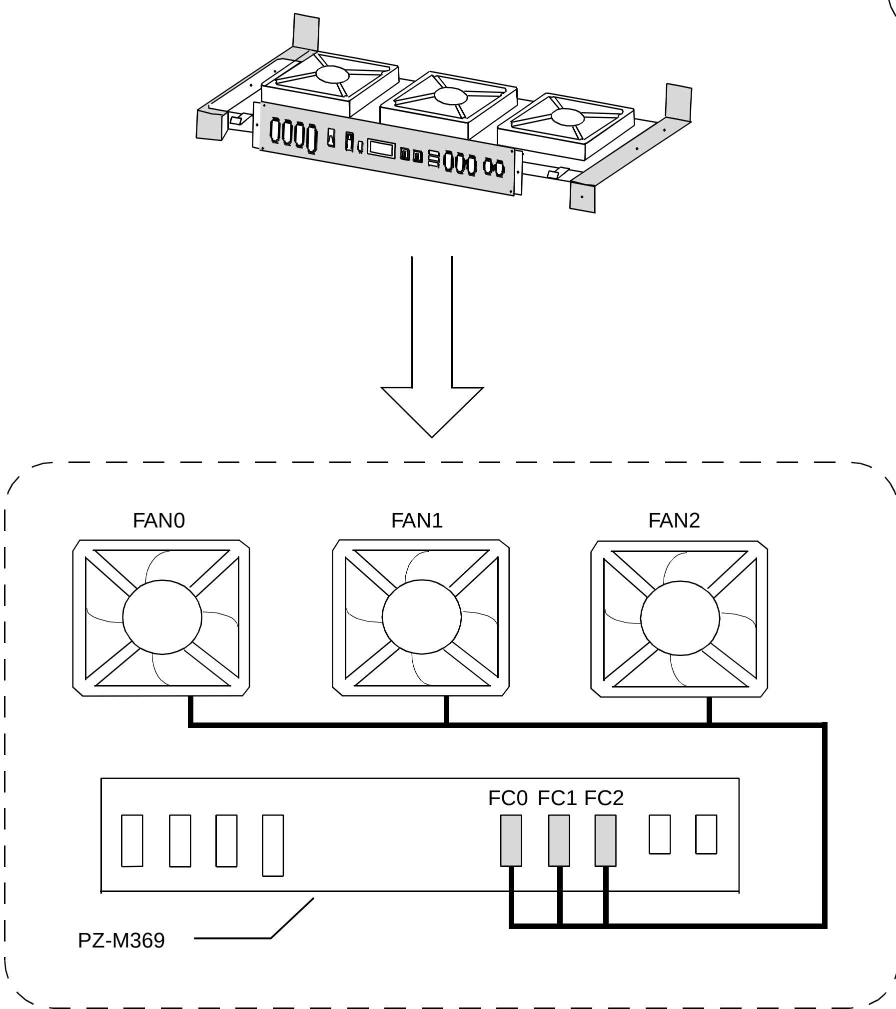


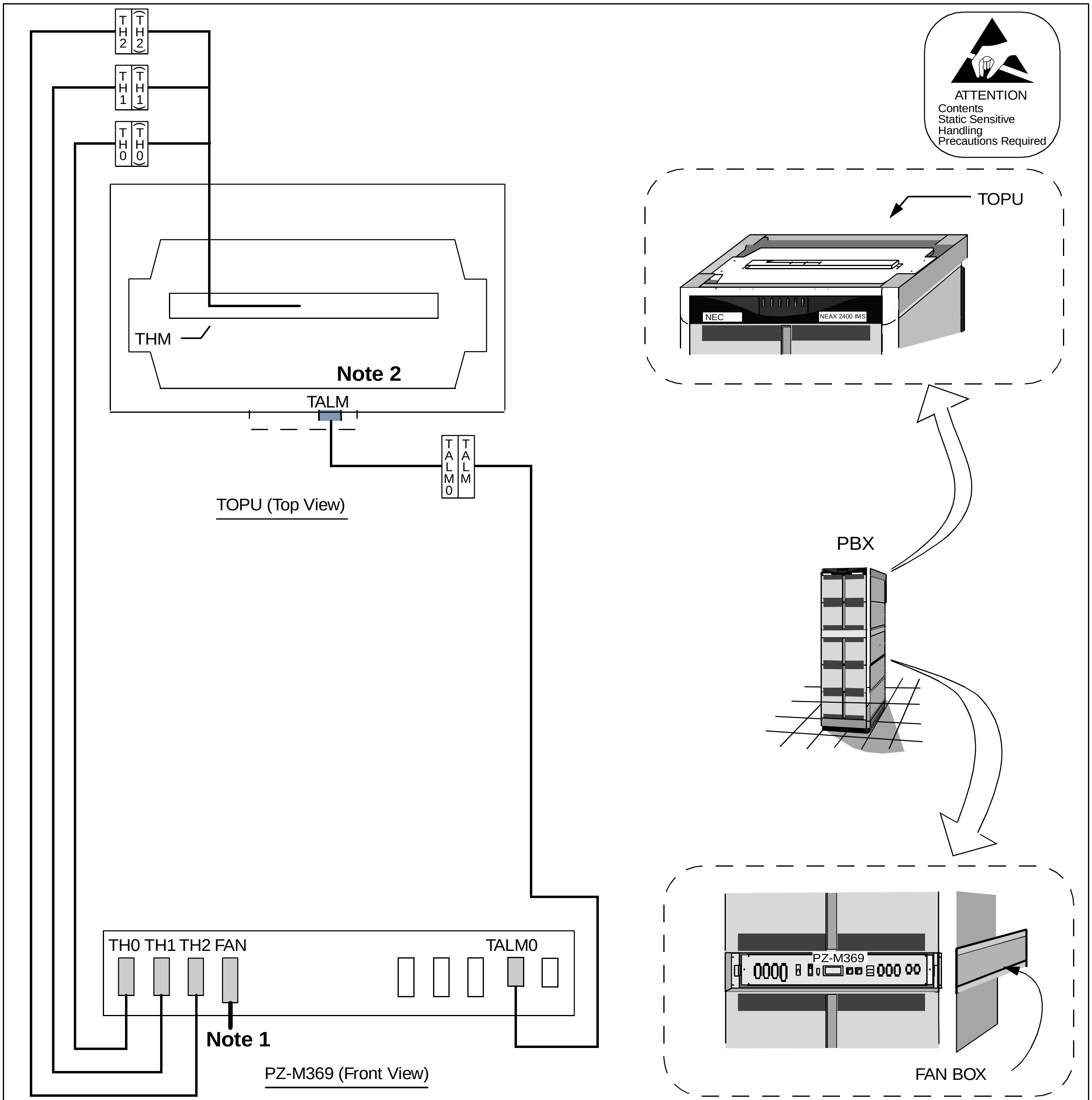
Figure 005-9 FAN Cable Connections for FC0/FC1/FC2 Connectors

STEP 11 : Fix a FAN fuse (5.0 A) onto the PZ-M369 by referring to Figure 005-4.

STEP 12 : Connect the remaining FAN cables per Figures 005-10 and 005-11.

STEP 13 : Lastly, attach the Top Cover onto the TOPU of the cabinet. Then, fasten the four screws (refer to Figure 005-7).

Note: *The procedures, STEP 1 through STEP 7, must be performed at each PBX cabinet adopting 3-PIM or 4-PIM configuration.*



Note 1: *For details on the FAN connector (PIM backplane), refer to Figure 005-11.*

Note 2: *For details on the TALM connector (TOPU panel), refer to Figure 005-3.*

Figure 005-10 Cable Connections for FANU in FAN BOX

NAP-200-005
Sheet 13/16
Mounting of Units and Modules

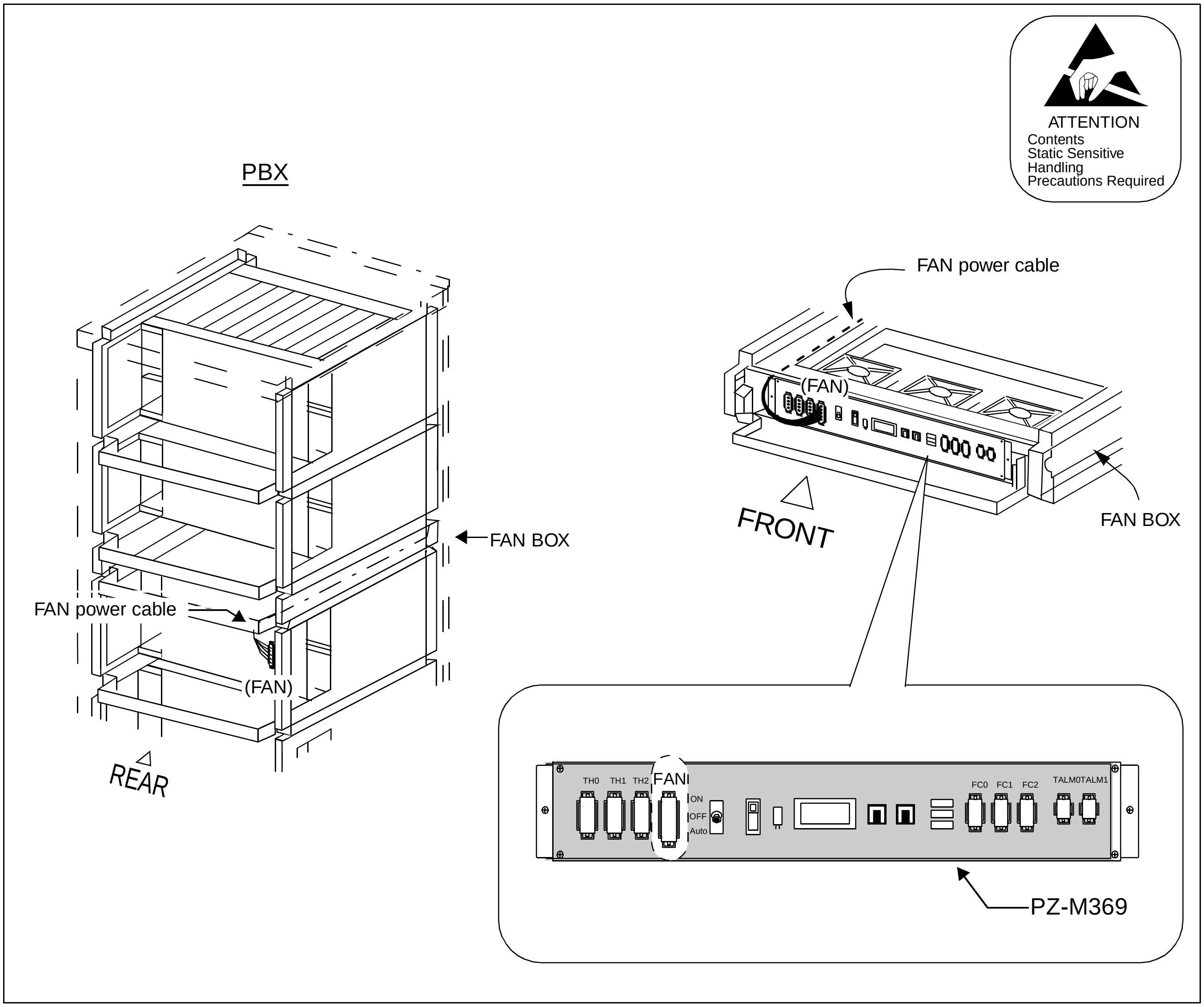


Figure 005-11 Connection of “FAN” Connector Cable (FAN BOX-PIM)

3. ATTACHING THE ADDITIONAL NOISE FILTER UNIT (NFILU) TO THE BASEU

The following flowchart shows the procedure to attach the Additional Noise Filter Unit (NFILU) to the BASEU of the PBX. This work should be performed in each IMG stack of all Local Nodes when they contain 3 or 4 PIMs.

START

- Referring to Figures 005-12 and 005-13, insert the NFILU to the BASEU and attach the NFILU with two screws.
- Referring to Figure 005-14, connect the cables equipped with the NFILU to the terminals on the BASEU.

END

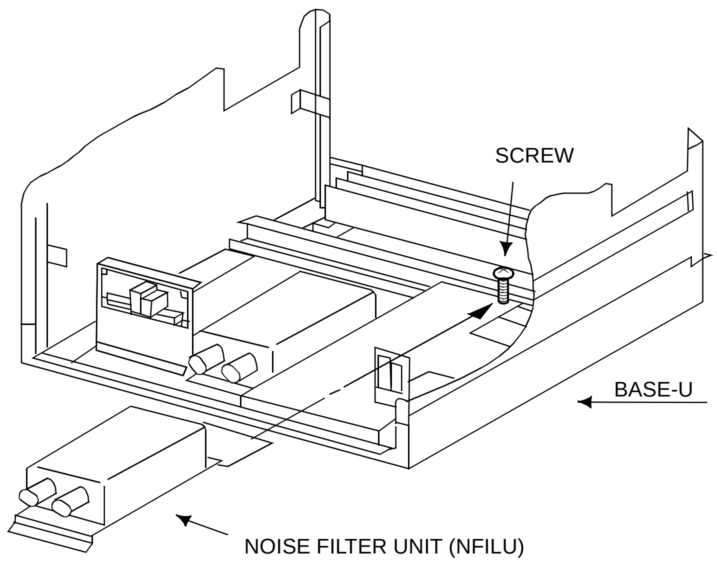


Figure 005-12 Insertion of NFILU

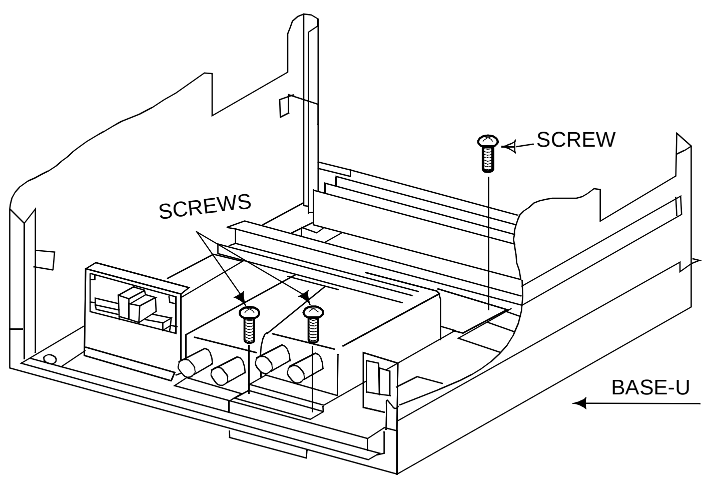


Figure 005-13 Attaching of NFILU

NAP-200-005
Sheet 16/16
Mounting of Units and Modules

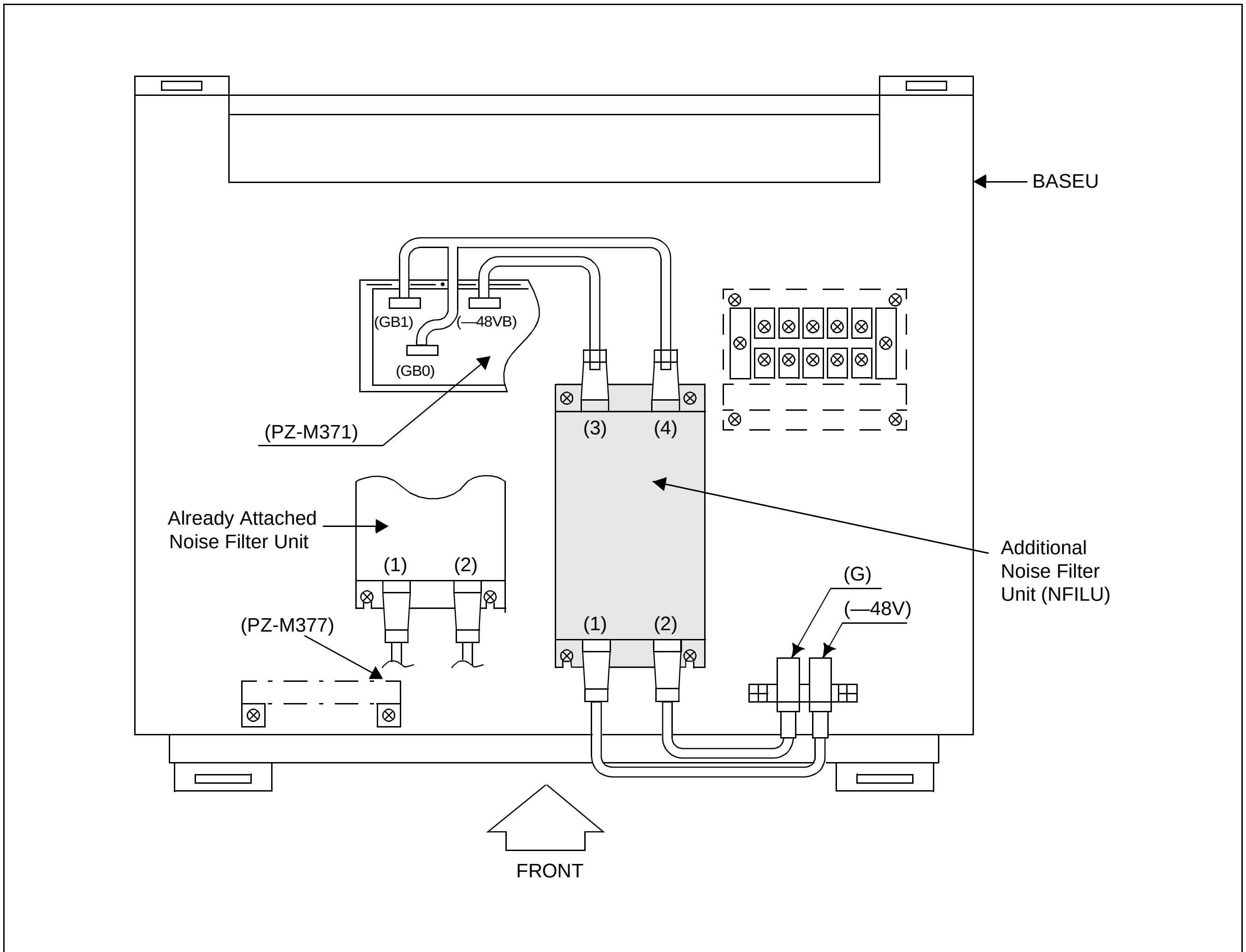


Figure 005-14 Cabling Diagram of NFILU

NAP-200-006
Sheet 1/1
Installation of Power Equipment

This NAP explains the procedures for installing the power equipment.

Note: *The Circuit Breaker (NFB) for the Rectifier's DC output must remain OFF.*

START

- Install the power equipment at the predetermined location using anchor bolts, etc. Install the framework for the batteries to be used for backup. Secure the framework using anchor bolts, etc.
- Check the cabling at the primary and secondary sides of the power equipment, and the cabling to the batteries.
- Confirm that the specifications of the customer-installed AC PDB (NFB capacity, voltage, phase, etc.) conform to the specifications of the Rectifier.
- Confirm that the proper communication ground is available.
- Connect the input power cable and grounding cable to the rectifier.
- Supply electrolyte to each battery as per the specifications of the battery.
- Charge the batteries after verifying that the rectifier is operating normally.

END

NAP-200-007
Sheet 1/1
Installation of the MDF

This NAP explains the procedures for installing the MDF.

START

- Install the MDF at the predetermined location on the floor or wall.
  Be sure to check the quantity of accessory items such as arresters, block terminals, etc.
- Install the MDF, taking into consideration the locations of lead-in holes for Local Cable, C.O. lines, Tie Lines, and Cable Running Routes.
- MDF Line Protector Ground must be separated from the Communication Ground connected to the rectifier.

END

NAP-200-008
Sheet 1/12
Connection of Power and Ground Cables from the Power Equipment

This NAP explains the following work items.

- Connection of Power and Ground Cables
- Connection of DC-DC Converter for Telephone sets equipped with Message Waiting Lamps
- End Jointing of Power and Ground Cables
- Branching of Power Cables

1. CONNECTION OF THE POWER AND GROUND CABLES

CAUTION: *Grounding circuit continuity is vital for safe operation of telecommunication equipment. Never operate telecommunication equipment with grounding conductor disconnected.*

START

- Cable Running — Run the power and ground cables per Figures 008-1/008-2.
- Running of power and ground cables up to the Power Receiving Terminals in the BASEU — An example of cable running on a free access or computer floor is shown in Figure 008-1.
- Confirm that the Circuit Breaker (NFB) of the Rectifier is OFF.
- Connection of the power and ground cables
  - Connect the power and ground cables to the Power Receiving Terminals on the BASEU per Figure 008-2.
  - Connect the power and ground cables to the output terminals of the Rectifier.
- Check after cable connections — Using a continuity tester, confirm that the -48 V power cable is not shorting to the G power cable or FE ground cable.

END

NAP-200-008
Sheet 2/12
Connection of Power and Ground Cables from the Power Equipment

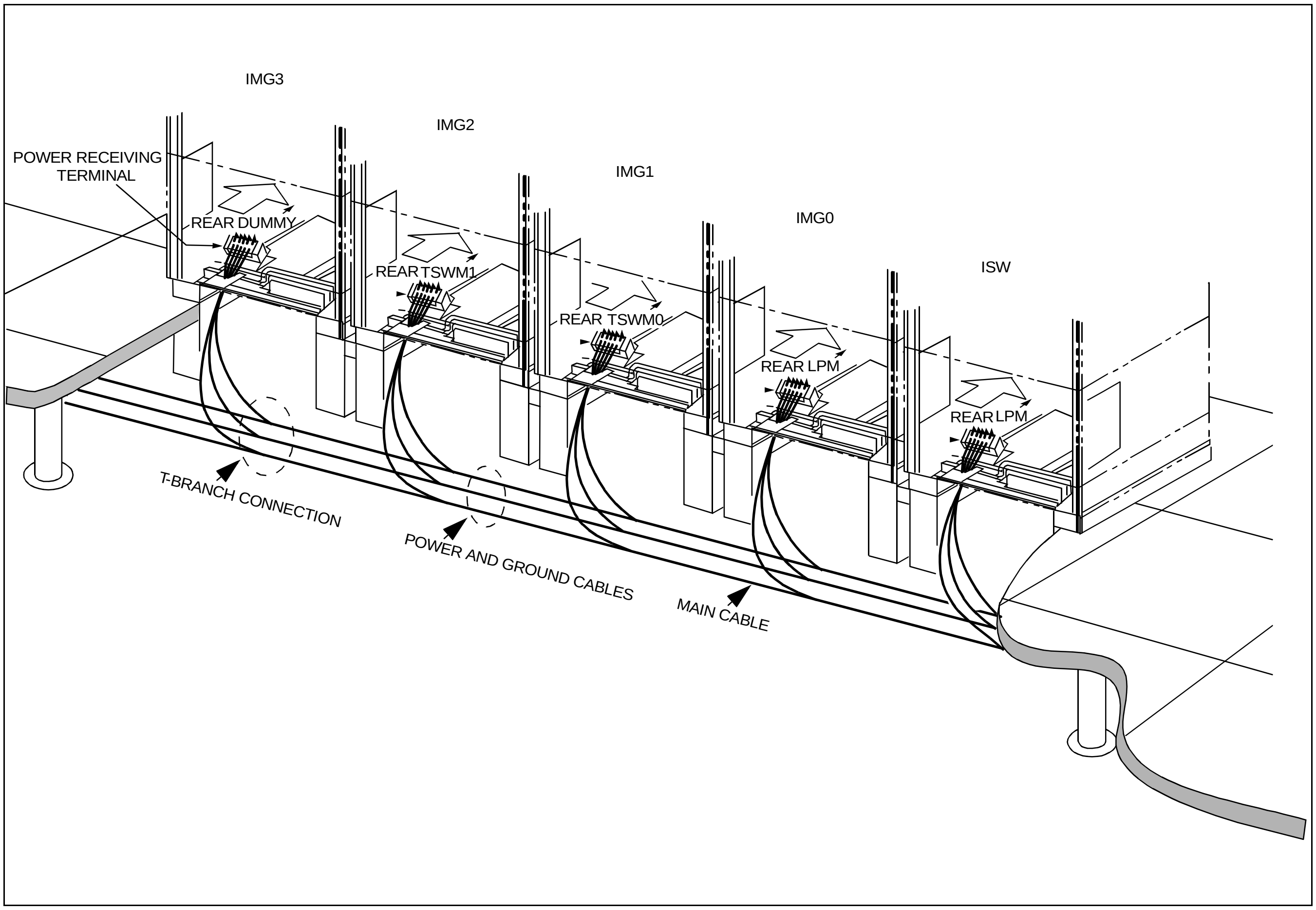
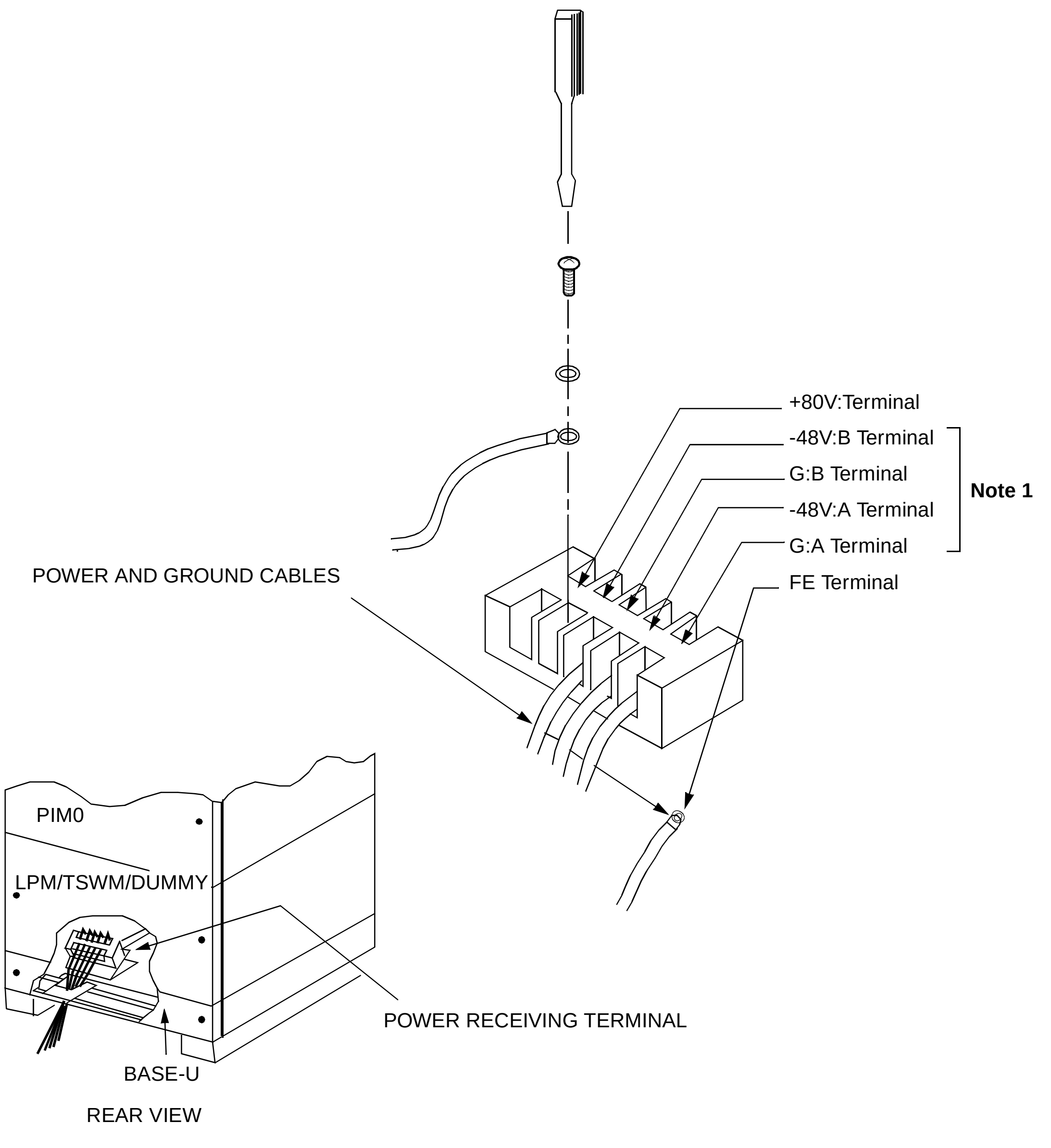


Figure 008-1 Detail of Cable Running

NAP-200-008
Sheet 3/12
Connection of Power and Ground Cables from the Power Equipment



Note 1: *For 1/2 PIM configuration, connect the cable only to the A terminal.*

Note 2: *An example of End Jointing (using A Type-Clamp terminal) is explained in Section 3 of thisNAP.*

Figure 008-2 Connection of Power and Ground Cables to Power Receiving Terminal

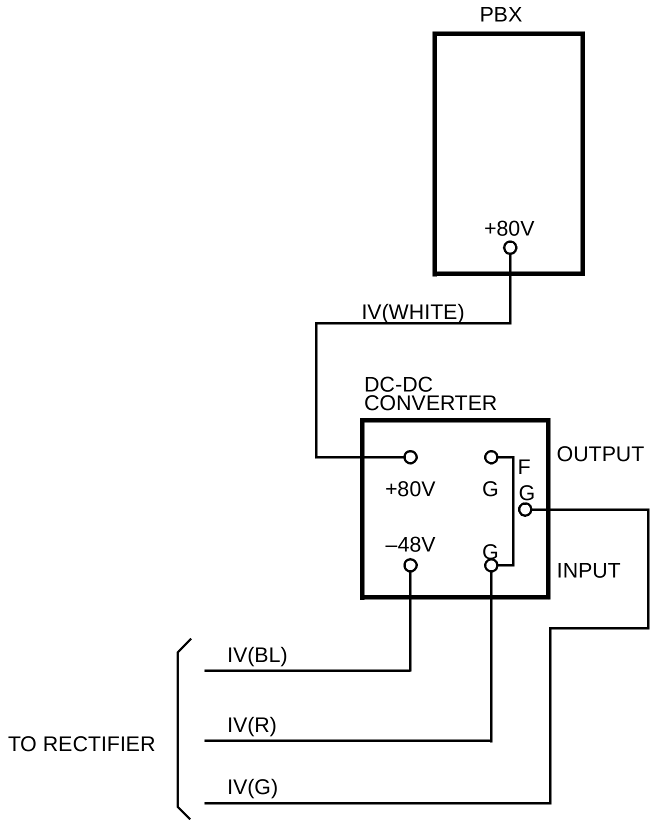
2. CONNECTION OF DC-DC CONVERTER FOR TELEPHONE SETS EQUIPPED WITH MESSAGE WAITING LAMPS

START

Cable Running	Referring to Figure 008-3, run the power and ground cables.
Removal of shorting piece and cable connection	Referring to Figure 008-4, remove the shorting piece from the +80 V connector of PZ-M371 card, then connect the cable provided on the +80 V Power Receiving Terminal Block to the +80 V connector.
Confirm that the Circuit Breaker (NFB) of the Rectifier is OFF.	
Connection of Power and Ground Cables	Referring to Figures 008-3 and 008-4, connect the power and ground cable to each terminal of the equipment.
Check after cable connections	Using a continuity tester, confirm that the –48 V and +80 V power cable are not short-circuiting with the G power cable or FE ground cables.

END

NAP-200-008
Sheet 5/12
Connection of Power and Ground Cables from the Power Equipment



Note: *The current capacity of the DC-DC Converter is calculated by multiplying the (current capacity of the message waiting lamp) by the number of telephone sets.*

Figure 008-3 Example Connection Diagram-DC-DC Converter for Message Waiting Lamps

NAP-200-008
Sheet 6/12
Connection of Power and Ground Cables from the Power Equipment

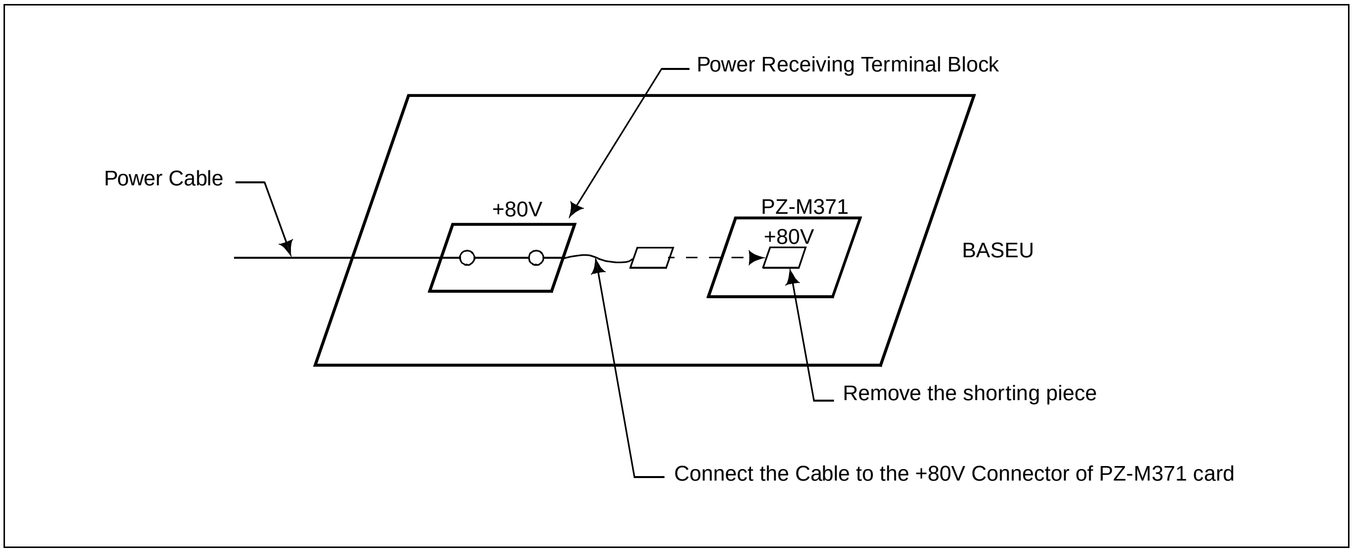
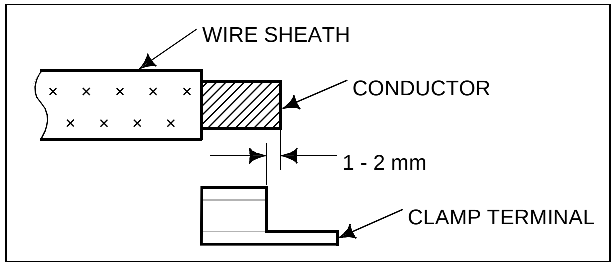


Figure 008-4 Removal of Shorting Piece and Cable Connection

3. END JOINTING OF POWER AND GROUND CABLES

START

- Stripping of Insulation Sheath — Strip the wire to exceed the length of the terminal body by 1 - 2 mm (1/8 inch).



- Clamping
  - Referring to Figure 008-5, place the terminal body on the die with the soldered part facing upward.
  - Referring to Figure 008-6, insert the stripped wire into the terminal body up to the insulation-sheath edge, and clamp the terminal.
  - Wipe the terminal with a dry cloth.

END

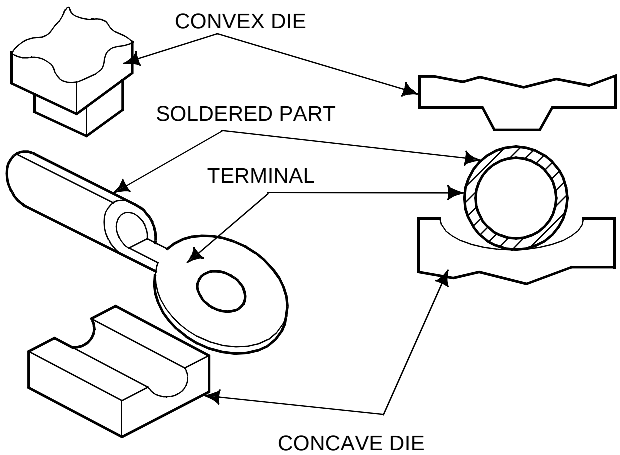


Figure 008-5 Placing the Clamp Terminal on the Die

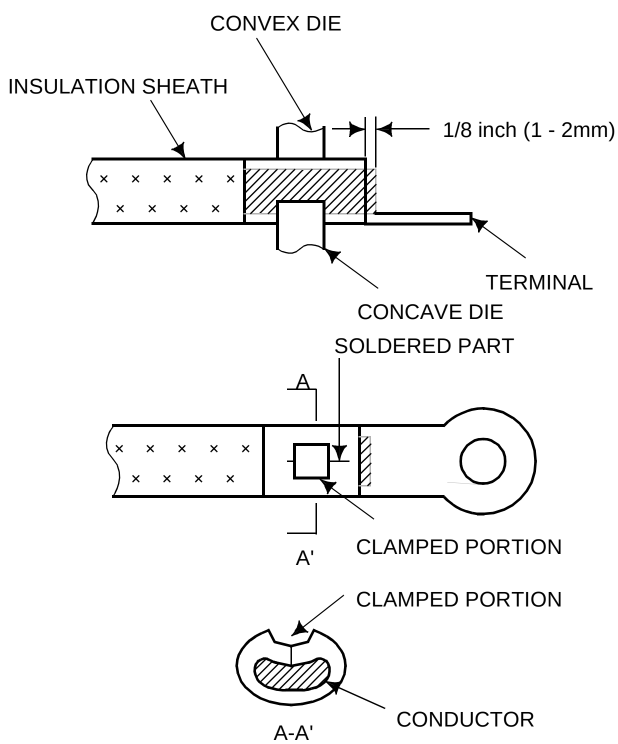
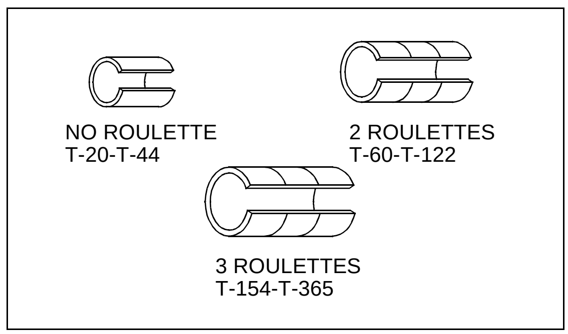


Figure 008-6 Clamping Method

4. BRANCHING OF POWER CABLES

START

- **Stripping Main and Branch Cable** — Referring to Figure 008-7, strip insulation coating with an electrician's knife. Avoid damage to the conductor during the stripping process.
- **Inserting of Cables into Terminal** — Insert the stripped main wire and branch wire into the terminal as shown in Figure 008-8.
- **Clamping for Branch Jointing** — Place T-Type terminal on the die of the clamping tool, T-20 - T-44 terminals should be placed on the center of the die.
  T-60 - T-365 terminals should be placed on the die in such a way that the terminal will be pressed on the part marked with the roulette.



  - Proceed with the operation of the clamping tool by referring to Figure 008-9.
  - Clean the terminal with a dry cloth.
- **Taping and Covering** — Referring to Figures 008-10 and 008-11, put an installation cover over the clamped portion, after taping with installation tape.

END

Table 008-1 Stripped Length

APPLICABLE TERMINAL	STRIPPED MAIN-WIRE LENGTH l^1 [inch (mm)]	STRIPPED MAIN-WIRE LENGTH l^2 [inch (mm)]
T-20	Approx. 1.2 (28)	Approx. 1.0 (24)
T-26	1.3 (32)	1.2 (28)
T-44	1.5 (37)	1.3 (33)
T-60	1.6 (40)	1.5 (36)
T-76	1.7 (42)	1.6 (39)
T-98	1.8 (44)	1.7 (41)
T-122	1.7–1.9 (43–46)	1.6–1.7 (40–43)
T-154	2.0 (49)	1.9 (46)
T-190	2.3 (57)	2.2 (54)
T-240	2.5 (63)	2.4 (60)
T-288	2.8 (69)	2.6 (66)
T-365	3.0 (75)	2.9 (72)

T-98

Sum of the cross sections of the main and branching, or the main and extension cables.

Type of clamp terminal (T type)

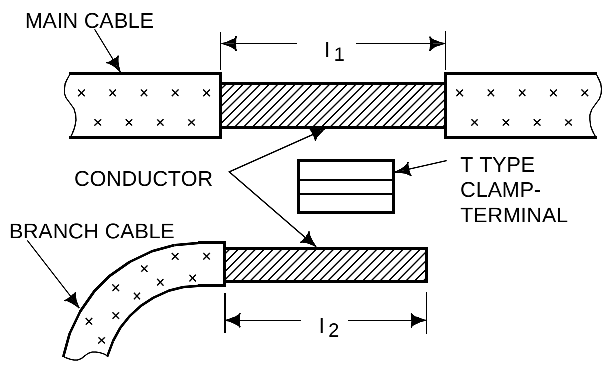


Figure 008-7 Stripped Length of Main and Branch Cable

NAP-200-008
Sheet 11/12
Connection of Power and Ground Cables from the Power Equipment

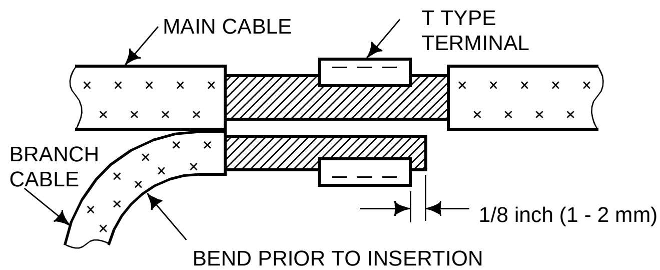
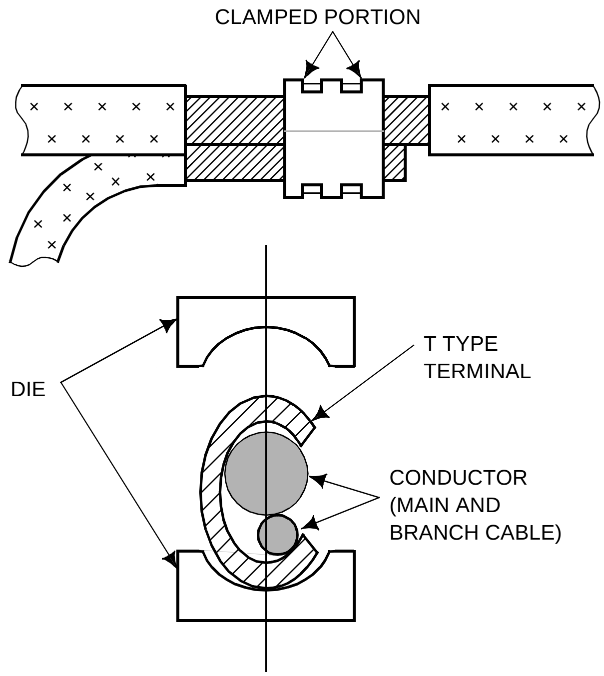


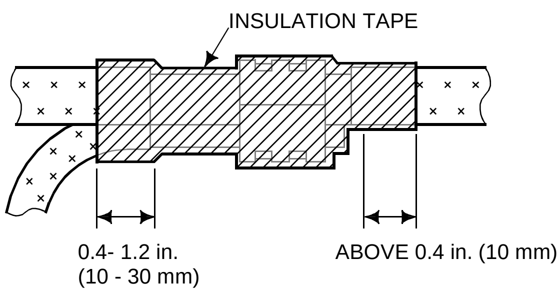
Figure 008-8 Inserting of Cables into Terminal



Note:

- *Prevent the wires from slipping out of the clamp terminal by holding them firmly.*
- *Check the indication of the pressure regulator.*
- *Operate the pressure release lever to release the wires from the die.*

Figure 008-9 Clamping for Branch Jointing



Note: *Taping should be done in two rounds with the tape overlapping half the tape width.*

Figure 008-10 Taping

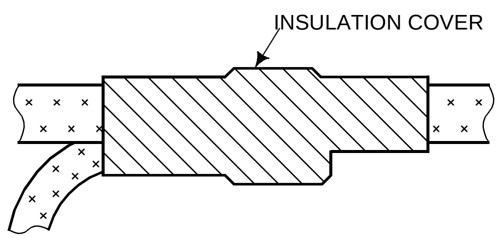


Figure 008-11 Covering

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This NAP explains the following work items:

- Extraction of Mounted Circuit Cards
- Mounting of Circuit Cards
- Setting of Switch Positions on Circuit Cards
- Installation of CPR

1. PRECAUTIONS

1.1 Protection Against Static Electricity

When setting switches on circuit cards, use a Portable Field Service Grounding Kit to prevent damage to static-sensitive components.

Example: 3M Model 8012, consists of:

- 2×2 VELOSTAT ® Work Mat
- 15 ft. Ground Cord
- CHARGE-GUARD ® Wrist Strap with alligator clip

Before handling any circuit cards, first spread out the work mat, then connect the ground cord to the frame or other ground source.

If a CHARGE-GUARD wrist strap is to be used, connect the wrist strap to the frame or other ground using the provided cable.

1.2 Handling Circuit Cards

Whenever possible, do not handle circuit cards with bare hands.

The only portion of the card that can be touched is its edge. Do not touch the surface or the mounted components. Doing so may damage the card.

Handle circuit cards with care. Never bang or drop them.

1.3 Mounting or Removing Circuit Cards When the System Is in Operation

Never mount or remove a circuit card without first setting its MBR and/or MB switch to the UP position.

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2. EXTRACTION OF MOUNTED CIRCUIT CARDS

START

- Remove the Card Stopper — Referring to Figure 009-1, remove the card stopper from the module.
- Extract Circuit Cards — Referring to Figure 009-2, pull the card puller tabs in the direction indicated by the arrow. The card will release from the connector and can then be removed.
  - Pull the card out about 50 mm (2 inches) from the edge of the module so that it does not contact the backplane connector.

END

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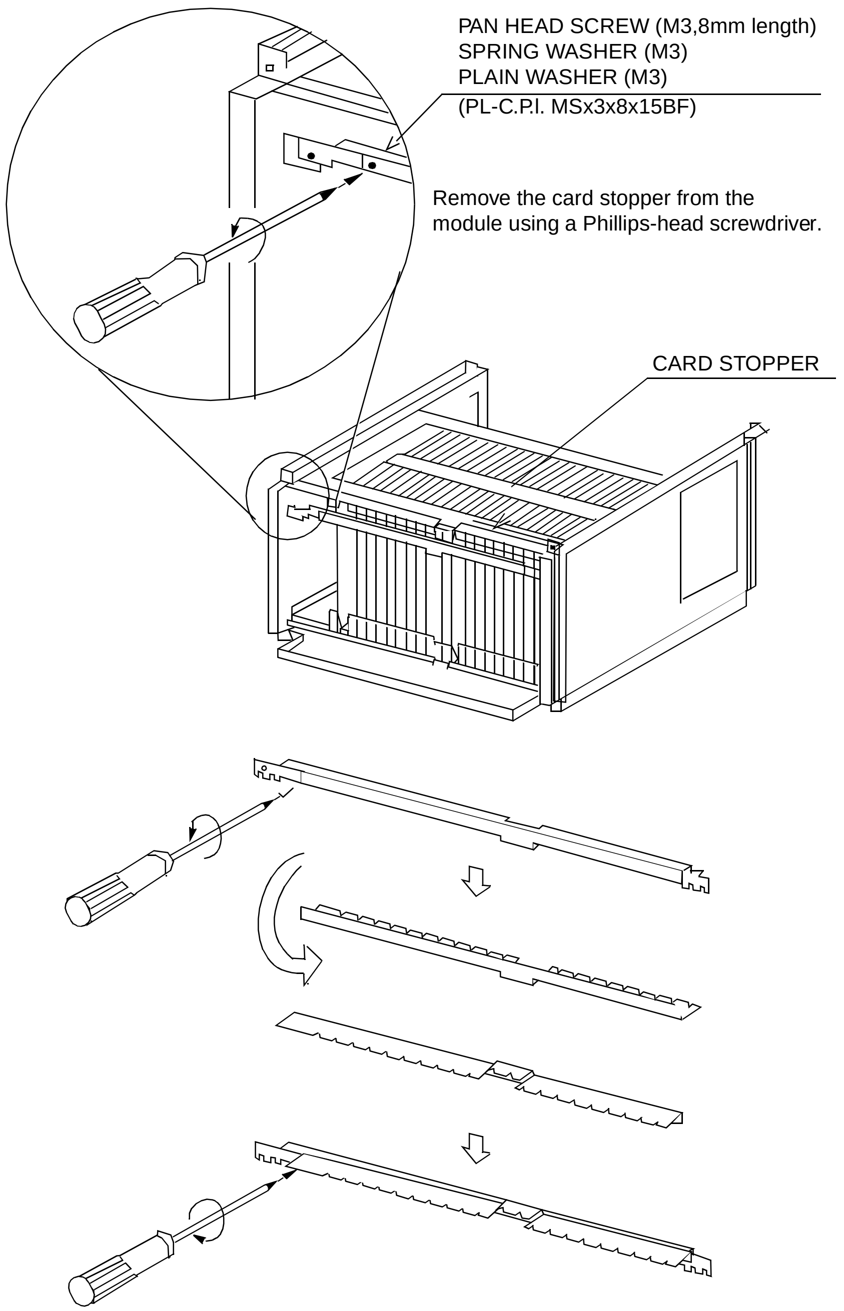

Figure 009-1 Removal of Card Stopper

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3. MOUNTING OF CIRCUIT CARDS

START

- Unpacking the Circuit Cards
  - Unpack each circuit card and remove it from its 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.
  - Confirm that the color code of the card puller tab coincides with that of the card mounting slot.
  - Confirm the Slot No. on the Module. Slot numbers are indicated at the bottom of each module, and range from 00 to 23.
- Insert the cards into the Module
  - Partially insert the circuit card into the module, making sure that it is correctly aligned at the top and bottom. The card should extend about two inches from the module, and must not contact the backplane connector (see Figure 009-3).

END

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4. SETTING OF SWITCH POSITIONS ON CIRCUIT CARDS

START

- Extracting the Circuit Cards from the Module
  - Extract one circuit card requiring switch setting from the module.
  - Place the extracted card onto the anti-static sheet.
- Perform switch setting
  - Set the required switches according to the Switch Setting Sheets in the Circuit Card Manual.
- Mounting of Circuit Cards
  - After the switches have been set, partially insert the card in the module. The card should extend about 50 mm (2 inches) from the module, and must not contact the backplane connector. Refer to Figure 009-3.

END

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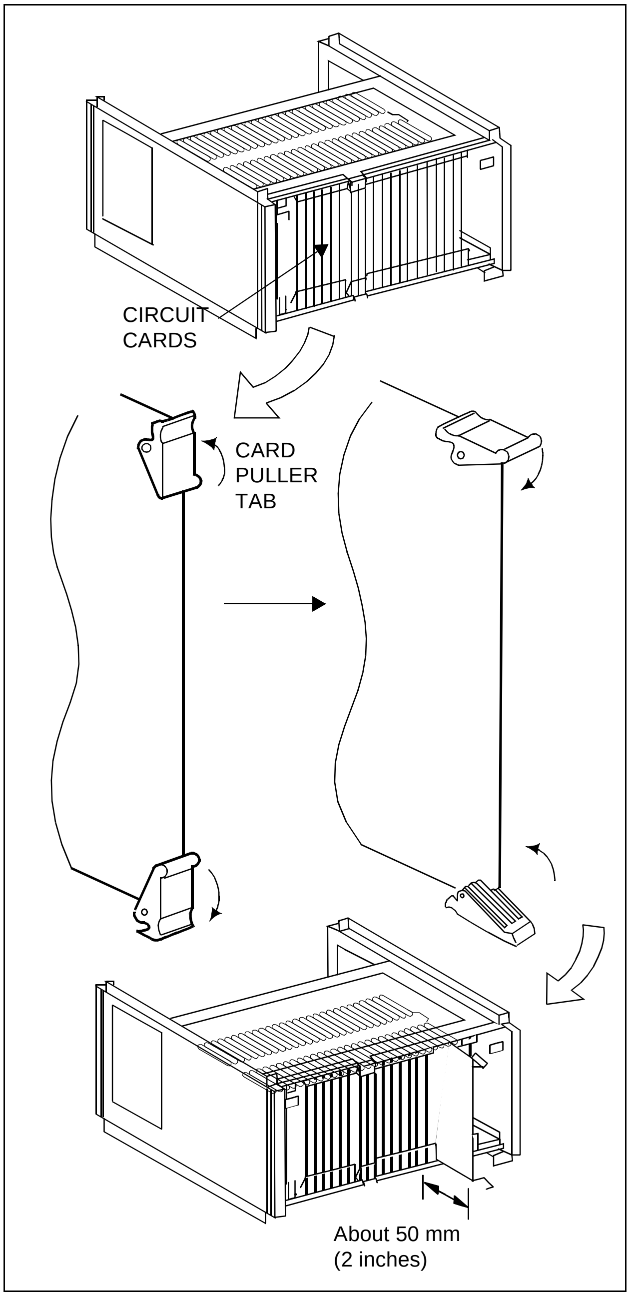

Figure 009-2 Extraction of Circuit Cards

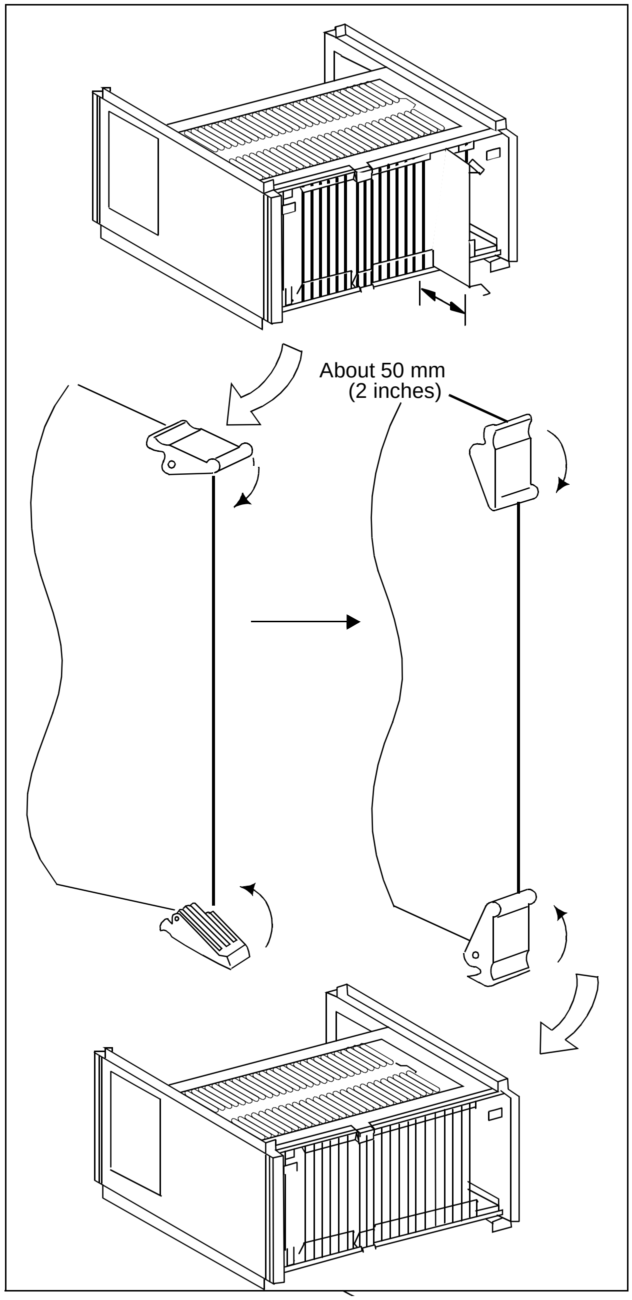

Figure 009-3 Circuit Card Mounting (Partial Insertion)

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5. INSTALLATION OF CPR

This section explains the procedure to install the CPR into the LPM of each Local Node (LN) and ISW. Perform the following for all the CPR (CPR0/1) of each LN and ISW.

1. Using the Phillips Screwdriver, remove the four + eight screws. Then, detach the front panel and top cover from the CPR. (Refer to Figure 009-4.)

As shown in the figure below, detach the front panel of the CPR by removing the four screws.
Then, also lift away the top cover by removing the eight screws.

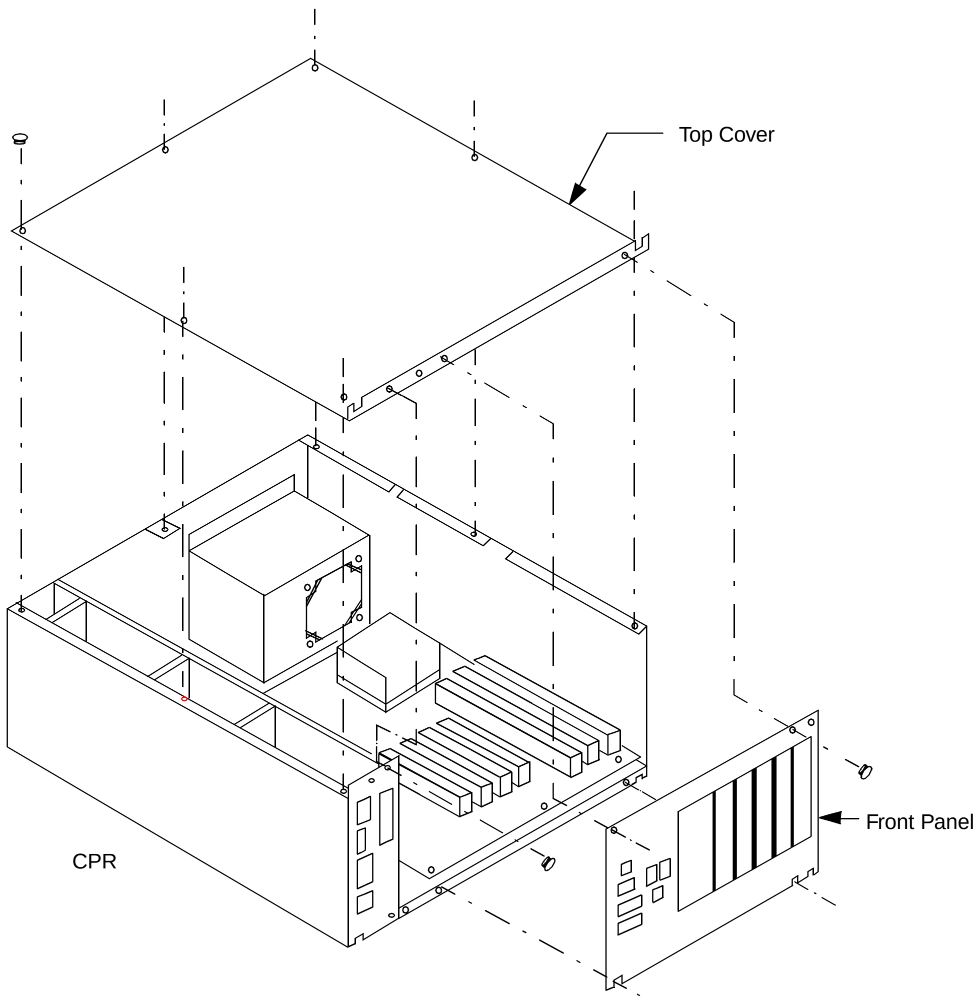

Figure 009-4 Removing Front Panel and Top Cover from CPR

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2. Depending on the system configuration, insert the ISAGT (PZ-GT13/PZ-GT20) and LANI (PZ-PC19) cards into the following slots of the CPR (refer to Figure 009-5):

   ISAGT (PZ-GT13) → slot 6 (ISA) (Fixed)

   ISAGT (PZ-GT20) → slot 5 (ISA) (When the LN has 3 or 4 IMGs) **Note**

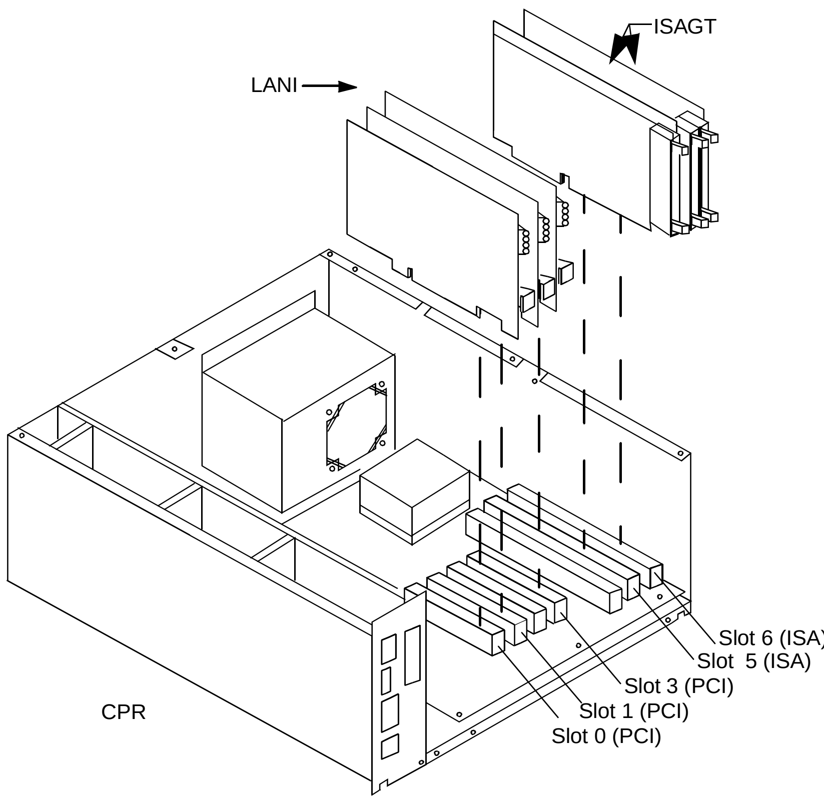
   LANI → Slot 0 (PCI) (For Fusion link)

   LANI → Slot 1 (PCI) (When connecting MAT via 10-BASE T and PCI buses)

   LANI → Slot 3 (PCI) (When LANI for Fusion link is in dual configuration)

Note: *This card is mounted in LN only.*

This figure (example) shows how to insert the ISAGT and LANI cards into CPR slots 5 and 6 (ISA), 0, 1 and 3 (PCI), respectively.



Note 1: *Actual accommodation of the LANI/ISAGT cards may differ, depending on your system configuration.*

Figure 009-5 Inserting ISAGT and LANI Cards into CPR Slots

3. Attach the top cover and front panel again by fastening the removed screws. (Refer to Figure 009-6.)

After mounting the ISAGT/LANI cards, reattach the top cover by tightening the eight screws.
Then, also attach the Front Panel by fastening the four screws.

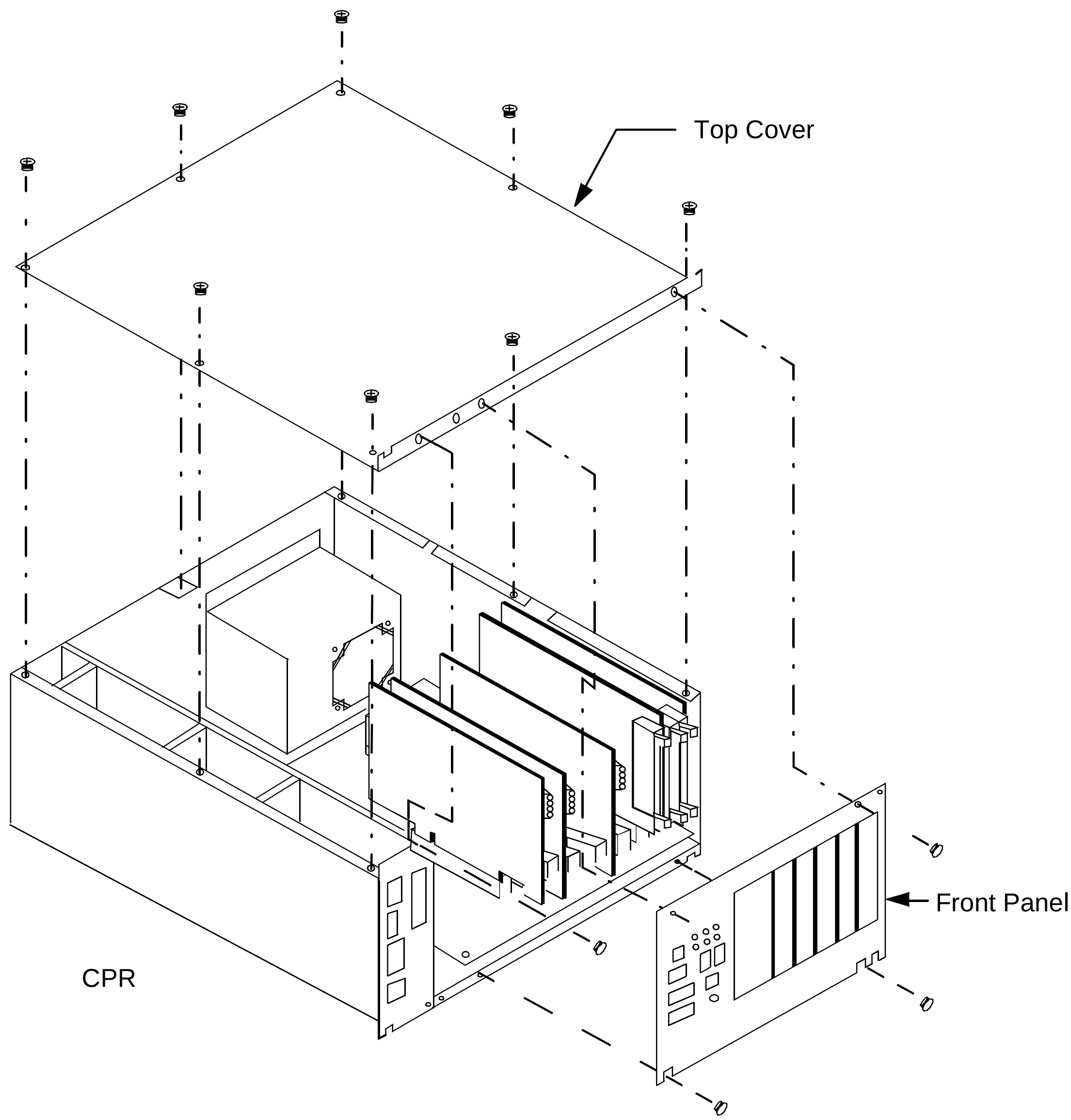


Figure 009-6 Reattaching CPR Top Cover and Front Panel

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4. After turning “ON” the MBR key on the DSP of the new CPR, insert the new CPR into the LPM. Then, fasten the four screws. (Refer to Figure 009-7.)

As shown in the figure below, insert the new CPR into the LPM. Then, fasten the four screws.

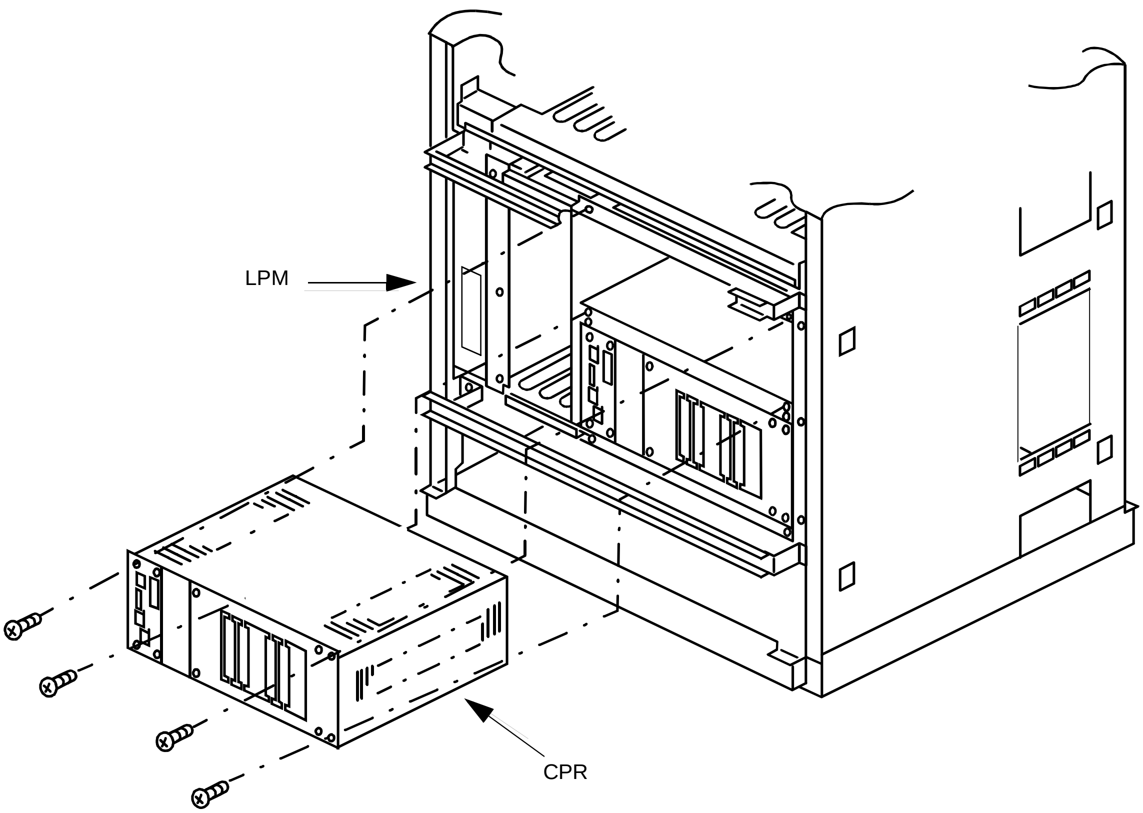

Figure 009-7 Accommodating New CPR into LPM

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5. Insert the new HFD (PZ-IO27/28) into the CPR. Then, fasten the two screws. (Refer to Figure 009-8.)

Using the two screws, fasten the new HFD onto the CPR.

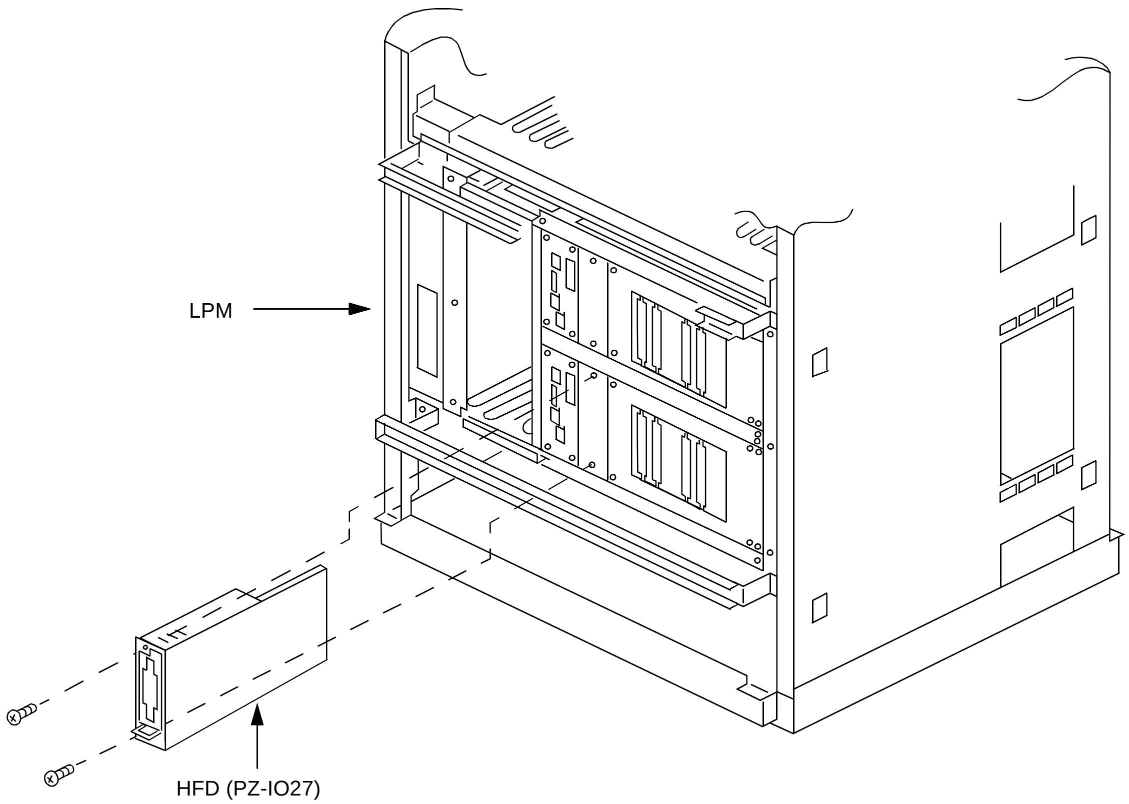

Figure 009-8 Insertion of New HFD into CPR

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6. Lastly, make sure that Switch 8 of “SYSTEM SELECT 1” (DIP Switch) on each CPU Front Panel (for all LNs and ISW) is set to “ON.” (Refer to Figure 009-9.)

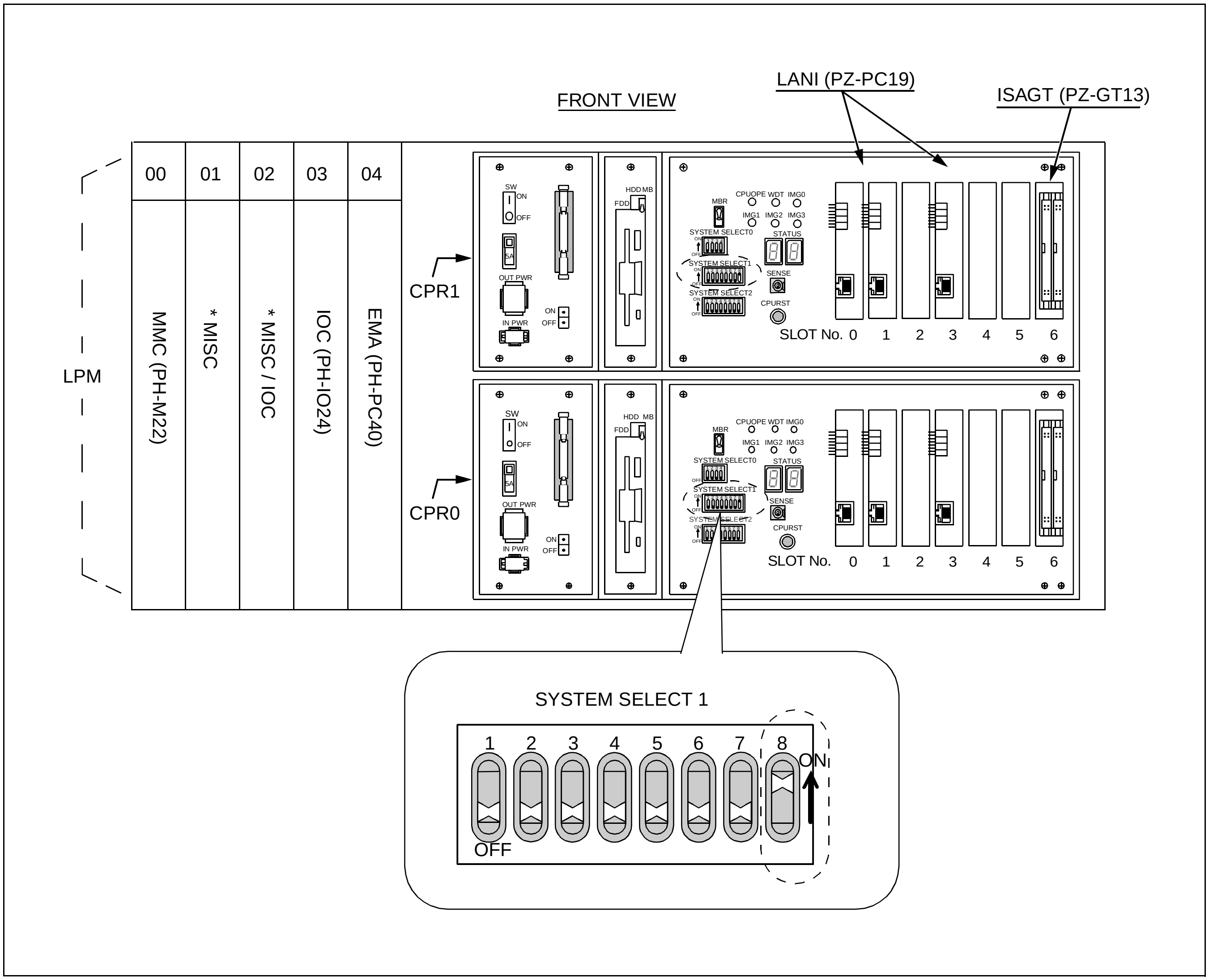

Figure 009-9 Switch Setting on the CPU Front Panel

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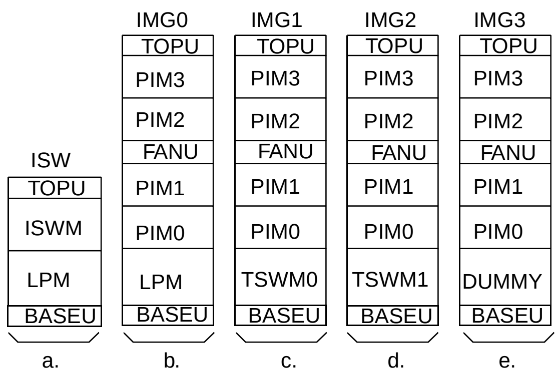
This NAP explains the procedure for connecting cables. Connect all the necessary cables (internal, inter-frame, node-to-node cables) in the following order.

Note 1: *All the figures in this NAP assume that the system adopts the fully expanded configuration. According to your system configuration, connect the whole necessary cables per each figure/table provided.*

Note 2: *The cable connections in Section 2 are common to all the LNs (LN0-3).*
According to each LN configuration, perform necessary cable connections.

START

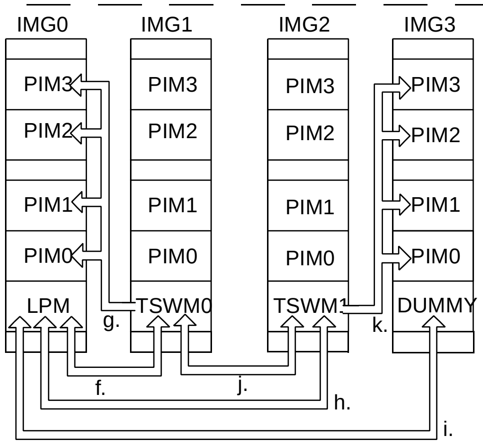
Internal Cable Connections for ISW/LN —— Section 1



a. Internal Power/Bus Cables for ISW
(See Figure 010-9 and 010-13.)
b. Internal Power/Bus Cables for IMG0
c. Internal Power/Bus Cables for IMG1
d. Internal Power/Bus Cables for IMG2
e. Internal Power/Bus Cables for IMG3

Note: *"Quick Reference Table for LN Cable Connection (Table 010-1)" shows which figures and tables are to be used for your system type.*

Inter-frame Cable Connections for LN —— Section 2



f. Inter-frame ISA/Alarm Bus Cables for IMG0-IMG1
g. Inter-frame Bus Cables for IMG0-IMG1
h. Inter-frame Alarm Bus Cables for IMG0-IMG2
i. Inter-frame Alarm Bus Cables for IMG0-IMG3
j. Inter-frame ISA/Alarm Bus Cables for IMG1-IMG2
k. Inter-frame Bus Cables for IMG2-IMG3

Note: *"Quick Reference Table for LN Cable Connection (Table 010-1)" shows which figures and tables are to be used for your system type.*

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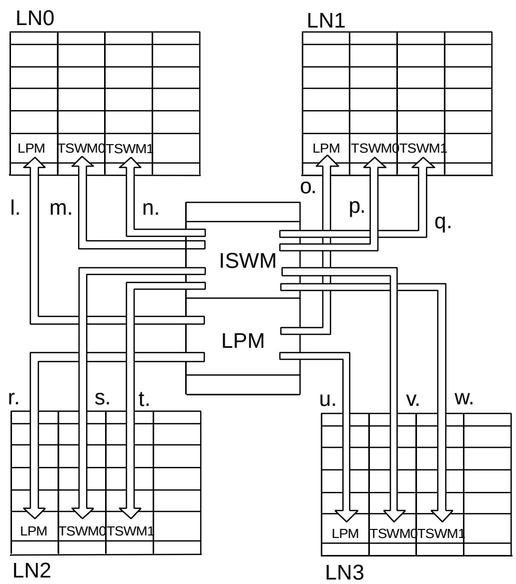
PCM and Alarm Bus Cable Connection between ISW and each LN —— Section 3



l. Inter-frame Cables for ISW-LN0, IMG0
(Refer to Figure 010-26.)

m. Inter-frame Bus Cables for ISW-LN0, IMG1
(Refer to Figure 010-30 and Table 010-14.)

n. Inter-frame Bus Cables for ISW-LN0, IMG2
(Refer to Figure 010-31 and Table 010-15.)

o. Inter-frame Cables for ISW-LN1, IMG0
(Refer to Figure 010-27.)

p. Inter-frame Bus Cables for ISW-LN1, IMG1
(Refer to Figure 010-32 and Table 010-16.)

q. Inter-frame Bus Cables for ISW-LN1, IMG2
(Refer to Figure 010-33 and Table 010-17.)

r. Inter-frame Cables for ISW-LN2, IMG0
(Refer to Figure 010-28.)

s. Inter-frame Bus Cables for ISW-LN2, IMG1
(Refer to Figure 010-34 and Table 010-18.)

t. Inter-frame Bus Cables for ISW-LN2, IMG2
(Refer to Figure 010-35 and Table 010-19.)

u. Inter-frame Cables for ISW-LN3, IMG0
(Refer to Figure 010-29.)

v. Inter-frame Bus Cables for ISW-LN3, IMG1
(Refer to Figure 010-36 and Table 010-20.)

w. Inter-frame Bus Cables for ISW-LN3, IMG2
(Refer to Figure 010-37 and Table 010-21.)

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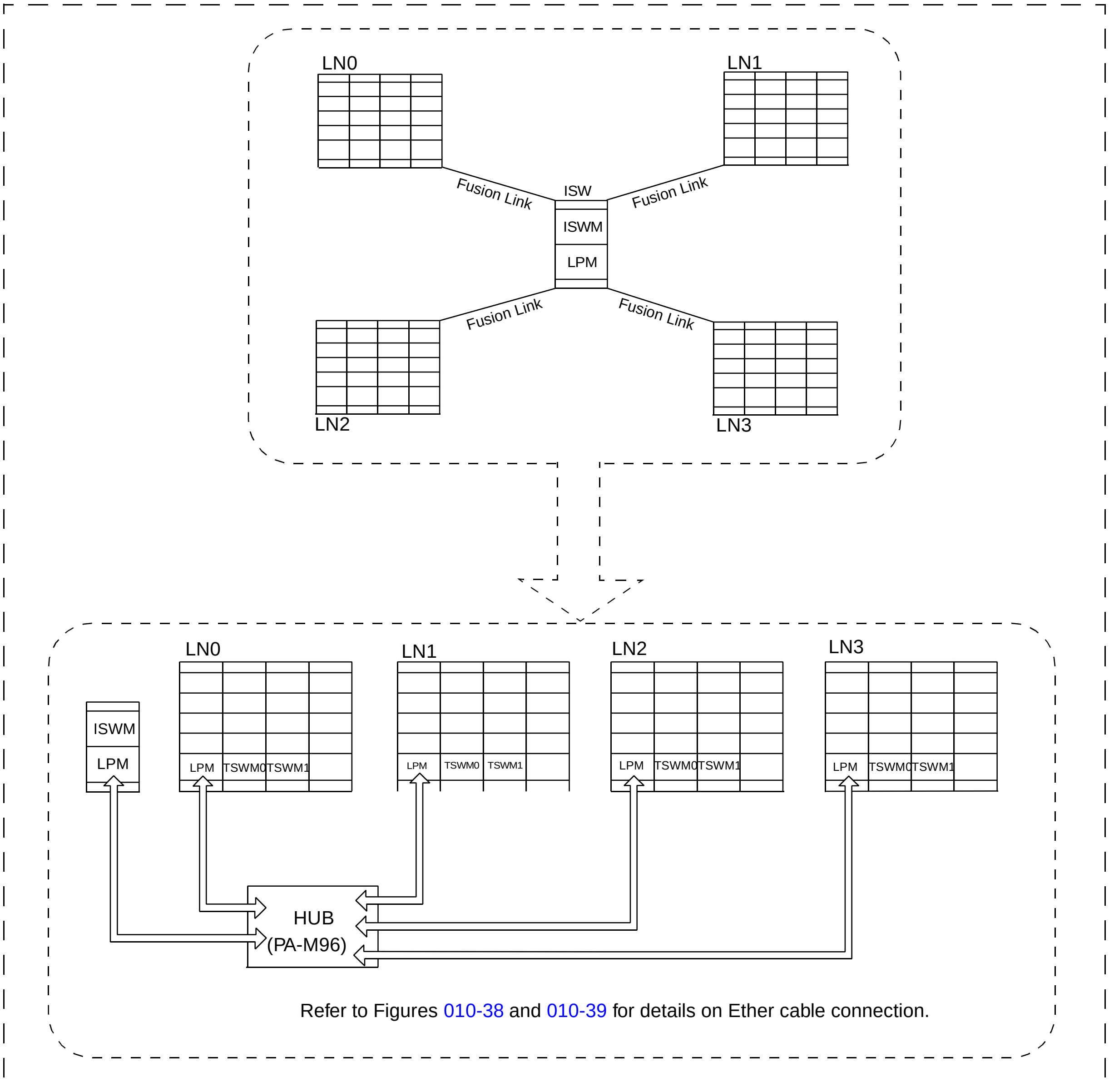
Ether Cable Connection —— Section 4



END

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Table 010-1 Quick Reference Table for LN Cable Connection (1/5)

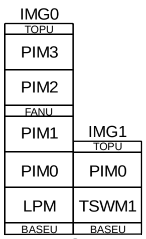
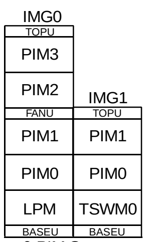
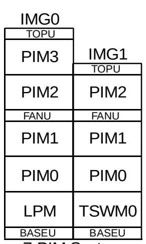
SYSTEM TYPE	KIND OF CABLE	FRAME NAME	FIGURE	TABLE
 5-PIM System	FANU Cable	IMG0	010-10	–
		IMG1	010-7	–
	Internal Power Cable	IMG0	010-10	010-3
		IMG1	010-11	010-4
	Internal Bus Cable	IMG0	010-14	010-7
		IMG1	010-15	010-8
	Inter-frame Bus Cable	IMG0-IMG1	010-18	010-10
			010-19	010-11
			010-20	010-12
 6-PIM System	FANU Cable	IMG0	010-10	–
		IMG1	010-8	–
	Internal Power Cable	IMG0	010-10	010-3
		IMG1	010-11	010-4
	Internal Bus Cable	IMG0	010-14	010-7
		IMG1	010-15	010-8
	Inter-frame Bus Cable	IMG0-IMG1	010-18	010-10
			010-19	010-11
			010-20	010-12
 7-PIM System	FANU Cable	IMG0	010-10	–
		IMG1	010-9	–
	Internal Power Cable	IMG0	010-10	010-3
		IMG1	010-11	010-4
	Internal Bus Cable	IMG0	010-14	010-7
		IMG1	010-15	010-8
	Inter-frame Bus Cable	IMG0-IMG1	010-18	010-10
			010-19	010-11
			010-20	010-12
			010-20	010-12

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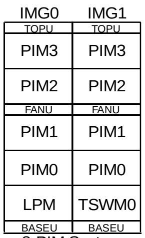
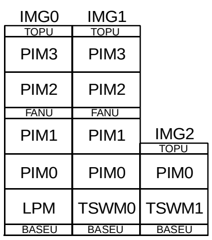
Table 010-1 Quick Reference Table for LN Cable Connection (2/5)

SYSTEM TYPE	KIND OF CABLE	FRAME NAME	FIGURE	TABLE
 8-PIM System	FANU Cable	IMG0/1	010-10	–
	Internal Power Cable	IMG0	010-10	010-3
		IMG1	010-11	010-4
	Internal Bus Cable	IMG0	010-14	010-7
		IMG1	010-15	010-8
	Inter-frame Bus Cable	IMG0-IMG1	010-18	010-10
			010-19	010-11
 9-PIM System	FANU Cable	IMG0/1	010-10	–
		IMG2	010-7	–
	Internal Power Cable	IMG0	010-10	010-3
		IMG1/2	010-11	010-4
	Internal Bus Cable	IMG0	010-14	010-7
		IMG1	010-15	010-8
		IMG2	010-16	010-9
	Inter-frame Bus Cable	IMG0-IMG1	010-18	010-10
			010-19	010-11
			010-20	010-12
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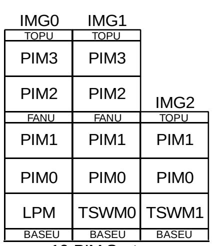
			010-22	–
		IMG1-IMG2	010-24	–
 10-PIM System	FANU Cable	IMG0/IMG1	010-10	–
		IMG2	010-8	–
	Internal Power Cable	IMG0	010-10	010-3
		IMG1/2	010-11	010-4
	Internal Bus Cable	IMG0	010-14	010-7
		IMG1	010-15	010-8
		IMG2	010-16	010-9
	Inter-frame Bus Cable	IMG0-IMG1	010-18	010-10
			010-19	010-11
			010-20	010-12
		IMG0-IMG2	010-21	–
			010-22	–
		IMG1-IMG2	010-24	–

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Table 010-1 Quick Reference Table for LN Cable Connection (3/5)

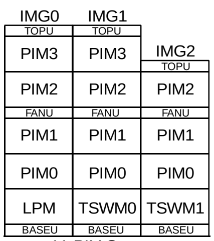
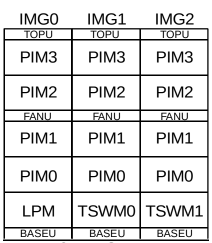
SYSTEM TYPE	KIND OF CABLE	FRAME NAME	FIGURE	TABLE
 11-PIM System	FANU Cable	IMG0/1	010-10	–
		IMG2	010-9	–
	Internal Power Cable	IMG0	010-10	010-3
		IMG1/2	010-11	010-4
	Internal Bus Cable	IMG0	010-14	010-7
		IMG1	010-15	010-8
		IMG2	010-16	010-9
	Inter-frame Bus Cable	IMG0-IMG1	010-18	010-10
			010-19	010-11
			010-20	010-12
		IMG0-IMG2	010-21	–
			010-22	–
		IMG1-IMG-2	010-24	–
 12-PIM System	FANU Cable	IMG0/1/2	010-10	–
	Internal Power Cable	IMG0	010-10	010-3
		IMG1/2	010-11	010-4
	Internal Bus Cable	IMG0	010-14	010-7
		IMG1	010-15	010-8
		IMG2	010-16	010-9
	Inter-frame Bus Cable	IMG0-IMG1	010-18	010-10
			010-19	010-11
			010-20	010-12
		IMG0-IMG2	010-21	–
			010-22	–
		IMG1-IMG2	010-24	–

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Table 010-1 Quick Reference Table for LN Cable Connection (4/5)

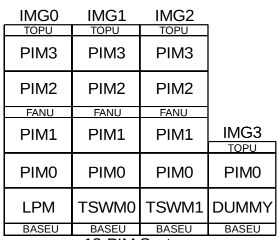
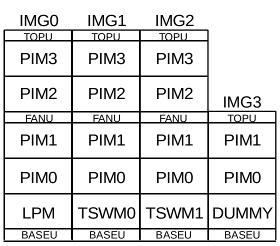
SYSTEM TYPE	KIND OF CABLE	FRAME NAME	FIGURE	TABLE
 13-PIM System	FANU Cable	IMG0/1/2	010-10	–
		IMG3	010-7	–
	Internal Power Cable	IMG0	010-10	010-3
		IMG1/2	010-11	010-4
		IMG3	010-12	010-5
	Internal Bus Cable	IMG0	010-14	010-7
		IMG1	010-15	010-8
		IMG2	010-16	010-9
		IMG3	010-17	–
	Inter-frame Bus Cable	IMG0-IMG1	010-18	010-10
			010-19	010-11
			010-20	010-12
		IMG0-IMG2	010-21	–
			010-22	–
		IMG0-IMG3	010-23	–
		IMG1-IMG2	010-24	–
		IMG2-IMG3	010-25	010-13
 14-PIM System	FANU Cable	IMG0/1/2	010-10	–
		IMG3	010-8	–
	Internal Power Cable	IMG0	010-10	010-3
		IMG1/2	010-11	010-4
		IMG3	010-12	010-5
	Internal Bus Cable	IMG0	010-14	010-7
		IMG1	010-15	010-8
		IMG2	010-16	010-9
		IMG3	010-17	–
	Inter-frame Bus Cable	IMG0-IMG1	010-18	010-10
			010-19	010-11
			010-20	010-12
		IMG0-IMG2	010-21	–
			010-22	–
		IMG0-IMG3	010-23	–
		IMG1-IMG2	010-24	–
		IMG2-IMG3	010-25	010-13

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Table 010-1 Quick Reference Table for LN Cable Connection (5/5)

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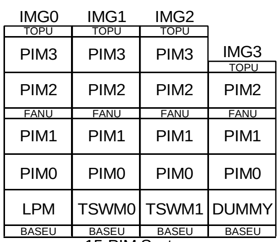
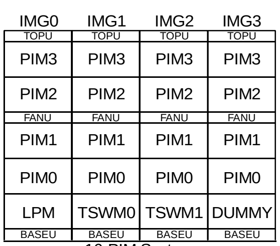
<tr><td rowspan="17">
15-PIM System</td><td rowspan="2">FANU Cable</td><td>IMG0/1/2</td><td>010-10</td><td>–</td></tr>
<tr><td>IMG3</td><td>010-9</td><td>–</td></tr>
<tr><td rowspan="3">Internal Power Cable</td><td>IMG0</td><td>010-10</td><td>010-3</td></tr>
<tr><td>IMG1/2</td><td>010-11</td><td>010-4</td></tr>
<tr><td>IMG3</td><td>010-12</td><td>010-5</td></tr>
<tr><td rowspan="4">Internal Bus Cable</td><td>IMG0</td><td>010-14</td><td>010-7</td></tr>
<tr><td>IMG1</td><td>010-15</td><td>010-8</td></tr>
<tr><td>IMG2</td><td>010-16</td><td>010-9</td></tr>
<tr><td>IMG3</td><td>010-17</td><td>–</td></tr>
<tr><td rowspan="8">Inter-frame Bus Cable</td><td rowspan="3">IMG0-IMG1</td><td>010-18</td><td>010-10</td></tr>
<tr><td>010-19</td><td>010-11</td></tr>
<tr><td>010-20</td><td>010-12</td></tr>
<tr><td rowspan="2">IMG0-IMG2</td><td>010-21</td><td>–</td></tr>
<tr><td>010-22</td><td>–</td></tr>
<tr><td>IMG0-IMG3</td><td>010-23</td><td>–</td></tr>
<tr><td>IMG1-IMG2</td><td>010-24</td><td>–</td></tr>
<tr><td>IMG2-IMG3</td><td>010-25</td><td>010-13</td></tr>
<tr><td rowspan="16">
16-PIM System</td><td>FANU Cable</td><td>IMG0/1/2/3</td><td>010-10</td><td>–</td></tr>
<tr><td rowspan="3">Internal Power Cable</td><td>IMG0</td><td>010-10</td><td>010-3</td></tr>
<tr><td>IMG1/2</td><td>010-11</td><td>010-4</td></tr>
<tr><td>IMG3</td><td>010-12</td><td>010-5</td></tr>
<tr><td rowspan="4">Internal Bus Cable</td><td>IMG0</td><td>010-14</td><td>010-7</td></tr>
<tr><td>IMG1</td><td>010-15</td><td>010-8</td></tr>
<tr><td>IMG2</td><td>010-16</td><td>010-9</td></tr>
<tr><td>IMG3</td><td>010-17</td><td>–</td></tr>
<tr><td rowspan="8">Inter-frame Bus Cable</td><td rowspan="3">IMG0-IMG1</td><td>010-18</td><td>010-10</td></tr>
<tr><td>010-19</td><td>010-11</td></tr>
<tr><td>010-20</td><td>010-12</td></tr>
<tr><td rowspan="2">IMG0-IMG2</td><td>010-21</td><td>–</td></tr>
<tr><td>010-22</td><td>–</td></tr>
<tr><td>IMG0-IMG3</td><td>010-23</td><td>–</td></tr>
<tr><td>IMG1-IMG2</td><td>010-24</td><td>–</td></tr>
<tr><td>IMG2-IMG3</td><td>010-25</td><td>010-13</td></tr>
</table>

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1. INTERNAL CABLE CONNECTIONS FOR ISW/LN

This section explains how to run the internal cables for ISW and LN.

START

- Confirm connector locations — Referring to Figure 010-1 through 010-8, confirm the locations of the connectors into which the cables are inserted.
- Connection of Internal Power Cables for ISW — Referring to Figure 010-9, connect internal power cables for ISW.
- Connection of Internal Power Cables for LN — Referring to Figure 010-10 through 010-12, connect internal power cables for all the LNs.
- Connection of Internal Bus Cables for ISW — Referring to Figure 010-13, connect internal bus cables for ISW.
- Connection of Internal Bus Cables for LN — Referring to Figure 010-14 through 010-17, connect internal bus cables for all the LNs.

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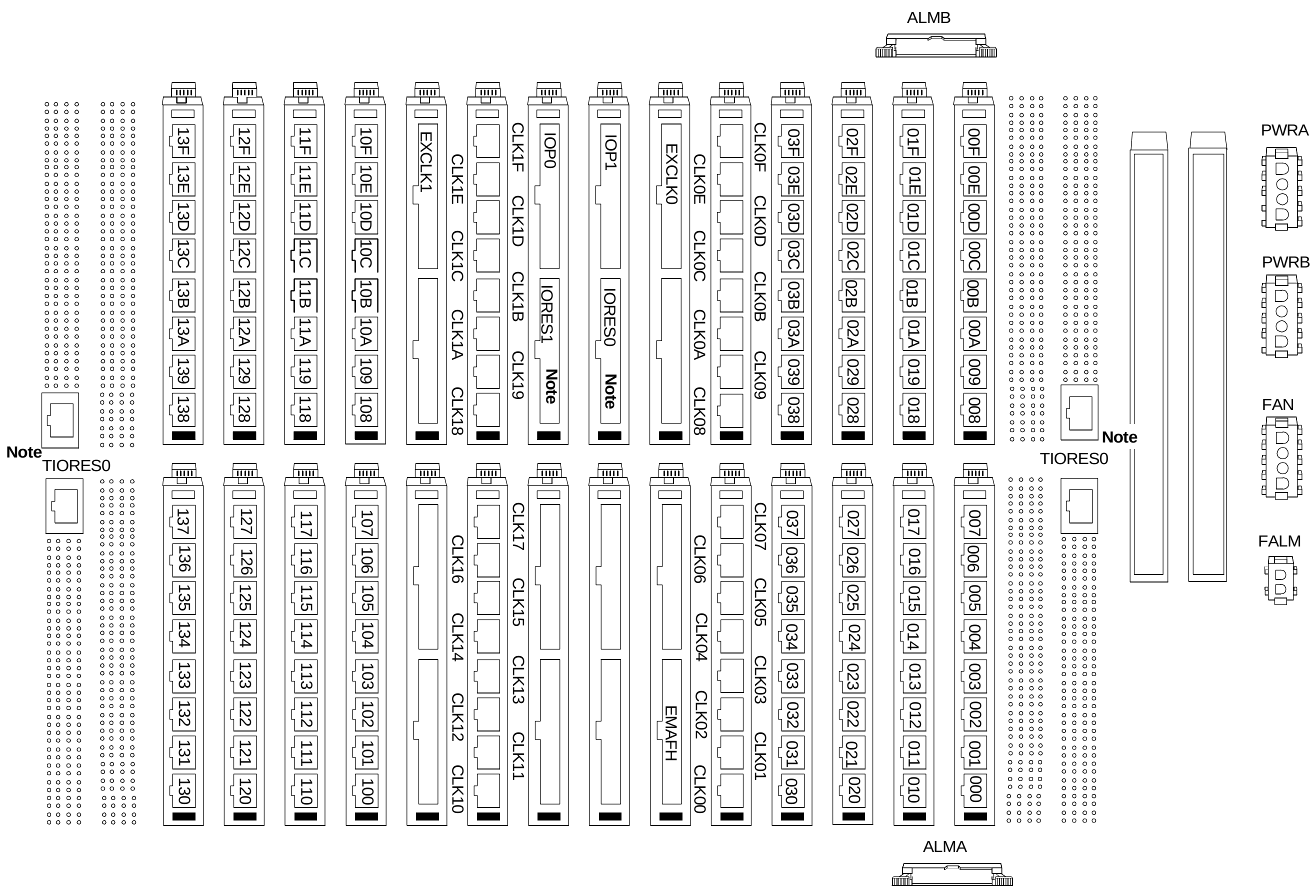

Note: *Terminal Registers are to be fastened onto these connectors. Details are on the next page.*

Figure 010-1 Location of Connectors on the ISWM Backplane

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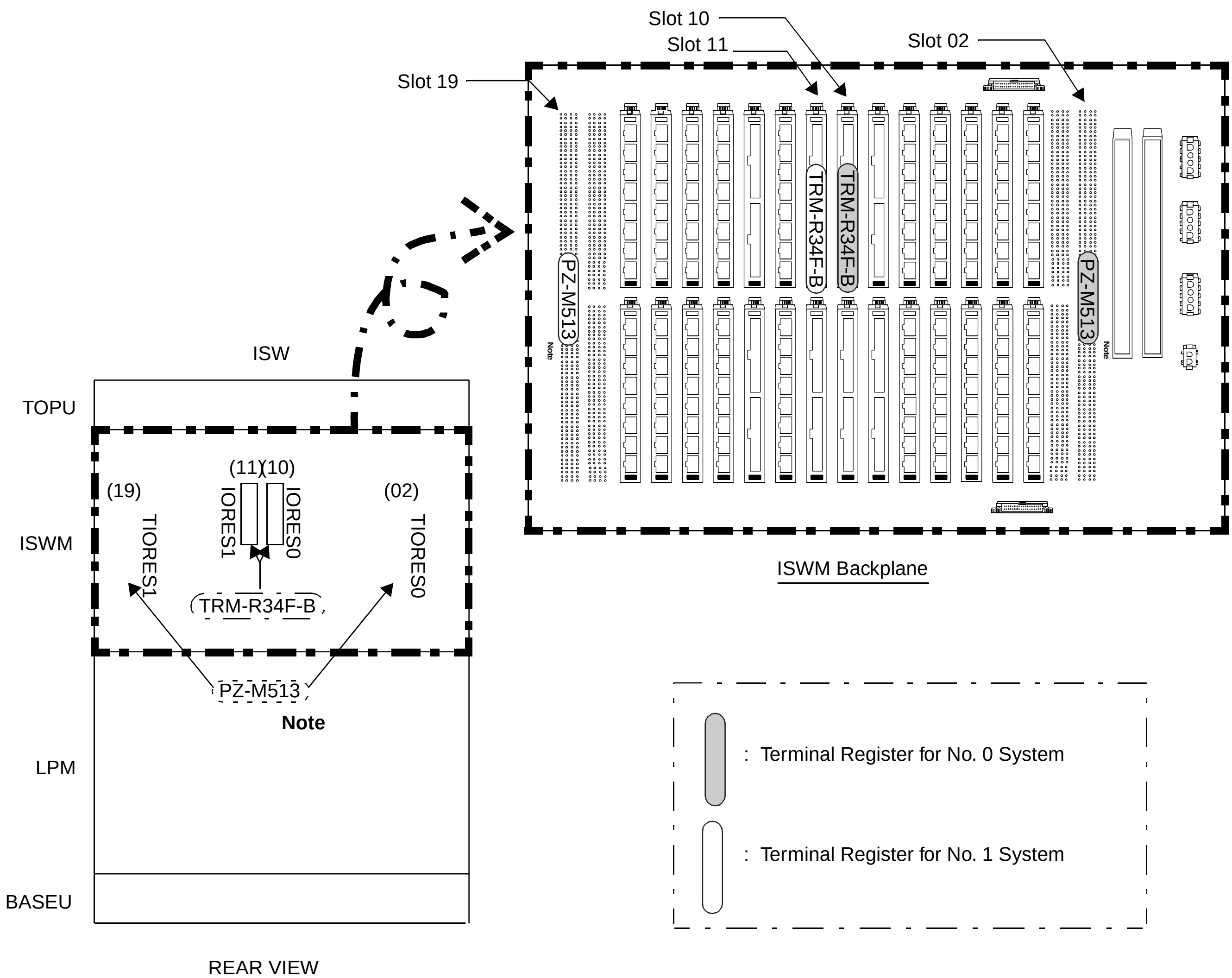
Referring to the figure below, fasten the Terminal Registers securely onto the relevant connectors on the ISWM backplane.



Note: *When attaching the Terminal Registers, PZ-M513, be sure to apply the supportive metal fittings, too, referring to Figure 010-3 on the next page.*

Figure 010-2 Location of Terminal Registers on the ISWM Backplane

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When attaching the Terminal Register, PZ-M513, also fasten the following metal fittings onto the ISWM backplane using the seven screws.

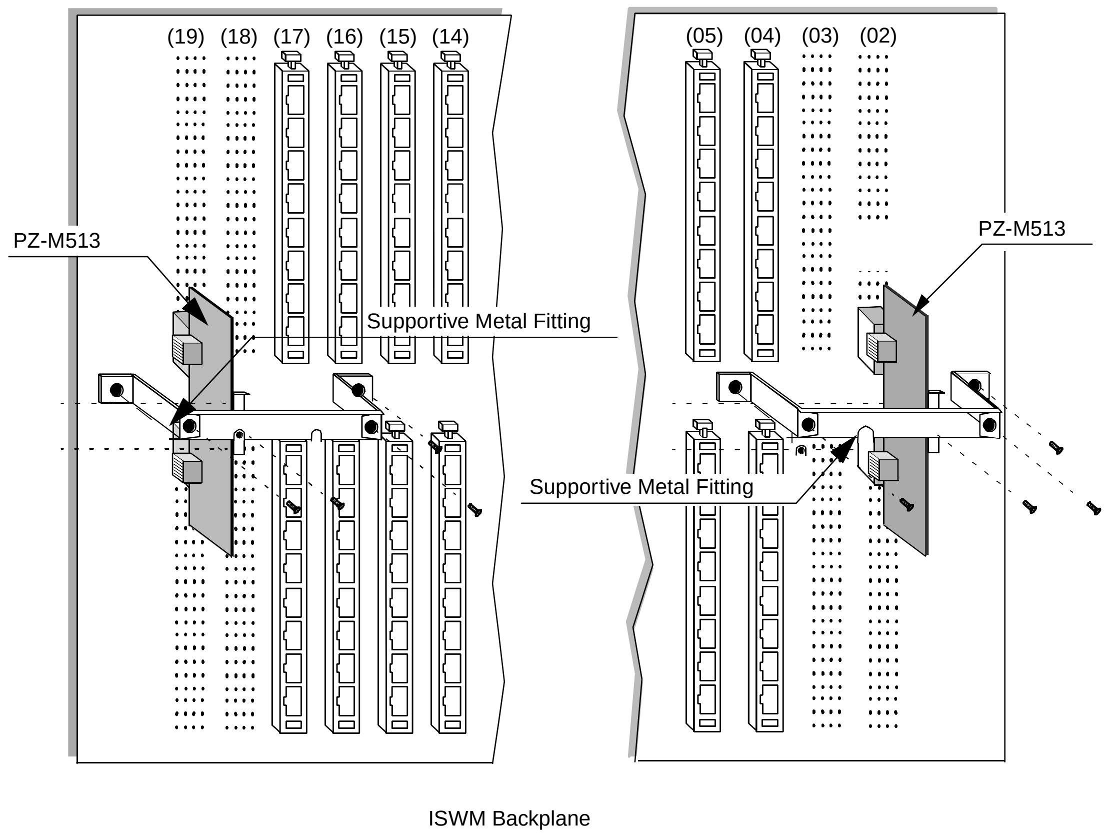

Figure 010-3 Details on Fastening PZ-M513 by Metal Fittings (ISWM Backplane)

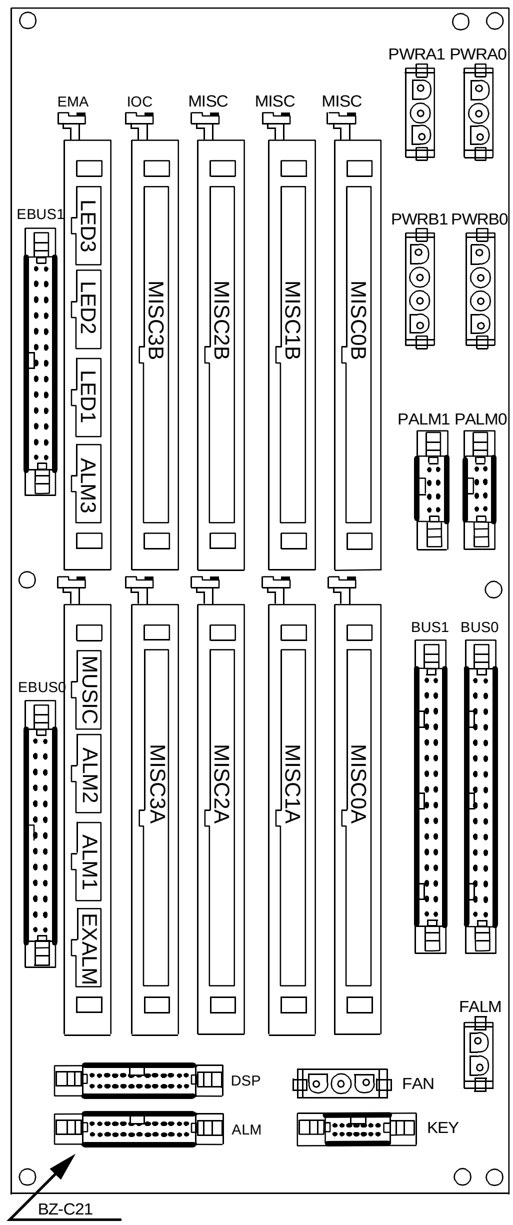

Figure 010-4 Location of Connectors on the LPM Backplane

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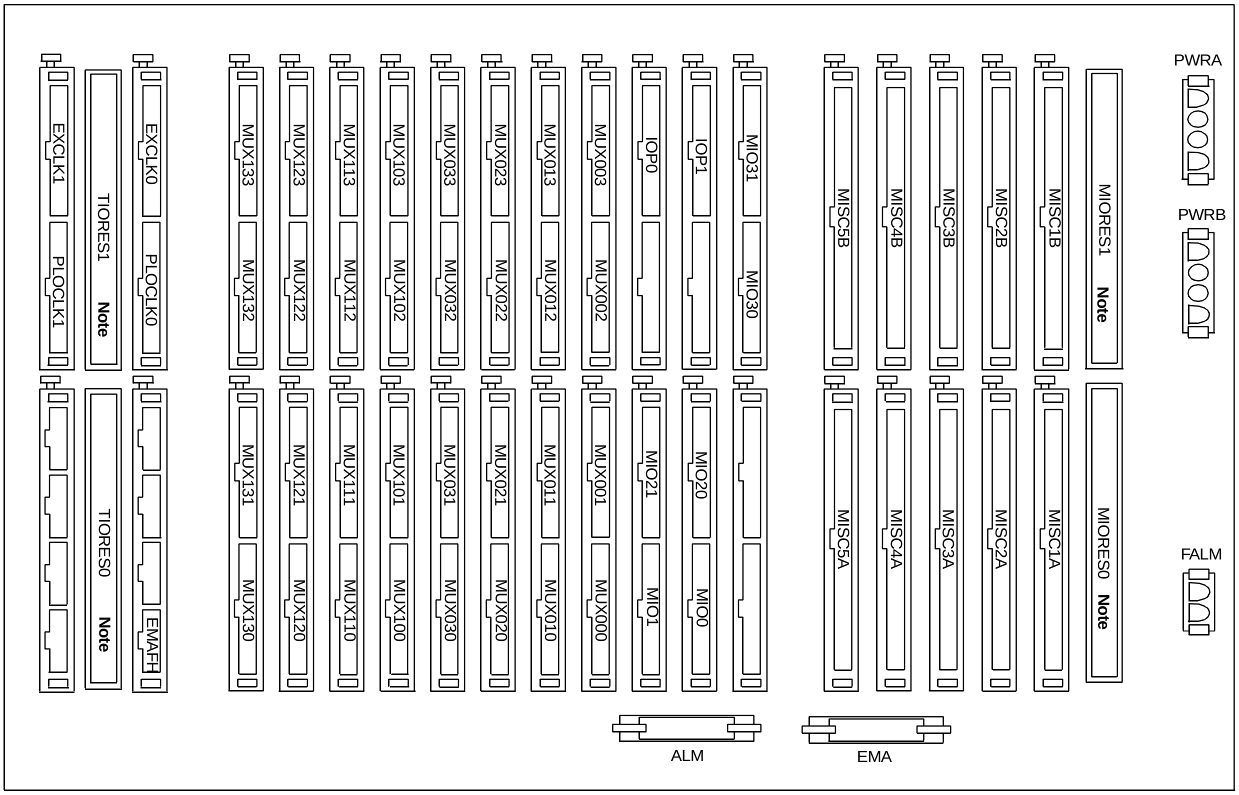
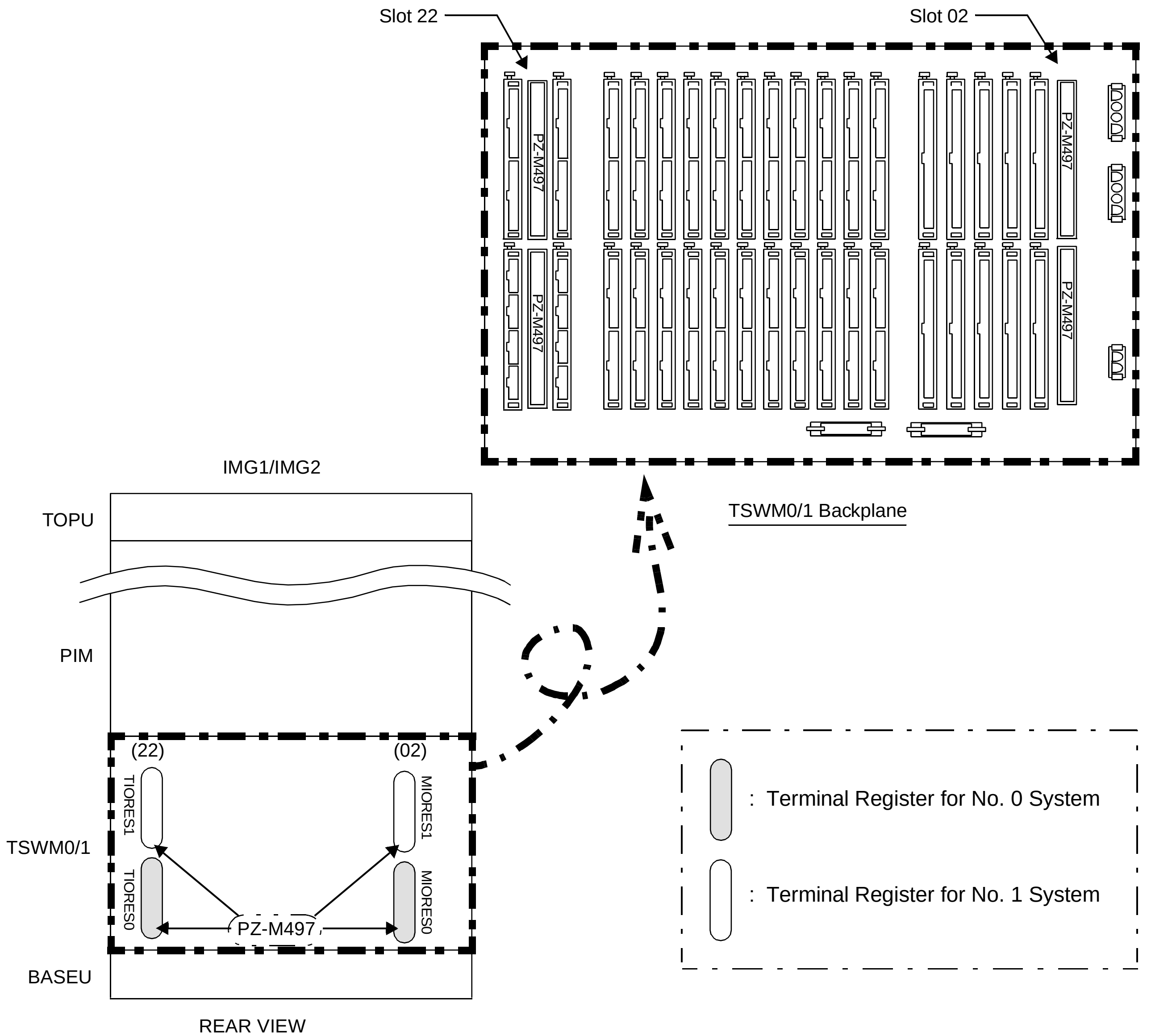


Note: *Terminal Registers (PZ-M497) are to be fastened onto these connectors. Details are on the next page.*

Figure 010-5 Location of Connectors on the TSWM Backplane

Referring to the figure below, fasten the Terminal Registers securely onto the relevant connectors on the TSWM0 and TSWM1 backplanes of each Local Node.



Note: *Perform this procedure for all the existing Local Nodes, both TSWM0 and TSWM1.*

Figure 010-6 Attachment of Terminal Registers for TSWM Backplane (LN)

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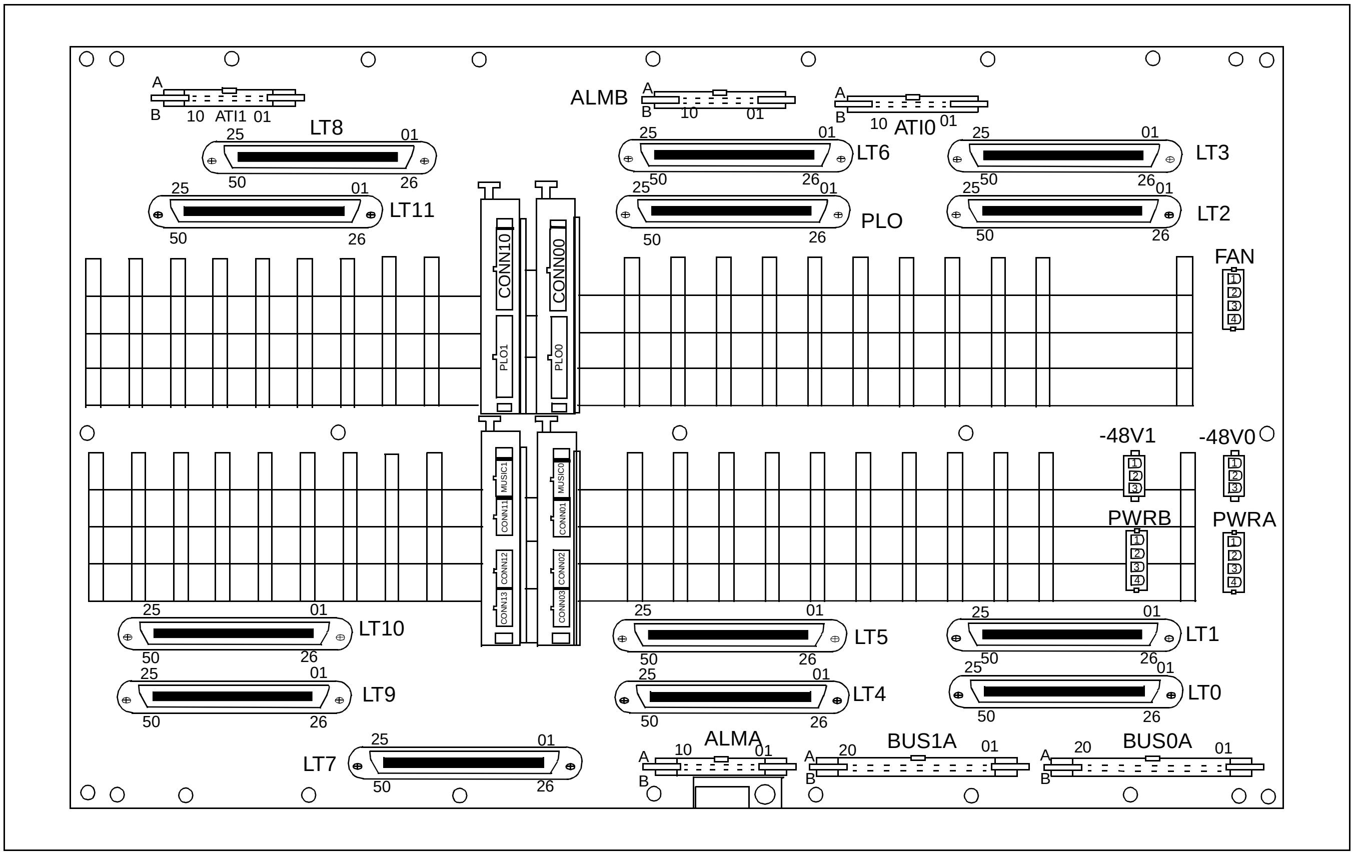

Figure 010-7 Location of Connectors on the PIM Backplane

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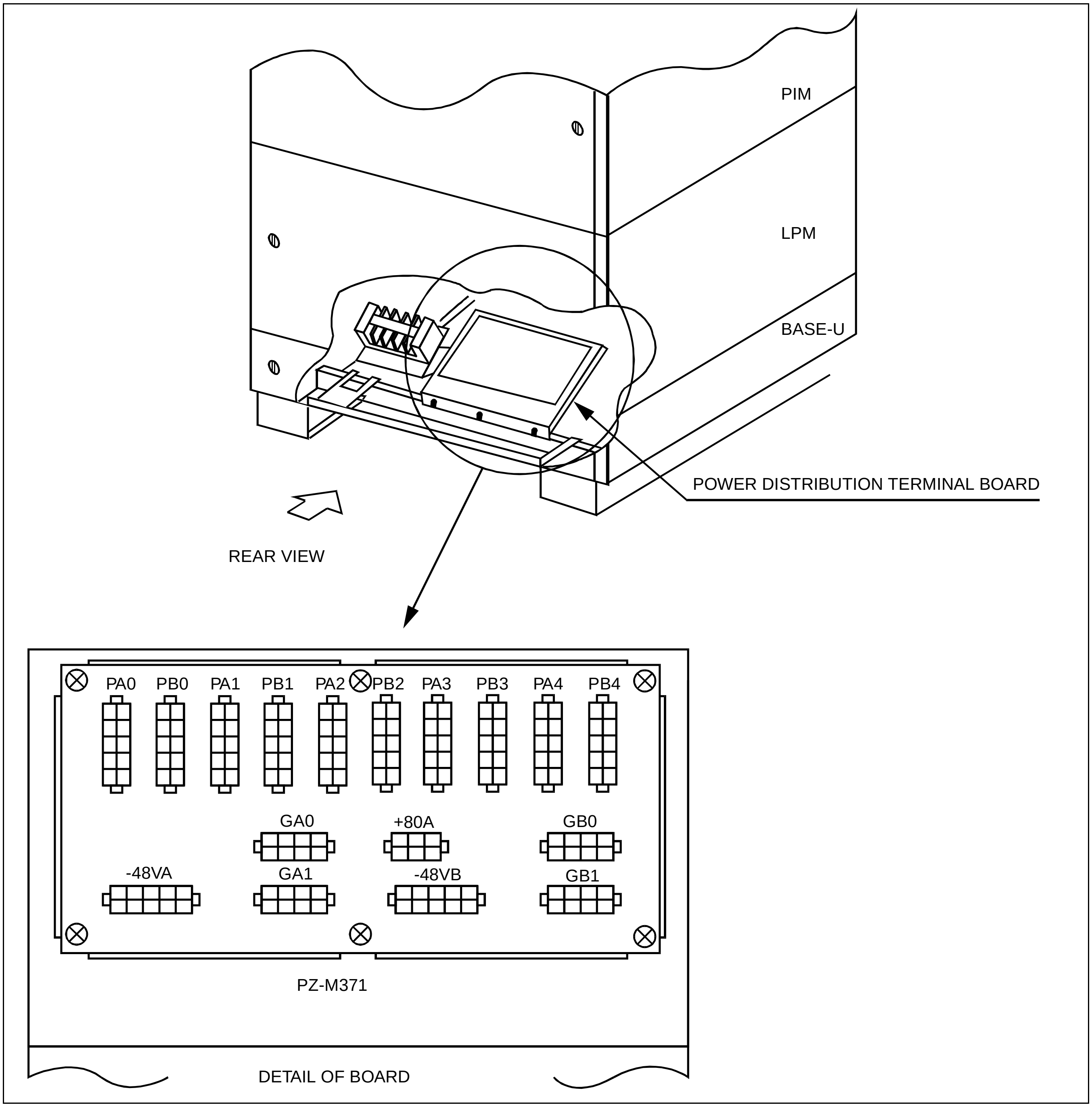

Figure 010-8 Location of Connectors on the Power Distribution Terminal Board (PZ-M371)

Run the internal power cables for ISW and each IMG of LN, referring to Figure 3-46 through 3-49.

Connect the internal power cables for ISW as shown in the figure below. Note that the dotted lines indicate power cables for a dual-system.

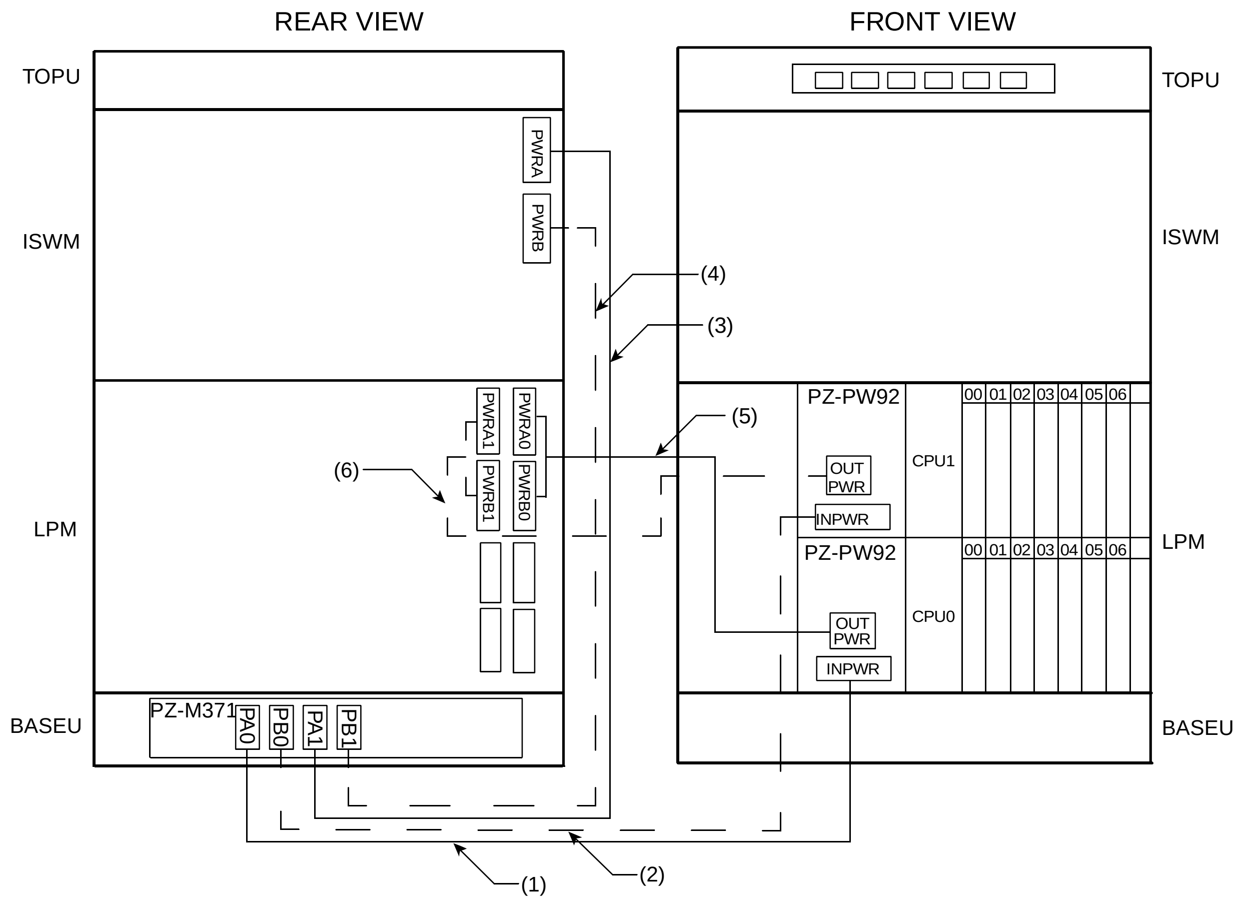

Figure 010-9 Internal Power Cable Connection for ISW

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Table 010-2 Internal Power Cable Connection for ISW

No.	TO		FROM		CABLE NAME	REMARKS
	UNIT/ MODULE	CONNECTOR NAME	UNIT/ MODULE	CONNECTOR NAME		
(1)	BASEU (PZ-M371)	PA0	LPM PWR0	IN PWR	4P-2P PWR CA-A	
(2)	BASEU (PZ-M371)	PB0	LPM PWR1	IN PWR	4P-2P PWR CA-B	For dual configuration
(3)	BASEU (PZ-M371)	PA1	ISWM	PWRA	4P PWR CA-C	
(4)	BASEU (PZ-M371)	PB1	ISWM	PWRB	4P PWR CA-D	For dual configuration
(5)	LPM PWR0	OUT PWR	LPM	PWRA0/B0	6P-(4P-3P) PWR CA-A	
(6)	LPM PWR1	OUT PWR	LPM	PWRA1/B1	6P-(4P-3P) PWR CA-B	For dual configuration

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Connect the internal power cables for IMG0 of each LN as shown below. Note that the dotted lines indicate power cables for a dual-system.

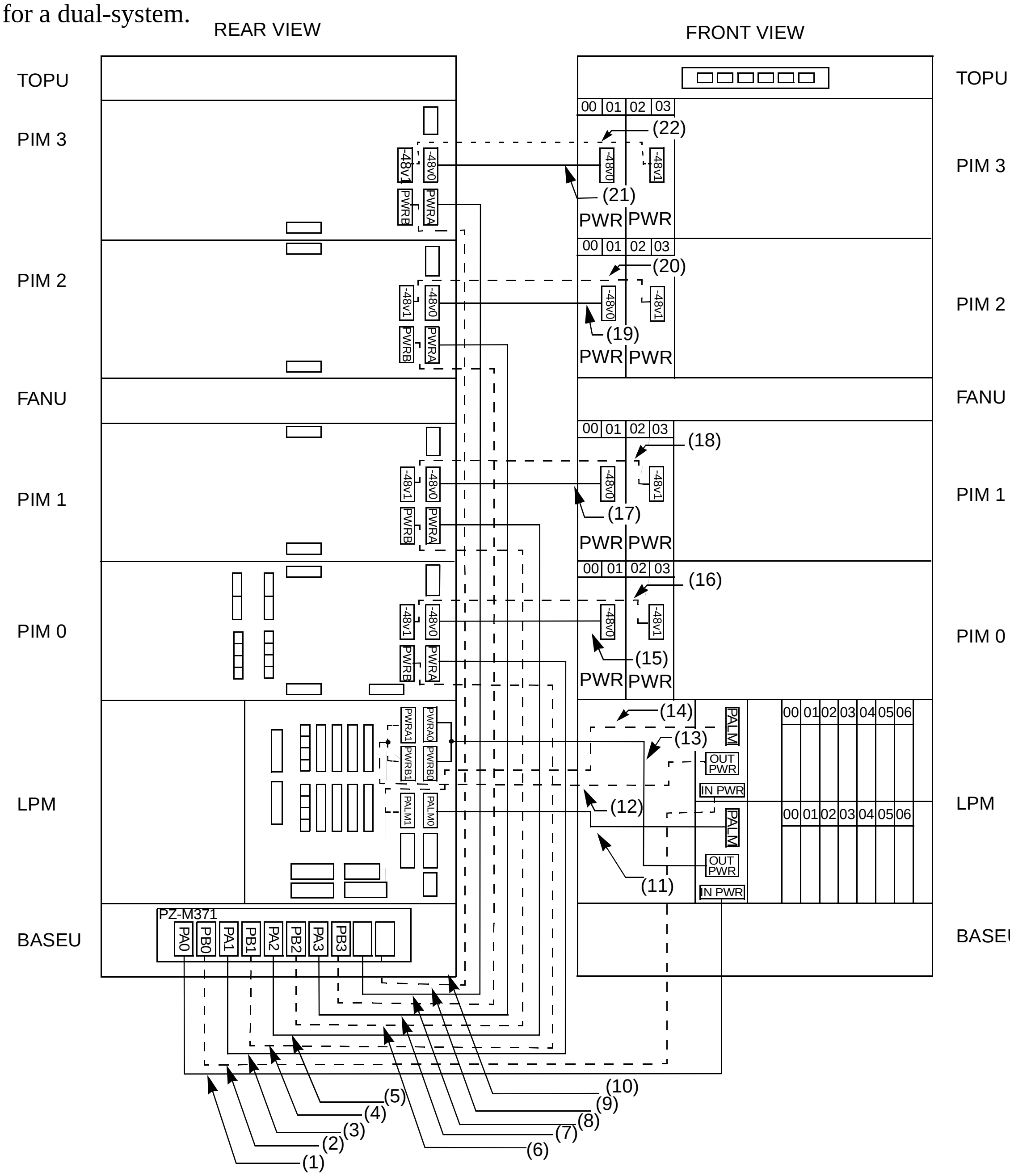

Figure 010-10 Internal Power Cable Connection for IMG0

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Table 010-3 Internal Power Cable Connection for IMG0

No.	TO		FROM		CABLE NAME	REMARKS
	UNIT/ MODULE	CONNECTOR NAME	UNIT/ MODULE	CONNECTOR NAME		
(1)	LPM	INPWR	BASEU	PA0	4P-2P PWR CA-A	For LN0/1 and if LN2/3 exist
(2)	LPM	INPWR	BASEU	PB0	4P-2P PWR CA-B	For dual configuration For LN0/1 and if LN2/3 exist
(3)	BASEU	PA1	PIM0	PWRA	4P PWR CA-C	For LN0/1 and if LN2/3 exist
(4)	BASEU	PB1	PIM0	PWRB	4P PWR CA-D	For dual configuration For LN0/1 and if LN2/3 exist
(5)	BASEU	PA2	PIM1	PWRA	4P PWR CA-E	For LN0/1 and if LN2/3 exist
(6)	BASEU	PB2	PIM1	PWRB	4P PWR CA-F	For dual configuration For LN0/1 and if LN2/3 exist
(7)	BASEU	PA3	PIM2	PWRA	4P PWR CA-G	For LN0/1 and if LN2/3 exist
(8)	BASEU	PB3	PIM2	PWRB	4P PWR CA-H	For dual configuration For LN0/1 and if LN2/3 exist
(9)	BASEU	PA4	PIM3	PWRA	4P PWR CA-I	For LN0/1 and if LN2/3 exist
(10)	BASEU	PB4	PIM3	PWRB	4P PWR CA-J	For dual configuration For LN0/1 and if LN2/3 exist
(11)	LPM	PALM	LPM	PALM0	10AL-(110) FLT CA	For LN0/1 and if LN2/3 exist
(12)	LPM	OUTPWR	LPM	PWR A1/ PWR B1	6P-(4P-3P) PWR CA-B	For dual configuration For LN0/1 and if LN2/3 exist
(13)	LPM	OUTPWR	LPM	PWR A0/ PWR B0	6P-(4P-3P) PWR CA-A	For LN0/1 and if LN2/3 exist
(14)	LPM	PALM	LPM	PALM1	10AL-(130) FLT CA	For dual configuration For LN0/1 and if LN2/3 exist
(15)	PIM0 (PWR)	-48V IN CONN	PIM0	-48V0	3P PWR CA-A	For LN0/1 and if LN2/3 exist
(16)	PIM0 (PWR)	-48V IN CONN	PIM0	-48V1	3P PWR CA-B	For dual configuration For LN0/1 and if LN2/3 exist
(17)	PIM1 (PWR)	-48V IN CONN	PIM1	-48V0	3P PWR CA-A	For LN0/1 and if LN2/3 exist
(18)	PIM1 (PWR)	-48V IN CONN	PIM1	-48V1	3P PWR CA-B	For dual configuration For LN0/1 and if LN2/3 exist
(19)	PIM2 (PWR)	-48V IN CONN	PIM2	-48V0	3P PWR CA-A	For LN0/1 and if LN2/3 exist
(20)	PIM2 (PWR)	-48V IN CONN	PIM2	-48V1	3P PWR CA-B	For dual configuration For LN0/1 and if LN2/3 exist
(21)	PIM3 (PWR)	-48V IN CONN	PIM3	-48V0	3P PWR CA-A	For LN0/1 and if LN2/3 exist
(22)	PIM3 (PWR)	-48V IN CONN	PIM3	-48V1	3P PWR CA-B	For dual configuration For LN0/1 and if LN2/3 exist

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Connect the internal power cables for IMG1 and IMG2 of each LN as shown below. Note that the dotted lines indicate power cables for a dual-system.

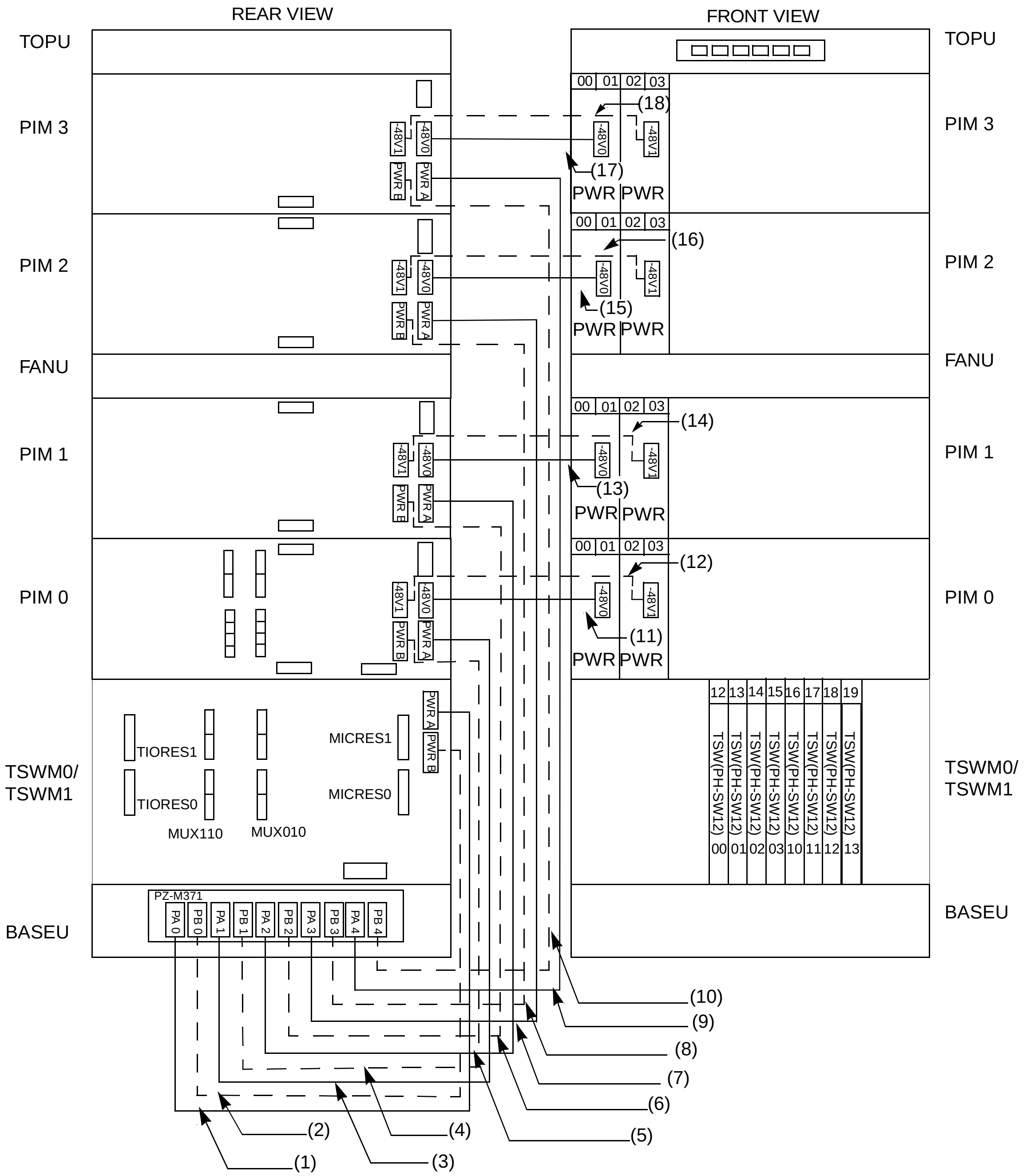

Figure 010-11 Internal Power Cable Connection for IMG1/2

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Table 010-4 Internal Power Cable Connection for IMG1/2

No.	TO		FROM		CABLE NAME	REMARKS
	UNIT/ MODULE	CONNECTOR NAME	UNIT/ MODULE	CONNECTOR NAME		
(1)	BASEU	PA0	TSWM0/1	PWR A	4P PWR CA-A	When IMG1/2 exists in LNn
(2)	BASEU	PB0	TSWM0/1	PWR B	4P PWR CA-B	For dual configuration When IMG1/2 exists in LNn
(3)	BASEU	PA1	PIM0	PWR A	4P PWR CA-C	When IMG1/2 exists in LNn
(4)	BASEU	PB1	PIM0	PWR B	4P PWR CA-D	For dual configuration When IMG1/2 exists in LNn
(5)	BASEU	PA2	PIM1	PWR A	4P PWR CA-E	When PIM1 exists in IMG1/2 of LNn
(6)	BASEU	PB2	PIM1	PWR B	4P PWR CA-F	For dual configuration When PIM1 exists in IMG1/2 of LNn
(7)	BASEU	PA3	PIM2	PWR A	4P PWR CA-G	When PIM2 exists in IMG1/2 of LNn
(8)	BASEU	PB3	PIM2	PWR B	4P PWR CA-H	For dual configuration When PIM2 exists in IMG1/2 of LNn
(9)	BASEU	PB4	PIM3	PWR A	4P PWR CA-I	When PIM3 exists in IMG1/2 of LNn
(10)	BASEU	PB4	PIM3	PWR B	4P PWR CA-J	For dual configuration When PIM3 exists in IMG1/2 of LNn
(11)	PIM0 (PWR)	-48V IN CONN	PIM0	-48V0	3P PWR CA-A	When IMG1/2 exists in LNn
(12)	PIM0 (PWR)	-48V IN CONN	PIM0	-48V1	3P PWR CA-B	For dual configuration When IMG1/2 exists in LNn
(13)	PIM1 (PWR)	-48V IN CONN	PIM1	-48V0	3P PWR CA-A	When PIM1 exists in IMG1/2 of LNn
(14)	PIM1 (PWR)	-48V IN CONN	PIM1	-48V1	3P PWR CA-B	For dual configuration When PIM1 exists in IMG1/2 of LNn
(15)	PIM2 (PWR)	-48V IN CONN	PIM2	-48V0	3P PWR CA-A	When PIM2 exists in IMG1/2 of LNn
(16)	PIM2 (PWR)	-48V IN CONN	PIM2	-48V1	3P PWR CA-B	For dual configuration When PIM2 exists in IMG1/2 of LNn
(17)	PIM3 (PWR)	-48V IN CONN	PIM3	-48V0	3P PWR CA-A	When PIM3 exists in IMG1/2 of LNn
(18)	PIM3 (PWR)	-48V IN CONN	PIM3	-48V1	3P PWR CA-B	For dual configuration When PIM3 exists in IMG1/2 of LNn

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Connect the internal power cables for IMG3 of each LN as shown below. Note that the dotted lines indicate power cables for a dual-system.

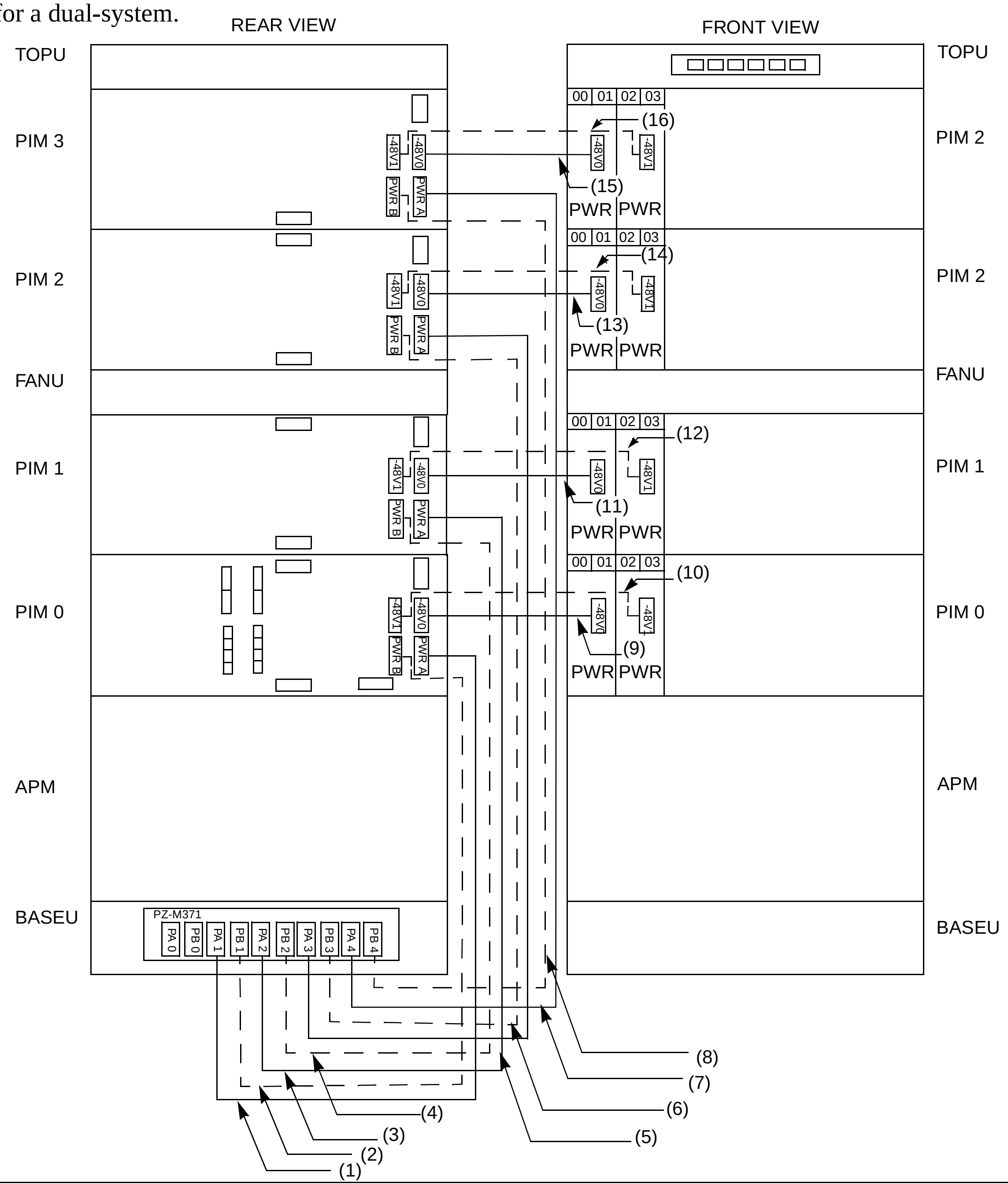

Figure 010-12 Internal Power Cable Connection for IMG3

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Table 010-5 Internal Power Cable Connection for IMG3

No.	TO		FROM		CABLE NAME	REMARKS
	UNIT/ MODULE	CONNECTOR NAME	UNIT/ MODULE	CONNECTOR NAME		
(1)	BASEU	PA1	PIM0	PWR A	4P PWR CA-C	When IMG3 exists in LNn
(2)	BASEU	PB1	PIM0	PWR B	4P PWR CA-D	For dual configuration When IMG3 exists in LNn
(3)	BASEU	PA2	PIM1	PWR A	4P PWR CA-E	When PIM1 exists in IMG3 of LNn
(4)	BASEU	PB2	PIM1	PWR B	4P PWR CA-F	For dual configuration When PIM1 exists in IMG3 of LNn
(5)	BASEU	PA3	PIM2	PWR A	4P PWR CA-G	When PIM2 exists in IMG3 of LNn
(6)	BASEU	PB3	PIM2	PWR B	4P PWR CA-H	For dual configuration When PIM2 exists in IMG3 of LNn
(7)	BASEU	PA4	PIM3	PWR A	4P PWR CA-I	When PIM3 exists in IMG3 of LNn
(8)	BASEU	PB4	PIM3	PWR B	4P PWR CA-J	For dual configuration When PIM3 exists in IMG3 of LNn
(9)	PIM0 (PWR)	-48V IN CONN	PIM0	-48V0	3P PWR CA-A	When IMG3 exists in LNn
(10)	PIM0 (PWR)	-48V IN CONN	PIM0	-48V1	3P PWR CA-B	For dual configuration When IMG3 exists in LNn
(11)	PIM1 (PWR)	-48V IN CONN	PIM1	-48V0	3P PWR CA-A	When PIM1 exists in IMG3 of LNn
(12)	PIM1 (PWR)	-48V IN CONN	PIM1	-48V1	3P PWR CA-B	For dual configuration When PIM1 exists in IMG3 of LNn
(13)	PIM2 (PWR)	-48V IN CONN	PIM2	-48V0	3P PWR CA-A	When PIM2 exists in IMG3 of LNn
(14)	PIM2 (PWR)	-48V IN CONN	PIM2	-48V1	3P PWR CA-B	For dual configuration When PIM2 exists in IMG3 of LNn
(15)	PIM3 (PWR)	-48V IN CONN	PIM3	-48V0	3P PWR CA-A	When PIM3 exists in IMG3 of LNn
(16)	PIM3 (PWR)	-48V IN CONN	PIM3	-48V1	3P PWR CA-B	For dual configuration When PIM3 exists in IMG3 of LNn

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Run the internal bus cables for ISW and each IMG of LN, referring to Figures 010-13 through 010-17.

Connect the internal bus cables for ISW as shown in the figure below. Note that the dotted lines indicate bus cables for a dual-system.

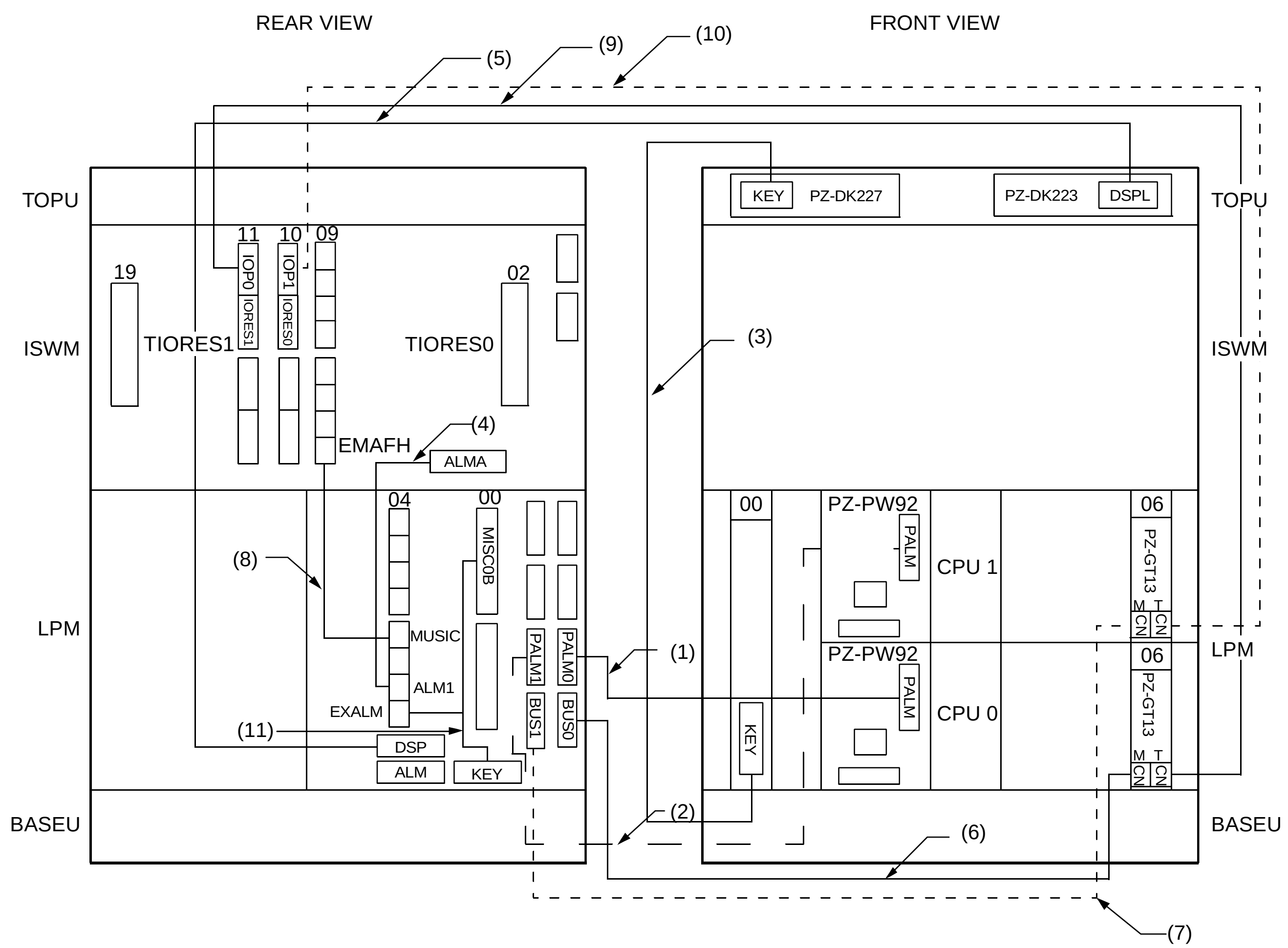

Figure 010-13 Internal Bus Cable Connection for ISW

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Table 010-6 Internal Bus Cable Connection for ISW

No.	TO		FROM		CABLE NAME	REMARKS
	UNIT/ MODULE	CONNECTOR NAME	UNIT/ MODULE	CONNECTOR NAME		
(1)	LPM	PALM	LPM	PALM0	10AL-(110) FLT CA	
(2)	LPM	PALM	LPM	PALM1	10AL-(130) FLT CA	For dual configuration
(3)	LPM	KEY	TOPU	KEY (PZ-DK227)	10AL-(400) FLT CA	
(4)	LPM	ALM1	ISWM	ALMA	16PH ALM CA-A	
(5)	LPM	DSP	TOPU	DSPL (PZ-DK223)	20AL-(270) FLT CA	
(6)	LPM (ISAGT0)	CN-M	LPM	BUS0	EXGT BUS CA-A	
(7)	LPM (ISAGT1)	CN-M	LPM	BUS1	EXGT BUS CA-A	For dual configuration
(8)	LPM	MUSIC	ISWM	EMAFH	16PH STD CA-A	
(9)	LPM (ISAGT0)	CN-T	ISWM	IOP0 (slot 11)	34PH 50AL CA-A	
(10)	LPM (ISAGT1)	CN-T	ISWM	IOP1 (slot 10)	34PH 50AL CA-A	For dual configuration
(11)	LPM	MISC0B/KEY	LPM	EXALM	68PH KEY CA	

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Connect the internal bus cables for IMG0 of all the LN as shown below. Note that the dotted line indicates the bus cable for a dual-system.

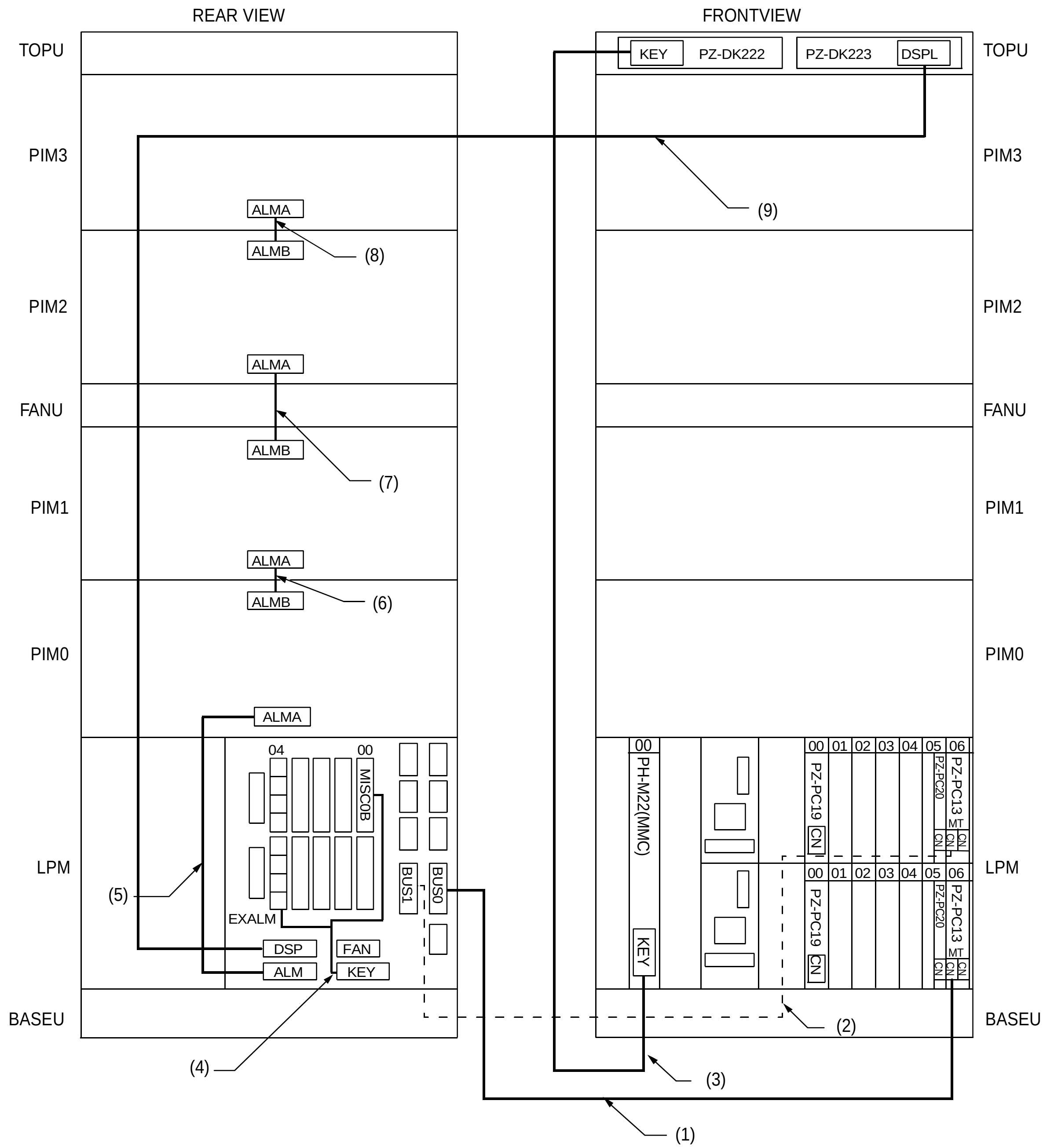

Figure 010-14 Internal Bus Cable Connection for IMG0

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Table 010-7 Internal Bus Cable Connection for IMG0

No.	TO		FROM		CABLE NAME	REMARKS
	UNIT/ MODULE	CONNECTOR NAME	UNIT/ MODULE	CONNECTOR NAME		
(1)	LPM (ISAGT0)	CN-M	LPM	BUS0	EXGT BUS CA-A	For LN0/1 and if LN2/3 exist
(2)	LPM (ISAGT1)	CN-M	LPM	BUS1	EXGT BUS CA-A	For dual configuration For LN0/1 and if LN2/3 exist
(3)	MMC	KEY	TOPU	KEY	10AL-(400) FLT CA	For LN0/1 and if LN2/3 exist
(4)	LPM	MISC0B/KEY	LPM	EXALM	68PH KEY CA	For LN0/1 and if LN2/3 exist
(5)	LPM	ALM	PIM0	ALMA	20AL-(60) FLT CA	For LN0/1 and if LN2/3 exist
(6)	PIM0	ALMB	PIM1	ALMA	20AL-(10) FLT CA	When PIM1 exists in IMG0 of LNn
(7)	PIM1	ALMB	PIM2	ALMA	20AL-(20) FLT CA	When PIM2 exists in IMG0 of LNn
(8)	PIM2	ALMB	PIM3	ALMA	20AL-(10) FLT CA	When PIM3 exists in IMG0 of LNn
(9)	LPM	DSP	TOPU	DSPL (PZ-DK223)	20AL-(270) FLT CA	

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Connect the internal bus cables for IMG1 of each LN as shown below. Note that the dotted lines indicate bus cables for a dual-system.

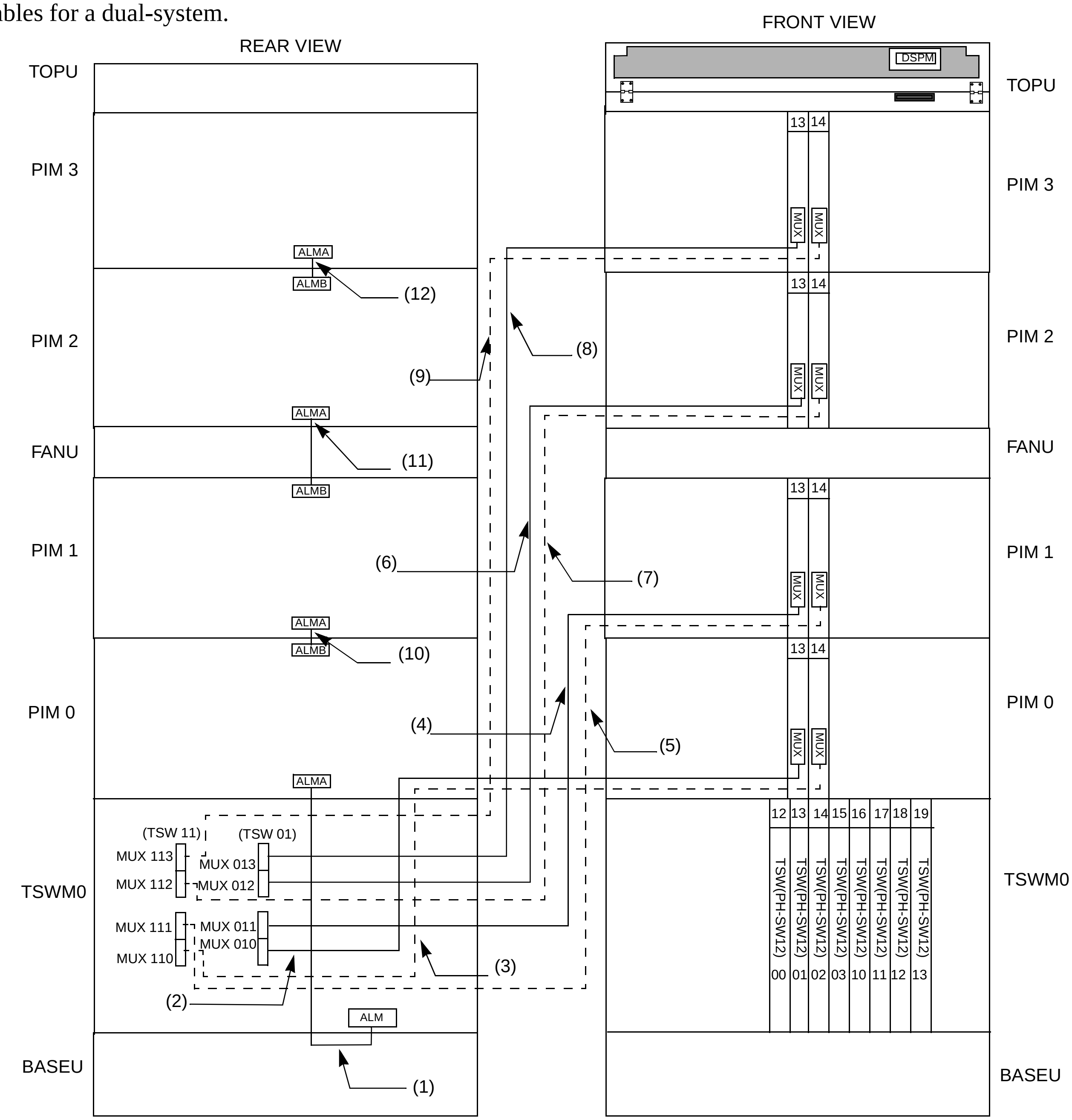

Figure 010-15 Internal Bus Cable Connection for IMG1

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Table 010-8 Internal Bus Cable Connection for IMG1

No.	TO		FROM		CABLE NAME	REMARKS
	UNIT/ MODULE	CONNECTOR NAME	UNIT/ MODULE	CONNECTOR NAME		
(1)	TSWM0	ALM	PIM0	ALMA	20AL-(60) FLT CA	For LN0/1 and if LN2/3 exist.
(2)	TSWM0	MUX010	PIM0	MUX (slot 13)	34PH MT24 TSW CA-D	For LN0/1 and if LN2/3 exist.
(3)	TSWM0	MUX110	PIM0	MUX (slot 14)	34PH MT24 TSW CA-D	For dual configuration For LN0/1 and if LN2/3 exist.
(4)	TSWM0	MUX011	PIM1	MUX (slot 13)	34PH MT24 TSW CA-E	When PIM1 exists in IMG1 of LNn
(5)	TSWM0	MUX111	PIM1	MUX (slot 14)	34PH MT24 TSW CA-E	For dual configuration When PIM1 exists in IMG1 of LNn
(6)	TSWM0	MUX012	PIM2	MUX (slot 13)	34PH MT24 TSW CA-F	When PIM2 exists in IMG1 of LNn
(7)	TSWM0	MUX112	PIM2	MUX (slot 14)	34PH MT24 TSW CA-F	For dual configuration When PIM2 exists in IMG1 of LNn
(8)	TSWM0	MUX013	PIM3	MUX (slot 13)	34PH MT24 TSW CA-G	When PIM3 exists in IMG1 of LNn
(9)	TSWM0	MUX113	PIM3	MUX (slot 14)	34PH MT24 TSW CA-G	For dual configuration When PIM3 exists in IMG1 of LNn
(10)	PIM0	ALMB	PIM1	ALMA	20AL-(10) FLT CA	When PIM1 exists in IMG1 of LNn
(11)	PIM1	ALMB	PIM2	ALMA	20AL-(20) FLT CA	When PIM2 exists in IMG1 of LNn
(12)	PIM2	ALMB	PIM3	ALMA	20AL-(10) FLT CA	When PIM3 exists in IMG1 of LNn

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Connect the internal bus cables for IMG2 of all the LN as shown below. The dotted lines indicate bus cables for a dual-system.

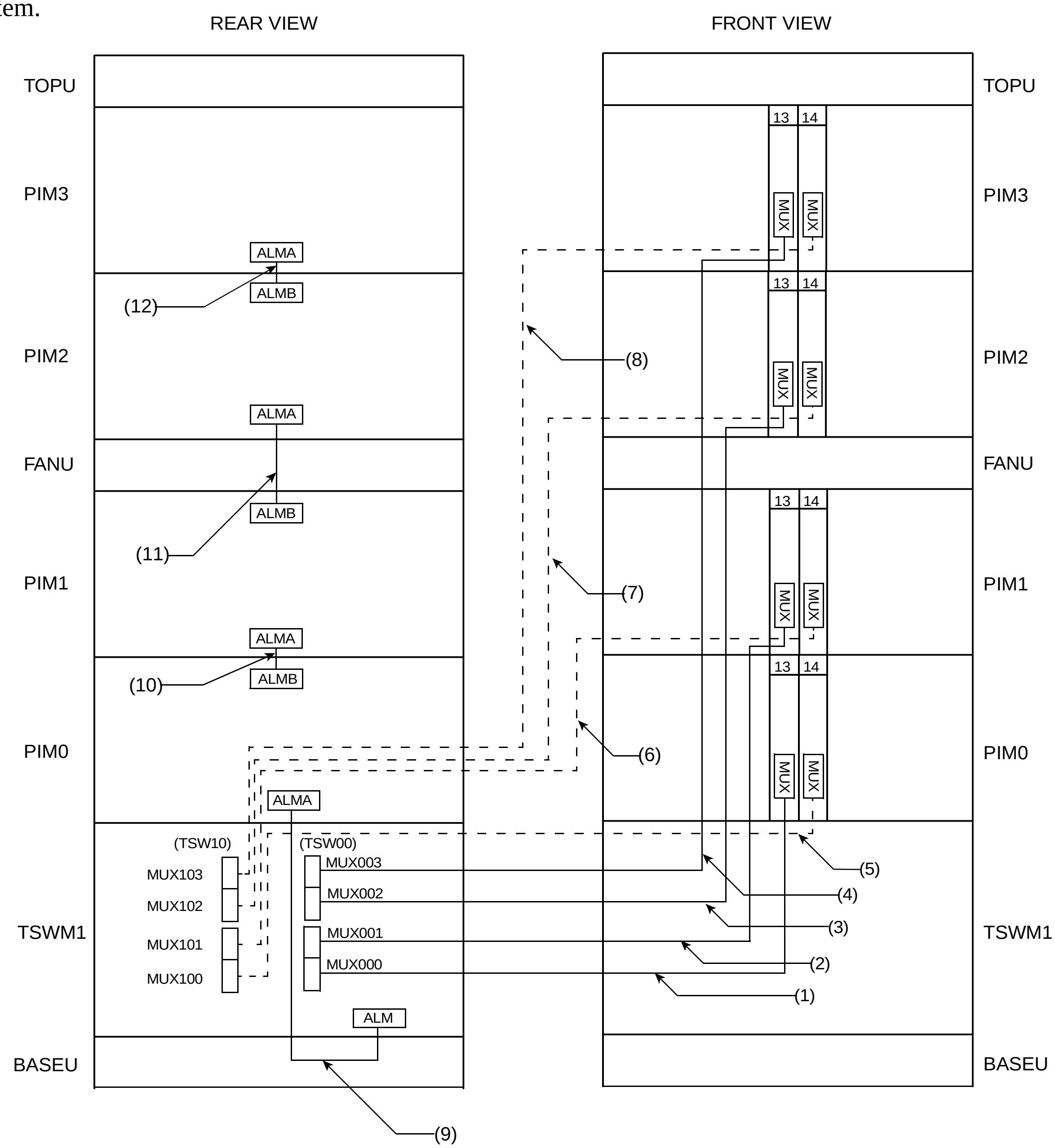

Figure 010-16 Internal Bus Cable Connection for IMG2

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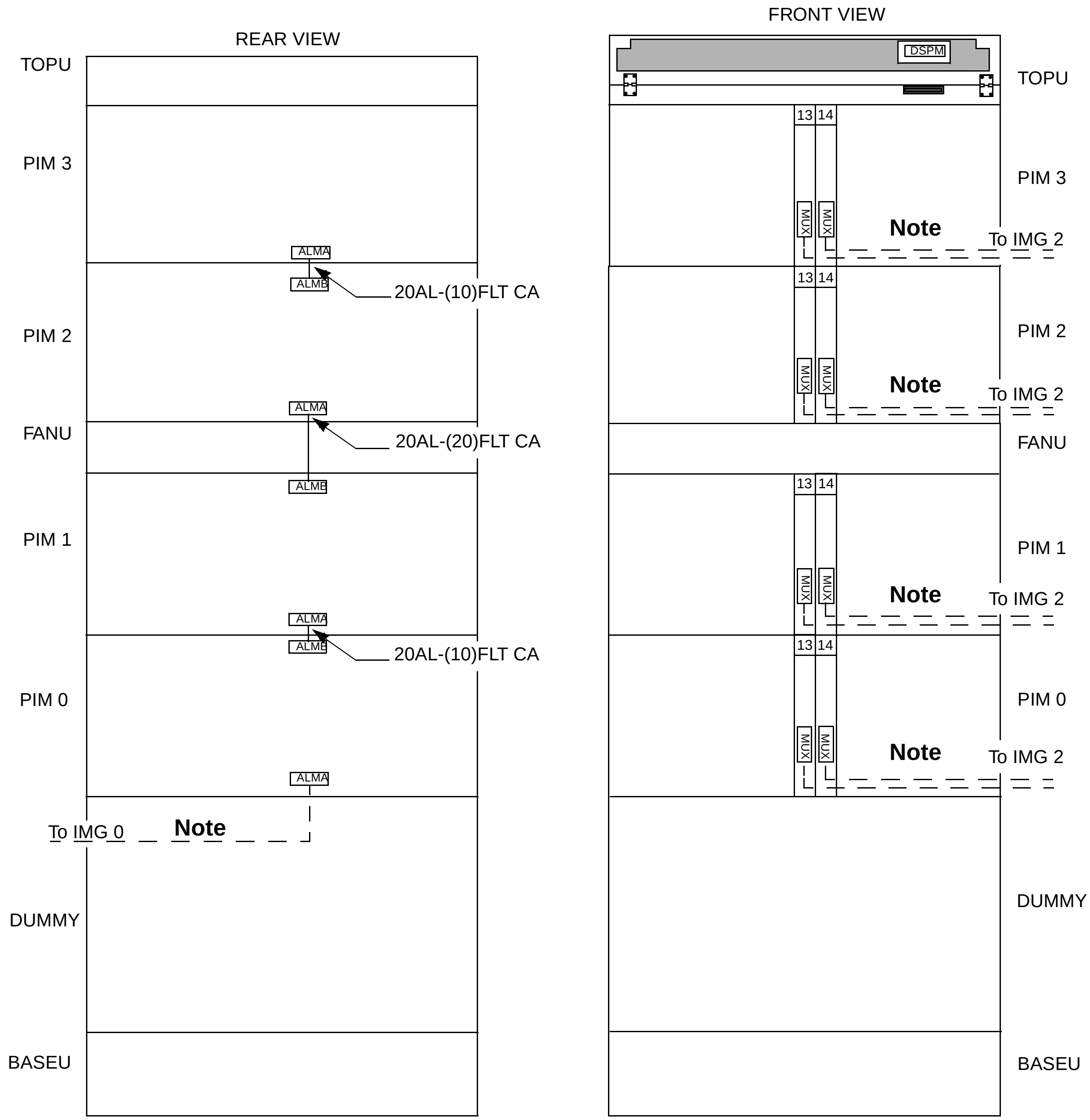
Table 010-9 Internal Bus Cables for IMG2

No.	TO		FROM		CABLE NAME	REMARKS
	UNIT/ MODULE	CONNECTOR NAME	UNIT/ MODULE	CONNECTOR NAME		
(1)	TSWM1	MUX000	PIM0	MUX (slot 13)	34PH MT24 TSW CA-D	When IMG2 exists in LNn
(2)	TSWM1	MUX001	PIM1	MUX (slot 13)	34PH MT24 TSW CA-E	When PIM1 exists in IMG2 of LNn
(3)	TSWM1	MUX002	PIM2	MUX (slot 13)	34PH MT24 TSW CA-F	When PIM2 exists in IMG2 of LNn
(4)	TSWM1	MUX003	PIM3	MUX (slot 13)	34PH MT24 TSW CA-G	When PIM3 exists in IMG2 of LNn
(5)	TSWM1	MUX100	PIM0	MUX (slot 14)	34PH MT24 TSW CA-D	When PIM0 exists in IMG2 of LNn For dual configuration
(6)	TSWM1	MUX101	PIM1	MUX (slot 14)	34PH MT24 TSW CA-E	When PIM1 exists in IMG2 of LNn For dual configuration
(7)	TSWM1	MUX102	PIM2	MUX (slot 14)	34PH MT24 TSW CA-F	When PIM2 exists in IMG2 of LNn For dual configuration
(8)	TSWM1	MUX103	PIM3	MUX (slot 14)	34PH MT24 TSW CA-G	When PIM3 exists in IMG2 of LNn For dual configuration
(9)	TSWM1	ALM	PIM0	ALMA	20AL-(60) FLT CA	When PIM0 exists in IMG2 of LNn
(10)	PIM0	ALMB	PIM1	ALMA	20AL-(10) FLT CA	When PIM1 exists in IMG2 of LNn
(11)	PIM1	ALMB	PIM2	ALMA	20AL-(20) FLT CA	When PIM2 exists in IMG2 of LNn
(12)	PIM2	ALMB	PIM3	ALMA	20AL-(10) FLT CA	When PIM3 exists in IMG2 of LNn

Connect the internal bus cables for IMG3 of all LN as shown below.



Note: *For these cable runnings, refer to Section 2: "Inter-frame Cable Connections."*

Figure 010-17 Internal Bus Cable Connection for IMG3

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2. INTER-FRAME CABLE CONNECTION FOR LN

This section explains how to run the frame-to-frame cables for LN. Perform this procedure for all the LNs.

START

- Confirm connector locations — Referring to Figure 010-4, Figure 010-5 and 010-7, confirm the locations of the connectors into which the cables are inserted.
- Connection of inter-frame bus cables for LN — Referring to Figure 010-18 through 010-25, connect the inter-frame Bus cables.

END

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Connect the inter-frame ISA bus cables as shown below. Note that the dotted line indicates the bus cable for a dual system.

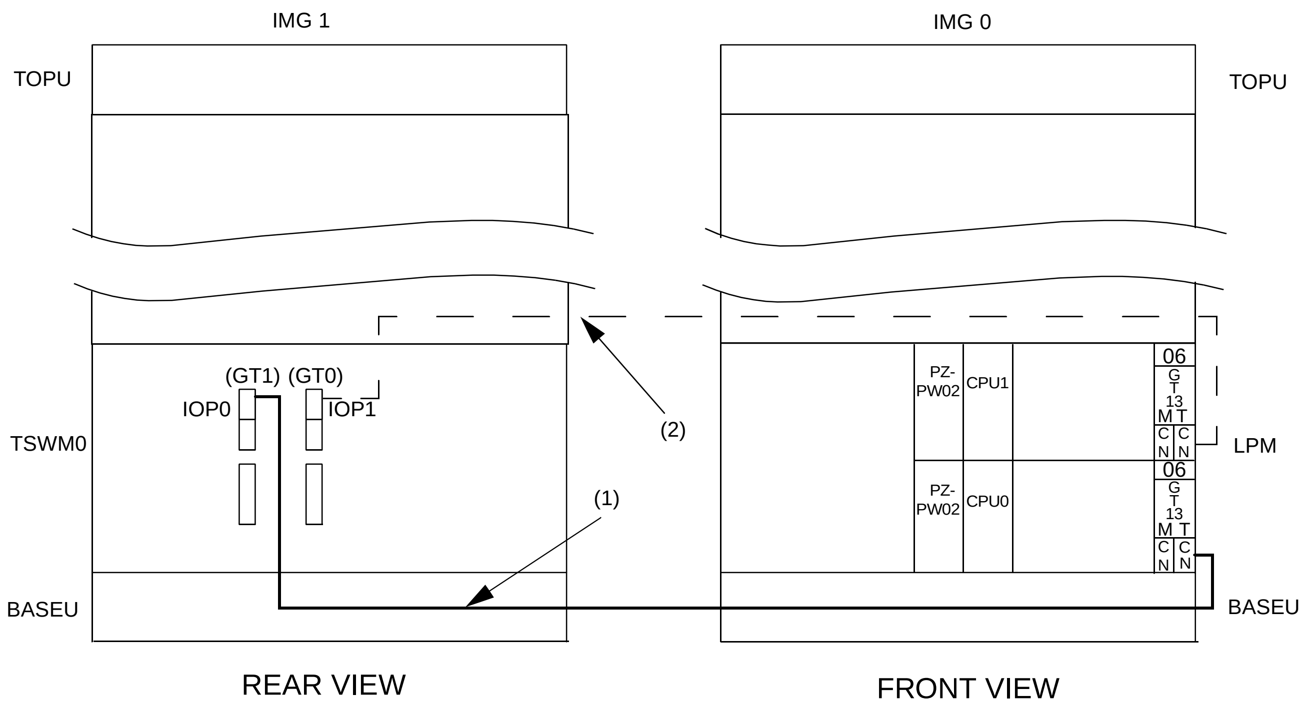

Figure 010-18 Inter-frame ISA Bus Cable Connection for IMG0-IMG1

Table 010-10 Inter-frame ISA Bus Cable Connection for IMG0-IMG1

No.	FROM		TO		CABLE NAME	REMARKS
	UNIT/ MODULE	CONNECTOR NAME	UNIT/ MODULE	CONNECTOR NAME		
(1)	LPM (ISAGT0)	CN-T	TSWM0	IOP0 (slot 11)	34PH 50AL CA-A	GT1
(2)	LPM (ISAGT1)	CN-T	TSWM0	IOP1 (slot 10)	34PH 50AL CA-A	GT0

Connect the inter-frame bus cables between IMG0 and IMG1 as shown below. Note that the dotted lines indicate bus cables for a dual-system.

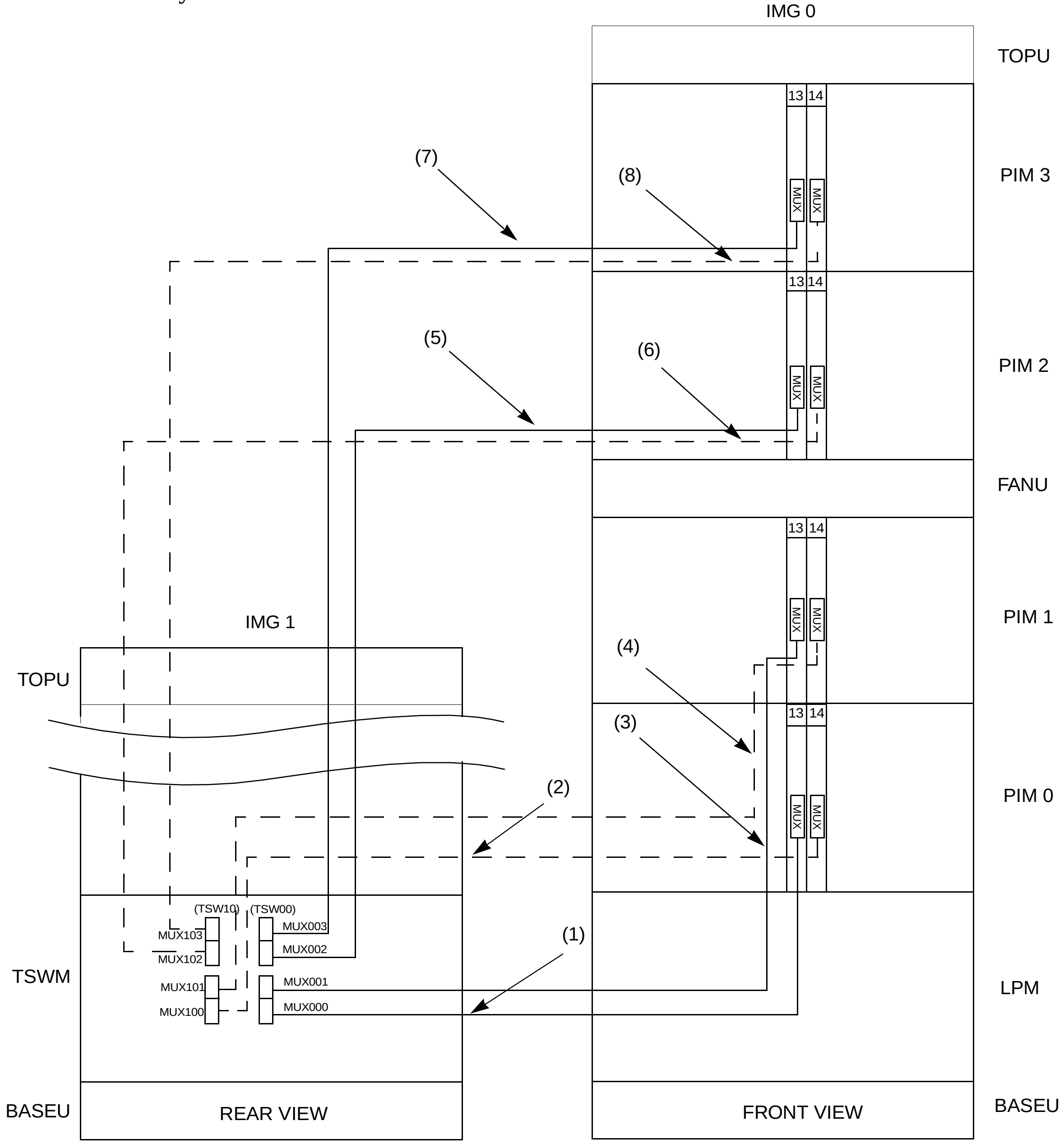

Figure 010-19 Inter-frame Bus Cable Connection for IMG0-IMG1

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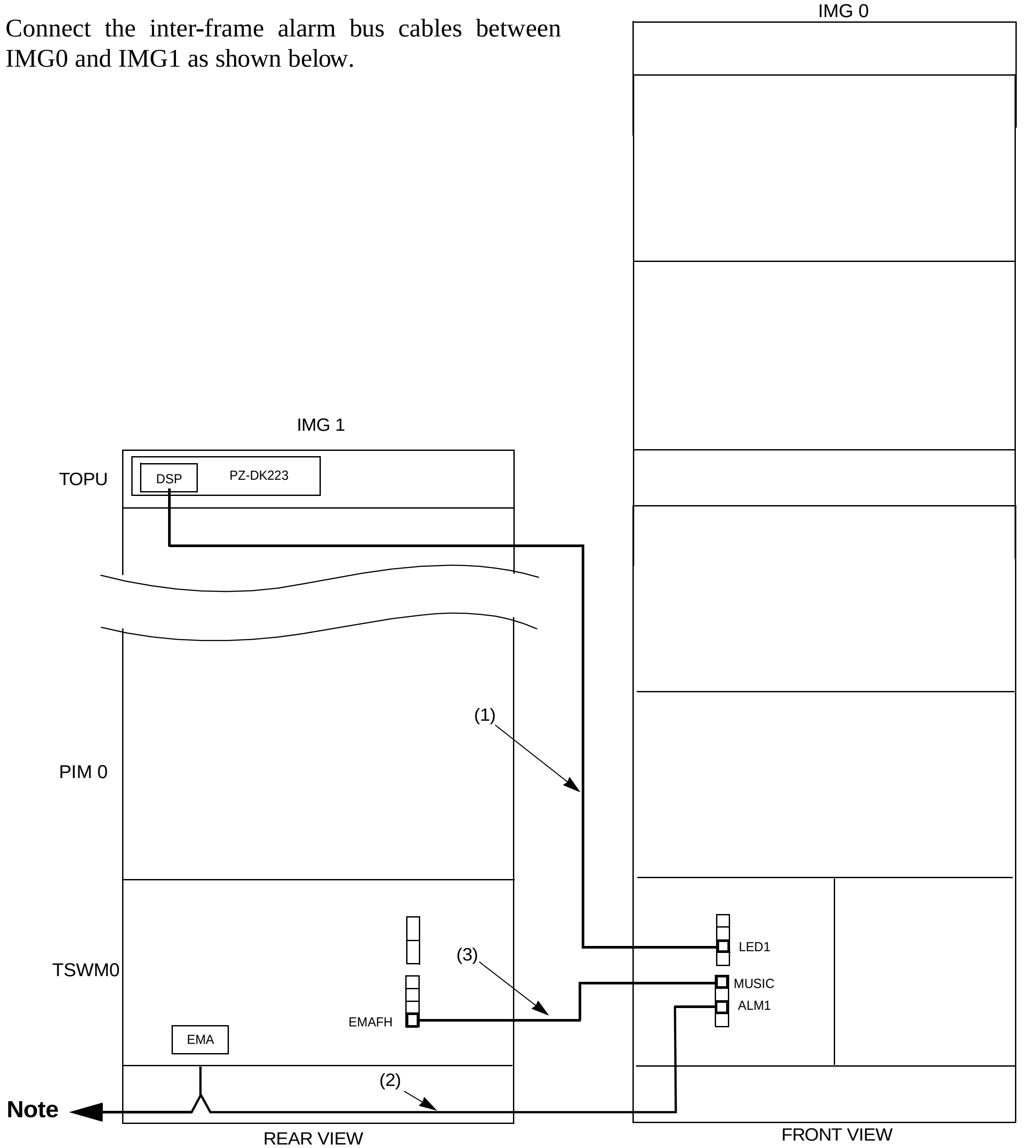
Table 010-11 Inter-frame Bus Cable Connection for IMG0-IMG1

No.	TO		FROM		CABLE NAME	REMARKS
	UNIT/ MODULE	CONNECTOR NAME	UNIT/ MODULE	CONNECTOR NAME		
(1)	TSWM0	MUX000	PIM0 (IMG0)	MUX (slot 13)	34PH MT24 TSW CA-F	
(2)	TSWM0	MUX100	PIM0 (IMG0)	MUX (slot 14)	34PH MT24 TSW CA-F	For dual configuration
(3)	TSWM0	MUX001	PIM1 (IMG0)	MUX (slot 13)	34PH MT24 TSW CA-E	
(4)	TSWM0	MUX101	PIM1 (IMG0)	MUX (slot 14)	34PH MT24 TSW CA-E	For dual configuration
(5)	TSWM0	MUX002	PIM2 (IMG0)	MUX (slot 13)	34PH MT24 TSW CA-H	
(6)	TSWM0	MUX102	PIM2 (IMG0)	MUX (slot 14)	34PH MT24 TSW CA-H	For dual configuration
(7)	TSWM0	MUX003	PIM3 (IMG0)	MUX (slot 13)	34PH MT24 TSW CA-H	
(8)	TSWM0	MUX103	PIM3 (IMG0)	MUX (slot 14)	34PH MT24 TSW CA-H	For dual configuration

Connect the inter-frame alarm bus cables between IMG0 and IMG1 as shown below.



Note: *Also to EMA connector in TSWM1 of IMG2.*

Figure 010-20 Inter-frame Alarm Bus Cable Connection for IMG0-IMG1

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Table 010-12 Inter-frame Alarm Bus Cable Connection for IMG0-IMG1

No.	FROM		TO		CABLE NAME	REMARKS
	UNIT/ MODULE	CONNECTOR NAME	UNIT/ MODULE	CONNECTOR NAME		
(1)	LPM	LED1	TOPU (IMG1)	DSPM	16PH LED CA-A	
(2)	LPM	ALM1	TSWM0	EMA	SP ALM CA	
(3)	LPM	MUSIC	TSWM0	EMAFH	16PH STD CA-F	

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Connect the inter-frame ISA bus cables between IMG0 and IMG2 as shown below. Note that the dotted line indicates the bus cable for a dual system.

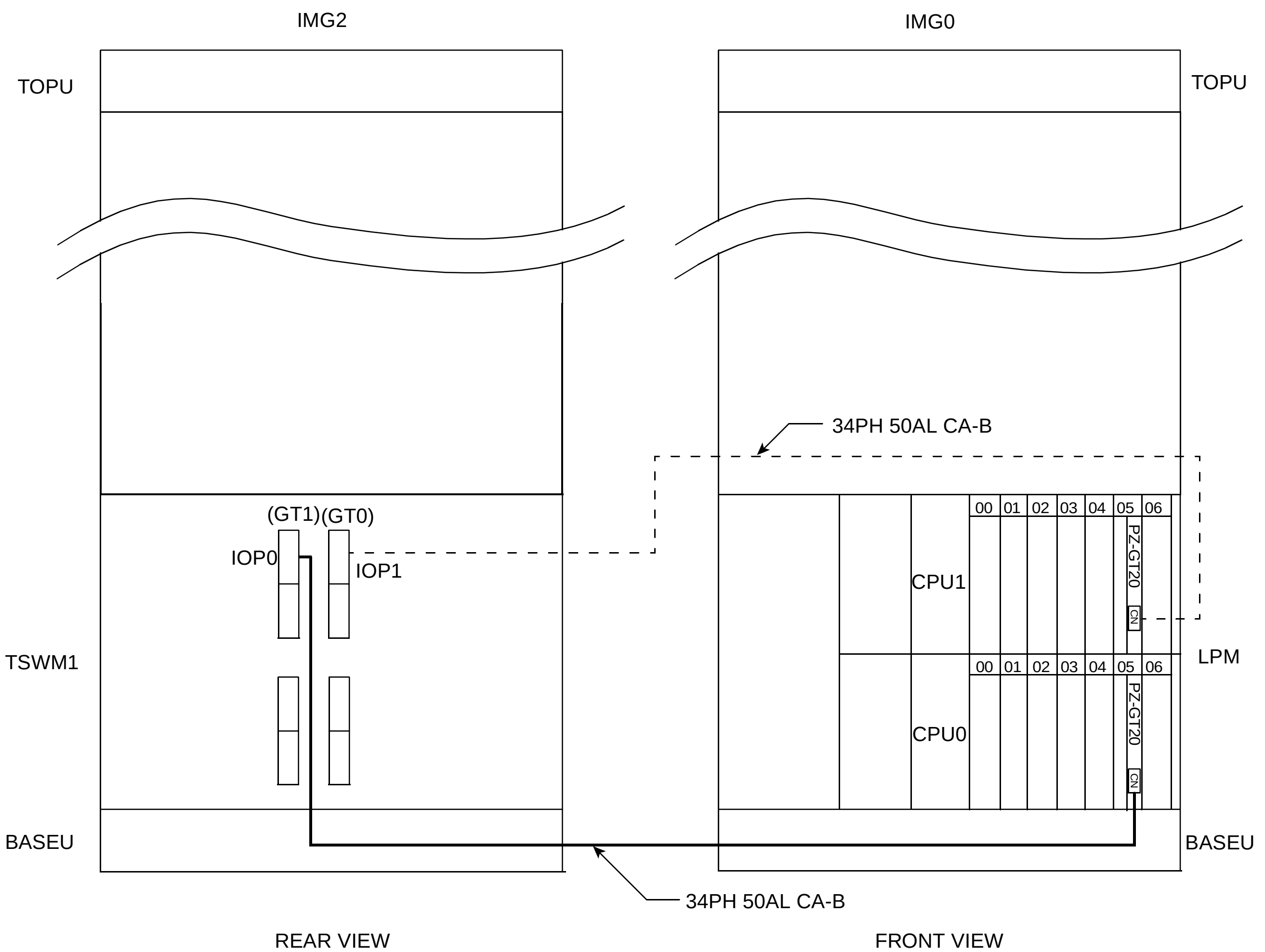
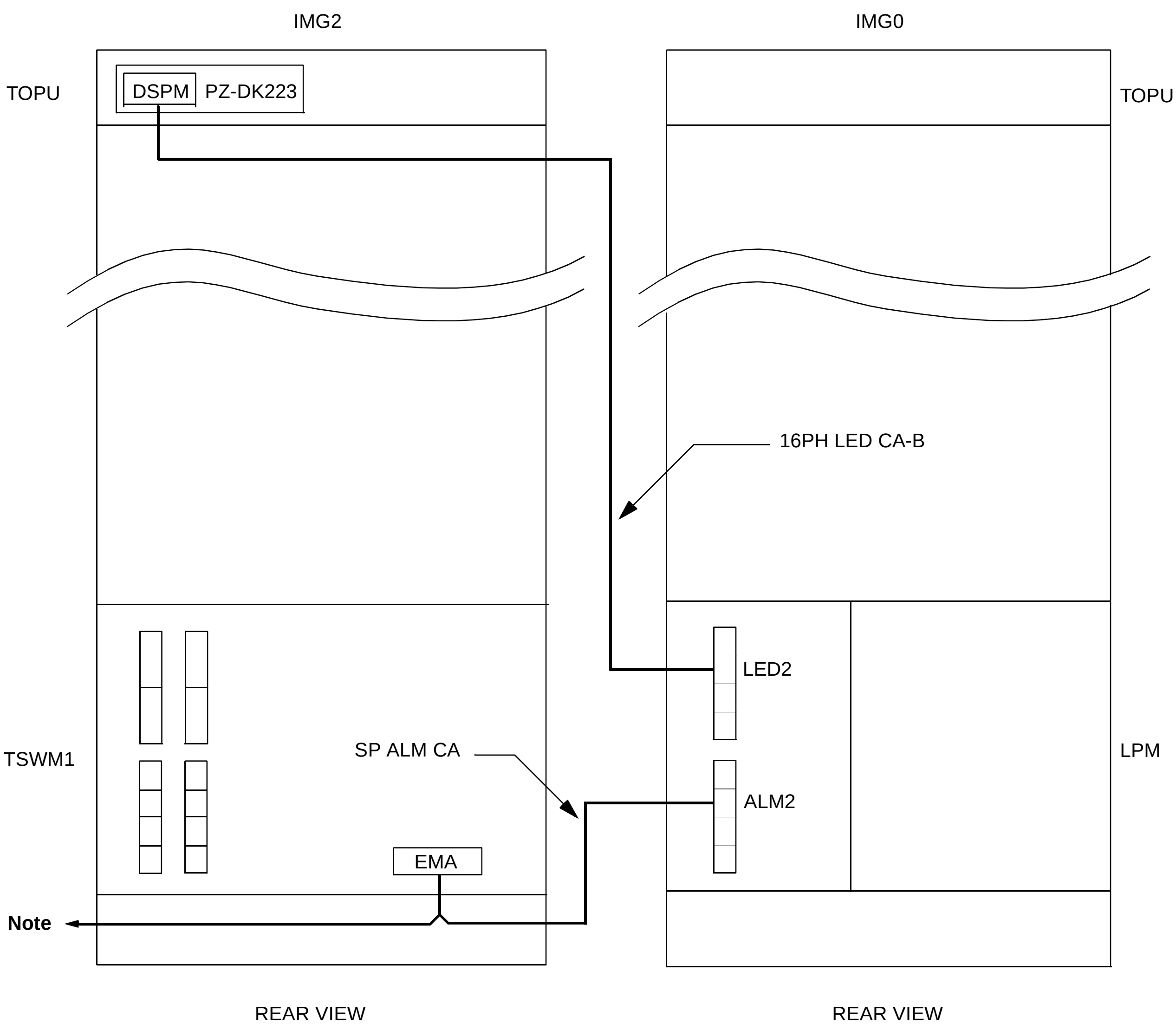


Figure 010-21 Inter-frame ISA Bus Cable Connection for IMG0-IMG2

Connect the inter-frame Alarm bus cables between IMG0 and IMG2 as shown below.



Note: *Also to EMA connector in TSWM0 of IMG1.*

Figure 010-22 Inter-frame Alarm Bus Cable Connection for IMG0-IMG2

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Connect the inter-frame Alarm bus cables between IMG0 and IMG3 of LN as shown below.

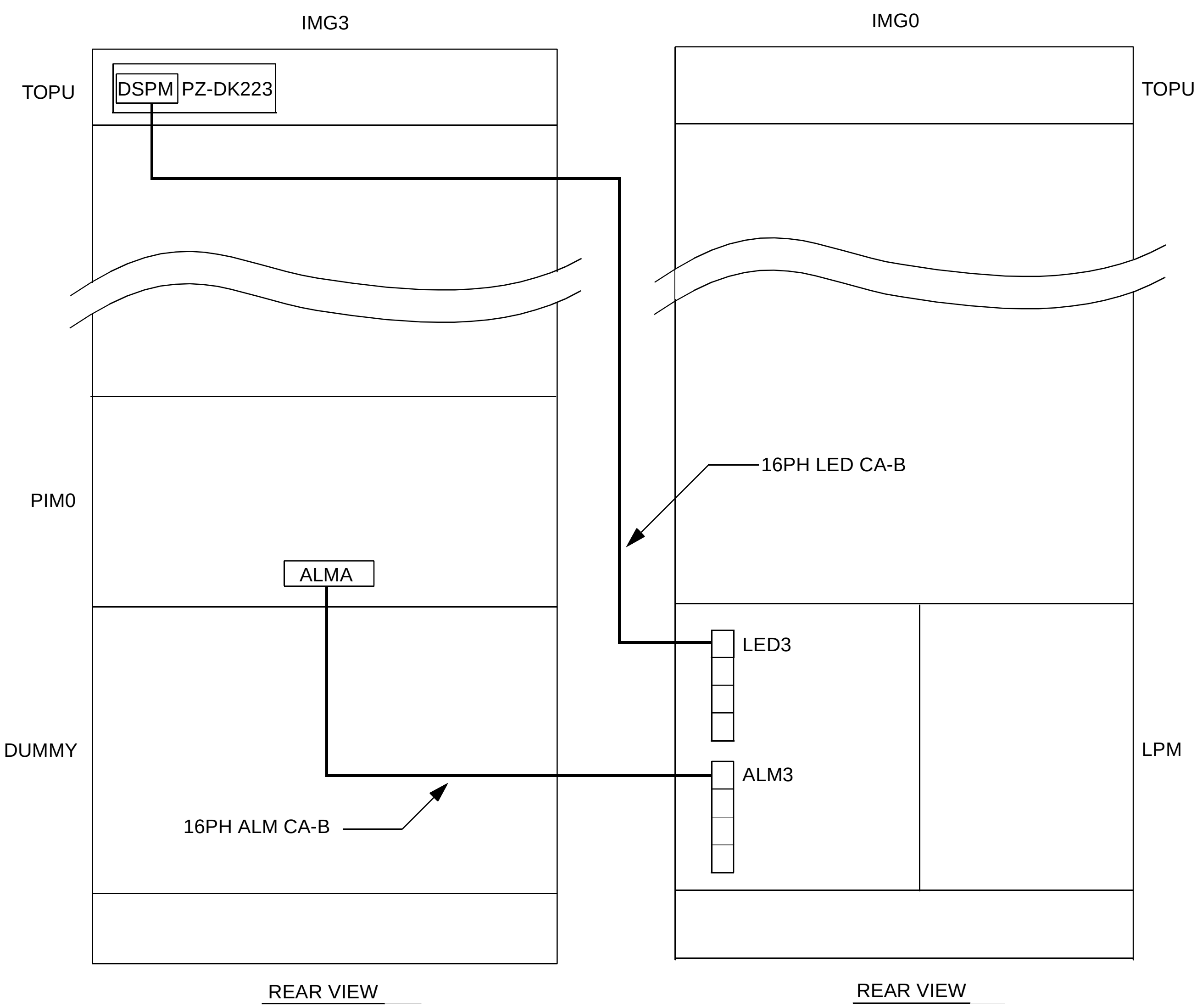
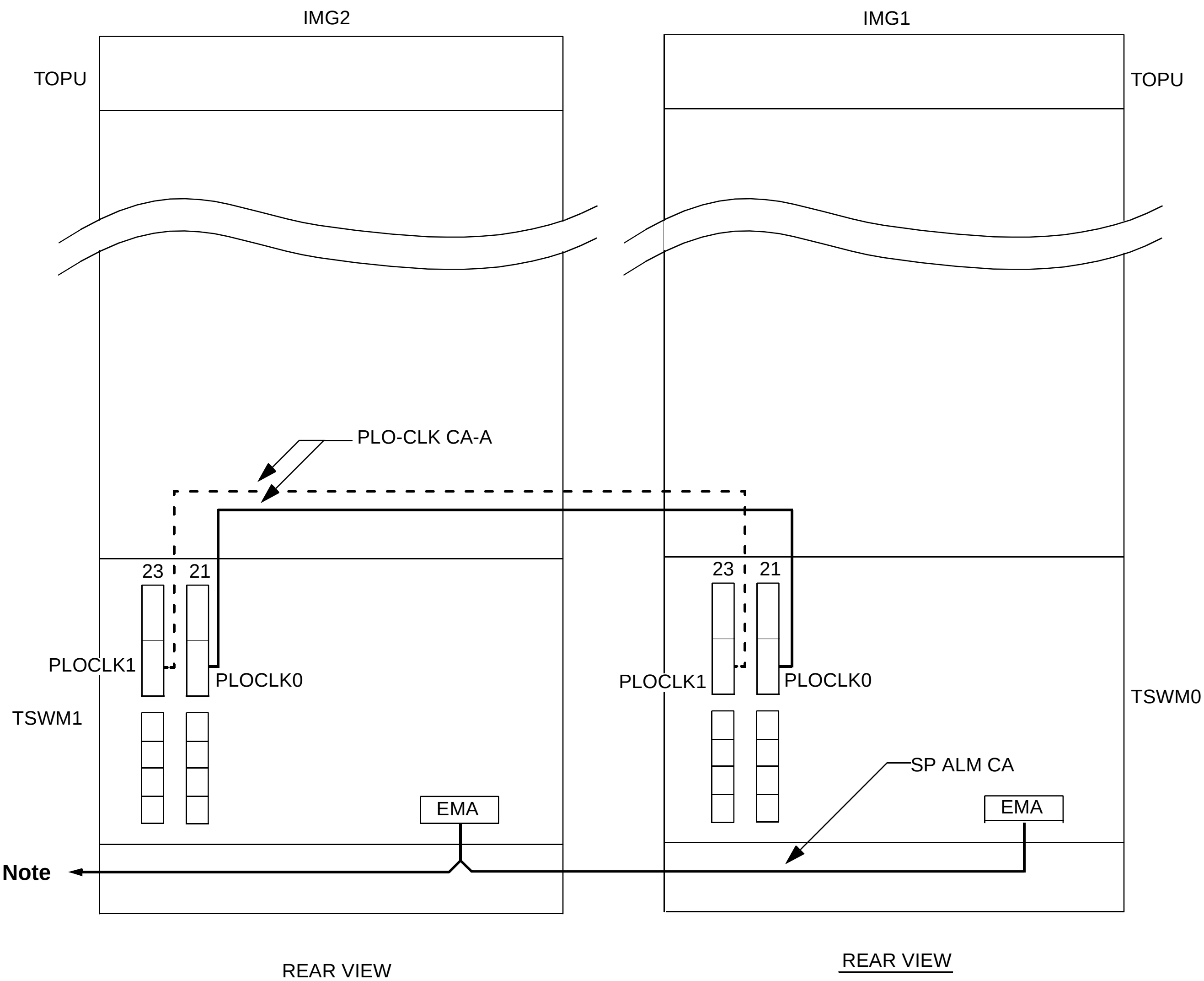


Figure 010-23 Inter-frame Alarm Bus Cable Connection for IMG0-IMG3

Connect the inter-frame bus cables between IMG1 and IMG2 of LN as shown below. The dotted line indicates the bus cable connection for a dual-system.



Note: *Also to ALM2 connector in LPM of IMG0.*

Figure 010-24 Inter-frame Bus Cable Connection for IMG1-IMG2

Connect the inter-frame bus cables between IMG2 and IMG3 of LN as shown below. Note that the dotted lines indicate the bus cable connection for a dual-system.

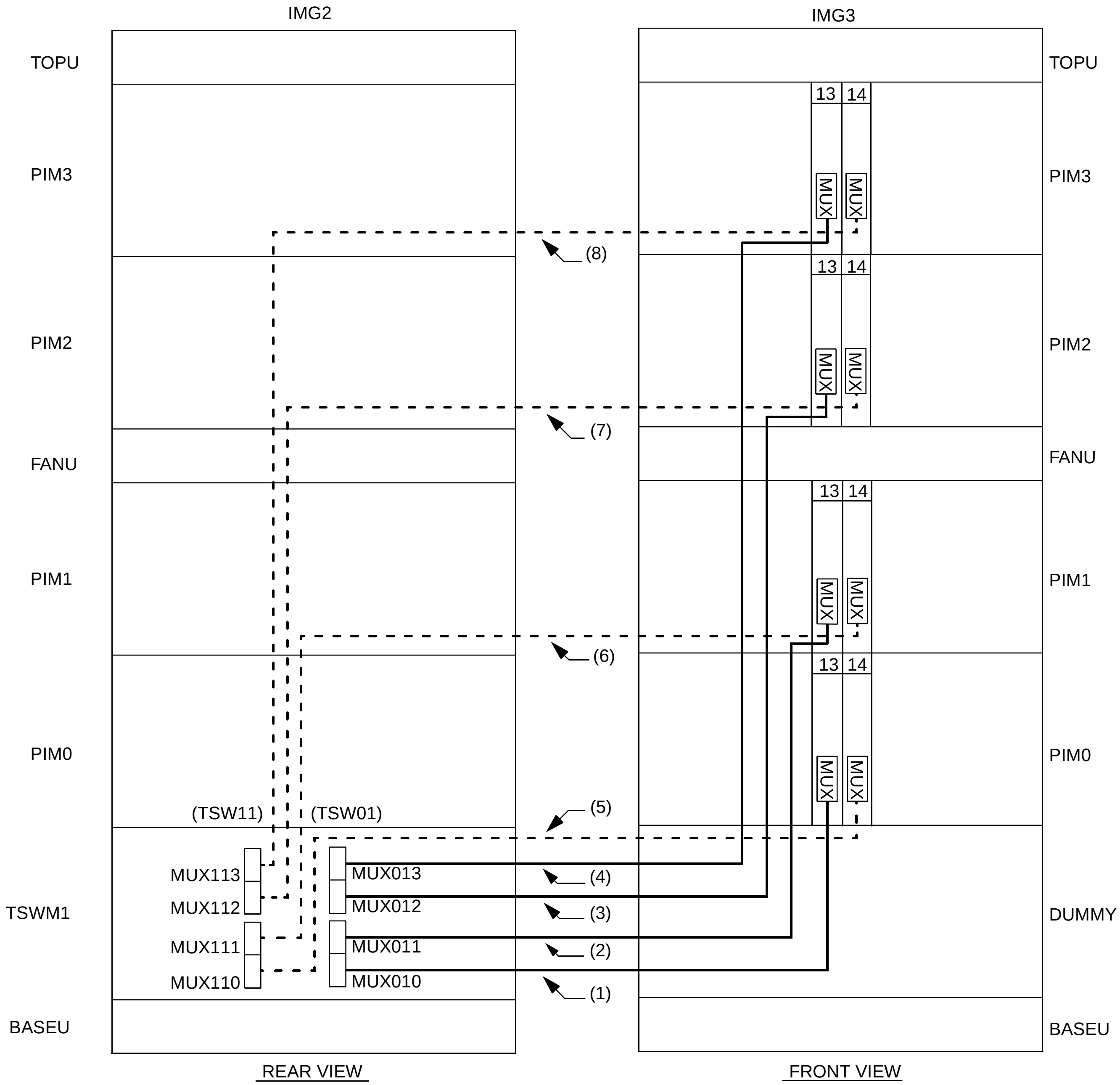


Figure 010-25 Inter-frame Bus Cable Connection for IMG2-IMG3

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Table 010-13 Inter-frame Bus Cable Connection for IMG2-IMG3

No.	FROM		TO		CABLE NAME	REMARKS
	UNIT/ MODULE	CONNECTOR NAME	UNIT/ MODULE	CONNECTOR NAME		
(1)	TSWM	MUX010	PIM0 (IMG3)	MUX (slot 13)	34PH MT24 TSW CA-F	When IMG3 exists in LNn
(2)	TSWM	MUX011	PIM1 (IMG3)	MUX (slot 13)	34PH MT24 TSW CA-F	When PIM1 exists in IMG3 of LNn
(3)	TSWM	MUX012	PIM2 (IMG3)	MUX (slot 13)	34PH MT24 TSW CA-G	When PIM2 exists in IMG3 of LNn
(4)	TSWM	MUX013	PIM3 (IMG3)	MUX (slot 13)	34PH MT24 TSW CA-H	When PIM3 exists in IMG3 of LNn
(5)	TSWM	MUX110	PIM0 (IMG3)	MUX (slot 14)	34PH MT24 TSW CA-F	For dual configuration When IMG3 exists in LNn
(6)	TSWM	MUX111	PIM1 (IMG3)	MUX (slot 14)	34PH MT24 TSW CA-F	For dual configuration When PIM1 exists in IMG3 of LNn
(7)	TSWM	MUX112	PIM2 (IMG3)	MUX (slot 14)	34PH MT24 TSW CA-G	For dual configuration When PIM2 exists in IMG3 of LNn
(8)	TSWM	MUX113	PIM3 (IMG3)	MUX (slot 14)	34PH MT24 TSW CA-H	For dual configuration When PIM3 exists in IMG3 of LNn

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3. PCM AND ALARM CABLE CONNECTIONS BETWEEN ISW AND EACH LN

This section explains how to run the frame-to-frame PCM and alarm bus cables between ISW and LN. According to your system configuration, connect all the necessary cables as shown below:

START

- Confirm connector locations — Referring to Figures 010-2 and 010-4, confirm the locations of the connectors into which the cables are inserted.
- Connection of Inter-frame alarm bus cables between ISW and LN — Referring to Figures 010-26 through 010-29, connect the inter-frame alarm bus cables between ISW and LN.
- Connection of inter-frame PCM cables between ISW and LN — Referring to Figures 010-30 through 010-37, connect the inter-frame PCM cables between ISW and LN.

END

Connect the inter-frame alarm bus cable between ISW and IMG0 of LN0 as shown below.

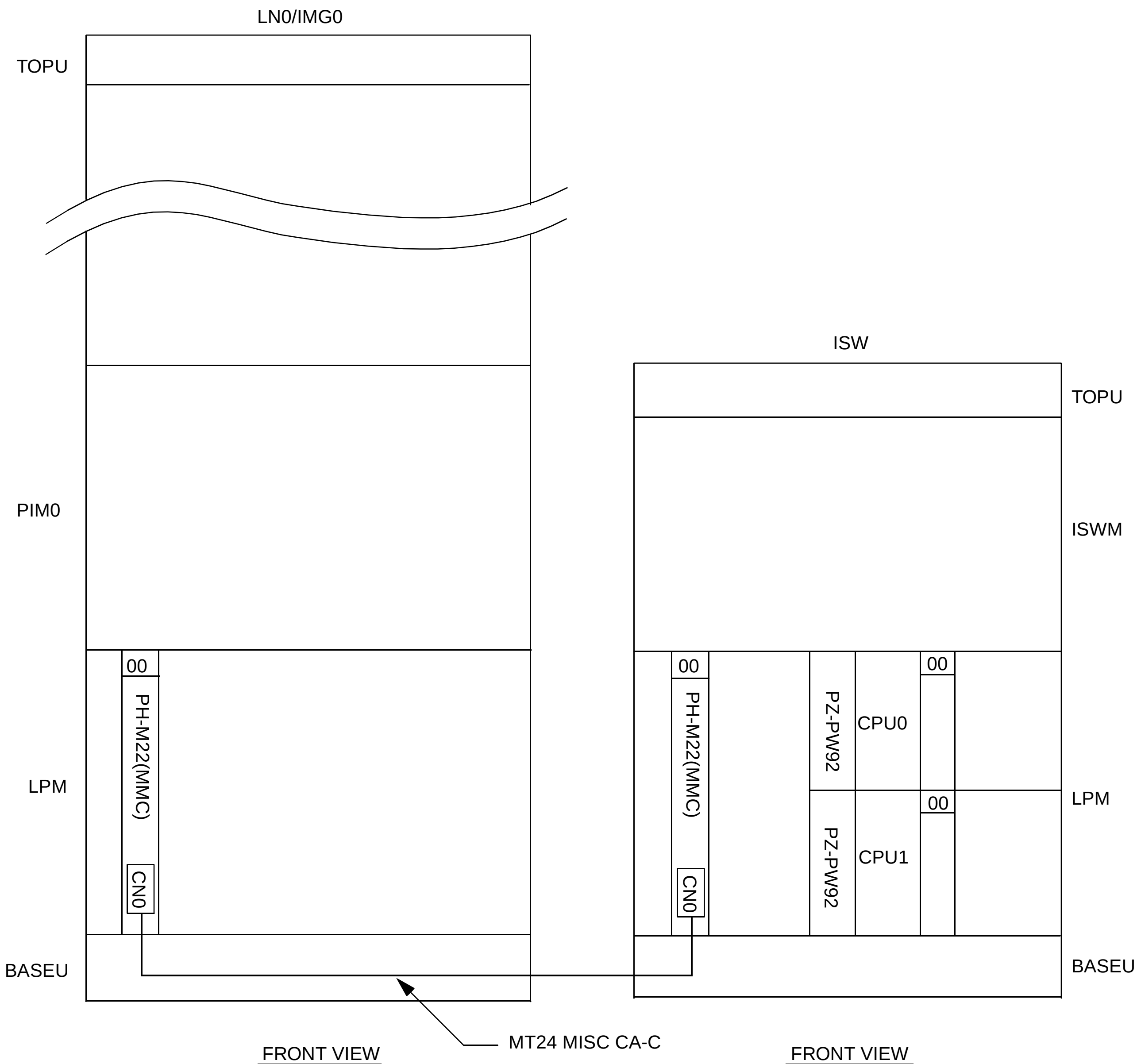


Figure 010-26 Inter-frame Cable Connection for ISW-LN0, IMG0

Connect the inter-frame alarm bus cable between ISW and IMG0 of LN1 as shown below.

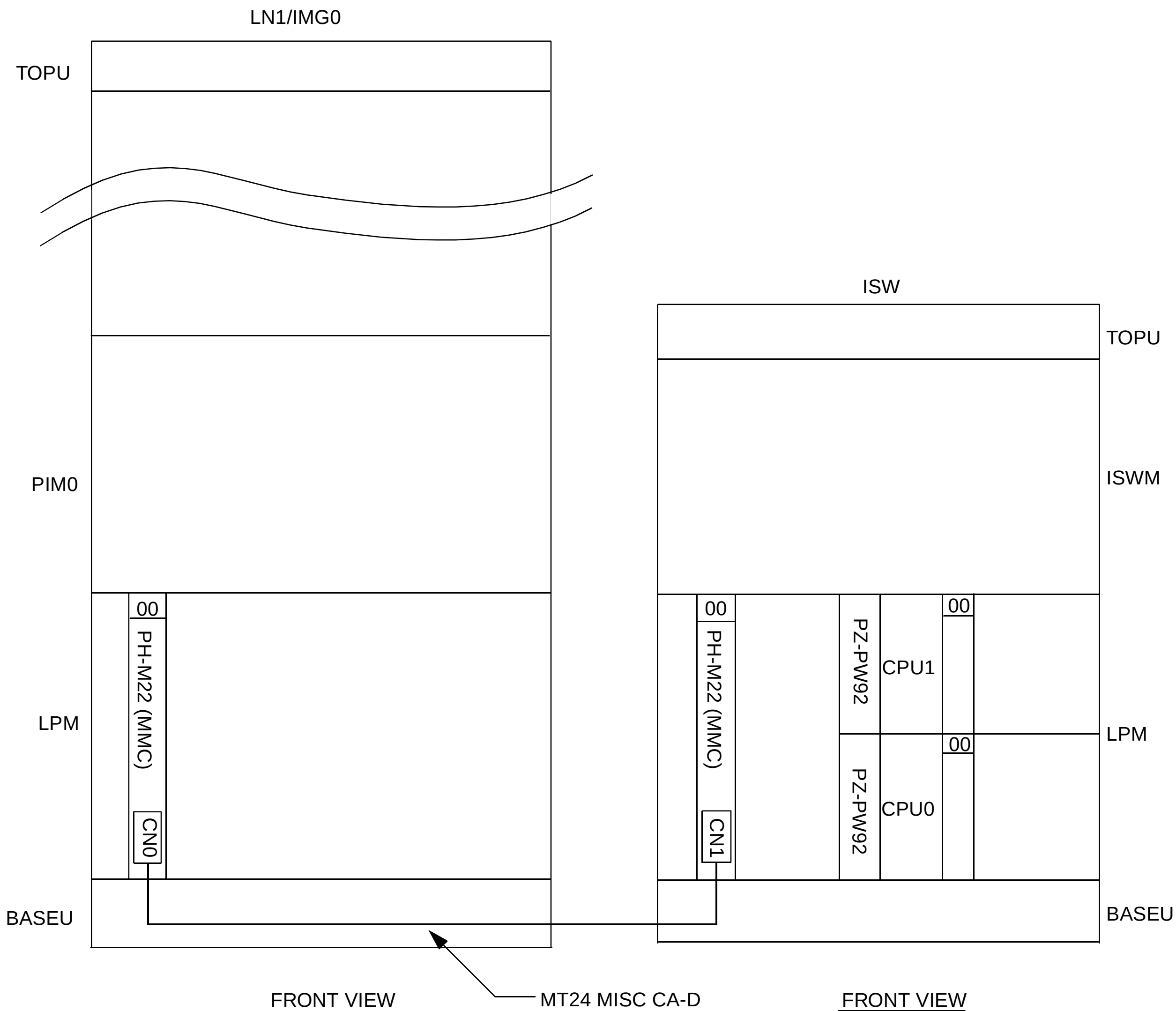
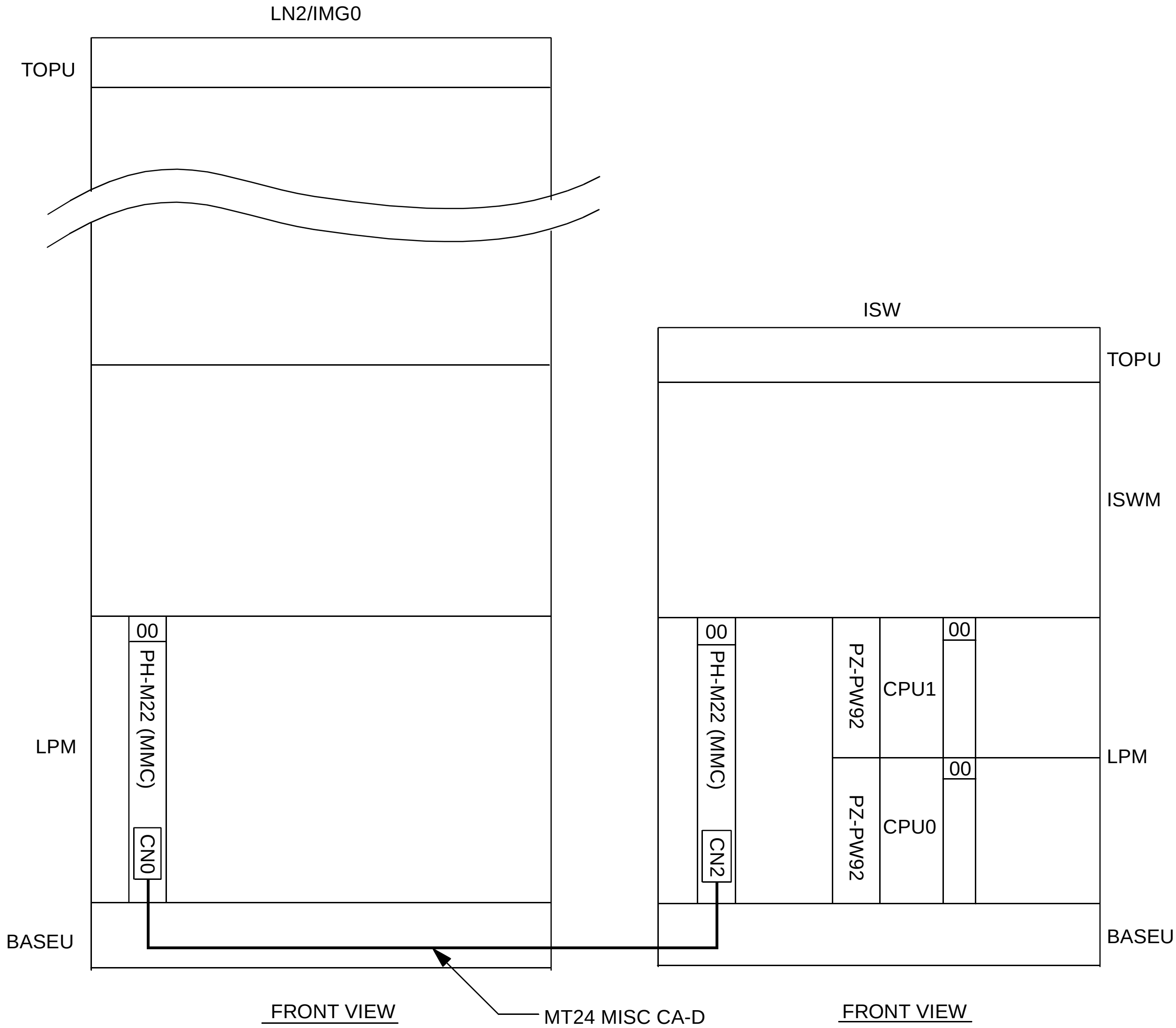


Figure 010-27 Inter-frame Cable Connection for ISW-LN1, IMG0

Connect the inter-frame alarm bus cable between ISW and IMG0 of LN2 as shown below.



Note: *This cable connection is required if LN2 exists in your system.*

Figure 010-28 Inter-frame Cable Connection for ISW-LN2, IMG0

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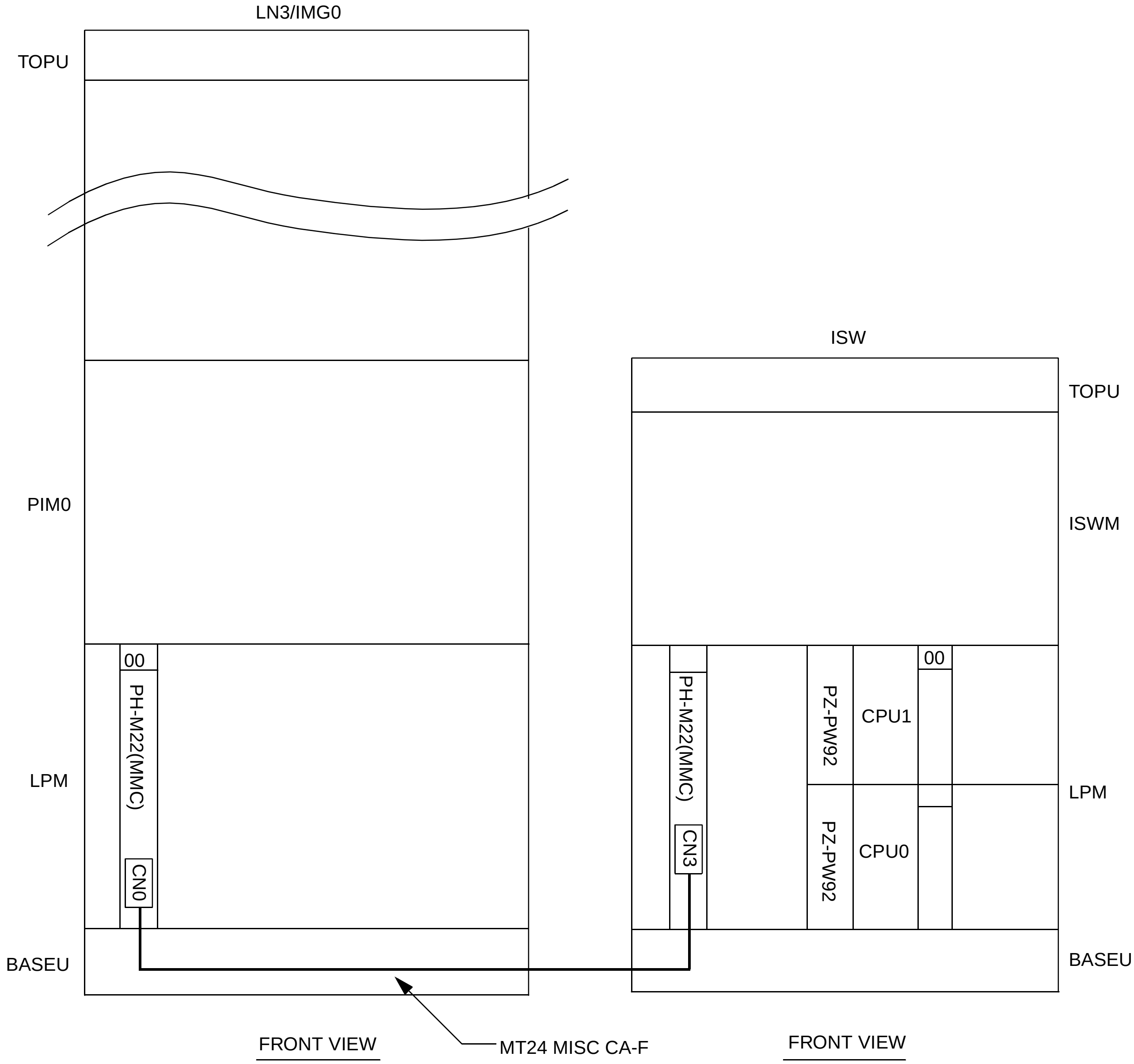
Connect the inter-frame alarm bus cable between ISW and IMG0 of LN3 as shown below.



Note: *This cable connection is required if LN3 exists in your system.*

Figure 010-29 Inter-frame Cable Connection for ISW-LN3, IMG0

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Connect the inter-frame bus cables between ISW and IMG1 of LN0 as shown below. Note that the dotted lines indicate the bus cable connection for a dual-system.

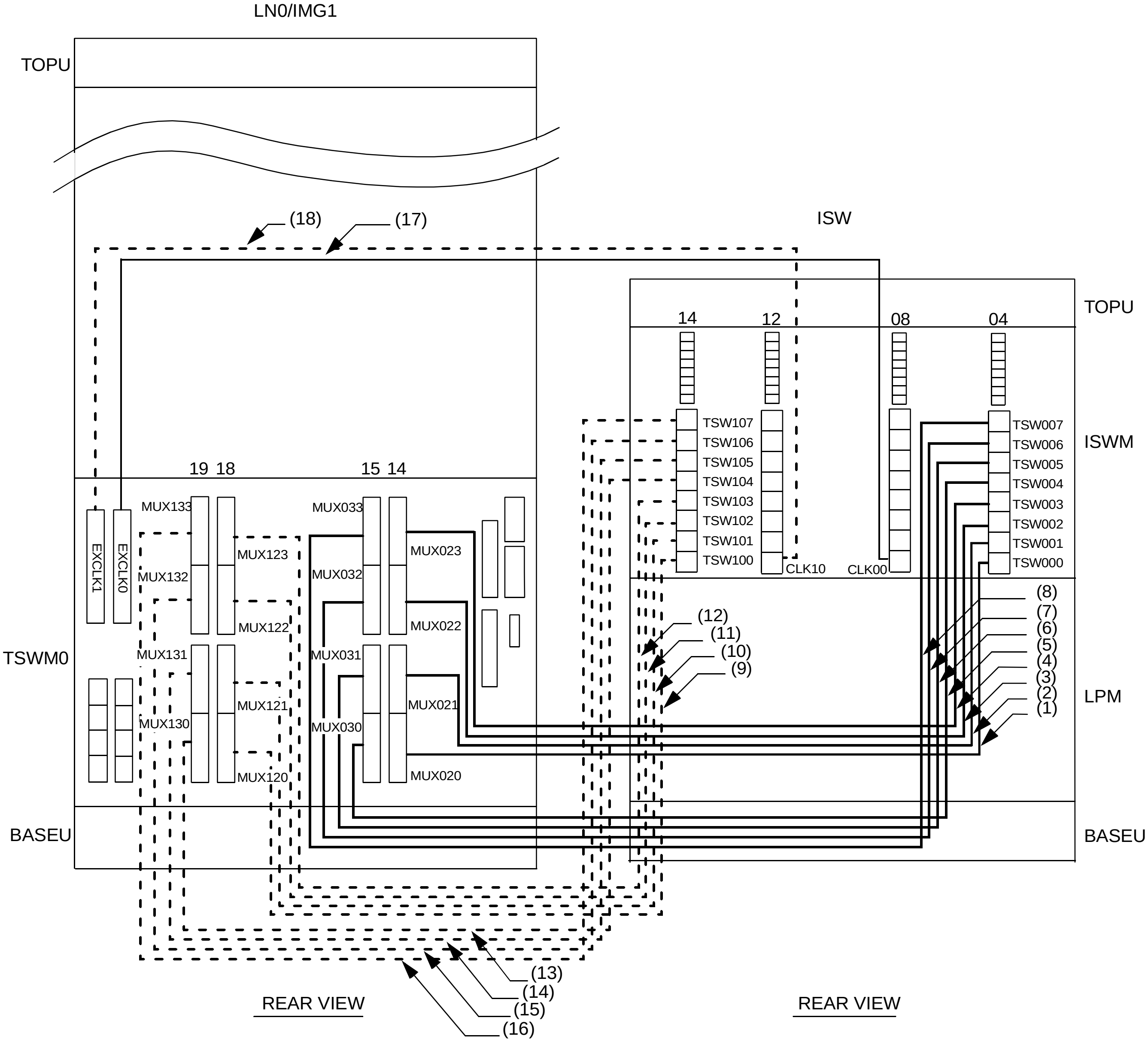

Figure 010-30 Inter-frame Bus Cable Connection for ISW-LN0, IMG1

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Table 010-14 Inter-frame Bus Cable Connection for ISW-LN0, IMG1

No.	FROM		TO		CABLE NAME	REMARKS
	UNIT/ MODULE	CONNECTOR NAME	UNIT/ MODULE	CONNECTOR NAME		
(1)	ISWM (slot 04)	TSW000	TSWM0 (slot 14)	MUX020	ISW-LN TSW-CA-A	
(2)	ISWM (slot 04)	TSW001	TSWM0 (slot 14)	MUX021	ISW-LN TSW-CA-A	
(3)	ISWM (slot 04)	TSW002	TSWM0 (slot 14)	MUX022	ISW-LN TSW-CA-A	
(4)	ISWM (slot 04)	TSW003	TSWM0 (slot 14)	MUX023	ISW-LN TSW-CA-A	
(5)	ISWM (slot 04)	TSW004	TSWM0 (slot 15)	MUX030	ISW-LN TSW-CA-A	
(6)	ISWM (slot 04)	TSW005	TSWM0 (slot 15)	MUX031	ISW-LN TSW-CA-A	
(7)	ISWM (slot 04)	TSW006	TSWM0 (slot 15)	MUX032	ISW-LN TSW-CA-A	
(8)	ISWM (slot 04)	TSW007	TSWM0 (slot 15)	MUX033	ISW-LN TSW-CA-A	
(9)	ISWM (slot 14)	TSW100	TSWM0 (slot 18)	MUX120	ISW-LN TSW-CA-A	For dual configuration
(10)	ISWM (slot 14)	TSW101	TSWM0 (slot 18)	MUX121	ISW-LN TSW-CA-A	For dual configuration
(11)	ISWM (slot 14)	TSW102	TSWM0 (slot 18)	MUX122	ISW-LN TSW-CA-A	For dual configuration
(12)	ISWM (slot 14)	TSW103	TSWM0 (slot 18)	MUX123	ISW-LN TSW-CA-A	For dual configuration
(13)	ISWM (slot 14)	TSW104	TSWM0 (slot 19)	MUX130	ISW-LN TSW-CA-A	For dual configuration
(14)	ISWM (slot 14)	TSW105	TSWM0 (slot 19)	MUX131	ISW-LN TSW-CA-A	For dual configuration
(15)	ISWM (slot 14)	TSW106	TSWM0 (slot 19)	MUX132	ISW-LN TSW-CA-A	For dual configuration
(16)	ISWM (slot 14)	TSW107	TSWM0 (slot 19)	MUX133	ISW-LN TSW-CA-A	For dual configuration
(17)	ISWM (slot 08)	CLK00	TSWM0 (slot 21)	EXCLK0	ISW-LN PLO CA-A	
(18)	ISWM (slot 12)	CLK10	TSWM0 (slot 23)	EXCLK1	ISW-LN PLO CA-A	For dual configuration

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Connect the inter-frame bus cables between ISW and IMG2 of LN0 as shown below. Note that the dotted lines indicate the bus cable connection for a dual-system.

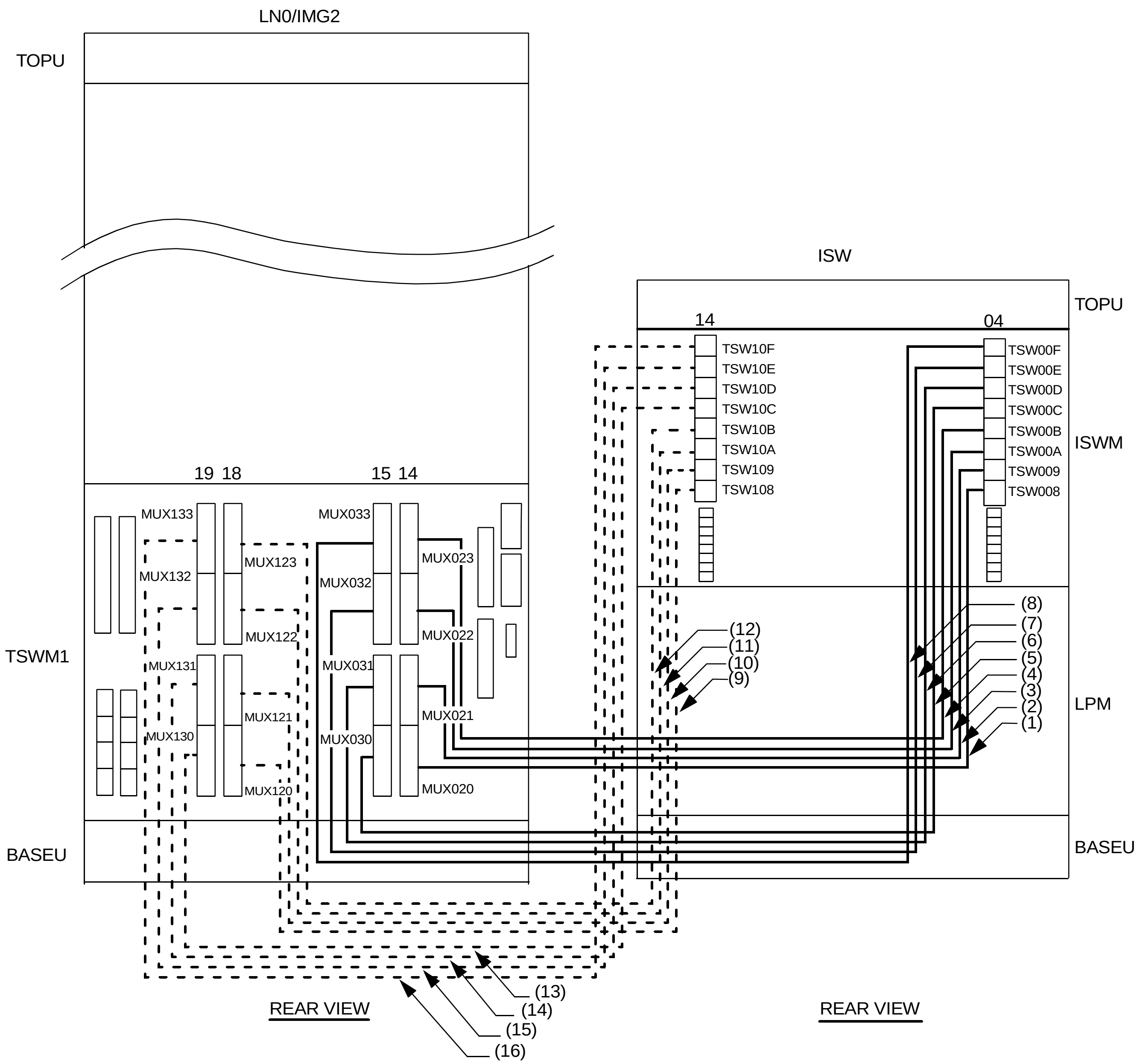

Figure 010-31 Inter-frame Bus Cable Connection for ISW-LN0, IMG2

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Table 010-15 Inter-frame Bus Cable Connection for ISW-LN0, IMG2

No.	FROM		TO		CABLE NAME	REMARKS
	UNIT/ MODULE	CONNECTOR NAME	UNIT/ MODULE	CONNECTOR NAME		
(1)	ISWM (slot 04)	TSW008	TSWM1 (slot 14)	MUX020	ISW-LN TSW-CA-B	When IMG2 exists in LN0
(2)	ISWM (slot 04)	TSW009	TSWM1 (slot 14)	MUX021	ISW-LN TSW-CA-B	When PIM1 exists in IMG2 of LN0
(3)	ISWM (slot 04)	TSW00A	TSWM1 (slot 14)	MUX022	ISW-LN TSW-CA-B	When PIM2 exists in IMG2 of LN0
(4)	ISWM (slot 04)	TSW00B	TSWM1 (slot 14)	MUX023	ISW-LN TSW-CA-B	When PIM3 exists in IMG2 of LN0
(5)	ISWM (slot 04)	TSW00C	TSWM1 (slot 15)	MUX030	ISW-LN TSW-CA-B	When IMG3 exists in LN0
(6)	ISWM (slot 04)	TSW00D	TSWM1 (slot 15)	MUX031	ISW-LN TSW-CA-B	When PIM1 exists in IMG3 of LN0
(7)	ISWM (slot 04)	TSW00E	TSWM1 (slot 15)	MUX032	ISW-LN TSW-CA-B	When PIM2 exists in IMG3 of LN0
(8)	ISWM (slot 04)	TSW00F	TSWM1 (slot 15)	MUX033	ISW-LN TSW-CA-B	When PIM3 exists in IMG3 of LN0
(9)	ISWM (slot 14)	TSW108	TSWM1 (slot 18)	MUX120	ISW-LN TSW-CA-B	When IMG2 exists in LN0 For dual configuration
(10)	ISWM (slot 14)	TSW109	TSWM1 (slot 18)	MUX121	ISW-LN TSW-CA-B	When PIM1 exists in IMG2 of LN0 For dual configuration
(11)	ISWM (slot 14)	TSW10A	TSWM1 (slot 18)	MUX122	ISW-LN TSW-CA-B	When PIM2 exists in IMG2 of LN0 For dual configuration
(12)	ISWM (slot 14)	TSW10B	TSWM1 (slot 18)	MUX123	ISW-LN TSW-CA-B	When PIM3 exists in IMG2 of LN0 For dual configuration
(13)	ISWM (slot 14)	TSW10C	TSWM1 (slot 19)	MUX130	ISW-LN TSW-CA-B	When IMG3 exists in LN0 For dual configuration
(14)	ISWM (slot 14)	TSW10D	TSWM1 (slot 19)	MUX131	ISW-LN TSW-CA-B	When PIM1 exists in IMG3 of LN0 For dual configuration
(15)	ISWM (slot 14)	TSW10E	TSWM1 (slot 19)	MUX132	ISW-LN TSW-CA-B	When PIM2 exists in IMG3 of LN0 For dual configuration
(16)	ISWM (slot 14)	TSW10F	TSWM1 (slot 19)	MUX133	ISW-LN TSW-CA-B	When PIM3 exists in IMG3 of LN0 For dual configuration

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Connect the inter-frame bus cables between ISW and IMG1 of LN1 as shown below. Note that the dotted lines indicate the bus cable connection for a dual-system.

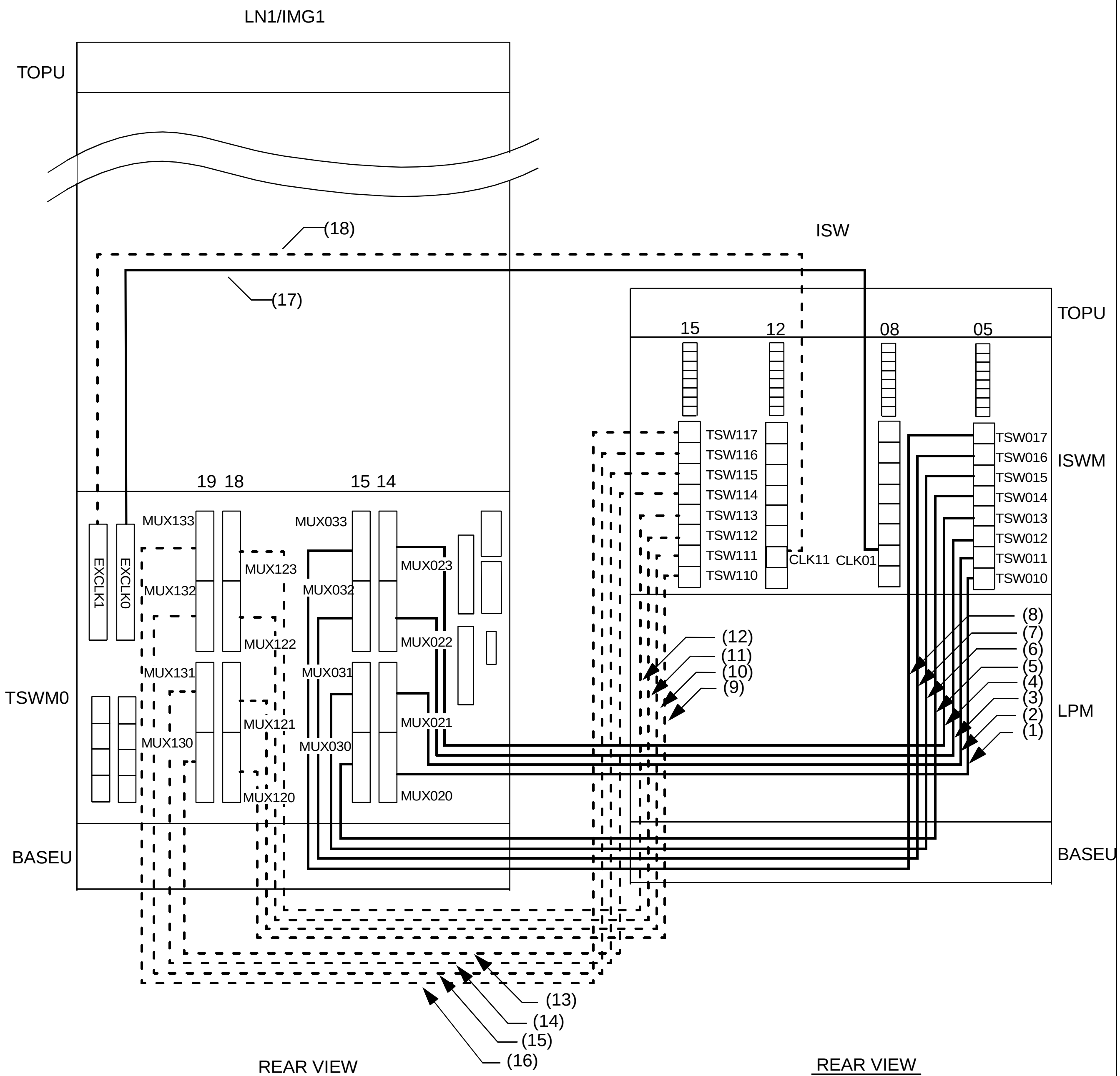

Figure 010-32 Inter-frame Bus Cable Connection for ISW-LN1, IMG1

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Table 010-16 Inter-frame Bus Cable Connection for ISW-LN1, IMG1

No.	FROM		TO		CABLE NAME	REMARKS
	UNIT/ MODULE	CONNECTOR NAME	UNIT/ MODULE	CONNECTOR NAME		
(1)	ISWM (slot 05)	TSW010	TSWM0 (slot 14)	MUX020	ISW-LN TSW-CA-G	
(2)	ISWM (slot 05)	TSW011	TSWM0 (slot 14)	MUX021	ISW-LN TSW-CA-G	
(3)	ISWM (slot 05)	TSW012	TSWM0 (slot 14)	MUX022	ISW-LN TSW-CA-G	
(4)	ISWM (slot 05)	TSW013	TSWM0 (slot 14)	MUX023	ISW-LN TSW-CA-G	
(5)	ISWM (slot 05)	TSW014	TSWM0 (slot 15)	MUX030	ISW-LN TSW-CA-G	
(6)	ISWM (slot 05)	TSW015	TSWM0 (slot 15)	MUX031	ISW-LN TSW-CA-G	When PIM1 exists in IMG1 of LN1
(7)	ISWM (slot 05)	TSW016	TSWM0 (slot 15)	MUX032	ISW-LN TSW-CA-G	When PIM2 exists in IMG1 of LN1
(8)	ISWM (slot 05)	TSW017	TSWM0 (slot 15)	MUX033	ISW-LN TSW-CA-G	When PIM3 exists in IMG1 of LN1
(9)	ISWM (slot 15)	TSW110	TSWM0 (slot 18)	MUX120	ISW-LN TSW-CA-G	For dual configuration
(10)	ISWM (slot 15)	TSW111	TSWM0 (slot 18)	MUX121	ISW-LN TSW-CA-G	For dual configuration
(11)	ISWM (slot 15)	TSW112	TSWM0 (slot 18)	MUX122	ISW-LN TSW-CA-G	For dual configuration
(12)	ISWM (slot 15)	TSW113	TSWM0 (slot 18)	MUX123	ISW-LN TSW-CA-G	For dual configuration
(13)	ISWM (slot 15)	TSW114	TSWM0 (slot 19)	MUX130	ISW-LN TSW-CA-G	For dual configuration
(14)	ISWM (slot 15)	TSW115	TSWM0 (slot 19)	MUX131	ISW-LN TSW-CA-G	When PIM1 exists in IMG1 of LN1 For dual configuration
(15)	ISWM (slot 15)	TSW116	TSWM0 (slot 19)	MUX132	ISW-LN TSW-CA-G	When PIM2 exists in IMG1 of LN1 For dual configuration
(16)	ISWM (slot 15)	TSW117	TSWM0 (slot 19)	MUX133	ISW-LN TSW-CA-G	When PIM3 exists in IMG1 of LN1 For dual configuration
(17)	ISWM (slot 08)	CLK01	TSWM0 (slot 21)	EXCLK0	ISW-LN PLO CA-D	
(18)	ISWM (slot 12)	CLK11	TSWM0 (slot 23)	EXCLK1	ISW-LN PLO CA-D	For dual configuration

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Connect the inter-frame bus cables between ISW and IMG2 of LN1 as shown below. Note that the dotted lines indicate the bus cable connection for a dual-system.

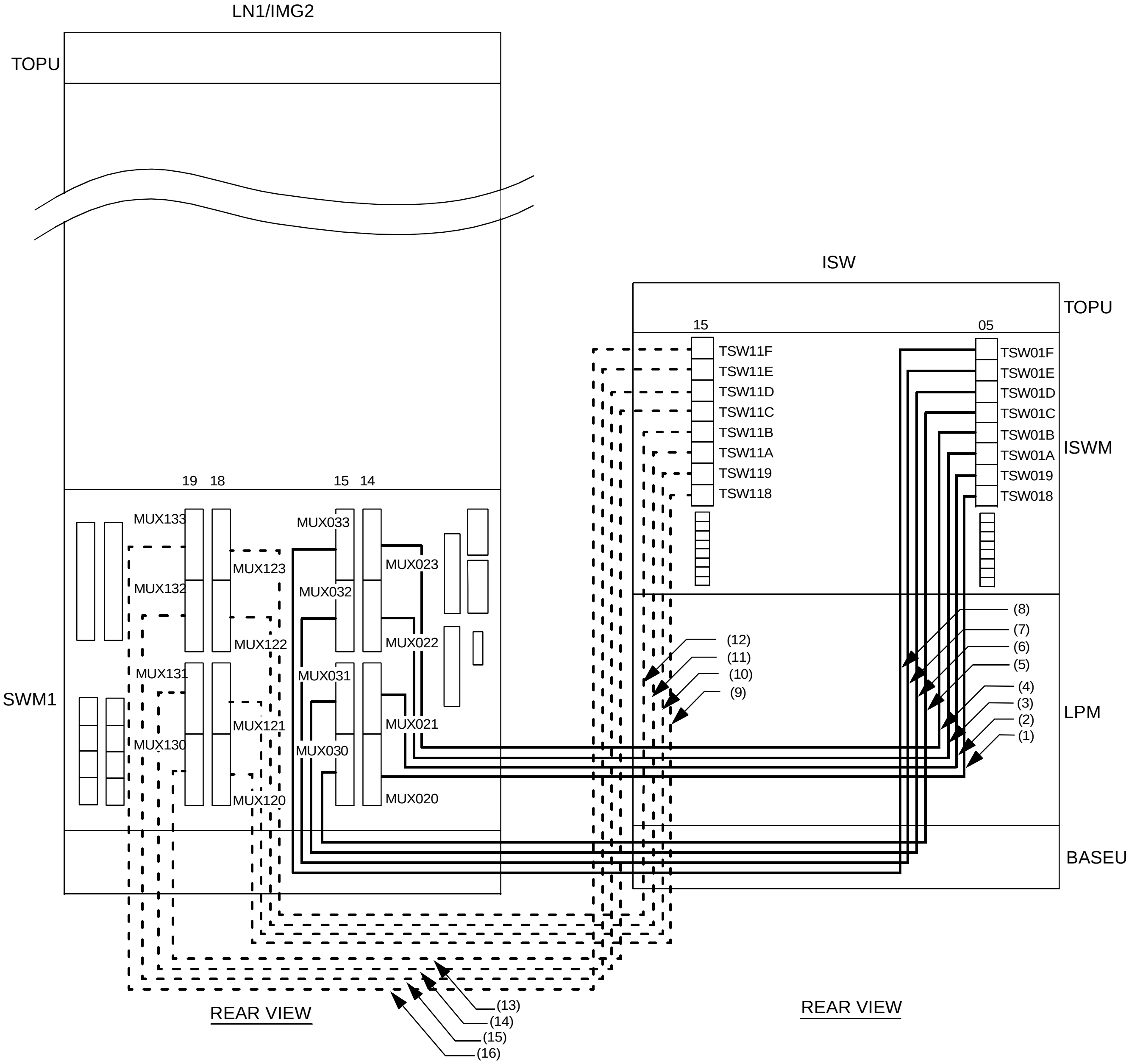

Figure 010-33 Inter-frame Bus Cable Connection for ISW-LN1, IMG2

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Table 010-17 Inter-frame Bus Cable Connection for ISW-LN1, IMG2

No.	FROM		TO		CABLE NAME	REMARKS
	UNIT/ MODULE	CONNECTOR NAME	UNIT/ MODULE	CONNECTOR NAME		
(1)	ISWM (slot 05)	TSW018	TSWM1 (slot 14)	MUX020	ISW-LN TSW-CA-H	When IMG2 exists in LN1
(2)	ISWM (slot 05)	TSW019	TSWM1 (slot 14)	MUX021	ISW-LN TSW-CA-H	When PIM1 exists in IMG2 of LN1
(3)	ISWM (slot 05)	TSW01A	TSWM1 (slot 14)	MUX022	ISW-LN TSW-CA-H	When PIM2 exists in IMG2 of LN1
(4)	ISWM (slot 05)	TSW01B	TSWM1 (slot 14)	MUX023	ISW-LN TSW-CA-H	When PIM3 exists in IMG2 of LN1
(5)	ISWM (slot 05)	TSW01C	TSWM1 (slot 15)	MUX030	ISW-LN TSW-CA-H	When IMG3 exists in LN1
(6)	ISWM (slot 05)	TSW01D	TSWM1 (slot 15)	MUX031	ISW-LN TSW-CA-H	When PIM1 exists in IMG3 of LN1
(7)	ISWM (slot 05)	TSW01E	TSWM1 (slot 15)	MUX032	ISW-LN TSW-CA-H	When PIM2 exists in IMG3 of LN1
(8)	ISWM (slot 05)	TSW01F	TSWM1 (slot 15)	MUX033	ISW-LN TSW-CA-H	When PIM3 exists in IMG3 of LN1
(9)	ISWM (slot 15)	TSW118	TSWM1 (slot 18)	MUX120	ISW-LN TSW-CA-H	When IMG2 exists in LN1 For dual configuration
(10)	ISWM (slot 15)	TSW119	TSWM1 (slot 18)	MUX121	ISW-LN TSW-CA-H	When PIM1 exists in IMG2 of LN1 For dual configuration
(11)	ISWM (slot 15)	TSW11A	TSWM1 (slot 18)	MUX122	ISW-LN TSW-CA-H	When PIM2 exists in IMG2 of LN1 For dual configuration
(12)	ISWM (slot 15)	TSW11B	TSWM1 (slot 18)	MUX123	ISW-LN TSW-CA-H	When PIM3 exists in IMG2 of LN1 For dual configuration
(13)	ISWM (slot 15)	TSW11C	TSWM1 (slot 19)	MUX130	ISW-LN TSW-CA-H	When IMG3 exists in LN1 For dual configuration
(14)	ISWM (slot 15)	TSW11D	TSWM1 (slot 19)	MUX131	ISW-LN TSW-CA-H	When PIM1 exists in IMG3 of LN1 For dual configuration
(15)	ISWM (slot 15)	TSW11E	TSWM1 (slot 19)	MUX132	ISW-LN TSW-CA-H	When PIM2 exists in IMG3 of LN1 For dual configuration
(16)	ISWM (slot 15)	TSW11F	TSWM1 (slot 19)	MUX133	ISW-LN TSW-CA-H	When PIM3 exists in IMG3 of LN1 For dual configuration

Connect the inter-frame bus cables between ISW and IMG1 of LN2 as shown below. Note that the dotted lines indicate the bus cable connection for a dual-system.

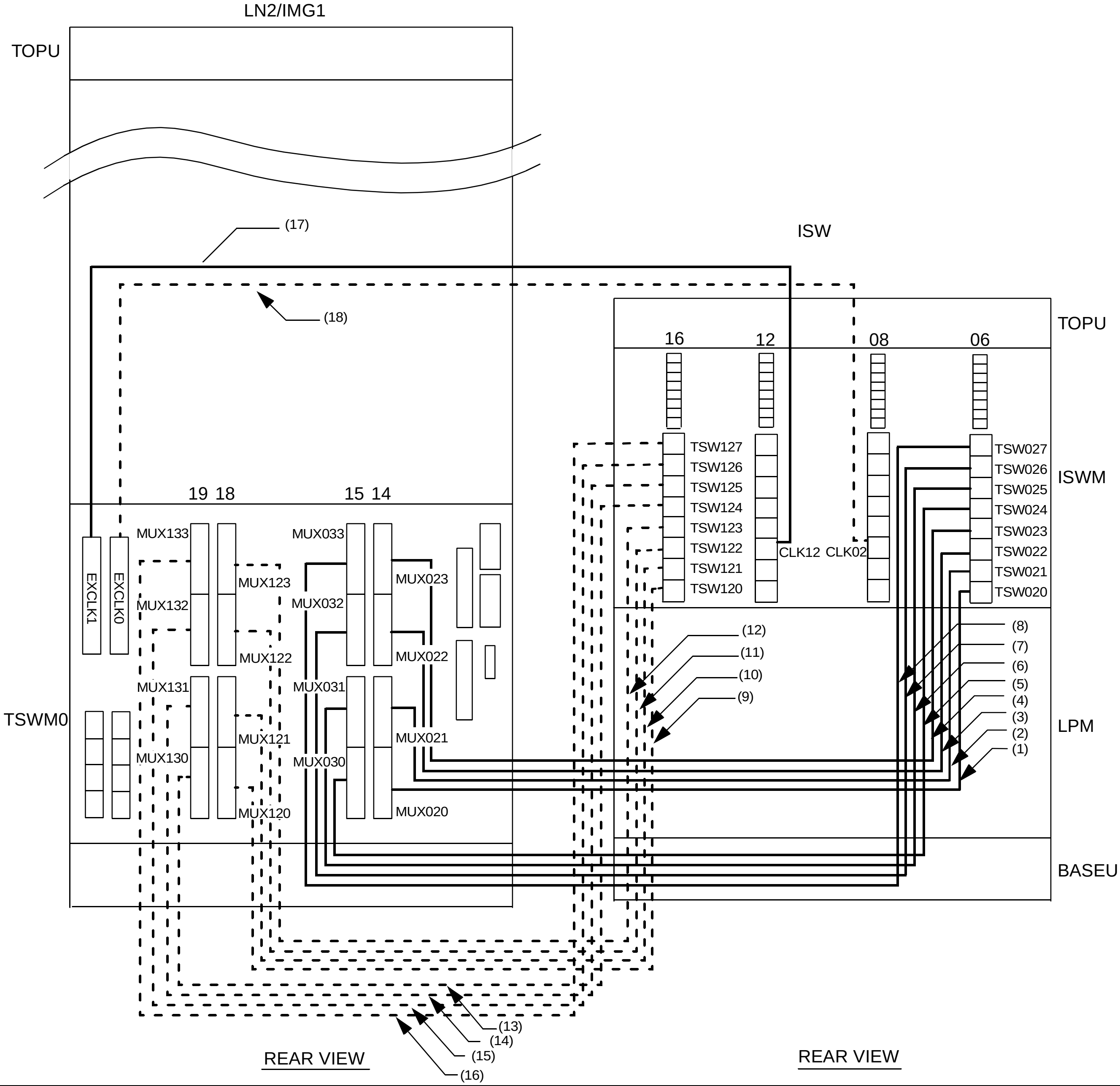

Figure 010-34 Inter-Frame Bus Cable Connection for ISW-LN2, IMG1

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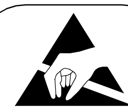
Table 010-18 Inter-frame Bus Cable Connection for ISW-LN2, IMG1

No.	FROM		TO		CABLE NAME	REMARKS
	UNIT/ MODULE	CONNECTOR NAME	UNIT/ MODULE	CONNECTOR NAME		
(1)	ISWM (slot 06)	TSW020	TSWM0 (slot 14)	MUX020	ISW-LN TSW-CA-H	When LN2 exists
(2)	ISWM (slot 06)	TSW021	TSWM0 (slot 14)	MUX021	ISW-LN TSW-CA-H	When LN2 exists
(3)	ISWM (slot 06)	TSW022	TSWM0 (slot 14)	MUX022	ISW-LN TSW-CA-H	When LN2 exists
(4)	ISWM (slot 06)	TSW023	TSWM0 (slot 14)	MUX023	ISW-LN TSW-CA-H	When LN2 exists
(5)	ISWM (slot 06)	TSW024	TSWM0 (slot 15)	MUX030	ISW-LN TSW-CA-H	When LN2 exists
(6)	ISWM (slot 06)	TSW025	TSWM0 (slot 15)	MUX031	ISW-LN TSW-CA-H	When PIM1 exists in IMG1 of LN2
(7)	ISWM (slot 06)	TSW026	TSWM0 (slot 15)	MUX032	ISW-LN TSW-CA-H	When PIM2 exists in IMG1 of LN2
(8)	ISWM (slot 06)	TSW027	TSWM0 (slot 15)	MUX033	ISW-LN TSW-CA-H	When PIM3 exists in IMG1 of LN2
(9)	ISWM (slot 16)	TSW120	TSWM0 (slot 18)	MUX120	ISW-LN TSW-CA-H	When LN2 exists For dual configuration
(10)	ISWM (slot 16)	TSW121	TSWM0 (slot 18)	MUX121	ISW-LN TSW-CA-H	When LN2 exists For dual configuration
(11)	ISWM (slot 16)	TSW122	TSWM0 (slot 18)	MUX122	ISW-LN TSW-CA-H	When LN2 exists For dual configuration
(12)	ISWM (slot 16)	TSW123	TSWM0 (slot 18)	MUX123	ISW-LN TSW-CA-H	When LN2 exists For dual configuration
(13)	ISWM (slot 16)	TSW124	TSWM0 (slot 19)	MUX130	ISW-LN TSW-CA-H	When LN2 exists For dual configuration
(14)	ISWM (slot 16)	TSW125	TSWM0 (slot 19)	MUX131	ISW-LN TSW-CA-H	When PIM1 exists in IMG1 of LN2 For dual configuration
(15)	ISWM (slot 16)	TSW126	TSWM0 (slot 19)	MUX132	ISW-LN TSW-CA-H	When PIM2 exists in IMG1 of LN2 For dual configuration
(16)	ISWM (slot 16)	TSW127	TSWM0 (slot 19)	MUX133	ISW-LN TSW-CA-H	When PIM3 exists in IMG1 of LN2 For dual configuration
(17)	ISWM (slot 08)	CLK02	TSWM0 (slot 21)	EXCLK0	ISW-LN PLO CA-D	
(18)	ISWM (slot 12)	CLK12	TSWM0 (slot 23)	EXCLK1	ISW-LN PLO CA-D	For dual configuration



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Connect the inter-frame bus cables between ISW and IMG2 of LN2 as shown below. Note that the dotted lines indicate the cable connection for a dual-system.

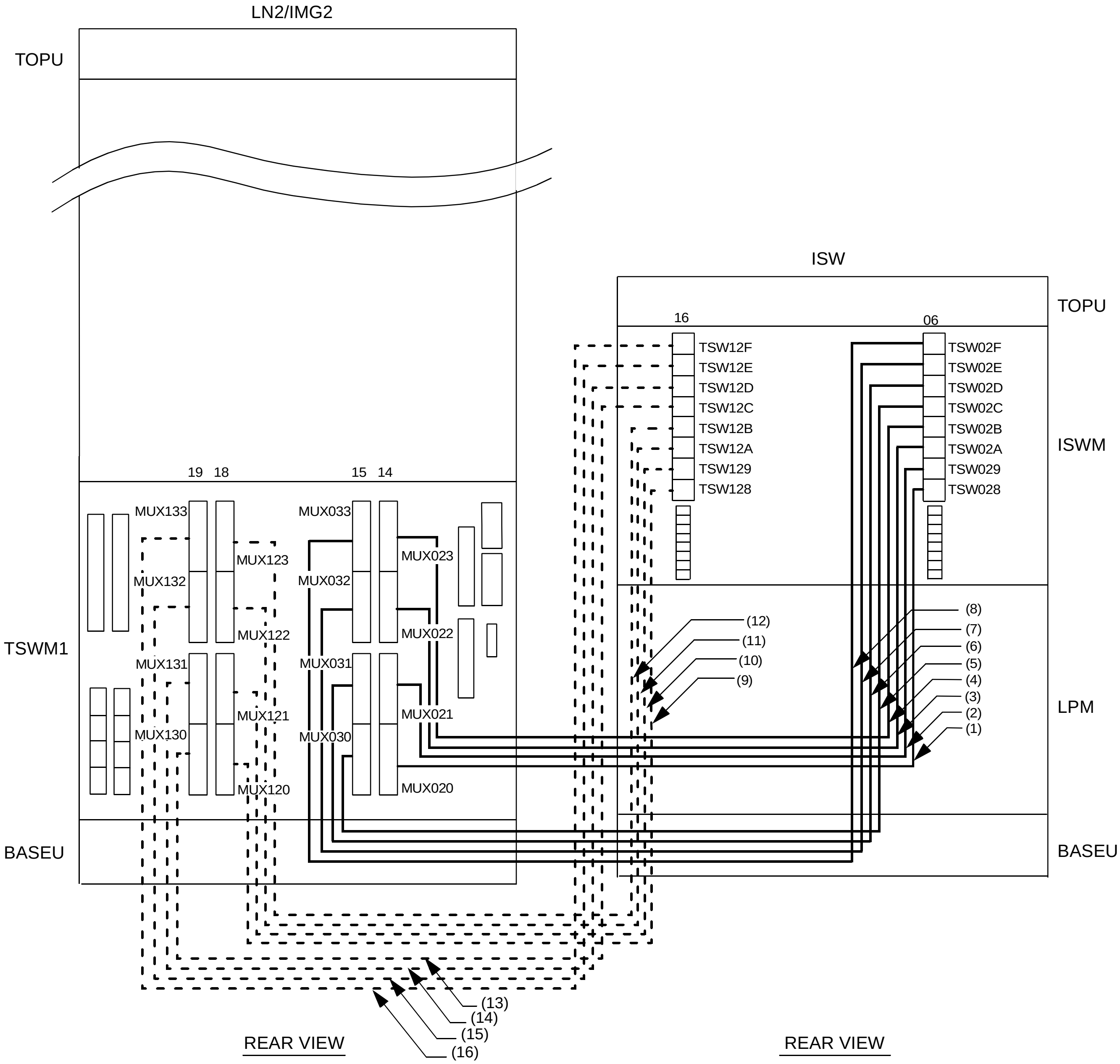

Figure 010-35 Inter-frame Bus Cable Connection for ISW-LN2, IMG2

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Table 010-19 Inter-frame Bus Cable Connection for ISW-LN2, IMG2

No.	FROM		TO		CABLE NAME	REMARKS
	UNIT/ MODULE	CONNECTOR NAME	UNIT/ MODULE	CONNECTOR NAME		
(1)	ISWM (slot 06)	TSW028	TSWM1 (slot 14)	MUX020	ISW-LN TSW-CA-H	When IMG2 exists in LN2
(2)	ISWM (slot 06)	TSW029	TSWM1 (slot 14)	MUX021	ISW-LN TSW-CA-H	When PIM1 exists in IMG2 of LN2
(3)	ISWM (slot 06)	TSW02A	TSWM1 (slot 14)	MUX022	ISW-LN TSW-CA-H	When PIM2 exists in IMG2 of LN2
(4)	ISWM (slot 06)	TSW02B	TSWM1 (slot 14)	MUX023	ISW-LN TSW-CA-H	When PIM3 exists in IMG2 of LN2
(5)	ISWM (slot 06)	TSW02C	TSWM1 (slot 15)	MUX030	ISW-LN TSW-CA-H	When IMG3 exists in LN2
(6)	ISWM (slot 06)	TSW02D	TSWM1 (slot 15)	MUX031	ISW-LN TSW-CA-H	When PIM1 exists in IMG3 of LN2
(7)	ISWM (slot 06)	TSW02E	TSWM1 (slot 15)	MUX032	ISW-LN TSW-CA-H	When PIM2 exists in IMG3 of LN2
(8)	ISWM (slot 06)	TSW02F	TSWM1 (slot 15)	MUX033	ISW-LN TSW-CA-H	When PIM3 exists in IMG3 of LN2
(9)	ISWM (slot 16)	TSW128	TSWM1 (slot 18)	MUX120	ISW-LN TSW-CA-H	When IMG2 exists in LN2 For dual configuration
(10)	ISWM (slot 16)	TSW129	TSWM1 (slot 18)	MUX121	ISW-LN TSW-CA-H	When PIM1 exists in IMG2 of LN2 For dual configuration
(11)	ISWM (slot 16)	TSW12A	TSWM1 (slot 18)	MUX122	ISW-LN TSW-CA-H	When PIM2 exists in IMG2 of LN2 For dual configuration
(12)	ISWM (slot 16)	TSW12B	TSWM1 (slot 18)	MUX123	ISW-LN TSW-CA-H	When PIM3 exists in IMG2 of LN2 For dual configuration
(13)	ISWM (slot 16)	TSW12C	TSWM1 (slot 19)	MUX130	ISW-LN TSW-CA-H	When IMG3 exists in LN2 For dual configuration
(14)	ISWM (slot 16)	TSW12D	TSWM1 (slot 19)	MUX131	ISW-LN TSW-CA-H	When PIM1 exists in IMG3 of LN2 For dual configuration
(15)	ISWM (slot 16)	TSW12E	TSWM1 (slot 19)	MUX132	ISW-LN TSW-CA-H	When PIM2 exists in IMG3 of LN2 For dual configuration
(16)	ISWM (slot 16)	TSW12F	TSWM1 (slot 19)	MUX133	ISW-LN TSW-CA-H	When PIM3 exists in IMG3 of LN2 For dual configuration

Connect the inter-frame bus cables between ISW and IMG1 of LN3 as shown below. Note that the dotted lines indicate the bus cable connection for a dual-system.

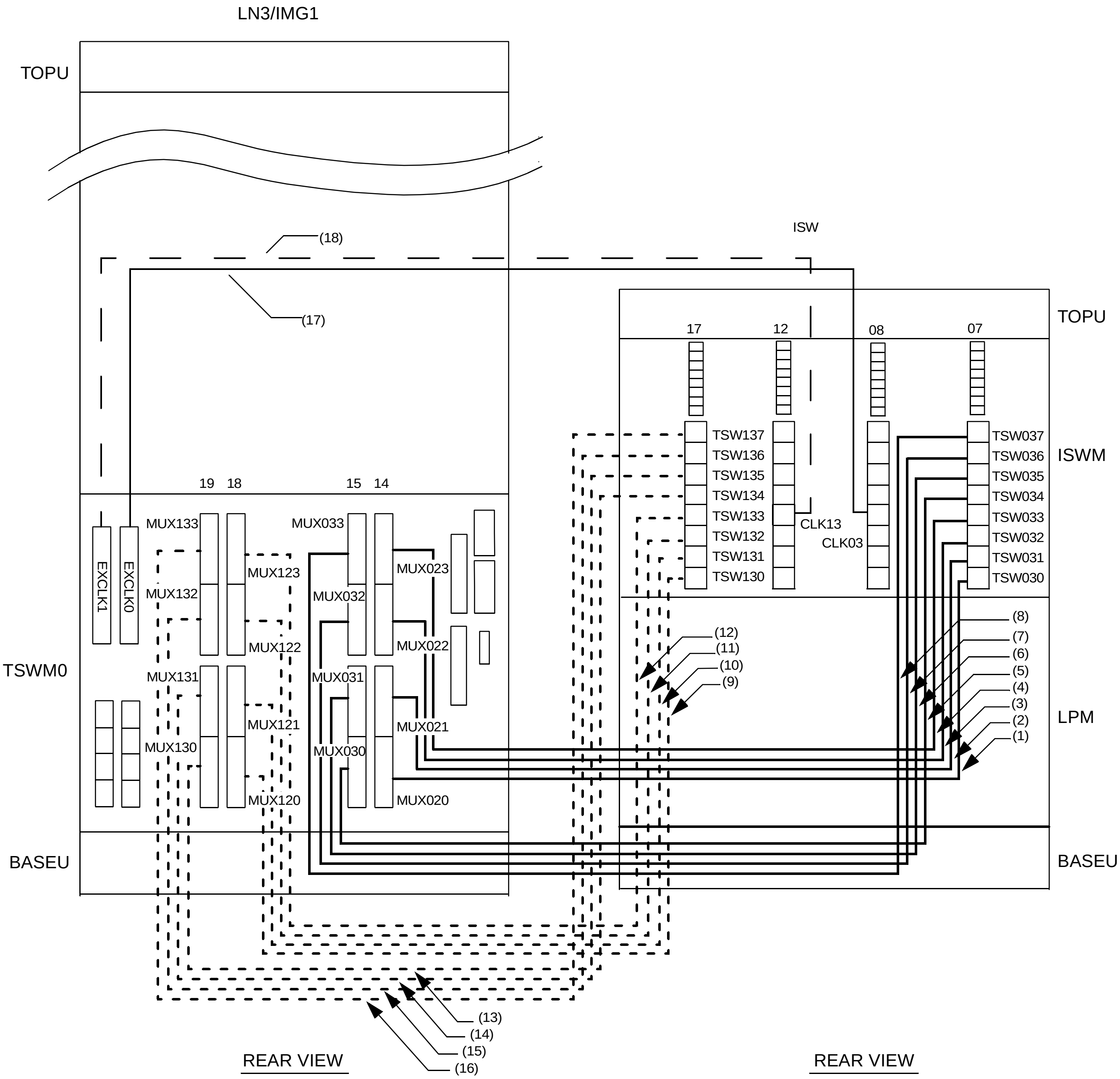

Figure 010-36 Inter-frame Bus Cable Connection for ISW-LN3, IMG1

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Table 010-20 Inter-frame Bus Cable Connection for ISW-LN3, IMG1

No.	FROM		TO		CABLE NAME	REMARKS
	UNIT/ MODULE	CONNECTOR NAME	UNIT/ MODULE	CONNECTOR NAME		
(1)	ISWM (slot 07)	TSW030	TSWM0 (slot 14)	MUX020	ISW-LN TSW-CA-I	When LN3 exists
(2)	ISWM (slot 07)	TSW031	TSWM0 (slot 14)	MUX021	ISW-LN TSW-CA-I	When LN3 exists
(3)	ISWM (slot 07)	TSW032	TSWM0 (slot 14)	MUX022	ISW-LN TSW-CA-I	When LN3 exists
(4)	ISWM (slot 07)	TSW033	TSWM0 (slot 14)	MUX023	ISW-LN TSW-CA-I	When LN3 exists
(5)	ISWM (slot 07)	TSW034	TSWM0 (slot 15)	MUX030	ISW-LN TSW-CA-I	When LN3 exists
(6)	ISWM (slot 07)	TSW035	TSWM0 (slot 15)	MUX031	ISW-LN TSW-CA-I	When PIM1 exists in IMG1 of LN3
(7)	ISWM (slot 07)	TSW036	TSWM0 (slot 15)	MUX032	ISW-LN TSW-CA-I	When PIM2 exists in IMG1 of LN3
(8)	ISWM (slot 07)	TSW037	TSWM0 (slot 15)	MUX033	ISW-LN TSW-CA-I	When PIM3 exists in IMG1 of LN3
(9)	ISWM (slot 17)	TSW130	TSWM0 (slot 18)	MUX120	ISW-LN TSW-CA-I	When LN3 exists For dual configuration
(10)	ISWM (slot 17)	TSW131	TSWM0 (slot 18)	MUX121	ISW-LN TSW-CA-I	When LN3 exists For dual configuration
(11)	ISWM (slot 17)	TSW132	TSWM0 (slot 18)	MUX122	ISW-LN TSW-CA-I	When LN3 exists For dual configuration
(12)	ISWM (slot 17)	TSW133	TSWM0 (slot 18)	MUX123	ISW-LN TSW-CA-I	When LN3 exists For dual configuration
(13)	ISWM (slot 17)	TSW134	TSWM0 (slot 19)	MUX130	ISW-LN TSW-CA-I	When LN3 exists For dual configuration
(14)	ISWM (slot 17)	TSW135	TSWM0 (slot 19)	MUX131	ISW-LN TSW-CA-I	When PIM1 exists in IMG1 of LN3 For dual configuration
(15)	ISWM (slot 17)	TSW136	TSWM0 (slot 19)	MUX132	ISW-LN TSW-CA-I	When PIM2 exists in IMG1 of LN3 For dual configuration
(16)	ISWM (slot 17)	TSW137	TSWM0 (slot 19)	MUX133	ISW-LN TSW-CA-I	When PIM3 exists in IMG1 of LN3 For dual configuration
(17)	ISWM (slot 08)	CLK03	TSWM0 (slot 21)	EXCLK0	ISW-LN PLO CA-I	
(18)	ISWM (slot 12)	CLK13	TSWM0 (slot 23)	EXCLK1	ISW-LN PLO CA-I	For dual configuration

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Cable Connections

Connect the inter-frame bus cables between ISW and IMG2 of LN3 as shown below. Note that the dotted lines indicate the bus cable connection for a dual-system.

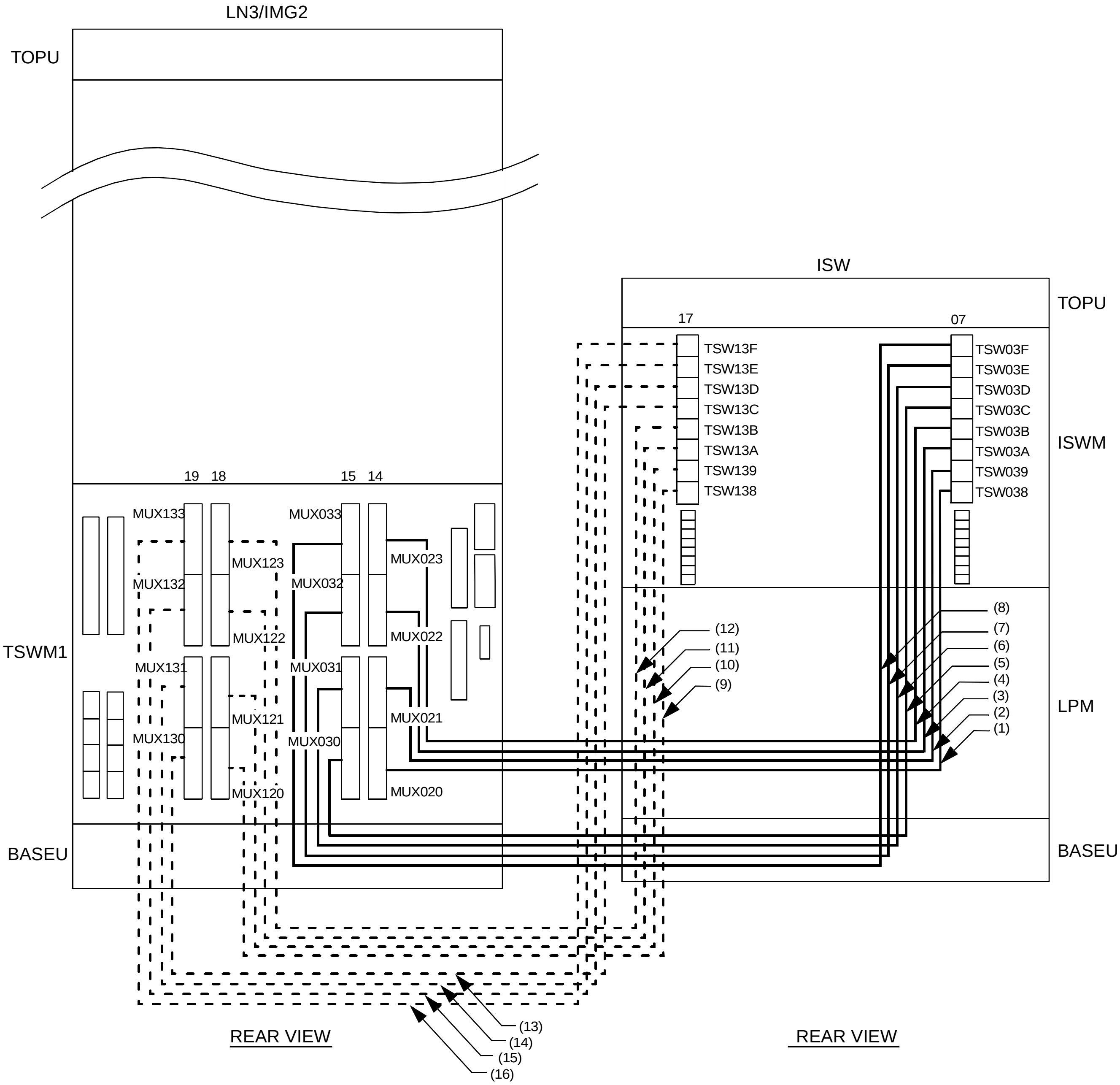

Figure 010-37 Inter-frame Bus Cable Connection for ISW-LN3, IMG2

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Table 010-21 Inter-frame Bus Cable Connection for ISW-LN3, IMG2

No.	FROM		TO		CABLE NAME	REMARKS
	UNIT/ MODULE	CONNECTOR NAME	UNIT/ MODULE	CONNECTOR NAME		
(1)	ISWM (slot 07)	TSW038	TSWM1 (slot 14)	MUX020	ISW-LN TSW-CA-J	When IMG2 exists in LN3
(2)	ISWM (slot 07)	TSW039	TSWM1 (slot 14)	MUX021	ISW-LN TSW-CA-J	When PIM1 exists in IMG2 of LN3
(3)	ISWM (slot 07)	TSW03A	TSWM1 (slot 14)	MUX022	ISW-LN TSW-CA-J	When PIM2 exists in IMG2 of LN3
(4)	ISWM (slot 07)	TSW03B	TSWM1 (slot 14)	MUX023	ISW-LN TSW-CA-J	When PIM3 exists in IMG2 of LN3
(5)	ISWM (slot 07)	TSW03C	TSWM1 (slot 15)	MUX030	ISW-LN TSW-CA-J	When IMG3 exists in LN3
(6)	ISWM (slot 07)	TSW03D	TSWM1 (slot 15)	MUX031	ISW-LN TSW-CA-J	When PIM1 exists in IMG3 of LN3
(7)	ISWM (slot 07)	TSW03E	TSWM1 (slot 15)	MUX032	ISW-LN TSW-CA-J	When PIM2 exists in IMG3 of LN3
(8)	ISWM (slot 07)	TSW03F	TSWM1 (slot 15)	MUX033	ISW-LN TSW-CA-J	When PIM3 exists in IMG3 of LN3
(9)	ISWM (slot 17)	TSW138	TSWM1 (slot 18)	MUX120	ISW-LN TSW-CA-J	When IMG2 exists in LN3 For dual configuration
(10)	ISWM (slot 17)	TSW139	TSWM1 (slot 18)	MUX121	ISW-LN TSW-CA-J	When PIM1 exists in IMG2 of LN3 For dual configuration
(11)	ISWM (slot 17)	TSW13A	TSWM1 (slot 18)	MUX122	ISW-LN TSW-CA-J	When PIM2 exists in IMG2 of LN3 For dual configuration
(12)	ISWM (slot 17)	TSW13B	TSWM1 (slot 18)	MUX123	ISW-LN TSW-CA-J	When PIM3 exists in IMG2 of LN3 For dual configuration
(13)	ISWM (slot 17)	TSW13C	TSWM1 (slot 19)	MUX130	ISW-LN TSW-CA-J	When IMG3 exists in LN3 For dual configuration
(14)	ISWM (slot 17)	TSW13D	TSWM1 (slot 19)	MUX131	ISW-LN TSW-CA-J	When PIM1 exists in IMG3 of LN3 For dual configuration
(15)	ISWM (slot 17)	TSW13E	TSWM1 (slot 19)	MUX132	ISW-LN TSW-CA-J	When PIM2 exists in IMG3 of LN3 For dual configuration
(16)	ISWM (slot 17)	TSW13F	TSWM1 (slot 19)	MUX133	ISW-LN TSW-CA-J	When PIM3 exists in IMG3 of LN3 For dual configuration

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4. ETHER CABLE CONNECTIONS

This section covers how to connect the Ether (10 BASE-T) cables to each LN and ISW. Because the terminal HUB (PA-M96) card (maximum 8 ports per card) can be mounted wherever in a PIM of any LNs (LN0-LN3), use the required number of HUB card(s), then perform unique Ether connection depending on your system configuration.

The flowchart below provides a summary of procedures using two examples:

- Figure 010-38 for basic Ether connection
- Figure 010-39 for secondary Ether connection (option) **Note**

Note: *Secondary Ether connection is available when your system uses dual LANIs for each CPR (i.e. second LANI cards are accommodated in PCI Slot 03 of all the CPR in ISW and each LN.)*

<Summary of Procedure>

START

Connection of Basic 10 BASE-T cables (straight)
* Example: Figure 010-38

Using the following cables, connect the LANI (PZ-PC19) cards in PCI slot 00 of ISW/each LN and the relevant HUB (PA-M96) card(s).

- When LANI and HUB cards are in the same IMG: "UTP CTG5 ST CA-O" **Note**
- When LANI and HUB cards are in different IMGs in the same LN: "UTP CTG5 ST CA-X"
- When LANI and HUB cards are in different LNs: "UTP CTG5 ST CA-A0"

Note: *When connecting the LANI of ISW to the HUB card in PIM0 of IMG0, LN0, use "UTP CTG5 CA-O" cable unconditionally.*

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Connection of 10 BASE-T cables (cross)
* Example: Figure 010-38

If multiple HUB (PA-M96) cards are used in the step above, cascade each HUB card via the following physical cables:

- When HUB cards are cascaded within the same PIM: "UTP CTG5 CRS CA-F"
- When HUB cards are cascaded within the same IMG: "UTP CTG5 CRS CA-O"
- When HUB cards are cascaded across different IMGs in the same LN: "UTP CTG5 CRS CA-X"
- When HUB cards are cascaded across different LNs: "UTP CTG5 CRS CA-A0"

Connection of additional 10 BASE-T cables (straight)
* Example: Figure 010-39

If your system uses second LANIs in PCI slot 03 of each CPR, also connect the whole second LANIs by using any of the following cables:

- When LANI (PZ-PC19) and HUB cards are in the same IMG: "UTP CTG5 ST CA-O"
- When LANI and HUB cards are in different IMGs in the same LN: "UTP CTG5 ST CA-X"
- When LANI and HUB cards are in the different LNs: "UTP CTG5 ST CA-A0"

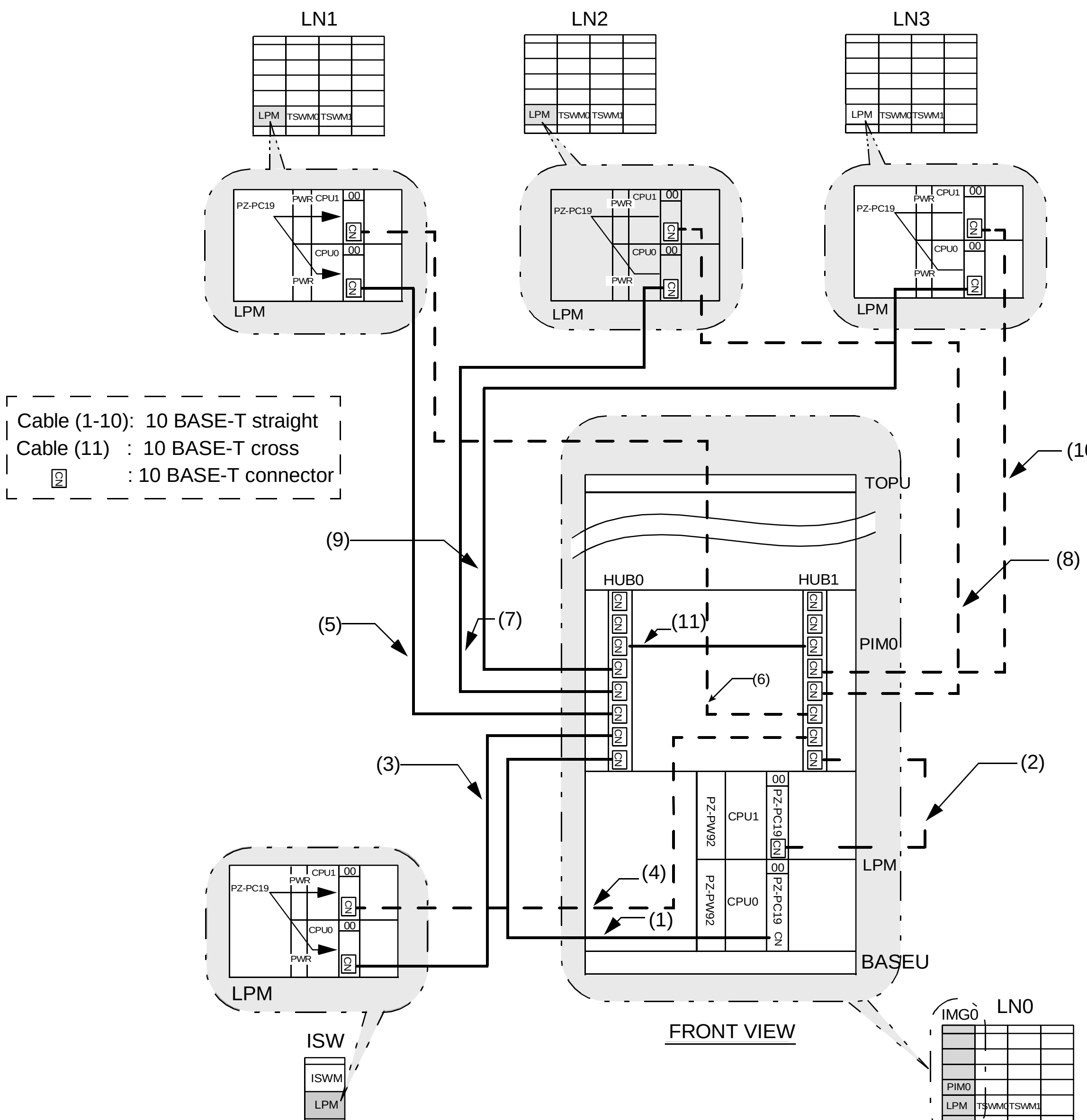
Connection of 10 BASE-T cables (cross)
* Example: Figure 010-39

If multiple HUB (PA-M96) cards are used in the step above, cascade each HUB card via the following physical cables:

- When HUB cards are cascaded within the same PIM: "UTP CTG5 CRS CA-F"
- When HUB cards are cascaded within the same IMG: "UTP CTG5 CRS CA-O"
- When HUB cards are cascaded across different IMGs in the same LN: "UTP CTG5 CRS CA-X"
- When HUB cards are cascaded across different LNs: "UTP CTG5 CRS CA-A0"

END

This figure shows an example where each LANI (PZ-PC19) card (PCI slot 00) in ISW/LN is connected to the two HUB (PA-M96) cards (HUB0/HUB1) in PIM0 of IMG0, LN0.



Note: *HUB (PA-M96) card can be mounted in any universal slot (slot 04 - 12, 15 - 23) of a PIM.*

Figure 010-38 Ether Cable Connection for ISW and LN (Example)

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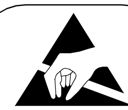
Table 010-22 Ether Cable Connections (Example)

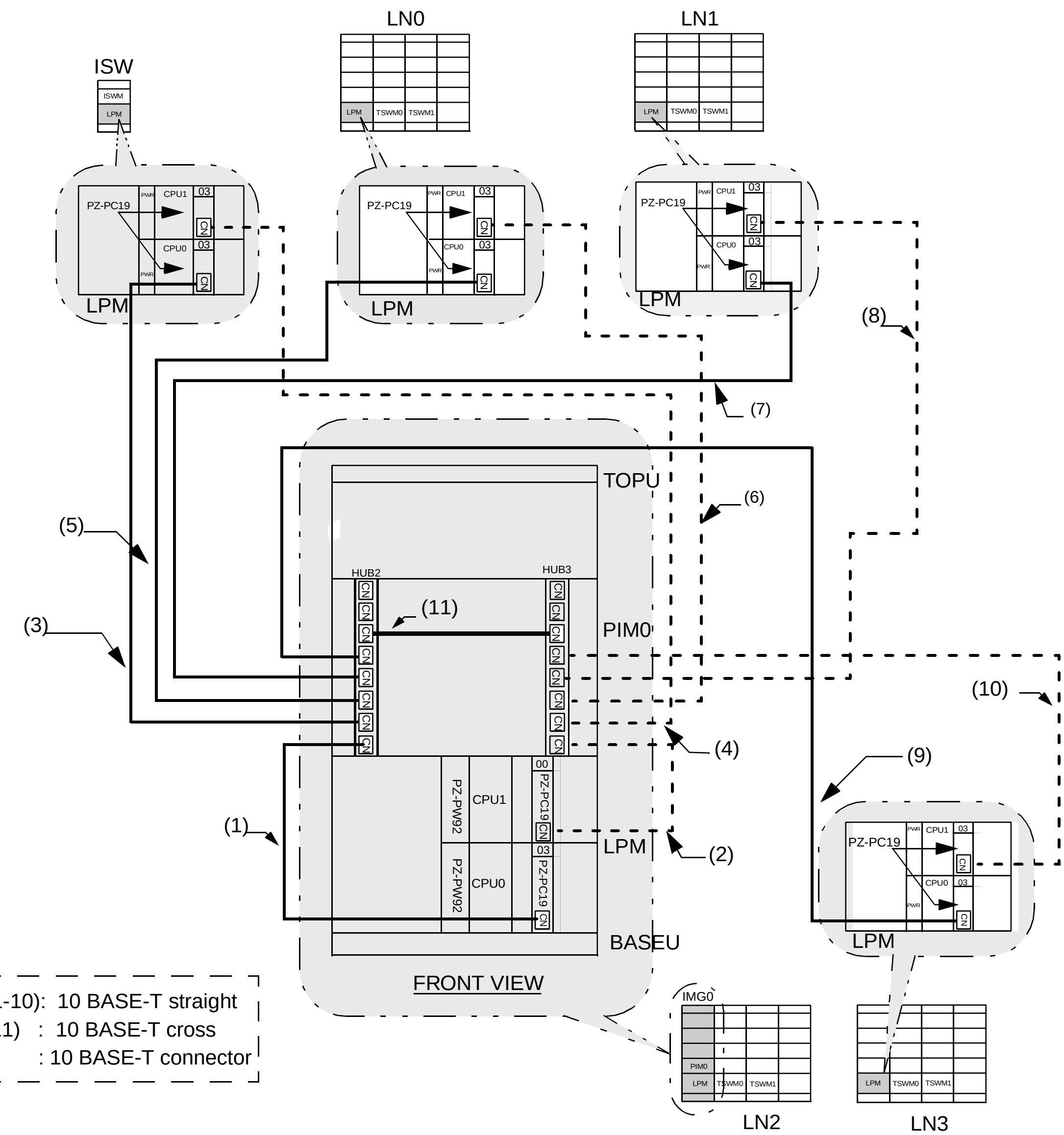
No.	FROM		TO		CABLE NAME	REMARKS
	UNIT/ MODULE	CONNECTOR NAME	UNIT/ MODULE	CONNECTOR NAME		
(1)	LPM (LN0)	CN (PZ-PC19, CPU0)	PIM0 (LN0, IMG0)	TPn-X (PA-M96, HUB0)	UTP CTG5 ST CA-O	
(2)	LPM (LN0)	CN (PZ-PC19, CPU1)	PIM0 (LN0, IMG0)	TPn-X (PA-M96, HUB1)	UTP CTG5 ST CA-O	For dual configuration
(3)	LPM (ISW)	CN (PZ-PC19, CPU0)	PIM0 (LN0, IMG0)	TPn-X (PA-M96, HUB0)	UTP CTG5 ST CA-O	
(4)	LPM (ISW)	CN (PZ-PC19, CPU1)	PIM0 (LN0, IMG0)	TPn-X (PA-M96, HUB1)	UTP CTG5 ST CA-O	For dual configuration
(5)	LPM (LN1)	CN (PZ-PC19, CPU0)	PIM0 (LN0, IMG0)	TPn-X (PA-M96, HUB0)	UTP CTG5 ST CA-A0	
(6)	LPM (LN1)	CN (PZ-PC19, CPU1)	PIM0 (LN0, IMG0)	TPn-X (PA-M96, HUB1)	UTP CTG5 ST CA-A0	For dual configuration
(7)	LPM (LN2)	CN (PZ-PC19, CPU0)	PIM0 (LN0, IMG0)	TPn-X (PA-M96, HUB0)	UTP CTG5 ST CA-A0	When LN2 exists in your system
(8)	LPM (LN2)	CN (PZ-PC19, CPU1)	PIM0 (LN0, IMG0)	TPn-X (PA-M96, HUB1)	UTP CTG5 ST CA-A0	For dual configuration When LN2 exists in your system
(9)	LPM (LN3)	CN (PZ-PC19, CPU0)	PIM0 (LN0, IMG0)	TPn-X (PA-M96, HUB0)	UTP CTG5 ST CA-A0	When LN3 exists in your system
(10)	LPM (LN3)	CN (PZ-PC19, CPU1)	PIM0 (LN0, IMG0)	TPn-X (PA-M96, HUB1)	UTP CTG5 ST CA-A0	For dual configuration When LN3 exists in your system
(11)	PIM0 (LN0, IMG0)	TPn-X (PA-M96, HUB0)	PIM0 (LN0, IMG0)	TPn-X (PA-M96, HUB1)	UTP CTG5 CRS CA-F	

Note: *This table is only an example when the Ether cable connection is provided as shown in Figure 010-38. Actual cables to be used may differ, depending on your system configuration. See details in the flowchart on the previous page (Sheet 70/73 and 71/73 in this NAP).*



ATTENTION
Contents
Static Sensitive
Handling
Precautions Required

If your system uses dual LANIs for each CPR, also connect the whole second LANIs (PCI slot 03) to another set of HUB (PA-M96) card(s) in addition to the first LANIs (connected in Figure 010-38). In this example, the second LANIs are connected to HUB2/HUB3/ in PIM0 of IMG0, LN2/



Note: *PA-M96 (HUB) card can be mounted in any universal slot (Slot No. 04-12, 15-23) of a PIM.*

Figure 010-39 Additional Ether Cable Connection When Second LANIs Are Used (Example)

ATTENTION
Contents
Static Sensitive
Handling
Precautions Required

Table 010-23 Ether Cable Connections for Second LANI (Example)

No.	FROM		TO		CABLE NAME	REMARKS
	UNIT/ MODULE	CONNECTOR NAME	UNIT/ MODULE	CONNECTOR NAME		
(1)	LPM (LN2)	CN (PZ-PC19, CPU0)	PIM0 (LN2, IMG0)	TPn-X (PA-M96, HUB2)	UTP CTG5 ST CA-O	
(2)	LPM (LN2)	CN (PZ-PC19, CPU1)	PIM0 (LN2, IMG0)	TPn-X (PA-M96, HUB3)	UTP CTG5 ST CA-O	For dual configuration
(3)	LPM (ISW)	CN (PZ-PC19, CPU0)	PIM0 (LN2, IMG0)	TPn-X (PA-M96, HUB2)	UTP CTG5 ST CA-O	
(4)	LPM (ISW)	CN (PZ-PC19, CPU1)	PIM0 (LN2, IMG0)	TPn-X (PA-M96, HUB3)	UTP CTG5 ST CA-O	For dual configuration
(5)	LPM (LN0)	CN (PZ-PC19, CPU0)	PIM0 (LN2, IMG0)	TPn-X (PA-M96, HUB2)	UTP CTG5 ST CA-A0	
(6)	LPM (LN0)	CN (PZ-PC19, CPU1)	PIM0 (LN2, IMG0)	TPn-X (PA-M96, HUB3)	UTP CTG5 ST CA-A0	For dual configuration
(7)	LPM (LN1)	CN (PZ-PC19, CPU0)	PIM0 (LN2, IMG0)	TPn-X (PA-M96, HUB2)	UTP CTG5 ST CA-A0	
(8)	LPM (LN1)	CN (PZ-PC19, CPU1)	PIM0 (LN2, IMG0)	TPn-X (PA-M96, HUB3)	UTP CTG5 ST CA-A0	For dual configuration
(9)	LPM (LN3)	CN (PZ-PC19, CPU0)	PIM0 (LN2, IMG0)	TPn-X (PA-M96, HUB2)	UTP CTG5 ST CA-A0	When LN3 exists in your system
(10)	LPM (LN3)	CN (PZ-PC19, CPU1)	PIM0 (LN2, IMG0)	TPn-X (PA-M96, HUB3)	UTP CTG5 ST CA-A0	For dual configuration When LN3 exists in your system
(11)	PIM0 (LN2, IMG0)	TPn-X (PA-M96, HUB2)	PIM0 (LN2, IMG0)	TPn-X (PA-M96, HUB3)	UTP CTG5 CRS CA-F	

Note: *This table is only an example when the Ether cable connection is provided as shown in Figure 010-39. Actual cables to be used may differ, depending on your system configuration. See details in the flowchart on the previous page (Sheet 70/73 and 71/73 in this NAP).*

NAP-200-011	
Sheet 1/1	
Front Cable Connections between Circuit Cards	

ATTENTION
Contents
Static Sensitive
Handling
Precautions Required

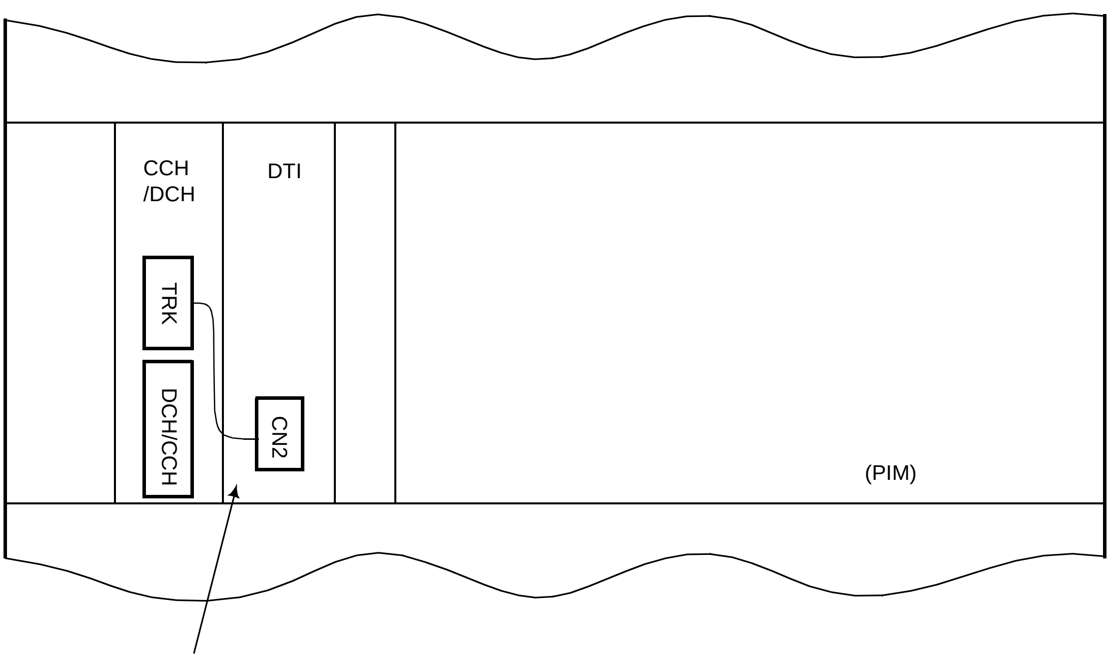
This NAP describes front cable connections between circuit cards.

Note: *Protection against static electricity:*
A Portable Field Service Grounding Kit must be used to protect system components from static discharge.

START

When CCH/DCH and DTI cards are mounted in PIM (For CCIS/ISDN), connect the front cable between CCH/DCH and DTI cards by referring to Figure 011-1

END



Connecting Cable Specification

Cable Name	:	10AL-(10)FLT CA
Desig. No.	:	NR-510247-001
Color Label	:	White
Length	:	10/4 (cm/inch)

Figure 011-1 Front Cable Connections between Circuit Cards for CCIS/ISDN

NAP-200-012
Sheet 1/13
Cable Running from the PBX to MDF, ATTCON, MAT and SMDR

This NAP explains the following work items:

- Cable Running from the PBX to the MDF and ATTCON (Desk Console)
- Cable Running from the PBX to the MAT and SMDR
- Connections at the PBX Side
- Cable Tying at the Equipment Frame

Note: *Compliance with EMI*

To comply with EMI, Shielded cables with CHAMP connector should be used for the following installation cables:

- *Cable from the PBX to the MDF*
- *Cable from the PBX to Attendant Console*
- *Cable from the PBX to alarm indicating equipment*
- *Cable from the PBX to the external music-on-hold source*
- *Cable for line test (connected to TEST connection)*

NAP-200-012
Sheet 2/13
Cable Running from the PBX to MDF, ATTCON, MAT and SMDR

1. CABLE RUNNING FROM THE PBX TO THE MDF AND ATTCON

START

- Cables (25P) for LT Connectors — At the PBX side, verify the names of the connectors on the PIM backplane, then bring each LT cable up to the corresponding connector position.
- Cables for Desk Console Connectors — Referring to Figures 015-1 through 015-13 in NAP-200-015, run the installation cables for the Desk Console to the relevant connector positions.
- Cables (25P) for MISC0A Connector (ISW) — At the PBX side, confirm the name of the connectors on the LPM backplane, then bring the 68PH EXMISC CA and installation cable up to the connector position.
- Cables (25P) for NCU Connectors — At the PBX side, bring each NCU cable up to the connector on the front of the PFT cards to be mounted in the PIM. Refer to Figure 014-4.
  — At the MDF side, confirm the location of the Terminal Block to which the cable is to be terminated, then bring the cable up to the terminal block.

A

NAP-200-012
Sheet 3/13
Cable Running from the PBX to MDF, ATTCON, MAT and SMDR

A

Cables for ODT Connectors

- Referring to description of 8TLT card in Circuit Card Manual, connect each 2400 ODT CABLE/2400 ODT CABLE-A and the corresponding installation cables.
- At the PBX side, bring each 2400 ODT CABLE/2400 ODT CABLE-A up to the connector position on the front of the 8TLT cards to be mounted in the PIM.
- At the MDF side, confirm the location of the Terminal Blocks to which each cable is to be terminated, then bring the cables up to the terminal blocks.

END

NAP-200-012
Sheet 4/13
Cable Running from the PBX to MDF, ATTCON, MAT and SMDR

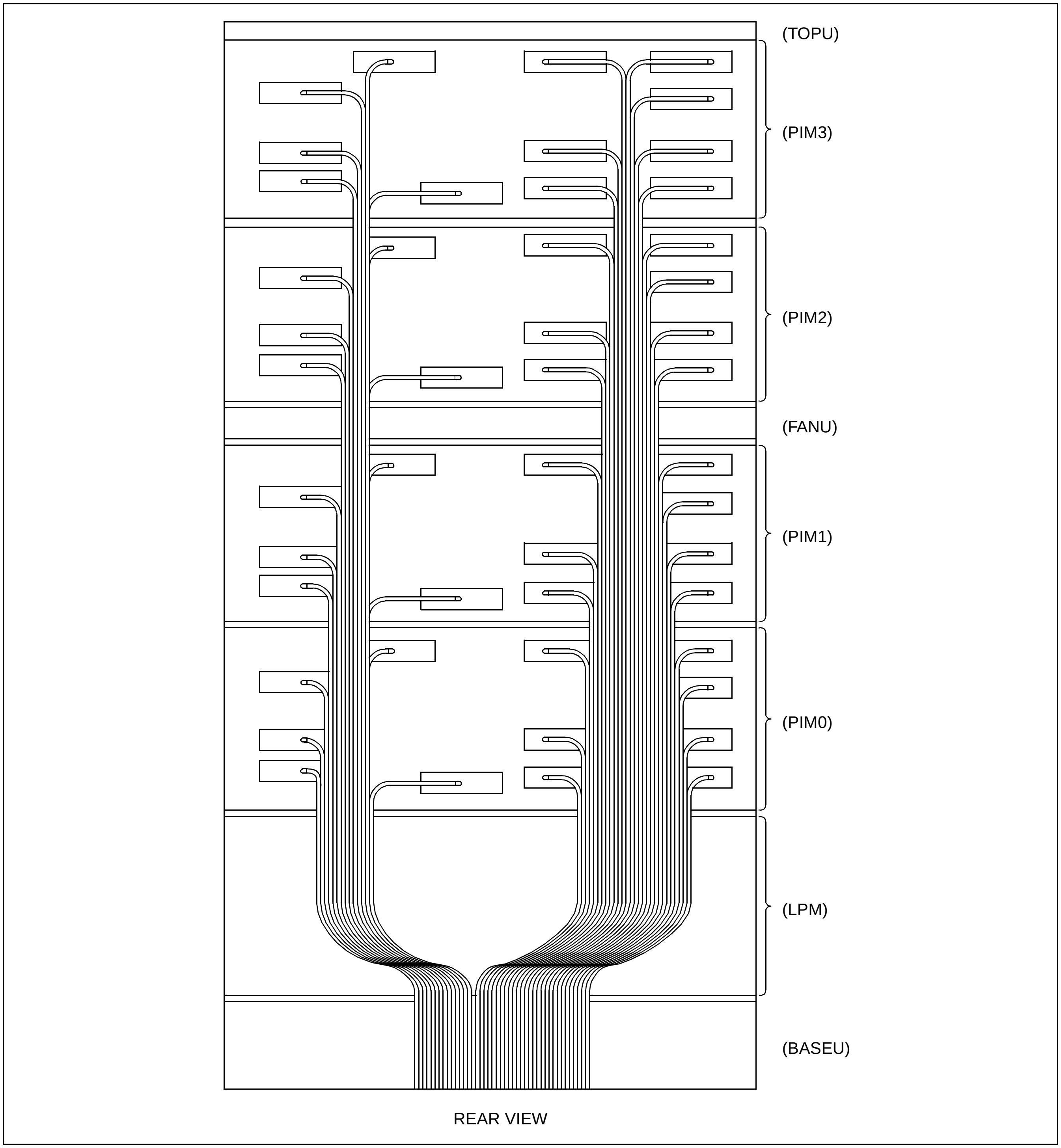


Figure 012-1 LT Cable Routing

NAP-200-012
Sheet 5/13
Cable Running from the PBX to MDF, ATTCON, MAT and SMDR

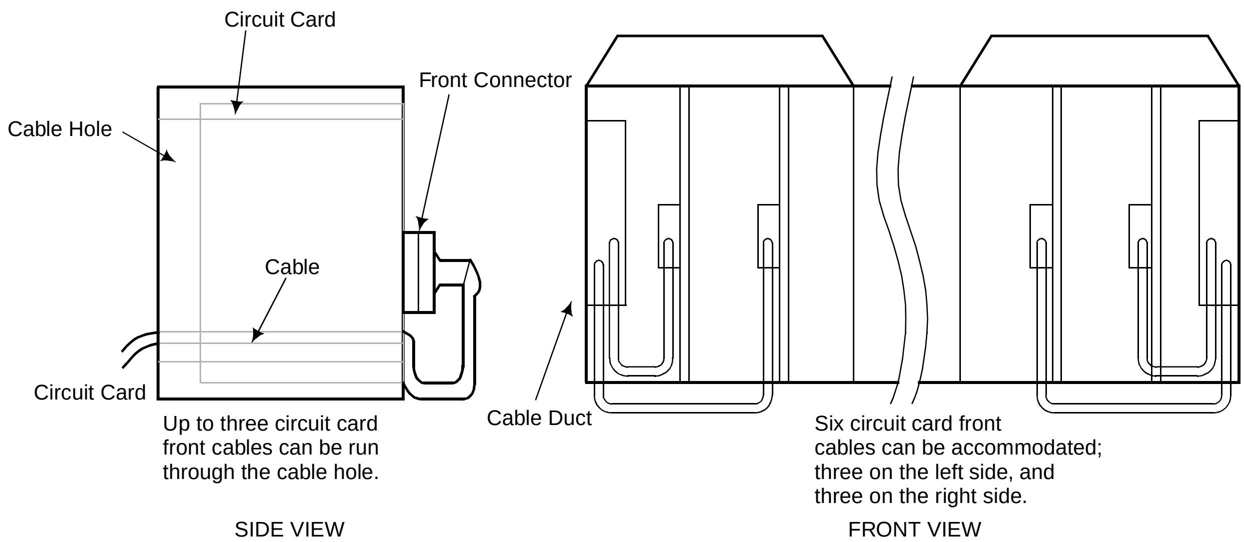


Figure 012-2 Cable Routing of Circuit Card Front Cable

NAP-200-012
Sheet 6/13
Cable Running from the PBX to MDF, ATTCON, MAT and SMDR

2. CABLE RUNNING FROM THE PBX TO THE MAT AND SMDR

START

- MAT (Refer to NAP-200-016)
  - Referring to NAP-200-016, connect 68PH S 2 PORTS CA-A and the installation cable (25P).
  - At the PBX side, confirm the connector name on the LPM backplane, then run 68PH S 2 PORTS CA-A up to the connector position.
  - At the MAT side, run RS-232-CA “0” up to the MAT.
- SMDR (Refer to NAP-200-017)
  - Referring to NAP-200-017, connect the PBX and the SMDR equipment.
  - At the PBX side, confirm the connector name on the LPM backplane, then run 68PH S 2 PORTS CA-A up to the connector position.
  - At the SMDR equipment side, run the installation cable (25P) up to the SMDR equipment.

END

NAP-200-012
Sheet 7/13
Cable Running from the PBX to MDF, ATTCON, MAT and SMDR

3. CONNECTIONS AT THE PBX SIDE

START

- LT Connectors — Confirm each connector name on the backplane and the corresponding LT connector, then connect the two.
- MISC0A Connector — Connect the 68PH EXMISC CA cable to the MISC0A rear connector on the LPM backplane.
- NCU Connectors — Connect the NCU cable to the connector on the front of the PFT card.
- IOC Connectors — Connect 68 PH S 2PORTS CA-A to the MISC connectors on the LPM backplane.

END

4. CABLE TYING AT THE PBX

START

- Referring to Figure 012-3, secure the connector cables to the Module.

END

NAP-200-012
Sheet 8/13
Cable Running from the PBX to MDF, ATTCON, MAT and SMDR

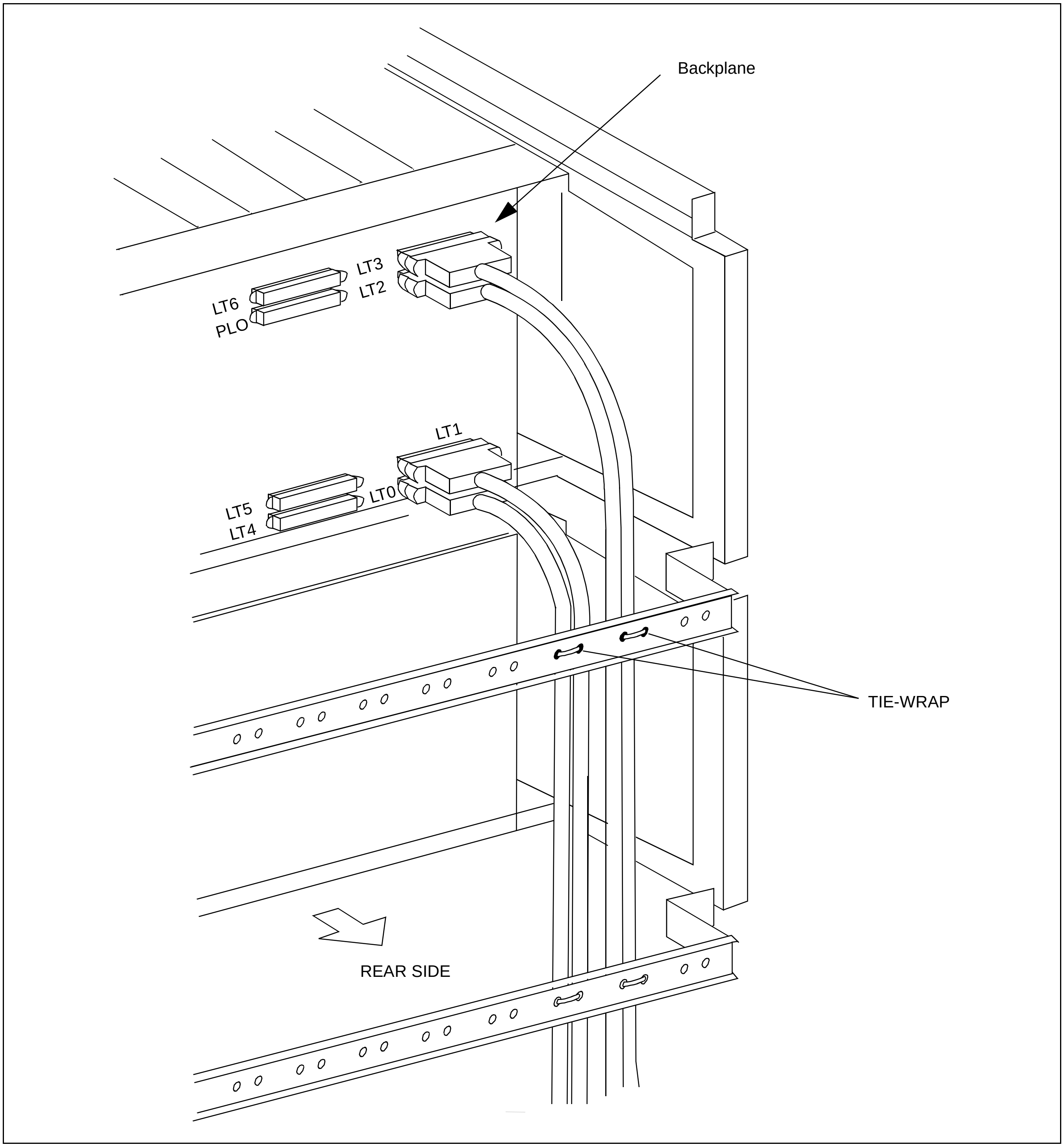


Figure 012-3 Example of Cable Tying Using Tie-Wrap

5. TERMINATION OF THE CABLES BETWEEN THE PBX AND THE MDF OR ATTCON ONTO THE CABLE SUPPORT ASSEMBLY

START

- Remove of the Cable Support Assembly.
  - Remove the Cable Support Assembly from the BASEU. (See Figure 012-4.)
- Peel the cable cover
  - Referring to Table 012-1, confirm the cable terminating locations on the Cable Support Assembly.
  - Per the cable terminating locations, peel the cable cover as shown on Figure 012-5.
- Terminate the cable
  - Referring to Figure 012-5, wind the M-clamp onto the cable portion from which the cover has been peeled off.
  - Referring to Figure 012-6, terminate the cable onto the Cable Support Assembly.
- When all the cables have been terminated to the Cable Support Assembly A, likewise terminate the cables onto the Cable Support Assembly B, C, D, E in the order named.

END

NAP-200-012	
Sheet 10/13	
Cable Running from the PBX to MDF, ATTCON, MAT and SMDR	

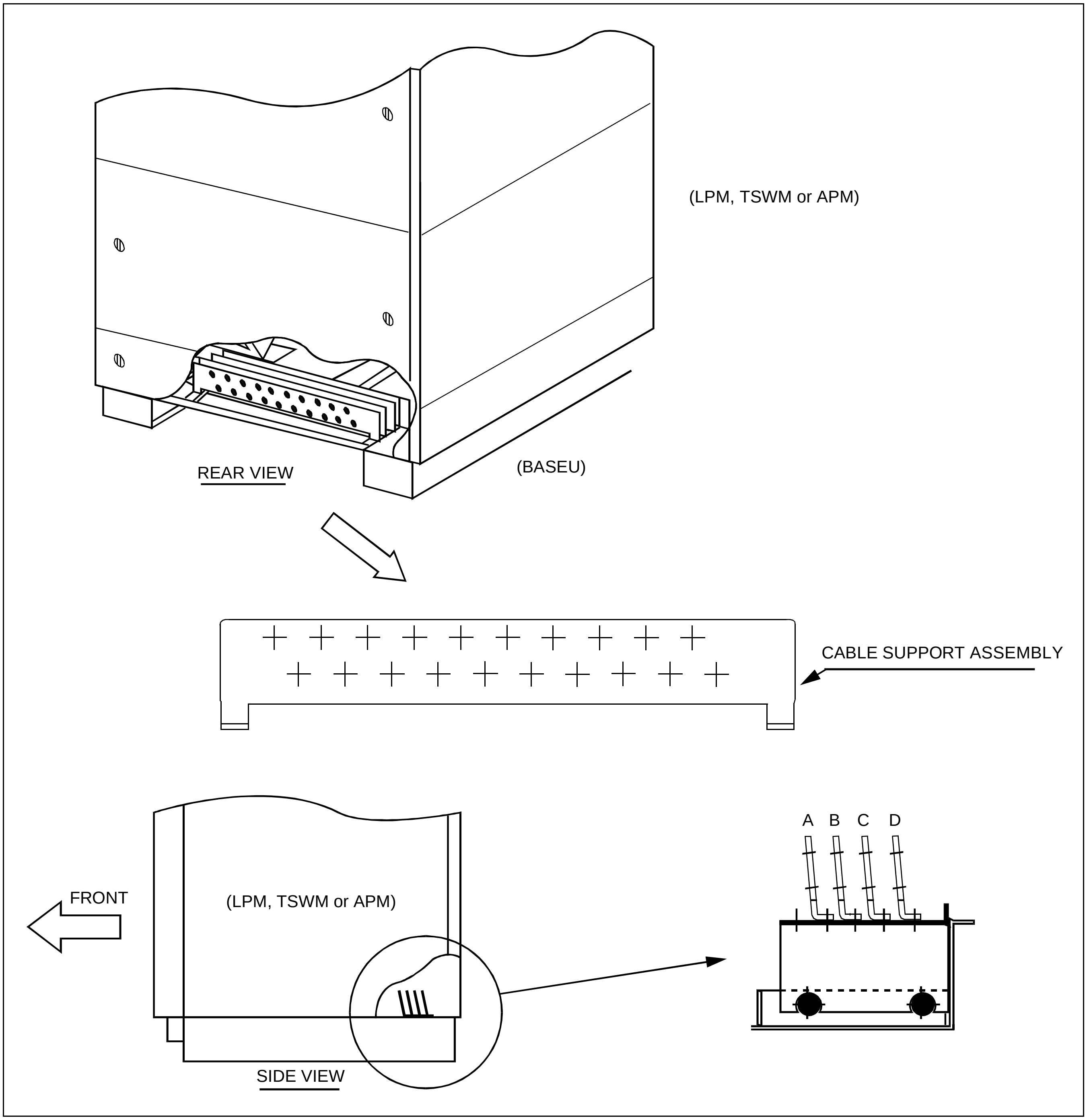


Figure 012-4 Cable Support Assembly

NAP-200-012
Sheet 11/13
Cable Running from the PBX to MDF, ATTCON, MAT and SMDR

Table 012-1 Cable Support Assembly

BACKPLANE		CABLE SUPPORT No.	USE	REMARKS
MODULE	CONNECTOR NAME			
LPM/ TSWM	MISCnA, MISCnB	A	for I/O Equipment (MAT, Printer, etc.)	Spare cable (15 cables) are to be used as Cable Support Assembly extra cables. The number of cables for the whole system is limited to maximum 100.
	MISC0A **Note**	A	for Alarm Indicating Panel, etc.	
		A (Extra)	Spare (15 cables)	
PIM0	Front of Circuit Card	B	The number of cables is limited to three for one side, and six for both sides.	If the required number of cables exceeds 20, the Cable Support Assembly extra cables should be used.
	LT0 - LT11	B	LT cable	
PIM1	Front of Circuit Card	C	The number of cables is limited to three for one side, and six for both sides.	If the required number of cables exceeds 20, the Cable Support Assembly extra cables should be used.
	LT0 - LT11	C	LT cable	
PIM2	Front of Circuit Card	D	The number of cables is limited to three for one side, and six for both sides.	If the required number of cables exceeds 20, the Cable Support Assembly extra cables should be used.
	LT0 - LT11	D	LT cable	
PIM3	Front of Circuit Card	E	The number of cables is limited to three for one side, and six for both sides.	If the required number of cables exceeds 20, the Cable Support Assembly extra cables should be used.
	LT0 - LT11	E	LT cable	

Note: *For LPM only.*

NAP-200-012
Sheet 12/13
Cable Running from the PBX to MDF, ATTCON, MAT and SMDR

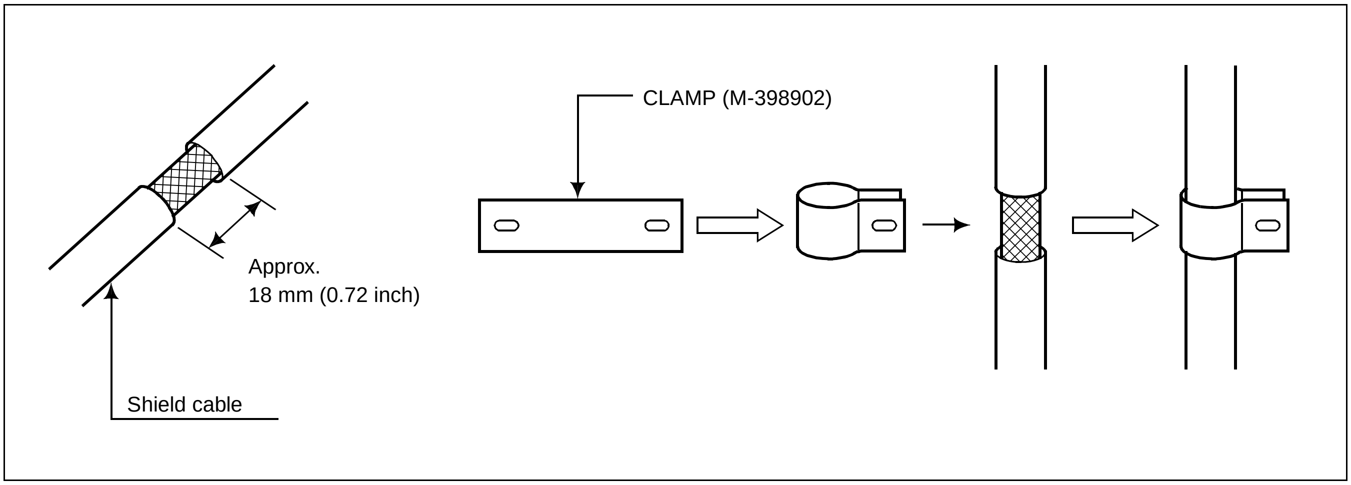


Figure 012-5 Clamp Winding

NAP-200-012
Sheet 13/13
Cable Running from the PBX to MDF, ATTCON, MAT and SMDR

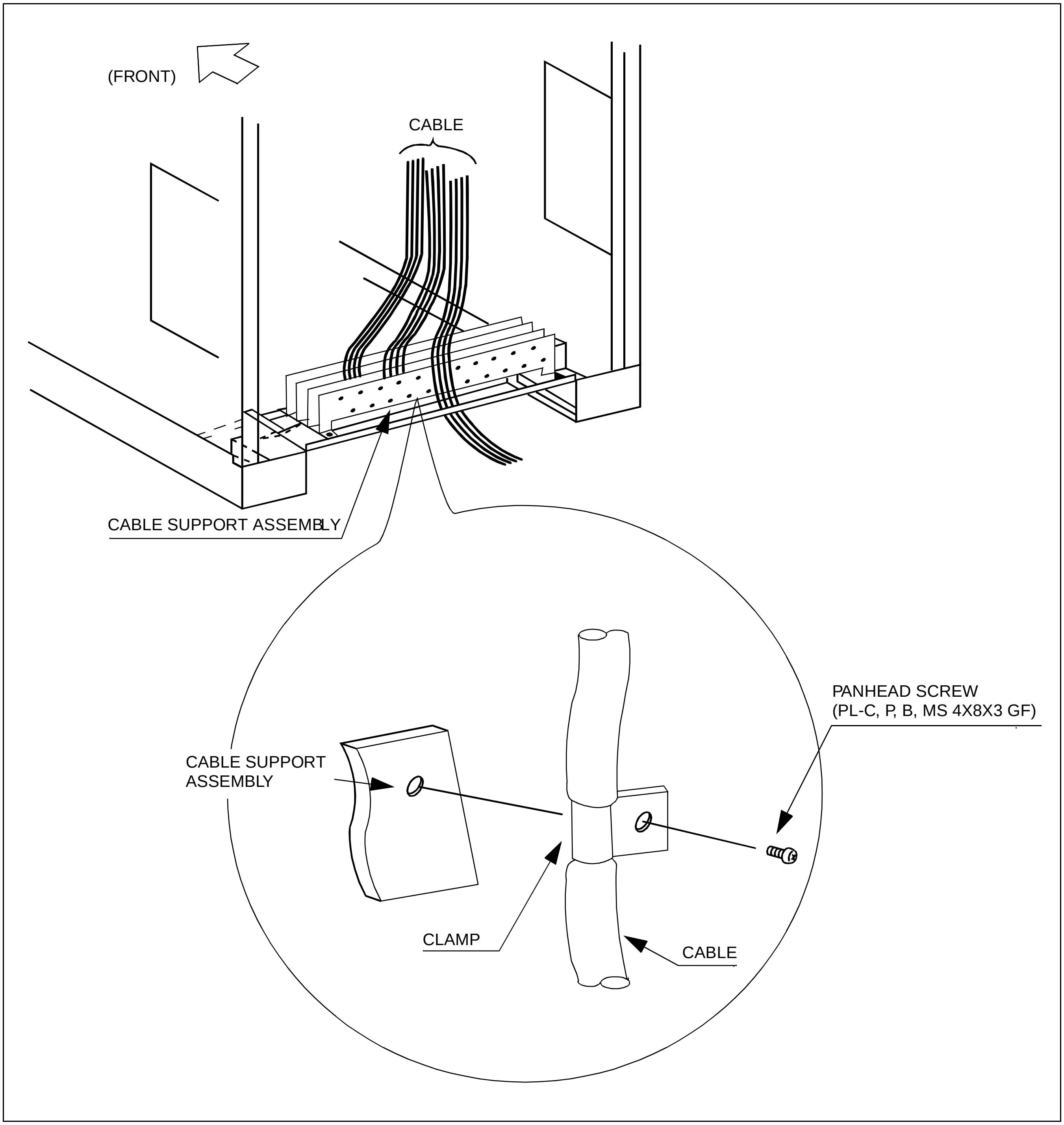


Figure 012-6 Termination of Installation Cables

NAP-200-013
Sheet 1/1
Termination of Cables on MDF (Wire Accommodation of Each Cable)

This NAP explains the procedures for terminating cables at the MDF.

CAUTION: *When terminating Cables to the MDF, the line/trunk circuit card should extend about 50 mm (2 inches) from the module, and must not contact the backplane connector.*

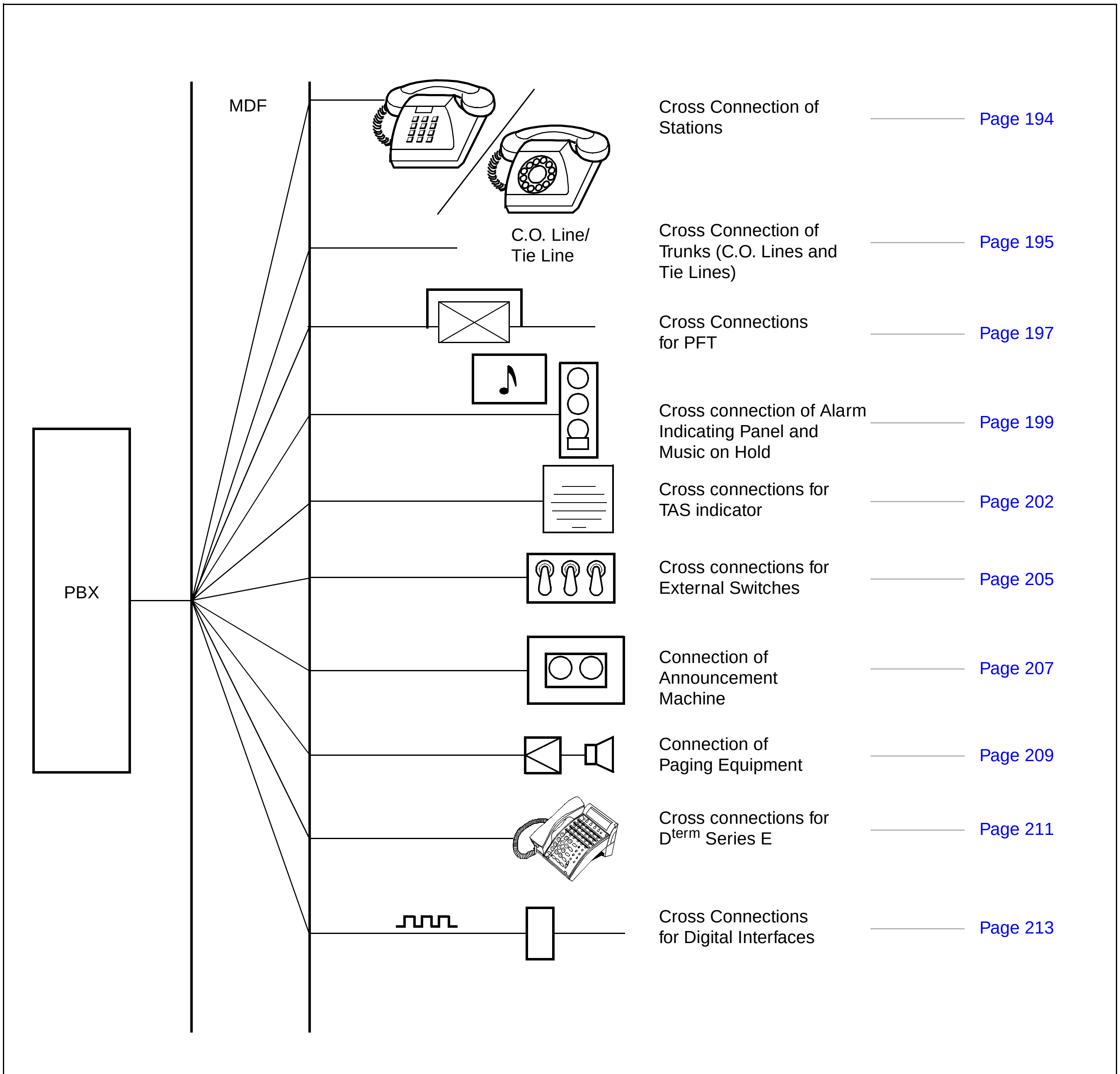
START

Step	Procedure
Cable trying at the MDF	Secure the CHAMP Connector cables, which have been extended to the MDF as per NAP-200-012, to the cable supports on the MDF after confirming their positions on the terminal block.
Cutting of excess cable	Shorten each CHAMP connector cable, leaving enough length so that they can be neatly terminated to the terminal block.
Cable termination to the MDF	Referring to Circuit Card Manual, punch down the CHAMP connector cables to the MDF.
Confirmation of connections	After confirming that no erroneous connections have been made on the Module Group side, use an IC buzzer on similar device to verify the connections at the MDF.

END

NAP-200-014
Sheet 1/27
Cable Termination and Cross Connections from MDF to Peripheral Equipment, C. O. Lines, and Tie Lines

This NAP explains the following work items:



NAP-200-014
Sheet 2/27
Cable Termination and Cross Connections from MDF to Peripheral Equipment, C. O. Lines, and Tie Lines

1. CROSS CONNECTION OF STATIONS

Note 1: *Provide the necessary cross connections at the MDF by using copper wires of 0.5 mm diameter (24AWG). 2-core twisted wire is used for speech path, and single-core wire is used for control wire.*

It is recommended that wires of different colors be used for trunks, station lines, PFT, etc., so that they can easily be distinguished.

Note 2: *For cross connections between stations and C.O. lines for PFT, refer to Section 3. "CROSS CONNECTIONS FOR PFT" in this NAP.*

START

Check the terminal locations on the Module Group side of the MDF	Referring to Port Accommodation sheet and description of 16LC card in Circuit Card Manual, identify the lead names for the 16LC card and the terminal locations of the leads.
Cross Connection	Referring to Figure 014-1, provide the necessary cross connections.

END

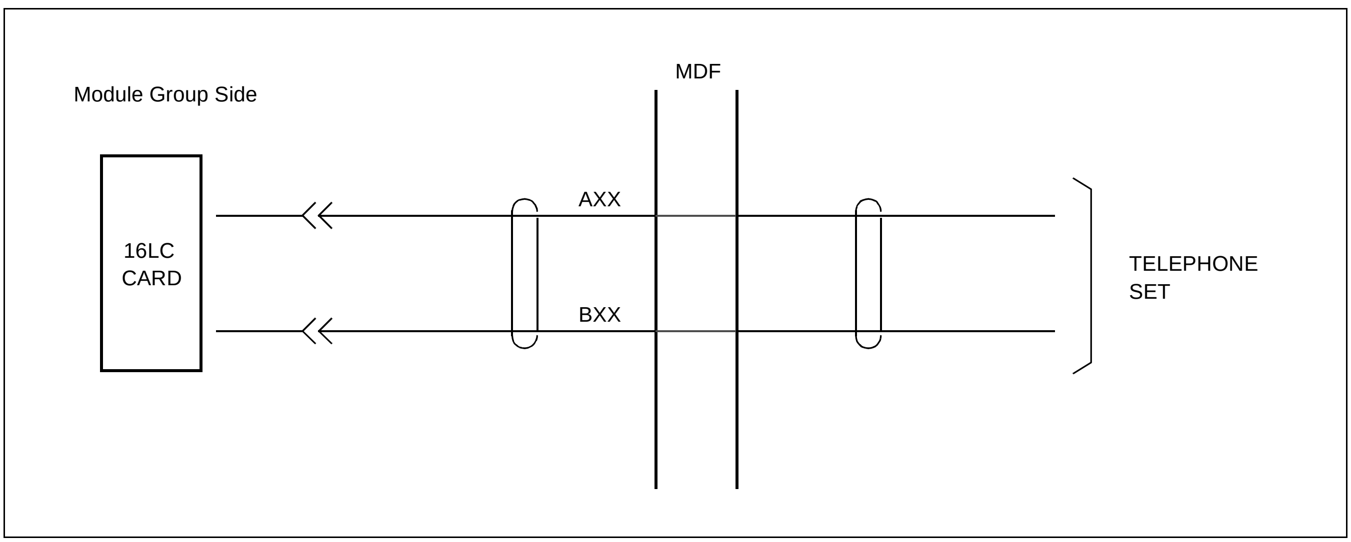


Figure 014-1 Cross Connection of Stations

NAP-200-014
Sheet 3/27
Cable Termination and Cross Connections from MDF to Peripheral Equipment, C. O. Lines, and Tie Lines

2. CROSS CONNECTION OF TRUNKS (C.O. LINES AND TIE LINES)

Note 1: *Provide the necessary cross connections at the MDF by using copper wires of 0.5 mm diameter*

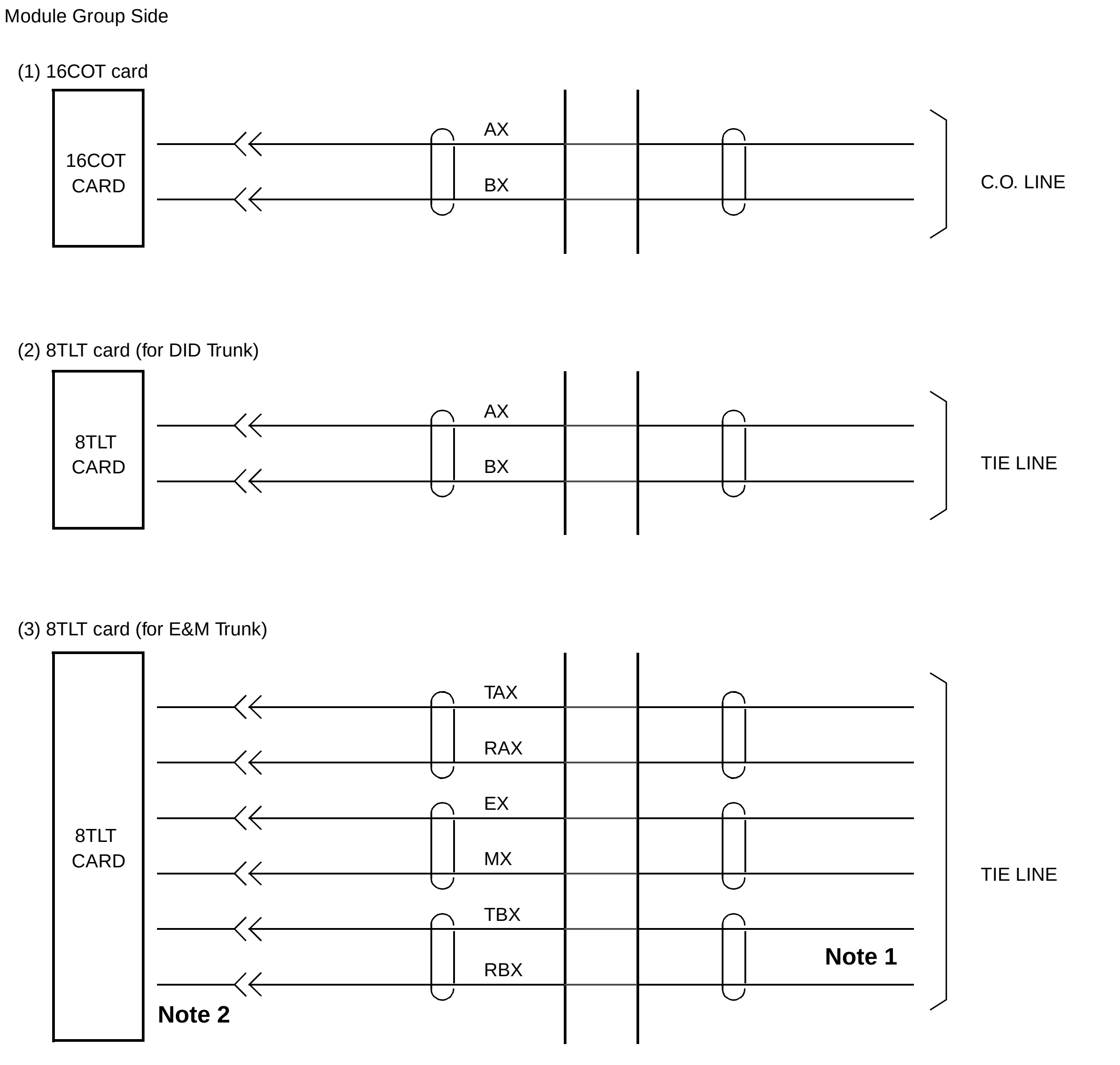
(24 AWG). 2-core twisted wire is used for speech path, and single-core wire is used for control wire. It is recommended that wires of different colors be used for trunks, station lines, PFT, etc., so that they can easily be distinguished.

Note 2: *For cross connections between stations and C.O. lines for PFT, refer to Section 3. "CROSS CONNECTIONS FOR PFT" in this NAP.*

START

- Check the terminal locations on the Module Group side of the MDF — Referring to Port Accommodation sheet and description of 16COT card or 8TLT card in Circuit Card Manual, identify the lead names for the 16COT, or 8TLT card and the terminal locations of the leads.
- Cross Connection — Referring to Figure 014-2, provide the necessary cross connections.

END



Note 1: *For 2W/4W E&M systems, these leads are not used.*

Note 2: *For No. 4–7 trunks, the leads appear at the front of the card. Refer to the description of the 8TLT card in the Circuit Card Manual.*

Figure 014-2 Cross Connection of Trunks (C.O. Lines and Tie Lines)

3. CROSS CONNECTIONS FOR PFT

Note 1: *The COT must be accommodated in a universal slot of the same Unit (U) in which the cross-connected PFT is mounted. See the figure below.*

Note 2: *Provide the necessary cross connections at the MDF by using copper wires of 0.5 mm diameter (24AWG). 2-core twisted wire is used for speech path, and single-core wire is used for control wire. It is recommended that wires of different colors be used for trunks, station lines, PFT, etc., so that they can easily be distinguished.*

The PFT (PA-M53) card is mounted in slot 04 or in slot 15 of each PIM.

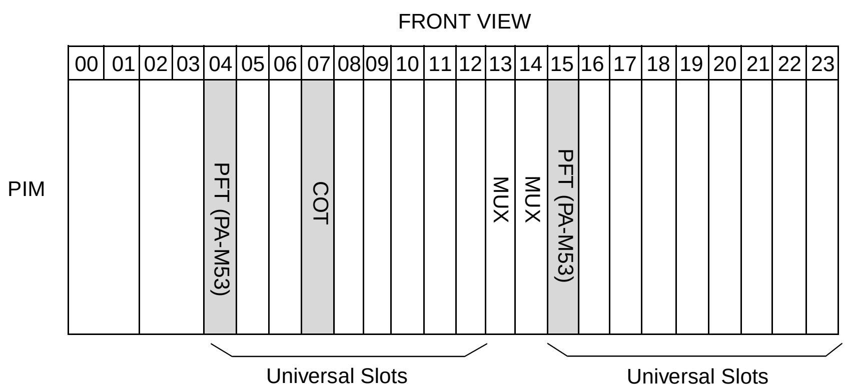


Figure 014-3 Mounting Locations of PFT (PA-M53)

START

- Check the terminal locations on the Module Group side of the MDF.
  - Referring to Section 1. "CROSS CONNECTION OF STATIONS"., "CROSS CONNECTION OF STATIONS" and Section 2. "CROSS CONNECTION OF TRUNKS (C.O. LINES AND TIE LINES)" in this NAP, identify the lead names of the stations and trunks to be connected to the PFT (NCU) card and the terminal locations of the leads.
  - Referring to the description of PFT card in the "Circuit Card Manual," identify the lead names for the "NCU" connector, "LT" connector, and the terminal locations of the leads.
- Cross Connection
  - Referring to Figure 014-4, provide the necessary cross connections.

END

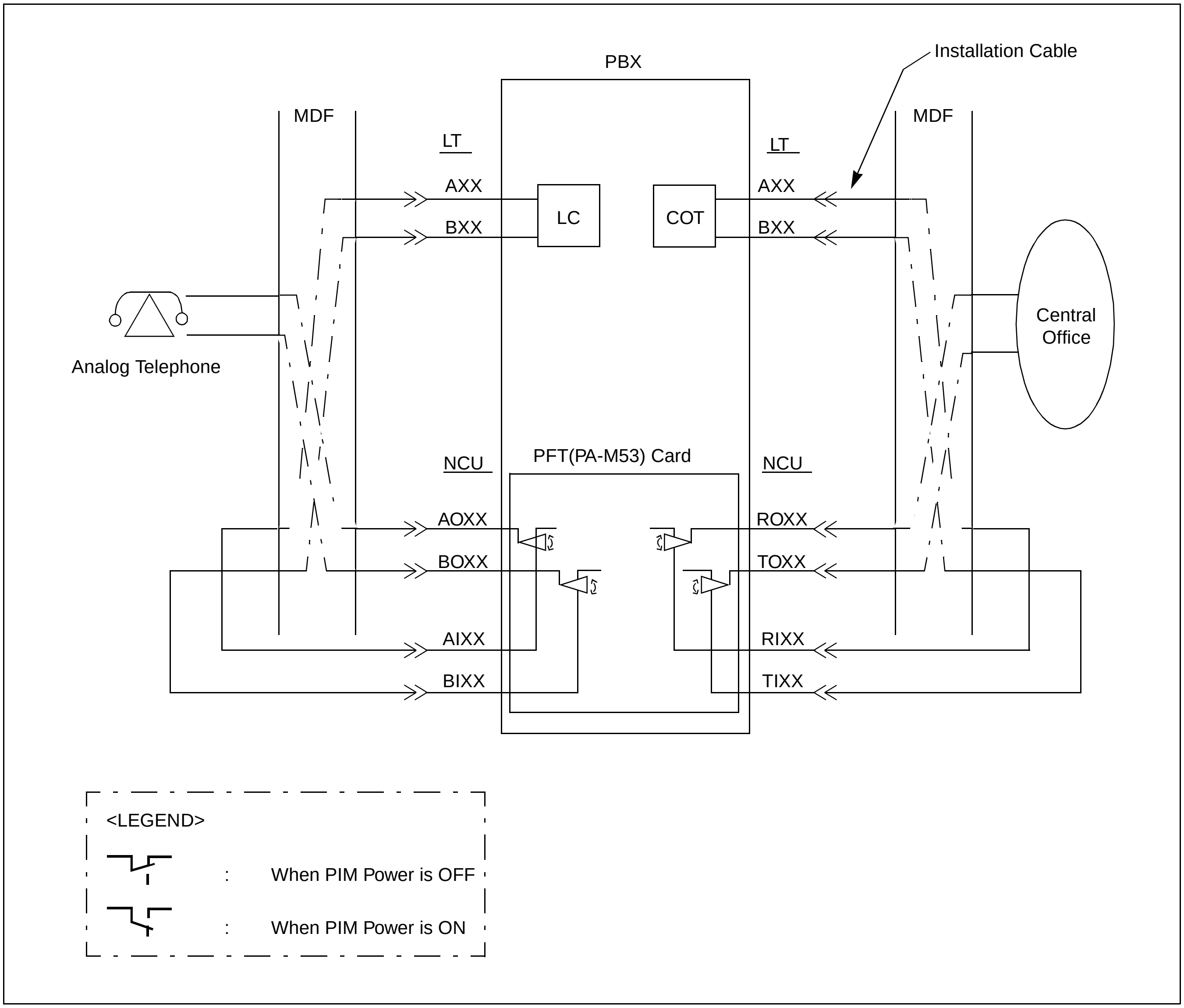


Figure 014-4 Cross Connection for PFT

4. CROSS CONNECTION OF ALARM INDICATING PANEL AND MUSIC ON HOLD

Note: *Provide the necessary cross connections at the MDF by using copper wires of 0.5 mm diameter (24AWG). 2-core twisted wire is used for speech path, and single-core wire is used for control wire. It is recommended that wires of different colors be used for trunks, station lines, PFT, etc., so that they can easily be distinguished.*

- Alarm Indicating Panel

START

- Mounting of Alarm Indicating panel
  - Mount the Alarm Indicating Panel by using AY plugs, curl plugs, board plugs, etc.
- Cable running
  - Referring to Figure 014-5, run the cables between the Alarm Indicating Panel and the MDF.
  - Referring to Figure 014-5, run the cable between the RPT on BASEU and the MDF.
  - Protect the cables by using cable ducts, etc.
- Termination of cables
  - Terminate the installed cables to the Alarm Indicating Panel, MDF, and RPT terminals.
- Cross connection
  - Referring Figure 014-5, provide the necessary cross connections at the Alarm Indicating Panel side and Module Group side.

END

- Music On Hold

START

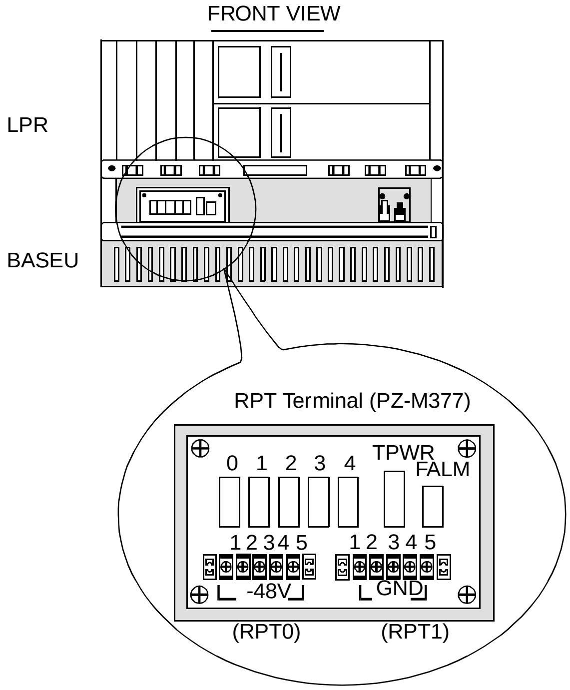
- Cross connection
  - Referring to Figure 014-6, run the cable between the MDF and the music source.
  - Connect the music source to the FM0 and E connections.

    Note: *FM1 is not used at this time.*

END

NAP-200-014
Sheet 8/27
Cable Termination and Cross Connections from MDF to Peripheral Equipment, C. O. Lines, and Tie Lines

- Locations of Terminal and Connector



- General Cable Connection for Alarm Indicating Panel

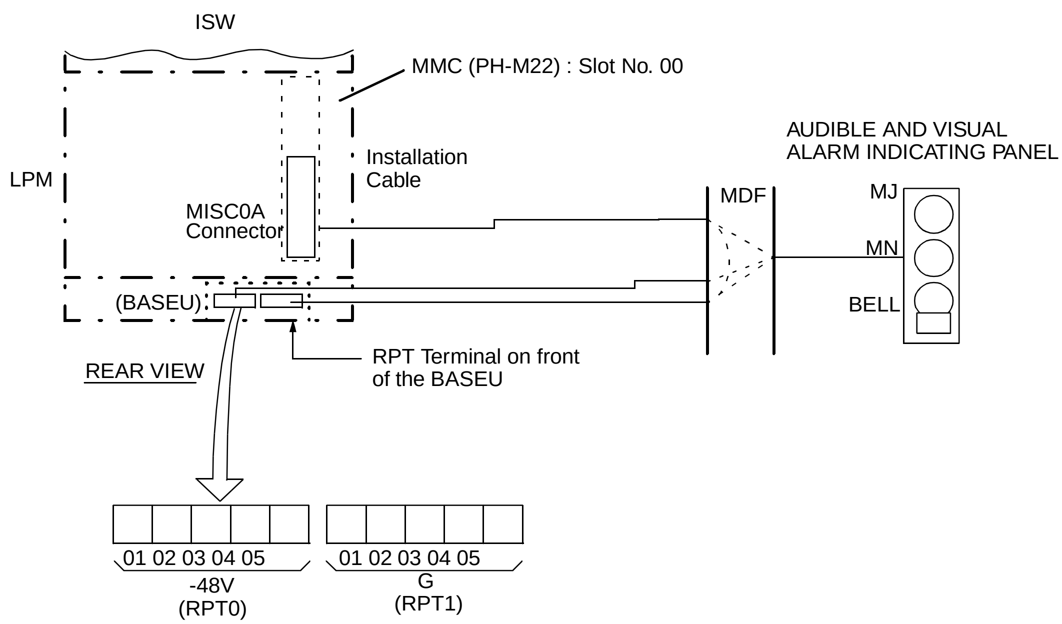
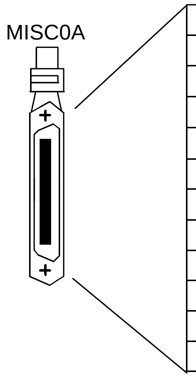


Figure 014-5 Connection of Alarm Indicating Panel

NAP-200-014	
Sheet 9/27	
Cable Termination and Cross Connections from MDF to Peripheral Equipment, C. O. Lines, and Tie Lines	

- Cabling Diagram



68PH EXMISC CA cable
Pin Assignment

12		37	
11	MPALM	36	
10		35	
9	EXTAA	34	
8		33	
7	BELAA	32	
6	-	31	
5	MNAA	30	MNBA
4	SUPAA	29	SUPBA
3	MJAA	28	MJBA
2		27	
1		26	

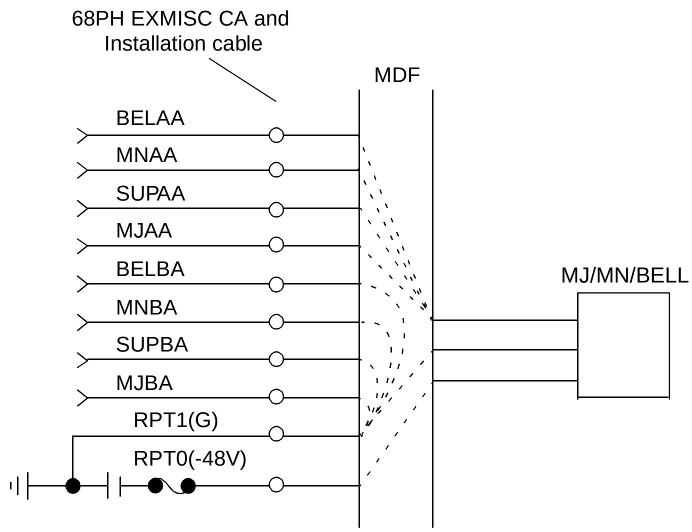
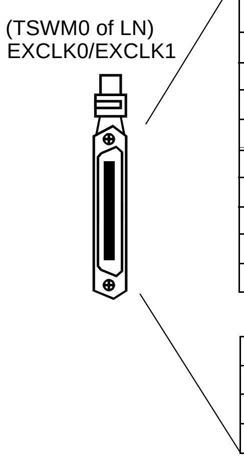


Figure 014-5 Connection of Alarm Indicating Panel (Continued)

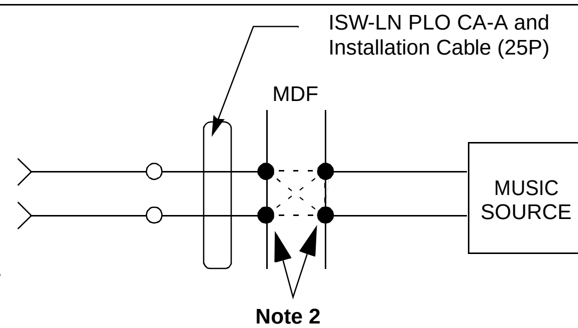
- Cabling Diagram



ISW-LN PLO CA-A cable
Pin Assignment

PIN No.	LEAD NAME	PIN No.	LEAD NAME
1	E	26	FM1
2	E	27	FM0
3		28	
4		29	
5		30	
6		31	
7		32	
8		33	
9		34	
22		47	
23		48	
24		49	
25		50	

Note 1



Note 1: *FMI is not used at this time.*

Note 2: *Also perform multiple connections between No. 0 and No. 1 systems on the MDF here.*

Figure 014-6 Connection of Music on Hold

5. CROSS CONNECTIONS FOR TAS INDICATOR

Note: *Provide the necessary cross connections at the MDF by using copper wires of 0.5 mm diameter (24AWG). 2-core twisted wire is used for speech path, and single-core wire is used for control wire. It is recommended that wires of different colors be used for trunks, station lines, PFT, etc., so that they can easily be distinguished.*

START

- Mounting of TAS Indicator — Mount the TAS Indicator by using AY plugs, curl plugs, board plugs, etc.
- Cable running — Referring to Figure 014-7, run the cables between the TAS and the MDF.
  - Protect the cables by using cable ducts, etc.
- Termination of cables — Terminate the installed cables to the TAS Indicator, and MDF.
- Check the terminal locations on the Module Group side of the MDF — Referring to Port Accommodation sheet and description of ATI (PA-CS33) card in the “Circuit Card Manual,” identify the lead names for the ATI card and the terminal locations of the leads.
- Cross Connection — Referring to Figure 014-7, provide the necessary cross connections at theTAS Indicator side and the PBX side.

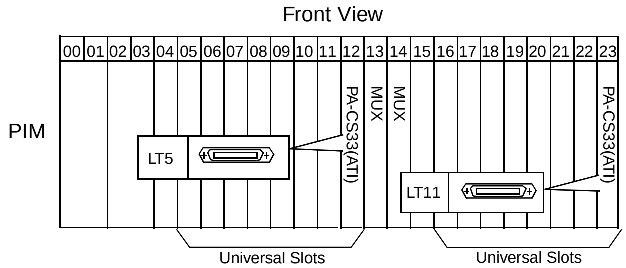
END

NAP-200-014
Sheet 11/27
Cable Termination and Cross Connections from MDF to Peripheral Equipment, C. O. Lines, and Tie Lines

The PA-CS33 card is used as the interface card to connect TAS. The card may be mounted in slot No. 12 or in slot No. 23. The leads appear on LT5 and LT11 respectively.

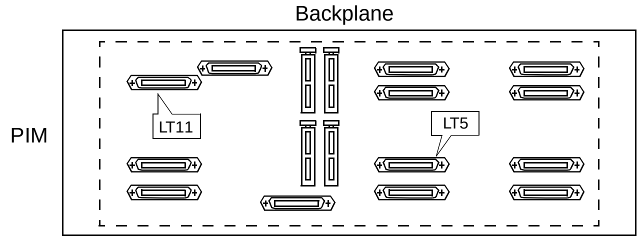
- PA-CS33 (ATI) mounting slots

PA-CS33 (ATI) card may be mounted in slots 12 and/or23.



- LT cable connectors

Use LT5 connector when the PA-CS33 card is mounted in slot 12. When the card is mounted in slot 23, use LT11 connector.



- LT cable Pin Assignment

Pins are assigned as follows on the LT connector for PA-CS33 card.

PA-CS33 Pin Assignment

	PIN No.	LEAD NAME	PIN No.	LEAD NAME
	26		1	
	27		2	
	32		7	
	33		8	
	34	BN4800	9	BN4801
	35		10	
	36	BN4820	11	BN4821
	37		12	
for TAS 1 ➡	38	TAS1B	13	TAS1A
	39	BN4810	14	BN4811
for TAS 0 ➡	40	TAS0B	15	TAS0A
	41	BN4830	16	BN4831
	42		17	
	43		18	
	44	B2	19	A2
	45		20	
	46		21	
	47		22	
	48	B3	23	A3
	49		24	
	50		25	

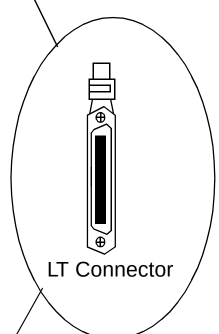


Figure 014-7 Cable Connection Diagram for TAS

NAP-200-014
Sheet 12/27
Cable Termination and Cross Connections from MDF to Peripheral Equipment, C. O. Lines, and Tie Lines

- Cable Connection Diagram
  Provide the following connections at the MDF.

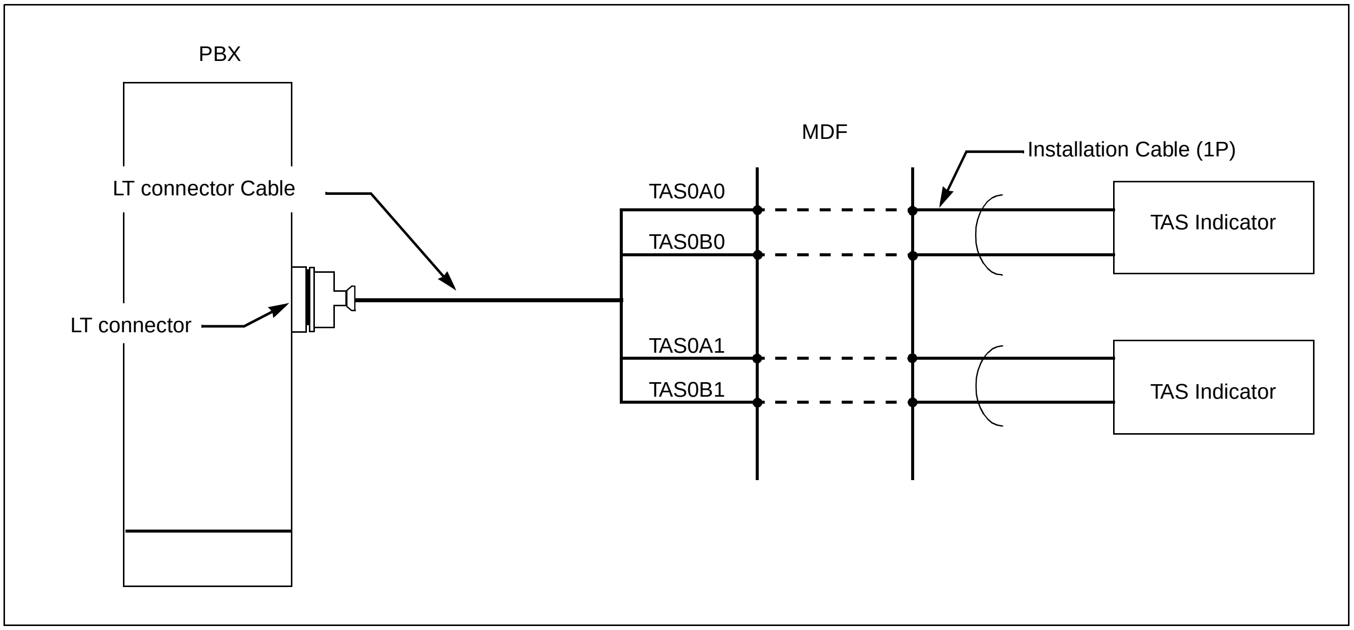


Figure 014-7 Cable Connection Diagram for TAS (Continued)

NAP-200-014
Sheet 13/27
Cable Termination and Cross Connections from MDF to Peripheral Equipment, C. O. Lines, and Tie Lines

6. CROSS CONNECTIONS FOR EXTERNAL SWITCHES

Note: *Provide the necessary cross connections at the MDF by using copper wires of 0.5 mm diameter (24AWG). 2-core twisted wire is used for speech path, and single-core wire is used for control wire. It is recommended that wires of different colors be used for trunks, station lines, PFT, etc., so that they can easily be distinguished.*

START

- Mounting of External Switches — Mount the External Switches by using AY plugs, curl plugs, board plugs, etc.
- Cable running
  - Referring to Figure 014-9, run the cables between the External Switches and the MDF.
  - Referring to Figure 014-9, run the cables between the External Switches and RPT on the BASEU.
  - Protect the cables by using cable ducts, etc.
- Termination of cables — Terminate the installed cables to the External Switches, and MDF.
- Check the terminal locations on the Module Group side of the MDF — Referring to Port Accommodation sheet and description of PFT (PA-M53) card in the "Circuit Card Manual," identify the lead names for the "LT" connector and the terminal locations of the leads.
- Cross connection — Referring to Figure 014-9, provide the necessary cross connections at the External Switch side and the PBX side.

END

When the EFCT key is in the UP position, operations of K0-K7 are effective. To turn on a circuit, set the corresponding key (K0-K7) in the UP position.

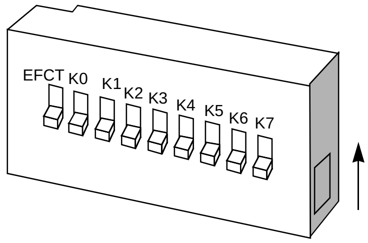
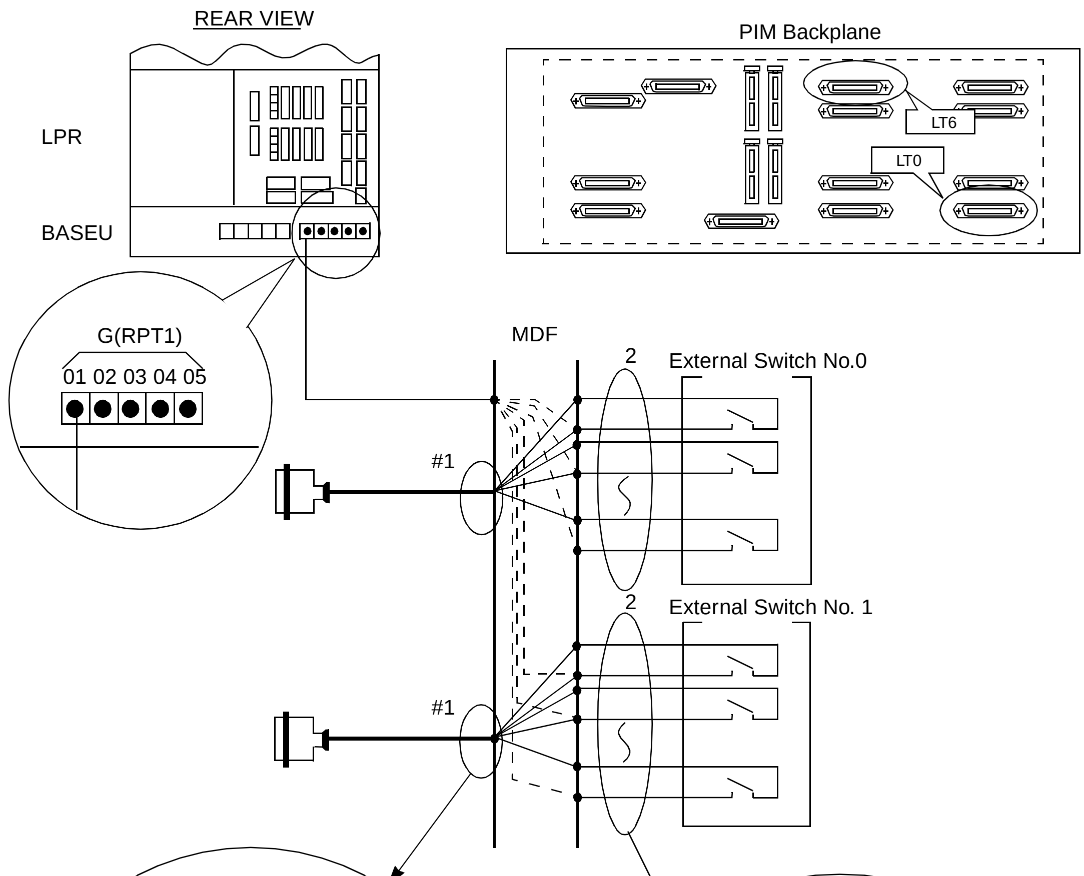


Figure 014-8 Outer View of External Switch

NAP-200-014
Sheet 14/27
Cable Termination and Cross Connections from MDF to Peripheral Equipment, C. O. Lines, and Tie Lines

Provide cable connections at the MDF as shown below.



Pin Assignment 1

PIN No.	LEAD NAME	PIN No.	LEAD NAME
26	KY1	1	KY0
27	KY3	2	KY2
28	KY5	3	KY4
29	KY7	4	KY6
30		5	
31		6	
32		7	
33		8	

Pin Assignment 2

1	K0	26	E
2	K1	27	E
3	K2	28	E
4	K3	29	E
5	K4	30	E
6	K5	31	E
7	K6	32	E
8	K7	33	E
9		34	

Figure 014-9 Connection of External Switches

7. CONNECTION OF ANNOUNCEMENT MACHINE

Note: *Provide the necessary cross connections at the MDF by using copper wires of 0.5 mm diameter (24AWG). 2-core twisted wire is used for speech path, and single-core wire is used for control wire.*

It is recommended that wires of different colors be used for trunks, station lines, PFT, etc., so that they can easily be distinguished.

START

Mounting of Announcement Machine	Mount the Announcement Machine by usingAY plugs, curl plugs, board plugs, etc.
Cable running	Referring to Figure 014-10, run the cable between the Announcement Machine and the MDF.
	Protect the cables by using cable ducts, etc.
Termination of cables	Terminate the installed cables to the Announcement Machine and MDF.
Check the terminal locations on the Module Group side of the MDF	Referring to Port Accommodation sheet and description of 16COT card in Circuit Card Manual and Figure 014-9, identify the lead names of the Announcement Trunk (ANTK) and the terminal locations of the leads.
Cross connections	Referring to Figure 014-10, provide the necessary cross connections at the Announcement Machine side and the PBX side.

END

Configuration of 16COT Lead

No. OF CKT	LEAD B	LEAD A
No.0	B0	A0
1	B1	A1
2	B2	A2
3	B3	A3
4	B4	A4
5	B5	A5

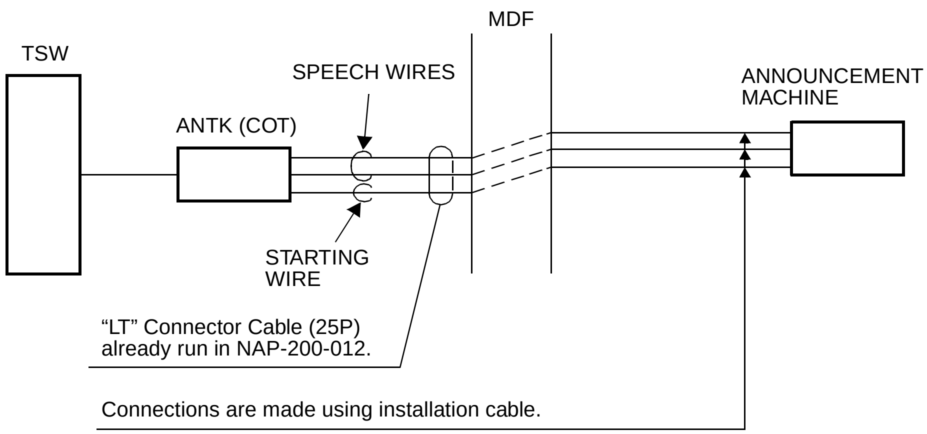
When No. 0 circuit is used for COT.

	No. OF CKT	LEAD B	LEAD A
ANTK	No.0	B0	A0
ANTK	1	B1 (M)	A1
	2	B2	A2
	3	B3	A3
	4	B4	A4
	5	B5	A5

Starting Wire
Speech Wires
When using 16COT-BE, connect to ground

When No. 0 circuit is used for Announcement Trunk.

Announcement Machine Cabling Diagram



A total of three wires are required per line: two wires for speech and one starting wire.
For a loop start system, only two wires are required.

Note: *An ANTK circuit is available only on the No. 0 circuit of the 16COT card. If a starting wire is required, the No. 1 circuit cannot be used for a COT.*

Figure 014-10 Connection of Announcement Machine

8. CONNECTION OF PAGING EQUIPMENT

Note: *Provide the necessary cross connections at the MDF by using copper wires of 0.5 mm diameter (24AWG). 2-core twisted wire is used for speech path, and single-core wire is used for control wire.*

It is recommended that wires of different colors be used for trunks, station lines, PFT, etc., so that they can easily be distinguished.

START

- Mounting of Paging Equipment — Mount the Paging Equipment by using AY plugs, curl plugs, board plugs, etc.
- Cable running — Referring to Figure 014-11, run the cables between the Paging Equipment and the MDF.
  — Protect the cables by using cable ducts, etc.
- Termination of cables — Terminate the installed cables to the Paging Equipment and the MDF.
- Check terminal locations on the Module Group side of the MDF — Referring to Port Accommodation sheet and description of 16COT card in Circuit Card Manual and Figure 014-11, identify the lead names for the Paging Trunk (PGT) and the terminal locations of the leads.
- Cross connections — Referring to Figure 014-11, provide the necessary cross connections at the Paging Equipment side and the PBX side.

END

NAP-200-014
Sheet 18/27
Cable Termination and Cross Connections from MDF to Peripheral Equipment, C. O. Lines, and Tie Lines

Configuration of 16COT Lead

No. OF CKT	LEAD	
	B	A
No.0	B0	A0
1	B1	A1
2	B2	A2
3	B3	A3
4	B4	A4
5	B5	A5

When No. 0 circuit is used for COT.

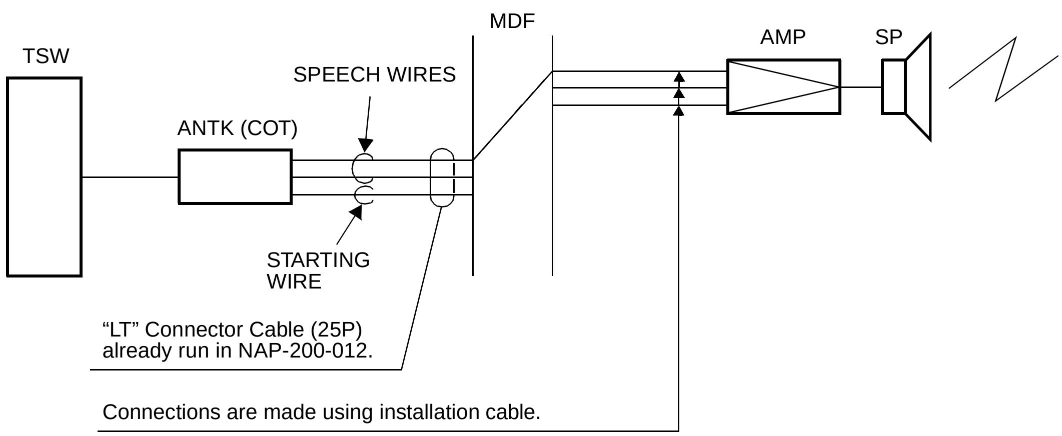
ANTK

No. OF CKT	LEAD	
	B	A
No.0	B0	A0
1	B1 (M)	A1
2	B2	A2
3	B3	A3
4	B4	A4
5	B5	A5

Starting Wire
Speech Wires
When using 16COT-BE, connect to ground

When No. 0 circuit is used for PGT.

Paging Equipment Cabling Diagram



A total of three wires are required per line: two wires for speech and one starting wire.
For a loop start system, only two wires are required.

Note: *A PGT circuit is available only on the No. 0 circuit of the 16COT card. If a starting wire is required, the No. 1 circuit cannot be used for a COT.*

Figure 014-11 Connection of Paging Equipment

NAP-200-014
Sheet 19/27
Cable Termination and Cross Connections from MDF to Peripheral Equipment, C. O. Lines, and Tie Lines

9. CROSS CONNECTIONS FOR D^{term} Series E

Note 1: *Provide the necessary cross connections at the MDF by using copper wires of 0.5 mm diameter (24AWG). 2-core twisted wire is used for speech path, and single-core wire is used for control wire. It is recommended that wires of different colors be used for trunks, station lines, PFT, etc., so that they can easily be distinguished.*

Note 2: *The maximum distance between the Module Group and D^{term} is 850 meters (2459 feet). The installation cable must be 24 AWG (0.5 mm dia.) or larger.*

START

- Cable running
  - Referring to Figure 014-13, run the cables between each D^{term} and its Modular Block (Jack), and between the Modular Blocks and the MDF.
  - Protect the cables by using cable ducts, etc.
- Termination of cables
  - Referring to Figure 014-13, terminate the installed cables to the MDF and the Modular Blocks.
- Check terminal locations on the Module Group side of the MDF
  - Referring to Port Accommodation sheet and description of 16ELC card in “Circuit Card Manual,” identify the lead names for the ELC card and the terminal locations of the leads.
- Cross Connection
  - Referring to Figure 014-13, provide the necessary cross connections at the D^{term} side and the PBX side.

END

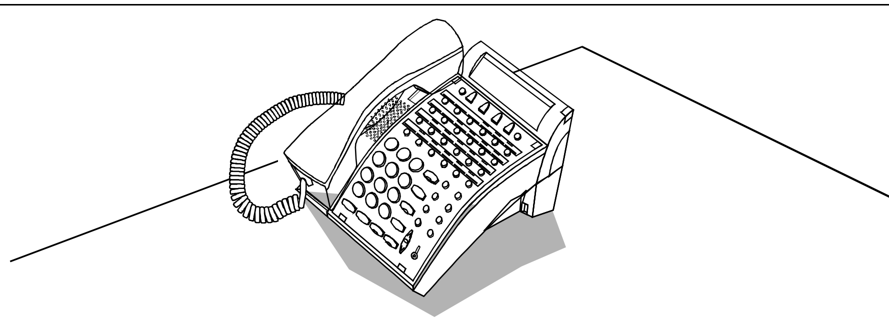


Figure 014-12 Outer View of D^{term} Series E

NAP-200-014
Sheet 20/27
Cable Termination and Cross Connections from MDF to Peripheral Equipment, C. O. Lines, and Tie Lines

Provide the following connections at the MDF.

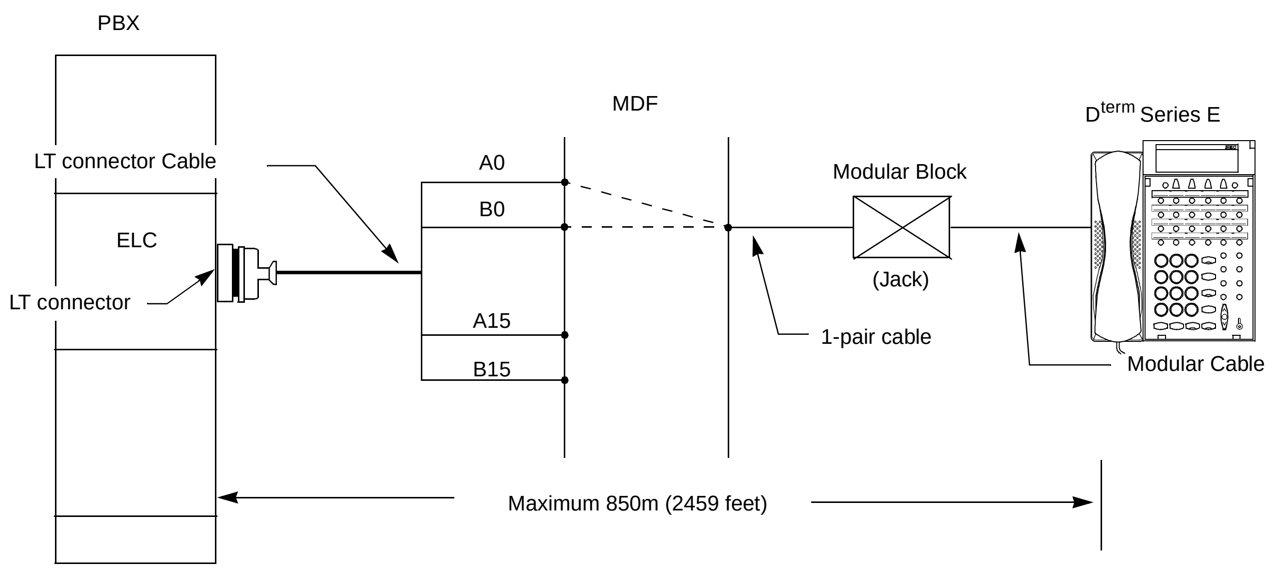


Figure 014-13 Cable Connection for D^{term} Series E

10. CROSS CONNECTIONS FOR DIGITAL INTERFACES

To use digital interfaces, the system requires the Phase Lock Oscillator (master/slave), which is available on the dedicated circuit card, PH-CK17-A/PH-CK16-A. According to Sections 10.1 and 10.2, perform necessary cross connections at the MDF.

Note: *PH-CK17-A is available only in ISW, which is designated as the clock source office.*

10.1 Cross Connections for Digital Interfaces (ISW)

Perform the following cross connections at the MDF, if the ISW uses PH-CK16-A as its PLO card, thus designating itself as the clock subordinate office:

Note: *Provide the necessary cross connections at the MDF by using copper wires of 0.5mm diameter (24AWG). 2-core twisted wire is used for speech path, and single-core wire is used for control path. It is recommended that wires of different colors be used for trunks, station lines, PFT, etc., so that they can easily be distinguished.*

> **WARNING:** *When attempting the cross connections, be sure to keep the PLO card from the inside module connector. Otherwise, the fuse mounted on the DTI card will blow and the card will become inoperative.*

START

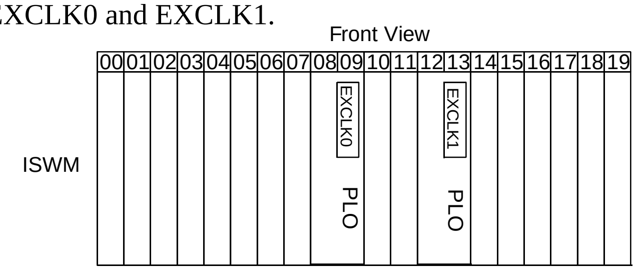
- Check terminal locations on the Module Group side of the MDF
  - Digital Trunk (DTI, CCT, PRT) — Referring to the Port Accommodation sheet and description of Digital Trunk card in the "Circuit Card Manual," identify the lead names for the Digital Trunk card and the terminal locations of the leads.
  - PLO leads — Referring to Figure 014-14, identify the lead names and the terminal locations for the PLO.
- Cross Connection **Note**
  - When accepting synchronization clocks from other node (master or submaster node) — Referring to Figure 014-15, provide the necessary cross connections.
  - When accepting synchronization clocks from External High-Stability Oscillator — Referring to Figure 014-16, provide the necessary cross connections.

END

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

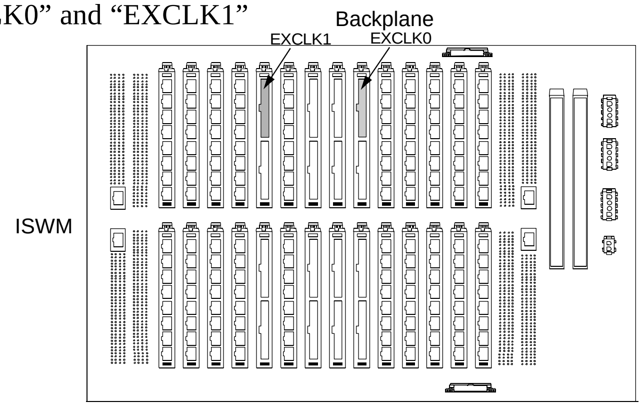
- PLO mounting slots

PLO card is mounted in slots 09 and 13 of ISWM.



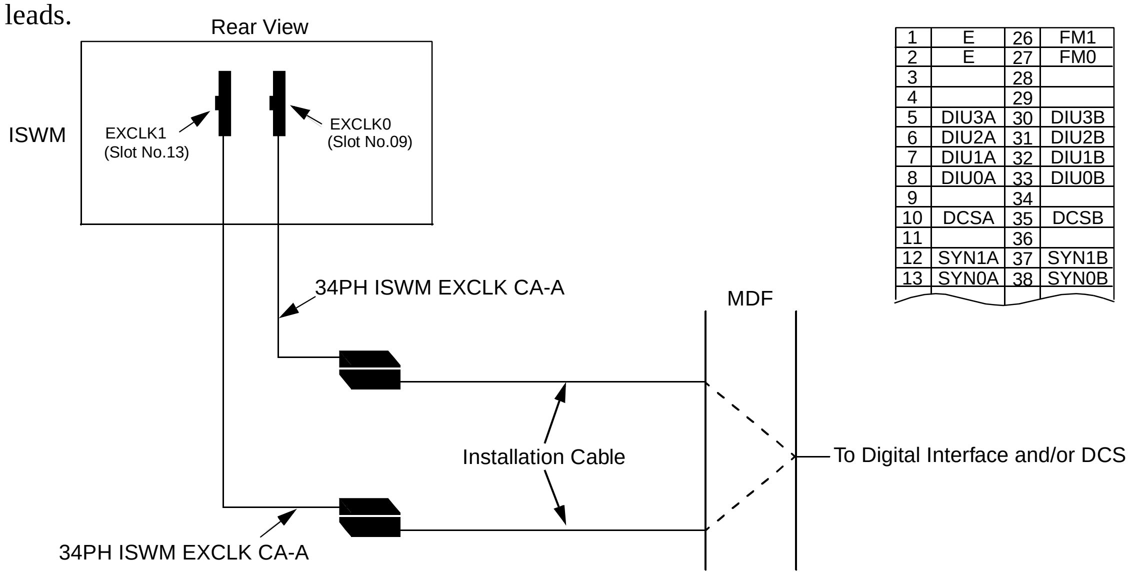
- LT cable connectors

Connect LT cables to the connectors labeled “EXCLK0” and “EXCLK1” on the ISWM 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). Contrarily, to receive clock from an external high-stability oscillator, use “DCSxx” leads.

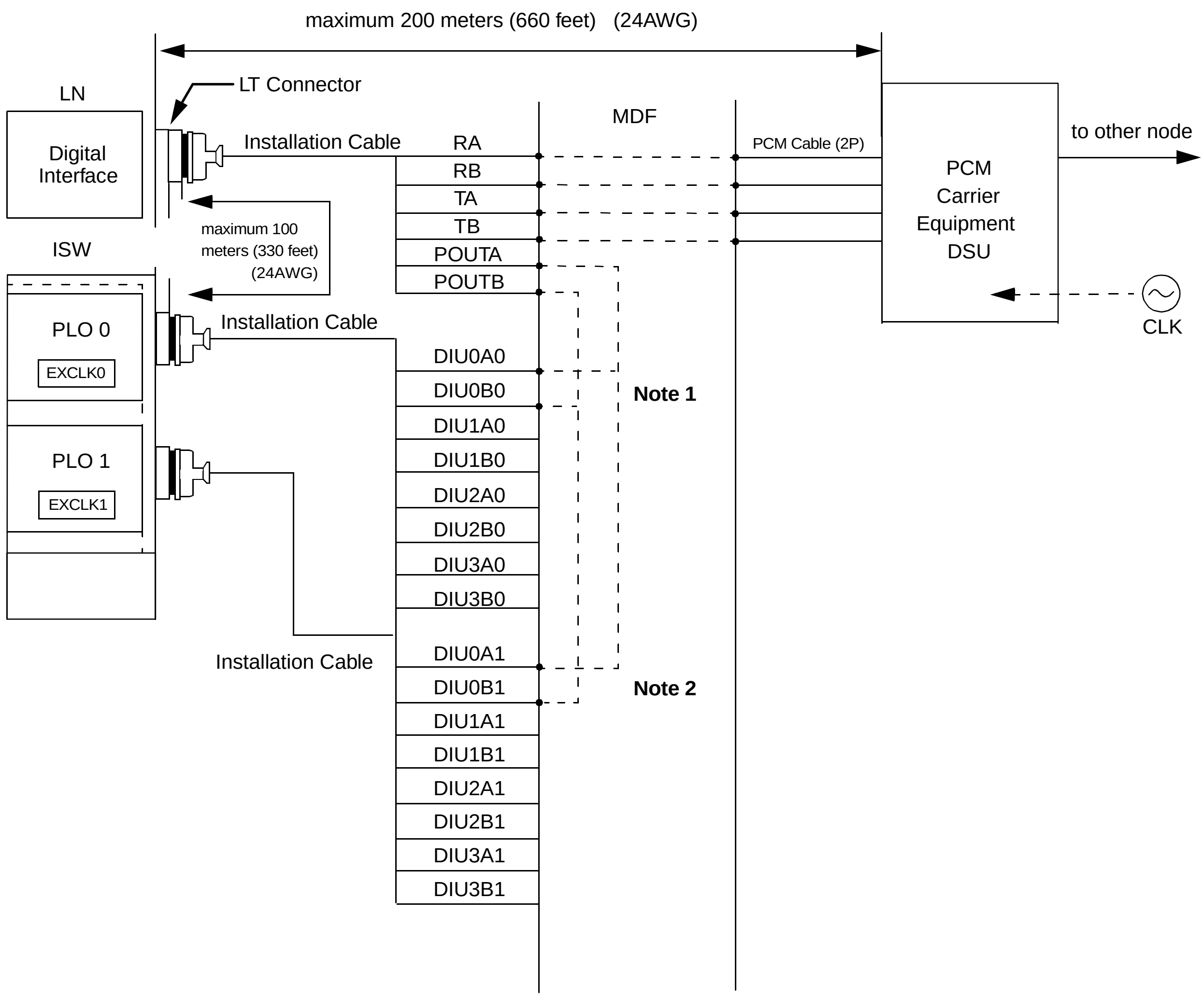


1	E	26	FM1
2	E	27	FM0
3		28	
4		29	
5	DIU3A	30	DIU3B
6	DIU2A	31	DIU2B
7	DIU1A	32	DIU1B
8	DIU0A	33	DIU0B
9		34	
10	DCSA	35	DCSB
11		36	
12	SYN1A	37	SYN1B
13	SYN0A	38	SYN0B

Figure 014-14 PLO Pin Assignment for Receiving Clock (ISW)

NAP-200-014
Sheet 23/27
Cable Termination and Cross Connections from MDF to Peripheral Equipment, C. O. Lines, and Tie Lines

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 four 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.*

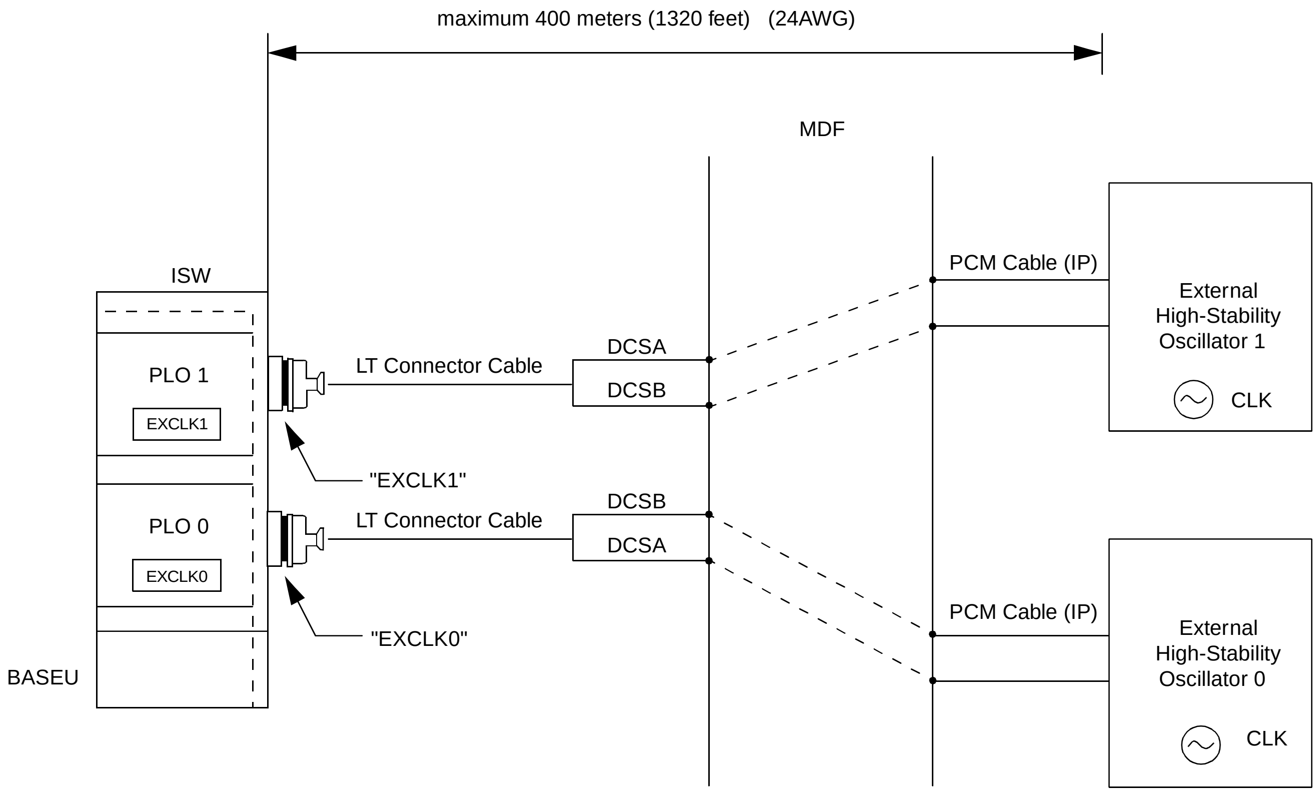
Note 2: *The connection is required for a dual PLO system.*

Figure 014-15 Cable Connection Diagram (ISW) for Distributing Clock from Digital Interface

NAP-200-014
Sheet 24/27
Cable Termination and Cross Connections from MDF to Peripheral Equipment, C. O. Lines, and Tie Lines

- 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 014-16 Cable Connection Diagram (ISW) for Accepting Synchronization Clocks from an External High-Stability Oscillator

NAP-200-014
Sheet 25/27
Cable Termination and Cross Connections from MDF to Peripheral Equipment, C. O. Lines, and Tie Lines

10.2 Cross Connections for Digital Interfaces (LN)

Usually, each LN accepts clock signals from PLO of ISW via the external ISW-LN PLO CA-n cables (See Figure “DCS Connections”). However, if the node requires a spare clock by an External High Stability Oscillator for emergency, perform the following cross connections as well:

Note: *Provide the necessary cross connections at the MDF using copper wires of 0.5mm diameter (24AWG). 2-core twisted wire is used for speech path, and single-core wire is used for control path. It is recommended that wires of different colors be used for trunks, station lines, PFT, etc., so that they can easily be distinguished.*

WARNING: *When attempting the cross connections, be sure to keep the PLO card from the inside module connector. Otherwise, the fuse mounted on the DTI card will blow and the card will become inoperative.*

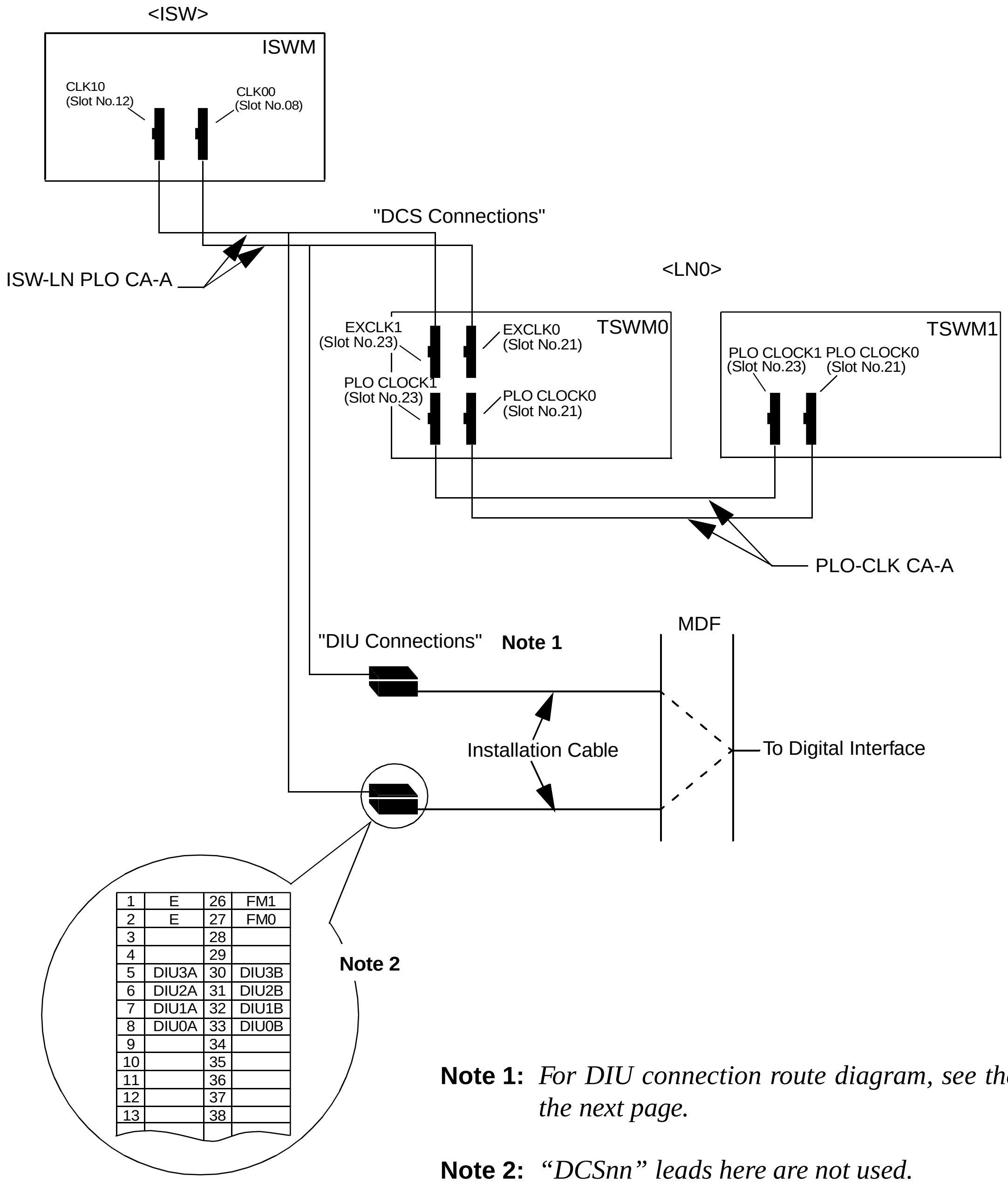
START

- Check terminal locations on the Module Group side of the MDF
  - Digital Trunk (DTI, CCT, PRT) — Referring to the Port Accommodation sheet and description of Digital Trunk card in the “Circuit Card Manual,” identify the lead names for the Digital Trunk card and the terminal locations of the leads.
  - PLO leads — Referring to Figure 014-17, identify the lead names and the terminal locations for the PLO.
- To accept synchronization clocks from other node for emergency, provide necessary cross connections referring to Figure 014-18.
  Note

END

NAP-200-014
Sheet 26/27
Cable Termination and Cross Connections from MDF to Peripheral Equipment, C. O. Lines, and Tie Lines

This figure shows an example for DCS connections between ISW and LN0. Also perform the same for connections between ISW-LN1, ISW-LN2 and ISW-LN3, by using each LT connector and cable.



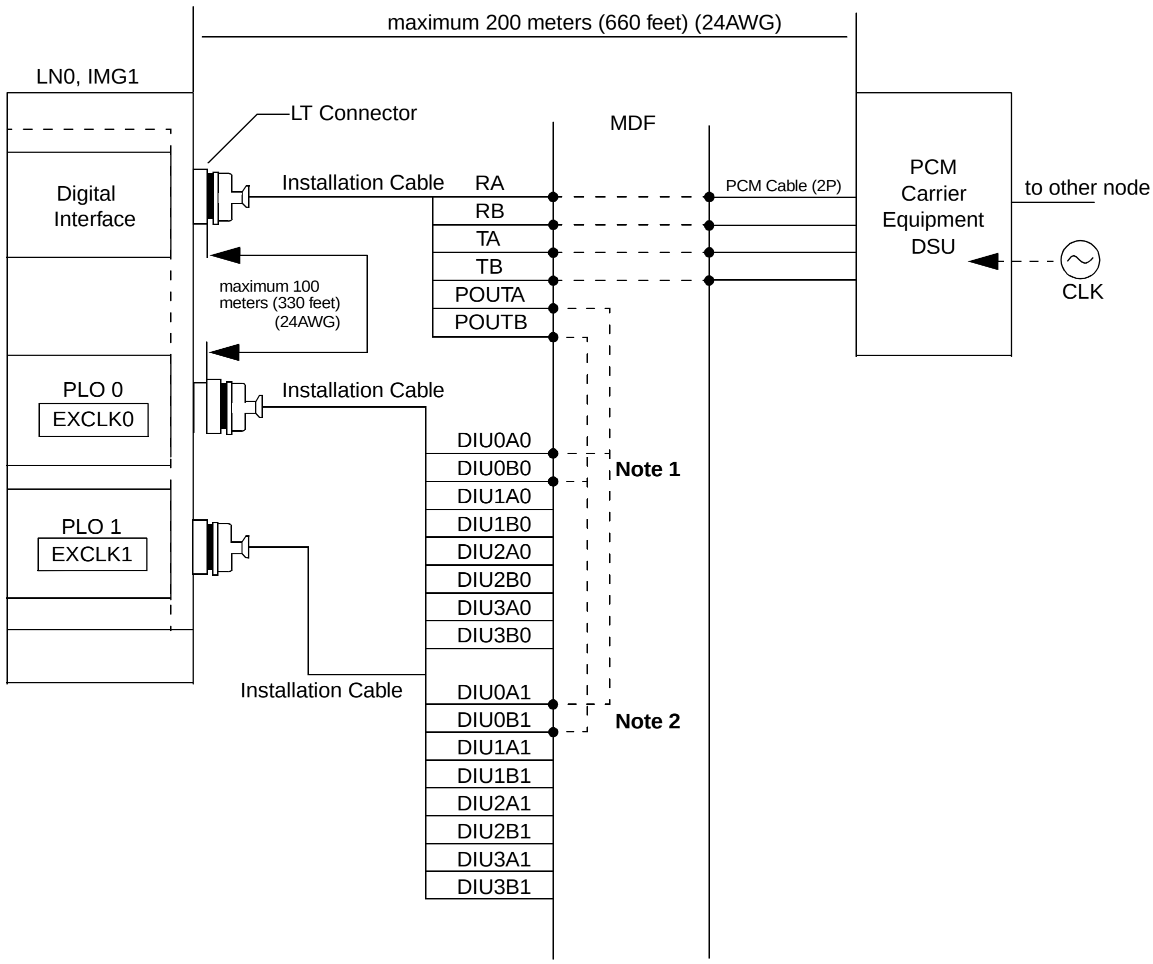
1	E	26	FM1
2	E	27	FM0
3		28	
4		29	
5	DIU3A	30	DIU3B
6	DIU2A	31	DIU2B
7	DIU1A	32	DIU1B
8	DIU0A	33	DIU0B
9		34	
10		35	
11		36	
12		37	
13		38	

Note 1: *For DIU connection route diagram, see the figure on the next page.*

Note 2: *"DCSnn" leads here are not used.*

Figure 014-17 LT Connector Lead Accommodation of PLO (ISW-LN0)

This figure shows an example of distributing clock from a digital interface in LN0. 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 four 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.*

Figure 014-18 Cable Connection Diagram (LN) for Distributing Clock from a Digital Interface

NAP-200-015
Sheet 1/41
Installation of the DESK CONSOLE and Cable Connection

This NAP explains the installation of the DESK CONSOLE and Cable Connection. Figure 015-1 shows the outer view of the DESK CONSOLE. Use the PA-CS33 (ATI) card as an interface card between the system and the DESK CONSOLE. The card can connect a maximum of two DESK CONSOLEs.

START

- Cable running
  - Referring to Figures 015-2 through 015-5, run the cables between each DESK CONSOLE and its Modular Block (Jack), and between the Modular Blocks and the MDF.
  - Protect the cables by using cable ducts, etc.
- Termination of cables
  - Referring to Figures 015-2 through 015-5 terminate the installed cables to the MDF and the Modular Blocks.
- Check the terminal locations on the Module Group side of the MDF.
  - Referring to Port Accommodation sheet and description of PA-CS33 card in the “Circuit Card Manual,” identify the lead names for the card and the terminal locations of the leads.
- Cross Connection
  - Referring to Figures 015-2 and 015-5, provide the necessary cross connection at the DESK CONSOLE side and the PBX side.
- Mounting of Headset (Optional)
  - Referring to Figure 015-6, mount optional Headset on DESK CONSOLE.
- Mounting of Handset (Optional)
  - Referring to Figure 015-7 or 015-8, mount optional Handset on DESK CONSOLE.

A

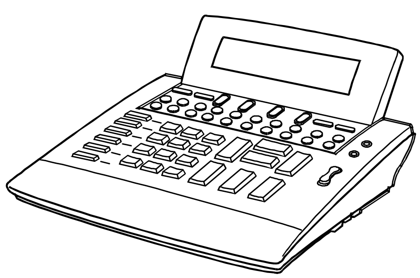


Figure 015-1 Outer View of DESK CONSOLE

NAP-200-015
Sheet 2/41
Installation of the DESK CONSOLE and Cable Connection

A

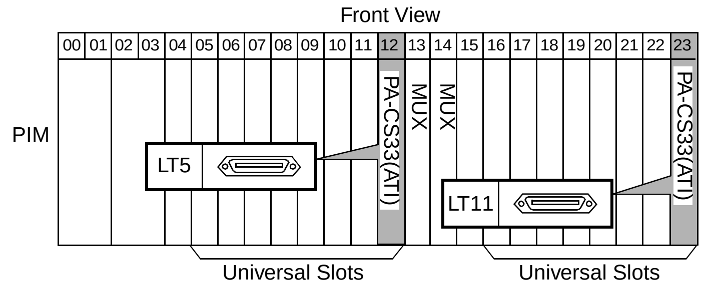
- Installation of Recording Equipment (Optional) — Referring to Figures 015-9 through 015-12, install optional Recording Equipment.
- Connection of AC-DC Adapter (Optional) — Referring to Figure 015-13, mount optional AC-DC adapter to DESK CONSOLE in the case of local power supply.
- Mounting of Add-On Console (for Hotel system) — For the Hotel system, mount Add-On Console to DESK CONSOLE referring to Figures 015-14 through 3-120.
- Assignment of Configuration Data — Assign configuration data for DESK CONSOLE.

END

To connect DESK CONSOLE(s), the PA-CS33 card is used as the interface card. The card may be mounted in slot No.12 or in slot No.23. The leads appear on LT5 and LT11 respectively. However, when replacing Attendant Console with DESK CONSOLE, the leads appear on the LT connector on the ATT TERM (See **Note** on the next page).

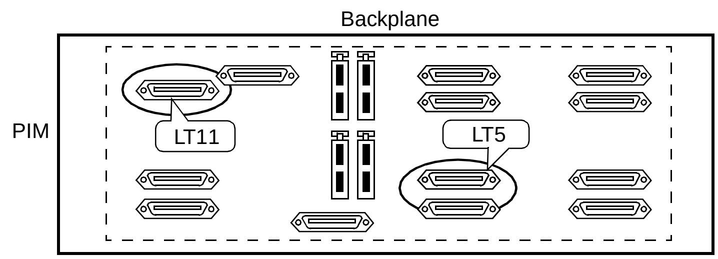
- PA-CS33(ATI) mounting slots

PA-CS33(ATI) card may be mounted in slots 12 and/or 23.



- LT cable connectors

Use LT5 connector when the PA-CS33 card is mounted in slot 12. When the card is mounted in slot 23, use LT11 connector.



- LT cable Pin Assignment

Pins are assigned as follows for PA-CS33 card.

PA-CS33 Pin Assignment

	PIN	LEAD	PIN	LEAD
	26		1	
	27		2	
	33		8	
for ADD-ON CONSOLE 0 →	34	BN4800	9	BN4801
	35		10	
for DESK CONSOLE 0 →	36	BN4820	11	BN4821
	37		12	
	38	TAS1B	13	TAS1A
for ADD-ON CONSOLE 1 →	39	BN4810	14	BN4811
	40	TAS0B	15	TAS0A
for DESK CONSOLE 1 →	41	BN4830	16	BN4831
for ADD-ON CONSOLE 0 →	42	B0	17	A0
	43		18	
for DESK CONSOLE 0 →	44	B2	19	A2
	45		20	
for ADD-ON CONSOLE 1 →	46	B1	21	A1
	47		22	
for DESK CONSOLE 1 →	48	B3	23	A3
	49		24	
	50		25	

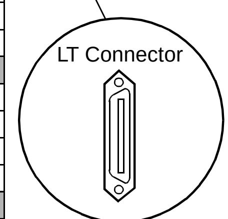


Figure 015-2 Cable Connection Diagram for DESK CONSOLE

Note: *When replacing Attendant Console with DESK CONSOLE, follow the procedure below:*

(a) Turn OFF the PWR card in the PIM.

(b) Remove installation cables connected to ATT0, ATT1 and LT connectors on the ATT TERM.

(c) Remove installation cables connected to the following connectors:

- *RLT connector on the ATT TERM*
- *ATI0 and LT5, ATI1 and LT11 connectors on the PIM*

(d) Install DESK CONSOLE using the LT connector on the ATT TERM.

(e) Turn ON the PWR card in the PIM.

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Installation of the DESK CONSOLE and Cable Connection

- **Cable Connection Diagram**

  a) When the power is supplied from the PBX

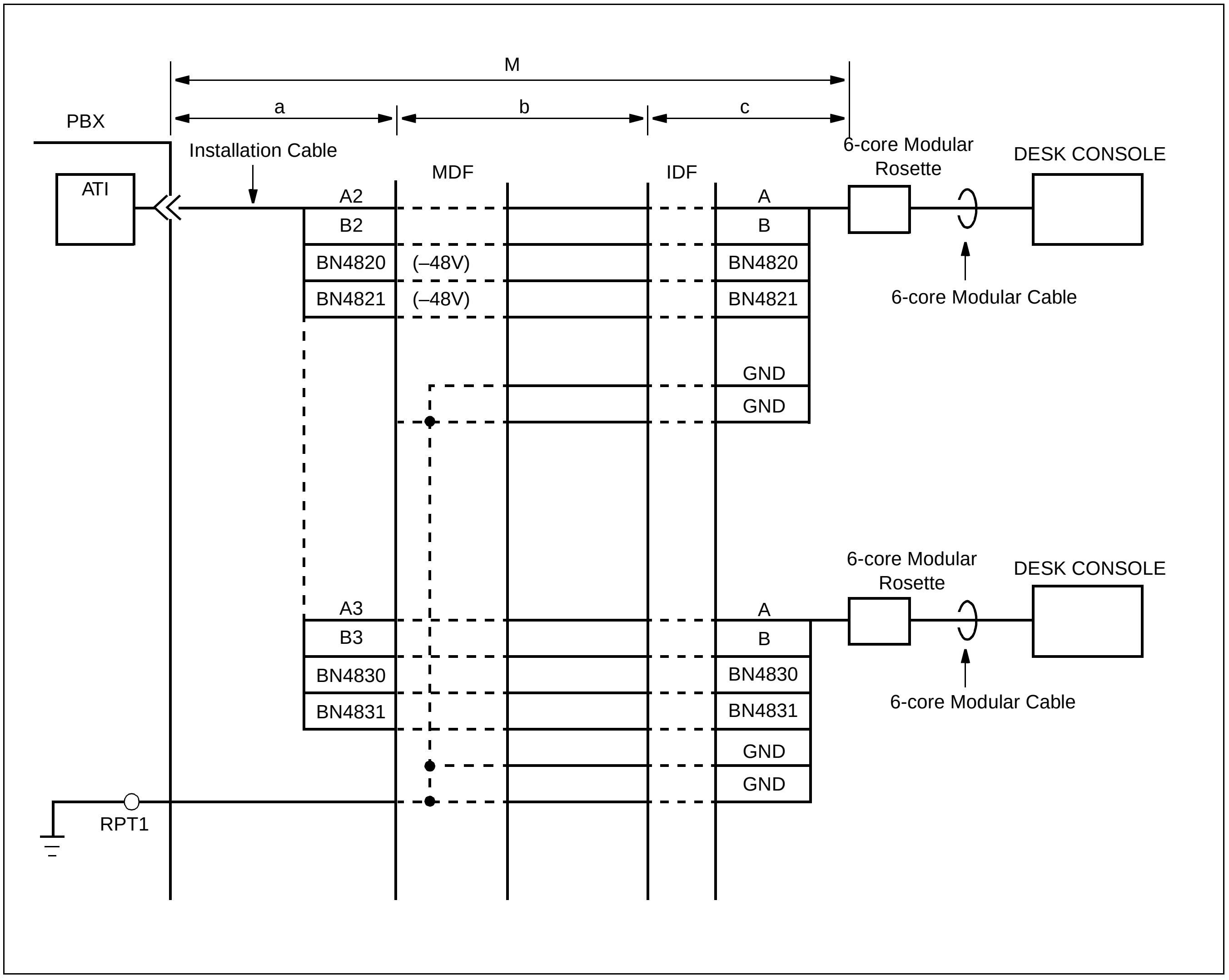

Figure 015-3 Cable Connection Diagram (When the power is supplied from the PBX)

The maximum distance between the ATI circuit card and DESK CONSOLE is as shown below.

Source	0.5 ϕ Cable	0.65 ϕ Cable
PBX	350 m (1148 ft. 3 in.)	500 m (1640 ft. 5 in.)

When exceeding the distance above, calculate the distance referring to instructions on the next page.

Calculation of the distance between the ATI circuit card and Modular Rosette

The distance M in Figure 015-3 is determined according to the Direct-Current resistance of power supply cables (–48V and GND). Note that the maximum resistance is 26 Ω as shown in the following formula:

$M = a + b + c \leq 26\ \Omega$

M: Maximum Direct–Current resistance between the ATI circuit card and Modular Rosette
a: Direct-Current resistance of power supply cables (–48V and GND) in the range of A
b: Direct-Current resistance of power supply cables (–48V and GND) in the range of B
c: Direct-Current resistance of power supply cables (–48V and GND) in the range of C

Example of Calculation

a, b, and c are calculated by the following formulae:

Note: *You are not required to use cable lengths in meters in the following formulae. You may use cable lengths in feet, yards, or whatever unit you prefer. However, the units of resistance you use must match the units of length you use. For example, if you use distance in feet, you must also use DC resistance per foot.*

$$a = \frac{\overset{\text{Resistance of –48V cables}}{u\ (\Omega/m) \times x\ (m)}}{\underset{\text{Number of –48V cables}}{2}} + \frac{\overset{\text{Resistance of GND cables}}{u\ (\Omega/m) \times x\ (m)}}{\underset{\text{Number of GND cable}}{1}}$$

$$b = \frac{\overset{\text{Resistance of –48V cables}}{v\ (\Omega/m) \times y\ (m)}}{\underset{\text{Number of –48V cables}}{2}} + \frac{\overset{\text{Resistance of GND cables}}{v\ (\Omega/m) \times y\ (m)}}{\underset{\text{Number of GND cables}}{2}}$$

$$c = \frac{\overset{\text{Resistance of –48V cables}}{w\ (\Omega/m) \times z\ (m)}}{\underset{\text{Number of –48V cables}}{2}} + \frac{\overset{\text{Resistance of GND cables}}{w\ (\Omega/m) \times z\ (m)}}{\underset{\text{Number of GND cables}}{2}}$$

u: Direct-Current resistance per meter in the range of A (Ω/m)
v: Direct-Current resistance per meter in the range of B (Ω/m)
w: Direct-Current resistance per meter in the range of C (Ω/m)
x: Cable length (m) in the range of A
y: Cable length (m) in the range of B
z: Cable length (m) in the range of C

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Installation of the DESK CONSOLE and Cable Connection

b) When using Local Power Supply **Note**

Note: *When using local power supply, DESK CONSOLE cannot be used in case of power failure.*

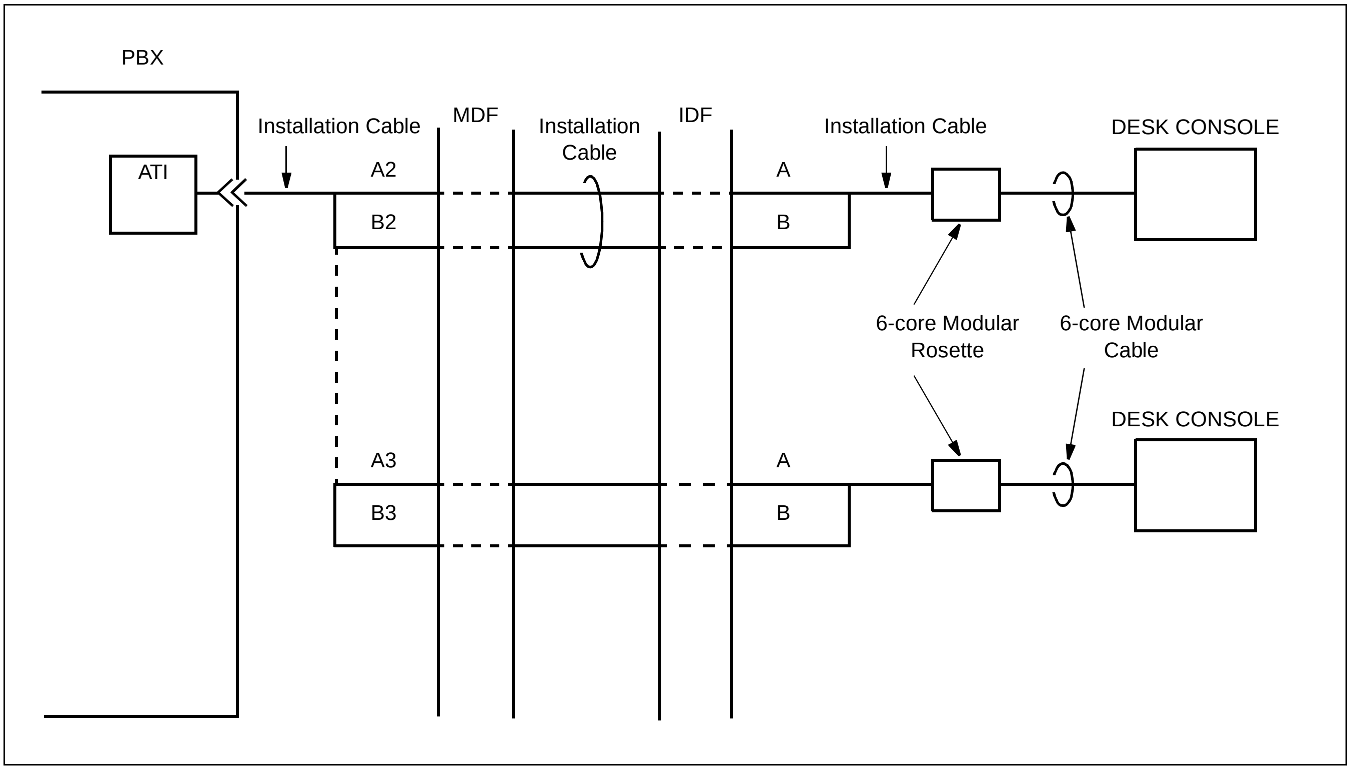
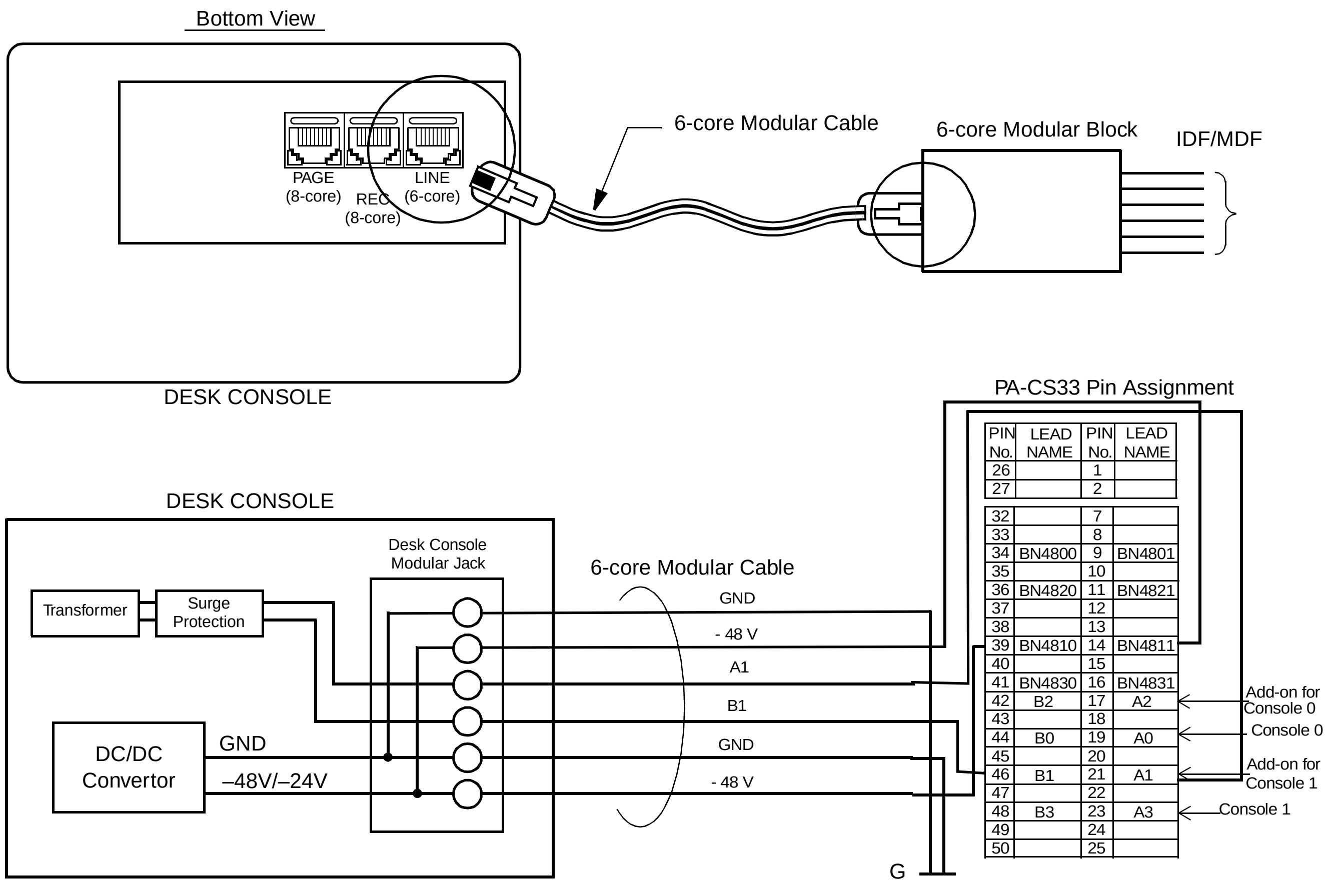


Figure 015-4 Cable Connection Diagram (When using Local Power Supply)

The maximum distance between the ATI circuit card and DESK CONSOLE is as shown below.

Source	0.5 ϕ Cable	0.65 ϕ Cable
Local Power Supply	1,200 m (3937 ft.)	1,500 m (4921 ft. 3 in.)

Wire the cables to the Modular Block as shown below.

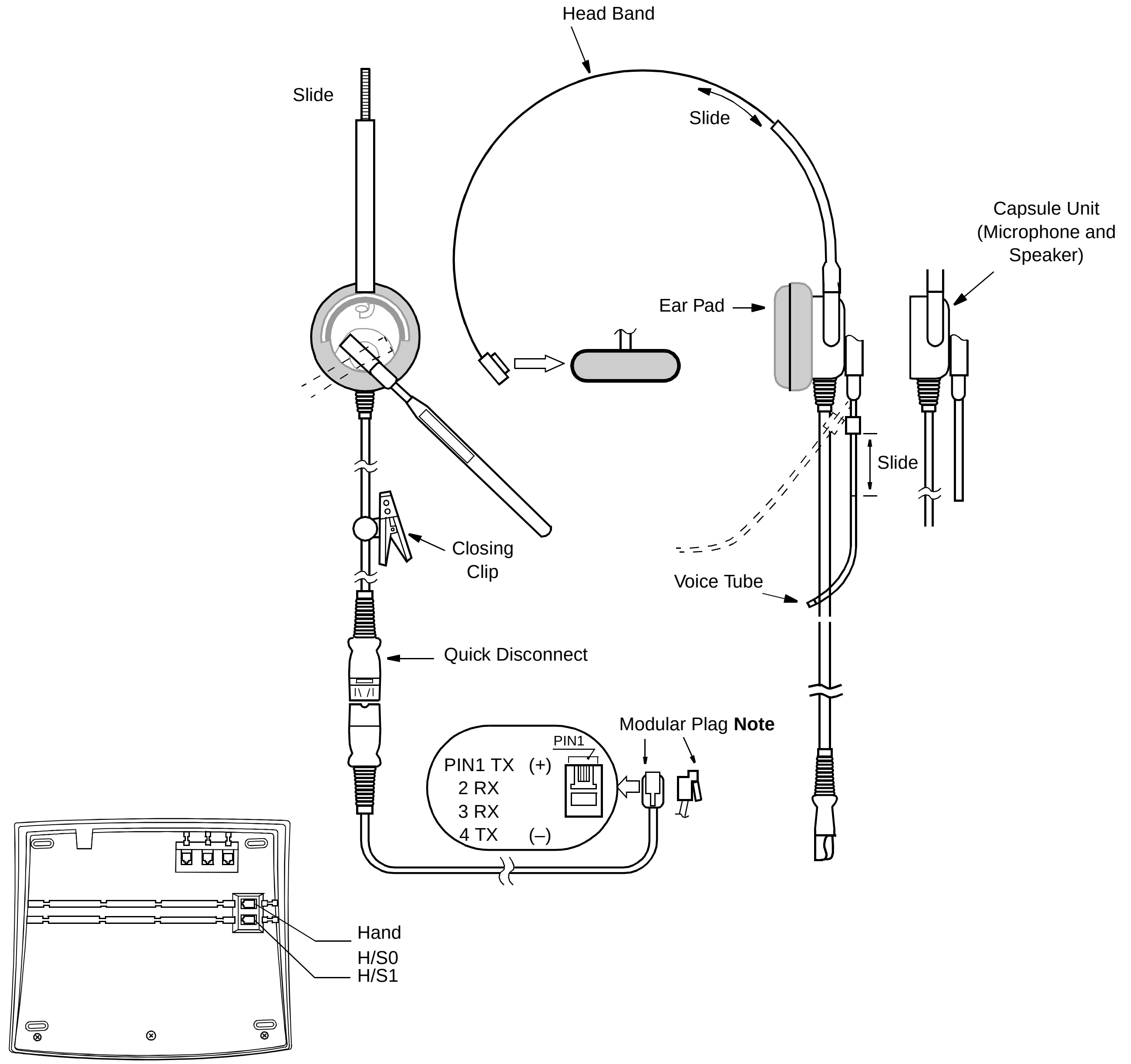


PIN No.	LEAD NAME	PIN No.	LEAD NAME
26		1	
27		2	
32		7	
33		8	
34	BN4800	9	BN4801
35		10	
36	BN4820	11	BN4821
37		12	
38		13	
39	BN4810	14	BN4811
40		15	
41	BN4830	16	BN4831
42	B2	17	A2
43		18	
44	B0	19	A0
45		20	
46	B1	21	A1
47		22	
48	B3	23	A3
49		24	
50		25	

Figure 015-5 Cable Connection Diagram for DESK CONSOLE Modular Block

- **Mounting of Headset (Optional)**

The Headset cable is connected to one of the modular jacks (HAND H/S 0 or H/S 1) on the bottom of DESK CONSOLE.



Note: *In daily use, use Quick Disconnect when connecting/disconnecting the Headset.*

Figure 015-6 Headset

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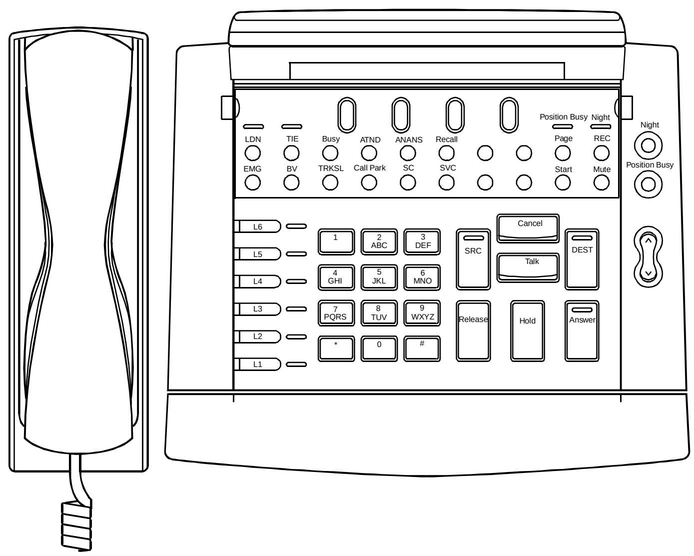
Installation of the DESK CONSOLE and Cable Connection

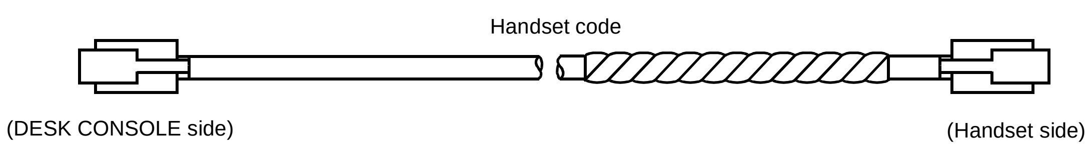
- **Mounting of Handset (Optional)**

The Handset cable is connected to the modular jack (HAND H/S 0) on the bottom of DESK CONSOLE.

a) When mounting at the left side of DESK CONSOLE (Standard)



1. Put the Handset code through the hole as shown below.



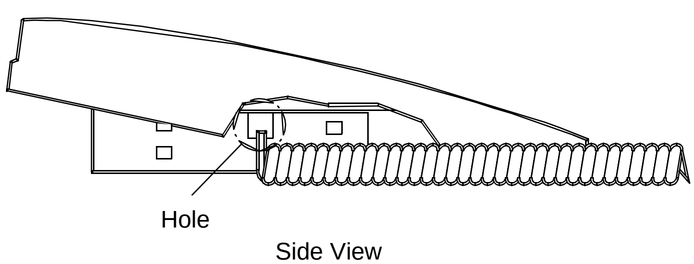
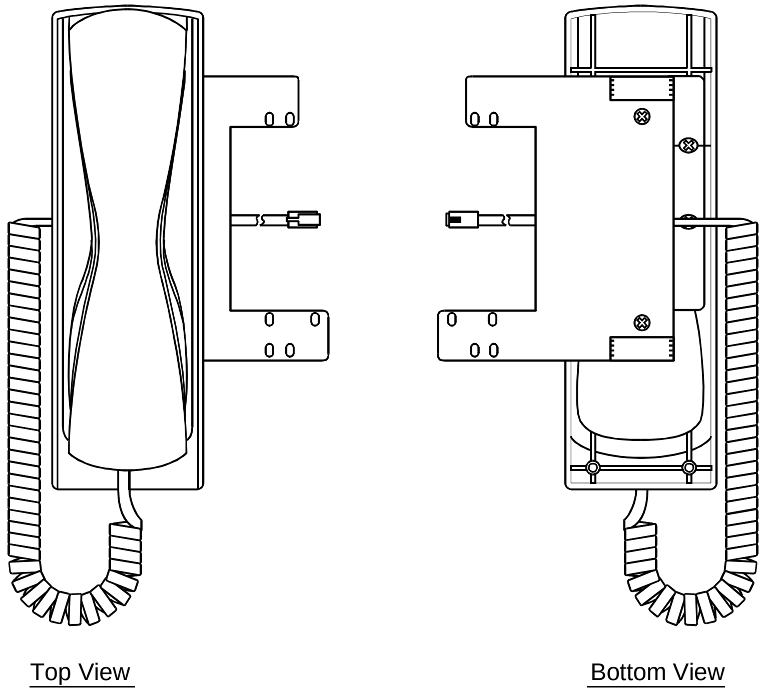
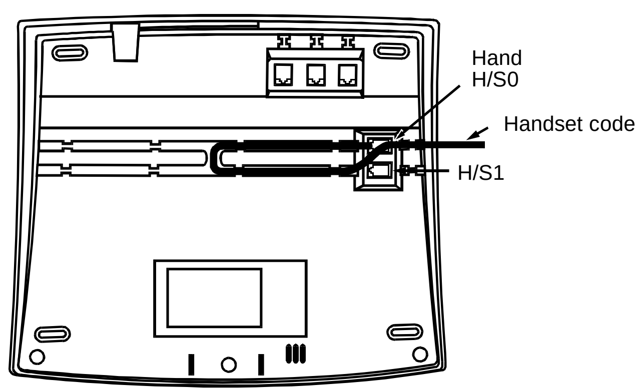


Figure 015-7 Mounting of Handset (Left side of DESK CONSOLE)



2. Connect the Handset code to HAND H/S0 connector as shown below (H/S1 is not used for the Handset).



Bottom View of DESK CONSOLE

Figure 015-7 Mounting of Handset (Left side of DESK CONSOLE) (Continued)

Mount the Handset Support to DESK CONSOLE with three screws as shown below.

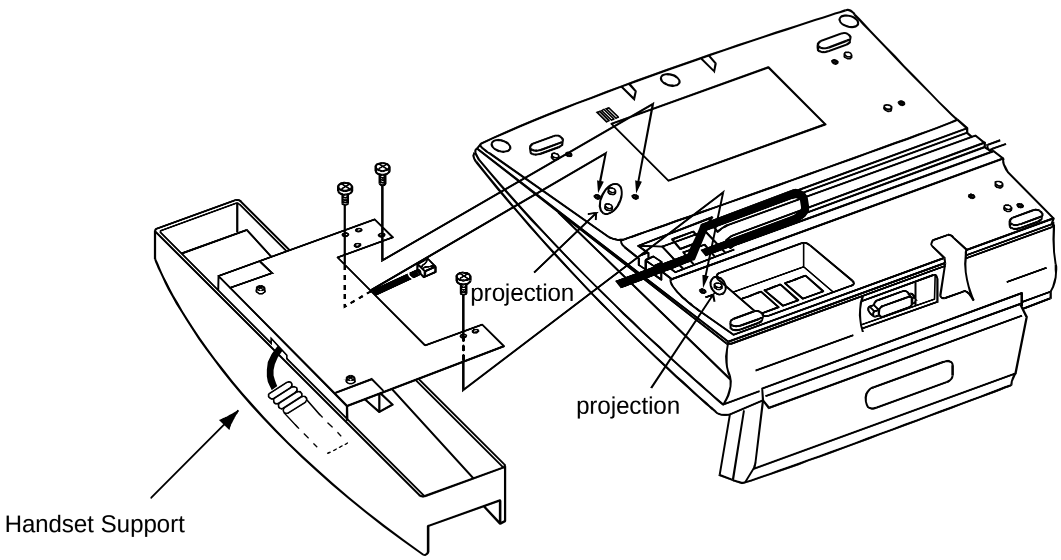
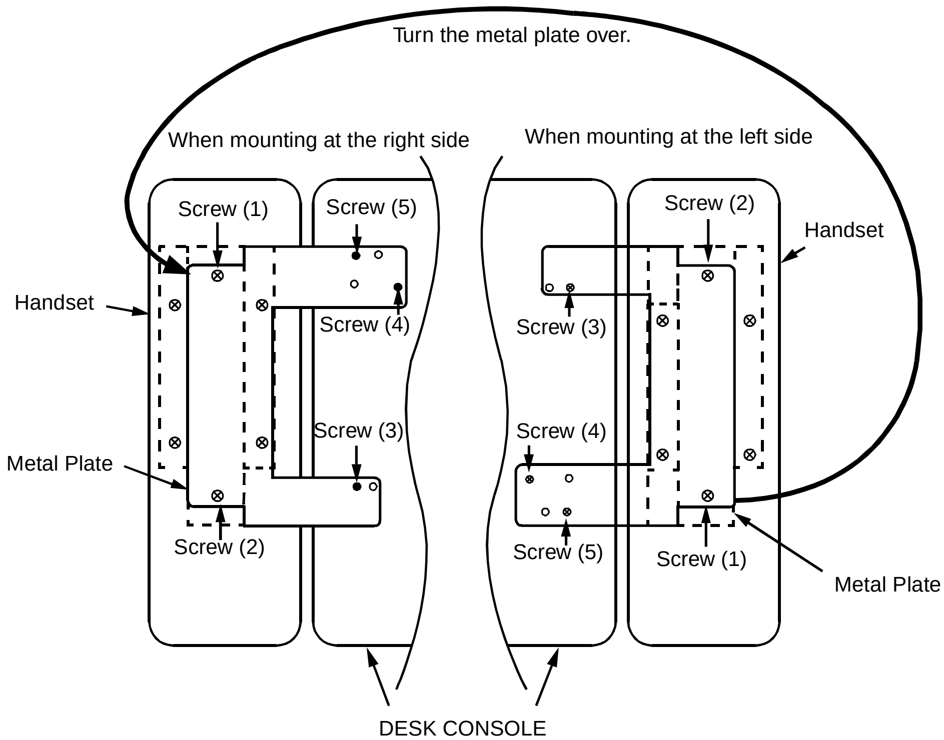


Figure 015-7 Mounting of Handset (Left side of DESK CONSOLE) (Continued)

b) When mounting at the right side of DESK CONSOLE

1. Remove the metal plate from the Handset, turn it over, and mount it to the Handset again.
   Refer to the figure below.



2. Put the Handset code through the hole as shown below.

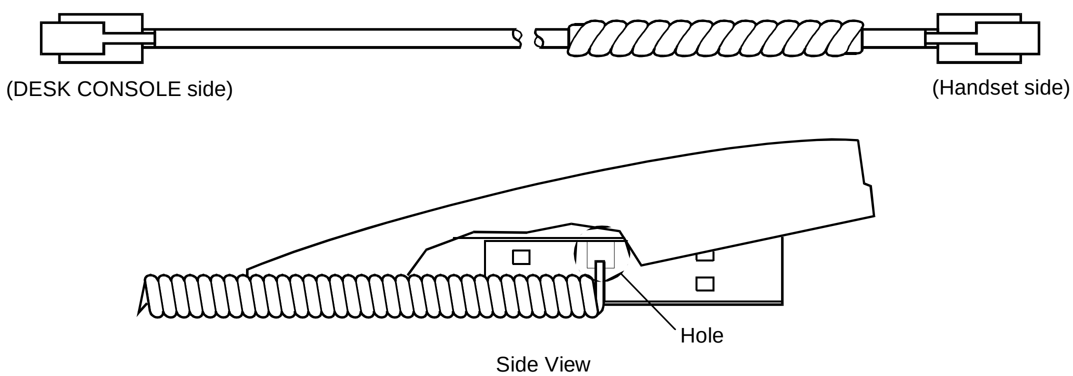
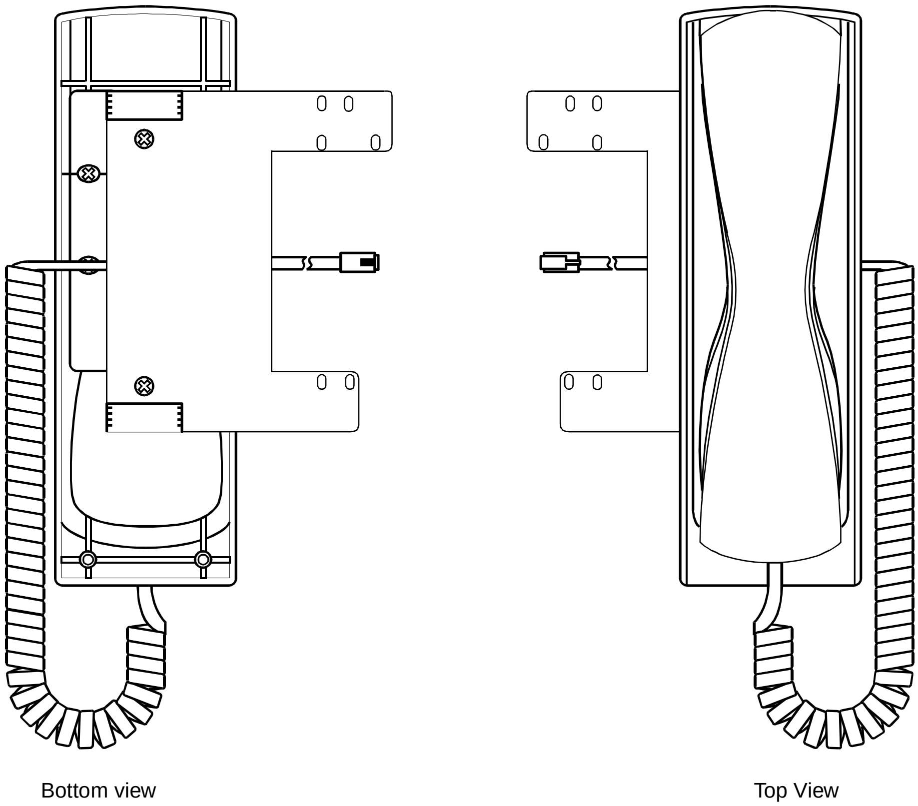


Figure 015-8 Mounting of Handset (Right side of DESK CONSOLE)



3. Connect the Handset code to HAND H/S0 connector as shown below (H/S1 is not used for the Handset).

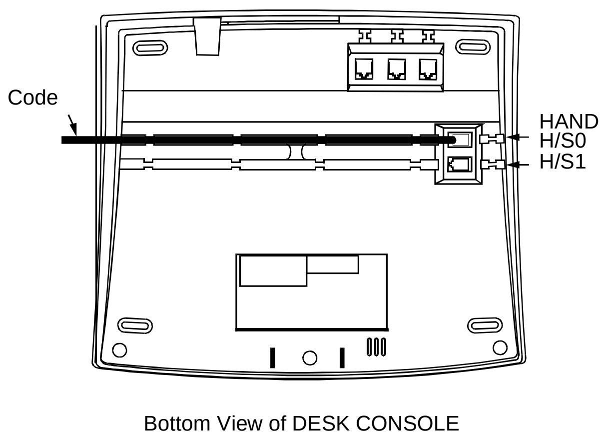


Figure 015-8 Mounting of Handset (Right side of DESK CONSOLE) (Continued)

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Installation of the DESK CONSOLE and Cable Connection

Mount the Handset Support to DESK CONSOLE with three screws as shown below.

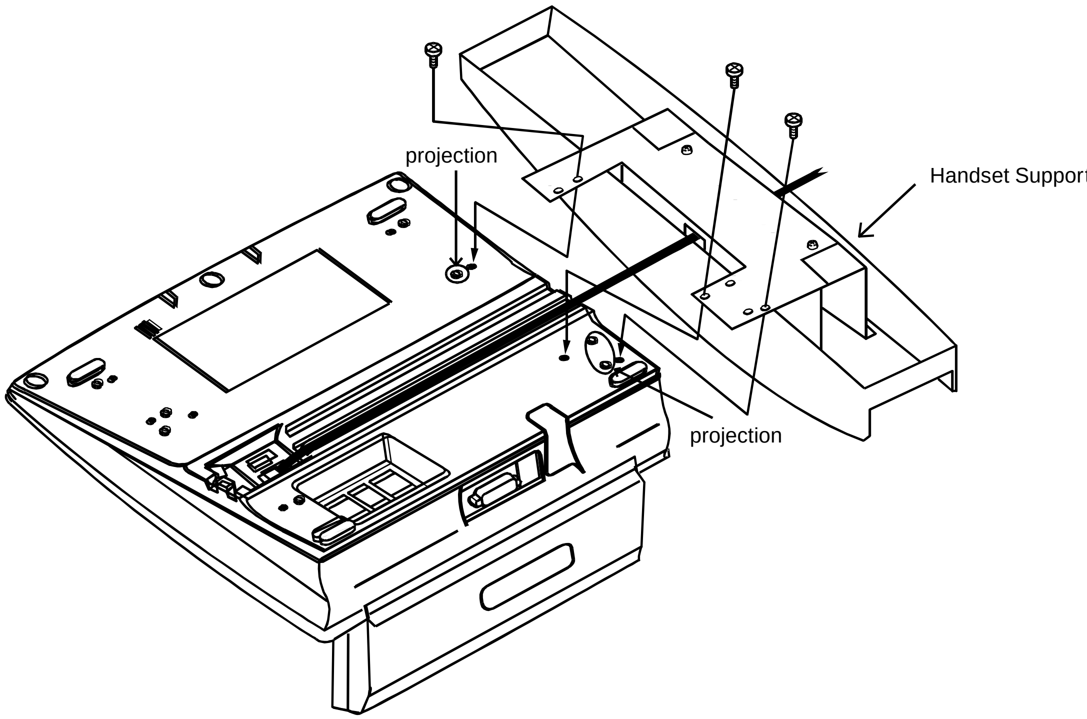

Figure 015-8 Mounting of Handset (Right side of DESK CONSOLE) (Continued)

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Installation of the DESK CONSOLE and Cable Connection

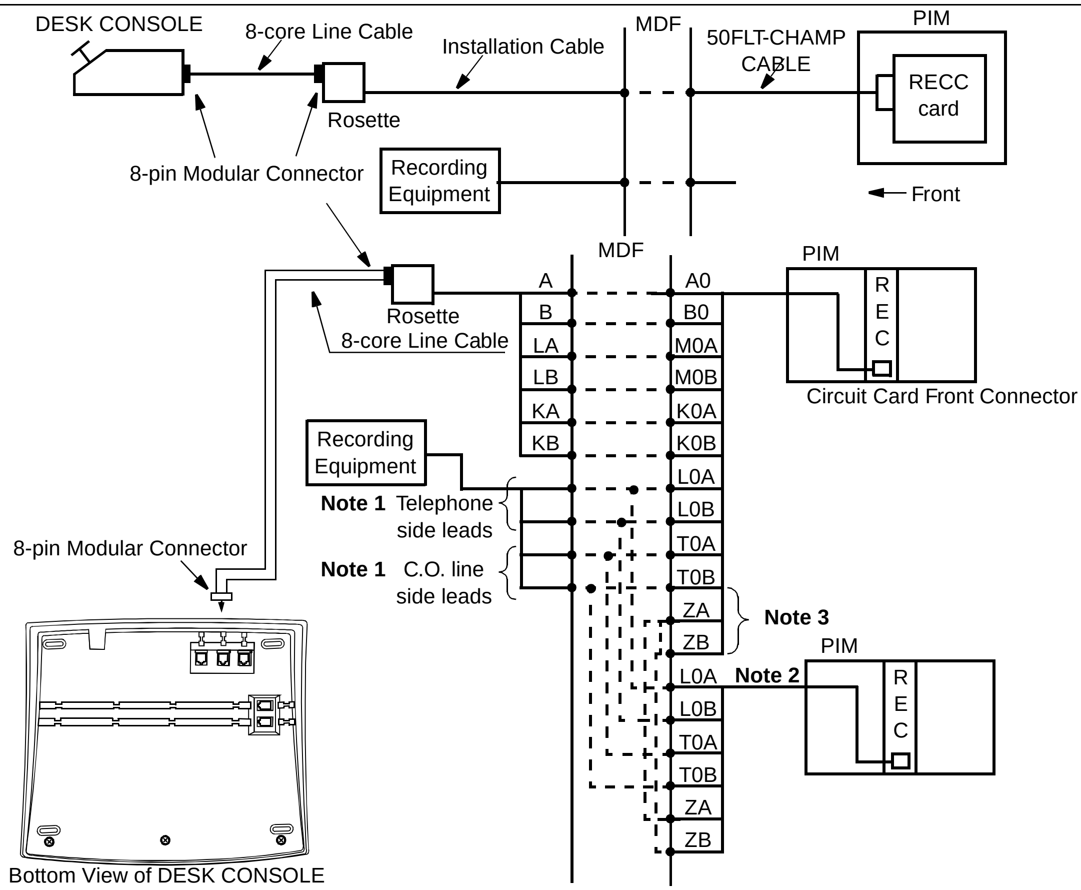
- **Connection of Recording Equipment**

The followings are required for using recording function:

- The RECC circuit card
- Recording Equipment
- 8-core Line Cable
- Rosette

A RECC card (PA-M87) connects DESK CONSOLEs and recording equipment in the following combinations:

- Six DESK CONSOLEs and one recording equipment×1 set
- Three DESK CONSOLEs and one recording equipment×2 set



Note 1: *Recording equipment is positioned between the C.O. line and telephones.*

Note 2: *One recording equipment can be shared with multiple RECC cards.*

Note 3: *When sharing one recording equipment with multiple RECC cards, multiple connection of ZA and ZB terminals is required.*

Figure 015-9 RECC Card Cable Connection Diagram

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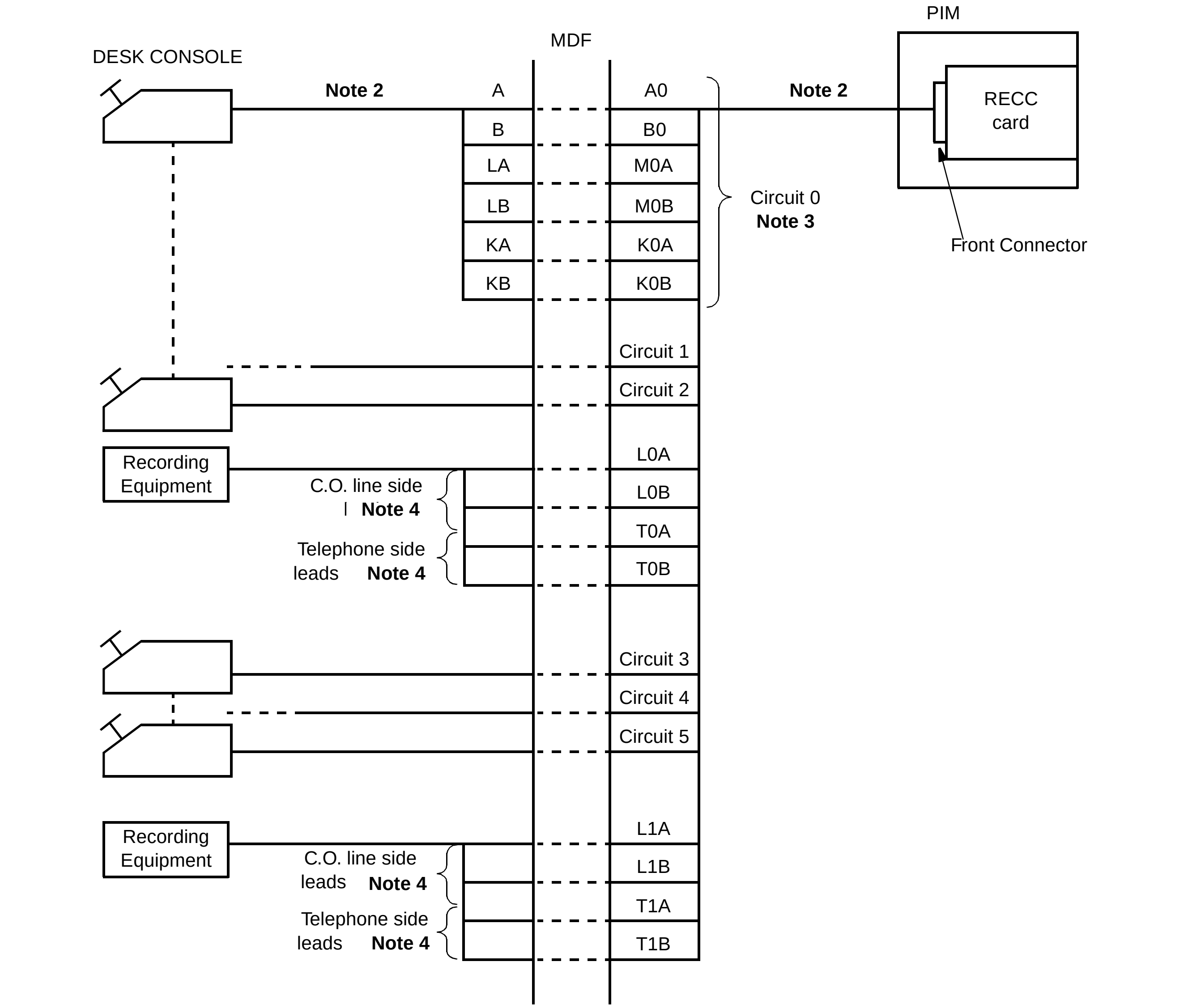
Installation of the DESK CONSOLE and Cable Connection

a) When using three DESK CONSOLEs and one recorder **Note 1**

Note 1: *Switch settings of SW10, SW12 and SW13 on the PA-M87 card is required. For switch setting and connector lead accommodation, refer to the Circuit Card Manual.*



Note 2: *Refer to Figure 015-9, "RECC Card Cable Connection Diagram" for cable connection.*

Note 3: *Connections of Circuit 1 through 5 are the same as those of Circuit 0.*

Note 4: *Recording equipment is positioned between the C.O. line and telephones.*

Figure 015-10 Three DESK CONSOLEs and One Recording Equipment

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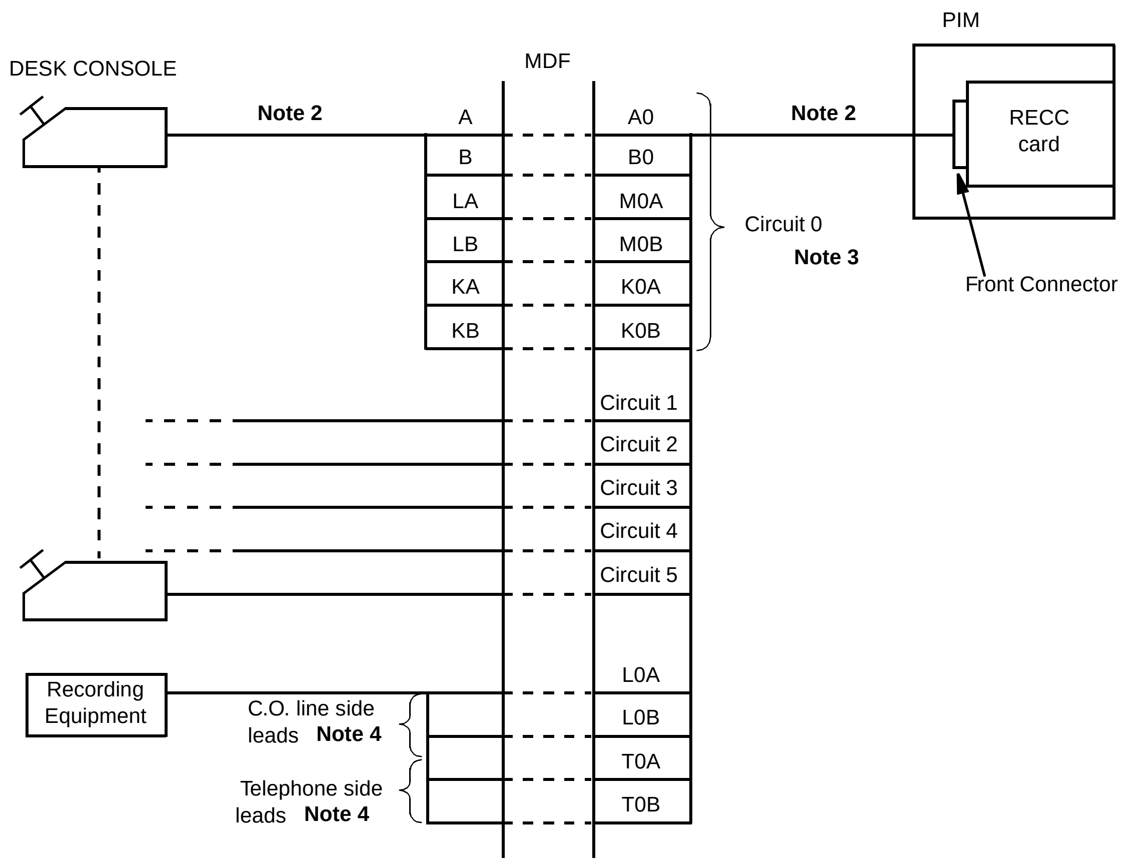
Installation of the DESK CONSOLE and Cable Connection

b) When using six DESK CONSOLEs and one recording equipment **Note 1**

Note 1: *Switch settings of SW10, SW12 and SW13 on the PA-M87 card is required. For switch setting and connector lead accommodation, refer to the Circuit Card Manual.*



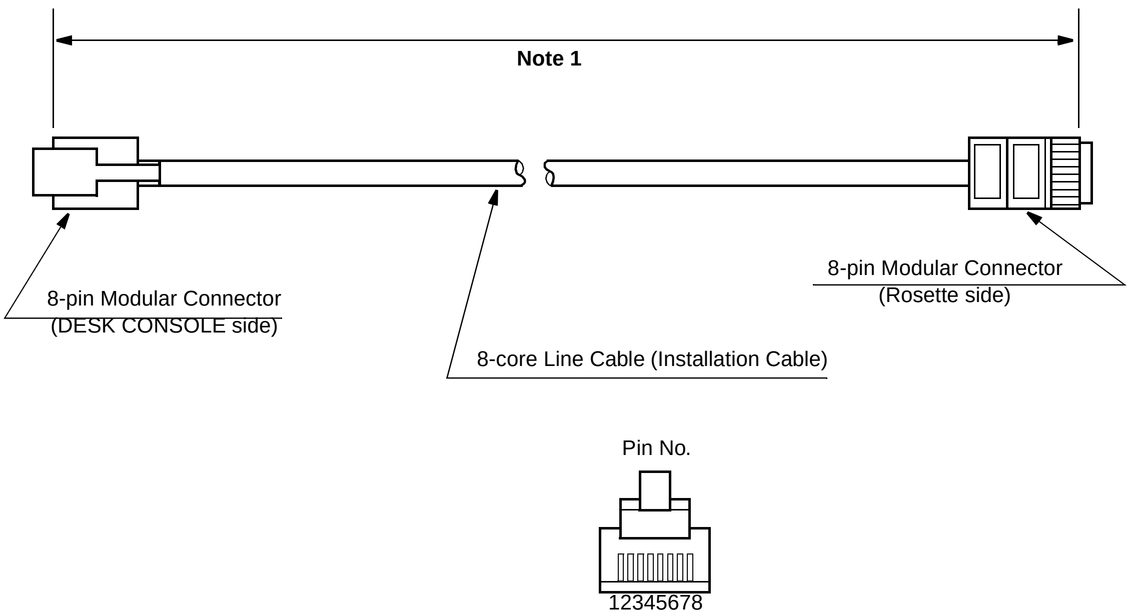
Note 2: *Refer to Figure 015-9 "RECC Card Cable Connection Diagram" for cable connection.*

Note 3: *Connections of Circuit 1 through 5 are the same as those of Circuit 0.*

Note 4: *Recording equipment is positioned between the C.O. line and telephones.*

Figure 015-11 Six DESK CONSOLEs and One Recording Equipment

- **8-core Line Cable (Installation Cable)**



Pin No.	LEAD NAME	MEANING
1	A	Speech
2	B	Speech
3	–	Not used
4	–	Not used
5	KA	Recording Start Signal (Relay Contact)
6	KB	Recording Start Signal (Relay Contact)
7	LA (**Note 2**)	Recording Lamp Signal (+)
8	LB (**Note 2**)	Recording Lamp Signal (–)

Note 1: *Cut the cable in proper length. Attach the modular connector to both sides of the 8-core line cable using installation tool.*

Note 2: *Be sure to check the polarity of pin numbers 7 (LA) (+) and 8 (LB)(–).*

Figure 015-12 8-core Line Cable

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Installation of the DESK CONSOLE and Cable Connection

- **Connection of AC-DC adapter (Optional)**

The AC-DC adapter is required when the power supply from the distant PBX is not available.

The connector for the AC-DC adapter is on the rear side of DESK CONSOLE.

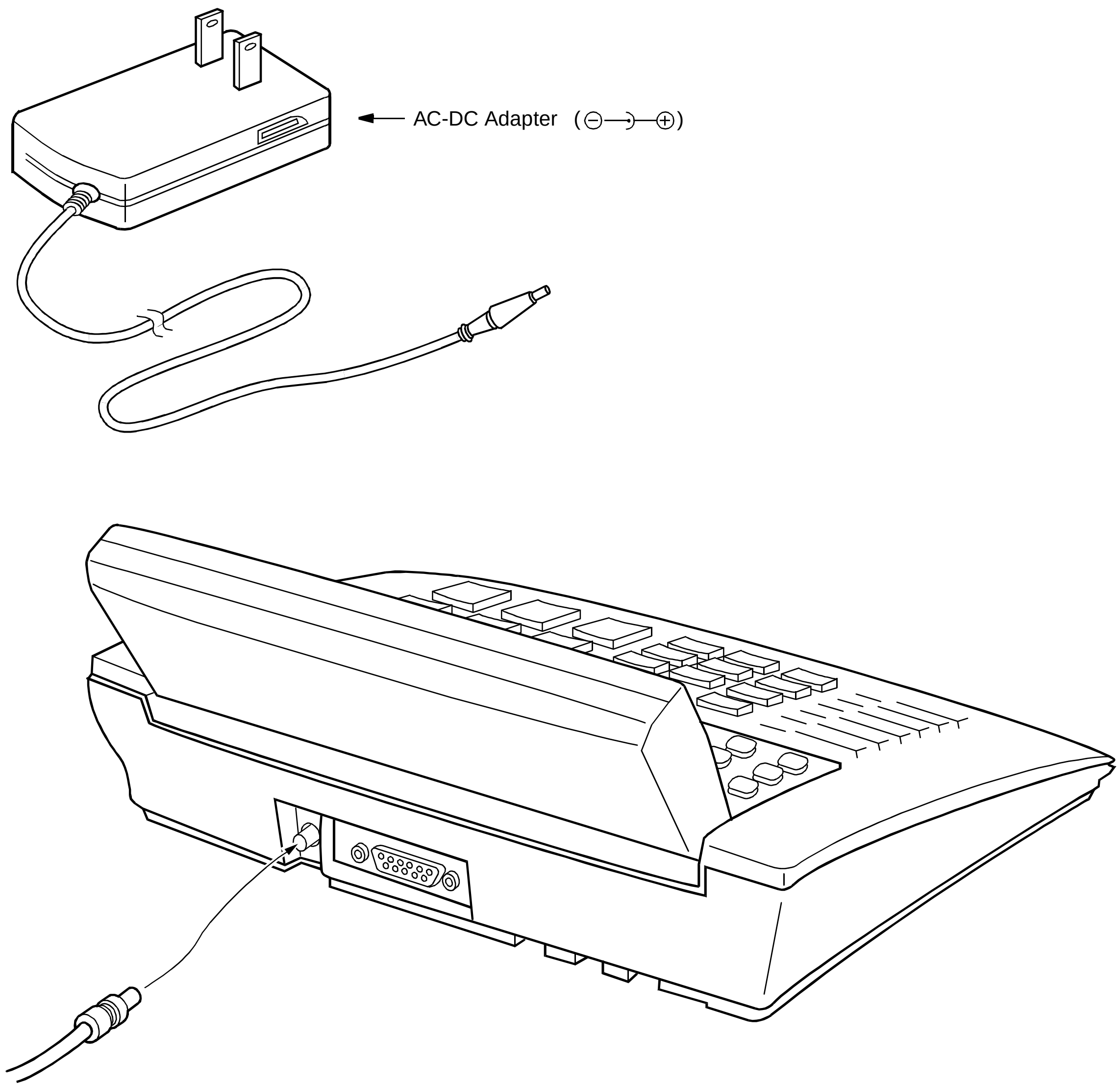

Figure 015-13 Connection of AC-DC Adapter

- **Mounting of Add-On Console (for Hotel System)**

ADD-ON CONSOLE is used in the Hotel System.

1. Cable Connection Diagram

   a) Cable Connection Diagram of Add-On Console (When the power is supplied from the PBX)

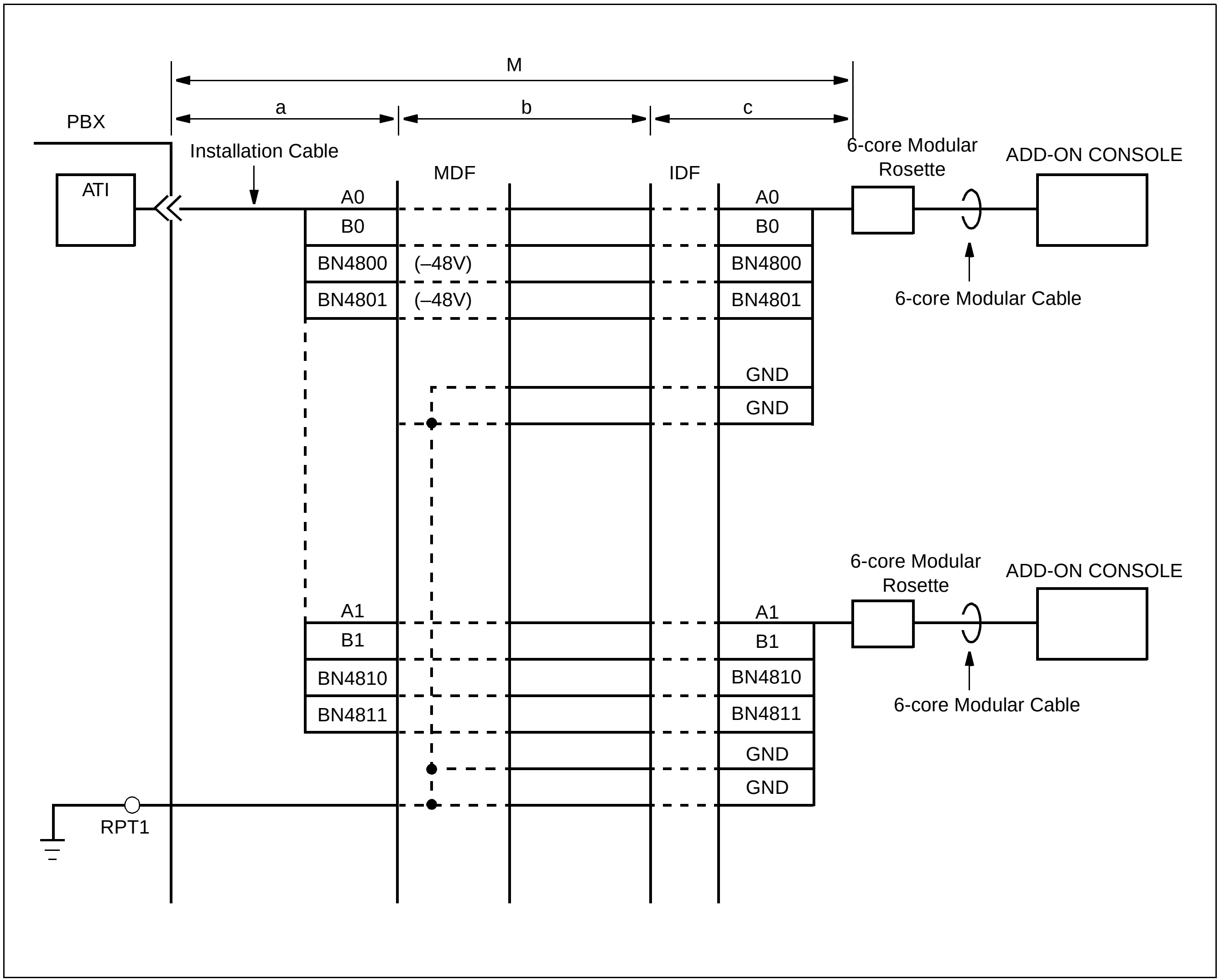

Figure 015-14 Add-On Console Cable Connection Diagram (When the power is supplied from the PBX)

b) Cable Connection Diagram of Add-On Console (When using Local Power Supply) **Note**

Note: *When using local power supply, DESK CONSOLE cannot be used in case of power failure.*

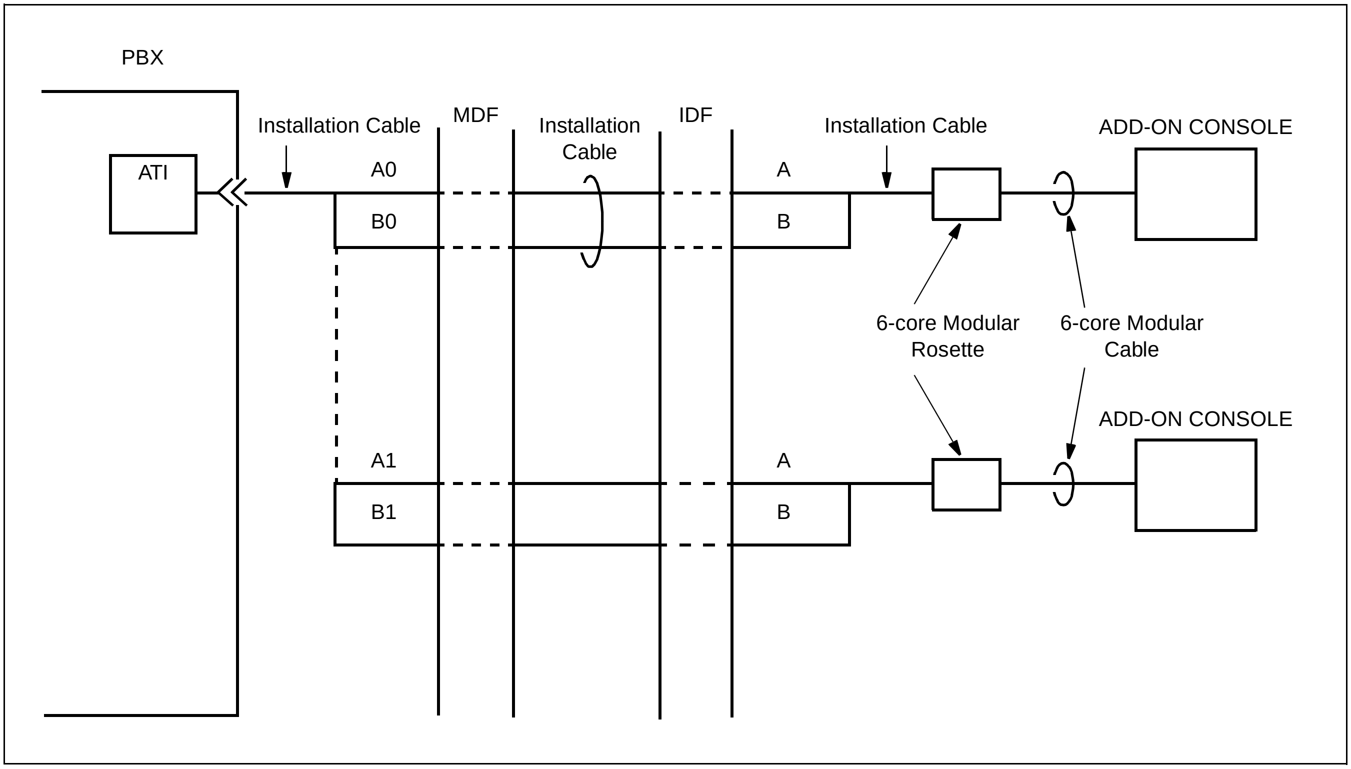

Figure 015-14 Add-On Console Cable Connection Diagram (When using Local Power Supply)

Wire the cables to the Modular Block as shown below.

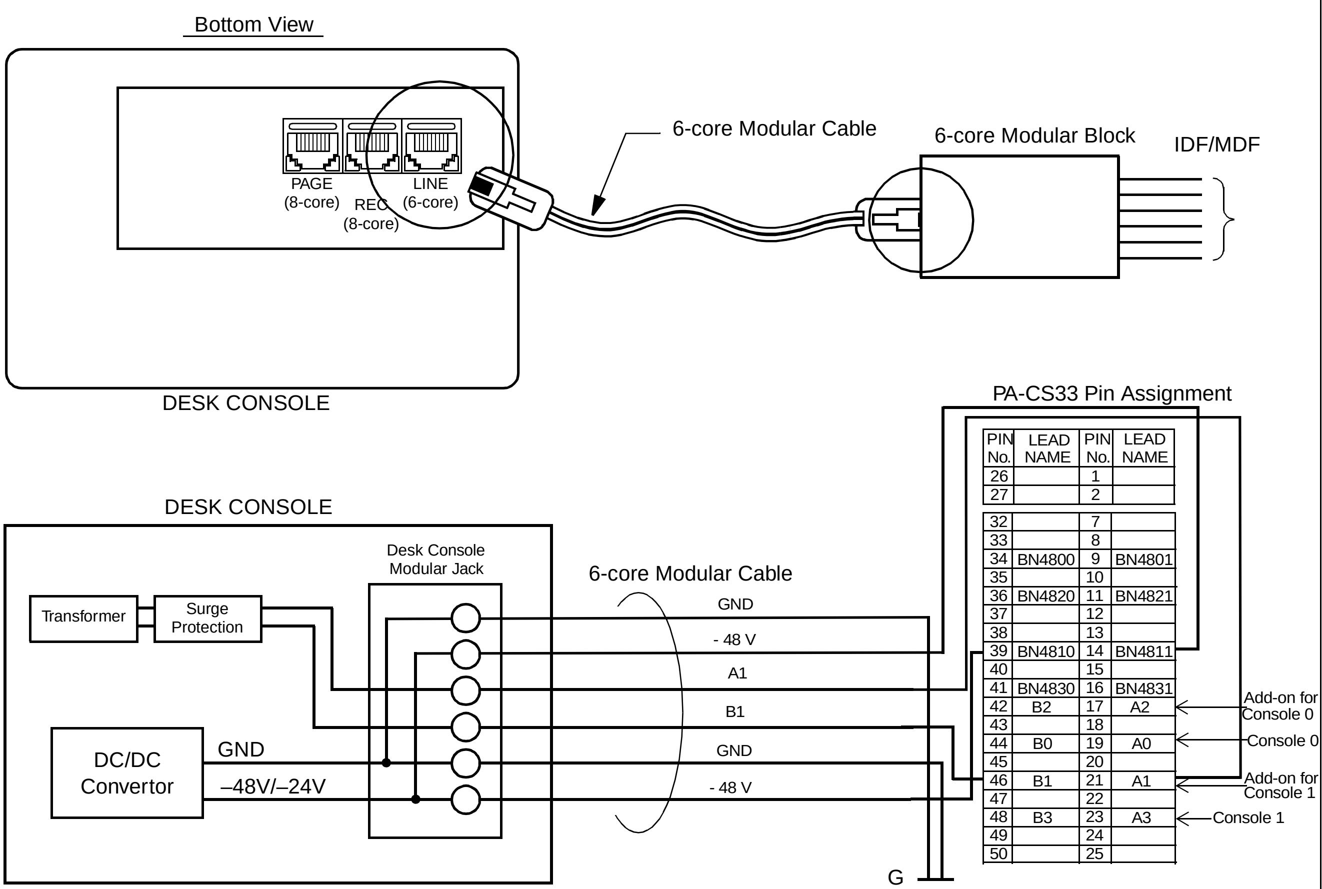

Figure 015-15 Cable Connection Diagram for Add-On Console Modular Block

2. Mounting of ADD-ON CONSOLE

a) When mounting at the right side of DESK CONSOLE

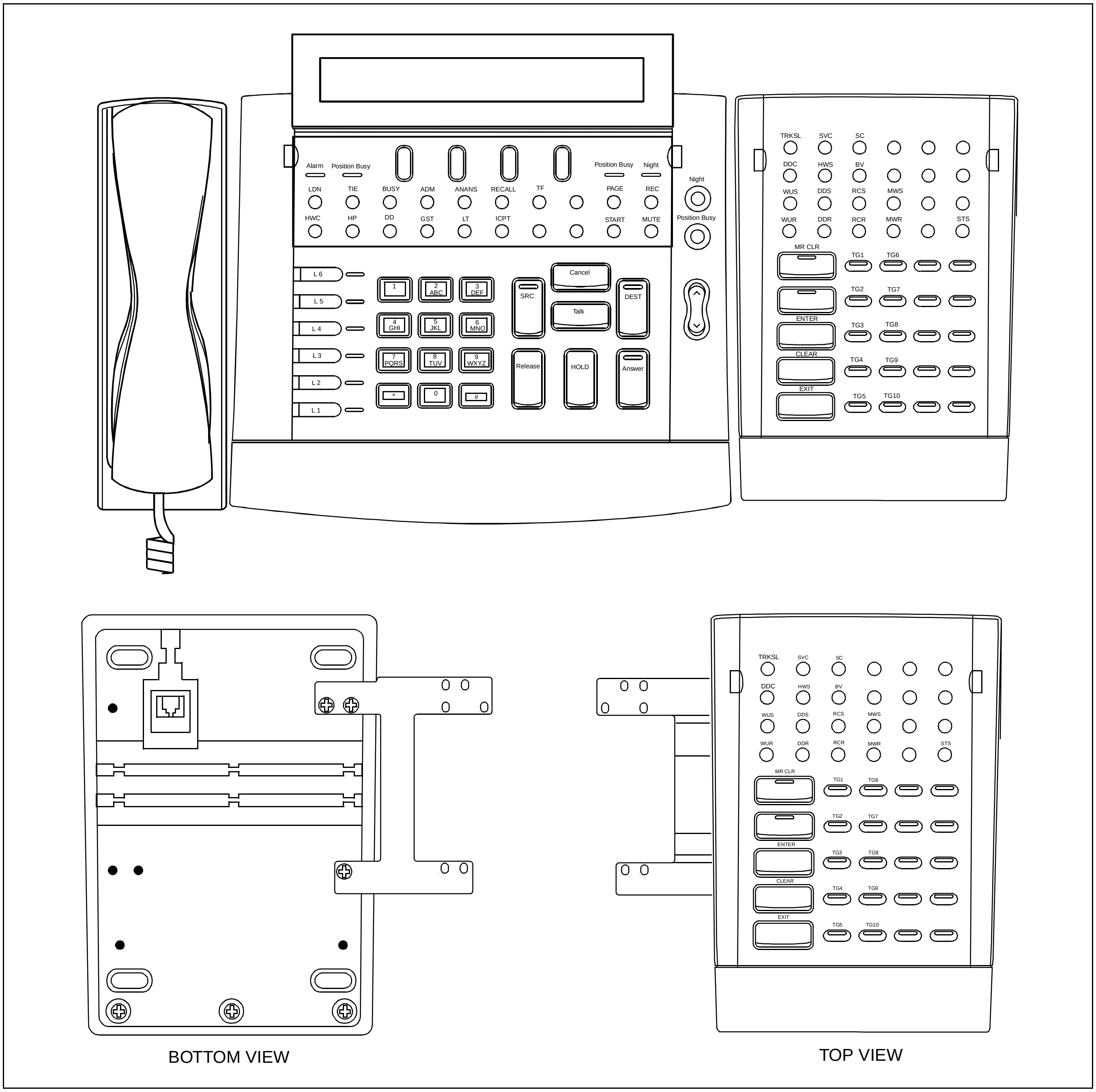

Figure 015-16 Mounting of Add-On Console (Right Side of DESK CONSOLE)

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Installation of the DESK CONSOLE and Cable Connection

Mount the ADD-ON CONSOLE to DESK CONSOLE with three screws as shown below.

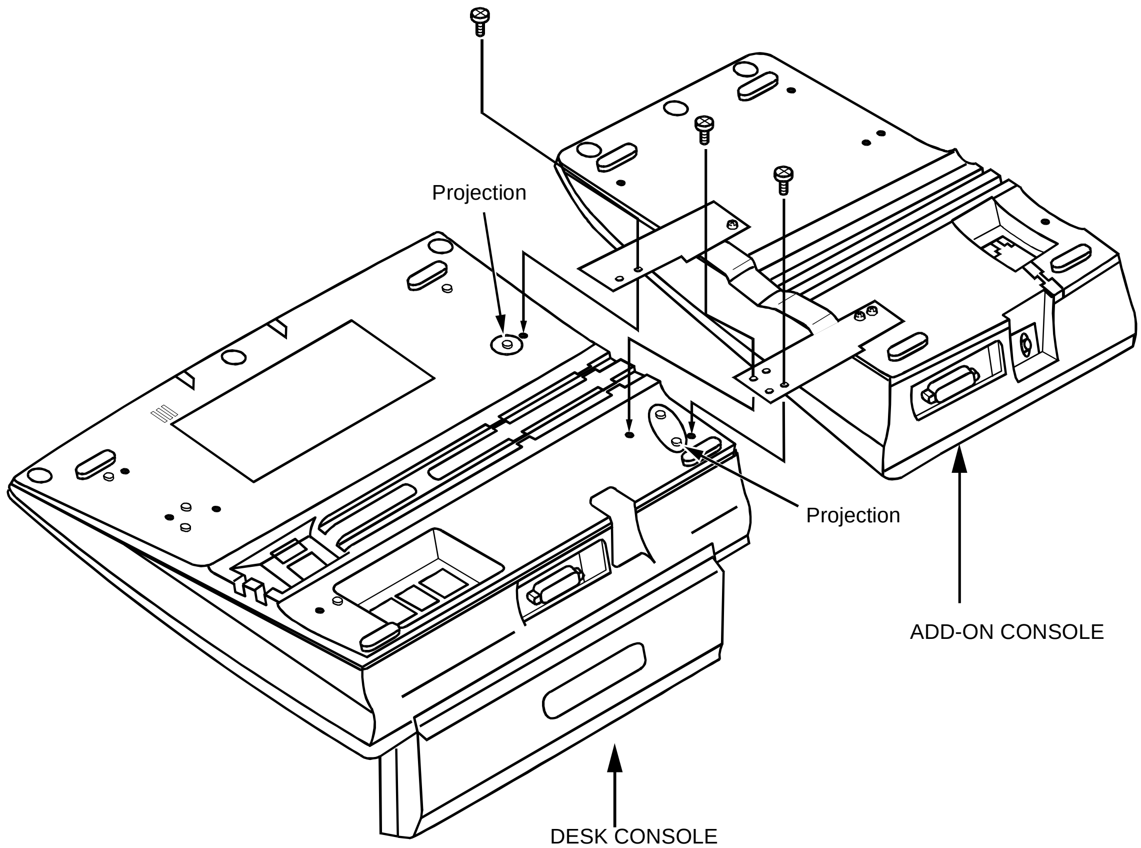
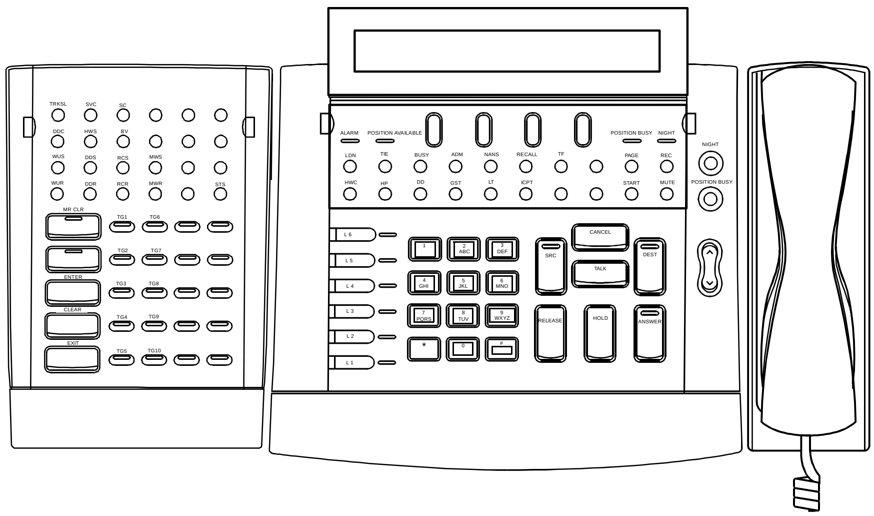


Figure 015-16 Mounting of Add-On Console (Right Side of DESK CONSOLE) (Continued)

b) When mounting at the left side of DESK CONSOLE



1. Remove the metal plate from the ADD-ON CONSOLE, turn it over, and mount it to the ADD-ON CONSOLE again. Refer to the figure below.

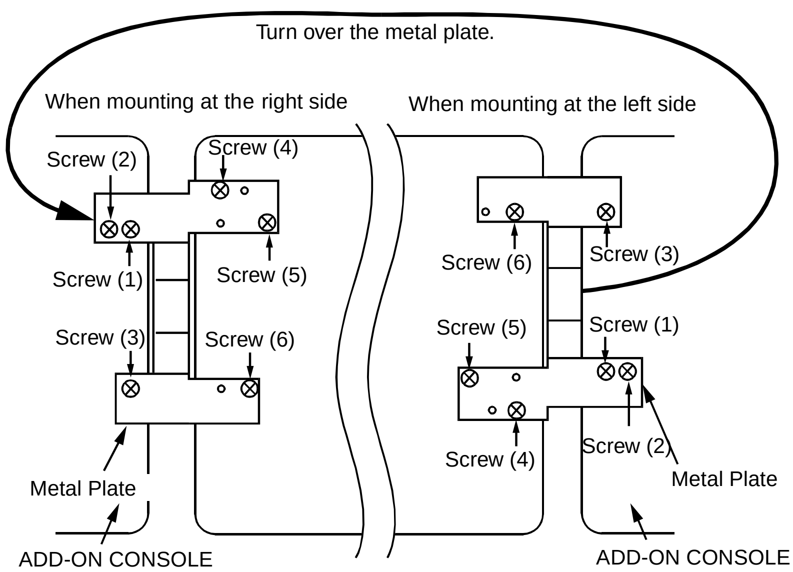
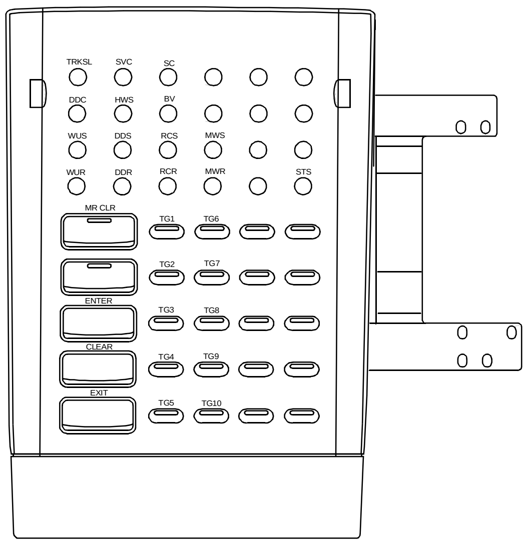
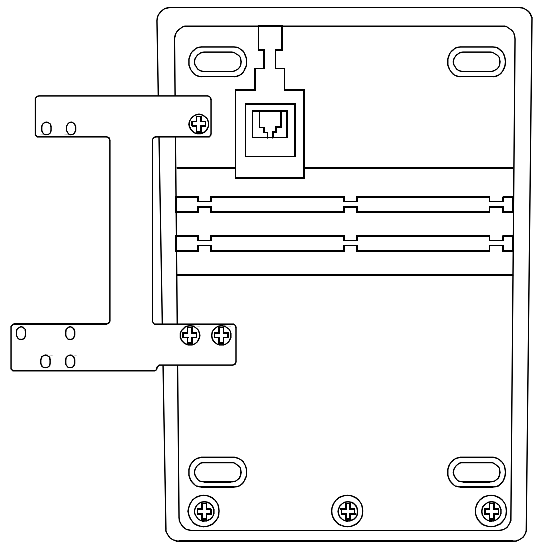


Figure 015-17 Mounting of Add-On Console (Left Side of DESK CONSOLE)



Top View



Bottom View

2. Mount the ADD-ON CONSOLE to DESK CONSOLE with three screws as shown below.

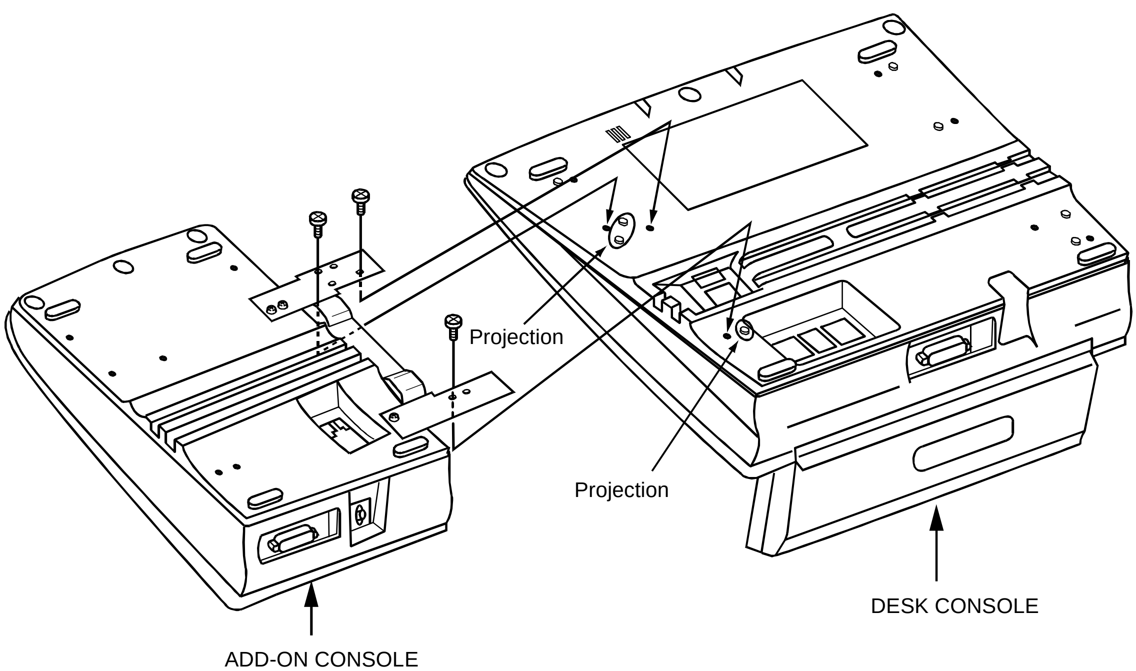


Figure 015-17 Mounting of Add-On Console (Left Side of DESK CONSOLE) (Continued)

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Installation of the DESK CONSOLE and Cable Connection

3. Connection of AC-DC adapter for Add-On Console (Optional)

The AC-DC adapter is required when the power supply from the distant PBX is not available.

The connector for the AC-DC adapter is on the rear side of ADD-ON CONSOLE.

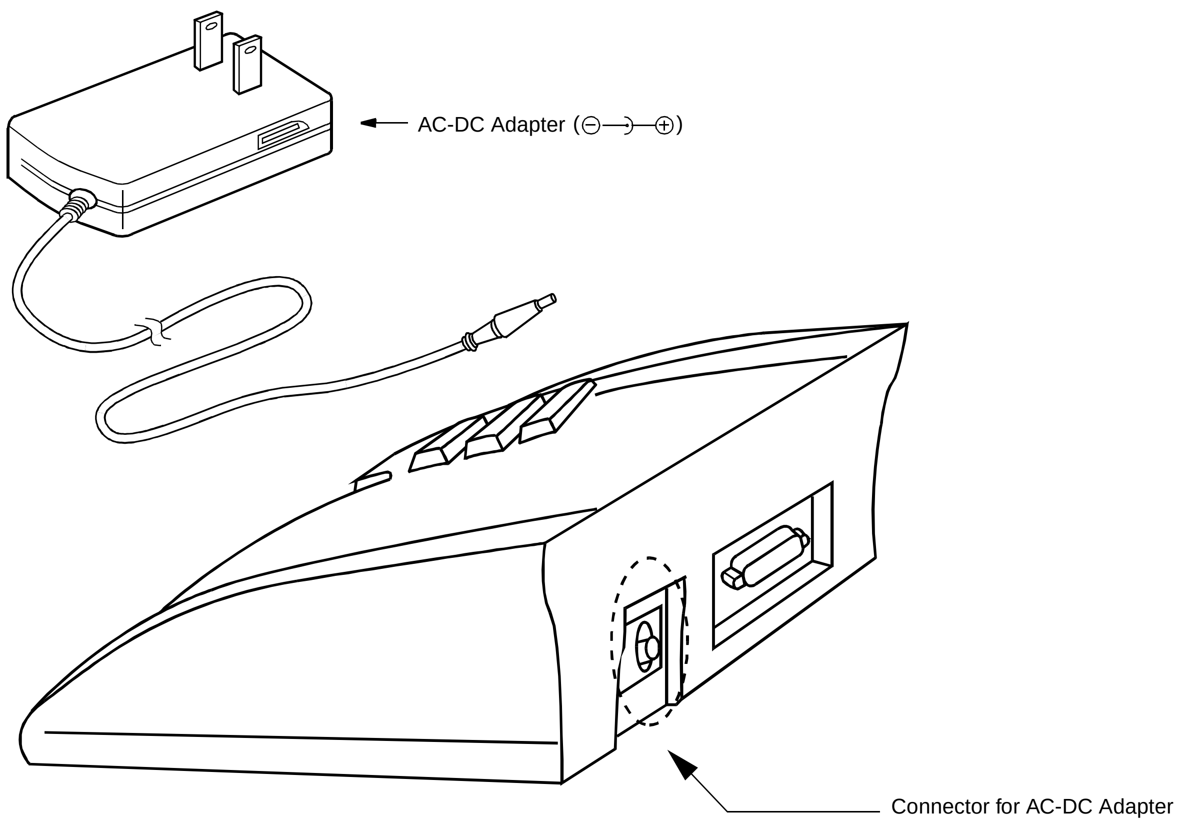


Figure 015-18 Connection of AC-DC Adapter for Add-On Console

- **Configuration Menu**

[General]

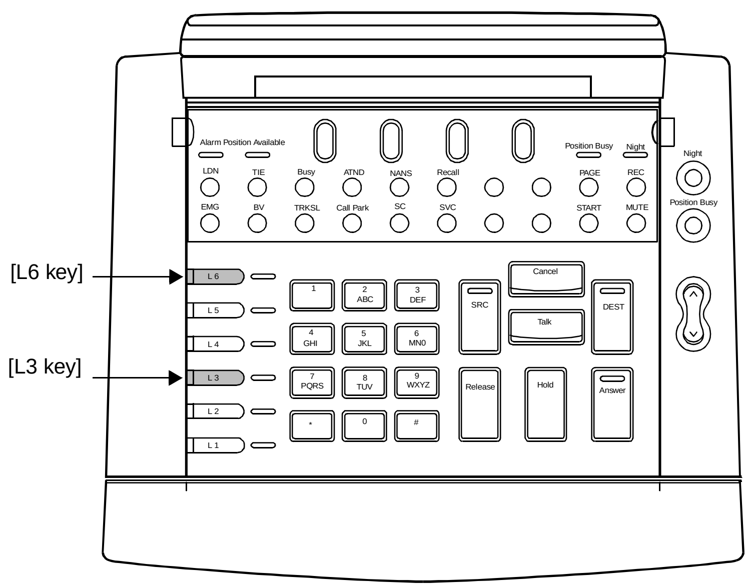
Configuration Menu is used for assigning configuration data for DESK CONSOLE. The menu has the following items:

1. HEADSET/HANDSET
2. HEADSET TYPE
3. MUTE
4. REC CONTROL
5. PAGE CONTROL
6. SUP CONNECTION
7. REC VOLUME
8. BLF
9. HOLD/START/RELEASE SWAP

[Selection of Configuration Item]

1. Displaying Configuration Menu

   a) Turn on the power while pressing the L3 and L6 keys simultaneously.



The first page of Configuration Menu appears on the LCD. Configuration Menu has a total of three pages.

- 1st Page

[CONFIG MENU P1] VER x	DEST: next page
1: HEADSET/HANDSET	Release: exit
2: HEADSET TYPE	Answer: update
3: MUTE	

- 2nd Page

[CONFIG MENU P2] VER x	SRC: prev page
1: REC CONTROL	DEST: next page
2: PAGE CONTROL **Note**	Release: exit
3: SUP CONNECTION	Answer: update

Note: *Do Not change this data.*

- 3rd Page

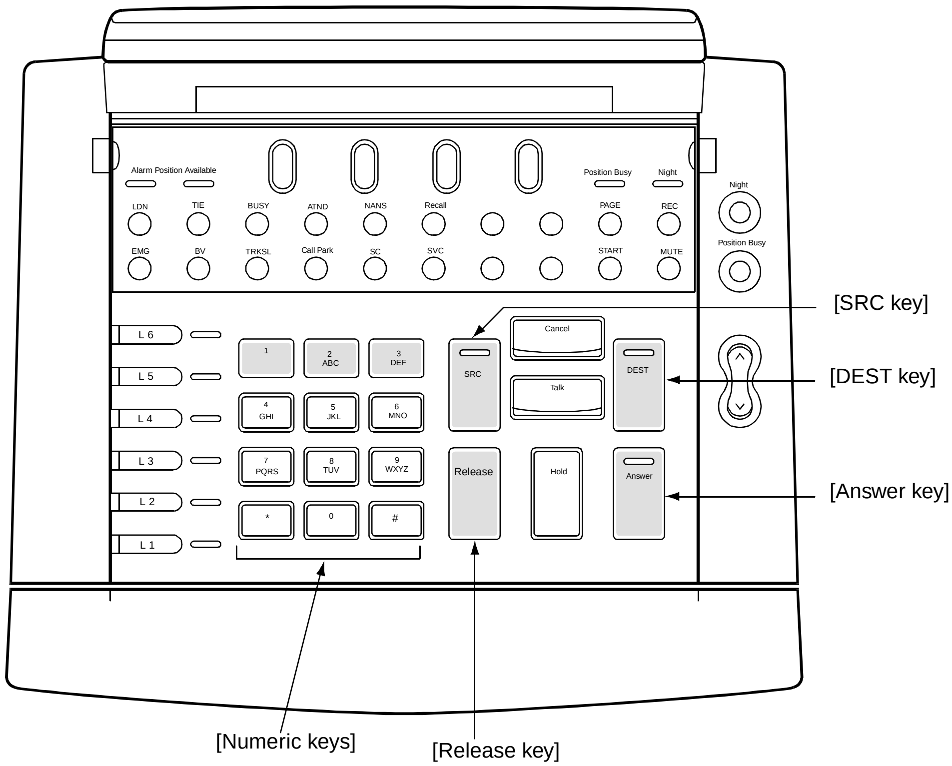
[CONFIG MENU P3] VER x	SRC: prev page
1: REC VOLUME	Release: exit
2: BLF	Answer: update
3: HOLD/START/RELEASE SWAP	

b) When the DEST key is pressed, the display changes to the next page. When returning to the previous page, press the SRC key.

c) When the Release key is pressed, Configuration Menu disappears and the DESK CONSOLE returns to normal operation.

2. Selection of Configuration Item

   Using a numeric key, press the desired number in Configuration Menu. A menu for assigning configuration data appears. Assign configuration data referring to“Assignment of Configuration Data” on the next page.



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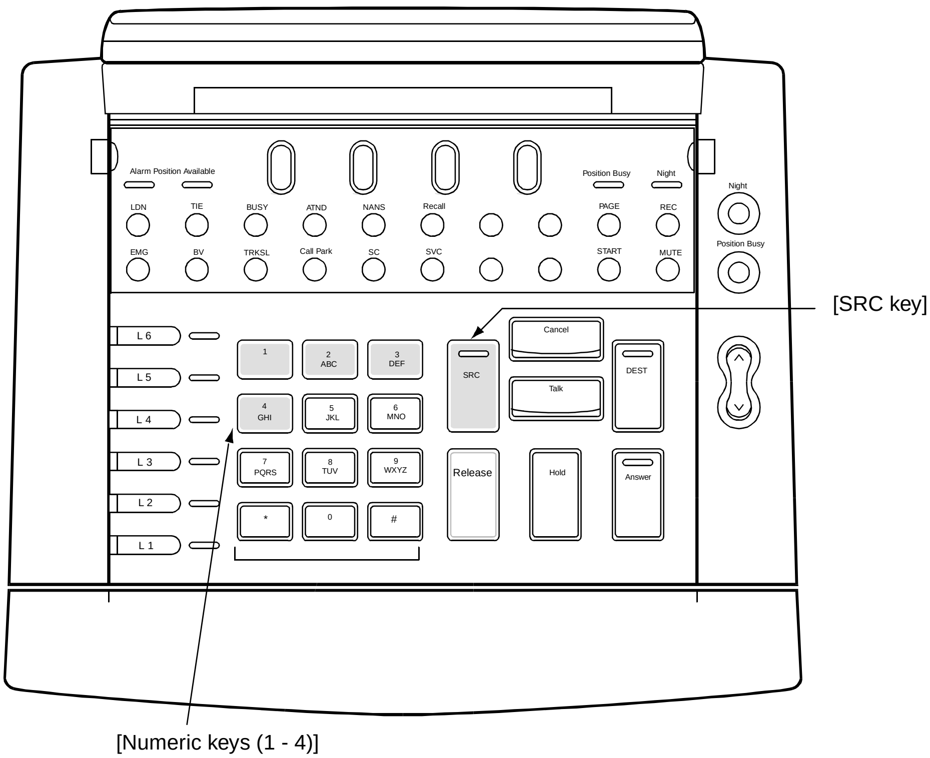
Installation of the DESK CONSOLE and Cable Connection

[Assignment of Configuration Data]

This section explains how to assign each configuration data. When assigning configuration data, the following shaded keys are used.



1. [HEADSET/HANDSET]

This item specifies an optional device connected to the HAND H/S0 connector.

Note: *With regard to the H/S1 connector, only the Headset is connected. Accordingly, data assignment for H/S1 connector is not required.*

a) Press the desired number. An asterisk shows the selected number.

[HEADSET/HANDSET]	SRC: menu
*1: HEADSET	
2: HANDSET	

1: Headset is connected to the HAND H/S0 connector
2: Handset is connected to the HAND H/S0 connector
SRC: Return to Configuration Menu

Note: *Default setting is "1: HEADSET".*

b) Press the SRC key. The display returns to Configuration Menu.

[CONFIG MENU P1] VER x	DEST: next page
1: HEADSET/HANDSET	Release: exit
2: HEADSET TYPE	Answer: update
3: MUTE	

c) When configuration data assignment is finished, proceed to "[Updating Configuration Data]" on Page 260. When the other item is also specified, return to "2. Selection of Configuration Item" on Page 250.

2. [HEADSET TYPE]

This item specifies the type of Headset connected to the H/S1 connector.

a) Press the desired number. An asterisk shows the selected number.

[HEADSET TYPE]	SRC: menu
*1: SUPRA	
2: COROLLE	

1: The type of Headset is “SUPRA”
2: The type of Headset is “COROLLE”
SRC: Return to Configuration Menu

Note: *Default setting is “1: SUPRA”.*

b) Press the SRC key. The display returns to Configuration Menu.

[CONFIG MENU P1] VER x	DEST: next page
1: HEADSET/HANDSET	Release: exit
2: HEADSET TYPE	Answer: update
3: MUTE	

c) When configuration data assignment is finished, proceed to "[Updating Configuration Data]" on Page 260. When the other item is also specified, return to "2. Selection of Configuration Item" on Page 250.

3. [MUTE]

This item specifies On/Off setting of the mute function for the HAND H/S0 or H/S1 connector.
While the mute function is set to On, if the Mute key is pressed, the voice at the DESK CONSOLE side is not sent to the other party.

a) Press the desired number. An asterisk shows the selected number.

[MUTE]	SRC: menu
*1: H/S0 ON, H/S1 ON	
2: H/S0 ON, H/S1 OFF	
3: H/S0 OFF, H/S1 ON	

1: Both H/S0 and H/S1 are set to On
2: Only H/S0 is set to On
3: Only H/S1 is set to Off
SRC: Return to Configuration Menu

Note: *Default setting is “1: H/S0 ON, H/S1 ON”.*

b) Press the SRC key. The display returns to Configuration Menu.

[CONFIG MENU P1] VER x	DEST: next page
1: HEADSET/HANDSET	Release: exit
2: HEADSET TYPE	Answer: update
3: MUTE	

c) When configuration data assignment is finished, proceed to "[Updating Configuration Data]" on Page 260. When the other item is also specified, return to "2. Selection of Configuration Item" on Page 250.

4. [REC CONTROL]

This item specifies the operation mode of a recording device. The following two types of modes are available:

[Manual mode]

Manual mode is available when the REC circuit card is mounted in the system. When the REC key is pressed, the system starts recording and the REC lamp lights. When the REC key is pressed again, the recording stops and the REC lamp goes off.

[Automatic mode]

In Automatic mode, a dedicated recording device is directly connected to the REC connector.
When a call is connected/disconnected, the system starts/ends recording automatically. Note that the REC key is not effective in Automatic mode.

a) Press the desired number. An asterisk shows the selected number.

[REC CONTROL]	SRC: menu
*1: MANUAL	
2: AUTO	

1: Manual mode
2: Automatic mode
SRC: Return to Configuration Menu

Note: *Default setting is “1: MANUAL”.*

b) Press the SRC key. The display returns to Configuration Menu.

[CONFIG MENU P2] VER x	DEST: next page
1: REC CONTROL	Release: exit
2: PAGE CONTROL **Note**	Answer: update
3: SUP CONNECTION	

Note: *Do Not change this data.*

c) When configuration data assignment is finished, proceed to "[Updating Configuration Data]" on Page 260. When the other item is also specified, return to "2. Selection of Configuration Item" on Page 250.

5. [SUP CONNECTION]

This item specifies whether the supervisory console is connected or not.

a) Press the desired number. An asterisk shows the selected number.

```
[SUP CONNECTION]                SRC: menu
*1: NONE
 2: CONNECTED
```

1: Supervisory Console is connected
2: Supervisory Console is not connected
SRC: Return to Configuration Menu

Note: *Default setting is “1: NONE”.*

b) Press the SRC key. The display returns to Configuration Menu.

```
[CONFIG MENU P2] VER x          SRC: prev page
1: REC CONTROL                  DEST: next page
2: PAGE CONTROL Note            Release: exit
3: SUP CONNECTION               Answer: update
```

Note: *Do Not change this data.*

c) When configuration data assignment is finished, proceed to "[Updating Configuration Data]" on Page 260. When the other item is also specified, return to "2. Selection of Configuration Item" on Page 250.

6. [REC VOLUME ADJUSTMENT]

This item specifies the recording level of the received voice from the other party. Note that the voice level at the operator side cannot be adjusted.

a) Press the desired number. An asterisk shows the selected number.

```
[REC VOLUME ADJUSTMENT]     SRC: menu
 1: +2dB           4: -8dB
*2: 0dB
 3: -4dB
```

1: +2dB Up
2: 0dB (Standard level)
3: -4dB Down
4: -8dB Down
SRC: Return to Configuration Menu

Note: *Default setting is “2: 0dB”.*

b) Press the SRC key. The display returns to Configuration Menu.

```
[CONFIG MENU P3] VER x       SRC: prev page
1: REC VOLUME                Release: exit
2: BLF                       Answer: update
3: HOLD/START/RELEASE
```

c) When configuration data assignment is finished, proceed to "[Updating Configuration Data]" on Page 260. When the other item is also specified, return to "2. Selection of Configuration Item" on Page 250.

7. [BLF]

This item specifies On/Off setting of the BLF function. When using BLF function, system data assignment is also required.

a) Press the desired number. An asterisk shows the selected number.

```
[BLF]                    SRC: menu
 1: ENABLE
*2: DISABLE
```

1: BLF Available
2: BLF Not available
SRC: Return to Configuration Menu

Note: *Default setting is “2: DISABLE”.*

b) Press the SRC key. The display returns to Configuration Menu.

```
[CONFIG MENU P3] VER x          DEST: next page
1: REC VOLUME                   Release: exit
2: BLF                          Answer: update
3: HOLD/START/RELEASE SWAP
```

c) When configuration data assignment is finished, proceed to "[Updating Configuration Data]" on Page 260. When the other item is also specified, return to "2. Selection of Configuration Item" on Page 250.

NAP-200-015	
Sheet 40/41	
Installation of the DESK CONSOLE and Cable Connection	

8. [HOLD/START/RELEASE/SWAP]

This item specifies the locations of HOLD, START and RELEASE key.

a) Press the desired number. An asterisk shows the selected number.

[HOLD/START/RELEASE/SWAP]	SRC: menu
*1: ORIGINAL	
2: SWAPPED	

1: Original setting
2: Swapped setting

Note: *The locations of each key changes as shown below.*

Original setting	Swapped setting
RELEASE	START
HOLD	RELEASE
START	HOLD

SRC:Return to Configuration Menu

Note: *Default setting is "1: ORIGINAL".*

b) Press the SRC key. The display returns to Configuration Menu.

[CONFIG MENU P3] VER x	DEST: next page
1: REC VOLUME	Release: exit
2: BLF	Answer: update
3: HOLD/START/RELEASE	

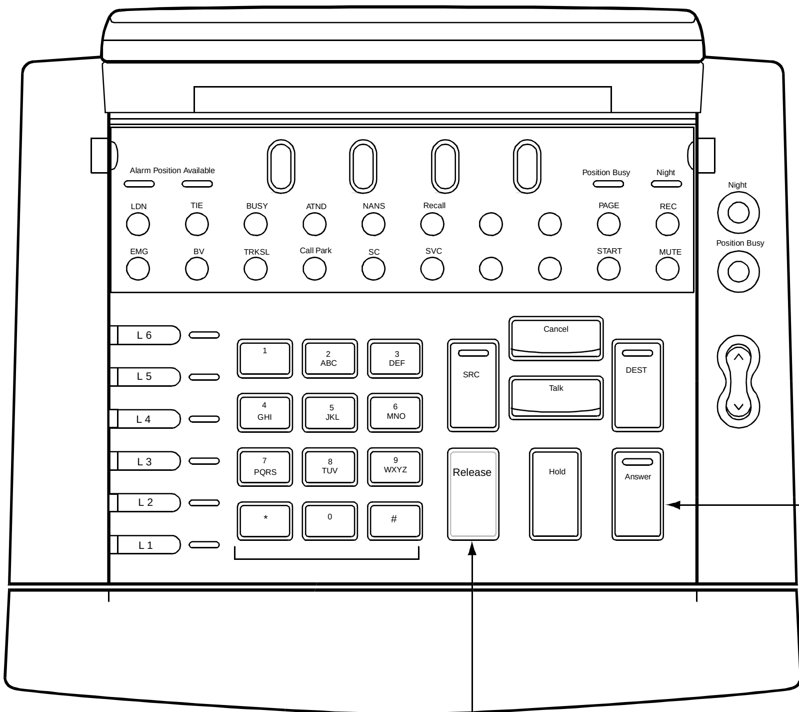
c) When configuration data assignment is finished, proceed to "[Updating Configuration Data]" on Page 260. When the other item is also specified, return to "2. Selection of Configuration Item" on Page 250.

NAP-200-015
Sheet 41/41
Installation of the DESK CONSOLE and Cable Connection

[Updating Configuration Data]

When configuration data assignment is complete, update configuration data according to the procedure below. When the RELEASE key is pressed, update is cancelled.

While one of the Configuration Menu is displayed on the LCD, press the ANSWER key.
Configuration data is updated and the DESK CONSOLE is automatically restarted.



[Answer key] (Update)

[Release key] (Cancel)

NAP-200-016
Sheet 1/9
Installation of the Maintenance Administration Terminal (MAT) and Cable Connections

This NAP explains the installation of the MAT (Maintenance Administration Terminal) and the System Message Printer focusing on their cable connections.

1. INSTALLATION OF MAT AND CABLE CONNECTIONS

START

- Preparation of the MAT — Set up the Personal Computer, CRT Display, Printer, and so on.
- Cable Connection — Connect the cables between the MAT and the PBX referring to Figures 016-1 and 016-2.

END

NAP-200-016
Sheet 2/9
Installation of the Maintenance Administration Terminal (MAT) and Cable Connections

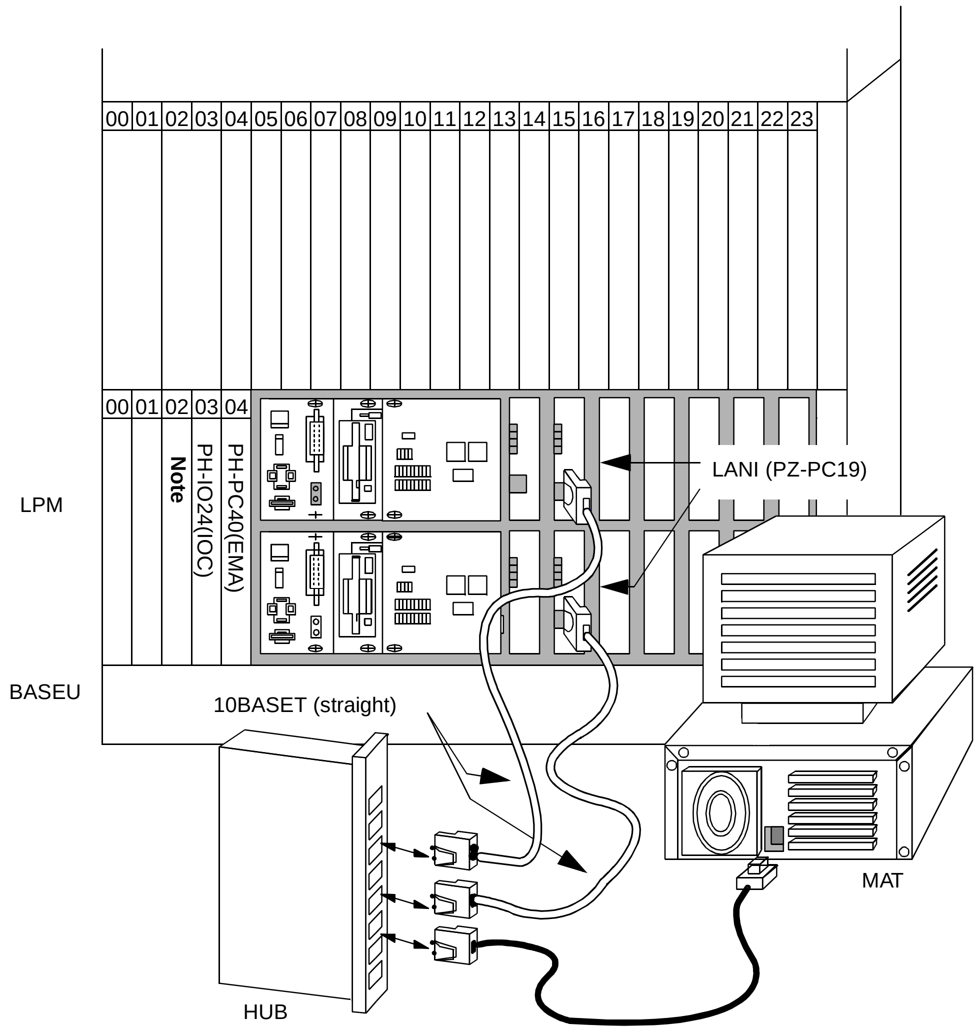
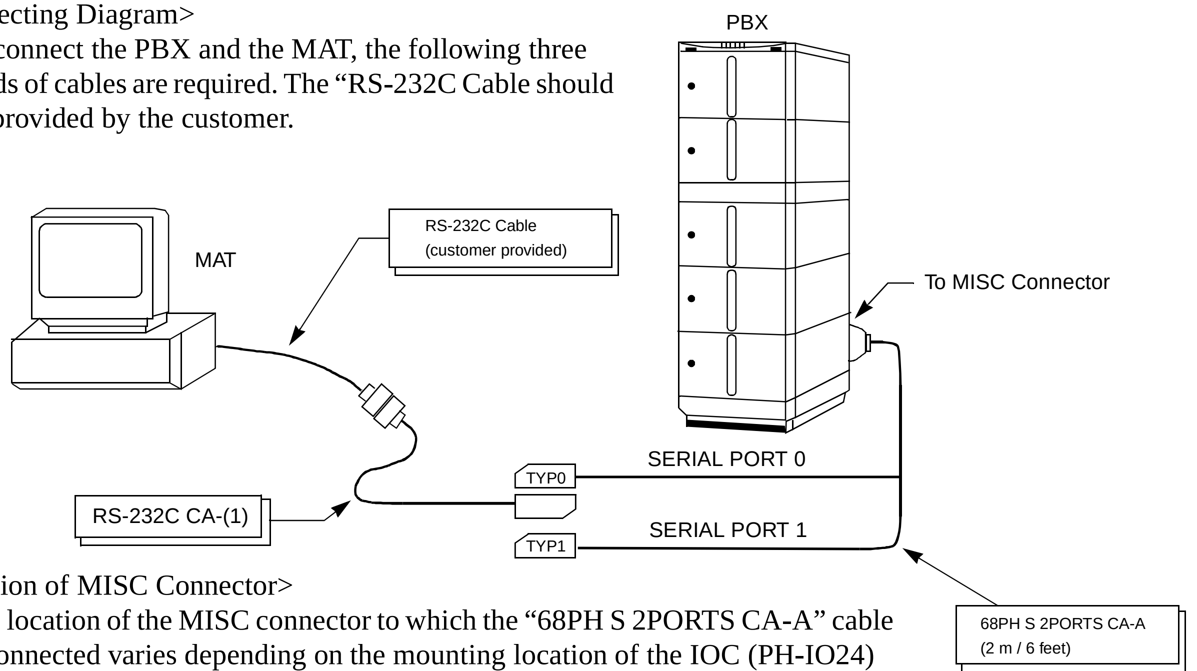


Figure 016-1 Cabling of MAT when Using Ethernet

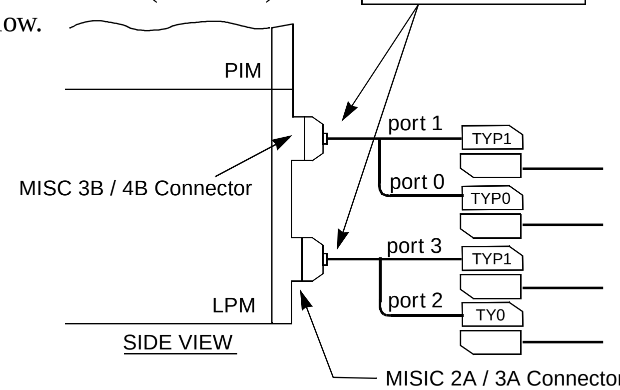
<Connecting Diagram>

- To connect the PBX and the MAT, the following three kinds of cables are required. The “RS-232C Cable should be provided by the customer.

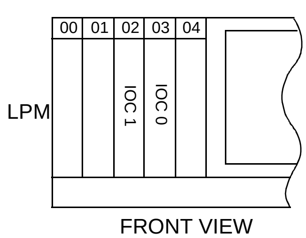


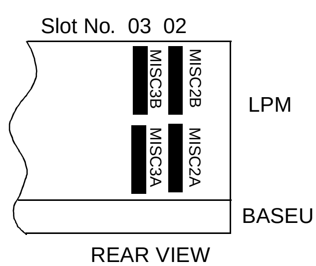
<Location of MISC Connector>

- The location of the MISC connector to which the “68PH S 2PORTS CA-A” cable is connected varies depending on the mounting location of the IOC (PH-IO24) card and the IOC port number (0 ~ 3). See the table below.



Slot No.	Port No.	MISC Connector
02	IOC Port 0	MISC 2B
	IOC Port 1	
	IOC Port 2	MISC 2A
	IOC Port 3	
03	IOC Port 0	MISC 3B
	IOC Port 1	
	IOC Port 2	MISC 3A
	IOC Port 3	





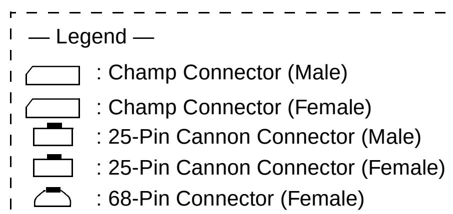


Figure 016-2 Cable Connection Diagram for the MAT

2. INSTALLATION OF MAT AND CABLE CONNECTION BY USING MODEM

Note: *When the distance between the PBX and the MAT (Maintenance Administration Terminal) exceeds 15 meters (50 feet), connect them with Modems as shown in Figure 016-3.*

START

- Preparation of the MAT —— Set up the Personal Computer, CRT Display, Printer, and so on.
- Preparation of the modems —— Set up the modems referring to its instruction book.
- Cable connection —— Connect the cables referring to Figure 016-3.

END

- To connect the PBX and the MAT, the following four kinds of communication cables are required. The "RS-232C Cable" should be provided by the customer.

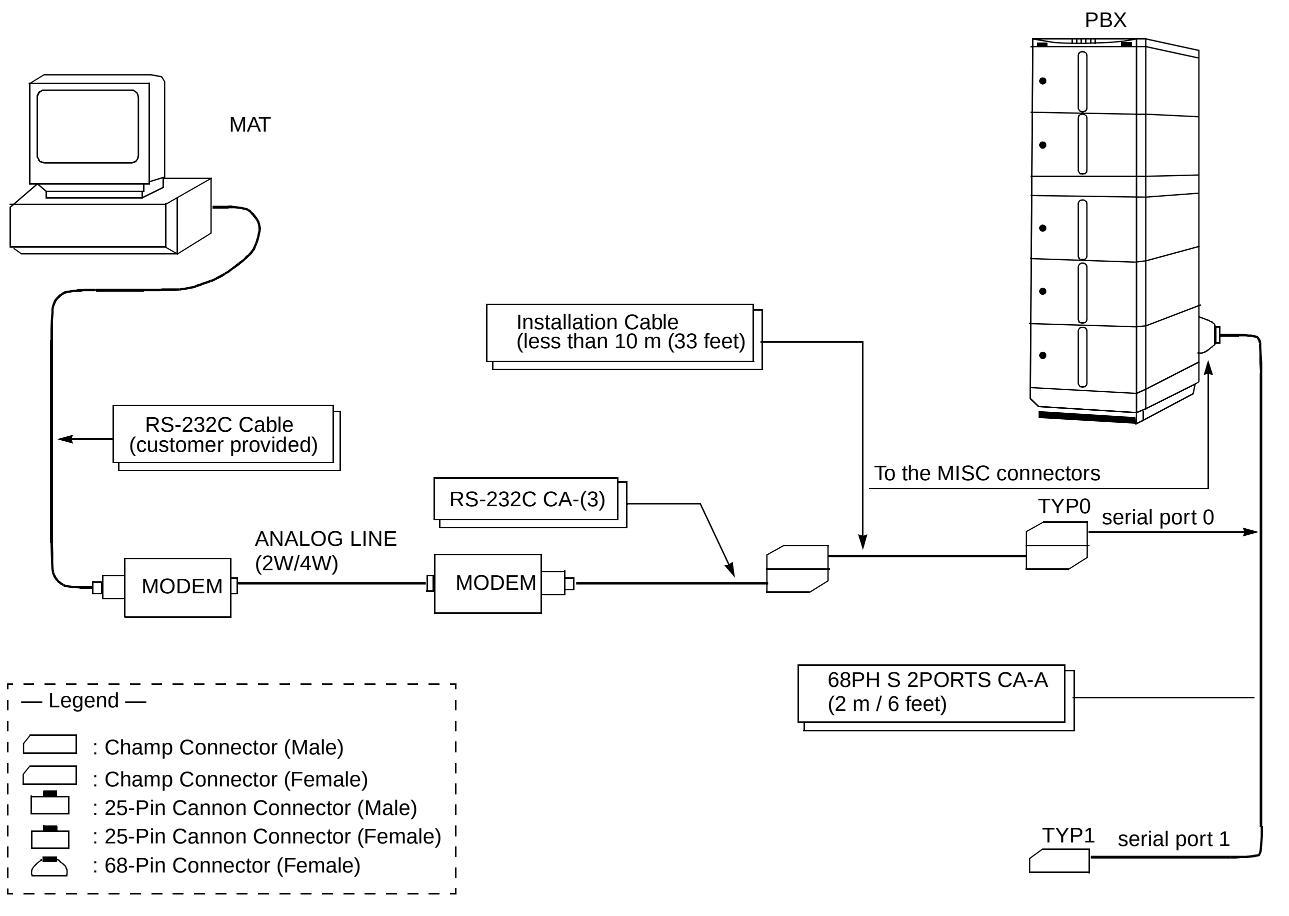


Figure 016-3 Cabling of MAT Using Modems

3. INSTALLATION OF SYSTEM MESSAGE PRINTER AND CABLE CONNECTIONS

START

- Installing printer —— Install printer according to its instructions.
- Cable connection —— Connect the cable between the PBX and the dedicated System Message Printer which is equipped with a parallel port referring to Figure 016-4.

END

- To connect the PBX and the dedicated SYSTEM MESSAGE PRINTER, the following three kinds of communication cables are required. The "RS-232C Cable" should be provided by the customer.

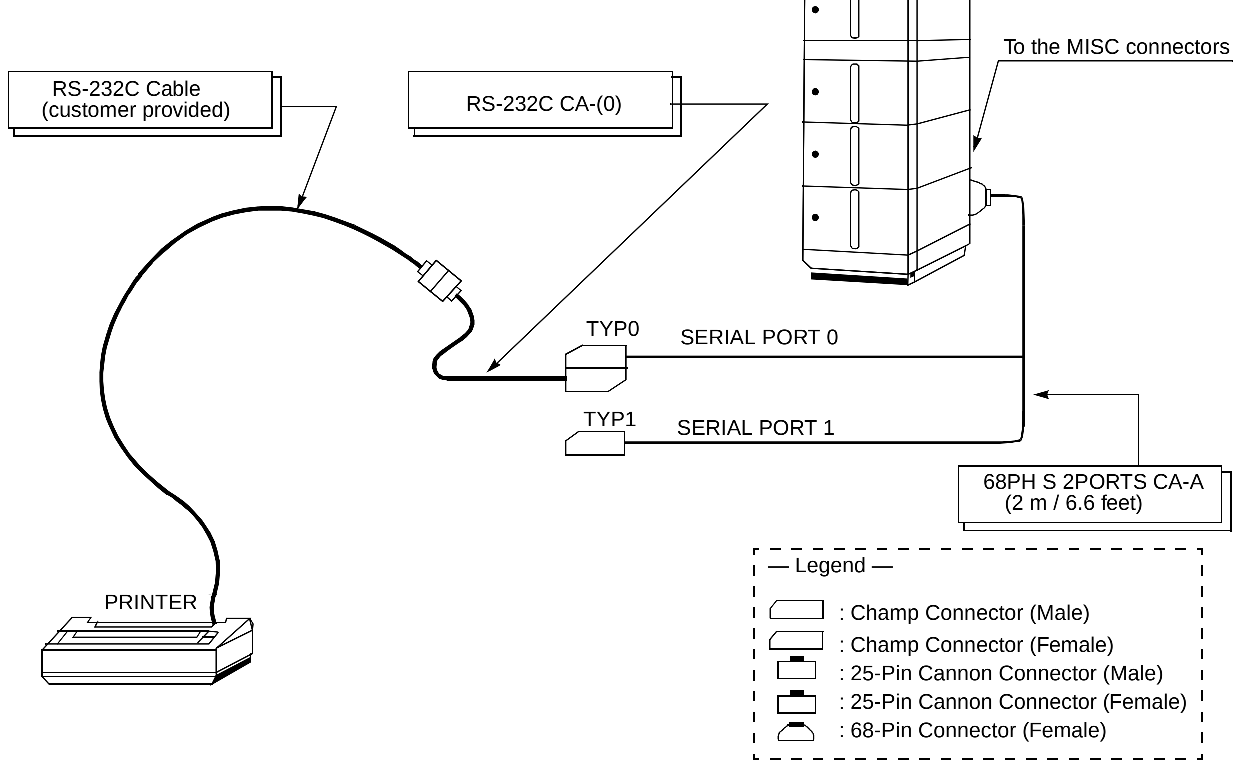


Figure 016-4 Connection of System Message Printer

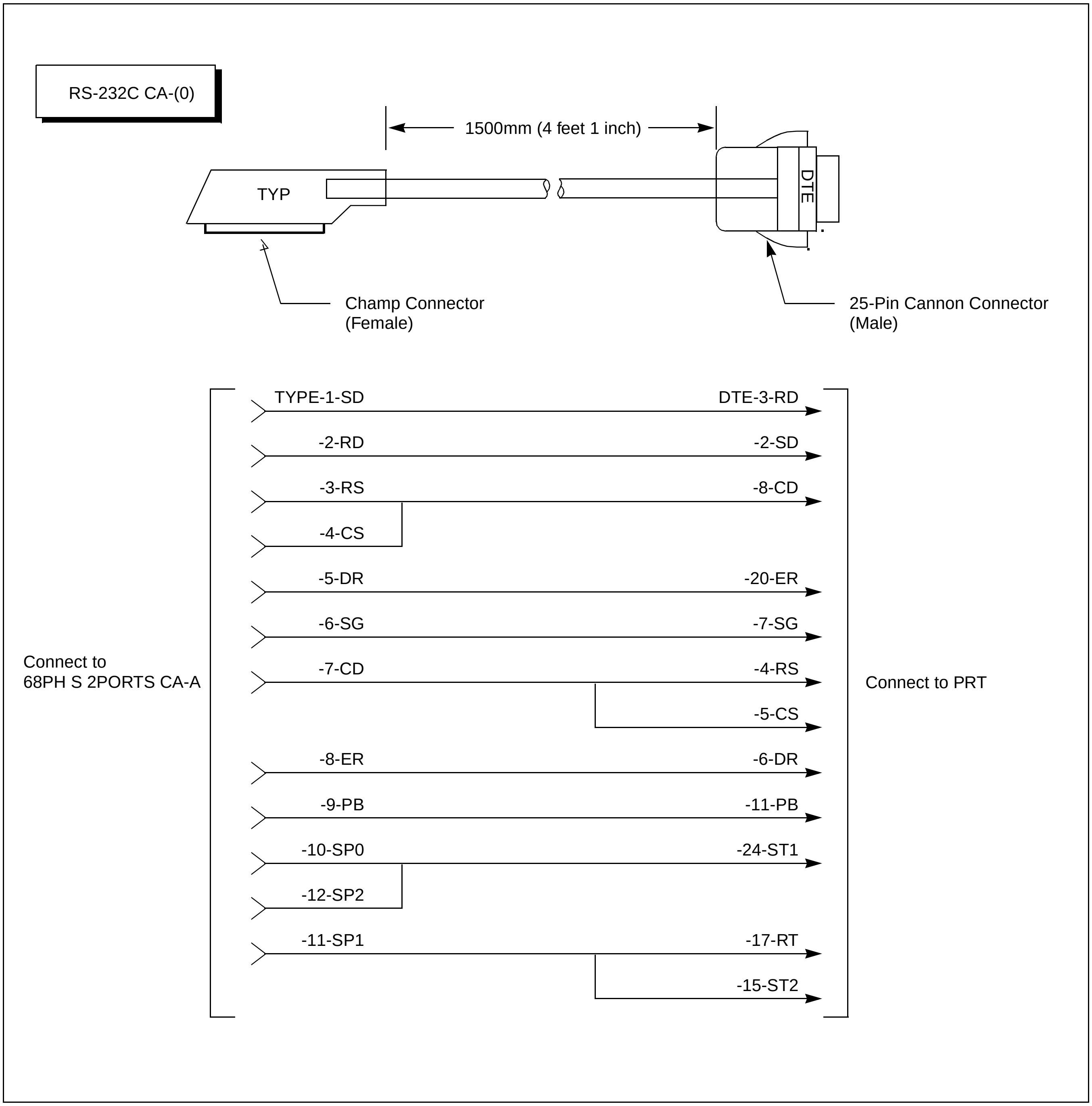


Figure 016-5 Detail of RS-232C CA-(0)

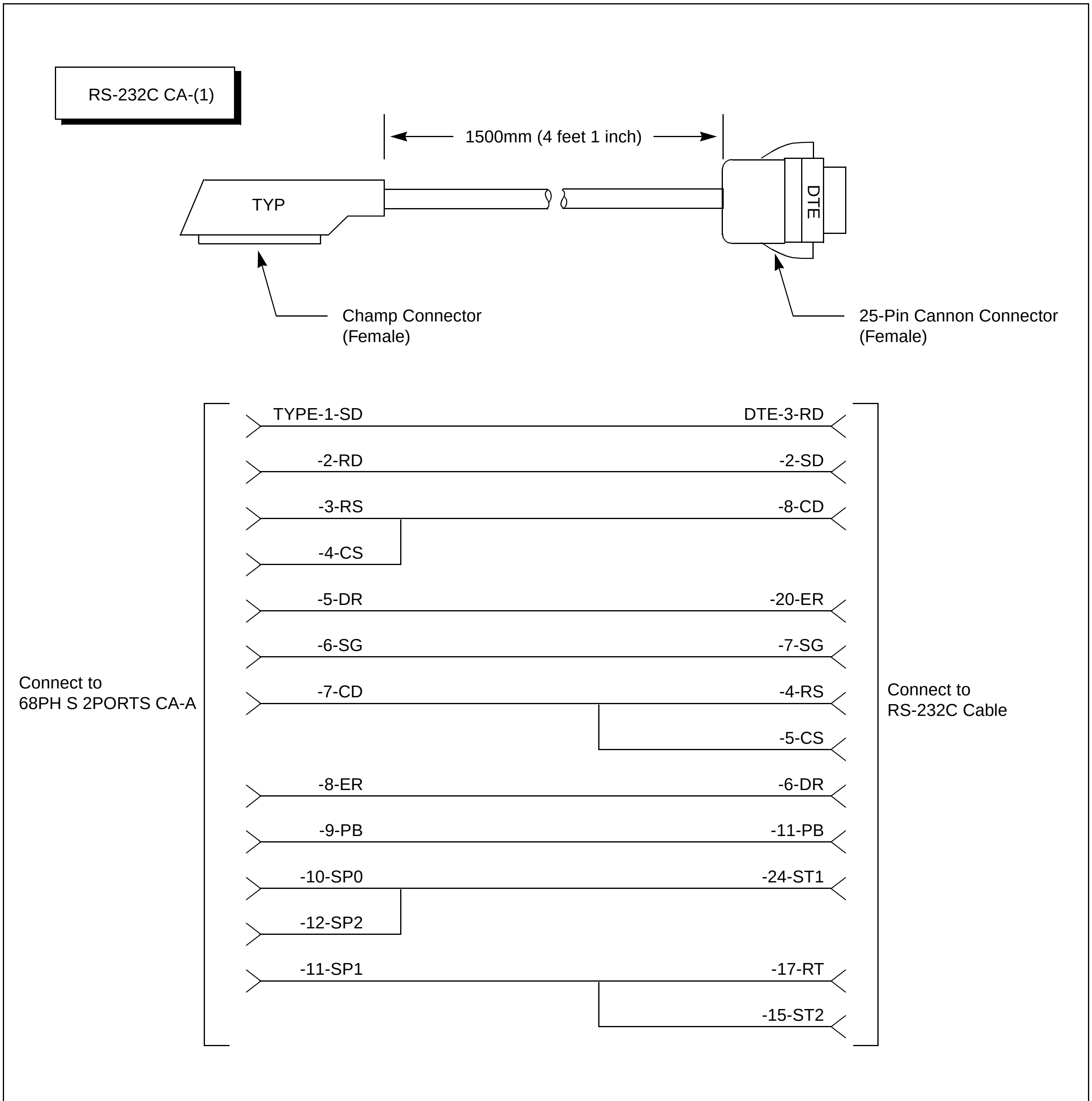


Figure 016-6 Detail of RS-232C CA-(1)

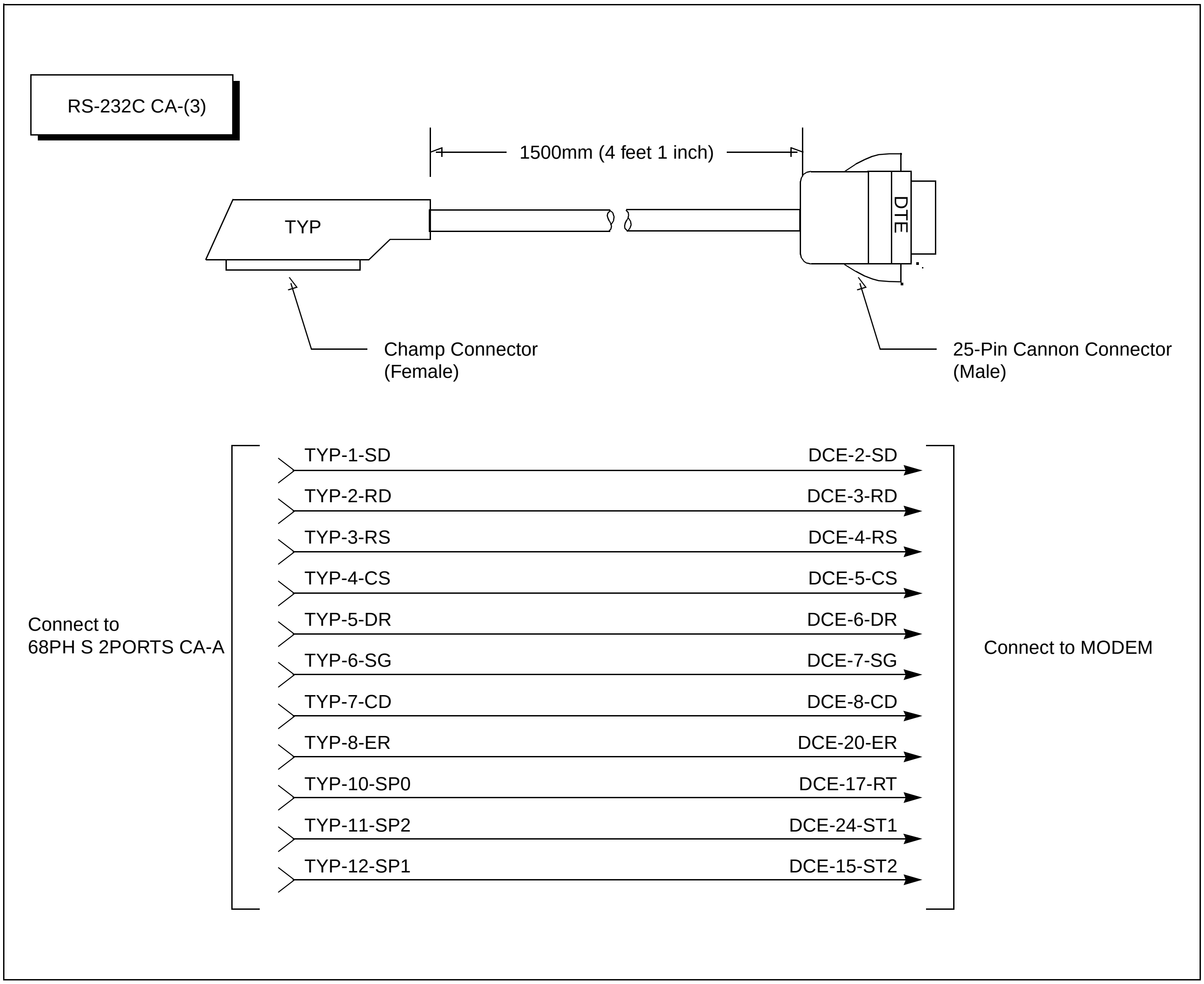


Figure 016-7 Detail of RS-232C CA-(3)

NAP-200-017
Sheet 1/3
Connections of SMDR

This NAP explains the cable connection of SMDR equipment.

Note: *The IOC circuit card (PH-IO24), which has four RS-232C interfaces, can be mounted in the slot Number 3 and/or 2 of the LPR. Consequently, the system can have maximum eight ports for the RS-232C terminals.*

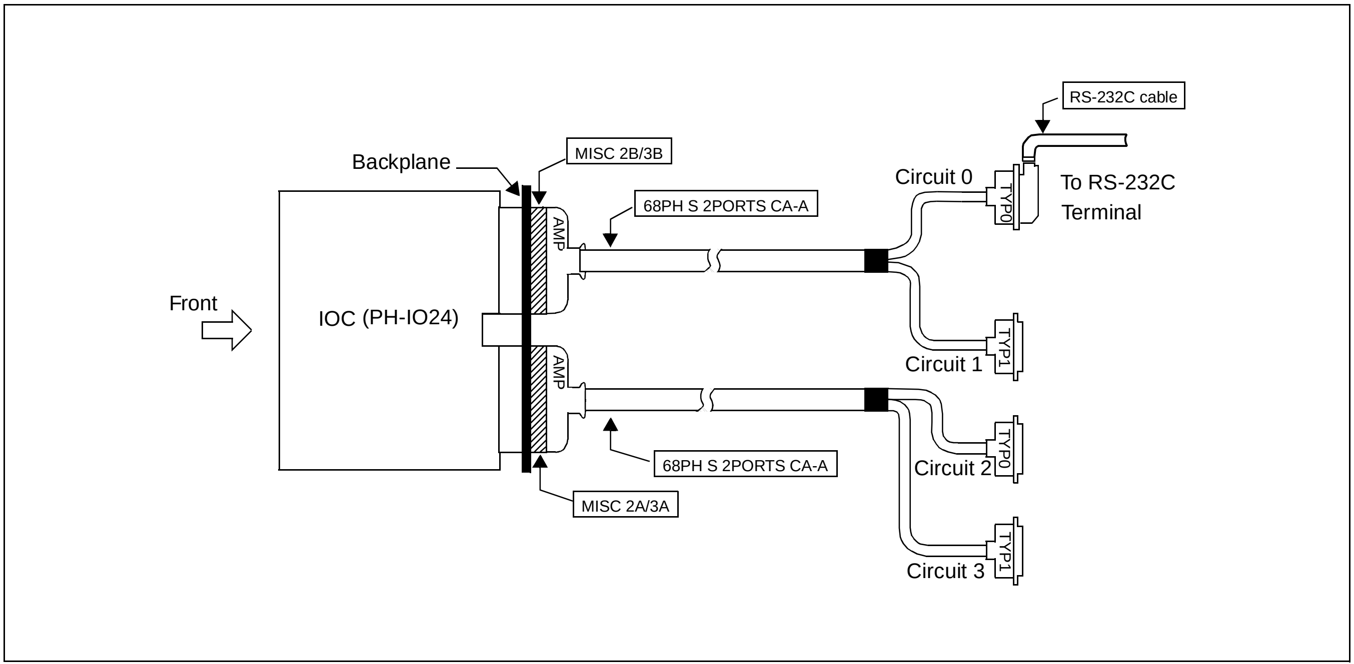


Figure 017-1 I/O Port Interface

The SMDR RS-232C interface specifications are:

- *Synchronization* — *Asynchronous*
- *Data Speed* — *9600 bps (maximum)*
- *Code* — *ASCII 7-bit + Parity Bit*
- *Maximum Distance* — *15 meters (50 feet) without Modems.*

START

- Installation of SMDR equipment
- Cable connection ———— Connect the cables referring to Figure 017-2.
  - Refer to Figure 017-3 when the length of the cables exceeds 15 meters (49.5 feet).

END

NAP-200-017
Sheet 2/3
Connections of SMDR

- The location of MISC connector to which “68PH S 2PORTS CA-A” cable is connected varies depending on the mounting location of the IOC (PH-IO24) card and the designated IOC port number (0 ~ 3).

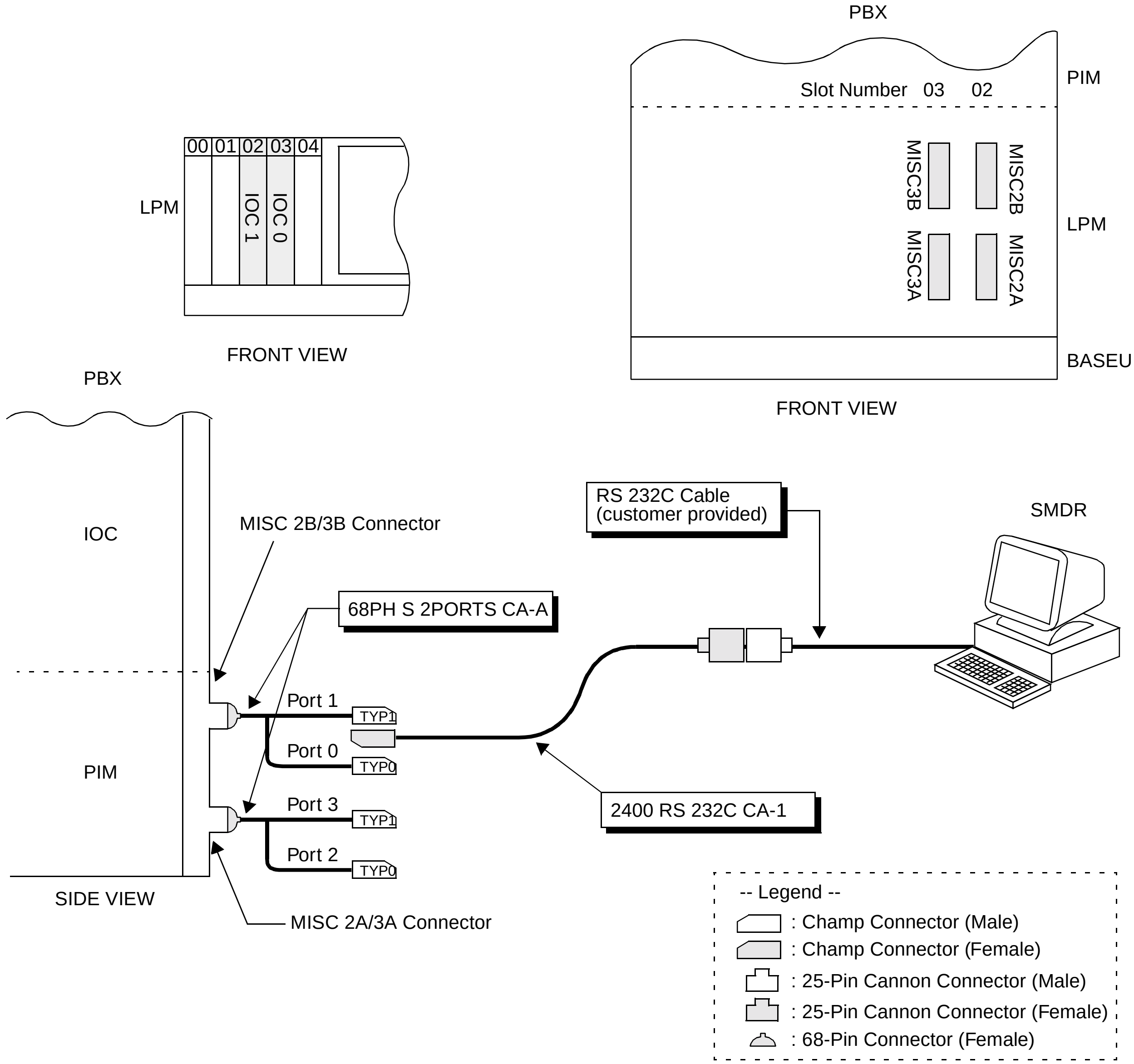


Figure 017-2 Cable Connection Diagram for the SMDR Equipment

NAP-200-017
Sheet 3/3
Connections of SMDR

- The location of MISC connector to which “68PH S 2 PORTS CA-A” cable is connected varies depending on the mounting location of the IOC (PH-IO24) card and the designated IOC number (0 ~ 3).

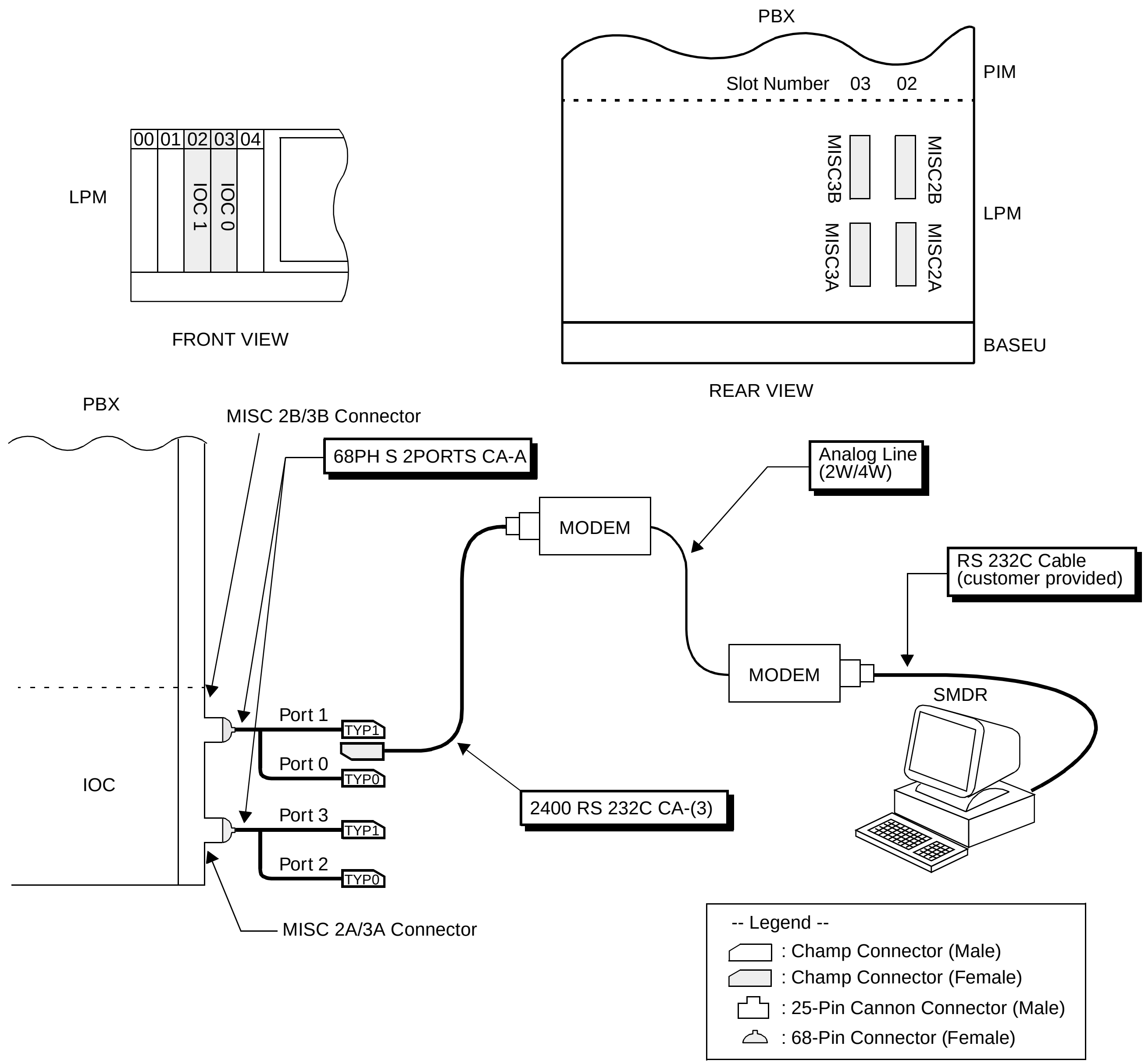


Figure 017-3 Connection of SMDR by Using MODEM

CHAPTER 4 SYSTEM STARTUP

1. GENERAL

This chapter describes the method to start up the system initially after completion of the installation of the PBX, and the method to check as to whether the system has started up normally. Before beginning the system startup, thoroughly read Section 2., "PRECAUTIONS BEFORE BEGINNING SYSTEM STARTUP" in this chapter, and observe the precautions while performing the system startup. Failure to so may delay the system cutover or may result in damage to the system equipment.

2. PRECAUTIONS BEFORE BEGINNING SYSTEM STARTUP

1. The system is to be started up using the basic system data.
2. When starting up the system, it is necessary to start up theMAT.
3. The following preparatory steps must be completed before the tests are begun:
   - All circuit card switches should be correctly set.
   - Flat cables should be securely connected.
   - CHAMP connectors should be securely connected.
   - All connector-ended cables should be secured at both ends.
   - The –48 V (Blue) and G (Red) power supply leads must be correctly connected.
   - An earth lead (less than 10 ohms) must be connected to the communication ground.
   - The installer should confirm at this point that all installation steps have been completed.
4. Do not place any object (a tool, manual, etc.) on top of the Module Group or within a unit (module).
   - An object such as a book, when placed on top of the Module Group, will adversely affect heat dissipation from the Module Group.
   - If an object placed on top of the Module Group or left within a unit (module) falls out, it may cause backplane pins, circuit cards, etc. to short-circuit.
5. Before initially turning ON power to the system, read the Power On Procedure (NAP-200-018).
   - Until the normal operation of all circuit cards has been confirmed, leave power ON only during testing.
6. Observe the temperature in the switch room.
   - Does the air-conditioning function properly at night?
   - Does the temperature fluctuate constantly because people go in and out frequently, or rise above the recommended level due to excessive heat being generated by any single piece of equipment?
   - The fan should be left ON constantly until the installation tests are completed.

7. A floppy disk (FD) copy of the programmed Office Data should be created. If a backup is not made, and the contents of the Data Memory are accidentally altered or destroyed, all the Office Data will have to be programmed again.

8. If any portion of the Office Data (especially data related to ringing patterns) has been changed via commands “ARTD/ARTDN,” “AKYD,” or “ASYD/ASYDL/ASYDN,” the system must be initialized and tests involving the changed data must be performed.

9. After the system is initialized, perform the following.

   - Set the current date and time using MAT command “ATIM/ATIMN.”
   - When the system is initialized, the system begins operating in Day Mode. To change over to Night Mode, press the NITE key on the Attendant Console.
   - If no Attendant Console is equipped, the system begins operating in night mode.

10. The following cross connections must be made at the MDF:

    - Complete necessary cross connections by extracting the related circuit cards from their mounting slots or by disconnecting the circuits with a cut plug if test springs are in use.
    - If the connection to a D^{term} is made incorrectly, the electronic fuse of the circuit card will blow out.

      (Repair Method: Correct the cross connections and flip the MB switch on the card Down-Up-Down).
    - While a test is in progress, do not perform cross connections without first consulting with the person conducting the test (Ringing signal: AC 20 Hz, effective value 90 V, may be flowing through the terminals).
    - Remove all temporary cross connections after the tests have been performed (If Office Data was assigned for test purposes, restore the original Office Data).

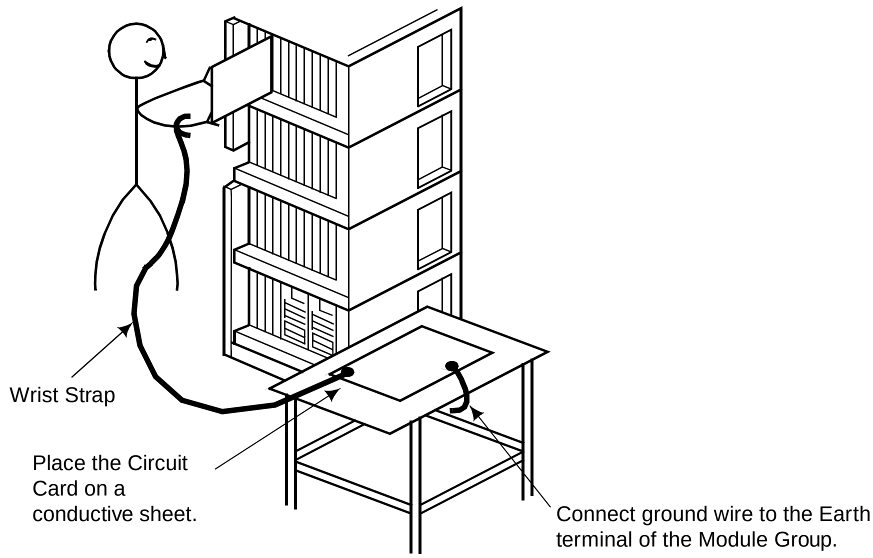
11. Observe the following when connecting cables:

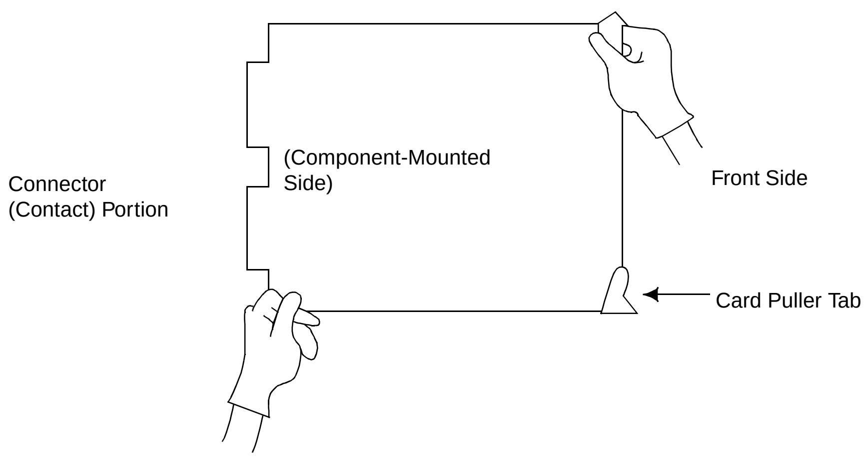
    - Before connecting or disconnecting the control cable (Front & Backplane), turn OFF the power to the Module Group (LPM / PIM etc).
    - Before connecting or disconnecting a CHAMP connector, turn OFF the power to the Module Group. This will prevent an accident from occurring in the event that a metal object such as a screw, screwdriver, etc. accidentally contacts the backplane circuitry or pins.
    - When connecting or disconnecting the connector cable of the Attendant Console, first set the MB switch on the ATI circuit card to the UP position, then connect/disconnect the cable.

12. Precautions when Handling Circuit Cards

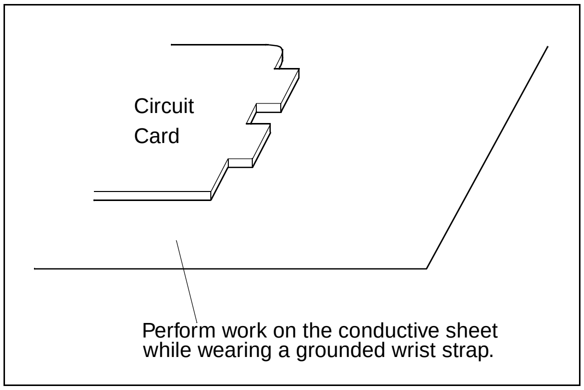
    - When handling a circuit card, use a Field Service Kit to protect against static discharge (example: 3M No. 8012 Portable Field Service Kit; available from NEC).
    - When touching a circuit card, be sure to wear the grounded wrist strap provided with the Portable Field Service Kit.
    - Set the MB switch to the UP position and extract the circuit card from its mounting slot.

- When holding a circuit card with bare hands, do not touch the component mounted side of the card or the connector portion.





- When placing a circuit card on a table or other flat surface, spread out a conductive sheet and set the card on the sheet.



- Set the MB switch of the circuit card to the UP position and confirm its mounting slot **(Note)**. Then insert the card into its mounting slot.

Note: *Confirm that the color of the card puller tab is the same as the color of the label showing the Slot Number.*

3. SYSTEM STARTUP PROCEDURE

The NAPs indicated in the following flowchart describe the procedures for powering on, starting up the system, assigning Office Data, and checking the startup conditions.

START

- Power ON: NAP-200-018
- Program Install/Load: NAP-200-019
- Office Data Assignment: NAP-200-020
- Check of Lamp Indication and System Messages: NAP-200-021
- Check of Alarm Lamps of the TOPU: NAP-200-022

END

NAP-200-018
Sheet 1/2
Power ON

ATTENTION
Contents
Static Sensitive
Handling
Precautions Required

START

- **Visual Inspection**
  - Check whether any pins are shorting on the backplane of each Module.
  - Check whether any foreign matter such as a cleaning fluid residue is present on the connector portion of the circuit cards.
  - On each circuit card equipped with ROM (CPU, etc.), check whether any pins of the ROM are bent or improperly seated.
- **Leave all circuit cards inserted halfway**
  - Mount all circuit cards (including PWR Supplies) in the Module, leaving them inserted only halfway. (They should not be inserted into their connectors.)
- **Check input voltage**
  - Check insulation across the -48 V and G terminals on the power receiving terminal of the Base Unit.
  - Turn power to the rectifier ON and check the voltage (DC -48V ± 5V) and its polarity on the power receiving terminal of the Base Unit.
- **Turn ON Fan Units**
  - Turn FAN UNIT ON.
  - Verify that air is blown upwards.
  - If the Fuse blows, the input polarity is reversed.
  - Turn OFF the FAN UNIT.
  - Correct polarity, replace the fuse and turn FAN UNIT ON.
  - Verify that the FAN blows air upwards.
- **Check PWR Supply**
  - Check the Power Supplies for each Module one at a time. Check Steps:
    1. Turn circuit breaker OFF and insert the PWR Supply.
    2. Turn circuit breaker ON (See Note).
    3. Various lamps (Green) illuminate.
    4. Observe the PWR Supply for a while and confirm that nothing abnormal (unusual smell, smoke, etc.) occurs.
    5. Turn the circuit breaker ON/OFF a few times and observe the condition.
    6. Turn the circuit breaker OFF and remove the PWR Supply.

Note: *If a Module is equipped with dual PWR Supplies, they must be turned ON/OFF simultaneously.*

A

NAP-200-018
Sheet 2/2
Power ON

A

- **Insert all PWR Supplies** — Insert all PWR Supplies into their positions.
  Insertion Steps:
  1. Turn each Power Supply's circuit breaker OFF and insert them one at a time.
  2. Turn circuit breakers ON.
  3. Confirm that there are no abnormal indications (unusual smell, smoke, alarm, etc.)

- **Insert and check Line/Trunk circuit cards** — Insert Line (16LC, etc.) and Trunk (16COT, etc.) circuit cards into their backplane connectors one at a time and confirm that no fuses are blown in the process.
  Check Steps:
  1. Set MB switch UP and insert the card.
  2. Set MB switch DOWN.
  3. Confirm that there are no abnormal indications.
  4. Set MB switch UP and remove the card.

- **Insert and check control system cards** — Insert control system circuit cards (TSW, MUX, etc.) one at a time and confirm that no fuses are blown in the process.
  Check Steps:
  1. Set MB switch UP and insert the card.
  2. Set MB switch DOWN.
  3. Confirm that there are no abnormal indications.
  4. Set MB switch UP and remove the card.

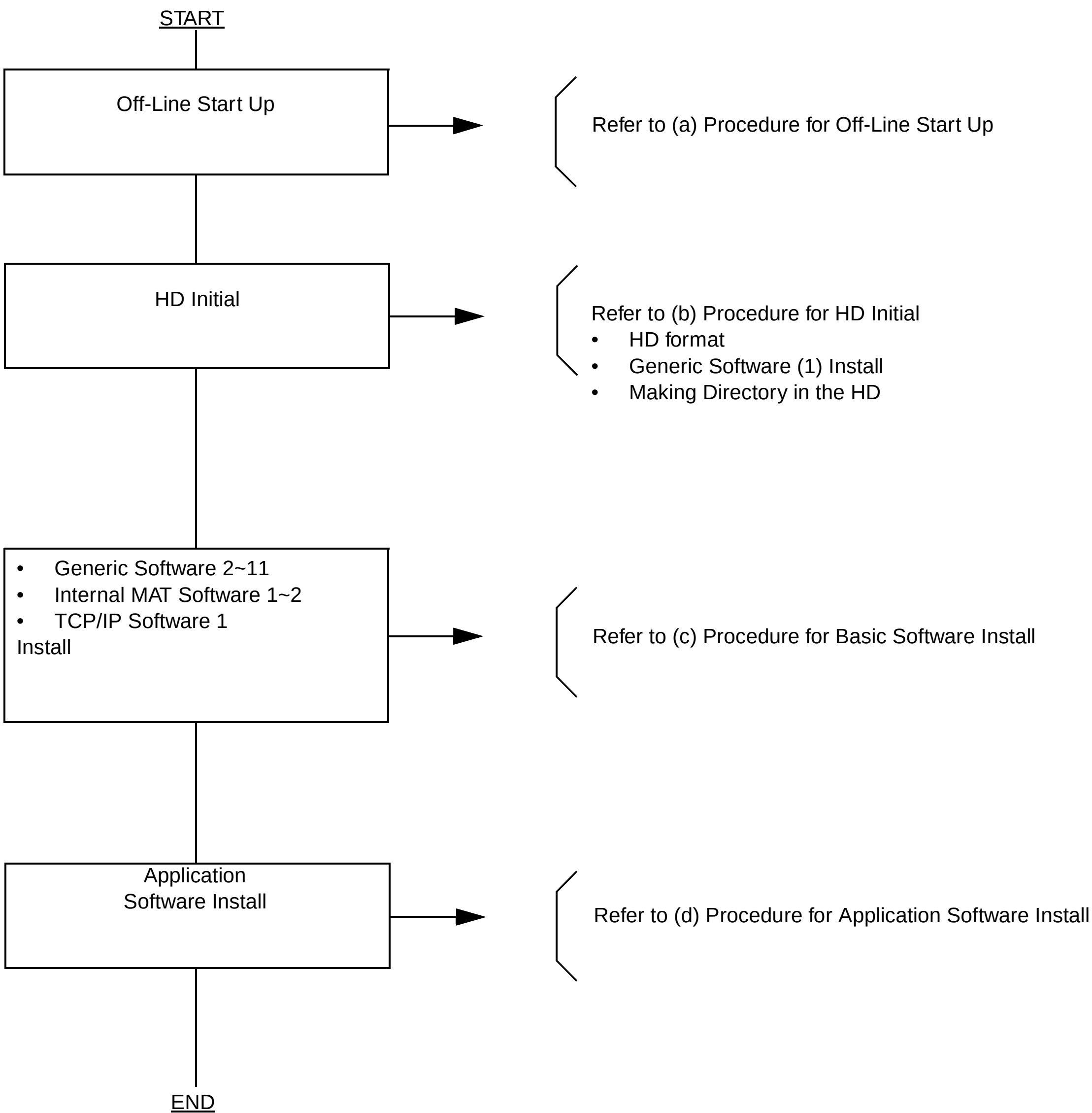
Note: *If a Module contains dual PWR Supplies, they must be turned ON or OFF simultaneously.*

<Power ON Procedure>For LNs: IMG3 → IMG2 → IMG1 → IMG0
IMG3: PIM0 → PIM1 → PIM2 → PIM3
IMG2: TSWM1 → PIM0 → PIM1 → PIM2 →PIM3
IMG1: TSWM0 → PIM0 → PIM1 → PIM2 → PIM3
IMG0: CPR0 → CPR1 → PIM0 → PIM1 → PIM2 → PIM3
For ISW: CPR0 → CPR1 → ISWM
<Power OFF Procedure>For LNs:IMG3 → IMG2 → IMG1 → IMG0
IMG3: PIM3 → PIM2 → PIM1 → PIM0
IMG2: PIM3 → PIM2 → PIM1 → PIM0 → TSWM1
IMG1: PIM3 → PIM2 → PIM1 → PIM0 → TSWM0
IMG0: PIM3 → PIM2 → PIM1 → PIM0 → CPR1 → CPR0
For ISW: ISWM → CPR1 → CPR0

END

NAP-200-019
Sheet 1/6
Program Install and Load

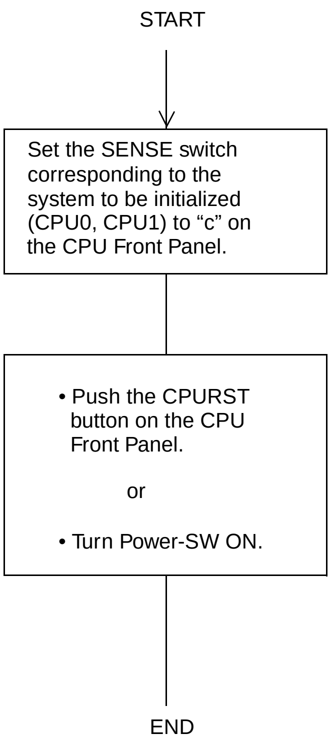
Procedure for Program Install consists of the following items.
Perform the procedures below for all the LNs and ISW, individually:



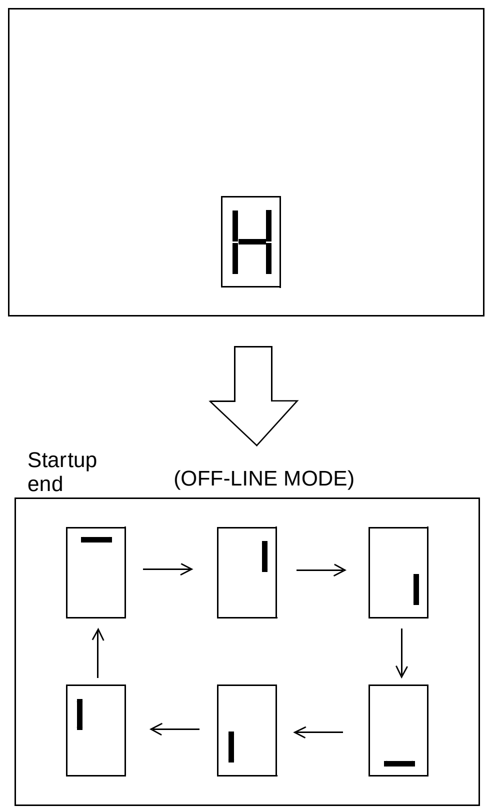
Note: *The control of 7-seg LED is the next page.*
(Case of program install and restart processing)

NAP-200-019
Sheet 2/6
Program Install and Load

(a) Procedure for off-line start-up



Status change of 7 Segment LED on the EMA card



Note: *Procedures (a) through (e) must be performed in all LNs and ISW, individually.*

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Sheet 3/6
Program Install and Load

ATTENTION
Contents
Static Sensitive
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(b) Procedure for HD Initial

Status change of 7 Segment LED on the CPU Front Panel.

START

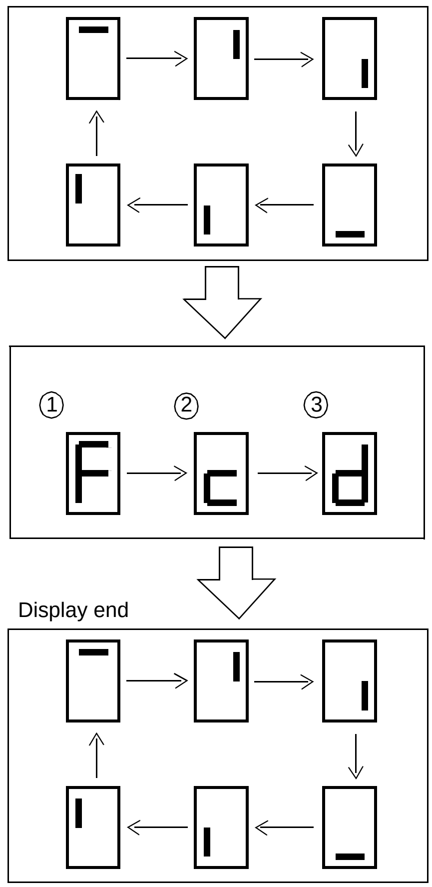
Set the SENSE switch corresponding to the system to be initialized (CPU0, CPU1) to “1” on the CPU Front Panel.

Insert the FD Generic Disk 1 into the FDD.

Flip the MBR key on the CPU Front Panel [OFF → ON → OFF].

• HD Format

END



SENS SW	7SEG LED	FUNCTION
‘1’	F → c → d	FORMAT → COPY → MAKING DIRECTORY

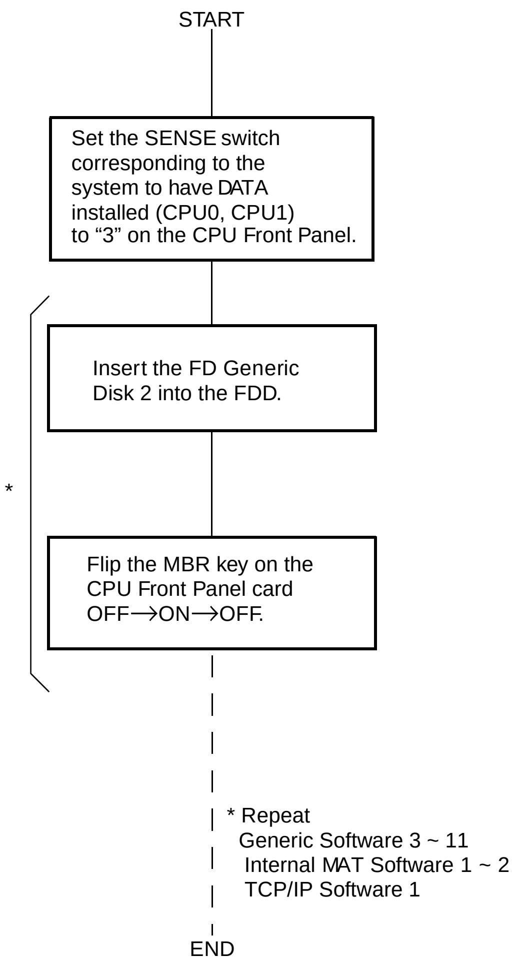
Note: *Procedures (a) through (e) must be performed in all LNs and ISW, individually.*

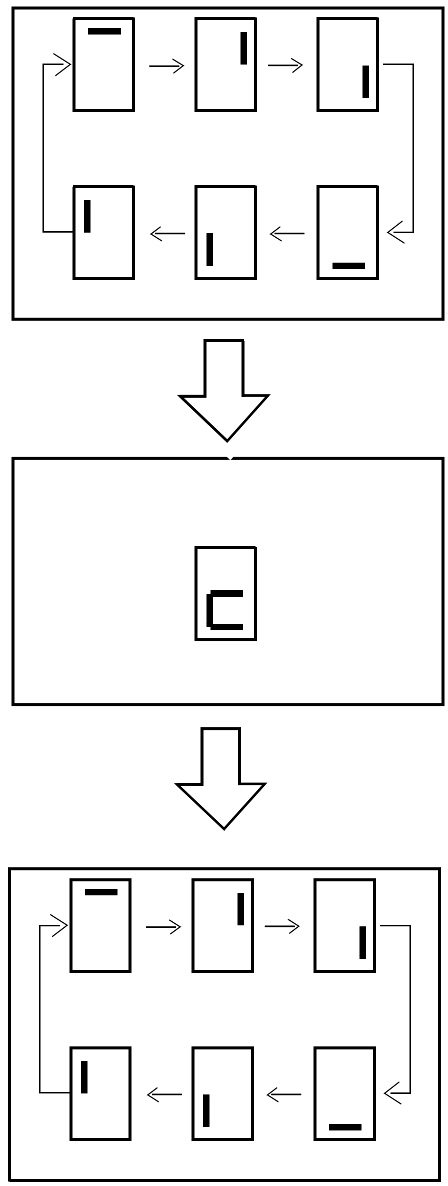
NAP-200-019
Sheet 4/6
Program Install and Load

ATTENTION
Contents
Static Sensitive
Handling
Precautions Required

(c) Procedure for Generic Software (2 ~ 11) Internal MAT Software (1 ~ 2), TCP / IP Software (1) Install

Status change of 7 Segment LED on the CPU Front Panel.





WARNING: *Removal or Make Busy of the HFD card is not allowed while the Floppy Disk or Hard Disk is being accessed.*

Note: *Procedures (a) through (e) must be performed in all LNs and ISW, individually.*

NAP-200-019
Sheet 5/6
Program Install and Load

ATTENTION
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(d) Procedure for Application Software Install

Status change of 7 Segment LED on the CPU Front Panel.

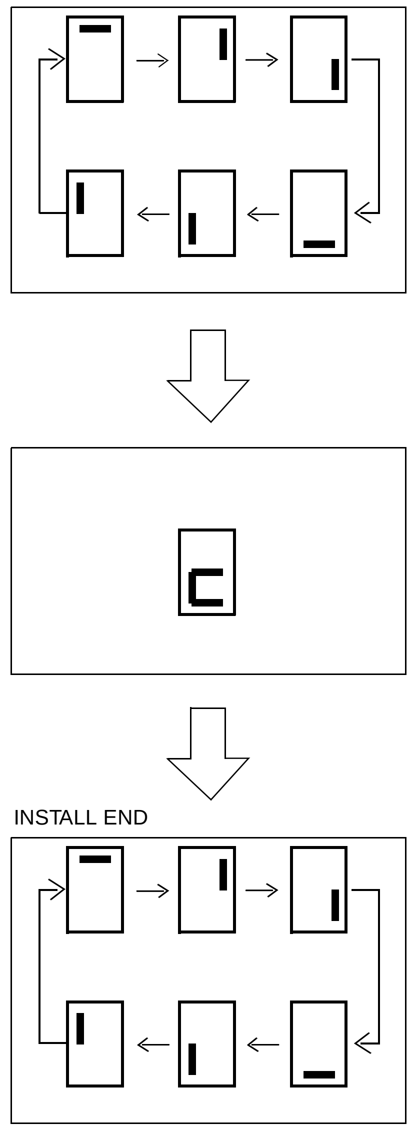
START

Set the SENSE switch corresponding to the system to have DATA installed (CPU0, CPU1) to “3” on the CPU Front Panel.

Insert the FD “Application Software” into the FDD.

Flip the MBR Key on the CPU Front Panel [OFF→ON→OFF].

END



WARNING: *Removal or Make Busy of the HFD card is not allowed while the Floppy Disk or Hard Disk is being accessed.*

Note: *Procedures (a) through (e) must be performed in all LNs and ISW, individually.*

NAP-200-019
Sheet 6/6
Program Install and Load

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(e) Procedure for Program Load

This section describes system start-up procedure in which a program is loaded from the HD to the MEM and the data memory is cleared.

START

- Program Load
  - Set the SENSE switch to “1” (restart with data memory clear) on the CPU Front Panel and press the CPURST button.
  - The system is initialized when LOADING from the HD to the MEM is completed.
    Verify that the OPE lamp on the CPU Front Panel starts flashing.
- Set On-Line mode
  - Set the SENSE switch to “2” (restart without data memory clear) on the CPU Front Panel.

END

Note: *Procedures (a) through (e) must be performed in all LNs and ISW, individually.*

NAP-200-020
Sheet 1/6
Assignment of Office Data

This NAP explains the procedure to assign office data to each node and ISW, after the Program Install and Load in NAP-200-019 are thoroughly completed. Follow the procedures below:

START

- Start up the MAT
- Enter basic data in ISW — Assign the following basic data via the MAT per the office data programming sheet.
  - "ATIM": Assignment of Data and Time
  - "ASYD (SYS1, 2, & 3)" /"ASYDL(SYS1 & 2)": System Data assignment **Note1**
- Assignment of Office Data — Assign the remaining office data according to the office data programming sheet. **Note 2**
- Save Office Data onto HD — Save the Office Data onto hard disk (HD) from the MEM using the MEM_HDD command.
- Save Office Data onto HD/FD — Save the Office Data onto a floppy disk (FD) from the HD of ISW using the HDD_FDD command.
- Enter basic data in LNs **Note 3** — Assign the following basic data via the MAT per the office data programming sheet.
  - "ATIM": Assignment of Data and Time
  - "ASYD (SYS1, 2, & 3)" /"ASYDL(SYS1 & 2)": System Data assignment **Note1**
  - "ASYDN": System Data Assignment for NDM (Required only when the node is designated as the Network Control Node. For details, refer to the Fusion Network System Manual.)
  - "AUNT": Unit Data assignment

A

Note 1: *See Sheet 3/6 in this NAP.*

Note 2: *See Sheet 4/6, 5/6 in this NAP.*

Note 3: *The procedures here are required in each LN, independently.*

NAP-200-020
Sheet 2/6
Assignment of Office Data

ATTENTION
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A

- Assignment of Office Data **Note 3** — Assign the remaining office data according to the office data programming sheet. **Note 2**
  (Assign all the remaining NDM data, too, if the node is designated as the Network Control Node. For details, refer to the Fusion Network System Manual.)
- Confirmation of data assignment at NCN — If the Network Control Node (NCN) exists outside the installed system (i.e. other IPX series is designated as the NCN), make sure that all the network-level data (NDM data) has been properly assigned at the NCN. (Reference: the Fusion Network System Manual)
- Broadcasting of NDM Data — Transfer all the NDM data, assigned at the NCN, to each Local Node and ISW, by using the CBCN command.
- Save Office Data onto HD **Note 3** — Save the Office Data onto hard disk (HD) from the MEM using the MEM_HDD command.
- Save Office Data onto HD/FD **Note 3** — Save the Office Data onto a floppy disk (FD) from the HD using the HDD_FDD command.
- Initialization of the system — Initialize the whole system (ISW + all LNs) simultaneously, using the keys on the TOPU of ISW
  - Set the INITIAL SELECT key to SYSTEM side.
  - Set the EFFECT key to ON side.
  - Set the SYSTEM DATA key to NON LOAD side, and PROGRAM key to NON LOAD side.
  - Perform the system initialization by pressing the START button.

END

Note 2: *See Sheet 4/6, 5/6 in this NAP.*

Note 3: *The procedures here are required in each LN, independently.*

NAP-200-020
Sheet 3/6
Assignment of Office Data

Note 1: *To initially start up the system, the data below must be at least assigned in the following nodes:*

1. Data to be assigned **in ISW only**

- ASYD SYS1
  INDEX 62, bit 6-7 (ACT/ST BY Changeover at Routine Diagnosis)
  INDEX 86, bit 2-3 (Fault Recovery on TRK Ineffective Hold Detection)
  INDEX 87 (Routine Diagnosis Program Start Time (Hour))
  INDEX 88 (Routine Diagnosis Program Start Time (Minute))
  INDEX 89 (Items of Routine Diagnosis)
  INDEX 90 (Items of Routine Diagnosis)

- ASYDL SYS1
  INDEX 929, b0-3 (TSW mounting condition in ISW)
  INDEX 930-933 (FPC No. of the LN to which TSW0 is connected)
  Note: *Available when SYS1, INDEX929, b0=1.*
  INDEX 934-937 (FPC No. of the LN to which TSW1 is connected)
  Note: *Available when SYS1, INDEX929, b1=1.*
  INDEX 938-941 (FPC No. of the LN to which TSW2 is connected)
  Note: *Available when SYS1, INDEX929, b2=1.*
  INDEX 942-945 (FPC No. of the LN to which TSW3 is connected)
  Note: *Available when SYS1, INDEX929, b3=1.*

Note: *In the following INDEX of ASYD command, default data, as shown below, has been already assigned. These data must not be changed on the ISW side.*

SYS1
INDEX 0 (Number of Module Group) = 01H (fixed)
INDEX 198 (IMG Mounting Status) = 03H (fixed)

2. Data to be assigned **in LN only**

- ASYD SYS1
  INDEX 0 (Number of Module Group)
  INDEX 1 (Number of Main Processor)
  INDEX 194, bit 0 = (MP Mounting Status)
  INDEX 198, bit 0-1 (IMG0 Mounting Status), bit 4-5 (IMG1 Mounting Status) 0/1=Not mounted/Mounted
  INDEX 199, bit 0-1 (IMG2 Mounting Status), bit 4-5 (IMG3 Mounting Status) 0/1=Not mounted/Mounted
  INDEX 232, bit 0-2 (Items of CF Clear)
  INDEX 304 (Items of Routine Back-up)

Note: *To enable the ISW to totally supervise the system-base Routine Diagnosis program, assign "FFFF" for SYS1, INDEX87, 88 of each LN. If other data is assigned at the LNs, the diagnosis works individually on each node basis.*

- ASYDL SYS1
  INDEX 928 (Recognition of FPC No. of ISW)

NAP-200-020
Sheet 4/6
Assignment of Office Data

3. Data to be assigned **in both LN and ISW**

- ASYD SYS1
  INDEX 3 (Configuration of Time Division Switch)
  INDEX 30 (Mounting capacity of Data Memory)
  INDEX 31 (Mounting capacity of Common Memory)
  INDEX 58, b0 (Configuration of CPU) 0/1=Single/Dual
  INDEX 64, b0=0 (μ-law for Time Division Switch)
  INDEX 86, b0-1, 4, 6-7 (Details on System Message Output)
  INDEX 91, b6-7 (PLO mounting condition)
  INDEX 96-115 (Office Name for each LN/ISW) **Note**

Note: *Office Name can be entered also via AOFC command.*

NAP-200-020
Sheet 5/6
Assignment of Office Data

Note 2: *When assigning office data, be sure to enter the following Fusion Trunk Data, too, by using ACRD and AFPC command. Refer to "Office Data Specification Manual" for Data Sheet.*

1. ACRD: Assignment of Route Class Data

   - In LNs, assign the connection route class data for the direction to ISW
   - In ISW, assign the connection route class data for the direction to each LN

CDN	FUNCTION	DATA	CONTENTS	REMARKS
1	TF	3	Type of Trunk Function	
2	TCL	4	Trunk Class	
3	RLP	2	Trunk Release Pattern	
4	SMDR	0	Detailed Billing Information	
5	LSG	12/13 **Note**	Line Signal	
6	PAD	0	PAD control	
7	TRKS	0	Trunk Selection Sequence	
8	TC/EC	0	Trunk Coda/Echo Canceller Control	
9	FINT	0	Fusion Interface Specification	
10	FPEG	0	Fusion-PEG	
11	TC	0	Timer Class	
12	MTC	0	Miscellaneous Timer Counter	
13	STSEQ	0	Status ENQ	
14	FGH	0	-	
15	MMN	0	Kind of Multiple Equipment	
16	LKIND	1	Kind of Fusion Link	

Note: *Assign "12" for this system.*

2. AFPC: Assignment of FCCH Routing Data for Local Data Memory

   - In each LN, assign connection routes (C_RT) toward ISW/other LN(s).
   - In ISW, assign connection routes (C_RT) toward each LN.
     (Example: See Figure 020-1 on the next page)

NAP-200-020
Sheet 6/6
Assignment of Office Data

This figure shows an example for connection route (C_RT) data assignment by AFPC command.

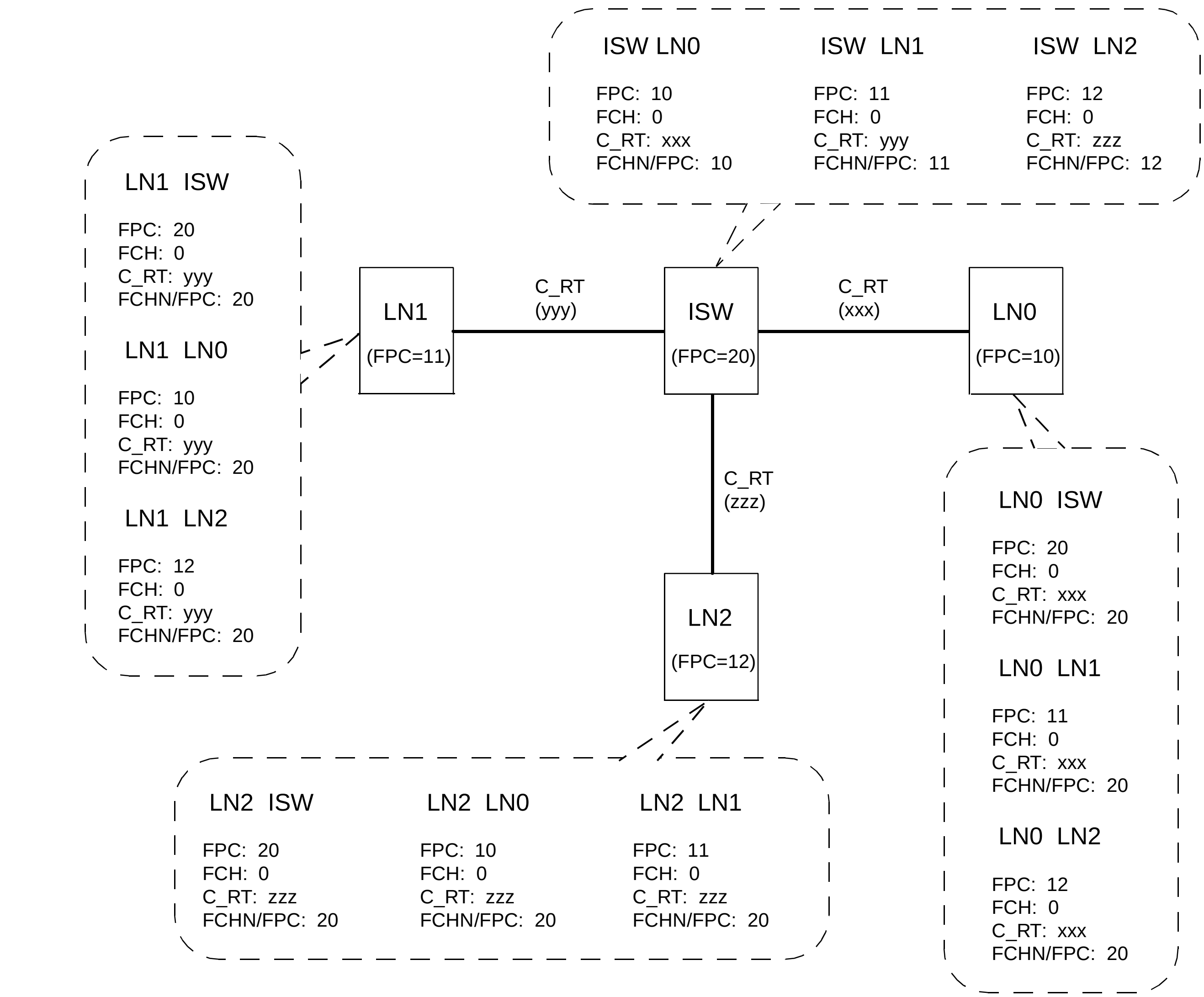

Figure 020-1 Example of Connection Route Data Assignment (AFPC Command)

NAP-200-021
Sheet 1/5
Check of Lamp Indications and System Messages

ATTENTION
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Static Sensitive
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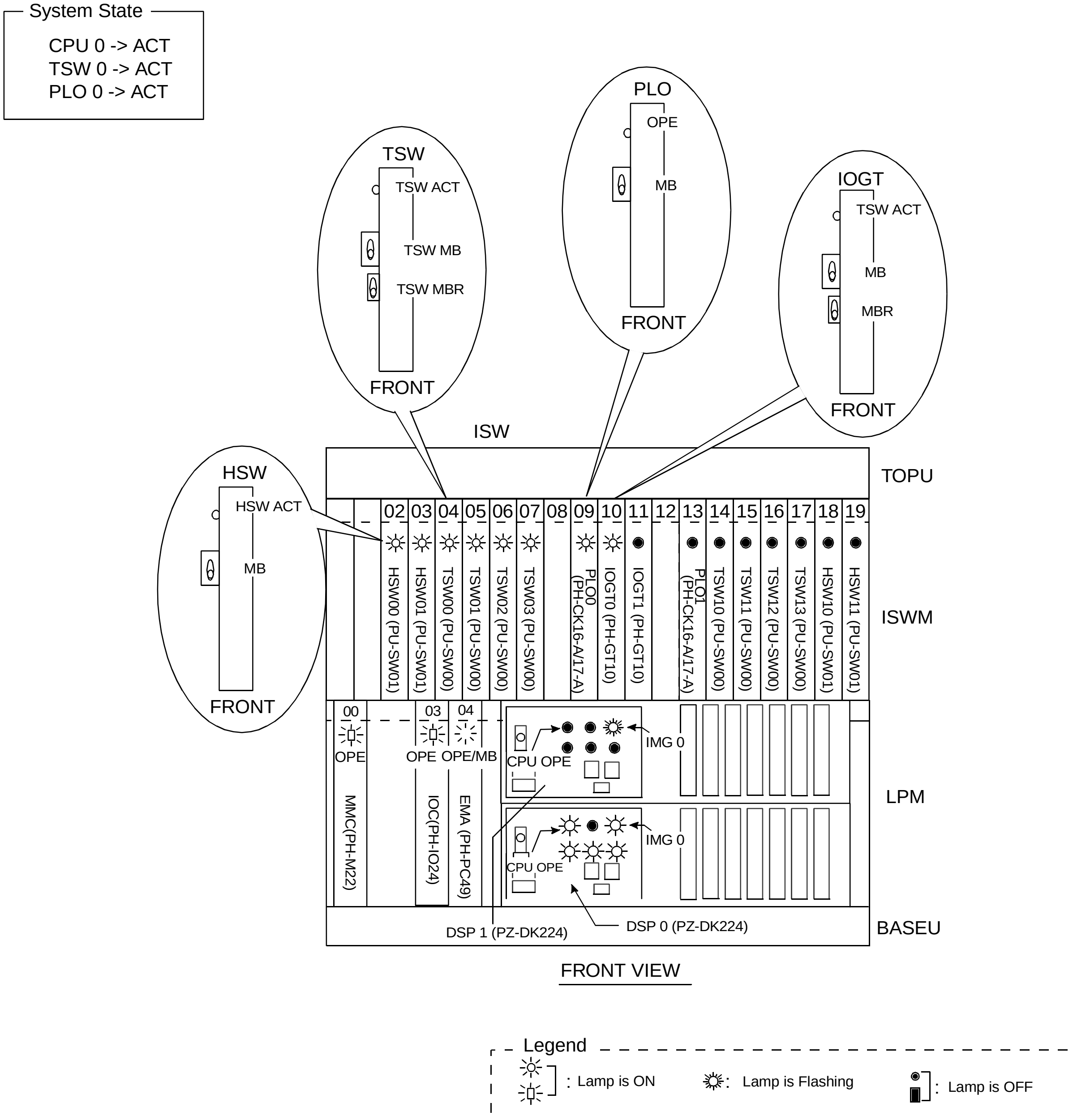
START

- Check lamp indications on Line/Trunk circuit cards
  - Check lamp indications on each of the assigned Line/Trunk circuit cards.
    - OPE lamp (G): ON
    - BL lamp (R): OFF
  - If the lamp indications are other than above, investigate per Chapter 6, “FAULT RECOVERY DURING TESTS”
- Check lamp indications on control system circuit cards
  - The OPE lamps (G) are shown in Figure 021-1 through Figure 021-4.
  - If any alarm lamp illuminates, check switch settings on the circuit card, mounting positions of the cards within that module, control cable connections (Front & Backplane), and Office Data assignments.
- Confirm that no alarm lamps (R) / (Y) are illuminating on the TOPU
  - For explanations of the TOPU (Top Unit) lamp indications, refer to the System Operation and Maintenance Manual.
- Check System Messages
  - Display System Messages using MAT command “DFTD.”
  - If a System Message which indicates a fault is displayed, investigate and recover the fault referring to the System Operation and Maintenance Manual.

END

NAP-200-021
Sheet 2/5
Check of Lamp Indications and System Messages

This figure shows the LED indications (example) of ISW.



Note: *This example assumes that the system adopts the fully expanded configuration.*

Figure 021-1 LED Indications of ISW in Normal Operation (example)

NAP-200-021
Sheet 3/5
Check of Lamp Indications and System Messages

This figure shows the LED indications (example) for a fully expanded IMG0 system.

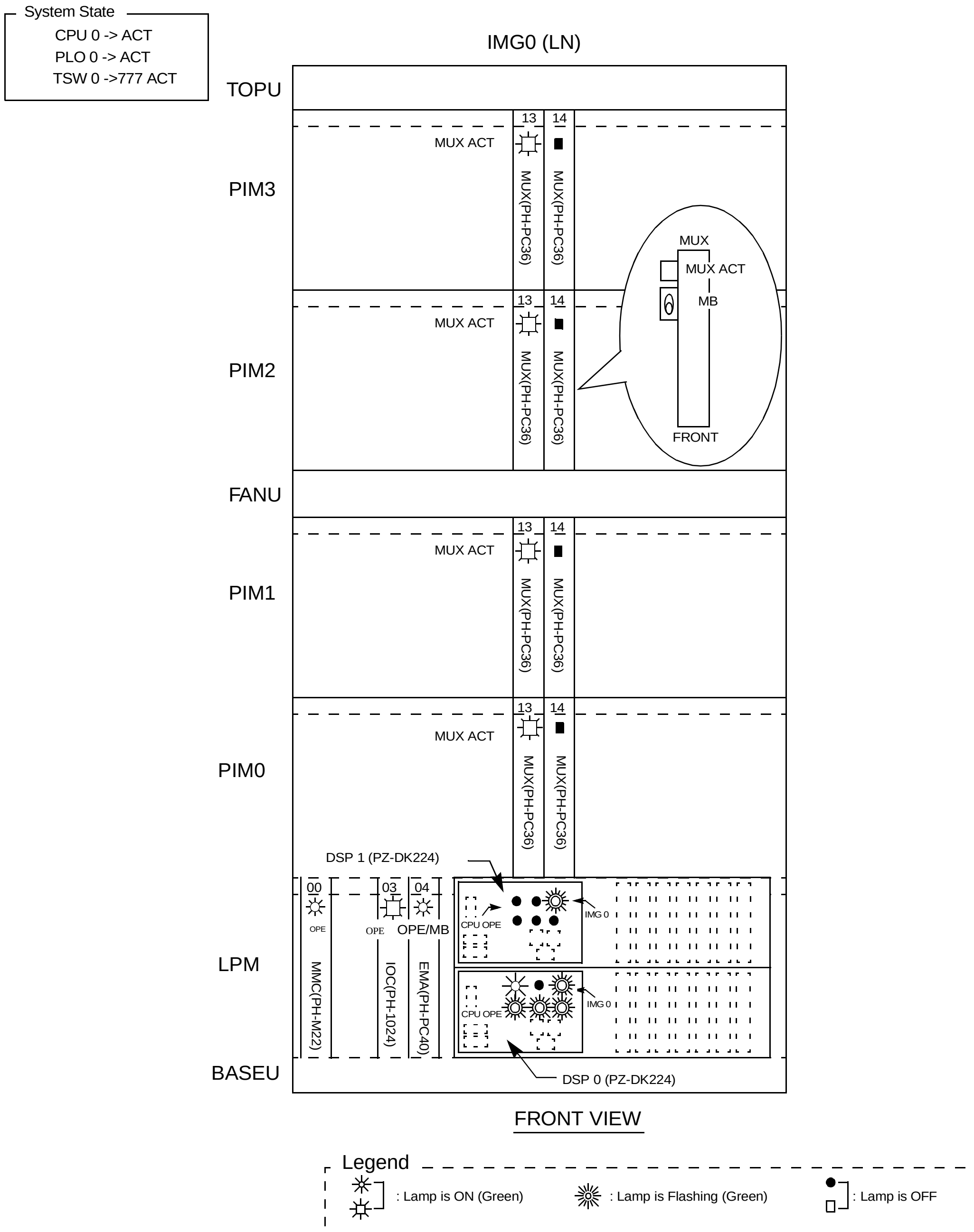
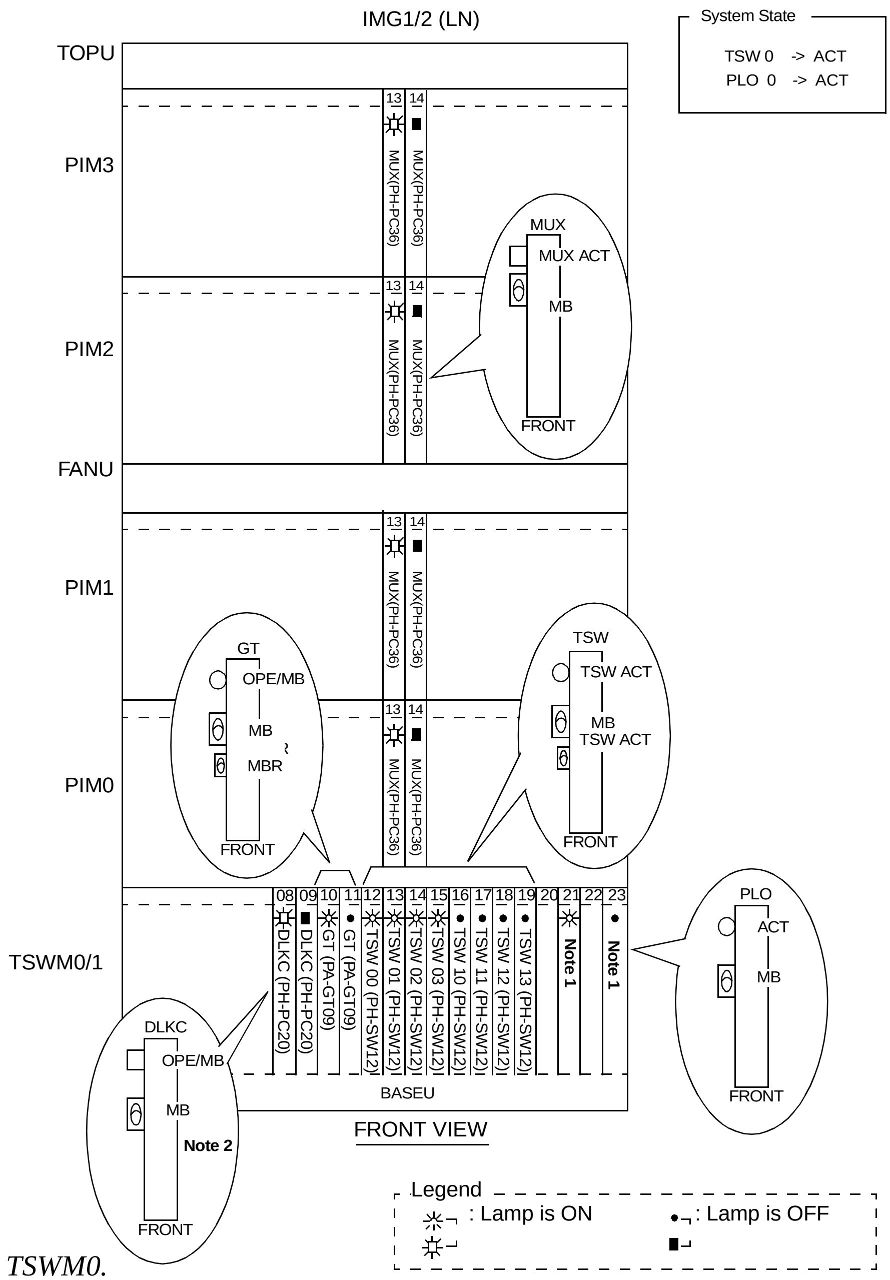


Figure 021-2 LED Indications of IMG0 in Normal Operation (example)

NAP-200-021
Sheet 4/5
Check of Lamp Indications and System Messages

This figure shows the LED indications (example) for a fully expanded IMG1/2.



Note 1: *PLO (PH-CK16A) for TSWM0.*
CLK (PH-CK18) for TSWM1.

Note 2: *DLKC (PH-PC20) cards are not used in IMG2 (TSWM1).*

Figure 021-3 LED Indications of IMG1/2 in Normal Operation (example)

NAP-200-021
Sheet 5/5
Check of Lamp Indications and System Messages

This figure shows the LED indications (example) of a fully expanded system of IMG 3.

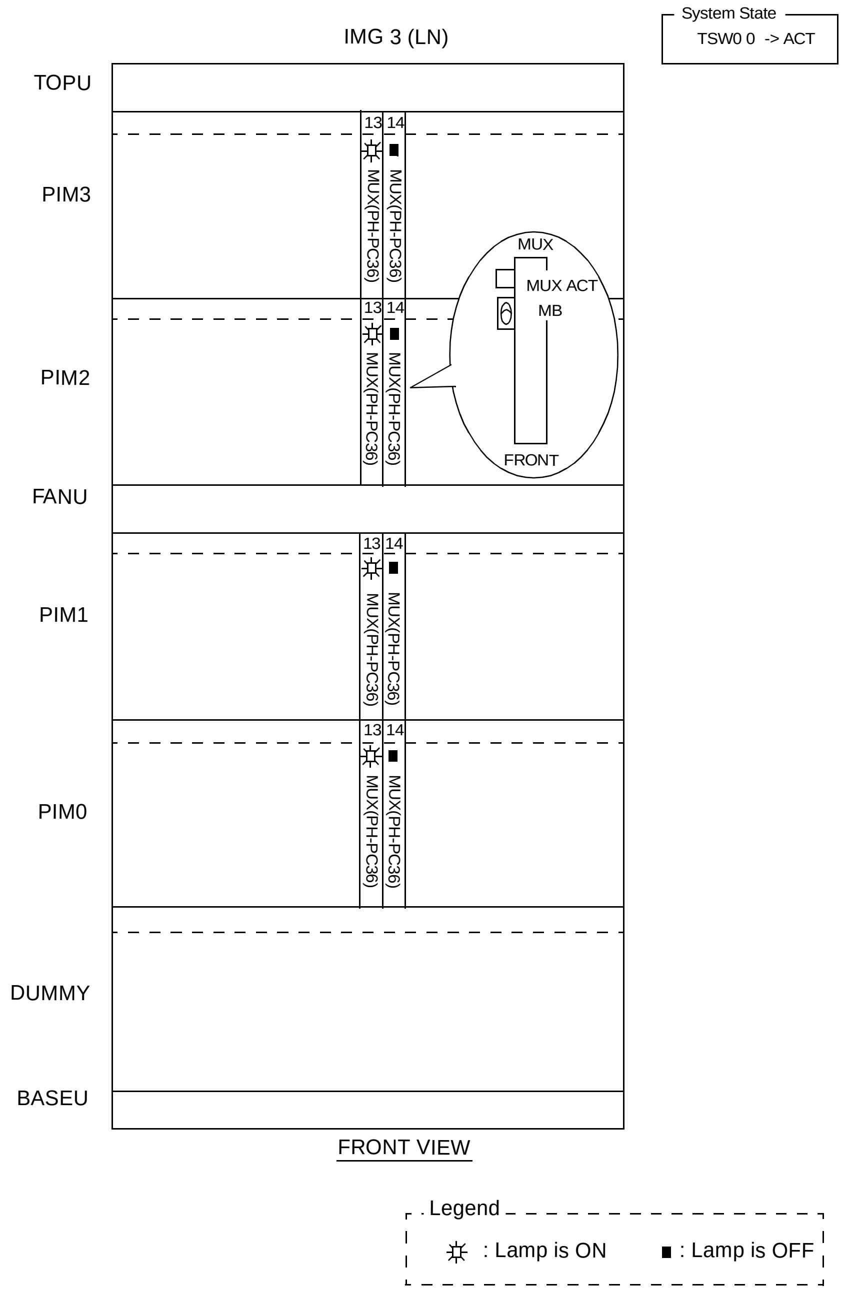


Figure 021-4 LED Indications of IMG3 in Normal Operation (example)

NAP-200-022
Sheet 1/2
Check of Alarm Lamps of the TOPU

Test Outline: The System has Alarm Lamps on the TOPU of ISW and IMG0 of each LN.
Figure 022-1 shows the Alarm Lamps on the TOPU.
For more information about each lamp, see the "System Operations and Maintenance Manual."

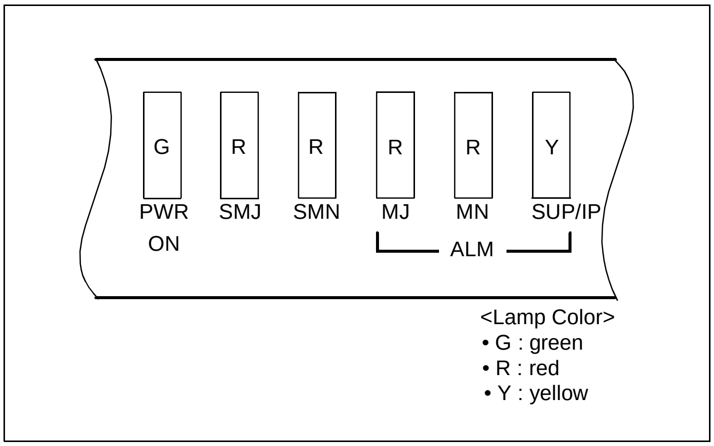


Figure 022-1 Alarm Lamps on the TOPU

NAP-200-022
Sheet 2/2
Check of Alarm Lamps of the TOPU

ATTENTION
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START

- Test of MJ (MAJOR) Lamp
  - Set the circuit breakers of the Power Supplies (PWR0, 1) in a PIM to OFF (About 10 seconds later, set the circuit breaker(s) back ON.
  - Confirm that the MJ lamp (red) on the TOPU illuminates.
  - Cancel the alarm indication by pressing the ALM RST button on the TOPU.
- Test of MN (MINOR) Lamp
  - Take an act side RGU Fuse out of the PWR card.
  - Confirm that the MN lamp (red) on the TOPU illuminates.
  - Cancel the alarm indication by pressing the ALM RST button on the TOPU.
- Test of SUP/IP (SUPERVISORY) Lamp
  - On the EMA Circuit card, flip the MB switch DOWN-UP-DOWN
  - Confirm that the SUP/IP lamp (yellow) on the TOPU illuminates.
  - Cancel the alarm indication by pressing the ALM RST button on the TOPU.

END

This page is for your notes.

CHAPTER 5 INSTALLATION TEST PROCEDURE

1. HOW TO ENTER DATA IN THE TEST CHECK COLUMN

Each NAP in this chapter has check column for test result entry for each test item (see Figure 5-1). This paragraph explains the method of entering test result into the check column concerned using Figure 5-1 as an example.

1. Method of Entry

   Each check column consists of two sections of “PROVIDED” and “CHECK”. If the equipment or service feature pertaining to the test item is provided in the system, enter “*” in the PROVIDED section. At the time of performing installation tests, the test item with “*” marked in the PROVIDED section must be tested without exception.

   In the “CHECK” column, enter the results of each test as follows:

   - When the test result is good: “OK”
   - When the test result is no good: “×”

2. Fault Recovery

   If a fault is discovered as a result of an installation test, enter “√” into the related check sheet. After finishing all tests in the same category, be sure to repair the detected fault before proceeding to the next test.

3. Entry into Check Column after Fault Recovery

   After fault recovery work has been completed, a test must be performed to confirm that the fault has been completely corrected. If the result of this confirmation indicates that the fault has been corrected, enter “OK” next to the “×” entered previously. This entry should appear as: “× OK.”

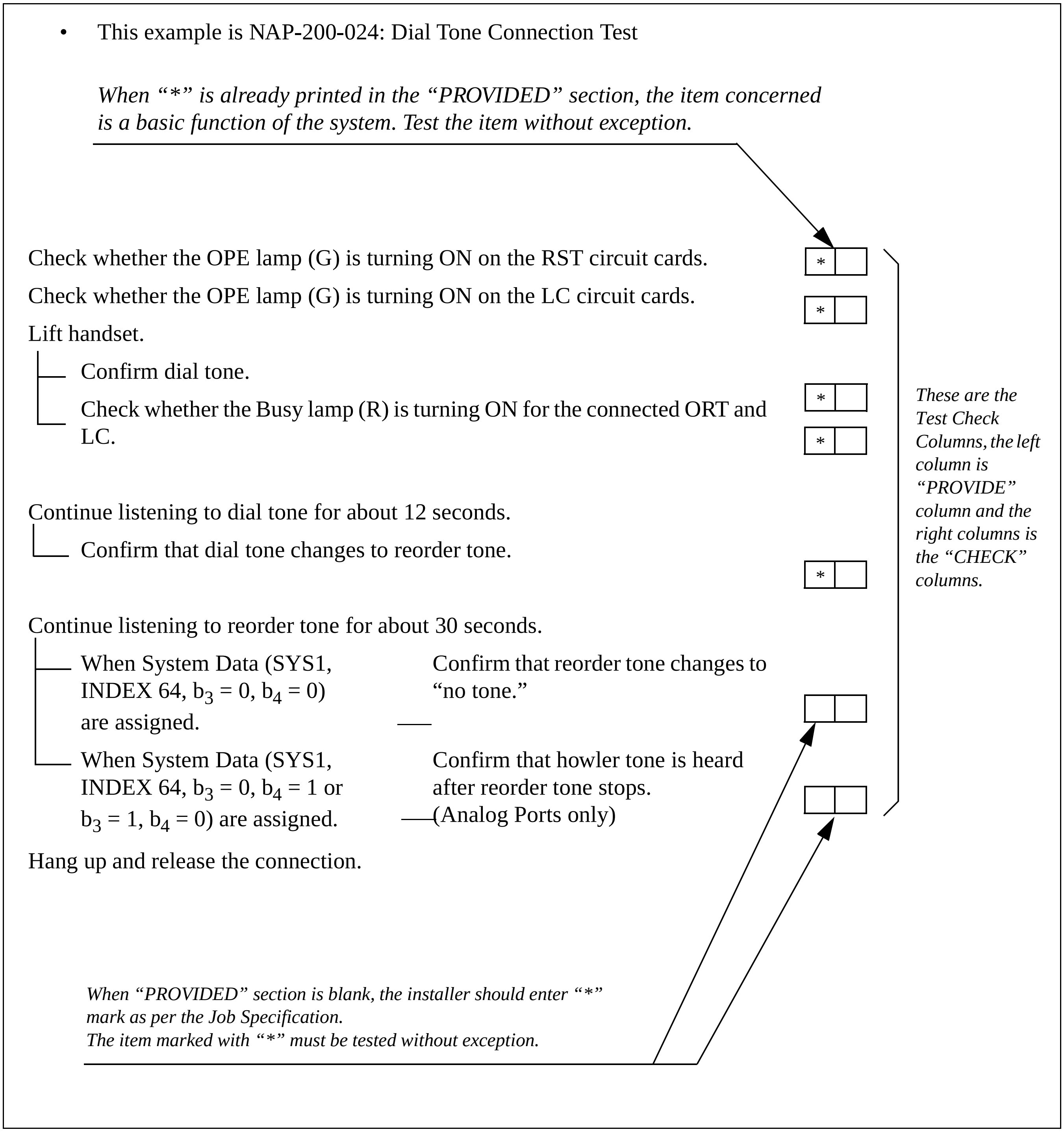


Figure 5-1 Example of Entry to Test Check Column

2. BASIC CONNECTION TEST

2.1 Outline

After the system has been started up, establish some basic connections and verify that the system operates normally.

2.2 Basic Connection Test Procedure

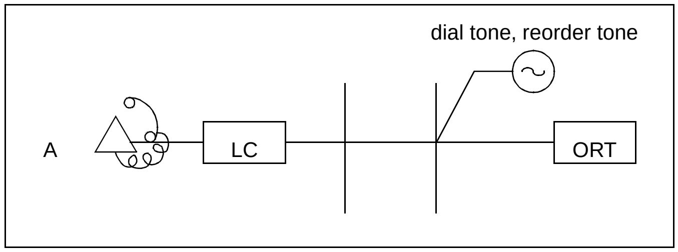
Perform tests on the operations of the processors and the system by referring to the NAP Number indicated to the right of each item in the following flowchart. If an operation cannot be performed satisfactorily, perform the necessary repair procedure(s) based on Chapter 5, "INSTALLATION TEST PROCEDURE".

START

- Dial Tone Connection Test: NAP-200-023
- Station-to-Station Connection Test: NAP-200-024

END

NAP-200-023
Sheet 1/1
Dial Tone Connection Test



START

- Check whether the OPE lamp (G) is illuminating on the RST circuit cards. [*]
- Check whether the OPE lamp (G) is illuminating on the LC circuit cards. [*]
- Lift handset.
  - Confirm dial tone. [*]
  - Check whether the Busy lamp (R) is illuminating for the connected ORT and LC. [*]
- Continue listening to dial tone for about 12 seconds.
  - Confirm that dial tone changes to ReorderTone. [*]
- Continue listening to reorder tone for about 30 seconds.
  - When System Data (SYS1, INDEX 64, $b_3 = 0$, $b_4 = 0$) are assigned. — Confirm that reorder tone changes to “no tone”. [ ]
  - When System Data (SYS1, INDEX 64, $b_3 = 0$, $b_4 = 1$ or $b_3 = 1$, $b_4 = 0$) are assigned. — Confirm that howler tone is heard after reorder tone stops. (Analog Ports only) [ ]
- Hang up and release the connection.

END

NAP-200-024
Sheet 1/2
Station to Station Connection Test

START

- Confirm that a connection can be established between Station “A” and Station “B.”
- Station “A” goes off-hook.
  - Station “A” hears dial tone. [*]
- Station “A” dials the station number of Station “B.”
  - Station “A” confirms that dial tone stops when the first digit has been dialed. [*]
  - Station “A” confirms that ringback tone is heard after dialing ends. [*]
- Station “B” hears ringing on the telephone set. [*]
- Station “B” lifts handset and answers the call.
  - After answering, both Stations “A” and “B” confirm that they can talk with each other. [*]
- Stations “A” and “B” hang up. The connection is released.

END

Note: *For this test, there are three patterns for connections which possibly can be set up. Refer to Figure 024-1 on the next page.*

NAP-200-024
Sheet 2/2
Station to Station Connection Test

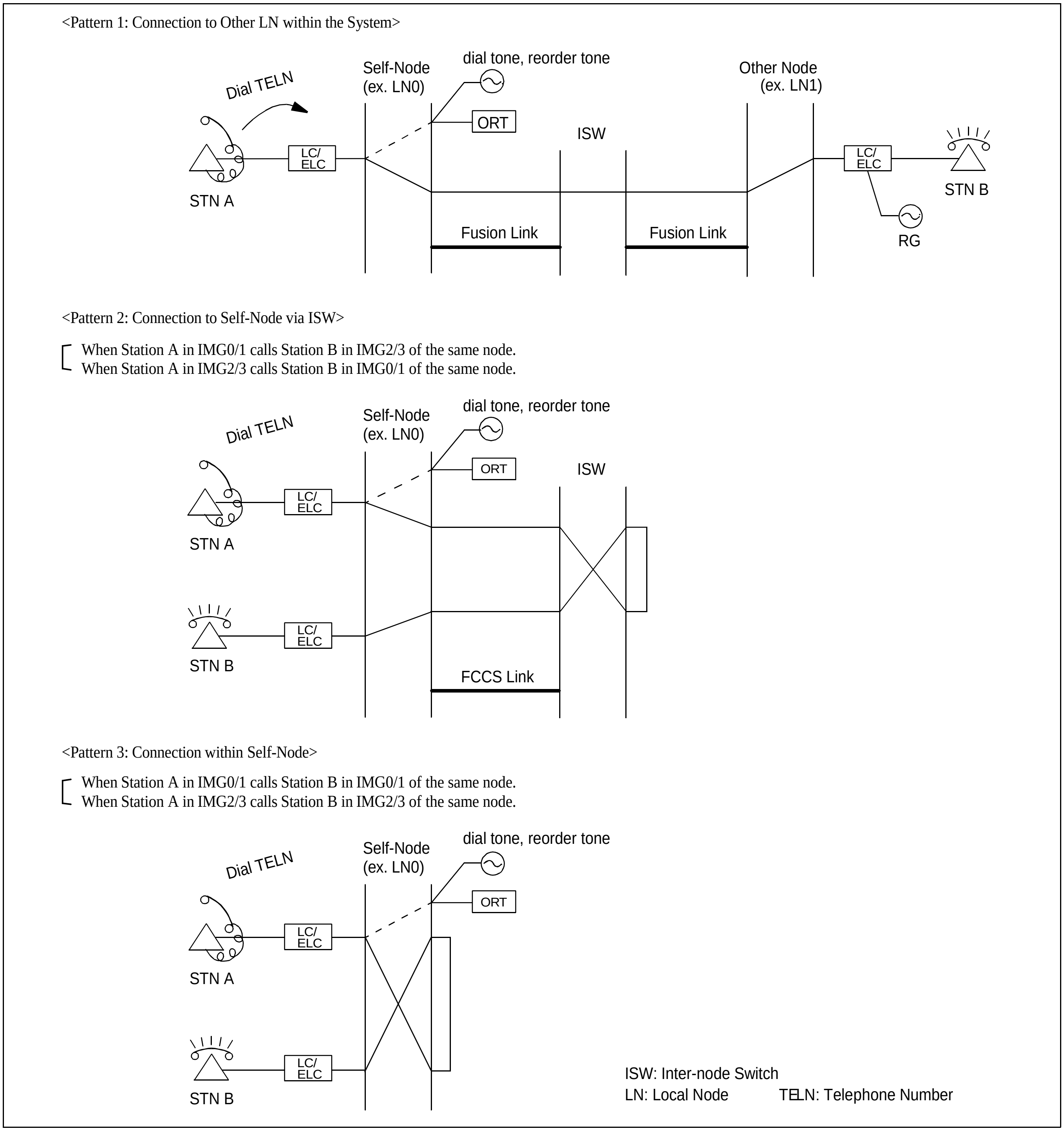


Figure 024-1 Station-to-Station Connection Test

3. SYSTEM INITIALIZED TEST

3.1 Outline

Tests are to be performed on the restart processing (reinitialization) and system changeover functions which enable the system to restart its operations and services.

3.2 System Initialized Test Procedure

The System Changeover Test and Initialization Tests are to be performed per the NAP Numbers indicated to the right of each item in the following flowchart.

START

- System Changeover Test: NAP-200-025
- System Initialization Test: NAP-200-026
- Circuit Card Initialization Test: NAP-200-027

END

NAP-200-025
Sheet 1/13
System Changeover Test

Test Outline

Tests are to be performed to see if the ACT/ST-BY of the following equipment is normally changed over:

1. Control Systems in each Local Node (LN)
2. Control Systems in ISW
3. Speech Path Systems in each LN (TSWM0/TSWM1)
4. Speech Path Systems in ISW + all LNs as a whole
5. PLO

NAP-200-025
Sheet 2/13
System Changeover Test

ATTENTION
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Precautions Required

1. Control System changeover in each LN

Follow the procedures below to perform the Control System changeover tests in each Local Node (LN). This test must be performed in each LN independently:

START

- Control System changeover via MBR key on the CPR DSP (PZ-DK224)
  - On the CPR DSP on which CPU OPE lamp is illuminating, flip the MBR key DOWN → UP → DOWN (OFF → ON → OFF).
  - Lamp indication on the DSP changes to “DSP in ST-BY mode” as shown in Figure 025-1.
  - System messages “7-C” and “7-D” are displayed in succession.
- Control System changeover via CPU SEL key on the EMA card. (Forced Changeover).
  - Designate CPU changeover via CPU SEL key on the EMA (PH-PC40) card.
    - CPU SEL key=UP: CPU of No. 0 system goes active (ACT)
    - CPU SEL key=DOWN: CPU of No. 1 system goes active (ACT)
  - Confirm the changed lamp indications on both DSP in ACT/ST-BY mode as shown in Figure 025-1.
  - System messages “7-C” and “7-D” are displayed in succession.

END

Note: *This changeover can also be performed via the CMODI/CMOD command. Refer to the “System Operations and Maintenance Manual.”*

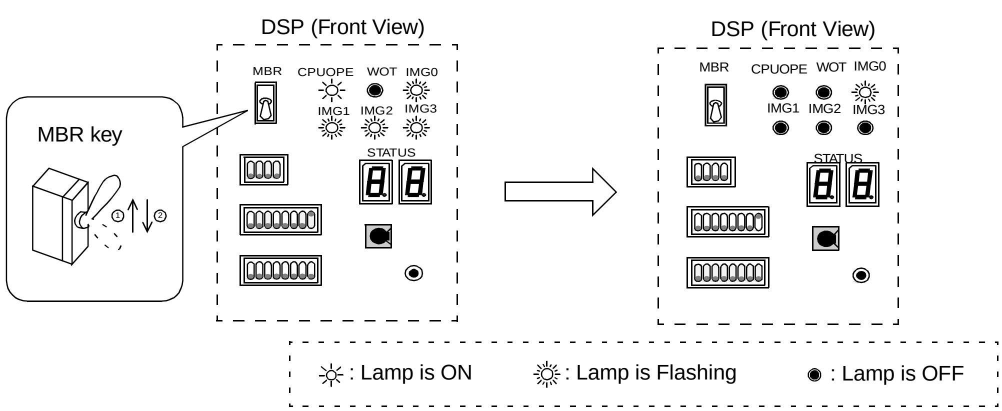

Figure 025-1 DSP in ACT/ST-BY Mode (Local Node)

NAP-200-025
Sheet 3/13
System Changeover Test

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Static Sensitive
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2. Control System changeover in ISW

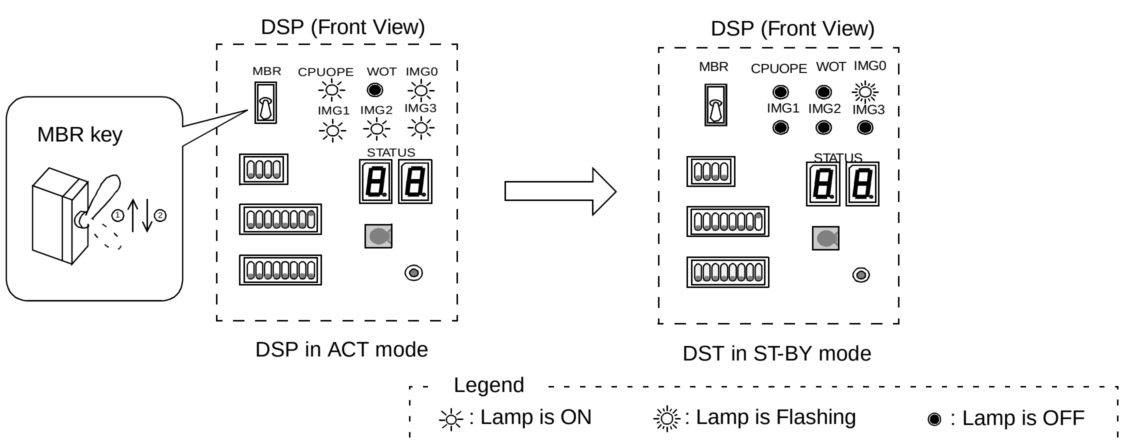
Follow the procedures below to perform the Control System changeover tests in ISW:

START

- Control System changeover via MBR key on the CPR DSP (PZ-DK224)
  - On the CPR DSP on which CPU OPE lamp is illuminating, flip the MBR key DOWN → UP → DOWN (OFF → ON → OFF).
  - Lamp indication on the DSP changes to "DSP in ST-BY mode" as shown in Figure 025-2.
  - System messages "7-C" and "7-D" are displayed in succession.
- Control System changeover via CPU SEL key on the EMA card. (Forced Changeover).
  - Designate CPU changeover via CPU SEL key on the EMA (PH-PC 40) card.
    - CPU SEL key=UP: CPU of No. 0 system goes active (ACT)
    - CPU SEL key=DOWN: CPU of No. 1 system goes active (ACT)
  - Confirm the changed lamp indications on both DSP in ACT/ST-BY mode as shown in Figure 025-2.
  - System messages "7-C" and "7-D" are displayed in succession.

END

Note: *This changeover can also be performed via the CMODI command. Refer to the "System Operations and Maintenance Manual."*



Note: *This figure assumes that the system adopts the fully-expanded configuration.*

Figure 025-2 DSP in ACT/ST-BY Mode (ISW)

NAP-200-025
Sheet 4/13
System Changeover Test

ATTENTION
Contents
Static Sensitive
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Precautions Required

3. Speech Path System changeover in each ISW

Follow the procedures below to perform the Speech Path System changeover tests in ISW:

START

- Change over the ACT/ST-BY of Speech Path Systems in ISW via key operation.
  - On the active GT (PH-GT10) card in ISW, flip the MB key DOWN → UP → DOWN (OFF → ON → OFF).
  - Make sure that the ACT/ST-BY of all Speech Path Systems in LN0/1/2/3 are totally changed over (Refer to Figures 025-3 and 025-7).

    Circuit cards to be checked
    <TSWM0>
    • TSW (PH-SW12)
    • DLKC (PH-PC20)
    <TSWM1>
    • TSW (PH-SW12)
    <PIMs in IMG0/1/2/3>
    • MUX (PH-PC36)

  - Analyze the system messages “7-E”, “7-F” and “1-T” to be displayed automatically.

END

Note: *This changeover can also be performed via the CMODI/CMOD command. Refer to the “System Operations and Maintenance Manual.”*

Note: *If you change over from LNs, the <u>entire system</u> will be changed over. Therefore, it is best to change over from ISW.*

NAP-200-025
Sheet 5/13
System Changeover Test

ATTENTION
Contents
Static Sensitive
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4. Total Speech Path System changeover

Perform the total Speech Path System changeover test by referring to the flowchart below. As suggested in the previous page, the ACT/ST-BY of Speech Path Systems can be differently set in every Local Node (LN). However, excepting a particular case, the Speech Path changeover is normally performed on a system basis as shown in this page:

START

- Change over the ACT/ST-BY of the whole Speech Path Systems via key operation.
  - On the active IOGT (PH-GT10) card in ISWM, flip the MBR key DOWN → UP → DOWN (OFF → ON → OFF).
  - Make sure that the ACT/ST-BY of all Speech Path Systems (in ISW and each Local Node) are totally changed over (Refer to Figures 025-3, 025-5, 025-6 and 025-7).

    Circuit cards to be checked

<ISW>	<LN, IMG0/1>	<LN, IMG2/3>
• IOGT (PH-GT10)	• TSW (PH-SW12)	• TSW (PH-SW12)
• TSW (PU-SW00)	• DLKC (PH-PC20)	• MUX (PH-PC36)
• HSW (PH-SW01)	• MUX (PH-PC36)	

    Note: *Check the whole cards in all LNs and ISW.*

  - Analyze the system messages 17-Y, 17-Z and 1-T to be displayed automatically.

END

Note: *This changeover can also be performed via the CMODI/CMOD command. Refer to the "System Operations and Maintenance Manual."*

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System Changeover Test

ATTENTION
Contents
Static Sensitive
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Precautions Required

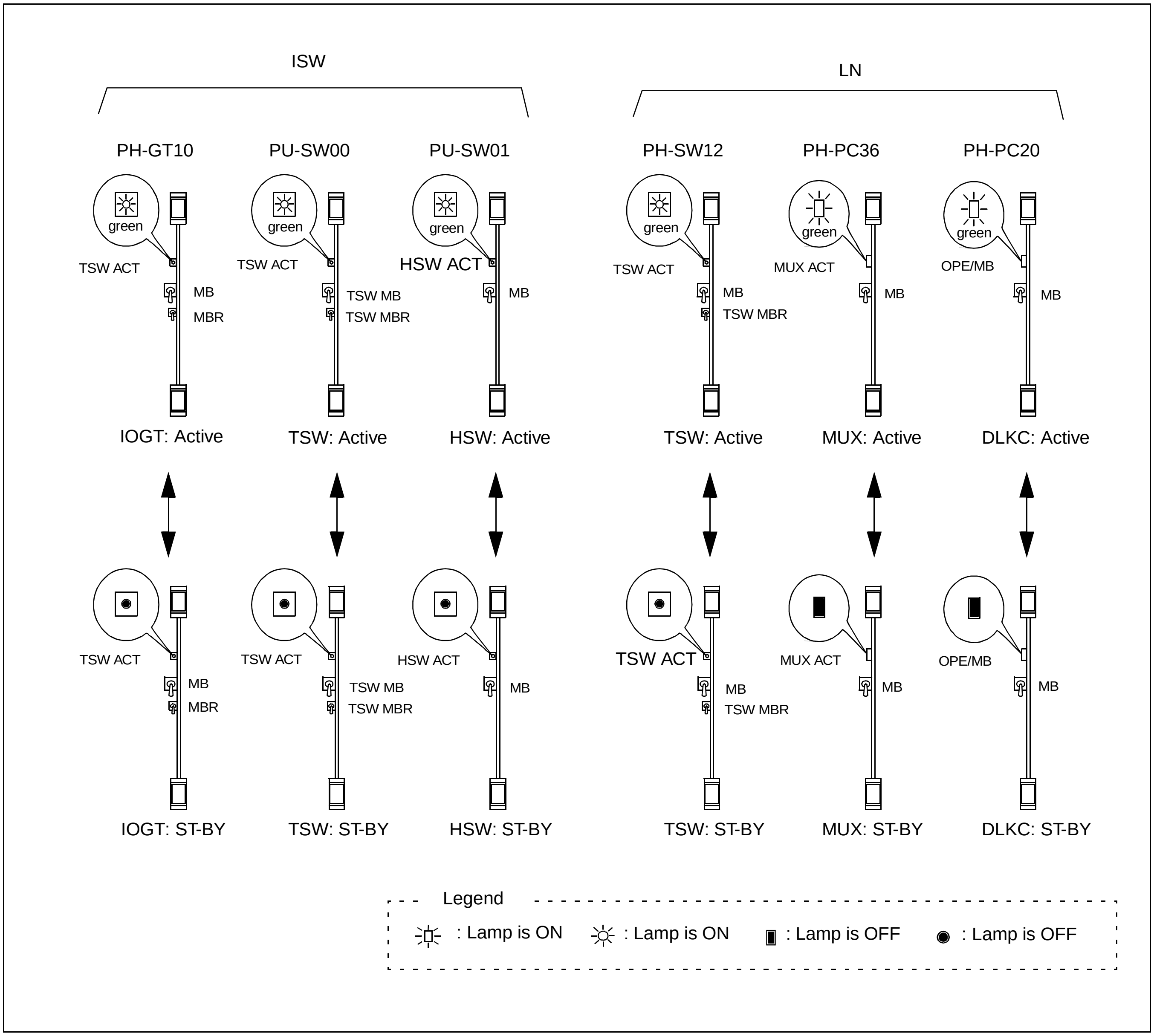

Figure 025-3 LEDs and Switches for Speech Path System Changeover

NAP-200-025
Sheet 7/13
System Changeover Test

ATTENTION
Contents
Static Sensitive
Handling
Precautions Required

5. PLO changeover

Perform the PLO changeover test referring to the flowchart below.

START

- Change over the ACT/ST-BY of the PLO systems in each LN via key operation.
  - On the active PLO (PH-CK16-A) card in TSWM0, flip the MB key DOWN → UP → DOWN (OFF → ON → OFF).
  - Make sure that the ACT/ST-BY of the whole PLO systems (PLO in TSWM0 and CLK in TSWM1) in the same Local Node (LN) are totally changed over. (Refer to Figures 025-4 and 025-7.)

    Circuit cards to be checked
    < TSWM0 >
    • PLO (PH-CK16-A) **Note**
    < TSWM1 >
    • CLK (PH-CK18) **Note**
    Note: *Check the whole cards in the same node*

  - Analyze the system messages "7-U" and "7-V" to be displayed automatically.
  - Repeat the steps above for all the remaining Local Nodes.
- Change over the ACT/ST-BY of the PLO systems in ISW via key operation.
  - On the active PLO (PH-CK16-A/PH-CK17-A) card in ISWM, flip the MB key DOWN → UP → DOWN (OFF → ON → OFF).
  - Make sure that the ACT/ST-BY of the PLO systems (PLO0/PLO1 in ISWM) are securely changed over. (Refer to Figures 025-4 and 025-6)

    Circuit cards to be checked
    < ISWM >
    • PLO (PH-CK16-A/PH-CK17-A) **Note**
    Note: *Even though the PLO in ISWM is once changed over, the PLO/CLK in each LN are not changed over.*

  - Analyze the system messages "7-U" and "7-V" to be displayed automatically.

END

NAP-200-025
Sheet 8/13
System Changeover Test

ATTENTION
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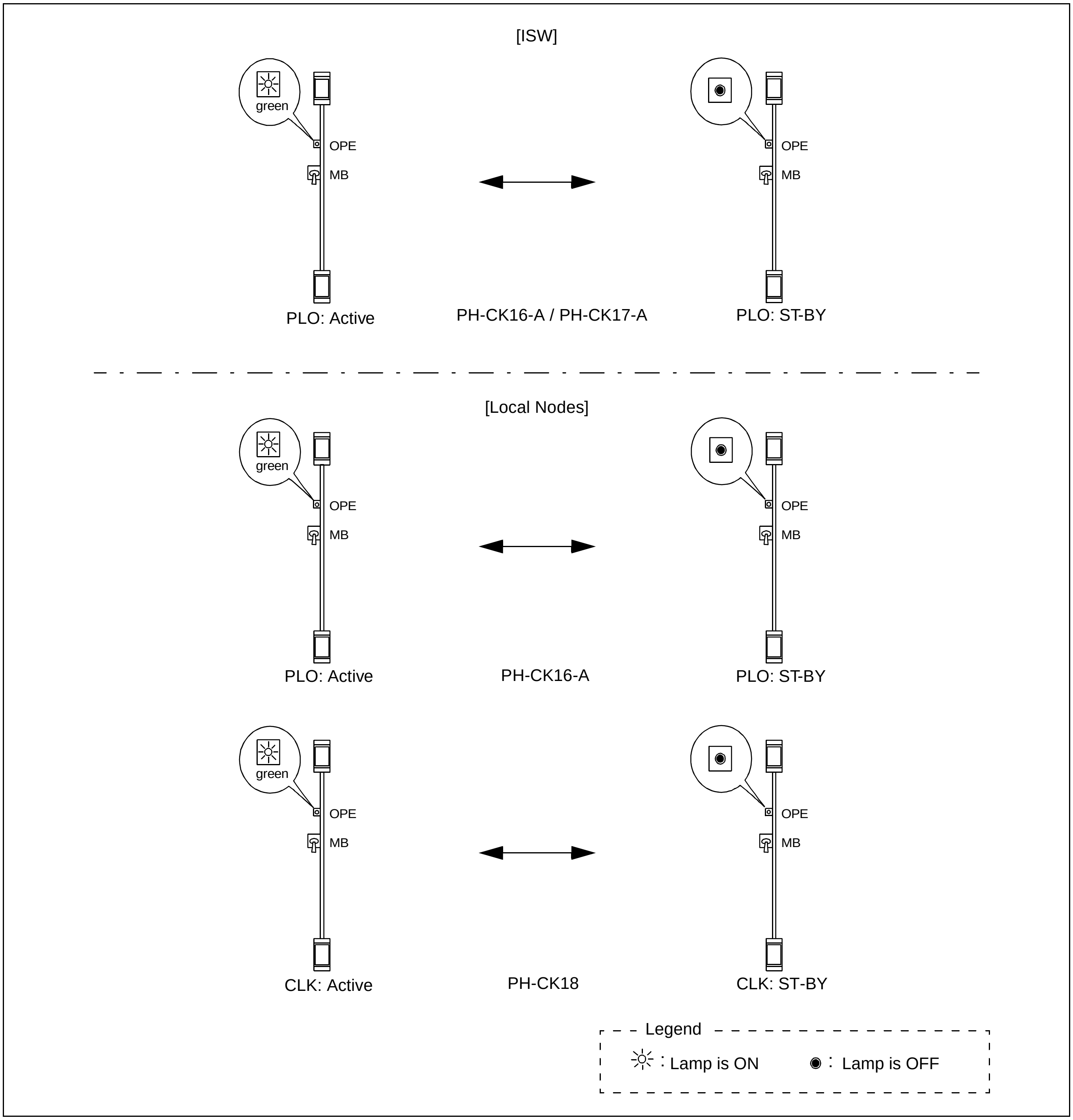

Figure 025-4 LEDs and Switches for PLO Changeover

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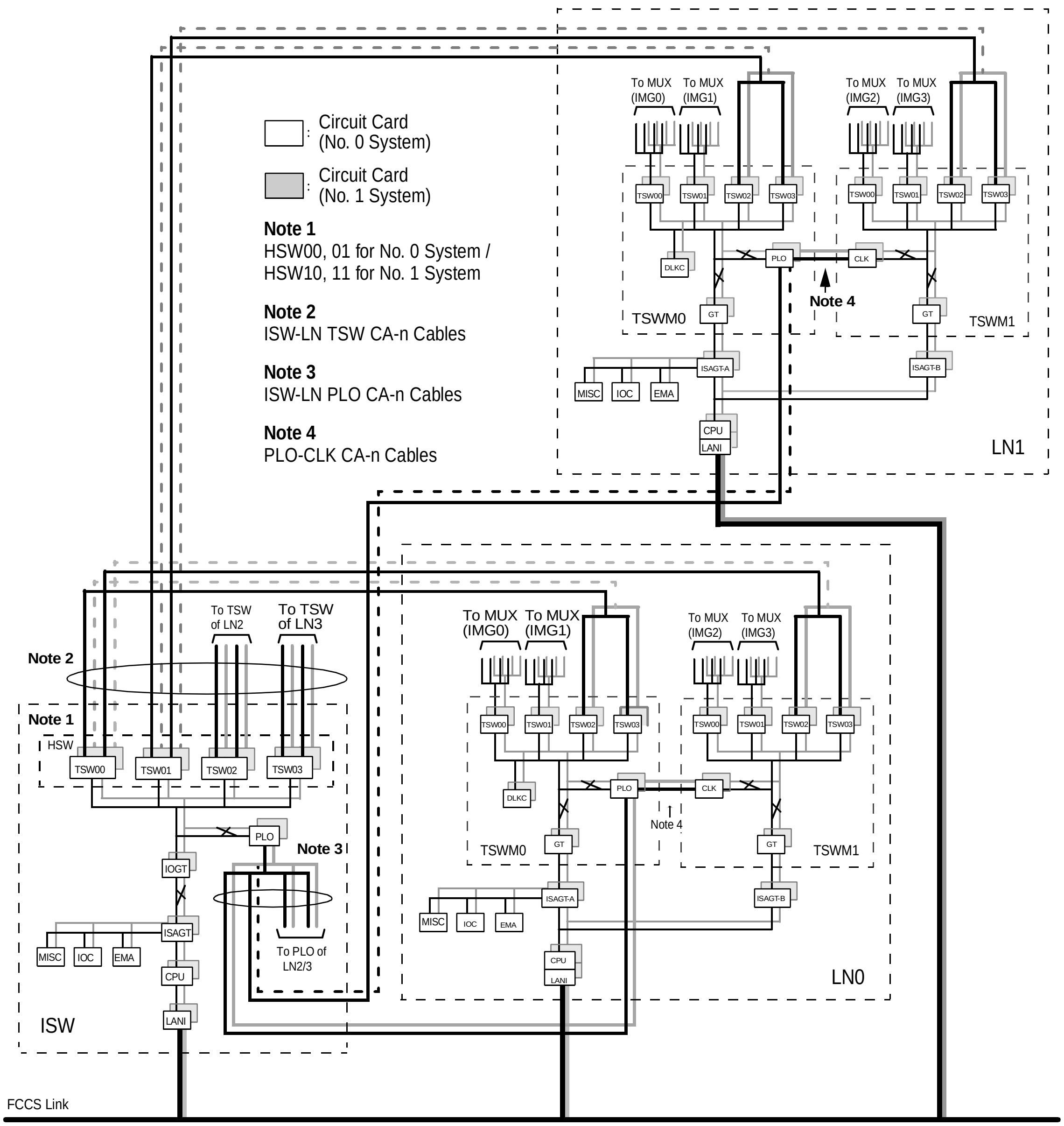
System Changeover Test

This figure roughly shows the general block diagram of the whole system.



< ISW (Inter-node Switch) >
ISAGT: PZ-GT13 LANI: PZ-PC19 IOGT: PH-GT10 ISW: PU-SW00
HSW: PU-SW01 PLO: PH-CK16/17-A EMA: PH-PC40 IOC: PH-IO24

< LN (Local Node) >
ISAGT-A: PZ-GT13 ISAGT-B: PZ-GT20 LANI: PZ-PC19 GT: PH-GT09 TSW: PH-SW12 MUX: PH-PC36
DLKC: PH-PC20 PLO: PH-CK16-A CLK: PH-CK18 EMA: PH-PC40 IOC: PH-IO24

Figure 025-5 General Block Diagram of the Whole System (1/2)

NAP-200-025
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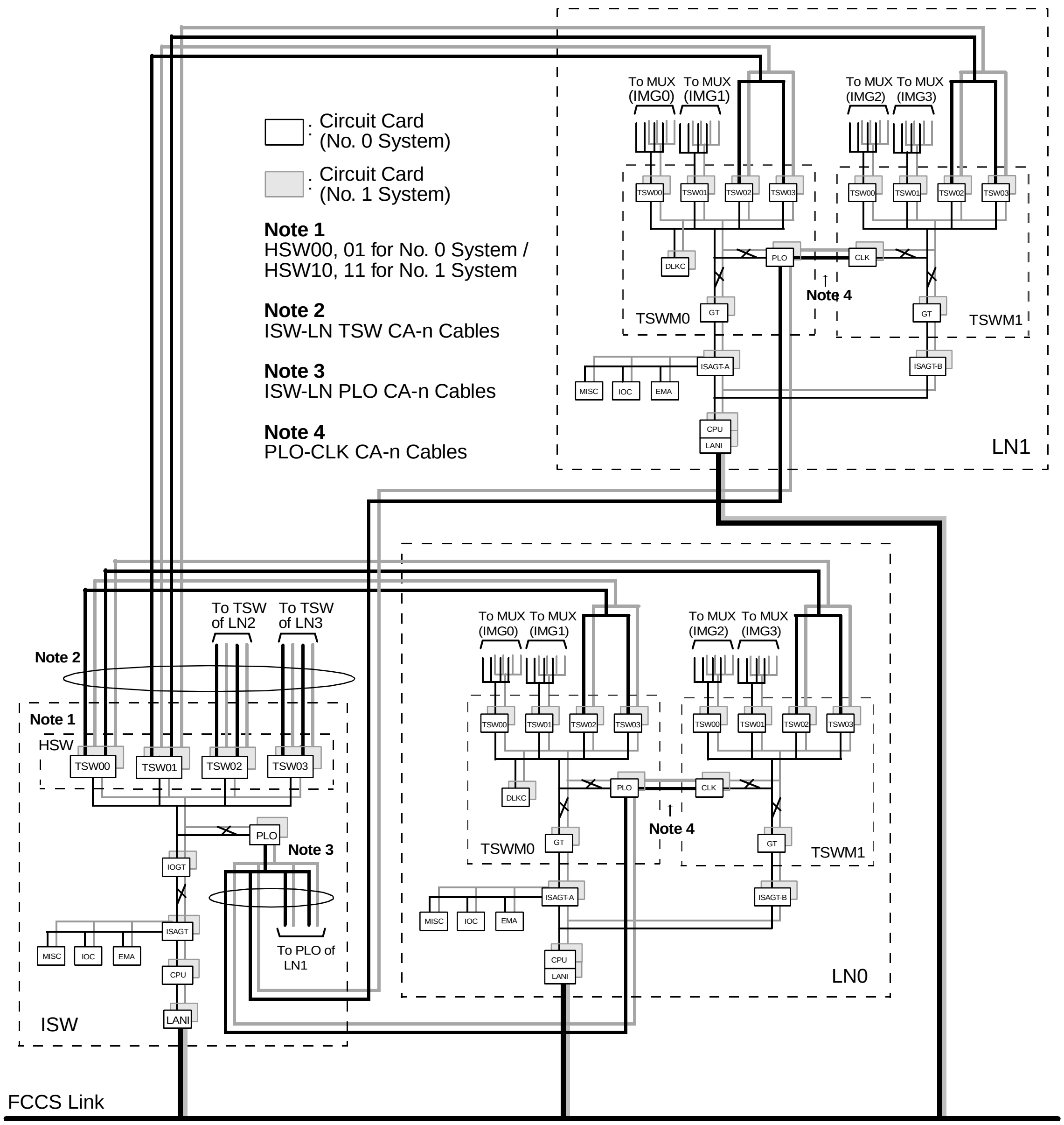
System Changeover Test

This figure roughly shows the general block diagram of the whole system.



< ISW (Inter-node Switch) >

ISAGT: PZ-GT13	LANI: PZ-PC19	IOGT: PH-GT10	ISW: PU-SW00
HSW: PU-SW01	PLO: PH-CK16/17-A	EMA: PH-PC40	IOC: PH-IO24

< LN (Local Node) >

ISAGT-A: PZ-GT13	ISAGT-B: PZ-GT20	LANI: PZ-PC19	GT: PH-GT09	TSW: PH-SW12	MUX: PH-PC36
DLKC: PH-PC20	PLO: PH-CK16-A	CLK: PH-CK18	EMA: PH-PC40	IOC: PH-IO24	

Figure 025-5 General Block Diagram of the Whole System (2/2)

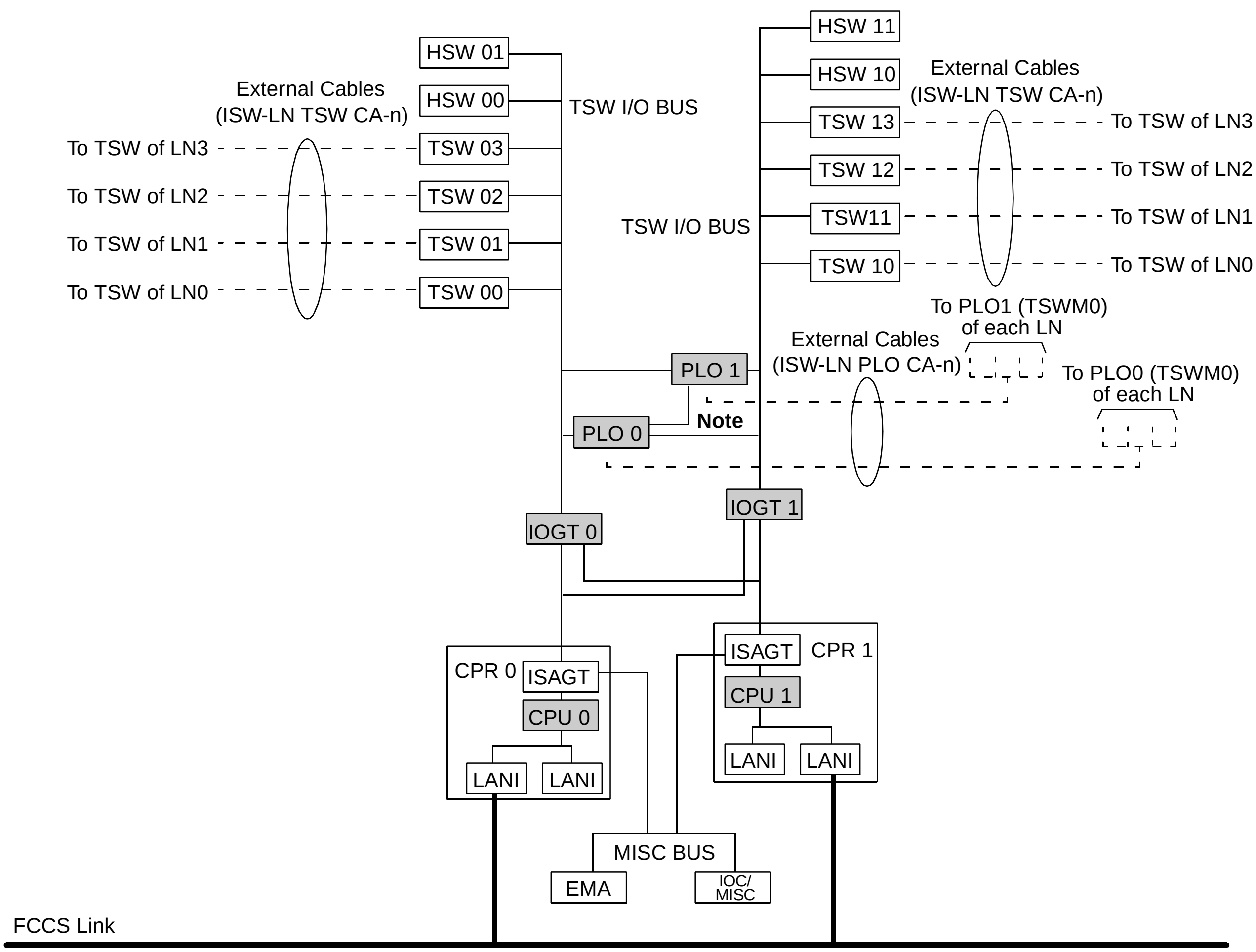
NAP-200-025
Sheet 11/13
System Changeover Test

This figure shows a system block diagram of ISW, which adopts a dual configuration. As seen in the figure, ISW has the following terminals for the ACT/ST-BY changeover of dual system equipment:

CPU: If the ACT/ST-BY of CPU (ISW) is once changed over, the whole controlling block (including CPU, ISAGT, LANI in ISW) are also changed over.

IOGT: If the ACT/ST-BY of IOGT (ISW) is once changed over, the whole switching block within the system (IOGT, TSW, HSW in ISW and TSW, MUX, DLKC in all LNs) are also changed over.
However, PLO (in both ISW and each LN) is not affected.

PLO: If the ACT/ST-BY of PLO in ISW is once changed over, only the PLOs in ISW are solely changed over.



ISAGT: PZ-GT13	LANI : PZ-PC19	IOGT: PH-GT10	TSW : PU-SW00
HSW : PU-SW01	PLO : PH-CK16/17-A	EMA : PH-PC40	IOC : PH-IO24

Note: *Even though the ACT/ST-BY of PLO in ISW is once changed over, the PLO/CLK in each LN are not changed over. This is because the PLOs in ISW and each LN (TSWM0) have multiple connections, respectively, via the backboard bus. For more details, refer to the "Circuit Card Manual."*

Figure 025-6 System Block Diagram for ISW Switching Network

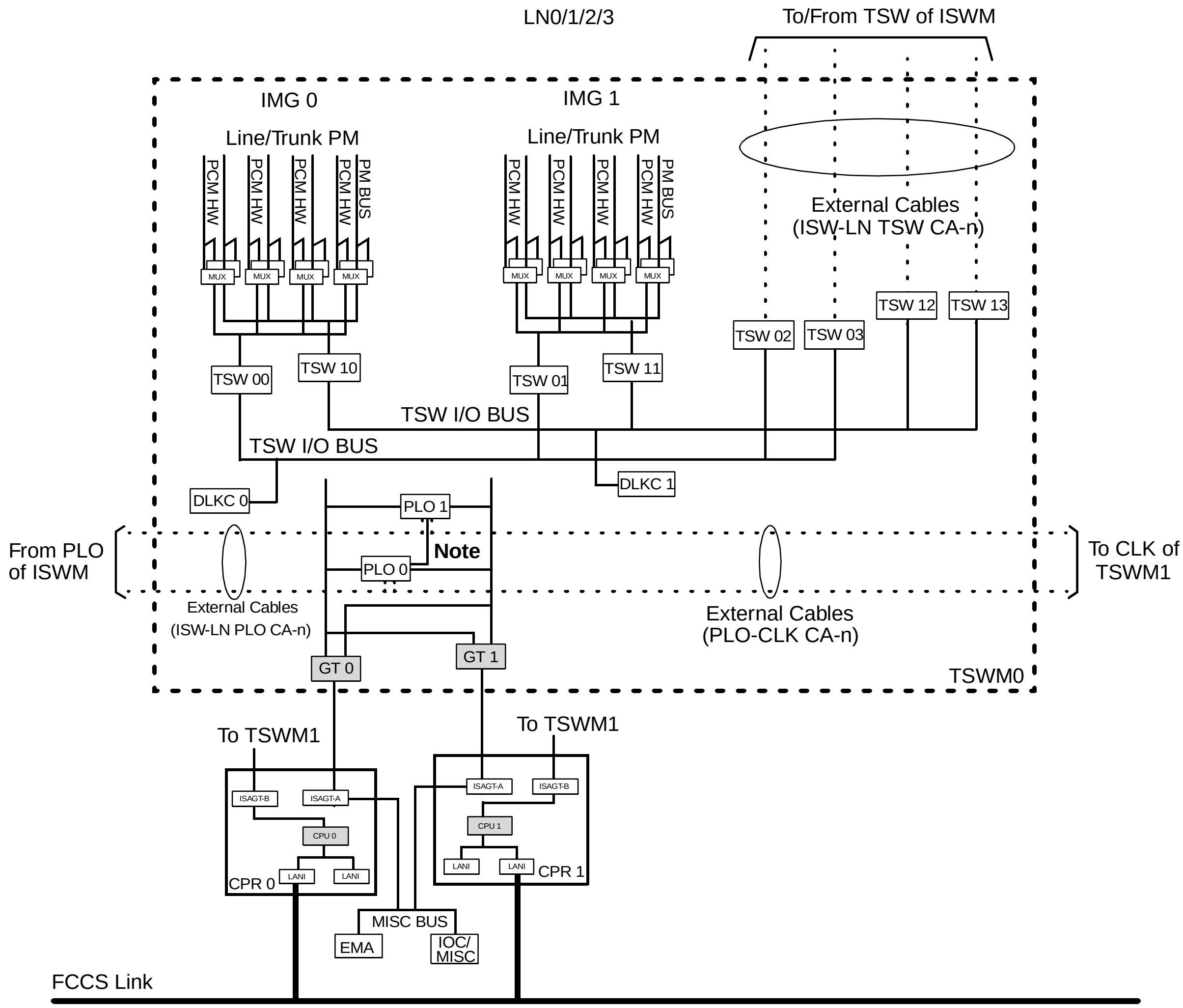
NAP-200-025
Sheet 12/13
System Changeover Test

This figure shows a system block diagram of LN, which adopts a dual configuration. As seen in the figure, each LN has following terminals for the ACT/ST-BY changeover of dual system equipment:

CPU: If the ACT/ST-BY of CPU is once changed over, the whole controlling block in the same node (including CPU, ISAGT, LANI) and GT in both TSWM0 and TSWM1 are also changed over.

GT (TSWM0): If the MBR key is flipped on the active GT (PH-GT09) card in TSWM0, the whole switching block in IPX-U [IMG0/1 (TSW, MUX, DLKC) and IMG2/3 (TSW, MUX)] is totally changed over. However, PLO (in TSWM0) and CLK (in TSWM1) are not affected.

PLO (TSWM0): If the MB key is flipped on the active PLO (PH-CK16-A) card (in TSWM0), the ACT/ST-BY of both PLOs in TSWM0 and CLKs in TSWM1 are totally changed over.



ISAGT-A: PZ-GT13	ISAGT-B: PZ-GT20	LANI: PZ-PC19	GT: PH-GT09	TSW: PH-SW12
MUX: PH-PC36	DLKC: PH-PC20	PLO: PH-CK16-A	EMA: PH-PC40	IOC: PH-IO24

Note: *See "***Note***" on the previous page.*

Figure 025-7 System Block Diagram for LN Switching Network (1/2)

NAP-200-025
Sheet 13/13
System Changeover Test

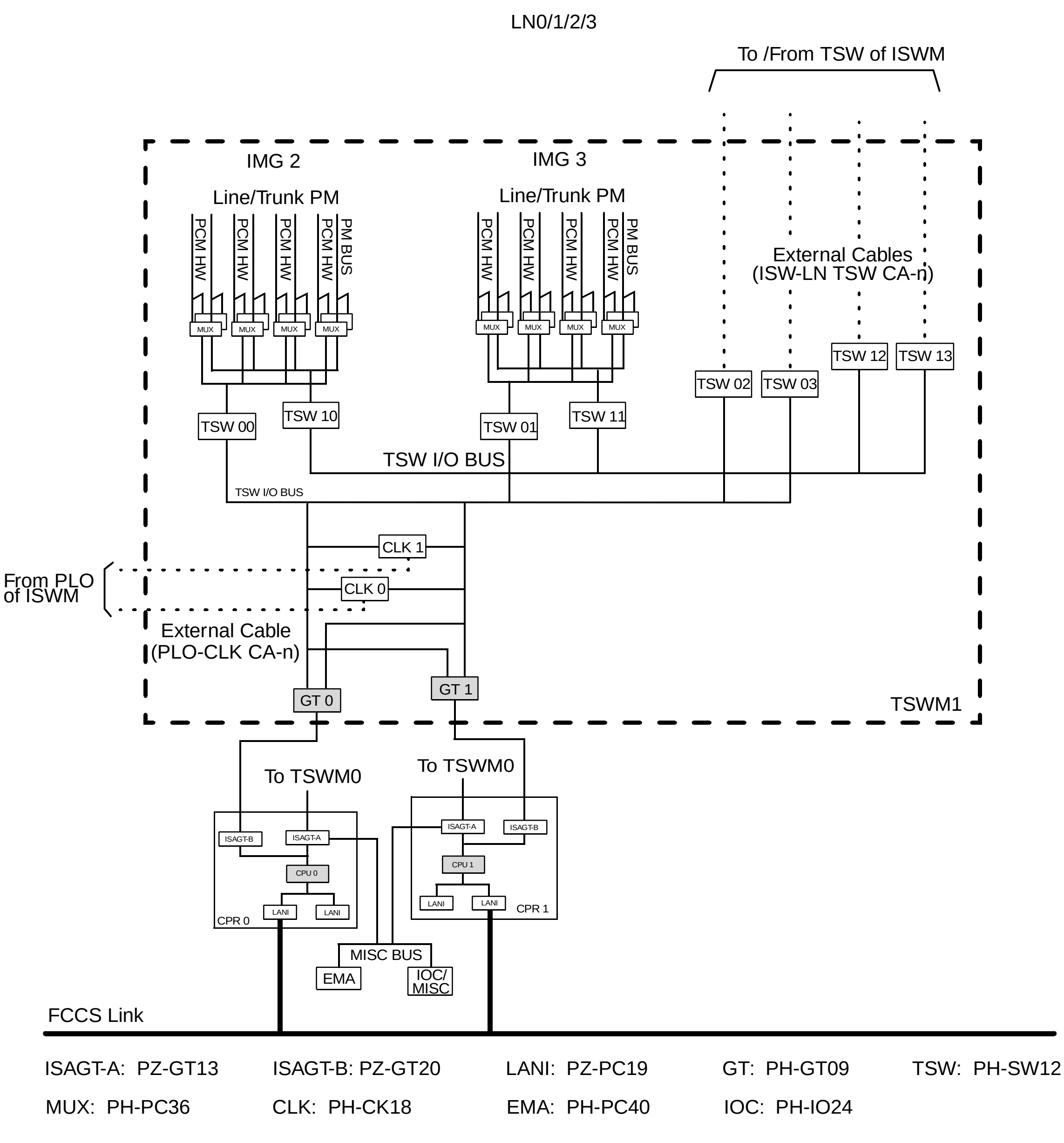


Figure 025-7 System Block Diagram for LN Switching Network (2/2)

NAP-200-026
Sheet 1/5
System Initialization Test

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Test Outline

Tests are to be performed to see if the system initialization can be executed on the following basis:

1. System Initialization on a Local Node basis (in each Local Node individually)
2. System Initialization in ISW only
3. System Initialization on a system basis (in ISW and all Local Nodes simultaneously)

NAP-200-026
Sheet 2/5
System Initialization Test

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1. System Initialization on a Local Node basis

Perform the system initialization test in each Local Node (LN), using the keys on the TOPU (refer to Figure 026-1):

START [* |]

- On the TOPU of the LN to be tested, set the EFFECT key to "ON" side.
- On the TOPU, set the SYSTEM DATA key to "NON LOAD" side, and PROGRAM key to "NON LOAD" side.
- Perform the system initialization by pressing the START button.
- Confirm
  - When the system is initialized, the CPU OPE lamp on the DSP of active CPR lights steady-green.
  - When the system is initialized, system message "7-B" is displayed automatically.
- Assign data and time via MAT command "ATIMN/ATIM".
- Repeat the steps above for all the remaining LNs.

END

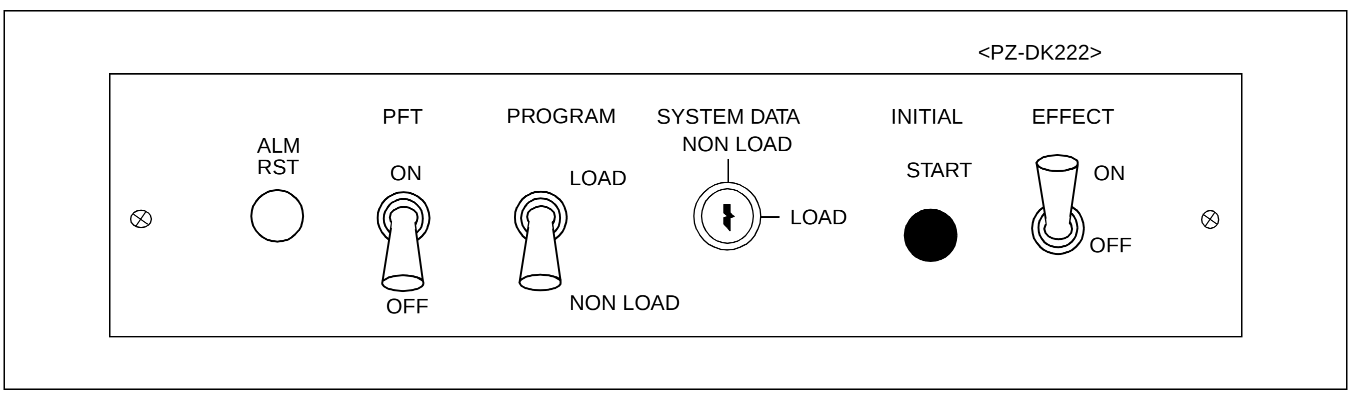

Figure 026-1 Keys on the TOPU (Local Node)

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2. System Initialization in ISW

Perform the system initialization test in ISW, by using the keys on the TOPU (refer to Figure 026-2):

START *

- On the TOPU of ISW, set the INITIAL SELECT key to “SELF” side.
- On the TOPU of ISW, set the EFFECT key to “ON” side.
- On the TOPU of ISW, set the SYSTEM DATA key to “NON LOAD” side and PROGRAM key to “NON LOAD” side.
- Perform the system initialization by pressing the START button.
- Confirm
  - When the system is initialized, the CPU OPE lamp on the DSP of active CPR lights steady-green.
  - When the system is initialized, system message “7-B” is displayed automatically.
- Assign data and time via MAT command “ATIMN/ATIM”.

END

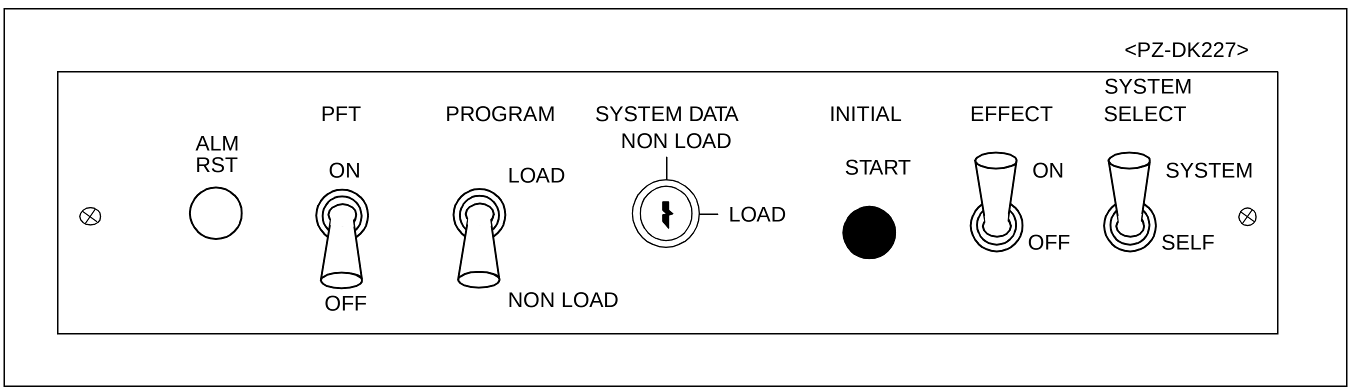

Figure 026-2 Keys on the TOPU (ISW)

NAP-200-026
Sheet 4/5
System Initialization Test

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3. System Initialization on a system basis

Perform the system initialization tests in ISW and all Local Nodes simultaneously, per the flowchart cited below. As in the flowchart, there are two kinds of method here; test via the keys on the TOPU of ISW, and test by turning the power ON and OFF.

START

- Perform the total system initialization via the keys on the TOPU (ISW) | * | |

  Note: *For key allocations, refer to Figure 026-2 on the previous page.*

  - On the TOPU of ISW, set the INITIAL SELECT key to "SYSTEM" side.
  - On the TOPU of ISW, set the EFFECT key to "ON" side.
  - On the TOPU of ISW, set the SYSTEM DATA key to "NON LOAD" side and PROGRAM key to "NON LOAD" side.
  - Perform the system initialization by pressing the START button.
  - Confirm
    - When the system is initialized, the CPU OPE lamps on the DSP of active CPR in all LNs and ISW light steady-green.
    - When the system is initialized, system message "7-B" is displayed automatically.

A

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A

Perform the total system initialization by powering ON/OFF *

On all PWR supplies, set the circuit breaker OFF (DOWN). If a module contains two PWR supplies, they must be turned OFF simultaneously.

<Power OFF Procedure>

- For LNs: IMG3 IMG2 IMG1 IMG0

IMG3:	PIM3	PIM2	PIM1	PIM0		
IMG2:	PIM3	PIM2	PIM1	PIM0	TSWM1	
IMG1:	PIM3	PIM2	PIM1	PIM0	TSWM0	
IMG0:	PIM3	PIM2	PIM1	PIM0	CPR1	CPR0

- For ISW: ISWM CPR1 CPR0

Turn ON the PWR supplies in each module in the following order. If a module contains two PWR supplies, they must be turned ON simultaneously.

<Power ON Procedure>

- For LNs: IMG3 IMG2 IMG1 IMG0

IMG3:	PIM0	PIM1	PIM2	PIM3		
IMG2:	TSWM1	PIM0	PIM1	PIM2	PIM3	
IMG1:	TSWM0	PIM0	PIM1	PIM2	PIM3	
IMG0:	CPR0	CPR1	PIM0	PIM1	PIM2	PIM3

- For ISW: CPR0 CPR1 ISWM

Confirm

When the system is initialized, the CUP OPE lamps on the DSP of active CPR in all LNs and ISW light steady-green.

When the system is initialized, system message “7-B” is displayed automatically.

Assignment of Data and Time

Upon completion of all the initialization tests, assign data and time via MAT command “ATIMN (available in the Network Control Node only).”

END

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Sheet 1/1
Circuit Card Initialization Test

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Contents
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Precautions Required

START

- Make the No. 0 CPU into active state.
- In each PIM, initialize any Line/Trunk circuit card.

*	

  - On the selected Line/Trunk circuit card, set the MB switch UP.
    - The OPE lamp goes out.
    - System Message “7-K” is displayed.
  - Set the MB switch DOWN.
    - The OPE lamp illuminates.
    - System Message “7-L” is displayed.
- Clear the alarm
  - Clear the alarm indication by pressing the “ALM RST” button on the TOPU.
- Place the No. 1 CPU into ACT system.
- In each PIM, unitialize any Line/Trunk circuit card.

  - On the selected Line/Trunk circuit card, set the MB switch UP.
    - The OPE lamp goes out.
    - System Message “7-K” is displayed.
  - Set the MB switch DOWN.
    - The OPE lamp illuminates.
    - System Message “7-L” is displayed.
- Clear the alarm
  - Clear the alarm indication by pressing the “ALM RST” button on the TOPU.

END

4. PORT CONNECTION TEST

4.1 Outline

Tests are to be performed on all the circuits of LC and Trunk circuit cards and PWR Supplies. LC and Trunk circuit cards are tested with respect to their operations and speech path conditions. PWR Supplies are tested with respect to howler tone and ringing signal.

While tests are in progress, the No. 0 CPU and TSW systems must be ACT (active).

4.2 Port Connection Test Procedure

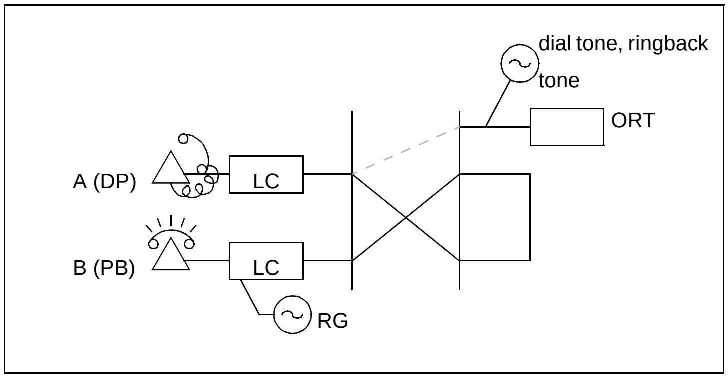
The connection test procedure for each type of circuit card is described in the NAP indicated to the right of each item in the following flowchart.

START

ORT (RST Card) Connection Test:	NAP-200-028
ATTCON (ATI Card) Connection Test:	NAP-200-029
Line (LC, ELC, DLC Card) Connection Test:	NAP-200-030
Outgoing Trunk (COT, TLT, DTI Card) Connection Test:	NAP-200-031
Incoming Trunk (COT, TLT, DTI Card) Connection Test:	NAP-200-032
Direct-In Termination Trunk (COT Card) Connection Test:	NAP-200-033
SND (RST Card) Connection Test:	NAP-200-034
3-Party Conference Trunk Function Test:	NAP-200-035
Connection Test - Announcement Trunk for Announcement Service:	NAP-200-036
Connection Test - Digital Announcement Trunk for Announcement Service:	NAP-200-037
Connection Test - Paging Trunk for Paging Access Service:	NAP-200-038
Connection Test - Paging Trunk for Paging Transfer Service:	NAP-200-039
Radio Paging Trunk (COT Card) Connection Test:	NAP-200-040
Howler and Ringing Signal Test:	NAP-200-041

END

NAP-200-028
Sheet 1/2
ORT (RST Card) Connection Test



START

- Make busy all ORTs
  - On the front of the RST card, set all MBR switches (0-7) to the OFF position, making all ORTs busy.
- From Station "A" (DP), test ORTs one circuit at a time.

*	

  - Un-busy (make idle) only the ORT to be tested.
  - Station "A" goes off-hook and after hearing dial tone, dials the station number of Station "B."
  - Station "A" confirms ringing to Station "B" and Station "B" answers.
  - Stations "A" and "B" go on-hook.
- From Station "B" (PB), test ORTs one circuit at a time.

*	

  - Un-busy only the ORT to be tested.
  - Station "B" goes off-hook and after hearing dial tone, dials the station number of Station "A."
  - Station "B" confirms ringing to Station "A" and Station "A" answers.
  - Stations "A" and "B" go on-hook.

A

NAP-200-028
Sheet 2/2
ORT (RST Card) Connection Test

A

Perform tests for a situation where all ORTs are busy.

System Data SYS1, INDEX 4, b_0 =0

- Station “A” goes off-hook.
- Station “A” confirms that reorder tone is heard.
- Station “A” goes off-hook.

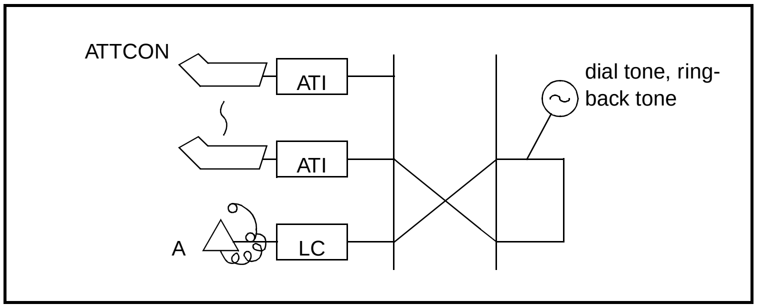
System Data SYS1, INDEX 4, b_0 =1

*

- Station “A” goes off-hook.
- Station “A” confirms that no tone is heard.
- Un-busy (make idle) a single ORT circuit.
- Station “A” confirms that dial tone is heard.
- Station “A” goes off-hook.

END

NAP-200-029
Sheet 1/1
ATTCON (ATI Card) Connection Test



START

- A station repeats an ATTCON call. Each ATTCON answers the call.

*	

  - Station “A” dials the operator access code (normally, “0”).
  - At each ATTCON, the operator confirms that theATT lamp flashes and the ringer sounds.
  - At each ATTCON, the operator answers the call by pressing the ATND key.
  - Station “A” confirms speech with each ATTCON.
  - The operator at each ATTCON releases by pressing the CANCEL key.
  - Station “A” goes on-hook.

- Each ATTCON calls a station by pressing LOOP keys one at a time.

*	

  - At each ATTCON, the operator dials the number of Station “A” by using LOOP keys (L1-L6) one at a time.
  - Ringing at Station “A” is confirmed.
  - Station “A” answers the call and confirms speech.
  - The operator at the ATTCON releases by pressing the CANCEL key.
  - Station “A” goes on-hook.

END

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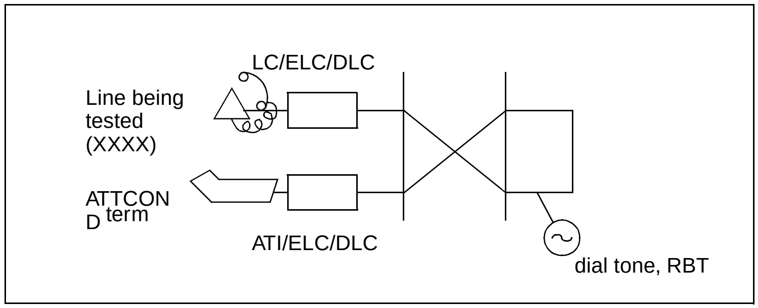
Sheet 1/1
Line (LC, ELC, DLC Card) Connection Test



START

- An ATTCON or D^{term} is called from each station. The called party confirms the station number.

*	

  - On the MDF, a telephone set is connected to the line circuit to be tested
  - The station (XXXX) to be tested goes off-hook and confirms dial tone.
  - The station (XXXX) calls an ATTCON or D^{term}.
  - The called ATTCON or D^{term} answers the call, and confirms speech and the station number of the calling station.
  - The call is released.

- The ATTCON or D^{term} calls a station being tested.

*	

  - The ATTCON or D^{term} dials the station number of the station being tested.
  - The called station answers and confirms speech.
  - The ATTCON or D^{term} confirms that the number dialed and the number of the station being tested are the same.
  - The call is released.

- The test conducted when the station involved is assigned as a Hot Line/House Phone.

  - The station being tested goes off-hook and confirms ringback tone.
  - The station checks whether the call is routed to the predetermined station/ATTCON or that a call is originated to a predetermined trunk.
  - The called side answers the call and confirms speech.
  - The call is released.

END

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Sheet 1/3
Outgoing Trunk (COT, TLT, DTI Card) Connection Test

Test Outline:

The purpose of this test is to confirm, by setting up an outgoing connection test for each outgoing trunk, that speech can be made and that the call can be released.

Outgoing trunks must be tested one at a time using the sequence of Routes and Trunk Numbers assigned at each office.

START

- When a C. O. Line or Tie Line is not connected with a trunk circuit, temporary cross connections between the Outgoing trunk being tested and the terminating trunk should be set up on the MDF as a loop-back circuit.
  - Referring to Figures 031-1 through 031-3, make temporary cross connections on the MDF for a loop-back circuit.
  - Temporarily assign Office Data from the MAT so that a loop-back connection from the trunk can be established.
- Make busy all Outgoing Trunks.
  - On the front of the Trunk circuit card, set the MB switch to the OFF position, making the trunk busy.
- Test the trunk circuits one at a time by establishing access from a station.
  - Un-busy (make idle) only the trunk to be tested.
  - The station dials the Access Code of the trunk being tested and the number for the call destination.
  - The called side answers.
  - The station confirms speech.
  - The call is released.
  - Make temporary cross connections for the next trunk to be tested.
- Restore the temporary connections, temporary Office Data, etc. to the original.

END

- Set up a loop-back connection between the COT (C.O. Trunk) to be tested and a station line.

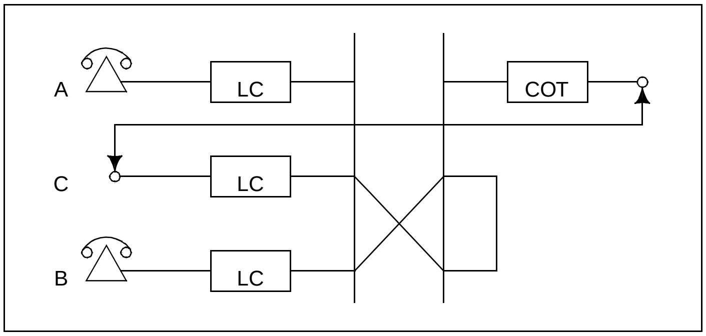


Figure 031-1 COT Test Configuration

- The trunk route must be assigned for Loop Start.

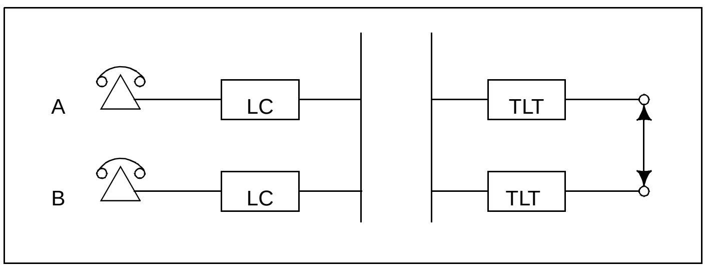
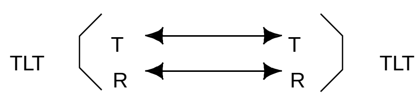
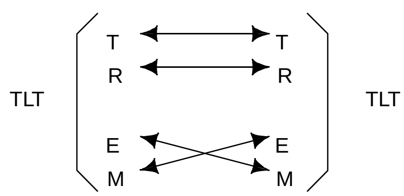


Figure 031-2 TLT Test Configuration

- Set up a loop-back connection between the TLT (Tie Line Trunk) to be tested and another EMT.
- If the TLT is a DID (Direct Inward Dialing) Trunk, connect the related leads as shown below.

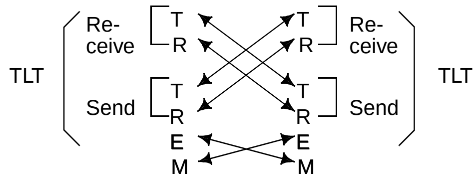


- If the TLT is a 2W E&M System, connect the related leads as shown below.



NAP-200-031
Sheet 3/3
Outgoing Trunk (COT, TLT, DTI Card) Connection Test

- If the TLT is a 4W E&M System, connect the related leads as shown below.



- Set up a loop-back connection between the DTI Trunk to be tested and another DTI Trunk as shown below:

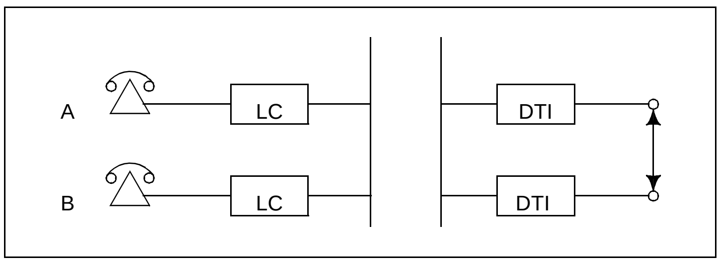
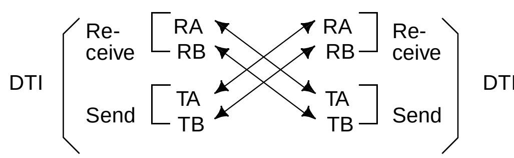


Figure 031-3 DTI Test Configuration



- If the office is the primary office (Clock-Source-Office), perform the tests by disconnecting the PLO and the M-OSC. (The mode of the PLO becomes “Self Operation Mode.”)

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Sheet 1/2
Incoming Trunk (COT, TLT, DTI Card) Connection Test

Test Outline:

The purpose of this test is to confirm, by setting up an incoming trunk connection test for each incoming trunk, that speech can be made with the ATTCON when a Ringdown Signal Interface is used, or with a station when a Dial-In Signal Interface is used. This test also confirms that the call can be released. Incoming trunks must be tested one at a time using the sequence of Route and Trunk Numbers assigned at each office.

START

- On the MDF, make temporary cross connections between the Incoming Trunk to be tested and an outgoing trunk as a loop-back circuit.
  - Referring to Figures 031-1 through 031-3 in NAP-200-031, make temporary cross connections on the MDF for a loop-back circuit.
  - Temporarily assign Office Data from the MAT so that a loop-back connection from the trunk can be established.
- Make busy all outgoing trunks other than the cross-connected trunk.
- Test Incoming trunk circuits one at a time.
  - For Ringdown Signal Interface.
    - Station "A" dials the telephone number of Station "C."
    - The call terminates to an Attendant Console.
    - The Attendant Console answers the call and confirms speech.
    - The call is released.
    - Make temporary connections for the next trunk to be tested.

A

B

NAP-200-032
Sheet 2/2
Incoming Trunk (COT, TLT, DTI Card) Connection Test

A

B

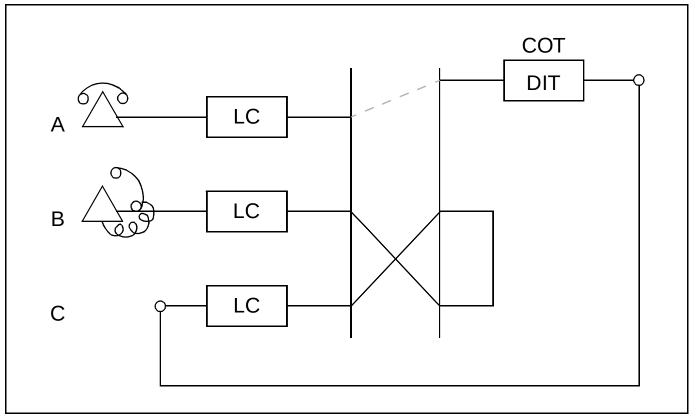
For a Dial-In Signal Interface.

- Station "A" dials the access code for the outgoing trunk and the telephone number of Station "B."
- Station "B" answers the call and confirms speech.
- The call is released.
- Make temporary cross connections for the next trunk to be tested.

Restore the temporary cross connections, temporary Office Data, etc. to the original.

END

NAP-200-033
Sheet 1/1
Direct-In Termination Trunk (COT Card) Connection Test



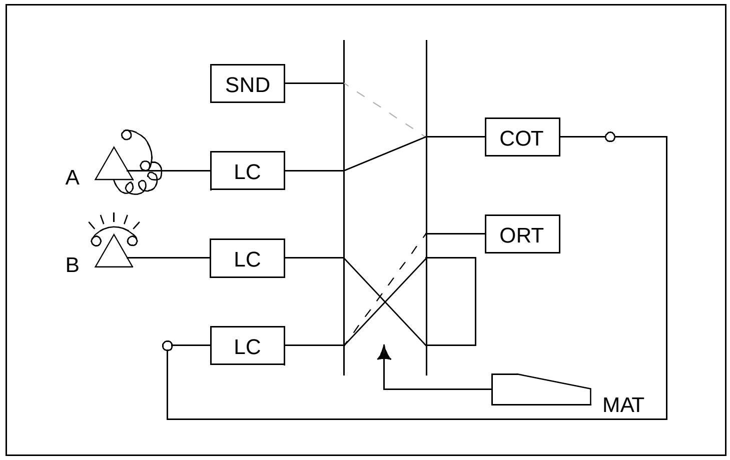
START

- On the MDF, make temporary cross connections between the Trunk for Direct-In Termination (DIT) and an LC.
- C.O. Line Incoming Call — Station "B" dials the telephone number of LC "C" (Station "C").
- Incoming Call to Station via DIT Trunk.
  - The call terminates to Station "A"; Station "A" rings.
  - Confirm that the ringing is distinct from that of an intra-office call or ordinary C.O. call.
    - The ringing signal for Direct-In Termination calls can be the same as that used for C.O. calls if the related Office Data is assigned.

      System Data SYS1, INDEX 72, SYS3, INDEX 0, and parameter DR of Command "ARTD."
- Answer and Talk
  - Station "A" goes off-hook.
  - Stations "A" and "B" talk with each other.
- Release — Station "A" and "B" both go on-hook.
- Remove the temporary cross connections.

END

NAP-200-034
Sheet 1/1
SND (RST Card) Connection Test

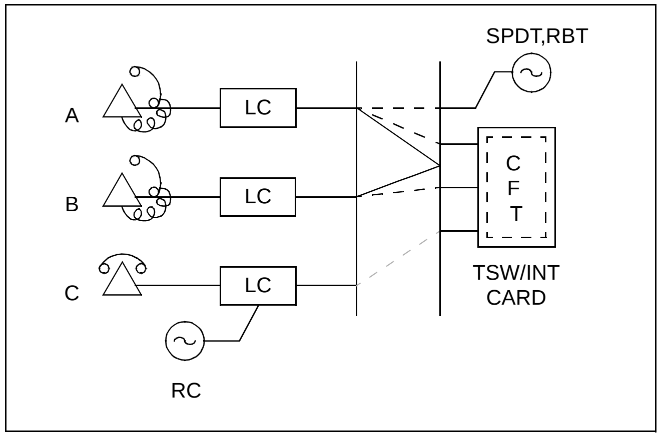


START

- When a C.O. Line or Tie Line is not connected with the trunk, make an arrangement for trunk loop-back as illustrated above.
  - On the MDF, make temporary cross connections for a loop back circuit.
  - Temporarily assign Office Data from the MAT so that a connection can be set up with Station "B" via a SND.
- Make busy all SNDs
  - On the front of the RST circuit card, set all MBS switches (0-7) to the OFF position, thereby making all SNDs busy.
- Test SNDs one after another
  - Un-busy (make idle) only the SND to be tested.
  - Station "A" dials the access code of the trunk and the telephone number of Station "B."
  - Station "B" answers and talks
  - The call is released.
- Restore the temporary cross connections, temporary Office Data etc. to the original.

END

NAP-200-035
Sheet 1/1
3-party Conference Trunk Function Test

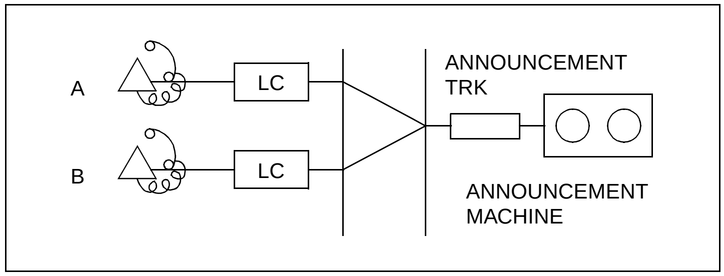


START

- Make busy all CFTs — Make busy all CFTs using MAT command “MBTK.”
- Test CFTs one at a time
  - Un-busy (make idle) only the CFT to be tested.
  - Stations “A” and “B” are engaged in a station to station connection.
  - Station “A” makes a Switch Hook Flash (SHF) and after hearing dial tone, dials the telephone number of Station “C.”
  - Station “C” answers the call.
  - Station “A,” after having talked with Station “C,” makes a SHF and confirms that a three-way connection has been set up.
  - The call is released.
- Cancel the Make Busy of the CFT — Un-busy (make idle) the CFT using the “MBTK” command.

END

NAP-200-036
Sheet 1/1
Connection Test-Announcement Trunk for Announcement Service

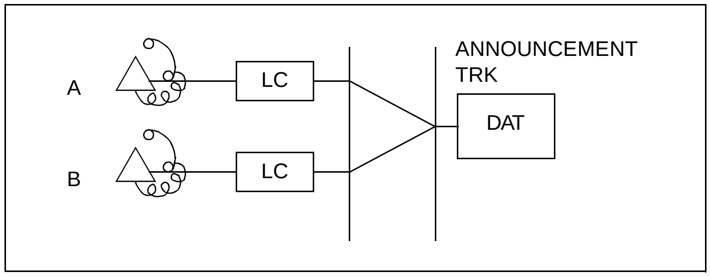


START

- Dial the announcement service code — Station “A” dials the announcement service code.
- Check the contents of the announcement — Station “A” is connected to the announcement machine and hears the announcement.
- Dial the announcement service code — Station “B” dials the announcement service code.
- Check the contents of the announcement — Station “B” is connected to the announcement machine and hears the announcement.
- Release — Confirm that the announcement machine stops when both Stations “A” and “B” goes on-hook.

END

NAP-200-037
Sheet 1/1
Connection Test-Digital Announcement Trunk for Announcement Service

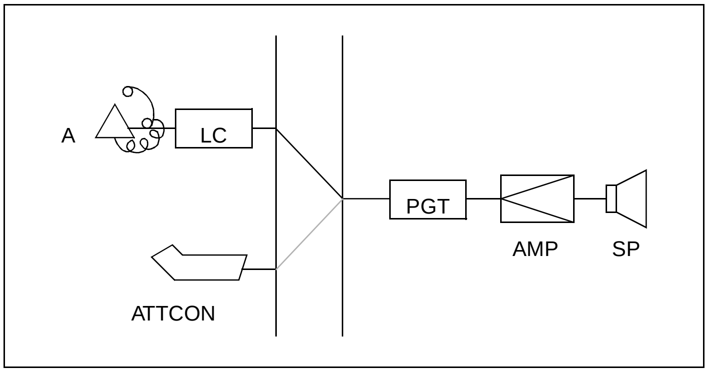


START

- Dial the announcement service code — Station "A" dials the announcement service code.
- Check the contents of the announcement ☐☐ — Station "A" is connected to the announcement trunk and hears the announcement.
- Dial the announcement service code — Station "B" dials the announcement service code.
- Check the contents of the announcement ☐☐ — Station "B" is connected to the announcement trunk and hears the announcement.
- Release — Confirm that the announcement stops when both Stations "A" and "B" goes on-hook.

END

NAP-200-038
Sheet 1/1
Connection Test-Paging Trunk for Paging Access Service



START

- Dial the paging access code — Station "A"/ATTCON dials the paging access code and hears CRBT (Continuous Ringback Tone).

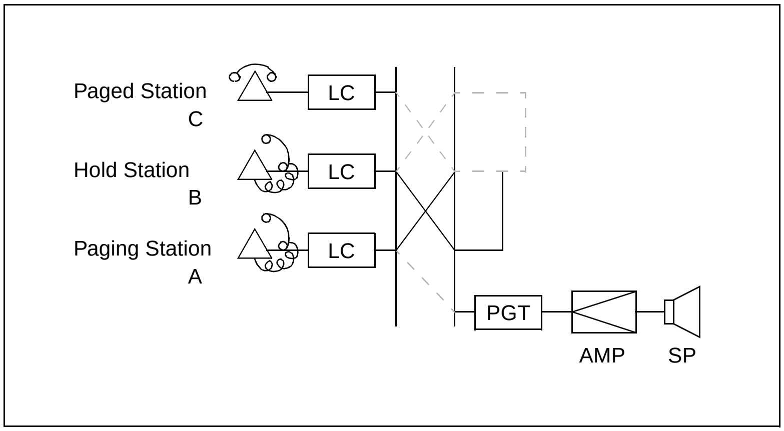
  In about 1 sec., CRBT stops.

- Speaker Paging — Check whether speaker paging is possible after CRBT has stopped.

- Release — Station "A" goes on-hook or theATTCON depresses the CANCEL key.

END

NAP-200-039	
Sheet 1/2	
Connection Test-Paging Trunk for Paging Transfer Service	



- Paging Transfer Service can be selected according to System Data (SYS1, INDEX 73).
  1. Non-Delay System
  2. Delay and Non-Delay System
  3. Paging Transfer Supervision

START

- Call the Paging Trunk ☐☐
  - Stations "A" and "B" are engaged in a station to station connection.
  - Station "A" makes a Switch Hook Flash (SHF) and hears SPDT. Station "B" is held on the line.
  - Station "A" dials the paging access code and hears CRBT. In about 1 sec., CRBT is no longer heard and Station "A" is able to page through the loudspeaker.
- The paging party
  - For a Non-Delay System:
    - Station "A" remains on hold. ☐☐
  - For a Delay System with Paging Transfer Supervision:
    - Station "A" hangs up. ☐☐
- The paged party answers ☐☐
  - Station "C" (the paged party) dials the paging access code (answer).

A

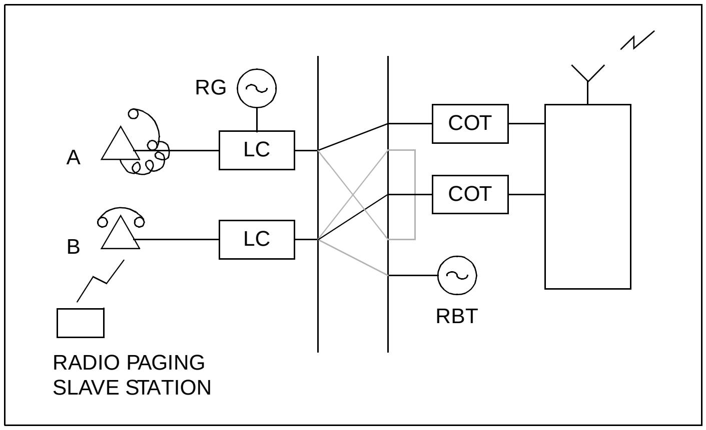
NAP-200-039
Sheet 2/2
Connection Test-Paging Trunk for Paging Transfer Service

A

- Connection
  - For Non-Delay-System
    - Station “C” is connected to Station “A.”
    - When Station “A” hangs up, Stations “B” and “C” are automatically connected with each other.
  - For a Delay-System
    - Station “A” rings and picks up handset.
    - Station “A” is connected to Stations “C.”
    - When Station “A” hangs up, Stations “B” and “C” are automatically connected with each other.
  - For Paging Transfer Supervision
    - Station “C” is connected to Station “B.”
- Release

END

NAP-200-040
Sheet 1/1
Radio Paging Trunk (COT Card) Connection Test

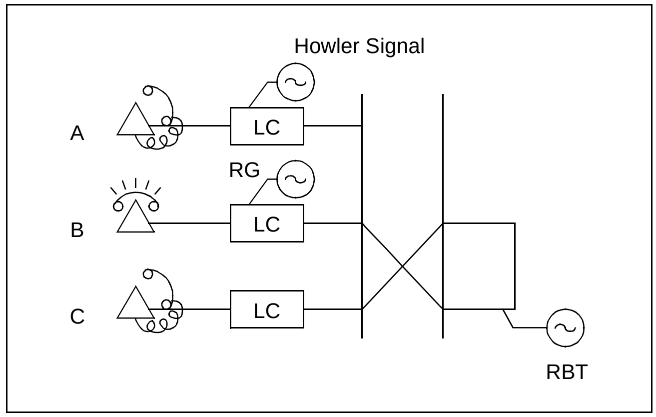


START

- Call the Radio Paging Equipment
  - Station "A" dials the radio paging access code and hears special dial tone from the Radio Paging Equipment, then dials the slave station number.
  - The paging radio of the slave station starts ringing.
  - By hearing CRBT (Continuous Ring Back Tone) from the Radio Paging Equipment, Station "A" confirms that the slave station is being paged, then goes on-hook.
- The paged party answers
  - The slave station (the radio-pages party) dials the paging answer code at the nearby Station "B", hears SPDT through the Radio Paging Equipment, then dials the paging answer code.
  - Station "A" rings and picks up the handset.
  - Confirm that Stations "A" and "B" can talk with each other.
- Release
  - Stations "A" and "B" both go on-hook.

END

NAP-200-041
Sheet 1/2
Howler & Ringing Signal Test



Test Outline:

The Howler Tone Generator and the Ringing Generator are equipped on the PWR Supply.
The purpose of the test is to confirm ringing signal by setting up a station to station connection and a howler tone connection from a station accommodated in any PIM.

START

- Check PWR0 in each PIM.
  - While both PWR Supplies are OFF, turn power to PWR0 ON. Leave PWR1 OFF.
  - Check howler tone. | * | |
    - A station accommodated in the PIM for which the PWR Supply is to be tested goes off-hook. (analog port only)
    - The station hears dial tone.
    - In about 12 seconds, the station hears reorder tone.
    - About 30 seconds later, the station should confirm hearing howler tone.
  - Check ringing signal. | * | |
    - Set up a station-to-station connection between two stations accommodated in the PIM in which the PWR Supply is to be tested. (analog port only)
    - Confirm that ringing signal is sent out.

A

NAP-200-041
Sheet 2/2
Howler & Ringing Signal Test

A

- Check PWR1 in each PIM.
  - While both PWR Supplies are OFF, turn power to PWR1 ON. Leave PWR0 OFF.
  - Check howler tone. | * | |
    - A station accommodated in the PIM in which the PWR Supply is to be tested goes off-hook. (analog port only)
    - The station hears dial tone.
    - In about 12 seconds, the station hears reorder tone.
    - About 30 seconds later, the station should confirm hearing howler tone.
  - Check ringing signal. | * | |
    - Set up a station-to-station connection between two stations accommodated in the PIM in which the PWR Supply is to be tested. (analog port only)
    - Confirm that ringing signal is sent out.

END

5. OVERALL TEST

5.1 Outline

Tests are to be performed to check the following lines by connecting them to a trunk on an individual basis:

- C.O. lines
- FCCS (Fusion Call Control Signal) - If the system has a connection with other IPX and/or IMX series via Fusion link
- Tie lines - If the system has a connection with tie lines including CCIS

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.

5.2 Overall Test Procedure

The procedure for performing the Overall Test is described in the NAPs indicated to the right of each item in the following flowchart.

START

Overall Test for C.O. Line Outgoing Call:	NAP-200-042
Overall Test for C.O. Line Incoming Call:	NAP-200-043
Overall Test of Fusion Link Connection with Other IPX and/or IMX Series:	NAP-200-044
Overall Test of CCIS Tie Line Outgoing Call:	NAP-200-045
Overall Test of CCIS Tie Line Incoming Call:	NAP-200-046
Test of Connection and Alternate Routing to All Tie Lines:	NAP-200-047
Test of Tandem Connection to Tie Line:	NAP-200-048
PAD Setting:	NAP-200-049

END

NAP-200-042
Sheet 1/3
Overall Test for C.O. Line Outgoing Call

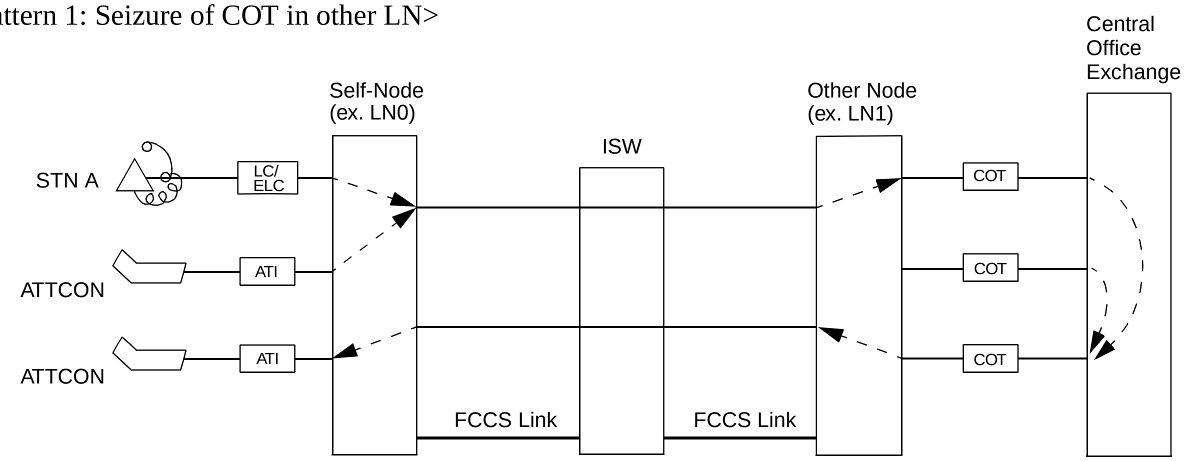
START

- Seizure of trunk to be tested
  - When seizing from a station
    - Place the trunk to be tested into idle state, and make all other trunks busy.
    - Station "A" dials the trunk access number.
    - Station "A," after hearing dial tone from the C.O., dials the pilot number for the local office and allows the call to be terminated to that office via loop-back at the C.O.
  - When seizing from an ATTCON
    - An ATTCON sets up the connection with a specific trunk designated via Individual Trunk Access service.
    - The ATTCON, after hearing dial tone from the C.O., dials the pilot number for the local office and allows the call to be terminated to that office via loop-back at the C.O.
- Call termination to ATTCON
  - The call looped back at the C.O. terminates to the ATTCON.
- 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 COTs have been checked and a fault is detected.
  - Perform a trunk loop-back test at the C.O., and determine whether the trunk side or the C.O. Line side is faulty.
  - If the C.O. Line is faulty, make a request to the C.O. for repair.

END

NAP-200-042
Sheet 2/3
Overall Test for C.O. Line Outgoing Call

<Pattern 1: Seizure of COT in other LN>



<Pattern 2: Seizure of COT in self-node via ISW>

- When Station/ATTCON in IMG0/1 seizes COT accommodated in IMG2/3 of the same node.
- When Station/ATTCON in IMG2/3 seizes COT accommodated in IMG0/1 of the same node.

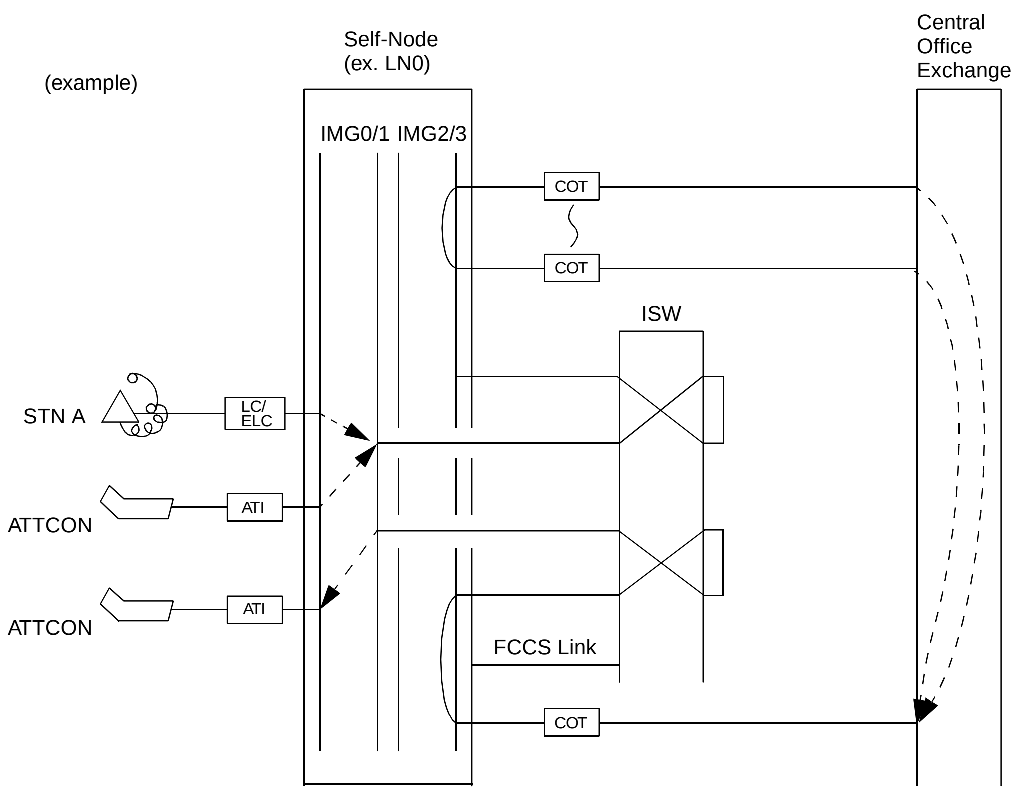


Figure 042-1 Overall Test for C.O. Line Outgoing Call (1/2)

NAP-200-042
Sheet 3/3
Overall Test for C.O. Line Outgoing Call

<Pattern 3: Seizure of COT in self-node (without ISW mediation)>

- When Station/ATTCON in IMG0/1 seizes COT accommodated in IMG0/1 of the same node.
- When Station/ATTCON in IMG2/3 seizes COT accommodated in IMG2/3 of the same node.

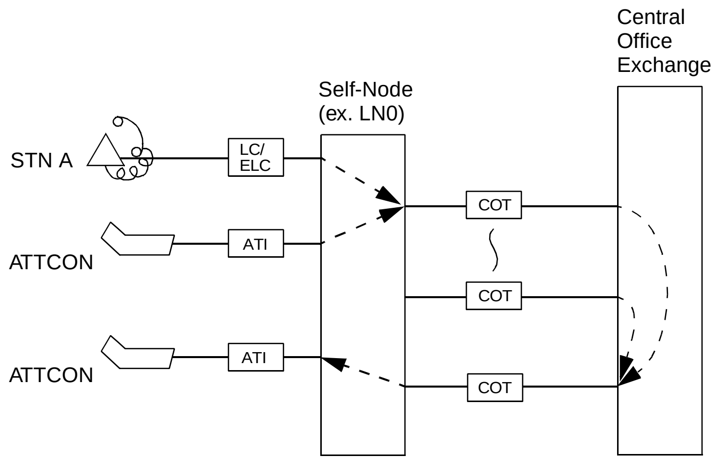


Figure 042-1 Overall Test for C.O. Line Outgoing Call (2/2)

NAP-200-043
Sheet 1/3
Overall Test for C.O. Line Incoming Call

Test Outline:

The tests comprising this NAP are to be performed according to the C.O. Line NumberTable provided by the C.O. If the C.O. Line Numbers are not known, tests cannot be performed because loop-back cannot be performed at the C.O.

In addition, tests cannot be performed which involve Direct Inward Dialing. Under such circumstances, the C.O. must be asked to perform an incoming test.

START

- Seizure of trunk to be tested
  - From the ATTCON, set up a connection with a specific trunk designated via Individual Trunk Access.
  - After hearing dial tone from the C.O., dial the C.O. Line number of the trunk being tested from the ATTCON.
- Call termination to ATTCON
  - The call looped back at the C.O. terminates to the ATTCON.
- Speech Condition Check
  - After the call has been answered at theATTCON, check the speech conditions including speech level, presence of noise, and one-way speech.
- Release
- When all COT trunks have been checked and a fault is detected.
  - Perform a trunk loop-back test at the C.O. and identify whether the trunk side or the C.O. Line side is faulty.
  - If the C.O. Line side is faulty, make a request to the C.O. for repair.

END

NAP-200-043
Sheet 2/3
Overall Test for C.O. Line Incoming Call

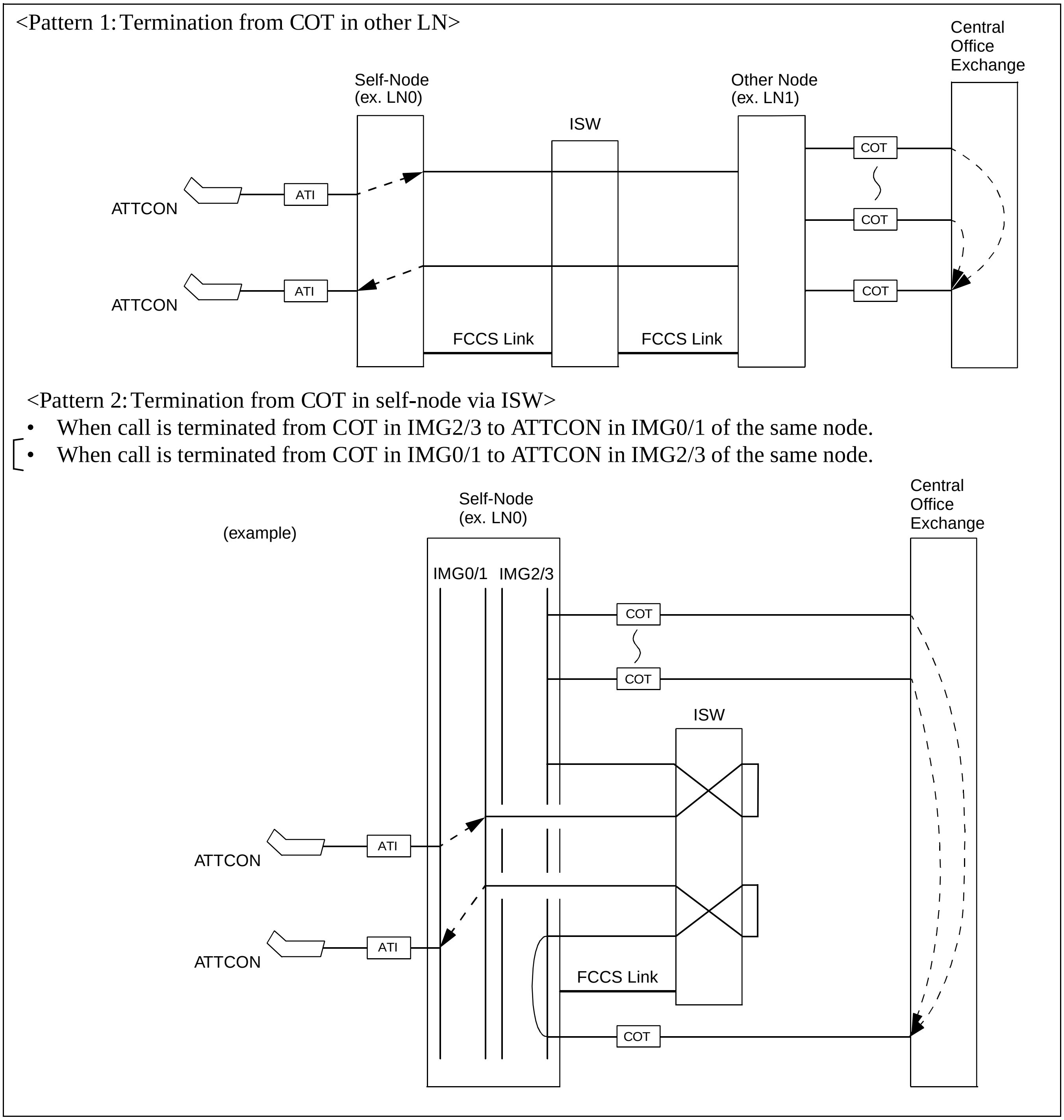


Figure 043-1 Overall Test for C.O. Line Incoming Call (1/2)

NAP-200-043
Sheet 3/3
Overall Test for C.O. Line Incoming Call

<Pattern 3: Termination from COT in self-node (without ISW mediation)>

- When call is terminated from COT in IMG0/1 to ATTCON in IMG0/1 of the same node.
- When call is terminated from COT in IMG2/3 to ATTCON in IMG2/3 of the same node.

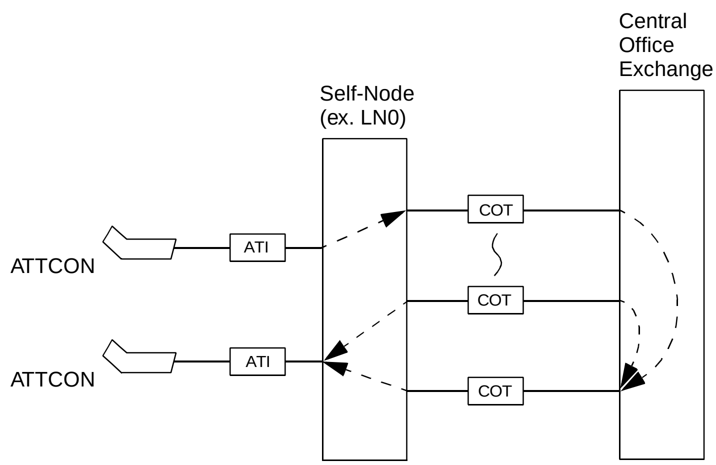


Figure 043-1 Overall Test for C.O. Line Incoming Call (2/2)

NAP-200-044
Sheet 1/1
Overall Test of Fusion Link Connection with Other IPX and/or IMX Series

As explained in CHAPTER 1, the installed system (IPX-U) can have a connection also with other IPX and/or IMX series via the FCCS link. If this is the case, perform the following tests, too, by referring to the "Fusion Network System Manual":

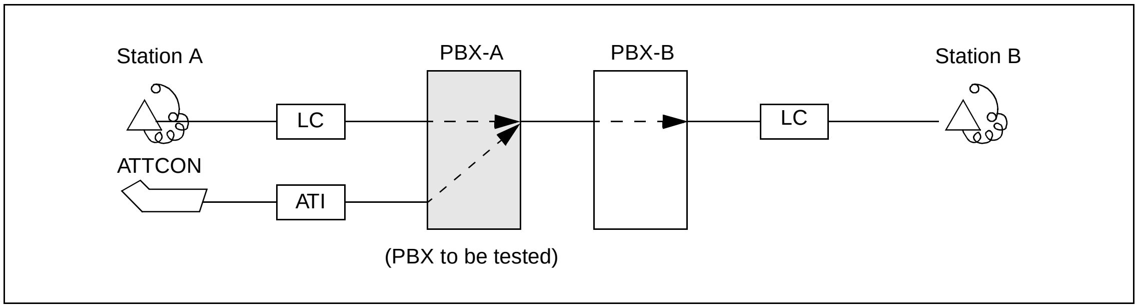
1. FCCS (Fusion Call Control Signal) Connection Tests between the installed system and other IPX and/or IMX series

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

2. FCCS Alternate Routing Test

NAP-200-045
Sheet 1/2
Overall Test of CCIS Tie Line Outgoing Call

If the installed system has a connection with a CCIS tie line, perform the test indicated in this NAP.



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 PBX-B
  - 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 PBX-B.
- Call termination to Station “B” in the PBX-B — 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 on the next page)
  - If the distant office is faulty, make a request to the distant office for repair.

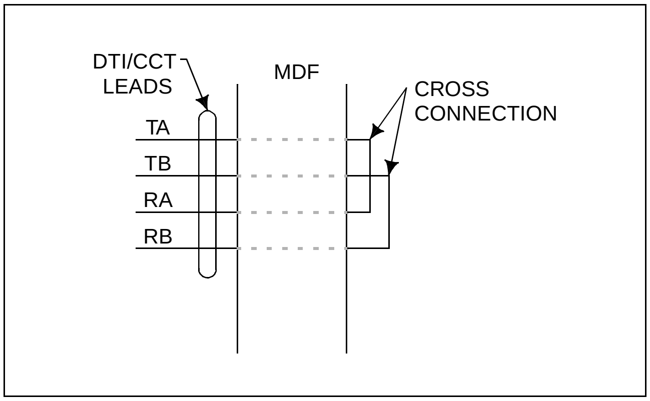
END

NAP-200-045
Sheet 2/2
Overall Test of CCIS Tie Line Outgoing Call

(Procedure A)

START

- On the DTI/CCT card, set its MB switch UP.
- In any office other than the Primary Office (Clock-Source-Office), disconnect the DTI/CCT cable connector at the DTI/CCT side (Backplane of 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.

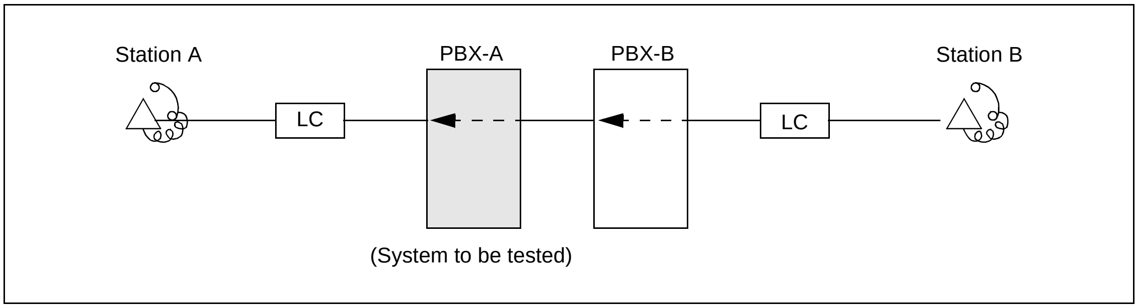


- The DTI does not recover. (CCH/CCT Link Failure may occur, but ignore it.)
  - System message "3-J" is not displayed.
  - The DTI/CCT is faulty.
- The DTI recovered. (CCH/CCT Link Failure may occur, but ignore it.)
  - System message "3-J" is displayed.
  - The DTI/CCT is normal.
  - Call the distant office and ask for repair.

END

NAP-200-046
Sheet 1/1
Overall Test of CCIS Tie Line Incoming Call

If the installed system has a connection with a CCIS tie line, perform the test indicated in this NAP.



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 NAP-200-045)
  - If the distant office is faulty, make a request to the distant office for repair.

END

NAP-200-047
Sheet 1/2
Test of Connection and Alternate Routing to All Tie Lines

If the installed system has a connection with any of the Public Network or Tie Line Network, perform the test indicated in this NAP.

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

NAP-200-047
Sheet 2/2
Test of Connection and Alternate Routing to All Tie Lines

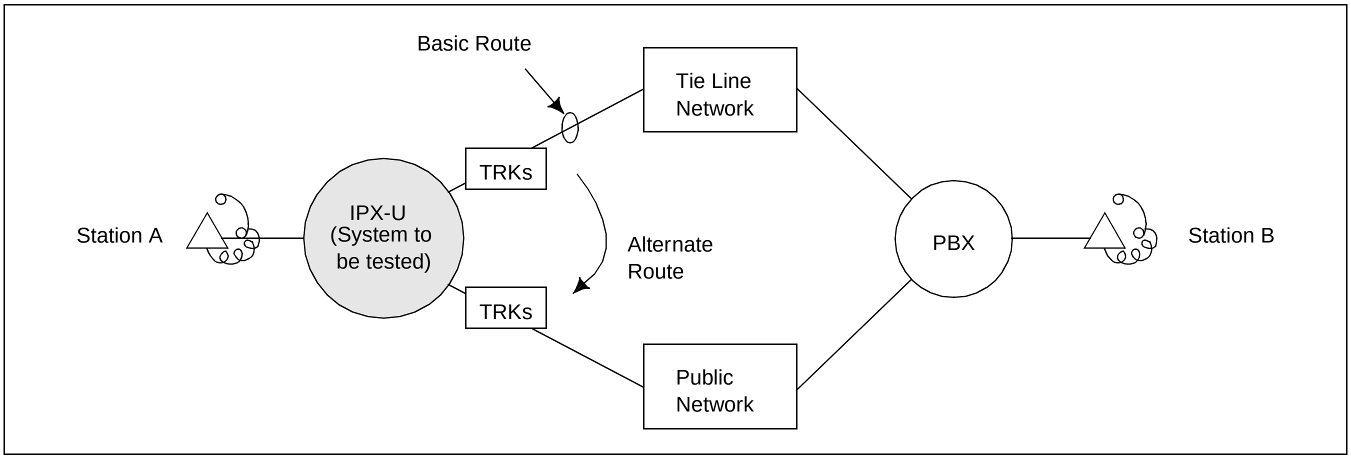


Figure 047-1 Combination of Tie Line Network and Public Network

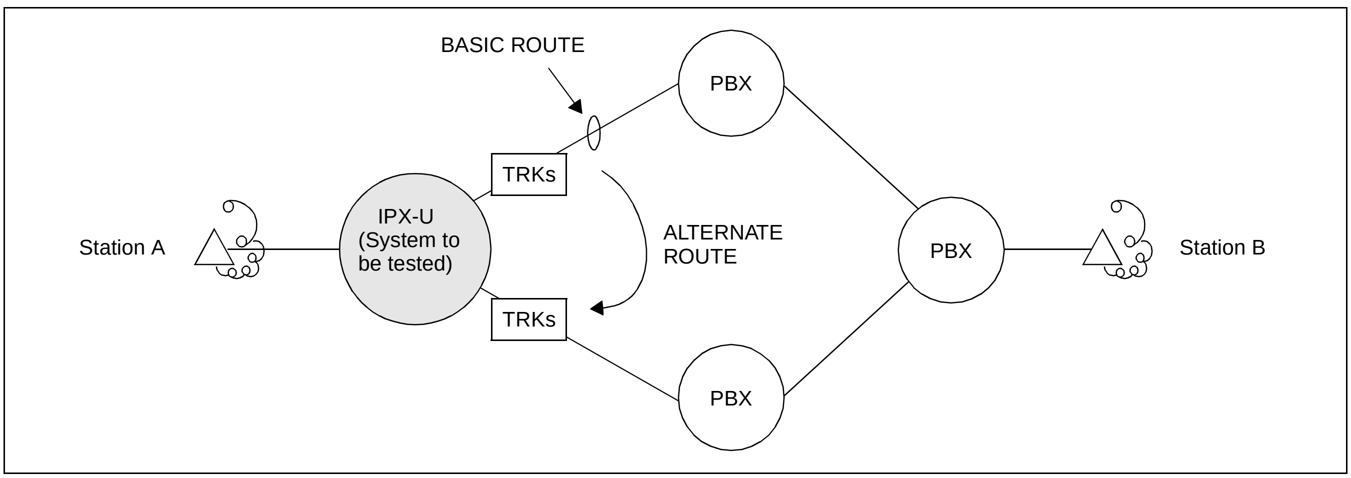


Figure 047-2 Tie Line Network

NAP-200-048
Sheet 1/2
Test of Tandem Connection to Tie Line

If the installed system has a connection with any of the tie lines, perform the test indicated in this NAP.

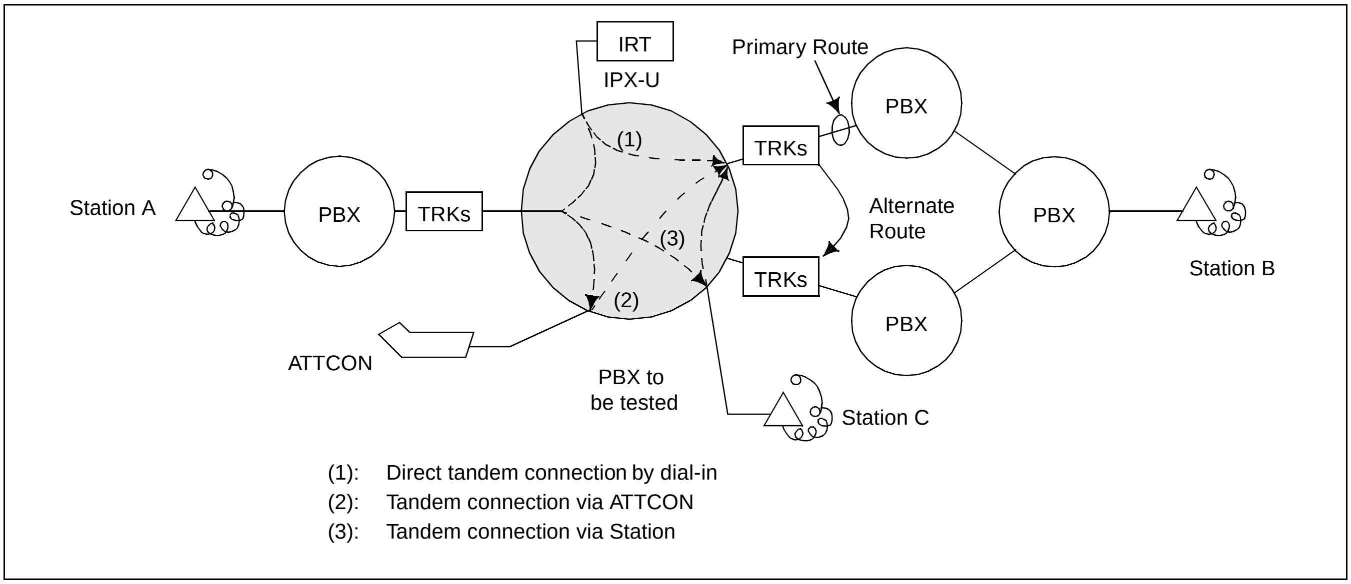


Figure 048-1 Test of Tandem Connection to Tie Line

START

- Test of direct dial-in tandem connection
  - Test of 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.
    - Un-busy (make idle) all the trunks.

A

NAP-200-048
Sheet 2/2
Test of Tandem Connection to Tie Line

A

- Test of tandem connection via ATTCON
  - Station “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 Stations“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” release. Speech between Stations “A” and “B” is confirmed.
  - Release.

END

NAP-200-049
Sheet 1/2
PAD Setting

PAD Setting

1. Analog Trunk

   a) For an outgoing/incoming call via a Tie Line:
      - Via MAT command “ARTD” and switch settings on the TLT circuit card.

   b) For a tandem Tie Line connection:
      - Via command “APAD” or switch settings on the TLT circuit card(s).

At both the originating and terminating offices, an 8 dB PAD is set for the EMT route via the “ARTD” command or switch settings. At the tandem office, a 4 dB PAD is set for the terminating and originating sides of each EMT route via command “APAD.”
Through this arrangement, an 8 dB PAD is in service for outgoing and incoming connections, and 4 dB PADs are in service for each line in a tandem connection (total: 8 dB). This arrangement is shown in Figure 049-1.

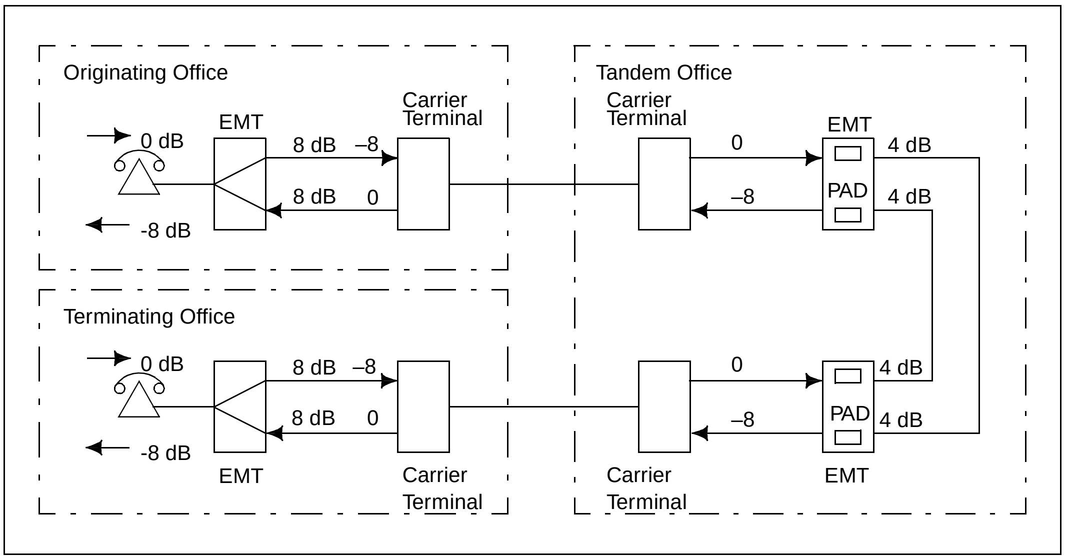


Figure 049-1 Example of PAD Setting (Analog)

NAP-200-049
Sheet 2/2
PAD Setting

2. Digital Trunk

   a) For an outgoing call to/incoming call from a Tie Line:
      - Via command "ARTD"/"ACRD" **Note**

   b) For a tandem Tie Line connection:
      - Via command "APAD"/"AFPD" **Note**

Note: *Command "ACRD" and "AFPD" are available for the Fusion network only. For details, refer to the "Office Data Specification."*

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"/"ACRD" command.
At the tandem office, 0 dB is set for both the terminating and originating sides of each DTI/CCT route via "APAD"/ "AFPD" command.
This arrangement is shown in Figure 049-2.

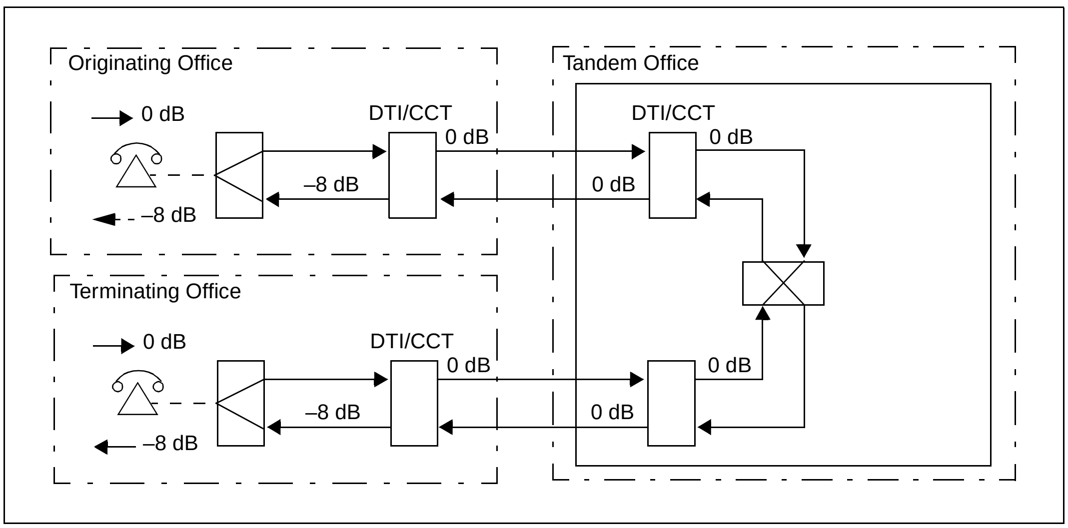


Figure 049-2 Example of PAD Setting (Digital)

6. LOAD TEST

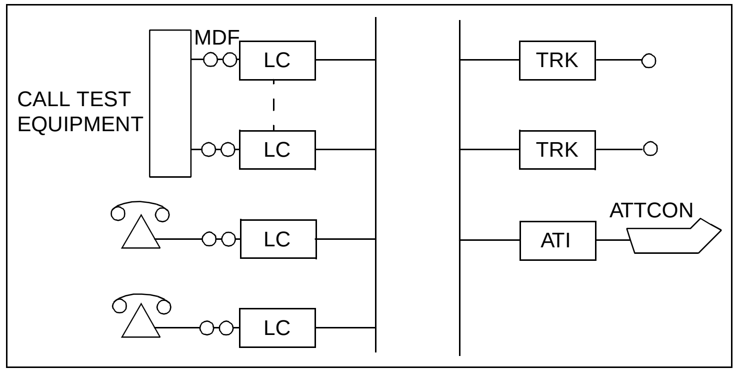
6.1 Outline

Load tests are to be performed by simulating actual operating conditions. When performing load tests, five to ten telephone sets, an Attendant Console, and, if available, a test call device are to be connected to the system. While load tests are in progress, System Messages, TOPU lamps, etc. must be checked to determine whether an abnormal condition is present.

6.2 Load Test Procedure

The procedure for performing the Load Test is described in NAP-200-050 “Load Test”.

NAP-200-050
Sheet 1/2
Load Test



START

- On the MDF, connect telephone sets and the call test equipment to line circuits.
  - On the MDF, connect five to ten telephone sets to line circuits. The accommodated locations of the line circuits are shown in Table 050-2.
  - Provide the required jumper connections according to the test pattern being used.
- Perform load test from Pattern 1 through Pattern 4 as shown in Table 050-1.
  - Set No.0 systems of TSW and CPU in all Local Nodes and ISW to the ACT mode (Test of Pattern 1).
  - Turn ON the power to the call test equipment, and perform tests for about 30 minutes. Check if a fault occurs.
  - Using the call test equipment and telephone sets, set up various types of connections (see Table 050-2) for about 10 seconds duration. Check if a fault occurs.
  - Similarly, perform the remaining load tests (Pattern 2-Pattern 4) per Table 050-1 plus 050-2.

END

NAP-200-050
Sheet 2/2
Load Test

Table 050-1 Load Test Patterns by CPU and TSW Mode

	Pattern 1	Pattern 2	Pattern 3	Pattern 4
Active CPU	No.0 system	No.0 system	No.1 system	No.1 system
Active TSW	No.0 system	No.1 system	No.0 system	No.1 system

Table 050-2 Load Test Connection Sheet

Called Party / Calling Party			LN (IMG0/2)								LN (IMG1/3)							
			PIM0		PIM1		PIM2		PIM3		PIM0		PIM1		PIM2		PIM3	
			U=0	U=1	U=2	U=3	U=0	U=1	U=2	U=3	U=0	U=1	U=2	U=3	U=0	U=1	U=2	U=3
LN IMG 0/2	PIM 0	U=0																
		U=1																
	PIM 1	U=2																
		U=3																
	PIM 2	U=0																
		U=1																
	PIM 3	U=2																
		U=3																
LN IMG 1/3	PIM 0	U=0																
		U=1																
	PIM 1	U=2																
		U=3																
	PIM 2	U=0																
		U=1																
	PIM 3	U=2																
		U=3																

This page is for your notes.

CHAPTER 6 FAULT RECOVERY DURING TESTS

1. GENERAL

The fault recovery procedures described in this chapter are used when a connection cannot be established in the normal manner or an abnormal connection is discovered as a result of the tests designated in Chapter 4, "SYSTEM STARTUP", and Section 2., "BASIC CONNECTION TEST" of Chapter 5.

2. OUTLINE OF PROCEDURE FOR FAULT RECOVERY

The procedures for performing fault recovery are described in the NAPs indicated to the right of each item in the following flowchart.

START

- Abnormal Lamp Indication After System Startup: NAP-200-051
- Dial Tone Connection Fault: NAP-200-052
- Station To Station Connection Fault: NAP-200-053

END

NAP-200-051
Sheet 1/2
Abnormal Lamp Indications After System Startup

ATTENTION
Contents
Static Sensitive
Handling
Precautions Required

START

- Check conducted when the OPE lamp (Green) do not illuminate on any circuit cards mounted in a PIM.
  - Using MAT command “AUNT”, check whether UNIT data has been assigned.
  - Replace the MUX card in the PIM with a spare.
  - Check whether the “MT24 TSW” cable, linking the MUX and TSW circuit cards, and the ISA bus (34PH 50AL CA-A or 34PH 50AL CA-B) cable, linking the ISA Gate and TSWM, are securely connected.
  - A PIM will occasionally malfunction due to a single circuit card mounted in the PIM. Therefore, check the circuit cards via the following steps:
    - Extract all circuit cards from the PIM other than the TSW/MUX and the PWR Supplies.
    - Insert one circuit card into its mounting slot and see if its OPE lamp illuminates. Repeat this procedure for the remaining circuit cards.
- Check conducted when the OPE lamp (Green) does not illuminate on a Line Circuit card.
  - Confirm that the MB switch of the circuit card is DOWN.
  - Using command “ASDT”, check whether station data is assigned to the circuits on the card.
  - Replace the card with a spare.
- Check conducted when OPE lamp of a Line Circuit card illuminates, but the BL lamp (Red) for an individual line flashes
  - Using command “MBST”, confirm that the specific line is not in Make Busy state.
  - Using command “ASDT”, check whether station data has been assigned to the line circuit.
  - Replace the circuit card with a spare.

A

NAP-200-051
Sheet 2/2
Abnormal Lamp Indications After System Startup

ATTENTION
Contents
Static Sensitive
Handling
Precautions Required

A

- Check conducted when the OPE lamp (Green) does not illuminate on a Trunk circuit card.
  - Confirm that the MB switch of the circuit card is DOWN.
  - Using command “ATRK,” check whether Trunk data has been assigned for the circuits on the card.
  - Replace the circuit card with a spare.
- Check conducted when the OPE lamp of a Trunk circuit card illuminates, but the BL lamp (Red) for an individual circuit flashes.
  - Confirm that the MB switch for each circuit of the card is OFF.
  - Using command “MBTK,” confirm that the trunk circuit is not in Make Busy state.
  - Using command “ATRK,” check whether trunk data has been assigned for the trunk circuit.
  - Replace the circuit card with a spare.
- Perform the following check before replacing a circuit card which is considered defective with a spare.
  - Confirm the switch settings on the circuit card.
  - Poor contact at the connector portion of the circuit card may be responsible for the malfunction. Check the circuit card once again by inserting and extracting it two or three times.

<u>END</u>

NAP-200-052
Sheet 1/1
Dial Tone Connection Fault

ATTENTION
Contents
Static Sensitive
Handling
Precautions Required

START

- Dial tone is not heard.
  - On the MDF, check the cross connections between the telephone and the corresponding line circuit.
  - Check whether the LT cable is securely connected to the PIM.
  - Replace the LC card with a spare.
- Dial tone cannot be heard from one or more lines of the same circuit card.
  - Replace the LC card with a spare.
- Dial tone cannot be heard from the lines accommodated by a specific PIM.
  - Check the switch settings on the TSW/MUX circuit card.
  - Replace the TSW/MUX card with a spare.
  - Check the switch settings on the TSW circuit card.
  - Replace the TSW card with a spare.
  - Check whether the “MT24 TSW” cable, connected to the front connector of the MUX card, is securely inserted to the “MUXnnn” connector fixed on the BWB (Back Wired Board) of the TSWM.

END

NAP-200-053
Sheet 1/2
Station to Station Connection Fault

ATTENTION
Contents
Static Sensitive
Handling
Precautions Required

START

- Dial tone is still heard after a digit is dialed (cannot break dial tone)
  - A specific RST card is involved — Replace the RST card with a spare.
  - A specific LC card is involved — Replace the LC card with a spare.
  - A specific UNIT card is involved — Replace the TSW/MUX card with a spare.
  - Entire System is involved — Replace the TSW card with a spare.
- Reorder tone is heard after a station number is dialed.
  - Using MAT command “ANPD/ANPDL/ANPDN,” check “Necessary Number of Digits” data.
  - Using command “ASPA/ASPAL/ASPAN,” check “Special Number” data.
  - Using command “ASDT,” check “Station” data.
  - Using command “ATNR,” check “Tenant Restriction Class” data.
- RBT (Ring Back Tone) is heard, but the bell at the called station remains silent.
  - Check whether the called station is assigned the correct LENS data in command “ASDT.”
  - When all the stations accommodated in a specific PIM do not ring, replace the PWR circuit card with a spare.
  - If the fault involves one or more lines within the same LC circuit card, replace the LC card with a spare.

A

NAP-200-053
Sheet 2/2
Station to Station Connection Fault

ATTENTION
Contents
Static Sensitive
Handling
Precautions Required

A

After the call has been answered, noise is heard or the speech path is one-way.

- If the fault involves one or more lines within the same LC circuit card, replace the card with a spare.
- If the fault involves a specific PIM, replace the MUX circuit card with a spare.
- If noise is heard throughout the entire system, replace the TSW circuit card with a spare.

END

CHAPTER 7 WORK AFTER INSTALLATION TESTS

This chapter explains various kinds of work and site cleaning, etc. which the installer must perform after completion of installation tests so that the system can be cut over normally.
Upon completion of all the required tests, the technician must confirm or perform the following.

1. Office Data Management
2. Preparation of Test Result Reports
3. Mounting of the Front and Rear Covers
4. Attachment of Inter-frame Brackets
5. Site Cleaning

1. OFFICE DATA MANAGEMENT

This Section explains the method of creating backup of the Office Data and the method of protecting the Office Data.

The PBX executes various kinds of processing according to the results of access by the CPU to the Data Memory in which the Office Data are stored. If the contents of Data Memory becomes faulty. It may result in erroneous operation of the system or in a system down. If any part of the Office Data has been illegally changed, it may also bring about a trouble the same as in the case of a fault occurrence to the Data Memory.

Thus, upon completion of the installation tests, ensure to create backup of the Office Data and provide a proper measure of office data protection.

1.1 Preservation of Office Data

The following items should be kept at the job site after the installation test has been completed for preservation of office data.

1. Office Data Programming Sheets

   Since the office data programming sheets should reflect the most up-to-date data at all times, entries into the office data programming sheets must be made in pencil.

2. Floppy Disks for Storing Data

   If a major change is made to the office data, especially a change involving System Data (command "ASYD/ASYDL/ASYDN"), the system may not function as expected afterward. To prepare for such an occurrence, an FD containing the office data before the change and one containing the data after the change should be kept on hand. The FD containing the data before the change allows the technician to restore the previous (running) condition if the system will not operate properly with the new data.

Note: *Cautions pertaining to Floppy Disks.*

(1) Do not place a heavy object on an FD or the FD will be damaged.

(2) When taking an FD out of its protective envelope, hold the top edge of the disk and gently pull it out.

(3) Do not expose the FD to direct sunlight or to a high temperature (above 65°C (150°F)).

(4) Do not pinch the FD with a clip.

(5) Do not touch the recorded surface of the floppy disk with bare hands; fingerprints left by bare hands will attract dust.

(6) Avoid cleaning of the floppy disk.

(7) Do not place the floppy disk near a magnet, etc. If an FD is exposed to a magnetic field of more than 50 Oe, the data on the disk is likely to be altered or destroyed.

(8) Do not bend the floppy disk.

(9) Do not apply force to outer edge of the floppy disk.

2. PREPARATION OF TEST RESULT REPORT

When submitting a report of test results to the end user or when performing test with customer’s representatives attending, prepare Test Result Report and record the test results into the prepared Test Result Report.

3. MOUNTING OF THE FRONT AND REAR COVERS

When mounting the front cover and the rear cover of the PBX, follow the procedure below.

START

Inspection		Set all MB switches back to their positions prior to the installation tests. Confirm that all circuit cards are mounted in the proper slots according to the Bayface Layout.
Mounting of Side Covers		Referring to Figures 7-1 through 7-4, mount the side covers onto the Modules and the Fan Unit.
Mounting of Rear Covers	Modules	Referring to Figures 7-5 and 7-6, mount the rear covers.
	Fan Unit	Referring to Figure 7-7, mount the rear covers.
Mounting of Front Cover(s)	Modules	Referring to Figures 7-8 through 7-11, mount the front cover(s) (A).
Check		Confirm that the mounted covers do not contact any of the cables, circuit cards, etc.

END

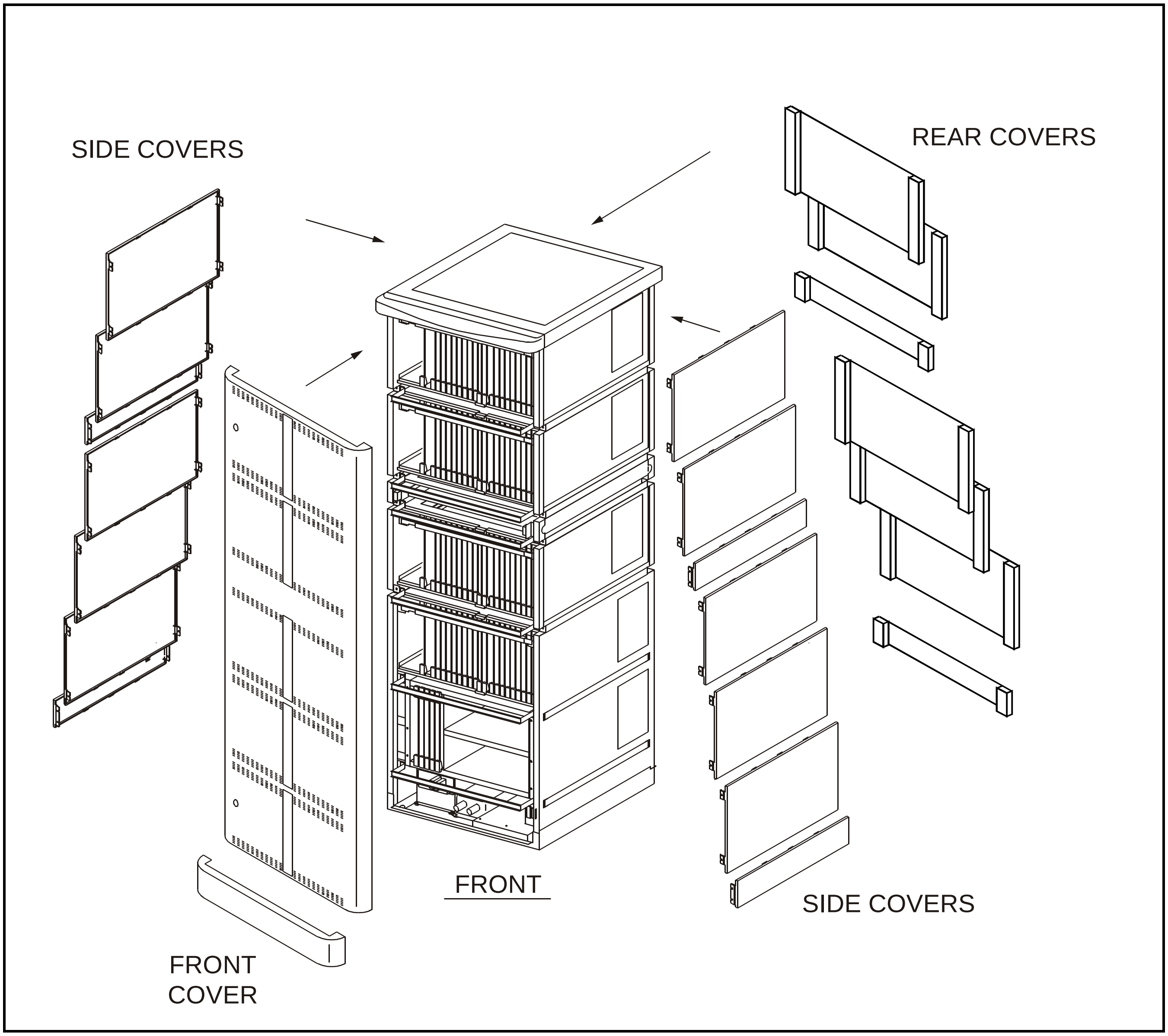


Figure 7-1 Mounting of the Covers in a Full System

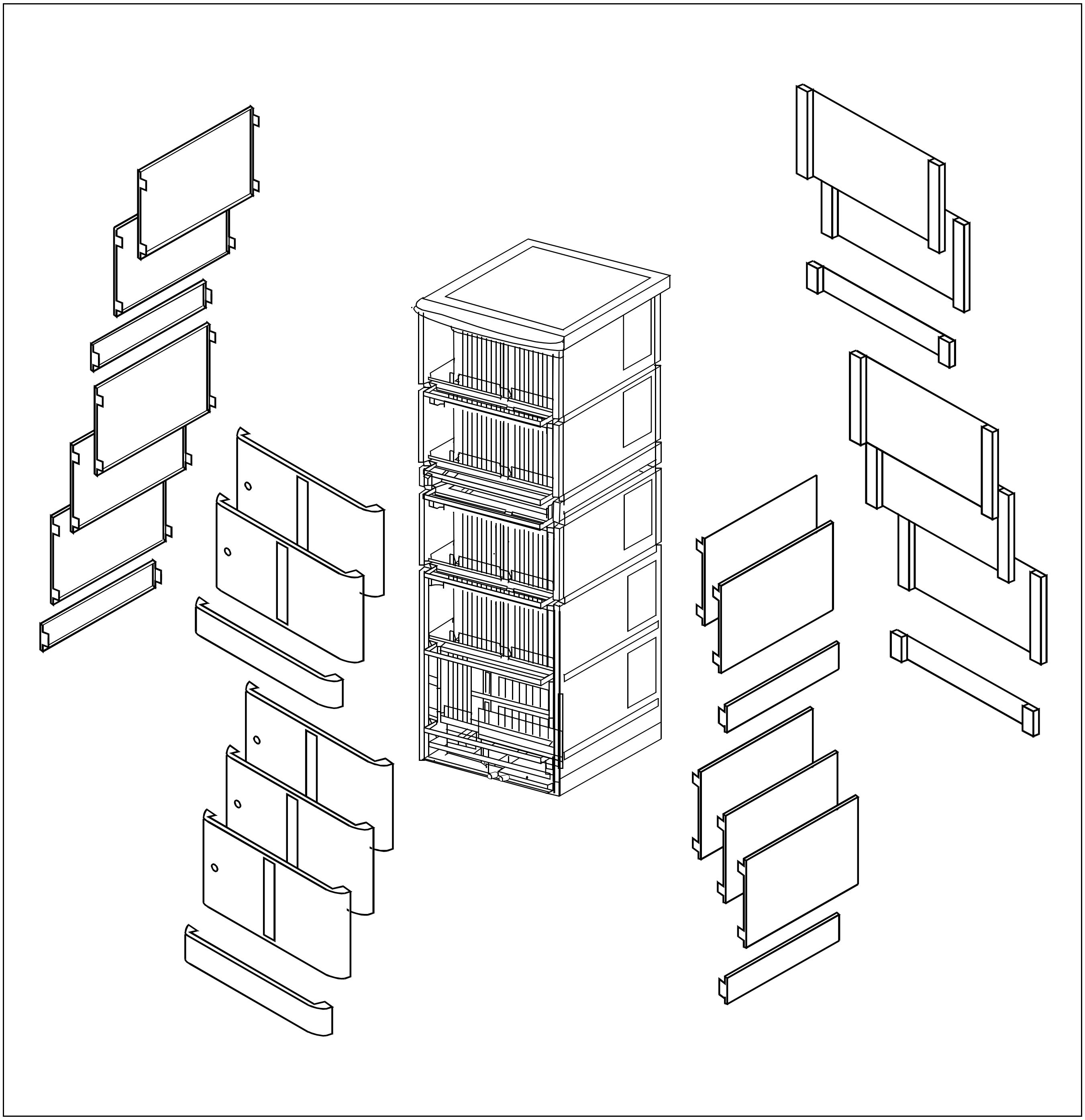


Figure 7-2   Mounting of the Covers

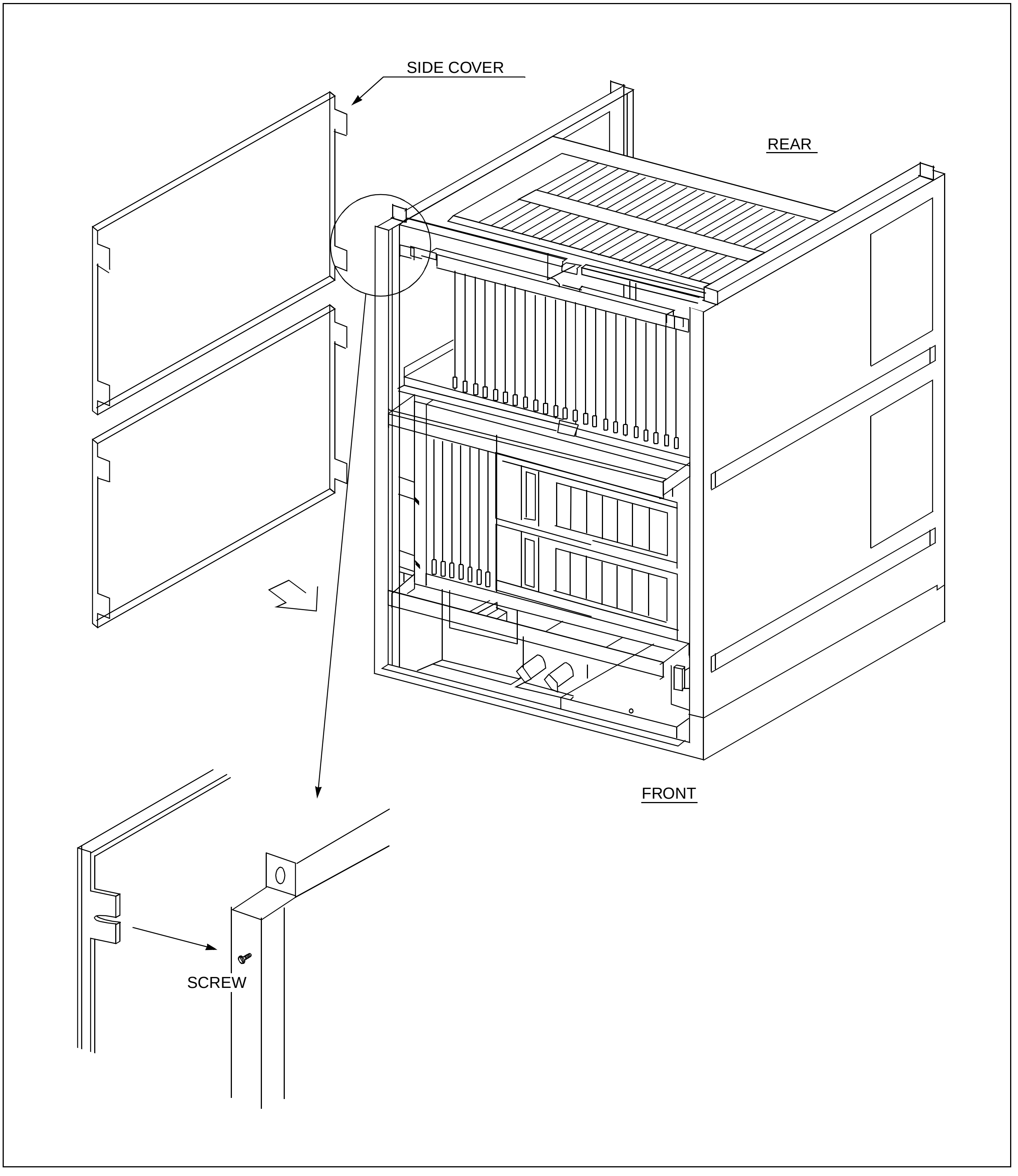
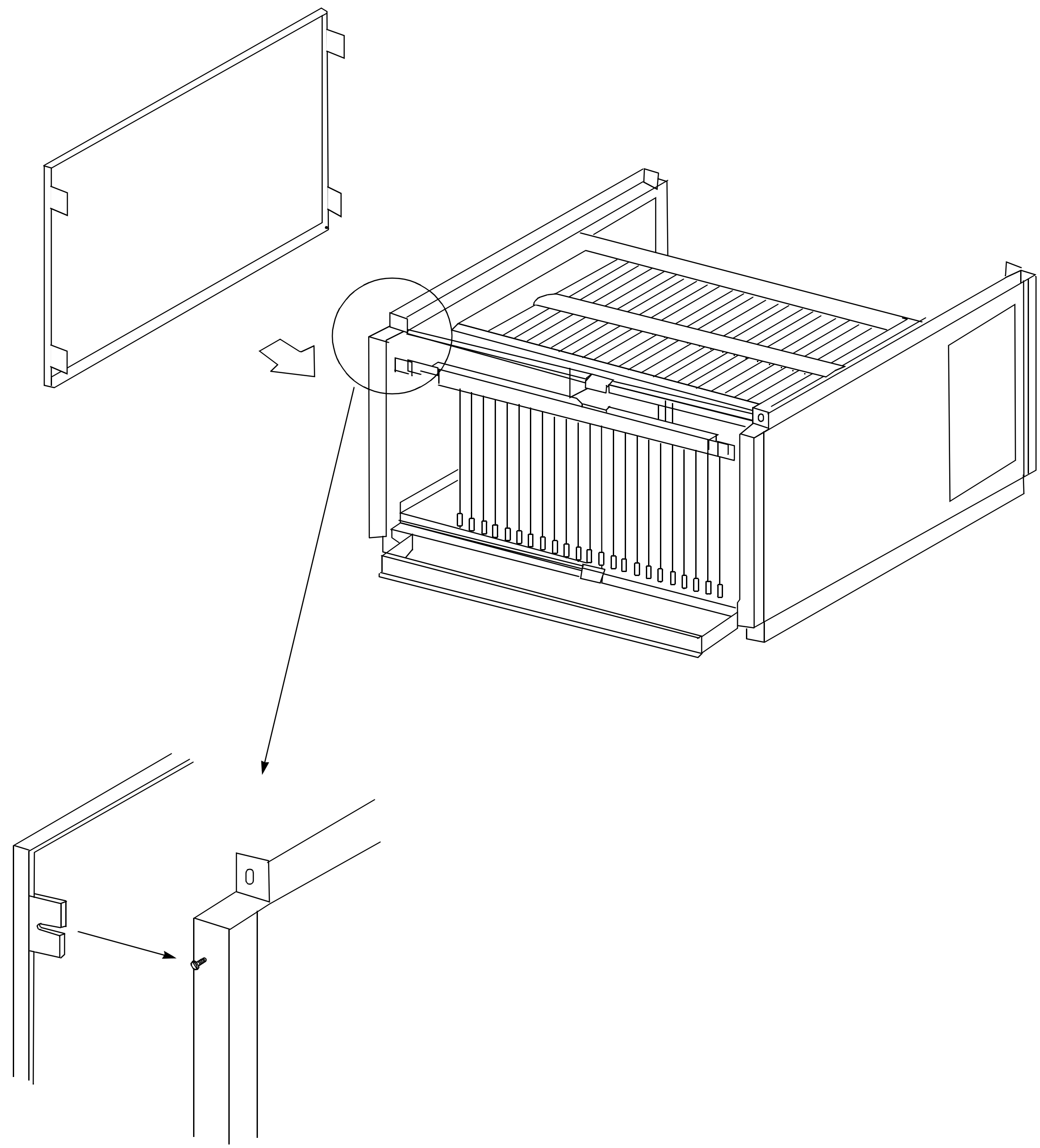


Figure 7-3 Side Cover Mounting Method (BASEU+LPM+PIM0)



Note: • *The cover can also be mounted upside-down, so confirm the upper and lower sides.*
• *The side covers included with the Top Unit (TOPU) are different from the module covers shown here.*

Figure 7-4 Side Cover Mounting Method (PIM)

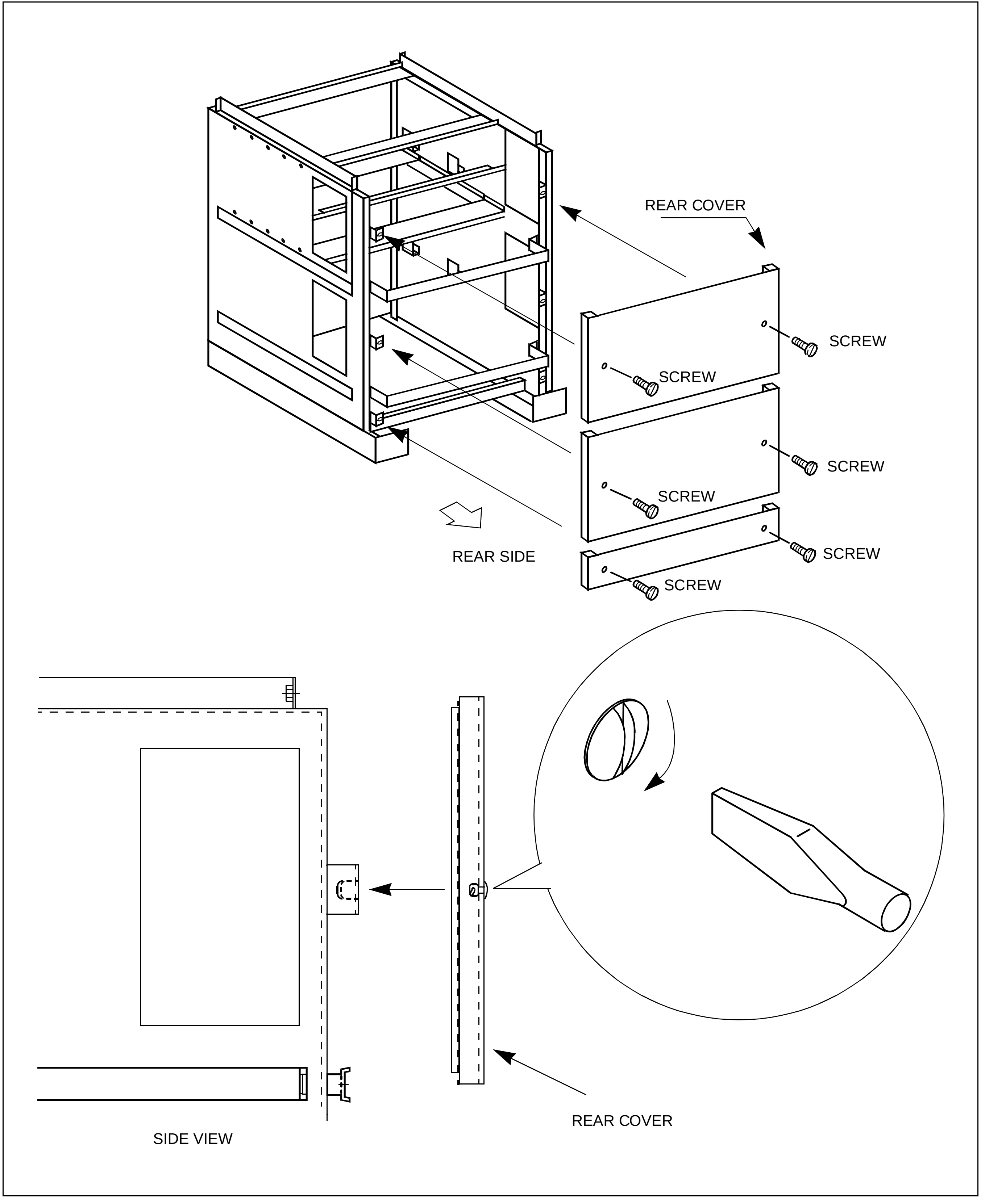


Figure 7-5 Rear Cover Mounting Method (BASEU+LPM+PIM0)

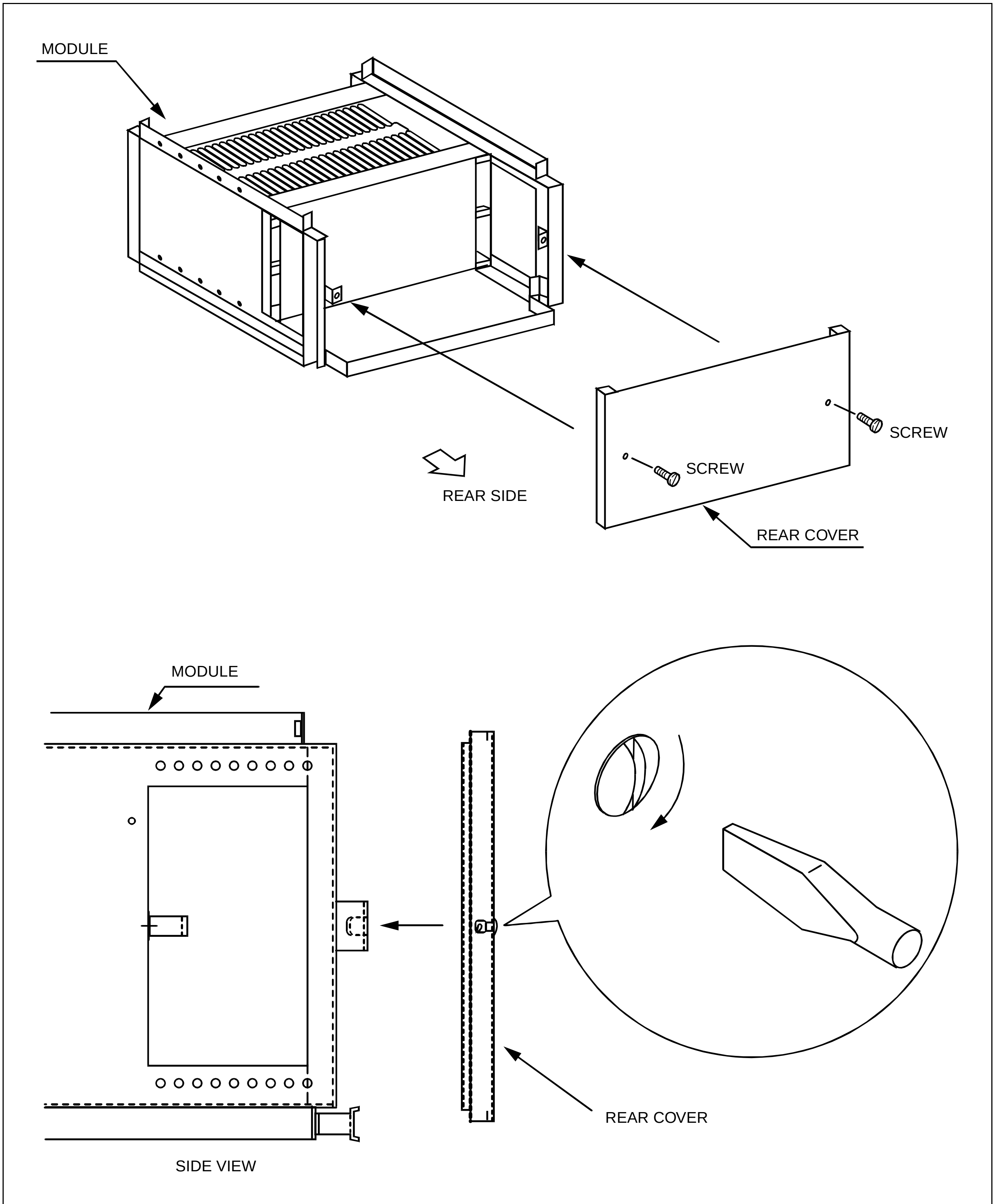


Figure 7-6 Rear Cover Mounting Method (PIM)

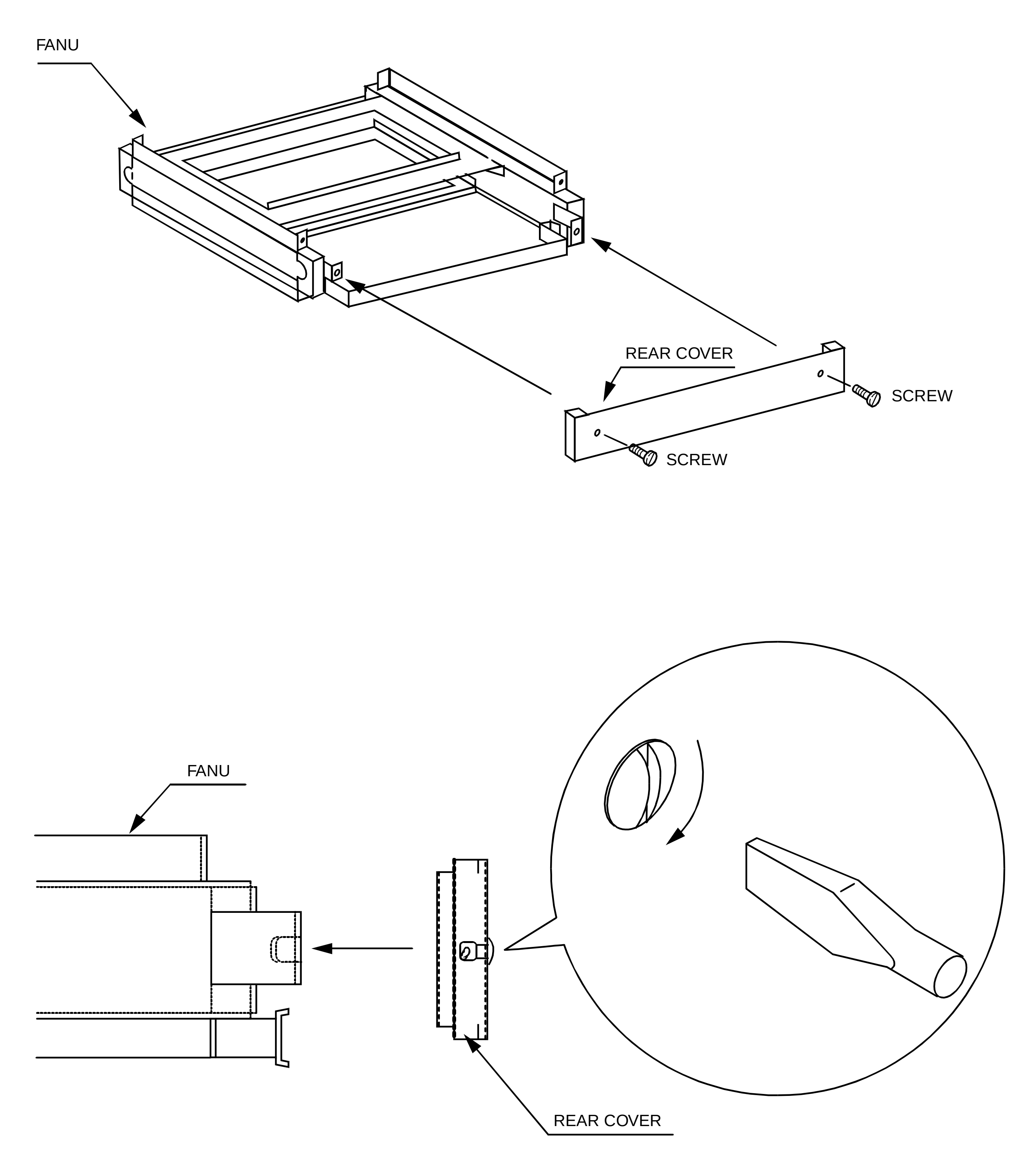


Figure 7-7 Rear Cover Mounting Method (FANU)

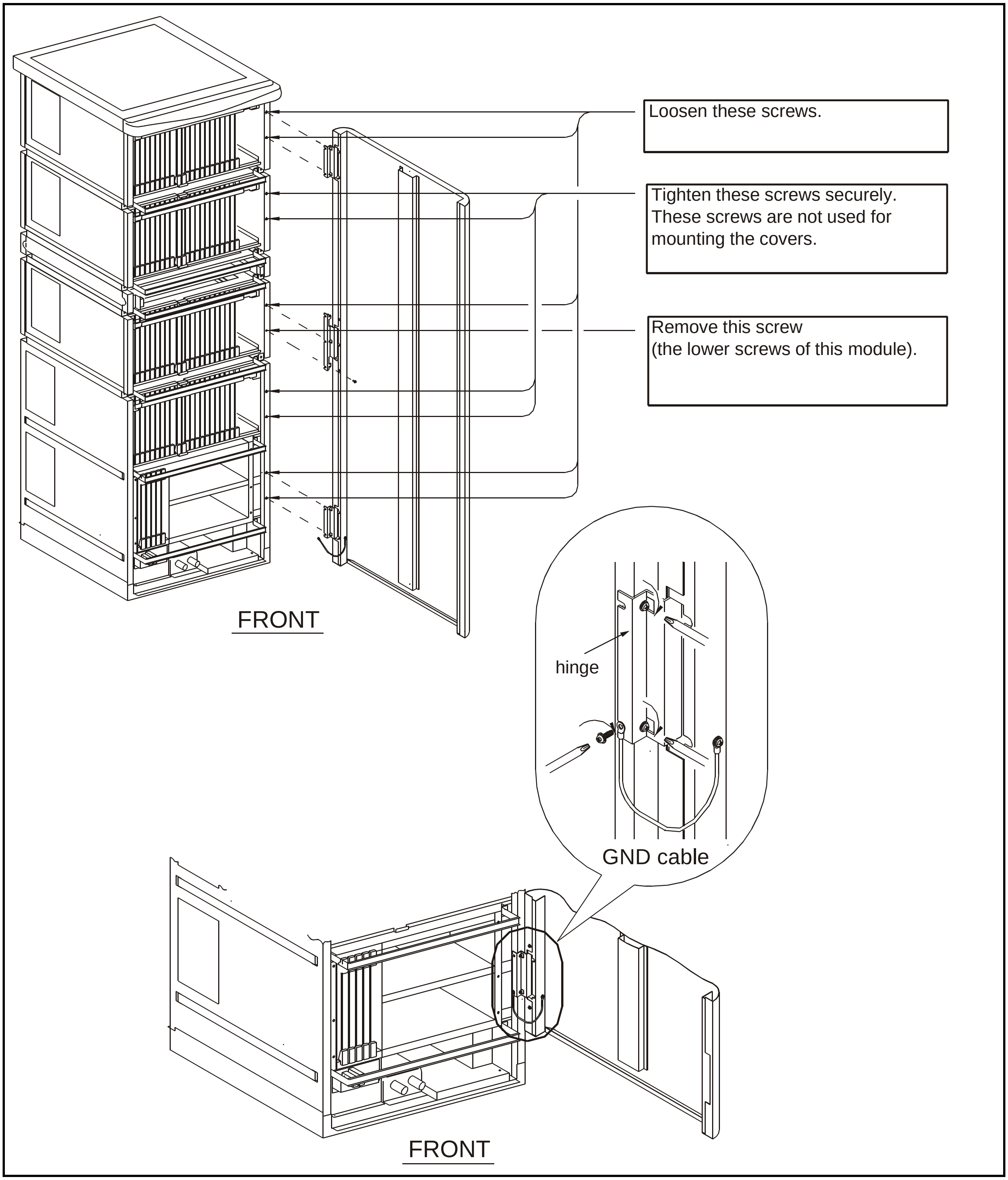


Figure 7-8 Front Cover Mounting Method in a Full System

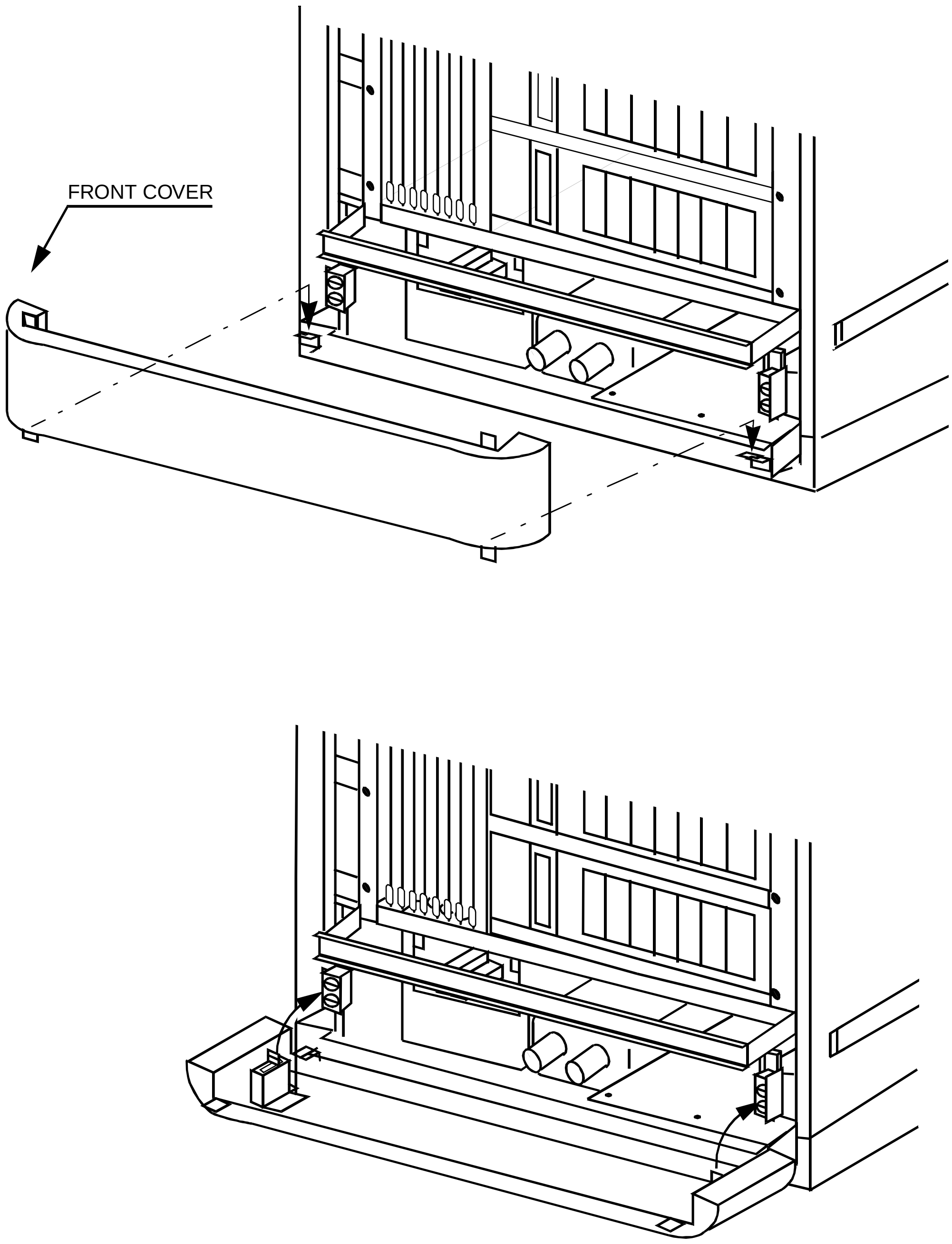
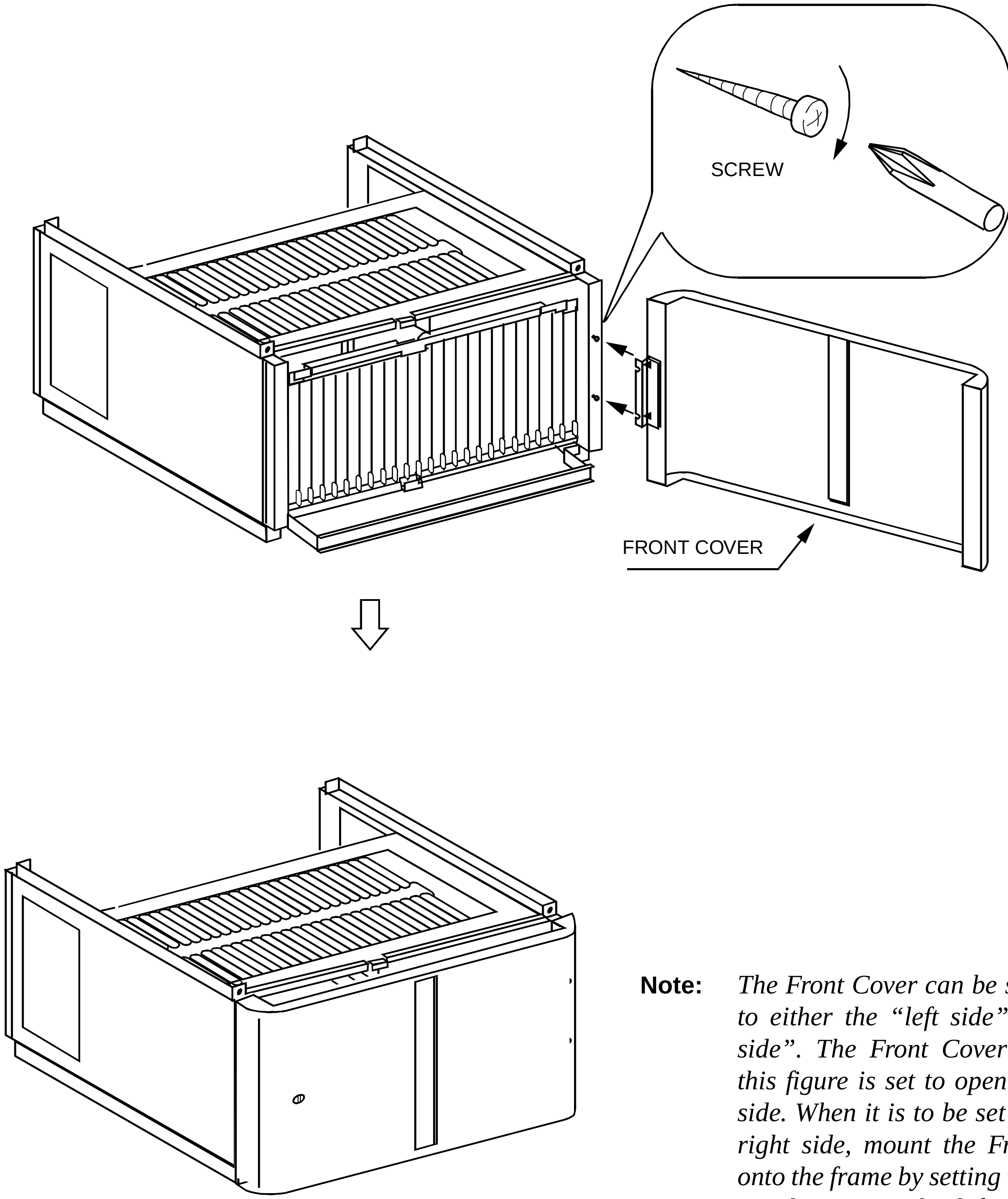


Figure 7-9 Front Cover Mounting Method (BASEU+LPM+PIM0)

Mount the Front Cover onto the module using screws.



Note: *The Front Cover can be set to open to either the "left side" or "right side". The Front Cover shown in this figure is set to open to the left side. When it is to be set to open to right side, mount the Front Cover onto the frame by setting the respective hinges on the left side of the frame and the Front Cover.*

Figure 7-10   Front Cover Mounting Method (PIM)

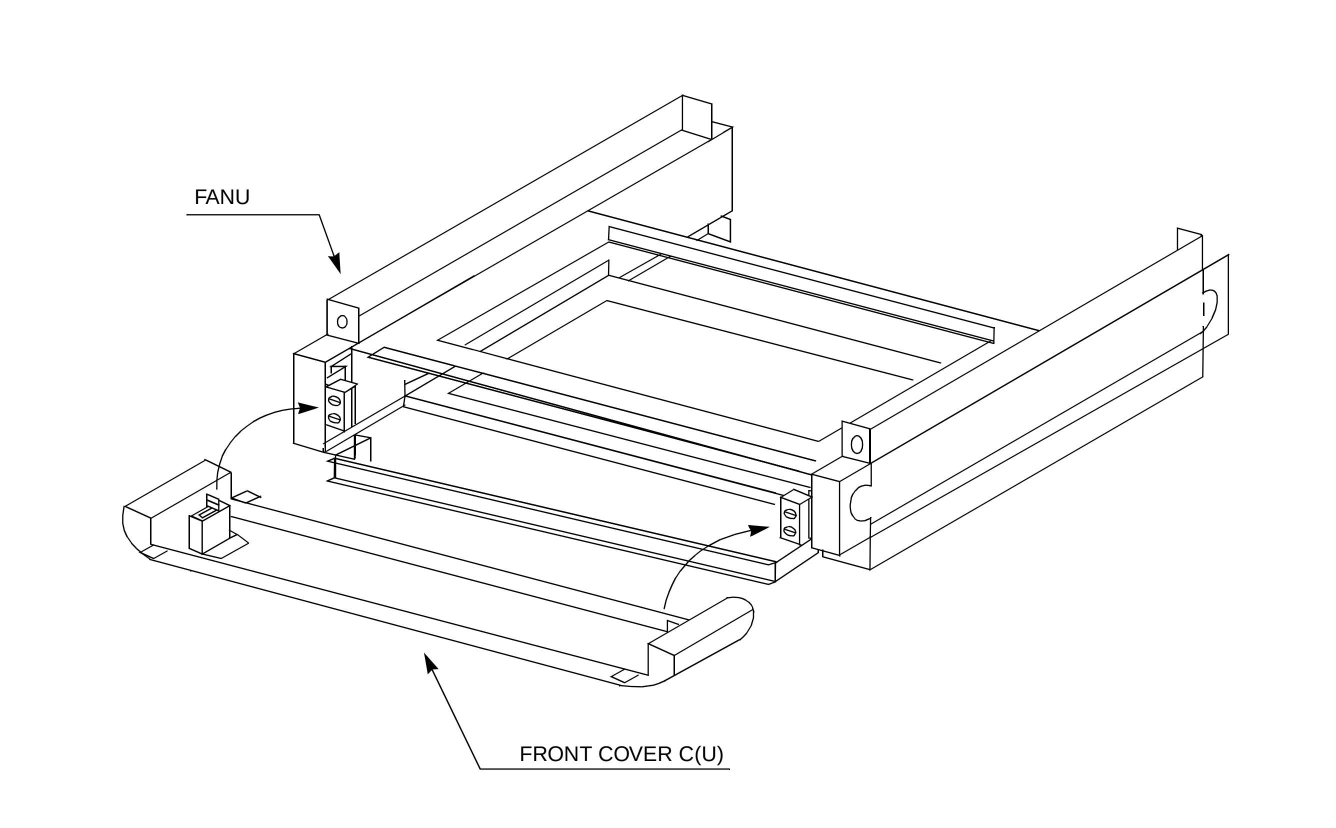


Figure 7-11 Front Cover Mounting Method (FANU)

4. ATTACHMENT OF INTER-FRAME BRACKETS

This section covers how to attach inter-frame brackets between the cabinets.

The inter-frame brackets should be attached in the following locations.

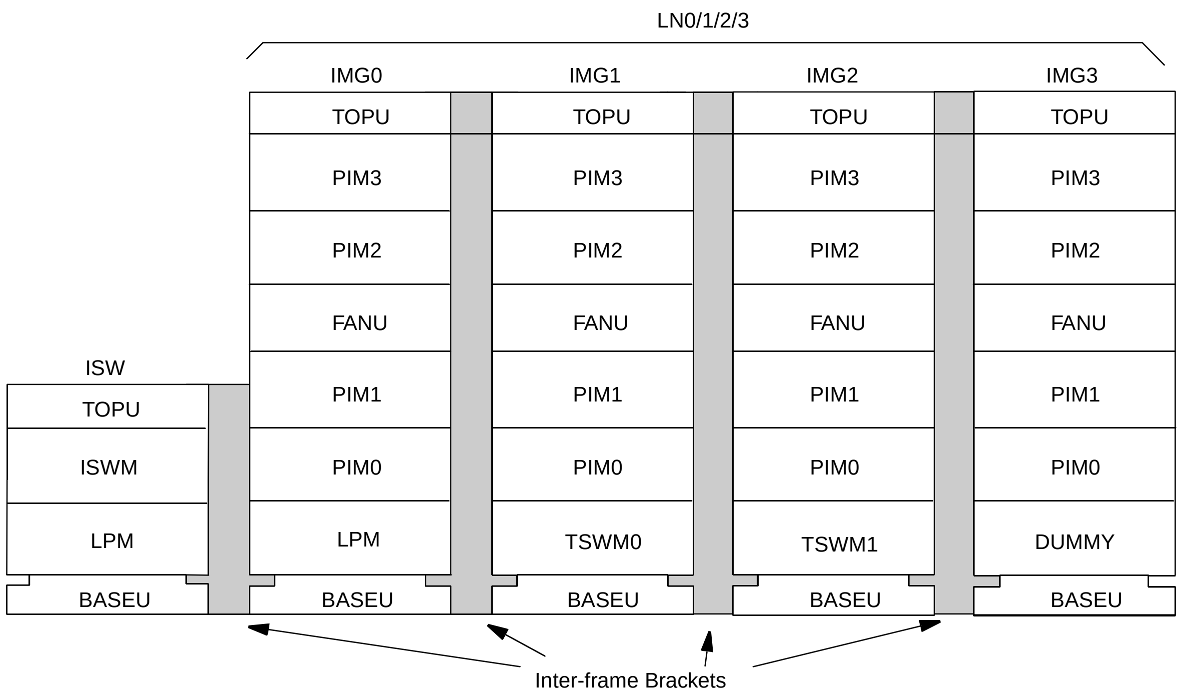
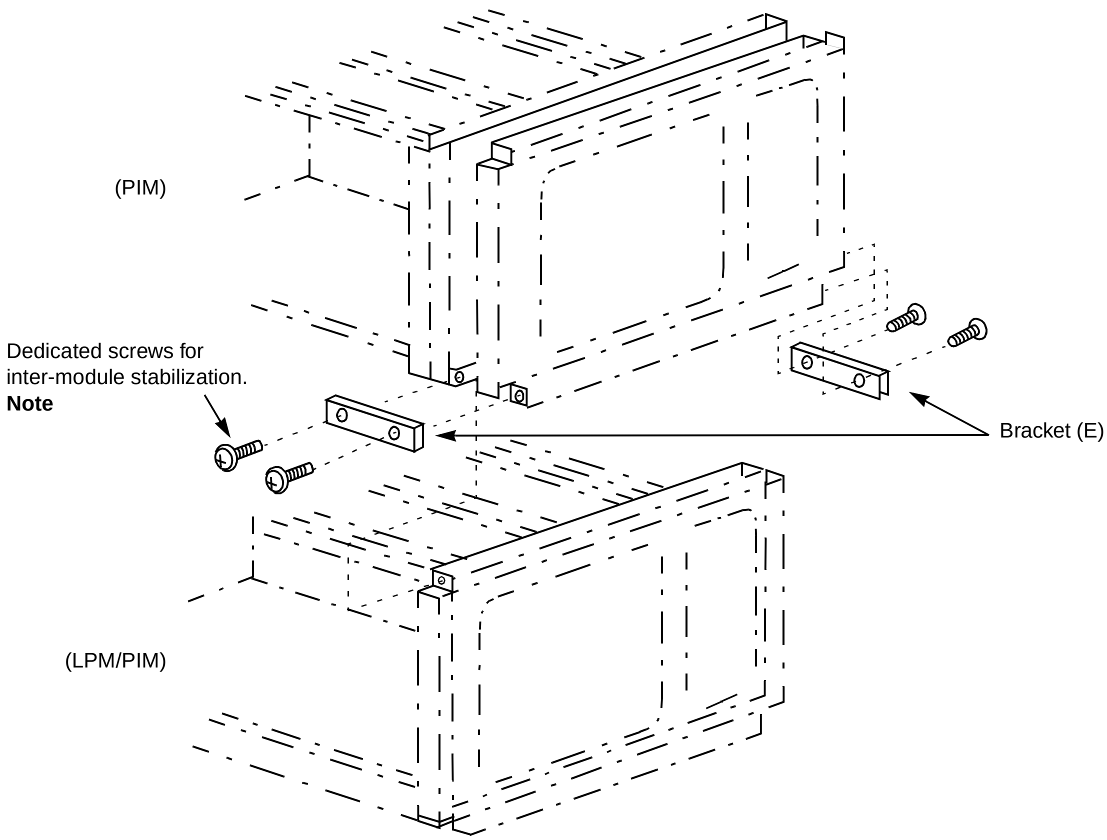


Figure 7-12 Locations of Inter-frame Brackets

<Attachment Procedure>

STEP 1: Referring to Figure 7-13, fix the brackets (E) between the LPM and PIM.



Note: *These screws are appended when obtaining the module components from NEC.*

Figure 7-13 How to Attach Inter-frame Brackets

STEP 2: Referring to Figure 7-13, fix the brackets (A) with the four screws.

STEP 3: Referring to Figure 7-13, fix the brackets (B) with the four screws.

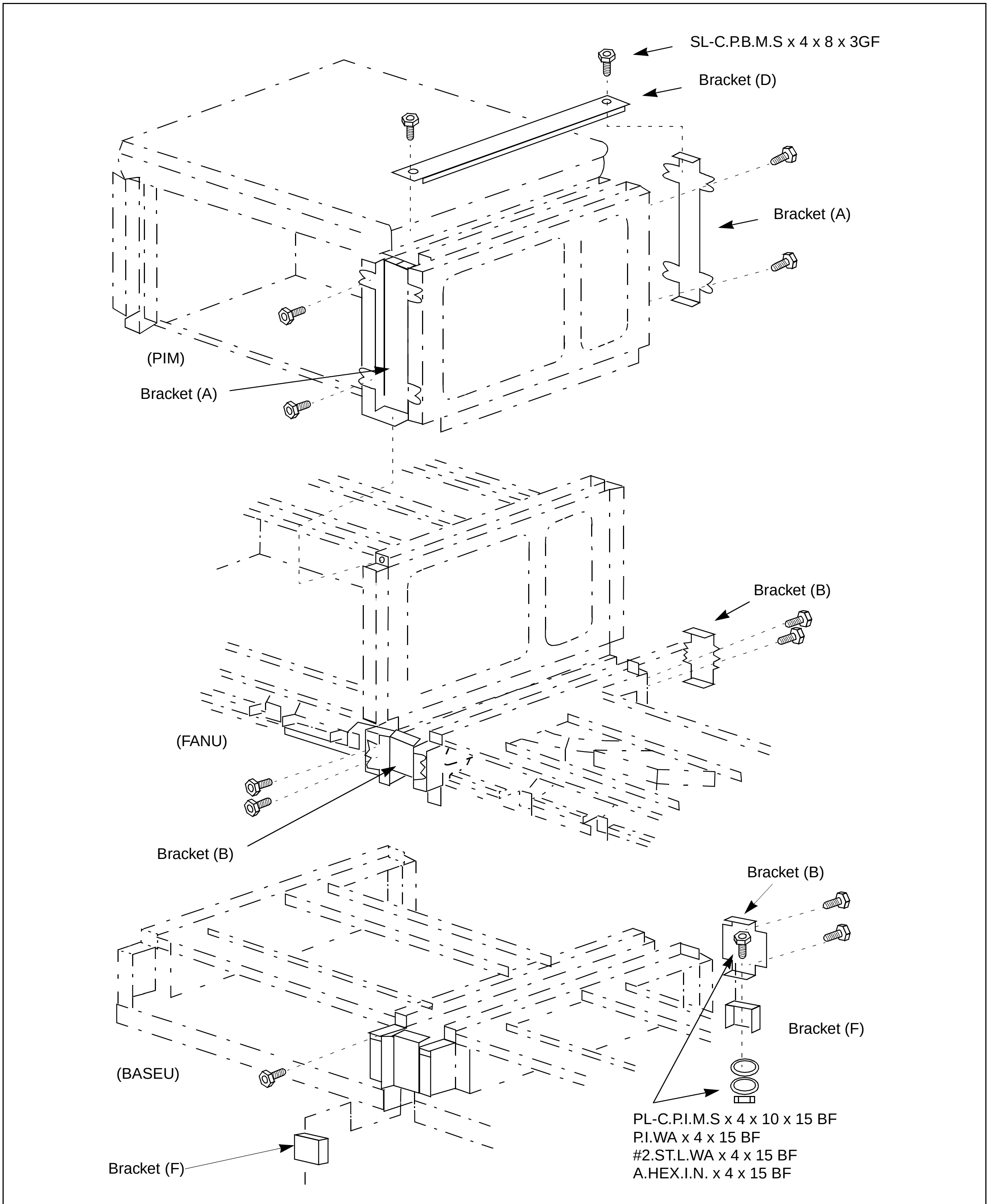


Figure 7-13 How to Attach Inter-frame Brackets (2 of 3)

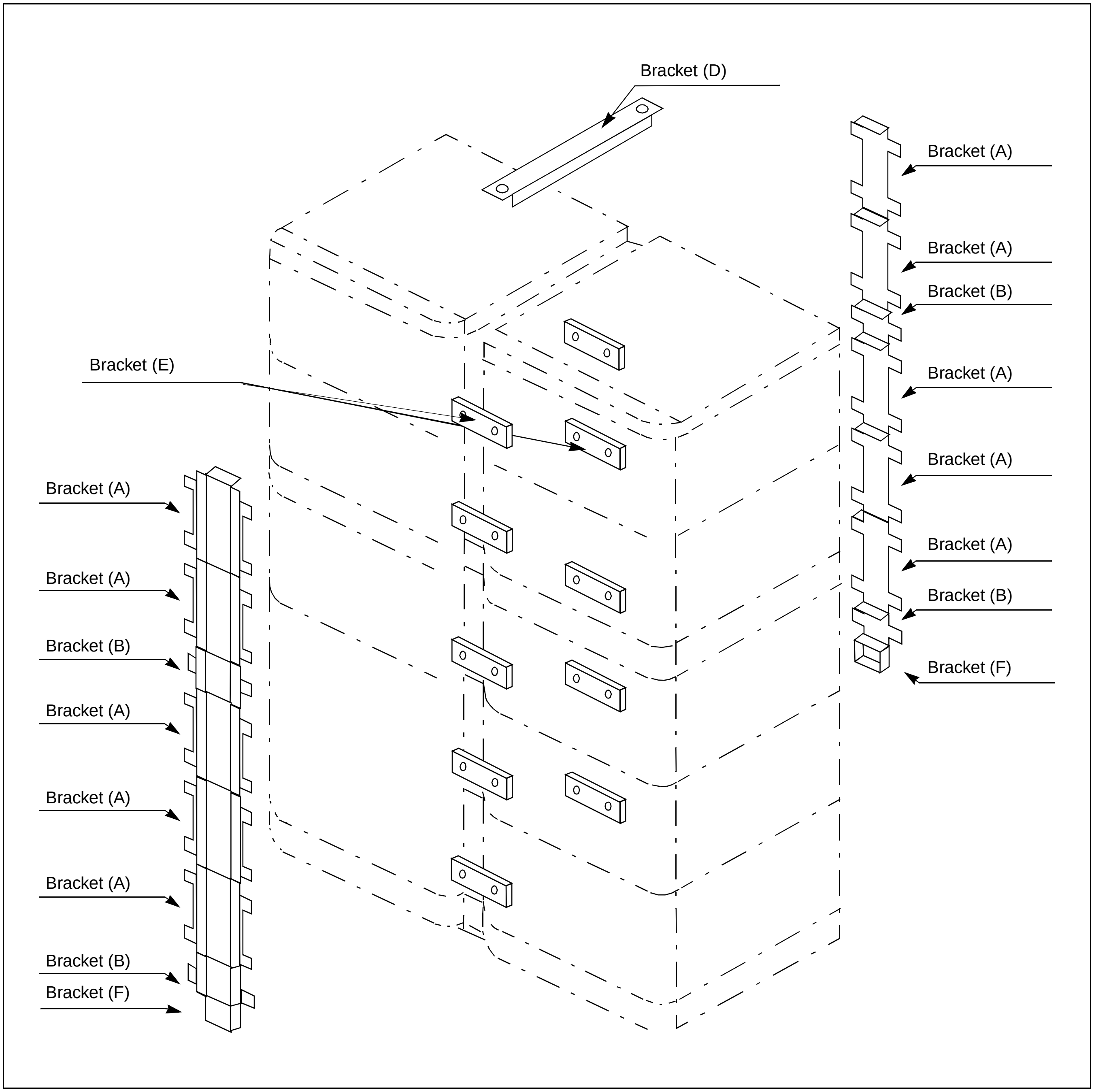


Figure 7-13 How to Attach Inter-frame Brackets (3 of 3)

STEP 4: Referring to Figure 7-13, fix the brackets (D) with the two screws.

STEP 5: Referring to Figure 7-13, fix the brackets (F) with the two screws.

5. SITE CLEANING

Upon completion of the works described in Sections 1 to 4 of this CHAPTER, execute or confirm the following items.

- Restore the cross connections arranged for test purposes to their original conditions.
- Clean around the Module Group and the MDF.
- Collect and organize all test equipment, tools, etc. used during the installation tests.
- Dispose of dust, trash, etc.

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