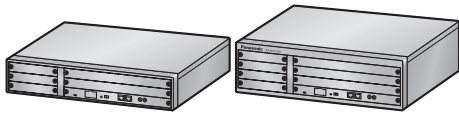


# Panasonic®

## Installation Manual

### Pure IP-PBX



Model No. **KX-NCP500**  
**KX-NCP1000**



Thank you for purchasing a Panasonic Pure IP-PBX.  
Please read this manual carefully before using this product and save this manual for future use.

**KX-NCP500/KX-NCP1000: PBMPR Software File Version 7.0000 or later**



SD Logo is  
a trademark of  
SD-3C, LLC.

# System Components

System Components Table

| Category                           | Model No.  | Description   |
|------------------------------------|------------|---|
| Main Unit                          | KX-NCP500  | Main Unit   |
|                                    | KX-NCP1000 | Main Unit   |
| Main Processing Card               |            | IP Convergence Main Processing Card (IPCMPR)  |
| IPCMPR Option Cards                | KX-NCP1104 | 4-Channel VoIP DSP Card (DSP4)  |
|                                    | KX-TDE0110 | 16-Channel VoIP DSP Card (DSP16)  |
|                                    | KX-TDE0111 | 64-Channel VoIP DSP Card (DSP64)  |
|                                    | KX-TDA0196 | Remote Card (RMT)   |
| Activation Key Codes <sup>*1</sup> | KX-NCS3102 | 2-Channel IP Trunk Activation Key (2 IP Trunk)  |
|                                    | KX-NCS3104 | 4-Channel IP Trunk Activation Key (4 IP Trunk)  |
|                                    | KX-NCS3201 | 1-Channel IP Softphone/IP Proprietary Telephone Activation Key (1 IP Softphone/IP PT)   |
|                                    | KX-NCS3204 | 4-Channel IP Softphone/IP Proprietary Telephone Activation Key (4 IP Softphone/IP PT)   |
|                                    | KX-NCS3208 | 8-Channel IP Softphone/IP Proprietary Telephone Activation Key (8 IP Softphone/IP PT)   |
|                                    | KX-NCS3216 | 16-Channel IP Softphone/IP Proprietary Telephone Activation Key (16 IP Softphone/IP PT) |
|                                    | KX-NCS3501 | 1-Channel IP Proprietary Telephone Activation Key (1 IP PT)                             |
|                                    | KX-NCS3504 | 4-Channel IP Proprietary Telephone Activation Key (4 IP PT)                             |
|                                    | KX-NCS3508 | 8-Channel IP Proprietary Telephone Activation Key (8 IP PT)                             |
|                                    | KX-NCS3516 | 16-Channel IP Proprietary Telephone Activation Key (16 IP PT)                           |
|                                    | KX-NCS3701 | 1-Channel SIP Extension Activation Key (1 SIP Extension)                                |
|                                    | KX-NCS3704 | 4-Channel SIP Extension Activation Key (4 SIP Extension)                                |
|                                    | KX-NCS3708 | 8-Channel SIP Extension Activation Key (8 SIP Extension)                                |
|                                    | KX-NCS3716 | 16-Channel SIP Extension Activation Key (16 SIP Extension)                              |
|                                    | KX-NCS3910 | Activation Key for Software Upgrade to Enhanced Version (Software Upgrade 01)           |
|                                    | KX-NCS2201 | Activation Key for CA PRO for 1 User (CA Pro 1user)                                     |

| Category                        | Model No.    | Description  |
|---------------------------------|--------------|--|
|                                 | KX-NCS2205   | Activation Key for CA PRO for 5 Users (CA Pro 5users)                        |
|                                 | KX-NCS2210   | Activation Key for CA PRO for 10 Users (CA Pro 10users)                      |
|                                 | KX-NCS2240   | Activation Key for CA PRO for 40 Users (CA Pro 40users)                      |
|                                 | KX-NCS2249   | Activation Key for CA PRO for 128 Users (CA Pro 128users)                    |
|                                 | KX-NCS2301   | Activation Key for CA ACD Monitor for 1 ICD Supervisor (CA Supervisor 1user) |
| <b>Virtual Trunk Cards</b>      | -            | Virtual 16-Channel VoIP Gateway Card (V-IPGW16)                              |
|                                 | -            | Virtual 16-Channel SIP Trunk Card (V-SIPGW16)                                |
| <b>Virtual Extension Cards</b>  | -            | Virtual 32-Channel VoIP Extension Card (V-IPEXT32)                           |
|                                 | -            | Virtual 32-Channel SIP Extension Card (V-SIPEXT32)                           |
|                                 | -            | Virtual 4 IP Cell Station Interface Card (V-IPCS4)                           |
| <b>Small Free Slot</b>          |              |  |
| <b>Physical Trunk Cards</b>     | KX-NCP1180   | 4-Port Analogue Trunk Card (LCOT4)   |
|                                 | KX-NCP1280   | 2-Port BRI Card (BRI2)   |
|                                 | KX-NCP1290CE | PRI Card (PRI30)   |
|                                 | KX-NCP1290CJ | PRI Card (PRI30)   |
|                                 | KX-NCP1290CN | PRI Card (PRI30)   |
|                                 | KX-NCP1290   | PRI Card (PRI23)   |
| <b>Physical Extension Card</b>  | KX-NCP1170   | 4-Port Digital Hybrid Extension Card (DHLC4)                                 |
| <b>Regular Free Slot</b>        |              |  |
| <b>Physical Trunk Cards</b>     | KX-NCP1187   | T-1 Trunk Card (T1)  |
|                                 | KX-NCP1188   | E-1 Trunk Card (E1)  |
| <b>Physical Extension Cards</b> | KX-NCP1171   | 8-Port Digital Extension Card (DLC8)   |
|                                 | KX-NCP1172   | 16-Port Digital Extension Card (DLC16)                                       |
|                                 | KX-NCP1173   | 8-Port Single Line Telephone Extension Card (SLC8)                           |
|                                 | KX-NCP1174   | 16-Port Single Line Telephone Extension Card (SLC16)                         |
| <b>Other Physical Card</b>      | KX-NCP1190   | Optional 3-Slot Base Card (OPB3)   |
| <b>OPB3</b>                     |              |  |

| Category             |                       | Model No.    | Description  |           |
|----------------------|-----------------------|--------------|--|-----------|
|                      |                       |              |  |           |
| Other Physical Cards |                       | KX-TDA0161   | 4-Port Doorphone Card (DPH4)   |           |
|                      |                       | KX-TDA0162   | 2-Port Doorphone Card (German Type) (DPH2)   |           |
|                      |                       | KX-TDA0164   | 4-Port External Input/Output Card (EIO4)   |           |
|                      |                       | KX-TDA0166   | 16-Channel Echo Canceller Card (ECHO16)  |           |
|                      |                       | KX-TDA0191   | 4-Channel Message Card (MSG4)  |           |
|                      |                       | KX-TDA0192   | 2-Channel Simplified Voice Message Card (ESVM2)  |           |
|                      |                       | KX-TDA0194   | 4-Channel Simplified Voice Message Card (ESVM4)  |           |
| Cell Stations (CSs)  | 2.4 GHz               | KX-TDA0141   | 2-Channel Cell Station Unit Using a DHLC/DLC Card (PT-interface CS) for 2.4 GHz Portable Station           |           |
|                      |                       | KX-TDA0151   | 2-Channel Cell Station Unit Using a DHLC/DLC Card (PT-interface CS) for 2.4 GHz Portable Station           |           |
|                      | DECT                  | KX-TDA0141CE | 2-Channel Cell Station Unit Using a DHLC/DLC Card (PT-interface CS) for DECT Portable Station              |           |
|                      |                       | KX-TDA0155CE | 2-Channel Cell Station Unit Using a DHLC/DLC Card (PT-interface CS) for DECT Portable Station              |           |
|                      |                       | KX-TDA0155LA | 2-Channel Cell Station Unit Using a DHLC/DLC Card (PT-interface CS) for DECT Portable Station              |           |
|                      |                       | KX-TDA0158CE | 8-Channel High-density Cell Station Unit Using a DHLC/DLC Card (PT-interface CS) for DECT Portable Station |           |
|                      |                       | KX-NCP0158CE | 8-Channel IP Cell Station Unit Using a V-IPCS4 Card for DECT Portable Station                              |           |
|                      | DECT 6.0              | KX-TDA0155   | DECT 6.0 2-Channel Cell Station Unit Using a DHLC/DLC Card (PT-interface CS) for DECT 6.0 Portable Station |           |
|                      |                       | KX-TDA0158   | DECT 6.0 8-Channel Cell Station Unit Using a DHLC/DLC Card (PT-interface CS) for DECT 6.0 Portable Station |           |
|                      |                       | KX-NCP0158   | DECT 6.0 8-Channel IP Cell Station Unit Using a V-IPCS4 Card for DECT 6.0 Portable Station                 |           |
|                      | Proprietary Equipment |              | KX-T30865<br>KX-T7765  | Doorphone |

\*1 Note that the types of activation keys are subject to change without notice. For CA activation keys, refer to the documentation for CA.

## Equipment Compatibility

### Compatible Panasonic Proprietary Telephones

The PBX supports the following telephones:

- IP proprietary telephones (e.g., KX-NT300/KX-NT500 series)

- IP softphones (e.g., KX-NCS8100)
- Digital proprietary telephones (e.g., KX-DT300 series)
- Analogue proprietary telephones (e.g., KX-T7700 series)
- Portable stations (e.g., KX-WT115, KX-WT125, KX-TCA355, KX-TCA256, KX-TD7690)
- DSS consoles (e.g., KX-DT390)
- Single line telephones (e.g., KX-T7710)

### Incompatible Panasonic Proprietary Telephones

The PBX does not support the following telephones:

- KX-T30800 series proprietary telephones and DSS consoles
- KX-T61600 series proprietary telephones and DSS consoles
- KX-T123200 series proprietary telephones and DSS consoles
- KX-TD7500 DECT portable station
- KX-NT136 IP proprietary telephone
- KX-NT265 IP proprietary telephone (apart from software version 2.00 or later)

#### Note

- For the equipment (e.g., Add-on Key Module, USB Module, Headset<sup>\*1</sup>) that can be connected to a particular telephone, refer to the telephone's manual.
  - For other equipment that can be connected to the PBX, refer to "1.1.2 System Connection Diagram".
  - In this manual, KX-NT500 series mean KX-NT543, KX-NT546 and KX-NT560.
- <sup>\*1</sup> The KX-T7090 headset can be connected to the KX-T7000, KX-T7200, KX-T7300, KX-T7400, and KX-T7500 (except for KX-T7560/KX-T7565) series telephones.

## Notice

- This PBX supports SIP Extensions. However, some PBX features may not be available for SIP Extensions, depending on your telephone type.
- Under power failure conditions, the connected telephones may not operate. Please ensure that a separate telephone, not dependent on local power, is available for emergency use.
- Prior to connection of this product, please verify that the intended operating environment is supported. Satisfactory performance cannot be guaranteed for the following:
  - interoperability and compatibility with all devices and systems connected to this product
  - proper operation and compatibility with services provided by telecommunications companies over connected networks

#### Note

- Some optional hardware, software, and features are not available in some countries/areas, or for some PBX models. Please consult your certified Panasonic dealer for more information.
- In this manual, the suffix of each model number (e.g., KX-NCP500**NE**) is omitted unless necessary.

## List of Abbreviations

- APT → Analogue Proprietary Telephone
- CA → Communication Assistant
- DPT → Digital Proprietary Telephone
- IP-PT → IP Proprietary Telephone
- PS → Portable Station
- PT → Proprietary Telephone
- SIP Extension → Session Initiation Protocol Extension (SIP hardphones/SIP softphones)
- SLT → Single Line Telephone

## ***Safety Notices***

Please observe the safety notices in this manual in order to avoid danger to users or other people, and prevent damage to property.

The notices are classified as follows, according to the severity of injury or damage:



### **WARNING**

This notice means that misuse could result in death or serious injury.



### **CAUTION**

This notice means that misuse could result in injury or damage to property.



# Important Information

## SAVE THESE INSTRUCTIONS



### WARNING

#### SAFETY REQUIREMENTS

##### **For All Telephone Equipment**

- Do not install the product in any other way than described in relevant manuals.
- The product must only be installed and serviced by qualified service personnel. The product should be used as-is from the time of purchase; it should not be disassembled or modified. Disassembly or modification can cause a fire, electric shock, or damage to the product.
- Do not install the product in a place exposed to rain or moisture, or a place where water, oil, or other liquids can drip or splash onto the product. Such conditions can lead to fire or electric shock, and may impair the performance of the product.
- Follow all warnings and instructions marked on the product.
- Do not place the product on an unstable or uneven surface. If the product were to fall over, it may cause injury or damage to the product.
- Products that require a power source should only be connected to the type of electrical power supply specified on the product label. If you are not sure of the type of power supply to your home, consult your dealer or local power company.
- For safety purposes some products are equipped with an earthed plug. If you do not have an earthed outlet, please have one installed. Do not bypass this safety feature by tampering with the plug.
- Do not supply power to a combination of devices that exceeds the total rated capacity of the wall outlets or extension cables used. If outlets, power strips, extension cords, etc. are used in a manner that exceeds their rated capacity, they emit large amounts of heat, which could cause a fire.
- Unplug the product from the wall outlet and have it serviced by qualified service personnel in the following cases:
  - 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 according to the operating instructions. Adjust only the controls that are explained in the operating instructions. Improper adjustment of other controls may result in damage and may require service 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 product performance deteriorates.

##### **For the PBX**

- Only use the 19-inch rack mounting equipment (attachment bracket, screws) included with the PBX.
- If damage to the unit exposes any internal parts, disconnect the power supply cord immediately and return the unit to your dealer.
- To prevent fires, electric shock, injury, or damage to the product, be sure to follow these guidelines when performing any wiring or cabling:
  - a. Before performing any wiring or cabling, unplug the product's power cord from the outlet. After completing all wiring and cabling, plug the power cord back into the outlet.
  - b. When laying cables, do not bundle the product's power cord with the power cords of other devices.
  - c. Do not place any objects on top of the cables connected to the PBX.
  - d. When running cables along the floor, use protectors to prevent the cables from being stepped on.

- e. Do not run any cables under carpeting.
- Unplug this unit from the AC outlet if it emits smoke, an abnormal smell or makes unusual noise. These conditions can cause fire or electric shock. Confirm that smoke has stopped and contact an authorised Panasonic Factory Service Centre.
- Do not insert objects of any kind into this product, as they may touch dangerous voltage points or short out parts that could result in a fire or electric shock.



## CAUTION

### SAFETY REQUIREMENTS

#### **For All Telephone Equipment**

- The product should be kept free of dust, moisture, high temperature (more than 40 °C) and vibration, and should not be exposed to direct sunlight.
- Unplug the product from the wall outlet before cleaning. Wipe the product with a soft cloth. Do not clean with abrasive powders or with chemical agents such as benzene or thinner. Do not use liquid cleaners or aerosol cleaners.

#### **For the PBX**

- Before touching the product (PBX, cards, etc.), discharge static electricity by touching ground or wearing an earthing strap. Failure to do so may cause the PBX to malfunction due to static electricity.
- When relocating the equipment, first disconnect the telecom connection before disconnecting the power connection. When the unit is installed in the new location, reconnect the power first, and then reconnect the telecom connection.
- The power supply cord is used as the main disconnect device. Ensure that the AC outlet is located near the equipment and is easily accessible.
- The SD Memory Card poses a choking hazard. Keep the SD Memory Card out of reach of children.
- Slots and openings in the front, back and bottom of the cabinet 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 while in use. The product should never be placed near or over a radiator or other heat source. This product should not be placed in a sealed environment unless proper ventilation is provided.
- When this product is no longer in use, make sure to detach it from the rack.

### SECURITY REQUIREMENTS

In order to use the PBX safely and correctly, the Security Requirements below must be observed. Failure to do so may result in:

- Loss, leakage, falsification or theft of user information.
- Illegal use of the PBX by a third party.
- Interference or suspension of service caused by a third party.

#### **What is User Information?**

User Information is defined as:

1. Information stored on the SD Memory Card  
Phonebook data, user IDs, system settings data, passwords (User/Administrator/Installer), Personal Identification Numbers (PINs), etc.
2. Information sent from the PBX to a PC or other external device:  
Phone call data (including telephone numbers of outside parties), call charge data, etc.



**Requirements**

1. The SD Memory Card contains software for all the processes of the PBX and all customer data. It can be easily removed and taken away from the PBX by a third party. Therefore, do not allow unauthorised access to prevent data leakage.
2. Always make backups of data stored on the SD Memory Card. For details, refer to "2.6.2 Utility—File Transfer PC to PBX (SD Card)" and "2.6.3 Utility—File Transfer PBX (SD Card) to PC" in the PC Programming Manual.
3. To prevent illegal access from the Internet, activate a Firewall.
4. To avoid unauthorised access and possible abuse of the PBX, we strongly recommend:
  - a. Keeping the password secret.
  - b. Selecting a complex, random password that cannot be easily guessed.
  - c. Changing your password regularly.
5. Perform the following when sending the PBX for repair or handing it over to a third party.
  - a. Make a backup of data stored on the SD Memory Card.
  - b. Using an SD formatter, format the SD Memory Card so that information cannot be retrieved from it.
6. To prevent data leakage, render the SD Memory Card physically unusable before disposal.
7. When user information is sent from the PBX to a PC or other external device, the confidentiality of that information becomes the responsibility of the customer. Before disposing of the PC or other external device, ensure that data cannot be retrieved from it by formatting the hard disk and/or rendering it physically unusable.

**Notice****SAFETY REQUIREMENTS****For All Telephone Equipment**

- Read and understand all instructions.

**For the PBX**

- Keep the unit away from heating appliances and devices that generate electrical noise such as fluorescent lamps, motors and televisions. These noise sources can interfere with the performance of the PBX.
- If you are having problems making calls to outside destinations, follow this procedure to test the trunks:
  - a. Disconnect the PBX from all trunks.
  - b. Connect known working SLTs to those trunks.
  - c. Make a call to an external destination using those SLTs.

If a call cannot be carried out correctly, there may be a problem with the trunk that the SLT is connected to. Contact your telephone company.

If all SLTs operate properly, there may be a problem with your PBX. Do not reconnect the PBX to the trunks until it has been serviced by an authorised Panasonic Factory Service Centre

## ***Important Safety Instructions***

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

- Do not use the product near water, for example, near a bathtub, wash bowl, kitchen sink, or laundry tub, in a wet basement, or near a swimming pool.
- Avoid using wired telephones during an electrical storm. There is a remote risk of electric shock from lightning.
- Do not use a telephone in the vicinity of a gas leak to report the leak.
- Rack Mount Instructions—The following or similar rack-mount instructions are included with the installation instructions:
  - a. Elevated Operating Ambient—If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (T<sub>ma</sub>) specified by the manufacturer.
  - b. Reliable Earthing—Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g., use of power strips).



**SAVE THESE INSTRUCTIONS**

# Precaution

## For users in the United Kingdom

FOR YOUR SAFETY, PLEASE READ THE FOLLOWING TEXT CAREFULLY.

This appliance is supplied with a moulded three-pin mains plug for your safety and convenience. Should the fuse need to be replaced, please ensure that the replacement fuse is of the same rating and that it is approved by ASTA or BSI to BS1362.

Check for the ASTA mark  or the BSI mark  on the body of the fuse.

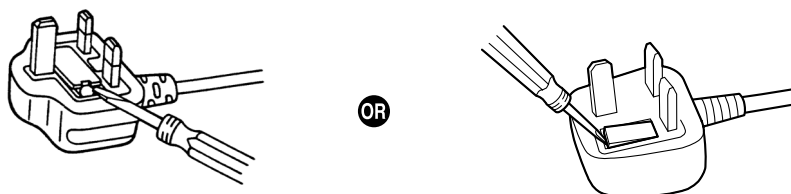
If the plug contains a removable fuse cover, you must ensure that it is refitted when the fuse is replaced. If you lose the fuse cover, the plug must not be used until a replacement cover is obtained. A replacement fuse cover can be purchased from your local Panasonic dealer.

IF THE FITTED MOULDED PLUG IS UNSUITABLE FOR THE AC OUTLET IN YOUR PREMISES, THEN THE FUSE SHOULD BE REMOVED AND THE PLUG CUT OFF AND DISPOSED OF SAFELY. THERE IS A DANGER OF SEVERE ELECTRICAL SHOCK IF THE CUT-OFF PLUG IS INSERTED INTO ANY 13 AMP SOCKET.

## **WARNING**

**This appliance must be earthed.**

**How to replace the fuse:** Open the fuse compartment with a screwdriver and replace the fuse and fuse cover.



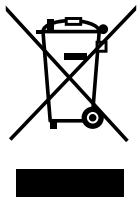
The equipment must be connected to direct extension lines, and a payphone should not be connected as an extension.

999 and 112 can be dialled on the apparatus after accessing the Exchange line for the purpose of making outgoing calls to the BT emergency services.

During dialling, this apparatus may tinkle the bells of other telephones using the same line. This is not a fault and we advise you not to call the Fault Repair Service.

## For users in the European Union only

### Information for Users on Collection and Disposal of Old Equipment and used Batteries



These symbols on the products, packaging, and/or accompanying documents mean that used electrical and electronic products and batteries should not be mixed with general household waste.

For proper treatment, recovery and recycling of old products and used batteries, please take them to applicable collection points, in accordance with your national legislation and the Directives 2002/96/EC and 2006/66/EC.

By disposing of these products and batteries correctly, you will help to save valuable resources and prevent any potential negative effects on human health and the environment which could otherwise arise from inappropriate waste handling.

For more information about collection and recycling of old products and batteries, please contact your local municipality, your waste disposal service or the point of sale where you purchased the items.

Penalties may be applicable for incorrect disposal of this waste, in accordance with national legislation.

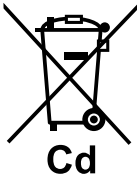
#### For business users in the European Union

If you wish to discard electrical and electronic equipment, please contact your dealer or supplier for further information.



#### Information on Disposal in other Countries outside the European Union

These symbols are only valid in the European Union. If you wish to discard these items, please contact your local authorities or dealer and ask for the correct method of disposal.



#### Note for the battery symbol (bottom two symbol examples):

This symbol might be used in combination with a chemical symbol. In this case it complies with the requirement set by the Directive for the chemical involved.

## For users in Germany only

- Machine Noise Information Ordinance, 3rd GPSGV: The highest sound pressure level is 70 dB (A) or less according to EN ISO 7779.
- This equipment is not for use at video display work stations according to BildscharbV.

## For users in Finland, Norway and Sweden only

- This equipment is intended for installation in restricted access locations where only authorised personnel may gain access through the use of a special tool, lock and key or other means of security.

## For users in New Zealand only

- This equipment shall not be set to make automatic calls to the Telecom '111' Emergency Service.
- The grant of a Telepermit for any item of terminal equipment indicates only that Telecom has accepted that the item complies with minimum conditions for connection to its network. It indicates no endorsement of the product by Telecom, nor does it provide any sort of warranty. Above all, it provides no assurance that any item will work correctly in all respects with another item of Telepermitted equipment of a different make or model, nor does it imply that any product is compatible with all of Telecom's network services.
- This equipment is not capable, under all operating conditions, of correct operation at the higher speeds for which it is designed. Telecom will accept no responsibility should difficulties arise in such circumstances.

- Some parameters required for compliance with Telecom's Telepermit requirements are dependent on the equipment (PBX) associated with this modem. In order to operate within the limits for compliance with Telecom's Specifications, the associated PBX equipment shall be set to ensure that modem calls are answered between 3 and 30 seconds of receipt of ringing.
- Using the toll services of a company other than Telecom:  
If the PBX is set up to use the toll services of a company other than Telecom, the telephone numbers dialled from the Caller Display listings within the PBX will be directed through the toll services of the other company because the telephone numbers include the toll access digit and area code digit. A toll charge may be incurred. Please check with the toll carrier concerned.
- **APPLICABLE ONLY TO TELECOM CUSTOMERS WHO HAVE AUTOMATIC ACCESS TO OTHER CARRIERS FOR TOLL CALLS**  
When calling back a number from the Caller ID list, all numbers prefixed with "0 + AREA CODE" will be automatically forwarded to your toll carrier. This includes numbers in your local calling area. The zero + area code should either be removed when calling back local numbers, or check with your toll carrier that a charge will not be levied.
- All persons using this device for recording telephone conversations shall comply with New Zealand law. This requires that at least one party to the conversation is to be aware that it is being recorded. In addition, the principles enumerated in the Privacy Act 1993 shall be complied with in respect to the nature of the personal information collected, the purpose for its collection, how it is used, and what is disclosed to any other party.

**For users in Australia only**

- No External TRC Terminal is provided due to an Internal Link between PE and TRC.

**For users in Taiwan only**

- Lithium batteries can be found in the circuit boards of the main board and optional cards of the PBX.

**Notice**

Regarding removing or replacing a battery in the circuit board, consult your dealer.

**Note**

- When disposing of any of the above products, all batteries must be removed. Follow the applicable laws, regulations, and guidelines in your country/area regarding disposal of batteries.
- When replacing a battery, use only the same battery type, or an equivalent recommended by the battery manufacturer.



廢電池請回收

# Introduction

This Installation Manual is designed to serve as an overall technical reference for the Panasonic Pure IP-PBX, KX-NCP500/KX-NCP1000. It provides instructions for installing the hardware, and programming the PBX using the Maintenance Console.

## The Structure of this Manual

This manual contains the following sections:

### Section 1 System Outline

Provides general information on the PBX, including the system capacity and specifications.

### Section 2 Activation Key Installation

Describes information on activation keys, including how to obtain an activation key and install it in the SD Memory Card.

### Section 3 Installation

Describes the procedures to install the PBX. Detailed instructions for planning the installation site, installing the shelves and optional service cards, and cabling of peripheral equipment are provided. Further information on system expansion and peripheral equipment installation is included.

### Section 4 Guide for the Maintenance Console

Explains the installation procedure, structure, and basic information of the Maintenance Console.

### Section 5 Troubleshooting

Provides information on the PBX and telephone troubleshooting.

## About the Other Manuals

Along with this Installation Manual, the following manuals are available:

### Feature Guide

Describes all basic, optional and programmable features of the PBX.

### PC Programming Manual

Provides step-by-step instructions for performing system programming using a PC.

### PT Programming Manual

Provides step-by-step instructions for performing system programming using a PT.

### User Manual

Provides operating instructions for end users using a PT, SLT, PS, or DSS Console.

## About the software version of your PBX

The contents of this manual apply to PBXs with a certain software version, as indicated on the cover of this manual. To confirm the software version of your PBX, see "How do I confirm the software version of the PBX or installed cards?" in 2.7.1 Frequently Asked Questions (FAQ) of the PC Programming Manual, or "[190] Main Processing (MPR) Software Version Reference" in the PT Programming Manual.

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# **Section 1**

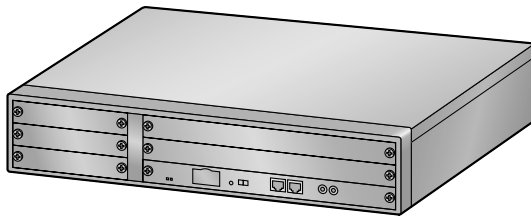
## **System Outline**

*This section provides general information on the PBX, including the system capacity and specifications.*

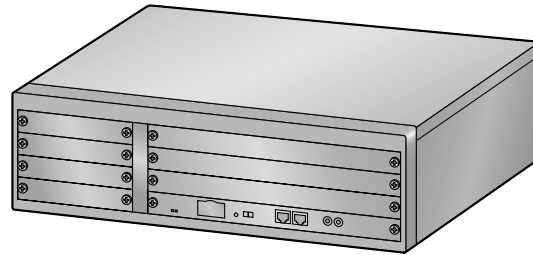
## 1.1 Basic System Construction

### 1.1.1 Main Unit

The main unit contains a power supply unit (PSU) and an IPCMPR card for starting and controlling the PBX.



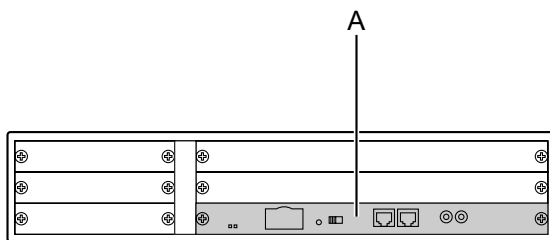
KX-NCP500



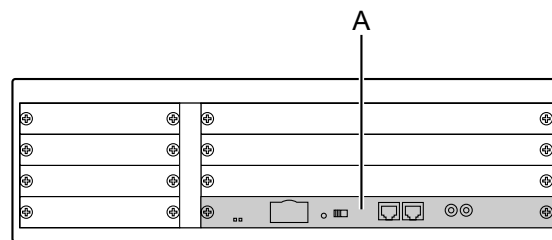
KX-NCP1000

### Construction of the Main Unit

#### A. IPCMPR Card

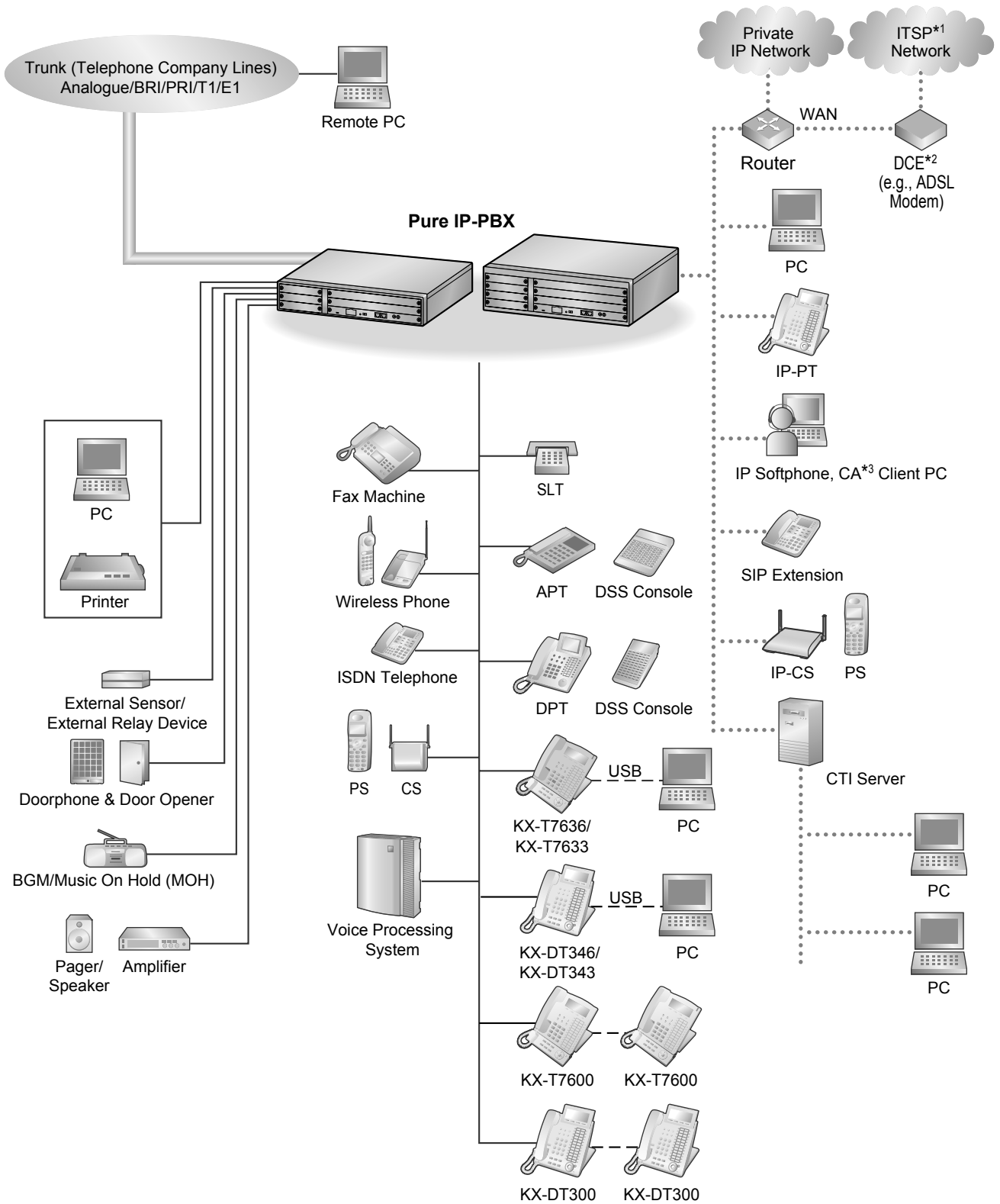


KX-NCP500



KX-NCP1000

## 1.1.2 System Connection Diagram

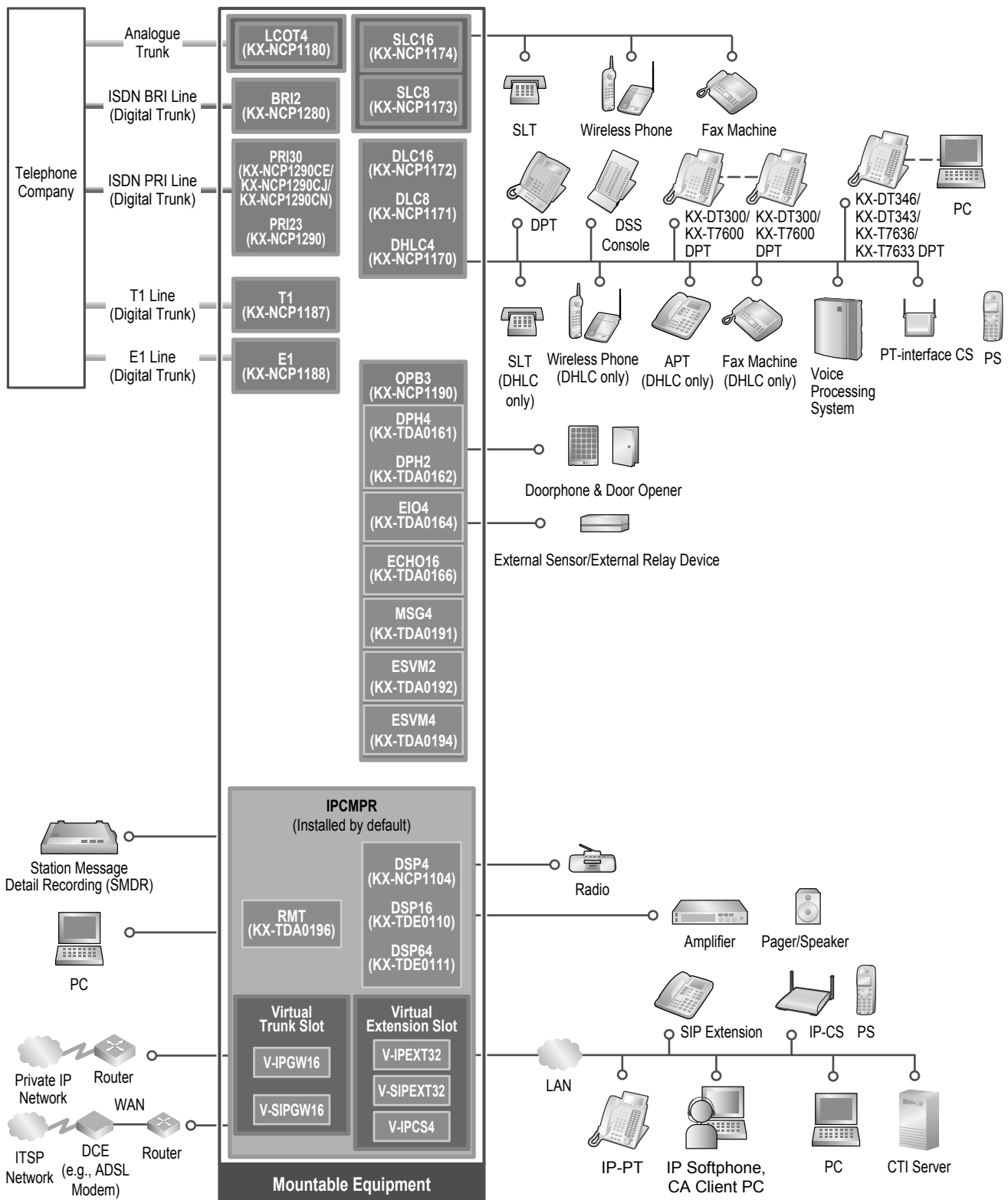


\*1 ITSP: Internet Telephony Service Provider

\*2 DCE: Data Circuit Terminating Equipment

\*3 CA: Communication Assistant

## 1.1.2 System Connection Diagram





## 1.2 Optional Equipment

### 1.2.1 Optional Equipment

| Model No.    | Model Name   | Description  |
|--------------|--|--|
| KX-NCP1104   | 4-Channel VoIP DSP Card (DSP4)                       | 4-channel digital signal processor card with a 4-Channel IP Trunk activation key and an 8-Channel IP Proprietary Telephone activation key preinstalled. Compliant with ITU-T G.729A and G.711 codec methods. To be mounted on the IPCMPR card. |
| KX-NCP1170   | 4-Port Digital Hybrid Extension Card (DHL4)          | 4-port digital hybrid extension card for DPTs, APTs, SLTs, DSS consoles, and PT-interface CSs, with 1 power failure transfer (PFT) port.   |
| KX-NCP1171   | 8-Port Digital Extension Card (DLC8)                 | 8-port digital extension card for DPTs, DSS consoles, and PT-interface CSs.  |
| KX-NCP1172   | 16-Port Digital Extension Card (DLC16)               | 16-port digital extension card for DPTs, DSS consoles, and PT-interface CSs.   |
| KX-NCP1173   | 8-Port Single Line Telephone Extension Card (SLC8)   | 8-Port Single Line Telephone Extension Card (SLC8)   |
| KX-NCP1174   | 16-Port Single Line Telephone Extension Card (SLC16) | 16-Port Single Line Telephone Extension Card (SLC16)   |
| KX-NCP1180   | 4-Port Analogue Trunk Card (LCOT4)                   | 4-port analogue trunk card with 1 power failure transfer (PFT) port.   |
| KX-NCP1187   | T-1 Trunk Card (T1)                                  | 1-port T1 trunk card. EIA/TIA standard compliant.  |
| KX-NCP1188   | E-1 Trunk Card (E1)                                  | 1-port E1 trunk card. ITU-T standard compliant.  |
| KX-NCP1190   | Optional 3-Slot Base Card (OPB3)                     | Optional 3-slot base card for mounting a maximum of 3 option cards.  |
| KX-NCP1280   | 2-Port BRI Card (BRI2)                               | 2-port ISDN Basic Rate Interface card. EURO-ISDN/ETSI compliant.   |
| KX-NCP1290   | PRI Card (PRI23)                                     | 1-port ISDN Primary Rate Interface card (23B channels). NI (North American standard ISDN protocol) compliant.  |
| KX-NCP1290CE | PRI Card (PRI30)                                     | 1-port ISDN Primary Rate Interface card (30B channels). EURO-ISDN/ETSI compliant.  |
| KX-NCP1290CJ | PRI Card (PRI30)                                     | 1-port ISDN Primary Rate Interface card (30B channels). EURO-ISDN/ETSI compliant.  |
| KX-NCP1290CN | PRI Card (PRI30)                                     | 1-port ISDN Primary Rate Interface card (30B channels). EURO-ISDN/ETSI compliant.  |
| KX-TDA0161   | 4-Port Doorphone Card (DPH4)                         | 4-port doorphone card for 4 doorphones and 4 door openers. To be mounted on the OPB3 card.   |

### 1.2.1 Optional Equipment

| Model No.  | Model Name                                      | Description  |
|------------|---|--|
| KX-TDA0162 | 2-Port Doorphone Card (German Type) (DPH2)      | 2-port doorphone card for 2 German-type doorphones and 2 door openers. To be mounted on the OPB3 card.   |
| KX-TDA0164 | 4-Port External Input/Output Card (EIO4)        | 4-port external input/output card. To be mounted on the OPB3 card.   |
| KX-TDA0166 | 16-Channel Echo Canceller Card (ECHO16)         | 16-channel card for echo cancellation during conferences. To be mounted on the OPB3 card.  |
| KX-TDA0191 | 4-Channel Message Card (MSG4)                   | 4-channel message card. To be mounted on the OPB3 card.  |
| KX-TDA0192 | 2-Channel Simplified Voice Message Card (ESVM2) | 2-channel simplified voice message card for Built-in Simplified Voice Message feature. Also supports MSG card features. To be mounted on the OPB3 card.  |
| KX-TDA0194 | 4-Channel Simplified Voice Message Card (ESVM4) | 4-channel simplified voice message card for Built-in Simplified Voice Message feature. Also supports MSG card features. To be mounted on the OPB3 card.  |
| KX-TDA0196 | Remote Card (RMT)                               | Analogue modem card for remote communication with the PBX. ITU-T V.90 support. To be mounted on the IPCMPR card.   |
| KX-TDE0110 | 16-Channel VoIP DSP Card (DSP16)                | 16-channel digital signal processor card with a 4-Channel IP Trunk activation key and an 8-Channel IP Proprietary Telephone activation key preinstalled. Compliant with ITU-T G.729A and G.711 codec methods. To be mounted on the IPCMPR card.        |
| KX-TDE0111 | 64-Channel VoIP DSP Card (DSP64)                | 64-channel digital signal processor card with four 4-Channel IP Trunk activation keys and four 8-Channel IP Proprietary Telephone activation keys preinstalled. Compliant with ITU-T G.729A and G.711 codec methods. To be mounted on the IPCMPR card. |

#### Note

For the maximum number of optional service cards that can be installed in the PBX, refer to "1.3.3 System Capacity".

## 1.3 Specifications

### 1.3.1 General Description

|  |                    |   |
|--|--------------------|---|
| <b>Control Bus</b>                                 |                    | Original bus (16-bit, 8 MHz, 10 megabytes per second)   |
| <b>Communication Bus</b>                           |                    | H.100 bus conformity (1024 time slots)  |
| <b>Switching</b>                                   |                    | Non-blocking  |
| <b>Power Input</b>                                 | <b>KX-NCP500</b>   | 100 V AC to 130 V AC; 1.0 A/200 V AC to 240 V AC; 0.6 A; 50 Hz/60 Hz                                    |
|  | <b>KX-NCP1000</b>  | 100 V AC to 130 V AC; 1.3 A/200 V AC to 240 V AC; 0.8 A; 50 Hz/60 Hz                                    |
| <b>Power Consumption (when fully mounted)</b>      | <b>KX-NCP500</b>   | 51 W<br>(240 V: 122 VA, 200 V: 113 VA, 130 V: 100 VA, 100 V: 92 VA)                                     |
|  | <b>KX-NCP1000</b>  | 65 W<br>(240 V: 142 VA, 200 V: 134 VA, 130 V: 119 VA, 100 V: 113 VA)                                    |
| <b>Maximum Power Failure Tolerance<sup>1</sup></b> |                    | 300 ms  |
| <b>Memory Backup Duration</b>                      |                    | 7 years   |
| <b>Dialling</b>                                    | <b>Trunk</b>       | Dial Pulse (DP) 10 pps, 20 pps<br>Tone (DTMF) Dialling  |
|  | <b>Extension</b>   | Dial Pulse (DP) 10 pps, 20 pps<br>Tone (DTMF) Dialling  |
| <b>Mode Conversion</b>                             |                    | DP-DTMF, DTMF-DP  |
| <b>Ring Frequency</b>                              |                    | 20 Hz/25 Hz (selectable)  |
| <b>Trunk Loop Limit</b>                            |                    | 1600 $\Omega$ maximum   |
| <b>Operating Environment</b>                       | <b>Temperature</b> | 0 °C to 40 °C   |
|  | <b>Humidity</b>    | 10 % to 90 % (non-condensing)   |
| <b>Conference Call Trunk</b>                       |                    | From 10 × 3-party conference call to 4 × 8-party conference call  |
| <b>Music on Hold (MOH)</b>                         |                    | 1 port (Level Control: -6 dB to +6 dB per 3 dB)<br>MOH1: Selectable Internal/External Music Source port |
| <b>Paging</b>                                      | <b>Internal</b>    | Level Control: -6 dB to +3 dB per 3 dB  |
|  | <b>External</b>    | 1 port (Volume Control: -15 dB to +6 dB per 3 dB)   |
| <b>Serial Interface Port</b>                       | <b>RS-232C</b>     | 1 (maximum 115.2 kbps)  |
| <b>RJ45 Port</b>                                   | <b>MNT Port</b>    | 1 (for PC connection)   |
|  | <b>LAN Port</b>    | 1 (for LAN connection)  |

### 1.3.1 General Description

---

|  |                   |                                      |   |
|--|-------------------|--------------------------------------|---|
| <b>Extension Connection Cable</b>      |                   | SLT                                  | 1-pair wire (T, R)                                    |
|  |                   | DPT                                  | 1-pair wire (D1, D2) or<br>2-pair wire (T, R, D1, D2) |
|  |                   | APT                                  | 2-pair wire (T, R, D1, D2)                            |
|  |                   | PT-interface CS (2-channel)          | 1-pair wire (D1, D2)                                  |
|  |                   | PT-interface CS (8-channel)          | 4-pair wire (D1, D2)                                  |
|  |                   | DSS Console and Add-on Key<br>Module | 1-pair wire (D1, D2)                                  |
| <b>Dimension</b>                       | <b>KX-NCP500</b>  | 430 mm (W) × 88 mm (H) × 340 mm (D)  |   |
|  | <b>KX-NCP1000</b> | 430 mm (W) × 130 mm (H) × 340 mm (D) |   |
| <b>Weight (when fully<br/>mounted)</b> | <b>KX-NCP500</b>  | Under 7 kg                           |   |
|  | <b>KX-NCP1000</b> | Under 8 kg                           |   |

<sup>\*\*1</sup> If tolerance may be exceeded, an Uninterruptible Power Supply (UPS) is recommended.

## 1.3.2 Characteristics

|   |  |
|---|--|
| <b>Terminal Equipment Loop Limit</b>                    | <ul style="list-style-type: none"> <li>PT: KX-DT300/KX-T7600 series DPT: 90 <math>\Omega</math>; all other DPTs/APTs: 40 <math>\Omega</math></li> <li>SLT: 600 <math>\Omega</math> including set</li> <li>Doorphone: 20 <math>\Omega</math></li> <li>CS: 65 <math>\Omega</math></li> </ul> |
| <b>Minimum Leakage Resistance</b>                       | 15 000 $\Omega$ minimum  |
| <b>Maximum Number of Extension Instruments per Line</b> | <ol style="list-style-type: none"> <li>for PT or SLT</li> <li>by Parallel or eXtra Device Port connection of an APT/DPT and an SLT</li> <li>by Digital eXtra Device Port connection of 2 DPTs and an SLT</li> </ol>  |
| <b>Ring Voltage</b>                                     | 75 Vrms at 20 Hz/25 Hz depending on the Ringing Load   |
| <b>Trunk Loop Limit</b>                                 | 1600 $\Omega$ maximum  |
| <b>Hookswitch Flash/Recall Timing Range</b>             | 24 ms to 2032 ms   |
| <b>BRI Cards Internal ISDN Mode</b>                     | Supply Voltage: 40 V<br>Power Supply (BRI2): 4.5 W per 1 line, 9 W per 2 lines<br>Power Supply Method: Phantom Power Supply  |
| <b>Door Opener Current Limit</b>                        | 24 V DC/30 V AC, 1 A maximum   |
| <b>External Relay Current Limit</b>                     | 24 V DC/30 V AC, 1 A maximum   |
| <b>External Sensor Current Limit</b>                    | Power to the external sensor is provided from the EIO4 card and must be grounded through the EIO4 card. For the connection diagram, refer to "3.7.4 EIO4 Card (KX-TDA0164)". The PBX detects input from the sensor when the signal is under 100 $\Omega$ .                                 |
| <b>Paging Terminal Impedance</b>                        | 600 $\Omega$   |
| <b>MOH (Music on Hold) Terminal Impedance</b>           | 10 000 $\Omega$  |

# 1.3.3 System Capacity

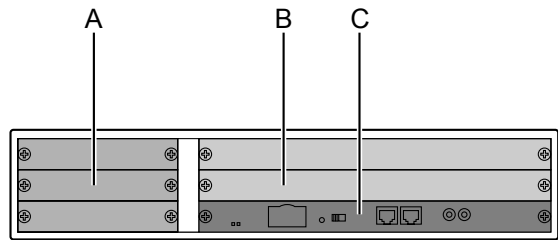
## Type and Maximum Number of Slots

The PBX supports the following type and number of slots.

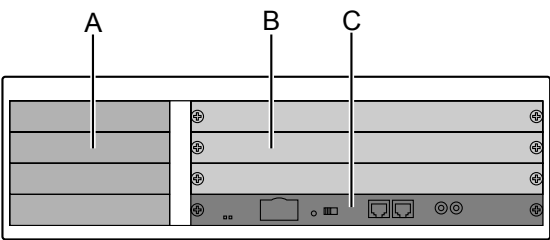
| Slot Type         |                        | Maximum Number |            |
|-------------------|------------------------|----------------|------------|
|                   |                        | KX-NCP500      | KX-NCP1000 |
| IPCMPR Card Slot  |                        | 1              | 1          |
| Regular Free Slot |                        | 2              | 3          |
| Small Free Slot   |                        | 3              | 4          |
| Virtual Slot      | Virtual Trunk Slot     | 4              | 4          |
|                   | Virtual Extension Slot | 4              | 4          |

### IPCMPR Card Slot and Free Slots

KX-NCP500



KX-NCP1000

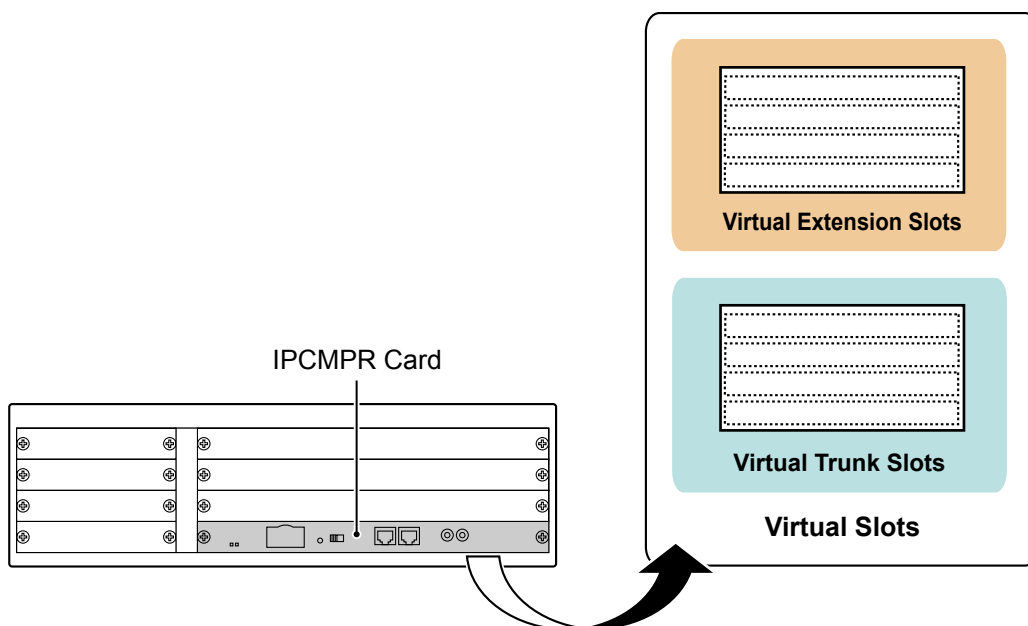


- A. Small Free Slots
- B. Regular Free Slots
- C. IPCMPR Card Slot



## Virtual Slots of the IPCMPR Card

Example: Virtual Slots of the KX-NCP1000



## Maximum Optional Service Cards

The following number of cards can be installed in the Free Slots or Virtual Slots of the PBX.

### Note

- Any card that exceeds the capacity of the PBX will be ignored.
- When the PBX starts up with an invalid configuration, some cards will be ignored.

### Cards Installed in Free Slots or Virtual Slots

◆ : For Small Free Slots

★ : For Regular Free Slots

| Card Type |                         | Maximum Number        |                       |
|-----------|-------------------------|-----------------------|-----------------------|
|           |                         | KX-NCP500             | KX-NCP1000            |
| IPCMRP    |                         | 1                     | 1                     |
|           | Trunk Card              | 9 <sup>*1</sup>       | 9 <sup>*1</sup>       |
|           | Virtual Trunk Card      | 4                     | 4                     |
|           | V-IPGW16                | 2                     | 2                     |
|           | V-SIPGW16               | 4                     | 4                     |
|           | Physical Trunk Card     | Total 5 <sup>*2</sup> | Total 5 <sup>*2</sup> |
|           | ◆ LCOT4                 | 3                     | 4                     |
|           | ◆ BRI2                  |                       |                       |
|           | ★ T1                    | 2                     | 2                     |
|           | ★ E1                    |                       |                       |
|           | ◆ PRI23                 |                       |                       |
|           | ◆ PRI30                 |                       |                       |
|           | Extension Card          | 7                     | 7                     |
|           | Virtual Extension Card  | 4                     | 4                     |
|           | V-IPEXT32               | 4                     | 4                     |
|           | V-SIPEXT32              | 4                     | 4                     |
|           | V-IPCS4                 | 4                     | 4                     |
|           | Physical Extension Card | 3                     | 3                     |
|           | ◆ DHLC4                 | 1                     | 1                     |
|           | ★ DLC8                  | 2                     | 2                     |
|           | ★ DLC16                 |                       |                       |
|           | ★ SLC8                  |                       |                       |
|           | ★ SLC16                 |                       |                       |
|           | ★ OPB3                  | 2                     | 3                     |
| Total     |                         | 13                    | 15                    |

\*1 When installing T1, E1, PRI30, PRI23 cards, make sure that the number of these cards × 2 + the number of the other cards does not exceed 9.

\*2 One T1, E1, PRI30, or PRI23 card counts as 2 cards.

## Cards Mounted on Other Optional Service Cards

| Card Type | Maximum Number  |                 | Mounted on  |
|-----------|-----------------|-----------------|-------------|
|           | KX-NCP500       | KX-NCP1000      |             |
| DSP4      | 1               | 1               | IPCMPR Card |
| DSP16     |                 |                 |             |
| DSP64     |                 |                 |             |
| RMT       | 1               | 1               |             |
| DPH4      | 4               | 4               | OPB3 Card   |
| DPH2      | 6               | 8               |             |
| ECHO16    | 2 <sup>*1</sup> | 2 <sup>*1</sup> |             |
| MSG4      | 4               | 4               |             |
| ESVM2     |                 |                 |             |
| ESVM4     |                 |                 |             |
| EIO4      | 4               | 4               |             |

\*1 Only 1 ECHO16 card can be mounted on each OPB3 card.

## Maximum Trunks and Extensions

The PBX supports the following number of trunks and extensions.

| Type                                | Maximum Number |
|-------------------------------------|----------------|
| Total Number of Trunks              | 128            |
| Trunk (Physical Trunk Card)         | 64             |
| Trunk (Virtual Trunk Card)          | 64             |
| H.323 Trunks                        | 32             |
| SIP Trunks                          | 64             |
| Total Number of Extensions          | 172            |
| Extension (Physical Extension Card) | 44             |
| Extension (Virtual Extension Card)  | 128            |
| IP-PT and IP Softphone              | 128            |
| SIP Extension                       |                |

#### DSP Card Resources

The maximum number of simultaneous calls using IP protocols is determined by the type of call, codec(s) used, and digital signal processor (DSP) card installed in the PBX.

Below are some example configurations and the maximum number of simultaneous calls for each.

##### For Calls between Virtual Trunks and Virtual Extensions

| Codec(s) Used              | Maximum Number of Simultaneous Calls |            |            |
|----------------------------|--------------------------------------|------------|------------|
|                            | DSP4 Card                            | DSP16 Card | DSP64 Card |
| G.711                      | 8                                    | 32         | 64         |
| G.711+G.729A <sup>*1</sup> | 2                                    | 12         | 42         |
| G.729A                     | 2                                    | 8          | 32         |

<sup>\*1</sup> For example, when a virtual extension uses G.711 and a virtual trunk uses G.729A for the same call.

##### For Calls between Virtual Trunks and Physical Card Extensions (e.g., DPTs, etc.)

| Codec Used | Maximum Number of Simultaneous Calls |            |            |
|------------|--------------------------------------|------------|------------|
|            | DSP4 Card                            | DSP16 Card | DSP64 Card |
| G.711      | 5                                    | 32         | 64         |
| G.729A     | 2                                    | 12         | 50         |

##### For Calls between Virtual Extensions and Physical Card Extensions/Trunks (e.g., PRI, etc.)

| Codec Used | Maximum Number of Simultaneous Calls |            |            |
|------------|--------------------------------------|------------|------------|
|            | DSP4 Card                            | DSP16 Card | DSP64 Card |
| G.711      | 16                                   | 64         | 113        |
| G.729A     | 4                                    | 16         | 64         |

#### Note

For non-peer-to-peer calls via the DSP card, calls cannot be made or received when all of the card's resources are being used.

## Maximum Terminal Equipment

The following shows the number of each terminal equipment type supported by the PBX.

| Terminal Equipment Type       | Maximum Number    |
|-------------------------------|-------------------|
| Telephone                     | 172               |
| SLT                           | 36                |
| KX-DT300/KX-T7600 series DPT  | 40                |
| KX-T7560/KX-T7565 DPT         | 36                |
| Other DPT                     | 10                |
| APT                           | 4                 |
| IP-PT <sup>*1</sup>           | 128 <sup>*2</sup> |
| SIP Extension                 | 128               |
| DSS console                   | 8                 |
| CS                            | 21 <sup>*3</sup>  |
| PT-interface CS (2-channel)   | 11                |
| PT-interface CS (8-channel)   | 5                 |
| IP-CS (8-channel)             | 16                |
| PS                            | 64                |
| Voice Processing System (VPS) | 2                 |
| Doorphone                     | 16 <sup>*4</sup>  |
| Door Opener                   | 16                |
| External Sensor               | 16                |
| External Relay                | 16                |

<sup>\*1</sup> KX-NT400, KX-NT300/KX-NT500 series, and KX-NT265 (software version 2.00 or later only)

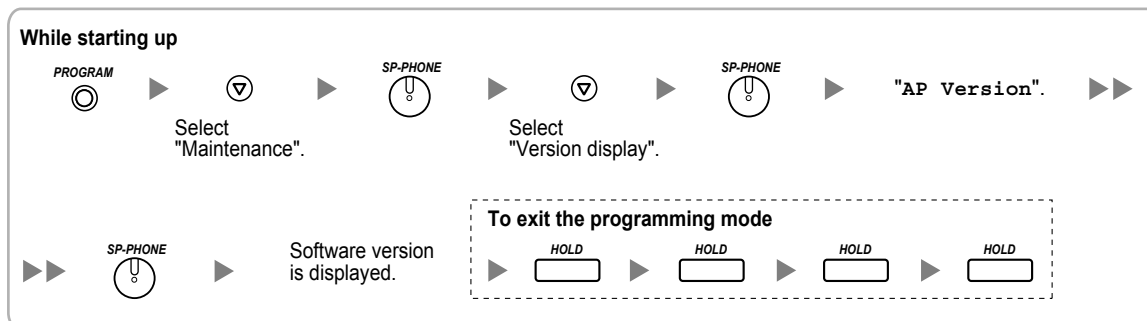
<sup>\*2</sup> For the KX-NT400, the maximum number of extensions that can be connected to the PBX is 64.

<sup>\*3</sup> One 8-channel PT-interface CS or IP-CS counts as 2 CSs, up to a maximum of 32 CSs. Therefore, the maximum number of CSs is 21 (eleven 2-channel CSs + ten 8-channel CSs).

<sup>\*4</sup> For the KX-NCP500, when using the DPH2 card, the maximum number of doorphones is 12.

#### Note for KX-NT265 IP-PT users

The supported card varies depending on the software version of your KX-NT265 IP-PT. To confirm the version, follow the procedure below:



## Digital EXtra Device Port (Digital XDP) Connection Capacity

The number of Digital XDP ports that can be assigned depends on the following:

- the number of connected DPTs
- the maximum number of DPTs the PBX can support

The table below shows examples of how many Digital XDP ports can be assigned with different configurations. For details about the Digital XDP connection, refer to "3.8.3 Digital EXtra Device Port (Digital XDP) Connection".

|                                 | Config.1  | Config.2  | Config.3  | Config.4 | Config.5 |
|---------------------------------|-----------|-----------|-----------|----------|----------|
| Small Free Slot                 | –         | DHLC4     | –         | –        | DHLC4    |
| Regular Free Slot               | DLC16     | DLC16     | DLC8      | DLC16    | DLC16    |
|                                 | –         | –         | DLC16     | DLC16    | DLC16    |
| No. of DPT ports                | 16        | 20        | 24        | 32       | 36       |
| <b>No. of Digital XDP ports</b> | <b>16</b> | <b>20</b> | <b>16</b> | <b>8</b> | <b>4</b> |
| Total No. of DPTs (max. 40)     | 32        | 40        | 40        | 40       | 40       |

#### Note

With Config.3, Config.4, and Config.5, the combination of 20 DPT ports and 20 Digital XDP ports is also possible.



## Power Supply Unit Capacity

The pre-installed power supply unit (PSU) in each PBX supports a different load figure.

| PBX Model            | Maximum Load Figure |
|----------------------|---------------------|
| KX-NCP500/KX-NCP1000 | 44                  |

### Load Figure Calculation

| Equipment Type                       |   | Load Figure |
|--------------------------------------|---|-------------|
| PT                                   | KX-DT300 series DPT/KX-DT300 series DSS console/KX-T7600 series DPT/KX-T7600 series DSS console | 1           |
|                                      | KX-T7560/KX-T7565 DPT   | 1           |
|                                      | Other DPT/Other DSS console   | 4           |
|                                      | APT   | 4           |
|                                      | IP-PT   | 0           |
|                                      | SIP Extension   | 0           |
| Extension Card <sup>*1</sup>         | DHLC4   | 4           |
|                                      | SLC8  | 8           |
|                                      | SLC16   | 16          |
| PT-interface CS (2-channel) (1 unit) |   | 4           |
| PT-interface CS (8-channel) (1 unit) |   | 8           |
| IP-CS (8-channel) (1 unit)           |   | 0           |
| ISDN Extension                       |   | 2           |
| VPS (1 port)                         |   | 1           |

<sup>\*1</sup> Only the extension cards that can support SLTs count for the load figures.

### Notice

If the total load figure exceeds the maximum load figure of the PBX by 3, the corresponding extension card cannot be supported by the PBX.

### Calculation Example

|       | Lines and Equipment |               | Load Figure | Required Card   |                   |              |
|-------|---------------------|---------------|-------------|-----------------|-------------------|--------------|
|       |                     |               |             | Small Free Slot | Regular Free Slot | Virtual Slot |
| Trunk | PRI                 | 1 line (23ch) | —           | PRI23           | —                 | —            |
|       | Analogue Trunk      | 4 lines       | —           | LCOT4           | —                 | —            |
|       | SIP Trunk           | 4 lines       | —           | —               | —                 | V-SIPGW16    |
|       | H.323 Trunk         | 4 lines       | —           | —               | —                 | V-IPGW16     |

### 1.3.3 System Capacity

|           | Lines and Equipment   |          | Load Figure | Required Card       |                     |                  |
|-----------|-----------------------|----------|-------------|---------------------|---------------------|------------------|
|           |                       |          |             | Small Free Slot     | Regular Free Slot   | Virtual Slot     |
| Extension | KX-DT300 series DPT   | 24 units | 28          | DHLC4 <sup>*1</sup> | DLC16 <sup>*1</sup> | –                |
|           | SLT                   | 16 units | 16          |                     | SLC16               | –                |
|           | KX-NT300 series IP-PT | 40 units | 0           | –                   | –                   | V-IPEXT32<br>× 2 |
|           | SIP Extension         | 0        | 0           | –                   | –                   | –                |
|           | VPS                   | 0        | 0           | –                   | –                   | –                |
|           | CS                    | 0        | 0           | –                   | –                   | –                |

<sup>\*1</sup> At least 4 of the 20 DPT ports of DHLC4 and DLC16 cards must be assigned as Digital XDP ports.

The total load figure in the example is 44, and is calculated as follows:  
 $(24 \text{ units} \times 1) + (1 \text{ DHLC4 card} \times 4) + (1 \text{ SLC16 card} \times 16) = 44$

---

## **Section 2**

# ***Activation Key Installation***

*This section describes information on activation keys, including how to obtain an activation key and install it in the SD Memory Card.*

## 2.1 Information about the Activation Keys

### 2.1.1 Activation Keys

To use IP trunks and IP telephones on a private IP network using the IPCMPR card or to upgrade the software for enhanced features, you need the appropriate activation keys.

Activation keys are provided via the DSP cards and optional activation key files.

#### Type and Maximum Number of Activation Keys

The PBX supports the following type and number of activation keys:

| Activation Key Type                       | Description                                | Maximum Number | Supported IP Trunks/IP Telephones/CA Users |
|---|--|----------------|--|
| <b>2 IP Trunk<sup>*1</sup></b>            | Allows the use of 2 IP trunks (H.323/SIP). | 32             | 64 IP trunks (H.323/SIP)                   |
| <b>4 IP Trunk<sup>*1</sup></b>            | Allows the use of 4 IP trunks (H.323/SIP). | 16             |  |
| <b>1 IP Softphone/IP PT<sup>*2</sup></b>  | Allows the use of 1 IP-PT/IP softphone.    | 128            | 128 IP-PTs/IP softphones                   |
| <b>4 IP Softphone/IP PT<sup>*2</sup></b>  | Allows the use of 4 IP-PTs/IP softphones.  | 32             |  |
| <b>8 IP Softphone/IP PT<sup>*2</sup></b>  | Allows the use of 8 IP-PTs/IP softphones.  | 16             |  |
| <b>16 IP Softphone/IP PT<sup>*2</sup></b> | Allows the use of 16 IP-PTs/IP softphones. | 8              |  |
| <b>1 IP PT</b>                            | Allows the use of 1 IP-PT.                 | 128            | 128 IP-PTs                                 |
| <b>4 IP PT</b>                            | Allows the use of 4 IP-PTs.                | 32             |  |
| <b>8 IP PT</b>                            | Allows the use of 8 IP-PTs.                | 16             |  |
| <b>16 IP PT</b>                           | Allows the use of 16 IP-PTs.               | 8              |  |
| <b>1 SIP Extension</b>                    | Allows the use of 1 SIP Extension.         | 128            | 128 SIP Extensions                         |
| <b>4 SIP Extension</b>                    | Allows the use of 4 SIP Extensions.        | 32             |  |
| <b>8 SIP Extension</b>                    | Allows the use of 8 SIP Extensions.        | 16             |  |
| <b>16 SIP Extension</b>                   | Allows the use of 16 SIP Extensions.       | 8              |  |
| <b>CA Pro 1user</b>                       | Allows the use of CA Pro for 1 user.       | 128            | 128 users                                  |
| <b>CA Pro 5users</b>                      | Allows the use of CA Pro for 5 users.      | 25             | 125 users                                  |
| <b>CA Pro 10users</b>                     | Allows the use of CA Pro for 10 users.     | 12             | 120 users                                  |
| <b>CA Pro 40users</b>                     | Allows the use of CA Pro for 40 users.     | 3              | 120 users                                  |
| <b>CA Pro 128users</b>                    | Allows the use of CA Pro for 128 users.    | 1              | 128 users                                  |

| Activation Key Type        | Description  | Maximum Number | Supported IP Trunks/IP Telephones/CA Users |
|----------------------------|--|----------------|--|
| <b>CA Supervisor 1user</b> | Allows the use of CA ACD Monitor for 1 ICD Supervisor. | 4              | 4 users                                    |
| <b>Software Upgrade 01</b> | Upgrades software to use enhanced features.            | 1              | -  |

- <sup>\*1</sup> You need to set the number of the installed activation key to be used for H.323 trunks through system programming. By default, all the installed activation keys will be used for SIP trunks.
- <sup>\*2</sup> You can set how many IP softphones can be used with the installed activation keys through system programming. By default, only IP softphones can be used with the installed activation keys.

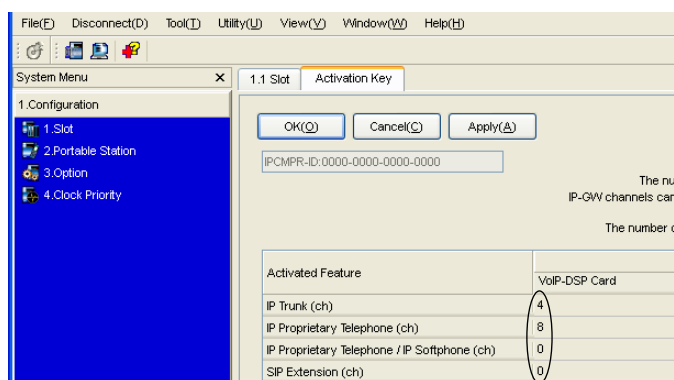
## Preinstalled Activation Keys in the DSP Cards

The following type and number of activation keys are preinstalled on the DSP card:

| Card Type | Activation Key                            |   | Supported IP Trunks/IP-PTs |
|-----------|---|---|----------------------------|
| DSP4      | <b>4-Channel IP Trunk</b>                 | 1 | 4 IP trunks (H.323/SIP)    |
|           | <b>8-Channel IP Proprietary Telephone</b> | 1 | 8 IP-PTs                   |
| DSP16     | <b>4-Channel IP Trunk</b>                 | 1 | 4 IP trunks (H.323/SIP)    |
|           | <b>8-Channel IP Proprietary Telephone</b> | 1 | 8 IP-PTs                   |
| DSP64     | <b>4-Channel IP Trunk</b>                 | 4 | 16 IP trunks (H.323/SIP)   |
|           | <b>8-Channel IP Proprietary Telephone</b> | 4 | 32 IP-PTs                  |

Depending on the number of IP trunks and IP-PTs to be used, you need to select the DSP card from the above.

### Example: Preinstalled Activation Keys in the DSP16 Card



## Additional Activation Keys in the SD Memory Card (Activation Key Files)

When the number of preinstalled activation keys on the DSP cards is not enough for the desired configuration or when you wish to use enhanced features, additional activation keys in the form of activation key files can be installed on the SD Memory Card.

The following type and number of additional activation keys can be installed on the SD Memory Card:

## 2.1.1 Activation Keys

### Activation Keys for IP Trunks

| Model No.  | Activation Key Type | Maximum Number/Supported IP Trunks |                             |            |                             |
|------------|---------------------|------------------------------------|-----------------------------|------------|-----------------------------|
|            |                     | with DSP4/DSP16                    |                             | with DSP64 |                             |
| KX-NCS3102 | 2 IP Trunk          | 30                                 | 60 IP trunks<br>(H.323/SIP) | 24         | 48 IP trunks<br>(H.323/SIP) |
| KX-NCS3104 | 4 IP Trunk          | 15                                 |                             | 12         |                             |

### Activation Keys for IP Telephones

| Model No.  | Activation Key Type   | Maximum Number/Supported IP Telephones |                          |            |                         |
|------------|-----------------------|--|--------------------------|------------|-------------------------|
|            |                       | with DSP4/DSP16                        |                          | with DSP64 |                         |
| KX-NCS3201 | 1 IP Softphone/IP PT  | 120                                    | 120 IP-PTs/IP softphones | 96         | 96 IP-PTs/IP softphones |
| KX-NCS3204 | 4 IP Softphone/IP PT  | 30                                     | 120 IP-PTs/IP softphones | 24         | 96 IP-PTs/IP softphones |
| KX-NCS3208 | 8 IP Softphone/IP PT  | 15                                     | 120 IP-PTs/IP softphones | 12         | 96 IP-PTs/IP softphones |
| KX-NCS3216 | 16 IP Softphone/IP PT | 7                                      | 112 IP-PTs/IP softphones | 6          | 96 IP-PTs/IP softphones |
| KX-NCS3501 | 1 IP PT               | 120                                    | 120 IP-PTs               | 96         | 96 IP-PTs               |
| KX-NCS3504 | 4 IP PT               | 30                                     | 120 IP-PTs               | 24         | 96 IP-PTs               |
| KX-NCS3508 | 8 IP PT               | 15                                     | 120 IP-PTs               | 12         | 96 IP-PTs               |
| KX-NCS3516 | 16 IP PT              | 7                                      | 112 IP-PTs               | 6          | 96 IP-PTs               |
| KX-NCS3701 | 1 SIP Extension       | 128                                    | 128 SIP Extensions       | 128        | 128 SIP Extensions      |
| KX-NCS3704 | 4 SIP Extension       | 32                                     |                          | 32         |                         |
| KX-NCS3708 | 8 SIP Extension       | 16                                     |                          | 16         |                         |
| KX-NCS3716 | 16 SIP Extension      | 8                                      |                          | 8          |                         |

### Activation Keys for CA Users

| Model No.  | Activation Key Type | Maximum Number | Supported CA Users |
|------------|---------------------|----------------|--------------------|
| KX-NCS2201 | CA Pro 1user        | 128            | 128 users          |
| KX-NCS2205 | CA Pro 5users       | 25             | 125 users          |
| KX-NCS2210 | CA Pro 10users      | 12             | 120 users          |
| KX-NCS2240 | CA Pro 40users      | 3              | 120 users          |
| KX-NCS2249 | CA Pro 128users     | 1              | 128 users          |
| KX-NCS2301 | CA Supervisor 1user | 4              | 4 users            |

**Activation Key for Software Upgrading**

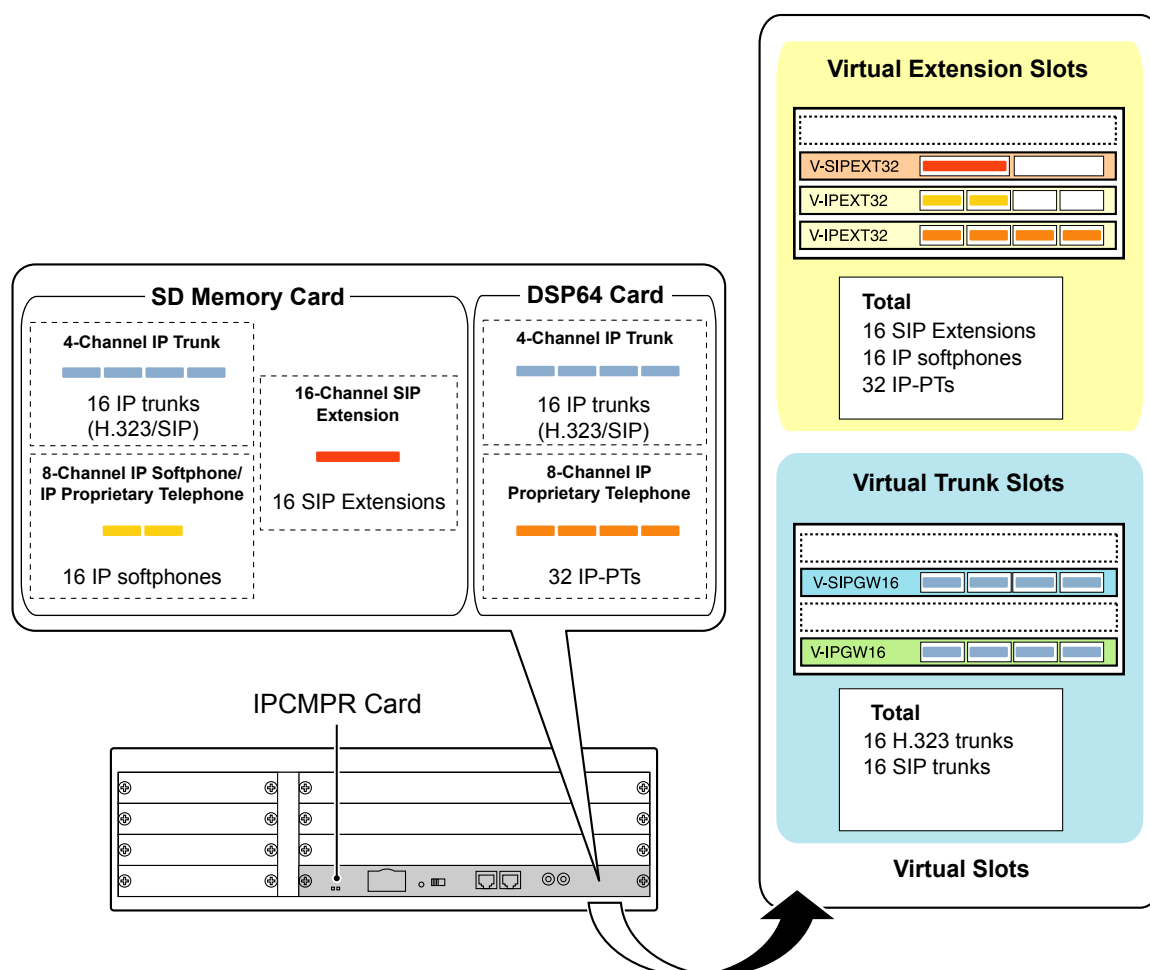
| Model No.  | Activation Key Type | Maximum Number |
|------------|---------------------|----------------|
| KX-NCS3910 | Software Upgrade 01 | 1              |

**Note**

- For information about how to obtain the additional activation keys, refer to "2.1.2 Activation Key Code and Key Management System".
- For information about how to install the activation key files on the SD Memory Card, refer to "2.1.3 Activation Key File".

**Activation Key Installation Example**

The following shows an example of when using 16 H.323 trunks, 16 SIP trunks, 32 IP-PTs, 16 IP softphones, and 16 SIP Extensions on a private IP network using the IPCMPR card.

**Example: KX-NCP1000**

### 2.1.2 Activation Key Code and Key Management System

To obtain additional activation keys, you need to purchase the appropriate activation key codes and access the Key Management System. You can download the activation keys as an activation key file from the Key Management System.

To download the activation keys, enter the MPR ID number shown on the IPCMPR card in the PBX, and activation key number and registration ID provided on each activation key code.

For information about the type of activation key codes available, refer to "Additional Activation Keys in the SD Memory Card (Activation Key Files)".

#### **Note**

- You can only download the activation key file once using the activation key number and registration ID provided on the activation key code.
- Up to 8 activation keys can be downloaded as one activation key file.
- Up to 100 activation key files can be installed in the SD Memory Card.
- It is possible to send the activation key file to a specified e-mail address at the same time as downloading it to a PC.
- Make sure to backup the downloaded activation key files on your PC.
- In the event of a system malfunction, you need a temporary activation key for maintenance purposes. The temporary activation key can only be used for a limited time period, and can be downloaded from the Key Management System in the same way as downloading activation key files. The PBX will be reset at midnight of the day the temporary activation key expires.



## 2.1.3 Activation Key File

The corresponding number of IP trunks and IP telephones or enhanced features can be activated by installing the downloaded activation key file(s) in the SD Memory Card of the IPCMPR card using the Maintenance Console.

### Installing the Activation Key File in the SD Memory Card

Make sure to install the Maintenance Console on the PC in advance, and connect the PC to the PBX. For details about the Maintenance Console, refer to "Section 4 Guide for the Maintenance Console".

1. Start the Maintenance Console from the Start menu.
2. From the **Utility** menu, select **File Transfer PC to PBX (SD Card)**.  
A dialogue box will be displayed.
3. Select the file to upload.  
A window showing the upload progress will be displayed.  
While transferring files to the SD memory card, the PBX automatically renames them according to the header information.  
A message will be displayed when the transfer is complete.
4. Click **OK**.
5. Under **Configuration**, click **Slot**.
6. Click **Activation Key**.
7. For IP trunk activation key file(s), click **Execute**.  
A confirmation message will be displayed. Click **Yes**.

#### **Notice**

The activation key file can only be installed in the PBX with the MPR ID number entered when the activation key file was downloaded. The activation key file cannot be reissued unless the IPCMPR card crashes.

#### **Note**

- It is necessary to restart the PBX to activate the Software Upgrade 01 activation key after performing the procedure above. To restart the PBX, refer to "5.1.4 Using the Reset Button".
- For information about programming activation keys using the Maintenance Console, refer to "3.3 [1-1] Slot—Activation Key" in the PC Programming Manual.

### 2.1.3 Activation Key File

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## **Section 3**

# ***Installation***

*This section describes the procedures to install the PBX. Detailed instructions for planning the installation site, installing the main unit and optional service cards, and cabling of peripheral equipment are provided. Further information on peripheral equipment installation is included.*

## 3.1 Before Installation

### 3.1.1 Before Installation

Please read the following notes concerning installation and connection before installing the PBX and terminal equipment.

Be sure to comply with all applicable laws, regulations, and guidelines.

### Safety Installation Instructions

#### **WARNING**

When installing telephone wiring, basic safety precautions should always be followed to reduce the risk of fire, electric shock and injury to persons, including the following:

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

### Installation Precautions

The PBX is made for 19-inch rack mounting or floor standing, and should be installed in a location where it is accessible for inspections and maintenance.

To prevent malfunction, noise, or discolouration, follow the instructions below:

#### **WARNING**

**Do not install the system in the following locations:**

- **Areas where shocks or vibrations are frequent or strong. Such activity may lead to the product falling over and causing injury, or may impair the product's performance.**
- **Areas with high amounts of dust. High amounts of dust can lead to fire or electric shock, and impair the performance of the product.**

#### **CAUTION**

Do not install the system in the following locations:

- In direct sunlight and hot, cold, or humid places. (Temperature range: 0 °C to 40 °C)
- Areas where sulphuric gases may be present, such as near thermal springs.
- Near devices that generate high frequencies, such as sewing machines or electric welders.
- Locations where other objects will obstruct the area around the PBX. Be especially careful to leave at least 5 cm to the sides of the PBX for ventilation.

#### **Notice**

Do not install the system in the following locations:

- On or near computers, telexes, or other office equipment, as well as microwave ovens or air conditioners. (It is preferable not to install the system in the same room as the above equipment.)
- Within 1.8 m of radios and televisions. (Both the PBX and PTs should be at least 1.8 m away from such devices.)

Do not perform the following:

- Do not block the openings of the PBX.
- Do not stack up the optional service cards.

## Wiring Precautions

Be sure to follow these instructions when wiring the unit:

### **CAUTION**

- Avoid using the same AC outlet for computers, telexes, and other office equipment, as noise generated by such equipment may hamper system performance or interrupt the system.
- Unplug the system from its power source when wiring, and plug the system back in only after all wiring is completed.
- Trunks should be installed with surge protectors. For details, refer to "3.2.9 Surge Protector Installation".


### **Notice**

- Use 2-pair telephone cables when connecting PTs.  
Use 1-pair telephone cables when connecting SLTs, data terminals, answering machines, computers, Voice Processing Systems, etc.
- Mis-wiring may cause the PBX to operate improperly. Refer to Section 3 "Section 3 Installation" when wiring the system.
- If an extension does not operate properly, disconnect the telephone from the extension line and connect it again, or turn off the PBX using the power switch, then turn it on again.
- Use twisted pair cable for trunk connection.
- To prevent signal noise from interfering with the performance of the product, do not run unshielded telephone cables near AC power cables, computer cables, AC power sources, etc. When running cables near other noise-generating devices or cables, use shielded telephone cables or shield the telephone cables with metal tubing.

## 3.2 Installation of the PBX

### 3.2.1 Unpacking

Unpack the box and check the items below:

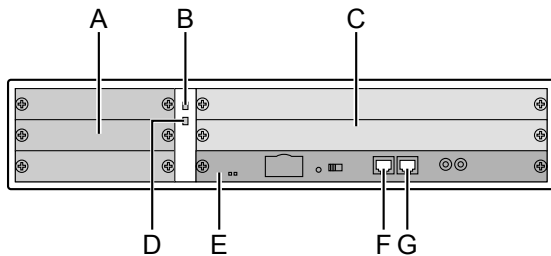
|                                    |   | KX-NCP500       | KX-NCP1000      |
|------------------------------------|---|-----------------|-----------------|
| Main Unit                          |   | 1               | 1               |
| Ferrite Core (for the IPCMPR card) |   | 2               | 2               |
| AC Cord                            |   | 1 <sup>*1</sup> | 1 <sup>*1</sup> |
| 19-inch Rack Attachment Bracket    |   | 2               | 2               |
| SD Memory Card                     |   | 1               | 1               |
| Screw                              |  | 6               | 6               |

<sup>\*1</sup> KX-NCP500BX/KX-NCP1000BX is supplied with 2 types of AC cord. Please use whichever is appropriate for the country/area.

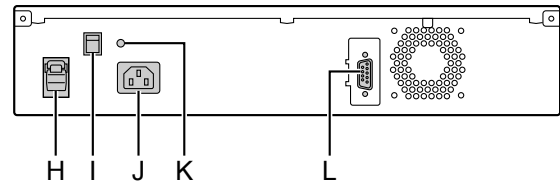
## 3.2.2 Names and Locations

### KX-NCP500

Front

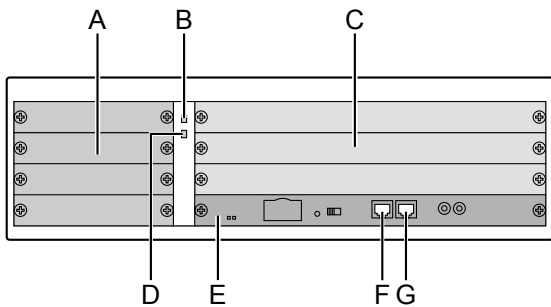


Back

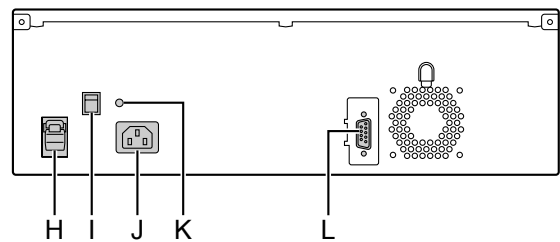


### KX-NCP1000

Front



Back



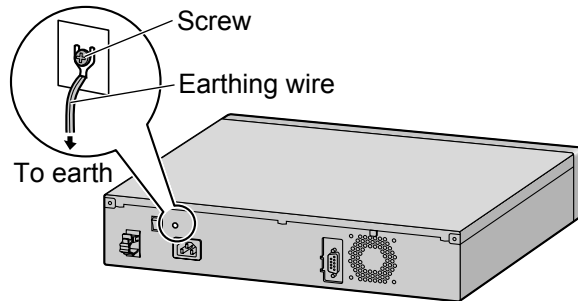
- A.** Small Free Slots
- B.** RUN Indicator
- C.** Regular Free Slots
- D.** ALARM Indicator
- E.** IPCMPR Card Slot
- F.** MNT Port
- G.** LAN Port
- H.** Hook Clip
- I.** Power Switch
- J.** AC Inlet
- K.** Earth Terminal
- L.** RS-232C Port

#### **Note**

A Power Supply Unit (PSU) is pre-installed.

## 3.2.3 Frame Earth Connection

1. Loosen the screw.
2. Insert an earthing wire (user-supplied).
3. Tighten the screw.
4. Connect the earthing wire to earth.



### **WARNING**

- Proper earthing (connection to earth) is very important to reduce the risk to the user of electrocution or to protect the PBX from the bad effects of external noise in the case of a lightning strike.
- The earthing wire of the AC cable has an effect against external noise and lightning strikes, but it may not be enough to protect the PBX. A permanent connection between earth and the earth terminal of the PBX must be made.

### **CAUTION**

For earthing wire, green-and-yellow insulation is required, and the cross-sectional area of the conductor must be more than 0.75 mm<sup>2</sup> or 18 AWG.


### **Notice**

Be sure to comply with applicable local regulations (e.g., laws, guidelines).



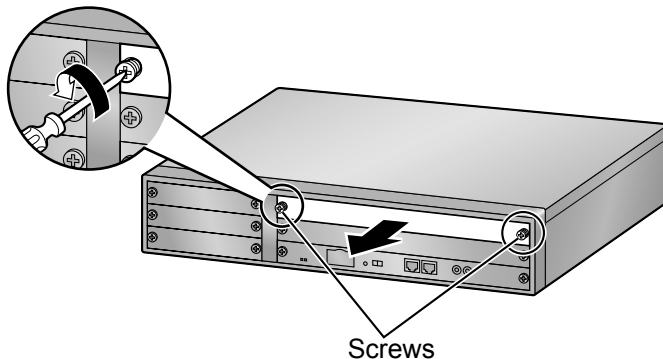
## 3.2.4 Installing/Removing the Optional Service Cards

### CAUTION

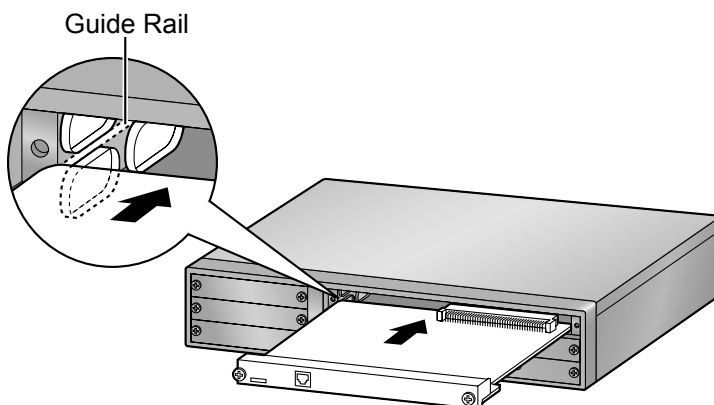
- To protect the back board from static electricity, do not touch parts on the back board in the main unit and on the optional service cards. To discharge static electricity, touch ground or wear an earthing strap.
- When the  label is attached to an optional service card (for small free slots), be sure to turn the power switch off before installing or removing the card.
- When installing or removing the IPCMPR card, the DC power supply must be turned off.

### Installing/Removing Optional Service Cards

1. Turn the 2 screws anticlockwise to remove the appropriate slot panel.



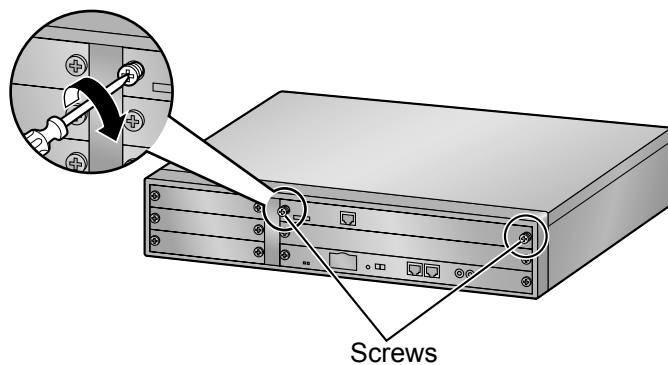
2. Insert the card along the guide rails.



### 3.2.4 Installing/Removing the Optional Service Cards

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3. Turn the 2 screws clockwise to fix the card in place.

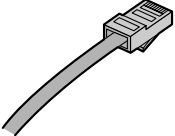
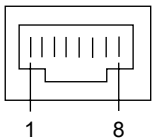
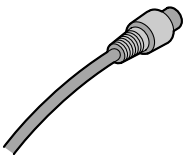

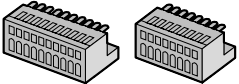
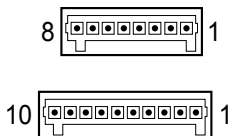
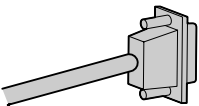
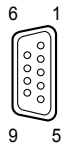


4. To remove the card, reverse the procedure above.

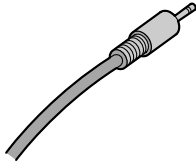

#### **Note**

Make sure the screws are tightened to earth the card securely.

## 3.2.5 Types of Connectors

| Connector Type   | Pin Number  | Used for   |
|--|---|--|
| <p>RJ45</p>  <p>(Twisted pair cable)</p>                |    | <ul style="list-style-type: none"> <li>• IPCMPR</li> <li>• DHLC4 (KX-NCP1170)</li> <li>• DLC8 (KX-NCP1171)</li> <li>• DLC16 (KX-NCP1172)</li> <li>• SLC8 (KX-NCP1173)</li> <li>• SLC16 (KX-NCP1174)</li> <li>• LCOT4 (KX-NCP1180)</li> <li>• T1 (KX-NCP1187)</li> <li>• E1 (KX-NCP1188)</li> <li>• BRI2 (KX-NCP1280)</li> <li>• PRI30 (KX-NCP1290CE/KX-NCP1290CJ/<br/>KX-NCP1290CN)</li> <li>• PRI23 (KX-NCP1290)</li> </ul> |
| <p>BNC</p>   |   | <ul style="list-style-type: none"> <li>• E1 (KX-NCP1188)</li> </ul>  |
| <p>10-pin Terminal Block    8-pin Terminal Block</p>  |  | <ul style="list-style-type: none"> <li>• DPH4 (KX-TDA0161)</li> <li>• DPH2 (KX-TDA0162)</li> <li>• EIO4 (KX-TDA0164)</li> </ul>  |
| <p>RS-232C</p>  <p>(Shielded cable)</p>               |  | <ul style="list-style-type: none"> <li>• Main Unit</li> </ul>  |

3.2.5 Types of Connectors

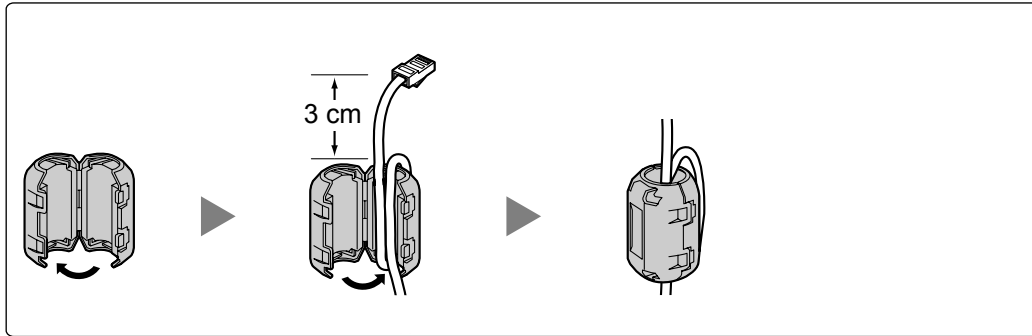
| Connector Type   | Pin Number  | Used for   |
|--|---|--|
| <div>Mini Plug</div>  |  | <ul style="list-style-type: none"><li>• IPCMPR</li></ul> |

## 3.2.6 Attaching a Ferrite Core

A ferrite core must be attached when an RJ45 connector is connected to an IPCMPR or E1/PRI30/BRI2 cards.

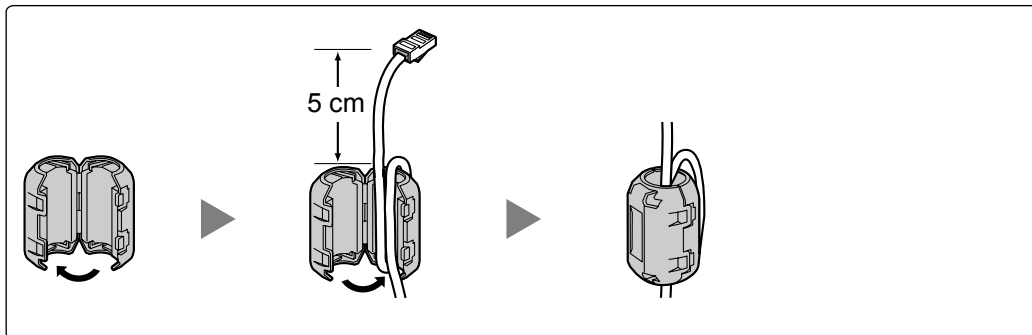
### For the IPCMPR Card

Wrap the cable once around the ferrite core, then close the case of the ferrite core. Attach the ferrite core 3 cm away from the connector. The ferrite core is included with the PBX.



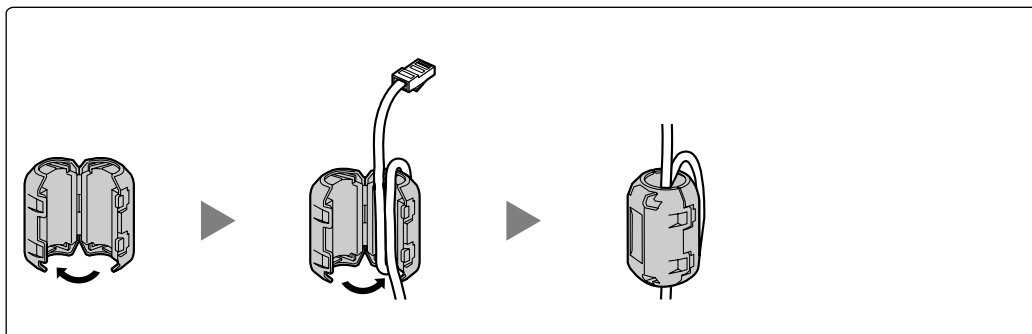
### For the E1/PRI30 Cards

Wrap the cable once around the ferrite core, then close the case of the ferrite core. Attach the ferrite core 5 cm away from the connector. The ferrite core is included with the card.



### For the BRI2 Card

Wrap the cable(s) once around the ferrite core, then close the case of the ferrite core. Attach the ferrite core as close to the card's connector as possible. The ferrite core is included with the card.



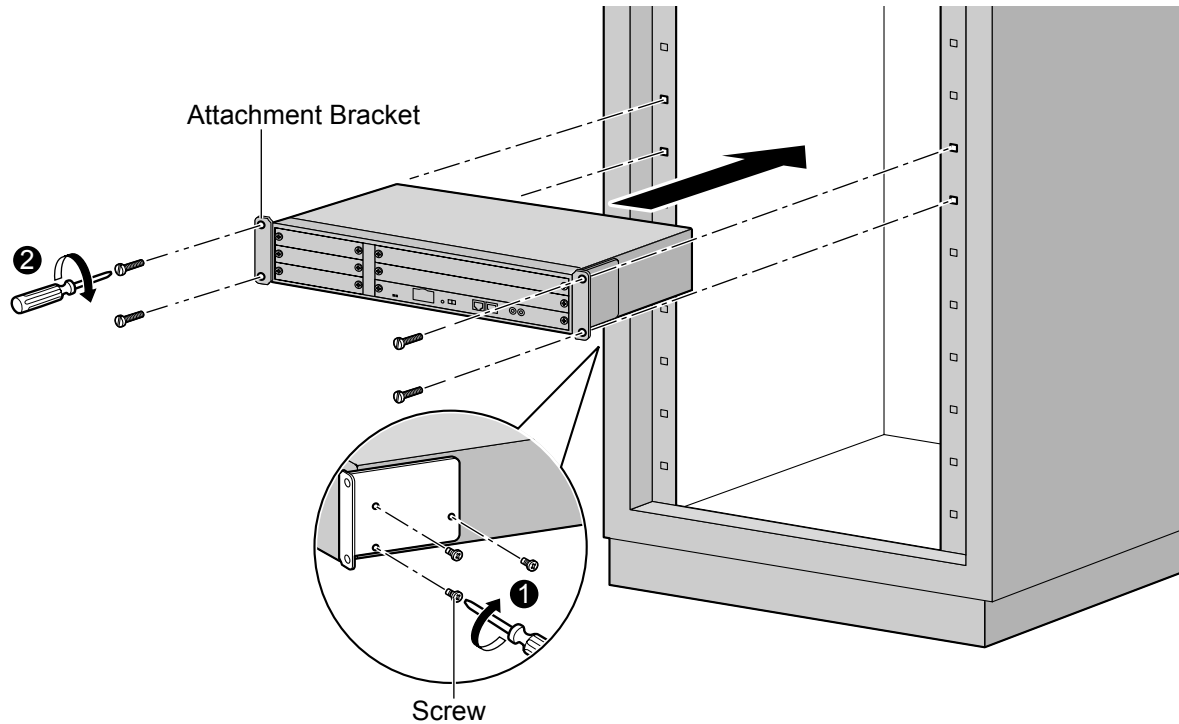
## 3.2.7 19-inch Rack Mounting

### **WARNING**

- Be careful not to drop any components. Dropping components may damage them or cause an injury.
- Only use the 19-inch rack mounting equipment (attachment bracket, screws) included with the PBX.

### **CAUTION**

- When the PBX is mounted on a 19-inch rack, make sure that the installation of the unit does not cause the temperature of the rack to exceed its limit.
  - If the PBX is not installed properly using the securing correct methods, the PBX may fall causing serious damage.
  - When this product is no longer in use, make sure to detach it from the rack.
1. Fix the attachment brackets to the left and right sides of the PBX with 3 screws. → ❶
  2. Place the PBX in the 19-inch rack and fix both attachment brackets to the rack with the rack's proprietary mounting equipment. → ❷



## 3.2.8 Floor Standing

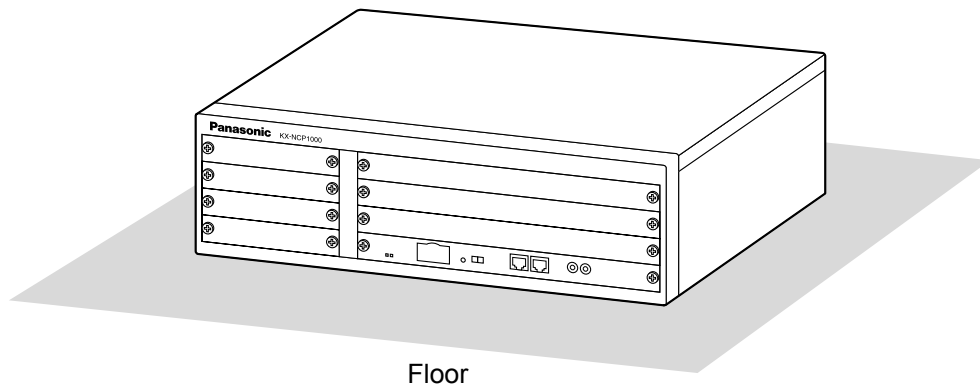
When installing the PBX on the floor, make sure to follow these instructions.

### **WARNING**

**Be careful not to drop any components. Dropping components may damage them or cause an injury.**

### **CAUTION**

- Make sure that the PBX is placed as indicated in the diagram below. Do not place it on its side or upside down.
- Do not block the openings of the PBX. Allow space of at least 20 cm above and 10 cm at the sides of the PBX.
- Make sure that the surface behind the PBX is flat and free of obstacles, so that the openings on the back of the PBX will not be blocked.
- Make sure that the surface behind the PBX is not made of wood.



## 3.2.9 Surge Protector Installation

### CAUTION

Performing surge protection is essential. Make sure to follow the instructions in this section.

### Overview

A massive electrical surge can be caused if lightning strikes a telephone cable 10 m above ground, or if a telephone line comes into contact with a power line. A surge protector is a device that is connected to a trunk to prevent potentially dangerous electrical surges from entering the building via the trunk and damaging the PBX and connected equipment.

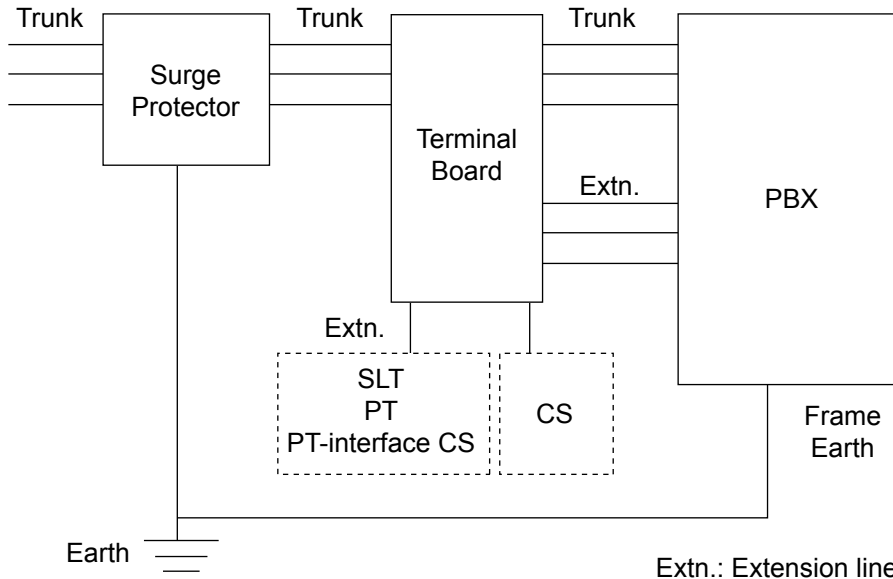
To protect the system from electrical surges, we strongly recommend connecting the system to a surge protector that meets the following specifications:

- Surge arrestor type: 3-electrode arrestor
- DC spark-over voltage: 230 V
- Maximum peak current: at least 10 kA

Additionally, proper earthing is very important for the protection of the system (refer to "3.2.3 Frame Earth Connection").

Many countries/areas have regulations requiring surge protection. Be sure to comply with all applicable laws, regulations, and guidelines.

### Installation







### 3.2.9 Surge Protector Installation

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1. Connect the earth rod to the surge protector using an earthing wire with a cross-sectional area of at least 1.3 mm<sup>2</sup>.
2. Bury the earth rod near the protector. The earthing wire should be as short as possible.
3. The earthing wire should run straight to the earth rod. Do not run the wire around other objects.
4. Bury the earth rod at least 50 cm underground.

#### **Note**

- The above figures are recommendations only.
- The length of earth rod and the required depth depend on the composition of the soil.

## 3.3 Information about the Main Processing Card

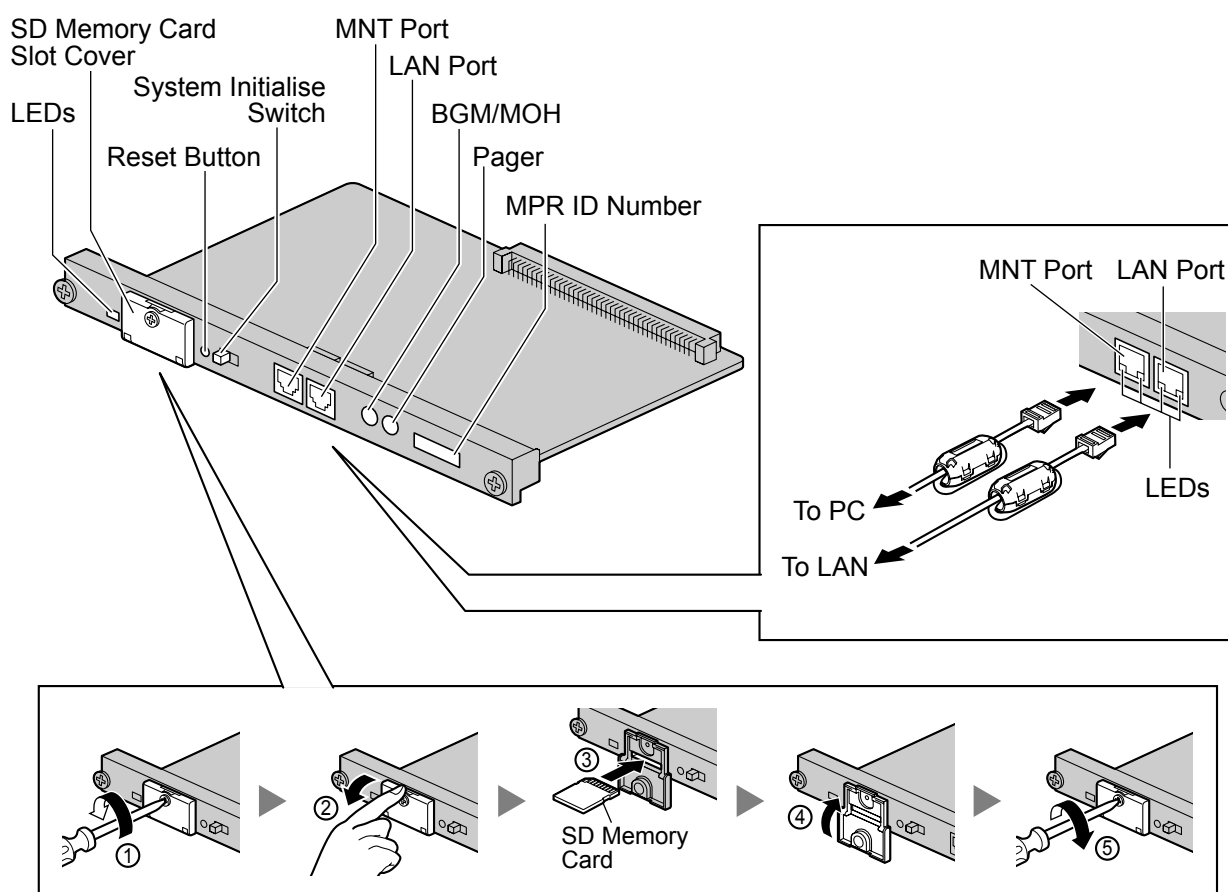
### 3.3.1 IPCMPR Card

#### Function

The IPCMPR card is the preinstalled main processing card with built-in ESVM card feature (2-channel). The Virtual Cards (trunk/extension) can be installed in Virtual Slots of the IPCMPR card and can be activated with the activation keys. Also, the IPCMPR supports LAN connection so that IP telephones (IP-PTs, IP softphones, SIP Extensions) and PCs can be connected on a private IP network.

#### Mountable Cards

- One of the DSP4, DSP16, or DSP64 cards (refer to "3.3.2 DSP4 Card (KX-NCP1104), DSP16 Card (KX-TDE0110), and DSP64 Card (KX-TDE0111)")
- RMT card (refer to "3.3.3 RMT Card (KX-TDA0196)")



#### Note

- Make sure to use the MNT port for PC connection, and the LAN port for LAN connection.
- The maximum length of the cable to be connected to the IPCMPR card is 100 m.
- When connecting the RJ45 connector, attach the ferrite core included with the PBX. Refer to "3.2.6 Attaching a Ferrite Core".
- For details about Virtual Slots, refer to "1.3.3 System Capacity".
- For details about the activation keys, refer to "2.1 Information about the Activation Keys".

### 3.3.1 IPCMPR Card

- For details about connecting to a LAN, refer to "3.11 LAN Connection"
- For details about connecting peripherals, refer to "3.10.1 Connection of Peripherals"
- For details about System Initialise Switch, refer to "3.13.1 Starting the PBX".
- For details about Reset Button, refer to "5.1.4 Using the Reset Button".
- Portions of this product contains software of Datalight, Inc. Copyright 1993–2000 Datalight, Inc., All Rights Reserved.

#### **WARNING**

**A lithium battery is used in the IPCMPR card. There is a risk of explosion if the battery is replaced with the incorrect type. Dispose of used batteries according to the manufacturer's instructions.**

#### **CAUTION**

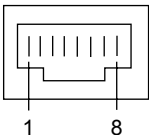
- The SD Memory Card contains software for all the processes of the PBX and all the customer data. It can be easily removed and taken away from the PBX by a third party. Therefore, do not allow unauthorised access to prevent data leakage.
- Do not remove the SD Memory Card while power is supplied to the PBX. Doing so may cause the PBX to fail to start when you try to restart the system.
- To prevent data leakage, render the SD Memory Card physically unusable before disposal.

#### **Notice**

- Use only the SD Memory Card included with the PBX.
- The SD Memory Card must be inserted in the SD Memory Card slot of the IPCMPR card before startup.

## Pin Assignments

### MNT Port/LAN Port (10BASE-T/100BASE-TX)

|   | No. | Signal Name | Input (I)/Output (O) | Function       |
|---|-----|-------------|----------------------|----------------|
|  | 1   | TPO+        | O                    | Transmit data+ |
|   | 2   | TPO-        | O                    | Transmit data- |
|   | 3   | TPI+        | I                    | Receive data+  |
|   | 4-5 | Reserved    | –                    | –              |
|   | 6   | TPI-        | I                    | Receive data-  |
|   | 7-8 | Reserved    | –                    | –              |

## LED Indications

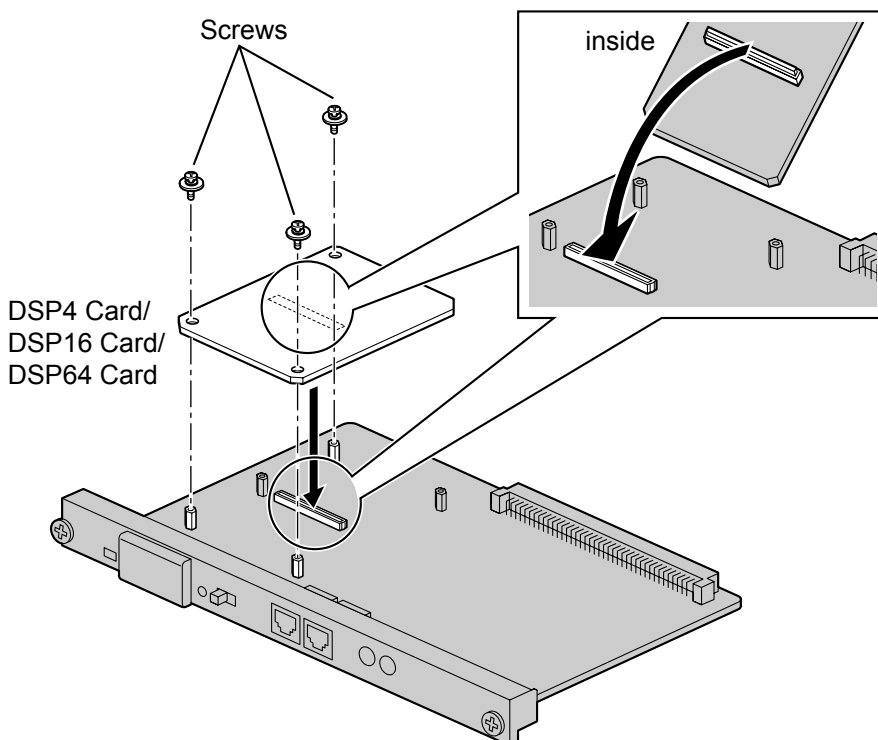
| Indication | Colour | Description  |
|------------|--------|--|
| BATT ALARM | Red    | Battery alarm indication <ul style="list-style-type: none"><li>• OFF: Normal</li><li>• ON: Alarm</li></ul> |
| SD ACCESS  | Green  | SD memory card status <ul style="list-style-type: none"><li>• ON: Accessing</li></ul>                      |

| Indication              |     |   |      | Colour | Description   |
|-------------------------|-----|---|------|--------|---|
| 10BASE-T/<br>100BASE-TX | MNT | 2 | LINK | Green  | Link status indication <ul style="list-style-type: none"> <li>• OFF: Off-line</li> <li>• ON: Linked normally</li> <li>• Flashing: In communication</li> </ul> |
|                         |     |   | 100  | Yellow | Data transmission speed indication <ul style="list-style-type: none"> <li>• OFF: 10 Mbps</li> <li>• ON: 100 Mbps</li> </ul>                                   |
|                         | LAN | 1 | LINK | Green  | Link status indication <ul style="list-style-type: none"> <li>• OFF: Off-line</li> <li>• ON: Linked normally</li> <li>• Flashing: In communication</li> </ul> |
|                         |     |   | 100  | Yellow | Data transmission speed indication <ul style="list-style-type: none"> <li>• OFF: 10 Mbps</li> <li>• ON: 100 Mbps</li> </ul>                                   |

## 3.3.2 DSP4 Card (KX-NCP1104), DSP16 Card (KX-TDE0110), and DSP64 Card (KX-TDE0111)

### Function

- DSP4:** 4-channel digital signal processor card with a 4-Channel IP Trunk activation key and an 8-Channel IP Proprietary Telephone activation key preinstalled. Compliant with ITU-T G.729A and G.711 codec methods. To be mounted on the IPCMPR card.
- DSP16:** 16-channel digital signal processor card with a 4-Channel IP Trunk activation key and an 8-Channel IP Proprietary Telephone activation key preinstalled. Compliant with ITU-T G.729A and G.711 codec methods. To be mounted on the IPCMPR card.
- DSP64:** 64-channel digital signal processor card with four 4-Channel IP Trunk activation keys and four 8-Channel IP Proprietary Telephone activation keys preinstalled. Compliant with ITU-T G.729A and G.711 codec methods. To be mounted on the IPCMPR card.



### Accessories and User-supplied Items

**Accessories (included):** Screws × 3

**User-supplied (not included):** none

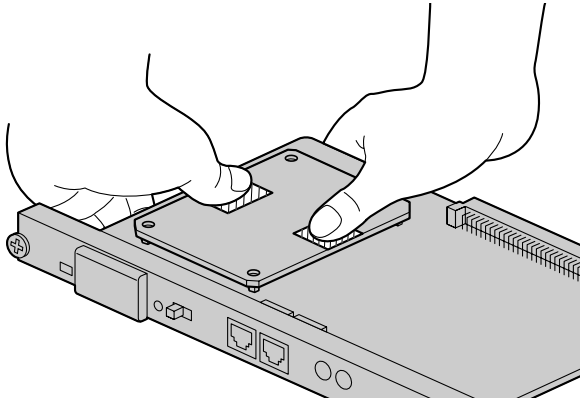
#### Note

- Depending on the number and the type of IP trunks and IP telephones you wish to use, required activation keys are determined, and the DSP4, DSP16, or DSP64 card is selected to be installed.
- If the preinstalled activation keys on the DSP cards are not enough for the desired configuration, you need to purchase activation key codes. For details about the activation keys, refer to "2.1 Information about the Activation Keys".

### 3.3.2 DSP4 Card (KX-NCP1104), DSP16 Card (KX-TDE0110), and DSP64 Card (KX-TDE0111)

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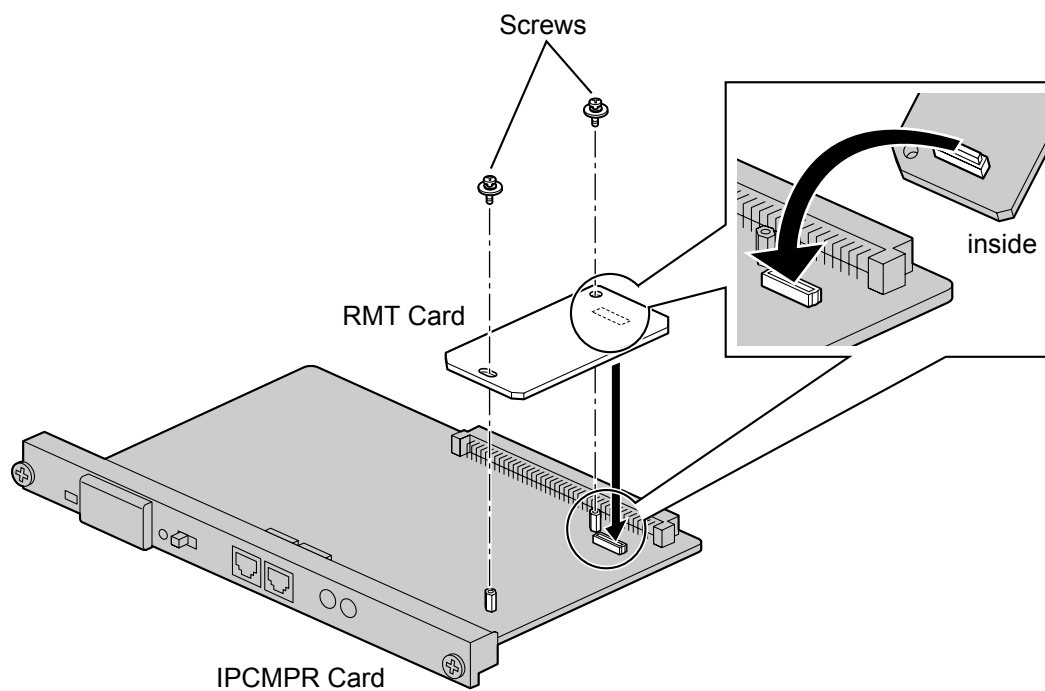
- When installing the DSP card, hold down the shaded areas of the card to connect it firmly.



## 3.3.3 RMT Card (KX-TDA0196)

### Function

Analogue modem card for remote communication with the PBX. ITU-T V.90 support. To be mounted on the IPCMPR card.



### Accessories and User-supplied Items

**Accessories (included):** Screws × 2

**User-supplied (not included):** none



## 3.4 Information about the Virtual Cards

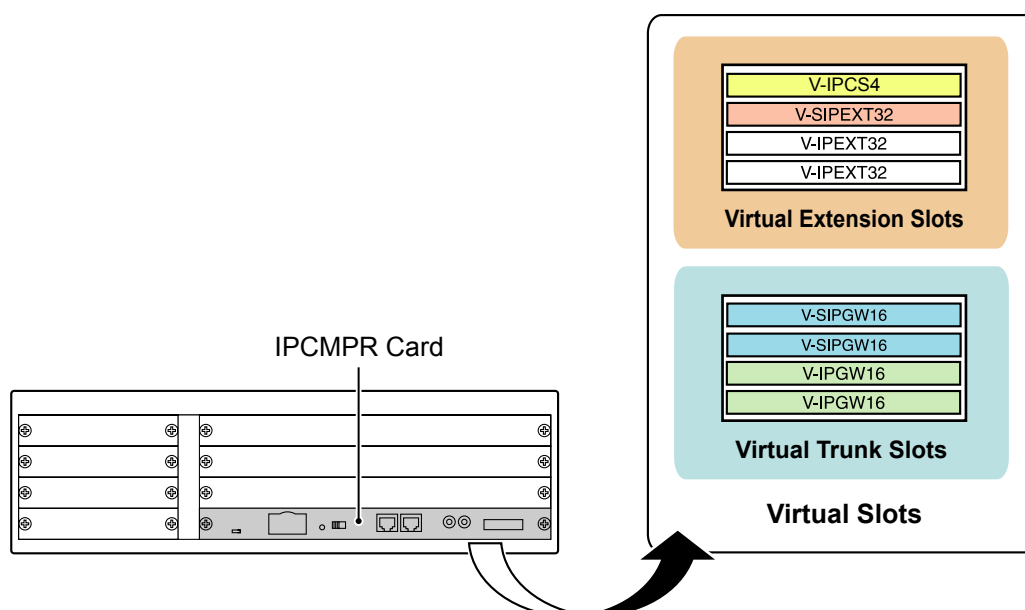
### 3.4.1 Virtual Cards

#### Function

Virtual Cards are included with the IPCMPR card and can be activated with the appropriate activation key (Only V-IPCS4 card can be activated without activation keys). By installing Virtual Cards in the Virtual Slots of the IPCMPR card using the Maintenance Console, IP trunks, IP extensions, and IP-CSs can be used via the IPCMPR card.

| Virtual Card                                       | Description   |
|--|---|
| Virtual 16-Channel VoIP Gateway Card (V-IPGW16)    | Virtual Card for 16-channel H.323 trunk. Compliant with VoIP H.323 V.5 protocol, and ITU-T G.729A and G.711 codec methods. Also supports T.38 protocol.                                 |
| Virtual 16-Channel SIP Trunk Card (V-SIPGW16)      | Virtual Card for 16-channel SIP trunk. Compliant with RFC 3261, 3262, 3264, 3311, 3581, 3960 and 4028 protocols, and ITU-T G.729A and G.711 codec methods. Also supports T.38 protocol. |
| Virtual 32-Channel VoIP Extension Card (V-IPEXT32) | Virtual Card for 32 VoIP extensions. Compliant with Panasonic proprietary protocol, and ITU-T G.729A, G.711 and G.722 codec methods.  |
| Virtual 32-Channel SIP Extension Card (V-SIPEXT32) | Virtual Card for 32 SIP Extensions. Compliant with RFC 3261, 3264, 3310, 2327, and 4028 protocols, and ITU-T G.729A, G.711 and G.722 codec methods.                                     |
| Virtual 4 IP Cell Station Interface Card (V-IPCS4) | Virtual Card for 4 IP-CSs. Compliant with ITU-T G.729A and G.711 codec methods.   |

#### Example: Virtual Cards in the Virtual Slots of the KX-NCP1000

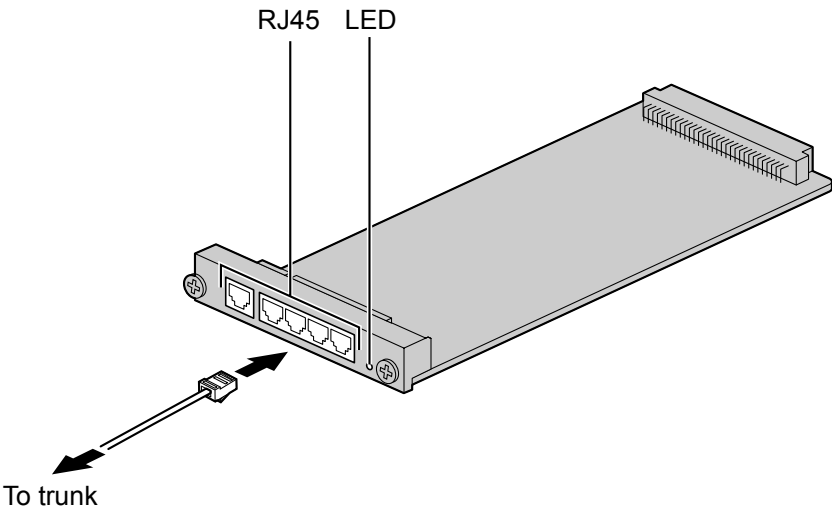


## 3.5 Information about the Physical Trunk Cards

### 3.5.1 LCOT4 Card (KX-NCP1180)

#### Function

4-port analogue trunk card with Caller ID (FSK/DTMF) and 1 power failure transfer (PFT) port.



#### Accessories and User-supplied Items

**Accessories (included):** none

**User-supplied (not included):** RJ45 connector

#### Note

- For details about power failure transfer, refer to "3.12.1 Power Failure Connections".
- To confirm the trunk connection, refer to "Confirming the Trunk Connection" in "3.13.1 Starting the PBX".

## Pin Assignments

### RJ45 Connector

|  | No. | Signal Name | Function |
|--|-----|-------------|----------|
|  | 1-3 | Reserved    | —        |
|  | 4   | R           | Ring     |
|  | 5   | T           | Tip      |
|  | 6-8 | Reserved    | —        |

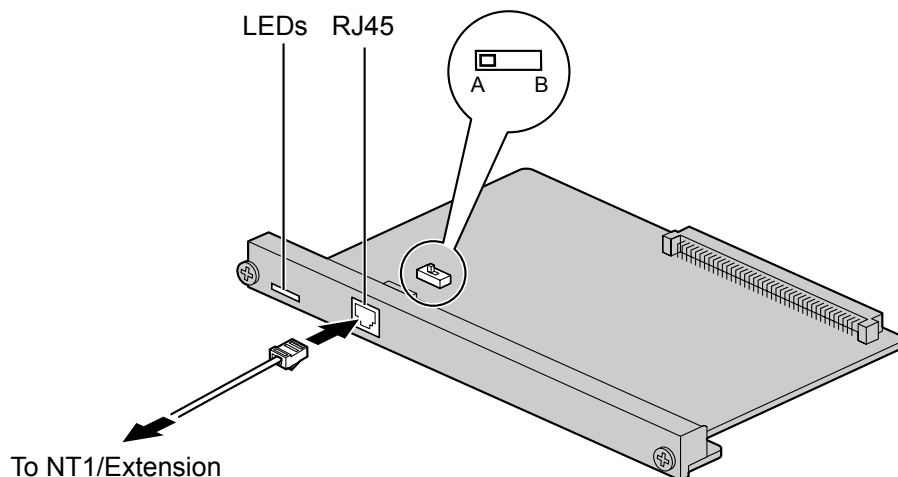
## LED Indications

| Indication  | Colour    | Description   |
|-------------|-----------|---|
| CARD STATUS | Green/Red | Card status indication <ul style="list-style-type: none"><li>• OFF: Power Off</li><li>• Green ON: Normal (all ports are idle)</li><li>• Green Flashing (60 times per minute): Normal (a port is in use)</li><li>• Red ON: Fault (includes reset)</li><li>• Red Flashing (60 times per minute): Out of Service</li></ul> |

## 3.5.2 T1 Card (KX-NCP1187)

### Function

1-port T1 trunk card. EIA/TIA standard compliant.



### Accessories and User-supplied Items

**Accessories (included):** none

**User-supplied (not included):** RJ45 connector

### CAUTION

- When connecting this optional service card to the trunk, connect through NT1; do not connect to the trunk directly.
- T1 ports are SELV ports and should only be connected to SELV services.

### Note

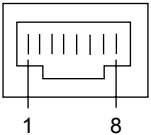
- This optional service card can be used for either trunk or extension connection, by setting the A/B switch or using the connector with appropriate pin assignments.
- To confirm the trunk connection, refer to "Confirming the Trunk Connection" in "3.13.1 Starting the PBX".

### Switch Settings

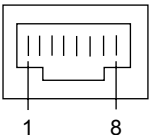
| Switch | Type  | Usage and Status Definition                          |
|--------|-------|--|
| A/B    | Slide | Select A (default) for trunk or B for extension use. |

## Pin Assignments

### RJ45 Connector for Trunk Use

|   | No. | Signal Name | Level [V] | Function          |
|---|-----|-------------|-----------|-------------------|
|  | 1   | RX+         | (+)       | Receive data (+)  |
|   | 2   | RX-         | (-)       | Receive data (-)  |
|   | 3   | Reserved    | –         | –                 |
|   | 4   | TX-         | (-)       | Transmit data (-) |
|   | 5   | TX+         | (+)       | Transmit data (+) |
|   | 6-8 | Reserved    | –         | –                 |

### RJ45 Connector for Extension Use

|  | No. | Signal Name | Level [V] | Function          |
|--|-----|-------------|-----------|-------------------|
|  | 1   | TX-         | (-)       | Transmit data (-) |
|  | 2   | TX+         | (+)       | Transmit data (+) |
|  | 3   | Reserved    | –         | –                 |
|  | 4   | RX+         | (+)       | Receive data (+)  |
|  | 5   | RX-         | (-)       | Receive data (-)  |
|  | 6-8 | Reserved    | –         | –                 |

## LED Indications

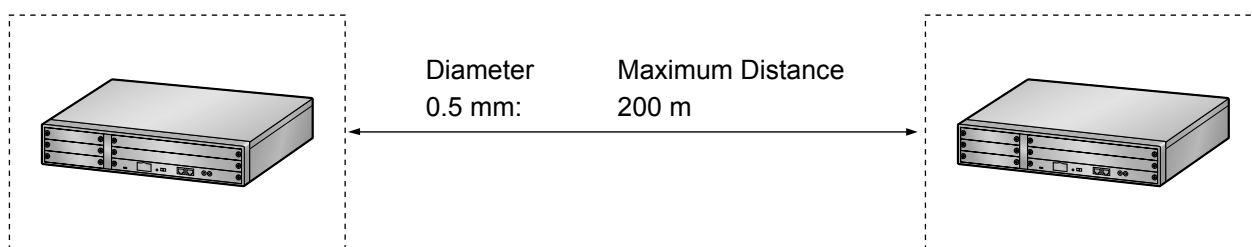
| Indication  | Colour    | Description   |
|-------------|-----------|---|
| CARD STATUS | Green/Red | Card status indication <ul style="list-style-type: none"> <li>• OFF: Power Off</li> <li>• Green ON: Normal (all ports are idle)</li> <li>• Green Flashing (60 times per minute): Normal (a port is in use)</li> <li>• Red ON: Fault (includes reset)</li> <li>• Red Flashing (60 times per minute): Out of Service</li> </ul> |
| SYNC-ERR    | Red       | Non-synchronisation status indication <ul style="list-style-type: none"> <li>• OFF: Normal</li> <li>• ON: Out of synchronisation</li> </ul>   |
| RAI         | Red       | RAI signal status indication <ul style="list-style-type: none"> <li>• OFF: Normal</li> <li>• ON: Alarm (Clock Slave)</li> <li>• Flashing (60 times per minute): Alarm (Clock Master)</li> </ul>   |
| AIS         | Red       | AIS status indication <ul style="list-style-type: none"> <li>• OFF: Normal</li> <li>• ON: Alarm</li> </ul>  |

### 3.5.2 T1 Card (KX-NCP1187)

| Indication | Colour | Description  |
|------------|--------|--|
| SYNC       | Green  | Synchronisation status indication <ul style="list-style-type: none"><li>• OFF: Not synchronised</li><li>• ON: Synchronised</li><li>• Flashing (60 times per minute): Synchronised (Clock Master)</li></ul> |

## Maximum Cabling Distance of Extension Connection

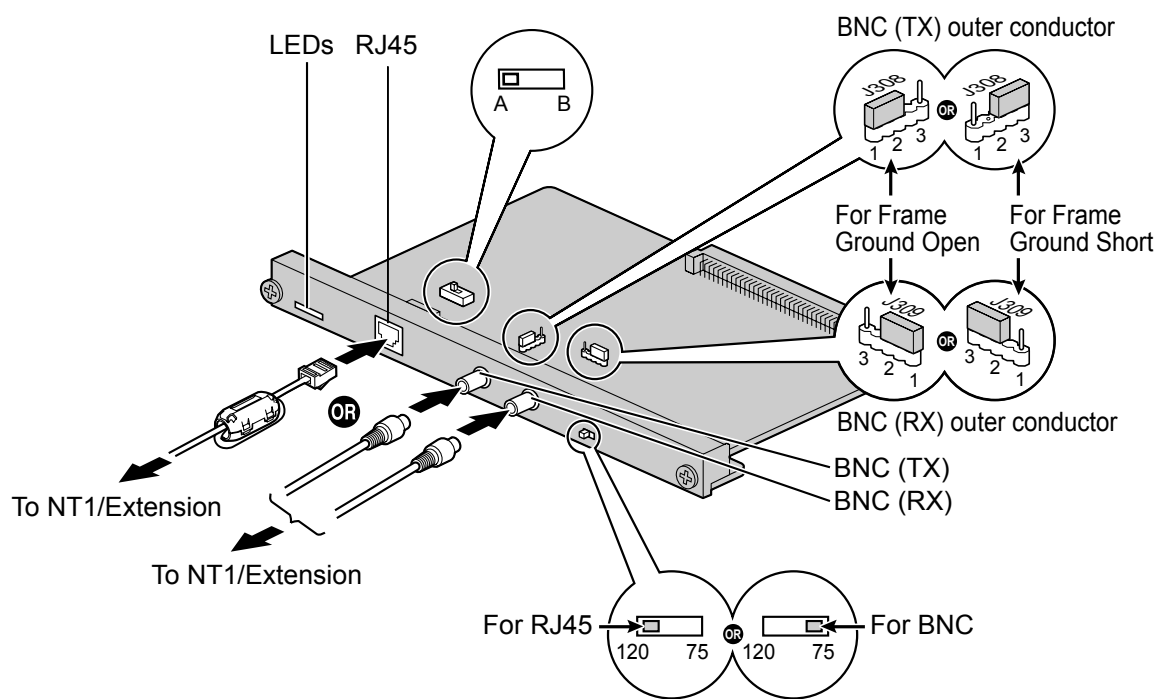
The maximum length of the extension cable that connects the T1 cards is shown below:



### 3.5.3 E1 Card (KX-NCP1188)

#### Function

1-port E1 trunk card. ITU-T standard compliant.



#### Accessories and User-supplied Items

**Accessories (included):** Ferrite core × 1

**User-supplied (not included):** RJ45 or BNC connector

#### CAUTION

- When connecting this optional service card to the trunk, connect through NT1; do not connect to the trunk directly.
- E1 ports are SELV ports and should only be connected to SELV services.

#### Notice

When connecting the RJ45 connector, attach the included ferrite core. Refer to "3.2.6 Attaching a Ferrite Core".

#### Note

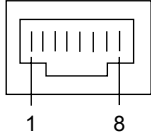
- In some countries/areas, this optional service card must not be connected to the Public Switched Telephone Network.
- Use only 1 type of connector (RJ45 or BNC) for connection; RJ45 and BNC cannot be used simultaneously.
- This optional service card can be used for either trunk or extension connection, by setting the A/B switch or using the connector with appropriate pin assignments.
- To confirm the trunk connection, refer to "Confirming the Trunk Connection" in "3.13.1 Starting the PBX".

## Switch Settings

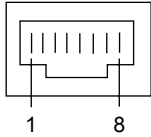
| Switch             | Type      | Usage and Status Definition  |
|--------------------|-----------|--|
| Termination        | Slide     | Select 120 $\Omega$ (default) or 75 $\Omega$ to match the connector type to be used.   |
| A/B                | Slide     | When using an RJ45 connector, select A (default) for trunk or B for extension use.<br>When using BNC connectors, make sure that A is selected.               |
| Frame Ground Short | Short pin | J308 is for BNC (TX) outer conductor, and J309 is for BNC (RX) outer conductor.<br><br>Connection of 1 and 2: Open (default)<br>Connection of 2 and 3: Short |

## Pin Assignments


### RJ45 Connector for Trunk Use

|   | No. | Signal Name | Level [V] | Function          |
|---|-----|-------------|-----------|-------------------|
|  | 1   | RX+         | (+)       | Receive data (+)  |
|   | 2   | RX-         | (-)       | Receive data (-)  |
|   | 3   | Reserved    | —         | —                 |
|   | 4   | TX-         | (-)       | Transmit data (-) |
|   | 5   | TX+         | (+)       | Transmit data (+) |
|   | 6-8 | Reserved    | —         | —                 |

### RJ45 Connector for Extension use

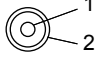
|   | No. | Signal Name | Level [V] | Function          |
|---|-----|-------------|-----------|-------------------|
|  | 1   | TX-         | (-)       | Transmit data (-) |
|   | 2   | TX+         | (+)       | Transmit data (+) |
|   | 3   | Reserved    | —         | —                 |
|   | 4   | RX+         | (+)       | Receive data (+)  |
|   | 5   | RX-         | (-)       | Receive data (-)  |
|   | 6-8 | Reserved    | —         | —                 |

### BNC (coaxial) Connector (TX)

|   | No. | Signal Name | Level [V] | Function          |
|---|-----|-------------|-----------|-------------------|
|  | 1   | TX+         | (+)       | Transmit data (+) |
|   | 2   | TX-         | (-)       | Transmit data (-) |



**BNC (coaxial) Connector (RX)**

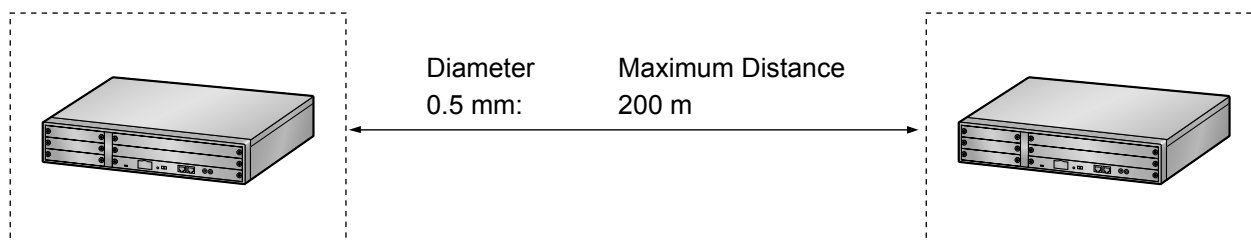
|   | No. | Signal Name | Level [V] | Function         |
|---|-----|-------------|-----------|------------------|
|  | 1   | RX-         | (-)       | Receive data (-) |
|   | 2   | RX+         | (+)       | Receive data (+) |

**LED Indications**

| Indication  | Colour    | Description   |
|-------------|-----------|---|
| CARD STATUS | Green/Red | Card status indication <ul style="list-style-type: none"> <li>• OFF: Power Off</li> <li>• Green ON: Normal (all ports are idle)</li> <li>• Green Flashing (60 times per minute): Normal (a port is in use)</li> <li>• Red ON: Fault (includes reset)</li> <li>• Red Flashing (60 times per minute): Out of Service</li> </ul> |
| SYNC-ERR    | Red       | Non-synchronisation status indication <ul style="list-style-type: none"> <li>• OFF: Normal</li> <li>• ON: Out of synchronisation</li> </ul>   |
| RAI         | Red       | RAI signal status indication <ul style="list-style-type: none"> <li>• OFF: Normal</li> <li>• ON: Alarm (Clock Slave)</li> <li>• Flashing (60 times per minute): Alarm (Clock Master)</li> </ul>   |
| AIS         | Red       | AIS status indication <ul style="list-style-type: none"> <li>• OFF: Normal</li> <li>• ON: Alarm</li> </ul>  |
| SYNC        | Green     | Synchronisation status indication <ul style="list-style-type: none"> <li>• OFF: Not synchronised</li> <li>• ON: Synchronised</li> <li>• Flashing (60 times per minute): Synchronised (Clock Master)</li> </ul>  |

**Maximum Cabling Distance of Extension Connection**

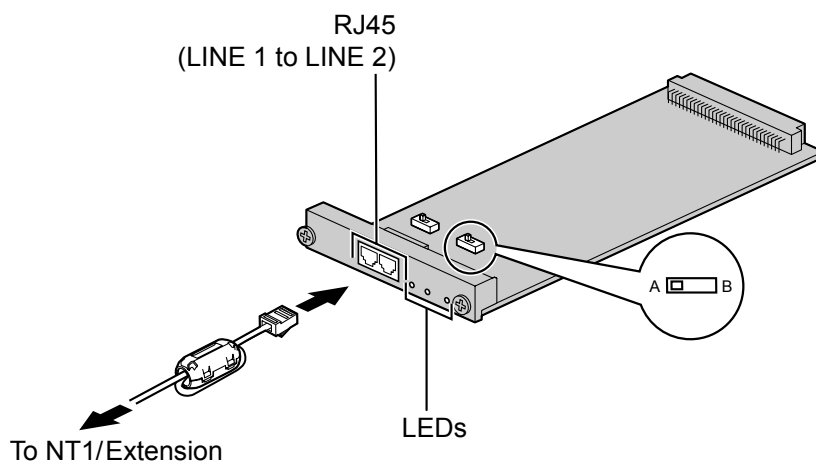
The maximum length of the extension cable that connects the E1 cards is shown below:



## 3.5.4 BRI2 Card (KX-NCP1280)

### Function

2-port ISDN Basic Rate Interface card. EURO-ISDN/ETSI compliant.



### Accessories and User-supplied Items

**Accessories (included):** Ferrite core × 1

**User-supplied (not included):** RJ45 connector

### CAUTION

- If the connected ISDN terminal has no external power source, make sure that the power is supplied from the BRI2 card by programming the PBX accordingly. However, if there is an external power source to the terminal, make sure that there is no power supplied to the terminal from the BRI2 card. Failure to do so may cause damage to the power supply circuit of the BRI2 card or the terminal.
- When connecting this optional service card to the trunk, connect through an NT1; do not connect to the U interface of the trunk directly.

### Notice

When connecting the RJ45 connector, attach the included ferrite core. Refer to "3.2.6 Attaching a Ferrite Core".

### Note

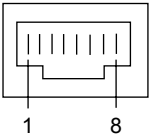
- This optional service card has 100  $\Omega$  of terminal resistance. For use in point to multi-point connection, the card must be placed at the end of the bus.
- This optional service card can be used for either trunk or extension connection, by setting the A/B switch or using the connector with appropriate pin assignments.
- To confirm the trunk connection, refer to "Confirming the Trunk Connection" in "3.13.1 Starting the PBX".

## Switch Settings

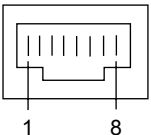
| Switch | Type  | Usage and Status Definition                          |
|--------|-------|--|
| A/B    | Slide | Select A (default) for trunk or B for extension use. |

## Pin Assignments

### RJ45 Connector for Trunk Use

|   | No. | Signal Name | Level [V] | Function        |
|---|-----|-------------|-----------|-----------------|
|  | 1-2 | Reserved    | –         | –               |
|   | 3   | TX1         | (+)       | Transmit data 1 |
|   | 4   | RX2         | (+)       | Receive data 2  |
|   | 5   | RX1         | (-)       | Receive data 1  |
|   | 6   | TX2         | (-)       | Transmit data 2 |
|   | 7-8 | Reserved    | –         | –               |

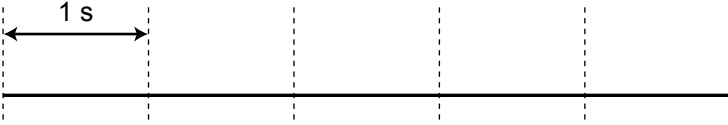
### RJ45 Connector for Extension Use

|  | No. | Signal Name | Level [V] | Function        |
|--|-----|-------------|-----------|-----------------|
|  | 1-2 | Reserved    | –         | –               |
|  | 3   | RX2         | (+)       | Receive data 2  |
|  | 4   | TX1         | (+)       | Transmit data 1 |
|  | 5   | TX2         | (-)       | Transmit data 2 |
|  | 6   | RX1         | (-)       | Receive data 1  |
|  | 7-8 | Reserved    | –         | –               |

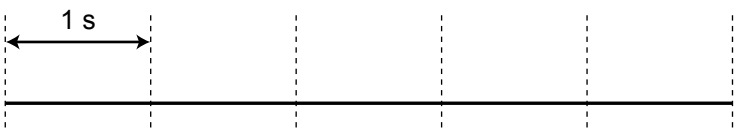


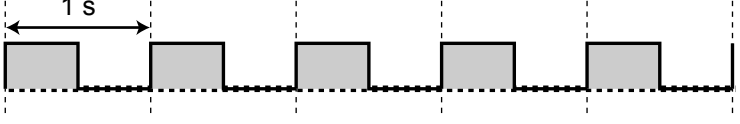
## LED Indications

| Indication       | Colour    | Description   |
|------------------|-----------|---|
| CARD STATUS      | Green/Red | Card status indication <ul style="list-style-type: none"> <li>• OFF: Power Off</li> <li>• Green ON: Normal (all ports are idle)</li> <li>• Green Flashing (60 times per minute): Normal (a port is in use)</li> <li>• Red ON: Fault (includes reset)</li> <li>• Red Flashing (60 times per minute): Out of Service</li> </ul> |
| LINE 2<br>LINE 1 | Green     | Line status indication (LINE 1 and LINE 2):<br>Refer to "LINE LED Pattern" below for details.   |

### LINE LED Pattern

| Layer 1 | Layer 2 | Master Clock | LED Pattern  |
|---------|---------|--------------|--|
| OFF     | OFF     | OFF          |  |

### 3.5.4 BRI2 Card (KX-NCP1280)

| Layer 1 | Layer 2 | Master Clock | LED Pattern  |
|---------|---------|--------------|--|
| ON      | OFF     | OFF          |  |
| ON      | ON      | OFF          |  |
| ON      | OFF     | ON           |  |
| ON      | ON      | ON           |  |

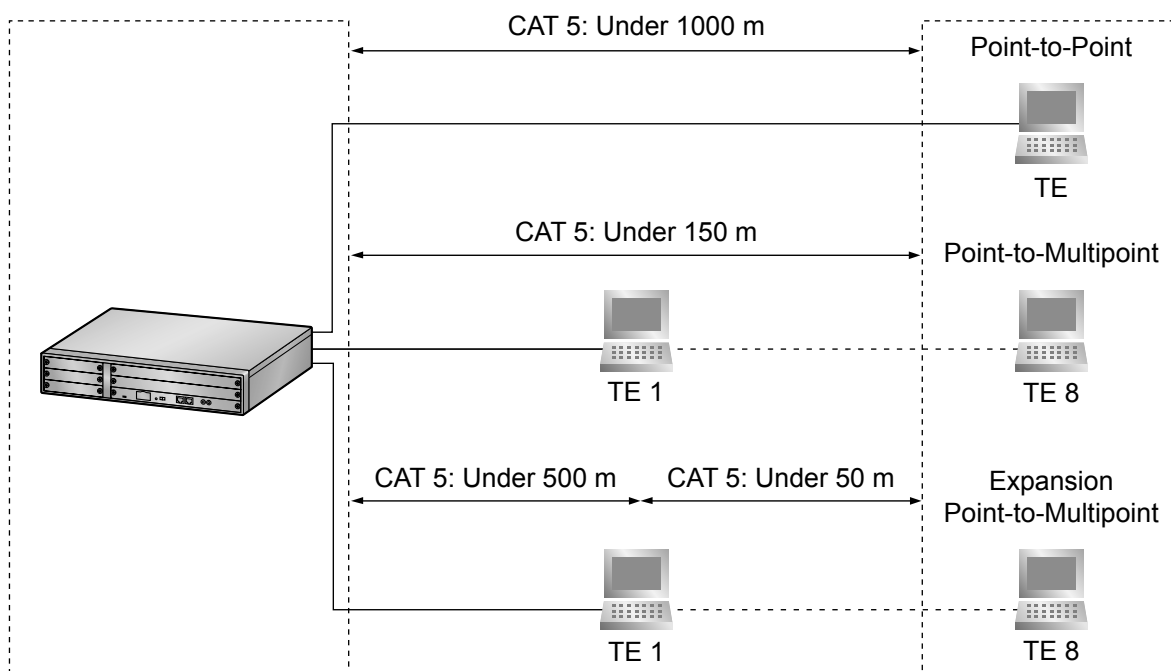
Layer 1: ON (Synchronous)

Layer 2: ON (Link established)/OFF (Link not established)

Master Clock: ON (Master)/OFF (Slave)

## Maximum Cabling Distance of S0 Bus Connection

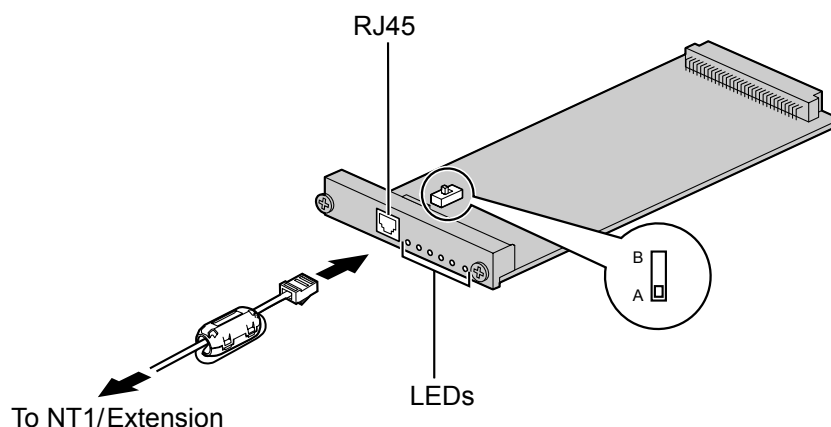
The maximum length of the extension cable that connects the PBX and the ISDN terminal equipment (TE) is shown below:



## 3.5.5 PRI30 Card (KX-NCP1290CE/KX-NCP1290CJ/KX-NCP1290CN)

### Function

1-port ISDN Primary Rate Interface card (30B channels). EURO-ISDN/ETSI compliant.



### Accessories and User-supplied Items

**Accessories (included):** Ferrite core × 1

**User-supplied (not included):** RJ45 connector

### CAUTION

- When connecting this optional service card to the trunk, connect through an NT1; do not connect to the U interface of the trunk directly.
- PRI ports are SELV ports and should only be connected to SELV services.

### Notice

When connecting the RJ45 connector, attach the included ferrite core. Refer to "3.2.6 Attaching a Ferrite Core".

### Note

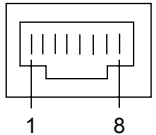
- In some countries/areas, this optional service card must not be connected to the Public Switched Telephone Network.
- This optional service card can be used for either trunk or extension connection, by setting the A/B switch or using the connector with appropriate pin assignments.
- To confirm the trunk connection, refer to "Confirming the Trunk Connection" in "3.13.1 Starting the PBX".

## Switch Settings

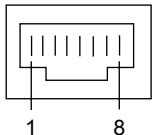
| Switch | Type  | Usage and Status Definition                          |
|--------|-------|--|
| A/B    | Slide | Select A (default) for trunk or B for extension use. |

## Pin Assignments

### RJ45 Connector for Trunk Use

|   | No. | Signal Name | Level [V] | Function          |
|---|-----|-------------|-----------|-------------------|
|  | 1   | RX+         | (+)       | Receive data (+)  |
|   | 2   | RX-         | (-)       | Receive data (-)  |
|   | 3   | Reserved    | —         | —                 |
|   | 4   | TX-         | (-)       | Transmit data (-) |
|   | 5   | TX+         | (+)       | Transmit data (+) |
|   | 6-8 | Reserved    | —         | —                 |

### RJ45 Connector for Extension Use

|  | No. | Signal Name | Level [V] | Function          |
|--|-----|-------------|-----------|-------------------|
|  | 1   | TX-         | (-)       | Transmit data (-) |
|  | 2   | TX+         | (+)       | Transmit data (+) |
|  | 3   | Reserved    | —         | —                 |
|  | 4   | RX+         | (+)       | Receive data (+)  |
|  | 5   | RX-         | (-)       | Receive data (-)  |
|  | 6-8 | Reserved    | —         | —                 |

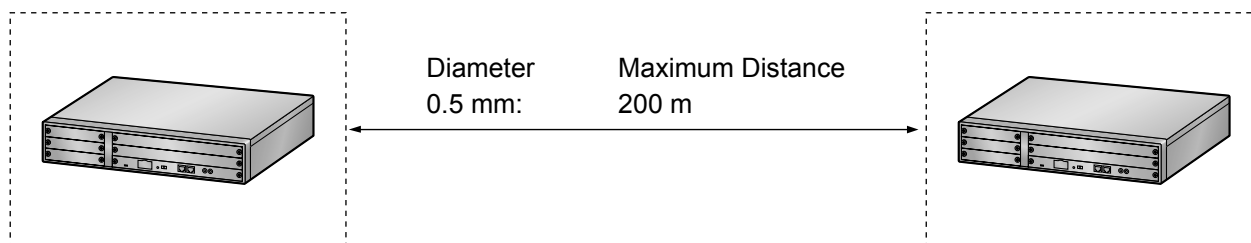
## LED Indications

| Indication  | Colour    | Description   |
|-------------|-----------|---|
| CARD STATUS | Green/Red | Card status indication <ul style="list-style-type: none"> <li>OFF: Power Off</li> <li>Green ON: Normal (all ports are idle)</li> <li>Green Flashing (60 times per minute): Normal (a port is in use)</li> <li>Red ON: Fault (includes reset)</li> <li>Red Flashing (60 times per minute): Out of Service</li> </ul> |
| SYNC-ERR    | Red       | Non-synchronisation status indication <ul style="list-style-type: none"> <li>OFF: Normal</li> <li>ON: Out of synchronisation</li> </ul>   |
| RAI         | Red       | RAI signal status indication <ul style="list-style-type: none"> <li>OFF: Normal</li> <li>ON: Alarm (Clock Slave)</li> <li>Flashing (60 times per minute): Alarm (Clock Master)</li> </ul>   |
| AIS         | Red       | AIS status indication <ul style="list-style-type: none"> <li>OFF: Normal</li> <li>ON: Alarm</li> </ul>  |

| Indication | Colour | Description  |
|------------|--------|--|
| SYNC       | Green  | Synchronisation status indication <ul style="list-style-type: none"><li>• OFF: Not synchronised</li><li>• ON: Synchronised</li><li>• Flashing (60 times per minute): Synchronised (Clock Master)</li></ul> |
| D-LINK     | Green  | Data link status indication <ul style="list-style-type: none"><li>• OFF: Not established</li><li>• ON: Established</li></ul>   |

## Maximum Cabling Distance of Extension Connection

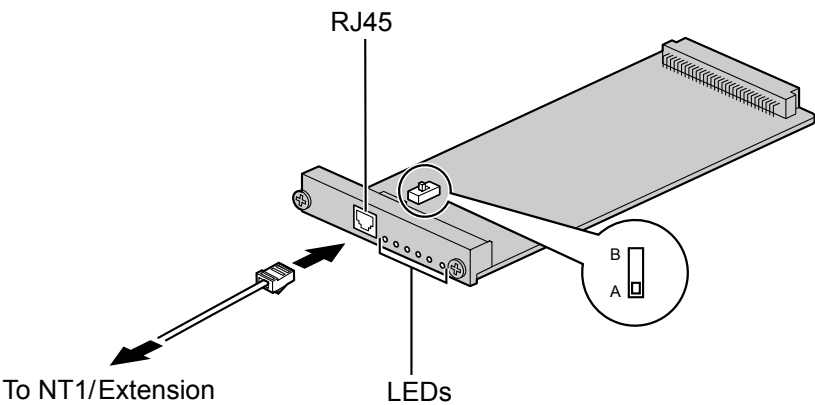
The maximum length of the extension cable that connects the PRI30 cards is shown below:



### 3.5.6 PRI23 Card (KX-NCP1290)

#### Function

1-port ISDN Primary Rate Interface card (23B channels). NI (North American standard ISDN protocol) compliant.



#### Accessories and User-supplied Items

**Accessories (included):** none

**User-supplied (not included):** RJ45 connector

#### CAUTION

- When connecting this optional service card to the trunk, connect through an NT1; do not connect to the U interface of the trunk directly.
- PRI ports are SELV ports and should only be connected to SELV services.

#### Note

- This optional service card can be used for either trunk or extension connection, by setting the A/B switch or using the connector with appropriate pin assignments.
- To confirm the trunk connection, refer to "Confirming the Trunk Connection" in "3.13.1 Starting the PBX".

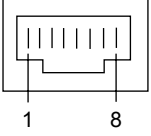
#### Switch Settings

| Switch | Type  | Usage and Status Definition                          |
|--------|-------|--|
| A/B    | Slide | Select A (default) for trunk or B for extension use. |

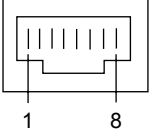


## Pin Assignments

### RJ45 Connector for Trunk Use

|   | No. | Signal Name | Level [V] | Function          |
|---|-----|-------------|-----------|-------------------|
|  | 1   | RX+         | (+)       | Receive data (+)  |
|   | 2   | RX-         | (-)       | Receive data (-)  |
|   | 3   | Reserved    | –         | –                 |
|   | 4   | TX-         | (-)       | Transmit data (-) |
|   | 5   | TX+         | (+)       | Transmit data (+) |
|   | 6-8 | Reserved    | –         | –                 |

### RJ45 Connector for Extension Use

|  | No. | Signal Name | Level [V] | Function          |
|--|-----|-------------|-----------|-------------------|
|  | 1   | TX-         | (-)       | Transmit data (-) |
|  | 2   | TX+         | (+)       | Transmit data (+) |
|  | 3   | Reserved    | –         | –                 |
|  | 4   | RX+         | (+)       | Receive data (+)  |
|  | 5   | RX-         | (-)       | Receive data (-)  |
|  | 6-8 | Reserved    | –         | –                 |

## LED Indications

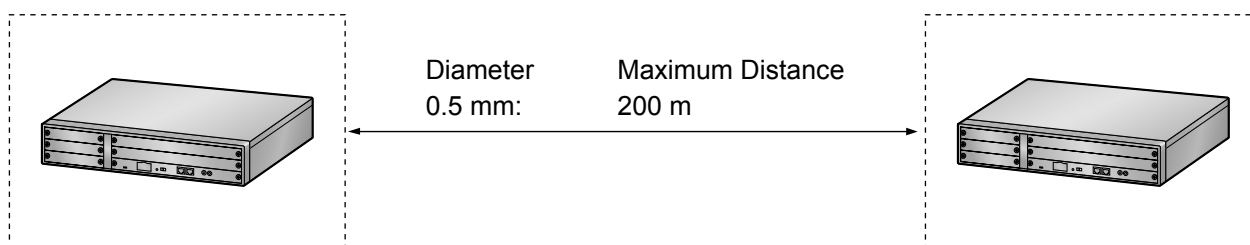
| Indication  | Colour    | Description   |
|-------------|-----------|---|
| CARD STATUS | Green/Red | Card status indication <ul style="list-style-type: none"> <li>• OFF: Power Off</li> <li>• Green ON: Normal (all ports are idle)</li> <li>• Green Flashing (60 times per minute): Normal (a port is in use)</li> <li>• Red ON: Fault (includes reset)</li> <li>• Red Flashing (60 times per minute): Out of Service</li> </ul> |
| SYNC-ERR    | Red       | Non-synchronisation status indication <ul style="list-style-type: none"> <li>• OFF: Normal</li> <li>• ON: Out of synchronisation</li> </ul>   |
| RAI         | Red       | RAI signal status indication <ul style="list-style-type: none"> <li>• OFF: Normal</li> <li>• ON: Alarm (Clock Slave)</li> <li>• Flashing (60 times per minute): Alarm (Clock Master)</li> </ul>   |
| AIS         | Red       | AIS status indication <ul style="list-style-type: none"> <li>• OFF: Normal</li> <li>• ON: Alarm</li> </ul>  |

### 3.5.6 PRI23 Card (KX-NCP1290)

| Indication | Colour | Description  |
|------------|--------|--|
| SYNC       | Green  | Synchronisation status indication <ul style="list-style-type: none"><li>• OFF: Not synchronised</li><li>• ON: Synchronised</li><li>• Flashing (60 times per minute): Synchronised (Clock Master)</li></ul> |
| D-LINK     | Green  | Data link status indication <ul style="list-style-type: none"><li>• OFF: Not established</li><li>• ON: Established</li></ul>   |

## Maximum Cabling Distance of Extension Connection

The maximum length of the extension cable that connects the PRI23 cards is shown below:

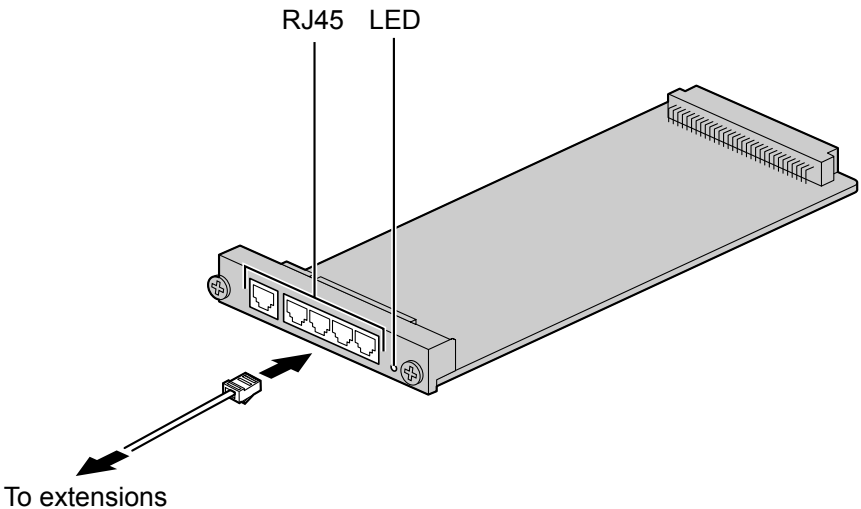


## 3.6 Information about the Physical Extension Cards

### 3.6.1 DHLC4 Card (KX-NCP1170)

#### Function

4-port digital hybrid extension card for DPTs, APTs, SLTs, DSS consoles, and PT-interface CSs, with Caller ID (FSK) and 1 power failure transfer (PFT) port.



#### Accessories and User-supplied Items

**Accessories (included):** none

**User-supplied (not included):** RJ45 connector

#### Note

For details about power failure transfer, refer to "3.12.1 Power Failure Connections".

#### Pin Assignments

##### RJ45 Connector

|  | No. | Signal Name | Function         |
|--|-----|-------------|------------------|
|  | 1-2 | Reserved    | —                |
|  | 3   | D1          | Data port (High) |
|  | 4   | T           | Tip              |
|  | 5   | R           | Ring             |
|  | 6   | D2          | Data port (Low)  |
|  | 7-8 | Reserved    | —                |

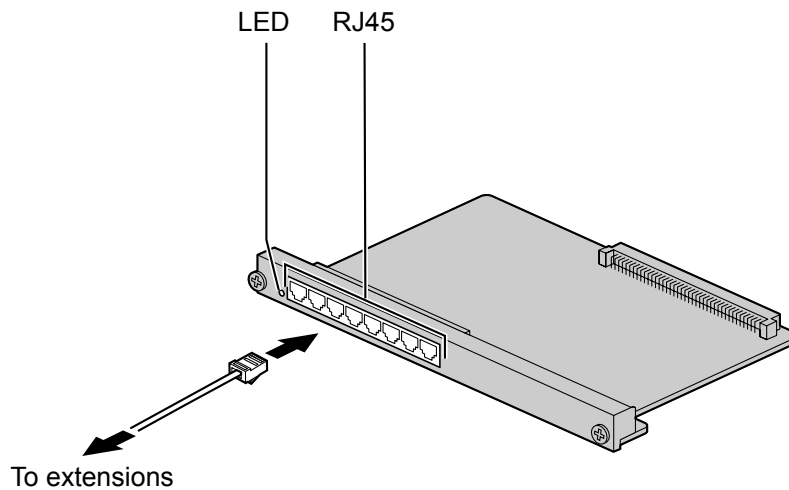
## LED Indications

| Indication  | Colour               | Description   |
|-------------|----------------------|---|
| CARD STATUS | Green/<br>Orange/Red | Card status indication <ul style="list-style-type: none"><li>• OFF: Power Off</li><li>• Green ON: Normal (all ports are idle)</li><li>• Green Flashing (60 times per minute): Normal (a port is in use)</li><li>• Orange Flashing: Detection of PT-interface CS connection (when starting up the PT-interface CS)</li><li>• Red ON: Fault (includes reset)</li><li>• Red Flashing (60 times per minute): Out of Service</li></ul> |

## 3.6.2 DLC8 Card (KX-NCP1171)

### Function

8-port digital extension card for DPTs, DSS consoles, and PT-interface CSs.



### Accessories and User-supplied Items

**Accessories (included):** none

**User-supplied (not included):** RJ45 connector

### Pin Assignments

#### RJ45 Connector

|  | No. | Signal Name | Function         |
|--|-----|-------------|------------------|
|  | 1-2 | Reserved    | —                |
|  | 3   | D1          | Data port (High) |
|  | 4-5 | Reserved    | —                |
|  | 6   | D2          | Data port (Low)  |
|  | 7-8 | Reserved    | —                |

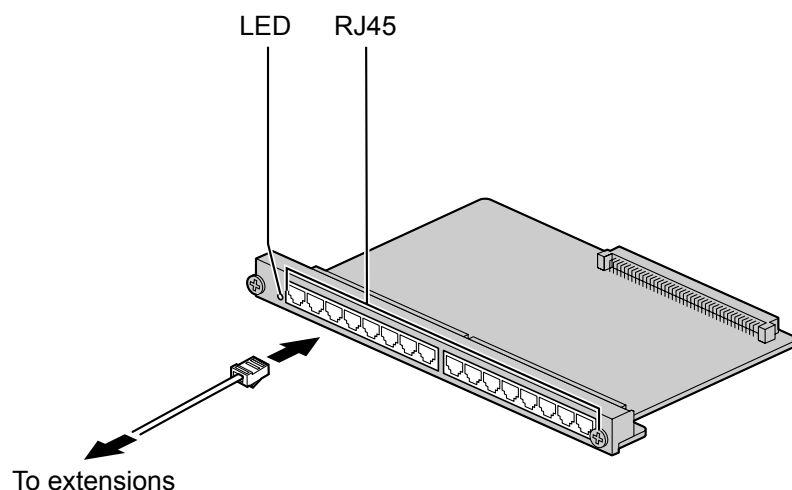
### LED Indications

| Indication  | Colour               | Description  |
|-------------|----------------------|--|
| CARD STATUS | Green/<br>Orange/Red | Card status indication <ul style="list-style-type: none"> <li>• OFF: Power Off</li> <li>• Green ON: Normal (all ports are idle)</li> <li>• Green Flashing (60 times per minute): Normal (a port is in use)</li> <li>• Orange Flashing: Detection of PT-interface CS connection (when starting up the PT-interface CS)</li> <li>• Red ON: Fault (includes reset)</li> <li>• Red Flashing (60 times per minute): Out of Service</li> </ul> |

### 3.6.3 DLC16 Card (KX-NCP1172)

#### Function

16-port digital extension card for DPTs, DSS consoles, and PT-interface CSs.



#### Accessories and User-supplied Items

**Accessories (included):** none

**User-supplied (not included):** RJ45 connector

#### Pin Assignments

##### RJ45 Connector

|  | No. | Signal Name | Function         |
|--|-----|-------------|------------------|
|  | 1-2 | Reserved    | —                |
|  | 3   | D1          | Data port (High) |
|  | 4-5 | Reserved    | —                |
|  | 6   | D2          | Data port (Low)  |
|  | 7-8 | Reserved    | —                |

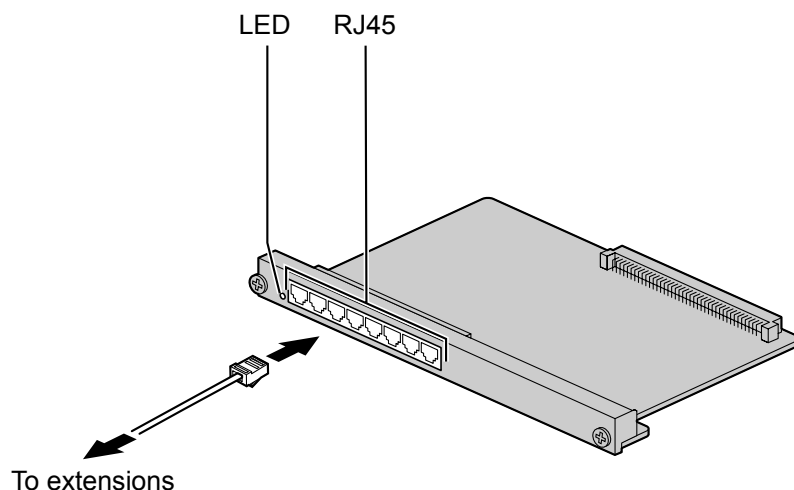
#### LED Indications

| Indication  | Colour               | Description  |
|-------------|----------------------|--|
| CARD STATUS | Green/<br>Orange/Red | Card status indication <ul style="list-style-type: none"> <li>• OFF: Power Off</li> <li>• Green ON: Normal (all ports are idle)</li> <li>• Green Flashing (60 times per minute): Normal (a port is in use)</li> <li>• Orange Flashing: Detection of PT-interface CS connection (when starting up the PT-interface CS)</li> <li>• Red ON: Fault (includes reset)</li> <li>• Red Flashing (60 times per minute): Out of Service</li> </ul> |

## 3.6.4 SLC8 Card (KX-NCP1173)

### Function

8-port extension card for SLTs with Caller ID (FSK).



### Accessories and User-supplied Items

**Accessories (included):** none

**User-supplied (not included):** RJ45 connector

### Pin Assignments

#### RJ45 Connector

|  | No. | Signal Name | Function |
|--|-----|-------------|----------|
|  | 1-3 | Reserved    | —        |
|  | 4   | T           | Tip      |
|  | 5   | R           | Ring     |
|  | 6-8 | Reserved    | —        |

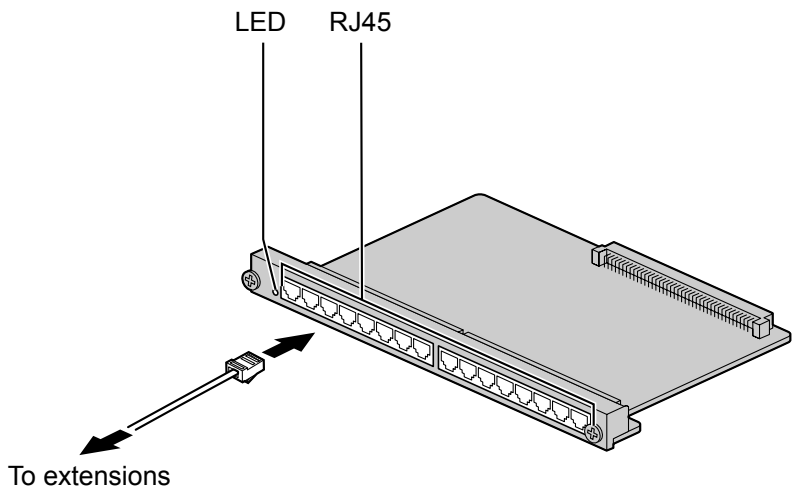
### LED Indications

| Indication  | Colour    | Description   |
|-------------|-----------|---|
| CARD STATUS | Green/Red | Card status indication <ul style="list-style-type: none"> <li>• OFF: Power Off</li> <li>• Green ON: Normal (all ports are idle)</li> <li>• Green Flashing (60 times per minute): Normal (a port is in use)</li> <li>• Red ON: Fault (includes reset)</li> <li>• Red Flashing (60 times per minute): Out of Service</li> </ul> |

### 3.6.5 SLC16 Card (KX-NCP1174)

#### Function

16-port extension card for SLTs with Caller ID (FSK).



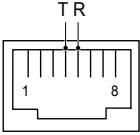
#### Accessories and User-supplied Items

**Accessories (included):** none

**User-supplied (not included):** RJ45 connector

#### Pin Assignments

##### RJ45 Connector

|   | No. | Signal Name | Function |
|---|-----|-------------|----------|
|  | 1-3 | Reserved    | —        |
|   | 4   | T           | Tip      |
|   | 5   | R           | Ring     |
|   | 6-8 | Reserved    | —        |

#### LED Indications

| Indication  | Colour    | Description   |
|-------------|-----------|---|
| CARD STATUS | Green/Red | Card status indication <ul style="list-style-type: none"><li>• OFF: Power Off</li><li>• Green ON: Normal (all ports are idle)</li><li>• Green Flashing (60 times per minute): Normal (a port is in use)</li><li>• Red ON: Fault (includes reset)</li><li>• Red Flashing (60 times per minute): Out of Service</li></ul> |



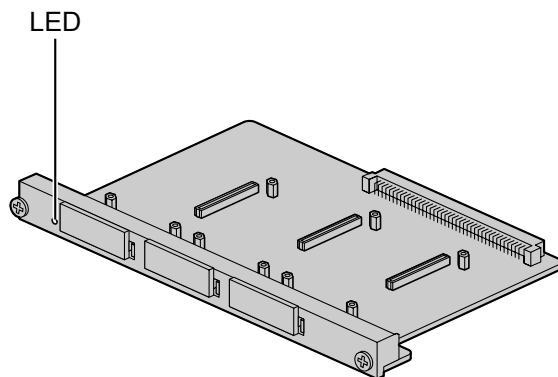
## 3.7 Information about the Other Physical Cards

### 3.7.1 OPB3 Card (KX-NCP1190)

#### Function

Optional 3-slot base card for mounting a maximum of 3 option cards from the following:

- DPH4 card
- DPH2 card
- EIO4 card
- ECHO16 card
- MSG4 card
- ESV4 card
- ESV2 card



#### Accessories and User-supplied Items

**Accessories (included):** none

**User-supplied (not included):** none

#### **WARNING**

A lithium battery is used in the OPB3 card. There is a risk of explosion if the battery is replaced with the incorrect type. Dispose of used batteries according to the manufacturer's instructions.

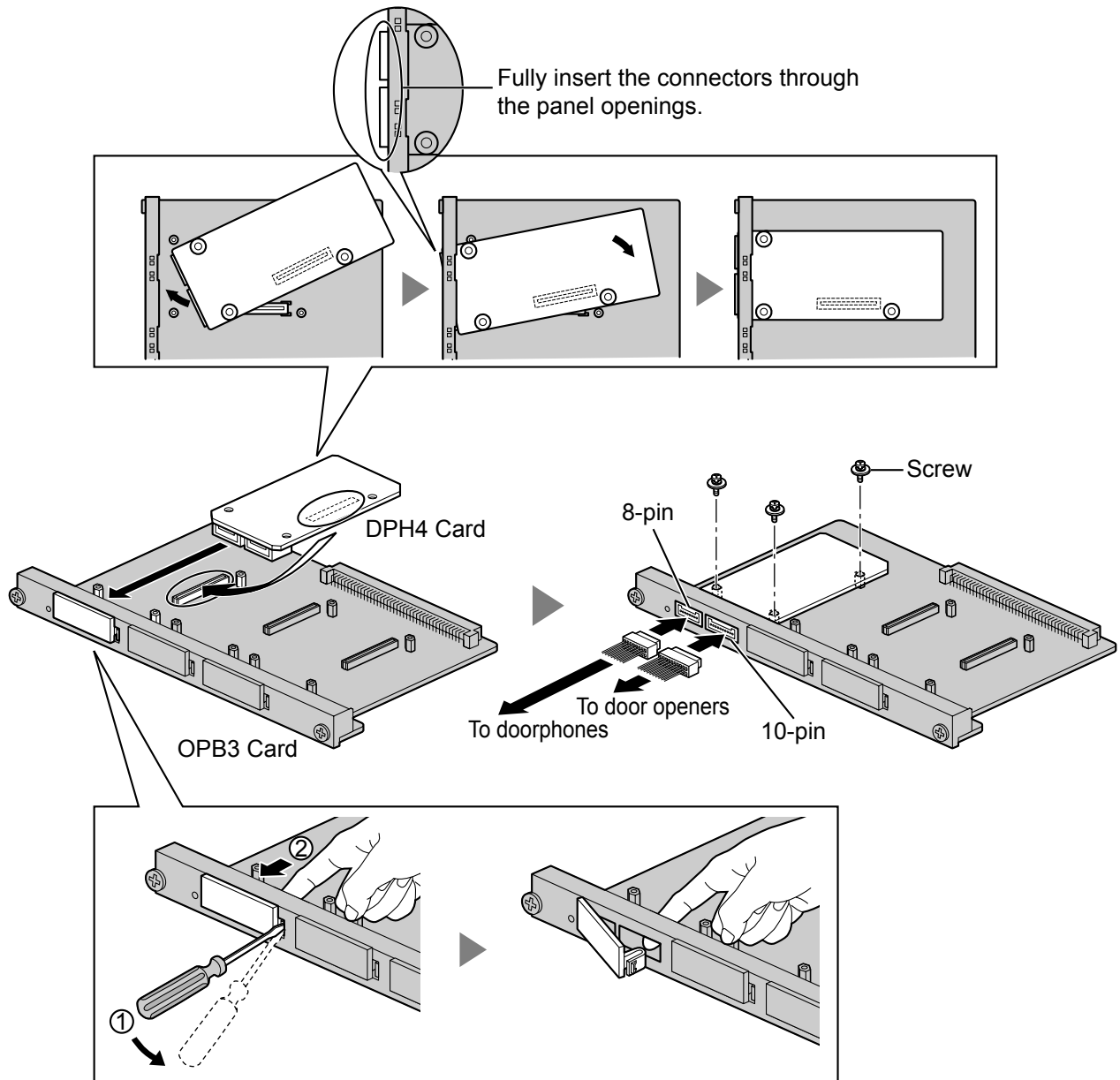
#### LED Indications

| Indication  | Colour    | Description   |
|-------------|-----------|---|
| CARD STATUS | Green/Red | Card status indication <ul style="list-style-type: none"> <li>• OFF: Power Off</li> <li>• Green ON: Normal (all ports are idle)</li> <li>• Green Flashing (60 times per minute): Normal (a port is in use)</li> <li>• Red ON: Fault (includes reset)</li> <li>• Red Flashing (60 times per minute): Out of Service</li> </ul> |

## 3.7.2 DPH4 Card (KX-TDA0161)

### Function

4-port doorphone card for 4 doorphones and 4 door openers. To be mounted on the OPB3 card.



### Accessories and User-supplied Items

**Accessories (included):** Screws × 3, 10-pin terminal block × 1, 8-pin terminal block × 1


**User-supplied (not included):** Copper wire

### Note


For details about connection to doorphones and door openers, refer to "3.9.1 Connection of Doorphones, Door Openers, External Sensors, and External Relays".

## Pin Assignments

### 8-pin Terminal Block

|   | No. | Signal Name | Function             |
|---|-----|-------------|----------------------|
|  | 1   | DP4         | Doorphone 4 transmit |
|   | 2   | com4        | Doorphone 4 receive  |
|   | 3   | DP3         | Doorphone 3 transmit |
|   | 4   | com3        | Doorphone 3 receive  |
|   | 5   | DP2         | Doorphone 2 transmit |
|   | 6   | com2        | Doorphone 2 receive  |
|   | 7   | DP1         | Doorphone 1 transmit |
|   | 8   | com1        | Doorphone 1 receive  |

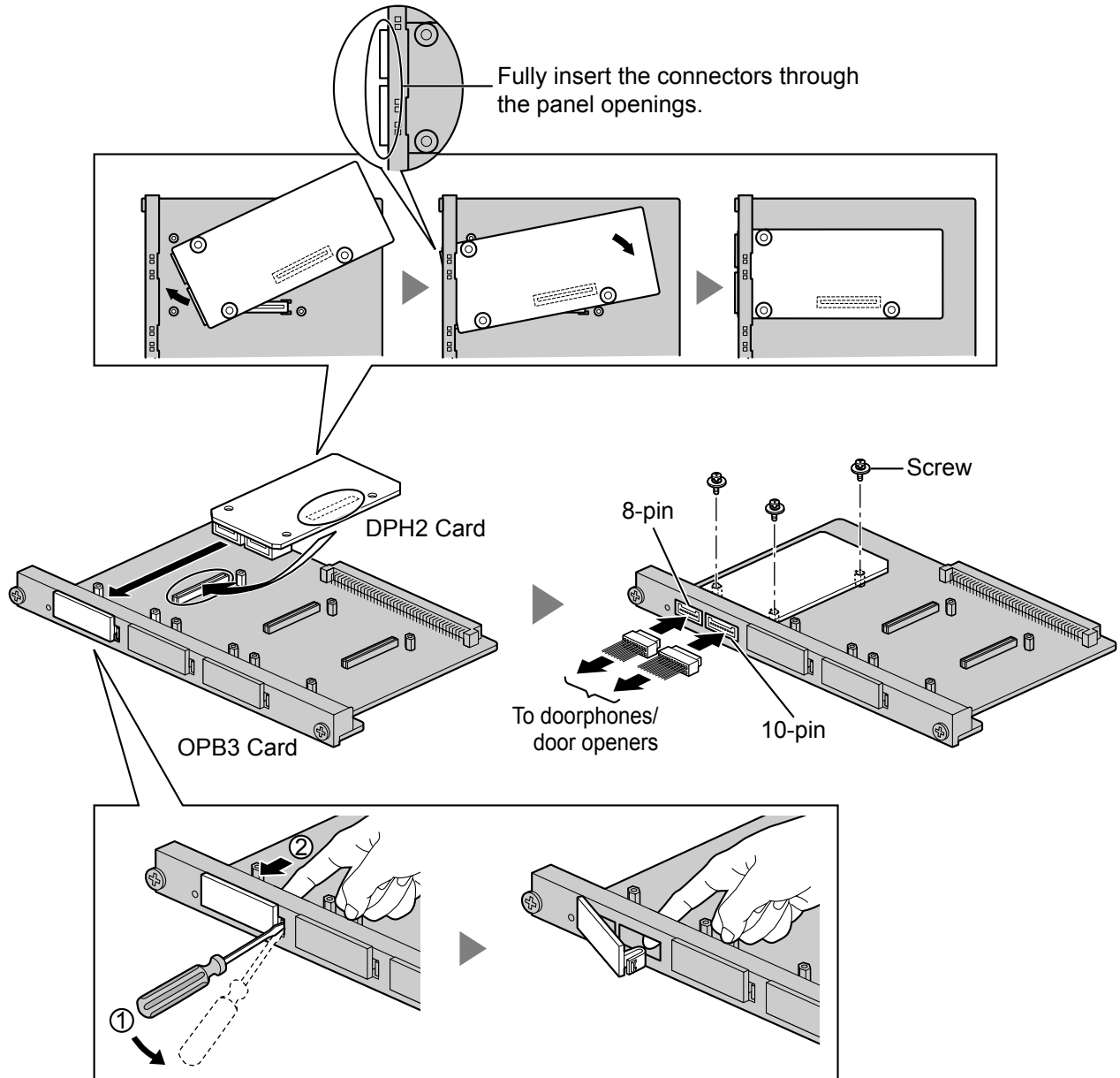
### 10-pin Terminal Block

|   | No. | Signal Name | Function          |
|---|-----|-------------|-------------------|
|  | 1-2 | Reserved    | –                 |
|   | 3   | OP4b        | Door opener 4     |
|   | 4   | OP4a        | Door opener 4 com |
|   | 5   | OP3b        | Door opener 3     |
|   | 6   | OP3a        | Door opener 3 com |
|   | 7   | OP2b        | Door opener 2     |
|   | 8   | OP2a        | Door opener 2 com |
|   | 9   | OP1b        | Door opener 1     |
|   | 10  | OP1a        | Door opener 1 com |

### 3.7.3 DPH2 Card (KX-TDA0162)

#### Function

2-port doorphone card for 2 German-type doorphones and 2 door openers. To be mounted on the OPB3 card.



#### Accessories and User-supplied Items

**Accessories (included):** Screws × 3, 10-pin terminal block × 1, 8-pin terminal block × 1

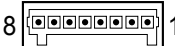
**User-supplied (not included):** Copper wire

#### Note

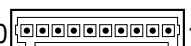
For details about connection to doorphones and door openers, refer to "3.9.1 Connection of Doorphones, Door Openers, External Sensors, and External Relays".

## Pin Assignments

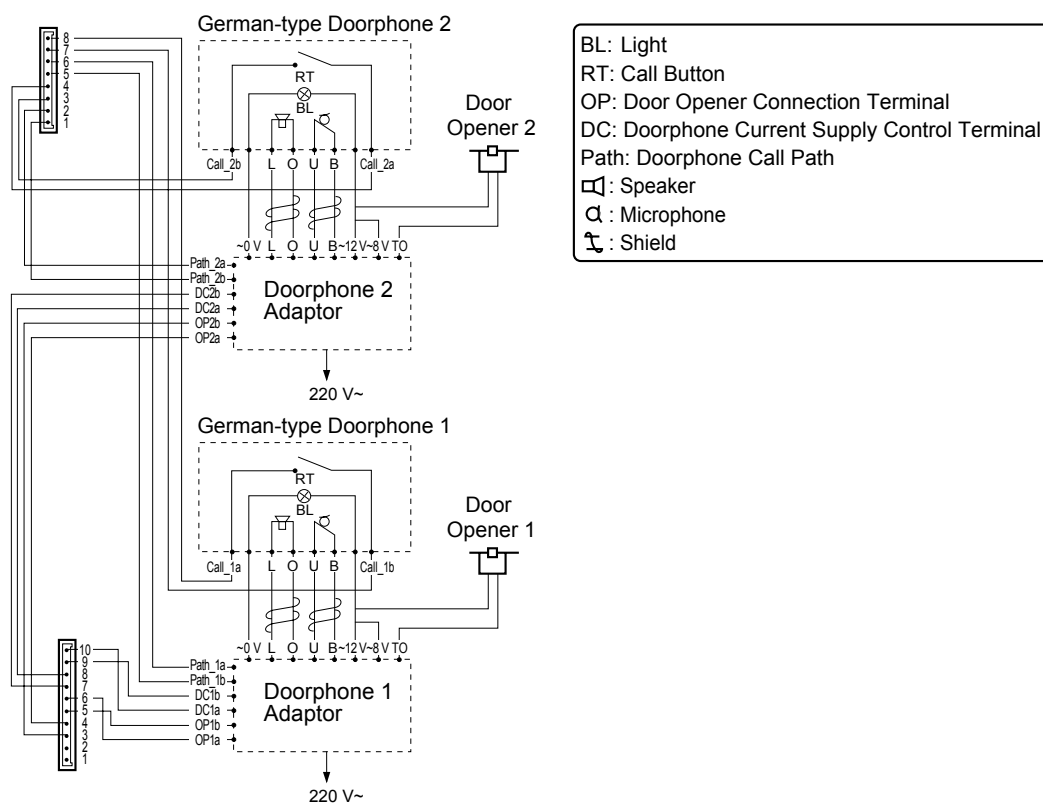
### 8-pin Terminal Block

|   | No. | Proprietary Signal Name | Standard Signal Name | Function                    |
|---|-----|-------------------------|----------------------|-----------------------------|
|  | 1   | Path_2b                 | b (2)                | Doorphone 2 transmit        |
|   | 2   | Path_2a                 | a (2)                | Doorphone 2 receive         |
|   | 3   | Call_2b                 | RT b (2)             | Doorphone 2 call button     |
|   | 4   | Call_2a                 | RT a (2)             | Doorphone 2 call button com |
|   | 5   | Path_1b                 | b (1)                | Doorphone 1 transmit        |
|   | 6   | Path_1a                 | a (1)                | Doorphone 1 receive         |
|   | 7   | Call_1b                 | RT b (1)             | Doorphone 1 call button     |
|   | 8   | Call_1a                 | RT a (1)             | Doorphone 1 call button com |

### 10-pin Terminal Block

|   | No. | Proprietary Signal Name | Standard Signal Name | Function                |
|---|-----|-------------------------|----------------------|-------------------------|
|  | 1-2 | Reserved                | Reserved             | –                       |
|   | 3   | OP2b                    | TO b (2)             | Door opener 2           |
|   | 4   | OP2a                    | TO a (2)             | Door opener 2 com       |
|   | 5   | OP1b                    | TO b (1)             | Door opener 1           |
|   | 6   | OP1a                    | TO a (1)             | Door opener 1 com       |
|   | 7   | DC2b                    | TS b (2)             | Doorphone control 2     |
|   | 8   | DC2a                    | TS a (2)             | Doorphone control 2 com |
|   | 9   | DC1b                    | TS b (1)             | Doorphone control 1     |
|   | 10  | DC1a                    | TS a (1)             | Doorphone control 1 com |

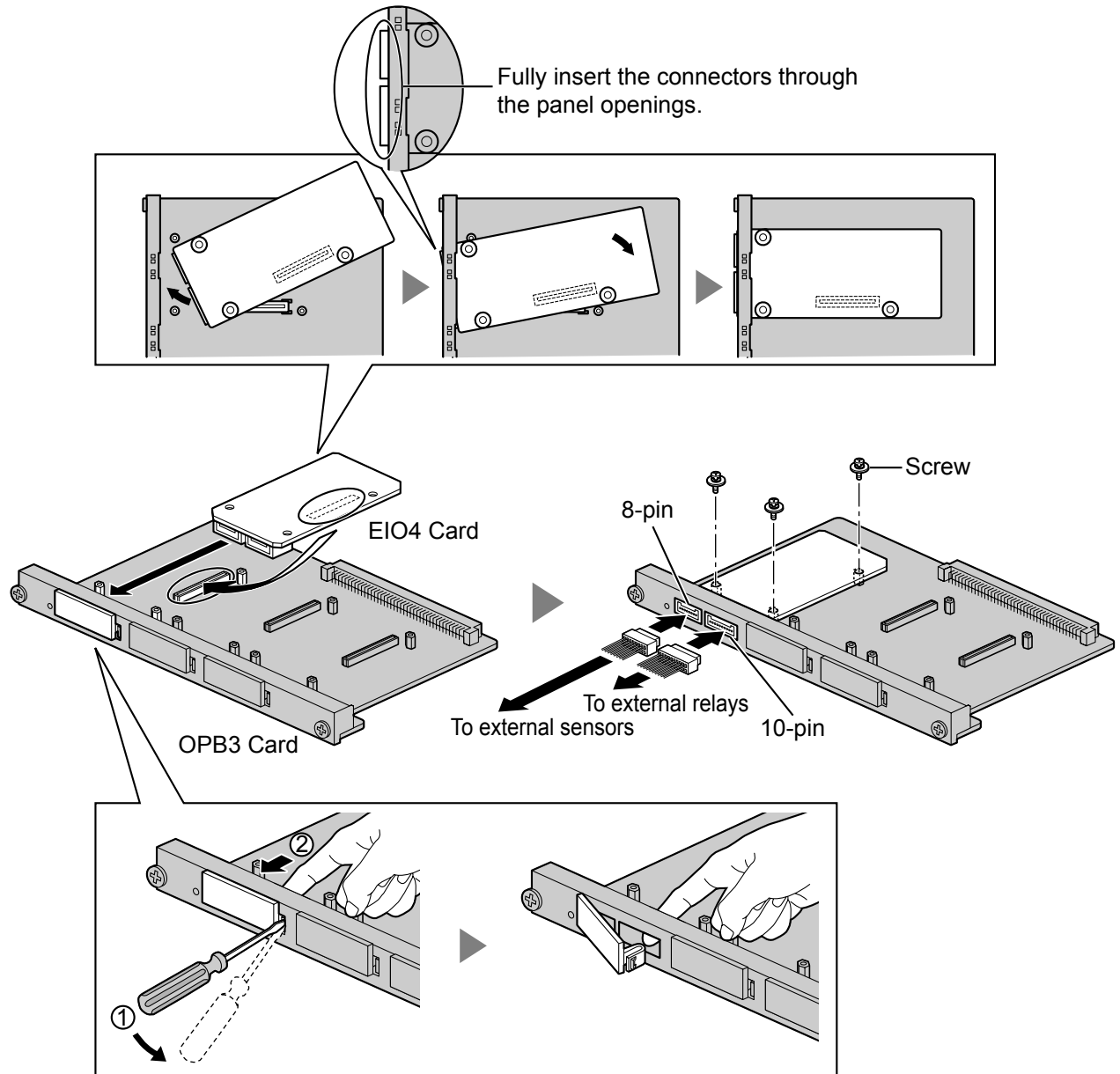
## Connection Diagram for German-type Doorphones and Door Openers



## 3.7.4 EIO4 Card (KX-TDA0164)

### Function

4-port external input/output card. To be mounted on the OPB3 card.



### Accessories and User-supplied Items

**Accessories (included):** Screws × 3, 10-pin terminal block × 1, 8-pin terminal block × 1


**User-supplied (not included):** Copper wire

### Note


For details about connection to external sensors and external relays, refer to "3.9.1 Connection of Doorphones, Door Openers, External Sensors, and External Relays".

## Pin Assignments

### 8-pin Terminal Block

|   | No. | Signal Name | Function      |
|---|-----|-------------|---------------|
|  | 1   | C4b         | Control 4     |
|   | 2   | C4a         | Control 4 com |
|   | 3   | C3b         | Control 3     |
|   | 4   | C3a         | Control 3 com |
|   | 5   | C2b         | Control 2     |
|   | 6   | C2a         | Control 2 com |
|   | 7   | C1b         | Control 1     |
|   | 8   | C1a         | Control 1 com |

### 10-pin Terminal Block

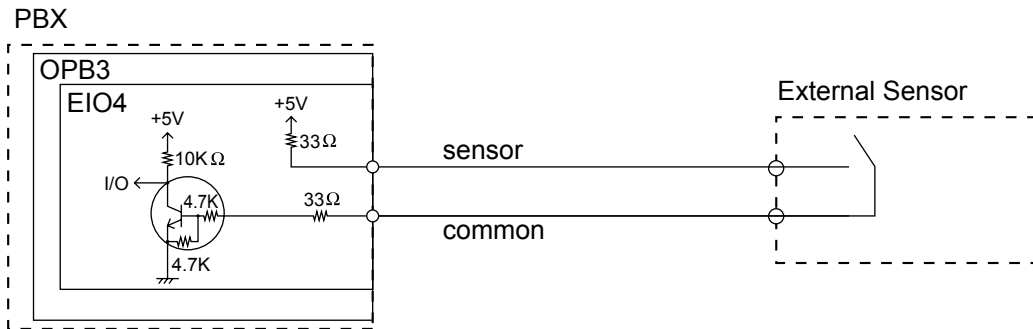
|   | No. | Signal Name | Function     |
|---|-----|-------------|--------------|
|  | 1-2 | Reserved    | –            |
|   | 3   | OP4b        | Opener 4     |
|   | 4   | OP4a        | Opener 4 com |
|   | 5   | OP3b        | Opener 3     |
|   | 6   | OP3a        | Opener 3 com |
|   | 7   | OP2b        | Opener 2     |
|   | 8   | OP2a        | Opener 2 com |
|   | 9   | OP1b        | Opener 1     |
|   | 10  | OP1a        | Opener 1 com |



### External Sensor

Power to the external sensor is provided from the EIO4 card and must be grounded through the EIO4 card as indicated in the diagram below. A pair of "sensor" and "common" lines are connected to the EIO4 card for each external sensor. The PBX detects input from the sensor when the signal is under 100  $\Omega$ .

### Connection Diagram



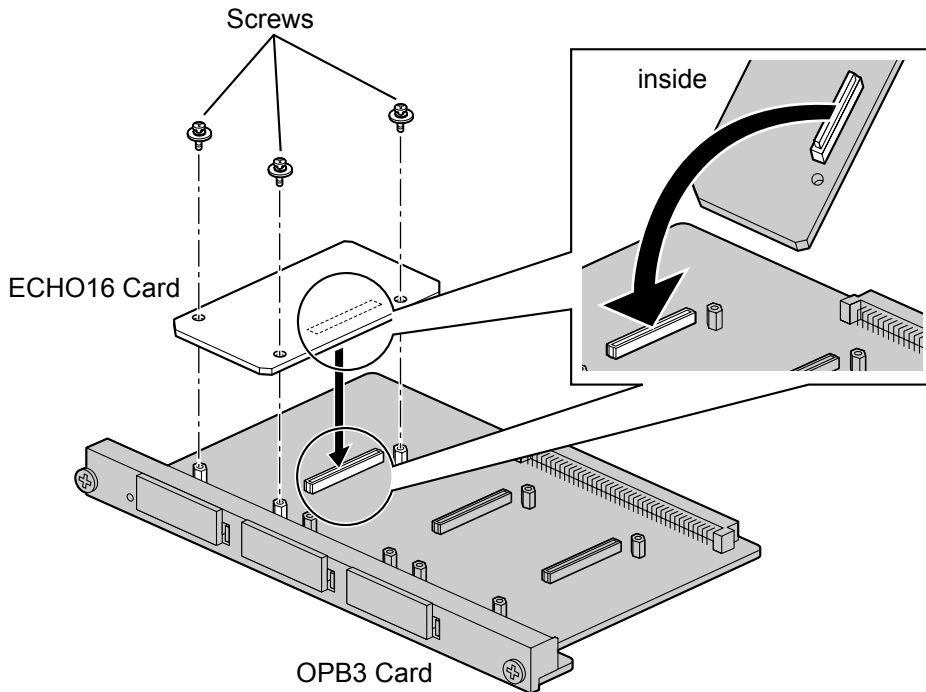
### External Relay

Current Limit: 24 V DC/30 V AC, 1 A maximum

## 3.7.5 ECHO16 Card (KX-TDA0166)

### Function

16-channel card for echo cancellation during conferences. To be mounted on the OPB3 card.



### Accessories and User-supplied Items

**Accessories (included):** Screws × 3

**User-supplied (not included):** none

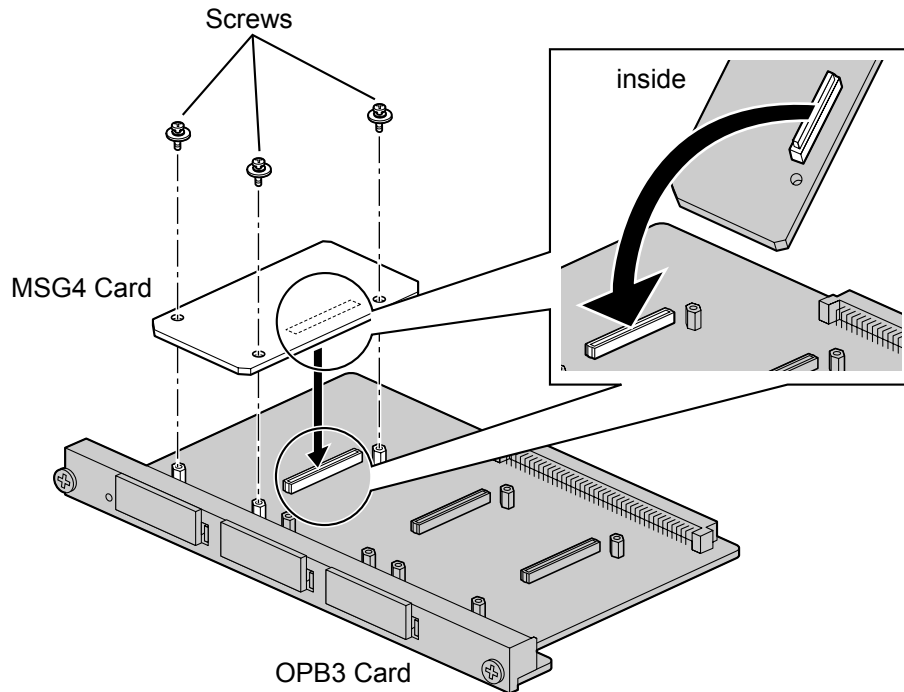
### Note

To establish a conference call involving 6 to 8 parties, install an ECHO16 card and enable echo cancellation for conferences using the Maintenance Console. For details, refer to "◆ Echo Cancel—Conference" in "4.18 [2-9] System Options" of the PC Programming Manual.

## 3.7.6 MSG4 Card (KX-TDA0191)

### Function

4-channel message card. To be mounted on the OPB3 card.



### Accessories and User-supplied Items

**Accessories (included):** Screws × 3

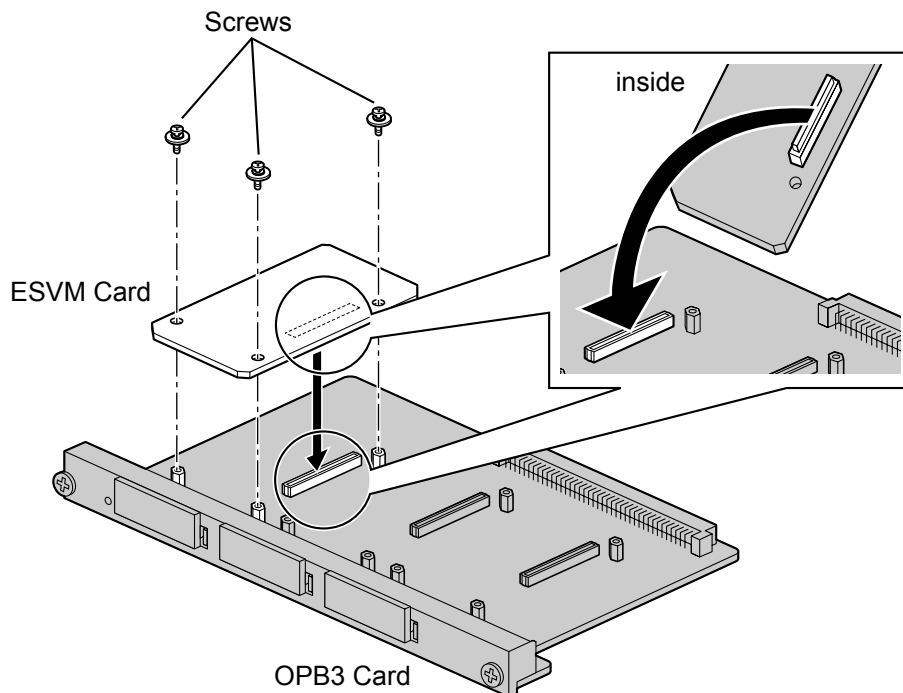
**User-supplied (not included):** none

## 3.7.7 ESVM2 Card (KX-TDA0192) and ESVM4 Card (KX-TDA0194)

### Function

**ESVM2:** 2-channel simplified voice message card for Built-in Simplified Voice Message feature. Also supports MSG card features. To be mounted on the OPB3 card.

**ESVM4:** 4-channel simplified voice message card for Built-in Simplified Voice Message feature. Also supports MSG card features. To be mounted on the OPB3 card.



### Accessories and User-supplied Items

**Accessories (included):** Screws × 3

**User-supplied (not included):** none

### CAUTION

When installing/uninstalling an ESVM card, be careful not to damage the chips around the connection parts. Doing so may cause severe damage to the ESVM card.

### Notice

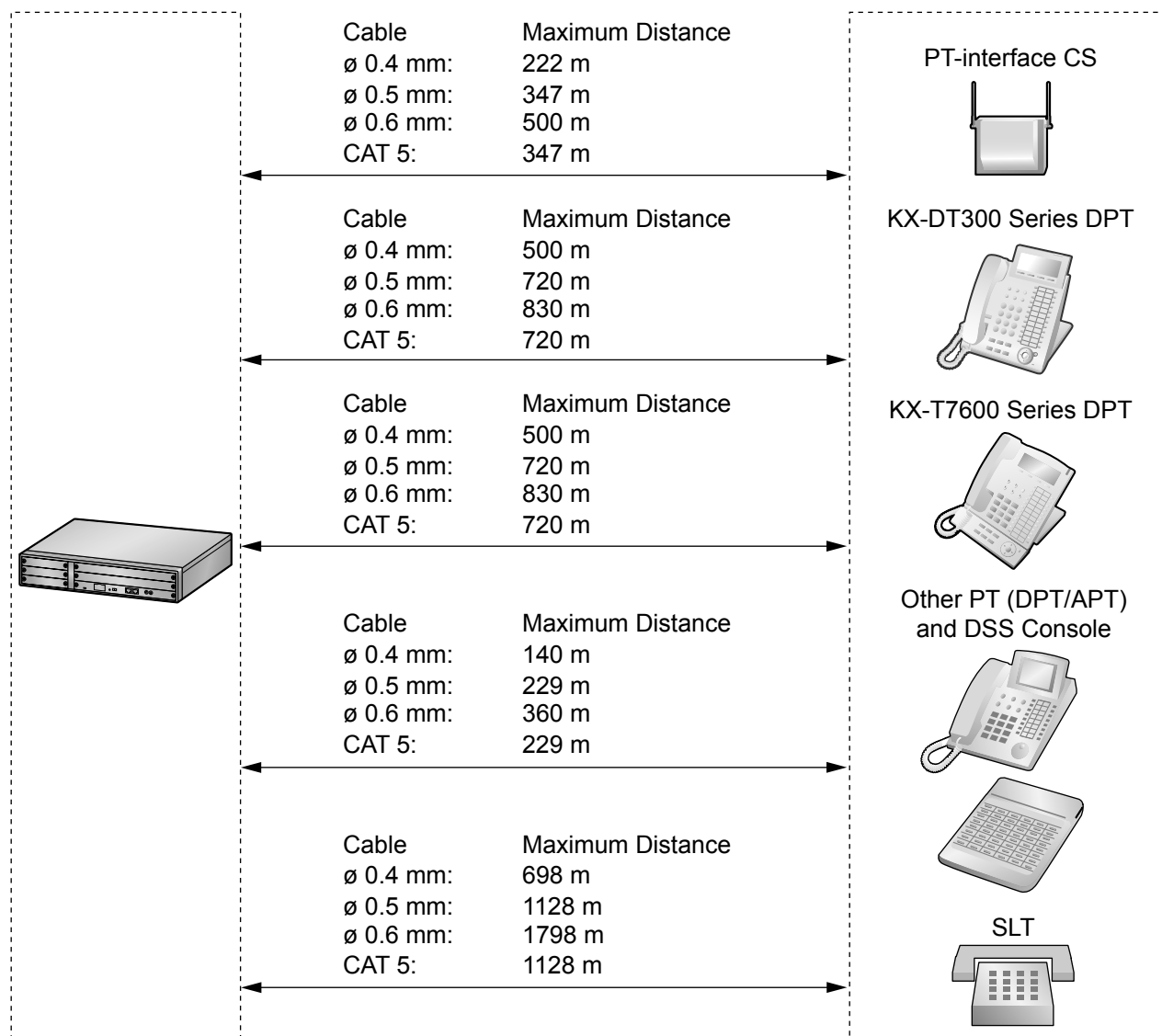
- When replacing an ESVM card, ensure that the status of the OPB3 card is In Service (INS), and then initialise the ESVM card. For details about the initialisation procedure, refer to "2.5.5 Tool—Simplified Voice Message—Delete All Recording" in the PC Programming Manual.
- When installing an ESVM card for the first time on an OPB3 card that is already installed in the PBX, do not remove the OPB3 card from the PBX until the card status becomes INS.
- After installing the OPB3 card, with an ESVM card mounted, for the first time, do not remove the OPB3 card from the PBX until the card status becomes INS.

### Note

When using an ESVM card for the SVM feature, it must be mounted on sub-slot 3 (leftmost slot) of the OPB3 card.

## 3.8 Connection of Extensions

### 3.8.1 Maximum Cabling Distances of the Extension Wiring (Twisted Cable)



#### Notice

The maximum cabling distance may vary depending on the conditions.

|                   | PT-interface CS | DPT | APT | DSS Console | SLT |
|-------------------|-----------------|-----|-----|-------------|-----|
| DHLC4 Card        | ✓               | ✓   | ✓   | ✓           | ✓   |
| SLC16, SLC8 Cards |                 |     |     |             | ✓   |
| DLC16, DLC8 Cards | ✓               | ✓   |     | ✓           |     |

### 3.8.1 Maximum Cabling Distances of the Extension Wiring (Twisted Cable)

---

"✓" indicates that the extension card supports the terminal.

## 3.8.2 Parallel Connection of the Extensions

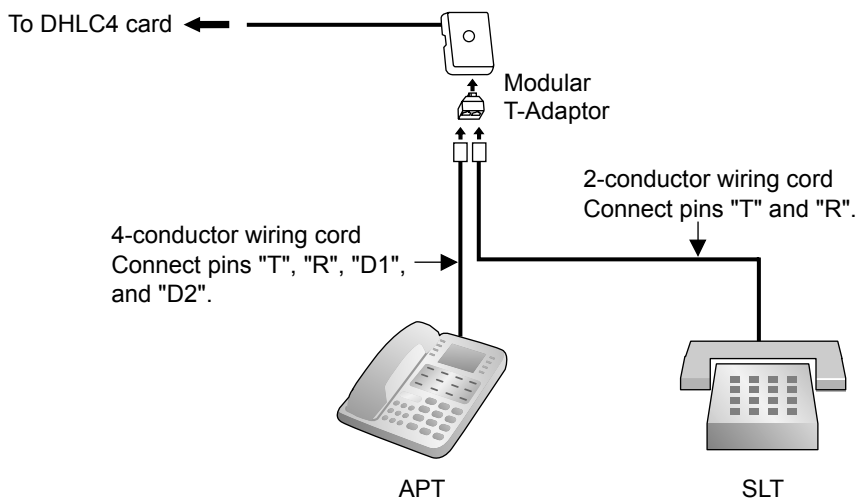
Any SLT can be connected in parallel with an APT or a DPT as follows.

### **Note**

In addition to an SLT, an answering machine, a fax machine or a modem (PC) can be connected in parallel with an APT or a DPT.

### **With APT**

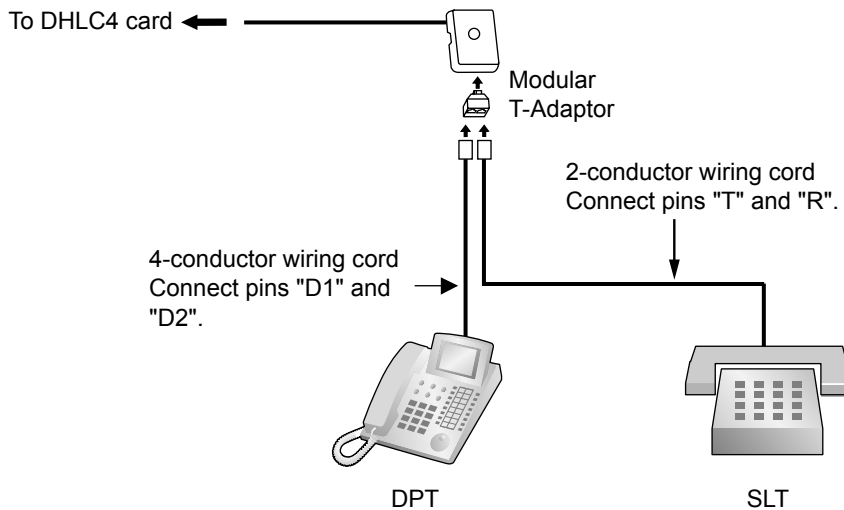
For parallel connection, eXtra Device Port (XDP) mode must be disabled for that port through system programming. Refer to "1.11.9 Paralleled Telephone" and "2.1.1 Extension Port Configuration" in the Feature Guide for further information.



## With DPT

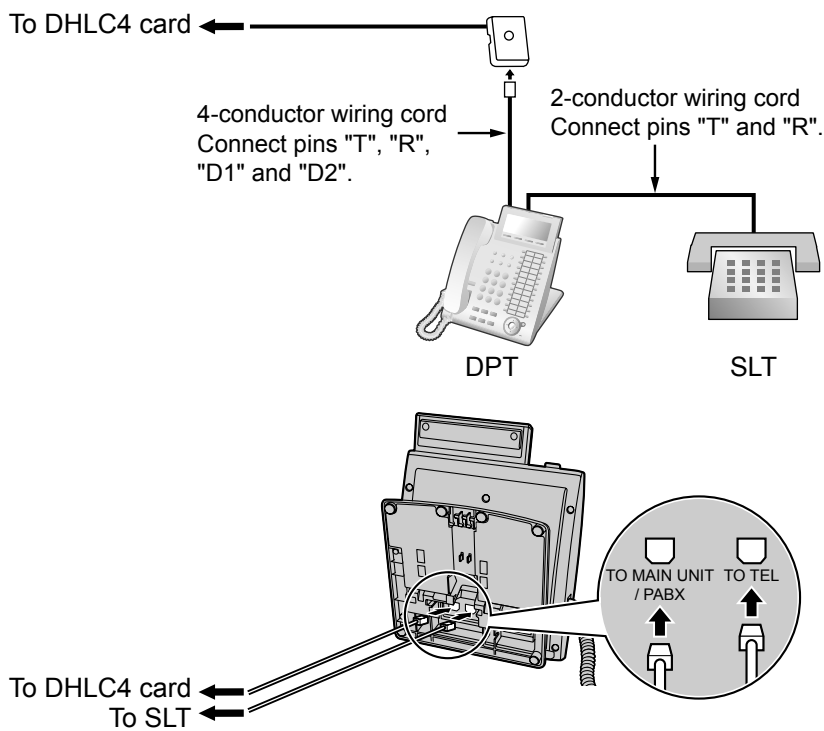
Parallel mode or eXtra Device Port (XDP) mode can be selected through system programming. If XDP mode is enabled through system programming, parallel connection is not possible. Refer to "1.11.9 Parallelled Telephone" and "2.1.1 Extension Port Configuration" in the Feature Guide for further information.

### Using a Modular T-Adaptor



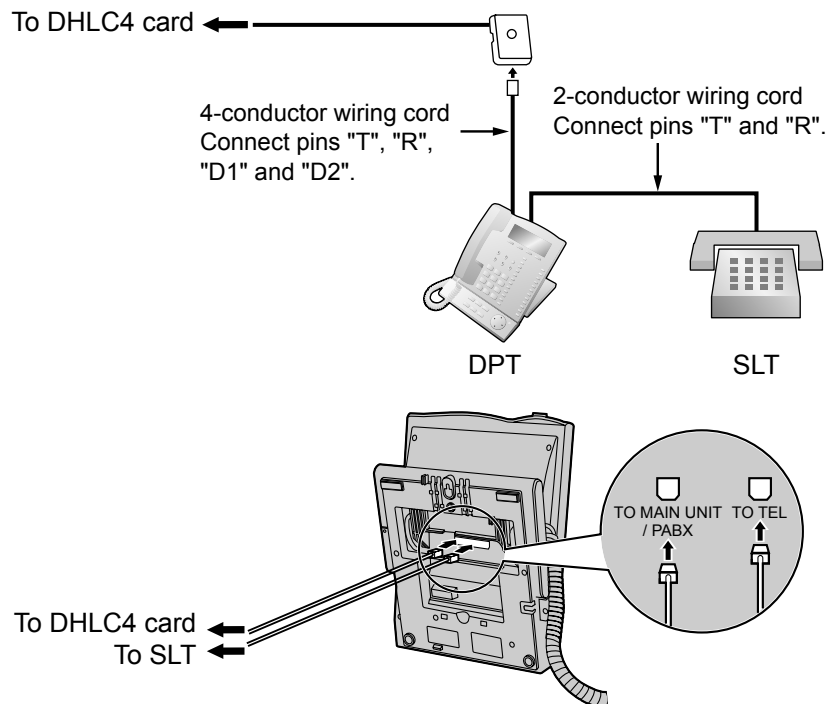
### Using an EXtra Device Port

#### With KX-DT300 Series DPT (except KX-DT321)

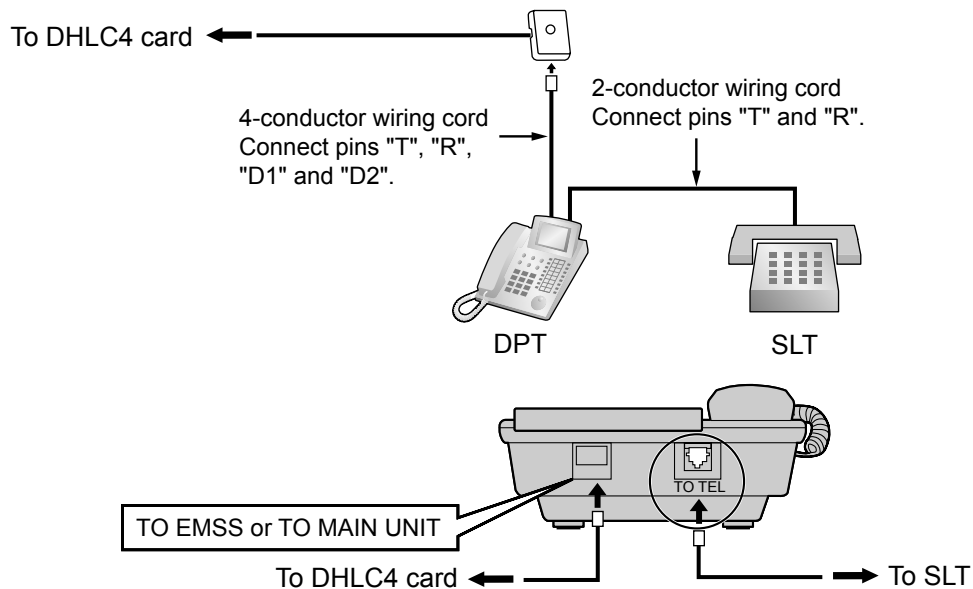




### With KX-T7600 Series DPT (except KX-T7665)



### With Other DPT (except KX-T7560 and KX-T7565)



## 3.8.3 Digital EXtra Device Port (Digital XDP) Connection

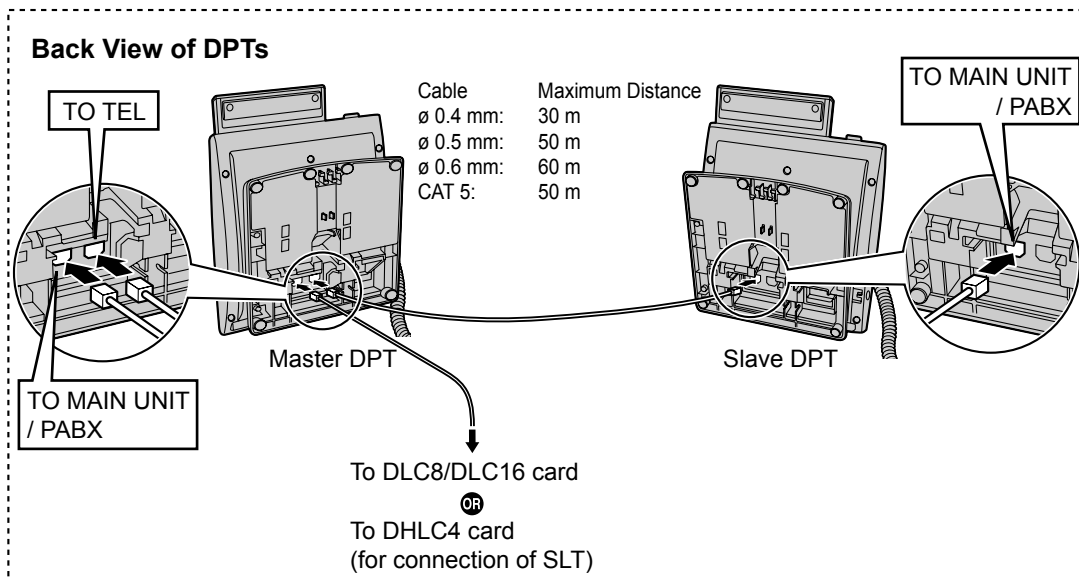
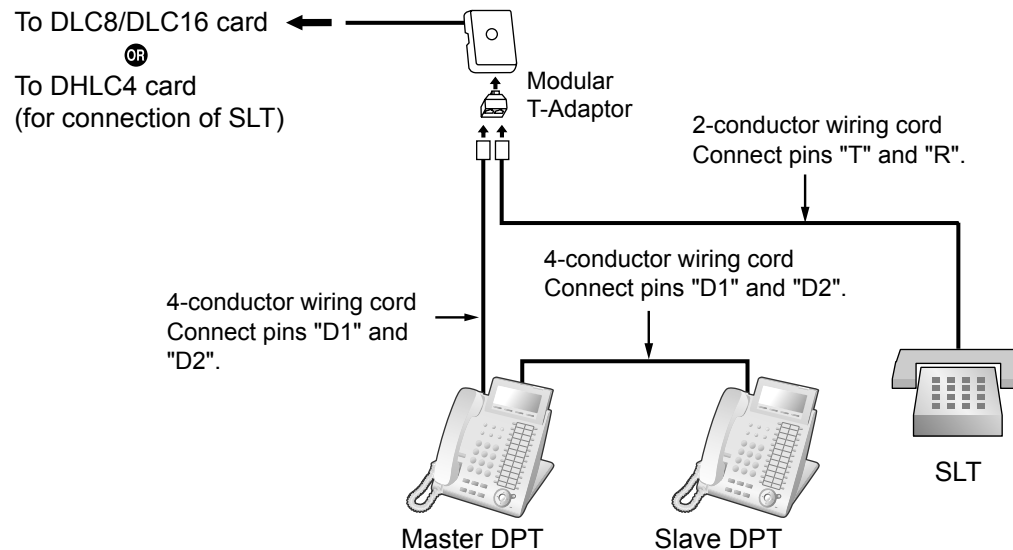
A DPT can be connected to another DPT on the Digital XDP connection. In addition, if the DPT is connected to a DHLC4 card, it can also have an SLT connected in Parallel mode or XDP mode.

#### Note

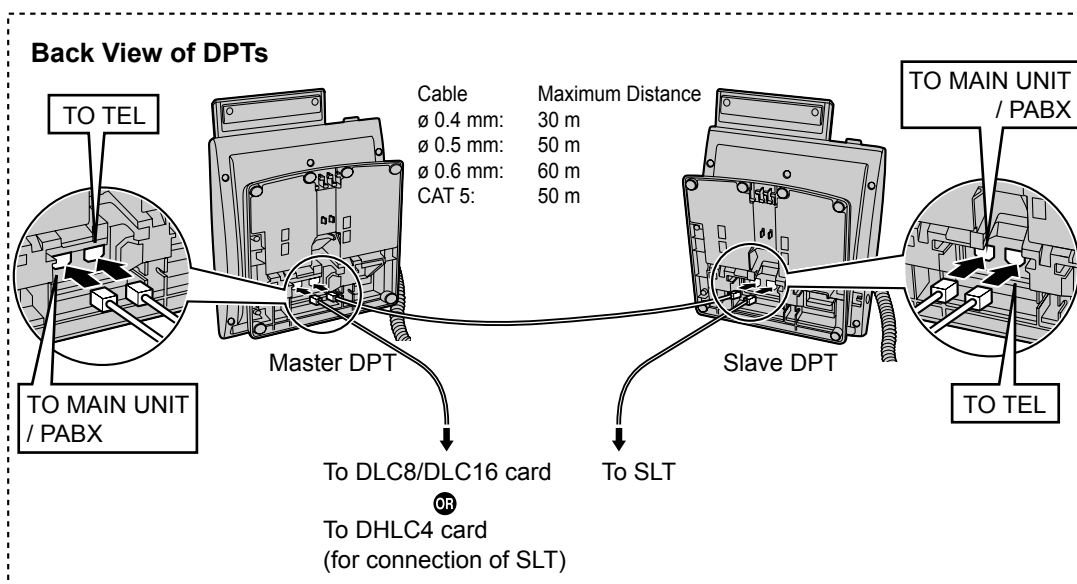
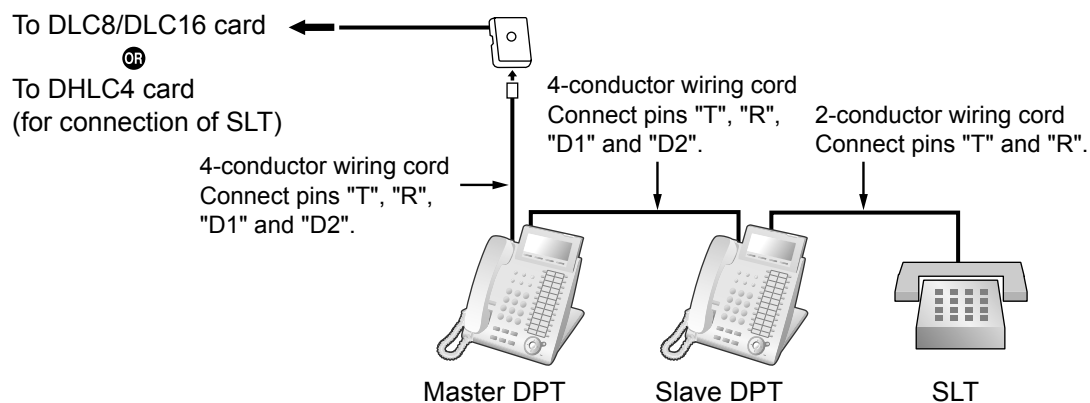
- Both DPTs must be KX-DT300/KX-T7600 series DPTs (except KX-T7640). Note that the KX-T7667 can only be connected as a slave DPT.
- Bluetooth® Modules or USB Modules must not be connected to DPTs in the Digital XDP connection.
- Parallel mode or XDP mode can be selected through system programming.
- If XDP mode is enabled through system programming, parallel connection is not possible. Refer to "1.11.9 Parallelled Telephone" and "2.1.1 Extension Port Configuration" in the Feature Guide for further information.

### With KX-DT300 Series DPT

#### Using a Modular T-Adaptor

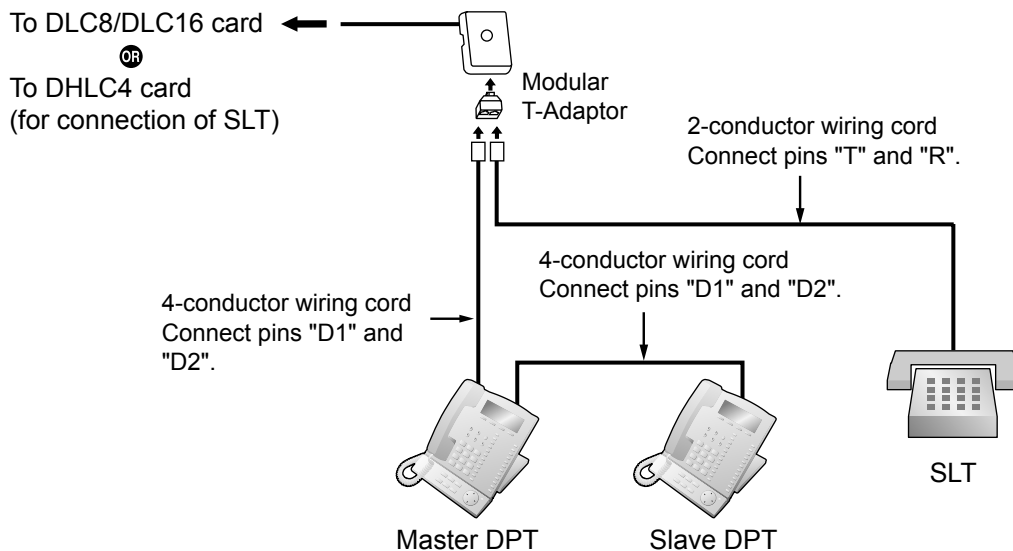


### Using an EXtra Device Port

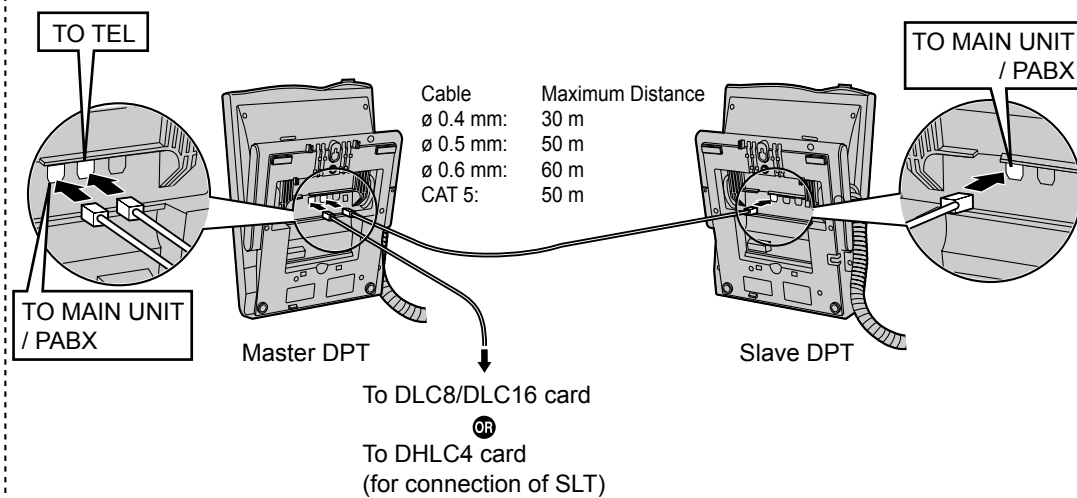


## With KX-T7600 Series DPT (except KX-T7600E Series)

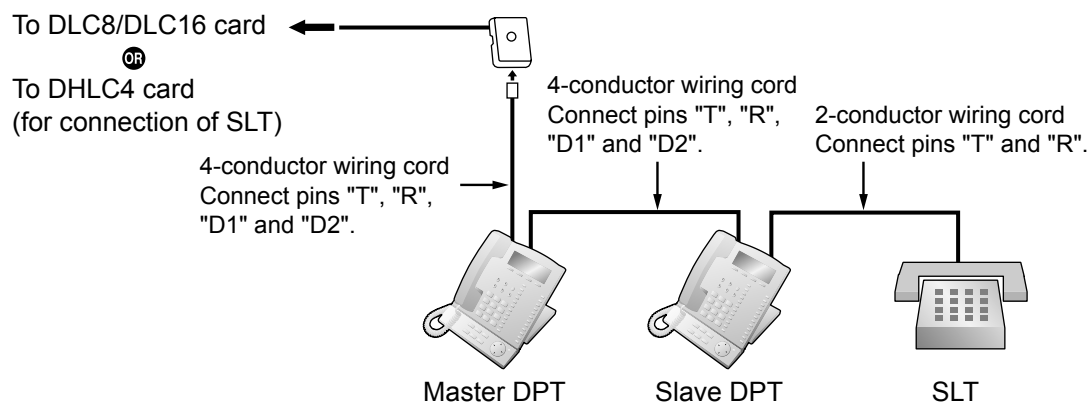
### Using a Modular T-Adaptor



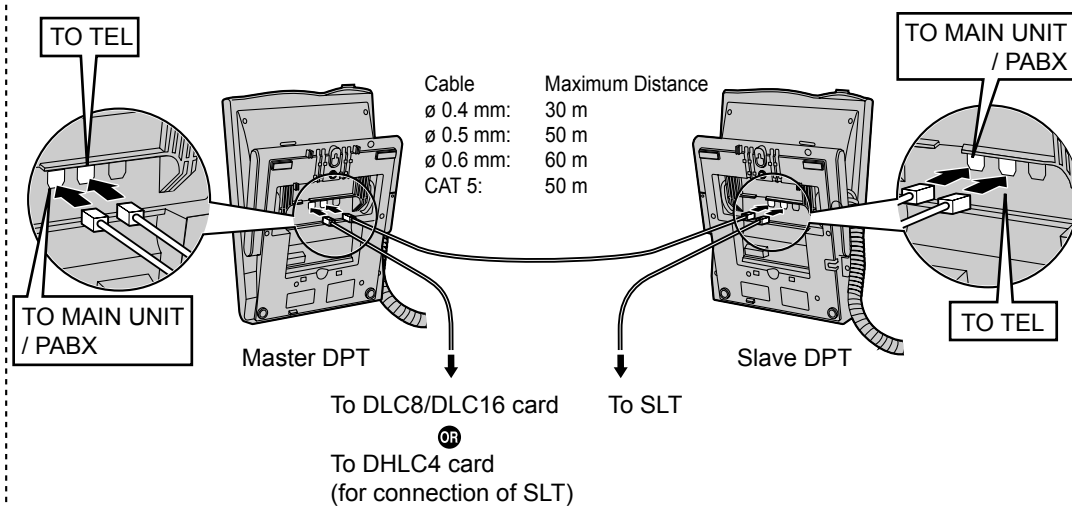
### Back View of DPTs



### Using an EXtra Device Port

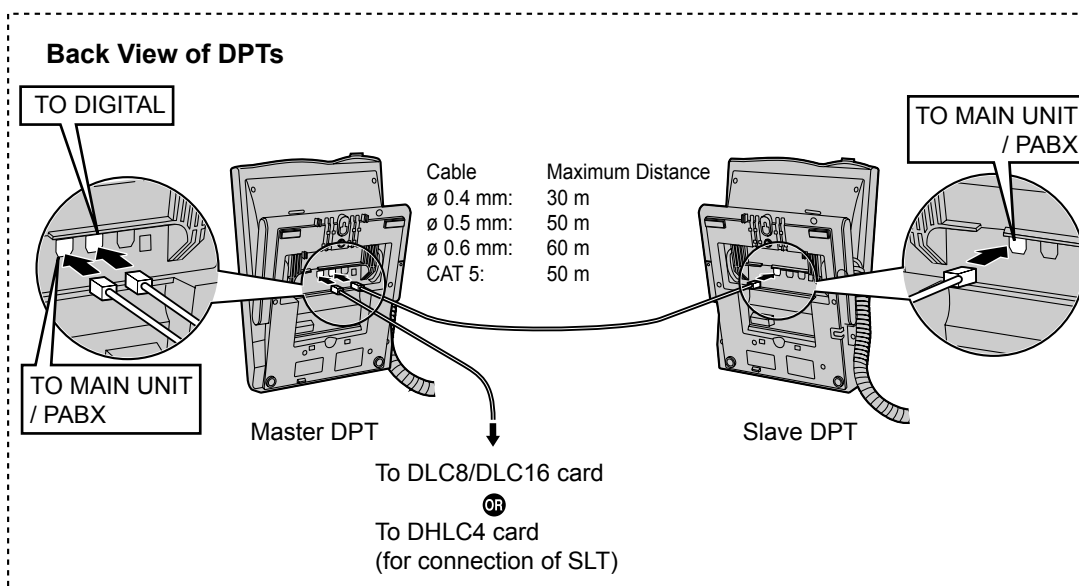
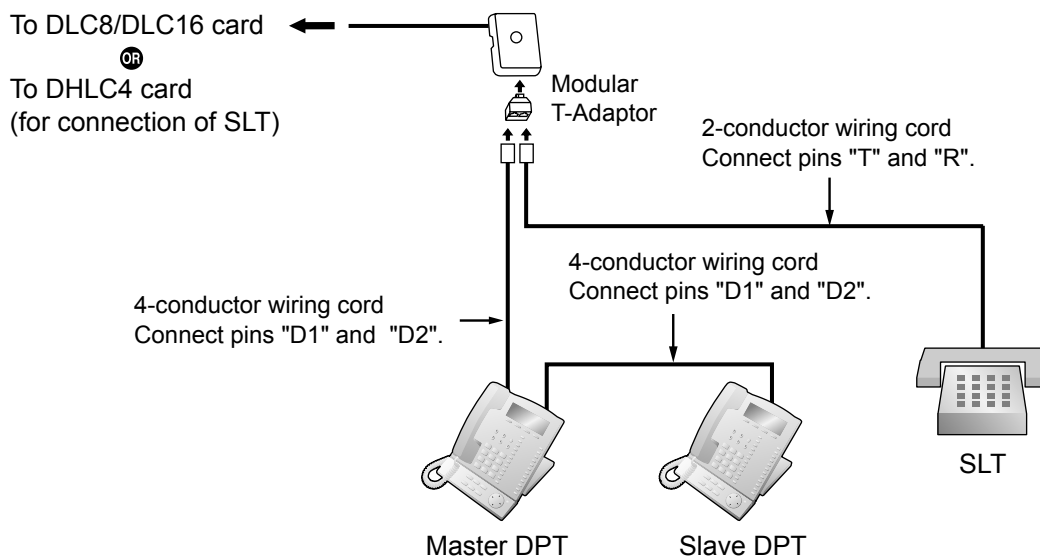


#### Back View of DPTs



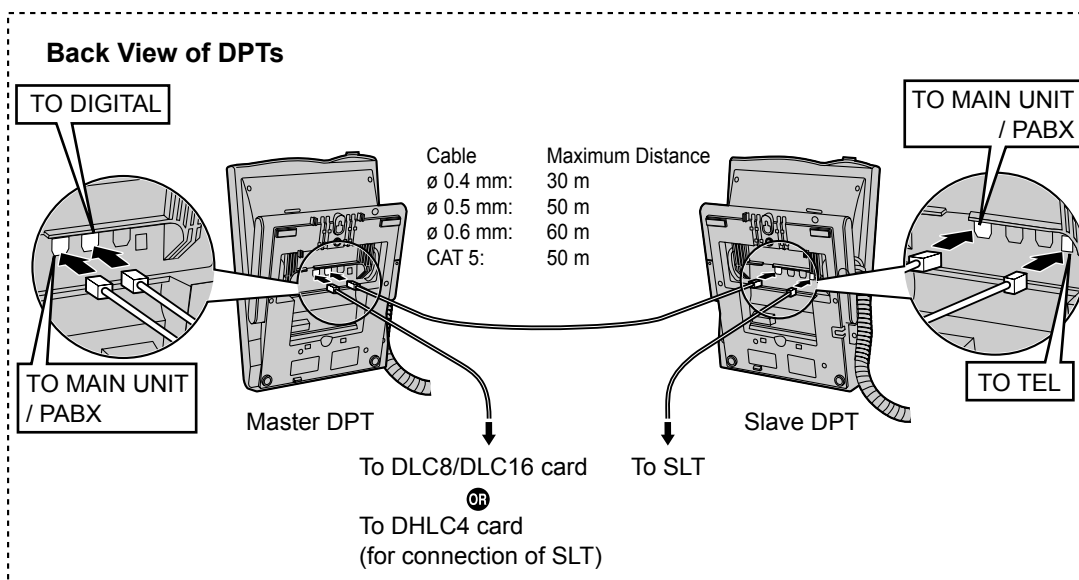
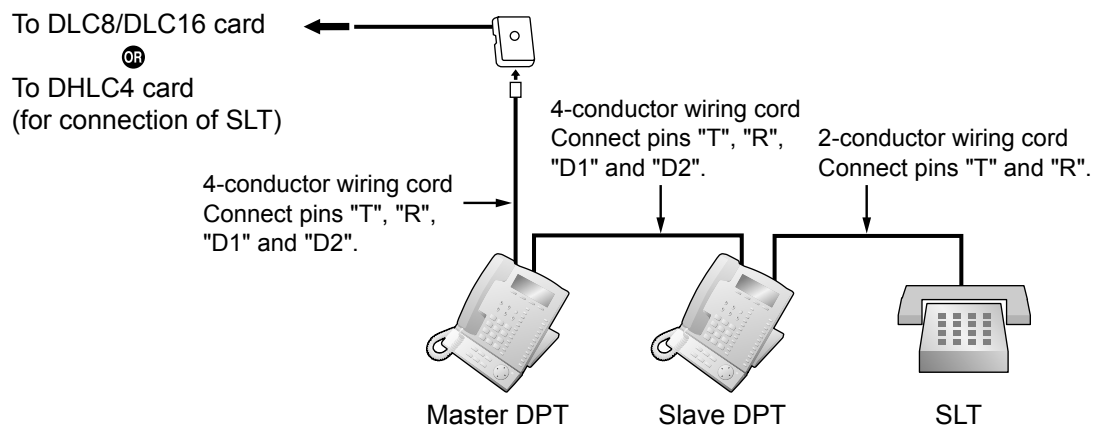
## With KX-T7600E Series DPT

### Using a Modular T-Adaptor



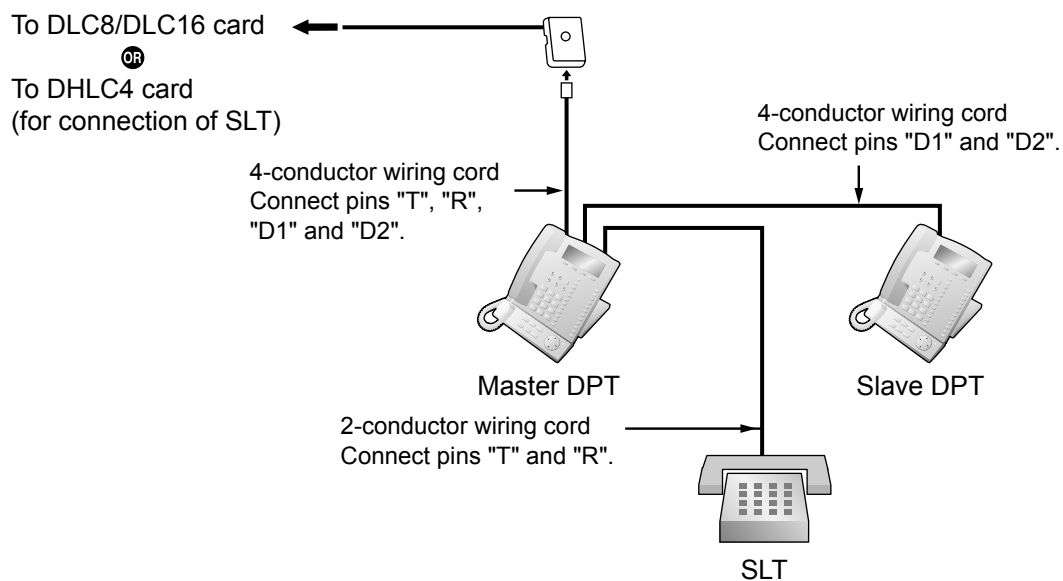
## Using an EXtra Device Port

### Connecting to a Slave DPT



### 3.8.3 Digital EXtra Device Port (Digital XDP) Connection

#### Connecting to a Master DPT



#### Back View of DPTs

To DLC8/DLC16 card

OR  
To DHLC4 card  
(for connection of SLT)

To slave DPT

| Cable     | Maximum Distance |
|-----------|------------------|
| ø 0.4 mm: | 30 m             |
| ø 0.5 mm: | 50 m             |
| ø 0.6 mm: | 60 m             |
| CAT 5:    | 50 m             |

To SLT

TO MAIN UNIT  
/ PABX  
TO DIGITAL  
TO TEL



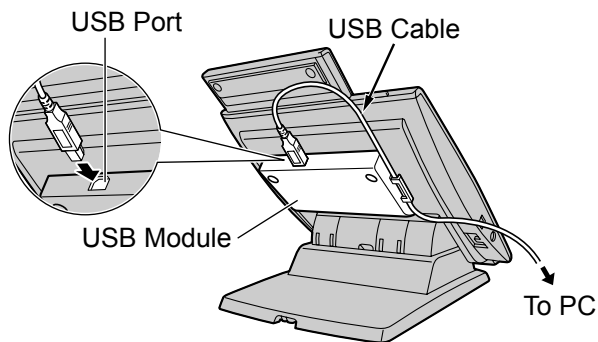
### 3.8.4 First Party Call Control CTI Connection

CTI connection between a PC and a KX-DT343/KX-DT346/KX-T7633/KX-T7636 DPT provides first party call control. The CTI connection is made via a USB interface (version 2.0), and uses the TAPI 2.1 protocol. A USB Module must be connected to the DPTs.

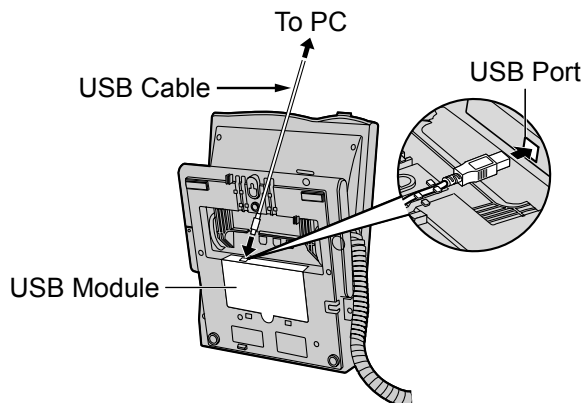
**Note**

The operating system of the PC required for first party call control depends on your CTI application software. For details, refer to the manual for your CTI application software.

**KX-DT343/KX-DT346**



**KX-T7633/KX-T7636**



**Note**

The maximum length of the USB cable is 3 m.

## 3.9 Connection of Doorphones, Door Openers, External Sensors, and External Relays

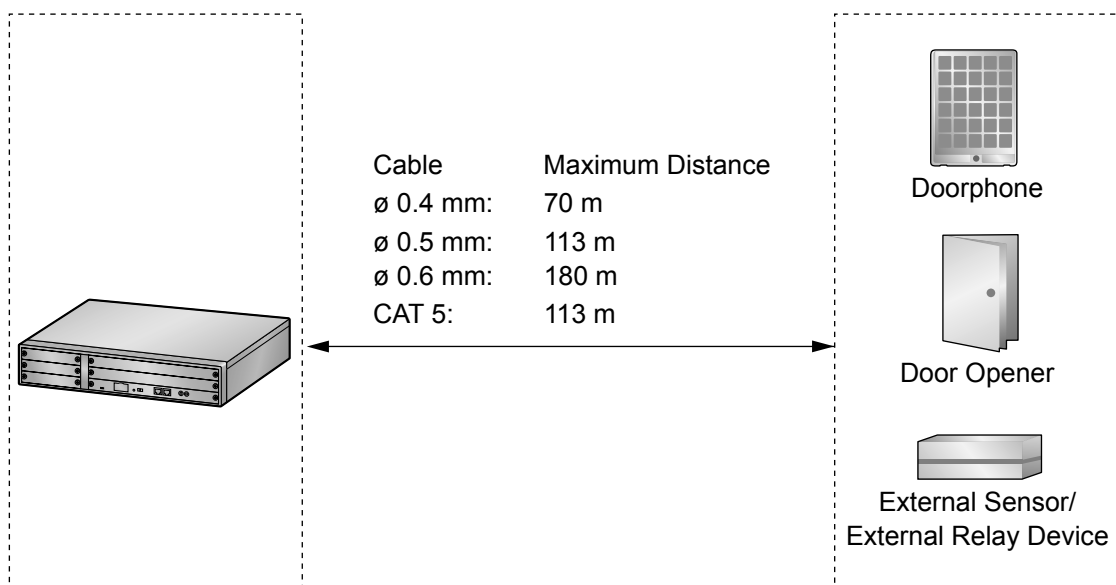
### 3.9.1 Connection of Doorphones, Door Openers, External Sensors, and External Relays

The PBX supports a maximum of 16 doorphones (KX-T30865/KX-T7765 with a DPH4 card, or German-type doorphone with a DPH2 card), 16 door openers, 16 external sensors, and 16 external relays.

#### **Note**

Doorphones, door openers, external sensors, and external relays are user-supplied.

#### Maximum Cabling Distance

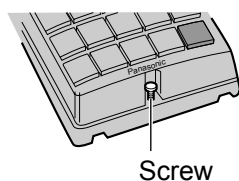


#### Installing the Doorphone (KX-T30865/KX-T7765)

#### **Note**

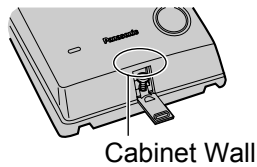
The illustrations shown in the installation procedure are based on the KX-T30865.

1. Loosen the screw to separate the doorphone into 2 halves.

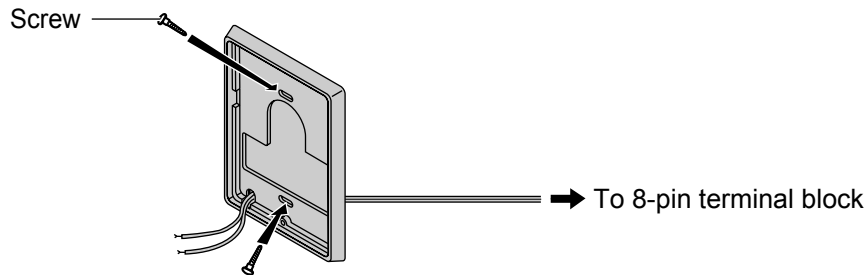


#### **Note for KX-T7765 Users**

When loosening/tightening the screw, do not scratch the cabinet wall with the driver shaft.



2. Pass the wires through the hole in the base cover, and attach the base cover to a wall using 2 screws.



#### **Note**

Two kinds of screws are included with the doorphone. Please choose the appropriate kind for your wall type.

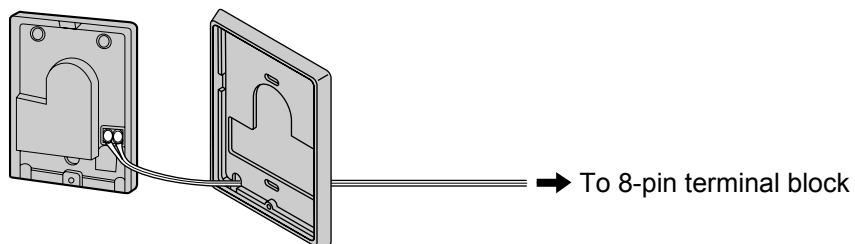


: when a doorphone plate has been fixed to the wall



: when you wish to install the doorphone directly onto the wall

3. Connect the wires to the screws located in the back cover.

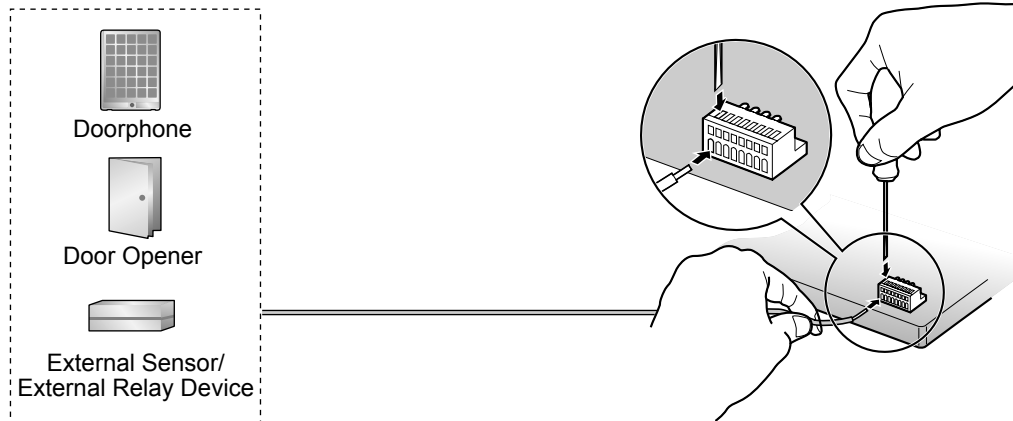


4. Re-attach the 2 halves and re-insert the screw.

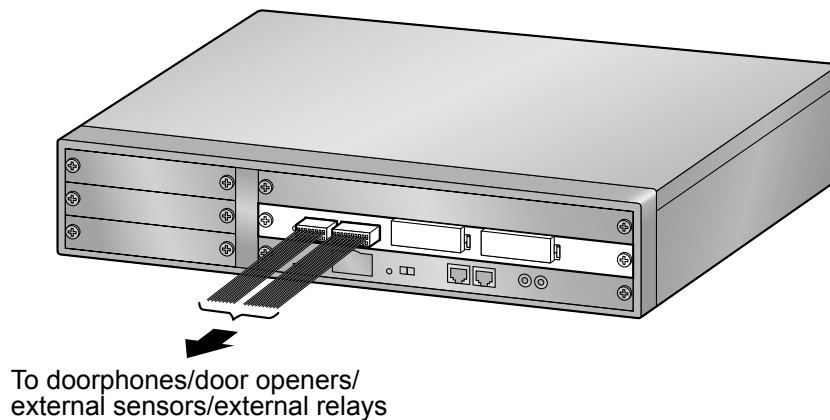
## Connection

Use 8-pin and 10-pin terminal blocks (included with the card) for connection.

1. While pressing down on the hole at the top of the terminal block using a screwdriver, insert the wire into the side hole as shown below. Repeat this procedure for other doorphones, door openers, external sensors, and external relays.  
Refer to "3.7.2 DPH4 Card (KX-TDA0161)", "3.7.3 DPH2 Card (KX-TDA0162)", and "3.7.4 EIO4 Card (KX-TDA0164)" for pin assignments.

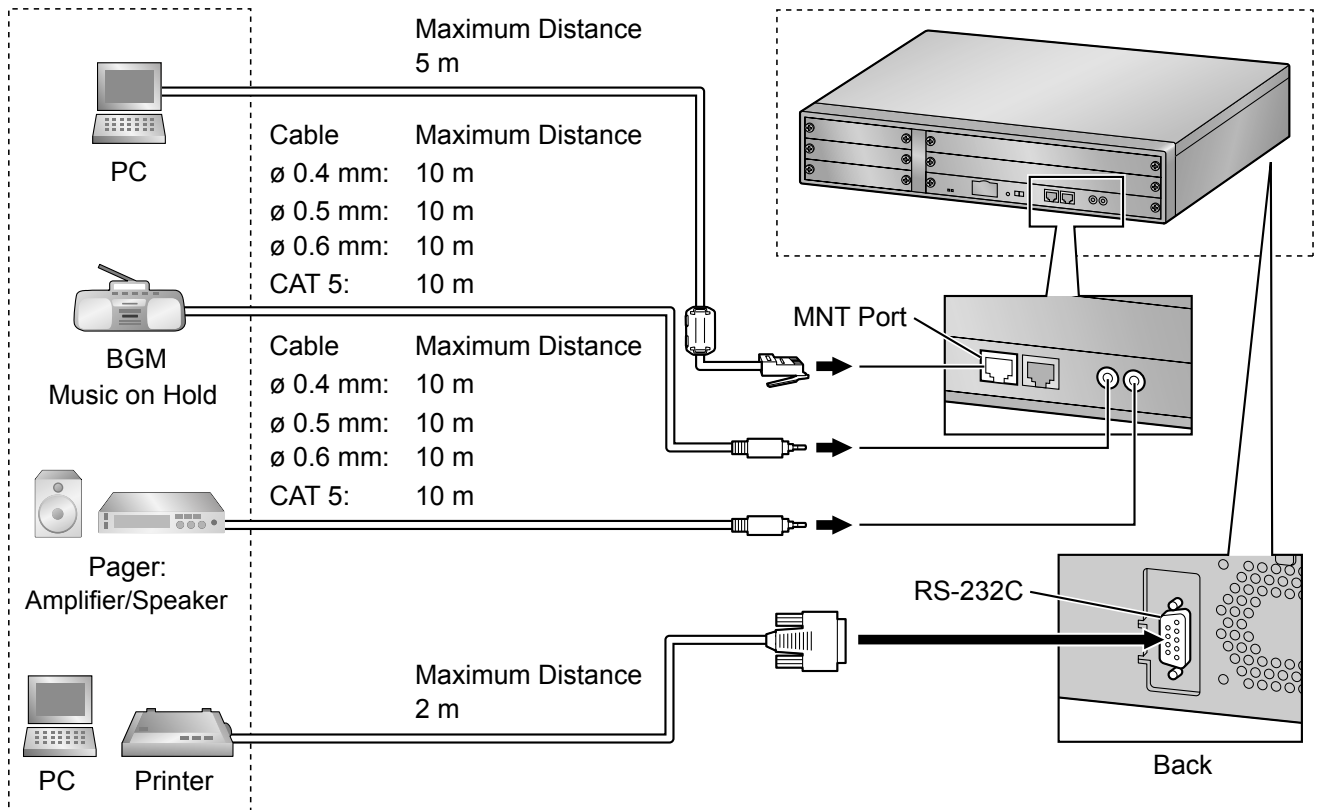


2. Attach the terminal blocks to the connectors of the DPH4/DPH2/EIO4 card on the PBX.



## 3.10 Connection of Peripherals

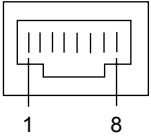
### 3.10.1 Connection of Peripherals



#### PC (via MNT Port)

A PC can be connected to the PBX via the MNT port of the IPCMPR card. It is used for system programming, diagnostics and external system database storage (save/load) functions.

#### Pin Assignments

|   | No. | Signal Name | Input (I)/Output (O) | Function       |
|---|-----|-------------|----------------------|----------------|
|  | 1   | TPO+        | O                    | Transmit data+ |
|   | 2   | TPO-        | O                    | Transmit data- |
|   | 3   | TPI+        | I                    | Receive data+  |
|   | 4-5 | Reserved    | —                    | —              |
|   | 6   | TPI-        | I                    | Receive data-  |
|   | 7-8 | Reserved    | —                    | —              |

## BGM/MOH

The PBX provides Background Music and Music on Hold. An external music source (e.g., user-supplied radio) can be connected to the PBX.

### CAUTION

The External Music Jack is an SELV port and should only be connected to an approved SELV device, or in Australia, via the Line Isolation Unit with the Telecommunications Compliance Label.

### Notice

- Wiring should be done carefully to prevent undue force being exerted on the plug. Otherwise, sound may only be heard intermittently.
- When the PBX and external music source are not connected to the same earth, hum noise may be induced into Background Music and Music on Hold.

## Pager

A paging device (user-supplied) can be connected to the PBX.

### CAUTION

The External Paging Jack is an SELV port and should only be connected to an approved SELV device, or in Australia, via the Line Isolation Unit with the Telecommunications Compliance Label.

## PC/Printer (via RS-232C)

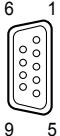
The PBX is equipped with an RS-232C interface. This interface provides communication between the PBX and the user-supplied devices such as PC or line printers. The RS-232C port is used for system programming, SMDR, diagnostics and external system database storage (save/load) functions.

### CAUTION

To protect the system, keep the following in mind:

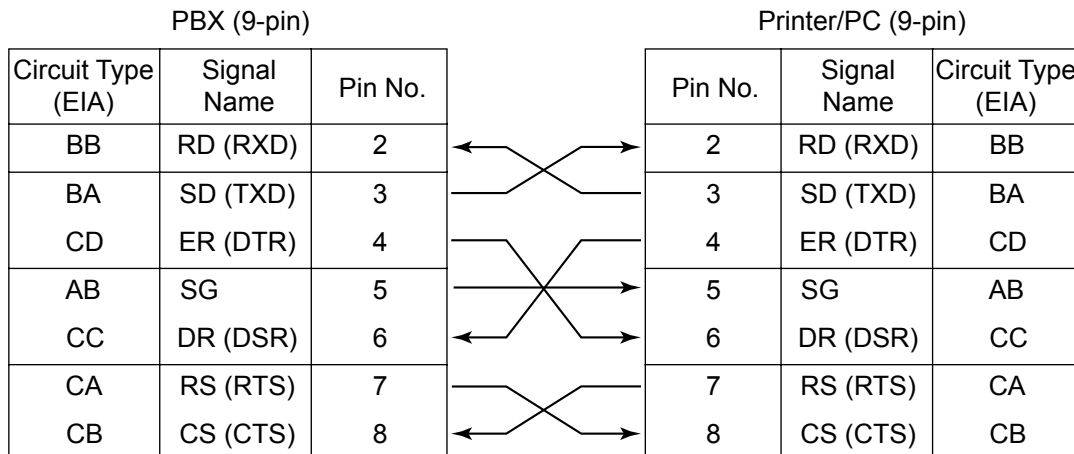
1. Make sure that both connector cases (frame ground) of the RS-232C cross cable (shielded cable) are conductive. If they are not conductive, make sure that both connector cases of the cable are firmly connected.
2. If this is not possible, connect the frame of the PBX to the frame of the PC/Printer using an earthing wire in order to prevent difference in the electrical potentials.

### Pin Assignments

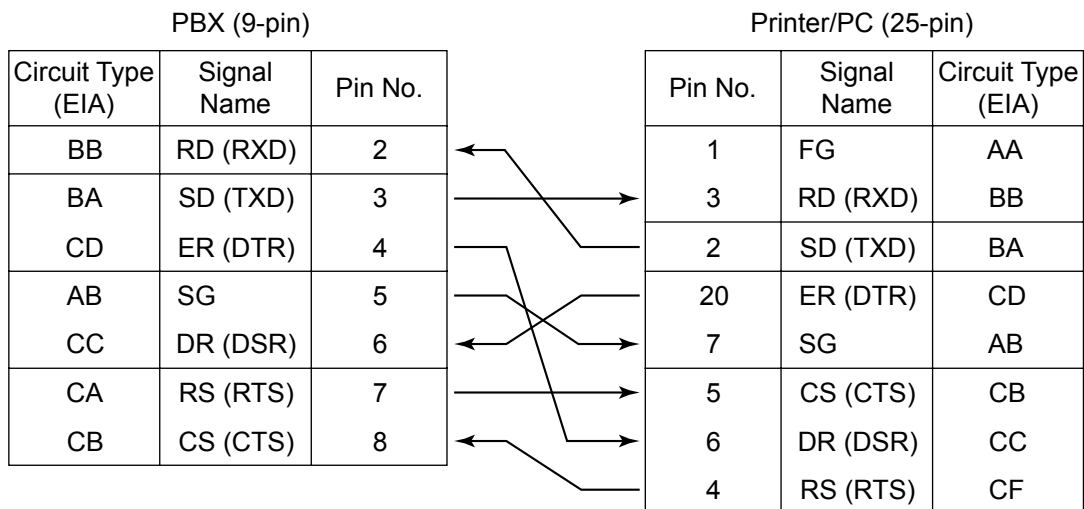
|   | No. | Signal Name | Function            | Circuit Type |       |
|---|-----|-------------|---------------------|--------------|-------|
|   |     |             |                     | EIA          | CCITT |
|  | 2   | RD (RXD)    | Receive Data        | BB           | 104   |
|   | 3   | SD (TXD)    | Transmit Data       | BA           | 103   |
|   | 4   | ER (DTR)    | Data Terminal Ready | CD           | 108.2 |
|   | 5   | SG          | Signal Ground       | AB           | 102   |
|   | 6   | DR (DSR)    | Data Set Ready      | CC           | 107   |
|   | 7   | RS (RTS)    | Request To Send     | CA           | 105   |
|   | 8   | CS (CTS)    | Clear To Send       | CB           | 106   |

### Connection Charts

#### For connecting a printer/PC with a 9-pin RS-232C connector



#### For connecting a printer/PC with a 25-pin RS-232C connector



### RS-232C Signals

- **Receive Data (RXD):...**(input)  
Conveys signals from the printer or the PC.
- **Transmit Data (TXD):...**(output)  
Conveys signals from the unit to the printer or the PC. A "Mark" condition is held unless data or BREAK signals are being transmitted.
- **Data Terminal Ready (DTR):...**(output)  
This signal line is turned ON by the unit to indicate that it is ON LINE. Circuit ER (DTR) ON does not indicate that communication has been established with the printer or the PC. It is switched OFF when the unit is OFF LINE.
- **Signal Ground (SG)**  
Connects to the DC ground of the unit for all interface signals.
- **Data Set Ready (DSR):...**(input)  
An ON condition of circuit DR (DSR) indicates the printer or the PC is ready. Circuit DR (DSR) ON does not indicate that communication has been established with the printer or the PC.
- **Request To Send (RTS):...**(output)  
This lead is held ON whenever DR (DSR) is ON.

### 3.10.1 Connection of Peripherals

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- **Clear To Send (CTS):...**(input)  
An ON condition of circuit CS (CTS) indicates that the printer or the PC is ready to receive data from the unit. The unit does not attempt to transfer data or receive data when circuit CS (CTS) is OFF.
- **Frame Ground (FG)**  
Connects to the unit frame and the earth ground conductor of the AC power cord.

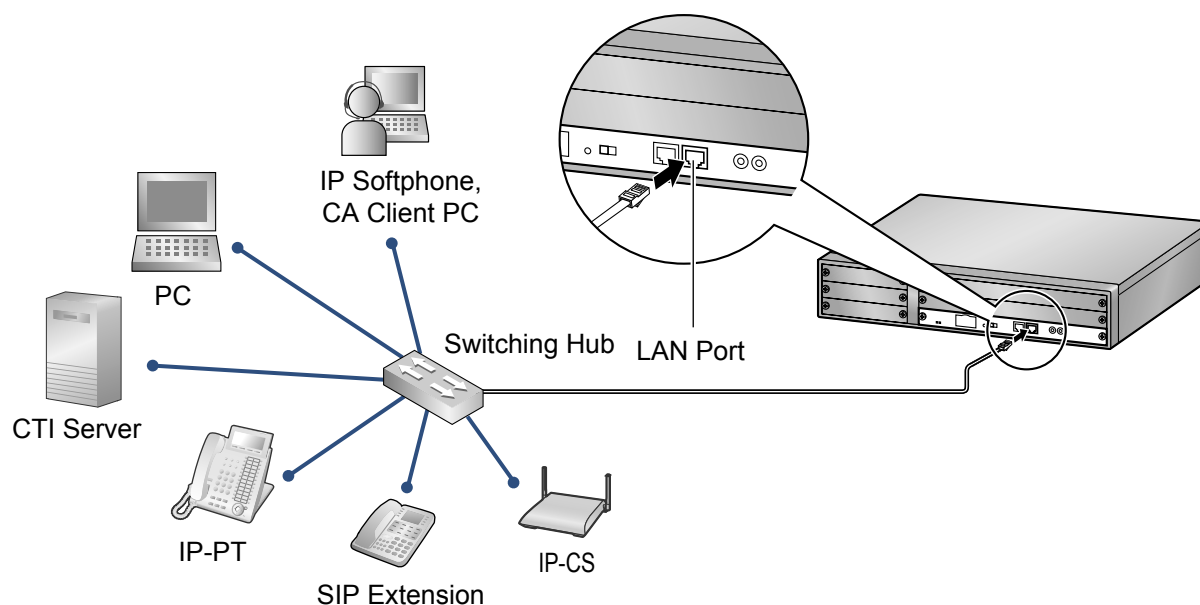


## 3.11 LAN Connection

### 3.11.1 LAN Connection

#### Connection Chart for LAN Connection

The PBX is equipped with a LAN port for connecting to a LAN so that IP telephones (IP-PTs, IP softphones, SIP Extensions), IP-CSs, PCs and a CTI Server can be connected on a private IP network.



| Switching Hub |         | PBX (LAN Port) |             |
|---------------|---------|----------------|-------------|
| Signal Name   | Pin No. | Pin No.        | Signal Name |
| TX+           | 1       | 1              | RX+         |
| TX-           | 2       | 2              | RX-         |
| RX+           | 3       | 3              | TX+         |
| RX-           | 6       | 6              | TX-         |

#### Note

- Use an Ethernet straight cable with an RJ45 connector for connection to a switching hub. The cable should be a 10BASE-T/100BASE-TX CAT 5 or higher cable.
- Make sure that all the CAT 5 cables in use are not over 100 m in length.
- Make sure to create a spanning tree for LAN connection in order to prevent loops from occurring in a multi-bridged environment. Otherwise, some packets may circulate for long periods of time and eventually PBX performance system may degrade.
- The CTI server can be used for connecting PCs on a LAN to provide third party call control CTI. CTI connection uses the CSTA Phase 3 or TAPI 2.1 protocol. The operating system of the PC or CTI server required for third party call control depends on your CTI application software. For details, refer to the manual for your CTI application software.

## 3.12 Power Failure Connections

### 3.12.1 Power Failure Connections

When the power supply to the PBX fails, power failure transfer (PFT) will switch from the current connection to the Power Failure Connection. Refer to "2.4.1 Power Failure Transfer" in the Feature Guide for further information.

#### Using Analogue Trunk Card and Extension Card

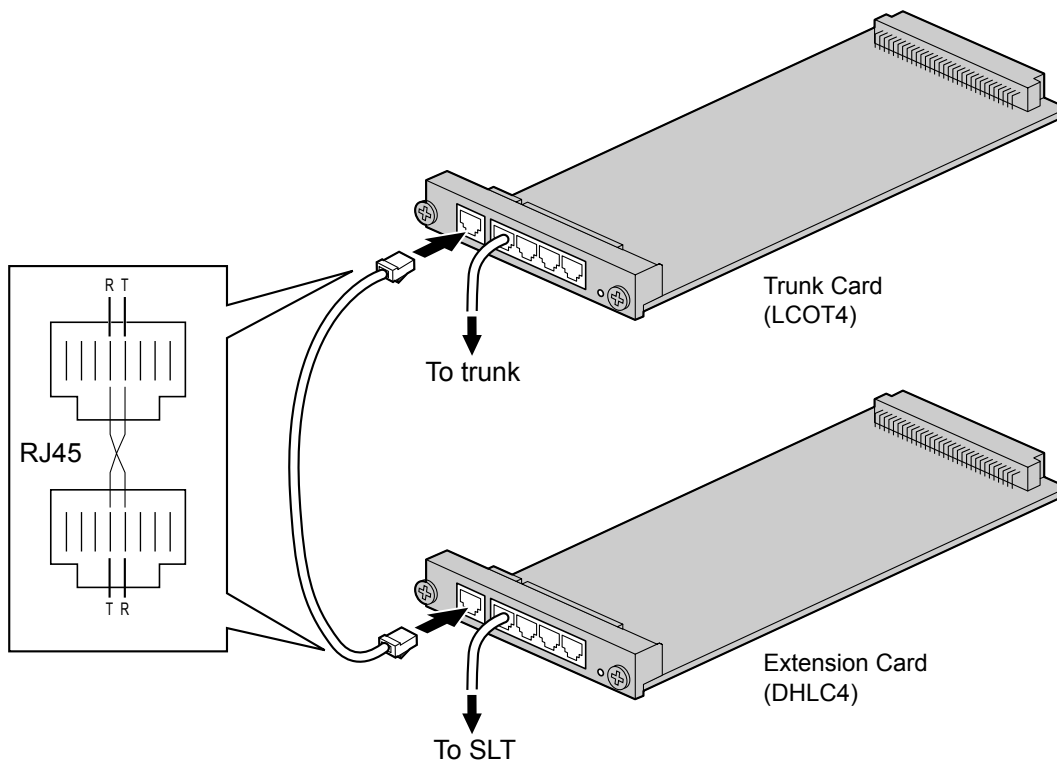
Power Failure Connection connects a specific SLT and a trunk in the event of power failure. The following analogue trunk and extension card can be used for Power Failure Connections:

- **Analogue trunk card:** LCOT4 (1 PFT port)
- **Extension card:** DHLC4 (1 PFT port)

To 1 analogue trunk card, connect only 1 extension card.

#### Note

By programming the PBX, a trunk conversation established during power failure can be maintained even when the power returns and the connection is switched back to the normal configuration from the Power Failure Connection. However, if no special programming is performed, the connection will be dropped when power returns.

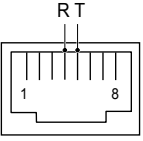


#### Accessories and User-supplied Items

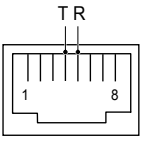
**Accessories (included):** none

**User-supplied (not included):** RJ45 connectors

**RJ45 Connector Pin Assignments for Analogue Trunk Card****PFT Port**

|   | No. | Signal Name | Function |
|---|-----|-------------|----------|
|  | 1-3 | Reserved    | —        |
|   | 4   | R           | Ring     |
|   | 5   | T           | Tip      |
|   | 6-8 | Reserved    | —        |

**RJ45 Connector Pin Assignments for Extension Card****PFT Port**

|   | No. | Signal Name | Function |
|---|-----|-------------|----------|
|  | 1-3 | Reserved    | —        |
|   | 4   | T           | Tip      |
|   | 5   | R           | Ring     |
|   | 6-8 | Reserved    | —        |

## 3.13 Starting the PBX

### 3.13.1 Starting the PBX

#### **WARNING**

Make sure that the AC outlet is properly earthed, then securely connect the 3-pin AC plug including the earthed pin.

#### **CAUTION**

- Use only the AC power cord included with the PBX.
- Before touching the System Initialise Switch, discharge static electricity by touching ground or wearing an earthing strap.
- Once you have started the PBX and if you unplug the PBX, do not perform the following procedures to start the PBX again. Otherwise, your programmed data is cleared. To restart the PBX, refer to "5.1.4 Using the Reset Button".
- The power supply cord is used as the main disconnect device. Ensure that the AC outlet is located near the equipment and is easily accessible.

#### **Notice**

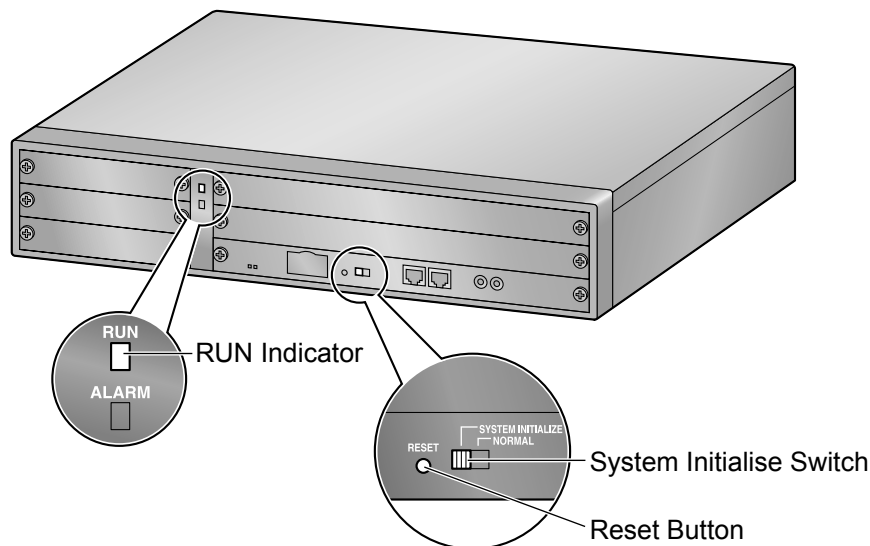
The SD Memory Card must be inserted in the SD Memory Card slot of the IPCMPR card before startup.

#### **Note**

The PBX will continue to be powered even if the power switch is turned "OFF".

### System Initialisation Procedure

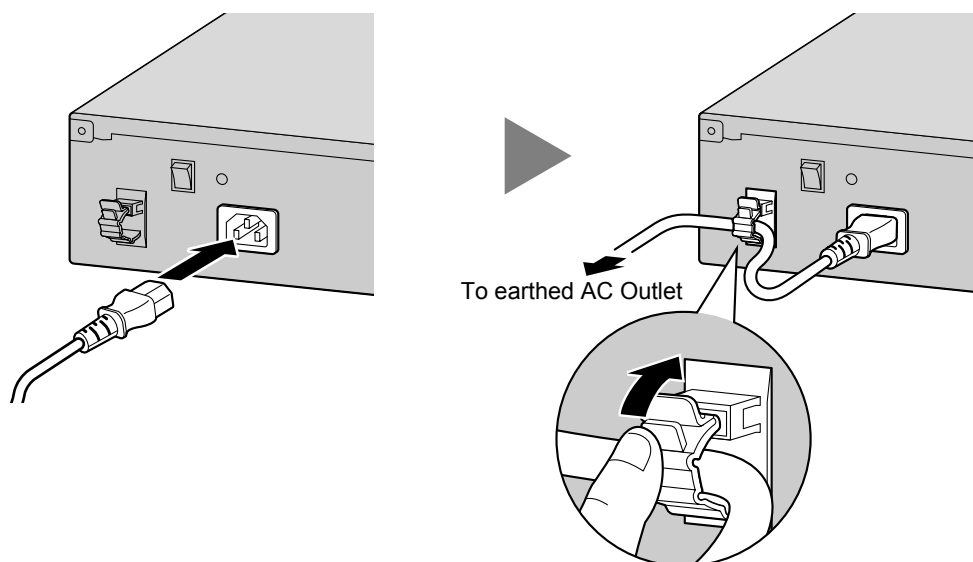
1. Slide the System Initialise Switch to the "SYSTEM INITIALIZE" position.



2. Plug the AC power cord into the PBX and pass the cord through the hook clip as indicated. Push the hook clip in the direction of the arrow until it clicks.

**Note**

For safety reasons, do not stretch or pinch the AC power cord.



3. Plug the other end of the cord into an AC outlet and turn on the PBX. The RUN indicator will flash.
  4. While the RUN indicator is flashing, slide the System Initialise Switch back to the "NORMAL" position. Depending on the configuration, initialisation takes about 1 min to 3 min. If successfully executed, the RUN indicator will stop flashing and stay lit.
- All data will be cleared, and the PBX as well as all optional service cards will be initialised to the default values. The DPTs should show the time as 01:00.

**Note**

When initialising the PBX, the built-in ESVM card will also be initialised. Therefore, the built-in ESVM card feature may not be used for up to 2 minutes after the PBX starts.

## LED Indications

| Indication | Colour | Description   |
|------------|--------|---|
| RUN        | Green  | PBX status indication <ul style="list-style-type: none"> <li>• OFF: Power Off (includes normal reset)</li> <li>• ON: Power On and running (on-line)</li> <li>• Flashing (60 times per minute): Starting up</li> <li>• Flashing (120 times per minute): Starting up or resetting with:               <ul style="list-style-type: none"> <li>• the System Initialise Switch in "SYSTEM INITIALIZE" position</li> <li>• the SD Memory Card not inserted</li> </ul> </li> </ul> |
| ALARM      | Red    | Alarm indication <ul style="list-style-type: none"> <li>• OFF: Normal</li> <li>• ON: Alarm (CPU stop, alarm for each optional service card)</li> <li>• Flashing: Alarm (IPCMPR file error in restarting)</li> </ul>   |

## Confirming the Trunk Connection

After initialisation, programme the PBX and connect trunks to the PBX.

To confirm that the trunks are successfully connected, dial [\*] [3] [7] + trunk number (3 digits) on a PT, or press the PT's S-CO button. You will hear a dial tone if the trunk is available and connected.

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## **Section 4**

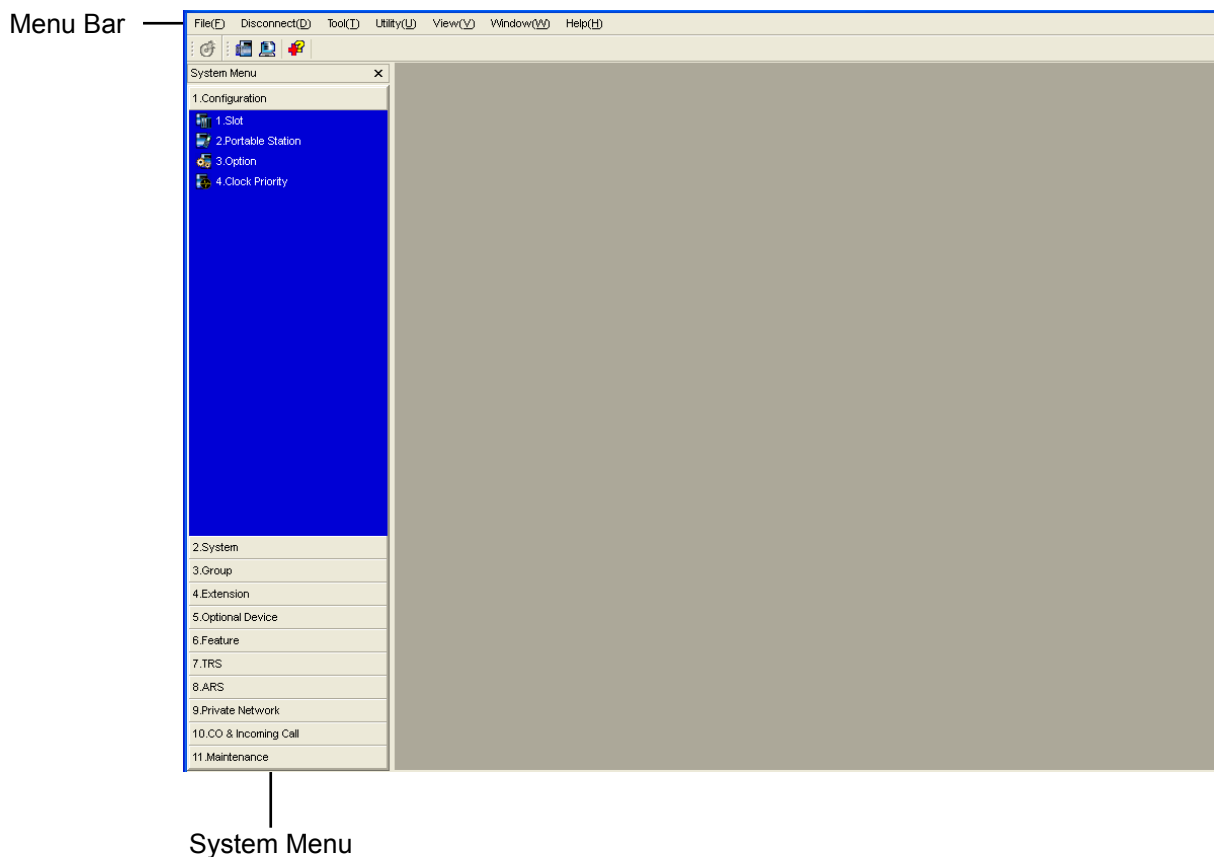
# ***Guide for the Maintenance Console***

*Explains the installation procedure, structure, and basic information of the Maintenance Console.*

## 4.1 Overview

### 4.1.1 Overview

The Maintenance Console is designed to serve as an overall system programming reference for the PBX. To programme and administer the PBX by PC, you need to install the Maintenance Console onto the PC. This section describes overview and installation of the Maintenance Console only.



#### **Note**

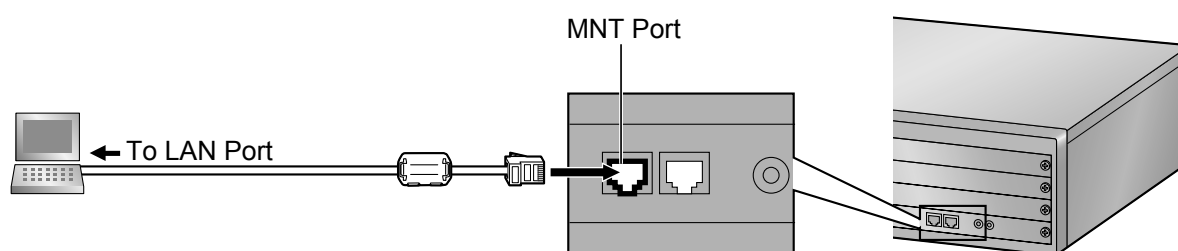
The contents and design of the software are subject to change without notice.



## 4.2 PC Connection

### 4.2.1 PC Connection

#### Connection via MNT Port of IPCMPR Card



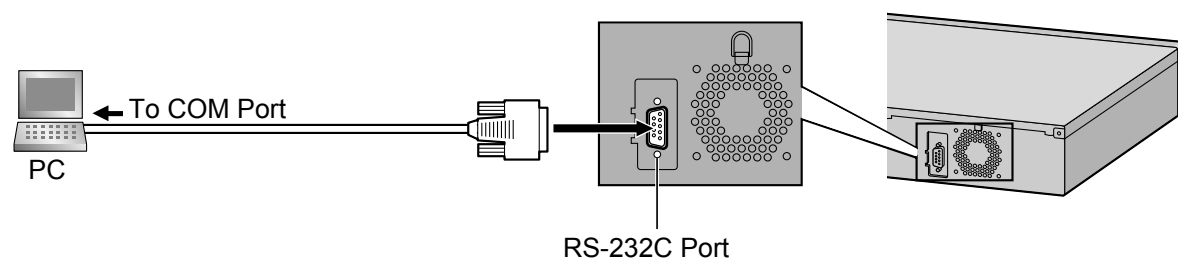
#### **Notice**

When connecting a PC to the PBX, a fixed IP address must be assigned to the PC. For information about fixed IP addresses, ask your network administrator.

#### **Note**

For pin assignments and maximum cabling distance, refer to "3.10.1 Connection of Peripherals".

#### Serial Interface Connection



#### **CAUTION**

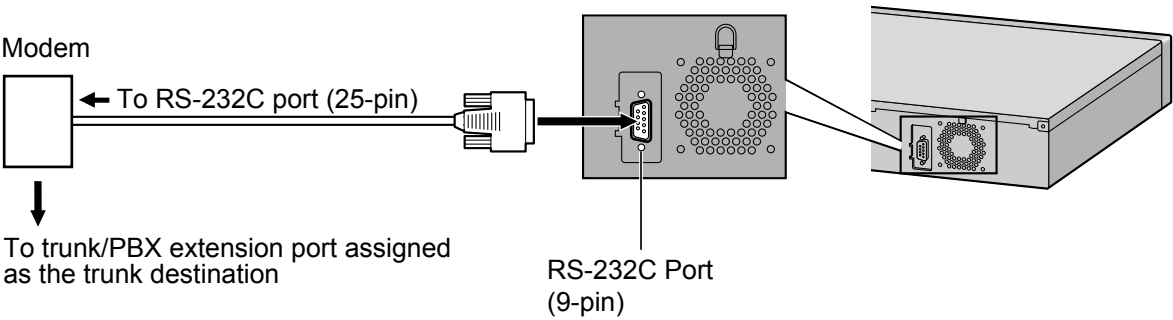
To protect the system, keep the following in mind:

1. Make sure that both connector cases (frame ground) of the RS-232C cross cable (shielded cable) are conductive. If they are not conductive, make sure that both connector cases of the cable are firmly connected.
2. If this is not possible, connect the frame of the PBX to the frame of the PC using an earthing wire in order to prevent difference in the electrical potentials.

#### **Note**

For pin assignments and maximum cabling distance, refer to "3.10 Connection of Peripherals".

External Modem Connection



| External Modem (25-pin) |         | PBX (9-pin) |             |
|-------------------------|---------|-------------|-------------|
| Signal Name             | Pin No. | Pin No.     | Signal Name |
| RD (RXD)                | 3       | 2           | RD (RXD)    |
| SD (TXD)                | 2       | 3           | SD (TXD)    |
| ER (DTR)                | 20      | 4           | ER (DTR)    |
| DR (DSR)                | 6       | 6           | DR (DSR)    |

CAUTION

- To protect the system, keep the following in mind:
1. Make sure that both connector cases (frame ground) of the RS-232C straight cable (shielded cable) are conductive. If they are not conductive, make sure that both connector cases of the cable are firmly connected.
  2. If this is not possible, connect the frame of the PBX to the frame of the external modem using an earthing wire in order to prevent difference in the electrical potentials.

After connecting the PBX and the external modem, set the power switch of the external modem to "ON", then the external modem will be initialised with the default values.

The following AT command settings may be required for the modem:

- The Data Terminal Ready (DTR) signal should be ignored.
- The Data Terminal Equipment (DTE)/Modem flow control should be turned off.
- Data compression should be disabled.
- Error Correction is not necessary.

Note

- An AT command (for initialisation, enabling automatic answer, etc.) can only be programmed by the Maintenance Console. "AT&F" is stored as the default value.
- For more information about the AT command, refer to the external modem's instructions.

## 4.3 Installation of the Maintenance Console

### 4.3.1 Installing and Starting the Maintenance Console

#### System Requirements

##### Required Operating System

- Microsoft® Windows® XP, Windows Vista® Business, Windows 7, Windows 7 Professional, Windows 8, or Windows 8 Professional operating system

##### Minimum Hardware Requirements

- HDD: 1 GB of available hard disk space
- The PC must fulfil the hardware requirements of the installed Microsoft Windows operating system.

##### Recommended Display Settings

- Screen resolution: XGA (1024 × 768)
- DPI setting: Normal size (96 DPI)

#### Password Security

##### **CAUTION**

##### **To the Administrator or Installer regarding the system password**

1. Please provide all system passwords to the customer.
2. To avoid unauthorised access and possible abuse of the PBX, keep the passwords secret, and inform the customer of the importance of the passwords, and the possible dangers if they become known to others.
3. The PBX has default passwords preset. For security, change these passwords the first time that you programme the PBX.
4. Change the passwords periodically.
5. It is strongly recommended that passwords of 10 numbers or characters be used for maximum protection against unauthorised access. For a list of numbers and characters that can be used in system passwords, refer to "1.1.2 Entering Characters" in the PC Programming Manual.

#### Installing the Maintenance Console

##### **Note**

- Make sure to install and use the latest version of the Maintenance Console.
  - To install or uninstall the software on a PC running Windows XP Professional, you must be logged in as a user in either the "Administrators" or "Power Users" group.
  - To install or uninstall the software on a PC running Windows Vista Business, Windows 7, Windows 7 Professional, Windows 8, or Windows 8 Professional, you must be logged in as a user in the "Administrators" group.
1. Copy the setup file of the Maintenance Console to your PC.
  2. Double-click the setup file to run the installer.
  3. Follow the on-screen instructions provided by the installation wizard.

## Starting the Maintenance Console and Assigning the Basic Items (Quick Setup)

When you start the Maintenance Console with the Installer Level Programmer Code and connect to the PBX for the first time after initialisation (with the factory default setting), Quick Setup will launch automatically. During Quick Setup, you will set up the basic items. For details about the basic items, refer to "2.3.4 Quick Setup" in the Feature Guide.

1. Connect the PC to the PBX with an Ethernet straight cable or RS-232C cross cable.
2. Start the Maintenance Console from the Start menu.
3. "Information before programming" appears.
  - a. Carefully read this important additional information, which includes updates to this and other manuals.
  - b. Click **OK** to close this window.
4.
  - a. Enter the Installer Level Programmer Code (default: **INSTALLER**).

### **Note**

There are 2 other Programmer Codes with limited authorisation: Administrator Level (default: **ADMIN**), and User Level (default: **USER**).

- b. Click **OK**.
5. Click **Connect**.
6.
  - a. Select **KX-NCP500/1000** from **PBX Model**.
  - b. Select the **LAN** or **RS-232C** tab, depending on the type of PC connection with the PBX.
  - c. Specify the settings as required.

### **Note**

When connecting to the PBX for the first time selecting **LAN**, the **IP Address** and **Port Number** must be set to **192.168.0.101** and **35300** respectively.

- d. Enter the system password for installer (default: **1234**).
  - e. Click **Connect**.
7. **When country/area data do not match:**
  - a. Click **OK** to replace the country/area data of the PBX. Replacement may take several minutes to complete.
  - b. Follow the procedure described in "3.13.1 Starting the PBX" and restart the PBX.
  - c. Repeat step **5** to reconnect the Maintenance Console to the PBX.
8. Follow the instructions of the Quick Setup wizard and assign the basic items (Quick Setup). After Quick Setup is completed, if the IP addressing information was not changed and a V-IPEXT card was installed during setup, the IP-PT registration screen is displayed. For information on registering IP-PTs to the PBX, refer to "3.15 [1-1] Slot—Port Property - Virtual IP Extension" in the PC Programming Manual. You may now begin programming the PBX.

### **Notice**

1. During a long programming session, it is highly recommended that you periodically save the system data to the SD Memory Card. If the PBX undergoes a sudden power failure or if the system is reset for some reason, all the system data in RAM will be lost. However, if system data has been saved to the SD Memory Card, it can be easily restored.  
To save the system data to the SD Memory Card, (1) click the **"SD Memory Backup"** icon before resetting the PBX or turning off the power, or (2) exit the Maintenance Console so that the PBX automatically saves the system data.

2. The PC will not perform any shutdown operation, or enter the power-saving system standby mode while the Maintenance Console is connected to the PBX. To perform either of the operations above, first close the connection to the PBX.

#### **CAUTION**

Do not remove the SD Memory Card while power is supplied to the PBX. Doing so may cause the PBX to fail to start when you try to restart the system.

#### 4.3.1 Installing and Starting the Maintenance Console

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## **Section 5**

# ***Troubleshooting***

*This section provides information on the PBX and telephone troubleshooting.*

## 5.1 Troubleshooting

### 5.1.1 Installation

| PROBLEM  | PROBABLE CAUSE                       | SOLUTION   |
|--|--------------------------------------|--|
| You cannot make/receive calls via an IP network. | • DSP card malfunction               | • Replace the corresponding card.  |
|  | • IPCMPR card malfunction            | • Replace the IPCMPR card (be sure to turn off the PBX when replacing).  |
|  | • Not enough activation keys         | • Purchase additional activation key codes. Please consult a certified dealer for details.   |
|  | • Poor connection                    | <ul style="list-style-type: none"> <li>• Make sure that an 8-pin twisted pair cable is used for connection.</li> <li>• Make sure that none of the CAT 5 cables in use are over 100 m in length.</li> <li>• Make sure that a straight cable is used for connection to a switching hub.</li> </ul> |
|  | • Network malfunction                | <ul style="list-style-type: none"> <li>• Make sure that all network devices in use are switched on.</li> <li>• Make sure that there is no unwanted firewall in the IP network.</li> </ul>  |
| IP-PTs/SIP Extensions do not operate.            | • DSP card malfunction               | • Replace the corresponding card.  |
|  | • IPCMPR card malfunction            | • Replace the IPCMPR card (be sure to turn off the PBX when replacing).  |
|  | • Not enough activation keys         | • Purchase additional activation key codes. Please consult a certified dealer for details.   |
|  | • IP-PT/SIP Extension not registered | • Register the corresponding IP-PT/SIP Extension.  |
|  | • IP-PT/SIP Extension malfunction    | • Replace the IP-PT/SIP Extension.   |
|  | • Poor connection                    | <ul style="list-style-type: none"> <li>• Make sure that an 8-pin twisted pair cable is used for connection.</li> <li>• Make sure that none of the CAT 5 cables in use are over 100 m in length.</li> <li>• Make sure that a straight cable is used for connection to a switching hub.</li> </ul> |
|  | • Network malfunction                | <ul style="list-style-type: none"> <li>• Make sure that all network devices in use are switched on.</li> <li>• Make sure that the IP-PT/SIP Extension is not blocked by the firewall or other network devices.</li> </ul>  |



| PROBLEM  | PROBABLE CAUSE  | SOLUTION   |
|--|---|--|
| Extensions (except IP-PT/ SIP Extension) do not operate.   | <ul style="list-style-type: none"> <li>Extension card malfunction</li> </ul>  | <ul style="list-style-type: none"> <li>Replace the corresponding card.</li> </ul>  |
|  | <ul style="list-style-type: none"> <li>Poor connection between the PBX and the extension</li> </ul>                                       | <ul style="list-style-type: none"> <li>Take the extension and plug it into the same extension port using a short telephone cord. If the extension works, then the connection between the PBX and the extension must be repaired.</li> </ul>  |
|  | <ul style="list-style-type: none"> <li>A telephone with an A-A1 relay is connected.</li> </ul>  | <ul style="list-style-type: none"> <li>Make sure that a 2-wire cord is used.</li> <li>Make sure that the A-A1 relay switch of the telephone is in "OUT" or "OFF" position.</li> </ul>  |
|  | <ul style="list-style-type: none"> <li>Extension malfunction</li> </ul>   | <ul style="list-style-type: none"> <li>Take the extension and plug it into another extension port that is working. If the extension does not work, replace the extension.</li> </ul>   |
| The PBX does not operate properly.   |   | <ul style="list-style-type: none"> <li>Press the Reset Button (refer to "5.1.4 Using the Reset Button").</li> <li>Turn off the power switch, and then turn it back on.</li> <li>Turn off the power switch, and then unplug the PBX. After 5 minutes, plug the PBX back in, and turn the power switch back on.</li> </ul> |
| Noise on external paging.  | <ul style="list-style-type: none"> <li>Induced noise on the wire between the PBX and the amplifier.</li> </ul>                            | <ul style="list-style-type: none"> <li>Use a shielded cable as the connection wire between the PBX and amplifier. A short shielded cable is recommended.</li> </ul>  |
| Distorted external music.  | <ul style="list-style-type: none"> <li>Excessive input level from external music source.</li> </ul>                                       | <ul style="list-style-type: none"> <li>Decrease the output level of the external music source by using the volume control on the music source.</li> </ul>  |
| Alternate Calling—Ring/Voice and Live Call Screening (LCS) do not function as set when using a Wireless Phone (KX-T7880/ KX-T7885/KX-TD7894/ KX-TD7895). | <ul style="list-style-type: none"> <li>Voice-calling mode and Hands-free mode with LCS are not available with Wireless Phones.</li> </ul> | <ul style="list-style-type: none"> <li>Switch the calling mode to ring-calling.</li> <li>Set the LCS mode to "Private".</li> </ul>   |
| The ALARM indicator on the front of the cabinet turns on red.  | <ul style="list-style-type: none"> <li>A major system error occurs in the PBX.</li> </ul>   | <ul style="list-style-type: none"> <li>See the error log using the Maintenance Console (refer to "5.1.5 Troubleshooting by Error Log").</li> </ul>   |

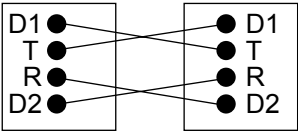
### 5.1.1 Installation

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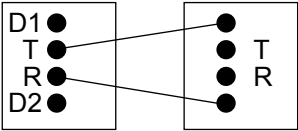
| PROBLEM  | PROBABLE CAUSE  | SOLUTION   |
|--|---|--|
| The LINK indicator of the IPCMPR does not turn on. | <ul style="list-style-type: none"><li>• IPCMPR card malfunction</li></ul> | <ul style="list-style-type: none"><li>• Replace the IPCMPR card (be sure to turn off the PBX when replacing).</li></ul>  |
|  | <ul style="list-style-type: none"><li>• Poor connection.</li></ul>        | <ul style="list-style-type: none"><li>• Make sure that an 8-pin twisted pair cable is used for connection.</li><li>• Make sure that none of the CAT 5 cables in use are over 100 m in length.</li><li>• Make sure that a straight cable is used for connection to a switching hub.</li></ul> |
|  | <ul style="list-style-type: none"><li>• Network malfunction</li></ul>     | <ul style="list-style-type: none"><li>• Make sure that all network devices in use are switched on.</li></ul>   |

## 5.1.2 Connection

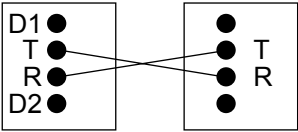
Connection between the PBX and a PT:

| Can you dial an extension? | No | <b>CAUSE</b><br>The T/R is connected to the D1/D2.<br><br>PBX                      Extension | <b>SOLUTION</b><br>Use the correct cord (the inner 2 wires are for T/R and the outer 2 wires are for D1/D2) |
|----------------------------|----|---|---|
|----------------------------|----|---|---|

Connection between the PBX and an SLT:

| CAUSE  | SOLUTION  |
|--|---|
| The T/R is connected to the D1/D2.<br><br>PBX                      Extension | Use the correct cord (the inner 2 wires are for T/R).<br>• If a telephone equipped with an A-A1 relay is connected to the PBX, set the A-A1 relay switch of the telephone to "OFF". |

Connection between the PBX and an SLT that is polarity-sensitive:

| CAUSE   | SOLUTION                            |
|---|-------------------------------------|
| The "T" is connected to the "R".<br><br>PBX                      Extension | Reverse the connections of the T/R. |

Yes

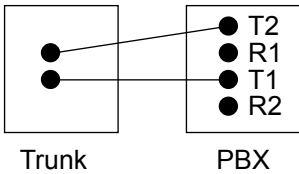
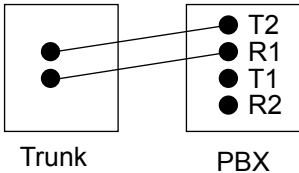
(Continued on the next page.)

Connection between the trunk and the PBX:

(Continued from the previous page.)

Can you dial out on a trunk?

No

| CAUSE  | SOLUTION   |
|--|--|
| <p>Trunk is connected to the T2/T1.</p>  <p>Trunk PBX</p> | <p>Reconnect the trunk to the T1/R1 or T2/R2 of the telephone jack using 2-conductor wiring.</p> |
| <p>Trunk is connected to the T2/R1.</p>  <p>Trunk PBX</p> |  |

## 5.1.3 Operation

| PROBLEM  | PROBABLE CAUSE  | SOLUTION  |
|--|---|---|
| <ul style="list-style-type: none"> <li>Cannot set the IP address, subnet mask address, and PBX IP address to the IP-PT.</li> </ul>     | <ul style="list-style-type: none"> <li>An unusable value is being set.</li> </ul>   | <ul style="list-style-type: none"> <li>Set an IP address within the valid range. IP address of the IP-PT/PBX: "1.0.0.0" to "223.255.255.255" Subnet mask address: "0–255.0–255.0–255.0–255" (except 0.0.0.0 and 255.255.255.255)</li> </ul>   |
| <ul style="list-style-type: none"> <li>Cannot register the IP-PT.</li> </ul>   | <ul style="list-style-type: none"> <li>The necessary network parameters are not set to the IP-PT.</li> </ul>  | <ul style="list-style-type: none"> <li>When not using a DHCP server, set the IP address, subnet mask address, and enter the PBX IP address. If necessary, also enter the IP address of the default gateway.</li> <li>When using a DHCP server, enter the PBX IP address.</li> </ul> |
| <ul style="list-style-type: none"> <li>The IP-PT cannot connect to the PBX.</li> </ul>   | <ul style="list-style-type: none"> <li>The wrong IP address, subnet mask address, PBX IP address, or default gateway address was entered.</li> </ul>        | <ul style="list-style-type: none"> <li>Check each parameter and enter the correct value.</li> </ul>   |
|  | <ul style="list-style-type: none"> <li>The Ethernet cable is not connected correctly.</li> </ul>  | <ul style="list-style-type: none"> <li>Check the Ethernet cable connections.</li> </ul>   |
|  | <ul style="list-style-type: none"> <li>The DHCP server is not active.</li> </ul>  | <ul style="list-style-type: none"> <li>Restart the DHCP server.</li> <li>Disable DHCP and re-enter settings as appropriate.</li> </ul>  |
| <ul style="list-style-type: none"> <li>Whenever you try to make calls using a SIP Extension, a busy tone is heard.</li> </ul>          | <ul style="list-style-type: none"> <li>The status of the port that the SIP Extension is connected to is Out of Service.</li> </ul>                          | <ul style="list-style-type: none"> <li>Change the port status from Out of Service to In Service using the Maintenance Console.</li> </ul>   |
| <ul style="list-style-type: none"> <li>When using the speakerphone on an APT, nothing is audible.</li> </ul>                           | <ul style="list-style-type: none"> <li>The HANDSET/ HEADSET selector is set to the "HEADSET" position.</li> </ul>   | <ul style="list-style-type: none"> <li>When the headset is not used, set the HANDSET/HEADSET selector to the "HANDSET" position.</li> </ul>   |
| <ul style="list-style-type: none"> <li>When using the speakerphone/monitor mode with a DPT, nothing is audible.</li> </ul>             | <ul style="list-style-type: none"> <li>The "HEADSET" mode is selected by Personal Programming, "Handset/Headset Selection".</li> </ul>                      | <ul style="list-style-type: none"> <li>When the headset is not used, select the "HANDSET" mode by Personal Programming.</li> </ul>  |
| <ul style="list-style-type: none"> <li>The PT does not ring.</li> </ul>  | <ul style="list-style-type: none"> <li>The ringer volume is off.</li> </ul>   | <ul style="list-style-type: none"> <li>Turn on the ringer volume.</li> </ul>  |
| <ul style="list-style-type: none"> <li>During a power failure, extensions connected to port 1 of DHLC4 card do not operate.</li> </ul> | <ul style="list-style-type: none"> <li>A DPT or APT is connected to the extension port.</li> <li>The dialling mode (tone or pulse) is incorrect.</li> </ul> | <ul style="list-style-type: none"> <li>Disconnect the DPT or APT and connect an SLT.</li> <li>Set the Tone/Pulse switch to the other position.</li> </ul>   |

### 5.1.3 Operation

---

| PROBLEM   | PROBABLE CAUSE  | SOLUTION   |
|---|---|--|
| <ul style="list-style-type: none"><li>• Originating an outside call, call transfer, or conference cannot be performed.</li></ul>                  | <ul style="list-style-type: none"><li>• The corresponding flexible button does not exist on the PT.</li></ul>   | <ul style="list-style-type: none"><li>• Programme the flexible button. Refer to "1.20.2 Flexible Buttons" in the Feature Guide.</li></ul>                      |
| <ul style="list-style-type: none"><li>• The KX-HGT100 does not work properly, or some features cannot be performed using the KX-HGT100.</li></ul> | <ul style="list-style-type: none"><li>• The firmware of the KX-HGT100 and the MPR software file version of the PBX are not upgraded to their latest versions.</li></ul> | <ul style="list-style-type: none"><li>• Upgrade the firmware of the KX-HGT100 and the MPR software file version of the PBX to their latest versions.</li></ul> |

## 5.1.4 Using the Reset Button

If the PBX does not operate properly, use the Reset Button. Before using the Reset Button, try the system feature again to confirm whether there definitely is a problem or not.

### CAUTION

In order to avoid possible corruption of data on the SD Memory Card, please ensure that the "SD ACCESS" LED is off before pressing the Reset Button.

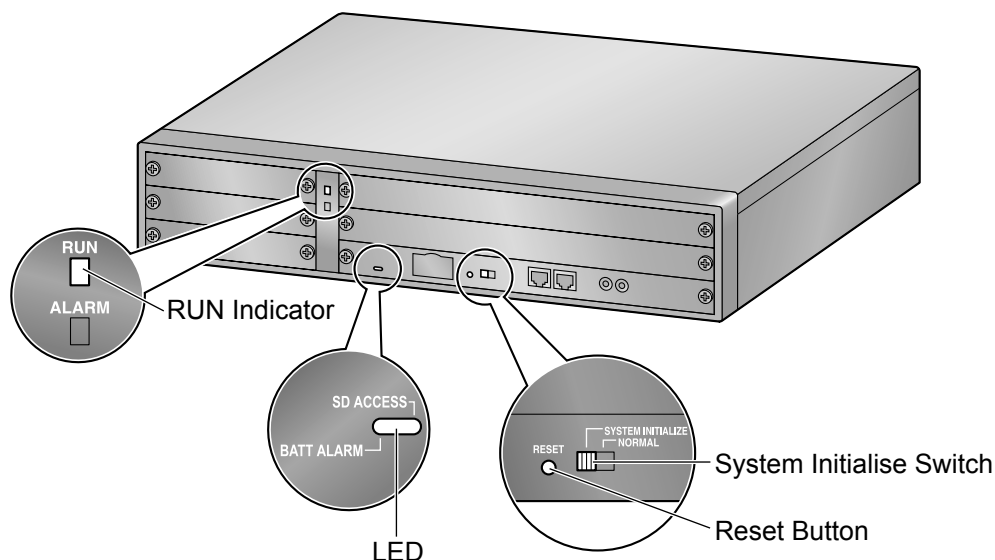
### Note

- When the System Initialise Switch is set to "NORMAL", pressing the Reset Button causes the following:
  - Camp-on is cleared.
  - Calls on hold are terminated.
  - Calls on exclusive hold are terminated.
  - Calls in progress are terminated.
  - Call park is cleared.
 Other data stored in memory, except the above, are not cleared.
- Be aware that pressing the Reset Button with the System Initialise Switch in the "SYSTEM INITIALIZE" position clears all data stored in the PBX. Do not perform this operation unless you intend to delete all data from the PBX.

## Operation

If the PBX does not operate properly:

- Slide the System Initialise Switch to the "NORMAL" position.
- Press the Reset Button for about 1 second.



## 5.1.5 Troubleshooting by Error Log

When a major system error occurs in the PBX, the ALARM indicator on the front of the cabinet turns on red, and the system logs the error information.

### Error Log Display Format

Below is the display format of the error log. For information about how to view the error log using the Maintenance Console, refer to "2.6.8 Utility—Error Log" in the PC Programming Manual.

#### Example: Maintenance Console

| Index | Date       | Time     | Error Code | Sub Code | Error Message  |
|-------|------------|----------|------------|----------|----------------|
| 0     | 05/26/2006 | 17:18:11 | 2          | 10000    | System Restart |

#### Example: Station Message Detail Recording (SMDR)

07/01/01 10:37AM MJ ALM #000 10000 MPR WDT overflow  
07/01/01 11:07AM MN ALM #010 10000 AC power down  
07/01/01 03:55PM MN ALM #301 10501 Digital trunk RAI reception

1 2 3 4 5 6

#### Description

|   | Item       |                | Description   |
|---|------------|----------------|---|
| 1 | Date       |                | The date of the error detection.  |
| 2 | Time       |                | The time of the error detection.  |
| 3 | Level      | Minor (MN ALM) | Displays minor errors, which affect only a certain part of system operation.                    |
|   |            | Major (MJ ALM) | Displays major errors, which affect operation of the whole system, or result in system failure. |
| 4 | Error Code |                | The 3-digit error code assigned by the PBX.   |



|   | Item            | Description  |
|---|-----------------|--|
| 5 | Sub Code        | <p>The 6-digit sub code of the relevant hardware (X1YYZZ).</p> <ul style="list-style-type: none"> <li>• X: Slot type <ul style="list-style-type: none"> <li>– Physical slot: " " (blank)</li> <li>– Virtual slot: "*" (asterisk)</li> </ul> </li> <li>• 1: Cabinet number</li> <li>• YY: Slot number <ul style="list-style-type: none"> <li>– KX-NCP500 (Physical slot): 00 to 05<br/>(00: IPCMPR Card Slot/Built-in ESVM card; 01 to 05: Free Slots)</li> <li>– KX-NCP1000 (Physical slot): 00 to 07<br/>(00: IPCMPR Card Slot/Built-in ESVM card; 01 to 07: Free Slots)</li> <li>– KX-NCP500/KX-NCP1000 (Virtual slot): 01 to 08<br/>(01 to 04: Virtual Trunk Slots; 05 to 08: Virtual Extension Slots)</li> </ul> </li> <li>• ZZ: Port number <ul style="list-style-type: none"> <li>– For optional service cards except OPB3 card:<br/>Port number (01 to 16) will be displayed.</li> <li>– For OPB3 card:<br/>Sub slot number (1 to 3) + port number (1 to 4) will be displayed as follows: <ul style="list-style-type: none"> <li>• Sub slot 1 of OPB3: 11 to 14</li> <li>• Sub slot 2 of OPB3: 21 to 24</li> <li>• Sub slot 3 of OPB3: 31 to 34</li> </ul> </li> </ul> </li> </ul> <p><b>Note</b></p> <p>When there is no parameter for slot and port number, YY and ZZ will be displayed as "00".<br/>Example: Sub code for IPCMPR card = " 10000"</p> |
| 6 | Error Message   | A description of the error.  |
| 7 | Log Information | Displays probable causes of the errors and their solutions.  |



---

## ***Section 6***

### ***Appendix***

## 6.1 Revision History

### 6.1.1 PBMPR Software File Version 2.0xxx

#### New Options

- System Components Table
  - KX-NCS2240      Activation Key for CA PRO for 40 Users (CA Pro 40users)
  - KX-NCS2249      Activation Key for CA PRO for 128 Users (CA Pro 128users)
  - KX-NCP0158CE    8-Channel IP Cell Station Unit Using a V-IPCS4 Card for DECT Portable Station
  - -                    Virtual 4 IP Cell Station Interface Card (V-IPCS4)

#### Changed Contents

- 1.1.2 System Connection Diagram
- 1.3.3 System Capacity
- 2.1.1 Activation Keys
- 3.4.1 Virtual Cards
- 3.8.4 First Party Call Control CTI Connection
- 3.11.1 LAN Connection
- 4.3.1 Installing and Starting the Maintenance Console
- 5.1.3 Operation

## 6.1.2 PBMPR Software File Version 4.1xxx

### New Options

- System Components Table
  - KX-TDA0155CE 2-Channel Cell Station Unit Using a DHLC/DLC Card (PT-interface CS) for DECT Portable Station
  - KX-NCP0158 DECT 6.0 8-Channel IP Cell Station Unit Using a V-IPCS4 Card for DECT 6.0 Portable Station

### Changed Contents

- 1.3.3 System Capacity
- 2.1.1 Activation Keys
- 2.1.2 Activation Key Code and Key Management System

## 6.1.3 PBMPR Software File Version 5.0xxx

### Changed Contents

- 1.3.3 System Capacity
  - Maximum Optional Service Cards
  - Maximum Trunks and Extensions
  - Maximum Terminal Equipment
  - Digital EXtra Device Port (Digital XDP) Connection Capacity
  - Power Supply Unit Capacity
- 2.1.1 Activation Keys
- 3.3.1 IPCMPR Card

## 6.1.4 PBMPR Software File Version 7.0xxx

### Changed Contents

- System Components
- 1.3.3 System Capacity
- 4.3.1 Installing and Starting the Maintenance Console





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The KX-NCP500UK/KX-NCP1000UK/KX-NCP500VUK/KX-NCP500XUK,  
KX-NCP500NE/KX-NCP1000NE/KX-NCP500VNE/KX-NCP500XNE,  
and the KX-NCP500GR/KX-NCP1000GR are designed to interwork with the:

- Analogue Public Switched Telephone Network (PSTN) of European countries
- Pan-European Integrated Services Digital Network (ISDN) using ISDN basic rate access
- Pan-European Integrated Services Digital Network (ISDN) using ISDN primary rate access
- ONP 2048 kbit/s digital structured leased lines (D2048S)

Panasonic System Networks Co., Ltd. declares that the KX-NCP500UK/KX-NCP1000UK/KX-NCP500VUK/KX-NCP500XUK, KX-NCP500NE/KX-NCP1000NE/KX-NCP500VNE/KX-NCP500XNE, and KX-NCP500GR/KX-NCP1000GR are in compliance with the essential requirements and other relevant provisions of Radio & Telecommunications Terminal Equipment (R&TTE) Directive 1999/5/EC.

Declarations of Conformity for the relevant Panasonic products described in this manual are available for download by visiting:

**<http://www.ptc.panasonic.eu>**

Contact to Authorised Representative:  
Panasonic Testing Centre  
Panasonic Marketing Europe GmbH  
Winsbergring 15, 22525 Hamburg, Germany

**For Future Reference**

Please print, record, and retain the following information for future reference.

**Note**

The serial number of this product can be found on the label affixed to the unit. You should record the model number and the serial number of this unit as a permanent record of your purchase to aid in identification in the event of theft.

|                   |                                  |
|-------------------|----------------------------------|
| MODEL NO.         | _____                            |
| SERIAL NO.        | _____                            |
| DATE OF PURCHASE  | _____                            |
| NAME OF DEALER    | _____                            |
| DEALER'S ADDRESS  | _____<br>_____<br>_____<br>_____ |
| DEALER'S TEL. NO. | _____                            |

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