

# Panasonic

## Installation Manual

### Pure IP-PBX



Model No. **KX-TDE100**  
**KX-TDE200**



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-TDE100/KX-TDE200: PMMPR Software File Version 2.0100 or later**



SD Logo is  
a trademark.

# System Components

System Components Table

Category	Model No.	Description
<b>Shelves</b>	KX-TDE100	Basic Shelf
	KX-TDE200	Basic Shelf
<b>Main Processing Card</b>		IP Convergence Main Processing Card (IPCMPR)
<b>IPCMPR Option Cards</b>	KX-TDE0110	16-Channel VoIP DSP Card (DSP16)
	KX-TDE0111	64-Channel VoIP DSP Card (DSP64)
	KX-TDA0196	Remote Card (RMT)
<b>Activation Key Codes</b>	KX-NCS4102	2-Channel IP Trunk Activation Key (2 IP Trunk)
	KX-NCS4104	4-Channel IP Trunk Activation Key (4 IP Trunk)
	KX-NCS4201	1-Channel IP Softphone/IP Proprietary Telephone Activation Key (1 IP Softphone/IP PT)
	KX-NCS4204	4-Channel IP Softphone/IP Proprietary Telephone Activation Key (4 IP Softphone/IP PT)
	KX-NCS4208	8-Channel IP Softphone/IP Proprietary Telephone Activation Key (8 IP Softphone/IP PT)
	KX-NCS4216	16-Channel IP Softphone/IP Proprietary Telephone Activation Key (16 IP Softphone/IP PT)
	KX-NCS4501	1-Channel IP Proprietary Telephone Activation Key (1 IP PT)
	KX-NCS4504	4-Channel IP Proprietary Telephone Activation Key (4 IP PT)
	KX-NCS4508	8-Channel IP Proprietary Telephone Activation Key (8 IP PT)
	KX-NCS4516	16-Channel IP Proprietary Telephone Activation Key (16 IP PT)
	KX-NCS4701	1-Channel SIP Extension Activation Key (1 SIP Extension)
	KX-NCS4704	4-Channel SIP Extension Activation Key (4 SIP Extension)
	KX-NCS4708	8-Channel SIP Extension Activation Key (8 SIP Extension)
	KX-NCS4716	16-Channel SIP Extension Activation Key (16 SIP Extension)
	KX-NCS4910	Activation Key for Software Upgrade to Enhanced Version (Software Upgrade 01)
<b>Virtual Trunk Cards</b>	-	Virtual 16-Channel VoIP Gateway Card (V-IPGW16)
	-	Virtual 16-Channel SIP Trunk Card (V-SIPGW16)

Category	Model No.	Description
<b>Virtual Extension Cards</b>	-	Virtual 32-Channel VoIP Extension Card (V-IPEXT32)
	-	Virtual 32-Channel SIP Extension Card (V-SIPEXT32)
<b>Physical Trunk Cards</b>	KX-TDA0180	8-Port Analogue Trunk Card (LCOT8)
	KX-TDA0181	16-Port Analogue Trunk Card (LCOT16)
	KX-TDA0182	8-Port DID Card (DID8)
	KX-TDA0183	4-Port Analogue Trunk Card (LCOT4)
	KX-TDA0184	8-Port E & M Trunk Card (E&M8)
	KX-TDA0187	T-1 Trunk Card (T1)
	KX-TDA0188	E-1 Trunk Card (E1)
	KX-TDA0189	8-Port Caller ID/Pay Tone Card (CID/PAY8)
	KX-TDA0193	8-Port Caller ID Card (CID8)
	KX-TDA0284	4-Port BRI Card (BRI4)
	KX-TDA0288	8-Port BRI Card (BRI8)
	KX-TDA0290CE	PRI Card (PRI30)
	KX-TDA0290CJ	PRI Card (PRI30)
	KX-TDA0290	PRI Card (PRI23)
	KX-TDA0484	4-Channel VoIP Gateway Card (IP-GW4E)
KX-TDA0490	16-Channel VoIP Gateway Card (IP-GW16)	
<b>Physical Extension Cards</b>	KX-TDA0143	4 Cell Station Interface Card (CSIF4)
	KX-TDA0144	8 Cell Station Interface Card (CSIF8)
	KX-TDA0170	8-Port Digital Hybrid Extension Card (DHLC8)
	KX-TDA0171	8-Port Digital Extension Card (DLC8)
	KX-TDA0172	16-Port Digital Extension Card (DLC16)
	KX-TDA0173	8-Port Single Line Telephone Extension Card (SLC8)
	KX-TDA0174	16-Port Single Line Telephone Extension Card (SLC16)
	KX-TDA0175	16-Port Single Line Telephone Extension with Message Lamp Card (MSLC16)
	KX-TDA0177	16-Port Single Line Telephone Extension Card with Caller ID (CSLC16)
	KX-TDA0470	16-Channel VoIP Extension Card (IP-EXT16)

Category		Model No.	Description	
<b>Other Physical Cards</b>		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-TDA0168	Extension Caller ID Card (EXT-CID)	
		KX-TDA0190	Optional 3-Slot Base Card (OPB3)	
		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)		
<b>Power Supply Units (PSUs)</b>		KX-TDA0103	L-Type Power Supply Unit (PSU-L)	
		KX-TDA0104	M-Type Power Supply Unit (PSU-M)	
		KX-TDA0108	S-Type Power Supply Unit (PSU-S)	
<b>Cell Stations (CSs)</b>	<b>2.4 GHz</b>	KX-TDA0141	2-Channel Cell Station Unit Using a DHLC/DLC Card (PT-interface CS) for 2.4 GHz Portable Station	
		KX-TDA0142	3-Channel Cell Station Unit Using a CSIF Card for 2.4 GHz Portable Station	
		KX-TDA0151	2-Channel Cell Station Unit Using a DHLC/DLC Card (PTinterface CS) for 2.4 GHz Portable Station	
		KX-TDA0152	3-Channel Cell Station Unit Using a CSIF Card for 2.4 GHz Portable Station	
	<b>DECT</b>	KX-TDA0141CE	2-Channel Cell Station Unit Using a DHLC/DLC Card (PT-interface CS) for DECT Portable Station	
		KX-TDA0142CE	4-Channel Cell Station Unit Using a CSIF Card 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	
	<b>DECT 6.0</b>	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	
	<b>Proprietary Equipment</b>		KX-A228	S/M-type Back-up Battery Cable
			KX-A229	L-type Back-up Battery Cable
			KX-A258	Blank Slot Cover
		KX-T30865	Doorphone	
		KX-T7765		

## Equipment Compatibility

### Compatible Panasonic Proprietary Telephones

The PBX supports the following telephones:

- IP proprietary telephones (e.g., KX-NT300 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-TCA355, KX-TCA256, KX-TD7690)
- DSS consoles (e.g., KX-T7640)
- 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

#### **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 "1.2.2 System Connection Diagram".
- <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 service cards and features are not available for certain countries/areas. Consult your certified Panasonic dealer for detailed instructions.
- In this manual, the suffix of each model number (e.g., KX-TDE100**NE**) is omitted unless necessary.

## 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:

<b><u>WARNING</u></b>	This notice means that misuse could result in death or serious injury.
<b><u>CAUTION</u></b>	This notice means that misuse could result in injury or damage to property.

### List of Abbreviations

- APT → Analogue Proprietary Telephone
- 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

## ***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.

**SAVE THESE INSTRUCTIONS**

# 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.
- For safety reasons, do not physically modify the product or any optional equipment.
- The product may only be installed and serviced by qualified service personnel.
- To prevent possible fire or electric shock, do not expose the product to rain or moisture.
- Follow all warnings and instructions marked on the product.
- Do not place the product on an unstable surface, as a fall may cause serious internal damage.
- The product 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 allow anything to rest on the power cord. Do not locate the product where the power cord may be stepped on or tripped on.
- To reduce the risk of fire or electric shock, do not overload wall outlets and extension cords.
- To reduce the risk of electric shock, do not disassemble the product. Only qualified personnel should service the product. Opening or removing covers may expose you to dangerous voltages or other risks. Incorrect reassembly can cause electric shock.
- 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**

- If damage to the unit exposes any internal parts, disconnect the power supply cord immediately and return the unit to your dealer.
- Do not bundle cables that are connected to the PBX with the AC power cords of machines located nearby.  
Use protectors to prevent the cables from being stepped on. Failure to do so may cause fire or electric shock.
- 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.
- Danger of explosion exists if a battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the battery manufacturer. Dispose of used batteries according to the manufacturer's instructions.



- Make sure that the wall that the shelf will be attached to is strong enough to support the shelf. If not, it is necessary for the wall to be reinforced.
- Only use the wall mounting equipment (anchor plug, screws, metal bracket) included with the PBX.
- When driving the screws into the wall, be careful to avoid touching any metal laths, wire laths or metal plates in the wall.
- When placing the metal bracket, make sure that the "TOP" arrow is pointing upward.
- When this product is no longer in use, make sure to detach it from the wall.
- Do not insert objects of any kind into this product through its slots and openings, as they may touch dangerous voltage points or short out parts that could result in a risk of fire or electric shock. Never spill liquid of any kind on or in the product.

## **CAUTION**

### **SAFETY REQUIREMENTS**

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

- 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.
- 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.

#### **For the PBX**

- 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.

#### **For the Cell Station**

##### **2.4 GHz Cell Station (Except for KX-TDA0151CN)**

**Medical**—consult the manufacturer of any personal medical devices, such as pacemakers, to determine if they are adequately shielded from external RF (radio frequency) energy. (The unit operates in the frequency range of 2401 MHz to 2480 MHz, and the power output level can range from 0.004 W to 0.4 W.) Do not use the unit in health care facilities if any regulations posted in the area instruct you not to do so. Hospitals or health care facilities may be using equipment that could be sensitive to external RF (radio frequency) energy.

##### **2.4 GHz Cell Station (Only for KX-TDA0151CN)**

**Medical**—consult the manufacturer of any personal medical devices, such as pacemakers, to determine if they are adequately shielded from external RF (radio frequency) energy. (The unit operates in the frequency range of 2401 MHz to 2480 MHz, and the output peak power level is less than 0.16 W.) Do not use the unit in health care facilities if any regulations posted in the area instruct you not to do so. Hospitals or health care facilities may be using equipment that could be sensitive to external RF (radio frequency) energy.

#### **DECT Cell Station**

**Medical**—consult the manufacturer of any personal medical devices, such as pacemakers, to determine if they are adequately shielded from external RF (radio frequency) energy. (The unit operates in the frequency range of 1881 MHz to 1898 MHz, and the output peak power level is less than 0.25 W.) Do not use the unit in health care facilities if any regulations posted in the area instruct you not to do so. Hospitals or health care facilities may be using equipment that could be sensitive to external RF (radio frequency) energy.

### **DECT 6.0 Cell Station**

**Medical**—consult the manufacturer of any personal medical devices, such as pacemakers, to determine if they are adequately shielded from external RF (radio frequency) energy. (The unit operates in the frequency range of 1920 MHz to 1930 MHz, and the output peak power level is less than 0.12 W.) Do not use the unit in health care facilities if any regulations posted in the area instruct you not to do so. Hospitals or health care facilities may be using equipment that could be sensitive to external RF (radio frequency) energy.

## **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.

# 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. A 5 amp fuse is fitted in this plug. Should the fuse need to be replaced, please ensure that the replacement fuse has a rating of 5 amps 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.

If a new plug is to be fitted, please observe the wiring code as shown below. If in any doubt, please consult a qualified electrician.

### **WARNING**

**This appliance must be earthed.**


**IMPORTANT:** The wires in the mains lead are coloured as follows:

Green-and-yellow: Earth

Blue: Neutral

Brown: Live

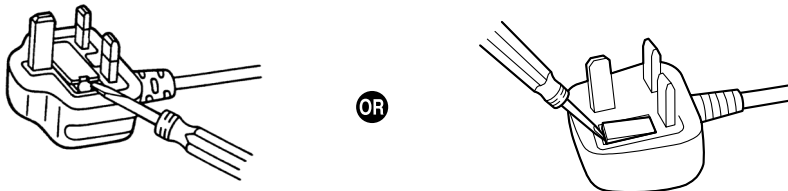
As the colours of the wires in the mains lead of this apparatus may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows.

The wire that is coloured GREEN-AND-YELLOW must be connected to the terminal in the plug that is marked with the letter E or by the safety earth symbol  or coloured GREEN or GREEN-AND-YELLOW.

The wire that is coloured BLUE must be connected to the terminal that is marked with the letter N or coloured BLACK.

The wire that is coloured BROWN must be connected to the terminal that is marked with the letter L or coloured RED.

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



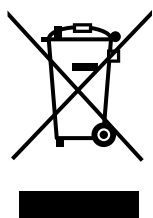
The equipment must be connected to direct extension lines, and a payphone should not be connected as an extension.

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 unit may only be installed in a room or space with restricted access, and equipotential bonding must be applied. For information on earthing, refer to "3.2.5 Frame Earth Connection".

## 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

## Precaution

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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.

### 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.

### Notice

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



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-TDE100/KX-TDE200. 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 System Highlights

## 1.1.1 System Highlights

### IPCMPR Card Features

The IPCMPR card (the preinstalled Main Processing card) includes the following features and resources:

#### VoIP Trunks/VoIP Extensions

The IPCMPR card allows the use of IP trunks (H.323/SIP) and IP telephones (IP-PTs, IP softphones, and SIP Extensions). By connecting a DSP card to the IPCMPR card, these IP trunks and extensions can be used. It is also possible to increase the number of IP trunks (max. 32) and extensions (max. 128) through the purchase of activation key codes.

#### LAN Connection

The IPCMPR card is equipped with a LAN port allowing for the PBX to be connected to a LAN.

#### Computer Telephony Integration (CTI) Features

Connecting a PC to a DPT, or connecting a CTI Server to this PBX, allows functions of the PC, PBX and extensions to be integrated. For example, detailed caller information can be taken from a database and displayed on the PC as a call arrives, or the PC can dial numbers for the extension automatically.

#### Built-in Simplified Voice Message (SVM) Features

The IPCMPR card comes preinstalled with the SVM feature (2 channels), allowing for simple answering machine services to be supported.

### Internet Protocol (IP) Telephone Features

This PBX supports the following telephone features that use IP:

#### IP-PT Features

This PBX supports the connection of IP-PTs which function almost identically to normal PTs. However, they connect to the PBX over a LAN and make and receive calls using IP. In addition, KX-NT300 series IP-PTs support the following features:

- **Self Labelling (KX-NT366 only)**  
The LCDs featured next to the 12 flexible buttons of the KX-NT366 can be programmed to display information regarding the setting of the corresponding flexible button. In addition, the flexible buttons can be organised into 4 "pages" allowing you to assign a total of 4 items to each physical button.
- **Optional Modules**
  - KX-NT307(PSLP1528) Bluetooth® Module:  
Allows for a Bluetooth wireless headset to be connected to a KX-NT300 series IP-PT.
  - KX-NT303 Add-on 12 Key Module:  
Allows for 12 additional flexible buttons to be connected to a KX-NT346 or KX-NT343.
  - KX-NT305 Add-on 60 Key Module:  
Allows for 60 additional flexible buttons to be connected to a KX-NT346 or KX-NT343.
- **High Sound Quality**  
Calls between KX-NT300 series IP-PTs support G.722 CODEC allowing for high sound quality conversations.

#### SIP (Session Initiation Protocol) Extensions

This PBX supports the connection of third party SIP supported IP telephones (hardphones and softphones). SIP Extensions make and receive calls using IP.

#### IP Softphones

This PBX supports the connection of Panasonic IP softphones, providing IP-PT operations and features using software on a PC.

## Internet Protocol (IP) Related Features

### Server Connection

This PBX supports the connection to the following servers, allowing for enhanced efficiency and record keeping:

- **SNMP Server:**  
Allows for users assigned as SNMP managers to manage and receive PBX system status information, such as local alarm information and general system activity using Simple Network Management Protocol (SNMP).
- **SNTP Server:**  
Allows for the PBX to automatically receive and update the time setting using Simple Network Time Protocol (SNTP).
- **DHCP Server:**  
Allows for this PBX to receive IP addresses from a Dynamic Host Configuration Protocol (DHCP) server.

### Peer-to-peer Connection

Intercom calls can be made between peer-to-peer compatible IP extensions allowing for communication without using the PBX's VoIP resources.

## Networking Features

This PBX supports the following networking features:

### Voice over Internet Protocol (VoIP) Network

The PBX can connect to another PBX via a private IP network. In this case, voice signals are converted into IP packets and sent through this network. Automatic rerouting of VoIP calls to public trunks is also available, in case of network difficulties.

### TIE Line Service

A TIE line is a privately leased communication line between two or more PBXs, which provides cost effective communications between company members at different locations.

### Virtual Private Network (VPN)

VPN is a service provided by the VPN service provider. It uses an existing public line as if it were a private line.

### QSIG Network

QSIG is a protocol based on ISDN (Q.931) and offers enhanced PBX features in a private network of two or more connected PBXs.

## External Device Support

The following are just a few of the many useful optional devices available to enhance your telephony system:

### Portable Station (PS) Features

PSs can be connected to this PBX. It is possible to use the PBX features using the PS like a PT. This PBX supports basic CSs (allows up to 4 PSs to be on a call simultaneously) as well as high-density CSs (allows up to 8 PSs to be on a call simultaneously). A PS can also be used in parallel with a wired telephone (**Wireless XDP Parallel Mode**). In this case, the wired telephone is the main telephone and the PS is the sub telephone.

### Cellular Phone Features (KX-NCS4910 required)

This PBX supports the use of cellular phones destinations with the PBX. In combination with the use of certain features such as Virtual PS, DISA, and XDP Parallel mode, cellular phones can make and receive calls as if they were registered extensions.

### Phone Assistant (PA) Pro Series

This PBX supports Phone Assistant Pro Series applications, a collection of highly-intuitive CTI applications that allow you to use your PC to access a variety of PBX features conveniently and efficiently. PA Pro

### 1.1.1 System Highlights

---

series applications combine the efficiency and user-friendliness of CTI applications with the convenience of server-based applications, allowing User IDs, passwords and PBX settings to be configured over a web browser.

#### Voice Mail Features

This PBX supports Voice Processing Systems (VPS) with DTMF Integration as well as DPT (Digital) Integration, connected locally and over a network.

#### ACD Report Server (KX-NCV200)

This PBX supports VPSs with an ACD Report Server. In addition to VPS features, the ACD Report Server provides you with a variety of features, such as monitoring, reporting, call logging features and creating performance graphs, to manage call information efficiently.

## Other Useful Features

### Easy Installation and Setup

#### – With Physical Cards

By simply connecting telephones and outside lines to analogue extension and trunk cards, you can make and receive calls. For digital trunks (e.g., E1, T1, etc.), it may be necessary to first make the required settings and restart the PBX.

#### – With Virtual Cards

By connecting the PBX to the LAN, installing each virtual card and registering the IP telephones through system programming, you can make and receive calls.

### Enhanced Walking Extension Feature

It is possible to use the Walking Extension feature with extensions in Service-in (functions normally) and Service-out (cannot make trunk calls or receive calls) modes, allowing users to use their extensions at home and at work, or for multiple users who work in shifts to use their own extension settings on a single telephone.

### Built-in Small Call Centre Features

An incoming call distribution (ICD) group can be used as a small call centre with the following features:

#### – Queuing Feature

When a preprogrammed number of extensions in an ICD group are busy, additional incoming calls can wait in a queue. While callers are waiting in the queue, they can be sent an outgoing message (OGM) informing the caller of the current situation, or be redirected to another destination or disconnected depending on the amount of time the caller has been waiting.

#### – Log-in/Log-out

ICD group members can join (**Log-in**) or leave (**Log-out**) their groups manually. After a call is completed, a preprogrammed time period where users will not receive calls can be assigned (**Wrap-up**). This gives time for users to make reports about the previous call without be interrupted or allows users to not receive calls while they are taking a break.

#### – VIP Call

The VIP Call feature is one method of making sure that calls from preferred customers or callers are answered quickly. When using VIP Call mode, ICD groups are assigned a priority, allowing calls in higher-priority groups to be answered before calls in lower-priority groups.

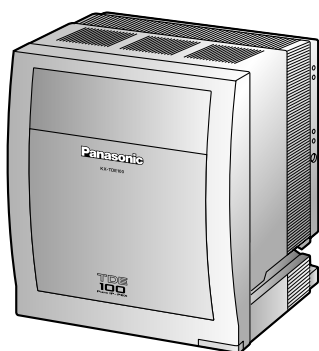
### Hospitality Features

This PBX has several features allowing it to be used effectively and efficiently in a hotel-type environment. These features allow extensions assigned as hotel operators to change and monitor the room status of guest rooms, check or set wake-up calls, and print out records of guest charges.

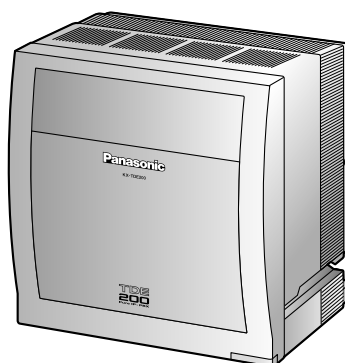
## 1.2 Basic System Construction

### 1.2.1 Basic Shelf

The basic shelf contains an IPCMPR card for controlling the PBX. To use the system, install a power supply unit (PSU) in the PSU Slot and optional service cards in the basic shelf.



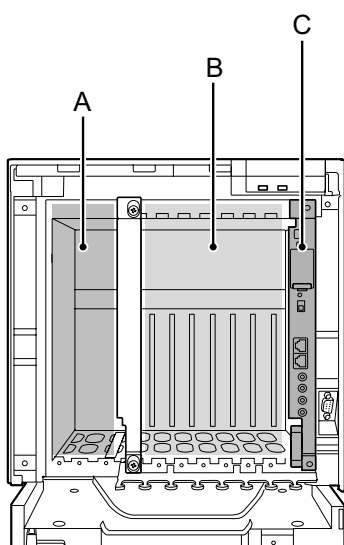
KX-TDE100



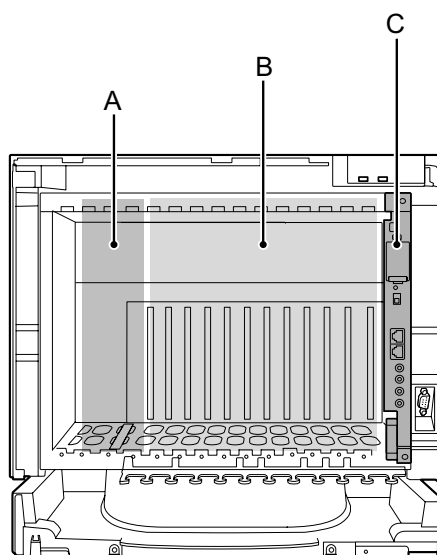
KX-TDE200

### Construction of the Basic Shelf

- A. PSU Slot
- B. Free Slots
- C. IPCMPR Card

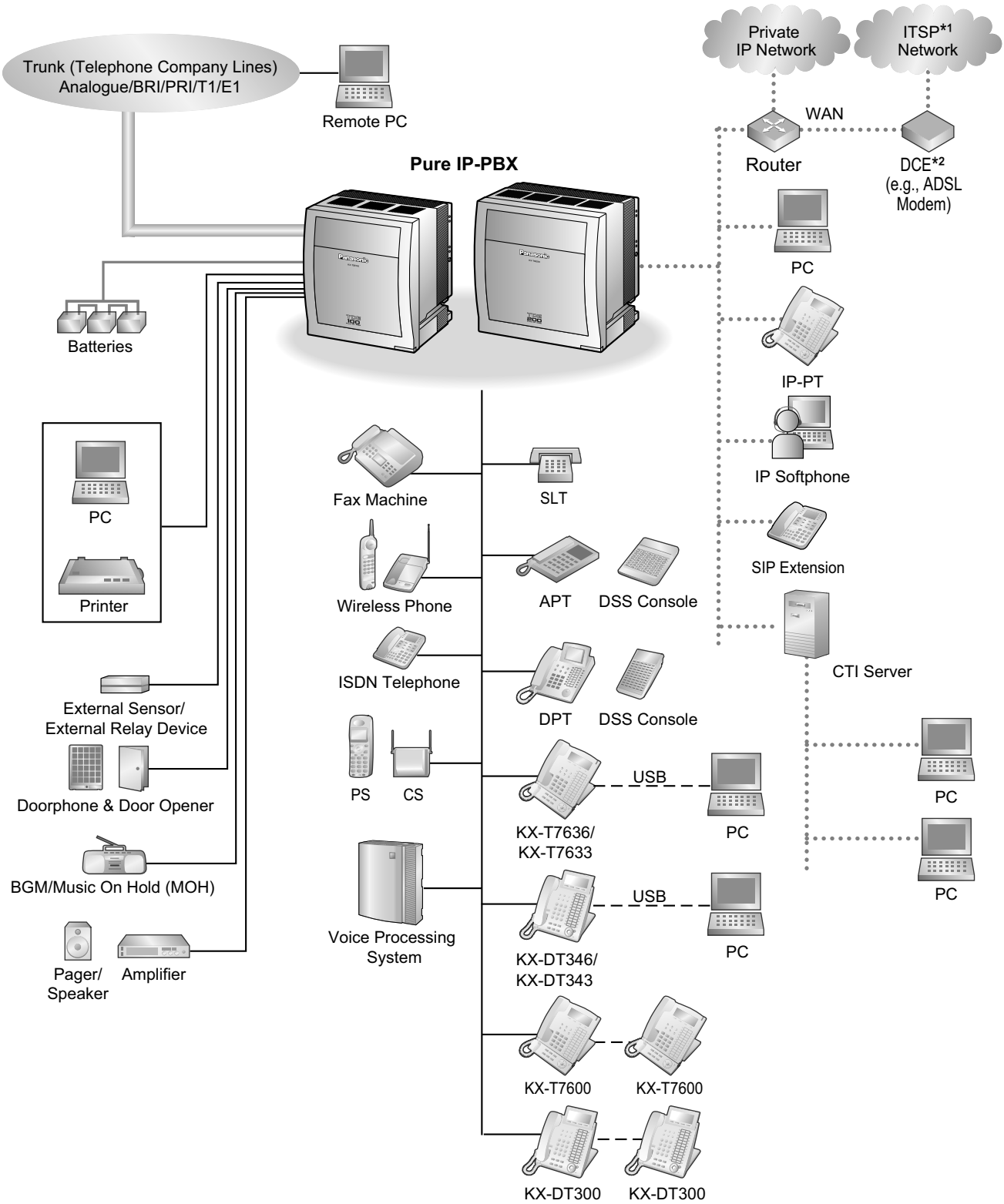


KX-TDE100



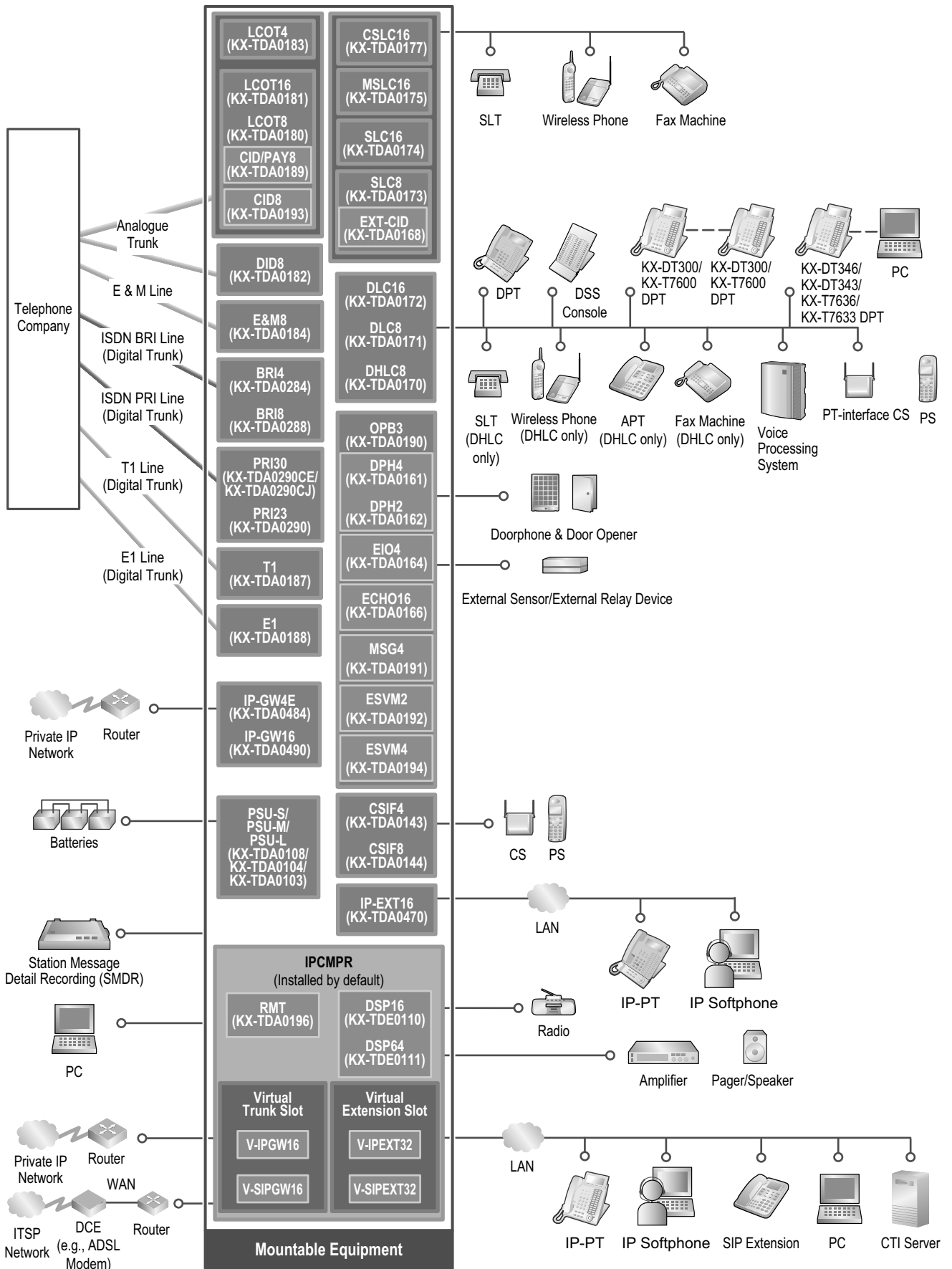
KX-TDE200

## 1.2.2 System Connection Diagram



\*1 ITSP: Internet Telephony Service Provider  
 \*2 DCE: Data Circuit Terminating Equipment





## 1.3 Optional Equipment

### 1.3.1 Optional Equipment

Model No.	Model Name	Description
KX-TDE0110	16-Channel VoIP DSP Card (DSP16)	16-channel digital signal processor card with a 4-Channel IP Trunk activation key and a 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.
KX-TDA0103	L-Type Power Supply Unit (PSU-L)	Power Supply Unit for the KX-TDE200. Total power output of 279 W. Safety Class 1 compliant.
KX-TDA0104	M-Type Power Supply Unit (PSU-M)	Power Supply Unit for the KX-TDE100 and KX-TDE200. Total power output of 140.4 W. Safety Class 1 compliant.
KX-TDA0108	S-Type Power Supply Unit (PSU-S)	Power Supply Unit for the KX-TDE100. Total power output of 74 W. Safety Class 1 compliant.
KX-TDA0143	4 Cell Station Interface Card (CSIF4)	4-port CS interface card for 4 CSs.
KX-TDA0144	8 Cell Station Interface Card (CSIF8)	8-port CS interface card for 8 CSs.
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.
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-TDA0168	Extension Caller ID Card (EXT-CID)	Sends Caller ID signals to extension ports. To be mounted on the SLC8 card only.
KX-TDA0170	8-Port Digital Hybrid Extension Card (DHLC8)	8-port digital hybrid extension card for DPTs, APTs, SLTs, DSS consoles, and PT-interface CSs, with 2 power failure transfer (PFT) ports.
KX-TDA0171	8-Port Digital Extension Card (DLC8)	8-port digital extension card for DPTs, DSS consoles, and PT-interface CSs.

Model No.	Model Name	Description
KX-TDA0172	16-Port Digital Extension Card (DLC16)	16-port digital extension card for DPTs, DSS consoles, and PT-interface CSs.
KX-TDA0173	8-Port Single Line Telephone Extension Card (SLC8)	8-port extension card for SLTs with 2 power failure transfer (PFT) ports.
KX-TDA0174	16-Port Single Line Telephone Extension Card (SLC16)	16-port extension card for SLTs with 4 power failure transfer (PFT) ports.
KX-TDA0175	16-Port Single Line Telephone Extension with Message Lamp Card (MSLC16)	16-port extension card for SLTs with Message Waiting Lamp control and 4 power failure transfer (PFT) ports. Maximum power output of 160 V/90 V for Message Waiting Lamp control.
KX-TDA0177	16-Port Single Line Telephone Extension Card with Caller ID (CSLC16)	16-port extension card for SLTs with Caller ID (FSK) and 4 power failure transfer (PFT) ports.
KX-TDA0180	8-Port Analogue Trunk Card (LCOT8)	8-port analogue trunk card with 2 power failure transfer (PFT) ports.
KX-TDA0181	16-Port Analogue Trunk Card (LCOT16)	16-port analogue trunk card with 4 power failure transfer (PFT) ports.
KX-TDA0182	8-Port DID Card (DID8)	8-port DID trunk card.
KX-TDA0183	4-Port Analogue Trunk Card (LCOT4)	4-port analogue trunk card with 2 power failure transfer (PFT) ports.
KX-TDA0184	8-Port E & M Trunk Card (E&M8)	8-port E & M (TIE) trunk card. Type 5 support.
KX-TDA0187	T-1 Trunk Card (T1)	1-port T1 trunk card. EIA/TIA standard compliant.
KX-TDA0188	E-1 Trunk Card (E1)	1-port E1 trunk card. ITU-T standard compliant.
KX-TDA0189	8-Port Caller ID/Pay Tone Card (CID/PAY8)	8-port Caller ID signal type FSK/FSK (with Call Waiting Caller ID [Visual Caller ID])/DTMF, and 8-port Pay Tone Service (12 kHz/16 kHz). To be mounted on the LCOT8/LCOT16 cards.
KX-TDA0190	Optional 3-Slot Base Card (OPB3)	Optional 3-slot base card for mounting a maximum of 3 option cards from the following: MSG4, ESVM2, ESVM4, DPH4, DPH2, EIO4, or ECHO16 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-TDA0193	8-Port Caller ID Card (CID8)	8-port Caller ID signal type FSK/FSK (with Call Waiting Caller ID [Visual Caller ID])/DTMF. To be mounted on the LCOT8/LCOT16 cards.

### 1.3.1 Optional Equipment

Model No.	Model Name	Description
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-TDA0284	4-Port BRI Card (BRI4)	4-port ISDN Basic Rate Interface card with 1 power failure transfer port. EURO-ISDN/ETSI compliant.
KX-TDA0288	8-Port BRI Card (BRI8)	8-port ISDN Basic Rate Interface card with 1 power failure transfer port. EURO-ISDN/ETSI compliant.
KX-TDA0290CE	PRI Card (PRI30)	1-port ISDN Primary Rate Interface card (30B channels). EURO-ISDN/ETSI compliant.
KX-TDA0290CJ	PRI Card (PRI30)	1-port ISDN Primary Rate Interface card (30B channels). EURO-ISDN/ETSI compliant.
KX-TDA0290	PRI Card (PRI23)	1-port ISDN Primary Rate Interface card (23B channels). NI (North American standard ISDN protocol) compliant.
KX-TDA0470	16-Channel VoIP Extension Card (IP-EXT16)	16-channel VoIP extension card. Compliant with Panasonic proprietary protocol, and ITU-T G.729A and G.711 CODEC methods.
KX-TDA0484	4-Channel VoIP Gateway Card (IP-GW4E)	4-channel VoIP gateway card. Compliant with VoIP H.323 V.2 protocol, and ITU-T G.729A, G.723.1 and G.711 CODEC methods.
KX-TDA0490	16-Channel VoIP Gateway Card (IP-GW16)	16-channel VoIP gateway card. Compliant with VoIP H.323 V.2 protocol, and ITU-T G.729A, G.723.1 and G.711 CODEC methods.

#### Note

For the maximum number of optional service cards that can be installed in the PBX, refer to "1.4.3 System Capacity".

## 1.4 Specifications

### 1.4.1 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>PSU-S</b>	100 V AC to 130 V AC; 1.4 A/200 V AC to 240 V AC; 0.8 A; 50 Hz/60 Hz
	<b>PSU-M</b>	100 V AC to 130 V AC; 2.5 A/200 V AC to 240 V AC; 1.4 A; 50 Hz/60 Hz
	<b>PSU-L</b>	100 V AC to 130 V AC; 5.1 A/200 V AC to 240 V AC; 2.55 A; 50 Hz/60 Hz
<b>External Battery</b>		+36 V DC (+12 V DC × 3, recommended maximum capacity is 28 Ah)
<b>Maximum Power Failure Tolerance</b>		300 ms (without using backup batteries)
<b>Memory Backup Duration</b>		7 years
<b>Dialling</b>	<b>Trunk</b>	Dial Pulse (DP) 10 pps, 20 pps Tone (DTMF) Dialling
	<b>Extension</b>	Dial Pulse (DP) 10 pps, 20 pps 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 Ω 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>		2 ports (Level Control: -11 dB to +11 dB in 1 dB steps) MOH1: External Music Source port MOH2: Selectable Internal/External Music Source port
<b>Paging</b>	<b>Internal</b>	Level Control: -15 dB to +6 dB in 3 dB steps
	<b>External</b>	2 ports (Volume Control: -15 dB to +15 dB in 1 dB steps)
<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)

### 1.4.1 General Description

<b>Extension Connection Cable</b>		SLT	1-pair wire (T, R)
		DPT	1-pair wire (D1, D2) or 2-pair wire (T, R, D1, D2)
		APT	2-pair wire (T, R, D1, D2)
		PT-interface CS	1-pair wire (D1, D2)
		PT-interface CS (High-density)	4-pair wire (D1, D2)
		DSS Console and Add-on Key Module	1-pair wire (D1, D2)
<b>Dimension</b>	<b>KX-TDE100</b>	334 mm (W) × 390 mm (H) × 272 mm (D)	
	<b>KX-TDE200</b>	430 mm (W) × 415 mm (H) × 276 mm (D)	
<b>Weight (when fully mounted)</b>	<b>KX-TDE100</b>	Under 12 kg	
	<b>KX-TDE200</b>	Under 16 kg	

## 1.4.2 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: 130 <math>\Omega</math>; PT-interface 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>1. for PT or SLT</li> <li>2. by Parallel or eXtra Device Port connection of an APT/DPT and an SLT</li> <li>3. 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 Power Supply (BRI4): 4.5 W per 1 line, 10 W per 4 lines Power Supply (BRI8): 4.5 W per 1 line, 20 W per 8 lines 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 $\Omega$

## 1.4.3 System Capacity

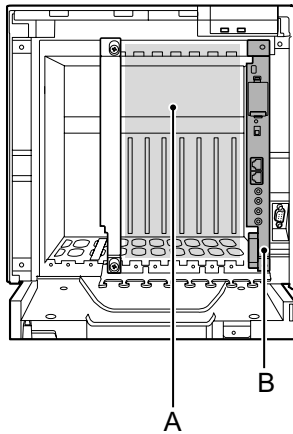
### Type and Maximum Number of Slots

The PBX supports the following type and number of slots.

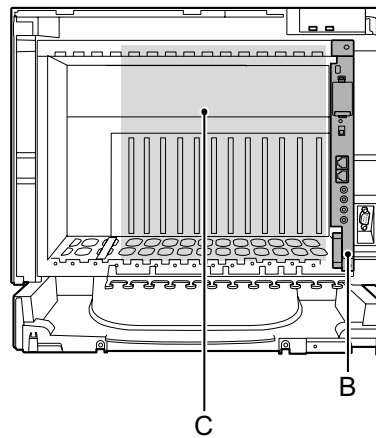
Slot Type		Maximum Number	
		KX-TDE100	KX-TDE200
IPCMPR Card Slot		1	1
Free Slot		6	11
Virtual Slot	Virtual Trunk Slot	4	4
	Virtual Extension Slot	4	4

#### IPCMPR Card Slot and Free Slots

**KX-TDE100**



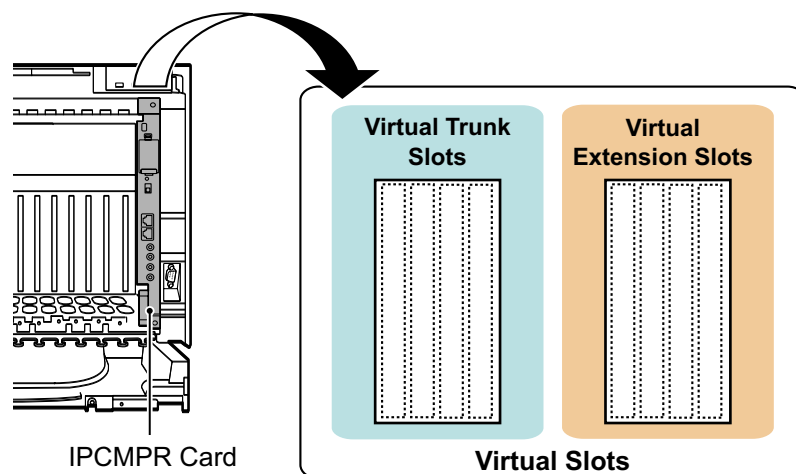
**KX-TDE200**



- A.** Free Slots 1 to 6 (from the left)
- B.** IPCMPR Card Slot
- C.** Free Slots 1 to 11 (from the left)



### Virtual Slots of the IPCMPR Card



## 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**

Card Type	Maximum Number	
	KX-TDE100	KX-TDE200
IPCMR	1	1
Trunk Card	8	8
Virtual Trunk Card	4	4
V-IPGW16	2	2
V-SIPGW16	2	2
Physical Trunk Card	Total 6 <sup>*1</sup>	Total 8 <sup>*2</sup>
LCOT4	6	8
LCOT8		
LCOT16		
DID8		
E&M8		
BRI4		
BRI8		
T1	4	4
E1		
PRI23		
PRI30		
IP-GW4E		
IP-GW16	4	4
Extension Card	8	8
Virtual Extension Card	4	4
V-IPEXT32	2	2
V-SIPEXT32	4	4
Physical Extension Card	Total 6	Total 8
DHLC8	6	8
DLC8		
DLC16		
SLC8		
SLC16		
CSLC16		
MSLC16		
IP-EXT16		
CSIF4	4	4
CSIF8	4	4
OPB3	4	4
<b>Total</b>	<b>14</b>	<b>16</b>

\*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 8.

\*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-TDE100	KX-TDE200	
DSP16	1	1	IPCMPR Card
DSP64			
RMT			
CID/PAY8	12	16	LCOT8 Card/LCOT16 Card
CID8			
EXT-CID	6	8	SLC8 Card
DPH4	4	4	OPB3 Card
DPH2	8	8	
ECHO16	2 <sup>1</sup>	2 <sup>1</sup>	
MSG4	4	4	
ESVM2			
ESVM4			
EIO4	4	4	

<sup>1</sup> 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	KX-TDE100	KX-TDE200
Total Number of Trunks	128	128
Trunk (Physical Trunk Card)	120	128
Trunk (Virtual Trunk Card)	32	32
Total Number of Extensions	256	256
Extension (Physical Extension Card)	160	256
Extension (Virtual Extension Card)	128	128
IP-PT and IP Softphone	64	64
SIP Extension	128	128

### 1.4.3 System Capacity

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**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	KX-TDE100	KX-TDE200
Telephone	256	256
SLT	96	128
KX-DT300/KX-T7600 series DPT	128	256
KX-T7560/KX-T7565 DPT	96	128
Other DPT	32	128
APT	24	64
IP-PT	160	160
IP-PT <sup>1</sup> (supported by IP-EXT16 card)	96	128
IP-PT <sup>2</sup> (supported by IPCMPR card)	64	64
SIP Extension	128	128
DSS console	8	8
CS	32	32
High-density CS	16	16
PS	128	128
Voice Processing System (VPS)	2	2
Doorphone	16	16
Door Opener	16	16
External Sensor	16	16
External Relay	16	16

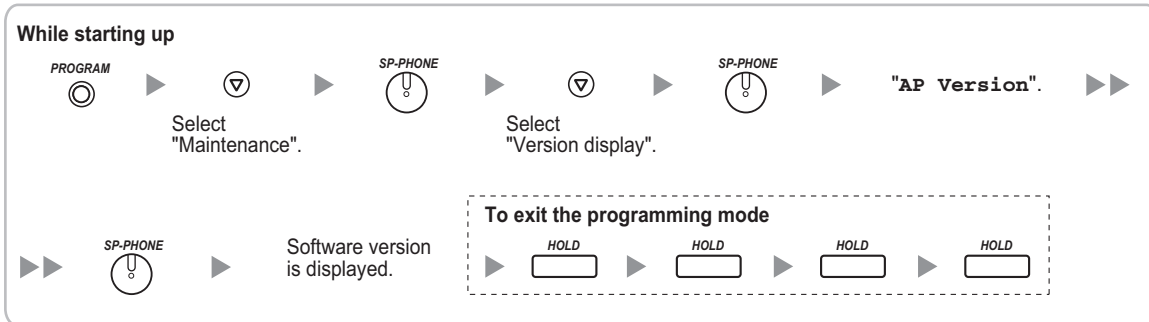
<sup>1</sup> KX-NT300 series (except KX-NT366/KX-NT305), KX-NT265, and KX-NT136

<sup>2</sup> KX-NT300 series and KX-NT265 (software version 2.00 or later only)

### 1.4.3 System Capacity

#### 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:



## Power Supply Unit Selection

The PBX needs a power supply unit (PSU) suitable for its configuration. Calculate the load figure from the type and number of items of equipment to be connected, and determine the type of PSU that will be required.

### 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>	DHLC8	8
	SLC8	8
	SLC16/MSLC16/CSLC16	16
CS (1 unit)		4
High-density CS (1 unit)		8
ISDN Extension		2
VPS (1 port)		1

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

### PSU Capacity

Each PSU supports a different load figure.

PSU Type	Maximum Load Figure
PSU-S (for KX-TDE100 only)	64
PSU-M	128
PSU-L (for KX-TDE200 only)	512

### Calculation Example (KX-TDE200)

Equipment Type	Load Figure	
KX-T7600 series DPT	48 units	48
Other DPT	2 units	8
SLC16	1 card	16
MSLC16	1 card	16
VPS	8 ports	8
Total		96

The total load figure is 96. As this is between 64 and 128, you should install the PSU-M. But if you expect expansion in the future, it may be better to install the PSU-L. There is no harm in installing a PSU that is larger than is required for the current configuration.

### 1.4.3 System Capacity

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## **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 DSP16/DSP64 card 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
<b>2 IP Trunk<sup>1</sup></b>	Allows the use of 2 IP trunks (H.323/SIP).	16	32 IP trunks (H.323/SIP)
<b>4 IP Trunk<sup>1</sup></b>	Allows the use of 4 IP trunks (H.323/SIP).	8	
<b>1 IP Softphone/IP PT<sup>2</sup></b>	Allows the use of 1 IP-PT/IP softphone.	64	64 IP-PTs/IP softphones
<b>4 IP Softphone/IP PT<sup>2</sup></b>	Allows the use of 4 IP-PTs/IP softphones.	16	
<b>8 IP Softphone/IP PT<sup>2</sup></b>	Allows the use of 8 IP-PTs/IP softphones.	8	
<b>16 IP Softphone/IP PT<sup>2</sup></b>	Allows the use of 16 IP-PTs/IP softphones.	4	
<b>1 IP PT</b>	Allows the use of 1 IP-PT.	64	64 IP-PTs
<b>4 IP PT</b>	Allows the use of 4 IP-PTs.	16	
<b>8 IP PT</b>	Allows the use of 8 IP-PTs.	8	
<b>16 IP PT</b>	Allows the use of 16 IP-PTs.	4	
<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>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-PTs can be used with the installed activation keys through system programming. By default, only IP softphones can be used with the installed activation keys.

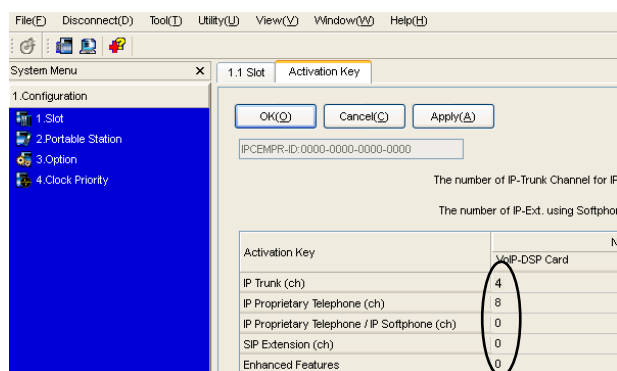
#### Preinstalled Activation Keys in the DSP16/DSP64

The following type and number of activation keys are preinstalled on the DSP16/DSP64 card:

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

Depending on the number of IP trunks and IP-PTs to be used, you need to select either the DSP16 or DSP64 card.

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



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

In addition to the preinstalled activation keys on the DSP16/DSP64 card, the following type and number of activation keys can be installed in the SD Memory Card:

Activation Key Type	Maximum Number		Supported IP Trunks/IP Telephones	
	with DSP16	with DSP64	with DSP16	with DSP64
2 IP Trunk	14	8	28 IP trunks (H.323/SIP)	16 IP trunks (H.323/SIP)
4 IP Trunk	7	4		
1 IP Softphone/IP PT	56	32	56 IP-PTs/IP softphones	32 IP-PTs/IP softphones
4 IP Softphone/IP PT	14	8	56 IP-PTs/IP softphones	32 IP-PTs/IP softphones
8 IP Softphone/IP PT	7	4	56 IP-PTs/IP softphones	32 IP-PTs/IP softphones
16 IP Softphone/IP PT	3	2	48 IP-PTs/IP softphones	32 IP-PTs/IP softphones
1 IP PT	56	32	56 IP-PTs	32 IP-PTs
4 IP PT	14	8	56 IP-PTs	32 IP-PTs
8 IP PT	7	4	56 IP-PTs	32 IP-PTs

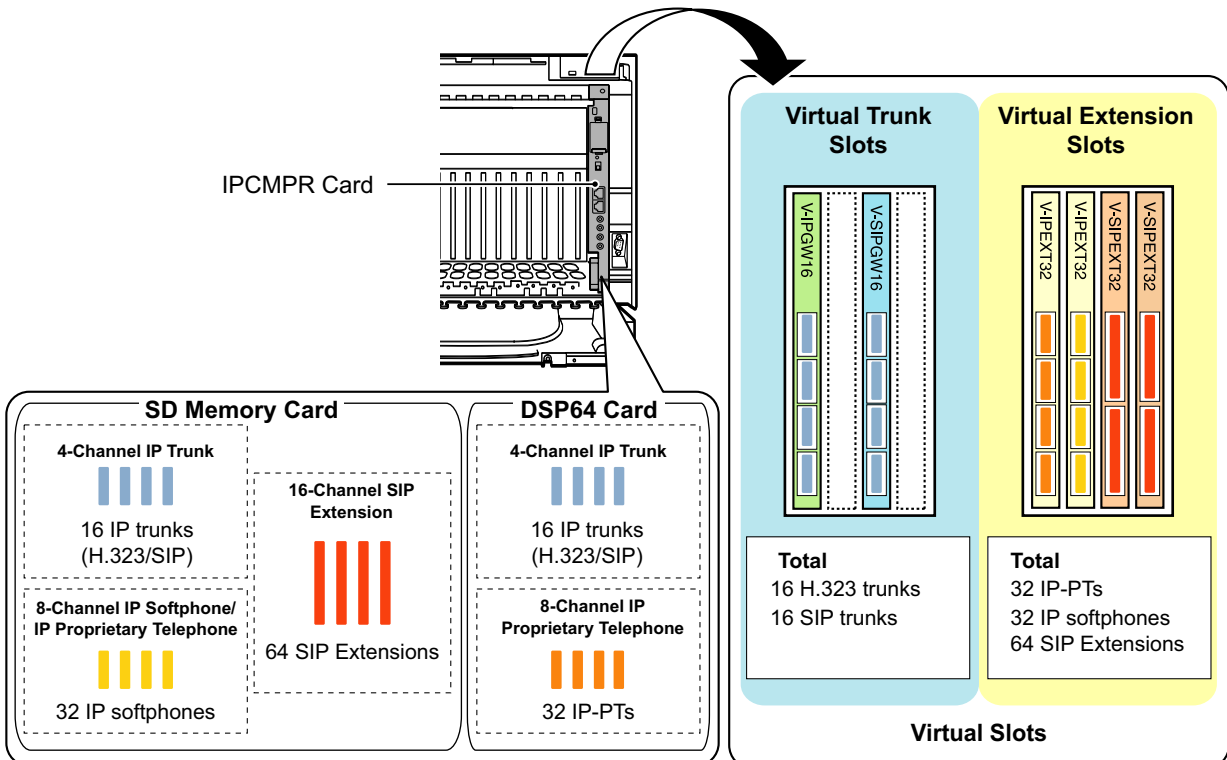
### 2.1.1 Activation Keys

Activation Key Type	Maximum Number		Supported IP Trunks/IP Telephones	
	with DSP16	with DSP64	with DSP16	with DSP64
16 IP PT	3	2	48 IP-PTs	32 IP-PTs
1 SIP Extension	128		128 SIP Extensions	
4 SIP Extension	32			
8 SIP Extension	16			
16 SIP Extension	8			
Software Upgrade 01	1		-	

If the preinstalled activation keys in the DSP card are not enough for the desired configuration or if you wish to use enhanced features, it is necessary to obtain additional activation keys in the form of activation key files and install them in the SD Memory Card. 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 in 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, 32 IP softphones, and 64 SIP Extensions on a private IP network using the IPCMPR card.



## 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.

The following activation keys are available:

Model No.	Activation Key Type	Description
KX-NCS4102	<b>2 IP Trunk</b>	Provides the activation key number and registration ID to download the activation key that enables the use of 2 IP trunks (H.323/SIP).
KX-NCS4104	<b>4 IP Trunk</b>	Provides the activation key number and registration ID to download the activation key that enables the use of 4 IP trunks (H.323/SIP).
KX-NCS4201	<b>1 IP Softphone/IP PT</b>	Provides the activation key number and registration ID to download the activation key that enables the use of 1 IP-PT/IP softphone.
KX-NCS4204	<b>4 IP Softphone/IP PT</b>	Provides the activation key number and registration ID to download the activation key that enables the use of 4 IP-PTs/IP softphones.
KX-NCS4208	<b>8 IP Softphone/IP PT</b>	Provides the activation key number and registration ID to download the activation key that enables the use of 8 IP-PTs/IP softphones.
KX-NCS4216	<b>16 IP Softphone/IP PT</b>	Provides the activation key number and registration ID to download the activation key that enables the use of 16 IP-PTs/IP softphones.
KX-NCS4501	<b>1 IP PT</b>	Provides the activation key number and registration ID to download the activation key that enables the use of 1 IP-PT.
KX-NCS4504	<b>4 IP PT</b>	Provides the activation key number and registration ID to download the activation key that enables the use of 4 IP-PTs.
KX-NCS4508	<b>8 IP PT</b>	Provides the activation key number and registration ID to download the activation key that enables the use of 8 IP-PTs.
KX-NCS4516	<b>16 IP PT</b>	Provides the activation key number and registration ID to download the activation key that enables the use of 16 IP-PTs.
KX-NCS4701	<b>1 SIP Extension</b>	Provides the activation key number and registration ID to download the activation key that enables the use of 1 SIP Extension.
KX-NCS4704	<b>4 SIP Extension</b>	Provides the activation key number and registration ID to download the activation key that enables the use of 4 SIP Extensions.
KX-NCS4708	<b>8 SIP Extension</b>	Provides the activation key number and registration ID to download the activation key that enables the use of 8 SIP Extensions.

## 2.1.2 Activation Key Code and Key Management System

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Model No.	Activation Key Type	Description
KX-NCS4716	<b>16 SIP Extension</b>	Provides the activation key number and registration ID to download the activation key that enables the use of 16 SIP Extensions.
KX-NCS4910	<b>Software Upgrade 01</b>	Provides the activation key number and registration ID to download the activation key that enables the use of enhanced features.

### **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 30 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.

## 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 on the PC.
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**.

#### **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.

#### **CAUTION**

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.

### 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 shelves and optional service cards, and cabling of peripheral equipment are provided. Further information on system expansion and 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

This set is made for wall mounting (KX-TDE100/KX-TDE200) or floor standing (KX-TDE200 only), and should be installed in a location where it is accessible for inspections and maintenance.

#### **CAUTION**

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

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 sulfuric gases may be present, such as near thermal springs.
- Areas where shocks or vibrations are frequent or strong.
- High-dust areas, or places the system may come into contact with water or oil.
- 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 20 cm of space above and 10 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:

**WARNING**

- 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.
- If cables are run on the floor, use protectors to prevent the cables from being stepped on. Avoid running cables under carpets.
- For safety purposes this unit is 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.

**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 "3.2.14 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 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.

## 3.2 Installation of the PBX

### 3.2.1 Unpacking

Unpack the box and check the items below:

	KX-TDE100	KX-TDE200
Main Unit	1	1
Ferrite Core (for the IPCMPR card)	2	2
AC Cord with a Ferrite Core <sup>*1</sup>	1 <sup>*2</sup>	1 <sup>*2</sup>
Metal Bracket	1	1
Screw A	3	4
Screw B (Black)	2	6
Anchor Plug	3	4
Mini Plug (for pager and music source)	4	4
SD Memory Card	1	1

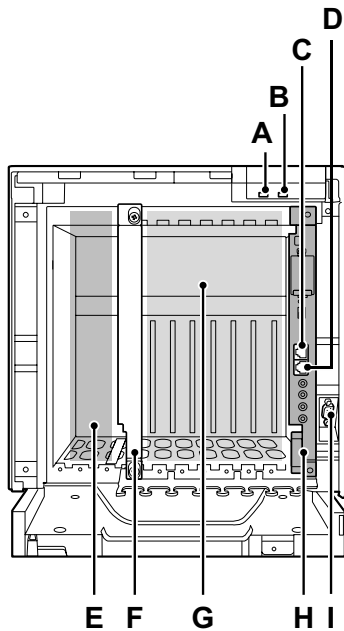
<sup>\*1</sup> In Canada, there is no ferrite core attached to the AC cord.

<sup>\*2</sup> KX-TDE100BX/KX-TDE200BX is supplied with 2 types of AC cord. Please use whichever is appropriate for the country/area.

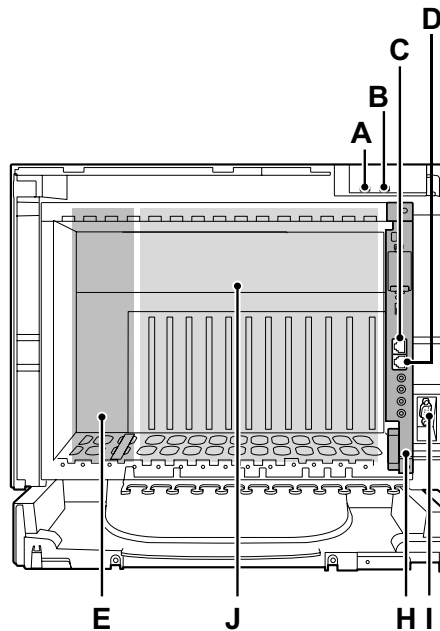
## 3.2.2 Names and Locations

### Inside View

KX-TDE100



KX-TDE200

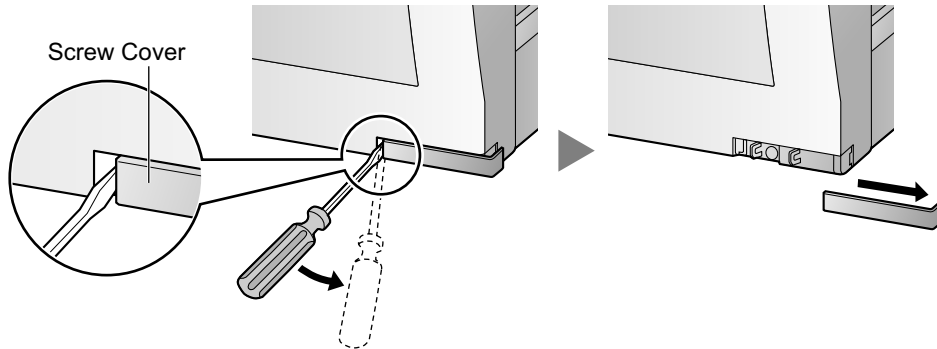


- A. RUN Indicator
- B. ALARM Indicator
- C. MNT Port
- D. LAN Port
- E. PSU Slot
- F. Null Slot (not available for any optional service card)
- G. Free Slots 1 to 6 (from the left)
- H. IPCMPR Card Slot
- I. RS-232C Port
- J. Free Slots 1 to 11 (from the left)

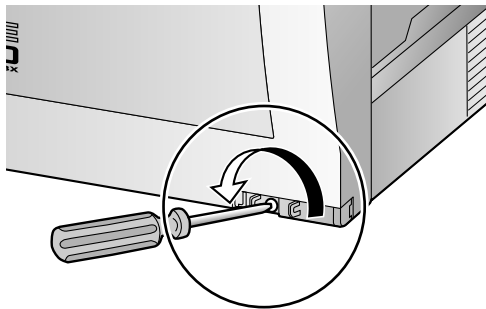
## 3.2.3 Opening/Closing the Front Cover

### Opening the Front Cover

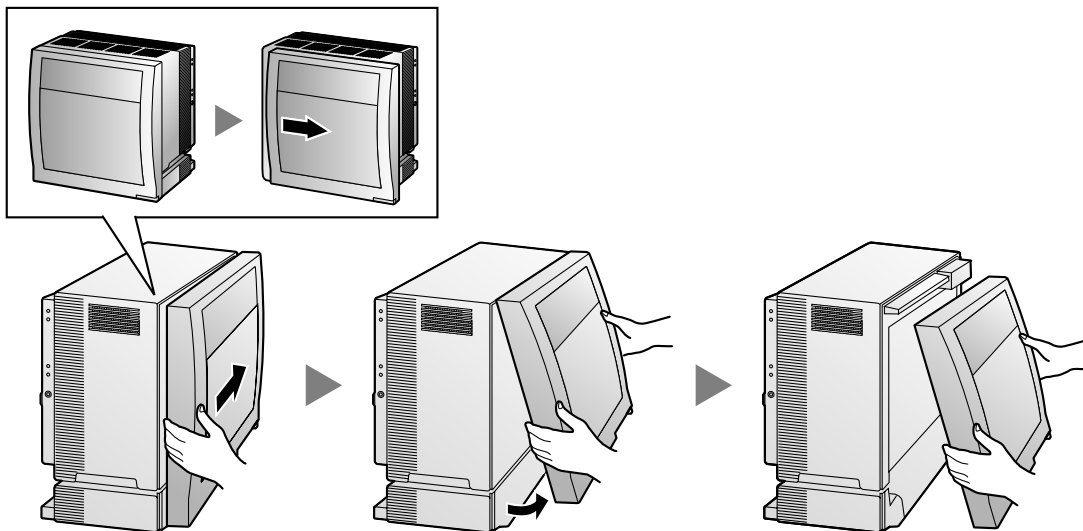
1. Insert a flathead screwdriver into the opening (on the left of the screw cover) and unlatch the screw cover.



2. Turn the screw anticlockwise to loosen.

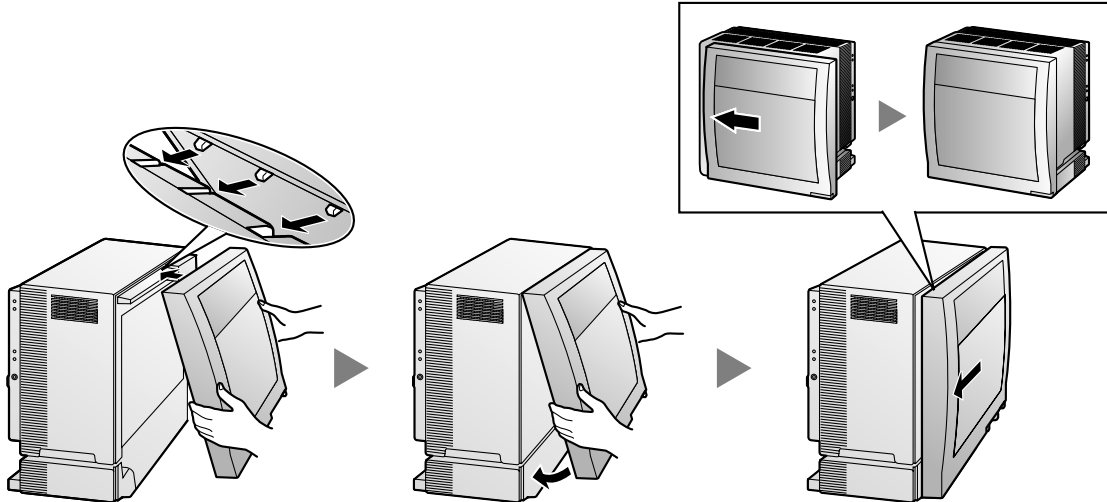


3. Slide the front cover to the right until it stops, then lift the front cover.

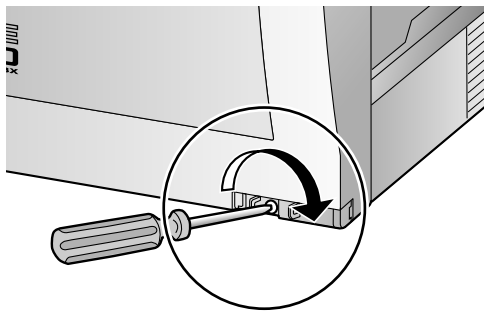


## Closing the Front Cover

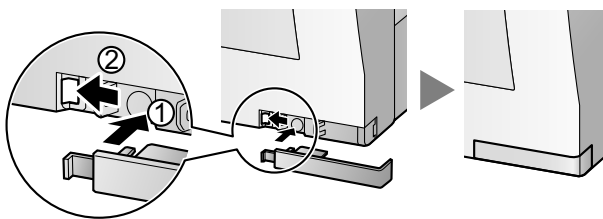
1. Hook the front cover onto the shelf (line up the protrusions on the cover with the receptacles on the shelf). Then slide the front cover to the left until it locks.



2. Turn the screw clockwise to tighten.



3. Secure the screw cover.



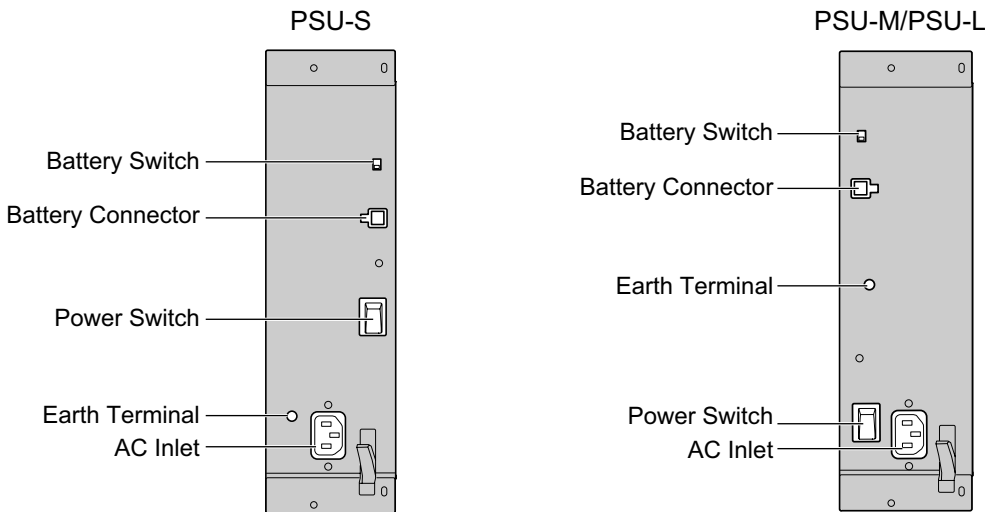
### CAUTION

- For safety reasons, close the front cover and tighten the screw before operating the PBX.
- Do not forget to tighten the screw before securing the screw cover.

## 3.2.4 Installing/Replacing the Power Supply Unit

### Function

PSU Type	Lower/Upper Input Voltage Range	Current	Input Frequency
<b>PSU-S</b> (for KX-TDE100)	Lower: 100 V AC to 130 V AC	1.4 A	50 Hz or 60 Hz
	Upper: 200 V AC to 240 V AC	0.8 A	
<b>PSU-M</b> (for KX-TDE100/ KX-TDE200)	Lower: 100 V AC to 130 V AC	2.5 A	
	Upper: 200 V AC to 240 V AC	1.4 A	
<b>PSU-L</b> (for KX-TDE200)	Lower: 100 V AC to 130 V AC	5.1 A	
	Upper: 200 V AC to 240 V AC	2.55 A	



### Accessories and User-supplied Items

**Accessories (included):** Screws × 4

**User-supplied (not included):** Earthing wire, Back-up Battery Cable (KX-A228 for PSU-S and PSU-M, or KX-A229 for PSU-L)

### Note

- For details about frame earth connection, refer to "3.2.5 Frame Earth Connection".
- For details about backup batteries connection, refer to "3.2.6 Backup Battery Connection".

### Safety Instructions

Each PSU complies with Safety Class 1 of IEC60950, EN60950, UL60950, CAN/CSA-C22.2 No.60950, and AS/NZS60950; therefore a protective earth connection exists between the mains outlet ground and the PSU case. To ensure the PBX chassis is safely grounded, it is essential that the PSU case be securely fastened to the PBX chassis with the 4 screws provided with each PSU.

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

1. Never install or replace a PSU during a lightning storm.
2. Never install or replace a PSU in wet locations.



3. Never install or replace a PSU unless at least 20 s has elapsed after the AC supply and backup battery supply are disconnected.
4. To protect the back board from static electricity, do not touch parts on the back board in the main unit and PSU. To discharge static electricity, touch ground or wear an earthing strap.

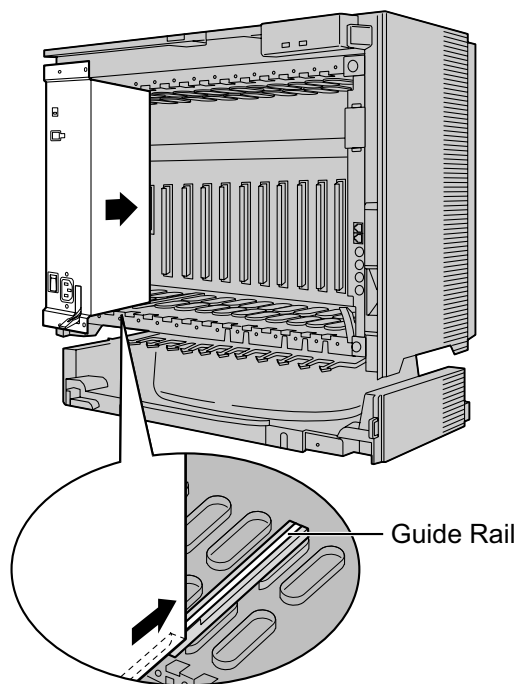
The following procedures are for installing or replacing a PSU only. Do not replace or remove the PSU for any other purpose.

## Installing the Power Supply Unit

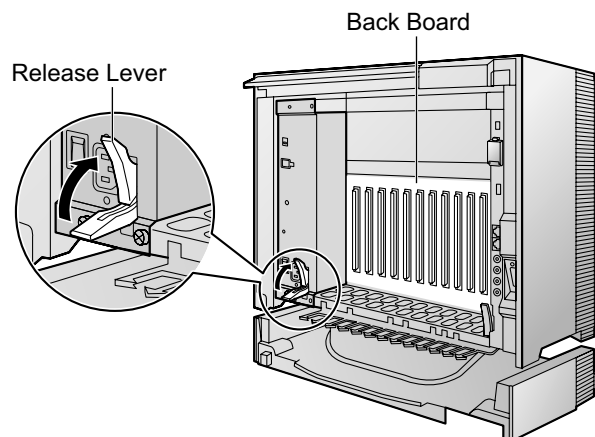
1. Insert the PSU along the guide rails.

### **CAUTION**

For safety reasons, do not touch parts in the PSU.



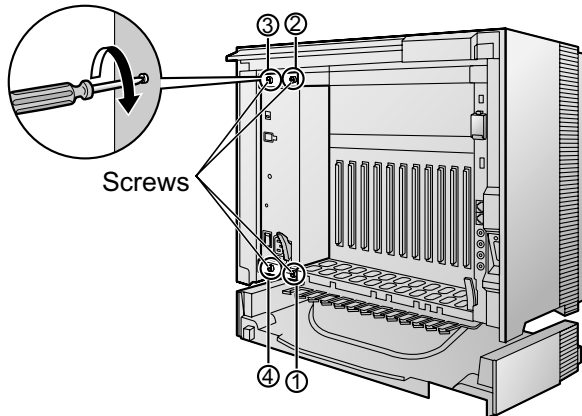
2. Push the release lever in the direction of the arrow, so that the PSU engages securely with the connector on the back board.



### 3.2.4 Installing/Replacing the Power Supply Unit

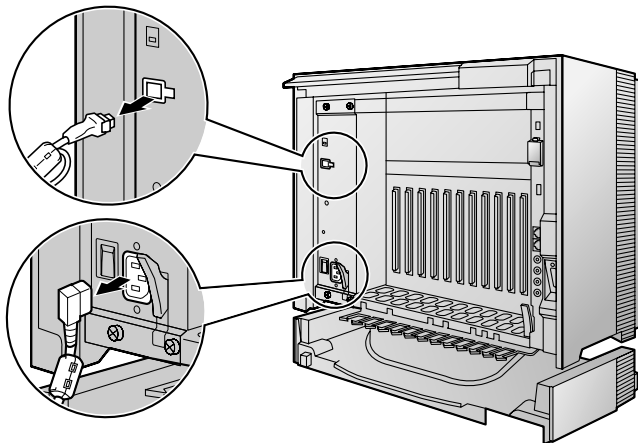
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3. Turn the 4 screws clockwise, in the order indicated by the numbers 1 to 4, to fix the PSU.

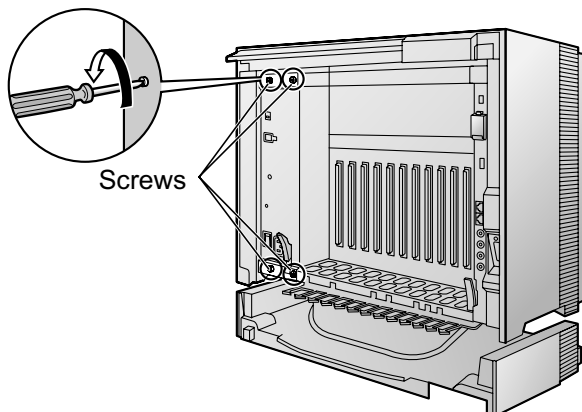


### Replacing the Power Supply Unit

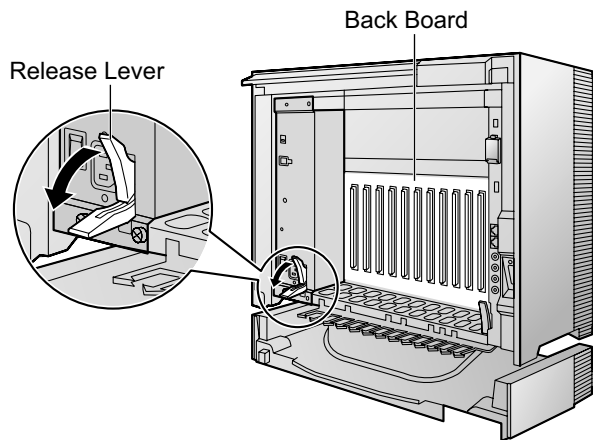
1. Unplug the AC power cord and Back-up Battery Cable.



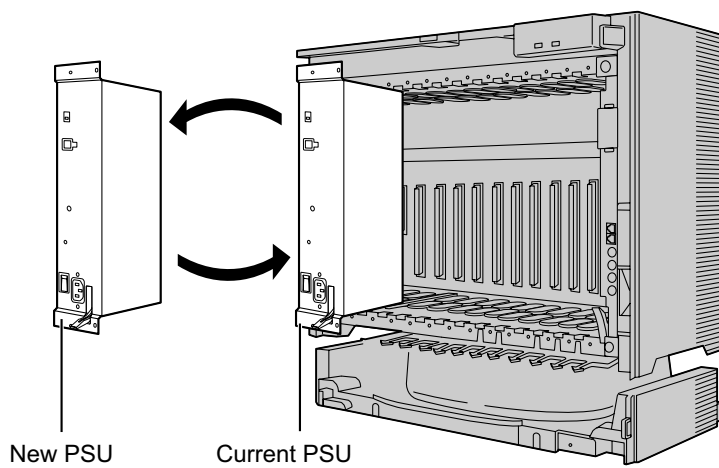
2. Turn the 4 screws anticlockwise to loosen them.



3. Pull the release lever in the direction of the arrow to disconnect the PSU from the back board.



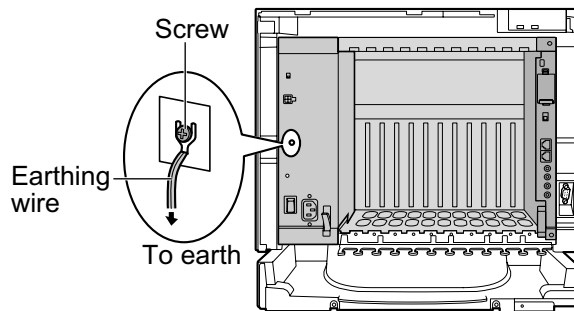
4. Replace the PSU.



5. Follow the steps in "Installing the Power Supply Unit".

## 3.2.5 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 protect the PBX from the bad effects of external noise or to reduce the risk to the user of electrocution in the case of a lightning strike.

### **CAUTION**

- Make sure to separately connect the frame of each shelf to a different earth terminal. Do not connect it to other shelves.
- For earthing wire, green-and-yellow insulation is required, and the cross-sectional area of the conductor must be more than  $0.75 \text{ mm}^2$  or 18 AWG.
- 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 each PBX must be made.

### **Notice**

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

## 3.2.6 Backup Battery Connection

The backup batteries and Back-up Battery Cable provide a backup power supply to allow full use of the PBX in the event of a power failure. In case of power failure, the backup batteries automatically maintain the power to the PBX without interruption.

### User-supplied Items

- Backup Batteries: VRLA (Valve Regulated Lead Acid) 12 V DC × 3
- Back-up Battery Cable: KX-A228 (for PSU-S and PSU-M) or KX-A229 (for PSU-L)

### **WARNING**

- **There is a danger of explosion if backup batteries are incorrectly replaced. Replace only with the same or equivalent type recommended by the battery manufacturer. Dispose of used batteries according to the manufacturer's instructions.**
- **Make sure that you do not short the backup batteries or cables.**

### **CAUTION**

- Make sure that each Back-up Battery Cable is securely fastened to both the backup batteries and the shelf.
- Make sure that the polarities of the backup batteries and wiring are correct.
- Use the correct type of Back-up Battery Cable for the PSU.

### **Notice**

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

### **Note**

- Turn on the battery switch on the PSU only after the installation of the PBX is finished and AC power is available.
- The recommended maximum capacity is 28 Ah, to maintain effective battery charge.
- Make sure that the type and capacity of the 3 backup batteries are identical.
- The Back-up Battery Cable should not be exposed to direct sunlight. Keep the Back-up Battery Cable and the backup batteries away from heating appliances and fire. Place the backup batteries in a ventilated place.
- For details about the backup batteries, refer to the manual for the batteries.

## Backup Power Supply Duration

The length of time that backup batteries can power the PBX varies depending on the total load figure. For how to calculate the load figure from the connected items, refer to "Load Figure Calculation".

### Examples

Battery Capacity	Total Load Figure	Backup Power Supply Duration <sup>*1</sup>
28 Ah	64	11 h
	128	5.5 h
	512	3 h

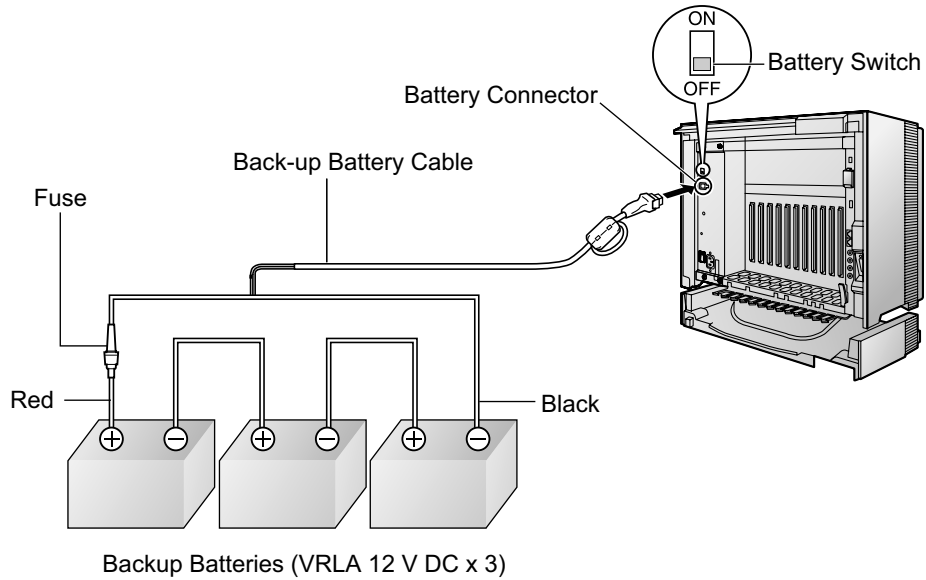
<sup>\*1</sup> The duration may vary depending on the conditions.

### 3.2.6 Backup Battery Connection

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## Connecting Backup Batteries

1. Turn off the battery switch on the PSU.
2. Connect the Back-up Battery Cable to a set of 3 identical batteries.



## 3.2.7 Installing/Removing the Optional Service Cards

### CAUTION

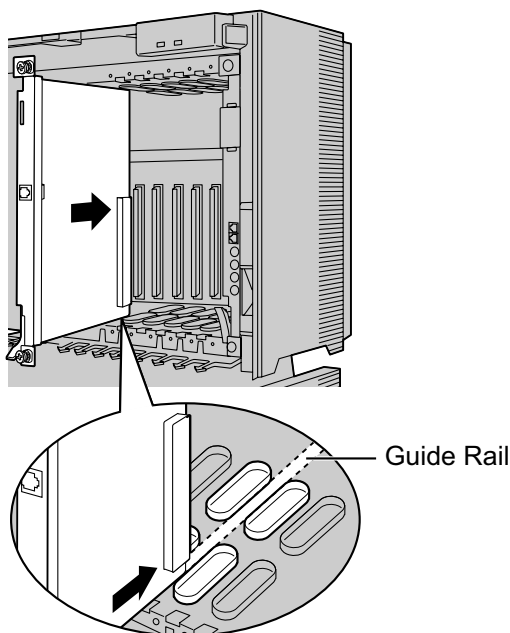
To protect the back board from static electricity, do not touch parts on the back board in the main unit and on the optional service cards. To discharge static electricity, touch ground or wear an earthing strap.

### Note

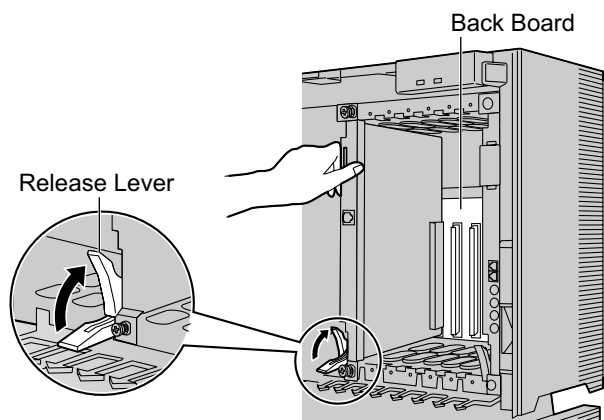
The optional service cards can be installed or removed while the DC power is supplied. However, when installing or removing the IPCMPR card, the DC power supply must be turned off.

## Installing Optional Service Cards

1. Insert the card along the guide rails.



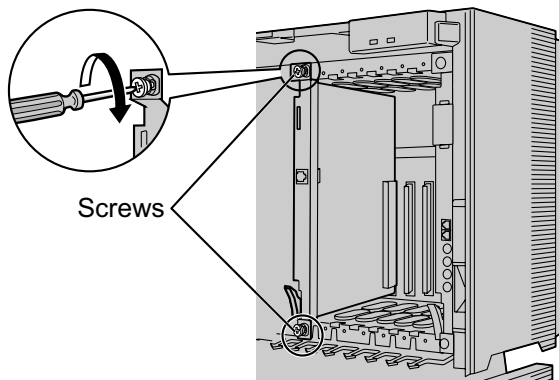
2. Holding the card as shown below, push the release lever in the direction of the arrow so that the card engages securely with the connector on the back board.



### 3.2.7 Installing/Removing the Optional Service Cards

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



**Note**

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

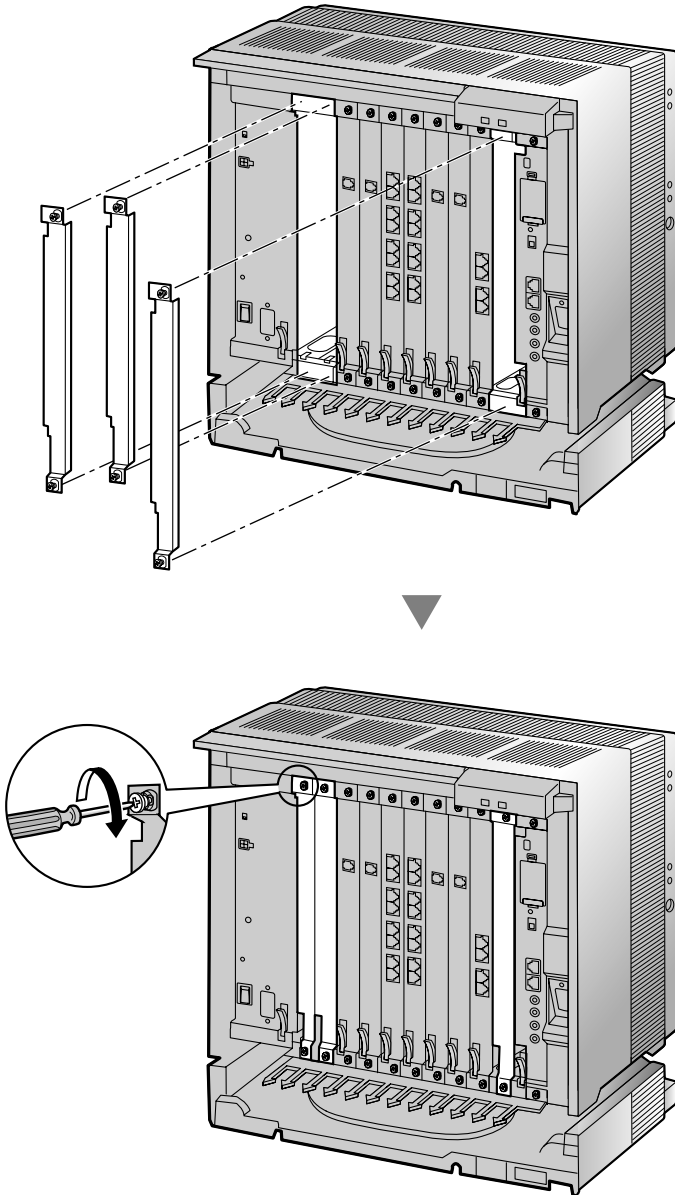


### Covering the Blank Slots

Be sure to cover each slot in which no optional service card is installed by using a Blank Slot Cover.

#### **CAUTION**

Failure to install the Blank Slot Cover may cause electromagnetic interference.

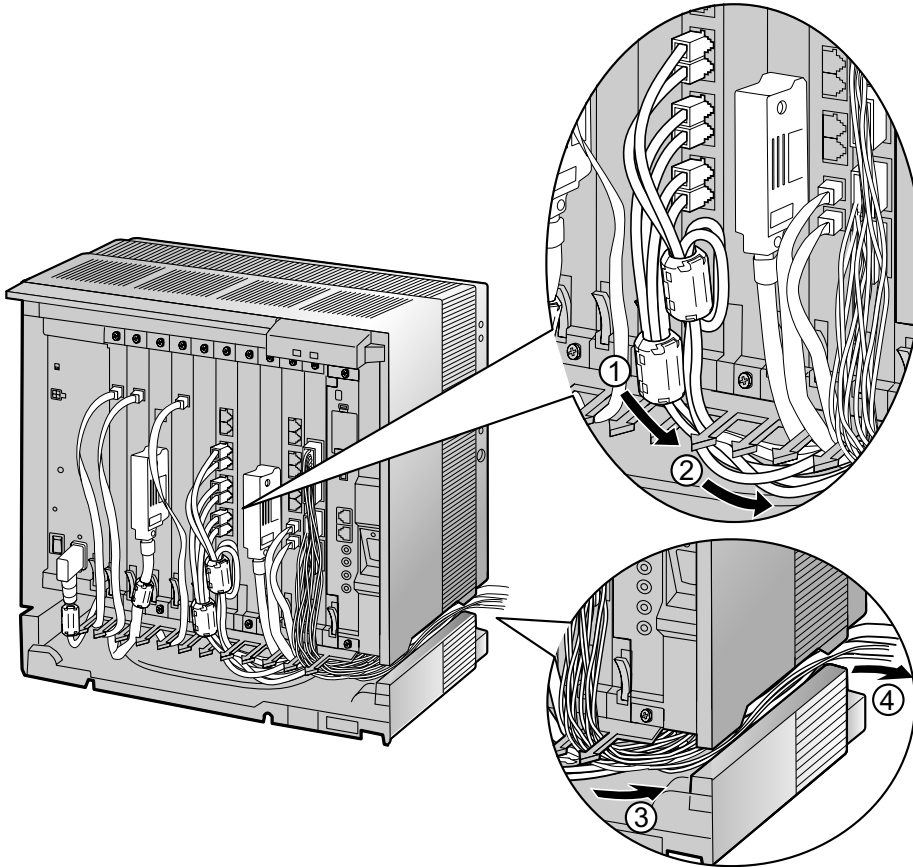


### 3.2.7 Installing/Removing the Optional Service Cards

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#### Handling of the Cables

When cables are connected to the PBX, run the cables to either the right or the left and then towards the back of the shelf as shown below.

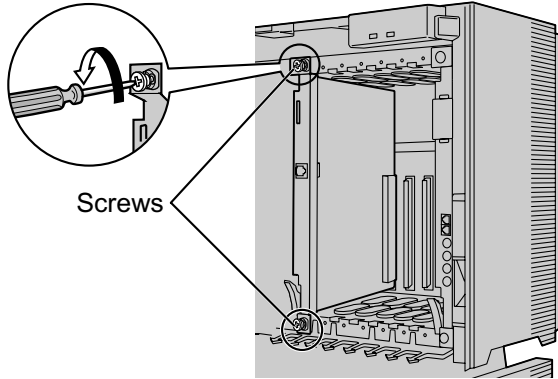


#### Note

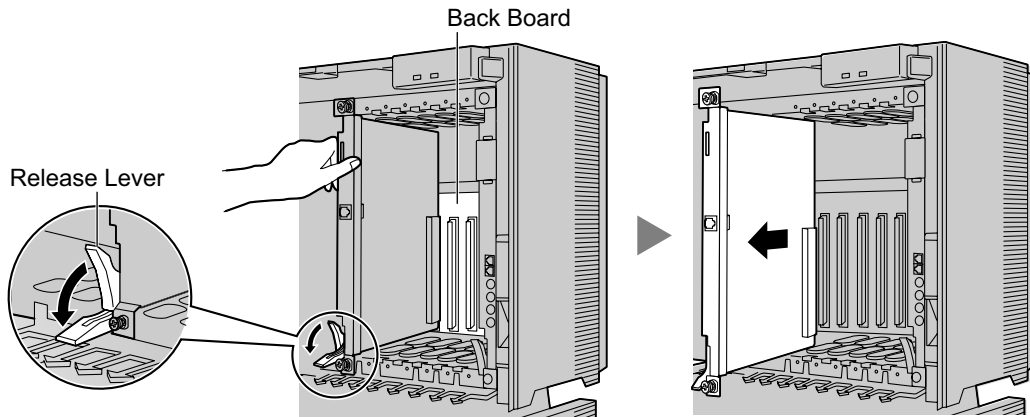
For safety reasons, do not stretch, bend, or pinch the AC power cord.

## Removing the Optional Service Cards

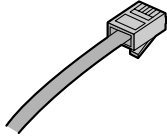
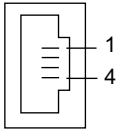
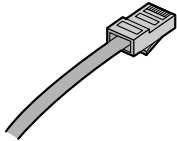
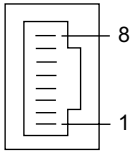
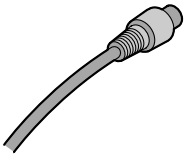

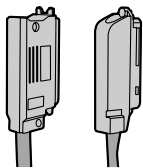
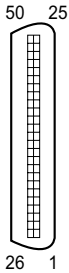
1. Turn the 2 screws anticlockwise to loosen them.

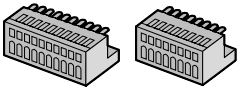
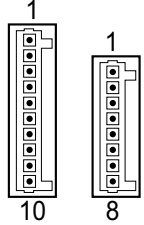
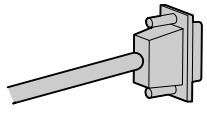
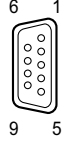
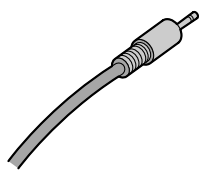
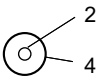


2. Pull the release lever in the direction of the arrow to disconnect the card from the back board. Pull the card from the shelf to remove it.



### 3.2.8 Types of Connectors

Connector Type	Pin Number	Used for
<p>RJ11</p>  <p>(Twisted pair cable)</p>		<ul style="list-style-type: none"> <li>• DHLC8 (KX-TDA0170)</li> <li>• SLC8 (KX-TDA0173)</li> <li>• SLC16 (KX-TDA0174)</li> <li>• MSLC16 (KX-TDA0175)</li> <li>• CSLC16 (KX-TDA0177)</li> <li>• LCOT8 (KX-TDA0180)</li> <li>• LCOT16 (KX-TDA0181)</li> <li>• LCOT4 (KX-TDA0183)</li> </ul>
<p>RJ45</p>  <p>(Twisted pair cable)</p>		<ul style="list-style-type: none"> <li>• IPCMPR</li> <li>• CSIF4 (KX-TDA0143)</li> <li>• CSIF8 (KX-TDA0144)</li> <li>• T1 (KX-TDA0187)</li> <li>• E1 (KX-TDA0188)</li> <li>• BRI4 (KX-TDA0284)</li> <li>• BRI8 (KX-TDA0288)</li> <li>• PRI30 (KX-TDA0290CE/KX-TDA0290CJ)</li> <li>• PRI23 (KX-TDA0290)</li> <li>• IP-EXT16 (KX-TDA0470)</li> <li>• IP-GW4E (KX-TDA0484)</li> <li>• IP-GW16 (KX-TDA0490)</li> </ul>
<p>BNC</p> 		<ul style="list-style-type: none"> <li>• E1 (KX-TDA0188)</li> <li>• PRI30 (KX-TDA0290CE/KX-TDA0290CJ)</li> </ul>
<p>Amphenol Type A Type B</p>  <p>(Shielded twisted pair cable)</p>		<ul style="list-style-type: none"> <li>• DHLC8 (KX-TDA0170)</li> <li>• DLC8 (KX-TDA0171)</li> <li>• DLC16 (KX-TDA0172)</li> <li>• SLC8 (KX-TDA0173)</li> <li>• SLC16 (KX-TDA0174)</li> <li>• MSLC16 (KX-TDA0175)</li> <li>• CSLC16 (KX-TDA0177)</li> <li>• LCOT8 (KX-TDA0180)</li> <li>• LCOT16 (KX-TDA0181)</li> <li>• DID8 (KX-TDA0182)</li> <li>• LCOT4 (KX-TDA0183)</li> <li>• E&amp;M8 (KX-TDA0184)</li> </ul>

Connector Type	Pin Number	Used for
<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>Basic Shelf</li> </ul>
<p>Mini Plug</p> 		<ul style="list-style-type: none"> <li>IPCMPR</li> </ul>

## 3.2.9 Attaching a Ferrite Core

A ferrite core must be attached when:

- an RJ45 connector is connected to an IPCMPR, T1, E1, PRI, BRI, IP-GW16 or IP-EXT16 cards, or
- an Amphenol connector is connected to an extension card.

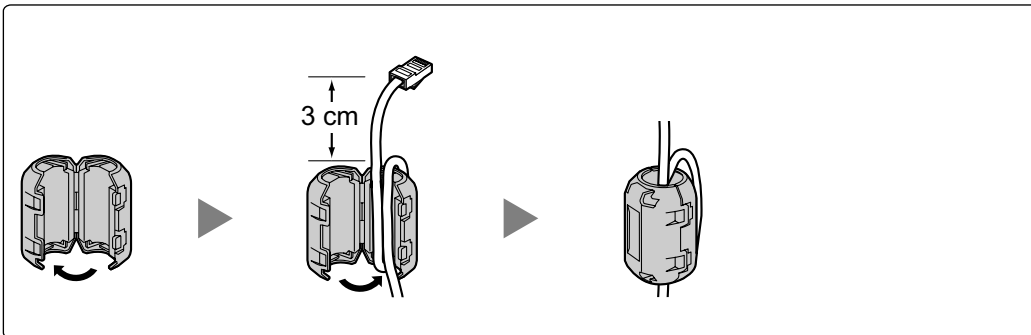
### Note

In Canada, the ferrite core is not necessarily required for the T1 and PRI23 cards.

### Attaching to an RJ45 Connector

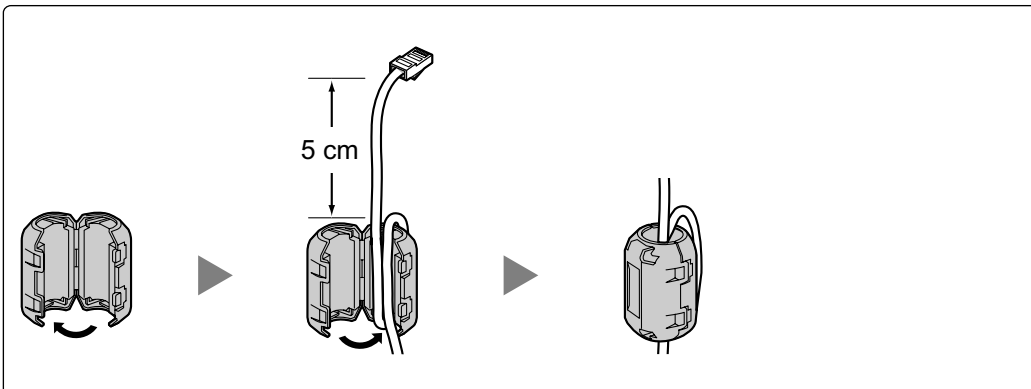
#### For the IPCMPR Card

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.



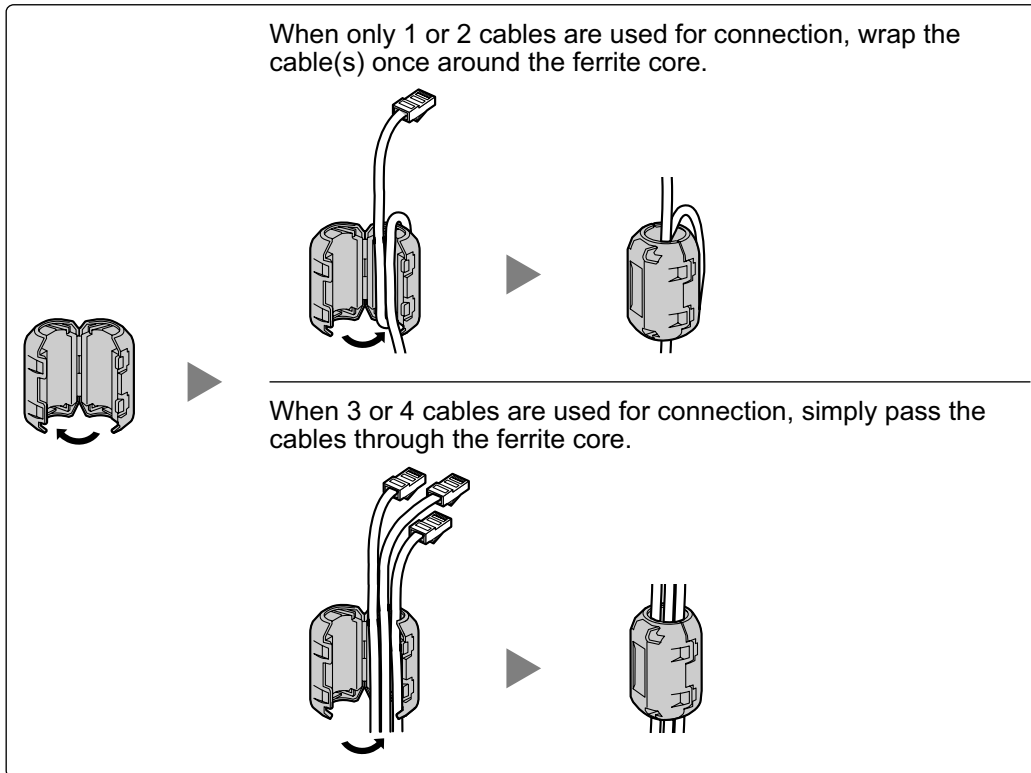
#### For T1/E1/PRI/IP-GW16/IP-EXT16 Cards

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 a BRI Card**

Attach 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.

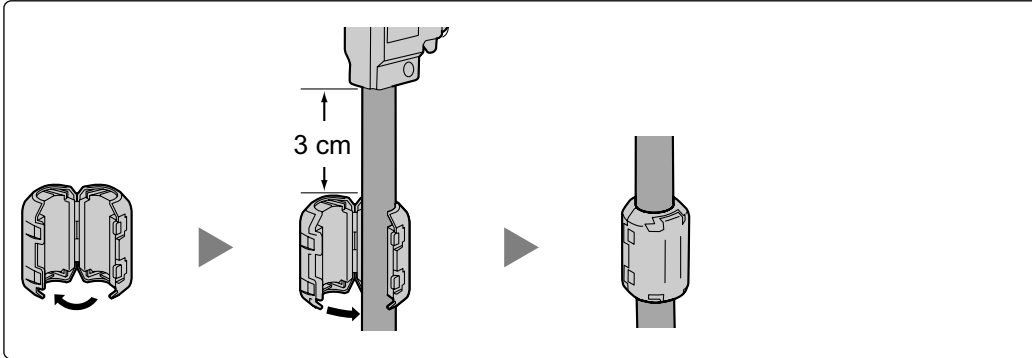
**Note**

For every 4 cables, use 1 ferrite core; a ferrite core holds a maximum of 4 cables.

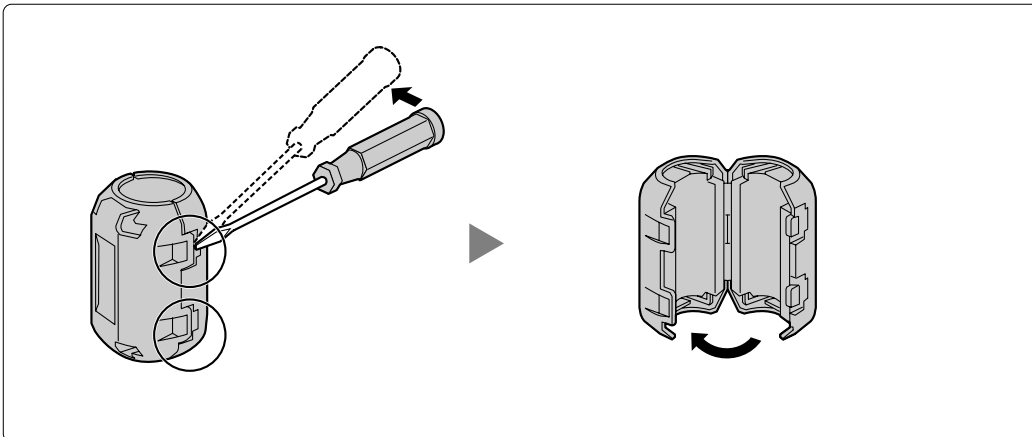
## Attaching to an Amphenol Connector

### For Extension Cards

Pass the cable through 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 card.



If you need to open the ferrite core, use a flathead screwdriver to unlatch the case of the ferrite core.

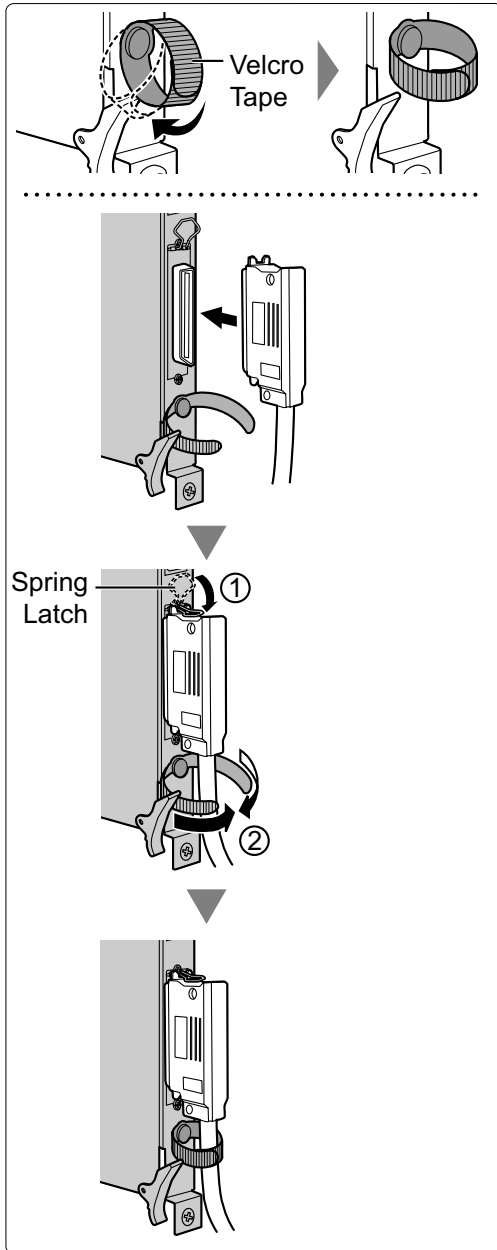




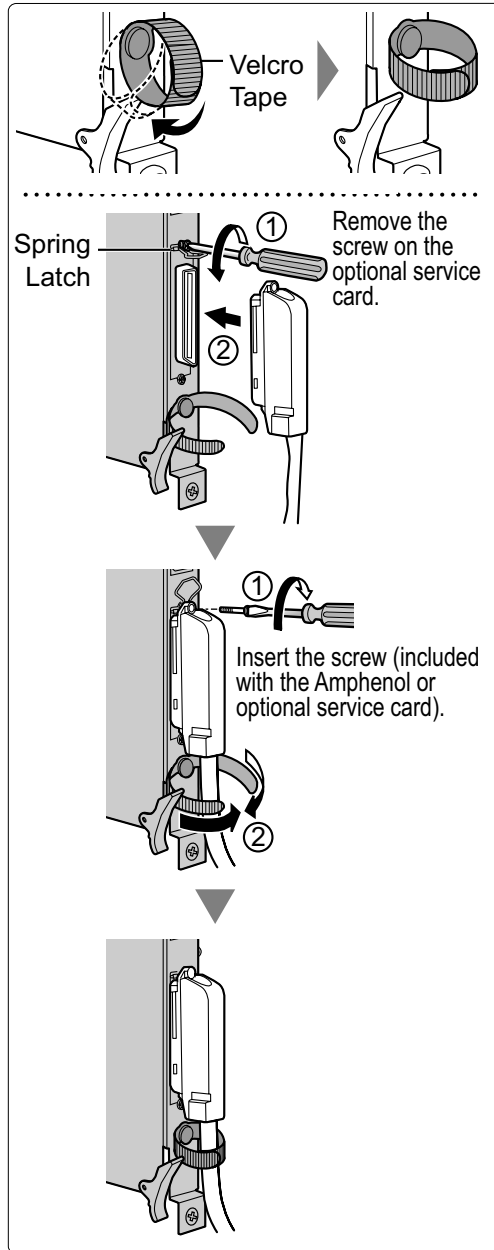
### 3.2.10 Fastening an Amphenol Connector

An Amphenol 57JE-type connector is used on some of the optional service cards. To connect an Amphenol connector, use the spring latch or screw to fix the upper part and use Velcro® tape to fix the lower part of the connector.

Type A (Spring Latch + Velcro Tape)



Type B (Screw + Velcro Tape)



### 3.2.10 Fastening an Amphenol Connector

## Amphenol Connector Pin Assignment Chart

Below is an Amphenol connector pin assignment chart for all optional service cards that use the Amphenol connector. For more details, refer to the appropriate section in "3.5 Information about the Physical Trunk Cards" and "3.6 Information about the Physical Extension Cards".

Pin No.	LCOT4	LCOT8	LCOT16	DID8	E&M8	DHLC8	DLC8	DLC16	MSLC16	CSLC16	SLC16	SLC8
1	RA	RA	RA	RA	TA	RA		D2A	RA	RA	RA	RA
26	TA	TA	TA	TA	RA	TA		D1A	TA	TA	TA	TA
2	RB	RB	RB	RB	T1A	D2A	D2A	D2B	RB	RB	RB	
27	TB	TB	TB	TB	R1A	D1A	D1A	D1B	TB	TB	TB	
3	RC	RC	RC	RC	EA			D2C	RC	RC	RC	
28	TC	TC	TC	TC	MA			D1C	TC	TC	TC	
4	RD	RD	RD	RD	SGA	RB		D2D	RD	RD	RD	RB
29	TD	TD	TD	TD	SGB	TB		D1D	TD	TD	TD	TB
5		RE	RE	RE	TB	D2B	D2B	D2E	RE	RE	RE	
30		TE	TE	TE	RB	D1B	D1B	D1E	TE	TE	TE	
6		RF	RF	RF	T1B			D2F	RF	RF	RF	
31		TF	TF	TF	R1B			D1F	TF	TF	TF	
7		RG	RG	RG	EB	RC		D2G	RG	RG	RG	RC
32		TG	TG	TG	MB	TC		D1G	TG	TG	TG	TC
8		RH	RH	RH	TC	D2C	D2C	D2H	RH	RH	RH	
33		TH	TH	TH	RC	D1C	D1C	D1H	TH	TH	TH	
9			RI		T1C			D2I	RI	RI	RI	
34			TI		R1C			D1I	TI	TI	TI	
10			RJ		EC	RD		D2J	RJ	RJ	RJ	RD
35			TJ		MC	TD		D1J	TJ	TJ	TJ	TD
11			RK		TD	D2D	D2D	D2K	RK	RK	RK	
36			TK		RD	D1D	D1D	D1K	TK	TK	TK	
12			RL		T1D			D2L	RL	RL	RL	
37			TL		R1D			D1L	TL	TL	TL	
13			RM		ED	RE		D2M	RM	RM	RM	RE
38			TM		MD	TE		D1M	TM	TM	TM	TE
14			RN		TE	D2E	D2E	D2N	RN	RN	RN	
39			TN		RE	D1E	D1E	D1N	TN	TN	TN	
15			RO		T1E			D2O	RO	RO	RO	
40			TO		R1E			D1O	TO	TO	TO	
16			RP		EE	RF		D2P	RP	RP	RP	RF
41			TP		ME	TF		D1P	TP	TP	TP	TF
17					TF	D2F	D2F					
42					RF	D1F	D1F					
18					T1F							
43					R1F							
19					EF	RG						RG
44					MF	TG						TG
20					TG	D2G	D2G					
45					RG	D1G	D1G					
21					T1G							
46					R1G							
22					EG	RH						RH
47					MG	TH						TH
23					TH	D2H	D2H					
48					RH	D1H	D1H					
24					T1H							
49					R1H							
25					EH							
50					MH							

## 3.2.11 Wall Mounting (KX-TDE200)

### **WARNING**

- Make sure that the wall that the shelf will be attached to is strong enough to support the shelf. If not, it is necessary for the wall to be reinforced.
- Only use the wall-mounting equipment (anchor plugs, screws, metal bracket) included with the PBX.

### **CAUTION**

- When placing the metal bracket, make sure that the "TOP" arrow is pointing upward.
- Do not block the openings of the shelf. Allow space of at least 20 cm above and 10 cm at the sides of the shelf.
- Make sure that the surface behind the shelf is flat and free of obstacles, so that the openings on the back of the shelf will not be blocked.
- Make sure that the surface behind the shelf is not made of wood.

### **Notice**

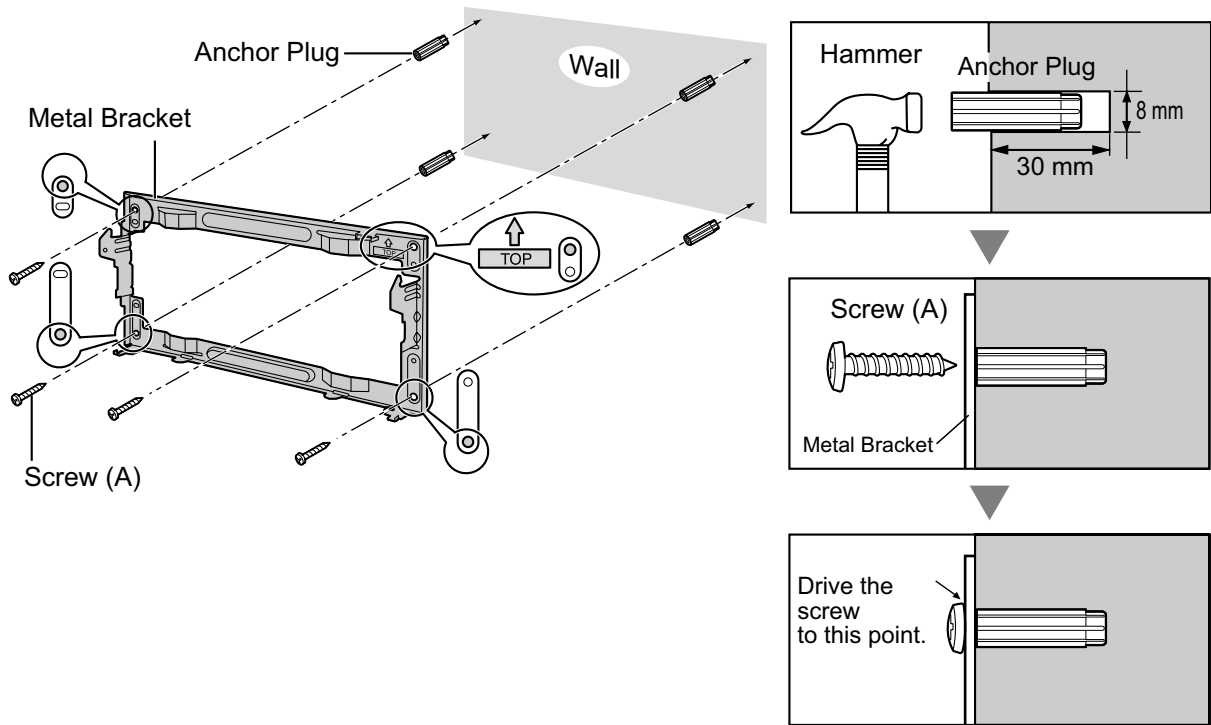
- When driving the screws into the wall, be careful to avoid touching any metal laths, wire laths or metal plates in the wall.
- When this product is no longer in use, make sure to detach it from the wall.
- Be careful not to drop the shelf.

### **Note**

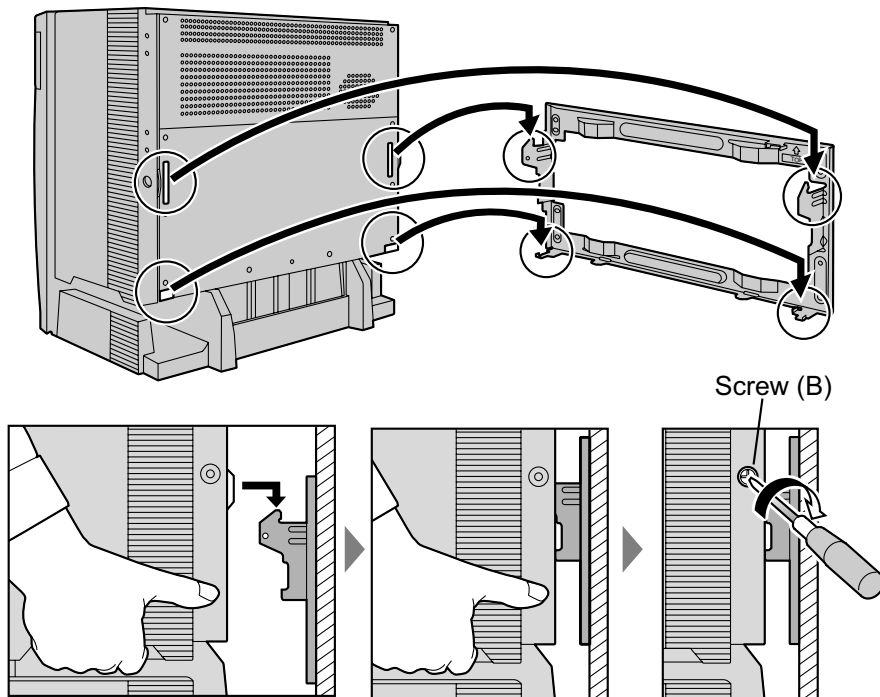
- Make sure to remove the front cover from each shelf before installing the shelves (refer to "3.2.3 Opening/Closing the Front Cover").
- Do not install any optional service cards or a PSU in the shelves before installation.
- For details about the dimensions and weight of the PBX, refer to "1.4.1 General Description".

### 3.2.11 Wall Mounting (KX-TDE200)

1. Install 4 anchor plugs in the wall, using the metal bracket as a template. Fix the metal bracket with 4 screws (A).



2. Hook the shelf onto the metal bracket, making sure that the shelf slides down and onto the hooked parts of the metal bracket. Use 2 screws (B) to fix both sides of the shelf.



## 3.2.12 Wall Mounting (KX-TDE100)

### **WARNING**

- Make sure that the wall that the shelf will be attached to is strong enough to support the shelf. If not, it is necessary for the wall to be reinforced.
- Only use the wall-mounting equipment (anchor plugs, screws, metal bracket) included with the PBX.

### **CAUTION**

- When placing the metal bracket, make sure that the "TOP" arrow is pointing upward.
- Do not block the openings of the shelf. Allow space of at least 20 cm above and 10 cm at the sides of the shelf.
- Make sure that the surface behind the shelf is flat and free of obstacles, so that the openings on the back of the shelf will not be blocked.
- Make sure that the surface behind the shelf is not made of wood.

### **Notice**

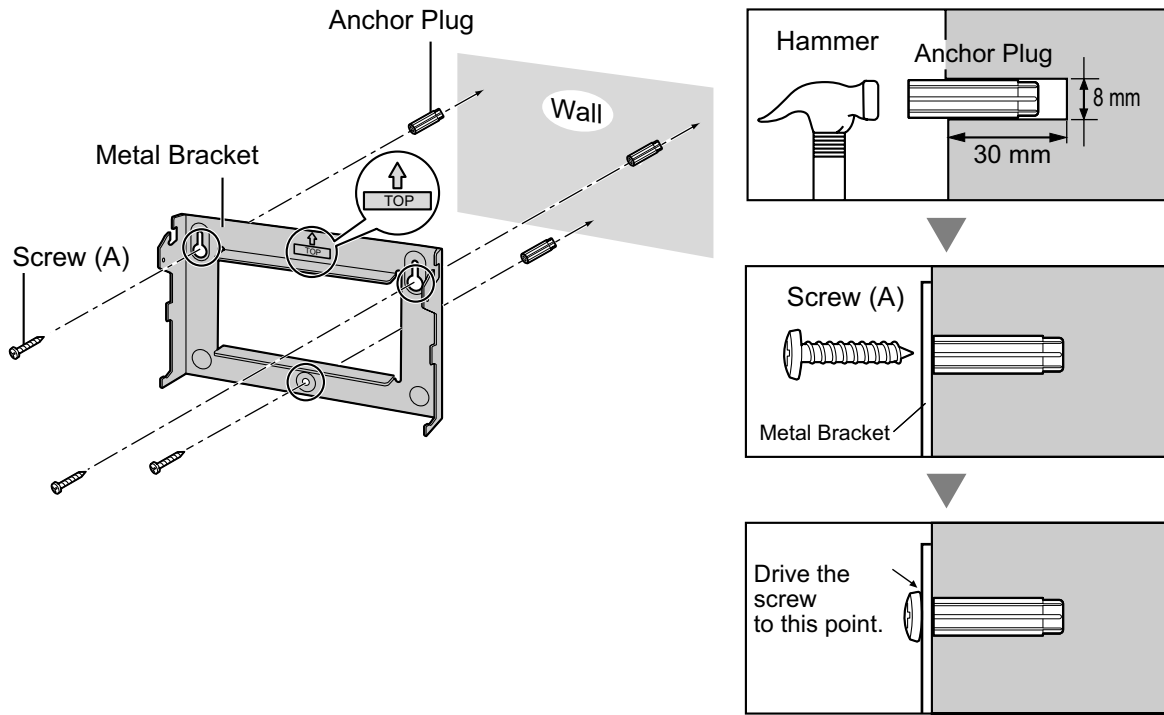
- When driving the screws into the wall, be careful to avoid touching any metal laths, wire laths or metal plates in the wall.
- When this product is no longer in use, make sure to detach it from the wall.
- Be careful not to drop the shelf.

### **Note**

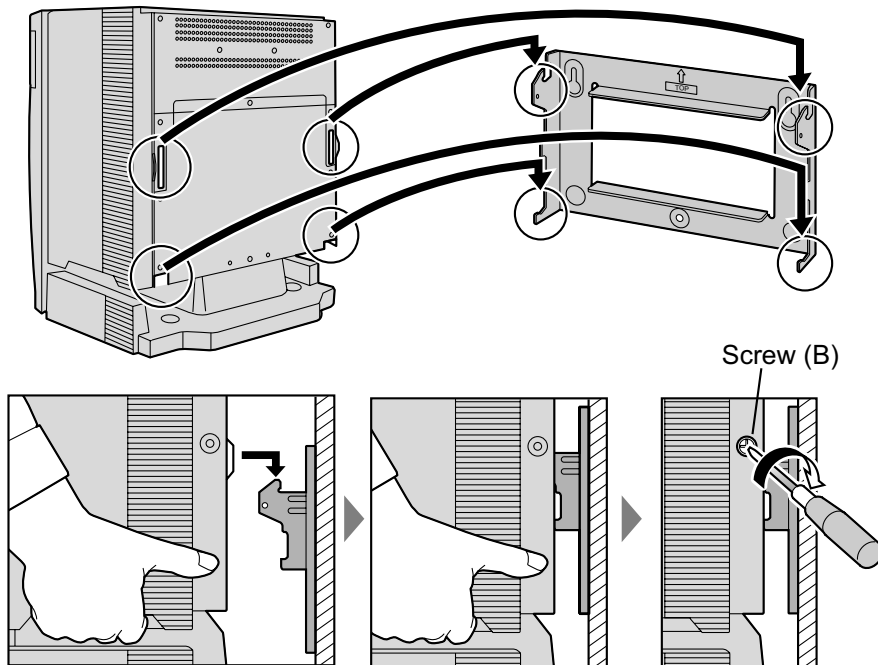
- Make sure to remove the front cover from each shelf before installing the shelves (refer to "3.2.3 Opening/Closing the Front Cover").
- Do not install any optional service cards or a PSU in the shelves before installation.
- For details about the dimensions and weight of the PBX, refer to "1.4.1 General Description".

3.2.12 Wall Mounting (KX-TDE100)

1. Install 3 anchor plugs in the wall, using the metal bracket as a template. Fix the metal bracket with 3 screws (A).



2. Hook the shelf onto the metal bracket, making sure that the shelf slides down and onto the hooked parts of the metal bracket. Use 2 screws (B) to fix both sides of the shelf.



### 3.2.13 Floor Standing (KX-TDE200 Only)

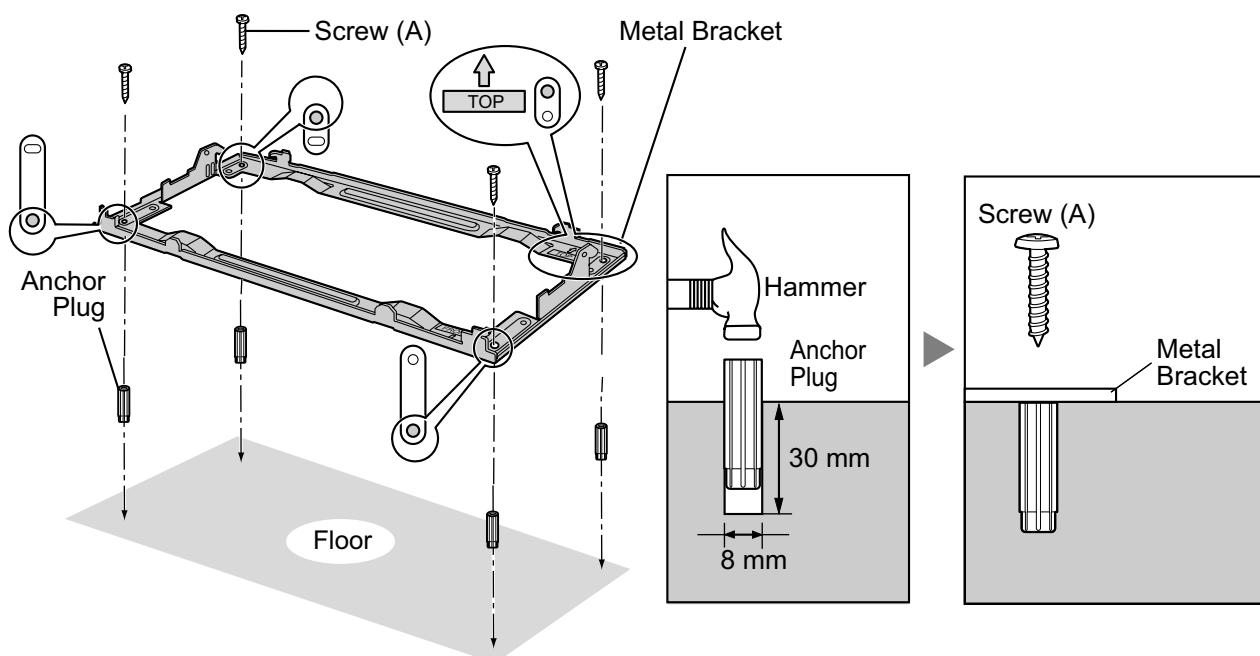
#### CAUTION

- Do not block the openings of the shelf. Allow space of at least 20 cm above and 10 cm at the sides of the shelf.
- Make sure that the surface behind the shelf is flat and free of obstacles, so that the openings on the back of the shelf will not be blocked.
- Make sure that the surface behind the shelf is not made of wood.

#### Notice

Be careful not to drop the shelf.

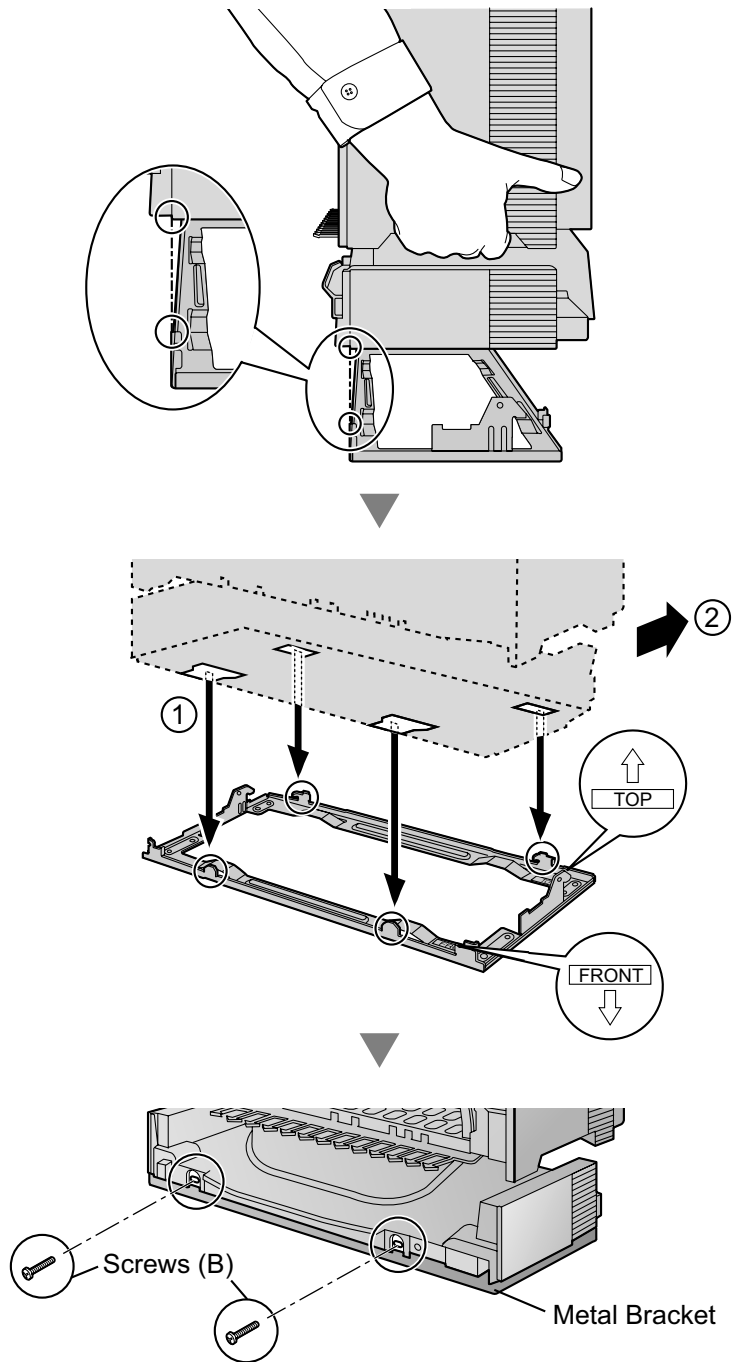
1. Install 4 anchor plugs in the floor, using the metal bracket as a template. Fix the metal bracket with 4 screws (A).



2. Remove the front cover of the shelf (refer to "3.2.3 Opening/Closing the Front Cover").

### 3.2.13 Floor Standing (KX-TDE200 Only)

3. Lift the shelf, attach it to the metal bracket, slide it backwards until it locks, and retain it with 2 screws (B).



4. Fix the front cover on the shelf (refer to "3.2.3 Opening/Closing the Front Cover").



## 3.2.14 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.

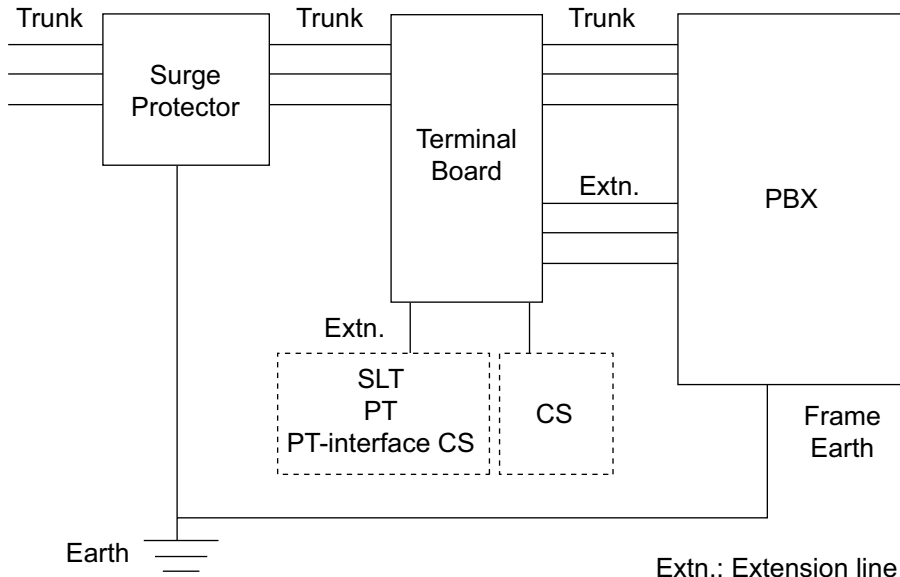
To protect the system from electrical surges, we strongly recommend connecting the system to a surge protector that meets the following specifications:

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

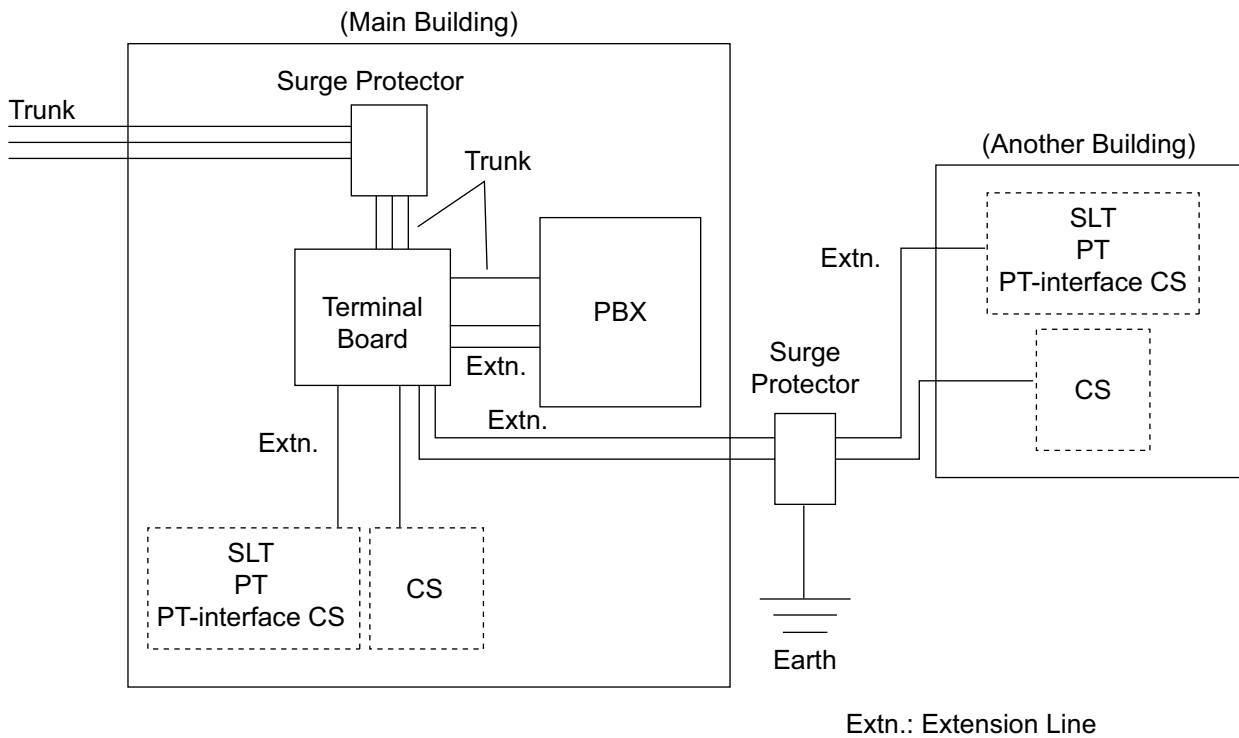
Additionally, proper earthing is very important for the protection of the system (refer to "3.2.5 Frame Earth Connection").

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

### Installation



## Outside Installation



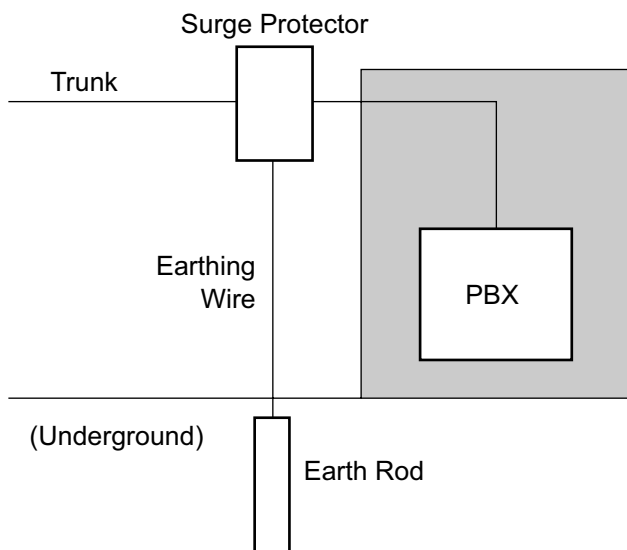
If you install an extension outside of the building, the following precautions are recommended:

- a. Install the extension wire underground.
- b. Use a conduit to protect the wire.

**Note**

The surge protector for an extension and CS is different from that for trunks.

## Installation of an Earth Rod



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

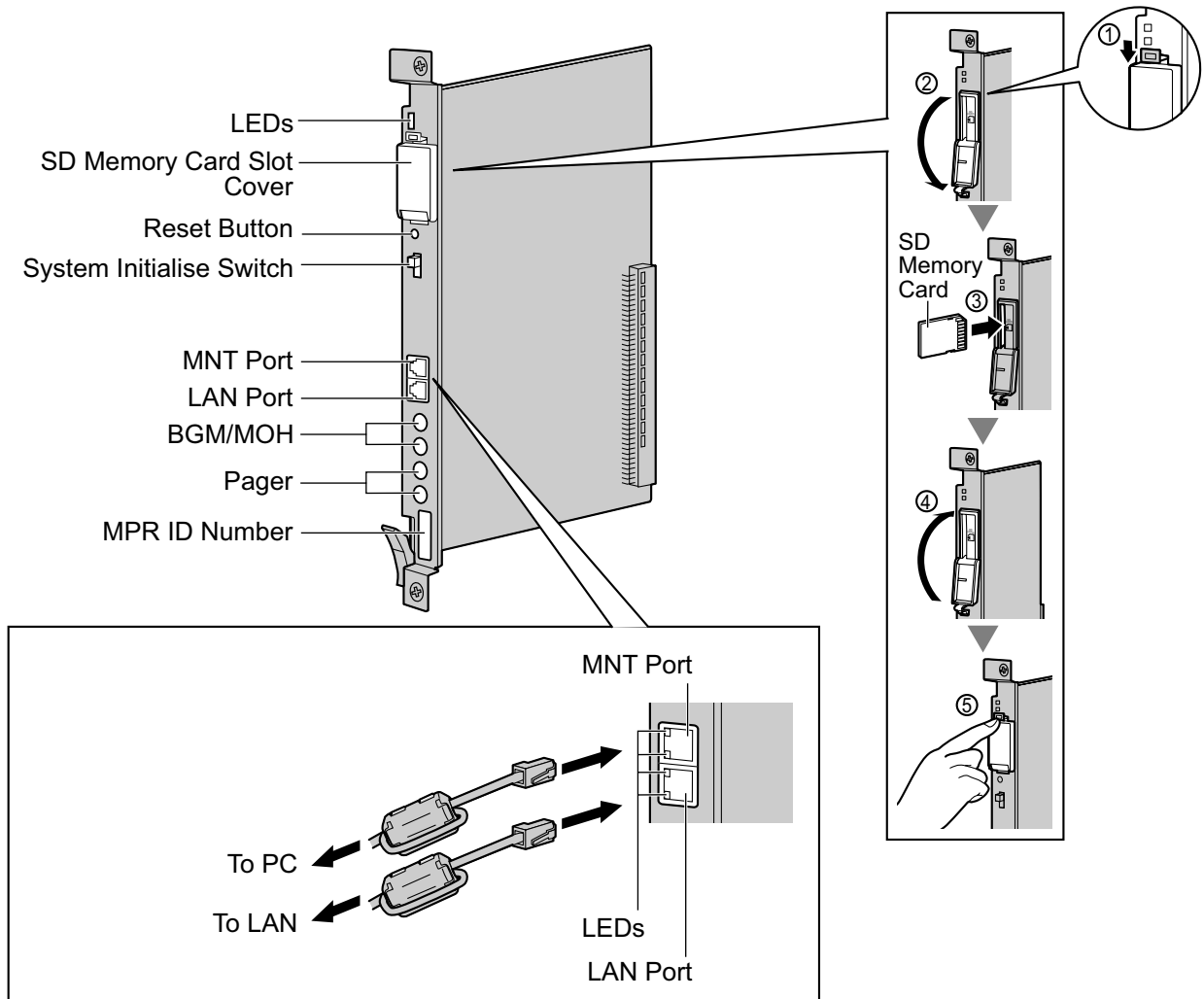
### 3.3.1 IPCMPR Card

#### Function

The IPCMPR card is the preinstalled main processing card with built-in SVM 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

- Either one of the DSP16 or DSP64 cards (refer to "3.3.2 DSP16 Card (KX-TDE0110) and DSP64 Card (KX-TDE0111)" )
- RMT card (refer to "3.3.3 RMT Card (KX-TDA0196)" )



#### 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.

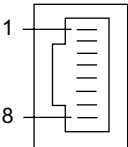
**Notice**

- 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.

**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 "3.2.9 Attaching a Ferrite Core".
- For details about Virtual Slots, refer to "1.4.3 System Capacity".
- For details about the activation keys, refer to "2.1 Information about the Activation Keys".
- For details about connecting to a LAN, refer to "3.14 LAN Connection".
- For details about connecting peripherals, refer to "3.13.1 Connection of Peripherals".
- For details about System Initialise Switch, refer to "3.16.1 Starting the PBX".
- For details about Reset Button, refer to "5.1.4 Using the Reset Button".

**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>

### 3.3.1 IPCMPR Card

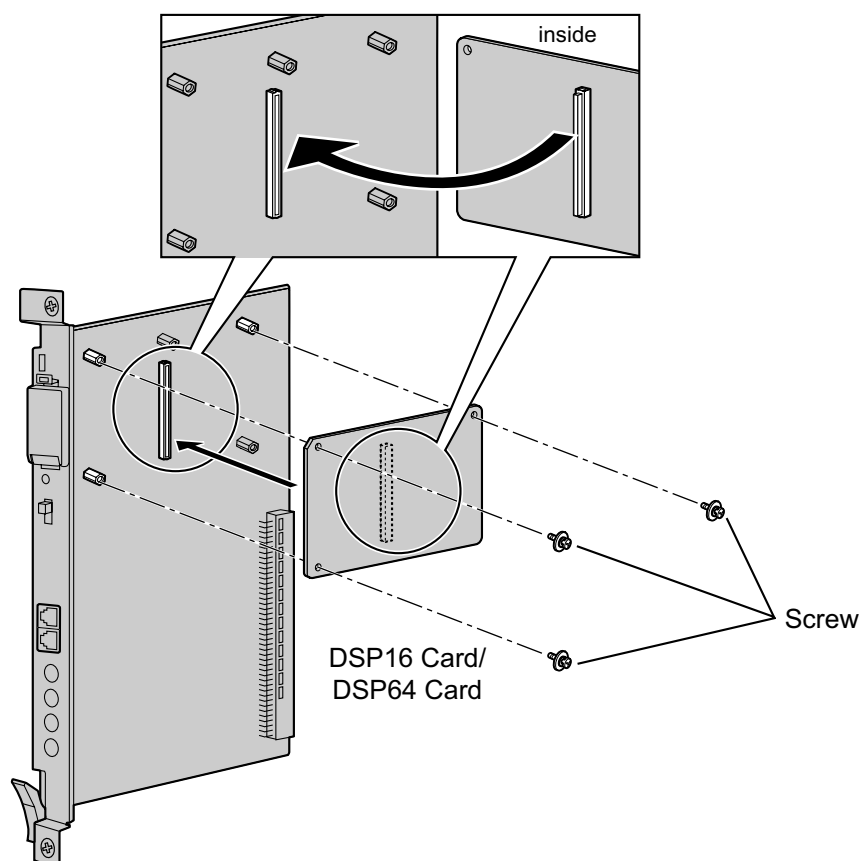
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Indication				Colour	Description
10BASE-T/100BASE-TX	MNT	2	LINK	Green	Link status indication <ul style="list-style-type: none"><li>• OFF: Off-line</li><li>• ON: Linked normally</li><li>• Flashing: In communication</li></ul>
			100	Yellow	Data transmission 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 DSP16 Card (KX-TDE0110) and DSP64 Card (KX-TDE0111)

### Function

- DSP16:** 16-channel digital signal processor card with a 4-Channel IP Trunk activation key and a 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

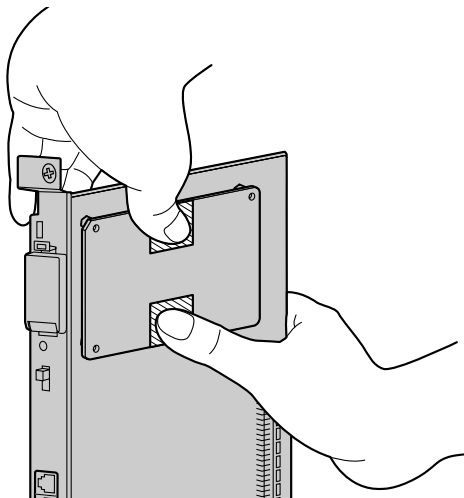
### Note

- Depending on the number and the type of IP trunks and IP telephones you wish to use, required activation keys are determined, and either the DSP16 or DSP64 card is selected to be installed.
- If the preinstalled activation keys on the DSP16 or DSP64 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 DSP16 Card (KX-TDE0110) and DSP64 Card (KX-TDE0111)

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- When installing the DSP16 or DSP64 card, hold down the shaded areas of the card to connect it firmly.

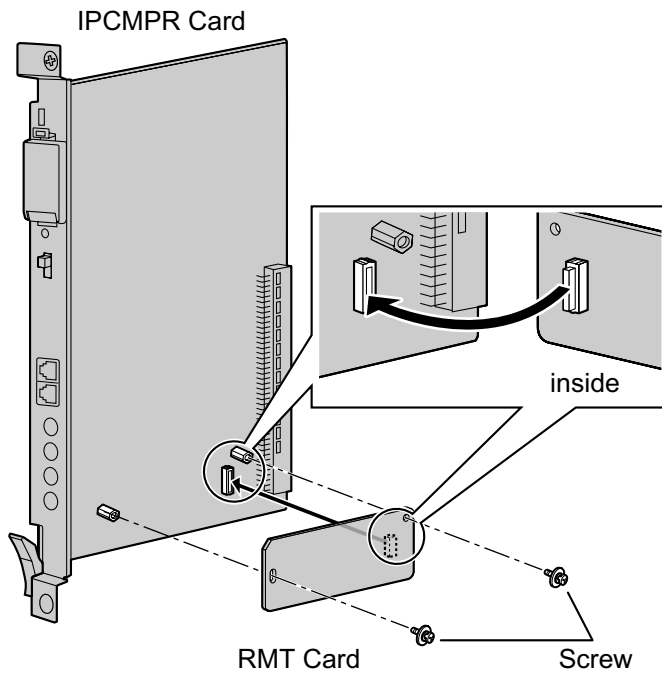




### 3.3.3 RMT Card (KX-TDA0196)

#### 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

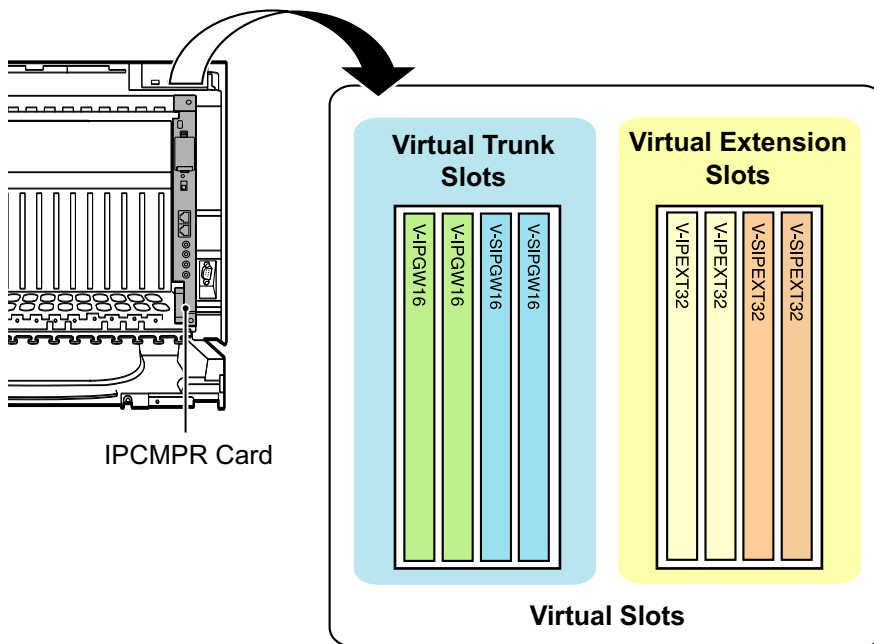
### 3.4.1 Virtual Cards

#### Function

Virtual Cards are included with the IPCMPR card and can be activated with the appropriate activation key. By installing Virtual Cards in the Virtual Slots of the IPCMPR card using the Maintenance Console, IP trunks and IP extensions 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.729AB 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.

#### Example: Virtual Cards in the Virtual Slots

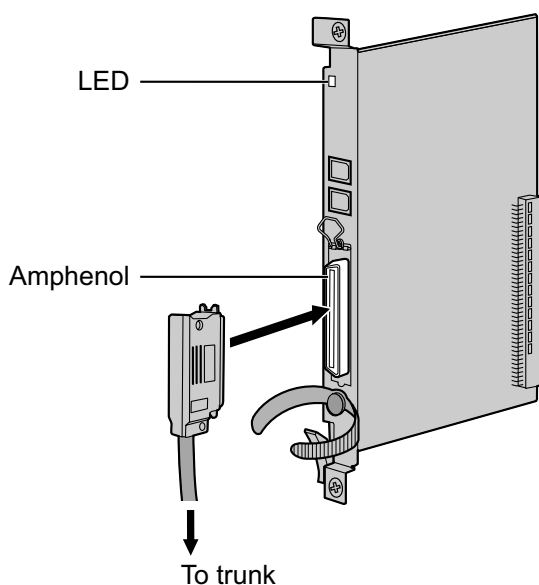


## 3.5 Information about the Physical Trunk Cards

### 3.5.1 LCOT4 Card (KX-TDA0183), LCOT8 Card (KX-TDA0180), and LCOT16 Card (KX-TDA0181)

#### Function

- LCOT4:** 4-port analogue trunk card with 2 power failure transfer (PFT) ports.
- LCOT8:** 8-port analogue trunk card with 2 power failure transfer (PFT) ports. One CID8 or CID/PAY8 card can be mounted on the LCOT8 card (refer to "3.5.3 CID/PAY8 Card (KX-TDA0189)" and "3.5.4 CID8 Card (KX-TDA0193)").
- LCOT16:** 16-port analogue trunk card with 4 power failure transfer (PFT) ports. A maximum of 2 CID8 cards, 2 CID/PAY8 cards, or one of each can be mounted on the LCOT16 card (refer to "3.5.3 CID/PAY8 Card (KX-TDA0189)" and "3.5.4 CID8 Card (KX-TDA0193)").



#### Accessories and User-supplied Items

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

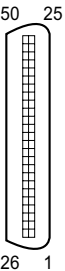
**User-supplied (not included):** Amphenol connector

#### Note

- To connect the Amphenol connector, refer to "3.2.10 Fastening an Amphenol Connector".
- For details about power failure transfer, refer to "3.15.1 Power Failure Connections".
- To confirm the trunk connection, refer to "Confirming the Trunk Connection" in "3.16.1 Starting the PBX".

## Pin Assignments

### Amphenol Connector



No.	Signal Name	Function	No.	Signal Name	Function
1	RA	Ring port 1	26	TA	Tip port 1
2	RB	Ring port 2	27	TB	Tip port 2
3	RC	Ring port 3	28	TC	Tip port 3
4	RD	Ring port 4	29	TD	Tip port 4
5	RE	Ring port 5	30	TE	Tip port 5
6	RF	Ring port 6	31	TF	Tip port 6
7	RG	Ring port 7	32	TG	Tip port 7
8	RH	Ring port 8	33	TH	Tip port 8
9	RI	Ring port 9	34	TI	Tip port 9
10	RJ	Ring port 10	35	TJ	Tip port 10
11	RK	Ring port 11	36	TK	Tip port 11
12	RL	Ring port 12	37	TL	Tip port 12
13	RM	Ring port 13	38	TM	Tip port 13
14	RN	Ring port 14	39	TN	Tip port 14
15	RO	Ring port 15	40	TO	Tip port 15
16	RP	Ring port 16	41	TP	Tip port 16
17-25	Reserved	–	42-50	Reserved	–

#### Note

- Pin assignments for the pins 5 to 8 and 30 to 33 are for the LCOT8 and LCOT16 card only.
- Pin assignments for the pins 9 to 16 and 34 to 41 are for the LCOT16 card only.

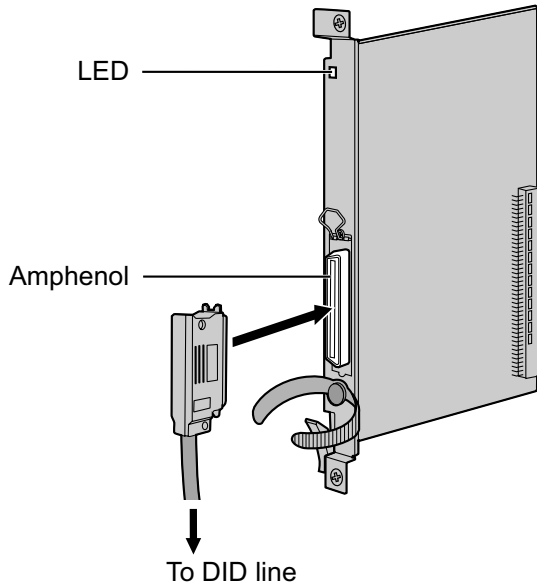
## LED Indications

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 DID8 Card (KX-TDA0182)

### Function

8-port DID trunk card.



### Accessories and User-supplied Items

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

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

#### Note

- To connect the Amphenol connector, refer to "3.2.10 Fastening an Amphenol Connector".
- To confirm the trunk connection, refer to "Confirming the Trunk Connection" in "3.16.1 Starting the PBX".

### Pin Assignments

#### Amphenol Connector

	No.	Signal Name	Function	No.	Signal Name	Function
	1	RA	Ring port 1	26	TA	Tip port 1
	2	RB	Ring port 2	27	TB	Tip port 2
	3	RC	Ring port 3	28	TC	Tip port 3
	4	RD	Ring port 4	29	TD	Tip port 4
	5	RE	Ring port 5	30	TE	Tip port 5
	6	RF	Ring port 6	31	TF	Tip port 6
	7	RG	Ring port 7	32	TG	Tip port 7
	8	RH	Ring port 8	33	TH	Tip port 8
	9-25	Reserved	–	34-50	Reserved	–

## LED Indications

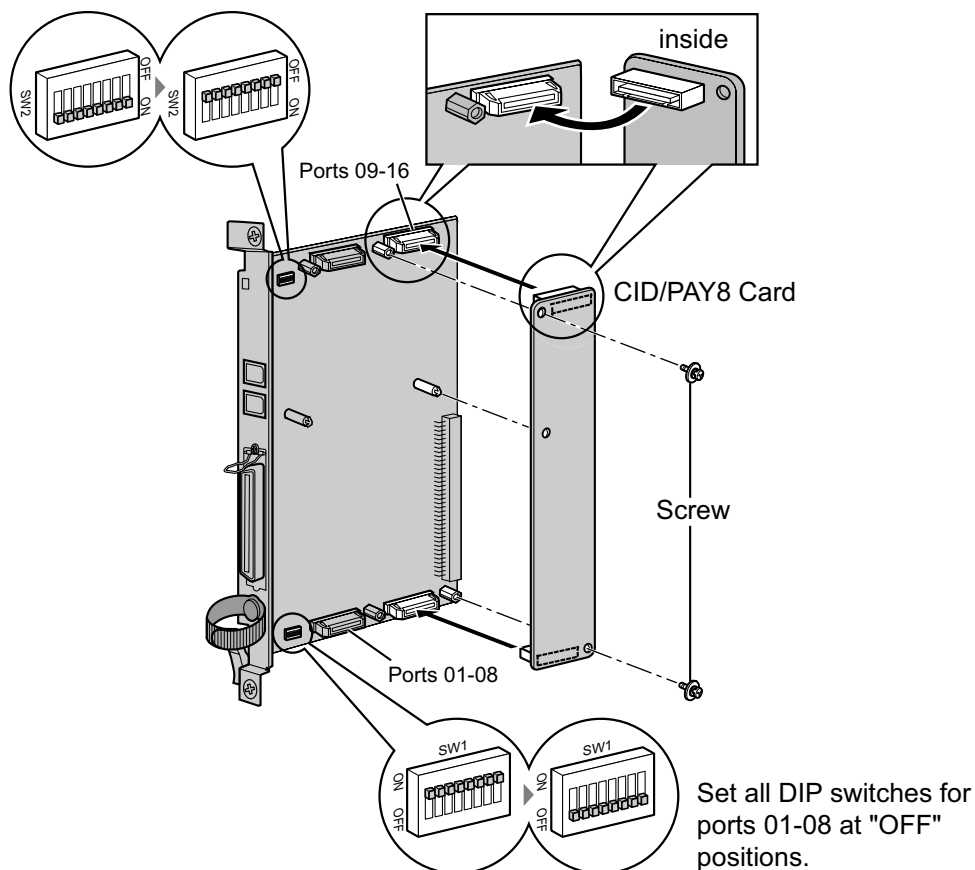
Indication	Colour	Description
CARD STATUS	Green/Red	Card status indication <ul style="list-style-type: none"><li>• OFF: Power Off</li><li>• Green ON: Normal (all ports are idle)</li><li>• Green Flashing (60 times per minute): Normal (a port is in use)</li><li>• Red ON: Fault (includes reset)</li><li>•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

## 3.5.3 CID/PAY8 Card (KX-TDA0189)

### Function

8-port Caller ID signal type FSK/FSK (with Call Waiting Caller ID [Visual Caller ID])/DTMF, and 8-port Pay Tone Service (12 kHz/16 kHz). To be mounted on the LCOT8/LCOT16 cards.

Set all DIP switches for ports  
09-16 at "OFF" positions  
(LCOT16 card only).



### Accessories and User-supplied Items

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

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

### Note

Only 1 CID/PAY8 card can be mounted on the LCOT8 card.

### Switch Settings (on LCOT8/LCOT16 cards)

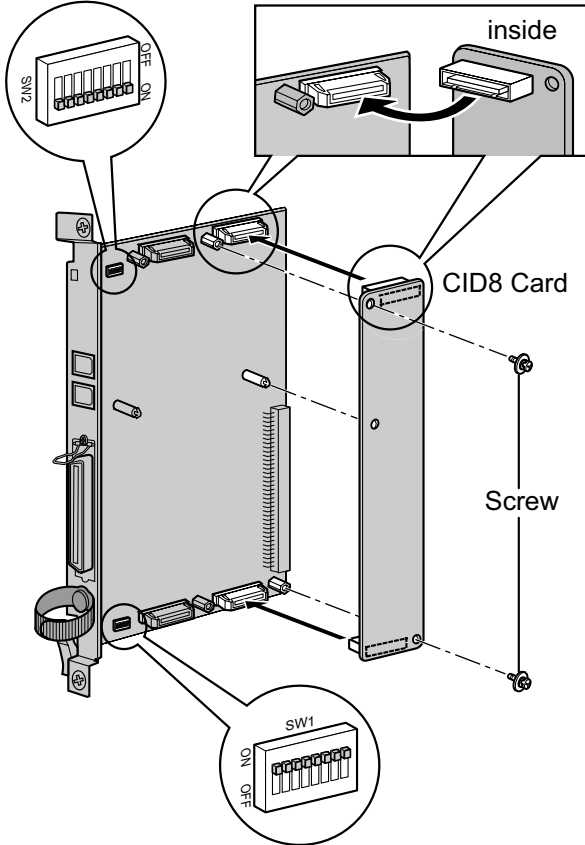
Switch	Type	Usage and Status Definition
Port Setting	DIP	Set all DIP switches at "OFF" positions.  <b>Note</b> SW2 is for the LCOT16 card only.

### 3.5.4 CID8 Card (KX-TDA0193)

#### Function

8-port Caller ID signal type FSK/FSK (with Call Waiting Caller ID [Visual Caller ID])/DTMF. To be mounted on the LCOT8/LCOT16 cards.

LCOT16 card only



#### Accessories and User-supplied Items

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

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

#### Note

Only 1 CID8 card can be mounted on the LCOT8 card.

#### Switch Settings (on LCOT8/LCOT16 cards)

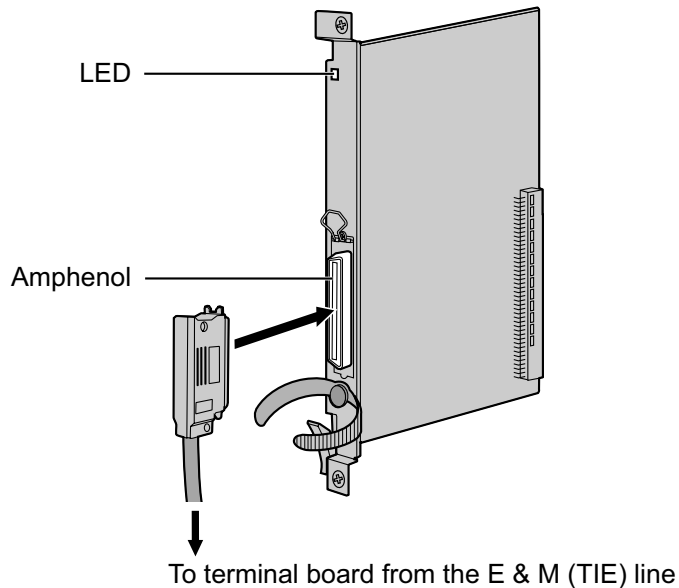
Switch	Type	Usage and Status Definition
Port Setting	DIP	Keep all DIP switches at default "ON" positions. Do not change the positions of these switches.  <b>Note</b> SW2 is for the LCOT16 card only.



## 3.5.5 E&M8 Card (KX-TDA0184)

### Function

8-port E & M (TIE) trunk card. Type 5 support.



### Accessories and User-supplied Items

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

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

#### Note

- Connect this optional service card to the trunk through terminal board from the E & M (TIE) line; do not connect to the trunk directly.
- To connect the Amphenol connector, refer to "3.2.10 Fastening an Amphenol Connector".
- To confirm the trunk connection, refer to "Confirming the Trunk Connection" in "3.16.1 Starting the PBX".

## Pin Assignments

### Amphenol Connector

	No.	Signal Name	Function	No.	Signal Name	Function
	1	TA	Tip port 1	26	RA	Ring port 1
	2	T1A	Tip 1 port 1	27	R1A	Ring 1 port 1
	3	EA	E line port 1	28	MA	M line port 1
	4	SGA	SG line port 1	29	SGB	SG line port 2
	5	TB	Tip port 2	30	RB	Ring port 2
	6	T1B	Tip 1 port 2	31	R1B	Ring 1 port 2
	7	EB	E line port 2	32	MB	M line port 2
	8	TC	Tip port 3	33	RC	Ring port 3

### 3.5.5 E&M8 Card (KX-TDA0184)

No.	Signal Name	Function	No.	Signal Name	Function
9	T1C	Tip 1 port 3	34	R1C	Ring 1 port 3
10	EC	E line port 3	35	MC	M line port 3
11	TD	Tip port 4	36	RD	Ring port 4
12	T1D	Tip 1 port 4	37	R1D	Ring 1 port 4
13	ED	E line port 4	38	MD	M line port 4
14	TE	Tip port 5	39	RE	Ring port 5
15	T1E	Tip 1 port 5	40	R1E	Ring 1 port 5
16	EE	E line port 5	41	ME	M line port 5
17	TF	Tip port 6	42	RF	Ring port 6
18	T1F	Tip 1 port 6	43	R1F	Ring 1 port 6
19	EF	E line port 6	44	MF	M line port 6
20	TG	Tip port 7	45	RG	Ring port 7
21	T1G	Tip 1 port 7	46	R1G	Ring 1 port 7
22	EG	E line port 7	47	MG	M line port 7
23	TH	Tip port 8	48	RH	Ring port 8
24	T1H	Tip 1 port 8	49	R1H	Ring 1 port 8
25	EH	E line port 8	50	MH	M line port 8

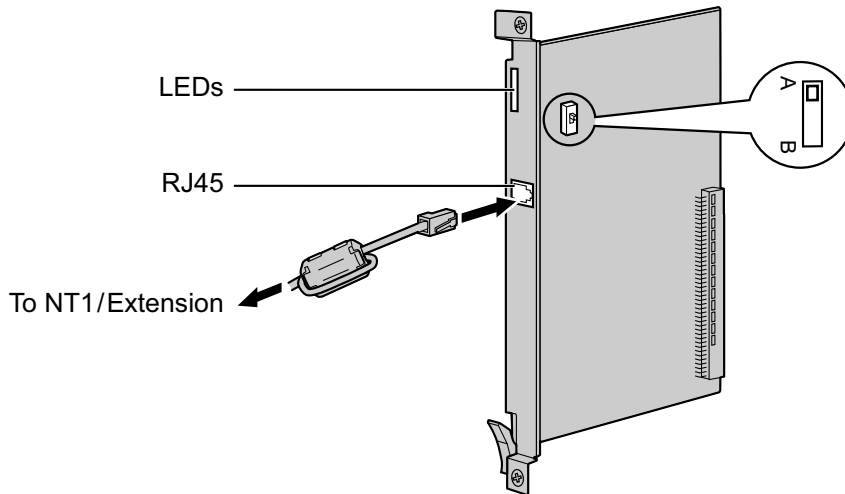
## LED Indications

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>

## 3.5.6 T1 Card (KX-TDA0187)

### Function

1-port T1 trunk card. EIA/TIA standard 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 NT1; do not connect to the trunk directly.
- T1 ports are SELV ports and should only be connected to SELV services.

### Notice

When connecting the RJ45 connector, attach the included ferrite core (except in Canada, where the ferrite core is not necessarily required). Refer to "3.2.9 Attaching a Ferrite Core".

### Note

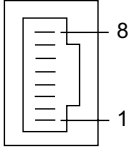
- This optional service card can be used for either trunk or extension connection, by setting the A/B switch or using the connector with appropriate pin assignments.
- To confirm the trunk connection, refer to "Confirming the Trunk Connection" in "3.16.1 Starting the PBX".

## Switch Settings

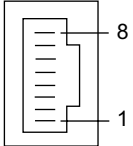
Switch	Type	Usage and Status Definition
A/B	Slide	Select A (default) for trunk or B for extension use.

## 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	–	–

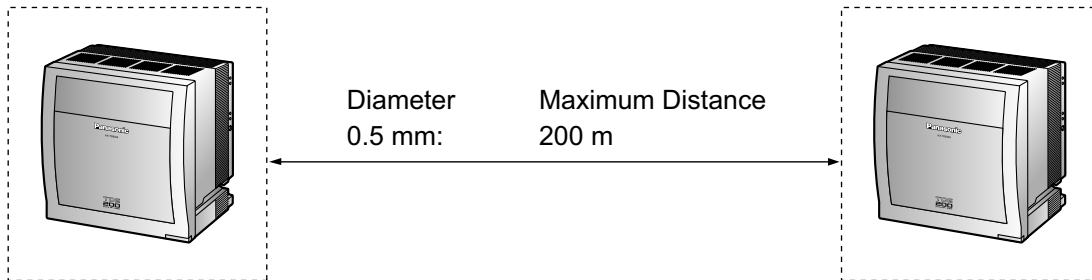
## LED Indications

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>

## Maximum Cabling Distance of Extension Connection

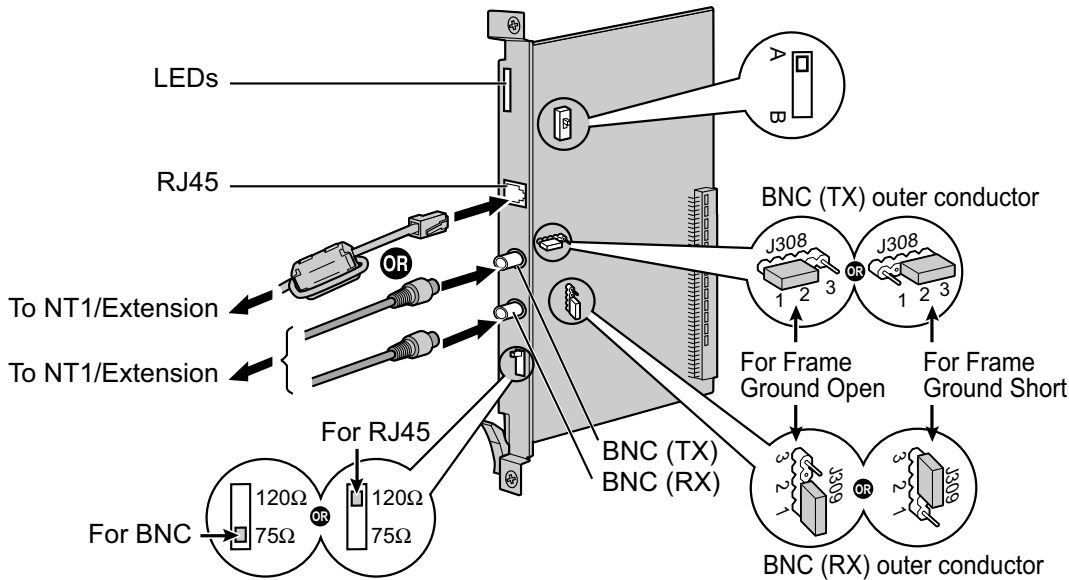
The maximum length of the extension cable that connects the T1 cards is shown below:



### 3.5.7 E1 Card (KX-TDA0188)

#### 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 "3.2.9 Attaching a Ferrite Core".

#### Note

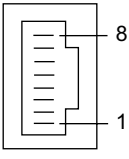
- In some countries/areas, this optional service card must not be connected to the Public Switched Telephone Network.
- Use only 1 type of connector (RJ45 or BNC) for connection; RJ45 and BNC cannot be used simultaneously.
- This optional service card can be used for either trunk or extension connection, 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 "3.16.1 Starting the PBX".

## Switch Settings

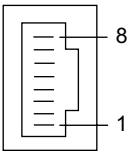
Switch	Type	Usage and Status Definition
Termination	Slide	Select 120 $\Omega$ (default) or 75 $\Omega$ to match the connector type to be used.
A/B	Slide	When using an RJ45 connector, select A (default) for trunk or B for extension use. When using BNC connectors, make sure that A is selected.
Frame Ground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

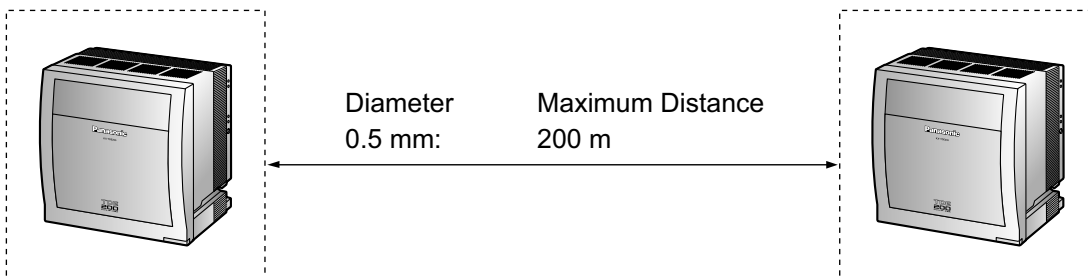
	No.	Signal Name	Level [V]	Function
	1	RX-	(-)	Receive data (-)
	2	RX+	(+)	Receive data (+)

**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:



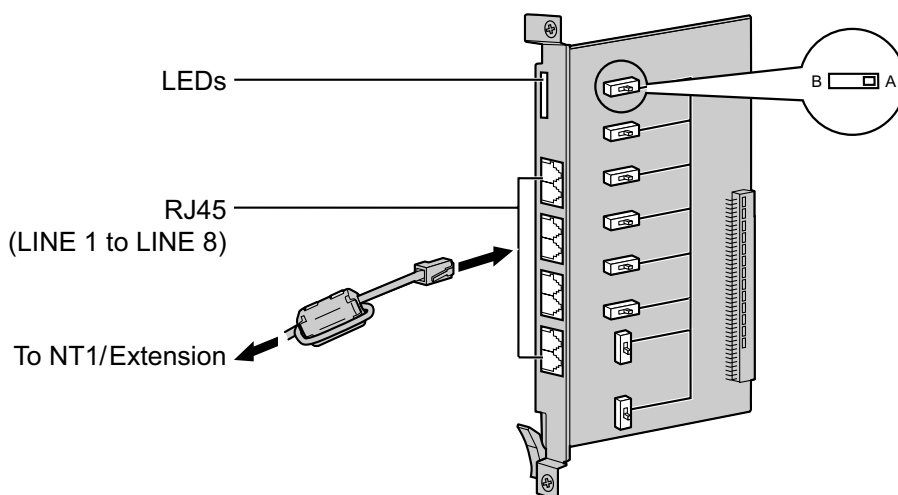


## 3.5.8 BRI4 Card (KX-TDA0284) and BRI8 Card (KX-TDA0288)

### Function

**BRI4:** 4-port ISDN Basic Rate Interface card with 1 power failure transfer port. EURO-ISDN/ETSI compliant.

**BRI8:** 8-port ISDN Basic Rate Interface card with 1 power failure transfer port. EURO-ISDN/ETSI compliant.



### Accessories and User-supplied Items

**Accessories (included):** Ferrite core(s) × 1 (BRI4 card) or 2 (BRI8 card)

**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 BRI4/BRI8 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 BRI4/BRI8 card. Failure to do so may cause damage to the power supply circuit of the BRI4/BRI8 card or the terminal.
- When connecting these optional service cards 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 "3.2.9 Attaching a Ferrite Core".

### Note

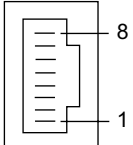
- LINE 5 to LINE 8 are for BRI8 card only.
- These optional service cards have 100 Ω of terminal resistance. For use in point to multi-point connection, the cards must be placed at the end of the bus.
- These optional service cards can be used for either trunk or extension connection, by setting the A/B switch or using the connector with appropriate pin assignments.
- For details about power failure transfer, refer to "3.15.1 Power Failure Connections".
- To confirm the trunk connection, refer to "Confirming the Trunk Connection" in "3.16.1 Starting the PBX".

## Switch Settings

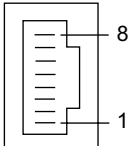
Switch	Type	Usage and Status Definition
A/B	Slide	Select A (default) for trunk or B for extension use.

## 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

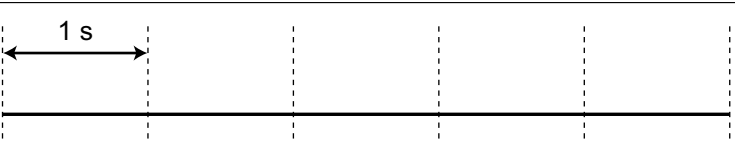
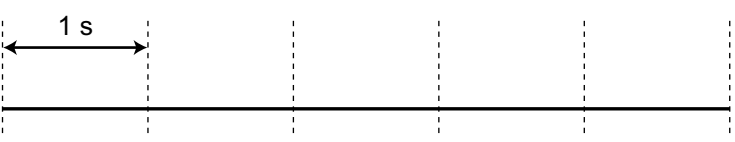
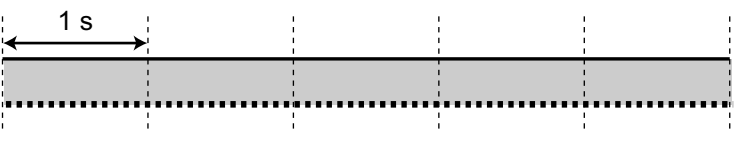
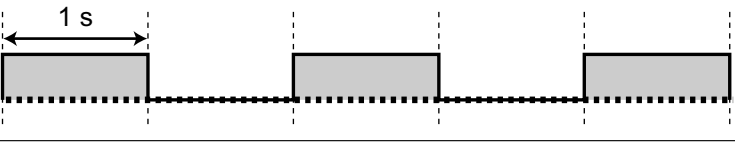
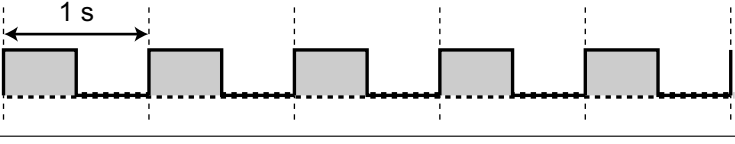
	No.	Signal Name	Level [V]	Function
	1-2	Reserved	–	–
	3	RX2	(+)	Receive data 2
	4	TX1	(+)	Transmit data 1
	5	TX2	(-)	Transmit data 2
	6	RX1	(-)	Receive data 1
	7-8	Reserved	–	–

## 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>

Indication	Colour	Description
LINE 8 LINE 7 LINE 6 LINE 5 LINE 4 LINE 3 LINE 2 LINE 1	Green	Line status indication (LINE 1 to LINE 8): Refer to "LINE LED Pattern" below for details.  <b>Note</b> LINE 5 to LINE 8 are for BRI8 card only.

**LINE LED Pattern**

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

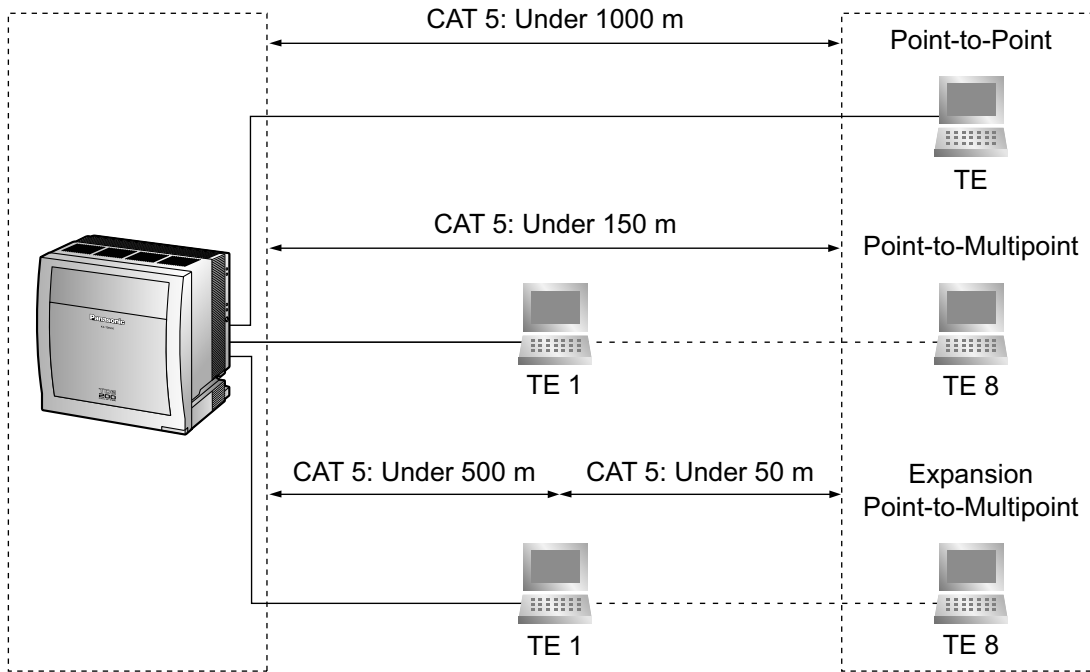
Layer 1: ON (Synchronous)

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

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

## Maximum Cabling Distance of S0 Bus Connection

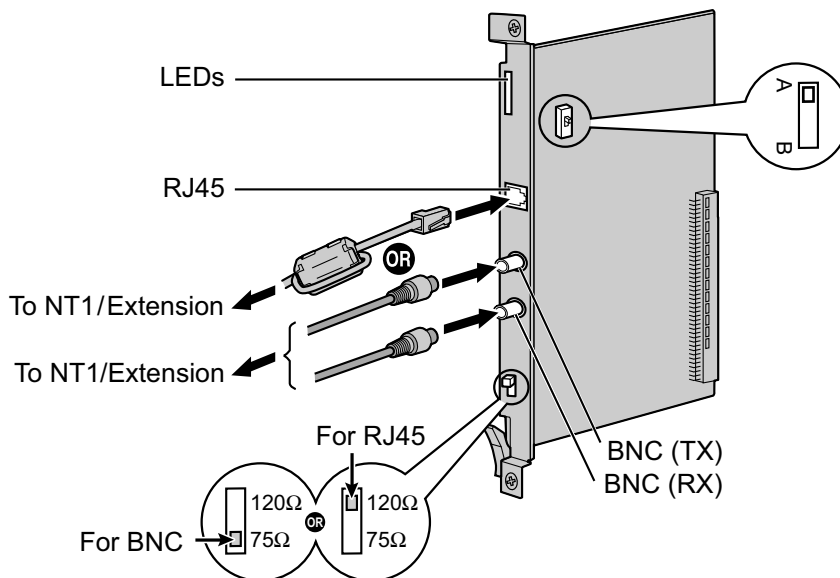
The maximum length of the extension cable that connects the PBX and the ISDN terminal equipment (TE) is shown below:



## 3.5.9 PRI30 Card (KX-TDA0290CE/KX-TDA0290CJ)

### 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 or BNC 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 "3.2.9 Attaching a Ferrite Core".

### Note

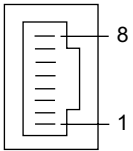
- In some countries/areas, this optional service card must not be connected to the Public Switched Telephone Network.
- Use only 1 type of connector (RJ45 or BNC) for connection; RJ45 and BNC cannot be used simultaneously.
- This optional service card can be used for either trunk or extension connection, 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 "3.16.1 Starting the PBX".

## Switch Settings

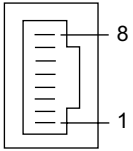
Switch	Type	Usage and Status Definition
Termination	Slide	Select 120 Ω (default) or 75 Ω to match the connector type to be used.
A/B	Slide	When using an RJ45 connector, select A (default) for trunk or B for extension use. When using BNC connectors, make sure that A is selected.

## 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)

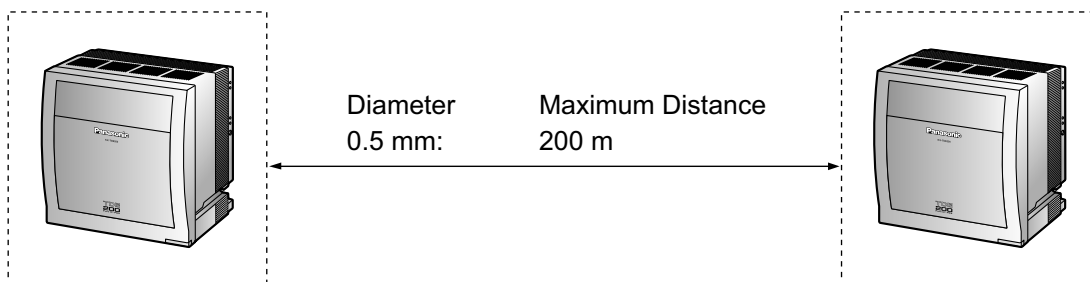
	No.	Signal Name	Level [V]	Function
	1	RX-	(-)	Receive data (-)
	2	RX+	(+)	Receive data (+)

## 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>
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

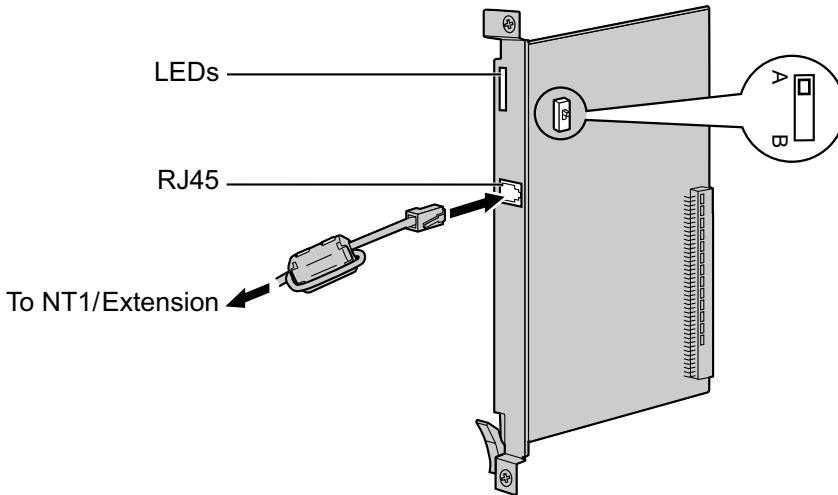
The maximum length of the extension cable that connects the PRI30 cards is shown below:



## 3.5.10 PRI23 Card (KX-TDA0290)

### Function

1-port ISDN Primary Rate Interface card (23B channels). NI (North American standard ISDN protocol) 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 (except in Canada, where the ferrite core is not necessarily required). Refer to "3.2.9 Attaching a Ferrite Core".

### 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 "3.16.1 Starting the PBX".

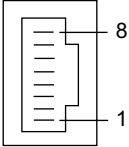
## Switch Settings

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

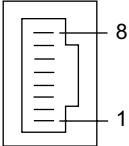


## Pin Assignments

### 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

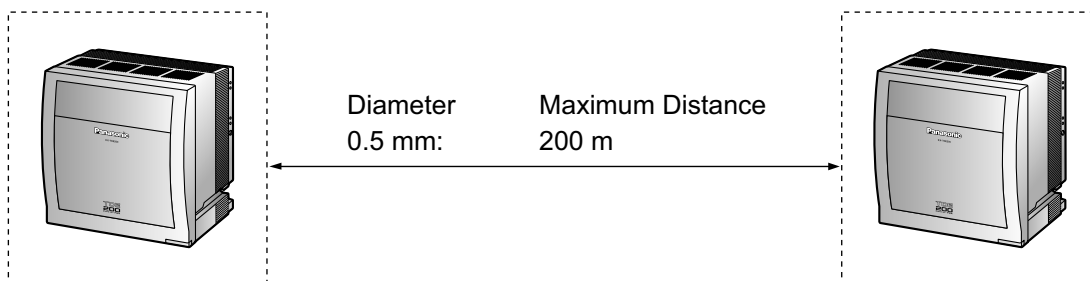
Indication	Colour	Description
CARD STATUS	Green/Red	Card status indication <ul style="list-style-type: none"> <li>• OFF: Power Off</li> <li>• Green ON: Normal (all ports are idle)</li> <li>• Green Flashing (60 times per minute): Normal (a port is in use)</li> <li>• Red ON: Fault (includes reset)</li>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

### 3.5.10 PRI23 Card (KX-TDA0290)

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

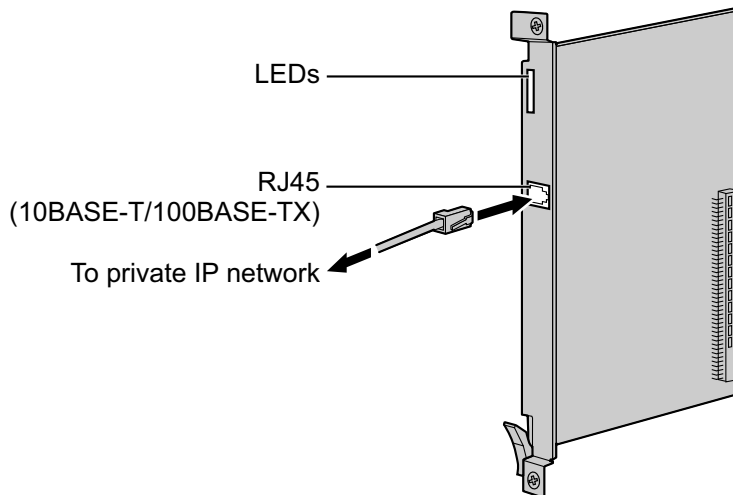
The maximum length of the extension cable that connects the PRI23 cards is shown below:



## 3.5.11 IP-GW4E Card (KX-TDA0484)

### Function

4-channel VoIP gateway card. Compliant with VoIP H.323 V.2 protocol, and ITU-T G.729A, G.723.1 and G.711 CODEC methods.



### Accessories and User-supplied Items

**Accessories (included):** CD-ROM (including documentation for web programming) × 1

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

#### Note

- The maximum length of the cable to be connected to this optional service card is 100 m.
- The IP-GW4E card occupies the space of only 1 free slot when it is installed in the PBX.
- For programming instructions and other information about the IP-GW4E card, refer to the documentation for the IP-GW4E card. To programme the IP-GW4E card, use the web programming designed for the IP-GW4E card.
- To confirm the trunk connection, refer to "Confirming the Trunk Connection" in "3.16.1 Starting the PBX".

### Pin Assignments

#### RJ45 Connector (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	—	—

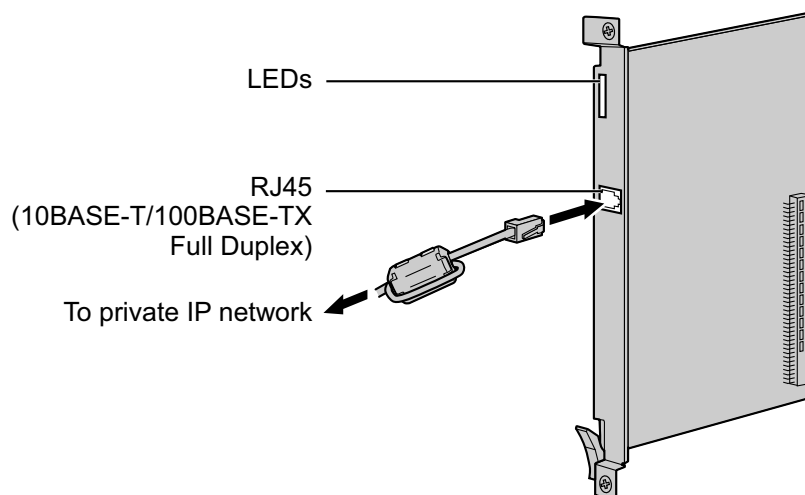
## LED Indications

Indication	Colour	Description
CARD STATUS	Green/Red	<p>Card status indication</p> <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>
ONLINE	Green	<p>On-line status indication</p> <ul style="list-style-type: none"> <li>• ON: On-line mode</li> <li>• OFF: Off-line mode</li> <li>• Flashing: Maintenance mode</li> </ul> <p><b>Note</b> If the LINK indicator is OFF, the ONLINE indicator will also be OFF.</p>
ALARM	Red	<p>Alarm indication</p> <ul style="list-style-type: none"> <li>• OFF: Normal</li> <li>• ON: Alarm</li> </ul>
VoIP BUSY	Green	<p>VoIP (H.323) process indication</p> <ul style="list-style-type: none"> <li>• OFF: VoIP process inactive</li> <li>• ON: VoIP process active</li> </ul>
LINK	Green	<p>Link status indication</p> <ul style="list-style-type: none"> <li>• OFF: Connection error</li> <li>• ON: Normal connection</li> </ul>
DATA	Green	<p>Data transmission indication</p> <ul style="list-style-type: none"> <li>• OFF: No data transmitted</li> <li>• ON: Data transmitting</li> </ul>

## 3.5.12 IP-GW16 Card (KX-TDA0490)

### Function

16-channel VoIP gateway card. Compliant with VoIP H.323 V.2 protocol, and ITU-T G.729A, G.723.1 and G.711 CODEC methods.



### Accessories and User-supplied Items

**Accessories (included):** Ferrite core × 1, CD-ROM (including documentation for web programming) × 1

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

#### Note

- The maximum length of the cable to be connected to this optional service card is 100 m.
- When connecting the RJ45 connector, attach the included ferrite core. Refer to "3.2.9 Attaching a Ferrite Core".
- For programming instructions and other information about the IP-GW16 card, refer to the documentation for the IP-GW16 card. To programme the IP-GW16 card, use the web programming designed for the IP-GW16 card.
- To confirm the trunk connection, refer to "Confirming the Trunk Connection" in "3.16.1 Starting the PBX".

### Pin Assignments

#### RJ45 Connector (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
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>
ONLINE	Green	On-line status indication <ul style="list-style-type: none"> <li>• ON: On-line mode</li> <li>• OFF: Off-line mode</li> <li>• Flashing: Maintenance mode</li> </ul> <p><b>Note</b> If the LINK indicator is OFF, the ONLINE indicator will also be OFF.</p>
ALARM	Red	Alarm indication <ul style="list-style-type: none"> <li>• OFF: Normal</li> <li>• ON: Alarm</li> </ul>
VoIP BUSY	Green	VoIP (H.323) process indication <ul style="list-style-type: none"> <li>• OFF: VoIP process inactive</li> <li>• ON: VoIP process active</li> </ul>
LINK	Green	Link status indication <ul style="list-style-type: none"> <li>• OFF: Connection error</li> <li>• ON: Normal connection</li> </ul>
DATA	Green	Data transmission indication <ul style="list-style-type: none"> <li>• OFF: No data transmitted</li> <li>• ON: Data transmitting</li> </ul>

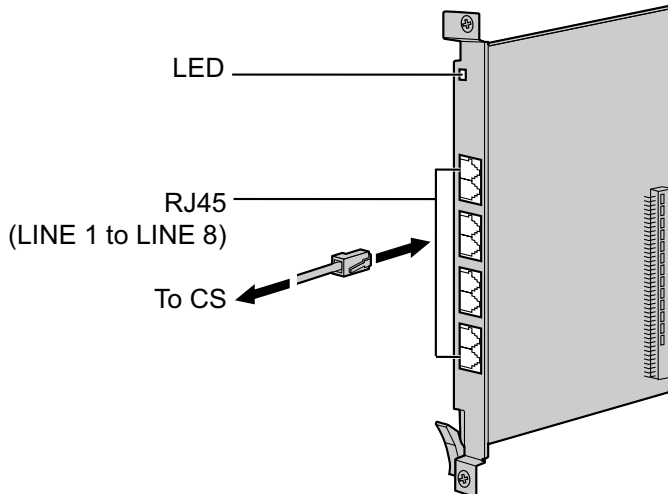
## 3.6 Information about the Physical Extension Cards

### 3.6.1 CSIF4 Card (KX-TDA0143) and CSIF8 Card (KX-TDA0144)

#### Function

**CSIF4:** 4-port CS interface card for 4 CSs.

**CSIF8:** 8-port CS interface card for 8 CSs.



#### Accessories and User-supplied Items

**Accessories (included):** none

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

#### CAUTION

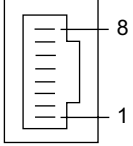
Make sure that the status of all the CSs connected to the CSIF cards are set to in-service (INS). For information about how to view CS information using the Maintenance Console, refer to "2.6.15 Utility—CS Information" in the PC Programming Manual. If there is a CS in out-of-service (OUS) status, make sure that it is securely connected to the CSIF card. If the CS remains in OUS status, there may be a fault with the connection. Do not leave the connected CS in OUS status since it may cause severe damage to the CSIF card.

#### Note

- LINE 5 to LINE 8 are for CSIF8 card only.
- When using the CSIF4 card, please note that the PBX software will recognise the CSIF4 card as the CSIF8 card. As a result, 8 cell stations may appear to be available; however, only 4 cell stations are supported by the CSIF4 card.
- For details about connecting the CS, refer to "3.9.7 Connecting a Cell Station to the PBX" in "3.9 Connection of DECT Portable Stations" or "3.10.7 Connecting a Cell Station to the PBX" in "3.10 Connection of 2.4 GHz Portable Stations".

## Pin Assignments

### RJ45 Connector

	No.	Signal Name	Function
	1-2	Reserved	–
	3	D1	Data port (High)
	4	POWH	Power (High)
	5	POWL	Power (Low)
	6	D2	Data port (Low)
	7-8	Reserved	–

## LED Indications

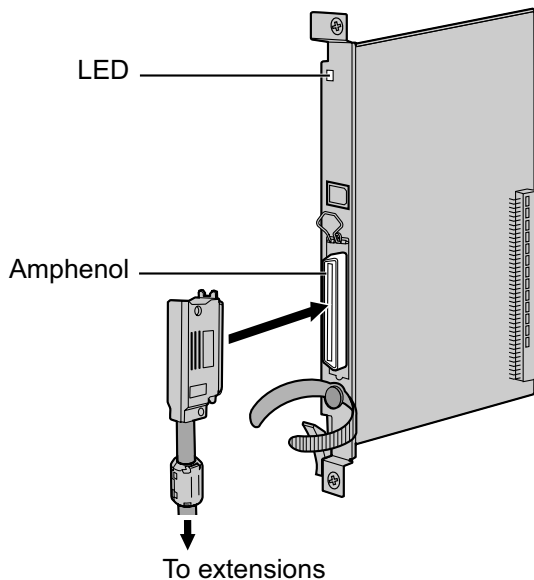
Indication	Colour	Description
CARD STATUS	Green/Red	Card status indication <ul style="list-style-type: none"> <li>• OFF: Power Off</li> <li>• Green ON: Normal (all ports are idle)</li> <li>• Green Flashing (60 times per minute): Normal (a port is in use)</li> <li>• Red ON: Fault (includes reset)</li>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



## 3.6.2 DHLC8 Card (KX-TDA0170)

### Function

8-port digital hybrid extension card for DPTs, APTs, SLTs, DSS consoles, and PT-interface CSs, with 2 power failure transfer (PFT) ports.



### Accessories and User-supplied Items

**Accessories (included):** Screws × 2, Ferrite core × 1

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

### Note

- Attach the included ferrite core to the cable. Refer to "3.2.9 Attaching a Ferrite Core".
- To connect the Amphenol connector, refer to "3.2.10 Fastening an Amphenol Connector".
- For details about power failure transfer, refer to "3.15.1 Power Failure Connections".

## Pin Assignments

### Amphenol Connector

	No.	Signal Name	Function	No.	Signal Name	Function
	1	RA	SLT Ring port 1	26	TA	SLT Tip port 1
	2	D2A	PT Data port 1 (Low)	27	D1A	PT Data port 1 (High)
	3	Reserved	–	28	Reserved	–
	4	RB	SLT Ring port 2	29	TB	SLT Tip port 2
	5	D2B	PT Data port 2 (Low)	30	D1B	PT Data port 2 (High)
	6	Reserved	–	31	Reserved	–
	7	RC	SLT Ring port 3	32	TC	SLT Tip port 3

### 3.6.2 DHLC8 Card (KX-TDA0170)

No.	Signal Name	Function	No.	Signal Name	Function
8	D2C	PT Data port 3 (Low)	33	D1C	PT Data port 3 (High)
9	Reserved	–	34	Reserved	–
10	RD	SLT Ring port 4	35	TD	SLT Tip port 4
11	D2D	PT Data port 4 (Low)	36	D1D	PT Data port 4 (High)
12	Reserved	–	37	Reserved	–
13	RE	SLT Ring port 5	38	TE	SLT Tip port 5
14	D2E	PT Data port 5 (Low)	39	D1E	PT Data port 5 (High)
15	Reserved	–	40	Reserved	–
16	RF	SLT Ring port 6	41	TF	SLT Tip port 6
17	D2F	PT Data port 6 (Low)	42	D1F	PT Data port 6 (High)
18	Reserved	–	43	Reserved	–
19	RG	SLT Ring port 7	44	TG	SLT Tip port 7
20	D2G	PT Data port 7 (Low)	45	D1G	PT Data port 7 (High)
21	Reserved	–	46	Reserved	–
22	RH	SLT Ring port 8	47	TH	SLT Tip port 8
23	D2H	PT Data port 8 (Low)	48	D1H	PT Data port 8 (High)
24-25	Reserved	–	49-50	Reserved	–

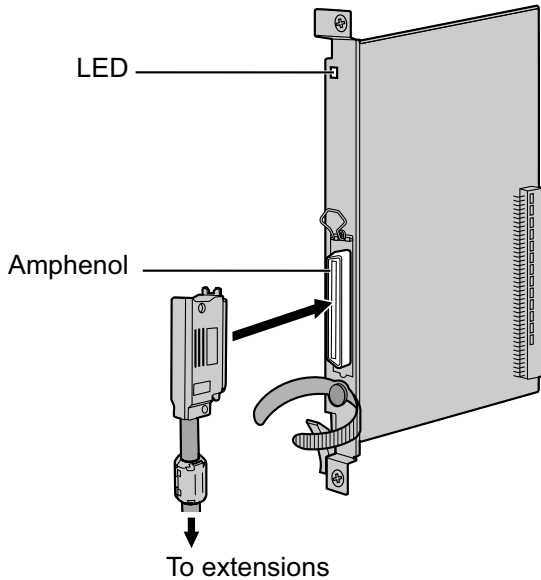
## LED Indications

Indication	Colour	Description
CARD STATUS	Green/ 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 DLC8 Card (KX-TDA0171)

### Function

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



### Accessories and User-supplied Items

**Accessories (included):** Screws × 2, Ferrite core × 1

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

### Note

- Attach the included ferrite core to the cable. Refer to "3.2.9 Attaching a Ferrite Core".
- To connect the Amphenol connector, refer to "3.2.10 Fastening an Amphenol Connector".

## Pin Assignments

### Amphenol Connector

	No.	Signal Name	Function	No.	Signal Name	Function
	1	Reserved	–	26	Reserved	–
	2	D2A	Data port 1 (Low)	27	D1A	Data port 1 (High)
	3-4	Reserved	–	28-29	Reserved	–
	5	D2B	Data port 2 (Low)	30	D1B	Data port 2 (High)
	6-7	Reserved	–	31-32	Reserved	–
	8	D2C	Data port 3 (Low)	33	D1C	Data port 3 (High)
	9-10	Reserved	–	34-35	Reserved	–
	11	D2D	Data port 4 (Low)	36	D1D	Data port 4 (High)
	12-13	Reserved	–	37-38	Reserved	–
	14	D2E	Data port 5 (Low)	39	D1E	Data port 5 (High)

### 3.6.3 DLC8 Card (KX-TDA0171)

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No.	Signal Name	Function	No.	Signal Name	Function
15-16	Reserved	–	40-41	Reserved	–
17	D2F	Data port 6 (Low)	42	D1F	Data port 6 (High)
18-19	Reserved	–	43-44	Reserved	–
20	D2G	Data port 7 (Low)	45	D1G	Data port 7 (High)
21-22	Reserved	–	46-47	Reserved	–
23	D2H	Data port 8 (Low)	48	D1H	Data port 8 (High)
24-25	Reserved	–	49-50	Reserved	–

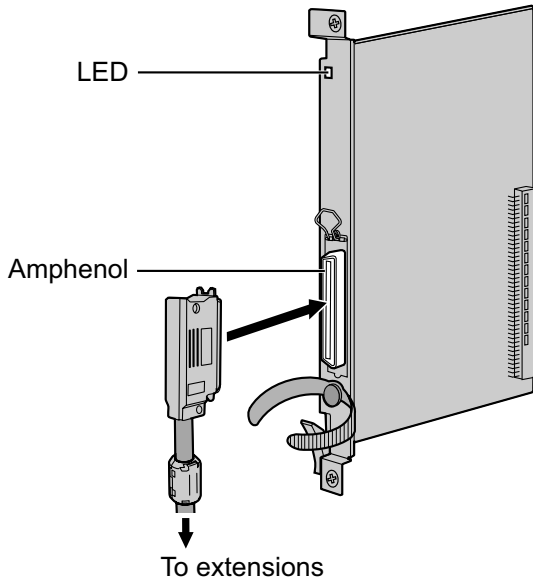
### LED Indications

Indication	Colour	Description
CARD STATUS	Green/ 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 DLC16 Card (KX-TDA0172)

### Function

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



### Accessories and User-supplied Items

**Accessories (included):** Screws × 2, Ferrite core × 1

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

### Note

- Attach the included ferrite core to the cable. Refer to "3.2.9 Attaching a Ferrite Core".
- To connect the Amphenol connector, refer to "3.2.10 Fastening an Amphenol Connector".

## Pin Assignments

### Amphenol Connector

	No.	Signal Name	Function	No.	Signal Name	Function
	1	D2A	Data port 1 (Low)	26	D1A	Data port 1 (High)
	2	D2B	Data port 2 (Low)	27	D1B	Data port 2 (High)
	3	D2C	Data port 3 (Low)	28	D1C	Data port 3 (High)
	4	D2D	Data port 4 (Low)	29	D1D	Data port 4 (High)
	5	D2E	Data port 5 (Low)	30	D1E	Data port 5 (High)
	6	D2F	Data port 6 (Low)	31	D1F	Data port 6 (High)
	7	D2G	Data port 7 (Low)	32	D1G	Data port 7 (High)
	8	D2H	Data port 8 (Low)	33	D1H	Data port 8 (High)
	9	D2I	Data port 9 (Low)	34	D1I	Data port 9 (High)
	10	D2J	Data port 10 (Low)	35	D1J	Data port 10 (High)

### 3.6.4 DLC16 Card (KX-TDA0172)

No.	Signal Name	Function	No.	Signal Name	Function
11	D2K	Data port 11 (Low)	36	D1K	Data port 11 (High)
12	D2L	Data port 12 (Low)	37	D1L	Data port 12 (High)
13	D2M	Data port 13 (Low)	38	D1M	Data port 13 (High)
14	D2N	Data port 14 (Low)	39	D1N	Data port 14 (High)
15	D2O	Data port 15 (Low)	40	D1O	Data port 15 (High)
16	D2P	Data port 16 (Low)	41	D1P	Data port 16 (High)
17-25	Reserved	–	42-50	Reserved	–

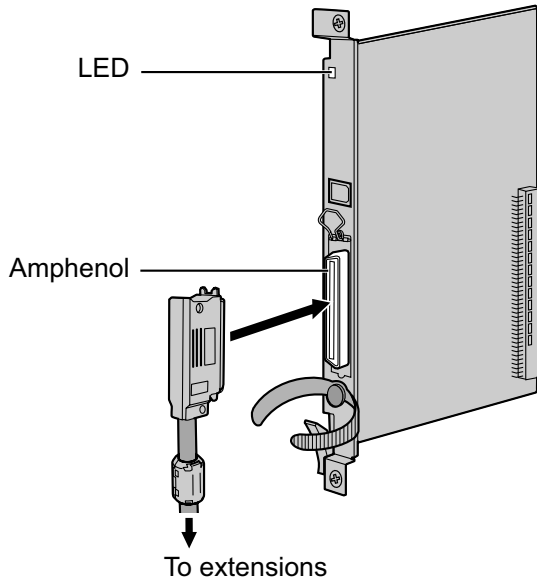
### LED Indications

Indication	Colour	Description
CARD STATUS	Green/ 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>

## 3.6.5 SLC8 Card (KX-TDA0173)

### Function

8-port extension card for SLTs with 2 power failure transfer (PFT) ports.



### Accessories and User-supplied Items

**Accessories (included):** Screws × 2, Ferrite core × 1

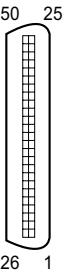
**User-supplied (not included):** Amphenol connector

### Note

- Attach the included ferrite core to the cable. Refer to "3.2.9 Attaching a Ferrite Core".
- To connect the Amphenol connector, refer to "3.2.10 Fastening an Amphenol Connector".
- For details about power failure transfer, refer to "3.15.1 Power Failure Connections".

## Pin Assignments

### Amphenol Connector

	No.	Signal Name	Function	No.	Signal Name	Function
	1	RA	Ring port 1	26	TA	Tip port 1
	2-3	Reserved	–	27-28	Reserved	–
	4	RB	Ring port 2	29	TB	Tip port 2
	5-6	Reserved	–	30-31	Reserved	–
	7	RC	Ring port 3	32	TC	Tip port 3
	8-9	Reserved	–	33-34	Reserved	–
	10	RD	Ring port 4	35	TD	Tip port 4
	11-12	Reserved	–	36-37	Reserved	–
	13	RE	Ring port 5	38	TE	Tip port 5
	14-15	Reserved	–	39-40	Reserved	–
	16	RF	Ring port 6	41	TF	Tip port 6
	17-18	Reserved	–	42-43	Reserved	–
	19	RG	Ring port 7	44	TG	Tip port 7
	20-21	Reserved	–	45-46	Reserved	–
	22	RH	Ring port 8	47	TH	Tip port 8
	23-25	Reserved	–	48-50	Reserved	–

## LED Indications

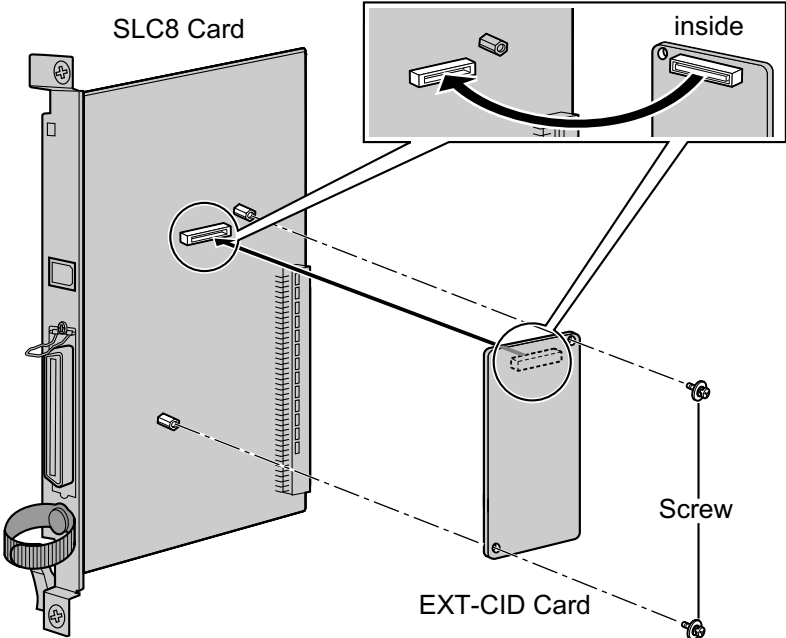
Indication	Colour	Description
CARD STATUS	Green/Red	Card status indication <ul style="list-style-type: none"> <li>• OFF: Power Off</li> <li>• Green ON: Normal (all ports are idle)</li> <li>• Green Flashing (60 times per minute): Normal (a port is in use)</li> <li>• Red ON: Fault (includes reset)</li>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



### 3.6.6 EXT-CID Card (KX-TDA0168)

#### Function

Sends Caller ID signals to extension ports. To be mounted on the SLC8 card only.



#### Accessories and User-supplied Items

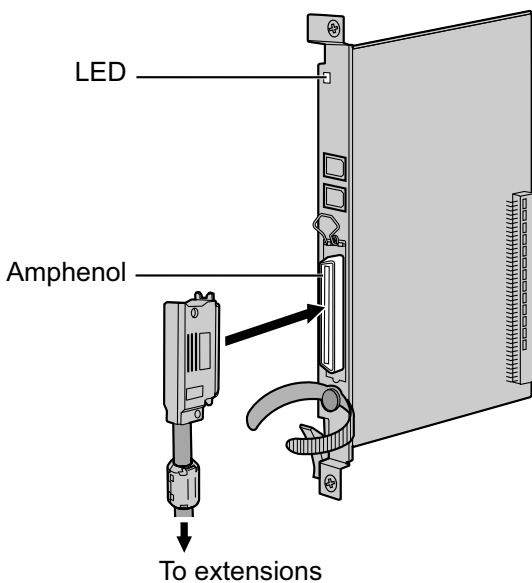
Accessories (included): Screws × 2

User-supplied (not included): none

## 3.6.7 SLC16 Card (KX-TDA0174), MSLC16 Card (KX-TDA0175), and CSLC16 Card (KX-TDA0177)

### Function

- SLC16:** 16-port extension card for SLTs with 4 power failure transfer (PFT) ports.
- MSLC16:** 16-port extension card for SLTs with Message Waiting Lamp control and 4 power failure transfer (PFT) ports. Maximum power output of 160 V/90 V for Message Waiting Lamp control.
- CSLC16:** 16-port extension card for SLTs with Caller ID (FSK) and 4 power failure transfer (PFT) ports



### Accessories and User-supplied Items

**Accessories (included):** Screws × 2, Ferrite core × 1

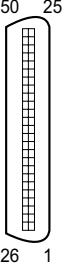
**User-supplied (not included):** Amphenol connector

### Note

- Panasonic SLT with Message Waiting Lamp (e.g., KX-T7710) is recommended for connection to the MSLC16 card.
- Attach the included ferrite core to the cable. Refer to "3.2.9 Attaching a Ferrite Core".
- To connect the Amphenol connector, refer to "3.2.10 Fastening an Amphenol Connector".
- For details about power failure transfer, refer to "3.15.1 Power Failure Connections".

## Pin Assignments

### Amphenol Connector

	No.	Signal Name	Function	No.	Signal Name	Function
	1	RA	Ring port 1	26	TA	Tip port 1
	2	RB	Ring port 2	27	TB	Tip port 2
	3	RC	Ring port 3	28	TC	Tip port 3
	4	RD	Ring port 4	29	TD	Tip port 4
	5	RE	Ring port 5	30	TE	Tip port 5
	6	RF	Ring port 6	31	TF	Tip port 6
	7	RG	Ring port 7	32	TG	Tip port 7
	8	RH	Ring port 8	33	TH	Tip port 8
	9	RI	Ring port 9	34	TI	Tip port 9
	10	RJ	Ring port 10	35	TJ	Tip port 10
	11	RK	Ring port 11	36	TK	Tip port 11
	12	RL	Ring port 12	37	TL	Tip port 12
	13	RM	Ring port 13	38	TM	Tip port 13
	14	RN	Ring port 14	39	TN	Tip port 14
	15	RO	Ring port 15	40	TO	Tip port 15
	16	RP	Ring port 16	41	TP	Tip port 16
	17-25	Reserved	–	42-50	Reserved	–

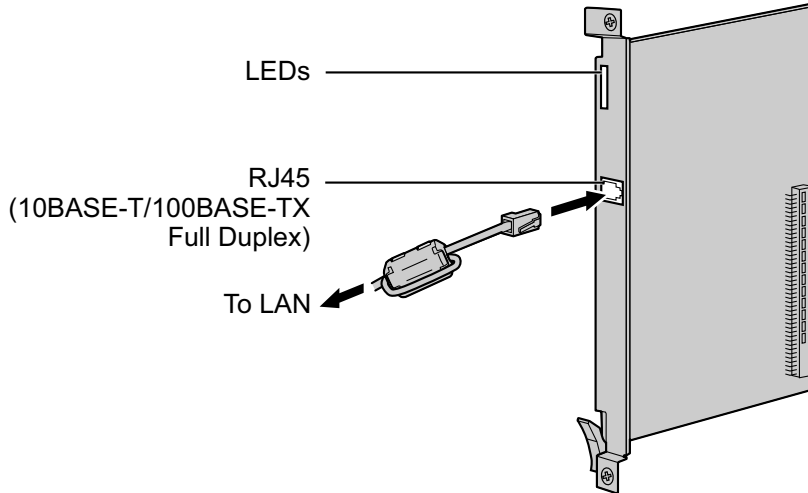
## LED Indications

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>

## 3.6.8 IP-EXT16 Card (KX-TDA0470)

### Function

16-channel VoIP extension card. Compliant with Panasonic proprietary protocol, and ITU-T G.729A and G.711 CODEC methods.



### Accessories and User-supplied Items

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

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

#### Note

- The maximum length of the cable to be connected to this optional service card is 100 m.
- When connecting the RJ45 connector, attach the included ferrite core. Refer to "3.2.9 Attaching a Ferrite Core".

### Pin Assignments

#### RJ45 Connector (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
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>
ONLINE	Green	On-line status indication <ul style="list-style-type: none"> <li>• ON: At least one port is in use (an IP-PT is connected)</li> <li>• OFF: No ports are in use (no IP-PTs are connected)</li> </ul> <p><b>Note</b> If the LINK indicator is OFF, the ONLINE indicator will also be OFF.</p>
ALARM	Red	Alarm indication <ul style="list-style-type: none"> <li>• OFF: Normal</li> <li>• ON: Alarm</li> </ul>
VoIP BUSY	Green	Panasonic proprietary VoIP protocol process indication <ul style="list-style-type: none"> <li>• OFF: VoIP process inactive</li> <li>• ON: VoIP process active</li> </ul>
LINK	Green	Link status indication <ul style="list-style-type: none"> <li>• OFF: Connection error</li> <li>• ON: Normal connection</li> </ul>
DATA	Green	Data transmission indication <ul style="list-style-type: none"> <li>• OFF: No data transmitted</li> <li>• ON: Data transmitting</li> </ul>

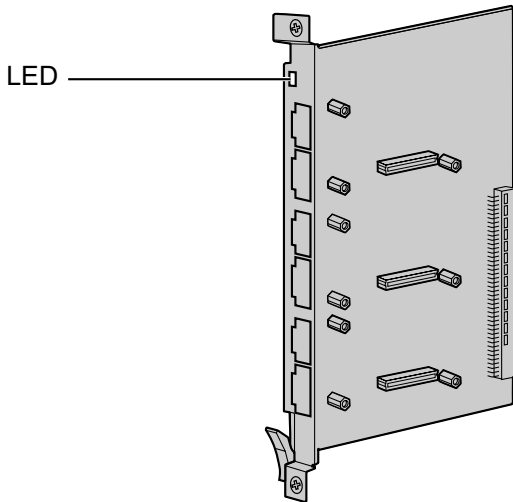
## 3.7 Information about the Other Physical Cards

### 3.7.1 OPB3 Card (KX-TDA0190)

#### 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
- ESVM2 card
- ESVM4 card



#### Accessories and User-supplied Items

**Accessories (included):** none

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

#### **WARNING**

A lithium battery is used in 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.

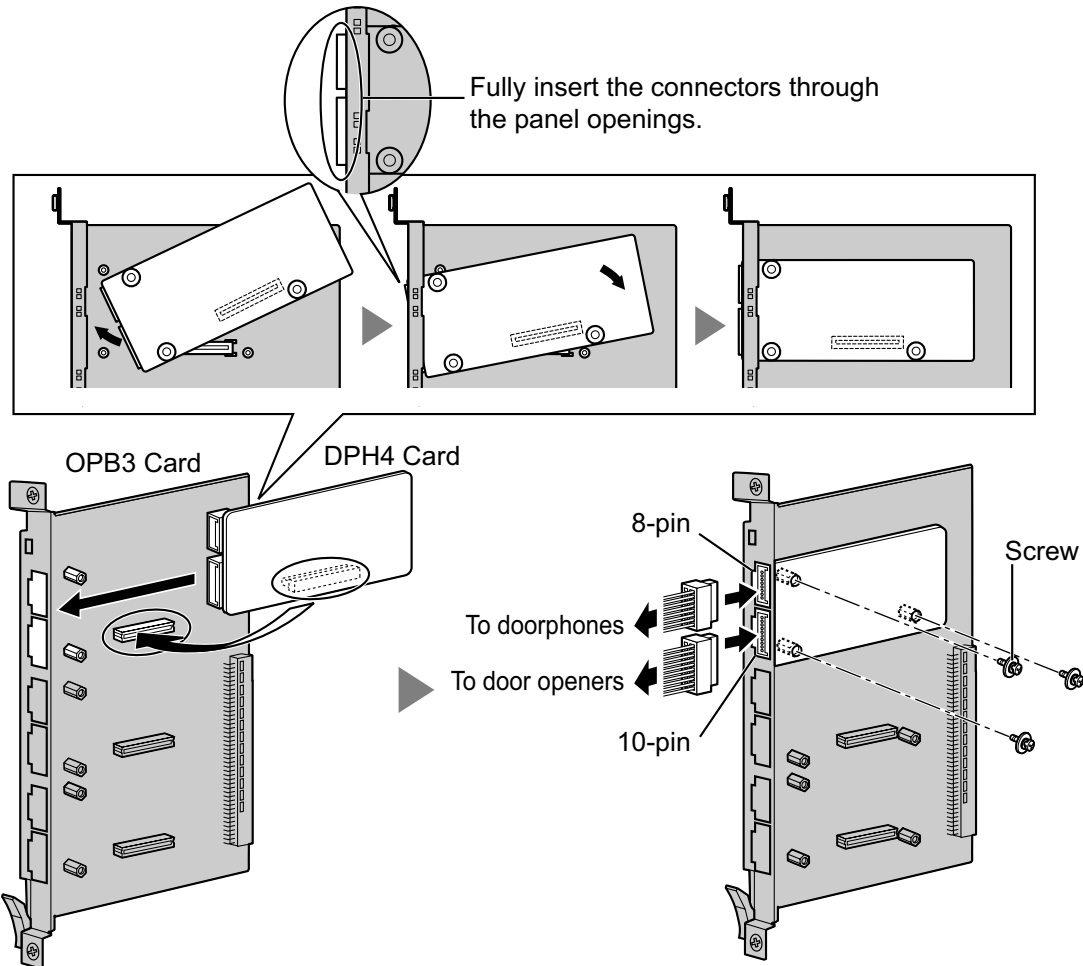
#### LED Indications

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

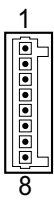
**User-supplied (not included):** Copper wire

### Note

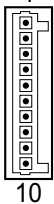
For details about connection to doorphones and door openers, refer to "3.12.1 Connection of Doorphones, Door Openers, External Sensors, and External Relays".

## 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

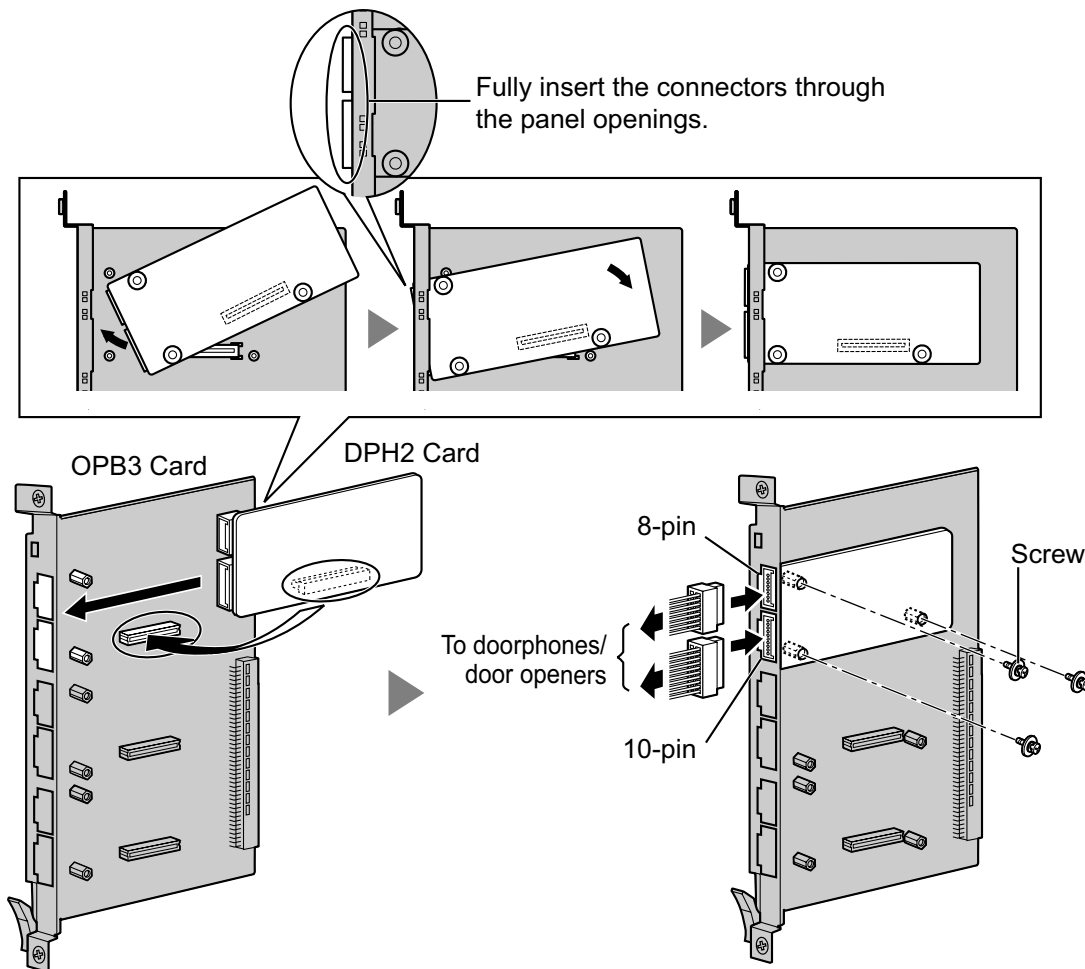
	No.	Signal Name	Function
	1-2	Reserved	–
	3	OP4b	Door opener 4
	4	OP4a	Door opener 4 com
	5	OP3b	Door opener 3
	6	OP3a	Door opener 3 com
	7	OP2b	Door opener 2
	8	OP2a	Door opener 2 com
	9	OP1b	Door opener 1
	10	OP1a	Door opener 1 com



## 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

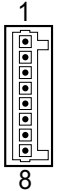
**User-supplied (not included):** Copper wire

### Note

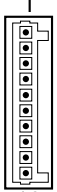
For details about connection to doorphones and door openers, refer to "3.12.1 Connection of Doorphones, Door Openers, External Sensors, and External Relays".

## Pin Assignments

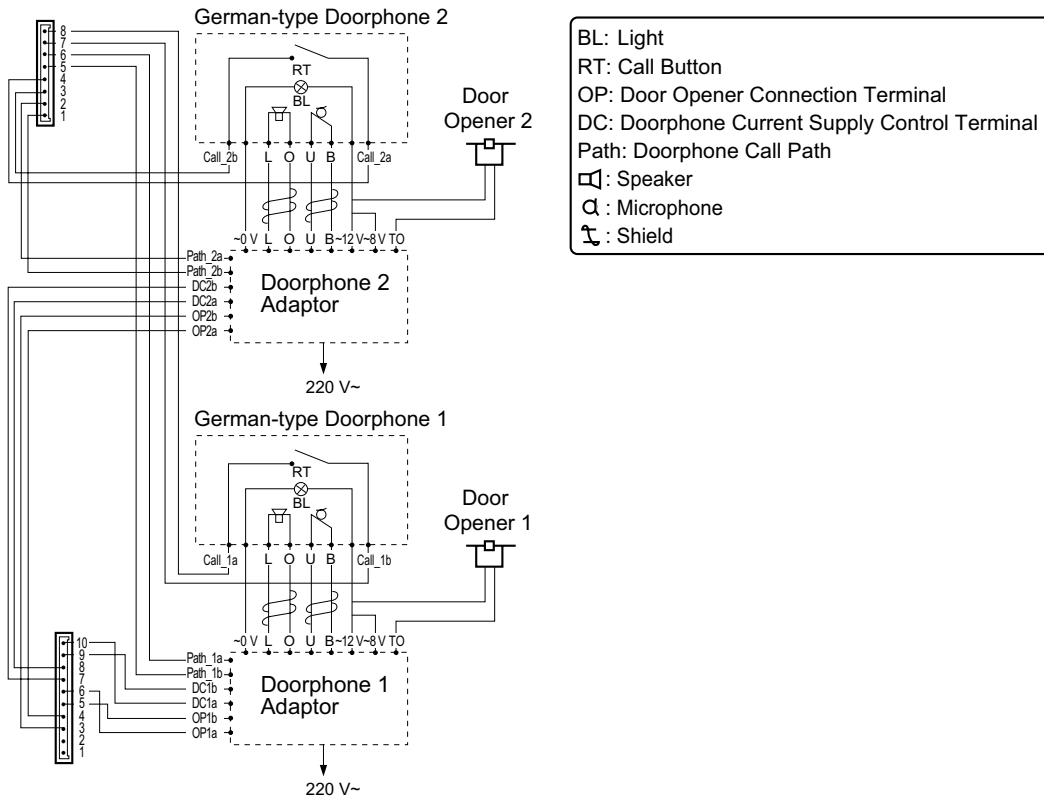
### 8-pin Terminal Block

	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

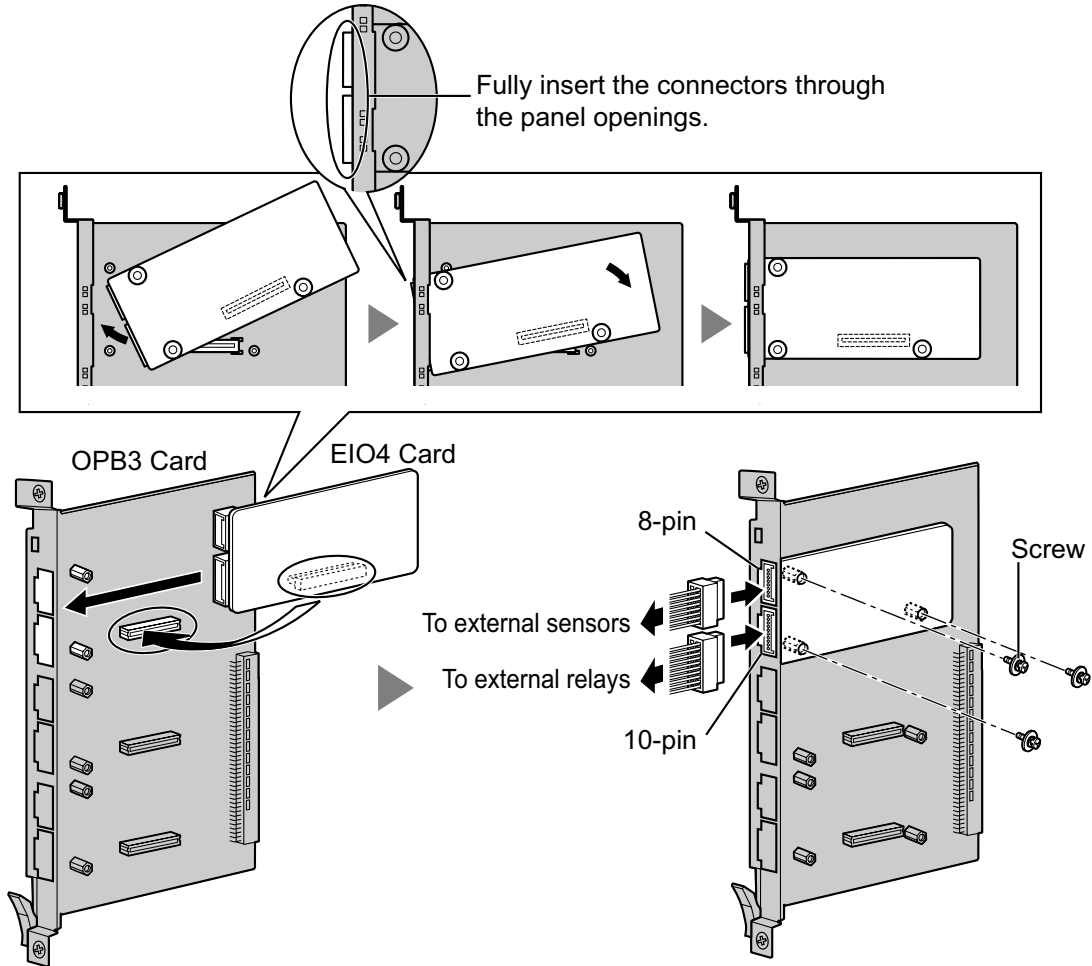
### Connection Diagram for German-type Doorphones and Door Openers



### 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

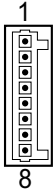
**User-supplied (not included):** Copper wire

#### Note

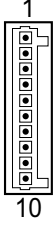
For details about connection to external sensors and external relays, refer to "3.12.1 Connection of Doorphones, Door Openers, External Sensors, and External Relays".

## 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

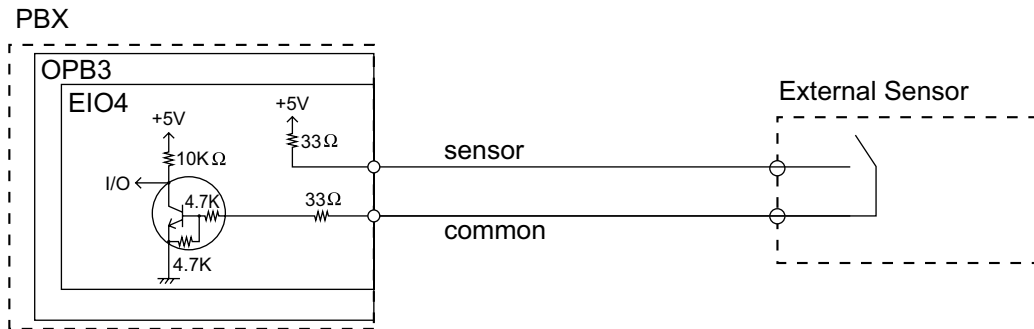
	No.	Signal Name	Function
	1-2	Reserved	–
	3	OP4b	Opener 4
	4	OP4a	Opener 4 com
	5	OP3b	Opener 3
	6	OP3a	Opener 3 com
	7	OP2b	Opener 2
	8	OP2a	Opener 2 com
	9	OP1b	Opener 1
	10	OP1a	Opener 1 com

### 3.7.4 EIO4 Card (KX-TDA0164)

#### 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



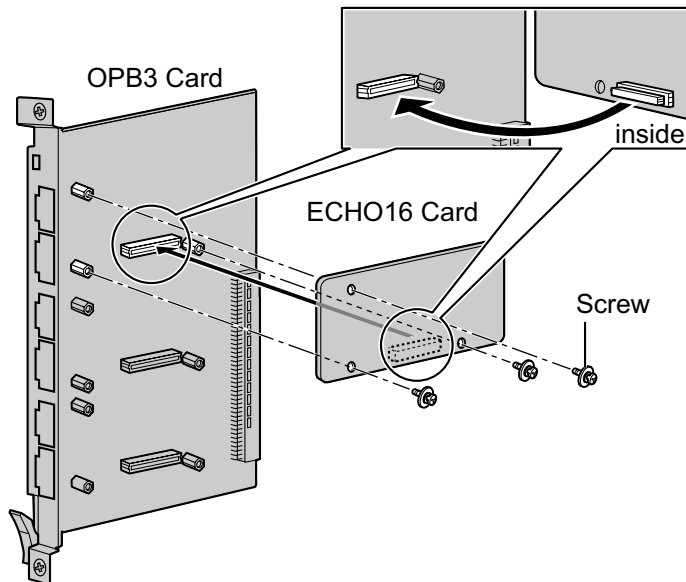
#### External Relay

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

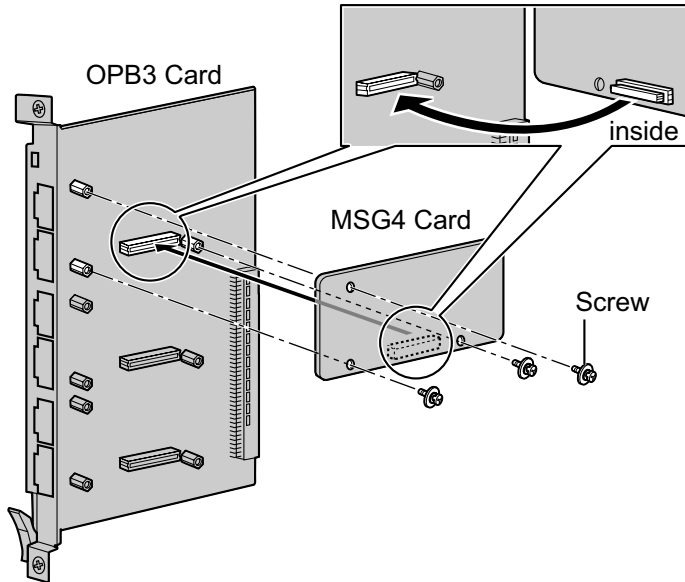
### Note

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

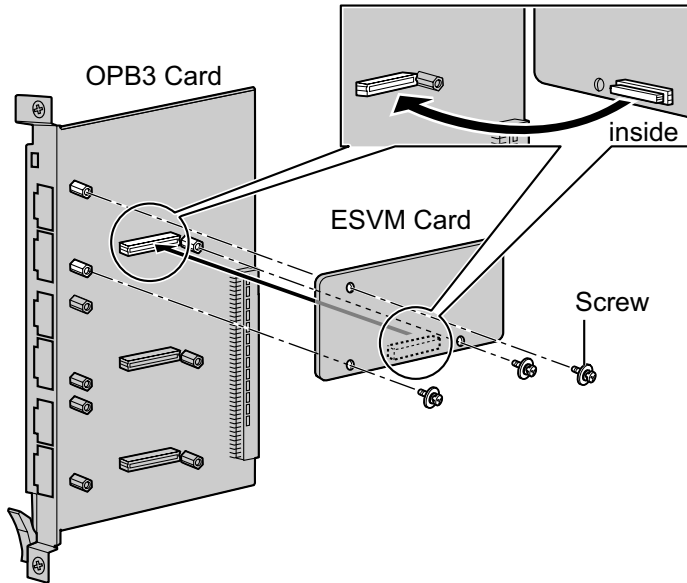


## 3.7.7 ESVM2 Card (KX-TDA0192) and ESVM4 Card (KX-TDA0194)

### 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**

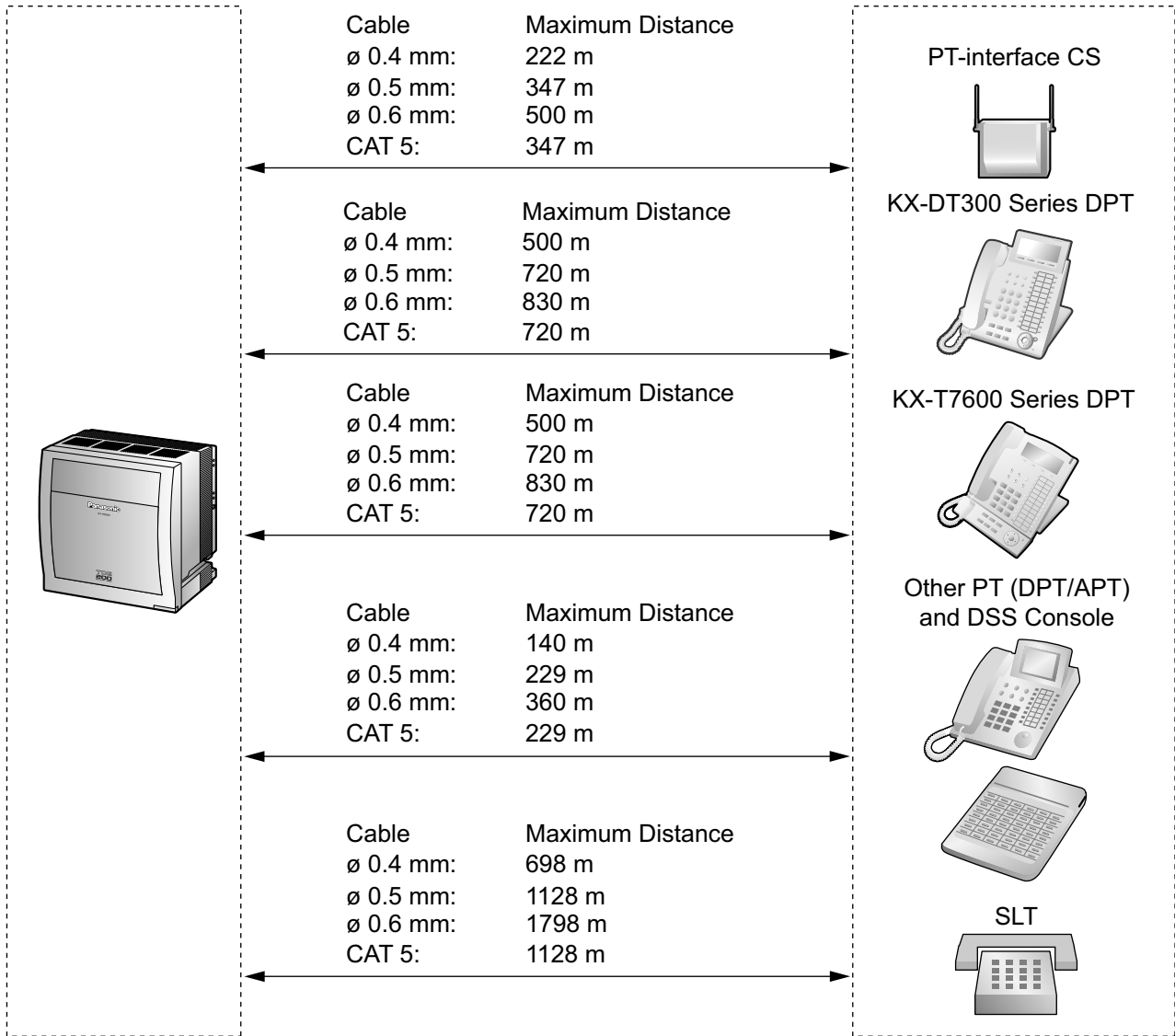
When installing/uninstalling an ESVM card, be careful not to damage the chips around the connection parts. Doing so may cause severe damage to the ESVM card.

### **Note**

When using an ESVM card for the SVM feature, it must be mounted on sub-slot 3 (highest 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
DHLC8 Card	✓	✓	✓	✓	✓
MSLC16, CSLC16, SLC16, SLC8 Cards					✓
DLC16, DLC8 Cards	✓	✓		✓	

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

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

### 3.8.2 Parallel Connection of the Extensions

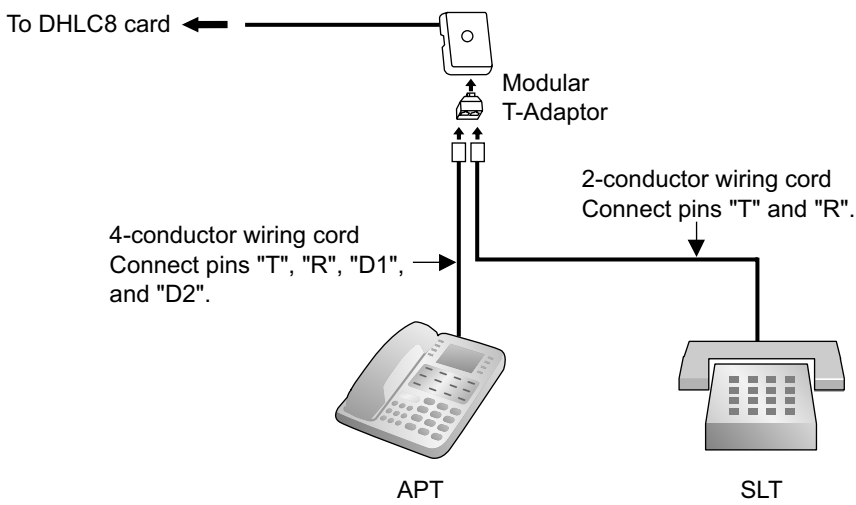
Any SLT can be connected in parallel with an APT or a DPT as follows.

**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

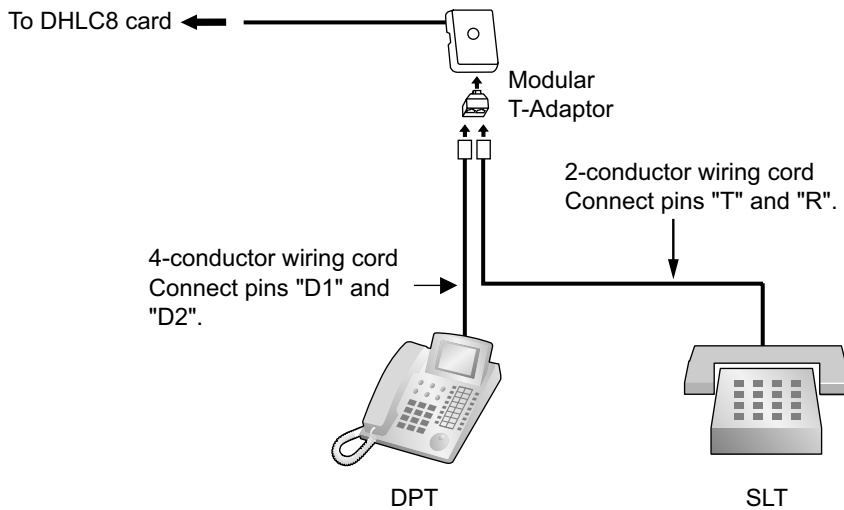
For parallel connection, eXtra Device Port (XDP) mode must be disabled for that port through system programming. Refer to "1.11.9 Paralleled Telephone" and "2.1.1 Extension Port Configuration" in the Feature Guide for further information.



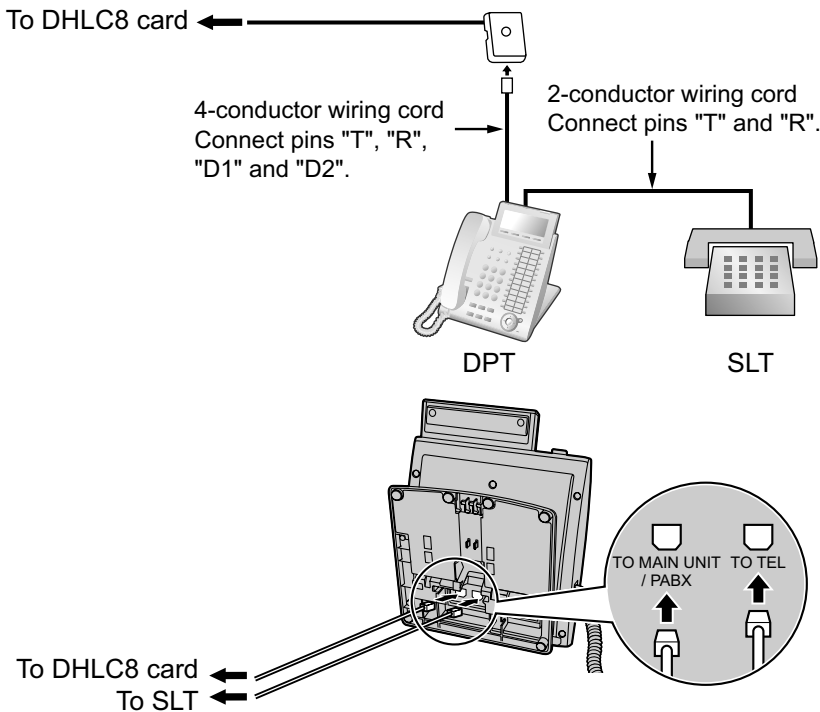
## With DPT

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 Paralleled Telephone" and "2.1.1 Extension Port Configuration" in the Feature Guide for further information.

### Using a Modular T-Adaptor

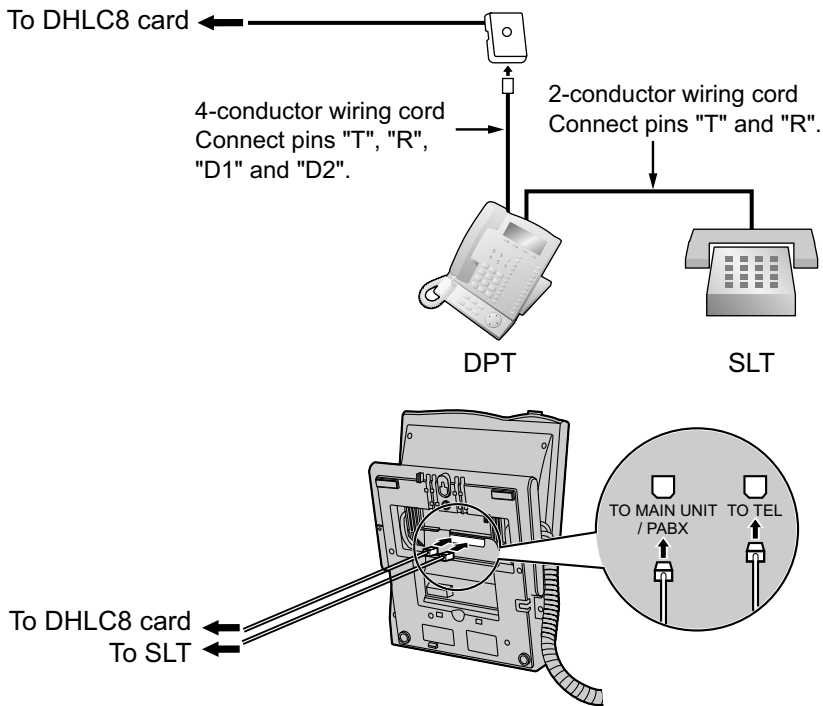


### Using an EXtra Device Port With KX-DT300 Series DPT (except KX-DT321)

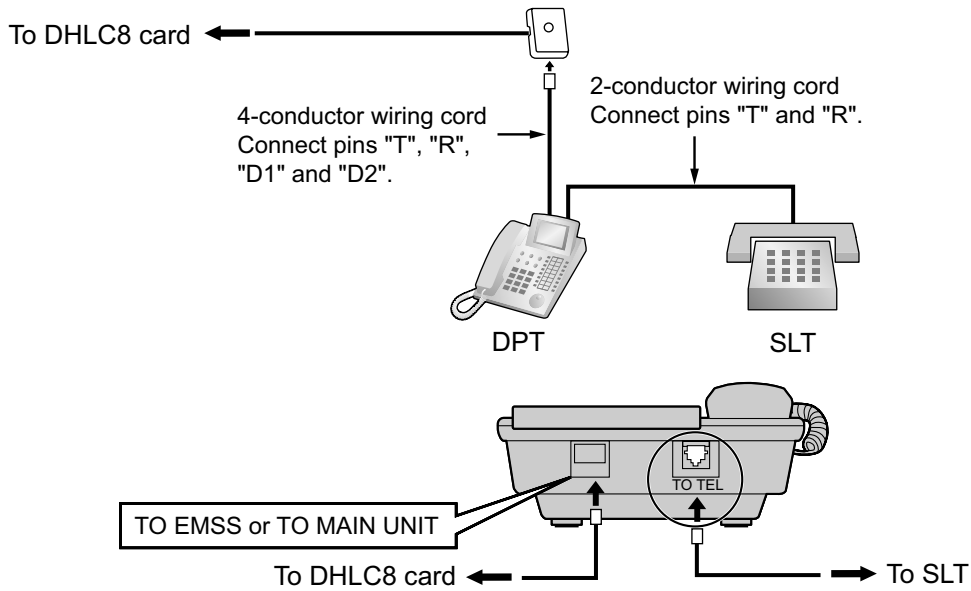


### 3.8.2 Parallel Connection of the Extensions

#### 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

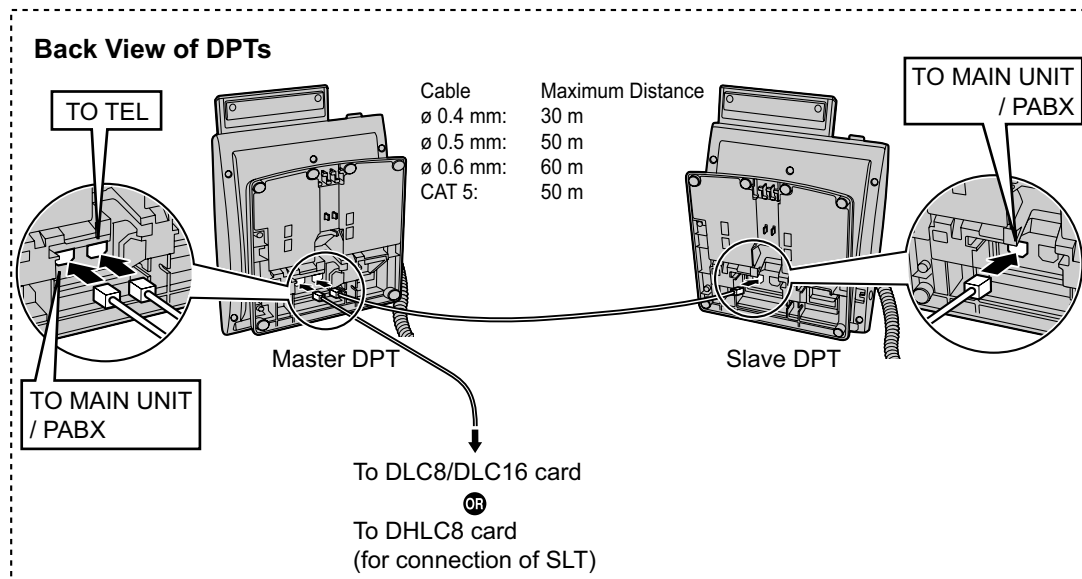
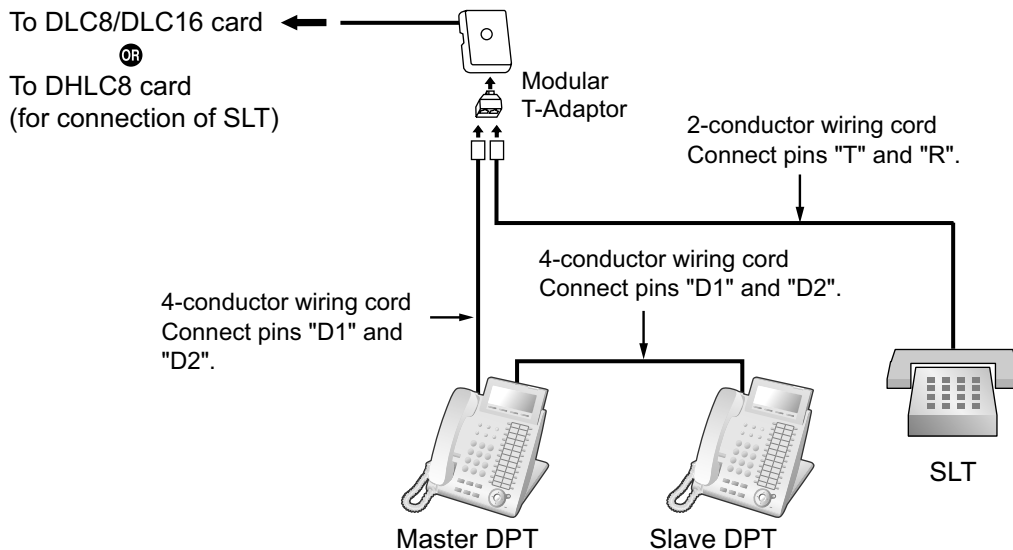
A DPT can be connected to another DPT on the Digital XDP connection. In addition, if the DPT is connected to a DHLC8 card, it can also have an SLT connected in Parallel mode or XDP mode.

**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 Paralleled Telephone" and "2.1.1 Extension Port Configuration" in the Feature Guide for further information.

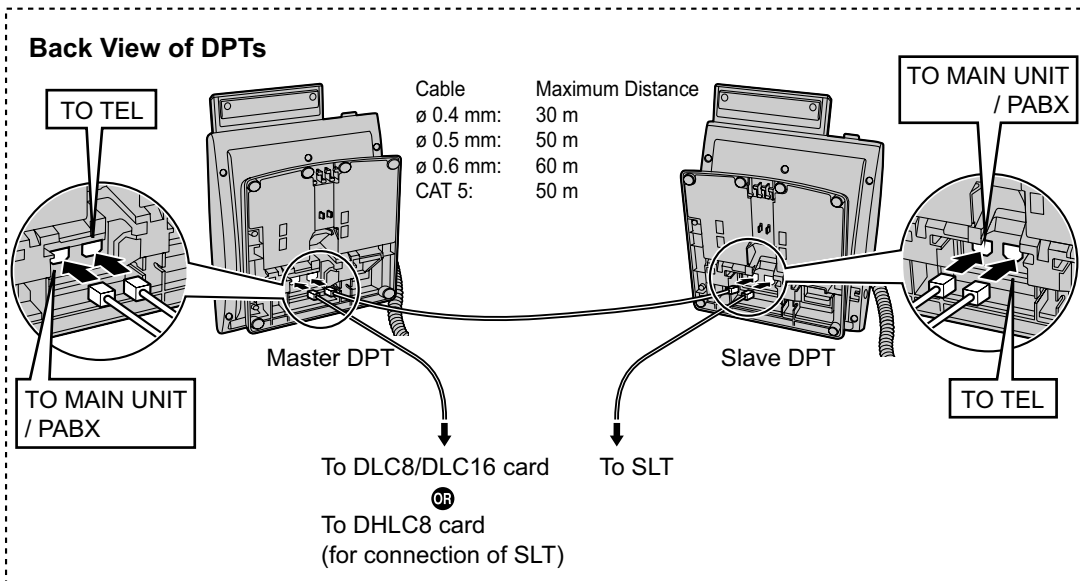
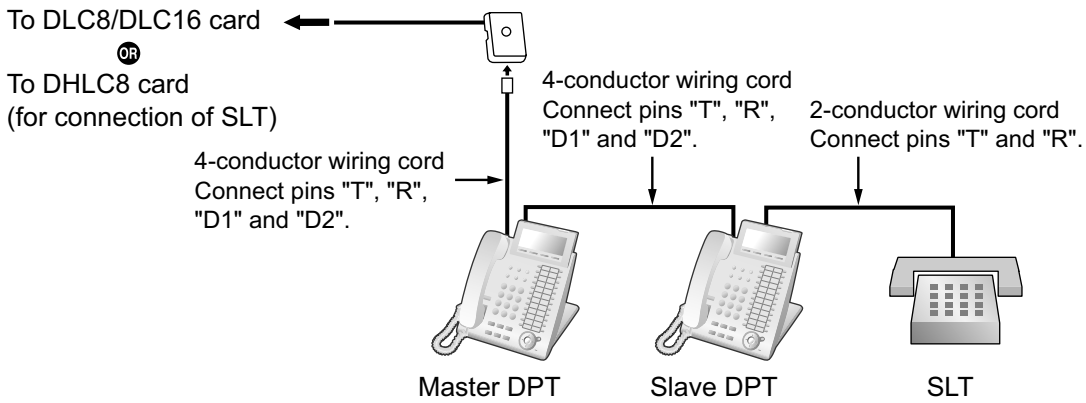
#### With KX-DT300 Series DPT

##### Using a Modular T-Adaptor



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

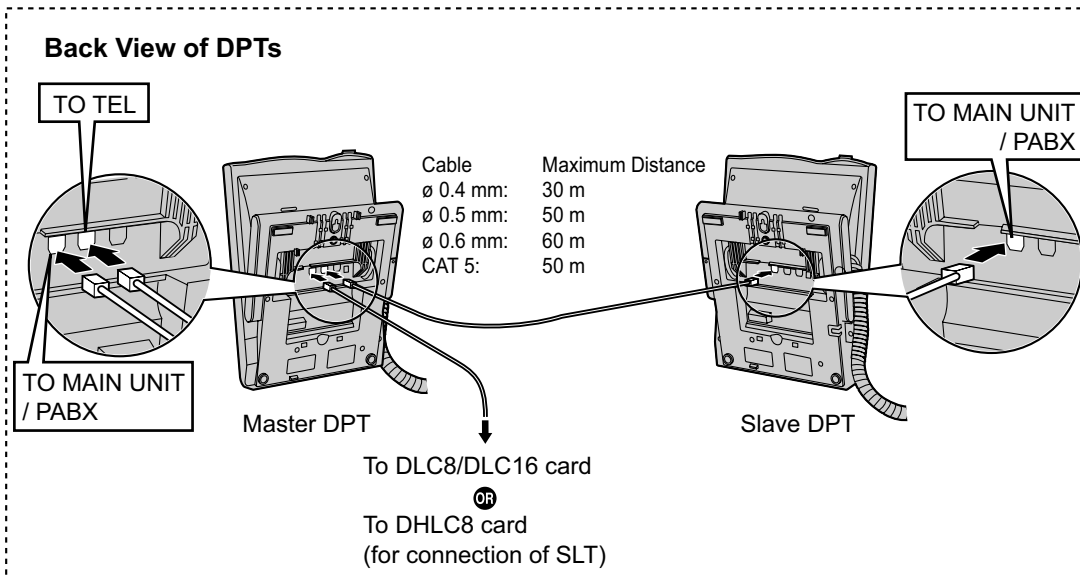
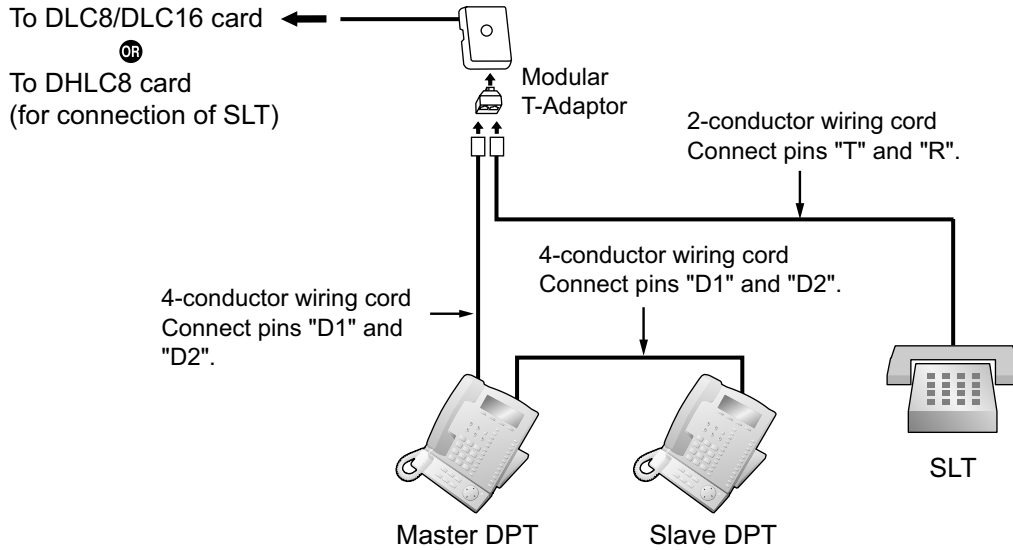
#### Using an EXtra Device Port





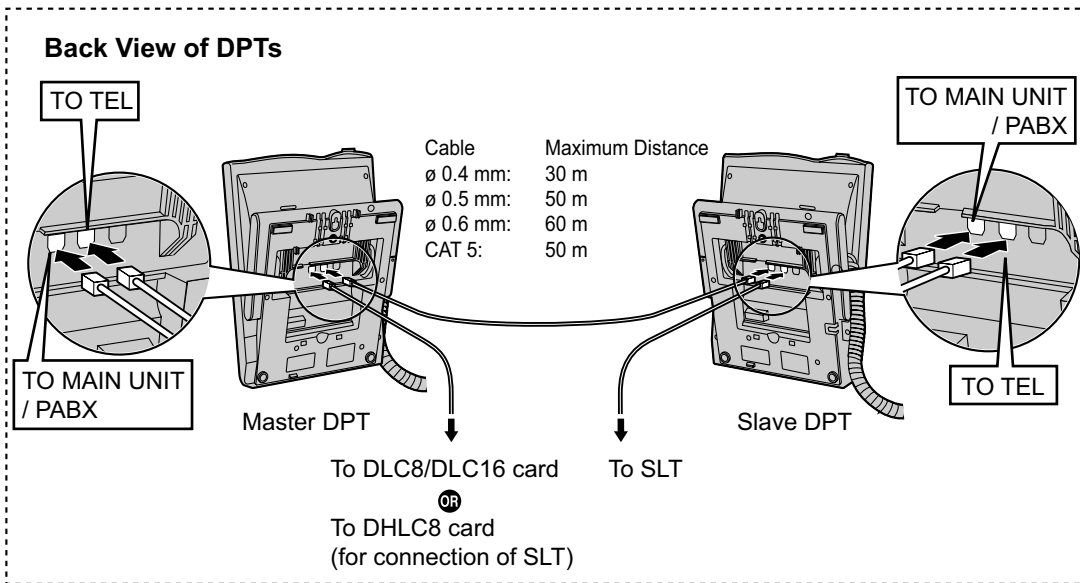
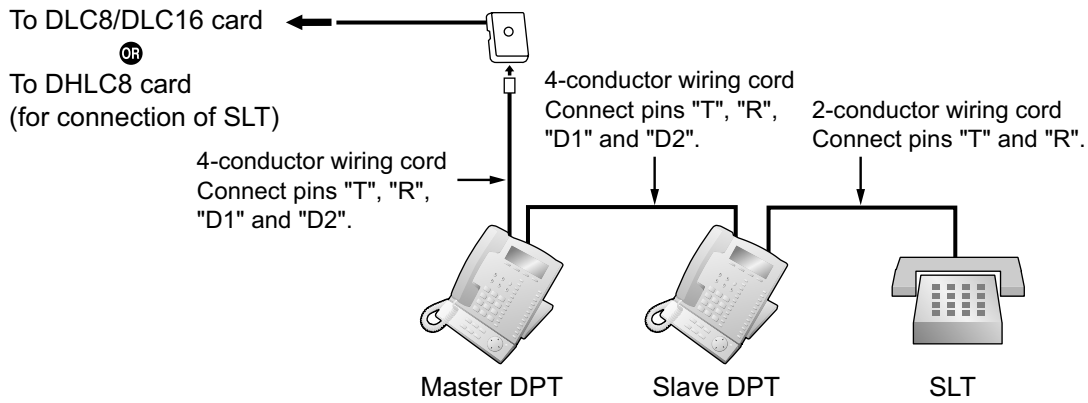
**With KX-T7600 Series DPT (except KX-T7600E Series)**

**Using a Modular T-Adaptor**



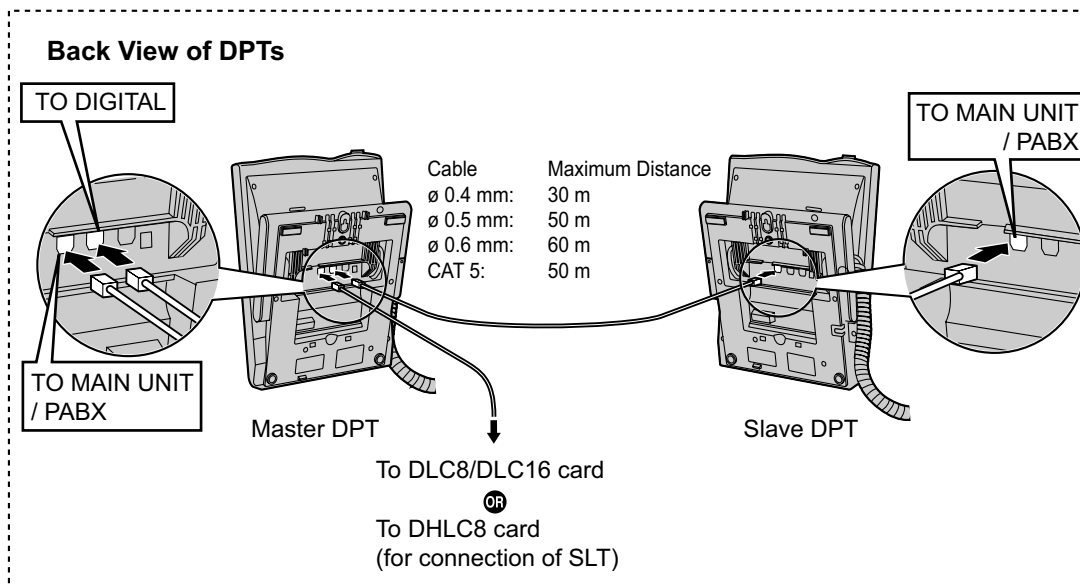
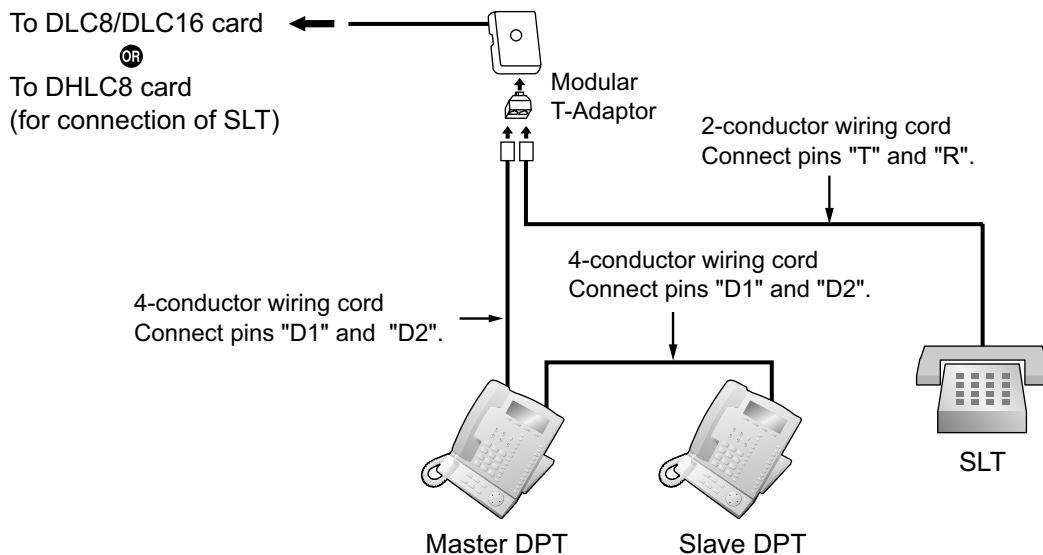
### 3.8.3 Digital EXtra Device Port (Digital XDP) Connection

#### Using an EXtra Device Port

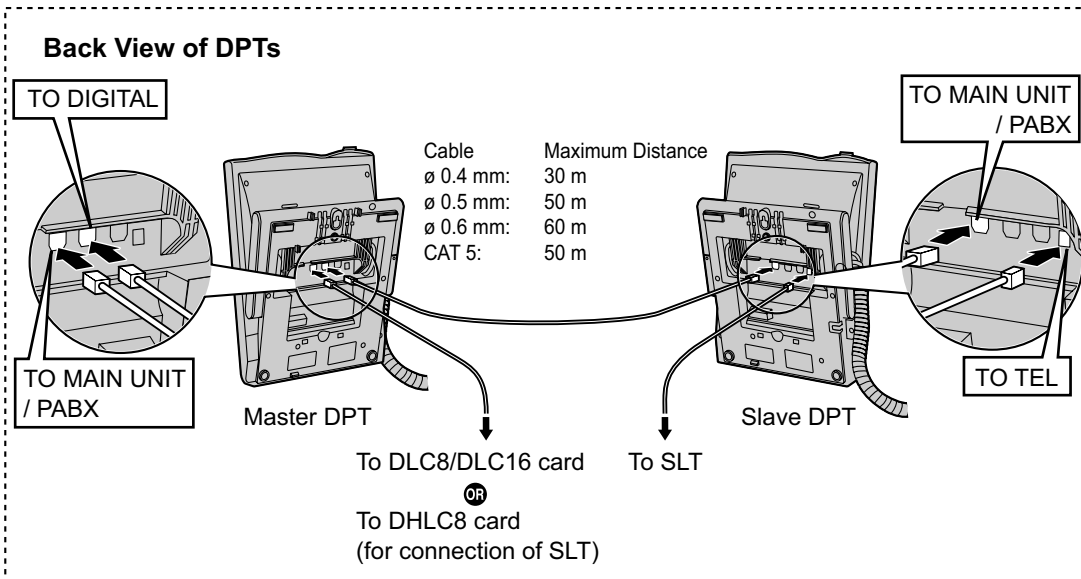
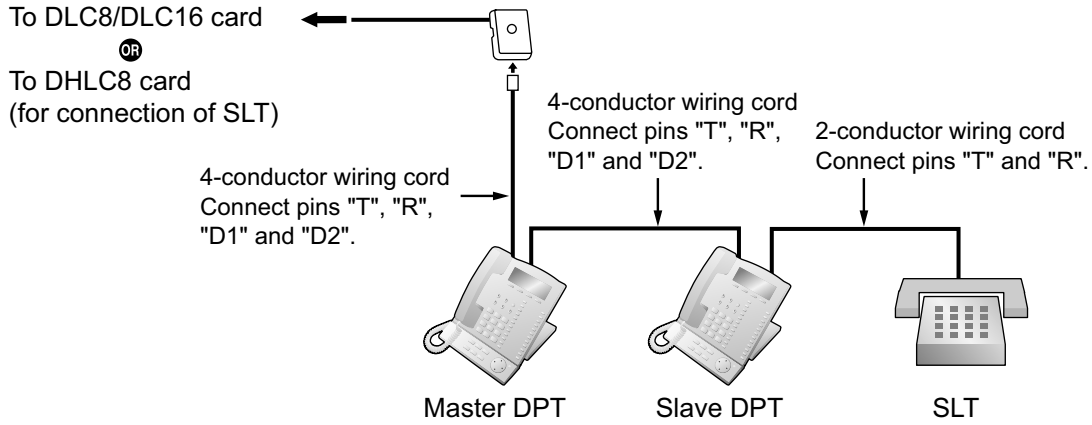


## With KX-T7600E Series DPT

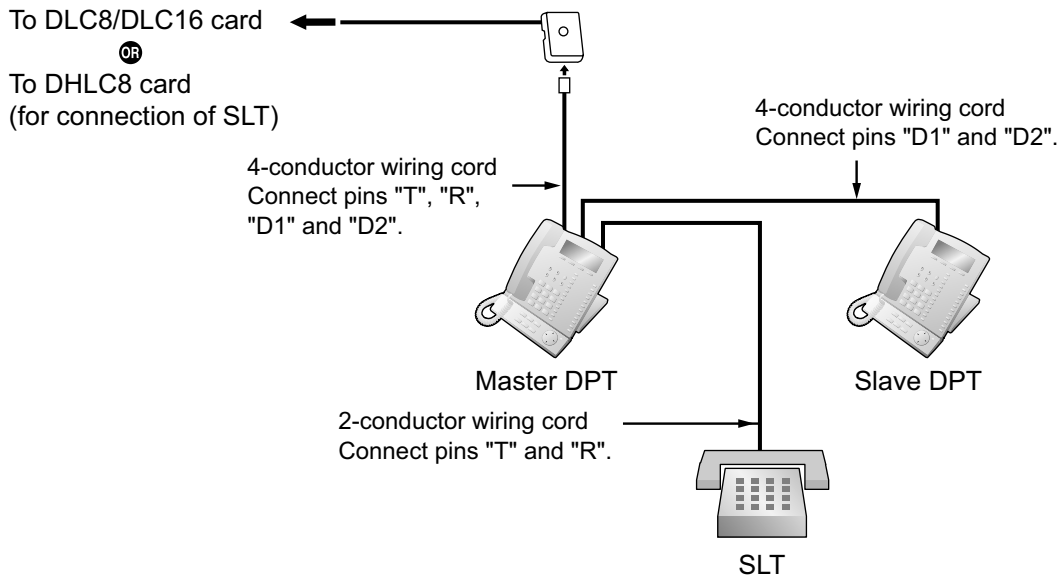
### Using a Modular T-Adaptor



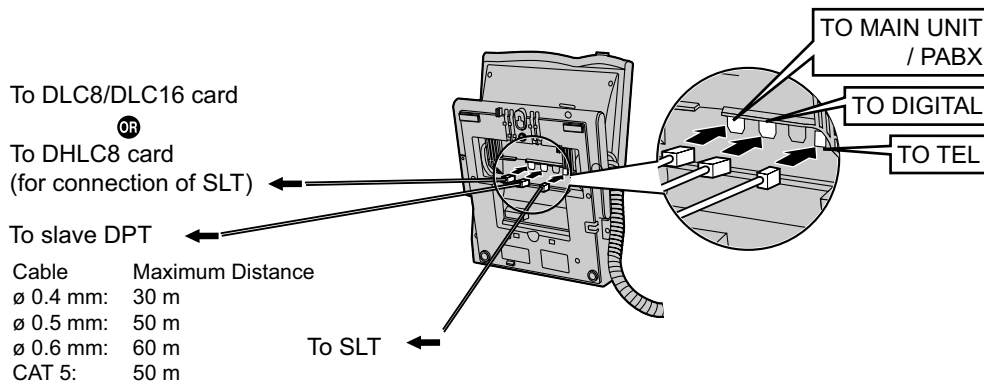
**Using an EXtra Device Port**  
**Connecting to a Slave DPT**



**Connecting to a Master DPT**



**Back View of DPTs**



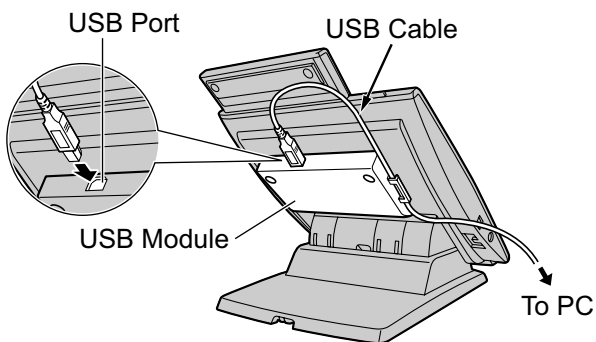
## 3.8.4 First Party Call Control CTI Connection

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 DPT.

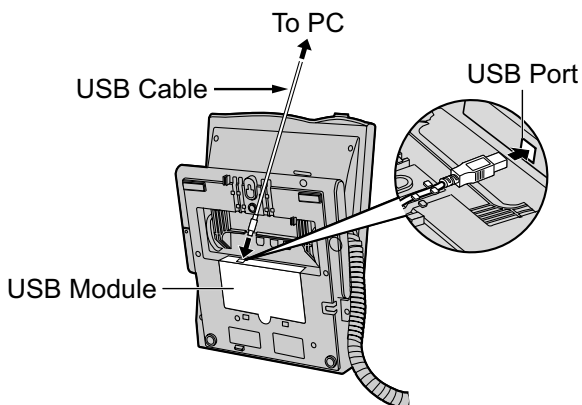
### Note

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 DECT Portable Stations

### 3.9.1 Overview

#### Required Equipment and Maximum Number of Calls

CSs determine the area covered by the wireless system. The number of calls that can be made simultaneously through each CS varies depending on the model, as follows:

CS	Connection Card	Maximum Calls	Compatible PSs
KX-TDA0158CE	DHLC/DLC	8	<ul style="list-style-type: none"> <li>• KX-TCA155</li> <li>• KX-TCA255</li> <li>• KX-TCA256</li> <li>• KX-TCA355</li> <li>• KX-TD7590</li> <li>• KX-TD7580</li> </ul>
KX-TDA0141CE	DHLC/DLC	2	
KX-TDA0142CE	CSIF	4	

#### Notice

The CSs for DECT are for connection to specified Panasonic PBXs only.

#### Note

For more details about the PS, refer to the Operating Instructions of the PS.

#### Required Distances between Equipment

##### CAUTION

Maintain the distances listed below between equipment in order to prevent noise, interference or the disconnection of a conversation. (The distance may vary depending on the environment.)

Equipment	Distance
CS and office equipment such as a computer, telex, fax machine, etc., or microwaves	More than 2 m
CS and PS	More than 1 m
Each PS	More than 0.5 m
PBX and CS	More than 2 m

#### Notice

Too many CSs in a small area can cause problems due to conflicts over which signal channels each CS can use. Ideally, CSs should be a minimum of 25 m to 40 m apart.

However, the required distance between CSs may vary depending on the environment of the installation site and conditions in which the wireless system is used. Conduct the site survey to determine the appropriate distance.

#### RF Specification

Item	Description
Radio Access Method	MultiCarrier TDMA-TDD

### 3.9.1 Overview

Item	Description
Frequency Band	1880 MHz to 1900 MHz <sup>*1</sup>
Number of Carriers	10 <sup>*2</sup>
Carrier Spacing	1728 kHz
Bit Rate	1152 kbps
Carrier Multiplex	TDMA, 24 (Tx12, Rx12) slots per frame
Frame Length	10 ms
Modulation Scheme	GFSK Roll-off factor=0.5 50 % roll-off in the transmitter
Data Coding for Modulator	Differential Coding
Voice CODEC	32 kbps ADPCM (CCITT G.721)
Transmission Output	Average 10 mW Peak 250 mW

<sup>\*1</sup> KX-TDE100BX/KX-TDE200BX: 1880 MHz to 1895 MHz

<sup>\*2</sup> KX-TDE100BX/KX-TDE200BX: 8

#### **CAUTION**

- The CS should be kept free of dust, moisture, high temperature (more than 40 °C), low temperature (less than 0 °C), and vibration, and should not be exposed to direct sunlight.
- The CS should not be placed outdoors (use indoors).
- The CS should not be placed near high-voltage equipment.
- The CS should not be placed on a metal object.
- Do not use this wireless system near another high-power cordless system such as DECT or SS wireless.



## 3.9.2 Procedure Overview

When connecting the wireless system, use extreme care in conducting the site survey. Site surveys can be conducted using the KX-TCA255/KX-TCA256/KX-TCA355/KX-TD7590 PS. An incorrectly performed site survey can result in poor service area, frequent noise, and disconnection of calls.

### 1. Investigate the installation site

Refer to "3.9.3 Site Planning".

- Obtain a map of the CS installation site.
- Identify the service area required by the user on the map.
- Plan the location of each CS, taking account of distance, building materials, etc.

### 2. Prepare for site survey

Refer to "3.9.4 Before Site Survey".

- Check and assign the CS ID number to the PS.
- Assign a channel number to each CS by setting the DIP switches on the back of the CS.
- Supply electricity to each CS using an AC adaptor/battery box or by connecting them to a CSIF/DLC/DHLC card.
- Install each CS temporarily as planned.

#### Note

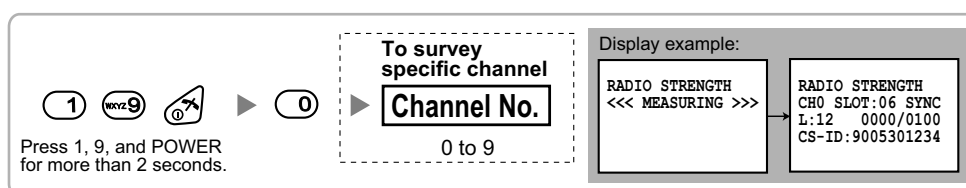
- Install at least 2 m above the floor.
- Place the antennas so that they are pointing in directions that are 90 degrees apart (for antenna diversity).

### 3. Conduct the site survey

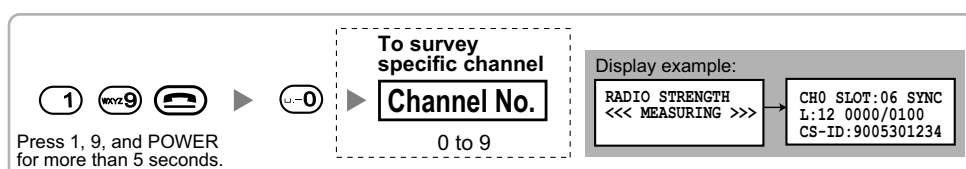
Refer to "3.9.5 Site Survey Using the KX-TCA255/KX-TCA256/KX-TCA355/KX-TD7590".

- Test the radio signal strength using the PS.  
Confirm that the radio signal strength level is "12" near the CS.

#### Using the KX-TCA255/KX-TCA256/KX-TCA355



#### Using the KX-TD7590



- By walking away from the CS with the PS, check the radio signal strength. The radio signal strength weakens as you walk away from the CS.
- Map the CS coverage area at radio signal strength levels "3" and "8".

### 3.9.2 Procedure Overview

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- d. Make sure that adjacent CS coverage areas overlap where the radio signal strength level is "8" by at least 5 m.
- e. Make sure that the radio signal strength level is greater than "3" at any location within the service area required by the user.

## 4. Finish the site survey

Refer to "3.9.6 After Site Survey".

- a. Turn off the PS.
- b. Stop supplying power, and return all DIP switches of each CS to the OFF position.

## 5. Connect the CS and PS to the PBX and test the operation

Refer to "3.9.7 Connecting a Cell Station to the PBX".

- a. Connect the CSs to the PBX.
- b. Register the PSs to the PBX.
- c. Walk around the service area while having a conversation using a registered PS. If noise is frequent or conversations disconnect, relocate the CSs or install an additional CS.

## 6. Mount the CS on the wall

Refer to "3.9.8 Wall Mounting".

- a. If there are no problems in testing, mount the CS on the wall.

## 3.9.3 Site Planning

Choosing the best site for the CS requires careful planning and testing of essential areas. The best location may not always be convenient for installation. Read the following information before installing the unit.

### Understanding Radio Waves

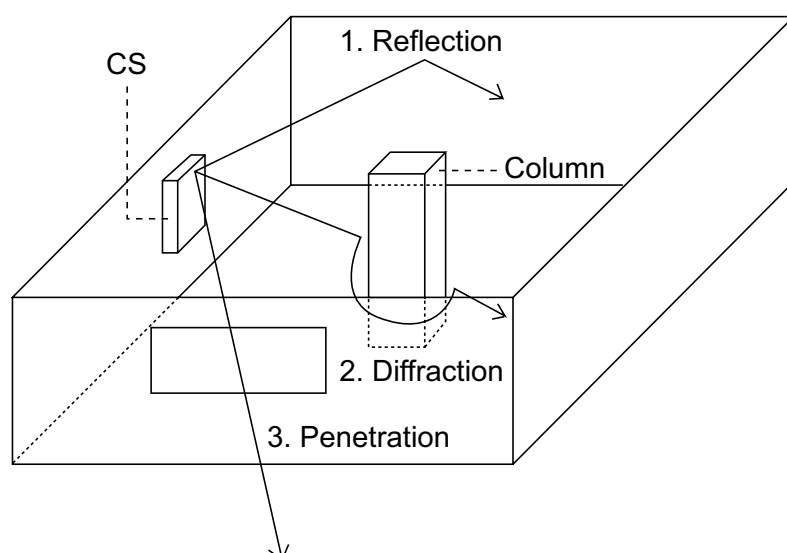
#### Characteristics of Radio Waves

The transmission of radio waves and the CS coverage area depend on the structure and materials of the building.

Office equipment, such as computers and fax machines, can interfere with radio waves. Such equipment may create noise or interfere with the performance of the PS.

The illustration below shows the special transmitting patterns of radio waves.

1. Radio waves are reflected by objects made of materials such as metal.
2. Radio waves are diffracted by objects such as metallic columns.
3. Radio waves penetrate objects made of materials such as glass.



#### Relationships Between Radio Waves and Building Structure and Materials

- The CS coverage area is affected more by the building materials and their thickness than the number of obstacles.
- Radio waves tend to be reflected or diffracted by conductive objects and rarely penetrate them.
- Radio waves tend to penetrate insulated objects and are rarely reflected by them.
- Radio waves penetrate thin objects more than thick objects.
- The table below shows the transmission tendency of radio waves when they reach objects made from various materials.

### 3.9.3 Site Planning

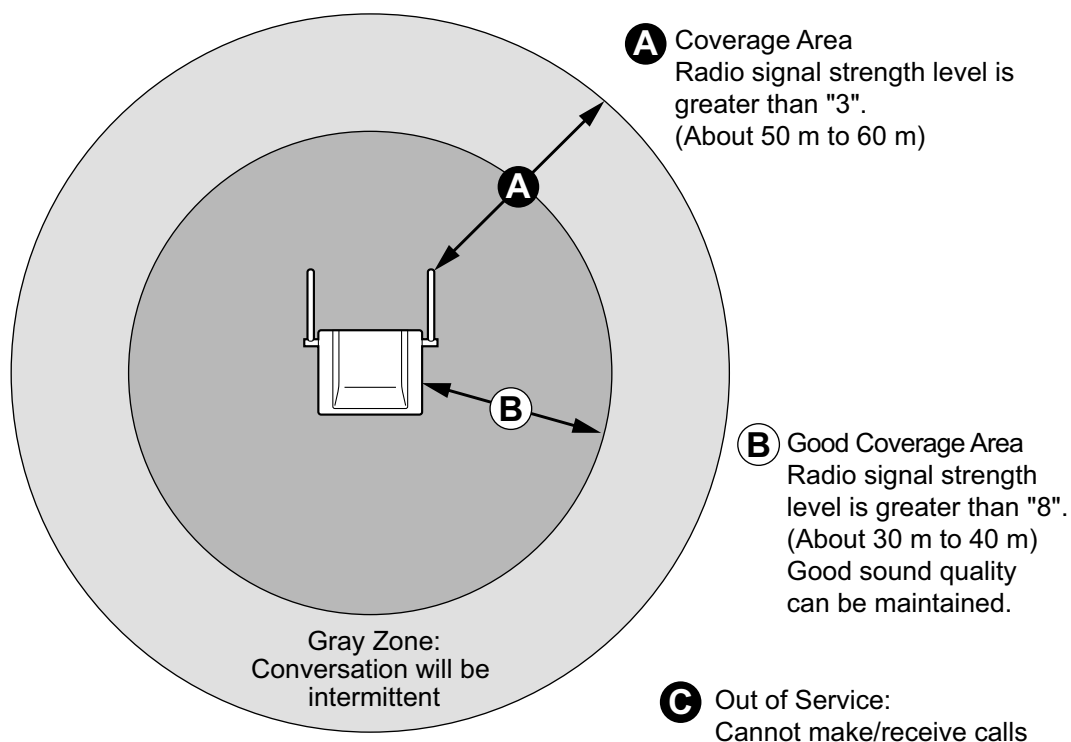
Object	Material	Transmission Tendency
Wall	Concrete	The thicker they are, the less radio waves penetrate them.
	Ferroconcrete	Radio waves can penetrate them, but the more iron there is, the more radio waves are reflected.
Window	Glass	Radio waves usually penetrate them.
	Glass with wire net	Radio waves can penetrate them, but tend to be reflected.
	Glass covered with heat-resistant film	Radio waves are weakened considerably when they penetrate windows.
Floor	Ferroconcrete	Radio waves can penetrate them, but the more iron there is, the more radio waves are reflected.
Partition	Steel	Radio waves are reflected and rarely penetrate them.
	Plywood, Glass	Radio waves usually penetrate them.
Column	Ferroconcrete	Radio waves can penetrate them, but the more iron there is, the more radio waves tend to be reflected or diffracted.
	Metal	Radio waves tend to be reflected or diffracted.
Cabinet	Steel	Radio waves are usually reflected or diffracted, and rarely penetrate them.
	Wood	Radio waves can penetrate them, but they are weakened.

## CS Coverage Area

The example below shows the size of the coverage area of 1 CS if it is installed in an area with no obstacles.

### Note

Radio signal strength levels are measured during the site survey (refer to "3.9.5 Site Survey Using the KX-TCA255/KX-TCA256/KX-TCA355/KX-TD7590").



### Radio Signal Strength Levels

Level: 00	↑	Out of range
Level: 01 to 02		Receives noise easily or disconnects
Level: 03 to 07		May receive noise
Level: 08 to 10	↓	Good
Level: 11 to 12		Better

## Site Survey Preparation

1. Obtain a map and investigate the installation site.
  - a. Check the obstacles (e.g., shelves, columns, and partitions).
  - b. Check the materials of the structures (e.g., metal, concrete, and plywood).
  - c. Check the layout and dimensions of the room, corridor, etc.
  - d. Write down the above information on the map.
2. Examine the service area required by the user on the map, referring to the following example.
  - a. Draw the coverage area around a CS. Extend the coverage area 30 m to 60 m in each direction, depending on the materials of the building structures and obstacles in the installation site. Note that a CS cannot be installed outside a building.
  - b. If 1 CS cannot cover the entire service area, install additional CSs as required. Overlap the coverage areas of adjacent CSs.

### 3.9.3 Site Planning

Where CS coverage areas overlap, the PS will start call handover to the next CS if the signal from one CS becomes weak. However, if a PS moves away from a CS and there are no CSs available for handover, the PS may go out of range and the call could be lost.

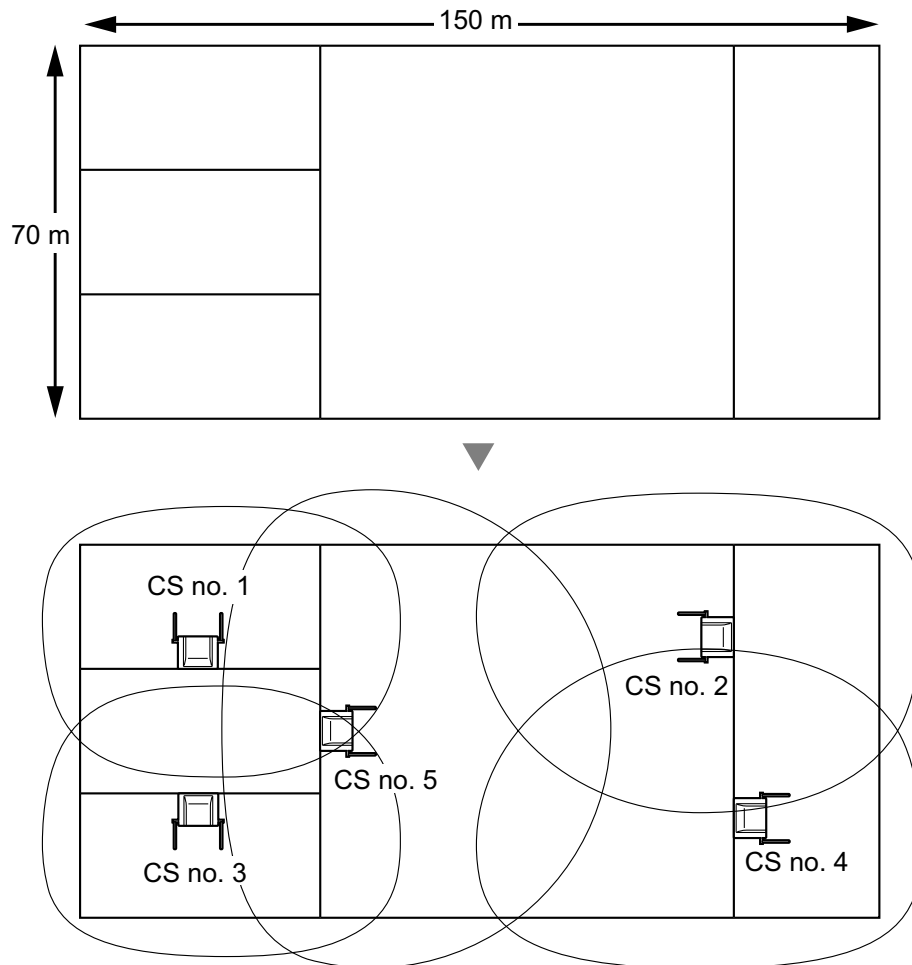
#### Example: Installing in a Room Separated by Interior Walls

##### Things to take note of:

- The room is separated by interior walls.
- The room is surrounded by concrete walls.

##### CS installation plan:

- The coverage area of each CS will not extend as far as when there are no obstacles, because the radio signals will be weakened by separating walls. Therefore, you will need 5 CSs to cover the entire room.



### 3.9.4 Before Site Survey

Use the KX-TCA255/KX-TCA256/KX-TCA355/KX-TD7590 PS to conduct the site survey.

**Note**

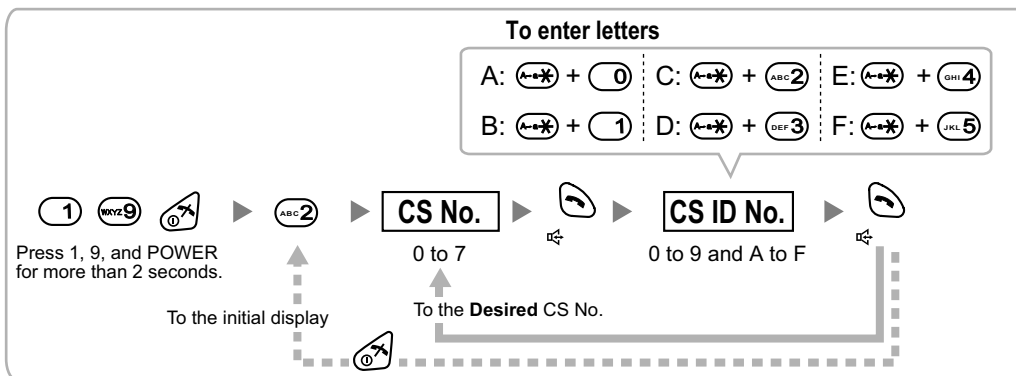
Display prompts for the site survey are only available in English.

#### Checking the CS ID Number

Check the CS ID number label attached to the CS. If the CS ID number label is not attached to the CS, check the CS ID number using the Maintenance Console. For details, refer to "2.6.15 Utility—CS Information" in the PC Programming Manual.

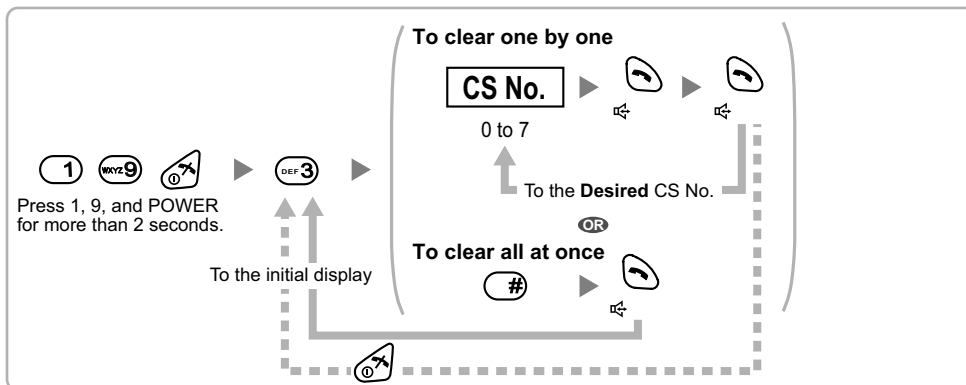
#### Assigning the CS ID Number to the PS

Using the KX-TCA255/KX-TCA256/KX-TCA355

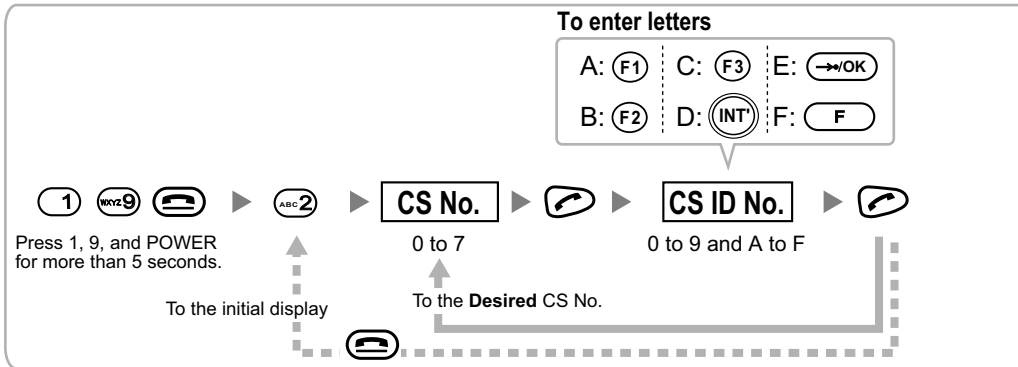


**Note**

To clear the CS ID number assigned to the PS, follow the procedure below:

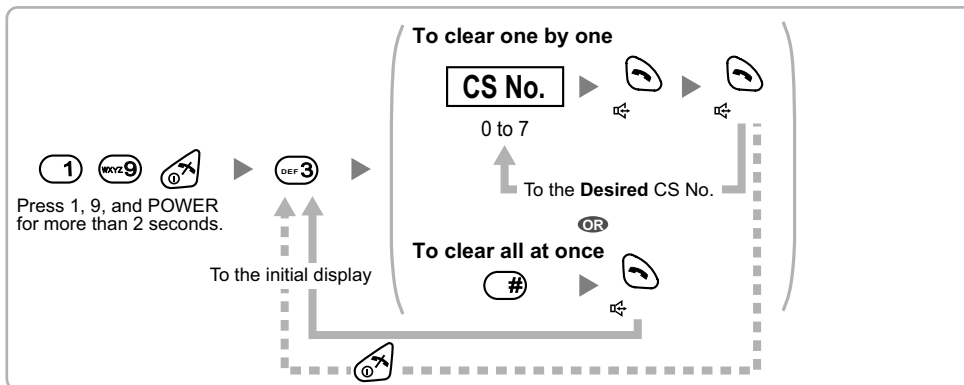


### Using the KX-TD7590



**Note**

To clear the CS ID number assigned to the PS, follow the procedure below:

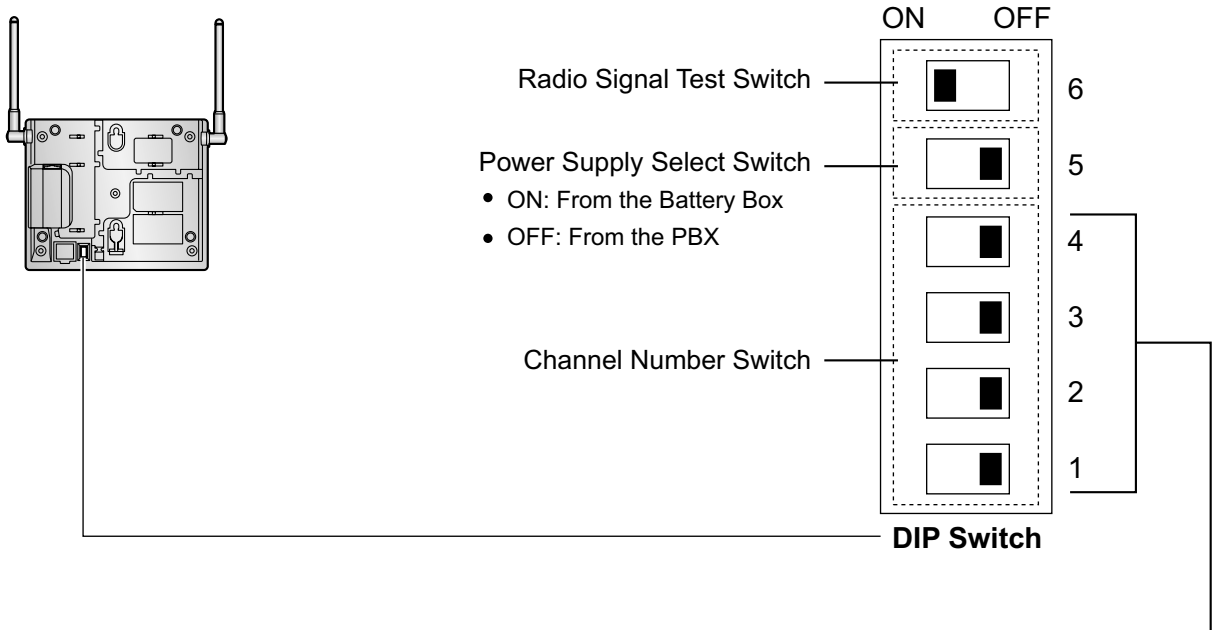




## Setting and Installing the CS Temporarily for Site Survey

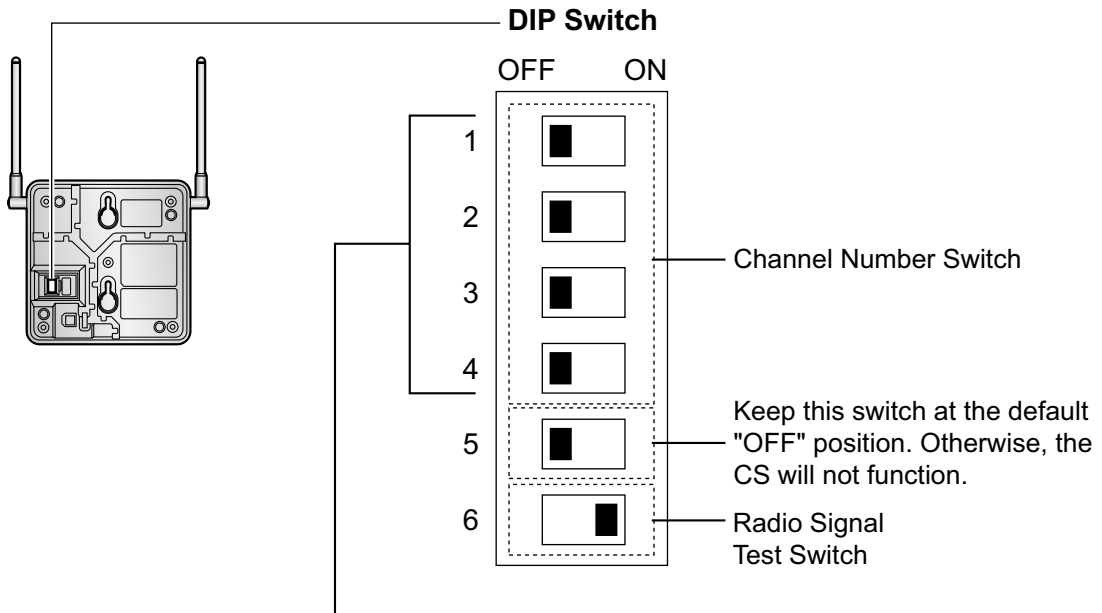
1. Switch the Radio Signal Test switch from OFF to ON.
2. Set the channel number switches as desired.
3. Set the Power Supply Select switch as desired (KX-TDA0158CE only).

### KX-TDA0158CE



Channel 0	Channel 1	Channel 2	Channel 3	Channel 4	Channel 5	Channel 6	Channel 7	Channel 8	Channel 9
4 <input type="checkbox"/>	4 <input type="checkbox"/>	4 <input type="checkbox"/>	4 <input type="checkbox"/>	4 <input type="checkbox"/>	4 <input type="checkbox"/>	4 <input type="checkbox"/>	4 <input type="checkbox"/>	4 <input checked="" type="checkbox"/>	4 <input type="checkbox"/>
3 <input type="checkbox"/>	3 <input type="checkbox"/>	3 <input type="checkbox"/>	3 <input type="checkbox"/>	3 <input checked="" type="checkbox"/>	3 <input type="checkbox"/>	3 <input type="checkbox"/>	3 <input checked="" type="checkbox"/>	3 <input type="checkbox"/>	3 <input type="checkbox"/>
2 <input type="checkbox"/>	2 <input type="checkbox"/>	2 <input checked="" type="checkbox"/>	2 <input type="checkbox"/>	2 <input type="checkbox"/>	2 <input type="checkbox"/>	2 <input checked="" type="checkbox"/>	2 <input checked="" type="checkbox"/>	2 <input type="checkbox"/>	2 <input type="checkbox"/>
1 <input type="checkbox"/>	1 <input checked="" type="checkbox"/>	1 <input type="checkbox"/>	1 <input checked="" type="checkbox"/>	1 <input type="checkbox"/>	1 <input checked="" type="checkbox"/>	1 <input type="checkbox"/>	1 <input checked="" type="checkbox"/>	1 <input type="checkbox"/>	1 <input checked="" type="checkbox"/>

**KX-TDA0141CE/KX-TDA0142CE**



Channel 0	Channel 1	Channel 2	Channel 3	Channel 4	Channel 5	Channel 6	Channel 7	Channel 8	Channel 9
1 <input type="checkbox"/> <input checked="" type="checkbox"/>	1 <input type="checkbox"/> <input checked="" type="checkbox"/>	1 <input type="checkbox"/> <input checked="" type="checkbox"/>	1 <input type="checkbox"/> <input checked="" type="checkbox"/>	1 <input type="checkbox"/> <input checked="" type="checkbox"/>	1 <input type="checkbox"/> <input checked="" type="checkbox"/>	1 <input type="checkbox"/> <input checked="" type="checkbox"/>	1 <input type="checkbox"/> <input checked="" type="checkbox"/>	1 <input type="checkbox"/> <input checked="" type="checkbox"/>	1 <input type="checkbox"/> <input checked="" type="checkbox"/>
2 <input type="checkbox"/> <input checked="" type="checkbox"/>	2 <input type="checkbox"/> <input checked="" type="checkbox"/>	2 <input type="checkbox"/> <input checked="" type="checkbox"/>	2 <input type="checkbox"/> <input checked="" type="checkbox"/>	2 <input type="checkbox"/> <input checked="" type="checkbox"/>	2 <input type="checkbox"/> <input checked="" type="checkbox"/>	2 <input type="checkbox"/> <input checked="" type="checkbox"/>	2 <input type="checkbox"/> <input checked="" type="checkbox"/>	2 <input type="checkbox"/> <input checked="" type="checkbox"/>	2 <input type="checkbox"/> <input checked="" type="checkbox"/>
3 <input type="checkbox"/> <input checked="" type="checkbox"/>	3 <input type="checkbox"/> <input checked="" type="checkbox"/>	3 <input type="checkbox"/> <input checked="" type="checkbox"/>	3 <input type="checkbox"/> <input checked="" type="checkbox"/>	3 <input type="checkbox"/> <input checked="" type="checkbox"/>	3 <input type="checkbox"/> <input checked="" type="checkbox"/>	3 <input type="checkbox"/> <input checked="" type="checkbox"/>	3 <input type="checkbox"/> <input checked="" type="checkbox"/>	3 <input type="checkbox"/> <input checked="" type="checkbox"/>	3 <input type="checkbox"/> <input checked="" type="checkbox"/>
4 <input type="checkbox"/> <input checked="" type="checkbox"/>	4 <input type="checkbox"/> <input checked="" type="checkbox"/>	4 <input type="checkbox"/> <input checked="" type="checkbox"/>	4 <input type="checkbox"/> <input checked="" type="checkbox"/>	4 <input type="checkbox"/> <input checked="" type="checkbox"/>	4 <input type="checkbox"/> <input checked="" type="checkbox"/>	4 <input type="checkbox"/> <input checked="" type="checkbox"/>	4 <input type="checkbox"/> <input checked="" type="checkbox"/>	4 <input type="checkbox"/> <input checked="" type="checkbox"/>	4 <input type="checkbox"/> <input checked="" type="checkbox"/>

**Note**

If more than 1 CS is in Radio Signal Test mode, each CS must have a unique channel number.

- After setting the DIP switches, connect the CS to an AC adaptor/battery box using a power supply adaptor.

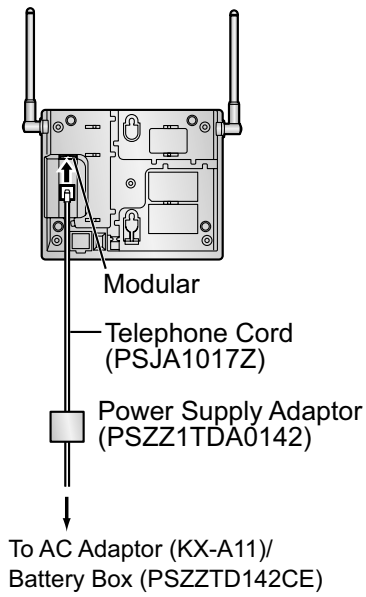
**WARNING**

The AC adaptor should be connected to a vertically oriented or floor-mounted AC outlet. Do not connect the AC adaptor to a ceiling-mounted AC outlet, as the weight of the adaptor may cause it to become disconnected.

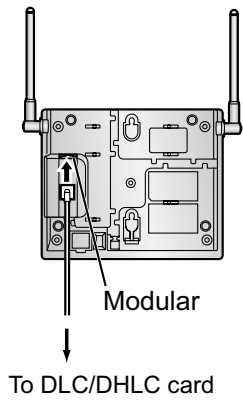
**Notice**

- For users in the United Kingdom:**  
240 V AC must not be used on a building site. Instead of an AC adaptor, connect a battery box to the CS.
- If the Power Supply Select switch is set to ON in step 3, connect the CS to an AC adaptor/battery box. If it is set to OFF, connect the CS to a DLC/DHLC card (KX-TDA0158CE only).

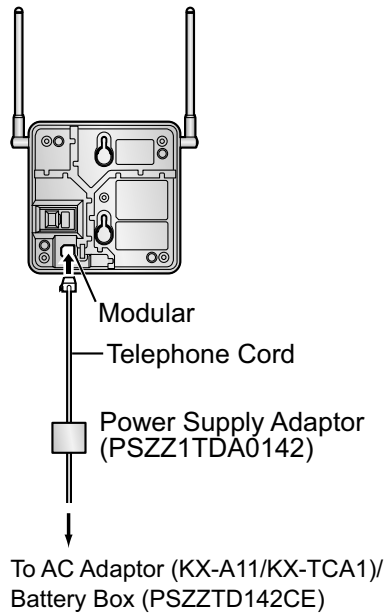
**KX-TDA0158CE**



**OR**



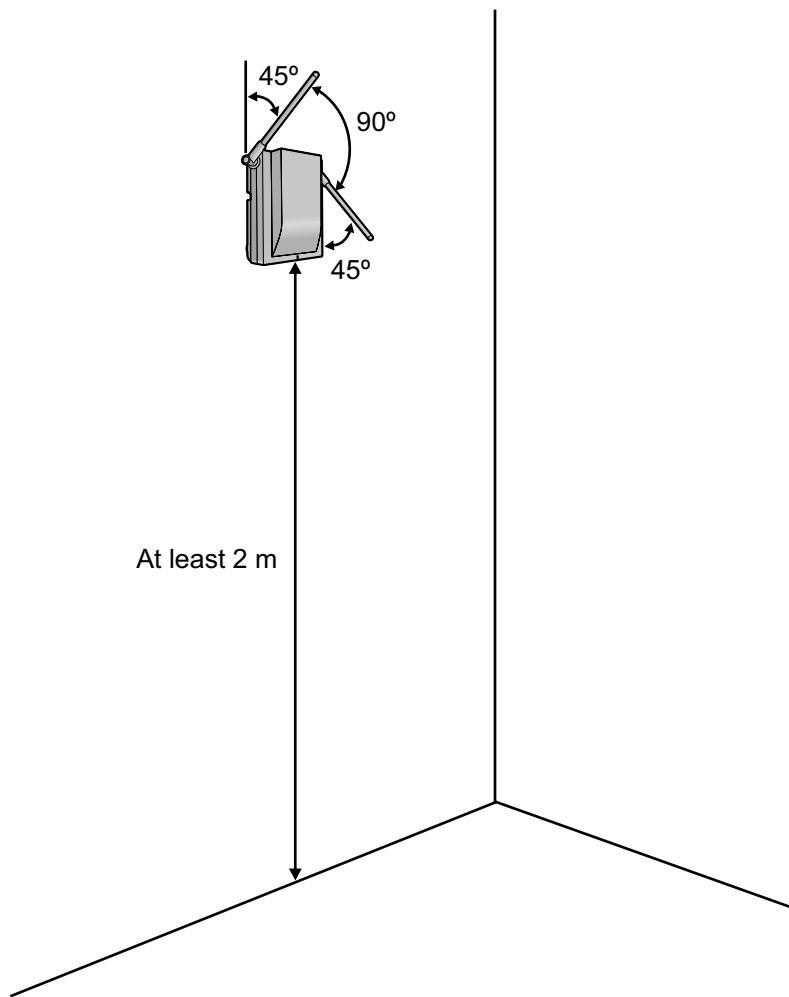
**KX-TDA0141CE/KX-TDA0142CE**



### 3.9.4 Before Site Survey

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5. Install the CS temporarily for the site survey. Install the CS at least 2 m above the floor, and place the antennas so that they are pointing in directions that are 90 degrees apart (for antenna diversity), as follows:



## 3.9.5 Site Survey Using the KX-TCA255/KX-TCA256/KX-TCA355/KX-TD7590

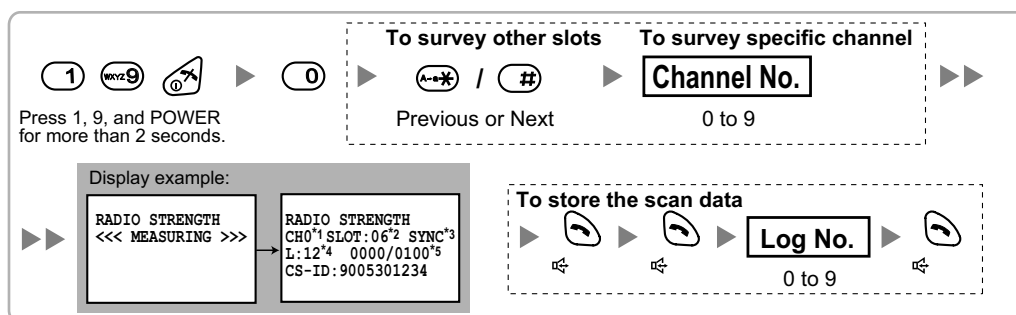
The PS has a Radio Signal Test mode that monitors the state of the radio link to the CS for site survey. In Radio Signal Test mode, the frame loss and signal strength of a synchronous slot, and the signal strength of the other slots can be measured when the PS is monitoring the CS. After installing the CSs temporarily as planned during site planning, set the PS to Radio Signal Test mode and locate each CS to measure its coverage area. Then, record the results on the map of the installation site.

### Testing the Radio Signal Strength

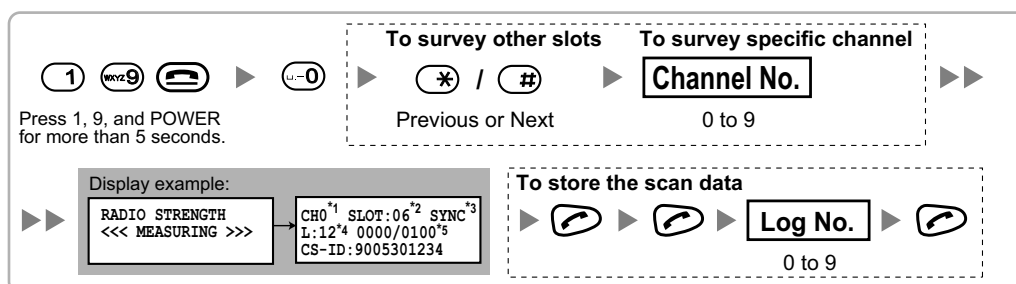
After locating the CS(s) temporarily, execute the Radio Signal Test using the PS. Directly after entering Radio Signal Test mode, the PS scans channel 0 for a CS that it can connect to. The channel to be scanned can be changed by pressing the appropriate keys 0 through 9.

1. Enter Radio Signal Test mode.

#### Using the KX-TCA255/KX-TCA256/KX-TCA355



#### Using the KX-TD7590



- \*1 : Channel number
- \*2 : Slot number
- \*3 : When a slot is synchronised, "SYNC" is displayed.
- \*4 : Radio signal strength level
- \*5 : Frame error (0000 to 9999)/Frame counter (0000 to 9999). Frame error indicates the number of errors out of 10 000 radio signal receptions. An increased number of frame errors indicates greater radio signal interference and more frequent noise during conversation. The ideal number of frame errors is "0000".

**Note**

Storing the scan data will clear all directory data.

2. Measure the radio signal strength by moving towards and away from the CS.

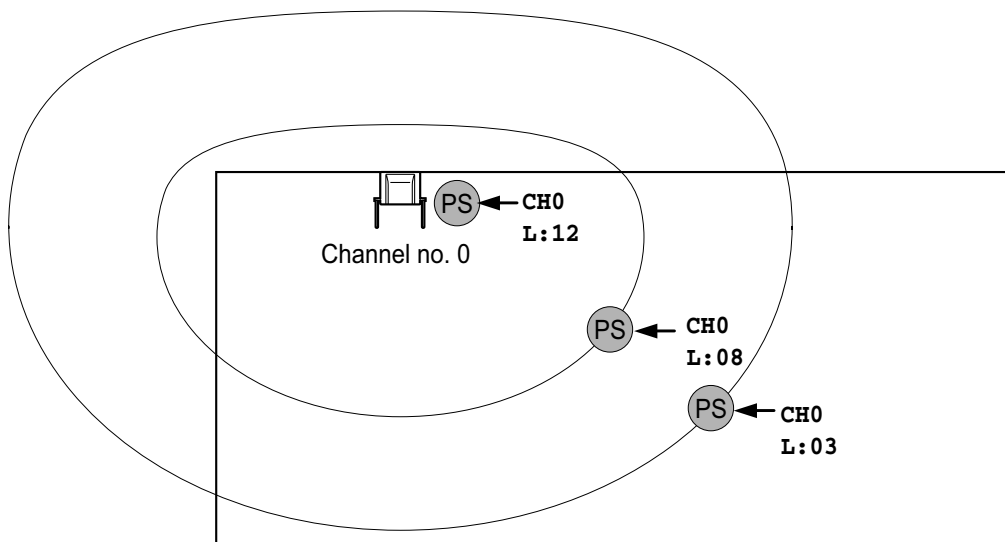
**Note**

- When the error rate is 2% or more, measure the error rate at the same location at least 5 times. You must disconnect the CS and then reconnect it to take each measurement. If the error rate is consistently 2% or more, there may be interference from external wireless equipment. In this case, the following may happen regardless of the radio signal strength level.

Error Rate	Description
Approx. 2%	May receive noise
Approx. 10%	May fail to make/receive calls

The above is a rough standard, and may vary depending on the environment.

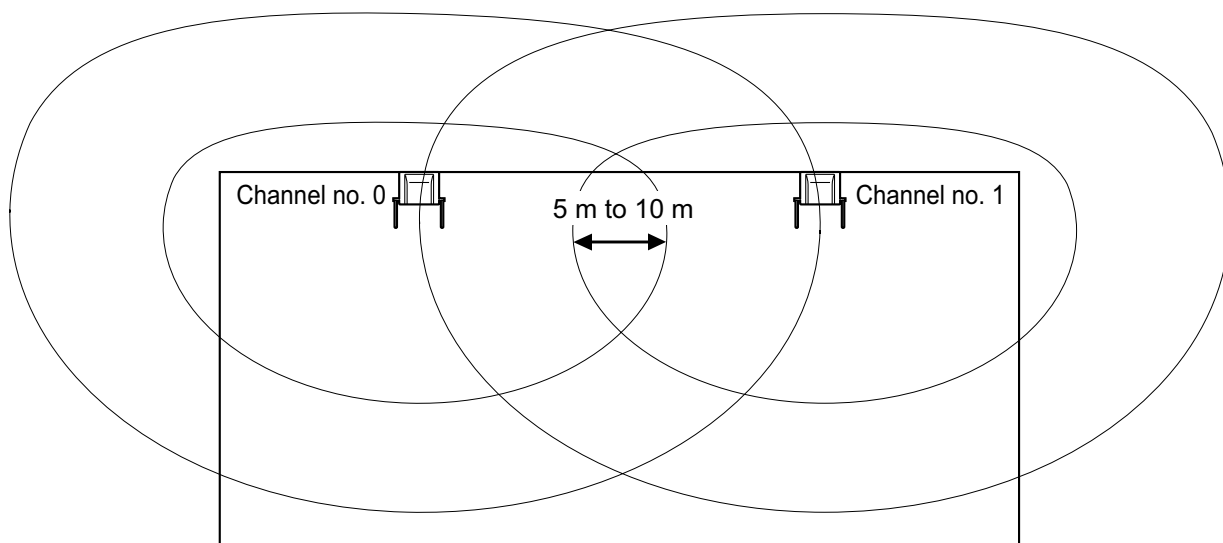
- When deciding where to install the CS, priority should be given to an error rate rather than a radio signal strength level.
  - After installing the CS according to the results of the survey, confirm that calls can be made and received, and conversations can be heard clearly.
- a. Move to the CS until the radio signal strength level becomes "12".
  - b. Move away from the CS and identify the CS coverage area within which the radio signal strength level is greater than "8". Draw the area on the map.
  - c. Move away from the CS and identify the CS coverage area within which the radio signal strength level is greater than "3". Draw the area on the map.



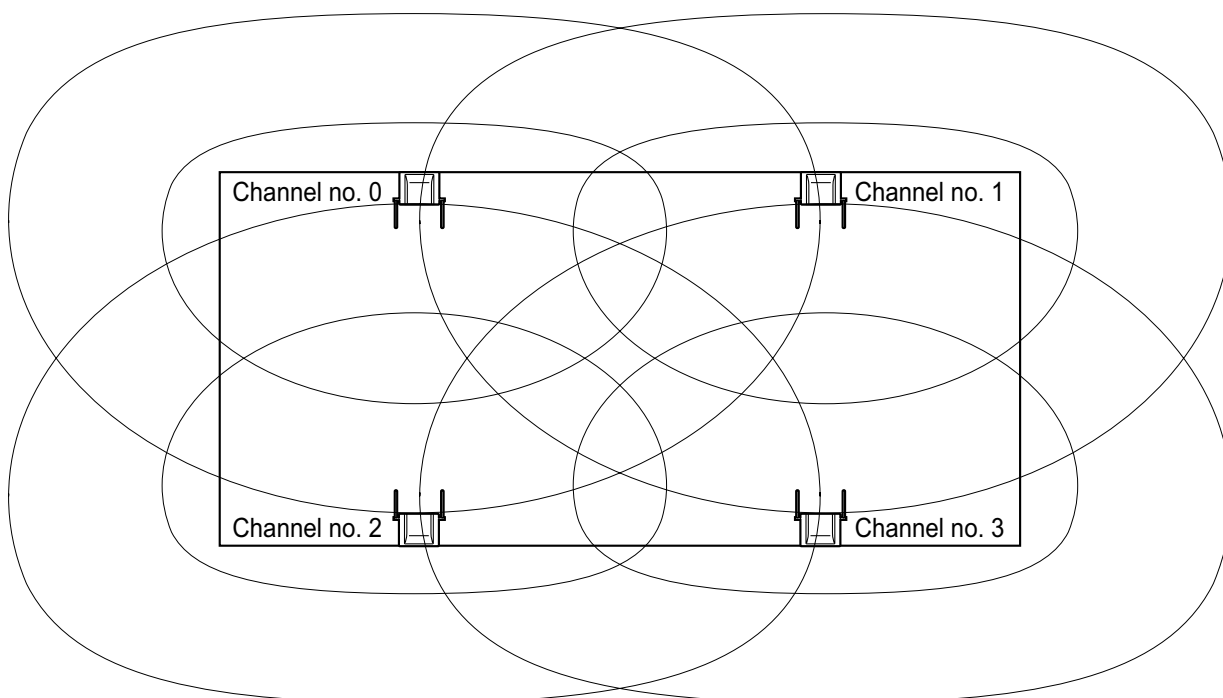
**Radio Signal Strength Levels**

Level: 00	Out of range
Level: 01 to 02	Receives noise easily or disconnects
Level: 03 to 07	May receive noise
Level: 08 to 10	Good
Level: 11 to 12	Better

3. Repeat steps 1 and 2 for other CSs, and relocate the CSs when necessary.
  - a. Overlap adjacent CS coverage areas where the radio signal strength level is "8" by 5 m to 10 m.



- b. Overlap the CS coverage areas of at least 2 CSs at any location in the installation site.



- c. Make sure that the radio signal strength level is greater than "3" at any location in the service area required by the user.

**Note**

- If a channel is set, the results of measurement for the 24 slots on the channel are saved each time. If the same channel is set, the new results override the previous ones. Therefore, a measurement of 10 channels  $\times$  24 slots in total can be made.
- If correct results cannot be obtained (e.g., there are many frame errors), change the location of the CS and repeat the site survey to select the best location.

## Referring to the Stored Scan Data

### Using the KX-TCA255/KX-TCA256/KX-TCA355

Press 1, 9, and POWER for more than 2 seconds.

Log No. 0 to 9

To go to other slots: Previous or Next (Left Arrow / Right Arrow) / #

To go to specific channel: Channel No. 0 to 9

### Using the KX-TD7590

Press 1, 9, and POWER for more than 5 seconds.

Log No. 0 to 9

To go to other slots: Previous or Next (Left Arrow / Right Arrow) / #

To go to specific channel: Channel No. 0 to 9

## Clearing the Stored Scan Data

When "CLEAR SCAN DATA" is displayed after turning on the PS, you are required to clear the scan data.

### Using the KX-TCA255/KX-TCA256/KX-TCA355

Press 1, 9, and POWER for more than 2 seconds.

GH1 4

### Using the KX-TD7590

Press 1, 9, and POWER for more than 5 seconds.

GH1 4

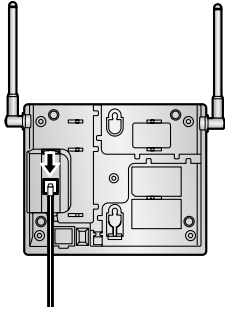


### 3.9.6 After Site Survey

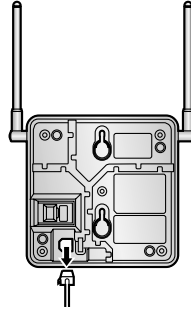
After obtaining the proper measurement results, exit Radio Signal Test mode before connecting the CS to the PBX.

1. Hold down the POWER button on the PS until the PS is turned OFF.
2. Disconnect the CS from the AC adaptor/battery box or the CSIF/DLC/DHLC card to stop supplying electricity.

**KX-TDA0158CE**

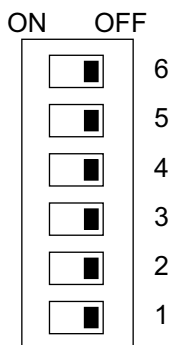


**KX-TDA0141CE/KX-TDA0142CE**

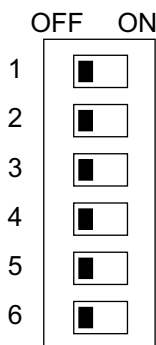


3. Switch all DIP switches on the CS from ON to OFF.

**KX-TDA0158CE**



**KX-TDA0141CE/KX-TDA0142CE**

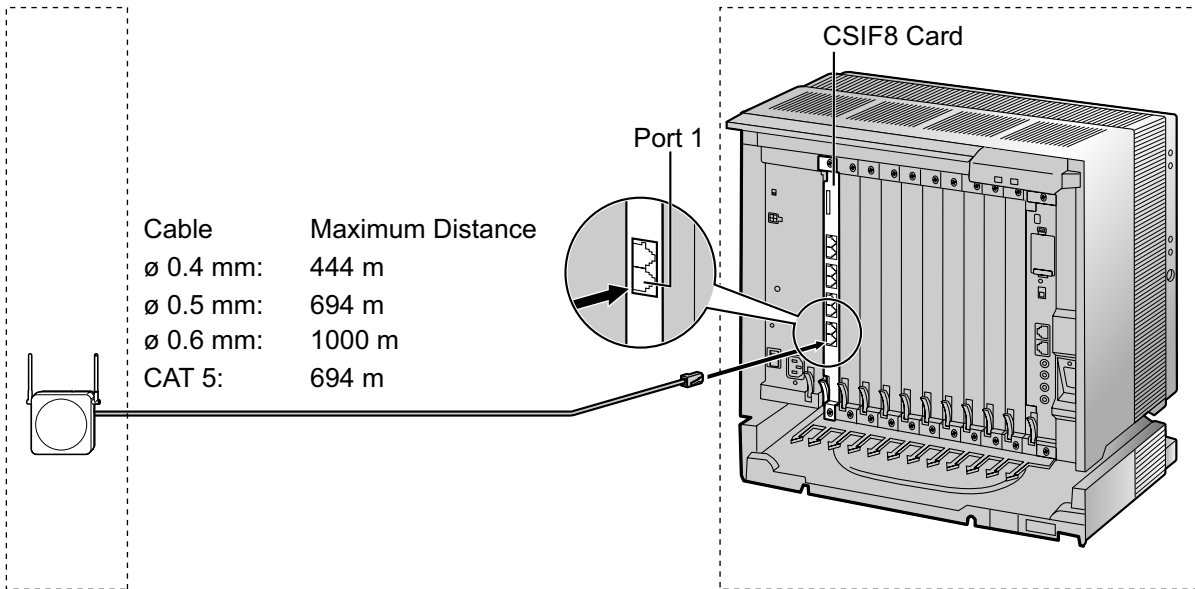


### 3.9.7 Connecting a Cell Station to the PBX

#### Using a CSIF Card

Refer to the following example to connect a CS to the PBX.

#### KX-TDA0142CE



CS (RJ11)		CSIF card (RJ45)	
Signal Name	Pin No.	Pin No.	Signal Name
D1	1	3	D1
POWH	2	4	POWH
POWL	3	5	POWL
D2	4	6	D2
		7	
		8	

#### Accessories and User-supplied Items for the CS

**Accessories (included):** Screws × 2, Washers × 2, Ferrite core × 1

**User-supplied (not included):** RJ11 connector

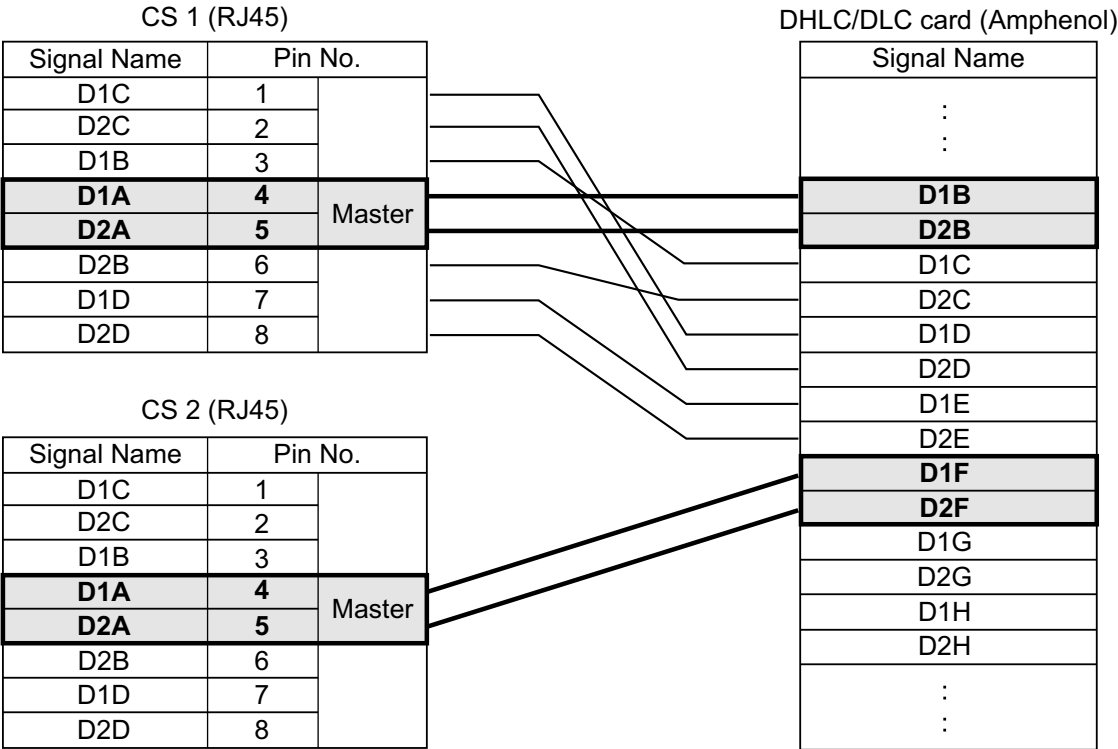
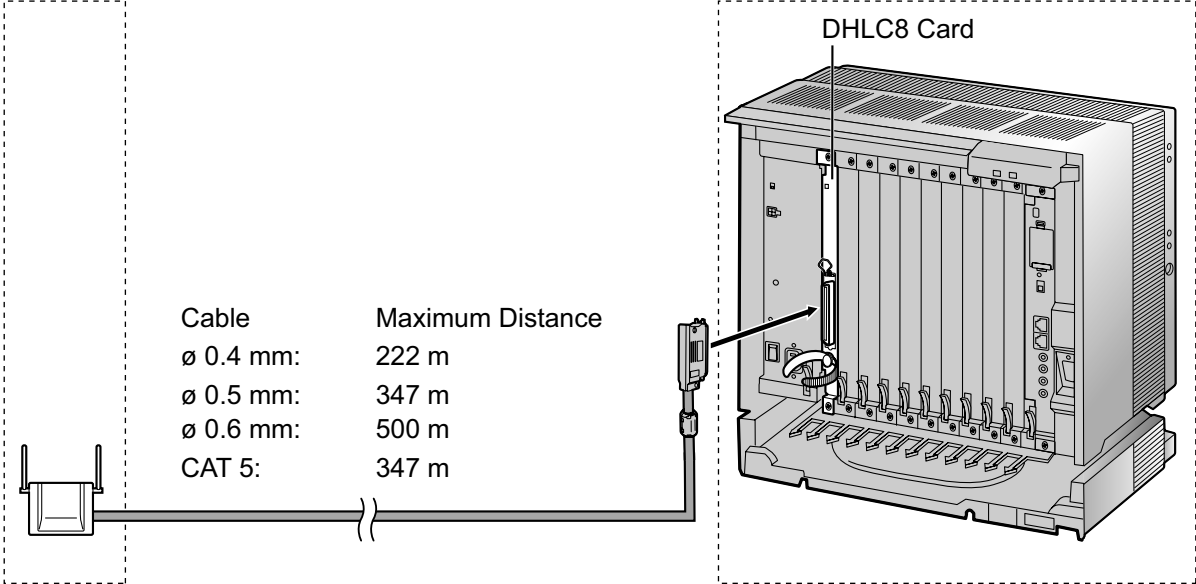
#### Note

For details about CSIF card, refer to "3.6.1 CSIF4 Card (KX-TDA0143) and CSIF8 Card (KX-TDA0144)".

**Using a DHLC/DLC Card**

Refer to the following examples to connect a CS to the PBX.

**KX-TDA0158CE**



**Accessories and User-supplied Items for the CS**

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

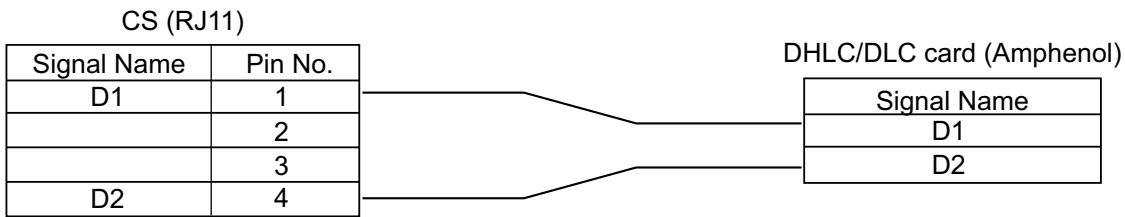
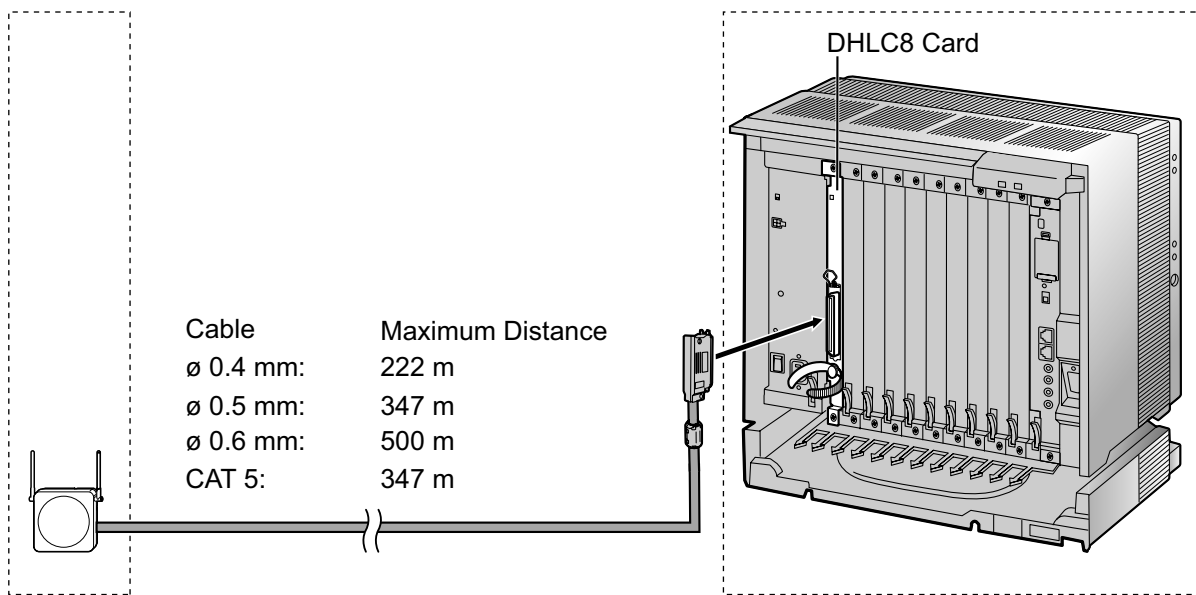
**User-supplied (not included):** RJ45 connector

### 3.9.7 Connecting a Cell Station to the PBX

**Note**

- The no. 4 and no. 5 pins (Master) of the CS must be connected to a pair of pins on the DHLC/DLC card. Then use 4 consecutive pairs of pins on the DHLC/DLC card, starting with the pins corresponding to the Master, as in the example above.
- When connecting multiple KX-TDA0158CE CSs to a DHLC/DLC card, make sure that the no. 4 and no. 5 pins (Master) of adjacent CSs are at least 3 pairs of pins away on the card.
- CS connections must be made within the same DHLC/DLC card.
- When a wrong connection is made, satisfactory performance of the CS cannot be guaranteed. Check the connection of CS and the PBX using the Maintenance Console. For information about how to view CS information using the Maintenance Console, refer to "2.6.15 Utility—CS Information" in the PC Programming Manual.

**KX-TDA0141CE**



**Accessories and User-supplied Items for the CS**

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

**User-supplied (not included):** RJ11 connector

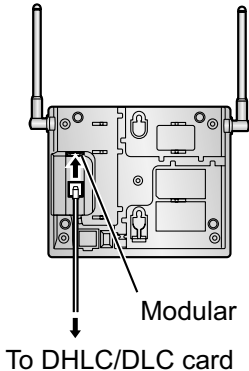
**Note**

For details about DHLC card or DLC card, refer to "3.6.2 DHLC8 Card (KX-TDA0170)", "3.6.3 DLC8 Card (KX-TDA0171)", or "3.6.4 DLC16 Card (KX-TDA0172)".

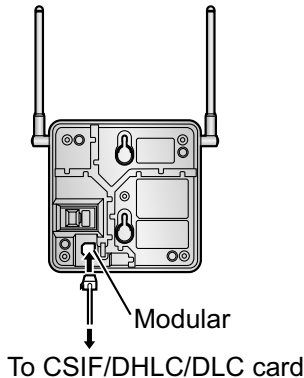
### Connecting the CS

- 1. Connect the cable from the CSIF/DHLC/DLC card to the CS.

**KX-TDA0158CE**

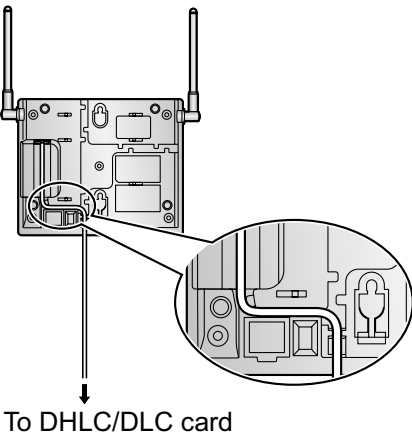


**KX-TDA0141CE/KX-TDA0142CE**

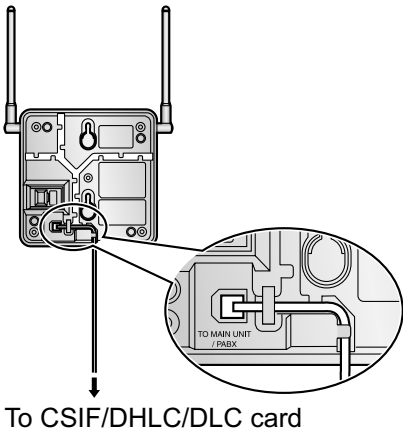


- 2. Pass the cable through the groove of the CS (in any direction depending on your preference).

**KX-TDA0158CE**

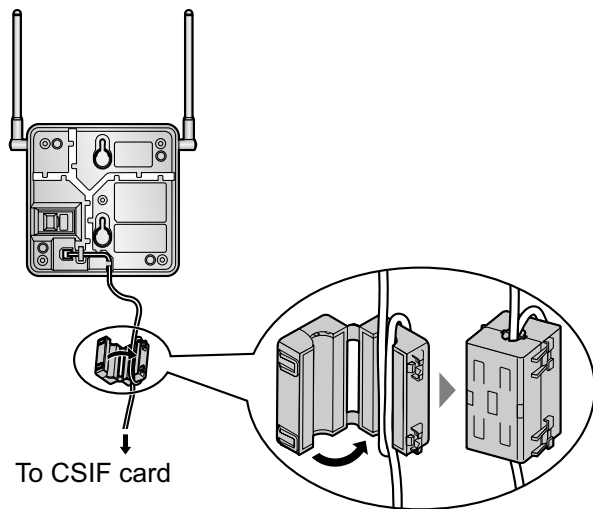


**KX-TDA0141CE/KX-TDA0142CE**



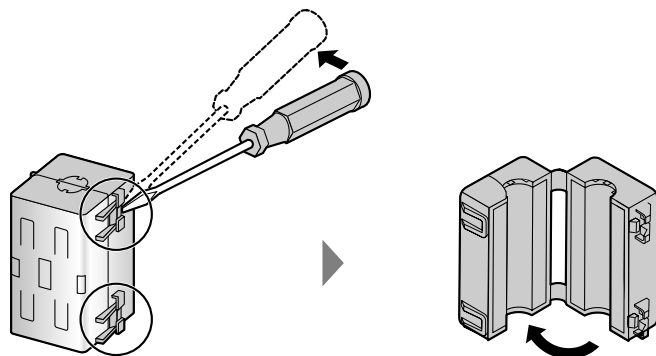
**For the KX-TDA0142CE User only:**

- 3. Wrap the cable once around the ferrite core. Then close the case of the ferrite core.



**Note**

If you need to open the ferrite core, use a flathead screwdriver to unlatch the case of the ferrite core.



### Registering the PS

The PS must be registered to the PBX before it can be used. Programming of both the PS and PBX is required. A PT with multiline display (e.g., KX-T7636 6-line display) is required to perform the PBX system programming.

**Note**

For details about system programming using a PT, refer to "2.3.2 PT Programming" in the Feature Guide, and "2.1 PT Programming" in the PT Programming Manual.

### Entering the PBX System Programming Mode Using a PT

**Administrator Level**

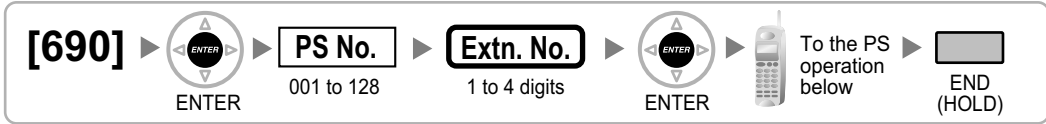


**Note**

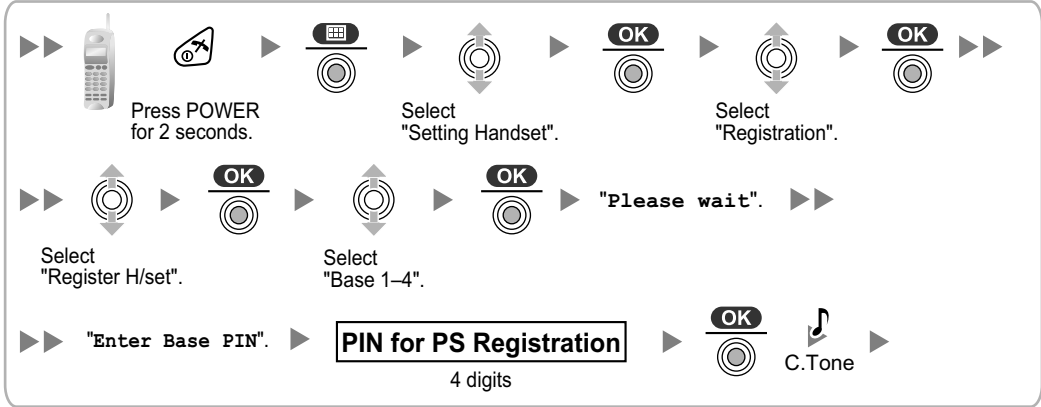
◆ means default value.

### PS Registration

One PS can be registered to a maximum of 4 different PBXs.



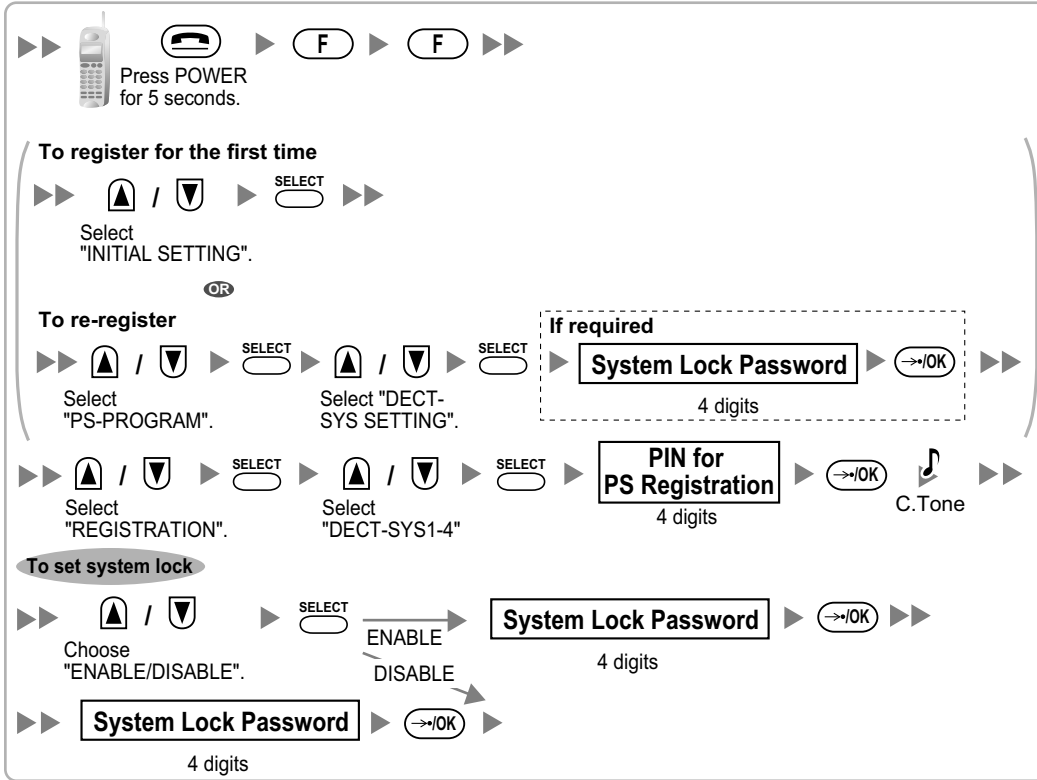
### Using the KX-TCA155/KX-TCA255/KX-TCA256/KX-TCA355



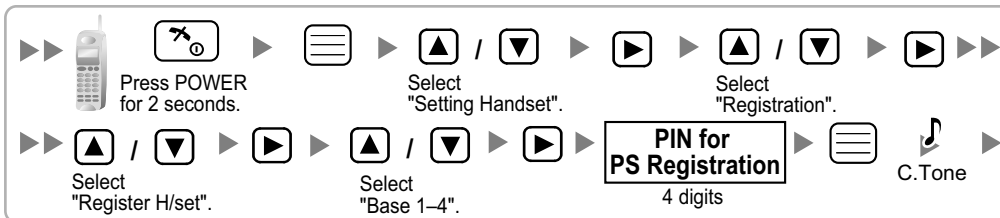
### 3.9.7 Connecting a Cell Station to the PBX

#### Using the KX-TD7590

System lock can be set after PS registration. When system lock is enabled, the system lock password will be required for system setting.



#### Using the KX-TD7580





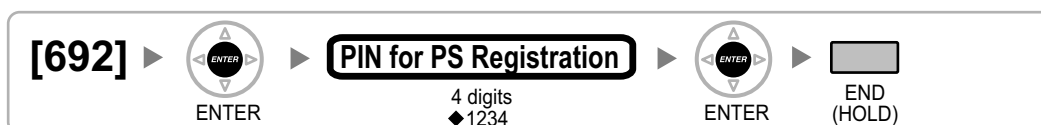
### Setting the Personal Identification Number (PIN) for PS Registration

To prevent registering the PS to a wrong PBX, a PIN for PS registration can be set to the PBX. Before registering the PS to the PBX, enter the PIN set to the PBX into the PS. By doing so, the PS will only be registered to the PBX with the matching PIN.

#### Note

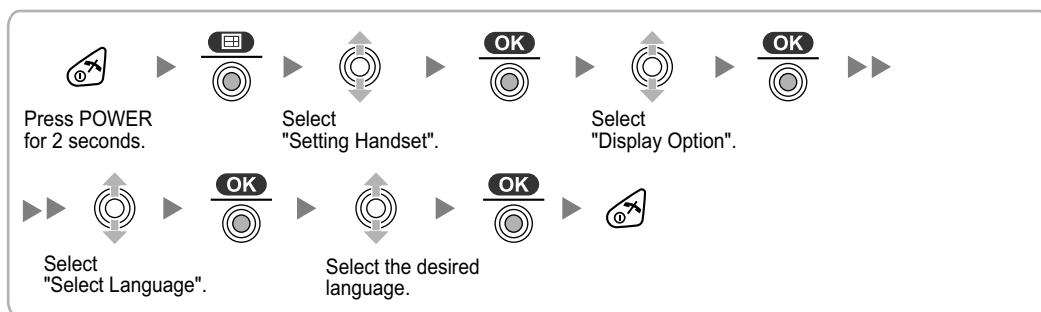
- By default, the PIN for PS registration is "1234" for both the PBX and PS. Therefore, the PS can be registered to the PBX without setting the PIN.
- The PIN for PS registration will only be used when registering the PS to the PBX. Therefore, during normal operation after registration, even if there is more than 1 PBX with the same PIN near the PS, the PS will not be inadvertently linked to a different PBX.

#### Setting the PIN for PBX

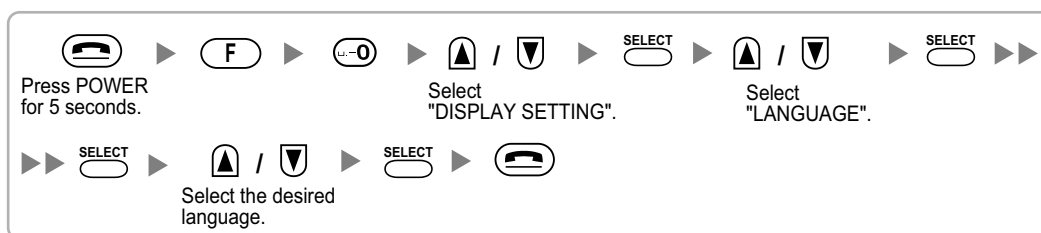


### Changing the Display Language of the PS

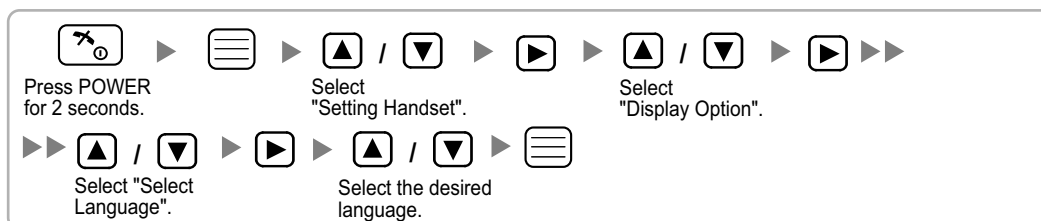
#### Using the KX-TCA155/KX-TCA255/KX-TCA256/KX-TCA355



#### Using the KX-TD7590



#### Using the KX-TD7580



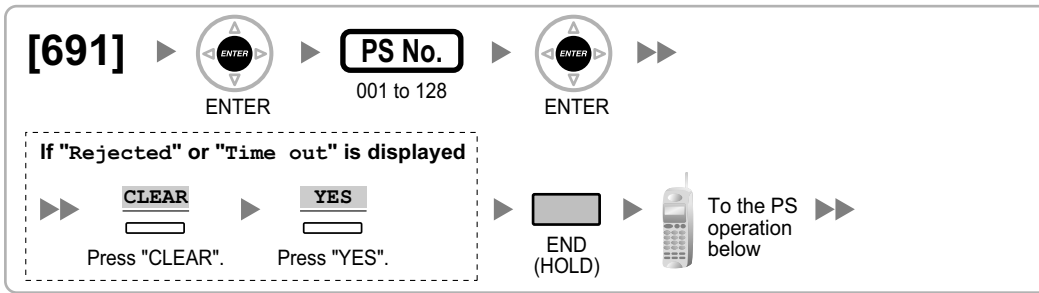
### PS Termination

Confirm the following before cancelling the PS registration:

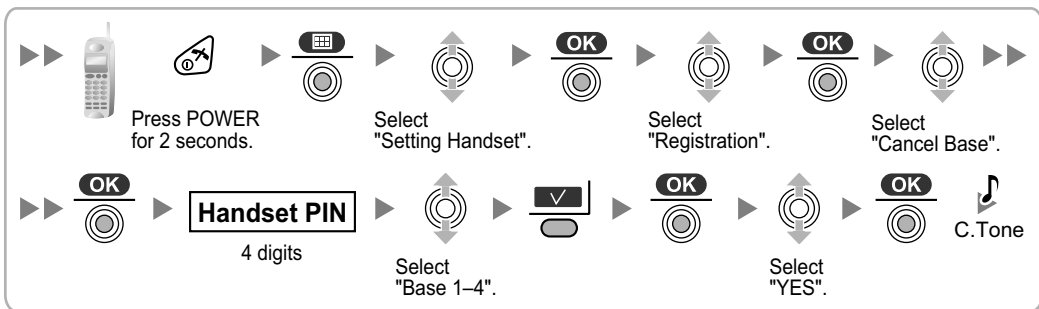
- The PS is turned on.

### 3.9.7 Connecting a Cell Station to the PBX

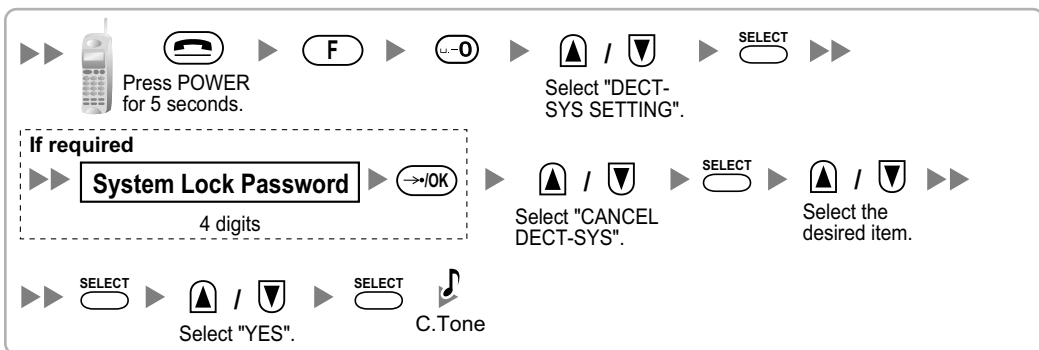
- The PS is within range.



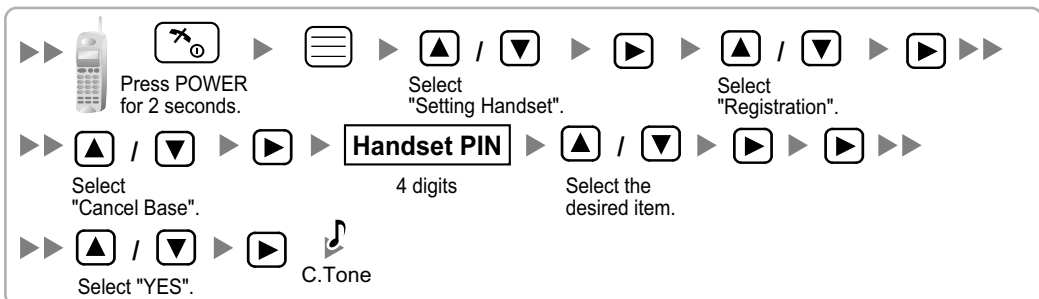
#### If the registration information is still stored in the PS Using the KX-TCA155/KX-TCA255/KX-TCA256/KX-TCA355



#### Using the KX-TD7590



#### Using the KX-TD7580



## Testing the Operation

Walk around the service area while having a conversation using a registered PS. If noise is frequent or conversations disconnect, relocate the CSs or install an additional CS.

## 3.9.8 Wall Mounting

### Mounting the KX-TDA0158CE

#### **WARNING**

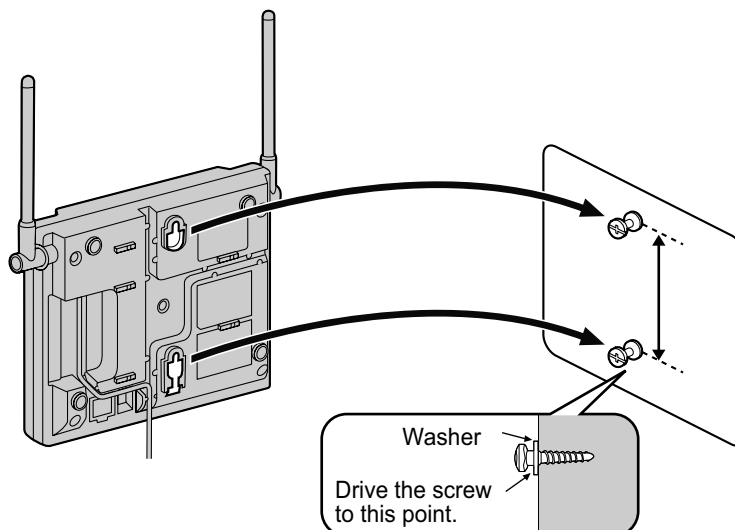
- Make sure that the wall that the unit will be attached to is strong enough to support the unit (approx. 310 g). If not, it is necessary for the wall to be reinforced.
- Only use the wall-mounting equipment (screws, washers) included with the unit.
- When driving the screws into the wall, be careful to avoid touching any metal laths, wire laths or metal plates in the wall.
- When this product is no longer in use, make sure to detach it from the wall.

#### **CAUTION**

- Do not stretch or bend the cables. Also, do not allow anything to rest on the cables.
  - Use cables that are fire-resistant or fireproof.
  - The CS and the cables should never be placed near or over a radiator or other heat source.
  - Do not bundle cables that are connected to the CS with the AC power cords of machines located nearby.
  - Make sure the cables are securely fastened to the wall.
1. Place the reference for wall mounting (KX-TDA0158CE) on the wall to mark the 2 screw positions.
  2. Install the 2 screws and washers (included) into the wall.

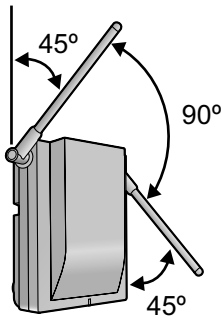
#### **Note**

- Make sure that the screw heads are at the same distance from the wall.
  - Install the screws perpendicular to the wall.
3. Hook the CS on the screw heads.



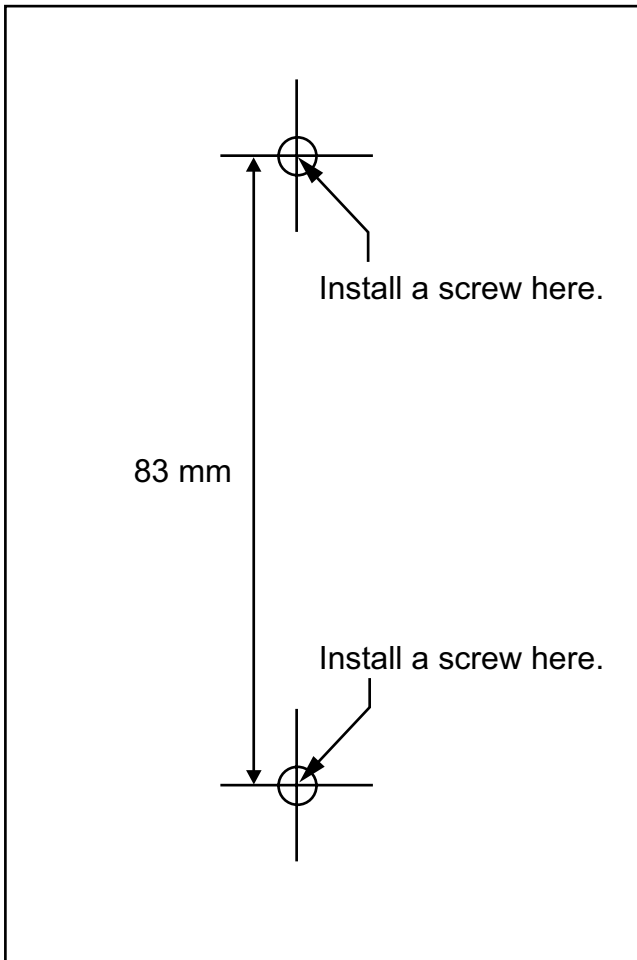
### 3.9.8 Wall Mounting

- Place the antennas so that they are pointing in directions that are 90 degrees apart (for antenna diversity), as follows:



### Reference for Wall Mounting (KX-TDA0158CE)

Please copy this page and use as a reference for wall mounting.



**Note**

Make sure to set the print size to correspond with the size of this page. If the dimension of the paper output still deviates slightly from the measurement indicated here, use the measurement indicated here.

## Mounting the KX-TDA0141CE/KX-TDA0142CE

### WARNING

- Make sure that the wall that the unit will be attached to is strong enough to support the unit (approx. 310 g). If not, it is necessary for the wall to be reinforced.
- Only use the wall-mounting equipment (screws, washers) included with the unit.
- When driving the screws into the wall, be careful to avoid touching any metal laths, wire laths or metal plates in the wall.
- When this product is no longer in use, make sure to detach it from the wall.

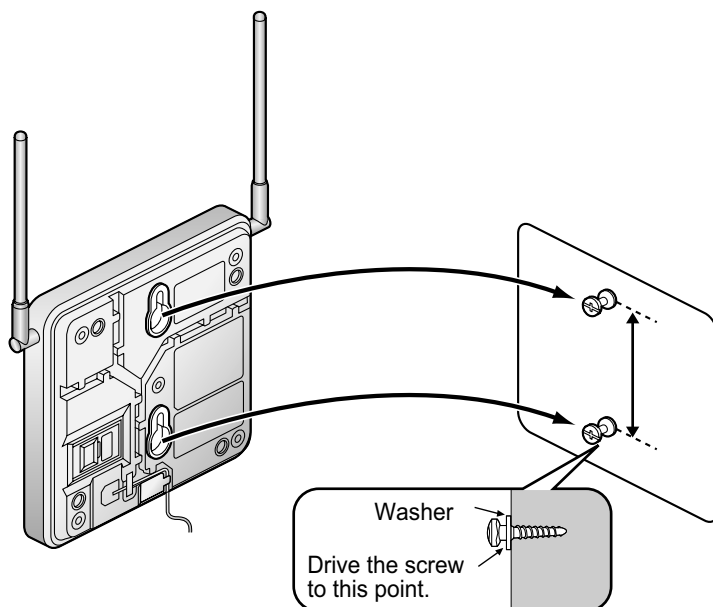
### CAUTION

- Do not stretch or bend the cables. Also, do not allow anything to rest on the cables.
- Use cables that are fire-resistant or fireproof.
- The CS and the cables should never be placed near or over a radiator or other heat source.
- Do not bundle cables that are connected to the CS with the AC power cords of machines located nearby.
- Make sure the cables are securely fastened to the wall.

1. Place the reference for wall mounting (KX-TDA0141CE/KX-TDA0142CE) on the wall to mark the 2 screw positions.
2. Install the 2 screws and washers (included) into the wall.

### Note

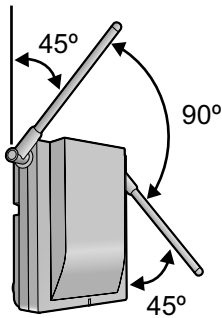
- Make sure that the screw heads are at the same distance from the wall.
  - Install the screws perpendicular to the wall.
3. Hook the CS on the screw heads.



### 3.9.8 Wall Mounting

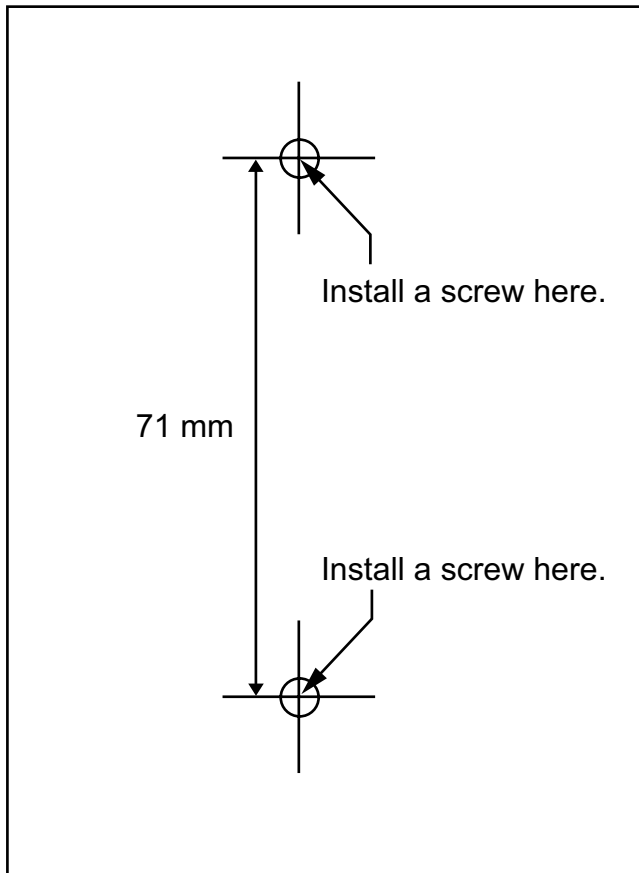
---

4. Place the antennas so that they are pointing in directions that are 90 degrees apart (for antenna diversity), as follows:



### Reference for Wall Mounting (KX-TDA0141CE/KX-TDA0142CE)

Please copy this page and use as a reference for wall mounting.



#### **Note**

Make sure to set the print size to correspond with the size of this page. If the dimension of the paper output still deviates slightly from the measurement indicated here, use the measurement indicated here.

## 3.10 Connection of 2.4 GHz Portable Stations

### 3.10.1 Overview

#### Required Equipment and Maximum Number of Calls

CSs determine the area covered by the wireless system. The number of calls that can be made simultaneously through each CS varies depending on the model, as follows:

CS	Connection Card	Maximum Calls	Compatible PSs
KX-TDA0151	DHLC/DLC	2	<ul style="list-style-type: none"> <li>• KX-TD7684</li> <li>• KX-TD7694</li> <li>• KX-TD7680</li> <li>• KX-TD7690</li> </ul>
KX-TDA0152	CSIF	3	
KX-TDA0141	DHLC/DLC	2	
KX-TDA0142	CSIF	3	

#### Note

For more details about the PS, refer to the Operating Instructions of the PS.

#### Required Distances between Equipment

##### CAUTION

- Keeping some distance between the equipment listed below may prevent interference. (The distance may vary depending on the environment.)

Equipment	Distance
CS and office equipment such as a computer, telex, fax machine, etc.	More than 2 m
CS and PS	More than 1 m
Each PS	More than 0.5 m
PBX and CS	More than 2 m
CS and CS	More than 15 m <sup>*1</sup>

\*1 KX-TDA0151CN: More than 3 m

- The CS should be kept free of dust, moisture, high temperature (more than 40 °C), low temperature (less than 0 °C), and vibration, and should not be exposed to direct sunlight.
- The CS should not be placed outdoors (use indoors).
- The CS should not be placed near high-voltage equipment.
- The CS should not be placed on a metal object.
- Systems using 2.4 GHz ISM (Industrial, Scientific and Medical) band may interfere with the KX-TDA wireless system. Examples of such systems are cordless telephones, wireless LAN, Home RF, microwave ovens and other ISM devices. These systems may cause minor noise.

#### Notice

Please take into consideration the distance between the CSs when site planning. Please consult a certified dealer for details.

### 3.10.1 Overview

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However, the required distance between CSs may vary depending on the environment of the installation site and conditions in which the wireless system is used. Conduct the site survey to determine the appropriate distance.



## 3.10.2 Procedure Overview

When connecting the wireless system, use extreme care in conducting the site survey. An incorrectly performed site survey can result in poor service area, frequent noise, and disconnection of calls.

### 1. Investigate the installation site

Refer to "3.10.3 Site Planning".

- a. Obtain a map of the CS installation site.
- b. Identify the service area required by the user on the map.
- c. Plan the location of each CS, taking account of distance, building materials, etc.

### 2. Prepare the CS for site survey

Refer to "3.10.4 Before Site Survey".

- a. Assign a CS number to each CS by setting the DIP switches on the back of the CS.
- b. Supply electricity to each CS using an AC adaptor/battery box or by connecting them to a CSIF/DLC/DHLC card.
- c. Install each CS temporarily as planned.

#### Note

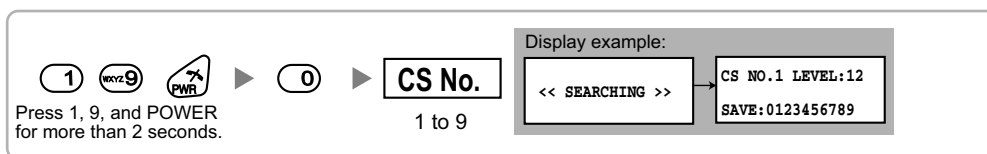
- Install at least 2 m above the floor.
- Place the antennas so that they are pointing in directions that are 90 degrees apart (for antenna diversity).

### 3. Conduct the site survey

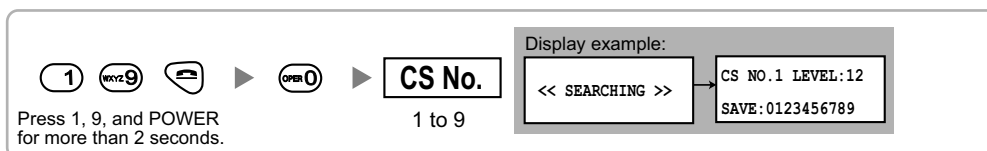
Refer to "3.10.5 Site Survey".

- a. Test the radio signal strength using the PS.  
Confirm that the radio signal strength level is "12" near the CS.

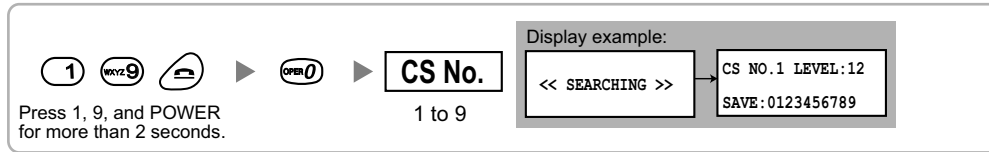
#### Using the KX-TD7684/KX-TD7694



#### Using the KX-TD7680



#### Using the KX-TD7690



- b. By walking away from the CS with the PS, check the radio signal strength. The radio signal strength weakens as you walk away from the CS.
- c. Map the CS coverage area at radio signal strength levels "3" and "8".
- d. Make sure that adjacent CS coverage areas overlap where the radio signal strength level is "8" by at least 5 m.
- e. Make sure that the radio signal strength level is greater than "3" at any location within the service area required by the user.

## 4. Finish the site survey

Refer to "3.10.6 After Site Survey".

1. Turn off the PS.
2. Stop supplying power, and return all DIP switches of each CS to the OFF position.

## 5. Connect the CS and PS to the PBX and test the operation

Refer to "3.10.7 Connecting a Cell Station to the PBX".

1. Connect the CSs to the PBX.
2. Register the PSs to the PBX.
3. Walk around the service area while having a conversation using a registered PS. If noise is frequent or conversations disconnect, relocate the CSs or install an additional CS.

## 6. Mount the CS on the wall

Refer to "3.10.8 Wall Mounting".

- a. If there are no problems in testing, mount the CS on the wall.

### 3.10.3 Site Planning

Choosing the best site for the CS requires careful planning and testing of essential areas. The best location may not always be convenient for installation. Read the following information before installing the unit.

#### Understanding Radio Waves

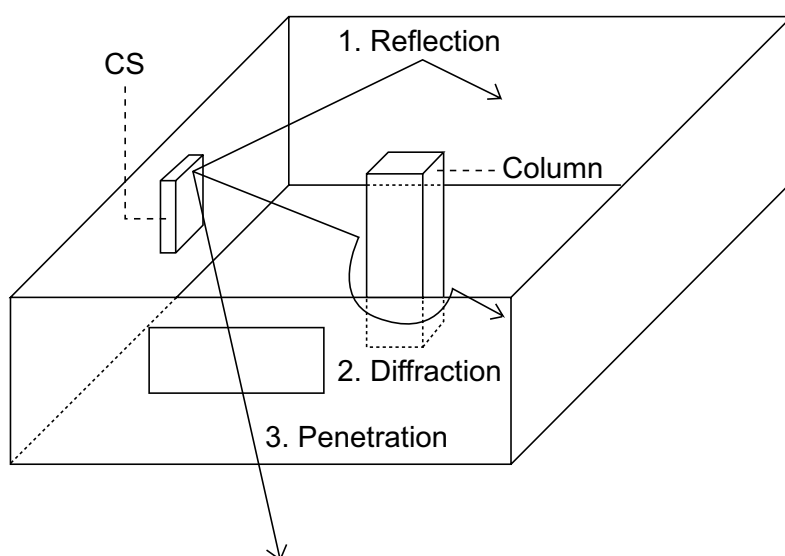
##### Characteristics of Radio Waves

The transmission of radio waves and the CS coverage area depend on the structure and materials of the building.

Office equipment, such as computers and fax machines, can interfere with radio waves. Such equipment may create noise or interfere with the performance of the PS.

The illustration below shows the special transmitting patterns of radio waves.

1. Radio waves are reflected by objects made of materials such as metal.
2. Radio waves are diffracted by objects such as metallic columns.
3. Radio waves penetrate objects made of materials such as glass.



##### Relationships Between Radio Waves and Building Structure and Materials

- The CS coverage area is affected more by the building materials and their thickness than the number of obstacles.
- Radio waves tend to be reflected or diffracted by conductive objects and rarely penetrate them.
- Radio waves tend to penetrate insulated objects and are rarely reflected by them.
- Radio waves penetrate thin objects more than thick objects.
- The table below shows the transmission tendency of radio waves when they reach objects made from various materials.

Object	Material	Transmission Tendency
Wall	Concrete	The thicker they are, the less radio waves penetrate them.
	Ferroconcrete	Radio waves can penetrate them, but the more iron there is, the more radio waves are reflected.

### 3.10.3 Site Planning

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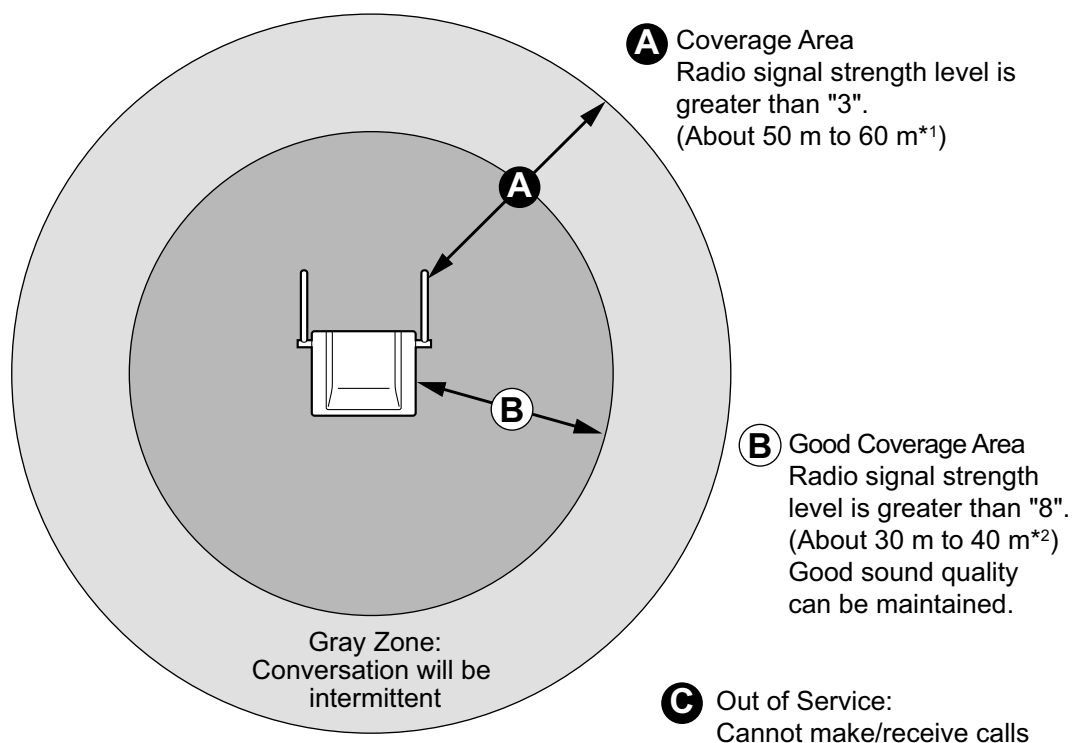
<b>Object</b>	<b>Material</b>	<b>Transmission Tendency</b>
Window	Glass	Radio waves usually penetrate them.
	Glass with wire net	Radio waves can penetrate them, but tend to be reflected.
	Glass covered with heat-resistant film	Radio waves are weakened considerably when they penetrate windows.
Floor	Ferroconcrete	Radio waves can penetrate them, but the more iron there is, the more radio waves are reflected.
Partition	Steel	Radio waves are reflected and rarely penetrate them.
	Plywood, Glass	Radio waves usually penetrate them.
Column	Ferroconcrete	Radio waves can penetrate them, but the more iron there is, the more radio waves tend to be reflected or diffracted.
	Metal	Radio waves tend to be reflected or diffracted.
Cabinet	Steel	Radio waves are usually reflected or diffracted, and rarely penetrate them.
	Wood	Radio waves can penetrate them, but they are weakened.

## CS Coverage Area

The example below shows the size of the coverage area of 1 CS if it is installed in an area with no obstacles.

### Note

Radio signal strength levels are measured during the site survey (refer to "3.10.5 Site Survey").



### Radio Signal Strength Levels

Level: 00	↑	Out of range
Level: 01 to 02		Receives noise easily or disconnects
Level: 03 to 07		May receive noise
Level: 08 to 10	↓	Good
Level: 11 to 12		Better

\*1 KX-TDA0151CN: About 35 m to 50 m

\*2 KX-TDA0151CN: About 20 m to 30 m

## Site Survey Preparation

1. Obtain a map and investigate the installation site.
  - a. Check the obstacles (e.g., shelves, columns, and partitions).
  - b. Check the materials of the structures (e.g., metal, concrete, and plywood).
  - c. Check the layout and dimensions of the room, corridor, etc.
  - d. Write down the above information on the map.
2. Examine the service area required by the user on the map, referring to the following example.
  - a. Draw the coverage area around a CS. Extend the coverage area 30 m to 60 m (20 m to 50 m for the KX-TDA0151CN) in each direction, depending on the materials of the building structures and obstacles in the installation site. Note that a CS cannot be installed outside a building.

### 3.10.3 Site Planning

- b. If one CS cannot cover the entire service area, install additional CSs as required. Overlap the coverage areas of adjacent CSs.

Where CS coverage areas overlap, the PS will start call handover to the next CS if the signal from one CS becomes weak. However, if a PS moves away from a CS and there are no CSs available for handover, the PS may go out of range and the call could be lost.

If the signal from the CS fades, due to the structure of the building, there may be some handover delay. The user will hear a range warning before handover in this case. This also applies in the case of interference from 2.4 GHz apparatus.

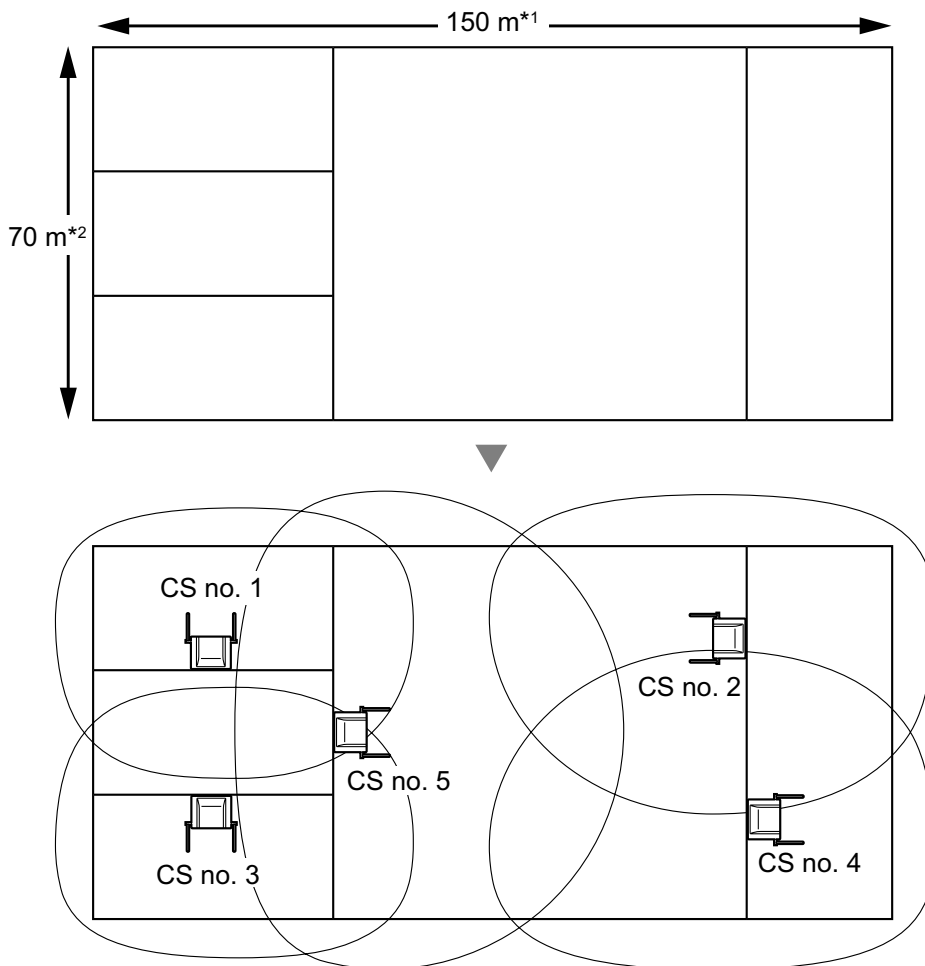
#### Example: Installing in a Room Separated by Interior Walls

##### Things to take note of:

- The room is separated by interior walls.
- The room is surrounded by concrete walls.

##### CS installation plan:

- The coverage area of each CS will not extend as far as when there are no obstacles, because the radio signals will be weakened by separating walls. Therefore, you will need 5 CSs to cover the entire room.



\*1 KX-TDA0151CN: 100 m

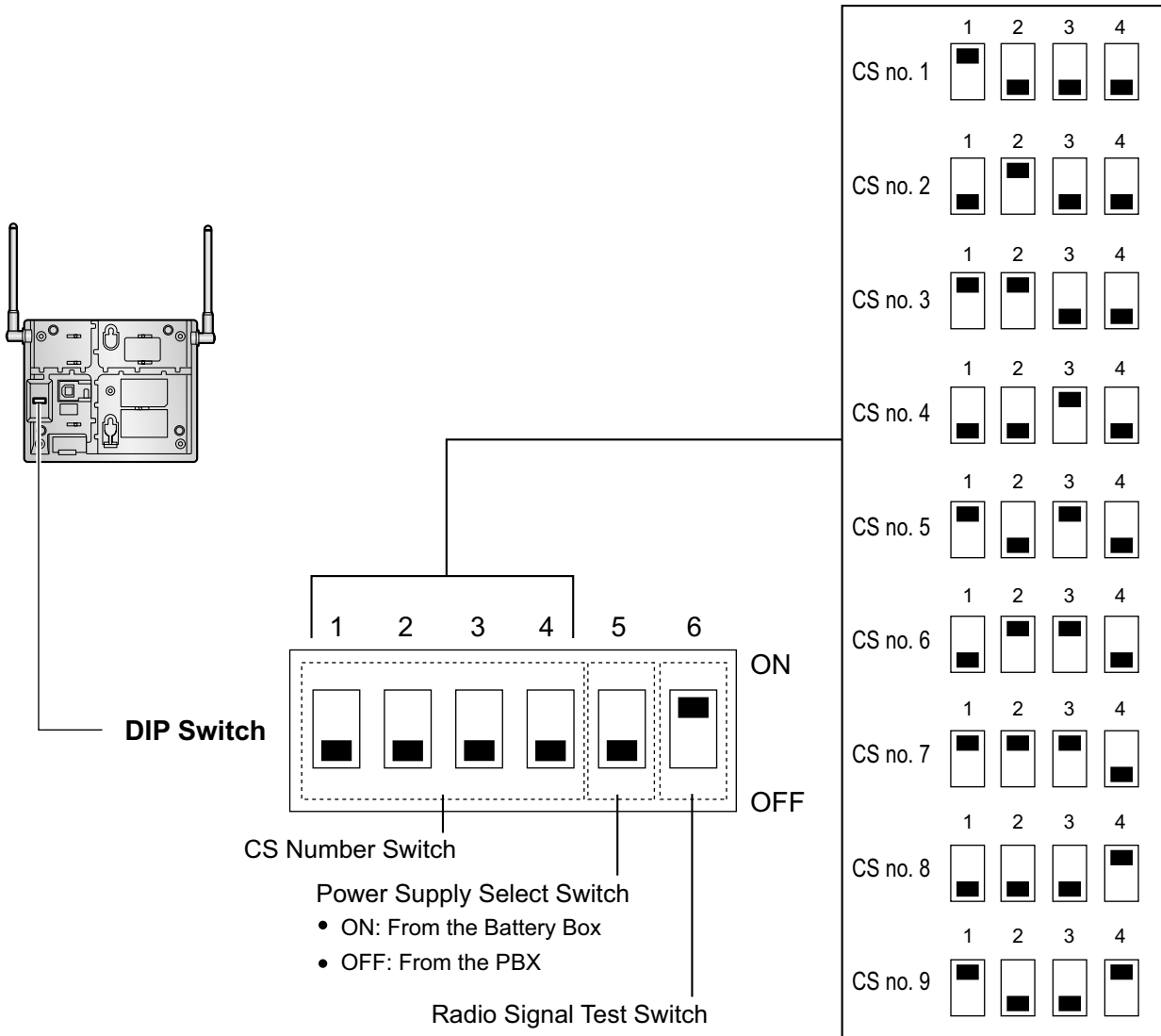
\*2 KX-TDA0151CN: 50 m

### 3.10.4 Before Site Survey

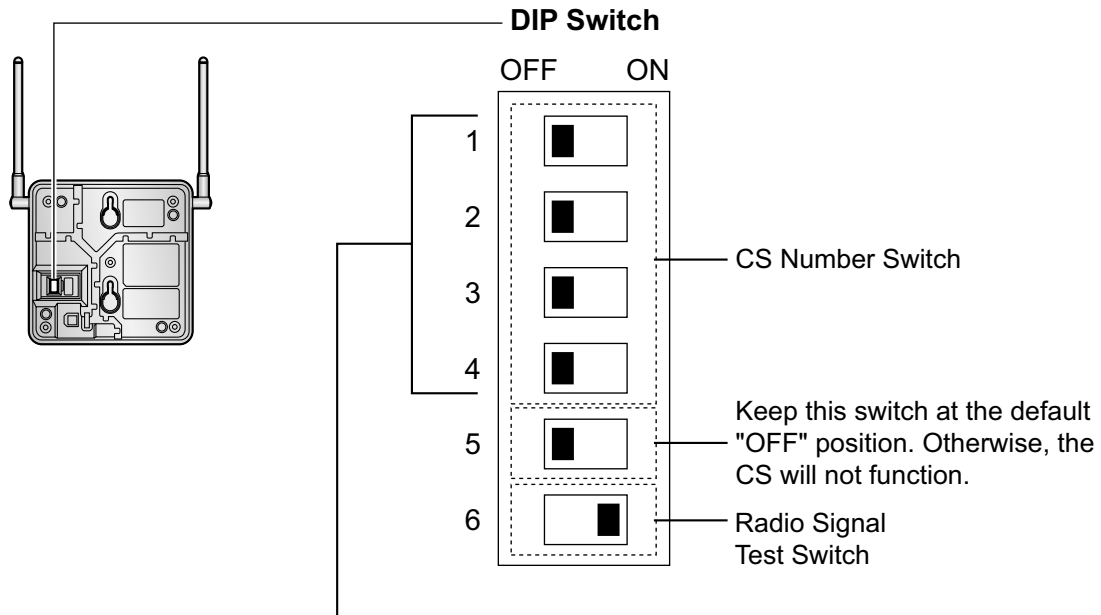
#### Setting and Installing the CS Temporarily for Site Survey

1. Switch the Radio Signal Test switch from OFF to ON.
2. Set the CS number switches as desired.
3. Set the Power Supply Select switch as desired (KX-TDA0151/KX-TDA0152 only).

#### KX-TDA0151/KX-TDA0152



**KX-TDA0141/KX-TDA0142**



CS no. 1	CS no. 2	CS no. 3	CS no. 4	CS no. 5	CS no. 6	CS no. 7	CS no. 8	CS no. 9
1 <input type="checkbox"/>	1 <input type="checkbox"/>	1 <input type="checkbox"/>	1 <input type="checkbox"/>	1 <input type="checkbox"/>	1 <input type="checkbox"/>	1 <input type="checkbox"/>	1 <input type="checkbox"/>	1 <input type="checkbox"/>
2 <input checked="" type="checkbox"/>	2 <input type="checkbox"/>	2 <input type="checkbox"/>	2 <input type="checkbox"/>	2 <input type="checkbox"/>	2 <input type="checkbox"/>	2 <input type="checkbox"/>	2 <input type="checkbox"/>	2 <input type="checkbox"/>
3 <input type="checkbox"/>	3 <input type="checkbox"/>	3 <input type="checkbox"/>	3 <input type="checkbox"/>	3 <input type="checkbox"/>	3 <input type="checkbox"/>	3 <input type="checkbox"/>	3 <input type="checkbox"/>	3 <input type="checkbox"/>
4 <input type="checkbox"/>	4 <input type="checkbox"/>	4 <input type="checkbox"/>	4 <input type="checkbox"/>	4 <input type="checkbox"/>	4 <input type="checkbox"/>	4 <input type="checkbox"/>	4 <input type="checkbox"/>	4 <input type="checkbox"/>

**Note**

If more than 1 CS is in Radio Signal Test mode, each CS must have a unique CS number.



- After setting the DIP switches, connect the CS to an AC adaptor/battery box using a power supply adaptor.

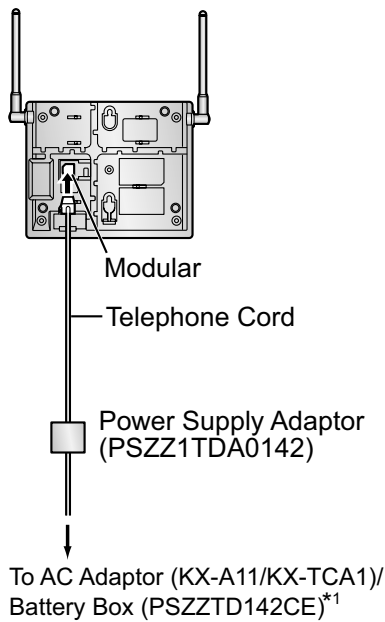
**WARNING**

The AC adaptor should be connected to a vertically oriented or floor-mounted AC outlet. Do not connect the AC adaptor to a ceiling-mounted AC outlet, as the weight of the adaptor may cause it to become disconnected.

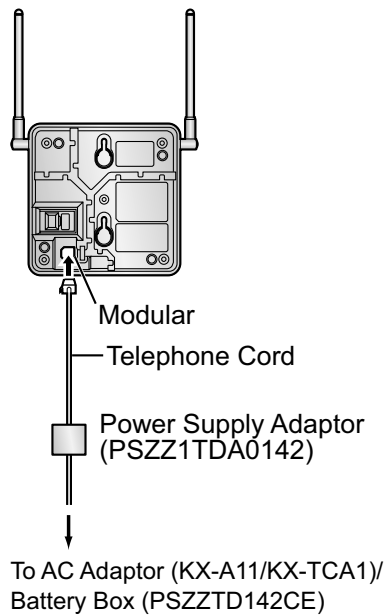
**Notice**

If the Power Supply Select switch is set to ON in step 3, connect the CS to an AC adaptor/battery box. If it is set to OFF, connect the CS to a CSIF/DLC/DHLC card (KX-TDA0151/KX-TDA0152 only).

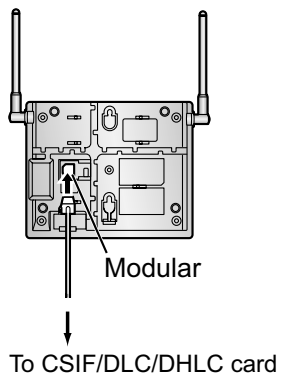
**KX-TDA0151/KX-TDA0152**



**KX-TDA0141/KX-TDA0142**



OR

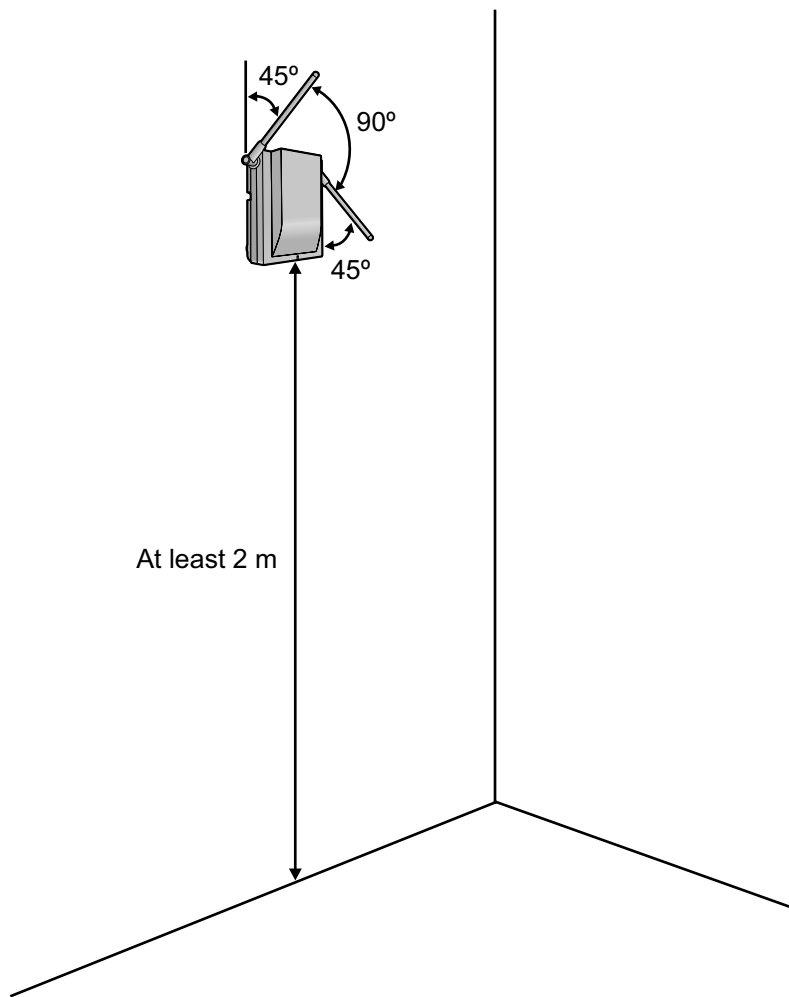


\*1 KX-TDA0151CN: Battery Box (PSZZTD142CE) only. The AC Adaptor is not available.

### 3.10.4 Before Site Survey

---

5. Install the CS temporarily for the site survey. Install the CS at least 2 m above the floor, and place the antennas so that they are pointing in directions that are 90 degrees apart (for antenna diversity), as follows:



## 3.10.5 Site Survey

The PS has a Radio Signal Test mode that monitors the state of the radio link to the CS. After installing the CSs temporarily, set the PS to Radio Signal Test mode and measure each CS coverage area. Then, record the results on the map of the installation site.

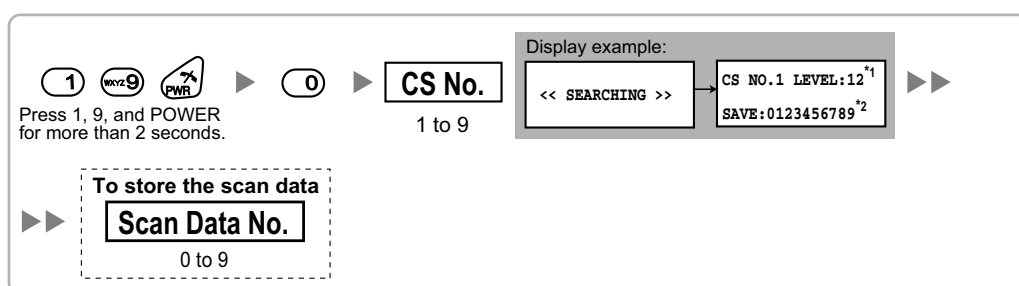
### Testing the Radio Signal Strength

#### Note

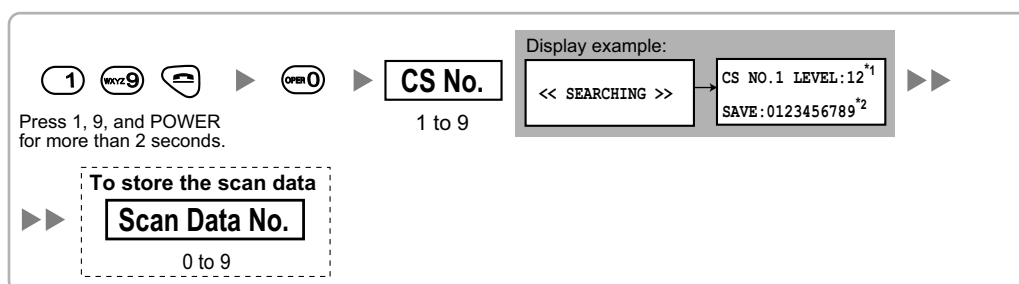
Display prompts for the site survey are only available in English.

1. Enter Radio Signal Test mode.

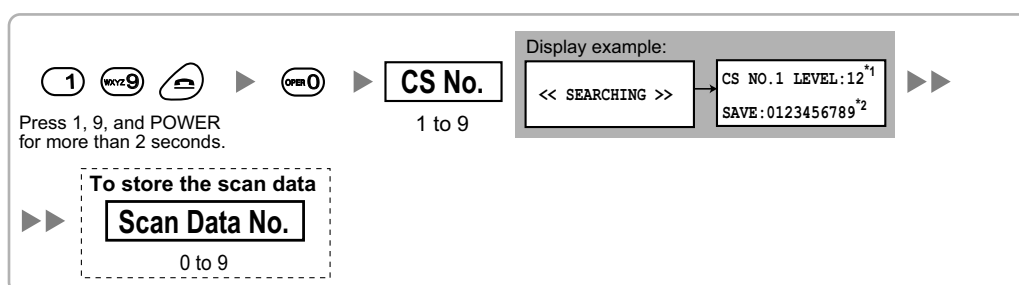
#### Using the KX-TD7684/KX-TD7694



#### Using the KX-TD7680



#### Using the KX-TD7690



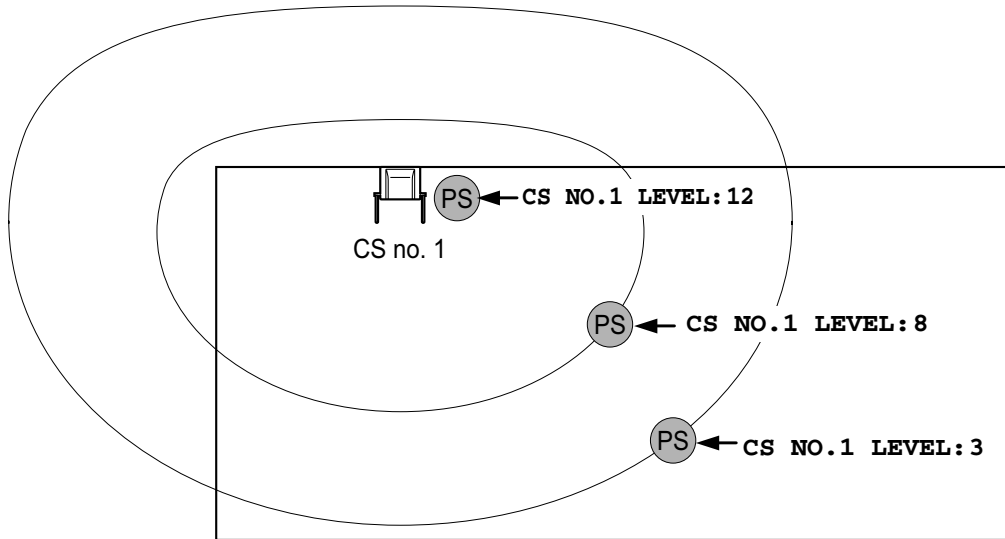
#### Note

\*1: CS number and radio signal strength level.

\*2: Scan data (test result) number. Empty memory space will be indicated by a number; stored memory space will be indicated by a "-".

3.10.5 Site Survey

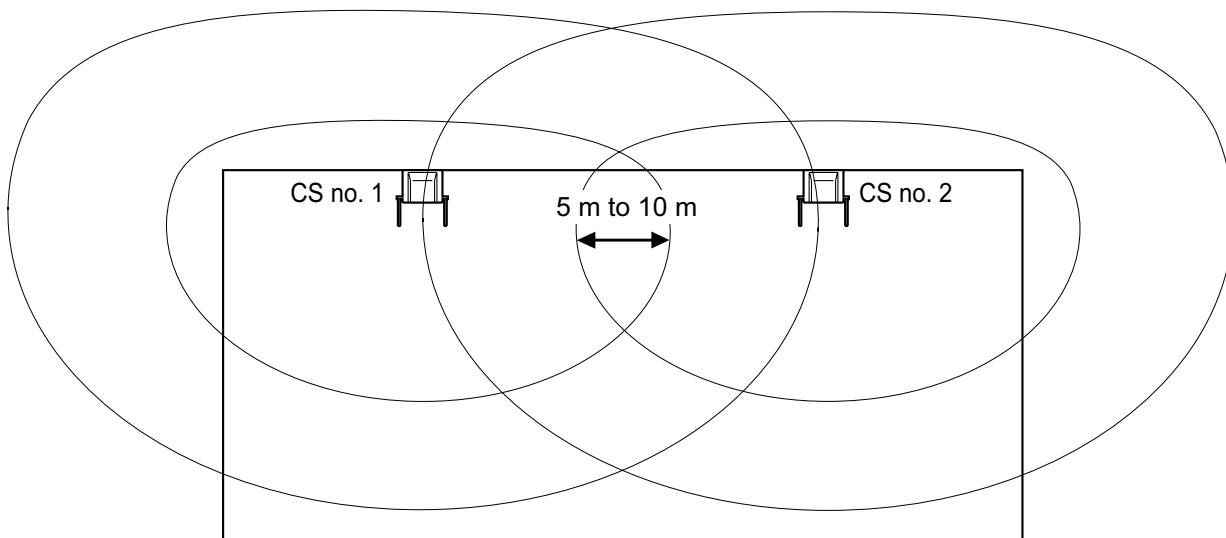
2. Measure the radio signal strength by moving towards and away from the CS.
  - a. Move to the CS until the radio signal strength level becomes "12".
  - b. Move away from the CS and identify the CS coverage area within which the radio signal strength level is greater than "8". Draw the area on the map.
  - c. Move away from the CS and identify the CS coverage area within which the radio signal strength level is greater than "3". Draw the area on the map.



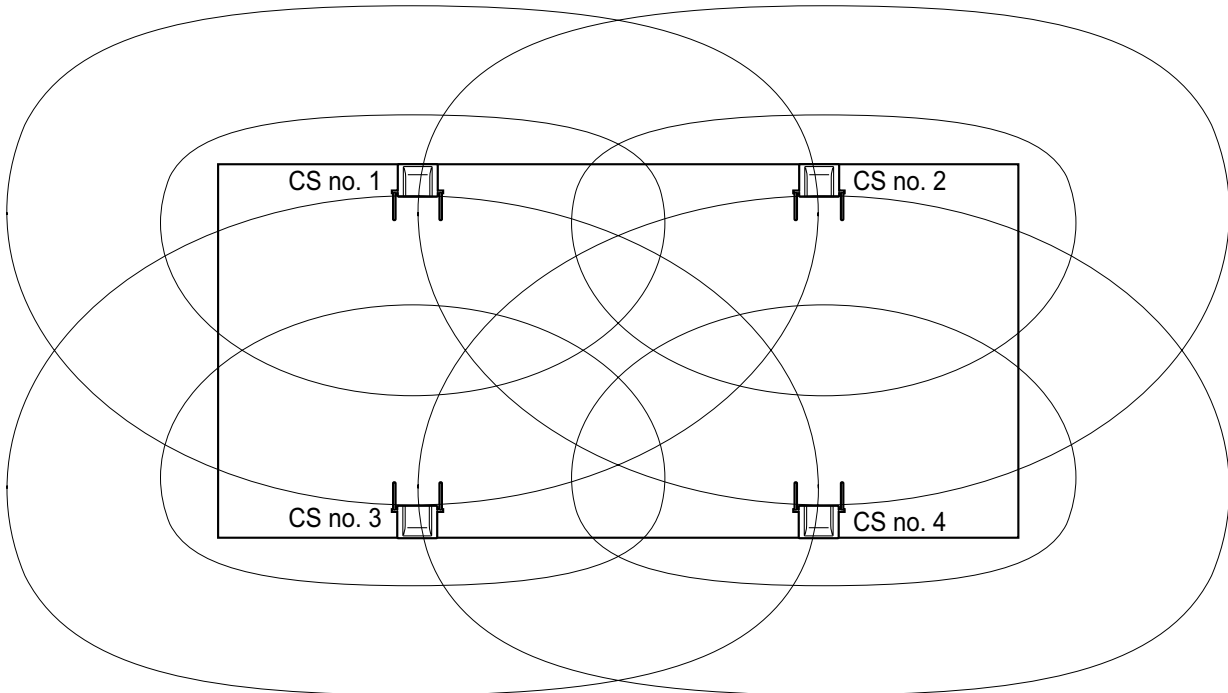
**Radio Signal Strength Levels**

Level: 00	↑	Out of range
Level: 01 to 02		Receives noise easily or disconnects
Level: 03 to 07	↓	May receive noise
Level: 08 to 10		Good
Level: 11 to 12		Better

3. Repeat steps 1 and 2 for other CSs, and relocate the CSs when necessary.
  - a. Overlap adjacent CS coverage areas where the radio signal strength level is "8" by 5 m to 10 m.



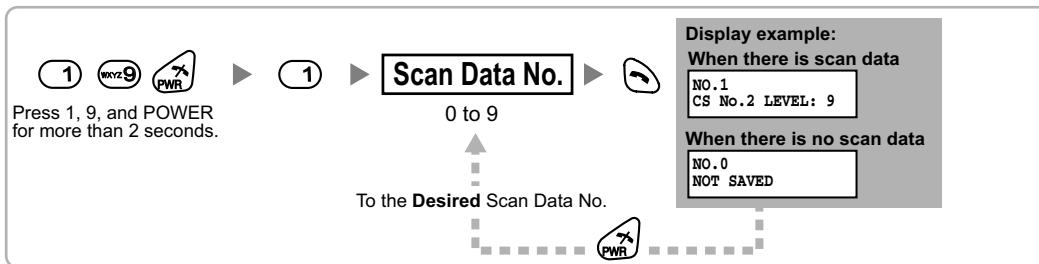
- b. Overlap the CS coverage areas of at least 2 CSs at any location in the installation site.



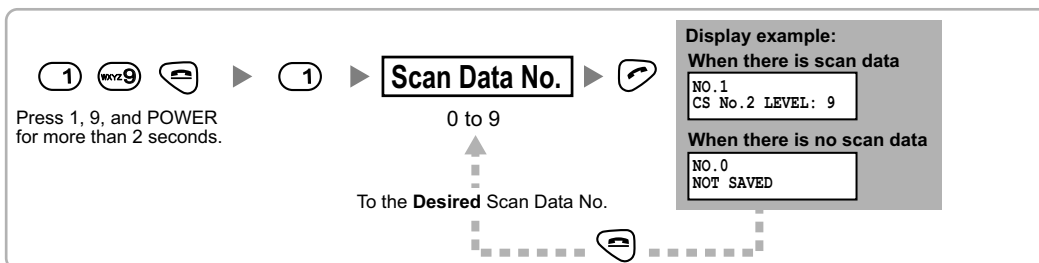
- c. Make sure that the radio signal strength level is greater than "3" at any location in the service area required by the user.

## Referring to the Stored Scan Data

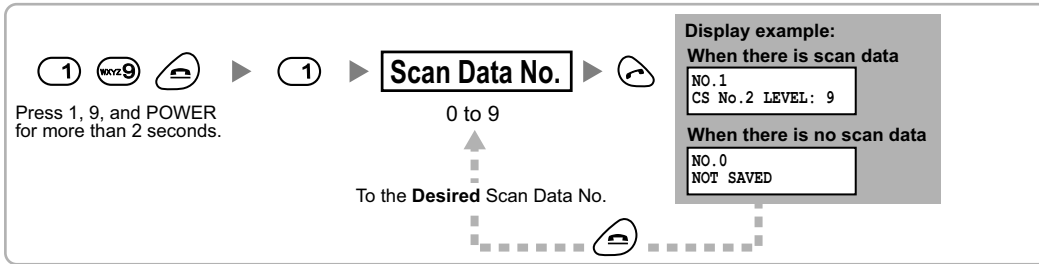
### Using the KX-TD7684/KX-TD7694



### Using the KX-TD7680

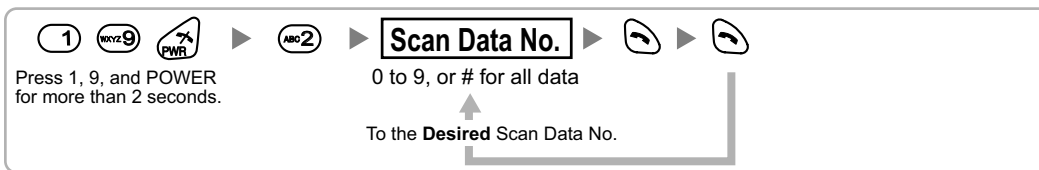


### Using the KX-TD7690

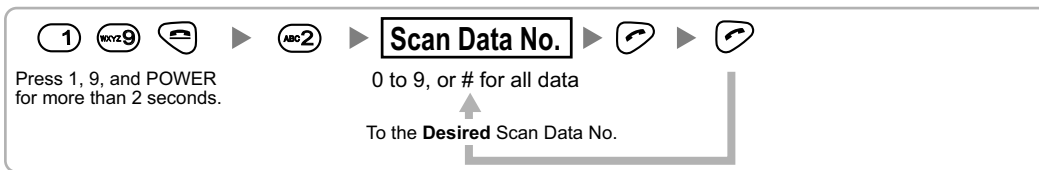


### Deleting the Stored Scan Data

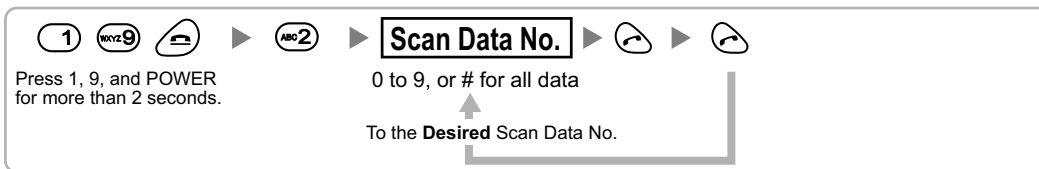
#### Using the KX-TD7684/KX-TD7694



#### Using the KX-TD7680



#### Using the KX-TD7690

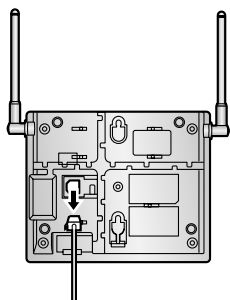


## 3.10.6 After Site Survey

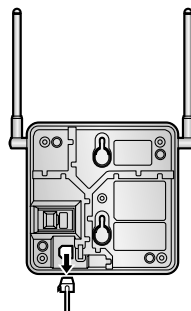
After obtaining the proper measurement results, exit Radio Signal Test mode before connecting the CS to the PBX.

1. Hold down the POWER button on the PS until the PS is turned OFF.
2. Disconnect the CS from the AC adaptor/battery box or the CSIF/DLC/DHLC card to stop supplying electricity.

**KX-TDA0151/KX-TDA0152**

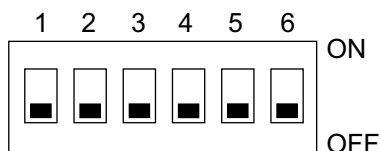


**KX-TDA0141/KX-TDA0142**

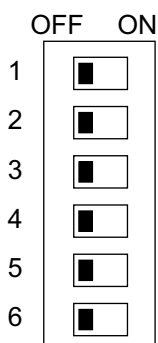


3. Switch all DIP switches on the CS from ON to OFF.

**KX-TDA0151/KX-TDA0152**



**KX-TDA0141/KX-TDA0142**

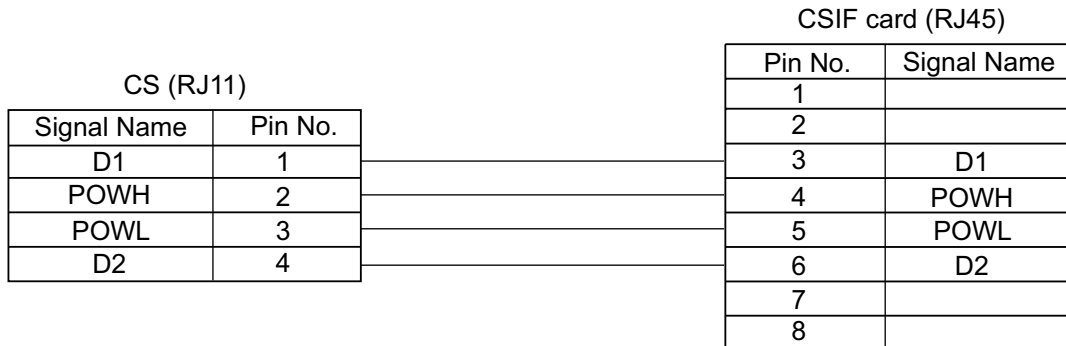
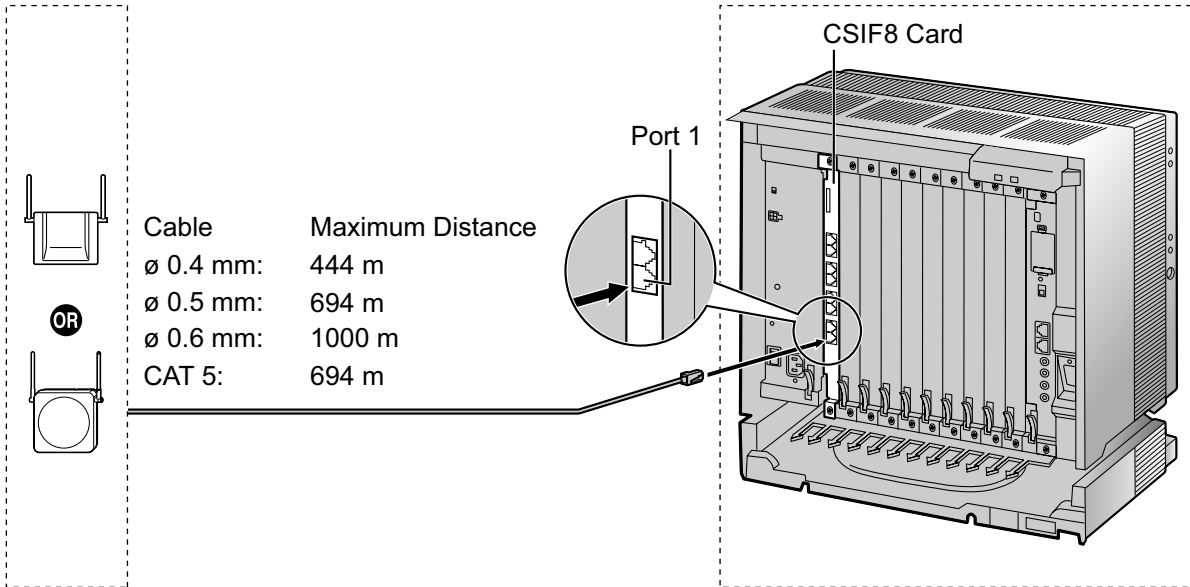


## 3.10.7 Connecting a Cell Station to the PBX

### Using a CSIF Card

Refer to the following example to connect a CS to the PBX.

#### KX-TDA0152/KX-TDA0142



### Accessories and User-supplied Items for the CS

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

**User-supplied (not included):** RJ11 connector

#### Note

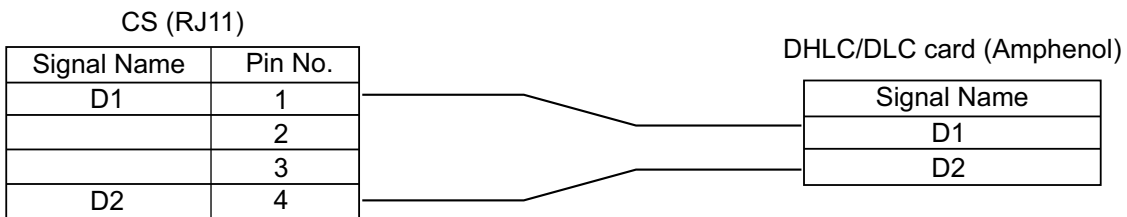
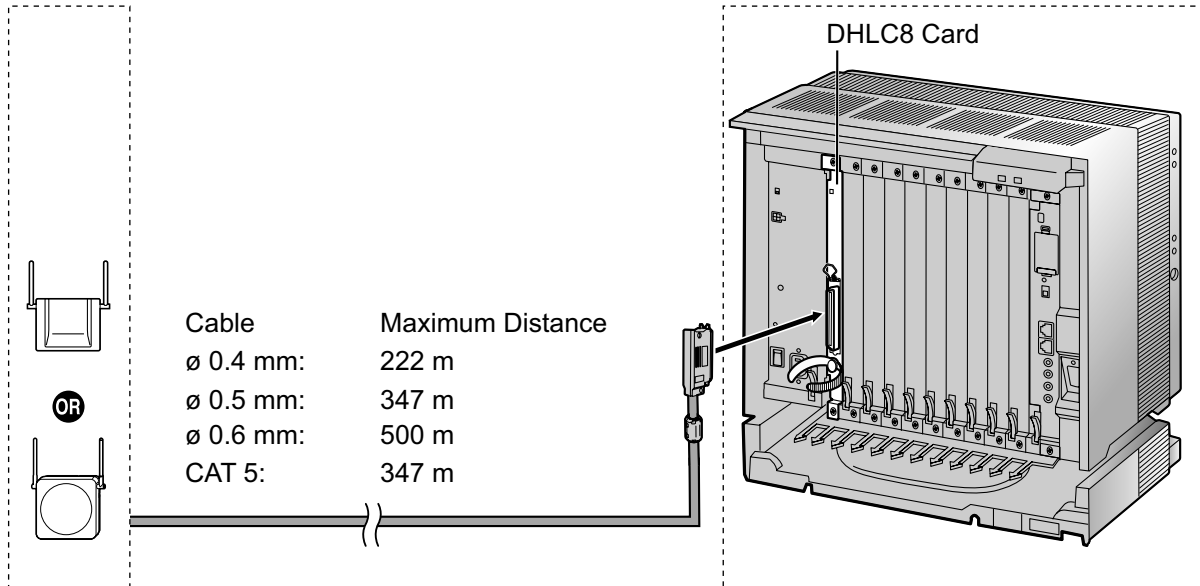
For details about CSIF card, refer to "3.6.1 CSIF4 Card (KX-TDA0143) and CSIF8 Card (KX-TDA0144)".



### Using a DHLC/DLC Card

Refer to the following example to connect a CS to the PBX.

#### KX-TDA0151/KX-TDA0141



### Accessories and User-supplied Items for the CS

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

**User-supplied (not included):** RJ11 connector

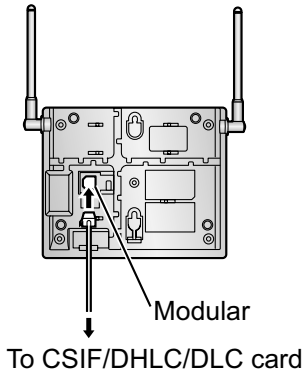
#### Note

For details about DHLC card or DLC card, refer to "3.6.2 DHLC8 Card (KX-TDA0170)", "3.6.3 DLC8 Card (KX-TDA0171)", or "3.6.4 DLC16 Card (KX-TDA0172)".

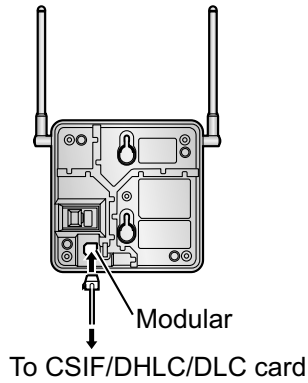
## Connecting the CS

1. Connect the cable from the CSIF/DHLC/DLC card to the CS.

**KX-TDA0151/KX-TDA0152**

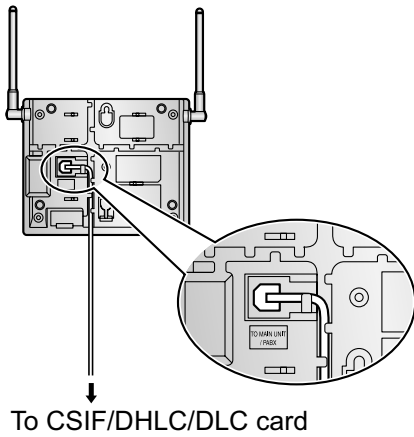


**KX-TDA0141/KX-TDA0142**

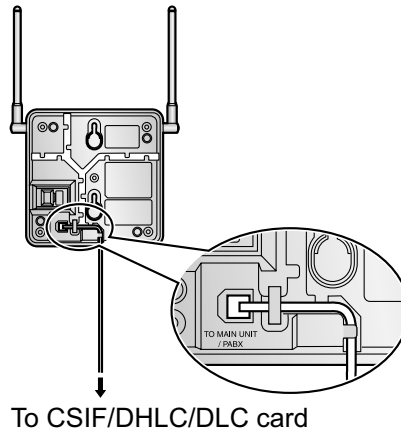


2. Pass the cable through the groove of the CS (in any direction depending on your preference).

**KX-TDA0151/KX-TDA0152**



**KX-TDA0141/KX-TDA0142**



## Registering the PS

The PS must be registered to the PBX before it can be used. Programming of both the PS and PBX is required. A PT with multiline display (e.g., KX-T7636 6-line display) is required to perform the PBX system programming.

### Note

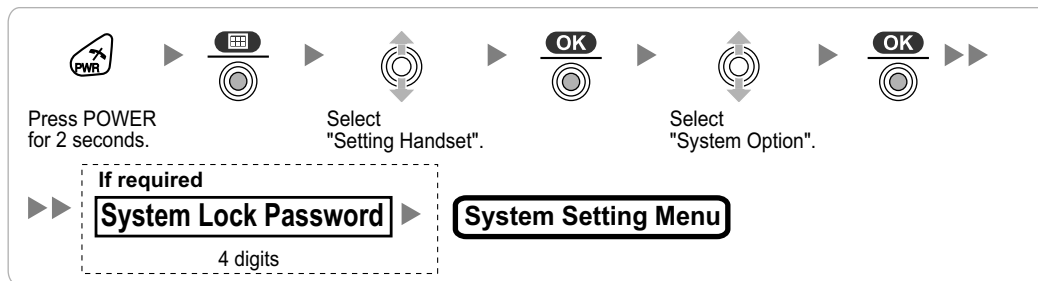
For details about system programming using a PT, refer to "2.3.2 PT Programming" in the Feature Guide, and "2.1 PT Programming" in the PT Programming Manual.

### Entering the System Programming Mode

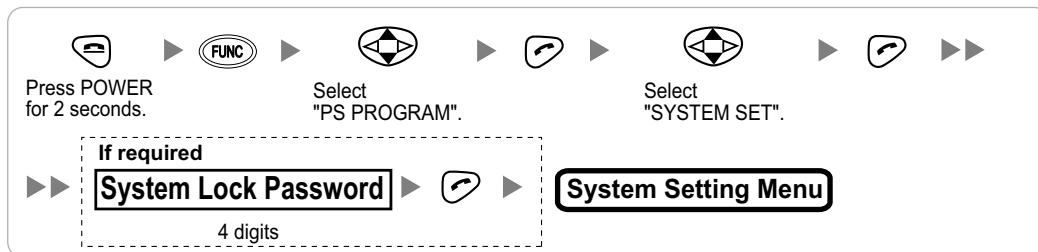
#### PT (Administrator Level)



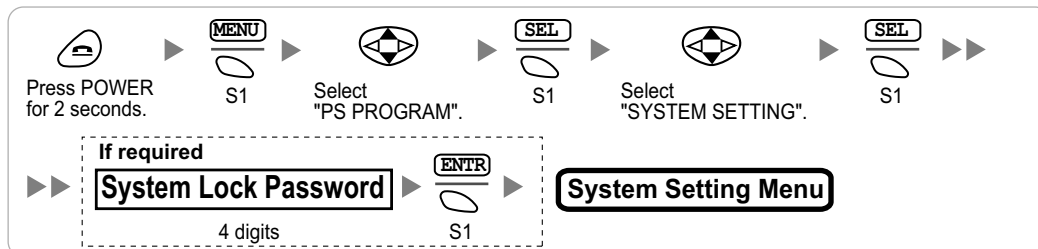
#### PS (Using the KX-TD7684/KX-TD7694)



#### PS (Using the KX-TD7680)



#### PS (Using the KX-TD7690)

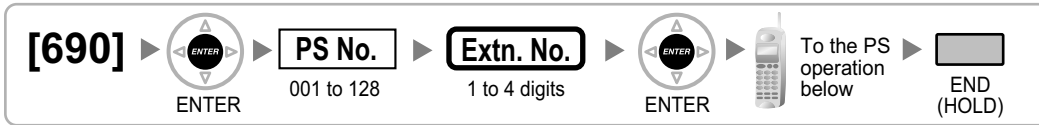


### Note

◆ means default value throughout this section.

### 3.10.7 Connecting a Cell Station to the PBX

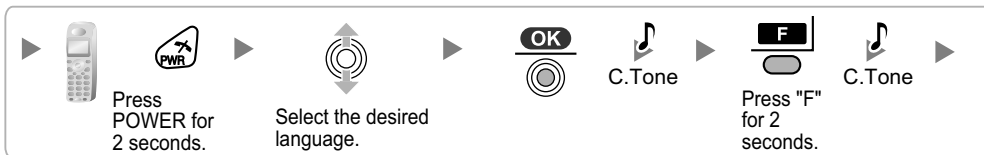
#### PS Registration



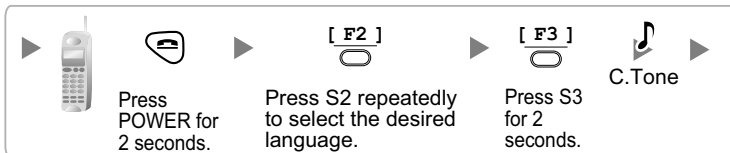
#### When the PS has not been registered yet

When registering the PS for the first time, it is possible to select the desired language for the display. (You do not need to enter the PS system programming mode when registering for the first time.)

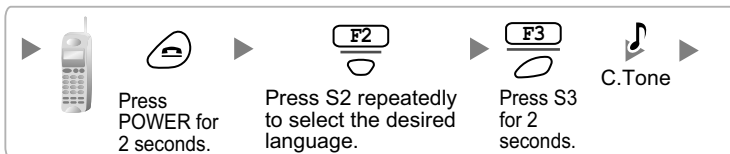
#### Using the KX-TD7684/KX-TD7694



#### Using the KX-TD7680



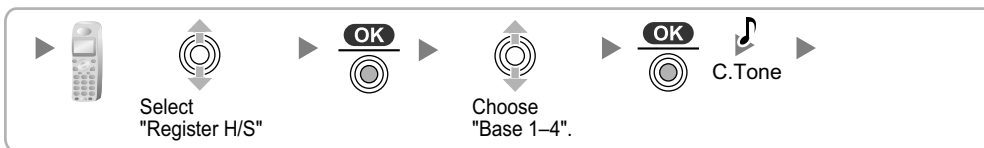
#### Using the KX-TD7690



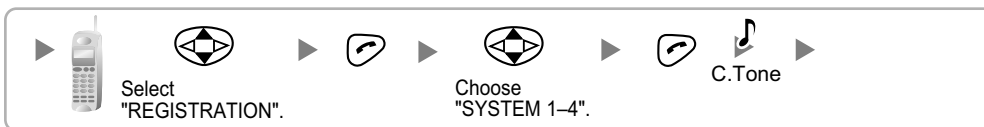
#### When the PS has already been registered to another PBX

One PS can be registered to a maximum of 4 different PBXs.

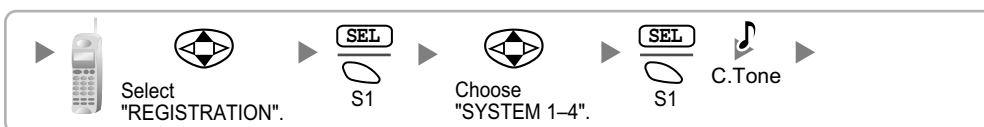
#### Using the KX-TD7684/KX-TD7694



#### Using the KX-TD7680



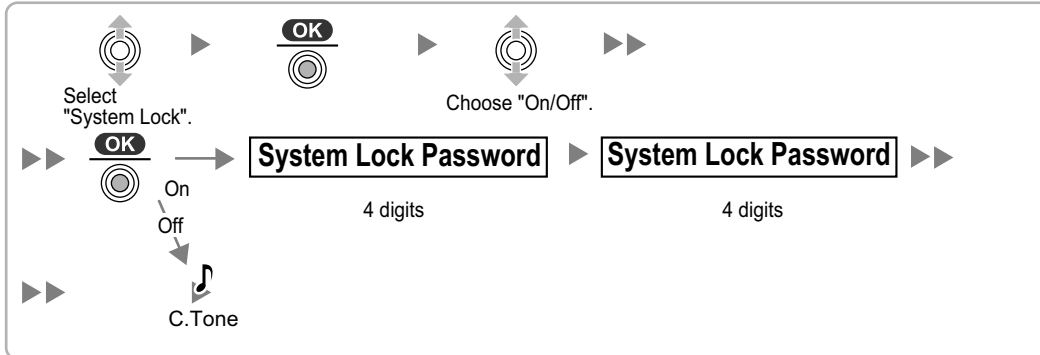
#### Using the KX-TD7690



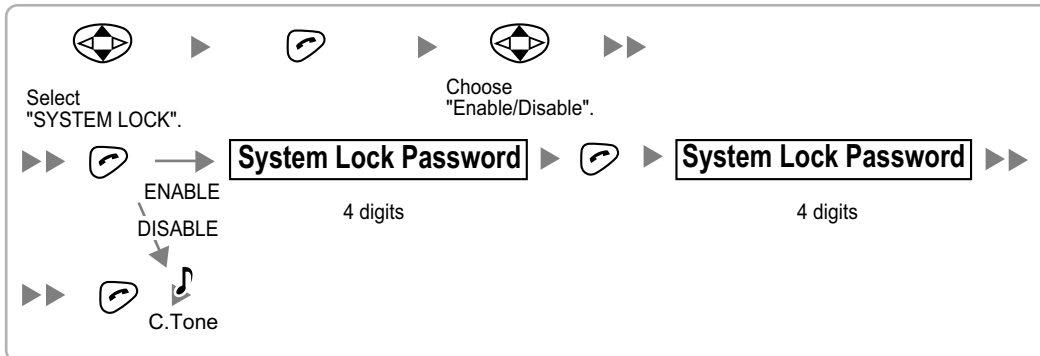
### Setting the System Lock

When a system lock has been set, the system lock password will be required for PS system setting.

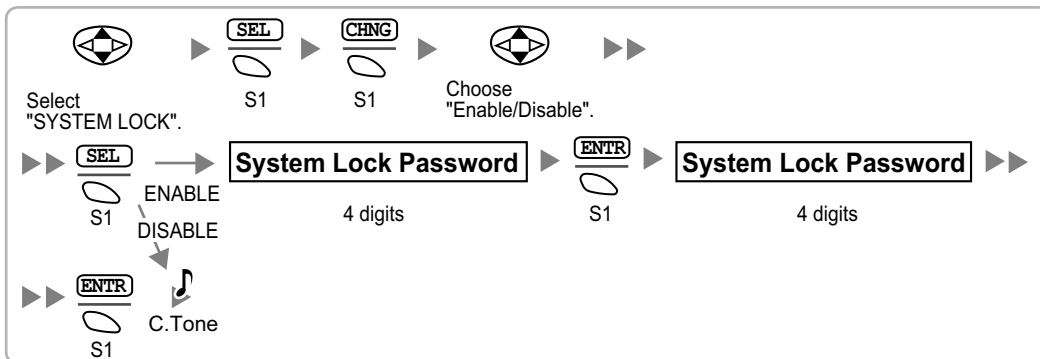
#### Using the KX-TD7684/KX-TD7694



#### Using the KX-TD7680



#### Using the KX-TD7690



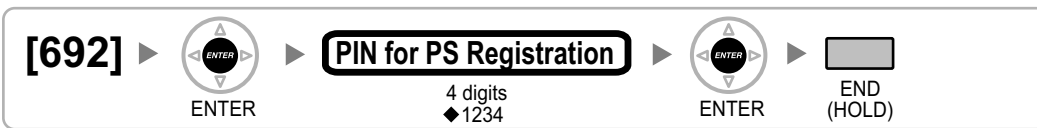
### Setting the Personal Identification Number (PIN) for PS Registration

To prevent registering the PS to a wrong PBX, a PIN for PS registration can be set to the PBX. Before registering the PS to the PBX, enter the PIN set to the PBX into the PS. By doing so, the PS will only be registered to the PBX with the matching PIN.

**Note**

- By default, the PIN for PS registration is "1234" for both the PBX and PS. Therefore, the PS can be registered to the PBX without setting the PIN.
- The PIN for PS registration will only be used when registering the PS to the PBX. Therefore, during normal operation after registration, even if there is more than 1 PBX with the same PIN near the PS, the PS will not be inadvertently linked to a different PBX.

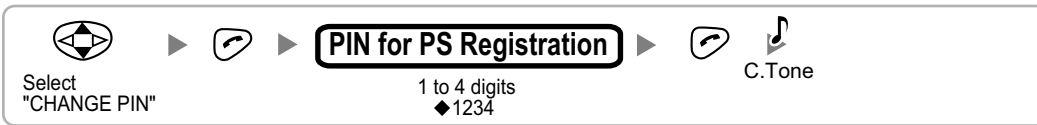
#### Setting the PIN for PBX



#### Setting the PIN for PS Using the KX-TD7684/KX-TD7694



#### Using the KX-TD7680



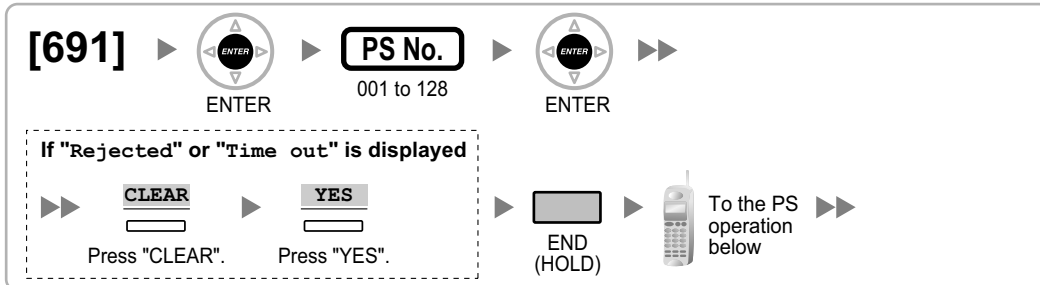
#### Using the KX-TD7690



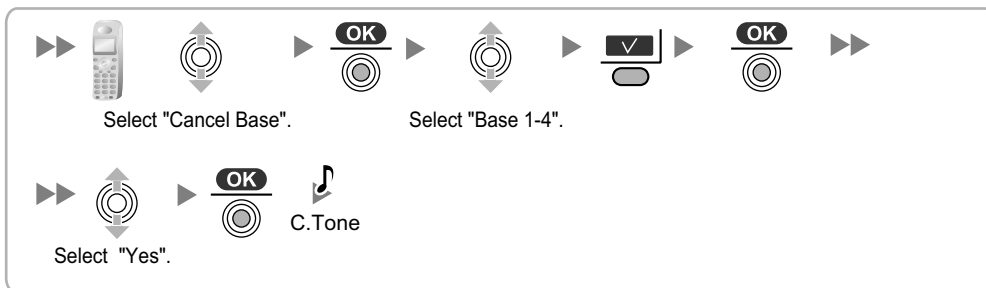
### PS Termination

Confirm the following before cancelling the PS registration:

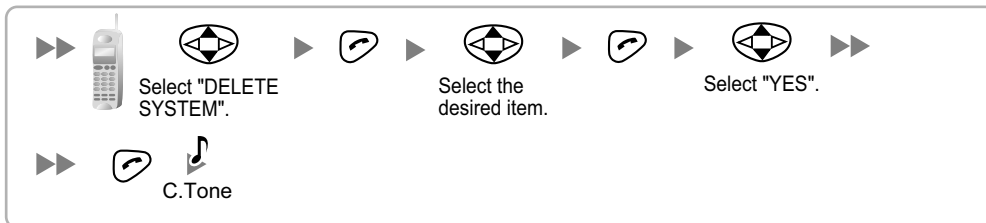
- The PS is turned on.
- The PS is within range.



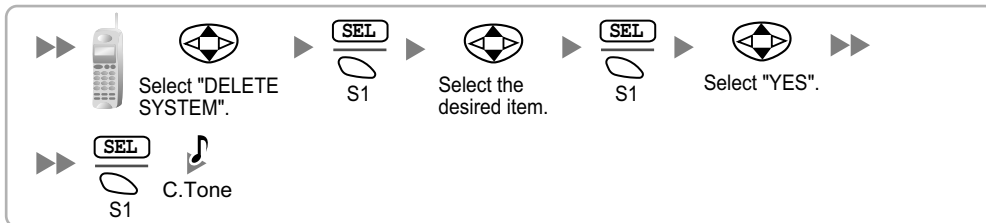
### If the registration information is still stored in the PS Using the KX-TD7684/KX-TD7694



### Using the KX-TD7680



### Using the KX-TD7690



## Testing the Operation

Walk around the service area while having a conversation using a registered PS. If noise is frequent or conversations disconnect, relocate the CSS or install an additional CS.

## 3.10.8 Wall Mounting

### Mounting the KX-TDA0151/KX-TDA0152

#### **WARNING**

- Make sure that the wall that the unit will be attached to is strong enough to support the unit (approx. 310 g). If not, it is necessary for the wall to be reinforced.
- Only use the wall-mounting equipment (screws, washers, wall mounting plate) included with the unit.
- When driving the screws into the wall, be careful to avoid touching any metal laths, wire laths or metal plates in the wall.
- When this product is no longer in use, make sure to detach it from the wall.

#### **CAUTION**

- Do not stretch or bend the cables. Also, do not allow anything to rest on the cables.
- Use cables that are fire-resistant or fireproof.
- The CS and the cables should never be placed near or over a radiator or other heat source.
- Do not bundle cables that are connected to the CS with the AC power cords of machines located nearby.
- Make sure the cables are securely fastened to the wall.

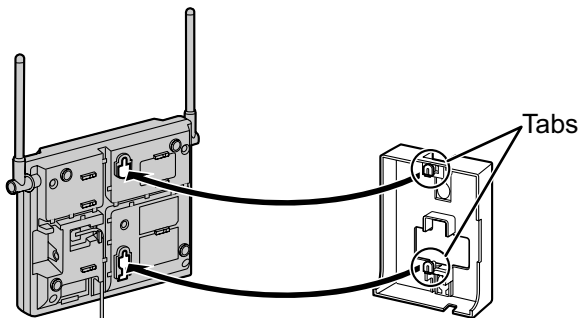
1. Place the reference for wall mounting (KX-TDA0151/KX-TDA0152) on the wall to mark the 2 screw positions.
2. Install the 2 screws and washers (included) into the wall.

#### **Note**

- Make sure that the screw heads are at the same distance from the wall.
- Install the screws perpendicular to the wall.

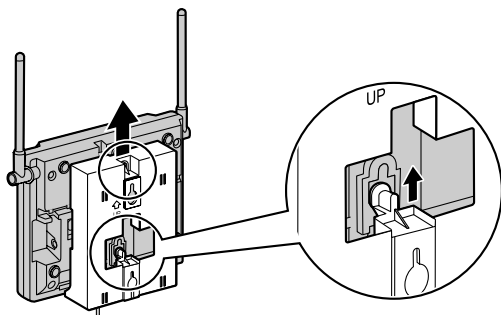
3. Insert the upper and lower tabs of the wall mounting plate into the designated openings in the base unit.

#### **KX-TDA0151/KX-TDA0152**

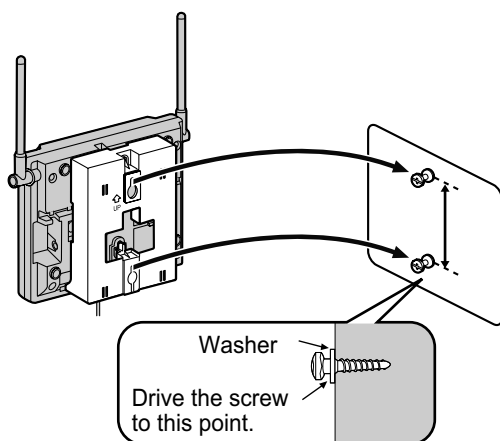




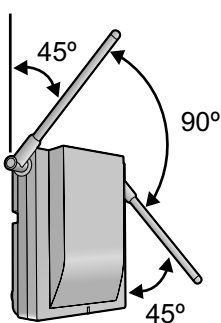
- Slide the wall mounting plate in the direction of the arrow until it clicks.

**KX-TDA0151/KX-TDA0152**

- Hook the CS on the screw heads.

**KX-TDA0151/KX-TDA0152**

- Place the antennas so that they are pointing in directions that are 90 degrees apart (for antenna diversity), as follows:

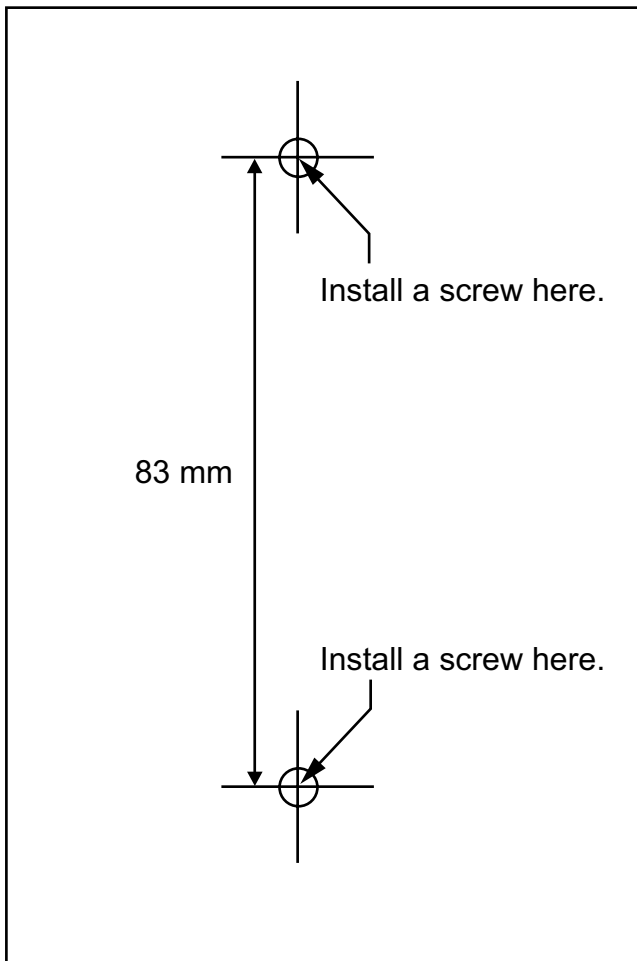


### 3.10.8 Wall Mounting

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## Reference for Wall Mounting (KX-TDA0151/KX-TDA0152)

Please copy this page and use as a reference for wall mounting.



### **Note**

Make sure to set the print size to correspond with the size of this page. If the dimension of the paper output still deviates slightly from the measurement indicated here, use the measurement indicated here.

## Mounting the KX-TDA0141/KX-TDA0142

### WARNING

- Make sure that the wall that the unit will be attached to is strong enough to support the unit (approx. 310 g). If not, it is necessary for the wall to be reinforced.
- Only use the wall-mounting equipment (screws, washers) included with the unit.
- When driving the screws into the wall, be careful to avoid touching any metal laths, wire laths or metal plates in the wall.
- When this product is no longer in use, make sure to detach it from the wall.

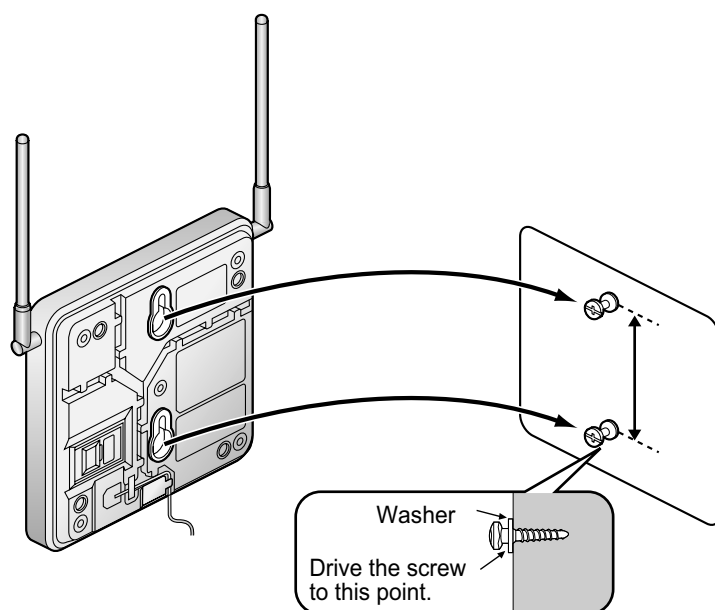
### CAUTION

- Do not stretch or bend the cables. Also, do not allow anything to rest on the cables.
- Use cables that are fire-resistant or fireproof.
- The CS and the cables should never be placed near or over a radiator or other heat source.
- Do not bundle cables that are connected to the CS with the AC power cords of machines located nearby.
- Make sure the cables are securely fastened to the wall.

1. Place the reference for wall mounting (KX-TDA0141/KX-TDA0142) on the wall to mark the 2 screw positions.
2. Install the 2 screws and washers (included) into the wall.

### Note

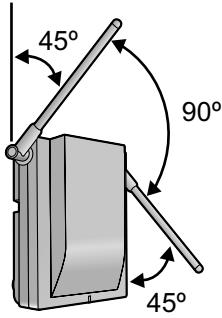
- Make sure that the screw heads are at the same distance from the wall.
  - Install the screws perpendicular to the wall.
3. Hook the CS on the screw heads.



### 3.10.8 Wall Mounting

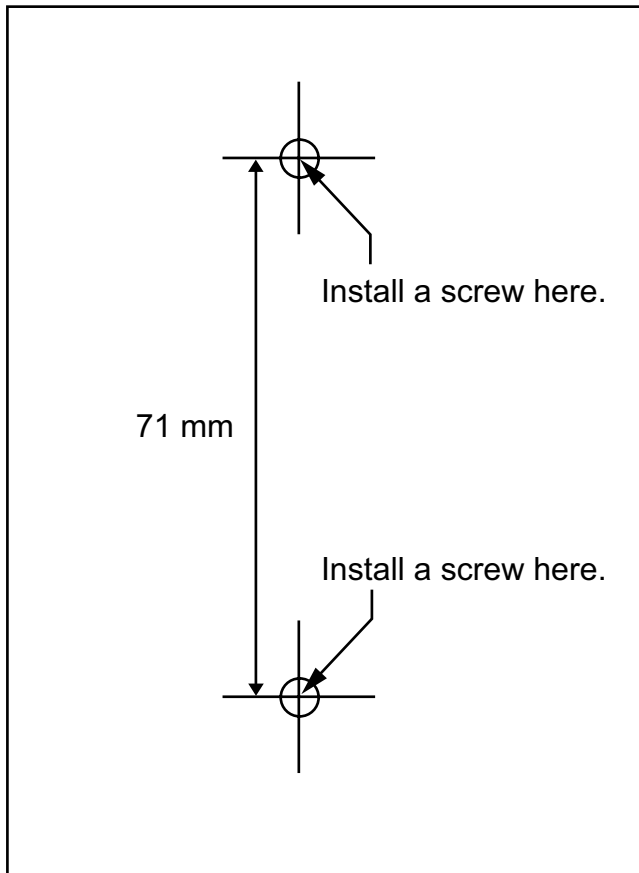
---

4. Place the antennas so that they are pointing in directions that are 90 degrees apart (for antenna diversity), as follows:



### Reference for Wall Mounting (KX-TDA0141/KX-TDA0142)

Please copy this page and use as a reference for wall mounting.



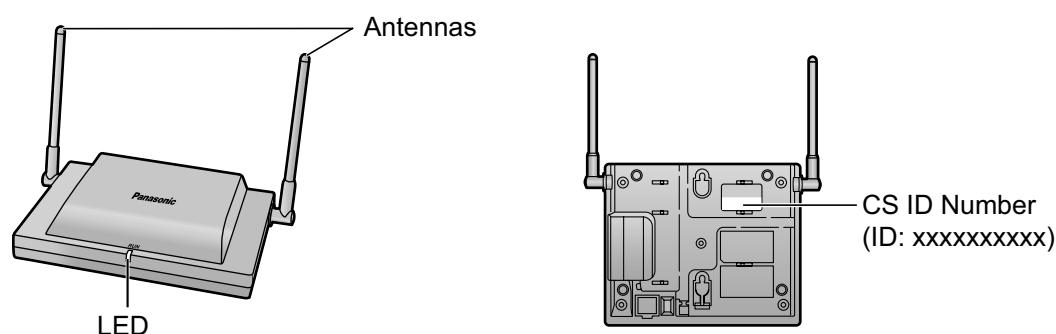
#### **Note**

Make sure to set the print size to correspond with the size of this page. If the dimension of the paper output still deviates slightly from the measurement indicated here, use the measurement indicated here.

## 3.11 Connection of DECT 6.0 Portable Stations

### 3.11.1 Overview

#### Names and Locations of CS



#### LED Indications

Indication	Colour	Description
STATUS	Green/Red	<p>CS status indication</p> <ul style="list-style-type: none"> <li>• OFF: Power Off</li> <li>• Green ON: Stand-by (no active calls)</li> <li>• Slow Green Flashing (60 times per minute): Talk (active calls)</li> <li>• Moderate Green Flashing (120 times per minute): Busy</li> <li>• Red ON: Fault (includes Initialisation)</li> <li>• Red Flashing (60 times per minute): Out of Service/Starting up</li> </ul> <p>CS status indication during the site survey</p> <ul style="list-style-type: none"> <li>• Red ON: The CS is connected to an AC adaptor/battery box.</li> <li>• Red Flashing (60 times per minute): The CS is connected to the PBX.</li> </ul>

#### Required Equipment and Maximum Number of Calls

CSs determine the area covered by the wireless system. The number of calls that can be made simultaneously through each CS varies depending on the model, as follows:

CS	Connection Card	Maximum Calls	Compatible PSs
KX-TDA0155	DHLC/DLC	2	<ul style="list-style-type: none"> <li>• KX-TD7685</li> <li>• KX-TD7695</li> </ul>
KX-TDA0158	DHLC/DLC	8	

#### Note

For more details about the PS, refer to the Operating Instructions of the PS.

## Required Distances between Equipment

Maintain the distances listed below between equipment in order to prevent noise, interference or the disconnection of a conversation. (The distance may vary depending on the environment.)

Equipment	Distance
CS and office equipment such as a computer, telex, fax machine, etc.	More than 2 m
CS and PS	More than 1 m
Each CS	More than 3 m
Each PS	More than 0.5 m
PBX and CS	More than 2 m

If multiple CSs cover the same area, the phone connection may become noisy or the number of possible simultaneous calls with PSs may decrease due to interference between the CSs. For details, refer to "3.11.5 Site Survey—Testing the Radio Signal Strength".

The required distance between CSs may vary depending on the environment of the installation site and conditions in which the wireless system is used. Conduct a site survey to determine the appropriate distance.

## RF Specification

Item	Description
Radio Access Method	MultiCarrier TDMA-TDD
Frequency Band	1920 MHz to 1930 MHz
Number of Carriers	5
Carrier Spacing	1728 kHz
Bit Rate	1152 kbps
Carrier Multiplex	TDMA, 24 (Tx12, Rx12) slots per frame
Frame Length	10 ms
Modulation Scheme	GFSK Roll-off factor=0.5 50 % roll-off in the transmitter
Data Coding for Modulator	Differential Coding
Voice CODEC	32 kbps ADPCM (CCITT G.726)
Transmission Output	Peak 0.12 W

### CAUTION

- The CS should be kept free of dust, moisture, high temperature (more than 40 °C), low temperature (less than 0 °C), and vibration, and should not be exposed to direct sunlight.
- The CS should not be placed outdoors (use indoors).
- The CS should not be placed near high-voltage equipment.
- The CS should not be placed on a metal object.

## 3.11.2 Procedure Overview

When connecting the wireless system, use extreme care in conducting the site survey. An incorrectly performed site survey can result in poor service area, frequent noise, and disconnection of calls.

### Notice

- When installing the DECT 6.0 wireless system in an area where another wireless system (2.4 GHz) is already installed, it is necessary to reconduct the site survey to find the optimum position for the CS. If you install the new CS in the same position as the old CS, it may result in a poor service area, frequent noise, and disconnection of calls.
- In this case, it is necessary to perform system initialisation. For details about the system initialisation procedure, refer to "3.16 Starting the PBX".

### 1. Investigate the installation site

Refer to "3.11.3 Site Planning".

- Obtain a map of the CS installation site.
- Identify the service area required by the user on the map.
- Plan the location of each CS, taking account of distance, building materials, etc.

### 2. Prepare for site survey

Refer to "3.11.4 Before Site Survey".

- Check and assign the CS ID number to the PS.
- Assign a channel number to each CS by setting the DIP switches on the back of the CS.
- Supply electricity to each CS using an AC adaptor/battery box or by connecting them to the PBX.
- Install each CS temporarily as planned.

### Note

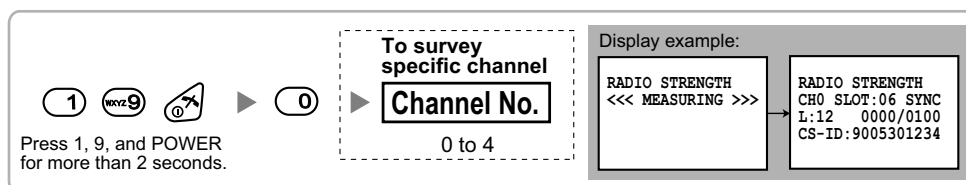
- Install at least 2 m above the floor.
- Place the antennas so that they are pointing in directions that are 90 degrees apart (for antenna diversity).

### 3. Conduct the site survey

Refer to "3.11.5 Site Survey".

- Test the radio signal strength using the PS.  
Confirm that the radio signal strength level is "12" near the CS.

#### Using the KX-TD7685/KX-TD7695



- By walking away from the CS with the PS, check the radio signal strength. The radio signal strength weakens as you walk away from the CS.
- Map the CS coverage area at radio signal strength levels "3" and "8".
- Make sure that adjacent CS coverage areas meet where the radio signal strength level is "7" to "9".
- Make sure that the radio signal strength level is greater than "3" at any location within the service area required by the user.

## 4. Finish the site survey

Refer to "3.11.6 After Site Survey".

- a. Turn off the PS.
- b. Stop supplying power, and return all DIP switches of each CS to the OFF position.

## 5. Connect the CS and PS to the PBX and test the operation

Refer to "3.11.7 Connecting a Cell Station to the PBX".

- a. Connect the CSs to the PBX.
- b. Register the PSs to the PBX.
- c. Walk around the service area while having a conversation using a registered PS. If noise is frequent or conversations disconnect, relocate the CSs or install an additional CS.

## 6. Mount the CS on the wall

Refer to "3.11.8 Wall Mounting".

- a. If there are no problems in testing, mount the CS on the wall.



### 3.11.3 Site Planning

Choosing the best site for the CS requires careful planning and testing of essential areas. The best location may not always be convenient for installation. Read the following information before installing the unit.

#### Understanding Radio Waves

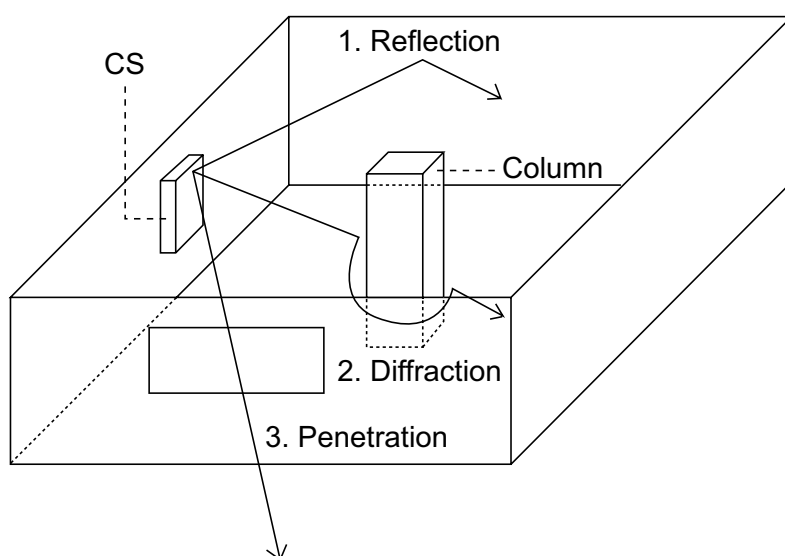
##### Characteristics of Radio Waves

The transmission of radio waves and the CS coverage area depend on the structure and materials of the building.

Office equipment, such as computers and fax machines, can interfere with radio waves. Such equipment may create noise or interfere with the performance of the PS.

The illustration below shows the special transmitting patterns of radio waves.

1. Radio waves are reflected by objects made of materials such as metal.
2. Radio waves are diffracted by objects such as metallic columns.
3. Radio waves penetrate objects made of materials such as glass.



##### Relationships between Radio Waves and Building Structure and Materials

- The CS coverage area is affected more by the building materials and their thickness than the number of obstacles.
- Radio waves tend to be reflected or diffracted by conductive objects and rarely penetrate them.
- Radio waves tend to penetrate insulated objects and are rarely reflected by them.
- Radio waves penetrate thin objects more than thick objects.
- The table below shows the transmission tendency of radio waves when they reach objects made from various materials.

### 3.11.3 Site Planning

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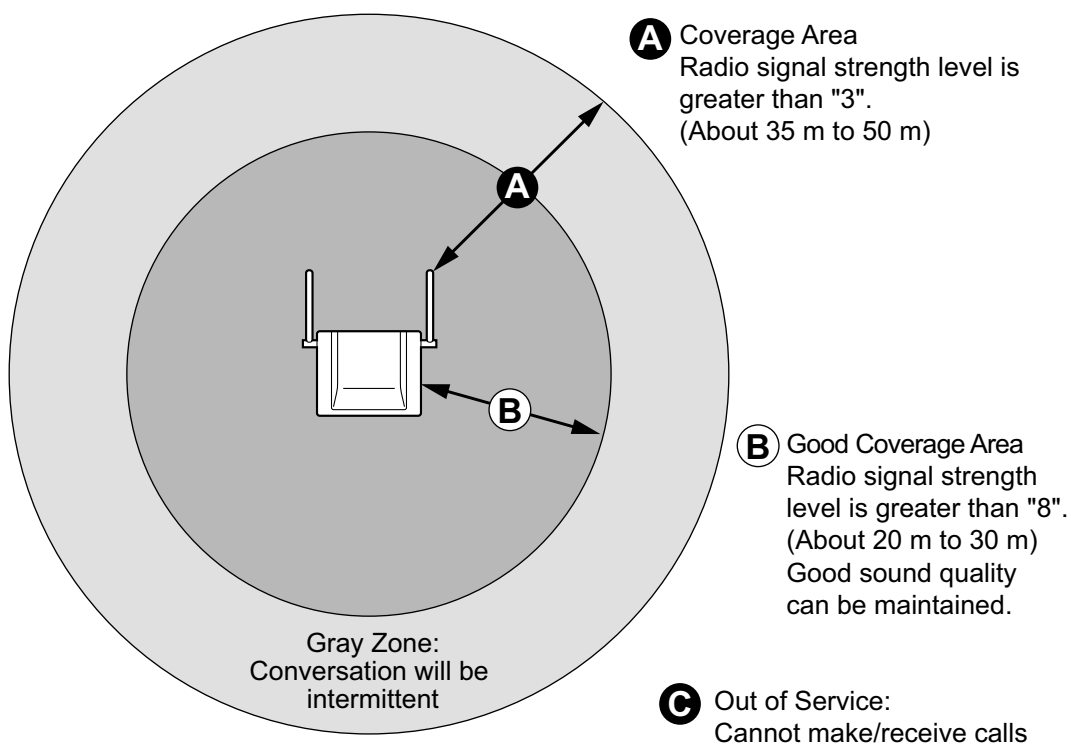
Object	Material	Transmission Tendency
Wall	Concrete	The thicker they are, the less radio waves penetrate them.
	Ferroconcrete	Radio waves can penetrate them, but the more iron there is, the more radio waves are reflected.
Window	Glass	Radio waves usually penetrate them.
	Glass with wire net	Radio waves can penetrate them, but tend to be reflected.
	Glass covered with heatresistant film	Radio waves are weakened considerably when they penetrate windows.
Floor	Ferroconcrete	Radio waves can penetrate them, but the more iron there is, the more radio waves are reflected.
Partition	Steel	Radio waves are reflected and rarely penetrate them.
	Plywood, Glass	Radio waves usually penetrate them.
Column	Ferroconcrete	Radio waves can penetrate them, but the more iron there is, the more radio waves tend to be reflected or diffracted.
	Metal	Radio waves tend to be reflected or diffracted.
Cabinet	Steel	Radio waves are usually reflected or diffracted, and rarely penetrate them.
	Wood	Radio waves can penetrate them, but they are weakened.

## CS Coverage Area

The example below shows the size of the coverage area of 1 CS if it is installed in an area with no obstacles.

**Note**

Radio signal strength levels are measured during the site survey (refer to "3.11.5 Site Survey").

**Radio Signal Strength Levels**

Level: 11 to 12		Better
Level: 08 to 10		Good
Level: 03 to 07		May receive noise
Level: 01 to 02		Receives noise easily or disconnects
Level: 00		Out of range

**Site Survey Preparation**

1. Obtain a map and investigate the installation site.
  - a. Check the obstacles (e.g., shelves, columns, and partitions).
  - b. Check the materials of the structures (e.g., metal, concrete, and plywood).
  - c. Check the layout and dimensions of the room, corridor, etc.
  - d. Write down the above information on the map.
2. Examine the service area required by the user on the map, referring to the following example.
  - a. Draw the coverage area around a CS. Extend the coverage area 20 m to 50 m in each direction, depending on the materials of the building structures and obstacles in the installation site. Note that a CS cannot be installed outside a building.
  - b. If 1 CS cannot cover the entire service area, install additional CSs as required. Overlap the coverage areas of adjacent CSs.  
Where CS coverage areas overlap, the PS will start call handover to the next CS if the signal from one CS becomes weak. However, if a PS moves away from a CS and there are no CSs available for handover, the PS may go out of range and the call could be lost.

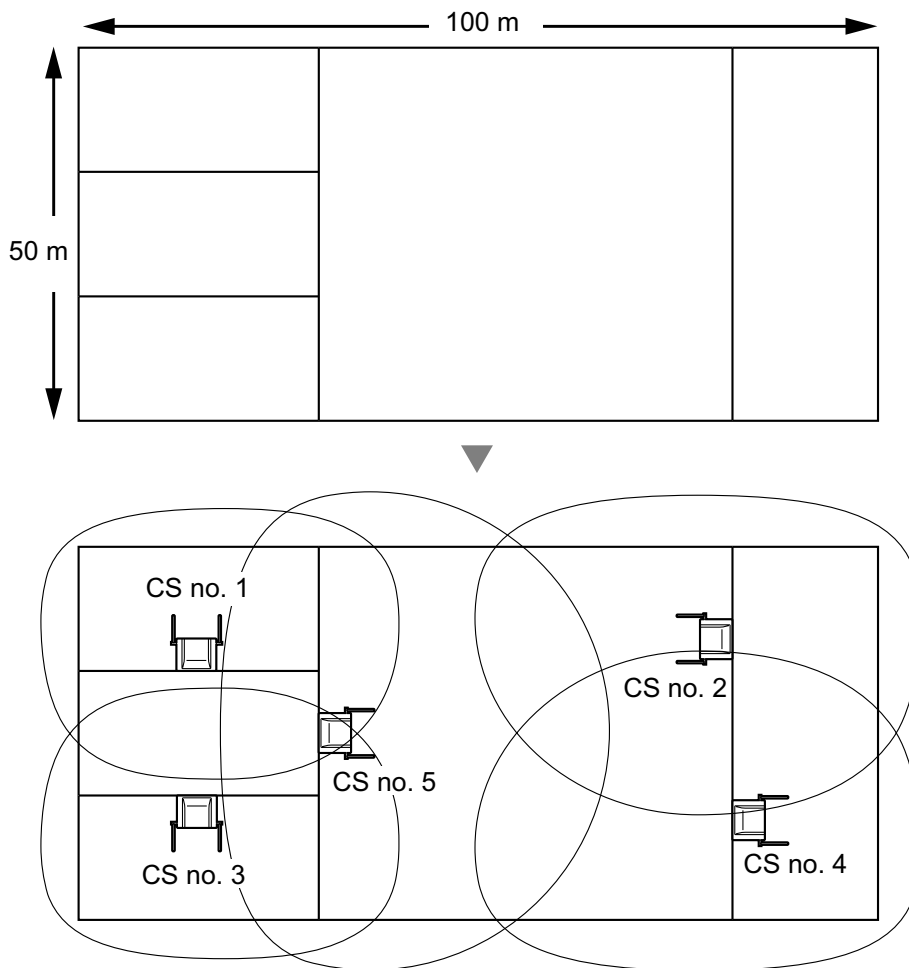
#### Example: Installing in a Room Separated by Interior Walls

##### Things to take note of:

- The room is separated by interior walls.
- The room is surrounded by concrete walls.

##### CS installation plan:

- The coverage area of each CS will not extend as far as when there are no obstacles, because the radio signals will be weakened by separating walls. Therefore, you will need 5 CSs to cover the entire room.



## 3.11.4 Before Site Survey

Use the KX-TD7685/KX-TD7695 PS to conduct the site survey.

### Note

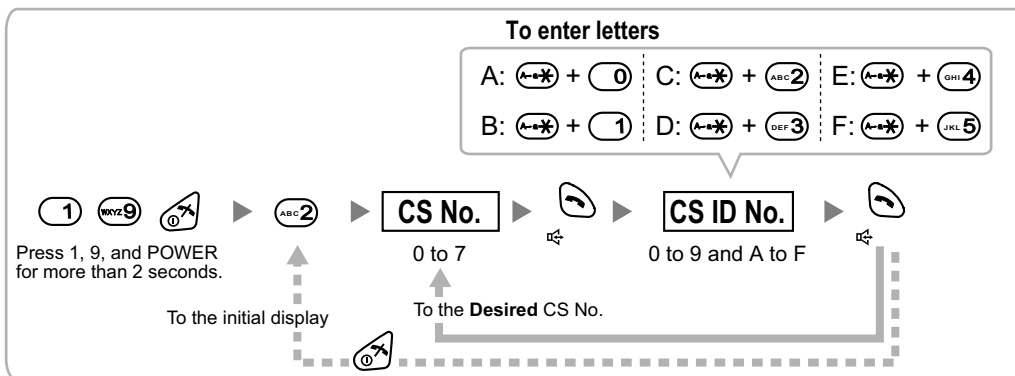
Display prompts for the site survey are only available in English.

## Checking the CS ID Number

Check the CS ID number label attached to the CS. If the CS ID number label is not attached to the CS, check the CS ID number using the Maintenance Console. For details, refer to "2.6.15 Utility—CS Information" in the PC Programming Manual.

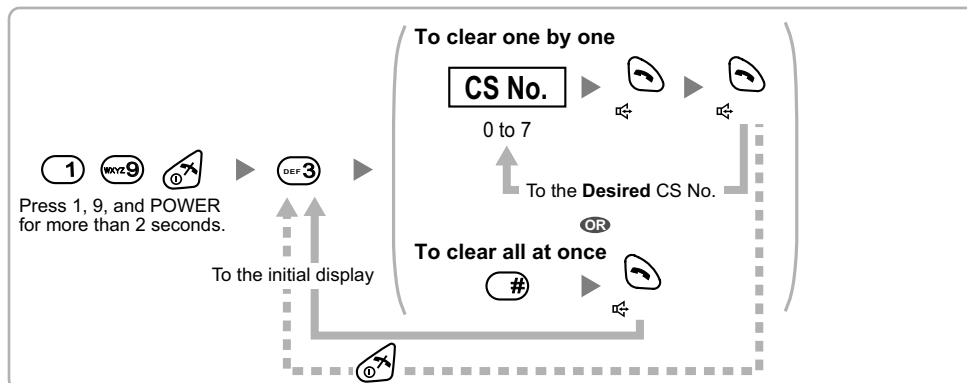
## Assigning the CS ID Number to the PS

### Using the KX-TD7685/KX-TD7695



### Note

To clear the CS ID number assigned to the PS, follow the procedure below:

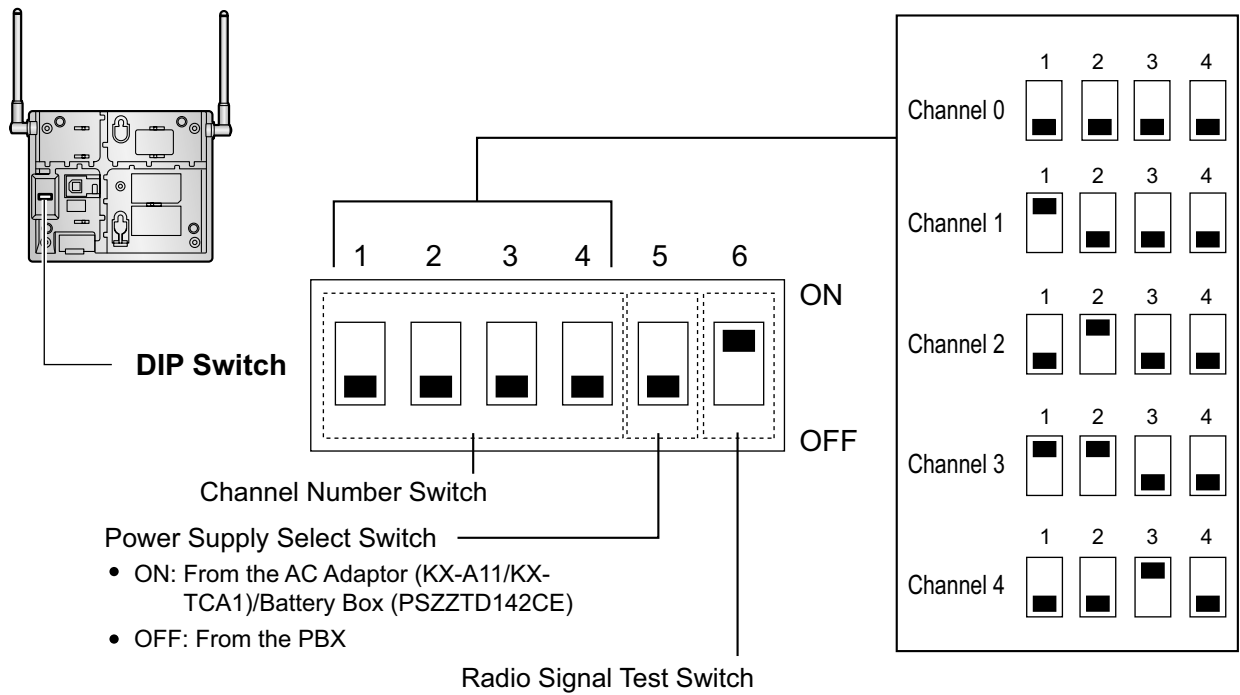


## Setting and Installing the CS Temporarily for Site Survey

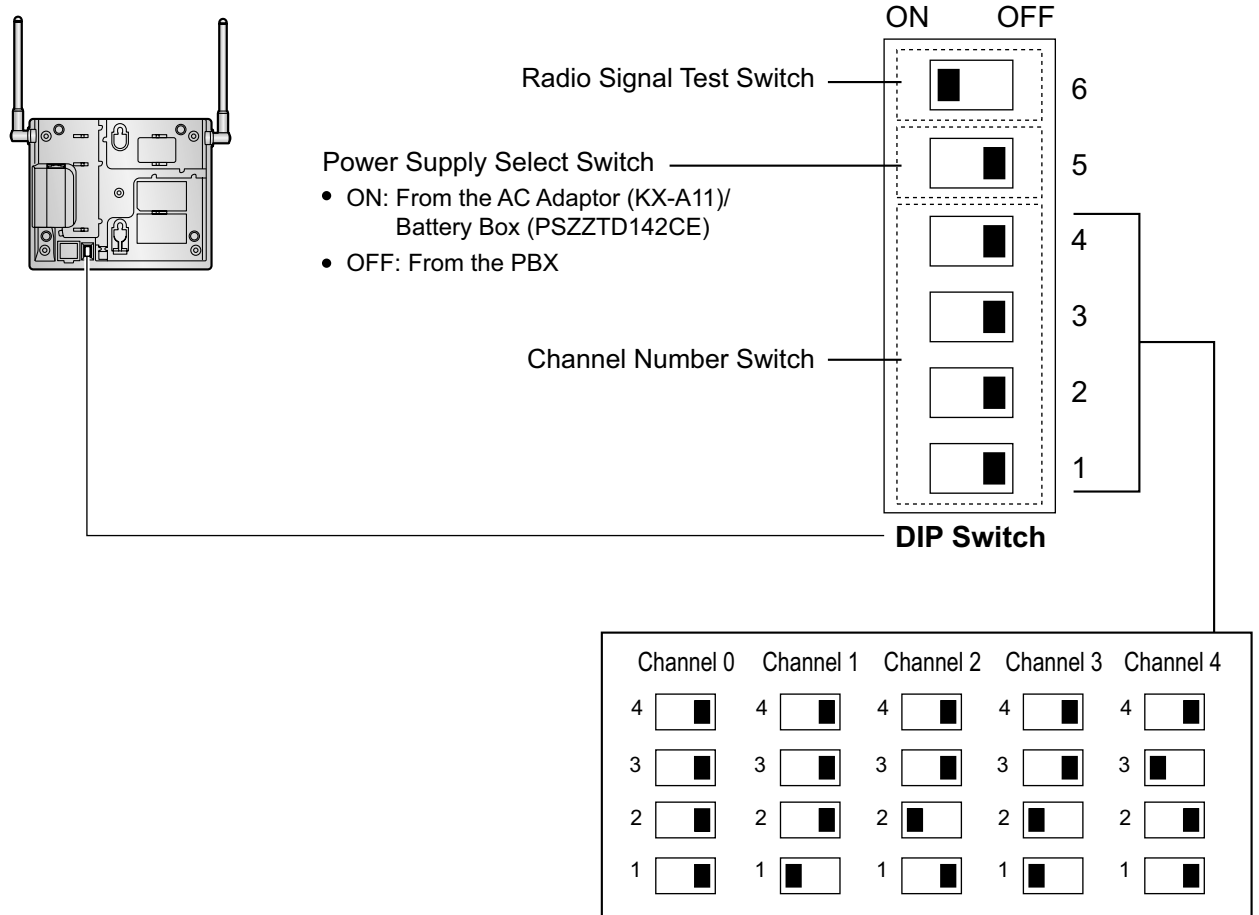
1. Switch the Radio Signal Test switch from OFF to ON.
2. Set the channel number switches as desired.
3. Set the Power Supply Select switch as desired.

### 3.11.4 Before Site Survey

#### KX-TDA0155



**KX-TDA0158**



**Note**

If more than 1 CS is in Radio Signal Test mode, each CS must have a unique channel number.

4. After setting the DIP switches, connect the CS to an AC adaptor/battery box using a power supply adaptor, or connect it to the PBX.

**WARNING**

The AC adaptor should be connected to a vertically oriented or floor-mounted AC outlet. Do not connect the AC adaptor to a ceiling-mounted AC outlet, as the weight of the adaptor may cause it to become disconnected.

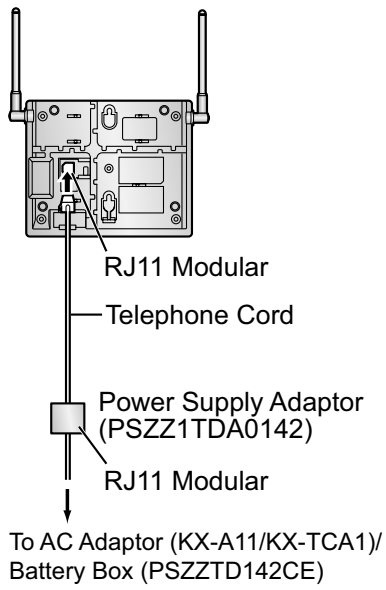
**Notice**

- When using the KX-TDA0158, it is NOT recommended to conduct the site survey using the battery box.
- If the Power Supply Select switch is set to ON in step 3, connect the CS to an AC adaptor/battery box. If it is set to OFF, connect the CS to the PBX.

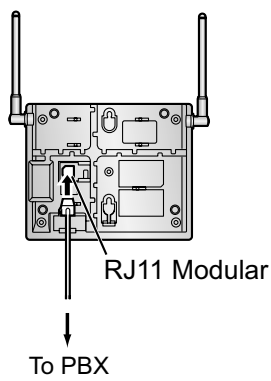
### 3.11.4 Before Site Survey

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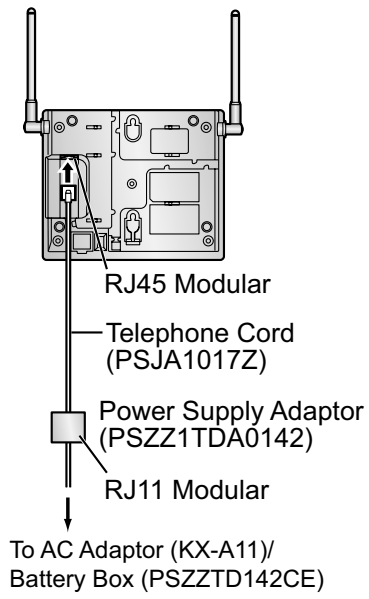
#### KX-TDA0155



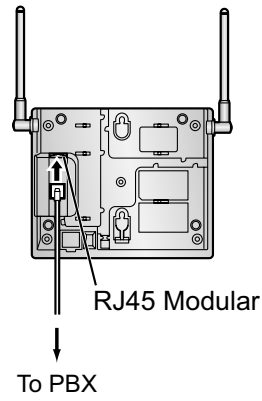
OR



#### KX-TDA0158

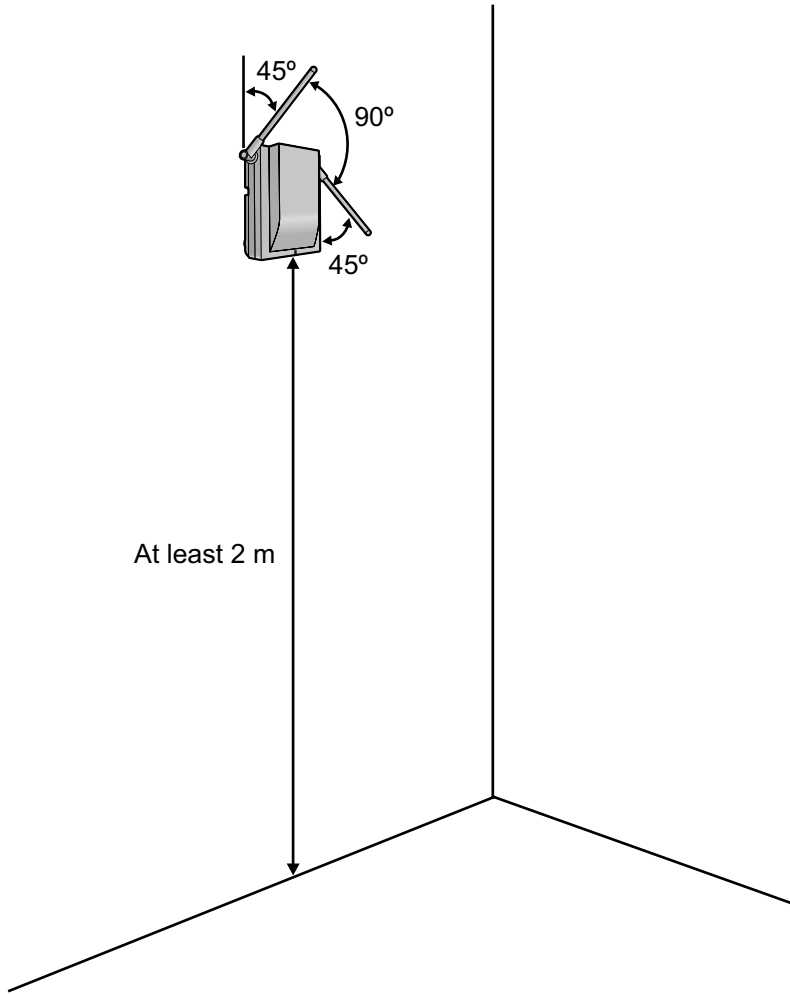


OR





5. Install the CS temporarily for the site survey. Install the CS at least 2 m above the floor, and place the antennas so that they are pointing in directions that are 90 degrees apart (for antenna diversity), as follows:



## 3.11.5 Site Survey

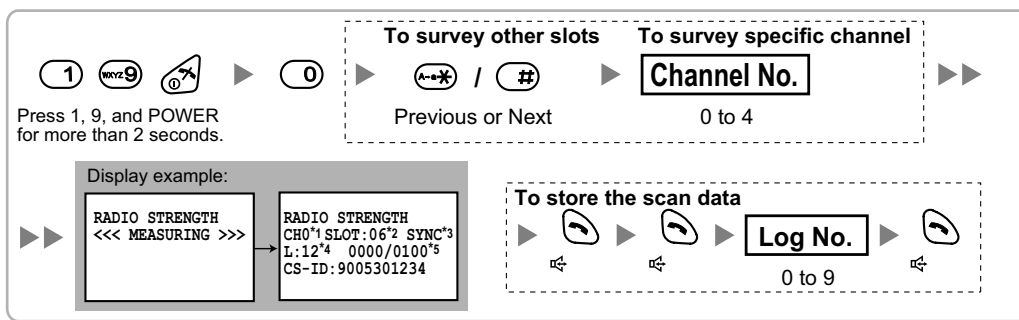
The PS has a Radio Signal Test mode that monitors the state of the radio link to the CS for site survey. In Radio Signal Test mode, the frame loss and signal strength of a synchronous slot, and the signal strength of the other slots can be measured when the PS is monitoring the CS. After installing the CSs temporarily as planned during site planning, set the PS to Radio Signal Test mode and locate each CS to measure its coverage area. Then, record the results on the map of the installation site.

### Testing the Radio Signal Strength

After locating the CS(s) temporarily, execute the Radio Signal Test using the PS. Directly after entering Radio Signal Test mode, the PS scans channel 0 for a CS that it can connect to. The channel to be scanned can be changed by pressing the appropriate keys 0 through 4.

#### 1. Enter Radio Signal Test mode.

##### Using the KX-TD7685/KX-TD7695



- \*1 : Channel number
- \*2 : Slot number
- \*3 : When a slot is synchronised, "SYNC" is displayed.
- \*4 : Radio signal strength level (12 to 00)
- \*5 : Frame error (0000 to 9999)/Frame counter (0000 to 9999). Frame error indicates the number of errors out of 10 000 radio signal receptions. An increased number of frame errors indicates greater radio signal interference and more frequent noise during conversation. The ideal number of frame errors is "0000".
- \*6 : Error rate (%) = Frame error (0000 to 9999) / Frame counter (0000 to 9999) × 100

#### Note

- Storing the scan data will clear all directory data.
- The PS will not operate in normal mode if scan data is saved on it. For details on clearing scan data, refer to "Clearing the Stored Scan Data".

#### 2. Measure the radio signal strength by moving towards and away from the CS.

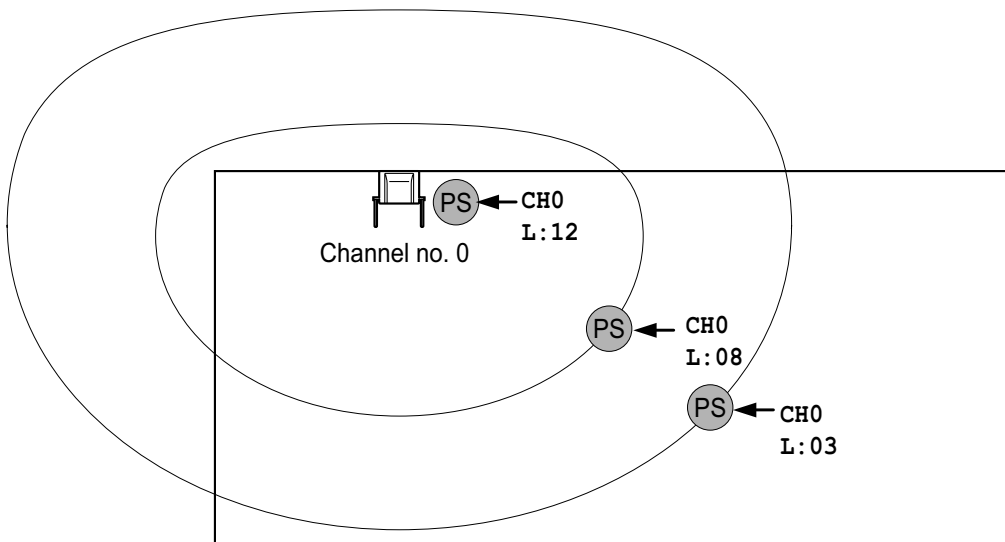
#### Note

- When the error rate is 2% or more, measure the error rate at the same location at least 5 times. You must disconnect the CS and then reconnect it to take each measurement. If the error rate is consistently 2% or more, there may be interference from external wireless equipment. In this case, the following may happen regardless of the radio signal strength level.

Error Rate	Description
Approx. 2%	May receive noise
Approx. 10%	May fail to make/receive calls

The above is a rough standard, and may vary depending on the environment.

- When deciding where to install the CS, priority should be given to an error rate rather than a radio signal strength level.
  - After installing the CS according to the results of the survey, confirm that calls can be made and received, and conversations can be heard clearly.
- a. Move to the CS until the radio signal strength level becomes "12".
  - b. Move away from the CS and identify the CS coverage area within which the radio signal strength level is greater than "8". Draw the area on the map.
  - c. Move away from the CS and identify the CS coverage area within which the radio signal strength level is greater than "3". Draw the area on the map.



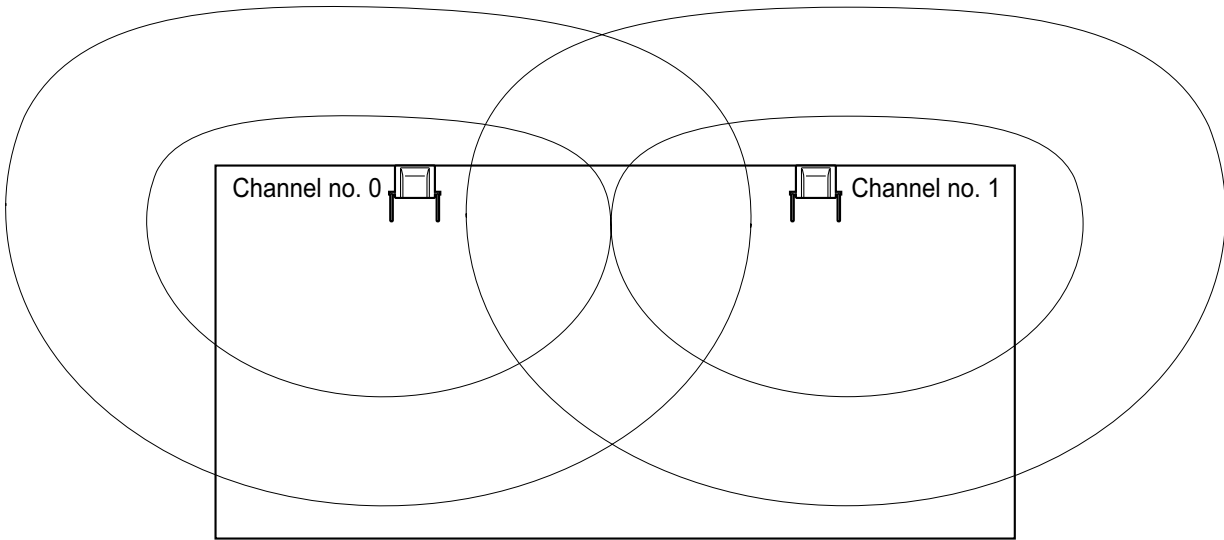
**Radio Signal Strength Levels**

Level: 11 to 12		Better
Level: 08 to 10		Good
Level: 03 to 07		May receive noise
Level: 01 to 02		Receives noise easily or disconnects
Level: 00		Out of range

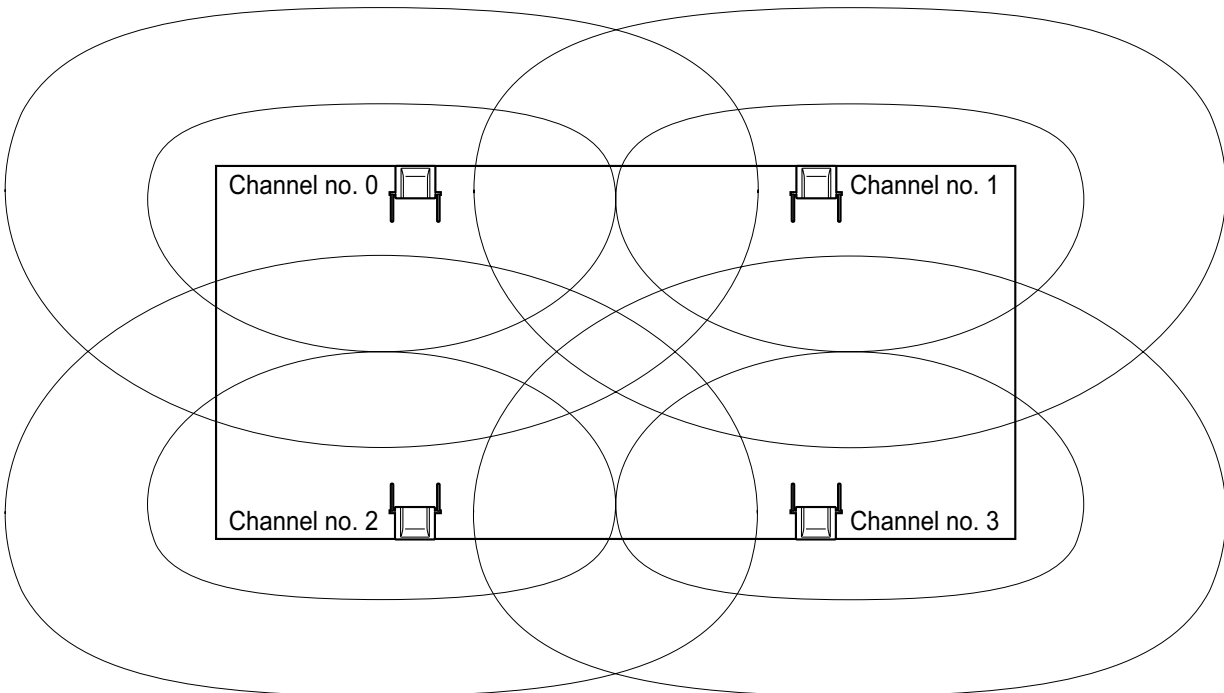
### 3.11.5 Site Survey

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3. Repeat steps 1 and 2 for other CSs, and relocate the CSs when necessary.
  - a. Plan adjacent CS coverage areas so that areas meet where radio signal strength level is "7" to "9".



- b. Plan the CS coverage areas to meet for at least 2 CSs at any location in the installation site.

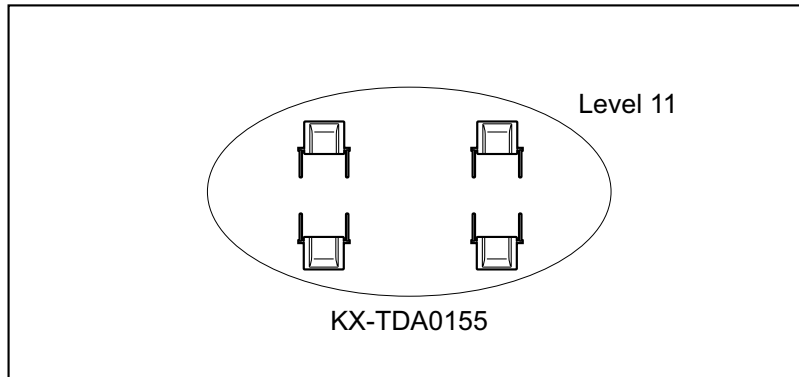


- c. Make sure that the radio signal strength level is greater than "3" at any location in the service area required by the user.

**Note**

- If a channel is set, the results of measurement for the 24 slots on the channel are saved each time. If the same channel is set, the new results override the previous ones. Therefore, a measurement of 5 channels × 24 slots in total can be made.
- If correct results cannot be obtained (e.g., there are many frame errors), change the location of the CS and repeat the site survey to select the best location.

- If multiple CSs cover the same area, the phone connection may become noisy or the number of possible simultaneous calls with PSs may decrease due to interference between the CSs. As a guideline, the maximum number of CSs in an area with a radio signal strength of "11" is 4 (for KX-TDA0155)/2 (for the KX-TDA0158).



To guarantee the number of simultaneous calls, the KX-TDA0158 is recommended.

## Referring to the Stored Scan Data

### Using the KX-TD7685/KX-TD7695

Press 1, 9, and POWER for more than 2 seconds.

0 to 9

**To go to other slots**      **To go to specific channel**

▶▶ [Left Arrow] / [Right Arrow] ▶▶ [Channel No.]

Previous or Next                      0 to 4

## Clearing the Stored Scan Data

### Using the KX-TD7685/KX-TD7695

Press 1, 9, and POWER for more than 2 seconds.

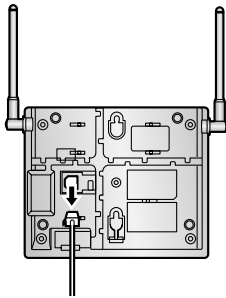
4

### 3.11.6 After Site Survey

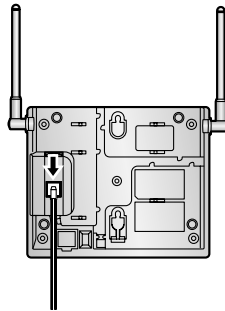
After obtaining the proper measurement results, exit Radio Signal Test mode before connecting the CS to the PBX.

1. Hold down the POWER button on the PS until the PS is turned OFF.
2. Disconnect the CS from the AC adaptor/battery box or the PBX to stop supplying electricity.

**KX-TDA0155**



**KX-TDA0158**

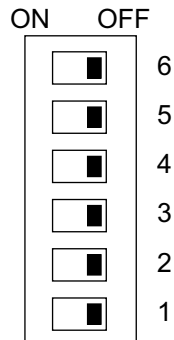


3. Switch all DIP switches on the CS from ON to OFF.

**KX-TDA0155**



**KX-TDA0158**



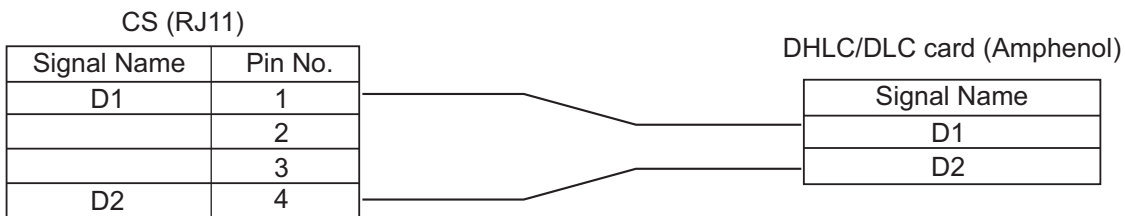
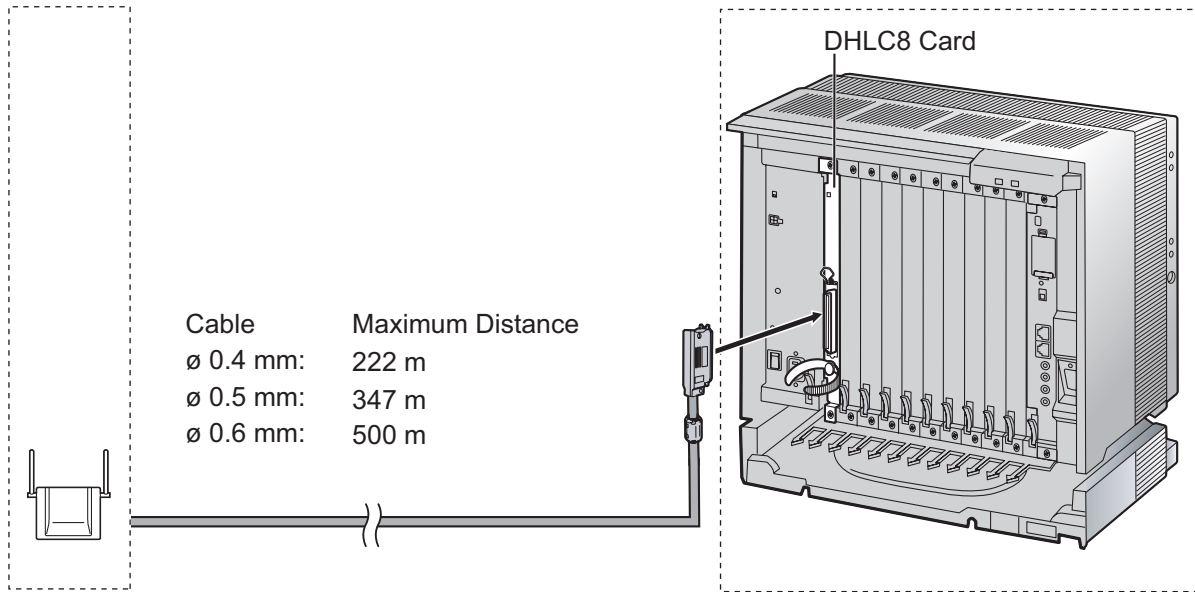
### 3.11.7 Connecting a Cell Station to the PBX

**Note**

When connecting both KX-TDA0155 and KX-TDA0158 CSs to the same card, the KX-TDA0158 CSs must be connected to lower-numbered pins on the card than the KX-TDA0155 CSs.

Refer to the following examples to connect a CS to the PBX.

**KX-TDA0155**



**Accessories and User-supplied Items for the CS**

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

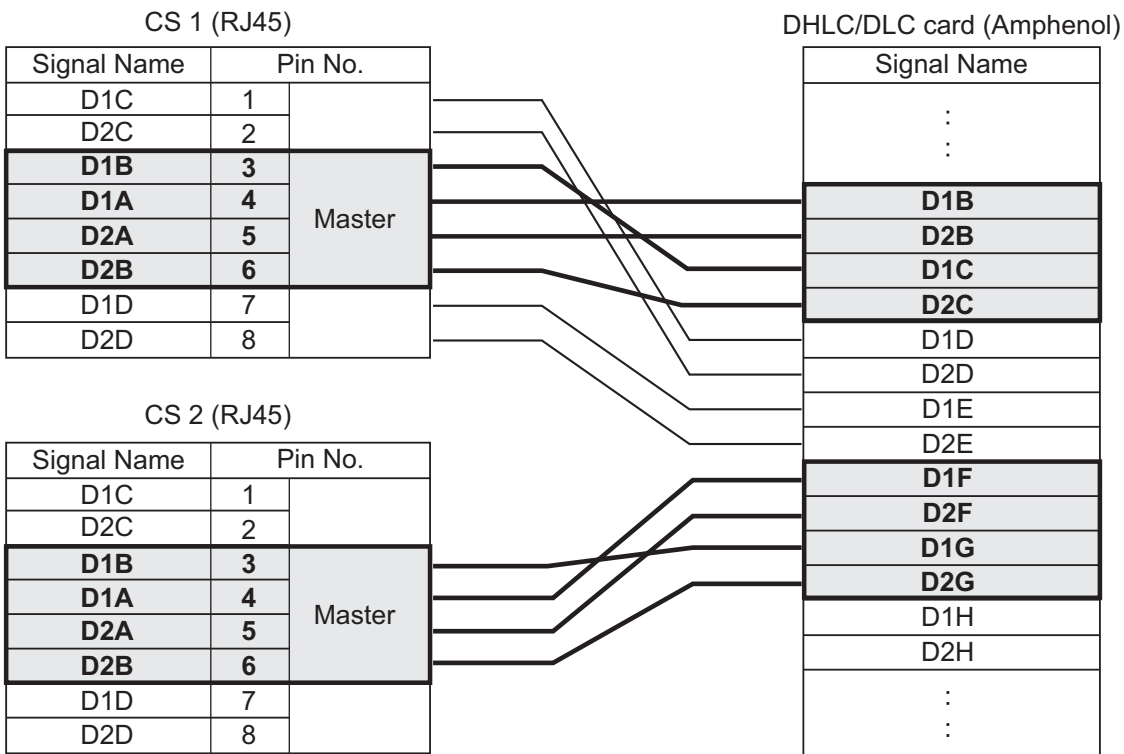
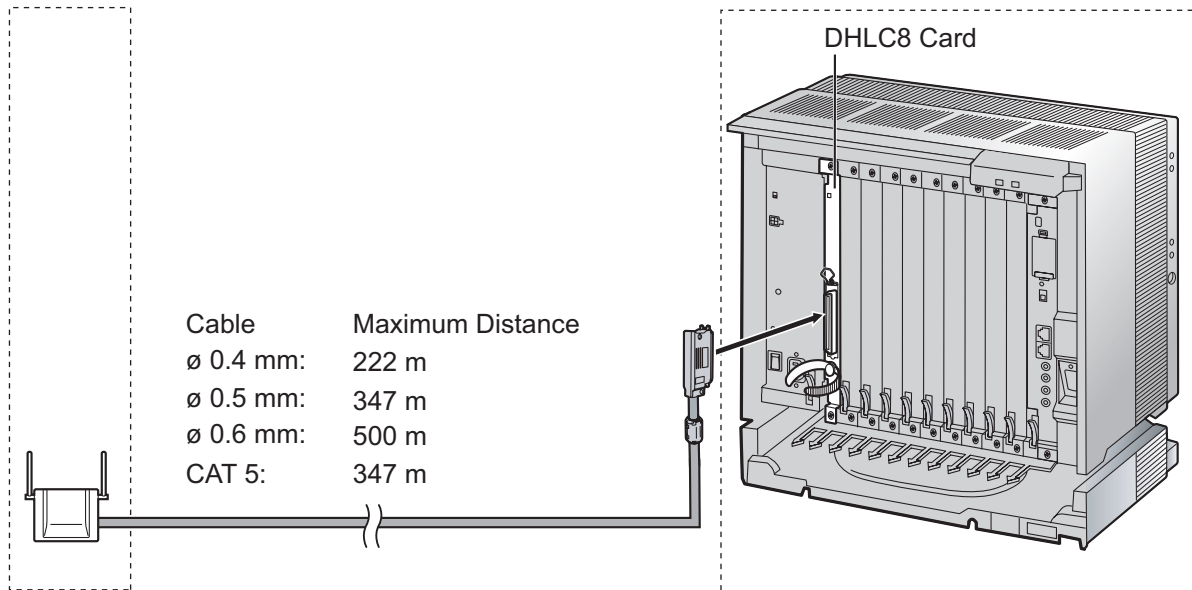
**User-supplied (not included):** RJ11 connector

**Note**

For details about DHLC card or DLC card, refer to "3.6.2 DHLC8 Card (KX-TDA0170)", "3.6.3 DLC8 Card (KX-TDA0171)", or "3.6.4 DLC16 Card (KX-TDA0172)".

3.11.7 Connecting a Cell Station to the PBX

KX-TDA0158



**Accessories and User-supplied Items for the CS**

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

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

**Note**

- The no. 3, 4, 5 and 6 pins (Master) of the CS must be connected to 2 pairs of pins on the DHLC/DLC card.

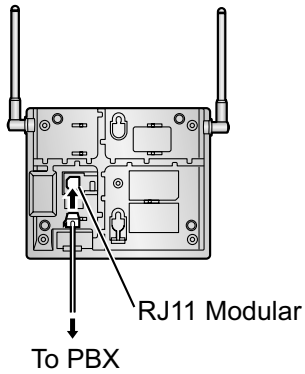


- When connecting multiple KX-TDA0158 CSs to a DHLC/DLC card, make sure that the no. 3, 4, 5 and 6 pins (Master) of adjacent CSs are at least 2 pairs of pins away on the card.
- For details about DHLC card or DLC card, refer to "3.6.2 DHLC8 Card (KX-TDA0170)", "3.6.3 DLC8 Card (KX-TDA0171)", or "3.6.4 DLC16 Card (KX-TDA0172)".
- The Local Processor (LPR) software of the DHLC/DLC card used must be version 5.000 or later. If necessary, upgrade the LPR software of the DHLC/DLC card. To confirm the LPR software version of the card, refer to "3.2 [1-1] Slot—Summary" in the PC Programming Manual.
- CS connections must be made within the same DHLC/DLC card.
- When a wrong connection is made, satisfactory performance of the CS cannot be guaranteed. Check the connection of CS and the PBX using the Maintenance Console. For information about how to view CS information using the Maintenance Console, refer to "2.6.15 Utility—CS Information" in the PC Programming Manual.

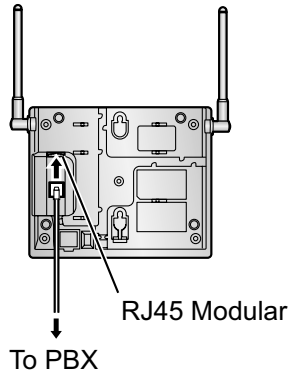
## Connecting the CS

1. Connect the cable from the PBX to the CS.

**KX-TDA0155**

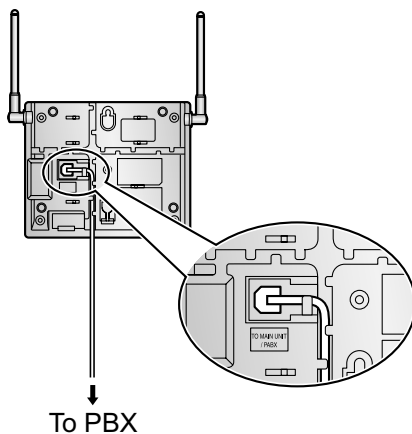


**KX-TDA0158**

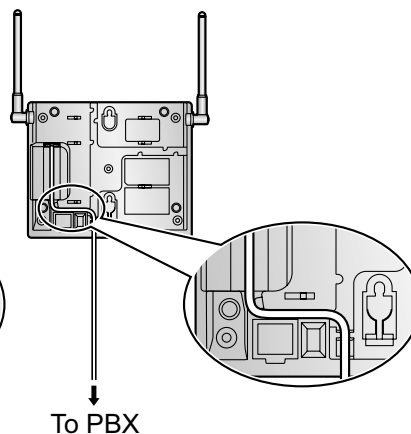


2. Pass the cable through the groove of the CS (in any direction depending on your preference).

**KX-TDA0155**



**KX-TDA0158**



## Registering the PS

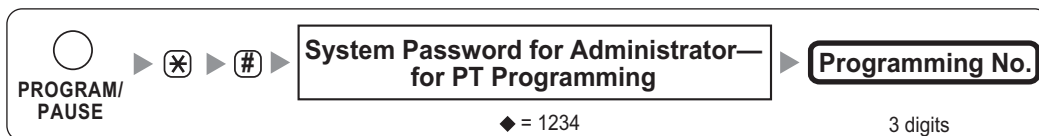
The PS must be registered to the PBX before it can be used. Programming of both the PS and PBX is required. A Proprietary Telephone (PT) with multiline display (e.g., KX-T7636 6-line display) is required to perform the PBX system programming.

### Note

For details about system programming using a PT, refer to "2.3.2 PT Programming" in the Feature Guide, and "2.1 PT Programming" in the PT Programming Manual.

## Entering the System Programming Mode

### PT (Administrator Level)



### Note

◆ means default value throughout this section.

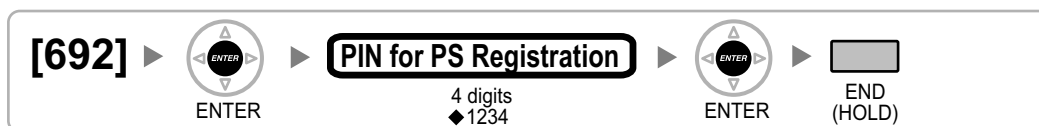
## Setting the Personal Identification Number (PIN) for PS Registration

To prevent registering the PS to a wrong PBX, a PIN for PS registration can be set to the PBX. Before registering the PS to the PBX, enter the PIN set to the PBX into the PS. By doing so, the PS will only be registered to the PBX with the matching PIN.

### Note

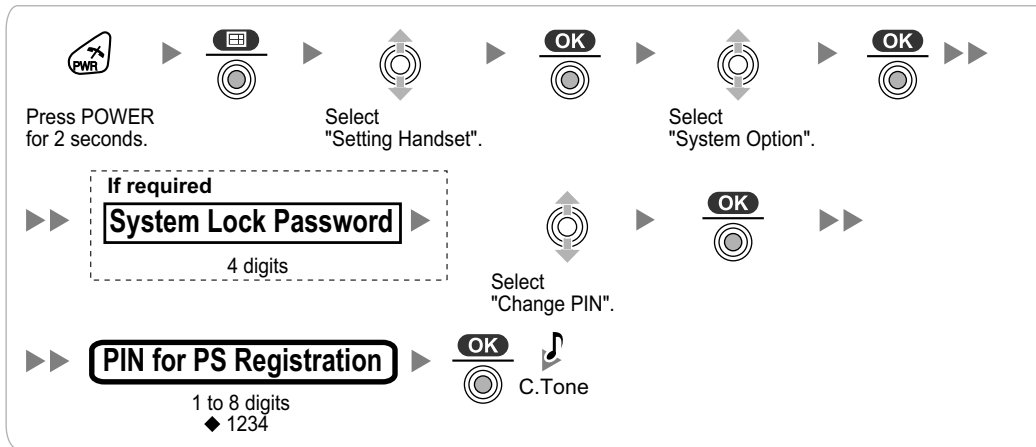
- By default, the PIN for PS registration is "1234" for both the PBX and PS. Therefore, the PS can be registered to the PBX without setting the PIN.
- The PIN for PS registration will only be used when registering the PS to the PBX. Therefore, during normal operation after registration, even if there is more than 1 PBX with the same PIN near the PS, the PS will not be inadvertently linked to a different PBX.

## Setting the PIN for PBX

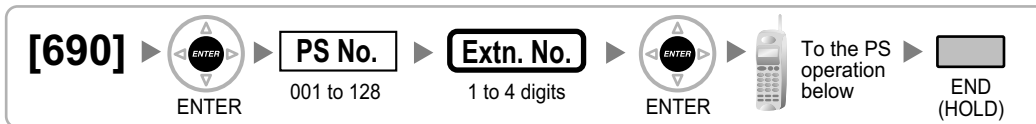


## Setting the PIN for PS

**Using the KX-TD7685/KX-TD7695**



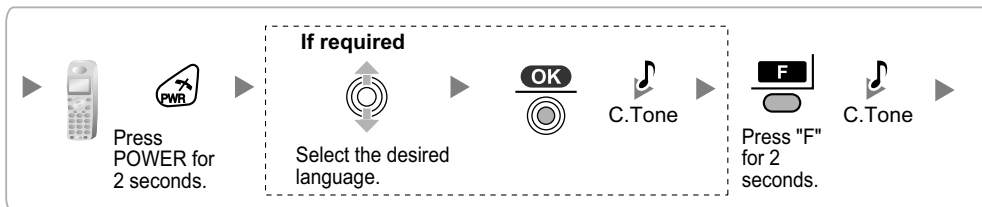
**PS Registration**



**When the PS has not been registered yet**

When registering the PS for the first time, it is possible to select the desired language for the display. (You do not need to enter the PS system programming mode when registering for the first time.)

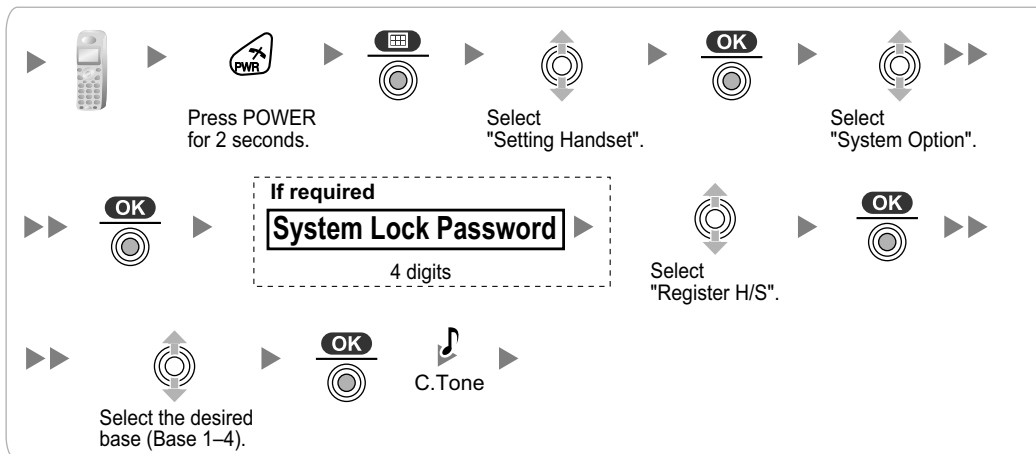
**Using the KX-TD7685/KX-TD7695**



**When the PS has already been registered to another PBX**

One PS can be registered to a maximum of 4 different PBXs.

**Using the KX-TD7685/KX-TD7695**

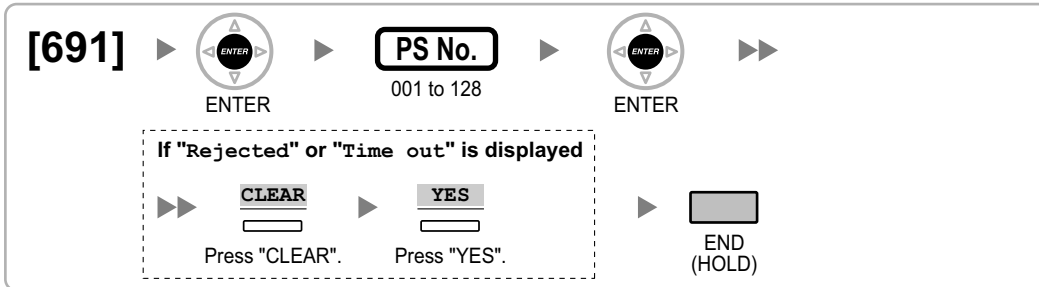


### 3.11.7 Connecting a Cell Station to the PBX

#### PS Termination

Confirm the following before cancelling the PS registration:

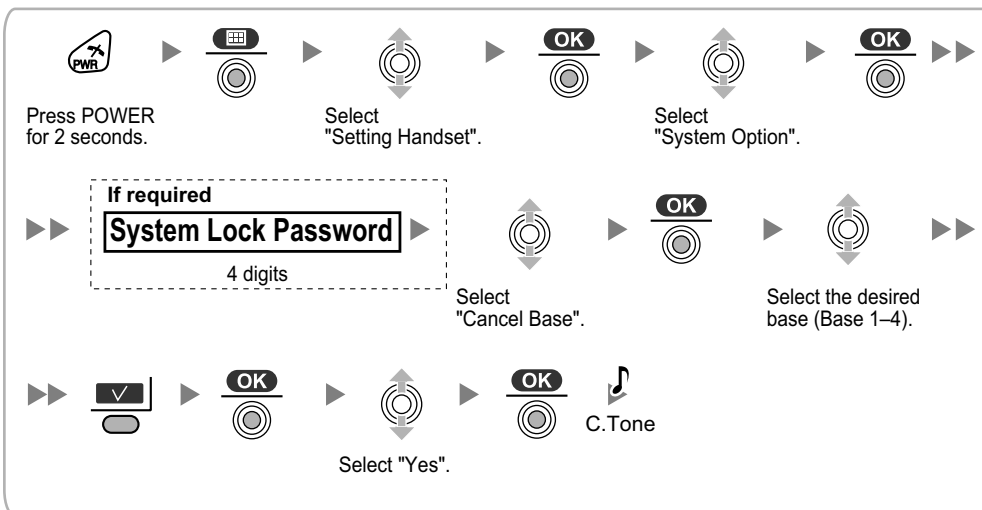
- The PS is turned on.
- The PS is within range.



#### If "Rejected" or "Time out" is displayed

The registration information is still stored in the PS. You need to delete the registration information from the PS.

#### Using the KX-TD7685/KX-TD7695



### Testing the Operation

Walk around the service area while having a conversation using a registered PS. If noise is frequent or conversations disconnect, relocate the CSs or install an additional CS.

## 3.11.8 Wall Mounting

### Mounting the KX-TDA0155/KX-TDA0158

#### **WARNING**

- Make sure that the wall that the unit will be attached to is strong enough to support the unit (approx. 310 g). If not, it is necessary for the wall to be reinforced.
- Only use the wall-mounting equipment (screws, washers, wall mounting plate) included with the unit.
- When driving the screws into the wall, be careful to avoid touching any metal laths, wire laths or metal plates in the wall.
- When this product is no longer in use, make sure to detach it from the wall.

#### **CAUTION**

- Do not stretch or bend the cables. Also, do not allow anything to rest on the cables.
- Use cables that are fire-resistant or fireproof.
- The CS and the cables should never be placed near or over a radiator or other heat source.
- Do not bundle cables that are connected to the CS with the AC power cords of machines located nearby.
- Make sure the cables are securely fastened to the wall.

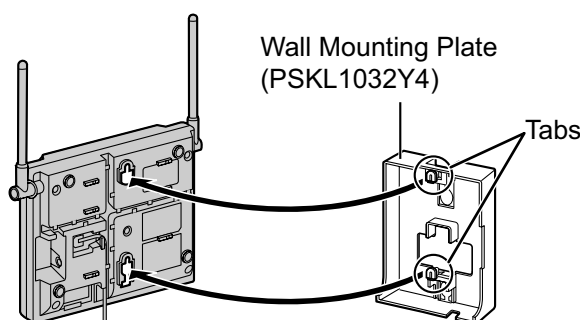
1. Place the reference for wall mounting on the wall to mark the 2 screw positions.
2. Install the 2 screws and washers (included) into the wall.

#### **Note**

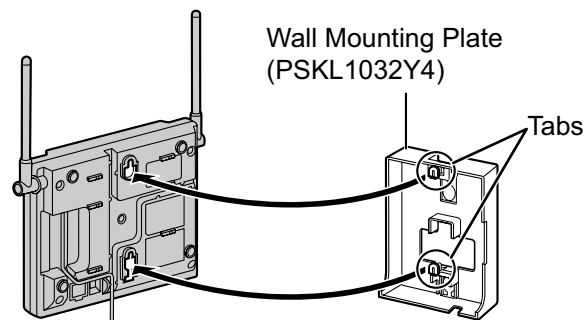
- Make sure that the screw heads are at the same distance from the wall.
- Install the screws perpendicular to the wall.

3. Insert the upper and lower tabs of the wall mounting plate into the designated openings in the base unit.

**KX-TDA0155**



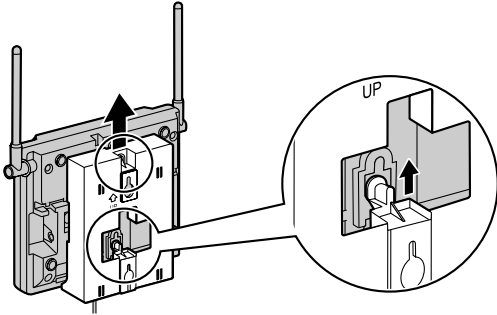
**KX-TDA0158**



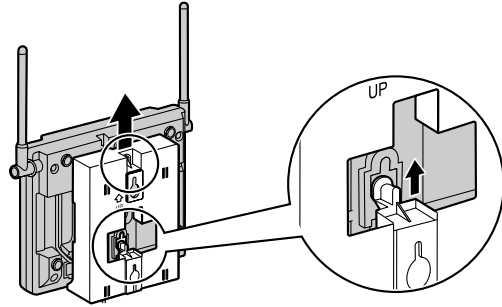
### 3.11.8 Wall Mounting

4. Slide the wall mounting plate in the direction of the arrow until it clicks.

**KX-TDA0155**

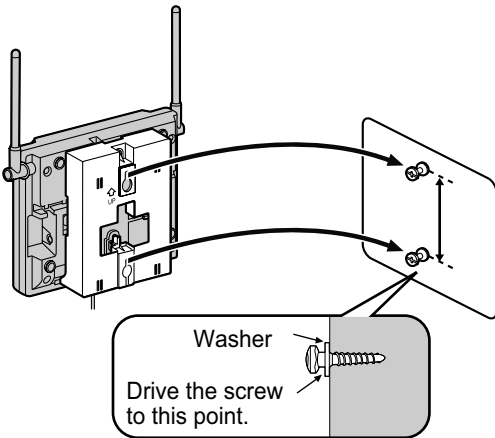


**KX-TDA0158**

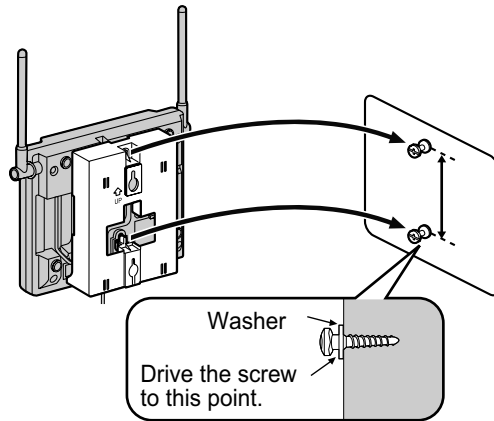


5. Hook the CS on the screw heads.

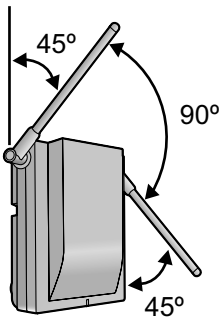
**KX-TDA0155**



**KX-TDA0158**

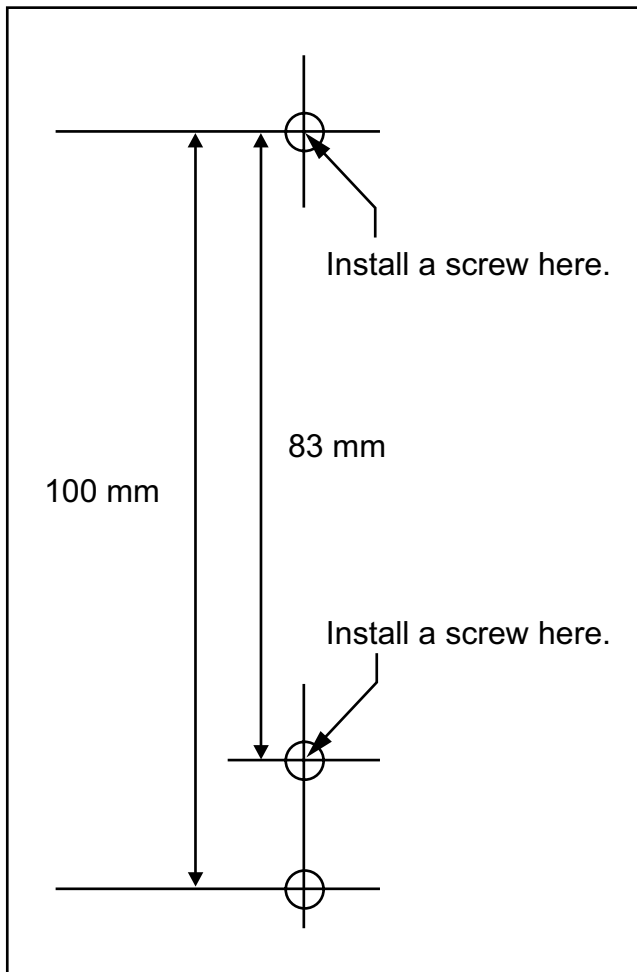


6. Place the antennas so that they are pointing in directions that are 90 degrees apart (for antenna diversity), as follows:



## Reference for Wall Mounting

Please copy this page and use as a reference for wall mounting.



### Note

Make sure to set the print size to correspond with the size of this page. If the dimension of the paper output still deviates slightly from the measurement indicated here, use the measurement indicated here.

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

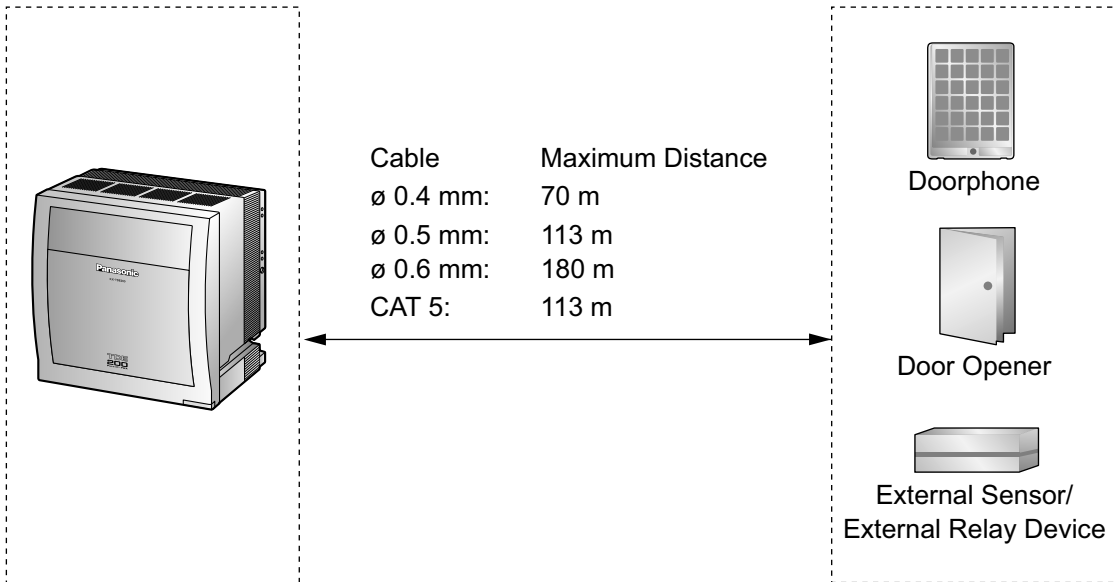
### 3.12.1 Connection of Doorphones, Door Openers, External Sensors, and External Relays

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

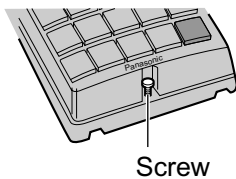


#### Installing the Doorphone (KX-T30865/KX-T7765)

**Note**

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

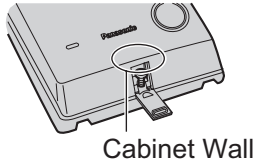
1. Loosen the screw to separate the doorphone into 2 halves.



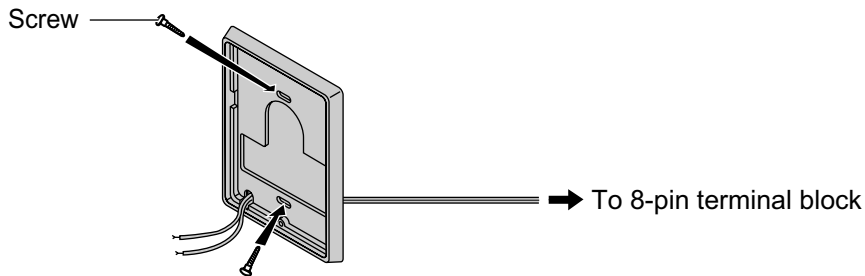
**Note for KX-T7765 Users**



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.



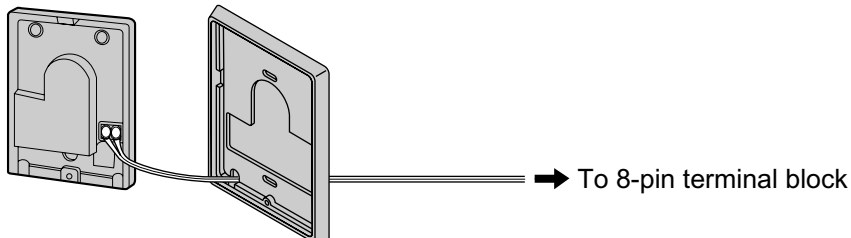
**Note**

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.

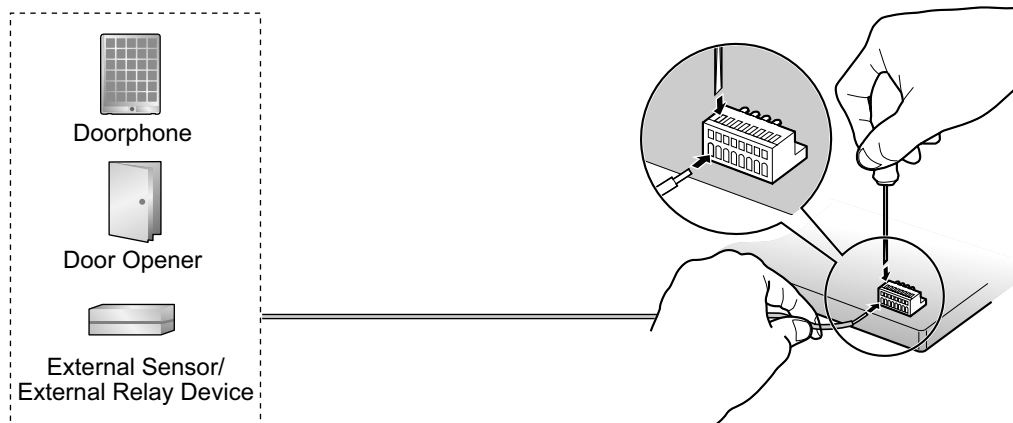


4. Re-attach the 2 halves and re-insert the screw.

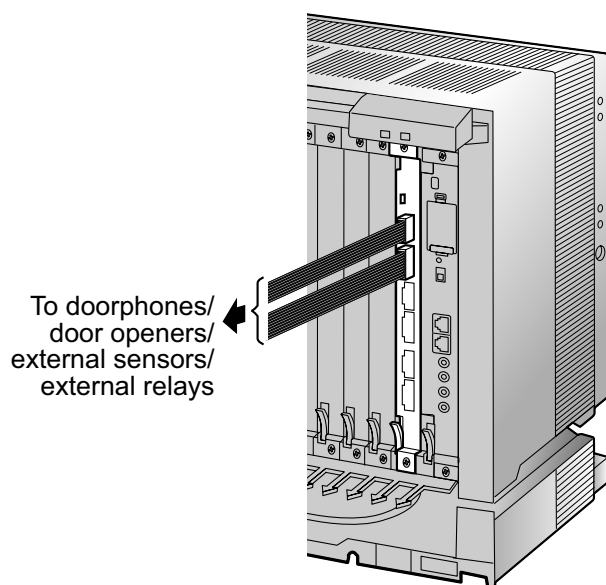
## Connection

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.

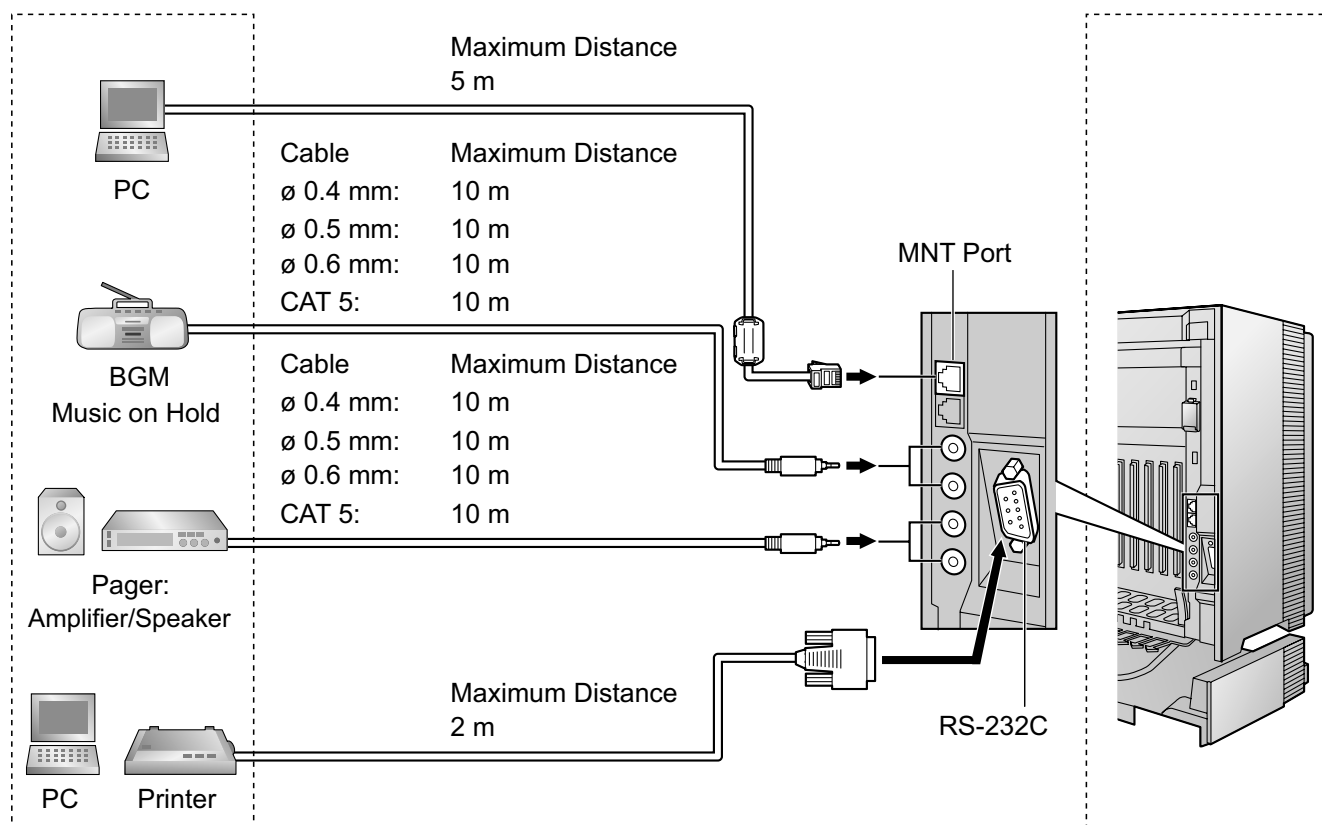


2. Attach the terminal blocks to the connectors of the DPH4/DPH2/EIO4 card on the PBX.



## 3.13 Connection of Peripherals

### 3.13.1 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. Up to 2 external music sources (e.g., user-supplied radios) can be connected to the PBX.

### CAUTION

- Wiring should be done carefully to prevent undue force being exerted on the plug. Otherwise, sound may only be heard intermittently.
- External Music Jacks are SELV ports and should only be connected to approved SELV devices, or in Australia, via the Line Isolation Unit with the Telecommunications Compliance Label.

### Note

When the PBX and external music sources are not connected to the same earth, hum noise may be induced into Background Music and Music on Hold.

## Pager

Up to 2 paging devices (user-supplied) can be connected to the PBX.

### CAUTION

External Paging Jacks are SELV ports and should only be connected to approved SELV devices, or in Australia, via the Line Isolation Unit with the Telecommunications Compliance Label.

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

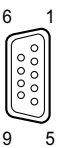
The PBX is equipped with an RS-232C interface. This interface provides communication between the PBX and the user-supplied devices such as PC or line printers. The RS-232C port is used for system programming, SMDR, diagnostics and external system database storage (save/load) functions.

### CAUTION

To protect the system, keep the following in mind:

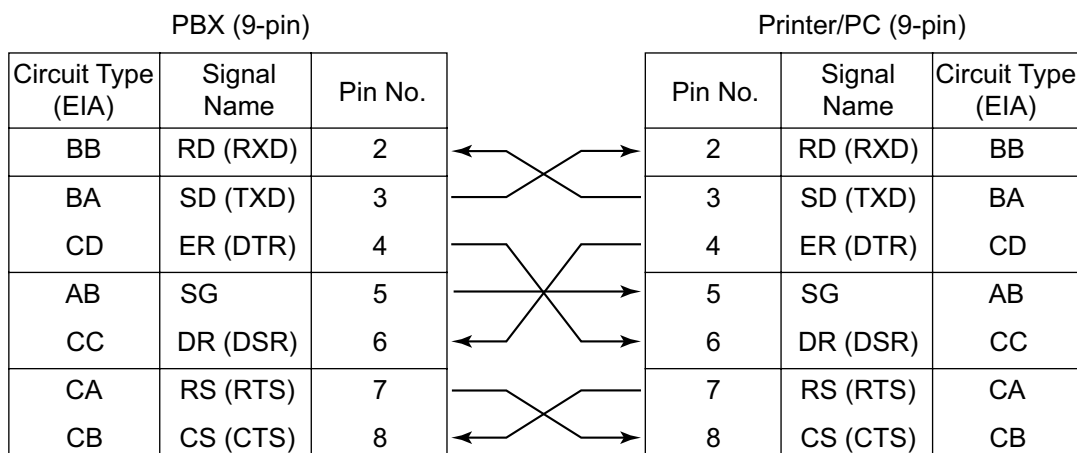
1. Make sure that both connector cases (frame ground) of the RS-232C cross cable (shielded cable) are conductive. If they are not conductive, make sure that both connector cases of the cable are firmly connected.
2. If this is not possible, connect the frame of the PBX to the frame of the PC/Printer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

### Pin Assignments

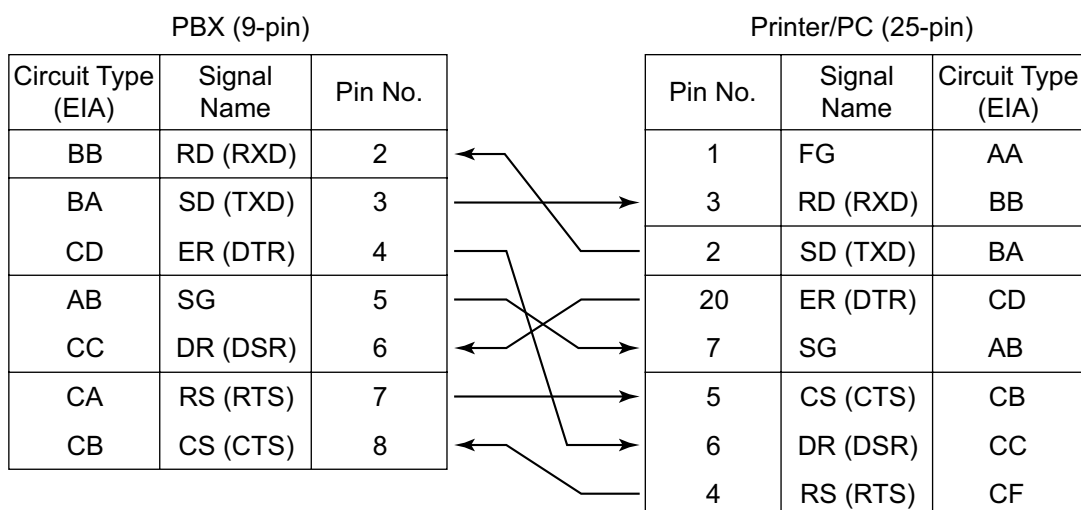
	No.	Signal Name	Function	Circuit Type	
				EIA	CCITT
	2	RD (RXD)	Receive Data	BB	104
	3	SD (TXD)	Transmit Data	BA	103
	4	ER (DTR)	Data Terminal Ready	CD	108.2
	5	SG	Signal Ground	AB	102
	6	DR (DSR)	Data Set Ready	CC	107
	7	RS (RTS)	Request To Send	CA	105
	8	CS (CTS)	Clear To Send	CB	106

## 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.

### 3.13.1 Connection of Peripherals

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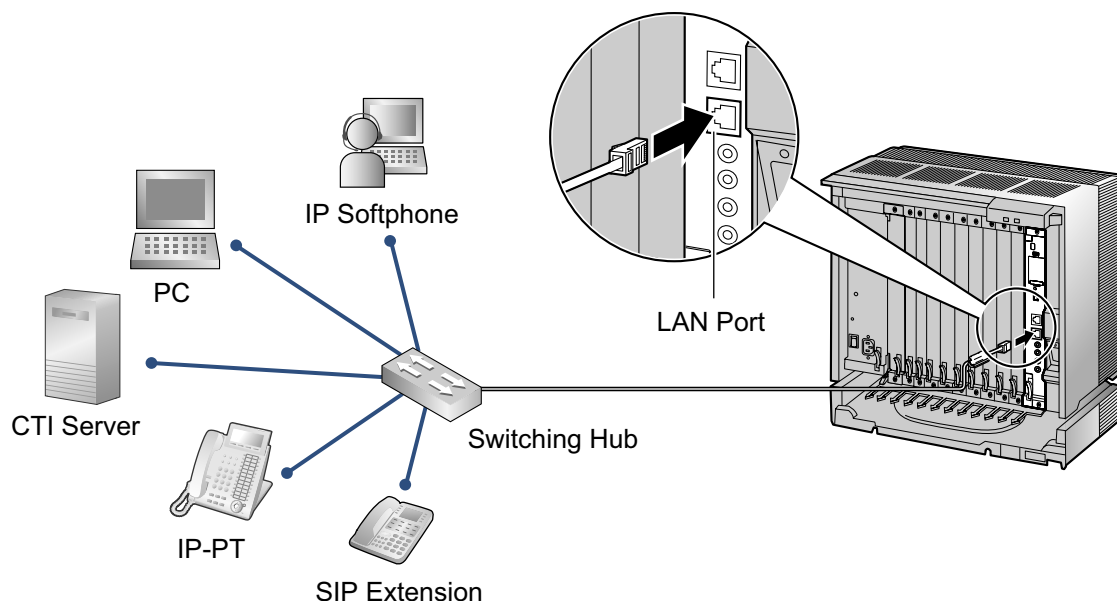
- **Clear To Send (CTS):...**(input)  
An ON condition of circuit CS (CTS) indicates that the printer or the PC is ready to receive data from the unit. The unit does not attempt to transfer data or receive data when circuit CS (CTS) is OFF.
- **Frame Ground (FG)**  
Connects to the unit frame and the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

## 3.14 LAN Connection

### 3.14.1 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), 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.

## 3.15 Power Failure Connections

### 3.15.1 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.

**Note**

While DC power is provided by the backup batteries, the PBX will remain fully operational and the connection will not switch to the Power Failure Connection.

### Using Analogue Trunk Card and Extension Card

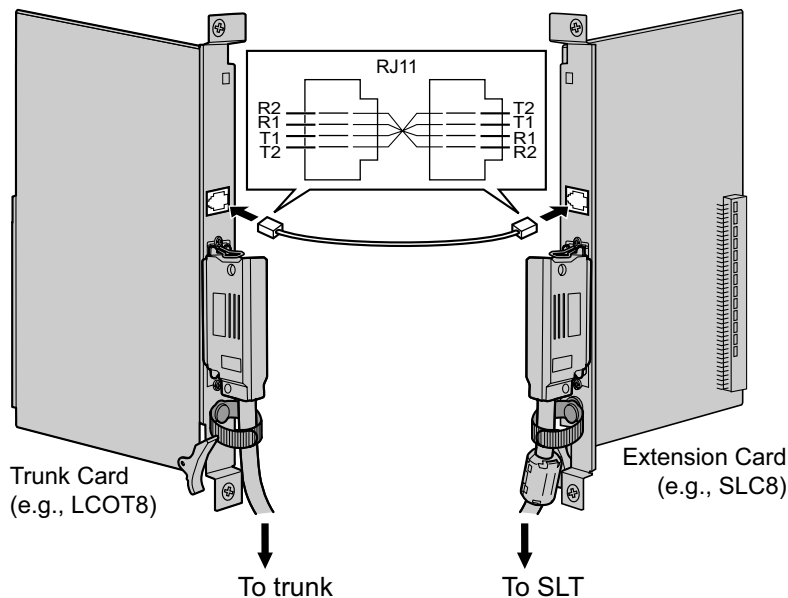
Power Failure Connection connects a specific SLT and a trunk in the event of power failure. The following analogue trunk and extension cards can be used for Power Failure Connections:

- **Analogue trunk cards:** LCOT16 (4 PFT ports), LCOT8 (2 PFT ports), and LCOT4 (2 PFT ports)
- **Extension cards:** MSLC16 (4 PFT ports), CSLC16 (4 PFT ports), SLC16 (4 PFT ports), DHLC8 (2 PFT ports) and SLC8 (2 PFT ports)

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

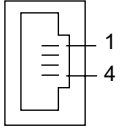
**Accessories (included):** none

**User-supplied (not included):** RJ11 connectors

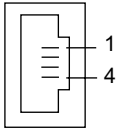


### RJ11 Connector Pin Assignments for Analogue Trunk Card

#### PFT Ports 1 and 2

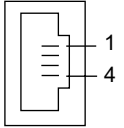
	No.	Signal Name	Function
	1	R2	Ring port 2
	2	R1	Ring port 1
	3	T1	Tip port 1
	4	T2	Tip port 2

#### PFT Ports 3 and 4 (for LCOT16 card only)

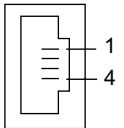
	No.	Signal Name	Function
	1	R4	Ring port 4
	2	R3	Ring port 3
	3	T3	Tip port 3
	4	T4	Tip port 4

### RJ11 Connector Pin Assignments for Extension Card

#### PFT Ports 1 and 2

	No.	Signal Name	Function
	1	T2	Tip port 2
	2	T1	Tip port 1
	3	R1	Ring port 1
	4	R2	Ring port 2

#### PFT Ports 3 and 4 (for MSLC16/CSLC16/SLC16 card only)

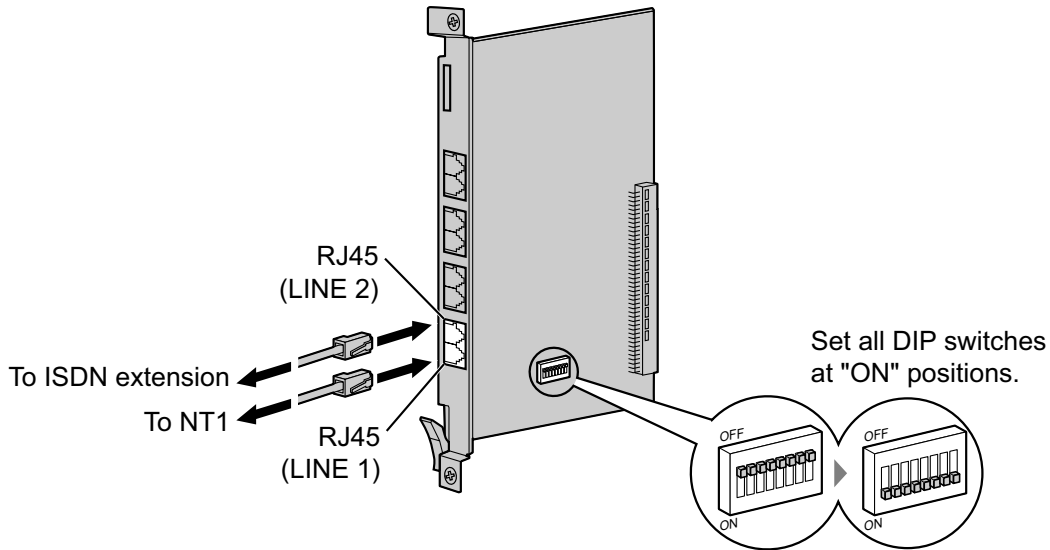
	No.	Signal Name	Function
	1	T4	Tip port 4
	2	T3	Tip port 3
	3	R3	Ring port 3
	4	R4	Ring port 4

## Using BRI Card

LINE 1 and LINE 2 of the BRI4 and BRI8 cards can be used for Power Failure Connections.

**Note**

When the power returns, the connection will switch back to normal configuration from the Power Failure Connection, and a trunk conversation established during power failure will be dropped.



### Accessories and User-supplied Items

**Accessories (included):** none

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

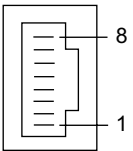
### Switch Settings

Switch	Type	Usage and Status Definition
PFT Setting	DIP	Set all DIP switches to "ON" positions to use LINE 1 and LINE 2 as a PFT port. LINE 1: Power Failure LINE (NT1) LINE 2: Power Failure EXTN (extension)

### RJ45 Connector LINE 1 Pin Assignments

	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 LINE 2 Pin Assignments**

	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	–	–

## 3.16 Starting the PBX

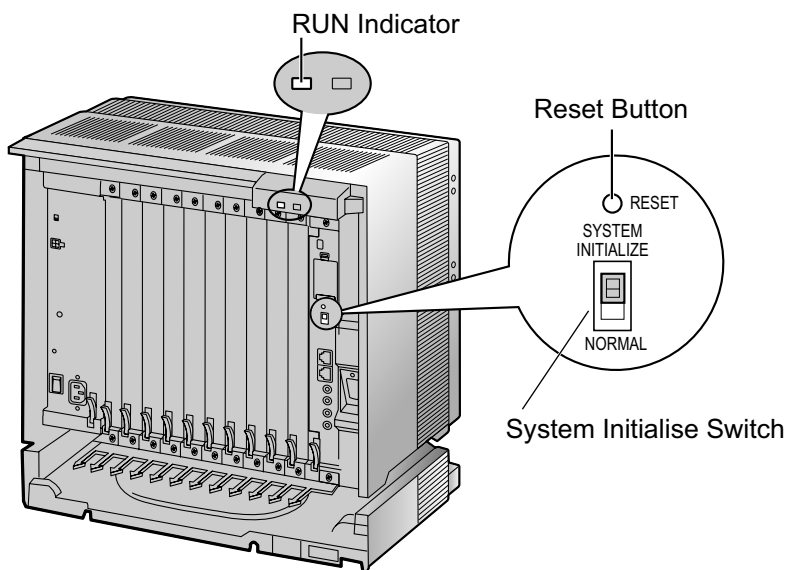
### 3.16.1 Starting the PBX

#### CAUTION

- The SD Memory Card must be inserted in the SD Memory Card slot of the IPCMPR card before startup.
- 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 PBX will continue to be powered even if the power switch is turned "OFF".
- 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.

#### System Initialisation Procedure

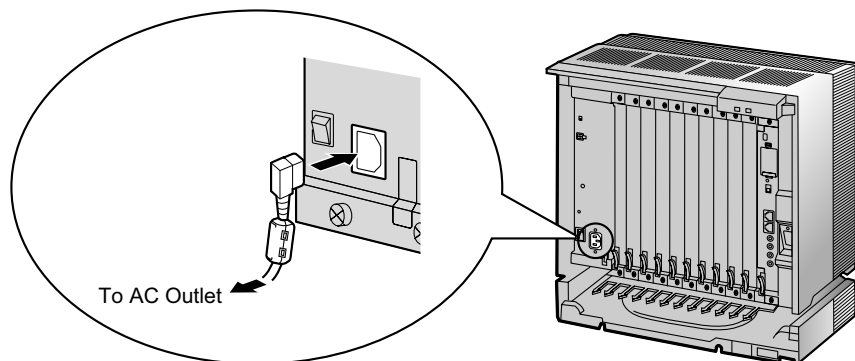
1. Slide the System Initialise Switch to the "SYSTEM INITIALIZE" position.



2. Plug the AC power cord into the PBX and an AC outlet, and turn on the PBX. The RUN indicator will flash.

**Note**

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



3. 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 (except for the IP-GW card) will be initialised to the default values. The DPTs should show the time as 01:00. The data of the IP-GW card will not be initialised.

**Note**

Use only the AC power cord included with the PBX for the PSU.

## 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.

### 3.16.1 Starting the PBX

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## **Section 4**

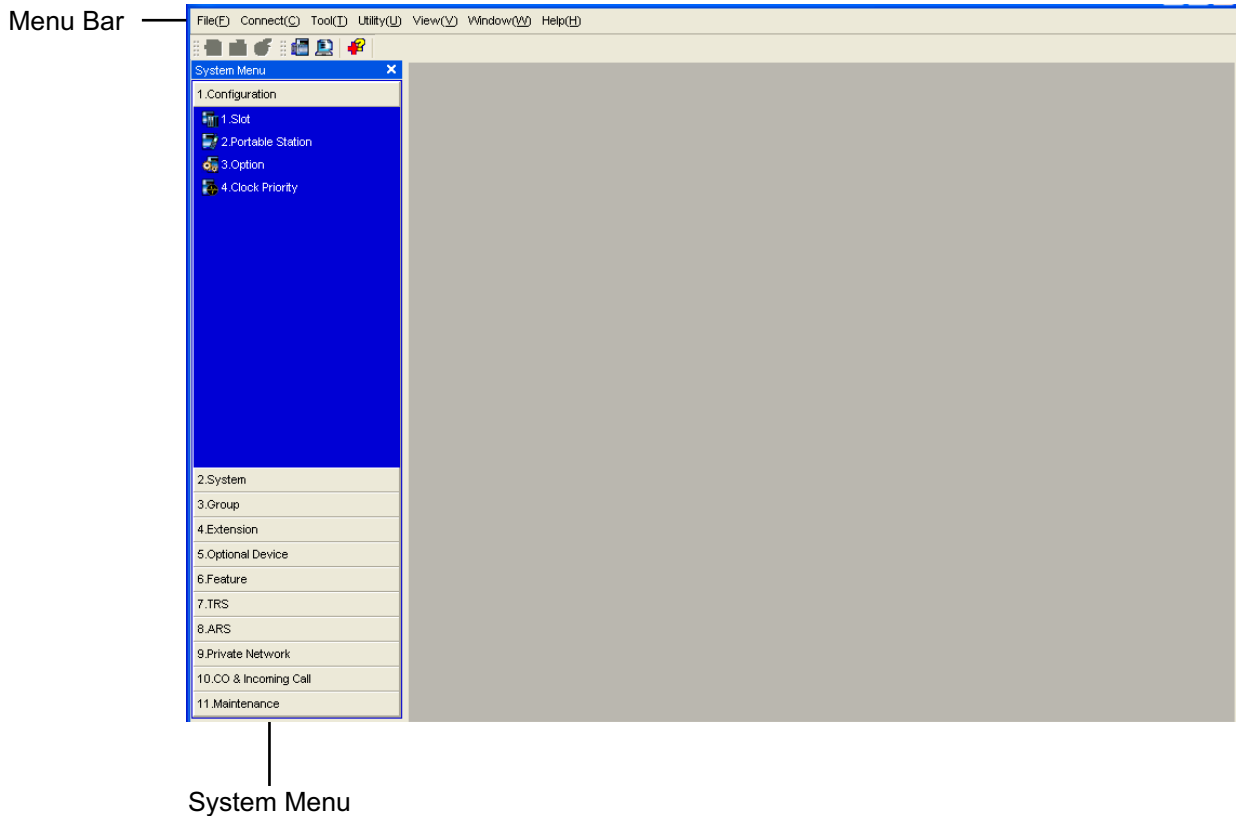
# ***Guide for the Maintenance Console***

*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**

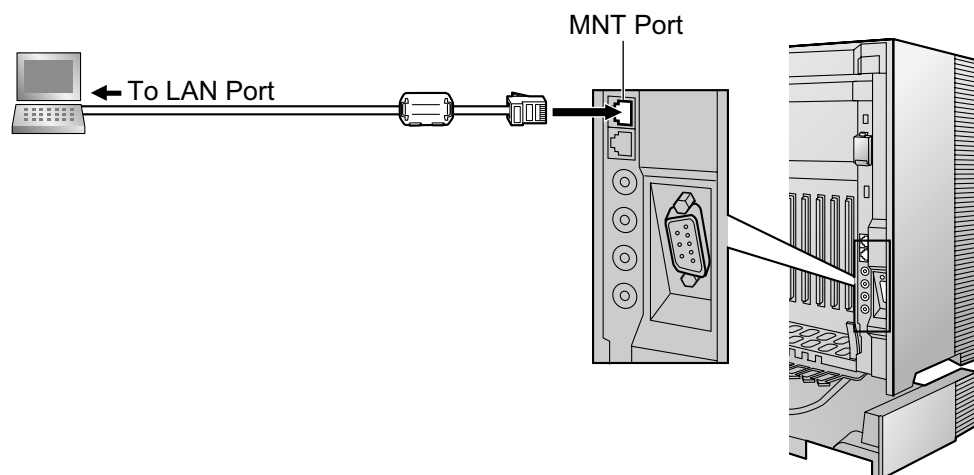
The contents and design of the software are subject to change without notice.



## 4.2 PC Connection

### 4.2.1 PC Connection

#### Connection via MNT Port of IPCMPR Card



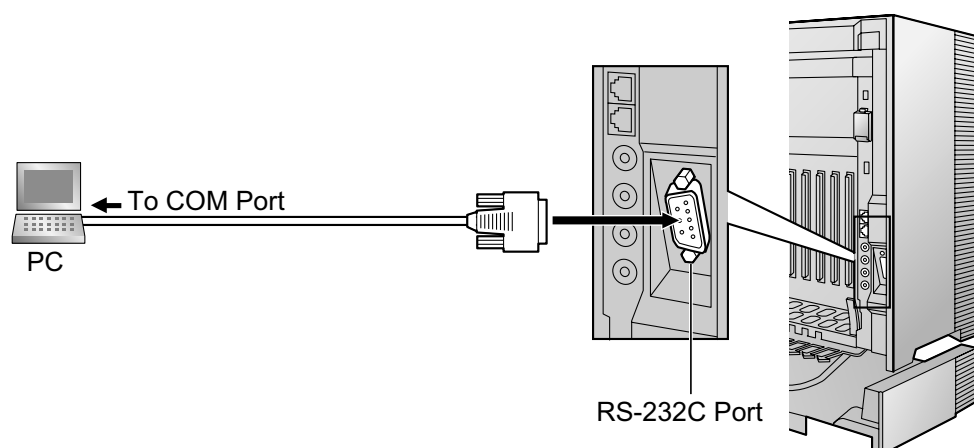
#### **Notice**

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 "3.13.1 Connection of Peripherals".

#### Serial Interface Connection



#### **CAUTION**

To protect the system, keep the following in mind:

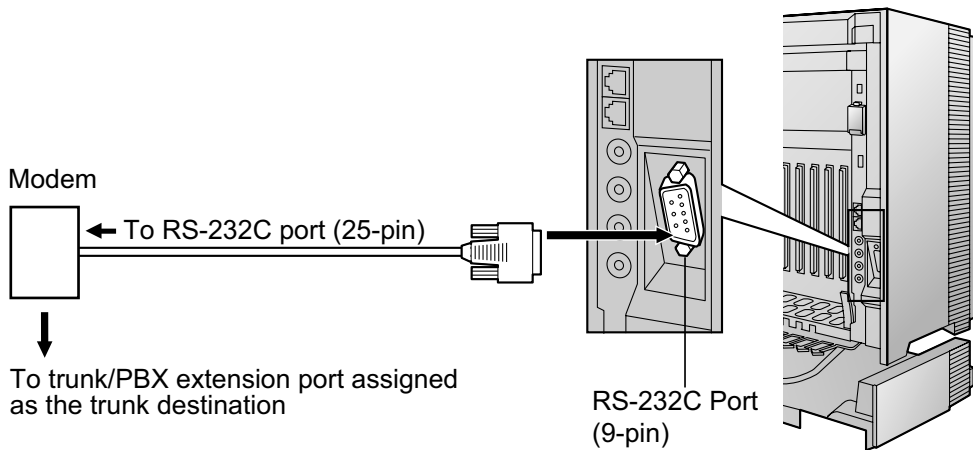
#### 4.2.1 PC Connection

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 "3.13.1 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 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 or Windows Vista® Business

##### Minimum Hardware Requirements

- HDD: 100 MB of available hard disk space

##### 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, 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**).  
The Programmer Code authorises different programming levels, and the Quick Setup is only available when you start the Maintenance Console with the Installer Level Programmer Code.

**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-TDE100/200** 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 "3.16.1 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).  
The system menu appears. 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.	<ul style="list-style-type: none"> <li>IP-EXT/IP-GW/DSP card malfunction</li> </ul>	<ul style="list-style-type: none"> <li>Replace the corresponding card.</li> </ul>
	<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>Not enough activation keys</li> </ul>	<ul style="list-style-type: none"> <li>Purchase additional activation key codes. Please consult a certified dealer for details.</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> <li>Make sure that there is no unwanted firewall in the IP network.</li> </ul>
IP-PTs/SIP Extensions do not operate.	<ul style="list-style-type: none"> <li>IP-EXT/DSP card malfunction</li> </ul>	<ul style="list-style-type: none"> <li>Replace the corresponding card.</li> </ul>
	<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>Not enough activation keys</li> </ul>	<ul style="list-style-type: none"> <li>Purchase additional activation key codes. Please consult a certified dealer for details.</li> </ul>
	<ul style="list-style-type: none"> <li>IP-PT/SIP Extension not registered</li> </ul>	<ul style="list-style-type: none"> <li>Register the corresponding IP-PT/SIP Extension.</li> </ul>
	<ul style="list-style-type: none"> <li>IP-PT/SIP Extension malfunction</li> </ul>	<ul style="list-style-type: none"> <li>Replace the IP-PT/SIP Extension.</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> <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>
	<ul style="list-style-type: none"> <li>Wrong type of PSU</li> </ul>	<ul style="list-style-type: none"> <li>Replace the PSU with the appropriate type.</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 shelf 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>

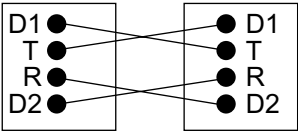
### 5.1.1 Installation

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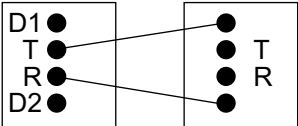
<b>PROBLEM</b>	<b>PROBABLE CAUSE</b>	<b>SOLUTION</b>
The LINK indicator of the IP-EXT/IP-GW/IPCMPR does not turn on.	<ul style="list-style-type: none"><li>• IP-EXT/IP-GW card malfunction</li></ul>	<ul style="list-style-type: none"><li>• Replace the corresponding card.</li></ul>
	<ul style="list-style-type: 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

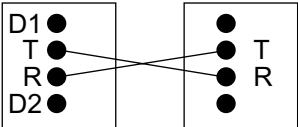
Connection between the PBX and a PT:

Can you dial an extension?	No	Connection between the PBX and a PT:	
		CAUSE	SOLUTION
		<p>The T/R is connected to the D1/D2.</p>  <p>PBX                      Extension</p>	<p>Use the correct cord (the inner 2 wires are for T/R and the outer 2 wires are for D1/D2)</p>

Connection between the PBX and an SLT:

CAUSE	SOLUTION
<p>The T/R is connected to the D1/D2.</p>  <p>PBX                      Extension</p>	<p>Use the correct cord (the inner 2 wires are for T/R).</p> <ul style="list-style-type: none"> <li>• 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".</li> </ul>

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

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

Yes

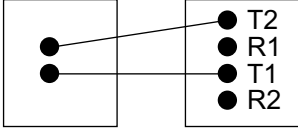
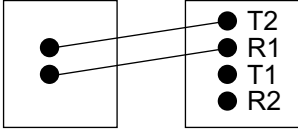
(Continued on the next page.)

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 ports 1 to 4 of MSLC16/CSLC16/SLC16 and ports 1 to 2 of DHLC8/SLC8 cards 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 LED of the CS does not change to Green ON.</li> </ul>	<ul style="list-style-type: none"> <li>CS is not connected properly.</li> </ul>	<ul style="list-style-type: none"> <li>Make sure that the cable is connected properly with correct pin assignments. Also, make sure that the cable does not make short circuits.</li> </ul>
	<ul style="list-style-type: none"> <li>CS is not set for normal operation.</li> </ul>	<ul style="list-style-type: none"> <li>Switch all DIP switches off.</li> </ul>
	<ul style="list-style-type: none"> <li>The status of the port that the CS 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>
	<p>&lt;KX-TDA0158 only&gt;</p> <ul style="list-style-type: none"> <li>The Local Processor (LPR) software of the corresponding DHLC/DLC card is not version 5.000 or later.</li> </ul>	<ul style="list-style-type: none"> <li>Upgrade the LPR software of the DHLC/DLC card.</li> </ul>
	<p>&lt;KX-TDA0158 only&gt;</p> <ul style="list-style-type: none"> <li>Both KX-TDA0158 and KX-TDA0155 CSs are connected to the same card, and the KX-TDA0158 CSs are connected to higher-numbered pins on the card than the KX-TDA0155 CSs.</li> </ul>	<ul style="list-style-type: none"> <li>Connect the KX-TDA0158 CSs to lower-numbered pins on the card than the KX-TDA0155 CSs.</li> <li>Connect the KX-TDA0158 and KX-TDA0155 CSs to different cards.</li> </ul>
<ul style="list-style-type: none"> <li>The LED of the CS stays Red ON during normal operation.</li> </ul>	<ul style="list-style-type: none"> <li>CS malfunction</li> </ul>	<ul style="list-style-type: none"> <li>Replace the CS.</li> </ul>
<ul style="list-style-type: none"> <li>"CLEAR SCAN DATA" is displayed on the PS's screen after turning on the PS.</li> </ul>	<ul style="list-style-type: none"> <li>The PS cannot be used for normal operation when scan data is stored on the PS.</li> </ul>	<ul style="list-style-type: none"> <li>Clear the scan data (refer to "3.9.5 Site Survey Using the KX-TCA255/ KX-TCA256/KX-TCA355/ KX-TD7590" or "3.11.5 Site Survey").</li> </ul>
<ul style="list-style-type: none"> <li>Cannot register the PS.</li> </ul>	<ul style="list-style-type: none"> <li>Wrong Personal Identification Number (PIN) is registered to the PS.</li> </ul>	<ul style="list-style-type: none"> <li>Enter the PIN set to the PBX into the PS.</li> </ul>
<ul style="list-style-type: none"> <li>PS becomes out of range.</li> </ul>	<ul style="list-style-type: none"> <li>CSIF card is not working.</li> </ul>	<ul style="list-style-type: none"> <li>Install the CSIF card properly.</li> </ul>

PROBLEM	PROBABLE CAUSE	SOLUTION
<ul style="list-style-type: none"> <li>Cannot make calls using the PS.</li> </ul>	<ul style="list-style-type: none"> <li>CS is not working.</li> <li>Location of CS is not good.</li> <li>Access system of the PS is not properly set.</li> </ul>	<ul style="list-style-type: none"> <li>Make sure that the cable is connected properly with correct pin assignments. Also, make sure that the cable does not make short circuits.</li> <li>Switch all DIP switches off.</li> <li>Locate the CS properly (refer to "3.9.5 Site Survey Using the KX-TCA255/KX-TCA256/KX-TCA355/KX-TD7590", "3.10.5 Site Survey", or "3.11.5 Site Survey").</li> <li>Change the access system setting of the PS to the appropriate system or automatic.</li> </ul>
<ul style="list-style-type: none"> <li>Noise is frequent while using the PS.</li> <li>Conversations disconnect while using the PS.</li> <li>"NO SERVICE" is displayed on the PS's screen.</li> </ul>	<ul style="list-style-type: none"> <li>Call handover is not working.</li> <li>PS is out of CS coverage area.</li> </ul>	<ul style="list-style-type: none"> <li>Locate the CS properly (refer to "3.9.5 Site Survey Using the KX-TCA255/KX-TCA256/KX-TCA355/KX-TD7590", "3.10.5 Site Survey", or "3.11.5 Site Survey").</li> </ul>
<ul style="list-style-type: none"> <li>The CS is not busy (i.e., the status of the LED is not Moderate Green Flashing), but calls cannot be made or received.</li> <li>There is noise during a phone call.</li> </ul>	<ul style="list-style-type: none"> <li>There is noise during a phone call.</li> </ul>	<ul style="list-style-type: none"> <li>Reduce the number of CSs in the area, or increase the distance between CSs (refer to "3.9.5 Site Survey Using the KX-TCA255/KX-TCA256/KX-TCA355/KX-TD7590", "3.10.5 Site Survey", or "3.11.5 Site Survey").</li> </ul>
<ul style="list-style-type: none"> <li>PS stays out of service when the CS status is changed from Out of Service to In Service.</li> </ul>	<ul style="list-style-type: none"> <li>It may take about 20 s for CS to start up after the status has been changed to In Service.</li> </ul>	<ul style="list-style-type: none"> <li>Wait until the CS starts up.</li> </ul>
<ul style="list-style-type: none"> <li>The maximum number of PS calls that a high-density CS supports cannot be made.</li> </ul>	<ul style="list-style-type: none"> <li>Poor connection</li> </ul>	<ul style="list-style-type: none"> <li>Make sure that a 4-pair cable is used for connection.</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.

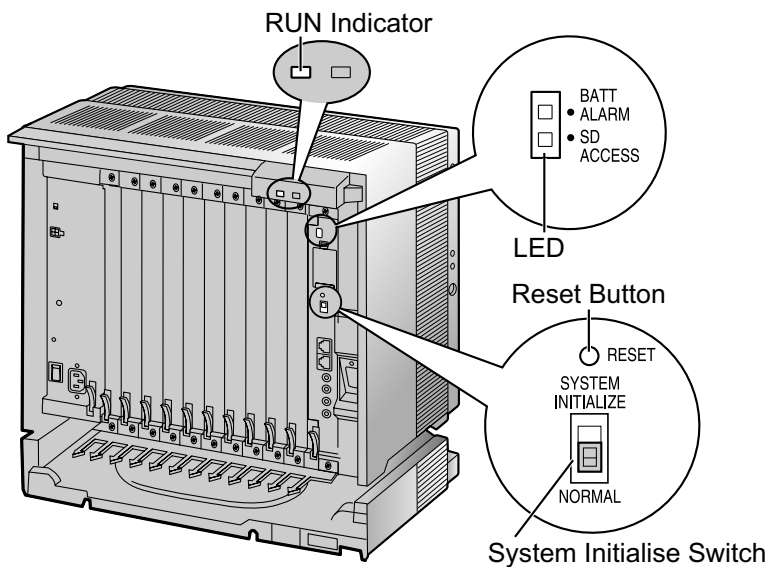
### Note

- 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:

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





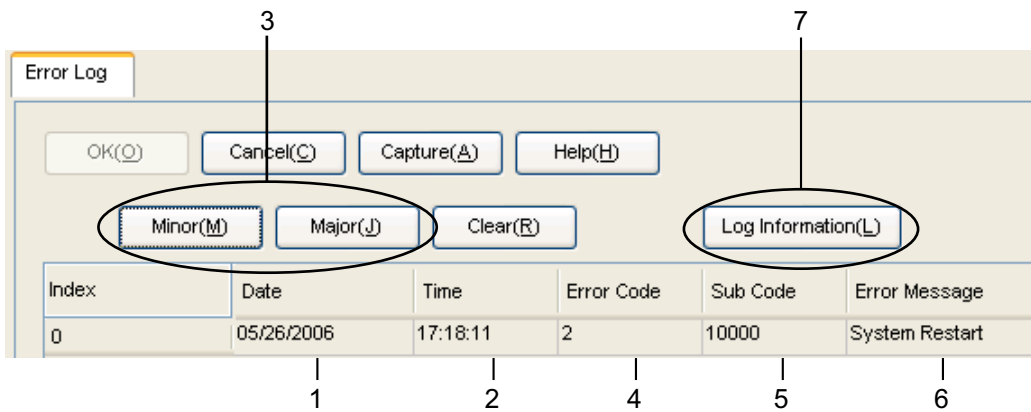
## 5.1.5 Troubleshooting by Error Log

When a major system error occurs in the PBX, the ALARM indicator on the front of the shelf 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



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

```

04/01/01 10:37AM MJ ALM #000 10000 MPR WDT overflow
04/01/01 11:07AM MN ALM #010 10000 AC power down
04/01/01 03:55PM MN ALM #301 10501 Digital trunk RAI reception
    
```

#### 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.

### 5.1.5 Troubleshooting by Error Log

	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: Shelf type               <ul style="list-style-type: none"> <li>– Physical shelf: " " (blank)</li> <li>– Virtual shelf: "*" (asterisk)</li> </ul> </li> <li>• 1: Shelf number</li> <li>• YY: Slot number               <ul style="list-style-type: none"> <li>– KX-TDE100 (Physical slot): 00 to 06 (00: IPCMPR Card Slot; 01 to 06: Free Slots)</li> <li>– KX-TDE200 (Physical slot): 00 to 11 (00: IPCMPR Card Slot; 01 to 11: Free Slots)</li> <li>– KX-TDE100/KX-TDE200 (Virtual slot): 01 to 08 (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: Port number (01 to 16) will be displayed.</li> <li>– For OPB3 card: 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". 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 PMMPR Software File Version 2.0xxx

#### New Options

- System Components Table
  - KX-TDA0177 16-Port Single Line Telephone Extension Card with Caller ID (CSLC16)
  - KX-TDA0192 2-Channel Simplified Voice Message Card (ESVM2)
  - KX-TDA0194 4-Channel Simplified Voice Message Card (ESVM4)
  - 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-T7765 Doorphone

#### New Contents

- 3.11 Connection of DECT 6.0 Portable Stations

## 6.1.2 PMMPR Software File Version 2.01xx

### New Options

- System Components Table
  - KX-NCS4501 1-Channel IP Proprietary Telephone Activation Key (1 IP PT)
  - KX-NCS4701 1-Channel SIP Extension Activation Key (1 SIP Extension)
  - KX-NCS4201 1-Channel IP Softphone/IP Proprietary Telephone Activation Key (1 IP Softphone/IP PT)
  - KX-NCS4204 4-Channel IP Softphone/IP Proprietary Telephone Activation Key (4 IP Softphone/IP PT)
  - KX-NCS4216 16-Channel IP Softphone/IP Proprietary Telephone Activation Key (16 IP Softphone/IP PT)
  - KX-NCS4102 2-Channel IP Trunk Activation Key (2 IP Trunk)
  - KX-NCS4504 4-Channel IP Proprietary Telephone Activation Key (4 IP PT)
  - KX-NCS4704 4-Channel SIP Extension Activation Key (4 SIP Extension)
  - KX-NCS4708 8-Channel SIP Extension Activation Key (8 SIP Extension)
  - KX-NCS4516 16-Channel IP Proprietary Telephone Activation Key (16 IP PT)

### Changed Contents

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



---

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The KX-TDE100UK/KX-TDE200UK, the KX-TDE100NE/KX-TDE200NE, the KX-TDE100GR/KX-TDE200GR, and the KX-TDE100CE/KX-TDE200CE 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 Communications Co., Ltd./Panasonic Communications Company (U.K.) Ltd. declares that this equipment is 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.doc.panasonic.de>**

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	_____ _____ _____
DEALER'S TEL. NO.	_____

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