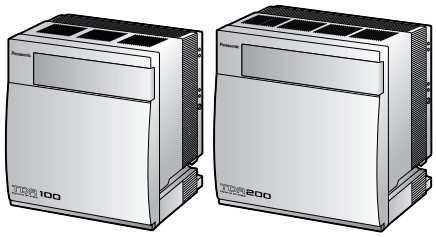
Panasonic

Hybrid IP-PBX

Installation Manual



Model KX-TDA100
KX-TDA200

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

KX-TDA100/KX-TDA200: Version 2.0

SD Logo is a trademark.

System Components

System Components Table

	Model	Description
Shelves	KX-TDA100	Basic Shelf
	KX-TDA200	Basic Shelf
Main Processing Card		Main Processing Card (MPR)
MPR Option Card	KX-TDA0105	Memory Expansion Card (MEC)
	KX-TDA0196	Remote Card (RMT)
Trunk Cards	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/CJ	PRI Card (PRI30)
	KX-TDA0290	PRI Card (PRI23)
	KX-TDA0480	4-Channel VoIP Gateway Card (IP-GW4)
	KX-TDA0484	4-Channel VoIP Gateway Card (IP-GW4E)
	KX-TDA0490	16-Channel VoIP Gateway Card (IP-GW16)
Extension Cards	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-TDA0470	16-Channel VoIP Extension Card (IP-EXT16)

System Components Table

	Model	Description
Other Cards	KX-TDA0161	4-Port Doorphone Card (DPH4)
	KX-TDA0162	2-Port Doorphone Card (German Type) (DPH2)
	KX-TDA0164	4-Port External Input/Output Card (EIO4)
	KX-TDA0166	16-Channel Echo Canceller Card (ECHO16)
	KX-TDA0168	Extension Caller ID Card (EXT-CID)
	KX-TDA0190	Optional 3-Slot Base Card (OPB3)
	KX-TDA0191	4-Channel Message Card (MSG4)
	KX-TDA0410	CTI Link Card (CTI-LINK)
Optional SD Memory Cards	KX-TDA0820	SD Memory Card for Software Upgrade
	KX-TDA0920	SD Memory Card for Software Upgrade to Enhanced Version
Power Supply Units (PSUs)	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)
Cell Stations (CSs)	KX-TDA0141CE	2-Channel Cell Station Unit Using a DHLC/DLC Card (PT-interface CS) for DECT Portable Station
	KX-TDA0141	2-Channel Cell Station Unit Using a DHLC/DLC Card (PT-interface CS) for 2.4 GHz Portable Station
	KX-TDA0142CE	4-Channel Cell Station Unit Using a CSIF Card for DECT Portable Station
	KX-TDA0142	3-Channel Cell Station Unit Using a CSIF Card for 2.4 GHz Portable Station
Proprietary Equipment	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

Available Proprietary Telephones

The Hybrid IP-PBX supports all of the Panasonic KX-T7000, KX-TD7000, KX-TCA, and KX-NT series:

- Digital/Analogue/IP proprietary telephones (e.g., KX-T7625, KX-T7630, KX-T7633, KX-T7636, KX-NT136)
- Portable stations (e.g., KX-TD7590, KX-TD7690, KX-TCA155, KX-TCA255)
- DSS consoles (e.g., KX-T7640)
- Single line telephones (e.g., KX-T7710)

Note

The Hybrid IP-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

For the equipment (e.g., Add-on Key Module, USB Module, Headset[*1]) that can be connected to a particular telephone, refer to the telephone's manual.

For other equipment that can be connected to the Hybrid IP-PBX, refer to "1.2.2 System Connection Diagram".

Abbreviations in this manual

Proprietary telephone: PT

Digital proprietary telephone: DPT

Analogue proprietary telephone: APT

IP proprietary telephone: IP-PT

Portable station: PS

Single line telephone: SLT

Notice

- There are some optional service cards and features that are not available for certain countries/areas. Consult your certified Panasonic dealer for detailed instructions.
- The power supply capacity of the Hybrid IP-PBX may differ from the values described in this manual depending on the model number. Please consult your dealer for detailed information.
- The KX-TDA100CN and KX-TDA200CN have a power supply unit (PSU-S and PSU-M, respectively) pre-installed.

[*1] 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.

Important Safety Instructions

SAFETY REQUIREMENTS

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:

1. Read and understand all instructions.
2. Follow all warnings and instructions marked on the product.
3. Unplug this product from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.
4. Do not use this product near water, for example, near a bathtub, wash bowl, kitchen sink, or laundry tub, in a wet basement, or near a swimming pool.
5. Do not place this product on an unstable cart, stand, or table. The product may fall, causing serious damage to the product.
6. Slots and openings in the cabinet and the back or bottom are provided for ventilation; to protect it from overheating, these openings must not be blocked or covered. The openings should never be blocked by placing the product on a bed, sofa, rug, or other similar surface. This product should never be placed near or over a radiator or other heat source. This product should not be placed in a built-in installation unless proper ventilation is provided.
7. This product should be operated only from the type of power source indicated 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.
8. This product is equipped with a 3-wire earthing type plug, a plug having a third (earthing) pin. This plug will only fit into an earthing type power outlet. This is a safety feature. If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolete outlet. Do not defeat the safety purpose of the earthing type plug.
9. Do not allow anything to rest on the power cord. Do not locate this product where the cord will be abused by people walking on it.
10. Do not overload wall outlets and extension cords as this can result in the risk of fire or electric shock.
11. Never push objects of any kind into this product through cabinet slots as they may touch dangerous voltage points or short out parts that could result in a risk of fire or electric shock. Never spill liquid of any kind on the product.
12. To reduce the risk of electric shock, do not disassemble this product, but take it to a qualified person when some service or repair work is required. Opening or removing covers may expose you to dangerous voltages or other risks. Incorrect reassembly can cause electric shock when the appliance is subsequently used.
13. Unplug this product from the wall outlet and refer servicing to qualified service personnel under the following conditions:
    - **a)** When the power supply cord or plug is damaged or frayed.
    - **b)** If liquid has been spilled into the product.
    - **c)** If the product has been exposed to rain or water.
    - **d)** If the product does not operate normally by following the operating instructions. Adjust only those controls that are covered by the operating instructions because improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the product to normal operation.
    - **e)** If the product has been dropped or the cabinet has been damaged.
    - **f)** If the product exhibits a distinct change in performance.
14. Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electric shock from lightning.

15. Do not use the telephone to report a gas leak in the vicinity of the leak.

SAVE THESE INSTRUCTIONS

Precaution

- Keep the unit away from heating appliances and electrical noise generating devices such as fluorescent lamps, motors and televisions. These noise sources can interfere with the performance of the Hybrid IP-PBX.
- This unit should be kept free of dust, moisture, high temperature (more than 40 °C) and vibration, and should not be exposed to direct sunlight.
- Never attempt to insert wires, pins, etc. into the vents or other holes of this unit.
- If there is any trouble, disconnect the unit from the telephone line. Plug an SLT into the telephone line. If the telephone operates properly, do not reconnect the unit to the line until the trouble has been repaired by an authorised Panasonic Factory Service Centre. If the telephone does not operate properly, chances are that the trouble is in the telephone network, and not in the Hybrid IP-PBX.
- Do not use benzene, thinner, or the like, or any abrasive powder to clean the cabinet. Wipe it with a soft cloth.

For users in Germany only

- When the unit is working, the noise is less than 70 dB (A) according to DIN 45635 Part 19.

For users in Finland, Norway and Sweden only (KX-TDA100/KX-TDA200 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 "2.2.5 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 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 sent to ensure that modem calls are answered between 3 and 30 seconds of receipt of ringing.
- IMPORTANT NOTICE
  Under power failure conditions, the wireless telephones may not operate. Please ensure that a separate telephone, not dependent on local power, is available for emergency use in emergencies.

For users in Australia only

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

WARNING

- **THIS UNIT MAY ONLY BE INSTALLED AND SERVICED BY QUALIFIED SERVICE PERSONNEL.**

- **WHEN A FAILURE OCCURS WHICH EXPOSES ANY INTERNAL PARTS, DISCONNECT THE POWER SUPPLY CORD IMMEDIATELY AND RETURN THIS UNIT TO YOUR DEALER.**
- **DISCONNECT THE TELECOM CONNECTION BEFORE DISCONNECTING THE POWER CONNECTION PRIOR TO RELOCATING THE EQUIPMENT, AND RECONNECT THE POWER FIRST.**
- **THIS UNIT IS EQUIPPED WITH AN EARTHING CONTACT PLUG. FOR SAFETY REASONS THIS PLUG MUST ONLY BE CONNECTED TO AN EARTHING CONTACT SOCKET WHICH HAS BEEN INSTALLED ACCORDING TO REGULATIONS.**
- **TO PREVENT THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS PRODUCT TO RAIN OR MOISTURE.**
- **THE POWER SUPPLY CORD IS USED AS THE MAIN DISCONNECT DEVICE. ENSURE THAT THE SOCKET-OUTLET IS LOCATED/INSTALLED NEAR THE EQUIPMENT AND IS EASILY ACCESSIBLE.**

CAUTION

DANGER OF EXPLOSION EXISTS IF THE BATTERY IS INCORRECTLY REPLACED. REPLACE THE BATTERY WITH THE SAME OR EQUIVALENT TYPE RECOMMENDED BY THE BATTERY MANUFACTURER. DISPOSE OF USED BATTERIES ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.

The serial number of this product may be found on the label affixed to the side of the unit. You should note the model number and the serial number of this unit in the space provided and retain this book as a permanent record of your purchase to aid in identification in the event of theft.

MODEL No.: _____

SERIAL No.: _____

For your future reference

DATE OF PURCHASE _____

NAME OF DEALER _____

DEALER'S ADDRESS _____

_____

_____

_____

DEALER'S TEL. NO. _____

CE

The KX-TDA100E/KX-TDA200E, the KX-TDA100NE/KX-TDA200NE, the KX-TDA100GR/KX-TDA200GR, and the KX-TDA100CE/KX-TDA200CE 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)

We, Panasonic Communications Co., Ltd./Panasonic Communications Company (U.K.) Ltd., declare that this equipment is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.
If you would like to receive a copy of the original Declaration of Conformity of our products which relates to the R&TTE, please visit our web address:

http://doc.panasonic.de

Introduction

This Installation Manual is designed to serve as an overall technical reference for the Panasonic Hybrid IP-PBX, KX-TDA100/KX-TDA200. It provides instructions for installing the hardware, and programming the Hybrid IP-PBX using the KX-TDA Maintenance Console.

The Structure of this Manual

This manual contains the following sections:

Section 1 System Outline

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

Section 2 Installation

Describes the procedures to install the Hybrid IP-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 3 Guide for the KX-TDA Maintenance Console

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

Section 4 Troubleshooting

Provides information on the Hybrid IP-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 Hybrid IP-PBX, and step-by-step instruction for performing system programming using a proprietary telephone or a personal computer (PC).

User Manual

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

Trademarks

Precautions 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 SOCKET 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 this mains leads are coloured in accordance with the following code:

Green-and-yellow: Earth

Blue: Neutral

Brown: Live

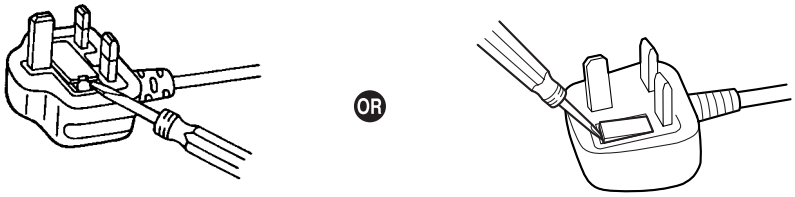
As the colours of the wires in the mains lead of this apparatus may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows.

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 exchange 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 (999) and (112) service.

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.

Table of Contents

Section 1
System Outline

This section provides general information on the Hybrid IP-PBX, including the system capacity and specifications.

1.1 System Highlights

1.1.1 System Highlights

Networking Features

This Hybrid IP-PBX supports the following networking features:

TIE Line Service

A TIE line is a privately leased communication line between 2 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 telephone company. It uses an existing line as if it were a private line.

QSIG Network

QSIG is a protocol which is based on ISDN (Q.931) and offers enhanced PBX features in a private network.

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.

Built-in Small Call Centre Features

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

Queuing Feature

When a preprogrammed number of extensions in an incoming call distribution group are busy, additional incoming calls can wait in a queue. While calls are waiting in the queue, the calls are handled by the Queuing Time Table, which can be assigned for each time mode (day/lunch/break/night).

Log-in/Log-out

Incoming call distribution group members can join (**Log-in**) or leave (**Log-out**) the groups manually. While logged-in, a member extension can have a preprogrammed time period automatically for refusing calls after completing the last call (**Wrap-up**).

VIP Call

It is possible to assign a priority to incoming call distribution groups. If an extension belongs to multiple groups and the extension becomes idle, queuing calls in the groups will be distributed to the extension in priority order.

Computer Telephony Integration (CTI) Features

Connecting a personal computer (PC) to a DPT, or connecting a Server PC to this Hybrid IP-PBX allows function of the PC, PBX and extension to be integrated so that, 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.

Voice Mail Features

This Hybrid IP-PBX supports Voice Processing Systems (VPS) with DTMF Integration as well as DPT (Digital) Integration.

Parallelled Telephone Features

By connecting telephones in parallel, you can increase the number of telephones connected to the PBX without adding additional extension cards.

Parallel Mode

An SLT can be connected to an APT or DPT which is connected to a Super Hybrid Port of the PBX. The SLT shares the same extension number with the APT or DPT.

EXtra Device Port (XDP) Mode

An SLT can be connected to a DPT which is connected to a Super Hybrid Port of the PBX. Unlike parallel mode, XDP mode allows each telephone to act as an independent extension with its own extension number.

Digital XDP

A DPT can be connected to another DPT which is connected to a DPT port or a Super Hybrid Port of the PBX. Similar to XDP mode, each DPT acts as an independent extension with its own extension number.

Portable Station (PS) Features

PSs (e.g., KX-TD7690) can be connected to this Hybrid IP-PBX. It is possible to use the Hybrid IP-PBX features using the PS like a PT. 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.

PC Phone/PC Console Features

This Hybrid IP-PBX supports PC Phone and PC Console. These Panasonic CTI applications provide advanced features combining telephone and PC, such as the ability to display detailed caller information, including a photograph, on the screen of the PC when a call is received, or to dial a telephone number automatically just by selecting a name.

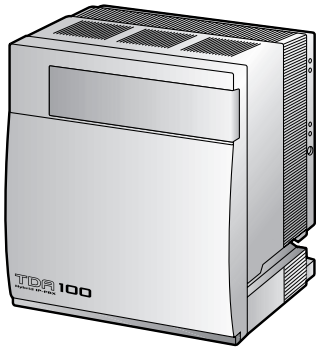
Hospitality Features

This Hybrid IP-PBX has several features that support its use in a hotel-type environment. Extensions corresponding to guest rooms can be "checked in" or "checked out" by a designated hotel operator, who can also check or set wake-up calls, and print out records of guest charges.

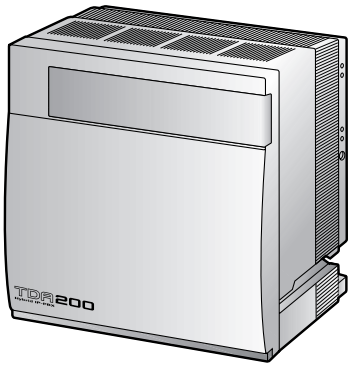
1.2 Basic System Construction

1.2.1 Basic Shelf

The basic shelf contains an MPR card. For system expansion, optional service cards and a power supply unit can be installed in the basic shelf.



KX-TDA100

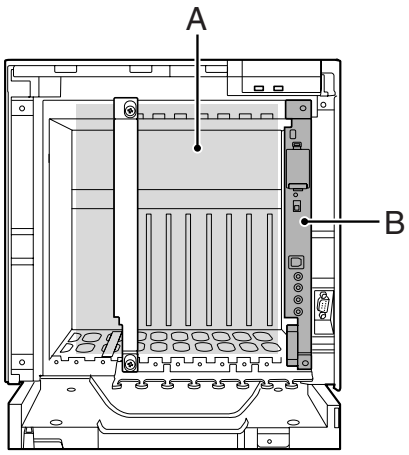


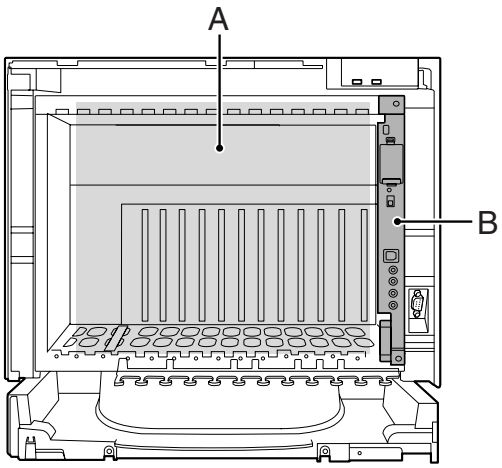
KX-TDA200

Construction of Basic Shelf

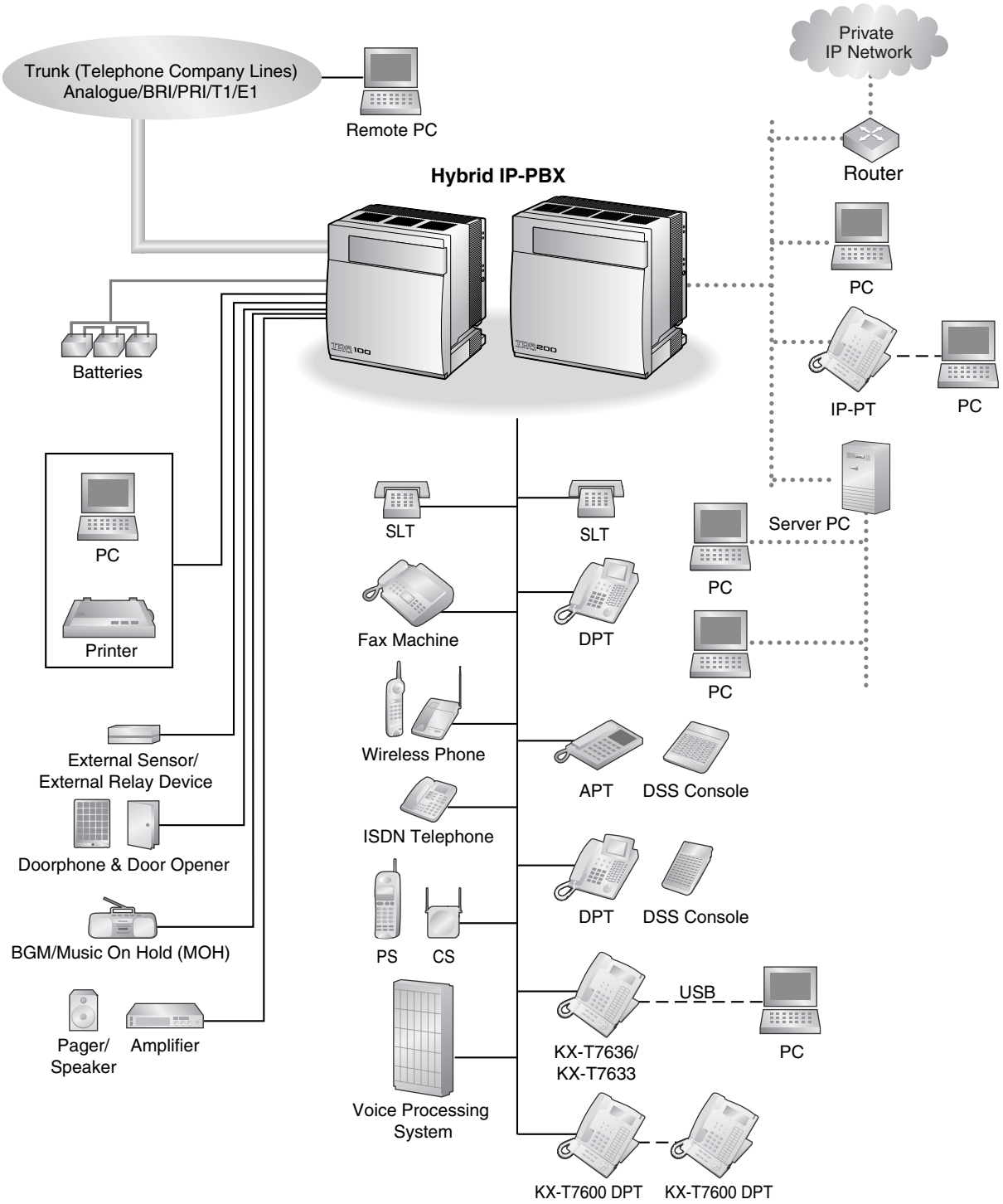
A: Slots for Expansion

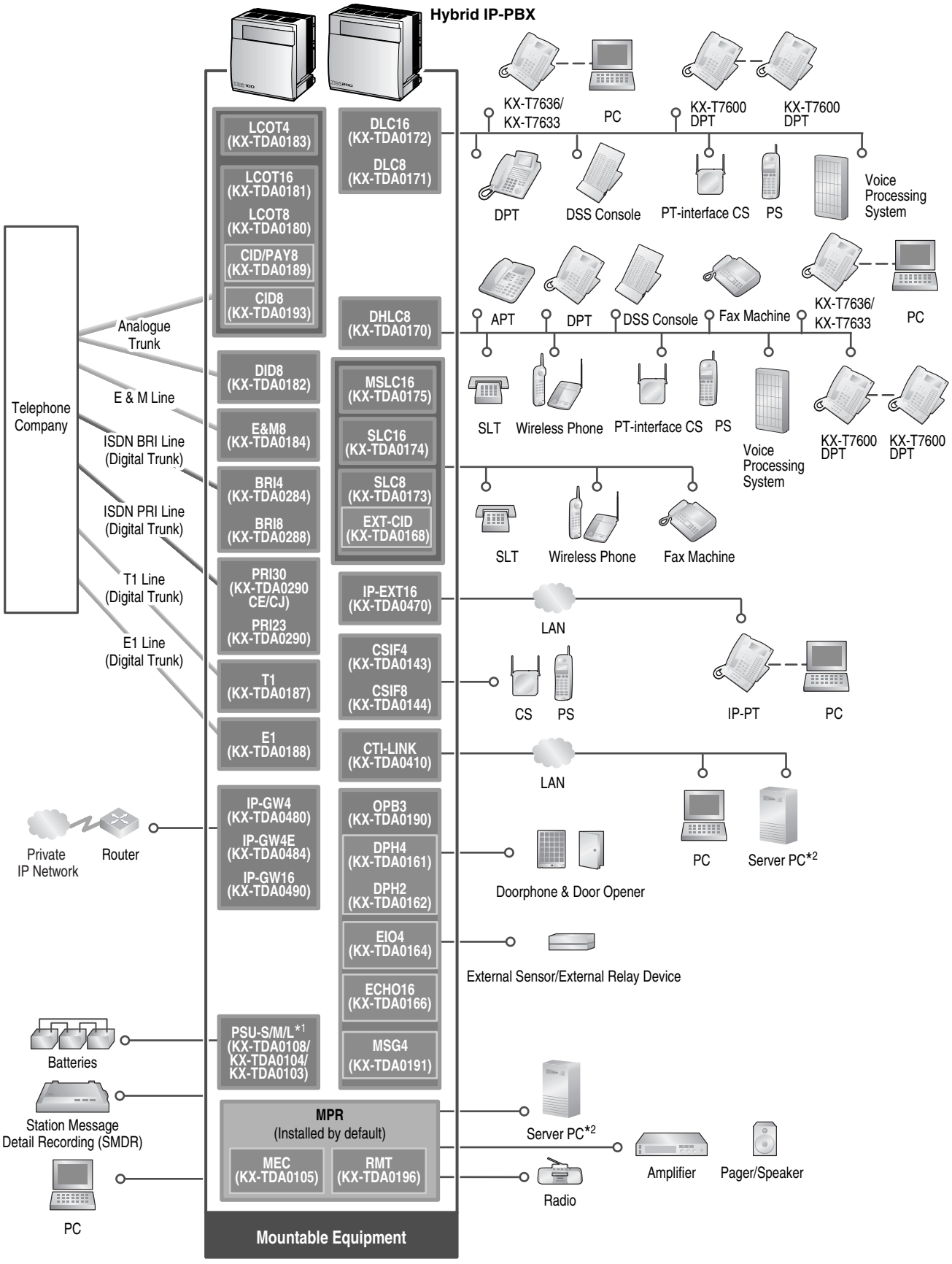
B: MPR Card





1.2.2 System Connection Diagram




Hybrid IP-PBX
LCOT4 (KX-TDA0183)
LCOT16 (KX-TDA0181)
LCOT8 (KX-TDA0180)
CID/PAY8 (KX-TDA0189)
CID8 (KX-TDA0193)
DLC16 (KX-TDA0172)
DLC8 (KX-TDA0171)
DHLC8 (KX-TDA0170)
DID8 (KX-TDA0182)
E&M8 (KX-TDA0184)
BRI4 (KX-TDA0284)
BRI8 (KX-TDA0288)
PRI30 (KX-TDA0290 CE/CJ)
PRI23 (KX-TDA0290)
T1 (KX-TDA0187)
E1 (KX-TDA0188)
MSLC16 (KX-TDA0175)
SLC16 (KX-TDA0174)
SLC8 (KX-TDA0173)
EXT-CID (KX-TDA0168)
IP-EXT16 (KX-TDA0470)
CSIF4 (KX-TDA0143)
CSIF8 (KX-TDA0144)
CTI-LINK (KX-TDA0410)
IP-GW4 (KX-TDA0480)
IP-GW4E (KX-TDA0484)
IP-GW16 (KX-TDA0490)
OPB3 (KX-TDA0190)
DPH4 (KX-TDA0161)
DPH2 (KX-TDA0162)
EIO4 (KX-TDA0164)
ECHO16 (KX-TDA0166)
MSG4 (KX-TDA0191)
PSU-S/M/L*1 (KX-TDA0108/ KX-TDA0104/ KX-TDA0103)
MPR
(Installed by default)
MEC (KX-TDA0105)
RMT (KX-TDA0196)
Mountable Equipment
Telephone Company
Analogue Trunk
E & M Line
ISDN BRI Line (Digital Trunk)
ISDN PRI Line (Digital Trunk)
T1 Line (Digital Trunk)
E1 Line (Digital Trunk)
KX-T7636/ KX-T7633
PC
KX-T7600 DPT
KX-T7600 DPT
DPT
DSS Console
PT-interface CS
PS
Voice Processing System
APT
DPT
DSS Console
Fax Machine
KX-T7636/ KX-T7633
PC
SLT
Wireless Phone
PT-interface CS
PS
Voice Processing System
KX-T7600 DPT
KX-T7600 DPT
SLT
Wireless Phone
Fax Machine
LAN
CS
PS
IP-PT
PC
LAN
PC
Server PC*2
Private IP Network
Router
Doorphone & Door Opener
External Sensor/External Relay Device
Batteries
Station Message Detail Recording (SMDR)
PC
Server PC*2
Amplifier
Pager/Speaker
Radio

*1 The KX-TDA100CN and KX-TDA200CN have a power supply unit (PSU-S and PSU-M, respectively) pre-installed.
*2 Only 1 Server PC can be connected to the Hybrid IP-PBX. Two or more Server PCs cannot be used simultaneously.

1.3 Options

1.3.1 Options

Model No.	Model Name	Description
KX-TDA0105	Memory Expansion Card (MEC)	Memory expansion card to increase system data storage space, enable Broadcasting and Call Billing for Guest Room features, and double the number of DPTs, using Digital XDP connection. To be mounted on the MPR card.
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.
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.
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-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.

Model No.	Model Name	Description
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 ports of 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, DPH4, DPH2, or ECHO16 card.
KX-TDA0191	4-Channel Message Card (MSG4)	4-channel message card. 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.
KX-TDA0196	Remote Card (RMT)	Analogue modem card for remote communication with the Hybrid IP-PBX. V90 support. To be mounted on the MPR 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/CJ	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-TDA0410	CTI Link Card (CTI-LINK)	Ethernet card for CTI communication via 10BASE-T port. CSTA Phase 3 protocol compatible.
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-TDA0480	4-Channel VoIP Gateway Card (IP-GW4)	4-channel VoIP gateway card. Compliant with VoIP H.323 V.2 protocol, and ITU-T G.729a and G.723.1 CODEC methods. G3 fax support.
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.

Model No.	Model Name	Description
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.
KX-TDA0103	L-Type Power Supply Unit (PSU-L)	Power Supply Unit for KX-TDA200. Total power output of 279 W. Safety Class 1 compliant.
KX-TDA0104	M-Type Power Supply Unit (PSU-M)	Power Supply Unit for KX-TDA100 and KX-TDA200. Total power output of 140.4 W. Safety Class 1 compliant.
KX-TDA0108	S-Type Power Supply Unit (PSU-S)	Power Supply Unit for KX-TDA100. Total power output of 74 W. Safety Class 1 compliant.
KX-TDA0820	SD Memory Card for Software Upgrade	Optional SD Memory Card to upgrade the Hybrid IP-PBX with software version 1 or 1.1 to version 2.0.
KX-TDA0920	SD Memory Card for Software Upgrade to Enhanced Version	Optional SD Memory Card to upgrade the Hybrid IP-PBX with software version 1 or 1.1 to version 2.0, and for NDSS feature and CTI enhancement.

1.4 Specifications

1.4.1 General Description

Control Bus		Original bus (16-bit, 8 MHz, 10 megabytes per second)
Communication Bus		H.100 bus conformity (1024 time slot)
Switching		Non-blocking
Power Input	**PSU-S**	100 V AC to 130 V AC, 1.4 A/200 V AC to 240 V AC, 0.8 A, 50 Hz/60 Hz
	PSU-M	100 V AC to 130 V AC, 2.5 A/200 V AC to 240 V AC, 1.4 A, 50 Hz/60 Hz
	PSU-L	100 V AC to 130 V AC, 5.1 A/200 V AC to 240 V AC, 2.55 A, 50 Hz/60 Hz
External Battery		+36 V DC (+12 V DC × 3, battery capacity of 28 Ah or below recommended for each external battery)
Maximum Power Failure Tolerance		300 ms (without using backup batteries)
Memory Backup Duration		7 years
Dialling	**Trunk**	Dial Pulse (DP) 10 pps, 20 pps Tone (DTMF) Dialling
	Extension	Dial Pulse (DP) 10 pps, 20 pps Tone (DTMF) Dialling
Mode Conversion		DP-DTMF, DTMF-DP
Ring Frequency		20 Hz/25 Hz (selectable)
Trunk Loop Limit		1600 Ω maximum
Operating Environment	**Temperature**	0 °C to 40 °C
	Humidity	10 % to 90 % (non-condensing)
Conference Call Trunk		From 10 × 3-party conference call to 4 × 8-party conference call
Music on Hold (MOH)		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
Paging	**Internal**	Level Control: -15 dB to +6 dB in 3 dB steps
	External	2 ports (Volume Control: -15 dB to +15 dB in 1 dB steps)
Serial Interface Port	**RS-232C**	1 (maximum 115.2 kbps)
	USB	1

Extension Connection Cable		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)
		DSS Console and Add-on Key Module	1-pair wire (D1, D2)
Dimension	**KX-TDA100**	334 mm (W) × 390 mm (H) × 270 mm (D)	
	KX-TDA200	430 mm (W) × 415 mm (H) × 270 mm (D)	
Weight (when fully mounted)	**KX-TDA100**	Under 12 kg	
	KX-TDA200	Under 16 kg	

1.4.2 Characteristics

Terminal Equipment Loop Limit	• PT: KX-T7600 series: 90 Ω; all other DPTs/APTs: 40 Ω • SLT: 60 Ω including set • Doorphone: 20 Ω • CS: 130 Ω; PT-interface CS: 65 Ω
Minimum Leakage Resistance	15 000 Ω minimum
Maximum Number of Extension Instruments per Line	**1** for PT or SLT **2** by Parallel or eXtra Device Port connection of an APT/DPT and an SLT **3** by Digital eXtra Device Port connection of two DPTs and an SLT
Ring Voltage	75 Vrms at 20 Hz/25 Hz depending on the Ringing Load
Trunk Loop Limit	1600 Ω maximum
Hookswitch Flash/Recall Timing Range	24 ms to 2032 ms
BRI Cards Internal ISDN Mode	Supply Voltage: 40 V Power Supply: 4.5 W per 1 line, 10 W per 4 lines (BRI4) 4.5 W per 1 line, 20 W per 8 lines (BRI8) Power Supply Method: Phantom Power Supply
Door Opener Current Limit	24 V DC/30 V AC, 1 A maximum
External Relay Current Limit	24 V DC/30 V AC, 1 A maximum
External Sensor Current Limit	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 "2.6.4 EIO4 Card". The Hybrid IP-PBX detects input from the sensor when the signal is under 100 Ω.
Paging Terminal Impedance	600 Ω
MOH (Music on Hold) Terminal Impedance	10 000 Ω

1.4.3 System Capacity

Maximum Optional Service Cards

There are 2 types of optional service cards for installation:

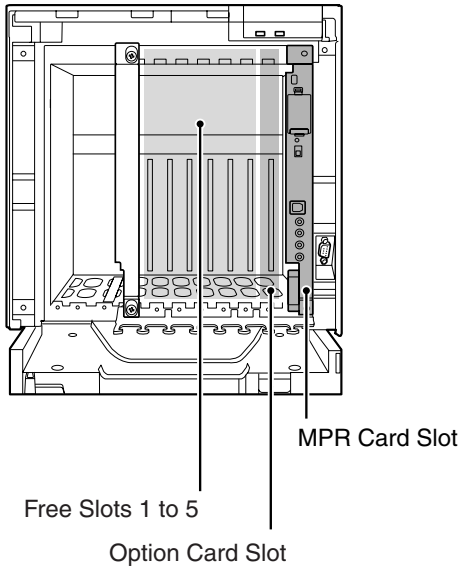
- Cards installed in the slots of the Hybrid IP-PBX
- Cards mounted on other optional service cards

Notes

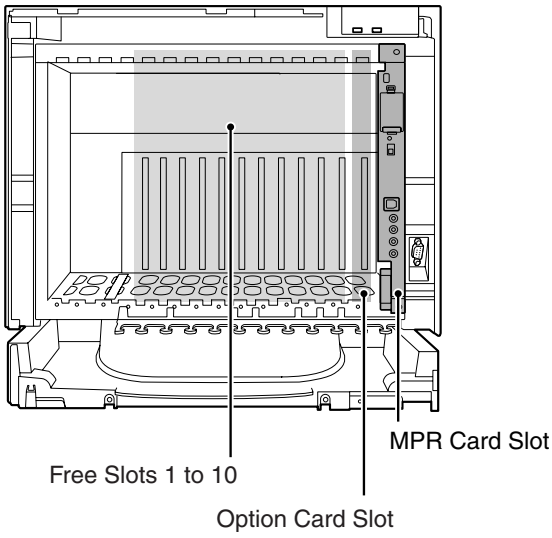
- Any card that exceeds the capacity of the Hybrid IP-PBX will be ignored.
- When the Hybrid IP-PBX starts up with an invalid configuration, some cards will be ignored.

Cards Installed in the Slots of the Hybrid IP-PBX

KX-TDA100



KX-TDA200



The following number of optional service cards can be installed in the various slots of the Hybrid IP-PBX.

<table>
<tr><th colspan="2" rowspan="2">Card Type</th><th colspan="2">Maximum Number</th><th rowspan="2">Installed in</th></tr>
<tr><th>KX-TDA100</th><th>KX-TDA200</th></tr>
<tr><td colspan="2">MPR</td><td>1</td><td>1</td><td>MPR Card Slot</td></tr>
<tr><td colspan="2">Trunk Card</td><td>Total 4*1</td><td>Total 8*1</td><td rowspan="20">Free Slot</td></tr>
<tr><td rowspan="8"></td><td>LCOT4</td><td rowspan="8">4</td><td rowspan="8">8</td></tr>
<tr><td>LCOT8</td></tr>
<tr><td>LCOT16</td></tr>
<tr><td>DID8</td></tr>
<tr><td>E&M8</td></tr>
<tr><td>BRI4</td></tr>
<tr><td>BRI8</td></tr>
<tr><td rowspan="4">T1
E1
PRI23
PRI30</td><td rowspan="4">2</td><td rowspan="4">4</td></tr>
<tr><td rowspan="3">IP-GW4
IP-GW4E
IP-GW16</td><td rowspan="3">2</td><td rowspan="3">4</td></tr>
<tr><td colspan="2">Extension Card</td><td>Total 4</td><td>Total 8</td></tr>
<tr><td rowspan="8"></td><td>DHLC8</td><td rowspan="8">4</td><td rowspan="8">8</td></tr>
<tr><td>DLC8</td></tr>
<tr><td>DLC16</td></tr>
<tr><td>SLC8</td></tr>
<tr><td>SLC16</td></tr>
<tr><td>MSLC16</td></tr>
<tr><td>IP-EXT16</td></tr>
<tr><td rowspan="2">CSIF4
CSIF8</td><td rowspan="2">2</td><td rowspan="2">4</td></tr>
</table>

Card Type	Maximum Number		Installed in
	KX-TDA100	KX-TDA200	
OPB3	2	4	Option Card Slot/Free Slot
CTI-LINK	1	1	

*1 One T1, E1, PRI30, PRI23, or IP-GW4 card counts as 2 cards. However, one IP-GW4E card counts as 1 card.

Cards Mounted on Other Optional Service Cards

The following number of optional service cards can be mounted on the specified other optional service cards.

Card Type	Maximum Number		Mounted on
	KX-TDA100	KX-TDA200	
MEC	1	1	MPR Card
RMT	1	1	
CID/PAY8	8	16	LCOT8 Card/LCOT16 Card
CID8			
EXT-CID	4	8	SLC8 Card
DPH4	2	4	OPB3 Card
DPH2	4	8	
ECHO16	2*1	4*1	
MSG4	2	4	
EIO4	2	4	

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

Maximum Terminal Equipment

The following number of items of terminal equipment can be supported by the Hybrid IP-PBX. For how to count the total number of items of equipment to be connected, refer to "MEC Card Calculation".

Terminal Equipment Type	KX-TDA100		KX-TDA200	
	Without MEC Card	With MEC Card	Without MEC Card	With MEC Card
Telephone*1	88	152	176	304
SLT, APT, DPT and IP-PT	64	128	128	256
SLT	64	64	128	128
APT/DPT	64	128	128	256
IP-PT	64	64	128	128
DSS console	8		8	
CS	16		32	
PS	128		128	
Voice Processing System (VPS)	2		2	
Doorphone	8		16	
Door Opener	8		16	
External Sensor	8		16	
External Relay	8		16	
Add-on Key Module	64	128	128	256
USB Module	64		128	

*1 A single "T1-OPX (Off Premise Extension) port" or "BRI/PRI extension port" is counted as a wired telephone.

MEC Card Calculation

Calculate the MEC figure from the type and total number of items of equipment to be connected. If the MEC figure exceeds 64 (for KX-TDA100) or 128 (for KX-TDA200), you need to install an MEC card.

MEC Card Calculation

Equipment Type		MEC Figure
PT	KX-T7600 series DPT/DSS console	1
	KX-T7560/KX-T7565 DPT	1
	Other DPT/DSS console	1
	APT	1
	IP-PT	1

Equipment Type		MEC Figure
Extension Card*1	DHLC8	8
	SLC8	8
	SLC16	16
	MSLC16	16
CS (1 unit)		0
PT-interface CS (1 unit)		0
ISDN Extension		0
VPS (1 port)		1

*1 Only the extension cards that can support SLTs count for the MEC figures.

Calculation Example (KX-TDA100)

Equipment Type		MEC Figure
KX-T7600 series DPT	48 units	48
SLC16	1 card	16
MSLC16	1 card	16
VPS	8 ports	8
Total		88

The total MEC figure is 88. As this exceeds 64, you need to install an MEC card for this configuration.

Power Supply Unit Selection

The Hybrid IP-PBX needs an optional 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-T7600 series DPT/DSS console	1
	KX-T7560/KX-T7565 DPT	1
	Other DPT/DSS console	4
	APT	4
	IP-PT	0
Extension Card*1	DHLC8	8
	SLC8	8
	SLC16	16
	MSLC16	16

Equipment Type	Load Figure
CS (1 unit)	4
PT-interface CS (1 unit)	4
ISDN Extension	2
VPS (1 port)	1

*1 Only the extension cards that can support SLTs count for the load figures.

PSU Capability

Each PSU supports a different amount of load figures.

PSU Type	Maximum Load Figures
PSU-S*1	64
PSU-M*2	128
PSU-L*3	512

*1 Available for the KX-TDA100
*2 Available for the KX-TDA100 and KX-TDA200
*3 Available for the KX-TDA200

Calculation Example (KX-TDA200)

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.

Section 2
Installation

This section describes the procedures to install the Hybrid IP-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.

2.1 Before Installation

2.1.1 Before Installation

Please read the following notes concerning installation and connection before installing the Hybrid IP-PBX. Be sure to comply with applicable local regulations (e.g., law, guidelines).

Safety Installation Instructions

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:

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

Installation Precautions

This set is made for wall mounting (KX-TDA100/KX-TDA200) or floor standing (KX-TDA200 only). Avoid installing in the following places. (Doing so may result in malfunction, noise, or discolouration.)

1. In direct sunlight and hot, cold, or humid places.
   Temperature range: 0 °C to 40 °C
2. Sulphuric gases produced in areas where there are thermal springs, etc. may damage the equipment or contacts.
3. Places in which shocks or vibrations are frequent or strong.
4. Dusty places, or places where water or oil may come into contact with the unit.
5. Near high-frequency generating devices such as sewing machines or electric welders.
6. On or near computers, telexes, or other office equipment, as well as microwave ovens or air conditioners. (It is preferable not to install in the same room with the above equipment.)
7. Closer than 1.8 m to radios and televisions (both the Hybrid IP-PBX and PTs).
8. Do not obstruct the area around the Hybrid IP-PBX (for reasons of maintenance and inspection—be especially careful to allow at least 20 cm above and 10 cm at the sides of the Hybrid IP-PBX for cooling).
9. Do not block the openings at top of the Hybrid IP-PBX.
10. Do not stack up the optional service cards.

Wiring Precautions

Be sure to follow these instructions when wiring.

1. Do not wire the telephone cable in parallel with an AC power source, computer, telex, etc. If the cables are run near those wires, shield the cables with metal tubing or use shielded cables and ground the shields.
2. If cables are run on the floor, use protectors to prevent the wires from being stepped on. Avoid wiring under carpets.

3. Avoid using the same power supply outlet for computers, telexes, and other office equipment. Otherwise, the Hybrid IP-PBX operation may be interrupted by the inducted noise from such equipment.
4. Please use 1-pair telephone wire for extension connection of (telephone) equipment such as standard telephones, data terminals, answering machines, computers, Voice Processing Systems, etc., except PTs (e.g., KX-T7600 series).
5. The power switch and battery switch of the Hybrid IP-PBX must be off during wiring. After the wiring is completed, turn the power switch on.
6. Mis-wiring may cause the Hybrid IP-PBX to operate improperly.
7. If an extension does not operate properly, disconnect the telephone from the extension line and then connect again, or turn the power to the Hybrid IP-PBX off and on again.
8. The Hybrid IP-PBX is equipped with a 3-wire earthing type plug. This is a safety feature. If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolete outlet. Do not defeat the purpose of the earthing-type plug.
9. Use twisted pair cable for trunk connection.
10. Trunks should be installed with surge protectors. For details, refer to "2.2.14 Surge Protector Installation".

2.2 Installation of the Hybrid IP-PBX

2.2.1 Unpacking

Unpack the box and check the items below:

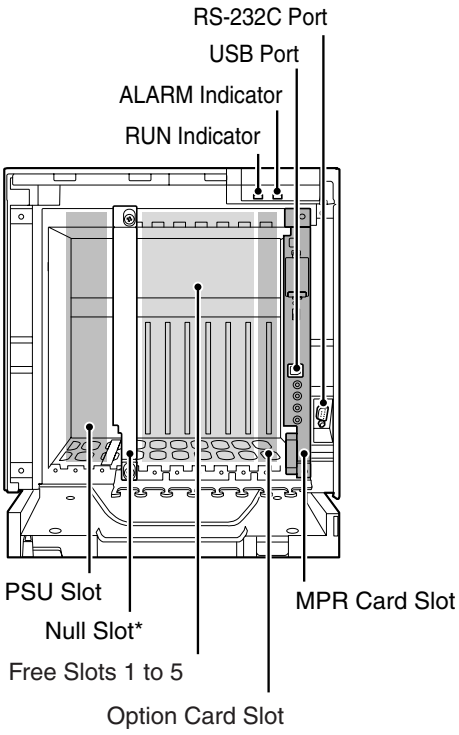
	KX-TDA100	KX-TDA200
Main Unit	1	1
AC Cord with a Ferrite Core*1	1	1
Metal Bracket	1	1
Screw A	3	4
Screw B (Black)	2	6
Anchor Plug	3	4
Mini Plug (for pager and music source)	4	4
SD Memory Card	1	1

*1 In Canada, there is no ferrite core attached to the AC cord.

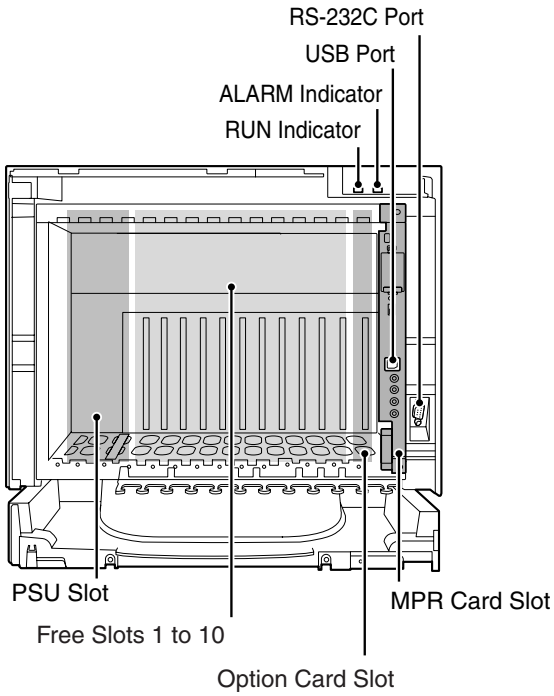
2.2.2 Names and Locations

Inside View

KX-TDA100



KX-TDA200



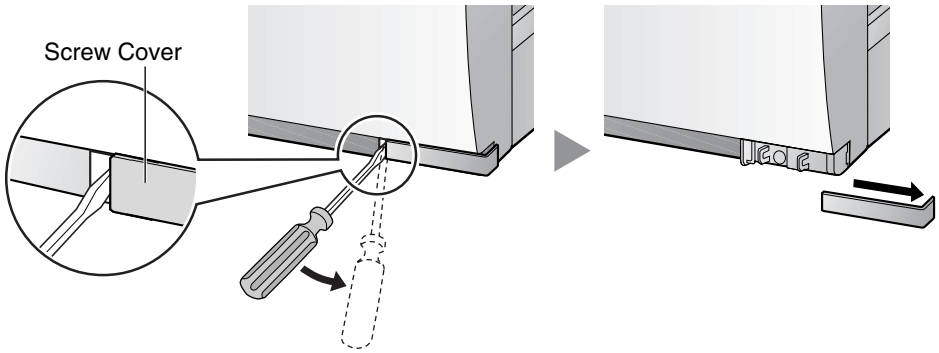
Note

* Null slot is not available for any optional service card.

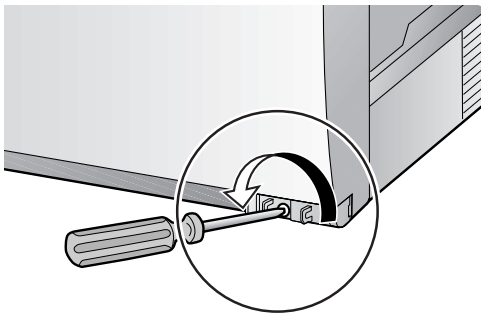
2.2.3 Opening/Closing the Front Cover

Opening the Front Cover

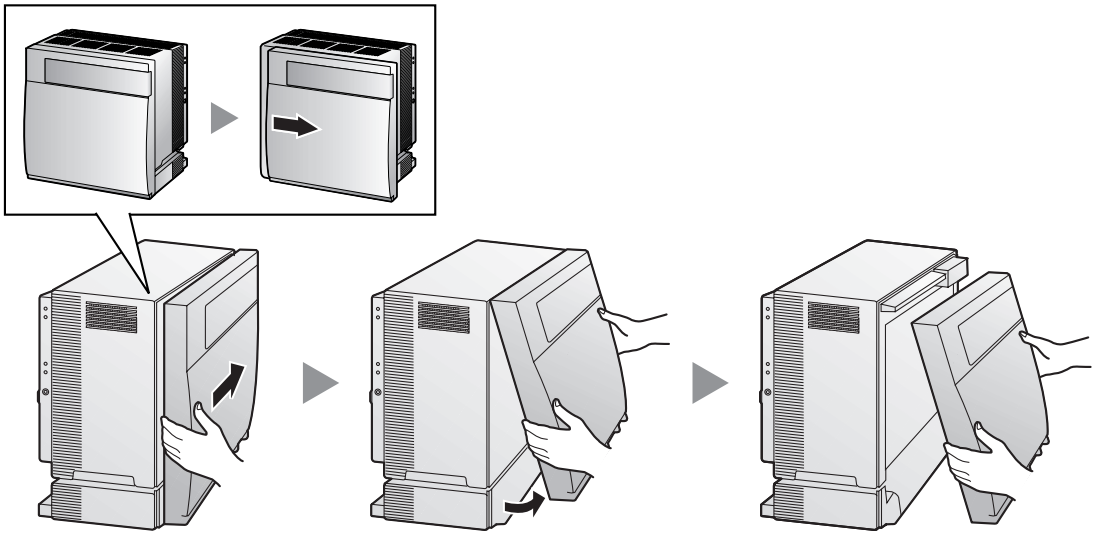
1. Insert a flathead screwdriver into the opening (on the left of the screw cover) and unlatch the screw cover.



2. Turn the screw anticlockwise to loosen.

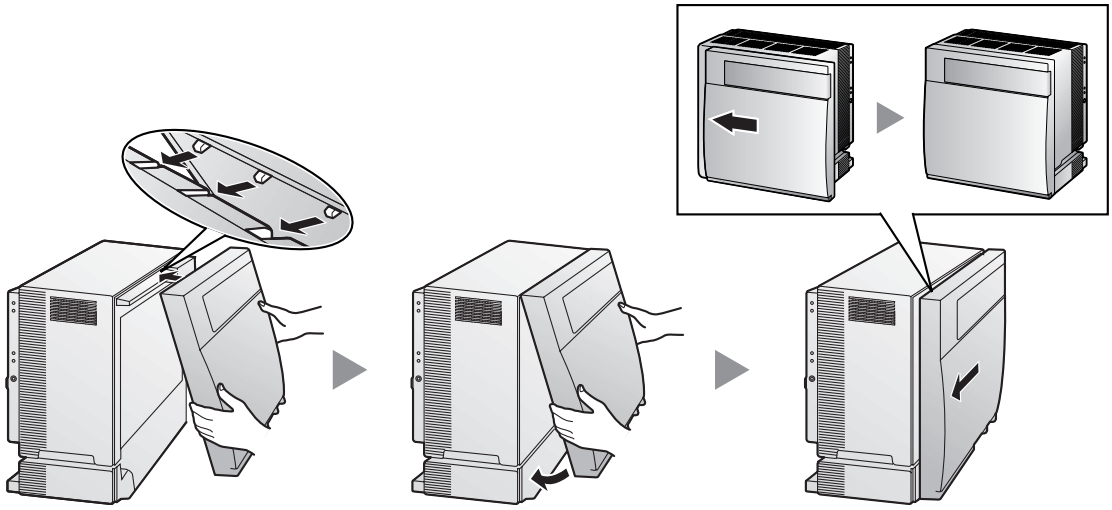


3. Slide the front cover to the right until it stops, then lift the front cover.

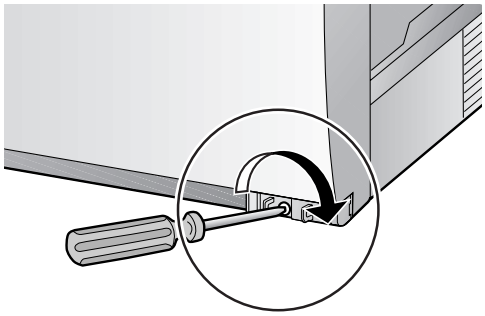


Closing the Front Cover

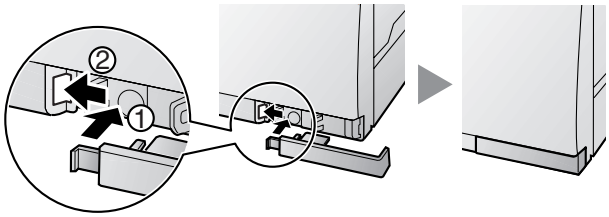
1. Hook the front cover onto the cabinet (line up the protrusions on the cover with the receptacles on the cabinet). Then slide the front cover to the left until it locks.



2. Turn the screw clockwise to tighten.



3. Secure the screw cover.



Notes

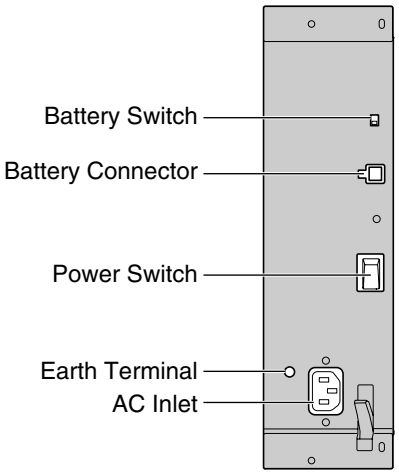
- For safety reasons, close the front cover and tighten the screw when the Hybrid IP-PBX is in operation.
- Do not forget to tighten the screw before securing the screw cover.

2.2.4 Installing/Replacing the Power Supply Unit

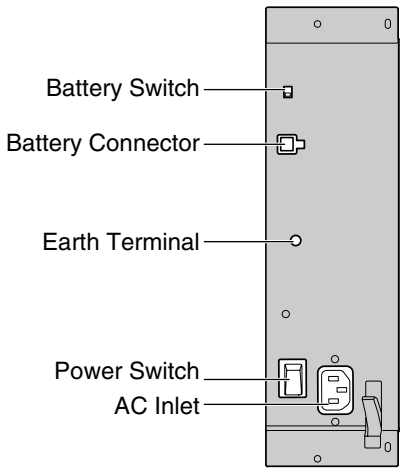
Function

PSU Type	Lower/Upper Input Voltage Range	Current	Input Frequency
PSU-S (for KX-TDA100)	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	
PSU-M (for KX-TDA100/200)	Lower: 100 V AC to 130 V AC	2.5 A	
	Upper: 200 V AC to 240 V AC	1.4 A	
PSU-L (for KX-TDA200)	Lower: 100 V AC to 130 V AC	5.1 A	
	Upper: 200 V AC to 240 V AC	2.55 A	

PSU-S



PSU-M/PSU-L



Accessory and User-supplied Items

Accessory (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)

Notes

- For details about frame earth connection, refer to "2.2.5 Frame Earth Connection".
- For details about backup batteries connection, refer to "2.2.6 Backup Batteries 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 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 PSU during a lightning storm.
2. Never install or replace PSU in wet locations.

3. Never install or replace 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.

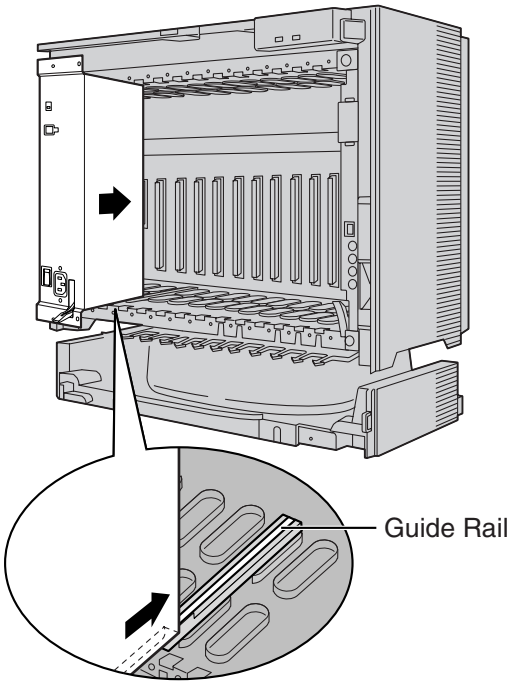
The following procedures are for installing or replacing a PSU only. Do not replace or remove the PSU for any other purpose.

Installing the Power Supply Unit

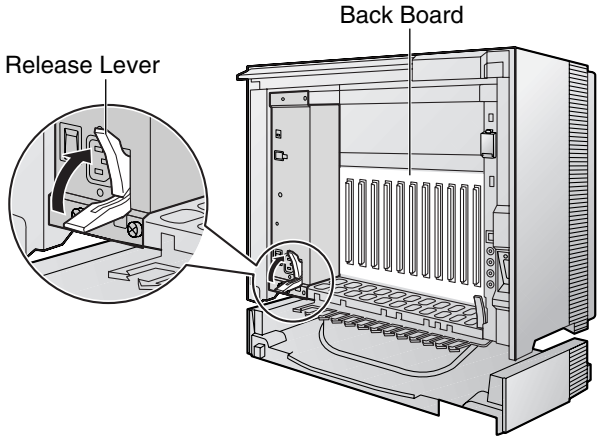
1. Insert the PSU along the guide rails.

CAUTION

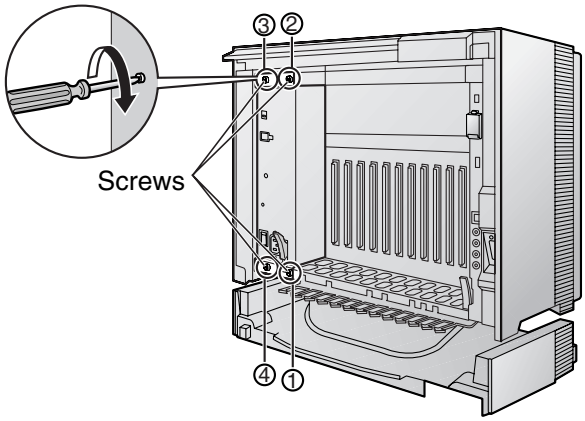
For safety reasons, do not touch parts in the PSU.



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

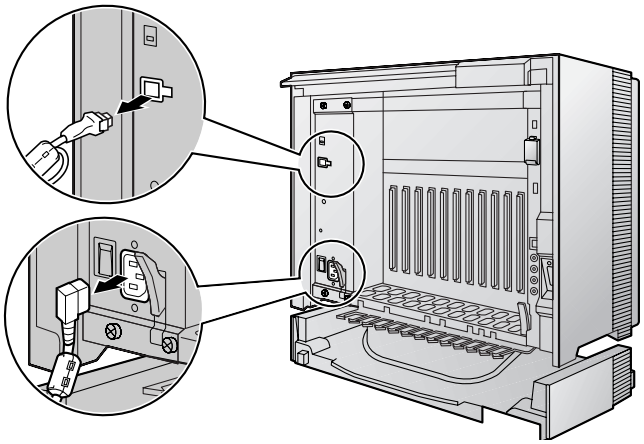


3. Turn the 4 screws clockwise, in the order indicated by the numbers 1 to 4, to fix the PSU.

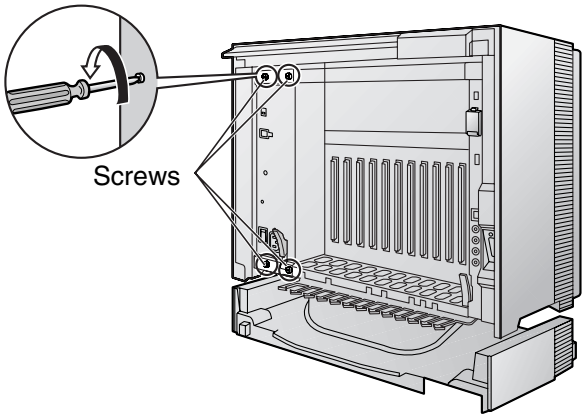


Replacing the Power Supply Unit

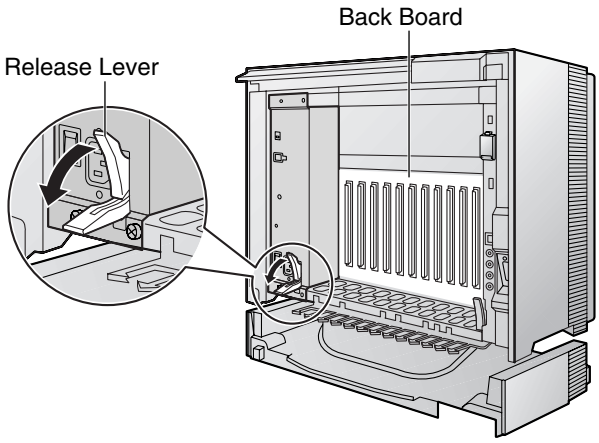
1. Unplug the AC power cord and Back-up Battery Cable.



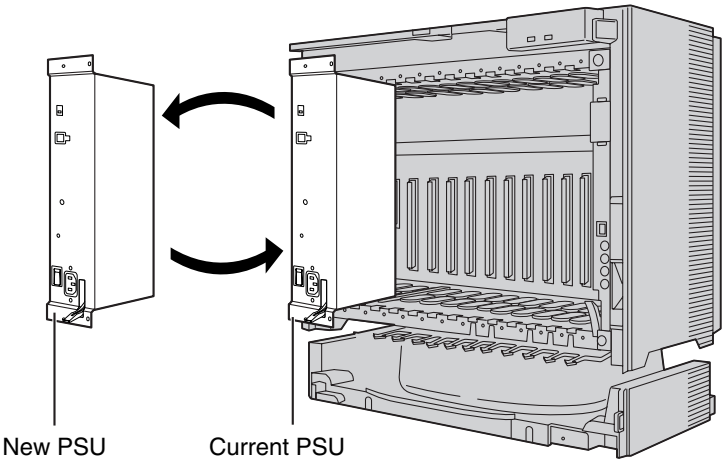
2. Turn the 4 screws anticlockwise to loosen them.



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



4. Replace the PSU.



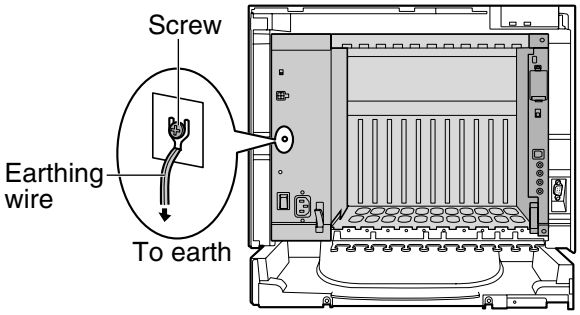
5. Follow the steps in "Installing the Power Supply Unit".

2.2.5 Frame Earth Connection

IMPORTANT

Connect the frame of the Hybrid IP-PBX to earth.

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



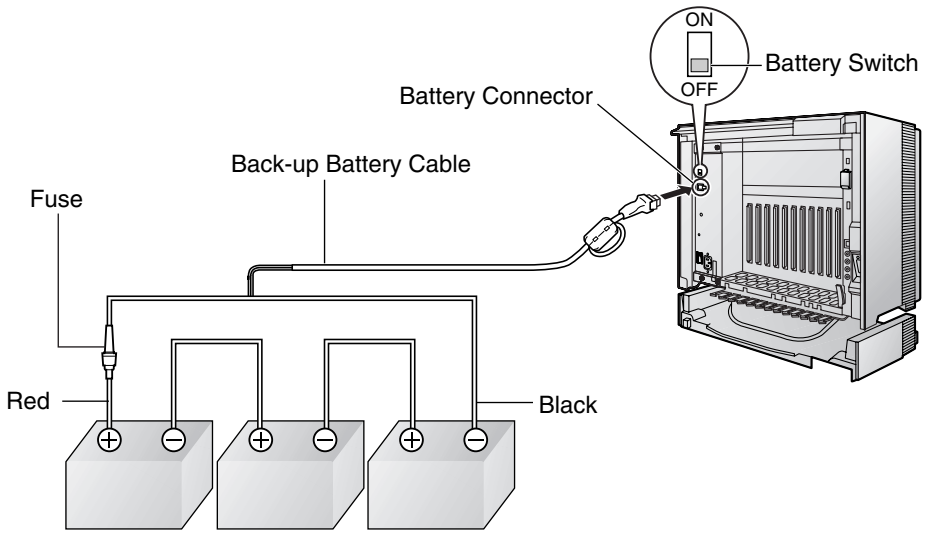
* For earthing wire, green-and-yellow insulation is required, and the cross-sectional area of the conductor must be more than 0.75 mm^2 or 18 AWG.

- Be sure to comply with applicable local regulations (e.g., law, guidelines).
- Proper earthing (connection to earth) is very important to protect the Hybrid IP-PBX from the bad effects of external noise or to reduce the risk to the user of electrocution in the case of lightning strike.
- The earthing wire of the AC cable has an effect against the external noise and lightning strikes, but it may not be enough to protect the Hybrid IP-PBX. A permanent connection between earth and the earth terminal of the Hybrid IP-PBX must be made.

2.2.6 Backup Batteries Connection

The backup batteries and Back-up Battery Cable (KX-A228 for PSU-S and PSU-M, or KX-A229 for PSU-L) provide a backup power supply to allow full use of the Hybrid IP-PBX in the event of a power failure. In case of power failure, the backup batteries automatically maintain the power to the Hybrid IP-PBX without interruption.

1. Turn off the battery switch on the PSU.
2. Connect the Back-up Battery Cable with 3 identical VRLA (Valve Regulated Lead Acid) batteries (12 V DC × 3).



Backup Batteries (12 V DC x 3)

- Turn on the battery switch on the PSU only after the installation of the Hybrid IP-PBX is finished and AC power is available.
- For each backup battery, battery capacity of 28 Ah or below is recommended (otherwise, the battery charge may not be maintained).
- 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 ventilated place.
- For details about the backup batteries, refer to the manual intended for the batteries.

CAUTION

- Be sure to comply with applicable local regulations (e.g., law, guidelines).
- Make sure that the polarities of the backup batteries and wiring are correct.
- Make sure that you do not short the backup batteries or cables.
- 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.
- Use the correct type of Back-up Battery Cable for the type of the PSU.

2.2.7 Installing/Removing the Optional Service Cards

CAUTION

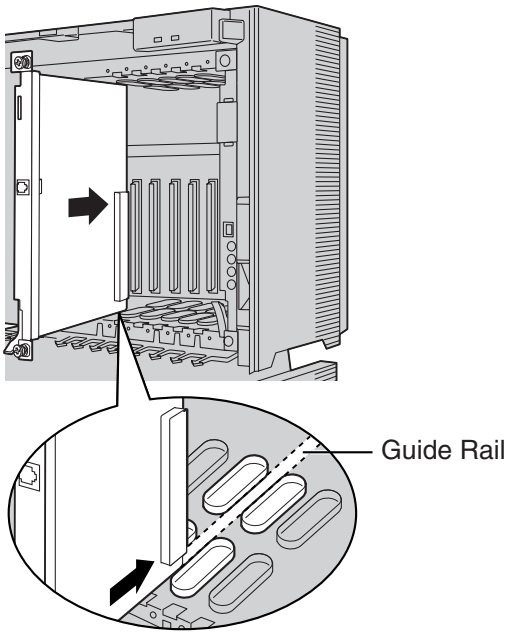
To protect the back board from static electricity, do not touch parts on the back board in the main unit and on the optional service cards. To discharge static electricity, touch ground or wear an earthing strap.

Note

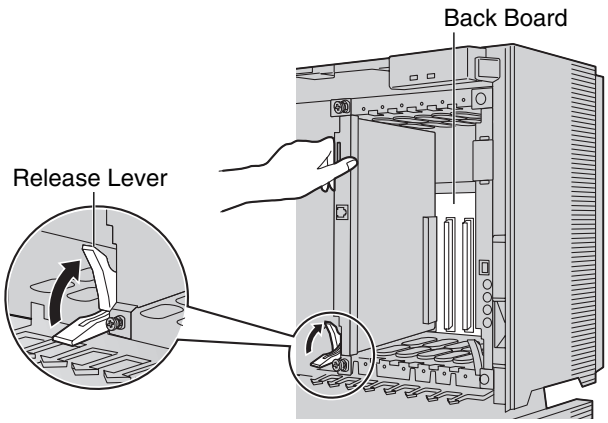
The optional service cards can be installed or removed while the DC power is supplied. However, when installing or removing the MPR card, the DC power supply must be turned off.

Installing Optional Service Cards

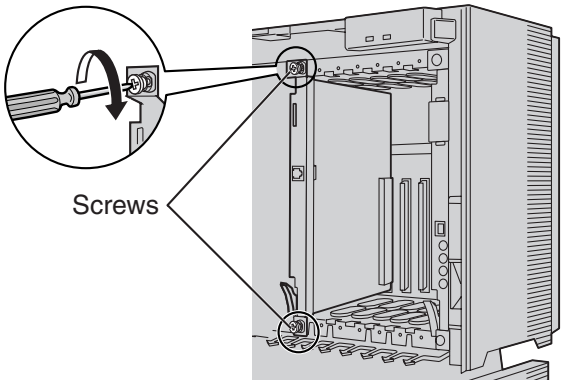
1. Insert the card along the guide rails.



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



Note

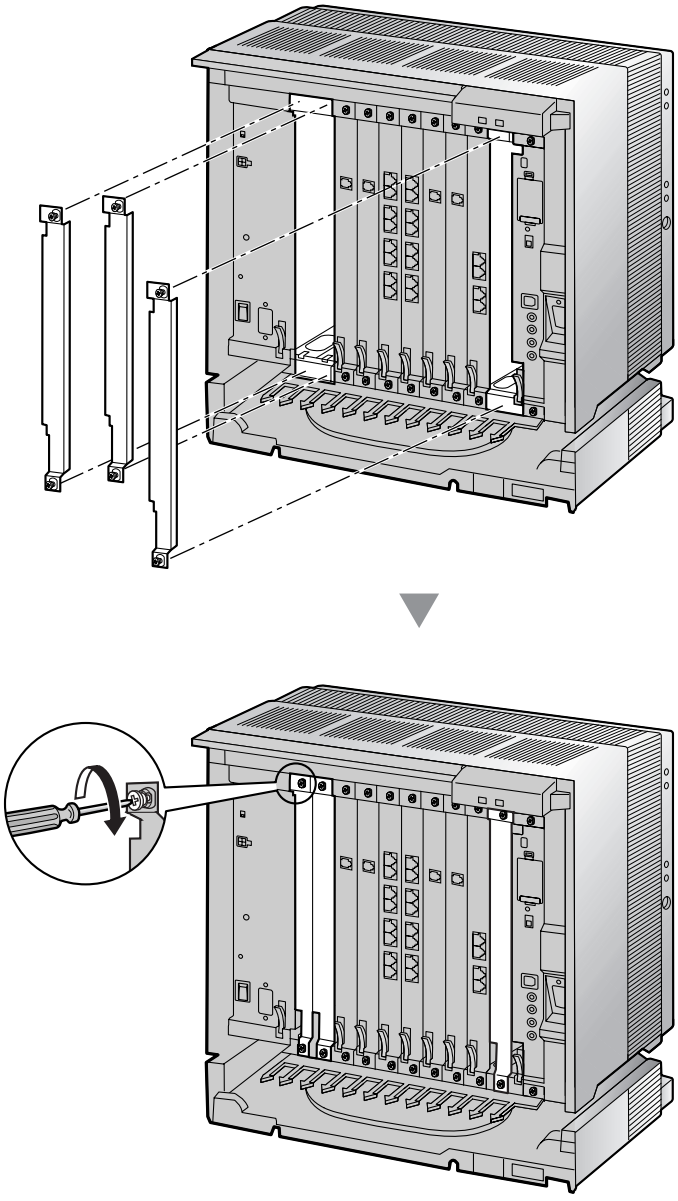
Make sure the screws are tightened to earth the card securely.

Covering the Blank Slots

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

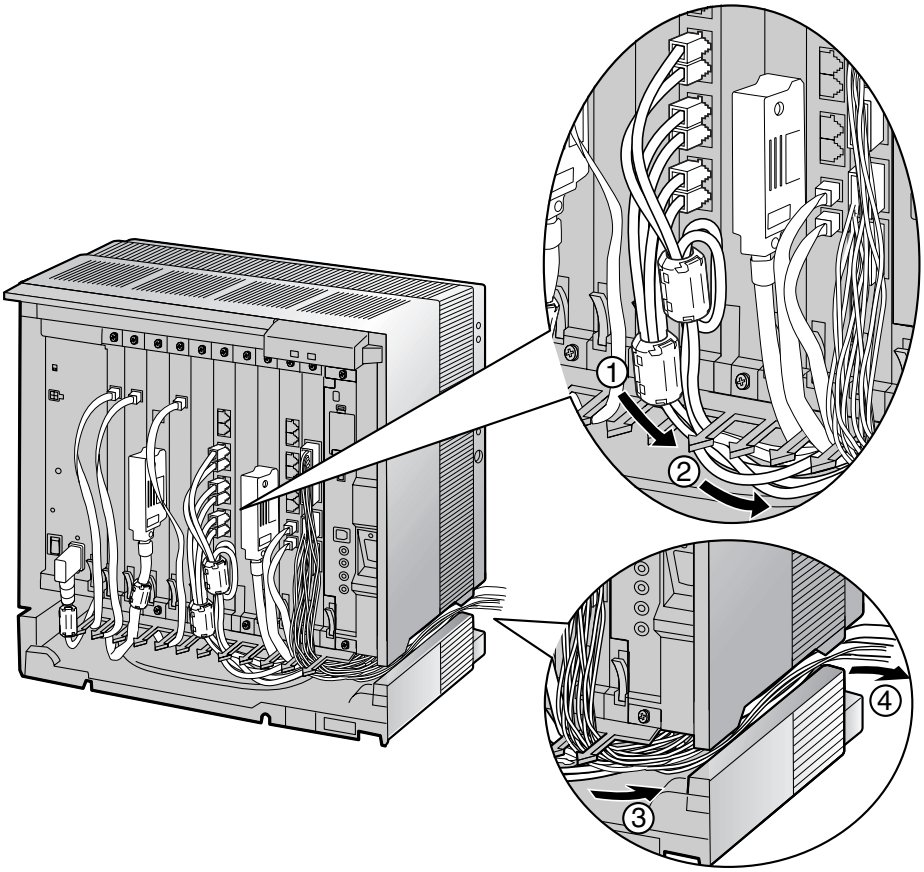
CAUTION

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



Handling of the Cables

When cables are connected to the Hybrid IP-PBX, run the cables to either right or left and then towards the backside of the cabinet as shown below.

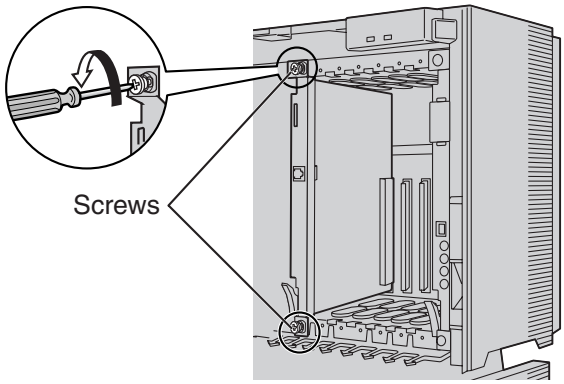


Note

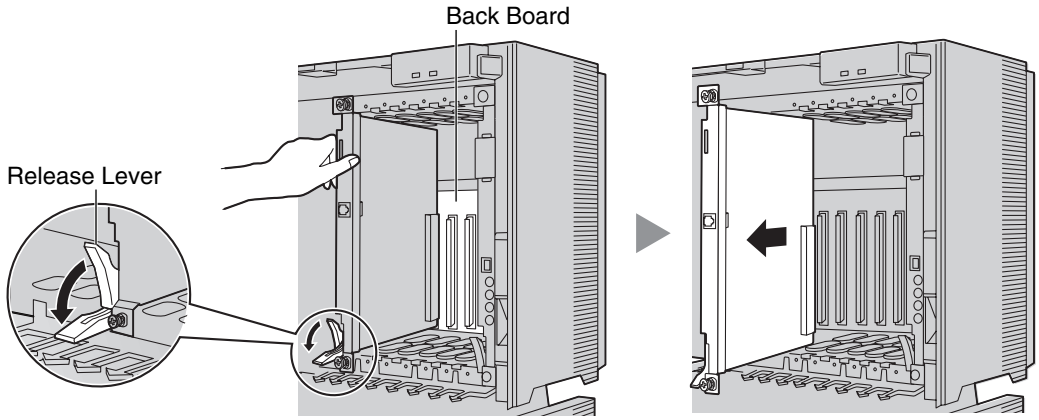
For safety reasons, do not stretch, bend, or pinch the AC power cord.

Removing the Optional Service Cards

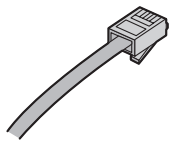
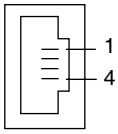
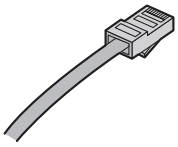
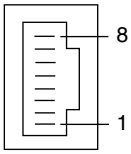
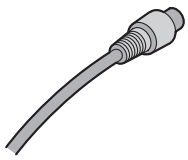
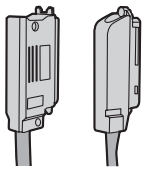
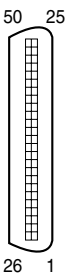
1. Turn the 2 screws anticlockwise to loosen them.

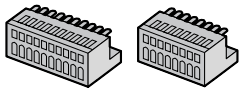
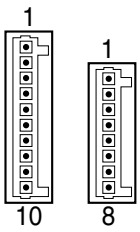
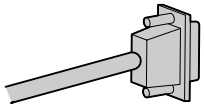
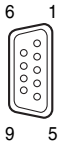
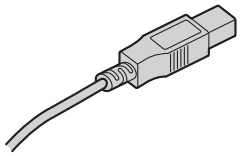
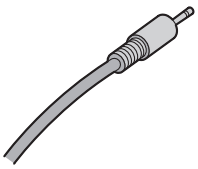


2. Pull the release lever in the direction of the arrow to disconnect the card from the back board. Pull the card from the cabinet to remove it.



2.2.8 Types of Connectors

Connector Type	Pin Number	Used for
RJ11  (Twisted pair cable)		• DHLC8 (KX-TDA0170) • SLC8 (KX-TDA0173) • SLC16 (KX-TDA0174) • MSLC16 (KX-TDA0175) • LCOT8 (KX-TDA0180) • LCOT16 (KX-TDA0181) • LCOT4 (KX-TDA0183)
RJ45  (Twisted pair cable)		• CSIF4 (KX-TDA0143) • CSIF8 (KX-TDA0144) • T1 (KX-TDA0187) • E1 (KX-TDA0188) • BRI4 (KX-TDA0284) • BRI8 (KX-TDA0288) • PRI30 (KX-TDA0290CE/CJ) • PRI23 (KX-TDA0290) • CTI-LINK (KX-TDA0410) • IP-EXT16 (KX-TDA0470) • IP-GW4 (KX-TDA0480) • IP-GW4E (KX-TDA0484) • IP-GW16 (KX-TDA0490)
BNC 		• E1 (KX-TDA0188) • PRI30 (KX-TDA0290CE/CJ)
Amphenol Type A Type B  (Shielded twisted pair cable)		• DHLC8 (KX-TDA0170) • DLC8 (KX-TDA0171) • DLC16 (KX-TDA0172) • SLC8 (KX-TDA0173) • SLC16 (KX-TDA0174) • MSLC16 (KX-TDA0175) • LCOT8 (KX-TDA0180) • LCOT16 (KX-TDA0181) • DID8 (KX-TDA0182) • LCOT4 (KX-TDA0183) • E&M8 (KX-TDA0184)

Connector Type	Pin Number	Used for
10-pin Terminal Block 8-pin Terminal Block 		• DPH4 (KX-TDA0161) • DPH2 (KX-TDA0162) • EIO4 (KX-TDA0164)
RS-232C 		• IP-GW4 (KX-TDA0480) • Basic Shelf
USB 		• MPR
Mini Plug 		• MPR

2.2.9 Attaching a Ferrite Core

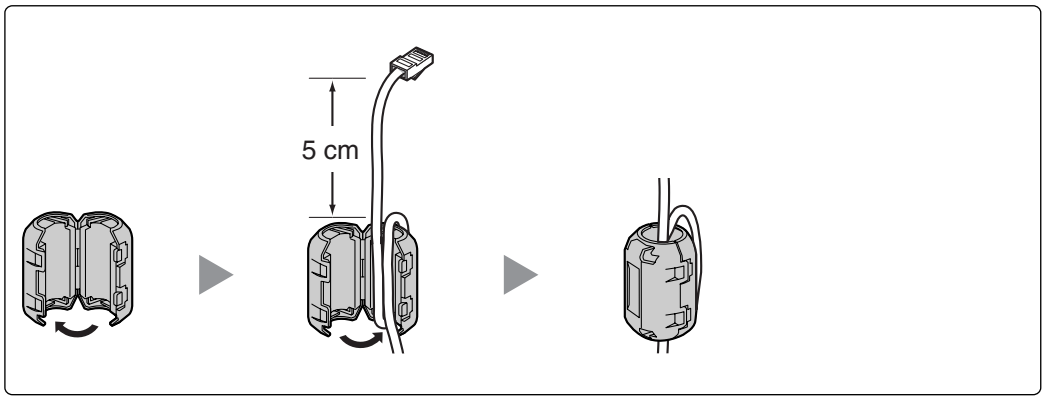
A ferrite core must be attached when:

- connecting T1, E1, PRI, BRI, IP-GW16, and IP-EXT16 cards using an RJ45 connector (except in Canada, where the ferrite core is not necessarily required), or
- connecting extension cards using an Amphenol connector.

The ferrite core is included with the card.

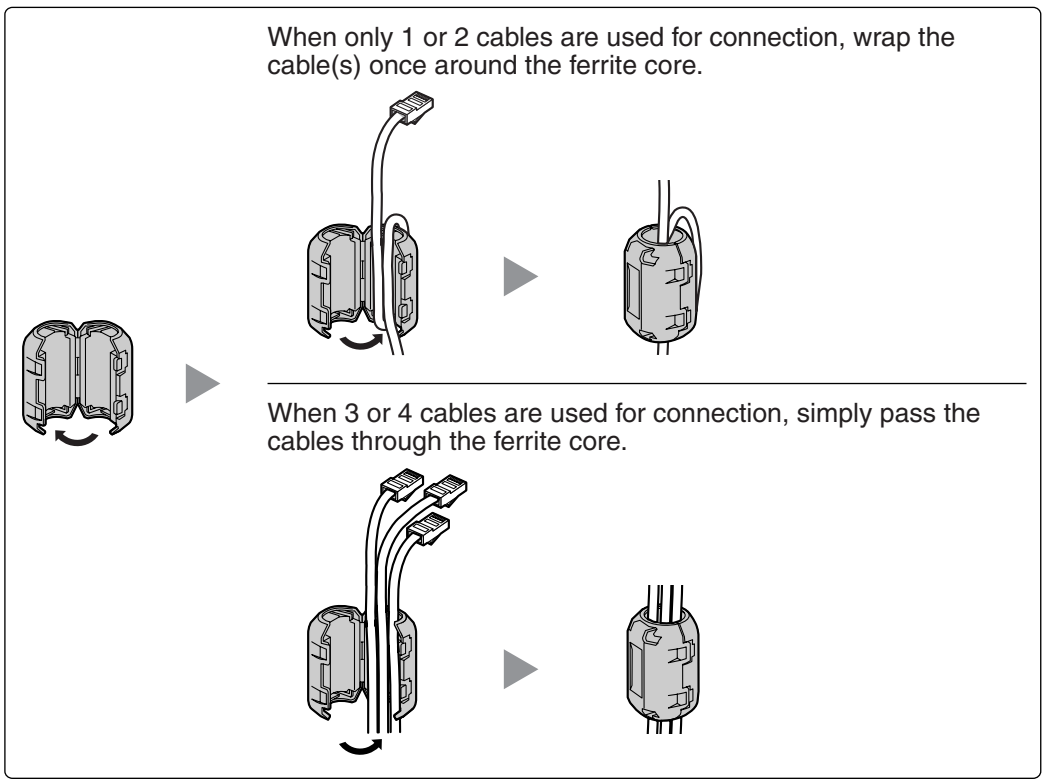
When connecting a T1/E1/PRI/IP-GW16/IP-EXT16 card

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.



When connecting 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.

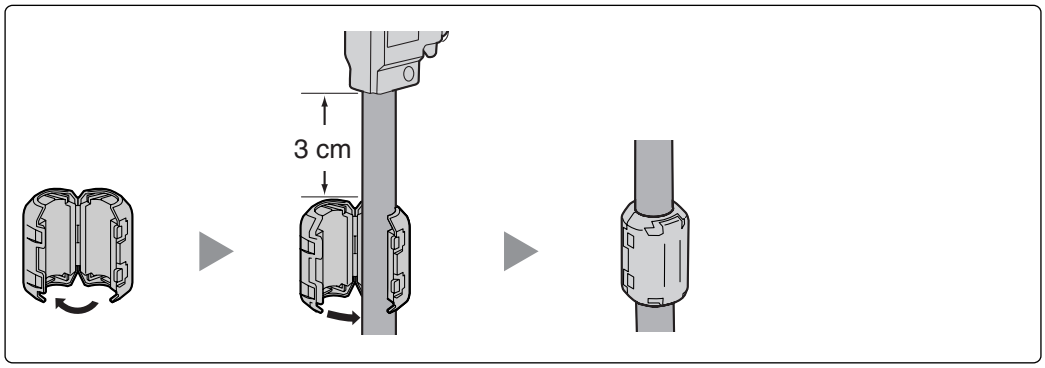


Note

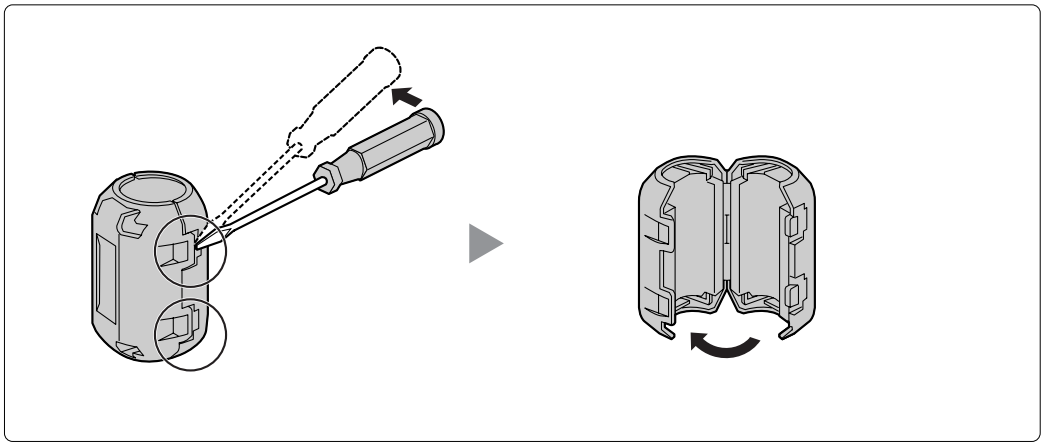
For every 4 cables, use 1 ferrite core; a ferrite core holds a maximum of 4 cables.

When connecting an extension card

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.



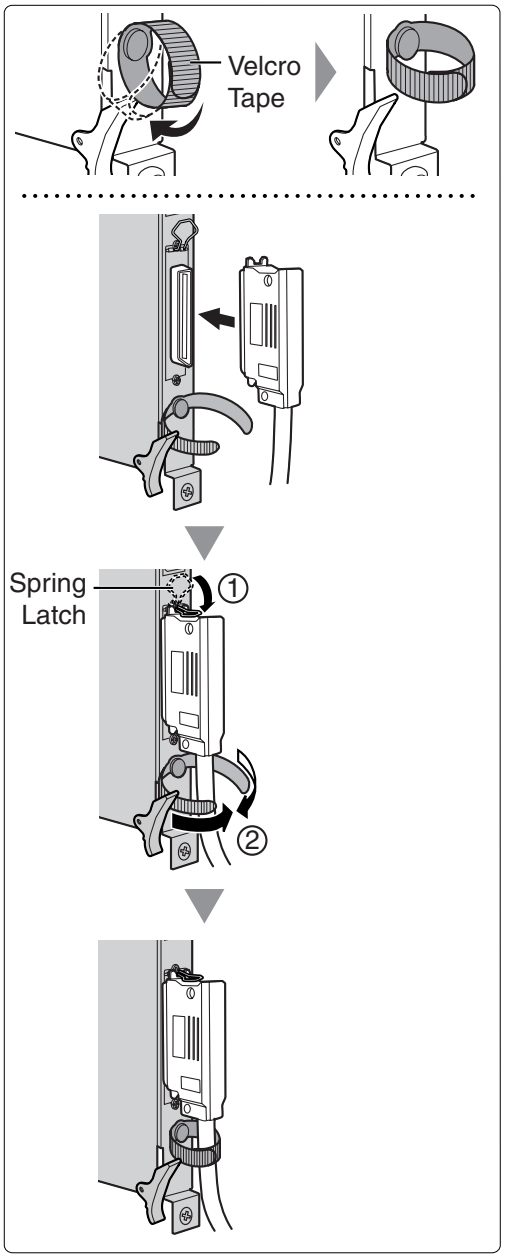
If you need to open the ferrite core, use a flathead screwdriver to unlatch the case of the ferrite core.



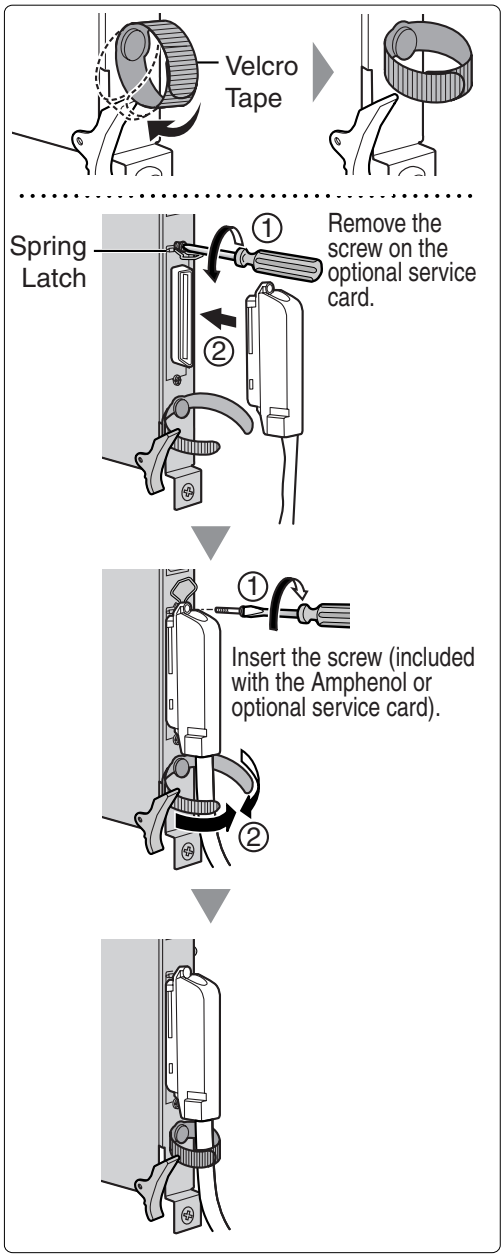
2.2.10 Fastening Amphenol Type Connector

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)



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 "2.4 Installation of the Trunk Cards" and "2.5 Installation of the Extension Cards".

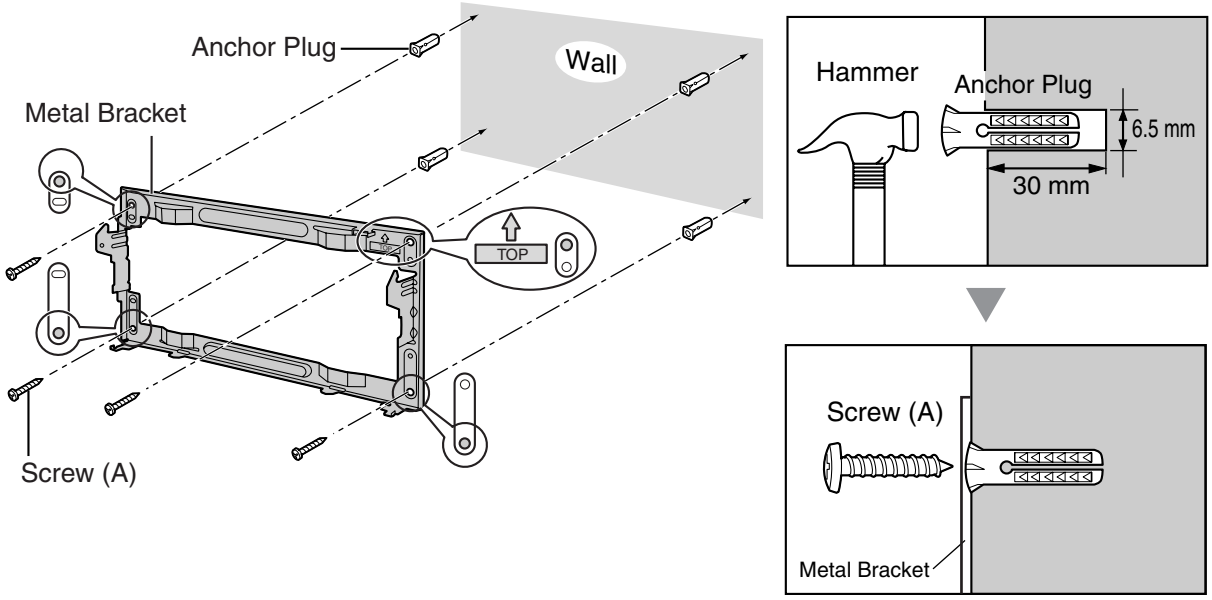
Pin No.	LCOT4	LCOT8	LCOT16	DID8	E&M8	DHLC8	DLC8	DLC16	MSLC16	SLC16	SLC8
1	RA	RA	RA	RA	TA	RA		D2A	RA	RA	RA
26	TA	TA	TA	TA	RA	TA		D1A	TA	TA	TA
2	RB	RB	RB	RB	T1A	D2A	D2A	D2B	RB	RB	
27	TB	TB	TB	TB	R1A	D1A	D1A	D1B	TB	TB	
3	RC	RC	RC	RC	EA			D2C	RC	RC	
28	TC	TC	TC	TC	MA			D1C	TC	TC	
4	RD	RD	RD	RD	SGA	RB		D2D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

2.2.11 Wall Mounting (KX-TDA200)

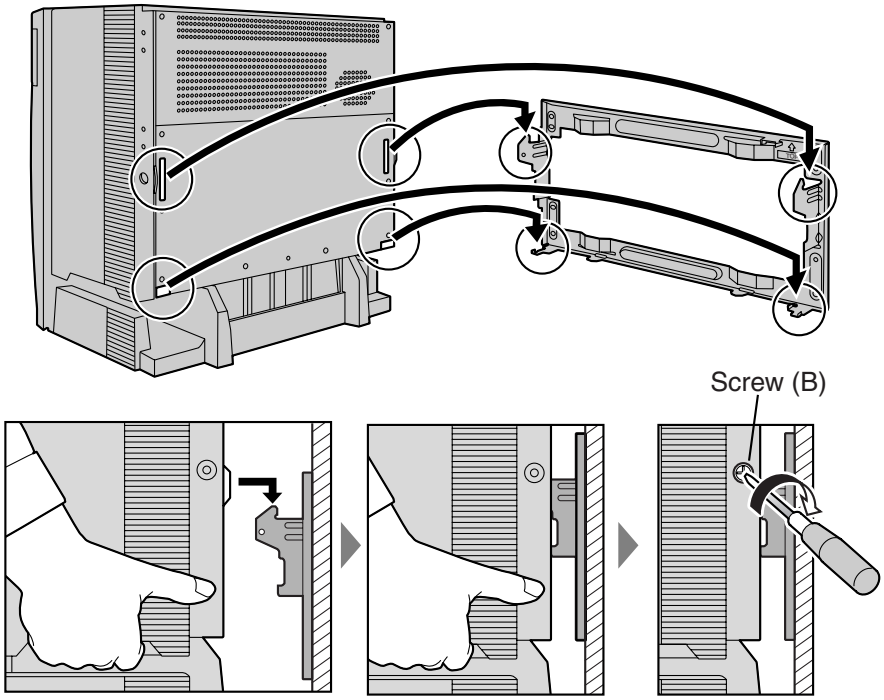
CAUTION

Drive mounting screws into the wall. Be careful to avoid touching any metal laths, wire laths or metal plates in the wall.

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



Notes

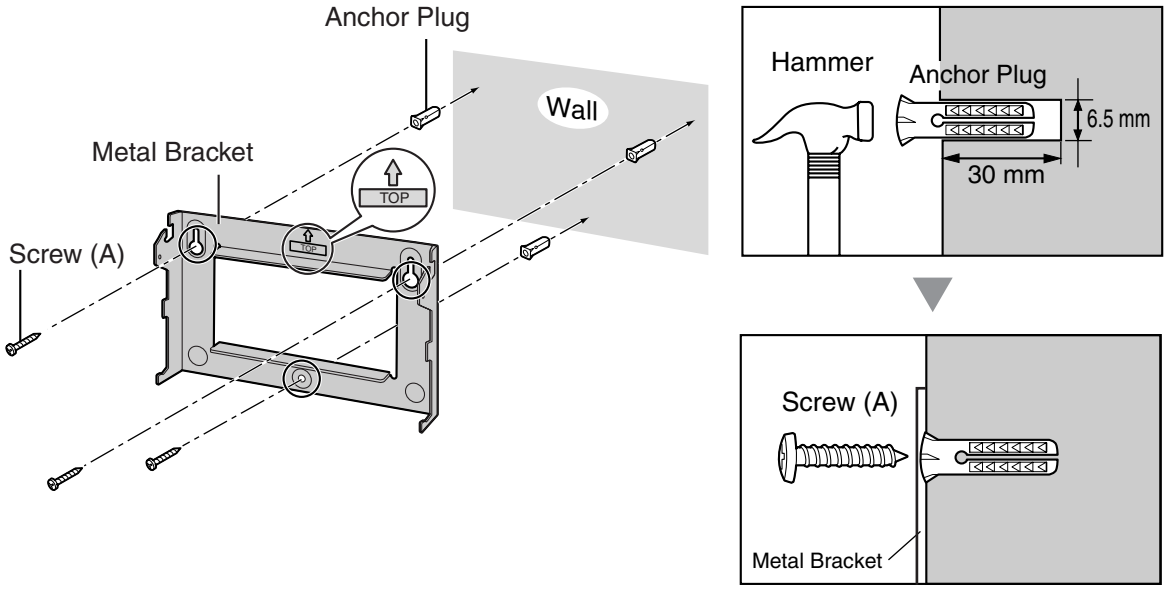
- Do not block the openings of the cabinet. Allow space of at least 20 cm above and 10 cm at the sides of the cabinet.
- Make sure that the wall behind the cabinet is flat and free of obstacles, so that the openings on the back of the cabinet will not be blocked.
- Make sure that the wall behind the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

2.2.12 Wall Mounting (KX-TDA100)

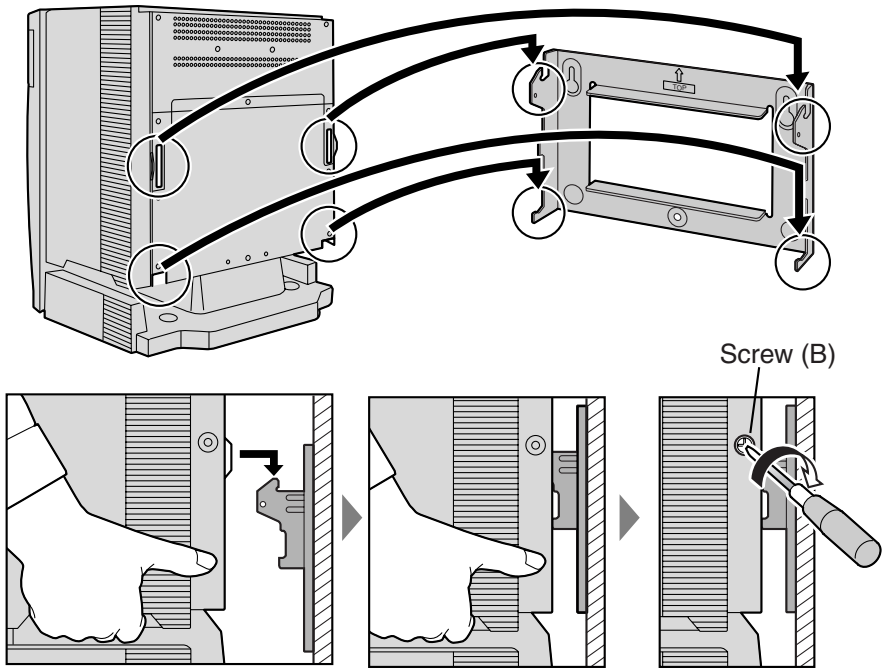
CAUTION

Drive mounting screws into the wall. Be careful to avoid touching any metal laths, wire laths or metal plates in the wall.

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

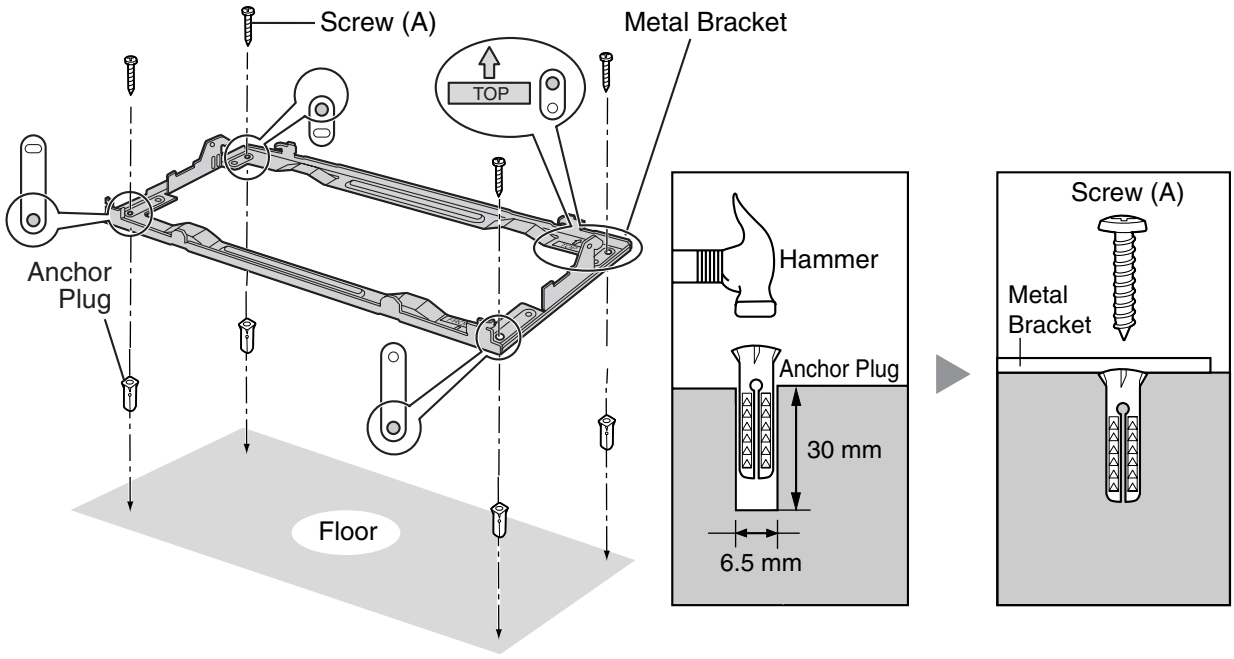


Notes

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

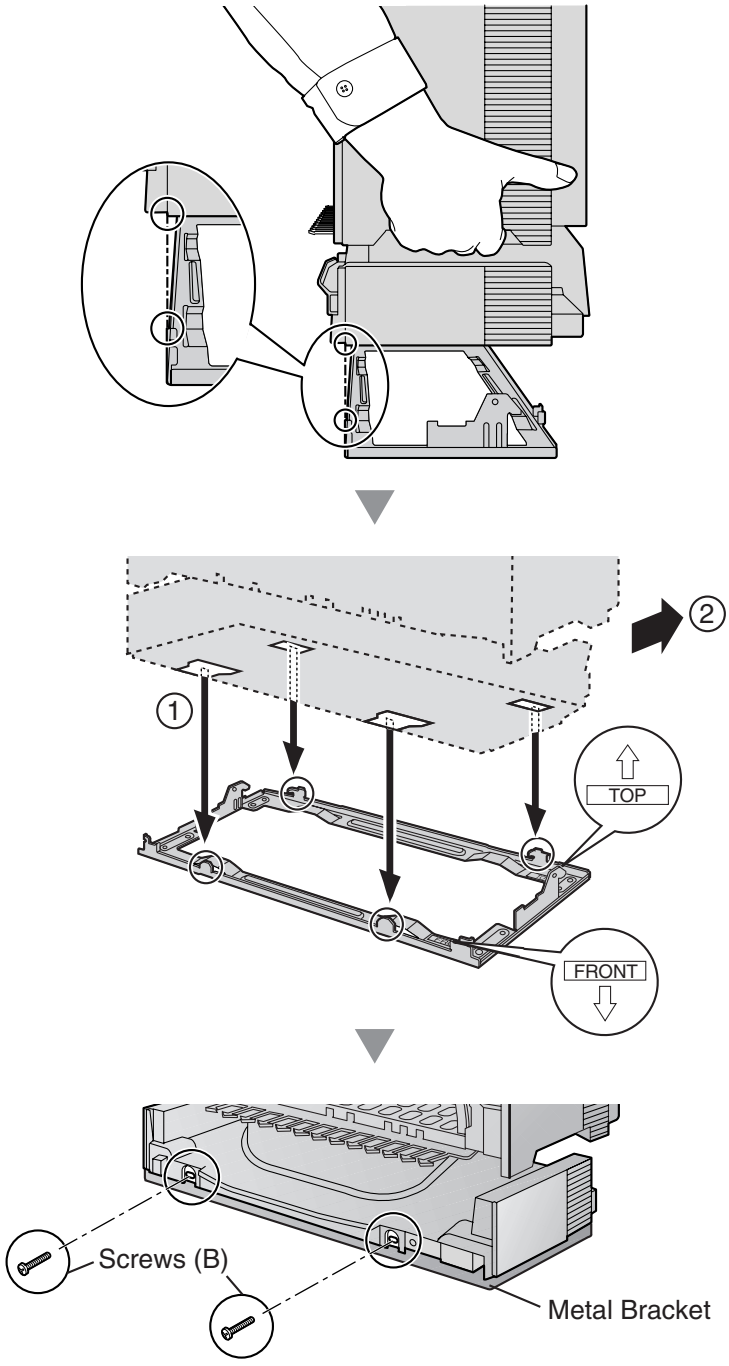
2.2.13 Floor Standing (KX-TDA200 Only)

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 cabinet (refer to "2.2.3 Opening/Closing the Front Cover").

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



Notes

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

- Make sure that the surface behind the cabinet is not made of wood.
- Be careful not to drop the cabinet.

4. Fix the front cover on the cabinet (refer to "2.2.3 Opening/Closing the Front Cover").

2.2.14 Surge Protector Installation

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 Hybrid IP-PBX and connected equipment.

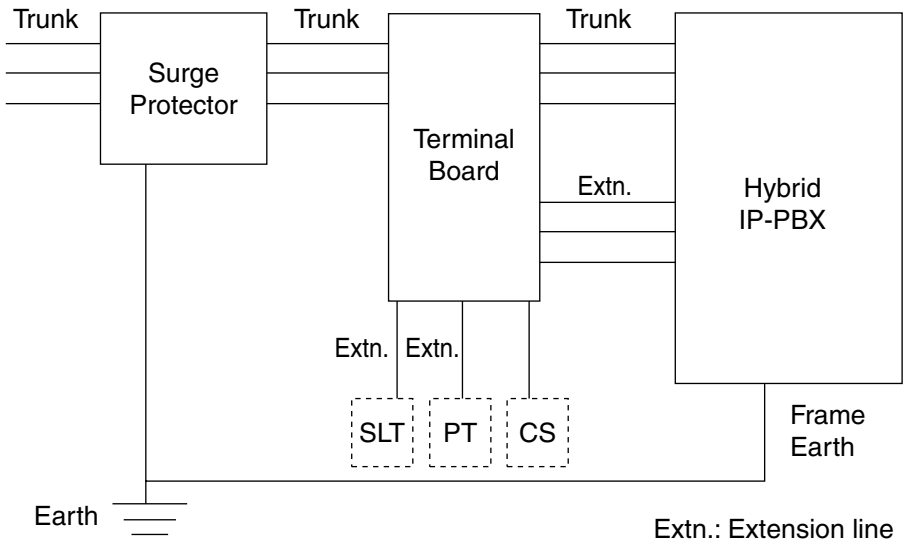
To protect the system from electrical surges, we strongly recommend connecting the system to a surge protector that meets the following specifications:

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

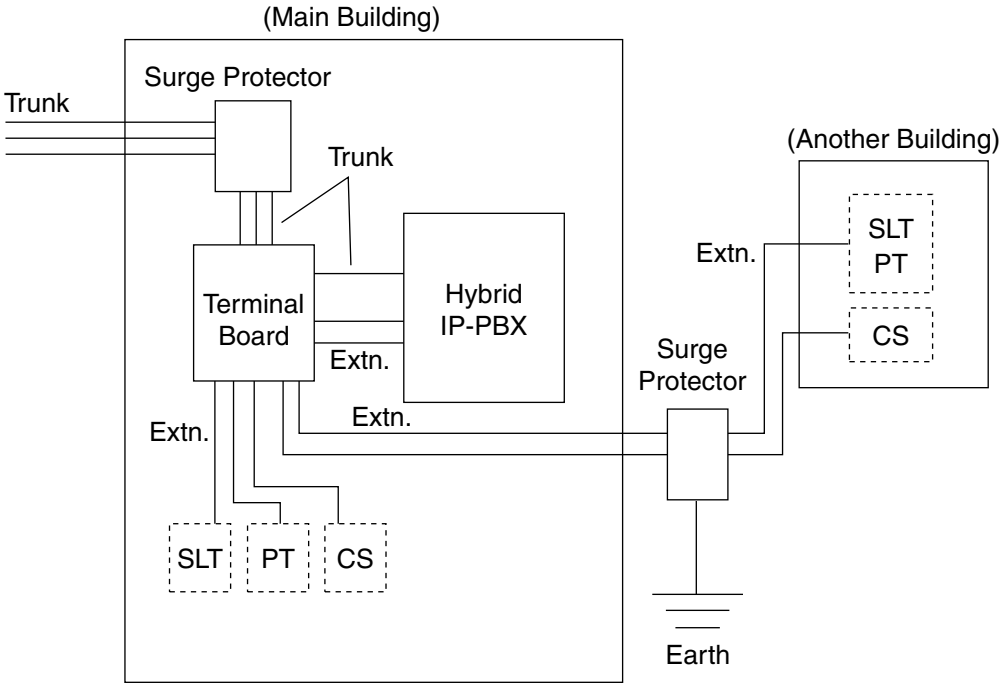
Additionally, proper earthing is very important for the protection of the system (refer to "2.2.5 Frame Earth Connection").

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

Installation



Outside Installation



Extn.: Extension Line

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

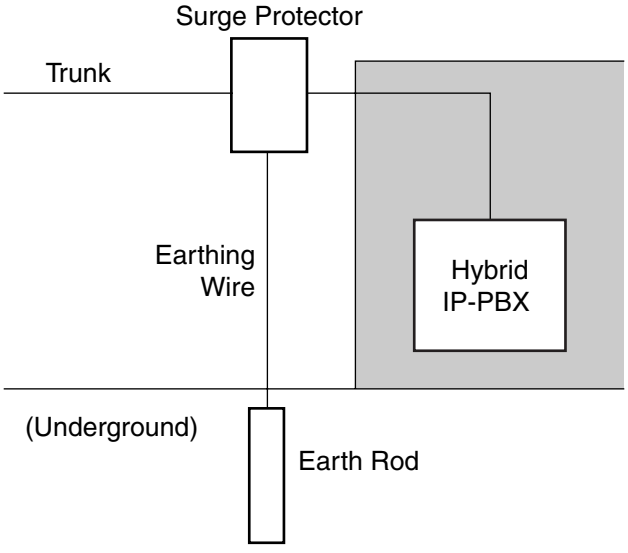
a. Install the extension wire underground.

b. Use a conduit to protect the wire.

Note

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

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^2.
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.

Notes

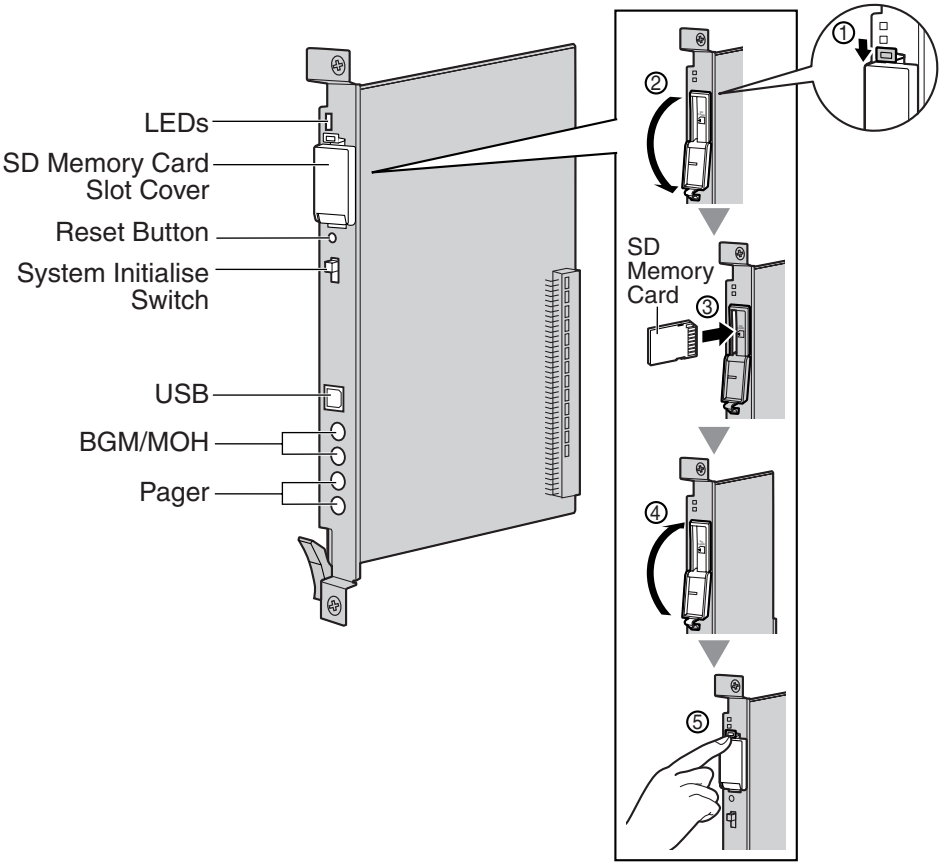
- The above figures are recommendations only.
- The length of earth rod and the required depth depend on the composition of the soil.

2.3 Installation of the Main Processing Card

2.3.1 MPR Card

Function

Contains the main processor for all processes, basic shelf main protocol, time switch (TSW) control, detection of system clock alarm, basic shelf power down alarm, and watchdog timer overflow. An MEC card and an RMT card can be mounted on the MPR card (refer to "2.3.2 MEC Card" and "2.3.3 RMT Card").



Notes

- For details about connecting peripherals, refer to "2.11.1 Connection of Peripherals".
- For details about System Initialise Switch, refer to "2.13.1 Starting the Hybrid IP-PBX".
- For details about Reset Button, refer to "4.1.4 Using the Reset Button".

CAUTION

- Use only the SD Memory Card included with the Hybrid IP-PBX, or a Panasonic optional upgrade SD Memory Card.
- The SD Memory Card contains software for all the processes of the Hybrid IP-PBX and all the customer data. The SD Memory Card must be inserted before start up.
- Do not remove the SD Memory Card while power is supplied to the Hybrid IP-PBX. Doing so may cause the Hybrid IP-PBX to fail to start when you try to restart the system.

- A LITHIUM BATTERY IS USED IN THE MPR CARD. THERE IS A RISK OF EXPLOSION IF BATTERY IS REPLACED WITH THE INCORRECT TYPE. DISPOSE OF USED BATTERIES ACCORDING TO THE INSTRUCTIONS.

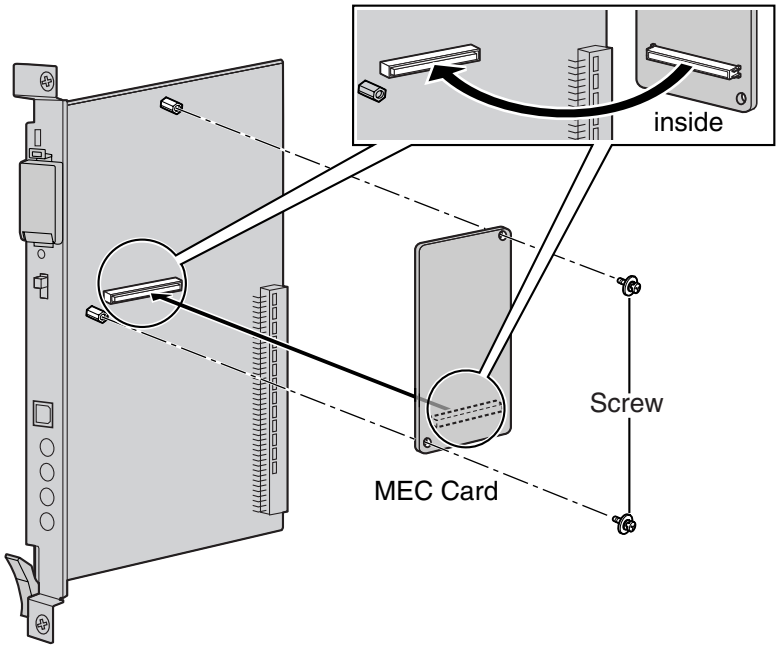
LED Indications

Indication	Colour	Description
BATT ALARM	Red	Battery alarm indication • OFF: Normal ON: Alarm
SD ACCESS	Green	SD memory card status • ON: Accessing

2.3.2 MEC Card

Function

Memory expansion card to increase system data storage space, enable Broadcasting and Call Billing for Guest Room features, and double the number of DPTs, using Digital XDP connection. To be mounted on the MPR card.



Accessory and User-supplied Items

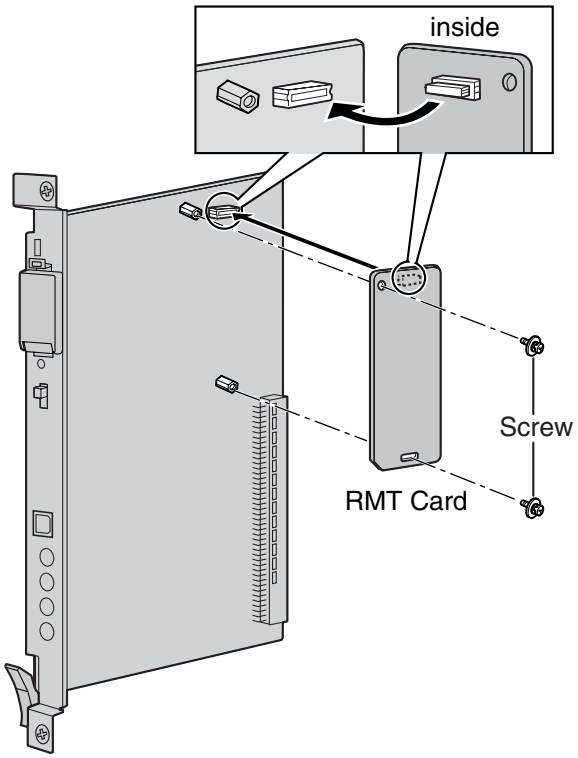
Accessory (included): Screws × 2

User-supplied (not included): none

2.3.3 RMT Card

Function

Analogue modem card for remote communication with the Hybrid IP-PBX. V90 support. To be mounted on the MPR card.



Accessory and User-supplied Items

Accessory (included): Screws × 2

User-supplied (not included): none

2.4 Installation of the Trunk Cards

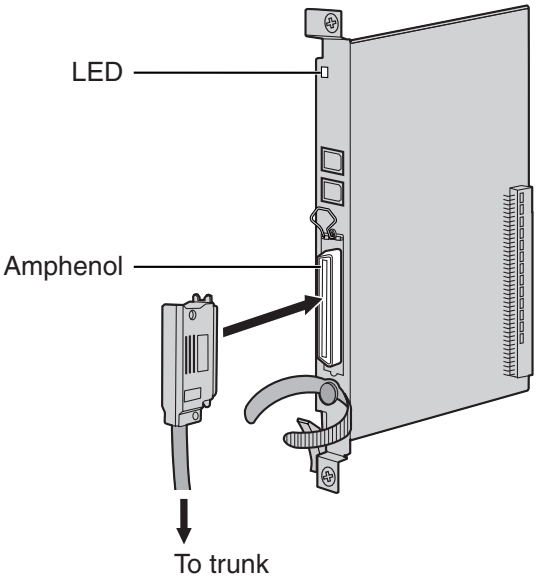
2.4.1 LCOT4, LCOT8, and LCOT16 Cards

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 "2.4.3 CID/PAY8 Card" and "2.4.4 CID8 Card").

LCOT16: 16-port analogue trunk card with 4 power failure transfer (PFT) ports. A maximum of 2 CID8 and CID/PAY8 cards can be mounted on the LCOT16 card (refer to "2.4.3 CID/PAY8 Card" and "2.4.4 CID8 Card").



Accessory and User-supplied Items

Accessory (included): Screws × 2

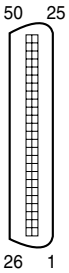
User-supplied (not included): Amphenol connector

Notes

- To connect the Amphenol connector, refer to "2.2.10 Fastening Amphenol Type Connector".
- For details about power failure transfer, refer to "2.12.1 Power Failure Connections".
- To confirm the trunk connection, refer to "Confirming the Trunk Connection" in "2.13.1 Starting the Hybrid IP-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	–

Notes

- 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.

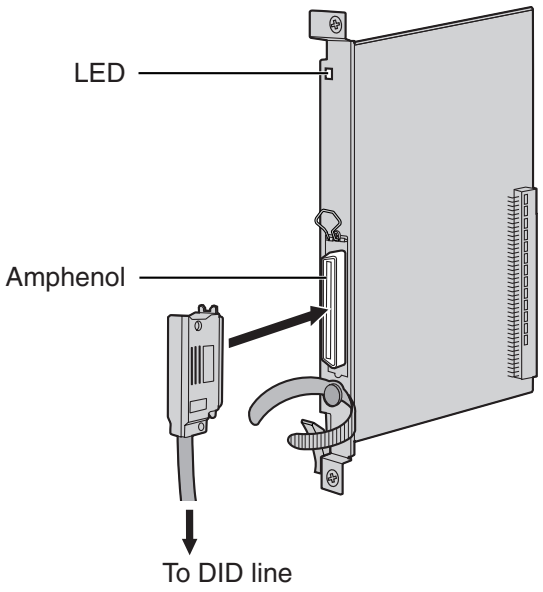
LED Indications

Indication	Colour	Description
CARD STATUS	Green/Red	Card status indication • OFF: Power Off • Green ON: Normal (all ports are idle) • Green Flashing (60 times per minute): Normal (a port is in use) • Red ON: Fault (includes reset) • Red Flashing (60 times per minute): Out of Service

2.4.2 DID8 Card

Function

8-port DID trunk card.



Accessory and User-supplied Items

Accessory (included): Screws × 2

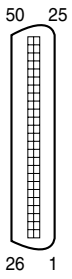
User-supplied (not included): Amphenol connector

Notes

- To connect the Amphenol connector, refer to "2.2.10 Fastening Amphenol Type Connector".
- To confirm the trunk connection, refer to "Confirming the Trunk Connection" in "2.13.1 Starting the Hybrid IP-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

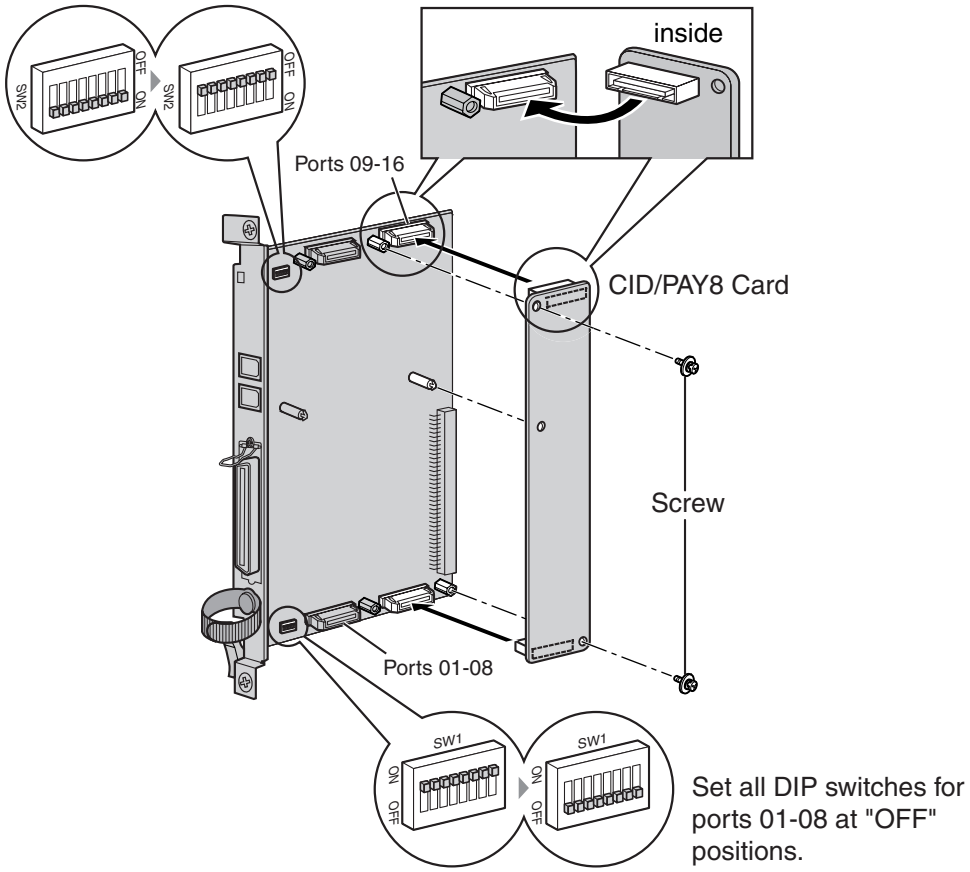
Indication	Colour	Description
CARD STATUS	Green/Red	Card status indication • OFF: Power Off • Green ON: Normal (all ports are idle) • Green Flashing (60 times per minute): Normal (a port is in use) • Red ON: Fault (includes reset) • Red Flashing (60 times per minute): Out of Service

2.4.3 CID/PAY8 Card

Function

8-port Caller ID signal type FSK/FSK (with Call Waiting Caller ID [Visual Caller ID])/DTMF, and 8 ports of 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).



Accessory and User-supplied Items

Accessory (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)

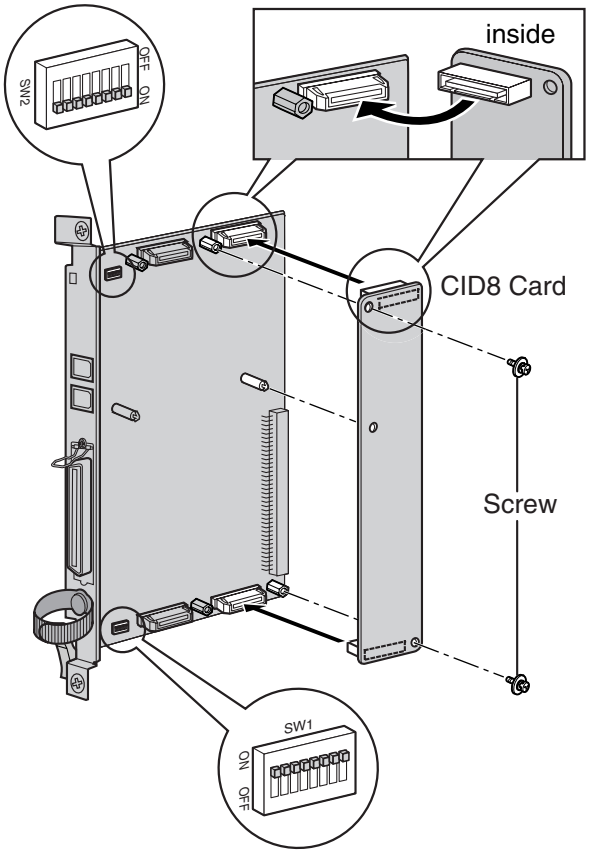
Switch	Type	Usage and Status Definition
Port Setting	DIP	Set all DIP switches at "OFF" positions. **Note** SW2 is for the LCOT16 card only.

2.4.4 CID8 Card

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



Accessory and User-supplied Items

Accessory (included): Screws × 2

User-supplied (not included): none

Note

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

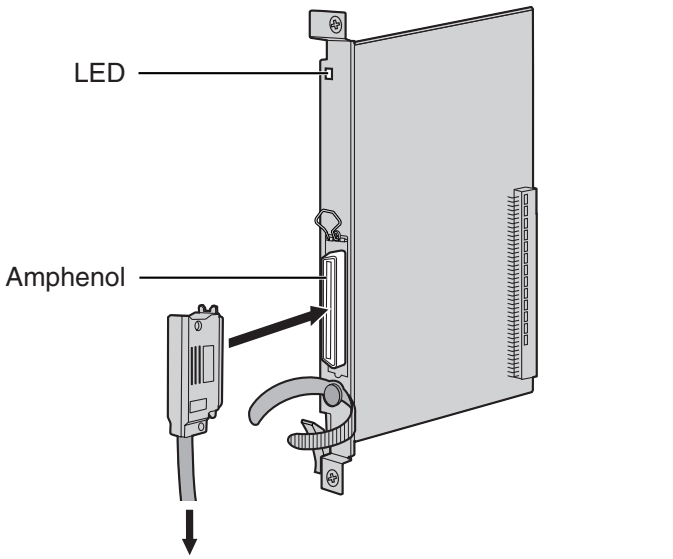
Switch Settings (on LCOT8/LCOT16 cards)

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. **Note** SW2 is for the LCOT16 card only.

2.4.5 E&M8 Card

Function

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



Accessory and User-supplied Items

Accessory (included): Screws × 2

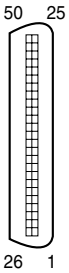
User-supplied (not included): Amphenol connector

Notes

- 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 "2.2.10 Fastening Amphenol Type Connector".
- To confirm the trunk connection, refer to "Confirming the Trunk Connection" in "2.13.1 Starting the Hybrid IP-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
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

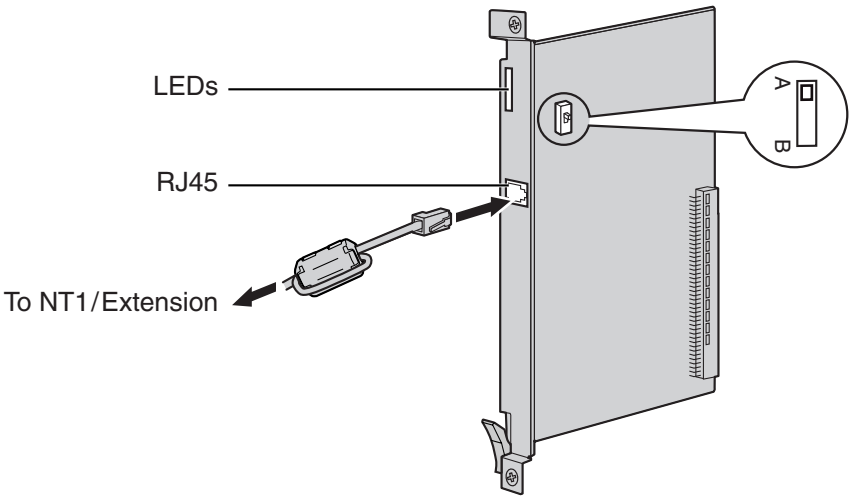
LED Indications

Indication	Colour	Description
CARD STATUS	Green/Red	Card status indication • OFF: Power Off • Green ON: Normal (all ports are idle) • Green Flashing (60 times per minute): Normal (a port is in use) • Red ON: Fault (includes reset) • Red Flashing (60 times per minute): Out of Service

2.4.6 T1 Card

Function

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



Accessory and User-supplied Items

Accessory (included): Ferrite core × 1

User-supplied (not included): RJ45 connector

Notes

- When connecting this optional service card to the trunk, connect through NT1; do not connect to the trunk directly.
- When connecting the RJ45 connector, attach the included ferrite core (except in Canada, where the ferrite core is not necessarily required). Refer to "2.2.9 Attaching a Ferrite Core".
- 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 "2.13.1 Starting the Hybrid IP-PBX".

CAUTION

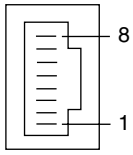
T1 ports are SELV ports and should only be connected to SELV services.

Switch Settings

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

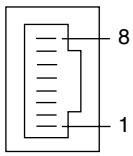
Pin Assignments

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	–	–

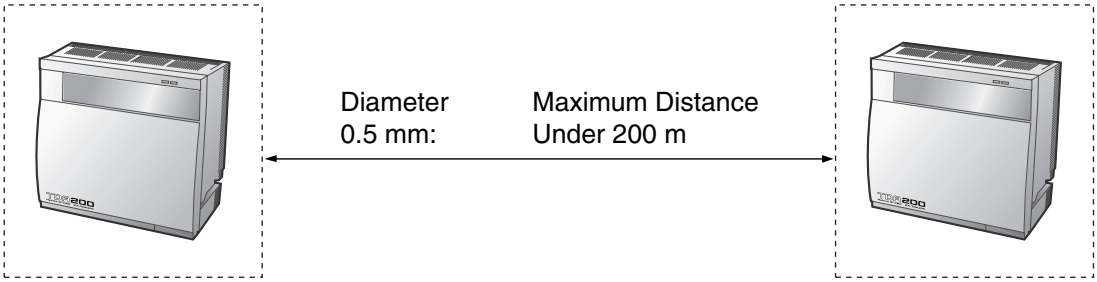
LED Indications

Indication	Colour	Description
CARD STATUS	Green/Red	Card status indication • OFF: Power Off • Green ON: Normal (all ports are idle) • Green Flashing (60 times per minute): Normal (a port is in use) • Red ON: Fault (includes reset) • Red Flashing (60 times per minute): Out of Service
SYNC-ERR	Red	Non-synchronisation status indication • OFF: Normal • ON: Out of synchronisation
RAI	Red	RAI signal status indication • OFF: Normal • ON: Alarm (Clock Slave) • Flashing (60 times per minute): Alarm (Clock Master)
AIS	Red	AIS status indication • OFF: Normal • ON: Alarm

Indication	Colour	Description
SYNC	Green	Synchronisation status indication • OFF: Not synchronised • ON: Synchronised • Flashing (60 times per minute): Synchronised (Clock Master)

Maximum Cabling Distance of Extension Connection

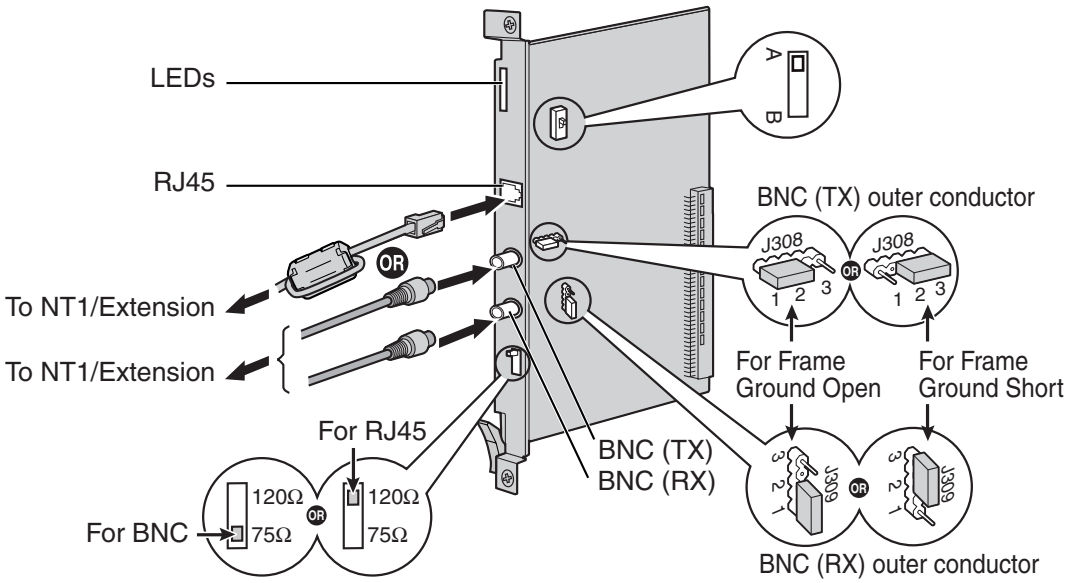
The maximum distance of the extension cable that connects the T1 cards is shown below:



2.4.7 E1 Card

Function

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



Accessory and User-supplied Items

Accessory (included): Ferrite core × 1

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

Notes

- In some countries/areas, this optional service card must not be connected to the Public Switched Telephone Network.
- When connecting this optional service card to the trunk, connect through NT1; do not connect to the trunk directly.
- Use only 1 type of connector (RJ45 or BNC) for connection; RJ45 and BNC cannot be used simultaneously.
- When connecting the RJ45 connector, attach the included ferrite core. Refer to "2.2.9 Attaching a Ferrite Core".
- 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 "2.13.1 Starting the Hybrid IP-PBX".

CAUTION

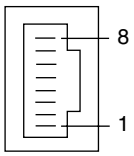
E1 ports are SELV ports and should only be connected to SELV services.

Switch Settings

Switch	Type	Usage and Status Definition
Termination	Slide	Select 120 Ω (default) or 75 Ω for 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, keep the A position.
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

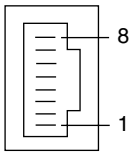
Pin Assignments

RJ45 Connector for Trunk Use



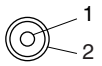
No.	Signal Name	Level [V]	Function
1	RX+	(+)	Receive data (+)
2	RX-	(-)	Receive data (-)
3	Reserved	–	–
4	TX-	(-)	Transmit data (-)
5	TX+	(+)	Transmit data (+)
6-8	Reserved	–	–

RJ45 Connector for Extension use



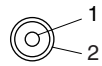
No.	Signal Name	Level [V]	Function
1	TX-	(-)	Transmit data (-)
2	TX+	(+)	Transmit data (+)
3	Reserved	–	–
4	RX+	(+)	Receive data (+)
5	RX-	(-)	Receive data (-)
6-8	Reserved	–	–

BNC (coaxial) Connector (TX)



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

BNC (coaxial) Connector (RX)

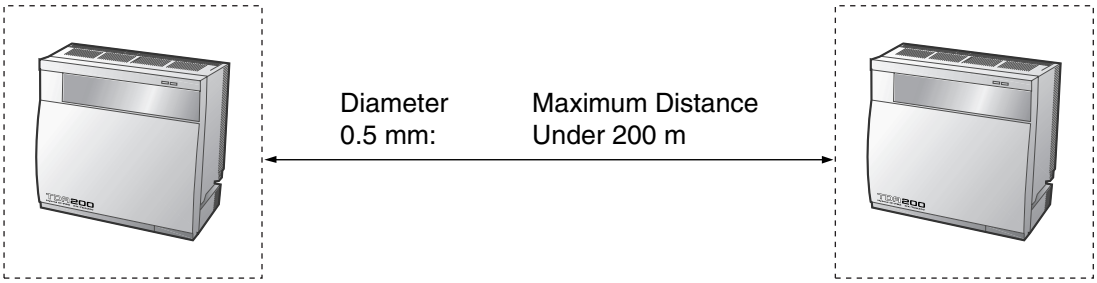
	No.	Signal Name	Level [V]	Function
	1	RX-	(-)	Receive data (-)
	2	RX+	(+)	Receive data (+)

LED Indications

Indication	Colour	Description
CARD STATUS	Green/Red	Card status indication • OFF: Power Off • Green ON: Normal (all ports are idle) • Green Flashing (60 times per minute): Normal (a port is in use) • Red ON: Fault (includes reset) • Red Flashing (60 times per minute): Out of Service
SYNC-ERR	Red	Non-synchronisation status indication • OFF: Normal • ON: Out of synchronisation
RAI	Red	RAI signal status indication • OFF: Normal • ON: Alarm (Clock Slave) • Flashing (60 times per minute): Alarm (Clock Master)
AIS	Red	AIS status indication • OFF: Normal • ON: Alarm
SYNC	Green	Synchronisation status indication • OFF: Not synchronised • ON: Synchronised • Flashing (60 times per minute): Synchronised (Clock Master)

Maximum Cabling Distance of Extension Connection

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

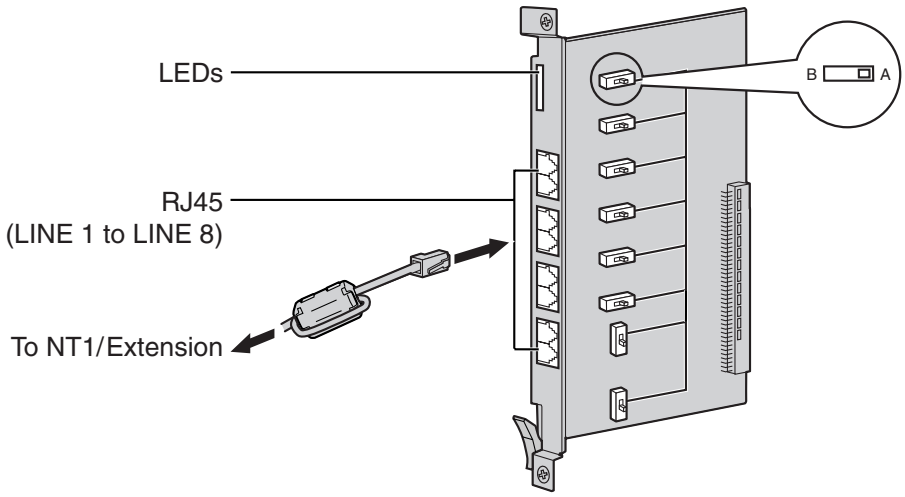


2.4.8 BRI4 and BRI8 Cards

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.



Accessory and User-supplied Items

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

User-supplied (not included): RJ45 connector

Notes

- LINE 5 to LINE 8 are for BRI8 card only.
- When connecting these optional service cards to the trunk, connect through an NT1; do not connect to the U interface of the trunk directly.
- 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.
- When connecting the RJ45 connector, attach the included ferrite core. Refer to "2.2.9 Attaching a Ferrite Core".
- 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 "2.12.1 Power Failure Connections".
- To confirm the trunk connection, refer to "Confirming the Trunk Connection" in "2.13.1 Starting the Hybrid IP-PBX".

Notice

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 Hybrid IP-PBX accordingly.

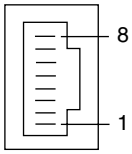
However, if there is an external power source to the terminal, make sure that there is no power supplied to the terminal from the BRI4/BRI8 card. Failure to do so may cause damage to the power supply circuit of the BRI4/BRI8 card or the terminal.

Switch Settings

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

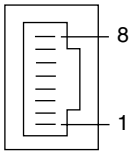
Pin Assignments

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



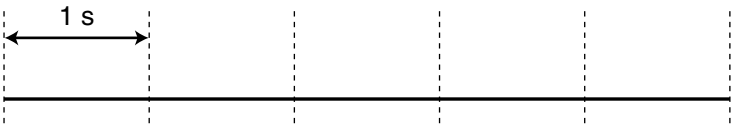
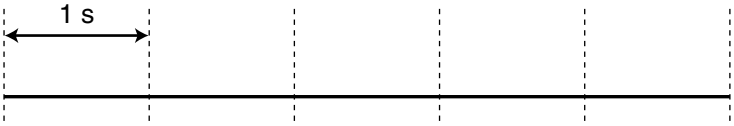
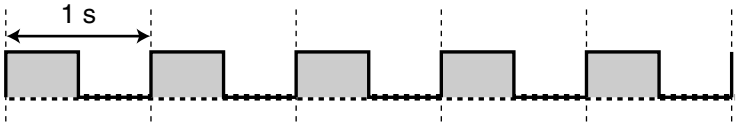
No.	Signal Name	Level [V]	Function
1-2	Reserved	–	–
3	RX2	(+)	Receive data 2
4	TX1	(+)	Transmit data 1
5	TX2	(-)	Transmit data 2
6	RX1	(-)	Receive data 1
7-8	Reserved	–	–

LED Indications

Indication	Colour	Description
CARD STATUS	Green/Red	Card status indication • OFF: Power Off • Green ON: Normal (all ports are idle) • Green Flashing (60 times per minute): Normal (a port is in use) • Red ON: Fault (includes reset) • Red Flashing (60 times per minute): Out of Service

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. **Note** 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	

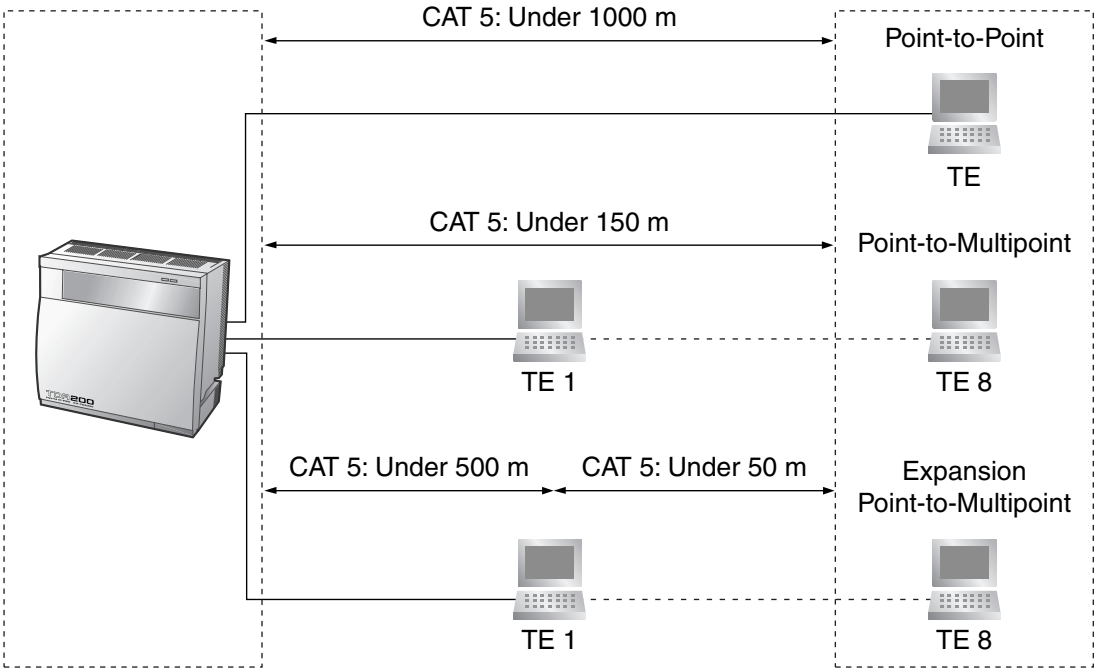
Layer 1: ON (Synchronous)

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

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

Maximum Cabling Distance of S0 Bus Connection

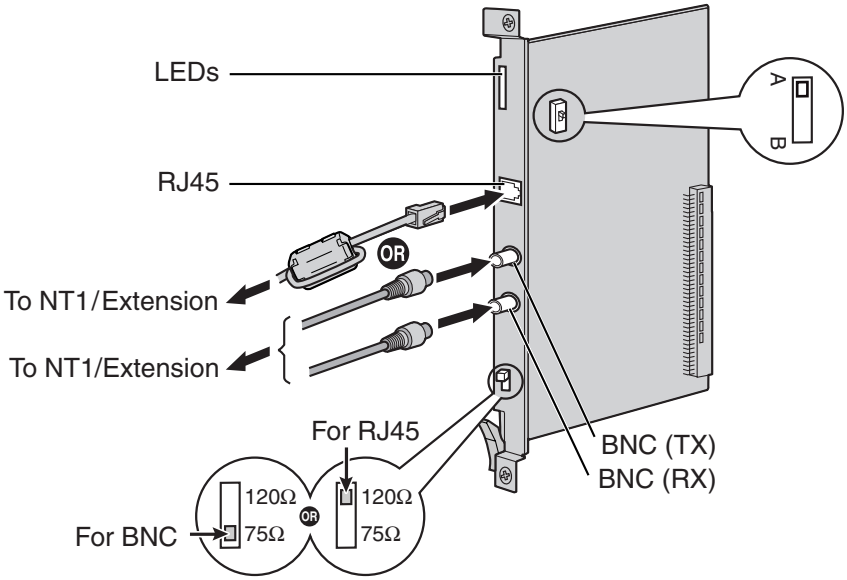
The maximum distance of the extension cable that connects the Hybrid IP-PBX and the ISDN terminal equipment (TE) is shown below:



2.4.9 PRI30 Card

Function

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



Accessory and User-supplied Items

Accessory (included): Ferrite core × 1

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

Notes

- In some countries/areas, this optional service card must not be connected to the Public Switched Telephone Network.
- When connecting this optional service card to the trunk, connect through an NT1; do not connect to the U interface of the trunk directly.
- Use only 1 type of connector (RJ45 or BNC) for connection; RJ45 and BNC cannot be used simultaneously.
- When connecting the RJ45 connector, attach the included ferrite core. Refer to "2.2.9 Attaching a Ferrite Core".
- 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 "2.13.1 Starting the Hybrid IP-PBX".

CAUTION

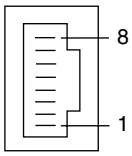
PRI ports are SELV ports and should only be connected to SELV services.

Switch Settings

Switch	Type	Usage and Status Definition
Termination	Slide	Select 120 Ω (default) or 75 Ω for 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, keep the A position.

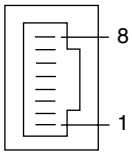
Pin Assignments

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)

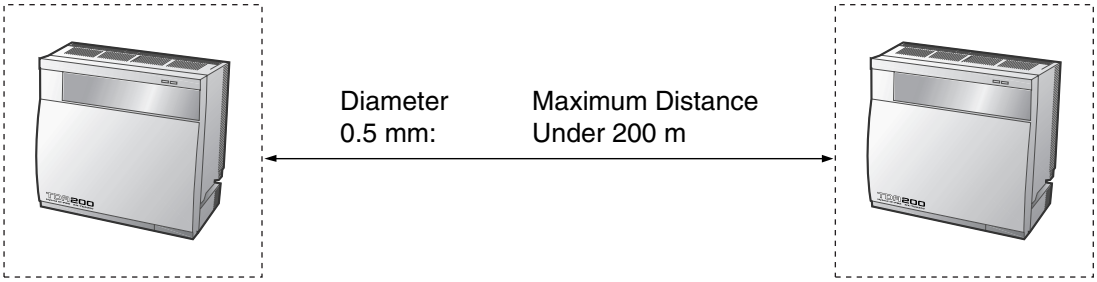
	No.	Signal Name	Level [V]	Function
	1	RX-	(-)	Receive data (-)
	2	RX+	(+)	Receive data (+)

LED Indications

Indication	Colour	Description
CARD STATUS	Green/Red	Card status indication • OFF: Power Off • Green ON: Normal (all ports are idle) • Green Flashing (60 times per minute): Normal (a port is in use) • Red ON: Fault (includes reset) • Red Flashing (60 times per minute): Out of Service
SYNC-ERR	Red	Non-synchronisation status indication • OFF: Normal • ON: Out of synchronisation
RAI	Red	RAI signal status indication • OFF: Normal • ON: Alarm (Clock Slave) • Flashing (60 times per minute): Alarm (Clock Master)
AIS	Red	AIS status indication • OFF: Normal • ON: Alarm
SYNC	Green	Synchronisation status indication • OFF: Not synchronised • ON: Synchronised • Flashing (60 times per minute): Synchronised (Clock Master)
D-LINK	Green	Data link status indication • OFF: Not established • ON: Established

Maximum Cabling Distance of Extension Connection

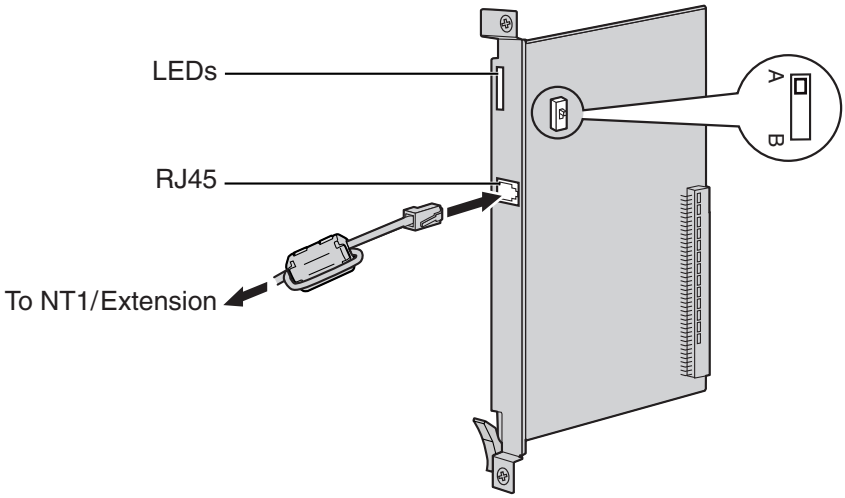
The maximum distance of the extension cable that connects the PRI30 cards is shown below:



2.4.10 PRI23 Card

Function

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



Accessory and User-supplied Items

Accessory (included): Ferrite core × 1

User-supplied (not included): RJ45 connector

Notes

- When connecting this optional service card to the trunk, connect through an NT1; do not connect to the U interface of the trunk directly.
- When connecting the RJ45 connector, attach the included ferrite core (except in Canada, where the ferrite core is not necessarily required). Refer to "2.2.9 Attaching a Ferrite Core".
- 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 "2.13.1 Starting the Hybrid IP-PBX".

CAUTION

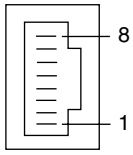
PRI ports are SELV ports and should only be connected to SELV services.

Switch Settings

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

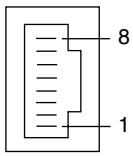
Pin Assignments

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	–	–

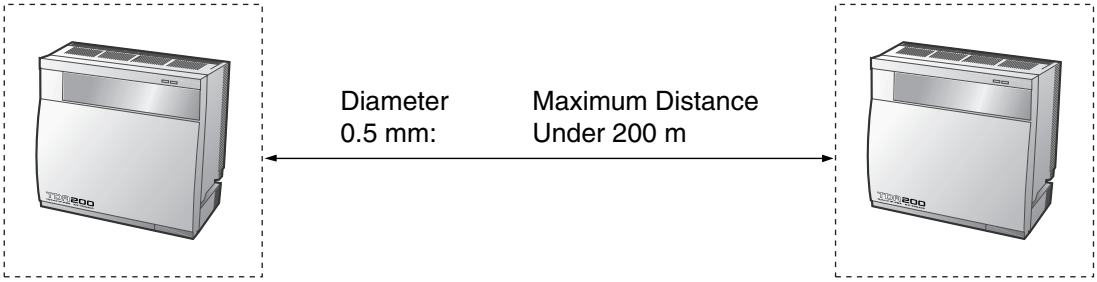
LED Indications

Indication	Colour	Description
CARD STATUS	Green/Red	Card status indication • OFF: Power Off • Green ON: Normal (all ports are idle) • Green Flashing (60 times per minute): Normal (a port is in use) • Red ON: Fault (includes reset) • Red Flashing (60 times per minute): Out of Service
SYNC-ERR	Red	Non-synchronisation status indication • OFF: Normal • ON: Out of synchronisation
RAI	Red	RAI signal status indication • OFF: Normal • ON: Alarm (Clock Slave) • Flashing (60 times per minute): Alarm (Clock Master)
AIS	Red	AIS status indication • OFF: Normal • ON: Alarm

Indication	Colour	Description
SYNC	Green	Synchronisation status indication • OFF: Not synchronised • ON: Synchronised • Flashing (60 times per minute): Synchronised (Clock Master)
D-LINK	Green	Data link status indication • OFF: Not established • ON: Established

Maximum Cabling Distance of Extension Connection

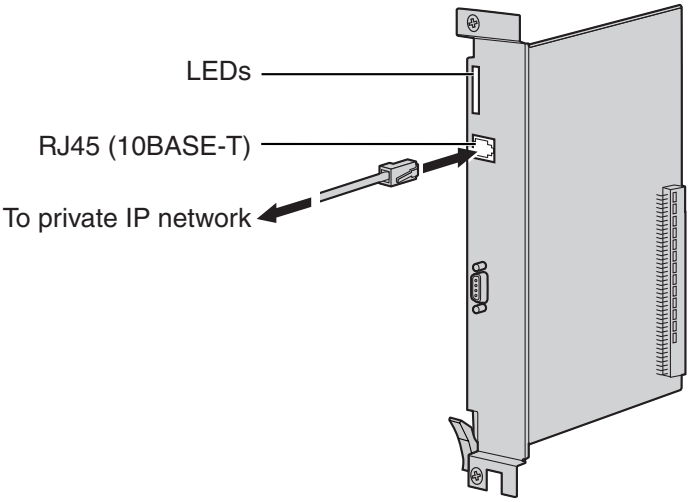
The maximum distance of the extension cable that connects the PRI23 cards is shown below:



2.4.11 IP-GW4 Card

Function

4-channel VoIP gateway card. Compliant with VoIP H.323 V.2 protocol, and ITU-T G.729a and G.723.1 CODEC methods. G3 fax support.



Accessory and User-supplied Items

Accessory (included): CD-ROM (including PC programming software and documentation) × 1

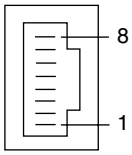
User-supplied (not included): RJ45 connector

Notes

- Maximum length of the cable to be connected to this optional service card is 100 m.
- The IP-GW4 card occupies the space of 2 free slots when it is installed in the Hybrid IP-PBX.
- For programming instructions and other information about the IP-GW4 card, refer to the documentation for the IP-GW4 card. To programme the IP-GW4 card, use the PC programming software designed for the IP-GW4 card.
- To confirm the trunk connection, refer to "Confirming the Trunk Connection" in "2.13.1 Starting the Hybrid IP-PBX".

Pin Assignments

RJ45 Connector (10BASE-T)



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	–	–

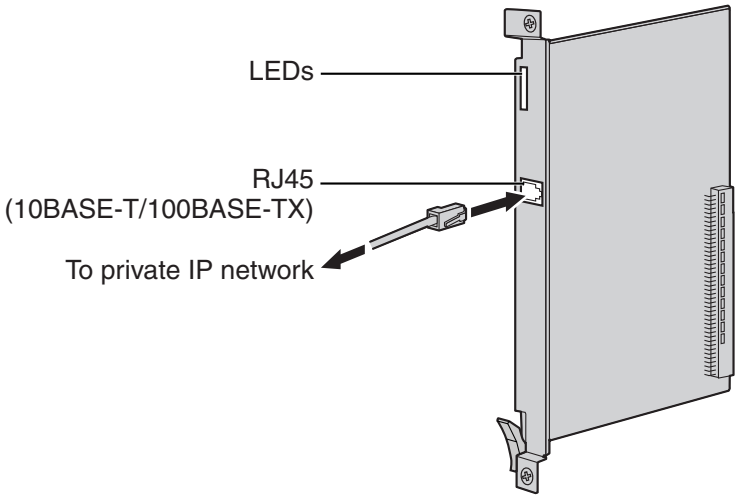
LED Indications

Indication	Colour	Description
CARD STATUS	Green/Red	Card status indication • OFF: Power Off • Green ON: Normal (all ports are idle) • Green Flashing (60 times per minute): Normal (a port is in use) • Red ON: Fault (includes reset) • Red Flashing (60 times per minute): Out of Service
ONLINE	Green	On-line status indication • ON: On-line mode • Flashing: Emergency maintenance mode
ALARM	Red	Alarm indication • OFF: Normal • ON: Alarm
IAM BUSY	Green	Busy status indication • OFF: Not used • ON: At least one line is used
LINK	Green	Link status indication • OFF: Connection error • ON: Normal connection
DATA	Green	Data transmission indication • OFF: No data transmitted • ON: Data transmitting
COL	Green	Data collision indication • OFF: No data collision • ON: Data collision
SIOSEL	Green	Serial maintenance port status indication • OFF: CPU power port used (maintenance port not available) • ON: Maintenance port available

2.4.12 IP-GW4E Card

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.



Accessory and User-supplied Items

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

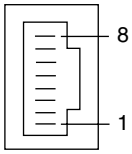
User-supplied (not included): RJ45 connector

Notes

- 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 Hybrid IP-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 "2.13.1 Starting the Hybrid IP-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	–	–

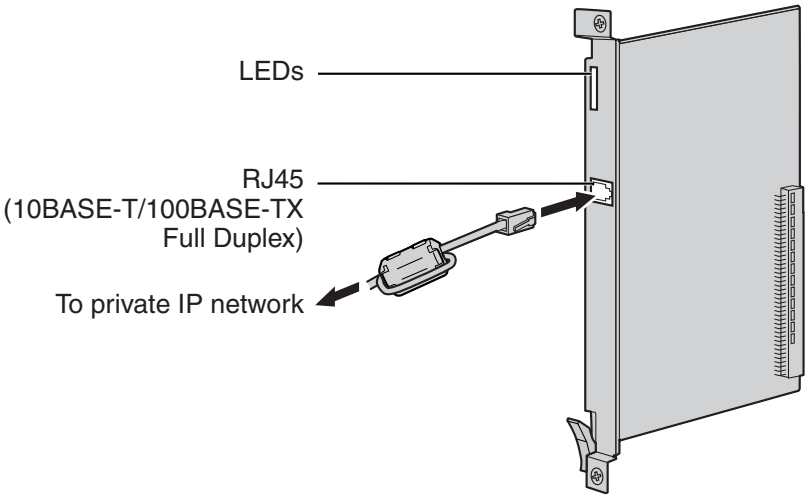
LED Indications

Indication	Colour	Description
CARD STATUS	Green/Red	Card status indication • OFF: Power Off • Green ON: Normal (all ports are idle) • Green Flashing (60 times per minute): Normal (a port is in use) • Red ON: Fault (includes reset) • Red Flashing (60 times per minute): Out of Service
ONLINE	Green	On-line status indication • ON: On-line mode • OFF: Off-line mode • Flashing: Maintenance mode **Note** If the LINK indicator is OFF, the ONLINE indicator will also be OFF.
ALARM	Red	Alarm indication • OFF: Normal • ON: Alarm
VoIP BUSY	Green	VoIP (H.323) process indication • OFF: VoIP process inactive • ON: VoIP process active
LINK	Green	Link status indication • OFF: Connection error • ON: Normal connection
DATA	Green	Data transmission indication • OFF: No data transmitted • ON: Data transmitting

2.4.13 IP-GW16 Card

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.



Accessory and User-supplied Items

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

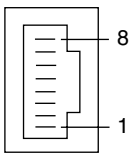
User-supplied (not included): RJ45 connector

Notes

- 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 "2.2.9 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 "2.13.1 Starting the Hybrid IP-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 • OFF: Power Off • Green ON: Normal (all ports are idle) • Green Flashing (60 times per minute): Normal (a port is in use) • Red ON: Fault (includes reset) • Red Flashing (60 times per minute): Out of Service
ONLINE	Green	On-line status indication • ON: On-line mode • OFF: Off-line mode • Flashing: Maintenance mode **Note** If the LINK indicator is OFF, the ONLINE indicator will also be OFF.
ALARM	Red	Alarm indication • OFF: Normal • ON: Alarm
VoIP BUSY	Green	VoIP (H.323) process indication • OFF: VoIP process inactive • ON: VoIP process active
LINK	Green	Link status indication • OFF: Connection error • ON: Normal connection
DATA	Green	Data transmission indication • OFF: No data transmitted • ON: Data transmitting

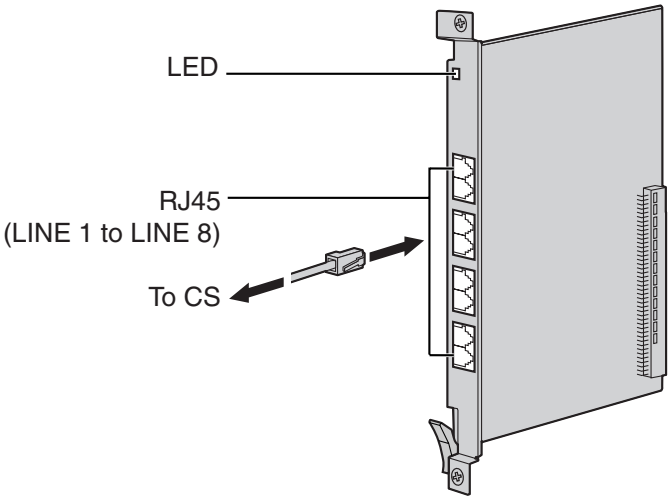
2.5 Installation of the Extension Cards

2.5.1 CSIF4 and CSIF8 Card

Function

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

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



Accessory and User-supplied Items

Accessory (included): none

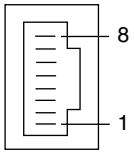
User-supplied (not included): RJ45 connector

Notes

- LINE 5 to LINE 8 are for CSIF8 card only.
- When using the CSIF4 card, please note that the Hybrid IP-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 "2.8.7 Connecting a Cell Station to the Hybrid IP-PBX" in "2.8 Connection of DECT Portable Stations" or "2.9.7 Connecting a Cell Station to the Hybrid IP-PBX" in "2.9 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	–

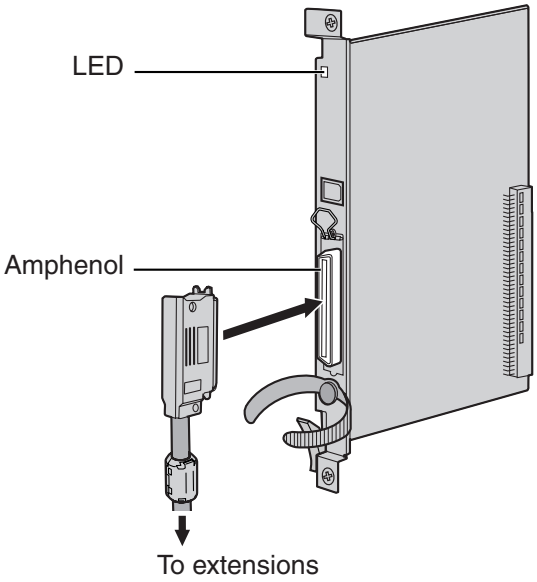
LED Indications

Indication	Colour	Description
CARD STATUS	Green/Red	Card status indication • OFF: Power Off • Green ON: Normal (all ports are idle) • Green Flashing (60 times per minute): Normal (a port is in use) • Red ON: Fault (includes reset) • Red Flashing (60 times per minute): Out of Service

2.5.2 DHLC8 Card

Function

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



Accessory and User-supplied Items

Accessory (included): Screws × 2, Ferrite core × 1

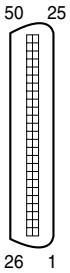
User-supplied (not included): Amphenol connector

Notes

- Attach the included ferrite core to the cable. Refer to "2.2.9 Attaching a Ferrite Core".
- To connect the Amphenol connector, refer to "2.2.10 Fastening Amphenol Type Connector".
- For details about power failure transfer, refer to "2.12.1 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
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	–

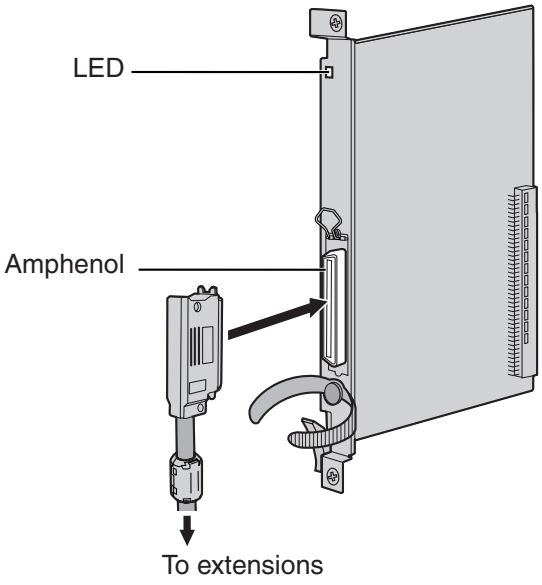
LED Indications

Indication	Colour	Description
CARD STATUS	Green/ Orange/Red	Card status indication • OFF: Power Off • Green ON: Normal (all ports are idle) • Green Flashing (60 times per minute): Normal (a port is in use) • Orange Flashing: Detection of PT-interface CS connection (when starting up the PT-interface CS) • Red ON: Fault (includes reset) • Red Flashing (60 times per minute): Out of Service

2.5.3 DLC8 Card

Function

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



Accessory and User-supplied Items

Accessory (included): Screws × 2, Ferrite core × 1

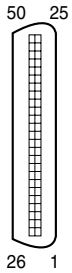
User-supplied (not included): Amphenol connector

Notes

- Attach the included ferrite core to the cable. Refer to "2.2.9 Attaching a Ferrite Core".
- To connect the Amphenol connector, refer to "2.2.10 Fastening Amphenol Type 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)
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	–

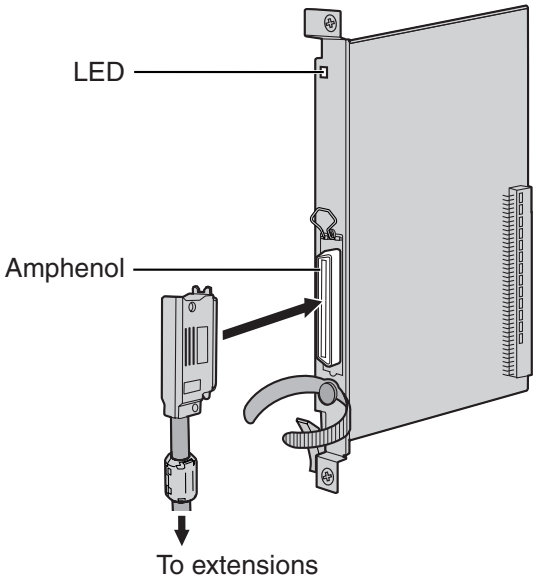
LED Indications

Indication	Colour	Description
CARD STATUS	Green/ Orange/Red	Card status indication • OFF: Power Off • Green ON: Normal (all ports are idle) • Green Flashing (60 times per minute): Normal (a port is in use) • Orange Flashing: Detection of PT-interface CS connection (when starting up the PT-interface CS) • Red ON: Fault (includes reset) • Red Flashing (60 times per minute): Out of Service

2.5.4 DLC16 Card

Function

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



Accessory and User-supplied Items

Accessory (included): Screws × 2, Ferrite core × 1

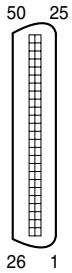
User-supplied (not included): Amphenol connector

Notes

- Attach the included ferrite core to the cable. Refer to "2.2.9 Attaching a Ferrite Core".
- To connect the Amphenol connector, refer to "2.2.10 Fastening Amphenol Type 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)
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	–

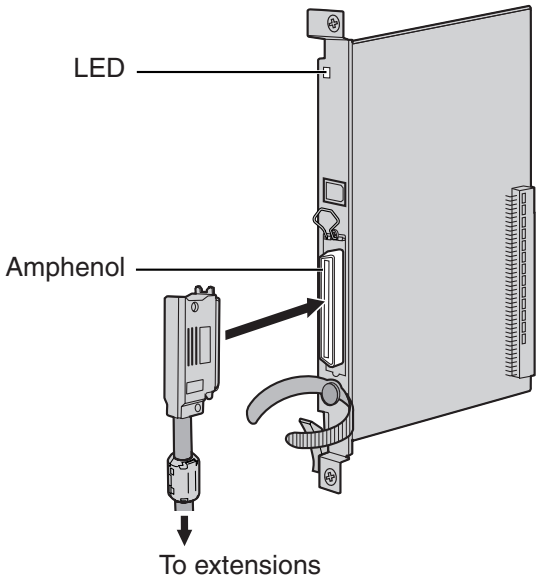
LED Indications

Indication	Colour	Description
CARD STATUS	Green/ Orange/Red	Card status indication • OFF: Power Off • Green ON: Normal (all ports are idle) • Green Flashing (60 times per minute): Normal (a port is in use) • Orange Flashing: Detection of PT-interface CS connection (when starting up the PT-interface CS) • Red ON: Fault (includes reset) • Red Flashing (60 times per minute): Out of Service

2.5.5 SLC8 Card

Function

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



Accessory and User-supplied Items

Accessory (included): Screws × 2, Ferrite core × 1

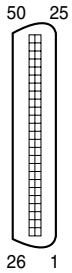
User-supplied (not included): Amphenol connector

Notes

- Attach the included ferrite core to the cable. Refer to "2.2.9 Attaching a Ferrite Core".
- To connect the Amphenol connector, refer to "2.2.10 Fastening Amphenol Type Connector".
- For details about power failure transfer, refer to "2.12.1 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	–	43-44	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	–

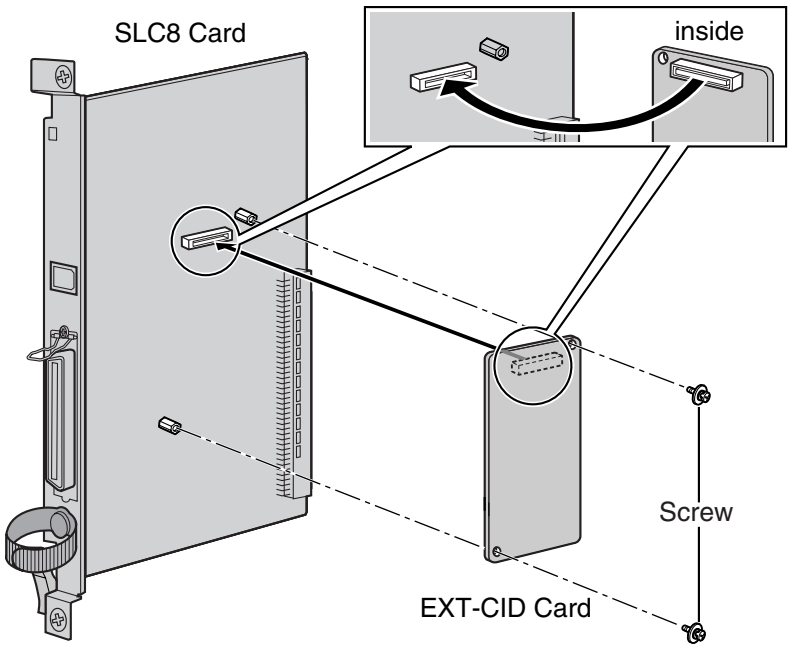
LED Indications

Indication	Colour	Description
CARD STATUS	Green/Red	Card status indication • OFF: Power Off • Green ON: Normal (all ports are idle) • Green Flashing (60 times per minute): Normal (a port is in use) • Red ON: Fault (includes reset) • Red Flashing (60 times per minute): Out of Service

2.5.6 EXT-CID Card

Function

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



Accessory and User-supplied Items

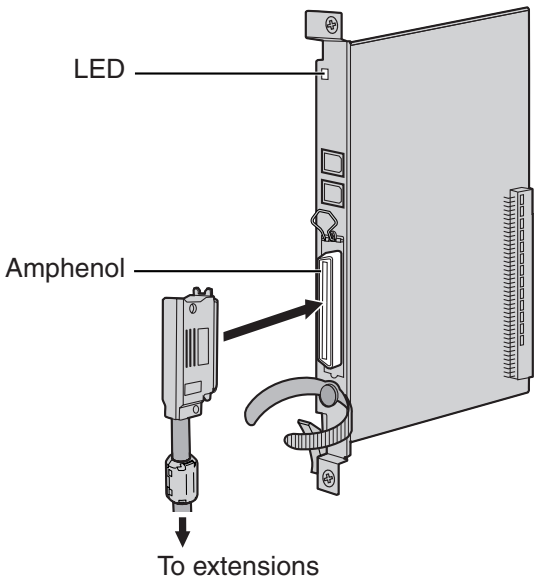
Accessory (included): Screws × 2

User-supplied (not included): none

2.5.7 SLC16 and MSLC16 Cards

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.



Accessory and User-supplied Items

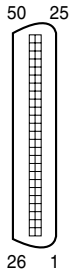
Accessory (included): Screws × 2, Ferrite core × 1
User-supplied (not included): Amphenol connector

Notes

- Panasonic SLT with Message Waiting Lamp (e.g., KX-T7310) is recommended for connection to the MSLC16 card.
- Attach the included ferrite core to the cable. Refer to "2.2.9 Attaching a Ferrite Core".
- To connect the Amphenol connector, refer to "2.2.10 Fastening Amphenol Type Connector".
- For details about power failure transfer, refer to "2.12.1 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	–

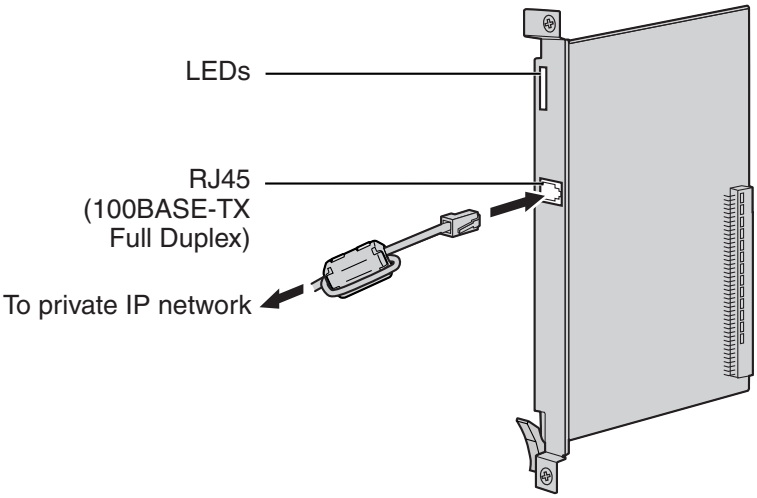
LED Indications

Indication	Colour	Description
CARD STATUS	Green/Red	Card status indication • OFF: Power Off • Green ON: Normal (all ports are idle) • Green Flashing (60 times per minute): Normal (a port is in use) • Red ON: Fault (includes reset) • Red Flashing (60 times per minute): Out of Service

2.5.8 IP-EXT16 Card

Function

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



Accessory and User-supplied Items

Accessory (included): Ferrite core × 1

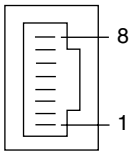
User-supplied (not included): RJ45 connector

Notes

- 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 "2.2.9 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 • OFF: Power Off • Green ON: Normal (all ports are idle) • Green Flashing (60 times per minute): Normal (a port is in use) • Red ON: Fault (includes reset) • Red Flashing (60 times per minute): Out of Service
ONLINE	Green	On-line status indication • ON: At least one port is in use (an IP-PT is connected) • OFF: No ports are in use (No IP-PTs are connected) **Note** If the LINK indicator is OFF, the ONLINE indicator will also be OFF.
ALARM	Red	Alarm indication • OFF: Normal • ON: Alarm
VoIP BUSY	Green	Panasonic proprietary VoIP protocol process indication • OFF: VoIP process inactive • ON: VoIP process active
LINK	Green	Link status indication • OFF: Connection error • ON: Normal connection
DATA	Green	Data transmission indication • OFF: No data transmitted • ON: Data transmitting

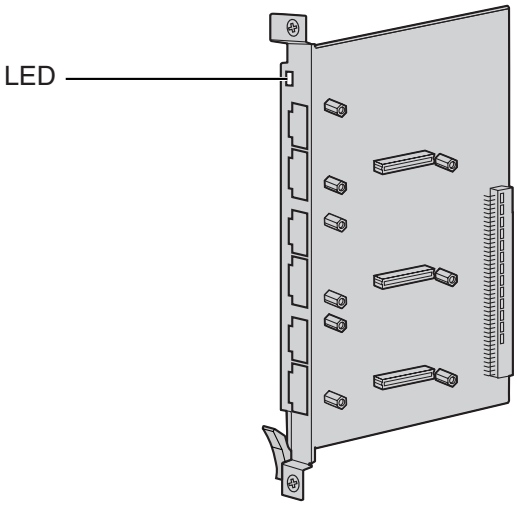
2.6 Installation of the Other Cards

2.6.1 OPB3 Card

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



CAUTION

A LITHIUM BATTERY IS USED IN OPB3 CARD. THERE IS A RISK OF EXPLOSION IF BATTERY IS REPLACED WITH THE INCORRECT TYPE. DISPOSE OF USED BATTERIES ACCORDING TO THE INSTRUCTIONS.

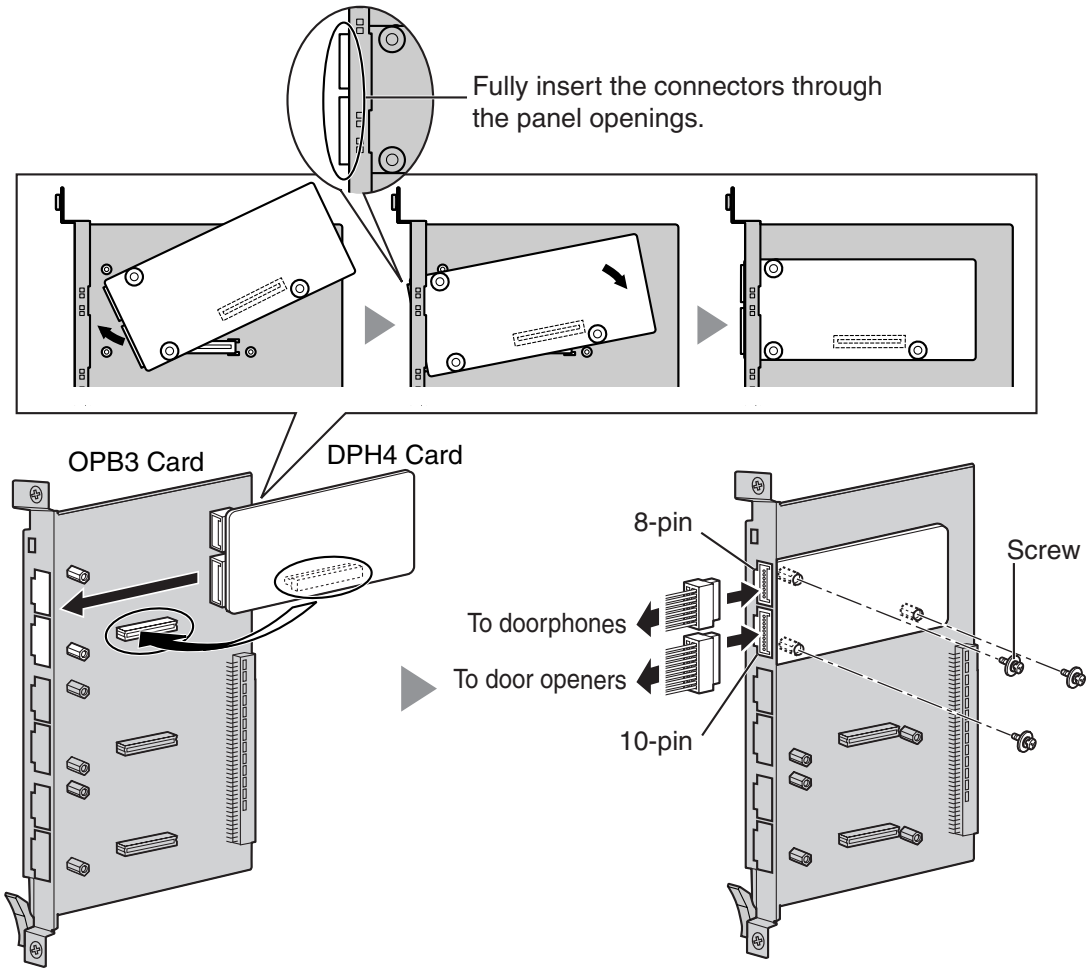
LED Indications

Indication	Colour	Description
CARD STATUS	Green/Red	Card status indication • OFF: Power Off • Green ON: Normal (all ports are idle) • Green Flashing (60 times per minute): Normal (a port is in use) • Red ON: Fault (includes reset) • Red Flashing (60 times per minute): Out of Service

2.6.2 DPH4 Card

Function

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



Accessory and User-supplied Items

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

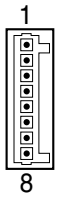
User-supplied (not included): Copper wire

Note

For details about connection to doorphones and door openers, refer to "2.10.1 Connection of Doorphones, Door Openers, External Sensors, and External Relays".

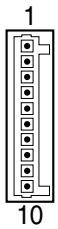
Pin Assignments

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

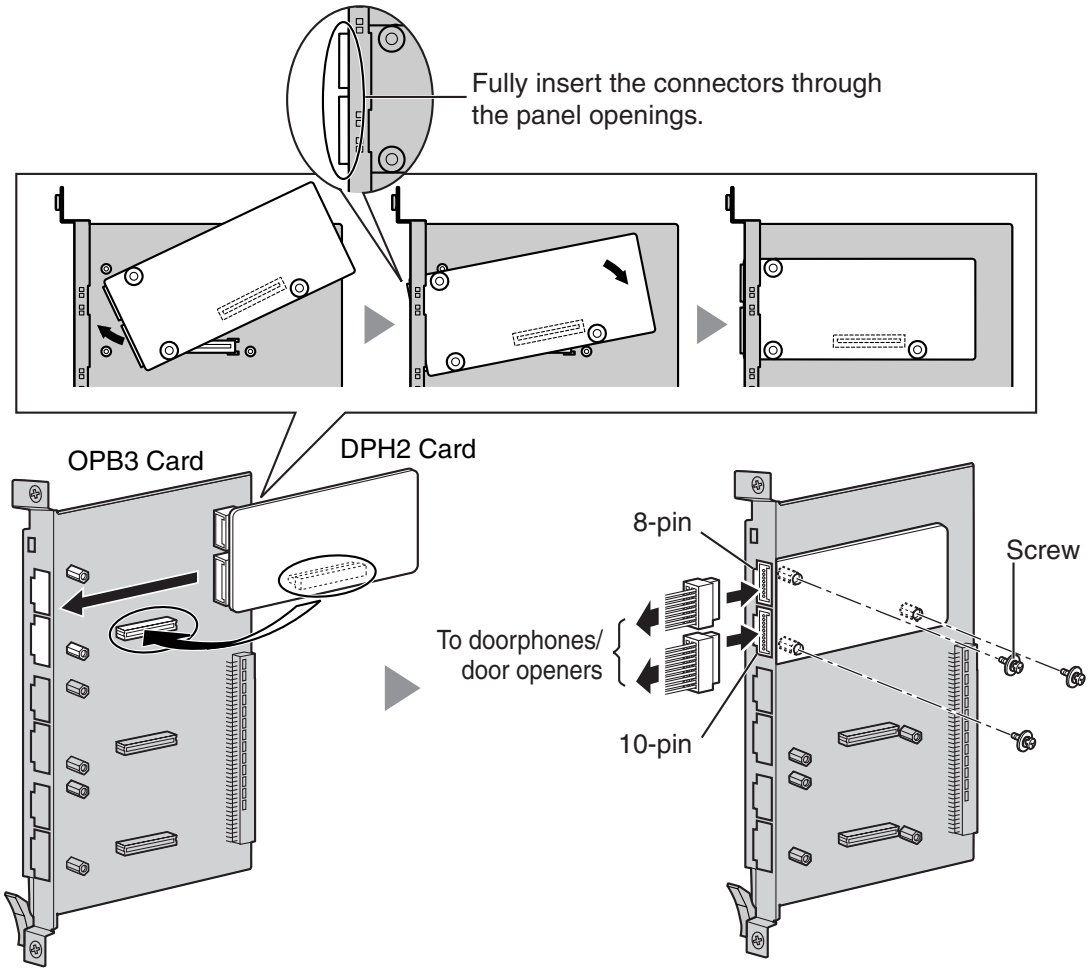


No.	Signal Name	Function
1-2	Reserved	–
3	OP4b	Door opener 4
4	OP4a	Door opener 4 com
5	OP3b	Door opener 3
6	OP3a	Door opener 3 com
7	OP2b	Door opener 2
8	OP2a	Door opener 2 com
9	OP1b	Door opener 1
10	OP1a	Door opener 1 com

2.6.3 DPH2 Card

Function

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



Accessory and User-supplied Items

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

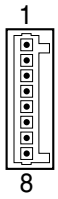
User-supplied (not included): Copper wire

Note

For details about connection to doorphones and door openers, refer to "2.10.1 Connection of Doorphones, Door Openers, External Sensors, and External Relays".

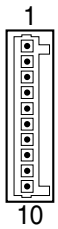
Pin Assignments

8-pin Terminal Block



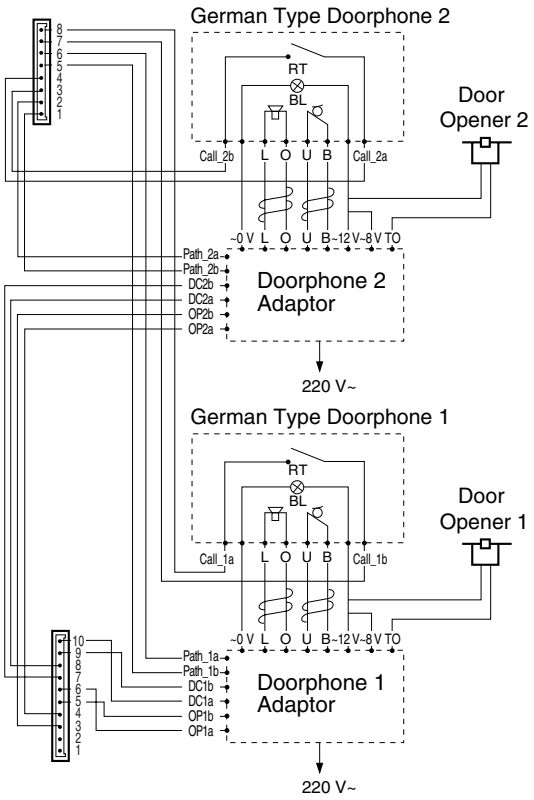
No.	Signal Name	Function
1	Path_2b	Doorphone 2 transmit
2	Path_2a	Doorphone 2 receive
3	Call_2b	Doorphone 2 call button
4	Call_2a	Doorphone 2 call button com
5	Path_1b	Doorphone 1 transmit
6	Path_1a	Doorphone 1 receive
7	Call_1b	Doorphone 1 call button
8	Call_1a	Doorphone 1 call button com

10-pin Terminal Block



No.	Signal Name	Function
1-2	Reserved	–
3	OP2b	Door opener 2
4	OP2a	Door opener 2 com
5	OP1b	Door opener 1
6	OP1a	Door opener 1 com
7	DC2b	Doorphone control 2
8	DC2a	Doorphone control 2 com
9	DC1b	Doorphone control 1
10	DC1a	Doorphone control 1 com

Connection Diagram for German Type Doorphones and Door Openers

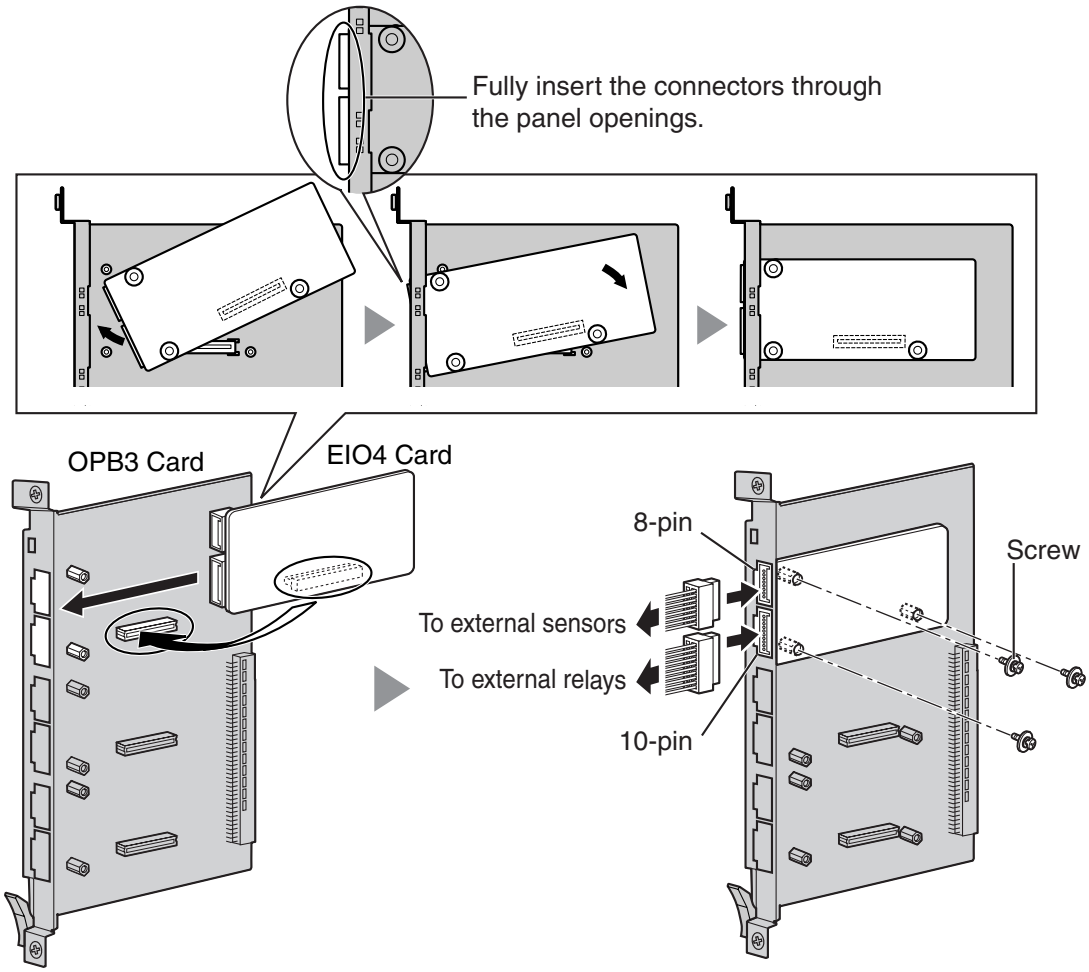


BL: Light
RT: Call Button
OP: Door Opener Connection Terminal
DC: Doorphone Current Supply Control Terminal
Path: Doorphone Call Path
: Speaker
: Microphone
: Shield

2.6.4 EIO4 Card

Function

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



Accessory and User-supplied Items

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

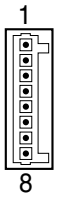
User-supplied (not included): Copper wire

Note

For details about connection to external sensors and external relays, refer to "2.10.1 Connection of Doorphones, Door Openers, External Sensors, and External Relays".

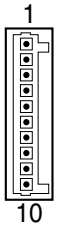
Pin Assignments

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

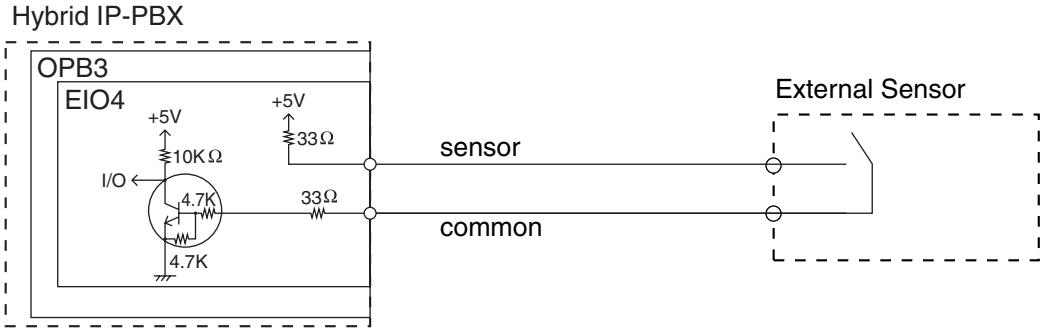
10-pin Terminal Block



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

Connection Diagram for External Sensor

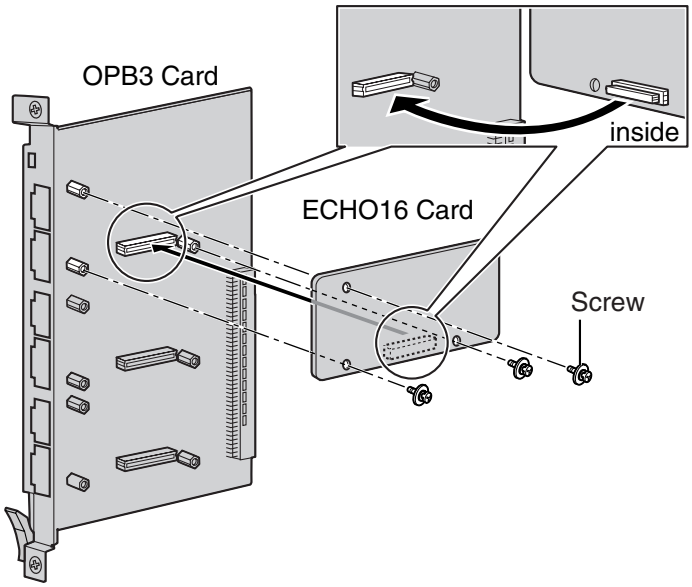
Power to the external sensor is provided from the EIO4 card and must be grounded through the EIO4 card as indicated in the diagram below. A pair of "sensor" and "common" lines are connected to the EIO4 card for each external sensor. The Hybrid IP-PBX detects input from the sensor when the signal is under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



2.6.5 ECHO16 Card

Function

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



Accessory and User-supplied Items

Accessory (included): Screws × 3

User-supplied (not included): none

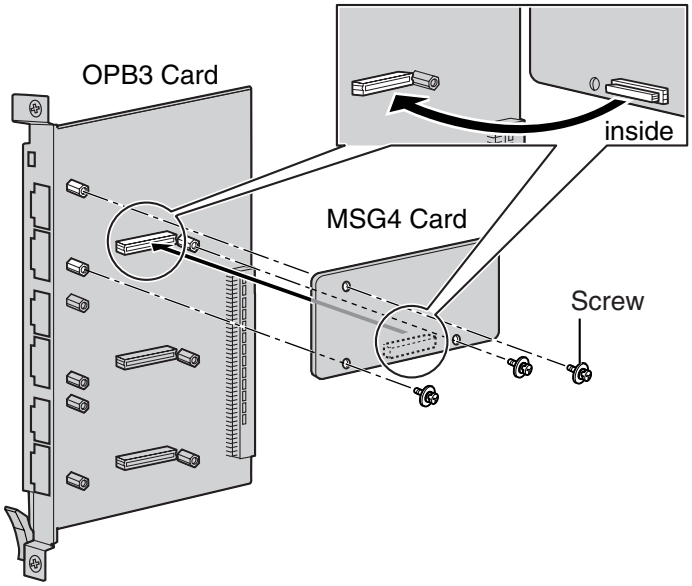
Note

To establish a conference call involving 6 to 8 parties, install an ECHO16 card and enable the echo cancellation for conference using the KX-TDA Maintenance Console. For details, refer to the on-line help of the KX-TDA Maintenance Console.

2.6.6 MSG4 Card

Function

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



Accessory and User-supplied Items

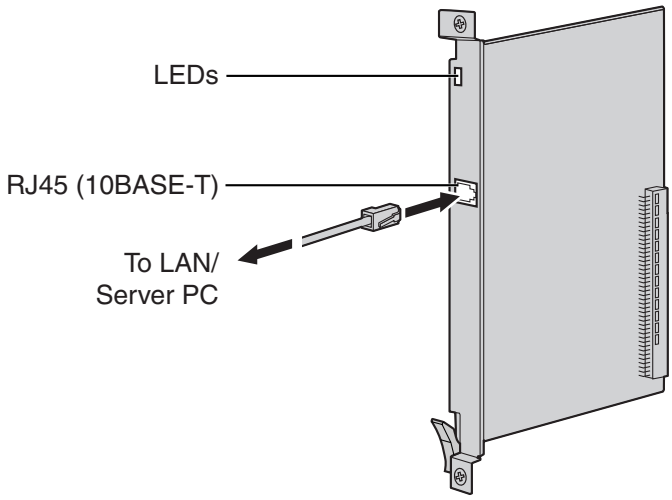
Accessory (included): Screws × 3

User-supplied (not included): none

2.6.7 CTI-LINK Card

Function

Ethernet card for CTI communication via 10BASE-T port. CSTA Phase 3 protocol compatible.



Accessory and User-supplied Items

Accessory (included): none

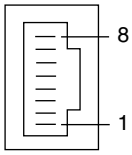
User-supplied (not included): RJ45 connector

Notes

- Maximum length of the cable to be connected to this optional service card is 100 m.
- This optional service card can be connected to PCs on a LAN via a Server PC to provide third party call control CTI.
  The operating system of the PC or Server PC required for third party call control depends on your CTI application software. For details, refer to the manual for your CTI application software.

Pin Assignments

RJ45 Connector (10BASE-T)



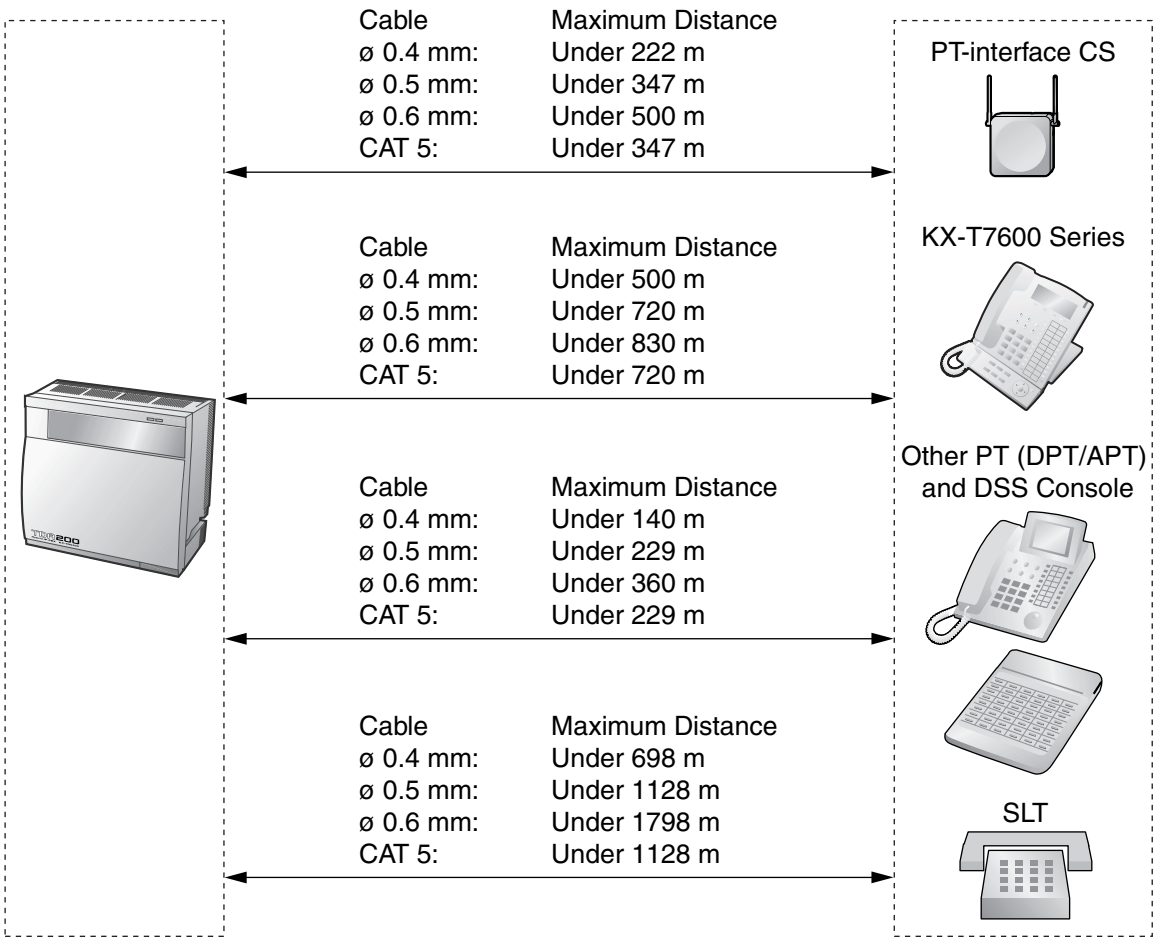
No.	Signal Name	Input (I)/Output (O)	Function
1	TPO+	O	Transmit data+
2	TPO-	O	Transmit data-
3	TPI+	I	Receive data+
4-5	Reserved	–	–
6	TPI-	I	Receive data-
7-8	Reserved	–	–

LED Indications

Indication	Colour	Description
CARD STATUS	Green/Red	Card status indication • OFF: Power Off • Green ON: Normal • Red ON: Fault (includes reset) • Red Flashing (60 times per minute): Out of Service
LINK STATUS	Green	Link status indication • Flashing: In communication • ON: In normal linking

2.7 Connection of Extensions

2.7.1 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, SLC16, SLC8 Cards					✔
DLC16, DLC8 Cards	✔	✔		✔	

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

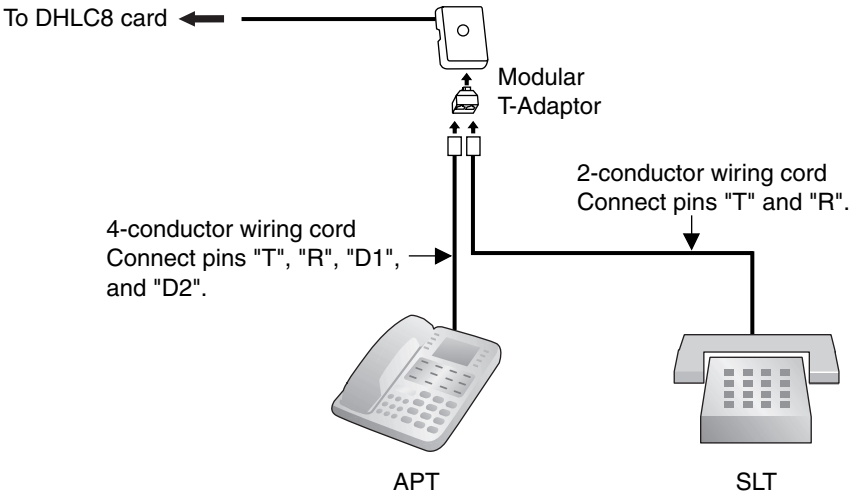
2.7.2 Parallel Connection of the Extensions

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

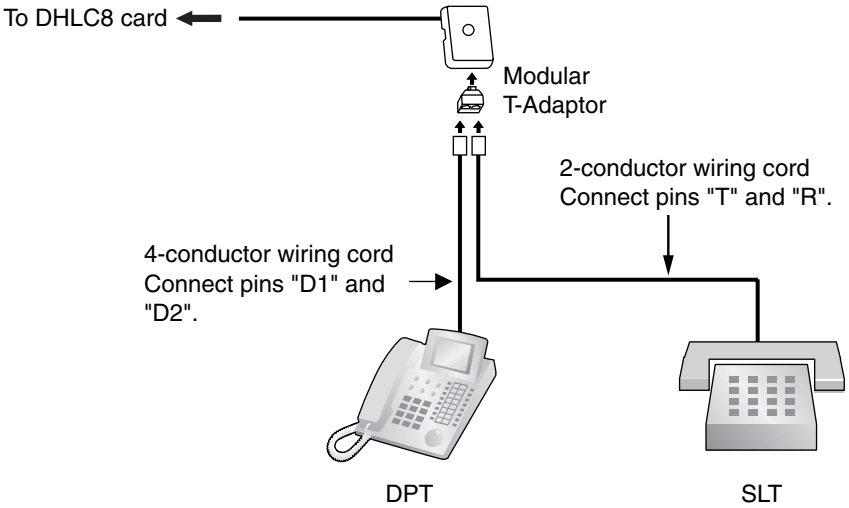


With DPT

Parallel mode or eXtra Device Port (XDP) mode can be selected through system programming.

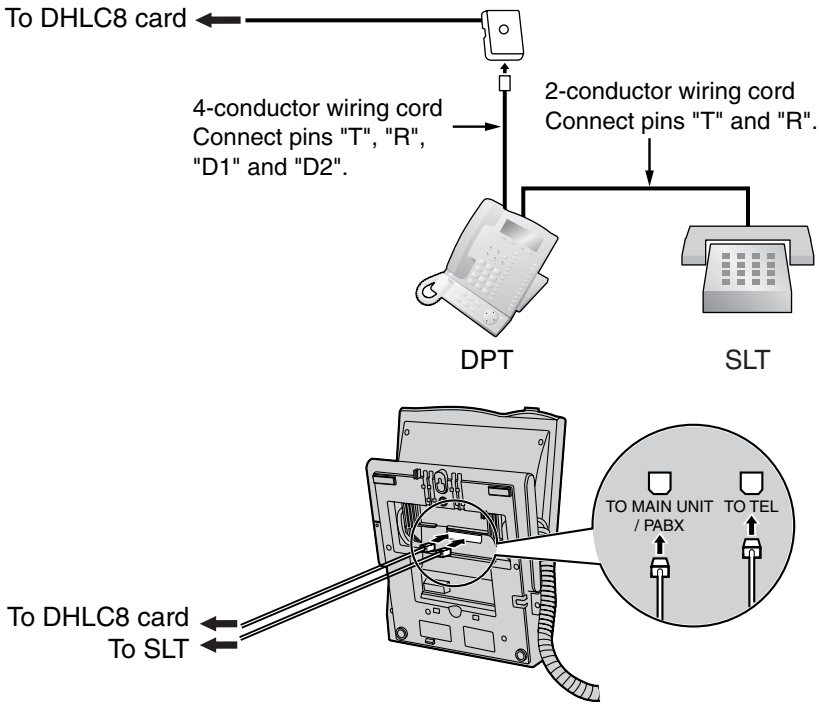
If the XDP mode is enabled through system programming, parallel connection is not possible. Refer to "1.10.9 Parallelled Telephone" and "2.1.1 Extension Port Configuration" in the Feature Guide for further information.

Using a Modular T-Adaptor

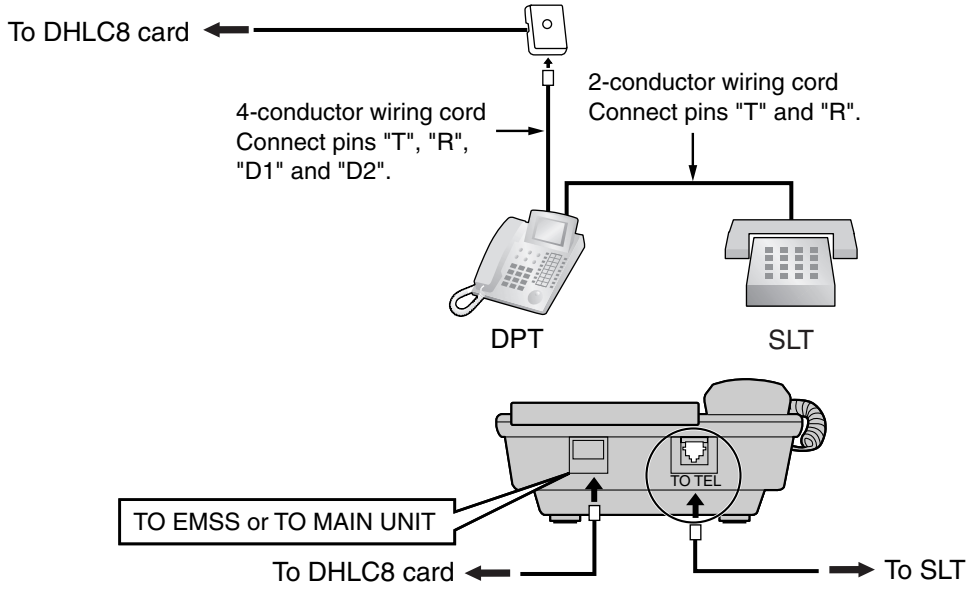


Using an EXtra Device Port

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



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



2.7.3 Digital EXtra Device Port (Digital XDP) Connection

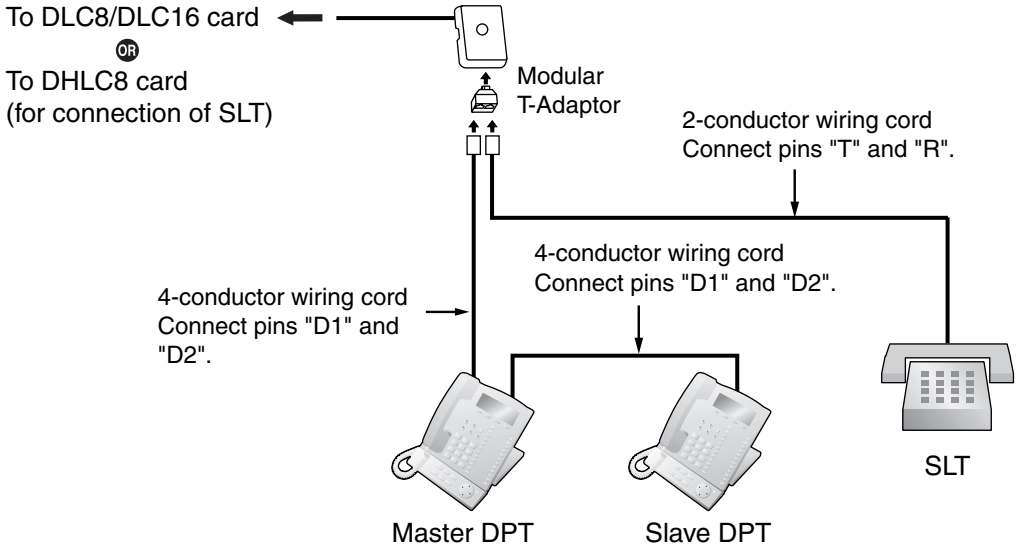
A DPT can be connected to another DPT on the Digital XDP connection. In addition, if the DPT is connected to a DHLC8 card, it can also have an SLT connected in Parallel mode or XDP mode.

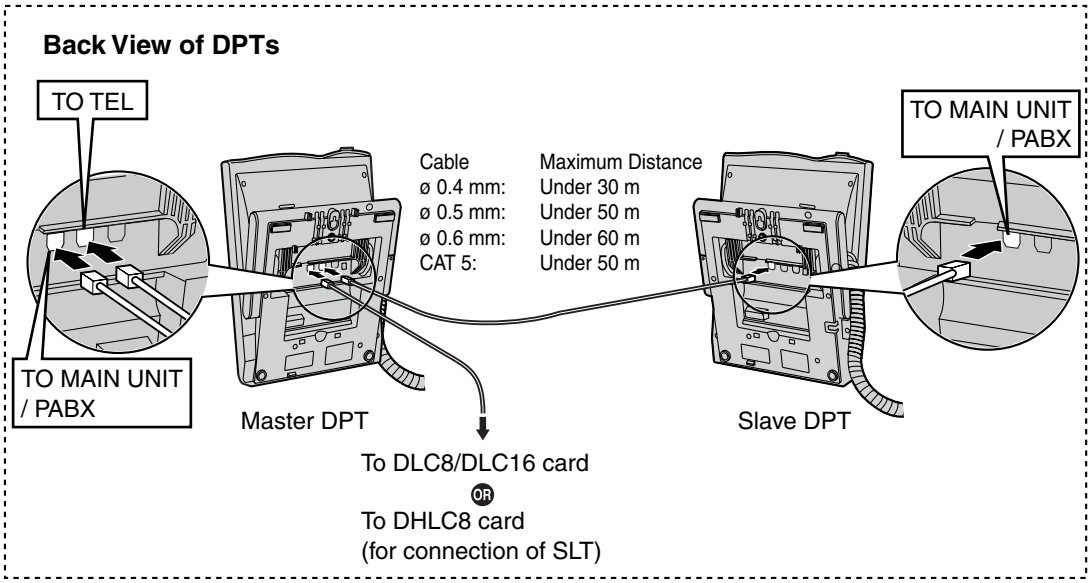
Notes

- Both DPTs must be KX-T7600 series DPTs (excluding KX-T7640).
- 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 "1.10.9 Parallelled Telephone" and "2.1.1 Extension Port Configuration" in the Feature Guide for further information.

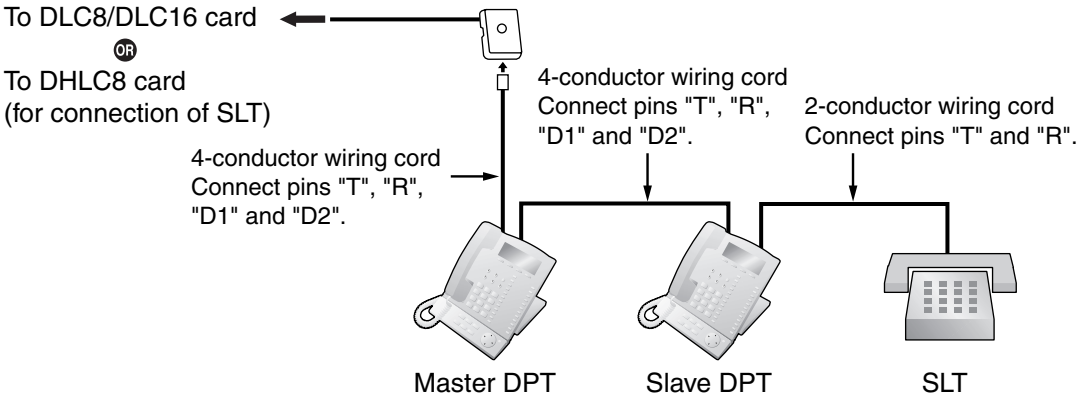
With KX-T7600 Series DPT (except KX-T7600E Series)

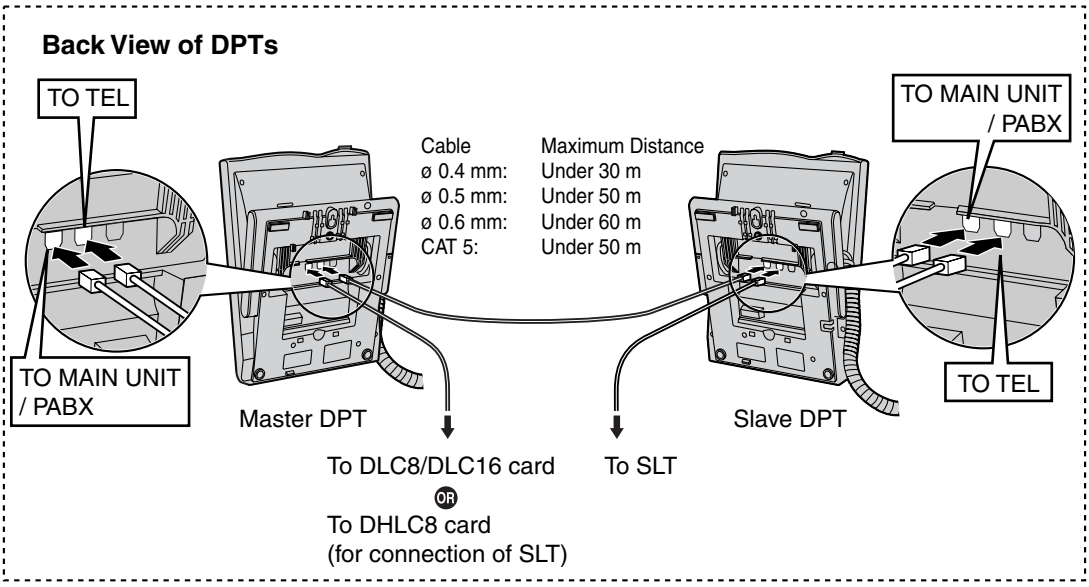
Using a Modular T-Adaptor





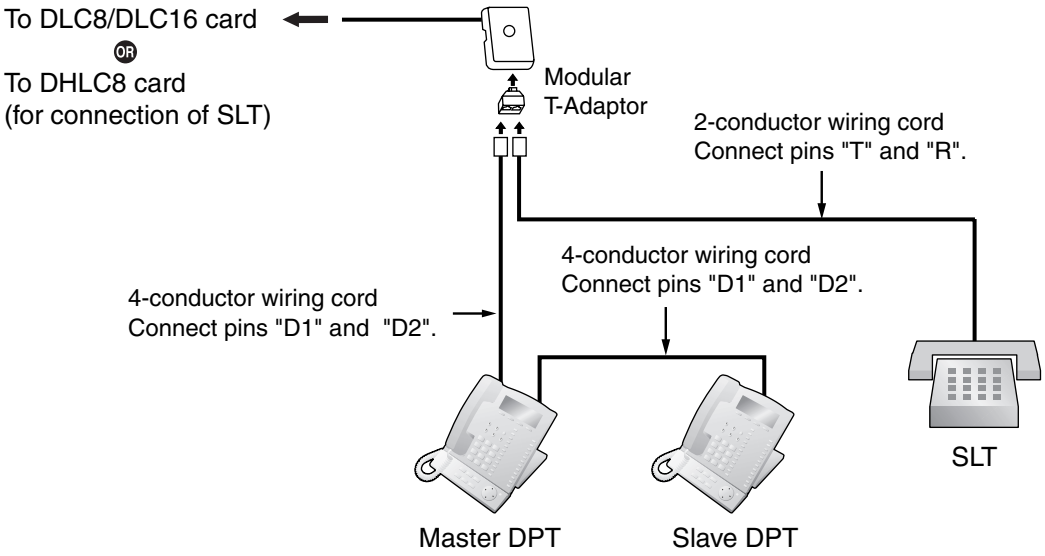
Using an EXtra Device Port

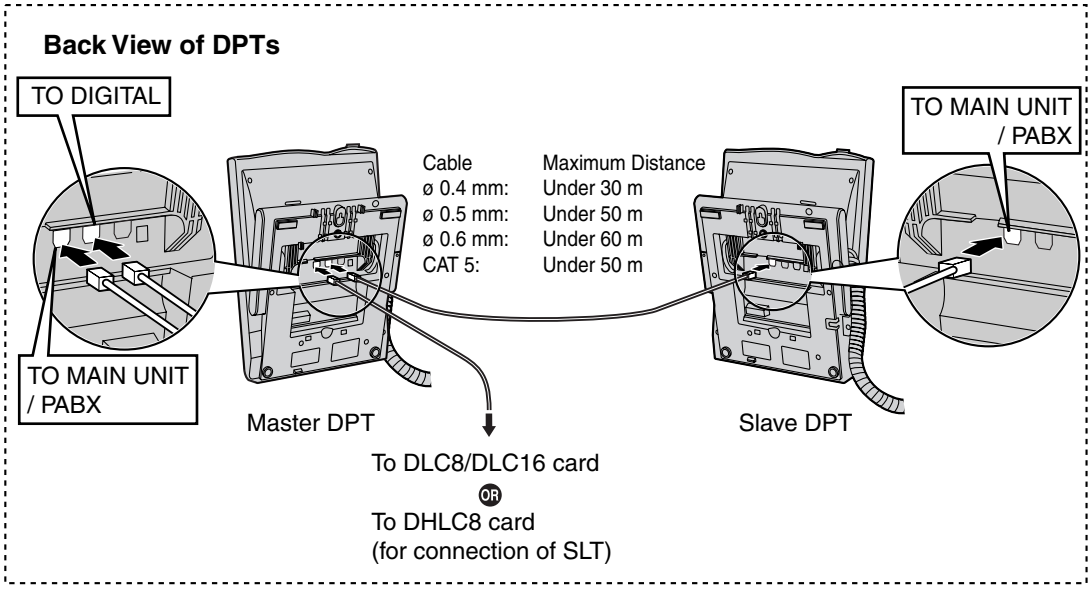




With KX-T7600E Series DPT

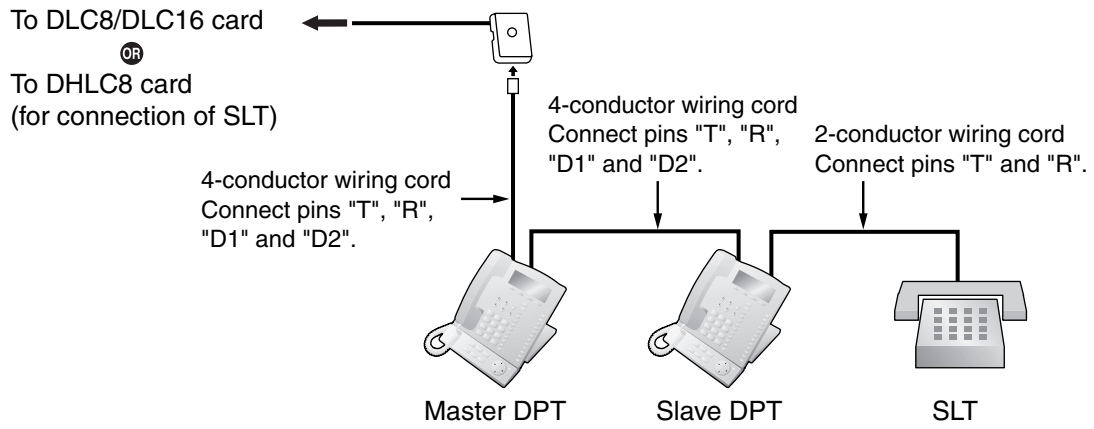
Using a Modular T-Adaptor



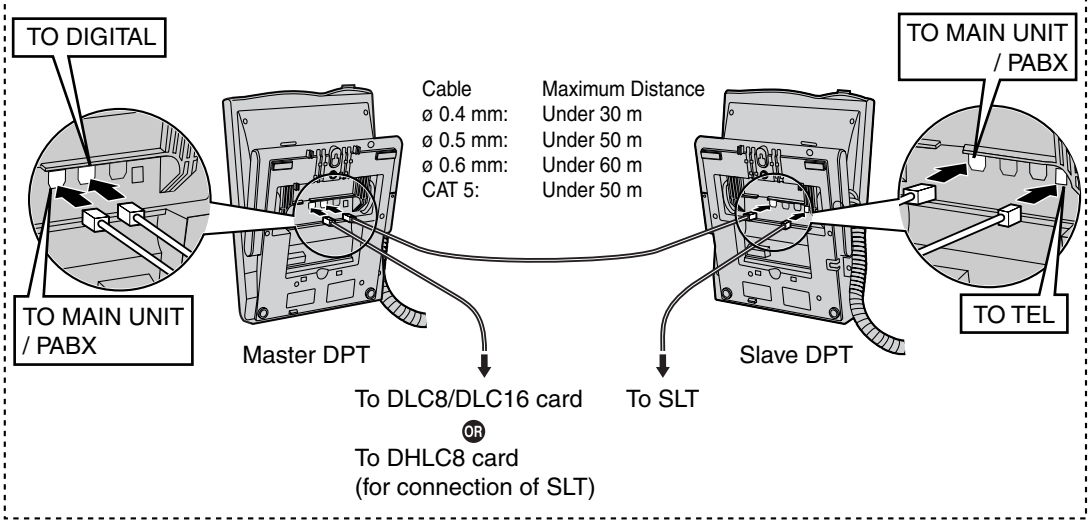


Using an EXtra Device Port

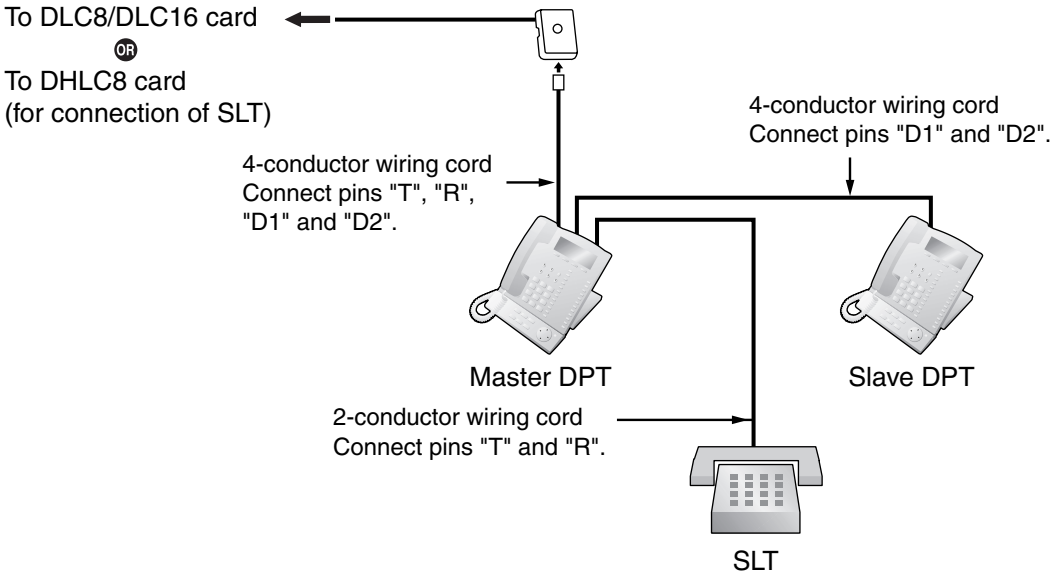
Connecting to a Slave DPT



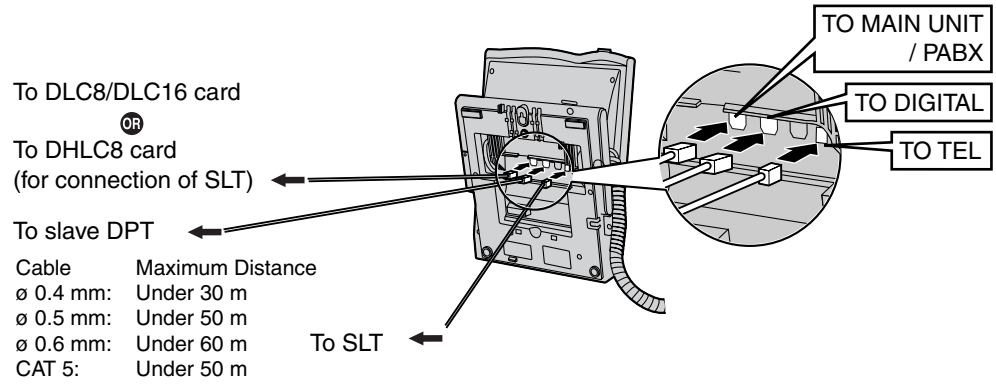
Back View of DPTs



Connecting to a Master DPT



Back View of DPTs



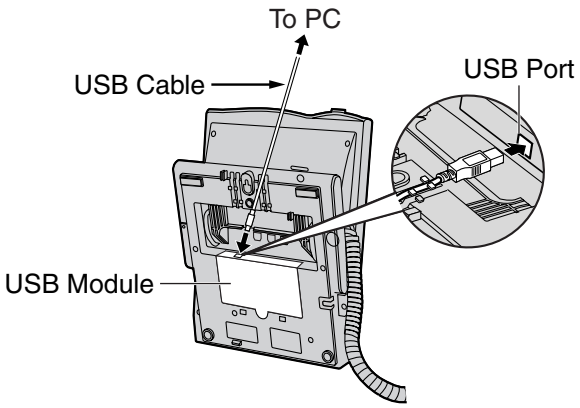
Cable	Maximum Distance
ø 0.4 mm:	Under 30 m
ø 0.5 mm:	Under 50 m
ø 0.6 mm:	Under 60 m
CAT 5:	Under 50 m

2.7.4 First Party Call Control CTI Connection

CTI connection between a PC and a KX-T7633/T7636 DPT provides first party call control. The CTI connection is made via a USB interface (version 1.1), and uses the TAPI 2.1 protocol.
A USB Module (KX-T7601) must be connected to the KX-T7633/T7636 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.



Notes

- Maximum length of the USB cable is 3 m.
- USB Modules must not be connected to DPTs in the Digital XDP connection. In a Digital XDP connection, the PC cannot be used. If a USB module is connected to a slave DPT, the DPT will not work properly.

2.8 Connection of DECT Portable Stations

2.8.1 Overview

The following equipment is required to connect the wireless system:

CS: Cell Station (KX-TDA0142CE/KX-TDA0141CE)

KX-TDA0142CE Using a CSIF Card

This unit determines the area covered by the wireless system. Up to 4 calls can be made at the same time through each CS.

- **CSIF4 (KX-TDA0143)**
  One CSIF4 card supports up to 4 Cell Stations. Up to 2 CSIF4 cards can be installed in the KX-TDA100, and up to 4 can be installed in the KX-TDA200.
- **CSIF8 (KX-TDA0144)**
  One CSIF8 card supports up to 8 Cell Stations. Up to 2 CSIF8 cards can be installed in the KX-TDA100, and up to 4 can be installed in the KX-TDA200.

KX-TDA0141CE Using a DHLC/DLC Card

This unit determines the area covered by the wireless system. Up to 2 calls can be made at the same time through each CS.

Note for users in Europe

This Cell Station Unit for DECT is for connection to a Panasonic PBX of a European country.

PS: DECT Portable Station (KX-TCA155/KX-TCA255/KX-TD7590/KX-TD7580)

The KX-TDA100 and KX-TDA200 can support up to 128 PSs. For more details about the PS, refer to the PS Operating Instructions.

RF Specification

Item	Description
Radio Access Method	Multi Carrier TDMA-TDD
Frequency Band	1880 MHz to 1900 MHz*1
Number of Carriers	10*2
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

*1 The number may vary depending on the country/area. In Taiwan, it is 1880 MHz to 1895 MHz.
*2 The number may vary depending on the country/area. In Taiwan, it is 8.

CAUTION

- The CS should be kept free of dust, moisture, high temperature (more than 40 °C), low temperature (less than 0 °C), 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.
- Keep 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
Hybrid IP-PBX and CS	More than 2 m

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.

2.8.2 Procedure Overview

When connecting the wireless system, use extreme care to conduct a site survey. Site surveys can be conducted using the KX-TCA255 or KX-TD7590 PS. Inadvertent site survey can result in poor service area, frequent noise, and disconnection of calls.

1. Investigate the installation site

Refer to "2.8.3 Site Planning".

a. Obtain the map of the CS installation site.

b. Consider the service area demanded by the user on the map.

c. Plan the locations of each CS, taking account of distance, building materials and etc.

2. Prepare for site survey

Refer to "2.8.4 Before Site Survey".

a. Check and assign the CS ID number to the PS.

b. Assign a channel number to each CS by setting the DIP switches on the back of the CS.

c. Supply electricity to each CS using an AC adaptor or a battery box.

d. Install each CS temporarily as planned.

Notes

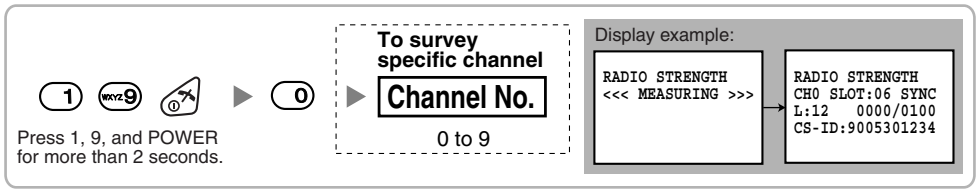
- Install at least 2 m above the floor.
- Keep the antennas in the upright position.

3. Conduct the site survey

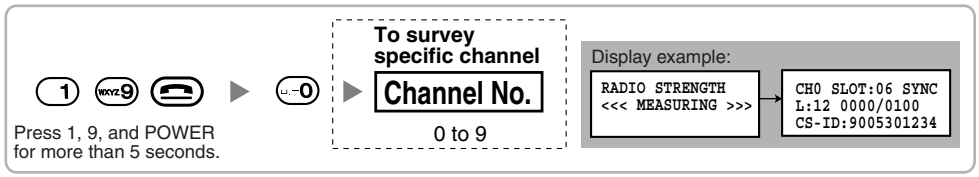
Refer to "2.8.5 Site Survey Using the KX-TCA255/KX-TD7590".

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

Using the KX-TCA255



Using the KX-TD7590



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 demanded by the user.

4. Finish the site survey

Refer to "2.8.6 After Site Survey".

a. Return all DIP switches of each CS to the OFF position, and stop supplying power.

b. Turn off the PS.

5. Connect the CS and PS to the Hybrid IP-PBX and test the operation

Refer to "2.8.7 Connecting a Cell Station to the Hybrid IP-PBX".

a. Connect the CSs to the Hybrid IP-PBX.

b. Register the PSs to the Hybrid IP-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 "2.8.8 Wall Mounting".

a. Assuming everything goes as planned, mount the CS on the wall.

2.8.3 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

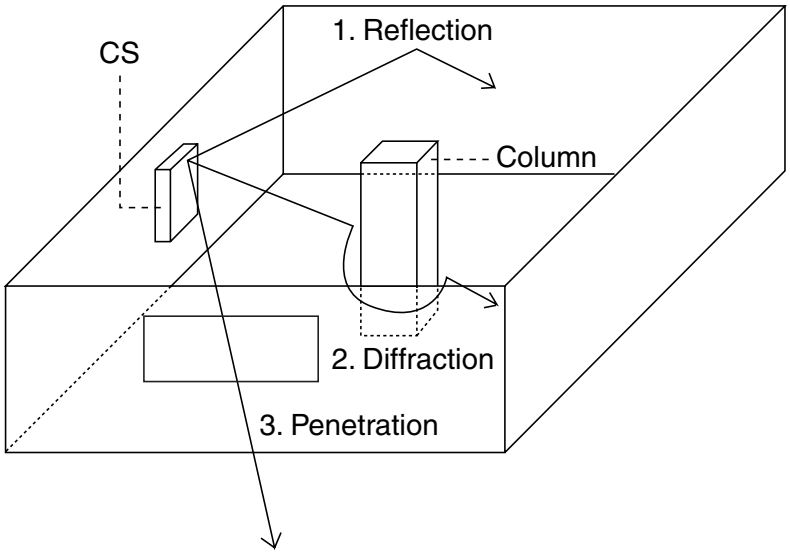
Characteristics of Radio Waves

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 such as those made of metal.
2. Radio waves are diffracted by objects such as metallic columns.
3. Radio waves penetrate objects like those made of 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.

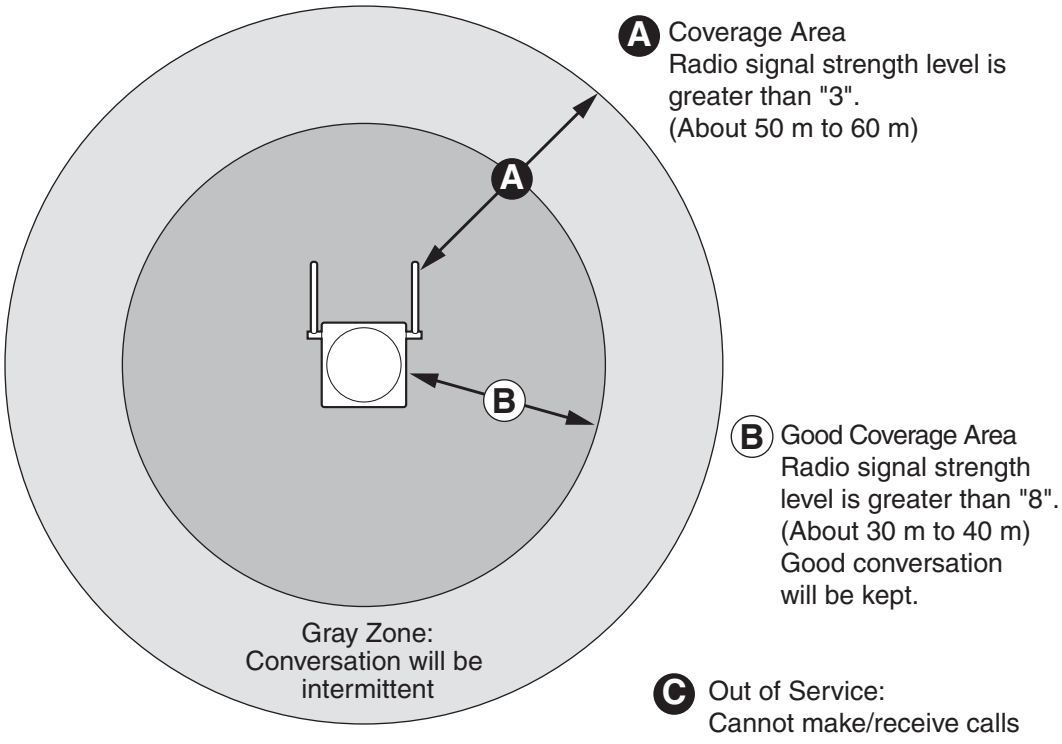
Object	Material	Transmission Tendency
Wall	Concrete	The thicker they are, the less radio waves penetrate them.
	Ferroconcrete	Radio waves can penetrate them, but the more iron there is, the more radio waves are reflected.
Window	Glass	Radio waves usually penetrate them.
	Glass with wire nets	Radio waves 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 where there is no obstacle.

Note

Radio signal strength levels are measured during the site survey (refer to "2.8.5 Site Survey Using the KX-TCA255/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 the 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 demanded by the user on the map, referring to the following example.
   - **a.** Draw the coverage area around a CS. Extend the coverage area to 30 m to 60 m in one 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.

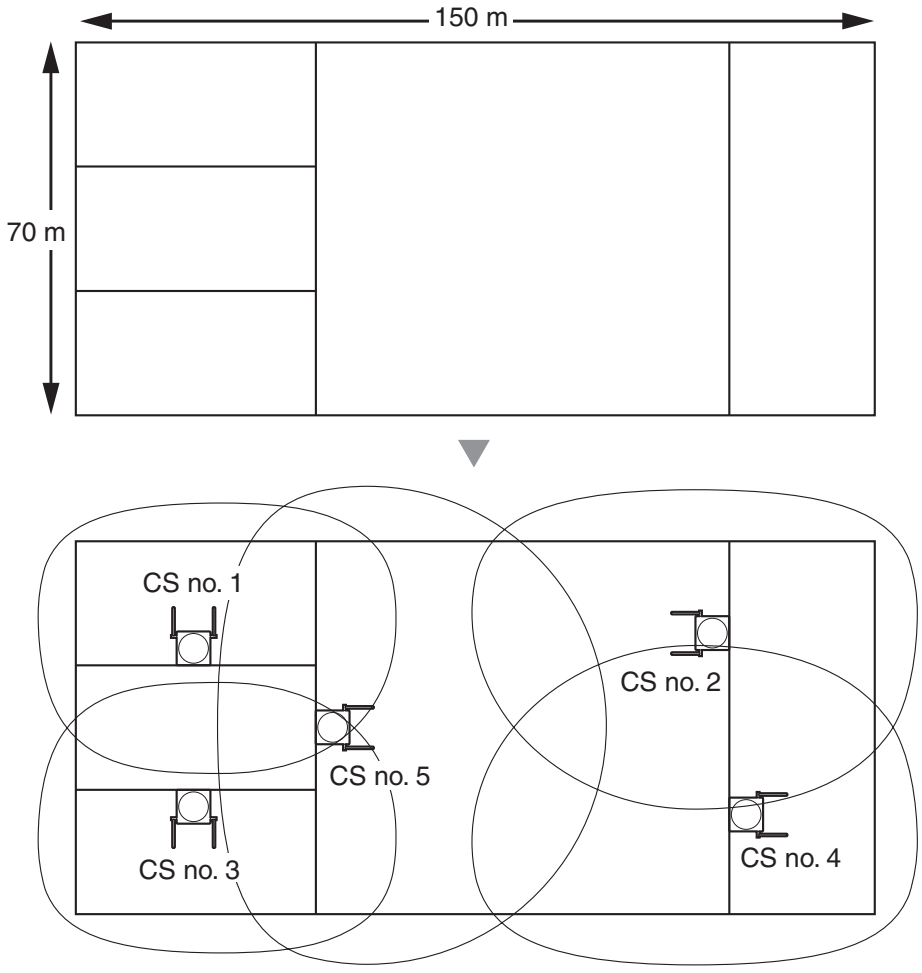
Example: Installing in a Room Separated by Walls

Things to take note of:

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

CS installation plan:

- The coverage area of each CS will not extend as much it does where there is no obstacle, because the radio signals will be weakened by separating walls. Therefore, you will need 5 CSs to cover the entire room.



2.8.4 Before Site Survey

Use the KX-TCA255 or KX-TD7590 PS to conduct the site survey.

Note

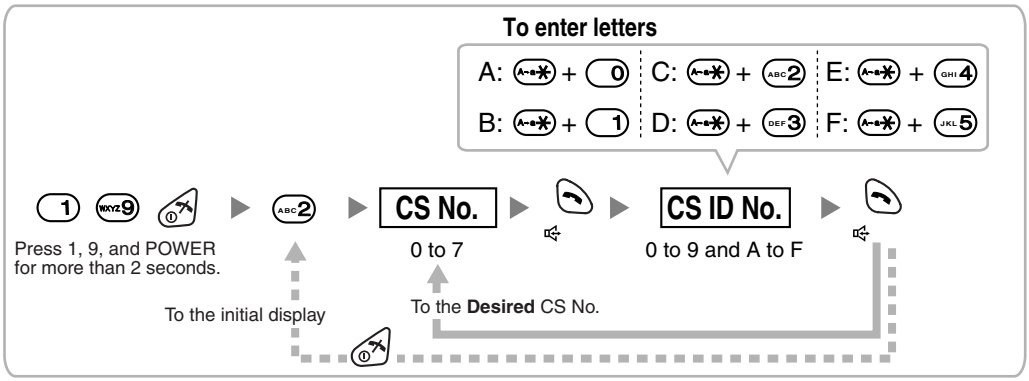
The display language for the site survey is only in English.

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 KX-TDA Maintenance Console. For details, refer to the on-line help of the KX-TDA Maintenance Console.

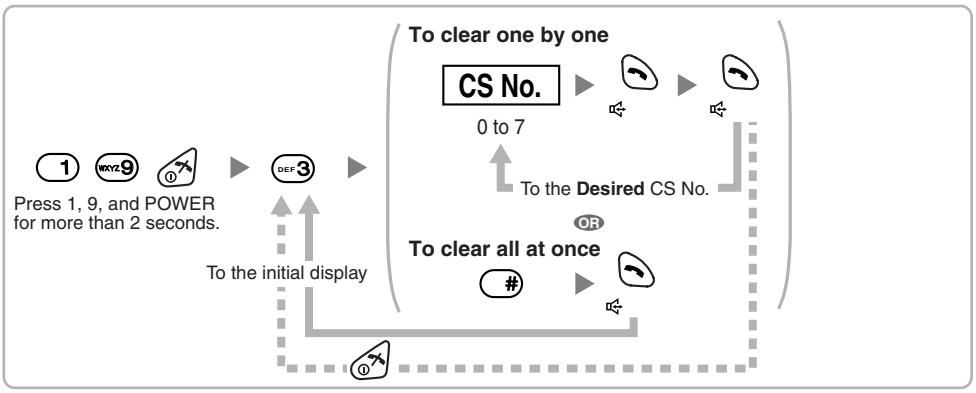
Assigning the CS ID Number to the PS

Using the KX-TCA255

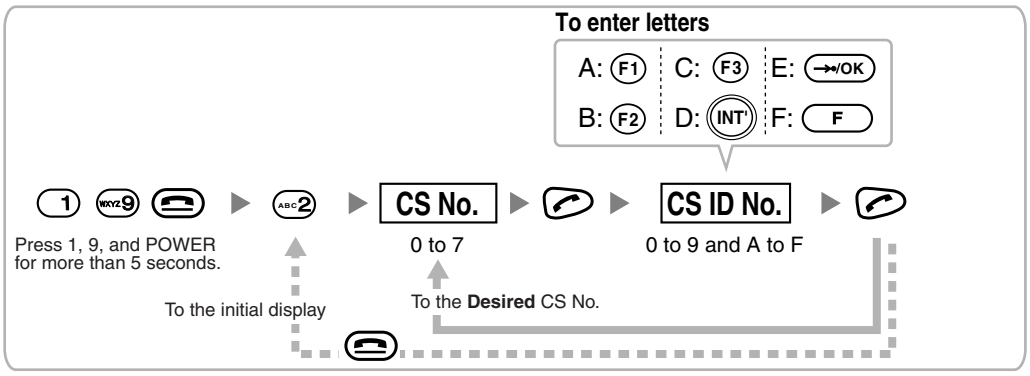


Note

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

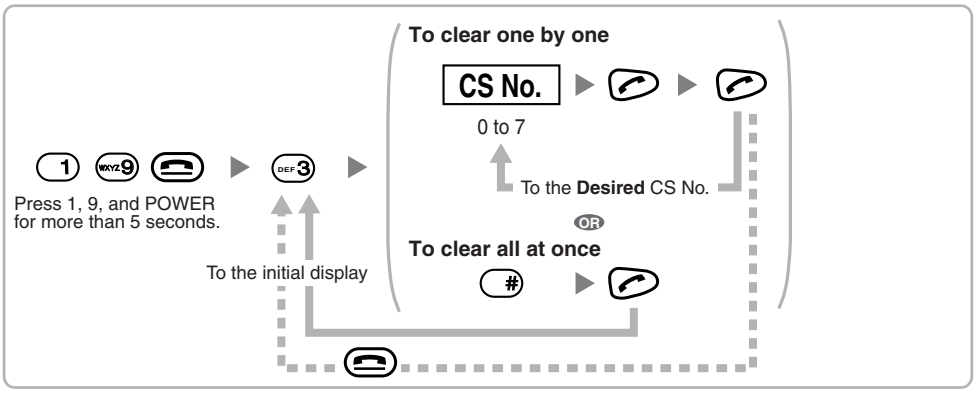


Using the KX-TD7590



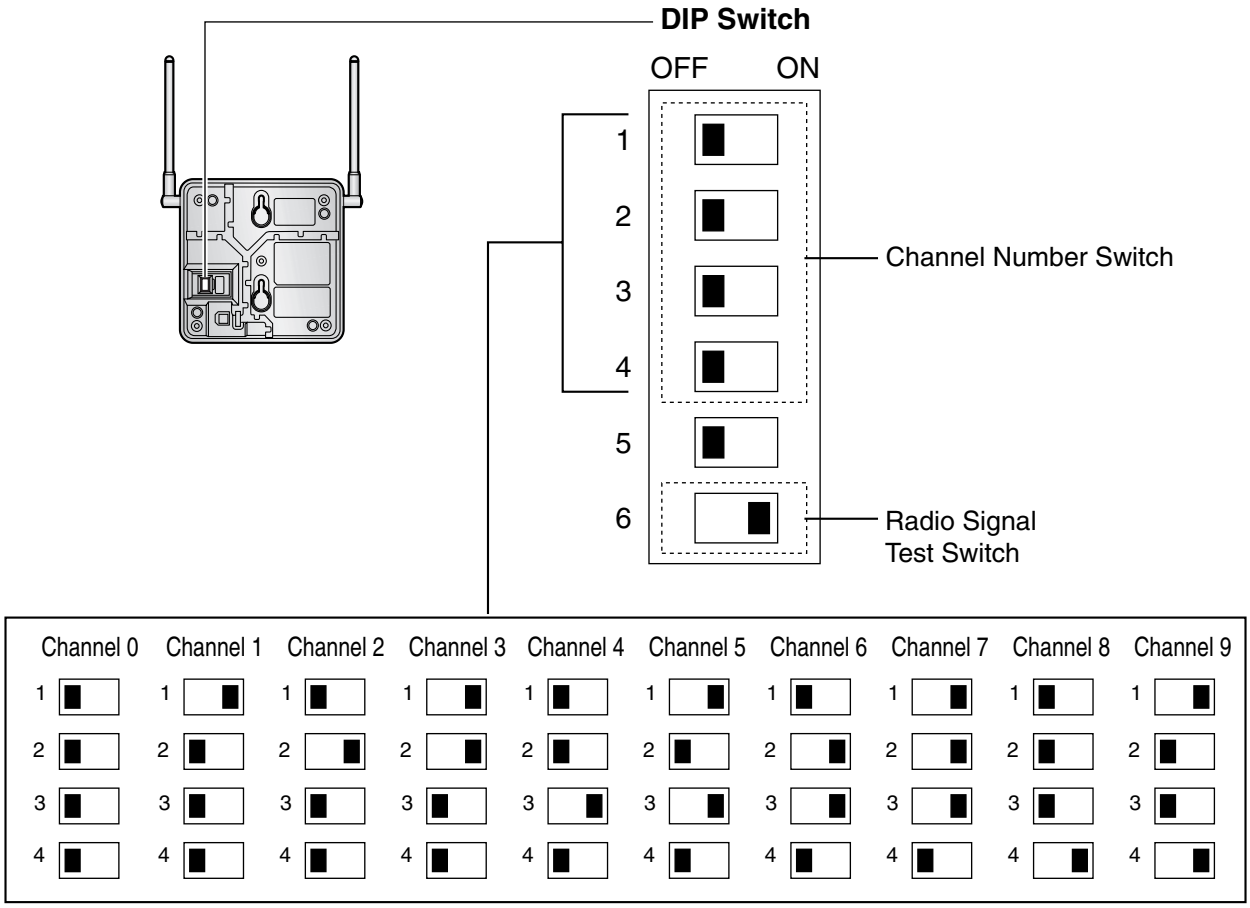
Note

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.



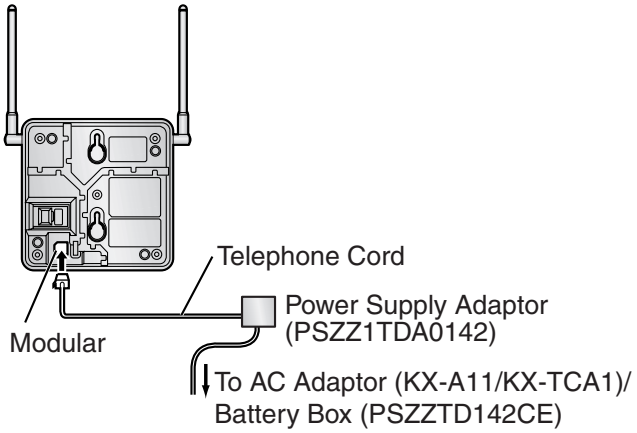
Notes

- To see the radio signal strength of more than 1 CS, a channel number must be set for each CS.
- If more than 1 CS is in Radio Signal Test mode, each CS must have a unique channel number.

3. After setting the DIP switch, connect an AC adaptor or battery box to the CS using a power supply adaptor.

Notes

- 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.
- **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.



4. Install the CS temporarily for the site survey. Install the CS at least 2 m above the floor, keeping the antennas in the upright position.

2.8.5 Site Survey Using the KX-TCA255/KX-TD7590

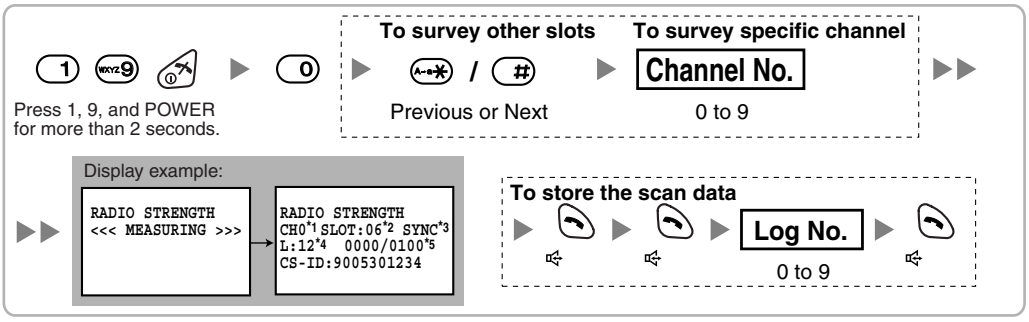
The PS has a Radio Signal Test mode that monitors the state of the radio link to the CS for site survey. In the Radio Signal Test mode, the frame loss and signal strength of a synchronous slot, and the signal strength of the other slots can be measured when the PS is monitoring the CS. After installing the CSs temporarily as planned during site planning, set the PS to the 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

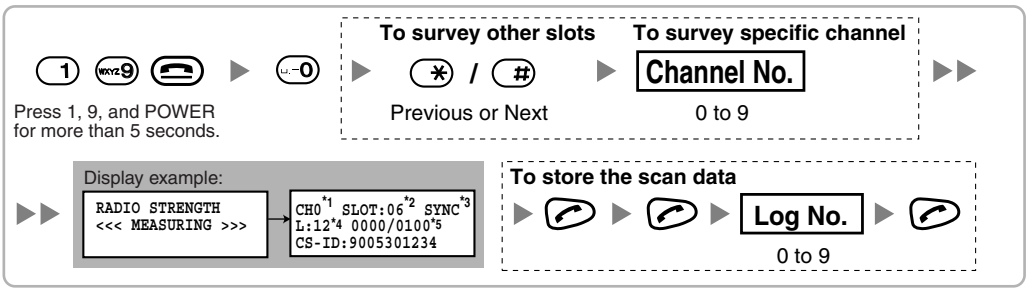
After locating the CS(s) temporarily, execute the Radio Signal Test using the PS. The PS scans whether there is a CS that can link with on channel 0 right after entering the Radio Signal Test mode. The channel to be scanned can be changed by pressing the appropriate keys 0 through 9.

1. Enter the Radio Signal Test mode.

Using the KX-TCA255



Using the KX-TD7590



Notes

*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 error is "0000".

CAUTION

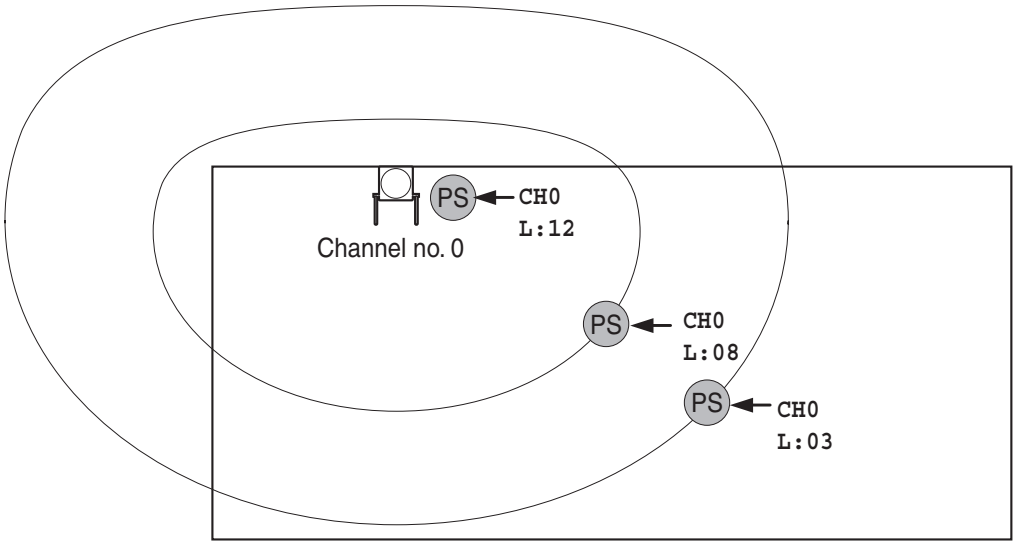
Storing the scan data will clear all directory data.

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

a. Move to the CS until the point 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.

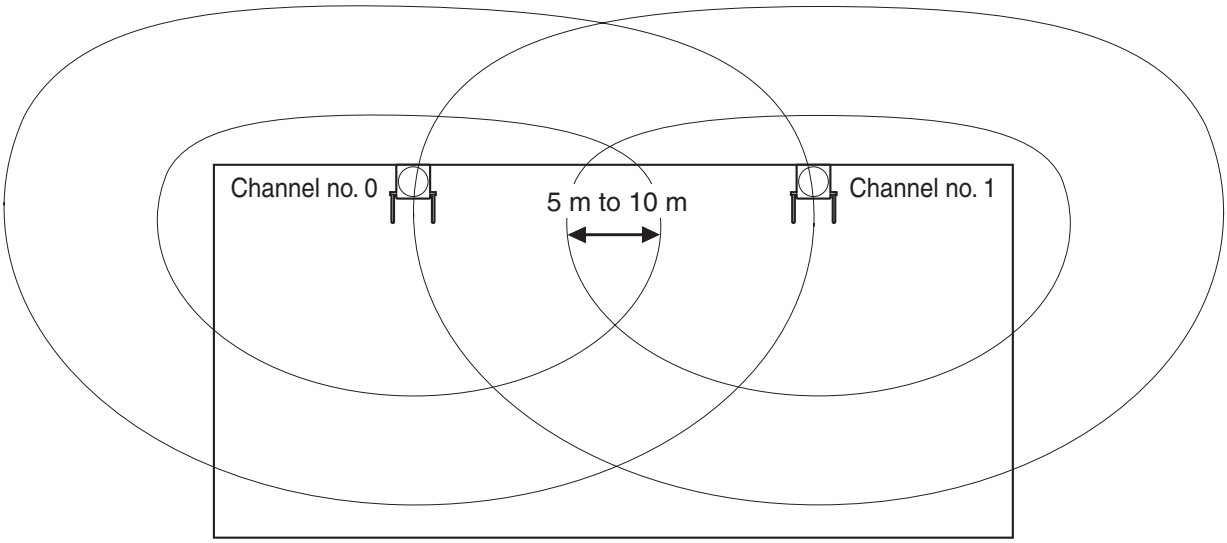


Radio Signal Strength Levels

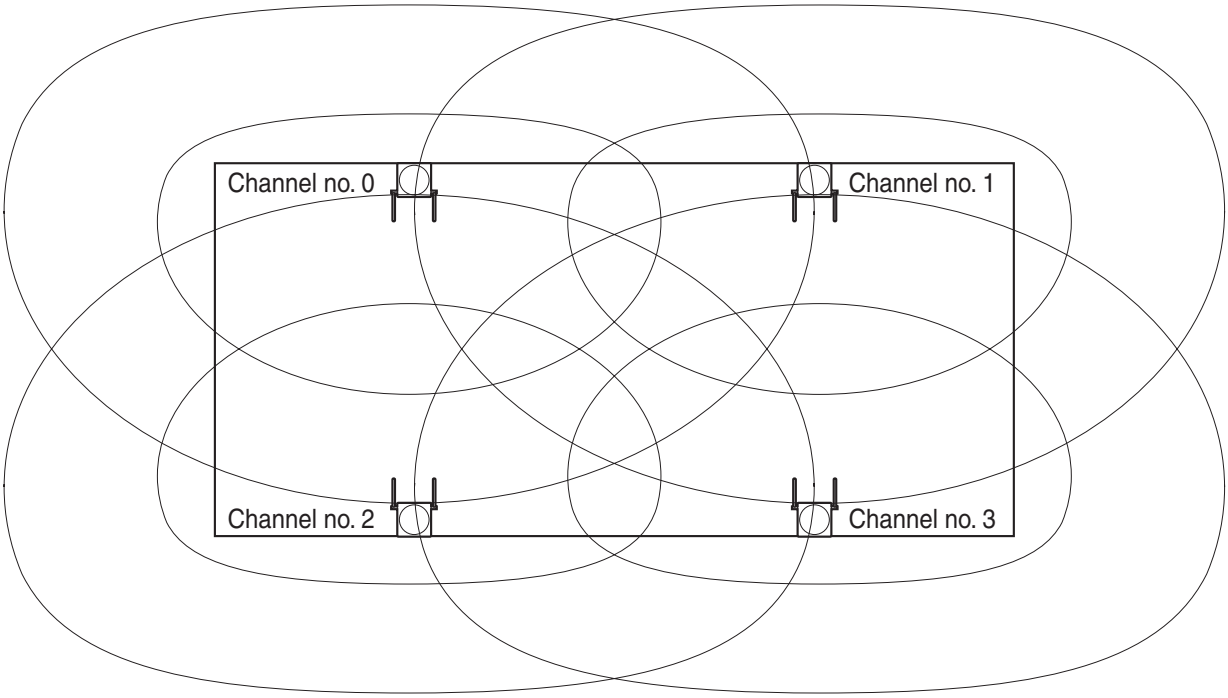
Level: 00	Out of range
Level: 01 to 02	Receives noise easily or disconnects
Level: 03 to 07	May receive noise
Level: 08 to 10	Good
Level: 11 to 12	Better

3. Repeat the 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.



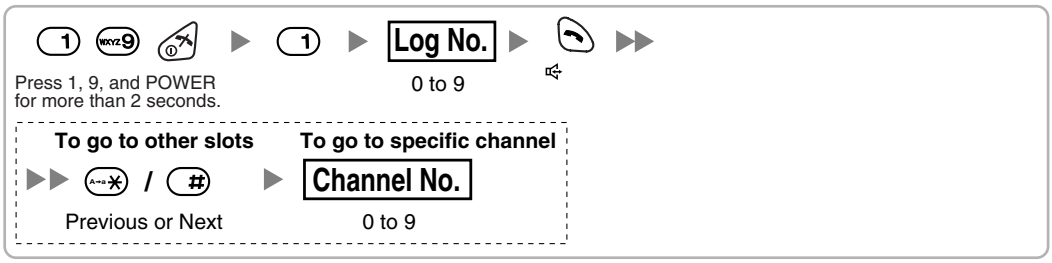
c. Make sure that the radio signal strength level is greater than "3" at any location in the service area demanded by the user.

Notes

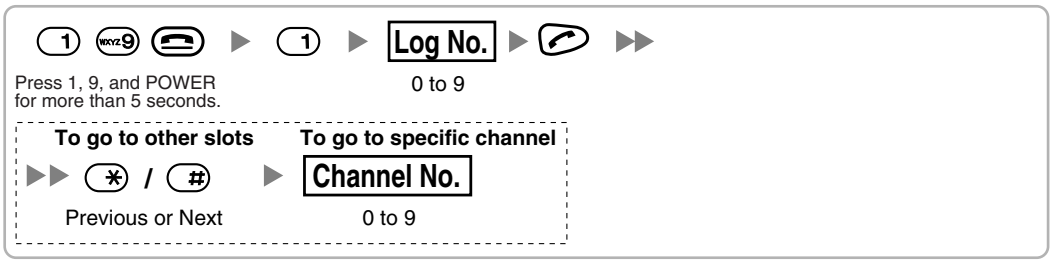
- If a channel is set, the results of measurement for the 24 slots on the channel are saved each time. If the same channel is set, the new results override the previous ones. Therefore, a measurement of 10 channels × 24 slots in total can be made.
- If correct results cannot be obtained (e.g., there are many error counters), 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



Using the KX-TD7590



Clearing the Stored Scan Data

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

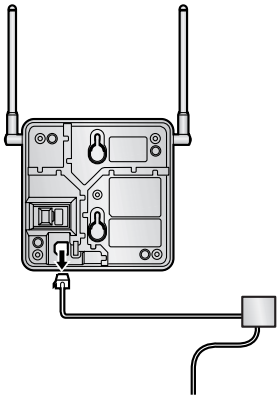
Using the KX-TCA255

Using the KX-TD7590

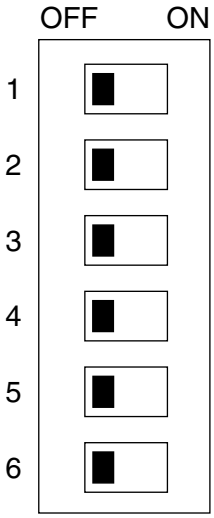
2.8.6 After Site Survey

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

1. Keep pressing POWER button on the PS until the PS is turned OFF.
2. Disconnect the AC adaptor or battery box from the CS and stop supplying electricity.



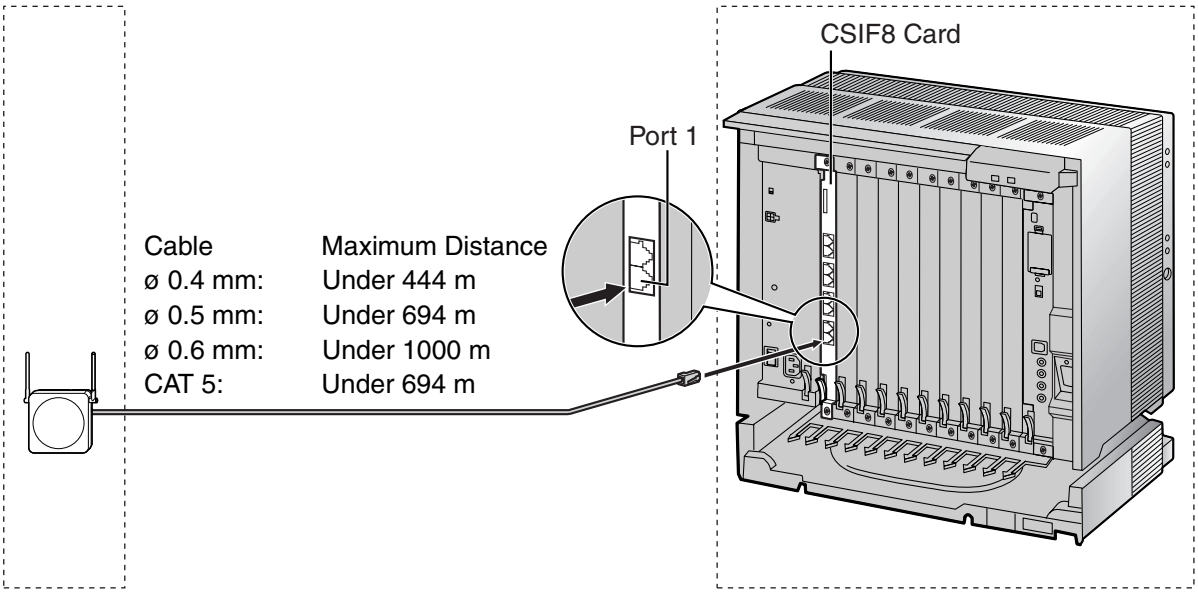
3. Switch all DIP switches on the CS from ON to OFF.



2.8.7 Connecting a Cell Station to the Hybrid IP-PBX

Using a CSIF Card

Refer to the following example to connect a CS to the Hybrid IP-PBX.



CS (RJ11)

Signal Name	Pin No.
D1	1
POWH	2
POWL	3
D2	4

CSIF card (RJ45)

Pin No.	Signal Name
1	
2	
3	D1
4	POWH
5	POWL
6	D2
7	
8	

Accessory and User-supplied Items for the CS

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

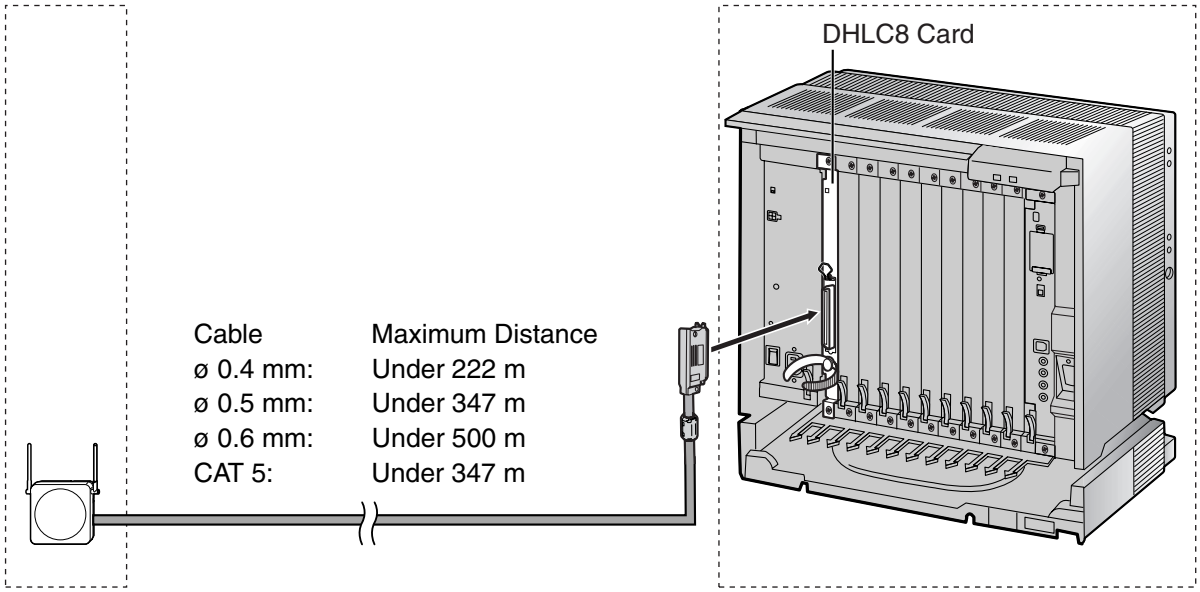
User-supplied (not included): RJ11 connector

Note

For details about CSIF card, refer to "2.5.1 CSIF4 and CSIF8 Card".

Using a DHLC/DLC Card

Refer to the following example to connect a CS to the Hybrid IP-PBX.



CS (RJ11)

Signal Name	Pin No.
D1	1
	2
	3
D2	4

DHLC/DLC card (Amphenol)

Signal Name
D1
D2

Accessory and User-supplied Items for the CS

Accessory (included): Screws × 2, Washers × 2

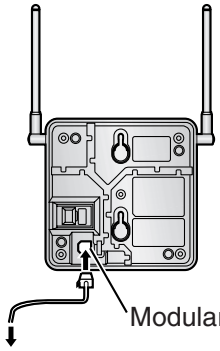
User-supplied (not included): RJ11 connector

Note

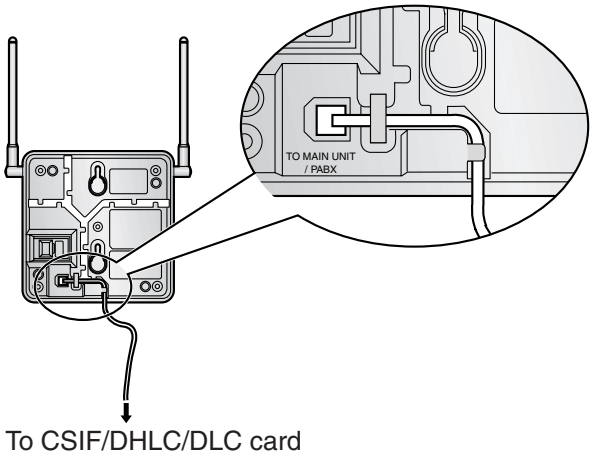
For details about DHLC card or DLC card, refer to "2.5.2 DHLC8 Card", "2.5.3 DLC8 Card", or "2.5.4 DLC16 Card" .

Connecting the CS

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

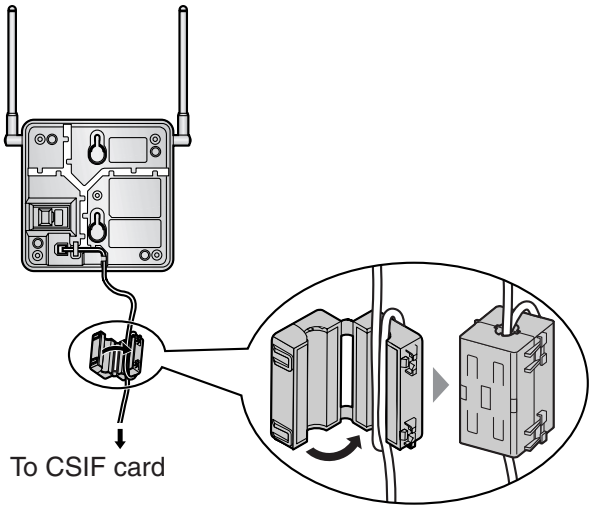


2. Pass the cable through the groove of the CS (in any direction depending on your preference).



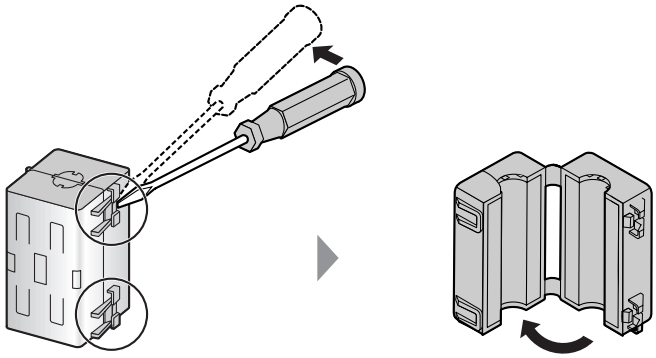
For the KX-TDA0142CE User only:

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

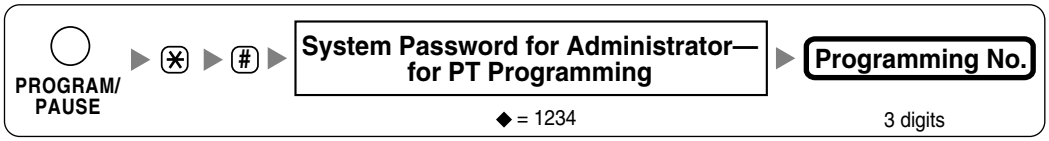
The PS must be registered to the Hybrid IP-PBX before it can be used. Programming of both the PS and Hybrid IP-PBX is required. A PT with multiline display (e.g., KX-T7636 6-line display) is required for the Hybrid IP-PBX system programming.

Note

For details about system programming using a PT, refer to "2.3.2 PT Programming" and "3.3 PT Programming" in the Feature Guide.

Entering the Hybrid IP-PBX System Programming Mode Using a PT

Administrator Level

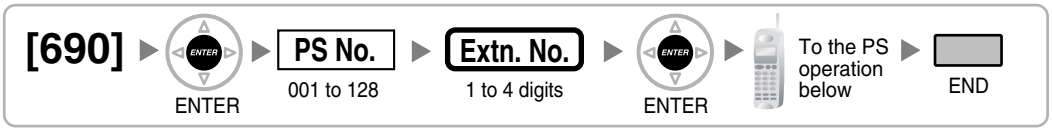


Note

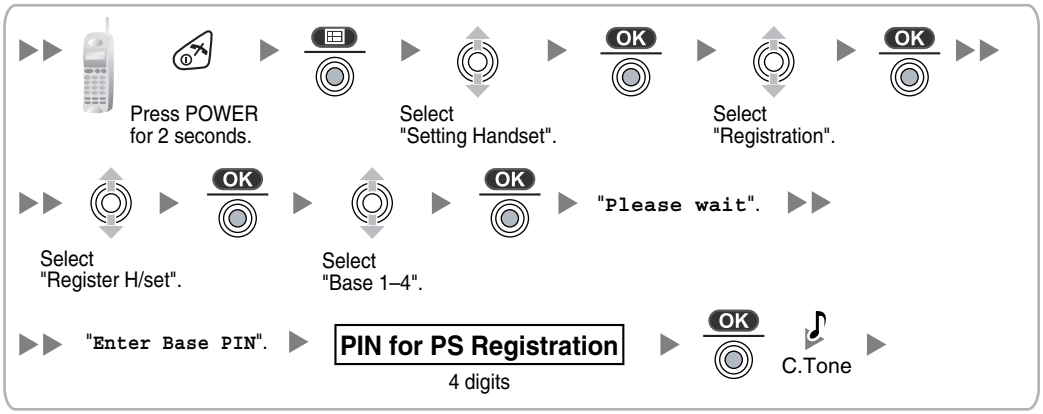
◆ means default value.

PS Registration

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

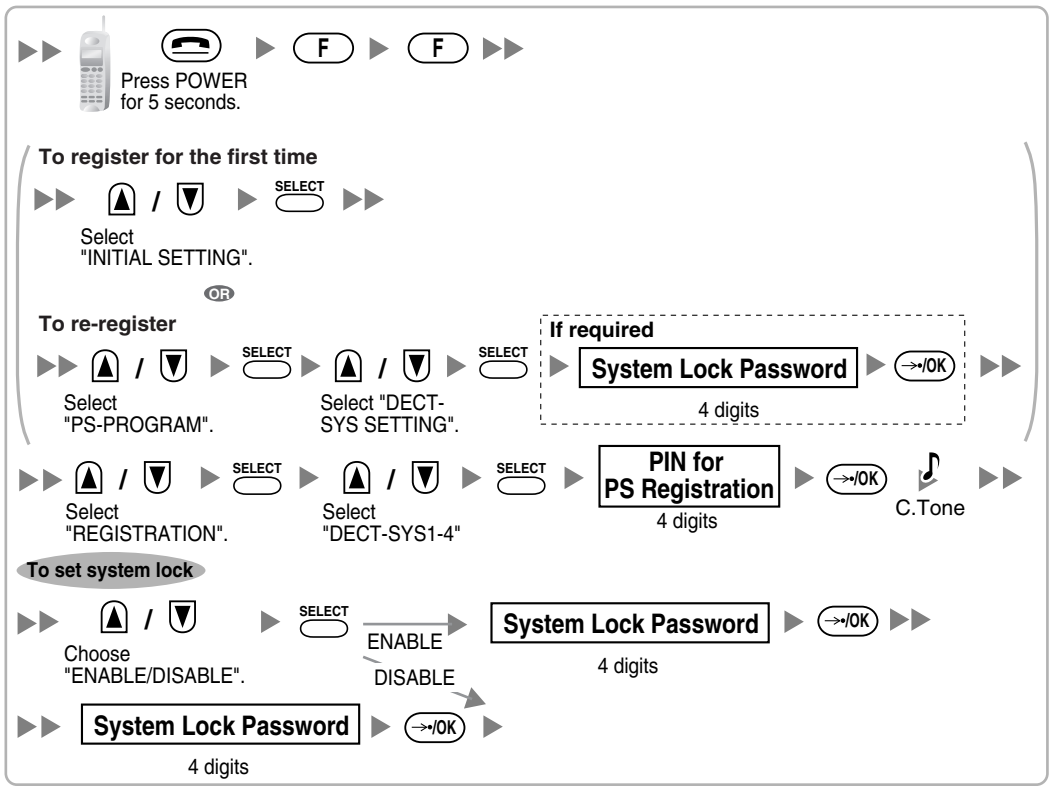


Using the KX-TCA155/KX-TCA255

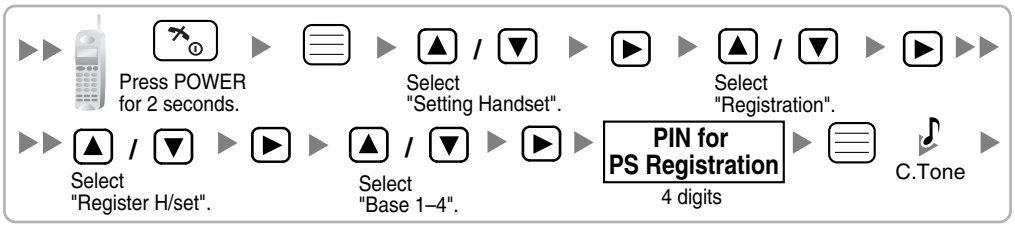


Using the KX-TD7590

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



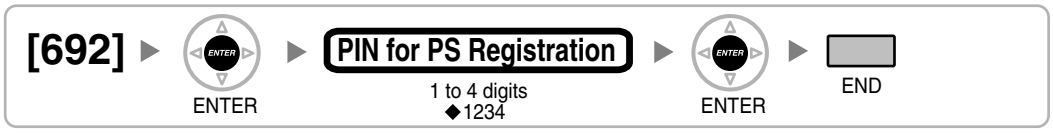
Setting the Personal Identification Number (PIN) for PS Registration

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

Notes

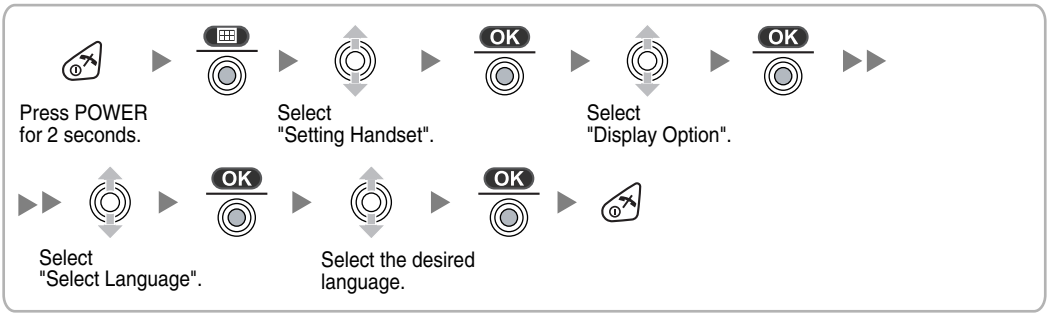
- By default, the PIN for PS registration is "1234" for both the Hybrid IP-PBX and PS. Therefore, the PS can be registered to the Hybrid IP-PBX without setting the PIN.
- The PIN for PS registration will only be used when registering the PS to the Hybrid IP-PBX. Therefore, even when there is more than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

Setting the PIN for Hybrid IP-PBX

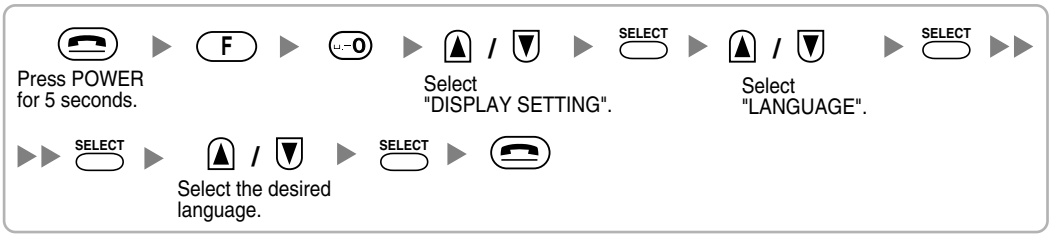


Changing the Display Language of the PS

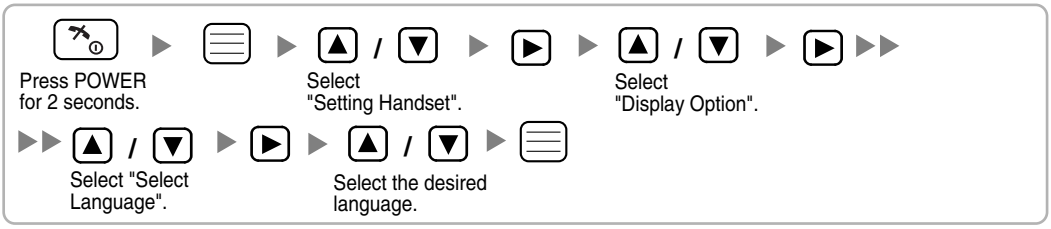
Using the KX-TCA155/KX-TCA255



Using the KX-TD7590



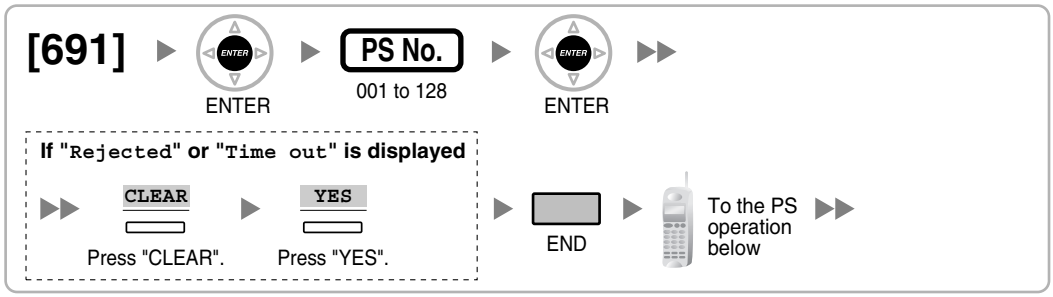
Using the KX-TD7580



PS Termination

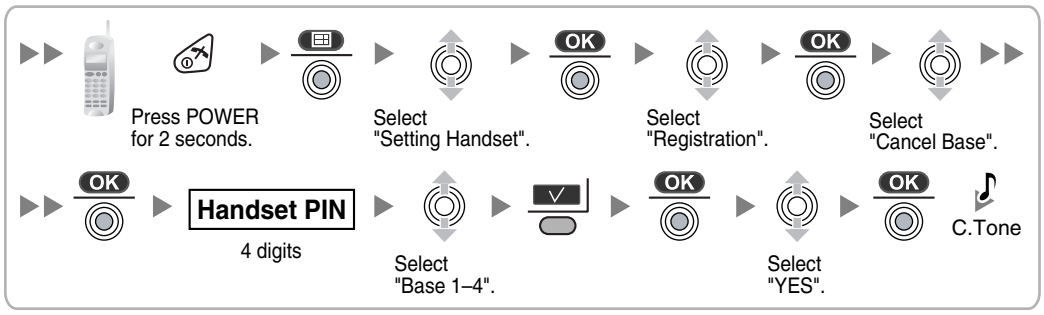
Confirm the following before cancelling the PS registration:

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

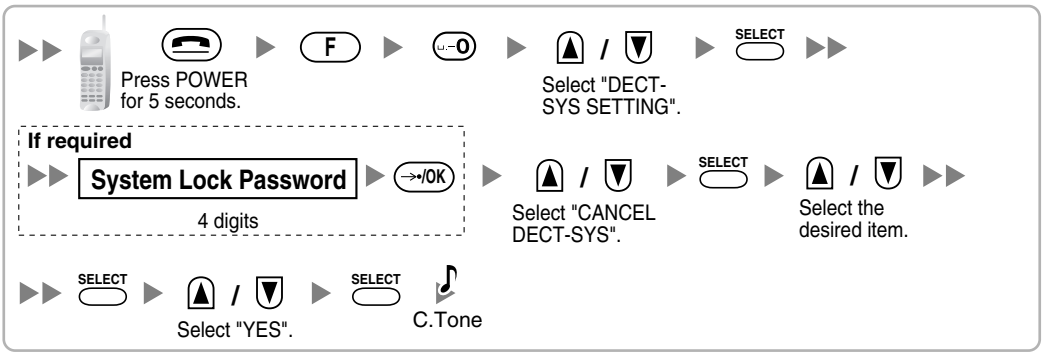


If the registration information is still stored in the PS

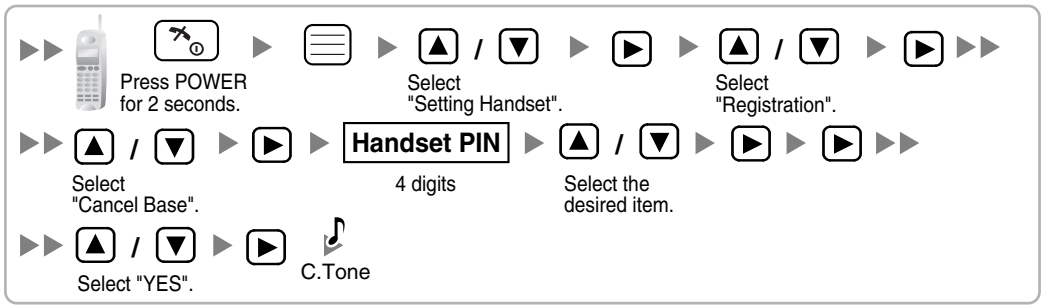
Using the KX-TCA155/KX-TCA255



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.

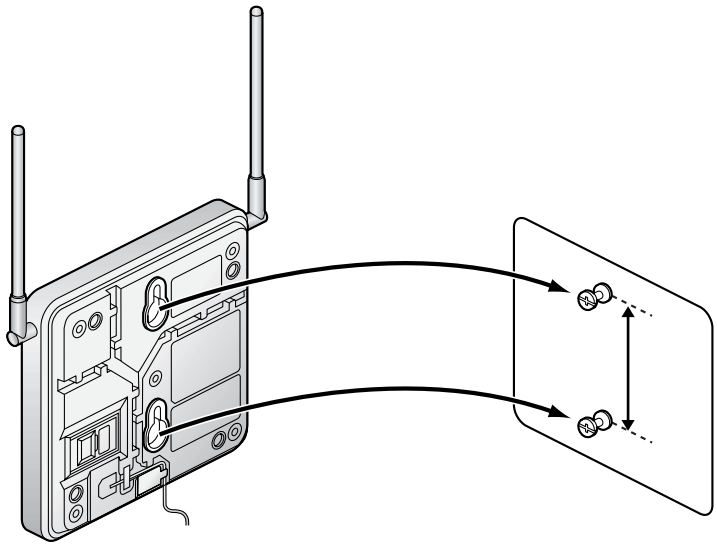
2.8.8 Wall Mounting

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

Notes

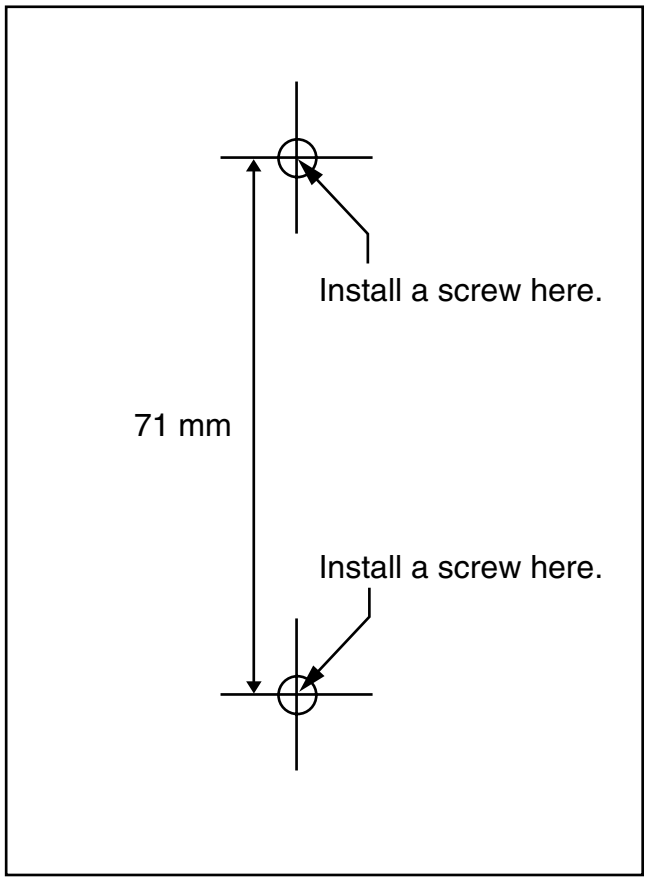
- Make sure that the screw heads are at the same distance from the wall.
- Install the screws perpendicular to the wall.

3. Hook the CS on the screw heads.



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.

2.9 Connection of 2.4 GHz Portable Stations

2.9.1 Overview

The following equipment is required to connect the wireless system:

CS: Cell Station (KX-TDA0142/KX-TDA0141)

KX-TDA0142 Using a CSIF Card

This unit determines the area covered by the wireless system. Up to 3 calls can be made at the same time through each CS.

- **CSIF4 (KX-TDA0143)**
  One CSIF4 card supports up to 4 Cell Stations. Up to 2 CSIF4 cards can be installed in the KX-TDA100, and up to 4 can be installed in the KX-TDA200.
- **CSIF8 (KX-TDA0144)**
  One CSIF8 card supports up to 8 Cell Stations. Up to 2 CSIF8 cards can be installed in the KX-TDA100, and up to 4 can be installed in the KX-TDA200.

KX-TDA0141 Using a DHLC/DLC Card

This unit determines the area covered by the wireless system. Up to 2 calls can be made at the same time through each CS.

PS: 2.4 GHz Portable Station (KX-TD7680/KX-TD7690)

The KX-TDA100 and KX-TDA200 can support up to 128 PSs. For more details about the PS, refer to the PS Operating Instructions.

CAUTION

- The CS should be kept free of dust, moisture, high temperature (more than 40 °C), low temperature (less than 0 °C), 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.
- 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
Hybrid IP-PBX and CS	More than 2 m
CS and CS	More than 15 m

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

2.9.2 Procedure Overview

When connecting the wireless system, use extreme care to conduct a site survey. Inadvertent site survey can result in poor service area, frequent noise, and disconnection of calls.

1. Investigate the installation site

Refer to "2.9.3 Site Planning".

a. Obtain the map of the CS installation site.

b. Consider the service area demanded by the user on the map.

c. Plan the locations of each CS, taking account of distance, building materials and etc.

2. Prepare the CS for site survey

Refer to "2.9.4 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 or a battery box.

c. Install each CS temporarily as planned.

Notes

- Install at least 2 m above the floor.
- Keep the antennas in the upright position.

3. Conduct the site survey

Refer to "2.9.5 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-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 demanded by the user.

4. Finish the site survey

Refer to "2.9.6 After Site Survey".

a. Return all DIP switches of each CS to the OFF position, and stop supplying power.

b. Turn off the PS.

5. Connect the CS and PS to the Hybrid IP-PBX and test the operation

Refer to "2.9.7 Connecting a Cell Station to the Hybrid IP-PBX".

a. Connect the CSs to the Hybrid IP-PBX.

b. Register the PSs to the Hybrid IP-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 "2.9.8 Wall Mounting".

a. Assuming everything goes as planned, mount the CS on the wall.

2.9.3 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

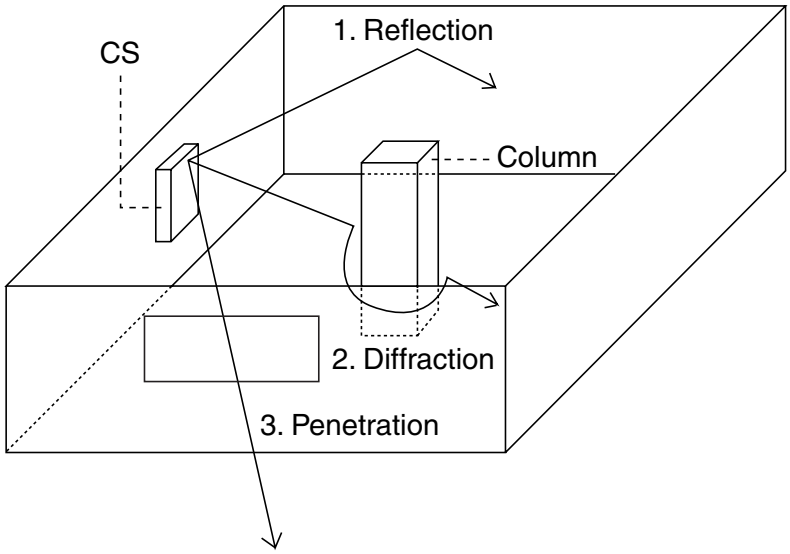
Characteristics of Radio Waves

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 such as those made of metal.
2. Radio waves are diffracted by objects such as metallic columns.
3. Radio waves penetrate objects like those made of 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.

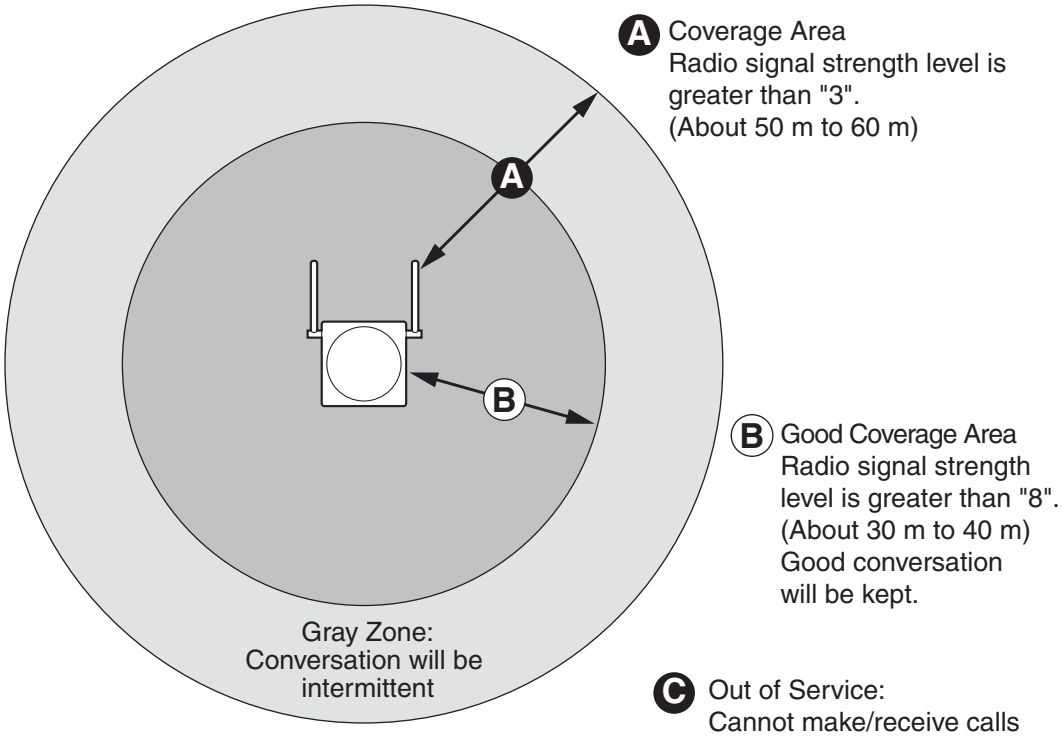
Object	Material	Transmission Tendency
Wall	Concrete	The thicker they are, the less radio waves penetrate them.
	Ferroconcrete	Radio waves can penetrate them, but the more iron there is, the more radio waves are reflected.
Window	Glass	Radio waves usually penetrate them.
	Glass with wire nets	Radio waves 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 where there is no obstacle.

Note

Radio signal strength levels are measured during the site survey (refer to "2.9.5 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

Site Survey Preparation

1. Obtain the 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 demanded by the user on the map, referring to the following example.
   - **a.** Draw the coverage area around a CS. Extend the coverage area to 30 m to 60 m in one 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 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.

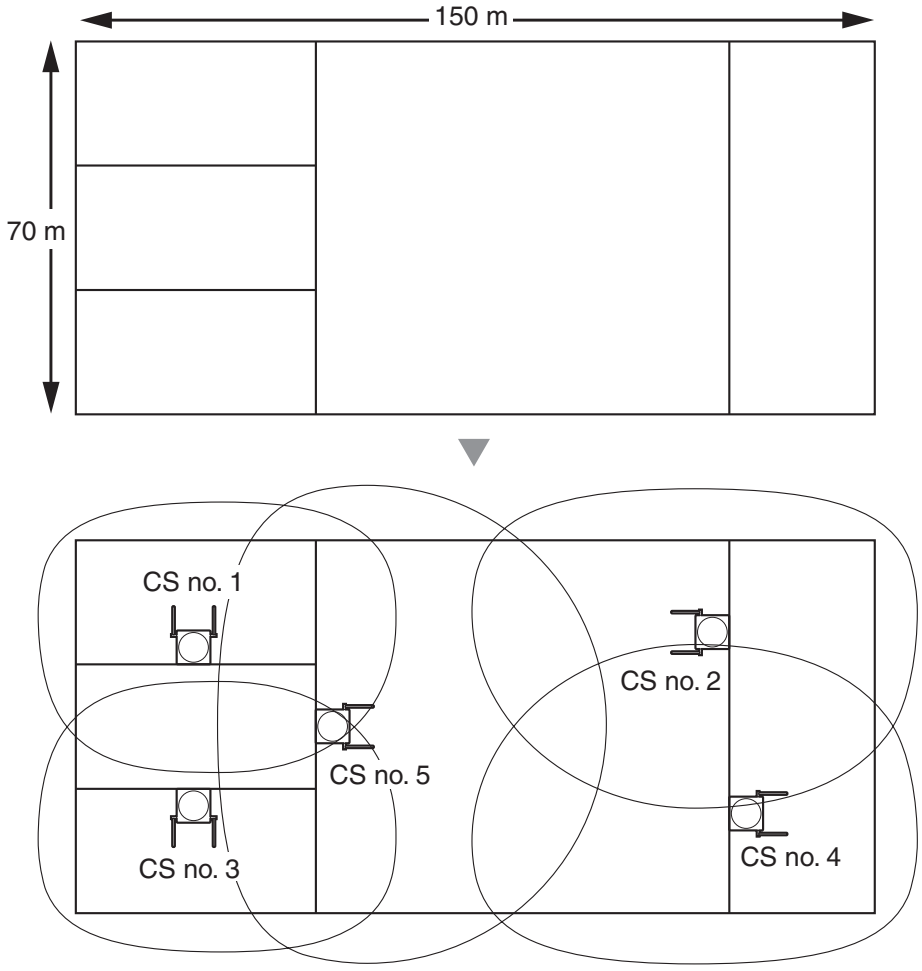
Example: Installing in a Room Separated by Walls

Things to take note of:

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

CS installation plan:

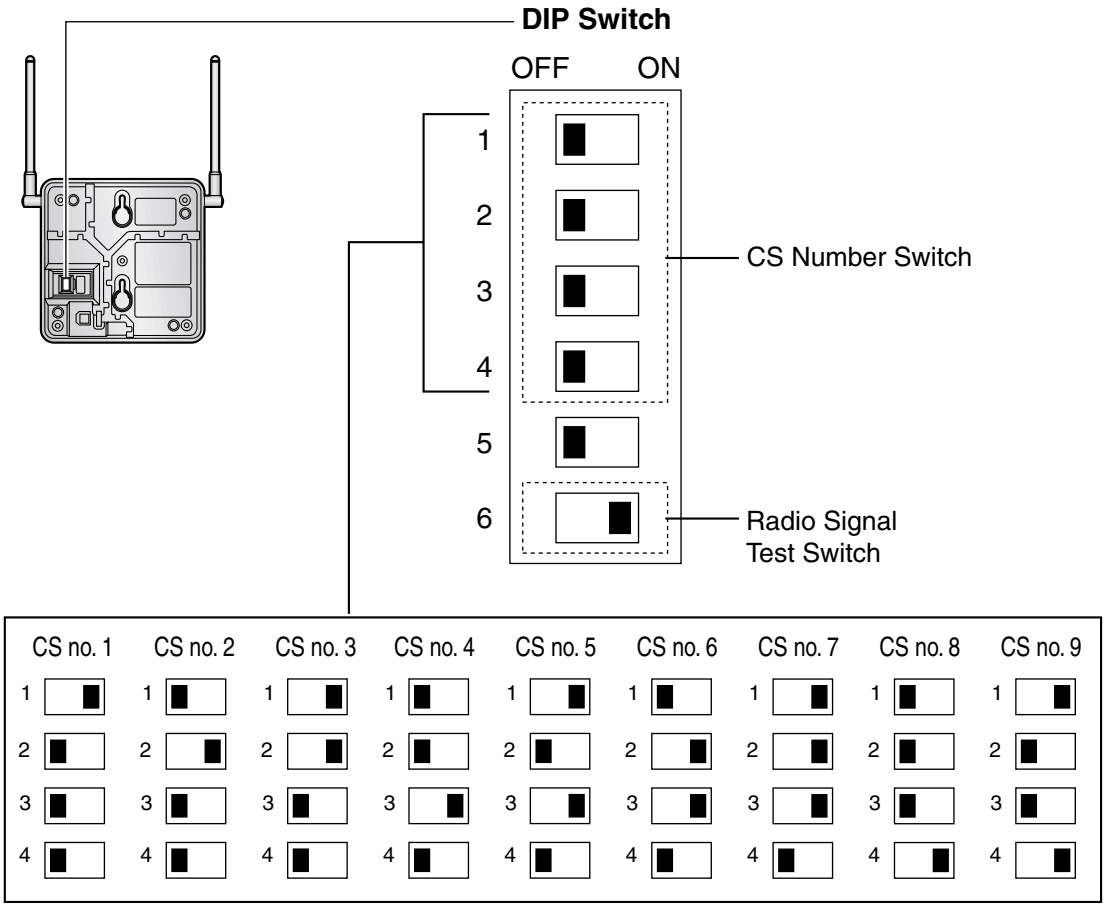
- The coverage area of each CS will not extend as much it does where there is no obstacle, because the radio signals will be weakened by separating walls. Therefore, you will need 5 CSs to cover the entire room.



2.9.4 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.



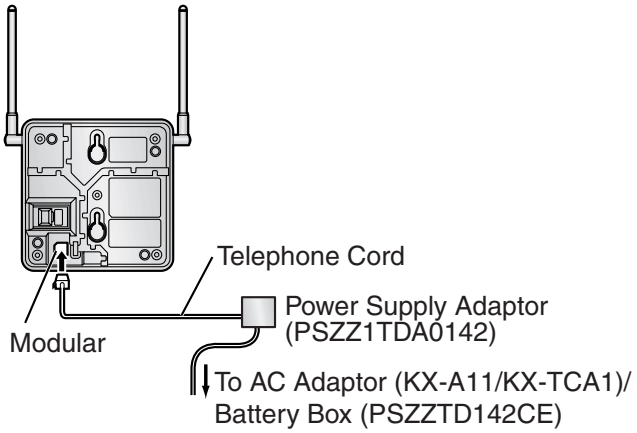
Notes

- To see the radio signal strength of more than 1 CS, a CS number must be set for each CS.
- If more than 1 CS is in Radio Signal Test mode, each CS must have a unique CS number.

3. After setting the DIP switch, connect an AC adaptor or battery box to the CS using a power supply adaptor.

Note

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.



4. Install the CS temporarily for the site survey. Install the CS at least 2 m above the floor, keeping the antennas in the upright position.

2.9.5 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 the Radio Signal Test mode and measure each CS coverage area. Then, record the results on the map of the installation site.

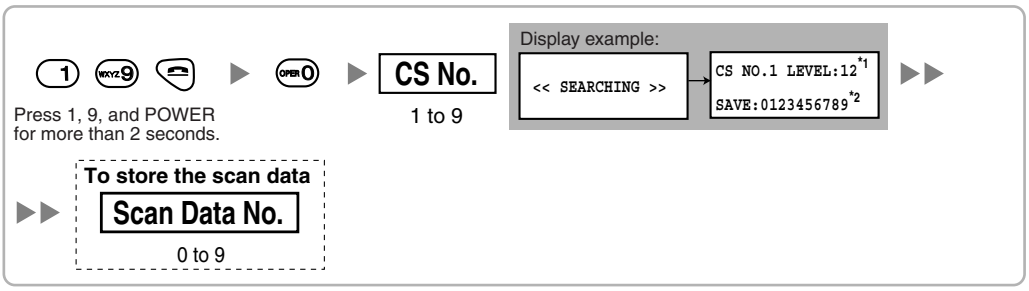
Testing the Radio Signal Strength

Note

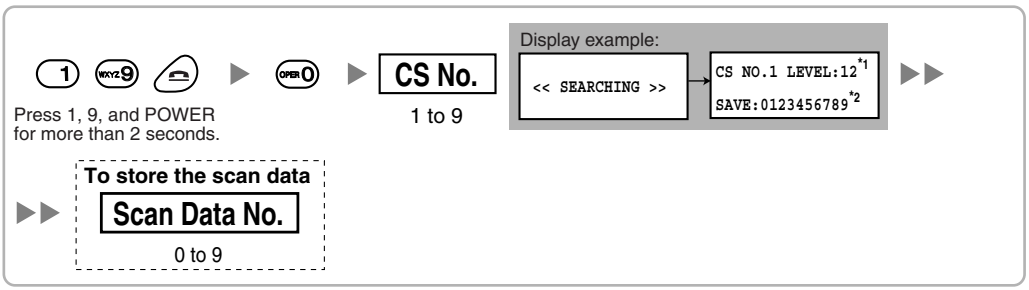
The display language for the site survey is only in English.

1. Enter the Radio Signal Test mode.

Using the KX-TD7680



Using the KX-TD7690



Notes

*1: CS number and radio signal strength level.

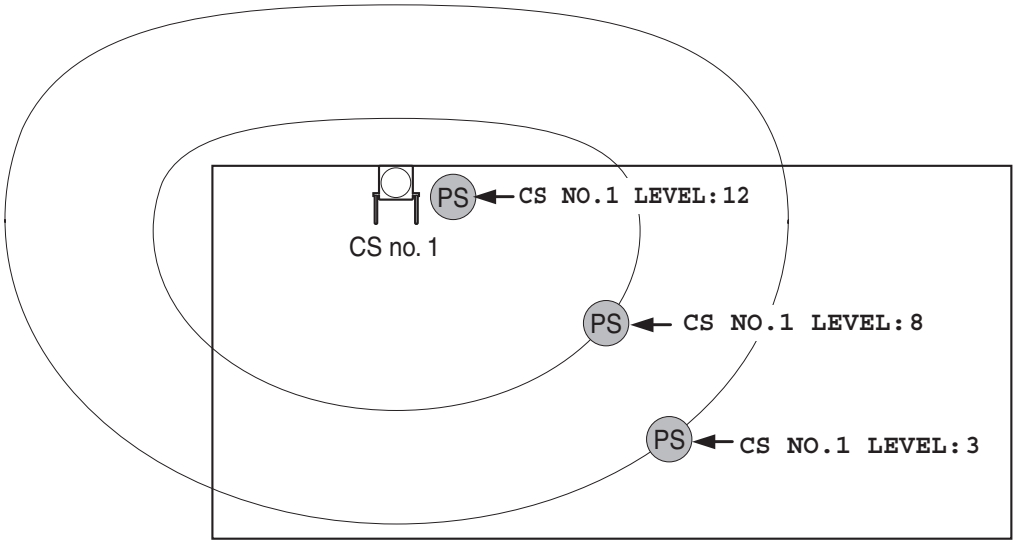
*2: Scan data (test result) number. Empty memory space will be indicated by a number; stored memory space will be indicated by a "-".

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

a. Move to the CS until the point 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.

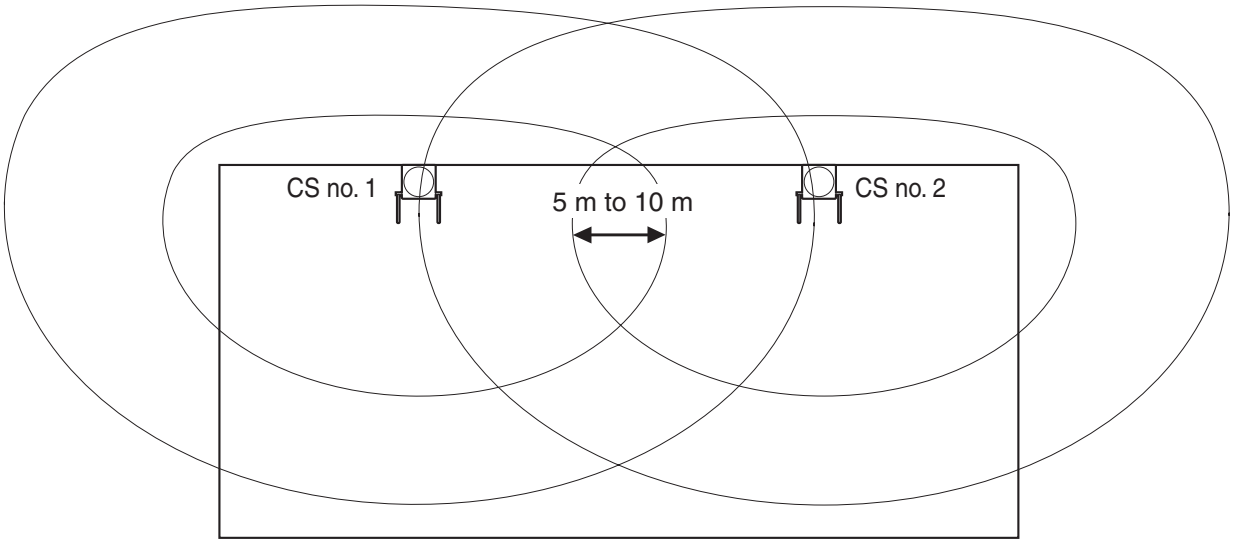


Radio Signal Strength Levels

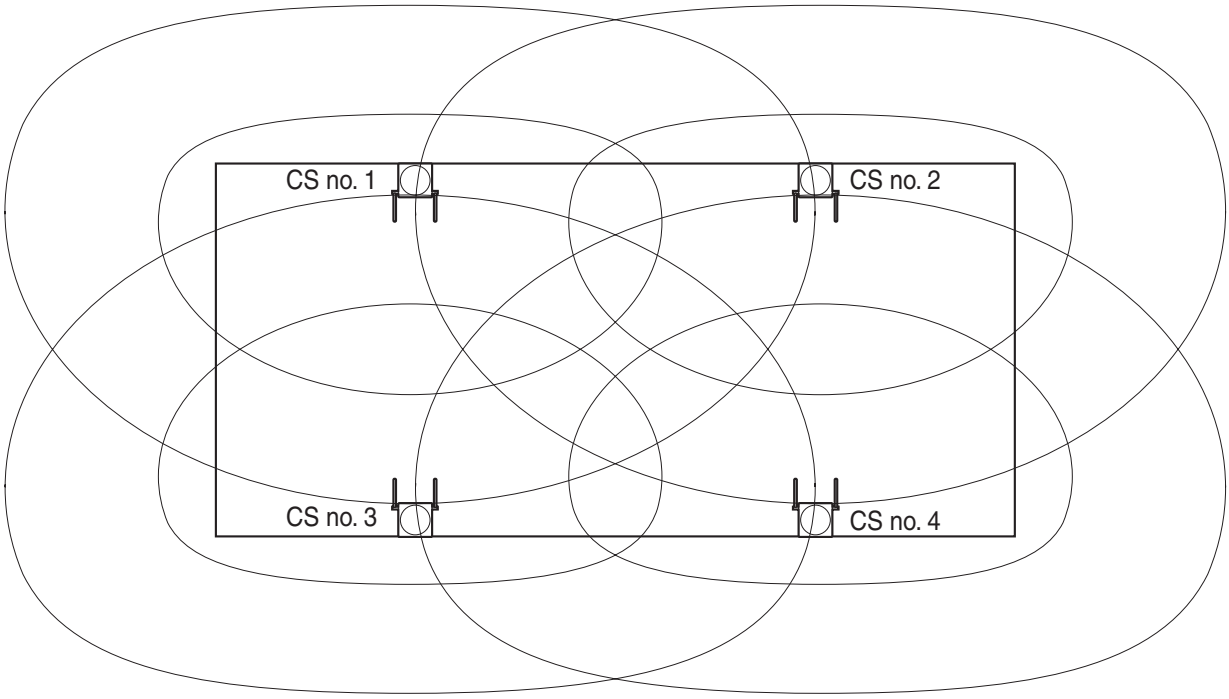
Level: 00	Out of range
Level: 01 to 02	Receives noise easily or disconnects
Level: 03 to 07	May receive noise
Level: 08 to 10	Good
Level: 11 to 12	Better

3. Repeat the 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.



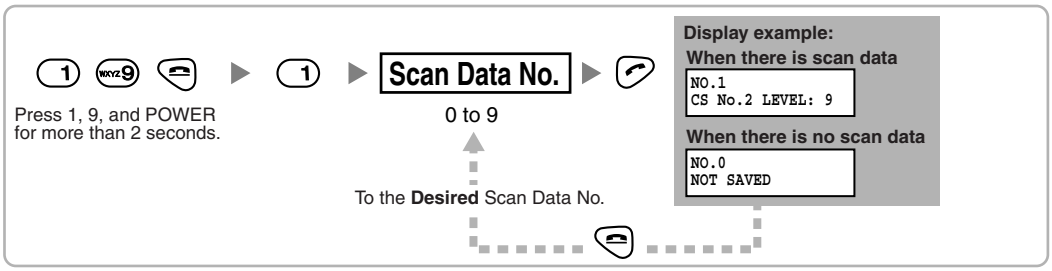
b. Overlap the CS coverage areas of at least 2 CSs at any location in the installation site.



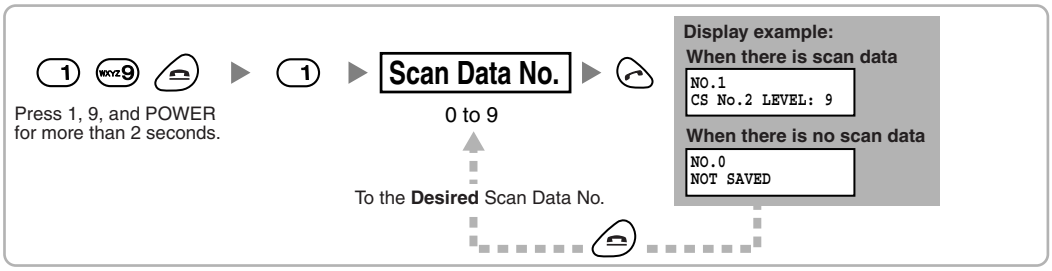
c. Make sure that the radio signal strength level is greater than "3" at any location in the service area demanded by the user.

Referring to the Stored Scan Data

Using the KX-TD7680

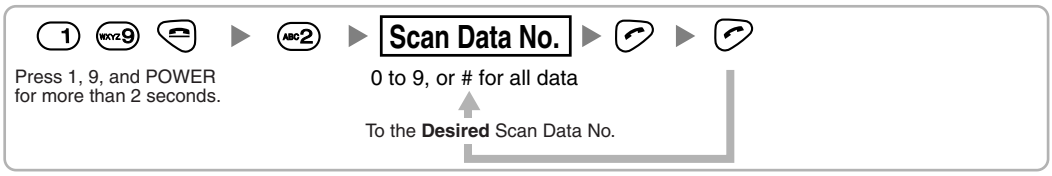


Using the KX-TD7690

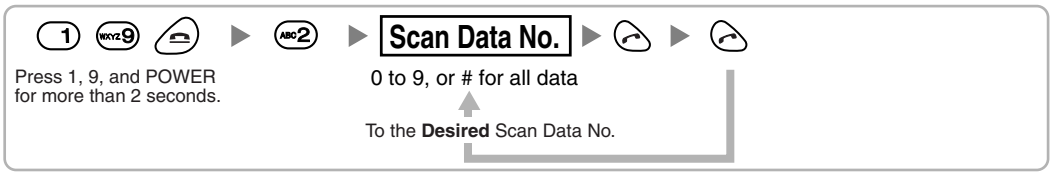


Deleting the Stored Scan Data

Using the KX-TD7680



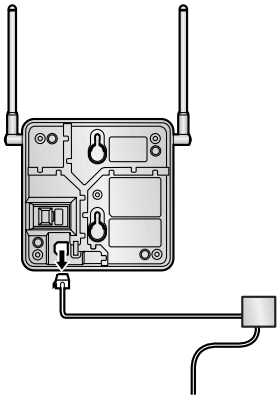
Using the KX-TD7690



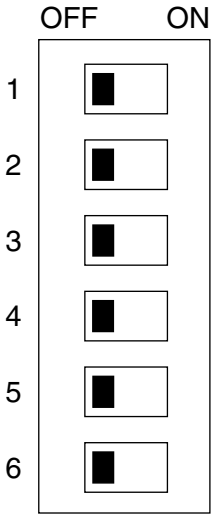
2.9.6 After Site Survey

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

1. Keep pressing POWER button on the PS until the PS is turned OFF.
2. Disconnect the AC adaptor or battery box from the CS and stop supplying electricity.



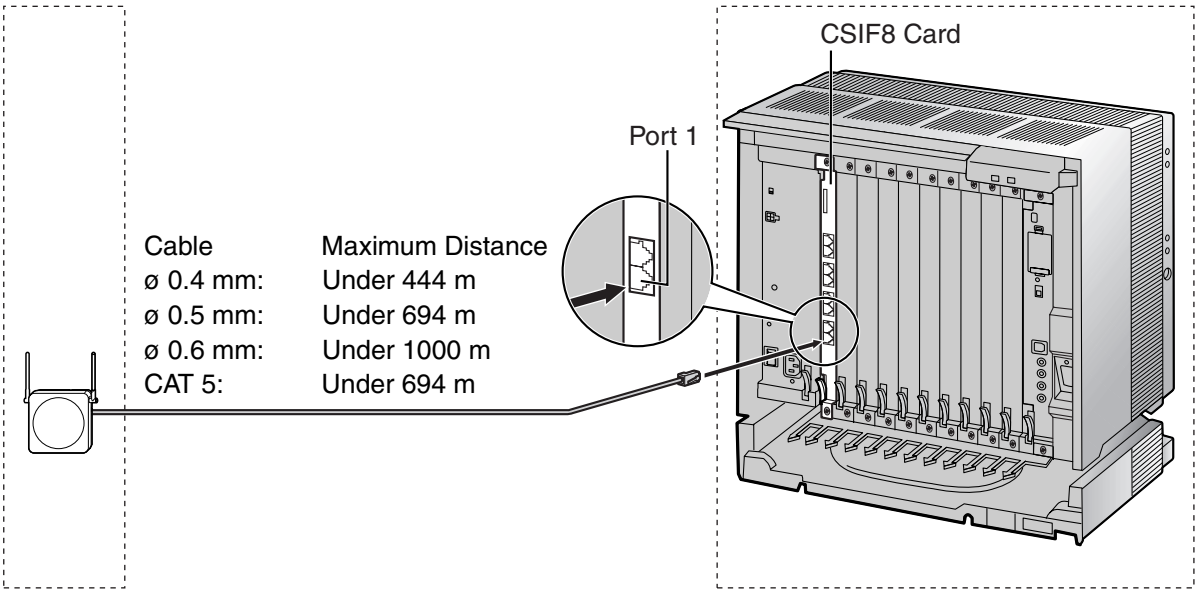
3. Switch all DIP switches on the CS from ON to OFF.



2.9.7 Connecting a Cell Station to the Hybrid IP-PBX

Using a CSIF Card

Refer to the following example to connect a CS to the Hybrid IP-PBX.



CS (RJ11)

Signal Name	Pin No.
D1	1
POWH	2
POWL	3
D2	4

CSIF card (RJ45)

Pin No.	Signal Name
1	
2	
3	D1
4	POWH
5	POWL
6	D2
7	
8	

Accessory and User-supplied Items for the CS

Accessory (included): Screws × 2, Washers × 2

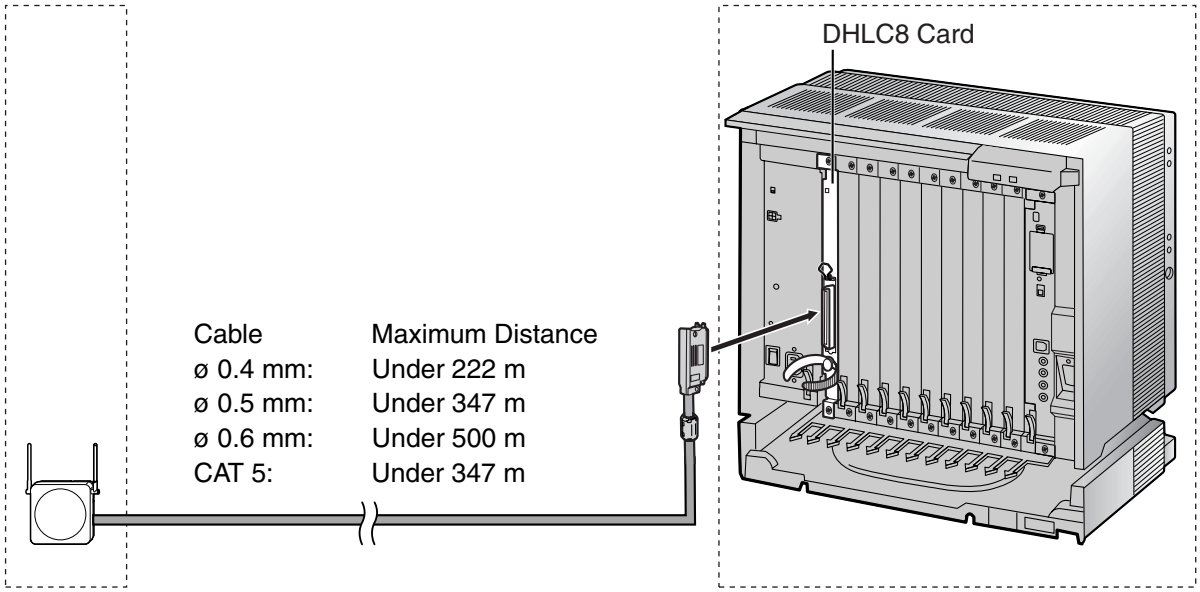
User-supplied (not included): RJ11 connector

Note

For details about CSIF card, refer to "2.5.1 CSIF4 and CSIF8 Card".

Using a DHLC/DLC Card

Refer to the following example to connect a CS to the Hybrid IP-PBX.



CS (RJ11)

Signal Name	Pin No.
D1	1
	2
	3
D2	4

DHLC/DLC card (Amphenol)

Signal Name
D1
D2

Accessory and User-supplied Items for the CS

Accessory (included): Screws × 2, Washers × 2

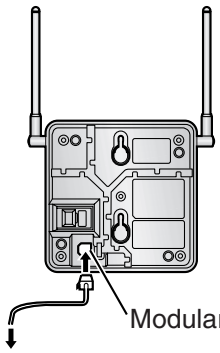
User-supplied (not included): RJ11 connector

Note

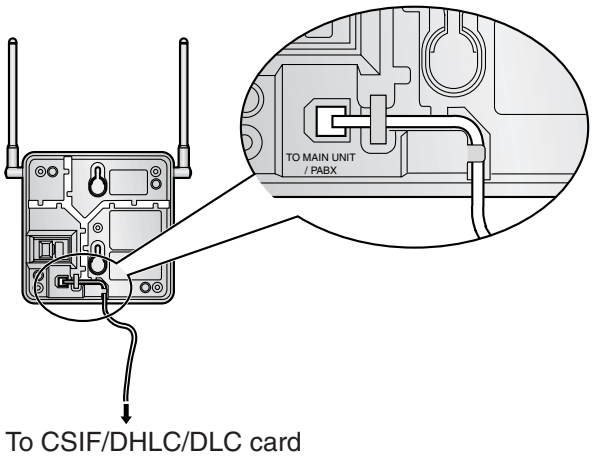
For details about DHLC card or DLC card, refer to "2.5.2 DHLC8 Card", "2.5.3 DLC8 Card", or "2.5.4 DLC16 Card".

Connecting the CS

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



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



Registering the PS

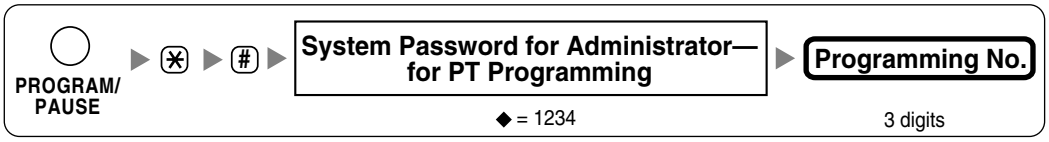
The PS must be registered to the Hybrid IP-PBX before it can be used. Programming of both the PS and Hybrid IP-PBX is required. A PT with multiline display (e.g., KX-T7636 6-line display) is required for the Hybrid IP-PBX system programming.

Note

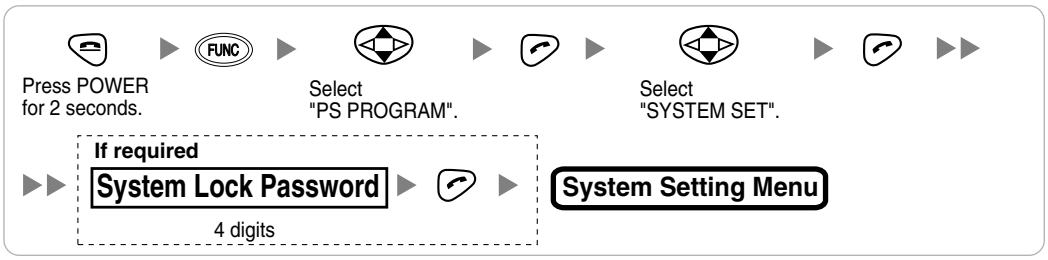
For details about system programming using a PT, refer to "2.3.2 PT Programming" and "3.3 PT Programming" in the Feature Guide.

Entering the System Programming Mode

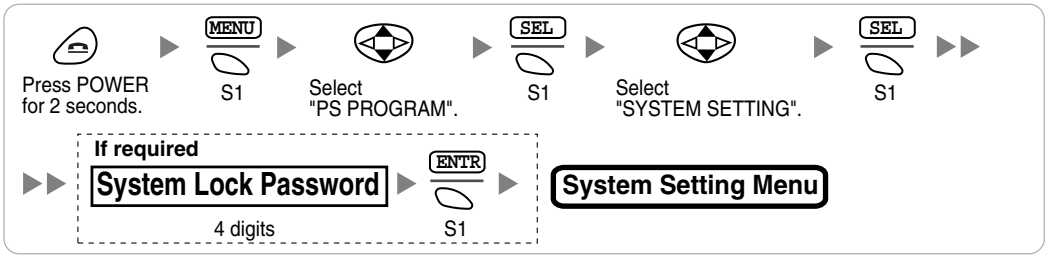
PT (Administrator Level)



PS (Using the KX-TD7680)



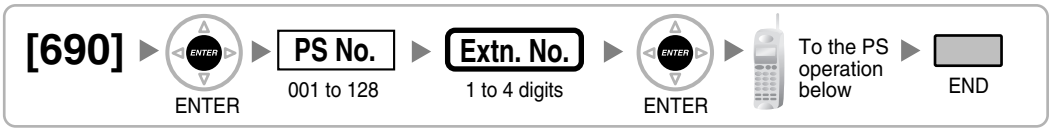
PS (Using the KX-TD7690)



Note

◆ means default value throughout this section.

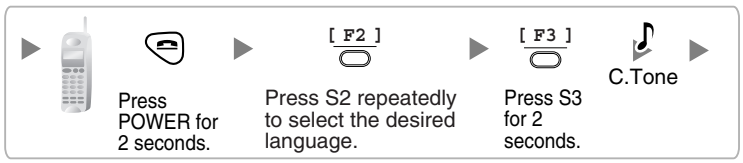
PS Registration



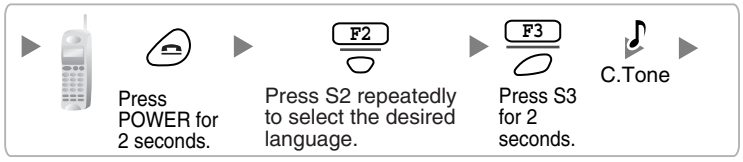
When the PS has not been registered yet

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-TD7680



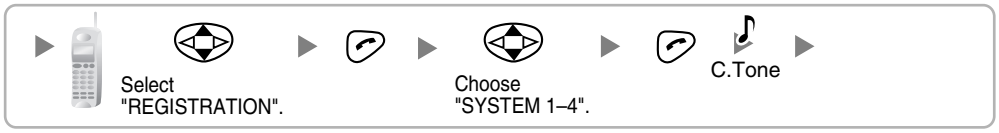
Using the KX-TD7690



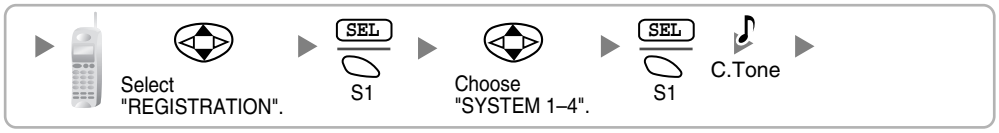
When the PS has already been registered to another Hybrid IP-PBX

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

Using the KX-TD7680



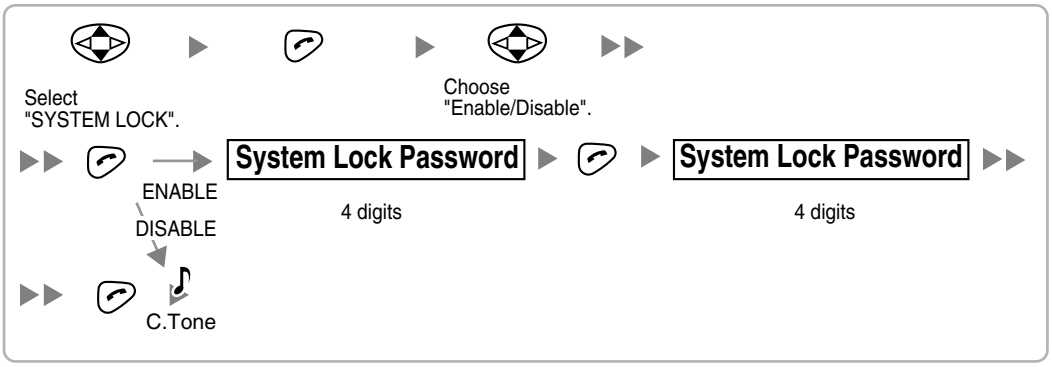
Using the KX-TD7690



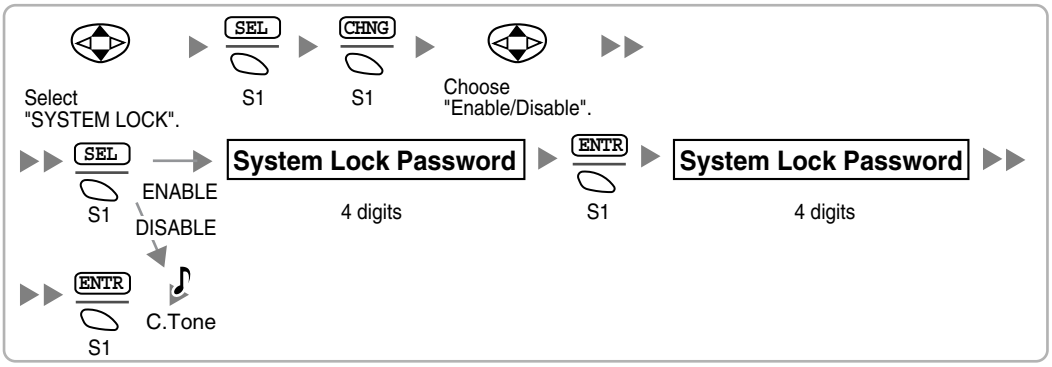
Setting the System Lock

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

Using the KX-TD7680



Using the KX-TD7690



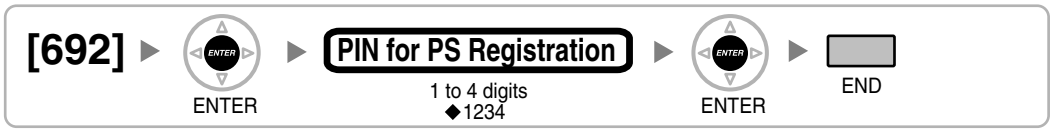
Setting the Personal Identification Number (PIN) for PS Registration

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

Notes

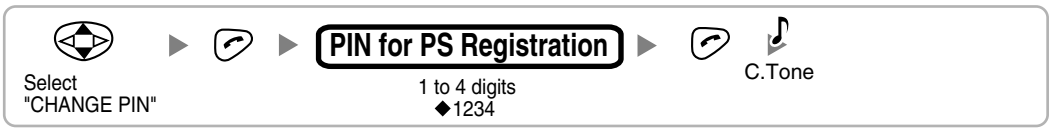
- By default, the PIN for PS registration is "1234" for both the Hybrid IP-PBX and PS. Therefore, the PS can be registered to the Hybrid IP-PBX without setting the PIN.
- The PIN for PS registration will only be used when registering the PS to the Hybrid IP-PBX. Therefore, even when there is more than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

Setting the PIN for Hybrid IP-PBX

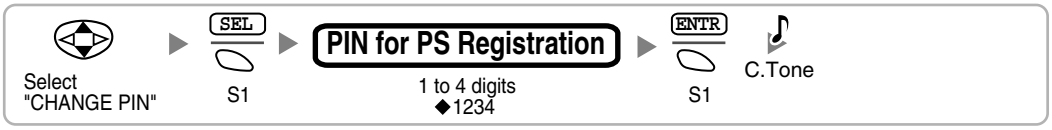


Setting the PIN for PS

Using the KX-TD7680



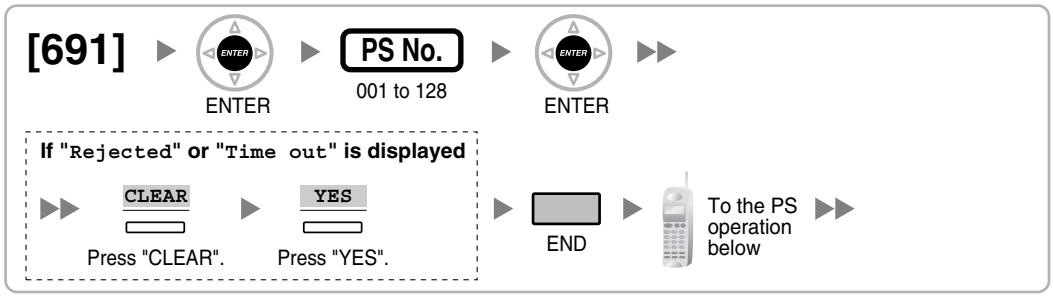
Using the KX-TD7690



PS Termination

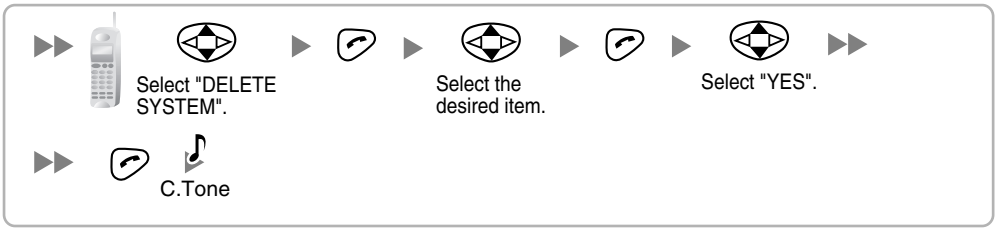
Confirm the following before cancelling the PS registration:

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

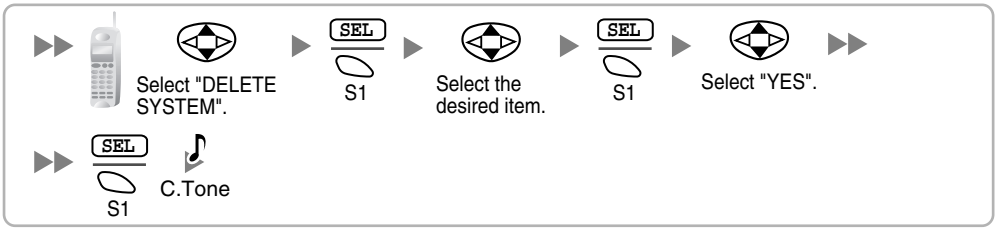


If the registration information is still stored in the PS

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.

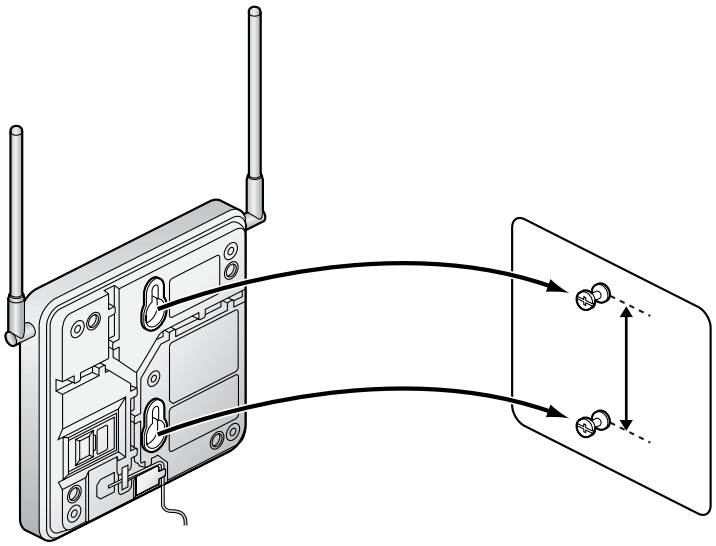
2.9.8 Wall Mounting

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

Notes

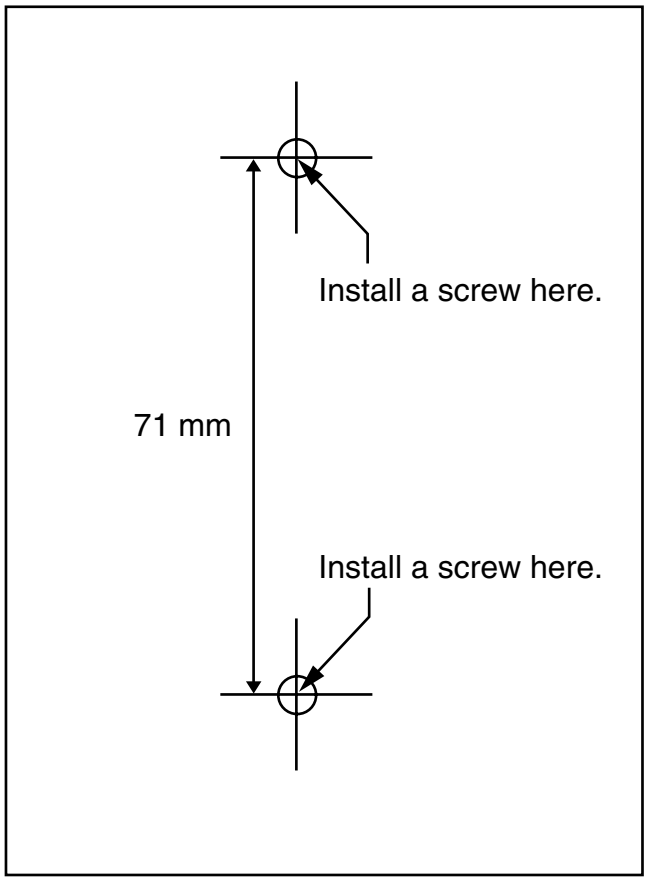
- Make sure that the screw heads are at the same distance from the wall.
- Install the screws perpendicular to the wall.

3. Hook the CS on the screw heads.



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.

2.10 Connection of Doorphones, Door Openers, External Sensors, and External Relays

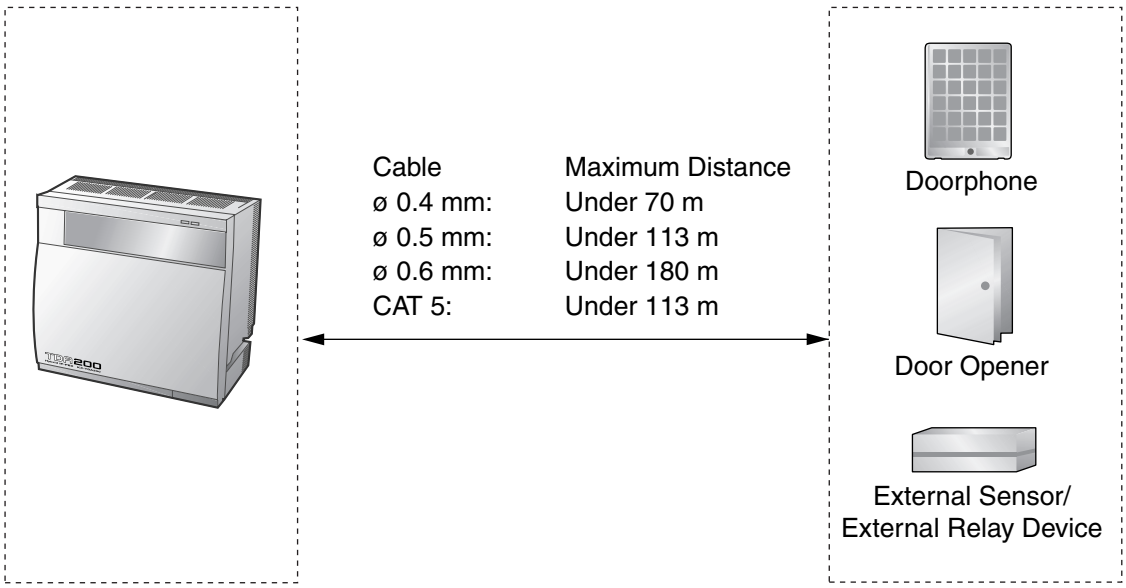
2.10.1 Connection of Doorphones, Door Openers, External Sensors, and External Relays

The KX-TDA100 supports a maximum of 8 doorphones (KX-T30865 with a DPH4 card, or German type with a DPH2 card), 8 door openers, 8 external sensors, and 8 external relays.
The KX-TDA200 supports a maximum of 16 doorphones (KX-T30865 with a DPH4 card, or German type with a DPH2 card), 16 door openers, 16 external sensors, and 16 external relays.

Notes

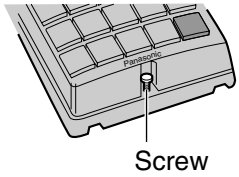
- KX-T30865 is a Panasonic doorphone.
- German type doorphones, door openers, external sensors, and external relays are user-supplied.

Maximum Cabling Distance

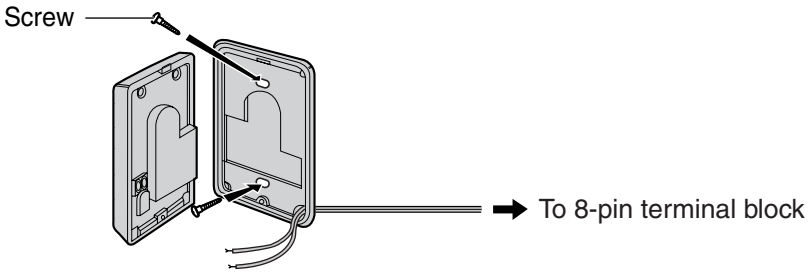


Installing the Doorphone (KX-T30865)

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



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



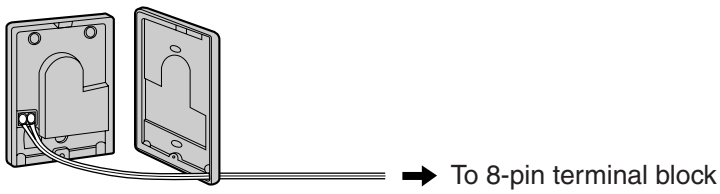
Note

Two kinds of screws are included with a KX-T30865. 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 front cover.

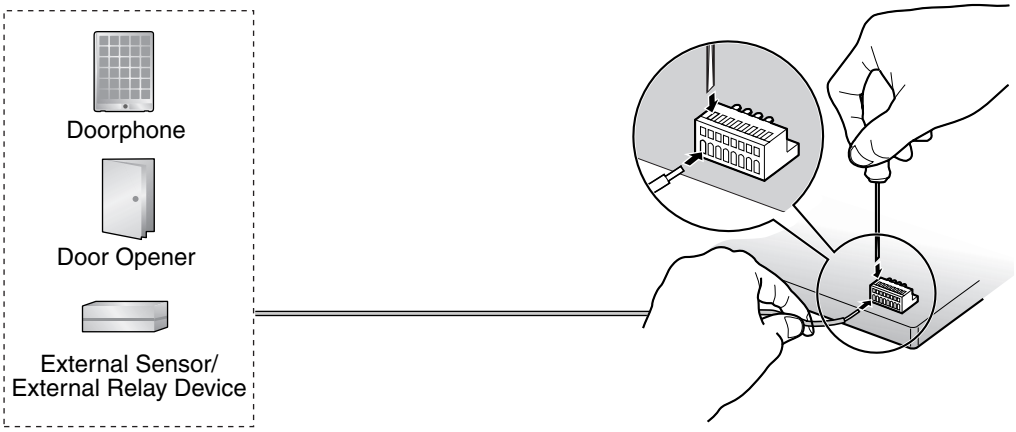


4. Re-attach the 2 halves and re-insert the screw.

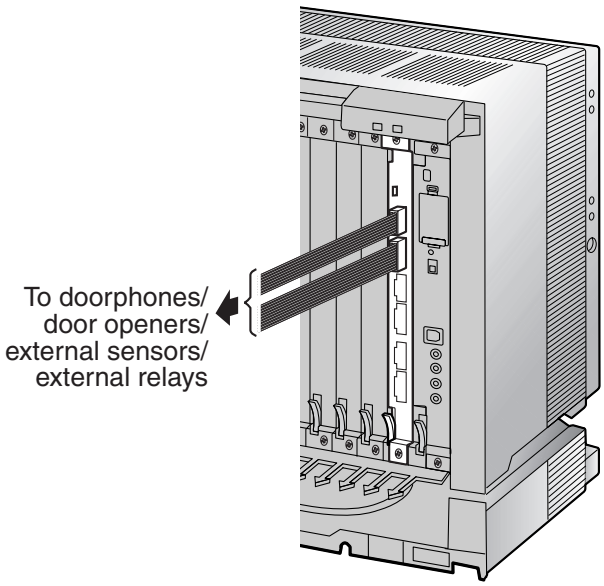
Connection

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 "2.6.2 DPH4 Card", "2.6.3 DPH2 Card", and "2.6.4 EIO4 Card" for pin assignments.

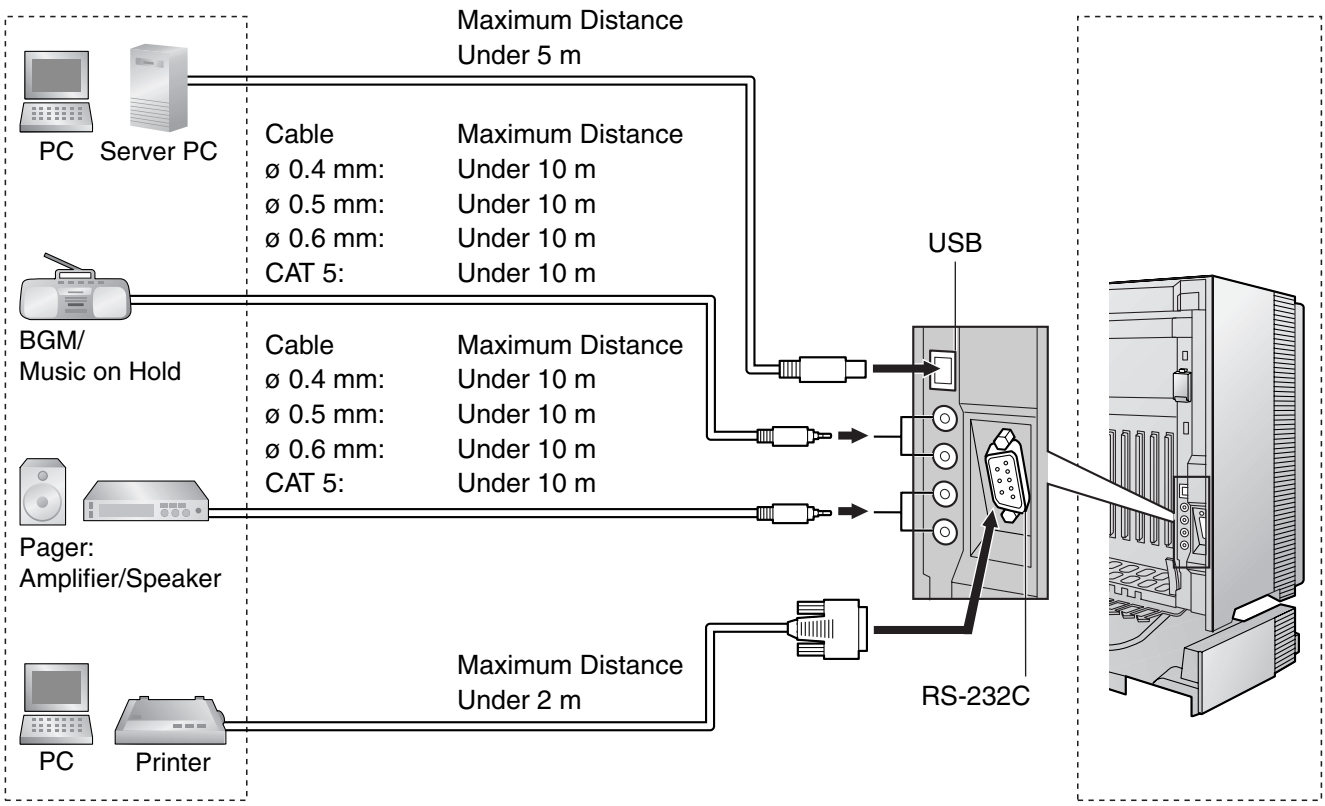


2. Attach the terminal blocks to the connectors of the DPH4/DPH2/EIO4 card on the Hybrid IP-PBX.



2.11 Connection of Peripherals

2.11.1 Connection of Peripherals



BGM/MOH

The Hybrid IP-PBX provides Background Music and Music on Hold. Up to 2 external music sources (e.g., user-supplied radios) can be connected to the Hybrid IP-PBX.

CAUTION

- Wiring should be done carefully to prevent undue force being exerted on the plug. Otherwise, music may intermittent.
- 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 Hybrid IP-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 Hybrid IP-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.

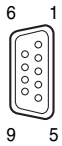
PC/Printer (via RS-232C)

The Hybrid IP-PBX is equipped with an RS-232C interface. This interface provides communication between the Hybrid IP-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.

Note

Use an RS-232C cross cable for connection between the Hybrid IP-PBX and PC.

Pin Assignments



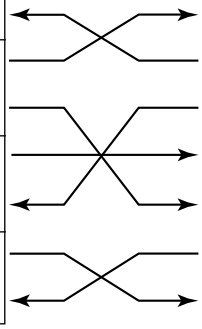
No.	Signal Name	Function	Circuit Type	
			EIA	CCITT
2	RD (RXD)	Receive Data	BB	104
3	SD (TXD)	Transmit Data	BA	103
4	ER (DTR)	Data Terminal Ready	CD	108.2
5	SG	Signal Ground	AB	102
6	DR (DSR)	Data Set Ready	CC	107
7	RS (RTS)	Request To Send	CA	105
8	CS (CTS)	Clear To Send	CB	106

Connection Charts

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

Hybrid IP-PBX

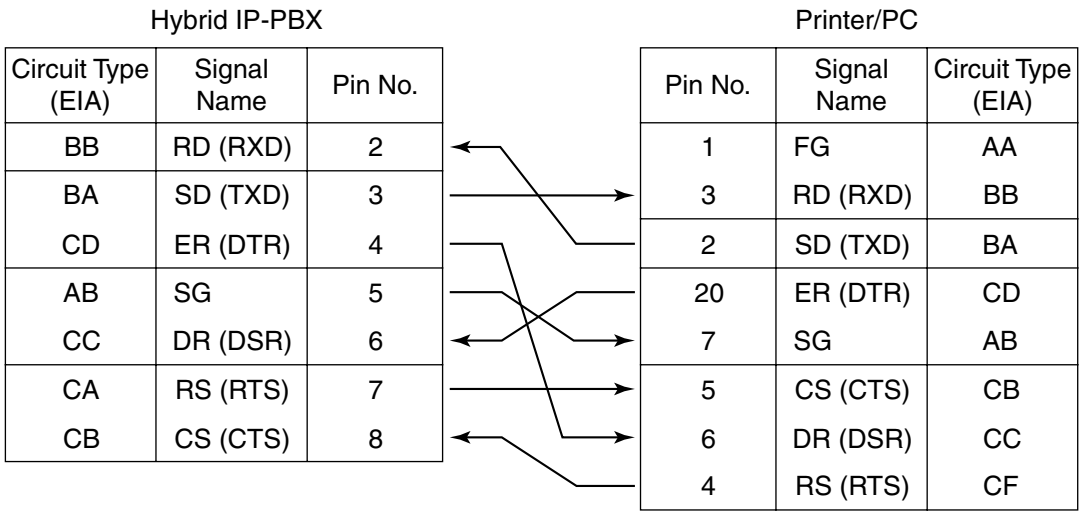
Circuit Type (EIA)	Signal Name	Pin No.
BB	RD (RXD)	2
BA	SD (TXD)	3
CD	ER (DTR)	4
AB	SG	5
CC	DR (DSR)	6
CA	RS (RTS)	7
CB	CS (CTS)	8



Printer/PC

Pin No.	Signal Name	Circuit Type (EIA)
2	RD (RXD)	BB
3	SD (TXD)	BA
4	ER (DTR)	CD
5	SG	AB
6	DR (DSR)	CC
7	RS (RTS)	CA
8	CS (CTS)	CB

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



Hybrid IP-PBX

Circuit Type (EIA)	Signal Name	Pin No.
BB	RD (RXD)	2
BA	SD (TXD)	3
CD	ER (DTR)	4
AB	SG	5
CC	DR (DSR)	6
CA	RS (RTS)	7
CB	CS (CTS)	8

Printer/PC

Pin No.	Signal Name	Circuit Type (EIA)
1	FG	AA
3	RD (RXD)	BB
2	SD (TXD)	BA
20	ER (DTR)	CD
7	SG	AB
5	CS (CTS)	CB
6	DR (DSR)	CC
4	RS (RTS)	CF

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.
- **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.

PC/Server PC (via USB version 1.1)

The Hybrid IP-PBX is equipped with a USB interface. This interface provides communication between the Hybrid IP-PBX and a PC or a Server PC.

The PC is used for system programming, diagnostics and external system database storage (save/load) functions.

The Server PC is used for connecting PCs on a LAN to provide third party call control CTI. The CTI connection uses the CSTA Phase 3 or TAPI 2.1 protocol.

Note

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

Pin Assignments

No.	Signal Name
1	VBUS
2	USB D-
3	USB D+
4	GND

2.12 Power Failure Connections

2.12.1 Power Failure Connections

When the power supply to the Hybrid IP-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.
Power Failure Connection is required to implement this feature.

Note

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

Using Analogue Trunk Card and Extension Card

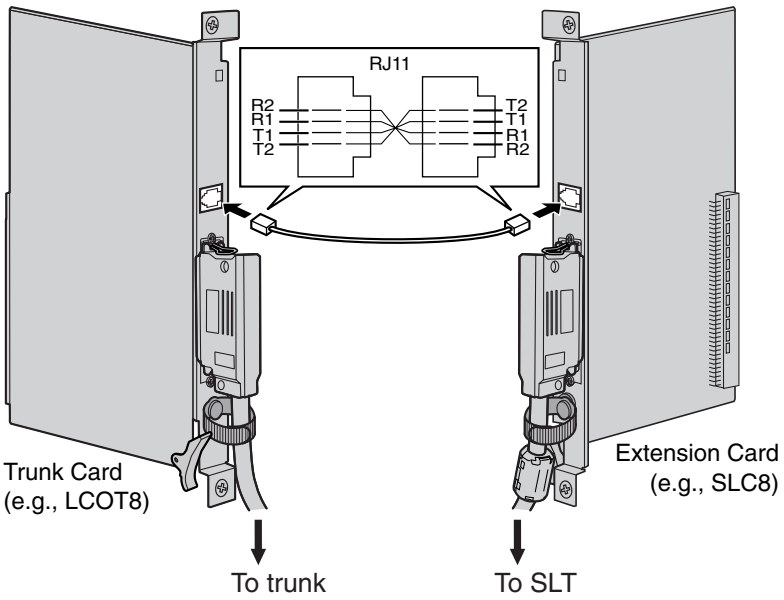
Power Failure Connection connects a specific SLT and a trunk in the event of power failure. The following analogue trunk and extension cards can be used for Power Failure Connections:

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

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

Note

By programming the Hybrid IP-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.



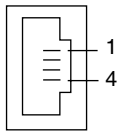
Accessory and User-supplied Items

Accessory (included): none

User-supplied (not included): RJ11 connectors

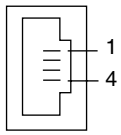
RJ11 Connector Pin Assignments for Analogue Trunk Card

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

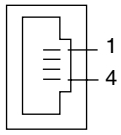
PFT Ports 3 and 4 (for LCOT16 card only)



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

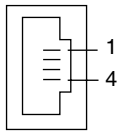
RJ11 Connector Pin Assignments for Extension Card

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/SLC16 card only)



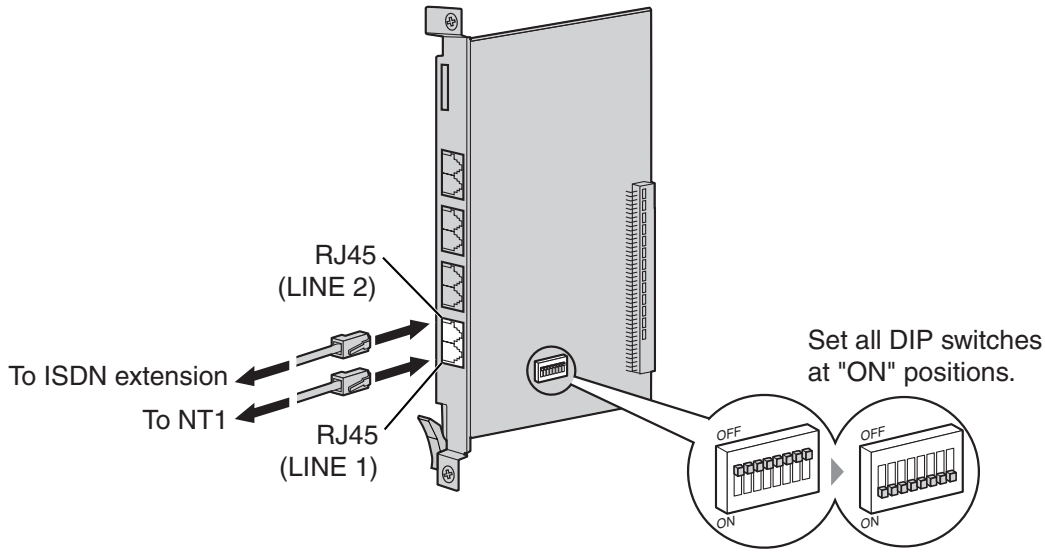
No.	Signal Name	Function
1	T4	Tip port 4
2	T3	Tip port 3
3	R3	Ring port 3
4	R4	Ring port 4

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.



Accessory and User-supplied Items

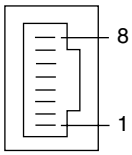
Accessory (included): none

User-supplied (not included): RJ45 connectors

Switch Settings

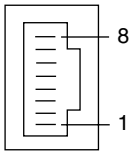
Switch	Type	Usage and Status Definition
PFT Setting	DIP	Set all DIP switches to "ON" positions to use LINE 1 and LINE 2 as a PFT port. LINE 1: Power Failure LINE (NT1) LINE 2: Power Failure EXTN (extension)

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	–	–

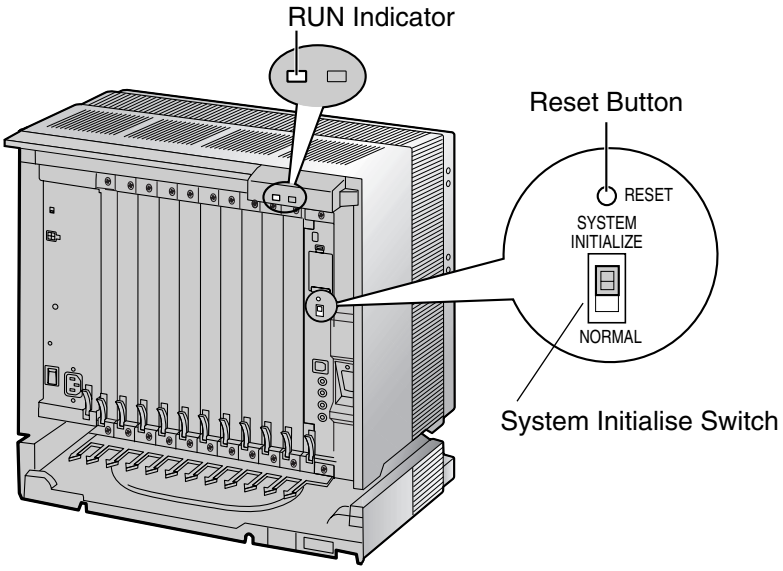
2.13 Starting the Hybrid IP-PBX

2.13.1 Starting the Hybrid IP-PBX

CAUTION

- SD Memory Card must be inserted in the SD Memory Card slot of the MPR card before start up.
- Before touching the System Initialise Switch, discharge static electricity by touching ground or wearing an earthing strap.
- Once you have started the Hybrid IP-PBX and if you unplug the Hybrid IP-PBX, do not perform the following procedures to start the Hybrid IP-PBX again. Otherwise, your programmed data is cleared. To restart the Hybrid IP-PBX, refer to "4.1.4 Using the Reset Button".
- The Hybrid IP-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 socket-outlet is located/installed near the equipment and is easily accessible.

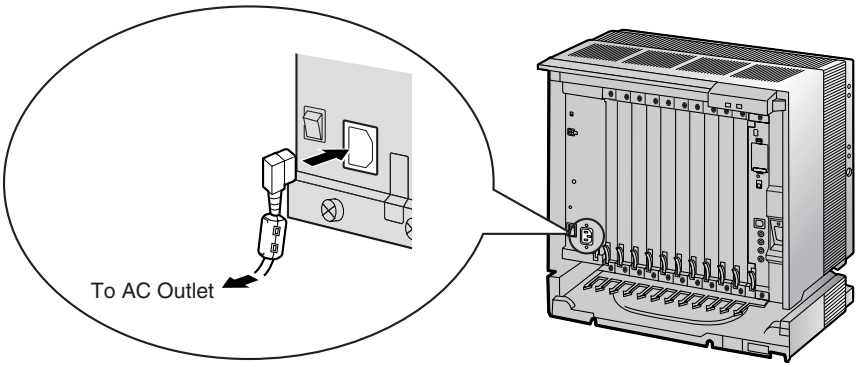
1. Set the System Initialise Switch to the "SYSTEM INITIALIZE" position.



2. Plug the AC power cord into the Hybrid IP-PBX and an AC outlet, and turn on the Hybrid IP-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, return the System Initialise Switch 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 be kept lit.

All data will be cleared, and the Hybrid IP-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.

Notes

- Use only the AC power cord included with the Hybrid IP-PBX for the PSU.
- Use only the supplied AC power cord for the purpose of applying the EMC standard, if the Hybrid IP-PBX is connected (Germany only).

LED Indications

Indication	Colour	Description

RUN	Green	PBX status indication
		• OFF: Power Off (includes normal reset)
		• ON: Power On and running (on-line)
		• Flashing (60 times per minute): Starting up
		• Flashing (120 times per minute): Starting up or resetting with:
		  • the System Initialise Switch in "SYSTEM INITIALIZE" position
		  • the SD Memory Card not inserted

ALARM	Red	Alarm indication • OFF: Normal • ON: Alarm (CPU stop, alarm for each card) • Flashing: Alarm (MPR file error in restarting)

Confirming the Trunk Connection

After initialisation, programme the Hybrid IP-PBX and establish trunk connection, and then use a PT to confirm it.

To confirm, dial [✳] [3] [7] + trunk number (3 digits) or press S-CO button. You will hear a dial tone if the trunk is available and connected.

Section 3

Guide for the KX-TDA Maintenance Console

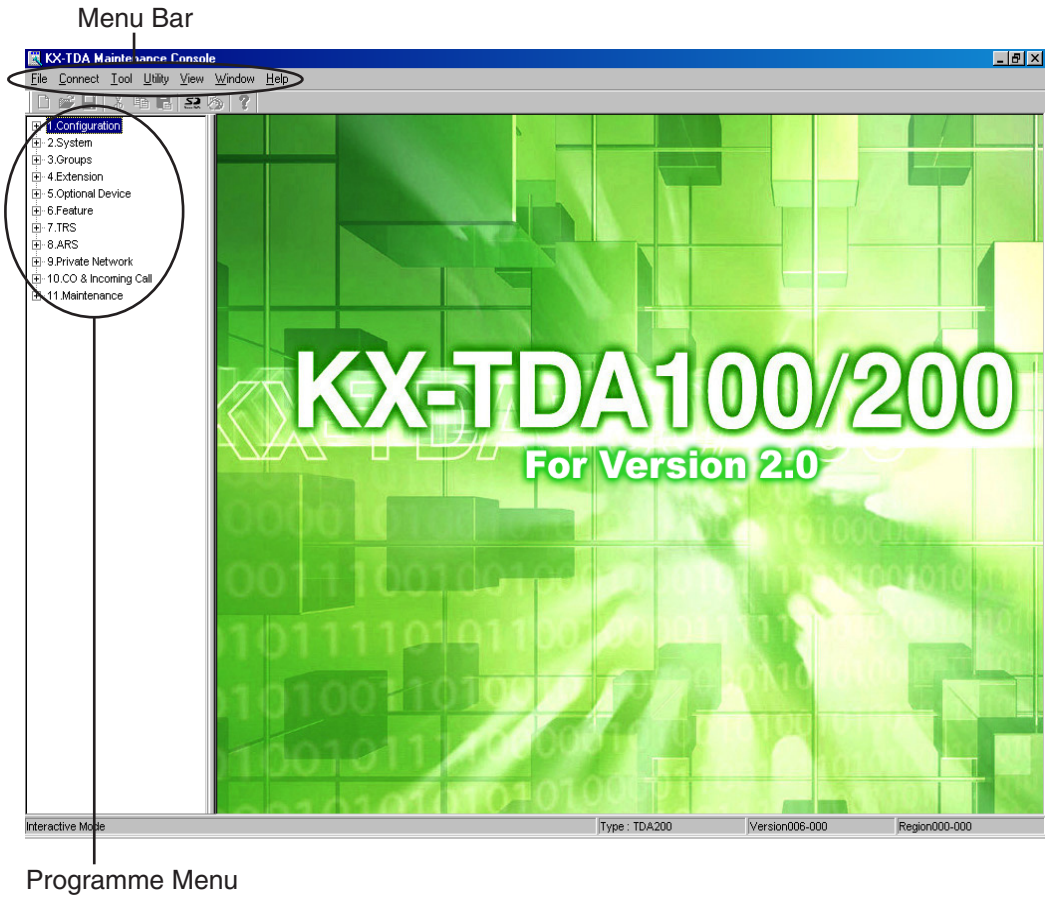
Explains the installation procedure, structure, and basic information of the KX-TDA Maintenance Console.

3.1 Overview

3.1.1 Overview

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

KX-TDA Maintenance Console[*1]

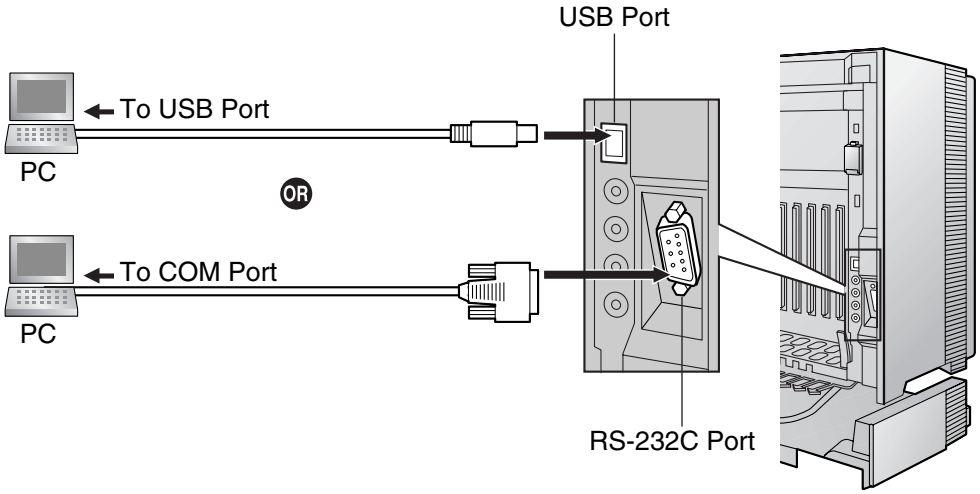


[*1] The contents and design of the software are subject to change without notice.

3.2 Connection

3.2.1 Connection

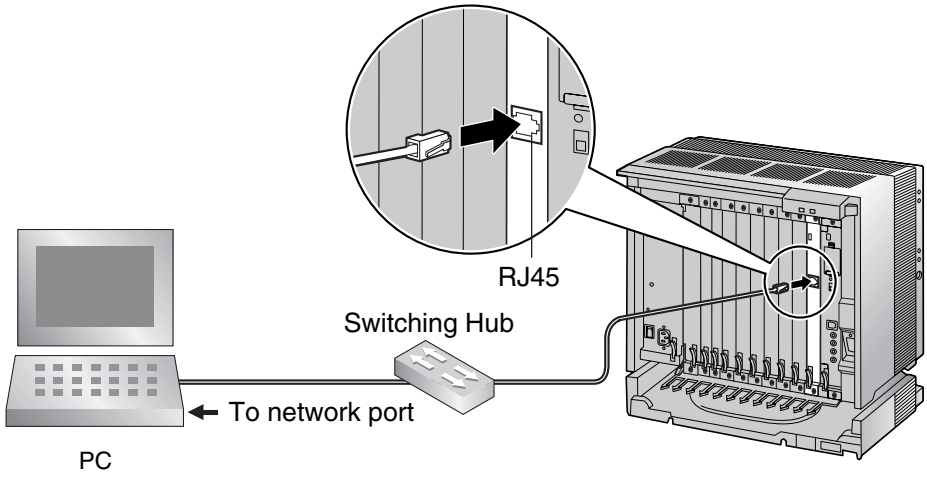
Serial Interface Connection



Note

For pin assignments and maximum cabling distance, refer to "2.11.1 Connection of Peripherals".

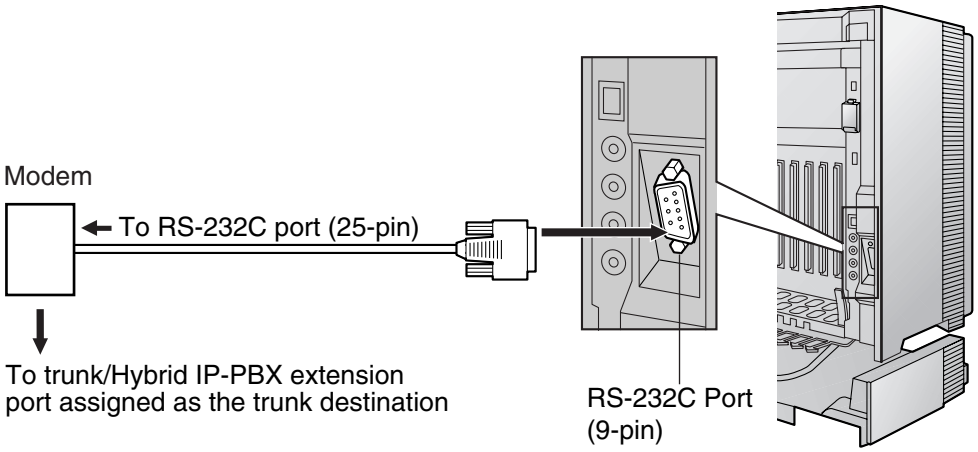
LAN Connection via CTI-LINK Card



Note

For pin assignments and maximum cabling distance, refer to "2.6.7 CTI-LINK Card".

External Modem Connection



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

After connecting the Hybrid IP-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.
- The data compression should be disabled.
- Error Correction is not necessary.

Notes

- Use an RS-232C straight cable for connection between the Hybrid IP-PBX and external modem.
- An AT command (for initialisation, enabling automatic answer, etc.) can only be programmed by KX-TDA Maintenance Console. "AT&F0Q0E0V1S0=1X0&D0" is stored as the default value.
- For more information about the AT command, refer to the external modem's instructions.

3.3 Installation of the KX-TDA Maintenance Console

3.3.1 Installing and Starting the KX-TDA Maintenance Console

System Requirements

Operating System

- Microsoft® Windows® 98 SE, Windows Me, Windows 2000, or Windows XP

Hardware

- CPU: Intel® Pentium® 133 MHz or better microprocessor
- RAM: at least 64 megabytes (MB) of free RAM (128 MB recommended)
- HDD: at least 100 MB of hard disc space

Password Security

Warning 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 "3.1.3 Entering Characters" in the Feature Guide.
6. If a system password is forgotten, it can be found by loading a backup of the system data into a PC, and checking the password using the KX-TDA Maintenance Console software. If you do not have a backup of the system data, you must reset the PBX to its factory defaults and reprogramme it. Therefore, we strongly recommend maintaining a backup of the system data. For more information on how to back up the system data, refer to the on-line help of the Maintenance Console.
   However, as system passwords can be extracted from backup copies of the system data file, do not allow unauthorised access to these files.

Installing the KX-TDA Maintenance Console

Notes

- Make sure to install and use the KX-TDA Maintenance Console for version 2.0.
- To install or uninstall the software into Windows 2000 Professional or Windows XP Professional, the user must be grouped either of "Administrators" or "Power Users".
- To connect the PC to the Hybrid IP-PBX via USB, the KX-TDA USB driver must have been installed. Follow the instructions of the wizard to install the KX-TDA USB driver.

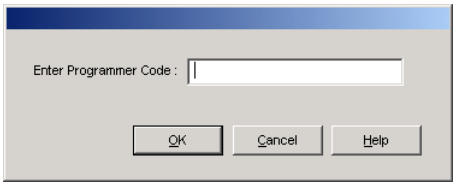
1. Save the setup file of the KX-TDA Maintenance Console on your PC.
2. Double-click the icon to execute the setup file.
3. Follow the instructions of the wizard.

Starting the KX-TDA Maintenance Console and Assigning the Basic Items (Quick Setup)

When you start the KX-TDA Maintenance Console with the Installer Level Programmer Code and connect to the Hybrid IP-PBX for the first time after initialisation (with the factory default setting), Quick Setup will launch automatically. During Quick Setup, you will setup the following basic items:

- Date and Time of the Hybrid IP-PBX. The date and time set on the PC will be used.
- System Password for installer for PC programming.
- Operator extension numbers. Operator extensions for all time modes (day/lunch/break/night) can be assigned.
- Flexible Numbering type to pattern 1 or pattern 2. If pattern 1 (with ⚹) is selected, "⚹" must prefix all feature numbers (except access numbers) when an extension user wants to use a feature.
- Operator call and Idle Line Access/ARS numbers (0 or 9). The feature numbers for operator call and Idle Line Access/ARS can be selected.
- Remote Maintenance Dial Number. Enter the complete telephone number of the PBX (including the country code). When necessary, this number will be used to access the PBX from a remote location for maintenance purposes.

1. Connect the PC to the Hybrid IP-PBX with a USB cable.
2. Start the **KX-TDA Maintenance Console** from the Start menu.

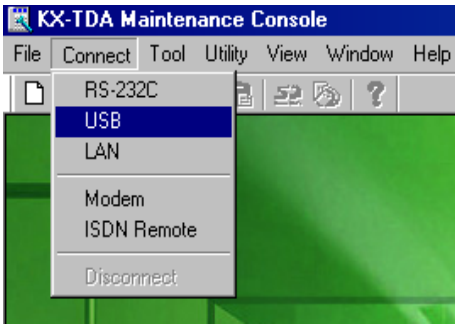


3. Type the Installer Level Programmer Code (default: **1234**), then click [OK].

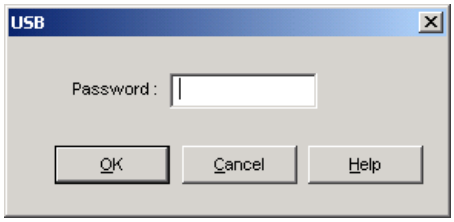
   The Programmer Code authorises different programming levels, and the Quick Setup is only available when you start the KX-TDA Maintenance Console with the Installer Level Programmer Code.

   Note

   There are 2 other Programmer Codes with limited authorisation: Administrator Level (default: **1111**), and User Level (default: none).

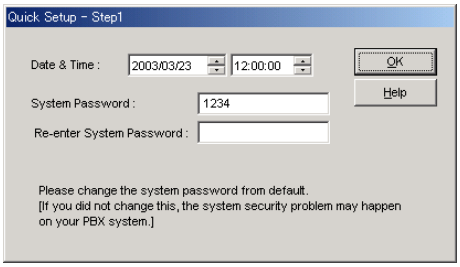


4. Click "**Connect**" → "**USB**" from the menu bar.

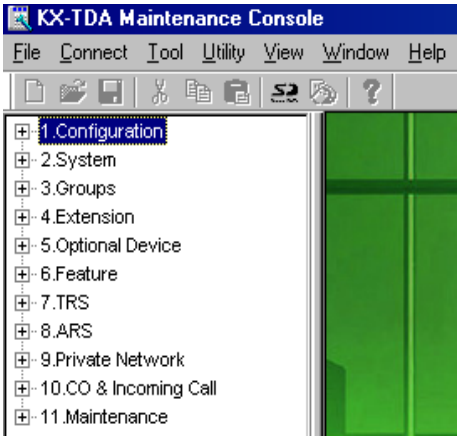


5. Type the system password for installer (default: **1234**), then click [OK] to log-in.

6. **When country/area data do not match:**
   - **a.** Click [OK] to replace the country/area data of the Hybrid IP-PBX. Replacement may take several minutes to complete.
   - **b.** Follow the procedure described in "2.13.1 Starting the Hybrid IP-PBX" and restart the Hybrid IP-PBX.
   - **c.** Repeat steps **2** to **5** to restart the KX-TDA Maintenance Console.



7. Follow the instructions of the wizard and assign the basic items (Quick Setup).



The programme menu appears.

Notice

1. During a long programming session, it is highly recommended that you periodically save the system data to the SD Memory Card. You can think of system data as stored in RAM, whereas SD Memory Card as stored on a hard disk. If the PBX undergoes a sudden power failure or system reset for some reason, all the system data in RAM will be lost.
   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 KX-TDA Maintenance Console so that the PBX starts automatically saving the system data.
2. When the PBX is initialised, not all data is taken from the SD Memory Card. The data for present status of extension FWD/DND buttons is taken from battery backup memory in the PBX.
3. The PC will not perform any shutdown operation, or enter the power-saving system standby mode while the KX-TDA Maintenance Console is connected to the Hybrid IP-PBX. To perform either of the operations above, first close the connection to the Hybrid IP-PBX.

CAUTION

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

Section 4
Troubleshooting

This section provides information on the Hybrid IP-PBX and telephone troubleshooting.

4.1 Troubleshooting

4.1.1 Installation

PROBLEM	PROBABLE CAUSE	SOLUTION
Extension does not operate.	Bad extension card.	• Exchange the card for a known working one.
	Bad connection between the Hybrid IP-PBX and telephone.	• Take the telephone and plug it into the same extension port using a short telephone cord. If the telephone works, then the connection between the Hybrid IP-PBX and the telephone must be repaired.
	A telephone with an A-A1 relay is connected.	• Use a 2-wire cord. • Set the A-A1 relay switch of the telephone to the "OUT" or "OFF" position.
	Bad telephone.	• Take the telephone and plug it into another extension port that is working. If the telephone does not work, replace the telephone.
	Wrong type of PSU.	• Replace the PSU with the appropriate type.
The Hybrid IP-PBX does not operate properly.		• Press the Reset Button (refer to "4.1.4 Using the Reset Button"). • Turn off the power switch, and then turn it back on. • Turn off the power switch, and then unplug the Hybrid IP-PBX. After 5 minutes, plug the Hybrid IP-PBX back in, and turn the power switch back on.
Noise on external paging.	Induced noise on the wire between the Hybrid IP-PBX and the amplifier.	• Use a shielded cable as the connection wire between the Hybrid IP-PBX and amplifier. A short shielded cable is recommended.
Distorted external music.	Excessive input level from external music source.	• Decrease the output level of the external music source by using the volume control on the music source.
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).	Voice-calling mode and Hands-free mode with LCS are not available with Wireless Phones.	• Switch the calling mode to ring-calling. • Set the LCS mode to "Private".

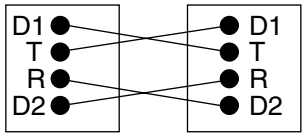
PROBLEM	PROBABLE CAUSE	SOLUTION
The ALARM indicator on the front of the cabinet turns on red.	A major system error occurs in the Hybrid IP-PBX.	• See the error log using the KX-TDA Maintenance Console (refer to "4.1.5 Troubleshooting by Error Log").

4.1.2 Connection

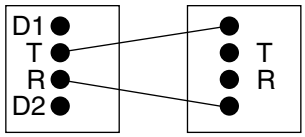
Can you dial an extension?

No

Connection between the Hybrid IP-PBX and a PT:

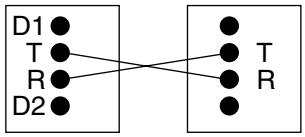
CAUSE	SOLUTION
The T/R is connected to the D1/D2.  Hybrid IP-PBX Extension	Use the correct cord (the inner 2 wires are for T/R and the outer 2 wires are for D1/D2).

Connection between the Hybrid IP-PBX and an SLT:

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

Yes

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

CAUSE	SOLUTION
The "T" is connected to the "R".  Hybrid IP-PBX Extension	Reverse the connections of the T/R.

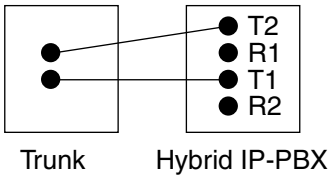
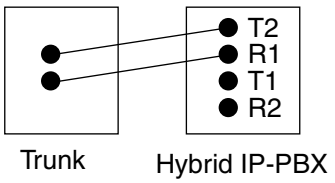
(Continued on the next page.)

(Continued from the previous page.)

Can you dial out on a trunk?

No

Connection between the trunk and the Hybrid IP-PBX:

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

4.1.3 Operation

PROBLEM	PROBABLE CAUSE	SOLUTION
• When using the speakerphone on an APT, nothing is audible. • When using the speakerphone/monitor mode with a DPT, nothing is audible.	• The HANDSET/HEADSET selector is set to the "HEADSET" position. • The "HEADSET" mode is selected by Personal Programming, "Handset/ Headset Selection".	• When the headset is not used, set the HANDSET/HEADSET selector to the "HANDSET" position. • When the headset is not used, select the "HANDSET" mode by Personal Programming.
• The PT does not ring.	• The ringer volume is off.	• Turn on the ringer volume.
• During a power failure, extensions connected to ports 1 to 4 of MSLC16/ SLC16 and ports 1 to 2 of DHLC8/SLC8 cards do not operate.	• A DPT or APT is connected to the extension port. • The dialling mode (tone or pulse) is incorrect.	• Disconnect the DPT or APT and connect an SLT. • Set the Tone/Pulse switch to the other position.
• Originating an outside call, call transfer, or conference cannot be performed.	• The corresponding CO button does not exist on the PT.	• Programme the CO button. Refer to "1.19.2 Flexible Buttons" in the Feature Guide.
• Cannot register the PS.	• Wrong Personal Identification Number (PIN) is registered to the PS. • CS is not connected properly.	• Register the PIN set to the Hybrid IP-PBX into the PS. • Make sure that the cable is connected properly with correct pin assignments. Also, make sure that the cable does not make short circuits. • Switch all DIP switches off.
• PS becomes out of range. • Cannot make calls using the PS.	• CSIF card is not working. • CS is not working. • Location of CS is not good. • Access system of the PS is not properly set.	• Install the CSIF card properly. • Make sure that the cable is connected properly with correct pin assignments. Also, make sure that the cable does not make short circuits. • Switch all DIP switches off. • Locate the CS properly (refer to "2.8.5 Site Survey Using the KX-TCA255/KX-TD7590" or "2.9.5 Site Survey"). • Change the access system setting of the PS to the appropriate system or automatic.
• Noise is frequent while using the PS. • Conversations disconnect while using the PS.	• Call handover is not working. • PS is out of CS coverage area.	• Locate the CS properly (refer to "2.8.5 Site Survey Using the KX-TCA255/KX-TD7590" or "2.9.5 Site Survey").

PROBLEM	PROBABLE CAUSE	SOLUTION
• PS stays out of service when the CS status is changed from Out of Service to In Service.	• It may take about 20 s for CS to start up after the status has been changed to In Service.	• Wait until the CS starts up.

4.1.4 Using the Reset Button

If the Hybrid IP-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.

Notes

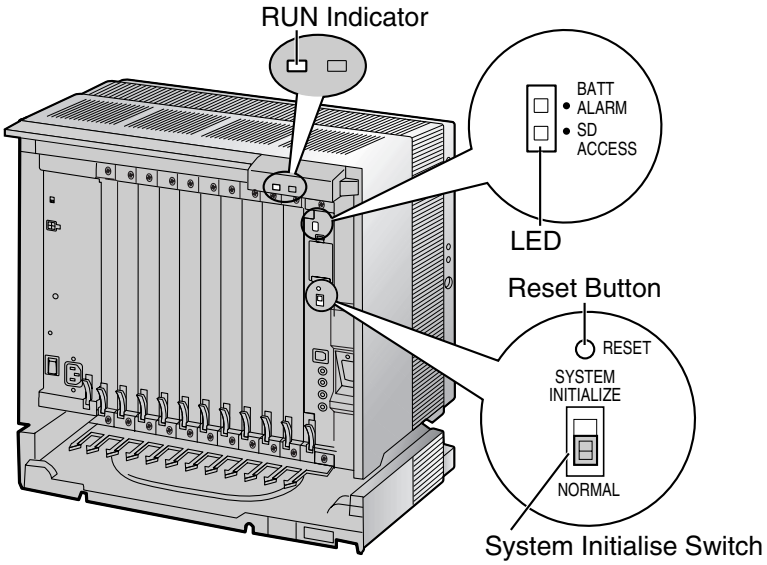
- When the System Initialise Switch is set to "NORMAL", pressing the Reset Button causes the following:
  - Camp-on is cleared.
  - Calls on hold are terminated.
  - Calls on exclusive hold are terminated.
  - Calls in progress are terminated.
  - Call park is cleared.

  Other data stored in memory, except the above, are not cleared.
- When the Reset Button is pressed with the System Initialise Switch in the "SYSTEM INITIALIZE" position, all data stored in memory are cleared.

Operation

If the Hybrid IP-PBX does not operate properly:

1. Set the System Initialise Switch to the "NORMAL" position.
2. Press the Reset Button.



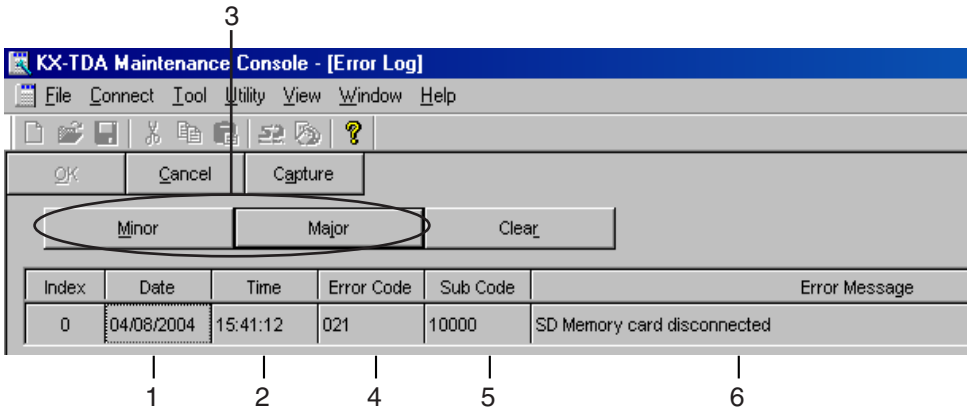
4.1.5 Troubleshooting by Error Log

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

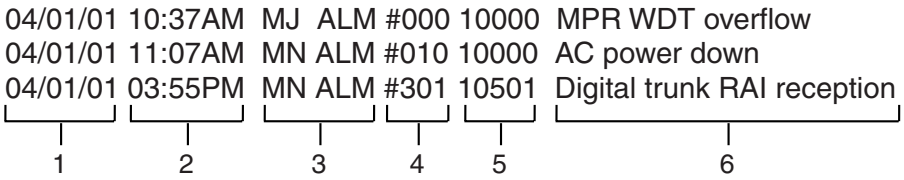
Error Log Display Format

Below is the display format of the error log. To see the error log using the KX-TDA Maintenance Console, refer to the on-line help of the KX-TDA Maintenance Console.

Example: KX-TDA Maintenance Console



Example: Station Message Detail Recording (SMDR)



Description

	Item	Description
1	Date	Date of the error detection
2	Time	Time of the error detection
3	Level	Major Alarm (MJ ALM): Errors that affect the whole system operation, or result in system failure Minor Alarm (MN ALM): Errors that affect certain part of system operation
4	Error Code	Three-digit error code

	Item	Description
5	Sub Code	Five-digit sub code (1XXYY) 1: Cabinet number XX: Slot number KX-TDA100: 00 to 06 (00: MPR slot; 01 to 05: Free slot; 06: Option slot) KX-TDA200: 00 to 11 (00: MPR slot; 01 to 10: Free slot; 11: Option slot) YY: Physical port number (01 to 16) For OPB3 card, sub slot number + port number will be displayed. Sub slot 1: 11 to 14 Sub slot 2: 21 to 24 Sub slot 3: 31 to 34 **Note** When there is no parameter for slot and physical port number, XX and YY will be displayed as "00". Example: Sub code for MPR card = 10000
6	Error Message	Error description

List of Errors and Solutions

The tables below list the errors and their solutions.

When an error whose error code is indicated with "*" occurs in the Hybrid IP-PBX, the ALARM indicator on the front of the cabinet turns on red, and the system logs the error information.

When the error conditions indicated by the error codes "021", "091", "092", "230", and "510" are recovered, the ALARM indicator will turn off automatically, indicating successful troubleshooting. When other errors are logged, the ALARM indicator will turn off only when the log for major or minor errors is cleared from the KX-TDA Maintenance Console.

In other words, the ALARM indicator will turn off under the following conditions:

- **When the errors "021", "091", "092", "230", and "510" are logged:** when the error conditions are recovered
- **When other errors are logged:** when the log for major or minor errors is cleared from the KX-TDA Maintenance Console

LPR (Optional Service Card with Local Processor) Initial Self Diagnosis

Error Code	Error Message	PROBABLE CAUSE	SOLUTION
211	Speech path loop-back check error	• Optional service card malfunction: DHLC, DLC, SLC, CSIF, LCOT, T1, E1, BRI, PRI, OPB3, E&M, IP-GW, DID	• See if the corresponding optional service card is installed properly • Pull out and re-insert the corresponding optional service card • Press the Reset Button • Replace the corresponding optional service card
212	Echo canceller access error	• Optional service card malfunction: CSIF, ECHO	
214	DSP Boot check error	• Optional service card malfunction: T1, E1	
215	Framer IC access error	• Optional service card malfunction: T1, E1, BRI, PRI	
216	MSG card DSP error	• Optional service card malfunction: MSG, OPB3	
217	MSG card data error	• Optional service card malfunction: MSG, OPB3 • Erroneous recording of messages	• See if the corresponding optional service card is installed properly • Pull out and re-insert the corresponding optional service card • Press the Reset Button • Re-record the messages • Replace the corresponding optional service card

System Start-up and On-line Operation

Error Code	Error Message	PROBABLE CAUSE	SOLUTION
000*	MPR WDT overflow	• MPR card malfunction • Optional service card malfunction: CTI-LINK • Erroneous processing of MPR card software • Software error due to external factors	• Press the Reset Button • Reprogramme the Hybrid IP-PBX • Replace the MPR card (be sure to turn off the Hybrid IP-PBX when replacing)
001	SDRAM bit error		
002	System Restart	• Reset Button is pressed • Power failure • MPR card malfunction • Erroneous processing of MPR card software • Software error due to external factors	• Ignore if not frequent • Press the Reset Button • Reprogramme the Hybrid IP-PBX • Replace the MPR card (be sure to turn off the Hybrid IP-PBX when replacing)
010*	AC power down	• Power supply system malfunction (e.g., power failure, power noise, trouble with UPS) • Bad connection or breaking of AC cord • Power supply circuit (PSU, back board) malfunction	• Check the power supply system • See if the AC cord is connected properly • Check the AC cord • Replace the AC cord (be sure to turn off the Hybrid IP-PBX when replacing) • Replace the PSU (be sure to turn off the Hybrid IP-PBX when replacing) • Replace the back board (be sure to turn off the Hybrid IP-PBX when replacing)
011*	DC power down	• AC power down • Power supply circuit (PSU, back board) malfunction • Detection of over current (short circuit on optional service cards)	• Check the power supply system • See if the AC cord is connected properly • Check the AC cord • Replace the AC cord (be sure to turn off the Hybrid IP-PBX when replacing) • Replace the PSU (be sure to turn off the Hybrid IP-PBX when replacing) • Replace the back board (be sure to turn off the Hybrid IP-PBX when replacing) • Remove the optional service cards and restart the Hybrid IP-PBX
012*	MPR RAM battery low	• Battery out • MPR card malfunction	• Replace the MPR card (be sure to turn off the Hybrid IP-PBX when replacing)
014*	FAN Alarm	• PSU-L malfunction	• See if anything is jammed in the fan • Replace the PSU (be sure to turn off the Hybrid IP-PBX when replacing)

Error Code	Error Message	PROBABLE CAUSE	SOLUTION
016	CS overload	• Defective cable • CS malfunction • Optional service card malfunction: CSIF	• Check the cable diameter and length • Replace the CS • Replace the corresponding optional service card
017	BRI port overload	• Defective cable • Defective ISDN terminal equipment • Optional service card malfunction: BRI	• Check the cable • Replace the defective terminal equipment • Check the number of connected terminal equipment • Replace the corresponding optional service card
020*	SD file access error	• SD Memory Card malfunction • Bad connection of SD Memory Card • MPR card malfunction	• Press the Reset Button • Reprogramme the Hybrid IP-PBX • Replace the SD Memory Card • Replace the MPR card (be sure to turn off the Hybrid IP-PBX when replacing)
021*	SD Memory Card disconnected	• SD Memory Card not installed • Bad connection of SD Memory Card • SD Memory Card malfunction • MPR card malfunction	
022	Not enough free space on SD card	• Not enough memory space available to save the system data, or to upload system files from the KX-TDA Maintenance Console	• Delete the files whose file names start with "$" from SD Memory Card • Delete the "Pxxx" files (old programme files of optional service cards) from SD Memory Card. "xxx" indicates the card type (e.g., "PDHLC" for DHLC card) **Note** Do not delete the "PMPR" file; it is the programme file of the MPR card.

Error Code	Error Message	PROBABLE CAUSE	SOLUTION
023	System data file version error	• Old system files on SD Memory Card • Defective system files on SD Memory Card	• Restore the backup files • Re-install the software
024	System initialization file version error		
025	Card initialization file version error		
026	LCD file version error		
027	System data file checksum error		
028	System initialization file checksum error		
029	Card initialization file checksum error		
030	LCD file checksum error		
031*	System data file not found	• SD Memory Card not installed • Bad connection of SD Memory Card • SD Memory Card malfunction • MPR card malfunction	• Press the Reset Button • Reprogramme the Hybrid IP-PBX • Replace the SD Memory Card • Replace the MPR card (be sure to turn off the Hybrid IP-PBX when replacing)
032*	System initialization file not found		
033*	Card initialization file not found		
034*	LCD file not found		
035	System data file access error		
036*	System initialization file access error		
037*	Card initialization file access error		
038*	LCD file access error		
039*	SD file access error		
090	Over Card Limitation	• Too many optional service cards installed	• Reduce the number of optional service cards
091*	PT connection over	• Too many PTs connected	• Reduce the number of PTs
092*	CS connection over	• Too many CSs connected	• Reduce the number of CSs
200	LPR start up error (ROM NG)	• Optional service card malfunction: DHLC, DLC, CSIF, T1, E1, BRI, PRI, OPB3, CTI-LINK, E&M, IP-GW, DID, SLC8	• Pull out and re-insert the corresponding optional service card • Press the Reset Button • Replace the corresponding optional service card
201*	LPR start up error (RAM NG)		

Error Code	Error Message	PROBABLE CAUSE	SOLUTION
202*	LPR start up error (No Program)	• Optional service card malfunction: DHLC, DLC, CSIF, T1, E1, BRI, PRI, OPB3, CTI-LINK, E&M, IP-GW, DID, SLC8	• Pull out and re-insert the corresponding optional service card • Press the Reset Button • Update the software of the corresponding optional service card • Replace the corresponding optional service card
203*	LPR start up error (Version NG)		
204*	LPR start up error (Download NG)		
205*	LPR start up error (No response)		
206	LPR start up error (Card type NG)		
207	LPR start up error (Check SUM NG)		
230*	Card disconnected	• Optional service card not installed properly • Optional service card malfunction • Back board malfunction	• See if the corresponding optional service card is installed properly • Pull out and re-insert the corresponding optional service card • Press the Reset Button • Replace the corresponding optional service card • Replace the back board (be sure to turn off the Hybrid IP-PBX when replacing)
231	LPR alive check error	• Optional service card malfunction: DHLC, DLC, CSIF, T1, E1, BRI, PRI, OPB3, CTI-LINK, E&M, IP-GW, DID, SLC8 • Back board malfunction • MPR card malfunction	• See if the corresponding optional service card is installed properly • Pull out and re-insert the corresponding optional service card • Press the Reset Button • Replace the corresponding optional service card • Replace the back board (be sure to turn off the Hybrid IP-PBX when replacing) • Replace the MPR card (be sure to turn off the Hybrid IP-PBX when replacing)
232	MPR-LPR communication error		
233	LPR data check error		
234	DPLL clock failure		
235*	CS clock failure	• Optional service card malfunction: CSIF	• Replace the corresponding optional service card
250*	T1/E1 DSP failure	• Optional service card malfunction: T1, E1	• See if the corresponding optional service card is installed properly • Replace the corresponding optional service card
251	MSG DSP failure	• Optional service card malfunction: MSG	

Error Code	Error Message	PROBABLE CAUSE	SOLUTION
300*	Digital trunk out of synchronization	• Network (digital trunk) malfunction • Optional service card malfunction: PRI, T1, E1 • Wrong A/B switch setting: PRI, T1, E1 • Wrong termination switch setting: PRI30, E1	• Check the signals from the network • Check the cable • See if the A/B switch is set to A on the corresponding optional service card • See if the termination switch is set properly on the corresponding optional service card: 120 Ω when using RJ45 connector; 75 Ω when using BNC connector • See if the corresponding optional service card is installed properly • Replace the corresponding optional service card
301*	Digital trunk RAI reception		
302*	Digital trunk AIS reception		
303*	Multiframe out of synchronization		
304*	Frame error		
305*	Data Link failure	• Data link between the CS and CSIF card or DHLC/ DLC card failed • Data link between the network and PRI/BRI card failed • Data link between the network and IP-GW card failed	• Check the connection between the CS and CSIF card or DHLC/DLC card • Check the connection between the network and PRI/BRI card • Check the connection between the network and IP-GW card
306	E1 Channel Block failure	• Network (digital trunk) malfunction • Optional service card malfunction: E1 • Wrong A/B switch setting: E1 • Wrong termination switch setting: E1	• Check the signals from the network • Check the cable • See if the A/B switch is set to A on the corresponding optional service card • See if the termination switch is set properly on the corresponding optional service card: 120 Ω when using RJ45 connector; 75 Ω when using BNC connector • See if the corresponding optional service card is installed properly • Replace the corresponding optional service card
307	LAN No Carrier	• IP-GW card not connected to the LAN	• Check the connection between the LAN and IP-GW card
308	IP-GW LAN Loop back Error	• Detection of IP-GW LAN Loop back Test error	• Replace the corresponding optional service card • Collect the log data of IP-GW (refer to the documentation for the IP-GW card)
309	IP-GW Core Data Link Error	• Detection of IP-GW Core data Link error	• Press the Reset Button • Collect the log data of IP-GW (refer to the documentation for the IP-GW card)

Error Code	Error Message	PROBABLE CAUSE	SOLUTION
310*	Port Link Failure	• Voice Processing System malfunction • Ports defective on optional service card: DHLC, DLC	• Check the Voice Processing System • See if the corresponding optional service card is installed properly • Replace the corresponding optional service card
320	IP-GW H.323 Dummy Call Test Error	• Detection of IP-GW H.323 Dummy Call Test error	• Replace the corresponding optional service card • Collect the log data of IP-GW (refer to the documentation for the IP-GW card)
321	IP-GW Gatekeeper Error	• Detection of Gatekeeper access error	• Check the IP address setting of Gatekeeper • Check whether the Gatekeeper is connected to the network and work properly • Check the route to the Gatekeeper
322	IP-GW Gatekeeper Registration Error	• Gatekeeper Registration is failed	• Check the Gatekeeper setting
323	IP-GW SDRAM Failure	• Detection of IP-GW SDRAM error	• Replace the corresponding optional service card
324	IP-GW DPRAM Failure	• Detection of IP-GW DPRAM error	• Replace the corresponding optional service card
325	IP-GW LAN Chip Failure	• Detection of IP-GW LAN Chip failure	• Replace the corresponding optional service card • Collect the log data of IP-GW (refer to the documentation for the IP-GW card)
326	IP-GW Stop	• IP-GW is stopped from a remote maintenance PC	• This information is logged when IP-GW is stopped from a remote maintenance PC
330	Loop current detection error	• Detection of LCOT loop current error	• Change the corresponding trunk status back to In Service • Enter the feature number to clear Busy Out status • The trunk status is automatically changed back to In Service by system diagnosis performed at a preprogrammed time every day
350	IP-unit SDRAM bit error	• Optional service card malfunction: IP-EXT	• The IP-EXT card will be rebooted automatically if the error is temporary • Replace the corresponding IP-EXT card if the card is not rebooted
351	IP-unit download data check-sum error		
352	IP-unit DSP failure	• Optional service card malfunction: IP-EXT	• Replace the corresponding optional service card

Error Code	Error Message	PROBABLE CAUSE	SOLUTION
353	IP-PT DSP failure	• IP-PT malfunction	• The IP-PT will be rebooted automatically if the error is temporary • Replace the corresponding IP-PT if the IP-PT is not rebooted
355	IP-unit alive check error	• Optional service card malfunction: IP-EXT	• The IP-EXT card will be rebooted automatically if the error is temporary • Replace the corresponding IP-EXT card if the card is not rebooted
356	IP/TEL-unit communication error		
357	IP-unit FLASH access error	• Optional service card malfunction: IP-EXT	• Replace the corresponding optional service card
358	IP-unit boot error		
359	IP-unit DSP failure (boot diagnosis)		
360	IP-PT SUB-CPU failure	• IP-PT malfunction	• The IP-PT will be rebooted automatically if the error is temporary • Replace the corresponding IP-PT if the IP-PT is not rebooted
361	IP-PT DHCP server no response	• DHCP server is not active • Network malfunction	• Consult your network administrator
362	IP-PT Rebooted (cause DHCP server)	• DHCP server is not active • Network malfunction • Network configuration has been changed	• Consult your network administrator
370	IP-GW Rebooted by Maintenance Console	• IP-GW is rebooted from a remote maintenance PC	• This information is logged when IP-GW is rebooted from a remote maintenance PC
371	IP-GW Rebooted	• Optional service card malfunction: IP-GW	• Check whether the software version of the IP-GW card is correct • Replace the corresponding optional service card
372	NDSS message over IPGW notification - caused by IPGW Tx resource limitation	• Optional service card malfunction: IP-GW	• Ignore if not frequent • Change the IP-GW card status to Out of Service, and then back to In Service
373	NDSS message over IPGW notification - caused by IPGW Rx resource limitation		
374	NDSS message over IPGW notification - caused by shortage of IPGW resource		

Error Code	Error Message	PROBABLE CAUSE	SOLUTION
375	NDSS message over IPGW notification - caused by Network side	• Network malfunction	• Ignore if not frequent • Consult your network administrator
390	Digital signal synchronization established	• Synchronisation of digital line established or restored	• This information is logged when synchronisation of digital line is established, and does not indicate an error condition that needs to be solved
391	Data Link established	• Connection with PC Phone/PC Console or Voice Processing System (DPT Integration) established or restored	• This information is logged when connection with PC Phone/PC Console or Voice Processing System (DPT Integration) is established, and does not indicate an error condition that needs to be solved. However, if this is logged frequently (with "305 Data Link failure"), check the connection as it may not be done properly.
392	Clock master card selected	• Clock master card has been changed to the one indicated by the sub code	• Check if the proper card is selected as the new clock master card
393	LAN Carrier detected	• IP-GW card connected to the LAN	• This information is logged when synchronisation of LAN is established
394	IP-GW Core Data Link established	• IP-GW Core Data Link established	• This information is logged when IP-GW Core Data Link is recovered
395	IP-GW Gatekeeper Error Cleared	• Connection to the Gatekeeper is recovered	• This information is logged when connection to the Gatekeeper is recovered
396	IP-GW Run	• IP-GW is started from a remote maintenance PC	• This information is logged when IP-GW is started from a remote maintenance PC
510*	SMDR disconnect	• RS-232C cable not connected • Breaking of RS-232C cable • Printer (terminal equipment) malfunction	• Check the RS-232C cable • Check the terminal equipment

Section 5
Appendix

5.1 Revision History

5.1.1 Version 1.1

New Options

- System Components Table
  - KX-TDA0105 Memory Expansion Card (MEC)
  - KX-TDA0182 8-Port DID Card (DID8)
  - KX-TDA0183 4-Port Analogue Trunk Card (LCOT4)
  - KX-TDA0484 4-Channel VoIP Gateway Card (IP-GW4E)
  - KX-TDA0143 4 Cell Station Interface Card (CSIF4)
  - KX-TDA0141CE 2-Channel Cell Station Unit Using a DHLC/DLC Card (PT-interface CS) for DECT Portable Station
  - KX-TDA0141 2-Channel Cell Station Unit Using a DHLC/DLC Card (PT-interface CS) for 2.4 GHz Portable Station

New Contents

- 2.7.3 Digital EXtra Device Port (Digital XDP) Connection

Changed Contents

- 1.4.3 System Capacity

5.1.2 Version 2.0

New Options

- System Components Table
  - KX-TDA0490 16-Channel VoIP Gateway Card (IP-GW16)
  - KX-TDA0470 16-Channel VoIP Extension Card (IP-EXT16)
  - KX-TDA0164 4-Port External Input/Output Card (EIO4)
  - KX-TDA0168 Extension Caller ID Card (EXT-CID)
  - KX-TDA0820 SD Memory Card for Software Upgrade
  - KX-TDA0920 SD Memory Card for Software Upgrade to Enhanced Version

Changed Contents

- 1.4.3 System Capacity
- 2.10.1 Connection of Doorphones, Door Openers, External Sensors, and External Relays

5.1 Revision History

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