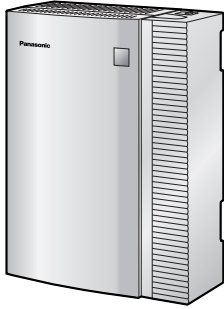


Panasonic



Hybrid IP-PBX Installation Manual

Model No. **KX-TDA30**



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-TDA30: PSMPR Software File Version 4.0000 or later



SD Logo is
a trademark.

System Components

System Components Table

| Category | Model No. | Description |
|---------------------------------|--------------|--|
| Main Unit | KX-TDA30 | Main Unit |
| Trunk Cards | KX-TDA3180 | 4-Port Analogue Trunk Card (LCOT4) |
| | KX-TDA3182 | 3-Port DID Card (DID3) |
| | KX-TDA3183 | 2-Port Analogue Trunk Card (LCOT2) |
| | KX-TDA3188 | E-1 Trunk Card (E1) |
| | KX-TDA3193 | 4-Port Caller ID Card (CID4) |
| | KX-TDA3280 | 2-Port BRI Card (BRI2) |
| | KX-TDA3283 | 1-Port BRI Card (BRI1) |
| | KX-TDA3450 | 4-Channel SIP Trunk Card (SIP-GW4) |
| | KX-TDA3451 | 4-Channel VoIP DSP Card (SIP-DSP4) |
| | KX-TDA3480 | 4-Channel VoIP Gateway Card (IP-GW4) |
| Extension Cards | KX-TDA3171 | 4-Port Digital Extension Card (DLC4) |
| | KX-TDA3172 | 8-Port Digital Extension Card (DLC8) |
| | KX-TDA3173 | 4-Port Single Line Telephone Extension Card (SLC4) |
| | KX-TDA3174 | 8-Port Single Line Telephone Extension Card (SLC8) |
| | KX-TDA3470 | 4-Channel VoIP Extension Card (IP-EXT4) |
| Other Cards | KX-TDA3105 | Memory Expansion Card (MEC) |
| | KX-TDA3161 | 4-Port Doorphone Card (DPH4) |
| | KX-TDA3162 | 2-Port Doorphone Card (German Type) (DPH2) |
| | KX-TDA3166 | 8-Channel Echo Canceller Card (ECHO8) |
| | KX-TDA3168 | Extension Caller ID Card (EXT-CID) |
| | KX-TDA3191 | 2-Channel Message Card (MSG2) |
| | KX-TDA3192 | 2-Channel Simplified Voice Message Card (SVM2) |
| | KX-TDA3196 | Remote Card (RMT) |
| Optional SD Memory Cards | KX-TDA3820 | SD Memory Card for Software Upgrade |
| | KX-TDA3920 | SD Memory Card for Software Upgrade to Enhanced Version |
| Cell Stations (CSs) | KX-TDA0141CE | 2-Channel Cell Station Unit Using a Super Hybrid Port or a DLC Card for DECT Portable Station |
| | KX-TDA0141 | 2-Channel Cell Station Unit Using a Super Hybrid Port or a DLC Card for 2.4 GHz Portable Station |

System Components Table

| Category | Model No. | Description |
|-----------------------|-----------|--------------------------------|
| Proprietary Equipment | KX-A236 | Additional AC Adaptor |
| | KX-A228 | S/M-type Back-up Battery Cable |
| | KX-T30865 | Doorphone |

Compatible Panasonic Proprietary Telephones

The Hybrid IP-PBX supports the following telephones:

- Digital proprietary telephones (e.g., KX-T7600 series)
- Analogue proprietary telephones (e.g., KX-T7700 series)
- IP proprietary telephones (e.g., KX-NT136)
- Portable stations (e.g., KX-TCA155, KX-TCA255, KX-TD7690)
- DSS consoles (e.g., KX-T7640)
- Single line telephones (e.g., KX-T7710)

Incompatible Panasonic Proprietary Telephones

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

Notes

- 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".

List of Abbreviations

- APT → Analogue proprietary telephone
- DPT → Digital proprietary telephone
- IP-PT → IP proprietary telephone
- PS → Portable station
- PT → Proprietary telephone
- SLT → Single line telephone

Notice

- Some optional service cards and features are not available for certain countries/areas. Consult your certified Panasonic dealer for detailed instructions.
- In this manual, the suffix of each model number (e.g., KX-TDA30**NE**) is omitted unless necessary.

^{*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 Notice

Prior to connection of this product, please verify that the intended operating environment is supported. Satisfactory performance cannot be guaranteed for the following:

- interoperability and compatibility with all devices and systems connected to this product
- proper operation and compatibility with services provided by telecommunications companies over connected networks

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 the product from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Clean with a damp cloth.
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 the product on an unstable surface, as a fall may cause serious internal damage.
6. Slots and openings in the front, back and bottom of the cabinet are provided for ventilation; to protect it from overheating, these openings must not be blocked or covered. The openings should never be blocked by placing the product on a bed, sofa, rug, or other similar surface while in use. The product should never be placed near or over a radiator or other heat source. This product should not be placed in a sealed environment unless proper ventilation is provided.
7. The product should only be connected to the type of electrical power supply specified on the product label. If you are not sure of the type of power supply to your home, consult your dealer or local power company.
8. For safety purposes this unit is equipped with an earthed plug. If you do not have an earthed outlet, please have one installed. Do not bypass this safety feature by tampering with the plug.
9. Do not allow anything to rest on the power cord. Do not locate this product where the power cord may be stepped on or tripped on.
10. To reduce the risk of fire or electric shock, do not overload wall outlets and extension cords.
11. Do not insert objects of any kind into this product through its slots and openings, as they may touch dangerous voltage points or short out parts that could result in a risk of fire or electric shock. Never spill liquid of any kind on or in the product.
12. To reduce the risk of electric shock, do not disassemble this product. Only qualified personnel should service this product. Opening or removing covers may expose you to dangerous voltages or other risks. Incorrect reassembly can cause electric shock.
13. Unplug this product from the wall outlet and have it serviced by qualified service personnel in the following cases:
 - a) When the power supply cord or plug is damaged or frayed.
 - b) If liquid has been spilled into the product.
 - c) If the product has been exposed to rain or water.
 - d) If the product does not operate according to the operating instructions. Adjust only the controls that are explained in the operating instructions. Improper adjustment of other controls may result in damage and may require service by a qualified technician to restore the product to normal operation.
 - e) If the product has been dropped or the cabinet has been damaged.
 - f) If product performance deteriorates.
14. Avoid using wired telephones during an electrical storm. There is a remote risk of electric shock from lightning.
15. Do not use a telephone in the vicinity of a gas leak to report the leak.

SAVE THESE INSTRUCTIONS

Precaution

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

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

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

- Wipe the unit with a soft cloth. Do not clean with abrasive powders or with chemical agents such as benzene or thinner.

For users in the European Union only

- **Information on Disposal for Users of Waste Electrical & Electronic Equipment (private households)**

This symbol on the products and/or accompanying documents means that used electrical and electronic products should not be mixed with general household waste. For proper treatment, recovery and recycling, please take these products to designated collection points, where they will be accepted on a free of charge basis. Alternatively, in some countries you may be able to return your products to your local retailer upon the purchase of an equivalent new product. Disposing of this product correctly will help to save valuable resources and prevent any potential negative effects on human health and the environment which could otherwise arise from inappropriate waste handling. Please contact your local authority for further details of your nearest designated collection point. Penalties may be applicable for incorrect disposal of this waste, in accordance with national legislation.

- **For business users in the European Union**

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

- **Information on Disposal in other Countries outside the European Union**

This symbol is only valid in the European Union. If you wish to discard this product, please contact your local authorities or dealer and ask for the correct method of disposal.



For users in Germany only

- Machine Noise Information Ordinance, 3rd GPSGV:
The highest sound pressure level is 70 dB (A) or less according to EN ISO 7779.

For users in New Zealand only

- This equipment shall not be set to make automatic calls to the Telecom '111' Emergency Service.
- The grant of a Telepermit for any item of terminal equipment indicates only that Telecom has accepted that the item complies with minimum conditions for connection to its network. It indicates no endorsement of the product by Telecom, nor does it provide any sort of warranty. Above all, it provides no assurance that any item will work correctly in all respects with another item of Telepermitted equipment of a different make or model, nor does it imply that any product is compatible with all of Telecom's network services.
- This equipment is not capable, under all operating conditions, of correct operation at the higher speeds for which it is designed. Telecom will accept no responsibility should difficulties arise in such circumstances.
- Some parameters required for compliance with Telecom's Telepermit requirements are dependent on the equipment (PBX) associated with this modem. In order to operate within the limits for compliance with Telecom's Specifications, the associated PBX equipment shall be set to ensure that modem calls are answered between 3 and 30 seconds of receipt of ringing.
- Using the toll services of a company other than Telecom:
If the PBX is set up to use the toll services of a company other than Telecom, the telephone numbers dialled from the Caller Display listings within the PBX will be directed through the toll services of the other company because the telephone numbers include the toll access digit and area code digit. A toll charge may be incurred. Please check with the toll carrier concerned.
- **IMPORTANT NOTICE**
Under power failure conditions, the connected telephones may not operate. Please ensure that a separate telephone, not dependent on local power, is available for emergency use.
- **APPLICABLE ONLY TO TELECOM CUSTOMERS WHO HAVE AUTOMATIC ACCESS TO OTHER CARRIERS FOR TOLL CALLS**
When calling back a number from the Caller ID list, all numbers prefixed with "0 + AREA CODE" will be automatically forwarded to your toll carrier. This includes numbers in your local calling area. The zero + area code should either be removed when calling back local numbers, or check with your toll carrier that a charge will not be levied.
- All persons using this device for recording telephone conversations shall comply with New Zealand law. This requires that at least one party to the conversation is to be aware that it is being recorded. In addition, the principles enumerated in the Privacy Act 1993 shall be complied with in respect to the nature of the personal information collected, the purpose for its collection, how it is used, and what is disclosed to any other party.

For users in Australia only

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

For users in Taiwan only

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

Notes

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

Notice

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



廢電池請回收

WARNING

- **THIS UNIT MAY ONLY BE INSTALLED AND SERVICED BY QUALIFIED SERVICE PERSONNEL.**
- **IF DAMAGE TO THE UNIT EXPOSES ANY INTERNAL PARTS, DISCONNECT THE POWER SUPPLY CORD IMMEDIATELY AND RETURN THE UNIT TO YOUR DEALER.**
- **UNPLUG THIS UNIT FROM THE AC OUTLET IF IT EMITS SMOKE, AN ABNORMAL SMELL OR MAKES UNUSUAL NOISE. THESE CONDITIONS CAN CAUSE FIRE OR ELECTRIC SHOCK. CONFIRM THAT SMOKE HAS STOPPED AND CONTACT AN AUTHORISED PANASONIC FACTORY SERVICE CENTRE.**
- **WHEN RELOCATING THE EQUIPMENT, FIRST DISCONNECT THE TELECOM CONNECTION BEFORE DISCONNECTING THE POWER CONNECTION. WHEN THE UNIT IS INSTALLED IN THE NEW LOCATION, RECONNECT THE POWER FIRST, AND THEN RECONNECT THE TELECOM CONNECTION.**
- **TO PREVENT POSSIBLE 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 AC OUTLET IS LOCATED NEAR THE EQUIPMENT AND IS EASILY ACCESSIBLE.**
- **DANGER OF EXPLOSION EXISTS IF A BATTERY IS INCORRECTLY REPLACED. REPLACE ONLY WITH THE SAME OR EQUIVALENT TYPE RECOMMENDED BY THE BATTERY MANUFACTURER. DISPOSE OF USED BATTERIES ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.**
- **THE SD MEMORY CARD POSES A CHOKING HAZARD. KEEP THE SD MEMORY CARD OUT OF REACH OF CHILDREN.**

For Future Reference

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

Note

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

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



The KX-TDA30E, KX-TDA30NE, KX-TDA30GR, and KX-TDA30CE 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

Panasonic Communications Co., Ltd./Panasonic Communications Company (U.K.) Ltd. declares that this equipment is in compliance with the essential requirements and other relevant provisions of Radio & Telecommunications Terminal Equipment (R&TTE) Directive 1999/5/EC.

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

<http://www.doc.panasonic.de>

Contact:
Panasonic Services Europe
a Division of Panasonic Marketing Europe GmbH
Panasonic Testing Centre
Winsbergring 15, 22525 Hamburg, Germany

Introduction

This Installation Manual is designed to serve as an overall technical reference for the Panasonic Hybrid IP-PBX, KX-TDA30. It provides instructions for installing the hardware, and programming the Hybrid IP-PBX using the KX-TDA30 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 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-TDA30 Maintenance Console

Explains the installation procedure, structure, and basic information of the KX-TDA30 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.

PC Programming Manual

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

PT Programming Manual

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

User Manual

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

About the software version of your Hybrid IP-PBX

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



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

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

WARNING

THIS APPLIANCE MUST BE EARTHED.


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

Green-and-yellow: Earth

Blue: Neutral

Brown: Live

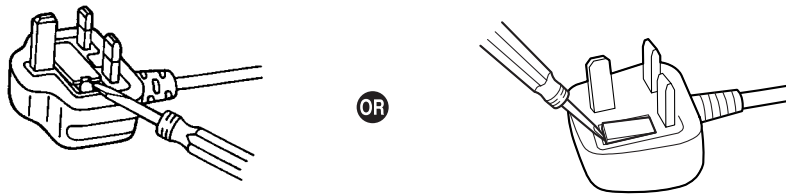
As the colours of the wires in the mains lead of this apparatus may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows.

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

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

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

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



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

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

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

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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 two or more PBXs, which provides cost effective communications between company members at different locations.

Virtual Private Network (VPN)

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

QSIG Network

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

Voice over Internet Protocol (VoIP) Network

The PBX can connect to another PBX via a private IP network. In this case, voice signals are converted into IP packets and sent through this network. Automatic Rerouting of Calls via a Private IP Network to Public Trunks is also available, in case of network difficulties.

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 PC to a DPT, or connecting a CTI server 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.

Paralleled 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 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.

Built-in Simplified Voice Message (SVM) Features

By just installing an optional voice message card in the Hybrid IP-PBX, simple answering machine services can be provided.

Cellular Phone Features (KX-TDA3920 required)

This Hybrid IP-PBX supports the use of cellular phones and other outside destinations with the Hybrid IP-PBX. Cellular phones can be treated as extensions within the Hybrid IP-PBX, and paired with wired telephones in Cellular Phone XDP Parallel Mode.

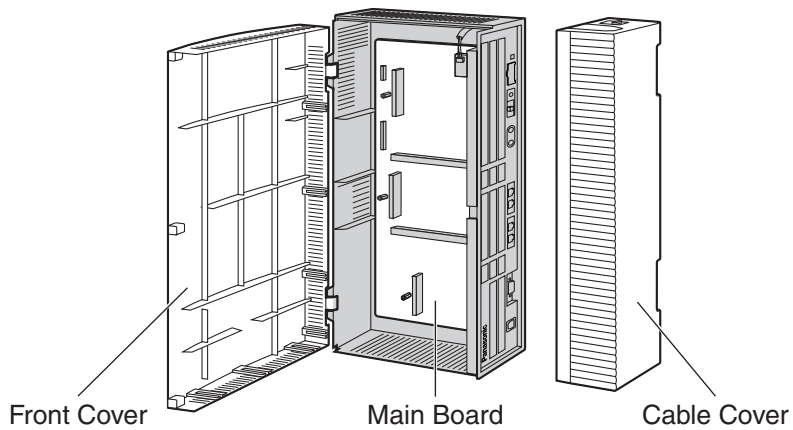
1.2 Basic System Construction

1.2.1 Main Unit

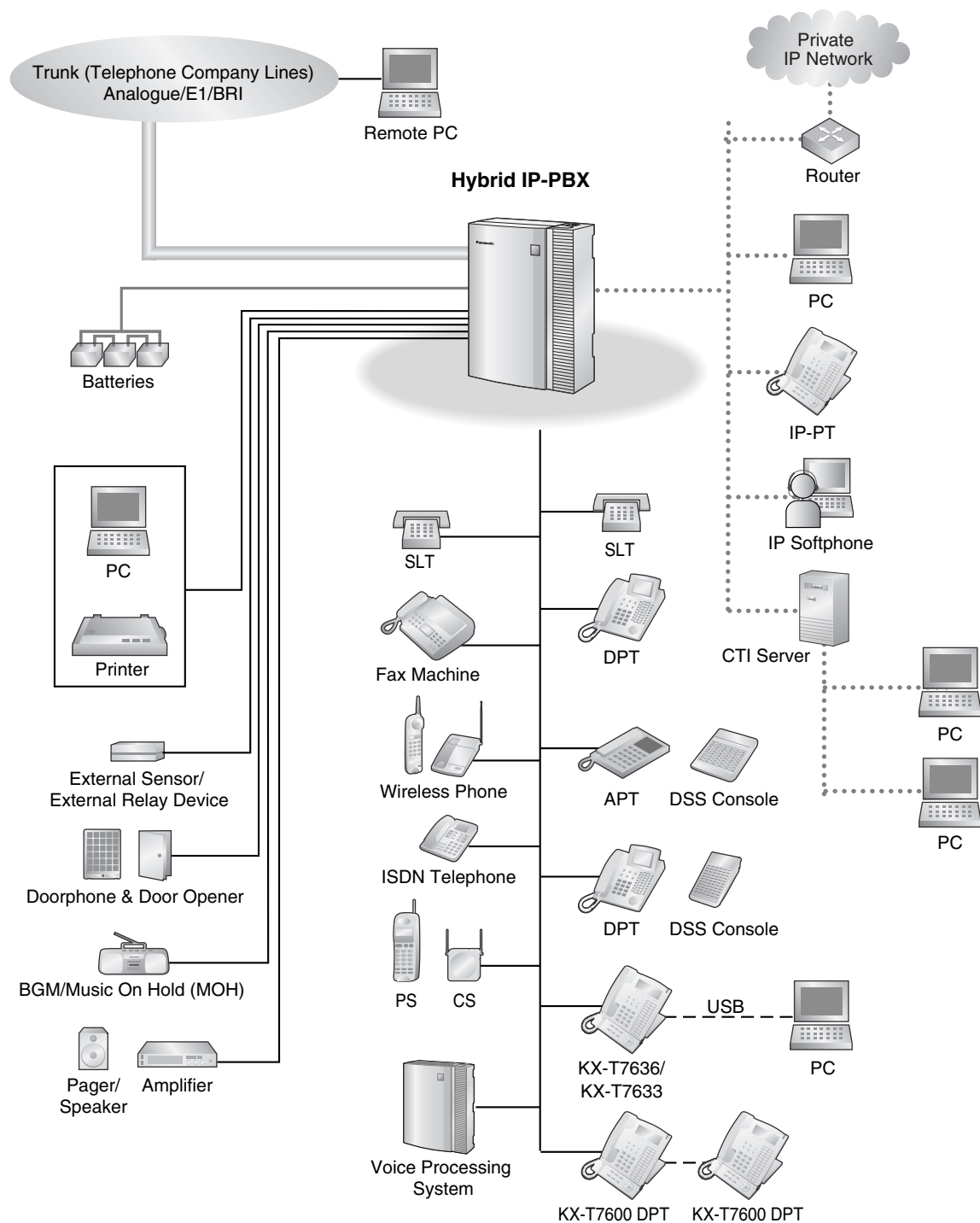
The main unit is equipped with 4 Super Hybrid Ports. For system expansion, optional service cards can be installed, and an additional AC adaptor can also be connected.



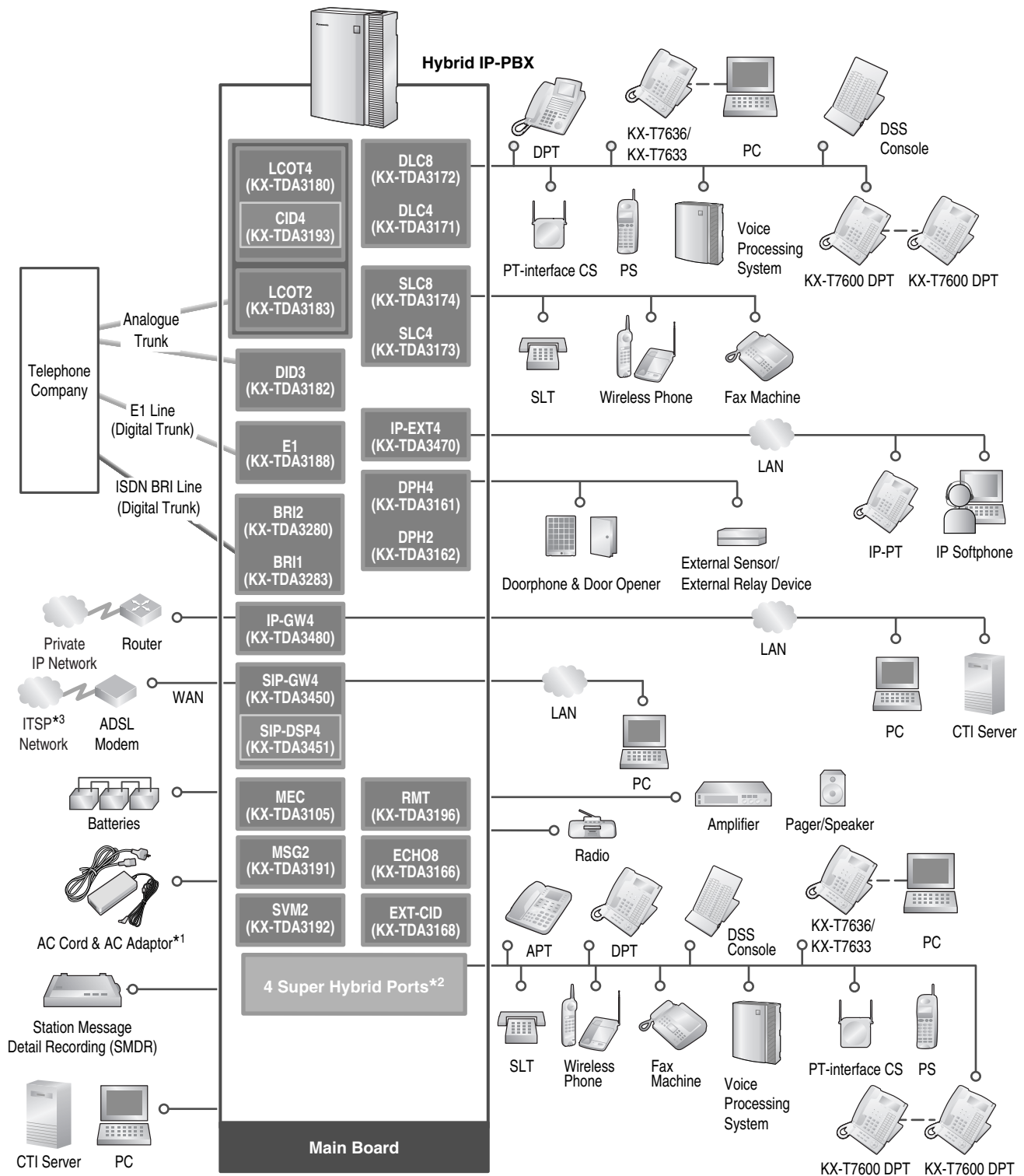
Construction of Main Unit



1.2.2 System Connection Diagram



1.2 Basic System Construction



*1 In addition to the supplied AC adaptor, an additional AC adaptor can be connected to the Hybrid IP-PBX.

*2 The Hybrid IP-PBX has 4 Super Hybrid Ports pre-installed.

*3 ITSP: Internet Telephony Service Provider

1.3 Optional Equipment

1.3.1 Optional Equipment

| Model No. | Model Name | Description | Maximum Quantity |
|------------|--|--|------------------|
| KX-TDA3105 | Memory Expansion Card (MEC) | Memory expansion card to increase system data storage space, double the number of DPTs (using Digital XDP connection), and enable Broadcasting, display language selection for VM Menu, and Call Billing for Guest Room features. To be installed in the MEC slot. | 1 |
| KX-TDA3161 | 4-Port Doorphone Card (DPH4) | 4-port doorphone card for 4 doorphones, 4 door openers or external relays, and 4 external sensors. | 1 |
| KX-TDA3162 | 2-Port Doorphone Card (German Type) (DPH2) | 2-port doorphone card for 2 German-type doorphones, 2 door openers, 4 external sensors, and 4 external relays. | 1 |
| KX-TDA3166 | 8-Channel Echo Canceller Card (ECHO8) | 8-channel card for echo cancellation during conferences. | 1 |
| KX-TDA3168 | Extension Caller ID Card (EXT-CID) | Sends Caller ID signals to extension ports. | 1 |
| KX-TDA3171 | 4-Port Digital Extension Card (DLC4) | 4-port digital extension card for DPTs, DSS consoles, a Voice Processing System (VPS), and PT-interface CSs. | 1 |
| KX-TDA3172 | 8-Port Digital Extension Card (DLC8) | 8-port digital extension card for DPTs, DSS consoles, a VPS, and PT-interface CSs. | 2 |
| KX-TDA3173 | 4-Port Single Line Telephone Extension Card (SLC4) | 4-port extension card for SLTs. | 1 |
| KX-TDA3174 | 8-Port Single Line Telephone Extension Card (SLC8) | 8-port extension card for SLTs. | 2 |
| KX-TDA3180 | 4-Port Analogue Trunk Card (LCOT4) | 4-port analogue trunk card with 2 power failure transfer (PFT) ports. | 3 |
| KX-TDA3182 | 3-Port DID Card (DID3) | 3-port DID analogue trunk card. | 2 |
| KX-TDA3183 | 2-Port Analogue Trunk Card (LCOT2) | 2-port analogue trunk card with 2 power failure transfer (PFT) ports. | 3 |
| KX-TDA3188 | E-1 Trunk Card (E1) | 30-channel E1 trunk card. ITU-T standard compliant. | 1 |
| KX-TDA3191 | 2-Channel Message Card (MSG2) | 2-channel message card. | 2 |

1.3 Optional Equipment

| Model No. | Model Name | Description | Maximum Quantity |
|------------|---|---|------------------|
| KX-TDA3192 | 2-Channel Simplified Voice Message Card (SVM2) | 2-channel simplified voice message card for Built-in Simplified Voice Message feature. | 2 |
| KX-TDA3193 | 4-Port Caller ID Card (CID4) | 4-port Caller ID signal type FSK/FSK (with Call Waiting Caller ID [Visual Caller ID])/DTMF. To be mounted on the LCOT4 card. | 3 |
| KX-TDA3196 | Remote Card (RMT) | Analogue modem card for remote communication with the Hybrid IP-PBX. ITU-T V.90 support. To be installed in the RMT slot. | 1 |
| KX-TDA3280 | 2-Port BRI Card (BRI2) | 2-port ISDN Basic Rate Interface card with 1 power failure transfer (PFT) port. EURO-ISDN/ETSI compliant. | 3 |
| KX-TDA3283 | 1-Port BRI Card (BRI1) | 1-port ISDN Basic Rate Interface card. EURO-ISDN/ETSI compliant. | 3 |
| KX-TDA3450 | 4-Channel SIP Trunk Card (SIP-GW4) | 4-channel SIP gateway card. Compliant with RFC 3261, 3262, 3264, 3311, and 4028 protocols, and ITU-T G.729a/b and G.711 CODEC methods. | 1 |
| KX-TDA3451 | 4-Channel VoIP DSP Card (SIP-DSP4) | 4-channel VoIP DSP card. To be mounted on the SIP-GW4 card. | 1 |
| KX-TDA3470 | 4-Channel VoIP Extension Card (IP-EXT4) | 4-channel VoIP extension card. Compliant with Panasonic proprietary protocol, and ITU-T G.729a and G.711 CODEC methods. | 1 |
| KX-TDA3480 | 4-Channel VoIP Gateway Card (IP-GW4) | 4-channel VoIP gateway card. This card also enables CTI communication and system programming via a LAN. Compliant with VoIP H.323 V.2 protocol, and ITU-T G.729a, G.723.1, and G.711 CODEC methods. CSTA Phase 3 protocol compatible. | 1 |
| KX-TDA3820 | SD Memory Card for Software Upgrade | Optional SD Memory Card to upgrade PSMPP file version 1.xxxx Hybrid IP-PBX. For more details, refer to the SD Memory Card Installation/Upgrade Guide. | 1 |
| KX-TDA3920 | SD Memory Card for Software Upgrade to Enhanced Version | Optional SD Memory Card to use enhanced features. For more details, refer to the SD Memory Card Installation/Upgrade Guide. | 1 |
| KX-A236 | Additional AC Adaptor | AC adaptor and AC cord for system expansion. | 1 |

1.4 Specifications

1.4.1 General Description

| | | |
|--|--|---|
| Switching | | Non-blocking |
| AC Adaptor | AC Input | <ul style="list-style-type: none"> Panasonic PSLP1244: 100 V AC to 240 V AC; 1.5 A; 50 Hz/60 Hz Panasonic PSLP1434: 110 V AC to 240 V AC; 1.35 A; 50 Hz/60 Hz |
| | DC Output | 40 V; 1.38 A (55.2 W) |
| DC Input | | <ul style="list-style-type: none"> DC IN 1: 40 V; 1.38 A (55.2 W) DC IN 2: 40 V; 1.38 A (55.2 W) |
| External Battery | | +36 V DC (+12 V DC × 3, recommended maximum capacity is 14 Ah) |
| 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 |
| Connectors | Trunk | RJ45/RJ11 (2 wire) × each trunk port |
| | Extension | RJ45/RJ11 (4 wire) × each extension port |
| | Paging Output | 1 conductor jack |
| | External MOH (Music on Hold) Output | 1 conductor jack |
| 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 | | 1 port (Level Control: -11 dB to +11 dB in 1 dB steps) Selectable Tone/External Music Source port |
| Paging | Internal | Level Control: -15 dB to +6 dB in 3 dB steps |
| | External | 1 port (Volume Control: -15 dB to +15 dB in 1 dB steps) |
| Serial Interface Port | RS-232C | 1 (maximum 115.2 kbps) |
| | USB | 1 |

1.4 Specifications

| | | |
|------------------------------------|--------------------------------------|---|
| 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 | 275 mm (W) × 376 mm (H) × 117 mm (D) | |
| Weight (when fully mounted) | Under 3.5 kg | |

1.4.2 Characteristics

| | |
|---|--|
| Terminal Equipment Loop Limit | <ul style="list-style-type: none"> PT: KX-T7600 series DPT: 90 Ω; all other DPTs/APTs: 40 Ω SLT: 600 Ω including set Doorphone: 20 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 a PT and an SLT 3 by Digital eXtra Device Port connection of 2 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, 5 W per 2 lines 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 DPH4 or DPH2 card and must be grounded through the DPH4 or DPH2 card. For the connection diagram, refer to "2.5.1 DPH4 Card (KX-TDA3161)" or "2.5.2 DPH2 Card (KX-TDA3162)". The Hybrid IP-PBX detects input from the sensor when the signal is under 100 Ω . |
| Paging Terminal Impedance | 600 Ω |
| MOH Terminal Impedance | 10 000 Ω |

1.4.3 System Capacity

Maximum Number of Trunks

The Hybrid IP-PBX supports the following number of trunks.

| Line Type | Maximum Number (channels) |
|------------------|---------------------------|
| LCOT + BRI + DID | 12 |
| VoIP (H.323) | 4 |
| VoIP (SIP) | 8 |
| E1 | 30 |

Maximum Terminal Equipment

The following number of items of terminal equipment can be supported by the Hybrid IP-PBX. Depending on the type and total number of items of equipment to be connected, the MEC card may be required. To determine whether or not the MEC card is necessary, refer to "MEC Card Calculation".

| Terminal Equipment Type | Without Additional AC Adaptor | With Additional AC Adaptor |
|--|-------------------------------|----------------------------|
| SLT | 24*1 | 24*1 |
| KX-T7600 series DPT/KX-T7600 series DSS console, and KX-T7560/KX-T7565 DPT | Total 24 | Total 48 |
| KX-T7600 series DPT | 24 | 48 |
| KX-T7600 series DSS console | 4 | 4 |
| KX-T7560/KX-T7565 DPT | 24 | 24 |
| Other DPT/Other DSS console and APT | Total 4 | Total 24 |
| Other DPT | 4 | 24 |
| Other DSS console | 4 | 4 |
| APT | 4 | 4 |
| IP-PT | 4 | 4 |
| DSS console | 4 | 4 |
| VPS | 4 ports (1 VPS)*2 | 4 ports (1 VPS)*2 |
| SLT, PT, DSS console, and VPS | 28 | 56 |
| CS | 4 | 8 |
| PS | 28 | 28 |
| Doorphone | 4 | 4 |
| Door Opener/External Relay | 4 | 4 |

| Terminal Equipment Type | Without Additional AC Adaptor | With Additional AC Adaptor |
|-------------------------|-------------------------------|----------------------------|
| External Sensor | 4 | 4 |

^{*1} This number includes all ports of SLC cards, regardless of whether an SLT is connected or not.

^{*2} A maximum of 4 ports (8 channels) of a single VPS can be connected to the Hybrid IP-PBX.

Note

Devices connected to the Hybrid IP-PBX that exceed the system capacity will not function.

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 28, you need to install an MEC card. Note that you also need to connect an additional AC adaptor in this case.

MEC Card Calculation

| Equipment Type | | MEC Figure |
|------------------------------------|---|------------|
| PT | KX-T7600 series DPT/KX-T7600 series DSS console | 1 |
| | KX-T7560/KX-T7565 DPT | 1 |
| | Other DPT/Other DSS console | 1 |
| | APT | 1 |
| | IP-PT | 1 |
| Pre-installed 4 Super Hybrid Ports | | 4 |
| Extension Card ^{*1} | SLC4 | 4 |
| | SLC8 | 8 |
| CS (1 unit) | | 0 |
| VPS (1 port) | | 1 |
| ISDN Telephone | | 0 |

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

Calculation Example

| Equipment Type | | MEC Figure |
|---------------------|----------|------------|
| KX-T7600 series DPT | 16 units | 16 |
| SLC4 | 1 card | 4 |
| SLC8 | 1 card | 8 |
| VPS | 4 ports | 4 |
| Total | | 32 |

The total MEC figure is 32. As this exceeds 28, you need to install an MEC card and connect an additional AC adaptor for this configuration.

AC Adaptor Selection (Without BRI Extension Port)

You must connect an additional AC adaptor in any of the following conditions:

- A total of more than 4 APTs, DPTs (except KX-T7600 series, KX-T7560, or KX-T7565), and DSS console (except KX-T7600 series) are connected.
- More than 4 CSs are connected.
- An MEC card is required to support a configuration with a total MEC figure exceeding 28.
- Both the DID3 card and the SLC4 or DLC4 card are installed in any of Slots 2 to 4.

Note

For how to connect an AC adaptor or additional AC adaptor, refer to "2.12.1 Starting the Hybrid IP-PBX".

AC Adaptor Selection (With BRI Extension Port)

If the Hybrid IP-PBX has a BRI extension port, you must connect an additional AC adaptor in any of the following conditions:

- A total of more than 4 APTs, DPTs (except KX-T7600 series, KX-T7560/KX-T7565), and DSS consoles (except KX-T7600 series) are connected.
- More than 4 CSs are connected.
- An MEC card is required to support a configuration with a total MEC figure exceeding 28.
- Both the DID3 card and the SLC4 or DLC4 card are installed in any of Slots 2 to 4.
- The total load figure exceeds 32.

Note

For how to connect an AC adaptor or additional AC adaptor, refer to "2.12.1 Starting the Hybrid IP-PBX".

Load Figure Calculation

| Equipment Type | | Load Figure |
|------------------------------------|---|-----------------|
| PT | KX-T7600 series DPT/KX-T7600 series DSS console | 0 |
| | KX-T7560/KX-T7565 DPT | 0 |
| | Other DPT/Other DSS console | 4 |
| | APT | 4 |
| | IP-PT | 0 |
| Pre-installed 4 Super Hybrid Ports | | 0 |
| Extension Card | SLC4 | 0 |
| | SLC8 | 0 |
| CS (1 unit) | | 4 |
| VPS (1 port) | | 0 |
| ISDN Telephone | | 1 ^{*1} |

^{*1} If the connected ISDN telephone has an external power source, its load figure is 0.

AC Adaptor Capacity

The following load figures can be supported.

| Connected AC Adaptor | Maximum Load Figure |
|---|---------------------|
| Supplied AC Adaptor only | 32 |
| Supplied AC Adaptor and Additional AC Adaptor | 96 ^{*1} |

^{*1} If the load figure exceeds 96, it cannot be supported by the KX-TDA30. In this case, use the KX-TDA100 with M-Type Power Supply Unit (PSU-M), or the KX-TDA200 with either PSU-M or L-Type Power Supply Unit (PSU-L).

Calculation Example

| Equipment Type | | Load Figure |
|---|---------|-------------|
| Other DPT/Other DSS console (except KX-T7600 series, KX-T7560/KX-T7565) | 4 units | 16 |
| CS | 3 units | 12 |
| ISDN Telephone | 5 units | 5 |
| Total | | 33 |

The total load figure is 33. As this exceeds 32, you need to connect an additional AC adaptor.

1.4 Specifications

Section 2

Installation

This section describes the procedures to install the Hybrid IP-PBX. Detailed instructions for planning the installation site, installing the 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 and terminal equipment.

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

Installation Precautions

This Hybrid IP-PBX is designed for wall mounting only, and should be installed in a location where it is accessible for inspections and maintenance.

To prevent malfunction, noise, or discolouration, avoid installing the system in the following locations:

1. In direct sunlight and hot, cold, or humid places. (Temperature range: 0 °C to 40 °C)
2. Areas where sulfuric gases may be present, such as near thermal springs.
3. Areas where shocks or vibrations are frequent or strong.
4. High-dust areas, or places the system may come into contact with water or oil.
5. Near devices that generate high frequencies, 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 the system in the same room as the above equipment.)
7. Within 1.8 m of radios and televisions. (Both the Hybrid IP-PBX and PTs should be at least 1.8 m away from such devices).
8. Locations where other objects will obstruct the area around the Hybrid IP-PBX. Be especially careful to leave at least 20 cm of space above and 10 cm to the sides of the Hybrid IP-PBX for ventilation.
9. Do not stack up the optional service cards. To avoid damage to the optional service cards, always use the extension bolts.

Wiring Precautions

Be sure to follow these instructions when wiring the unit:

1. Do not run unshielded telephone cables near AC power cables, computer cables, AC power sources, etc. When running cables near other noise-generating devices or cables, use shielded telephone cables or shield the telephone cables with metal tubing.
2. If cables are run on the floor, use protectors to prevent the cables from being stepped on. Avoid running cables under carpets.
3. Avoid using the same AC outlet for computers, telexes, and other office equipment, as noise generated by such equipment may hamper system performance or interrupt the system.

4. Use 2-pair telephone cables when connecting PTs.
Use 1-pair telephone cables when connecting SLTs, data terminals, answering machines, computers, Voice Processing Systems, etc.
5. Unplug the system from its power source when wiring, and plug the system back in only after all wiring is completed.
6. Mis-wiring may cause the Hybrid IP-PBX to operate improperly. Refer to Section 2 "Installation" when wiring the system.
7. If an extension does not operate properly, disconnect the telephone from the extension line and connect it again, or turn off the Hybrid IP-PBX using the power switch, then turn it on again.
8. For safety purposes this unit is equipped with an earthed plug. If you do not have an earthed outlet, please have one installed. Do not bypass this safety feature by tampering with the plug.
9. Use twisted pair cable for trunk connection.
10. Trunks should be installed with surge protectors. For details, refer to "2.2.12 Surge Protector Installation".

2.2 Installation of the Hybrid IP-PBX

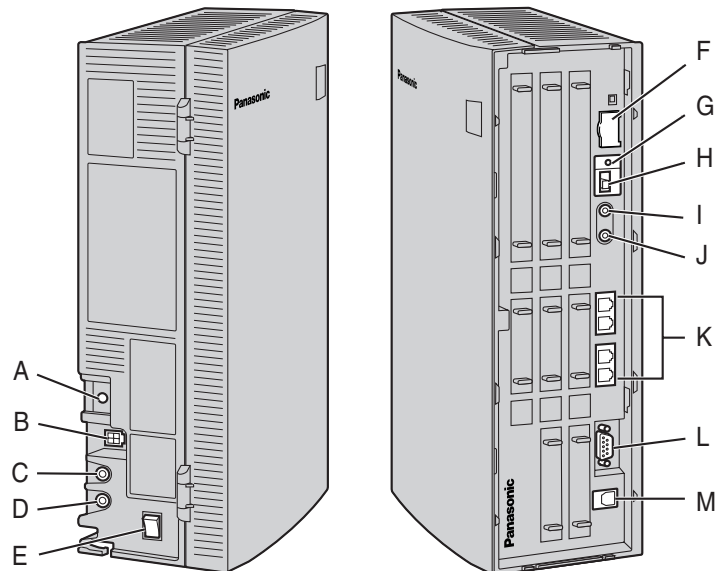
2.2.1 Unpacking

Unpack the box and check the items below:

| | |
|--|-----------------|
| Main Unit | 1 |
| AC Cord | 1* ¹ |
| AC Adaptor | 1 |
| Screws for Wall Mounting | 5 |
| Washers for Wall Mounting | 5 |
| Mini Plug (for pager and music source) | 2 |
| SD Memory Card | 1 |
| Main Strap | 1 |
| Optional Card Label Sheet | 1 |

*¹ KX-TDA30BX is supplied with 2 types of AC cord. Please use whichever is appropriate for the country/area.

2.2.2 Names and Locations

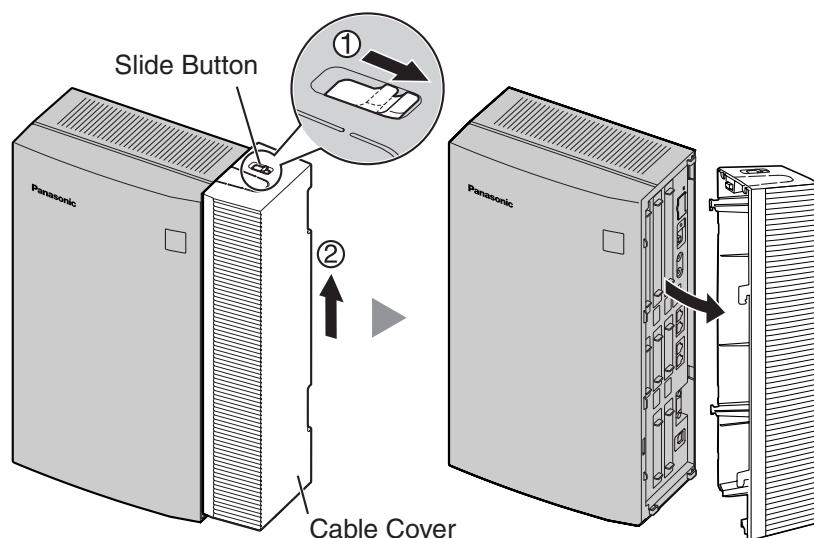


- A.** Earth Terminal
- B.** Battery Connector
- C.** DC IN 2
- D.** DC IN 1
- E.** Power Switch
- F.** SD Memory Card Slot Cover
- G.** Reset Button
- H.** System Initialise Switch
- I.** MOH port
- J.** Pager port
- K.** Super Hybrid Ports
- L.** RS-232C port
- M.** USB port

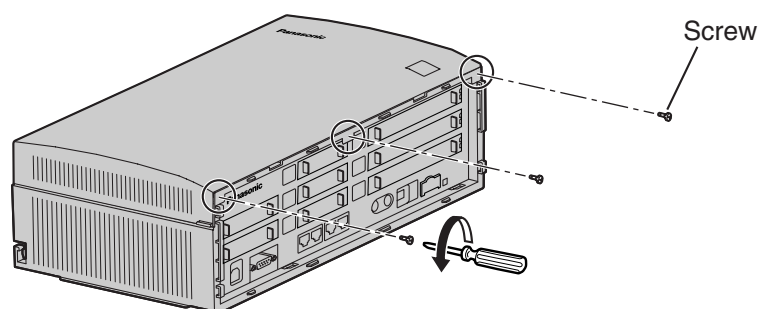
2.2.3 Opening/Closing the Covers

Opening the Covers

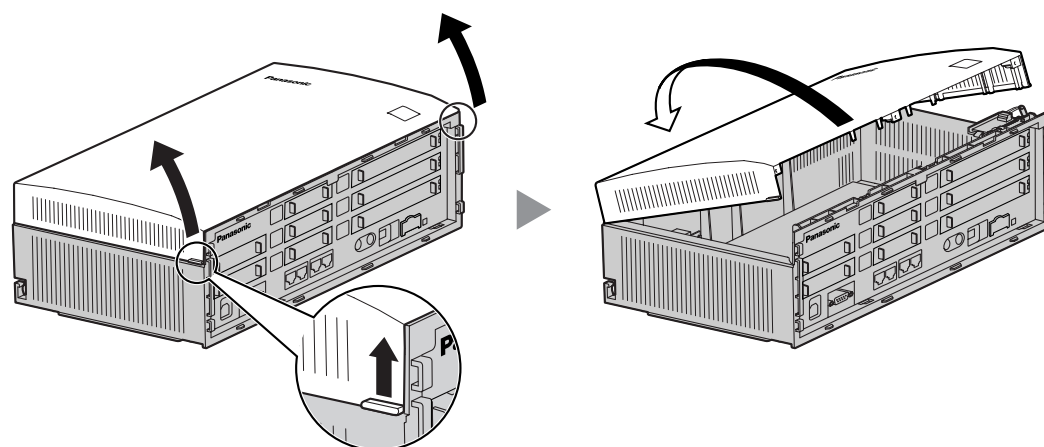
1. Pull the slide button to the right and, holding it, slide the cable cover upwards. Then turn the cable cover slightly to remove it.



2. Remove the three screws.



3. Holding the protrusions on both sides of the front cover, swing the cover open.

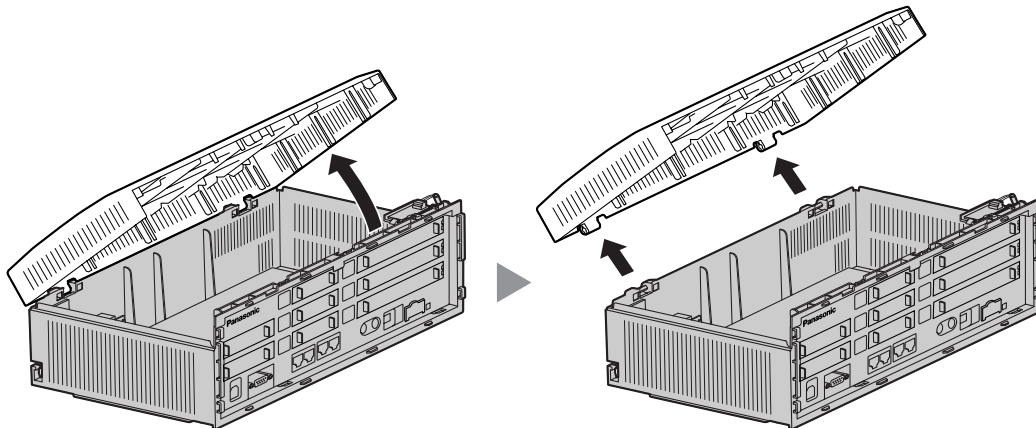


Removing/Attaching the Front Cover

If you prefer, you can remove the front cover.

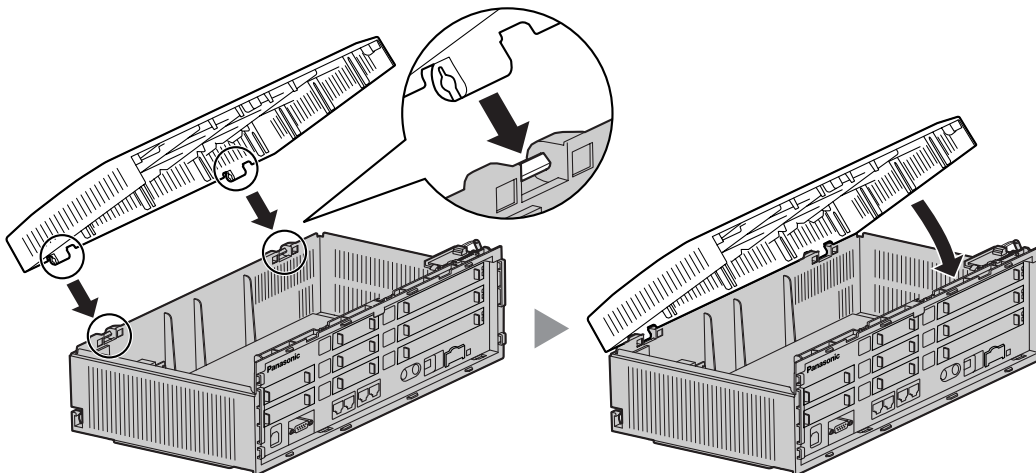
Removing the Front Cover

Holding the front cover open at about a 45° angle, remove the front cover by pushing it in the direction of the arrow as shown below.



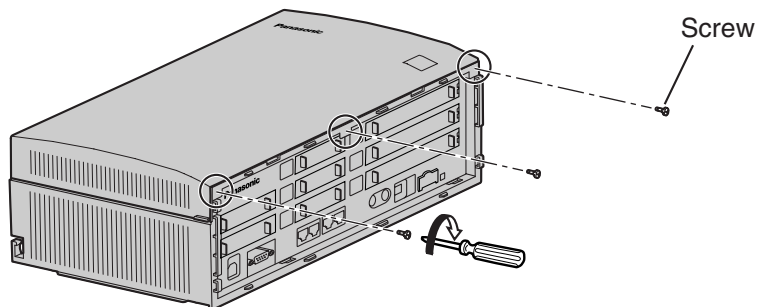
Attaching the Front Cover

Fit the front cover to the main unit as shown below, and then close the front cover.

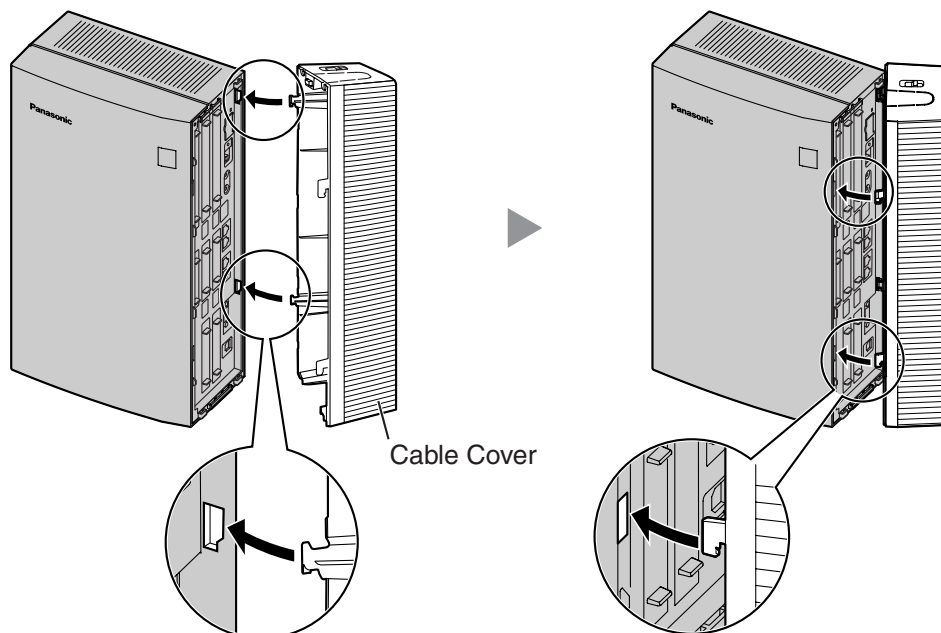


Closing the Covers

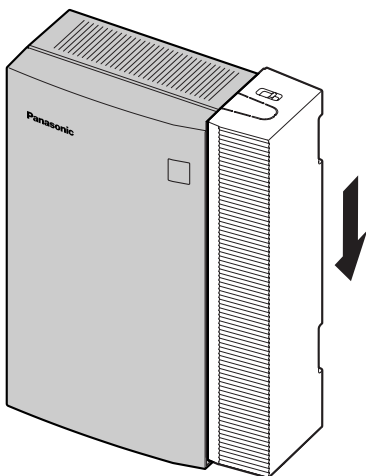
1. Close the front cover, then tighten the three screws.



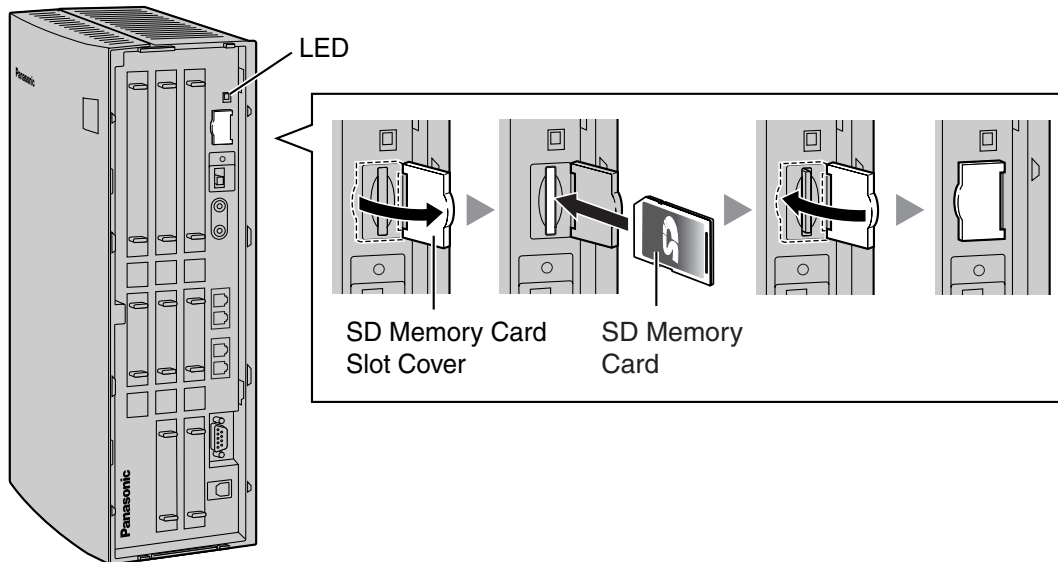
2. Attach the rear hooks on the cable cover to the main unit, then swing the cable cover closed so that the front hooks fit in place.



3. Slide the cable cover down until it locks.



2.2.4 Installation of the SD Memory Card



CAUTION

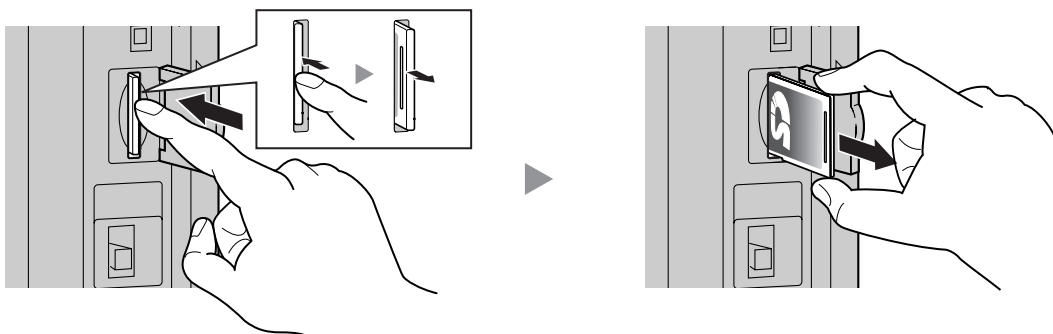
- Use only the SD Memory Card included with the Hybrid IP-PBX, or a Panasonic optional upgrade SD Memory Card.
- The SD Memory Card contains software for all the processes of the Hybrid IP-PBX and all the customer data. The SD Memory Card must be inserted before startup.
- Do not remove the SD Memory 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.
- To prevent data leakage, render the SD Memory Card physically unusable before disposal.

LED Indications

| Indication | Colour | Description |
|------------|--------|---|
| SD ACCESS | Green | SD memory card status <ul style="list-style-type: none"> • ON: Accessing |

Note

If you need to remove the SD Memory Card:

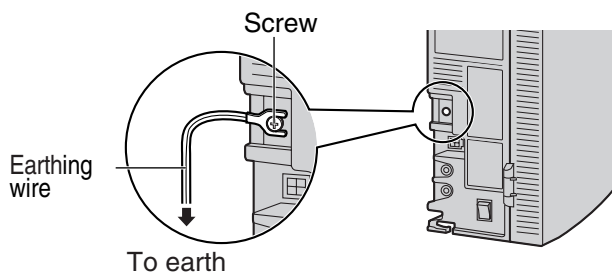


2.2.5 Frame Earth Connection

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 mm² or 18 AWG.

- Be sure to comply with applicable local regulations (e.g., laws, 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 a lightning strike.
- The earthing wire of the AC cable has an effect against external noise and lightning strikes, but it may not be enough to protect the Hybrid IP-PBX. A permanent connection between earth and the earth terminal of the Hybrid IP-PBX must be made.

2.2.6 Backup Battery Connection

The backup batteries and Back-up Battery Cable 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.

User-supplied Items

- Backup Batteries: VRLA (Valve Regulated Lead Acid) 12 V DC × 3
- Back-up Battery Cable: KX-A228

WARNING

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

CAUTION

- Make sure that the Back-up Battery Cable is securely fastened to both the backup batteries and the Hybrid IP-PBX.
- Be sure to comply with applicable local regulations (e.g., laws, 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.

Notes

- Turn on the power switch of the Hybrid IP-PBX only after the installation of the Hybrid IP-PBX is finished and AC power is available.
- The recommended maximum capacity is 14 Ah, to maintain effective battery charge.
- Make sure that the type and capacity of the 3 backup batteries are identical.
- The Back-up Battery Cable should not be exposed to direct sunlight. Keep the Back-up Battery Cable and the backup batteries away from heating appliances and fire. Place the backup batteries in a ventilated place.
- For details about the backup batteries, refer to the manual for the batteries.

Backup Power Supply Duration

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

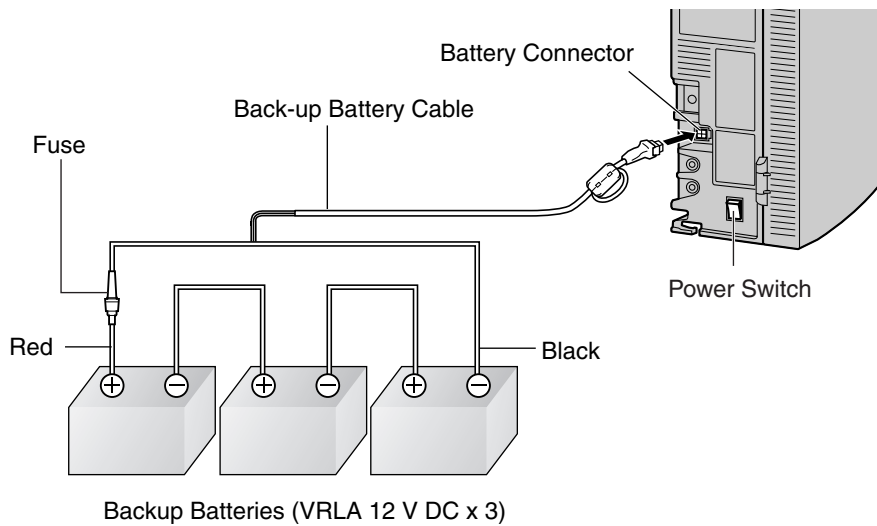
Examples

| Battery Capacity | Total Load Figure | Backup Power Supply Duration ^{*1} |
|------------------|-------------------|--|
| 14 Ah | 32 | 9 h |
| | 96 | 3 h |

^{*1} The duration may vary depending on the conditions.

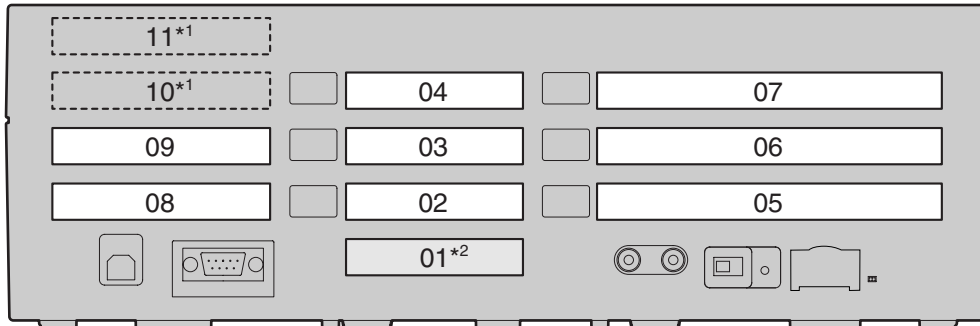
Connecting Backup Batteries

1. Turn off the power switch of the Hybrid IP-PBX.
2. Connect the Back-up Battery Cable to a set of 3 identical batteries.



2.2.7 Installing/Removing the Optional Service Cards

Slot Position



*1 Slots 10 and 11 accept only cards that do not have external ports. Therefore, these slots do not have removable cover plates.

*2 Slot 01 contains the pre-installed Super Hybrid Ports. No optional service card can be installed.

Slot Restrictions

The following table shows the slot restrictions. "✓" indicates that the slot supports the optional service card.

| Card | | Slot Number | | | | | | | | | |
|---------|-----|-------------|----|----|----|----|----|----|----|----|----|
| Type | Max | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 |
| LCOT4 | 3 | ✓ | ✓ | ✓ | | | | | | | |
| LCOT2 | 3 | ✓ | ✓ | ✓ | | | | | | | |
| DID3 | 2 | ✓ | ✓ | ✓ | | | | | | | |
| BRI2 | 3 | ✓ | ✓ | ✓ | | | | | | | |
| BRI1 | 3 | ✓ | ✓ | ✓ | | | | | | | |
| DLC4 | 1*1 | ✓ | ✓ | ✓ | | | | | | | |
| SLC4 | | ✓ | ✓ | ✓ | | | | | | | |
| E1 | 1 | | | | ✓ | ✓ | ✓ | | | | |
| SIP-GW4 | 1 | 2 | | | ✓ | ✓ | ✓ | | | | |
| IP-GW4 | 1 | | | | ✓ | ✓ | ✓ | | | | |
| IP-EXT4 | 1 | | | | ✓ | ✓ | ✓ | | | | |
| DLC8 | 2*2 | | | | ✓ | ✓ | ✓ | | | | |
| SLC8 | | | | | ✓ | ✓ | ✓ | | | | |

2.2 Installation of the Hybrid IP-PBX

| Card | | Slot Number | | | | | | | | | |
|---------|-----|-------------|----|----|----|----|----|----|----|----|----|
| Type | Max | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 |
| DPH4 | 1*3 | | | | | | | ✓ | ✓ | | |
| DPH2 | | | | | | | | ✓ | ✓ | | |
| ECHO8 | 1 | | | | | | | ✓ | ✓ | ✓ | ✓ |
| EXT-CID | 1 | | | | | | | ✓ | ✓ | ✓ | ✓ |
| MSG2 | 2 | | | | | | | ✓ | ✓ | ✓ | ✓ |
| SVM2 | 2 | | | | | | | ✓ | ✓ | ✓ | ✓ |

*1 Only one of either the DLC4 or SLC4 card can be installed.

*2 A maximum of two DLC8 cards, two SLC8 cards, or one of each card can be installed.

*3 Only one of either the DPH4 or DPH2 card can be installed.

CAUTION

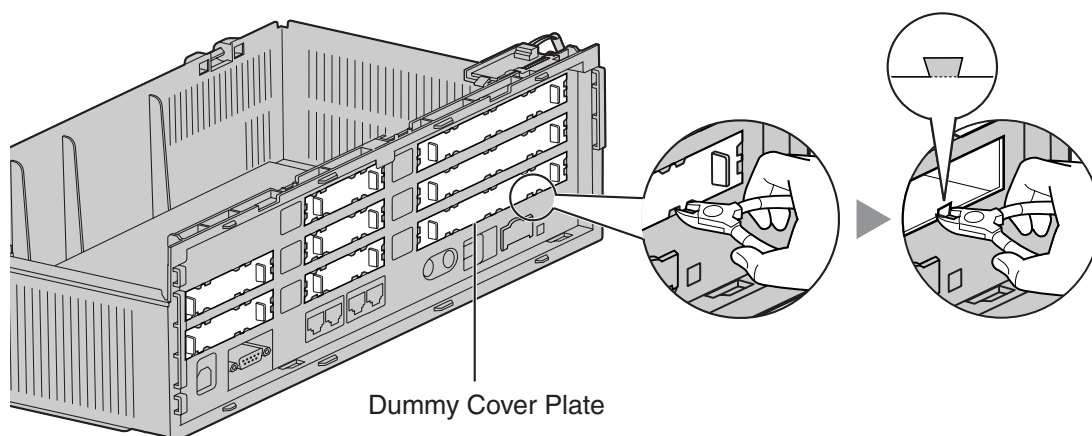
To protect the main board from static electricity, do not touch parts on the main board or on the optional service cards. To discharge static electricity, touch ground or wear an earthing strap.

Notes

- When installing or removing the optional service cards, the power switch of the Hybrid IP-PBX must be in the off position.
- For each card, the maximum number that can be installed in the Hybrid IP-PBX is listed in "1.3.1 Optional Equipment".
- 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.

Installing Optional Service Cards

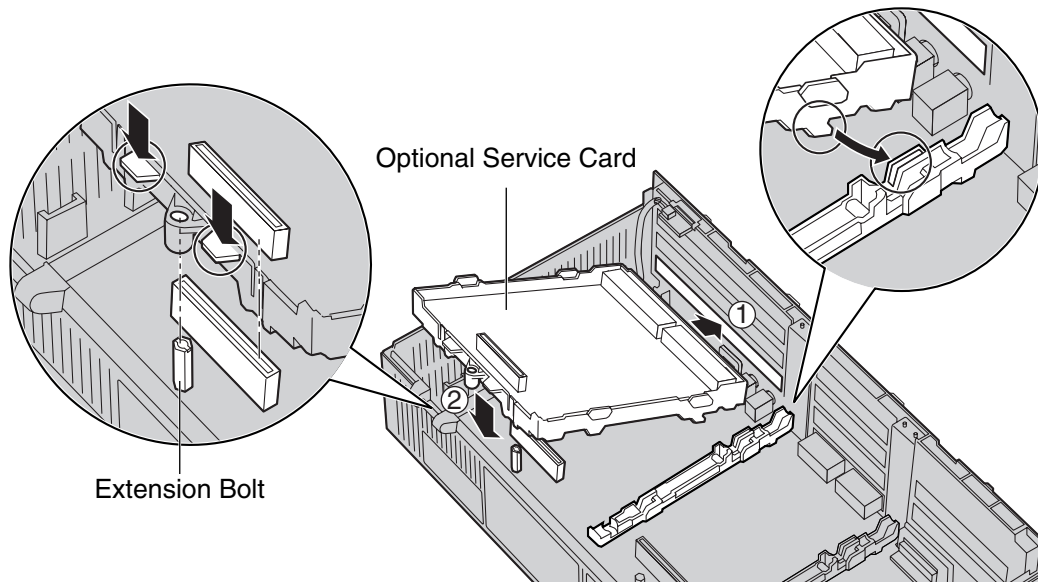
1. Before installing the optional service cards, cut and remove the appropriate dummy cover plates from the main unit.



CAUTION

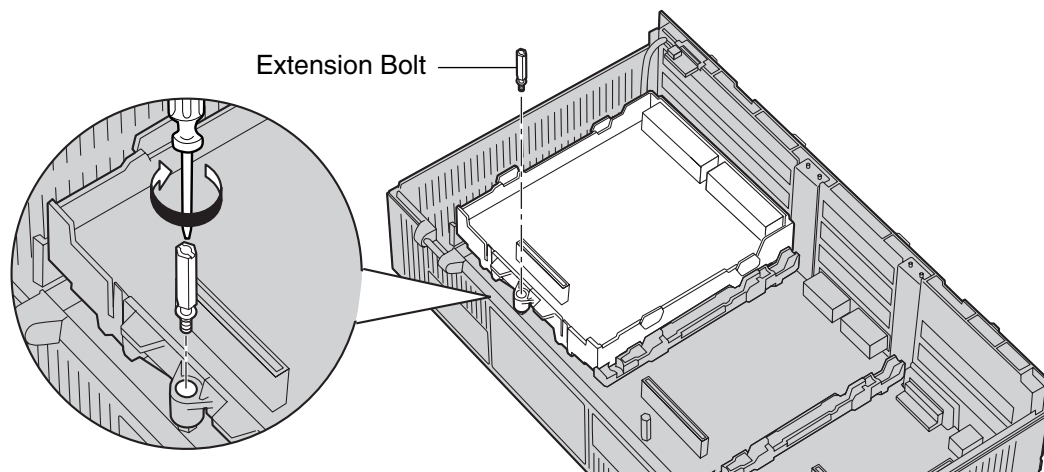
For safety reasons, smooth the cut edges after removing the dummy cover plates.

2. Position the card in the open slot, making sure that the tabs on the both sides of the card fit into place. Then, holding the card firmly in place, lower the rear end so that the hole of the card fits over the extension bolt.

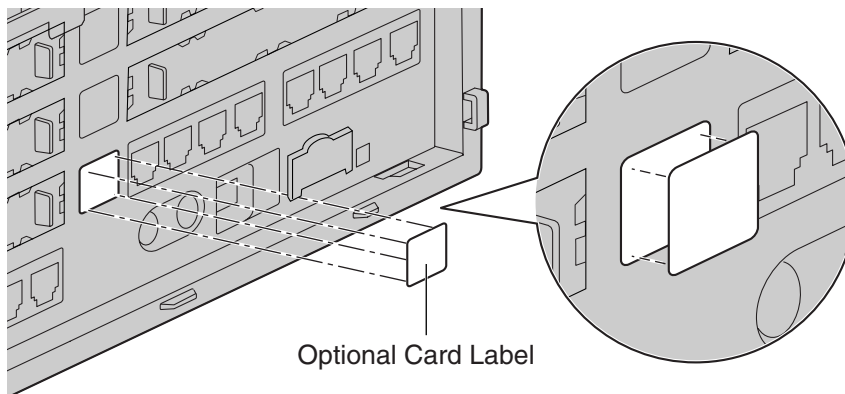
**CAUTION**

When installing the optional service cards, do not put pressure on any parts of the main board. Doing so may result in damage to the Hybrid IP-PBX.

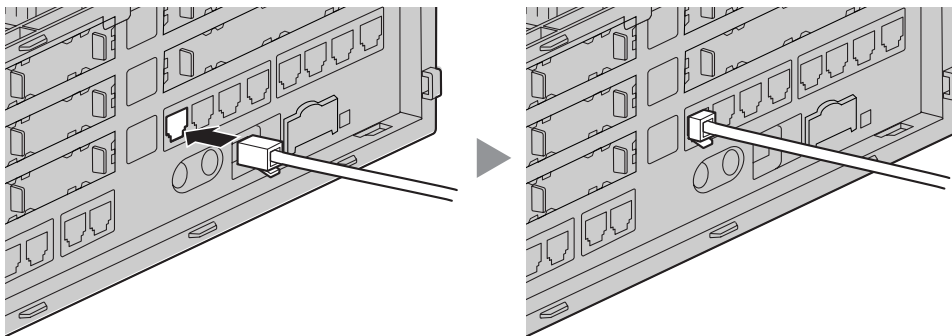
3. Insert the new extension bolt (included with the card) into the hole on the card, and tighten it to secure the card.



4. Stick an appropriate optional card label (included) to the left side of the corresponding card.



5. Connect a cable to an appropriate port of the card.
For details about pin assignments, refer to the appropriate section in "2.3 Information about the Trunk Cards" and "2.4 Information about the Extension Cards".



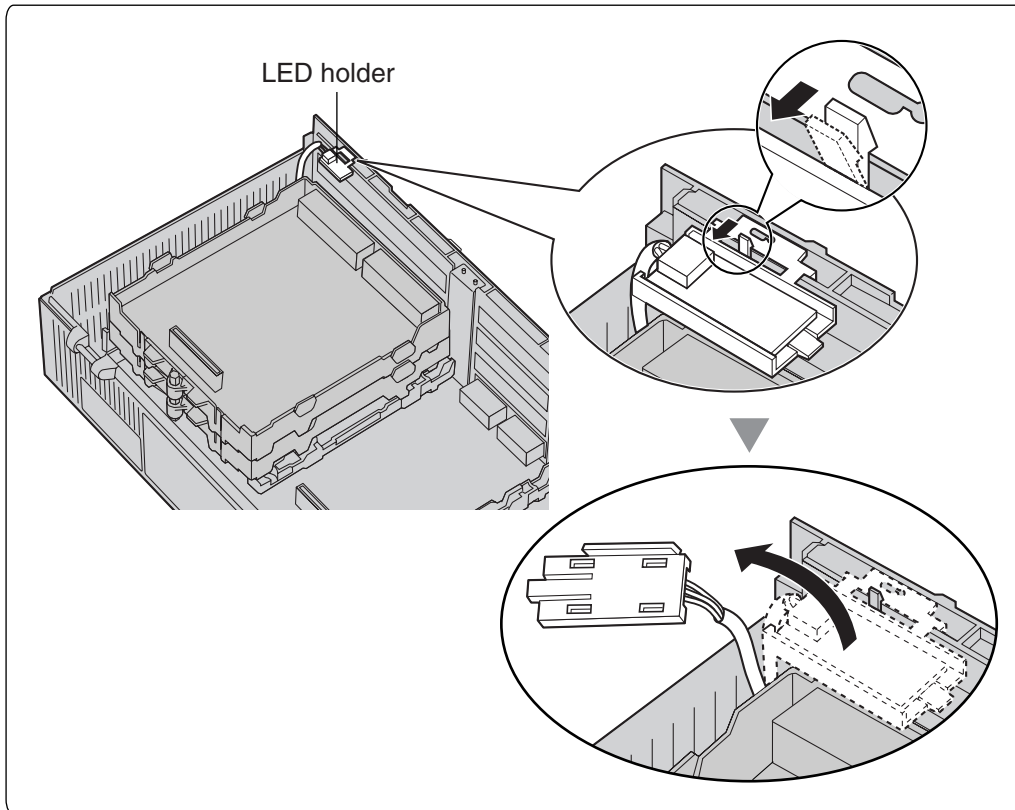
Note

Make sure to connect cables after installing the card in the Hybrid IP-PBX, not before.

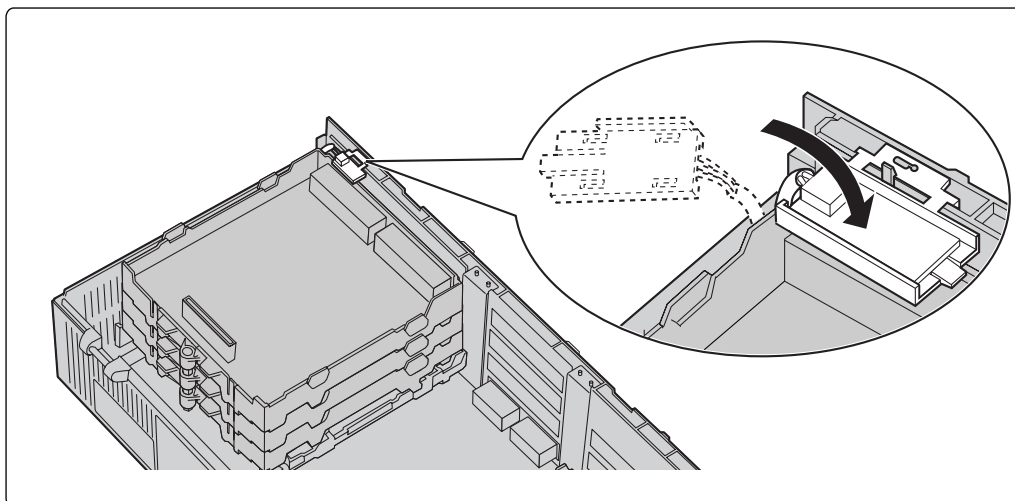
6. Repeat the procedure for other cards.

A. When installing a card in Slot 07, make sure to detach the LED holder first. After installing the card, reattach the LED holder.

To detach the LED holder

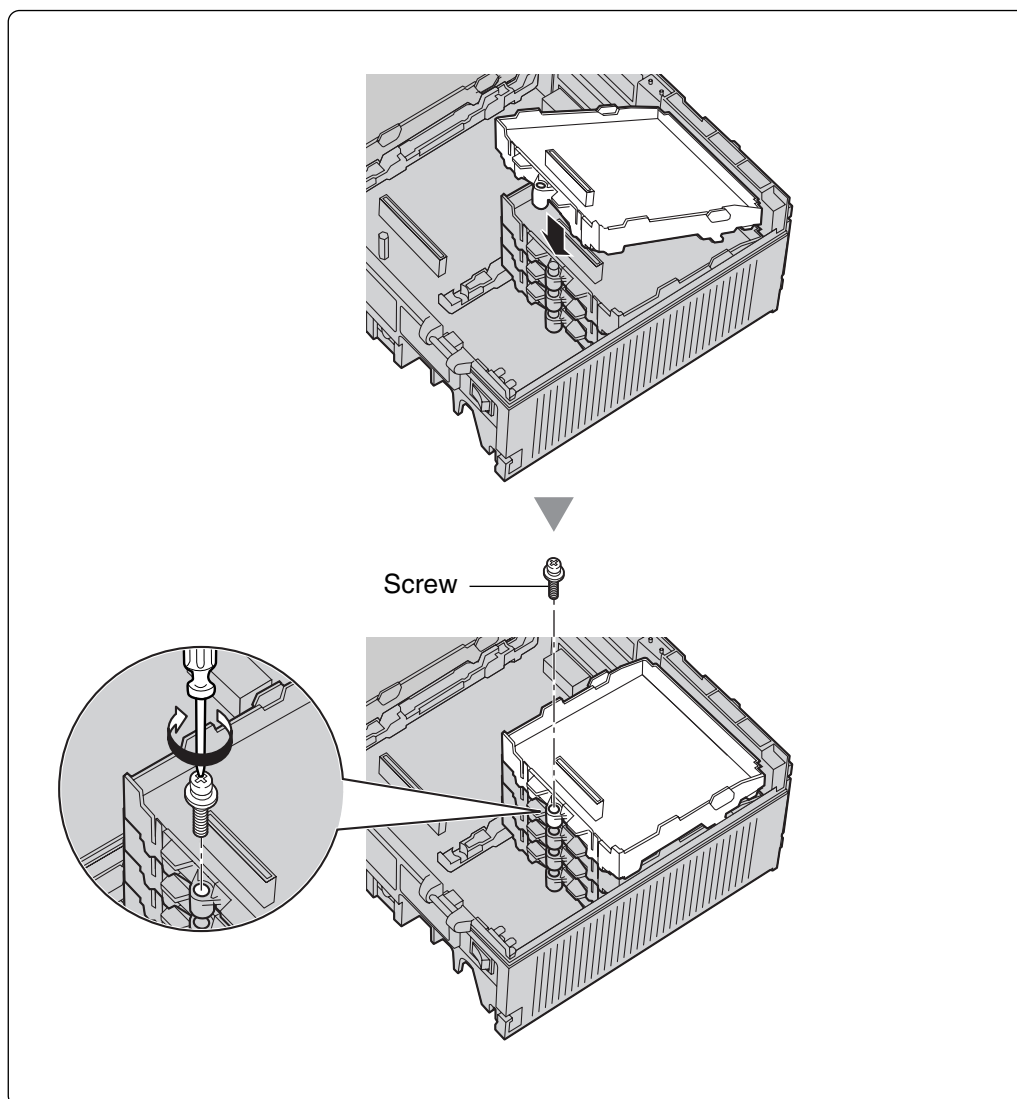


To attach the LED holder



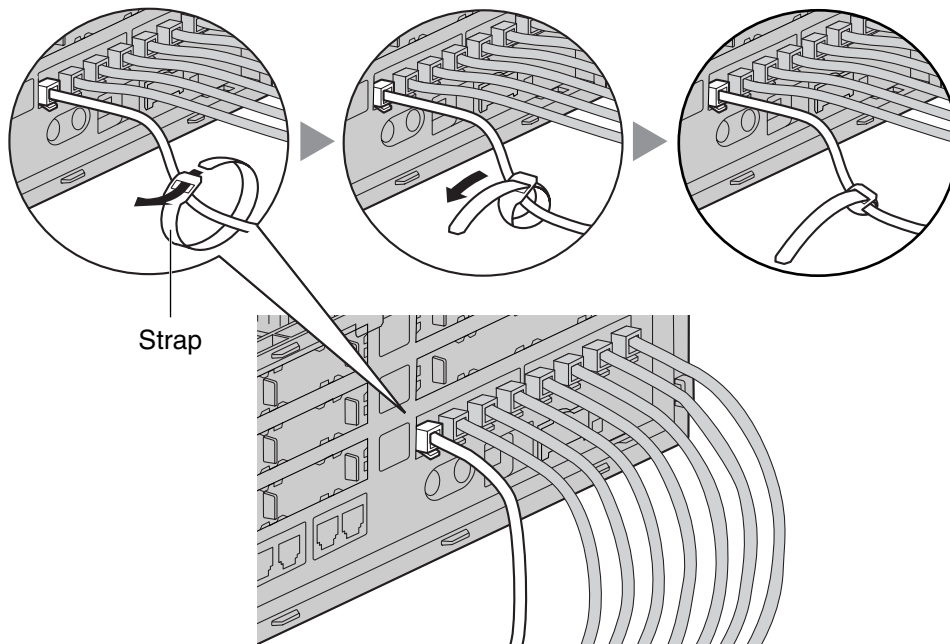
2.2 Installation of the Hybrid IP-PBX

- B.** When installing a card in Slot 11, tighten the card using the screw included with the card, instead of the extension bolt.

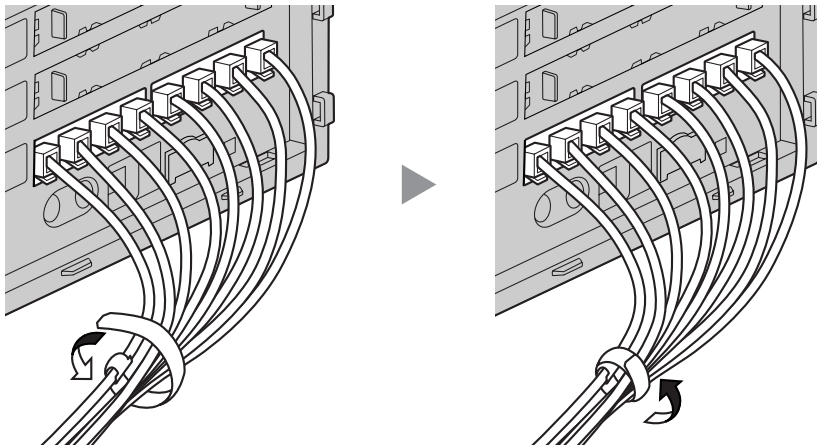


Cable Handling

1. Attach the strap included with the card to one of the connected cables.



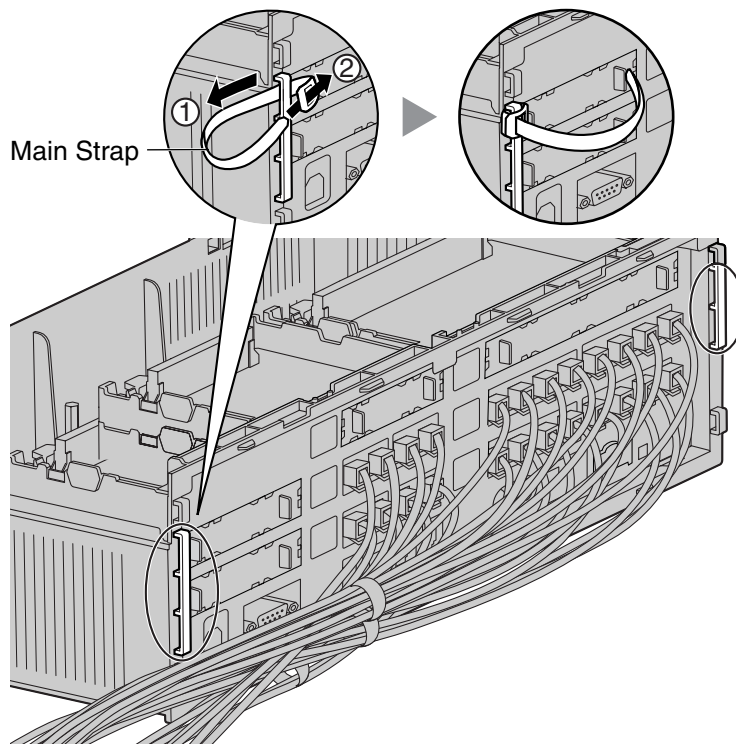
2. Bind all the connected cables together using the strap.



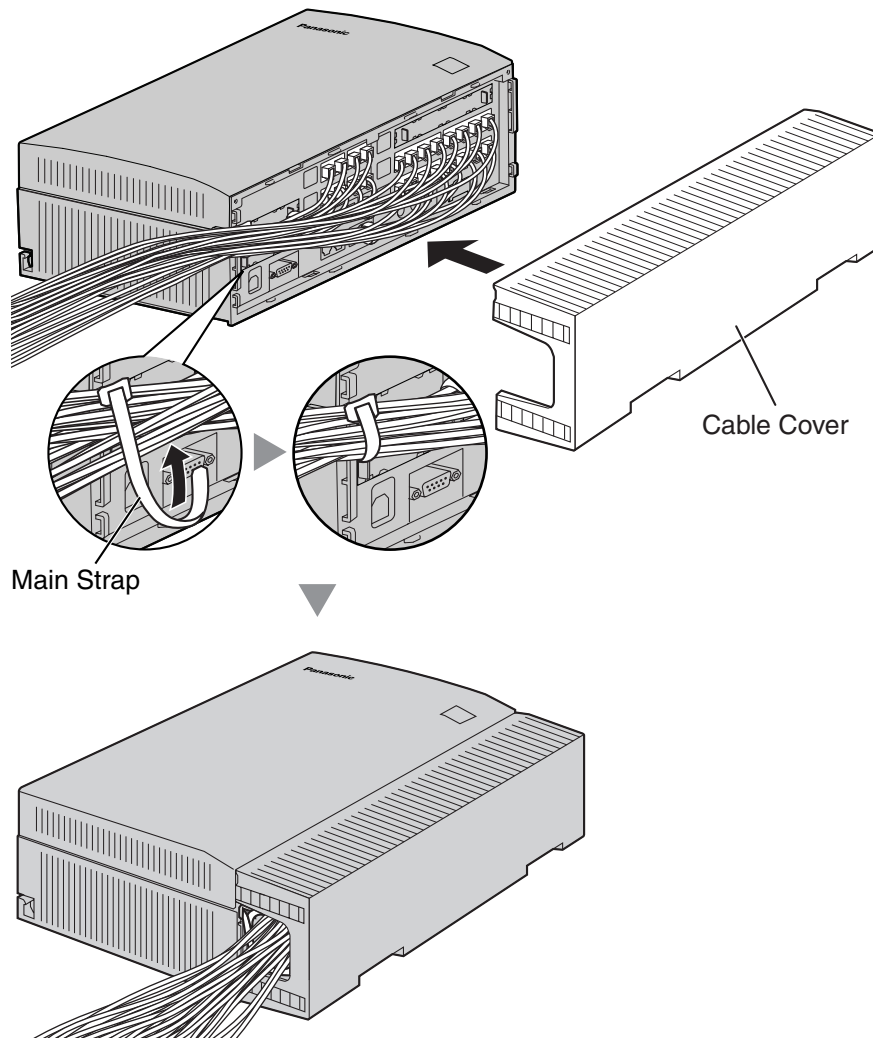
3. Repeat the procedure for other cards.

2.2 Installation of the Hybrid IP-PBX

4. Attach the main strap (included with the Hybrid IP-PBX) to any of the 5 rails depending on your preference.

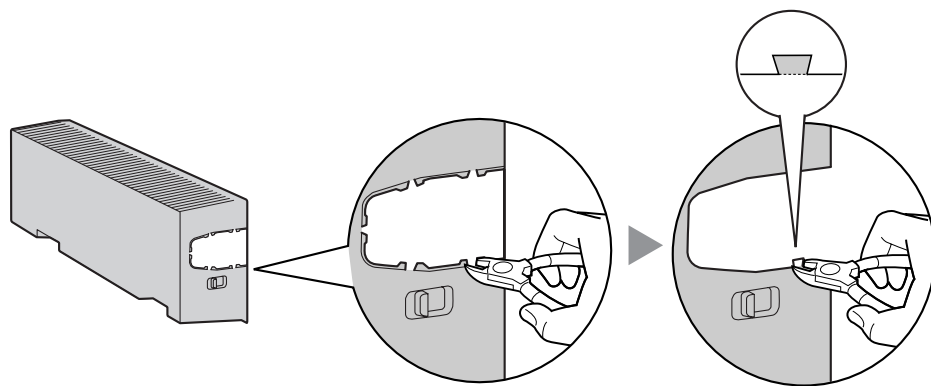


5. Bind all the connected cables together using the main strap, and then close the cable cover. For how to close the cable cover, refer to "2.2.3 Opening/Closing the Covers".



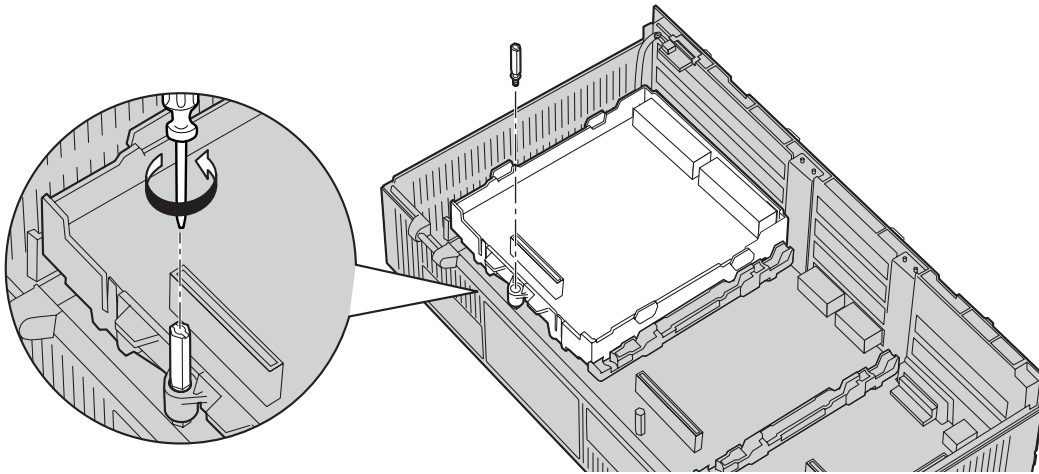
Notes

- For safety reasons, do not stretch, bend, or pinch the cables.
- If you prefer, you can cut the other side of the cable cover and run the cables through that opening. For safety reasons, smooth the cut edges.

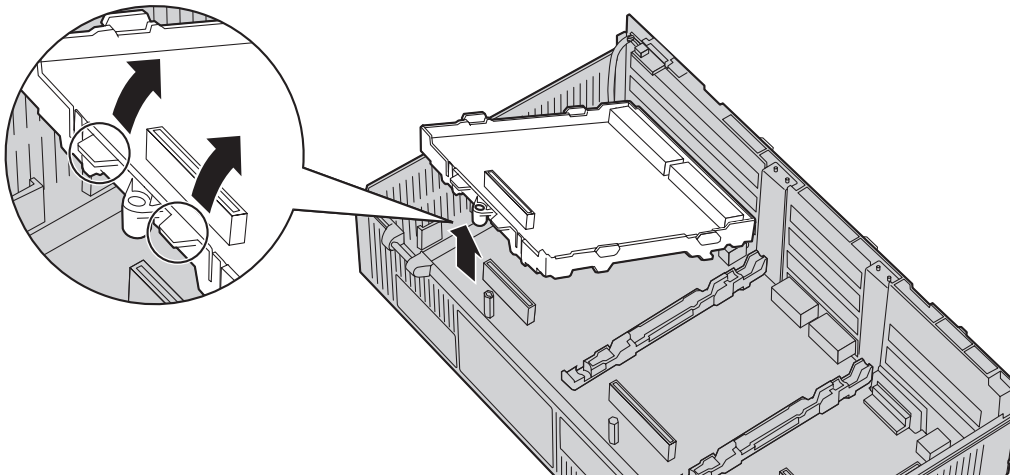


Removing the Optional Service Cards

1. Loosen and remove the extension bolt.



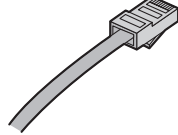
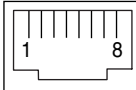
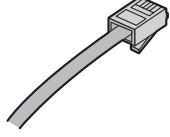
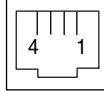
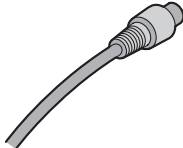

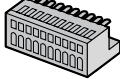
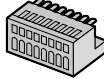
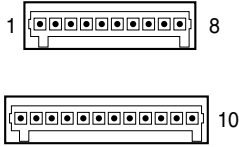
2. Holding the protrusions of the card, pull the card in the direction of the arrows.



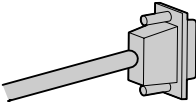
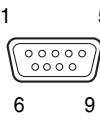
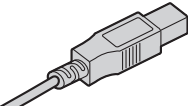



CAUTION

When removing the optional service cards, do not put pressure on any parts of the main board. Doing so may result in damage to the Hybrid IP-PBX.

2.2.8 Types of Connectors

| Connector Type | Pin Number | Used for |
|--|---|--|
| RJ45  (Twisted pair cable) |  | <ul style="list-style-type: none"> • DPH4 (KX-TDA3161NE) • DPH2 (KX-TDA3162) • DLC4 (KX-TDA3171NE) • DLC8 (KX-TDA3172NE) • SLC4 (KX-TDA3173NE) • SLC8 (KX-TDA3174NE) • LCOT4 (KX-TDA3180NE) • LCOT2 (KX-TDA3183) • E1 (KX-TDA3188) • BRI2 (KX-TDA3280) • BRI1 (KX-TDA3283) • SIP-GW4 (KX-TDA3450) • IP-EXT4 (KX-TDA3470) • IP-GW4 (KX-TDA3480) • Super Hybrid Ports (Main Board)*¹ |
| RJ11  (Twisted pair cable) |  | <ul style="list-style-type: none"> • DPH4 (KX-TDA3161) • DLC4 (KX-TDA3171) • DLC8 (KX-TDA3172) • SLC4 (KX-TDA3173) • SLC8 (KX-TDA3174) • LCOT4 (KX-TDA3180) • DID3 (KX-TDA3182) • Super Hybrid Ports (Main Board)*² |
| BNC  |  | <ul style="list-style-type: none"> • E1 (KX-TDA3188) |
| 10-pin Terminal Block 8-pin Terminal Block   |  | <ul style="list-style-type: none"> • DPH4 (KX-TDA3161) • DPH2 (KX-TDA3162) |

2.2 Installation of the Hybrid IP-PBX

| Connector Type | Pin Number | Used for |
|--|---|---|
| RS-232C  |  | <ul style="list-style-type: none"> Main Board |
| USB  |  | <ul style="list-style-type: none"> Main Board |
| Mini Plug  |  | <ul style="list-style-type: none"> Main Board (Pager port, MOH port) |

^{*1} The KX-TDA30E, KX-TDA30NE, and KX-TDA30GR have the Super Hybrid Ports with RJ45 connectors.

^{*2} Other models of the KX-TDA30 (other than the KX-TDA30E, KX-TDA30NE, and KX-TDA30GR) have the Super Hybrid Ports with RJ11 connectors.

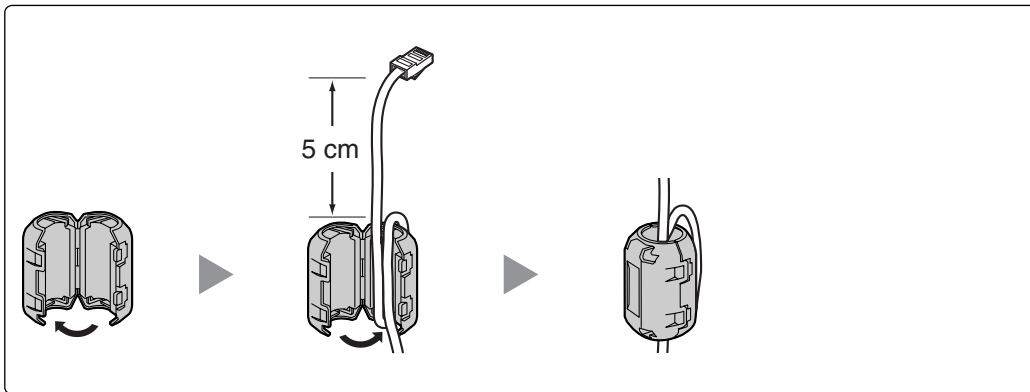
2.2.9 Attaching a Ferrite Core

A ferrite core must be attached when an RJ45 connector is connected to the SIP-GW4 or IP-EXT4 card.

Attaching to an RJ45 Connector

For SIP-GW4/IP-EXT4 Cards

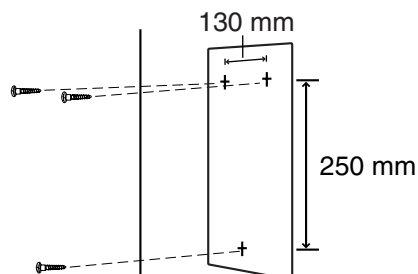
Wrap the cable once around the ferrite core, then close the case of the ferrite core. Attach the ferrite core 5 cm away from the connector. The ferrite core is included with the card.



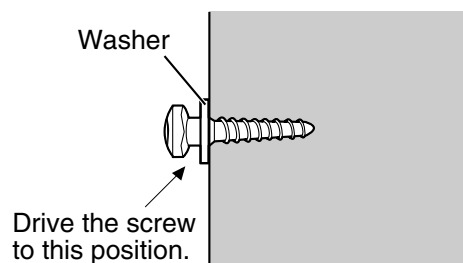
2.2.10 Wall Mounting (KX-TDA30)

Mounting on Wooden Wall

1. Place the reference for wall mounting (on the last page of this manual) on the wall to mark the 3 screw positions.



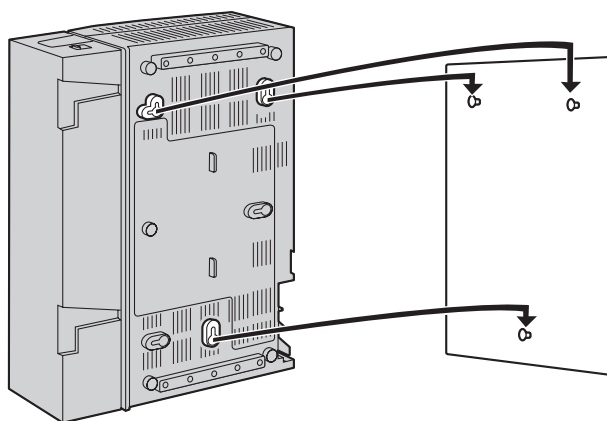
2. Install the screws and washers (included) in the wall.



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 main unit on the screw heads.



Notes

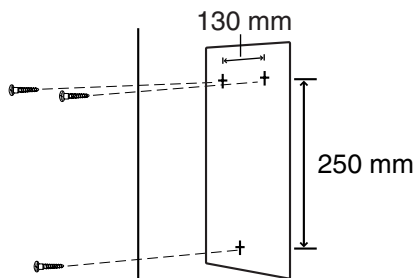
- Do not block the openings of the cabinet. Leave at least 20 cm of space above and 10 cm to the sides of the Hybrid IP-PBX for ventilation.
- Make sure that the surface behind the cabinet is flat and free of obstacles, so that the openings on the back of the cabinet will not be blocked.
- Be careful not to drop the cabinet.

Mounting on Concrete or Mortar Wall

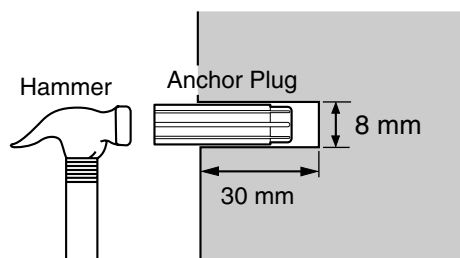
CAUTION

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

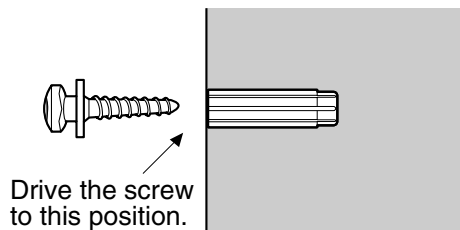
1. Place the reference for wall mounting (on the last page of this manual) on the wall to mark the 3 screw positions.



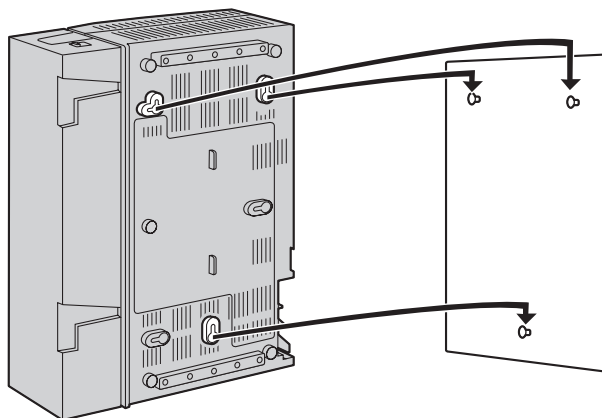
2. Install three anchor plugs (user-supplied) in the wall.



3. Install the screws (included) in the wall.



4. Hook the main unit on the screw heads.



2.2 Installation of the Hybrid IP-PBX

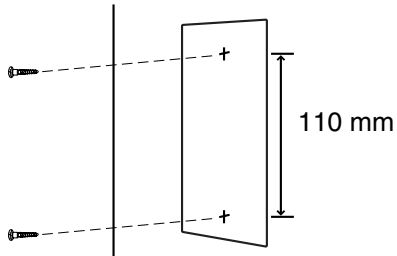
Notes

- Do not block the openings of the cabinet. Leave at least 20 cm of space above and 10 cm to the sides of the Hybrid IP-PBX for ventilation.
- 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.
- Be careful not to drop the cabinet.

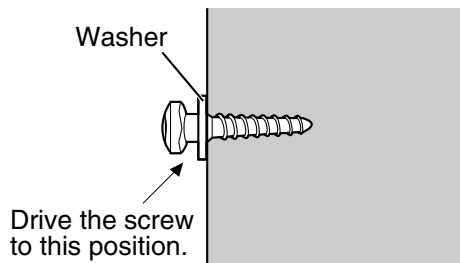
2.2.11 Wall Mounting (AC Adaptor)

Mounting on Wooden Wall

1. Place the reference for wall mounting (on the following page) on the wall to mark the 2 screw positions.

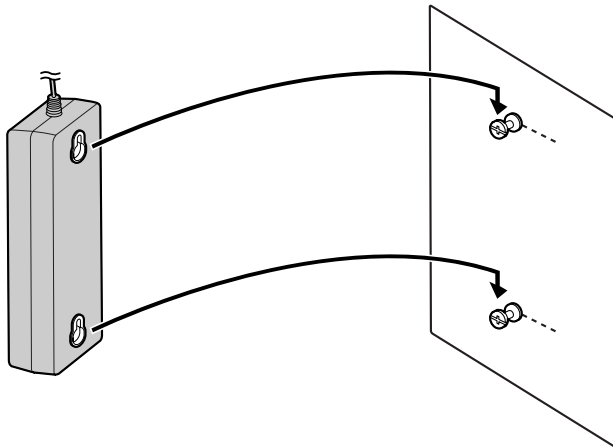


2. Install the screws and washers (included) in the wall.



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 AC adaptor on the screw heads.



Note

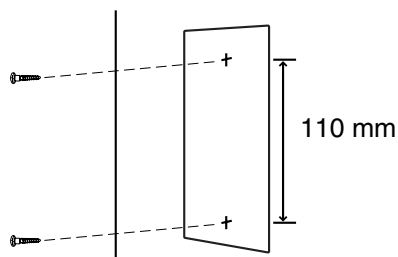
Be careful not to drop the AC adaptor.

Mounting on Concrete or Mortar Wall

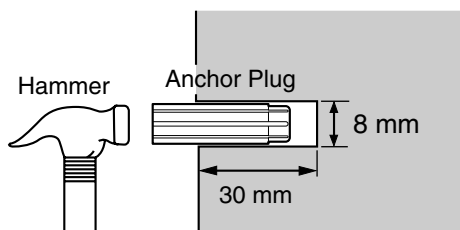
CAUTION

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

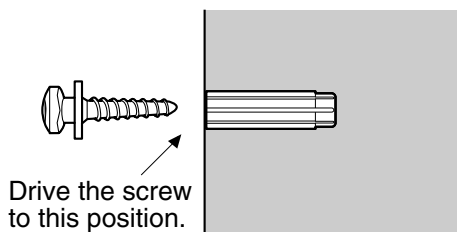
1. Place the reference for wall mounting (on the following page) on the wall to mark the 2 screw positions.



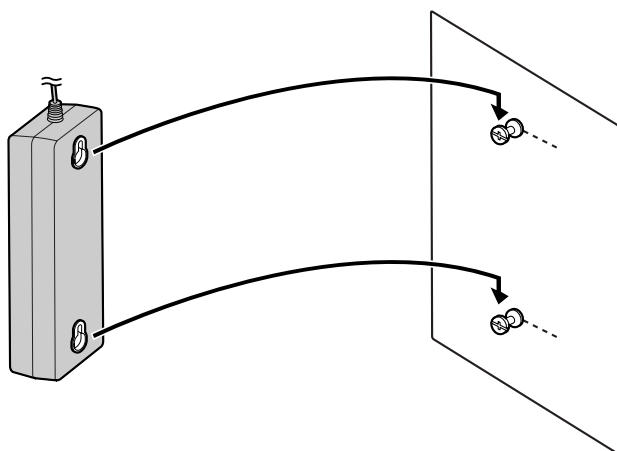
2. Install two anchor plugs (user-supplied) in the wall.



3. Install the screws (included) in the wall.



4. Hook the AC adaptor on the screw heads.

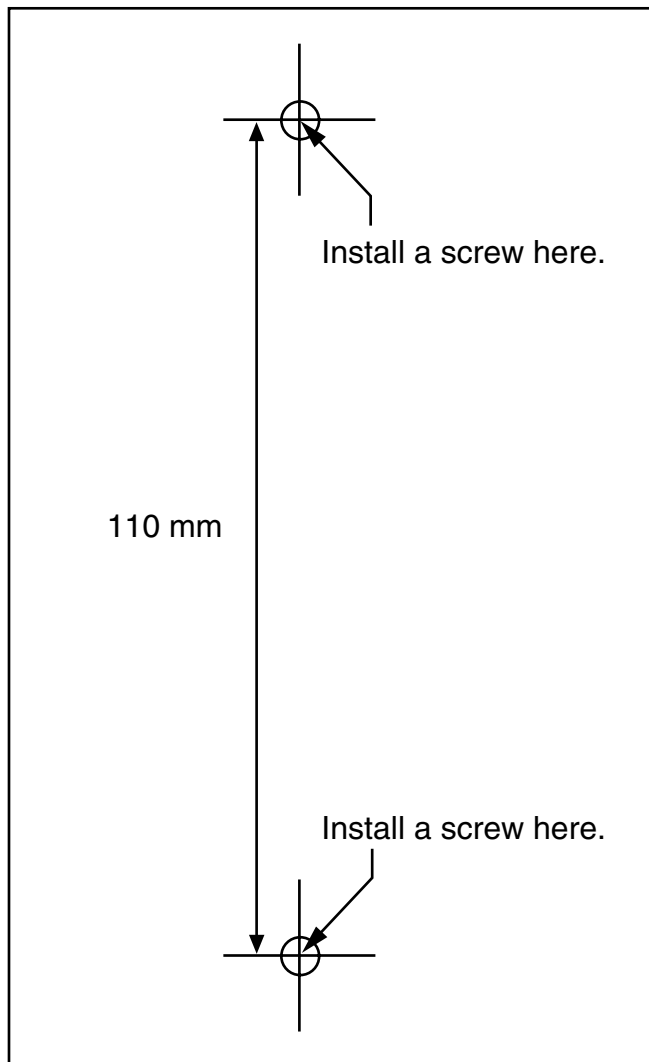


Note

Be careful not to drop the AC adaptor.

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.

2.2.12 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.

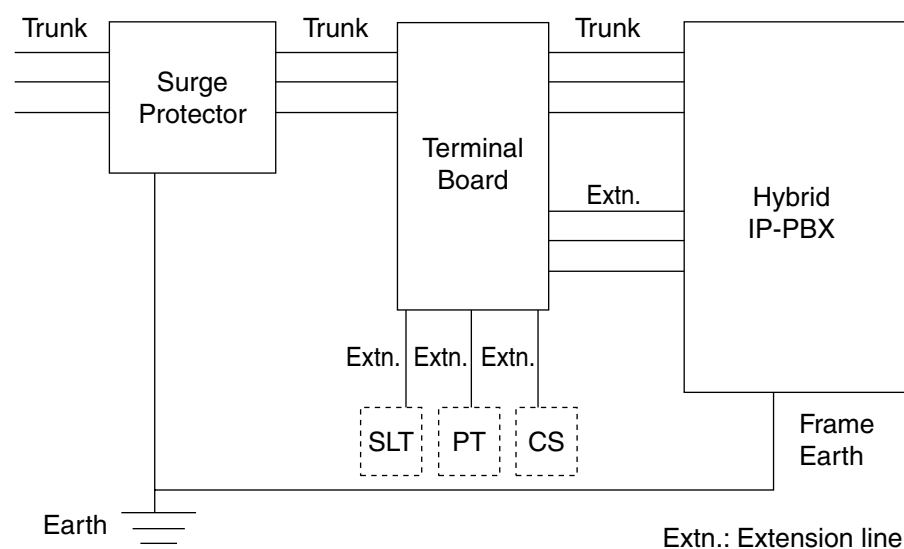
To protect the system from electrical surges, we strongly recommend connecting the system to a surge protector that meets the following specifications:

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

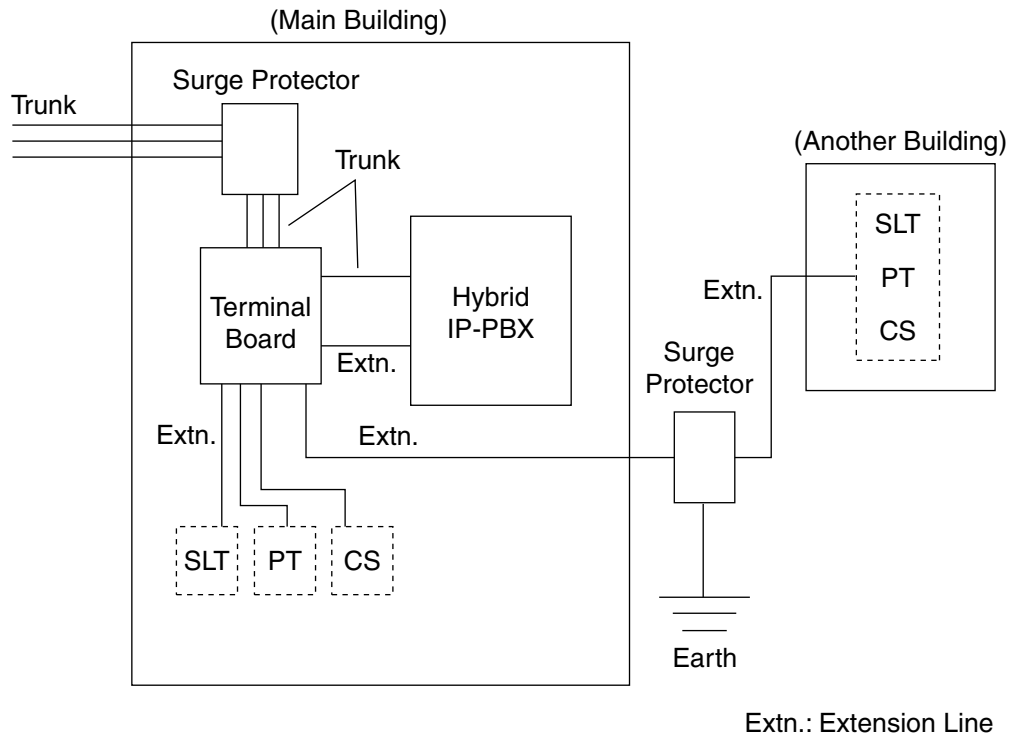
Additionally, proper earthing is very important for the protection of the system (refer to "2.2.5 Frame Earth Connection").

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

Installation



Outside Installation



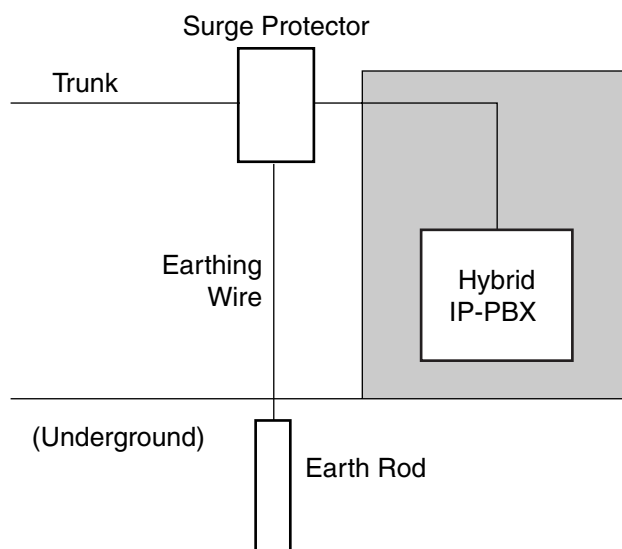
If you install an extension outside of the building, the following precautions are recommended:

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

Note

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

Installation of an Earth Rod



2.2 Installation of the Hybrid IP-PBX

1. Connect the earth rod to the surge protector using an earthing wire with a cross-sectional area of at least 1.3 mm².
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

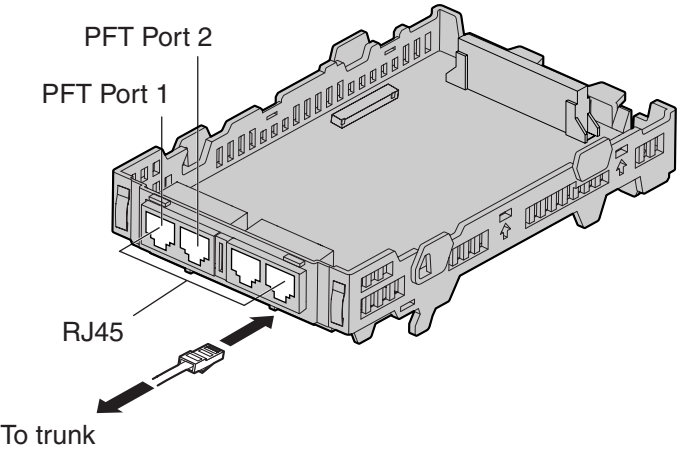
- The above figures are recommendations only.
- The length of earth rod and the required depth depend on the composition of the soil.

2.3 Information about the Trunk Cards

2.3.1 LCOT4 Card (KX-TDA3180)

Function

4-port analogue trunk card with 2 power failure transfer (PFT) ports. One CID4 card can be mounted on the LCOT4 card (refer to "2.3.3 CID4 Card (KX-TDA3193)").



Accessories and User-supplied Items

Accessories (included): Extension Bolt × 1, Strap × 1

User-supplied (not included): RJ45 connector or RJ11 connector

Notice

The connector type may be RJ45 or RJ11 depending on the country/area.

Notes

- To confirm the trunk connection, refer to "Confirming the Trunk Connection" in "2.12.1 Starting the Hybrid IP-PBX".
- For details about power failure transfer, refer to "2.11.1 Power Failure Connections".

Pin Assignments

RJ45 Connector

| | Signal Name | Function |
|--|-------------|----------|
| | R | Ring |
| | T | Tip |
| | — | Reserved |

2.3 Information about the Trunk Cards

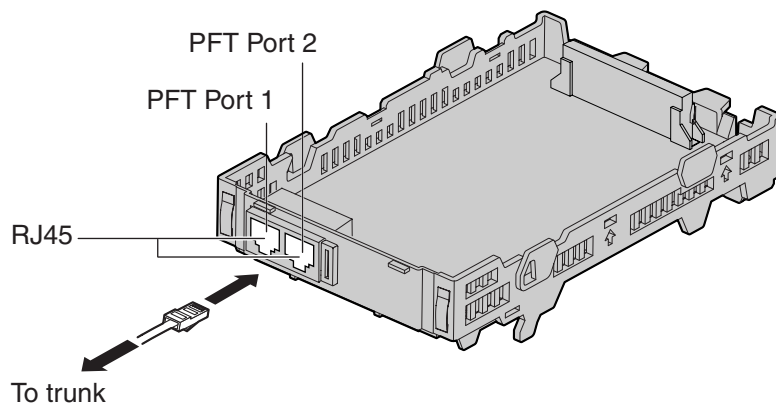
RJ11 Connector

|  | Signal Name | Function |
|---|-------------|----------|
| | R | Ring |
| | T | Tip |
| | — | Reserved |

2.3.2 LCOT2 Card (KX-TDA3183)

Function

2-port analogue trunk card with 2 power failure transfer (PFT) ports.



Accessories and User-supplied Items

Accessories (included): Extension Bolt × 1, Strap × 1, Optional Card Label × 1

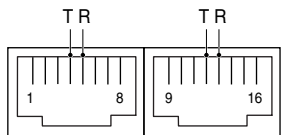
User-supplied (not included): RJ45 connector

Notes

- To confirm the trunk connection, refer to "Confirming the Trunk Connection" in "2.12.1 Starting the Hybrid IP-PBX".
- For details about power failure transfer, refer to "2.11.1 Power Failure Connections".

Pin Assignments

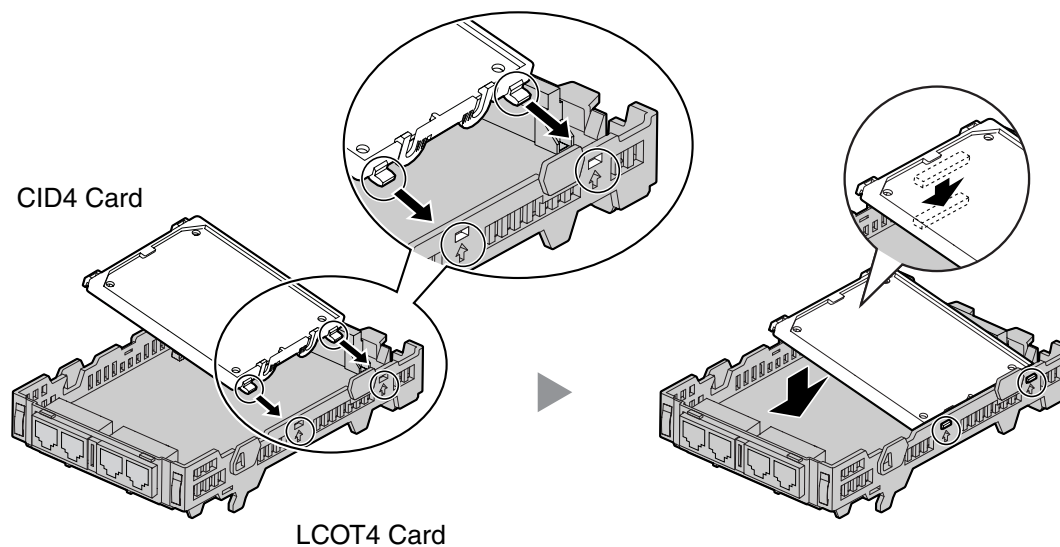
RJ45 Connector

|  | Signal Name | Function |
|---|-------------|----------|
| | R | Ring |
| | T | Tip |
| | — | Reserved |

2.3.3 CID4 Card (KX-TDA3193)

Function

4-port Caller ID signal type FSK/FSK (with Call Waiting Caller ID [Visual Caller ID])/DTMF. To be mounted on the LCOT4 card.



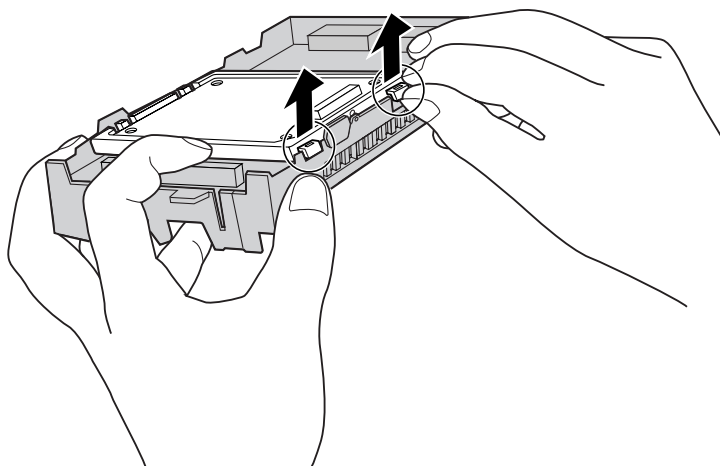
Accessories and User-supplied Items

Accessories (included): none

User-supplied (not included): none

Note

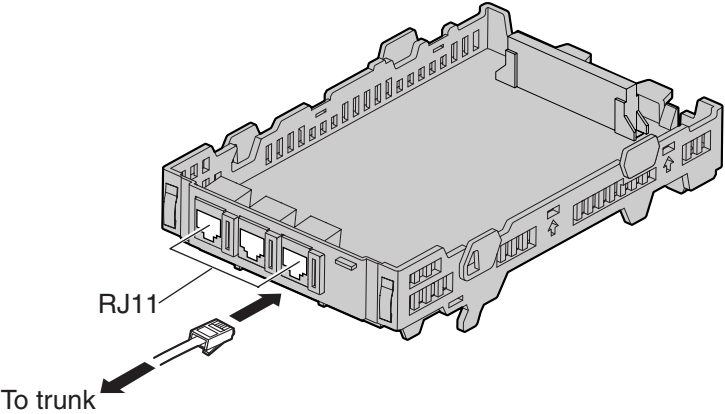
If you need to remove the CID4 Card:



2.3.4 DID3 Card (KX-TDA3182)

Function

3-port DID analogue trunk card.



Accessories and User-supplied Items

Accessories (included): Extension Bolt × 1, Strap × 1, Optional Card Label × 1

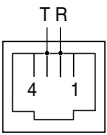
User-supplied (not included): RJ11 connector

Note

To confirm the trunk connection, refer to "Confirming the Trunk Connection" in "2.12.1 Starting the Hybrid IP-PBX".

Pin Assignments

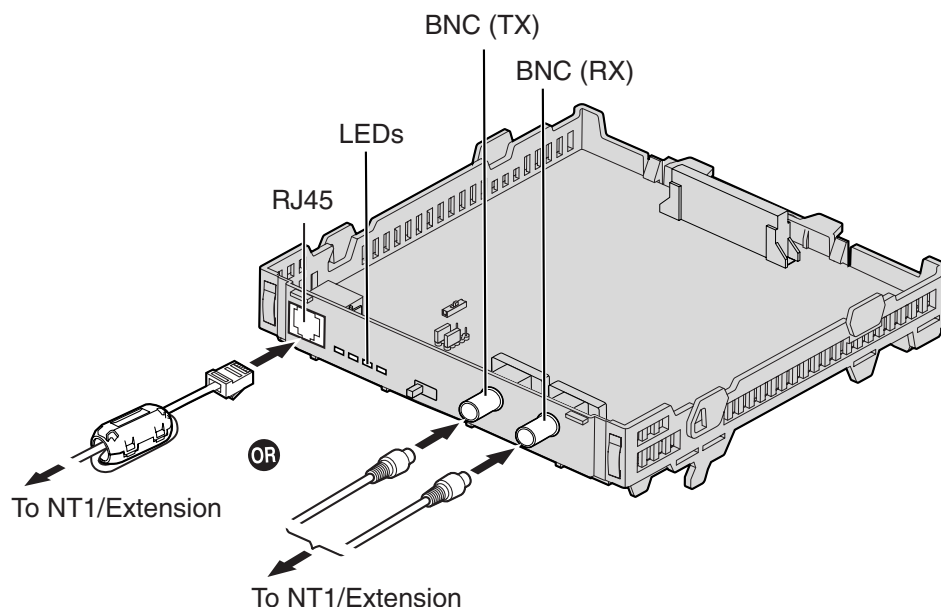
RJ11 Connector

|  | Signal Name | Function |
|---|-------------|----------|
| | R | Ring |
| | T | Tip |

2.3.5 E1 Card (KX-TDA3188)

Function

30-channel E1 trunk card. ITU-T standard compliant.



Accessories and User-supplied Items

Accessories (included): none

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

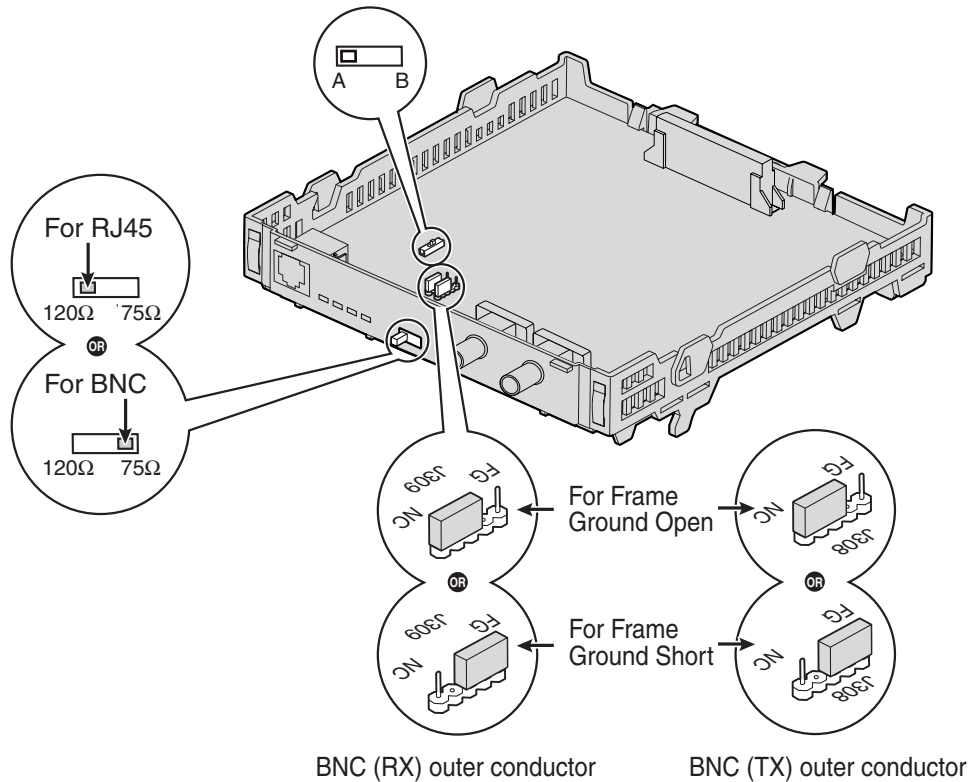
Notes

- 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 trunk directly.
- Use only 1 type of connector (RJ45 or BNC) for connection; RJ45 and BNC cannot be used simultaneously.
- This optional service card can be used for either trunk or extension connection, by setting the A/B switch or using the connector with appropriate pin assignments.
- To confirm the trunk connection, refer to "Confirming the Trunk Connection" in "2.12.1 Starting the Hybrid IP-PBX".

CAUTION

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

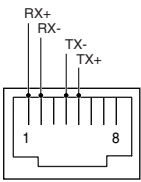
Switch Settings



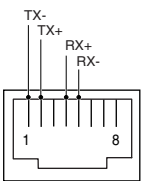
| Switch | Type | Usage and Status Definition |
|--------------------|-----------|--|
| Termination | Slide | Select 120 Ω (default) or 75 Ω to match the connector type to be used. |
| A/B | Slide | When using an RJ45 connector, select A (default) for trunk or B for extension use. When using BNC connectors, make sure that A is selected. |
| Frame Ground Short | Short pin | J308 is for BNC (TX) outer conductor, and J309 is for BNC (RX) outer conductor. "NC" position: Open (default) "FG" position: Short |

Pin Assignments

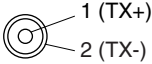
RJ45 Connector for Trunk Use

|  | Signal Name | Level [V] | Function |
|---|-------------|-----------|-------------------|
| | RX+ | (+) | Receive data (+) |
| | RX- | (-) | Receive data (-) |
| | TX- | (-) | Transmit data (-) |
| | TX+ | (+) | Transmit data (+) |
| | — | — | Reserved |

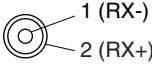
RJ45 Connector for Extension Use

|  | Signal Name | Level [V] | Function |
|--|-------------|-----------|-------------------|
| | TX- | (-) | Transmit data (-) |
| | TX+ | (+) | Transmit data (+) |
| | RX+ | (+) | Receive data (+) |
| | RX- | (-) | Receive data (-) |
| | — | — | Reserved |

BNC (coaxial) Connector (TX)

|  | Signal Name | Level [V] | Function |
|---|-------------|-----------|-------------------|
| | TX+ | (+) | Transmit data (+) |
| | TX- | (-) | Transmit data (-) |

BNC (coaxial) Connector (RX)

|  | Signal Name | Level [V] | Function |
|---|-------------|-----------|------------------|
| | RX- | (-) | Receive data (-) |
| | RX+ | (+) | Receive data (+) |

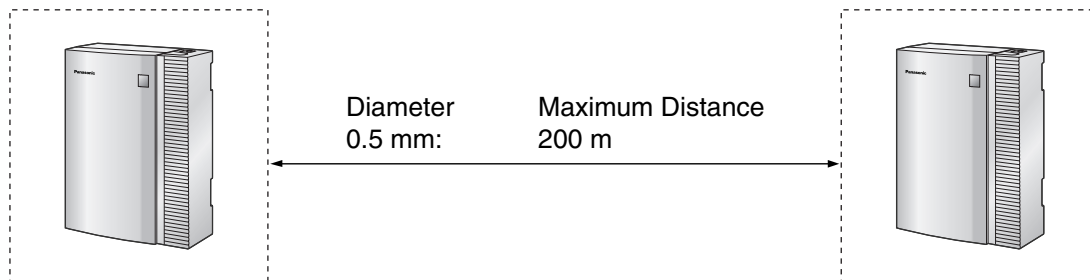
LED Indications

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

| Indication | Colour | Description |
|------------|--------|---|
| RAI | Red | RAI signal status indication <ul style="list-style-type: none"> • OFF: Normal • ON: Alarm (Clock Slave) • Flashing (60 times per minute): Alarm (Clock Master) |
| AIS | Red | AIS status indication <ul style="list-style-type: none"> • OFF: Normal • ON: Alarm |
| SYNC-ERR | Red | Non-synchronisation status indication <ul style="list-style-type: none"> • OFF: Normal • ON: Out of synchronisation |

Maximum Cabling Distance of Extension Connection

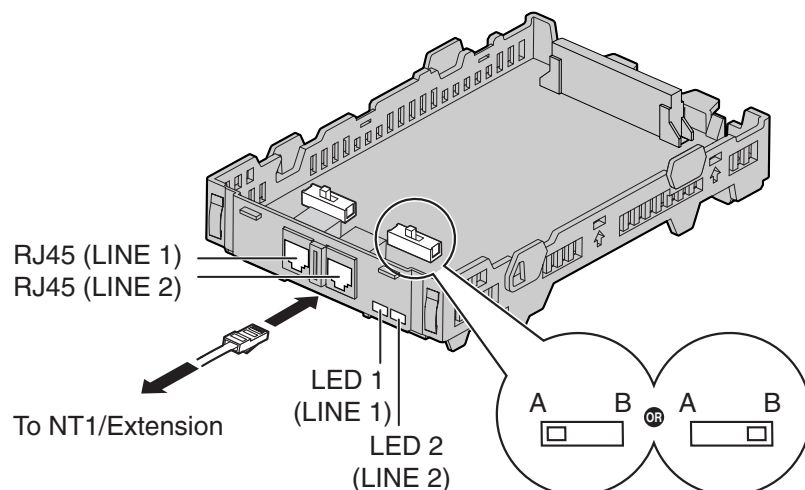
The maximum length of the extension cable that connects the E1 cards is shown below:



2.3.6 BRI2 Card (KX-TDA3280)

Function

2-port ISDN Basic Rate Interface card with 1 power failure transfer (PFT) port. EURO-ISDN/ETSI compliant.



Accessories and User-supplied Items

Accessories (included): Extension Bolt × 1, Strap × 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.
- This optional service card has 100 Ω of terminal resistance. For use in point to multi-point connection, the card must be placed at the end of the bus.
- This optional service card can be used for either trunk or extension connection, by setting the A/B switch or using the connector with appropriate pin assignments.
- For details about power failure transfer, refer to "2.11.1 Power Failure Connections".
- To confirm the trunk connection, refer to "Confirming the Trunk Connection" in "2.12.1 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 BRI2 card by programming the Hybrid IP-PBX accordingly.

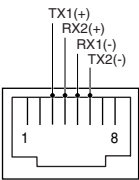
However, if there is an external power source to the terminal, make sure that there is no power supplied to the terminal from the BRI2 card. Failure to do so may cause damage to the power supply circuit of the BRI2 card or the terminal.

Switch Settings

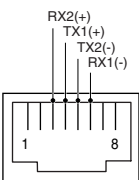
| Switch | Type | Usage and Status Definition |
|--------|-------|--|
| A/B | Slide | Select A (default) for trunk or B for extension use. |

Pin Assignments

RJ45 Connector for Trunk Use

|  | Signal Name | Level [V] | Function |
|---|-------------|-----------|-----------------|
| | TX1 | (+) | Transmit data 1 |
| | RX2 | (+) | Receive data 2 |
| | RX1 | (-) | Receive data 1 |
| | TX2 | (-) | Transmit data 2 |
| | — | — | Reserved |

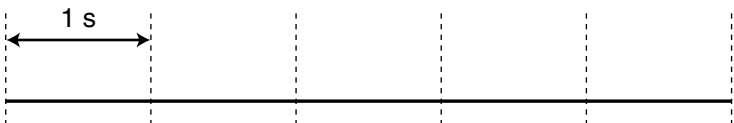
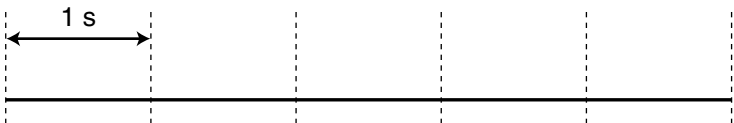
RJ45 Connector for Extension Use

|  | Signal Name | Level [V] | Function |
|--|-------------|-----------|-----------------|
| | RX2 | (+) | Receive data 2 |
| | TX1 | (+) | Transmit data 1 |
| | TX2 | (-) | Transmit data 2 |
| | RX1 | (-) | Receive data 1 |
| | — | — | Reserved |



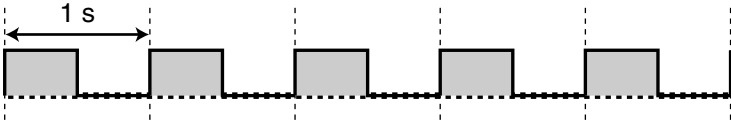
LED Indications

| Indication | Colour | Description |
|------------|--------|---|
| LINE 1 | Green | LINE 1 status indication: Refer to "LINE LED Pattern" below for details. |
| LINE 2 | Green | LINE 2 status indication: Refer to "LINE LED Pattern" below for details. |

LINE LED Pattern

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

2.3 Information about the Trunk Cards

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

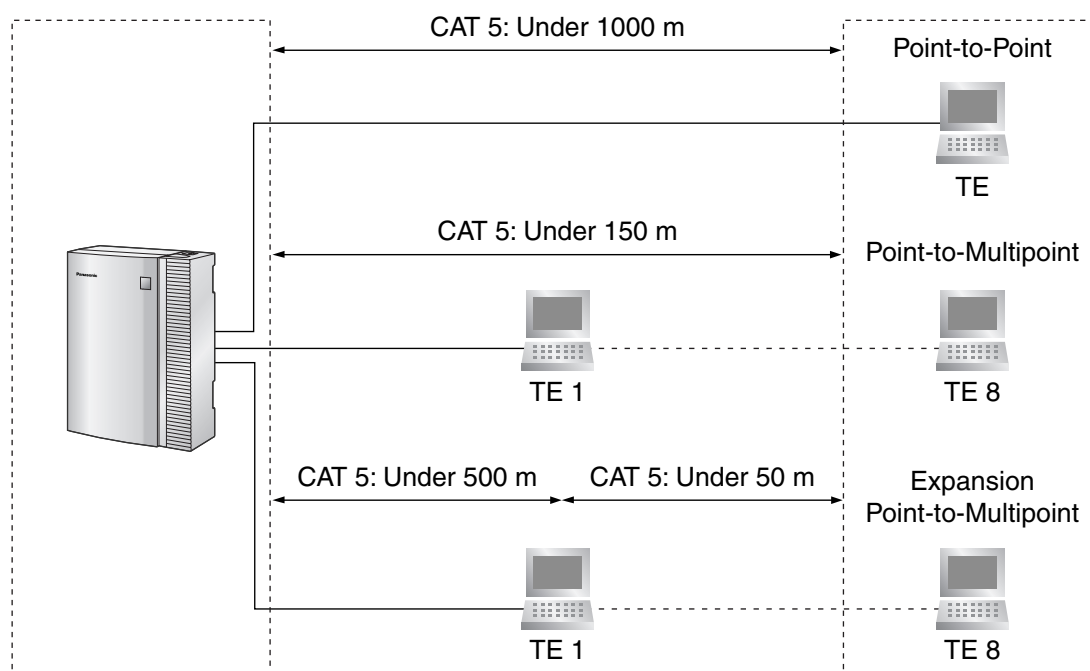
Layer 1: ON (Synchronous)

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

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

Maximum Cabling Distance of S0 Bus Connection

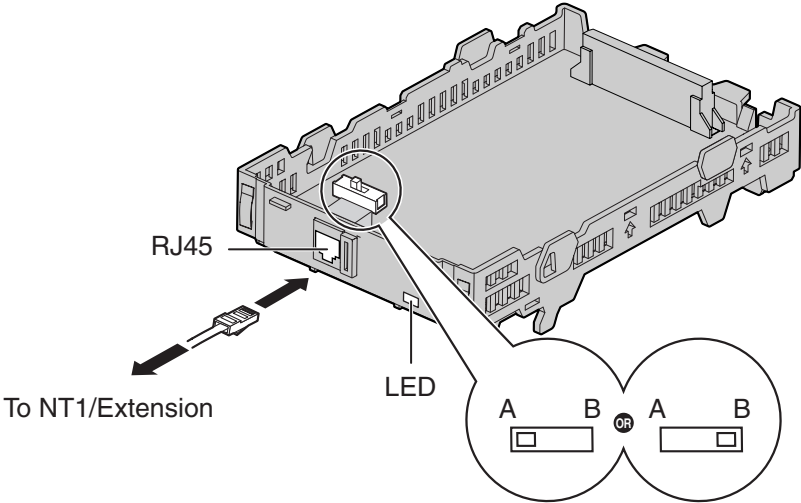
The maximum length of the extension cable that connects the Hybrid IP-PBX and the ISDN terminal equipment (TE) is shown below:



2.3.7 BRI1 Card (KX-TDA3283)

Function

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



Accessories and User-supplied Items

Accessories (included): Extension Bolt × 1, Strap × 1, Optional Card Label × 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.
- This optional service card has 100 Ω of terminal resistance. For use in point to multi-point connection, the card must be placed at the end of the bus.
- This optional service card can be used for either trunk or extension connection, by setting the A/B switch or using the connector with appropriate pin assignments.
- To confirm the trunk connection, refer to "Confirming the Trunk Connection" in "2.12.1 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 BRI1 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 BRI1 card. Failure to do so may cause damage to the power supply circuit of the BRI1 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

| | Signal Name | Level [V] | Function |
|--|-------------|-----------|-----------------|
| | TX1 | (+) | Transmit data 1 |
| | RX2 | (+) | Receive data 2 |
| | RX1 | (-) | Receive data 1 |
| | TX2 | (-) | Transmit data 2 |
| | — | — | Reserved |

RJ45 Connector for Extension Use


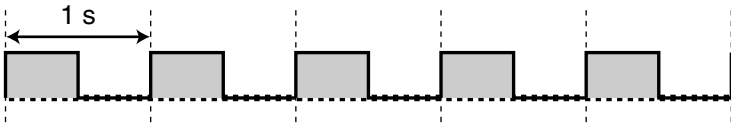
| | Signal Name | Level [V] | Function |
|--|-------------|-----------|-----------------|
| | RX2 | (+) | Receive data 2 |
| | TX1 | (+) | Transmit data 1 |
| | TX2 | (-) | Transmit data 2 |
| | RX1 | (-) | Receive data 1 |
| | — | — | Reserved |

LED Indications

| Indication | Colour | Description |
|------------|--------|---|
| LINE 1 | Green | LINE 1 status indication: Refer to "LINE LED Pattern" below for details. |

LINE LED Pattern

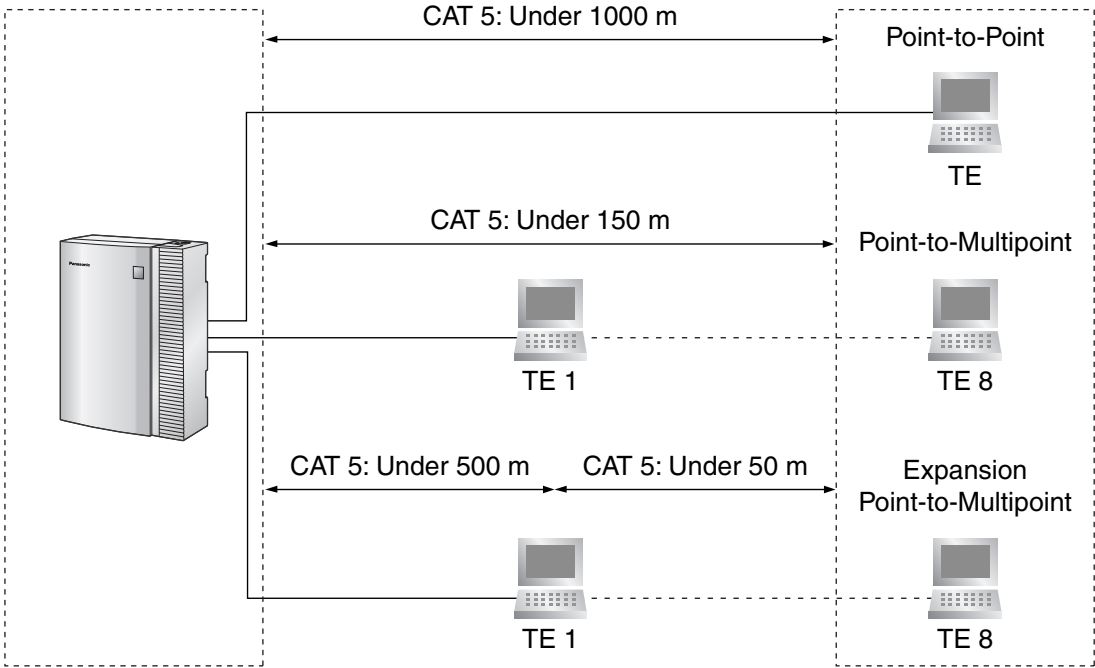
| Layer 1 | Layer 2 | Master Clock | LED Pattern |
|---------|---------|--------------|-------------|
| OFF | OFF | OFF | |
| ON | OFF | OFF | |
| ON | ON | OFF | |

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

Layer 1: ON (Synchronous)
Layer 2: ON (Link established)/OFF (Link not established)
Master Clock: ON (Master)/OFF (Slave)

Maximum Cabling Distance of S0 Bus Connection

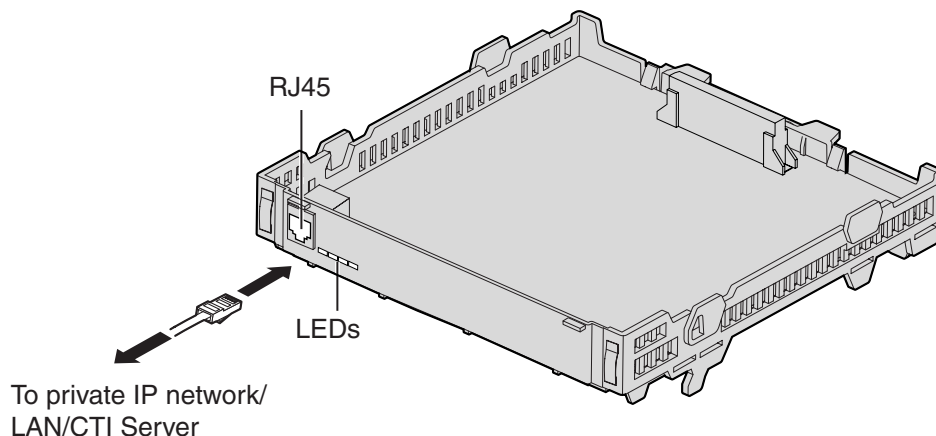
The maximum length of the extension cable that connects the Hybrid IP-PBX and the ISDN terminal equipment (TE) is shown below:



2.3.8 IP-GW4 Card (KX-TDA3480)

Function

4-channel VoIP gateway card. This card also enables CTI communication and system programming via a LAN. Compliant with VoIP H.323 V.2 protocol, and ITU-T G.729a, G.723.1, and G.711 CODEC methods. CSTA Phase 3 protocol compatible.



Accessories and User-supplied Items

Accessories (included): Extension Bolt × 1, Strap × 1, CD-ROM (including documentation for web programming) × 1

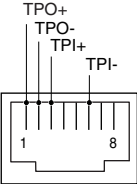
User-supplied (not included): RJ45 connector

Notes

- The 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 CTI server to provide third party call control CTI.
The operating system of the PC or CTI server required for third party call control depends on your CTI application software. For details, refer to the manual for your CTI application software.
- For CTI communication and system programming, the firmware (not LPR software) of the card must be version 1.400 or later. For details about the firmware version, refer to the documentation for the IP-GW4 card.
- 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 web programming designed for the IP-GW4 card.
- To confirm the trunk connection, refer to "Confirming the Trunk Connection" in "2.12.1 Starting the Hybrid IP-PBX".

Pin Assignments

RJ45 Connector (10BASE-T/100BASE-TX)

|  | Signal Name | Input (I)/Output (O) | Function |
|---|-------------|----------------------|----------------|
| | TPO+ | O | Transmit data+ |
| | TPO- | O | Transmit data- |
| | TPI+ | I | Receive data+ |
| | TPI- | I | Receive data- |
| | — | — | Reserved |

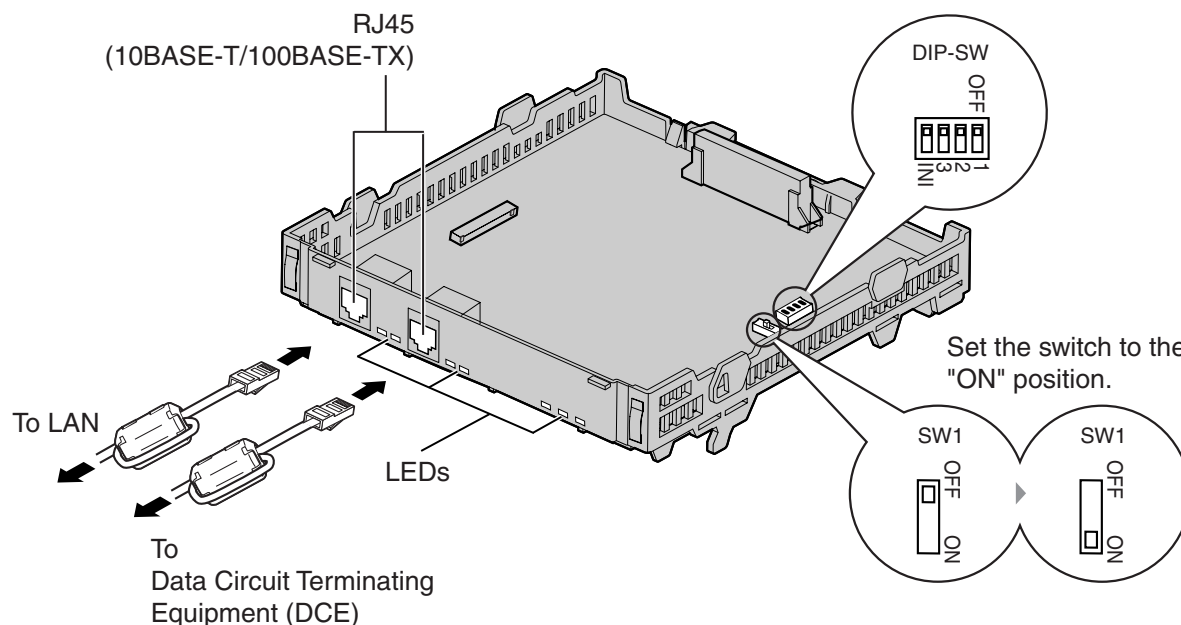
LED Indications

| Indication | Colour | Description |
|------------|--------|---|
| ON LINE | Green | On-line status indication <ul style="list-style-type: none"> ON: On-line mode OFF: Off-line mode Flashing: Maintenance mode <p>Note If the LINK indicator is OFF, the ON LINE indicator will also be OFF.</p> |
| ALARM | Red | Alarm indication <ul style="list-style-type: none"> ON: Alarm OFF: Normal |
| LINK | Green | Link status indication <ul style="list-style-type: none"> ON: Normal Connection OFF: Connection Error |
| DATA | Green | Data transmission indication <ul style="list-style-type: none"> ON: Data transmitting OFF: No data transmitted |

2.3.9 SIP-GW4 Card (KX-TDA3450)

Function

4-channel SIP gateway card. Compliant with RFC 3261, 3262, 3264, 3311, and 4028 protocols, and ITU-T G.729a/b and G.711 CODEC methods.



Accessories and User-supplied Items

Accessories (included): Ferrite core × 2, Extension Bolt × 1, Strap × 1, CD-ROM (including documentation for web programming) × 1

User-supplied (not included): RJ45 connector

Notes

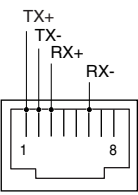
- The maximum length of the cable to be connected to this optional service card is 100 m.
- When connecting the RJ45 connector, attach the included ferrite core. Refer to "2.2.9 Attaching a Ferrite Core".
- For programming instructions and other information about the SIP-GW4 card, refer to the documentation for the SIP-GW4 card. To programme the SIP-GW4 card, use the web programming designed for the SIP-GW4 card.
- To confirm the trunk connection, refer to "Confirming the Trunk Connection" in "2.12.1 Starting the Hybrid IP-PBX".

Switch Settings

| Switch | Usage and Status Definition |
|--------|--|
| SW1 | Set the switch at "ON" position before installing the card in the PBX. |
| DIP-SW | Keep all DIP switches at default "OFF" positions. |

Pin Assignments

RJ45 Connector (10BASE-T/100BASE-TX)

|  | Signal Name | Level [V] | Function |
|---|-------------|-----------|-------------------|
| | TX+ | (+) | Transmit data (+) |
| | TX- | (-) | Transmit data (-) |
| | RX+ | (+) | Receive data (+) |
| | RX- | (-) | Receive data (-) |
| | — | — | Reserved |

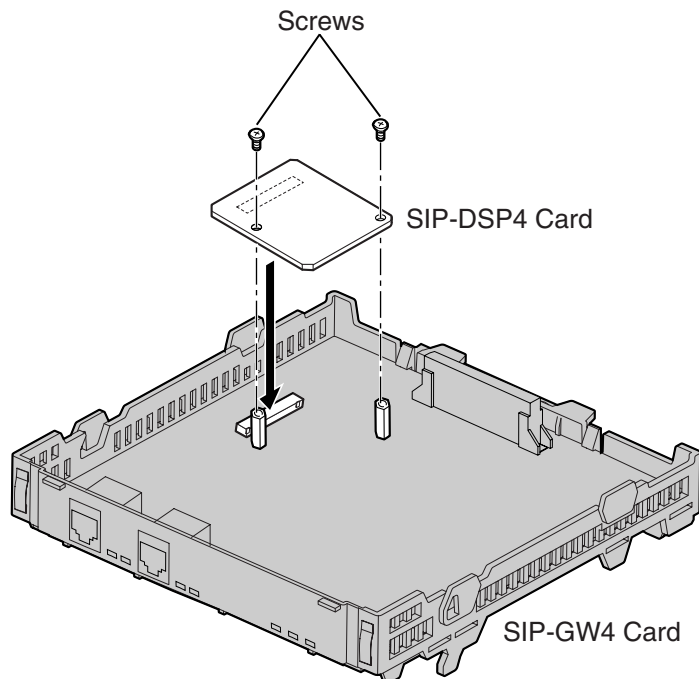
LED Indications

| Indication | | Colour | Description |
|------------|------|--------|--|
| RUN | | Green | Card status indication <ul style="list-style-type: none"> ON: Normal OFF: Power Off |
| VoIP | | Green | Voice data transmission status indication <ul style="list-style-type: none"> ON: Registered on a VoIP server OFF: Not registered on a VoIP server Flashing: During a conversation |
| PPP | | Green | Indication of whether a PPPoE session has been established with the IP telephone company <ul style="list-style-type: none"> ON: PPPoE session established OFF: PPPoE session not established Flashing: PPPoE session establishment in process |
| WAN | LINK | Green | Indication of link status with connected devices (e.g., ADSL modem) <ul style="list-style-type: none"> ON: Normal connection OFF: Connection error |
| | 100 | Green | Indication of transmission speed with connected devices (e.g., ADSL modem) <ul style="list-style-type: none"> ON: Operating at 100 Mbps OFF: Operating at 10 Mbps Flashing: Data transmitting (only when operating at 100 Mbps) |
| LAN | LINK | Green | Indication of link status with connected devices (e.g., PC, hub) <ul style="list-style-type: none"> ON: Normal connection OFF: Connection error |
| | 100 | Green | Indication of transmission speed with connected devices (e.g., PC, hub) <ul style="list-style-type: none"> ON: Operating at 100 Mbps OFF: Operating at 10 Mbps Flashing: Data transmitting (only when operating at 100 Mbps) |

2.3.10 SIP-DSP4 Card (KX-TDA3451)

Function

4-channel VoIP DSP card. To be mounted on the SIP-GW4 card.



Accessories and User-supplied Items

Accessories (included): Screws × 2

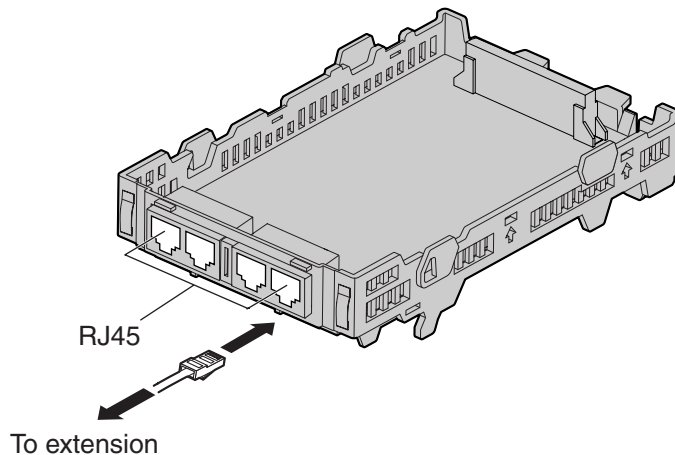
User-supplied (not included): none

2.4 Information about the Extension Cards

2.4.1 DLC4 Card (KX-TDA3171)

Function

4-port digital extension card for DPTs, DSS consoles, a Voice Processing System (VPS), and PT-interface CSs.



Accessories and User-supplied Items

Accessories (included): Extension Bolt × 1, Strap × 1

User-supplied (not included): RJ45 connector or RJ11 connector

Notice

The connector type may be RJ45 or RJ11 depending on the country/area.

Note

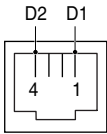
For details about connecting the CS, refer to "2.8.7 Connecting a Cell Station to the Hybrid IP-PBX".

Pin Assignments

RJ45 Connector

| | Signal Name | Function |
|--|-------------|------------------|
| | D1 | Data port (High) |
| | D2 | Data port (Low) |
| | — | Reserved |

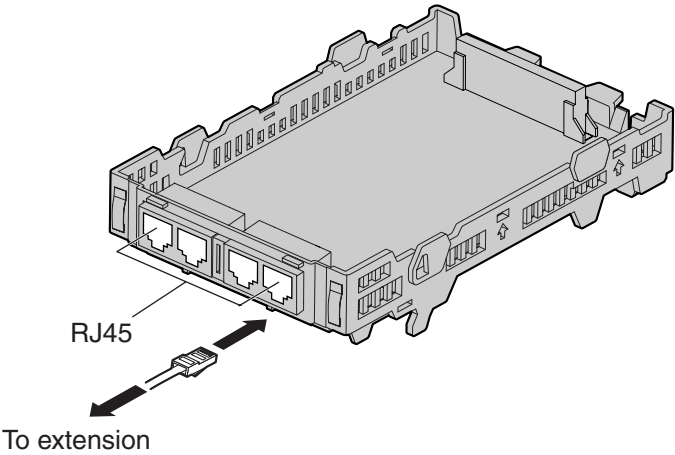
RJ11 Connector

|  | Signal Name | Function |
|---|-------------|------------------|
| | D1 | Data port (High) |
| | D2 | Data port (Low) |
| | — | Reserved |

2.4.2 SLC4 Card (KX-TDA3173)

Function

4-port extension card for SLTs.



Accessories and User-supplied Items

Accessories (included): Extension Bolt × 1, Strap × 1

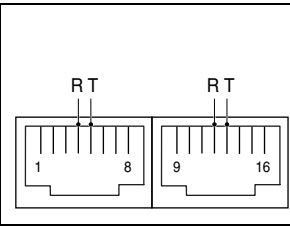
User-supplied (not included): RJ45 connector or RJ11 connector

Notice

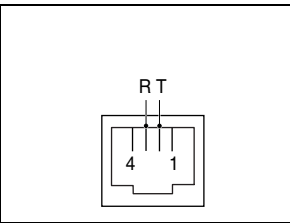
The connector type may be RJ45 or RJ11 depending on the country/area.

Pin Assignments

RJ45 Connector

|  | Signal Name | Function |
|---|-------------|----------|
| | T | Tip |
| | R | Ring |
| | — | Reserved |

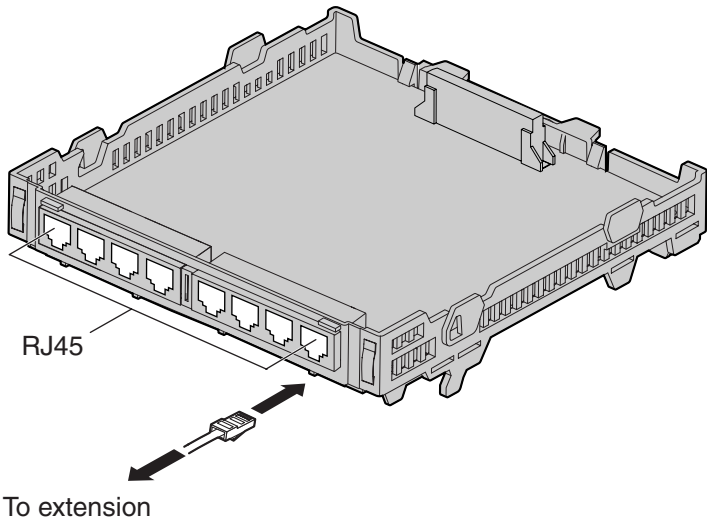
RJ11 Connector

|  | Signal Name | Function |
|---|-------------|----------|
| | T | Tip |
| | R | Ring |
| | — | Reserved |

2.4.3 DLC8 Card (KX-TDA3172)

Function

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



Accessories and User-supplied Items

Accessories (included): Extension Bolt × 1, Strap × 1

User-supplied (not included): RJ45 connector or RJ11 connector

Notice

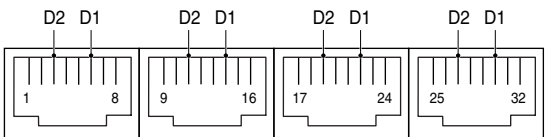
The connector type may be RJ45 or RJ11 depending on the country/area.

Note

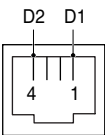
For details about connecting the CS, refer to "2.8.7 Connecting a Cell Station to the Hybrid IP-PBX".

Pin Assignments

RJ45 Connector

|  | Signal Name | Function |
|---|-------------|------------------|
| | D1 | Data port (High) |
| | D2 | Data port (Low) |
| | — | Reserved |

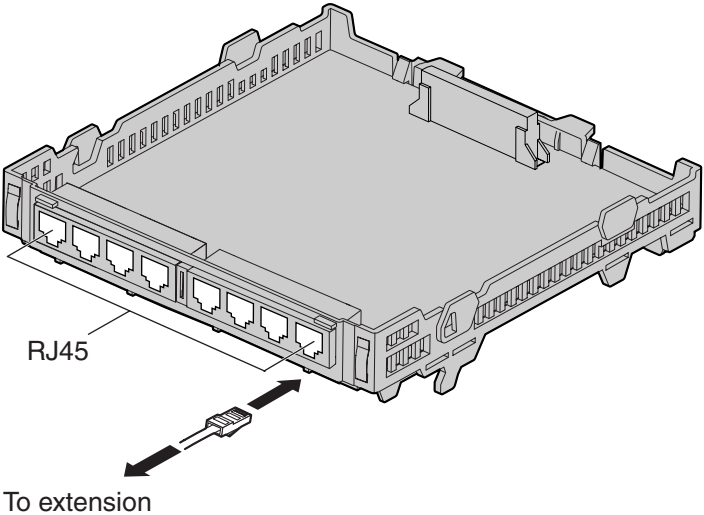
RJ11 Connector

|  | Signal Name | Function |
|---|-------------|------------------|
| | D1 | Data port (High) |
| | D2 | Data port (Low) |
| | — | Reserved |

2.4.4 SLC8 Card (KX-TDA3174)

Function

8-port extension card for SLTs.



Accessories and User-supplied Items

Accessories (included): Extension Bolt ×1, Strap × 1

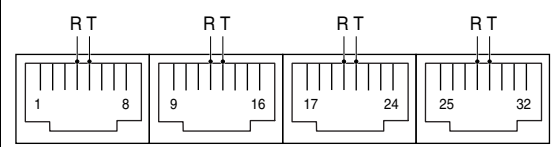
User-supplied (not included): RJ45 connector or RJ11 connector

Notice

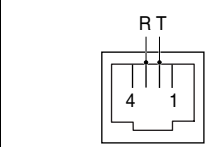
The connector type may be RJ45 or RJ11 depending on the country/area.

Pin Assignments

RJ45 Connector

|  | Signal Name | Function |
|---|-------------|----------|
| | T | Tip |
| | R | Ring |
| | — | Reserved |

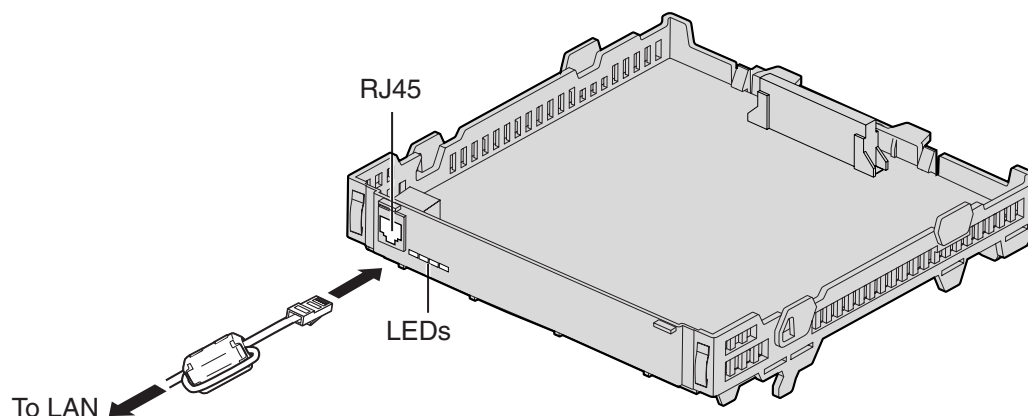
RJ11 Connector

|  | Signal Name | Function |
|---|-------------|----------|
| | T | Tip |
| | R | Ring |
| | — | Reserved |

2.4.5 IP-EXT4 Card (KX-TDA3470)

Function

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



Accessories and User-supplied Items

Accessories (included): Ferrite core × 1, Extension Bolt × 1, Strap × 1

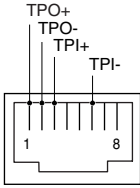
User-supplied (not included): RJ45 connector

Notes

- The maximum length of the cable to be connected to this optional service card is 100 m.
- When connecting the RJ45 connector, attach the included ferrite core. Refer to "2.2.9 Attaching a Ferrite Core".

Pin Assignments

RJ45 Connector (100BASE-TX)

|  | Signal Name | Input (I)/Output (O) | Function |
|---|-------------|----------------------|----------------|
| | TPO+ | O | Transmit data+ |
| | TPO- | O | Transmit data- |
| | TPI+ | I | Receive data+ |
| | TPI- | I | Receive data- |
| | — | — | Reserved |

LED Indications

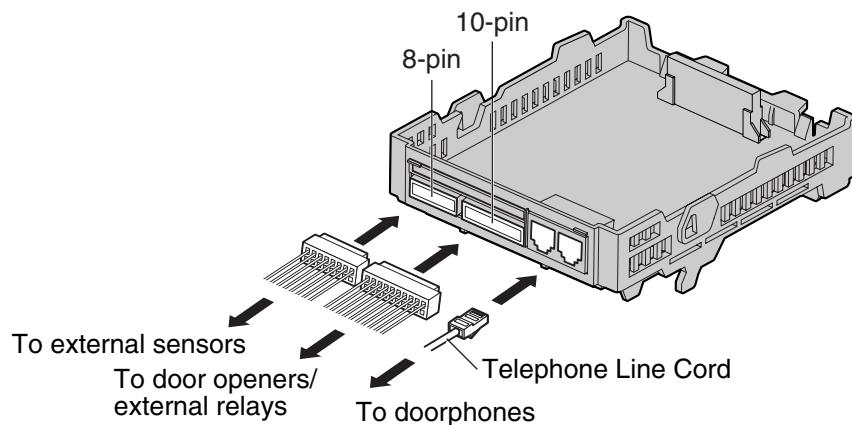
| Indication | Colour | Description |
|------------|--------|--|
| ON LINE | Green | <p>On-line status indication</p> <ul style="list-style-type: none"> ON: At least one port is in use (an IP-PT is connected) OFF: No ports are in use (no IP-PTs are connected) <p>Note</p> <p>If the LINK indicator is OFF, the ON LINE indicator will also be OFF.</p> |
| ALARM | Red | <p>Alarm indication</p> <ul style="list-style-type: none"> ON: Alarm OFF: Normal |
| LINK | Green | <p>Link status indication</p> <ul style="list-style-type: none"> ON: Normal connection OFF: Connection error |
| DATA | Green | <p>Data transmission indication</p> <ul style="list-style-type: none"> ON: Data transmitting OFF: No data transmitted |

2.5 Information about the Other Cards

2.5.1 DPH4 Card (KX-TDA3161)

Function

4-port doorphone card for 4 doorphones, 4 door openers or external relays, and 4 external sensors.



Accessories and User-supplied Items

Accessories (included): Extension Bolt × 1, Strap × 1, 8-pin terminal block × 1, 10-pin terminal block × 1, Telephone Line Cord × 2, Terminal Box × 1 (for DPH4 card with RJ45 connectors) or 2 (for DPH4 card with RJ11 connectors)

User-supplied (not included): Copper wire

Notice

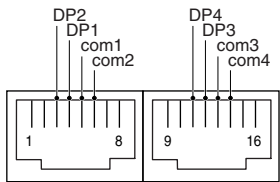
The connector type may be RJ45 or RJ11 depending on the country/area.
Shown above is a card having the RJ45 connectors.

Note

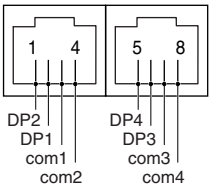
For details about connection to doorphones, door openers, external sensors, and external relays, refer to "2.9.1 Connection of Doorphones, Door Openers, External Sensors, and External Relays".

Pin Assignments

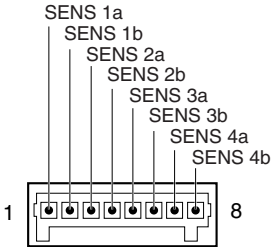
RJ45 Connector

|  | Signal Name | Function |
|---|-------------|----------------------|
| | DP2 | Doorphone 2 transmit |
| | DP1 | Doorphone 1 transmit |
| | com1 | Doorphone 1 receive |
| | com2 | Doorphone 2 receive |
| | DP4 | Doorphone 4 transmit |
| | DP3 | Doorphone 3 transmit |
| | com3 | Doorphone 3 receive |
| | com4 | Doorphone 4 receive |
| | — | Reserved |

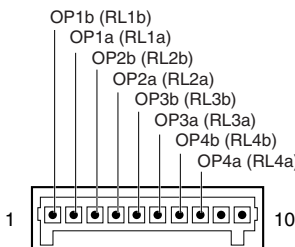
RJ11 Connector

|  | Signal Name | Function |
|---|-------------|----------------------|
| | DP2 | Doorphone 2 transmit |
| | DP1 | Doorphone 1 transmit |
| | com1 | Doorphone 1 receive |
| | com2 | Doorphone 2 receive |
| | DP4 | Doorphone 4 transmit |
| | DP3 | Doorphone 3 transmit |
| | com3 | Doorphone 3 receive |
| | com4 | Doorphone 4 receive |

8-pin Terminal Block

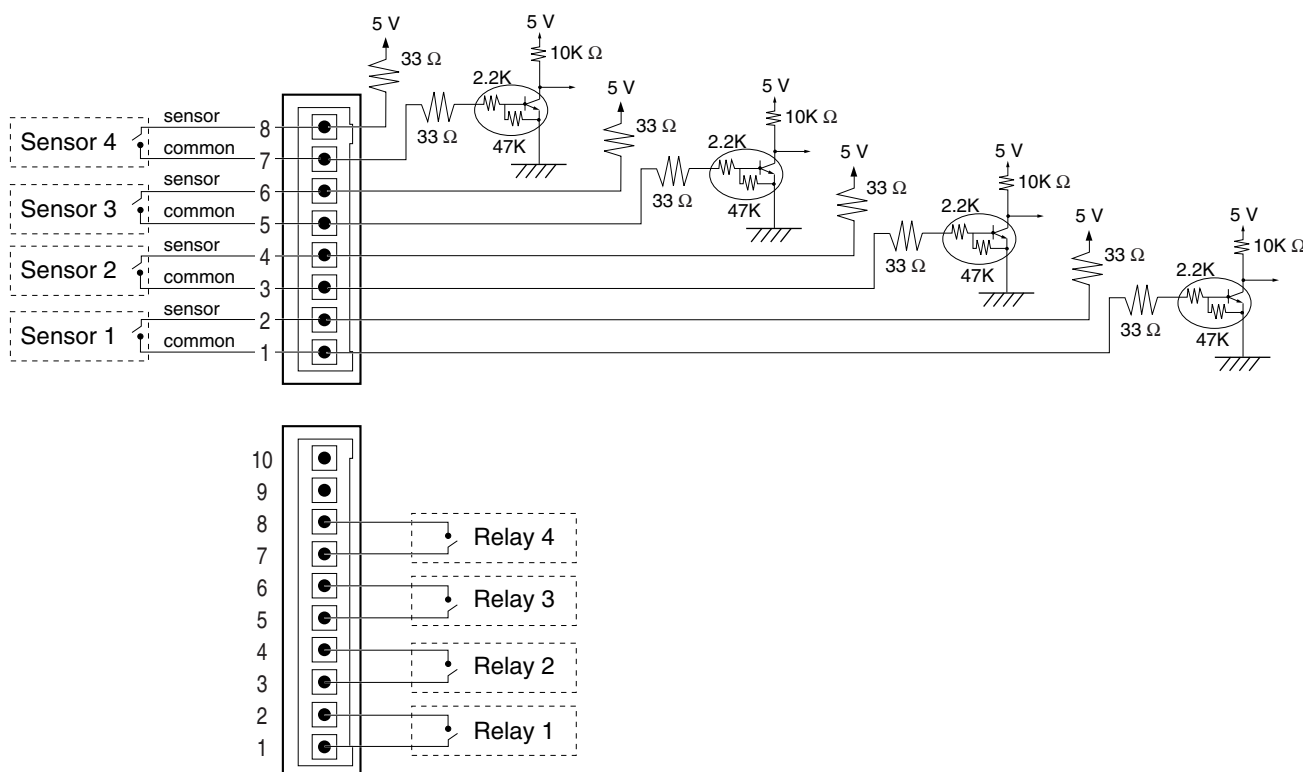
|  | Signal Name | Function |
|---|-------------|----------------|
| | SENS 1a | Sensor Input 1 |
| | SENS 1b | com 1 |
| | SENS 2a | Sensor Input 2 |
| | SENS 2b | com 2 |
| | SENS 3a | Sensor Input 3 |
| | SENS 3b | com 3 |
| | SENS 4a | Sensor Input 4 |
| | SENS 4b | com 4 |

10-pin Terminal Block

| | Signal Name | Function |
|---|-------------|---------------------------------|
|  | OP1b (RL1b) | Door opener 1 (Relay 1) |
| | OP1a (RL1a) | Door opener 1 com (Relay 1 com) |
| | OP2b (RL2b) | Door opener 2 (Relay 2) |
| | OP2a (RL2a) | Door opener 2 com (Relay 2 com) |
| | OP3b (RL3b) | Door opener 3 (Relay 3) |
| | OP3a (RL3a) | Door opener 3 com (Relay 3 com) |
| | OP4b (RL4b) | Door opener 4 (Relay 4) |
| | OP4a (RL4a) | Door opener 4 com (Relay 4 com) |
| | — | Reserved |
| | — | Reserved |

Connection Diagram for External Sensors and External Relays

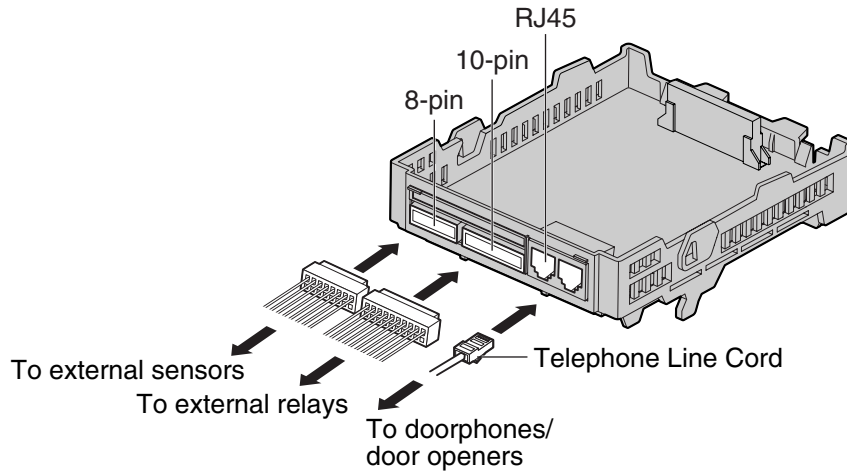
Power to the external sensor is provided from the DPH4 card and must be grounded through the DPH4 card as indicated in the diagram below. A pair of "sensor" and "common" lines must be connected to the DPH4 card for each external sensor. The Hybrid IP-PBX detects input from the sensor when the signal is under $100\ \Omega$.



2.5.2 DPH2 Card (KX-TDA3162)

Function

2-port doorphone card for 2 German-type doorphones, 2 door openers, 4 external sensors, and 4 external relays.



Accessories and User-supplied Items

Accessories (included): Extension Bolt × 1, Strap × 1, 8-pin terminal block × 1, 10-pin terminal block × 1, Telephone Line Cord × 2, Terminal Box × 1

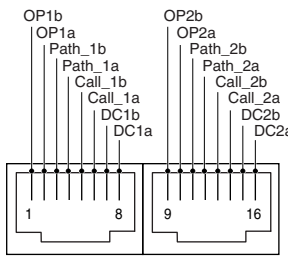
User-supplied (not included): Copper wire

Note

For details about connection to doorphones, door openers, external sensors, and external relays, refer to "2.9.1 Connection of Doorphones, Door Openers, External Sensors, and External Relays".

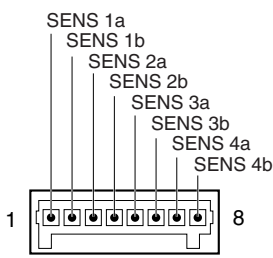
Pin Assignments

RJ45 Connector

|  | Proprietary Signal Name | Standard Signal Name | Function |
|---|-------------------------|-----------------------------|---------------|
| | OP1b | TO b (1) | Door opener 1 |
| OP1a | TO a (1) | Door opener 1 com | |
| Path_1b | b (1) | Doorphone 1 transmit | |
| Path_1a | a (1) | Doorphone 1 receive | |
| Call_1b | RT b (1) | Doorphone 1 call button | |
| Call_1a | RT a (1) | Doorphone 1 call button com | |
| DC1b | TS b (1) | Doorphone control 1 | |
| DC1a | TS a (1) | Doorphone control 1 com | |
| OP2b | TO b (2) | Door opener 2 | |
| OP2a | TO a (2) | Door opener 2 com | |
| Path_2b | b (2) | Doorphone 2 transmit | |
| Path_2a | a (2) | Doorphone 2 receive | |
| Call_2b | RT b (2) | Doorphone 2 call button | |
| Call_2a | RT a (2) | Doorphone 2 call button com | |
| DC2b | TS b (2) | Doorphone control 2 | |
| DC2a | TS a (2) | Doorphone control 2 com | |

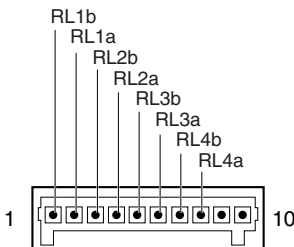
8-pin Terminal Block

| Signal Name | Function |
|-------------|----------------|
| SENS 1a | Sensor Input 1 |
| SENS 1b | com 1 |
| SENS 2a | Sensor Input 2 |
| SENS 2b | com 2 |
| SENS 3a | Sensor Input 3 |
| SENS 3b | com 3 |
| SENS 4a | Sensor Input 4 |
| SENS 4b | com 4 |



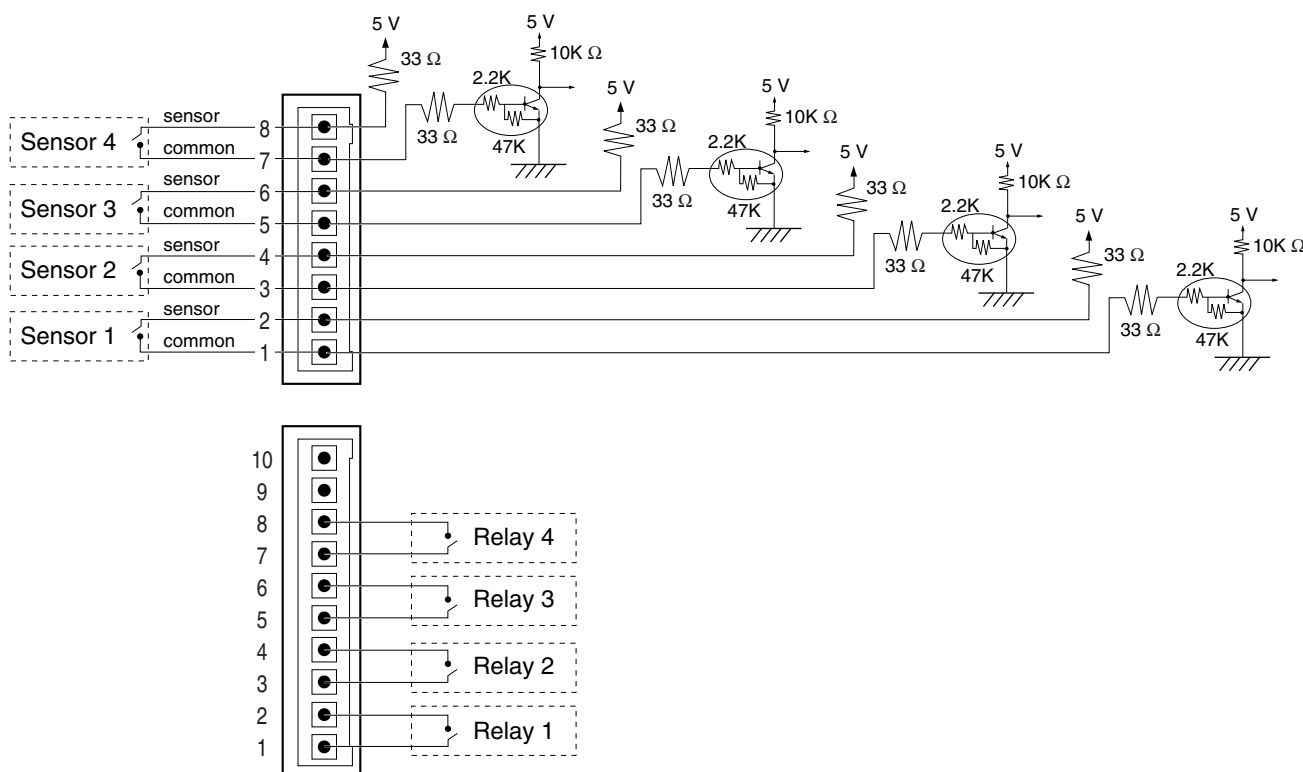
1 8

10-pin Terminal Block

|  | Signal Name | Function |
|---|-------------|-------------|
| | RL1b | Relay 1 |
| | RL1a | Relay 1 com |
| | RL2b | Relay 2 |
| | RL2a | Relay 2 com |
| | RL3b | Relay 3 |
| | RL3a | Relay 3 com |
| | RL4b | Relay 4 |
| | RL4a | Relay 4 com |
| | — | Reserved |

Connection Diagram for External Sensors and External Relays

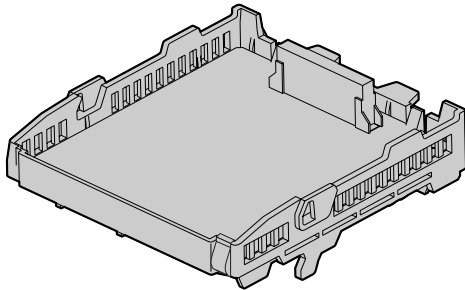
Power to the external sensor is provided from the DPH2 card and must be grounded through the DPH2 card as indicated in the diagram below. A pair of "sensor" and "common" lines must be connected to the DPH2 card for each external sensor. The Hybrid IP-PBX detects input from the sensor when the signal is under 100 Ω .



2.5.3 ECHO8 Card (KX-TDA3166)

Function

8-channel card for echo cancellation during conferences.



Accessories and User-supplied Items

Accessories (included): Extension Bolt × 1, Screw × 1

User-supplied (not included): none

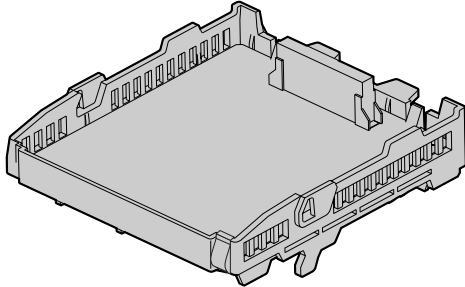
Note

To establish a conference call involving 6 to 8 parties, install an ECHO8 card and enable echo cancellation for conferences using the KX-TDA30 Maintenance Console. For details, refer to "Echo Cancel—Conference" in "2.8.17 [2-9] System Options" of the PC Programming Manual.

2.5.4 MSG2 Card (KX-TDA3191)

Function

2-channel message card.



Accessories and User-supplied Items

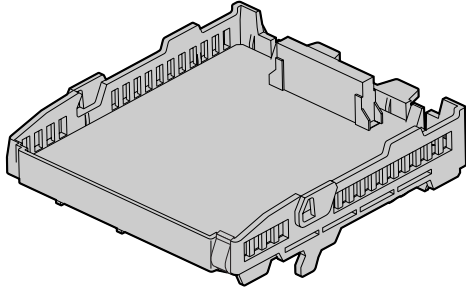
Accessories (included): Extension Bolt × 1, Screw × 1

User-supplied (not included): none

2.5.5 SVM2 Card (KX-TDA3192)

Function

2-channel simplified voice message card for Built-in Simplified Voice Message feature.



Accessories and User-supplied Items

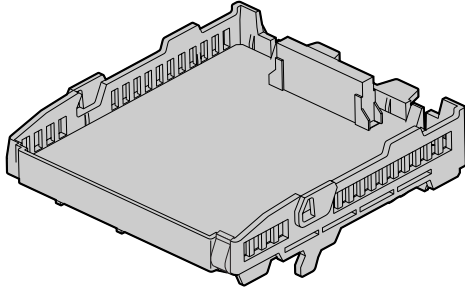
Accessories (included): Extension Bolt × 1, Screw × 1

User-supplied (not included): none

2.5.6 EXT-CID Card (KX-TDA3168)

Function

Sends Caller ID signals to extension ports.



Accessories and User-supplied Items

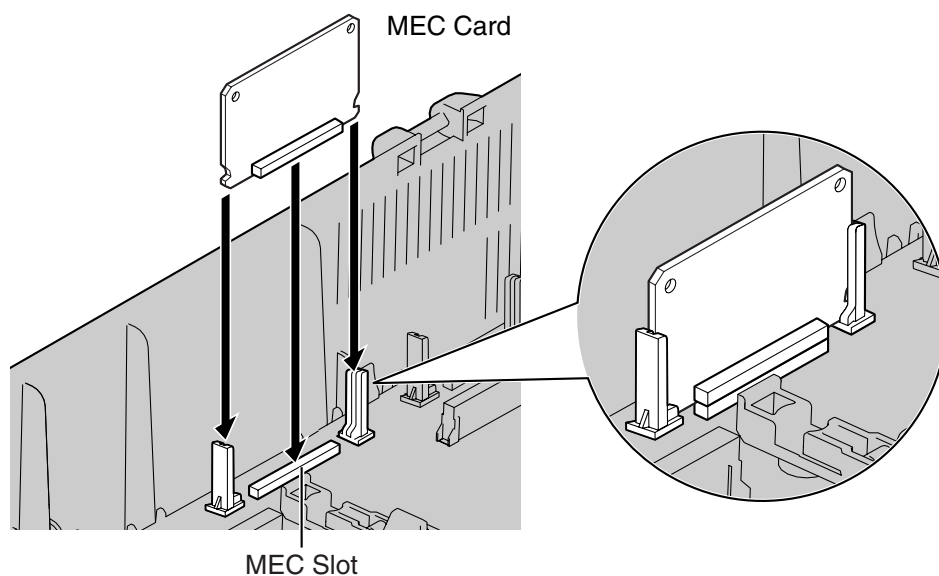
Accessories (included): Extension Bolt × 1, Screw × 1

User-supplied (not included): none

2.5.7 MEC Card (KX-TDA3105)

Function

Memory expansion card to increase system data storage space, double the number of DPTs (using Digital XDP connection), and enable Broadcasting, display language selection for VM Menu, and Call Billing for Guest Room features. To be installed in the MEC slot.



Accessories and User-supplied Items

Accessories (included): none

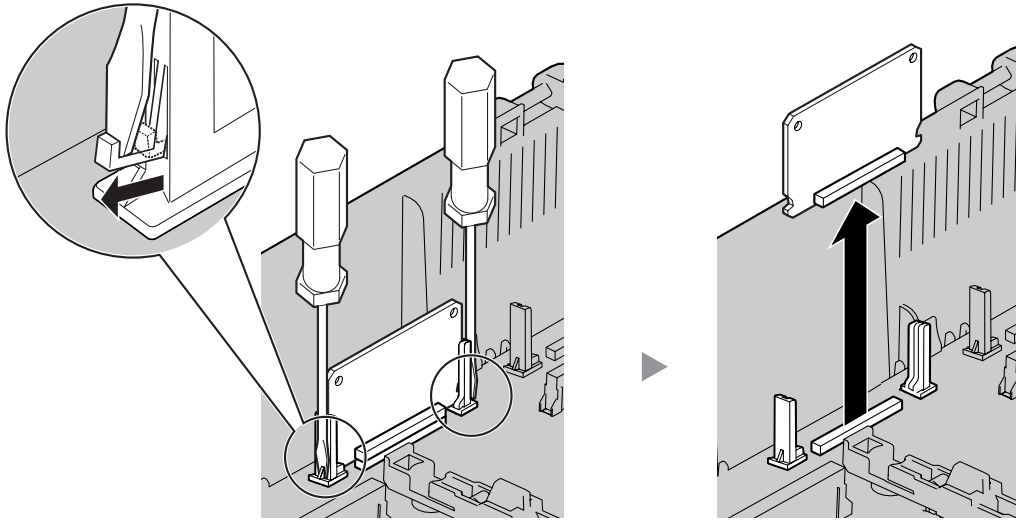
User-supplied (not included): none

CAUTION

Make sure to insert the MEC card between the guide rails until it locks into the MEC slot. Push the card firmly into place until you hear a clicking sound.

Removing the MEC Card

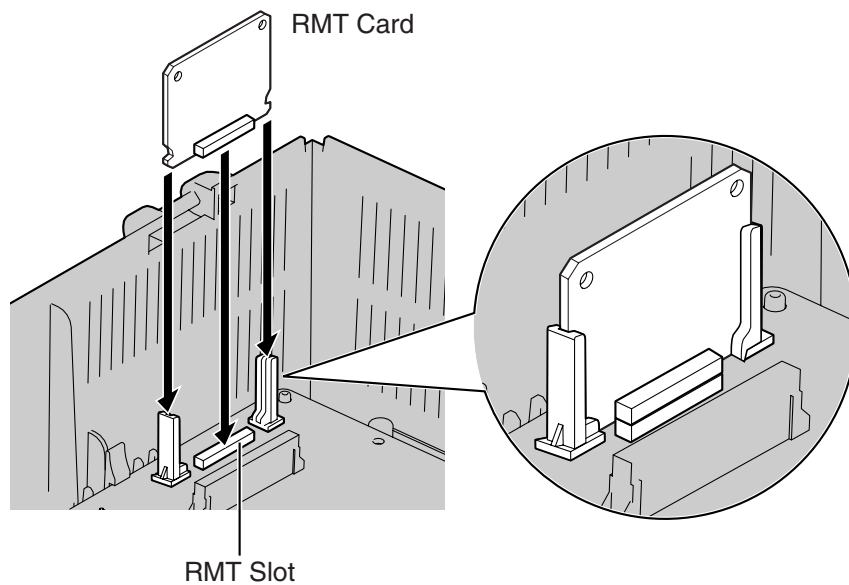
Pull open the guide rails using a flathead screwdriver and, while holding them open, remove the MEC card.



2.5.8 RMT Card (KX-TDA3196)

Function

Analogue modem card for remote communication with the Hybrid IP-PBX. ITU-T V.90 support. To be installed in the RMT slot.



Accessories and User-supplied Items

Accessories (included): none

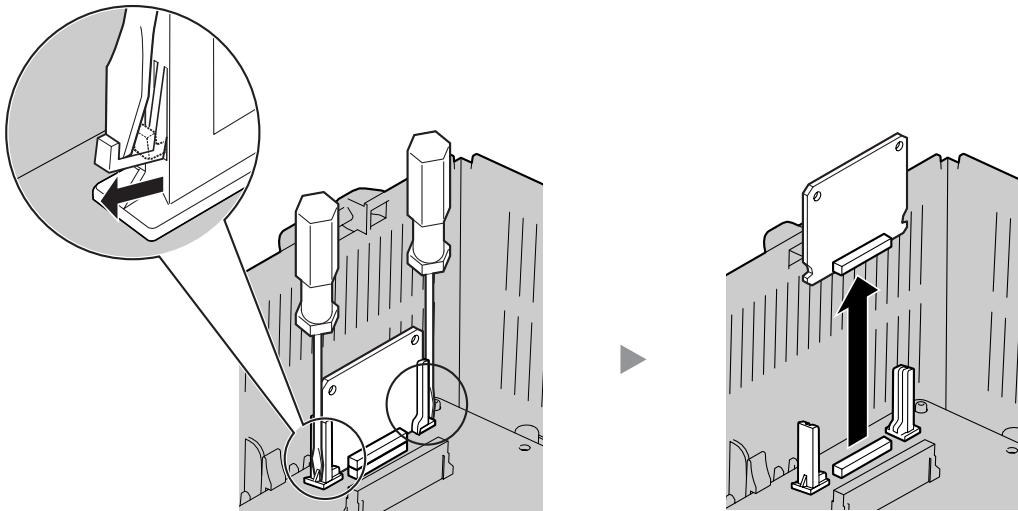
User-supplied (not included): none

CAUTION

Make sure to insert the RMT card between the guide rails until it locks into the RMT slot. Push the card firmly into place until you hear a clicking sound.

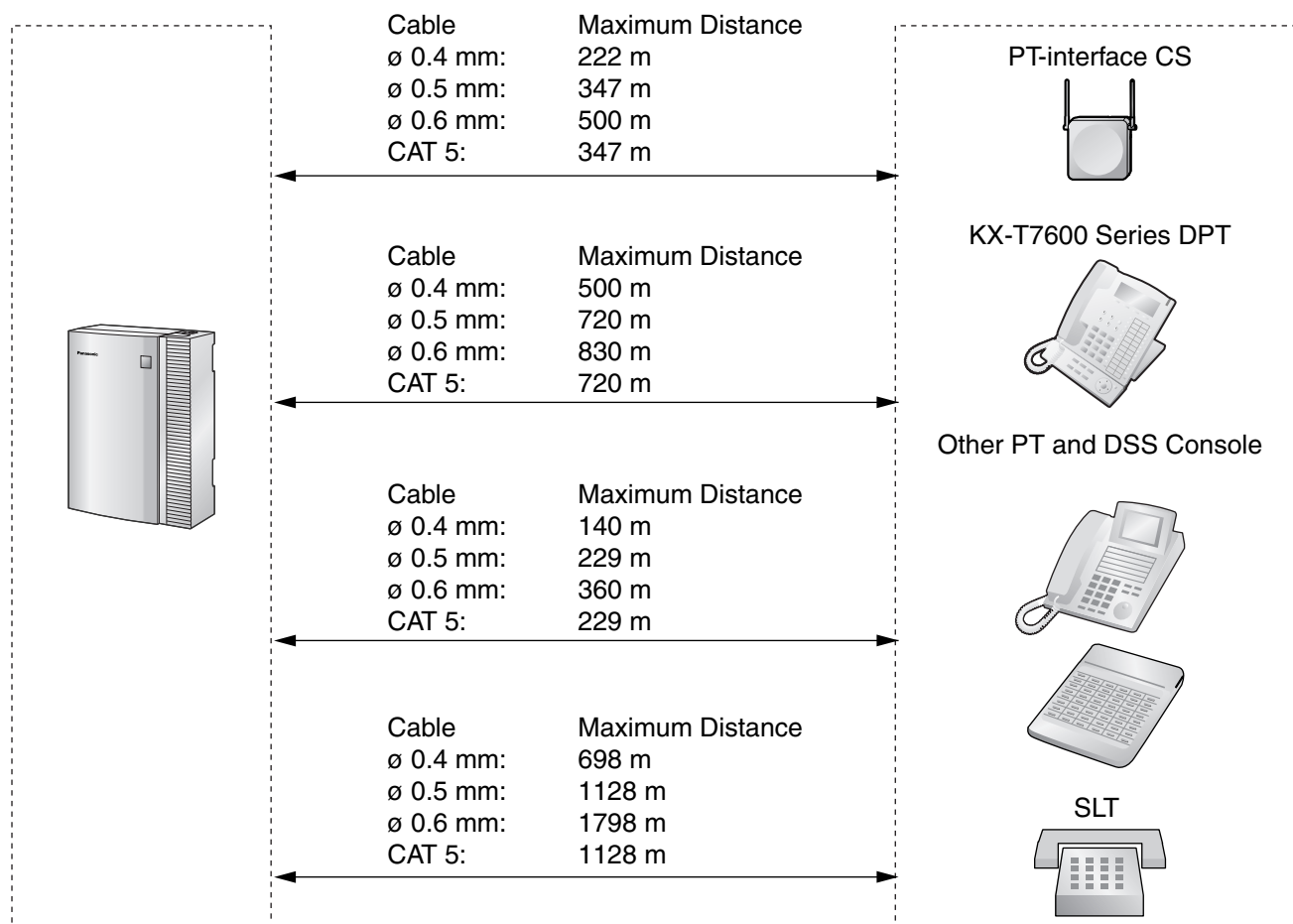
Removing the RMT Card

Pull open the guide rails using a flathead screwdriver and, while holding them open, remove the RMT card.



2.6 Connection of Extensions

2.6.1 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 |
|---------------------------------|-----------------|-----|-----|-------------|-----|
| Super Hybrid Ports (Main Board) | ✓ | ✓ | ✓ | ✓ | ✓ |
| SLC4, SLC8 Cards | | | | | ✓ |
| DLC4, DLC8 Cards | ✓ | ✓ | | ✓ | |

"✓" indicates that the extension card or Super Hybrid Ports support the terminal.

2.6.2 Parallel Connection of the Extensions

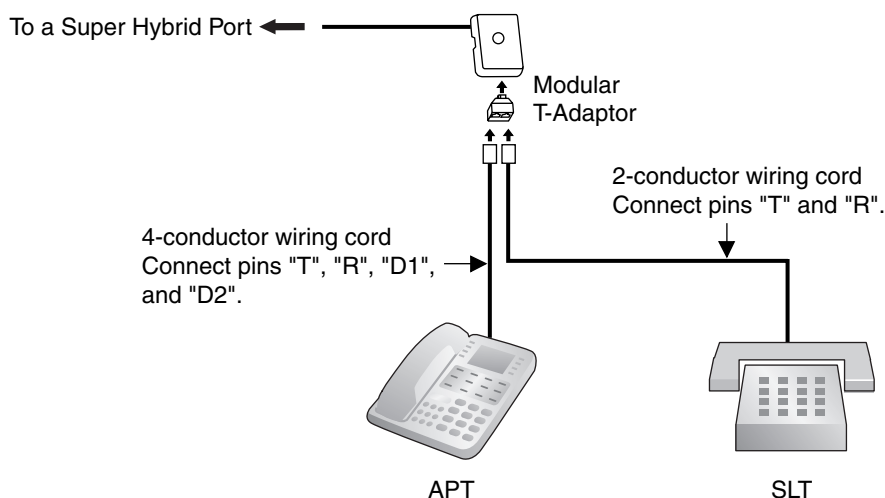
Any SLT can be connected in parallel with an APT or a DPT as follows.

Note

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

With APT

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

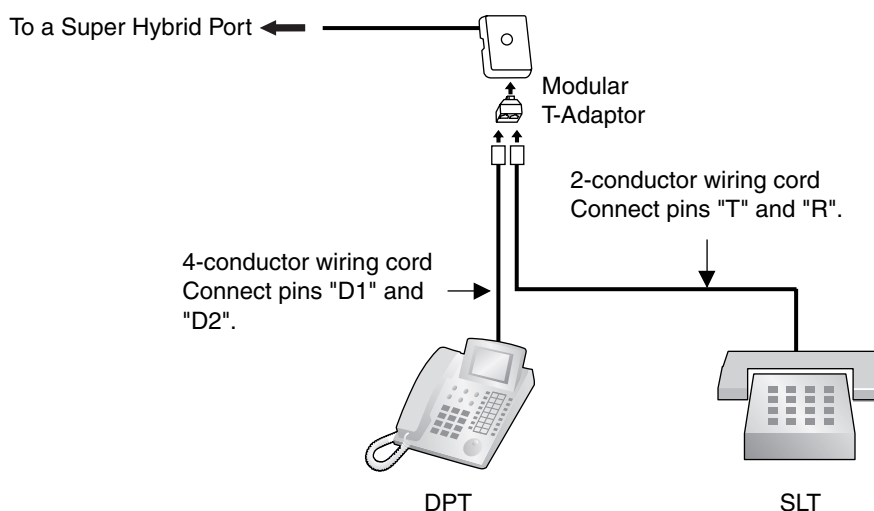


With DPT

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

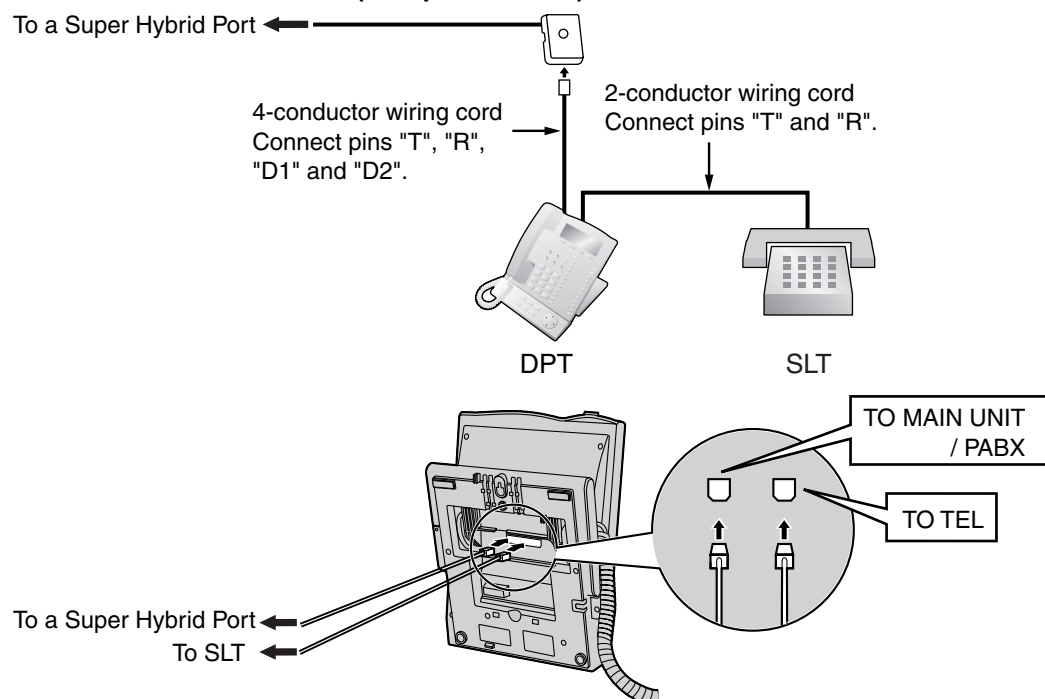
If XDP mode is enabled through system programming, parallel connection is not possible. Refer to "1.11.9 Parallelled Telephone" and "2.1.1 Extension Port Configuration" in the Feature Guide for further information.

Using a Modular T-Adaptor

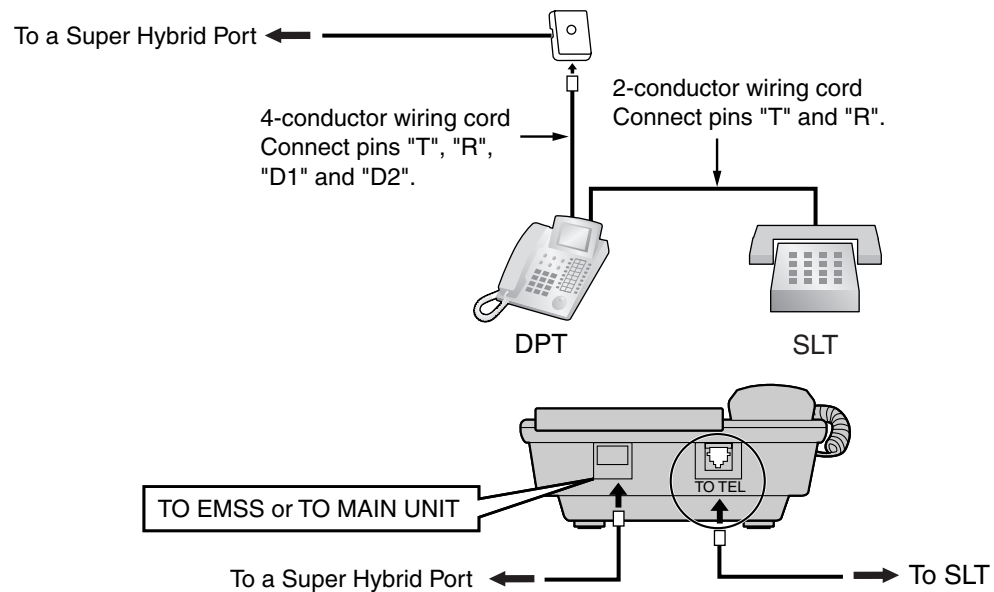


Using an EXtra Device Port

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



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



2.6.3 Digital EXtra Device Port (Digital XDP) Connection

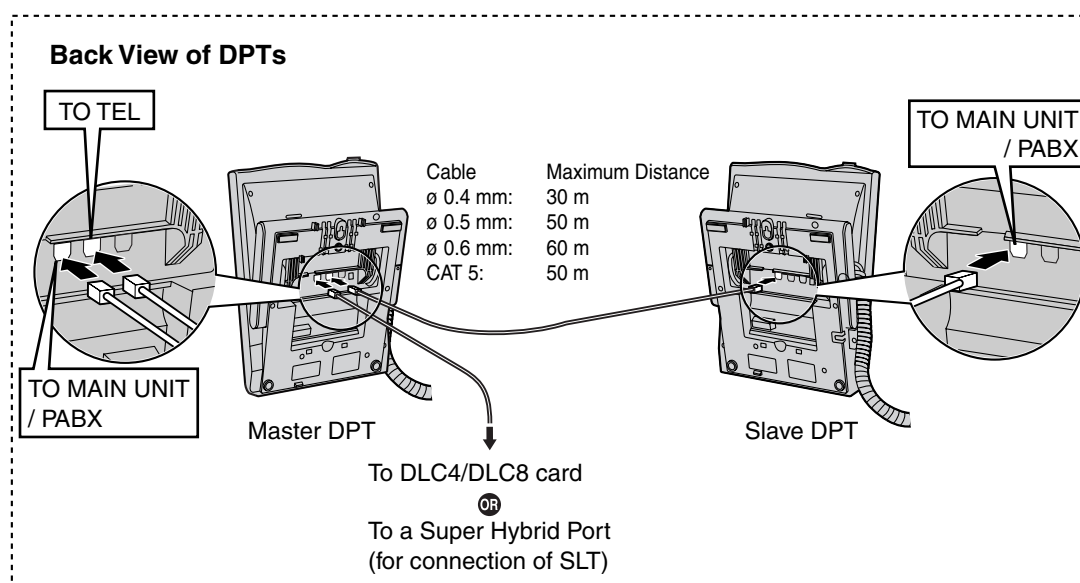
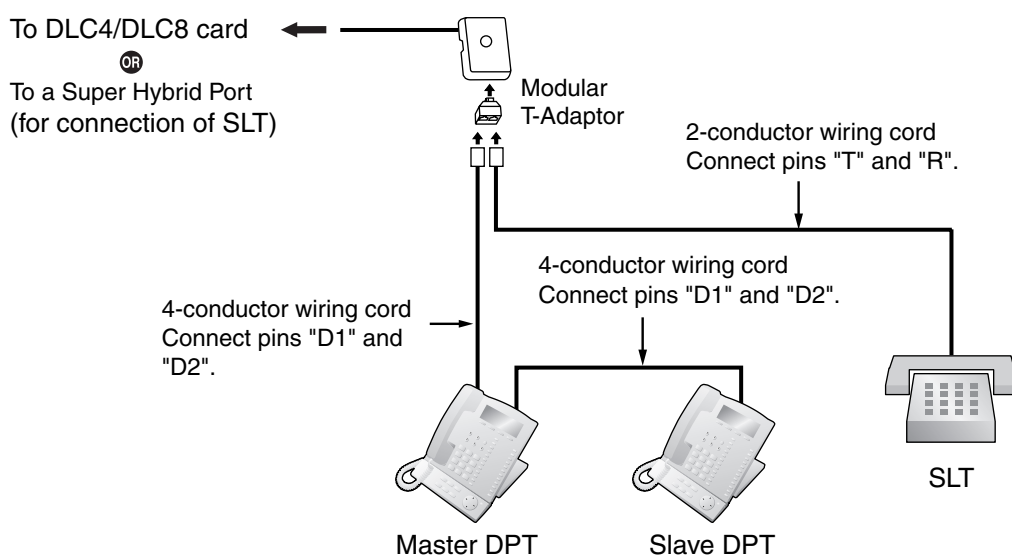
A DPT can be connected to another DPT on the Digital XDP connection. In addition, if the DPT is connected to a Super Hybrid Port, it can also have an SLT connected in Parallel mode or XDP mode.

Notes

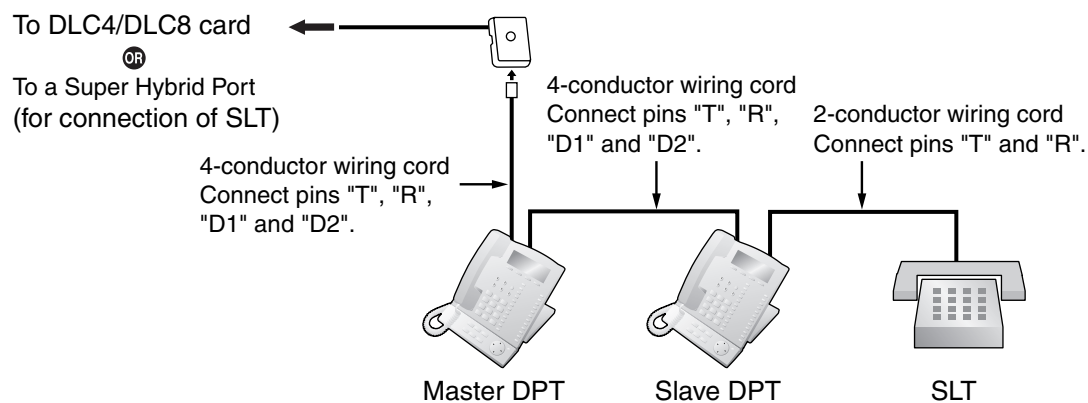
- Both DPTs must be KX-T7600 series DPTs (except KX-T7640). Note that the KX-T7667 can only be connected as a slave DPT.
- Parallel mode or XDP mode can be selected through system programming.
- If XDP mode is enabled through system programming, parallel connection is not possible. Refer to "1.11.9 Parallelled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

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

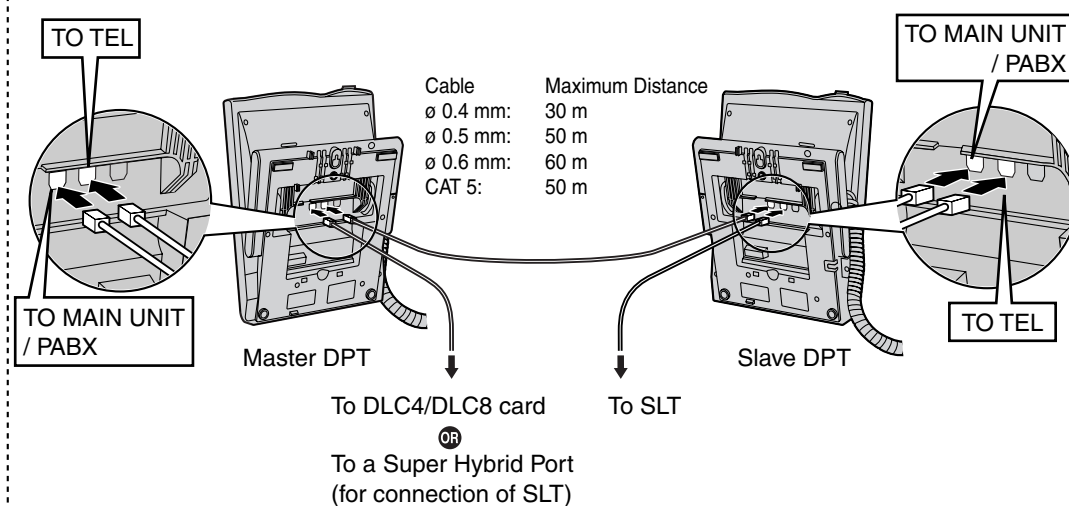
Using a Modular T-Adaptor



Using an EXtra Device Port

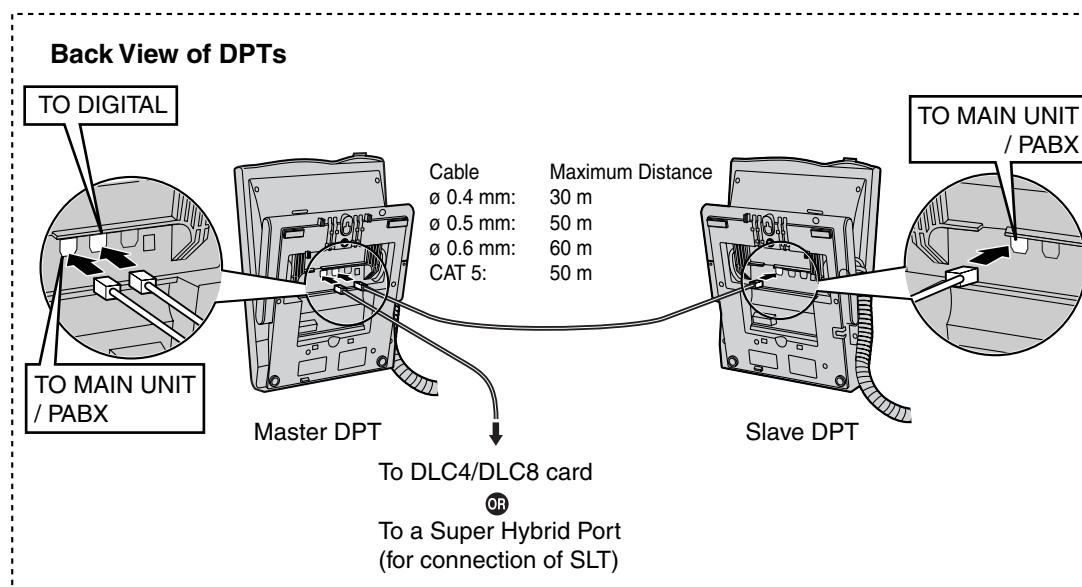
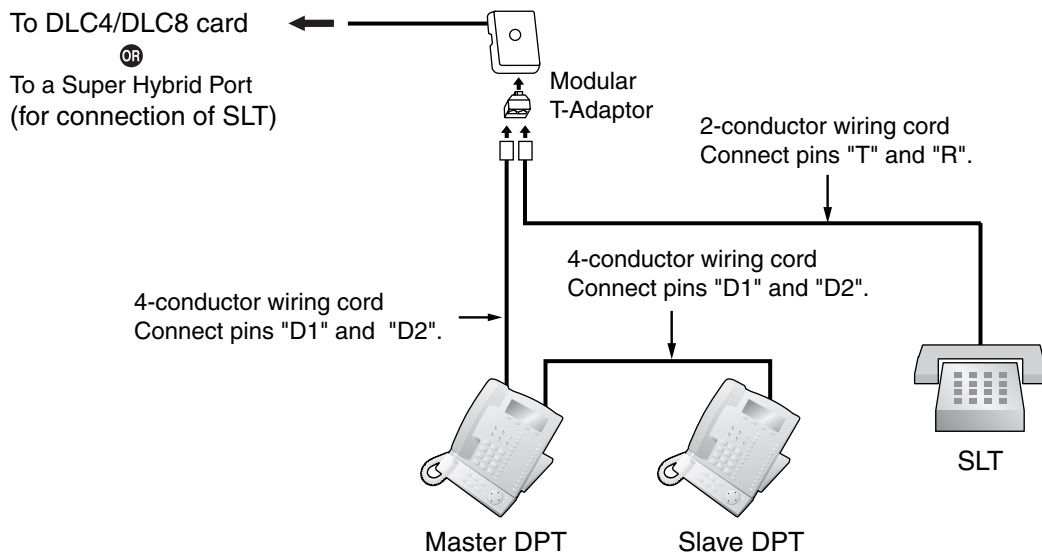


Back View of DPTs

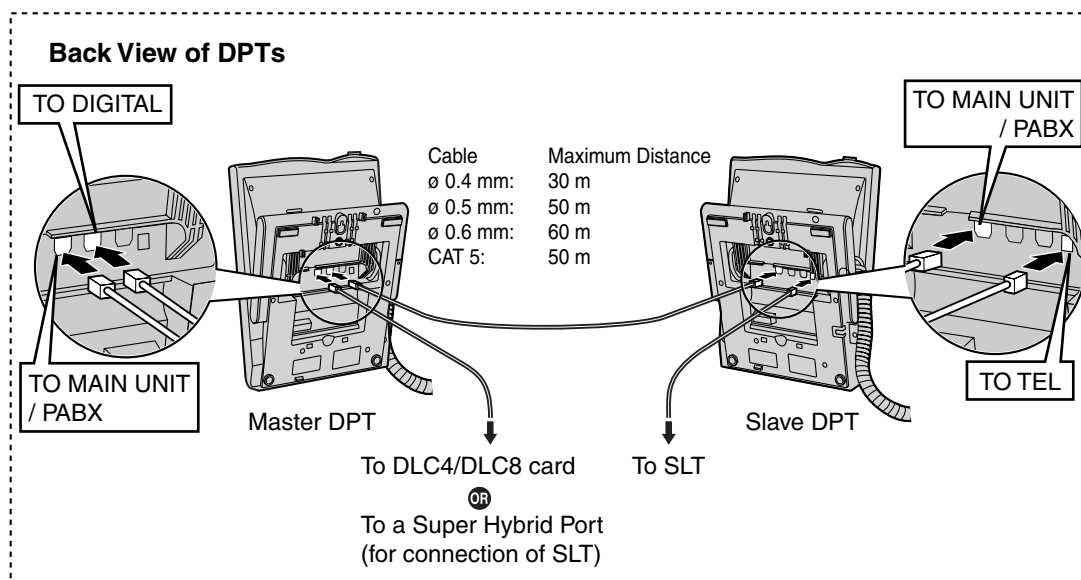
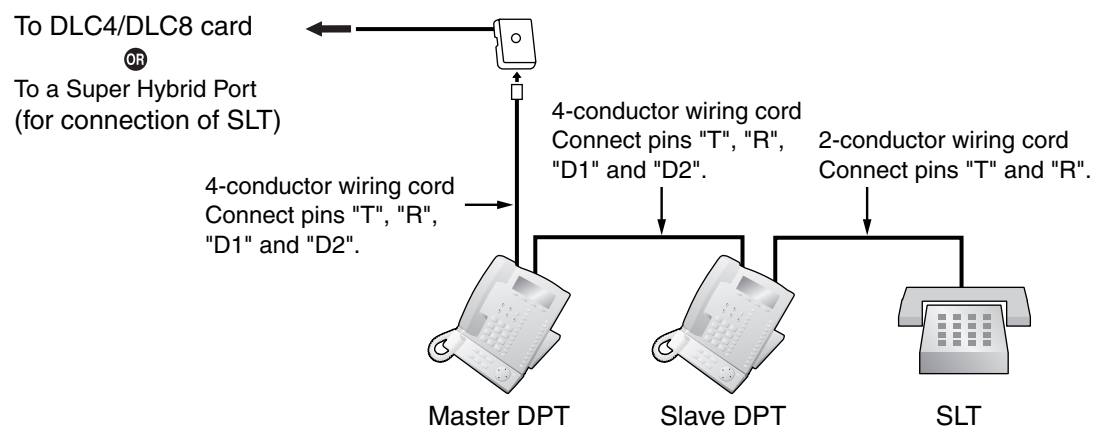


With KX-T7600E Series DPT

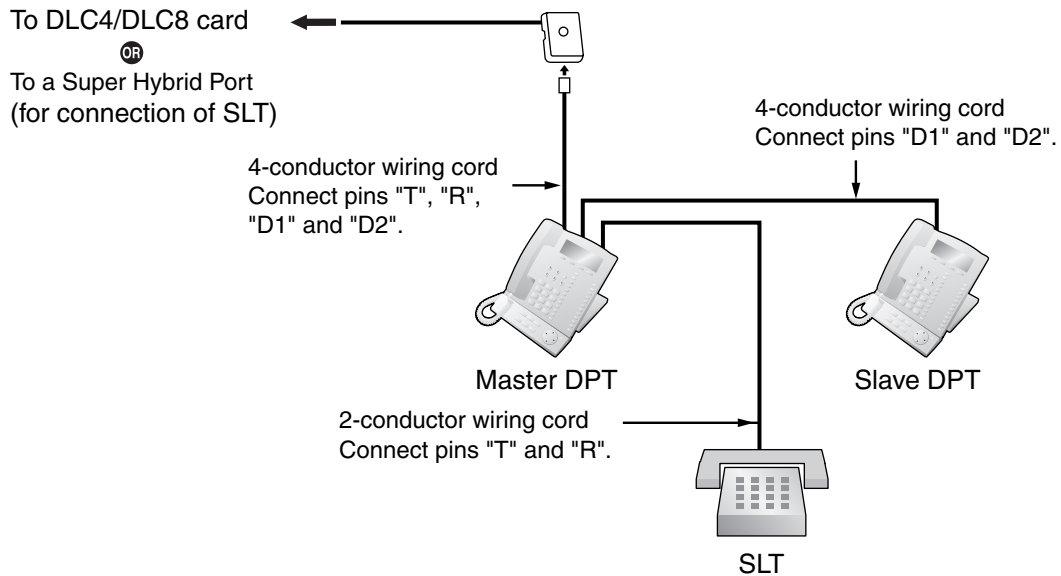
Using a Modular T-Adaptor



Using an EXtra Device Port Connecting to a Slave DPT



Connecting to a Master DPT



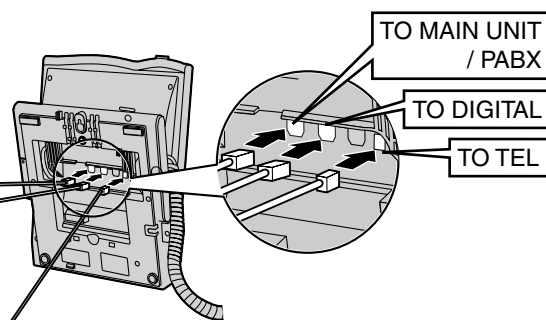
Back View of DPTs

To DLC4/DLC8 card
OR
To a Super Hybrid Port
(for connection of SLT)

To slave DPT

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

To SLT



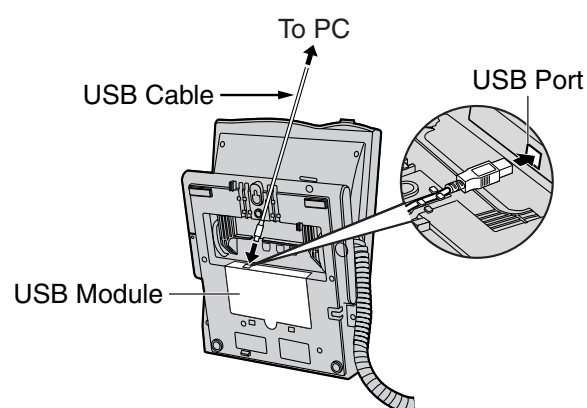
2.6.4 First Party Call Control CTI Connection

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 2.0), 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

- The 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.

2.7 Connection of DECT Portable Stations

2.7.1 Overview

The following equipment is required to connect the wireless system:

CS: Cell Station (KX-TDA0141CE)

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 Panasonic PBXs in use in European countries.

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

The KX-TDA30 can support up to 28 PSs. For more details about the PS, please refer to the PS Operating Instructions.

RF Specification

| Item | Description |
|---------------------------|---|
| Radio Access Method | MultiCarrier 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} KX-TDA30BX/KX-TDA30TW: 1880 MHz to 1895 MHz

^{*2} KX-TDA30BX/KX-TDA30TW: 8

CAUTION

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

2.7 Connection of DECT Portable Stations

- Do not use this wireless system near another high-power cordless system such as DECT or SS wireless.
- Maintain the distances listed below between equipment in order to prevent noise, interference or the disconnection of a conversation. (The distance may vary depending on the environment.)

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

2.7.2 Procedure Overview

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

1. Investigate the installation site

Refer to "2.7.3 Site Planning".

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

2. Prepare for site survey

Refer to "2.7.4 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

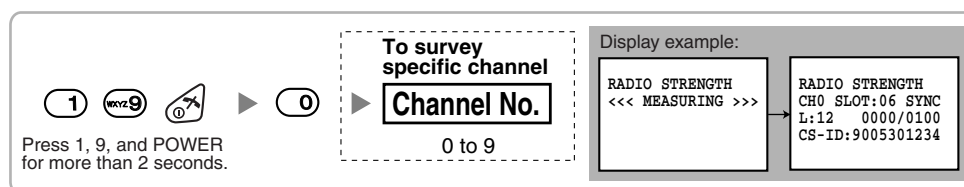
- Install at least 2 m above the floor.
- Keep the antennas in the upright position.

3. Conduct the site survey

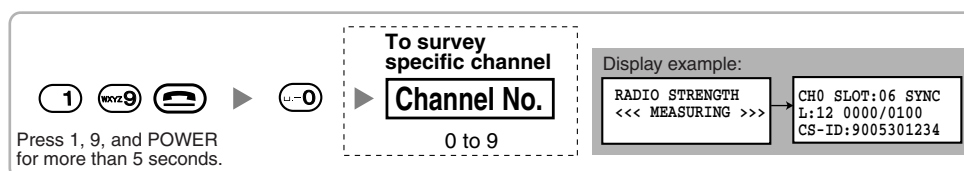
Refer to "2.7.5 Site Survey Using the KX-TCA255/KX-TD7590".

- 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 required by the user.

4. Finish the site survey

Refer to "2.7.6 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 "2.7.7 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 "2.7.8 Wall Mounting".

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

2.7.3 Site Planning

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

Understanding Radio Waves

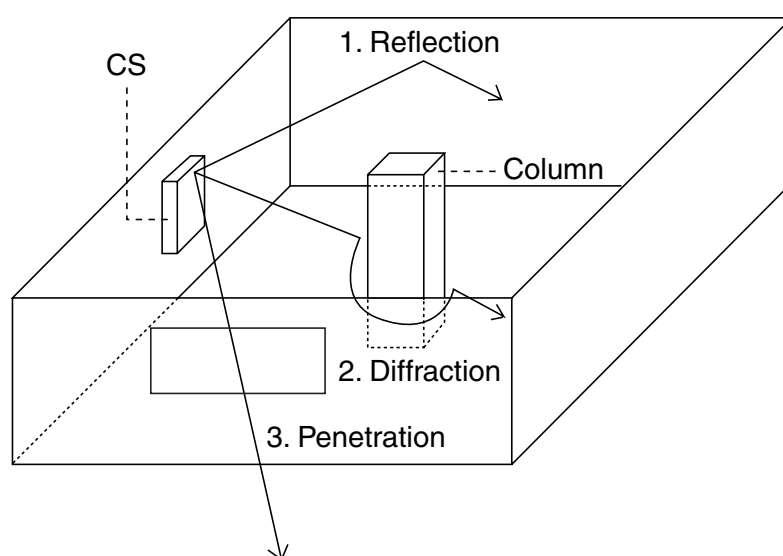
Characteristics of Radio Waves

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

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

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

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



Relationships Between Radio Waves and Building Structure and Materials

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

2.7 Connection of DECT Portable Stations

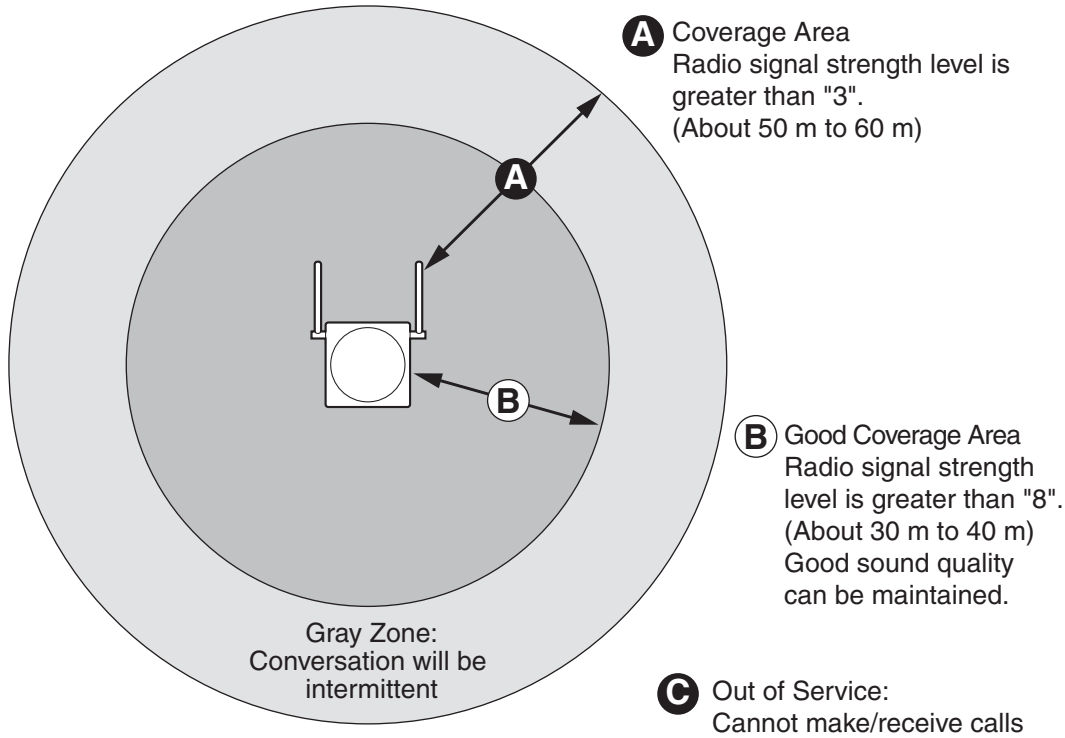
| Object | Material | Transmission Tendency |
|-----------|--|--|
| Wall | Concrete | The thicker they are, the less radio waves penetrate them. |
| | Ferroconcrete | Radio waves can penetrate them, but the more iron there is, the more radio waves are reflected. |
| Window | Glass | Radio waves usually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

CS Coverage Area

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

Note

Radio signal strength levels are measured during the site survey (refer to "2.7.5 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 a map and investigate the installation site.
 - a. Check the obstacles (e.g., shelves, columns, and partitions).
 - b. Check the materials of the structures (e.g., metal, concrete, and plywood).
 - c. Check the layout and dimensions of the room, corridor, etc.
 - d. Write down the above information on the map.
2. Examine the service area required by the user on the map, referring to the following example.
 - a. Draw the coverage area around a CS. Extend the coverage area 30 m to 60 m in each direction, depending on the materials of the building structures and obstacles in the installation site. Note that a CS cannot be installed outside a building.
 - b. If 1 CS cannot cover the entire service area, install additional CSs as required. Overlap the coverage areas of adjacent CSs.

2.7 Connection of DECT Portable Stations

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

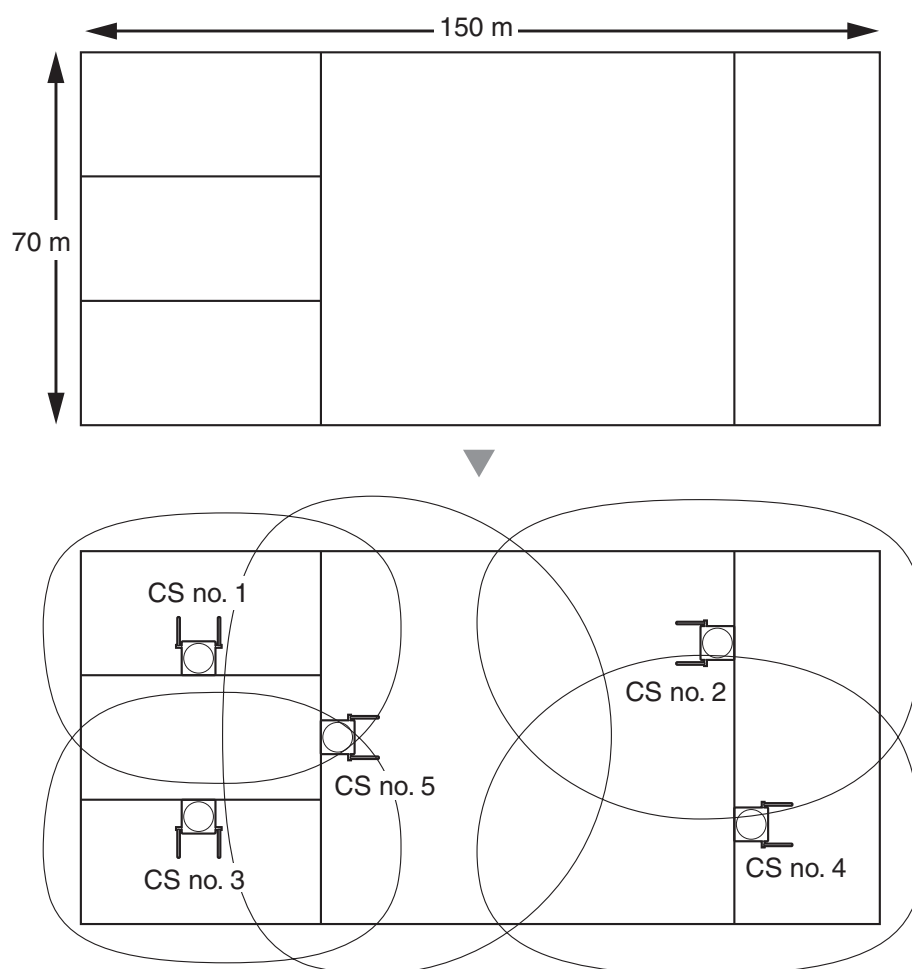
Example: Installing in a Room Separated by Interior Walls

Things to take note of:

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

CS installation plan:

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



2.7.4 Before Site Survey

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

Note

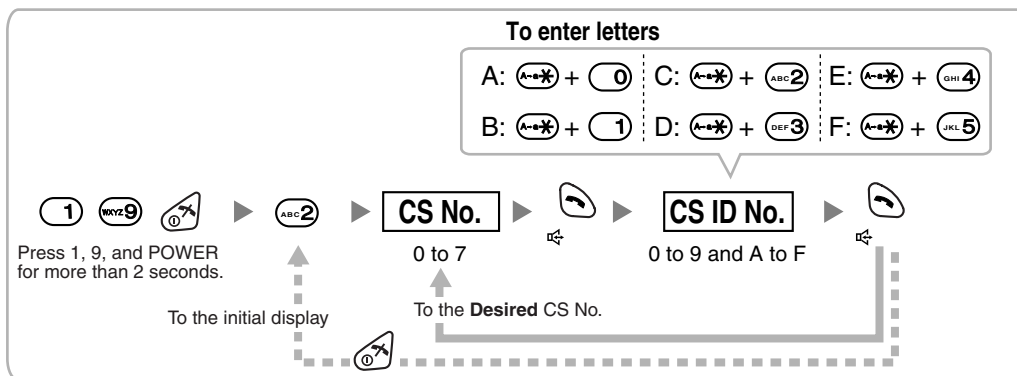
Display prompts for the site survey are only available in English.

Checking the CS ID Number

Check the CS ID number label attached to the CS.

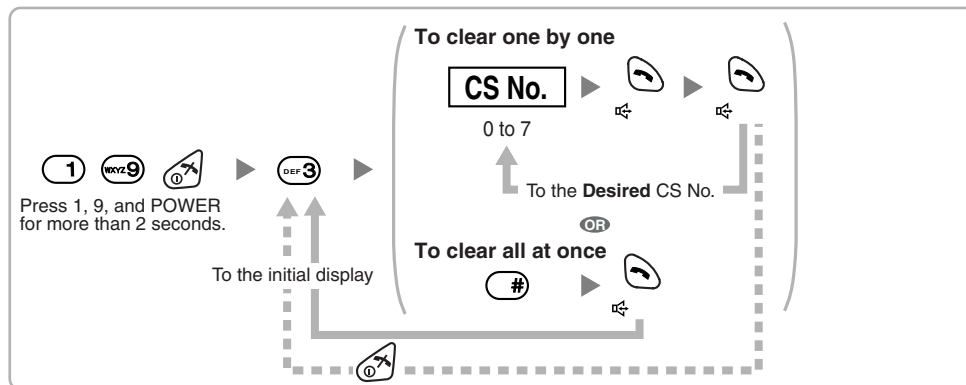
Assigning the CS ID Number to the PS

Using the KX-TCA255



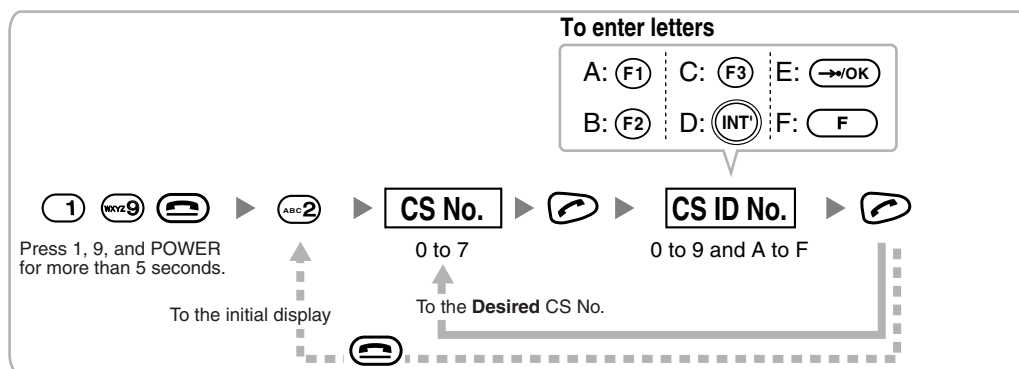
Note

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



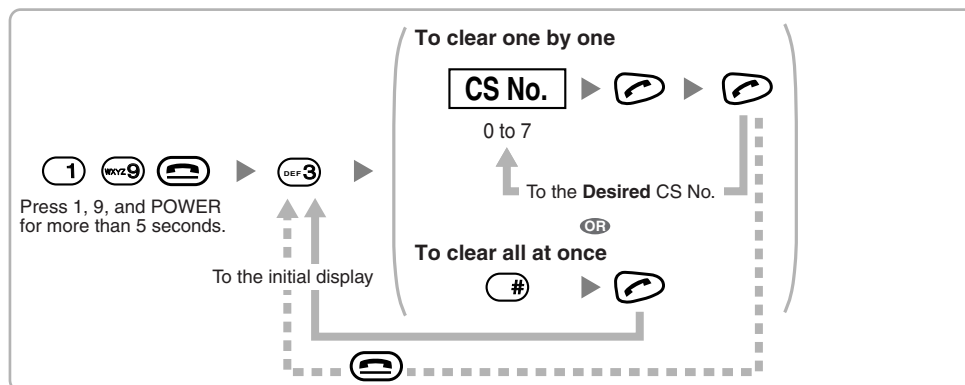
2.7 Connection of DECT Portable Stations

Using the KX-TD7590



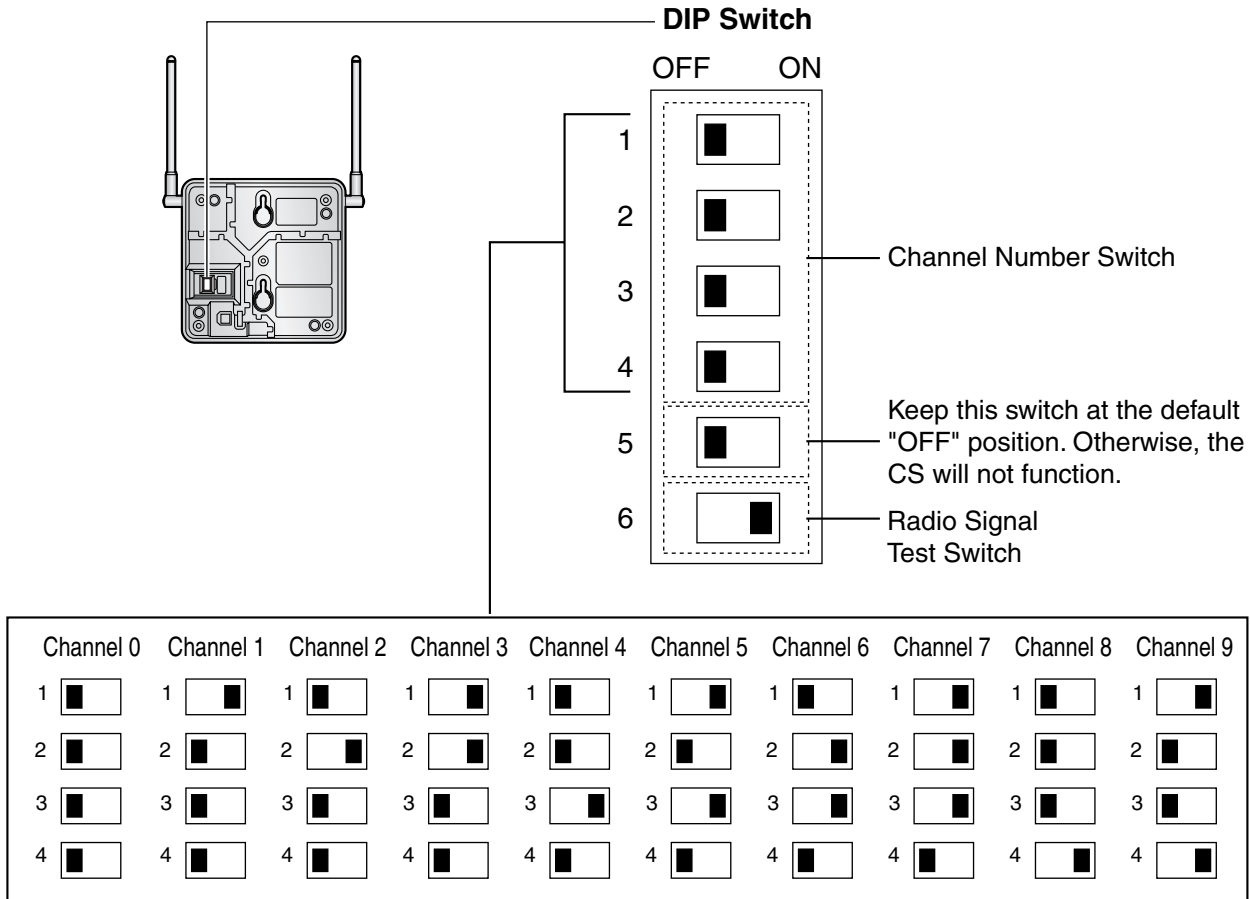
Note

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.



Note

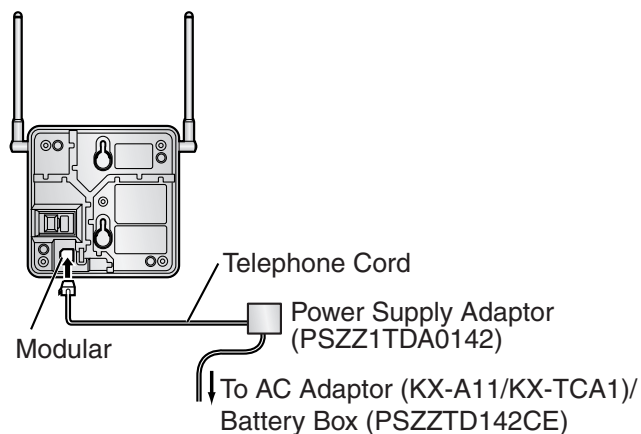
If more than 1 CS is in Radio Signal Test mode, each CS must have a unique channel number.

2.7 Connection of DECT Portable Stations

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.

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

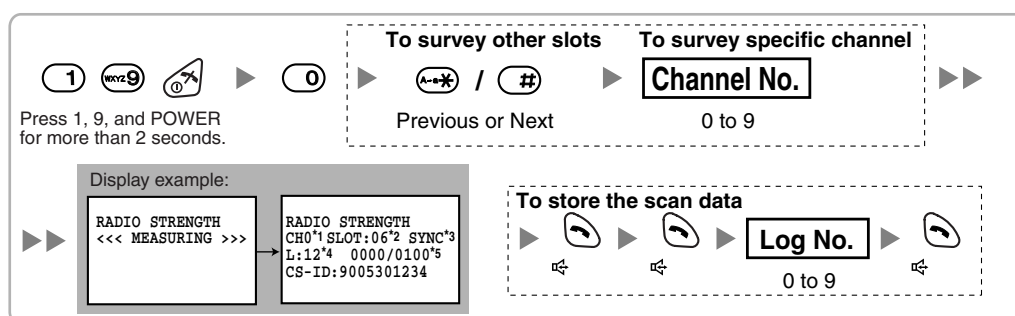
The PS has a Radio Signal Test mode that monitors the state of the radio link to the CS for site survey. In Radio Signal Test mode, the frame loss and signal strength of a synchronous slot, and the signal strength of the other slots can be measured when the PS is monitoring the CS. After installing the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

Testing the Radio Signal Strength

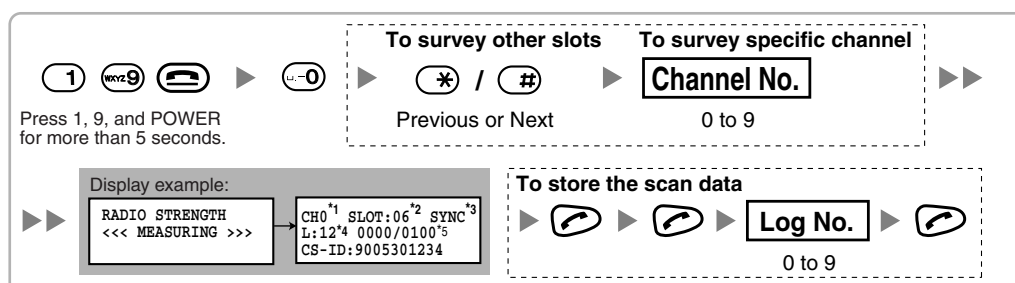
After locating the CS(s) temporarily, execute the Radio Signal Test using the PS. Directly after entering Radio Signal Test mode, the PS scans channel 0 for a CS that it can connect to. The channel to be scanned can be changed by pressing the appropriate keys 0 through 9.

1. Enter Radio Signal Test mode.

Using the KX-TCA255



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 errors is "0000".

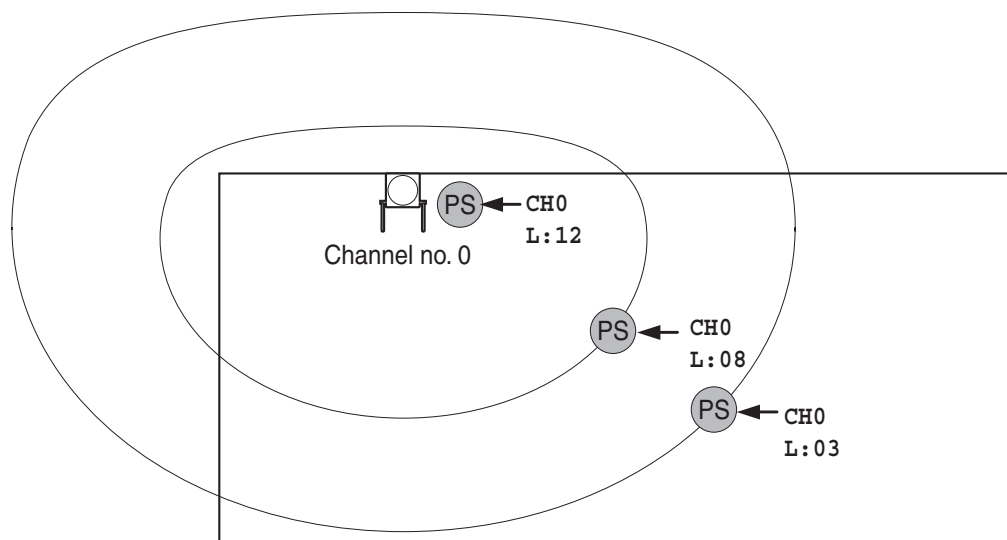
CAUTION

Storing the scan data will clear all directory data.

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

2.7 Connection of DECT Portable Stations

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

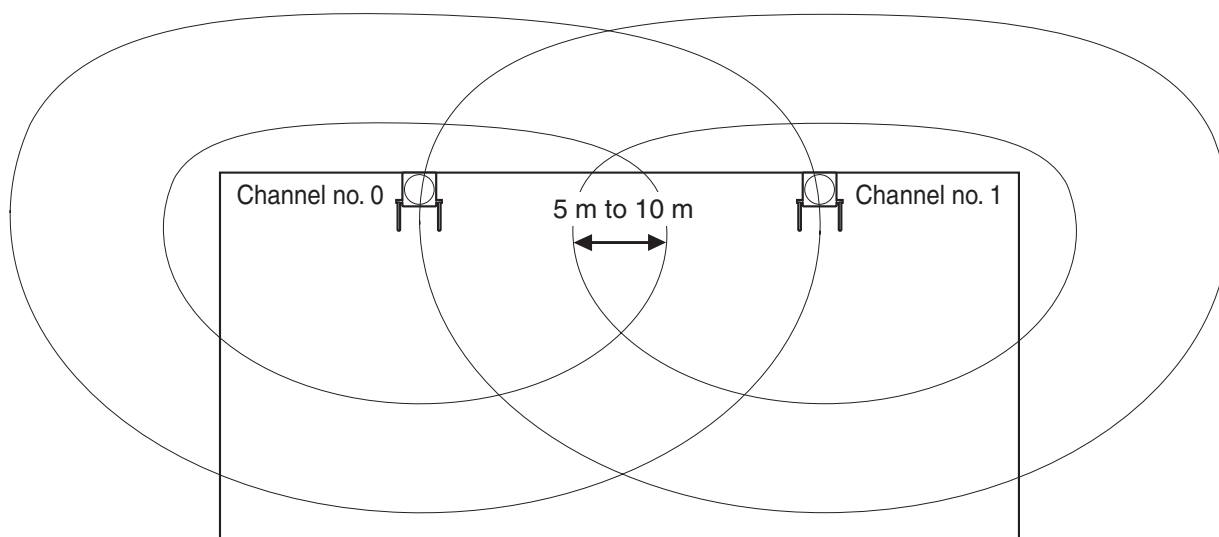


Radio Signal Strength Levels

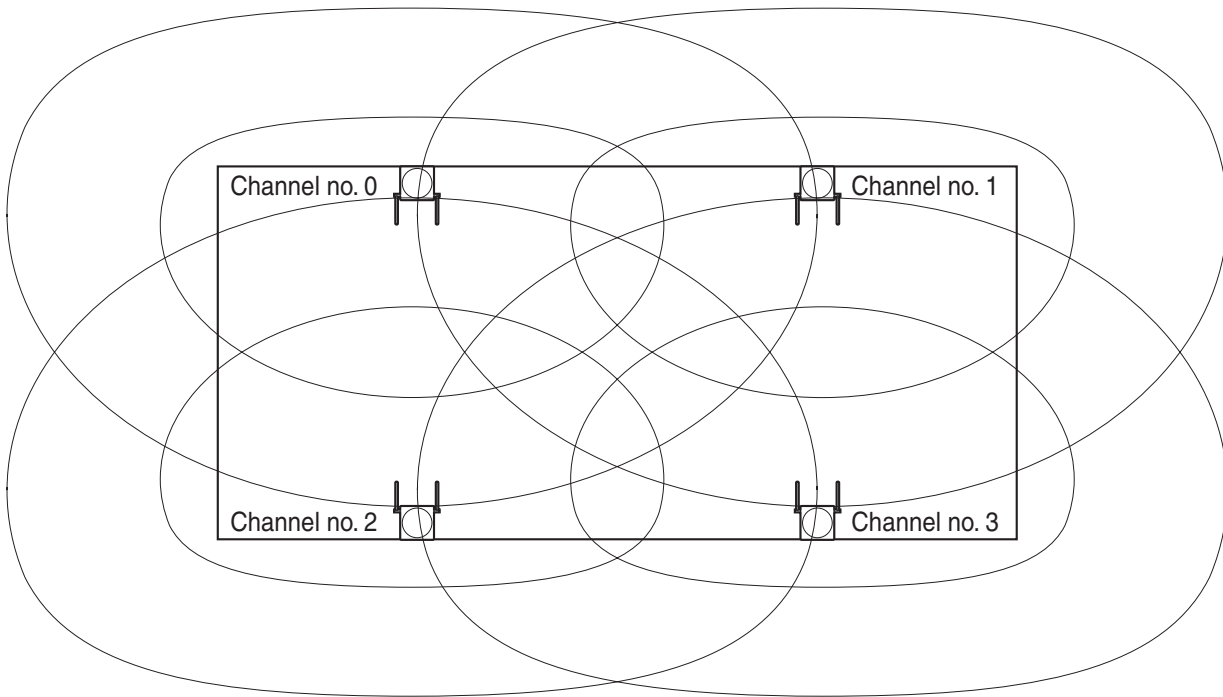
| | |
|-----------------|--------------------------------------|
| Level: 00 | Out of range |
| Level: 01 to 02 | Receives noise easily or disconnects |
| Level: 03 to 07 | May receive noise |
| Level: 08 to 10 | Good |
| Level: 11 to 12 | Better |

3. Repeat steps 1 and 2 for other CSs, and relocate the CSs when necessary.

- a. Overlap adjacent CS coverage areas where the radio signal strength level is "8" by 5 m to 10 m.



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




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

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 frame errors), change the location of the CS and repeat the site survey to select the best location.

Referring to the Stored Scan Data


Using the KX-TCA255


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


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


Previous or Next Channel No.
0 to 9

Using the KX-TD7590


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

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


Previous or Next Channel No.
0 to 9

Clearing the Stored Scan Data

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

Using the KX-TCA255


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

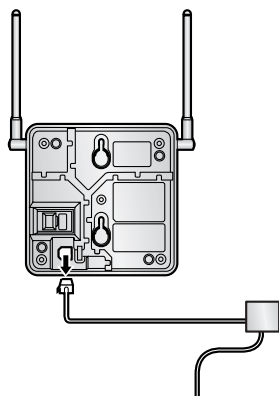
Using the KX-TD7590


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

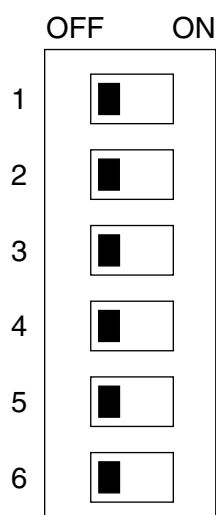
2.7.6 After Site Survey

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

1. Keep pressing the 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.

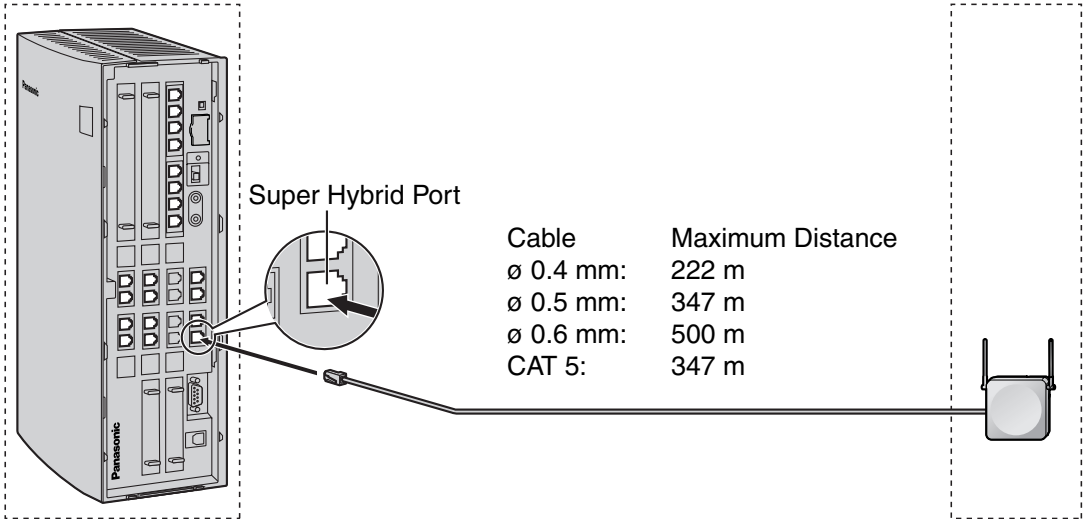


3. Switch all DIP switches on the CS from ON to OFF.



2.7.7 Connecting a Cell Station to the Hybrid IP-PBX

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



A Super Hybrid Port,
or DLC4/DLC8 card (RJ45)

| Signal Name | Pin No. |
|-------------|---------|
| | 1 |
| | 2 |
| D2 | 3 |
| | 4 |
| | 5 |
| D1 | 6 |
| | 7 |
| | 8 |

CS (RJ11)

| Pin No. | Signal Name |
|---------|-------------|
| 1 | D1 |
| 2 | |
| 3 | |
| 4 | D2 |

OR

A Super Hybrid Port,
or DLC4/DLC8 card (RJ11)

| Signal Name | Pin No. |
|-------------|---------|
| D1 | 1 |
| | 2 |
| | 3 |
| D2 | 4 |

CS (RJ11)

| Pin No. | Signal Name |
|---------|-------------|
| 1 | D1 |
| 2 | |
| 3 | |
| 4 | D2 |

Accessories and User-supplied Items for the CS

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

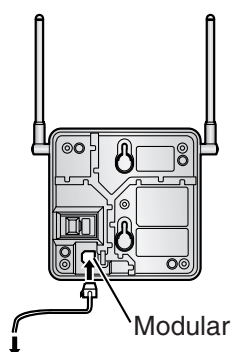
User-supplied (not included): RJ45 connector or RJ11 connector

Note

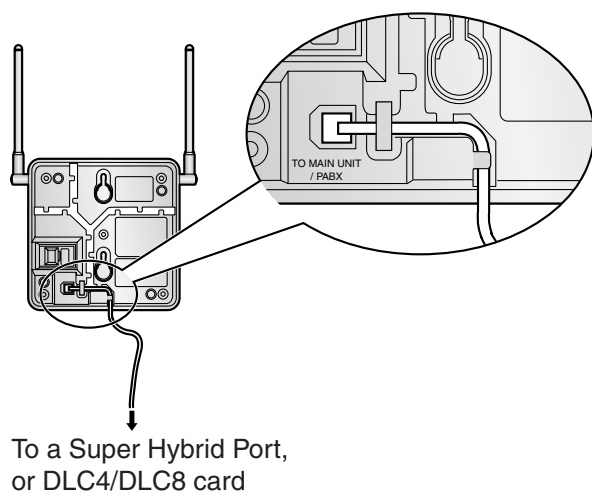
For details about DLC4 card or DLC8 card, refer to "2.4.1 DLC4 Card (KX-TDA3171)" or "2.4.3 DLC8 Card (KX-TDA3172)".

Connecting the CS

1. Connect the cable from a Super Hybrid Port or the DLC4/DLC8 card to the CS.



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



Registering the PS

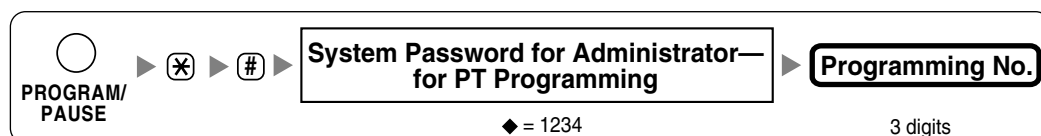
The PS must be registered to the Hybrid IP-PBX before it can be used. Programming of both the PS and Hybrid IP-PBX is required. A PT with multiline display (e.g., KX-T7636 6-line display) is required to perform the Hybrid IP-PBX system programming.

Note

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

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

Administrator Level

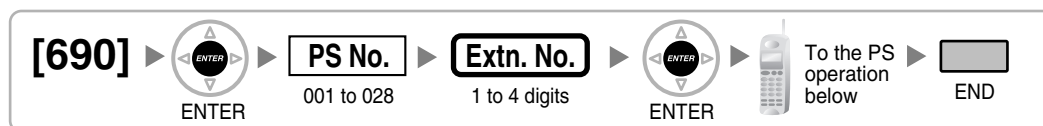


Note

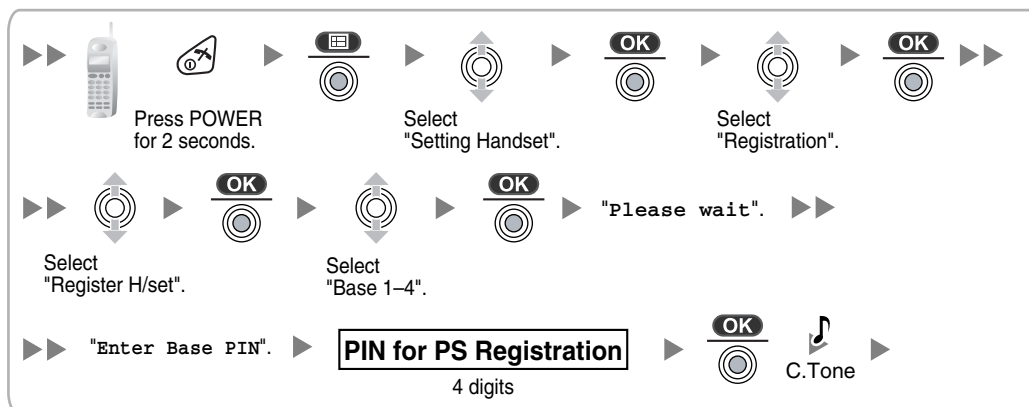
◆ means default value.

PS Registration

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

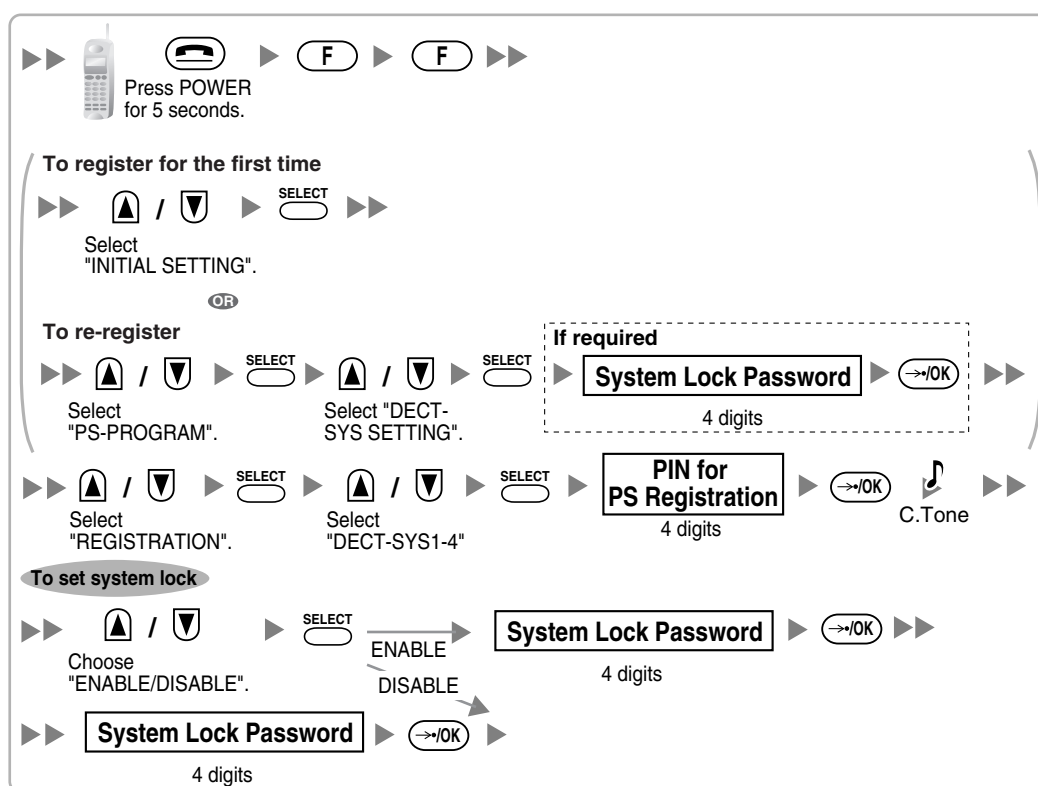


Using the KX-TCA155/KX-TCA255

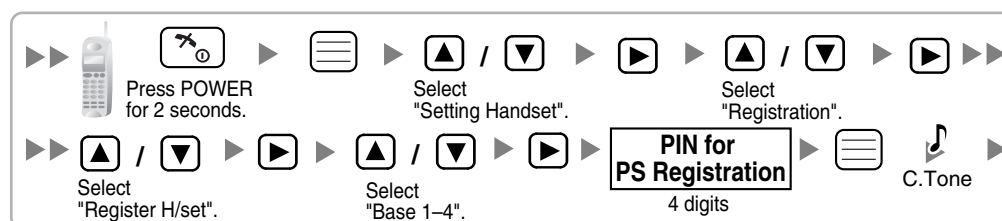


Using the KX-TD7590

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, enter 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

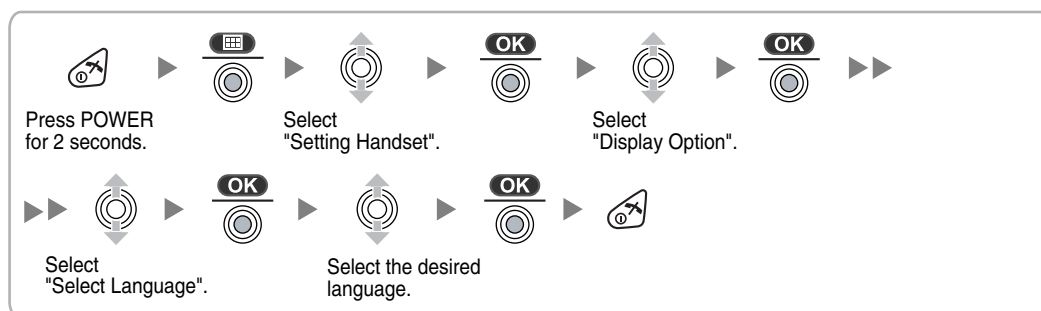
- By default, the PIN for PS registration is "1234" for both the Hybrid IP-PBX and PS. Therefore, the PS can be registered to the Hybrid IP-PBX without setting the PIN.
- The PIN for PS registration will only be used when registering the PS to the Hybrid IP-PBX. Therefore, during normal operation after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

Setting the PIN for Hybrid IP-PBX

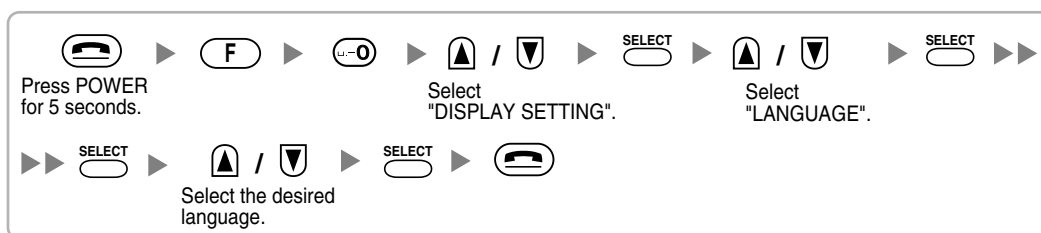


Changing the Display Language of the PS

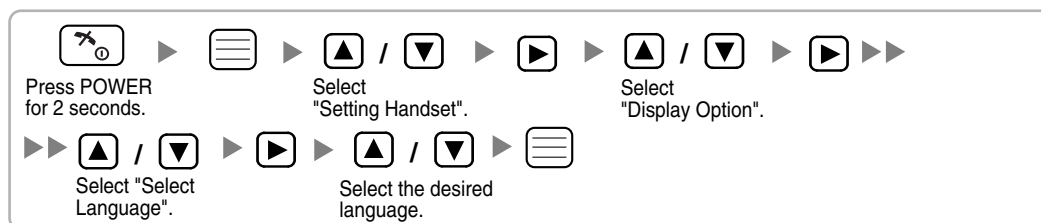
Using the KX-TCA155/KX-TCA255



Using the KX-TD7590



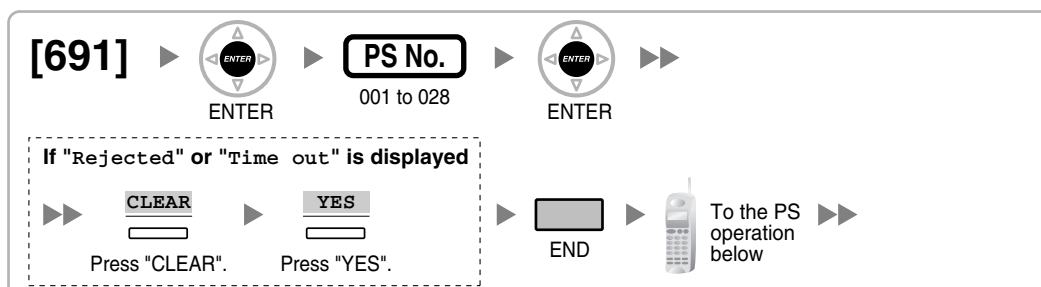
Using the KX-TD7580



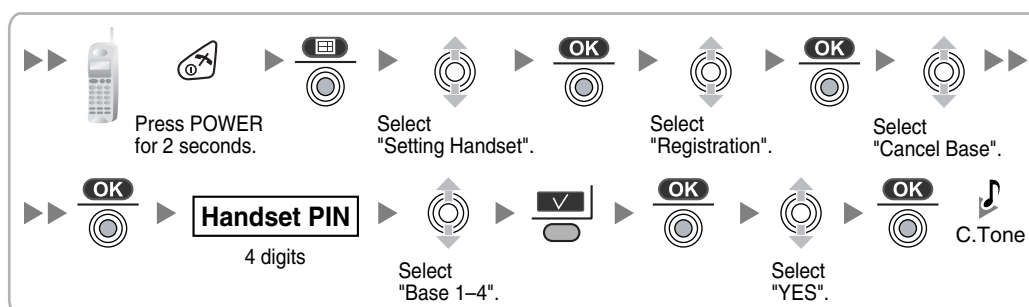
PS Termination

Confirm the following before cancelling the PS registration:

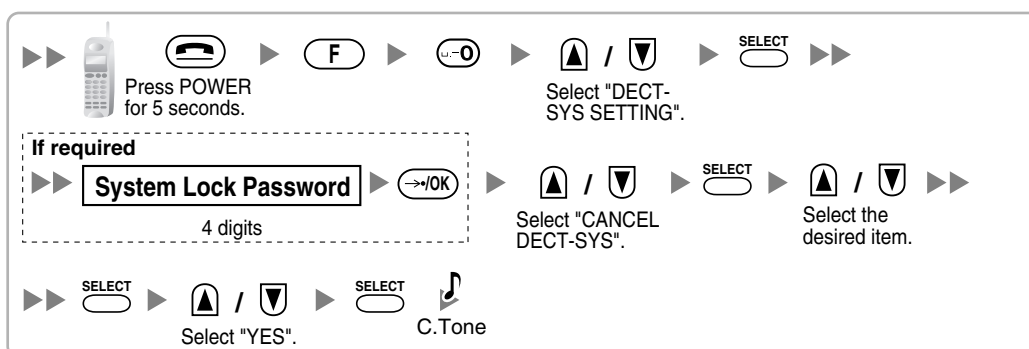
- The PS is turned on.
- The PS is within range.



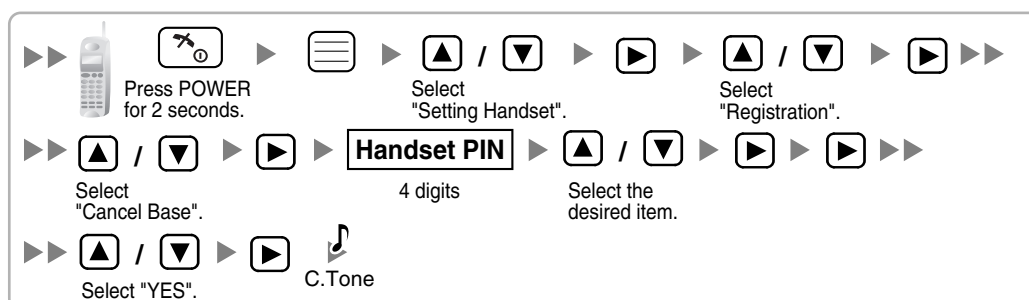
If the registration information is still stored in the PS
Using the KX-TCA155/KX-TCA255



Using the KX-TD7590



Using the KX-TD7580



Testing the Operation

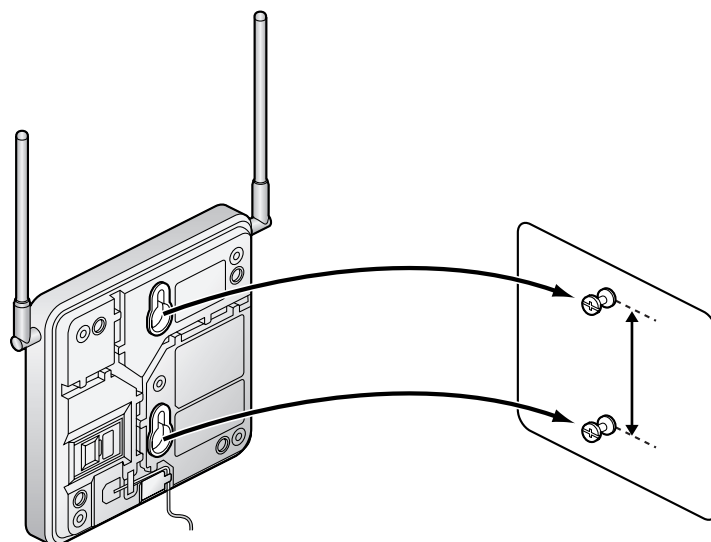
Walk around the service area while having a conversation using a registered PS. If noise is frequent or conversations disconnect, relocate the CSs or install an additional CS.

2.7.8 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.

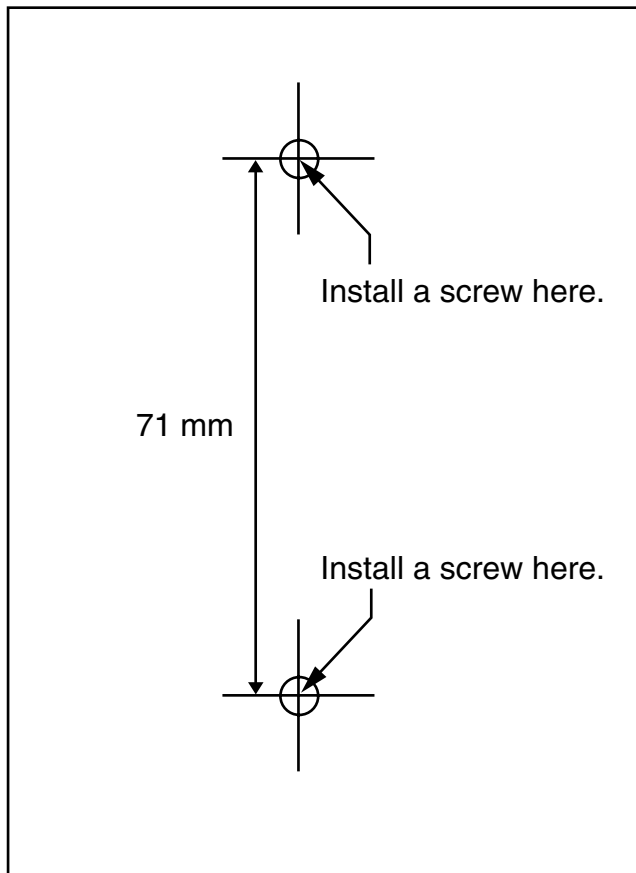
Notes

- 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.

2.8 Connection of 2.4 GHz Portable Stations

2.8.1 Overview

The following equipment is required to connect the wireless system:

CS: Cell Station (KX-TDA0141)

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-TDA30 can support up to 28 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), and vibration, and should not be exposed to direct sunlight.
- The CS should not be placed outdoors (use indoors).
- The CS should not be placed near high-voltage equipment.
- The CS should not be placed on a metal object.
- Systems using 2.4 GHz ISM (Industrial, Scientific and Medical) band may interfere with the KX-TDA wireless system. Examples of such systems are cordless telephones, wireless LAN, Home RF, microwave ovens and other ISM devices. These systems may cause minor noise.
- 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.

2.8.2 Procedure Overview

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

1. Investigate the installation site

Refer to "2.8.3 Site Planning".

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

2. Prepare the CS for site survey

Refer to "2.8.4 Before Site Survey".

- Assign a CS number to each CS by setting the DIP switches on the back of the CS.
- Supply electricity to each CS using an AC adaptor or a battery box.
- Install each CS temporarily as planned.

Notes

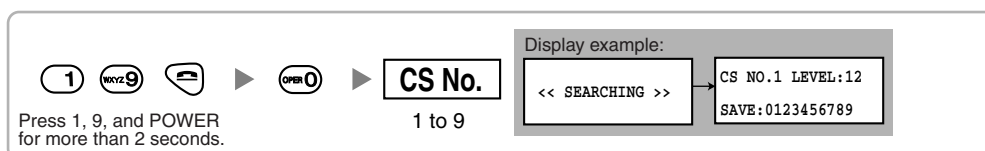
- Install at least 2 m above the floor.
- Keep the antennas in the upright position.

3. Conduct the site survey

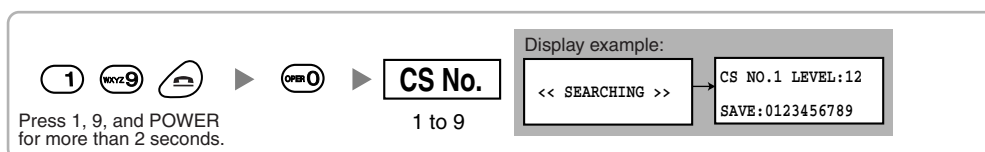
Refer to "2.8.5 Site Survey".

- 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



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

4. Finish the site survey

Refer to "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. If there are no problems in testing, 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

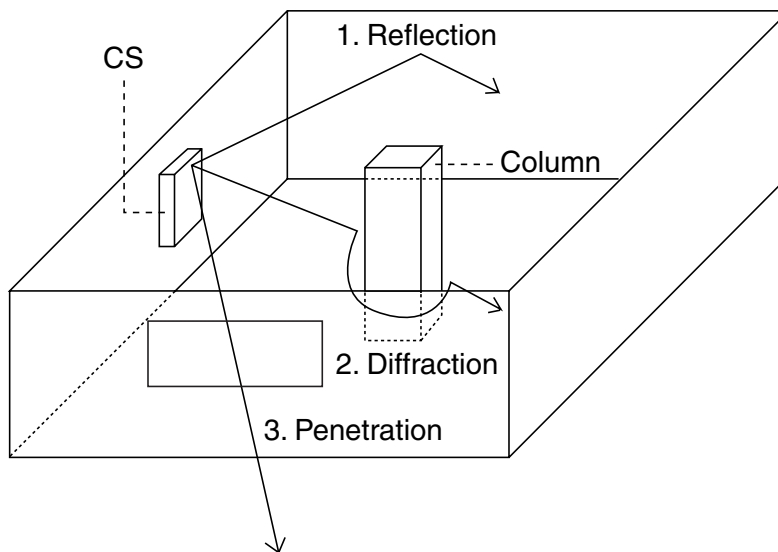
Characteristics of Radio Waves

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



Relationships Between Radio Waves and Building Structure and Materials

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

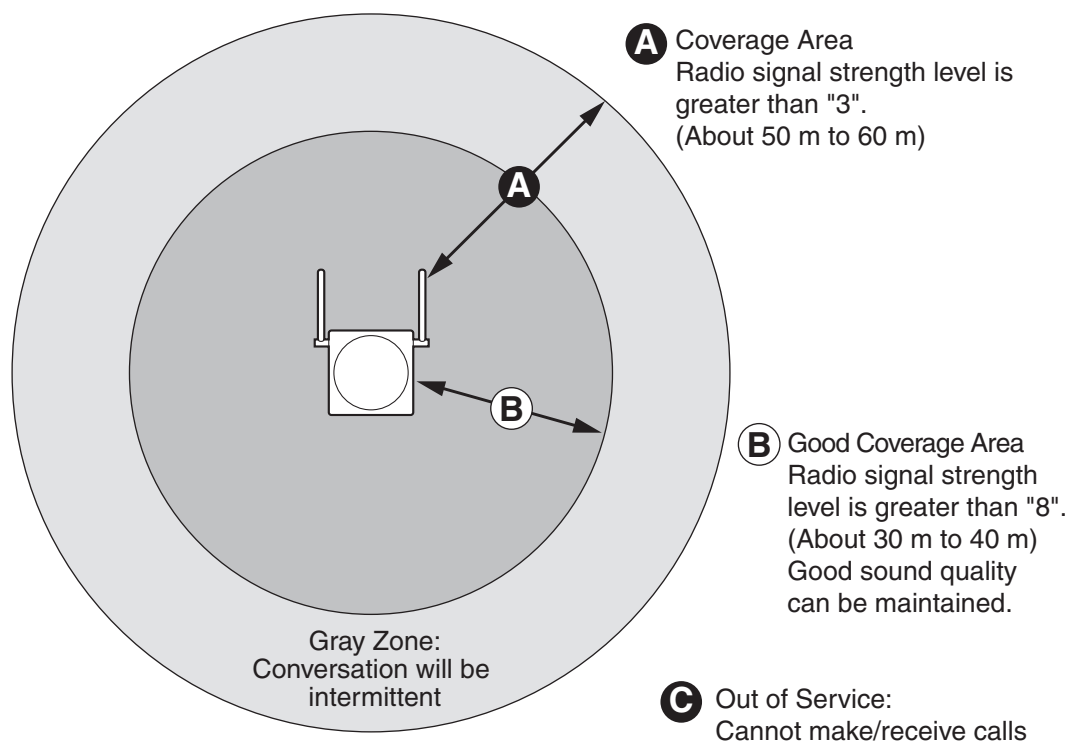
| Object | Material | Transmission Tendency |
|-----------|--|--|
| Wall | Concrete | The thicker they are, the less radio waves penetrate them. |
| | Ferroconcrete | Radio waves can penetrate them, but the more iron there is, the more radio waves are reflected. |
| Window | Glass | Radio waves usually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

CS Coverage Area

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

Note

Radio signal strength levels are measured during the site survey (refer to "2.8.5 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

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

one CS becomes weak. However, if a PS moves away from a CS and there are no CSs available for handover, the PS may go out of range and the call could be lost.

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

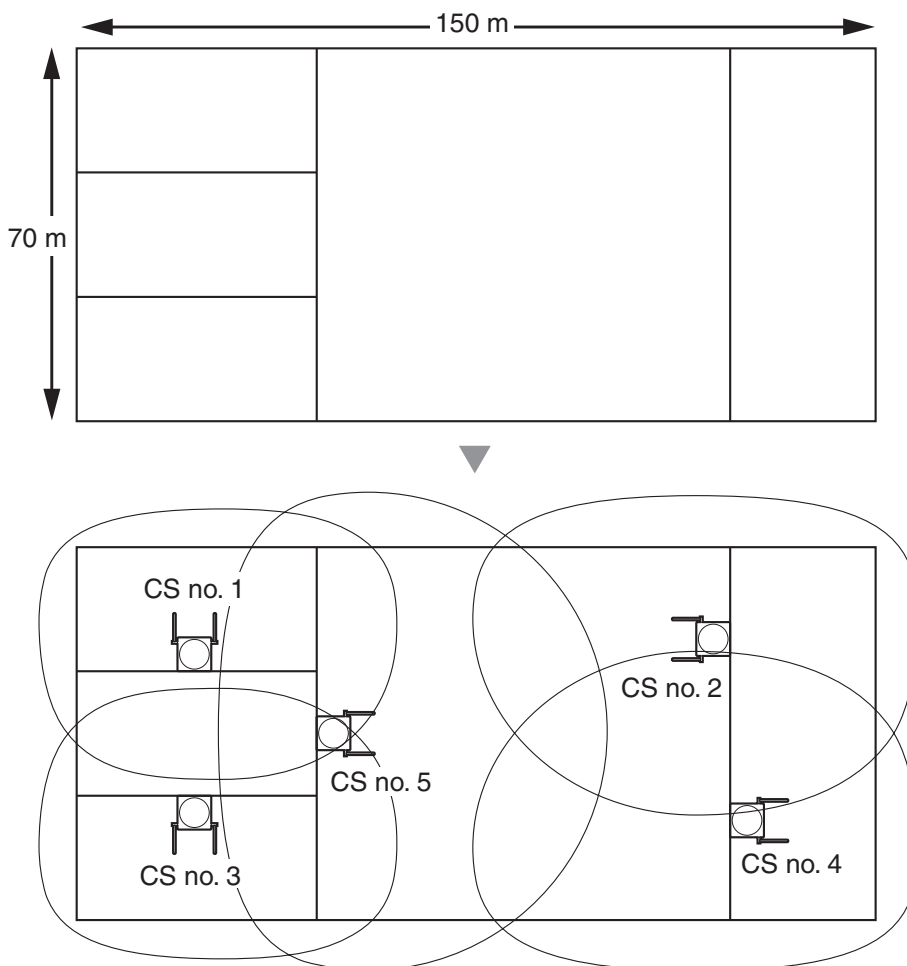
Example: Installing in a Room Separated by Interior Walls

Things to take note of:

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

CS installation plan:

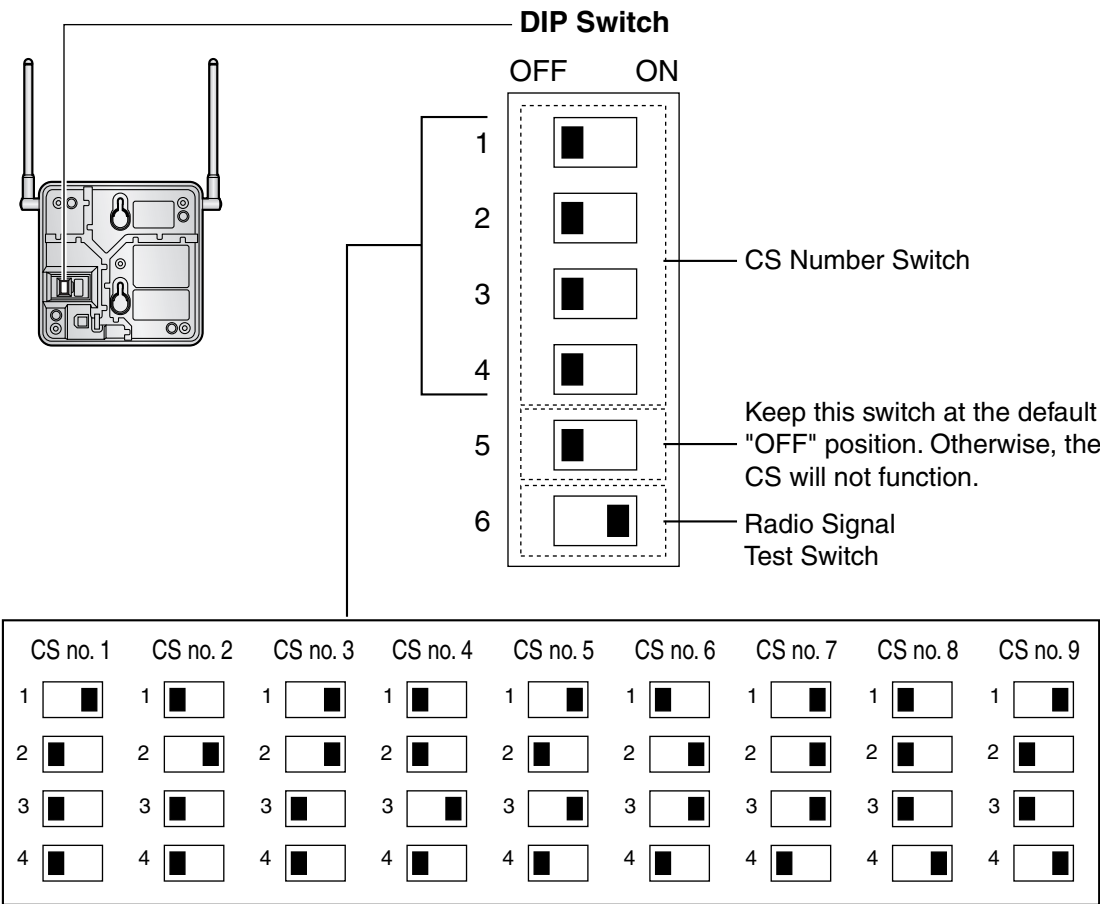
- The coverage area of each CS will not extend as far as when there are no obstacles, because the radio signals will be weakened by separating walls. Therefore, you will need 5 CSs to cover the entire room.



2.8.4 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.



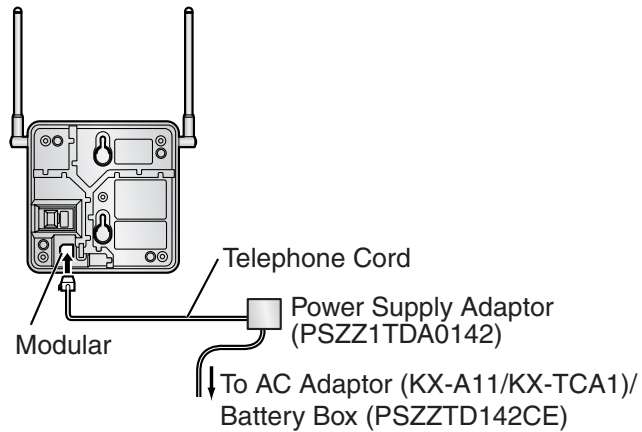
Note

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.

2.8.5 Site Survey

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

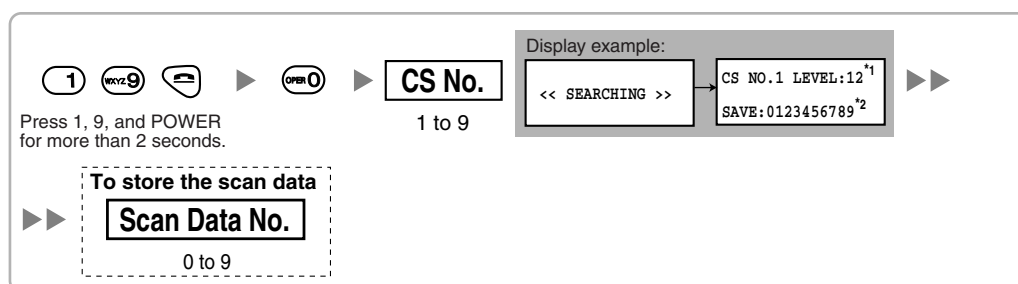
Testing the Radio Signal Strength

Note

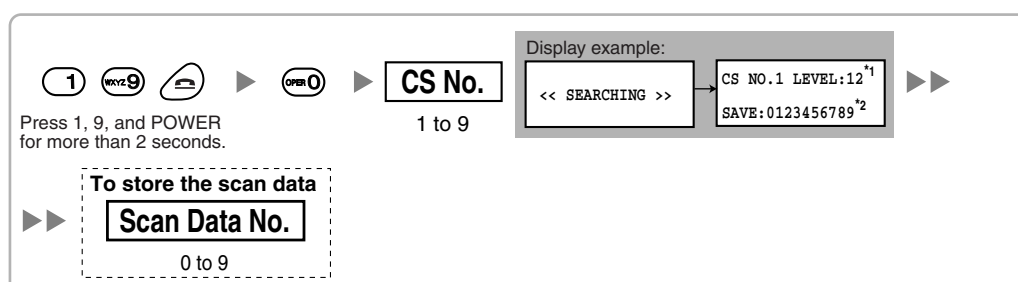
Display prompts for the site survey are only available in English.

1. Enter Radio Signal Test mode.

Using the KX-TD7680



Using the KX-TD7690

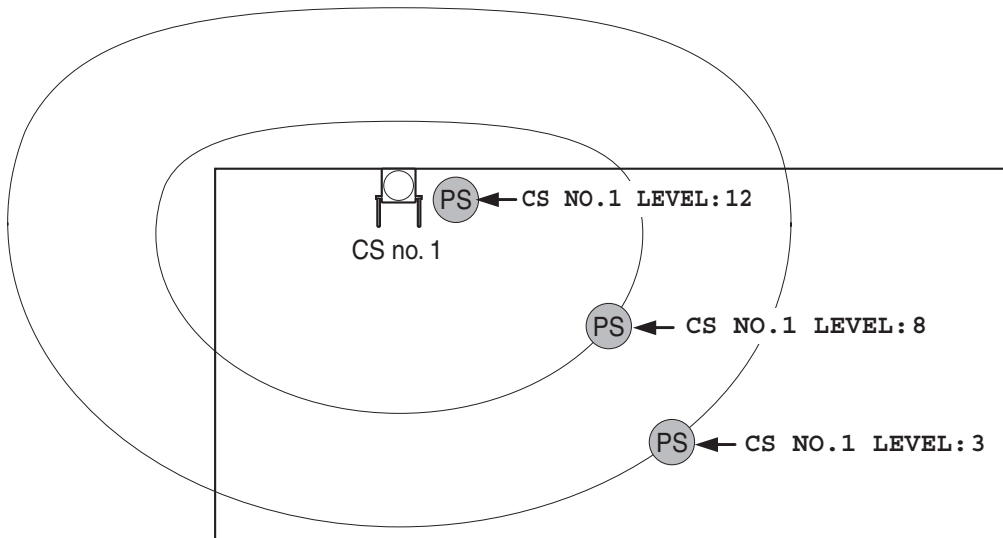


Notes

*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 "-".

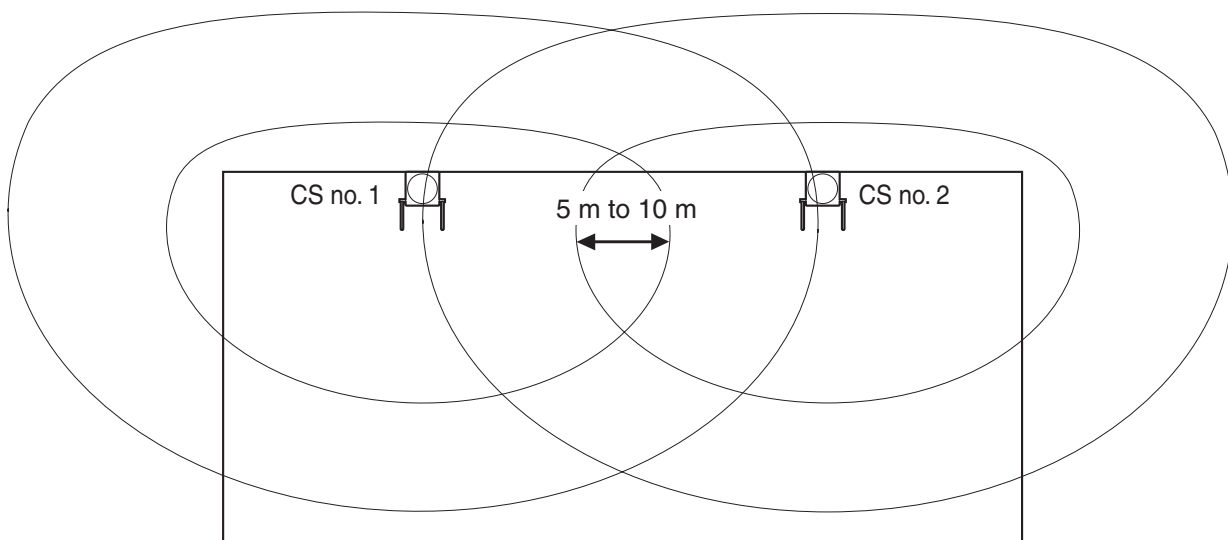
2. Measure the radio signal strength by moving towards and away from the CS.
 - a. Move to the CS until the radio signal strength level becomes "12".
 - b. Move away from the CS and identify the CS coverage area within which the radio signal strength level is greater than "8". Draw the area on the map.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



Radio Signal Strength Levels

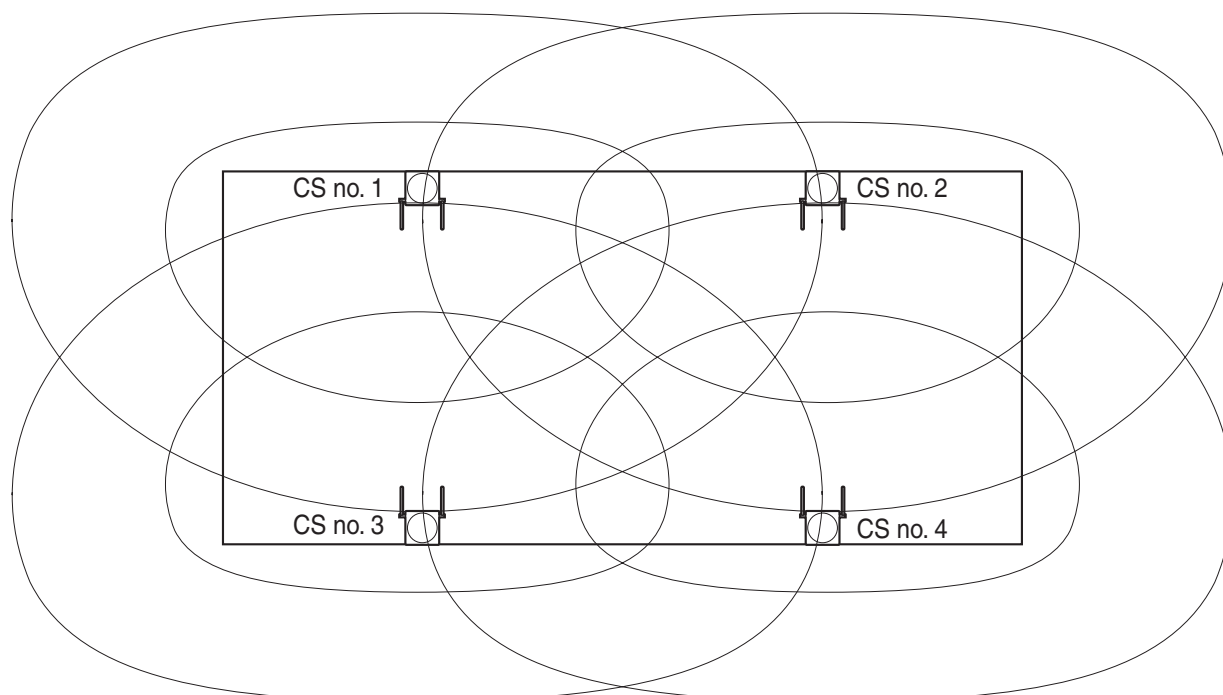
| | |
|-----------------|--------------------------------------|
| Level: 00 | Out of range |
| Level: 01 to 02 | Receives noise easily or disconnects |
| Level: 03 to 07 | May receive noise |
| Level: 08 to 10 | Good |
| Level: 11 to 12 | Better |

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



2.8 Connection of 2.4 GHz Portable Stations

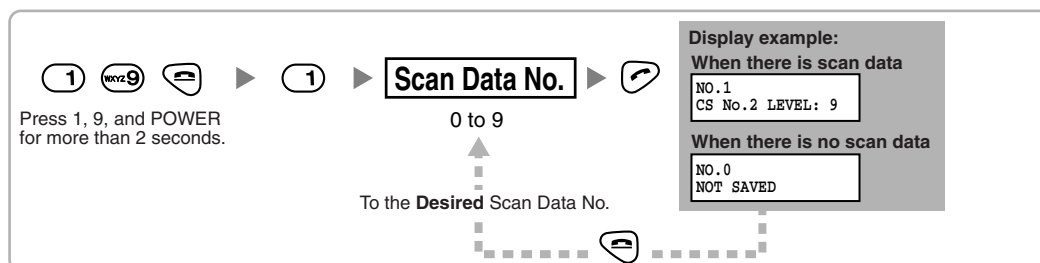
- b. Overlap the CS coverage areas of at least 2 CSs at any location in the installation site.



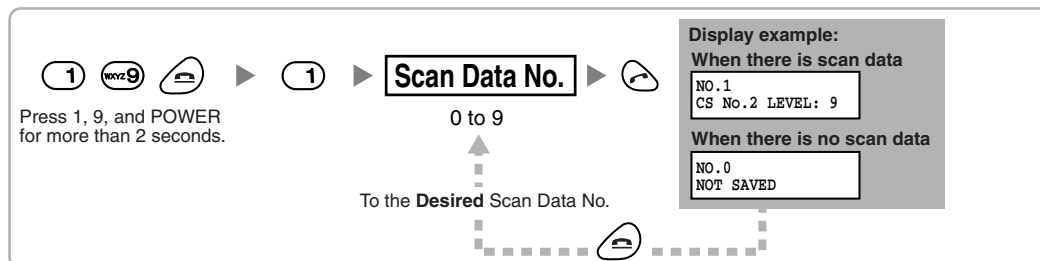
- c. Make sure that the radio signal strength level is greater than "3" at any location in the service area required by the user.

Referring to the Stored Scan Data

Using the KX-TD7680

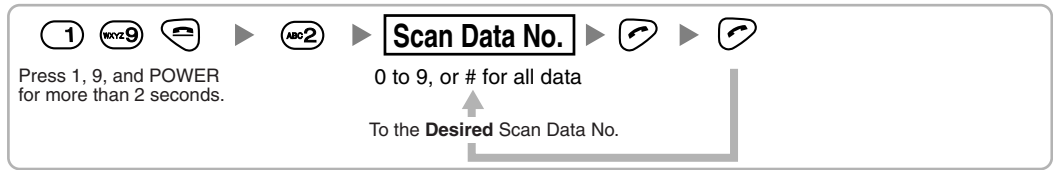


Using the KX-TD7690

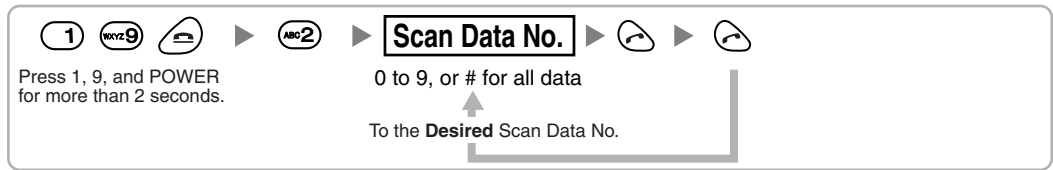


Deleting the Stored Scan Data

Using the KX-TD7680



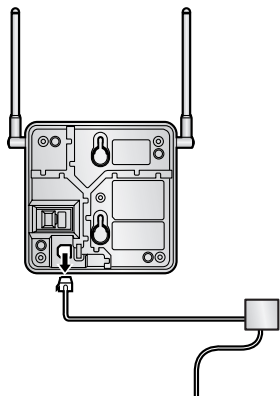
Using the KX-TD7690



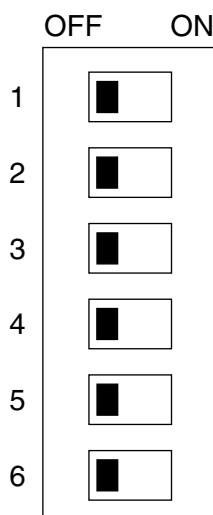
2.8.6 After Site Survey

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

1. Keep pressing the 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.

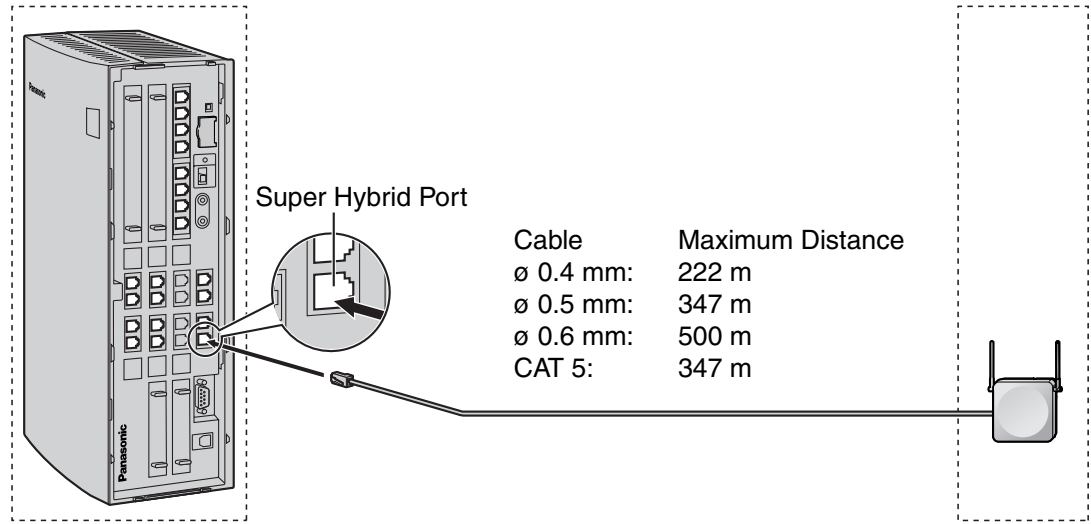


3. Switch all DIP switches on the CS from ON to OFF.



2.8.7 Connecting a Cell Station to the Hybrid IP-PBX

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



A Super Hybrid Port,
or DLC4/DLC8 card (RJ45)

| Signal Name | Pin No. |
|-------------|---------|
| | 1 |
| | 2 |
| D2 | 3 |
| | 4 |
| | 5 |
| D1 | 6 |
| | 7 |
| | 8 |

CS (RJ11)

| Pin No. | Signal Name |
|---------|-------------|
| 1 | D1 |
| 2 | |
| 3 | |
| 4 | D2 |

OR

A Super Hybrid Port,
or DLC4/DLC8 card (RJ11)

| Signal Name | Pin No. |
|-------------|---------|
| D1 | 1 |
| | 2 |
| | 3 |
| D2 | 4 |

CS (RJ11)

| Pin No. | Signal Name |
|---------|-------------|
| 1 | D1 |
| 2 | |
| 3 | |
| 4 | D2 |

Accessories and User-supplied Items for the CS

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

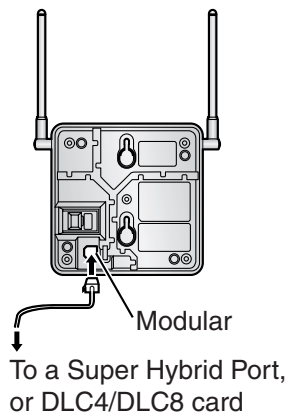
User-supplied (not included): RJ45 connector or RJ11 connector

Note

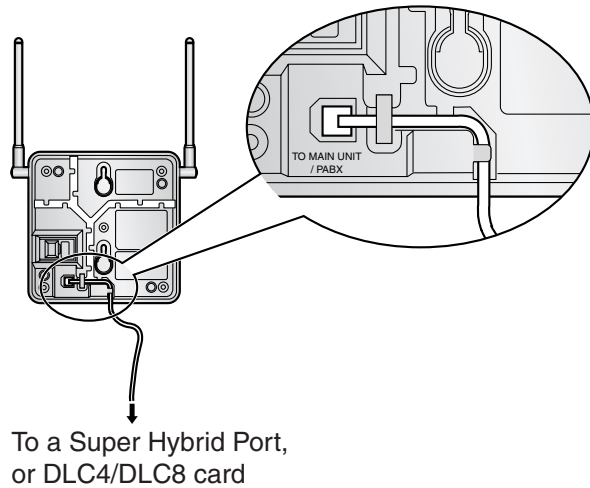
For details about DLC4 card or DLC8 card, refer to "2.4.1 DLC4 Card (KX-TDA3171)" or "2.4.3 DLC8 Card (KX-TDA3172)".

Connecting the CS

1. Connect the cable from a Super Hybrid Port or the DLC4/DLC8 card to the CS.



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



Registering the PS

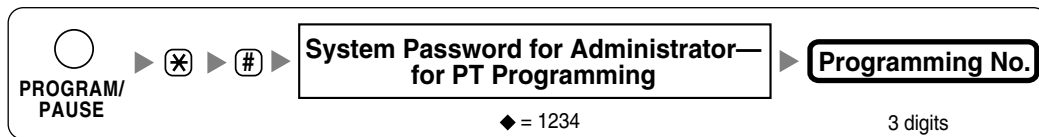
The PS must be registered to the Hybrid IP-PBX before it can be used. Programming of both the PS and Hybrid IP-PBX is required. A PT with multiline display (e.g., KX-T7636 6-line display) is required to perform the Hybrid IP-PBX system programming.

Note

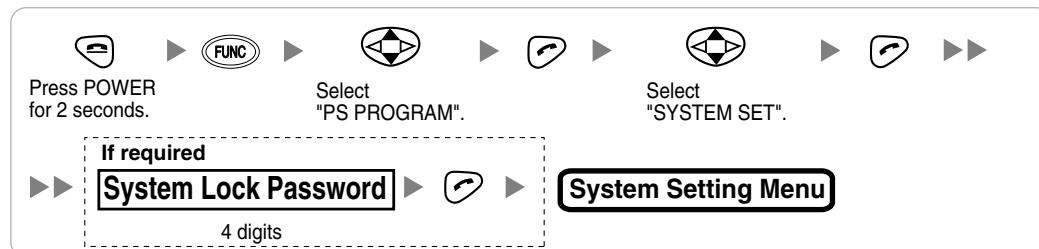
For details about system programming using a PT, refer to "2.3.2 PT Programming" in the Feature Guide, and "2.1 PT Programming" in the PT Programming Manual.

Entering the System Programming Mode

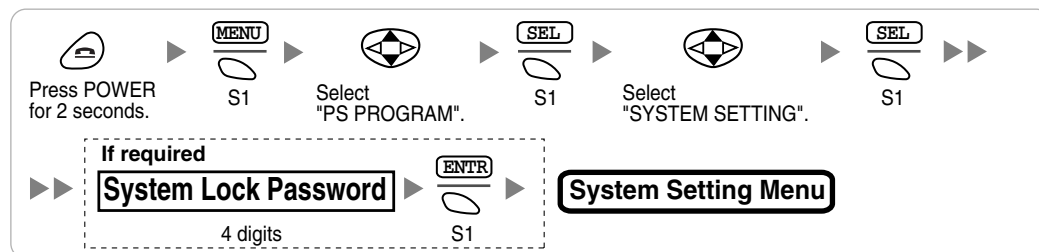
PT (Administrator Level)



PS (Using the KX-TD7680)



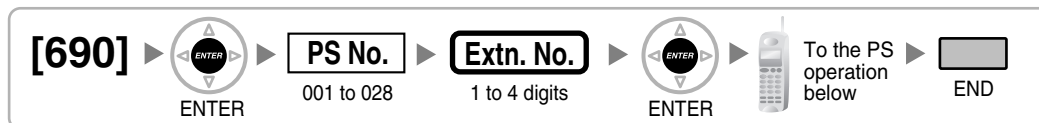
PS (Using the KX-TD7690)



Note

◆ means default value throughout this section.

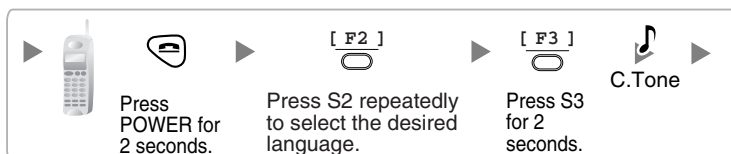
PS Registration



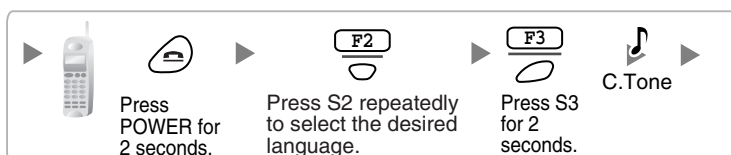
When the PS has not been registered yet

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



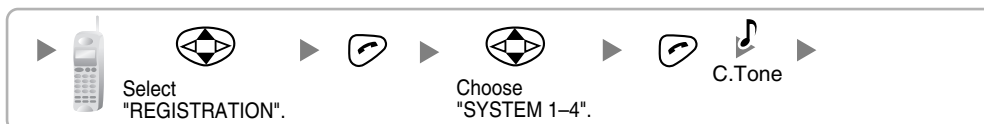
Using the KX-TD7690



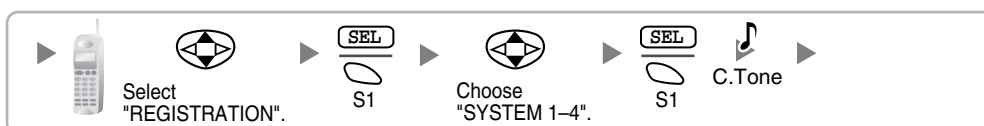
When the PS has already been registered to another Hybrid IP-PBX

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

Using the KX-TD7680



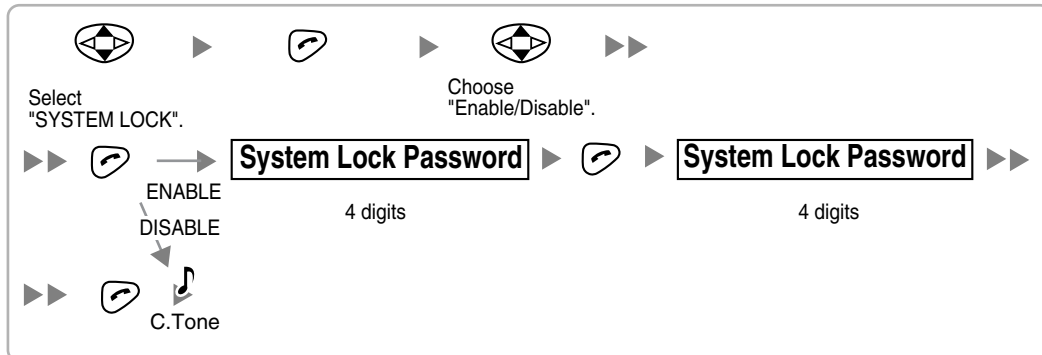
Using the KX-TD7690



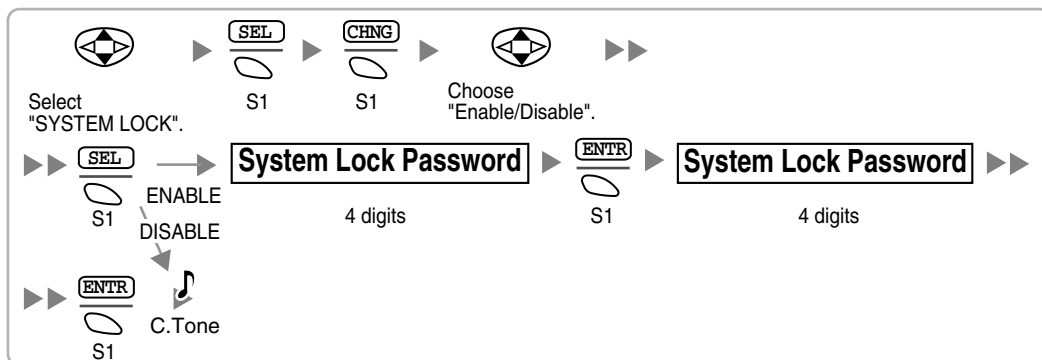
Setting the System Lock

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, enter 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

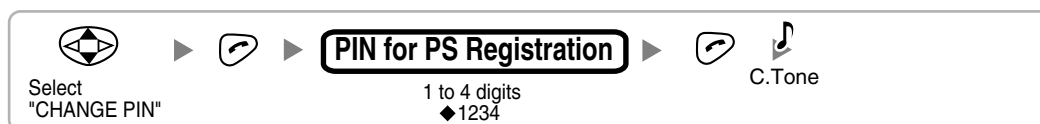
- By default, the PIN for PS registration is "1234" for both the Hybrid IP-PBX and PS. Therefore, the PS can be registered to the Hybrid IP-PBX without setting the PIN.
- The PIN for PS registration will only be used when registering the PS to the Hybrid IP-PBX. Therefore, during normal operation after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

Setting the PIN for Hybrid IP-PBX

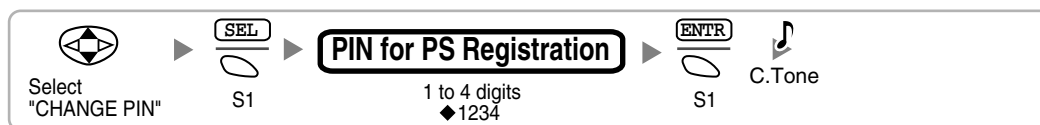


Setting the PIN for PS

Using the KX-TD7680



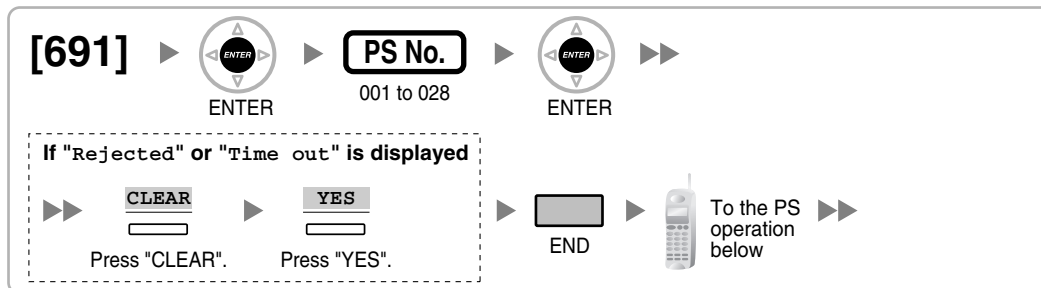
Using the KX-TD7690



PS Termination

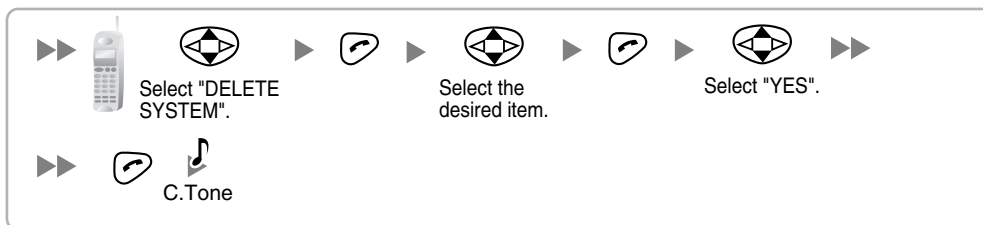
Confirm the following before cancelling the PS registration:

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

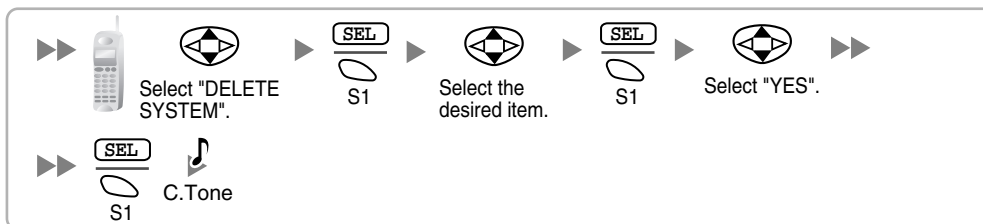


If the registration information is still stored in the PS

Using the KX-TD7680



Using the KX-TD7690



Testing the Operation

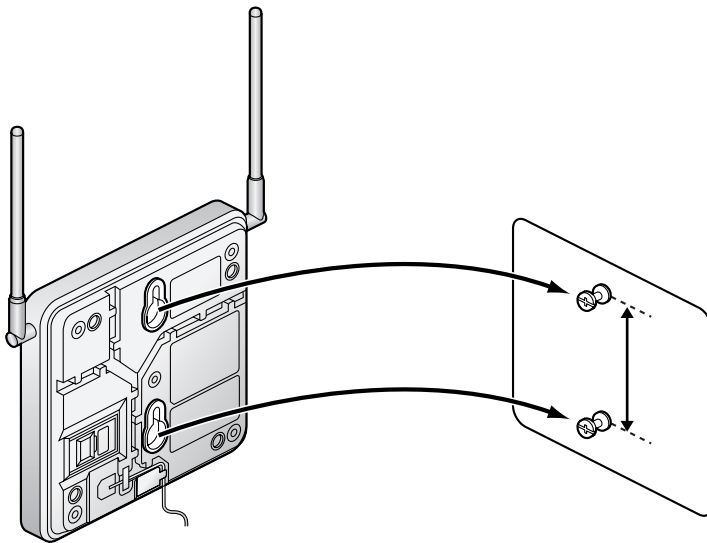
Walk around the service area while having a conversation using a registered PS. If noise is frequent or conversations disconnect, relocate the CSs or install an additional CS.

2.8.8 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.

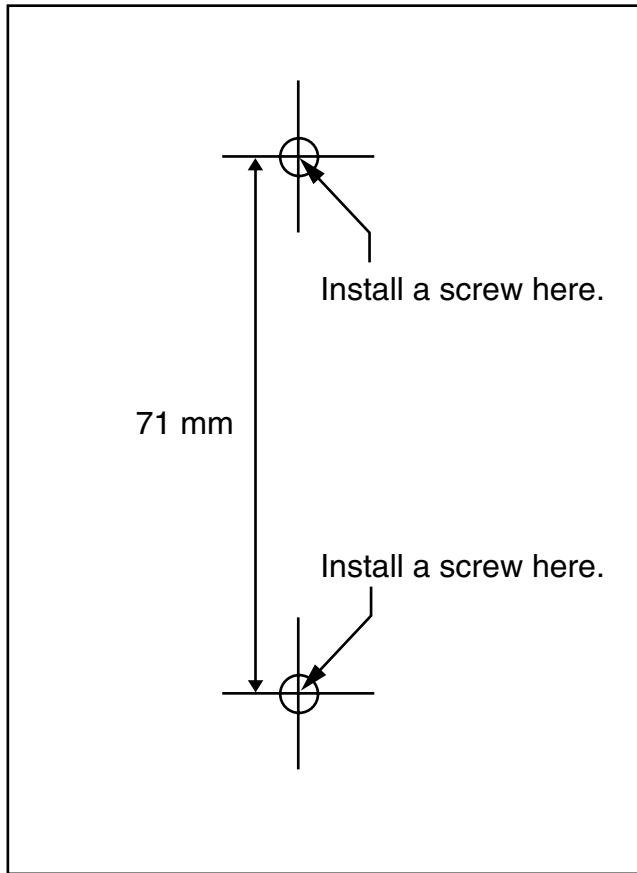
Notes

- 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 Doorphones, Door Openers, External Sensors, and External Relays

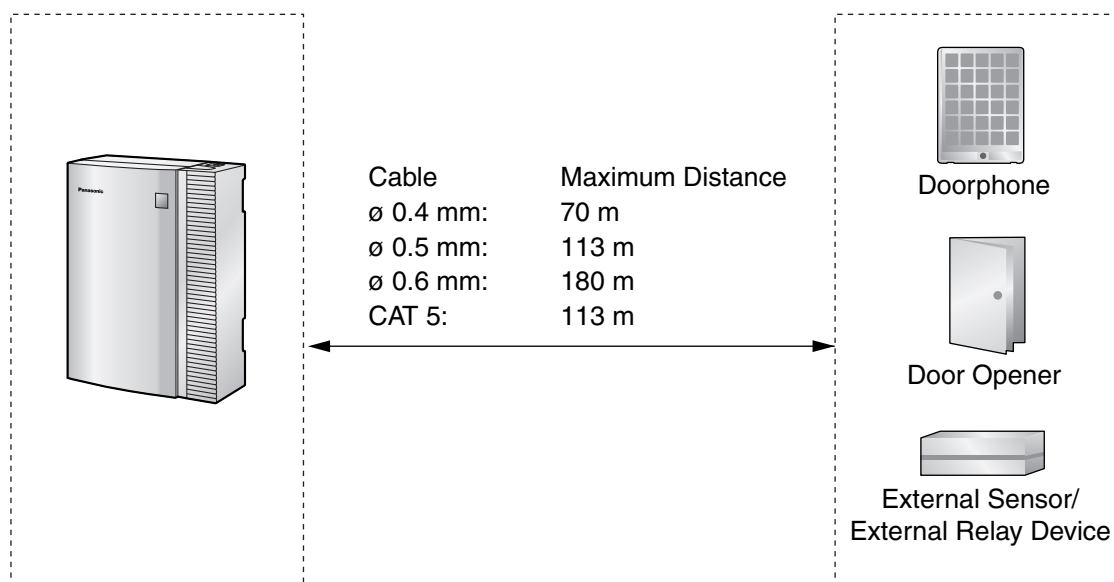
2.9.1 Connection of Doorphones, Door Openers, External Sensors, and External Relays

A maximum of 4 doorphones (KX-T30865), 4 door openers or external relays, and 4 external sensors can be connected to the Hybrid IP-PBX with a DPH4 card. A maximum of 2 doorphones (German-type), 2 door openers, 4 external sensors, and 4 external relays can be connected to the Hybrid IP-PBX with a DPH2 card.

Notes

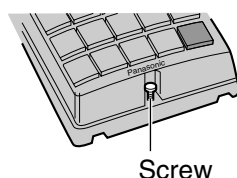
- KX-T30865 is a Panasonic doorphone.
- German-type doorphones, door openers, external sensors, and external relays are user-supplied.

Maximum Cabling Distance

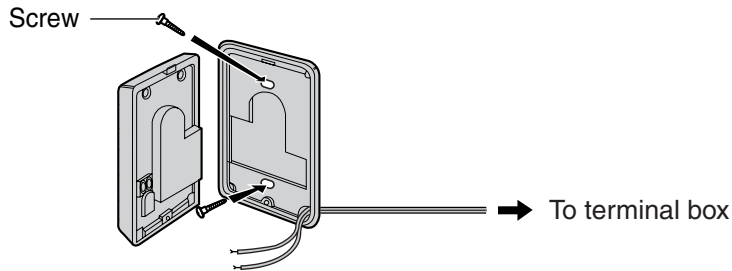


Installing the Doorphone (KX-T30865)

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 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 to the wall

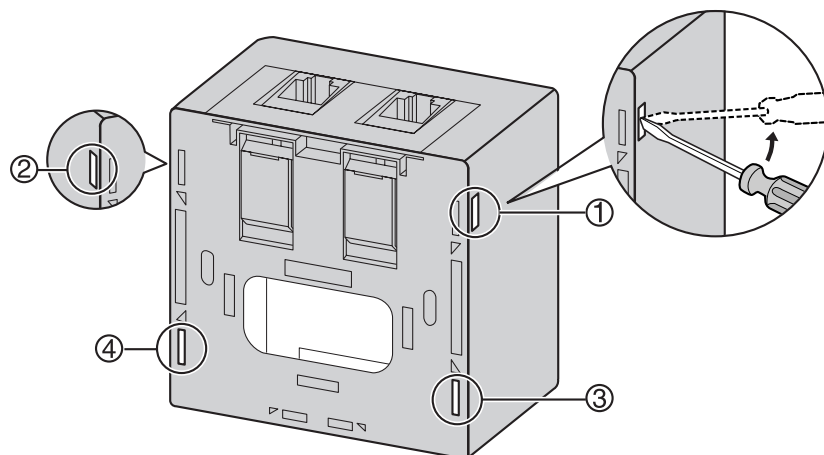
3. Connect the wires to the screws located in the front cover.



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

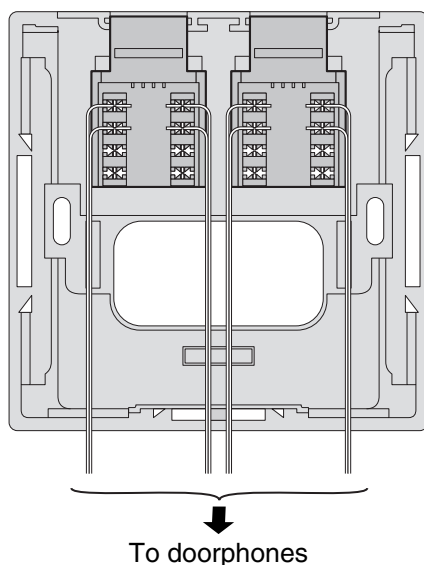
Connection of Doorphones to the DPH4 Card with RJ45 Connectors

1. Unlatch the cover of the terminal box by inserting a flathead screwdriver into the openings and levering the cover open. Follow the order indicated by the numbers 1 to 4.

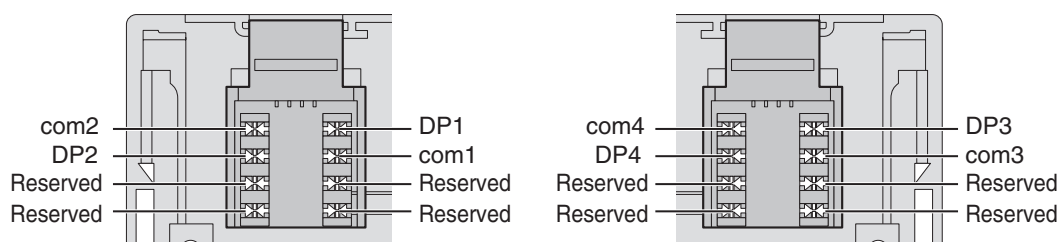


2. Connect the wires of doorphones to the terminal box.
For details about pin assignments for the DPH4 card, refer to "2.5.1 DPH4 Card (KX-TDA3161)".

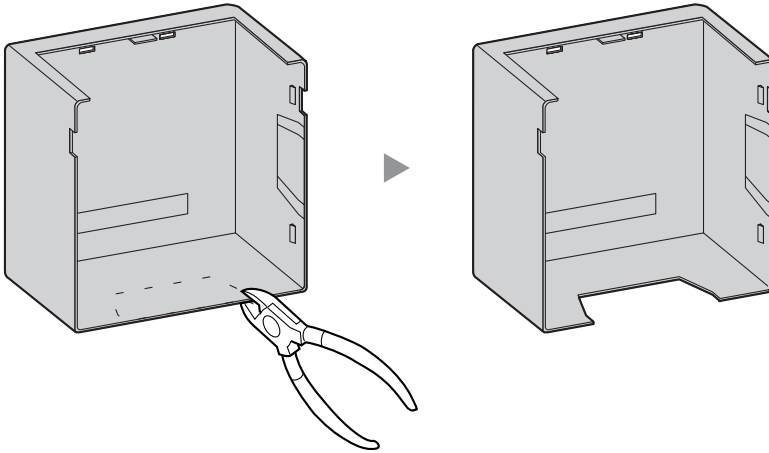
Terminal Box
(included with the card)



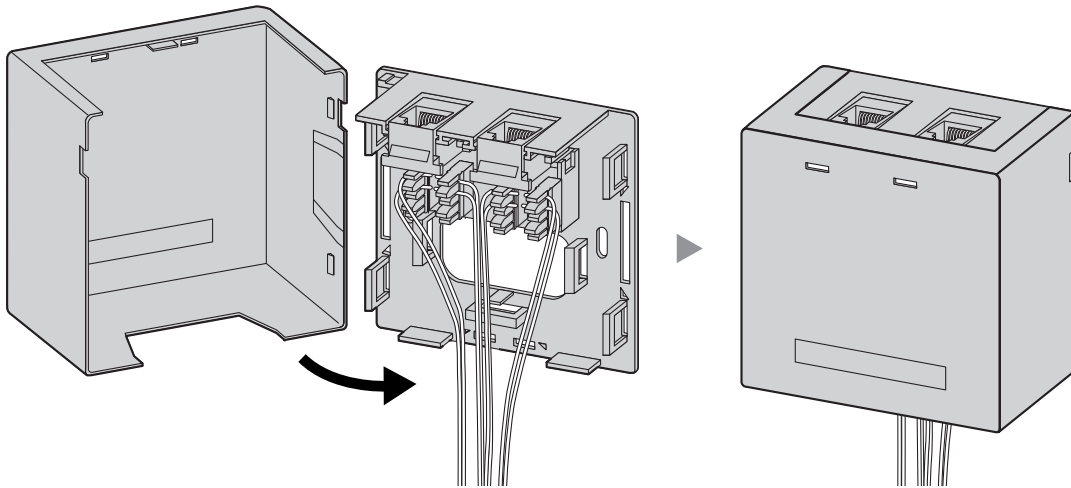
Pin Assignments for Terminal Box



3. Cut and remove the appropriate parts from the cover depending on your preference.

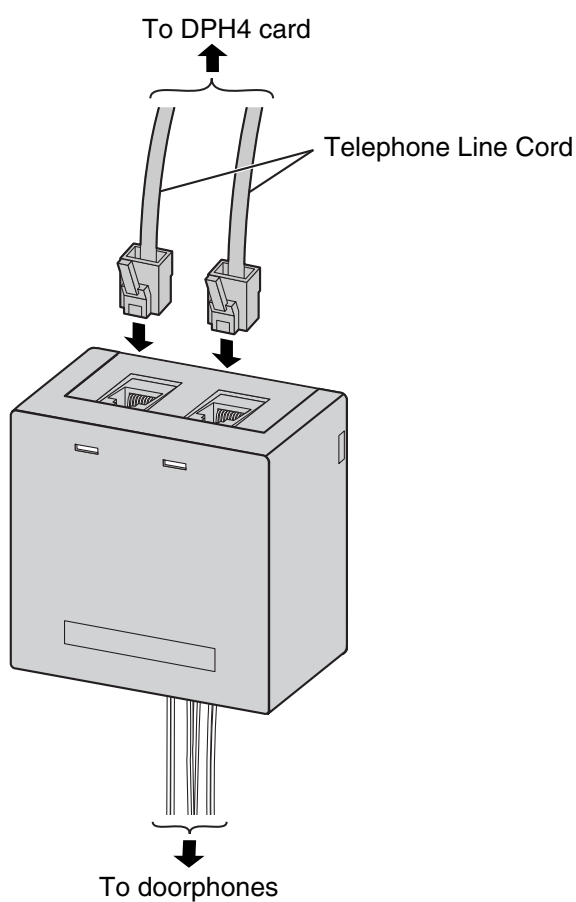


4. Make sure to run the connected wires through the opening. Then, close the cover.



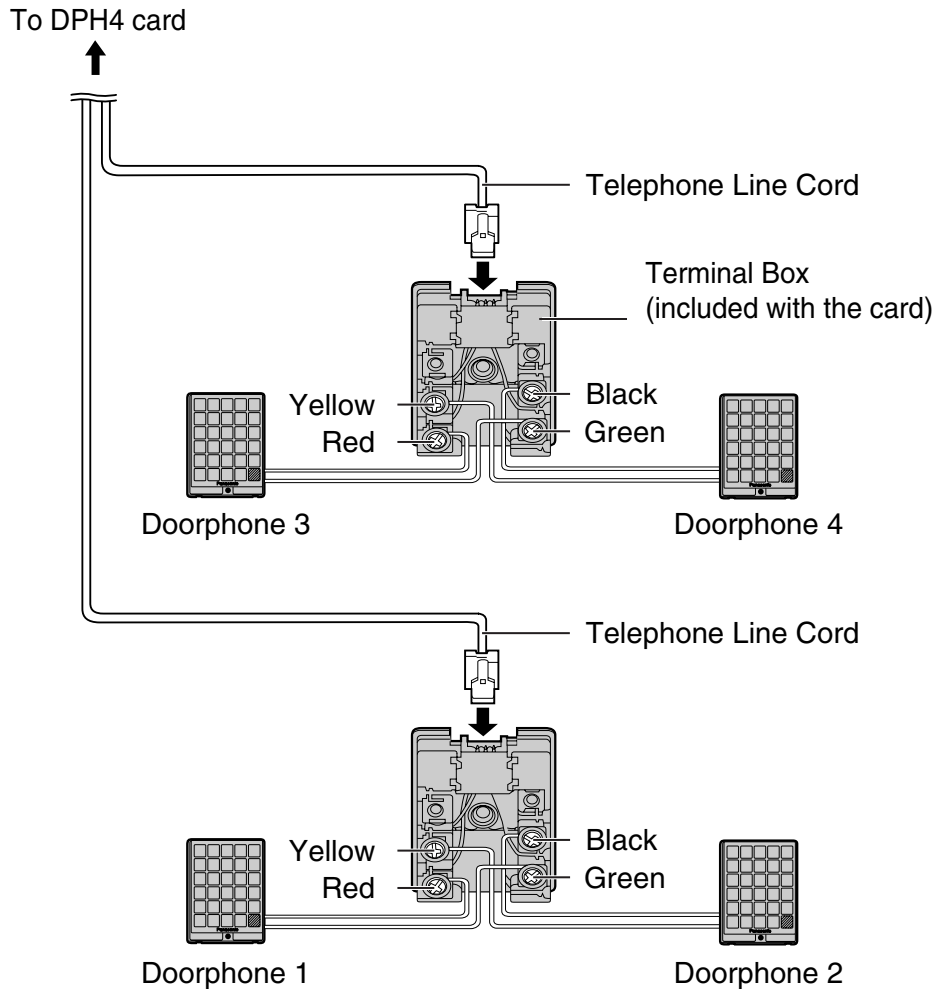
2.9 Connection of Doorphones, Door Openers, External Sensors, and External Relays

5. Connect the terminal box to the DPH4 card in the Hybrid IP-PBX using the telephone line cords included with the card.



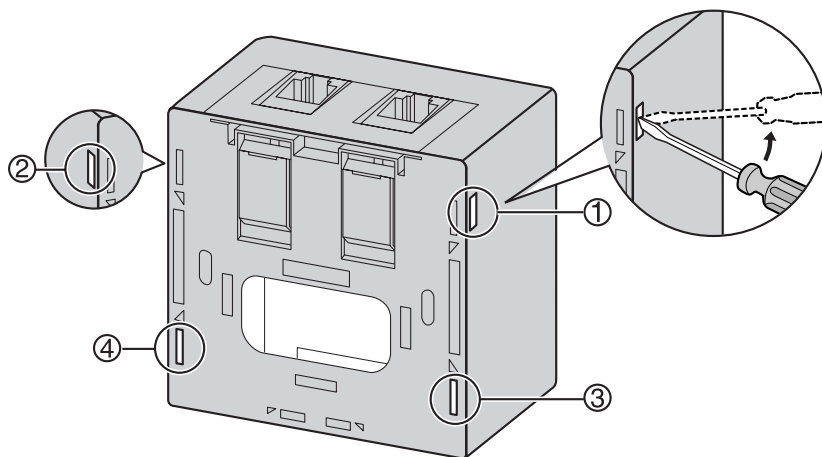
Connection of Doorphones to the DPH4 Card with RJ11 Connectors

1. Connect the DPH4 card to the terminal boxes using the telephone line cords included with the card. Refer to "2.5.1 DPH4 Card (KX-TDA3161)" for pin assignments.
2. Connect the wires of doorphones 1 and 3 to the red and green screws on the terminal box.
3. Connect the wires of doorphones 2 and 4 to the yellow and black screws on the terminal box.



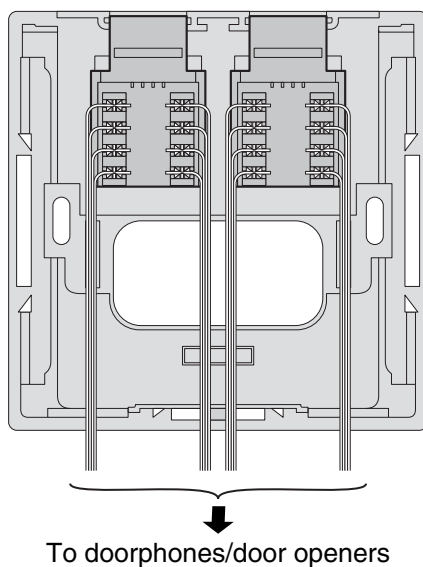
Connection of Door Openers and German Type Doorphones to DPH2 Card

1. Unlatch the cover of the terminal box by inserting a flathead screwdriver into the openings and levering the cover open. Follow the order indicated by the numbers 1 to 4.

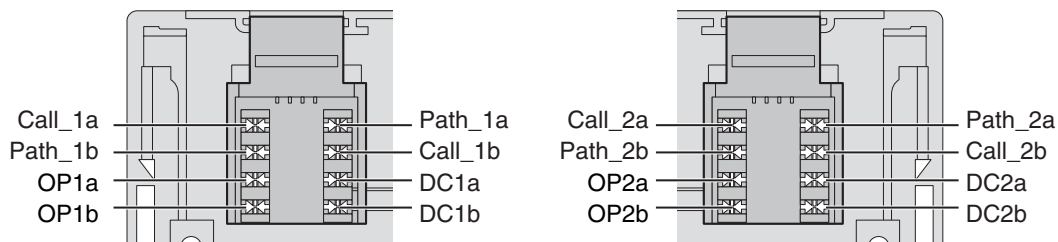


2. Connect the wires of door openers and doorphones to the terminal box. For details about pin assignments for the DPH2 card, refer to "2.5.2 DPH2 Card (KX-TDA3162)".

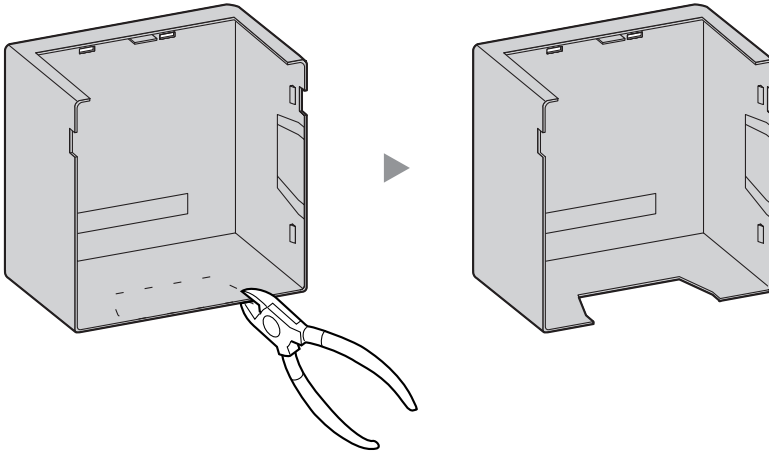
Terminal Box
(included with the card)



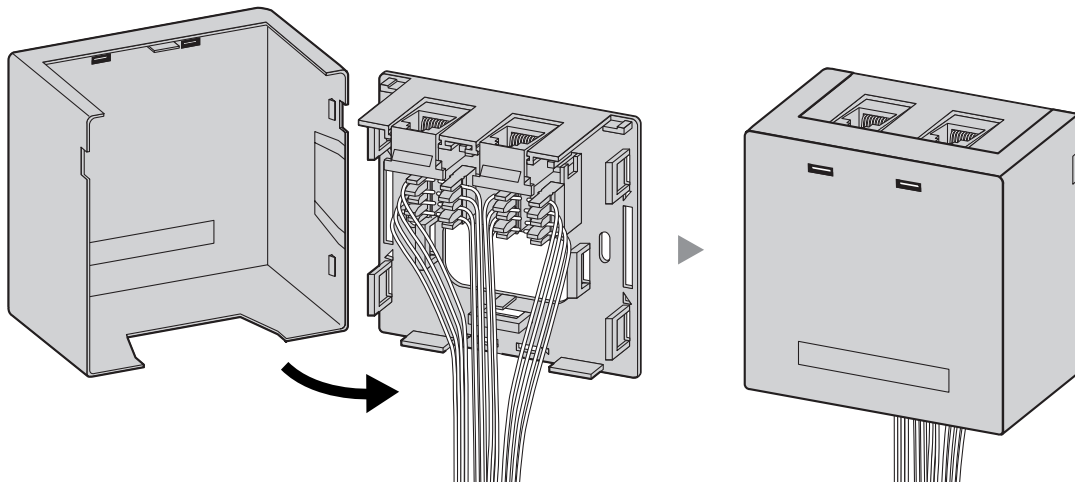
Pin Assignments for Terminal Box



3. Cut and remove the appropriate parts from the cover depending on your preference.

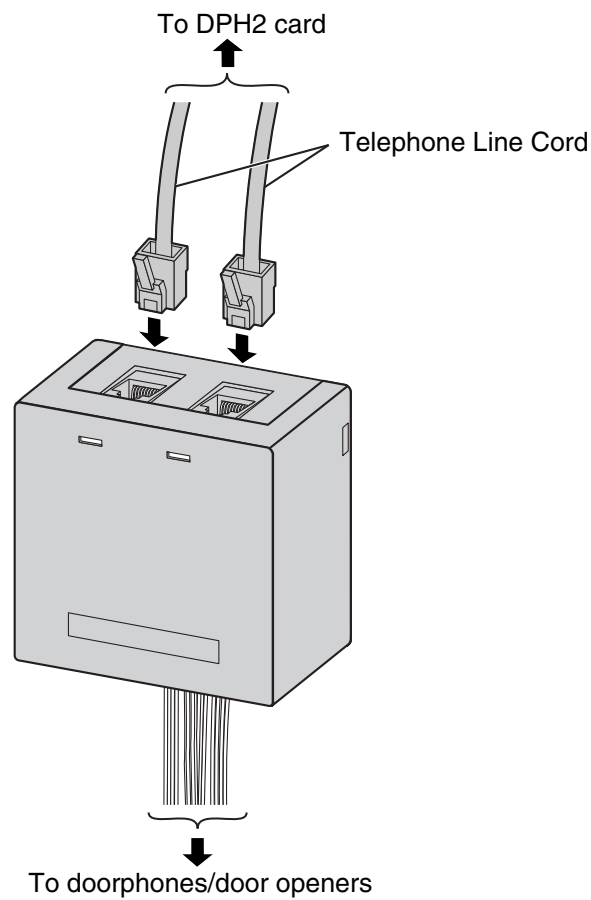


4. Make sure to run the connected wires through it. Then, close the cover.



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

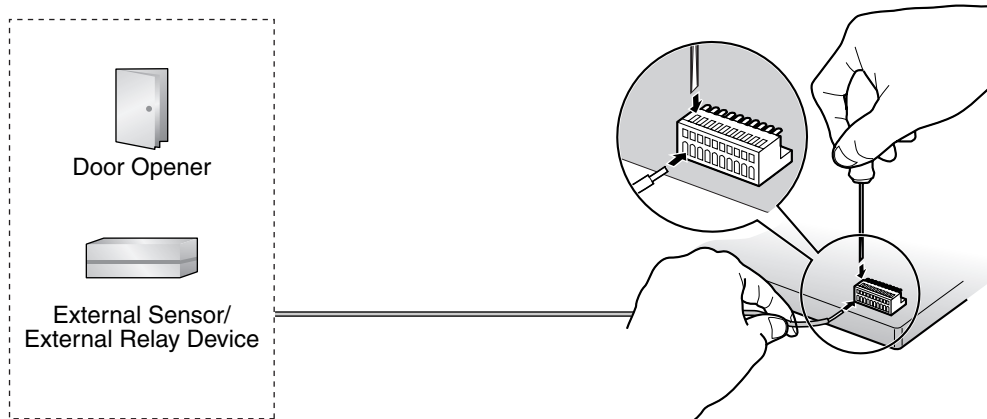
5. Connect the terminal box to the DPH2 card in the Hybrid IP-PBX using the telephone line cords included with the card.



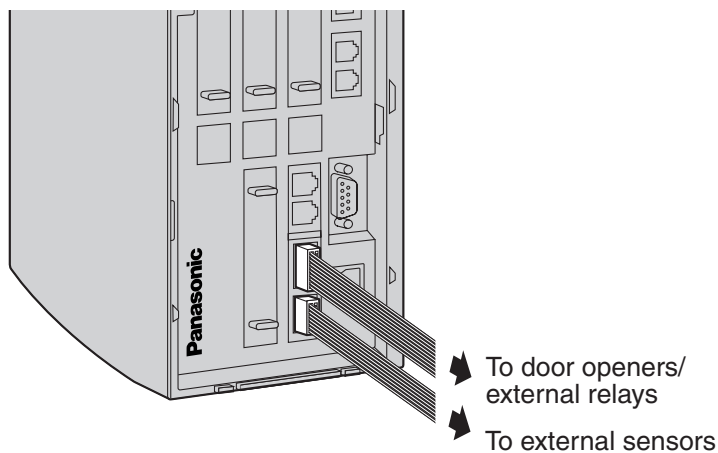
Connection of Door Openers, External Sensors, and External Relays to DPH4 Card

Use 8-pin and 10-pin terminal block (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 door openers, external sensors, and external relays.
Refer to "2.5.1 DPH4 Card (KX-TDA3161)" for pin assignments.



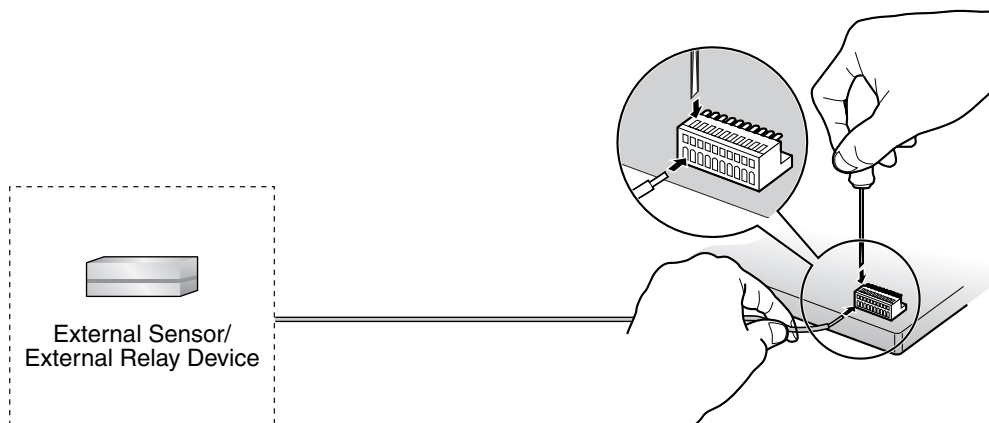
2. Attach the terminal block to the connector of the DPH4 card in the Hybrid IP-PBX.



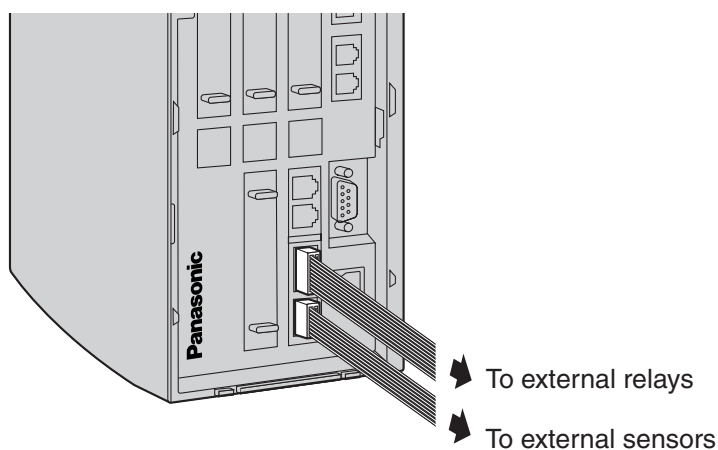
Connection of External Sensors and External Relays to DPH2 Card

Use 8-pin and 10-pin terminal block (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 external sensors and external relays. Refer to "2.5.2 DPH2 Card (KX-TDA3162)" for pin assignments.

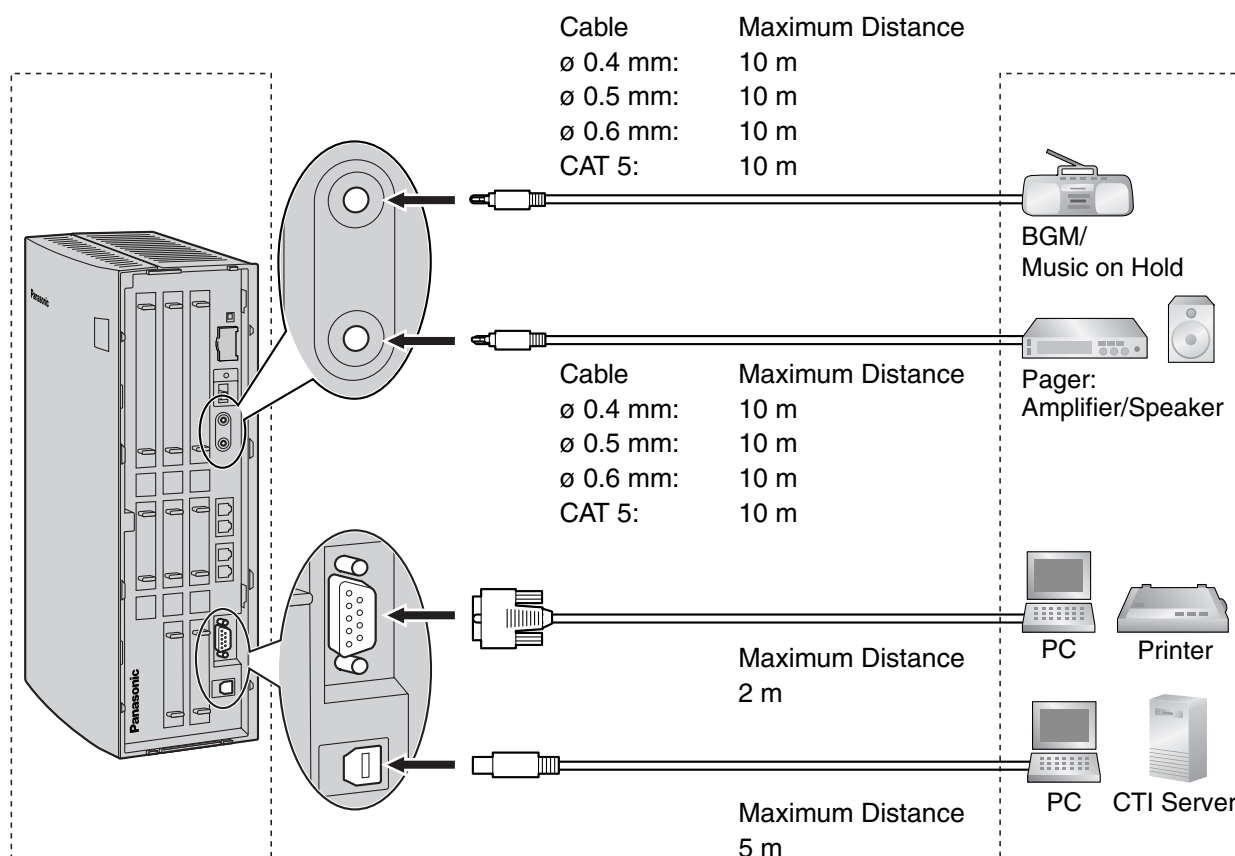


2. Attach the terminal block to the connector of the DPH2 card in the Hybrid IP-PBX.



2.10 Connection of Peripherals

2.10.1 Connection of Peripherals



BGM/MOH

The Hybrid IP-PBX provides Background Music and Music on Hold. Only 1 external music source (e.g., a user-supplied radio) can be connected to the Hybrid IP-PBX.

CAUTION

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

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

Only 1 paging device (user-supplied) can be connected to the Hybrid IP-PBX.

CAUTION

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

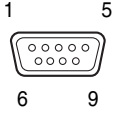
PC/Printer (via RS-232C)

The 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

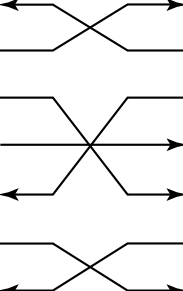
Use an RS-232C cross cable for connection between the Hybrid IP-PBX and PC.

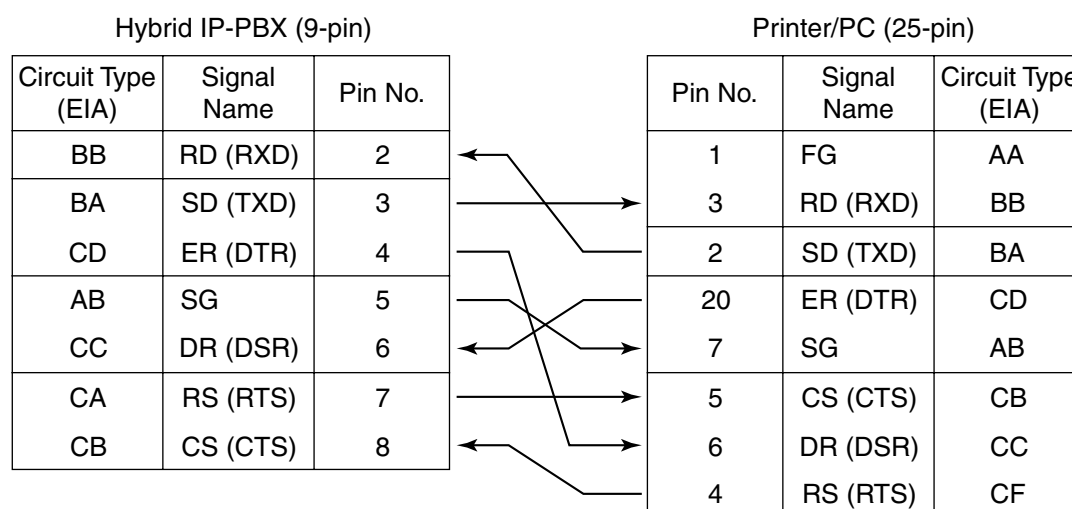
Pin Assignments

|  | 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 (9-pin) | | | Printer/PC (9-pin) | | | |
|-----------------------|-------------|---------|---|---------|-------------|--------------------|
| Circuit Type (EIA) | Signal Name | Pin No. | | Pin No. | Signal Name | Circuit Type (EIA) |
| BB | RD (RXD) | 2 |  | 2 | RD (RXD) | BB |
| BA | SD (TXD) | 3 | | 3 | SD (TXD) | BA |
| CD | ER (DTR) | 4 | | 4 | ER (DTR) | CD |
| AB | SG | 5 | | 5 | SG | AB |
| CC | DR (DSR) | 6 | | 6 | DR (DSR) | CC |
| CA | RS (RTS) | 7 | | 7 | RS (RTS) | CA |
| CB | CS (CTS) | 8 | | 8 | CS (CTS) | CB |

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

- **Receive Data (RXD):...**(input)
Conveys signals from the printer or the PC.
- **Transmit Data (TXD):...**(output)
Conveys signals from the unit to the printer or the PC. A "Mark" condition is held unless data or BREAK signals are being transmitted.
- **Data Terminal Ready (DTR):...**(output)
This signal line is turned ON by the unit to indicate that it is ON LINE. Circuit ER (DTR) ON does not indicate that communication has been established with the printer or the PC. It is switched OFF when the unit is OFF LINE.
- **Signal Ground (SG)**
Connects to the DC ground of the unit for all interface signals.
- **Data Set Ready (DSR):...**(input)
An ON condition of circuit DR (DSR) indicates the printer or the PC is ready. Circuit DR (DSR) ON does not indicate that communication has been established with the printer or the PC.
- **Request To Send (RTS):...**(output)
This lead is held ON whenever DR (DSR) is ON.
- **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/CTI Server (via USB version 2.0)

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


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

The CTI server 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 CTI server required for third party call control depends on your CTI application software. For details, refer to the manual for your CTI application software.

Pin Assignments

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

2.11 Power Failure Connections

2.11.1 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.

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 Super Hybrid Ports

In the event of power failure, SLTs connected to Ports 1 and 2 of the Super Hybrid Ports (on the Main Board) are automatically connected to PFT ports 1 and 2 of the first LCOT2/LCOT4 card (installed in the least slot number).

Note

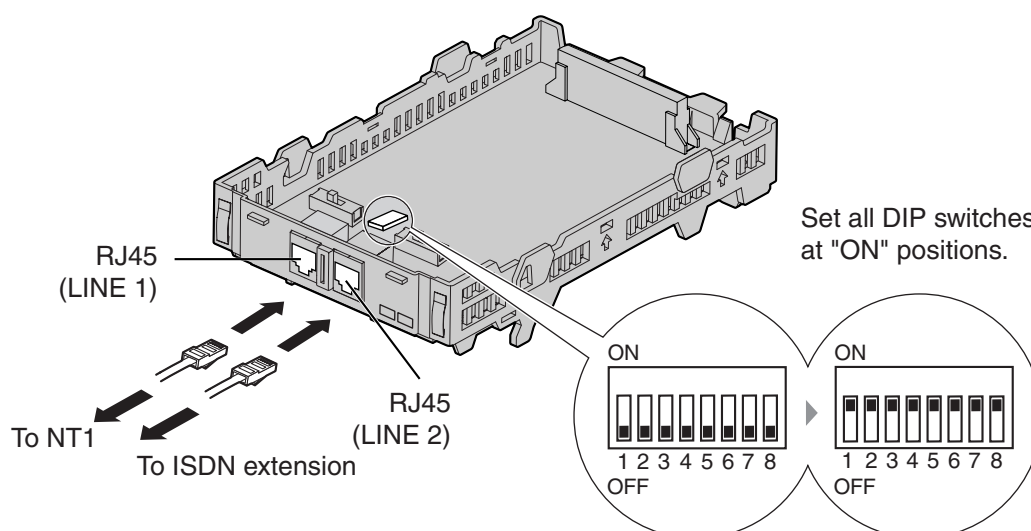
Even when the power returns, the conversation established during power failure will be maintained.

Using BRI2 Card

LINE 1 and LINE 2 of the BRI2 card can be used for Power Failure Connections.

Note

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



Accessories and User-supplied Items

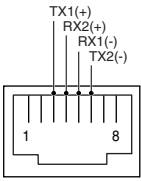
Accessories (included): Extension Bolt × 1, Strap × 1

User-supplied (not included): RJ45 connectors

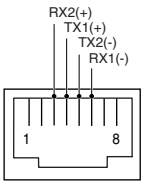
Switch Settings

| 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

|  | Signal Name | Level [V] | Function |
|---|-------------|-----------|-----------------|
| | TX1 | (+) | Transmit data 1 |
| | RX2 | (+) | Receive data 2 |
| | RX1 | (-) | Receive data 1 |
| | TX2 | (-) | Transmit data 2 |
| | — | — | Reserved |

RJ45 Connector LINE 2 Pin Assignments

|  | Signal Name | Level [V] | Function |
|---|-------------|-----------|-----------------|
| | RX2 | (+) | Receive data 2 |
| | TX1 | (+) | Transmit data 1 |
| | TX2 | (-) | Transmit data 2 |
| | RX1 | (-) | Receive data 1 |
| | — | — | Reserved |

2.12 Starting the Hybrid IP-PBX

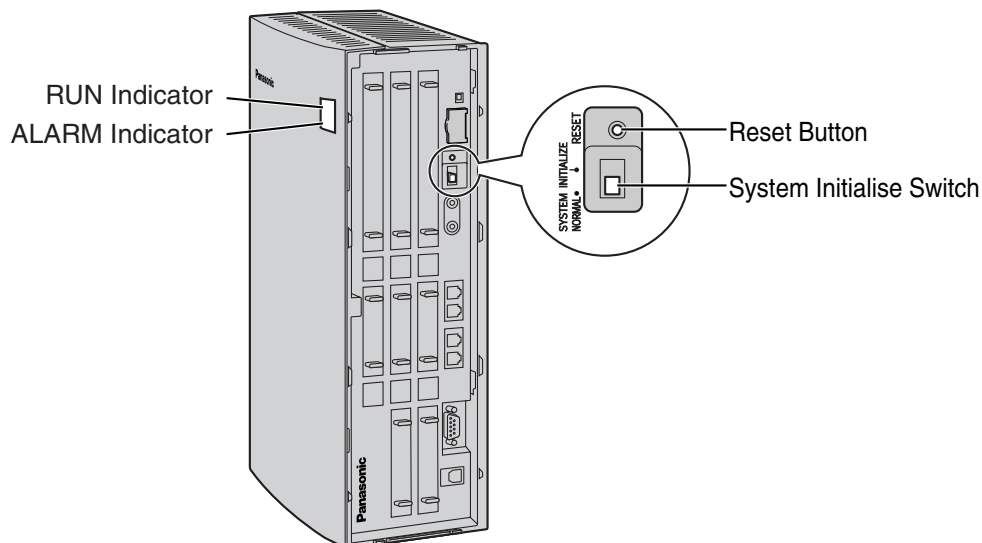
2.12.1 Starting the Hybrid IP-PBX

CAUTION

- The SD Memory Card must be inserted in the SD Memory Card slot of the main board before startup.
- 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 AC outlet is located near the equipment and is easily accessible.

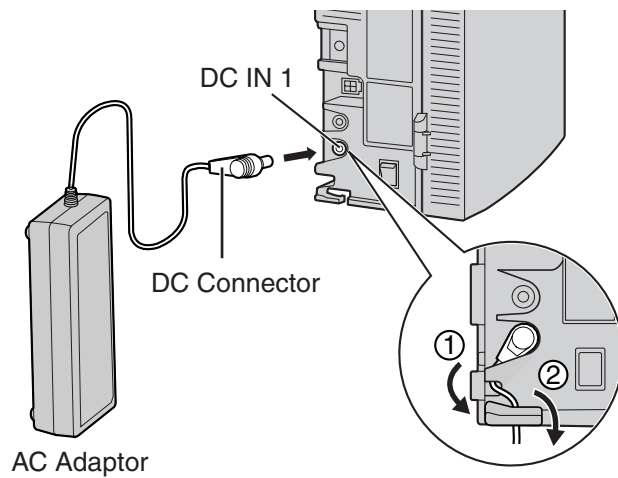
System Initialisation Procedure

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



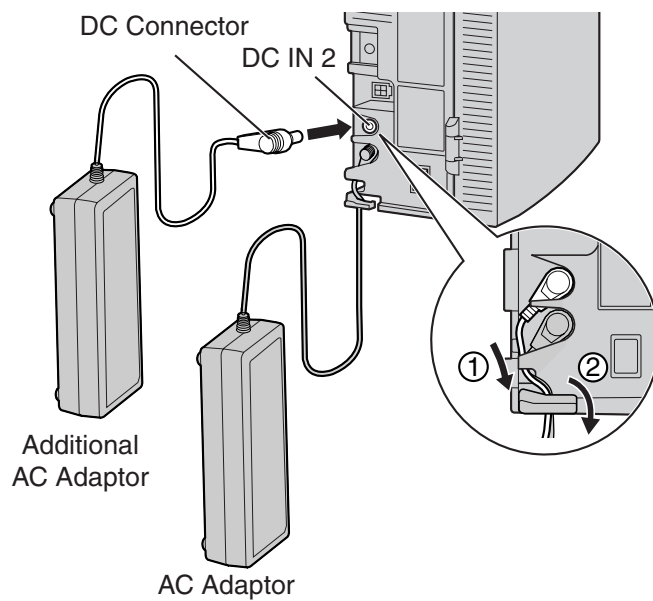
2.12 Starting the Hybrid IP-PBX

2. Plug the DC connector of the AC adaptor into DC IN 1.

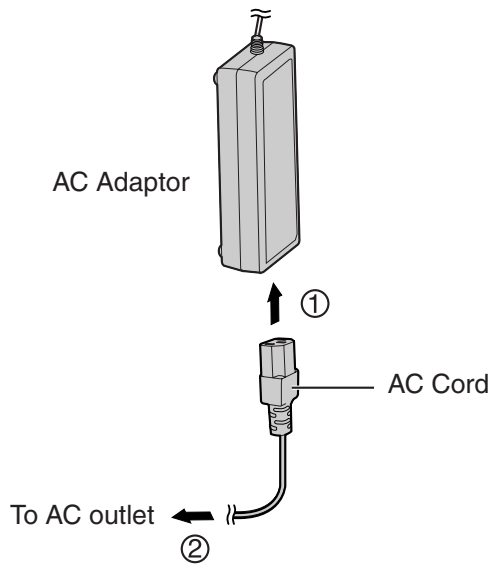


Notes

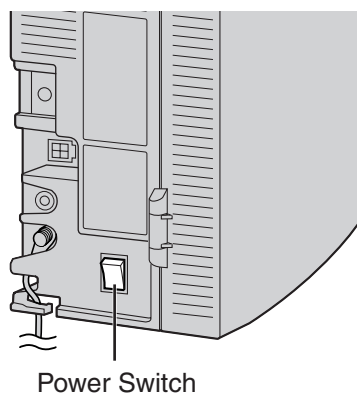
- The AC adaptor supplied with the Hybrid IP-PBX must be connected to DC IN 1. If an AC adaptor is connected only to DC IN 2, the Hybrid IP-PBX will not start.
- If you need to connect an additional AC adaptor, plug the DC connector of the additional AC adaptor into DC IN 2.



3. Plug the AC cord into the AC adaptor, and then plug the other end into an AC outlet.



4. Turn on the power switch. The RUN indicator will flash.



Notes

- For safety reasons, follow the procedures as indicated when turning on the Hybrid IP-PBX.
 - For safety reasons, do not stretch, bend, or pinch the AC cord and the DC cable of the AC adaptor.
5. While the RUN indicator is flashing, slide the System Initialise Switch back to the "NORMAL" position. Depending on the configuration, initialisation takes about 1 min to 3 min. If successfully executed, the RUN indicator will stop flashing and stay lit.

All data will be cleared, and the Hybrid IP-PBX as well as all optional service cards (except for the IP-GW4 card) will be initialised to the default values. The DPTs should show the time as 01:00. The data of the IP-GW4 card will not be initialised.

IMPORTANT

Use only the AC adaptor (Panasonic PSLP1244/Panasonic PSLP1434) and AC cord supplied with the Hybrid IP-PBX, or the Additional AC Adaptor (KX-A236).

LED Indications

| Indication | Colour | Description |
|------------|--------|--|
| RUN | Green | <p>PBX status indication</p> <ul style="list-style-type: none">• 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:<ul style="list-style-type: none">• the System Initialise Switch in "SYSTEM INITIALIZE" position• the SD Memory Card not inserted |
| ALARM | Red | <p>Alarm indication</p> <ul style="list-style-type: none">• OFF: Normal• ON: Alarm (CPU stop, alarm for each optional service card)• Flashing: Alarm (MPR file error in restarting) |

Confirming the Trunk Connection

After initialisation, programme the Hybrid IP-PBX and connect trunks to the Hybrid IP-PBX.

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

Turning off the Hybrid IP-PBX

For safety reasons, make sure to turn off the power switch before unplugging the Hybrid IP-PBX. To unplug, follow the reverse steps to plug it in.

Section 3

Guide for the KX-TDA30 Maintenance Console

Explains the installation procedure, structure, and basic information of the KX-TDA30 Maintenance Console.

3.1 Overview

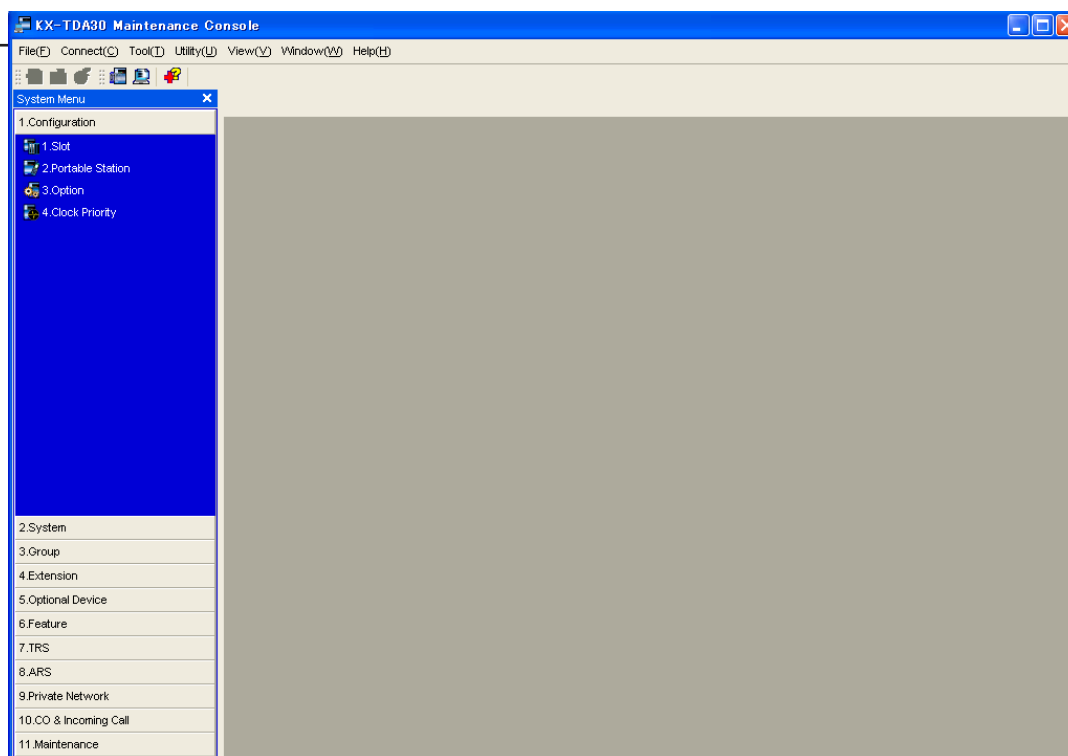
3.1.1 Overview

KX-TDA30 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-TDA30 Maintenance Console onto the PC.

This manual describes overview and installation of the KX-TDA30 Maintenance Console only.

KX-TDA30 Maintenance Console*¹

Menu Bar



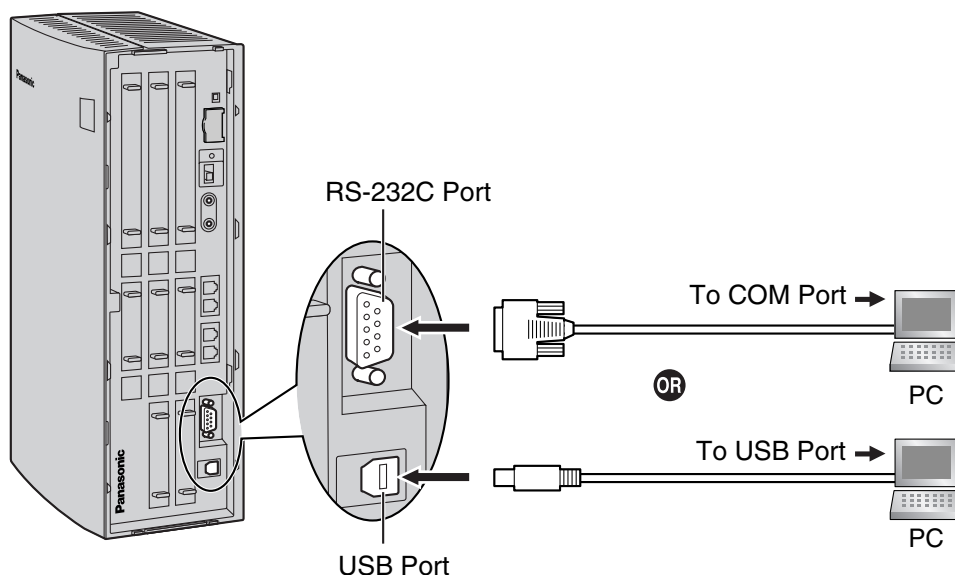
System Menu

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

3.2 Connection

3.2.1 Connection

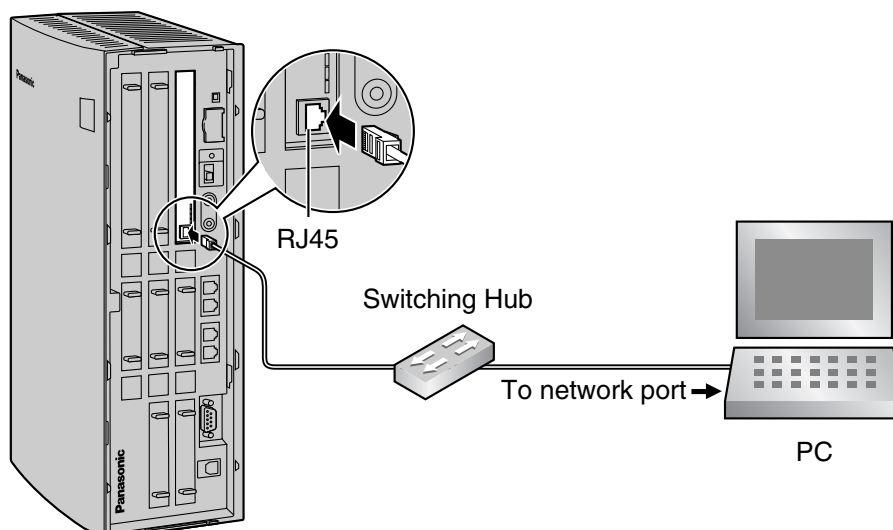
Serial Interface Connection



Note

For pin assignments and maximum cabling distance, refer to "2.10.1 Connection of Peripherals".

LAN Connection via IP-GW4 Card

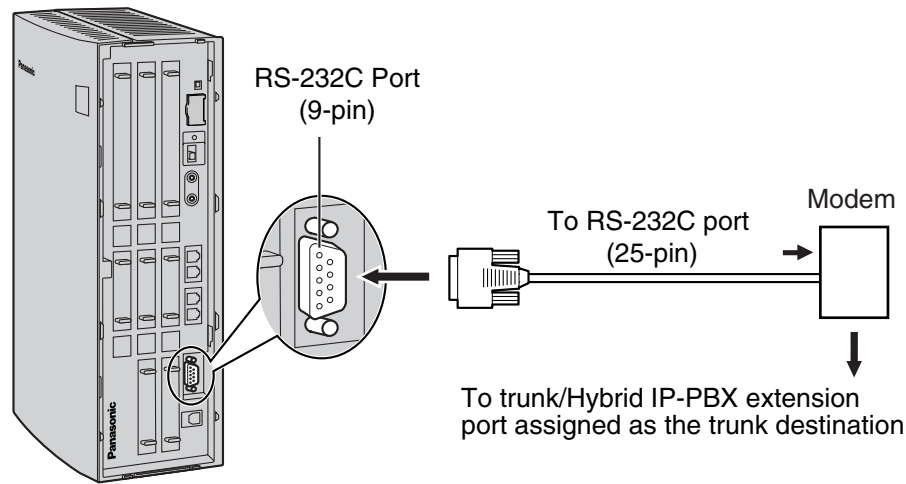


Note

For pin assignments and maximum cabling distance, refer to "2.3.8 IP-GW4 Card (KX-TDA3480)".



External Modem Connection



| Hybrid IP-PBX (9-pin) | | External Modem (25-pin) | |
|-----------------------|---------|-------------------------|-------------|
| Signal Name | Pin No. | Pin No. | Signal Name |
| RD (RXD) | 2 | 3 | RD (RXD) |
| SD (TXD) | 3 | 2 | SD (TXD) |
| ER (DTR) | 4 | 20 | ER (DTR) |
| DR (DSR) | 6 | 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.
- 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-TDA30 Maintenance Console. "AT&F" 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-TDA30 Maintenance Console

3.3.1 Installing and Starting the KX-TDA30 Maintenance Console

System Requirements

Required Operating System

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

Minimum Hardware Requirements

- CPU: 300 MHz Intel® Celeron® microprocessor
- HDD: 100 MB of available hard disk space
- RAM: 128 MB of available RAM

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 Hybrid IP-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 Hybrid IP-PBX has default passwords preset. For security, change these passwords the first time that you programme the Hybrid IP-PBX.
4. Change the passwords periodically.
5. It is strongly recommended that passwords of 10 numbers or characters be used for maximum protection against unauthorised access. For a list of numbers and characters that can be used in system passwords, refer to "1.1.2 Entering Characters" in the PC Programming Manual.

Installing the KX-TDA30 Maintenance Console

Notes

- Make sure to install and use the latest version of the KX-TDA30 Maintenance Console.
- To install or uninstall the software on a PC running Windows 2000 Professional or Windows XP Professional, you must be logged in as a user in either the "Administrators" or "Power Users" group.
- To connect the PC to the Hybrid IP-PBX via USB, the KX-TDA USB driver must be installed. Follow the instructions of the wizard to install the KX-TDA USB driver. When the Hybrid IP-PBX is first connected to the PC via USB, you may be asked to select the appropriate USB driver. Browse for and select the KX-TDA USB driver that was installed previously.



1. Copy the setup file of the KX-TDA30 Maintenance Console to your PC. (Its icon is shown here, on the left.)
2. Double-click the setup file to run the installer.
3. Follow the on-screen instructions provided by the installation wizard.

Starting the KX-TDA30 Maintenance Console and Assigning the Basic Items (Quick Setup)

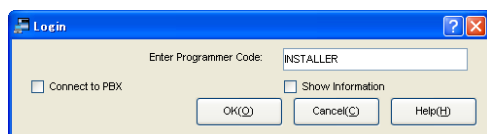
When you start the KX-TDA30 Maintenance Console with the Installer Level Programmer Code and connect to the Hybrid IP-PBX for the first time after initialisation (with the factory default setting), Quick Setup will launch automatically. During Quick Setup, you will set up the basic items. For details about the basic items, refer to "2.3.4 Quick Setup" in the Feature Guide.

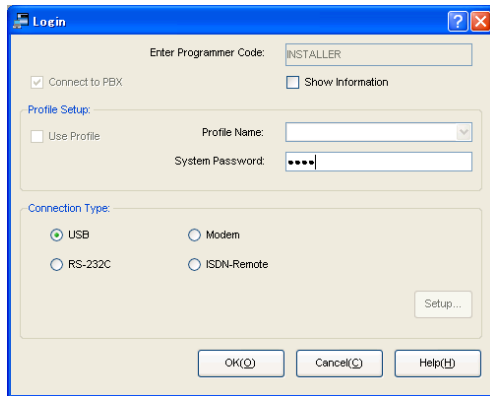
1. Connect the PC to the Hybrid IP-PBX with a USB cable.
2. Start the **KX-TDA30 Maintenance Console** from the Start menu.
3. "Information before programming" appears.
 - a. Carefully read this important additional information, which includes updates to this and other manuals.
 - b. Click **OK** to close this window.
4. Enter the Installer Level Programmer Code (default: **INSTALLER**).

The Programmer Code authorises different programming levels, and the Quick Setup is only available when you start the KX-TDA30 Maintenance Console with the Installer Level Programmer Code.

Note

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





5. a. Click the check box to connect to the Hybrid IP-PBX. Options will appear as shown here, on the left.
- b. Enter the system password for installer (default: **1234**).
- c. Select "USB", then click **OK**.

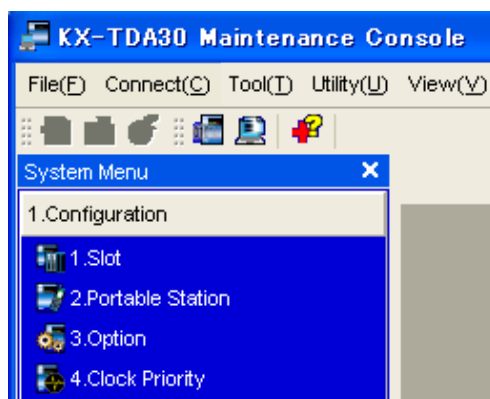
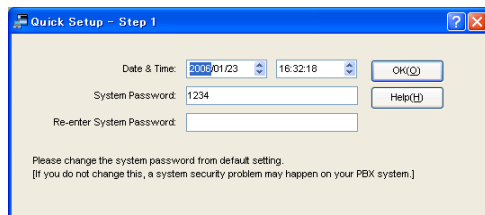
Note

To connect to the Hybrid IP-PBX via USB, the KX-TDA USB driver must be installed on the PC, as explained above in "Installing the KX-TDA30 Maintenance Console".

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 "2.12.1 Starting the Hybrid IP-PBX" and restart the Hybrid IP-PBX.
- c. Repeat step 5 to reconnect the KX-TDA30 Maintenance Console to the Hybrid IP-PBX.

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



The system menu appears. You may now begin programming the Hybrid IP-PBX.

Notice

1. During a long programming session, it is highly recommended that you periodically save the system data to the SD Memory Card. If the Hybrid IP-PBX undergoes a sudden power failure or if the system is reset for some reason, all the system data in RAM will be lost. However, if system data has been saved to the SD Memory Card, it can be easily restored. To save the system data to the SD Memory Card, (1) click the **"SD Memory Backup"** icon before resetting the Hybrid IP-PBX or turning off the power, or (2) exit the KX-TDA30 Maintenance Console so that the Hybrid IP-PBX automatically saves the system data.

3.3 Installation of the KX-TDA30 Maintenance Console

2. The PC will not perform any shutdown operation, or enter the power-saving system standby mode while the KX-TDA30 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.

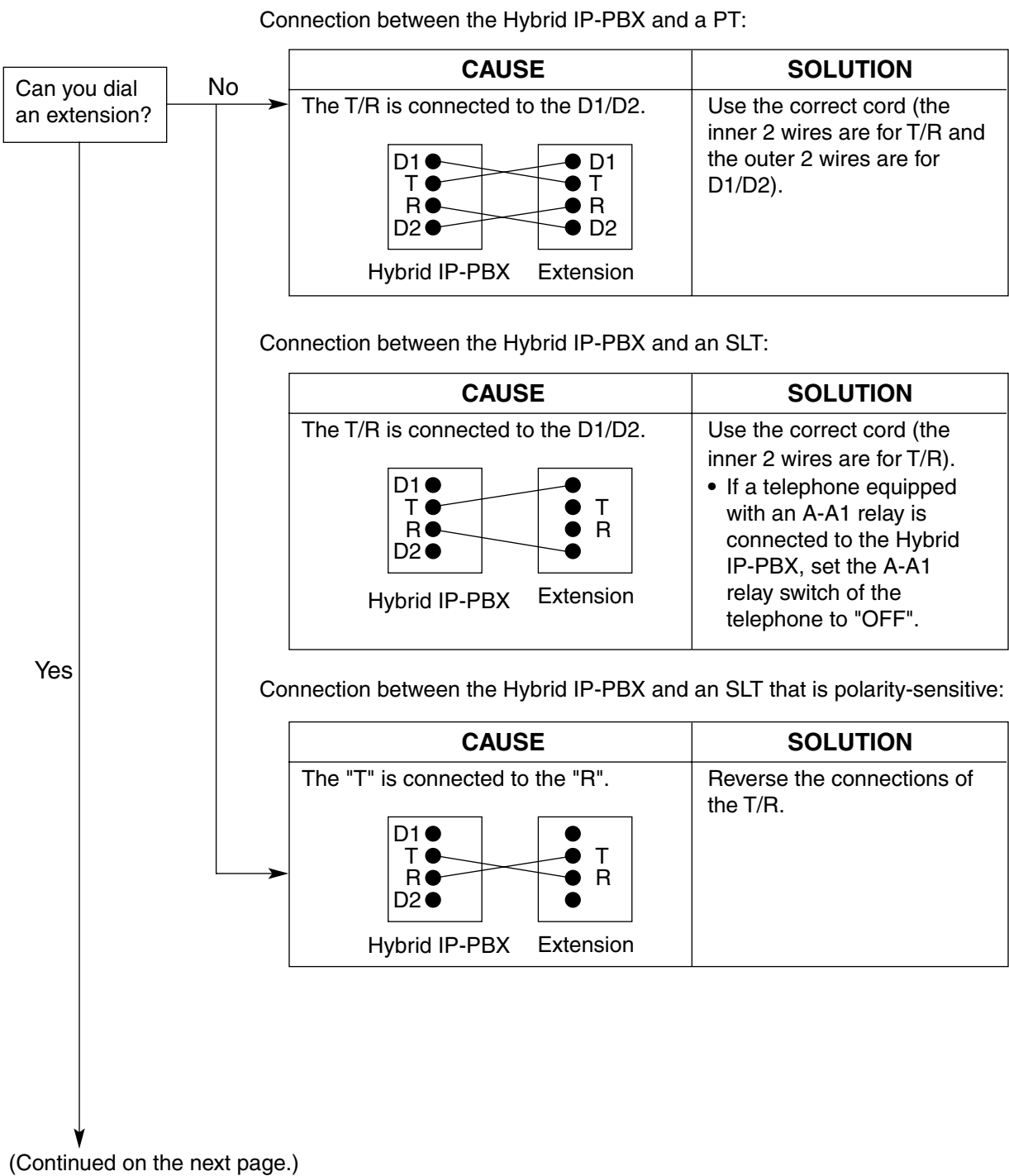
4.1 Troubleshooting

4.1.1 Installation

| PROBLEM | PROBABLE CAUSE | SOLUTION |
|--|---|--|
| Extension does not operate. | Bad extension card. | <ul style="list-style-type: none"> Exchange the card for a known working one. |
| | Bad connection between the Hybrid IP-PBX and telephone. | <ul style="list-style-type: none"> 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. | <ul style="list-style-type: none"> Use a 2-wire cord. Set the A-A1 relay switch of the telephone to the "OUT" or "OFF" position. |
| | Bad telephone. | <ul style="list-style-type: none"> Take the telephone and plug it into another extension port that is working. If the telephone does not work, replace the telephone. |
| | The number of terminal equipment exceeds the capacity of the Hybrid IP-PBX with the supplied AC adaptor only. | <ul style="list-style-type: none"> Connect an additional AC adaptor. |
| The Hybrid IP-PBX does not operate properly. | | <ul style="list-style-type: none"> 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. | <ul style="list-style-type: none"> 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. | <ul style="list-style-type: none"> 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. | <ul style="list-style-type: none"> Switch the calling mode to ring-calling. Set the LCS mode to "Private". |

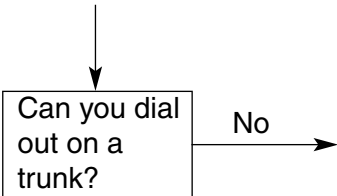
| PROBLEM | PROBABLE CAUSE | SOLUTION |
|---|---|---|
| The ALARM indicator on the front of the cabinet turns on red. | A major system error occurs in the Hybrid IP-PBX. | <ul style="list-style-type: none">See the error log using the KX-TDA30 Maintenance Console (refer to "4.1.5 Troubleshooting by Error Log"). |

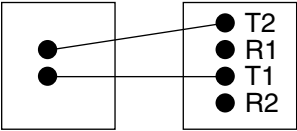
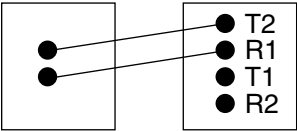
4.1.2 Connection



Connection between the trunk and the Hybrid IP-PBX:

(Continued from the previous page.)



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

4.1.3 Operation

| PROBLEM | PROBABLE CAUSE | SOLUTION |
|--|--|---|
| <ul style="list-style-type: none"> When using the speakerphone on an APT, nothing is audible. When using the speakerphone/monitor mode with a DPT, nothing is audible. | <ul style="list-style-type: none"> The HANDSET/HEADSET selector is set to the "HEADSET" position. The "HEADSET" mode is selected by Personal Programming, "Handset/Headset Selection". | <ul style="list-style-type: none"> 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. |
| <ul style="list-style-type: none"> The PT does not ring. | <ul style="list-style-type: none"> The ringer volume is off. | <ul style="list-style-type: none"> Turn on the ringer volume. |
| <ul style="list-style-type: none"> During a power failure, extensions connected to ports 1 and 2 of Super Hybrid Ports do not operate. | <ul style="list-style-type: none"> A DPT or APT is connected to the extension port. The dialling mode (tone or pulse) is incorrect. | <ul style="list-style-type: none"> Disconnect the DPT or APT and connect an SLT. Set the Tone/Pulse switch to the other position. |
| <ul style="list-style-type: none"> Originating an outside call, call transfer, or conference cannot be performed. | <ul style="list-style-type: none"> The corresponding CO button does not exist on the PT. | <ul style="list-style-type: none"> Programme the CO button. Refer to "1.20.2 Flexible Buttons" in the Feature Guide. |
| <ul style="list-style-type: none"> Cannot register the PS. | <ul style="list-style-type: none"> Wrong Personal Identification Number (PIN) is registered to the PS. CS is not connected properly. | <ul style="list-style-type: none"> Enter 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. |
| <ul style="list-style-type: none"> PS becomes out of range. Cannot make calls using the PS. | <ul style="list-style-type: none"> CS is not working. Location of CS is not good. Access system of the PS is not properly set. | <ul style="list-style-type: none"> 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 "2.7.5 Site Survey Using the KX-TCA255/KX-TD7590" or "2.8.5 Site Survey"). Change the access system setting of the PS to the appropriate system or automatic. |
| <ul style="list-style-type: none"> Noise is frequent while using the PS. Conversations disconnect while using the PS. | <ul style="list-style-type: none"> Call handover is not working. PS is out of CS coverage area. | <ul style="list-style-type: none"> Locate the CS properly (refer to "2.7.5 Site Survey Using the KX-TCA255/KX-TD7590" or "2.8.5 Site Survey"). |
| <ul style="list-style-type: none"> PS stays out of service when the CS status is changed from Out of Service to In Service. | <ul style="list-style-type: none"> It may take about 10 s for CS to start up after the status has been changed to In Service. | <ul style="list-style-type: none"> 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.

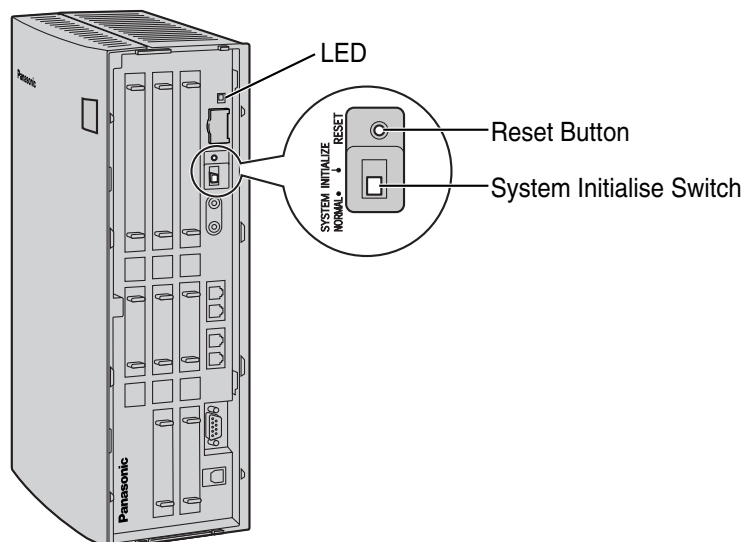
Notes

- 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.
- Be aware that pressing the Reset Button with the System Initialise Switch in the "SYSTEM INITIALIZE" position clears all data stored in the Hybrid IP-PBX. Do not perform this operation unless you intend to delete all data from the Hybrid IP-PBX.

Operation

If the Hybrid IP-PBX does not operate properly:

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



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. For information about how to view the error log using the KX-TDA30 Maintenance Console, refer to "2.5.8 Utility—Error Log" in the PC Programming Manual.

Example: KX-TDA30 Maintenance Console

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

Example: Station Message Detail Recording (SMDR)

| | | | | | |
|------------------|----|----------|-------|----------------------------|--|
| 04/01/01 10:37AM | MJ | ALM #000 | 10000 | MPR WDT overflow | |
| 04/01/01 11:07AM | MN | ALM #010 | 10000 | AC power down | |
| 04/01/01 03:55PM | MN | ALM #392 | 10401 | Clock master card selected | |

Description

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

| | Item | Description |
|---|-----------------|---|
| 5 | Sub Code | <p>The 5-digit sub code of the relevant hardware (1XXYY).</p> <ul style="list-style-type: none"> • 1: Cabinet number • XX: Slot number 00 to 11 (00: MPR card slot; 01: Super hybrid ports; 02 to 11: Slots for optional service cards) • YY: Physical port number <ul style="list-style-type: none"> – For optional service cards: Physical port number (01 to 16) will be displayed. – For optional service cards that are installed in Slots 08 to 11: Sub slot number 1 + port number (1 to 4) will be displayed as follows: <ul style="list-style-type: none"> • Sub slot 1: 11 to 14 <p>Note</p> <p>When there are no parameters for the slot and physical port numbers, XX and YY will be displayed as "00". Example: Sub code for MPR card = 10000</p> |
| 6 | Error Message | A description of the error. |
| 7 | Log Information | Displays probable causes of the errors and their solutions. |

4.1 Troubleshooting

Section 5

Appendix

5.1 Revision History

5.1.1 PSMPR Software File Version 1.1xxx

New Options

- System Components Table
 - KX-TDA3182 3-Port DID Card (DID3)
 - KX-TDA3183 2-Port Analogue Trunk Card (LCOT2)
 - KX-TDA3105 Memory Expansion Card (MEC)

Changed Contents

- 1.4.3 System Capacity

5.1.2 PSMPR Software File Version 2.0xxx

New Options

- System Components Table
 - KX-TDA3283 1-Port BRI Card (BRI1)
 - KX-TDA3820 SD Memory Card for Software Upgrade
 - KX-TDA3920 SD Memory Card for Software Upgrade to Enhanced Version

Changed Contents

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

5.1.3 PSMPR Software File Version 2.2xxx

New Options

- System Components Table
 - KX-TDA3192 2-Channel Simplified Voice Message Card (SVM2)
 - KX-TDA3283 1-Port BRI Card (BRI1)
 - KX-TDA3820 SD Memory Card for Software Upgrade
 - KX-TDA3920 SD Memory Card for Software Upgrade to Enhanced Version

Changed Contents

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

5.1.4 PSMPR Software File Version 3.0xxx

New Options

- System Components Table
 - KX-TDA3188 E-1 Trunk Card (E1)

Changed Contents

- 1.4.3 System Capacity
- 3.3.1 Installing and Starting the KX-TDA30 Maintenance Console

5.1.5 PSMPR Software File Version 4.0xxx

New Options

- System Components Table
 - KX-TDA3450 4-Channel SIP Trunk Card (SIP-GW4)
 - KX-TDA3451 4-Channel VoIP DSP Card (SIP-DSP4)
 - KX-TDA3470 4-Channel VoIP Extension Card (IP-EXT4)

Changed Contents

- 1.4.3 System Capacity
- 2.3.8 IP-GW4 Card (KX-TDA3480)
- 3.2.1 Connection

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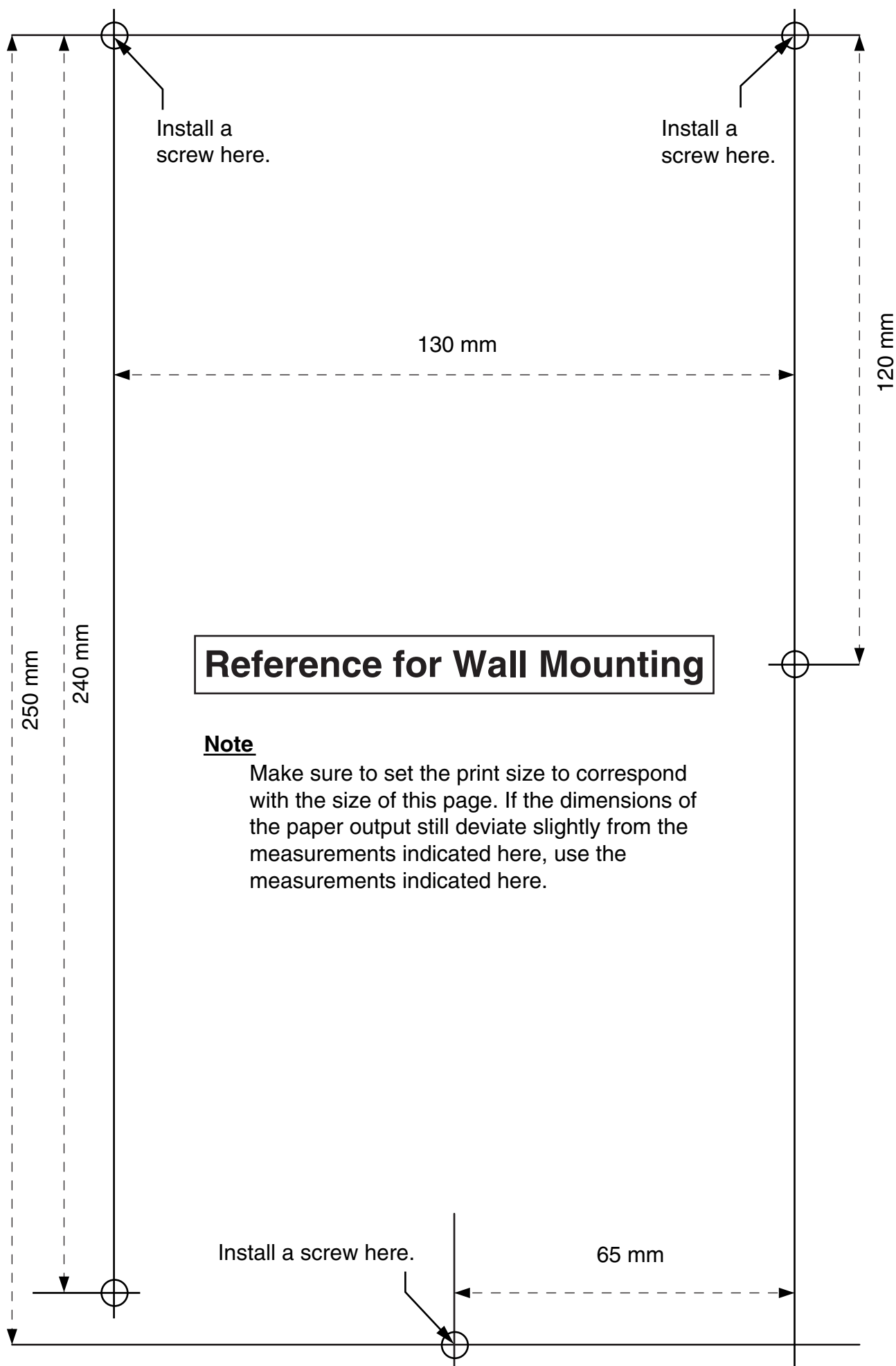
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