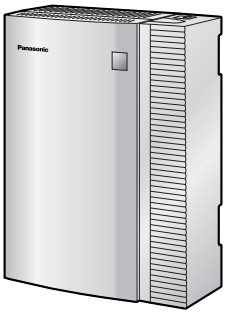
Panasonic



Hybrid IP-PBX

Installation Manual

Model No. KX-TDA15

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-TDA15: MPR Version 2.2

SD Logo is a trademark.

System Components

System Components Table

	Model	Description
Main Unit	KX-TDA15	Main Unit
Trunk Cards	KX-TDA3183	2-Port Analogue Trunk Card (LCOT2)
	KX-TDA3280	2-Port BRI Card (BRI2)
	KX-TDA3283	1-Port BRI Card (BRI1)
	KX-TDA3480	4-Channel VoIP Gateway Card (IP-GW4)
Extension Cards	KX-TDA3172	8-Port Digital Extension Card (DLC8)
	KX-TDA3174	8-Port Single Line Telephone Extension Card (SLC8)
Other Cards	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-TDA3191	2-Channel Message Card (MSG2)
	KX-TDA3192	2-Channel Simplified Voice Message Card (SVM2)
	–	Extension Caller ID Card (EXT-CID)
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
Proprietary Equipment	KX-T30865	Doorphone

Available Proprietary Telephones

The Hybrid IP-PBX supports Panasonic KX-T7000, KX-TD7000, and KX-TCA series telephones:

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

Note

The Hybrid IP-PBX does not support the following telephones:

- KX-T30800 series Proprietary Telephones and DSS consoles
- KX-T61600 series Proprietary Telephones and DSS consoles
- KX-T123200 series Proprietary Telephones and DSS consoles
- KX-TD7500 DECT Portable Station

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

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

Abbreviations in this manual

Proprietary telephone: PT

Digital proprietary telephone: DPT

Analogue proprietary telephone: APT

Portable station: PS

Single line telephone: SLT

Notice

There are some optional service cards and features that are not available for certain countries/areas. Consult your certified Panasonic dealer for detailed instructions.

[*1] The KX-T7090 headset can be connected to the KX-T7000, KX-T7200, KX-T7300, KX-T7400, and KX-T7500 (except for KX-T7560/KX-T7565) series telephones.

Important Safety Instructions

SAFETY REQUIREMENTS

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

1. Read and understand all instructions.
2. Follow all warnings and instructions marked on the product.
3. Unplug 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 Germany only

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

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.**

CAUTION

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.

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.	_____

CE

The KX-TDA15E, KX-TDA15NE, KX-TDA15GR, and KX-TDA15CE 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 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://doc.panasonic.de

Contact:
Panasonic Services Europe GmbH
Panasonic Testing Centre
Winsbergring 15, 22525 Hamburg, F.R. Germany

Introduction

This Installation Manual is designed to serve as an overall technical reference for the Panasonic Hybrid IP-PBX, KX-TDA15. 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, and step-by-step instruction for performing system programming using a proprietary telephone or a personal computer (PC).

User Manual

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

Trademarks

Precautions for Users in the United Kingdom

FOR YOUR SAFETY, PLEASE READ THE FOLLOWING TEXT CAREFULLY.

This appliance is supplied with a moulded three-pin mains plug for your safety and convenience. A 5 amp fuse is fitted in this plug. Should the fuse need to be replaced, please ensure that the replacement fuse has a rating of 5 amps and that it is approved by ASTA or BSI to BS1362.

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

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

IF THE FITTED MOULDED PLUG IS UNSUITABLE FOR THE 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

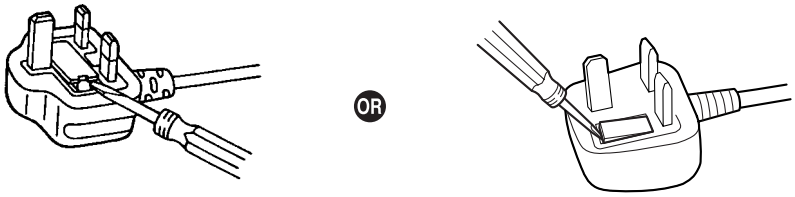
As the colours of the wires in the mains lead of this apparatus may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows.

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.

Table of Contents

Section 1
System Outline

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

1.1 System Highlights

1.1.1 System Highlights

Networking Features

This Hybrid IP-PBX supports the following networking features:

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.

Voice over Internet Protocol (VoIP) Network

The PBX can connect to another PBX via a private IP network. In this case, voice signals are converted into IP packets and sent through this network.

Built-in Small Call Centre Features

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

Queuing Feature

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

Log-in/Log-out

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

VIP Call

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

Computer Telephony Integration (CTI) Features

Connecting a personal computer (PC) to a DPT, or connecting a Server PC to this Hybrid IP-PBX allows function of the PC, PBX and extension to be integrated so that, for example, detailed caller information can be taken from a database and displayed on the PC as a call arrives, or the PC can dial numbers for the extension automatically.

Voice Mail Features

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

Parallelled Telephone Features

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

Parallel Mode

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

EXtra Device Port (XDP) Mode

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

Digital XDP

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

Portable Station (PS) Features

PSs (e.g., KX-TCA255) 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.

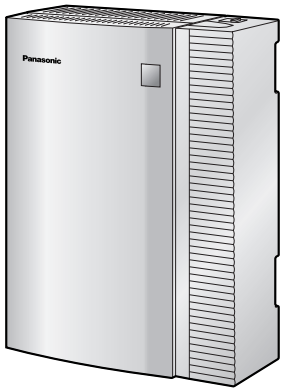
Built-in Simplified Voice Message (SVM) Features

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

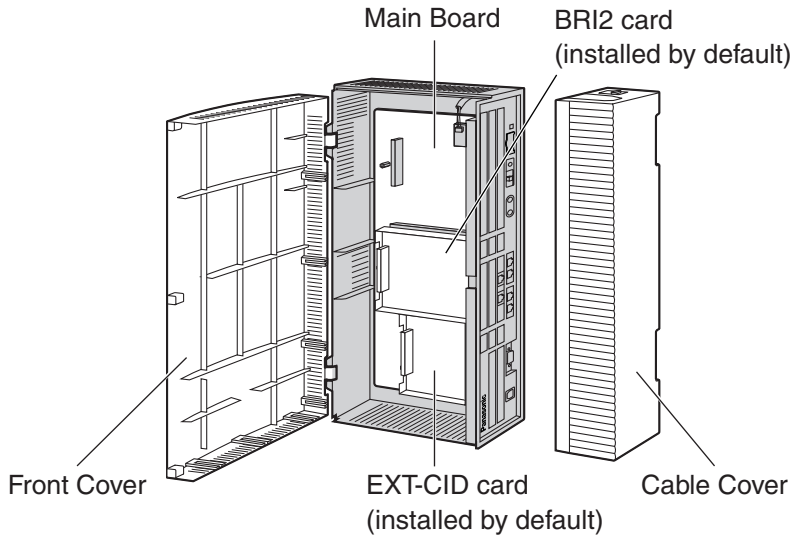
1.2 Basic System Construction

1.2.1 Main Unit

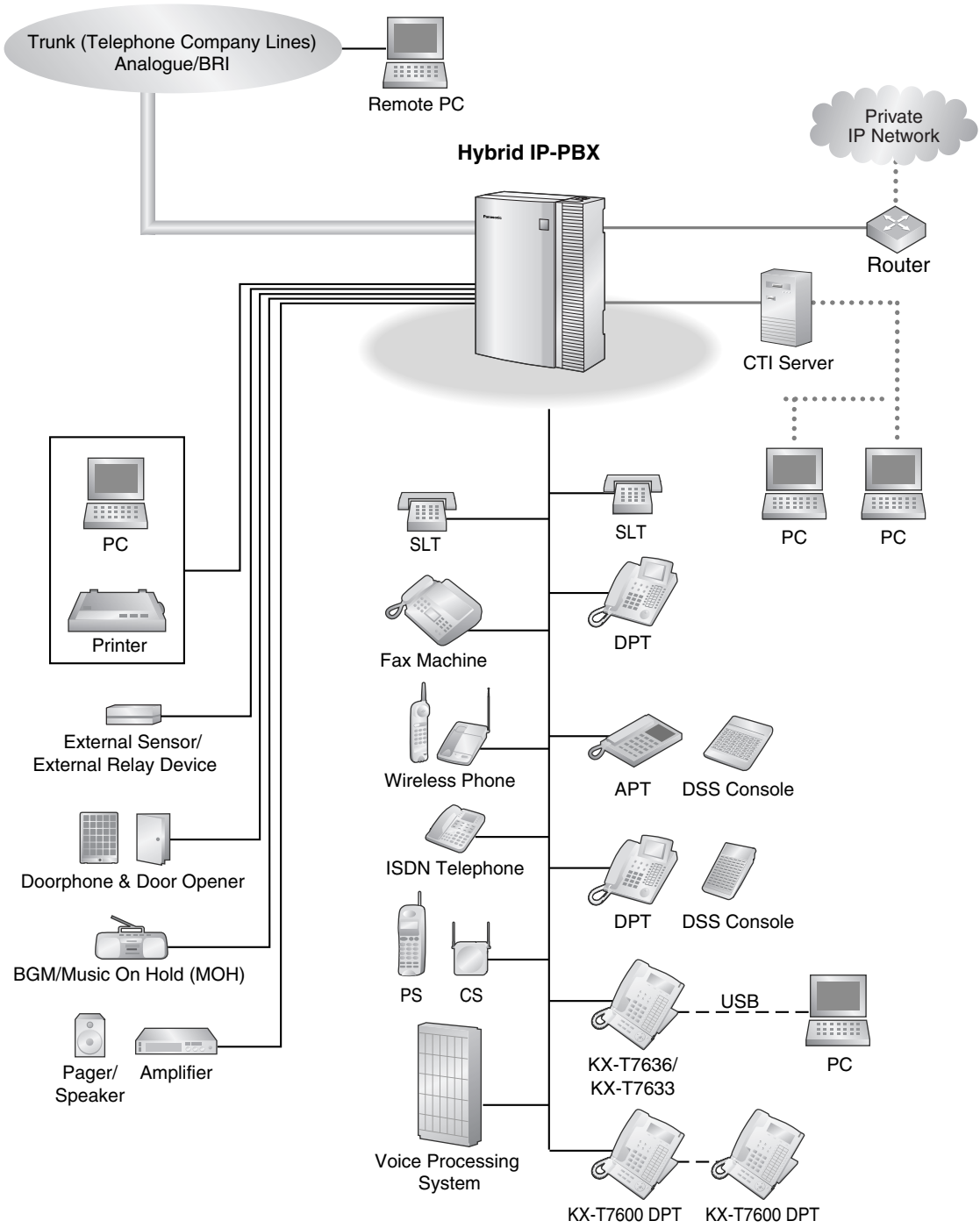
The main unit is equipped with 4 Super Hybrid Ports, one BRI2 card, and one EXT-CID card. For system expansion, optional service cards can be installed.

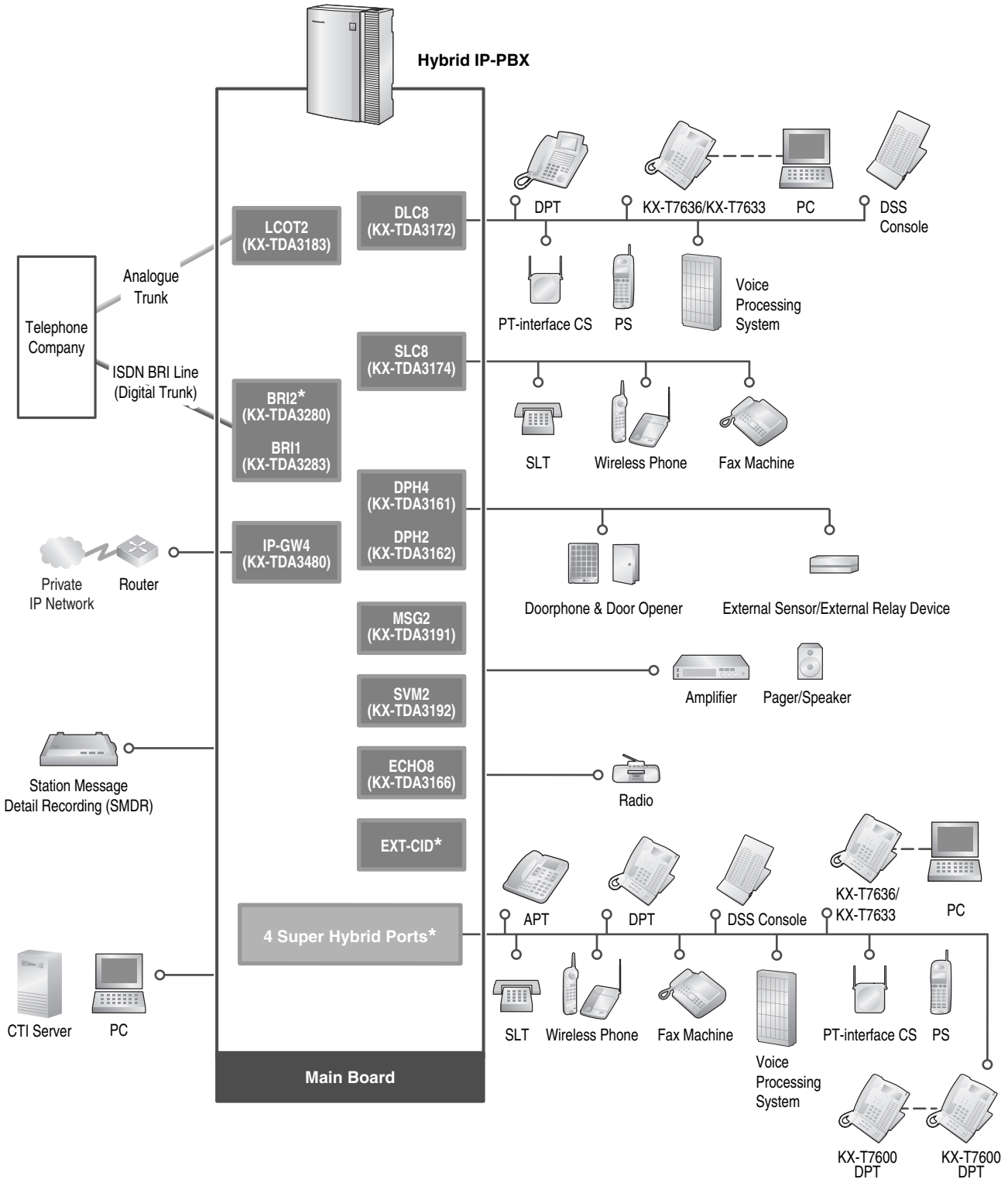


Construction of Main Unit



1.2.2 System Connection Diagram





* The Hybrid IP-PBX has 4 Super Hybrid Ports, one BRI2 card, and one EXT-CID card pre-installed.

1.3 Options

1.3.1 Options

Model No.	Model Name	Description	Maximum Quantity
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-TDA3172	8-Port Digital Extension Card (DLC8)	8-port digital extension card for DPTs, DSS consoles, a VPS, and PT-interface CSs.	1
KX-TDA3174	8-Port Single Line Telephone Extension Card (SLC8)	8-port extension card for SLTs.	1
KX-TDA3183	2-Port Analogue Trunk Card (LCOT2)	2-port analogue trunk card.	1
KX-TDA3191	2-Channel Message Card (MSG2)	2-channel message card.	2
KX-TDA3192	2-Channel Simplified Voice Message Card (SVM2)	2-channel simplified voice message card for Built-in Simplified Voice Message feature.	2
KX-TDA3280	2-Port BRI Card (BRI2)	2-port ISDN Basic Rate Interface card. EURO-ISDN/ETSI compliant.	1[*1]
KX-TDA3283	1-Port BRI Card (BRI1)	1-port ISDN Basic Rate Interface card. EURO-ISDN/ETSI compliant.	1
KX-TDA3480	4-Channel VoIP Gateway Card (IP-GW4)	4-channel VoIP gateway card. Compliant with VoIP H.323 V.2 protocol, and ITU-T G.729a, G.723.1, and G.711 CODEC methods.	1
KX-TDA3820	SD Memory Card for Software Upgrade	Optional SD Memory Card to upgrade the Hybrid IP-PBX with MPR version 1.1 to version 2.2.	1
KX-TDA3920	SD Memory Card for Software Upgrade to Enhanced Version	Optional SD Memory Card to upgrade the Hybrid IP-PBX with MPR version 1.1 to version 2.2, and for NDSS feature and CTI enhancement.	1

[*1] One BRI2 card is installed by default. One more BRI2 card can be installed in the Hybrid IP-PBX as an option.

1.4 Specifications

1.4.1 General Description

Switching		Non-blocking
AC Adaptor	**AC Input**	100 V AC to 240 V AC, 1.5 A, 50 Hz/60 Hz
	DC Output	40 V, 1.38 A (55.2 W)
DC Input		40 V, 1.38 A (55.2 W)
Maximum Power Failure Tolerance		300 ms
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 (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

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	• PT: KX-T7600 series: 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 two DPTs and an SLT
Ring Voltage	75 Vrms at 20 Hz/25 Hz depending on the Ringing Load
Trunk Loop Limit	1600 Ω maximum
Hookswitch Flash/Recall Timing Range	24 ms to 2032 ms
BRI Cards Internal ISDN Mode	Supply Voltage: 40 V Power Supply: 4.5 W per 1 line, 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" or "2.5.2 DPH2 Card". 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 Trunk and VoIP Line

The Hybrid IP-PBX supports the following number of trunk lines and VoIP lines.

Line Type	Maximum Number
Trunk Line	8
VoIP Line	4

Maximum Terminal Equipment

The following amount of terminal equipment can be supported by the Hybrid IP-PBX.

Terminal Equipment Type	Maximum Number
SLT	12
PT	Total 16
KX-T7600 series DPT	16
KX-T7560/KX-T7565 DPT	12
Other DPT	4
APT	4
DSS console	4
CS	2
PS	28
VPS	4 ports (1 VPS)*1
SLT, PT, DSS console, CS, and VPS	Total 20
Doorphone	4
Door Opener/External Relay	4
External Sensor	4
Add-on Key Module	Total 16
USB Module	

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

Notes

- Devices connected to the Hybrid IP-PBX that exceed the system capacity will not function.
- For how to connect an AC adaptor, refer to "2.10.1 Starting the Hybrid IP-PBX".

Load Figure Calculation (BRI Extension Port)

If the Hybrid IP-PBX has a BRI extension port, you need to calculate the total load figure from the type and number of equipment to be connected.
If the total load figure exceeds 32, it cannot be supported by the KX-TDA15. In this case, use the KX-TDA30 with Additional AC Adaptor. If the load figure exceeds 96, 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).

Equipment Type		Load Figure
PT	KX-T7600 series DPT/DSS console	0
	KX-T7560/KX-T7565 DPT	0
	Other DPT/DSS console	4
	APT	4
Pre-installed 4 Super Hybrid Ports		0
Extension Card	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.

Calculation Example

Equipment Type		Load Figure
Other DPT/DSS console (except KX-T7600 series, KX-T7560/KX-T7565)	4 units	16
CS	2 units	8
ISDN Telephone	1 unit	1
Total		25

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 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 "2.2.10 Surge Protector Installation".

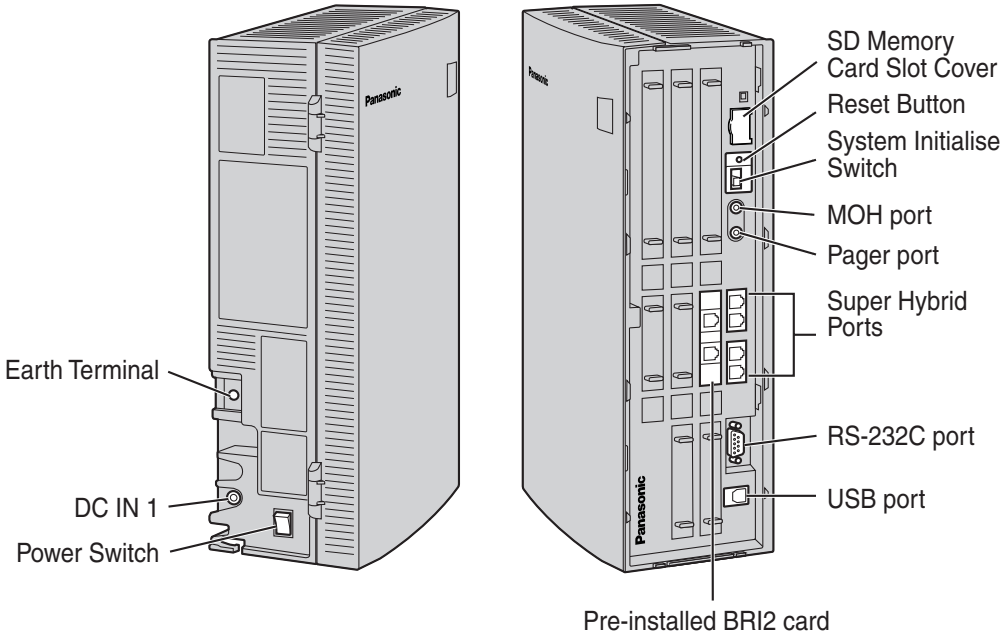
2.2 Installation of the Hybrid IP-PBX

2.2.1 Unpacking

Unpack the box and check the items below:

Main Unit	1
AC Cord	1
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
Strap (for the pre-installed BRI2 card)	1
Optional Card Label Sheet	1

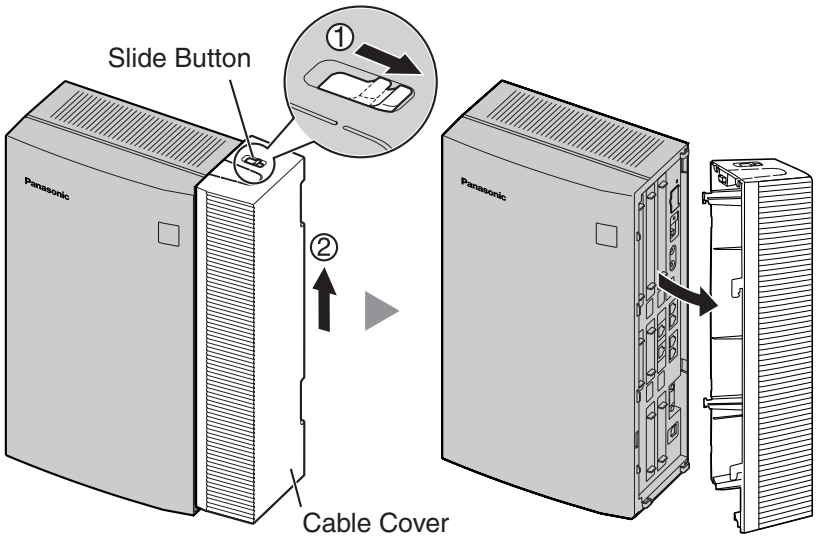
2.2.2 Names and Locations



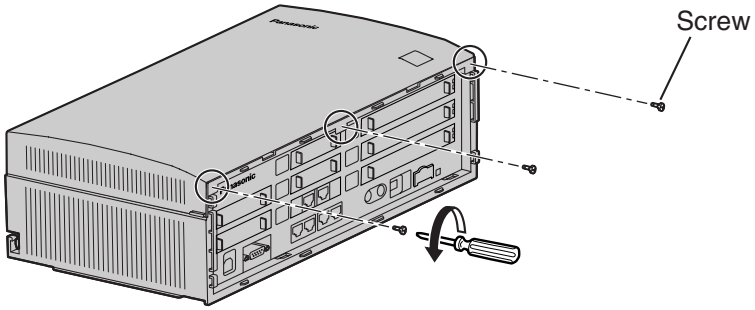
2.2.3 Opening/Closing the Covers

Opening the Covers

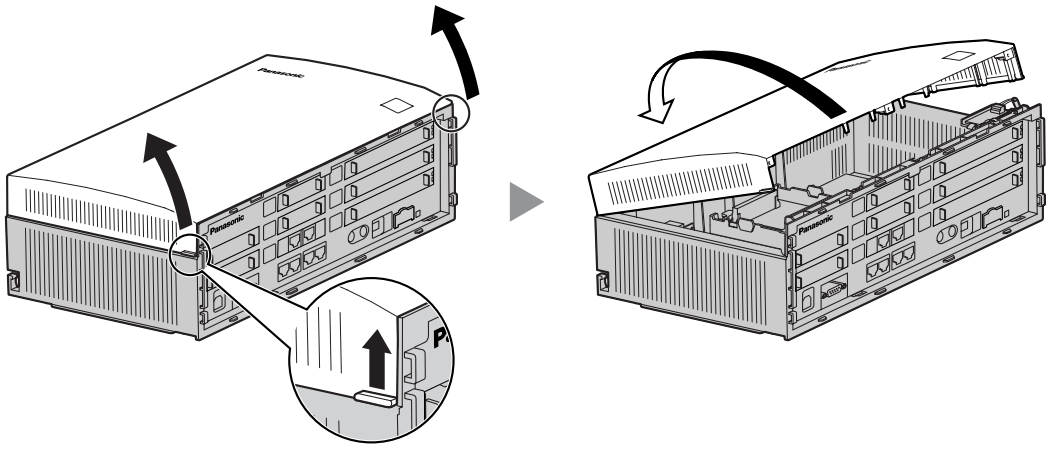
1. Pull the slide button to the right and, holding it, slide the cable cover upwards. Then turn the cable cover slightly to remove it.



2. Remove the three screws.



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

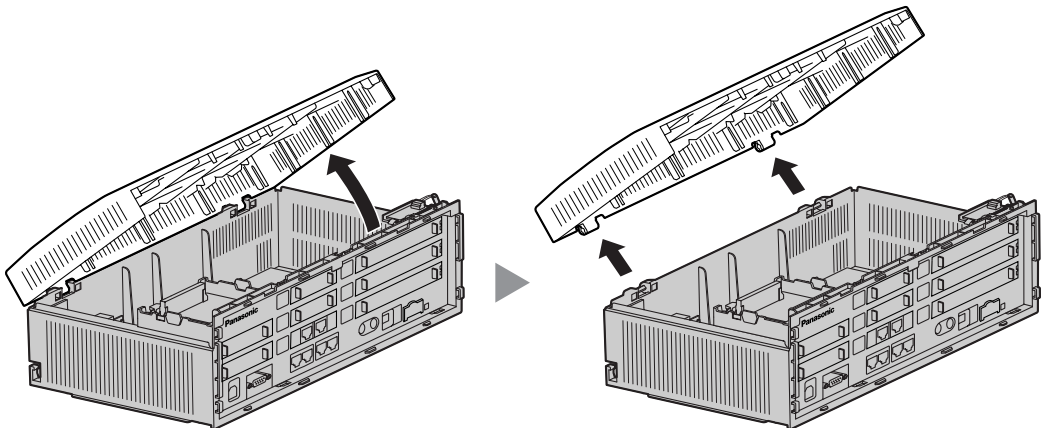


Removing/Attaching the Front Cover

If you prefer, you can remove the front cover.

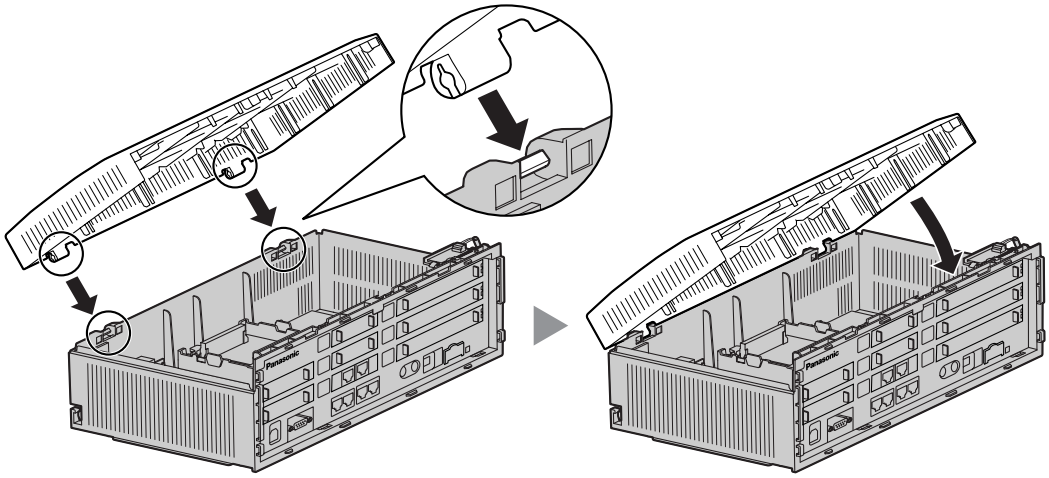
Removing the Front Cover

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.



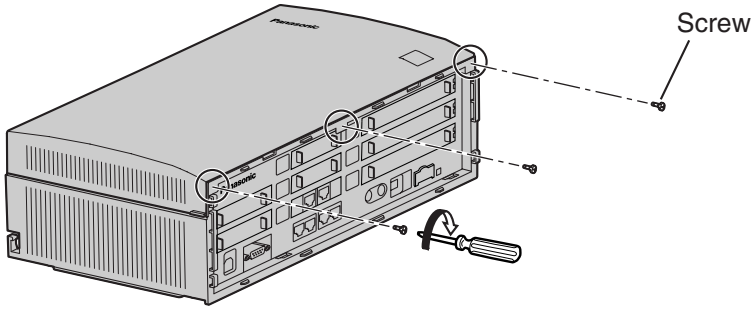
Attaching the Front Cover

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

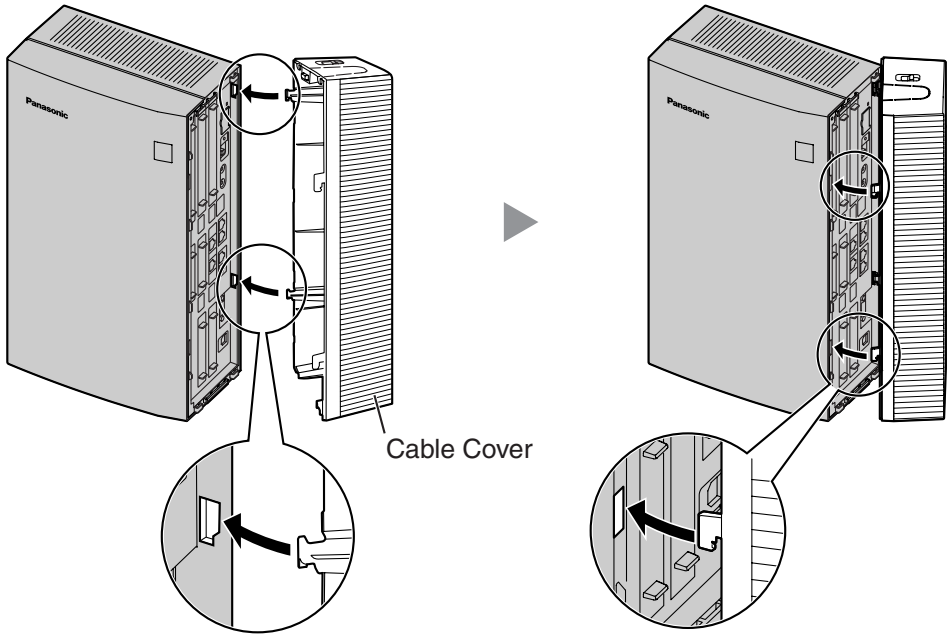


Closing the Covers

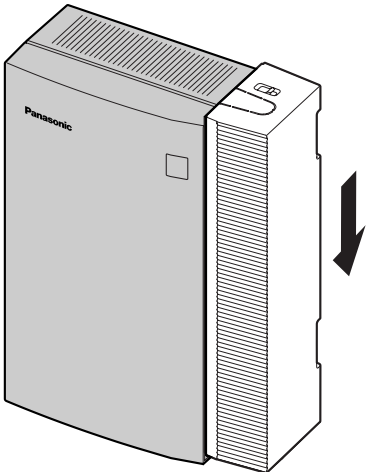
1. Close the front cover, then tighten the three screws.



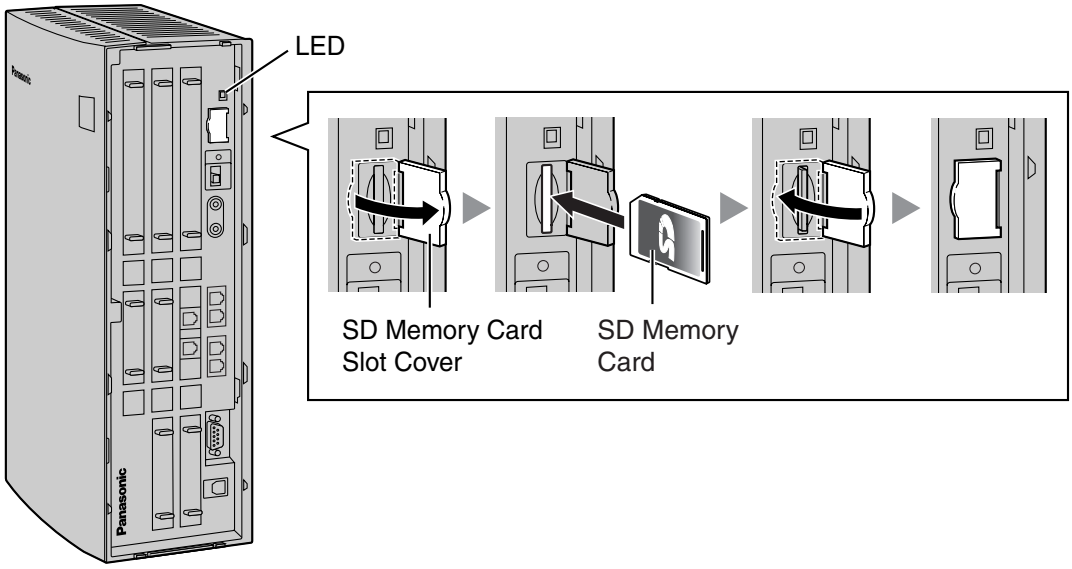
2. Attach the rear hooks on the cable cover to the main unit, then swing the cable cover closed so that the front hooks fit in place.



3. Slide the cable cover down until it locks.



2.2.4 Installation of the SD Memory Card



CAUTION

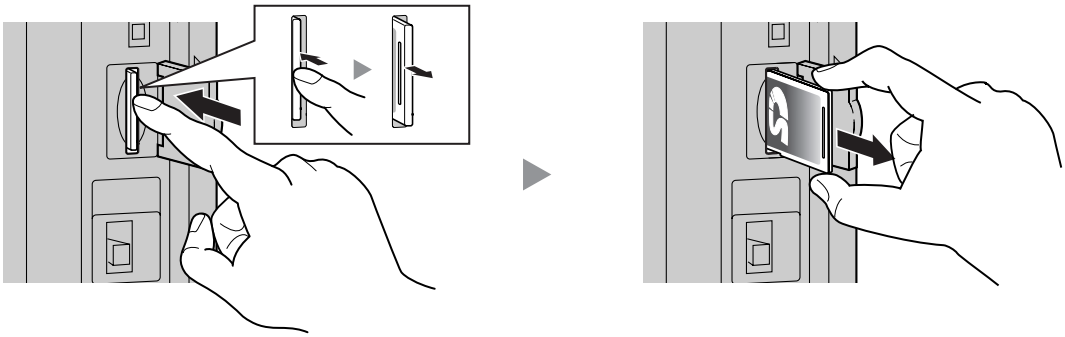
- Use only the SD Memory Card included with the Hybrid IP-PBX, or a Panasonic optional upgrade SD Memory Card.
- The SD Memory Card contains software for all the processes of the Hybrid IP-PBX and all the customer data. The SD Memory Card must be inserted before start up.
- Do not remove the SD Memory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

LED Indications

Indication	Colour	Description
SD ACCESS	Green	SD memory card status • ON: Accessing

Note

If you need to remove the SD Memory Card:

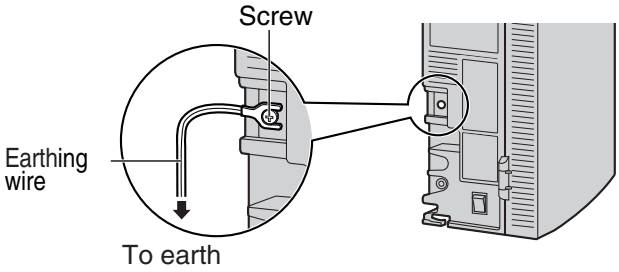


2.2.5 Frame Earth Connection

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.

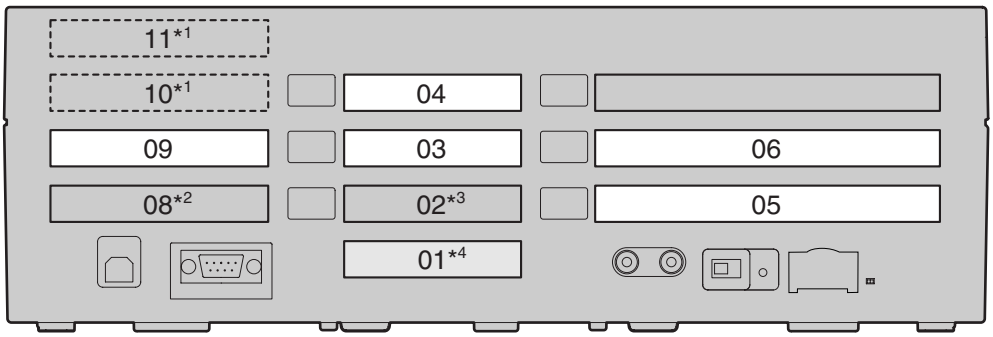


* For earthing wire, green-and-yellow insulation is required, and the cross-sectional area of the conductor must be more than 0.75 mm^2 or 18 AWG.

- Be sure to comply with applicable local regulations (e.g., law, guidelines).
- Proper earthing (connection to earth) is very important to protect the Hybrid IP-PBX from the bad effects of external noise or to reduce the risk to the user of electrocution in the case of 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 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 08 contains the pre-installed EXT-CID card.
*3 Slot 02 contains the pre-installed BRI2 card.
*4 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	03	04	05	06	09	10	11
LCOT2	1	✔	✔					
BRI2	1	✔						
BRI1	1	✔	✔					
IP-GW4	1			✔	✔			
DLC8	1*1			✔	✔			
SLC8				✔	✔			
DPH4	1*2					✔		
DPH2						✔		
ECHO8	1					✔	✔	✔
MSG2	2					✔	✔	✔
SVM2	2					✔	✔	✔

*1 Only one of either DLC8 or SLC8 card can be installed.
*2 Only one of either DPH4 or DPH2 card can be installed.

Trunk Card Combinations

Trunk cards can be installed along with the pre-installed BRI2 card in any one of the following combinations:

- BRI2 + BRI2
- BRI2 + BRI1
- BRI2 + LCOT2
- BRI2 + BRI1 + LCOT2

CAUTION

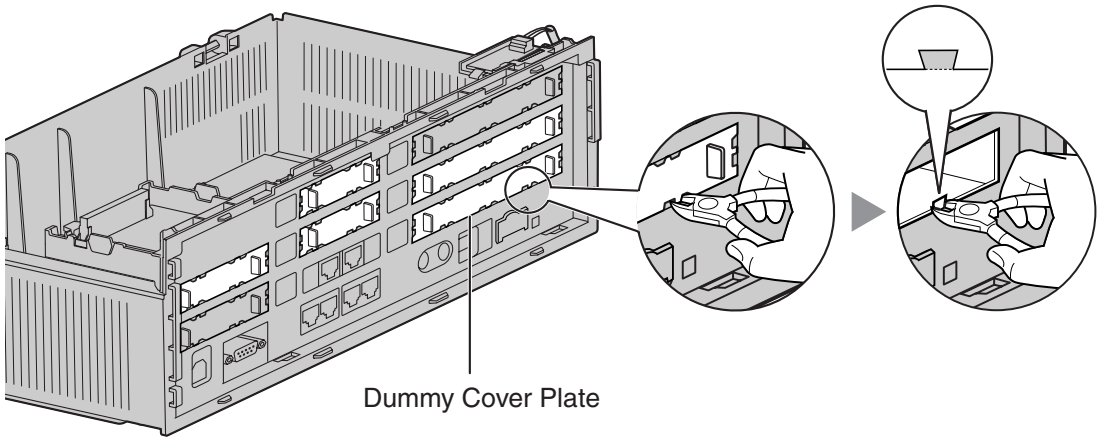
To protect the main board from static electricity, do not touch parts on the main board or on the optional service cards. To discharge static electricity, touch ground or wear an earthing strap.

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 Options".
- 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

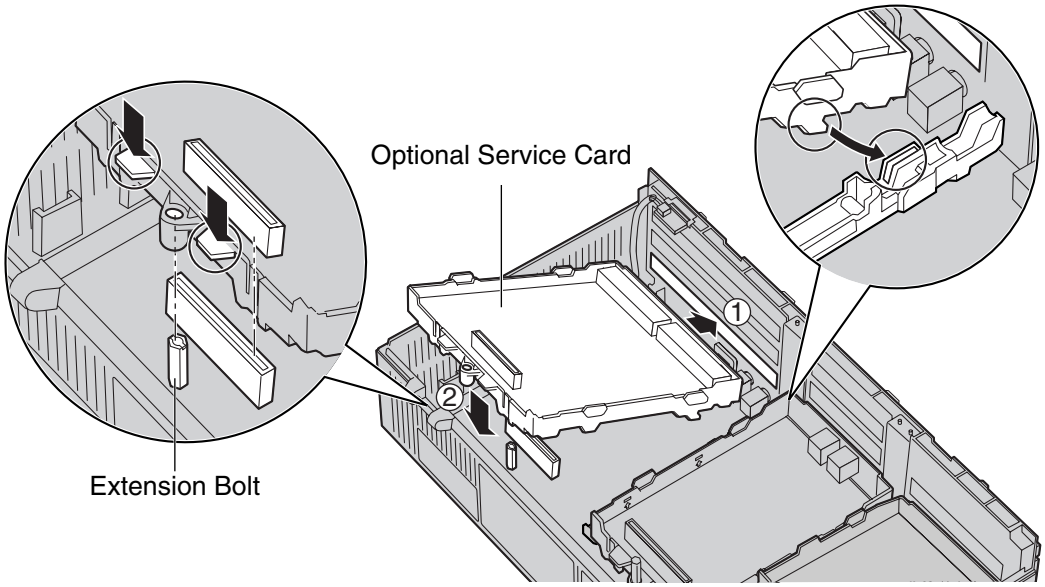
1. Before installing the optional service cards, cut and remove the appropriate dummy cover plates from the main unit.



CAUTION

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

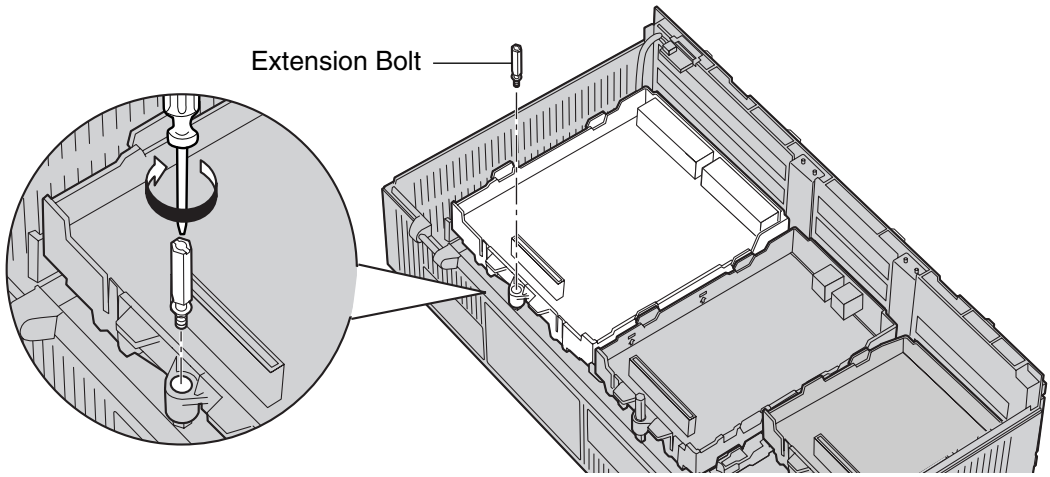
2. Position the card in the open slot, making sure that the tabs on the both sides of the card fit into place. Then, holding the card firmly in place, lower the rear end so that the hole of the card fits over the extension bolt.



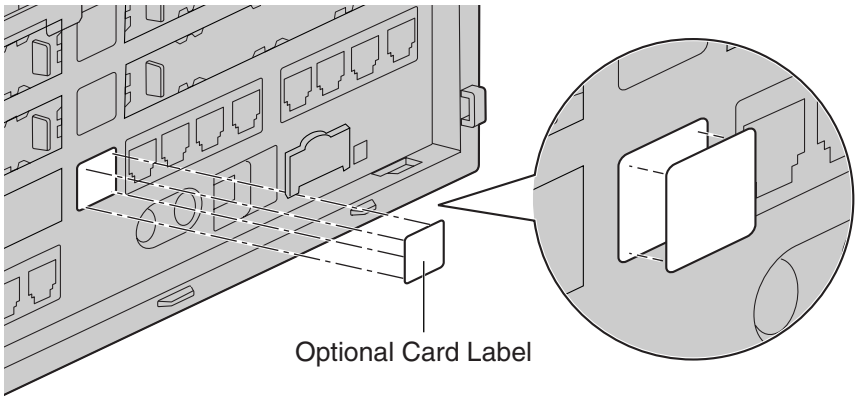
CAUTION

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.

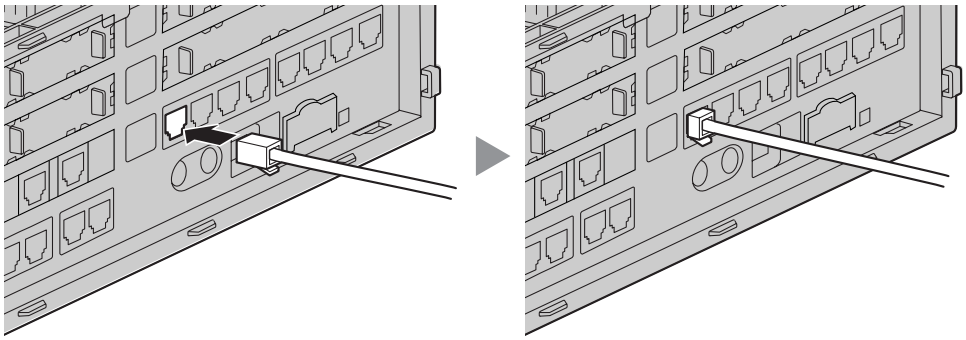
3. Insert the new extension bolt (included with the card) into the hole on the card, and tighten it to secure the card.



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



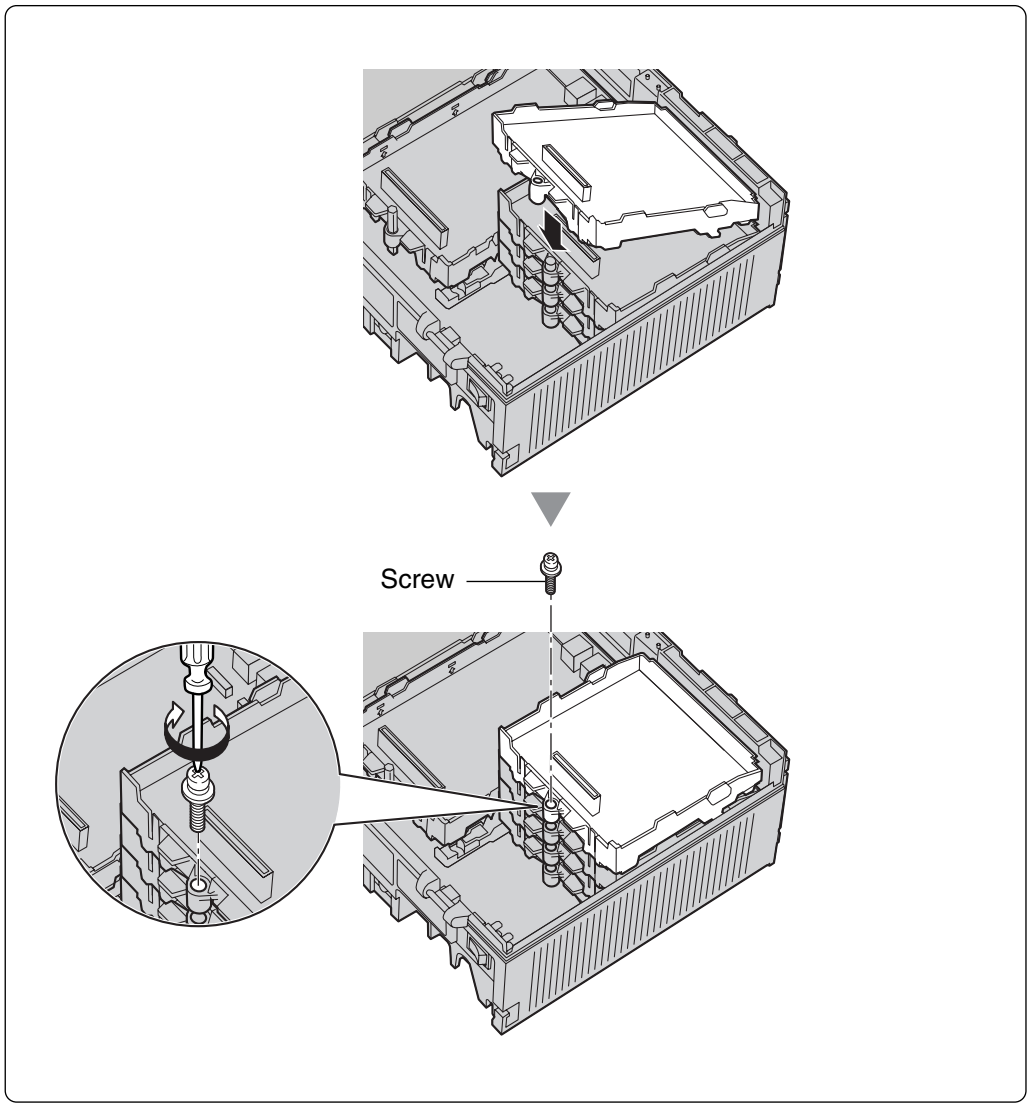
5. Connect a cable to an appropriate port of the card.
For details about pin assignments, refer to the appropriate section in "2.3 Installation of the Trunk Cards" and "2.4 Installation of the Extension Cards".



Note

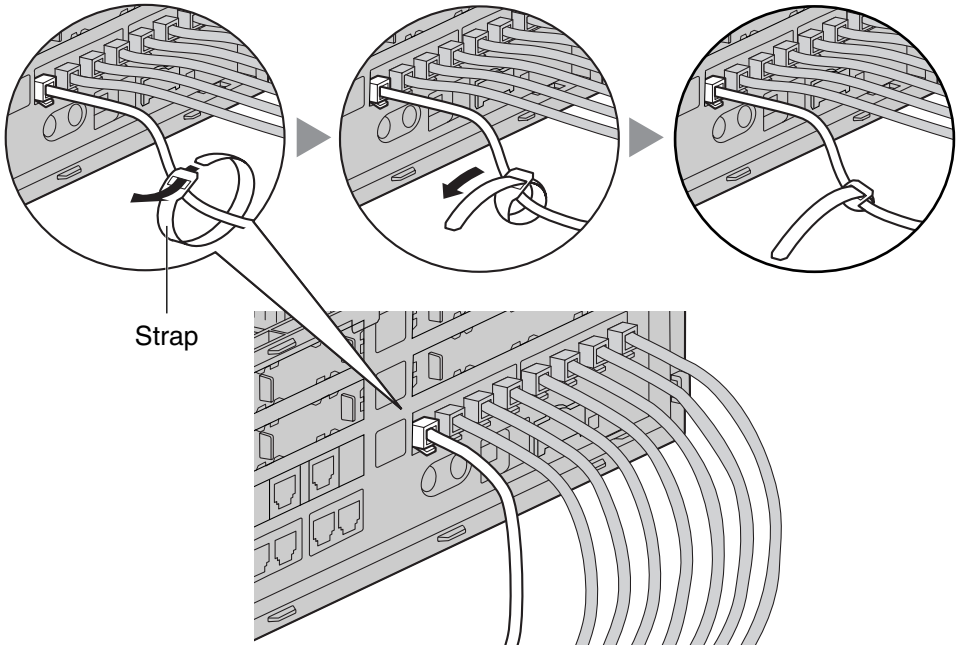
Make sure to connect cables after installing the card in the Hybrid IP-PBX, not before.

6. Repeat the procedure for other cards.
When installing a card in Slot 11, tighten the card using the screw included with the card, instead of the extension bolt.

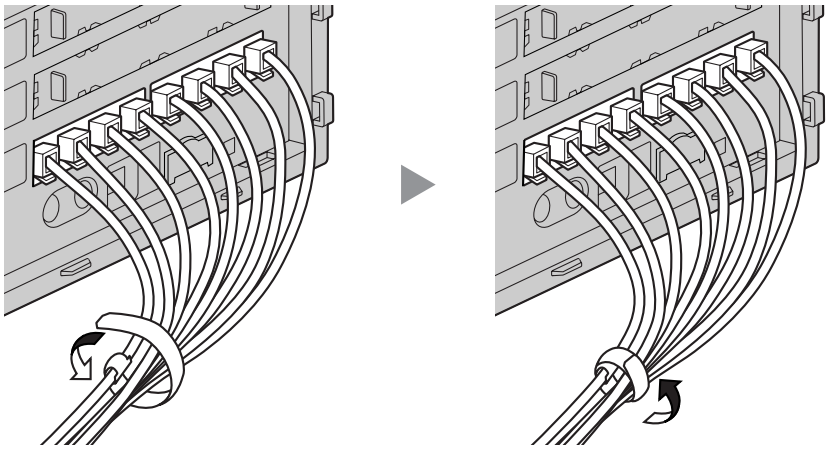


Handling of the Cables

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

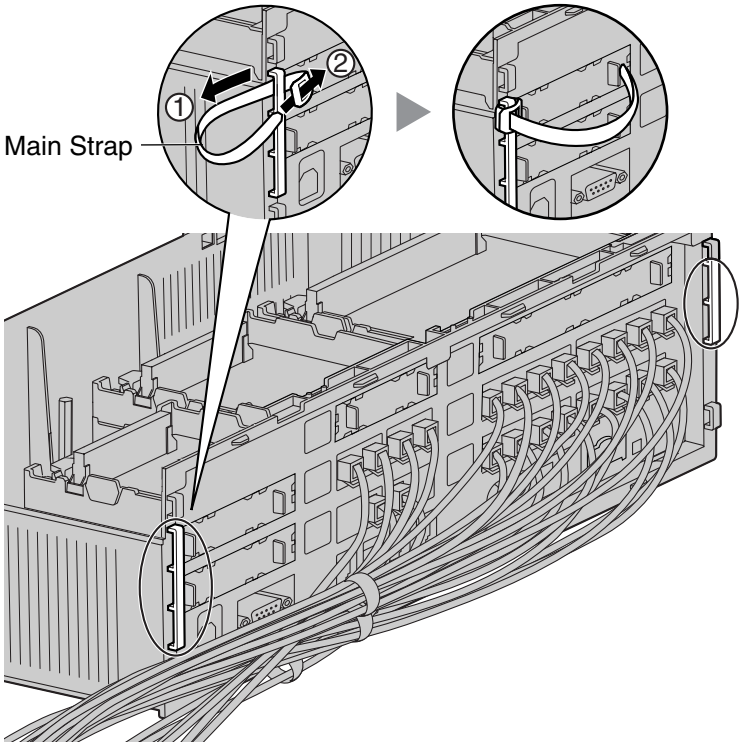


2. Bind all the connected cables together using the strap.

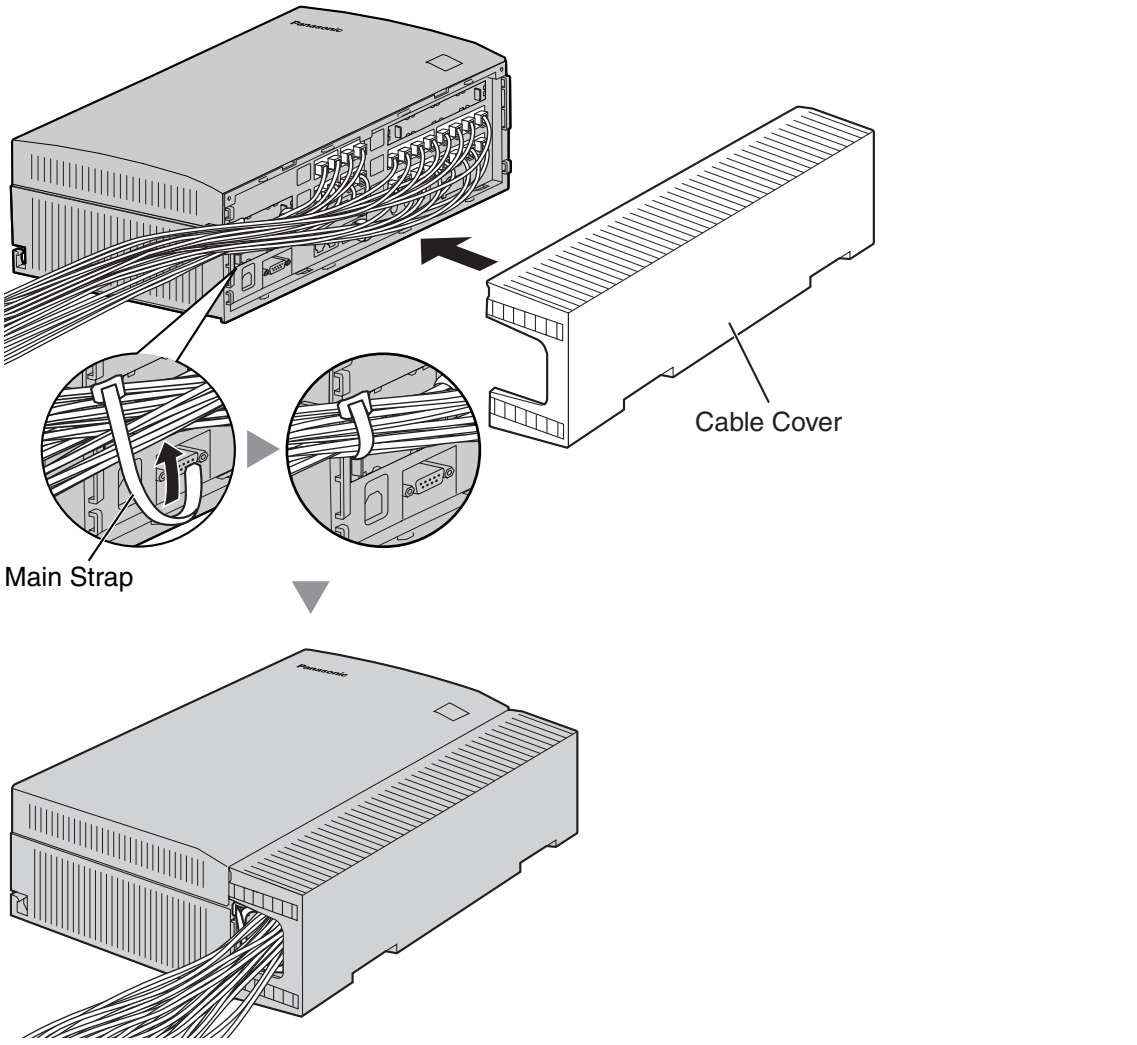


3. Repeat the procedure for other cards.

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

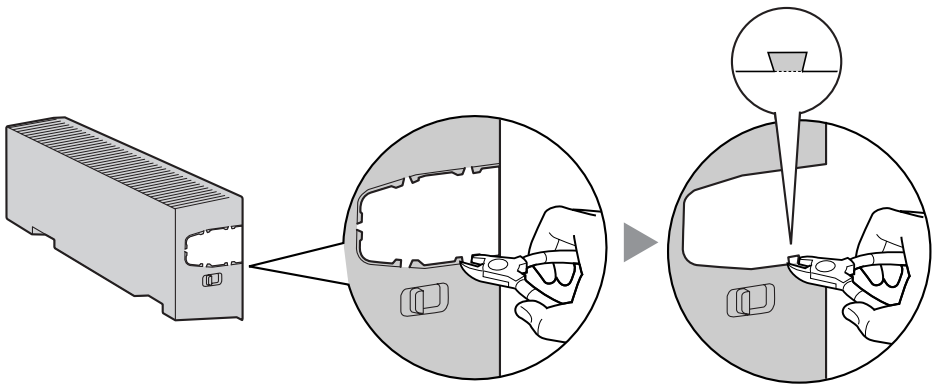


5. Bind all the connected cables together using the main strap, and then close the cable cover. For how to close the cable cover, refer to "2.2.3 Opening/Closing the Covers".



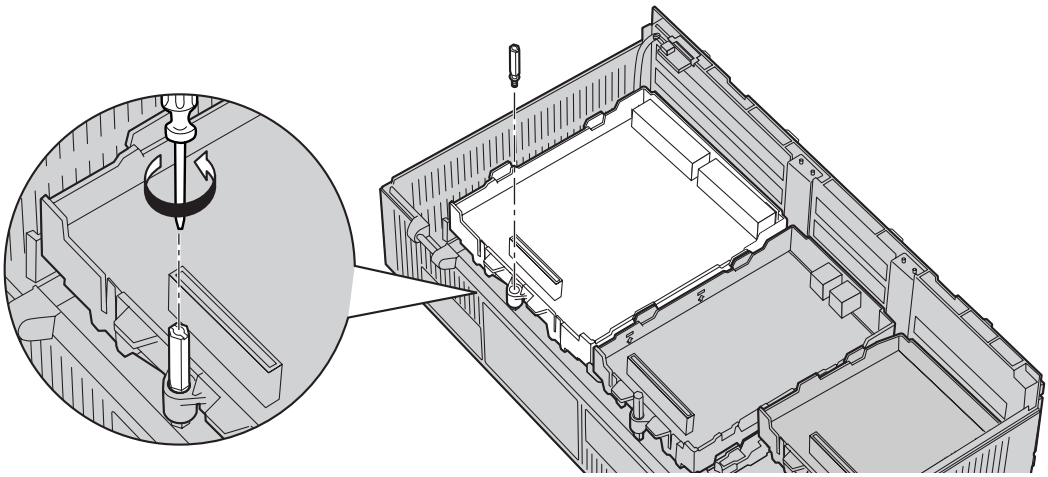
Notes

- 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.

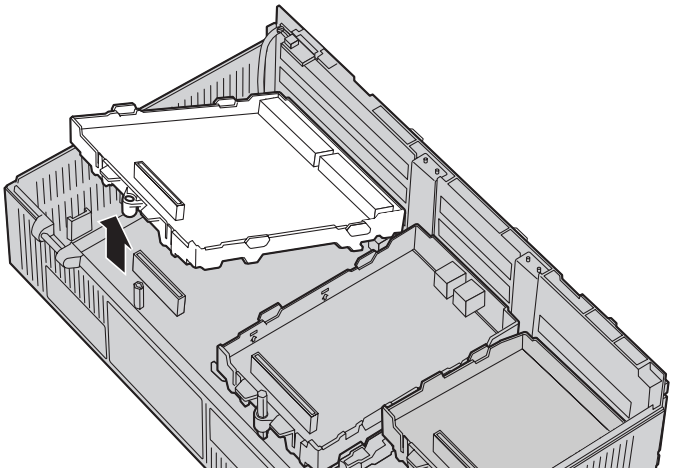


Removing the Optional Service Cards

1. Loosen and remove the extension bolt.



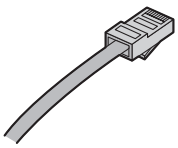
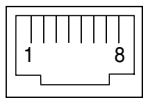
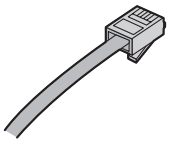
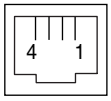
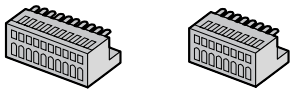
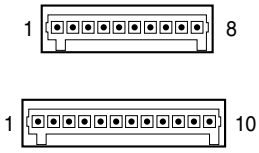
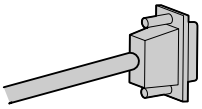
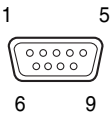
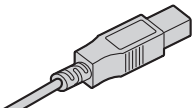
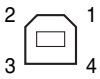
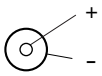
2. Holding the protrusions of the card, pull the card in the direction of the arrows.



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.

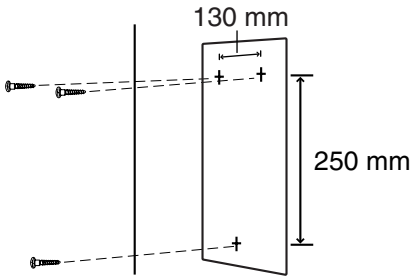
2.2.7 Types of Connectors

Connector Type	Pin Number	Used for
RJ45  (Twisted pair cable)		• DPH4 (KX-TDA3161NE) • DPH2 (KX-TDA3162) • DLC8 (KX-TDA3172NE) • SLC8 (KX-TDA3174NE) • LCOT2 (KX-TDA3183) • BRI2 (KX-TDA3280) • BRI1 (KX-TDA3283) • IP-GW4 (KX-TDA3480) • Super Hybrid Ports (Main Board)
RJ11  (Twisted pair cable)		• DPH4 (KX-TDA3161) • DLC8 (KX-TDA3172) • SLC8 (KX-TDA3174)
10-pin Terminal Block 8-pin Terminal Block 		• DPH4 (KX-TDA3161) • DPH2 (KX-TDA3162)
RS-232C 		• Main Board
USB 		• Main Board
Mini Plug 		• Main Board (Pager port, MOH port)

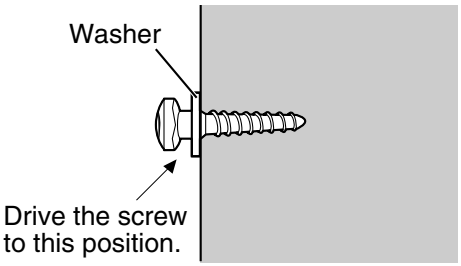
2.2.8 Wall Mounting (KX-TDA15)

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.



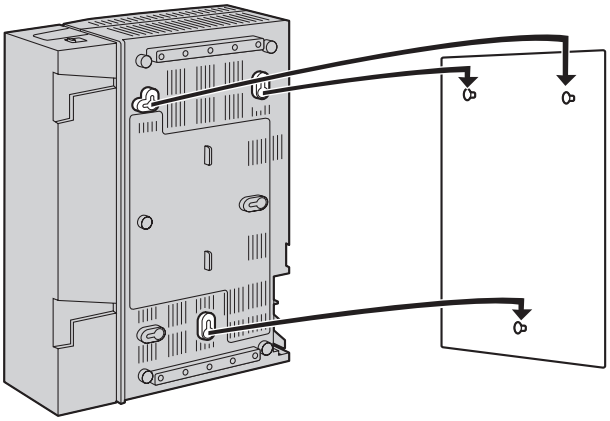
2. Install the screws and washers (included) in the wall.



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

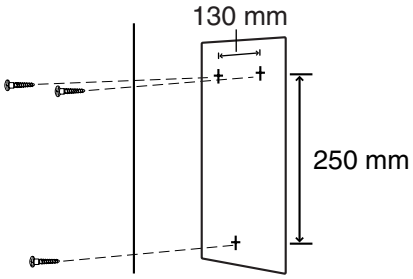
- Do not block the openings of the cabinet. Leave at least 20 cm of space above and 10 cm to the sides of the Hybrid IP-PBX for ventilation.
- Make sure that the wall behind the cabinet is flat and free of obstacles, so that the openings on the back of the cabinet will not be blocked.
- Be careful not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

Mounting on Concrete or Mortar Wall

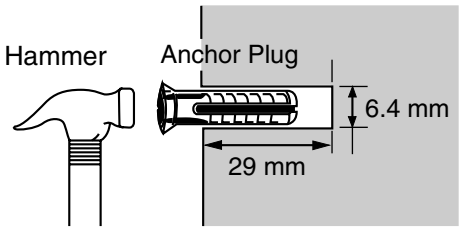
CAUTION

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

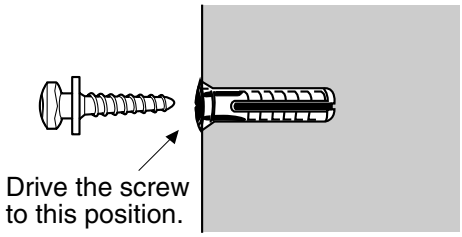
1. Place the reference for wall mounting (on the last page of this manual) on the wall to mark the 3 screw positions.



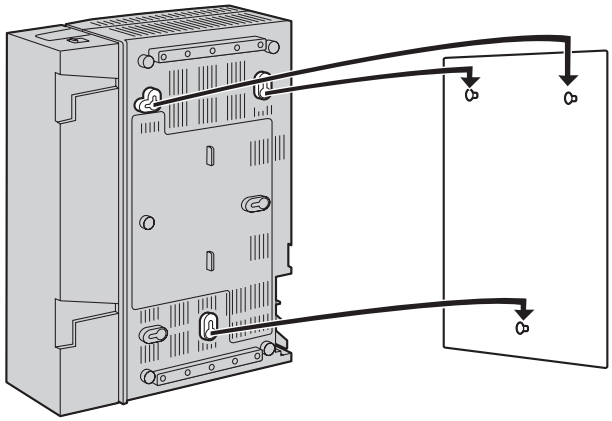
2. Install three anchor plugs (user-supplied) in the wall.



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



4. Hook the main unit on the screw heads.



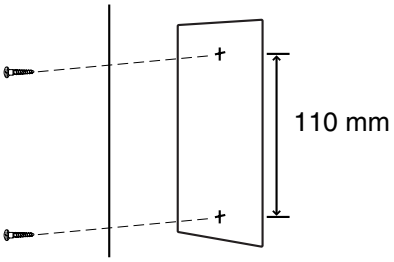
Notes

- 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 wall 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.

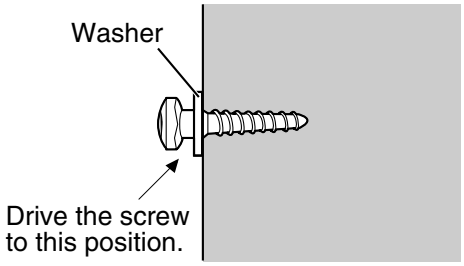
2.2.9 Wall Mounting (AC Adaptor)

Mounting on Wooden Wall

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



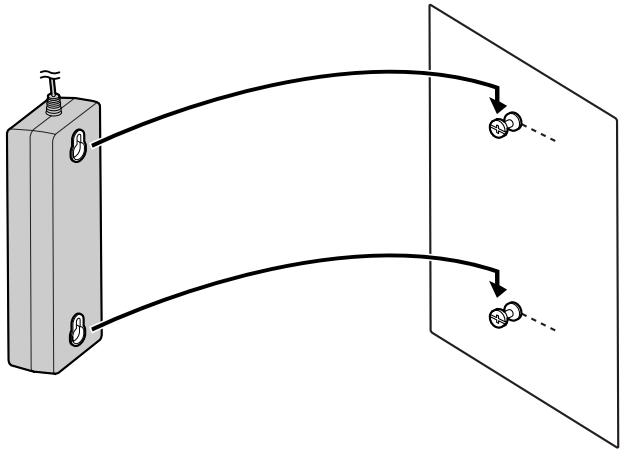
2. Install the screws and washers (included) in the wall.



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

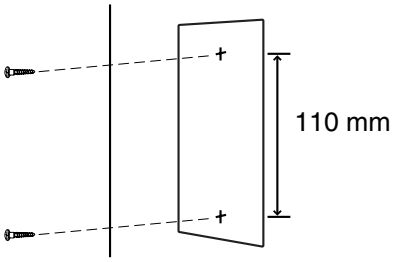
Be careful not to drop the AC adaptor.

Mounting on Concrete or Mortar Wall

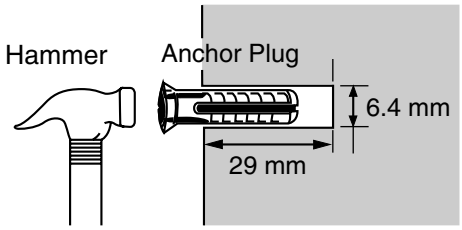
CAUTION

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

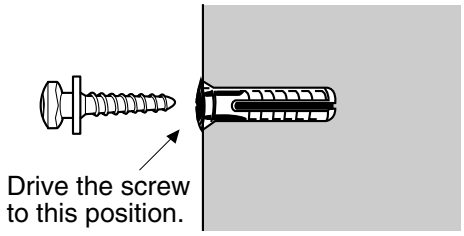
1. Place the reference for wall mounting (on the following page) on the wall to mark the 2 screw positions.



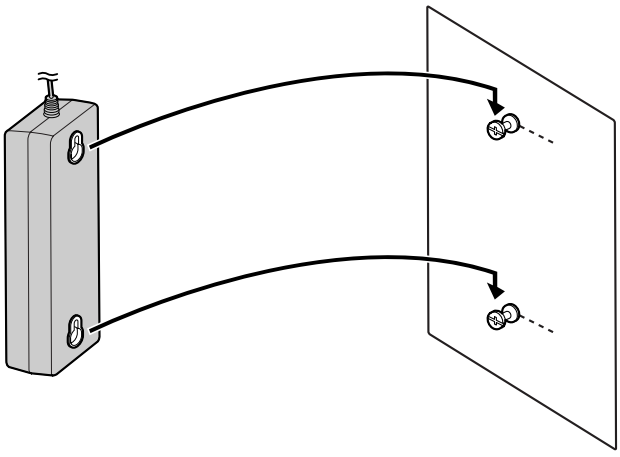
2. Install two anchor plugs (user-supplied) in the wall.



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



4. Hook the AC adaptor on the screw heads.

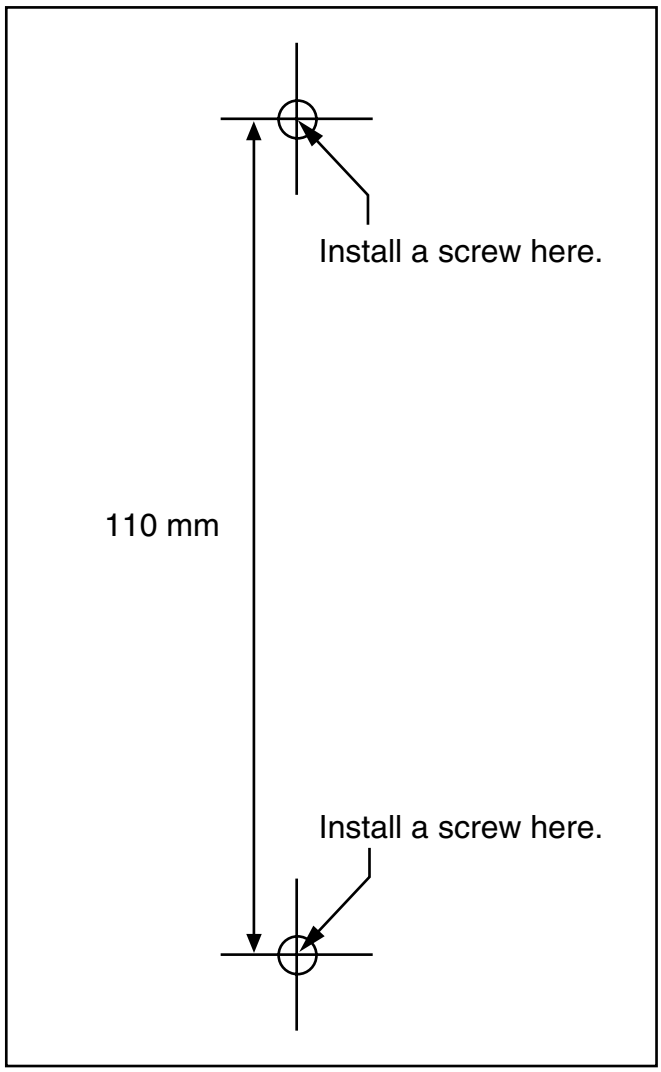


Note

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.

2.2.10 Surge Protector Installation

Overview

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

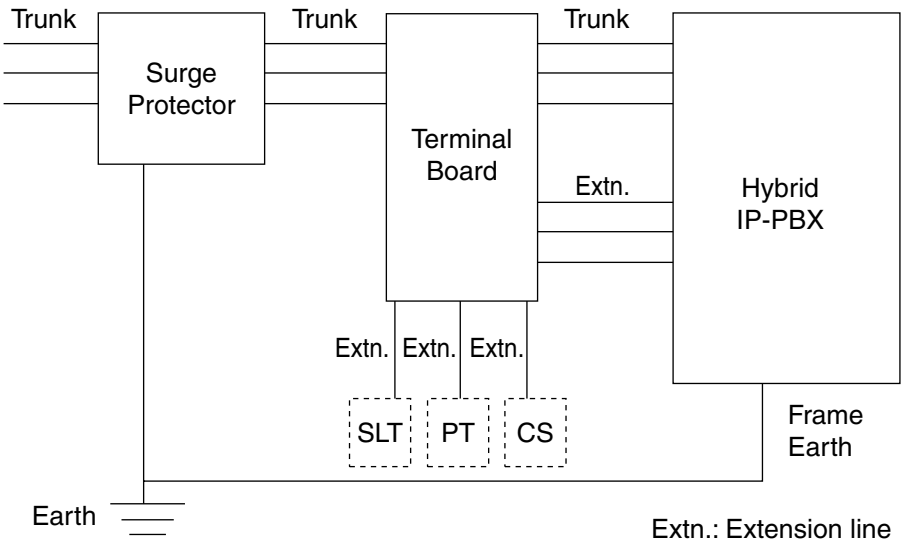
To protect the system from electrical surges, we strongly recommend connecting the system to a surge protector that meets the following specifications:

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

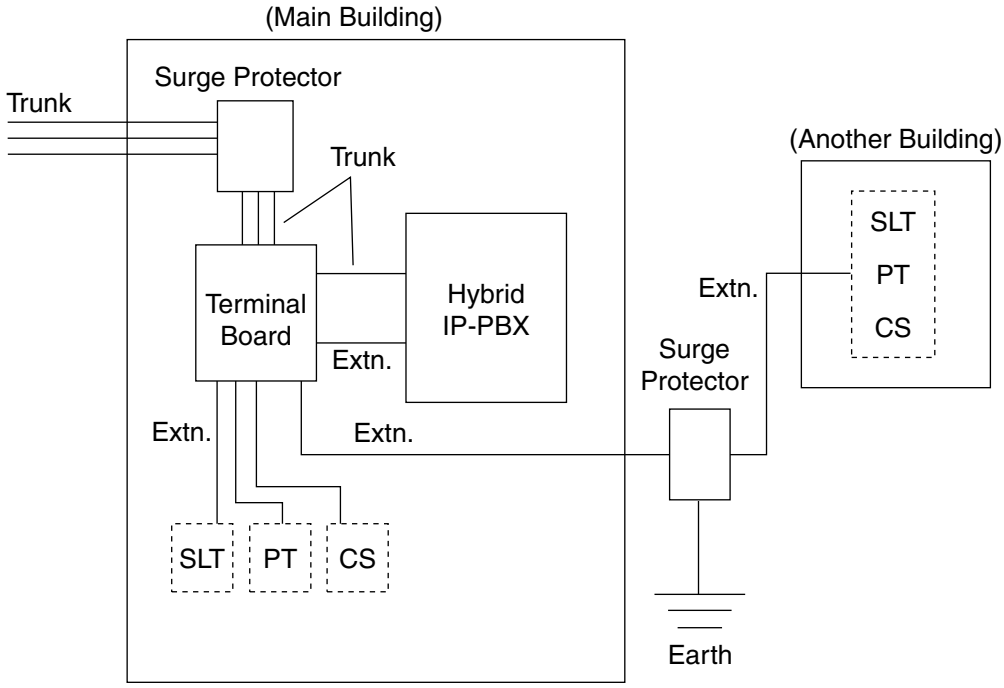
Additionally, proper earthing is very important for the protection of the system (refer to "2.2.5 Frame Earth Connection").

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

Installation



Outside Installation



Extn.: Extension Line

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

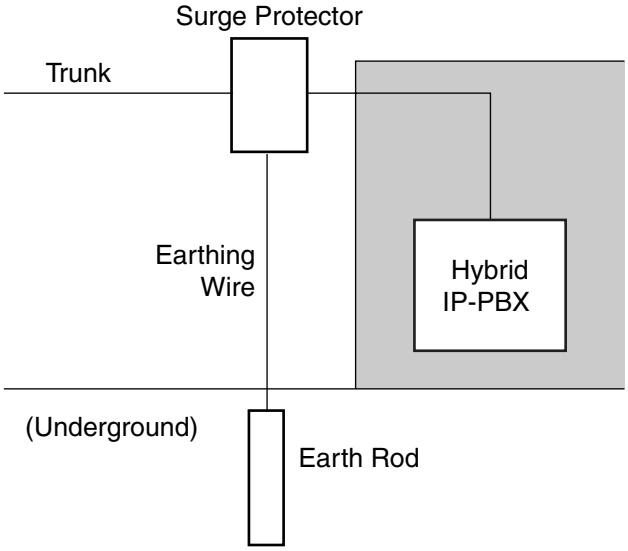
a. Install the extension wire underground.

b. Use a conduit to protect the wire.

Note

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

Installation of an Earth Rod



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

Notes

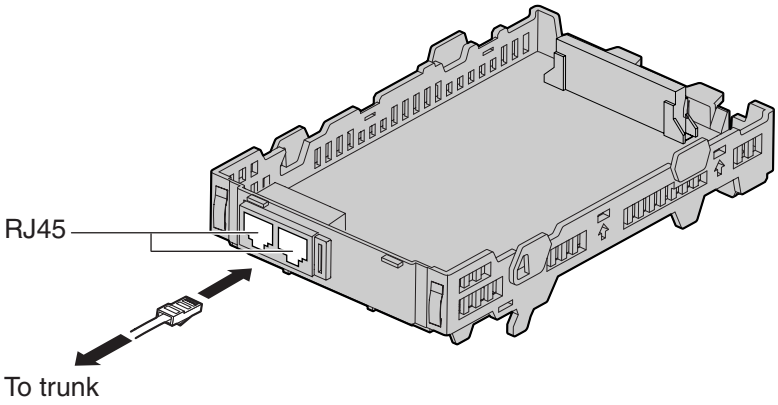
- The above figures are recommendations only.
- The length of earth rod and the required depth depend on the composition of the soil.

2.3 Installation of the Trunk Cards

2.3.1 LCOT2 Card

Function

2-port analogue trunk card.



Accessories and User-supplied Items

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

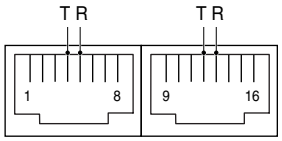
User-supplied (not included): RJ45 connector

Notes

- To confirm the trunk connection, refer to "Confirming the Trunk Connection" in "2.10.1 Starting the Hybrid IP-PBX".

Pin Assignments

RJ45 Connector

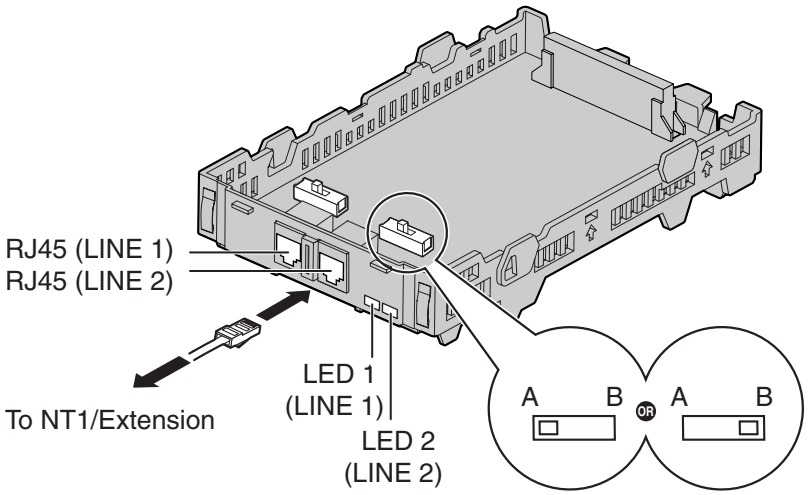


Signal Name	Function
R	Ring
T	Tip
–	Reserved

2.3.2 BRI2 Card

Function

2-port ISDN Basic Rate Interface card. 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.
- To confirm the trunk connection, refer to "Confirming the Trunk Connection" in "2.10.1 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.

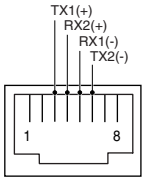
However, if there is an external power source to the terminal, make sure that there is no power supplied to the terminal from the BRI2 card. Failure to do so may cause damage to the power supply circuit of the BRI2 card or the terminal.

Switch Settings

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

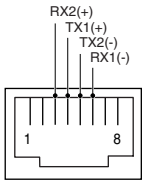
Pin Assignments

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



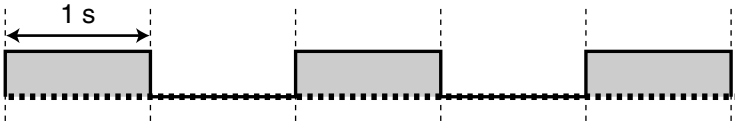
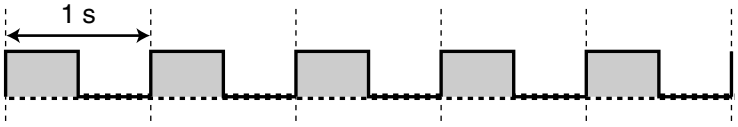
Signal Name	Level [V]	Function
RX2	(+)	Receive data 2
TX1	(+)	Transmit data 1
TX2	(-)	Transmit data 2
RX1	(-)	Receive data 1
–	–	Reserved

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	

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

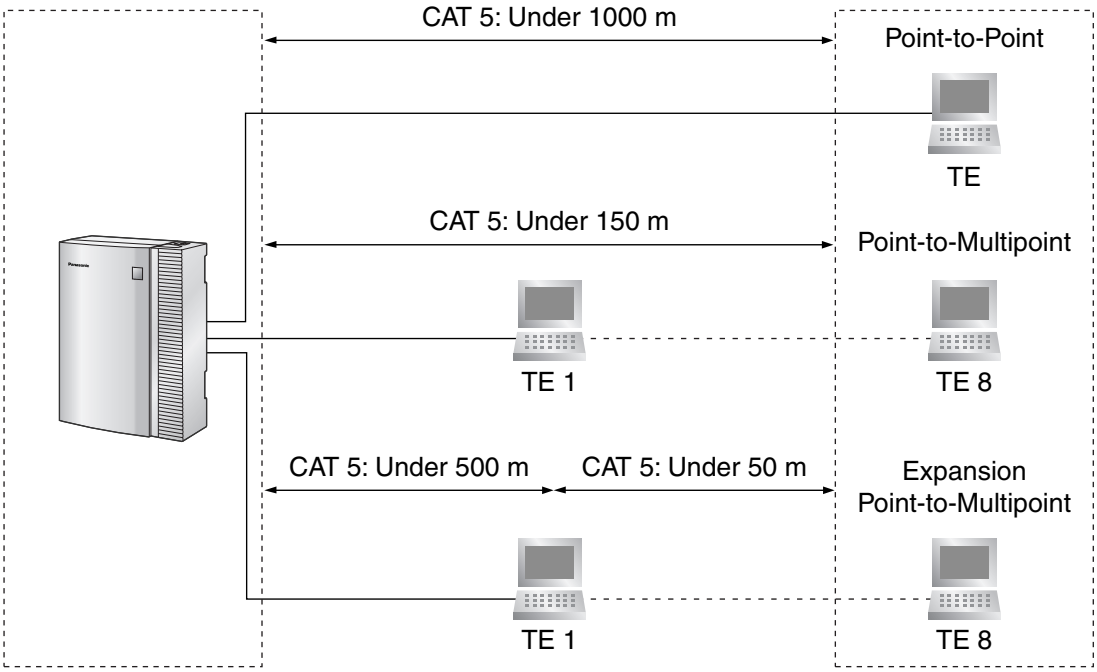
Layer 1: ON (Synchronous)

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

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

Maximum Cabling Distance of S0 Bus Connection

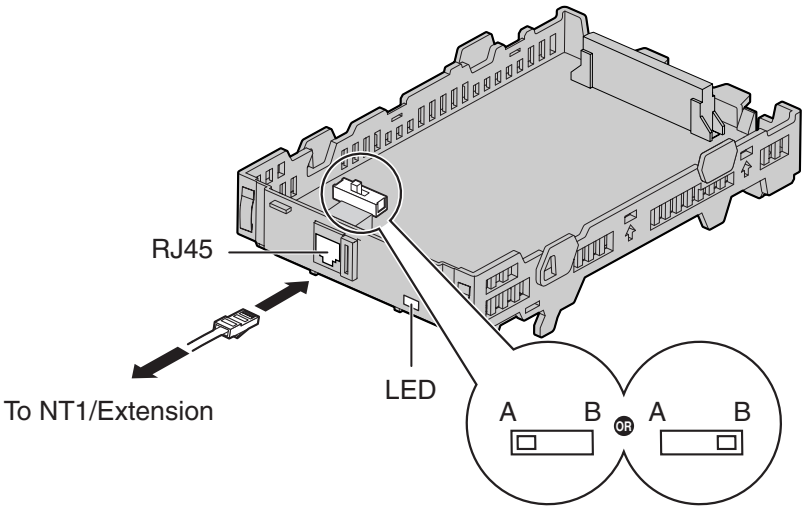
The maximum distance of the extension cable that connects the Hybrid IP-PBX and the ISDN terminal equipment (TE) is shown below:



2.3.3 BRI1 Card

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 "2.10.1 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.

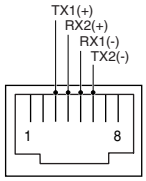
However, if there is an external power source to the terminal, make sure that there is no power supplied to the terminal from the BRI1 card. Failure to do so may cause damage to the power supply circuit of the BRI1 card or the terminal.

Switch Settings

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

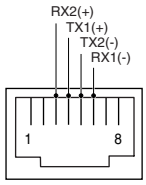
Pin Assignments

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

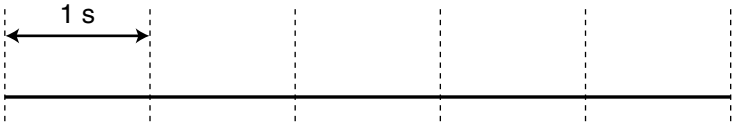
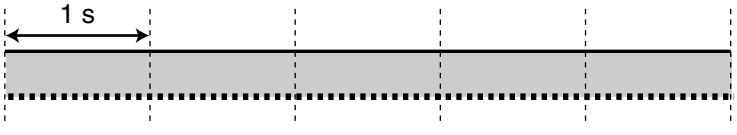


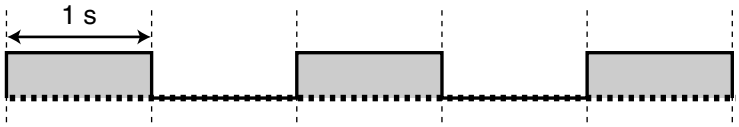
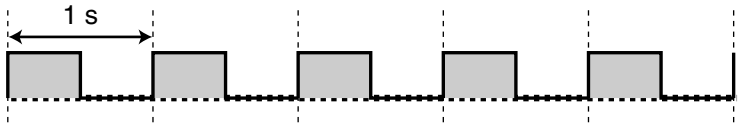
Signal Name	Level [V]	Function
RX2	(+)	Receive data 2
TX1	(+)	Transmit data 1
TX2	(-)	Transmit data 2
RX1	(-)	Receive data 1
–	–	Reserved

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	

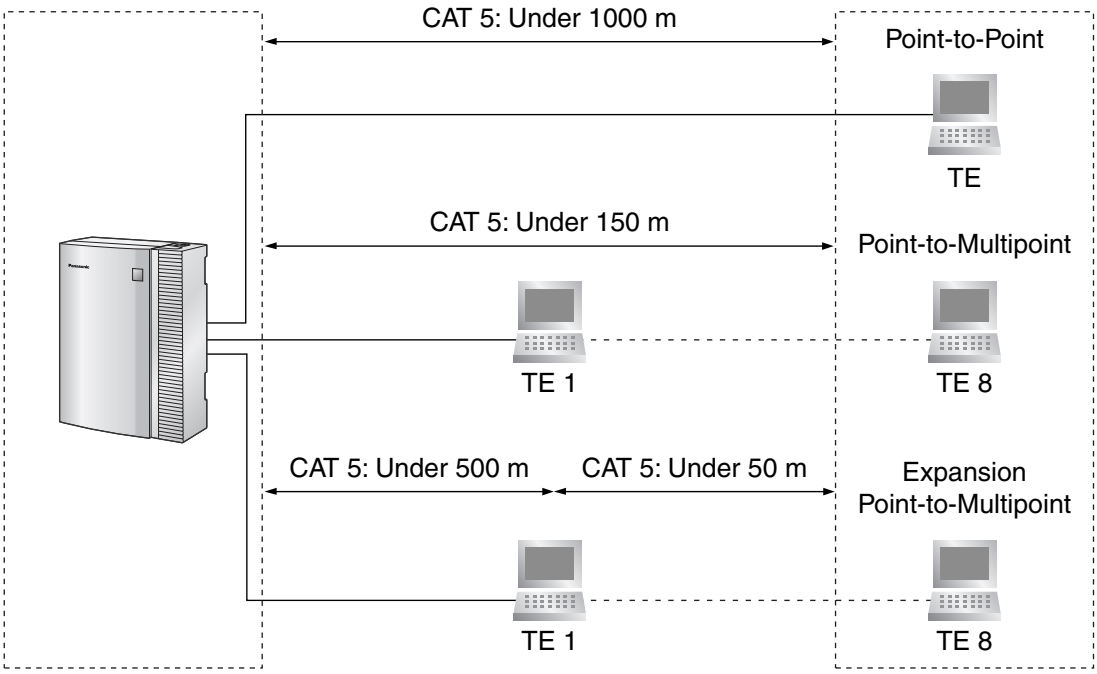
Layer 1: ON (Synchronous)

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

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

Maximum Cabling Distance of S0 Bus Connection

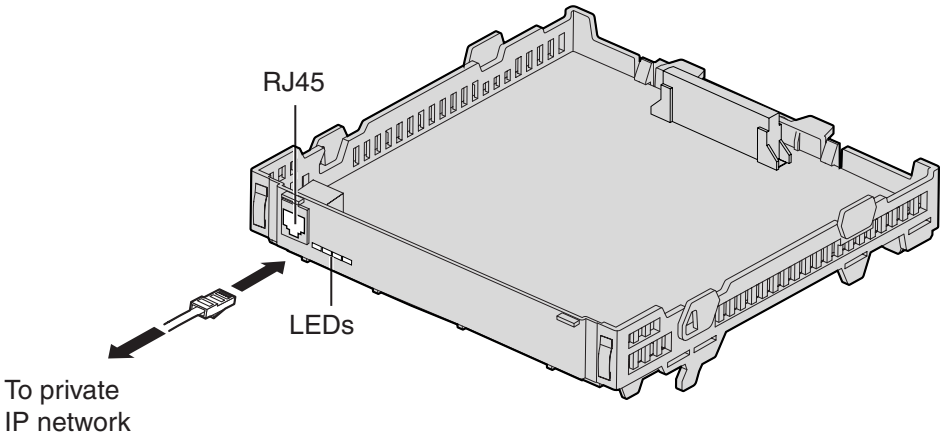
The maximum distance of the extension cable that connects the Hybrid IP-PBX and the ISDN terminal equipment (TE) is shown below:



2.3.4 IP-GW4 Card

Function

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



Accessories and User-supplied Items

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

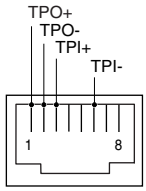
User-supplied (not included): RJ45 connector

Notes

- Maximum length of the cable to be connected to this optional service card is 100 m.
- For programming instructions and other information about the IP-GW4 card, refer to the documentation for the IP-GW4 card.
- To confirm the trunk connection, refer to "Confirming the Trunk Connection" in "2.10.1 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

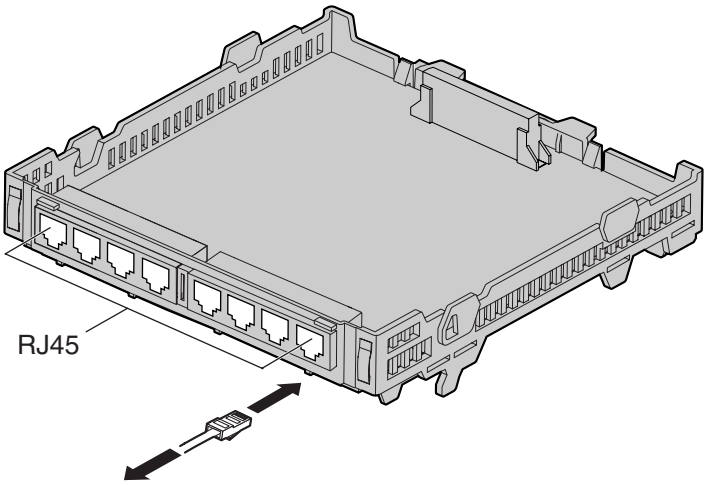
Indication	Colour	Description
ON LINE	Green	On-line status indication • ON: On-line mode • OFF: Off-line mode • Flashing: Maintenance mode **Note** If the LINK indicator is OFF, the ON LINE indicator will also be OFF.
ALARM	Red	Alarm indication • ON: Alarm • OFF: Normal
LINK	Green	Link status indication • ON: Normal Connection • OFF: Connection Error
DATA	Green	Data transmission indication • ON: Data transmitting • OFF: No data transmitted

2.4 Installation of the Extension Cards

2.4.1 DLC8 Card

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

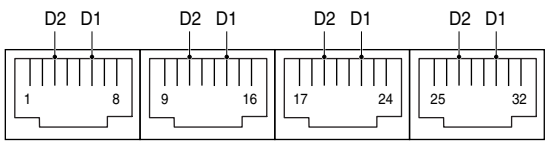
The connector type may be RJ45 or RJ11 depending on the country/area.

Note

For details about connecting the CS, refer to "2.7.7 Connecting a Cell Station to the Hybrid IP-PBX".

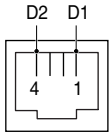
Pin Assignments

RJ45 Connector



Signal Name	Function
D1	Data port (High)
D2	Data port (Low)
–	Reserved

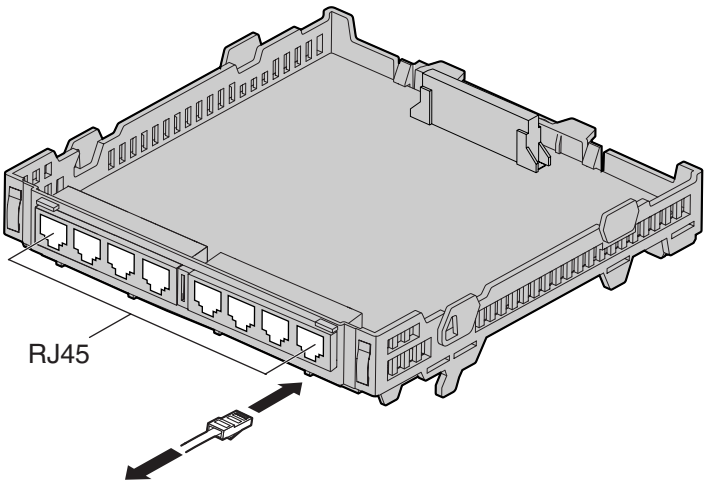
RJ11 Connector

	Signal Name	Function
	D1	Data port (High)
	D2	Data port (Low)
	–	Reserved

2.4.2 SLC8 Card

Function

8-port extension card for SLTs.



Accessories and User-supplied Items

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

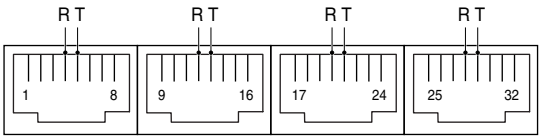
User-supplied (not included): RJ45 connector or RJ11 connector

Notice

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

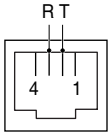
Pin Assignments

RJ45 Connector



Signal Name	Function
T	Tip
R	Ring
–	Reserved

RJ11 Connector



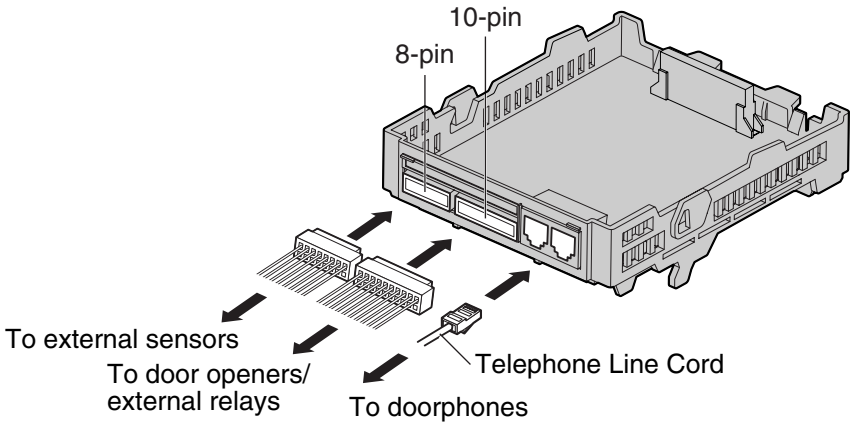
Signal Name	Function
T	Tip
R	Ring
–	Reserved

2.5 Installation of the Other Cards

2.5.1 DPH4 Card

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.

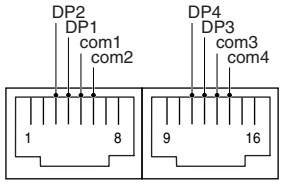
Shown above is a card having the RJ45 connectors.

Note

For details about connection to doorphones, door openers, external sensors, and external relays, refer to "2.8.1 Connection of Doorphones, Door Openers, External Sensors, and External Relays".

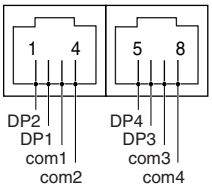
Pin Assignments

RJ45 Connector



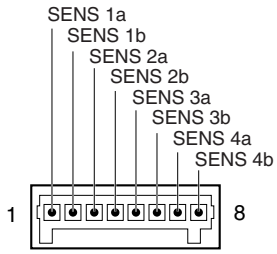
Signal Name	Function
DP2	Doorphone 2 transmit
DP1	Doorphone 1 transmit
com1	Doorphone 1 receive
com2	Doorphone 2 receive
DP4	Doorphone 4 transmit
DP3	Doorphone 3 transmit
com3	Doorphone 3 receive
com4	Doorphone 4 receive
–	Reserved

RJ11 Connector



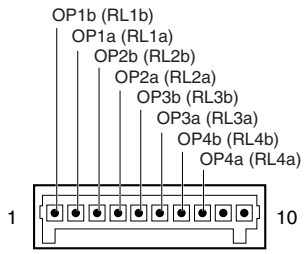
Signal Name	Function
DP2	Doorphone 2 transmit
DP1	Doorphone 1 transmit
com1	Doorphone 1 receive
com2	Doorphone 2 receive
DP4	Doorphone 4 transmit
DP3	Doorphone 3 transmit
com3	Doorphone 3 receive
com4	Doorphone 4 receive

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

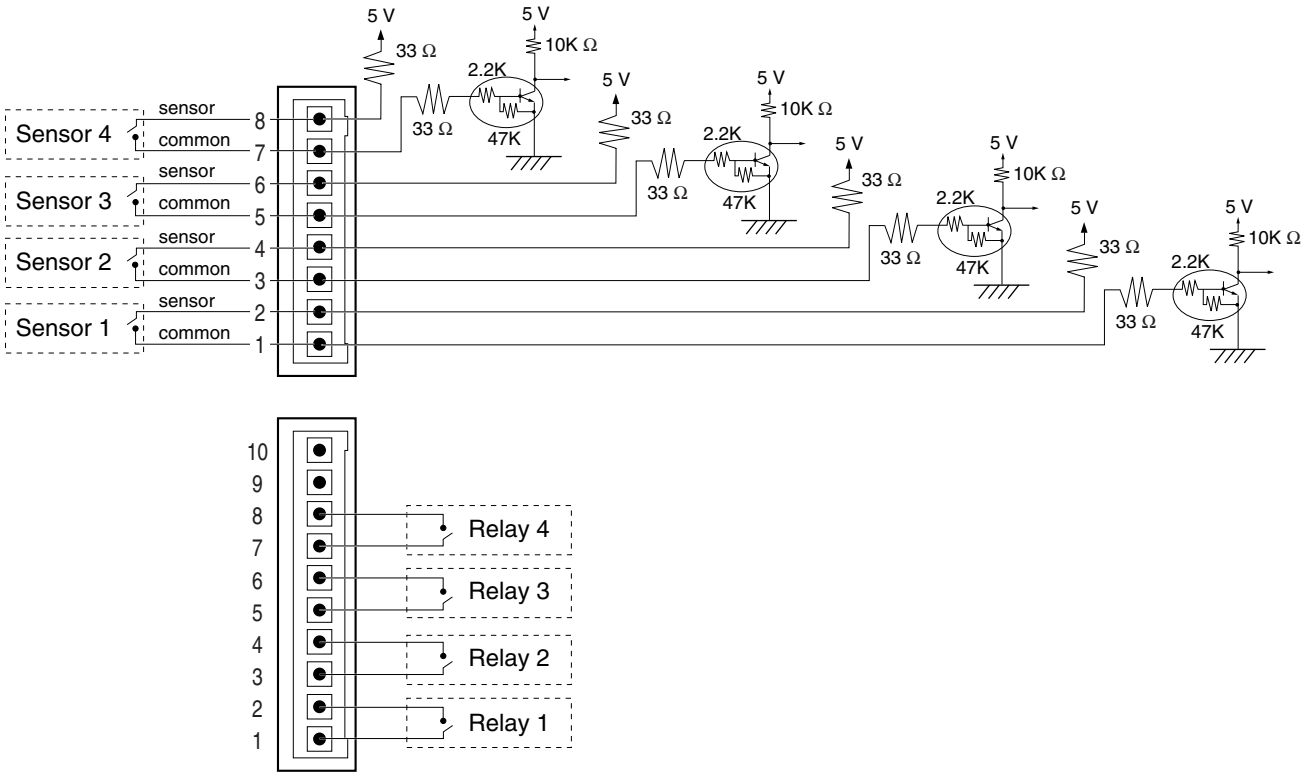
10-pin Terminal Block



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

Connection Diagram for External Sensors and External Relays

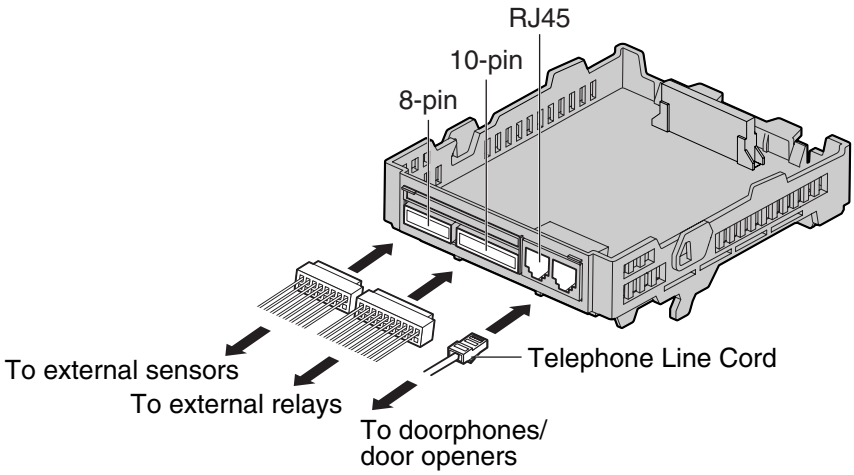
Power to the external sensor is provided from the DPH4 card and must be grounded through the DPH4 card as indicated in the diagram below. A pair of "sensor" and "common" lines must be connected to the DPH4 card for each external sensor. The Hybrid IP-PBX detects input from the sensor when the signal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



2.5.2 DPH2 Card

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

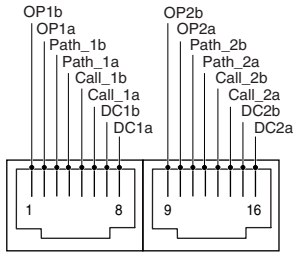
User-supplied (not included): Copper wire

Note

For details about connection to doorphones, door openers, external sensors, and external relays, refer to "2.8.1 Connection of Doorphones, Door Openers, External Sensors, and External Relays".

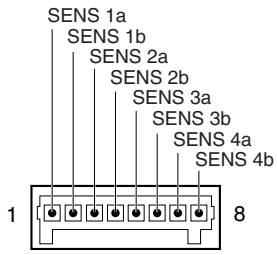
Pin Assignments

RJ45 Connector



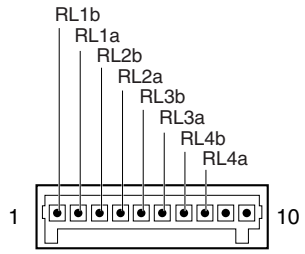
Signal Name	Function
OP1b	Door opener 1
OP1a	Door opener 1 com
Path_1b	Doorphone 1 transmit
Path_1a	Doorphone 1 receive
Call_1b	Doorphone 1 call button
Call_1a	Doorphone 1 call button com
DC1b	Doorphone control 1
DC1a	Doorphone control 1 com
OP2b	Door opener 2
OP2a	Door opener 2 com
Path_2b	Doorphone 2 transmit
Path_2a	Doorphone 2 receive
Call_2b	Doorphone 2 call button
Call_2a	Doorphone 2 call button com
DC2b	Doorphone control 2
DC2a	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

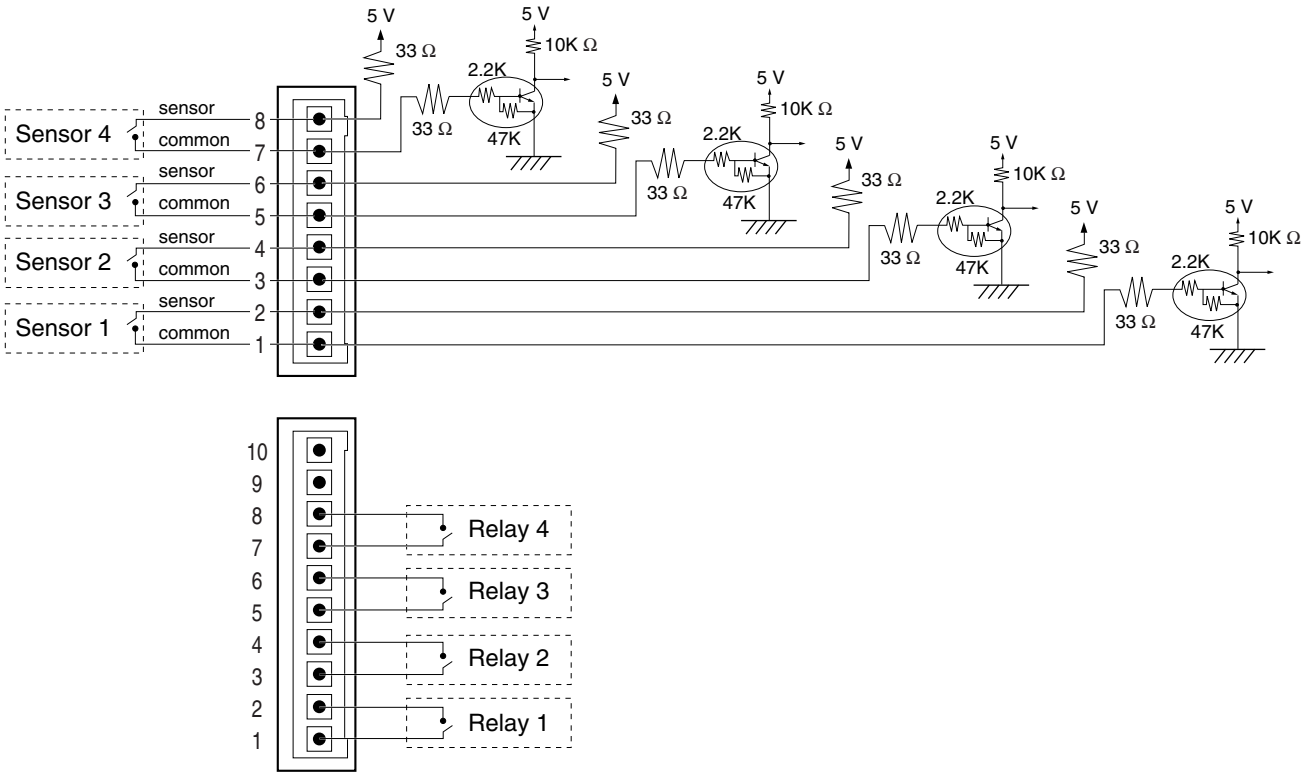
10-pin Terminal Block



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

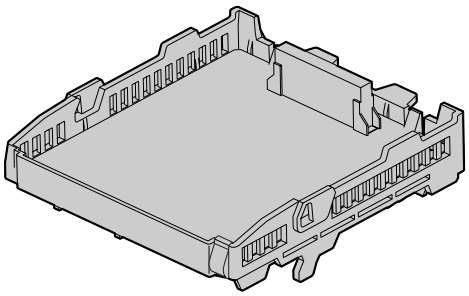
Power to the external sensor is provided from the DPH2 card and must be grounded through the DPH2 card as indicated in the diagram below. A pair of "sensor" and "common" lines must be connected to the DPH2 card for each external sensor. The Hybrid IP-PBX detects input from the sensor when the signal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



2.5.3 ECHO8 Card

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

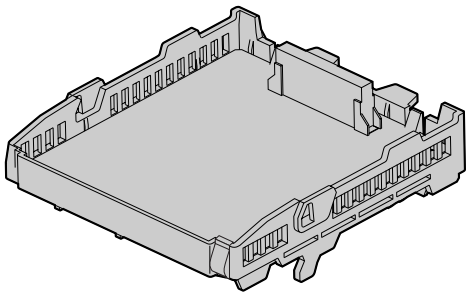
Note

To establish a conference call involving 6 to 8 parties, install an ECHO8 card and enable the echo cancellation for conference using the KX-TDA30 Maintenance Console. For details, refer to the online help of the KX-TDA30 Maintenance Console.

2.5.4 MSG2 Card

Function

2-channel message card.



Accessories and User-supplied Items

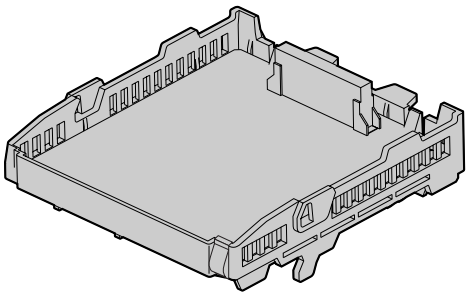
Accessories (included): Extension Bolt × 1, Screw × 1

User-supplied (not included): none

2.5.5 SVM2 Card

Function

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



Accessories and User-supplied Items

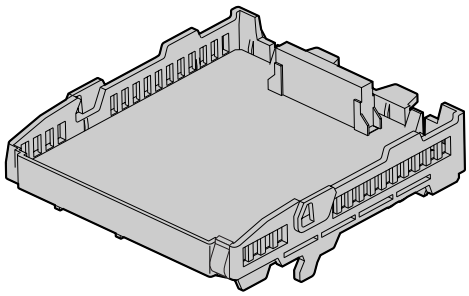
Accessories (included): Extension Bolt × 1, Screw × 1

User-supplied (not included): none

2.5.6 EXT-CID Card

Function

Sends Caller ID to extension ports.

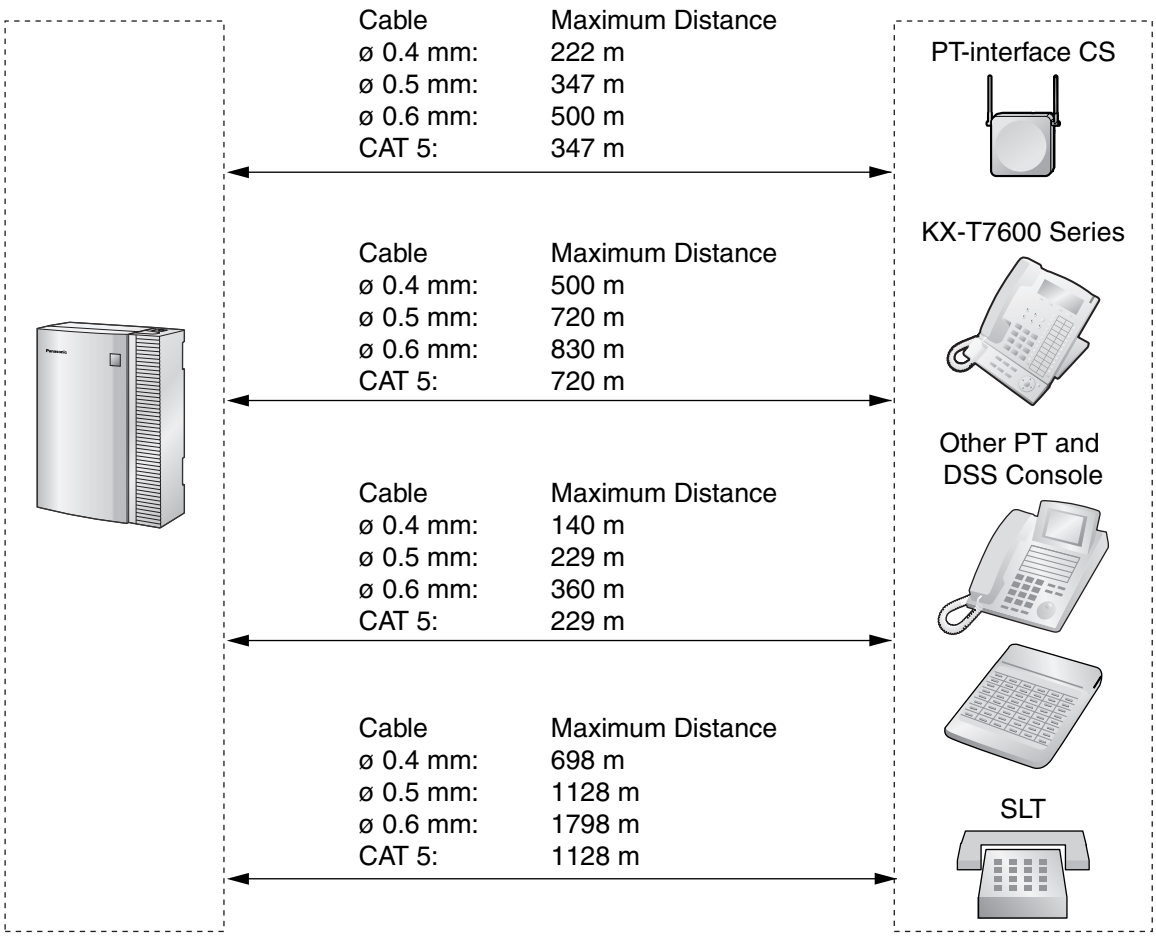


Note

This card is installed by default.

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)	✔	✔	✔	✔	✔
SLC8 Cards					✔
DLC8 Cards	✔	✔		✔	

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

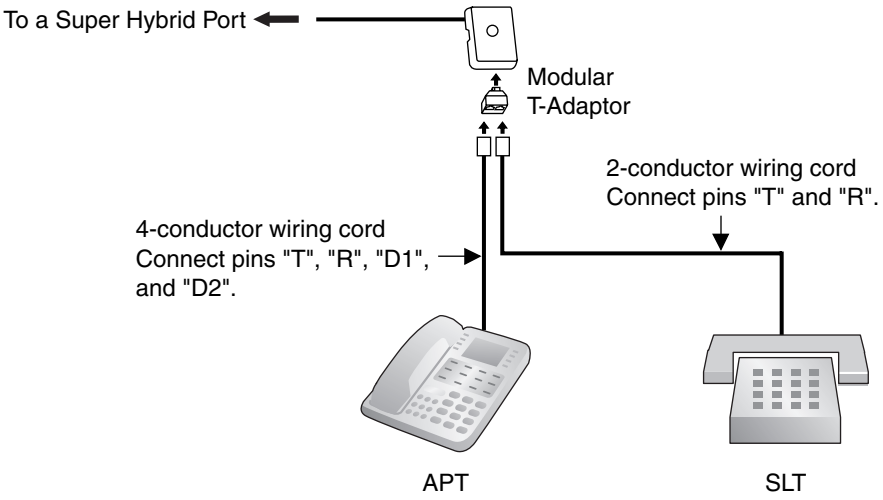
2.6.2 Parallel Connection of the Extensions

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

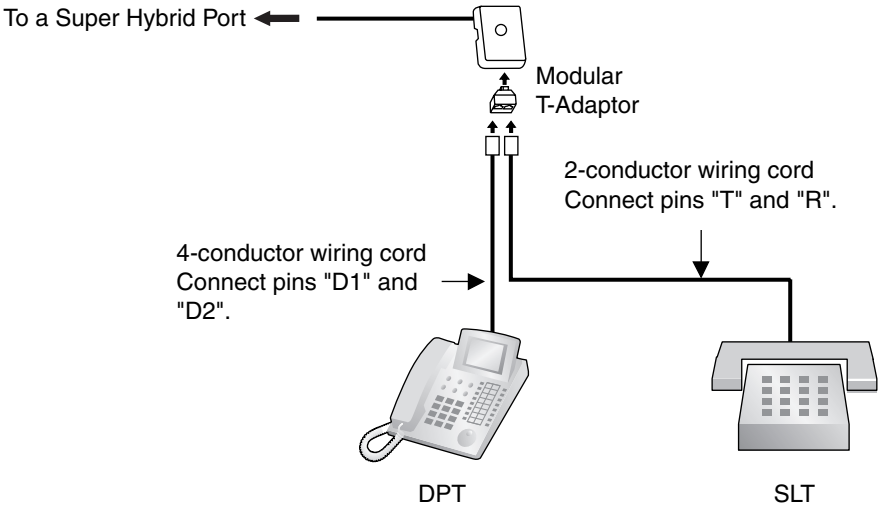


With DPT

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

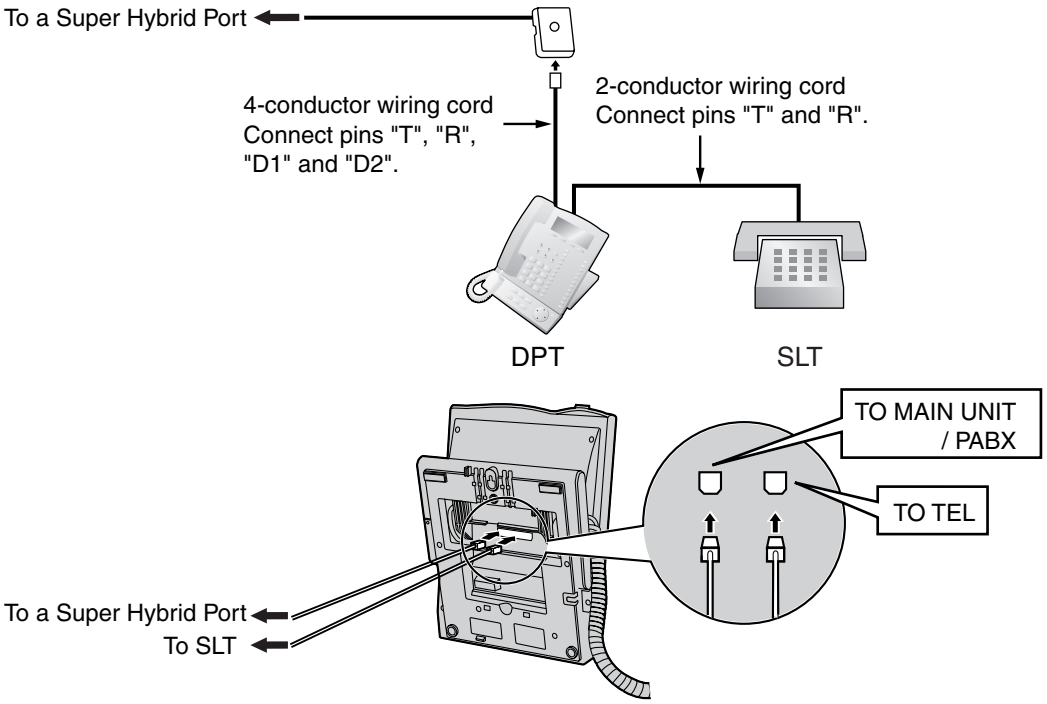
If the XDP mode is enabled through system programming, parallel connection is not possible. Refer to "1.10.9 Parallelled Telephone" and "2.1.1 Extension Port Configuration" in the Feature Guide for further information.

Using a Modular T-Adaptor

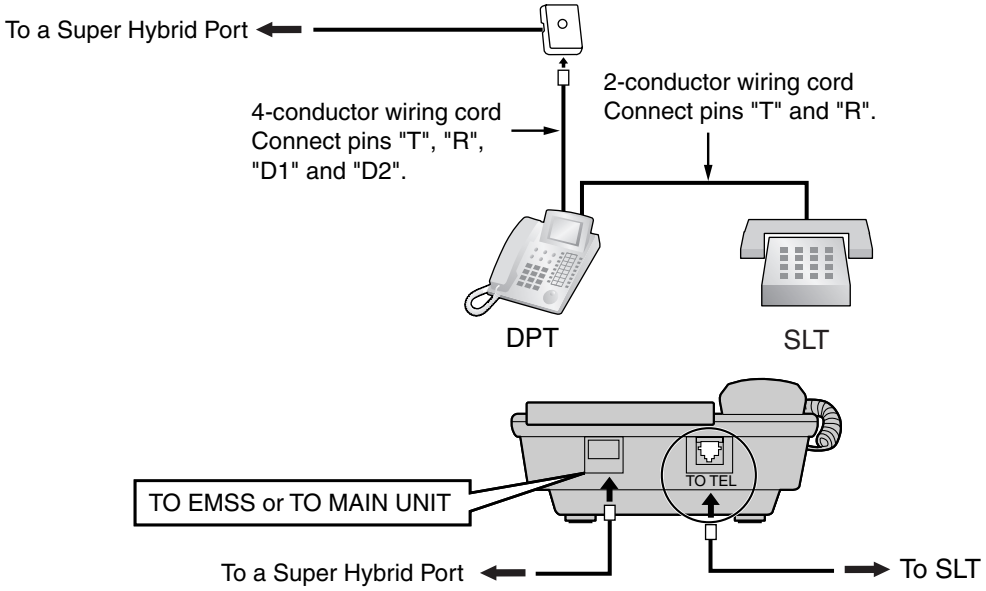


Using an EXtra Device Port

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



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



2.6.3 Digital EXtra Device Port (Digital XDP) Connection

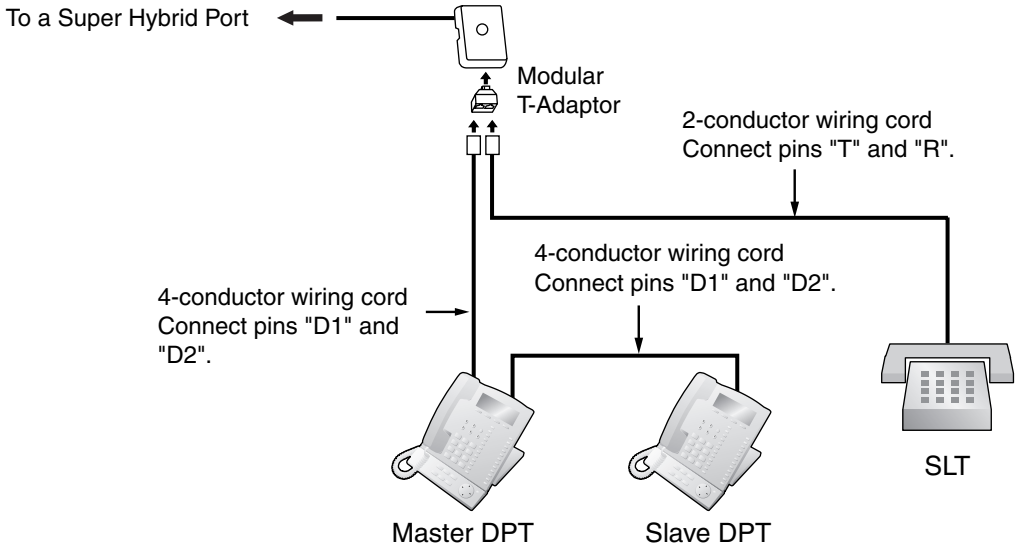
A DPT can be connected to another DPT on the Digital XDP connection. In addition, a DPT connected to a Super Hybrid Port can also have an SLT connected in Parallel mode or XDP mode.

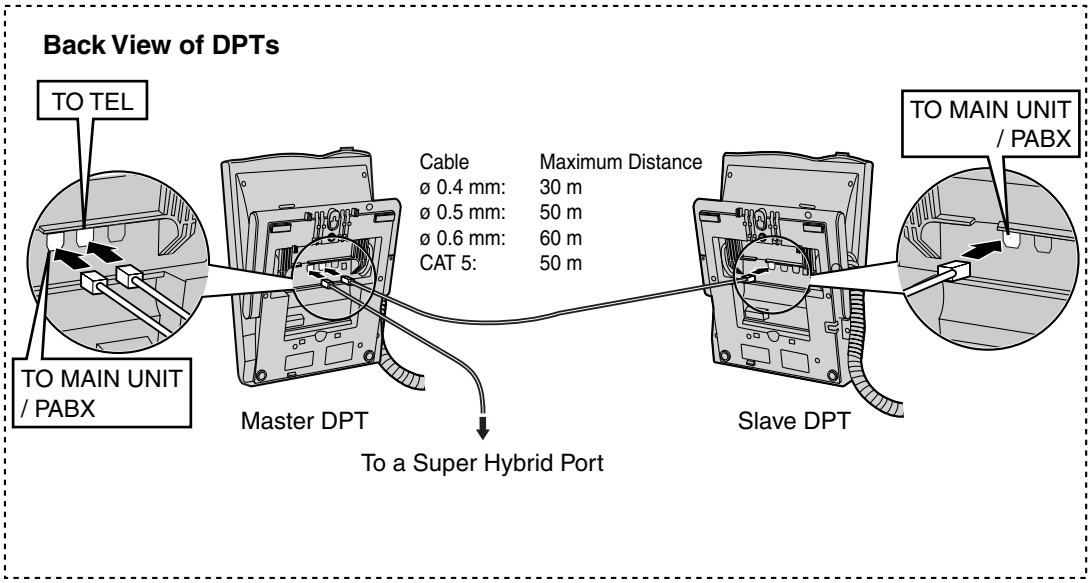
Notes

- Both DPTs must be KX-T7600 series DPTs (excluding KX-T7640).
- Parallel mode or XDP mode can be selected through system programming.
- If XDP mode is enabled through system programming, parallel connection is not possible. Refer to "1.10.9 Parallelled Telephone" and "2.1.1 Extension Port Configuration" in the Feature Guide for further information.

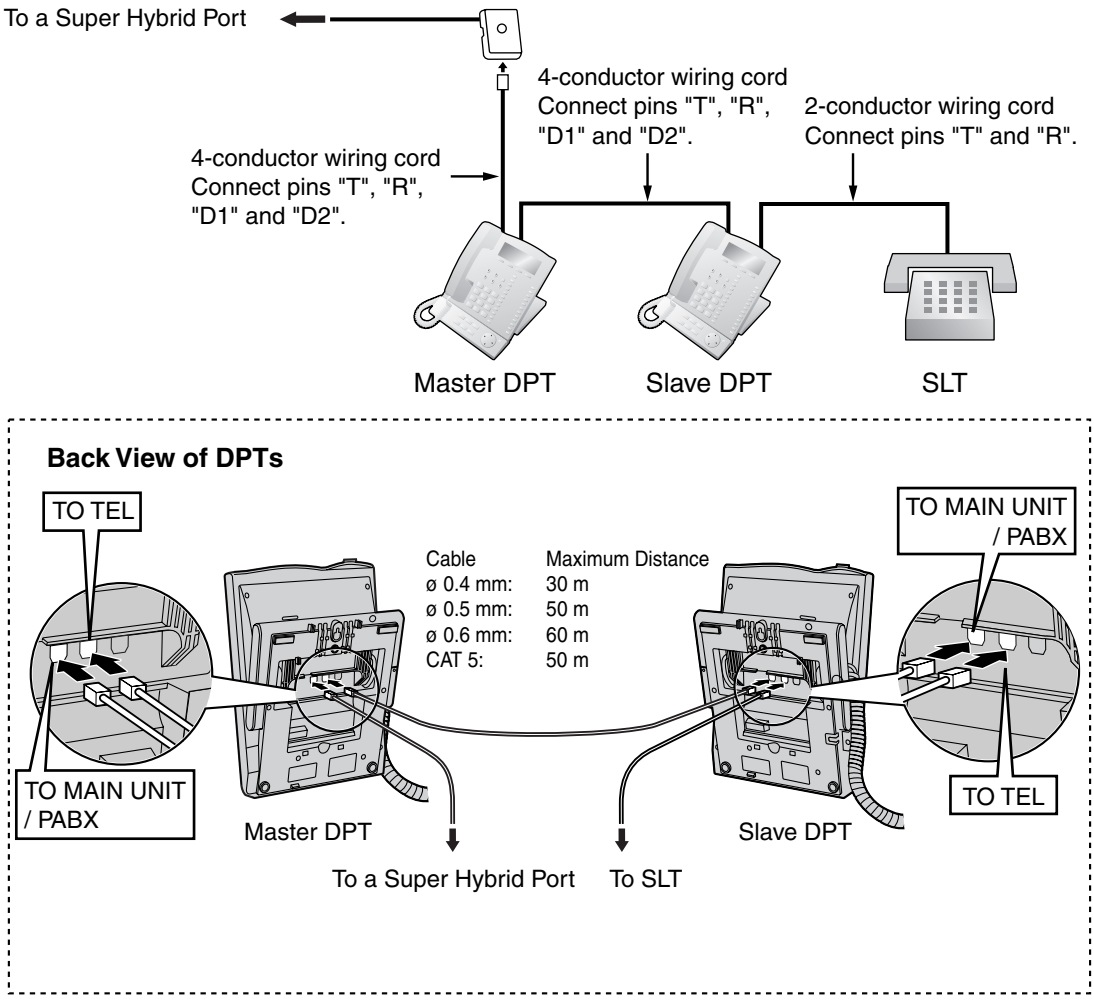
With KX-T7600 Series DPT (except KX-T7600E Series)

Using a Modular T-Adaptor



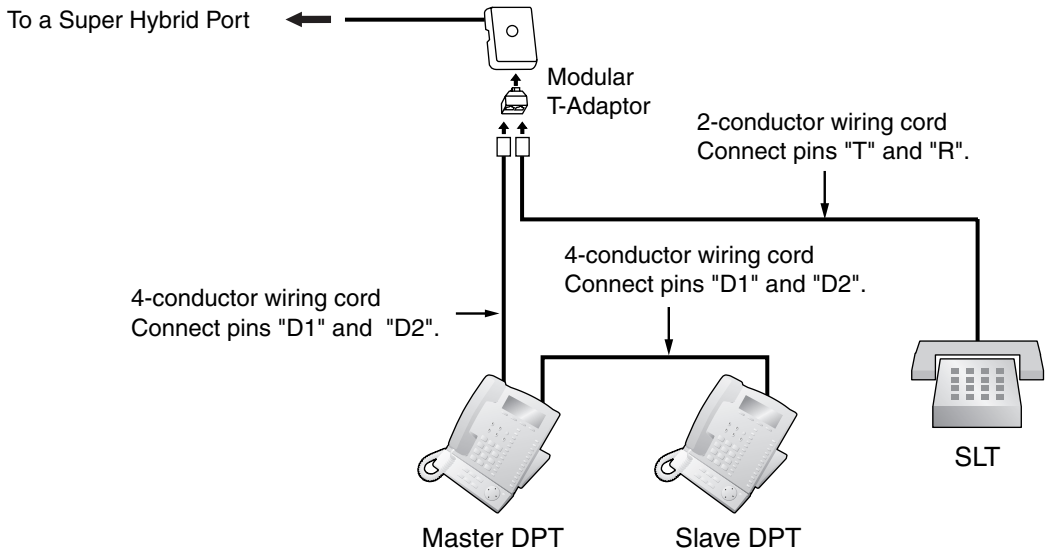


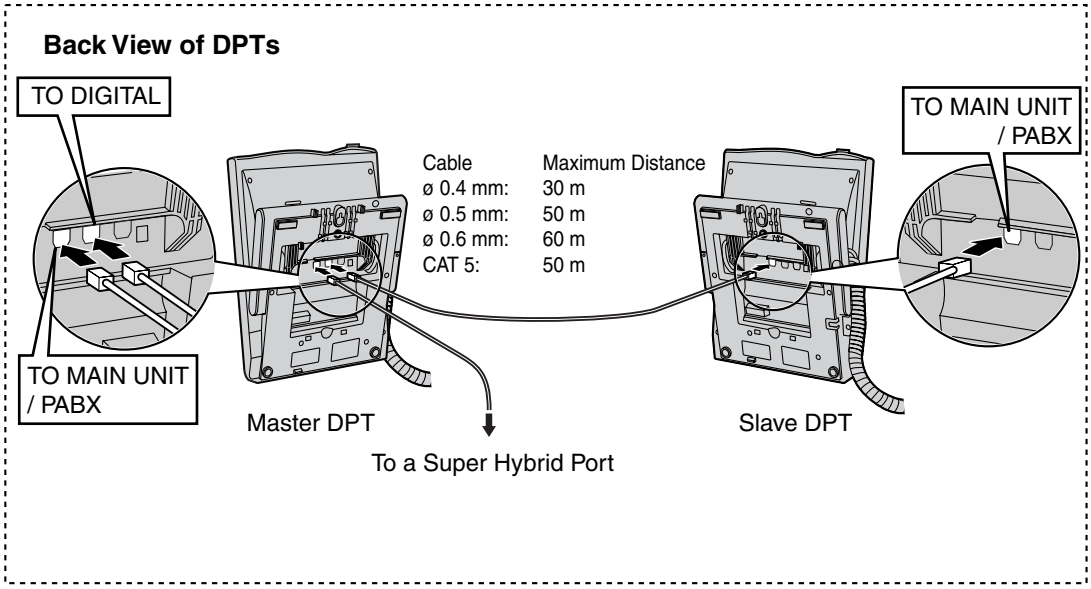
Using an EXtra Device Port



With KX-T7600E Series DPT

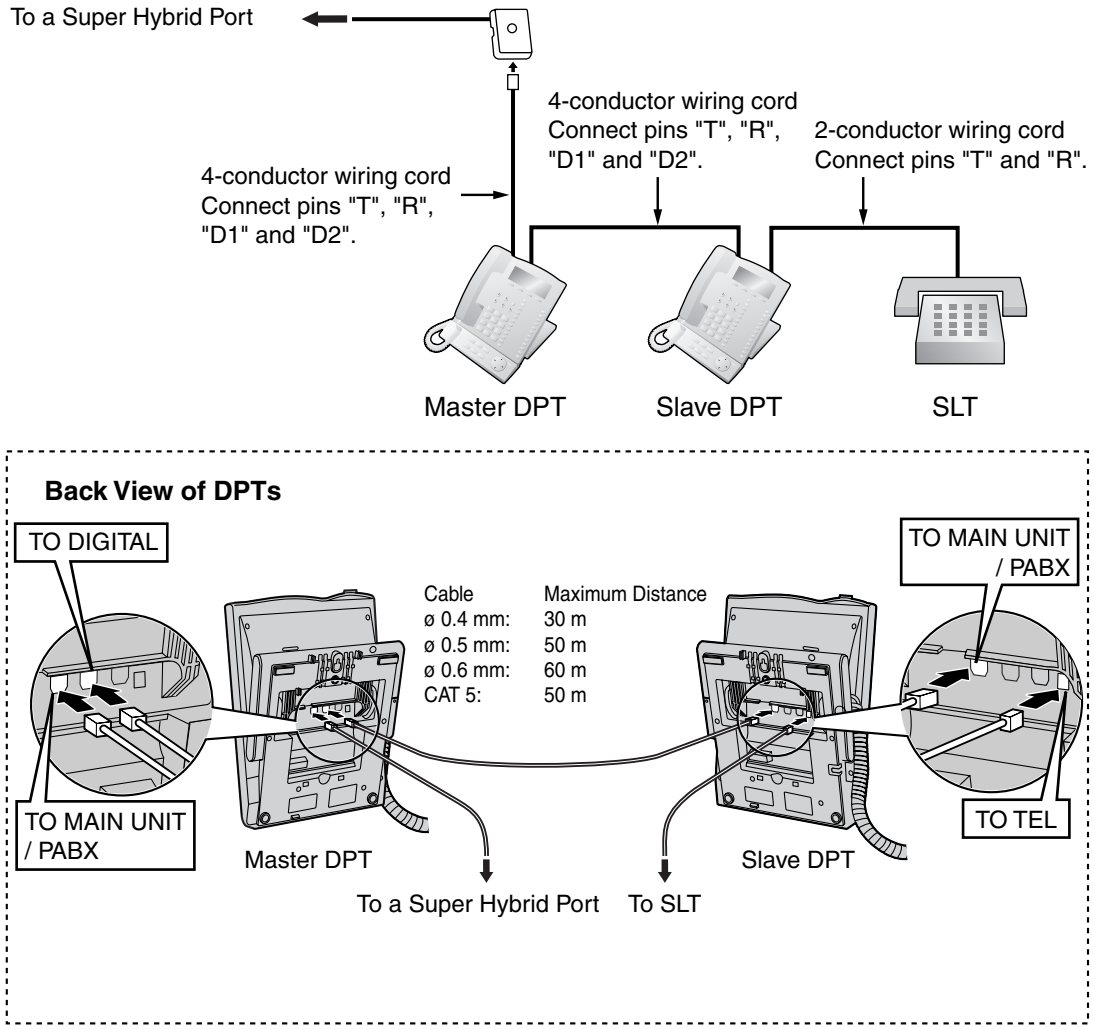
Using a Modular T-Adaptor



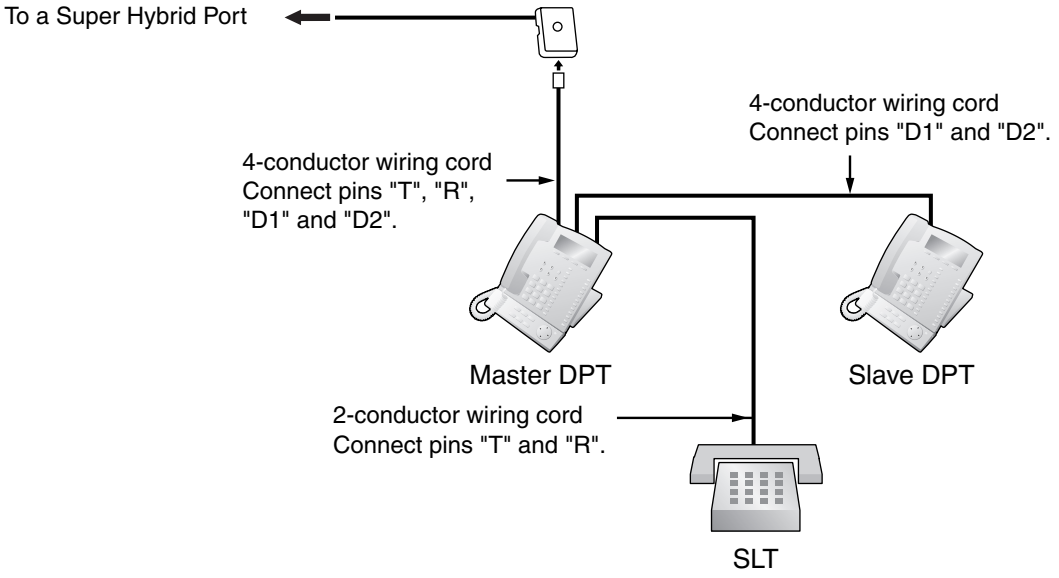


Using an EXtra Device Port

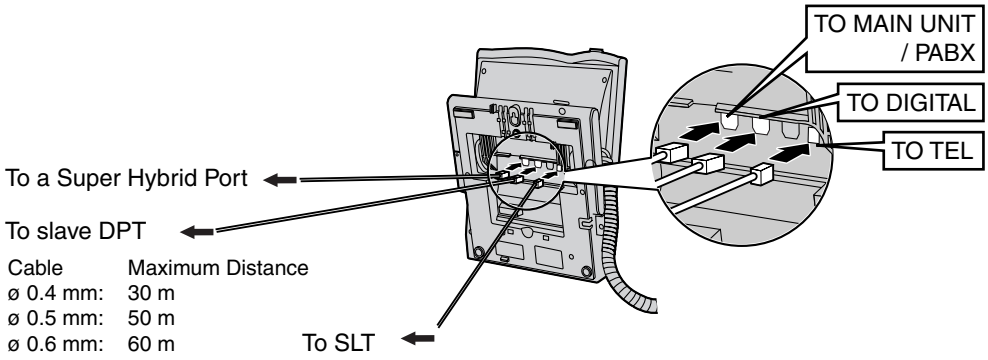
Connecting to a Slave DPT



Connecting to a Master DPT



Back View of DPTs



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

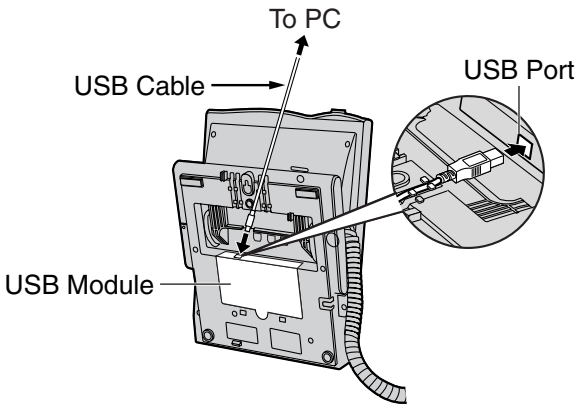
2.6.4 First Party Call Control CTI Connection

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 1.1), and uses the TAPI 2.1 protocol.

A USB Module (KX-T7601) must be connected to the KX-T7633/T7636 DPT.

Note

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



Notes

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

2.7 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

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

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

The KX-TDA15 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	Multi Carrier TDMA-TDD
Frequency Band	1880 MHz to 1900 MHz
Number of Carriers	10
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

CAUTION

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

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

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

Too many CSs in a small area can cause problems due to conflicts over which signal channels each CS can use. Ideally, CSs should be a minimum of 25 m to 40 m apart.
However, the required distance between CSs may vary depending on the environment of the installation site and conditions in which the wireless system is used. Conduct the site survey to determine the appropriate distance.

2.7.2 Procedure Overview

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

1. Investigate the installation site

Refer to "2.7.3 Site Planning".

a. Obtain the map of the CS installation site.

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

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

2. Prepare for site survey

Refer to "2.7.4 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

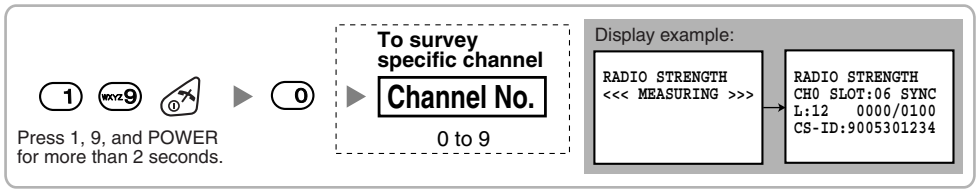
- Install at least 2 m above the floor.
- Keep the antennas in the upright position.

3. Conduct the site survey

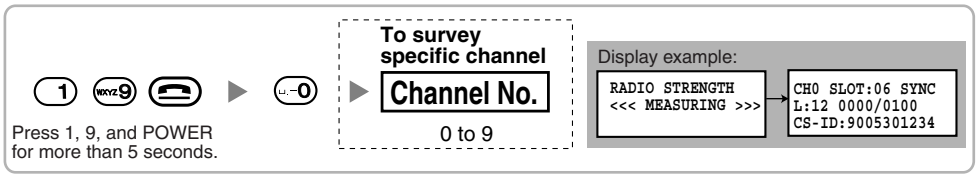
Refer to "2.7.5 Site Survey Using the KX-TCA255/KX-TD7590".

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 demanded 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. Assuming everything goes as planned, 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

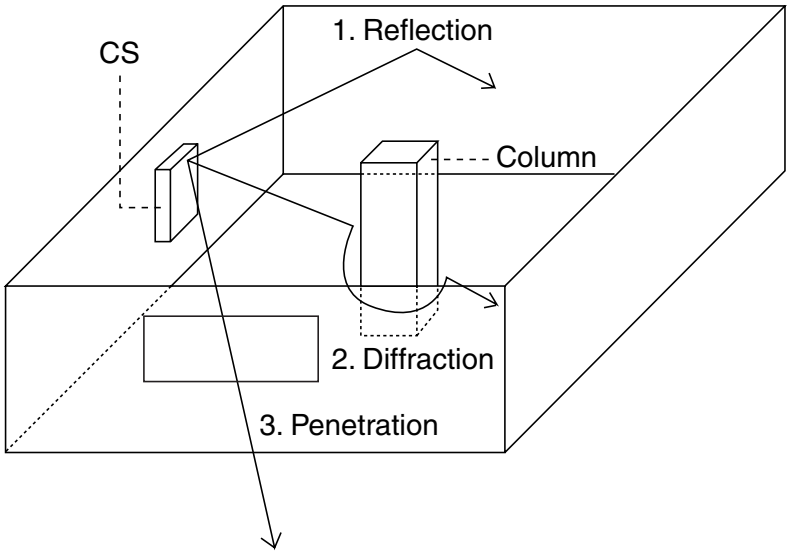
Characteristics of Radio Waves

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



Relationships Between Radio Waves and Building Structure and Materials

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

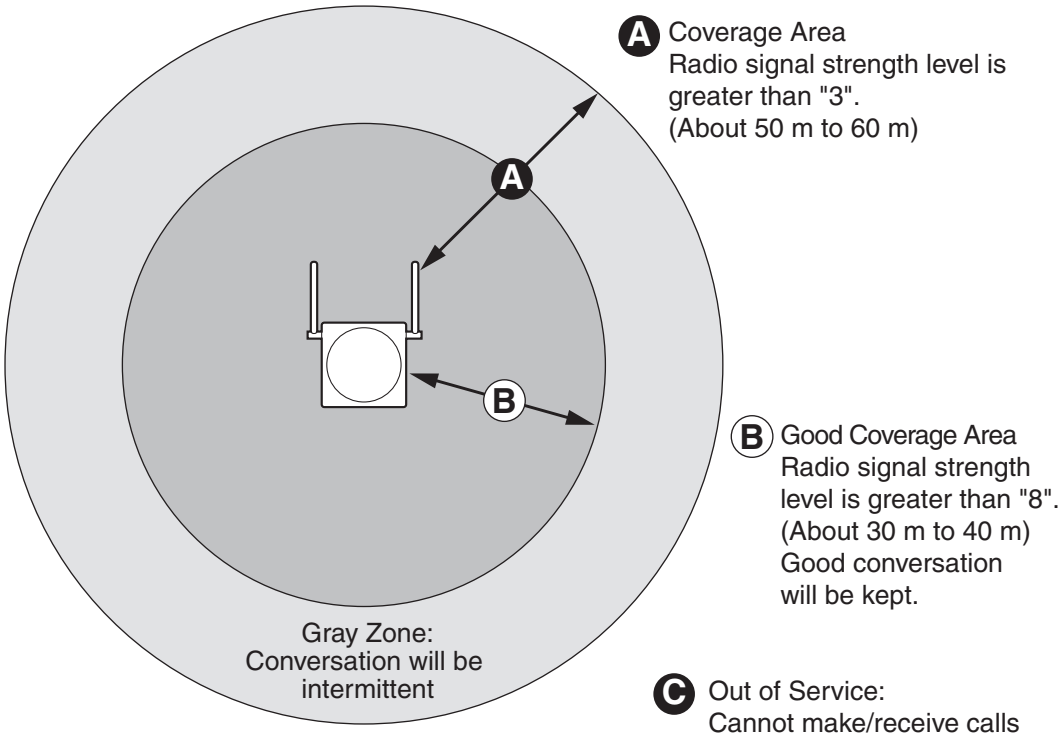
Object	Material	Transmission Tendency
Wall	Concrete	The thicker they are, the less radio waves penetrate them.
	Ferroconcrete	Radio waves can penetrate them, but the more iron there is, the more radio waves are reflected.
Window	Glass	Radio waves usually penetrate them.
	Glass with wire nets	Radio waves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

CS Coverage Area

The example below shows the size of the coverage area of 1 CS if it is installed where there is no obstacle.

Note

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

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

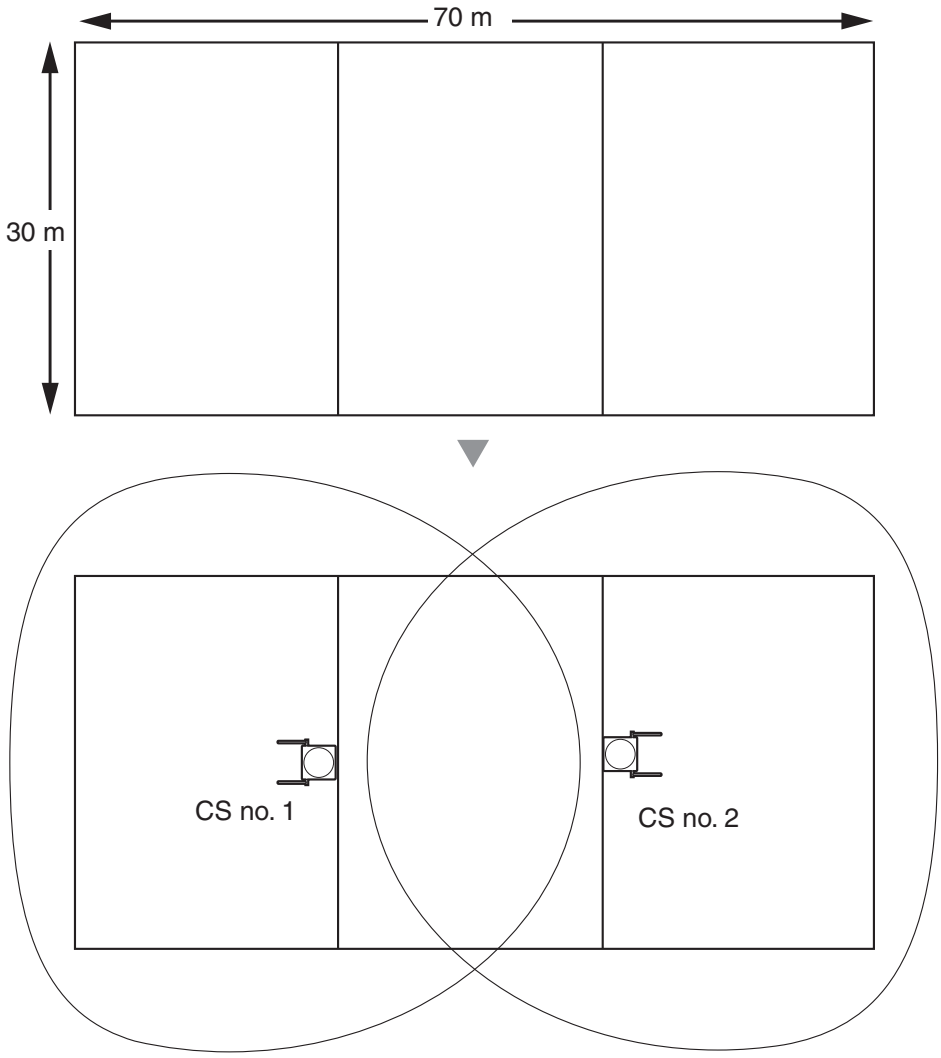
Example: Installing in a Room Separated by Walls

Things to take note of:

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

CS installation plan:

- The coverage area of each CS will not extend as far as when there is no obstacle, because the radio signals will be weakened by separating walls. Therefore, you will need an additional CS 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

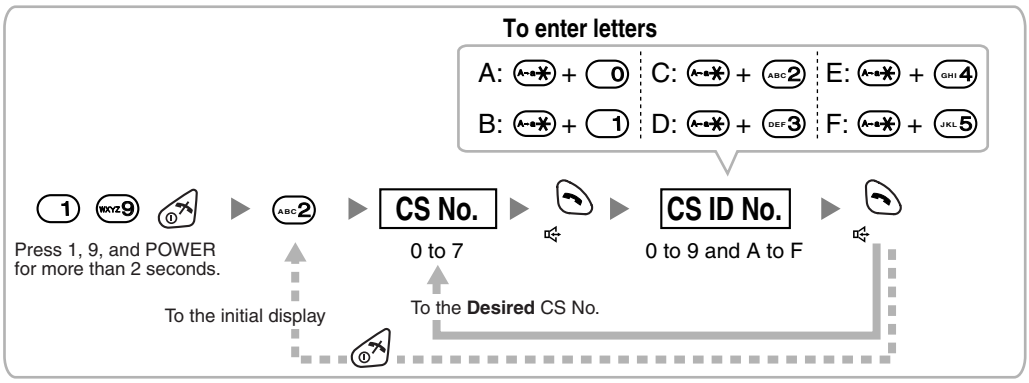
The display language for the site survey is only in English.

Checking the CS ID Number

Check the CS ID number label attached to the CS.

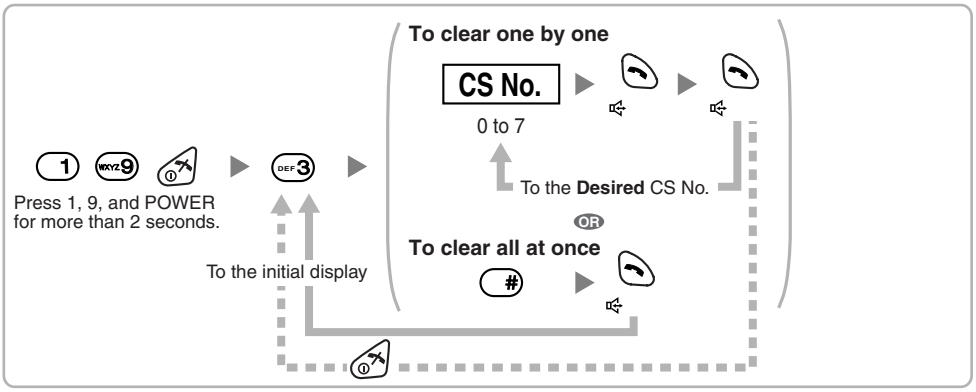
Assigning the CS ID Number to the PS

Using the KX-TCA255

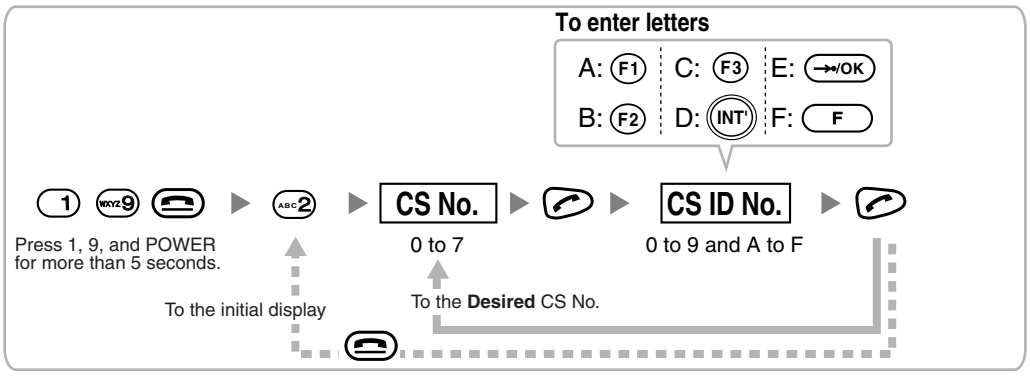


Note

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

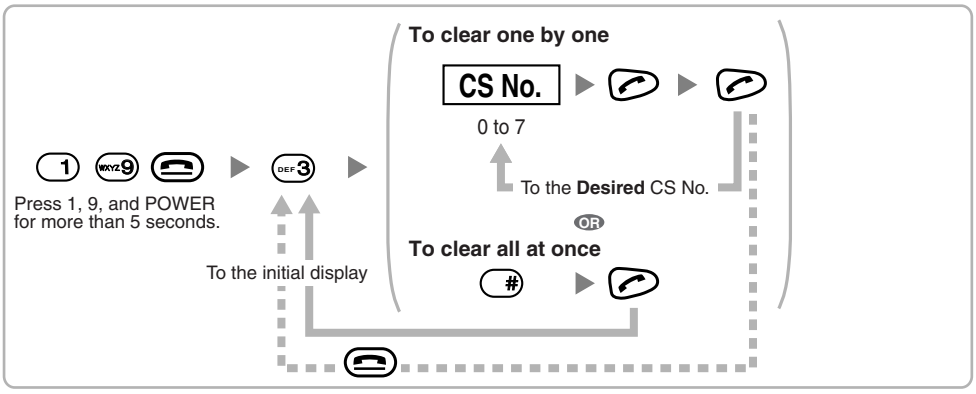


Using the KX-TD7590



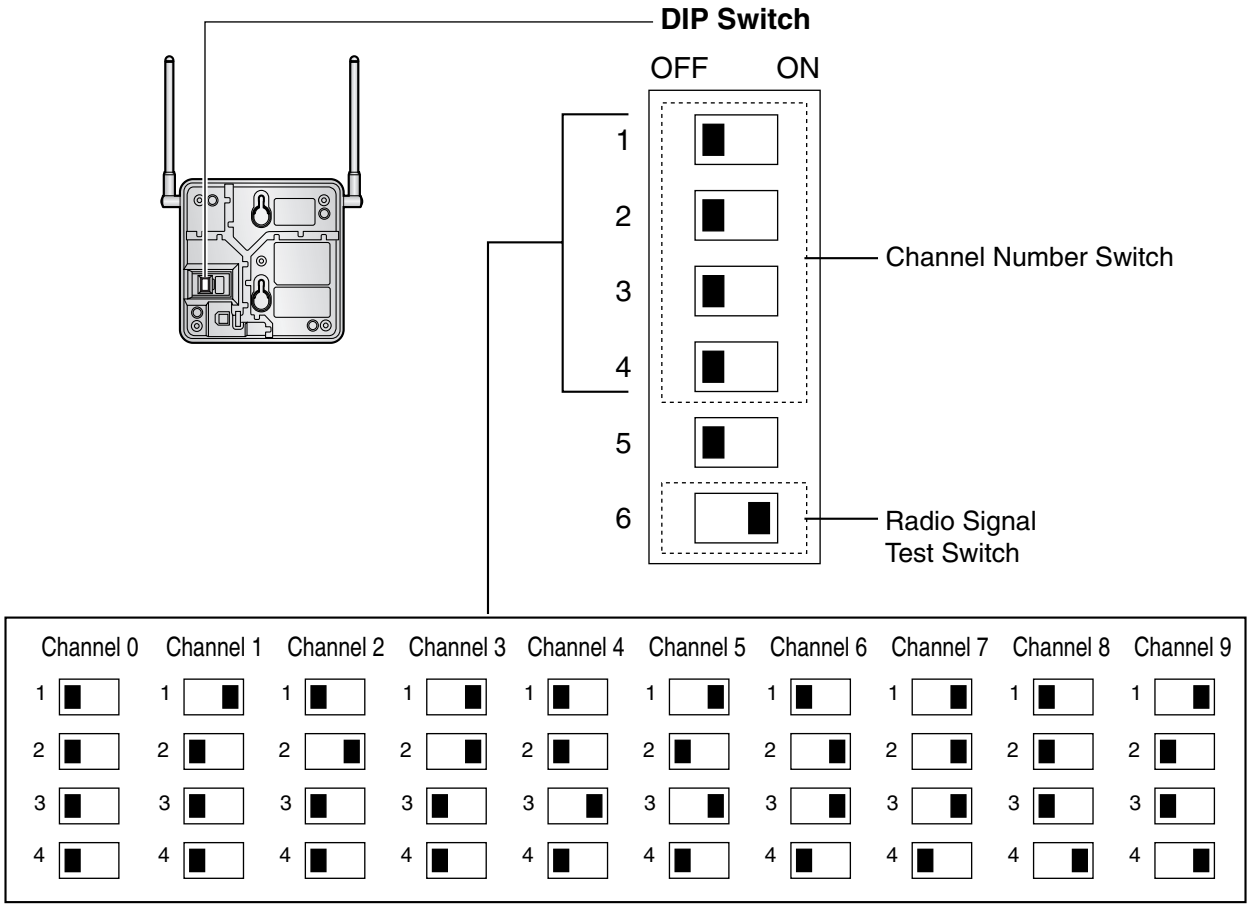
Note

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



Setting and Installing the CS Temporarily for Site Survey

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



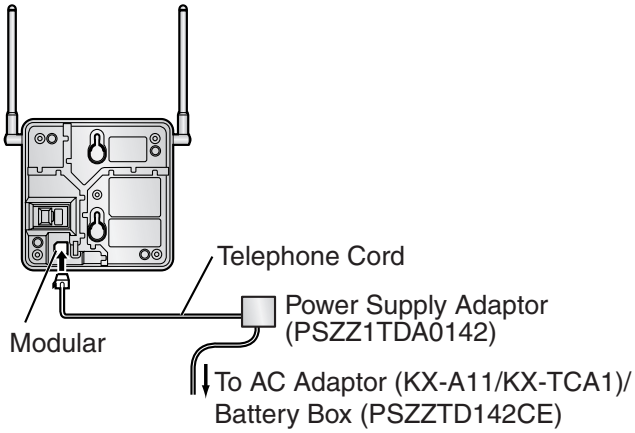
Notes

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

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

Notes

- The AC adaptor should be connected to a vertically oriented or floor-mounted AC outlet. Do not connect the AC adaptor to a ceiling-mounted AC outlet, as the weight of the adaptor may cause it to become disconnected.
- **For users in the United Kingdom:**
  240 V AC must not be used on a building site. Instead of an AC adaptor, connect a battery box to the CS.



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

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

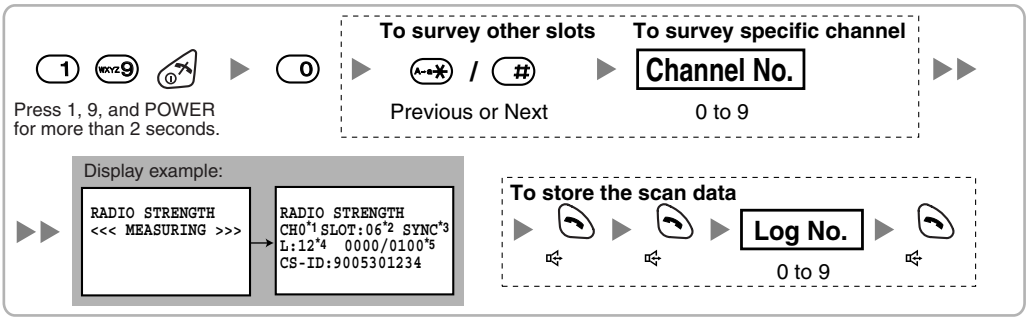
The PS has a Radio Signal Test mode that monitors the state of the radio link to the CS for site survey. In the Radio Signal Test mode, the frame loss and signal strength of a synchronous slot, and the signal strength of the other slots can be measured when the PS is monitoring the CS. After installing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

Testing the Radio Signal Strength

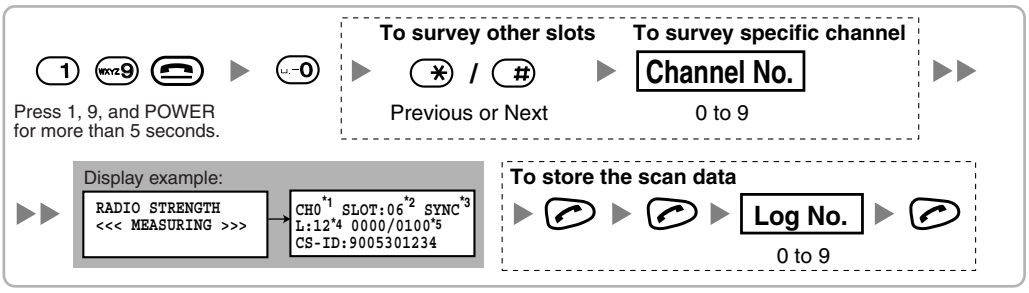
After locating the CS(s) temporarily, execute the Radio Signal Test using the PS. The PS scans whether there is a CS that can link with on channel 0 right after entering the Radio Signal Test mode. The channel to be scanned can be changed by pressing the appropriate keys 0 through 9.

1. Enter the Radio Signal Test mode.

Using the KX-TCA255



Using the KX-TD7590



Notes

*1: Channel number

*2: Slot number

*3: When a slot is synchronised, "**SYNC**" is displayed.

*4: Radio signal strength level

*5: Frame error (0000 to 9999)/Frame counter (0000 to 9999). Frame error indicates the number of errors out of 10 000 radio signal receptions. An increased number of frame errors indicates greater radio signal interference and more frequent noise during conversation. The ideal number of frame error is "0000".

CAUTION

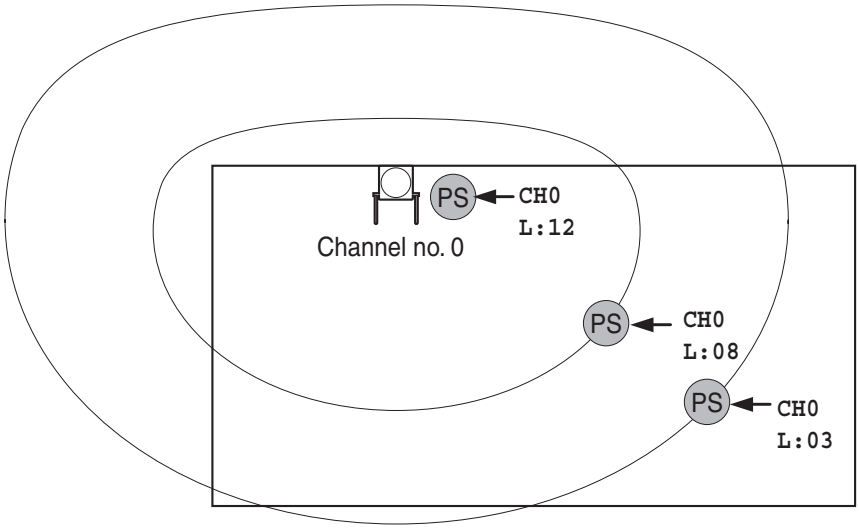
Storing the scan data will clear all directory data.

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

a. Move to the CS until the point the radio signal strength level becomes "12".

b. Move away from the CS and identify the CS coverage area within which the radio signal strength level is greater than "8". Draw the area on the map.

c. Move away from the CS and identify the CS coverage area within which the radio signal strength level is greater than "3". Draw the area on the map.

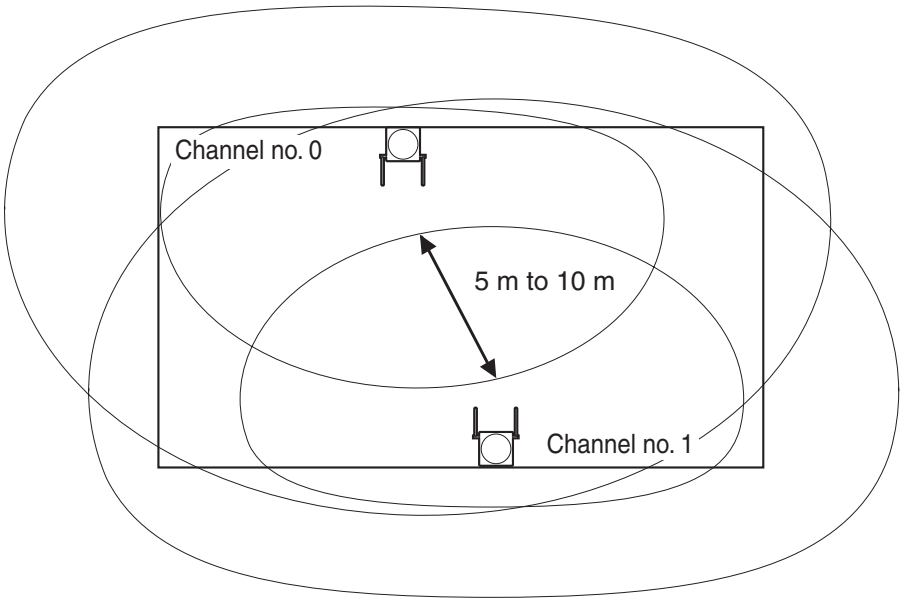


Radio Signal Strength Levels

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

3. Repeat the steps 1 and 2 for another CS, 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.



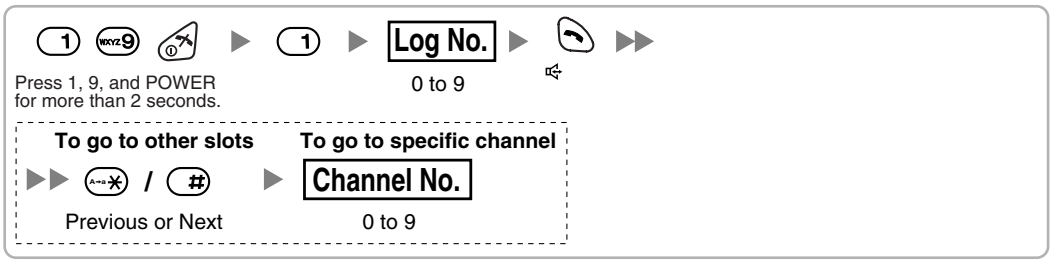
b. Make sure that the radio signal strength level is greater than "3" at any location in the service area demanded by the user.

Notes

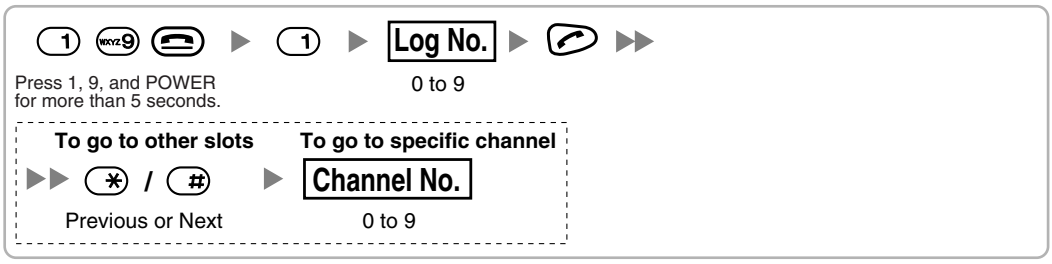
- If a channel is set, the results of measurement for the 24 slots on the channel are saved each time. If the same channel is set, the new results override the previous ones. Therefore, a measurement of 10 channels × 24 slots in total can be made.
- If correct results cannot be obtained (e.g., there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

Referring to the Stored Scan Data

Using the KX-TCA255



Using the KX-TD7590



Clearing the Stored Scan Data

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

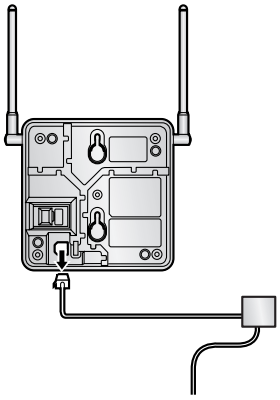
Using the KX-TCA255

Using the KX-TD7590

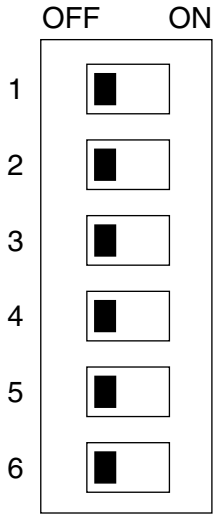
2.7.6 After Site Survey

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

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

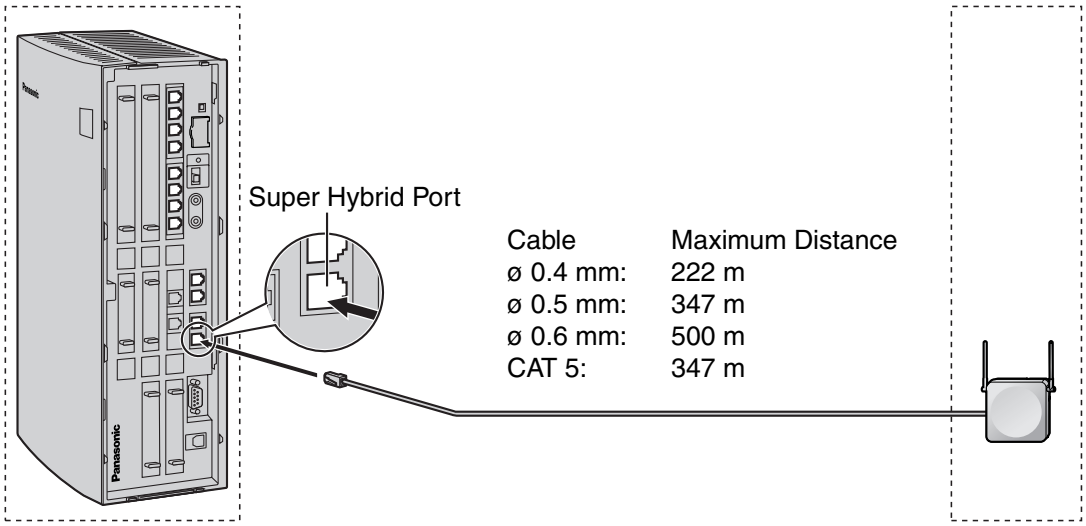


3. Switch all DIP switches on the CS from ON to OFF.



2.7.7 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 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 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

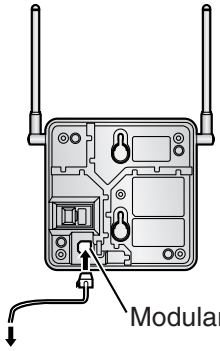
User-supplied (not included): RJ45 connector or RJ11 connector

Note

For details about DLC8 card, refer to "2.4.1 DLC8 Card".

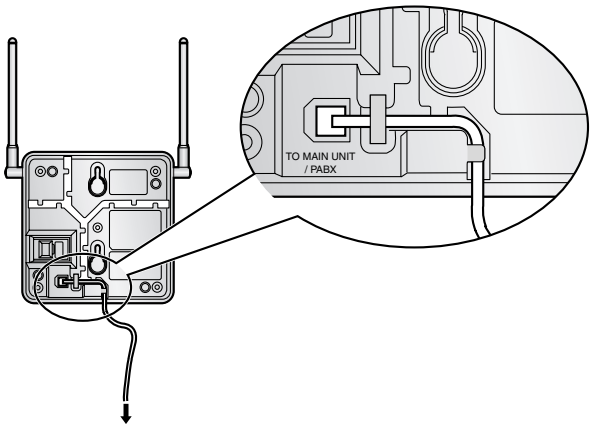
Connecting the CS

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



To a Super Hybrid Port
or DLC8 card

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



To a Super Hybrid Port
or DLC8 card

Registering the PS

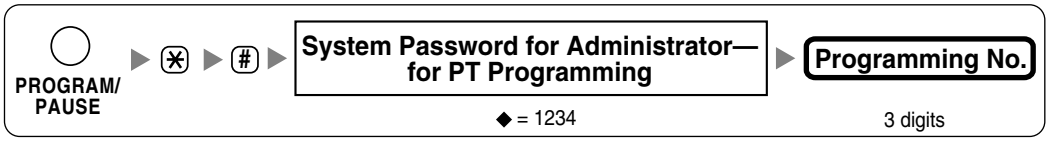
The PS must be registered to the Hybrid IP-PBX before it can be used. Programming of both the PS and Hybrid IP-PBX is required. A PT with multiline display (e.g., KX-T7636 6-line display) is required for the Hybrid IP-PBX system programming.

Note

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

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

Administrator Level

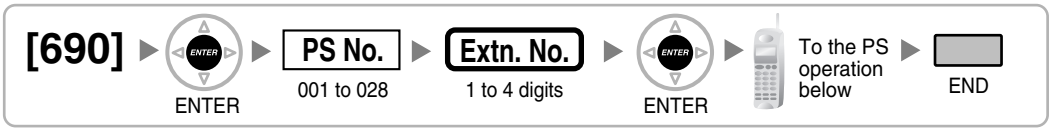


Note

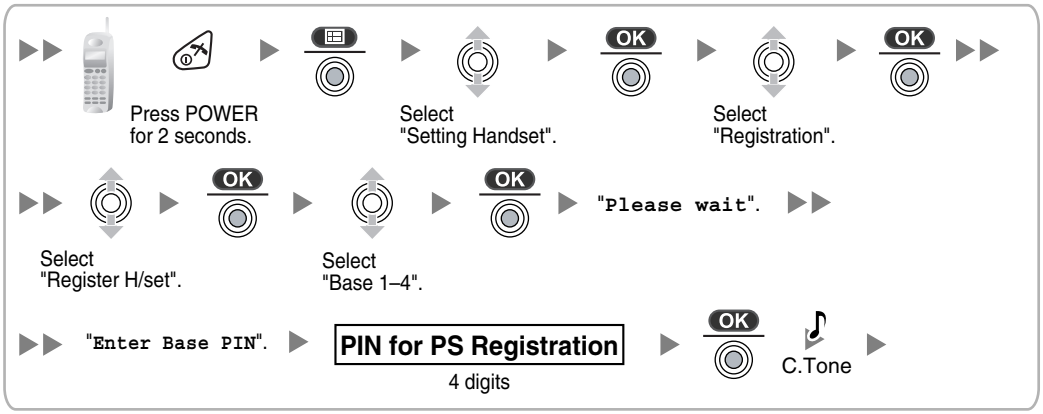
◆ means default value.

PS Registration

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

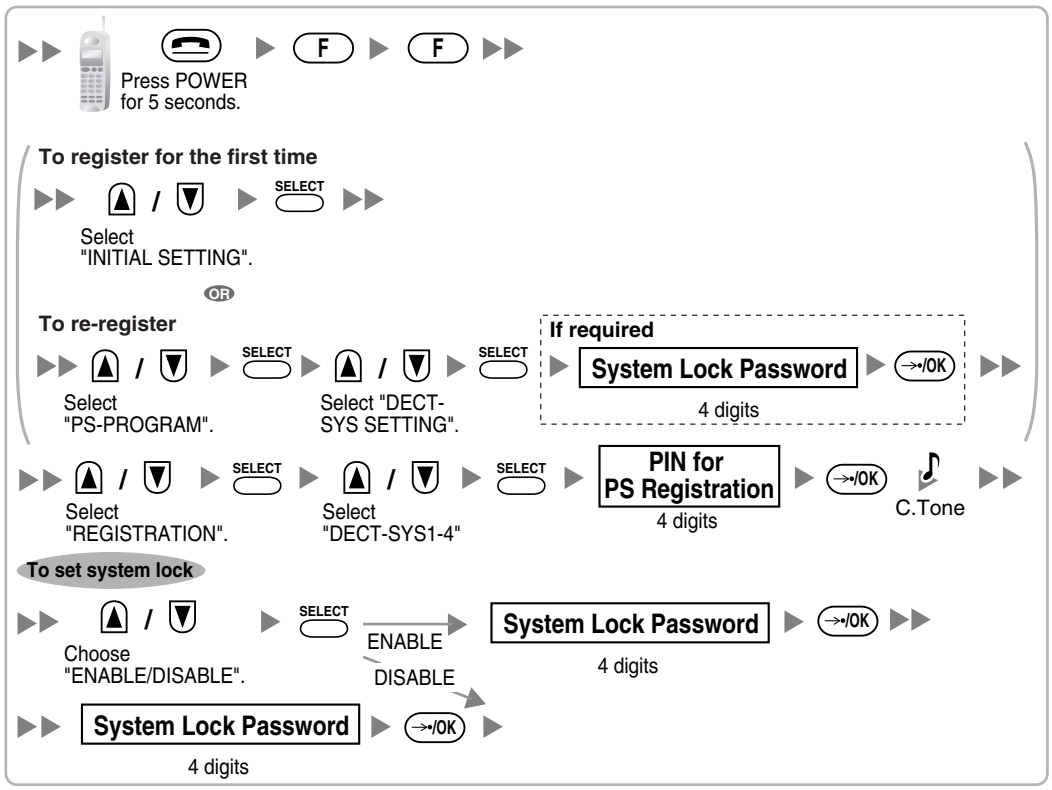


Using the KX-TCA155/KX-TCA255

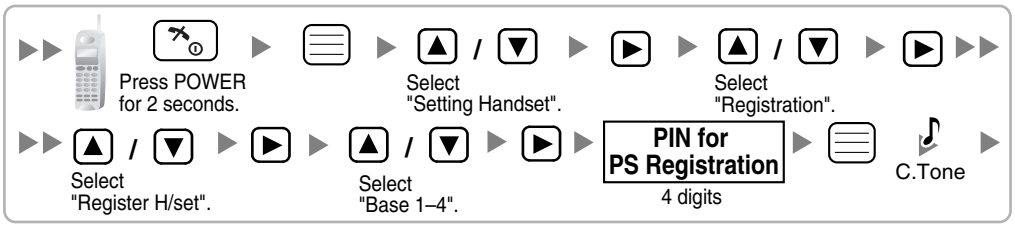


Using the KX-TD7590

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



Using the KX-TD7580



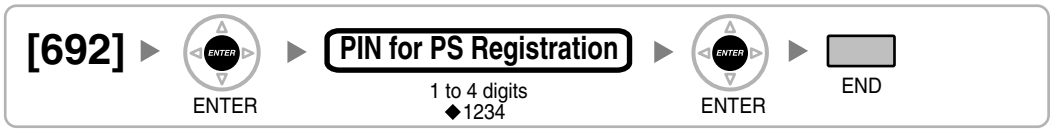
Setting the Personal Identification Number (PIN) for PS Registration

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

Notes

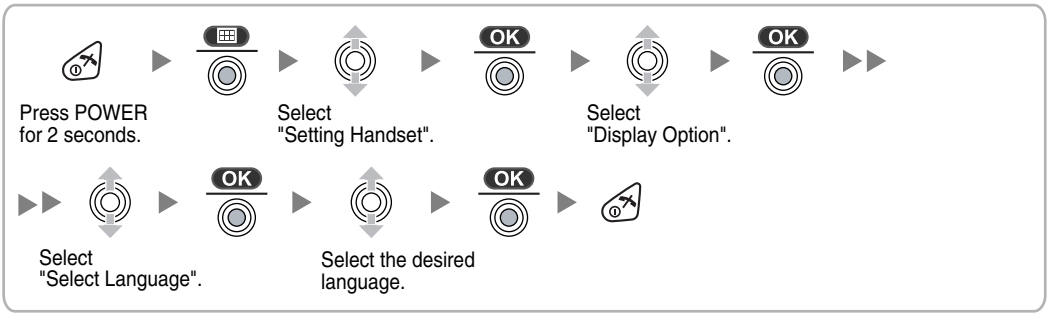
- By default, the PIN for PS registration is "1234" for both the Hybrid IP-PBX and PS. Therefore, the PS can be registered to the Hybrid IP-PBX without setting the PIN.
- The PIN for PS registration will only be used when registering the PS to the Hybrid IP-PBX. Therefore, even when there is more than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

Setting the PIN for Hybrid IP-PBX

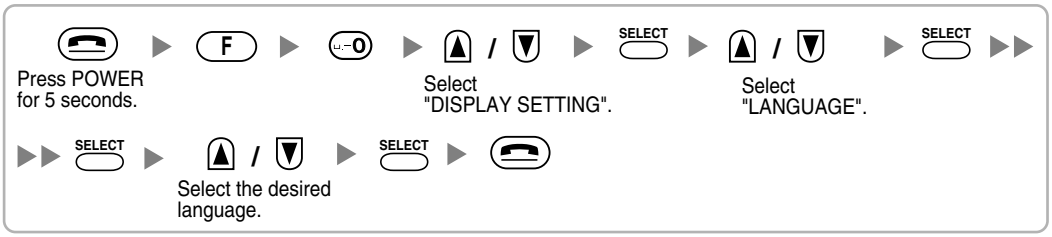


Changing the Display Language of the PS

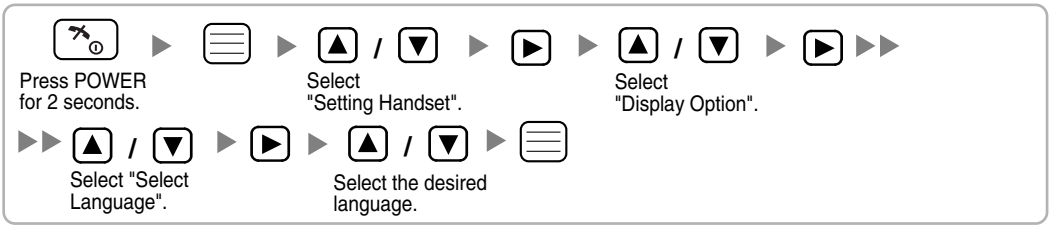
Using the KX-TCA155/KX-TCA255



Using the KX-TD7590



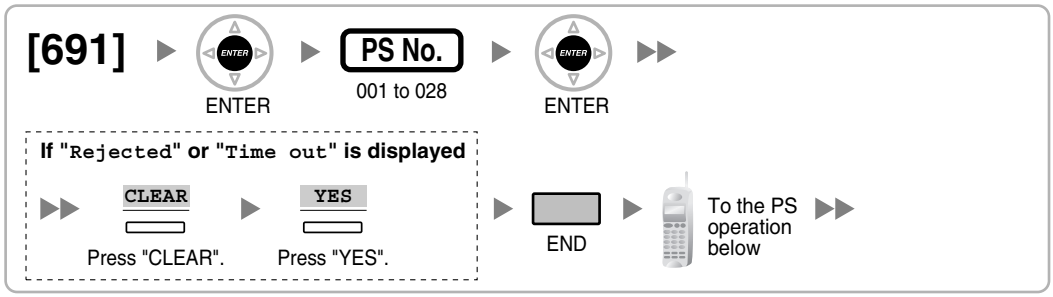
Using the KX-TD7580



PS Termination

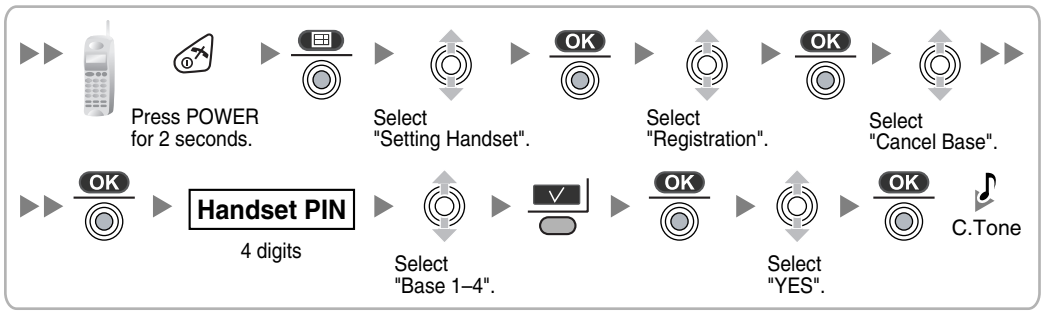
Confirm the following before cancelling the PS registration:

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

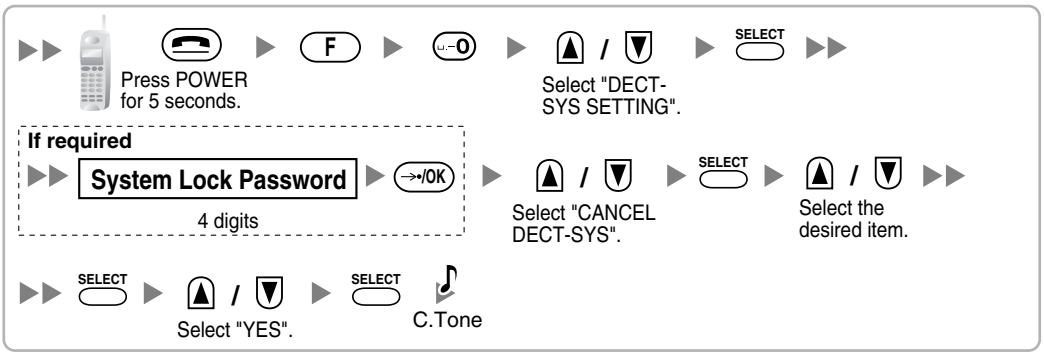


If the registration information is still stored in the PS

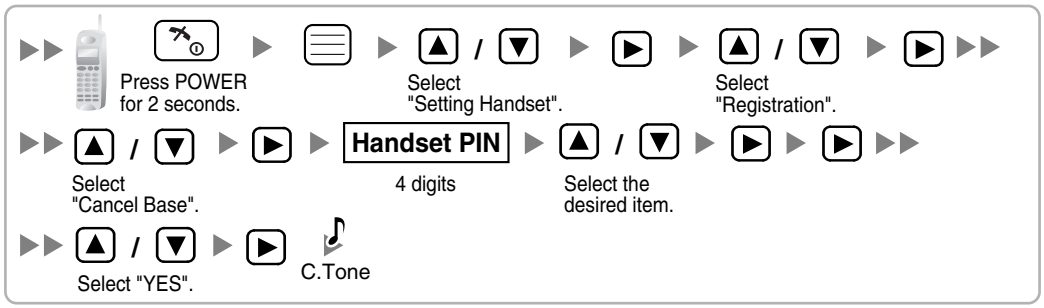
Using the KX-TCA155/KX-TCA255



Using the KX-TD7590



Using the KX-TD7580



Testing the Operation

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

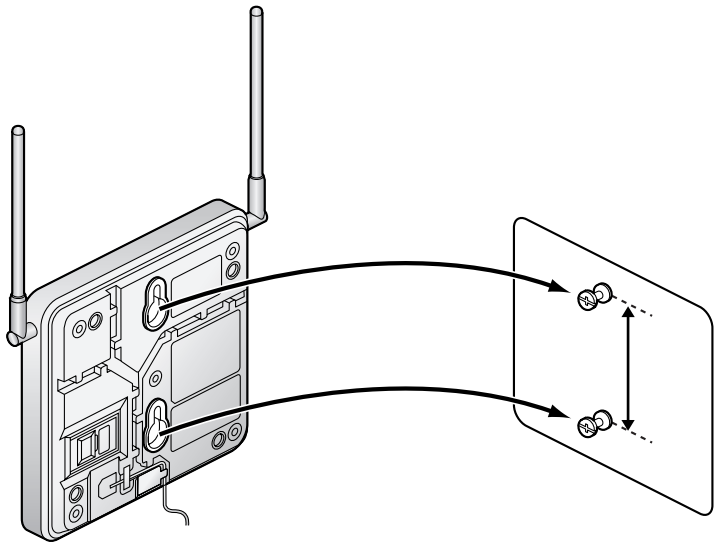
2.7.8 Wall Mounting

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

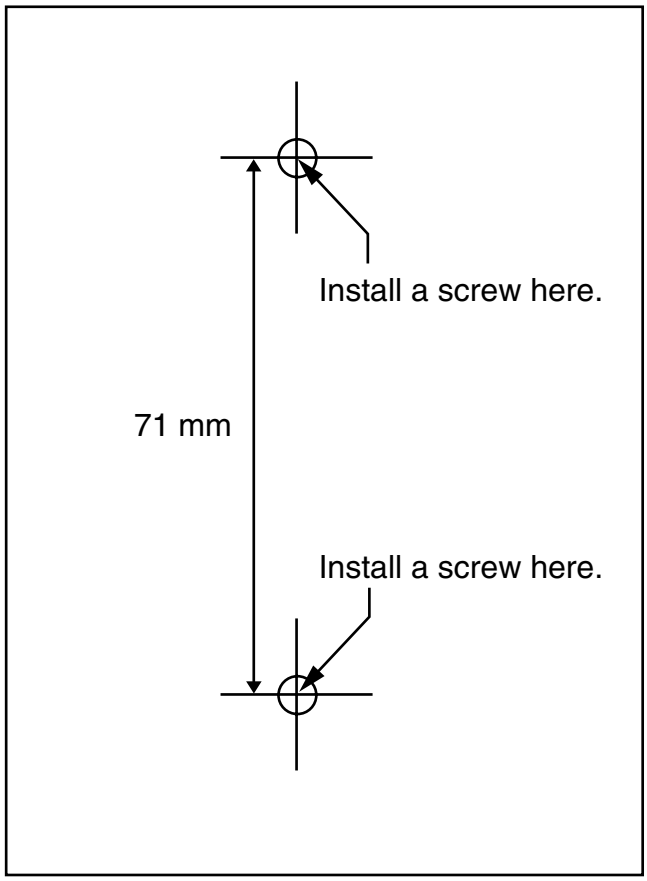
- Make sure that the screw heads are at the same distance from the wall.
- Install the screws perpendicular to the wall.

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 Doorphones, Door Openers, External Sensors, and External Relays

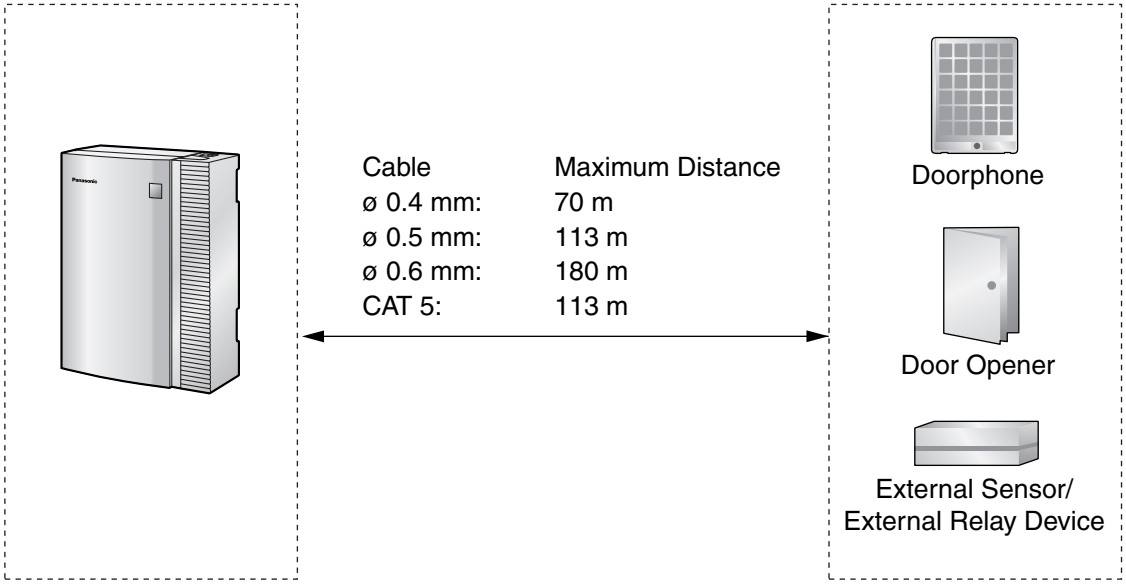
2.8.1 Connection of Doorphones, Door Openers, External Sensors, and External Relays

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

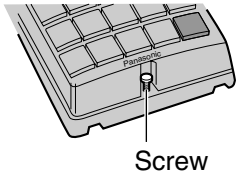
- KX-T30865 is a Panasonic doorphone.
- German type doorphones, door openers, external sensors, and external relays are user-supplied.

Maximum Cabling Distance

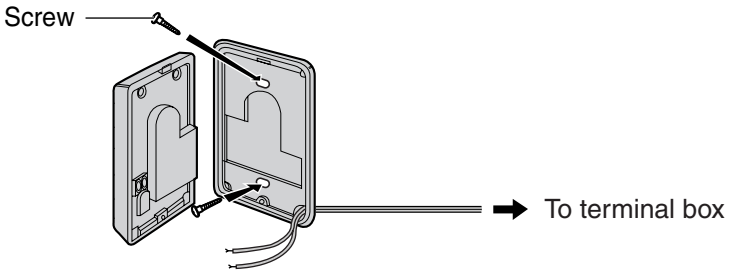


Installing the Doorphone (KX-T30865)

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.



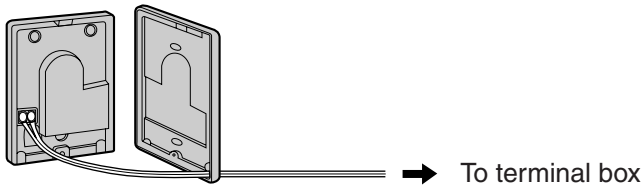
Note

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

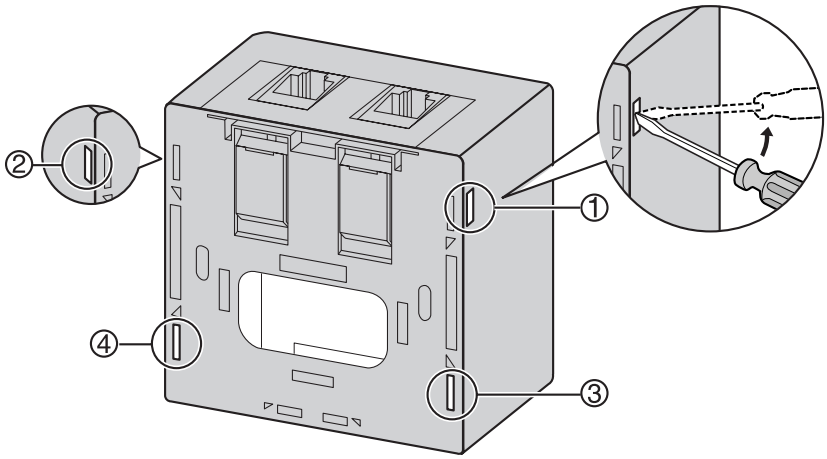
3. Connect the wires to the screws located in the front cover.



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

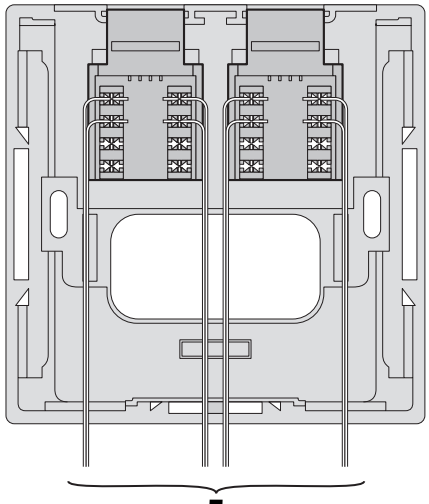
Connection of Doorphones to the DPH4 Card with RJ45 Connectors

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.



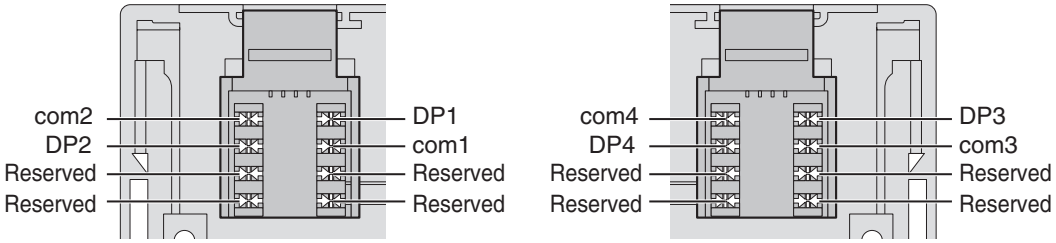
2. Connect the wires of doorphones to the terminal box.
For details about pin assignments for the DPH4 card, refer to "2.5.1 DPH4 Card".

Terminal Box
(included with the card)

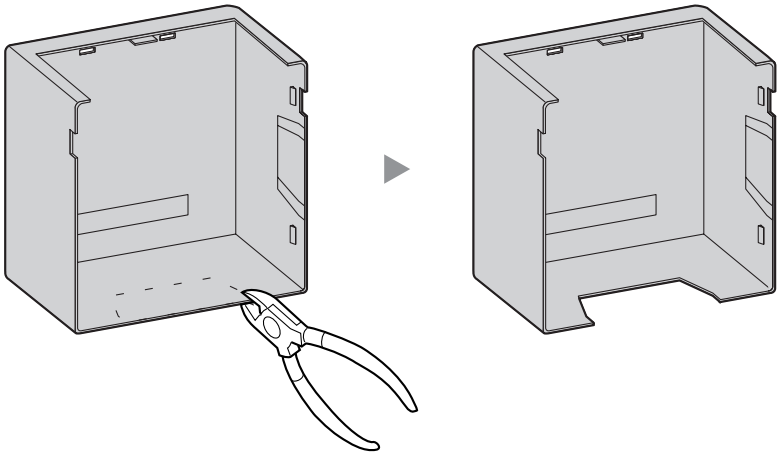


To doorphones

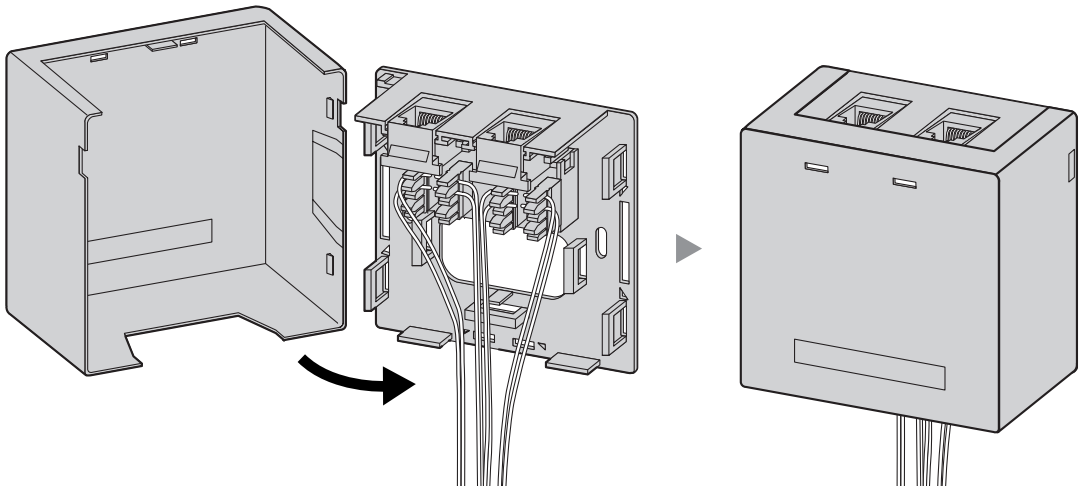
Pin Assignments for Terminal Box



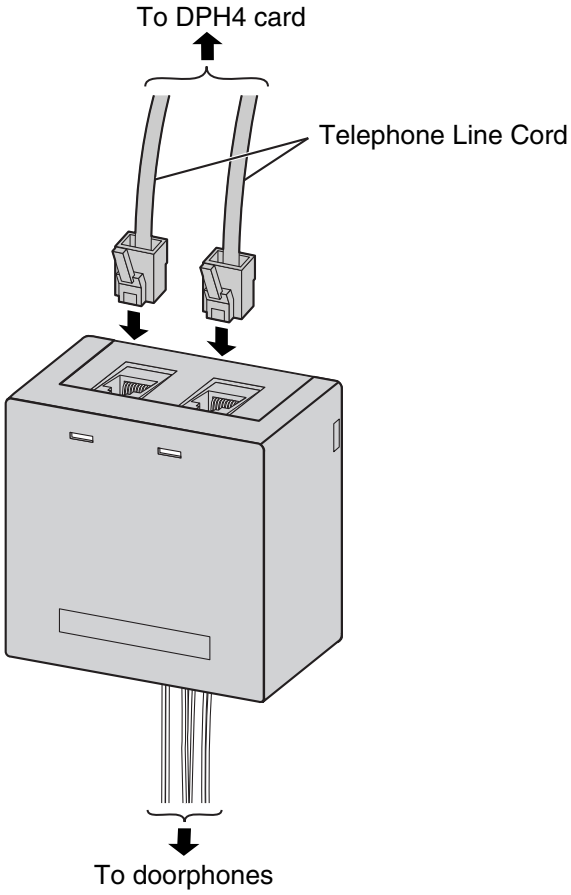
3. Cut and remove the appropriate parts from the cover depending on your preference.



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

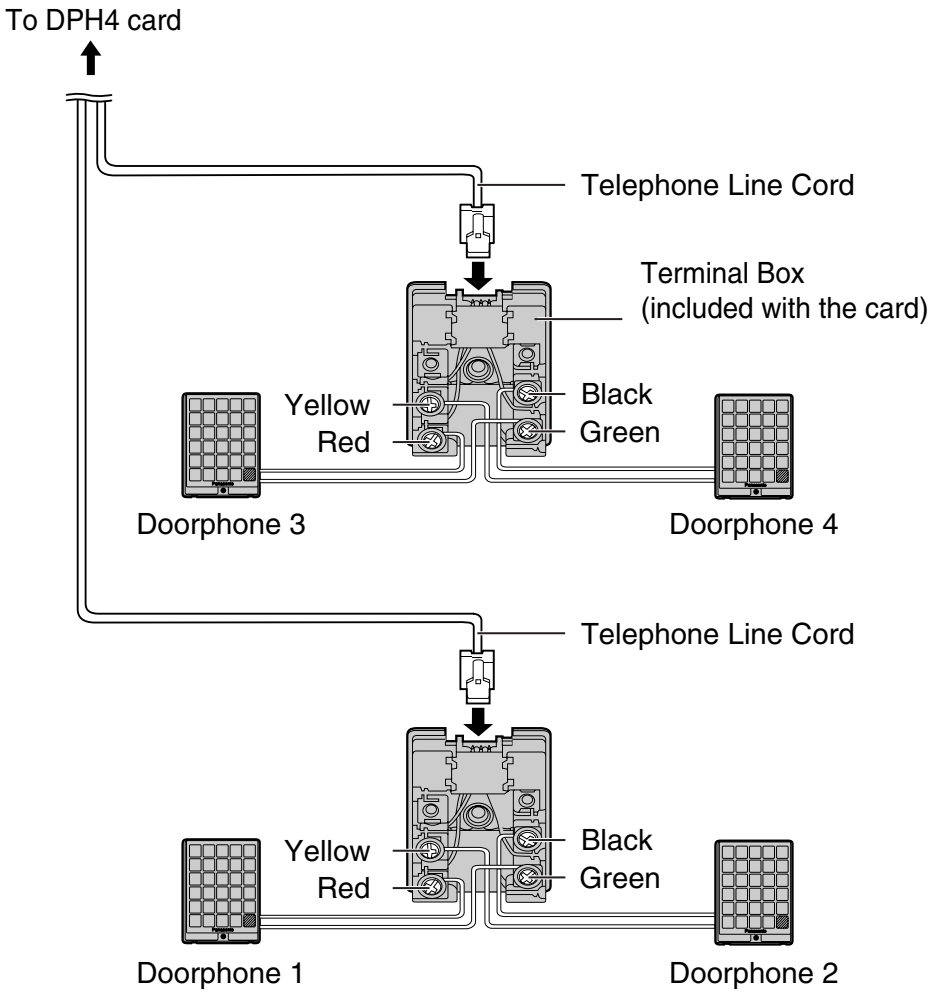


5. Connect the terminal box to the DPH4 card in the Hybrid IP-PBX using the telephone line cords included with the card.



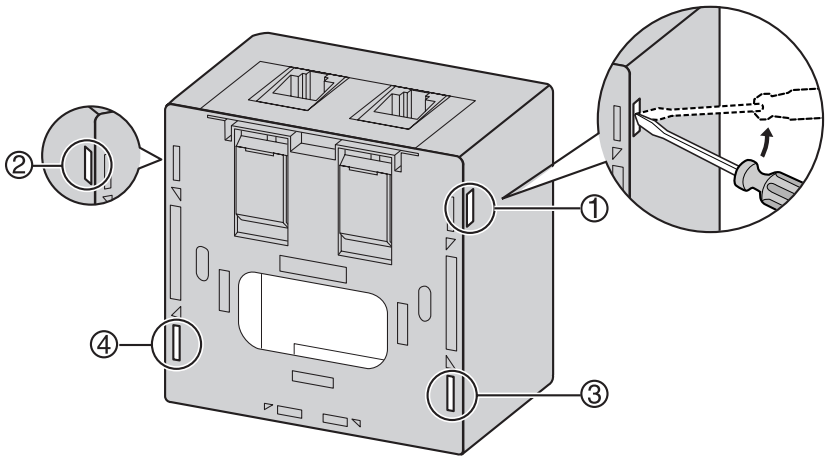
Connection of Doorphones to the DPH4 Card with RJ11 Connectors

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" 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.



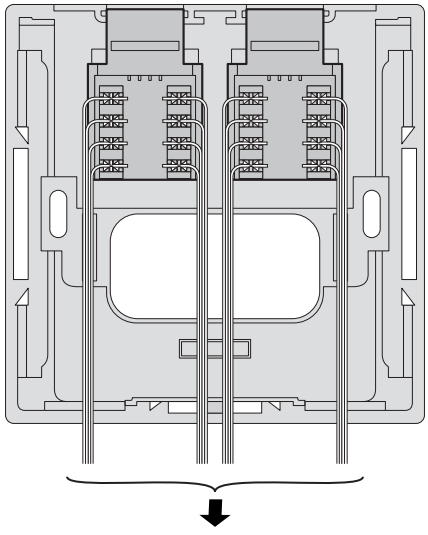
Connection of Door Openers and German Type Doorphones to DPH2 Card

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.



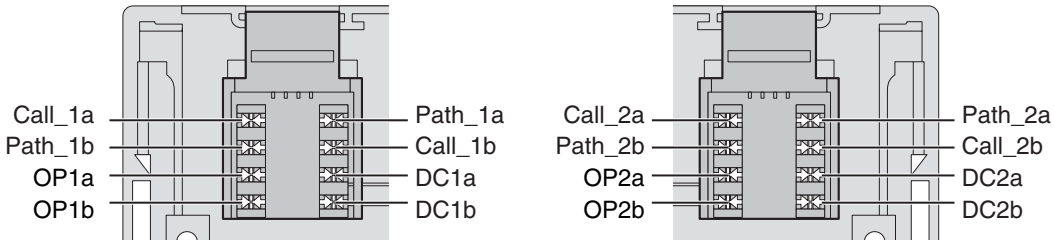
2. Connect the wires of door openers and doorphones to the terminal box.
For details about pin assignments for the DPH2 card, refer to "2.5.2 DPH2 Card".

Terminal Box
(included with the card)

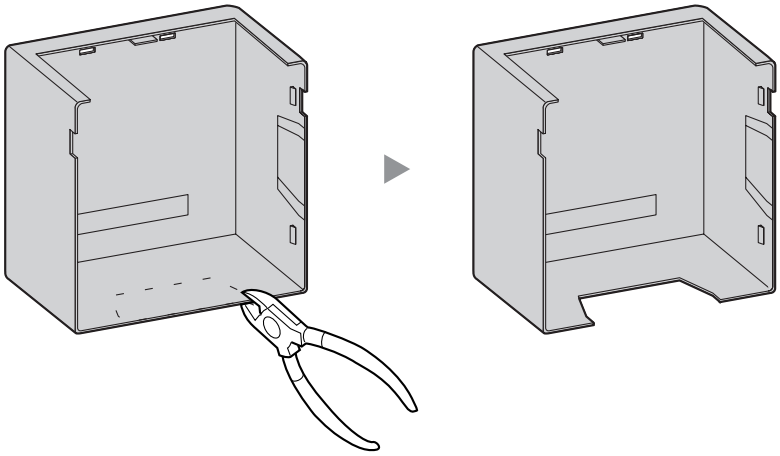


To doorphones/door openers

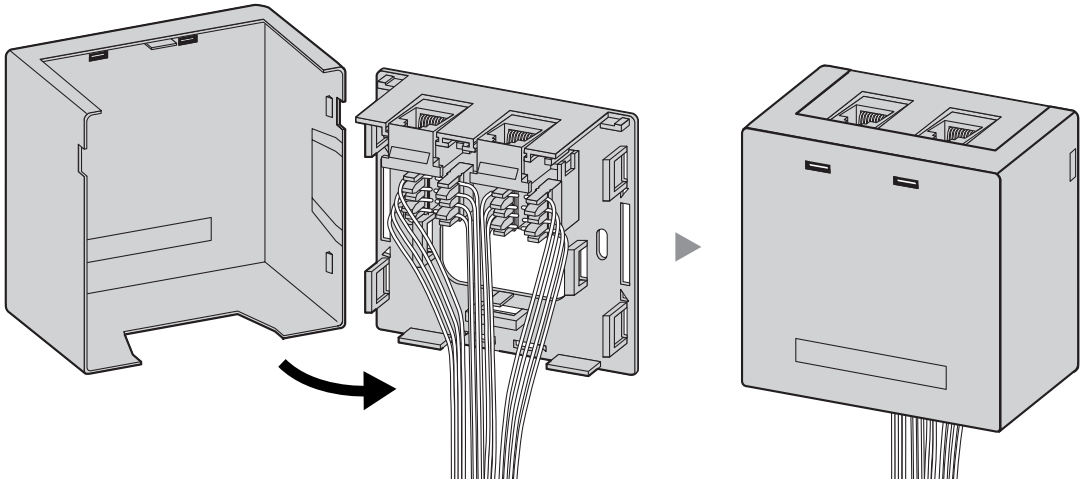
Pin Assignments for Terminal Box



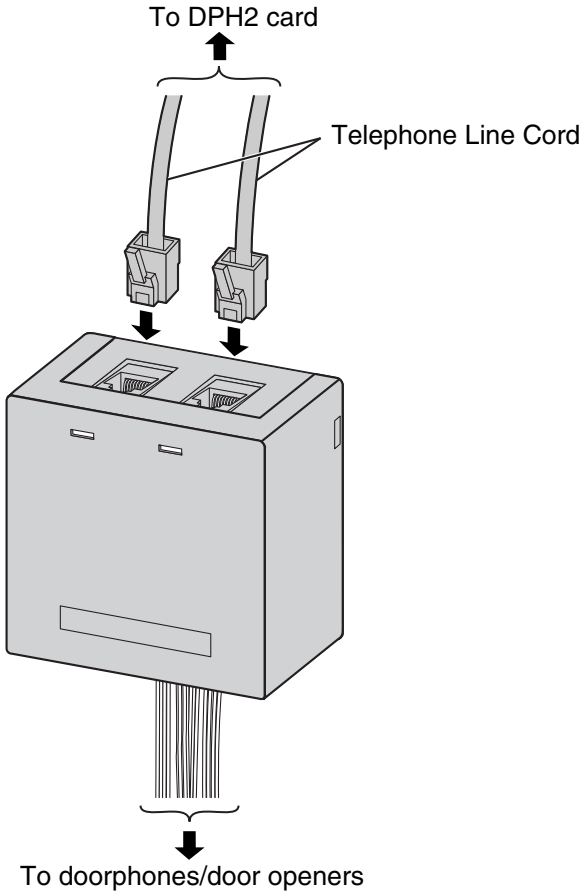
3. Cut and remove the appropriate parts from the cover depending on your preference.



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



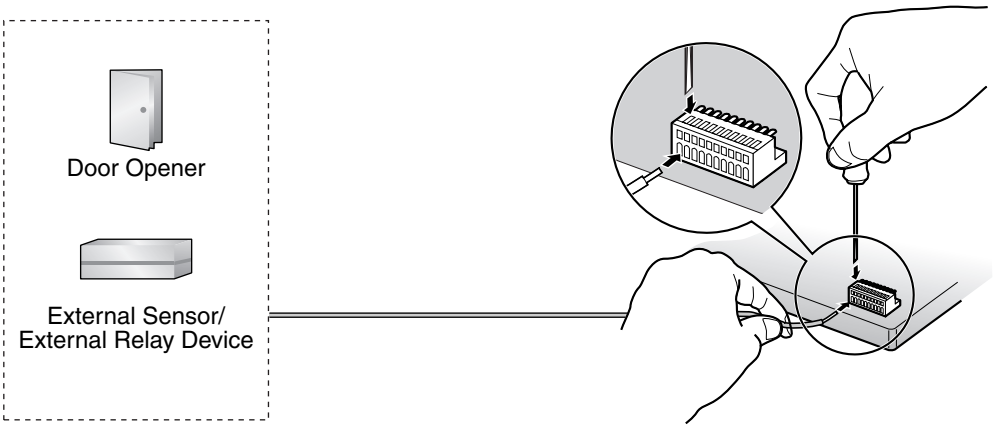
5. Connect the terminal box to the DPH2 card in the Hybrid IP-PBX using the telephone line cords included with the card.



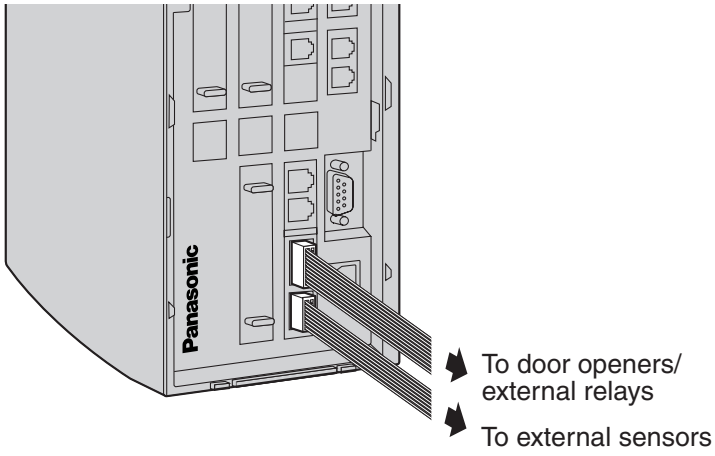
Connection of Door Openers, External Sensors, and External Relays to DPH4 Card

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" for pin assignments.



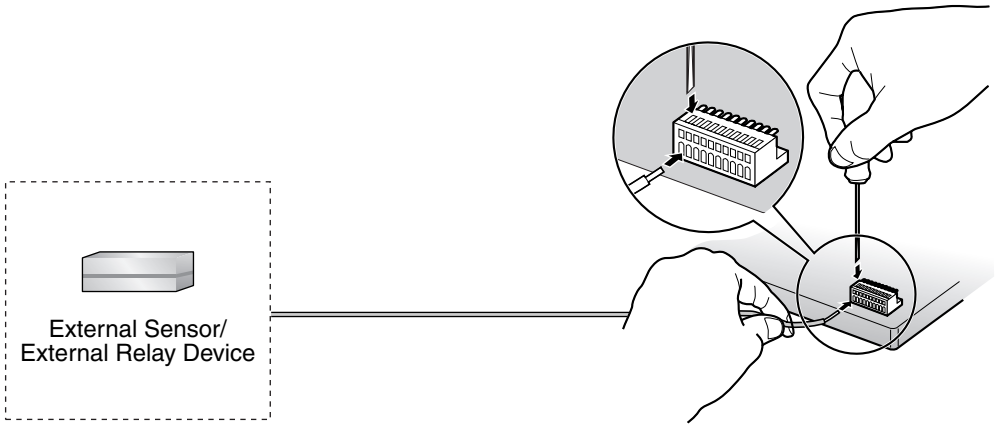
2. Attach the terminal block to the connector of the DPH4 card in the Hybrid IP-PBX.



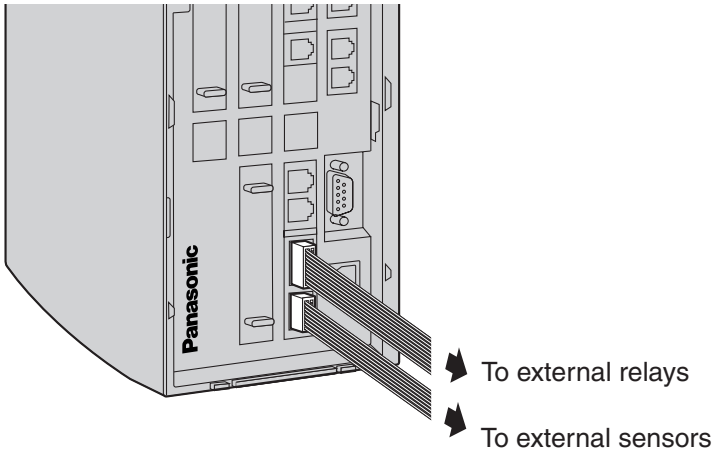
Connection of External Sensors and External Relays to DPH2 Card

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" for pin assignments.

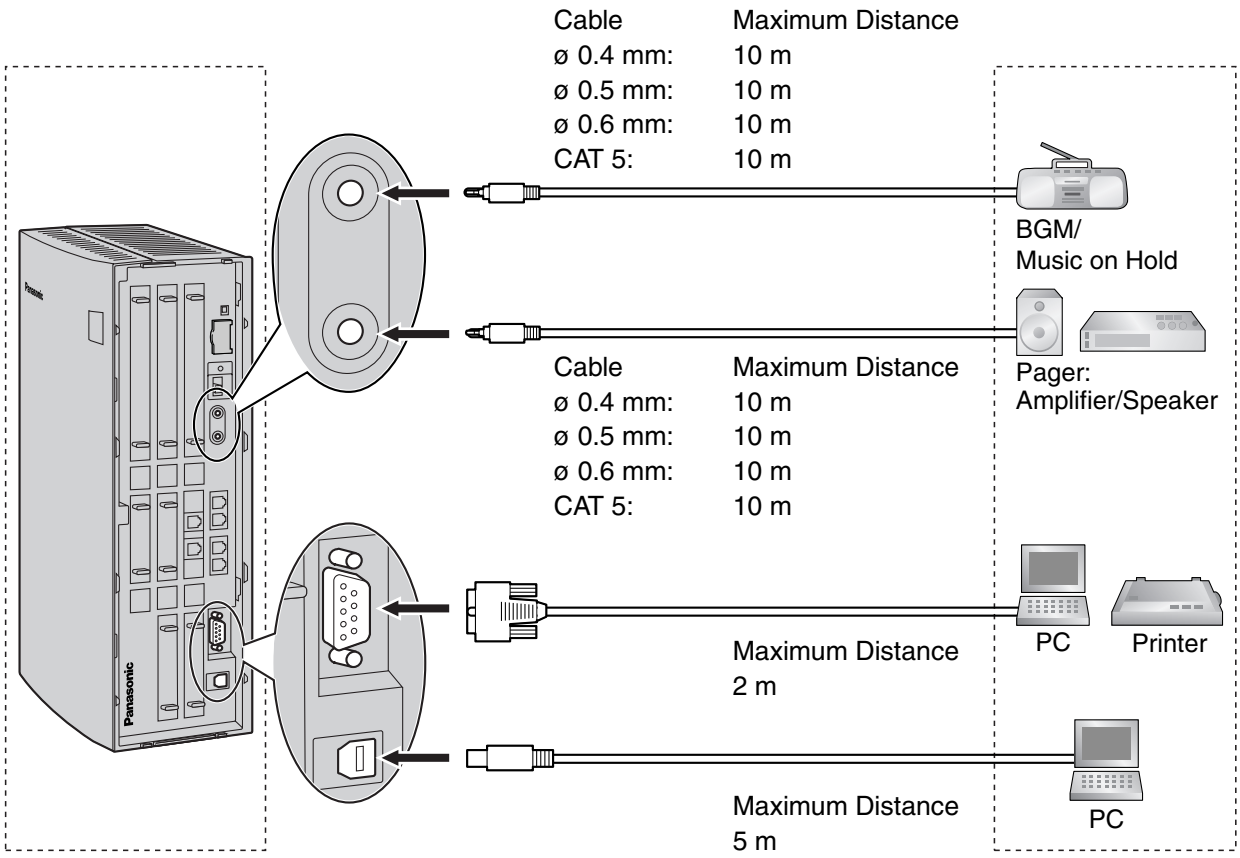


2. Attach the terminal block to the connector of the DPH2 card in the Hybrid IP-PBX.



2.9 Connection of Peripherals

2.9.1 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, music may be intermittent.
- An External Music Jack is an SELV port and should only be connected to an approved SELV device.

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.

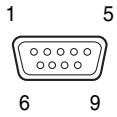
PC/Printer (via RS-232C)

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

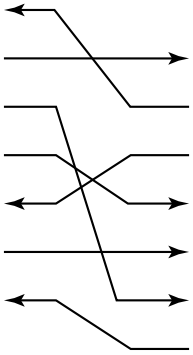
For connecting a printer/PC with a 9-pin RS-232C connector

Hybrid IP-PBX				Printer/PC		
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

Hybrid IP-PBX

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



Printer/PC

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

RS-232C Signals

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

PC/CTI Server (via USB version 1.1)

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

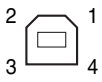
The PC is used for system programming, diagnostics and external system database storage (save/load) functions.

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

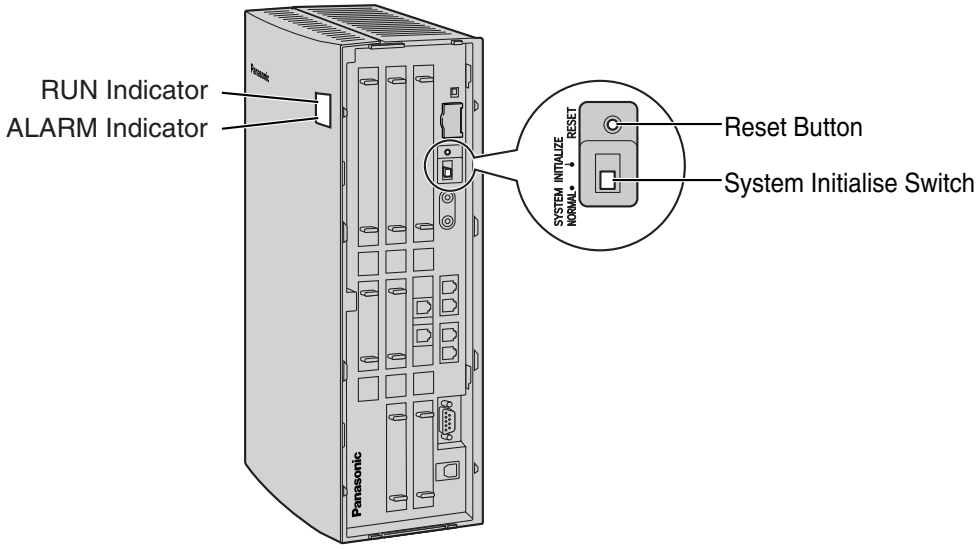
2.10 Starting the Hybrid IP-PBX

2.10.1 Starting the Hybrid IP-PBX

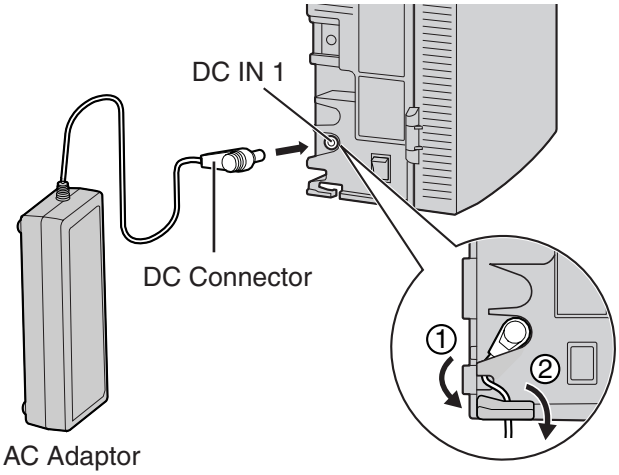
CAUTION

- SD Memory Card must be inserted in the SD Memory Card slot of the main board before start up.
- Before touching the System Initialise Switch, discharge static electricity by touching ground or wearing an earthing strap.
- Once you have started the Hybrid IP-PBX and if you unplug the Hybrid IP-PBX, do not perform the following procedures to start the Hybrid IP-PBX again. Otherwise, your programmed data is cleared. To restart the Hybrid IP-PBX, refer to "4.1.4 Using the Reset Button".
- The Hybrid IP-PBX will continue to be powered even if the power switch is turned "OFF".
- The power supply cord is used as the main disconnect device. Ensure that the AC outlet is located near the equipment and is easily accessible.

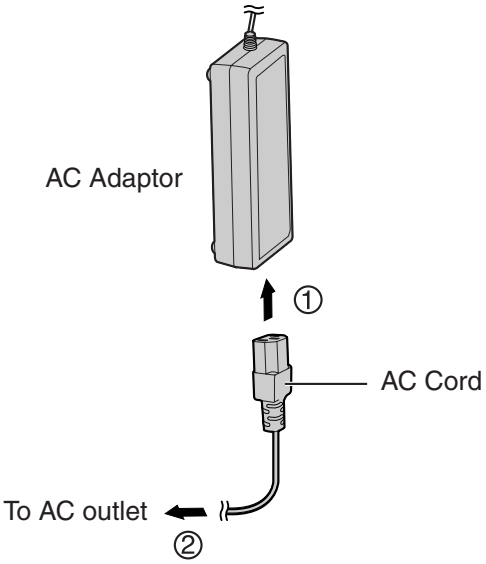
1. Set the System Initialise Switch to the "SYSTEM INITIALIZE" position.



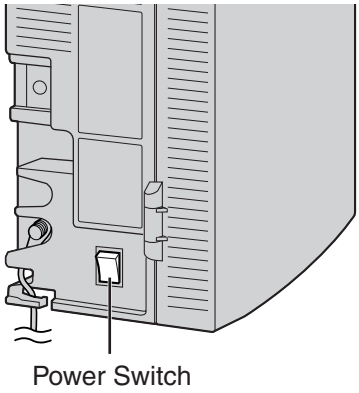
2. Plug the DC connector of the AC adaptor into DC IN 1.



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, return the System Initialise Switch to the "NORMAL" position. Depending on the configuration, initialisation takes about 1 min to 3 min. If successfully executed, the RUN indicator will stop flashing and be kept lit.

All data will be cleared, and the Hybrid IP-PBX as well as all optional service cards (except for the IP-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.

Note

Use the same types of AC adaptor and AC cord that are supplied with the Hybrid IP-PBX only.

LED Indications

Indication	Colour	Description

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

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

Confirming the Trunk Connection

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

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

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

System programming of the Hybrid IP-PBX can be performed using PC software. The software for the KX-TDA15 is shared by both the KX-TDA15 and KX-TDA30, and is referred to as the "KX-TDA30 Maintenance Console". 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.

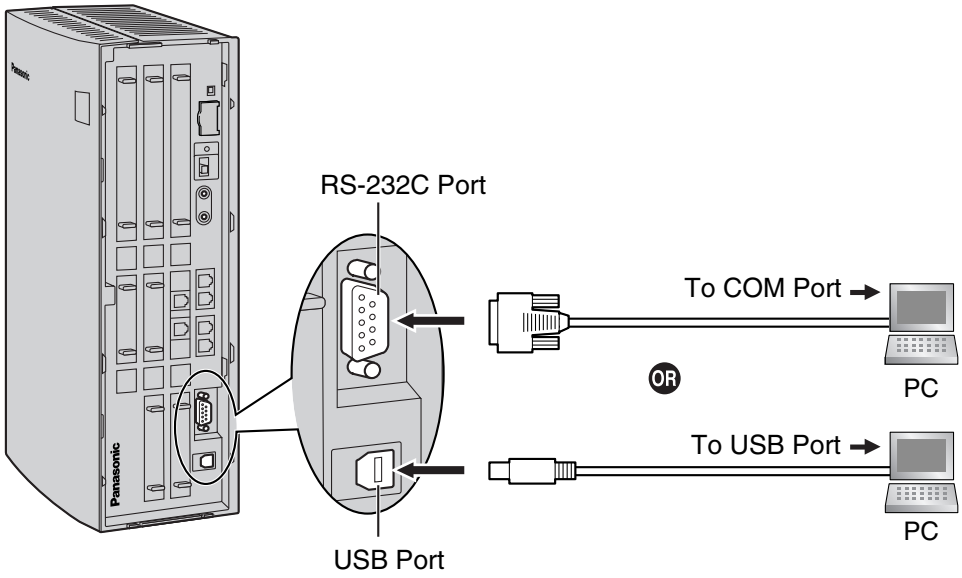
KX-TDA30 Maintenance Console[*1]

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

3.2 Connection

3.2.1 Connection

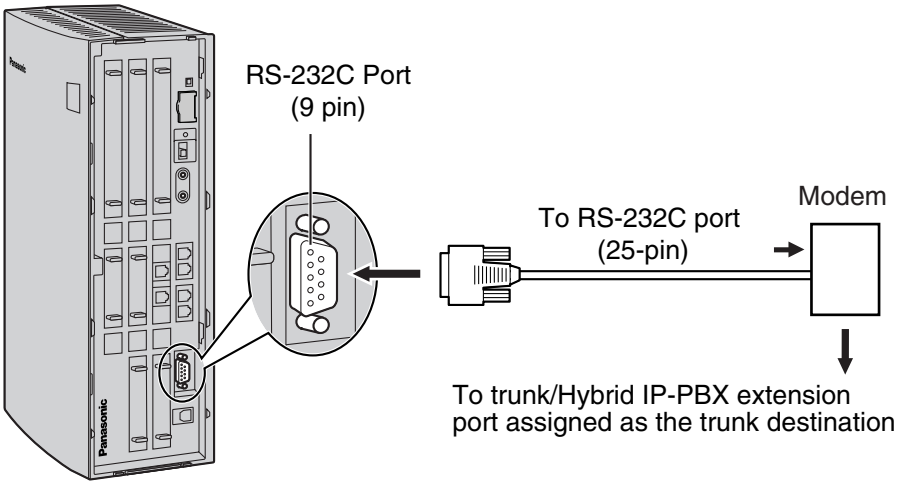
Serial Interface Connection



Note

For pin assignments and maximum cabling distance, refer to "2.9.1 Connection of Peripherals".

External Modem Connection



Hybrid IP-PBX

Signal Name	Pin No.
RD (RXD)	2
SD (TXD)	3
ER (DTR)	4
DR (DSR)	6

External Modem

Pin No.	Signal Name
2	SD (TXD)
3	RD (RXD)
6	DR (DSR)
20	ER (DTR)

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

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

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

Notes

- Use an RS-232C straight cable for connection between the Hybrid IP-PBX and external modem.
- An AT command (for initialisation, enabling automatic answer, etc.) can only be programmed by KX-TDA30 Maintenance Console. "AT&F0Q0E0V1S0=1X0&D0" is stored as the default value.
- For more information about the AT command, refer to the external modem's instructions.

3.3 Installation of the KX-TDA30 Maintenance Console

3.3.1 Installing and Starting the KX-TDA30 Maintenance Console

System Requirements

Operating System

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

Hardware

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

Password Security

Warning to the Administrator or Installer regarding the system password

1. Please provide all system passwords to the customer.
2. To avoid unauthorised access and possible abuse of the PBX, keep the passwords secret, and inform the customer of the importance of the passwords, and the possible dangers if they become known to others.
3. The PBX has default passwords preset. For security, change these passwords the first time that you programme the PBX.
4. Change the passwords periodically.
5. It is strongly recommended that passwords of 10 numbers or characters be used for maximum protection against unauthorised access. For a list of numbers and characters that can be used in system passwords, refer to "3.1.3 Entering Characters" in the Feature Guide.
6. If a system password is forgotten, it can be found by loading a backup of the system data into a PC, and checking the password using the KX-TDA30 Maintenance Console software. If you do not have a backup of the system data, you must reset the PBX to its factory defaults and reprogramme it. Therefore, we strongly recommend maintaining a backup of the system data. For more information on how to back up the system data, refer to the on-line help of the Maintenance Console.
   However, as system passwords can be extracted from backup copies of the system data file, do not allow unauthorised access to these files.

Installing the KX-TDA30 Maintenance Console

Notes

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

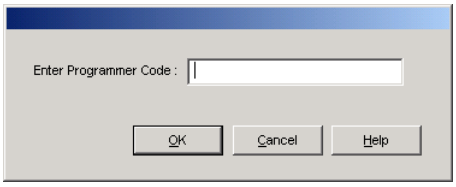
1. Save the setup file of the KX-TDA30 Maintenance Console on your PC.
2. Double-click the icon to execute the setup file.
3. Follow the instructions of the wizard.

Starting the KX-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 setup the following basic items:

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

1. Connect the PC to the Hybrid IP-PBX with a USB cable.
2. Start the **KX-TDA30 Maintenance Console** from the Start menu.

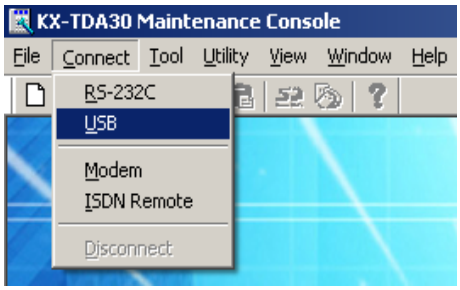


3. Type the Installer Level Programmer Code (default: **1234**), then click [OK].

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

   Note

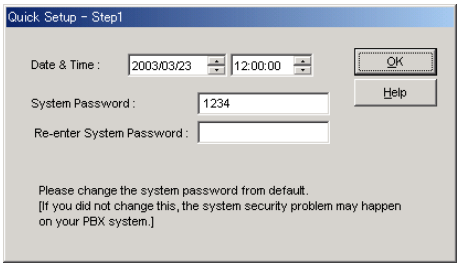
   There are 2 other Programmer Codes with limited authorisation: Administrator Level (default: **1111**), and User Level (default: none).



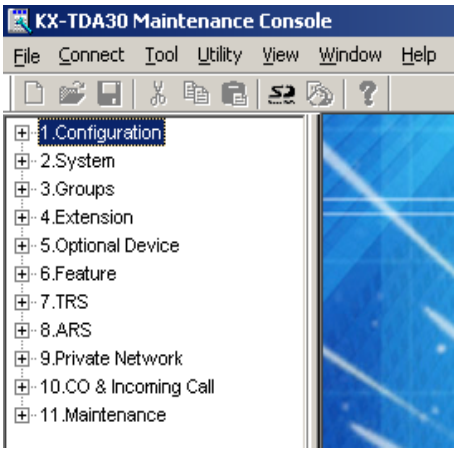
4. Click "**Connect**" → "**USB**" from the menu bar.

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

6. **When country/area data do not match:**
   - **a.** Click [OK] to replace the country/area data of the Hybrid IP-PBX. Replacement may take several minutes to complete.
   - **b.** Follow the procedure described in "2.10.1 Starting the Hybrid IP-PBX" and restart the Hybrid IP-PBX.
   - **c.** Repeat steps **4** to **5** to reconnect the KX-TDA30 Maintenance Console to the Hybrid IP-PBX.



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



The programme menu appears.

Notice

1. During a long programming session, it is highly recommended that you periodically save the system data to the SD Memory Card. You can think of system data as stored in RAM, whereas SD Memory Card as stored on a hard disk. If the PBX undergoes a sudden power failure or system reset for some reason, all the system data in RAM will be lost.
   To save the system data to the SD Memory Card, (1) click the "**SD Memory Backup**" icon before resetting the PBX or turning off the power, or (2) exit the KX-TDA30 Maintenance Console so that the PBX starts automatically saving the system data.
2. When the PBX is initialised, not all data is taken from the SD Memory Card. The data for present status of extension FWD/DND buttons is taken from battery backup memory in the PBX.
3. The PC will not perform any shutdown operation, or enter the power-saving system standby mode while the KX-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

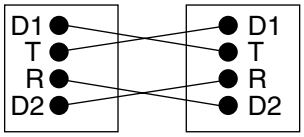
PROBLEM	PROBABLE CAUSE	SOLUTION
Extension does not operate.	Bad extension card.	• Exchange the card for a known working one.
	Bad connection between the Hybrid IP-PBX and telephone.	• Take the telephone and plug it into the same extension port using a short telephone cord. If the telephone works, then the connection between the Hybrid IP-PBX and the telephone must be repaired.
	A telephone with an A-A1 relay is connected.	• Use a 2-wire cord. • Set the A-A1 relay switch of the telephone to the "OUT" or "OFF" position.
	Bad telephone.	• Take the telephone and plug it into another extension port that is working. If the telephone does not work, replace the telephone.
The Hybrid IP-PBX does not operate properly.		• Press the Reset Button (refer to "4.1.4 Using the Reset Button"). • Turn off the power switch, and then turn it back on. • Turn off the power switch, and then unplug the Hybrid IP-PBX. After 5 minutes, plug the Hybrid IP-PBX back in and turn the power switch back on.
Noise on external paging.	Induced noise on the wire between the Hybrid IP-PBX and the amplifier.	• Use a shielded cable as the connection wire between the Hybrid IP-PBX and amplifier. A short shielded cable is recommended.
Distorted external music.	Excessive input level from external music source.	• Decrease the output level of the external music source by using the volume control on the music source.
Alternate Calling—Ring/Voice and Live Call Screening (LCS) do not function as set when using a Wireless Phone (KX-T7880/ KX-T7885/KX-TD7894/KX-TD7895).	Voice-calling mode and Hands-free mode with LCS are not available with Wireless Phones.	• Switch the calling mode to ring-calling. • Set the LCS mode to "Private".
The ALARM indicator on the front of the cabinet turns on red.	A major system error occurs in the Hybrid IP-PBX.	• See the error log using the KX-TDA30 Maintenance Console (refer to "4.1.5 Troubleshooting by Error Log").

4.1.2 Connection

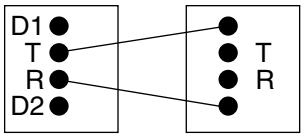
Can you dial an extension?

No

Connection between the Hybrid IP-PBX and a PT:

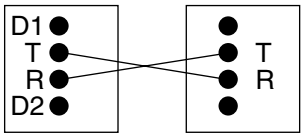
CAUSE	SOLUTION
The T/R is connected to the D1/D2.  	Use the correct cord (the inner 2 wires are for T/R and the outer 2 wires are for D1/D2).

Connection between the Hybrid IP-PBX and an SLT:

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

Yes

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

CAUSE	SOLUTION
The "T" is connected to the "R".  	Reverse the connections of the T/R.

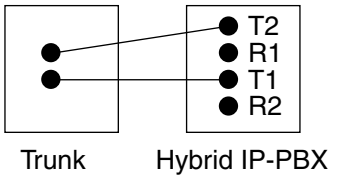
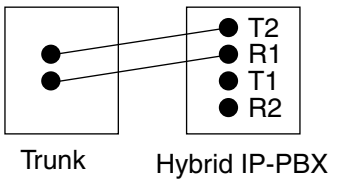
(Continued on the next page.)

(Continued from the previous page.)

Can you dial out on a trunk?

No

Connection between the trunk and the Hybrid IP-PBX:

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

4.1.3 Operation

PROBLEM	PROBABLE CAUSE	SOLUTION
• When using the speakerphone on an APT, nothing is audible. • When using the speakerphone/monitor mode with a DPT, nothing is audible.	• The HANDSET/HEADSET selector is set to the "HEADSET" position. • The "HEADSET" mode is selected by Personal Programming, "Handset/ Headset Selection".	• When the headset is not used, set the HANDSET/HEADSET selector to the "HANDSET" position. • When the headset is not used, select the "HANDSET" mode by Personal Programming.
• The PT does not ring.	• The ringer volume is off.	• Turn on the ringer volume.
• Originating an outside call, call transfer, or conference cannot be performed.	• The corresponding CO button does not exist on the PT.	• Programme the CO button. Refer to "1.18.2 Flexible Buttons" in the Feature Guide.
• Cannot register the PS.	• Wrong Personal Identification Number (PIN) is registered to the PS. • CS is not connected properly.	• Register the PIN set to the Hybrid IP-PBX into the PS. • Make sure that the cable is connected properly with correct pin assignments. Also, make sure that the cable does not make short circuits. • Switch all DIP switches off.
• PS becomes out of range. • Cannot make calls using the PS.	• CS is not working. • Location of CS is not good. • Access system of the PS is not properly set.	• 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"). • Change the access system setting of the PS to the appropriate system or automatic.
• Noise is frequent while using the PS. • Conversations disconnect while using the PS.	• Call handover is not working. • PS is out of CS coverage area.	• Locate the CS properly (refer to "2.7.5 Site Survey Using the KX-TCA255/KX-TD7590").
• PS stays out of service when the CS status is changed from Out of Service to In Service.	• It may take about 10 s for CS to start up after the status has been changed to In Service.	• Wait until the CS starts up.

4.1.4 Using the Reset Button

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

CAUTION

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

Notes

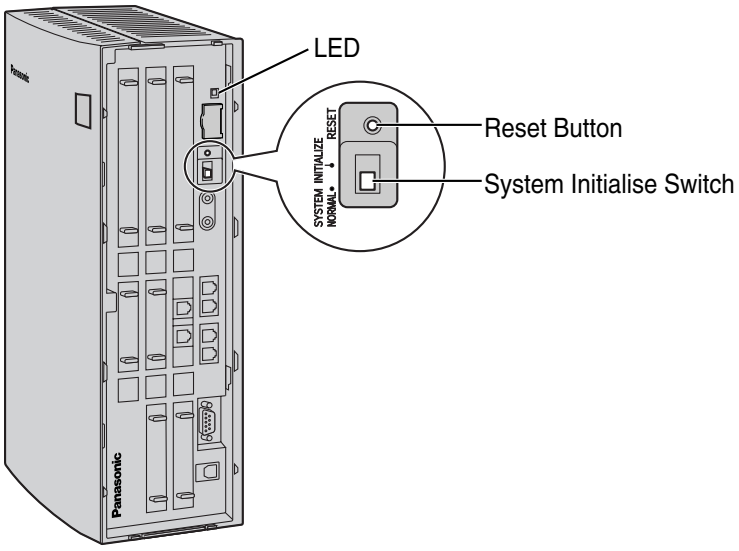
- When the System Initialise Switch is set to "NORMAL", pressing the Reset Button causes the following:
  - Camp-on is cleared.
  - Calls on hold are terminated.
  - Calls on exclusive hold are terminated.
  - Calls in progress are terminated.
  - Call park is cleared.

  Other data stored in memory, except the above, are not cleared.
- 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:

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



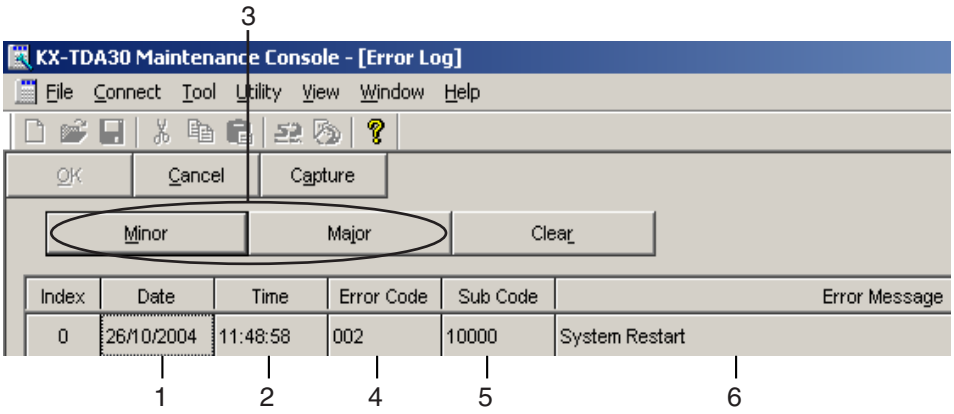
4.1.5 Troubleshooting by Error Log

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

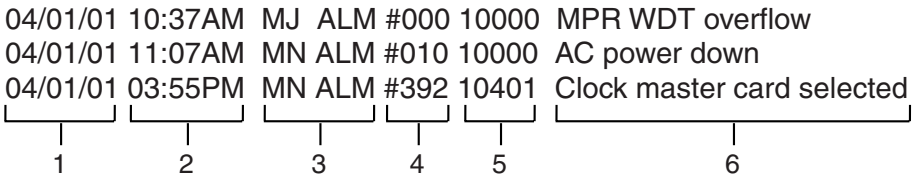
Error Log Display Format

Below is the display format of the error log. To see the error log using the KX-TDA30 Maintenance Console, refer to the on-line help of the KX-TDA30 Maintenance Console.

Example: KX-TDA30 Maintenance Console



Example: Station Message Detail Recording (SMDR)



Description

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

	Item	Description
5	Sub Code	Five-digit sub code (1XXYY) 1: Cabinet number XX: Slot number 00 to 11 (00: MPR; 01: Super hybrid ports; 02 to 11: Slots for optional service cards) YY: Physical port number (01 to 16) For optional service cards that are installed in Slots 08 to 11, sub slot number + port number will be displayed. Sub slot 1: 11 to 14 **Note** When there is no parameter for slot and physical port number, XX and YY will be displayed as "00". Example: Sub code for MPR = 10000
6	Error Message	Error description

List of Errors and Solutions

The tables below list the errors and their solutions.

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

When the error conditions indicated by the error codes "021", "091", "092", and "510" are recovered, the ALARM indicator will turn off automatically, indicating successful troubleshooting. When other errors are logged, the ALARM indicator will turn off only when the log for major or minor errors is cleared from the KX-TDA30 Maintenance Console.

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

- **When the errors "021", "091", "092", and "510" are logged:** when the error conditions are recovered
- **When other errors are logged:** when the log for major or minor errors is cleared from the KX-TDA30 Maintenance Console

Optional Service Card Initial Self Diagnosis

Error Code	Error Message	PROBABLE CAUSE	SOLUTION
212	Echo canceller access error	• Optional service card malfunction: ECHO	• See if the corresponding optional service card is installed properly • Pull out and re-insert the corresponding optional service card • Press the Reset Button • Replace the corresponding optional service card
215	Framer IC access error	• Optional service card malfunction: BRI	
216	MSG/SVM card DSP error	• Optional service card malfunction: MSG, SVM	
217	MSG/SVM card data error	• Optional service card malfunction: MSG, SVM • Erroneous recording of messages	• See if the corresponding optional service card is installed properly • Pull out and re-insert the corresponding optional service card • Press the Reset Button • Re-record the messages • Replace the corresponding optional service card

System Start-up and On-line Operation

Error Code	Error Message	PROBABLE CAUSE	SOLUTION
000*	MPR WDT overflow	• Main Board (MPR) malfunction • Erroneous processing of Main Board (MPR) software • Software error due to external factors	• Press the Reset Button • Reprogramme the Hybrid IP-PBX • Replace the Hybrid IP-PBX
001	SDRAM bit error		

Error Code	Error Message	PROBABLE CAUSE	SOLUTION
002	System Restart	• Reset Button is pressed • Power failure • Main Board malfunction • Erroneous processing of Main Board software • Software error due to external factors	• Ignore if not frequent • Press the Reset Button • Reprogramme the Hybrid IP-PBX • Replace the Hybrid IP-PBX
010	AC power down	• AC power down • Bad connection or breaking of AC cord	• Check the power supply system • See if the AC cord is connected properly • Check the AC cord • Replace the AC cord (be sure to turn off the Hybrid IP-PBX when replacing)
011	DC power down	• AC power down • Power supply circuit (Main Board) malfunction • Detection of over current (short circuit on optional service cards)	• Check the power supply system • See if the AC cord is connected properly • Check the AC cord • Replace the AC cord (be sure to turn off the Hybrid IP-PBX when replacing) • Replace the Hybrid IP-PBX • Remove the optional service cards and restart the Hybrid IP-PBX
017	BRI port overload	• Defective cable • Defective ISDN terminal equipment • Optional service card malfunction: BRI	• Check the cable • Replace the defective terminal equipment • Check the number of connected terminal equipment • Replace the corresponding optional service card
020*	SD file access error	• SD Memory Card malfunction • Bad connection of SD Memory Card • Main Board malfunction	• Press the Reset Button • Reprogramme the Hybrid IP-PBX • Replace the SD Memory Card • Replace the Hybrid IP-PBX
021*	SD Memory Card disconnected	• SD Memory Card not installed • Bad connection of SD Memory Card • SD Memory Card malfunction • Main Board malfunction	

Error Code	Error Message	PROBABLE CAUSE	SOLUTION
022	Not enough free space on SD card	• Not enough memory space available to save the system data, or to upload system files from the KX-TDA30 Maintenance Console	• Delete the files whose file names start with "$" from SD Memory Card **Note** Do not delete the "PSMPR" file; it is the programme file of the Main Board (MPR).
023	System data file version error	• Old system files on SD Memory Card • Defective system files on SD Memory Card	• Restore the backup files • Re-install the software
024	System initialization file version error		
025	Card initialization file version error		
026	LCD file version error		
027	System data file checksum error		
028	System initialization file checksum error		
029	Card initialization file checksum error		
030	LCD file checksum error		

Error Code	Error Message	PROBABLE CAUSE	SOLUTION
031*	System data file not found	• SD Memory Card not installed • Bad connection of SD Memory Card • SD Memory Card malfunction • Main Board malfunction	• Press the Reset Button • Reprogramme the Hybrid IP-PBX • Replace the SD Memory Card • Replace the Hybrid IP-PBX
032*	System initialization file not found		
033*	Card initialization file not found		
034*	LCD file not found		
035	System data file access error		
036*	System initialization file access error		
037*	Card initialization file access error		
038*	LCD file access error		
039*	SD file access error		
090	Over Card Limitation	• Too many optional service cards installed	• Reduce the number of optional service cards
091*	PT connection over	• Too many PTs connected	• Reduce the number of PTs
092*	CS connection over	• Too many CSs connected	• Reduce the number of CSs
234	DPLL clock failure	• Optional service card malfunction: DLC, BRI, IP-GW • Main Board (MPR) malfunction	• See if the corresponding optional service card is installed properly • Pull out and re-insert the corresponding optional service card • Press the Reset Button • Replace the corresponding optional service card • Replace the Hybrid IP-PBX
251	MSG/SVM DSP failure	• Optional service card malfunction: MSG, SVM	• See if the corresponding optional service card is installed properly • Replace the corresponding optional service card
305*	Data Link failure	• Data link between the CS and Hybrid IP-PBX failed • Data link between the network and BRI/IP-GW card failed	• Check the connection between the CS and Hybrid IP-PBX • Check the connection between the network and BRI/IP-GW card

Error Code	Error Message	PROBABLE CAUSE	SOLUTION
307	LAN No Carrier	• IP-GW card not connected to the LAN	• Check the connection between the LAN and IP-GW card
308	IP-GW LAN Loop back Error	• Detection of IP-GW LAN Loop back Test error	• Replace the corresponding optional service card • Collect the log data of IP-GW (refer to the documentation for the IP-GW card)
309	IP-GW Core Data Link Error	• Detection of IP-GW Core data Link error	• Press the Reset Button • Collect the log data of IP-GW (refer to the documentation for the IP-GW card)
310*	Port Link Failure	• Voice Processing System malfunction • Ports defective on optional service card: DLC	• Check the Voice Processing System • See if the corresponding optional service card is installed properly • Replace the corresponding optional service card
320	IP-GW H.323 Dummy Call Test Error	• Detection of IP-GW H.323 Dummy Call Test error	• Replace the corresponding optional service card • Collect the log data of IP-GW (refer to the documentation for the IP-GW card)
321	IP-GW Gatekeeper Error	• Detection of Gatekeeper access error	• Check the IP address setting of Gatekeeper • Check whether the Gatekeeper is connected to the network and work properly • Check the route to the Gatekeeper
322	IP-GW Gatekeeper Registration Error	• Gatekeeper Registration is failed	• Check the Gatekeeper setting
323	IP-GW SDRAM Failure	• Detection of IP-GW SDRAM error	• Replace the corresponding optional service card
324	IP-GW DPRAM Failure	• Detection of IP-GW DPRAM error	• Replace the corresponding optional service card
325	IP-GW LAN Chip Failure	• Detection of IP-GW LAN Chip failure	• Replace the corresponding optional service card • Collect the log data of IP-GW (refer to the documentation for the IP-GW card)
326	IP-GW Stop	• IP-GW is stopped from a remote maintenance PC	• This information is logged when IP-GW is stopped from a remote maintenance PC
370	IP-GW Rebooted by Maintenance Console	• IP-GW is rebooted from a remote maintenance PC	• This information is logged when IP-GW is rebooted from a remote maintenance PC
371	IP-GW Rebooted	• Optional service card malfunction: IP-GW	• Check whether the software version of the IP-GW card is correct

Error Code	Error Message	PROBABLE CAUSE	SOLUTION
372	NDSS message over IPGW notification - caused by IPGW Tx resource limitation	• Optional service card malfunction: IP-GW	• Ignore if not frequent • Change the IP-GW card status to Out of Service, and then back to In Service
373	NDSS message over IPGW notification - caused by IPGW Rx resource limitation		
374	NDSS message over IPGW notification - caused by shortage of IPGW resource		
375	NDSS message over IPGW notification - caused by Network side	• Network malfunction	• Ignore if not frequent • Consult your network administrator
391	Data Link established	• Connection with PC Phone/ PC Console or Voice Processing System (DPT Integration) established or restored	• This information is logged when connection with PC Phone/PC Console or Voice Processing System (DPT Integration) is established, and does not indicate an error condition that needs to be solved. However, if this is logged frequently (with "305 Data Link failure"), check the connection as it may not be done properly.
392	Clock master card selected	• Clock master card has been changed to the one indicated by the sub code	• Check if the proper card is selected as the new clock master card
393	LAN Carrier detected	• IP-GW card connected to the LAN	• This information is logged when synchronisation of LAN is established
394	IP-GW Core Data Link established	• IP-GW Core Data Link established	• This information is logged when IP-GW Core Data Link is recovered
395	IP-GW Gatekeeper Error Cleared	• Connection to the Gatekeeper is recovered	• This information is logged when connection to the Gatekeeper is recovered
396	IP-GW Run	• IP-GW is started from a remote maintenance PC	• This information is logged when IP-GW is started from a remote maintenance PC

Error Code	Error Message	PROBABLE CAUSE	SOLUTION
510*	SMDR disconnect	• RS-232C cable not connected • Breaking of RS-232C cable • Printer (terminal equipment) malfunction	• Check the RS-232C cable • Check the terminal equipment

Section 5
Appendix

5.1 Revision History

5.1.1 MPR Version 2.2

New Options

- System Components Table
  - KX-TDA3192 2-Channel Simplified Voice Message Card (SVM2)
  - 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
- 2.8.1 Connection of Doorphones, Door Openers, External Sensors, and External Relays

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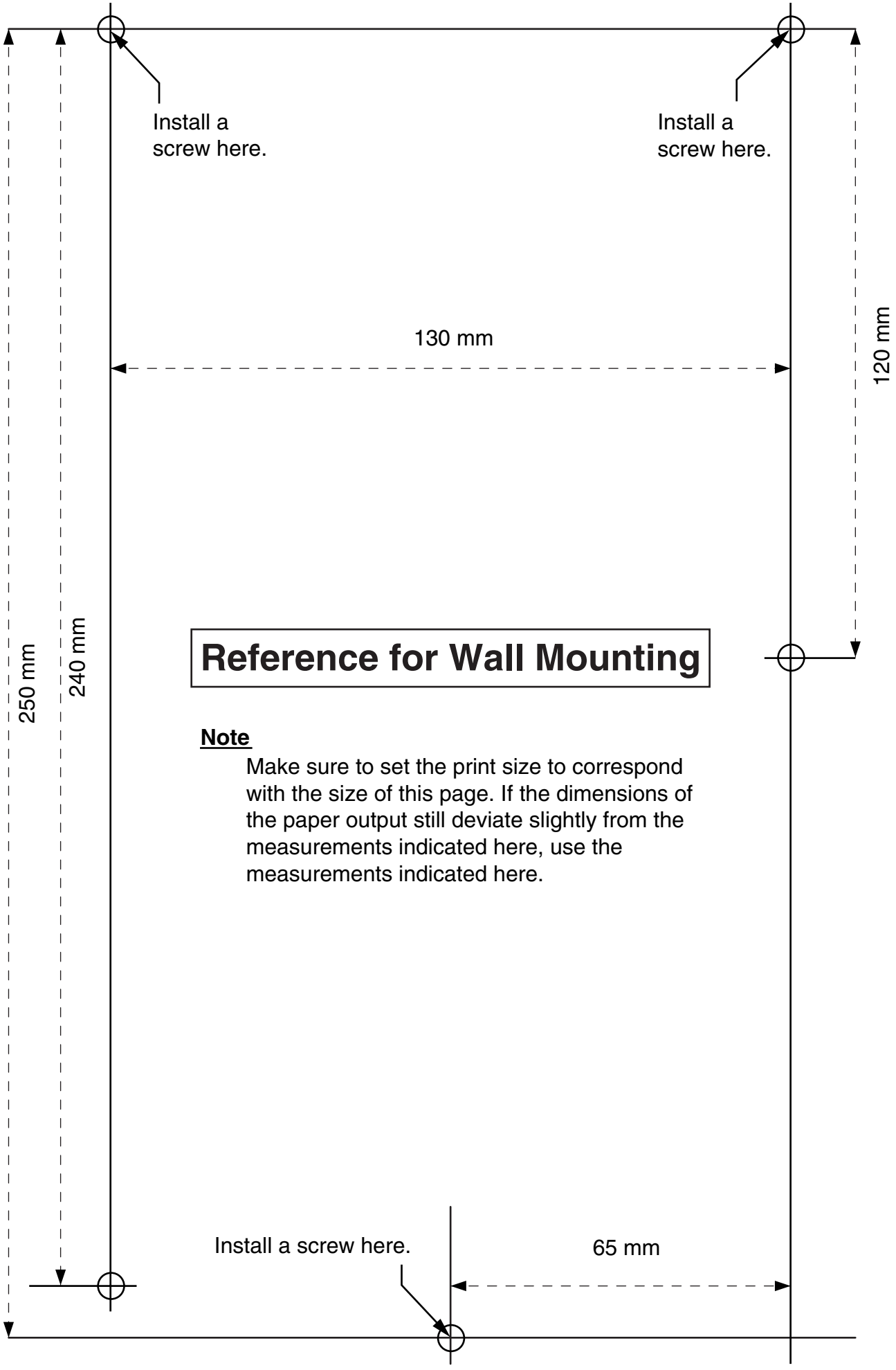

Reference for Wall Mounting

Note

Make sure to set the print size to correspond with the size of this page. If the dimensions of the paper output still deviate slightly from the measurements indicated here, use the measurements indicated here.

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