Panasonic

Installation Guide

DECT 4-Channel IP Cell Station Unit

Model No. KX-NS0154

Thank you for purchasing this Panasonic product.
Please read this manual carefully before using this product and save this manual for future use.

Notes

- In this manual, the suffix of each model number (e.g., KX-NS0154**CE**) is omitted unless necessary.
- The illustrations may differ from the appearance of the actual product.
- The contents and design of the software are subject to change without notice.
- Operation of the KX-NS0154 depends on the model and version of the PBX and the version of the KX-NS0154.
  You can confirm compatibility and download related documentation on the Panasonic Web site at:
  https://panasonic.net/cns/pcc/support/pbx/
- This product contains Synthia software developed by Balance, Inc.

Document Version: 2015-02

Table of Contents

1 Important Information

Notice

SAFETY REQUIREMENTS

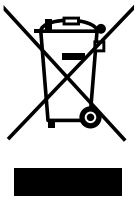
- Before connecting the product, confirm that the product, supports the intended operating environment.
- If the product does not operate properly, disconnect the AC adaptor cord and Ethernet cable, then connect again.
- The product may not operate in the event of a power failure.
- Do not move the product while it is in use.
- Satisfactory operation, interoperability, and compatibility cannot be guaranteed with all equipment connected to the product, nor with all services provided by telecommunications providers over networks connected to the product.

SECURITY REQUIREMENTS

- Privacy of communications may not be ensured when using the wireless systems.
- Keep a copy of all important data (such as your network information) before sending the machine for repair.
- The product can store your private/confidential information. To protect your privacy/confidentiality, we recommend that you initialize the product to erase all user data and restore the factory default settings before you dispose, transfer or return the product.

For Users in the European Union

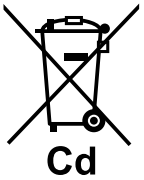
Information for Users on Collection and Disposal of Old Equipment and used Batteries



These symbols on the products, packaging, and/or accompanying documents mean that used electrical and electronic products and batteries should not be mixed with general household waste.
For proper treatment, recovery and recycling of old products and used batteries, please take them to applicable collection points, in accordance with your national legislation and the Directives 2002/96/EC and 2006/66/EC.
By disposing of these products and batteries correctly, you will help to save valuable resources and prevent any potential negative effects on human health and the environment which could otherwise arise from inappropriate waste handling.
For more information about collection and recycling of old products and batteries, please contact your local municipality, your waste disposal service or the point of sale where you purchased the items.
Penalties may be applicable for incorrect disposal of this waste, in accordance with national legislation.

For business users in the European Union
If you wish to discard electrical and electronic equipment, please contact your dealer or supplier for further information.

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



Note for the battery symbol (bottom two symbol examples):
This symbol might be used in combination with a chemical symbol. In this case it complies with the requirement set by the Directive for the chemical involved.

Hereby, Panasonic Corporation declares that the radio equipment described in this manual is in compliance with Directive 2014/53/EU.
The full text of the EU declaration of conformity is available at the following internet address:

http://www.ptc.panasonic.eu/doc

Contact to Authorized Representative:
Panasonic Testing Center
Panasonic Marketing Europe GmbH
Winsbergring 15, 22525 Hamburg, Germany

For Users in the United States

FCC and Other Information

Privacy of communications may not be ensured when using this unit.

FCC RF Exposure Warning

- This product complies with FCC radiation exposure limits set forth for an uncontrolled environment.
- To comply with FCC RF exposure requirements, the base unit must be installed and operated 20 cm (8 inches) or more between the product and all person's body.
- This product may not be collocated or operated in conjunction with any other antenna or transmitter.

FCC ID can be found on the back of this unit.

Note

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the distance between the equipment and receiver.
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

CAUTION

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this product.

For Users in Canada

Industry Canada Notices and Other Information

This product meets the applicable Industry Canada technical specifications.

Note

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.
Privacy of communications may not be ensured when using this unit.
This Class B digital apparatus complies with Canadian ICES-003.

CAUTION

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this product.

RF Exposure Warning

- This product complies with IC radiation exposure limits set forth for an uncontrolled environment.
- To comply with IC RF exposure requirements, the base unit must be installed and operated 20 cm (8 inches) or more between the product and all person's body.
- This product may not be collocated or operated in conjunction with any other antenna or transmitter.

For Users in New Zealand

- This equipment is not capable, under all operating conditions, of correct operation at the higher speeds for which it is designed. Telecom will accept no responsibility should difficulties arise in such circumstances.

PTC General Warning

- The grant of a Telepermit for any item of terminal equipment indicates only that Telecom has accepted that the item complies with minimum conditions for connection to its network. It indicates no endorsement of the product by Telecom, nor does it provide any sort of warranty. Above all, it provides no assurance that any item will work correctly in all respects with another item of Telepermitted equipment of a different make or model, nor does it imply that any product is compatible with all of Telecom's network services.

For Users in Ukraine

Інформаційний центр Panasonic

Міжнародні дзвінки та дзвінки з Києва: +38-0-(44) 490-38-98
Безкоштовні дзвінки зі стаціонарних телефонів в межах України: 0-800-309-8-800

For Users in Argentina

CONDICIONES DE OPERACION

La operación de los sistemas dentro de las bandas especificadas esta condicionado a que los mismos no produzcan interferencia perjudicial sobre otros sistemas radioelectricos autorizados.
Además no habrá lugar a reclamo ante interferencias causadas sobre los sistemas en cuestión por estaciones autorizadas.

PRIVACIDAD DE LAS COMUNICACIONES

Los sistemas abarcados por la presente norma no están garantizados contra la escucha ilegal.
El proveedor del equipamiento terminal deberá proporcionar la información referente a los sistemas de seguridad de la comunicación que el equipo posee.

2 Overview

2.1 Introduction

Feature Highlights

- Easy installation with over the LAN synchronization feature.
- PS Firmware download over the air from PBX through this CS.*1
- Durable voice quality under multi-path environment.*1
- Up to 4 simultaneous calls, or up to 8 simultaneous calls with activation key.

*1 KX-TCA185/KX-TCA285/KX-TCA385 only

Outline

This document describes the installation, deployment, configuration of a DECT system that works with the Panasonic IP-PBX. In this system, DECT Portable Stations are used together with IP Cell Stations.

Related Documentation

Important Information
Describes the safety precautions to prevent personal injury and/or damage to property.

Please refer to the following web site for more information:
https://panasonic.net/cns/pcc/support/pbx/

Terminology

CS
Cell Station

IP-CS
IP Cell Station (e.g., KX-NS0154, KX-NCP0158)

Old IP-CS
IP-CS older than this product (e.g., KX-NCP0158)

Traditional CS
CSs other than IP-CSs (e.g., KX-TDA0155, KX-TDA0156, KX-TDA0158)

PS
CS compatible Portable Station/Handset
For details, refer to "Compatible PSs".

DECT
Digital Enhanced Cordless Telecommunication

LAN Synchronization
It is necessary to establish synchronization for stable operation and handover between CSs.
As a method of synchronization, LAN synchronization is used.

LAN Sync Group
LAN Synchronization Group
CSs can be used in the same area by assigning them to a LAN Sync Group.
Handover is supported between CSs within the same LAN Sync Group.

Air Synchronization
It is necessary to establish synchronization for stable operation and handover between CSs.

As a method of synchronization, air synchronization is used.

Air Sync Group

Air Synchronization Group
CSs can be used in the same area by assigning them to an Air Sync Group.
Handover is supported between CSs within the same Air Sync Group.

Handover

Allows you to move between IP Cell Station coverage areas during a conversation without disrupting the call. This is only possible within the same LAN Sync Group or the same Air Sync Group.

Primary CS

Primary CS for air synchronization

Secondary CS

Secondary CS for air synchronization

Web Maintenance Console

Used for system programming, diagnosis and administration of the KX-NS series PBX via PCs. Web Maintenance Console is accessed through a Web browser running on a networked PC.

2.2 System Overview

This CS can be connected to a PBX via LAN. The CS supports existing DECT PSs. When activation keys are installed, the number of simultaneous calls increases from 4 to 8.

The CS provides the following:

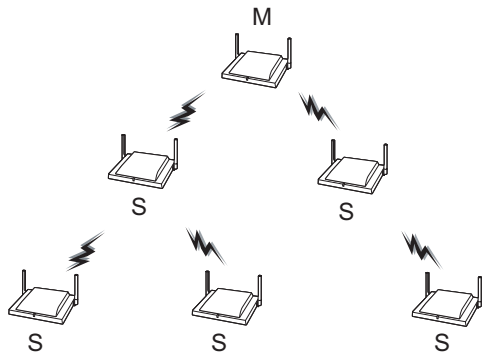
– Speedy installation
  Through LAN synchronization, installation can be performed as quickly as with traditional CSs.
– High quality communication even in environments where reception can be difficult
  In reflective environments such as a warehouse with steel or metal walls, noise and cutouts can be a problem. Call control settings can be used to reduce noise and provide high quality communication. (KX-TCA185/KX-TCA285/KX-TCA385 only).
– Expansion using activation keys
  By installing activation keys, the number of simultaneous call channels can be increased from 4 to 8. This is effective in an area where more simultaneous call channels are required. For information about the type of activation key codes available, refer to "Optional Accessories".

Air Synchronization/LAN Synchronization

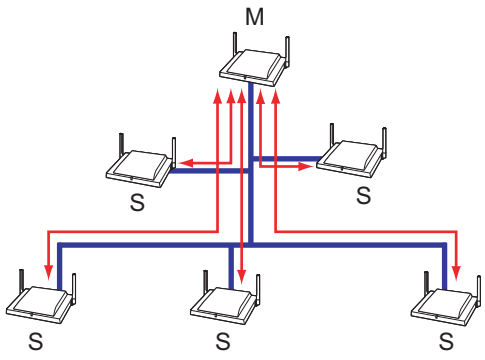
The unit supports the following two synchronization methods.

- Air Synchronization
  Each Slave CS is connected to the Master CS or another Slave CS "over the air". This method should be used when adding this unit to an existing network where CSs cannot connect via a LAN connection, or a network containing old IP-CSs. This kind of network is limited to the distance radio waves can travel between CSs.
  For details about air synchronization, refer to "5.6 Air Synchronization". For more details about adding this unit to an existing network, refer to "5.7 Synchronization with Traditional CSs or Old IP-CSs".
- LAN Synchronization
  Each Slave CS is connected to the Master CS via a LAN connection.

Air Synchronization



LAN Synchronization



M: Master CS
S: Slave CS

<u>Since LAN synchronization has several benefits compared to air synchronization, it is recommended to use LAN synchronization when possible. If LAN synchronization is not possible, use air synchronization.</u>

The benefits of LAN synchronization are listed below.

- Creating a synchronization hierarchy is not required. Therefore if one slave CS fails, the other slave CSs are not affected.

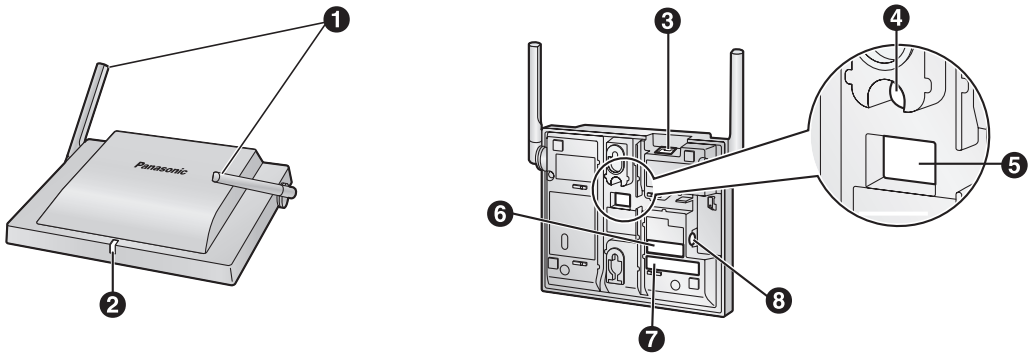
- The distance between CSs is dependent only upon a LAN connection. Therefore, the number of required CSs may be less than with air synchronization.

Easy Registration to the PBX

- Automatic Registration
  You can register the unit to the PBX via Full Automatic Mode without using Web Maintenance Console.
- Easy Remote Installation (Announce Mode)
  When installing at a remote site, by inputting the PBX IP address at one of the units, the unit can send that information to other IP-CSs and KX-NT series terminals in the network. The unit can also receive the PBX's IP address from other IP-CSs or KX-NT series terminals in the network.

2.3 Overview of the Unit

Names and Locations



Parts	
❶	Antennas
❷	LED
❸	RJ45 Modular
❹	RESET Switch
❺	DIP Switch
❻	CS ID Number (ID: xxxxxxxxxx)
❼	MAC Address
❽	DC Jack

Note

When you install the unit, we recommend that you position the antennas according to the above illustration so that they are pointing in directions that are 90 degrees apart (for antenna diversity). By doing so, it is possible to extend the reach of radio waves (refer to "page 21").

Accessory Information

Included Accessories

Unpack the box and check the items below:

	Number of Pieces	
	KX-NS0154	KX-NS0154CE/KX-NS0154LA
CS	1	1
Screws	2	2
Washers	2	2
Wall Mounting Plate	1	0

Optional Accessories

	Model No.	Description
Activation Key Code[*1]	KX-NSE201	Allows the use of up to 8 channels on 1 CS.
	KX-NSE205	Allows the use of up to 8 channels on 5 CSs.
	KX-NSE210	Allows the use of up to 8 channels on 10 CSs.
	KX-NSE220	Allows the use of up to 8 channels on 20 CSs.

	CS	AC Adaptor No.*3
AC Adaptor*2	KX-NS0154	KX-A239 (PQLV206)/KX-A239X (PQLV206)
	KX-NS0154CE	KX-A239CE (PQLV206CE)/KX-A239BX (PQLV206CE)/ KX-A239UK (PQLV206E)/KX-A239EJ (PQLV206E)/ KX-A239AL (PQLV206AL)/KX-A239X (PQLV206)/ KX-A420CE (PSLP1662)
	KX-NS0154LA	KX-A239X (PQLV206)/KX-A239BX (PQLV206CE)/ KX-A420BR (PSLP1662)

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

- Activation key files must be installed on the PBX.

To enable activation keys, configure the Port Property screen for the V-IPCS4 card on the PBX's Web Maintenance Console. For details, refer to the PC Programming Manual for your PBX.

- When activation keys are installed and 8 channels can be used, the LED color turns from green to blue.
- If CSs that have been expanded to use 8 channels are connected to a different PBX via a One-look network, CSs connected to the other PBX will not be able to use 8 channels.
- If CSs that can use 8 channels in a One-look network are automatically rerouted to a secondary PBX when the primary PBX fails, activation keys are also required for the secondary PBX.
- For details about installing activation keys, refer to the Installation Manual for your PBX.

*2 This unit complies with the IEEE 802.3af Power-over-Ethernet (PoE) standard. If PoE is available on your network, this unit can receive the necessary power from the network through the Ethernet cable. In this case, no AC adaptor is needed. However, if PoE is not available, you will need to connect an AC adaptor to the unit.

*3 To order an optional AC adaptor, please order using the "KX-A239xx/KX-A420xx" model number (not "PQLV206xx/PSLP1662") For details about which AC adaptor model number you should order, consult your dealer.

Note

For users in Argentina, power can only be supplied by PoE.

LED Indications

Color		Status
Green (4 channels — without activation key[*1])	ON	Stand-by (no active calls)
	Slow Flashing	Talking (active calls, channels available)
	Moderate Flashing	All channels busy
Blue (8 channels — with activation key[*1])	ON	Stand-by (no active calls)
	Slow Flashing	Talking (active calls, channels available)
	Moderate Flashing	All channels busy
Amber	ON	Stand-by (unstable air/LAN synchronization [no active calls])
	Slow Flashing	Talking (unstable air/LAN synchronization [active calls])
	Moderate Flashing	All channels busy (unstable air/LAN synchronization)
Red	ON	Fault
	Slow Flashing	Out of service or starting up (from data link establishment to air/LAN synchronization)
	Moderate Flashing	Starting up (communication with the PBX not established)
Red and green	Alternate blinking	Site survey master mode
OFF		Power off or updating the firmware

[*1] Refer to "Optional Accessories".

Note

LED flashing patterns are as follows:

- Slow Flashing: 60 times per minute
- Moderate Flashing: 120 times per minute

RESET Switch

Pressing the RESET switch allows you to return the unit to its factory default settings, perform site survey mode operations or perform advance diagnosis mode operations.

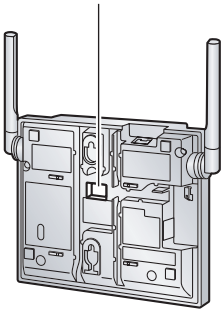
Operation	Description
Pressing and holding the RESET switch for 10 seconds when the unit is on.	Returns the unit to its factory default settings.
Pressing and releasing the RESET switch in site survey mode.	Makes the unit a slave CS for the site survey. Pressing the RESET switch again returns the unit to a Master CS. For details about performing the site survey, refer to "3.3 Site Survey".

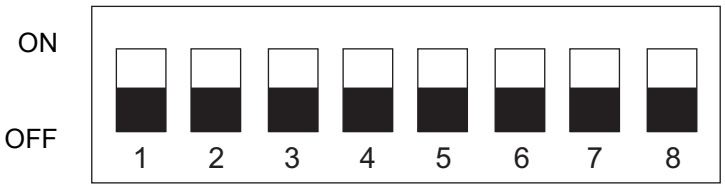
Pressing and releasing the RESET switch in LAN Synchronization Diagnosis.	Makes the unit a master CS for the LAN Synchronization Diagnosis. Pressing the RESET switch again returns the unit to a slave CS. For details about performing the LAN Synchronization Diagnosis, refer to "5.4 LAN Synchronization Diagnosis".

DIP Switch

The unit has 8 DIP switches. For details, refer to "DIP Switch Settings".

DIP Switch





3 Deployment Procedure

This section describes the deployment procedure for installing the unit for the first time.
For details about installing the unit in an area containing traditional CSs, refer to "5.7 Synchronization with Traditional CSs or Old IP-CSs".

3.1 Procedure Overview

When connecting the wireless system, use extreme care in conducting the site survey. Site surveys can be conducted using CSs. An incorrectly performed site survey can result in poor service area, frequent noise, disconnection of calls, and synchronization failure for CSs.

Notice

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

Step 1: Site Planning (→3.2 Site Planning)

Obtain a map of the CS installation site, and identify the service area required by the user on the map. Plan the location of each CS, taking into account factors such as distance, building materials, etc.
Choosing the best site for the unit requires careful planning and testing of essential areas. The best location may not always be convenient for installation.

Step 2: Site Survey (→3.3 Site Survey)

Once all CSs have been located in site planning, enter site survey mode on the unit. In this mode you can confirm the installation location of the unit by using the LEDs of the CSs.

Step 3: Registering the unit to the PBX (→3.4 Registering the Unit to the PBX)

Register the unit to the PBX.

Step 4: Registering the PS to the PBX

Register the PS to the PBX.
For details about the registration procedure, refer to the Installation Manual for your PBX.

Step 5: Wall Mounting (→3.5 Wall Mounting)

Mount the unit onto a wall and complete setup.

3.2 Site Planning

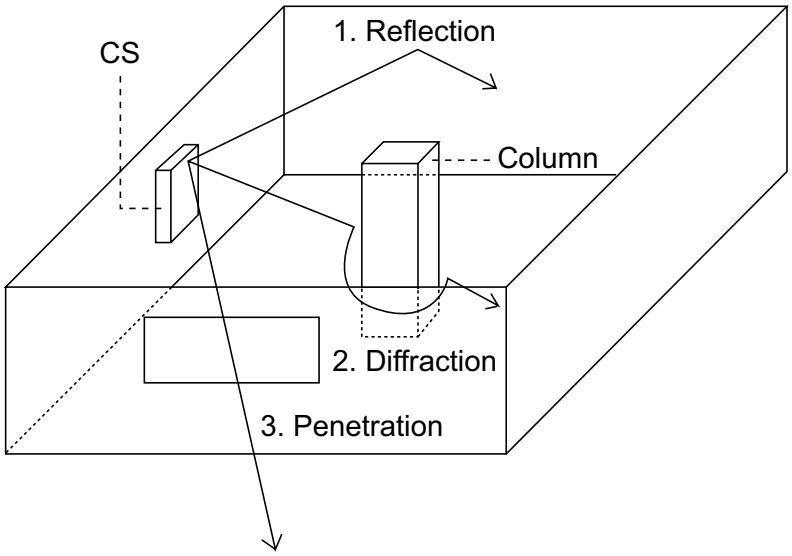
Choosing the best site for the unit requires careful planning and testing of essential areas. The best location may not always be convenient for installation. Read the following information before installing the unit.

Understanding Radio Waves

Characteristics of Radio Waves

The transmission of radio waves and the CS coverage area depend on the structure and materials of the building.
Office equipment, such as computers and fax machines, can interfere with radio waves. Such equipment may create noise or interfere with the performance of the PS.
The illustration below shows the special transmitting patterns of radio waves.

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



Relationships Between Radio Waves and Building Structure and Materials

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

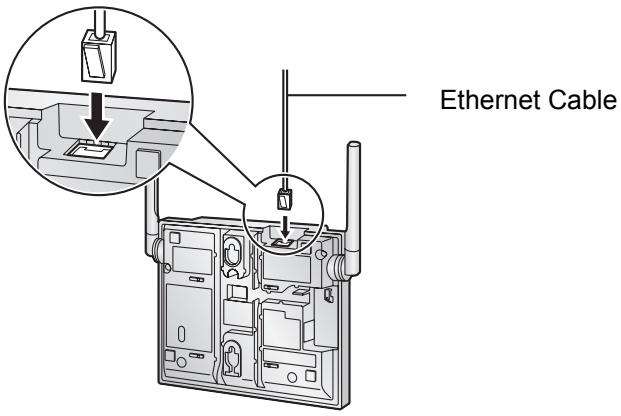
Object	Material	Transmission Tendency
Wall	Concrete	The thicker they are, the less radio waves penetrate them.
	Ferroconcrete	Radio waves can penetrate them, but the more iron there is, the more radio waves are reflected.
Window	Glass	Radio waves usually penetrate them.
	Glass with wire net	Radio waves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

Site Planning Tool

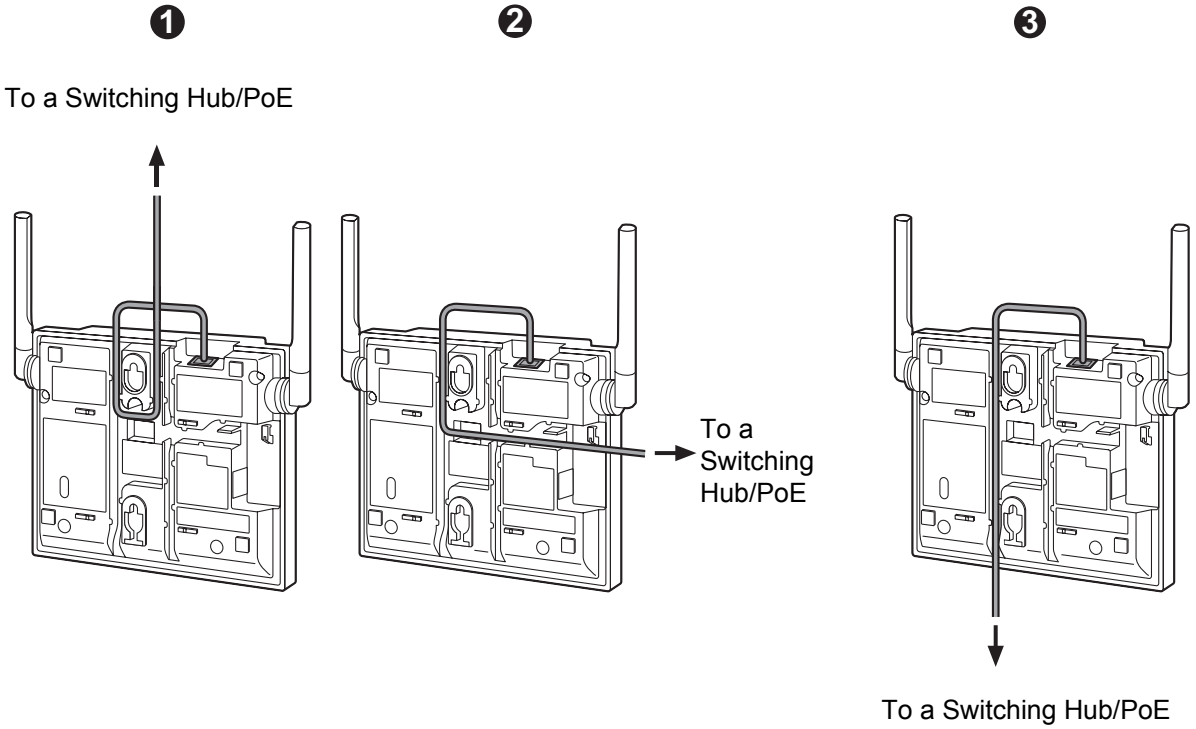
You can download the Site Planning Tool from the following Web site to estimate the number of CSs required for your installation area and their approximate installation locations.
https://panasonic.net/cns/pcc/support/pbx/
The Site Planning Tool for LAN synchronization is different from the Site Planning Tool for Air synchronization. You must use the Site Planning Tool corresponding to synchronization method.

Setting and Installing a CS Temporarily

1. Connect the CS to an AC adaptor, battery, or PoE.
   When connecting to a battery, refer to "5.8 Connecting the Unit to a Battery".
   a. Connecting the Ethernet cable to the unit

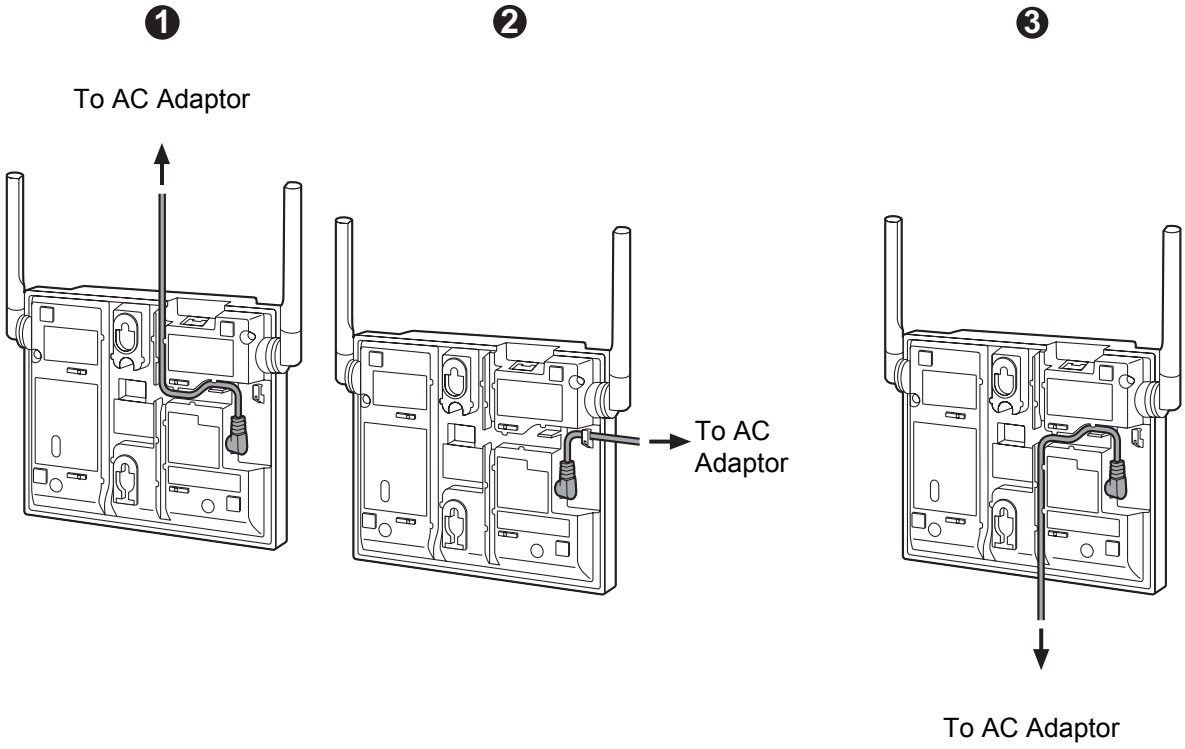


b. Pass the cable through the groove of the unit in one of the following three ways.



c. Connecting the AC adaptor cord to the unit

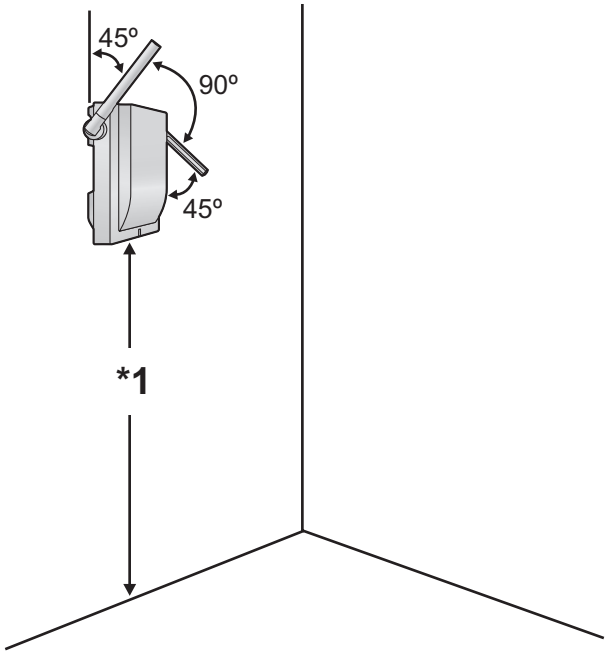
d. Pass the cord through the groove of the unit in one of the following three ways.



2. Connecting the Unit to the Network
Temporarily install the unit in the best site as defined in Site Planning, connect the unit to a nearby hub.

[LAN Synchronization only]
LAN synchronization should be diagnosed in advance when connecting to a network that does not comply with recommendations 1 and 2 in "5.3 Recommended Network Configuration".
For details about LAN synchronization diagnosis, refer to "5.4 LAN Synchronization Diagnosis".

3. Install the CS temporarily for the site survey, as follows. Install the CS at least 2 m (6 ft 7 in) above the floor, and place the antennas so that they are pointing in directions that are 90 degrees apart (for antenna diversity).



*1 At least 2 m (6 ft 7 in)

3.3 Site Survey

The section describes how to perform the site survey by using CSs. This is done by starting up a CS with DIP switch settings as the following table, and then starting up another CS in the same state to synchronize with the first CS. During this synchronization, the color of the second CS's LED changes according to the radio signal strength level. This can be used as a guide to position the CS.

DIP switch settings

SW	LAN Synchronization	Air Synchronization
SW5	OFF	ON
SW6	ON	ON

Note

Site Survey can also be performed using a PS.
For details, refer to "5.5 Site Survey Using PS".

Setting and Installing a CS Temporarily for Site Survey

Perform the procedure in "Setting and Installing a CS Temporarily" to position the CS at the temporary position.

Testing the Radio Signal Strength

1. Start up the first CS.
   The LED will flash red and green alternately.
2. Press and release the RESET switch on the second CS.
   The LED of the second CS will turn red.
3. Move the second CS near the first CS until the LED of the second CS turns green.
4. Repeat steps 1 and 2 for all other CSs.

For details about the LED status of the second CS and all other CSs, see the following table.

LED status during site survey

Color		Radio Signal Strength
Green	ON	Good
	Slow Flashing	Unreliable
Amber	ON	Bad
Red	ON	Signal lost

Checking the Coverage Area Using PS

If necessary, check the coverage area and handover operation by using a PS.
For details about checking the coverage area by using a PS, refer to "5.5.3 Measuring the Signal Strength".

3.4 Registering the Unit to the PBX

When installing the unit at the same site as the PBX, connect the unit to the LAN and turn it on.

Connecting the Unit to the LAN

When connecting the unit to the LAN, connect it to a switching hub.

Note

- Use an Ethernet straight cable with an RJ45 connector to connect the CS to a switching hub. The cable should be a 10 BASE-T/100 BASE-TX CAT 5 (Category 5) or higher cable, and the diameter of the cable must be 6.5 mm (1/4 in) or less.
- It is possible to connect the CS to the LAN while registering the CS to the PBX.

1. Connect the cable to the unit.
2. Pass the cable through the groove of the unit.
3. Connect the other end of the cable to the switching hub.

Connecting the AC Adaptor to the Unit

This unit complies with the IEEE 802.3af Power-over-Ethernet (PoE) standard. If PoE is available on your network, this unit can receive the necessary power from the network through the Ethernet cable. In this case, no AC adaptor is needed.
However, if PoE is not available, you will need to connect an AC adaptor to the unit.

Note

Only use a compatible AC adaptor (optional). For details, refer to "Optional Accessories".

1. Connect the AC adaptor cord to the unit.
2. Pass the cord through the groove of the unit.
3. Connect the AC adaptor to an AC outlet.

Registering the Unit to the PBX

[Full Automatic Mode]
If networking settings have been completed, when the unit is connected to the same network as the PBX, it will be registered automatically. No registration procedure is required.

[Manual Mode]
After connecting the unit to the PBX over a network, register the unit to the PBX manually.
For details about the registration procedure in manual mode, refer to "5.9 Registering IP Cell Stations to the KX-NS series PBX".

Note

The PBX's default synchronization method setting is LAN synchronization. If air synchronization is used, change this setting before registering the unit to the PBX.

[LAN Synchronization Mode]
The unit registered to the PBX is assigned to LAN Sync Group No. 1.
If no Master CS is configured, the first CS assigned to the LAN Sync Group becomes the Master CS automatically.

3.5 Wall Mounting

Notice

Panasonic assumes no responsibility for injuries or property damage resulting from failures arising out of improper installation or operation inconsistent with this documentation.

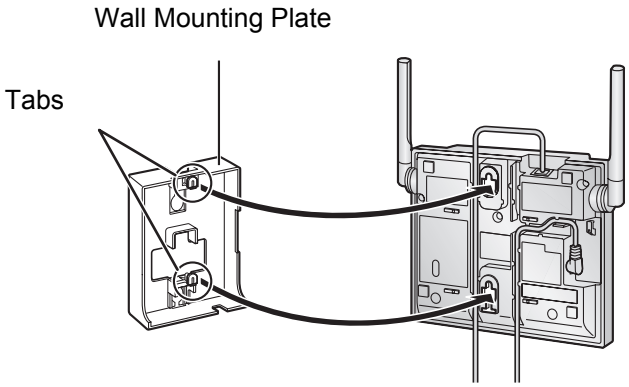
Mounting (for North America)

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

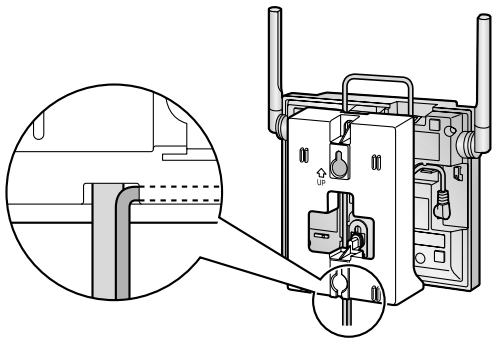
Note

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

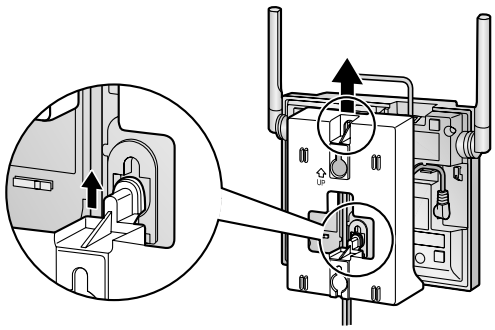
3. Insert the upper and lower tabs of the wall mounting plate into the designated openings in the unit.



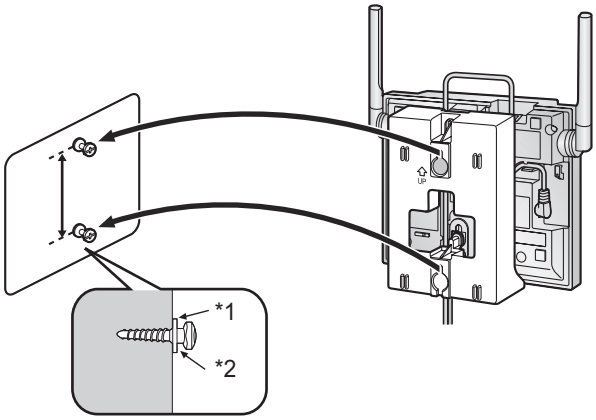
4. Pass the AC adaptor cord and Ethernet cable through the hole of the wall mounting plate.



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

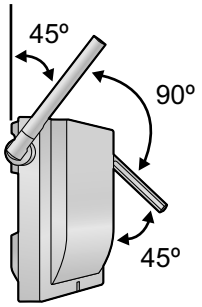


6. Hook the unit on the screw heads.



*1 Washer
*2 Drive the screw to this point.

7. Place the antennas according to the following illustration so that they are pointing in directions that are 90 degrees apart (for antenna diversity).



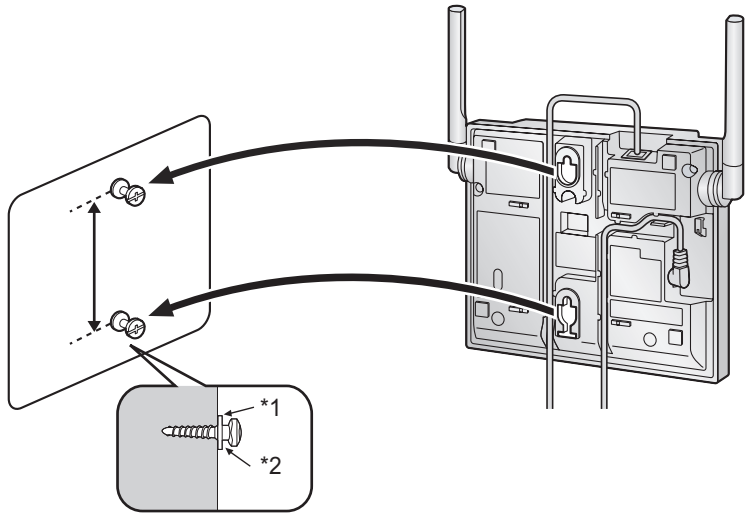
Mounting (for all other countries/areas)

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

Note

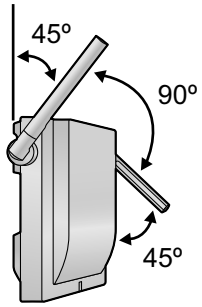
- Make sure that the screw heads are at the same distance from the wall.
- Install the screws perpendicular to the wall.

3. Hook the unit on the screw heads.



*1 Washer
*2 Drive the screw to this point.

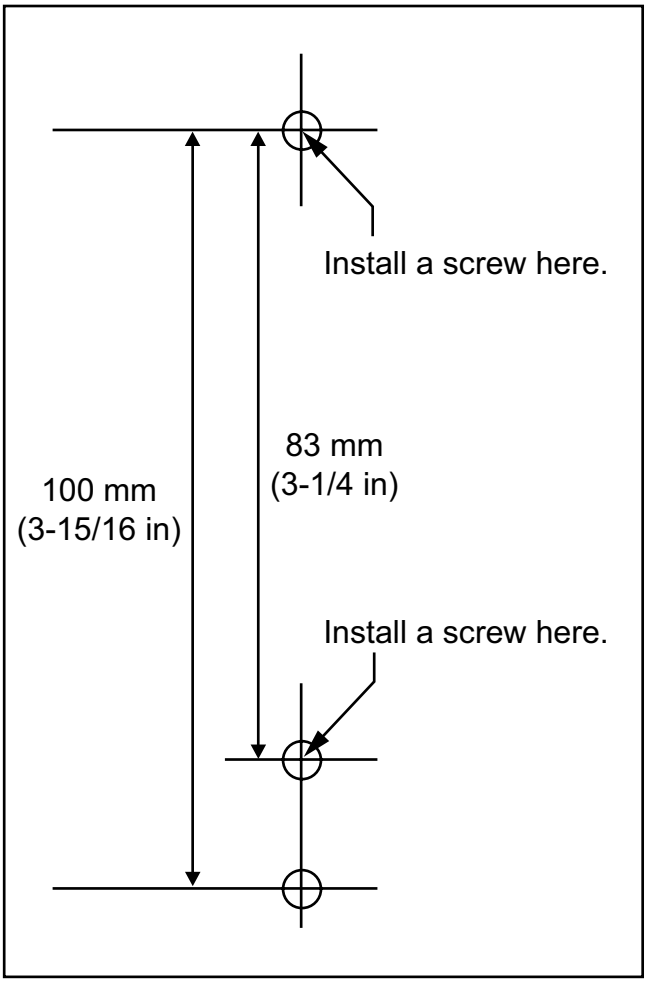
4. Place the antennas according to the following illustration so that they are pointing in directions that are 90 degrees apart (for antenna diversity).



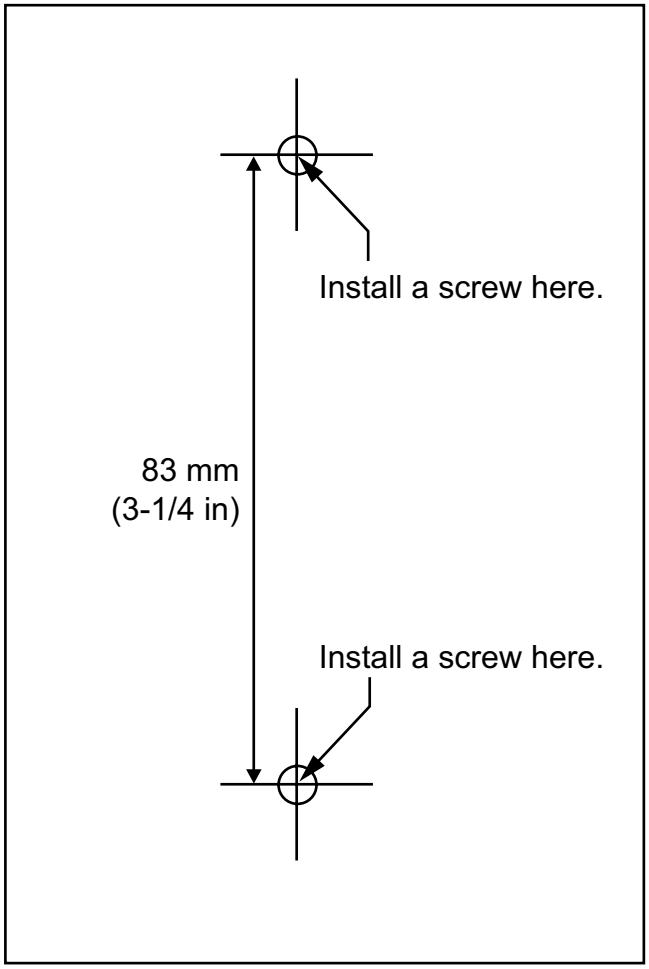
Reference for Wall Mounting

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

For North America



For all other countries/areas



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.

4 Troubleshooting

PROBLEM	PROBABLE CAUSE	SOLUTION
• The LED of the CS stays Amber ON during normal operation.	When using LAN synchronization: • LAN synchronization to Master CS has failed.	• Check the network configuration (refer to "5.3 Recommended Network Configuration"). • Diagnose the network configuration with IP Terminal Maintenance Console (refer to "5.12 IP Terminal Maintenance Console").
	When using air synchronization: • Air synchronization to Master CS has failed.	• Check the air synchronization (refer to "5.6 Air Synchronization").
• The LED of the CS stays Red ON during normal operation.	• CS malfunction	• Replace the CS.
	• Network failure	• Configure the network settings again using the IP Terminal Maintenance Console (refer to "5.12 IP Terminal Maintenance Console").
• "CLEAR SCAN DATA" is displayed on the PS's screen after turning on the PS.	• The PS cannot be used for normal operation when scan data is stored on the PS.	• Clear the scan data by following the procedure described in "5.5.5 Clearing the Stored Scan Data" in this guide.
• Cannot register the CS even when maximum number of CSs is not exceeded.	When using air synchronization: • Air Sync Master is also a member of Air Sync Group 1, so maximum 15 IP-CSs are available in this Group.	• Change the Air Synchronization Group No. to None using the Maintenance Console (refer to PC Programming Manual for your PBX).
• Cannot register the PS.	• Wrong Personal Identification Number (PIN) is registered to the PS.	• Enter the PIN set to the PBX into the PS.
• PS becomes out of range. • Cannot make calls using the PS.	• Location of CS is not good. • Access system of the PS is not properly set.	• Locate the CS properly (refer to "3.3 Site Survey"). • Change the access system setting of the PS to the appropriate system or automatic.

PROBLEM	PROBABLE CAUSE	SOLUTION
• Noise is frequent while using the PS. • Conversations disconnect while using the PS. • There is noise during a phone call. • Call handover is not working. • "NO SERVICE" is displayed on the PS's screen.	• PS is out of CS coverage area.	• Locate the CS properly (refer to "3.3 Site Survey").
	When using LAN synchronization: • LAN synchronization to Master CS has failed.	• Check the network configuration (refer to "5.3 Recommended Network Configuration"). • Diagnose the network configuration with IP Terminal Maintenance Console (refer to "5.12 IP Terminal Maintenance Console").
	When using air synchronization: • The clock signal source CS is out of range for air synchronization.	• Locate the CS properly (refer to "3.3 Site Survey").
	When using air synchronization: • Air synchronization between Master CS1 and Master CS2 has failed and each CS is generating its own clock signal.	• Confirm the error log from Utility—Log—Error Log—Minor using the Maintenance Console. If "369 IP-CS Handover error" is displayed for the error log, restart Master CS1 and Master CS2.
	• Metallic materials in the surrounding structure are interfering with the signal received by the PS.	• Install an additional CS where the signal interference is worst.
When traditional CSs are assigned as Master CSs: • IP-CSs reset frequently. • KX-TCA175/KX-TCA275 PSs do not operate properly.	When using air synchronization: • The software version of the traditional CSs is old.	• Update the traditional CSs to version 5.000 or later.
• PS stays out of service when the CS status is changed from Out of Service to In Service.	• It may take about 20 s for the CS to start up after the status has been changed to In Service.	• Wait until the CS starts up.
• IP-CSs are installed at a remote site after installing CSs at a local site, but the IP-CSs do not operate.	When using air synchronization: • IP-CSs are not properly synchronized with any CS.	• When using only one IP-CS at a remote site, assign the IP-CS as Master CS1. • When using multiple IP-CSs at a remote site, establish air synchronization between IP-CSs.
• After uninstalling some CSs, other CSs do not operate.	When using air synchronization: • Master CS is uninstalled.	• Assign a Master CS again for air synchronization (refer to "Assigning the Synchronizing CSs").

PROBLEM	PROBABLE CAUSE	SOLUTION
• When performing System Control—Program Update— Update Program File (for a KX-NS series PBX) using the Maintenance Console, the programs stored in IP-CSs cannot be updated.	• The network is busy.	• Set the value of Keep Alive Time-Out to 40 seconds or more for Slot—Virtual—V-IPCS4—Card Property (for a KX-NS series PBX). **Notice** Be sure to change the value back to its previous value after the update is complete.
• LAN synchronization diagnosis fails after 10 minutes.	• The first 10 minutes of LAN synchronization diagnosis is sensitive. Therefore, a change in room temperature may adversely affect the result.	• Try LAN synchronization diagnosis again. If it fails repeatedly, network jitter may be excessive. Try reconnecting the CS to a switch that a working CS is connected to, or use the recommended LAN and switch configuration (refer to "5.3 Recommended Network Configuration").
• The CS restarts repeatedly.	• Both the LAN Sync Group No. and Air Sync Group No. settings are set to "None".	• Set either the LAN Sync Group No. or Air Sync Group No. setting to a value other than "None" for Slot—Virtual—V-IPCS4—Port Property (for a KX-NS series PBX).

5 Appendix

5.1 Specifications

CS Specifications

Item	KX-NS0154/KX-NS0154CE/KX-NS0154LA
Power Supply	PoE (IEEE802.3af, Class 2) or AC adaptor*1
Codec	G.711, G.726, G.729A
RJ45 (LAN) port	10 BASE-T*2, 100 BASE-TX
VLAN (Virtual LAN)	Yes (by local setting and LLDP*3)
Failover to secondary PBX	Yes
Dimensions	(W) 190 mm × (H) 134 mm × (D) 39 mm ([W] 17-1/2 in × [H] 5-1/4 in × [D] 1-1/2 in)
Weight	290 g (9.3 oz) without wall mounting kit 330 g (11.6 oz) with wall mounting kit
Operating Environment	0 °C – 40 °C (32 °F – 104 °F)

*1 Optional accessory
*2 LAN synchronization is not available for 10 BASE-T.
*3 LLDP: Link Layer Discovery Protocol

RF Specifications

Item	KX-NS0154	KX-NS0154CE	KX-NS0154LA
Wireless Interface	DECT 6.0	DECT	
Radio Access Method	MultiCarrier TDMA-TDD		
Frequency Band	1920 MHz to 1930 MHz	1880 MHz to 1900 MHz*1	1910 MHz to 1920 MHz
Number of Carriers	5	10*2	5
Carrier Spacing	1728 kHz		
Transmission Output	Peak 125 mW	Peak 250 mW	Peak 250 mW

*1 If the suffix of your PBX model is BX, TW, or XE, the value is 1880 MHz to 1895 MHz.
*2 If the suffix of your PBX model is BX, TW, or XE, the value is 8.

CAUTION

- The CS should be kept free of dust, moisture, high temperature (more than 40 °C [104 °F]), low temperature (less than 0 °C [32 °F]), and vibration, and should not be exposed to direct sunlight.
- The CS should not be placed outdoors (use indoors).
- The CS should not be placed near high-voltage equipment.
- The CS should not be placed on a metal object.

Compatible PSs

CS	Compatible PSs
KX-NS0154	KX-TCA185/KX-TCA285/KX-TCA385/ KX-TD7685/KX-TD7695/KX-TD7696/ KX-WT125/KX-WT126
KX-NS0154CE	KX-TCA185/KX-TCA285/KX-TCA385/ KX-TCA155/KX-TCA175/ KX-TCA256/KX-TCA275/ KX-TCA355/KX-TCA364/ KX-WT115
KX-NS0154LA	KX-WT115/KX-TCA185/KX-TCA285/KX-TCA385

Compatible PBXs

PBX	MPR Software Version
KX-NS series PBX	For details about the supported PBX models and versions, refer to **https://panasonic.net/cns/pcc/support/pbx/**.

Compatible Repeaters

Repeater	KX-A405[*1]	KX-A406
Maximum number of cascade steps	3	3

[*1] PBX configuration is required.

Maximum Number of CSs Supported by each PBX and Maximum Number of Synchronization Groups

For details, refer to the Installation Manual for your PBX.

Required Distances between Equipment

CAUTION

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

Equipment	Distance
CS and office equipment such as a computer, telex, fax machine, etc.	More than 2 m (6 ft 7 in)
CS and PS	More than 1 m (3 ft 3 in)
Each CS	More than 3 m (10 ft)
Each PS	More than 0.5 m (1 ft 8 in)
PBX and CS	More than 2 m (6 ft 7 in)

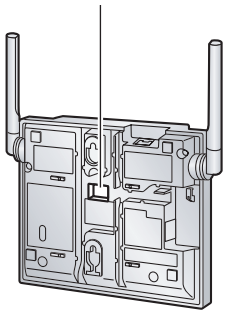
Notice

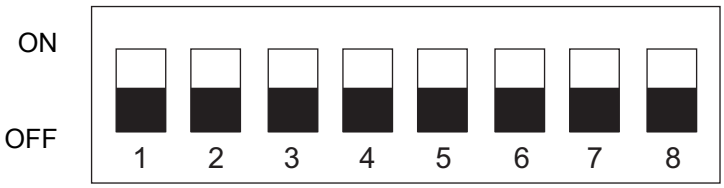
If multiple CSs cover the same area, the phone connection may become noisy or the number of possible simultaneous calls with PSs may decrease due to interference between the CSs. The required distance between CSs may vary depending on the environment of the installation site and conditions in which the wireless system is used. Conduct a site survey to determine the appropriate distance.

5.2 DIP Switch

The unit has 8 DIP switches, which can be used to enter the following operation modes.

DIP Switch





Note

- All switches are turned off by default and should be in this state during normal operation.
- The unit must be restarted to enable changes to DIP switches.

Switch	Description
1–3	**When switches 4 and 6 are on and switch 8 is off** Specifies the channel number used for the site survey when using a PS. → Specifying the site survey channel **When switches 4 and 8 are on** Specifies the time required for long-term LAN synchronization diagnosis. → Time Required for Long-Term Diagnosis
4	**When switch 6 is on and switch 8 is off** • Set to ON when performing a site survey using a PS other than KX-TCA185/KX-TCA285/KX-TCA385. • Set to OFF when performing a site survey using a KX-TCA185/KX-TCA285/KX-TCA385. **When switches 6 and 8 are off** • Set to ON when starting up in Secondary PBX connection mode*1. • Set to OFF when starting up in normal mode.*2 **When switch 8 is on** • Set to ON when starting up in long-term LAN synchronization diagnosis mode. • Set to OFF when starting up in short-term LAN synchronization diagnosis mode.
5	• Set to ON when performing a site survey using air synchronization. • Set to OFF when performing a site survey using LAN synchronization.
6	• Set to ON when performing a site survey. • Set to OFF when starting up in normal mode.
7	• Set to ON when starting up in static IP mode. • Set to OFF when starting up in DHCP/Static normal mode.

Switch	Description
8	• Set to ON when starting up in LAN synchronization diagnosis mode. • Set to OFF when starting up in normal mode.

*1 This unit can switch its connection from the primary PBX to the secondary PBX without a communication path failure with the primary PBX in this mode. To enable this feature, you must register the IP address of the secondary PBX on the unit in advance. For details, refer to "5.10 Registration to Secondary PBX".

*2 This unit can temporarily switch its connection from a primary PBX to a secondary PBX when a communication path fault occurs to the primary PBX. This allows the unit to continue operating without interruption. To enable this feature, you must register the IP address of the secondary PBX on the unit in advance. For details, refer to "5.10 Registration to Secondary PBX".

DIP Switch Settings

The following tables describe various DIP switch configurations.

Note

0: OFF, 1: ON

Specifying the site survey channel

Specify a site survey channel when using a PS other than a KX-TCA185/KX-TCA285/KX-TCA385.

DIP Switch								Site Survey Channel	
1	2	3	4	5	6	7	8	KX-NS0154	KX-NS0154CE/ KX-NS0154LA
0	0	0	1		1		0	0 ch	2 ch
1	0	0	1		1		0	1 ch	3 ch
0	1	0	1		1		0	2 ch	4 ch
1	1	0	1		1		0	3 ch	5 ch
0	0	1	1		1		0	4 ch	6 ch
1	0	1	1		1		0	0 ch	7 ch
0	1	1	1		1		0	1 ch	8 ch
1	1	1	1		1		0	2 ch	9 ch

Channel for automatic site survey

Use this setting when using a KX-TCA185/KX-TCA285/KX-TCA385 PS.

DIP Switch								Description
1	2	3	4	5	6	7	8	
			0		1		0	Setting for a KX-TCA185/KX-TCA285/ KX-TCA385.

Time Required for Long-Term Diagnosis

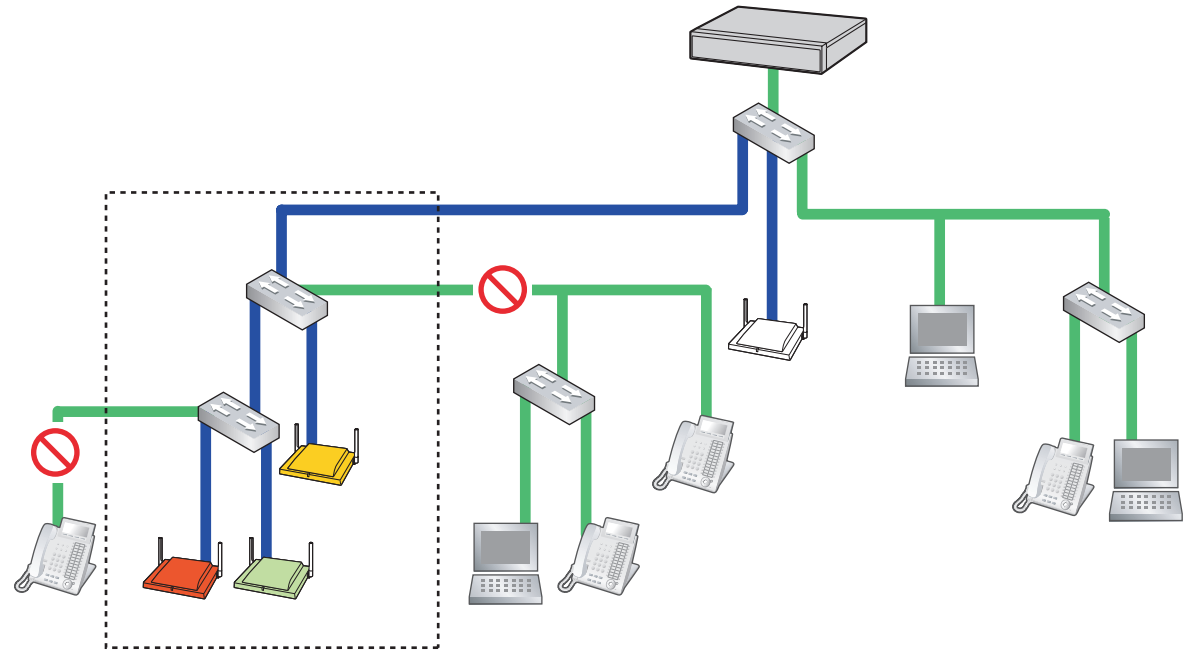
DIP Switch								Time
1	2	3	4	5	6	7	8	
0	0	0	1				1	1 day (24 hours)
1	0	0	1				1	2 days (48 hours)
0	1	0	1				1	3 days (72 hours)
1	1	0	1				1	4 days (96 hours)
0	0	1	1				1	5 days (120 hours)
1	0	1	1				1	6 days (144 hours)
0	1	1	1				1	7 days (168 hours)
1	1	1	1				1	8 hours

5.3 Recommended Network Configuration

This section describes 2 recommended network configurations for maintaining LAN synchronization. When connecting the unit to a network described in recommendations 1 and 2, it is not necessary to perform LAN synchronization diagnosis. In network environments other than those described in recommendations 1 and 2, performing a LAN synchronization diagnosis is necessary. If the network fails this diagnosis, reconnect the CS to a switch that a working CS is connected to, and perform a LAN synchronization diagnosis again. If the network fails this diagnosis, LAN synchronization cannot be used. In this case, using air synchronization is recommended. For details about air synchronization, refer to "5.6 Air Synchronization".

Recommendation 1: Physically separate the LAN synchronization communication channels

- Do not connect other terminals/computers to the switches that the CSs are connected to or the switches on LAN synchronization communication channels between CSs.
- Use Panasonic-recommended switches for the switches that the CSs are connected to and the switches on the LAN synchronization communication channel between CSs.
- When connecting 32 or more CSs, use gigabit switches for the switches that the CSs are connected to and the switches on the LAN synchronization communication channel between CSs.
- Configure the installation so that CS synchronization communication is not mixed with the communication of other terminals between switches. As long as communication is not mixed, it is possible to connect CSs, other terminals and switches that connect to other terminals, to the same switch.



: CS communication

: Other terminal/computer communication

: PBX

: IP-PT

: Master CS1

: SW

: Not connected

: Master CS2-1

: PC

: CS

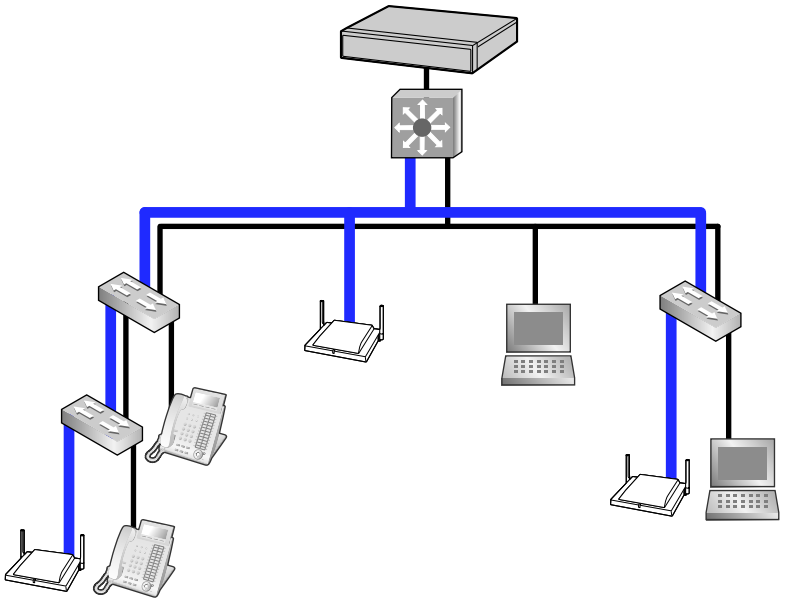
: Master CS2-2

Note

- The maximum number of hierarchy levels for a switch between the Master CS and a Slave CS is 7 levels.
- One LAN synchronization Master CS is required for each LAN Sync Group.
- The first CS registered to the PBX becomes Master CS1 automatically. Master CS1 can be changed using the PBX's Web Maintenance Console.
- If necessary, you can set Master CS2-1 and Master CS2-2 using the PBX's Web Maintenance Console. Master CS2-1 is connected to the same hub as Master CS1 and acts as a backup if a problem occurs with Master CS1. Master CS2-2 is connected to a different hub from Master CS1 and acts as a backup if a problem occurs with the hub containing Master CS1. Setting Master CS2-1 and Master CS2-2 allows synchronization to continue when Master CS1 or Master CS1's hub stops working.

Recommendation 2: Separate LAN synchronization communication channels using port VLAN (Virtual LAN)

- Separate the communication channels of CSs and other terminals/computers by using port VLAN to group switches that the CS is connected to and switches on LAN synchronization communication channels between CSs.
- Use Panasonic-certified switches for the switches that the CSs are connected to and the switches on the LAN synchronization communication channel between CSs.
- When connecting 32 or more CSs, use gigabit switches for the switches that the CSs are connected to and the switches on the LAN synchronization communication channel between CSs.



: Port VLAN1
CS communication

: Port VLAN2
Other terminal/computer communication

: PBX

: PC

: CS

: SW

: IP-PT

: L3 SW

5.4 LAN Synchronization Diagnosis

This feature is used to check whether the planned location of each CS is suitable for actual communication. Make sure that the CSs are temporarily installed at the locations calculated using the Site Planning Tool and confirm that all CSs are in LAN synchronization.

Note

PBX registration is not necessary at this point.

Short-term Diagnosis

1. Turn off DIP switches no. 4 and turn on DIP switch no. 8 for each CS.
2. Connect each CS in turn to a nearby hub. If the hub does not support PoE (Power over Ethernet), connect the CS to a power outlet using the AC adaptor.

3. Select a CS as the Master CS and press that CS's RESET switch.
   The Master CS will flash red and green alternately, and other CSs (Slave CSs) will flash amber.
4. After one hour, the color of the LEDs on Slave CSs indicates the diagnosis results.

Color	Diagnosis Result
Green	Completed successfully
Red	Completed unsuccessfully
Amber	Can be used under certain conditions

5. If the LED of the CS is red or amber, connect the CS to a hub that has a CS with a green LED connected, or a hub that has no CSs connected, and turn on the CS.
6. If necessary, repeat the above procedure.
   If repeating the procedure does not fix the problem, reconfigure the network according to "5.3 Recommended Network Configuration", or consider air synchronization instead of LAN synchronization.
   If the result is still undetermined, a long-term diagnosis will start in the background automatically. The result of this diagnosis can be obtained via IP Terminal Maintenance Console. Also, temporary results can be obtained every hour by checking the LEDs.
   For details about IP Terminal Maintenance Console, refer to "5.12 IP Terminal Maintenance Console".

Note

- The CS set as the Master CS in advance diagnosis mode should be the first CS registered to the PBX so that it becomes the Master CS in regular operation.
- Long-term diagnosis can also be started by setting DIP switches. For details about setting the DIP switches, refer to "Time Required for Long-Term Diagnosis" in "5.2 DIP Switch".

Long-term Diagnosis

1. Turn on DIP switches no. 4 and no. 8 for each CS.
2. Specifies the time required for long-term diagnosis by using DIP switches no.1-3, refer to "5.2 DIP Switch".
3. Connect each CS in turn to a nearby hub. If the hub does not support PoE (Power over Ethernet), connect the CS to a power outlet using the AC adaptor.
   During the diagnosis, the LED flashes green. If the LED flashes red or amber, a temporary result of "Completed unsuccessfully" or "Undetermined result" has been reached.
4. After 24 hours, the color of the LEDs indicates the diagnosis results.

Color	Diagnosis Result
Green	Completed successfully
Red	Completed unsuccessfully
Amber	Can be used under certain conditions

5. If the LED of the CS is red, reconfigure the network again referring to "5.3 Recommended Network Configuration".

Note

The default time for long-term diagnosis is 24 hours. However, this can be changed to between 2 and 168 hours in IP Terminal Maintenance Console.
For details about IP Terminal Maintenance Console, refer to "5.12 IP Terminal Maintenance Console".

5.5 Site Survey Using PS

The section describes performing the Site Survey using one the following PSs.

- For North America: KX-TCA185/KX-TCA285/KX-TCA385/KX-WT125/KX-WT126/KX-TD7685/KX-TD7695/KX-TD7696
- For South America: KX-WT115/KX-TCA285
- For other countries/areas: KX-TCA185/KX-TCA285/KX-TCA385/KX-TCA155/KX-TCA175/KX-TCA256/KX-TCA275/KX-TCA355/KX-TCA364

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

Notice

- An incorrectly performed site survey may cause CSs to reset due to synchronization failure. Therefore, it is necessary to conduct the site survey and plan the location of CSs with extreme care.
- The reception of radio signals can vary depending on your handset. For example, when the radio signal strength is weak, some handsets may be out of range when other handsets are not. In this case, reconduct site planning, and add or relocate CSs as necessary.
- For details about performing the site survey with CSs only (i.e., without using a PS), refer to "3.3 Site Survey".

5.5.1 Before Site Survey Using PS

If you are using a KX-TCA185/KX-TCA285/KX-TCA385, you can skip this procedure.

The section describes the preparation procedure for the Site Survey using one the following PSs.

- For North America: KX-WT125/KX-WT126/KX-TD7685/KX-TD7695/KX-TD7696
- For South America: KX-WT115
- For other countries/areas: KX-TCA155/KX-TCA175/KX-TCA256/KX-TCA275/KX-TCA355/KX-TCA364

Note

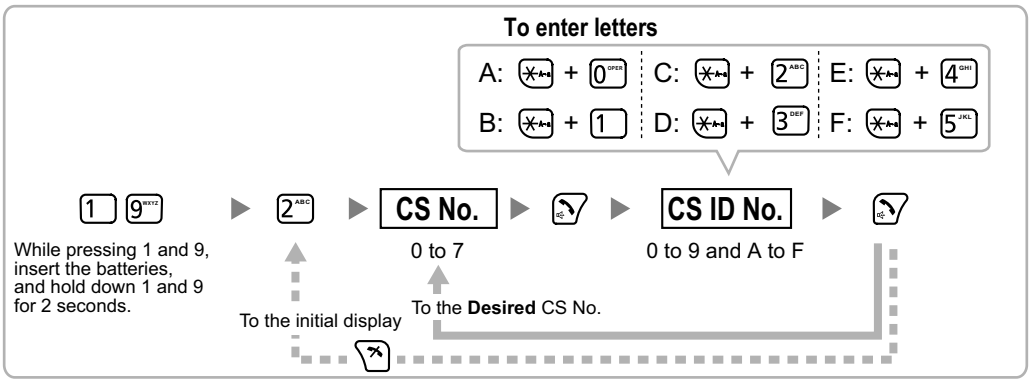
Display prompts for the site survey are only available in English.

Checking the CS ID Number

Check the CS ID number label attached to the CS. If the CS ID number label is not attached to the CS, check the CS ID number using Web Maintenance Console. For details, refer to "CS Information" in the PC Programming Manual for your PBX.

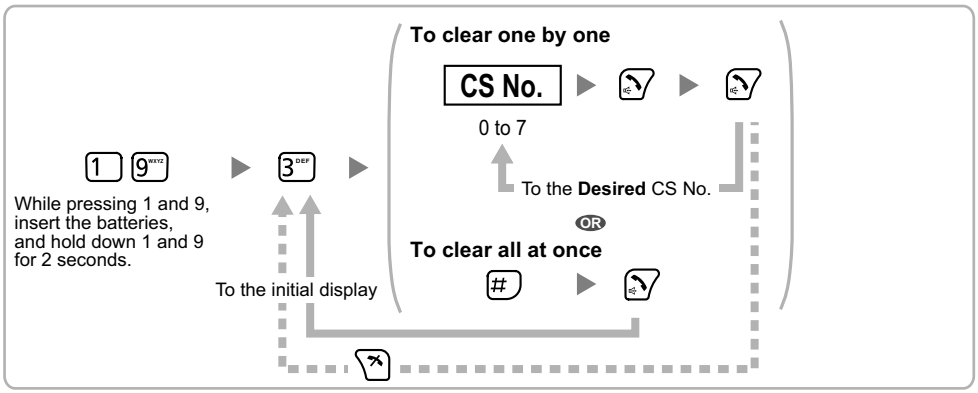
Assigning the CS ID Number to the PS

Using the KX-WT125/KX-WT126 (for North America)

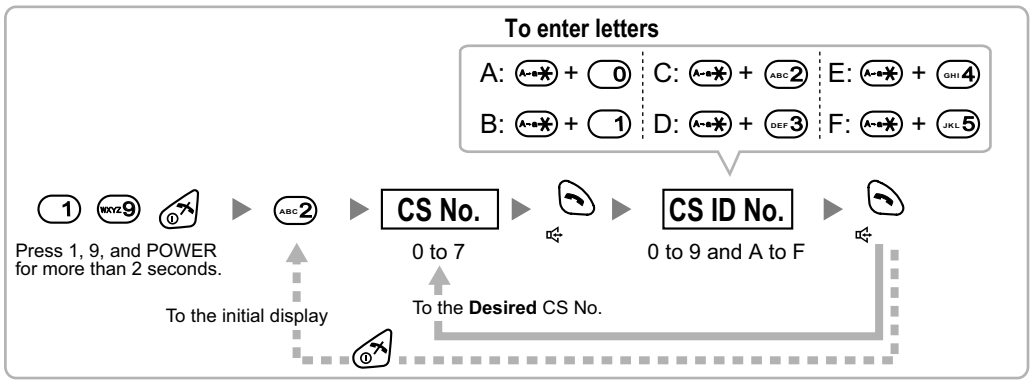


Note

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

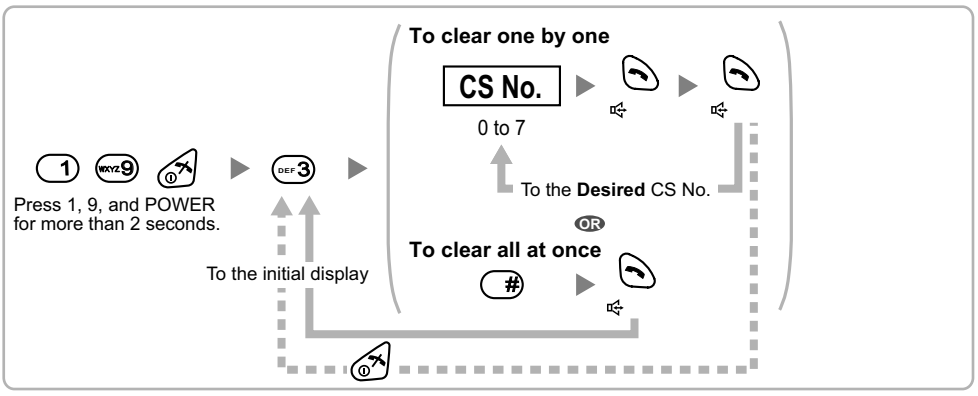


Using the KX-TD7685/KX-TD7695/KX-TD7696/KX-TCA155/KX-TCA175/KX-TCA256/KX-TCA275/KX-TCA355/KX-TCA364/KX-WT115



Note

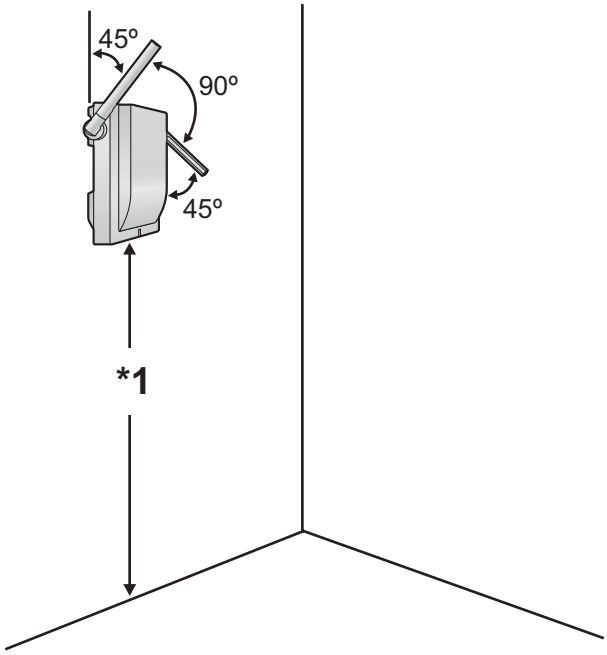
To clear the CS ID number assigned to the PS, follow the procedure below:



Setting and Installing a CS Temporarily for Site Survey

Perform the procedure in "Setting and Installing a CS Temporarily" to position the CS at the temporary position.

1. Install the CS temporarily for the site survey, as follows. Install the CS at least 2 m (6 ft 7 in) above the floor, and place the antennas so that they are pointing in directions that are 90 degrees apart (for antenna diversity).



*1 At least 2 m (6 ft 7 in)

5.5.2 Preparing PSs to Test the Radio Signal Strength

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

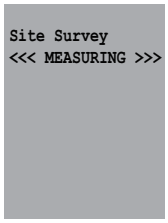
Using the KX-TCA185/KX-TCA285/KX-TCA385 PS

If the PS is not registered:

1. Press **MON**.
2. Press **OK**.
   The PS will enter Radio Signal Test mode.

If the PS is registered:

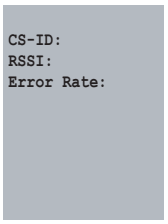
1. If the PS is on, turn it off by pressing and holding the POWER/CANCEL key.
2. Turn on the PS by pressing and holding the POWER/CANCEL key.
3. A blank screen will be displayed. Press and hold the TALK/SP-PHONE key for about 8 seconds.
4. Press the left soft key, press **[1]**, and then press **[9]**.
5. Press **OK**.
   The PS will enter Radio Signal Test mode.

   Note

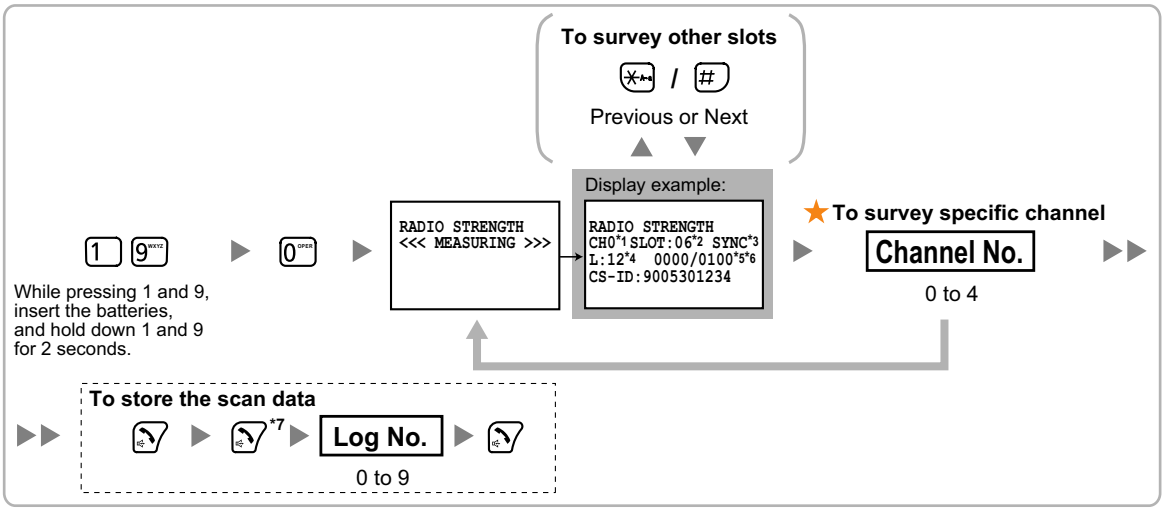
   If the PS is in the communication range of the unit, the cyclic tone outputted from the PS can be heard from the PS by looping back the unit.

6. Confirm that the CS ID number on the screen matches the previously noted CS ID number.
   If the CS IDs do not match, press **NEXT** and search the other CSs.
   - RSSI: Received Signal Strength Indicator
   - If RSSI/Error Rate value is stronger than threshold level, the color of the text background becomes green.

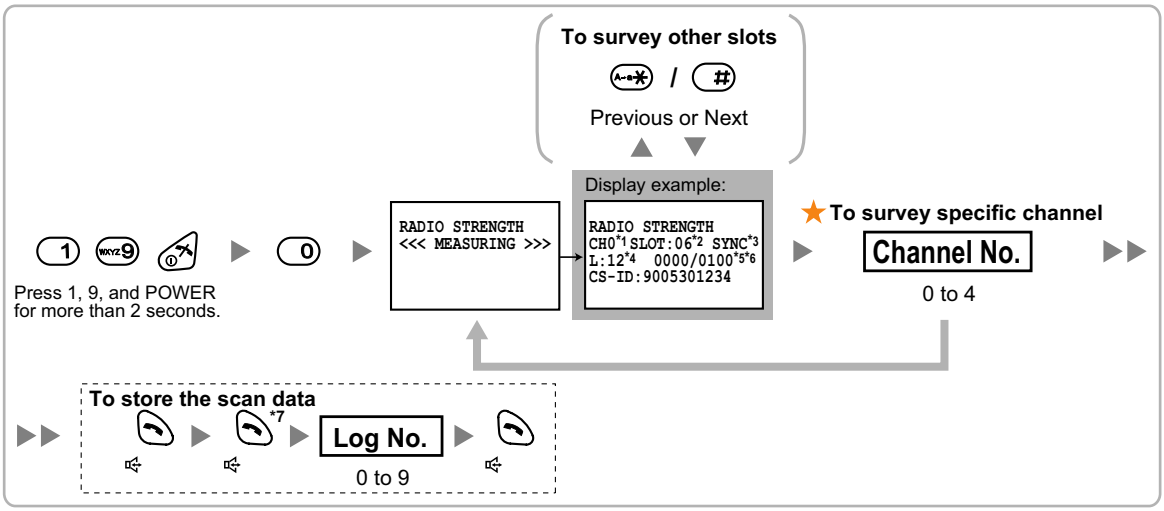
   

When using a PS other than a KX-TCA185/KX-TCA285/KX-TCA385

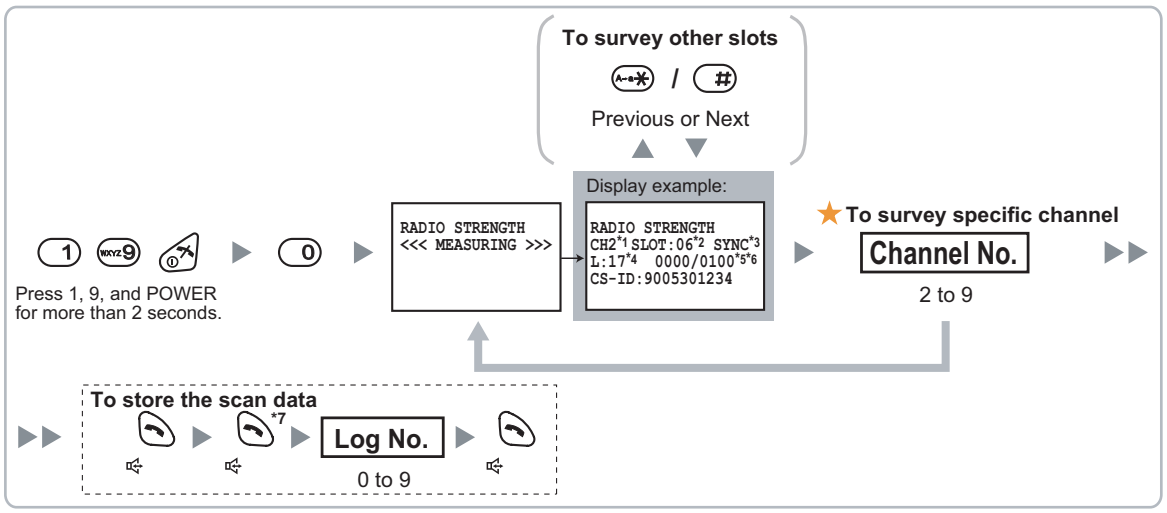
Using the KX-WT125/KX-WT126 (for North America)



Using the KX-TD7685/KX-TD7695/KX-TD7696 (for North America)



Using the KX-TCA155/KX-TCA175/KX-TCA256/KX-TCA275/KX-TCA355/KX-TCA364/ KX-WT115



*1 Channel number
*2 Slot number
*3 When a slot is synchronized, "**SYNC**" is displayed.
*4 Radio signal strength level
*5 Frame error (0000 to 9999)/Frame counter (0000 to 9999). Frame error indicates the number of errors out of 10 000 radio signal receptions. An increased number of frame errors indicates greater radio signal interference and more frequent noise during conversation. The ideal number of frame errors is "0000".
*6 Error rate (%) = Frame error (0000 to 9999) / Frame counter (0000 to 9999) × 100
*7 This operation is necessary only the first time you store scan data for a channel.

Note

- Storing the scan data will clear all phonebook data.
- The PS will not operate in normal mode if scan data is saved on it. For details on clearing scan data, refer to "5.5.5 Clearing the Stored Scan Data".

5.5.3 Measuring the Signal Strength

You can measure the error rate and the radio signal strength by moving towards and away from the CS.

Note

- If the error rate is 2% or more, measure the error rate at the same location at least 5 times. The rate varies for different regions. For details, refer to the following list. You must disconnect the CS and then reconnect it to take each measurement.
  If the error rate is consistently 2% or more, there may be interference from external wireless equipment. In this case, the results below may happen regardless of the radio signal strength level. If the error rate is consistently 2% or more without interference from external wireless equipment, it is likely that metallic materials in the surrounding structures are causing interference. In this case, move the CS or increase the number of CSs in the area.

  Error Rate for Establishing Conversations Using PSs

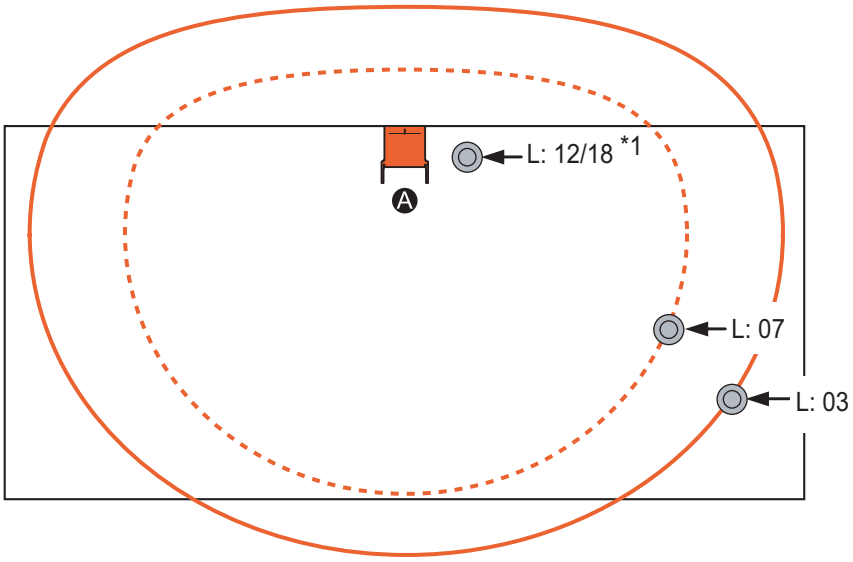
Region	Error Rate	Result
KX-NS0154	Approx. 3%	May receive noise
	Approx. 10%	May fail to make/receive calls
KX-NS0154CE/ KX-NS0154LA	Approx. 2%	May receive noise
	Approx. 10%	May fail to make/receive calls

  If the frame error value continues to increase abnormally (100 per second), the radio signal has been lost. In this case, re-perform the procedure in "5.5.2 Preparing PSs to Test the Radio Signal Strength" starting from ★ (only when using a PS other than a KX-TCA185/KX-TCA285/KX-TCA385).
  The above is a rough standard, and may vary depending on the environment.
- When deciding where to install the CS, priority should be given to an error rate rather than a radio signal strength level.
- After installing the CS according to the results of the survey, confirm that calls can be made and received, and conversations can be heard clearly.

[Procedure]

1. Move closer to the CS until the radio signal strength level becomes "12 or 18"[*1].
2. LAN Synchronization:
   – Move away from the CS and identify the CS coverage area within which the radio signal strength level is greater than "03". Draw the area on the map.

   Air Synchronization:
   – Move away from the CS and identify the CS coverage area within which the radio signal strength level is greater than "07". Draw the area on the map.



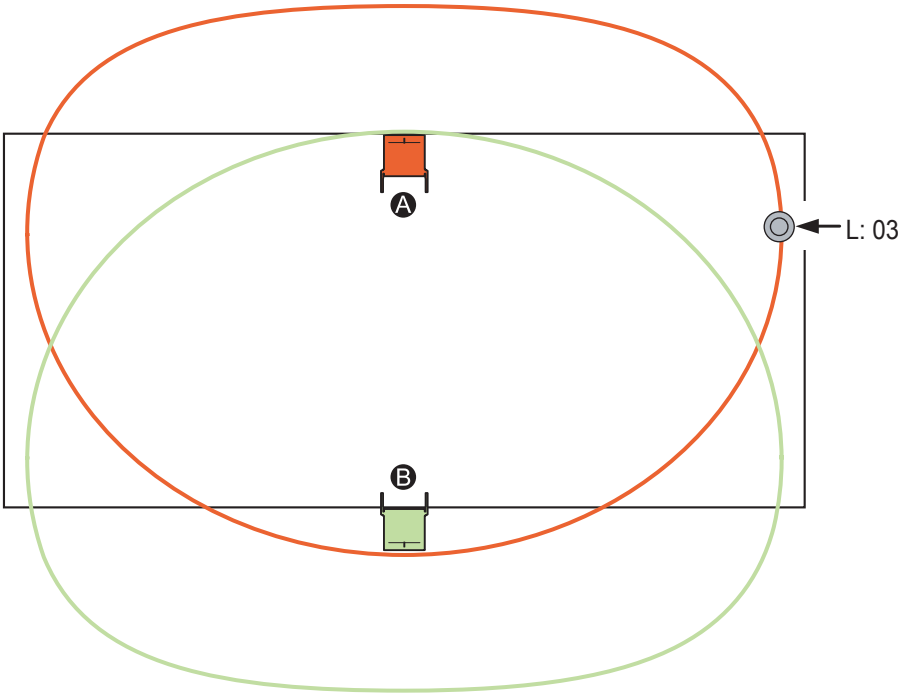
[*1] 12: KX-TD7685/KX-TD7695/KX-TD7696/KX-WT125/KX-WT126
18: KX-TCA185/KX-TCA285/KX-TCA385/KX-TCA155/KX-TCA175/KX-TCA256/KX-TCA275/KX-TCA355/KX-TCA364/KX-WT115

Radio Signal Strength Levels for Establishing Conversations Using PSs

Radio Signal Strength	KX-TCA185/KX-TCA285/ KX-TCA385/KX-TCA155/ KX-TCA175/KX-TCA256/ KX-TCA275/KX-TCA355/ KX-TCA364/KX-WT115	KX-TD7685/KX-TD7695/ KX-TD7696/KX-WT125/ KX-WT126
Better	Level: 14 to 18	Level: 11 to 12
Good	Level: 08 to 13	Level: 08 to 10
May receive noise	Level: 03 to 07	Level: 03 to 07
Receives noise easily or disconnects	Level: 01 to 02	Level: 01 to 02
Out of range	Level: 00	Level: 00

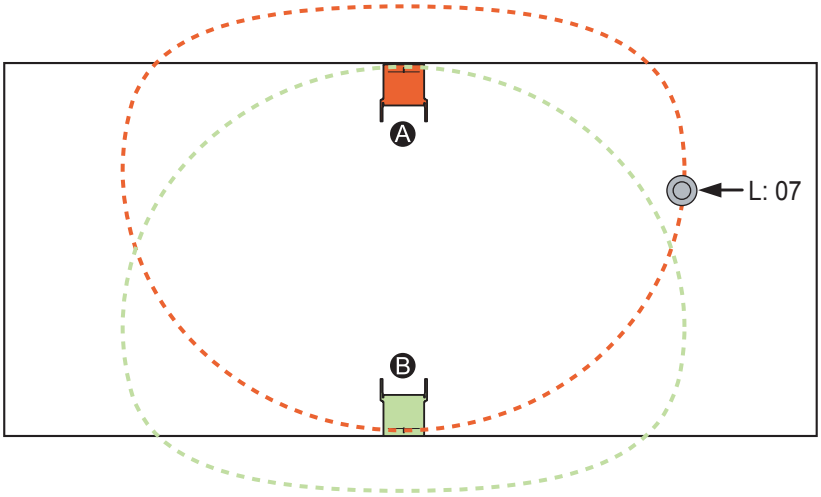
3. Repeat this procedure for all other CSs, and relocate the CSs when necessary.
   LAN Synchronization:

– Plan the location of the CS within range where the radio signal strength level is "03".



Air Synchronization:

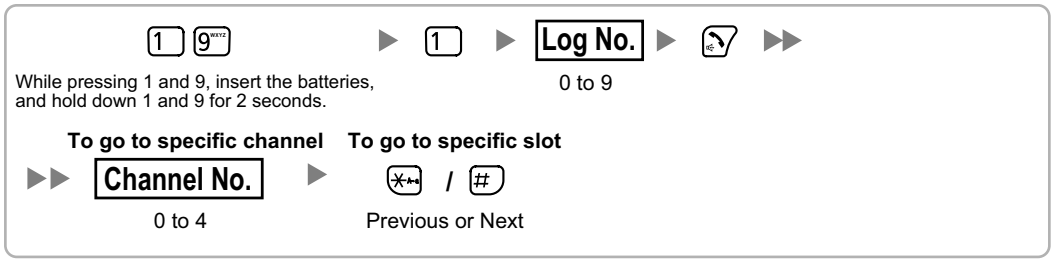
– Plan the location of the CS so that its clock signal source is within range of the CS where the radio signal strength level is "07".



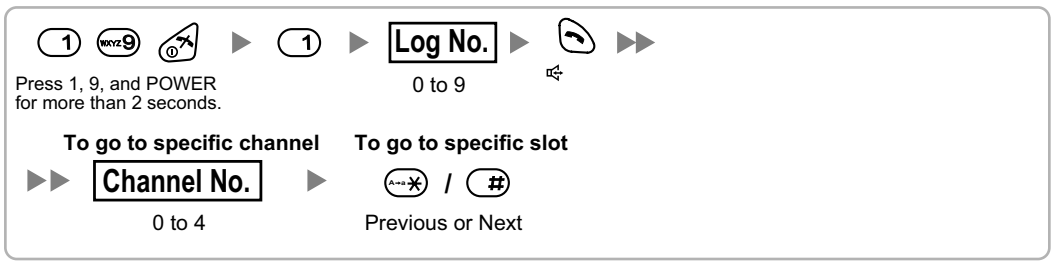
5.5.4 Referring to the Stored Scan Data

If you are using a KX-TCA185/KX-TCA285/KX-TCA385, you can skip this procedure.

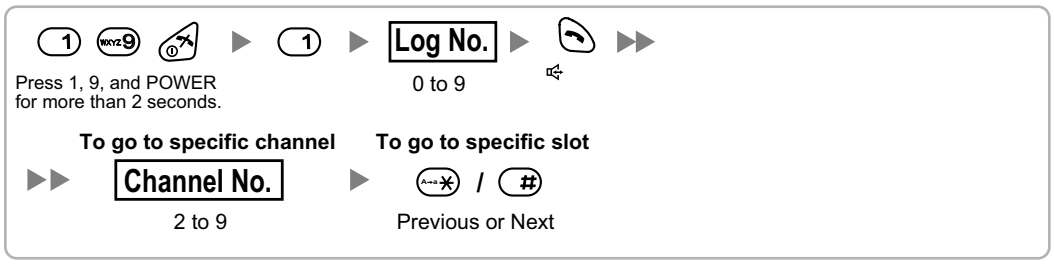
Using the KX-WT125/KX-WT126 (for North America)



Using the KX-TD7685/KX-TD7695/KX-TD7696 (for North America)



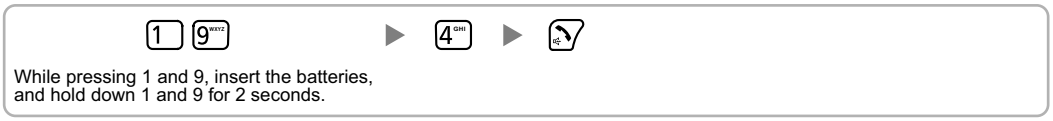
Using the KX-TCA155/KX-TCA175/KX-TCA256/KX-TCA275/KX-TCA355/KX-TCA364/ KX-WT115



5.5.5 Clearing the Stored Scan Data

If you are using a KX-TCA185/KX-TCA285/KX-TCA385, you can skip this procedure.

Using the KX-WT125/KX-WT126 (for North America)



Using the KX-TD7685/KX-TD7695/KX-TD7696/KX-TCA155/KX-TCA175/KX-TCA256/ KX-TCA275/KX-TCA355/KX-TCA364/KX-WT115

5.5.6 After Site Survey

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

1. Hold down the POWER button on the PS until the PS is off.
2. Disconnect the CS from the AC adaptor, battery or PoE to stop supplying electricity.
3. Switch all DIP switches on the CS from ON to OFF.

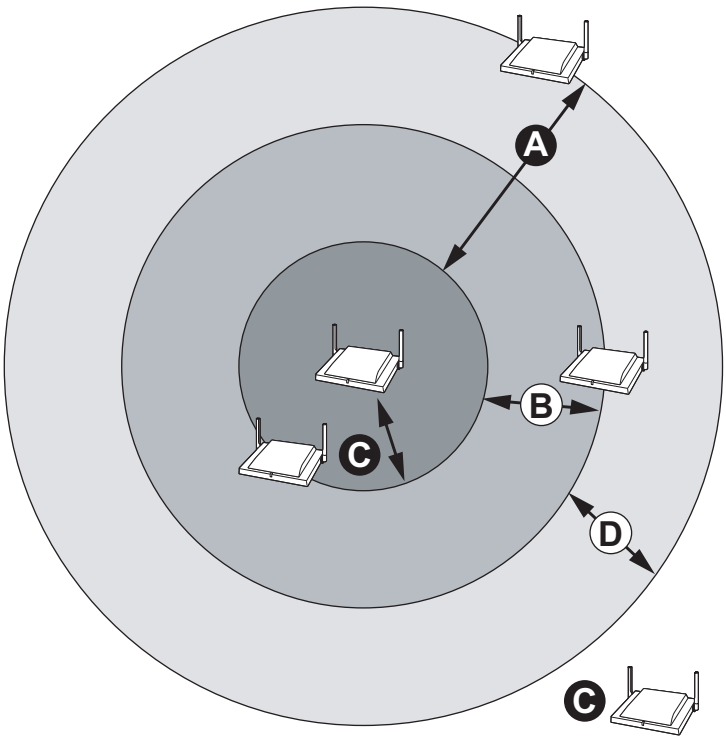
5.6 Air Synchronization

CS Coverage Area for Air Synchronization between CSs

The example below shows the size of the area where one CS can synchronize with other CSs, if it is installed in an area with no obstacles.

Note

Radio signal strength levels are measured during the site survey.



A Coverage Area

B Good Coverage Area:
Good synchronization quality can be maintained.

C Out of Service

D Gray Zone:
Conversation will be intermittent.

Radio Signal Strength	KX-NS0154	KX-NS0154CE/KX-NS0154LA
Good Coverage Area	Level 07 or more: about 30 m to 35 m (about 98 ft to 115 ft)	Level 07 or more: about 30 m to 40 m (about 98 ft to 131 ft)
Coverage Area	Level 03 or more: about 45 m to 55 m (about 148 ft to 180 ft)	Level 03 or more: about 50 m to 60 m (about 164 ft to 197 ft)
Out of Service	Outside coverage area or within about 1 m (about 3.28 ft) from the CS.	

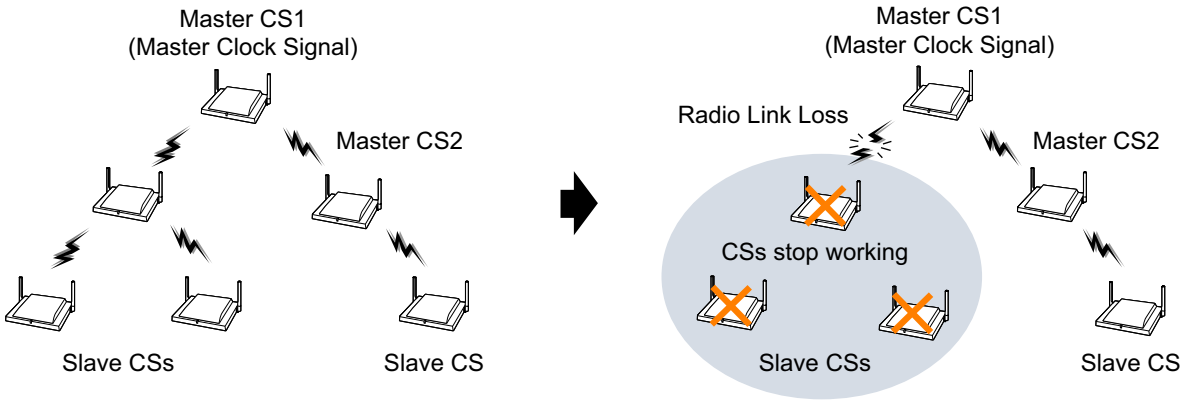
CS Classifications

CSs are assigned to any one of the following three classifications for implementing air synchronization:

CS Class	Description
Master CS1 (synchronization source clock)	Generates clock signal.
Master CS2 (backup for Master CS1)	Receives clock signal from Master CS1 (can also generate clock signal if Master CS1 malfunctions).
Slave CS	Receives clock signal from other CSs.

Synchronization Hierarchy

Air synchronization has a hierarchical structure with a Master CS1 at the top. Therefore, it is necessary to conduct the site survey with extreme care to ensure stable synchronization since one disruption of the radio link could cause loss of service to a wide area.



Search Order (Primary/Secondary)

The search order used for synchronizing CSs must be set. If the CS cannot synchronize with the Primary CS for some reason, it will try to synchronize with the Secondary CS.

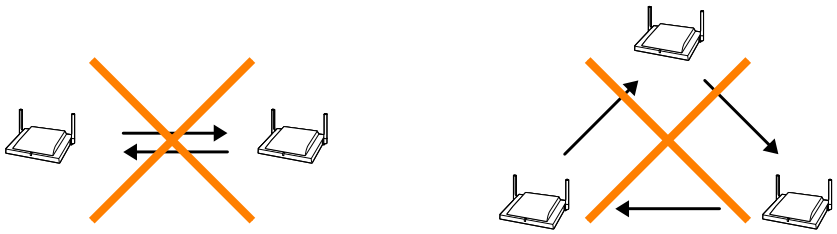
CS Class	Primary CS	Secondary CS
Master CS1	None	None
Master CS2	Master CS1	None
Slave CS	Master CS1, Master CS2, or Slave CS	Master CS1, Master CS2, Slave CS, or None

For example, if synchronization is completely lost by malfunction of the Master CS etc., handover will not work and ongoing calls will be disconnected after a while. In addition, new calls cannot be made or received. Therefore, it is recommended to not only assign the Primary CS but also the Secondary CS as an alternative source for synchronizing CSs.

Conditions for Configuring the Air Synchronization

- Master CS2 must be within range of Master CS1.
- It is recommended that Master CSs be placed in the middle of the installation site.
- Both a Primary CS and Secondary CS should be assigned to Slave CSs.
- When using only two CSs on the network (only two CSs are connected to the PBX), make sure that you do not create a Master CS2.
- All traditional CSs are automatically assigned and fixed as Master CS1.
- When using IP-CSs and traditional CSs in the same area, make sure that you do not create a Master CS2.
- When synchronizing CSs, do not create loops as in the examples below:

  [Examples]



- It is recommended that the number of levels in the synchronization hierarchy is minimized for stable air synchronization. The maximum number of levels is 4.

Notice about Mutual Interference of Radio Waves

Mutual interference of radio waves may occur under the following conditions. This could lead to loss of air synchronization.

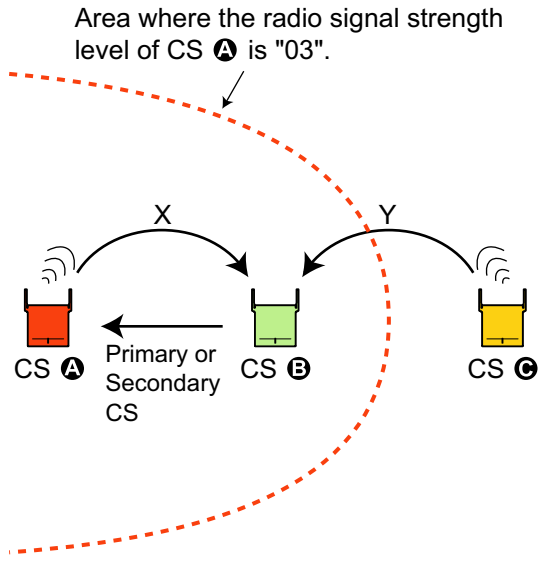
[Installation Environment]
As shown in the diagram below,

- CS Ⓑ is synchronized with CS Ⓐ.
- CS Ⓒ is outside the area where the radio signal strength level of CS Ⓐ is "03".
- CS Ⓑ is within the area where the radio signal strength level of CS Ⓒ is "03".

[Conditions]
X = radio signal strength level of CS Ⓐ, Y = radio signal strength level of CS Ⓒ

- Y is greater than X.
- X and Y are nearly equal.

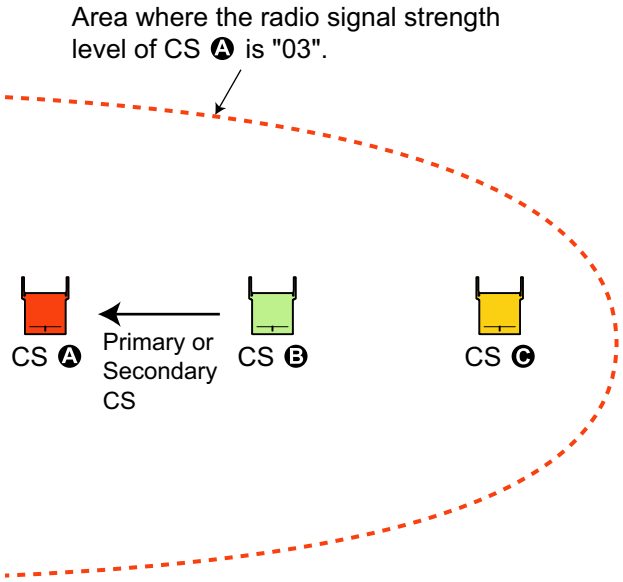
[Result]
CS Ⓑ loses air synchronization since the radio waves of CS Ⓒ interfere with the radio waves of CS Ⓐ received by CS Ⓑ.



Solution

Move CS Ⓒ to within the area where the radio signal strength level of CS Ⓐ is "03".

[Result]
Radio wave interference will not occur since CS Ⓐ and CS Ⓒ will monitor each other's radio waves.



When Installing Additional CSs

Ensure that the following conditions are met when installing additional CSs.

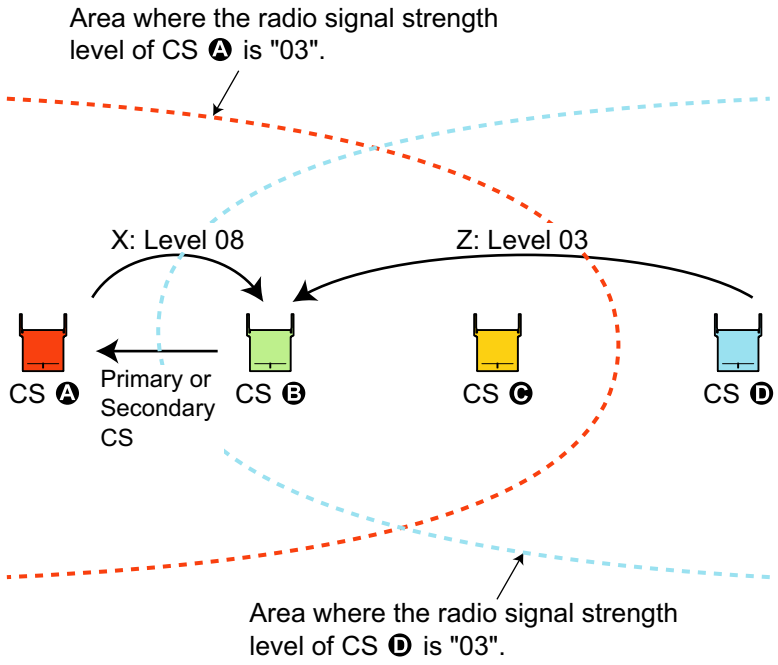
- For North America
  → Locate CS Ⓑ within the area where the radio signal strength level of CS Ⓐ is "08".
  For other countries/areas
  → Locate CS Ⓑ within the area where the radio signal strength level of CS Ⓐ is between "06" and "07".
- Locate CS Ⓑ within the area where the radio signal strength level of CS Ⓓ is "03".

[Result]

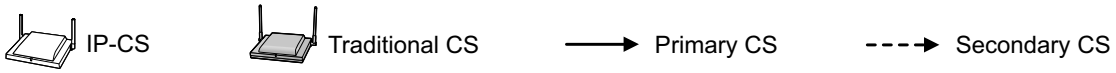
X = radio signal strength level of CS Ⓐ, Z = radio signal strength level of CS Ⓓ.

- X is much greater than Z.

The radio waves of CS Ⓓ are not a source of interference since the radio waves that CS Ⓑ receives from CS Ⓐ are stronger than those received from CS Ⓓ.



Recommended Configuration

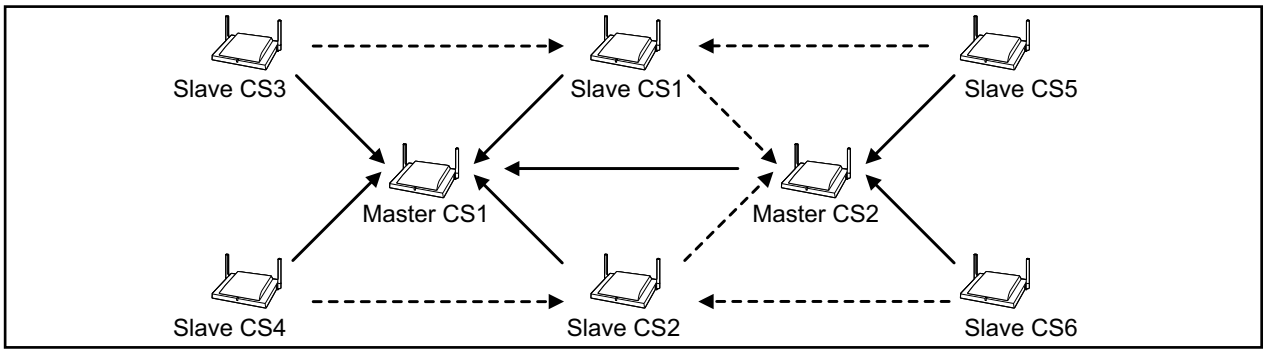


Note

The KX-NS1000 PBX supports only IP-CSs directly.

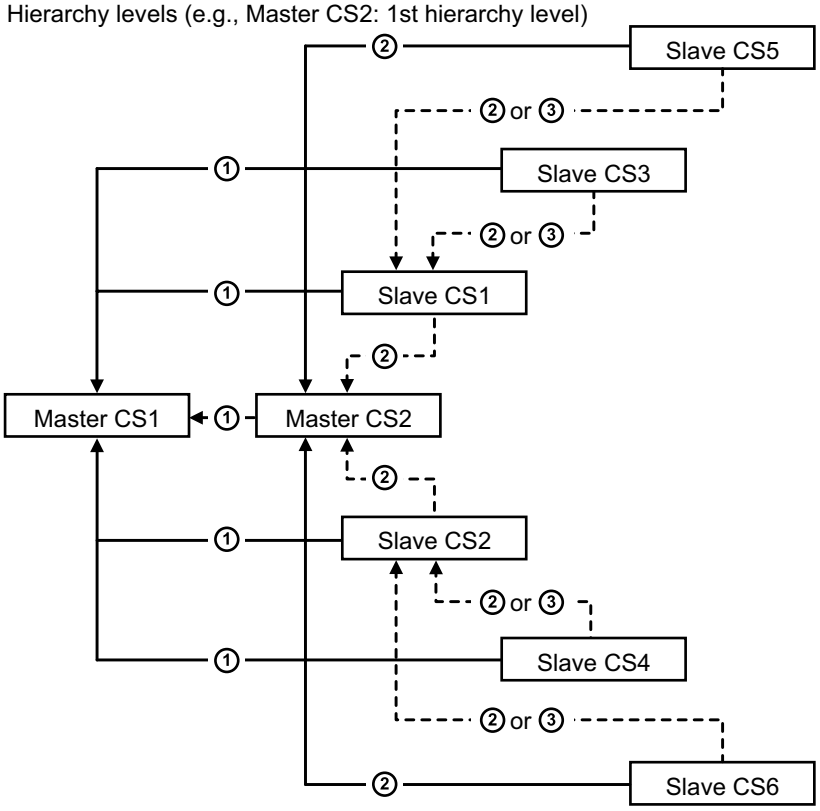
[Configuration Example 1]

Diagram



Air Synchronization Tree

①–③: Hierarchy levels (e.g., Master CS2: 1st hierarchy level)



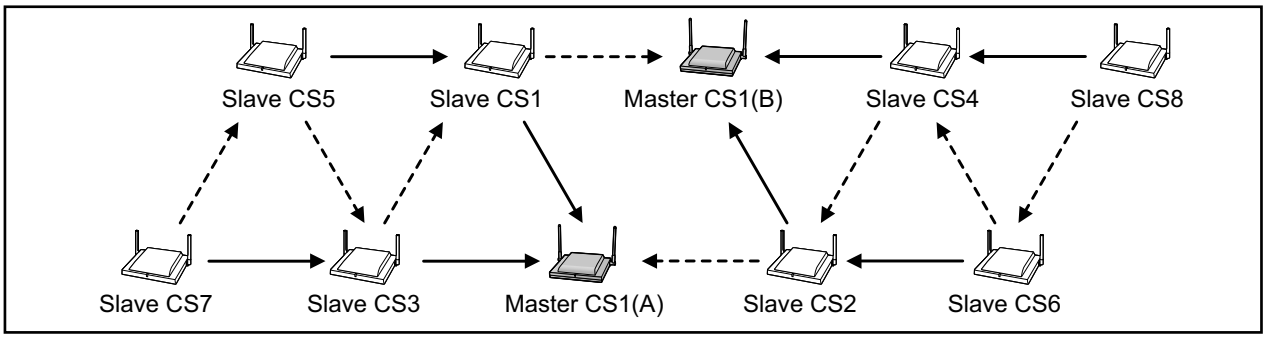
Note

Ensure that the Slave CSs in the first column are located within the area where the radio signal strength level of the respective CSs in the second column is "03".

Slave CS3 and Slave CS4	Master CS2
Slave CS5 and Slave CS6	Master CS1

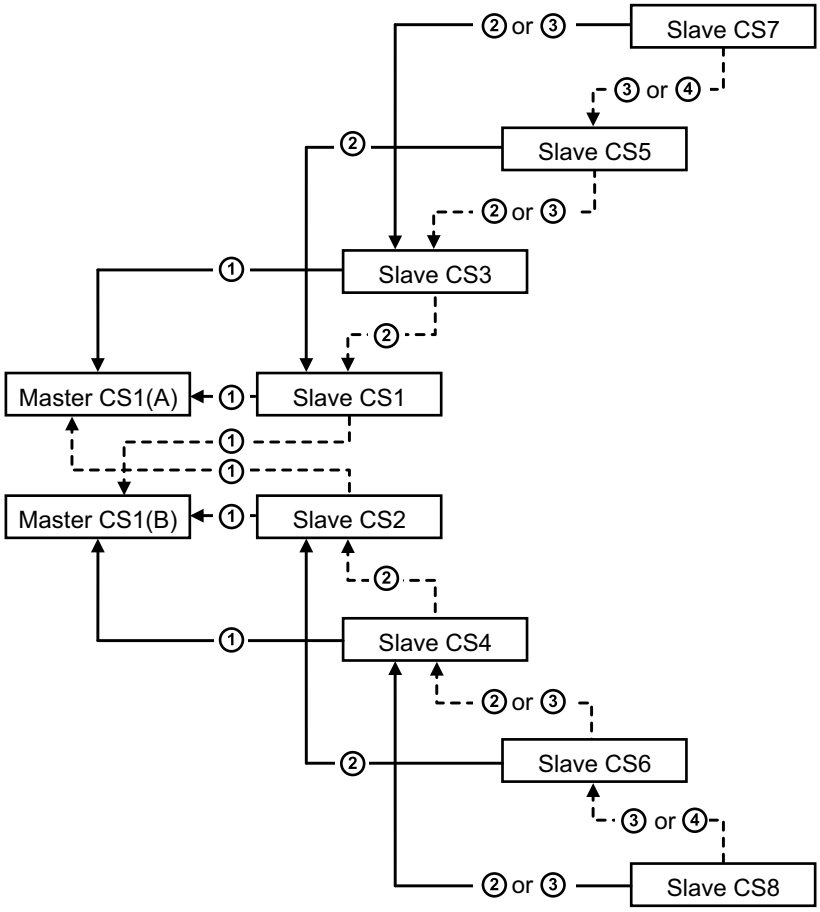
[Configuration Example 2]

Diagram



Air Synchronization Tree

①–④ : Hierarchy levels (e.g., Slave CS1: 1st hierarchy level)



Note

Ensure that the Slave CSs in the first column are located within the area where the radio signal strength level of the respective CSs in the second column is "03".

Slave CS3	Master CS1(B)
Slave CS4	Master CS1(A)
Slave CS5	both Master CS1(A) and Master CS1(B)
Slave CS6	both Master CS1(A) and Master CS1(B)
Slave CS7	both Master CS1(A) and Slave CS1
Slave CS8	both Master CS1(B) and Slave CS2

Assigning the Synchronizing CSs

Assigning the Master CSs

Note

When using only one IP-CS at an installation site, assign it as Master CS1 so that it can generate the clock signal.

1. Click Setup → PBX Configuration → Maintenance → Air Synchronization.
2. From the Air Synchronization Group Number drop-down list, select the desired Air Synchronization Group number.
3. Click a cell in the Connection column for the registered CS to open the Command window for the port. In the Command window, click OUS to change the status of the port to "OUS".
4. Select the desired classification for the CS in the CS Class column.

   Note

   For details about other parameters on this screen, refer to the PC Programming Manual for your PBX.
5. Click Apply.

   Note

   Please wait about one minute after clicking Apply to allow changes to take effect.
6. Click the cell in the Connection column again, and click INS in the Command window to return the status of the port to "INS".

Setting the Synchronizing CS Search Order (Primary/Secondary)

The search order of each CS can be set by the following procedure:

1. Click Setup → PBX Configuration → Maintenance → Air Synchronization.
2. From the Air Synchronization Group Number drop-down list, select the desired Air Synchronization Group number.
3. Click a cell in the Connection column for the registered CS to open the Command window for the port. In the Command window, click OUS to change the status of the port to "OUS".
4. Select the desired CS number in the Primary CS - Index and Secondary CS - Index.

   Note

   For details about other parameters on this screen, refer to the PC Programming Manual for your PBX.
5. Click Apply.

   Note

   Please wait about one minute after clicking Apply to allow changes to take effect.
6. Click the cell in the Connection column again, and click INS in the Command window to return the status of the port to "INS".

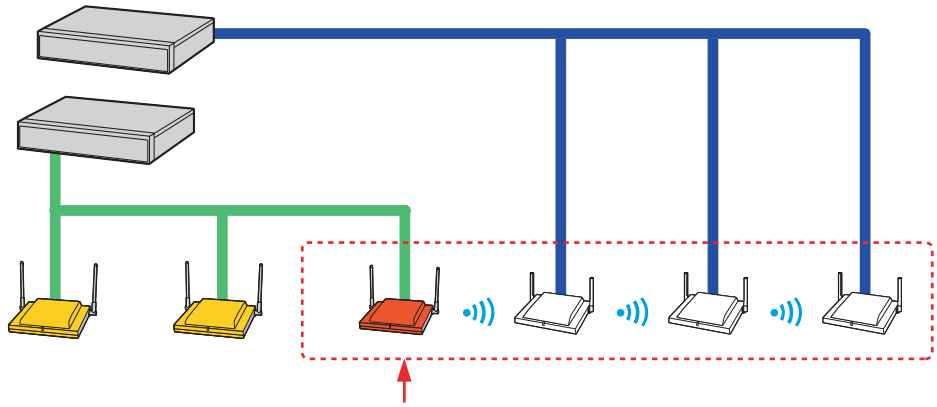
5.7 Synchronization with Traditional CSs or Old IP-CSs

When Traditional CSs are Connected via a Stacking Connection

LAN synchronization is not available in this case.
Assign and locate one of the traditional CSs as the Air Sync Master of the Air Sync Group.
IP-CSs (KX-NS0154 and KX-NCP0158) can only be assigned as Slave CSs, as shown in the following figure.

Note

- Air Sync Master is also a member of Air Sync Group 1. Therefore, this group can contain up to 15 IP-CSs.
- In order to cover the same area, the required number of air synchronized IP-CSs may be larger than that of traditional CSs, or LAN synchronized KX-NS0154s.
- When using IP-CSs and traditional CSs in the same area, make sure that you do not create a Master CS2.



Air Sync Group 1

 : PBX

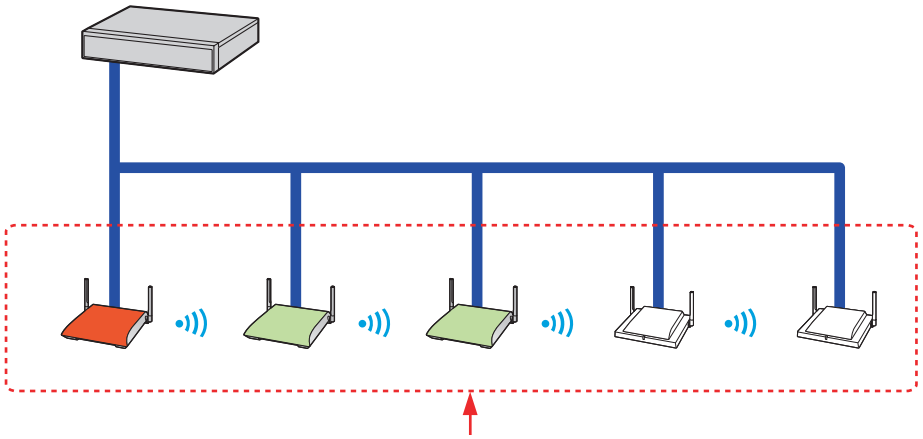
 : Traditional CS

 : Traditional CS (Air Sync Master)

 : KX-NS0154

When Synchronizing with a KX-NCP0158

LAN synchronization is not available in this case.
Add units as Slave CSs to the Air Synchronization Group of the KX-NCP0158.



Air Sync Group 1

 : PBX

 : KX-NCP0158 (Air Sync Master)

 : KX-NCP0158

 : KX-NS0154

Note

- In order to cover the same area, the required number of air synchronized IP-CSs may be larger than that of LAN synchronized KX-NS0154s.

5.8 Connecting the Unit to a Battery

WARNING

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

CAUTION

- The DC jack cover poses a choking hazard. Keep the DC jack cover out of reach of children.
- Use only the specified battery and battery cable for the CS.
- Make sure that the battery cable is securely fastened to both the battery and the CS.
- Make sure that the polarities of the battery and wiring are correct.

Notice

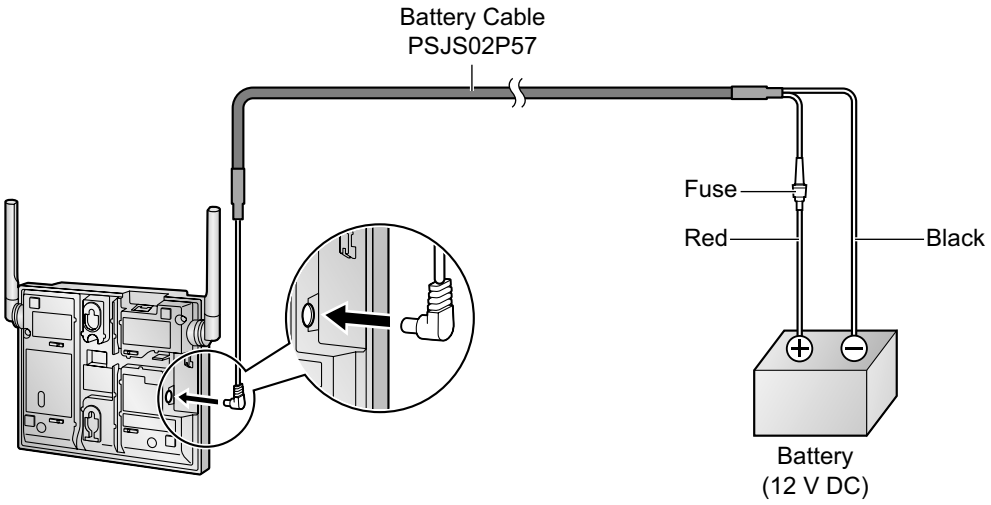
Be sure to comply with applicable local regulations (e.g., laws, guidelines).

Note

- The battery cable should not be exposed to direct sunlight. Keep the battery cable and the battery away from heating appliances and fire. Place the battery in a ventilated place.
- For details about the battery, refer to the manual for the battery.

User-supplied Items

- Battery: VRLA (Valve Regulated Lead Acid) 12 V DC × 1
- Battery cable: PSJS02P57



Power Supply Duration

Battery Conditions: 12 V DC, 2.5 Ah to 28 Ah

Example

Battery Capacity	Power Supply Duration[*1]
4 Ah	10 hours (when conducting the site survey)

[*1] The duration may vary depending on the conditions.

5.9 Registering IP Cell Stations to the KX-NS series PBX

Note

The following procedures are based on the KX-NS1000 PBX.

Registering the IP-CS

Note

The KX-NS series PBX supports only IP-CSs directly.

1. Connect the PC to the MNT port of the PBX with an Ethernet straight cable.
2. Launch your Web browser and in the address bar, enter the following address corresponding to the PBX exactly as shown:
   – **http://kx-ns1000.** or **223.0.0.1**

   Note

   If entering "**http://kx-ns1000.**", be sure to include the period at the end as shown.
3. Log in using the Installer level account name and password.
   – The login name for the Installer level account is "INSTALLER".
   – The default login password for the Installer level account is "1234".

   CAUTION

   To avoid unauthorized access and possible abuse of the PBX, we strongly recommend:
   a. Keeping the password secret.
   b. Changing your password regularly.
   c. Selecting a complex, random password that cannot be easily guessed.
4. **a.** Click Setup → PBX Configuration → Configuration → Slot.
   b. Move the mouse pointer over Site Property and click Main.
   c. Select Manual for IP-CS Registration Mode.
   d. Click OK.
5. **a.** Click Setup → PBX Configuration → Configuration → Slot.
   b. Click Virtual → V-IPCS4.
   c. From the Total number of cards drop-down list, select the desired number of cards.
   d. Move the mouse pointer over a V-IPCS4 card that has been added. A menu will be shown under the mouse pointer.
   e. Click Port Property.
6. Click Registration.
   A dialogue box will appear. Non-registered (available) IP-CSs are displayed on the left.

7. **a.** Highlight IP-CSs and click the right arrow to select them for registration.
   b. Click Next. A screen will appear with information on the selected IP-CS for programming.

   Note

   - If the IP-CS has been connected to the LAN and power has been turned on, the IP address of the PBX will be assigned automatically.
   - If not, connect the IP-CS to the LAN and turn the power on within 15 minutes after this operation is done. The IP address of the PBX will then be assigned automatically.

   c. If the registration is still in progress, the dialogue box will show "Registration Executing".
   If the registration is successful, the dialogue box will show "Registration Completed". Click Close.

Once the IP-CS is successfully registered, the status of the IP-CS will update to show "Registered".

Note

The PBX's default synchronization method setting is LAN synchronization. The IP-CS registered to the PBX is assigned to LAN Sync Group No. 1. The synchronization method, Sync Group and CS class can be changed using the PBX's Web Maintenance Console. For details, refer to the PC Programming Manual for your PBX.

De-registering the IP-CS

When uninstalling an IP-CS that has been installed once, de-register the IP-CS.

Note

When uninstalling IP-CSs that are supplying the clock signal, air synchronization is lost. If there is an IP-CS that is synchronized with the IP-CS that is being uninstalled, reconstruct the air synchronization tree beforehand so that the uninstalled IP-CS is not supplying the clock signal to any IP-CSs.

1. **a.** Click Setup → PBX Configuration → Configuration → Slot.
   b. Click Virtual → V-IPCS4.
   c. Move the mouse pointer over the V-IPCS4 card. A menu will be shown under the mouse pointer.
   d. Click Port Property.
2. Click De-registration.
   A dialogue box will appear. Registered IP-CSs are displayed on the left.

3. **a.** Highlight IP-CSs and click the right arrow to select them for de-registration.
   b. Click Next.
   A dialogue box will appear.
   c. Click Confirm.
   If the de-registration is successful, the dialogue box will show "De-registration Succeed".
   d. Click Close.

Once the IP-CS is successfully de-registered, the status of the IP-CS will update to show "None".

Forced De-registering the IP-CS

Follow the steps below to forcibly de-register an IP-CS when normal de-registration was unsuccessful.

1. **a.** Click Setup → PBX Configuration → Configuration → Slot.
   b. Click Virtual → V-IPCS4.
   c. Move the mouse pointer over the V-IPCS4 card. A menu will be shown under the mouse pointer.
   d. Click Port Property.
2. Click Forced De-registration.
   A dialogue box will appear. Registered IP-CSs are displayed on the left.
3. **a.** Highlight IP-CSs and click the right arrow to select them for de-registration.
   b. Click Next.
   A dialogue box will appear.
   c. Click OK.
   A dialogue box will appear.
   d. Click Confirm.
   If the de-registration is successful, the dialogue box will show "Forced de-registration succeed!".
   e. Click Close.

Once the IP-CS is successfully de-registered, the status of the IP-CS will update to show "None".

5.10 Registration to Secondary PBX

This unit can temporarily switch its connection from a primary PBX to a secondary PBX when a communication path fault occurs to the primary PBX. To enable this feature, you must register the IP address of the secondary PBX on the unit in advance.
Follow the steps below to register the secondary PBX's IP address.

1. Start IP Terminal Maintenance Console.
   For details about IP Terminal Maintenance Console, refer to "5.12 IP Terminal Maintenance Console".
   a. Click "Setting".*1
   b. When using Default IP address mode:
      – Click "Next" three times.
      When using Variable IP address mode:
      – After entering the IP address and Port No., click "Next" two times.
   c. On the Configure IP Terminal Setting screen, if the PBX Address (Primary) and PBX Address (Secondary) fields are empty, set the appropriate IP addresses.
2. Set the PBX connection mode by using DIP switch no. 4 (refer to "5.2 DIP Switch").
3. Restart the unit.

*1 If the local IP address setting screen appears, select the relevant local IP address.

Note

If an activation key (KX-NSE201/KX-NSE205/KX-NSE210/KX-NSE220) is installed on the primary PBX, the same activation key must also be installed on the secondary PBX.

5.11 Firmware update of the proprietary PSs

The firmware of the proprietary PSs (KX-TCA185/KX-TCA285/KX-TCA385 only) can be updated via the unit. There are two methods to download the firmware from the unit.

Step 1: Firmware download from KX-NS series PBX to the unit

The download method is specified by using the Web Maintenance Console. About the details, refer to the manual of the PBX.

Step 2: Firmware download from the unit to the PSs

1. After starting the download mode, "Searching" is blinking on the LCD of the PS.
2. When finding the CS, "Please Wait..." is blinking while trying to connect the CS.
3. If the connection succeeded, the firmware information is displayed.
4. When starting the download, "Downloading xx%" is displayed.
   xx: progress ratio
5. When the download completed, "Download OK" is displayed.

Note

- The PS will restart several times during the firmware update.
- PS firmware updates can be performed simultaneously for up to 4 PSs per CS.
- PS firmware downloading can be performed during regular operation.

5.12 IP Terminal Maintenance Console

IP Terminal Maintenance Console has the following two features.

- LAN synchronization diagnosis feature
  Sets and controls LAN synchronization diagnosis and outputs the diagnosis results.
  For details about the diagnosis results, refer to the following table.
- Local setting feature
  Performs network settings (e.g., secondary PBX IP address), VLAN settings, and site survey.
  You can start IP Terminal Maintenance Console from Off-line Web Maintenance Console for KX-NS series PBXs. For details, consult your dealer or sales company.

Term	Result Information	Action Information	Recommended Action	LED Color
Short Long	OK		—	Green
Long	Conditional OK (Signal Jitter)	Confirm H.O error ratio is acceptable	Confirm that the H.O error ratio is acceptable. Reconnect the CS to a switch that a working CS is connected to. Use recommended LAN and switch configuration.	Amber
Long	Conditional OK (Signal Delay)	Confirm H.O error ratio is acceptable	Confirm that the H.O error ratio is acceptable. Reconnect the CS to a switch that a working CS is connected to. Use recommended LAN and switch configuration.	
Short	Indeterminable (IGMP Querier not found)*1	Confirm again by long term diagnosis	Confirm Installation Guide (If IGMP*1 snooping of the switch is activated, synchronization over the LAN may fail).	
Short	Indeterminable	Confirm again by long term diagnosis	Confirm again by long term diagnosis. Reconnect the CS to a switch that a working CS is connected to. Use recommended LAN and switch configuration.	

Term	Result Information	Action Information	Recommended Action	LED Color
Short Long	Not OK (Signal Jitter)	Change the LAN configuration	Reconnect the CS to a switch that a working CS is connected to. Use recommended LAN and switch configuration.	Red
Short Long	Not OK (Signal Delay)	Change the LAN configuration	Reconnect the CS to a switch that a working CS is connected to. Use recommended LAN and switch configuration.	
Short Long	Out of sync (10base-T)	Change the LAN configuration	Use L2 switch which supports 100base-TX full.	
Short Long	Out of sync (100base-TX Half)	Change the LAN configuration	Use L2 switch which supports 100base-TX full.	
Short Long	Out of sync (IGMP Querier not found)*1	Change the LAN configuration	Confirm Installation Guide.	
Short Long	Out of sync	Change the LAN configuration	Reconnect the CS to a switch that a working CS is connected to. Use recommended LAN and switch configuration.	

*1 IGMP: Internet Group Management Protocol

5.13 PS Area Check (KX-TCA185/KX-TCA285/ KX-TCA385 only)

In this section, you can check the service area, handover and voice quality alone, using 2 registered PSs under actual conditions.

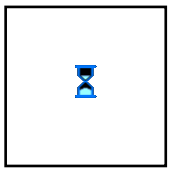
Starting the PS in Maintenance Mode

To enter Maintenance mode, follow the procedure below:

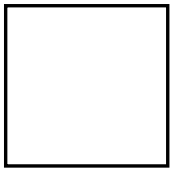
Note

Before using an PS, the battery must be inserted and then charged for the specified amount of time. For details, refer to the documentation for the PS.

1. The PS should be in a powered off state. If the PS is turned on, turn it off by pressing and holding the POWER/CANCEL key.
2. Turn on the PS by pressing and holding the POWER/CANCEL key.



3. After turning on the PS, a blank screen will be displayed. At this time, press and hold the TALK/ SP-PHONE key for about 8 seconds.



4. Press the left soft key, press **[8]**, and then press **[1]**.
   The Maintenance mode screen will be displayed.

5. Press **OK**.
   The Maintenance mode main menu will be displayed.

Entering PS Area Check mode

1. Start the PS in Maintenance mode.
2. Select "PS area check", and then press **OK**.

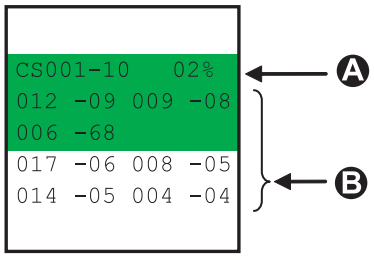
3. Select "On".
4. Press OK.
5. Press the POWER/CANCEL key until the PS is turned off to exit Maintenance mode.
6. Press the POWER/CANCEL key until the PS is turned on.
7. Repeat the procedure from **1** to **6** for another PS.

Note

Both PSs must be in PS Area check mode.

Conducting PS Area Check

1. Call PS(2) from PS(1) to call the registered phone number via PS Registration.
   PS(1) sends a tone signal to PS(2), and PS(2) returns the signal back to PS(1).
   You can hear a tone when this signal is received.
2. Set PS(2) close to the IP-CS and move around the service area listening to the tone from PS(1)'s receiver to confirm voice quality and handover operation.
   The CS-ID and signal strength of the IP-CS you are connected to and the target IP-CS for Handover is displayed on the PS. When the signal strength is sufficiently strong, the CS-ID is displayed in green.



Ⓐ CSnnn-xx yy%
nnn: Current sync CS ID
xx: RSSI level
yy: Error rate

Ⓑ Detected CS IDs and RSSI level are displayed.
If the RSSI level exceeds the threshold, it is displayed with green shading.

Notice

When checking the PS area, ensure that at least one IP-CS is displayed in green on the LCD of the handset within the service area.

Note

For information about the numbers displayed on this LCD screen, refer to the tables and example image shown in "5.5.2 Preparing PSs to Test the Radio Signal Strength".

Notes for Conducting PS Area Check

When you conduct PS area checking, please note the following:

- In order to perform handover for PSs, at least two IP-CSs need to be recognized by the PSs in the service area.
- IP-CSs with a signal strength that is sufficiently strong but that are not currently connected are also displayed in green on the PS's LCD screen.
- When the PS moves towards another IP-CS, the RSSI level of the currently connected IP-CS changes.

- Handover is performed when the RSSI level of the currently connected IP-CS becomes lower than the other IP-CS's RSSI level.
- Make sure to check that there is no noise during handover.

Exiting PS Area Check Mode

When the PS area check is finished, exit the PS area check mode.

1. Start the PS in Maintenance mode.
2. Select "PS area check", and then press OK.
3. Select "Off".
4. Press OK.
5. Press the POWER/CANCEL key until the PS is turned off.
6. Press the POWER/CANCEL key until the PS is turned on.
7. Repeat the procedure from **1** to 6 for the other PS.

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