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NEC

SL1100

Hardware Manual

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Regulatory

GENERAL INFORMATION

This equipment complies with Part 68 of the FCC Rules and the requirements adopted by the ACTA. On the equipment is a label that contains, among other information, a product identifier in the format: **US:AAAEQ##TXXXX**. If requested, this number must be provided to the telephone company.

The telephone company may make changes in its technical operations and procedures. When such changes affect the compatibility or use of the SL1100 system, the telephone company is required to give adequate notice of the changes in order for you to maintain uninterrupted service.

The REN is used to determine the number of devices that may be connected to a telephone line. Excessive RENs on a telephone line may result in the devices not ringing in response to an incoming call. In most, but not all areas, the sum of RENs should not exceed five (5.0). To be certain of the number of devices that may be connected to a line, as determined by the total RENs, contact the local telephone company. For products approved after **July 23, 2001**, the REN for this product is the product identifier in format: **US:AAAEQ##TXXXX**. The digits represented by ## are the REN without a decimal point (e.g., 03 is a REN of 0.3).

Connection to party line service is subject to state tariffs. Contact the state public utilities commission, public service commission or corporation commission for information.

For single and two-line equipment that connects to the telephone network via a plug and jack, the plug and jack used with this equipment must comply with FCC Part 68 rules.

A plug and jack used to connect this equipment to the premises wiring and telephone network must comply with the applicable FCC Part 68 rules and requirements adopted by the ACTA. A compliant telephone cord and modular plug is provided with this product. It must be connected to a compatible modular jack that is also compliant.

TELEPHONE/SERVICE PROVIDER COMPANY NOTIFICATION

Before connecting this telephone system to the telephone network, the following information must be provided to the telephone company:

1. Your telephone number.
2. FCC registration number:

- When the system is to be installed as a Key Function system (no dial access to Trunk Groups/Route Advance Blocks), use the following number:
  US:NIFKF10BSL1100
- When the system is to be installed as a Multifunction system, use the following number:
  US:NIFMF10BSL1100
- When the system is to be installed as a PBX system, use the following number:
  US:NIFPF10BSL1100

Ringer Equivalence Number (REN): **1.0B**

USOC jacks required: **RJ11C, RJEX, RJ2FX, RJ2HX, RJ48C, RJ21X**

INCIDENCE OF HARM

If this equipment causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. But if advance notice is not practical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.

The telephone company may make changes in its facilities, equipment, operations or procedures that could affect the operation of the equipment. If this happens, the telephone company will provide advance notice in order for you to make necessary modifications to maintain interrupted service.

REPAIR SERVICE REQUIREMENTS

If the equipment is causing harm to the telephone network, the telephone company may request that you disconnect the equipment until the problem is resolved.

If equipment malfunctions, all repairs must be performed by an authorized agent of NEC Corporation of America or by NEC Corporation of America. The user requiring service is responsible for reporting the need for service to a NEC Corporation of America authorized agent or to NEC Corporation of America.

PRIVATE (LEASED) LINES

For Private (Leased) Line (Analog Data Format) equipment, type JM8 jack is required. Refer to ATIS Technical Report No. 5 for details on this connector.
The Facility Interface Code (FIC) associated with each private line application represents the type of service that will be provided by the telephone company. The user instructions must contain a detailed list of private line ports and the associated FICs for which the equipment has been approved. In addition, the Service Order Code (SOC) must also be included for analog systems. The SOC indicates the degree of network protection provided by the equipment,.
For Private (Leased) Line (Digital Format) equipment, in addition to the general requirements for all equipment, certain digital connections require that an encoded analog content and billing protection affidavit be provided the telephone company. Customer instructions must contain information on the preparation and submission of the affidavit.
To comply with state tariffs, the telephone company must be given notification prior to connection. In some states, the state public utility commission, public service commission or corporation commission must give prior approval of connection.

TOLL RESTRICTION AND LEAST COST ROUTING EQUIPMENT

The consumer/purchaser/supplier instructions accompanying this equipment and/or software features must contain the following notice:

- The software contained in the SL1100 to allow user access to the network must be upgraded to recognize newly established network area codes and exchange codes as they are placed into service.
- Failure to upgrade the premises systems or peripheral equipment to recognize the new codes as they are established will restrict the customer and the customer's employees from gaining access to the network and these codes.

DIRECT INWARD DIALING

ALLOWING THIS EQUIPMENT TO BE OPERATED IN SUCH A MANNER AS TO NOT PROVIDE FOR PROPER ANSWER SUPERVISION IS A VIOLATION OF PART 68 OF THE FCC RULES.

Direct Inward Dialing (DID) must contain the following:

Proper Answer Supervision is when:

- This equipment returns answer supervision to the Public Switched Telephone Network (PSTN) when Direct Inward Dialing (DID) calls are:
  - Answered by the called station.
  - Answered by the Attendant.
  - Routed to a recorded announcement that can be administered by the Customer Premise Equipment (CPE) user.
  - Routed to a dial prompt.
- This equipment returns answer supervision on all DID calls forwarded to the Public Switched Telephone Network (PSTN). Permissible exceptions are:
  - A call is unanswered.
  - A busy tone is received.

- A reorder tone is received.

VOICE ANNOUNCEMENT/MONITORING OVER DID LINES

When using voice announcement or monitoring over DID Lines, observe the following.

CAUTION

Using the Voice Announcement feature to eavesdrop or record sound activities at the other end of the telephone line may be illegal under certain circumstances and laws. Consult a legal advisor before implementing any practice to monitor or record a telephone conversation. Some federal and state laws require a party monitoring or recording a telephone to use a beep-tone(s), notify all parties to the telephone conversation and/or obtain consent of all parties to the telephone conversation. In monitoring or recording sound activities at the other end of the telephone line using the Voice Announcement feature, the sound of the alert tone at the beginning of the Voice Announcement may or may not be considered sufficient under applicable laws. Some of the applicable laws provide for strict penalties for illegal monitoring or recording of telephone conversations.

EQUAL ACCESS REQUIREMENTS

If equipment such as Private Branch Exchanges (PBX), key systems or customer-owned coin/credit card telephones is sold to a call aggregator, it must be capable of providing users access to interstate providers of operator services through the use of access codes. Modification of this equipment by call aggregators to block access dialing codes is a violation of the Telephone Operator Consumers Act of 1990.

ELECTRICAL SAFETY ADVISORY

Parties responsible for equipment requiring AC power should consider including an advisory notice in their customer information suggesting the customer use a surge arrestor. Telephone companies report that electrical surges, typically lightening transients, are very destructive to customer terminal equipment connected to AC power sources. This has been identified as a major nationwide problem.

HEARING AID COMPATIBILITY

NEC Multiline Terminals and NEC Single Line Telephones that are provided for this system are hearing aid compatible. The manufacturer of other Single Line Telephones for use with the system must provide notice of hearing aid compatibility to comply with FCC rules that now prohibit the use of non-hearing aid compatible telephones.

MUSIC ON HOLD

IMPORTANT NOTE

"In accordance with U.S. Copyright Law, a license may be required from the American Society of Composers, Authors and Publishers, or other similar organization, if radio or TV broadcasts are transmitted through the Music On Hold feature of this telecommunication system. NEC Corporation of America, hereby disclaims any liability arising out of the failure to obtain such a license."

RADIO FREQUENCY INTERFERENCE

In compliance with FCC Part 15 rules, the following statement is provided:

IMPORTANT NOTE

“This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the System Hardware Manual, may cause interference to radio communications. This equipment has been tested and approved for compliance with the limits for a Class B (except as noted below) computing device pursuant to subpart J of Part 15 of FCC Rules, that are designed to

provide reasonable protection against such interference when operated in a commercial environment. Operation of this telephone system in a residential area is likely to cause interference, in which case, the user, at his or her own expense, is required to take whatever measures may be required to correct the interference."

When equipped with the 1228M/ME-B KSU, the SL1100 can be operated as a Class B device.

SAFETY INFORMATION

This equipment has been certified by CSA International and found to comply with all Applicable safety requirements:

- CAN/CSA C22.2 No. 0-M – General Requirements – Canadian Electrical Code, Part II
- CAN/CSA C22.2 No. 60950-1-07 – Safety of Information Technology Equipment – Part I: General Requirements
- UL 60950-1-SAFETY, 2nd Edition – Safety of Information Technology Equipment – Part I: General Requirements

INDUSTRY CANADA REQUIREMENTS

Industry Canada has established rules that permit this telephone system to be directly connected to the telephone network. Prior to the connection or disconnection of this telephone system to or from the telephone network, the telephone company must be provided with the following information.

This product meets the applicable Industry Canada Technical Specifications/Le present material est conforme aux specifications techniques applicables d'industrie Canada.

1. Your telephone number.
2. IC registration number: IC: 140L-SL1100
3. Ringer Equivalence Number (REN) of the equipment: 1.0B

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be coordinated by a representative designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, when present, are connected together. This precaution may be particularly important in rural areas.

CAUTION

Users should not attempt to make such connections themselves, but should contact the applicable electrical inspection authority or electrician.

The Ringer Equivalence Number (REN) is an indication of the maximum number of devices allowed to be connected to the telephone interface. The termination on an interface may consist of any combination of devices subject only to the requirement that the sum of RENs of all the devices does not exceed five/L'indice d'equivalence de la sonnerie (IES) sert a indiquer le nombre maximal de terminaus qui peuvent etre raccordes a une interface telephonique. La terminaison d'une interface peut consister en une combinaison quelconque de dispositifs, a la seule condition que la somme d'indices d'equivalence de la sonnerie de tous les dispositifs n'excede pas 5.

This equipment meets Industry Canada Requirements in accordance with **IC CS-03, issue 9 Part 1**.

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus as set out in the radio interference regulations of Industry Canada/Le present appareil numerique n'emet pas de bruits radioelectriques depassant les limites applicables aux appareils numeriques de Classe A prescrites dans le reglement sur le brouillage radioelectrique edicte par Industrie Canada.

BATTERY DISPOSAL

The SL1100 system includes the batteries listed below. When disposing of these batteries, KSU, and/or Unit, you must comply with applicable federal and state regulations regarding proper disposal procedures.

Unit Name	Type of Battery	Quantity	Note
IP4[ ]-CPU-B1	Lithium	1	
External Battery (IP4WW-Battery Box)	Sealed Lead	2 per IP4WW-Battery Box	
DTL-8R-1 Cordless Handset	Ni-MH	1	
ML440 Wireless Handset	Lithium-ion	1	

The SL1100 IP4[ ]-CPU-B1 provides memory backup for approximately three years. The Lithium battery should be replaced every two years.

IMPORTANT SAFEGUARDS FOR BATTERY DISPOSAL

DO NOT PLACE USED BATTERIES IN YOUR REGULAR WASTE! THE PRODUCT YOU PURCHASED CONTAINS LITHIUM, SEALED LEAD BATTERIES. LITHIUM, SEALED LEAD BATTERIES MUST BE COLLECTED, RECYCLED, OR DISPOSED OF IN AN ENVIRONMENTALLY SOUND MANNER.

The incineration, landfilling or mixing of sealed lead batteries with the municipal solid waste stream is PROHIBITED BY LAW in most areas. Contact your local solid waste management officials for other information regarding the environmentally sound collection, recycling, and disposal of the battery.

Sealed lead batteries must be returned to a federal or state approved sealed lead battery recycler. This may be where the batteries were originally sold or a local seller of automotive batteries. Contact your local waste management officials for other information regarding the environmentally sound collection, recycling and disposal of the battery contained in this product.

The packaging for the SL1100 system contains the following labels regarding proper disposal.

Pb

CONTAINS SEALED LEAD BATTERY.
BATTERY MUST BE RECYCLED. MUST NOT BE DISPOSED OF IN MUNICIPAL WASTE.

EUROPEAN UNION INFORMATION

Notice to the user

The system described in this manual is intended to be connected to analog and digital networks and supports a wide range of peripheral equipment. The following interfaces are available for connection to public analog and digital telecommunication networks:

- TBR3 ISDN basic rate interface
- TBR4 ISDN primary rate interface
- ES203-021 Analogue interface

To take advantage of all features of this system and the connected equipment, the country or network specific features should match the supported features of the system. For an overview of the supported features, refer to the detailed documentation that comes with this system, contact your local NEC Unified Solutions representative or the support desk of NEC Unified Solutions.

Declaration of conformity

Hereby, NEC Unified Solutions, declares that the SL1100 is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.

For the Declaration of Conformity, visit: http://www.nec-unified.com/doc

CE

Electromagnetic Compatibility

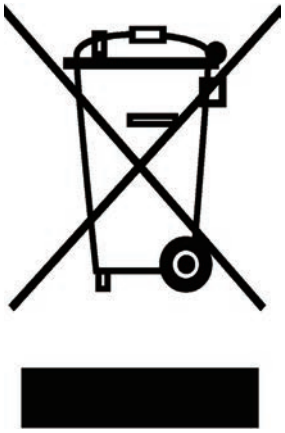
For the SL1100 system the following warning is applicable:

Warning

This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

PRODUCT DISPOSAL INFORMATION

For Countries in the European Union



The symbol depicted here has been affixed to your product to inform you that electrical and electronic products should not be disposed of as municipal waste.

Electrical and electronic products including the cables, plugs and accessories should be disposed of separately to allow proper treatment, recovery and recycling. These products should be taken to a designated facility where the best available treatment, recovery and recycling techniques are available. Separate disposal has significant advantages: valuable materials can be re-used and it prevents the dispersion of unwanted substances into the municipal waste stream. This contributes to the protection of human health and the environment.

Please be informed that a fine may be imposed for illegal disposal of electrical and electronic products via the general municipal waste stream.

To facilitate separate disposal and environmentally sound recycling arrangements have been made for local collection and recycling. If your electrical and electronic products must be disposed of please refer to your supplier or the contractual agreements that your company has made upon acquisition of these products.

At www.nec-unified.com/weee you can find information about separate disposal and environmentally sound recycling.

BATTERY INFORMATION

Defective or exhausted batteries should never be disposed of as municipal waste. Return old batteries to the battery supplier, a licensed battery dealer or a designated collection facility. Do not incinerate batteries. This product uses Lithium batteries. Do not use any other type.

For an overview of the location of batteries used in these systems, the battery replacement or removal instructions, please refer to the SL1100 System Hardware Manual.

Memo

Introduction

SECTION 1 GENERAL INFORMATION

The SL1100 system is designed to support small/medium businesses with simple installation and easy operation. The small compact KSU comes with an installed CPU and eight digital and four analog extension ports and has two stackable slots for further expansion.
Two more expansion KSUs provide a maximum of 36 analog trunks and 72 Multiline terminals. The SL1100 is also equipped to support Digital Network (PRI, T1) and IP Trunks (SIP) or IP extensions. Also, the SL1100 initially bundles Voice Mail and MEMDB.

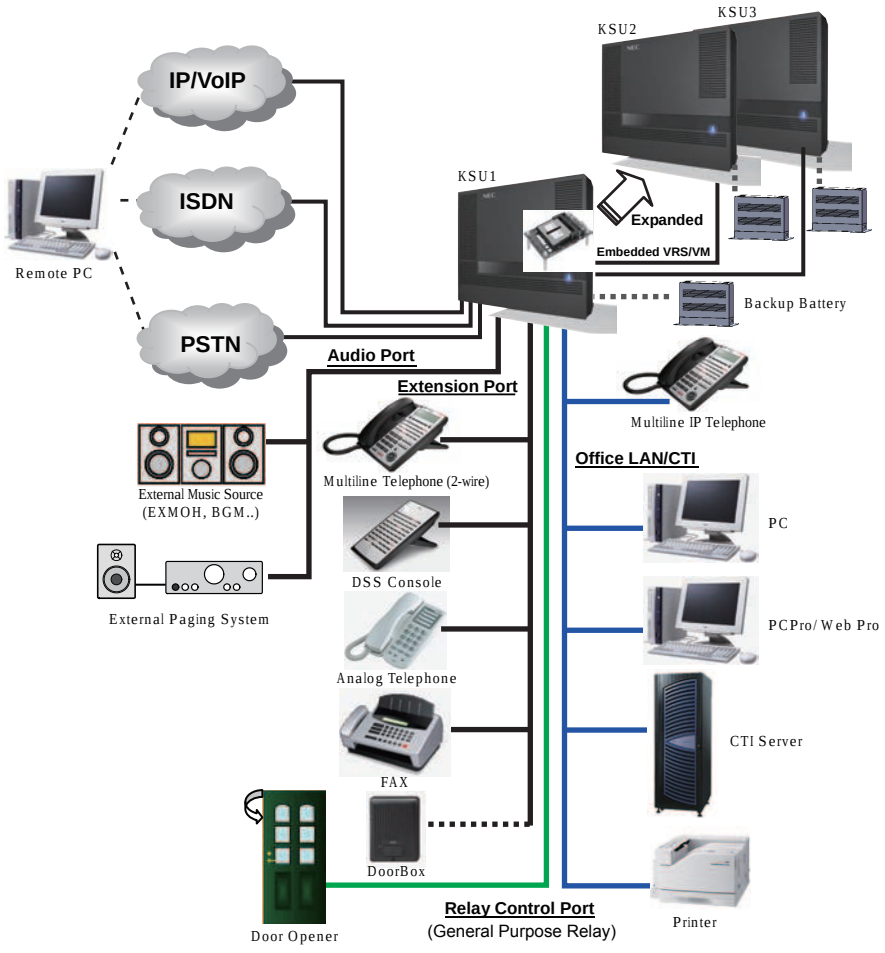


Figure 1-1 System Configuration

SECTION 2 EQUIPMENT LIST

The following table lists all equipment for the SL1100 system.

Stock Number	Equipment Name	Equipment Description	Note
1100001	SL1100 TDM Basic Kit (4x8x4)	SL1100 Basic Kit (4x8x4) <Including> IP4NA-1228M-B KSU, IP4WW-4COIDB-B1, IP4WW-12TXH-B-TEL (BK) (3 sets)	
1100010	IP4NA-1228M-B KSU	IP4NA-1228M-B KSU with AC Cable (for NA) <Including> IP4NA-CPU-B1, IP4WW-084M-B1, Power Supply, PZ-VM21, IP4NA-MEMDB-C1	
1100011	IP4NA-1228ME-B EXP	IP4WW-1228ME-B EXP with AC Cable <Including> IP4WW-EXIFE-C1, IP4WW-084M-B1, Power Supply	
1100110	IP4WW-EXIFB-C1	Expansion KSU Interface Unit, 3 jacks (two only are used)	
1100114	IP4WW-Battery Box	External Battery Box without Batteries	
1100020	IP4WW-080E-B1	8 Digital Extensions Interface	
1100021	IP4WW-008E-B1	8 Analog Extensions Interface	
1100022	IP4WW-4COIDB-B1	4 Analog Trunks Interface, mounted on 084M-B1/080E-B1/008E-B1 board	
1100024	IP4WW-1PRIU-C1	1 Primary Rate Interface (PRI/T1)	
1100111	IP4WW-VOIPDB-C1	16-channel VOIP on CPU	
1100112	IP4WW-CFVMS-C1	Compact Flash for VRS and InMail (Approx. 15 hours, VRS: 4ch (default)/InMail: 2ch (default))	
1100113	IP4WW-CFVML-C1	Compact Flash for VRS and InMail (Approx. 40 hours, VRS: 4ch (default)/InMail: 4ch (default))	
1100060	IP4WW-12TXH-B-TEL (WH)	2-wire 12-key Multiline Telephone	
1100061	IP4WW-12TXH-B-TEL (BK)		
1100062	IP4WW-24TXH-B-TEL (WH)	2-wire 24-key Multiline Telephone	
1100063	IP4WW-24TXH-B-TEL (BK)		
1100160	IP4WW-24TIXH-C-TEL (WH)	24-Keys, Multiline IP Telephone	
1100161	IP4WW-24TIXH-C-TEL (BK)		
1100064	IP4WW-60D DSS-B CONSOLE (WH)	60-button Direct Station Selection (DSS) Console	
1100065	IP4WW-60D DSS-B CONSOLE (BK)		
721160	DP-D-1A	Doorphone	
922450	DX4NA Doorphone	Doorphone	
690631	AC-L UNIT	AC/DC Adapter for 24TIXH TEL	
780135	AC-2R UNIT	AC/DC Adapter for 24TIXH TEL	
1100080	SL-IP-SIPTRK-1 LIC	SIP Trunk License (1 port)	
1100089	SL-IP-SIPEXT-1 LIC	Standard SIP Terminal License (1 port)	
1100081	SL-IP-ENCRYPTION LIC	Encryption License for Multiline IP Telephone (1 license per system)	
1100083	SL-VM-CHANNEL-2 LIC	Additional InMail Channel License (2 ports)	

Stock Number	Equipment Name	Equipment Description	Note
1100084	SL-VM-ADVANCE LIC	InMail Advanced Features License (1 license per system)	
1100085	SL-SYS-MOBILE-1 LIC	Additional Mobile Extension Port License (1 port)	
1100086	SL-SYS-HOTEL LIC	Hotel/Motel Feature License (1 license per system)	
1100082	SL-IP-CHANNEL-16 LIC	Additional 16 DSP Resource License (1 license per system)	
1100162	IP4WW-WALL MOUNT UNIT	Wall-Mount Unit for IP4WW-24TIXH-C-TEL	
730095	DTL-8R-1 Cordless Handset	Cordless DECT Handset	
730639	DTL-RPT-1 Repeater	Repeater for DTL-8R-1	
730651	AP20 Base Unit	Base Unit for ML440	
730650	ML440 Multiline Wireless Handset	ML440 Multiline Wireless Handset	

2.1 KSUs and Optional Unit

2.1.1 IP4[ ]-1228M-B KSU

The Main or controlling KSU is shipped fully assembled. The following are included with the KSU:

- CPU with main software (CPU-B1)
- Power supply (110V/240V)
- 1 External backup battery connector
- 2 mounting spaces for 080E/008E/1PRIU
- 8 digital and 4 analog extension I/F (084M-B1)
- 1 mounting space for 4COIDB-B1
- 1 slot for EXIFB-C1
- 2 general purpose relay
- 1 audio output for Paging (mini-jack)
- 2 audio inputs for ExMOH/BGM (mini-jack)
- SLT ringer
- Message waiting lamp driver
- 2ch Built-in Auto Attendant
- VMDB/MEMDB are initially equipped on the IP4NA-CPU-B1.

The on-board DSP provides:

- 16 telephony resources (DTMF/Dial tone/Busy tone/FSK caller-ID receiver/sender)
- 128 tone sender resources (System tones sender/DTMF sender)
- 32 ch conference resources

2.1.2 IP4[ ]-1228ME-B EXP

A maximum of two additional 1228ME EXPs can be connected to expand the system capacity of the 1228M KSU. Although similar in shape and size as the 1228M KSU, the capabilities are not the same. The following are included with the 1228ME EXP:

- Power supply (110 V/240 V)
- 1 external backup battery connector
- 2 mounting spaces for 080E/008E/1PRIU
- 8 digital and 4 analog extension I/F (084M-B1)
- 1 mounting space for 4COIDB-B1
- EXIFE-C1 (1 connector for 1228M-B KSU)
- 2 general purpose relay
- 1 audio output for Paging (mini-jack)
- 2 audio inputs for ExMOH/BGM (mini-jack)
- SLT ringer
- Message waiting lamp driver

The EXIFE DSP provides:

- 32 telephony resources (DTMF/Dial tone/Busy tone/FSK caller-ID receiver/sender)

The 1228ME-B EXP does **NOT** have CPU and main software and cannot be used in a stand-alone mode.

2.1.3 IP4WW-EXIFB-C1

Using a Cat5 cable, EXIFB-C1 card installed in the Main KSU is individually connected to each EXIFE-C1 card (Expansion KSU).

- Install this card to the Main KSU.
- Two connections for Expansion KSUs (No.3 connector is not used).

2.1.4 IP4WW-Battery Box

Connected to each KSU power supply, the external backup battery provides DC power in case a loss of AC power occurs. An optional (locally procured), external battery source can be used to provide power during a power failure.

- Connect this box to the power supply at each KSU.
- Wall/floor-mountable
- One KSU can be mounted on the Battery box.
- Backup duration is approximately one hour.

2.2 Trunk/Extension/ISDN Expansion Interface Cards

2.2.1 IP4WW-080E-B1

The 080E card is installed in the 1228M KSU or 1228ME EXP and provides a total of eight digital ports. The analog trunk daughter board (4COIDB) can be mounted on this card.

- Install this card to the expansion card slot at Main/Expansion KSU.
- Enables the DSS console to connect to any extension port.
- One analog trunk daughter board connection.

2.2.2 IP4WW-008E-B1

This 008E card is installed in the 1228M KSU or 1228ME EXP and provides a total of eight analog ports. The analog trunk daughter board (4COIDB) can be mounted on this card.

- Install this card to the expansion card slot at Main/Expansion KSU.
- One analog trunk daughter board connection.

2.2.3 IP4WW-4COIDB-B1

The 4COIDB provides four analog trunk and is mounted on the 084M, 080E or 008E card. A total of nine 4COIDBs can be installed per system or three 4COIDBs per KSU.

- Mount this board onto the 084M, 080E or 008E card.
- 1 power failure transfer circuit

2.2.4 IP4WW-1PRIU-C1

The 1PRIU is installed in the 1228M KSU or 1228ME EXP providing for either an ISDN Primary Rate Interface, T1 Interface. A total of two 1PRIUs can be installed per system or one 1PRIU per KSU.

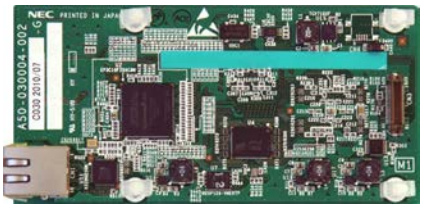
- Install this card to the expansion card slot at Main/Expansion KSU.
- Supports T/S point connection (Hard-switch).

2.3 Optional Interface Cards

2.3.1 IP4WW-VOIPDB-C1

The VOIPDB-C1 card provides the RTP/RTCP voice processing function.

- Mount this card onto the CPU card (VoIPDB slot) at Main KSU.
- Max. 32 channels by license control.



2.3.2 IP4WW-CFVMS-C1/IP4WW-CFVML-C1

Two types of VRS/VM CF cards are available:

- Install into the VMDB mounted on the CPU card at Main KSU.
- CFVMS: VRS and 2-channel InMail (Approx. 15 hours)
- CFVML: VRS and 4-channel InMail (Approx. 40 hours)

2.4 Multiline Telephones and Optional Equipment

2.4.1 IP4WW-12TXH-B TEL

The 12TXH-B TEL is a 2-wire digital multiline telephone featuring:

- Programmable keys: 12
- Soft Keys: 4
- LCD: 24 digits x 3 lines with Backlit
- Handsfree: Full-duplex
- Backlit dial pad: Yes
- Angle Adjustment: 2-steps
- Wall-Mounting kit: Built-in

2.4.2 IP4WW-24TXH-B TEL

The 24TXH-B TEL is a 2-wire digital multiline telephone featuring:

- Programmable keys: 24
- Soft Keys: 4
- LCD: 24 digits x 3 lines with Backlit
- Handsfree: Full-duplex
- Backlit dial pad: Yes
- Angle Adjustment: 2-steps
- Wall-Mounting kit: Built-in

2.4.3 IP4[ ]-24TIXH-C TEL

The 24TIXH-C TEL is an IP multiline telephone featuring:

- Programmable keys: 24
- Soft Keys: 4
- LCD: 24 digits x 3 lines with Backlit
- Handsfree: Full-duplex
- Interface: 2 x RJ45 Ethernet Ports (10Base-T/100Base-TX) for LAN and PC
- Power Feeding: AC Adapter (optional) or PoE (IEEE802.3af)
- Support CODEC: G.711/G.729a/G.722
- Backlit dial pad: Yes
- Angle Adjustment: 2-steps
- Wall-Mounting kit: IP4WW-WALL MOUNT UNIT (Optional)

2.4.4 IP4WW-60D DSS-B

The DSS console gives a multiline terminal user a Busy Lamp Field (BLF) and one-button access to extensions, trunks and system features. Mainly designed for operator use, the 60-button DSS console provides an additional 60 programmable keys.

- Connect this console to digital extension port at 084M/080E of each KSU.
- Programmable keys: 60
- Angle Adjustment: 2-steps
- Wall-Mounting kit: Built-in

2.4.5 DP-D-1D

This is the Doorphone Box.

- Connects to analog port number 3 or 4 on the 084M of each KSU.

2.5 Wireless DECT Telephones

2.5.1 DTL-8R-1 Cordless DECT Telephone

DTL-8R-1 is a single-cell cordless DECT telephone that is adapted for digital NEC SL1100 system. It is designed for use in the office environment.
The following are included with the DTL-8R-1 Cordless DECT Telephone.

- DTL-8R-1 Base Unit
- DTL-8R-1 Cordless Handset

2.5.2 DTL-RPT-1 Cordless DECT Telephone Repeater

DTL-RPT-1 is a repeater to extend the coverage area of DTL-8R-1 Cordless DECT telephone system in all directions.

2.5.3 ML440 and AP20 Wireless DECT Telephone

ML440 and AP20 is a multi-cell wireless DECT telephone that is adapted for digital NEC SL1100 System. It is designed for use in the office environment.
The following are included with the ML440 Wireless DECT.

- AP20 Base Unit
- ML440 Wireless Handset

SECTION 3 SYSTEM CAPACITY

3.1 System Capacity

Table 1-1 System Capacity

Items		1 KSU (1228)	2 KSU (2456)	3 KSU (3684)	Note
Expansion Slot		2	4	6	
System Maximum Port		52	104	144	1KSU: 084M+PRI+080E+4COIDBx2 2KSU: (084M+PRI+080E)x2+4COIDBx4 3KSU: 084Mx3+PRIx2+080Ex4+4COIDBx7
Trunk Port Max.		32	64	76	1KSU: PRIx1+4COIDBx2 2KSU: PRIx2+4COIDBx4 3KSU: PRIx2+4COIDBx7
Trunk Port	**Analog Trunks (COT)**	12	24	36	1KSU: 4COIDBx3 on 084M/080E/008E 2KSU: 4COIDBx6 3KSU: 4COIDBx9
	PRI (24B)	24	48	48	**Max. one PRI/KSU** **Max. two PRIs/system**
	IP Trunk (SIP)	32			
Station Port Max.		28	56	84	1KSU: 084M+080Ex2 2KSU: 084Mx2+080Ex4 3KSU: 084Mx3+080Ex6
Station Port	**2W Key Set**	24	48	72	**Max. 24/KSU** 084M+080Ex2
	SLT (–28V)	20	40	60	1KSU: 084M+008Ex2 2KSU: 084Mx2+008Ex6 3KSU: 084Mx3+008Ex9
	2W DSS Console	12			Connect to digital extension Port at 084M/080E
	Doorphone	2	4	6	2DPH I/F on 084M (analog extension port 3, 4) Alternative use with SLT
	SIP-MLT/ SIP Std. terminal	64			
	VM/VRS Channels	2 VM ports/ 4 VRS ports (default) (Total Max.16)			CFVMS-C1 Port increased by license.
		4 VM ports/ 4 VRS ports (default) (Total Max.16)			CFVML-C1 Port increased by license.
Virtual Extension		50			
Relay		2	4	6	2 circuits on 084M
Power Failure Transfer		3	6	9	1 PFT circuit on 4COIDB (COI port 1 and PF port)
External Paging (Audio Out)		1	2	3	1 audio-In/Out and 2 audio-In circuits on 084M. Select one of 084M for MOH/BGM.
External MOH (Audio In)		1			
External BGM (Audio In)		1			
Ethernet Port		1			1 circuit on CPU
Built-In Answering Machine Channel		2			2 circuits on CPU
VoIP Channels		32			Port increased by license.
V.34 Modem		1			1 circuit on CPU-B1 (VMDB)
Conference Circuits		32 (Max. 16 parties per Conference)			

Items	1 KSU (1228)	2 KSU (2456)	3 KSU (3684)	Note
DSP Resource *1	32			For 1228M KSU (DSP on CPU)
	-	32	64	For 1228ME EXP 32ch DSP on each EXIFE-C1
DSP Sender[*2]	128			

*1. Service Tone receiver, DTMF receiver, Caller ID sender / receiver, MF receiver, MFC receiver

*2. Service Tone sender, DTMF sender, MF sender, MFC sender

3.2 KSU Capacity

System image of KSU capacity (ISDN, Trunk, Extension) is shown as below.

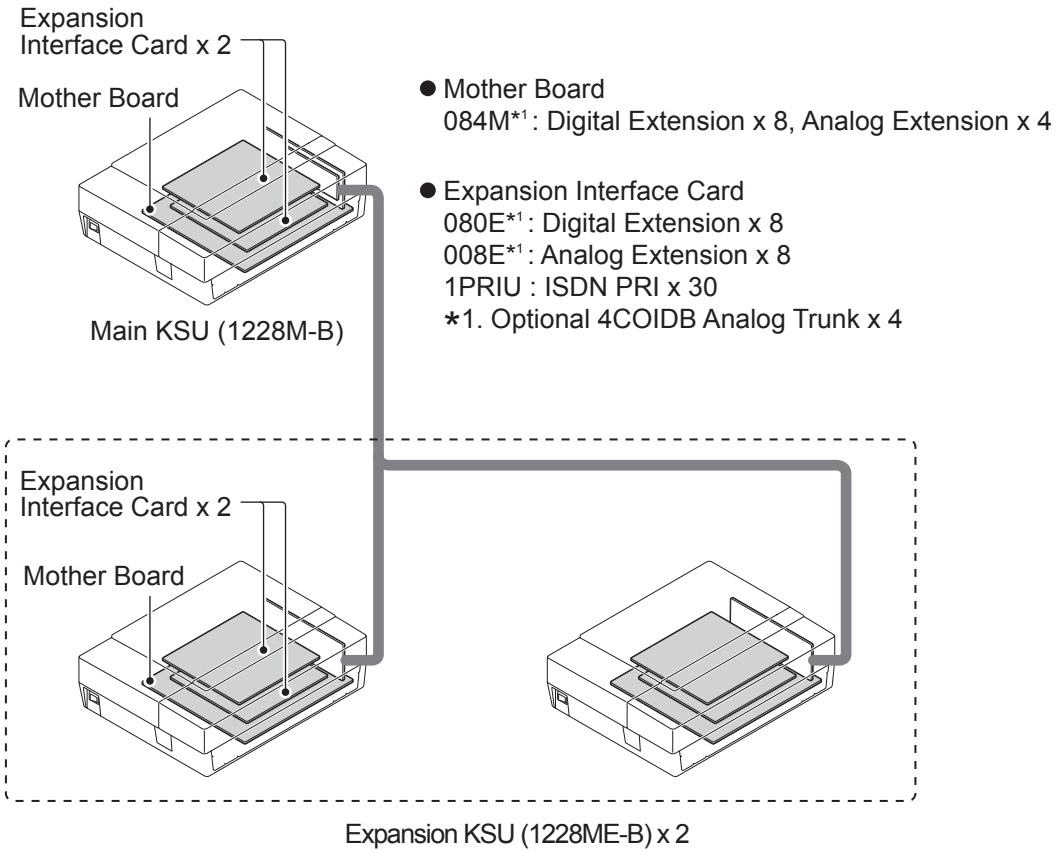


Figure 1-2 System Image

3.2.1 Expandability of Trunk and Extension (without PRI)

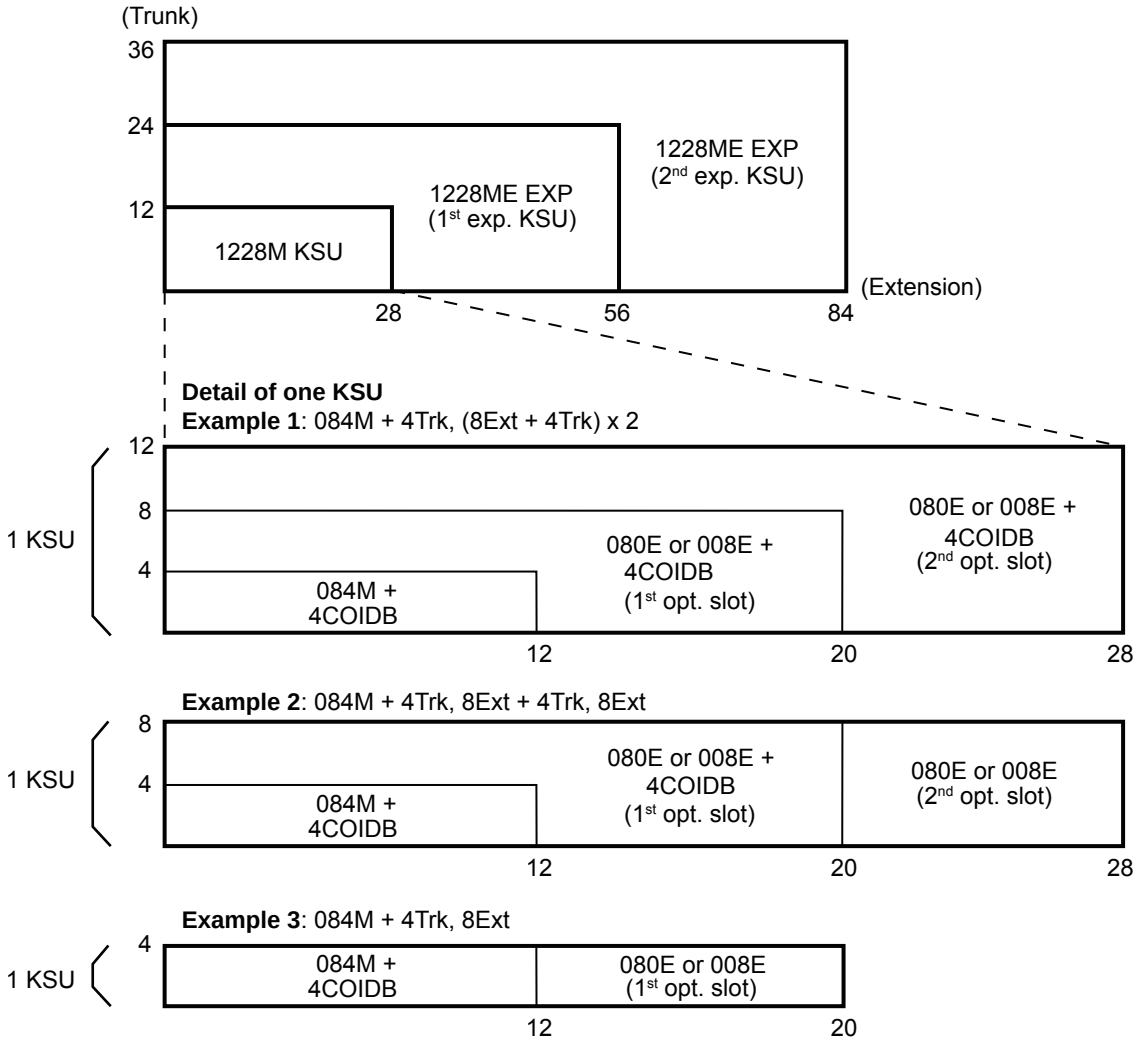


Figure 1-3 Maximum KSU Capacity - Expandability of Trunk and Extension (without PRI)

3.2.2 Expandability of Trunk and Extension (with PRI)

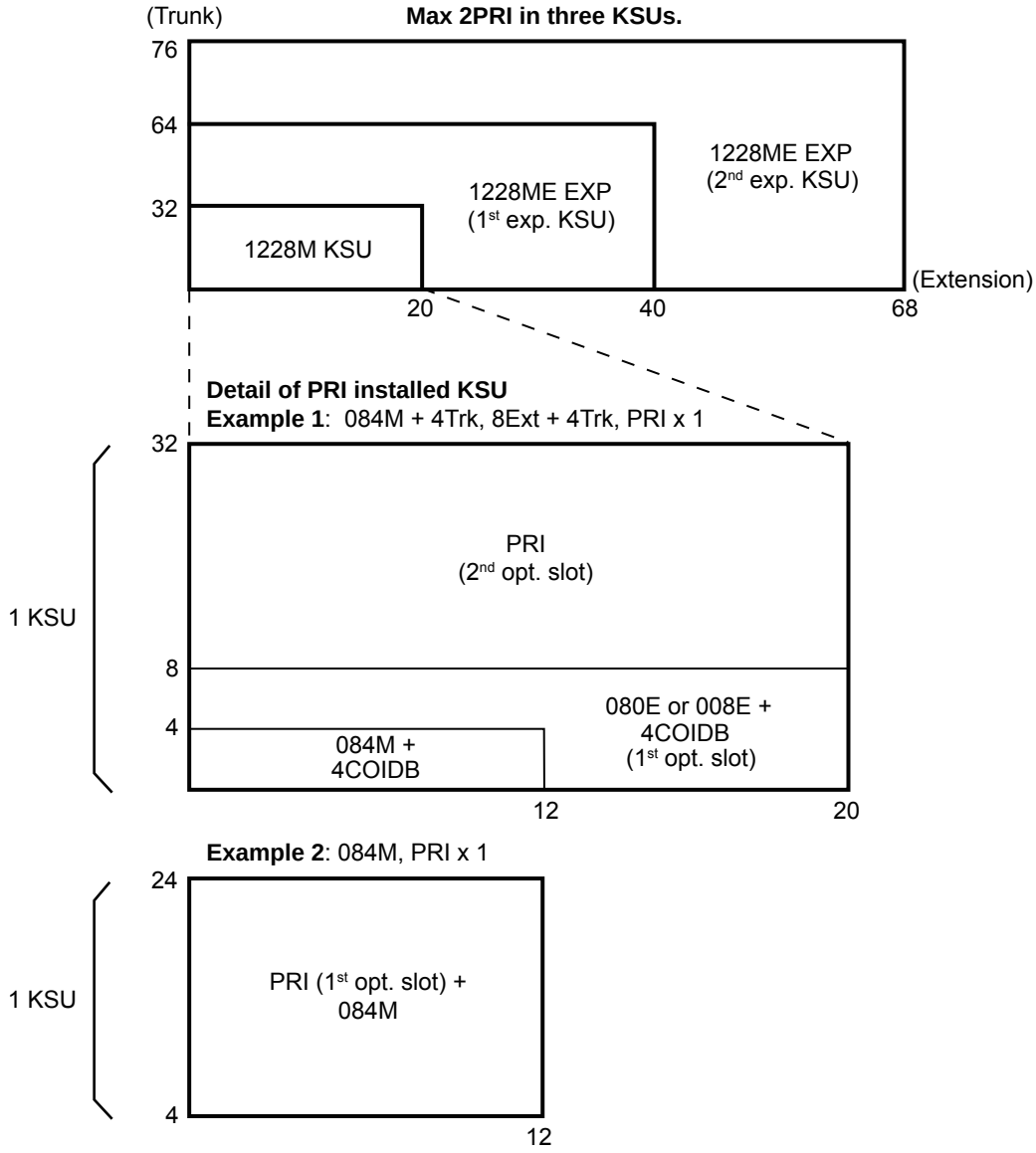


Figure 1-4 Maximum KSU Capacity - Expandability of Trunk and Extension (with PRI)

Installation

2

Installation

SECTION 1 INSTALLING THE MAIN & EXPANSION KSUS

1.1 Before Installing the KSU(s)

1.1.1 General Precautions

- To avoid shock or equipment damage, do not plug in or turn the system power on before completing the installation process.
- Avoid working with the Equipment during electrical storms.
- Use only commercial AC power to prevent shock or fire.
- Use the power cord supplied with the KSU.
- Install batteries with the correct polarity to prevent damaging equipment.
- Never install telephone wiring during a lightning storm.
- Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.
- Never touch uninsulated telephone wires or terminals unless the telephone line is disconnected at the network interface.
- To avoid damage, the KSU should not be placed on unstable surfaces.
- To prevent overheating, do not bundle AC power cords together.
- Make sure the KSU has proper Earth ground.
- If Expansion KSU(s) are installed, turn the power on/off in the following order:
  Expansion 2 KSU, Expansion 1 KSU and then Main KSU

1.1.2 Preparations

- Make sure the necessary tools (screw driver set, pliers set, etc) are available.
- Make sure you have a building plan showing common equipment, extensions, the telecom demarcation, and earth ground location. The installation site must meet the following site / environmental requirements.

1.1.3 Site Requirements

Each Main or Expansion KSU(s) can have the optional Battery Box connected, before deciding on the mounting location refer to Figure 2-4 Horizontal Arrangement of the KSUs on page 2-5 and INSTALLING THE EXTERNAL BACKUP BATTERY on page 2-17.

- The system without the IP4WW-Battery Box should be wall-mounted only. The system with the IP4WW-Battery Box can be installed on either the floor or wall (horizontally). Ensure enough space exists to allow the installation of additional KSU(s) and/or battery box.
- A dedicated 100V-120V/220V/230V/240VAC circuit located within two meters of the KSU is required. A separate dedicated AC outlet is necessary for each KSU.

1.1.4 Environmental Requirements

Meeting established environmental standards maximizes the life of the system. Make sure that the site is not:

- In direct sunlight or in hot, cold or humid places.
- In dusty areas or in areas where sulfuric gases are produced.
- In places where shocks or vibrations are frequent or strong.
- In places where water or other fluids comes in contact with the equipment.

- In areas near high-frequency machines or electric welders.
- Near computers, telexes, microwaves, air conditioners, etc.
- Near radio antennas (including shortwave).

1.1.5 Unpacking

Unpack the KSU and check it against the following list. Inspect for physical damage.

Table 2-1 KSU Packing List

Items	List of Contents	QTY
1228M-B KSU	1228M-B KSU	1
	AC Power Cord	1
	Screws (M4.1x25)	4
	Wall-Mounting Template	1
1228ME-B EXP	1228ME-B EXP	1
	AC Power Cord	1
	Screws (M4.1x25)	4
	Expansion Cable	1
	Wall-Mounting Template	1

1.2 Installing the Main KSU (1228M-B KSU)

The Main KSU has a CPU-B card, an eight digital and four analog extension Interface, a control relay circuit for External devices, and two mounting spaces for optional cards (080E-B1/008E-B1/1PRIU-C1).

An Expansion KSU can be added increasing system capacity. Each KSU (Main or Expansion) is powered by its own power supply.

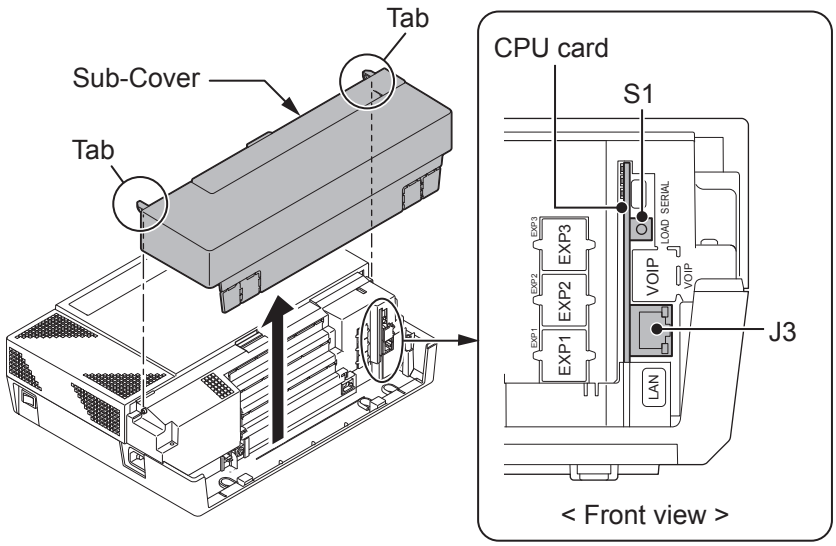
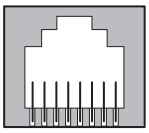


Figure 2-1 CPU Card Location

Table 2-2 Items on the CPU card

Item	Description
S1 (LOAD)	Switch for System Restart/System Reset (Cold start occurs)/Upload Software

Item	Description	
J3 (RJ45)  87654321	Ethernet Cable Connection (for SMDR (PC, Printer), PCPro or WebPro….etc)	
	Pin No.	**Connection**
	1	Tx+
	2	Tx-
	3	Rx+
	4	-
	5	-
	6	Rx-
	7	-
	8	-

For the detail of LED (D1 - D5), refer to Figure 4-17 Inserting the CF Card on page 4-10 and Table 4-2 CPU LED Indications on page 4-12.

1.3 Wall-Mounting the KSU(s)

1.3.1 KSU Dimensions

For Dimensions of the 1228M-B and 1228ME-B KSUs, refer to Figure 2-2 Dimension of the Main and Expansion KSU on this page.

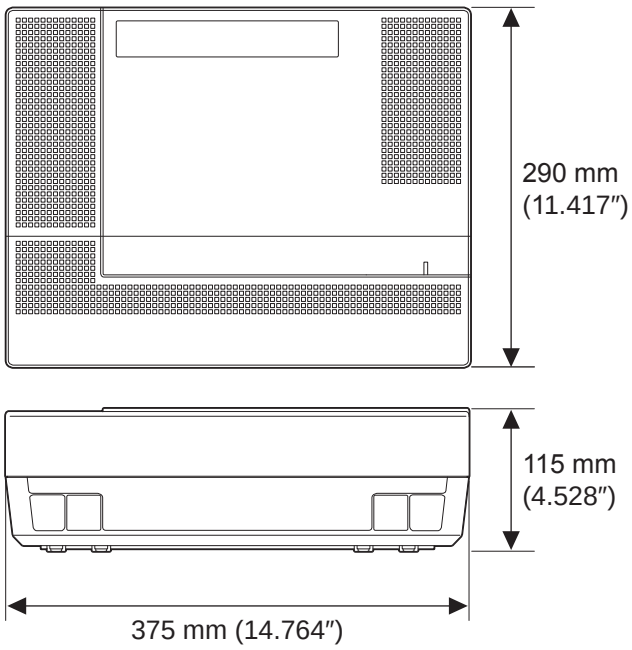


Figure 2-2 Dimension of the Main and Expansion KSU

1.3.2 Wall Installation of KSU

The Main KSU (1228M-B) and Expansion KSU(s) (1228ME-B) be mounted on the wall. Before installing, ensure the appropriate spacing exists as shown below. In case of horizontal arrangement, refer to Mounting one KSU on the Battery Box on page 2-30 for mounting on the IP4WW-Battery Box.

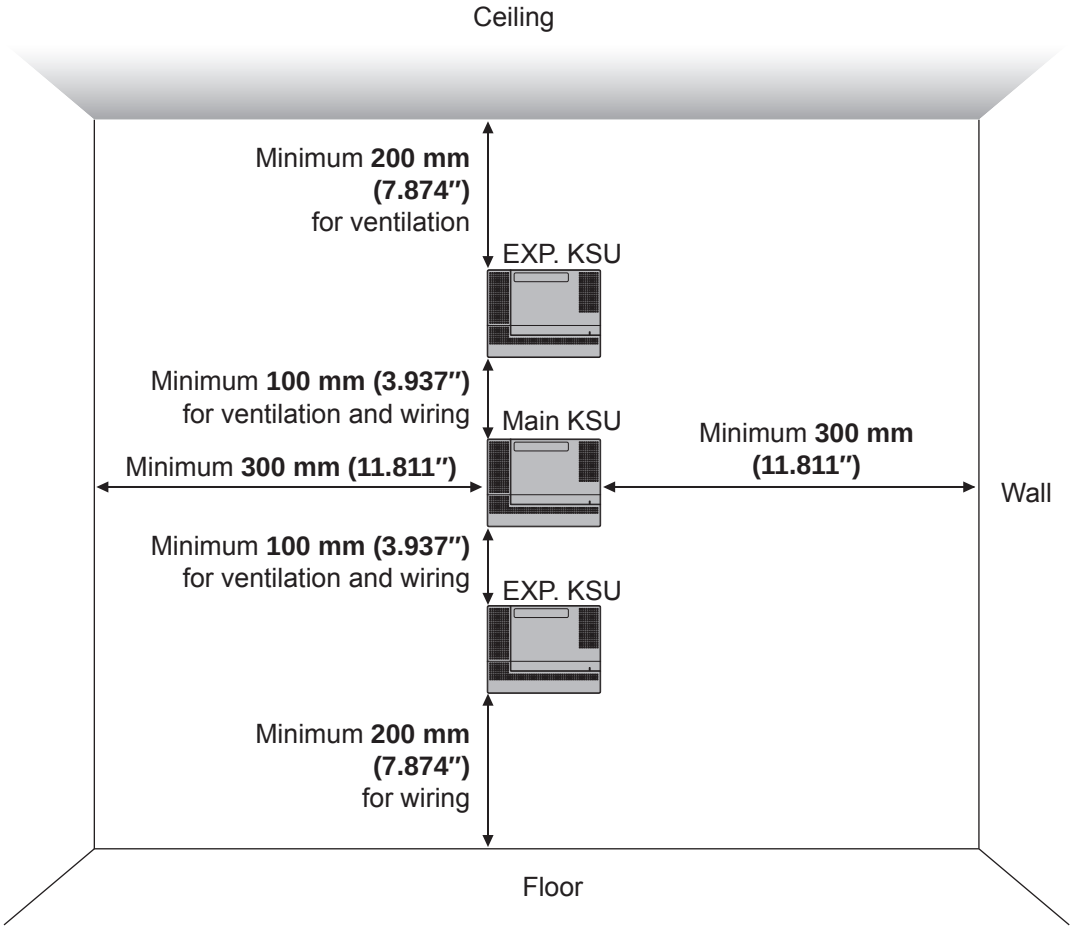


Figure 2-3 Vertical Arrangement of KSUs

- *Due to the limit of extension cable length to connect Main KSU and Expansion KSU(s), the install location of Main KSU and each Expansion KSU(s) must be considered as above or as the next figure.*
- *When KSU is mounted on the Battery Box, it cannot be wall-mounted for vertically as above.*
- *In the case, the KSU is mounted on Battery Box must be wall-mounted horizontally as shown on the Figure 2-4 Horizontal Arrangement of KSUs on the next page.*

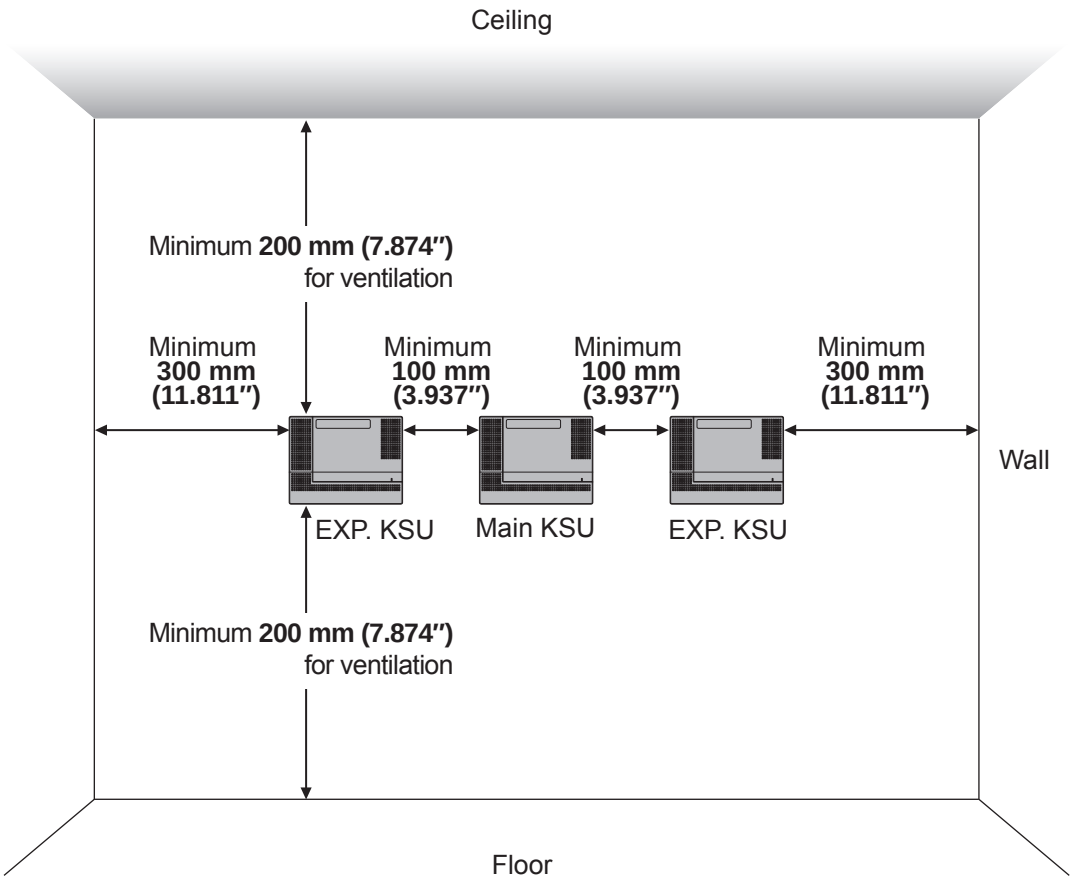


Figure 2-4 Horizontal Arrangement of KSUs

Due to the limit of extension cable length to connect between Main KSU and Expansion KSU(s), the install location of Main KSU and each Expansion KSU(s) must be considered as Figure 2-4 Horizontal Arrangement of KSUs on this page.

1.3.3 Mounting Procedure of KSU

One Main KSU or Expansion KSU(s) can be mounted per IP4WW-Battery Box. For the mounting, refer to Mounting one KSU on the Battery Box on page 2-30.

1. Place the attached template on the wall to mark the four screw positions.

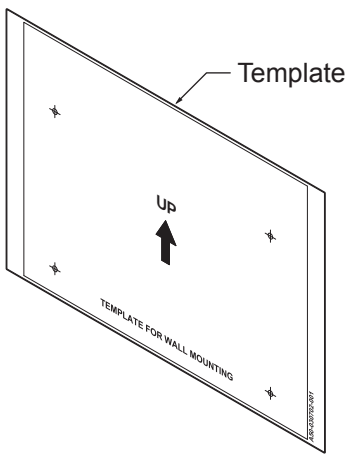


Figure 2-5 Wall-Mounting Template

2. Install four screws into the wall. The screw heads must stand off from the wall about 2.5 mm (0.098″) to 3.5 mm (0.138″).

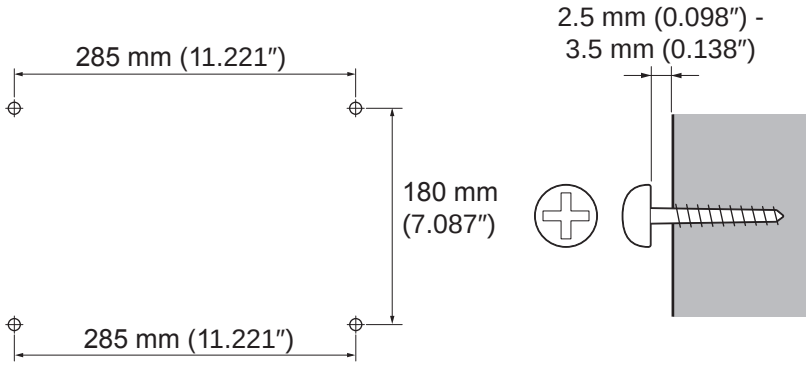


Figure 2-6 Screw Positions

- Wall-Mounting Screws (M4.1x 25: 4 pcs) are attached to the KSU.
- The screw diameter is 4 mm (0.158″) to 4.5 mm (0.177″).

3. Push the center of the Sub-Cover and slide it outward.

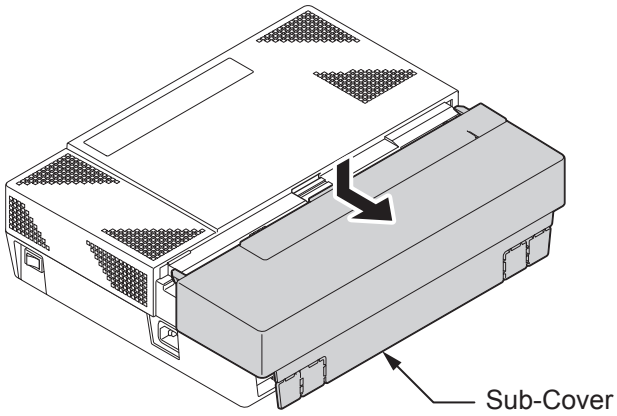


Figure 2-7 Sub-Cover Slide-out

4. Pull out the Sub-Cover by pushing out the tabs.

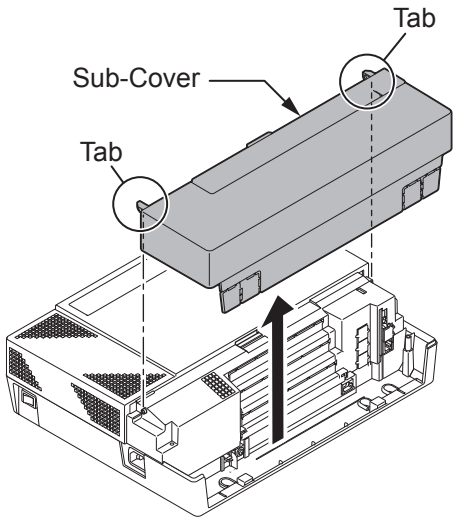


Figure 2-8 Removing the Sub-Cover

- The Sub-Cover can be opened and held in the open position.

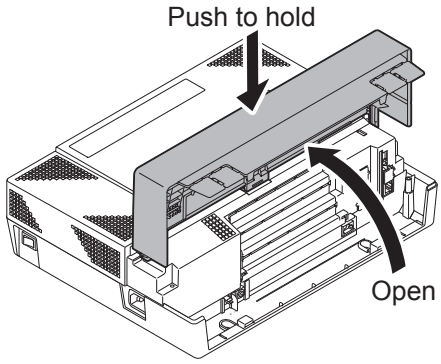


Figure 2-9 Sub-Cover Open Position

5. Align the four holes on the back of the KSU with the four screws installed in the wall.

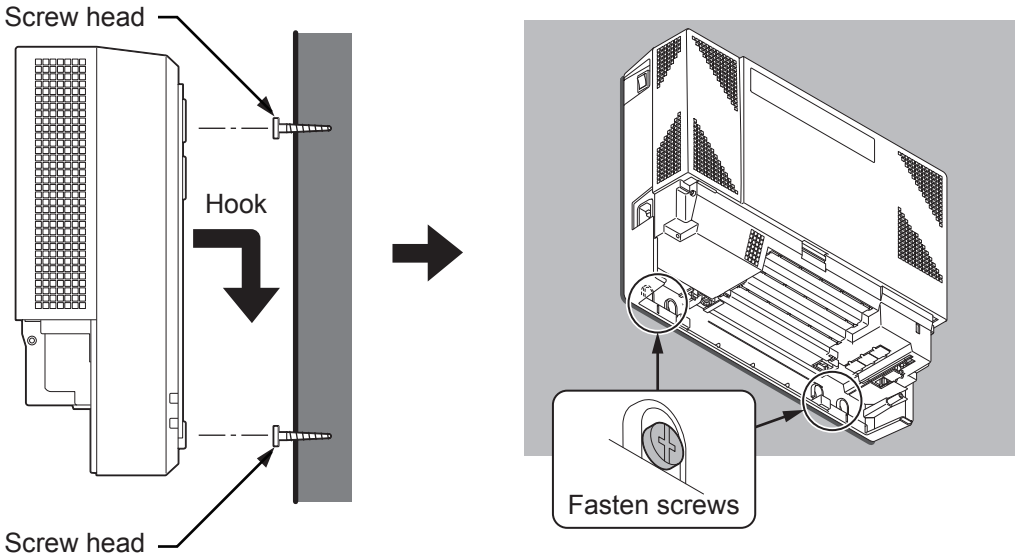


Figure 2-10 Mounting the KSU

6. Slide the KSU into position and tighten the lower two screws.

1.4 Installing the Expansion KSU(s)

1.4.1 General

Each Expansion KSU is connected to the Main KSU individually. The EXIFB-C1 card must be installed in the Main **KSU (1228M-B)**.

1.4.2 Unpacking (EXIFB-C1)

Unpack the EXIFB-C1 and check it against physical damage.

Table 2-3 EXIFB-C1 Packing List

Items	List of Contents	QTY
EXIFB-C1	EXIFB-C1 PCB	1

1.4.3 Connectors Location (EXIFB-C1)

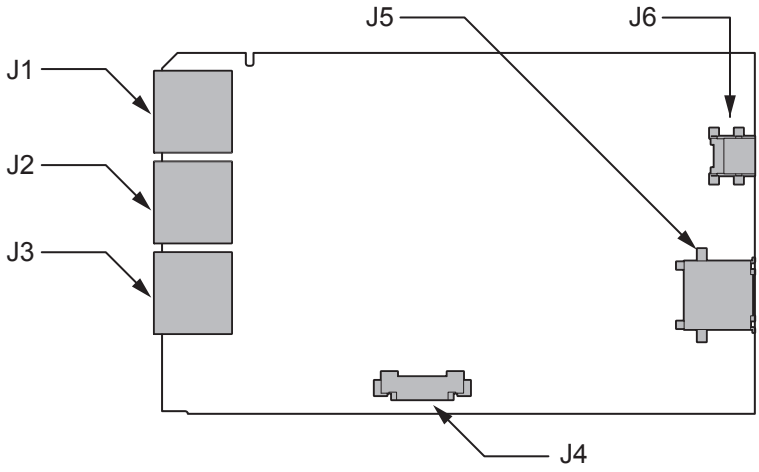


Figure 2-11 Connectors of EXIFB-C1

Table 2-4 Connectors of EXIFB-C1

No.	Connectors	Connectable Devices
J1	Expansion Connector (Not used)	-
J2	Expansion Connector	Expansion KSU 2
J3	Expansion Connector	Expansion KSU 1
J4	Mother PCB	J1 connector on 084M-B1
J5, J6	Debug Purpose (Not used)	-

1.4.4 Installing the EXIFB-C1 PCB

Do Not Power on until all installations have been completed.

1. Turn off the system power and disconnect the AC cord from KSU.
2. Open and pull out the Sub-Cover of the Main KSU.

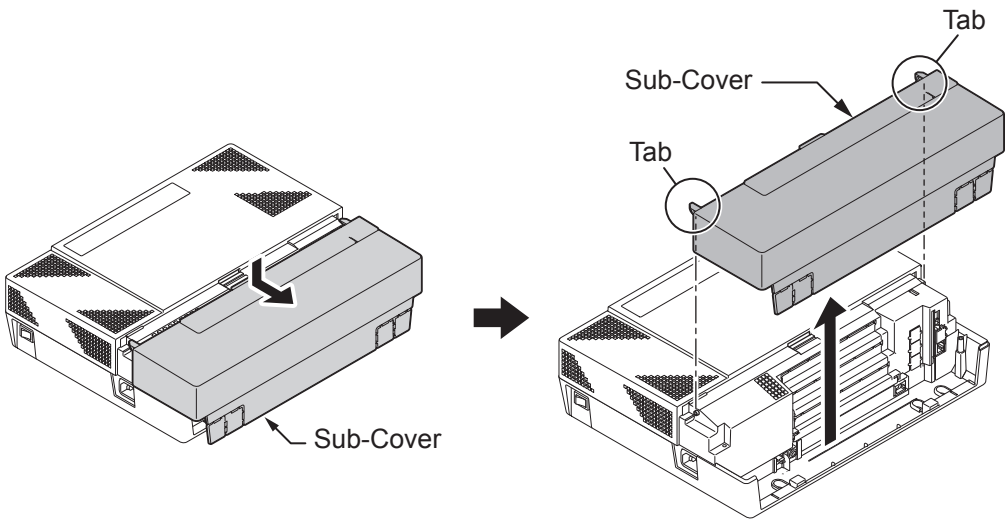


Figure 2-12 Removing the Sub-Cover

3. Loosen two screws and pull out the Main-Cover by pressing the two hooks.

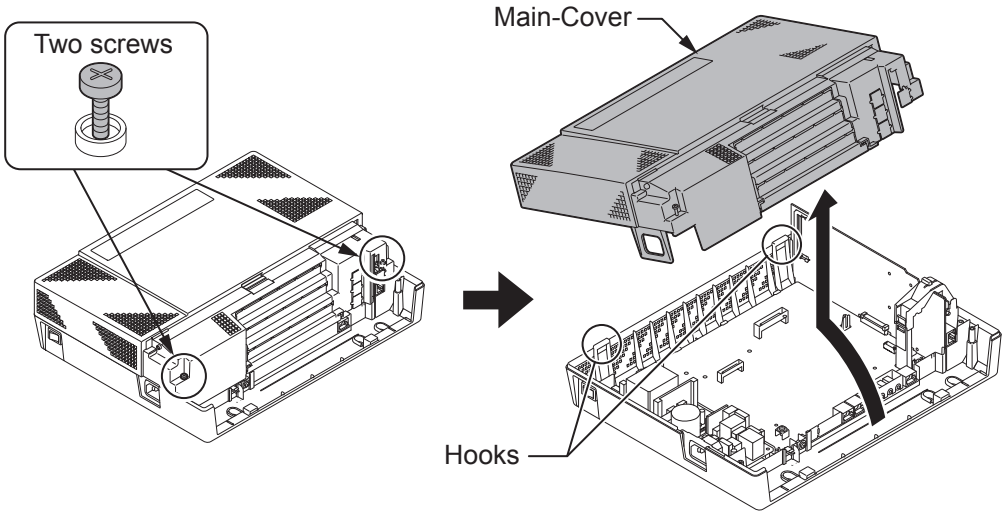


Figure 2-13 Removing the Main-Cover

4. Press tab A and lift the CPU support bracket.

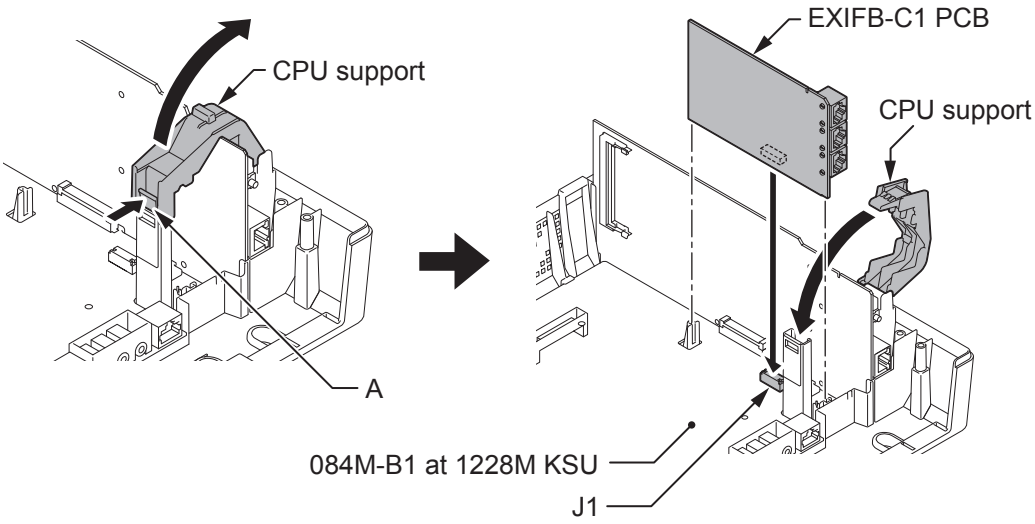


Figure 2-14 EXIFB-C1 PCB Installation

5. Insert the EXIFB-C1 PCB into the J1 connector on the 084M-B1 at 1228M-B KSU.
6. Close the CPU support and make sure the tab A locks into place.
7. Cut and remove the Plastic Knockouts as needed for Expansion KSU.

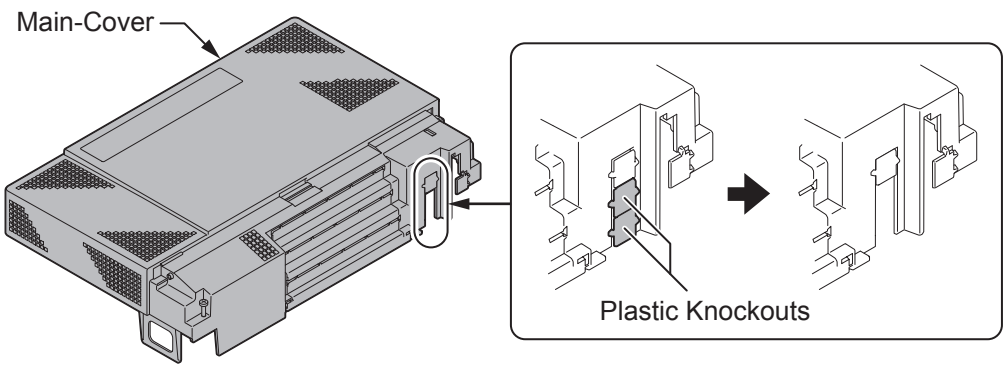


Figure 2-15 Removing the Plastic Knockouts

8. Replace the Main-Cover and fasten two screws.

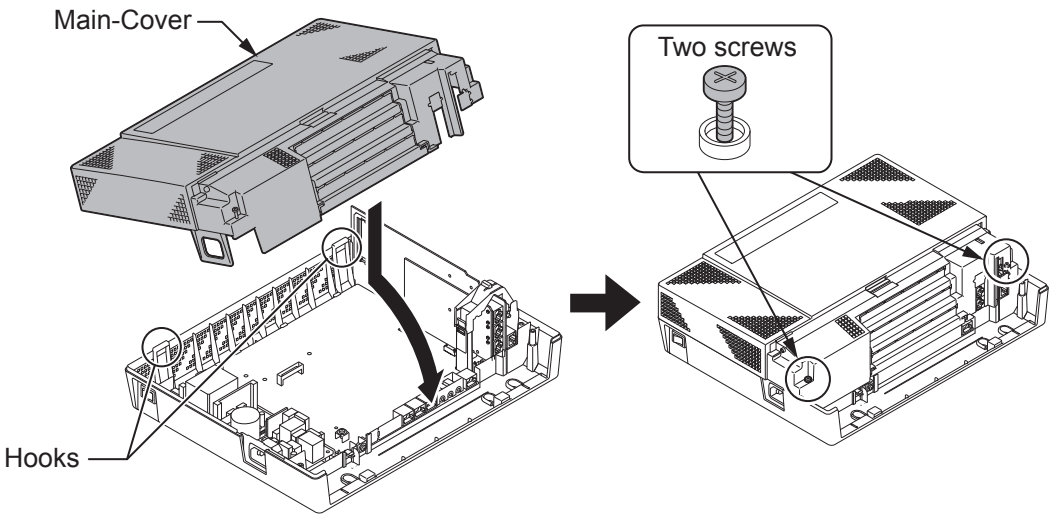


Figure 2-16 Replacing the Main-Cover

1.4.5 KSUs Inter-connection

1. Connect the Main KSU (1228M-B) and Expansion KSU (1228ME-B) using the cables attached to the Expansion KSU. The cable must pass two times (two rounds) through the Ferrite Core refer to Figure 2-17 Connection of KSUs on the next page. (Ferrite Core is attached with the Expansion KSU.)

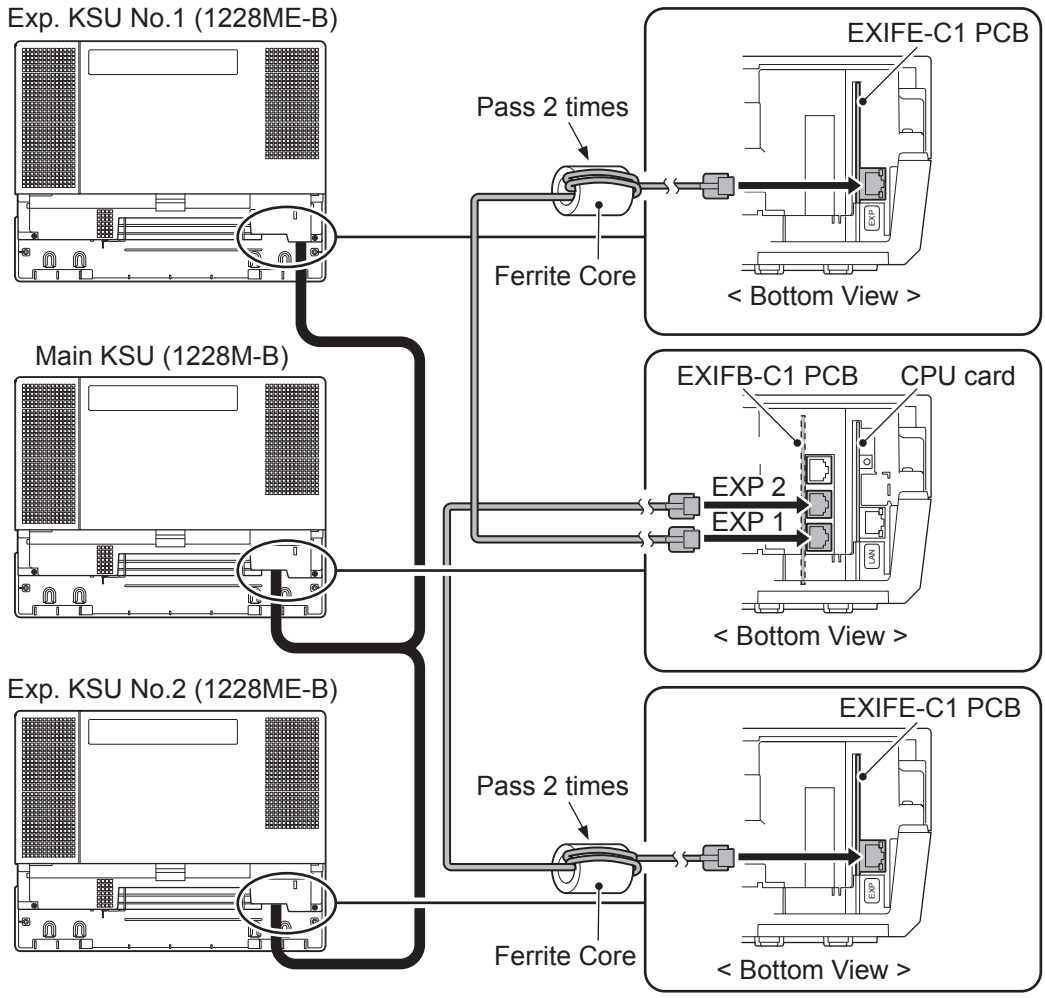


Figure 2-17 Connection of KSUs

Use attached cables for the above inter-connection.
Because of cable length, KSU positioning is limited.

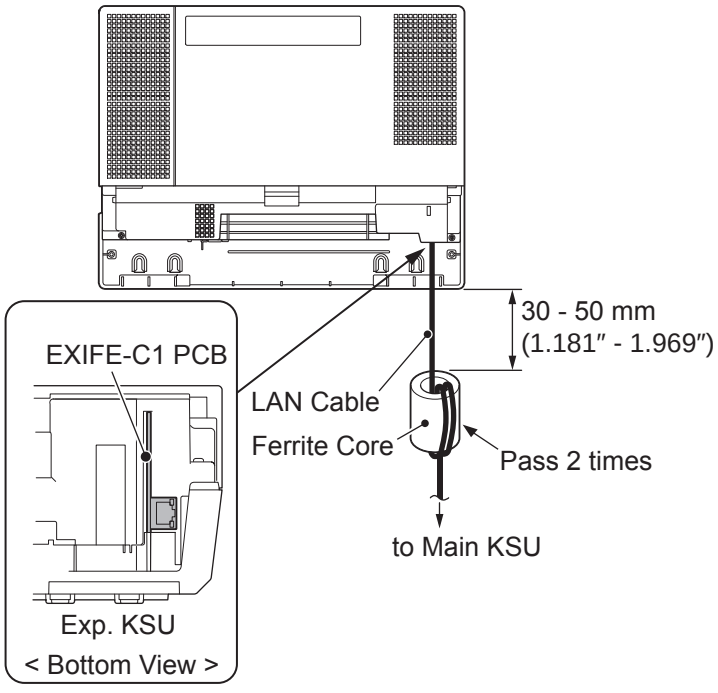


Figure 2-18 Installing Ferrite Core

1.5 Grounding and AC Cabling

The ETH (Earth Ground Lug) is located near the power supply on each KSU. The Sub-Cover must be opened in order to access to it.

1.5.1 Grounding the KSU

Ensure all Main and Expansion KSU(s) are powered off and unplug the AC cord.

In each KSU, connect the ETH lug to the verified grounding point using a minimum cable size of 14AWG (Φ2.0 mm) wire.

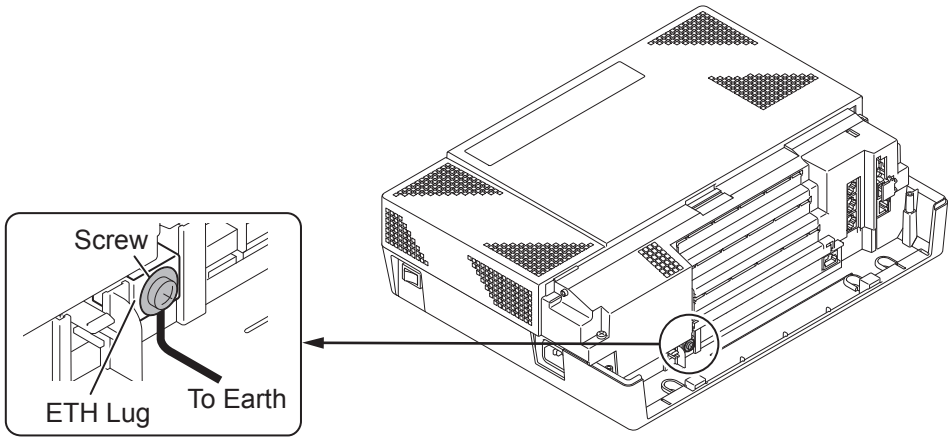


Figure 2-19 ETH Lug

- The grounding cable is supplier-provided.(not attached to the system)

1. Loosen the screw.
2. Insert a grounding wire (user supplied).
3. Tighten the screw.
4. Connect the grounding wire to earth ground.

Proper grounding is very important to protect the system from external noise and to reduce the risk of electrocution in the event of a lightning strike.

1.5.2 AC Power Requirement

A dedicated 100V-120V/220V/230V/240V 50/60Hz circuit located within two meters of the KSU is required. A separate dedicated AC outlet is necessary for each KSU.

Double Pole/Neutral Fusing
(Power supply fuses are located at both the L and N side.)

Table 2-5 Power Requirement

	110VAC	120VAC	220VAC	230VAC	240VAC
Power Requirement	110 VAC@15 A	120 VAC@15 A	220 VAC@15 A	230 VAC@15 A	240 VAC@15 A
Power Consumption	Main KSU = 128 VA	Main KSU = 130 VA	Main KSU = 154 VA	Main KSU = 154 VA	Main KSU = 156 VA
	3 KSU Total = 384 VA	3 KSU Total = 390 VA	3 KSU Total = 462 VA	3 KSU Total = 462 VA	3KSU Total = 468 VA
Input Voltage (Rated Voltage)	90 VAC to 264 VAC (100VAC/120VAC/220VAC/230VAC/240VAC)				
Frequency	47 Hz - 63 Hz (Rated Frequency: 50/60 Hz)				
Phase and Wire	Single Phase, 2 Line + PE Type				

	110VAC	120VAC	220VAC	230VAC	240VAC
Ground Requirement	No.14 AWG Copper Wire				
Feeding Voltage	SLT: 20 mA/ -27 V				
AC Input I	Main KSU = 1.16 A 3 KSU Total = 3.48 A	Main KSU = 1.08 A 3 KSU Total = 3.24 A	Main KSU = 0.70 A 3 KSU Total = 2.10 A	Main KSU = 0.67 A 3 KSU Total = 2.01 A	Main KSU = 0.65 A 3 KSU Total = 1.95 A
KWh	Main KSU = 0.128 KWh 3 KSU Total =0.384 KWh	Main KSU = 0.130 KWh 3 KSU Total =0.390 KWh	Main KSU = 0.154 KWh 3 KSU Total =0.462 KWh	Main KSU = 0.154 KWh 3 KSU Total =0.462 KWh	Main KSU = 0.156 KWh 3 KSU Total =0.468 KWh
BTU (KWh x 3413)	Main KSU = 437 BTU 3 KSU Total =1311 BTU	Main KSU = 444 BTU 3 KSU Total =1332 BTU	Main KSU = 526 BTU 3 KSU Total =1578 BTU	Main KSU = 526 BTU 3 KSU Total =1578 BTU	Main KSU = 532 BTU 3 KSU Total =1596 BTU

1.5.3 AC Power Cord

The AC power switch and AC power inlet are located at the left side of each KSU. The AC power cord is connected to the AC inlet and the commercial AC power socket.

Do not plug-in AC power cord if the KSU Cover is removed.

Before connecting the AC power cord, make sure:
- ***The power switch at the left side of each KSU is turned OFF.***
- ***The power switch at the commercial AC power socket is turned OFF.***
- ***The AC plug fits the commercial AC power socket. The plug adapter is necessary if it does not fit.***

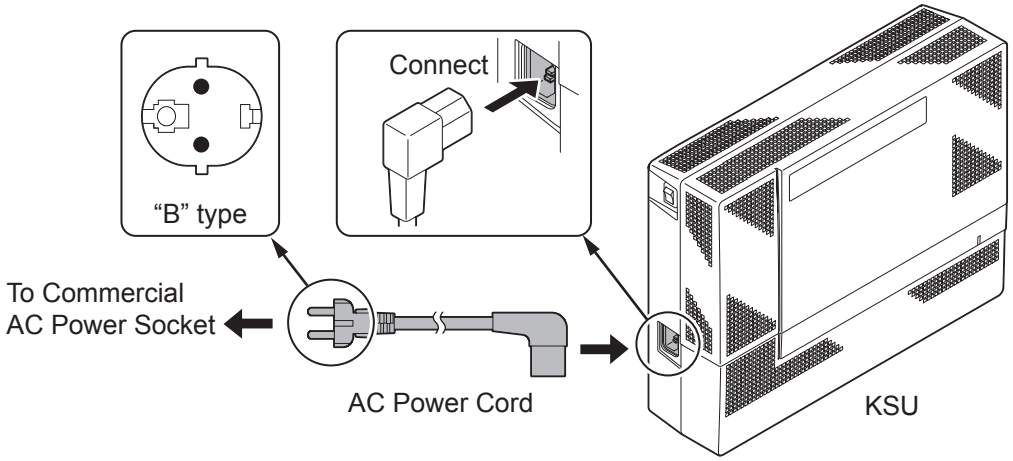


Figure 2-20 AC Power Cord

- ***Each KSU must have its own commercial AC power socket.***
- ***DO NOT POWER ON until all KSU installation has been completed.***

1.6 Trunk/Extension Cabling

1.6.1 General

The system provides RJ61 modular jacks for analog trunk and analog/digital extension connections.

1.6.2 Precautions for Cabling

- Do not wire the cable with an AC cable, computer, etc.

- Do not run the cable near a high frequency generating device.
- Use cable protectors in case the cables are run on the floor.
- Aerial distribution wiring is not allowed.
- Trunks must be installed with lightning protectors.
- Do not install the DSX Terminal in the SL1100 system, it does not work properly.

1.6.3 Trunk Cabling

Trunk cabling is required for the 4COIDB or 1PRIU PCBs.
Refer to INSTALLING THE EXPANSION INTERFACE CARDS on page 2-38 for mounting and cabling 4COIDB and 1PRIU PCBs.

1.6.4 Extension Cabling

The 084M-B1 PCB within each KSU provides two "RJ61" modular jacks for digital extension (8ports) and one for analog extensions (4ports).

Before plugging in the Multiline Telephone, DSS Console, Single line Telephone or Doorphone, ensure all Main and Expansion KSUs are powered off.

DSX Terminal does not work properly when it connected.

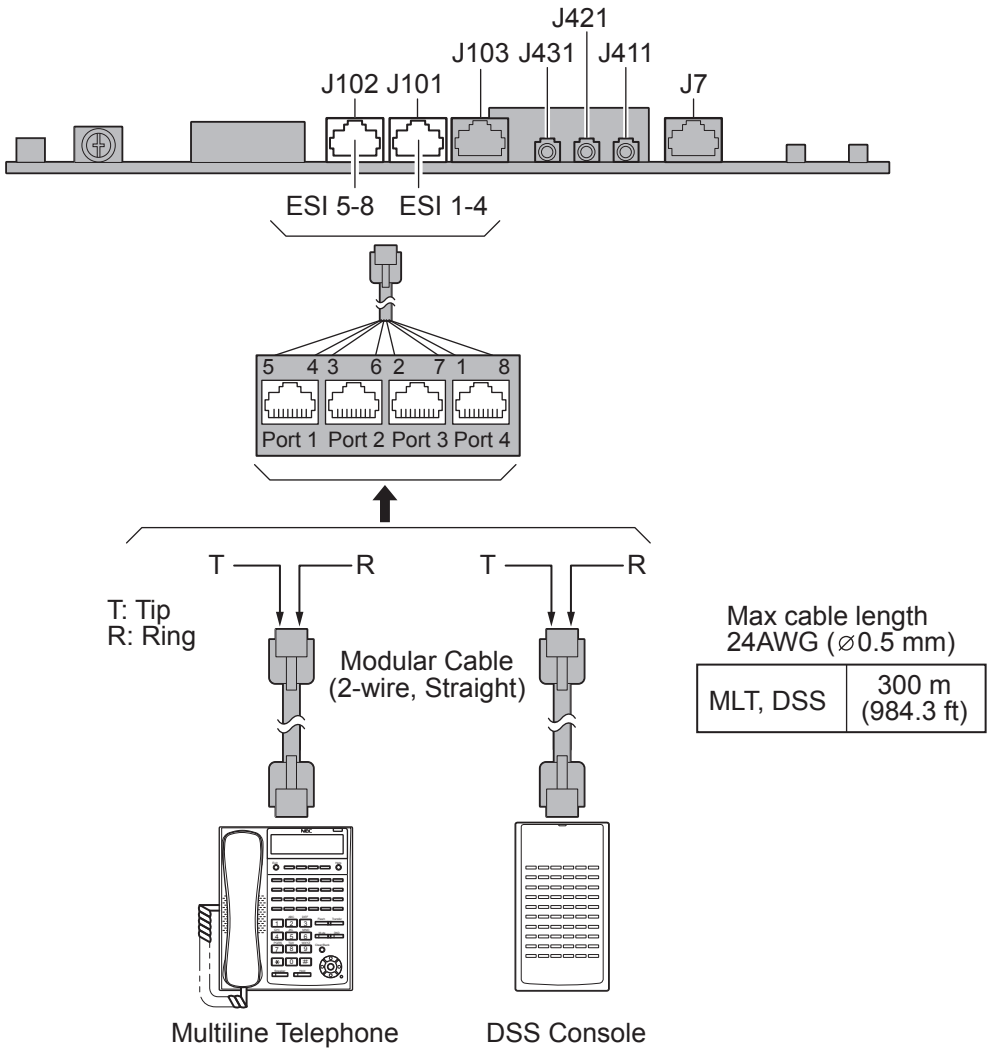


Figure 2-21 Digital Extension Cabling

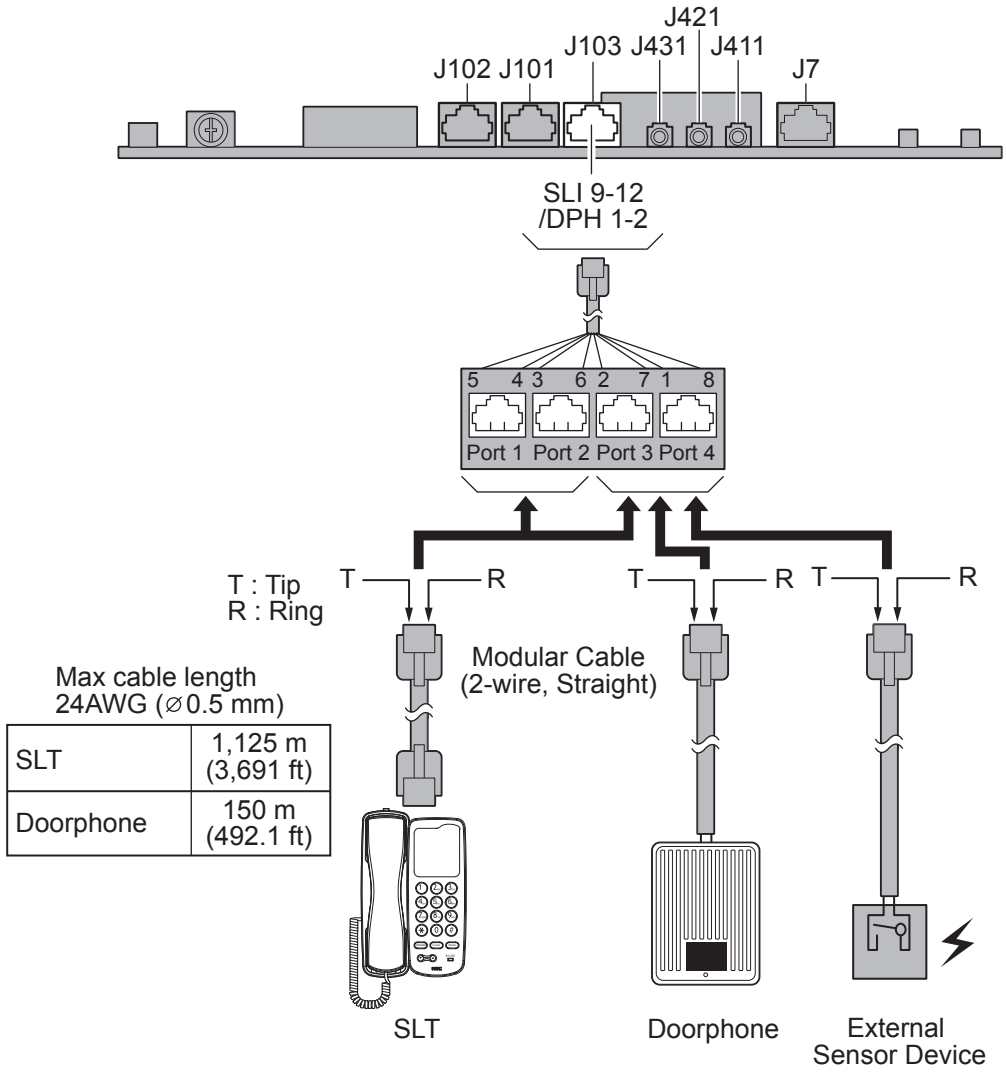


Figure 2-22 Analog Extension Cabling

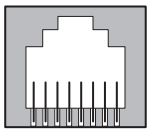
While a Digital/Analog Telephone (port) is ringing or MW-lamp is flashing on a Digital/Analog Phone (port), do not disconnect the phone from the port or connect another type of the terminal to this port.

- *Doorphone/External Sensor Device must be connected to the No. 3 or 4 PORT of the RJ61 connector for Analog extensions on each 084M-B1.*
- *Setting program 10-03 to "Door Phone" is required when connecting a Door phone Box or Sensor device.*

1.6.4.1 Connectors

The following table shows the pin-outs for the RJ-61 cable connector for Digital/Analog extension connections.

Table 2-6 RJ61 Cable Connector Pin-Outs (J101-J103)

	Pin No.	ESI 1-4 (J101), ESI 5-8 (J102): 2-Wire Digital Extension Port Connector (RJ-61)	SLI 9-12/DPH 1-2 (J103): Analog Extension Port Connector (RJ-61)
	1	T4 (Tip for port 4)	T4 (Tip for port 4)
	2	T3 (Tip for port 3)	T3 (Tip for port 3)
	3	T2 (Tip for port 2)	T2 (Tip for port 2)
	4	R1 (Ring for port 1)	R1 (Ring for port 1)
	5	T1 (Tip for port 1)	T1 (Tip for port 1)
	6	R2 (Ring for port 2)	R2 (Ring for port 2)
	7	R3 (Ring for port 3)	R3 (Ring for port 3)
	8	R4 (Ring for port 4)	R4 (Ring for port 4)

1.6.5 Cable Routing and Clamping

1. Depending on cabling requirement, select either a right or left route. Clamp and route cable to outside.

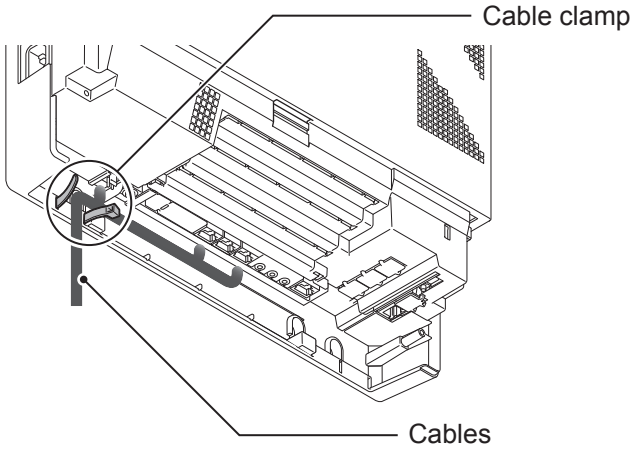


Figure 2-23 Cabling

2. Cut and remove the Plastic Knockouts as needed from the Sub-Cover.

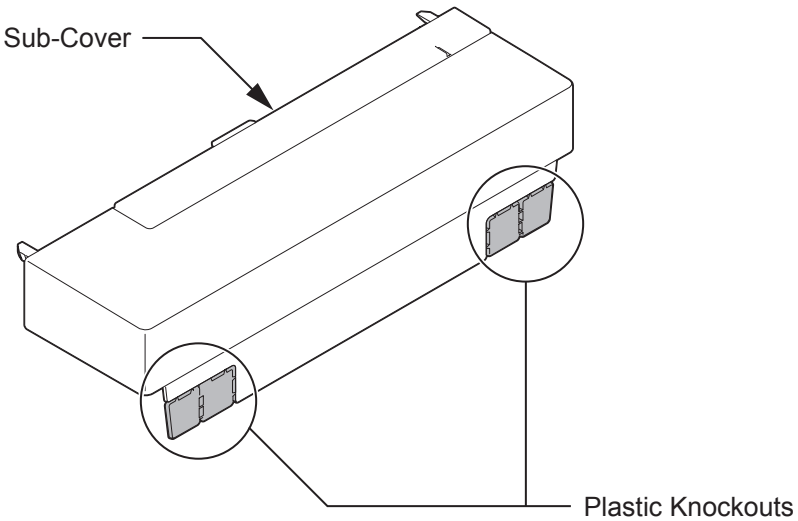


Figure 2-24 Sub-Cover

3. Replace the Sub-Cover.

SECTION 2 INSTALLING THE EXTERNAL BACKUP BATTERY

2.1 General

The external backup battery box (IP4WW-Battery Box) with batteries provides power to the system when AC power fails. It is connected to the power supply of each KSU.

- *An optional (locally procured), external battery source can be used to provide power during a power failure.*
- *Each KSU must have own IP4WW-Battery Box.*

To avoid damage to equipment, do not install the Topaz Battery Box (DX2E-32i/NX7E Battery Box) to the SL1100 system.

2.2 Unpacking

Unpack the IP4WW-Battery Box and check it against the following list. Inspect for physical damage.

Table 2-7 IP4WW-Battery Box Packing List

Items	List of Contents	QTY
IP4WW-Battery Box	Battery Box	1
	Battery Connection Cable (Black & Red)	1
	Battery Connection Cable (Blue)	1
	Screws: M4 x 8 M3 x 6 with Washer Screws: M4.1 x 16	10 1 6
	Battery Box FM/WM Base-F Battery Box FM/WM Base-R	1 1
	Battery Box WM Support Battery Box WM Hook	1 1

2.3 Battery Box Dimensions

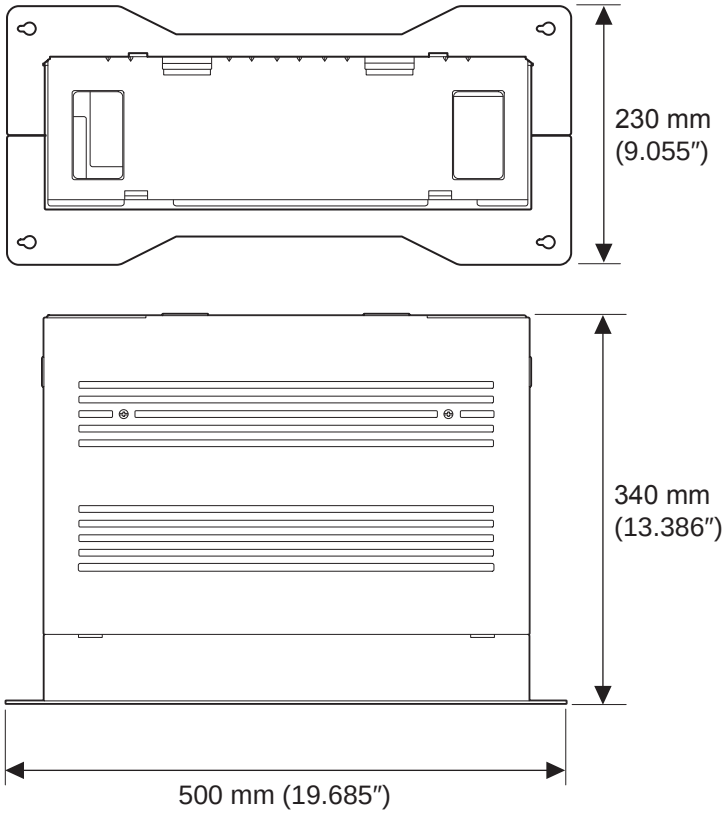


Figure 2-25 Dimension of the IP4WW-Battery Box

2.4 Battery Specifications

Table 2-8 Battery Specifications

Item	Data
Capacity	12 V, 7.0 Am/H or equivalent (Voltage must be 12 V)
Recommended Battery	GS Yuasa NP7-12 (151 x 65 x 97.5 mm / 2.7 kg) <GS Yuasa International LTD.> The Battery must be UL recognized product.
Number of Batteries (per Box)	2
Backup Duration (Estimated)	1 hour

2.5 Battery Installation

Before floor-mounting or wall-mounting the IP4WW-Battery Box, the batteries must be installed into the IP4WW-Battery Box.

1. Loosen two screws and remove the Front Cover.

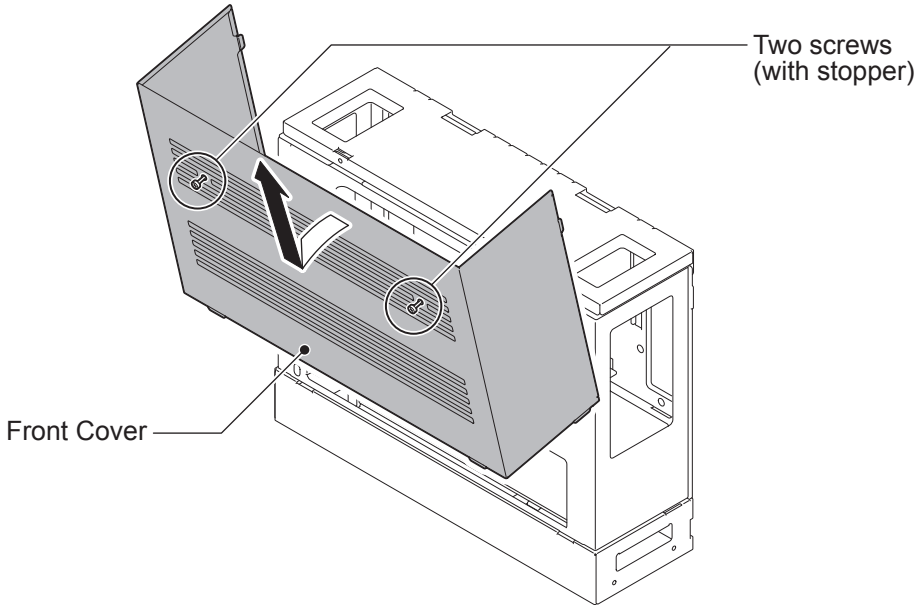


Figure 2-26 Removing the Front Cover

2. Disconnect the Battery Connection Cable from the Fuse Unit if the cable is plugged already.

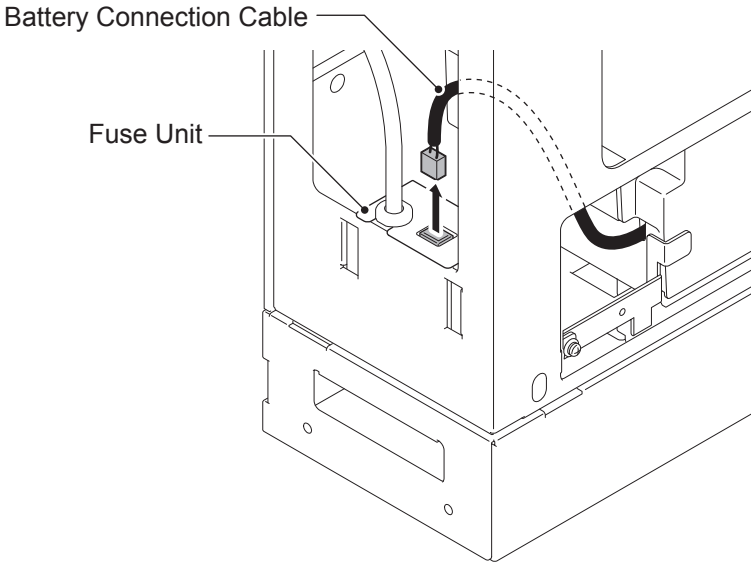


Figure 2-27 Disconnect Battery Connection Cable

3. Loosen the screw and lift the Batt Stopper.

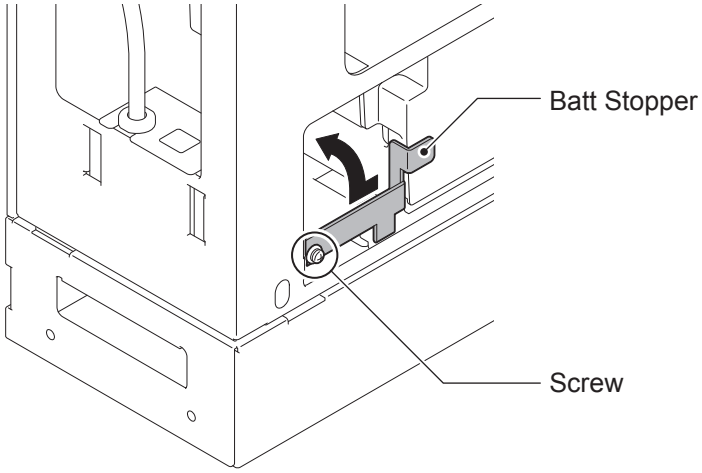


Figure 2-28 Batt Stopper

4. Pull out the Battery tray.

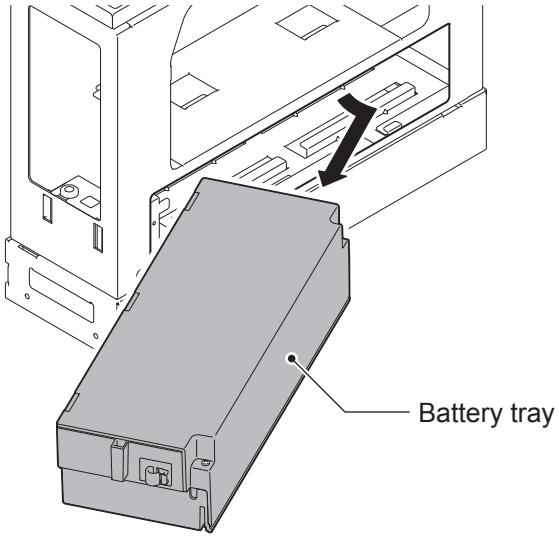


Figure 2-29 Pulling out the Battery Tray

5. Loosen two screws and remove the Battery tray cover.
6. Remove two screws and remove the Battery tray bracket.

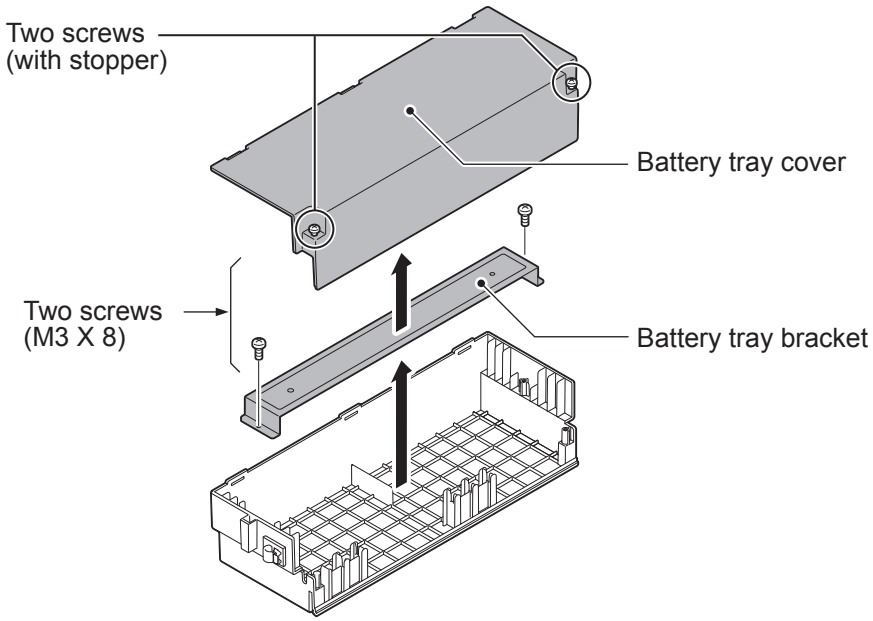


Figure 2-30 Remove the Battery Tray Bracket

7. Install two batteries into the Battery tray.

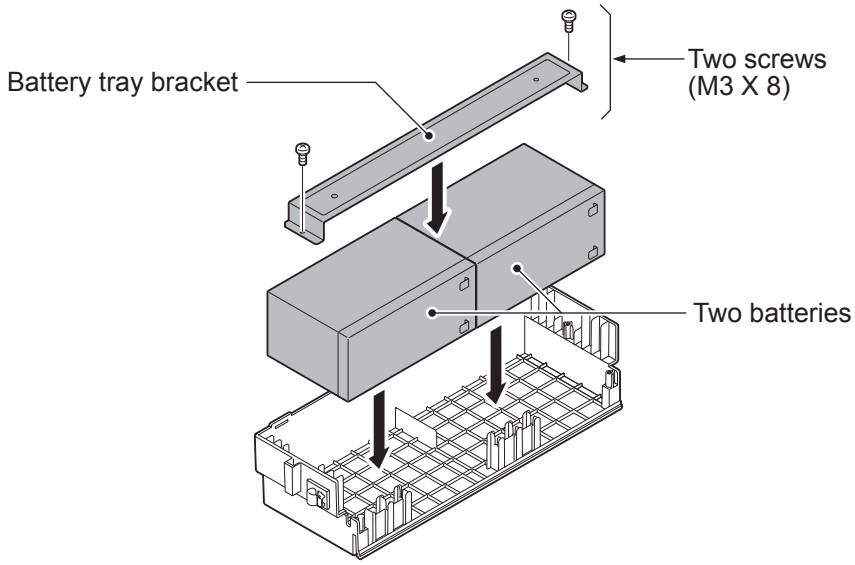


Figure 2-31 Battery Installation

8. Connect the battery cables.

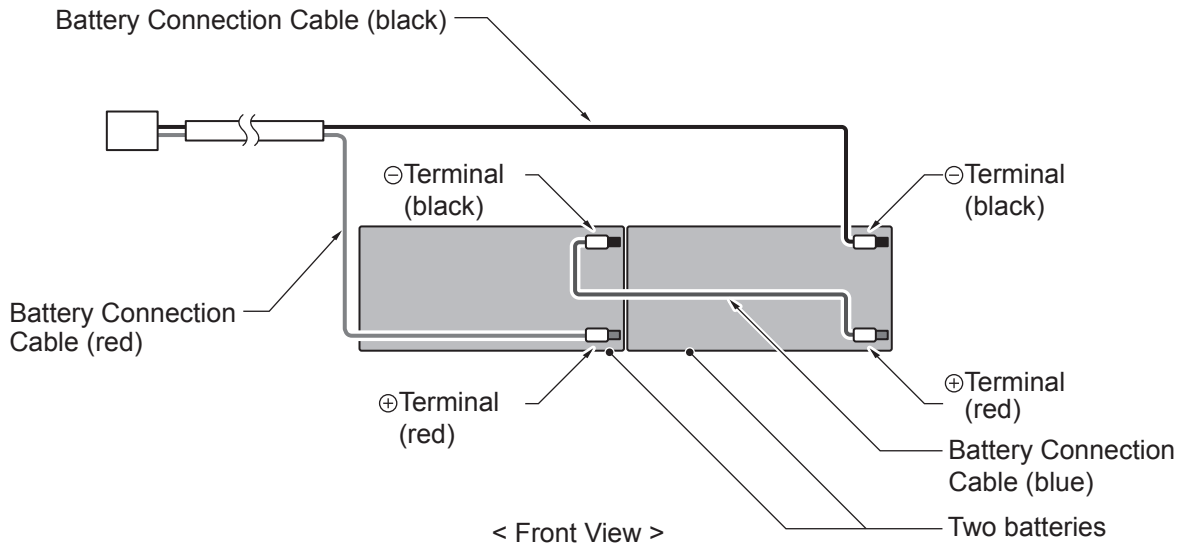


Figure 2-32 Connecting the Battery Cables

Incorrect installation of batteries may damage the Fuse Unit or cause possible fire.

9. Insert Battery Connection Cable into the Cable guides as shown in the next diagram.
10. Install the Battery tray cover aligning the three tabs and tightening the two screws.

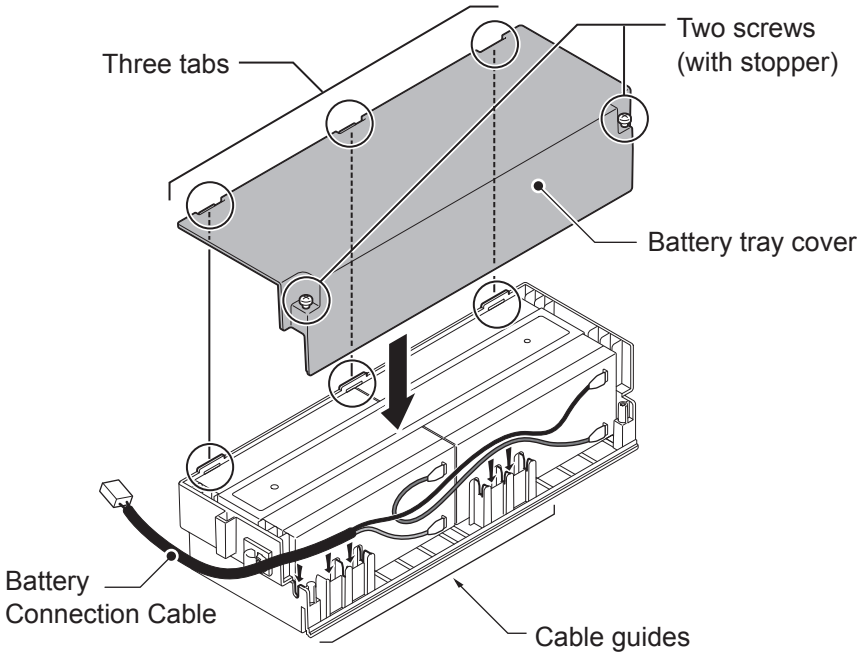


Figure 2-33 Installation of Battery Tray Cover

- ***Do not pull the Battery connection cable strongly.***
- ***Be careful not to catch the Battery Connection Cable when installing the Battery tray cover.***

Write down the year and month of the next battery replacement in the label on Front cover.

11. Insert the Battery tray into the Battery Box.

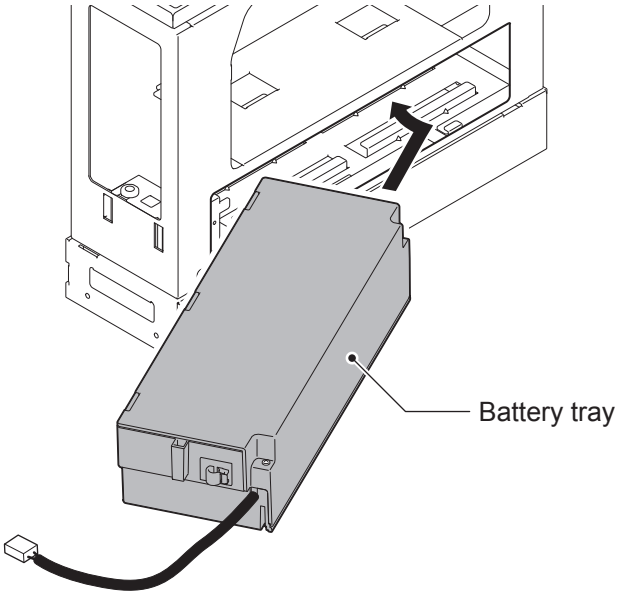


Figure 2-34 Inserting the Battery Tray

12. Set the Batt Stopper bracket in place and secure with screw.

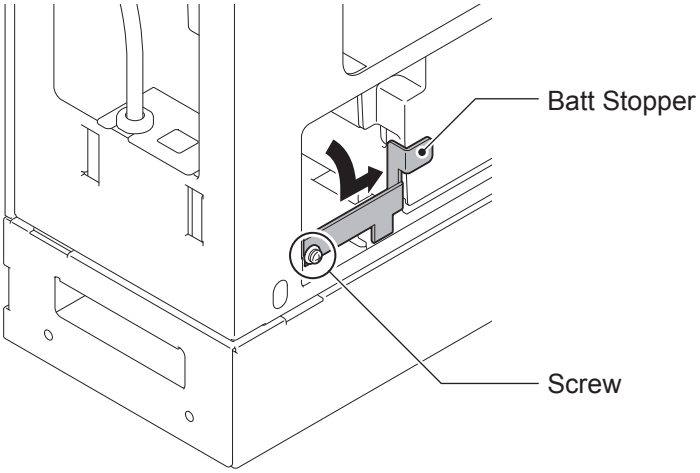


Figure 2-35 Secure Batt Stopper Bracket

13. Plug the Battery Connection Cable into the Fuse unit.

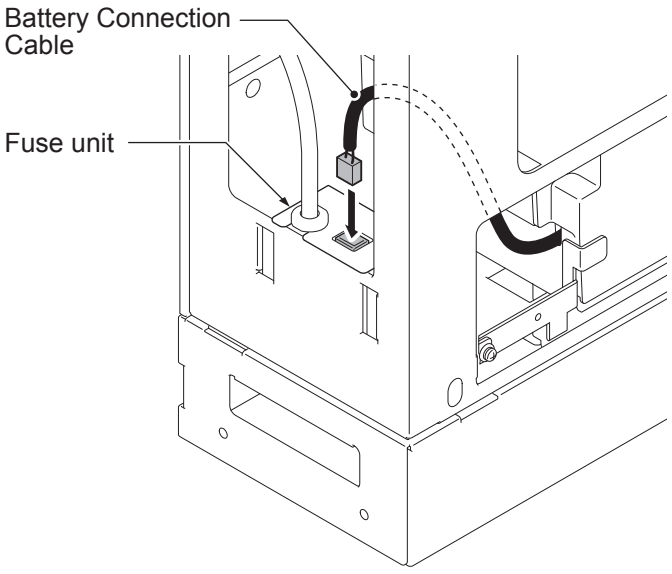


Figure 2-36 Connecting the Battery Connection Cable

14. Align tabs a to f to holes A to F on Battery Box. Slide the Front cover and tighten the two screws.

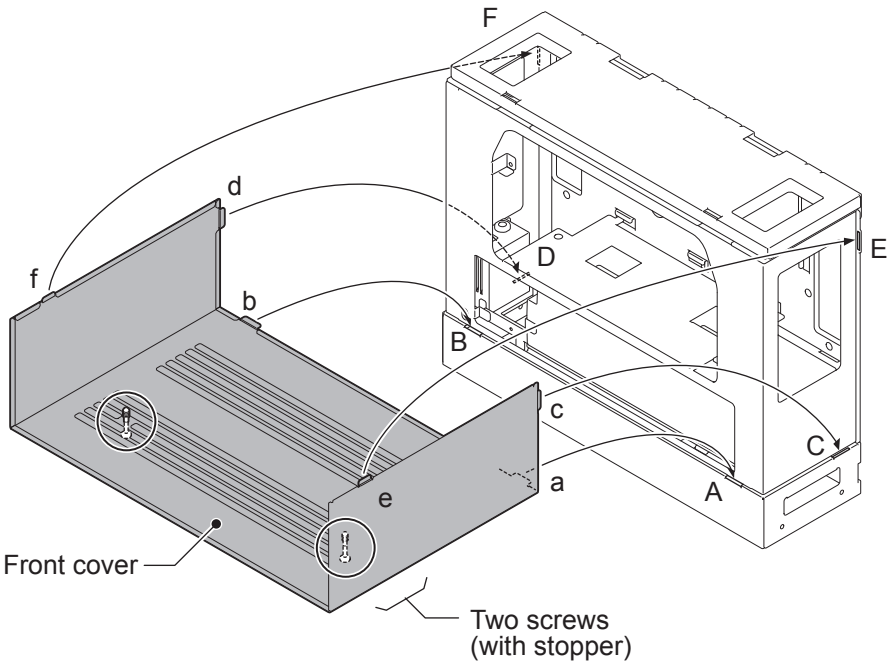


Figure 2-37 Installation of Front Cover

2.6 Mounting the IP4WW-Battery Box

The IP4WW-Battery Box can be installed on either the floor or wall. One KSU can be mounted on an IP4WW-Battery Box.

2.6.1 Floor-Mounting the IP4WW-Battery Box

Battery box can be mounted on the floor using the FM/WM Base-F, FM/WM Base-R and WM Support. (Note: FM = Floor-Mount and WM = Wall-Mount)

1. Assemble the FM/WM Base-F, Base-R and WM Support.

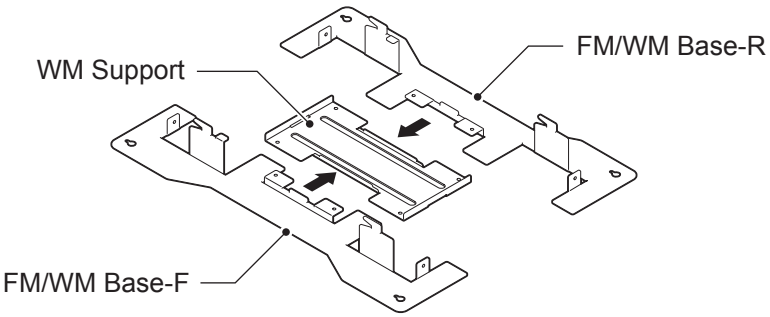


Figure 2-38 Bases and Support of the Battery Box

2. Refer to Figure 2-39 Floor-Mount Spacing Guide on this page for required spacing before drilling holes for 10 mm (0.394″) anchor bolts (locally procured).
   Mark and drill the four holes required to install the FM/WM Base.
3. Using anchor bolts, secure the FM/WM Base to the floor.

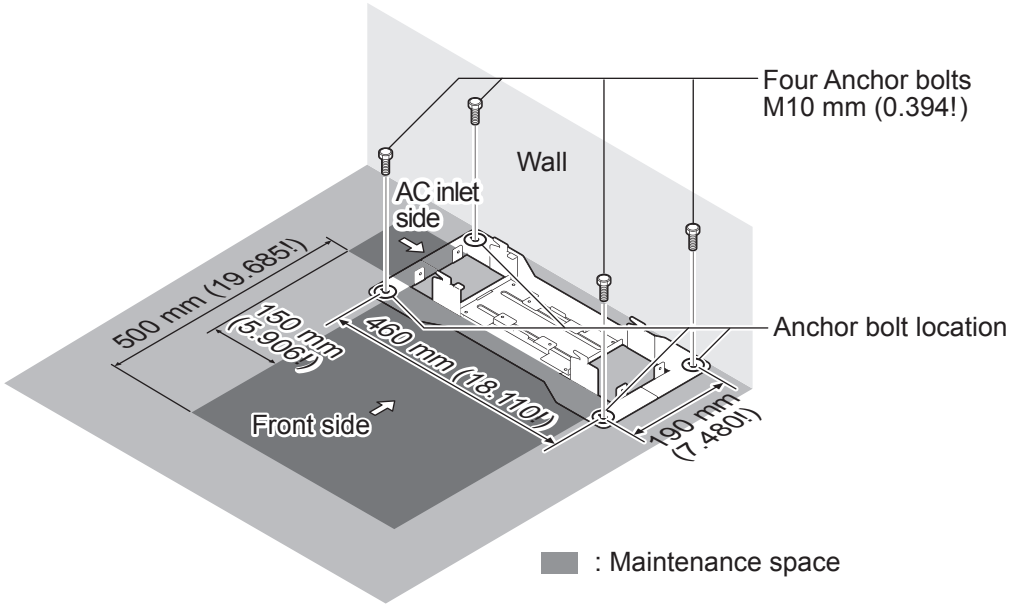


Figure 2-39 Floor-Mount Spacing Guide

4. Using the four hooks on the FM/WM Base mount the IP4WW-Battery Box on the Base.

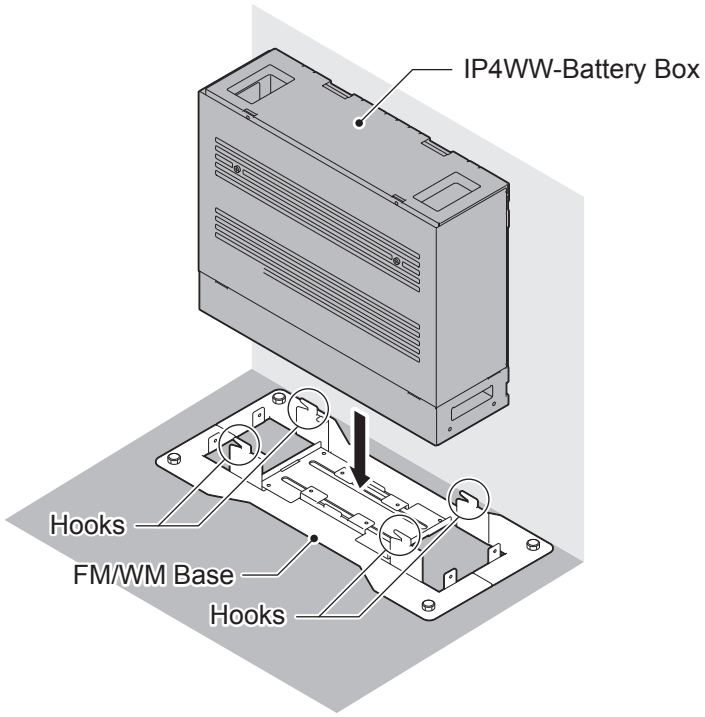


Figure 2-40 Mounting the Battery Box

5. Using four supplied screws, secure the IP4WW-Battery Box to the FM/WM Base.

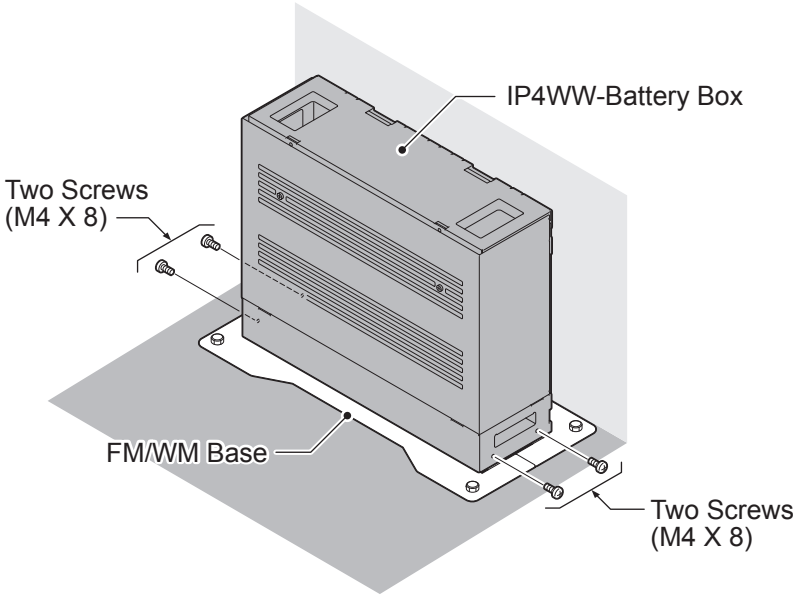


Figure 2-41 Securing the Battery Box

2.6.2 Wall-Mounting the IP4WW-Battery Box

When wall-mounting the IP4WW-Battery Box, ensure the wall can support the weight of the Battery Box (Total weight=17.6 kg (620.75 oz) - Including 2-batteries, cord, KSU, etc). The Battery Box is secured to the wall using the FM/WM BASE. Ensure that enough space is available to allow the installation of additional KSU.

Plywood should first be installed on the wall where the Battery Box will be positioned. This allows secure anchoring of the screws which support the weight of the Battery Box.

1. Using four supplied screws, secure the WM Support to the FM/WM Base-F and Base-R.

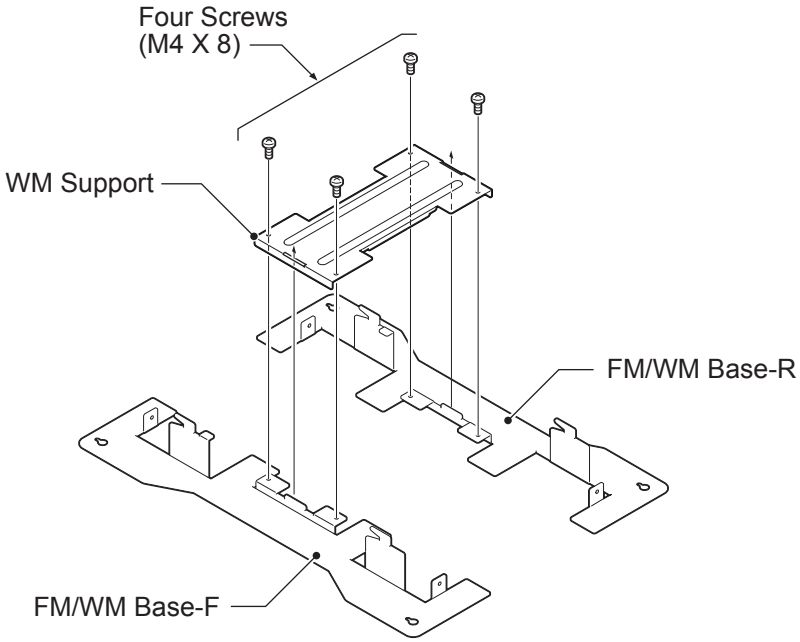


Figure 2-42 Assemble Battery Box Base

2. Refer to Figure 2-43 Wall-Mount Spacing Guide on the next page for required spacing before drilling holes for 10 mm anchor bolts (locally procured).
   Mark and drill the four holes required to install the FM/WM Base.
3. Using anchor bolts, secure the FM/WM Base to the wall.

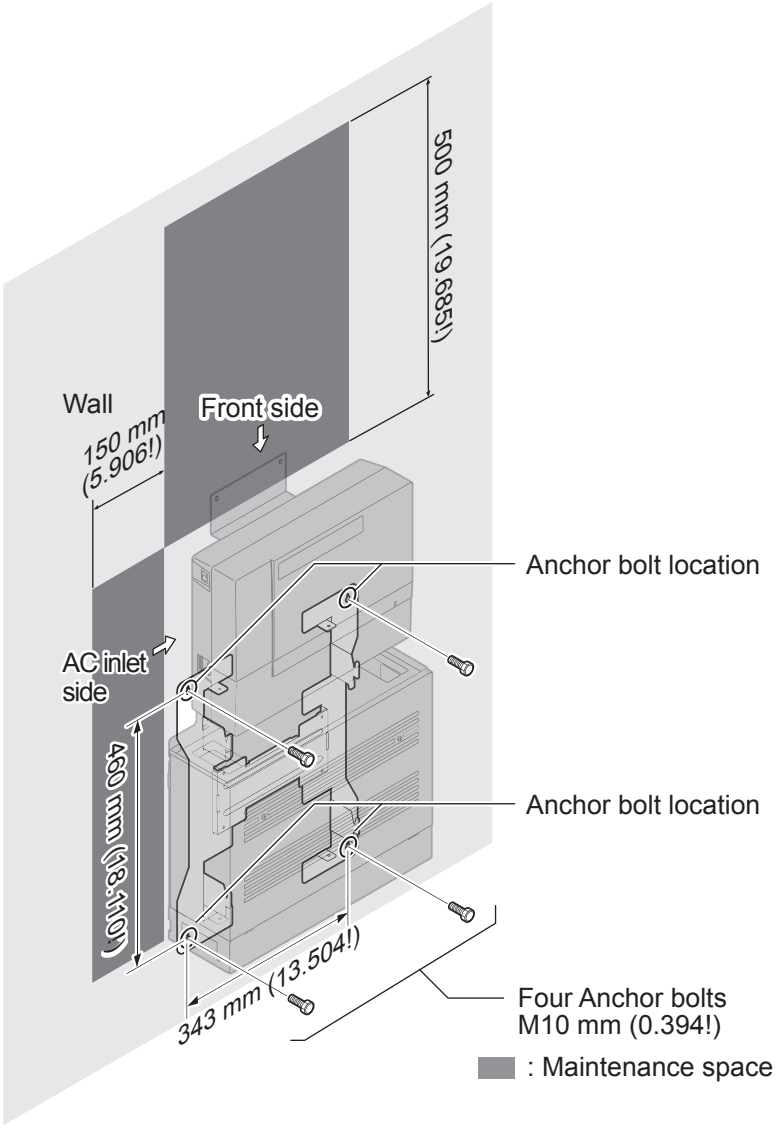


Figure 2-43 Wall-Mount Spacing Guide

4. Loosen two screws and remove the Front Cover.

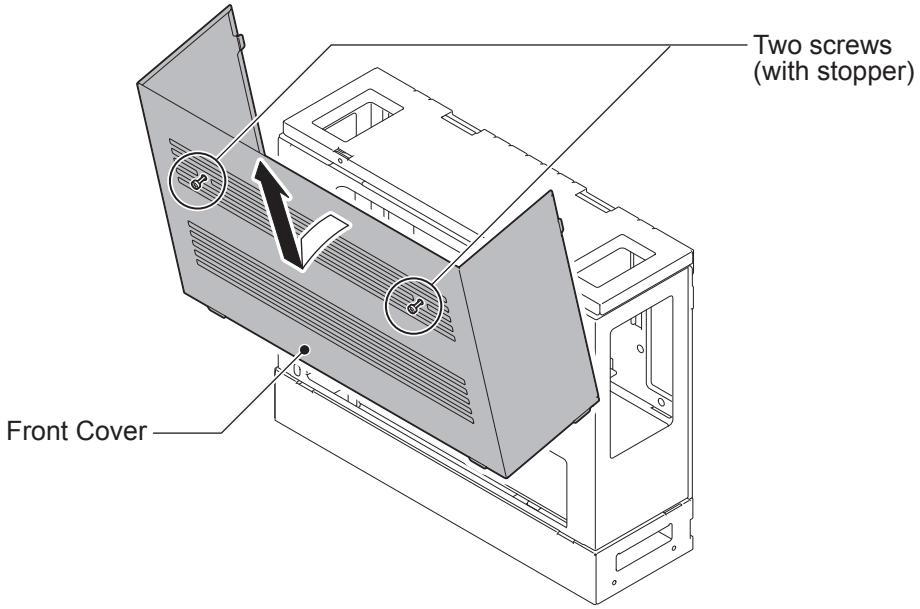


Figure 2-44 Removing the Front Cover

5. Using the four hooks on the FM/WM Base mount the IP4WW-Battery Box to the Base.

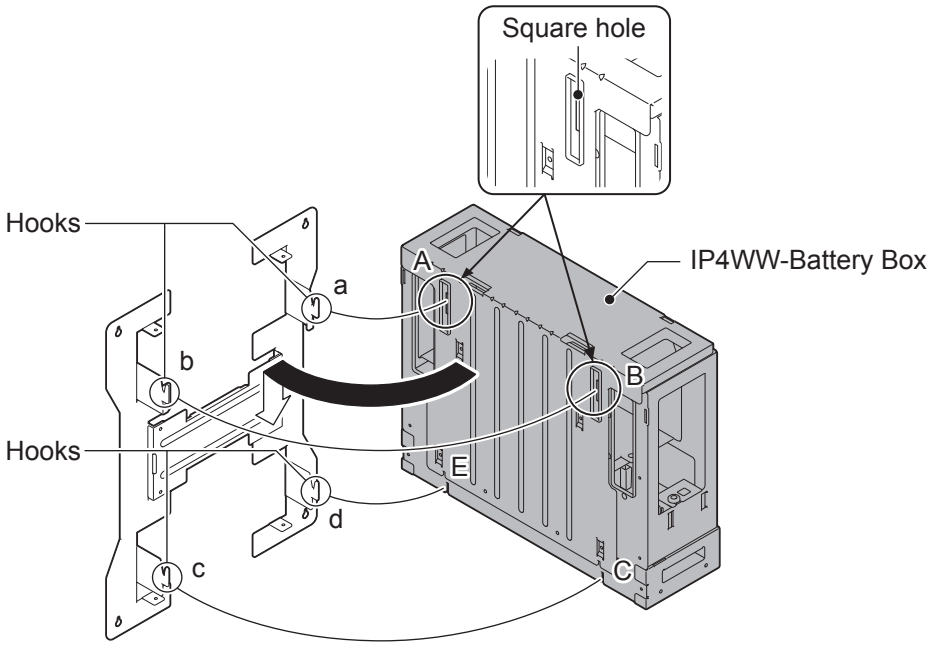


Figure 2-45 Mounting the Battery Box

6. Using one supplied screw (M3x6 with washer), secure the back plane of the Battery Box to the FM/WM Base.

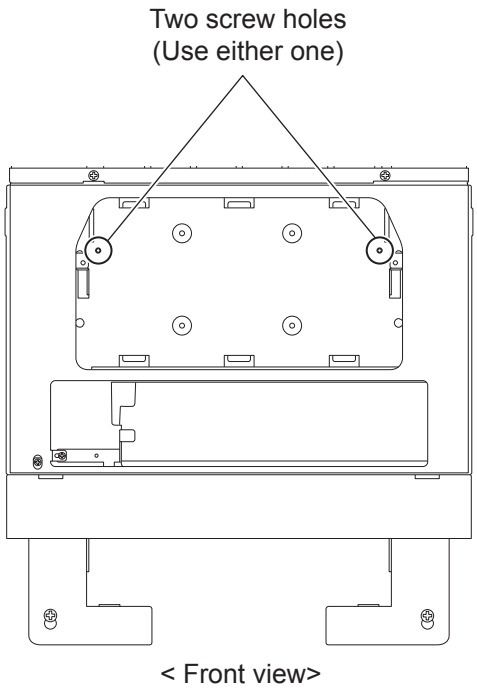


Figure 2-46 Securing the Battery Box

2.6.3 Mounting One KSU on the Battery Box

Before wall-mounting or floor-mounting the IP4WW-Battery Box, a single KSU can be mounted on the Battery Box.

1. Loosen two screws and remove the Front Cover of the Battery Box.

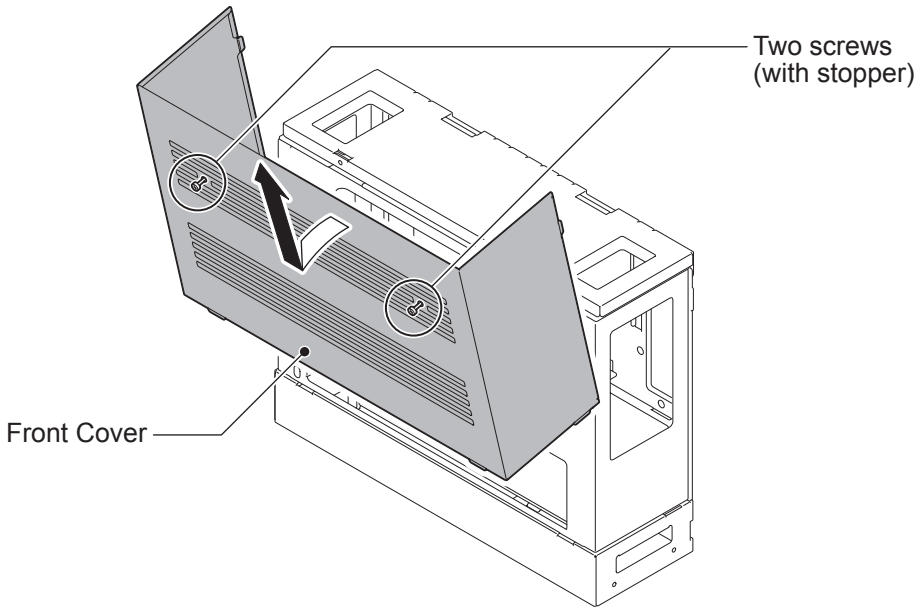


Figure 2-47 Removing the Front Cover

2. Loosen two screws and remove the L-Bracket.

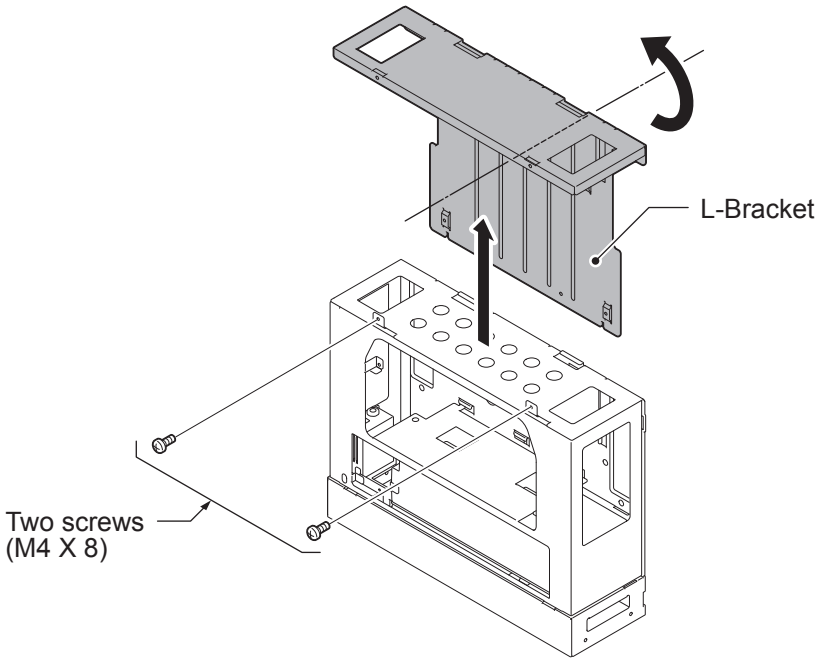


Figure 2-48 Removing the L-Bracket

3. Turn the L-Bracket upside down.
   Rotate the L-Bracket 180 degrees so that the upper FACE as shown in Figure 2-48 Removing the L-Bracket on this page is located at the bottom as shown in Figure 2-49 Securing the L-Bracket and WM Hook on the next page.
4. Insert tabs on Battery Box into holes on L-Bracket.
   Secure the L-Bracket to the Battery Box using two screws.
5. Using two screws (M4x8), secure the WM Hook to the L-Bracket.
6. Using two anchor bolts (locally procured), secure the WM Hook to the wall.

The WM Hook is required for securing both Floor-mount and Wall-mount cases.

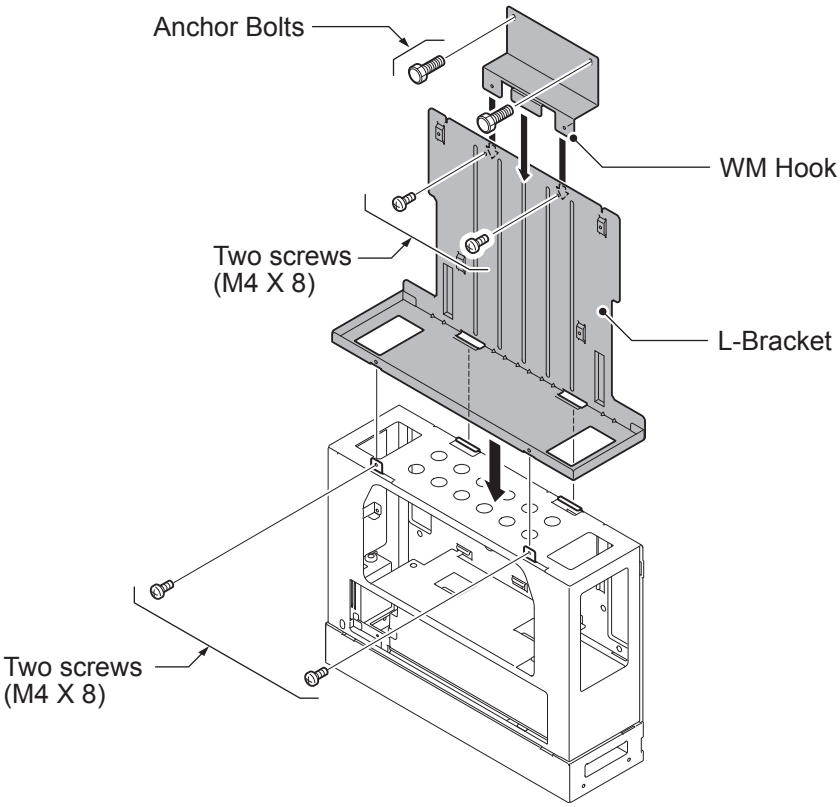


Figure 2-49 Securing the L-Bracket and WM Hook

7. Install four screws into the L-Bracket (Do not tighten). A space of 2.5 mm (0.098″) to 3.5 mm (0.138″) for KSU mounting is required. Mount the KSU on the screw heads.

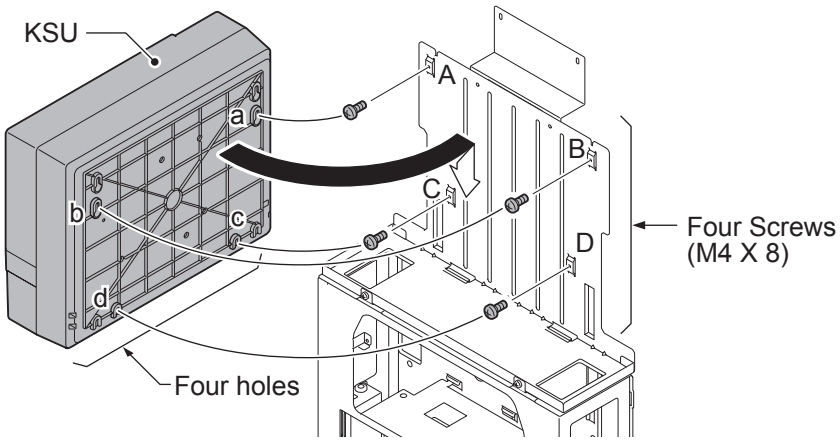


Figure 2-50 Attaching the KSU

8. Hold open the Sub-Cover of the KSU, and fasten two screws to mount the KSU.

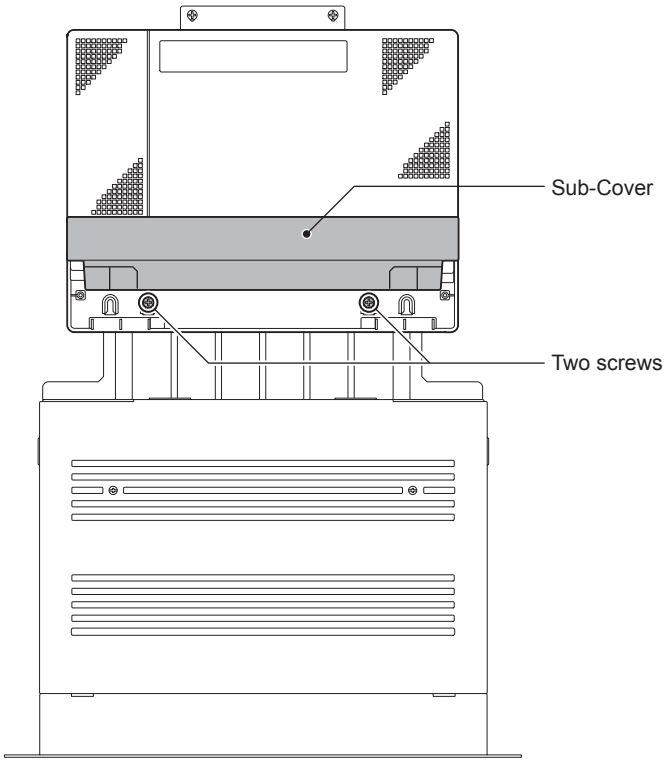


Figure 2-51 KSU Mounting on Battery Box

2.7 IP4WW-Battery Box to KSU Connection

To avoid damage to equipment, do not install the Topaz Battery Box (DX2E-32i/NX7E Battery Box) to the SL1100 system.

- ***Make sure the system power is off.***
- ***If Expansion KSU(s) are installed, turn the power on/off in the order of Expansion 2 KSU, Expansion 1 KSU and then Main KSU.***

1. Power off the KSU and disconnect AC cord.
2. Open the Sub-Cover of the KSU.

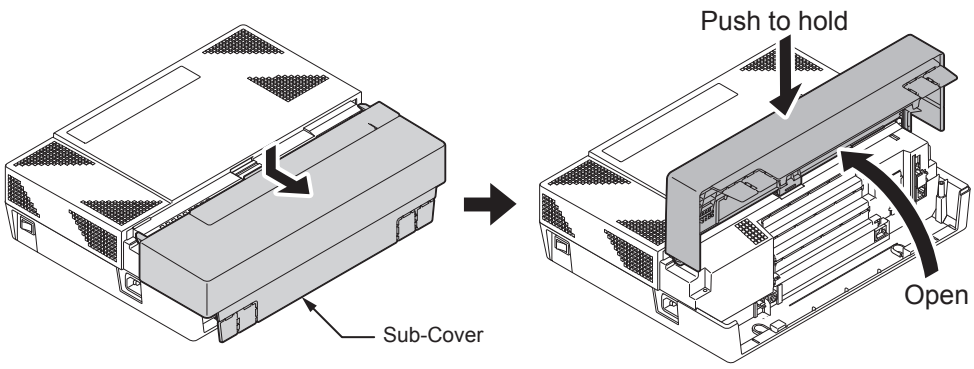


Figure 2-52 Sub-Cover Open and Hold

3. Cut and remove Plastic Knockout from the Sub-Cover to connect Battery cable.

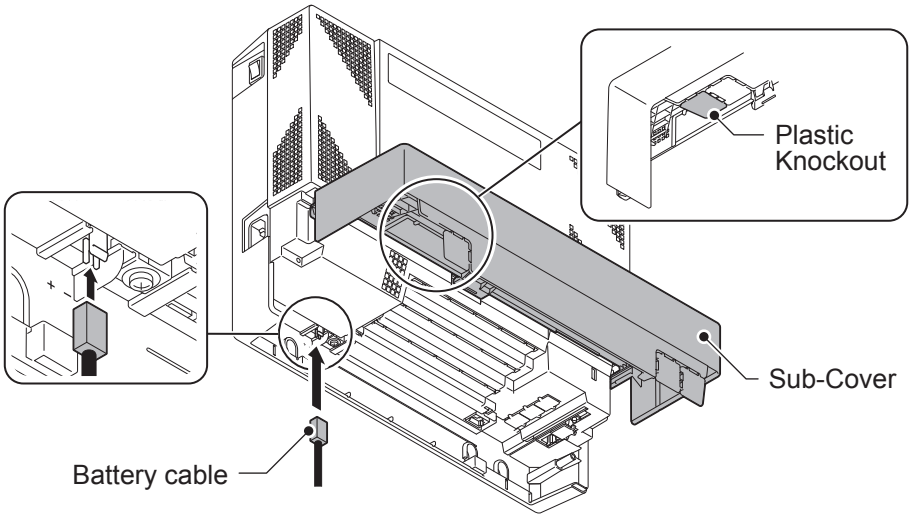


Figure 2-53 Connecting Battery Cable

4. Connect Battery cable from the Battery box to Battery connector on the KSU.

2.8 IP4WW-Battery Box Fuse Replacement

- ***In the event of a blown fuse correct the fault causing the fuse to blow before replacing the fuse; otherwise you may cause fire or electrical hazards.***
- ***Be sure to use only the specified fuse (250VT8AL).***
- ***Be sure to install the fuse into the correct location.***
- ***Be careful not to burn yourself on the heated fuse. The blown fuse may be heated soon after blowing.***
- ***If Expansion KSU(s) are installed, turn the power on/off in the order of Expansion 2 KSU, Expansion 1 KSU and then Main KSU.***

1. Power off the KSU and disconnect AC cord.
2. Loosen two screws and remove the Front Cover.

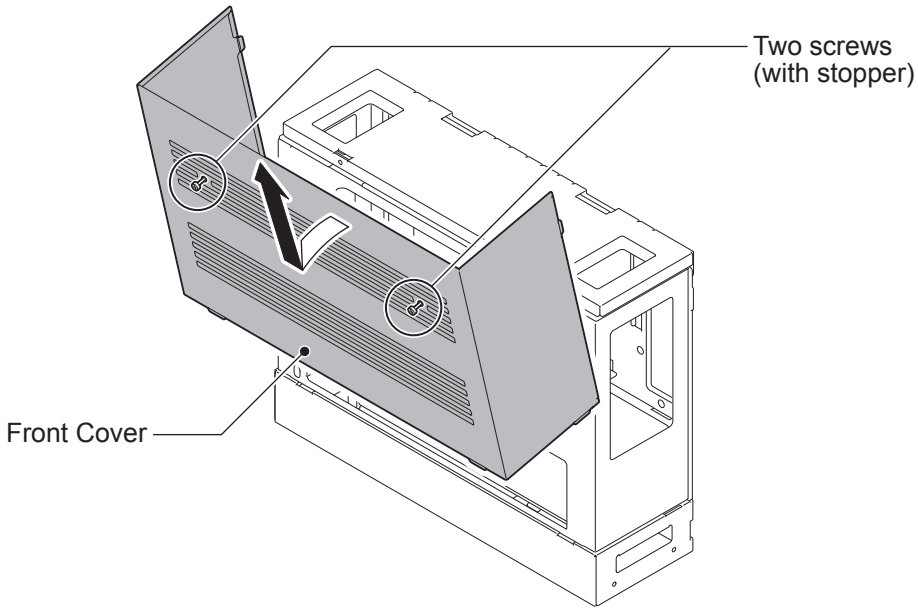


Figure 2-54 Removing the Front Cover

3. Disconnect the Battery connection cable from the Fuse Unit.

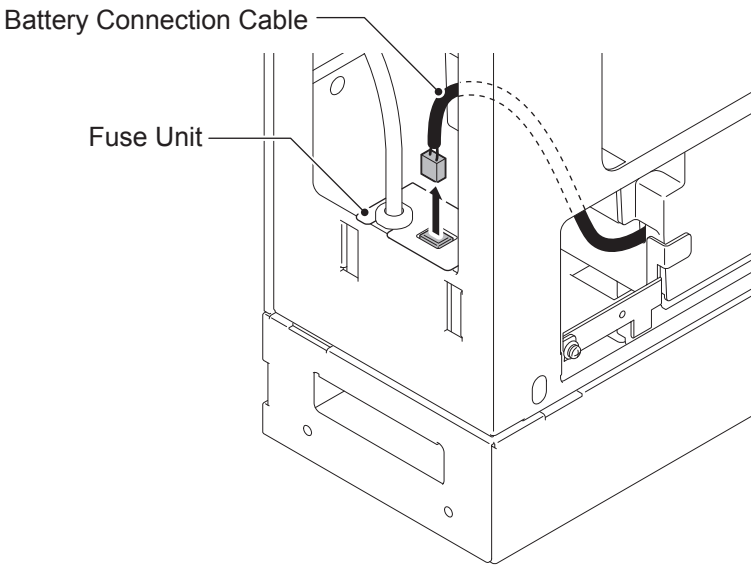


Figure 2-55 Disconnecting the Battery Connection Cable

4. Loosen the screw from the Fuse Unit.

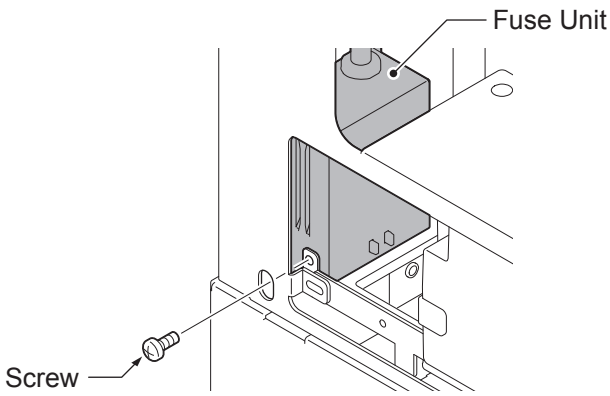


Figure 2-56 Loosen the Fuse Unit Screw

5. Slide Fuse Unit out of the Battery box.
6. Replace the fuse (250VT8AL).

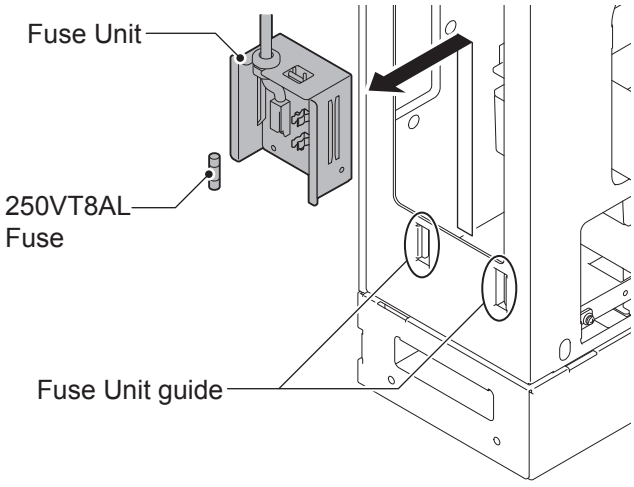


Figure 2-57 Replacing the Fuse

7. Using the Fuse Unit guides, slide the Fuse Unit into the Battery Box.

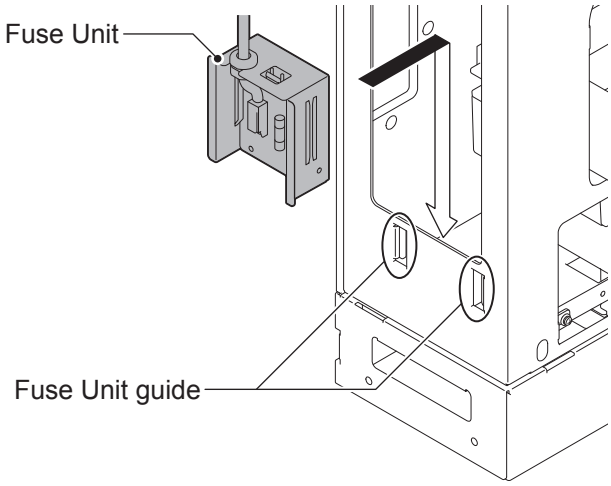


Figure 2-58 Install the Fuse Unit

8. Secure the Fuse Unit by tightening the screw.

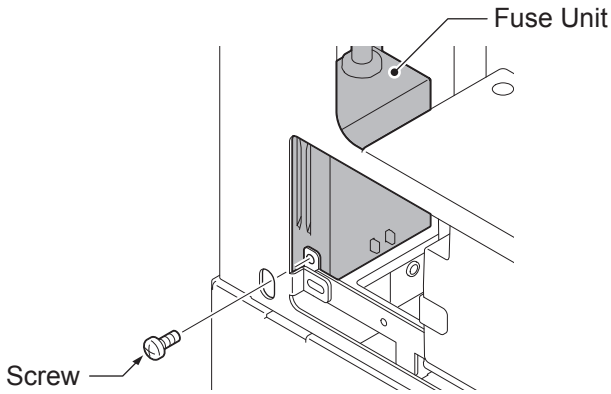


Figure 2-59 Securing the Fuse Unit

9. Reconnect the Battery Connection Cable to the Fuse Unit.

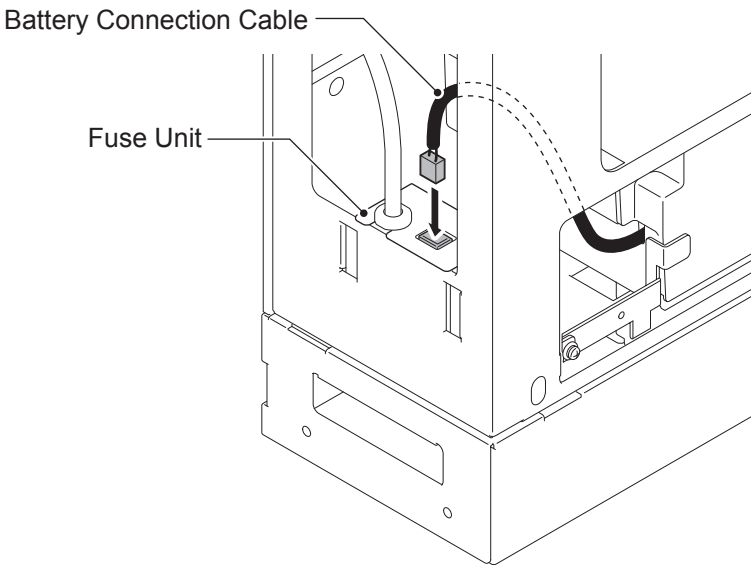


Figure 2-60 Connect Battery Connection Cable

10. Align tabs a to f to holes A to F on Battery Box. Slide the Front Cover into position and tighten the two screws.

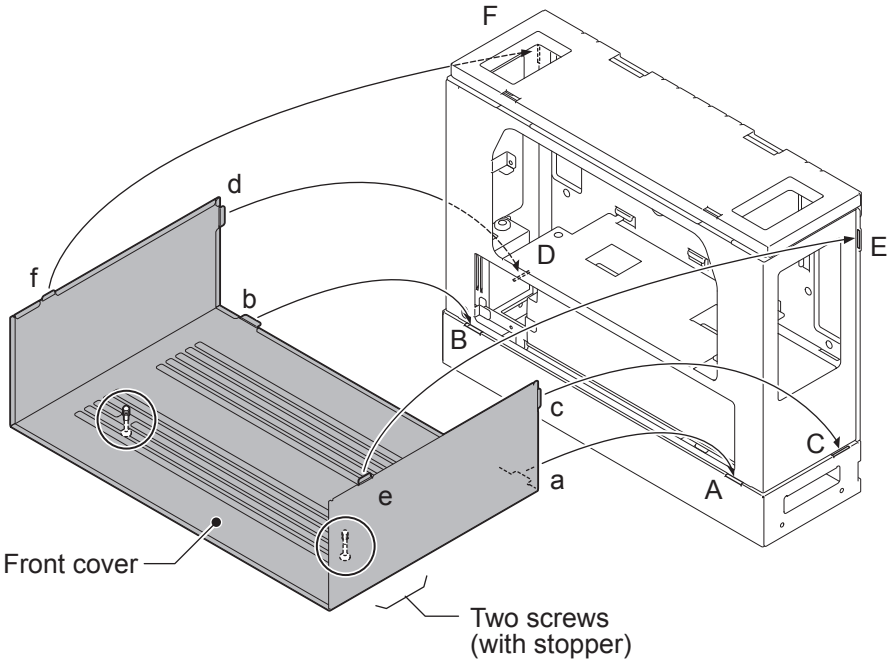


Figure 2-61 Installation of the Front Cover

SECTION 3 INSTALLING THE EXPANSION INTERFACE CARDS

3.1 General

Up to two expansion interface cards can be installed per KSU.

Table 2-9 Expansion Cards

Expansion Interface Card	Description	Note
IP4WW-080E-B1	8 digital extensions card	
IP4WW-008E-B1	8 analog extensions card	
IP4WW-4COIDB-B1	4 analog trunk daughter board (Mount on the 084M-B1/080E-B1/008E-B1)	
IP4WW-1PRIU-C1	1 PRI (PRI/T1) card	

• *The 4COIDB-B1 can be installed in following combinations;*

Daughter Board	Option Unit		
	084M-B1	080E-B1	008E-B1
4COIDB-B1	Yes	Yes	Yes

3.2 Unpacking

Unpack the 080E-B1/008E-B1/4COIDB-B1/1PRIU-C1 and check it against the following list. Inspect for physical damage.

Table 2-10 Expansion Card Packing List

Items	List of Contents	QTY	Note
IP4WW-080E-B1	080E-B1 PCB (with PKG Spacer)	1	
	Nylon Spacers	2	
	Metal Spacers	2	
	Screws (with circular washer)	2	
IP4WW-008E-B1	008E-B1 PCB (with PKG Spacer)	1	
	Nylon Spacers	2	
	Metal Spacers	2	
	Screws (with circular washer)	2	
IP4WW-4COIDB-B1	4COIDB-B1 PCB	1	
	Nylon Spacers	2	
	4COIDB Label	1	
	Metal Spacers	1	
	Screws (with circular washer)	2	
IP4WW-1PRIU-C1	1PRIU-C1 PCB (with PKG Spacer)	1	
	Nylon Spacers	2	
	Metal Spacers	2	
	Screws (with circular washer)	2	

3.3 Mounting the Expansion Interface Card

DO NOT POWER ON until all installation has been completed.
Fit the optional 4COIDB-B1 daughter boards before installing the 084M-B1/080E-B1/008E-B1 PCBs.

3.3.1 Mounting the 080E-B1/008E-B1/1PRIU-C1 PCBs

The procedure for mounting the expansion interface cards is as follows;

- ***Do Not Power on until all installation have been completed.***
- ***If Expansion KSU(s) are installed, turn the power on/off in the order of Expansion 2 KSU, Expansion 1 KSU and then Main KSU.***

1. Turn off the system power and disconnect the AC cord from KSU.
2. Open and remove the Sub-Cover.

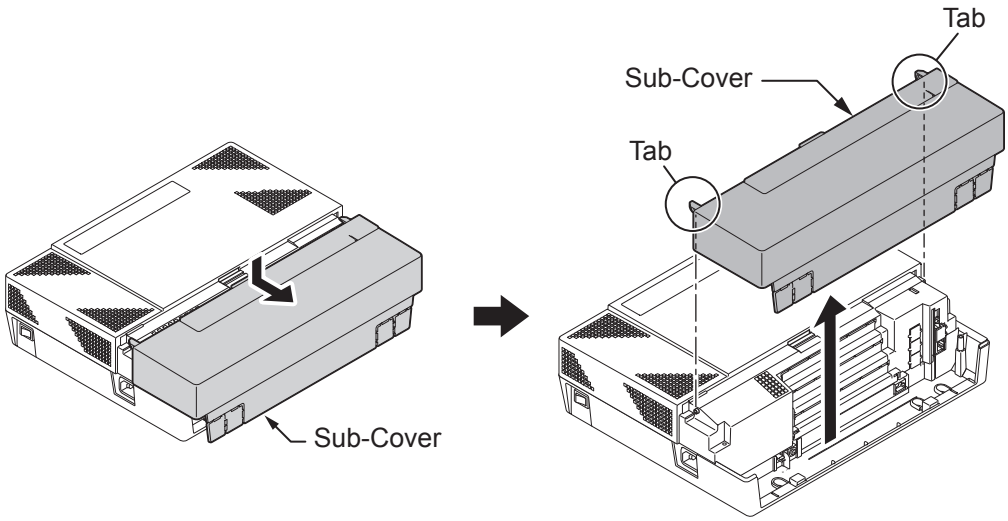


Figure 2-62 Removing the Sub-Cover

3. Loosen two screws and remove the Main-Cover.

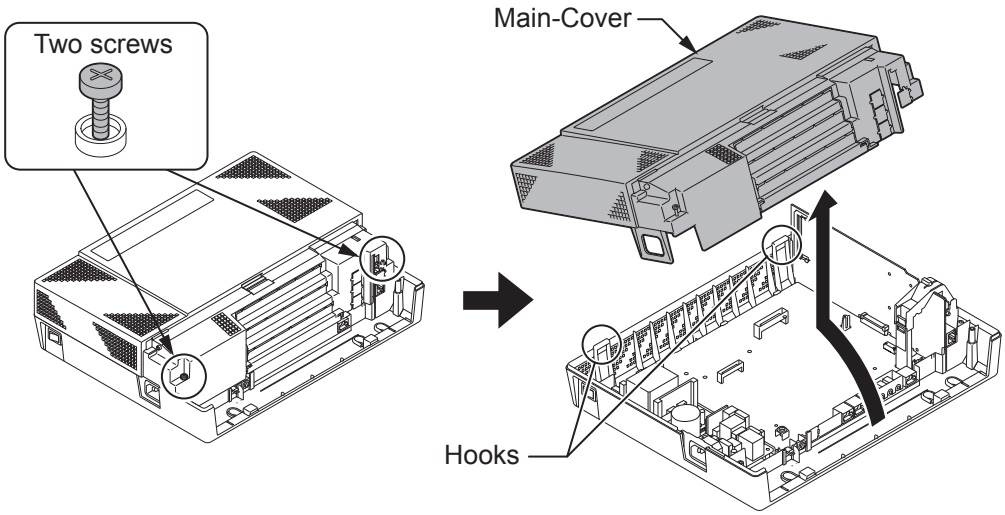


Figure 2-63 Removing the Main-Cover

4. Insert two Nylon-spacers into the specified holes, and fasten two Metal-spacers into the specified holes. (Both Nylon and Metal spacers are provided with 080E/008E/1PRIU)
   If no more Expansion Interface cards are to be mounted on the 1st PCB, fasten two screws to

secure the 1st PCB on the top of the 080E/008E/1PRIU.

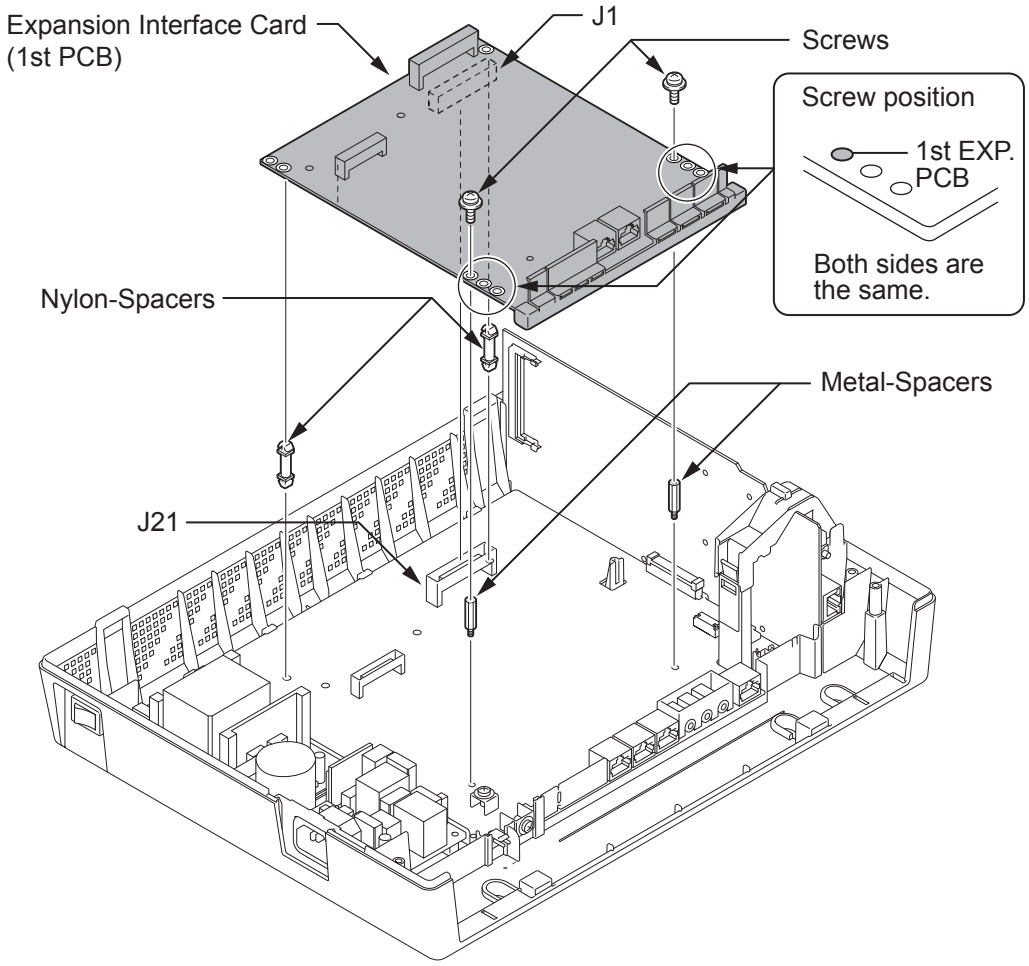


Figure 2-64 Mounting the 1st Expansion Interface Card

5. In case a 2nd PCB is mounted, insert two Nylon-spacers into the specified holes, and fasten two Metal-spacers into the specified holes. (Both Nylon and Metal spacers are provided with 080E/008E/1PRIU)

Fasten two screws to secure the 2nd PCB to the top of the 080E/008E/1PRIU.

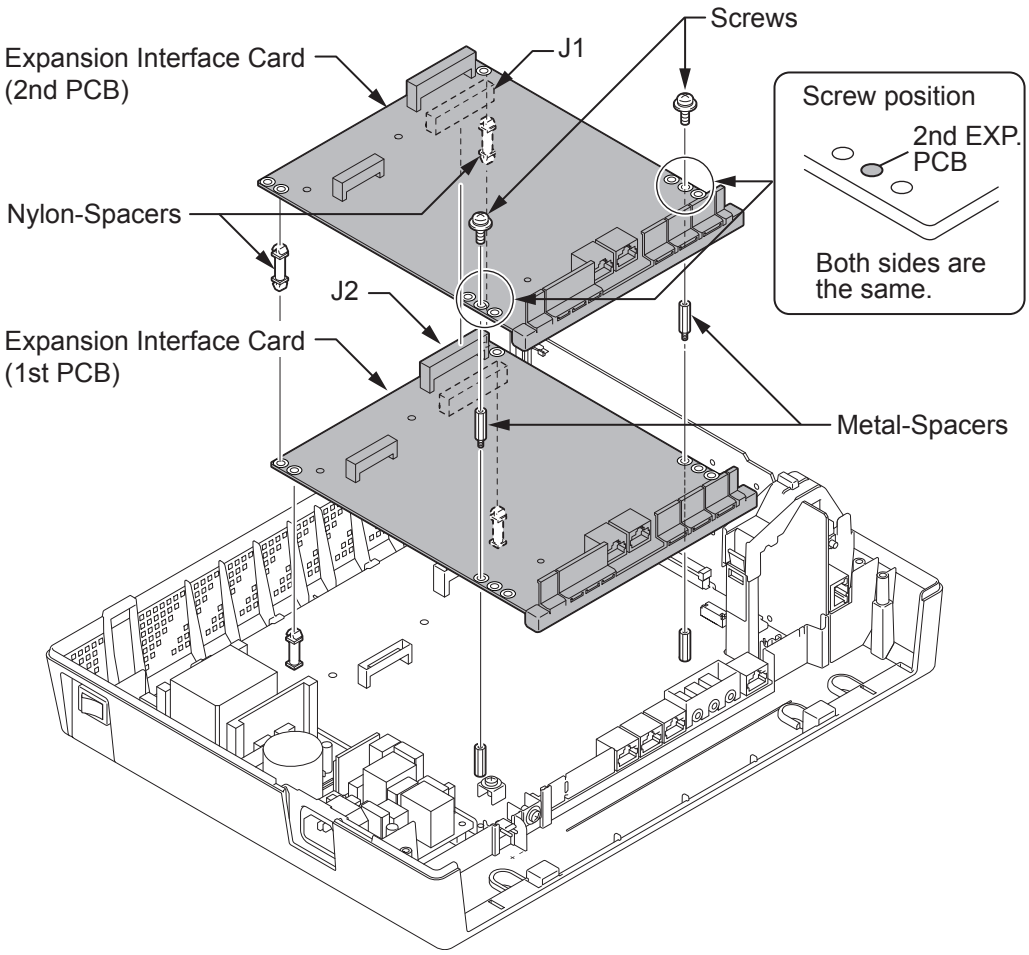


Figure 2-65 Mounting the 2nd Expansion Interface Card

6. Following illustration shows an example for installing two expansion PCBs onto the KSU.

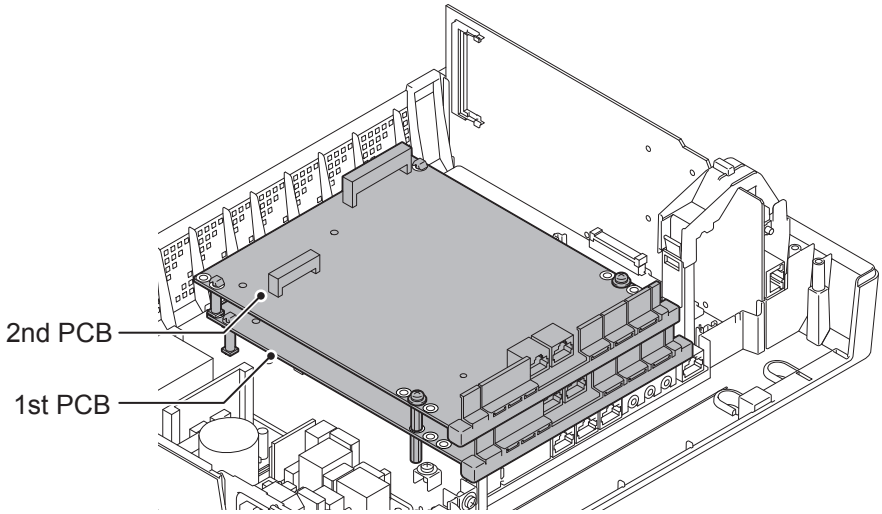


Figure 2-66 Mounting Two Expansion Interface Cards

7. Cut and remove the Plastic Knockouts as required for each Expansion interface card.

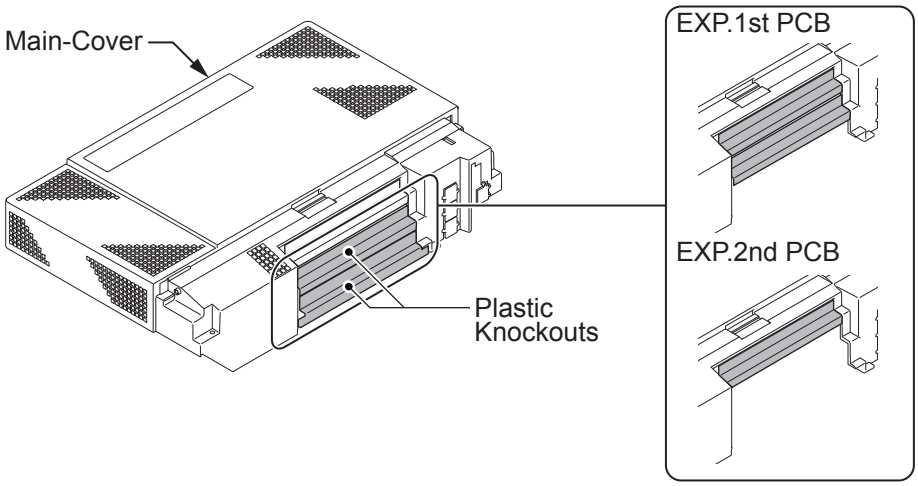


Figure 2-67 Plastic Knockouts

8. Replace the Main-Cover and fasten two screws.

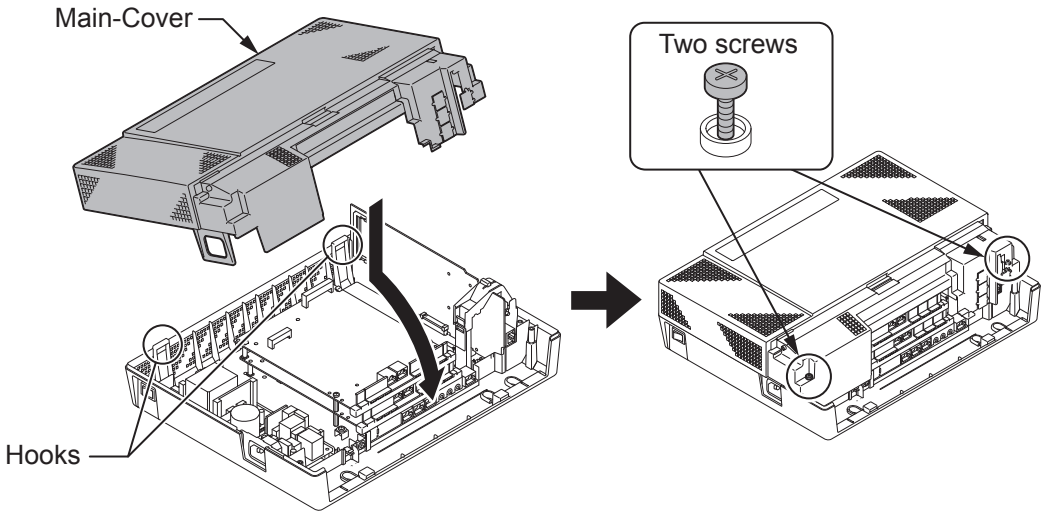


Figure 2-68 Replacing the Main-Cover

3.3.2 Mounting the 4COIDB PCB

1. Cut and remove specified Plastic Knockouts on the 084M-B1/080E-B1/008E-B1 PCB.

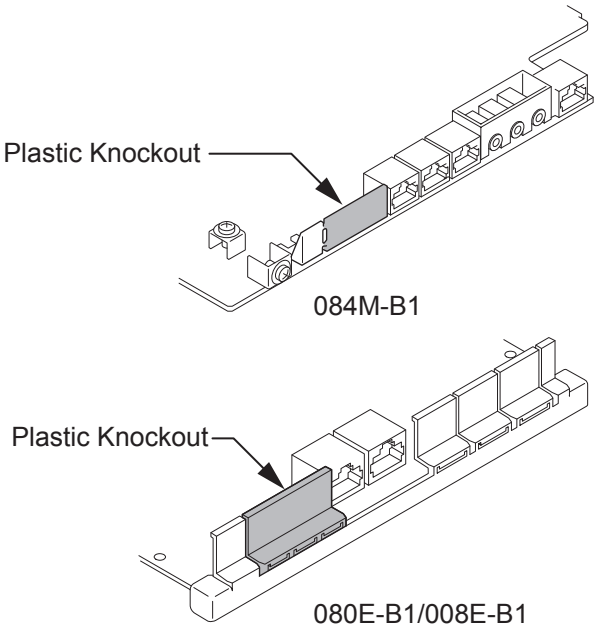


Figure 2-69 Plastic Knockouts on 084M-B1/080E-B1/008E-B1

2. Insert two Nylon-spacers into the specified holes. Using supplied screw, fasten Metal Spacer to 4COIDB-B1 PCB.
3. Mount the 4COIDB-B1 PCB onto the 084M-B1/080E-B1/008E-B1 PCB using two Nylon-spacers and one screw. (Refer to Figure 2-70 Installing the 4COIDB-B1 on this page)
4. Attach the 4COIDB Label to the specified position on the 084M-B1/080E-B1/008E-B1 PCB.

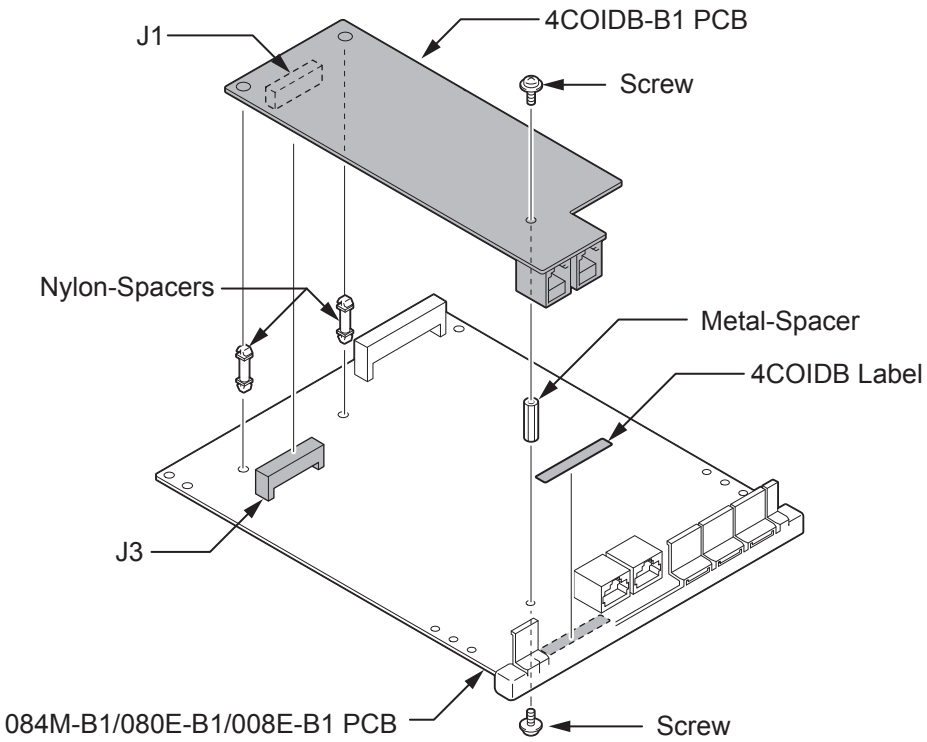


Figure 2-70 Installing the 4COIDB-B1

The 4COIDB-B1 cannot be mounted on the 1PRIU-C1 PCB.

5. Mount the 4COIDB-B1 with 084M-B1/080E-B1/008E-B1 PCB into the KSU.

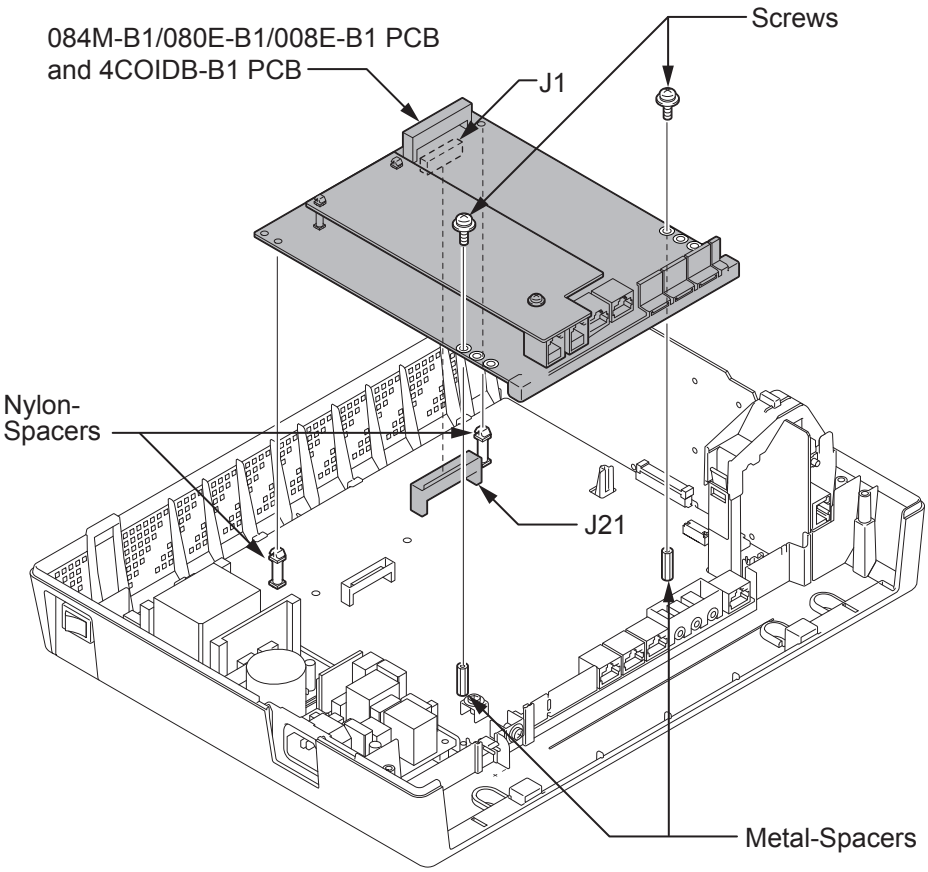


Figure 2-71 Mounting the 4COIDB-B1 into the KSU

6. Replace the Main-Cover and fasten two screws.

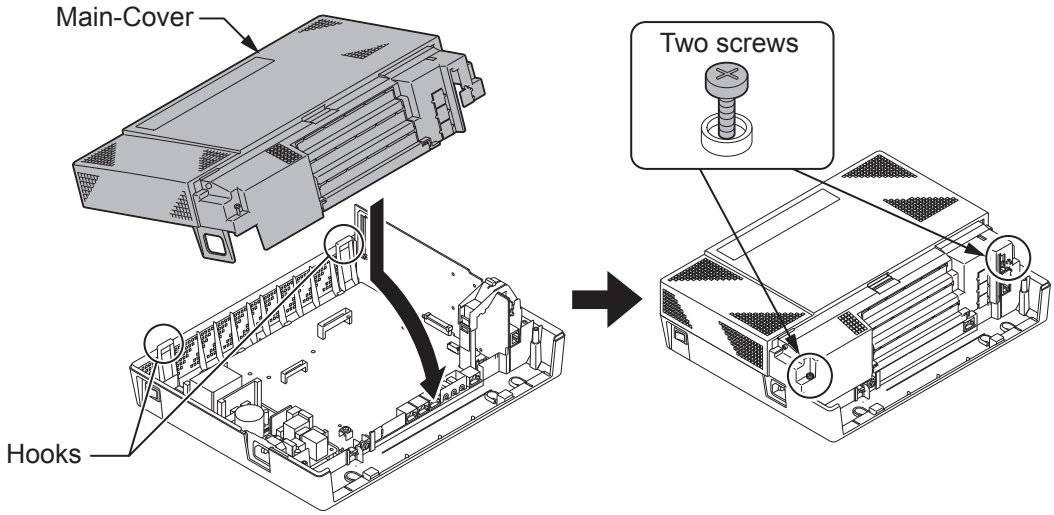


Figure 2-72 Replacing the Main-Cover

3.4 Cabling and Setting the Expansion Interface Card

Precautions for Cabling

- Do not wire the cable with an AC cable, computer, etc.
- Do not run the cable near the high frequency generating device.
- Use cable protectors in case the cables run on the floor.
- Aerial distribution wiring is not allowed.
- Trunks must be installed with lightning protectors.

- Do not install the DSX Terminal in the SL1100 system, it does not work properly.

3.4.1 Cabling IP4WW-080E-B1

This IP4WW-080E-B1 PCB provides two RJ-61 connections for digital extensions.

Before plugging in the Multiline Telephone, DSS Console, Single line Telephone or Doorphone, ensure all Main and Expansion KSUs are powered off.

DSX Terminal does not work properly when it connected.

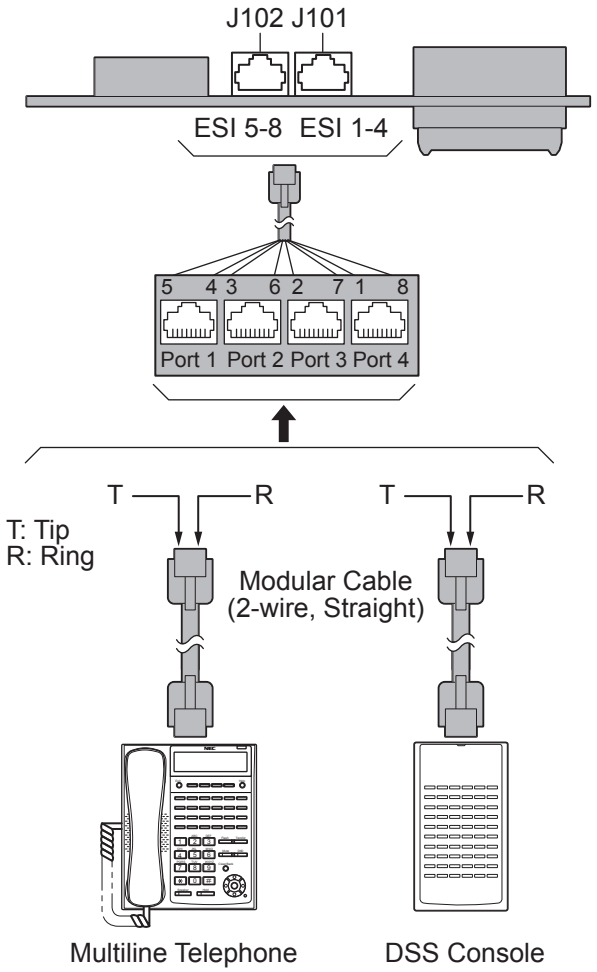
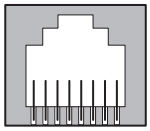


Figure 2-73 Connectors of 080E-B1

3.4.1.1 Connectors

The following table shows the pin-outs for the RJ-61 cable connector for Digital extension connections.

Table 2-11 RJ-61 Digital Connector Pin-Outs (J101, J102)

	Pin No.	ESI 1-4 (J101), ESI 5-8 (J102): 2-Wire Digital Extension Port Connector (RJ-61)
	1	T4 (Tip for port 4)
	2	T3 (Tip for port 3)
	3	T2 (Tip for port 2)
	4	R1 (Ring for port 1)
	5	T1 (Tip for port 1)
	6	R2 (Ring for port 2)
	7	R3 (Ring for port 3)
	8	R4 (Ring for port 4)

3.4.2 Cabling IP4WW-008E-B1

This IP4WW-008E-B1 PCB provides two RJ-61 connections for analog extensions.

Before plugging in the Multiline Telephone, DSS Console, Single line Telephone or Doorphone, ensure all Main and Expansion KSUs are powered off.

DSX Terminal does not work properly when it connected.

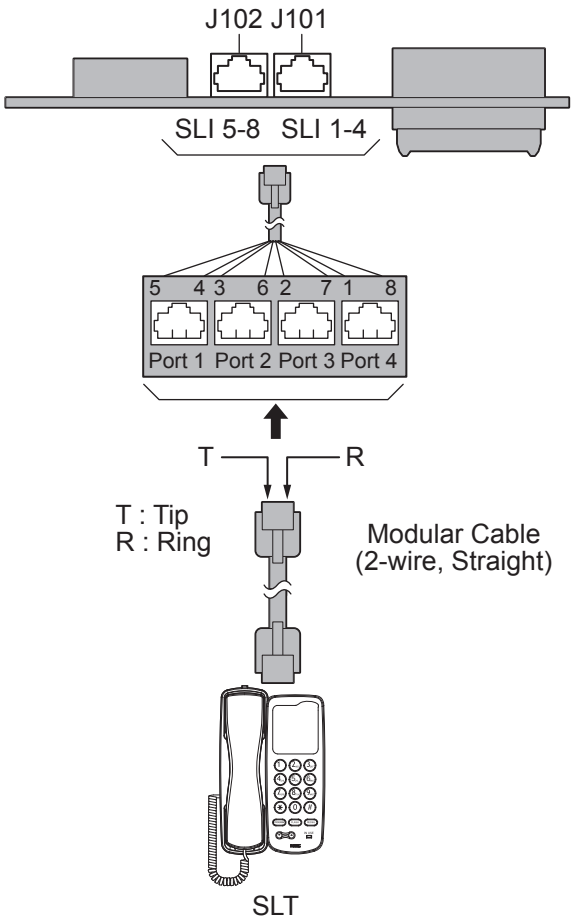


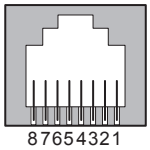
Figure 2-74 Connectors of 008E-B1

While an Analog Telephone (port) is ringing or MW-lamp is flashing on an Analog Phone (port), do not disconnect the phone from the port and or connect another type of the terminal to this port.

3.4.2.1 Connectors

The following table shows the pin-outs for the RJ-61 cable connector for Analog extension connections.

Table 2-12 RJ-61 Analog Pin-Outs (J101, J102)

	Pin No.	SLI 1-4 (J101), SLI 5-8 (J102): 2-Wire Analog Extension port Connector (RJ-61)
 87654321	1	T4 (Tip for port 4)
	2	T3 (Tip for port 3)
	3	T2 (Tip for port 2)
	4	R1 (Ring for port 1)
	5	T1 (Tip for port 1)
	6	R2 (Ring for port 2)
	7	R3 (Ring for port 3)
	8	R4 (Ring for port 4)

3.4.3 Cabling and Setting IP4WW-4COIDB-B1

This IP4WW-4COIDB-B1 PCB provides two RJ-61 connections for CO lines (J2) and PFT TEL (J3).

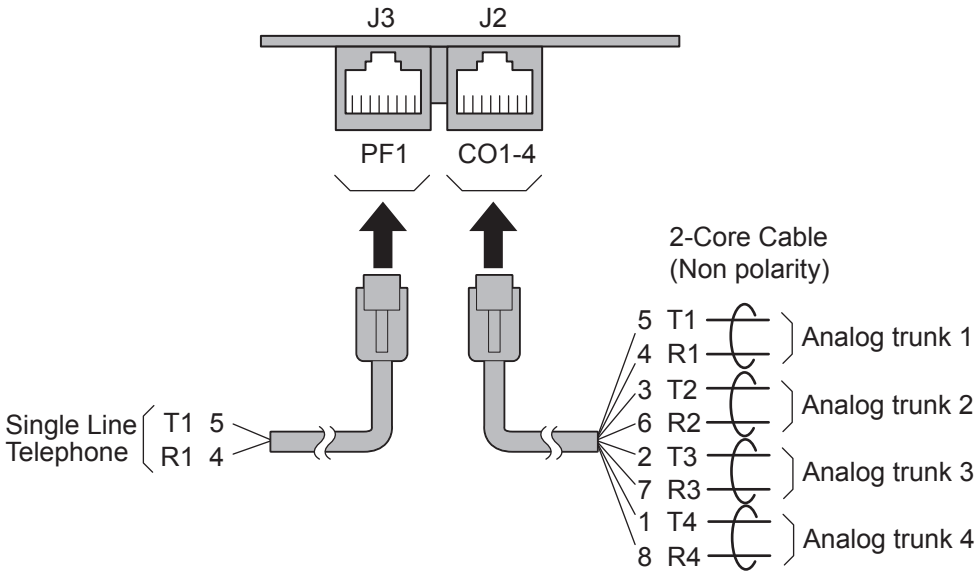
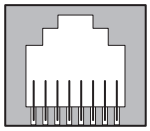


Figure 2-75 Connectors of 4COIDB-B1

3.4.3.1 Connectors

The following table shows the pin-outs for the RJ-61 cable connector for CO (J2) and PF (J3) connections.

Table 2-13 RJ-61 CO/PF Pin-Outs (J2, J3)

	Pin No.	CO1-4 (J2): CO Port Connector (RJ-61)	PF1 (J3): PF Tel Port Connector (RJ-61)
 87654321	1	T4 (Tip for port 4)	-
	2	T3 (Tip for port 3)	-
	3	T2 (Tip for port 2)	-
	4	R1 (Ring for port 1)	R1 (Ring for port 1)
	5	T1 (Tip for port 1)	T1 (Tip for port 1)
	6	R2 (Ring for port 2)	-
	7	R3 (Ring for port 3)	-
	8	R4 (Ring for port 4)	-

3.4.4 Cabling and Setting IP4WW-1PRIU-C1

This IP4WW-1PRIU-C1 PCB provides one RJ-45 PRI connection.

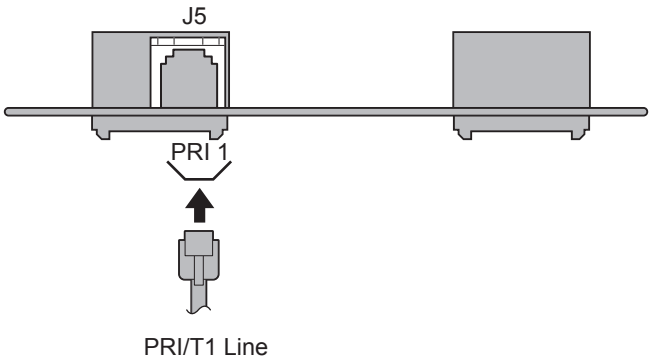
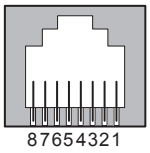


Figure 2-76 Connector of 1PRIU-C1

3.4.4.1 Connector

Following table shows the pin-outs for the RJ-45 cable connector for S-Bus and T-Bus RJ-45 connections.

Table 2-14 RJ-45 PRI Pin-Outs (S-Bus, T-Bus)

	Pin No.	RJ-45 Cable Connector- PRI 1 (J5) S-Bus Connection	RJ-45 Cable Connector- PRI 1 (J5) T-Bus Connection
 87654321	1	TA	RA
	2	TB	RB
	3	-	-
	4	RA	TA
	5	RB	TB
	6	-	-
	7	-	-
	8	-	-

3.4.4.2 Switch Setting

The following figure shows the location of the switches and LEDs on the IP4WW-1PRIU-C1 Card.

1. Set the switches J6 to J9 according to the system, referring the Table 2-15 Switch Setting of 1PRIU-C1 on this page.

Table 2-15 Switch Setting of 1PRIU-C1

Switch No.	Switch Position	Description
J6, J7	2M	Connect PRI/E1 (2.048 Mb/s) line
	1.5M (default)	Connect PRI/T1 (1.544 Mb/s) line
J8, J9	T (default)	T-Bus connection
	S	S-Bus connection

2. Connect the cables from the NT1 Network Termination cable to the J5 connector on the 1PRIU-C1 Card.

3. Assign whether the unit works as PRI/T1 by PRG10-51-01.

With normal operation, D4 LED flashes green.

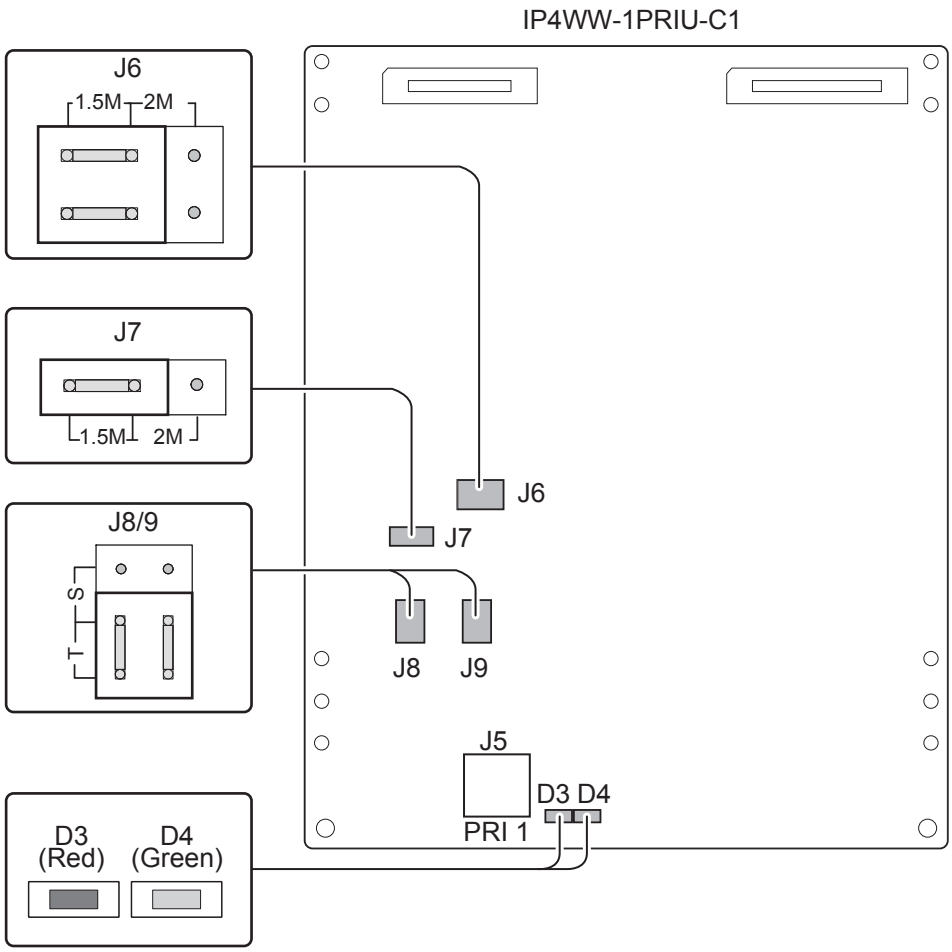


Figure 2-77 Switches and LEDs Location of 1PRIU-C1

3.4.4.3 LED Indication

LED indications for the IP4WW-1PRIU-C1 are listed in following table. Each LED is listed with its associated function and LED and operational status.

Table 2-16 LED Indication

LED Indication		Operation Status		Remarks
Live LED (D4) (Green)	**Busy LED (D3) (Red)**			
On	On	System Initializing		-
Flash (1s)	On	The assignment of the unit is refused		When you exceed the system capacity. When the main software version is not matched.
	Flash (1s)	Trouble found during self-diagnostics.		-
Flash (100ms)	On	Normal Operation	A Channel is busy (use another from Ch1 - Chx)	-
	Off		All channels are Idle.	-

LED Indication		Operation Status		Remarks
Live LED (D4) (Green)	Busy LED (D3) (Red)			
Off	On	Unit Busy	A Channel is busy (use another from Ch1 - Chx)	-
	Off		All channels are Idle.	-
	Flash 80ms (On/Off) x3/ 400ms Off	Downloading firmware		-

T1 Alarm Mode

Refer to following figure for LED pattern information. LED indications for the T1 are listed in Table 2-17 T1 LED Indications on this page.

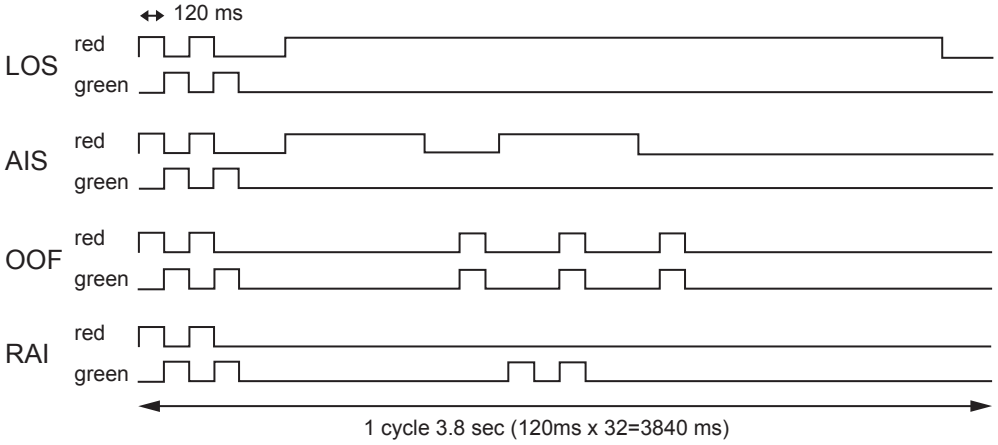


Figure 2-78 1PRIU-C1 LED Indication Pattern of Layer 1 on T1 Unit

Table 2-17 T1 LED Indications

Alarm	Details of the alarm	The LED indication pattern
LOS	LOS (Loss of Signal (Red Alarm)) No Signal (Analog Interface)	Following an alarm blink (red, green, red, green), a red LED lighting up.
AIS	AIS (Alarm Indication Signal (Blue Alarm))	Following an alarm blink (red, green, red, green), a red LED flashes on and off slowly twice
OOF	OOF (Out of Frame (Red Alarm))	Following an alarm blink (red, green, red, green), a red LED and a green LED flash on and off 3 times simultaneously.
RAI	RAI (Remote Alarm Indication (Yellow Alarm))	Following an alarm blink (red, green, red, green), a green LED flashes on and off twice.
No alarm	System does LED control	

3.5 Power Failure Transfer (4COIDB-B1 only)

3.5.1 General

In the event of AC power failure, the specified trunk is directly connected to the specified extension port as below. And SLT must be connected to the specified extension. The multiline telephone (2W) does not work when the specified trunk is connected to the specified extension port.

J2 (CO1-4): Trunk Port 1 → J3 (PF1): Extension Port 1

Refer to Table 2-13 RJ-61 CO/PF Pin-Outs (J2, J3) on page 2-48 for wiring of the power failure telephone.

- *The connected extension must be SLT (Single Line Telephone).*

SECTION 4 INSTALLING THE OPTIONAL INTERFACE CARDS

4.1 VoIP Card (VOIPDB-C1)

4.1.1 General

The IP4WW-VOIPDB-C1 daughter board is used to convert the RTP (Real Time Transfer Protocol) packets via the IP Network and PCM highway. The daughter board is installed on the CPU card.

4.1.2 Unpacking

Table 2-18 VOIPDB-C1 Packing List

Items	List of Contents	QTY
IP4WW-VOIPDB-C1	IP4WW-VOIPDB-C1	1
	Ferrite Core (for Ethernet Cable)	1

4.1.3 Installing the VOIPDB-C1 PCB

- ***Do not remove or install the CPU Card with the power on.***
- ***If Expansion KSU(s) are installed, turn the power on/off in the order of Expansion 2 KSU, Expansion 1 KSU and then Main KSU.***
- ***When the VOIPDB-C1 is installed on the CPU-B1, the NIC card on the CPU does not function anymore.***

1. Turn off the system power and disconnect AC cord.
2. Open and remove the Sub-Cover.

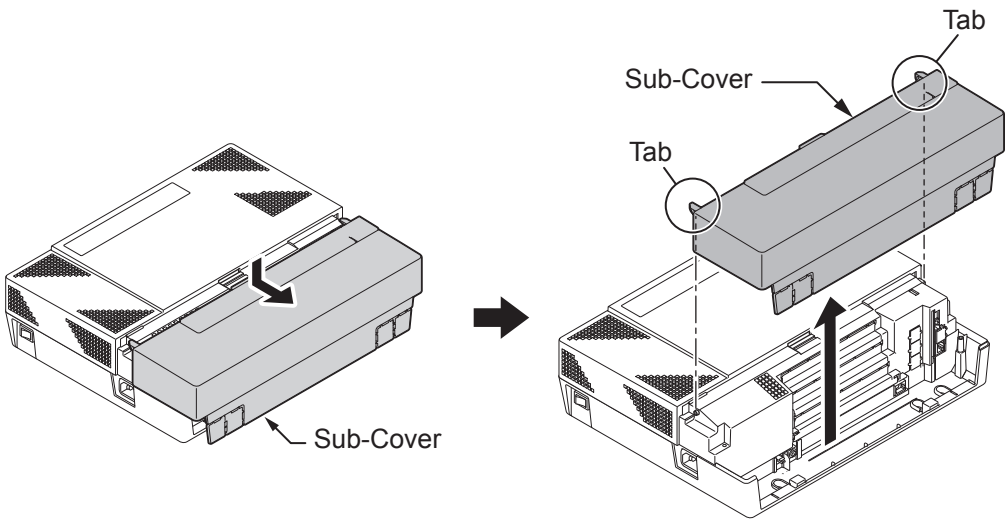


Figure 2-79 Removing the Sub-Cover

3. Loosen two screws and remove the Main-Cover.

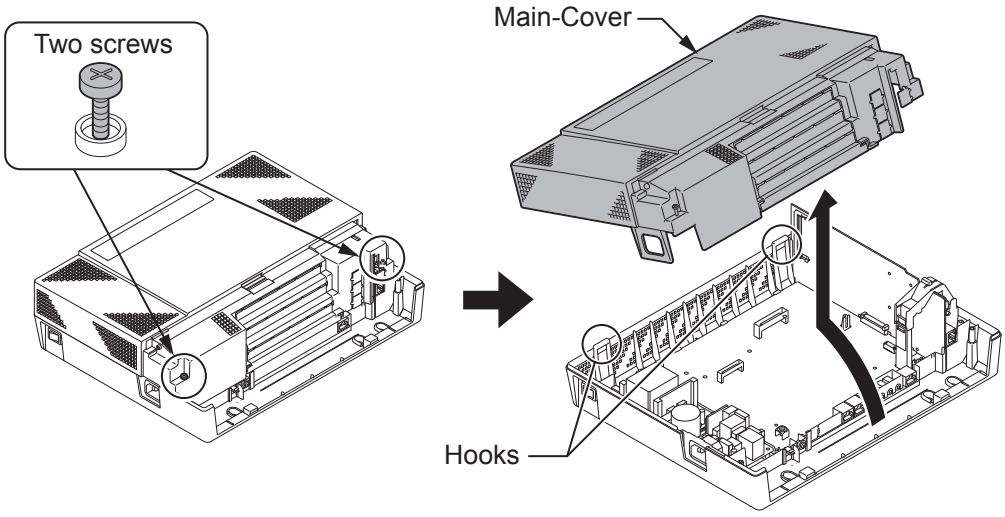


Figure 2-80 Removing the Main-Cover

4. Press tab A and lift the CPU support bracket. Remove the CPU card.

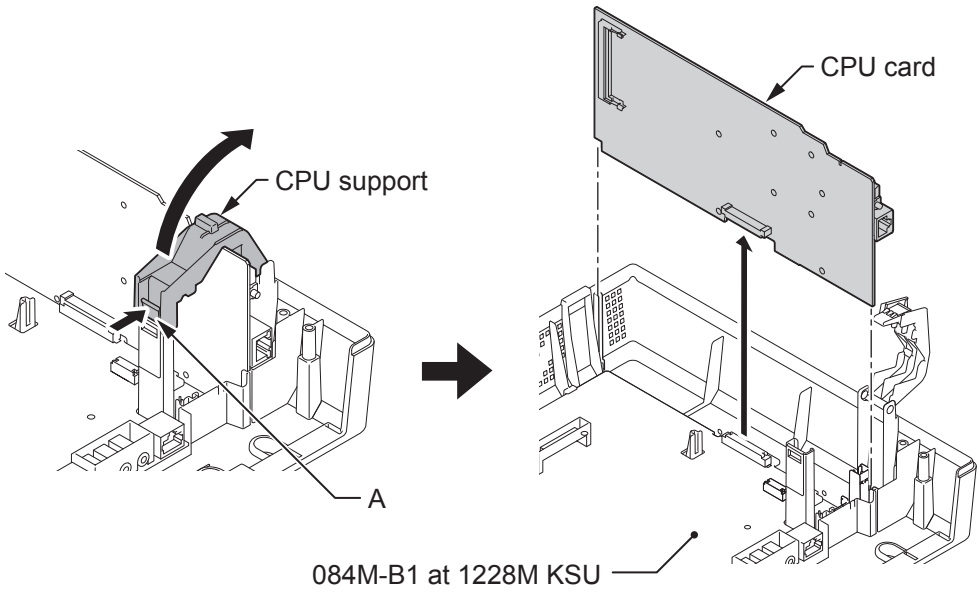


Figure 2-81 Removing the CPU Card

5. Install the VOIPDB-C1 daughter board to J5 connector on the CPU card.

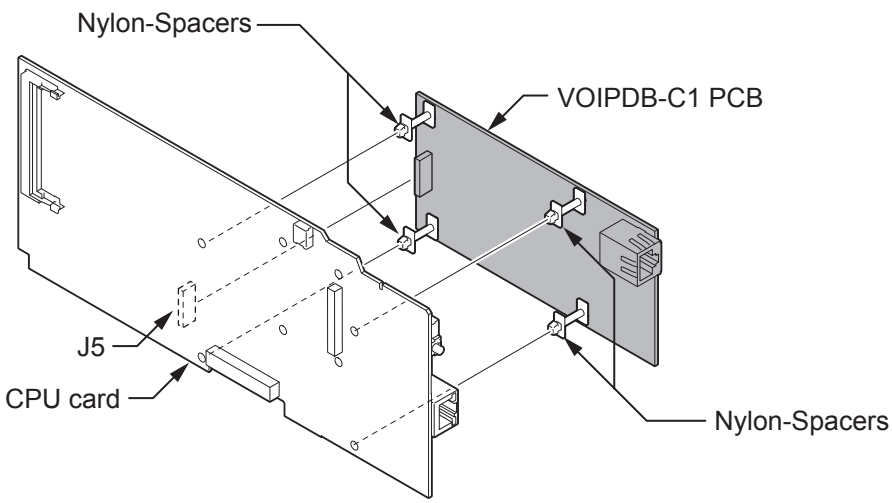


Figure 2-82 Installing the VOIPDB-C1 PCB

6. Reinstall the CPU card into the 084M-B1 mother board, and close the CPU Support making sure tab A locks into place.

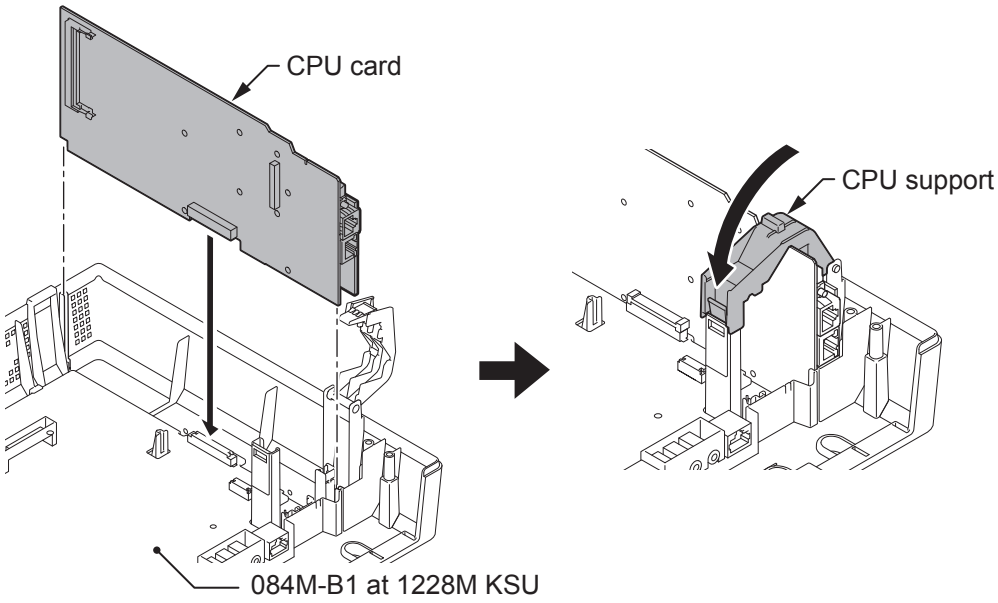


Figure 2-83 Installing the CPU Card

7. Cut and remove the Plastic Knockout for VoIP connector, then replace the Main-Cover and fasten two screws.

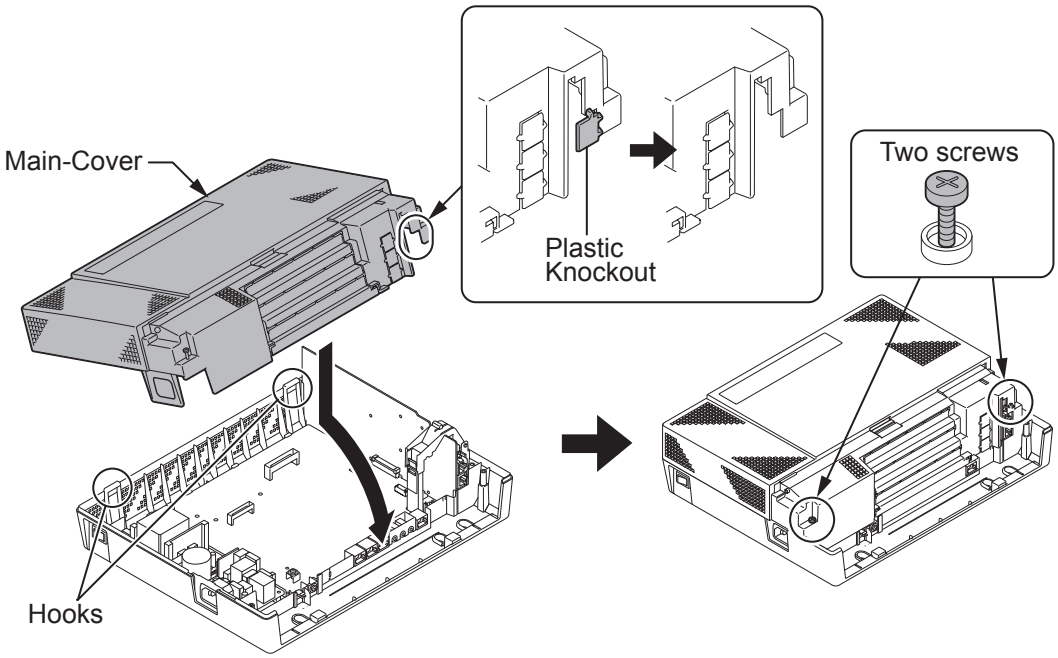


Figure 2-84 Removing the Plastic Knockout and Replacing the Main-Cover

8. Connect the VOIPDB-C1 to an Switching hub using an LAN Cable.

The LAN Cable must pass two times (two rounds) through the Ferrite Core as below. (Ferrite Core is attached with VOIPDB-C1)

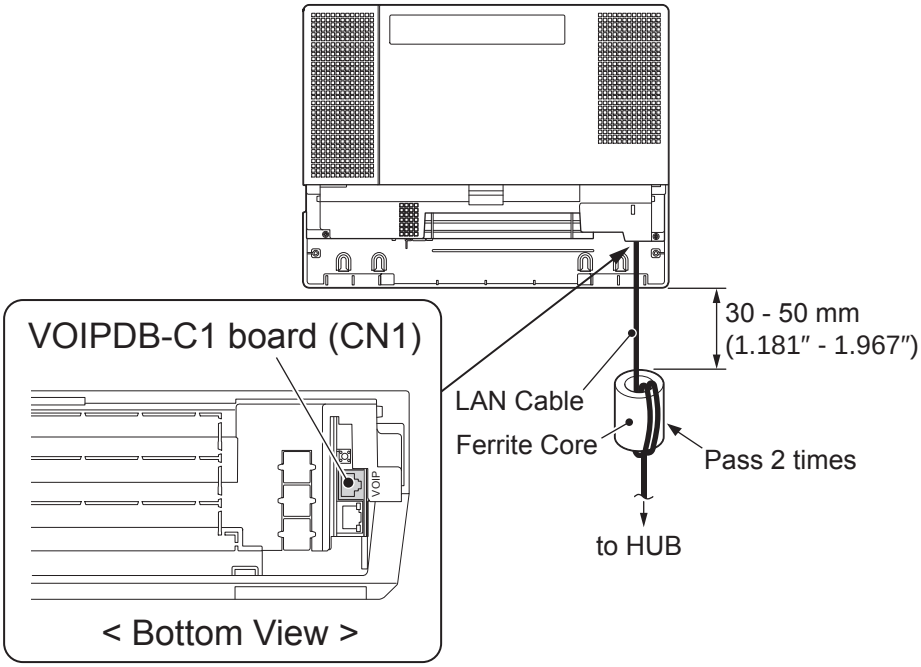


Figure 2-85 Connecting a LAN Cable

9. Refer to the SL1100 Programming Manual for detailed programming instructions.
   The VoIP feature requires system configuration.
   For the details of setting and operation, refer to the SL1100 Features & Specifications Manual (separate issue).

4.1.4 LED Indication

LED indications for the IP4WW-VOIPDB-C1 are listed Table 2-19 VOIPDB LED Indications on this page. Each LED is listed with its associated function and operational status.

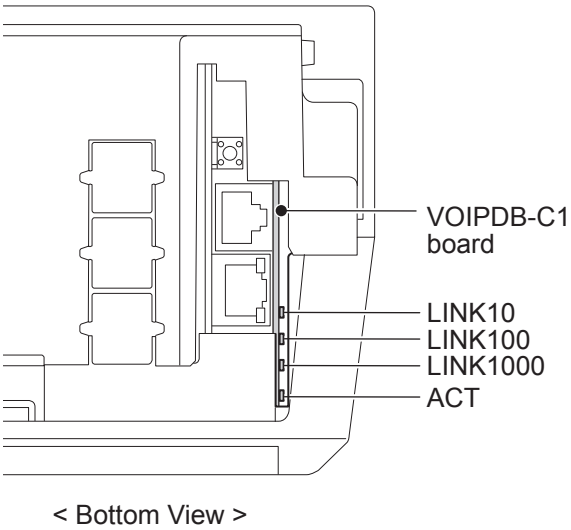


Figure 2-86 Location of LEDs

Table 2-19 VOIPDB LED Indications

LED	Function	LED Status	Operation status
ACT	**Link activity** or data transmission and reception.	On Green	LED lights when link up is completed. LED flash when data is transmitting or receiving.
LINK1000	**1000Base-T link speed** indicator	On Yellow	Lights up when 1000Base-T link up.

LED	Function	LED Status	Operation status
LINK100	**100Base-TX link speed** indicator.	On Red	Lights up when 100Base-TX link up.
LINK10	**10Base-TX link speed** indicator.	On Red	Lights up when 10Base-T link up.

Table 2-20 Operation of VOIPDB LED Indications

LED				Operation status
ACT	LINK1000	LINK100	LINK10	
Off	Off	Flash	Flash	Internal Error (Hardware Error)
Off	On	Flash	Flash	
On	On	Flash	Flash	
On	Off	Flash	Flash	State of half duplex transmission (Not support) Please change HUB etc. to full duplex transmission.
Flash	Blinking one by one			The firmware is being updated.

4.2 Installing the CF Card (CFVMS/CFVML)

- ***Do not remove or install the CPU Card with the power on.***
- ***If Expansion KSU(s) are installed, turn the power on/off in the order of Expansion 2 KSU, Expansion 1 KSU and then Main KSU.***
- ***When installing a compact flash card onto the VMDB the system MUST be powered off. Never install or uninstall the compact flash card while the system is under power.***

1. Turn off the system power and disconnect AC cord.
2. Remove the CPU card and insert the compact flash card into the CF slot (CN2).

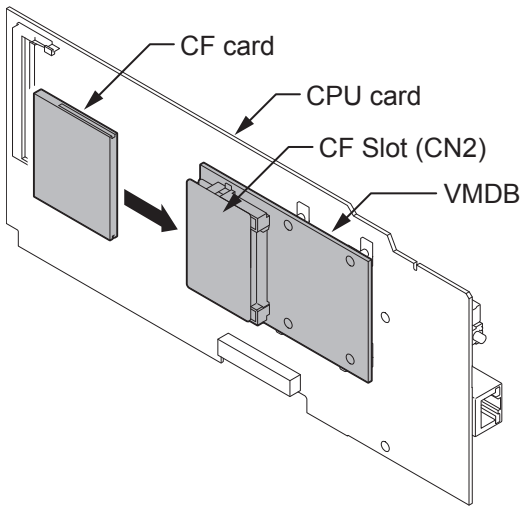


Figure 2-87 Installing the CF Card

3. Reinstall the CPU card into the 084M-B1 mother board, and close the CPU Support making sure tab A locks into place.

SECTION 5 INSTALLING THE MULTILINE TELEPHONES AND OPTIONAL TERMINALS

5.1 Installing the Multiline Telephones

There are three types of Multiline Telephones available in the SL1100 system.

- IP4WW-12TXH-B-TEL
- IP4WW-24TXH-B-TEL
- IP4WW-24TIXH-C-TEL (IP)

5.1.1 Location of Controls

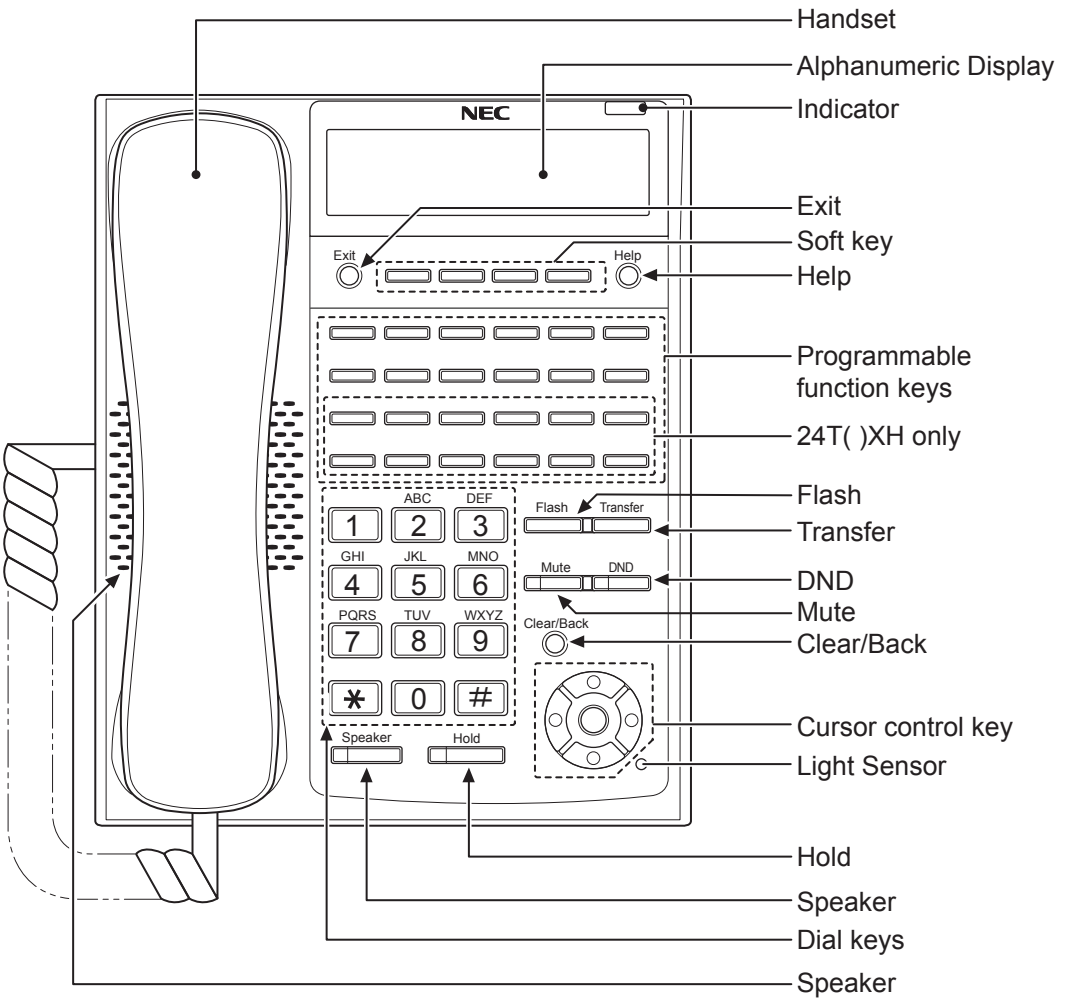


Figure 2-88 Multiline Telephone (12TXH/24TXH/24TIXH (IP))

Table 2-21 Multiline Telephone Functions (12TXH/24TXH/24TIXH (IP))

Functions	12TXH	24TXH	24TIXH
Programming Keys	12 (Busy lamp field: Red-Green)	24 (Busy lamp field: Red-Green)	24 (Busy lamp field: Red-Green)
Display	24-digit x 3 lines with Backlit		
Handsfree	Full-duplex		
Wall-Mount Kit	Yes (Built-in)		Yes (Optional)
SoftKeys	Yes		
Backlit Dial Pad	Yes		
Incoming LED	2 colors (Red/Green)		

Functions	12TXH	24TXH	24TIXH
Connected to	Digital Extension Port		Ethernet Port on the Network
Headset Port	Yes		
Power Feeding	-	-	AC Adapter (DC27 V,1 A) or PoE (IEEE802.3af)

5.1.2 Multiline Telephone Legs Adjustment

The Multiline Telephone provides adjustable legs for angling the phone to best suit each user. The leg can be set for two different heights (Low/High).

5.1.2.1 Low Position Setting

1. Turn telephone over (button side down).
2. Adjust the legs to desired height.

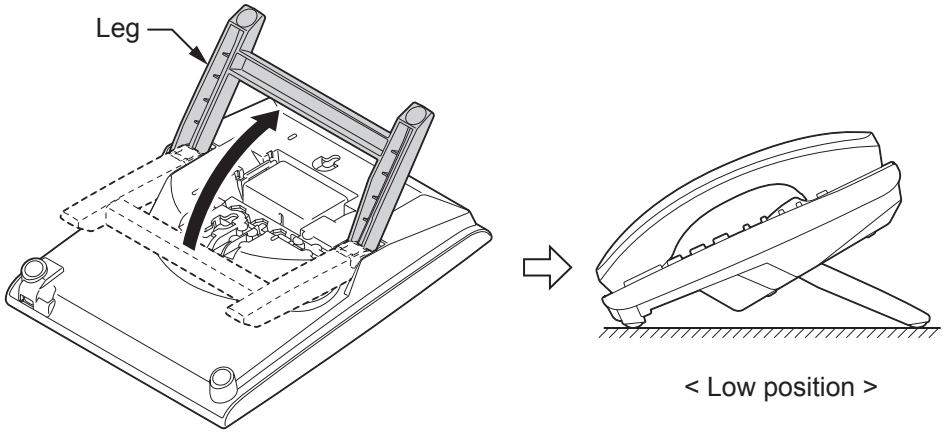


Figure 2-89 Leg Setting for Low Position

3. Lead the Line and Handset cords through the applicable grooves.

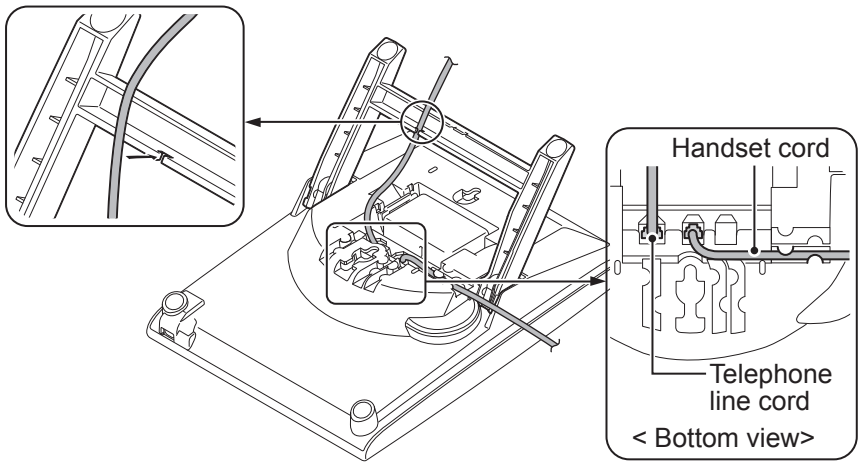


Figure 2-90 Cabling of Multiline Telephone

4. Turn telephone over (button side up).

5.1.2.2 High position setting

1. Turn telephone over (button side down).
2. Pull up the Leg Stoppers.

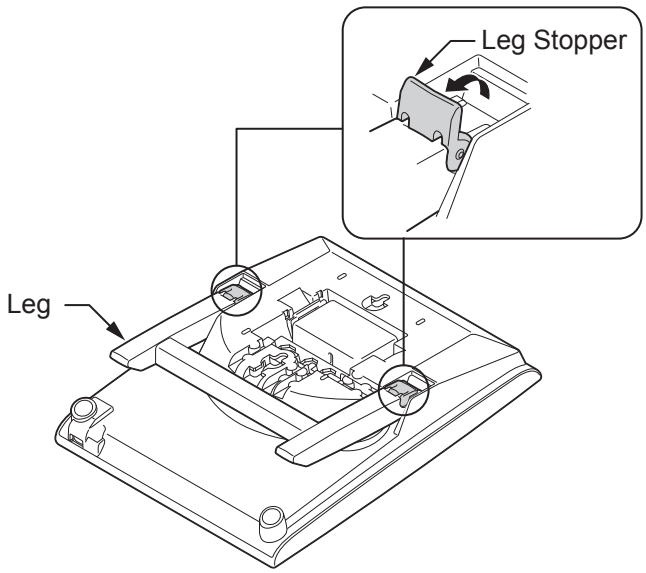


Figure 2-91 Setting for High Position

3. Adjust the leg to desired height.

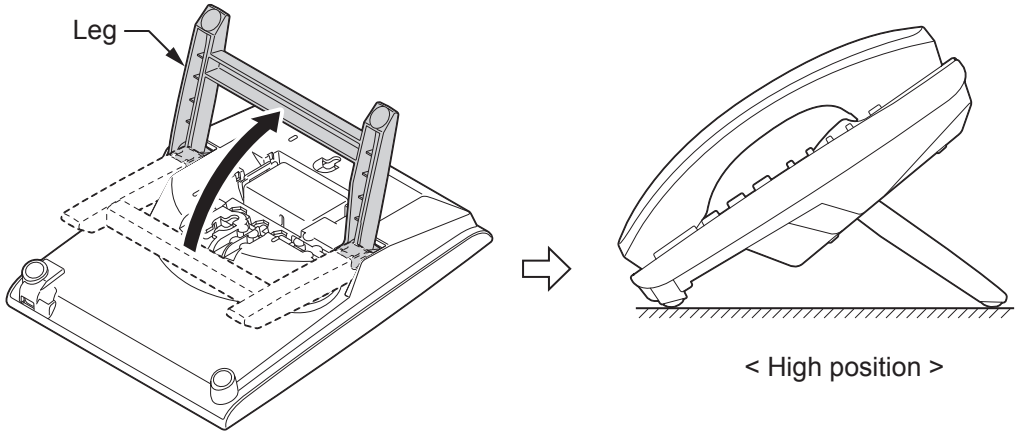


Figure 2-92 Leg Setting for High Position

4. Lead the Line and Handset cords through the applicable grooves.
(Refer to Figure 2-90 Cabling of Multiline Telephone on the previous page)

5.1.3 Wall-Mounting the Multiline Telephone

1. Arrange the cables and put down the leg as shown below.

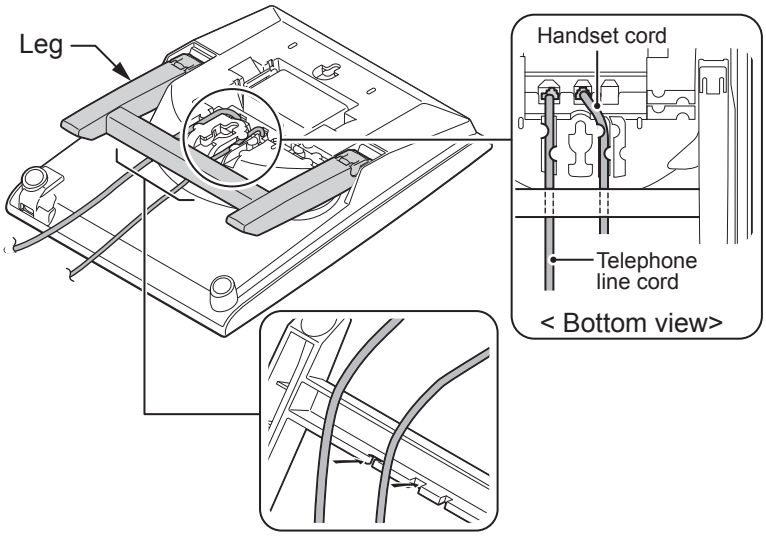


Figure 2-93 Cabling for Wall-Mount

For IP4WW-24TIXH-C only:

When wall-mounting the IP4WW-24TIXH-C, attach the IP4WW-WALL MOUNT UNIT to the bottom panel as shown.

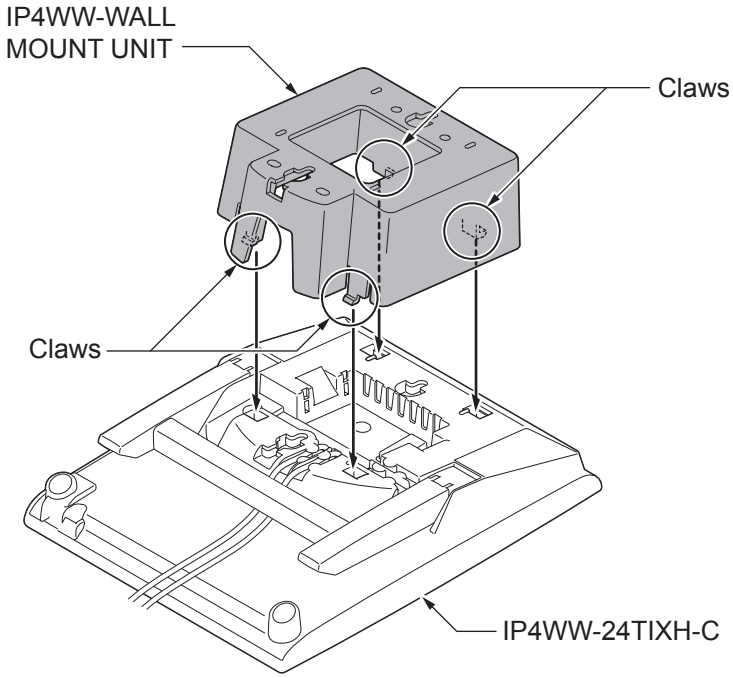


Figure 2-94 Wall-Mount Unit - 24TIXH-C

2. Remove the switch-hook from the unit. Turn the tab toward the top. Then slide the hook-switch into position. Refer to Figure 2-95 Hook-Switch Hanger on the next page.

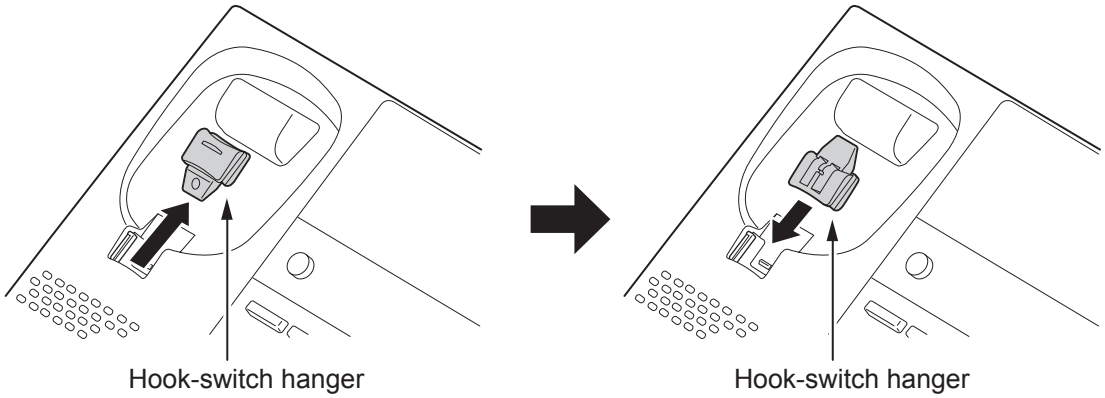


Figure 2-95 Hook-Switch Hanger

3. Install two screws into a wall. The screw heads must be remained about 3 mm (0.12″).

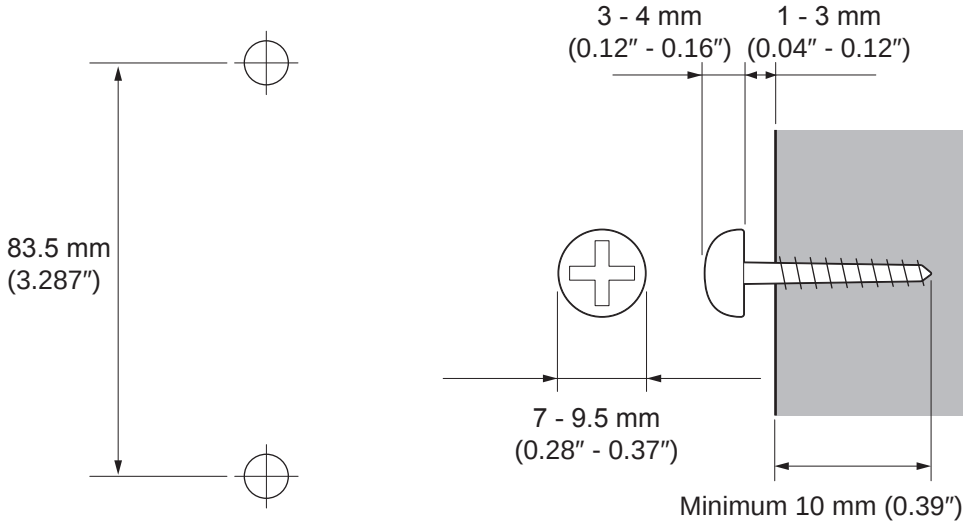


Figure 2-96 Wall-Mount Screw Guide

4. Mount the telephone on the wall.

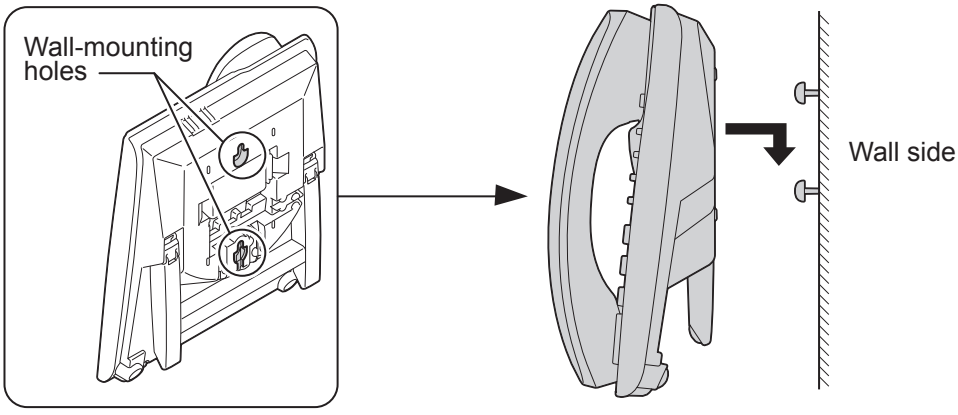


Figure 2-97 Mounting the Multiline Telephone

5.2 Install the IP Multiline Telephone (IP4WW-24TIXH-C1 TEL)

5.2.1 System Connection

The IP Multiline Telephone is connected via HUB.

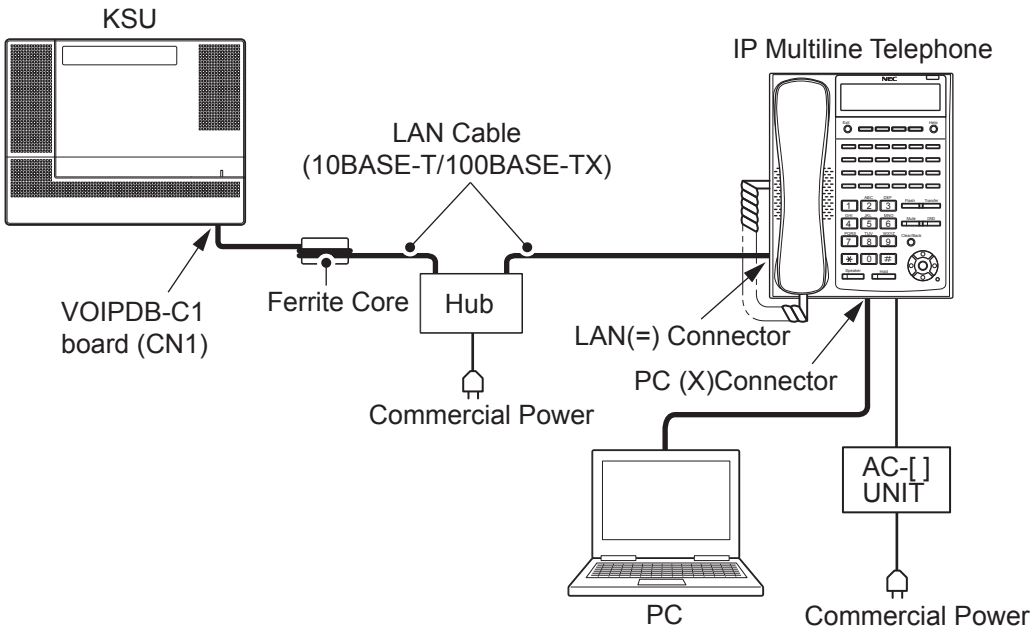
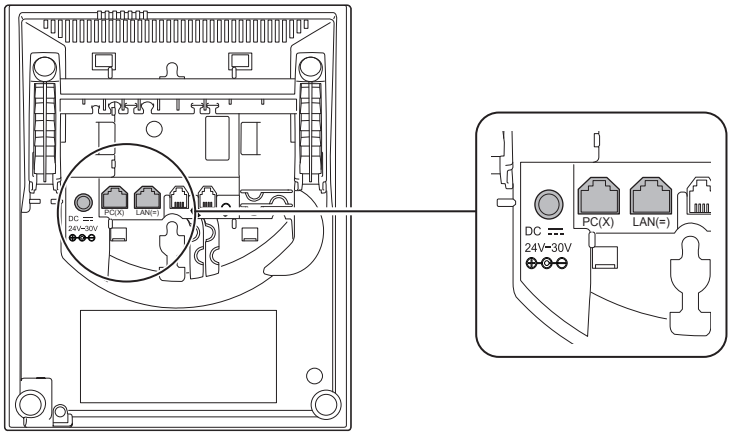


Figure 2-98 IP Multiline Telephone Connection

5.2.2 Installing the IP Multiline Telephone

1. Connect the LAN Network 10Base-T/100Base-TX cable to the **LAN(=)** connector.
2. If the Power feeding is used by AC-[ ] UNIT, plug the AC-[ ] UNIT cable to the DC input jack on the IP Multiline Telephone Base.
3. The IP Multiline Telephone has a Switching HUB to connect a PC to the LAN Network. Connect the 10Base-T/100Base-TX straight cable used for connection to the PC to the **PC(X)** connector and to the PC.



< Bottom view>

Figure 2-99 IP Multiline Telephone Connectors

5.2.3 Applying Power to the IP Multiline Telephone

IP Multiline Telephone (IP4WW-24TIXH-C1) supports two different power sources for the Telephone.

- AC-2R UNIT/AC-L UNIT

Plug the Optional AC-[ ] AC adapter input jack in the telephone base unit, and plug the 2-prong wall plug of the AC adapter in AC outlet.

- PoE(IEEE802.3af)
  PoE (Power Over Ethernet) is a LAN technology that allows standard 10Base-T/100Base-TX data cables to pass electrical current from a power source to a requesting end device.

5.3 Installing the DSS Console

The 60D DSS-B Console can be installed on any digital extension port of each 084M-B1/080E-B1 card directly. The pair extension for the DSS Console is assigned using system programming.
For the settings, refer to the SL1100 Features & Specifications Manual.

5.3.1 DSS Console Leg Adjustment

The DSS Console provides the leg for angling the console to best suit each user. The leg can be set for two different heights (Low/High).

5.3.1.1 Low Position Setting

1. Turn DSS Console over (button side down).
2. Adjust the legs to desired height.

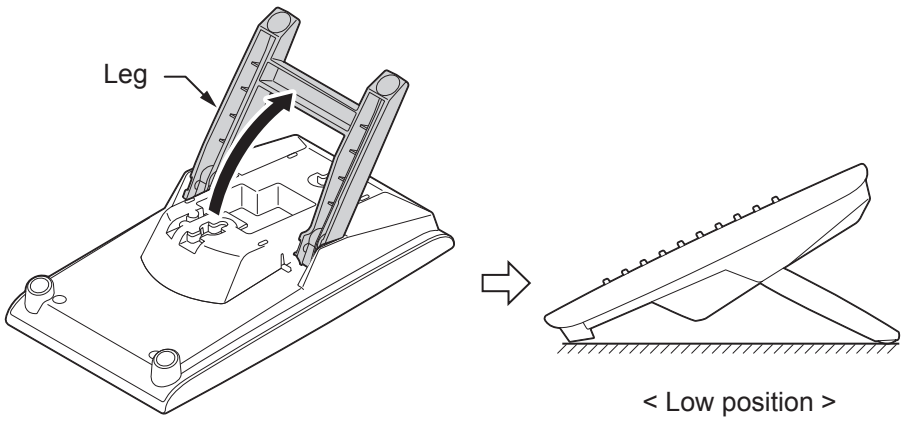


Figure 2-100 Low Position Setting

3. Lead the Line cord through the applicable grooves.

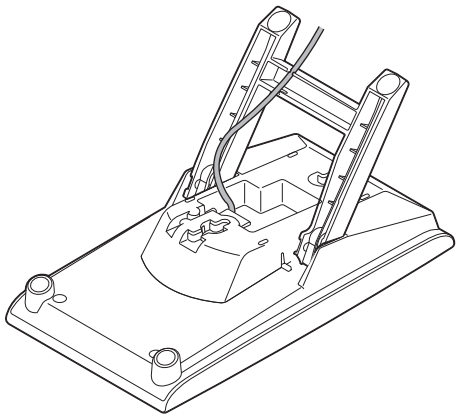


Figure 2-101 Cabling of DSS

5.3.1.2 High position setting

1. Turn DSS Console over (button side down).
2. Pull up the Leg Stoppers.

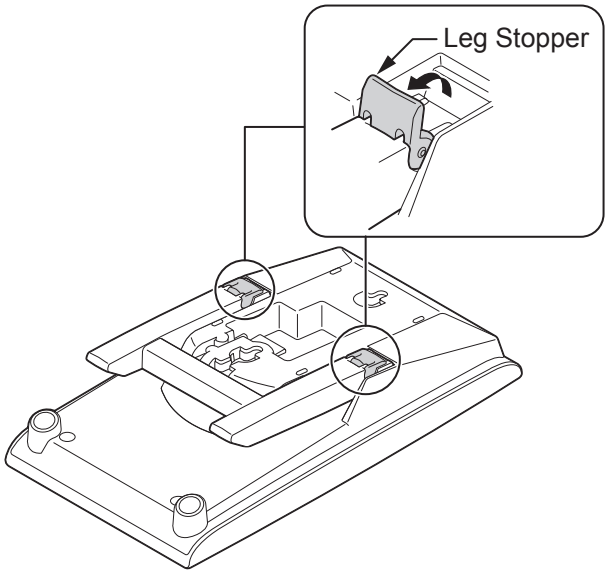


Figure 2-102 Leg Stopper of DSS Console

3. Adjust the leg to desired height.

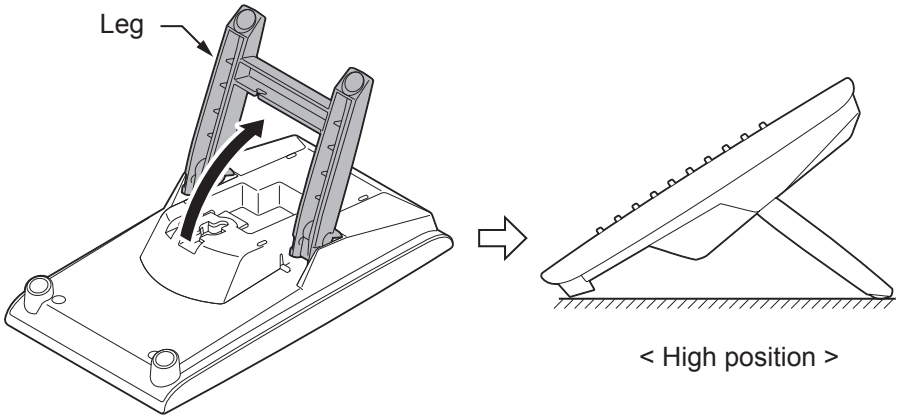


Figure 2-103 High Position Setting

4. Lead the Line cord through the applicable grooves.
   (Refer to Figure 2-101 Cabling of DSS on the previous page)

5.3.2 Wall-Mounting the DSS Console

1. Lift the leg and lead the cable through the applicable grooves. Refer to Figure 2-104 Cabling for Wall-Mount on the next page. Lower leg to stowed position.

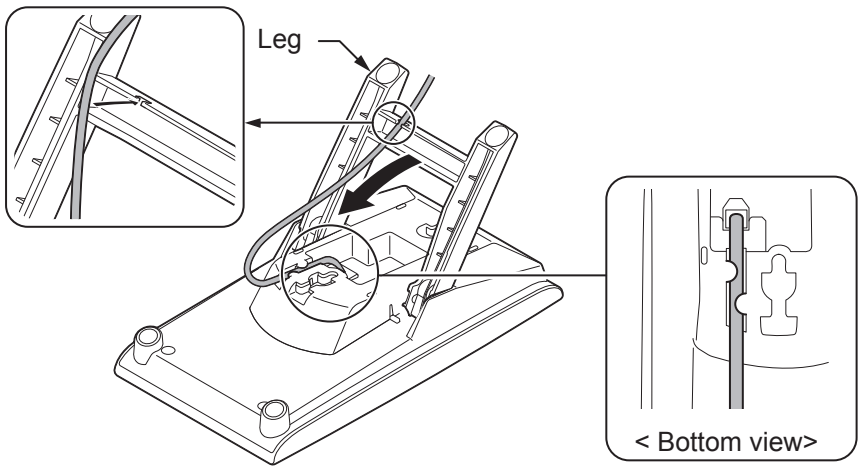


Figure 2-104 Cabling for Wall-Mount

2. Install two screws into a wall. The screw heads must be remained about 3 mm (0.12″).

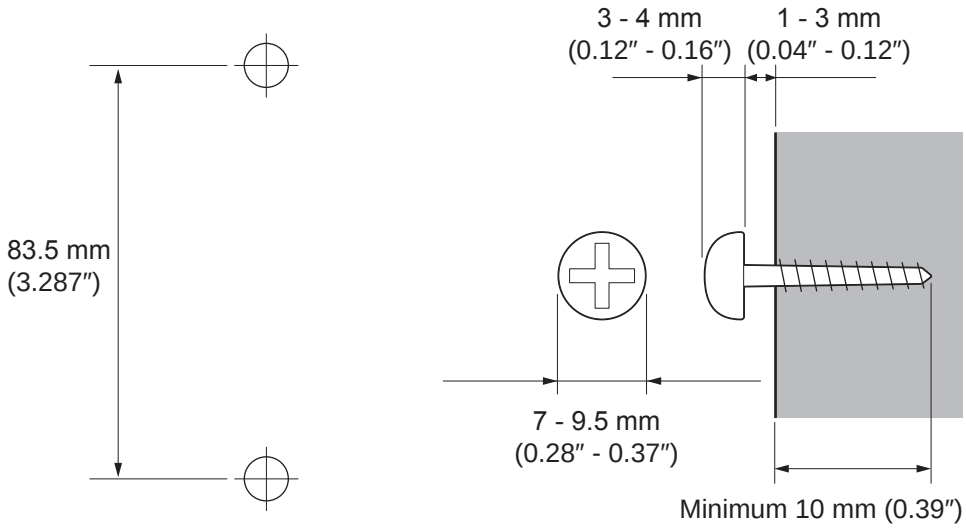


Figure 2-105 Wall-Mount Screw Guide

3. Mount the DSS Console to the wall.

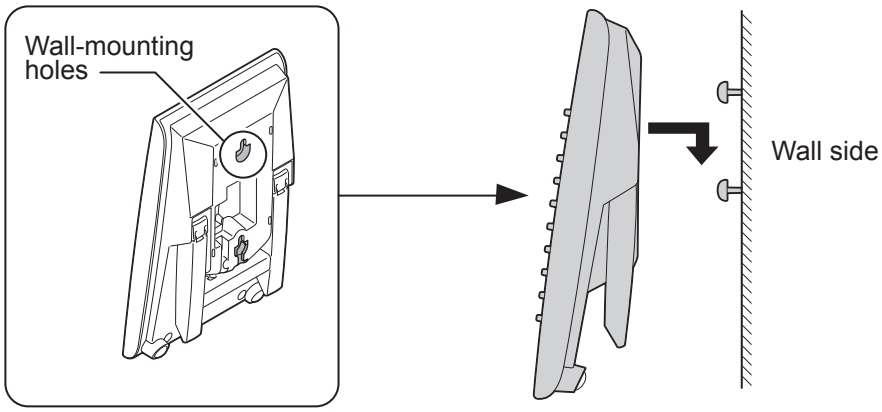
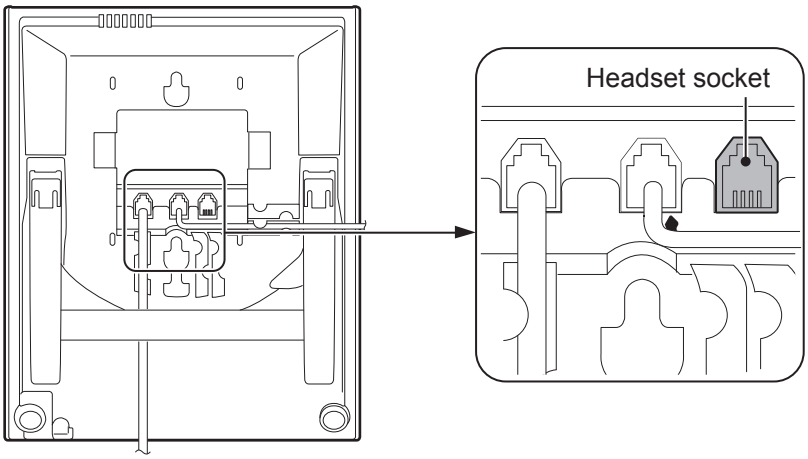


Figure 2-106 Mounting the DSS

5.4 Installing the Headset

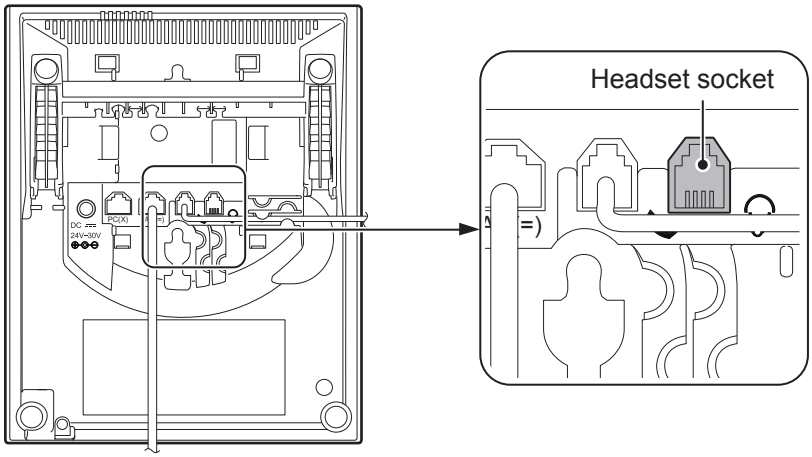
The Multiline Telephone user can utilize a customer-provided headset in place of the handset. Like using Handsfree, using the headset frees up the user's hands for other work. However, Headset Operation provides privacy not available from Handsfree.

1. Connect the Headset cord into the Headset socket.



< Bottom view>

Figure 2-107 Headset Socket (2-wire Multiline Telephone)



< Bottom view>

Figure 2-108 Headset Socket (IP Multiline Telephone)

<Recommended Headset>

- HW251N-A10-NE
  This Item is made by Plantronics, inc.

For the details of setting and operation, refer to the SL1100 Feature & Specifications Manual. (separate issue)
The headset configuration is assigned using system programming.

5.5 Installing the Doorphone Box

5.5.1 Wall-Mounting the Doorphone

1. Remove the screw on the front of the Doorphone Box.
2. Remove the Wall-Mount bracket from the Doorphone Box.
3. Connect the cable to the screw terminals on the Doorphone box. (No polarity sensitive)

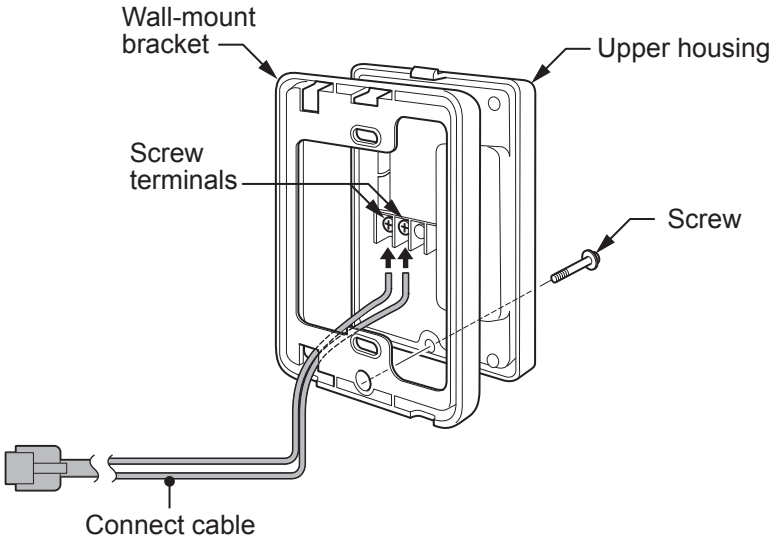


Figure 2-109 Doorphone Box and Bracket

4. Mount the Wall-Mount bracket on the wall using supplied screws.
5. Replace the Upper housing and tighten the screw.

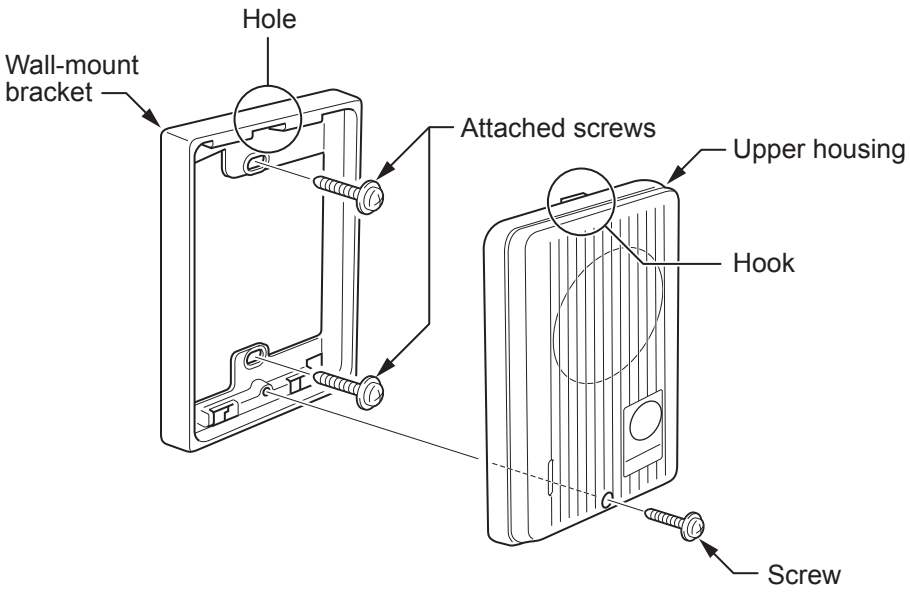


Figure 2-110 Doorphone

5.5.2 Connecting the Doorphone

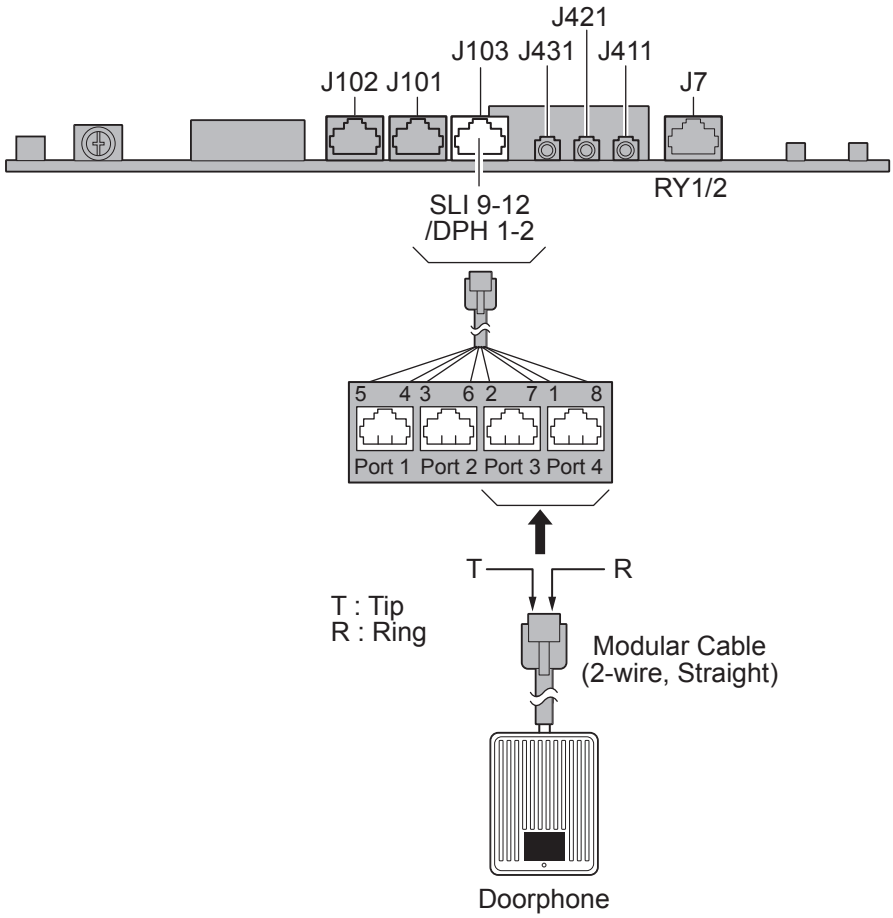


Figure 2-111 Connecting the Doorphone

The Doorphone configuration is assigned using system programming.

The 3rd party Doorphone Boxes cannot be connected to the port.

5.5.3 Doorphone Interface Specifications

Table 2-22 Doorphone Interface Specifications

Item	Specification
Output Impedance	600 Ω
Output Level	Nominal 250 mV (-10 dBm)
Maximum Output	400 mV RMS

5.6 Installing the Door Unlock Devices

A maximum of two door unlock devices can be connected to each KSU.

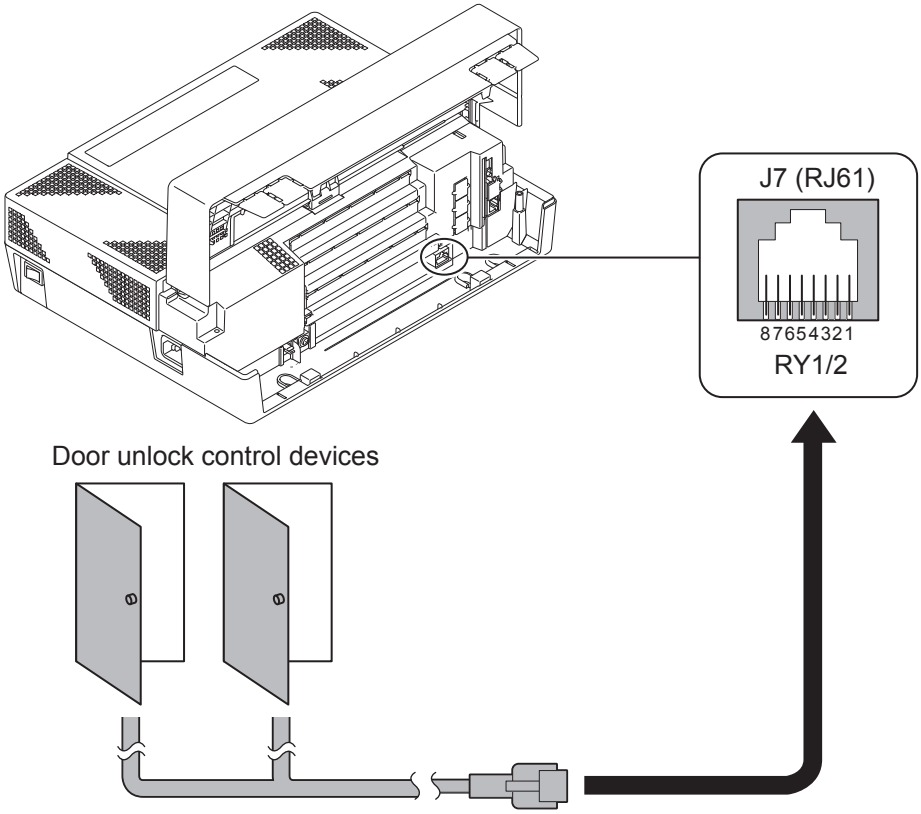


Figure 2-112 Connecting the Door Unlock Device

The following table shows the pin-outs for the RJ-61 cable connector.

Table 2-23 RJ-61 General Purpose/Door Unlock Relay Control Connector (J7)

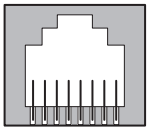
	Pin No.	Connection
 87654321 RY1/2 (J7)	1	-
	2	-
	3	Relay 2
	4	Relay 1
	5	Relay 1
	6	Relay 2
	7	-
	8	-

Table 2-24 General Purpose/Door Unlock Relay Specifications

Item	Specification
Rated Voltage	DC 48 V Maximum
Rated Current	DC 320 mA Maximum
Contact	Normally Open

5.7 Installing the External Paging Speaker/External MOH/BGM Sources

5.7.1 Connecting the Audio Equipment

- *The audio jack labeled PAGE, MOH, BGM can be used for audio port (External paging, External MOH, BGM)*
- *Audio port configuration is assigned using system programming.*

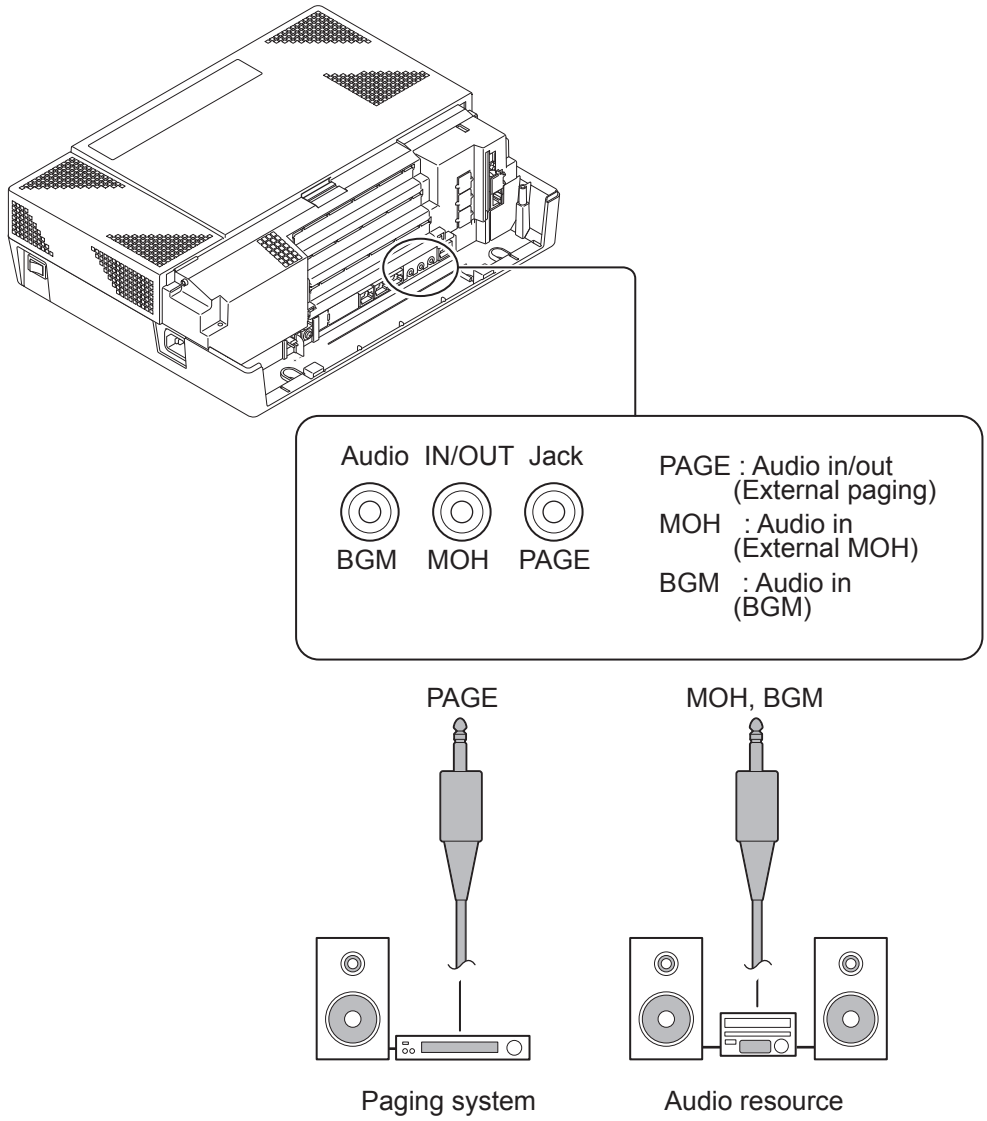


Figure 2-113 Connecting Audio Equipment

5.7.2 External Paging Output Specifications

Table 2-25 External Paging Output Specifications

Item	Specification
Output Impedance	600 Ω @ 1kHz
Output Level	Nominal 250 mV (-10 dBm)
Maximum Output	400 mV RMS

5.7.3 BGM/External MOH Source Input Specifications

Table 2-26 BGM/External MOH Source Input Specifications

Item	Specification
Input Impedance	600 Ω @ 1 kHz
Input Level	Nominal 250 mV (-10 dBm)
Maximum Input	1 V RMS

5.8 SMDR (Station Message Detail Recording)

5.8.1 General

SMDR (Station Message Detail Recording) provides a record of the system's outside calls. Typically, the record outputs to a customer-provided SMDR device such as PC via LAN port (J3) on the CPU card.

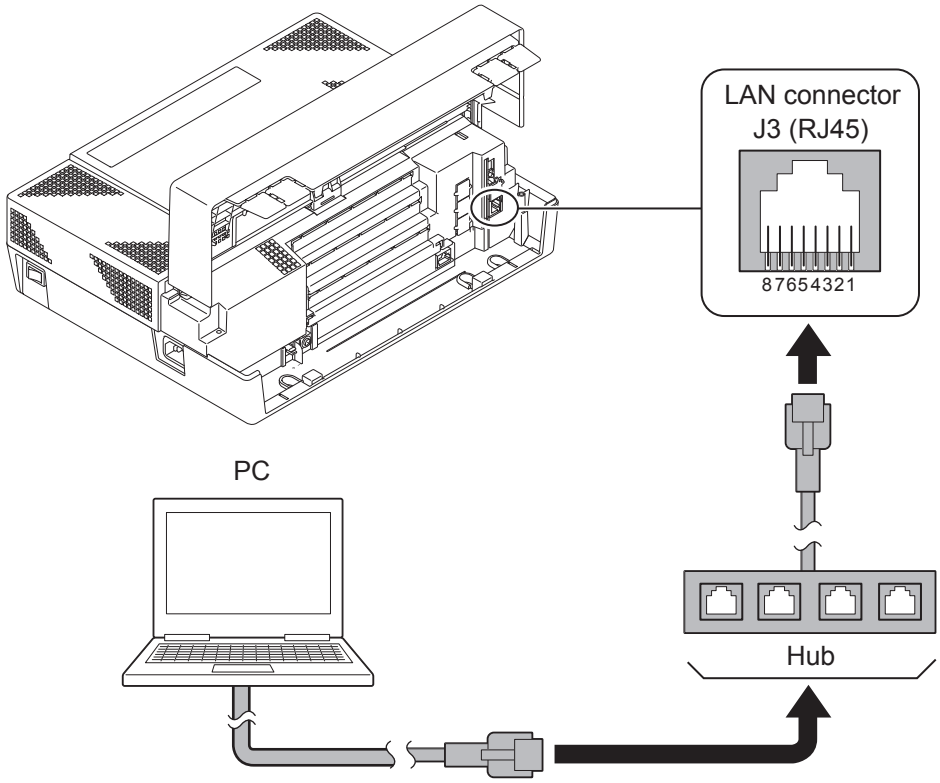


Figure 2-114 Connecting a PC for SMDR

1. Connect the straight type Ethernet cable (CAT5) between the system and In-house LAN.

The SMDR feature is assigned using system programming.

SECTION 6 INSTALLING WIRELESS DECT TELEPHONES

6.1 Installing the DTL-8R-1 Cordless DECT Telephone

DTL-8R-1 is a cordless telephone that is adapted for NEC SL1100 System. It is designed for use in the office environment.

Figure 2-115 Cordless DECT Telephone (DTL-8R-1)

- *A Handset and wired phone cannot be used at the same time.*
- *The Handset and Base Station must have the original ID that is written on each unit at the factory.*

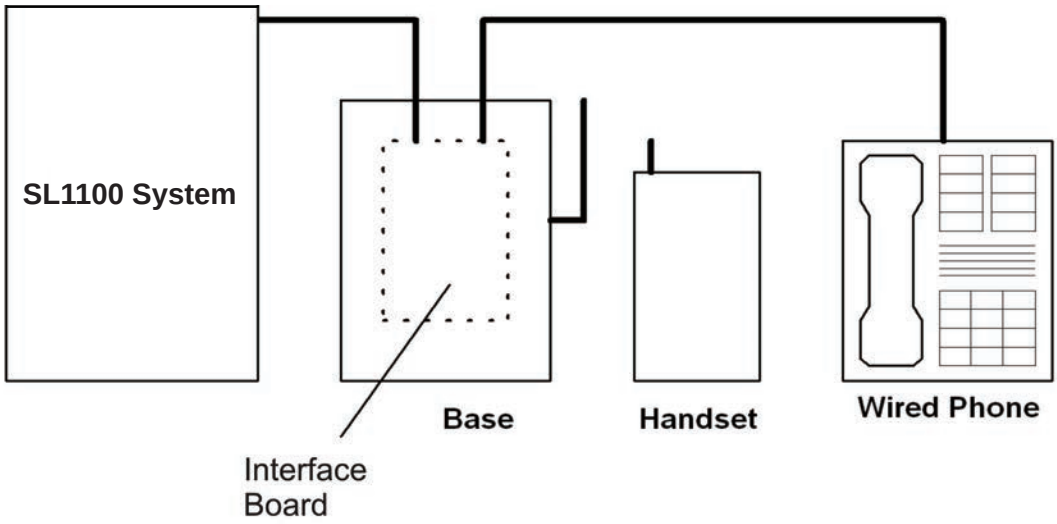


Figure 2-116 System Overview

6.1.1 Selecting a Location

Select a location for the DTL-8R-1 Cordless DECT to avoid excessive heat or humidity. The base unit of the DTL-8R-1 Cordless DECT can be placed on a desk or tabletop near a standard 120 V AC outlet

and telephone line jack. The base unit can also be mounted on a standard wall plate using the wall mount adapter. Keep the base unit and handset away from sources of electrical noise (motors, fluorescent lighting, computers, PC monitor).

6.1.2 Installation Precautions

To ensure optimum performance follow these guidelines.

- Base units must be placed at least 20 feet apart.
- Always place the base unit on top of a desk or on higher shelves. Avoid locations surrounded by metal surfaces.
- Place the base away from any electrical component such as a PC, monitor and other telephone.

6.1.3 Connecting the Telephone Cords

When connecting the telephone cords, observe the following precautions.

- ***Never install telephone wiring during a lightning storm.***
- ***Never touch bare telephone wires or terminals unless the telephone line is disconnected at the network interface.***
- ***Use caution when installing or modifying telephone lines.***

To connect the telephone cords:

1. Connect the cord from the telephone jack to the Line In on the DTL-8R-1 Cordless DECT.

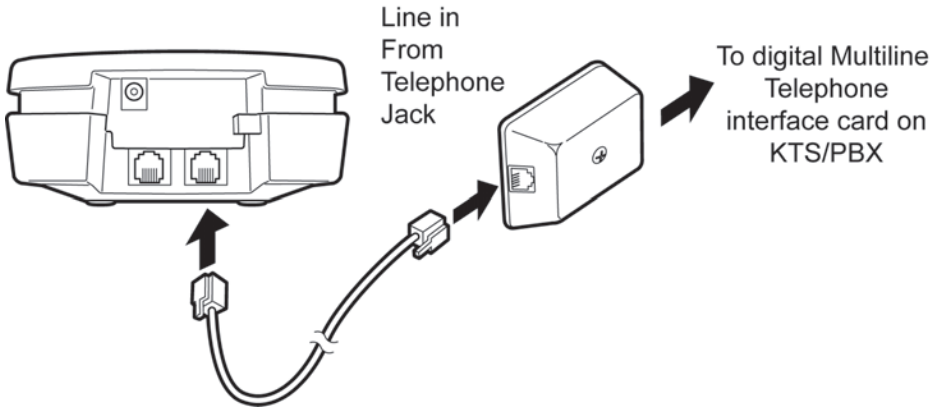


Figure 2-117 Connecting Telephone Cords to the Telephone Jack

2. Connect a SL1100 digital multiline terminal to the DTL-8R-1 Cordless DECT.

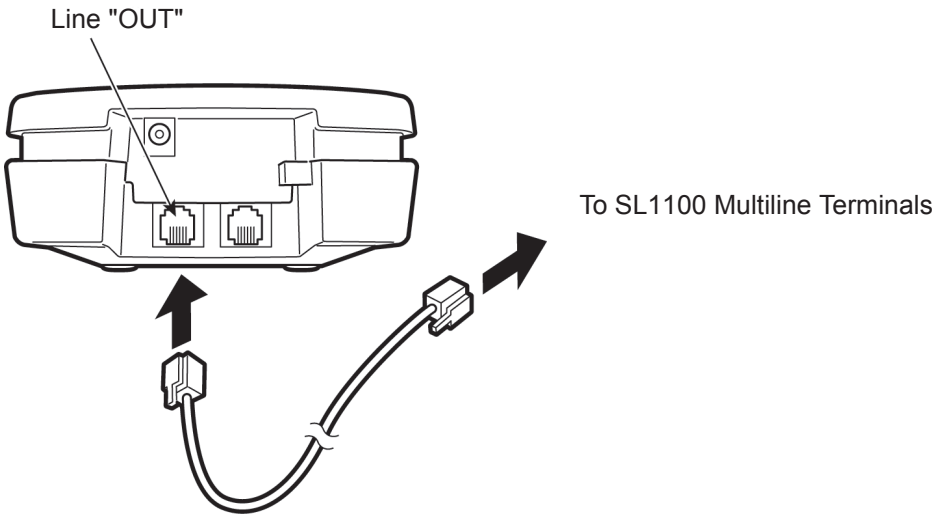


Figure 2-118 Connecting the DTL-8R-1 Cordless DECT to the Multiline Terminal

6.1.4 Applying Power to the Charging Unit

The unique design of the telephone allows the user to place the handset in the charging unit with or without the belt clip attached. The charging unit can charge a second battery with or without the handset being charged. The battery packs can be recharged automatically either in or out of the handset.

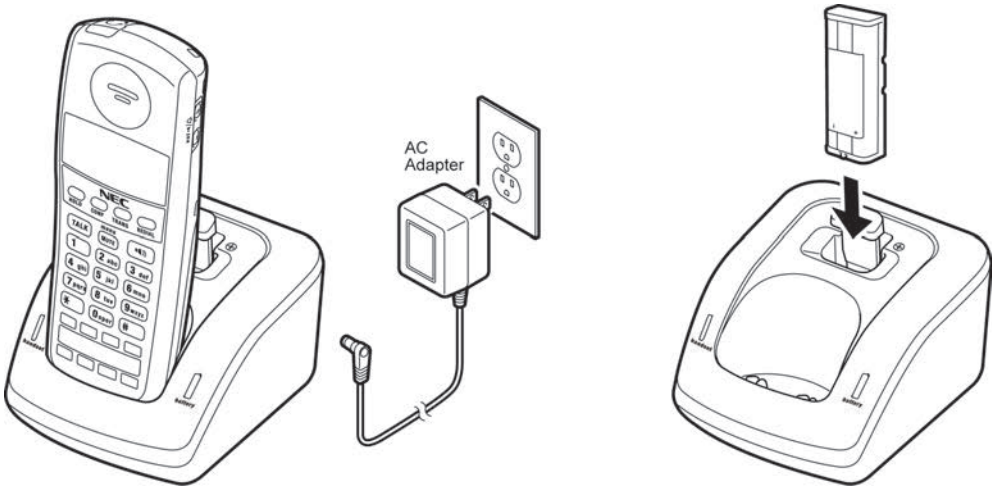


Figure 2-119 Applying Power to the Charging Unit

Use only the supplied AC adapter for the charging unit.

The AC adapter furnished with this telephone usually has a polarized line plug with one blade wider than the other. This plug fits in the power outlet only one way. If you cannot insert the plug fully in the outlet, try reversing the plug.

Refer to Figure 2-120 Polarized Plug on this page.

If you cannot plug the AC adapter in the outlet, you may need to replace it.

Route the power cord where it can not create a trip hazard, or where it could become chafed and create a fire or other electrical hazards.

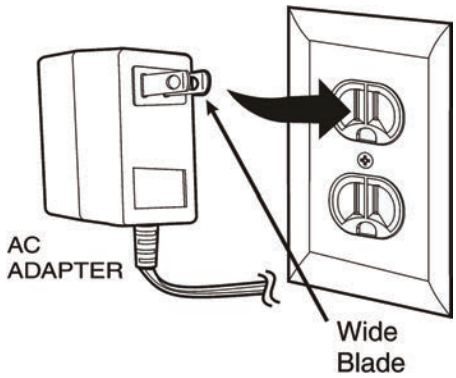


Figure 2-120 Polarized Plug

6.1.5 Mounting the Base to a Standard Wall Plate

The base unit can be mounted on a standard wall plate. To attach the wall mount stand to the base unit:

1. Slide the wall mount stand in the notches at the top of the base unit.

Rotate the wall mount stand down and snap it into place.

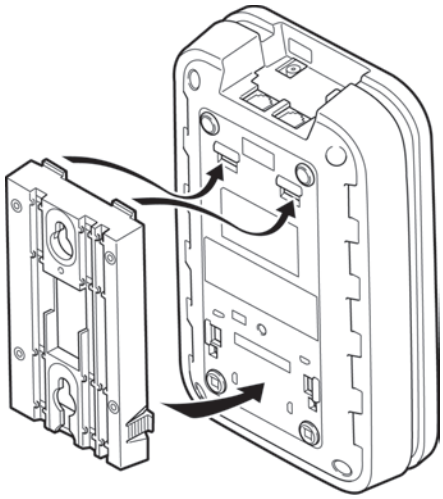


Figure 2-121 Attaching the Wall Mount Stand to the Base Unit

2. Plug the AC adapter into the base unit.
3. Place the AC adapter cord inside the molded channel of the wall mount stand.

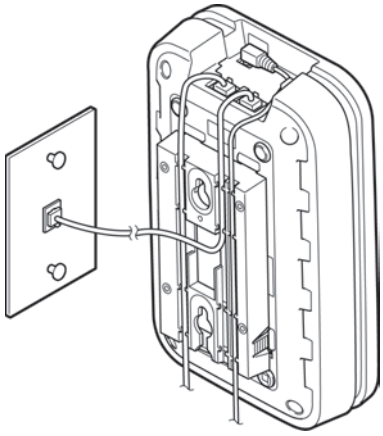


Figure 2-122 Placing the AC Adapter Cord Inside the Wall Mount Stand

4. Plug one end of the short telephone cord (locally supplied) in the ***LINE*** jack on the base unit. Plug one end of the SL1100 digital multiline terminal into the ***PHONE*** jack. Place the telephone cords inside the molded channels on the bottom of the wall mount stand.
5. Plug the other end of the short telephone cord into the modular wall jack in the center of the wall plate.
6. Place the base unit on the posts of the wall plate and push down until it is firmly seated.

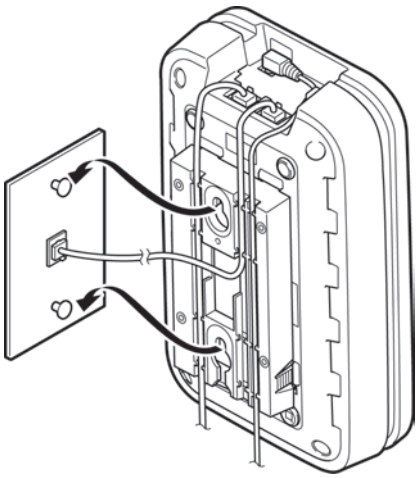


Figure 2-123 Placing the Base Unit on the Posts of the Wall Plate

Because of variation in wall plates, this method is not recommended.

7. Plug the AC adapter into a standard 120 Vac wall outlet.

Do not use an outlet controlled by a wall switch.

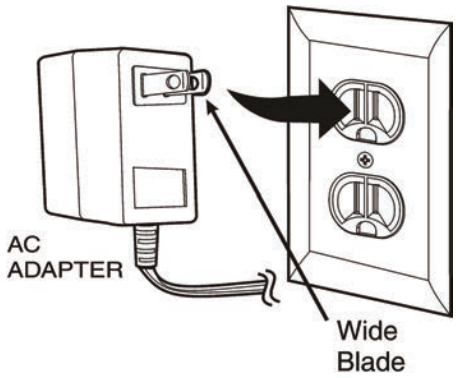


Figure 2-124 Plugging the AC Adapter into the AC Wall Outlet

6.1.6 Mounting the Base Directly to the Wall

If a standard wall plate is not available, mount the telephone directly on the wall. Before mounting the telephone, consider the following:

- Select a location away from electrical cables, pipes, or other items behind the mounting location that could cause a hazard when inserting screws into the wall.
- Make sure the wall material can support the weight of the base unit.
- Use #10 screws with anchoring devices suitable for the wall material where the base unit will be placed.

To mount the telephone:

1. Insert two mounting screws 3-15/16 inches apart. Allow about 3/16 of an inch between the wall and screw heads for mounting the telephone.

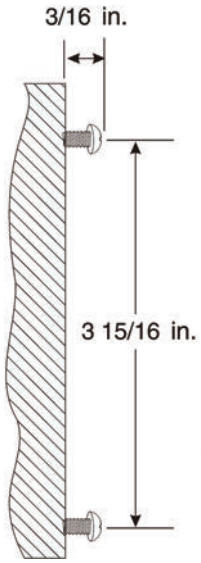


Figure 2-125 Inserting Screws into the Wall for Wall Mounting the Telephone

2. Plug in and secure the AC adapter.
3. Plug the AC adapter into the base unit.
4. Plug one end of the short telephone cord into the ***LINE*** jack on the base unit. Then plug one end of a SL1100 multiline terminal into the ***PHONE*** jack. Place the telephone cords inside the molded channels on the bottom of the wall mount stand.

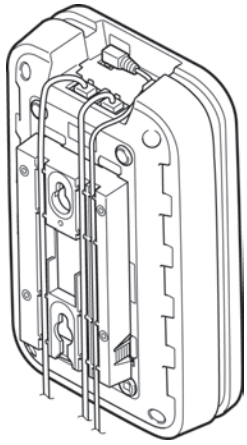


Figure 2-126 Placing the Telephone Cords Inside the Wall Mount Stand

5. Place the base unit on the posts of the wall screws and push down until it is firmly seated.

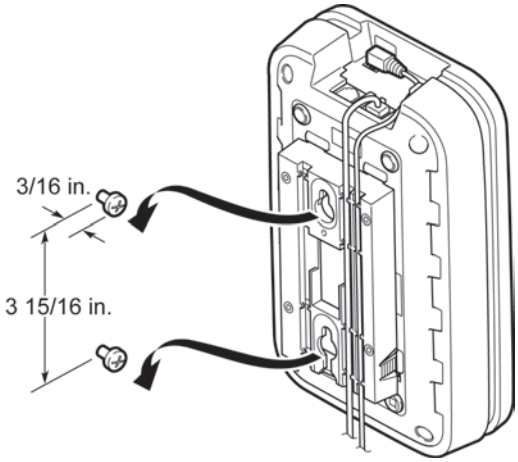


Figure 2-127 Attaching the Wall Mount Unit to the Wall

6. Plug the other end of the short telephone cord into a telephone wall jack.
7. Plug the AC adapter into a standard 120 Vac wall outlet. Refer to Figure 2-124 Plugging the AC Adapter into the AC Wall Outlet on page 2-76.

Do not use an outlet controlled by a wall switch.

6.1.7 Wall Mounting the Charging Unit

The charging unit can be wall mounted as well. Before mounting the charging unit, consider the following:

- Select a location away from electrical cables, pipes, or other items behind the mounting location that could cause a hazard when inserting screws into the wall.
- Make sure the wall material can support the weight of the charging unit.
- Use #10 screws with anchoring devices suitable for the wall material where the charging unit will be placed.

To mount the charging unit:

1. Insert two mounting screws as shown below. Allow about 3/16 of an inch between the wall and screw heads for mounting the telephone.

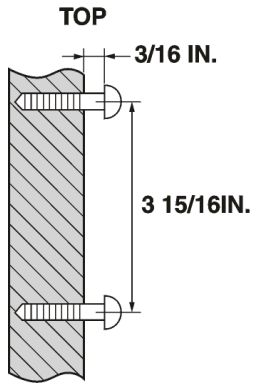


Figure 2-128 Inserting Screws for Wall Mounting

2. Plug the AC adapter in the charging unit. Wrap the AC adapter cord around the strain relief.

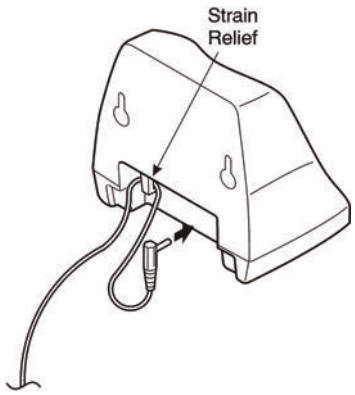


Figure 2-129 Wrapping the AC Adapter Cord Around the Strain Relief

3. Place the charging unit on the posts of the wall screws and push down until it is firmly seated.

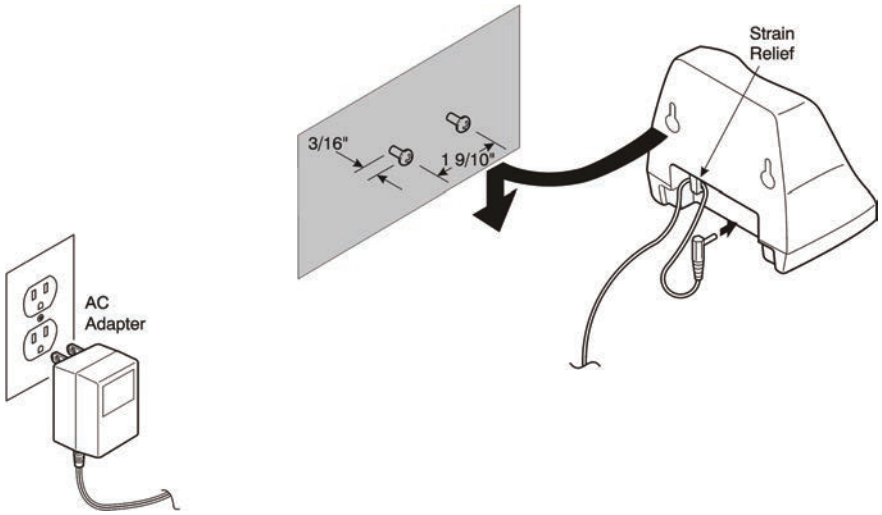


Figure 2-130 Placing the Charging Unit on the Wall

4. Plug the AC adapter into a standard 120 Vac wall outlet. Refer to Figure 2-130 Placing the Charging Unit on the Wall on this page.

6.1.8 Attaching and Removing the Belt Clip

A belt clip can be used to attach the handset to a belt or pocket for convenient portability.

1. Slide the clip into the tab slots. Press firmly until it snaps into place. The belt clip fits snugly onto the handset.

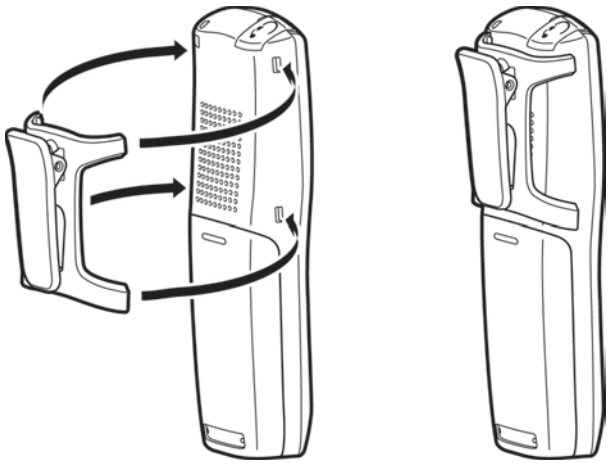


Figure 2-131 Attaching the Belt Clip to the Handset

2. To remove the clip, press the retaining clip in toward the belt clip blade and slide the clip up at the same time.

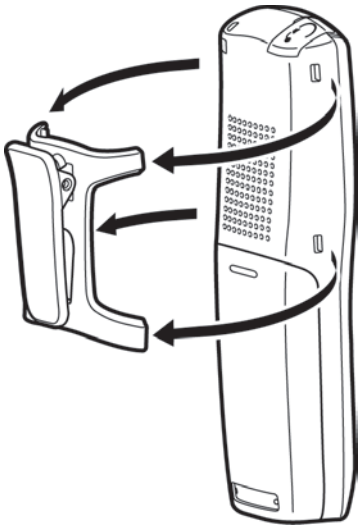


Figure 2-132 Removing the Belt Clip

6.1.9 Installing the Handset Battery Pack

Before installing batteries, refer to *D*^{term}® Cordless DECT Owner's Manual Specifications and Battery Safety. It is important to follow safety regulations when handling batteries.

1. Remove the battery cover by pressing the latch and sliding the cover down and off of the handset.

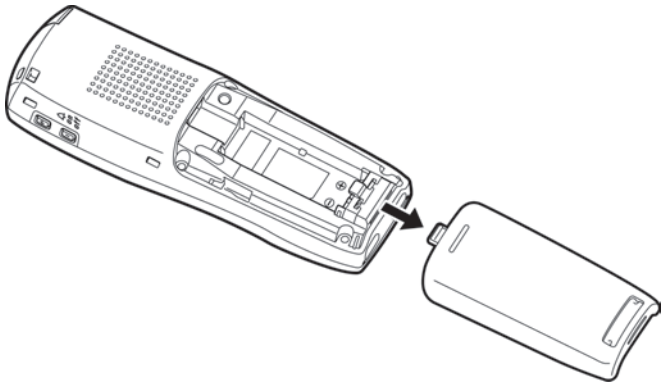


Figure 2-133 Removing the Battery Cover

2. Slide the battery pack down into the handset.

It may be necessary to remove the old battery at this time.

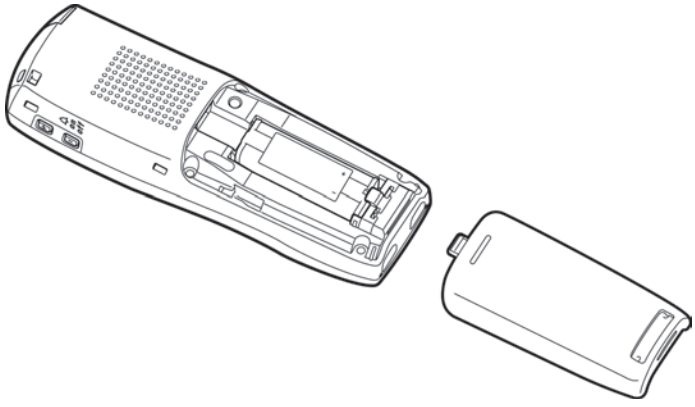


Figure 2-134 Replacing the Battery Pack

3. Replace the cover and slide it up until it latches onto the handset.

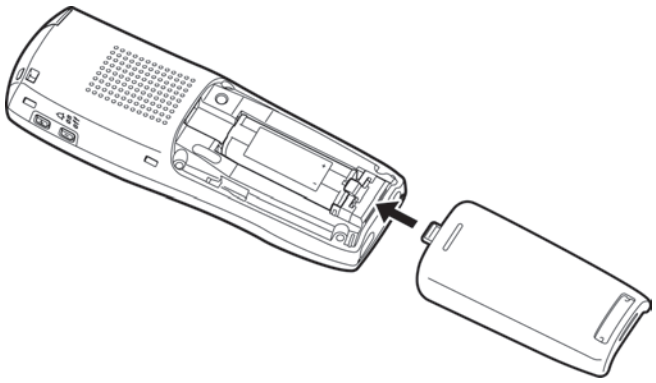


Figure 2-135 Replacing the Battery Cover

6.1.10 Charging Batteries

The rechargeable battery pack must be fully charged before using the DTL-8R-1 Cordless DECT for the first time.

Charge the battery pack without interruption for five to eight hours.

6.1.11 Charging Spare Battery Packs

The DTL-8R-1 Cordless DECT is equipped with a battery charger for charging the spare battery pack.

6.2 Installing the DTL-RPT-1 Cordless DECT Telephone REPEATER

The UDR100 repeater lets you extend the coverage area of your cordless DECT telephone system in all directions.

Figure 2-136 Cordless DECT Telephone Repeater DTL-RPT-1

If the repeaters are installed so their coverage area overlaps the coverage area of the base, the base can hand-off calls to the repeaters as the user moves from one coverage area to another. When connected to the repeater, the mobile handset operates the exact same way as it does when connected to the base, and the hand-off from the base to the repeater can be completely invisible to

the end user, even during an active call.

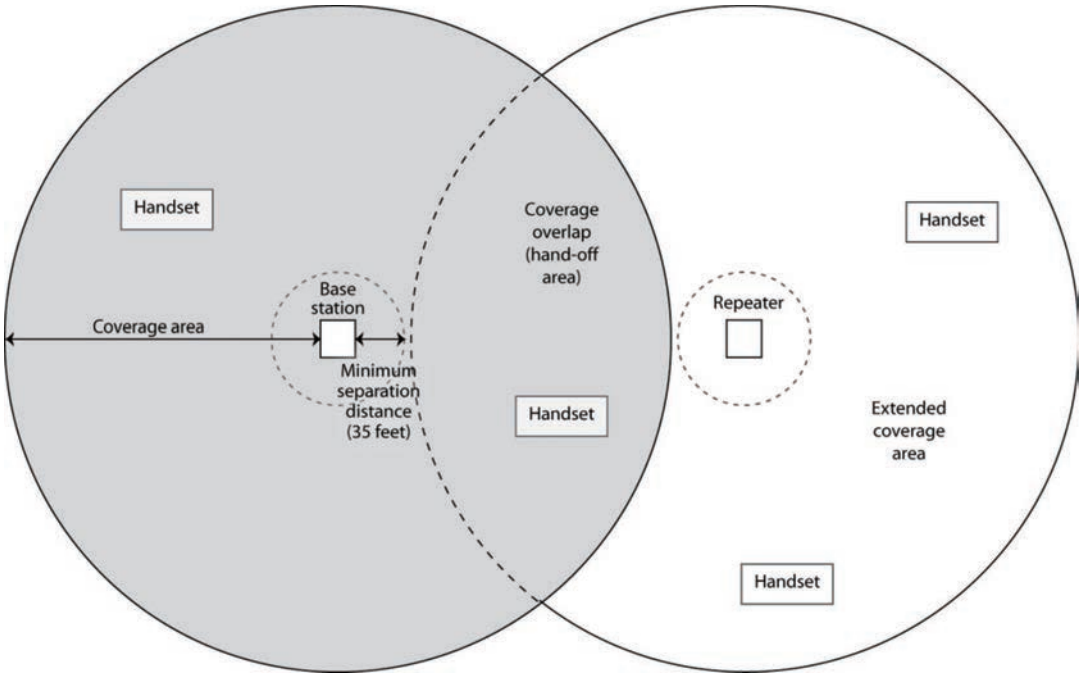


Figure 2-137 Single Repeater Attached to Base

Each base supports up to six repeaters, so you can extend coverage in all directions, including through floors and ceilings:

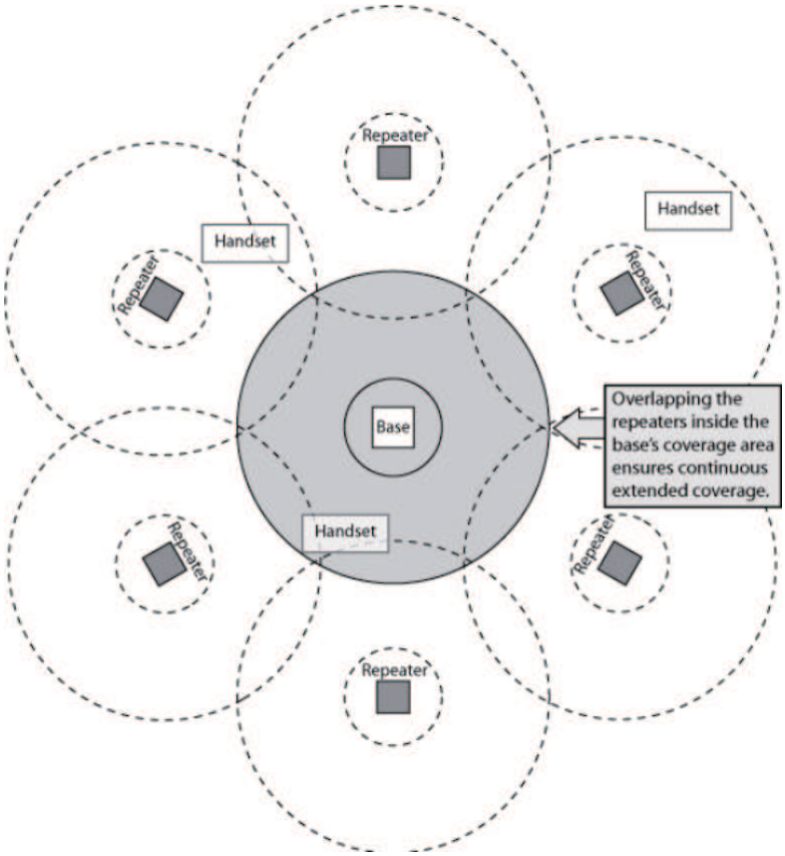


Figure 2-138 Six Repeaters Attached to Base

In addition, the UDR100 supports a sequential or "daisy-chain" layout to extend coverage in a single direction. Up to three repeaters can be installed in sequence:

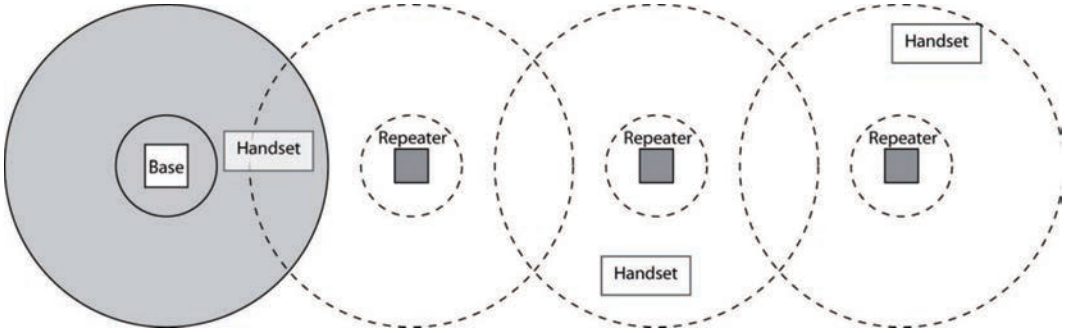


Figure 2-139 Daisy-Chain Layout

For detailed information on daisy-chain layout and configuration, contact your installer or refer to the UDR100 Administrator's Guide.

6.2.1 Setting Up Your Repeater

Before installing the repeater, you must activate the repeater mode on your base and then register the repeater to the base and any handsets. Before you start the registration process, be sure you have:

- A working base
- A working handset registered to that base
- Any repeaters you want to register to this base (you must complete the registration process separately for each repeater)
- At least one of the AC adapters supplied with the repeaters

Use ONLY the power adapter that came with your repeater. A different power adapter may cause an electrical hazard or damage the repeater.

6.2.1.1 Changing the Telephone System PIN

Before you start the registration process, you must reset the system PIN of your telephone to ***0000*** (consult the manual that came with your base for more information). After you reset the PIN, make sure to register the handset you used back to the base station.

6.2.1.2 Automatic Registration

The repeater seeks out the base with strongest DECT/GAP signal and automatically registers to that base.

1. Make sure the repeater is powered off (i.e., the AC power adapter is not connected).
2. Set the base in registration mode. (Consult the owner's manual that came with your base station for more information.
3. Use the AC adapter to connect the repeater to a standard 120 V AC outlet. (Do not use a power outlet controlled by a wall switch.) The LED on the repeater flashes briefly, then remains on and steady.

If the LED continues to flash, register the repeater again.

The repeater is now registered to this base and is ready to use.

You can safely disconnect the power and move the repeater to the selected location; the repeater stays registered to the base.

6.2.1.3 Manual Registration

If you are registering more than one repeater to the same base, you must use the manual registration procedure.

1. Connect the repeater to power for 1 ~ 5 seconds and then disconnect it.

2. Reconnect the power to the repeater. The LED on the repeater flashes slowly, indicating the repeater is in registration mode.

The repeater stays in registration mode for five minutes. If you cannot complete the registration in five minutes, repeat the procedure starting with step 1.

3. Set the base in registration mode. (Consult the owner's manual that came with your base station for more information.)
4. The LED on the front of the repeater flashes quickly, with no interruptions.

If the LED has brief interruptions in the flash, you need to reset your telephone system PIN to 0000. (Refer to Changing the Telephone System PIN on the previous page.)

5. Press the handset TALK? key to go off-hook. The LED stops flashing.
6. Use the number pad on the handset to assign a repeater number. Press a number between 2 and 7. Each repeater number can be used only once per base. (These numbers are independent of any handset extension number.)
7. When the repeater accepts the assignment, the LED flashes a corresponding number of times.
8. Press the STAR? key to confirm the registration, and then the END? key. The LED goes off for two seconds, flashes for a brief moment, and then remains on steady.

The repeater is now registered to this base station. You can repeat the procedure with each repeater that you want to register to this base, or you can disconnect the power and move the repeater to the selected location.

The repeater remains registered even if you disconnect the AC adapter or there is a power failure. If you want to clear the registration (for example, so you can register to a different base), you must reset the repeater.

6.2.1.4 Registration for a Daisy-Chain Layout

Registering the repeaters to operate in a daisy-chain or sequential layout requires network administrator access and configuration software. Contact your installer or refer to the DTL-RPT-1 Administrator's Guide (provided with the configuration software) for more information.

6.2.1.5 Registering to a Different Base

After the repeater is registered, you must reset it before you can change the registration to a different base. If you want to reset the repeater and clear its registration, follow the steps below:

1. Disconnect the power.
2. Connect the power for one to five seconds, and disconnect it again.
3. Connect the power for 25 ~ 35 seconds.
4. Disconnect the power, and perform the registration procedure with the new base.

6.2.2 Installing the Repeater

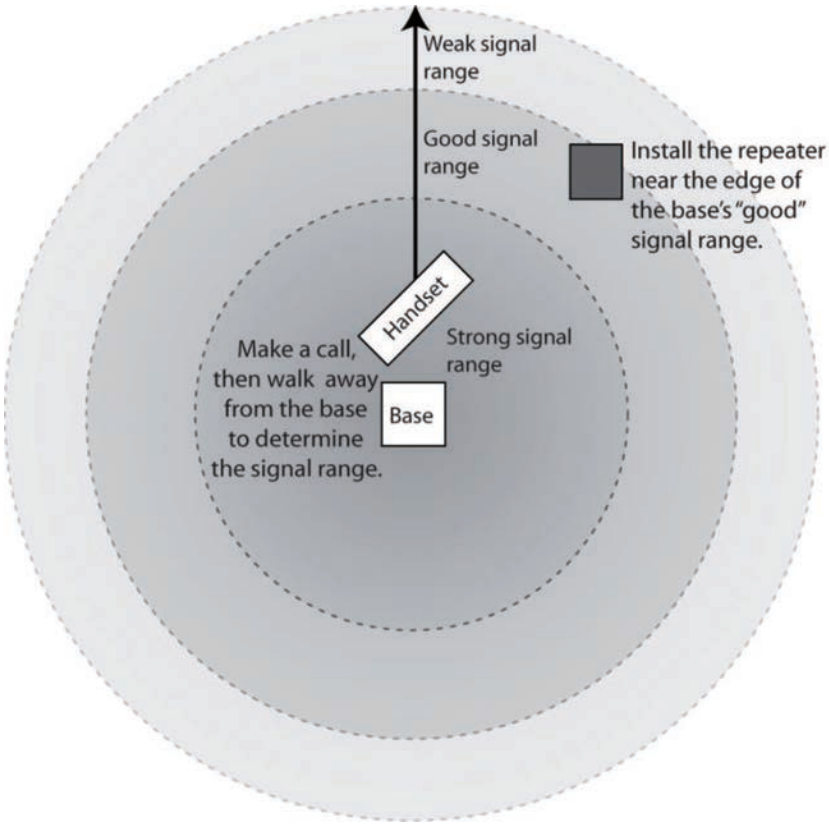
6.2.2.1 Finding the Right Location

To get the best operating conditions for the repeater, it is important to place it correctly. Here are a few tips for placing repeaters:

- Place the repeater as high as possible, but at least six feet above the floor.
- Make sure you have good reception from the base.
- Make sure the location is close to a standard 120 V AC power outlet. Never install electrical cords across a traffic area: they can create a trip hazard or become damaged and create a fire or electrical hazard.
- Allow at least 30 feet between repeaters (if you are installing repeaters across multiple floors, remember to allow 30 feet vertically, also).
- Avoid sources of electrical interference, such as hi-fi systems, office equipment or microwave ovens.
- Avoid heat sources and direct sunlight.
- Avoid things that can interfere with radio signals, such as metal doors, thick walls, niches and cupboards.

6.2.2.2 Map the Base Coverage Area

To find the best location for the repeater, you need to determine the base coverage area. Stand near the base and make a call. Walk away from the base with the handset, and make a note where the signal becomes weaker. The optimum location for the repeater is as far from the base as possible while still maintaining a good signal, or just inside the location where the signal became weaker.



Base Coverage Area

6.2.2.3 Test the Location

To test the location, plug the AC adapter into the repeater, then hold the repeater in the place where you plan to mount it. The LED should remain on and steady, indicating that the repeater has a good signal from the base.

If the LED flashes, the repeater is not getting a good signal. The repeater may be too far away from the base, there may be interference from electronic devices, or the signal might be blocked by thick walls or metal objects. Try moving the repeater to another location.

6.2.2.4 Installing the Repeater

Be sure the wall material can hold the weight of the repeater. Never install a repeater in damaged or decaying wall material.

1. Hold the repeater in its final location, and mark the center of the top edge.
2. From the edge mark, measure down approximately 1-1/2 inches, and mark the screw location.
3. At the screw location, use a 3/16ths drill bit to make a pilot hole approximately one inch deep.
4. Place the wall anchor into the pilot hole and tap it gently with a hammer until the anchor is flush with the wall.
5. Insert the mounting screw into the anchor, leaving approximately 1/4 inch space between the screw head and the wall.
6. Put the repeater over the screw head and slide it down into place.
7. Connect the repeater to the 120V AC power outlet.

6.2.2.5 Multiple Repeater Systems

You can register up to six repeaters to one base as long as the repeaters are a minimum of 30 feet apart. ***Remember*** that the signal can cross through walls and floors.

Incorrect Installation

Figure 2-141 Incorrect Installation on this page illustrates repeaters that are incorrectly installed.

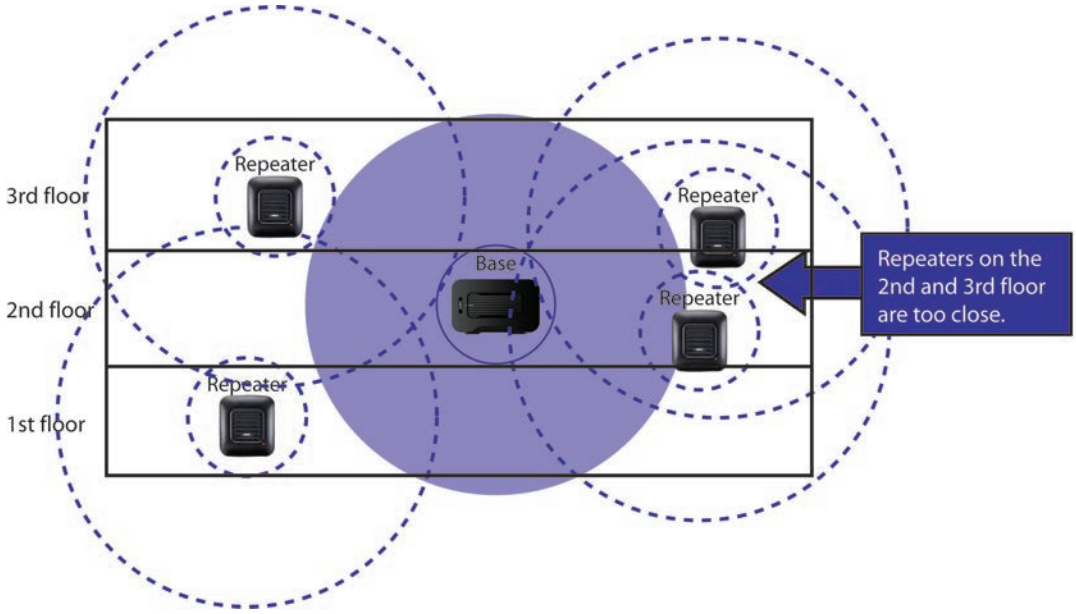


Figure 2-141 Incorrect Installation

Correct Installation

Figure 2-142 Base Coverage Area on this page illustrates repeaters that are correctly installed.

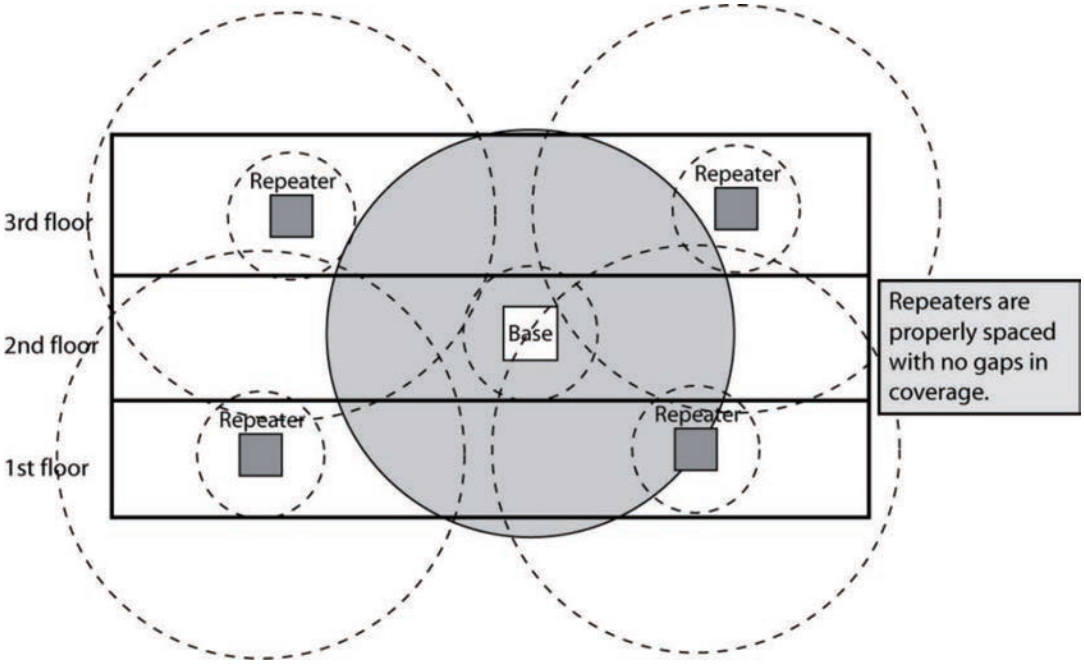


Figure 2-142 Base Coverage Area

Daisy-Chain Installation

You can combine normal and daisy-chain connections to create a wide variety of coverage configurations, as long as you have no more than six repeaters per base unit.

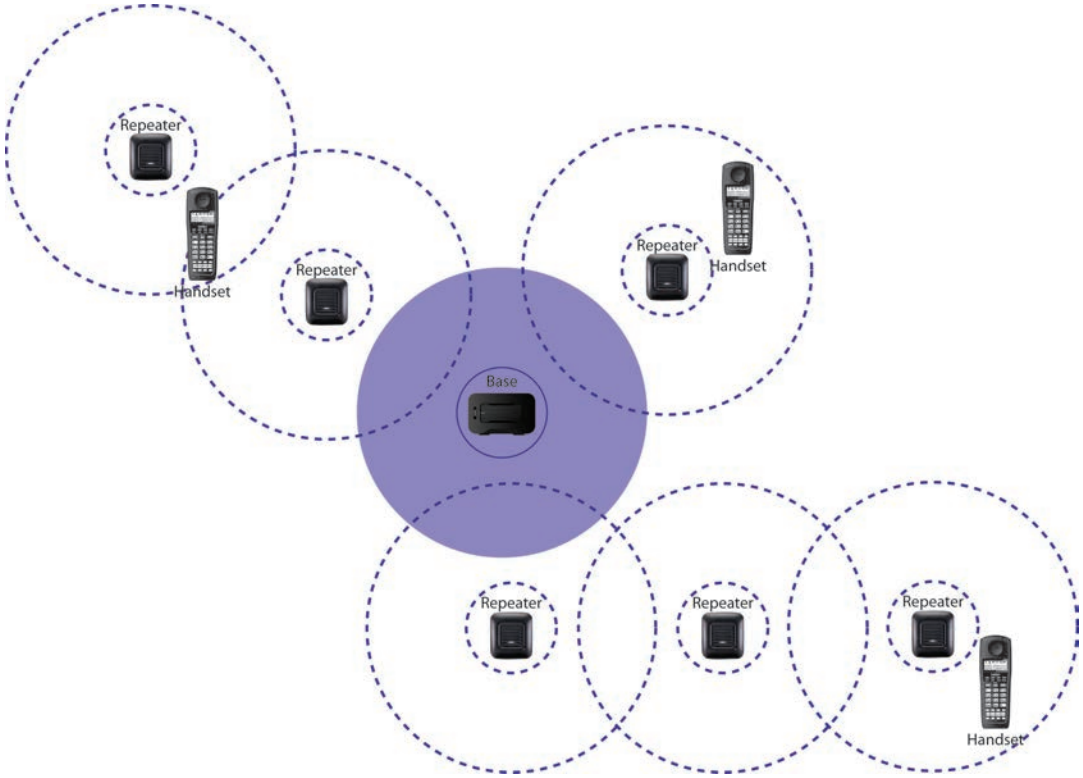


Figure 2-143 Daisy-Chain Layout

6.2.3 Troubleshooting Chart

To review common problems and possible solutions, refer to the Cordless DECT Repeater Guide DTL-RPT-1.

6.2.4 Turning on the Verification Tone

To activate the verification tone to aid in troubleshooting installation problems, refer to the Cordless DECT Repeater Guide DTL-RPT-1.

6.2.5 Maintenance

For user maintenance of the repeater, refer to the Cordless DECT Repeater Guide DTL-RPT-1.

6.3 Installing the ML440 and AP20 Wireless DECT Telephone

This section outlines the steps for connecting and mounting the base station, charging the battery, and powering on the handset.

The following topics are included in this section:

- Connecting the Base Station on the next page
- Wall Mounting the Base Station on page 2-90
- Handset and Charger on page 2-92

6.3.1 Connecting the Base Station

Figure 2-144 Base Station Front and Back View on this page provides a front and rear view of the base station.

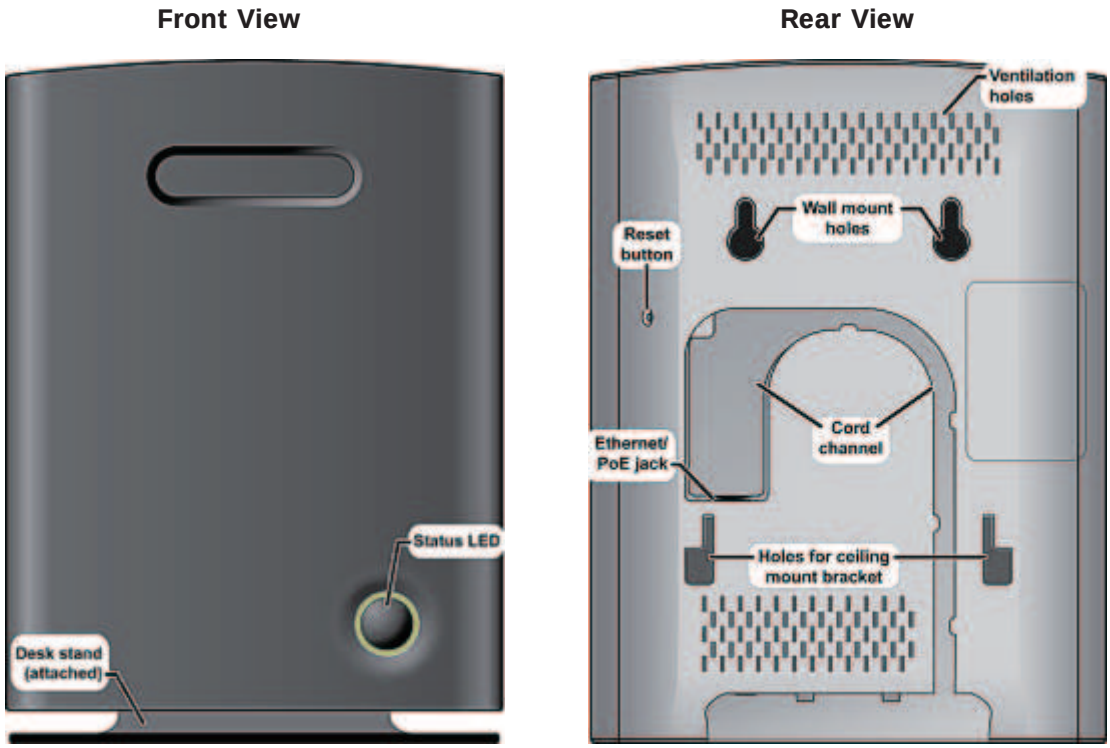


Figure 2-144 Base Station Front and Back View

If your network connection does not provide Power Over Ethernet, you will need to order a base station AC adapter and a standard Ethernet-to-PoE adapter. Contact Customer Service.

Follow the steps below to connect the base station.

1. Connect a standard Ethernet cable (Cat 5 or higher) to the Ethernet/PoE jack on the rear of the base station.
2. Route the cable through the channel as shown in Figure 2-145 Connecting the Base Station on the next page.

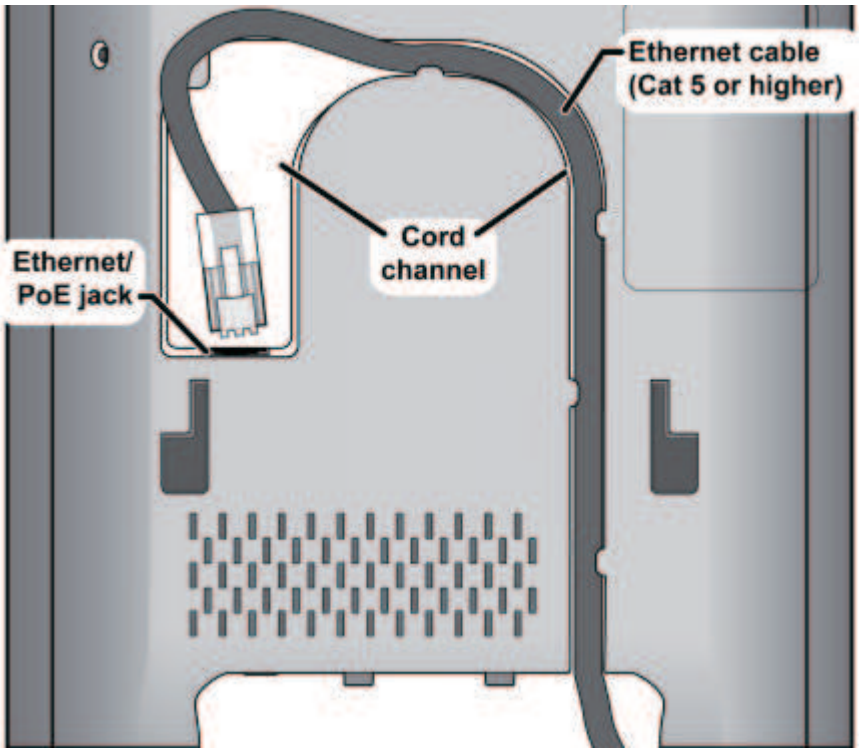


Figure 2-145 Connecting the Base Station

3. Connect the other end of the cable to your TCP/IP network.
   When the base station powers on, the STATUS LED on the front briefly lights orange and then turns off while it initializes and connects to the network. After the base station successfully initializes and connects to the network, the LED lights green and remains steady on.
   Table 2-27 Base Station LEDs States and Meanings on this page provides a list of base station LEDs and their meanings.

Table 2-27 Base Station LEDs States and Meanings

Color	State	Meaning
Green	Flickering	Stage in base flash memory rewrite at the end of the base firmware update.
Green	Steady on	All operations normal.
N/A	Off	No power in unit OR initializing and connecting to the network.
Orange	Briefly on	Powering on.
Orange	Flickering	Stage in base flash memory rewrite at the end of the base firmware update.
Red	Blinking	Factory reset warning. A factory reset has been initiated or is in progress.
Red	Blinking	No Ethernet connection available OR handset registration failed.
Red	Flickering	Stage in base flash memory rewrite at the end of the base firmware update.
Red	Steady on	Critical error. Contact technical support.

6.3.2 Wall Mounting the Base Station

Follow the steps below to mount the base station to a wall.

Be sure the wall material can hold the weight of the base.

1. Hold the base in its final location and mark the screw location based on the measurements shown in Figure 2-146 Base Mounting Dimensions on the next page.

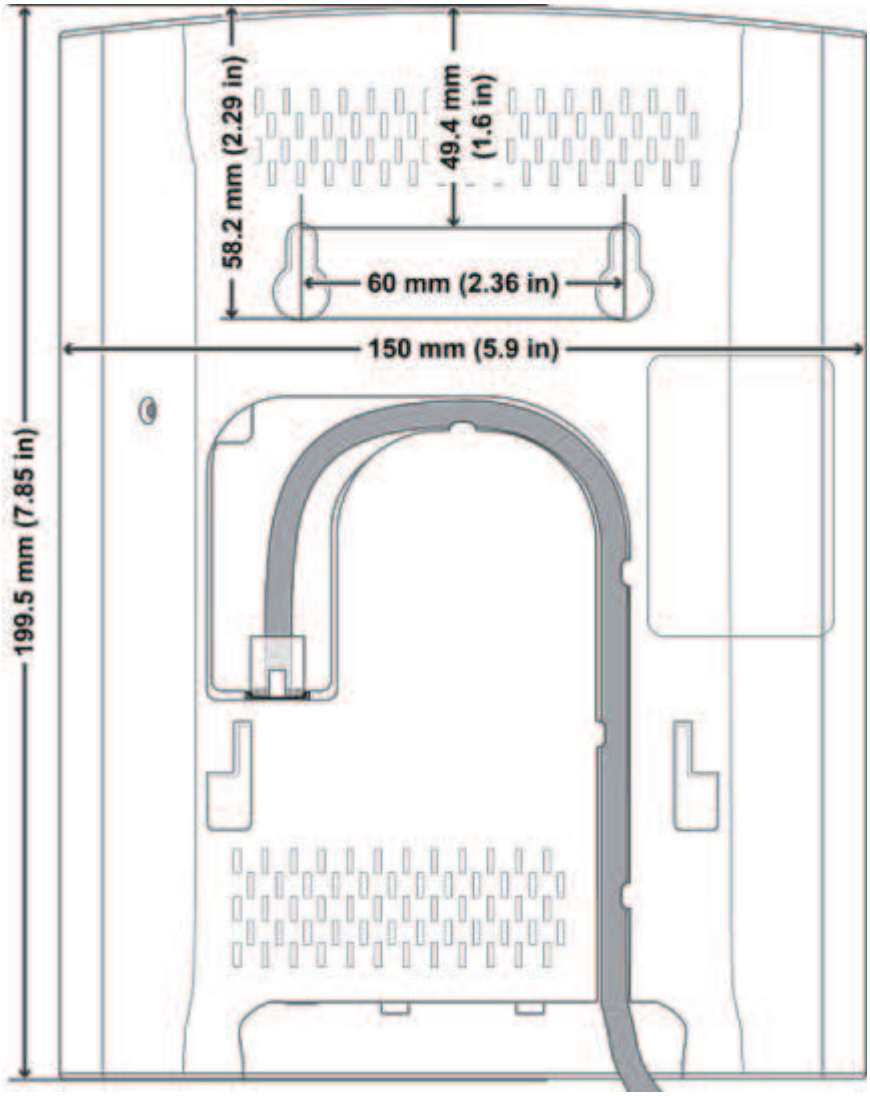


Figure 2-146 Base Mounting Dimensions

2. Insert the appropriate anchors for the wall material.
3. Insert the mounting screws into the anchors, leaving about 1/4 inch of space between the screw head and the wall.
4. Connect the Ethernet cable and route the cord as shown in Figure 2-146 Base Mounting Dimensions on this page.
5. Place the base over the screw heads and slide it down into place.

6.3.3 Handset and Charger

Figure 2-147 Handset Front View on this page provides a front view of the handset and Figure 2-148 Charger Top View on the next page provides a top view of the charger.

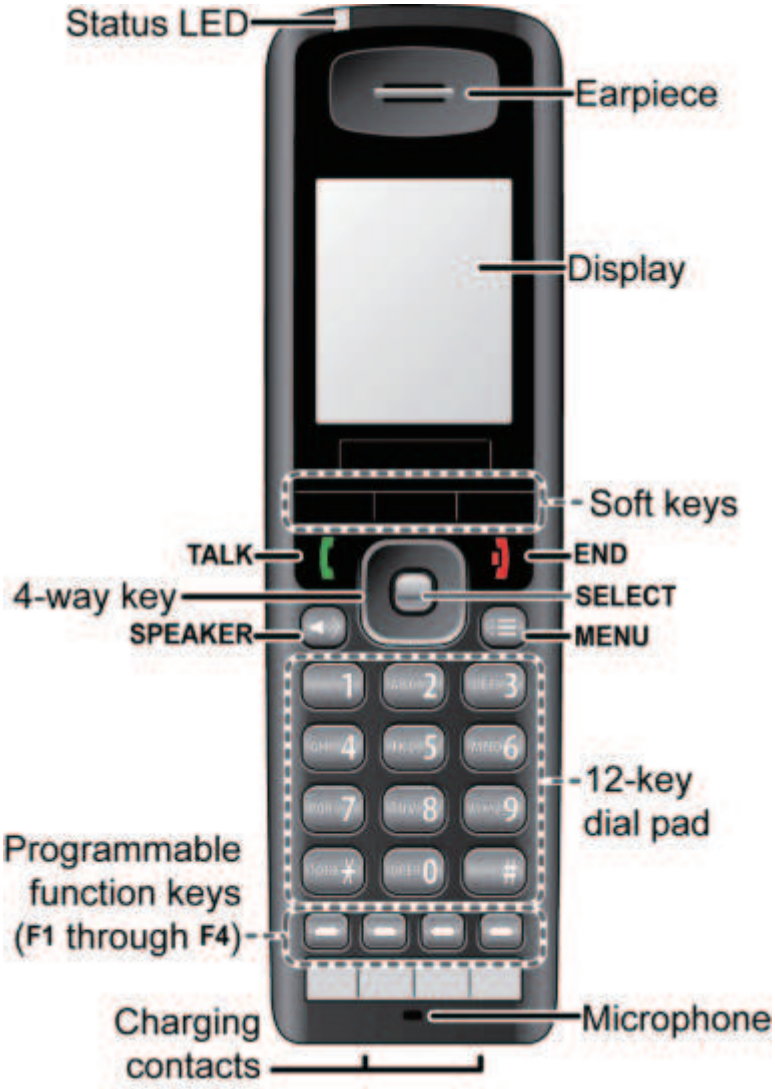


Figure 2-147 Handset Front View

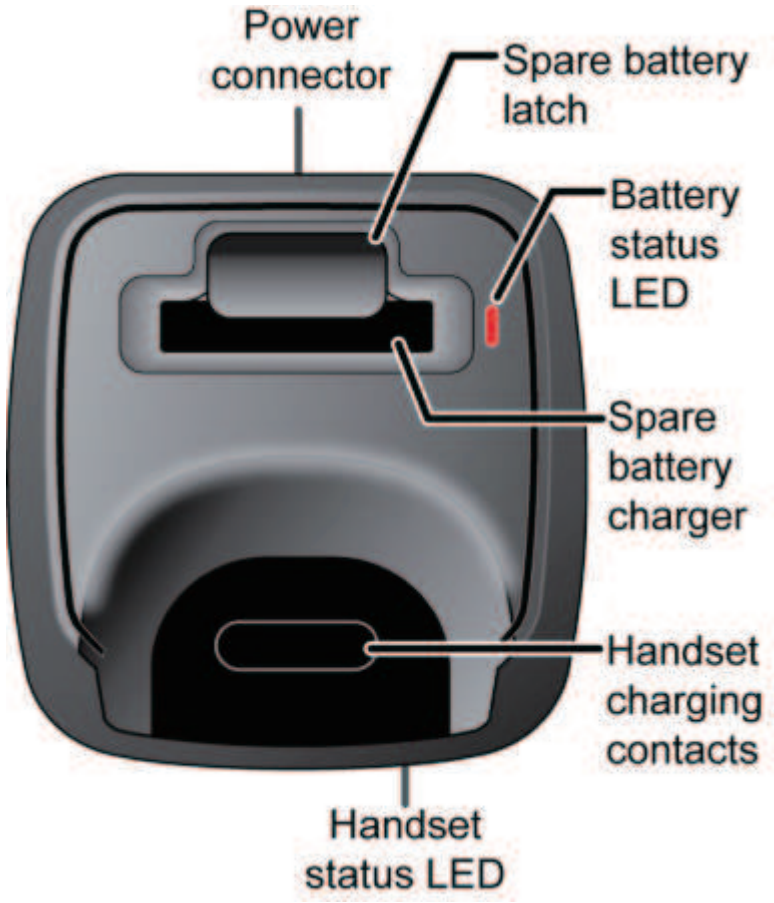


Figure 2-148 Charger Top View

6.3.3.1 Charging the Battery

Follow the steps below to charge the battery.

1. Install the handset battery as shown below in Figure 2-149 Installing the Handset Battery on this page.

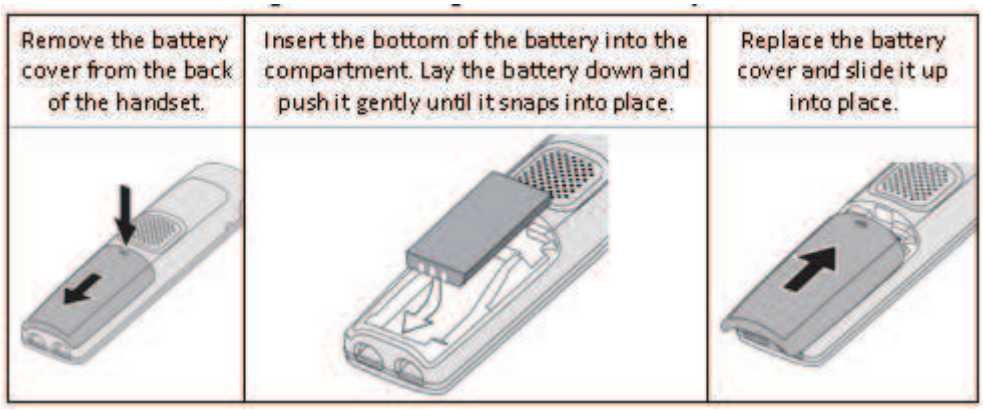


Figure 2-149 Installing the Handset Battery

2. Use the charger AC adapter to connect the charger's AC jack to a standard 120 V AC power outlet.
3. Place the handset in the charger with the display facing forward. The HANDSET STATUS LED should turn on; if it doesn't, reseat the handset or try plugging the AC adapter into a different outlet.

4. Place the spare battery (if available) in the back section of the charger; the BATTERY STATUS LED should turn on. (Pull the battery latch back slightly to fit the battery in the slot.) See Figure 2-150 Inserting Handset into the Charger on the previous page.

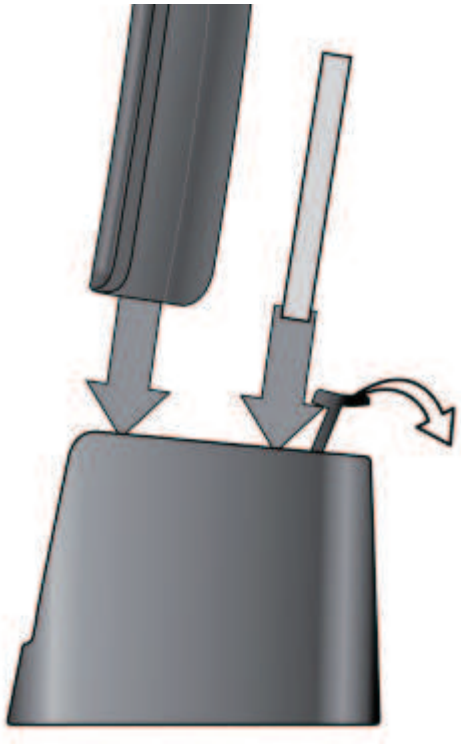


Figure 2-150 Inserting Handset into the Charger

Charge each battery completely (about 10 hours) before use.

6.3.3.2 Powering on the Handset

To power up the handset, press and hold **End** until the display flashes once (about 3 seconds). The handset searches for the base station or multi-cell chain it is registered to and connects to the unit with the strongest signal.

System Start Up

SECTION 1 SYSTEM START UP

1.1 Before Starting Up the System

Before starting up the system, make sure:

- KSU(s) are installed correctly.
- All extensions are cabled correctly.
- All earth ground and PSTN Trunks are cabled correctly.
- All PCBs are configured, equipped, and secured correctly.
- AC power cord is cabled correctly.
- At least one display type Multiline Telephone is connected to the system. (for Programming)
- Pull out the Lithium battery protection sheet, before starting up the system.

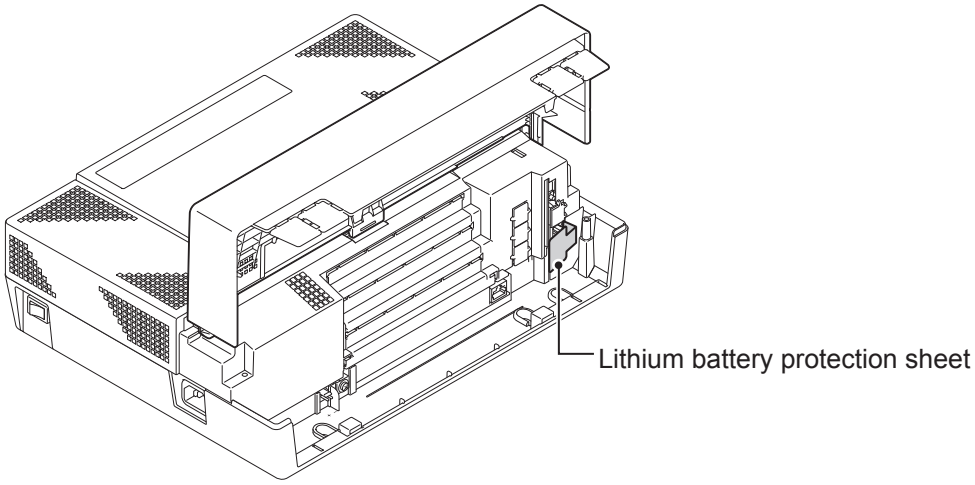


Figure 3-1 Lithium Battery Protection Sheet

- If Expansion KSU(s) are installed, turn the power on/off in the order of Expansion 2 KSU, Expansion 1 KSU and then Main KSU.

1.2 Starting Up the System

There are two methods for startup (COLD Start and HOT Start).

Table 3-1 Start Up Method

Start Up Method	Description	Purpose
COLD Start	The factory setting data is loaded.	• First time start up • System Initialization
HOT Start	The customer setting data is loaded.	• System Reboot

1.2.1 Perform a Cold Start

This section describes the process for starting the system for the first time or starting a system that requires the customer data be deleted.

System software is loaded from flash memory, and the customer data is deleted from RAM memory.

If Expansion KSU(s) are installed, turn the power on/off in the order of Expansion 2 KSU, Expansion 1 KSU and then Main KSU.

To perform a Cold Start;

1. Set the power switch to off position.

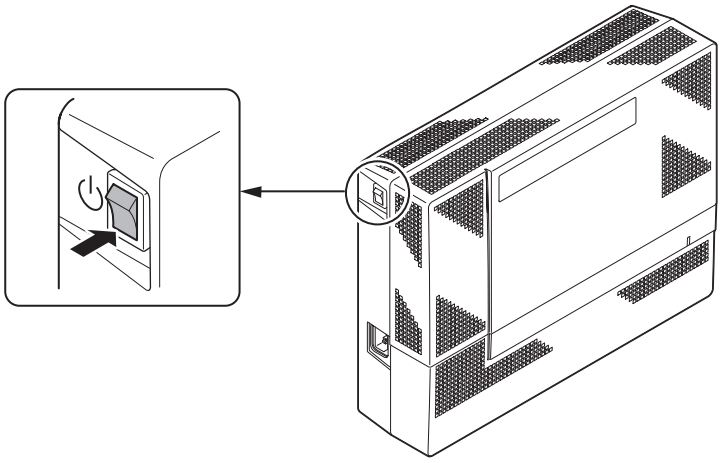


Figure 3-2 Power Switch Location

2. Open the Sub-Cover on the Main KSU and identify the LOAD button (S1) location on the CPU card.

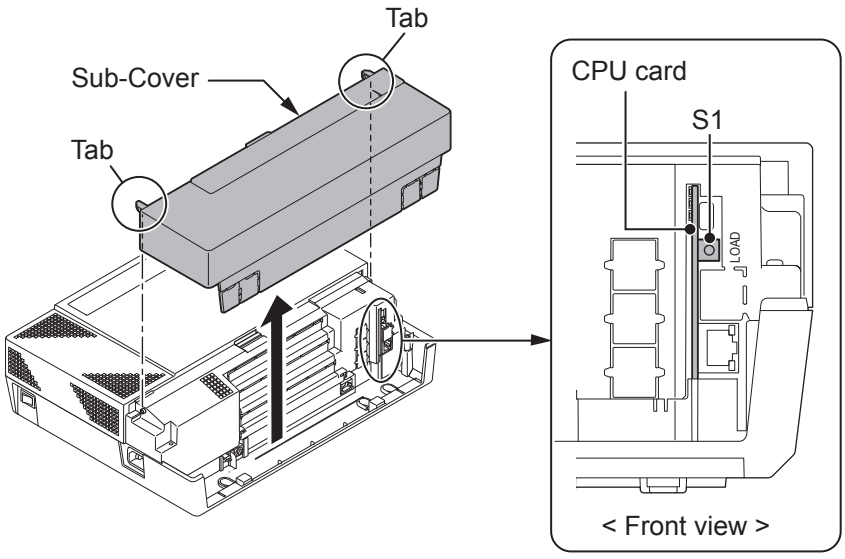


Figure 3-3 Load Button (S1) Location

3. Once the system has powered off, push in and hold the LOAD button (S1).

If Expansion KSU(s) are installed, the Power Switch must be ON at Expansion KSU(s).

4. Turn the power switch ON at the Main KSU.

5. Continue holding the LOAD button (S1) for approximately three seconds or until Status LED (D5) starts flashing red.

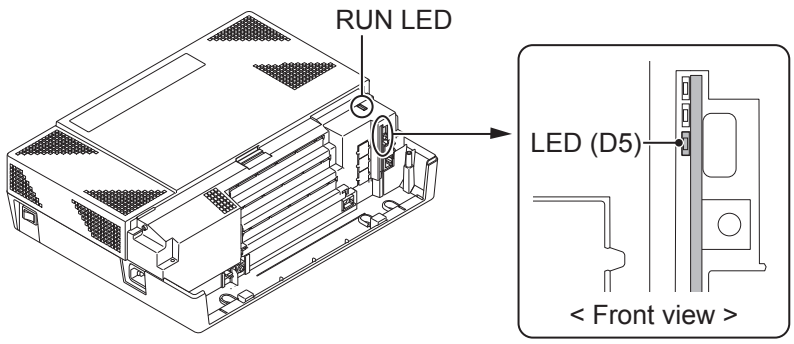


Figure 3-4 Status LED (D5) and RUN LED Location

6. Release the LOAD button.
7. When the system has completed reloading the software (about two minutes), the RUN LED is flashing blue on the CPU card and the connected Multiline Telephone's display will show the Time & Date and Extension Number.

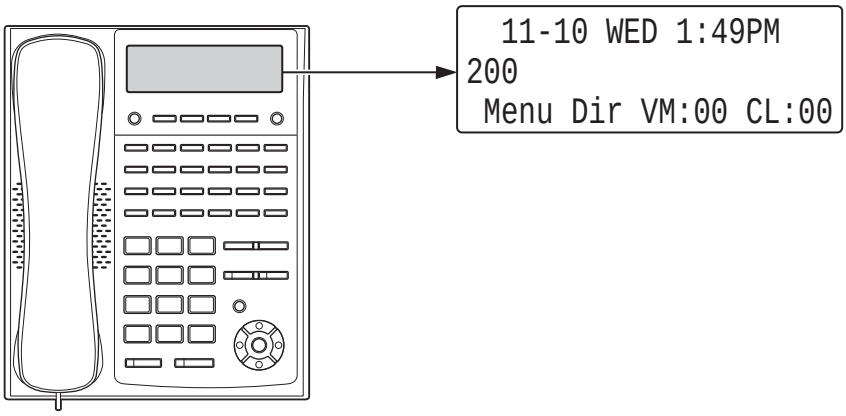


Figure 3-5 Display Indication (Idle)

1.2.2 Perform a Hot Start

This section describes how to load system software from flash memory, and the customer data from RAM memory.

System software is loaded from flash memory, and the customer data is loaded from RAM memory.

If Expansion KSU(s) are installed, turn the power on/off in the order of Expansion 2 KSU, Expansion 1 KSU and then Main KSU.

To perform a Hot Start;

1. Turn the system power off.
2. After it has powered off, turn the power switch back to ON. Wait approximately two minutes.
3. When the system has completed reloading the software, the RUN LED is flashing blue on the CPU card, and the connected Multiline Telephone's display will show the Time & Date and Extension Number as Figure 3-5 Display Indication (Idle) on this page.

SECTION 2 PROGRAMMING MODE

2.1 Entering the Programming Mode

The installer/system administrator can enter to the system programming mode from the Display Type Multiline Telephone. (A maximum of two users can enter mode at the same time)

In a newly installed system, use extension port 1.

1. Press Speaker key. (Do not lift the handset)
2. Dial # ✱ # ✱.

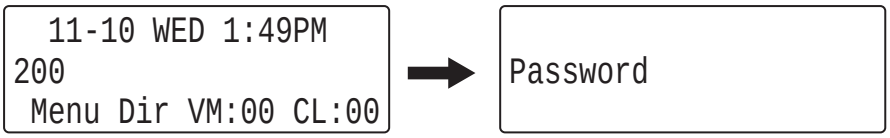


Figure 3-6 Entering Programming Mode Display 1

3. Dial the system password, then press **Hold** key to enter the Program Mode.

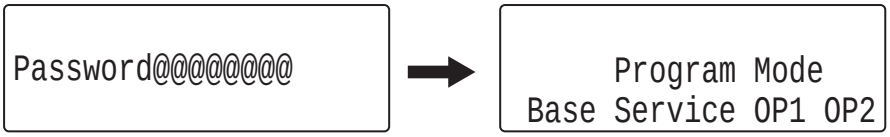


Figure 3-7 Entering Programming Mode Display 2

For the details of programming, refer to the SL1100 Programming Manual. (separate issue)

2.2 Exiting the Programming Mode

1. Press **Mute** key several times to return to the "Program Mode" Screen.

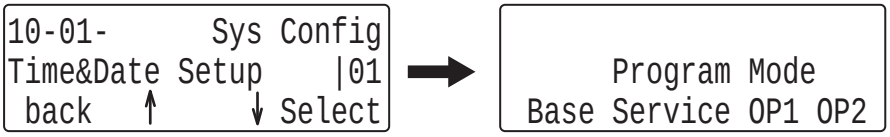


Figure 3-8 Exiting the Programming Mode Display 1

2. Press **Speaker** key to exit.

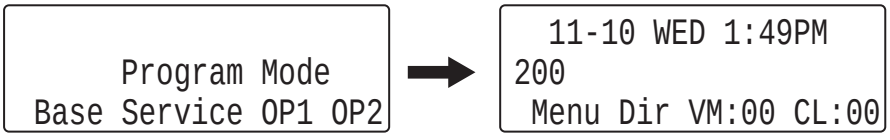


Figure 3-9 Exiting Programming Mode Display 2

The system automatically saves the customer data to the memory which is backed up by lithium battery.

2.3 Saving (Backup) the Customer Data

When the installer/system administrator exits from the programming mode, the system will automatically save the customer data to the on-board memory which is backed up by lithium battery. Additionally, the customer data can be saved to a CF Card for backup purpose. The **BLANK** CF card is inserted to the CF slot on the VMDB.

1. Turn the system power off, insert the blank CF card (32 MB or larger) to the CF slot on VMDB.

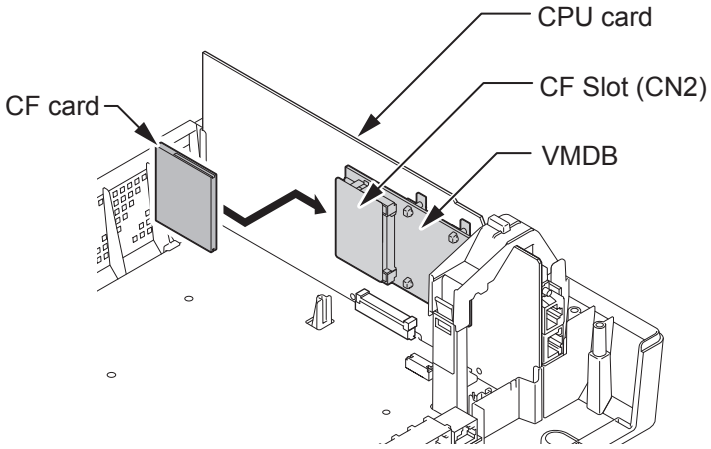


Figure 3-10 Inserting the CF card

2. Turn the power on, enter the Program Mode then PRG90-03.

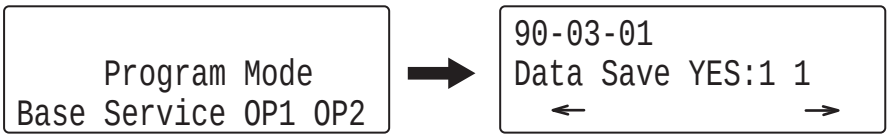


Figure 3-11 PRG90-03 Display

3. Dial **1** and press **Hold** key.
4. When the data backup to the CF card is completed, the display will be changed to the next PRG.

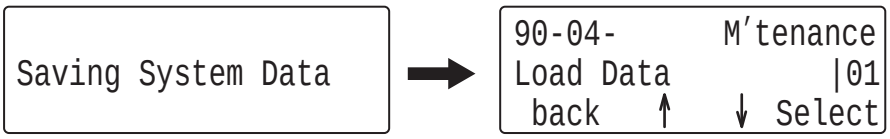


Figure 3-12 PRG90-04 Display

5. Remove the CF Card and exit from the Programming Mode.

The saved data on CF Card cannot be edited by the PC.

2.4 Loading the Customer Data

The backed up customer data can be loaded to the system by CF Card.

1. Turn the power off, insert the Customer Data CF card into the CF Slot on VMDB.

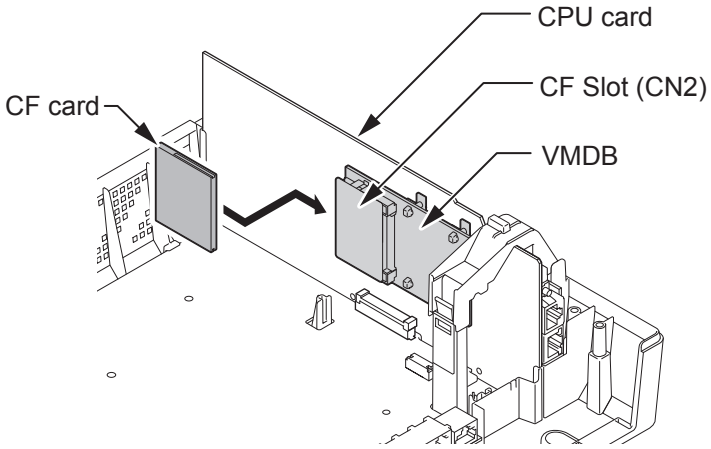


Figure 3-13 Inserting the CF card

2. Turn the power on, enter the Program Mode then PRG90-04.

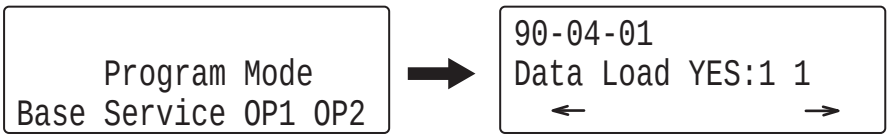


Figure 3-14 PRG90-04 Display

3. Dial **1** and press **Hold** key.
4. When the data backup to the CF card is completed, the display changes to the next PRG.

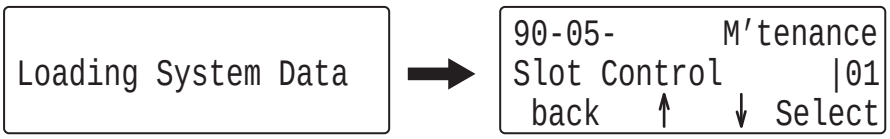


Figure 3-15 Next PRG Display

5. Remove the CF card and exit from the Program Mode.

SECTION 3 SYSTEM SHUT DOWN

3.1 Powering Off the System

1. Turn the all KSU(s) power off using the power switch.

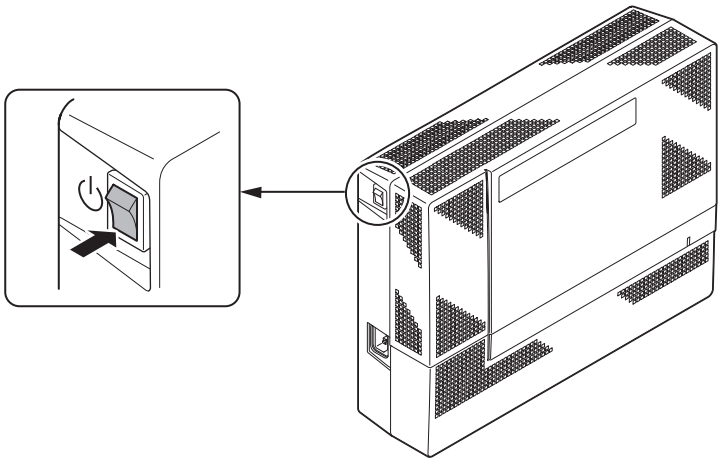


Figure 3-16 Power Switch Location

- *If Expansion KSU(s) are installed, turn the power on/off in the order of Expansion 2 KSU, Expansion 1 KSU and then Main KSU.*
- *DO NOT power off by disconnecting the AC (or DC for battery backup) power. Always use the Power Switch on the Main/Expansion KSU.*
- *All calls in progress will be cut off when the system is powered off, and if the Power Failure is set, the applicable extension will become operational.*
- *All user's setting (such as Call Forward, Camp-On, etc) will be kept.*

3.2 Resetting the System

The system reset is carried out using the "Power OFF and ON" operation.

Memo

Maintenance

SECTION 1 FUSE REPLACEMENT

1.1 Replacing the Fuse

This fuse is only for external battery box connection, it is not used for AC power to the system.

If Expansion KSU(s) are installed, turn the power on/off in the order of Expansion 2 KSU, Expansion 1 KSU and then Main KSU.

1. Turn off the system power and disconnect AC cord.
2. Open and remove the Sub-Cover.

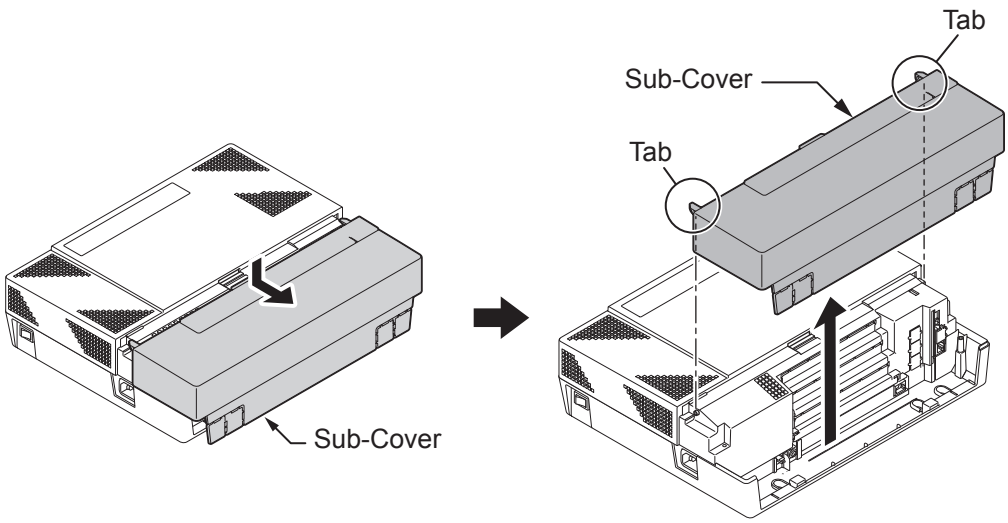


Figure 4-1 Removing the Sub-Cover

3. Loosen two screws and remove the Main-Cover.

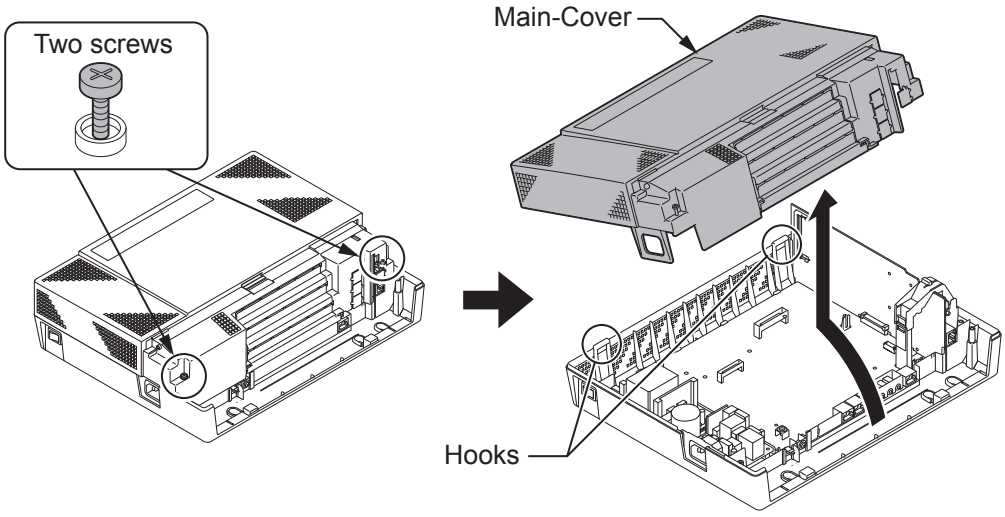


Figure 4-2 Removing the Main-Cover

4. Exchange the fuse (250 V/8 A) on 084M-B1 PCB.

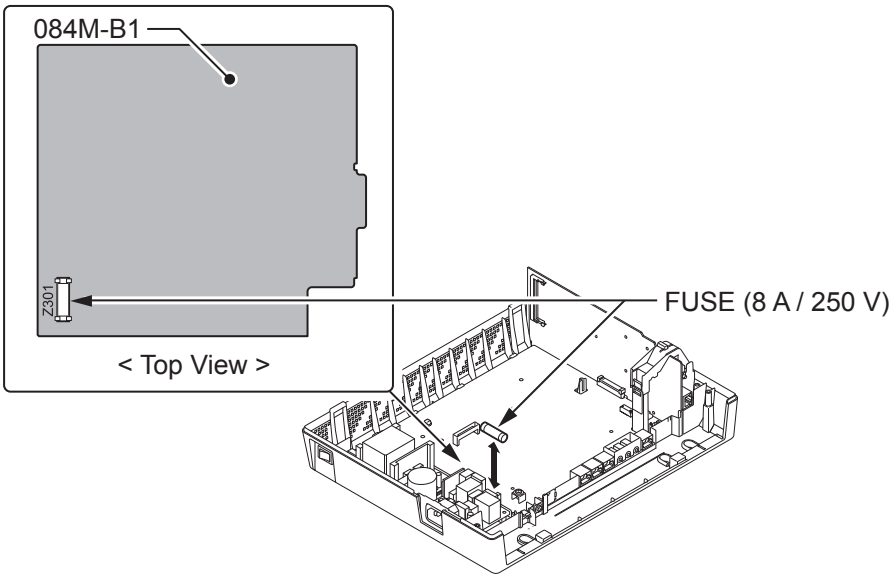


Figure 4-3 Exchanging the Fuse

5. Replace the Main-Cover and fasten two screws.

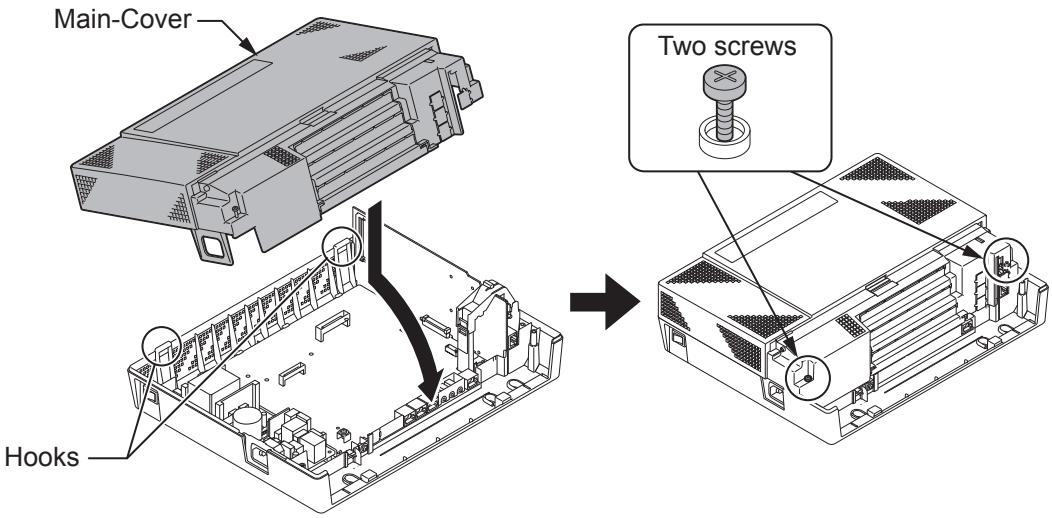


Figure 4-4 Replacing the Main-Cover

SECTION 2 LITHIUM BATTERY REPLACEMENT

2.1 General

The Lithium Battery (CR2032) is installed on the CPU Card in Main KSU. It provides the battery-backup of the RAM memory for approximately 36 months. When the battery power becomes low, the system will display a "Warning Message" to the assigned Display Multiline Telephone as below.

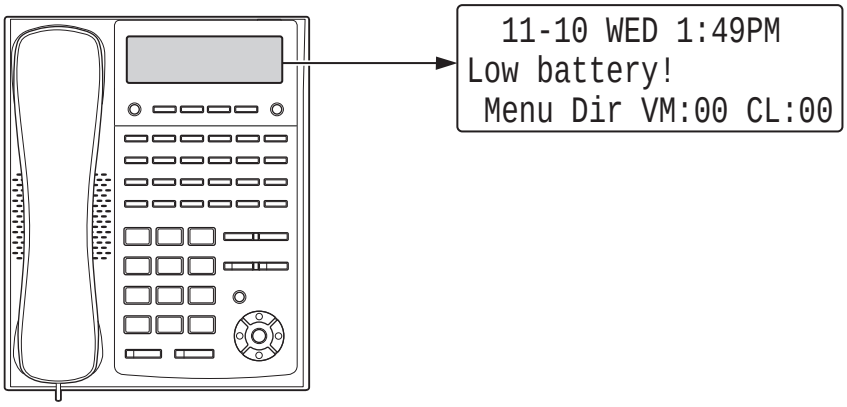


Figure 4-5 Warning of Low Battery

2.2 Lithium Battery Specification

Before replacing the Lithium battery, make sure which type of Lithium battery is required and prepare the new Lithium battery. (CR2032)

NEC recommends that a backup of the customer data is performed before powering off the system (either PCPro file or CF card backup) in order to replace the backup battery.

- ***Risk of explosion if the battery is replaced by an incorrect type.***
- ***Dispose of used batteries as instructed by the manufacturer of the battery.***
- ***If Expansion KSU(s) are installed, turn the power on/off in the order of Expansion 2 KSU, Expansion 1 KSU and then Main KSU.***

2.3 Replacing the Lithium Battery

1. Remove the Sub-Cover at the Main KSU.

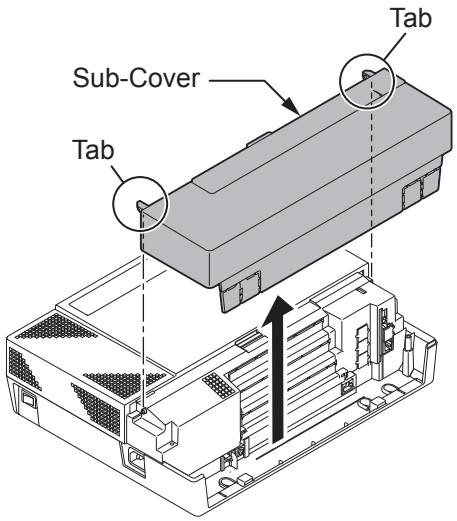


Figure 4-6 Removing the Sub-Cover

2. Power off the system, and remove the AC plug from the AC outlet.
3. Disconnect the AC power cord from the KSU.

AC power cord must be disconnected, otherwise the Main-Cover cannot be opened.

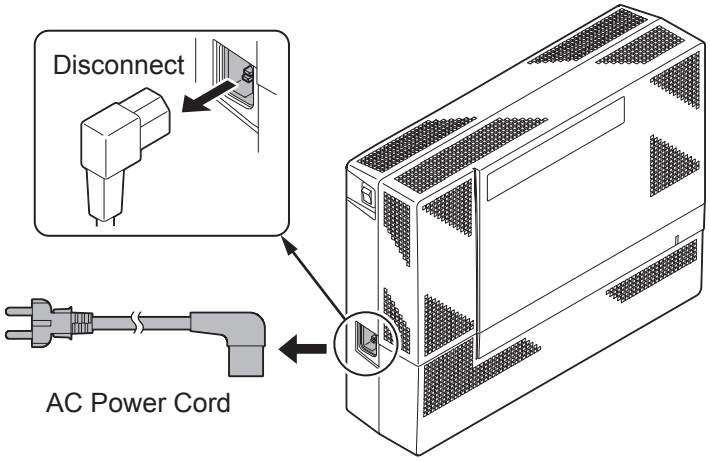


Figure 4-7 Disconnecting the AC Power Cord

4. Loosen two screws and remove the Main-Cover.

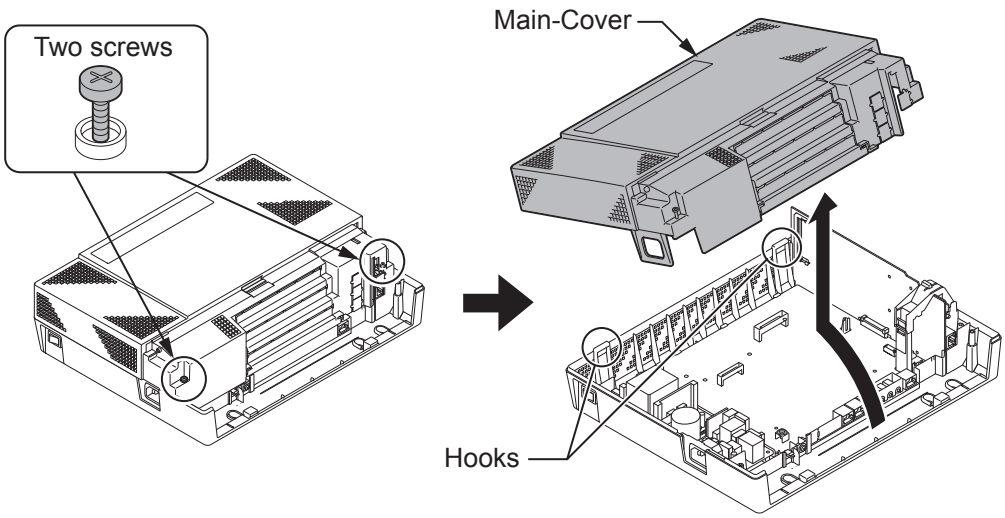


Figure 4-8 Removing the Main-Cover

5. Press tab A and lift the CPU support bracket.
6. Remove CPU card from the Main KSU.

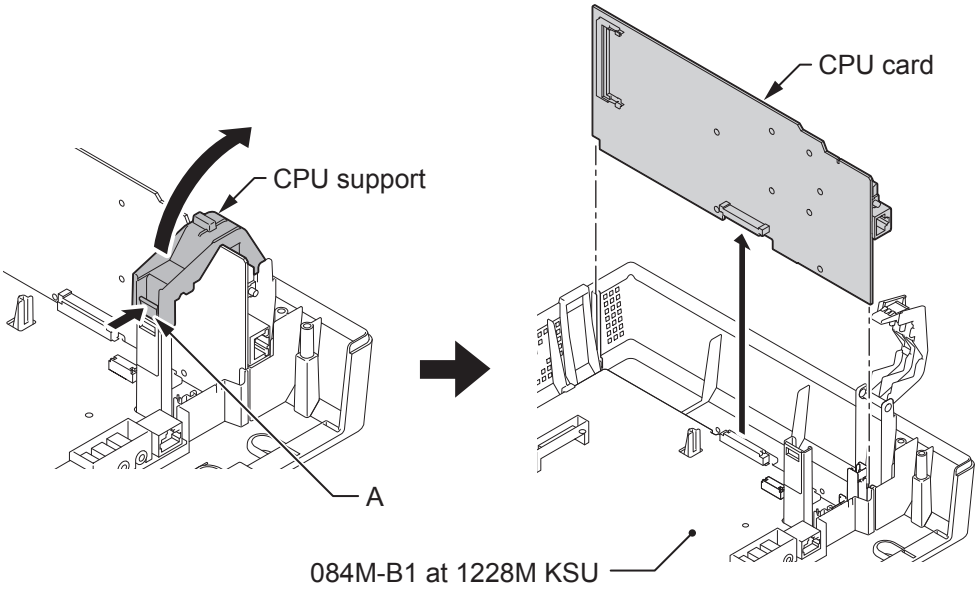


Figure 4-9 Removing the CPU Card

7. Refer to following figure for the Lithium battery location on the CPU card.

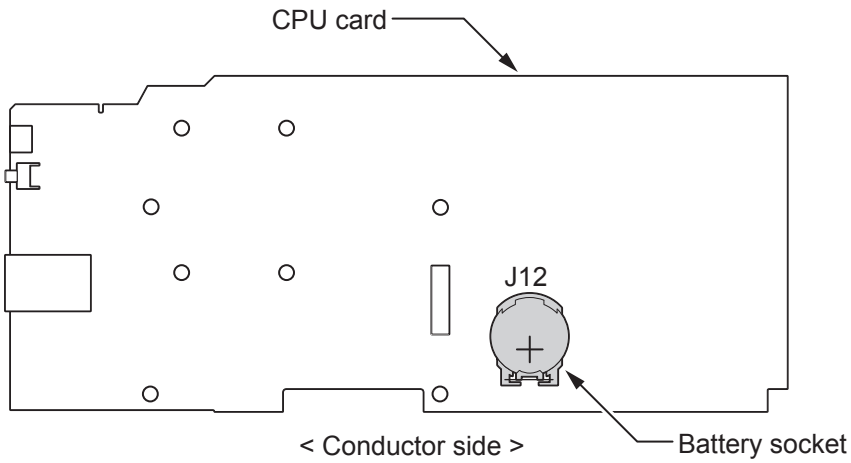


Figure 4-10 Location of Lithium Battery Socket

8. Remove the old Lithium battery and insert the new one into the socket.

The polarity "+" symbol must be on top as illustrated in following figure.

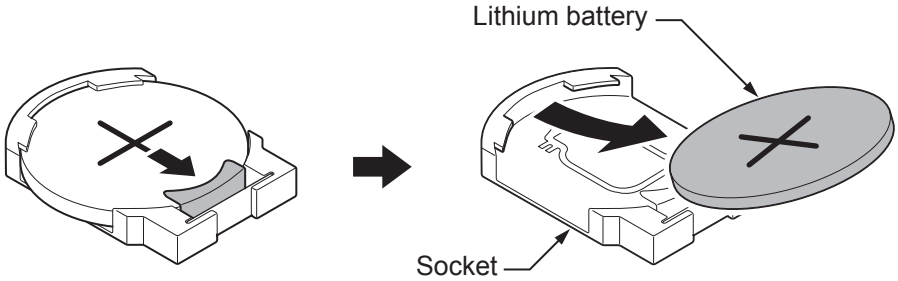


Figure 4-11 Removing the Lithium Battery

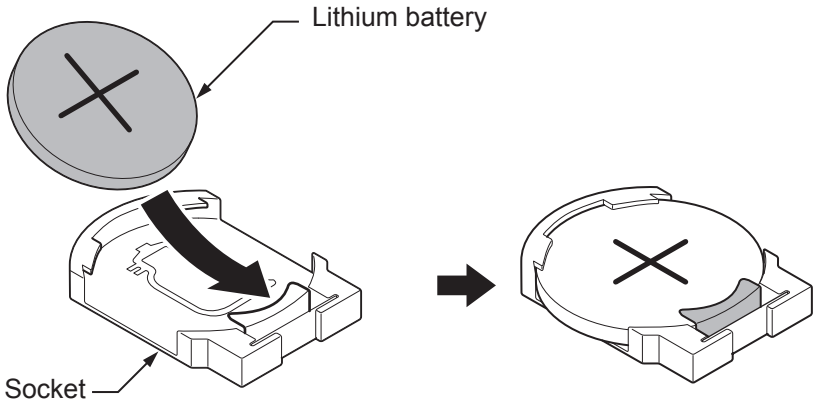


Figure 4-12 Inserting the Lithium Battery

9. Reinstall the CPU card into the 084M-B1 mother board and close the CPU support bracket.

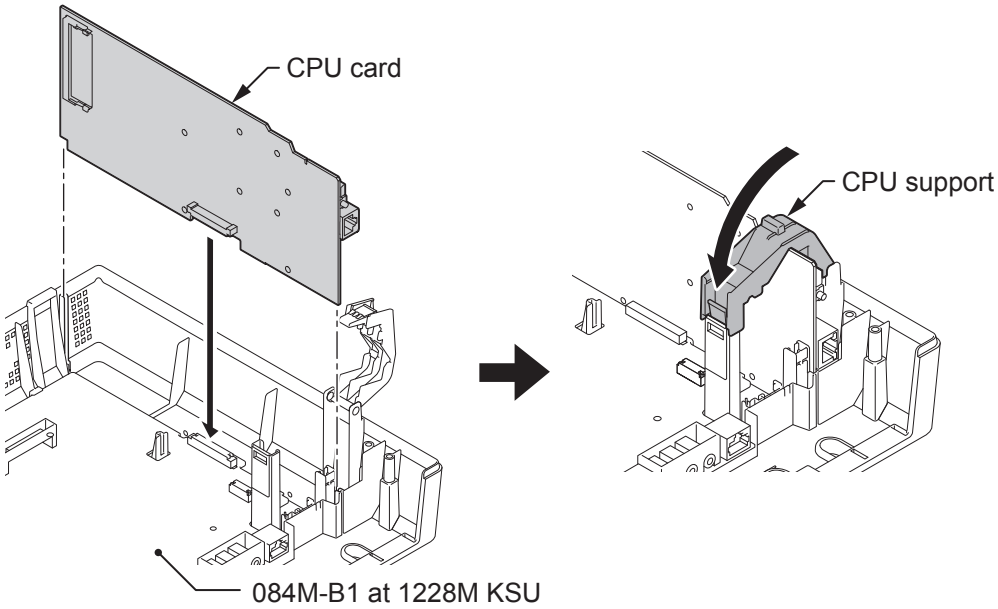


Figure 4-13 Installing the CPU Card

10. Replace the Main-Cover and Sub-Cover.

SECTION 3 MAIN SOFTWARE UPGRADING

3.1 General

The main system software is initially stored in the Flash memory located on the CPU card of the Main KSU. It can be upgraded by the new software on the CF (Compact Flash) card.

3.2 Before Upgrading the Main Software

NEC recommends that a backup of the customer data is performed before upgrading the main software (either PCPro file or CF card backup).

Before upgrading the main system software, the following preparations are necessary.

- Prepare the CF Card (32MB, or upwards and formatting by FAT(16)), and store the new main software on the CF card by PC. (New main system software is supplied by NEC.)

3.3 Main Software Version Confirmation

The main system software version is confirmed by the following operation at the display type Multiline Telephone.

The following steps assume that program 15-02-60 is set to Advanced 1 or Advanced 2. If set to Standard the operation is as follows:

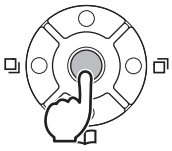
1. On-hook Condition.
2. Press Enter Key (Navigation Key).
3. Press "3" On Keypad to show the Main System Software version and Hardware Key Code.

1. On-hook Condition.

```
  11-10 WED 1:49PM
200
 Menu Dir VM:00 CL:00
```

Figure 4-14 Display of Multiline Telephone

2. Press Enter Key (Navigation Key).



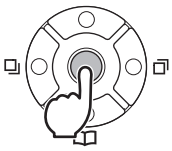
```
10:Volume Preferences

Prev Next Select Exit
```

3. Dial **93**.

```
93:Option Preferences
System Information
Prev Next Select Back
```

4. Press Enter Key (Navigation Key) to show the main system software version and Hardware Key Code.



```
VERSION:          01.00
MAC:  00-60-B9-D8-DF-8E
HKEY:    2810-0000-0000
```

5. Off-Hook and return to Time & Date mode.

```
  11-10 WED 1:49PM
200
 Menu Dir VM:00 CL:00
```

3.4 Upgrading the Main Software

If Expansion KSU(s) are installed, turn the power on/off in the order of Expansion 2 KSU, Expansion 1 KSU and then Main KSU.

1. Power off the system and disconnect the AC cord from the KSU.
2. Remove the Sub-Cover.

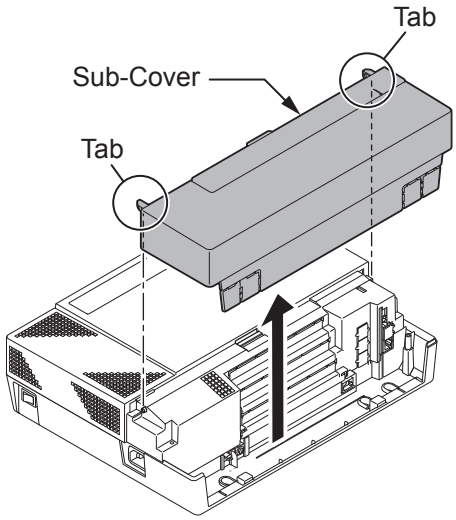


Figure 4-15 Removing the Sub-Cover

3. Loosen two screws and remove the Main-Cover.

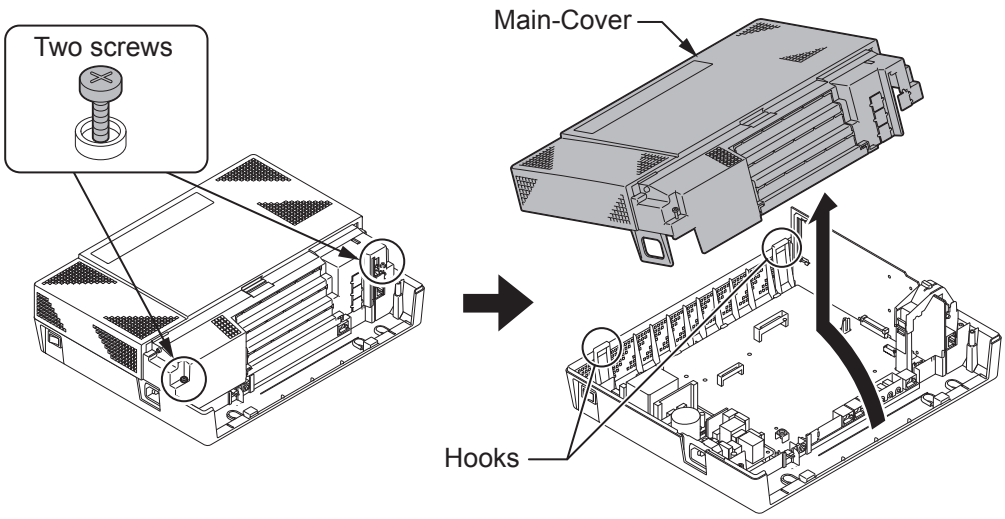


Figure 4-16 Removing the Main-Cover

4. Insert the CF card (with the new main system software loaded) to the CF slot on VMDB daughter board.

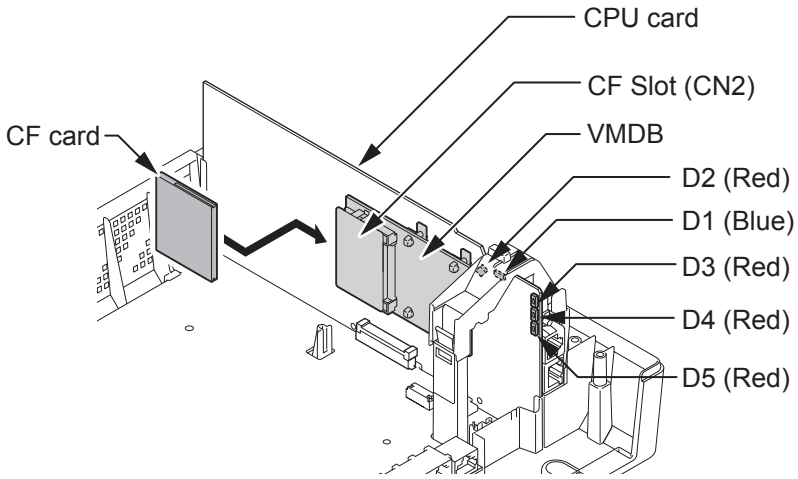


Figure 4-17 Inserting the CF card

5. Push in and hold the LOAD button (S1 on the CPU card).

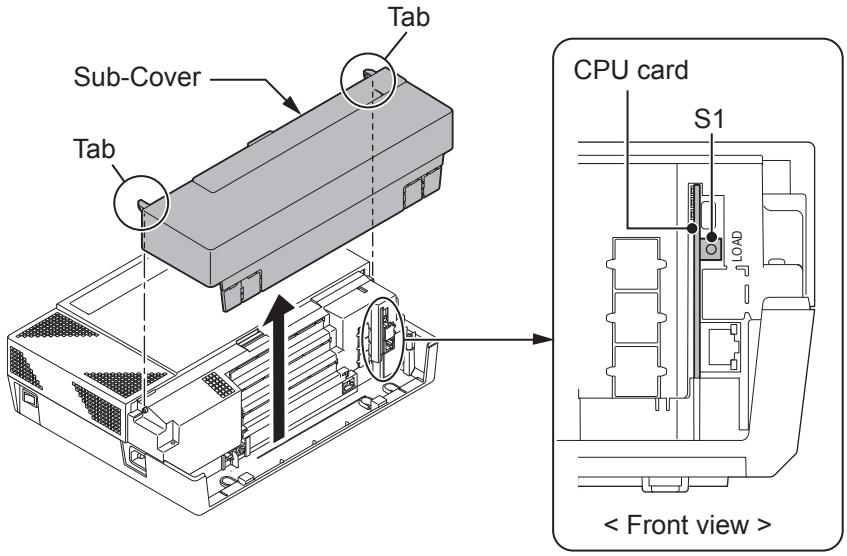


Figure 4-18 LOAD Button (S1) Location

6. Turn the system power on.
7. Continue holding the LOAD button (S1) for approximately 10 seconds or until Status LED (D5) starts flashing red.
8. Release the LOAD button (S1).
9. Wait until the Status LEDs (D2 to D5) on the CPU card has the following indications (approximately two minutes).

Table 4-1 Status LEDs

LED No.	Indication	Remarks
D2	Flashing Red	
D3	Flashing Red	
D4	Flashing Red	
D5	Off	

10. Turn the power off and remove the CF card from the CF slot on VMDB.

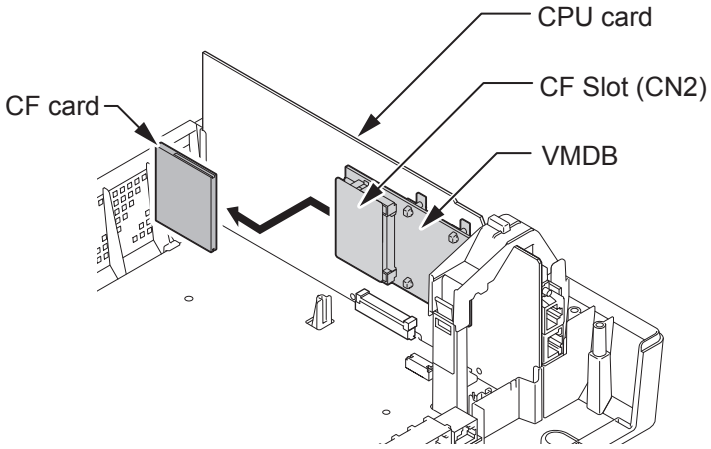


Figure 4-19 Removing the CF card

11. Replace the Main-Cover and Sub-Cover.
12. Turn the system power back on.
13. When the system has completed reloading the software, the RUN LED (D1) will flash blue.

- *To confirm the new software version number, press the Navigation key on any display telephone to view the system version number see Main Software Version Confirmation on page 4-8.*
- *The existing system data in the flash memory is replaced, but the customer data (stored in the RAM) is saved.*

SECTION 4 LED INDICATIONS

The LEDs on the CPU indicate the following:

- RUN (D1) = The CPU is operating (Blue)
- D2, and D3 = Alarms (Red)
- D4 = Flash access indication (Red)
- D5 = Boot status (Red)
- Refer to Program 90-10: System Alarm Setup for details on assigning alarm LEDs.

Table 4-2 CPU LED Indications on this page provides a list of each LED and associated operation and status indications. Refer to Figure 4-17 Inserting the CF card on page 4-10 for the location of the LEDs on the CPU.

Table 4-2 CPU LED Indications

Status	LED Indication				
	RUN (D1)	**D2**	**D3**	**D4**	**D5**
System Operating Normally	Blinking	Off	Off	Off	Off
System Operate Normal + File accessing	Blinking	Off	Off	Access Blinking	Off
System Starting Up	On	Off	Off	Off	Off
Boot is starting	On	Off	Off	Off	Blinking
Initializing the disk or formatting	Blinking	Off	Off	Off	Off
Reading System Program	Blinking	Off	On	Access Blinking	Off
Reading Error of System Program	Off	On	Off	Off	Off
System Initializing + DSP loading process	On	Off	On	Access Blinking	Off
Initializing System Program	Blinking	Off	On	Access Blinking	Off
Upgrading System Program (in the Flash Memory)	Off	Blinking	Off	Access Blinking	Off
Batch file Error	Off	On	On	Off	Off
Completed the System Program Upgrade	Off	Blinking	Blinking	Blinking	Off
Security Tip Error	Off	Blinking	Off	Off	Off
Error alarm (Major) occurred	Blinking	Blinking	Off	Off	Off
Error alarm (Minor) occurred	Blinking	Blinking	Off	Off	Off
Shutting Down	Blinking	Off	Off	Off	Off
Power Off	Off	Off	Off	Off	Off

Specifications

SECTION 1 SYSTEM CAPACITY

Table 5-1 System Capacity

Items		1 KSU (1228)	2 KSU (2456)	3 KSU (3684)	Note
Expansion Slot		2	4	6	
System Maximum Port		52	104	144	1KSU: 084M+PRI+080E+4COIDBx2 2KSU: (084M+PRI+080E)x2+4COIDBx4 3KSU: 084Mx3+PRIx2+080Ex4+4COIDBx7
Trunk Port Max.		32	64	76	1KSU: PRIx1+4COIDBx2 2KSU: PRIx2+4COIDBx4 3KSU: PRIx2+4COIDBx7
Trunk Port	**Analog Trunks (COT)**	12	24	36	1KSU: 4COIDBx3 on 084M/080E/008E 2KSU: 4COIDBx6 3KSU: 4COIDBx9
	PRI (24B)	24	48	48	**Max. one PRI/KSU** **Max. two PRIs/system**
	IP Trunk (SIP)	32			
Station Port Max.		28	56	84	1KSU: 084M+080Ex2 2KSU: 084Mx2+080Ex4 3KSU: 084Mx3+080Ex6
Station Port	**2W Key Set**	24	48	72	**Max. 24/KSU** 084M+080Ex2
	SLT (–28V)	20	40	60	1KSU: 084M+008Ex2 2KSU: 084Mx2+008Ex6 3KSU: 084Mx3+008Ex9
	2W DSS Console	12			Connect to digital extension Port at 084M/080E
	Doorphone	2	4	6	2DPH I/F on 084M (analog extension port 3, 4) Alternative use with SLT
	SIP-MLT/ SIP Std. terminal	64			
	VM/VRS Channels	2 VM ports/ 4 VRS ports (default) (Total Max.16)			CFVMS-C1 Port increased by license.
		4 VM ports/ 4 VRS ports (default) (Total Max.16)			CFVML-C1 Port increased by license.
Virtual Extension		50			
Relay		2	4	6	2 circuits on 084M
Power Failure Transfer		3	6	9	1 PFT circuit on 4COIDB (COI port 1 and PF port)
External Paging (Audio Out)		1	2	3	1 audio-In/Out and 2 audio-In circuits on 084M. Select one of 084M for MOH/BGM.
External MOH (Audio In)		1			
External BGM (Audio In)		1			

Items	1 KSU (1228)	2 KSU (2456)	3 KSU (3684)	Note
Ethernet Port	1			1 circuit on CPU
Built-In Answering Machine Channel	2			2 circuits on CPU
VoIP Channels	32			Port increased by license.
V.34 Modem	1			1 circuit on CPU-B1 (VMDB)
Conference Circuits	32 (Max. 16 parties per Conference)			
DSP Resource *1	32			For 1228M KSU (DSP on CPU)
	-	32	64	For 1228ME EXP 32ch DSP on each EXIFE-C1
DSP Sender[*2]	128			

*1. Service Tone receiver, DTMF receiver, Caller ID sender / receiver, MF receiver, MFC receiver

*2. Service Tone sender, DTMF sender, MF sender, MFC sender

SECTION 2 SYSTEM SPECIFICATIONS

2.1 General Precautions

- Never attempt to insert wires, pins, etc. into the vents or other holes of the equipment.
- Do not use benzene, thinner, or the like, or any abrasive powder to clean the equipment. Wipe it with a soft cloth.

2.2 Environmental Requirements

Meeting established environmental standards maximizes the life of the system. Be sure that the site is not:

- In direct sunlight or in hot, cold or humid places.
- In dusty areas or in areas where sulfuric gases are produced.
- In places where shocks or vibrations are frequent or strong.
- In places where water or other fluids comes in contact with the equipment.
- In areas near high-frequency machines or electric welders.
- Near computers, telexes, microwaves, air conditioners, etc.
- Near radio antennas (including shortwave)

2.3 Operating Conditions

Table 5-2 Operating Conditions

Unit	Operating Conditions
KSU, PCBs and Multiline Telephones	Temperature: 0 to +40 degree C (32 to 104 degree F) Humidity: 10 to 90(non-condensing)
Doorphone Box	Temperature: -20 to +60 degree C (-4 to 140 degree F) Humidity: 20 to 80(non-condensing)

2.4 Site Requirements

A KSU can only be wall-mounted, it can only be floor-mounted if the optional External Backup Battery Box is installed.

2.5 AC Power Requirement

A dedicated 100V-120V/220V/230V/240V 50/60Hz circuit located within 2 meters of the KSU is required. A separate dedicated AC outlet is necessary for each KSU.

Double Pole/Neutral Fusing
(Power supply fuses are located at both the L and N side.)

Table 5-3 Power Requirement

	110VAC	120VAC	220VAC	230VAC	240VAC
Power Requirement	110 VAC@15 A	120 VAC@15 A	220 VAC@15 A	230 VAC@15 A	240 VAC@15 A
Power Consumption	Main KSU = 128 VA	Main KSU = 130VA	Main KSU = 154 VA	Main KSU = 154 VA	Main KSU = 156 VA
	3 KSU Total = 384 VA	3 KSU Total = 390VA	3 KSU Total = 462 VA	3 KSU Total = 462 VA	3KSU Total = 468 VA
Input Voltage (Rated Voltage)	90 VAC to 264 VAC (100VAC/120VAC/220VAC/230VAC/240VAC)				
Frequency	47 Hz - 63 Hz (Rated Frequency: 50/60 Hz)				

	110VAC	120VAC	220VAC	230VAC	240VAC
Phase and Wire	Single Phase, 2 Line + PE Type				
Ground Requirement	No.14 AWG Copper Wire				
Feeding Voltage	SLT: 20 mA/-27 V				
AC Input I	Main KSU = 1.16 A 3 KSU Total = 3.48 A	Main KSU = 1.08 A 3 KSU Total = 3.24 A	Main KSU = 0.70 A 3 KSU Total = 2.10 A	Main KSU = 0.67 A 3 KSU Total = 2.01 A	Main KSU = 0.65 A 3 KSU Total = 1.95 A
KWh	Main KSU = 0.128 KWh 3 KSU Total =0.384 KWh	Main KSU = 0.130 KWh 3 KSU Total =0.390 KWh	Main KSU = 0.154 KWh 3 KSU Total =0.462 KWh	Main KSU = 0.154 KWh 3 KSU Total =0.462 KWh	Main KSU = 0.156 KWh 3 KSU Total =0.468 KWh
BTU(KWh x 3413)	Main KSU = 437 BTU 3 KSU Total =1311 BTU	Main KSU = 444 BTU 3 KSU Total =1332 BTU	Main KSU = 526 BTU 3 KSU Total =1578 BTU	Main KSU = 526 BTU 3 KSU Total =1578 BTU	Main KSU = 532 BTU 3 KSU Total =1596 BTU

2.6 Electrical Specifications <Power Supply> (KSU)

Table 5-4 Electrical Specifications of KSU

Item	Specification
Output Voltage	-27 V (81 W)
Related Voltage	-27 V
Load Fluctuation	-25.92 V to -28 V (-27.0 V ±4)
Output Current	3.0 A
Ripple/Noise	200 mVp-p or less
Noise	-65 dBm or less
Over Voltage Protection	-31.2 V to -36.9 V
Over Current Protection	3.3 A to 3.9 A
Load Capacity	5000 µF

2.7 IP Terminal Power Chart

Table 5-5 IP Terminal Power Chart

IP Terminal	IEEE 802.3af Class	Label Indication (Maximum Current with All Options)			
		48 VDC		27 VDC	
IP4WW-24TIXH-C TEL	Class 2	130 mA	6.2 W	235 mA	6.3 W

2.8 IEEE802.af Class Specification

Table 5-6 IEEE802.af Class Specification

IEEE802.af	Minimum	Maximum
Class 2	3.84 W	6.49 W

2.9 Mechanical Specifications

Table 5-7 Mechanical Specifications

Equipment	Width	Depth	Height	Weight	Note
1228M-B KSU, 1228ME-B EXP	375 mm (14.76 in)	115 mm (4.53 in)	290 mm (11.42 in)	Approx. 2 kg (70.55 oz)	
External Backup Battery	500 mm (19.69 in)	230 mm (90.55 in)	340 mm (13.39 in)	10.3 kg (excluding battery) (363.32 oz) 15.6 kg (including battery) (550.27 oz)	
Multiline Telephone	180 mm (7.09 in)	221 mm (8.70 in)	136 mm (5.35 in)	0.90 kg (31.75 oz)	
DSS Console	122 mm (4.80 in)	221 mm (8.70 in)	113 mm (4.45 in)	0.45 kg (15.87 oz)	
Doorphone	98 mm (3.89 in)	28.5 mm (1.12 in)	130 mm (5.12 in)	0.2 kg (7.05 oz)	

2.10 Optional Unit Mechanical Specifications

Table 5-8 Optional Unit Mechanical Specifications

Unit	Width	Depth	Height	Weight
IP4WW-VOIPDB-C1	66 mm (2.60 in)	138 mm (5.43 in)	18 mm (0.71 in)	0.05 kg (1.76 oz)
IP4WW-080E-B1	160 mm (6.30 in)	198 mm (7.80 in)	32 mm (1.26 in)	0.17 kg (6.00 oz)
IP4WW-008E-B1	160 mm (6.30 in)	198 mm (7.80 in)	32 mm (1.26 in)	0.16 kg (5.64 oz)
IP4WW-4COIDB-B1	75 mm (2.95 in)	170 mm (6.69 in)	18 mm (0.71 in)	0.08 kg (2.82 oz)
IP4WW-1PRIU-C1	160 mm (6.30 in)	198 mm (7.80 in)	32 mm (1.26 in)	0.15 kg (5.29 oz)
IP4WW-EXIFB-C1	70 mm (2.76 in)	115 mm (4.53 in)	16 mm (0.63 in)	0.04 kg (1.41 oz)
IP4WW-CFVMS-C1	43 mm (1.69 in)	37 mm (1.46 in)	3.5 mm (0.14 in)	0.01 kg (0.35 oz)
IP4WW-CFVML-C1	43 mm (1.69 in)	37 mm (1.46 in)	3.5 mm (0.14 in)	0.01 kg (0.35 oz)

2.11 Doorphone Interface Specifications

Table 5-9 Doorphone Interface Specifications

Item	Specification
Output Impedance	600 Ω
Output Level	Nominal 250 mV (-10 dBm)
Maximum Output	400 mV RMS

2.12 General Purpose/Door Unlock Relay Specifications

Table 5-10 General Purpose/Door Unlock Relay Specifications

Item	Specification
Rated Voltage	DC 48 V Maximum
Rated Current	DC 320 mA Maximum
Contact	Normally Open

2.13 External Paging Output Specifications

Table 5-11 External Paging Output Specifications

Item	Specification
Output Impedance	600 Ω @ 1 kHz
Output Level	Nominal 250 mV (-10 dBm)
Maximum Output	400 mV RMS

2.14 BGM/ExMOH Source Input Specifications

Table 5-12 BGM/External MOH Source Input Specifications

Item	Specification
Output Impedance	600 Ω @ 1 kHz
Input Level	Nominal 250 mV (-10 dBm)
Maximum Input	1 V RMS

2.15 External Sensor Device Interface Specifications

Table 5-13 External Sensor Device Interface Specifications

Applied Voltage during Sensor Off	Loop Current during Sensor On	Port Assignment
24 V	40 mA	Program10-03-05: 0
5 V		Program10-03-05: 1

The External Sensor device configuration shall be assigned by system program and the programming is different with a Sensor Type.

2.16 CPU Card LAN Port Specifications

Table 5-14 CPU Card LAN Port Specifications

Item	Specification
Standard	IEEE802.3 10Base-T and 100Base-TX Compliant
Access	CSMA/CD
I/F (Layer 1)	Speed: 10 Mbps/100 Mbps Auto Negotiation Cable: CAT5 or better, Straight/Cross Auto Crossover

2.17 Cabling Requirements

- Do not run extension cable in parallel with the AC source, telex or computer etc. If the cables are near cable runs to those devices, use shielded cable with grounded shields or install the cable in conduit.
- When cables must be run on the floor, cable protectors must be used.
- Cable runs for Multiline Telephones, DSS Consoles, Single Line Telephones, and Doorphone Boxes must be a dedicated, isolated cable pair.
- Aerial distribution cabling is not allowed.
- Trunk Lines must be installed with lightning protectors.
- Do not use 4-wire cabling for SLT connections.

2.18 Cable Requirements

Table 5-15 Cable Requirements

Device	Cable Type	Cable Run Length
Multiline Telephone	24 AWG (Φ0.5 mm)	300 m (984.3 ft)
Multiline IP Telephone	CAT5 Straight Cable	100 m (328.1 ft)
DSS Console	24 AWG (Φ0.5 mm)	300 m (984.3 ft)
Single Line Telephone Analog Terminals (20mA)	24 AWG (Φ0.5 mm)	1,125 m (3,691ft)
Doorphone Box	24 AWG (Φ0.5 mm)	150 m (492.1 ft)
CPU LAN Port to External Device	Ethernet Cross Cable	100 m (328.1 ft)
CPU LAN Port to Switching Hub	Ethernet Straight Cable	100 m (328.1 ft)
ISDN Terminal	4-wire, 24 AWG (Φ0.5 mm)	100 m (328.1 ft) (P-MP Short -passive) 300 m (984.3 ft) (P-MP Long -passive) 500 m (1,640.4 ft) (P-P)
1228ME-B EXP	Ethernet Straight Cable (Attached to 1228ME-B EXP)	1.2 m (3.9 ft)

Memo

Memo

SL1100

Hardware Manual

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