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# ***SL1000***

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## ***Hardware Manual***

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## **Before use**

- Please read this manual carefully before operating this product and save this manual for future use.
- The telephone system can only be used in NEC-designated countries.
- If a system-down, malfunction, defect or external factor such as an electrical failure indirectly causes a loss of profit, the company (or affiliates) will not be held responsible.
- The goal is to produce a comprehensive and accurate manual. However, if errors or omissions are found in this manual, please notify NEC Corporation.
- If the system requires installation or repair, contact the dealer or its service technician.
- Carefully read all the manuals that relate to the system.

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# Regulatory

## BATTERY DISPOSAL

The SL1000 system includes the batteries listed below. When disposing of these batteries, KSU, and/or Unit, you must comply with applicable regulations relating to your location regarding proper disposal procedures.

Unit Name	Type of Battery	Quantity	Note
IP4[ ]-CPU-A1	Lithium	1	
External Battery (IP4WW-Battery Box)	Sealed Lead	2 per IP4WW-Battery Box	

The SL1000 IP4[ ]-CPU-A1 provides memory backup for approximately three years. The Lithium battery should be replaced every two years.

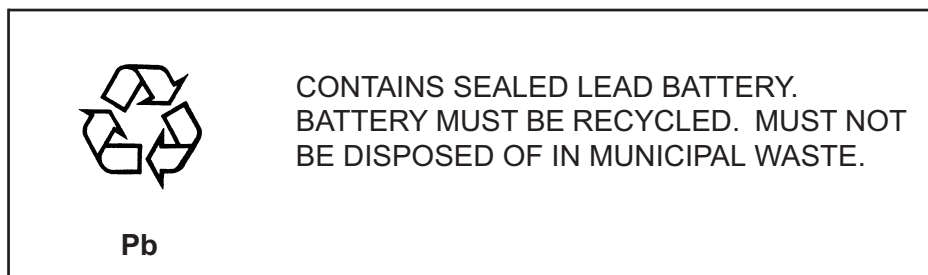
## IMPORTANT SAFEGUARDS FOR BATTERY DISPOSAL

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 an 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 SL1000 system contains the following labels regarding proper disposal.



## 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 Enterprise Solutions representative or the support desk of NEC Enterprise Solutions.

### Declaration of conformity

Hereby, NEC Enterprise Solutions, declares that the SL1000 is in compliance with the essential requirements and other relevant provisions of Directives 1999/5/EC, 2004/108/EC, 2006/95/EC, 2011/65/EU.

For the Declaration of Conformity, visit: <http://www.nec-enterprise.com/Support/Declaration-of-Conformity/>



### Electromagnetic Compatibility

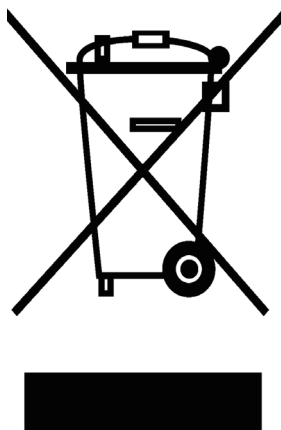
For the SL1000 system the following warning is applicable:

#### 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-enterprise.com/About-NEC/Environment/](http://www.nec-enterprise.com/About-NEC/Environment/) 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 SL1000 System Hardware Manual.

*MEMO*

# Introduction

## SECTION 1 GENERAL INFORMATION

Designed to support small/medium businesses with simple installation and easy operation. Small compact KSU comes with basic configuration of CPU, four analog trunk ports and eight hybrid extension ports and has three stackable slots for further expansion.

The system can be increased to a maximum of 48 analog trunks and 96 Multiline extensions by adding up three more expansion KSUs, also equipped to support Digital Network (BRI/PRI, E1), IP Trunks (SIP/H.323) and IP extensions.

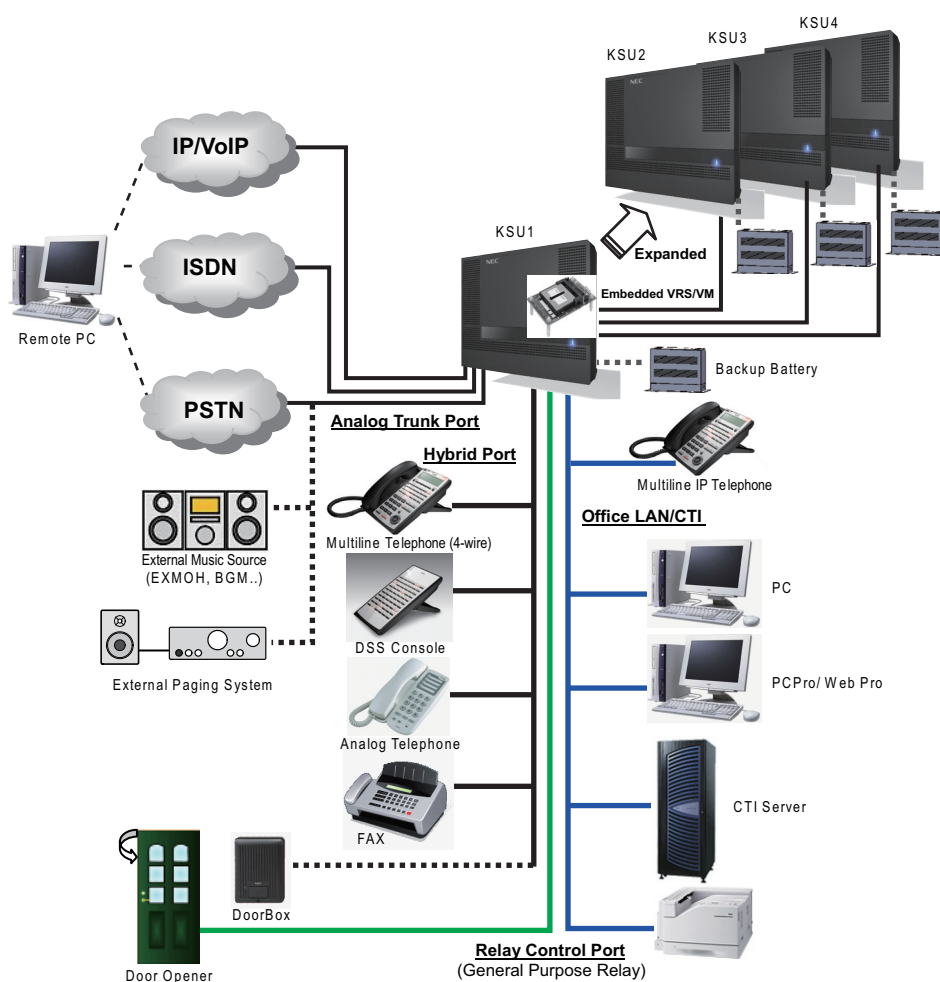


Figure 1-1 System Configuration

## SECTION 2 EQUIPMENT LIST

The following table lists all equipment for the SL1000 system.

Stock Number	Equipment Name	Equipment Description	Note
BE110231 1101010	IP4WW-1632M-A KSU w/o C	IP4WW-1632M-A KSU without AC Cable <Including> IP4WW-CPU-A1, IP4WW-408M-A1, Power Supply	
BE110232	IP4WW-1632M-A KSU	IP4WW-1632M-A KSU with AC Cable <Including> IP4WW-CPU-A1, IP4WW-408M-A1, Power Supply	
BE110235	IP4U-1632M-A KSU	IP4WW-1632M-A KSU with AC Cable (for China) <Including> IP4WW-CPU-A1, IP4WW-408M-A1, Power Supply	
BE110236 1101011	IP4WW-1632ME-A EXP w/o C	IP4WW-1632ME-A EXP without AC Cable <Including> IP4WW-EXIFE-C1, IP4WW-408M-A1, Power Supply	
BE110237	IP4WW-1632ME-A EXP	IP4WW-1632ME-A EXP with AC Cable <Including> IP4WW-EXIFE-C1, IP4WW-408M-A1, Power Supply	
BE110238	IP4U-1632ME-A EXP	IP4WW-1632ME-A EXP with AC Cable (for China) <Including> IP4WW-EXIFE-C1, IP4WW-408M-A1, Power Supply	
BE110258 1100110	IP4WW-EXIFB-C1	Expansion KSU Interface Unit, 3 jacks	
BE110239 1100114	IP4WW-Battery Box	External Battery Box without Batteries	
BE110250 1101031	IP4WW-408E-A1	4-port Loop Start Trunks and 8-port Hybrid Station In- terface	
BE110251 1101032	IP4WW-008E-A1	8-port Hybrid Station Interface	
BE110252	IP4WW-000E-A1	Extension board for 2BRIDB daughter board	
BE110257 1101033	IP4WW-2BRIDB-C1	2 Basic Rate Interface, mounted on 008E-A1/000E-A1 board	
BE110255 1100120	IP4WW-1PRIU-C1	1 Primary Rate Interface (PRI/E1/T1)	
BE110246 1101030	IP4WW-MEMDB-C1	Memory Expansion on CPU (for GE)	
BE110290 1100111	IP4WW-VOIPDB-C1	16-channel VOIP on CPU	(V1.2 Added)
BE106339 670103	PZ-VM21	16 Channels for Voice Mail with a Single Channel V.34 Modem	
BE107874	PZ-VM21 (for China)	16 Channels for Voice Mail with a Single Channel V.34 Modem	
BE110730	IP4WW-CFVRS-C1	Compact Flash for VRS (VRS: 4ch (default))	
BE110731 1100112	IP4WW-CFVMS-C1	Compact Flash for VRS and InMail ( Approx. 15 hours, VRS: 4ch (default)/InMail: 2ch (default))	
BE110732 1100113	IP4WW-CFVML-C1	Compact Flash for VRS and InMail ( Approx. 40 hours, VRS: 4ch (default)/InMail: 4ch (default))	
BE110261 1101060	IP4WW-12TXH-A-TEL (WH)	4-wire 12-key Multiline Telephone	
BE110262 1101061	IP4WW-12TXH-A-TEL (BK)		

Stock Number	Equipment Name	Equipment Description	Note
BE110263 1101062	IP4WW-24TXH-A-TEL (WH)	4-wire 24-key Multiline Telephone	
BE110264 1101063	IP4WW-24TXH-A-TEL (BK)		
BE110277 1100160	IP4WW-24TIXH-C-TEL (WH)	24-Keys, Multiline IP Telephone	(V1.2 Added)
BE110278 1100161	IP4WW-24TIXH-C-TEL (BK)		
BE111129	IP4U-24TIXH-C-TEL (WH)	24-Keys, Multiline IP Telephone	(V1.2 Added)
BE111130	IP4U-24TIXH-C-TEL (BK)		
BE110281 1101064	IP4WW-60D DSS-A CONSOLE (WH)	60-button Direct Station Selection (DSS) Console	
BE110282 1101065	IP4WW-60D DSS-A CONSOLE (BK)		
BE112179	ITX-1DE-1W(BK) TEL	Standard SIP Phone	(except for China) (V5.0 Added)
BE108045	DP-D-1D	Doorphone	
721160	DP-D-1A	Doorphone	
922450	DX4NA Doorphone	Doorphone	
BE109742	HS.D503DOR-A	Doorphone	
BE108057	AC-LE UNIT	AC/DC Adapter for 24TIXH TEL (w/o AC Cable)	(V1.2 Added)
BE110752 1100080	SL-IP-SIPTRK-1 LIC	SIP Trunk License (1 port)	(V1.2 Added)
BE111175	SL-IP-SIPEXT-1 LIC	Standard SIP Terminal License (1 port)	(V1.2 Added)
BE110753 1100081	SL-IP-ENCRYPTION LIC	Encryption License for Multiline IP Telephone (1 license per system)	(V1.2 Added)
BE110754 1101082	SL-IP-NAPT LIC	NAPT License for Multiline IP Telephone (1 license per system)	(V1.2 Added)
BE110755 1100083	SL-VM-CHANNEL-2 LIC	Additional InMail Channel License (2 ports)	(V1.2 Added)
BE113410	SL-SYS-ASPIRENET 1- LIC	AspireNet License (1 license per Channel)	(V4.0 Added)
BE110733 1100084	SL-VM-ADVANCE LIC	InMail Advanced Features License (1 license per system)	(V1.2 Added)
BE110756 1100085	SL-SYS-MOBILE-1 LIC	Additional Mobile Extension Port License (1 port)	(V1.2 Added)
BE110757 1100086	SL-SYS-HOTEL LIC	Hotel/Motel Feature License (1 license per system)	(V1.2 Added)
BE111312 1101088	SL-DT-DESKTOP SUITE-1 LIC	Desktop Client with Soft phone Client License (1 Client)	
1101035	IP4NA-KSU AC CABLE	AC Cable	
1101036	IP2BR-924M AC CABLE	AC Cable	
1101037	IP2AP-924M AC CABLE (L)	AC Cable	
1101038	IP2AP-924M AC CABLE	AC Cable	
BE110790 1100162	IP4WW-WALL MOUNT UNIT	Wall-Mount Unit for IP4WW-24TIXH-C-TEL	(V1.2 Added)

## 2.1 KSUs and Optional Unit

### 2.1.1 IP4[ ]-1632M-A KSU

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

- CPU with main software (CPU-A1)
- Power supply (110V/240V)
- 1 External backup battery connector
- 3 mounting spaces for 408E/008E/000E/1PRIU  
(3rd Slot of each KSU can not use for 4-Wire Multiline Telephone or DSS Console.)
- 4 trunks + 8 hybrid Ext. I/F (408M-A1)
- 1 power failure transfer circuit
- 1 slot for EXIFB-C1
- 2 general purpose relay
- SLT ringer
- Message waiting lamp driver
- One built-in answering circuit (VRS)



The on-board DSP provides:

- 20 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[ ]-1632ME-A EXP

A maximum of three additional 1632ME EXPs can be connected to expand the system capacity of the 1632M KSU. Although similar in shape and size as the 1632M KSU, the capabilities are not the same. The following are included with the 1632ME EXP:

- Power supply (110V/240V)
- 1 external backup battery connector
- 3 mounting spaces for 408E/008E/000E/1PRIU  
(3rd Slot of each KSU can not use for 4-Wire Multiline Telephone or DSS Console.)
- 4 trunks + 8 hybrid Ext. I/F
- 1 power failure transfer circuit
- EXIFE-C1 (1 connector for 1632M-A KSU)
- 2 general purpose relay
- SLT ringer
- Message waiting lamp driver



The EXIFE DSP provides:

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

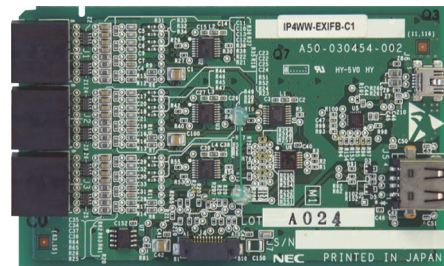
The 1632ME-A EXP does **NOT** have CPU and main software and cannot be used in a stand-alone mode.



### 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.
- Three connections for Expansion KSUs



### 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.

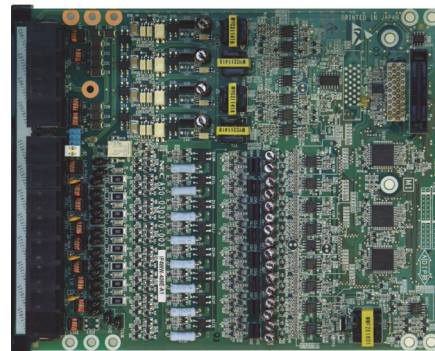


## 2.2 Trunk/Extension/ISDN Expansion Interface Cards

### 2.2.1 IP4WW-408E-A1

This 408E card is installed in the 1632M KSU or 1632ME EXP and provides a total of four analog trunk and eight hybrid extension ports.

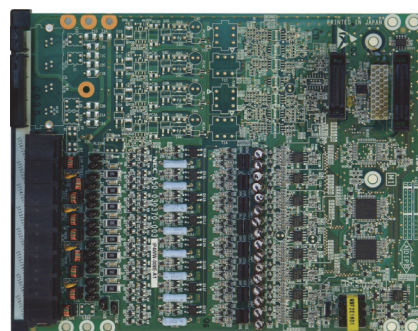
- Install this card to the expansion card slot at Main/Expansion KSU
- Enables to connect the DSS console to hybrid Ext. port No.8
- 1 power failure transfer circuit



### 2.2.2 IP4WW-008E-A1

This 008E card is installed in the 1632M KSU or 1632ME EXP and provides a total of eight hybrid extension ports. The ISDN BRI daughter board (2BRDB) can be mounted on this board.

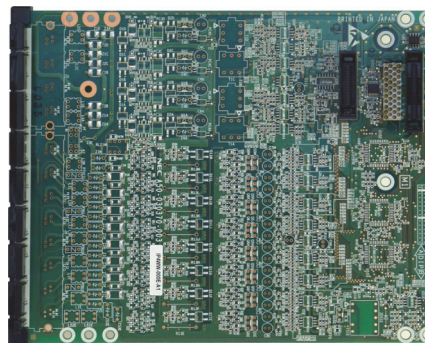
- Install this card to the expansion card slot at Main/Expansion KSU
- Enables to connect the DSS console to hybrid extension port No.8
- One ISDN BRI daughter board connection



### 2.2.3 IP4WW-000E-A1

This is an expansion card for mounting 2BRIDB board, and is installed into 1632M KSU/1632ME EXP.

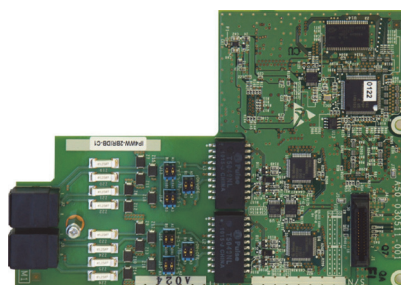
- Install this card to the expansion card slot at Main/Expansion KSU
- One ISDN BRI daughter board connection



### 2.2.4 IP4WW-2BRIDB-C1

The 2BRIDB provides two ISDN (Basic Rate) circuit and is mounted on the 008E or 000E card. A total of nine 2BRIDBs can be installed per system or three 2BRIDBs per KSU.

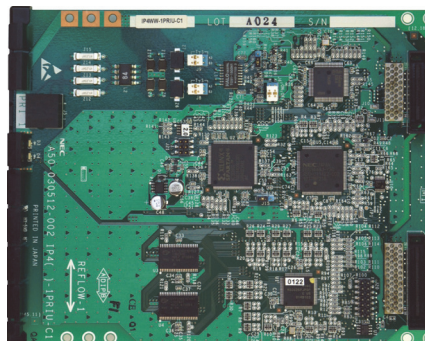
- Mount this board onto the 008E or 000E card.
- Supports T/S point connection (Hard-switch).
- All ISDN circuits are not supplied with DC power from the system.



### 2.2.5 IP4WW-1PRIU-C1

The 1PRIU is installed in the 1632M KSU or 1632ME EXP providing for either an ISDN Primary Rate Interface, T1 Interface or E1 interface. A total of three 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 IP4[ ]-MEMDB-C1

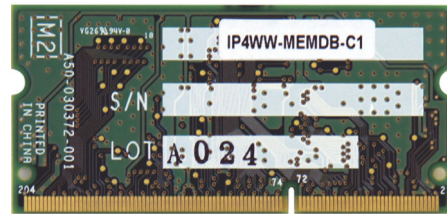
This card provides additional expansion memory. Following memories are equipped on this card.

**Table 1-1 Memory Capacity of MEMDB-C1**

Memory Type	Capacity
SDRAM	64 MB
Flash Memory	32 MB

The MEMDB is mounted on the CPU card and provides the SDRAM and Flash Memory required by the following:

- Expansion KSU(s)
- VoIP
- CTI
- Remote Upgrade (main software)
- VRS Channel Increment
- InMail Channel Increment

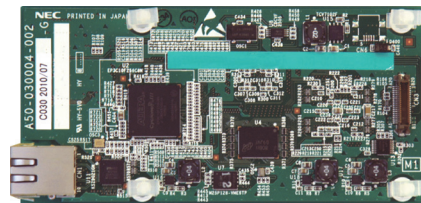


### 2.3.2 IP4WW-VOIPDB-C1

(This unit is for V1.2 or higher)

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

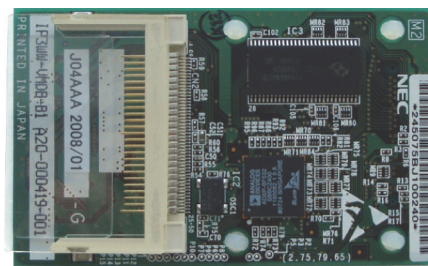
- Mount this card onto the CPU card (VoIPDB slot) at Main KSU.
- Max. 32 channels by license control. (V5.1 or higher)



### 2.3.3 PZ-VM21

The PZ-VM21 daughter board provides additional Voice Response and Voice Mail functionality using a Compact Flash (CF) interface and a single channel V.34 modem.

- Mount this card onto the CPU card (VMDB slot) at Main KSU.
- V.34 (33.6kbps) analog modem is initially mounted (for remote maintenance).
- VRS/VM CF card is separate preparation.



### 2.3.4 IP4WW-CFVRS-C1/IP4WW-CFVMS-C1/IP4WW-CFVML-C1

Three types of VRS/VM CF cards are available:

- Install into the PZ-VM21 mounted on the CPU card at Main KSU.
- CFVRS: 4-channel VRS
- 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-A TEL

The 12TXH-A TEL is a 4-wire multiline telephone featuring:

- Programmable keys: 12
- LCD: 16 digits x 2 lines
- Handsfree: Half-duplex
- Backlit dial pad: No
- Angle Adjustment: 2-steps
- Wall-Mounting kit: Built-in



### 2.4.2 IP4WW-24TXH-A TEL

The 24TXH-A TEL is a 4-wire multiline telephone featuring:

- Programmable keys: 24
- LCD: 16 digits x 2 lines
- Handsfree: Half-duplex
- Backlit dial pad: No
- Angle Adjustment: 2-steps
- Wall-Mounting kit: Built-in



### 2.4.3 IP4[ ]-24TIXH-C TEL

**(This terminal is for V1.2 or higher)**

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-A

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 extension port No. 8 at 408M/408E/008E 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 hybrid port number 6 or 7 on the 408M of each KSU.



#### 2.4.6 ITX-1DE-1W(BK) TEL (except for China) (V5.0 or higher)

ITX-1DE-1W(BK) TEL is a standard SIP Phone featuring;

- 8 Speed Dial keys and 11 Function keys
- Scroll UP/DOWN keys with SELECT & MENU/EXIT key
- Graphic LCM (132 x 32 dots)
- Handsfree: Full-duplex
- RJ45 10/100 Ethernet LAN port x 1
- Power over Ethernet (PoE): IEEE802.3af
- Narrowband Codec: G.711u/A, G.729A



## SECTION 3 SYSTEM CAPACITY

### 3.1 System Capacity

Table 1-2 System Capacity

Items		1 KSU (1632)	2 KSU (3264)	3 KSU (4896)	4 KSU (64128)	Note
Expansion Slot		3	6	9	12	*4th slot of each KSU can not be used for 4w Key Set. *4th KSU can not be used for COI, 2BRIDB and 1PRIU.
System Maximum Port		66	132	198	230	1KSU: 408M+PRI+408Ex2 2KSU: 408Mx2+PRIx2+408Ex4 3KSU: 408Mx3+PRIx3+408Ex6 4KSU: 408Mx4+PRIx3+408Ex6+008Ex3-400Mx1(4th KSU)
Trunk Port Max.		42	84	126	126	1KSU: 408M+PRIx1+408Ex2 2KSU: 408Mx2+PRIx2+408Ex4 3/4KSU: 408Mx3+PRIx3+408Ex6
Trunk Port	Analog Trunks (COT)	16	32	48	48	1KSU: 408M+408Ex3 2KSU: (408M+408Ex3) x2 3/4KSU: (408M+408Ex3)x3
	BRI	12	24	36	36	1KSU: 2BRlx3 on 008E/000E 2KSU: 2BRlx6 3/4KSU: 2BRlx9
	PRI (E1)	30	60	90	90	<b>Max. 1 PRI/KSU</b> <b>Max. 3 PRI/sys</b>
	IP Trunk (SIP/H.323)	16				When MEMDB is installed
		32 (V5.1 Added)				When MEMDB and SL-IP-CHANNEL-16 LIC are installed. (V5.1 Added)
	External Paging (Audio Out)	1	2	3	3	1 audio In/Out and 2 audio In circuits on 408M (COI port 2: Paging, 3: MOH, 4: BGM) Need the Program Setting. Alternative use with COT
	External MOH (Audio In)	1				
External BGM (Audio In)	1					
Station Port Max.		32	64	96	128	1KSU: 408M+408Ex3 2KSU: 408Mx2+408Ex6 3KSU: 408Mx3+408Ex9 4KSU: 408Mx4+408Ex12

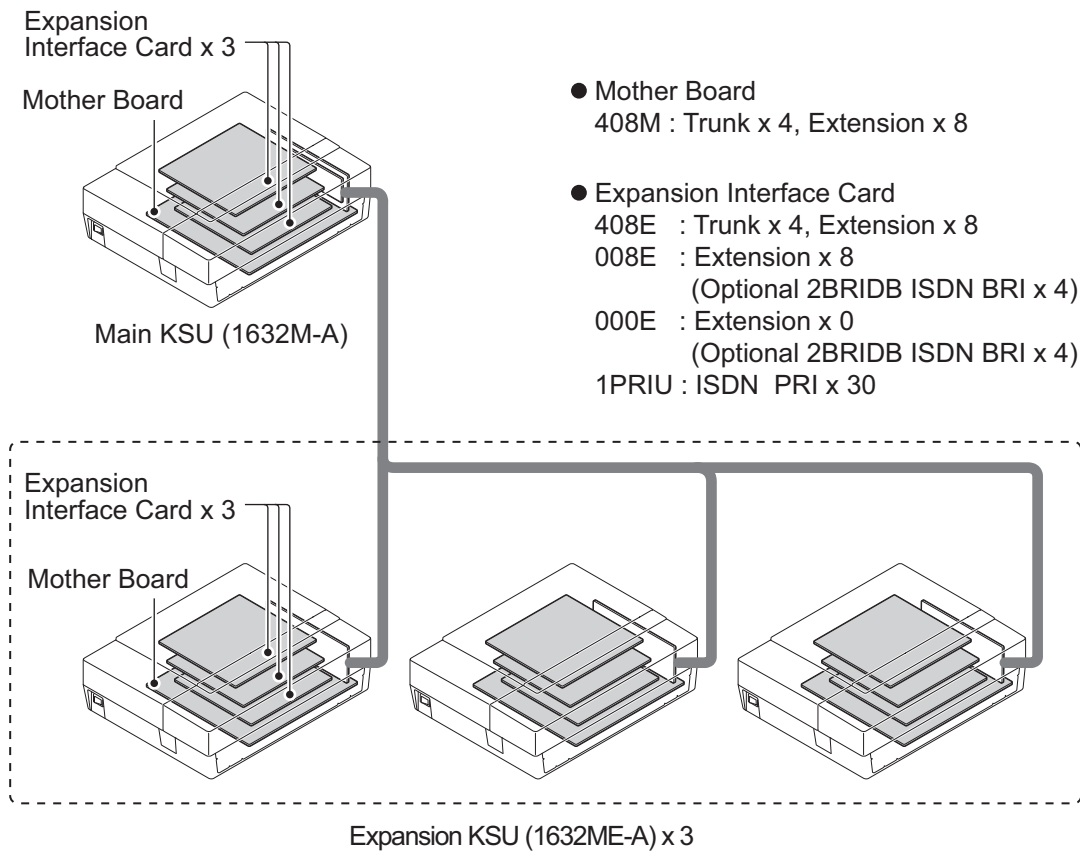
Items		1 KSU (1632)	2 KSU (3264)	3 KSU (4896)	4 KSU (64128)	Note
Station Port	4W Key Set	24	48	72	96	Max. 24/KSU
	SLT (-28V)	32	64	96	128	1KSU: 408M+408Ex3 2KSU: 408Mx2+408Ex6 3KSU: 408Mx3+408Ex9 4KSU: 408Mx4+408Ex12
	BRI (S-Point)	12	24	36	36	1KSU: 2BR1x3 on 008E/000E 2KSU: 2BR1x6 on 008E/000E 3KSU: 2BR1x9 on 008E/000E 4KSU: 2BR1x12 on 008E/000E
	4W DSS Console	3	6	9	12	Max. 3/KSU Connect to HBI Port 8 at 408M/408E/008E
	Doorphone	2	4	6	8	2DPH I/F on 408M (HBI port 6,7) Needs Program setting. Alternative use with SLT
	SIP-MLT/ SIP Std. terminal	16				When MEMDB is installed
		64 (V5.1 Added)				When MEMDB and SL-IP-CHANNEL-16 LIC are installed. (V5.1 Added)
	VRS Channels	4				CFVRS-C1
		Max. 16				When MEMDB is installed
	VM/VRS Channels	2 VM ports/ 4 VRS ports (default) (Total Max.8 w/o MEMDB or 16 w/ MEMDB)				CFVMS-C1 Port increased by license.
4 VM ports/ 4 VRS ports (default) (Total Max.8 w/o MEMDB or 16 w/ MEMDB)				CFVML-C1 Port increased by license.		
Virtual Extension	50					
Relay	2	4	6	8	2 circuits on 408M	
Power Failure Transfer	4	8	12	12	1PFT circuit on 408M and 408E (COI port 1 and HBI port 8) Needs HW switch change. Alternative use with SLT.	
Ethernet Port	1				1 circuit on CPU	
Built-In Answering Machine Channel	1				1 circuit on CPU	
VoIP Channels	16				When MEMDB is installed	
	32 (V5.1 Added)				When MEMDB and SL-IP-CHANNEL-16 LIC are installed. (V5.1 Added)	
V34 Modem	1				1 circuit on PZ-VM21	
Conference Circuits	32 (Max. 16 parties per Conference)				Mounted on CPU	
DSP Resource <sup>*1</sup>	20				For 1632M KSU (DSP on CPU)	
	16				When PZ-VM21 is installed	
	-	32	64	96	For 1632ME EXP 32ch DSP on each EX- IFE-C1	
DSP Sender <sup>*2</sup>	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)

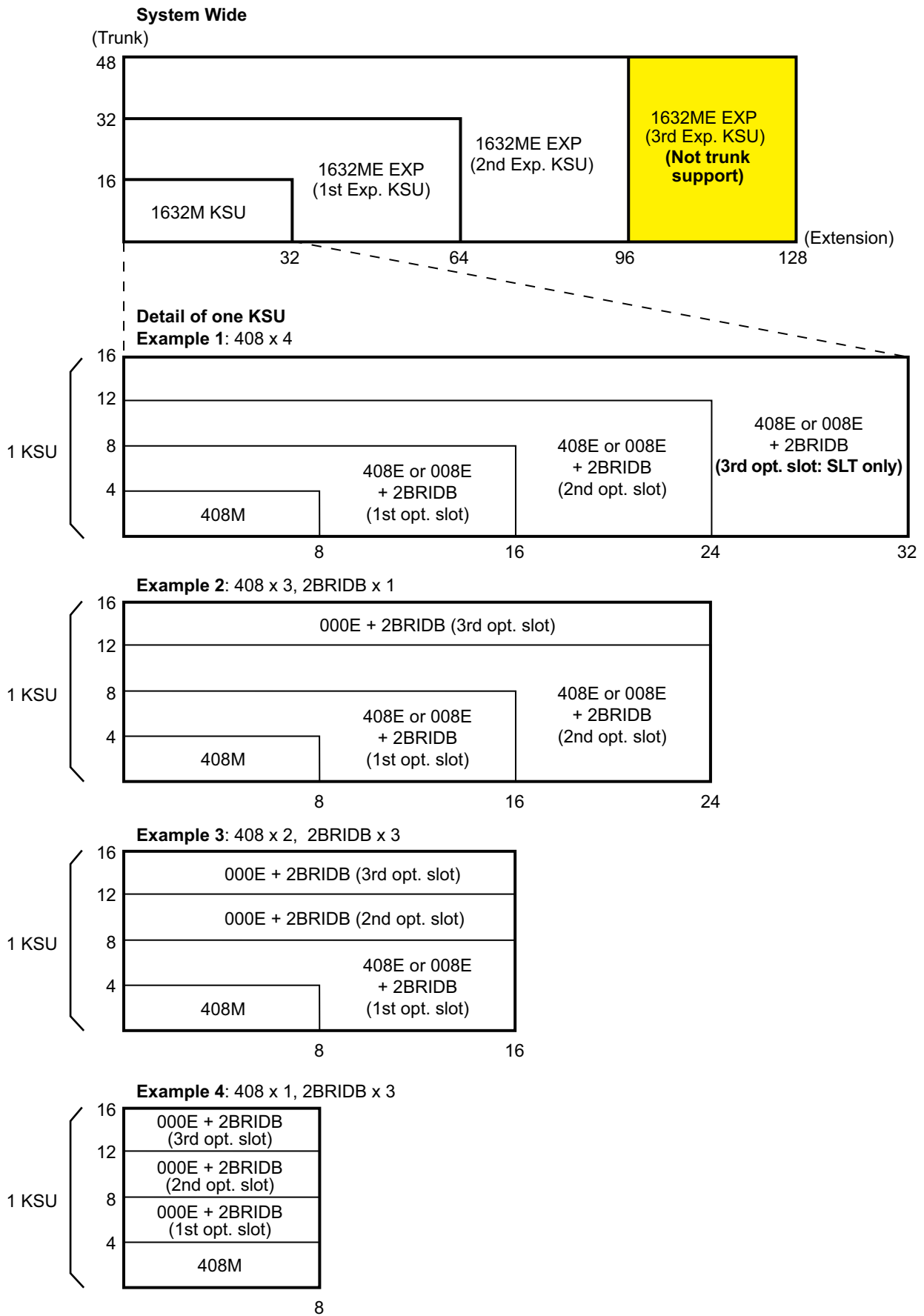


Figure 1-3 Maximum KSU Capacity - Expandability of Trunk and Extension (without PRI)

### 3.2.2 Expandability of Trunk and Extension (with PRI)

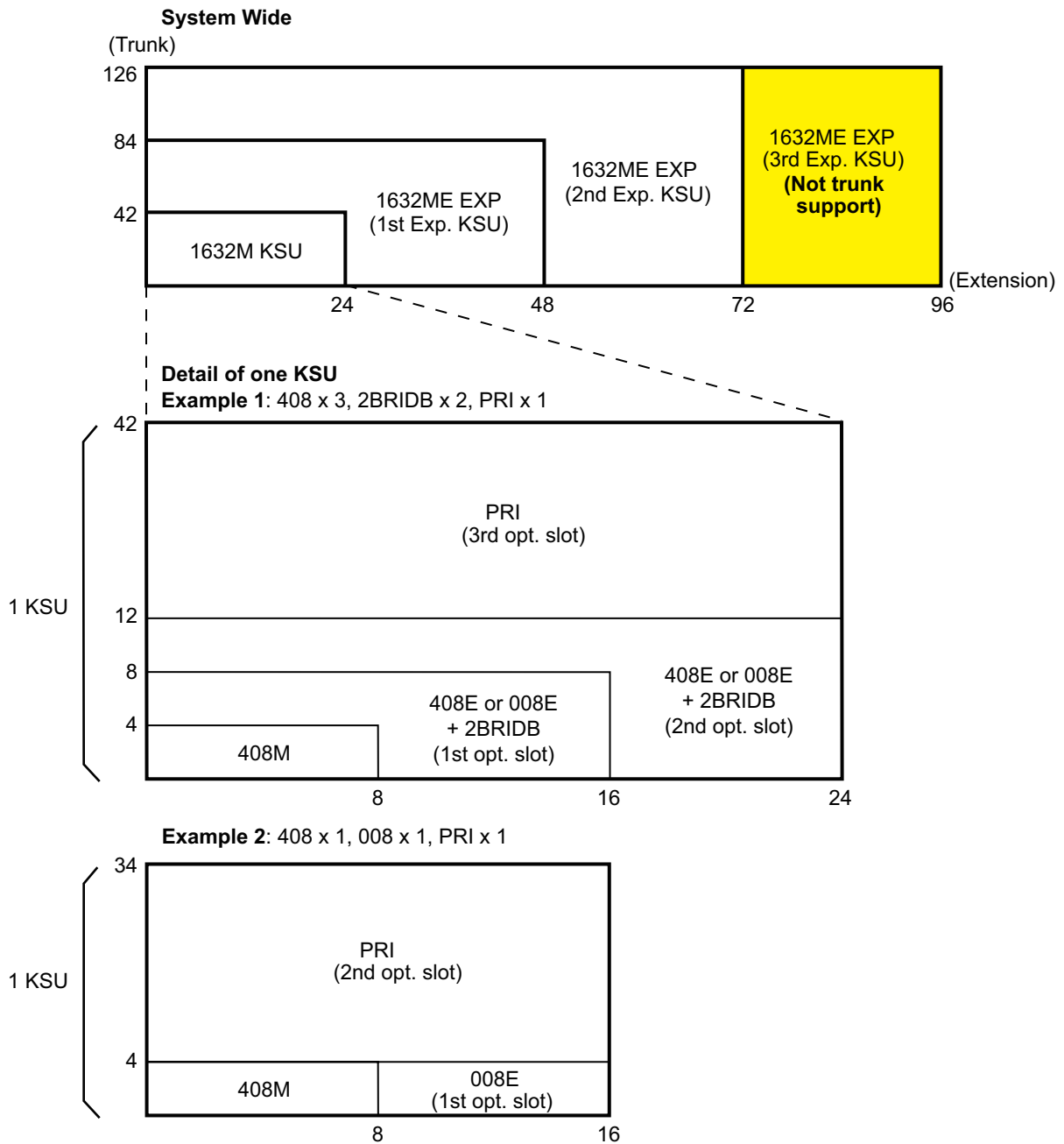


Figure 1-4 Maximum KSU Capacity - Expandability of Trunk and Extension (with PRI)

# Installation

## SECTION 1 INSTALLING THE MAIN & EXPANSION KSUs

### 1.1 Before Installing the KSU(s)

Please read following precautions carefully before installation. (V6.0 or higher)

#### 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 3 KSU, 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 2-6](#) and [INSTALLING THE EXTERNAL BACKUP BATTERY on page 2-20](#).

- 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.

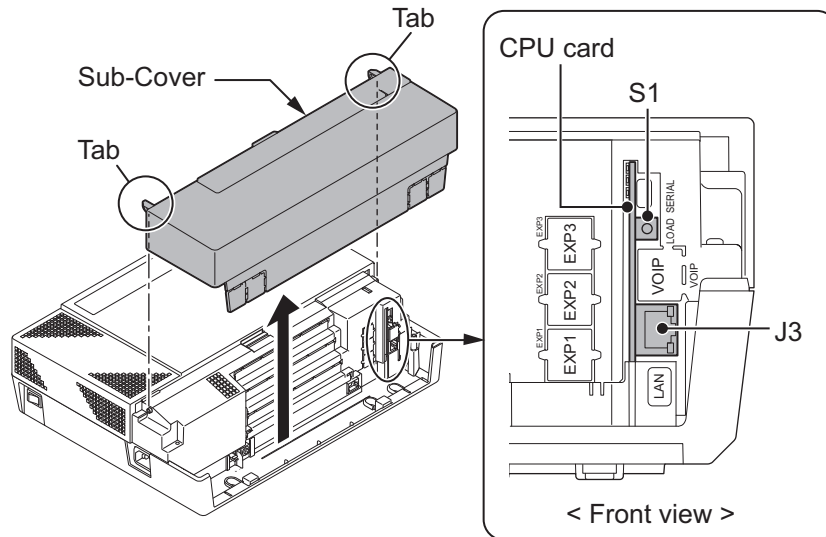
**Table 2-1 KSU Packing List**

Items	List of Contents	QTY
1632M-A KSU	1632M-A KSU	1
	AC Power Cord (AC Power Cord is not attached for IP4[ ]-1632M-A KSU w/o C type)	1
	Manual CD	1
	Screws (M4.1x25)	4
	Wall-Mounting Template	1
1632ME-A EXP	1632ME-A EXP	1
	AC Power Cord (AC Power Cord is not attached for IP4[ ]-1632ME-A EXP w/o C type)	1
	Screws (M4.1x25)	4
	Expansion Cable	1
	Wall-Mounting Template	1

## 1.2 Installing the Main KSU (1632M-A KSU)

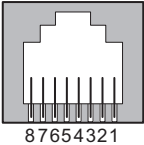
The Main KSU has a CPU-A card, four trunks and eight hybrid extension Interface with one power failure transfer circuit, and a control relay circuit for External devices. And three mounting space for optional card (408E-A1/008E-A1/000E-A1/1PRIU-C1) are available.

When the IP4[ ]-MEMDB-C1 is installed into the CPU card, 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**

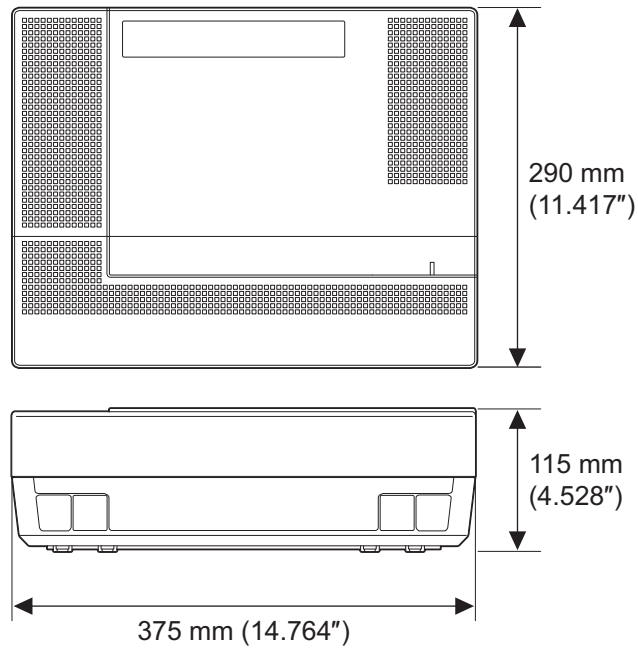
Item	Description	
<b>S1 (LOAD)</b>	Switch for System Restart/System Reset (Cold start occurs)/Upload Software	
<b>J3 (RJ45)</b> 	Ethernet Cable Connection (for SMDR (PC, Printer), PCPro or WebPro....etc)	
	Pin No.	Connection
	1	Tx+
	2	Tx-
	3	Rx+
	4	-
	5	-
	6	Rx-
	7	-
8	-	

For the detail of LED (D1 - D5), refer to [Figure 4-17 Inserting the CF Card on page 4-11](#) and [Table 4-2 CPU LED Indications on page 4-13](#).

### 1.3 Wall-Mounting the KSU(s)

#### 1.3.1 KSU Dimensions

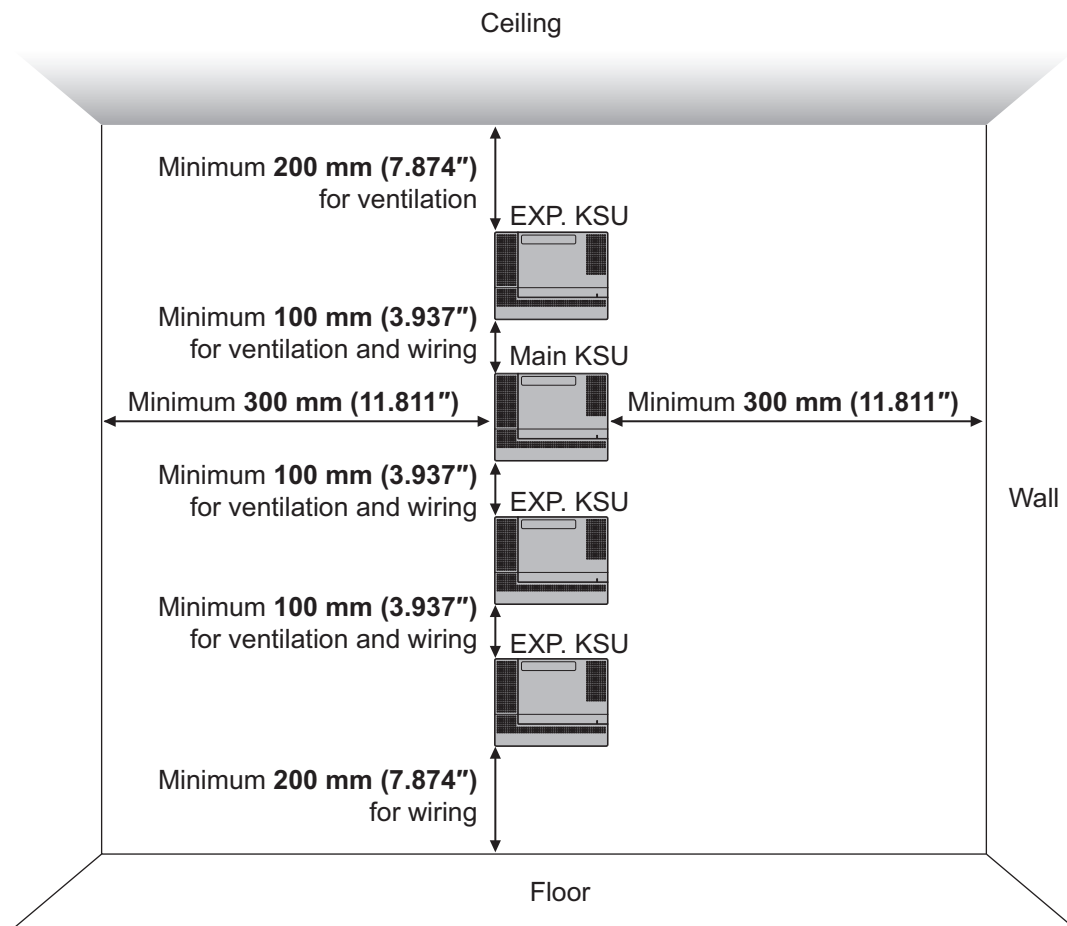
For Dimensions of the 1632M-A and 1632ME-A KSUs, refer to [Figure 2-2 Dimension of the Main and Expansion KSU on page 2-4](#).



**Figure 2-2 Dimension of the Main and Expansion KSU**

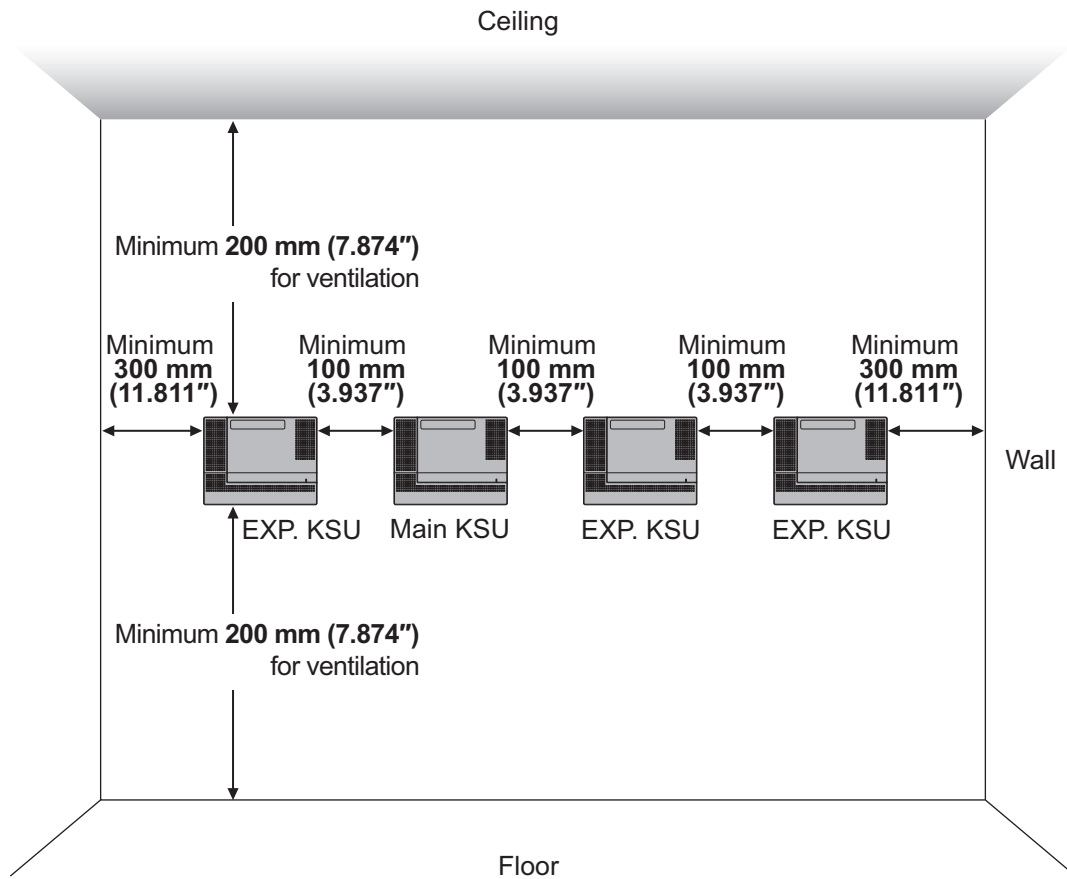
### 1.3.2 Wall Installation of KSU

The Main KSU (1632M-A) and Expansion KSU(s) (1632ME-A) 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 2-33](#) 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 page 2-6](#).



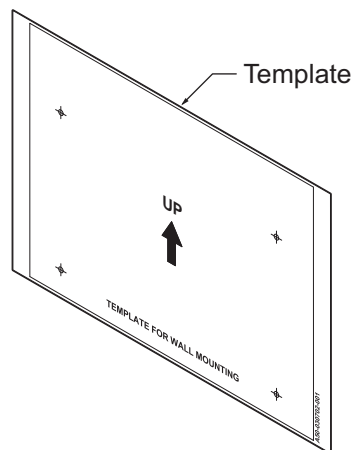
**Figure 2-4 Horizontal Arrangement of KSUs**

 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 page 2-6](#).

**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 2-33](#).

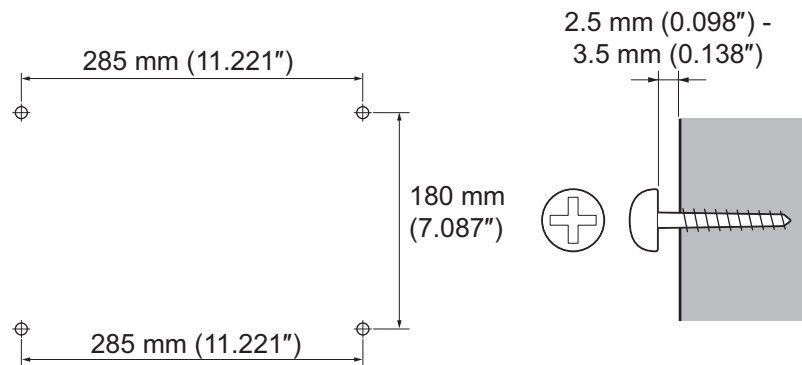
1. Place the attached template on the wall to mark the four screw positions.



**Figure 2-5 Wall-Mounting Template**

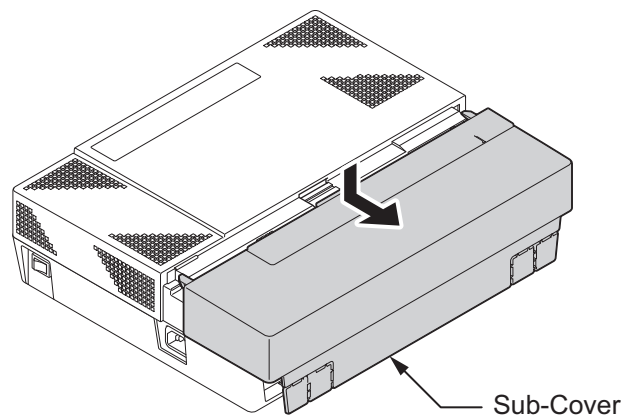


2. Install four screws into the wall. The screw heads must stand off from the wall about 2.5 mm (0.098") to 3.5 mm (0.138").



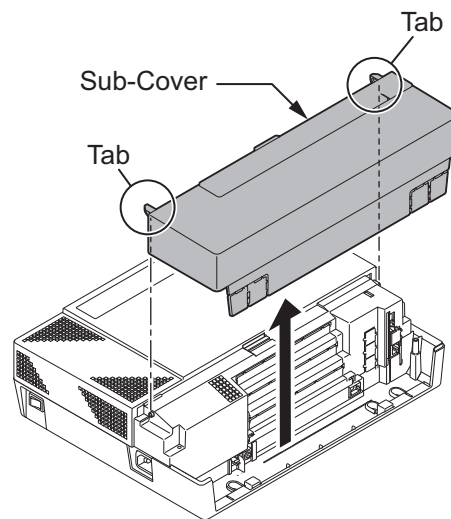
**Figure 2-6 Screw Positions**

- 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.



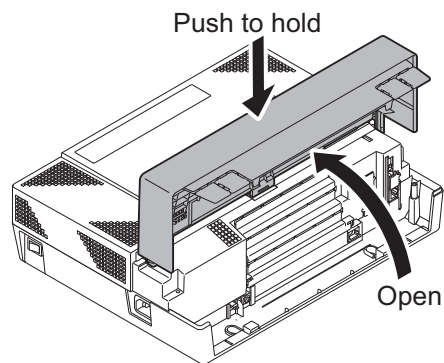
**Figure 2-7 Sub-Cover Slide-out**

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



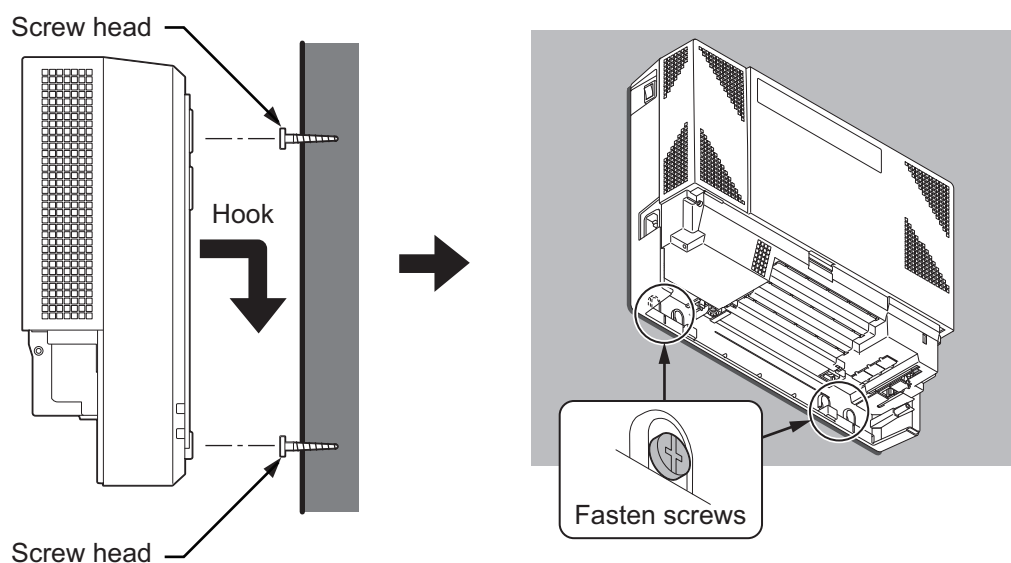
**Figure 2-8 Removing the Sub-Cover**

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



**Figure 2-9 Sub-Cover Open Position**

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



**Figure 2-10 Mounting the KSU**

- 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 and the MEMDB-C1 card must be installed in the Main **KSU (1632M-A)** . (Refer to [Installing the Expansion Memory Card \(MEMDB-C1\) on page 2-60](#) for MEMDB-C1 card)

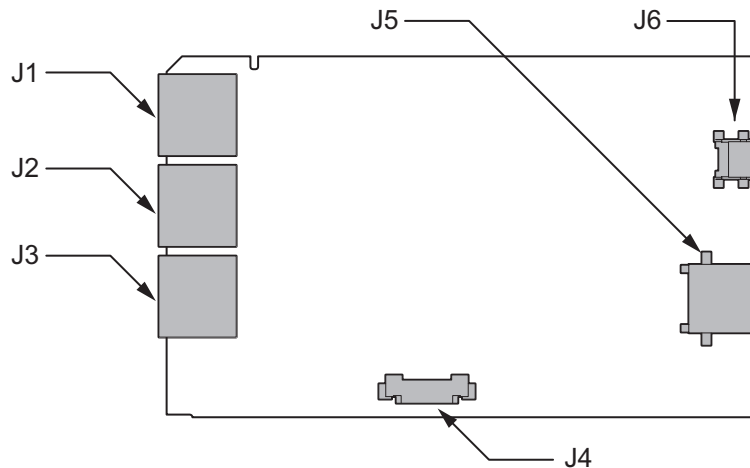
### 1.4.2 Unpacking (EXIFB-C1)

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	Expansion KSU 3
J2	Expansion Connector	Expansion KSU 2
J3	Expansion Connector	Expansion KSU 1
J4	Mother PCB	J1 connector on 408M-A1
J5, J6	Debug Purpose (Not used)	-

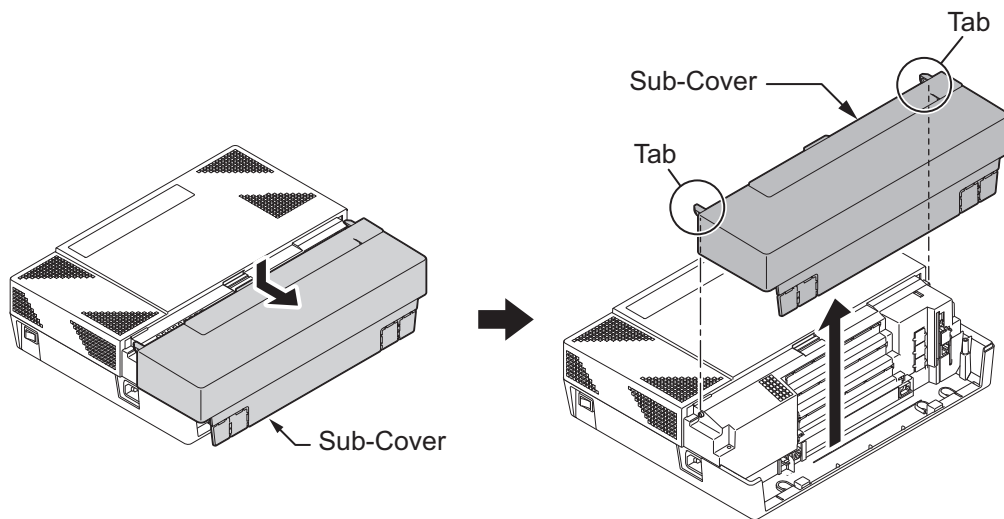
### 1.4.4 Installing the EXIFB-C1 PCB



***Do Not Power on until all installations have been completed.***

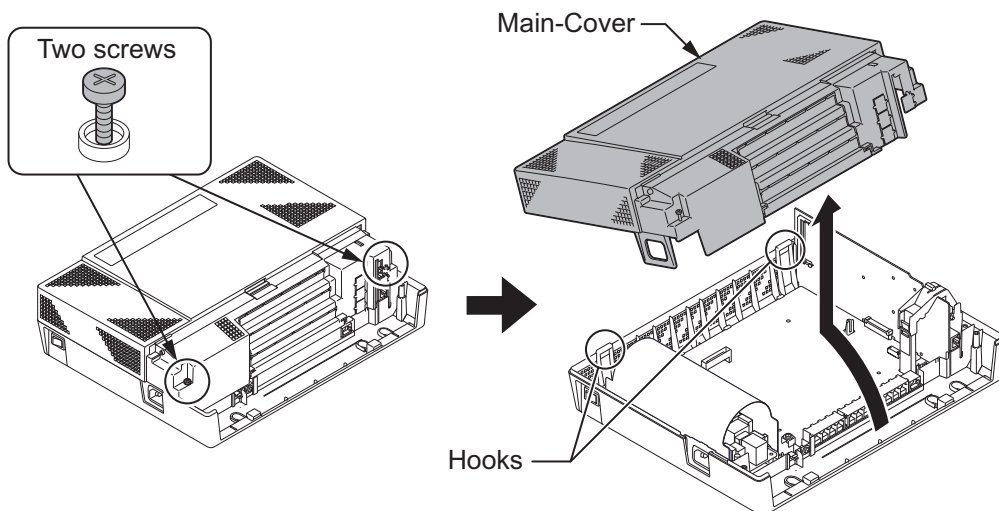
1. Turn off the system power and disconnect the AC cord from KSU.

2. Open and pull out the Sub-Cover of the Main KSU.



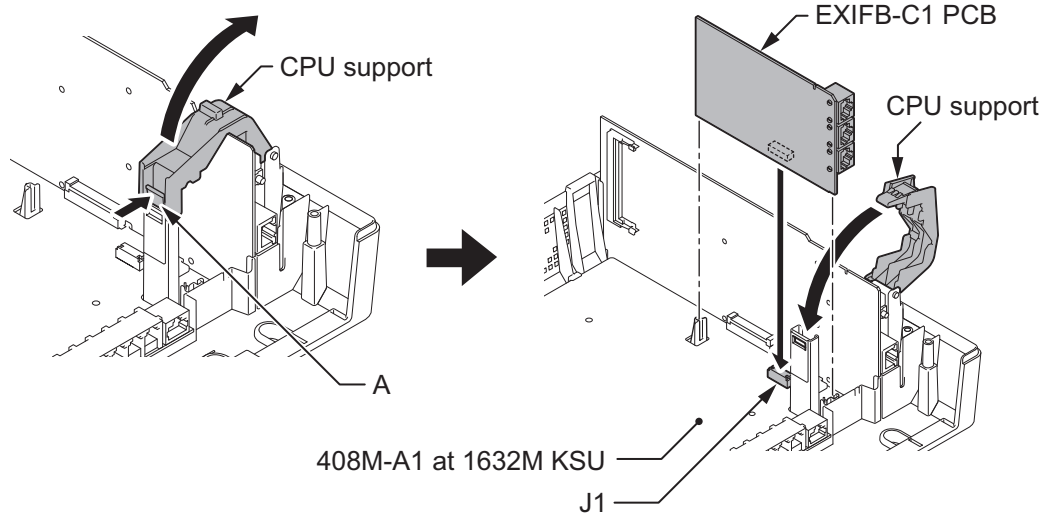
**Figure 2-12 Removing the Sub-Cover**

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



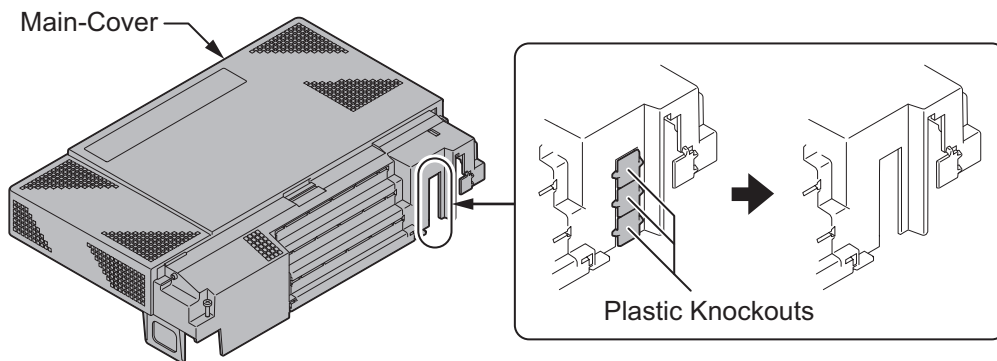
**Figure 2-13 Removing the Main-Cover**

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



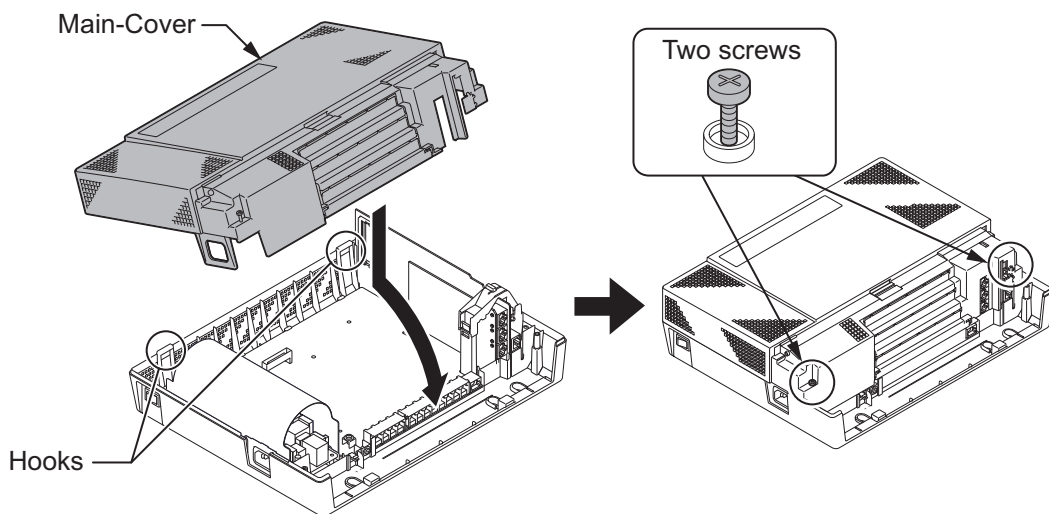
**Figure 2-14 EXIFB-C1 PCB Installation**

5. Insert the EXIFB-C1 PCB into the J1 connector on the 408M-A1 at 1632M-A 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 (1632M-A) and Expansion KSU (1632ME-A) using the cables attached to the Expansion KSU.

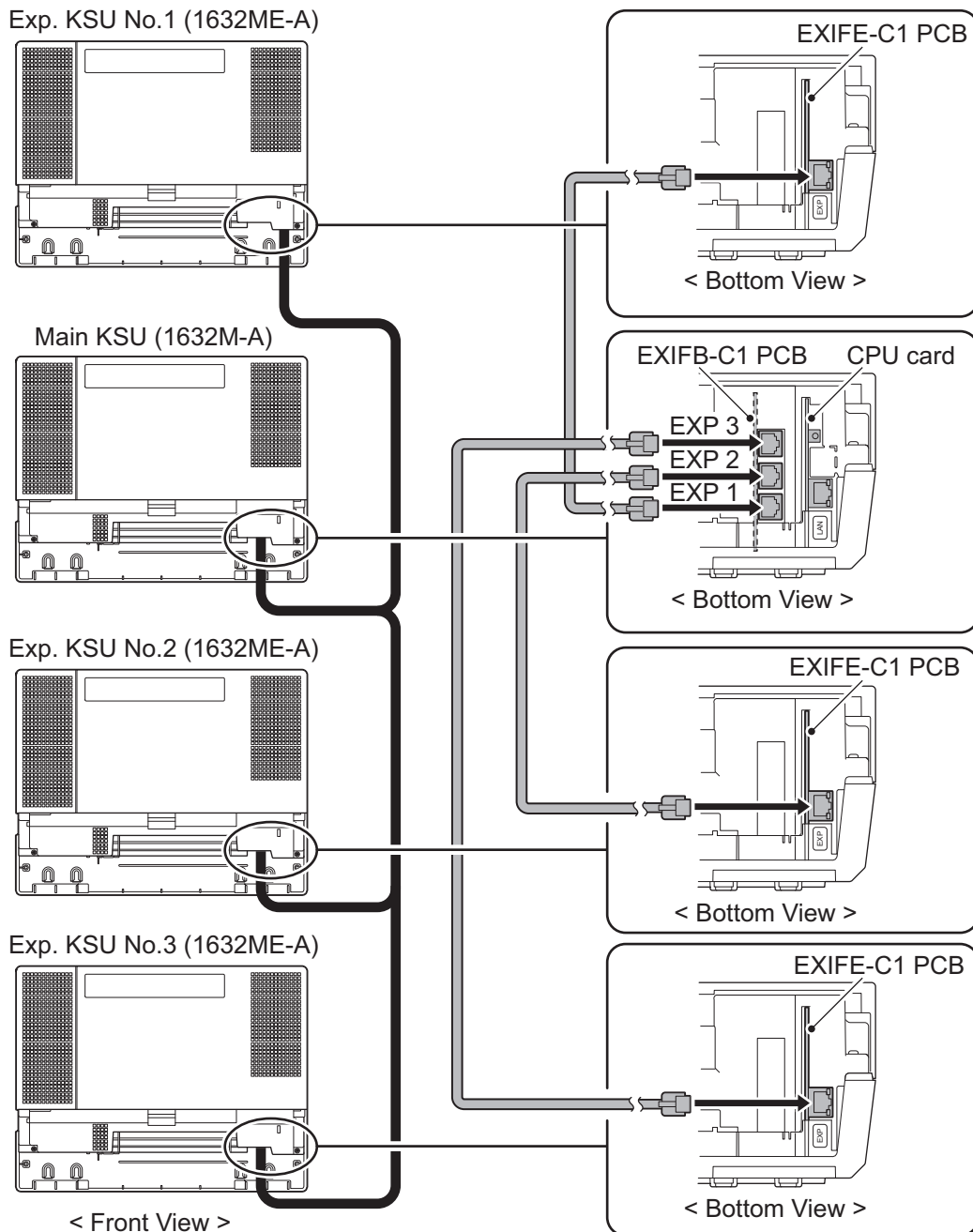


Figure 2-17 Connection of KSUs



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

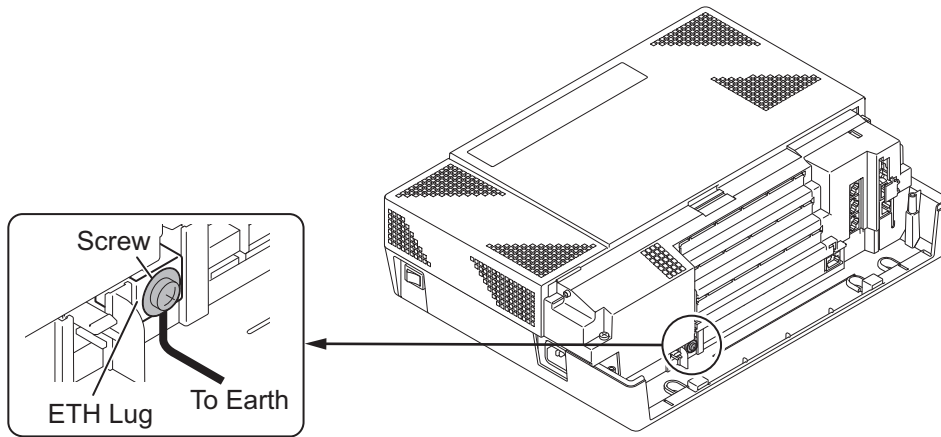
## 1.5 Grounding and AC Cabling

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 2-18 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**

	110 VAC	220 VAC	230 VAC	240 VAC
<b>Power Requirements</b>	110 VAC@15 A	220 VAC@15 A	230 VAC@15 A	240 VAC@15 A
<b>Power Consumption</b>	Main KSU = 144 VA 4 KSU Total = 576 VA	Main KSU = 172 VA 4 KSU Total = 688 VA	Main KSU = 175 VA 4 KSU Total = 700 VA	Main KSU = 175 VA 4 KSU Total = 700 VA
<b>Input Voltage (Rated Voltage)</b>	90 VAC to 264 VAC (100VAC/120VAC/220VAC/230VAC/240VAC)			
<b>Frequency</b>	47 Hz - 63 Hz (Rated Frequency:50/60 Hz)			
<b>Phase and Wire</b>	Single Phase, 2 Line + PE Type			
<b>Grounding Requirement</b>	No.14 AWG Copper Wire			

	110 VAC	220 VAC	230 VAC	240 VAC
Feeding Voltage	SLT: 20 mA/-27 V			
AC Input I	Main KSU = 1.31 A 4 KSU Total = 5.24 A	Main KSU = 0.78 A 4 KSU Total = 3.12 A	Main KSU = 0.76 A 4 KSU Total = 3.04 A	Main KSU = 0.73 A 4 KSU Total = 2.92 A
KWh	Main KSU = 0.144 KWh 4 KSU Total = 0.576 KWh	Main KSU = 0.172 KWh 4 KSU Total = 0.688 KWh	Main KSU = 0.175 KWh 4 KSU Total = 0.700 KWh	Main KSU = 0.175 KWh 4 KSU Total = 0.700 KWh
BTU (KWhx3413)	Main KSU = 491 BTU 4 KSU Total = 1964 BTU	Main KSU = 587 BTU 4 KSU Total = 2348 BTU	Main KSU = 597 BTU 4 KSU Total = 2388 BTU	Main KSU = 597 BTU 4 KSU Total = 2388 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.

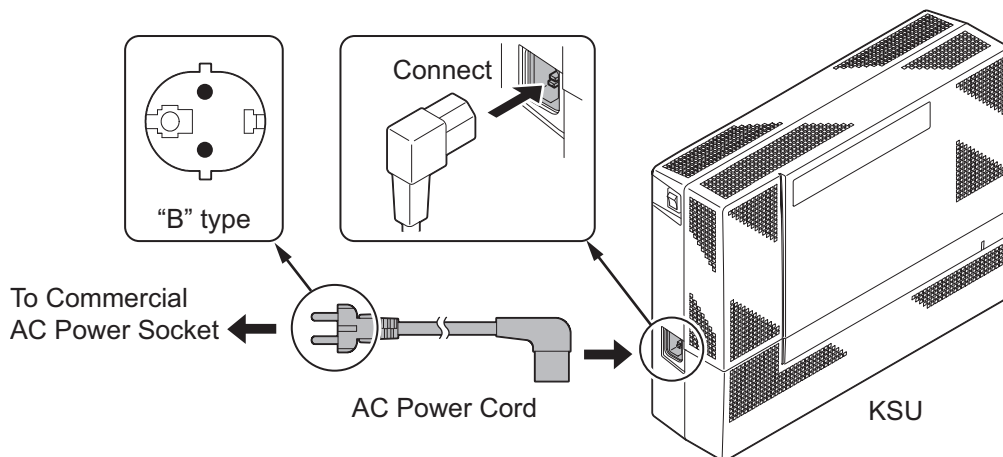


***Do not plug-in AC power cord if the KSU Cover is removed.***



***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 2-19 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 RJ11 modular jacks for analog trunk and extension connections.



### 1.6.2 Precautions for Cabling

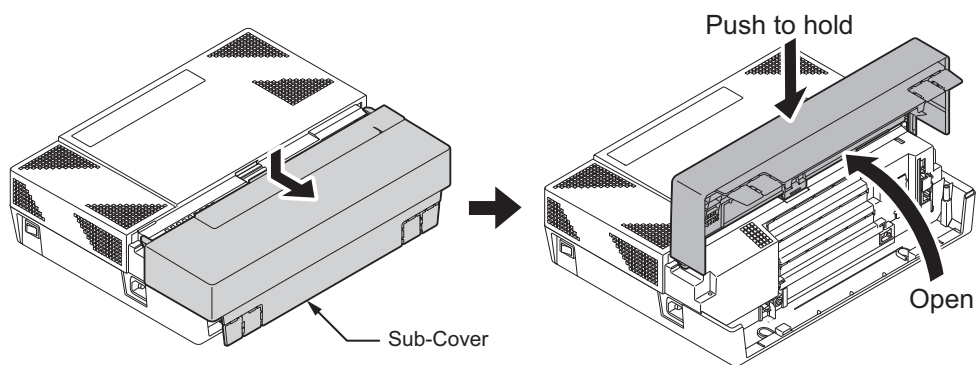
- Do not wire the cable with an AC cable, computer, etc.
- Do not run the cable near a high frequency generating device.
- Use cable protectors in case the cables are run on the floor.
- Aerial distribution wiring is not allowed.
- Trunks must be installed with lightning protectors.
- Do not install the Topaz Terminal in the SL1000 system, it does not work properly.

### 1.6.3 Trunk Cabling



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

1. Open the Sub-Cover.



**Figure 2-20 Sub-Cover Open and Hold**

2. Insert the modular plugs of the trunk line cords into the analog trunk modular jacks on the system.

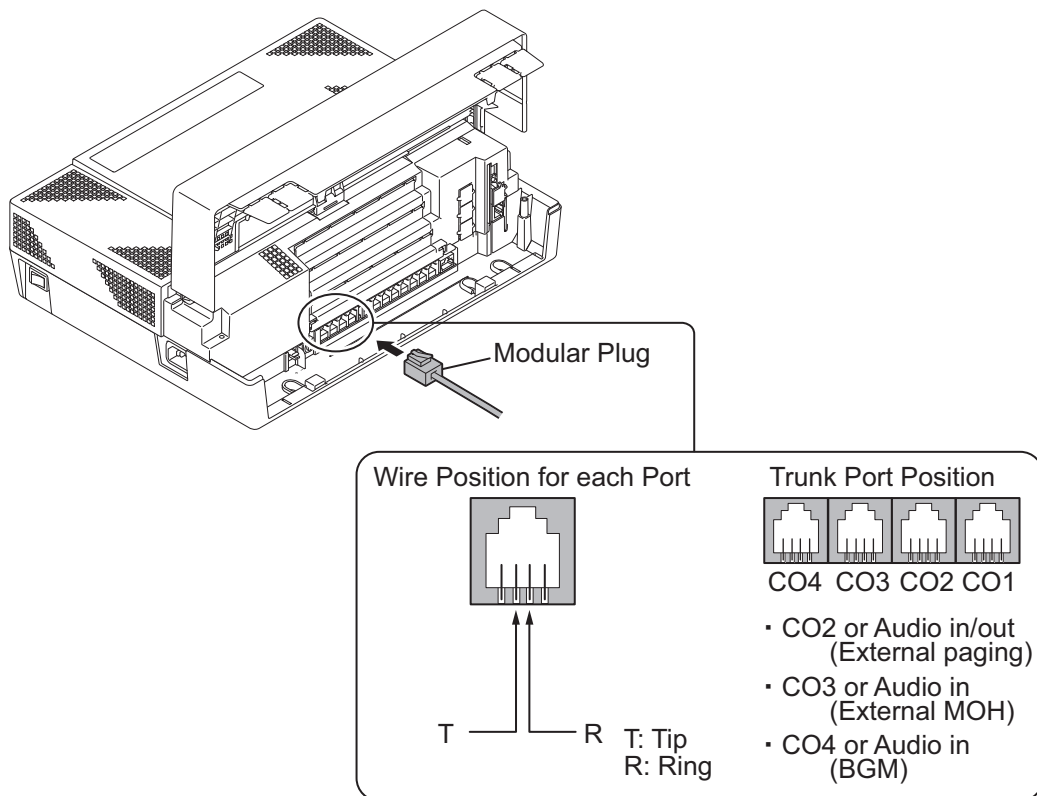


Figure 2-21 Trunk Cabling



***The lightning protectors MUST BE INSTALLED on a trunk.***



- Unused CO port (CO2 to CO4) can be used for Audio port (External paging, External MOH or BGM).
- The program setting must be required when using Audio port instead of Trunk port in the system.
- The External Paging can be set for 408M-A1 PCB at each KSU.
- The External MOH and BGM can be set only one port for each External source in the system.
- Using a single port, Trunk port and Audio port can not be used at the same time.
- Doorphone box can not be used on the Trunk port.

#### 1.6.4 Extension Cabling



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



***Topaz Terminal does not work properly when it connected.***

1. Open the Sub-Cover.

- Insert the modular plugs of the extension line cords (2-wire/4-wire) into the extension modular jacks on the KSU.

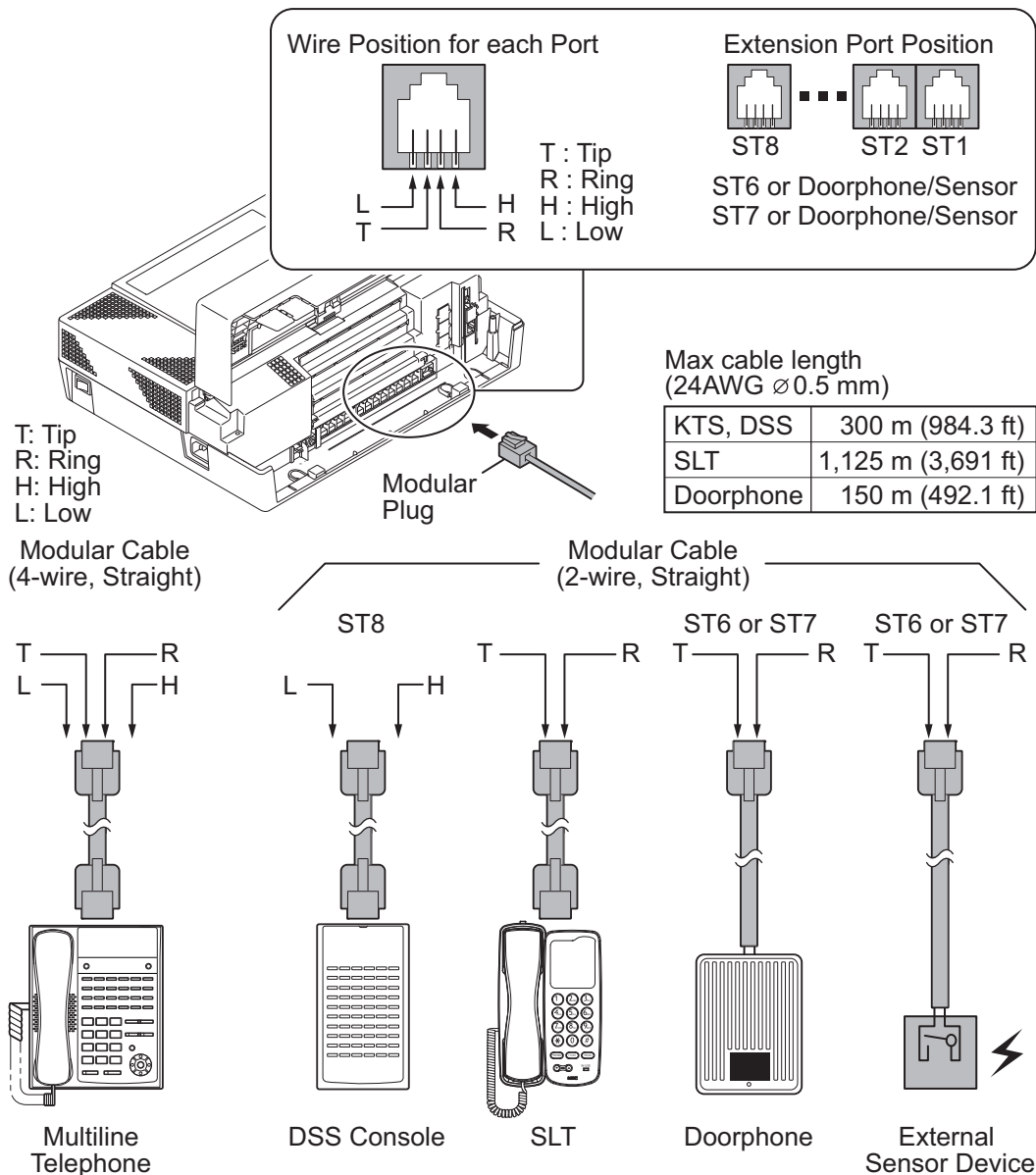


Figure 2-22 Extension Cabling

**!** *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 or connect another type of the terminal to this port.*

- ✍** *DSS Console must be connected to the LAST PORT.*
- Doorphone/External Sensor Device must be connected to the No. 6 or 7 PORT of each 408M-A1.*
- The program setting is required when connecting a Doorphone/External Sensor Device.*

## 1.6.5 Power Failure Transfer

### 1.6.5.1 General

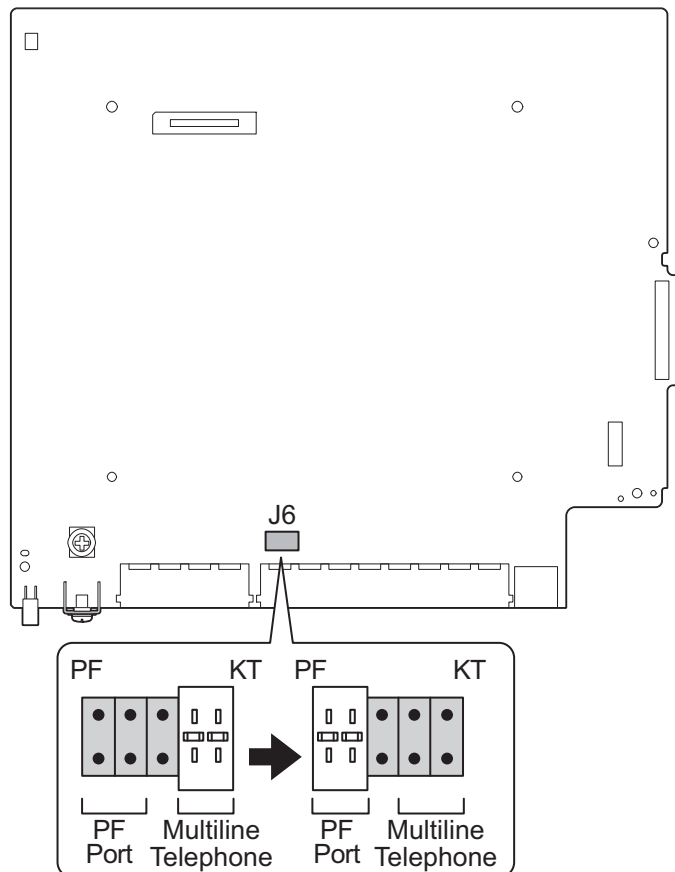
In the event of AC power failure, the specified trunks are directly connected to the specified extension ports as below. And SLT must be connected to the specified extension. The multiline telephone (4W) does not work when connected to the specified extension port.

Trunk Port No. 1 → Extension Port No. 8

- ✎ • The connected extension must be SLT (Single Line Telephone).
- Hardware switch (J6) must be set from "KT" to "PF" side (default: KT) when use the Power failure transfer circuit.
- Refer to [Power Failure Transfer on page 2-58](#) for Power Failure Transfer of 408E-A1.

### 1.6.5.2 Power Failure Setting

1. Use Needle-nose pliers to change the switch position of "J6" from **"KT" to "PF"** as below. (Default: KT)

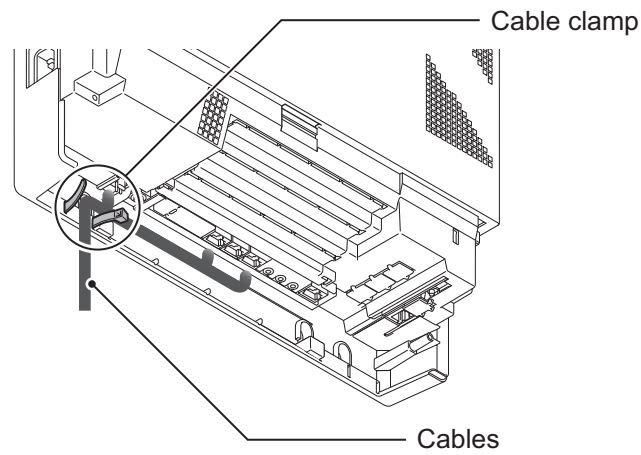


**Figure 2-23 PF/KT Switch of 408M-A1**

2. Connect a SLT to the extension port No. 8.

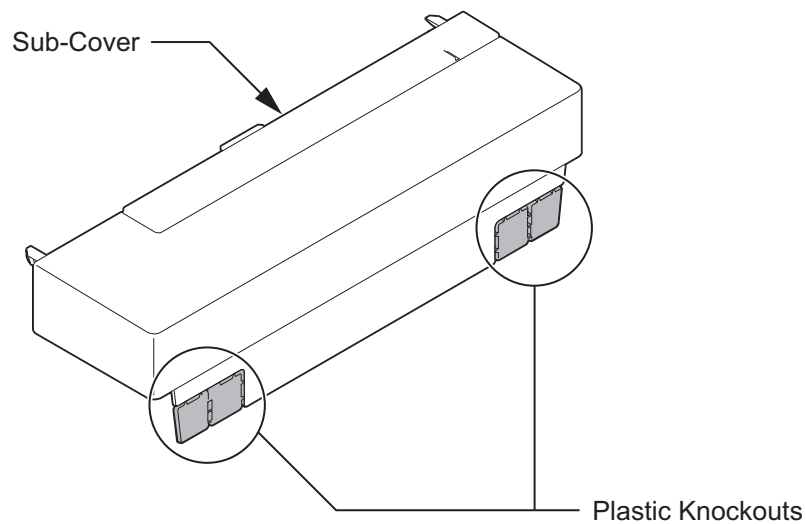
### 1.6.6 Cable Routing and Clamping

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



**Figure 2-24 Cabling**

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




**Figure 2-25 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 SL1000 system.***

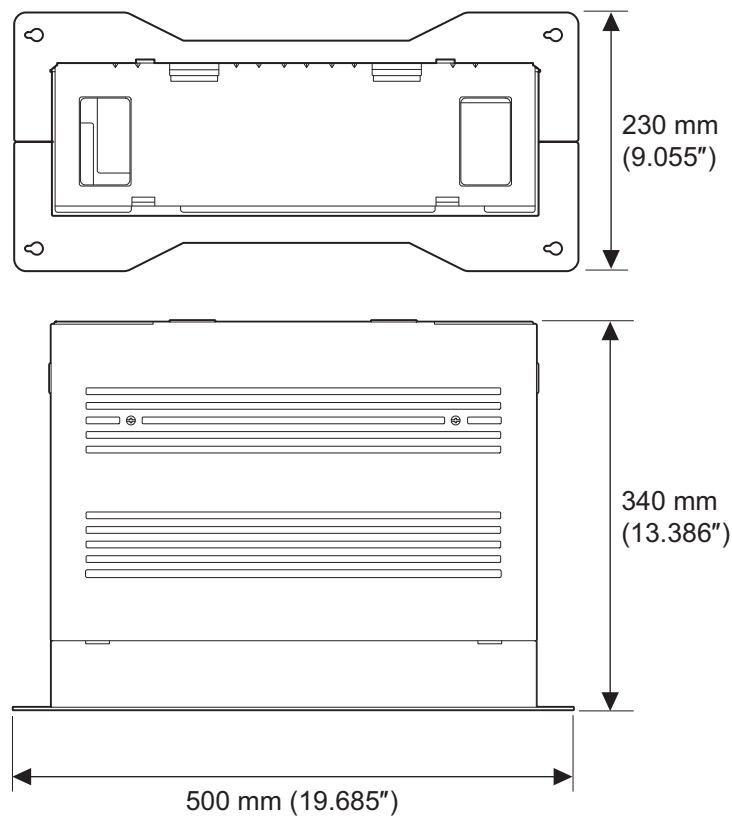
### 2.2 Unpacking

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

**Table 2-6 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	10
	M3 x 6 with Washer	1
	Screws: M4.1 x 16	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 2-26 Dimension of the IP4WW-Battery Box**

## 2.4 Battery Specifications

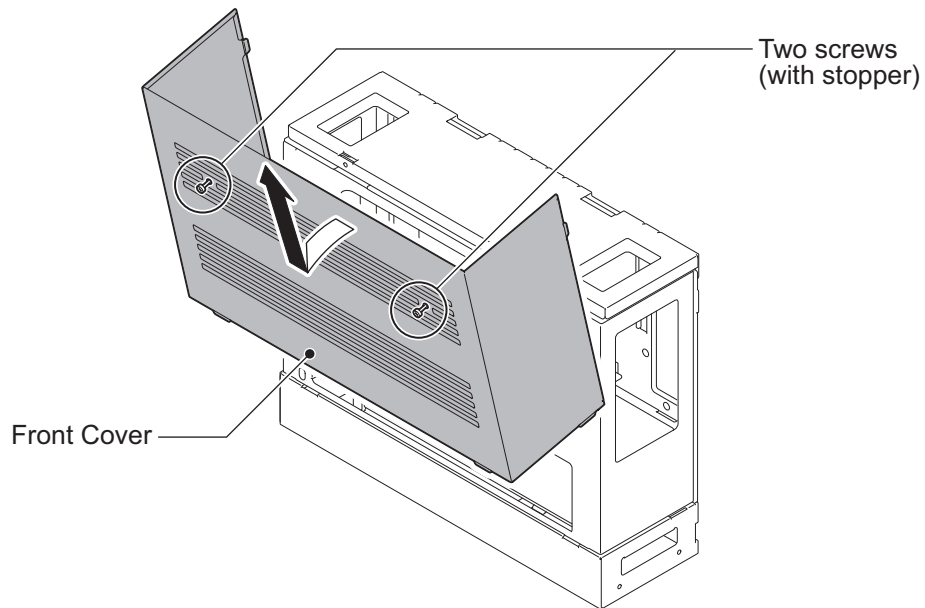
**Table 2-7 Battery Specifications**

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

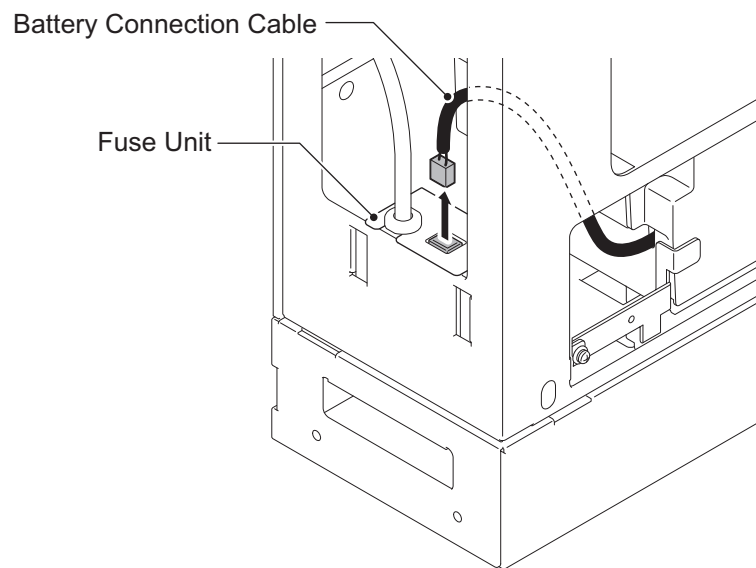
Before floor-mounting or wall-mounting the IP4WW-Battery Box, the batteries must be installed into the IP4WW-Battery Box.

1. Loosen two screws and remove the Front Cover.



**Figure 2-27 Removing the Front Cover**

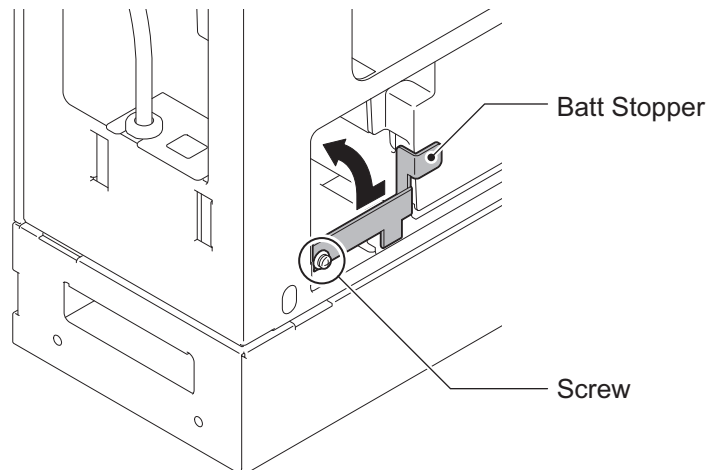
2. Disconnect the Battery Connection Cable from the Fuse Unit if the cable is plugged already.



**Figure 2-28 Disconnect Battery Connection Cable**

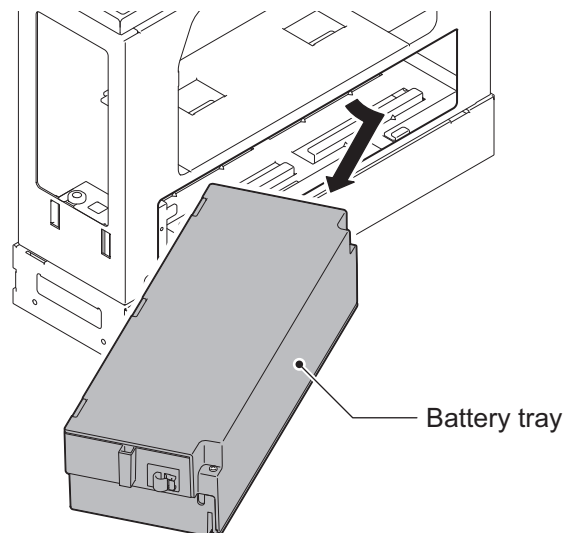


3. Loosen the screw and lift the Batt Stopper.



**Figure 2-29 Batt Stopper**

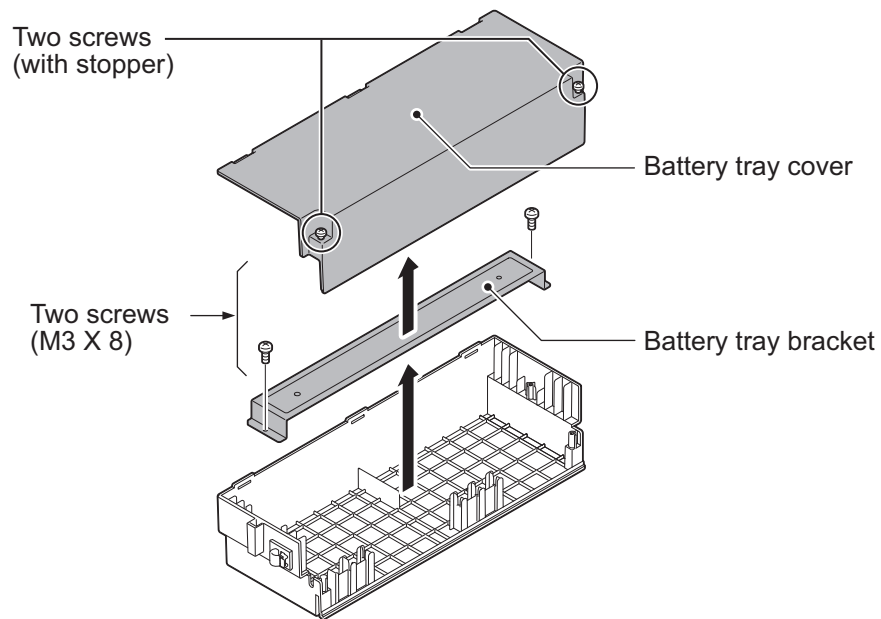
4. Pull out the Battery tray.



**Figure 2-30 Pulling out the Battery Tray**

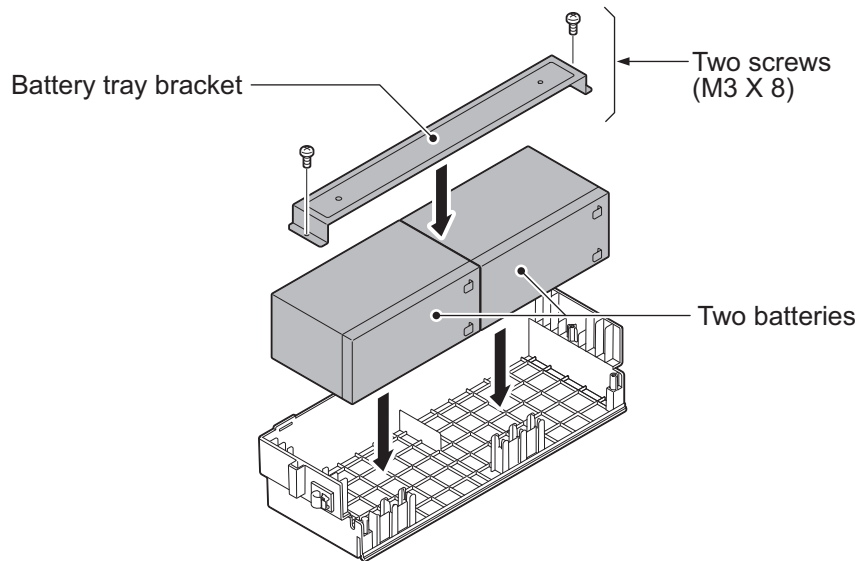
5. Loosen two screws and remove the Battery tray cover.

6. Remove two screws and remove the Battery tray bracket.



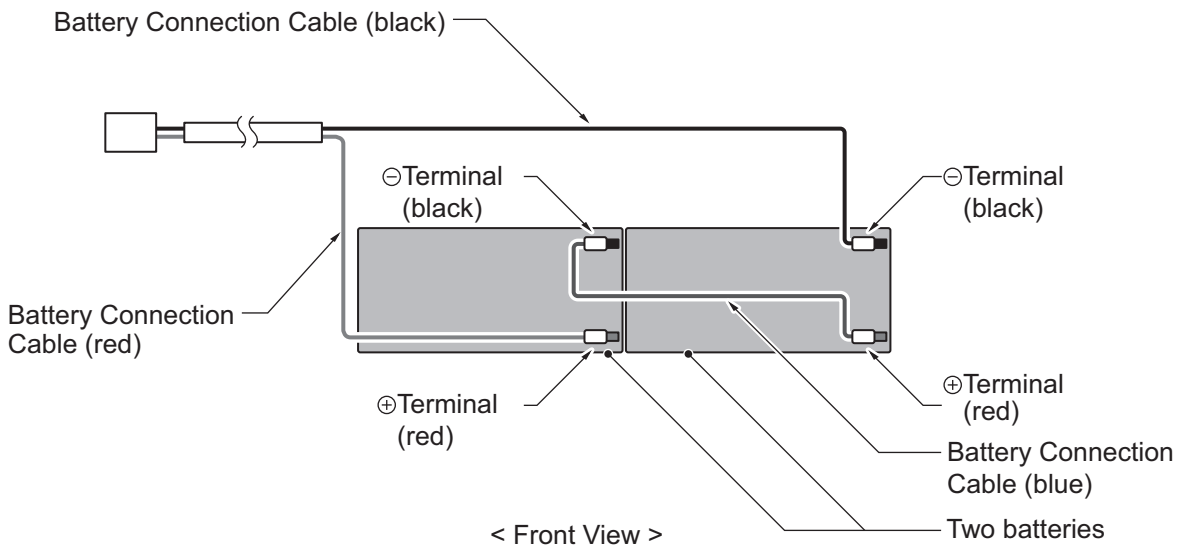
**Figure 2-31 Remove the Battery Tray Bracket**

7. Install two batteries into the Battery tray.



**Figure 2-32 Battery Installation**

8. Connect the battery cables.



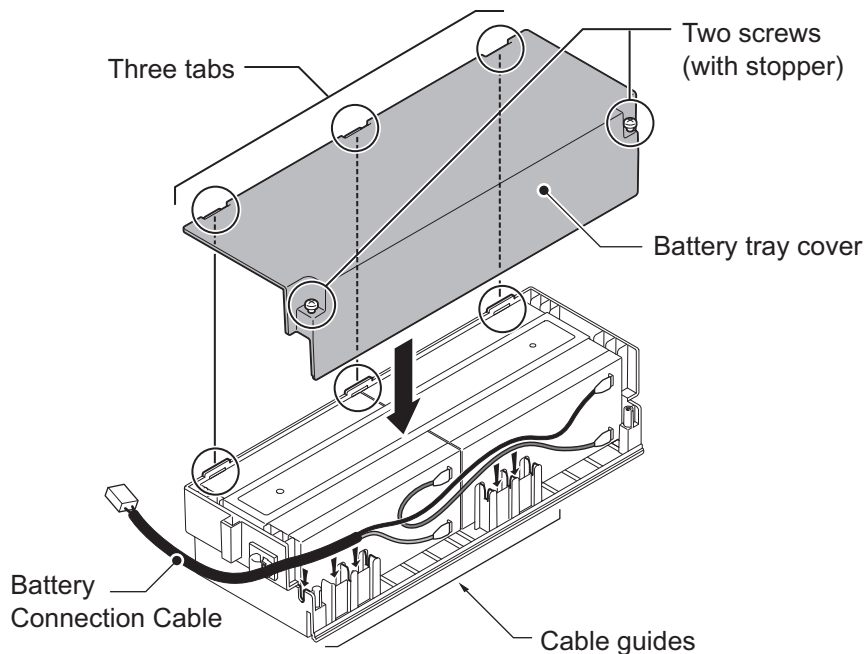
**Figure 2-33 Connecting the Battery Cables**



***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 2-34 Installation of Battery Tray Cover**

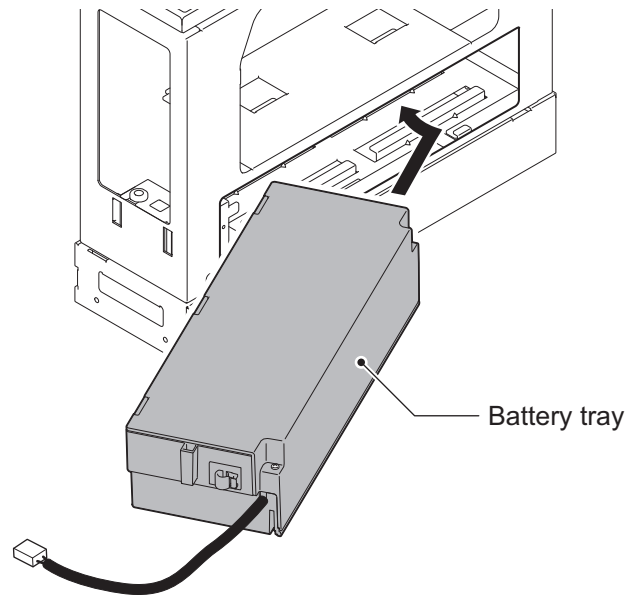


- ***Do not pull the Battery connection cable strongly.***
- ***Be careful not to catch the Battery Connection Cable when installing the Battery tray cover.***



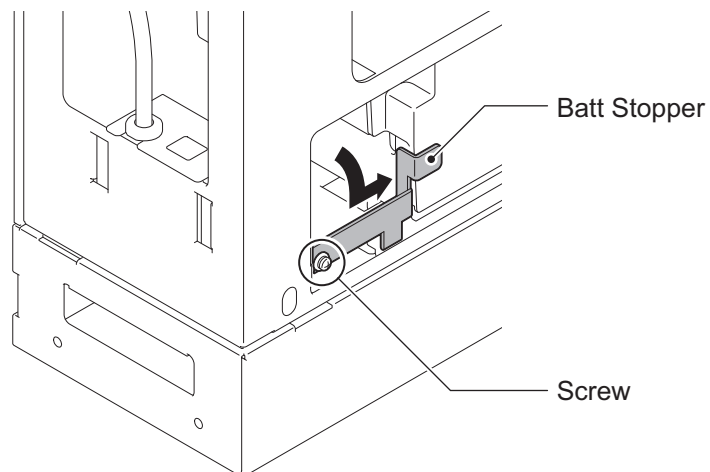
*Write down the year and month of the next battery replacement in the label on Front cover.*

11. Insert the Battery tray into the Battery Box.



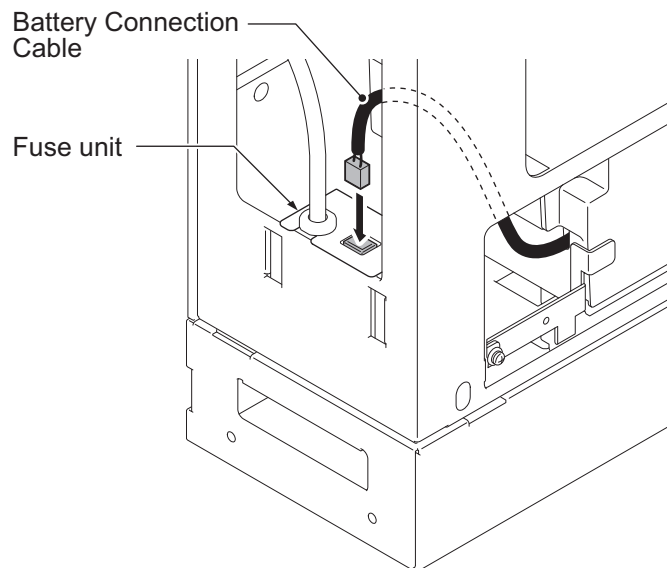
**Figure 2-35 Inserting the Battery Tray**

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



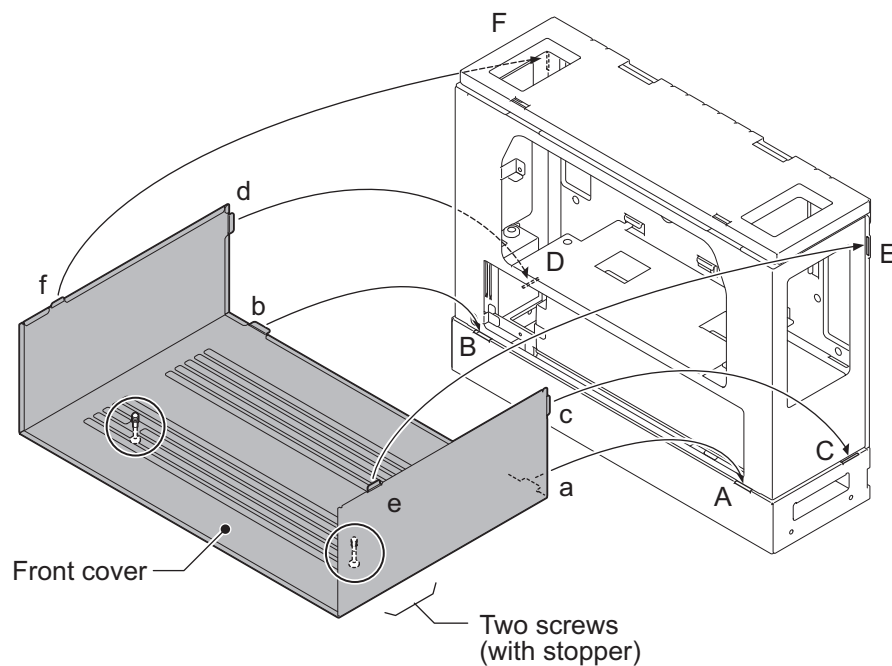
**Figure 2-36 Secure Batt Stopper Bracket**

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



**Figure 2-37 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 2-38 Installation of Front Cover**

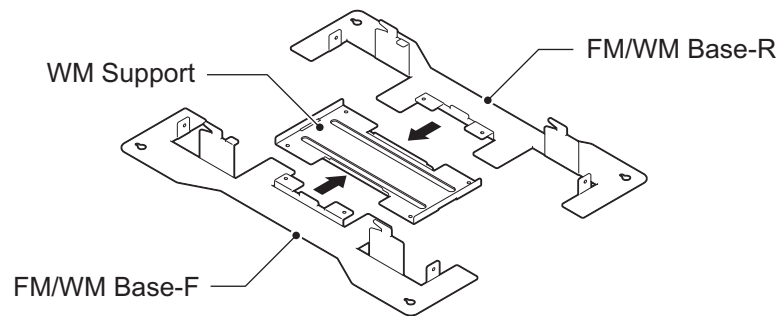
## 2.6 Mounting the IP4WW-Battery Box

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

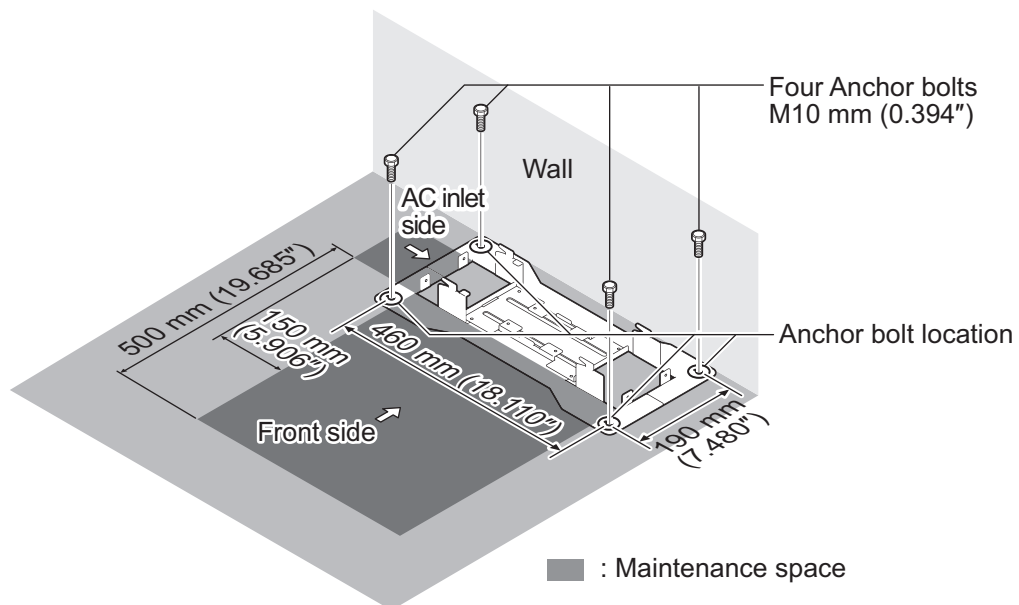
Battery box can be mounted on the floor using the FM/WM Base-F, FM/WM Base-R and WM Support. (Note: FM = Floor-Mount and WM = Wall-Mount)

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



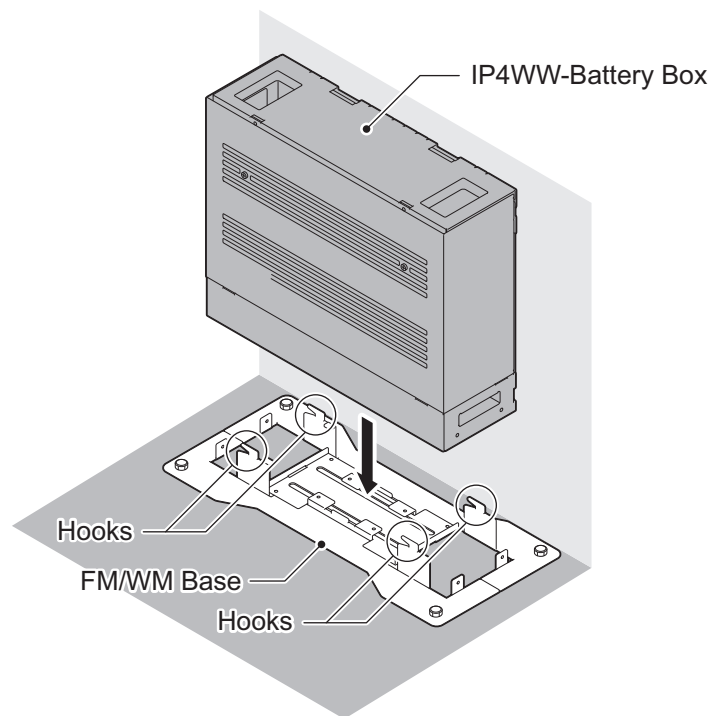
**Figure 2-39 Bases and Support of the Battery Box**

2. Refer to [Figure 2-40 Floor-Mount Spacing Guide on page 2-28](#) 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.



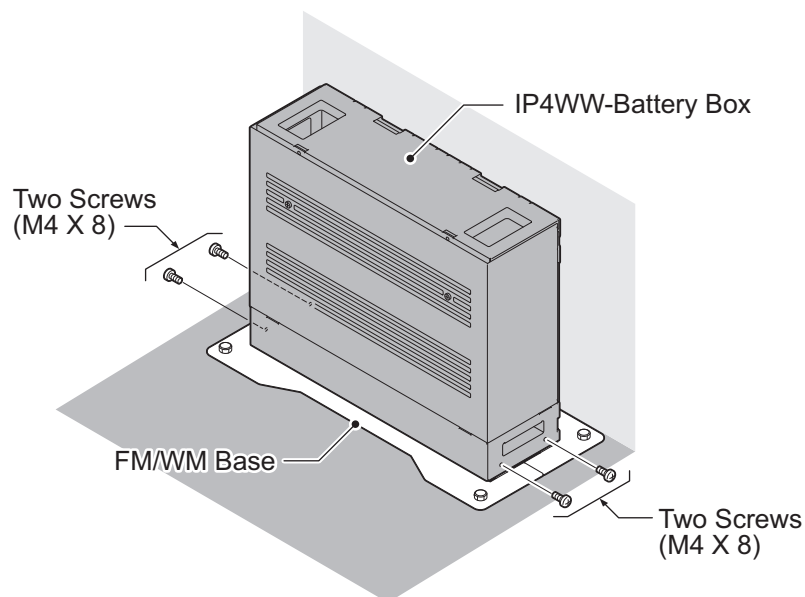
**Figure 2-40 Floor-Mount Spacing Guide**

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



**Figure 2-41 Mounting the Battery Box**

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




**Figure 2-42 Securing the Battery Box**

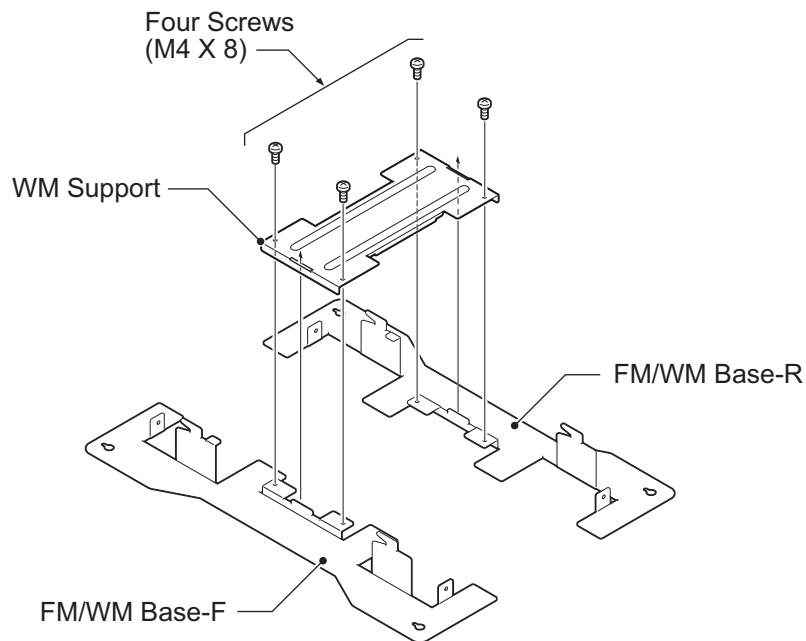
### 2.6.2 Wall-Mounting the IP4WW-Battery Box



***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.

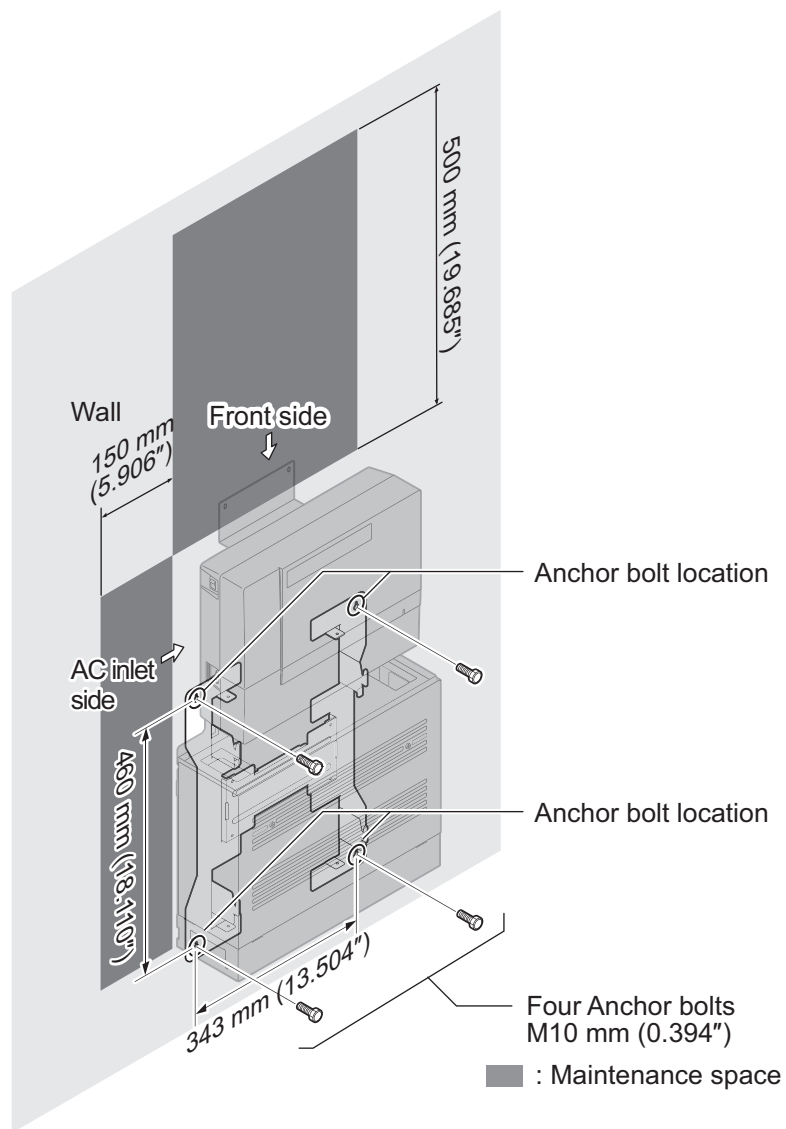


**Figure 2-43 Assemble Battery Box Base**

2. Refer to [Figure 2-44 Wall-Mount Spacing Guide on page 2-31](#) 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.

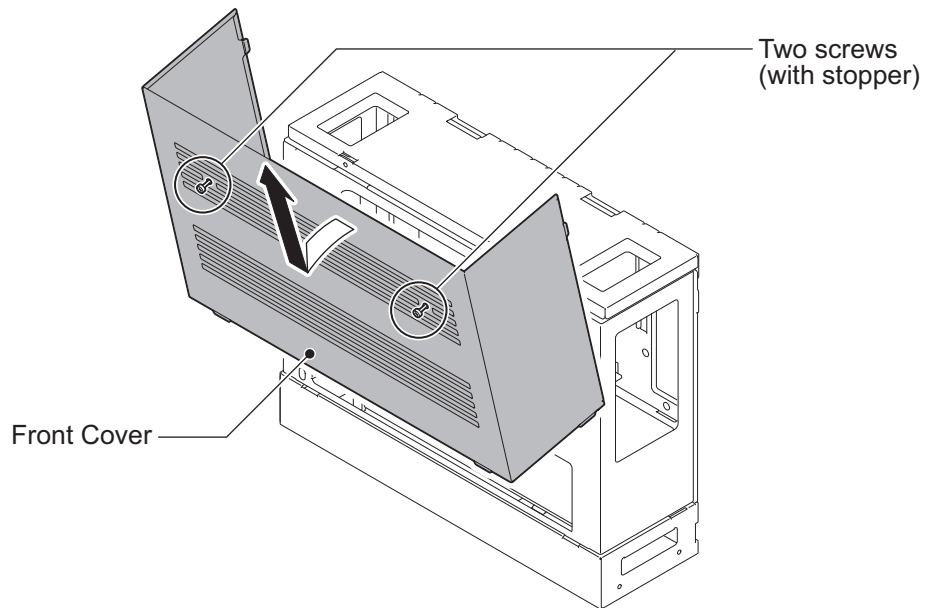


- Using anchor bolts, secure the FM/WM Base to the wall.



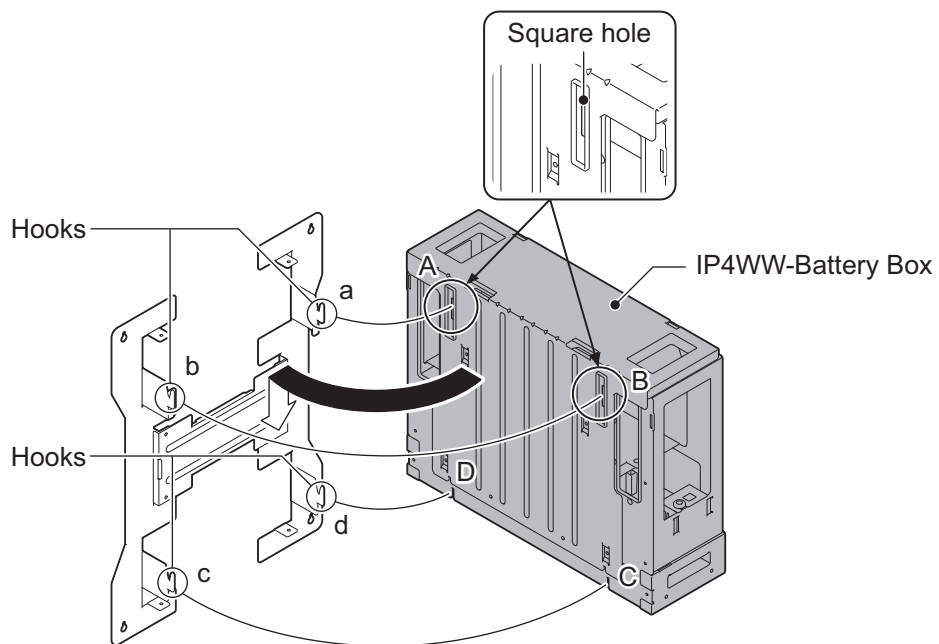
**Figure 2-44 Wall-Mount Spacing Guide**

- Loosen two screws and remove the Front Cover.



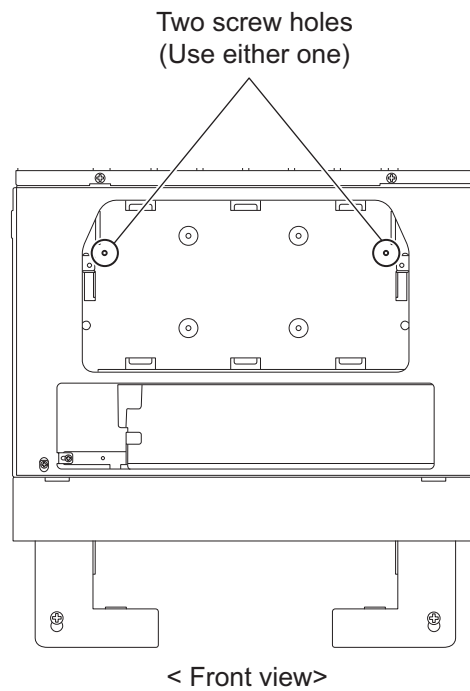
**Figure 2-45 Removing the Front Cover**

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



**Figure 2-46 Mounting the Battery Box**

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

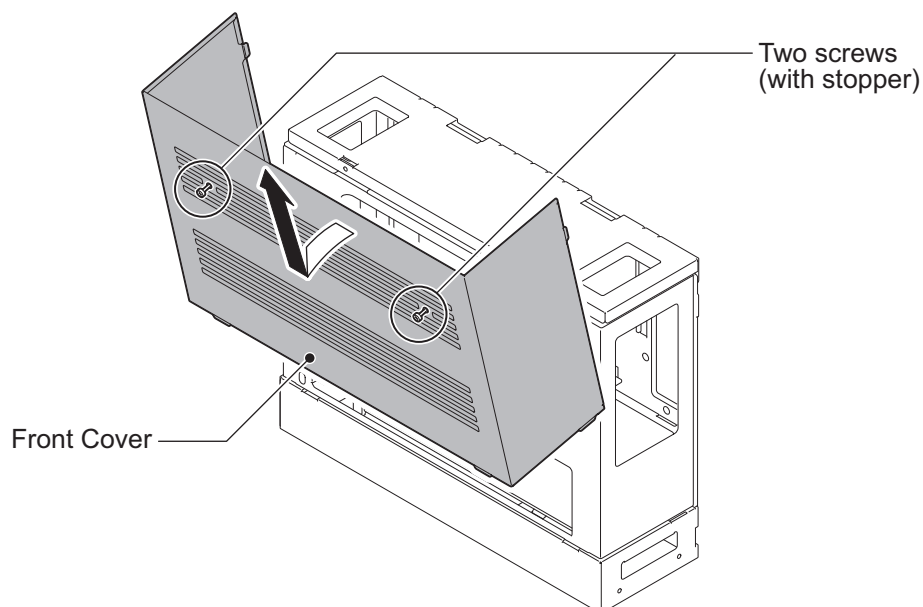


**Figure 2-47 Securing the Battery Box**

### 2.6.3 Mounting One KSU on the Battery Box

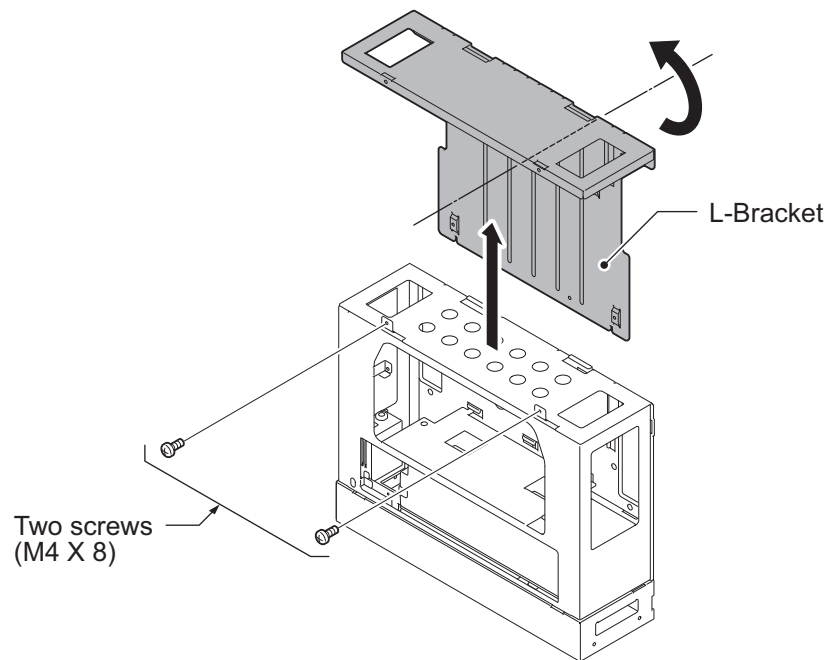
Before wall-mounting or floor-mounting the IP4WW-Battery Box, a single KSU can be mounted on the Battery Box.

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



**Figure 2-48 Removing the Front Cover**


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

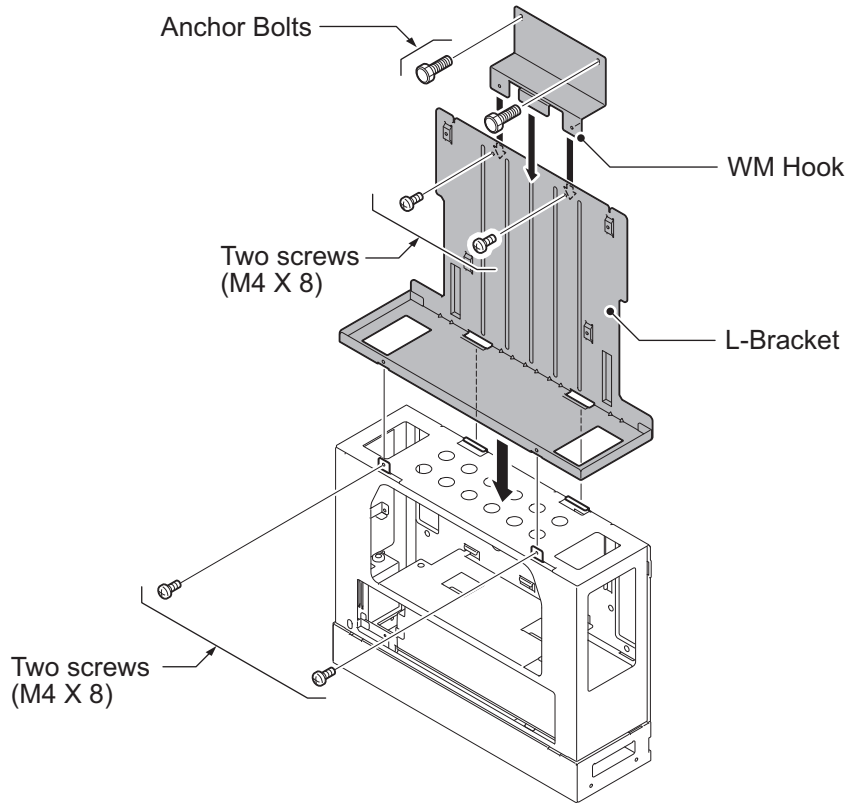


**Figure 2-49 Removing the L-Bracket**

3. Turn the L-Bracket upside down.  
Rotate the L-Bracket 180 degrees so that the upper FACE as shown in [Figure 2-49 Removing the L-Bracket on page 2-34](#) is located at the bottom as shown in [Figure 2-50 Securing the L-Bracket and WM Hook on page 2-35](#).
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.

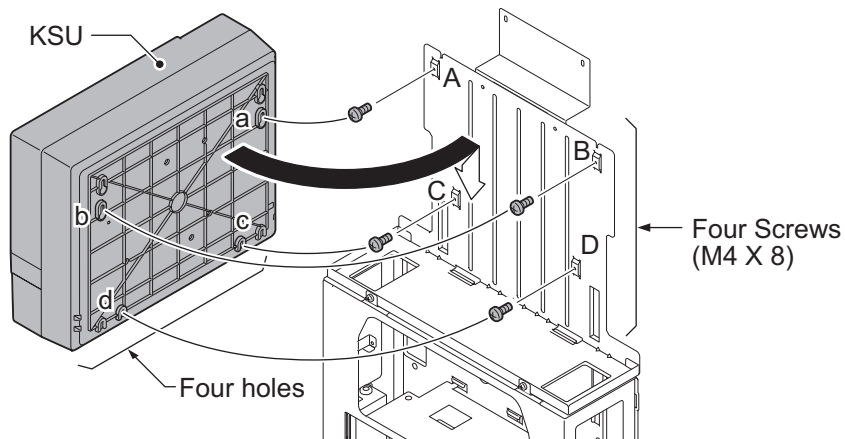
- Using two anchor bolts (locally procured), secure the WM Hook to the wall.

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



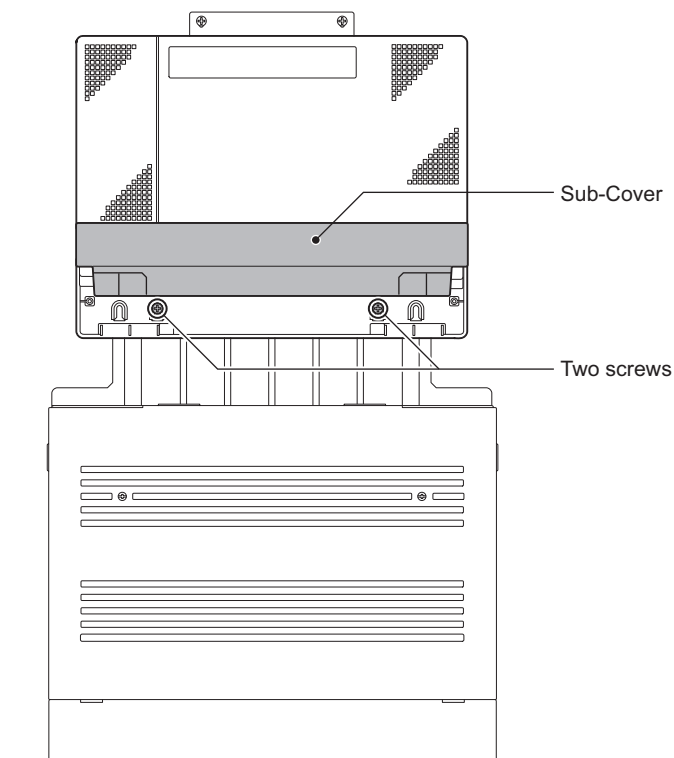
**Figure 2-50 Securing the L-Bracket and WM Hook**

- 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 2-51 Attaching the KSU**

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



**Figure 2-52 KSU Mounting on Battery Box**

## 2.7 IP4WW-Battery Box to KSU Connection

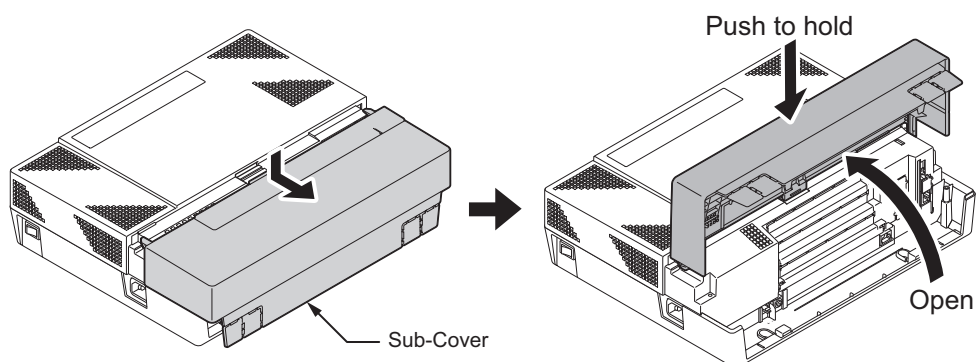


*To avoid damage to equipment, do not install the Topaz Battery Box (DX2E-32i/NX7E Battery Box) to the SL1000 system.*



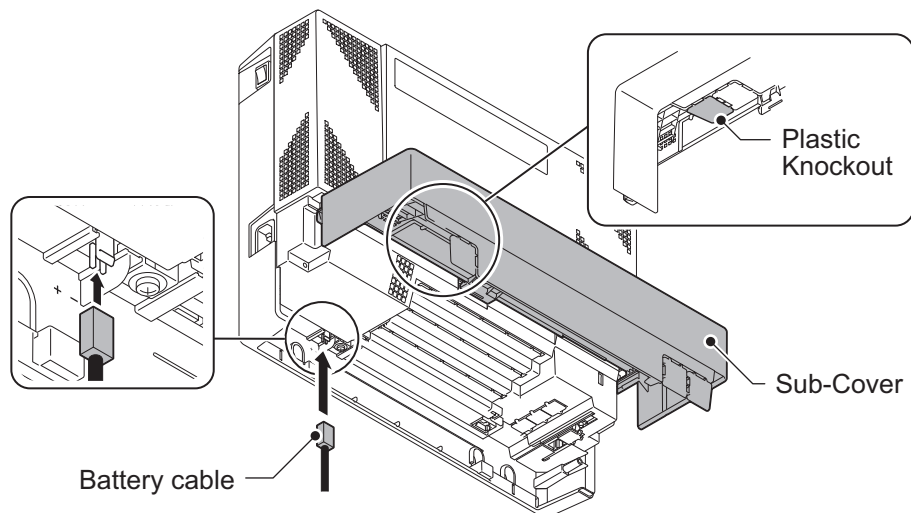
- *Make sure the system power is off.*
- *If Expansion KSU(s) are installed, turn the power on/off in the order of Expansion 3 KSU, Expansion 2 KSU, Expansion 1 KSU and then Main KSU.*

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



**Figure 2-53 Sub-Cover Open and Hold**

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



**Figure 2-54 Connecting Battery Cable**

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

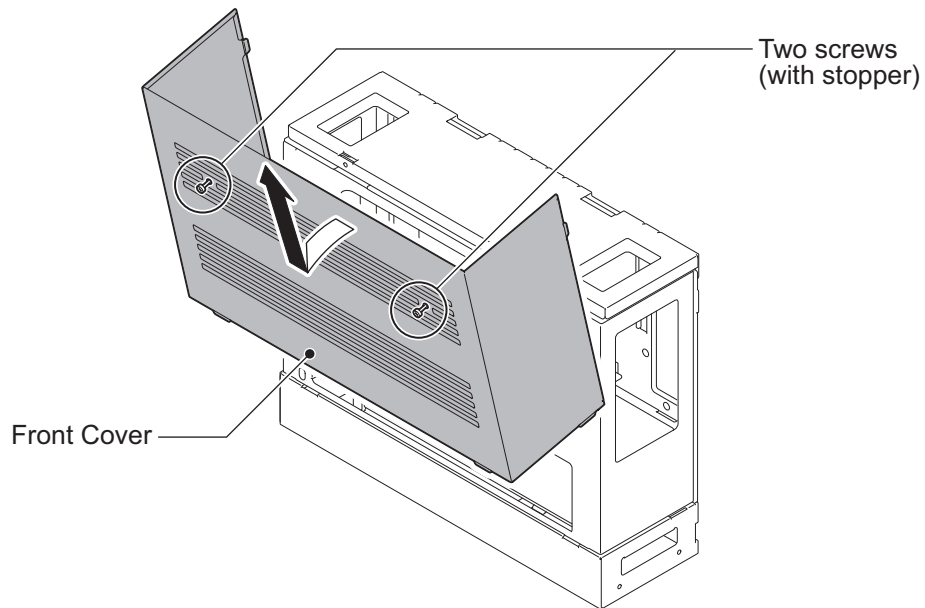
## 2.8 IP4WW-Battery Box Fuse Replacement



- 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 3 KSU, Expansion 2 KSU, Expansion 1 KSU and then Main KSU.*

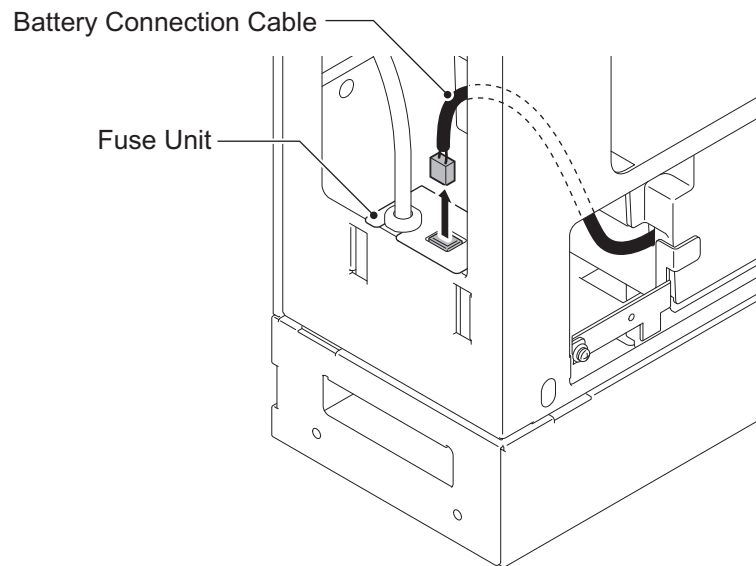
- Power off the KSU and disconnect AC cord.

2. Loosen two screws and remove the Front Cover.



**Figure 2-55 Removing the Front Cover**

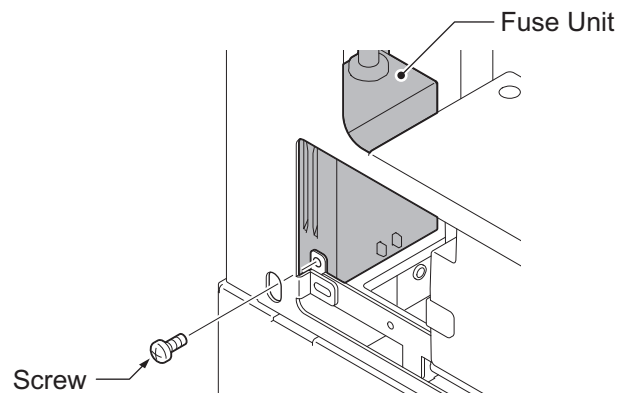
3. Disconnect the Battery connection cable from the Fuse Unit.



**Figure 2-56 Disconnecting the Battery Connection Cable**

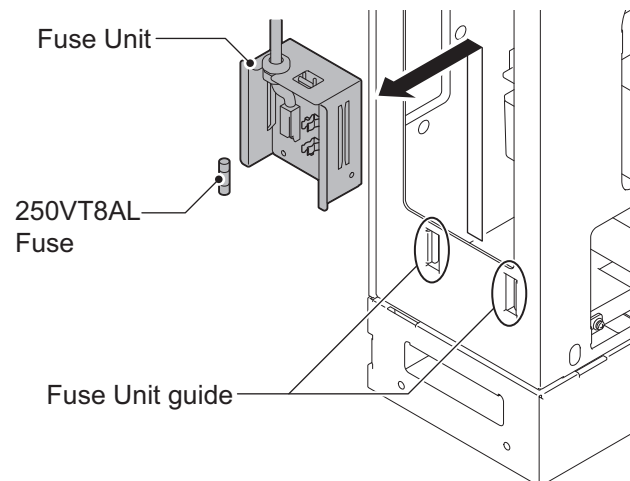


4. Loosen the screw from the Fuse Unit.



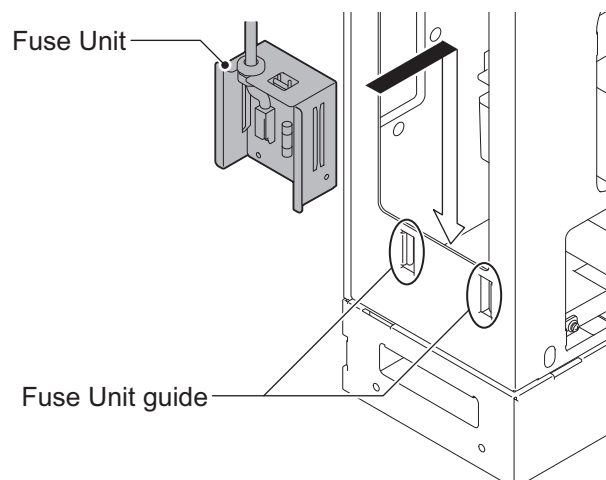
**Figure 2-57 Loosen the Fuse Unit Screw**

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



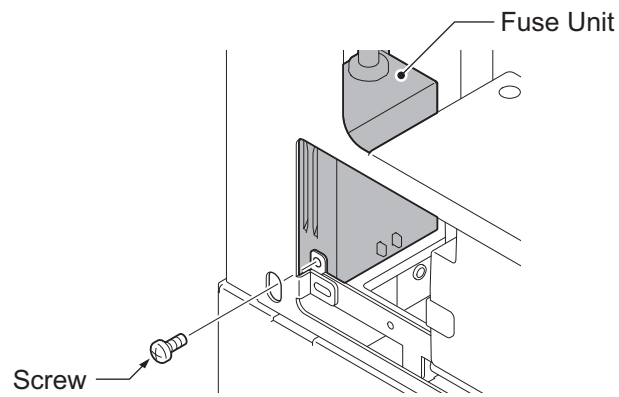
**Figure 2-58 Replacing the Fuse**

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



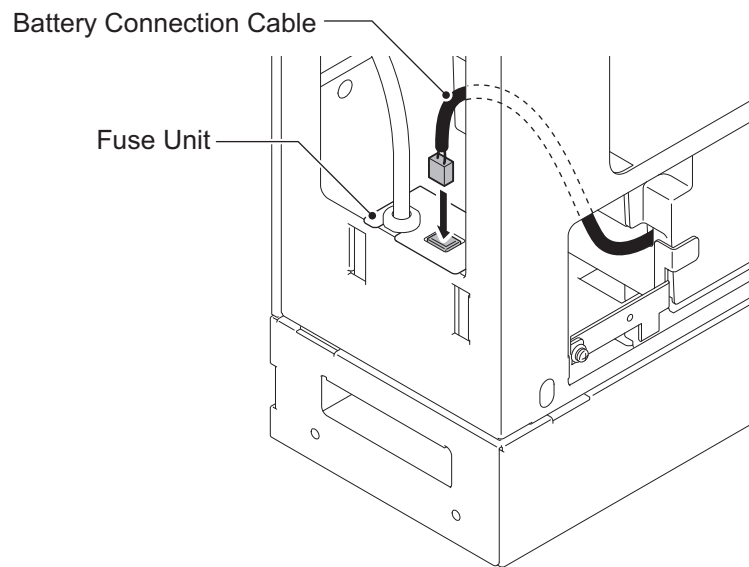
**Figure 2-59 Install the Fuse Unit**

- Secure the Fuse Unit by tightening the screw.



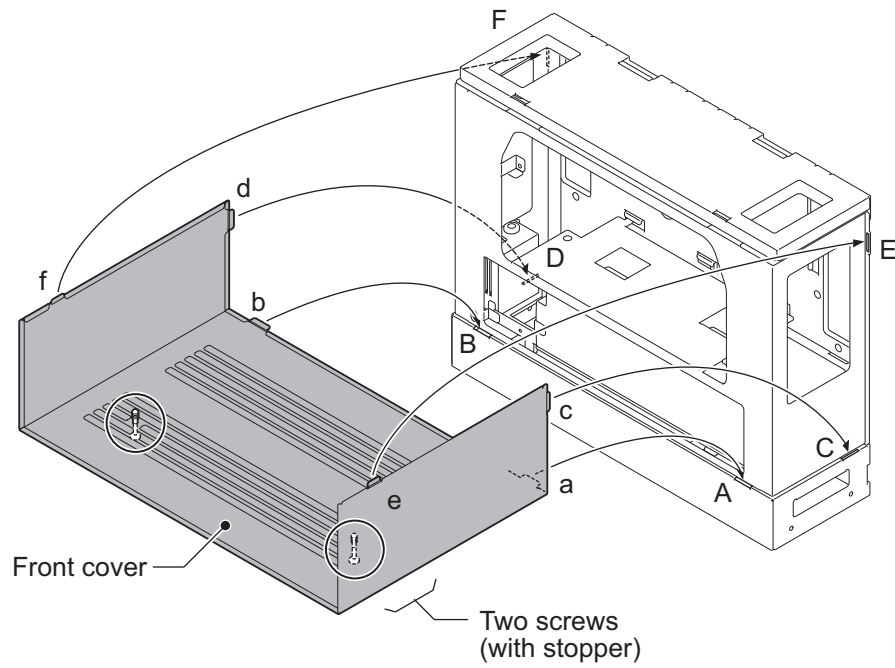
**Figure 2-60 Securing the Fuse Unit**

- Reconnect the Battery Connection Cable to the Fuse Unit.



**Figure 2-61 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 2-62 Installation of the Front Cover**

## SECTION 3 INSTALLING THE EXPANSION INTERFACE CARDS

### 3.1 General

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

**Table 2-8 Expansion Cards**

Expansion Interface Card	Description	Note
IP4WW-408E-A1	4 analog trunks and 8 hybrid extensions card	
IP4WW-008E-A1	8 hybrid extensions card	
IP4WW-000E-A1	0 trunk/extension card for ISDN BRI	
IP4WW-2BRIDB-C1	2 Euro-ISDN BRI daughter board (Mount on the 008E-A1 or 000E-A1)	
IP4WW-1PRIU-C1	1 Euro-ISDN PRI (E1 for Latin America) card	



*The 408E-A1, 2BRIDB-C1 or 1PRIU-C1 should not be installed into the 3rd Expansion KSU. The 3rd Expansion KSU does not support any trunks.*



- The function of IP4WW-000E-A1 card is just a mounting card for the 2BRIDB.
- The 2BRIDB-C1 can be installed in following combinations;

Daughter Board	Option Unit			
	408M-A1	408E-A1	008E-A1	000E-A1
2BRIDB-C1	No	No	Yes	Yes

### 3.2 Unpacking


Unpack the 408E-A1/008E-A1/000E-A1/2BRIDB-C1/1PRIU-C1 and check it against the following list. Inspect for physical damage.

**Table 2-9 Expansion Card Packing List**

Items	List of Contents	QTY
IP4WW-408E-A1	408E-A1 PCB (with PKG Spacer)	1
	Nylon Spacers	2
	Metal Spacers	2
	Screws (with circular washer)	2
IP4WW-008E-A1	008E-A1 PCB (with PKG Spacer)	1
	Nylon Spacers	2
	Metal Spacers	2
	Screws (with circular washer)	2
IP4WW-000E-A1	000E-A1 PCB (with PKG Spacer)	1
	Nylon Spacers	2
	Metal Spacers	2
	Screws (with circular washer)	2


Items	List of Contents	QTY
IP4WW-2BRIDB-C1	2BRIDB-C1 PCB	1
	Nylon Spacers	2
	2BRI 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

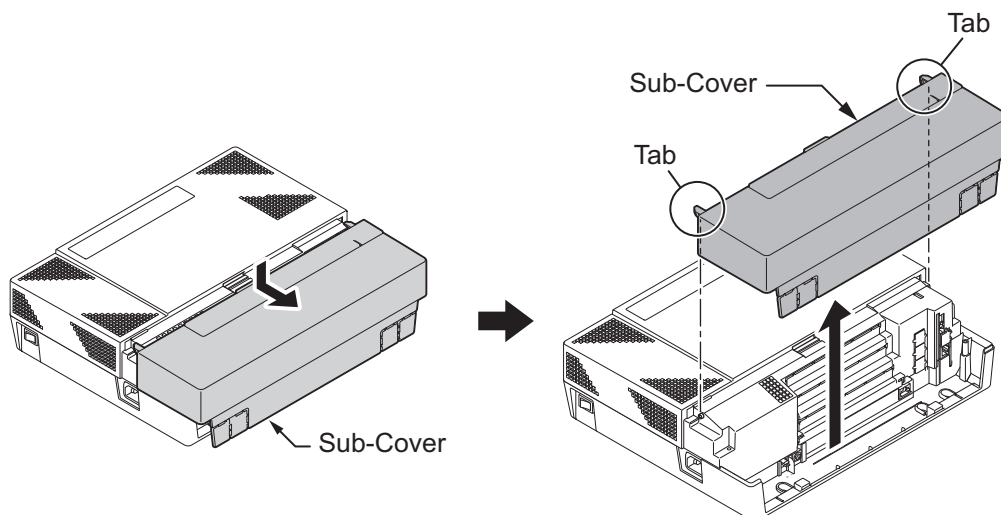
 *DO NOT POWER ON until all installation has been completed.*  
*Fit the optional 2BRIDB-C1 daughter boards before installing the 000E-A1/008E-A1 PCBs. Set the switches on the 2BRIDB-C1 board before mounting it onto the 000E-A1/008E-A1 PCB.*

#### 3.3.1 Mounting the 408E-A1/008E-A1/000E-A1/1PRIU-C1 PCBs

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

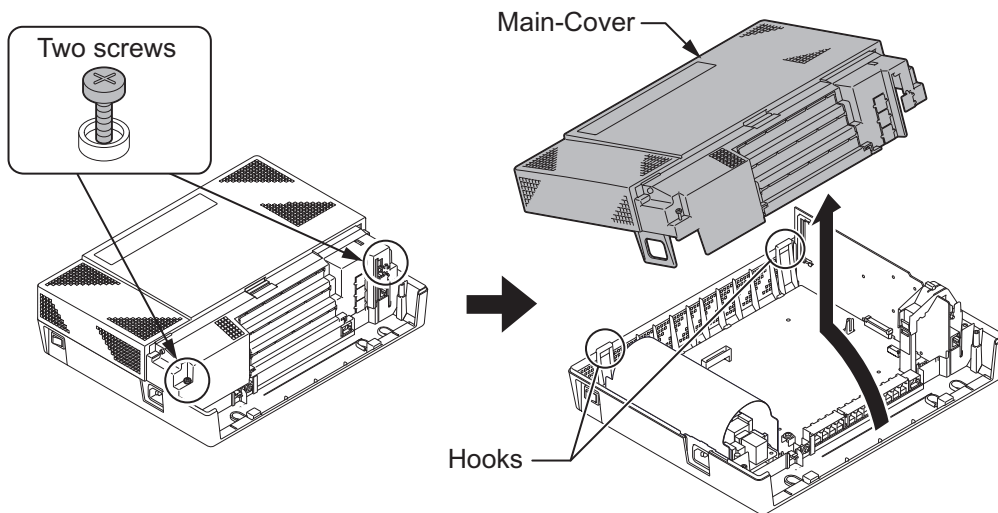
-  ***Do Not Power on until all installation have been completed.***
- If Expansion KSU(s) are installed, turn the power on/off in the order of Expansion 3 KSU, Expansion 2 KSU, Expansion 1 KSU and then Main KSU.***

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



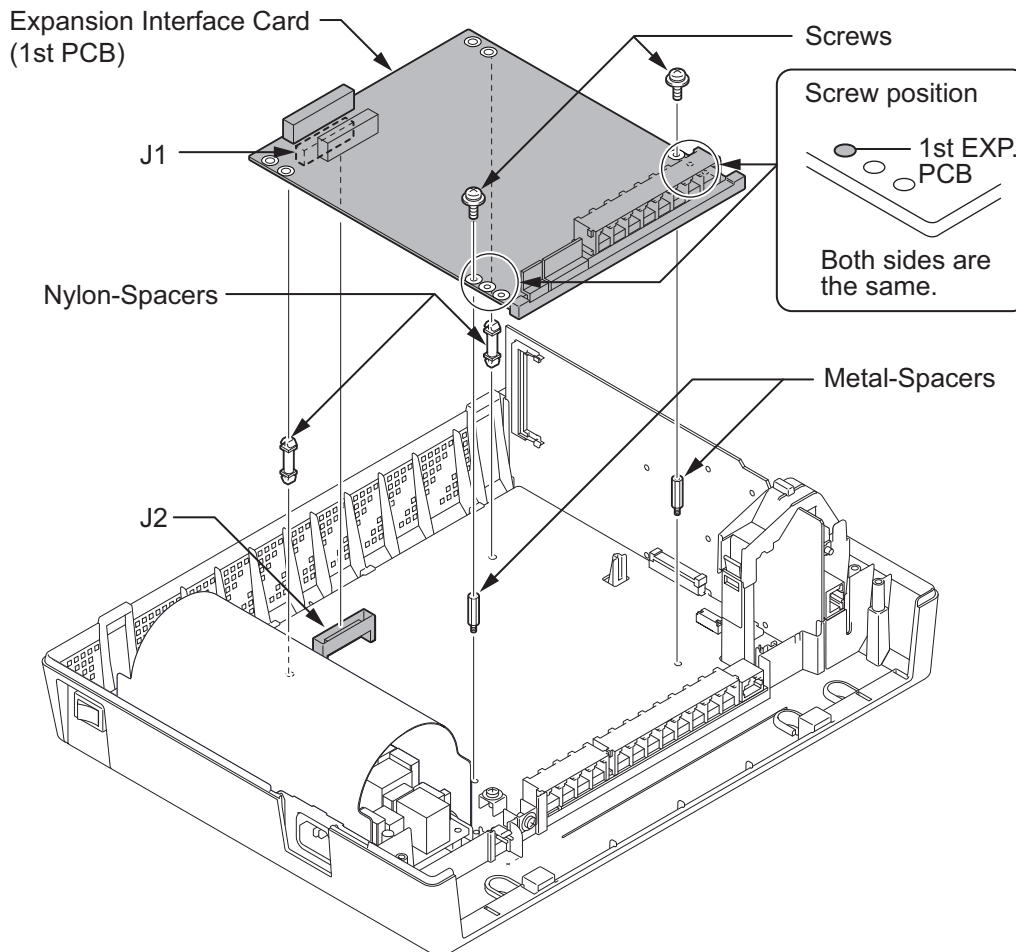
**Figure 2-63 Removing the Sub-cover**

- Loosen two screws and remove the Main-cover.



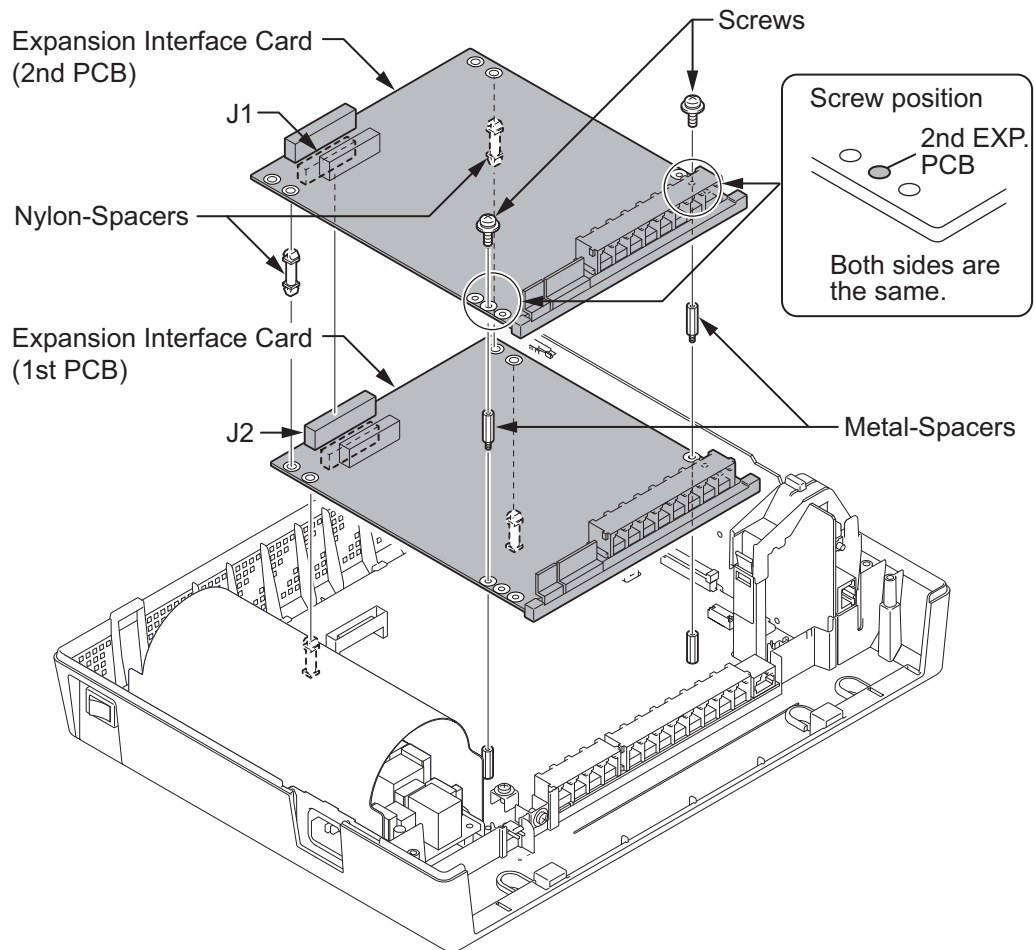
**Figure 2-64 Removing the Main-cover**

- 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 408E/008E/000E/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 408E/008E/000E/1PRIU.



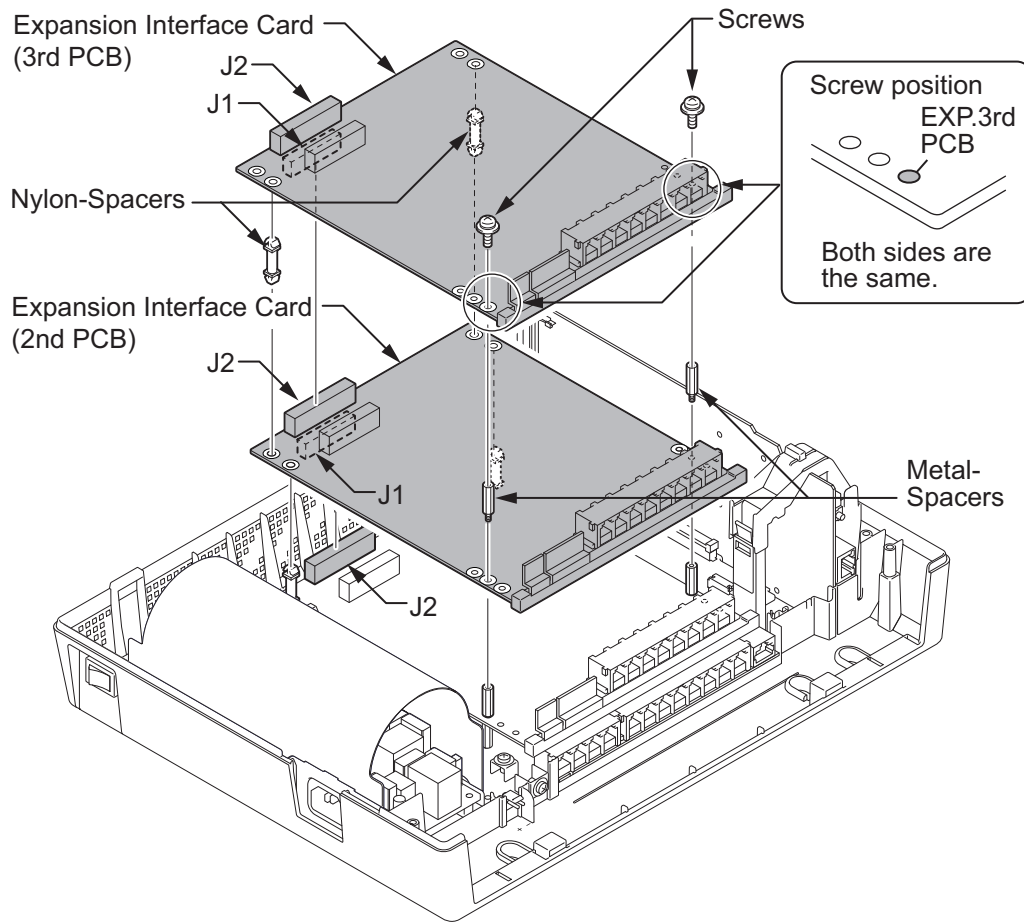
**Figure 2-65 Mounting of the 1st Expansion Interface Card**

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 408E/008E/000E/1PRIU)  
If no more Expansion interface card is mounted on the 2nd PCB, fasten two screws to secure the 2nd PCB to the top of the 408E/008E/000E/1PRIU.



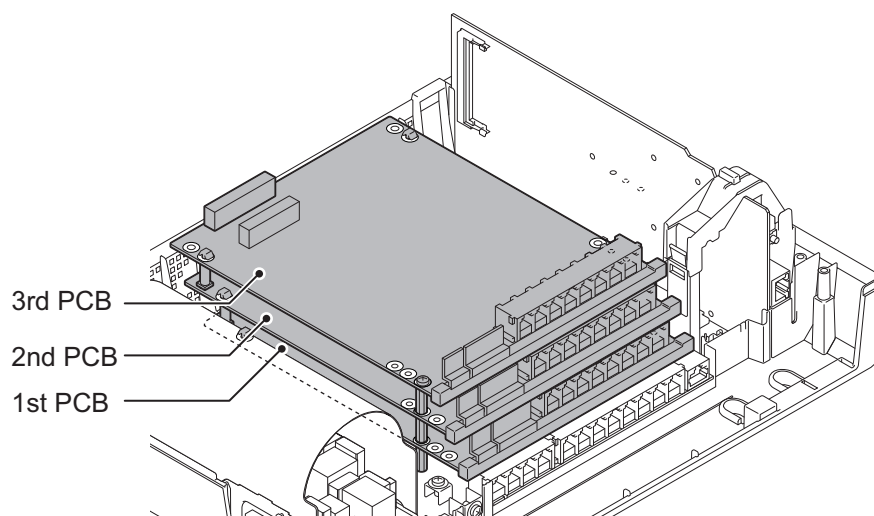
**Figure 2-66 Mounting the 2nd Expansion Interface Card**

6. In case a 3rd 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 408E/008E/000E/1PRIU)  
Fasten two screws to secure the 3rd PCB to the top of the 408E/008E/000E/1PRIU.



**Figure 2-67 Mounting the 3rd Expansion Interface Card**

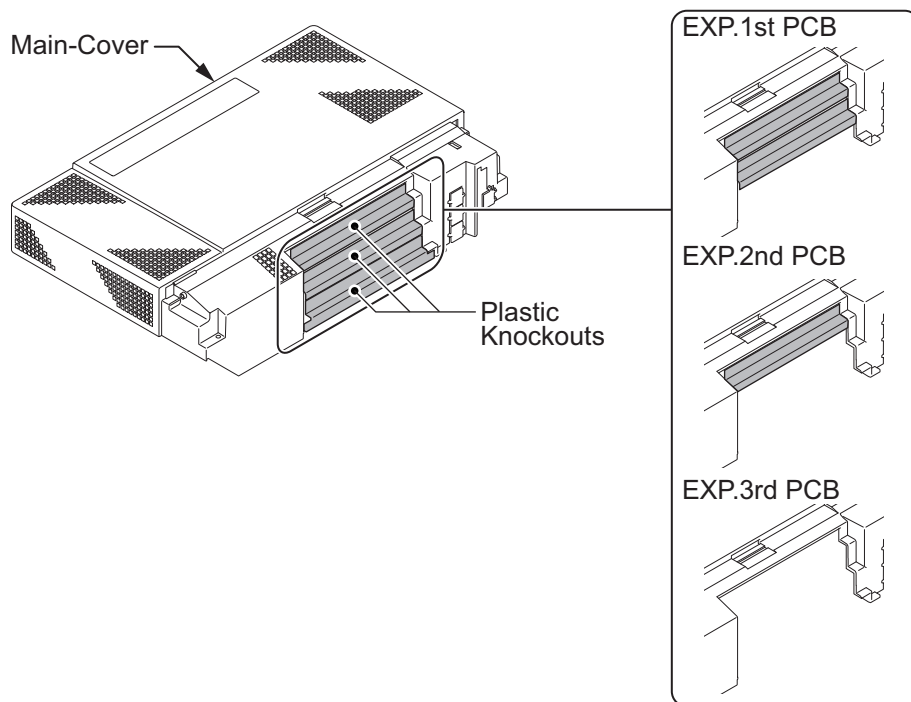
7. Following illustration shows an example for installing 3 expansion PCBs onto the KSU.



**Figure 2-68 Mounting Three Expansion Interface Cards**

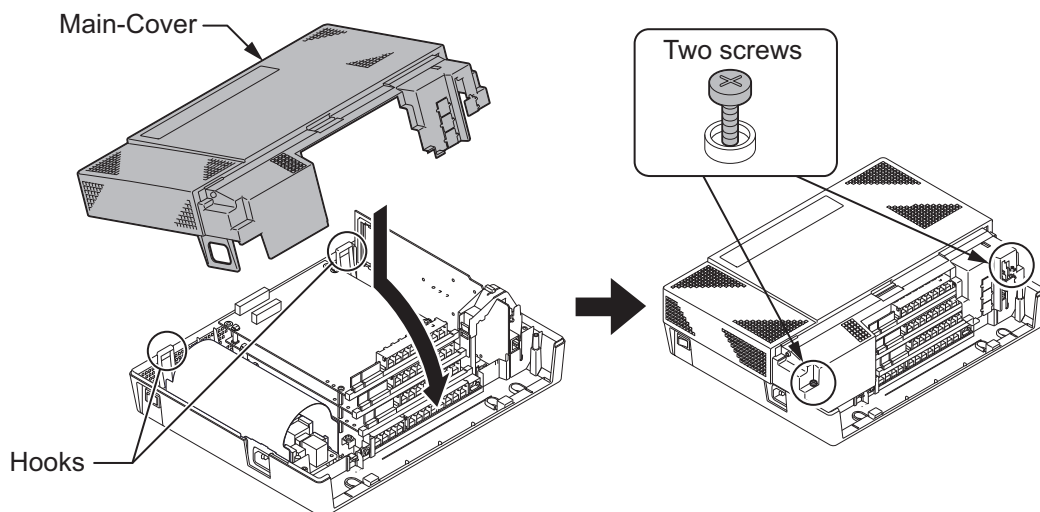


8. Cut and remove the Plastic Knockouts as required for each Expansion interface card.



**Figure 2-69 Plastic Knockouts**

9. Replace the Main-cover and fasten two screws.



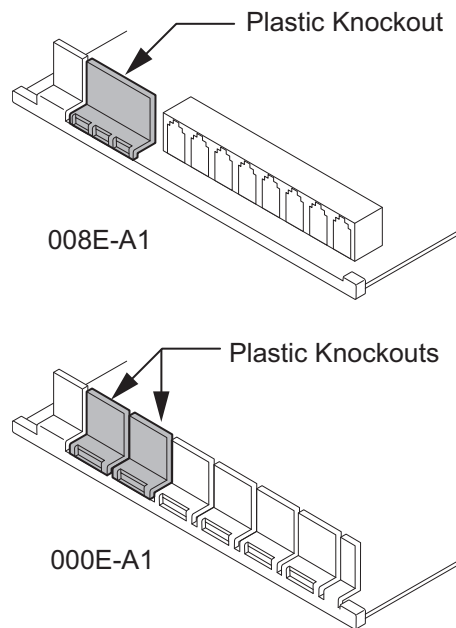
**Figure 2-70 Replacing the Main-cover**

### 3.3.2 Mounting the 2BRIDB PCB



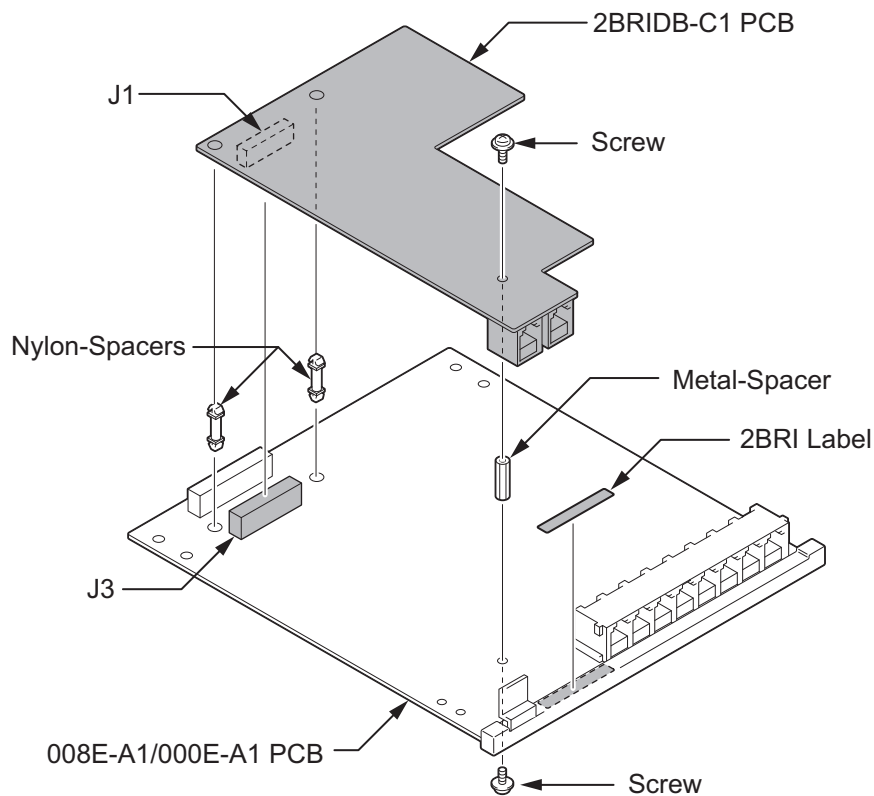
*Set the switches on the 2BRIDB-C1 PCB before mounting onto the 008E-A1/000E-A1 PCB, refer to the [Switch Setting](#) on page 2-53.*

1. Cut and remove specified Plastic Knockouts on the 008E-A1/000E-A1 PCB.



**Figure 2-71 Plastic Knockouts on 008E-A1/000E-A1**

2. Insert two Nylon-spacers into the specified holes. Using supplied screw, fasten Metal Spacer to 2BRIDB-C1 PCB.
3. Mount the 2BRIDB-C1 PCB onto the 008E-A1/000E-A1 PCB using two Nylon-spacers and one screw. (Refer to [Figure 2-72 Installing the 2BRIDB-C1 on page 2-48](#))
4. Attach the 2BRI Label to the specified position on the 008E-A1/000E-A1 PCB.

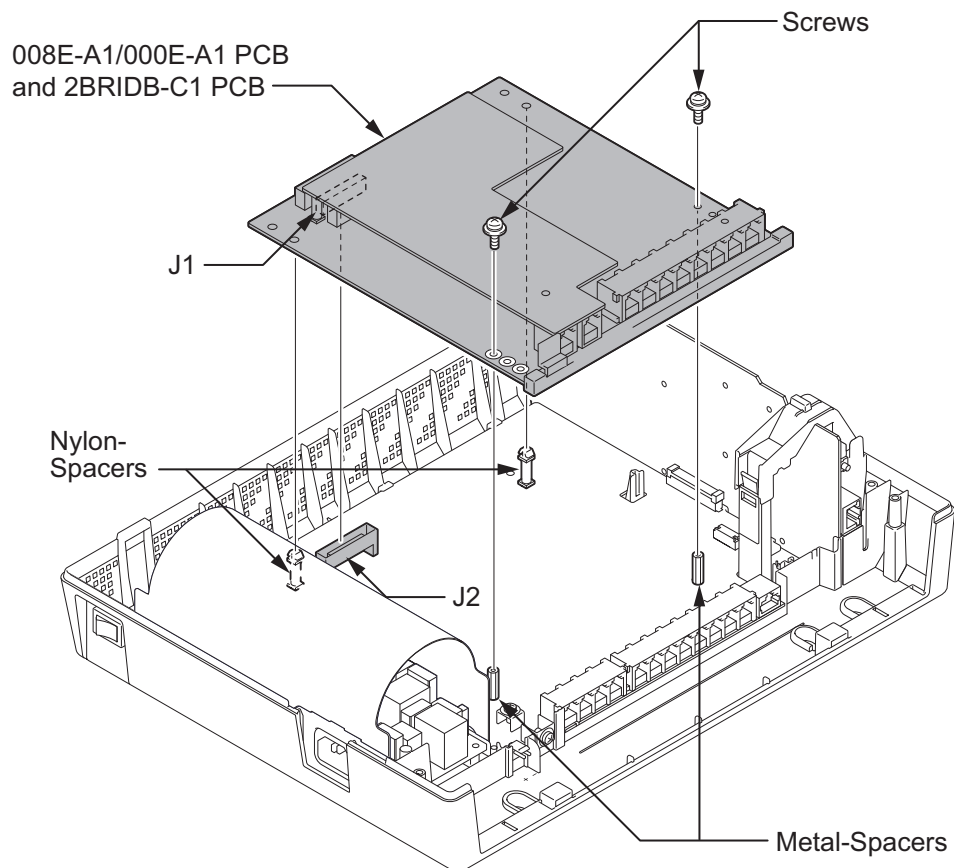


**Figure 2-72 Installing the 2BRIDB-C1**



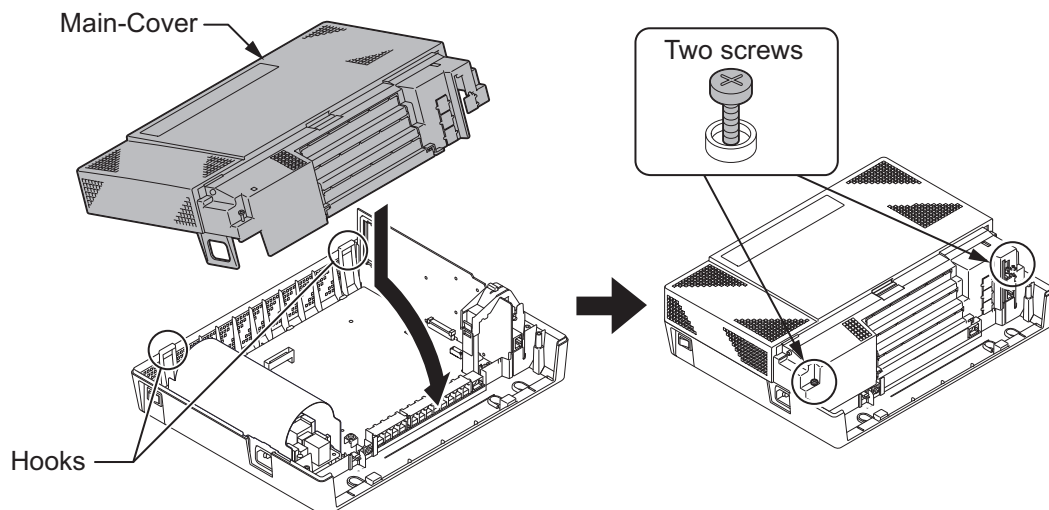
*The 2BRIDB-C1 cannot be mounted on the 408M-A1/408E-A1/1PRIU-C1 PCB.*

5. Mount the 2BRIDB-C1 with 008E-A1/000E-A1 PCB into the KSU.



**Figure 2-73 Mounting the 2BRIDB-C1 into the KSU**

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



**Figure 2-74 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 Topaz Terminal in the SL1000 system, it does not work properly.

### 3.4.1 Cabling IP4WW-408E-A1

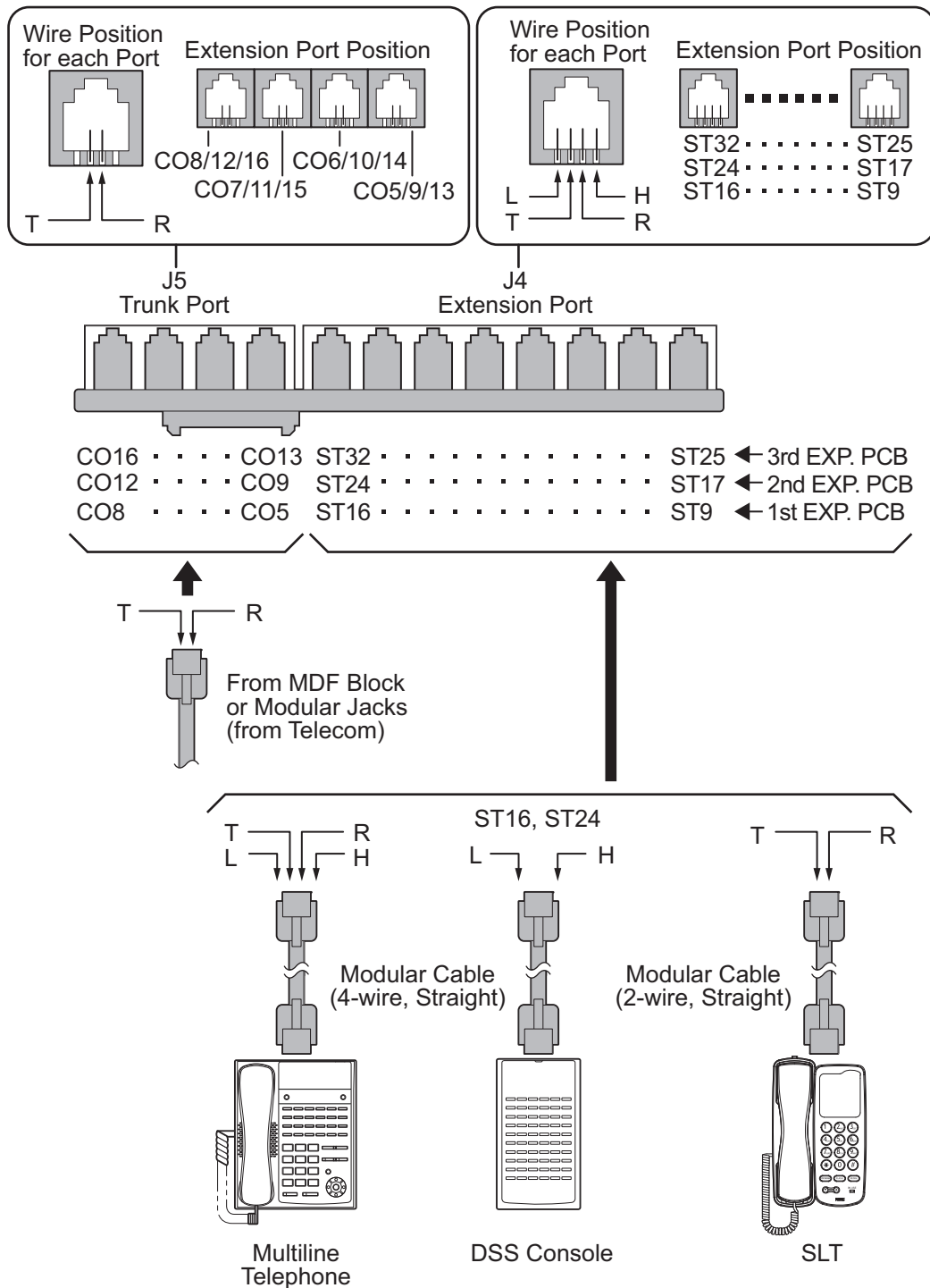
This IP4WW-408E-A1 PCB provides four RJ11 connections for analog trunks and eight RJ11 connections for hybrid extensions.




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



***Topaz Terminal does not work properly when it connected.***



**Figure 2-75 Connectors of 408E-A1**

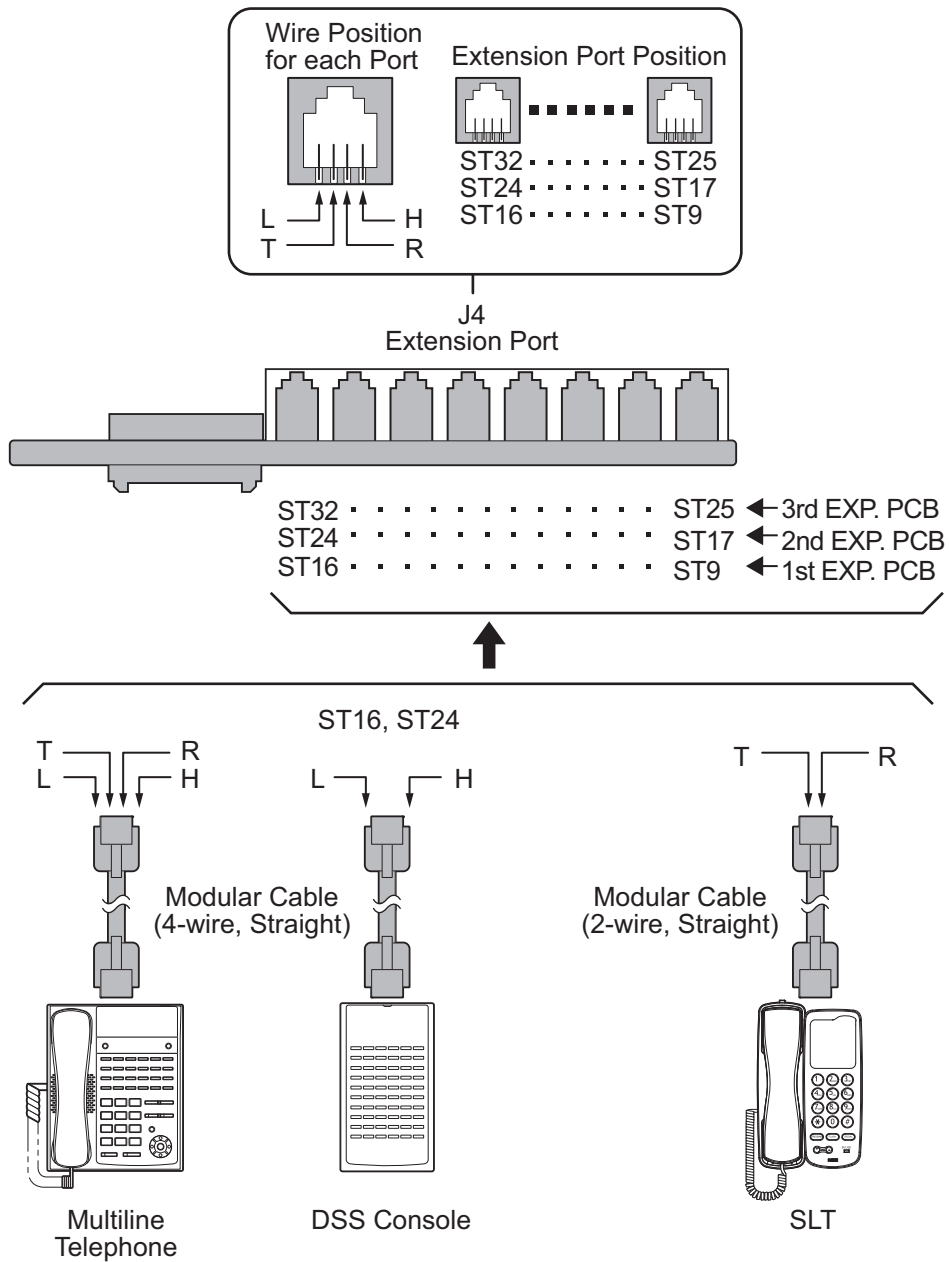
 Only Analog Telephones can be connected when this PCB is installed as the 3rd PCB in each Main or Expansion KSU. Multiline Telephones and DSS Console must not be connected.

### 3.4.2 Cabling IP4WW-008E-A1


This IP4WW-008E-A1 PCB provides eight RJ11 connections for hybrid extensions.

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

 **Topaz Terminal does not work properly when it connected.**



**Figure 2-76 Connectors of 008E-A1**

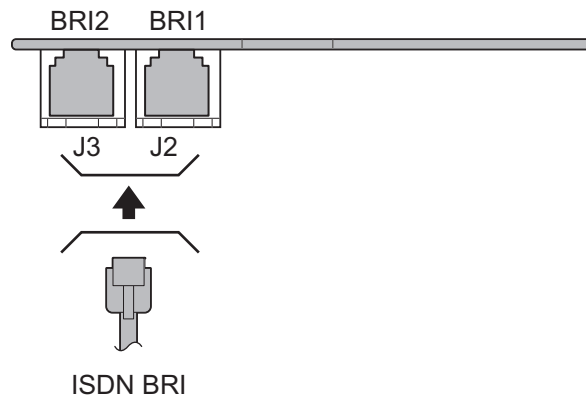
 Only Analog Telephones can be connected when this PCB is installed as the 3rd PCB in each Main or Expansion KSU. Multiline Telephones and DSS Console must not be connected.

**3.4.3 Cabling IP4WW-000E-A1**

This IP4WW-000E-A1 PCB does not have any connector for cabling.

**3.4.4 Cabling and Setting IP4WW-2BRIDB-C1**

This IP4WW-2BRIDB-C1 PCB provides two RJ-61 BRI connections.

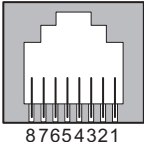


**Figure 2-77 Connectors of 2BRIDB-C1**

### 3.4.4.1 Connectors

The following table shows the pin-outs for the RJ-61 cable connector for S-Bus and T-Bus connections.

**Table 2-10 RJ-61 BRI Pin-Outs (S-Bus, T-Bus)**

	Pin No.	RJ-61 Cable Connector-2BRIDB-J2 (BRI1), J3 (BRI2) S-Bus Connection	RJ-61 Cable Connector-2BRIDB-J2 (BRI1), J3 (BRI2) T-Bus Connection
	1	-	-
	2	-	-
	3	RA	TA
	4	TA	RA
	5	TB	RB
	6	RB	TB
	7	-	-
	8	-	-


### 3.4.4.2 Switch Setting

Figure 2-78 Switches Location of 2BRIDB-C1 on page 2-54 shows the location of the connectors and switches on the IP4WW-2BRIDB-C1.

1. Set the switches J12 to J17 according to the system, referring the [Table 2-11 Switch Setting of 2BRIDB-C1](#) on page 2-54.

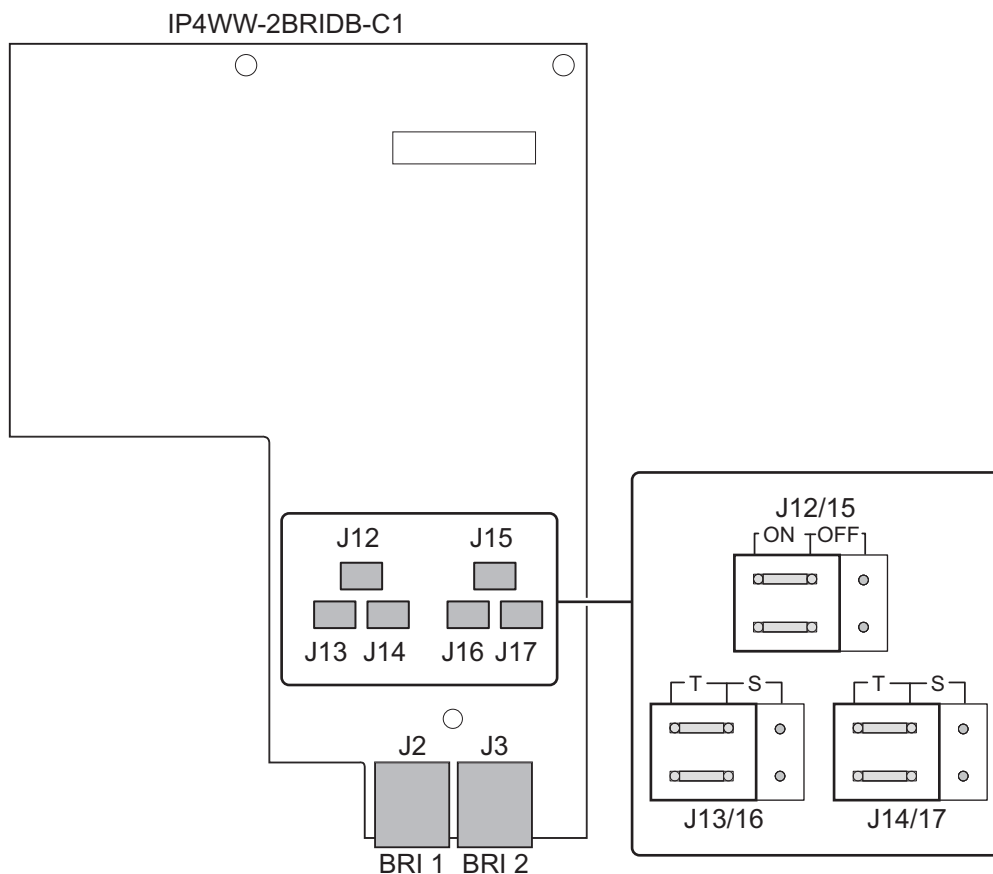
**Table 2-11 Switch Setting of 2BRIDB-C1**

Switch No.	Switch Position	Description
J12/J15	ON (default)	Termination register is ON. This SW should be ON in case: <ul style="list-style-type: none"> <li>• T-Bus Point-to-Point connection is selected.</li> <li>• T-Bus Point-to-Multipoint is selected, and if the system is Terminal 8. (last device on the bus)</li> <li>• S-Bus.</li> </ul>
	OFF	P-MP (Terminal 7)
J13, J14/J16, J17	T (default)	T-Bus connection
	S	S-Bus connection

-  *J12 & J15 do not configure the connection type on the system, they only add/remove the termination of the circuit.*  
*J13, J14 & J16, J17 do not configure the connection type on the system, they only select the polarity of the connector J2/J3.*  
*The 2BRIDB-C1 circuits must also be setup within the system configuration.*

2. Connect the cables from the NT1 Network Termination cable to the J2 or J3 connector on the 2BRIDB-C1 daughter board.  
 Connector J2 - BRI1: Use switches J12, J13, J14  
 Connector J3 - BRI2: Use switches J15, J16, J17

 **Ensure that you set all switches correctly for each BRI circuit.**



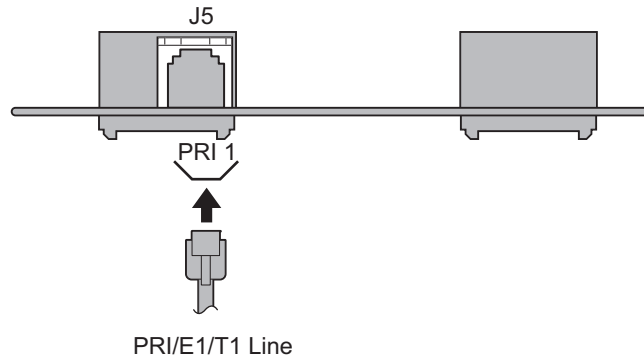
**Figure 2-78 Switches Location of 2BRIDB-C1**



### 3.4.5 Cabling and Setting IP4WW-1PRIU-C1

 *The E1 standard may differ from country by country. The conformity test must be required before setting the E1 Trunk. (V4.0 Added)*

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

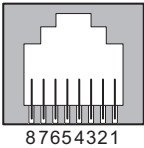


**Figure 2-79 Connector of 1PRIU-C1**

#### 3.4.5.1 Connector

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

**Table 2-12 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
	1	TA	RA
	2	TB	RB
	3	-	-
	4	RA	TA
	5	RB	TB
	6	-	-
	7	-	-
	8	-	-

#### 3.4.5.2 Switch Setting


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

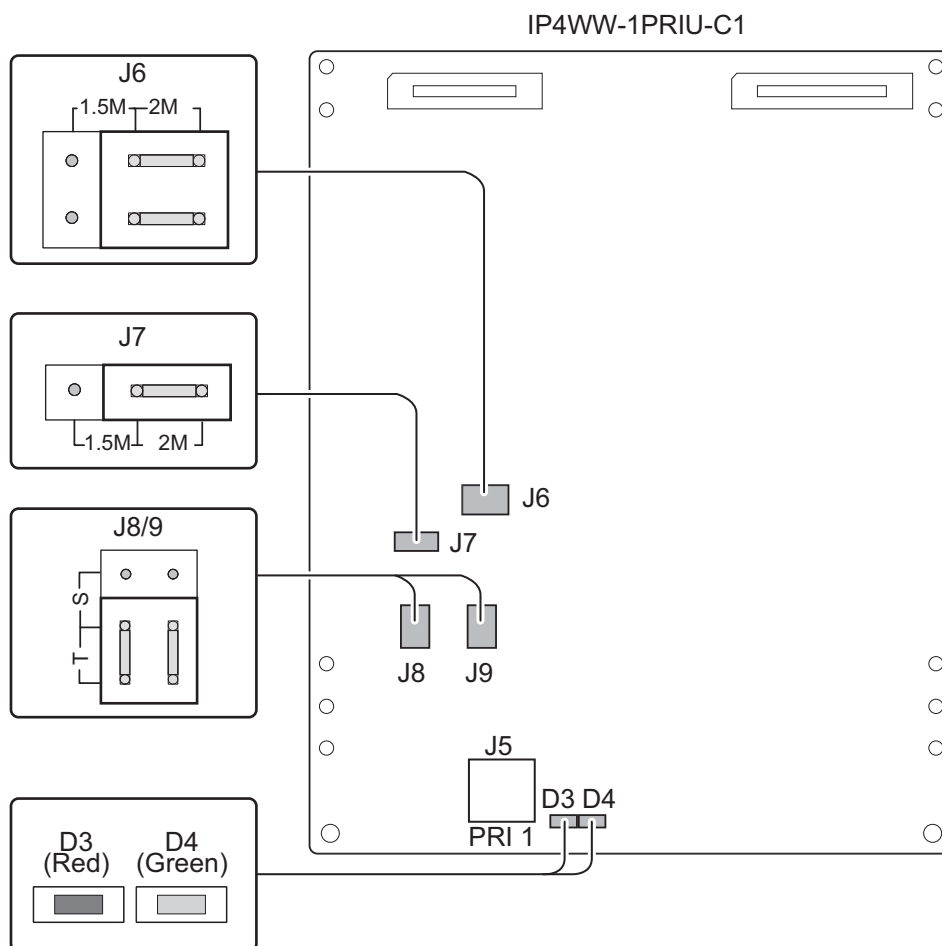
1. Set the switches J6 to J9 according to the system, referring the [Table 2-13 Switch Setting of 1PRIU-C1](#) on page 2-56.

**Table 2-13 Switch Setting of 1PRIU-C1**

Switch No.	Switch Position	Description
J6, J7	2M (default)	Connect PRI/E1 (2.048 Mb/s) line
	1.5M	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/E1 by PRG10-51-01.

 *With normal operation, D4 LED flashes green.*



**Figure 2-80 Switches and LEDs Location of 1PRIU-C1**

### 3.4.5.3 LED Indication

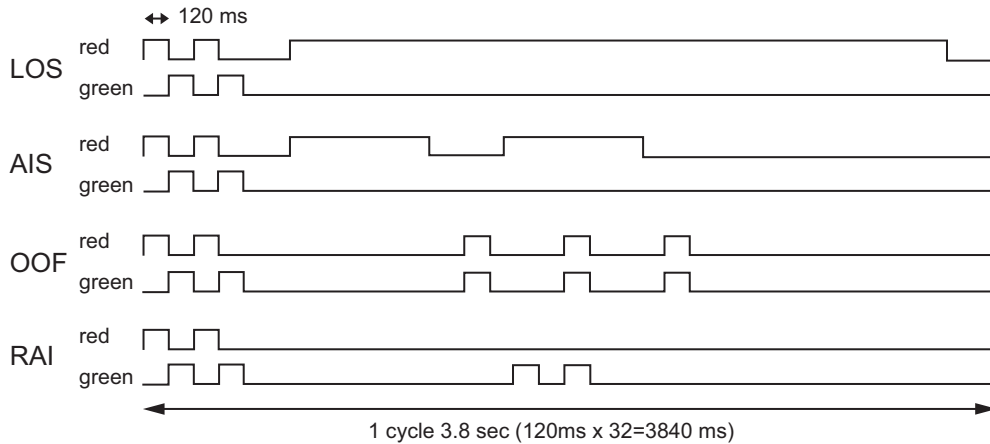
LED indications for the IP4WW-1PRIU-C1 are listed in following table. Each LED is listed with its associated function and LED and operational status.

**Table 2-14 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.	-
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 2-15 T1 LED Indications on page 2-57](#).



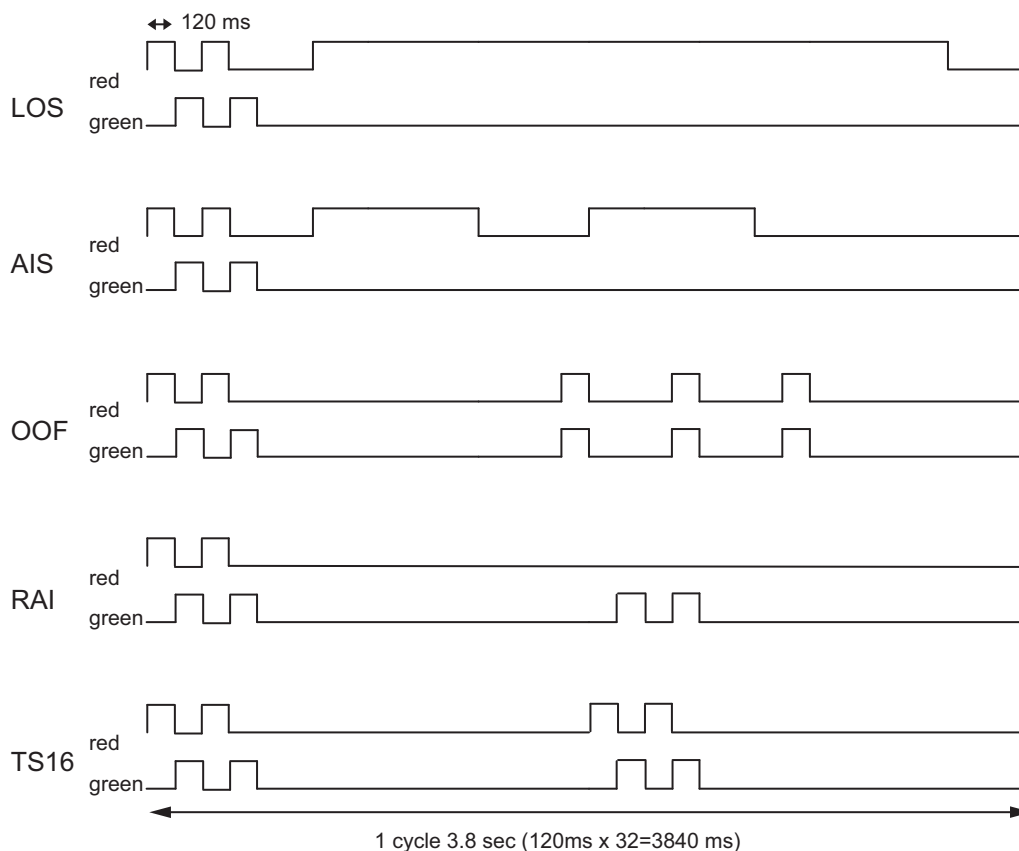
**Figure 2-81 1PRIU-C1 LED Indication Pattern of Layer 1 on T1 Unit**

**Table 2-15 T1 LED Indications**

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

## E1 Alarm Mode

Refer to following figure for LED pattern information. LED indications for the E1 are listed in [Table 2-16 E1 LED Indications on page 2-58](#).



**Figure 2-82 1PRIU-C1 LED Indication Pattern of Layer 1 on E1 Unit**

**Table 2-16 E1 LED Indications**

Alarm	Details of the alarm	The LED indication pattern
<b>LOS</b>	LOS (Loss of Signal (Red Alarm)) No Signal (Analog Interface)	Following an alarm blink (red, green, red, green), a red LED lighting up.
<b>AIS</b>	AIS (Alarm Indication Signal (Blue Alarm))	Following an alarm blink (red, green, red, green), a red LED flashes on and off slowly twice
<b>OOF</b>	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.
<b>RAI</b>	RAI (Remote Alarm Indication (Yellow Alarm))	Following an alarm blink (red, green, red, green), a green LED flashes on and off twice.
<b>TS16</b>	TS16 (Receive Time Slot 16 all Alarm)	An alarm blink repeat twice by 1 cycle.
<b>No alarm</b>	System does LED control	

## 3.5 Power Failure Transfer (408E-A1 only)


### 3.5.1 General

In the event of AC power failure, the specified trunks are directly connected to the specified extension ports as below. And SLT must be connected to the specified extension. The multiline telephone (4W) does not work when connected to the specified extension port.

Trunk Port No. 5 → Extension Port No. 16

Trunk Port No. 9 → Extension Port No. 24

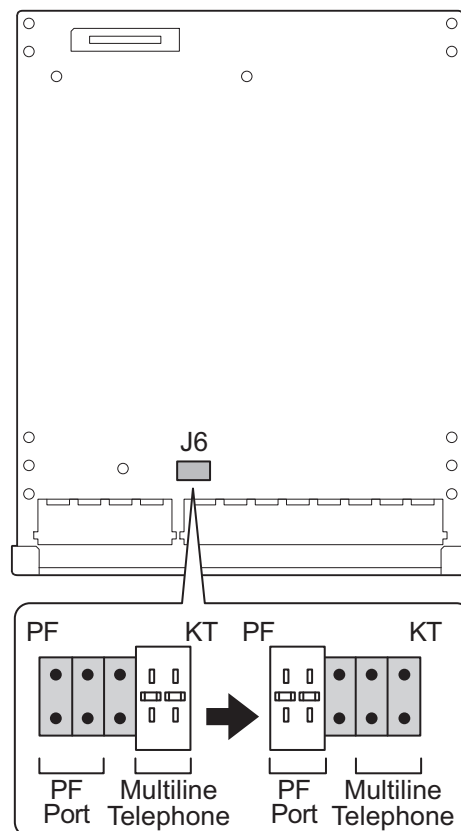
Trunk Port No. 13 → Extension Port No. 32

-  • The connected extension must be SLT (Single Line Telephone).
- Hardware switch (J6) must be set from "KT" to "PF" side (default: KT) when use the Power failure transfer circuit.
- Refer to [Power Failure Transfer on page 2-17](#) for Power Failure Transfer of 408M-A1.

### 3.5.2 Power Failure Setting

Hardware switch (J6) must be set from "KT" to "PF" side (default: KT) when use the Power failure transfer circuit.

1. Use Needle-nose pliers to change the switch position of "J6" from **"KT" to "PF"** as below. (Default: KT)



**Figure 2-83 PF/KT Switch of 408E-A1**

2. Connect SLT to the extension port No. 16/24/32.

## SECTION 4 INSTALLING THE OPTIONAL INTERFACE CARDS

### 4.1 Installing the Expansion Memory Card (MEMDB-C1)

#### 4.1.1 General

The Memory expansion daughter board (IP4[ ]-MEMDB-C1) provides additional memory for the system to use following features;

- A System with multiple KSUs
- To use VoIP Card (IP4WW-VOIPDB-C1)
- Remote Upgrade (Main Software)
- E-Mail Notification (InMail)
- VRS Channel increase from 4 to 16 channels
- VRS/InMail channel increase from 8 to 16 channels

This daughter board is mounted on the CPU card and provides the SDRAM and flash memories.

#### 4.1.2 Unpacking

**Table 2-17 MEMDB-C1 Packing List**

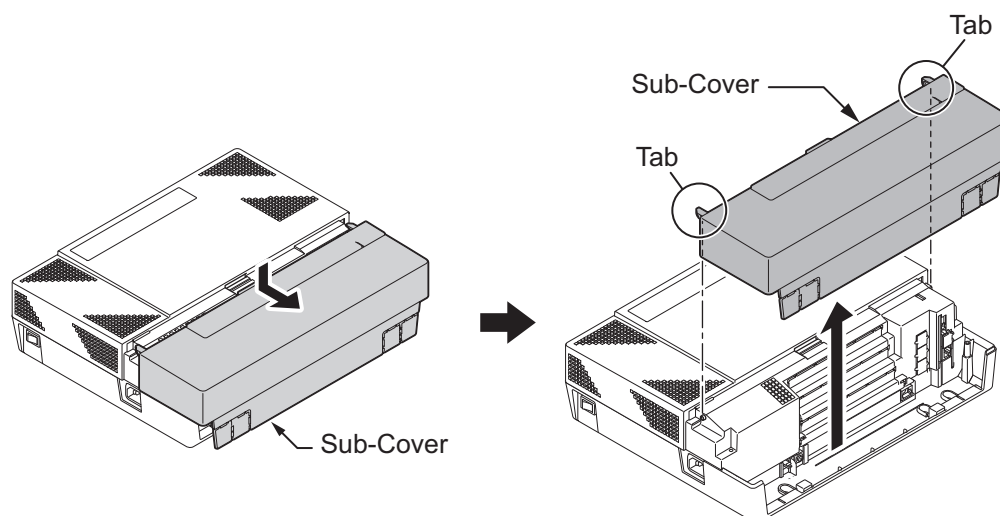
Items	List of Contents	QTY
IP4[ ]-MEMDB-C1	MEMDB-C1 PCB	1

#### 4.1.3 Installing the MEMDB PCB



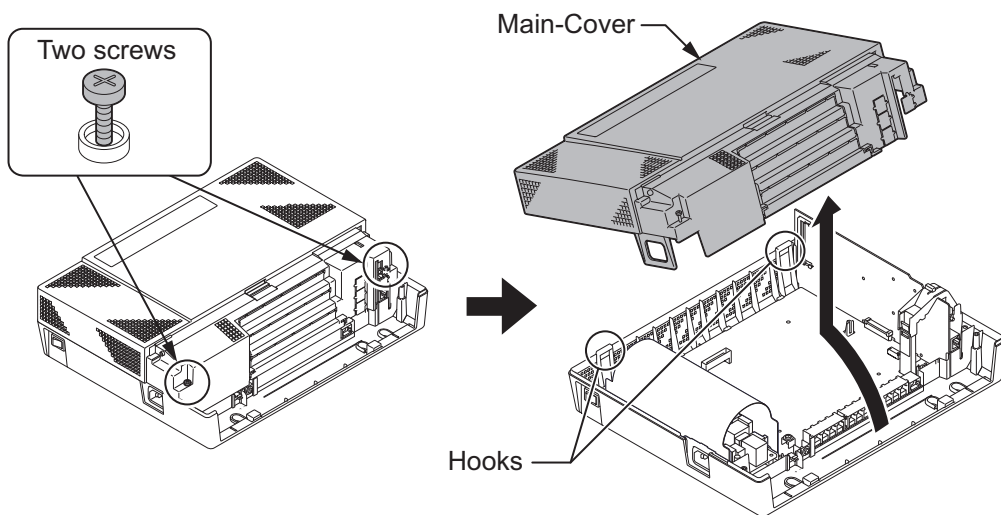
- *Do not remove or install the CPU card with power on.*
- *If Expansion KSU(s) are installed, turn the power on/off in the order of Expansion 3 KSU, Expansion 2 KSU, Expansion 1 KSU and then Main KSU.*

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



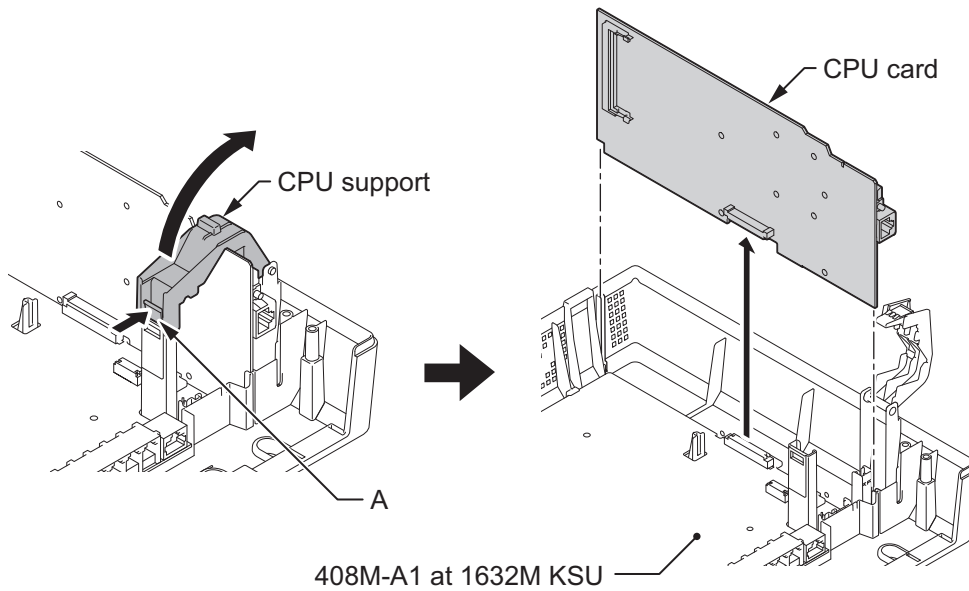
**Figure 2-84 Removing the Sub-Cover**

- Loosen two screws and remove the Main-Cover.




**Figure 2-85 Removing the Main-Cover**

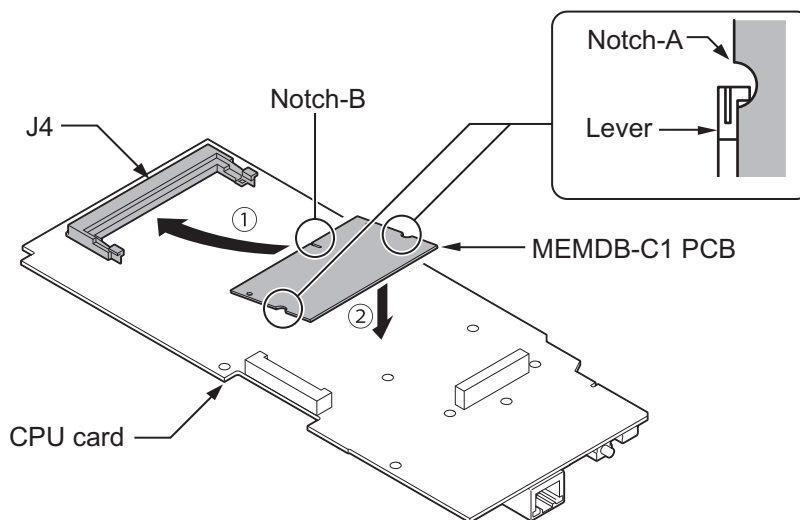
- Press tab A and lift the CPU support bracket. Remove the CPU card.



**Figure 2-86 Removing the CPU Card**

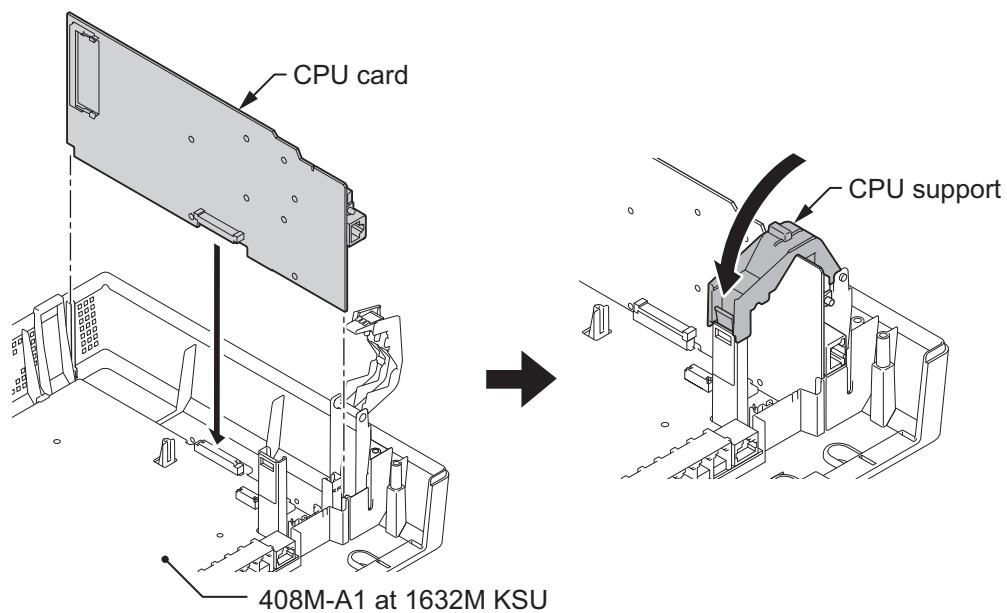
5. Insert the MEMDB-C1 daughter board to J4 socket on the CPU card and press down the MEMDB-C1 daughter board to secure.

 Both levers must be secured to notch-A.



**Figure 2-87 Installing the MEMDB PCB**

6. Reinstall the CPU card into the 408M-A1 mother board, and close the CPU support making sure the tab A locks into place.



**Figure 2-88 Installing the CPU Card**



- Replace the Main-Cover and fasten two screws.

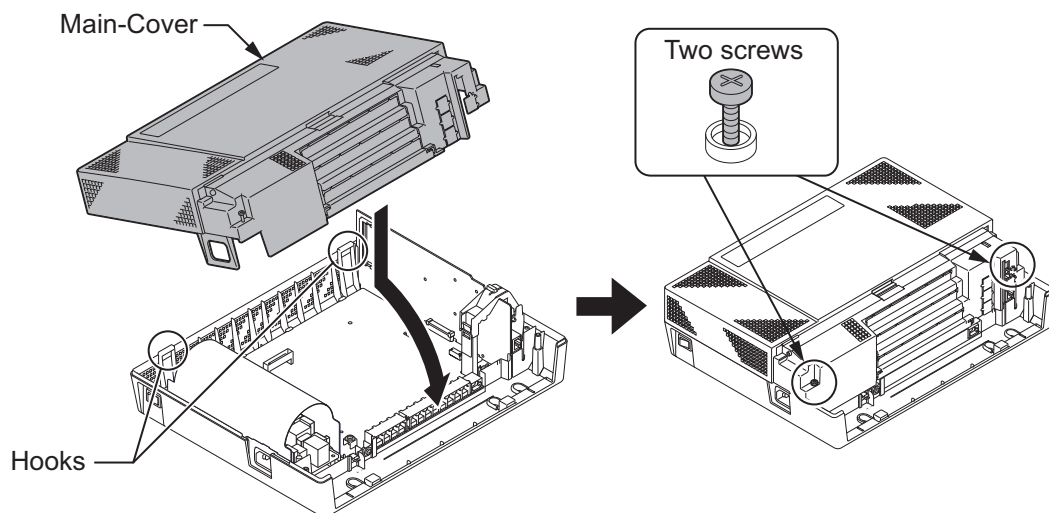


Figure 2-89 Replacing the Main-Cover

## 4.2 VoIP Card (VOIPDB-C1)

(This item is for V1.2 or higher)

### 4.2.1 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.

### 4.2.2 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

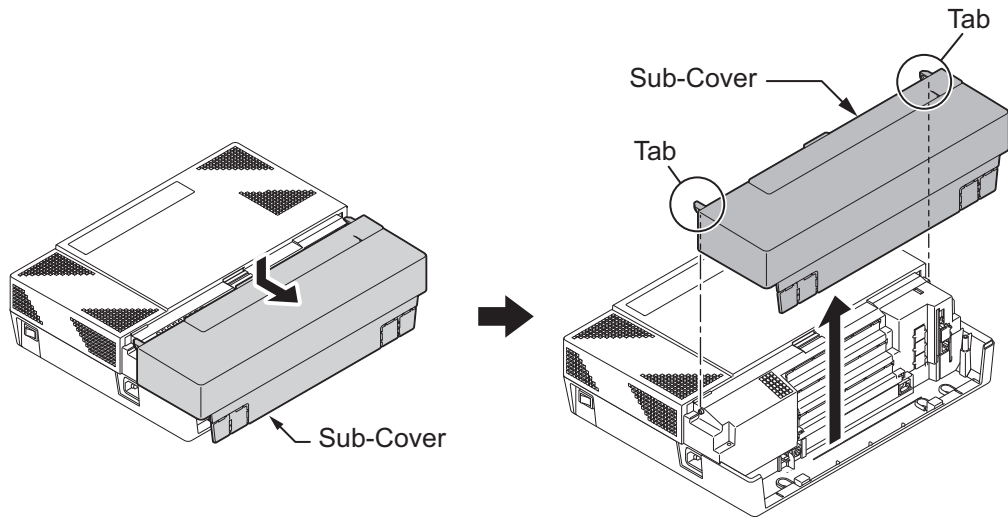
### 4.2.3 Installing the VOIPDB-C1 PCB



- 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 3 KSU, Expansion 2 KSU, Expansion 1 KSU and then Main KSU.*

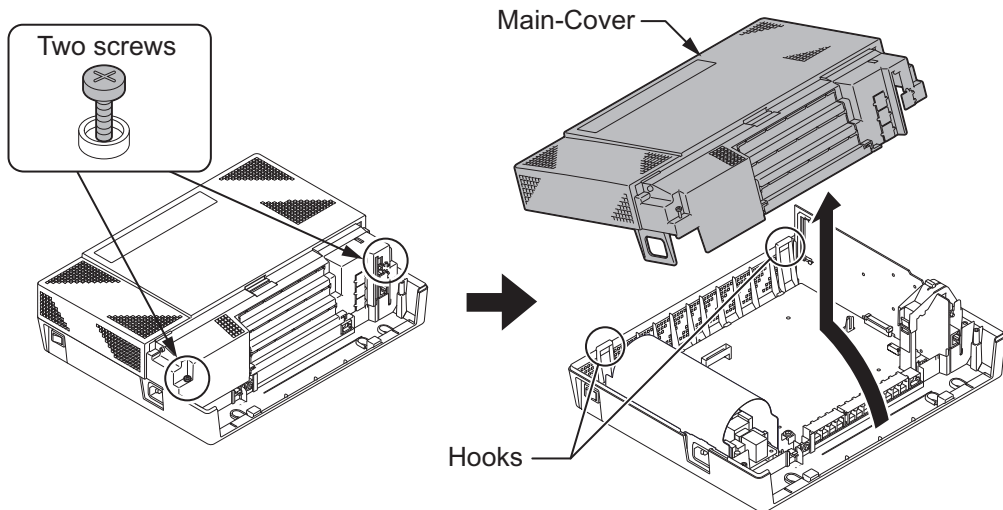
- Turn off the system power and disconnect AC cord.

2. Open and remove the Sub-Cover.



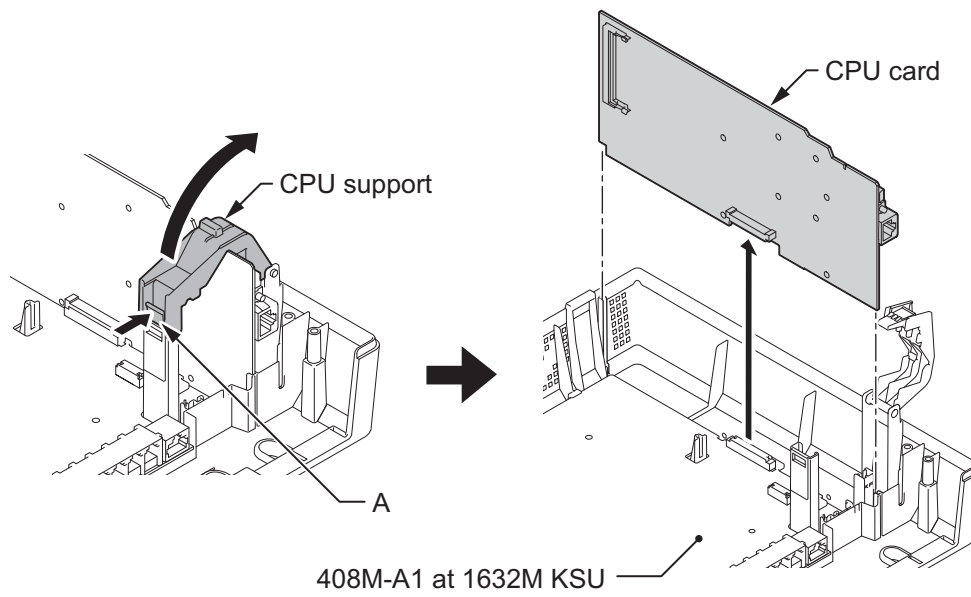
**Figure 2-90 Removing the Sub-Cover**

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



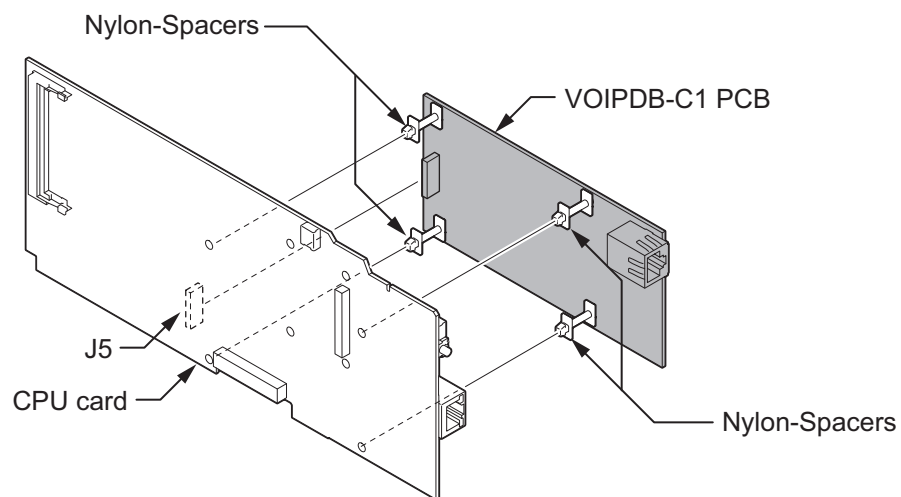
**Figure 2-91 Removing the Main-Cover**

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



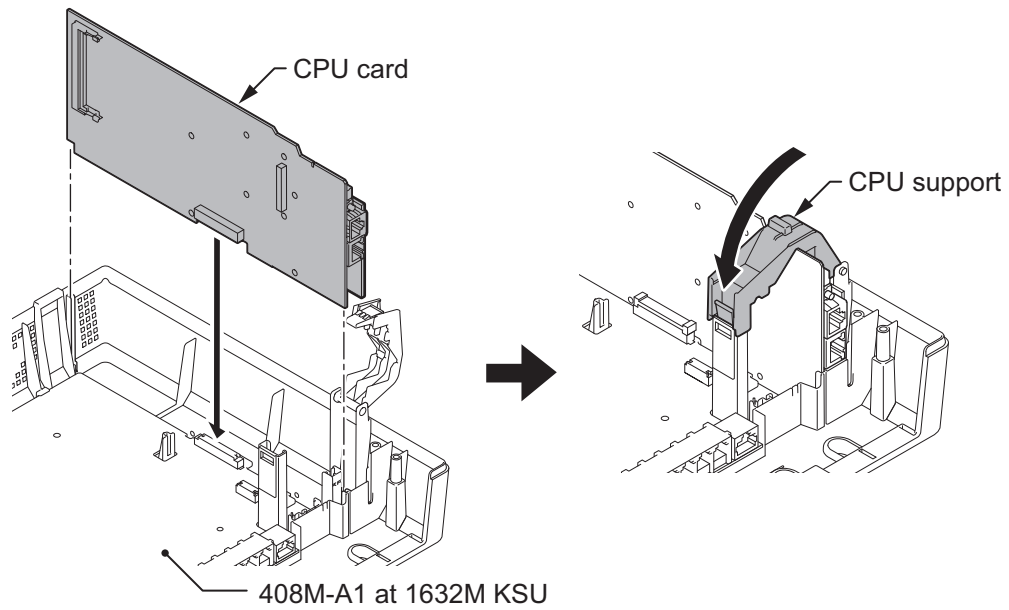
**Figure 2-92 Removing the CPU Card**

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



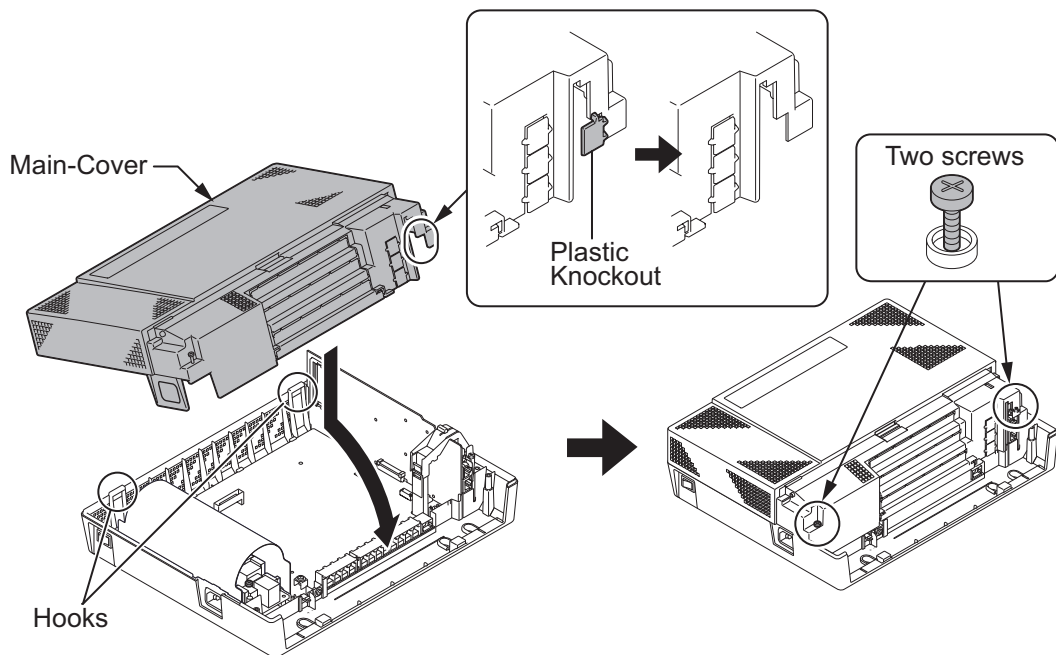
**Figure 2-93 Installing the VOIPDB-C1 PCB**

6. Reinstall the CPU card into the 408M-A1 mother board, and close the CPU Support making sure tab A locks into place.



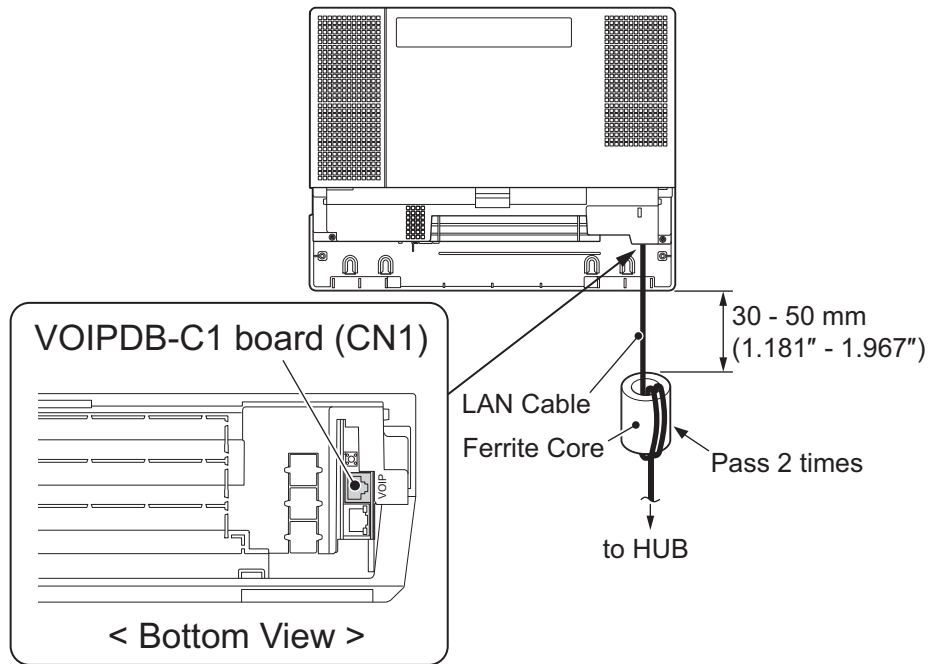
**Figure 2-94 Installing the CPU Card**

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



**Figure 2-95 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)

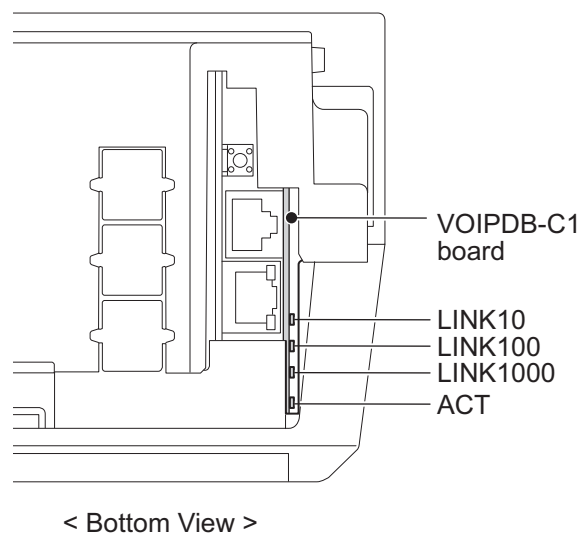


**Figure 2-96 Connecting a LAN Cable**

9. Refer to the SL1000 Programming Manual for detailed programming instructions.  
*The VoIP feature requires system configuration.*  
*For the details of setting and operation, refer to the SL1000 Features & Specifications Manual (separate issue).*

**4.2.4 LED Indication**

LED indications for the IP4WW-VOIPDB-C1 are listed [Table 2-19 VOIPDB LED Indications on page 2-68](#). Each LED is listed with its associated function and operational status.



**Figure 2-97 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.
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.

### 4.3 VRS/Voice Mail Card (PZ-VM21)

#### 4.3.1 General

The PZ-VM21 daughter board provides additional DSP resource with 8/16 ch VRS (Voice Response system) and Voice Mail Service (a compact flash card (CFVRS/CFVMS/CFVML) is required) and a Single Channel V.34 (33.6 kbps) modem for remote maintenance functions. The daughter board is installed onto the CPU card.

#### 4.3.2 Unpacking

**Table 2-21 PZ-VM21 Packing List**

Items	List of Contents	QTY
PZ-VM21	PZ-VM21 PCB	1
	Nylon Spacers	4

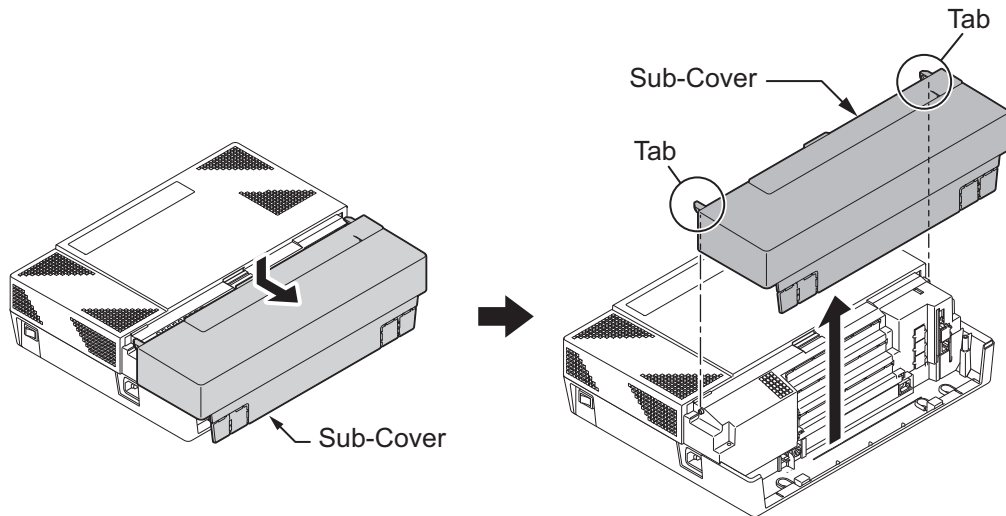
#### 4.3.3 Installing the PZ-VM21 PCB



- *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 3 KSU, Expansion 2 KSU, Expansion 1 KSU and then Main KSU.*

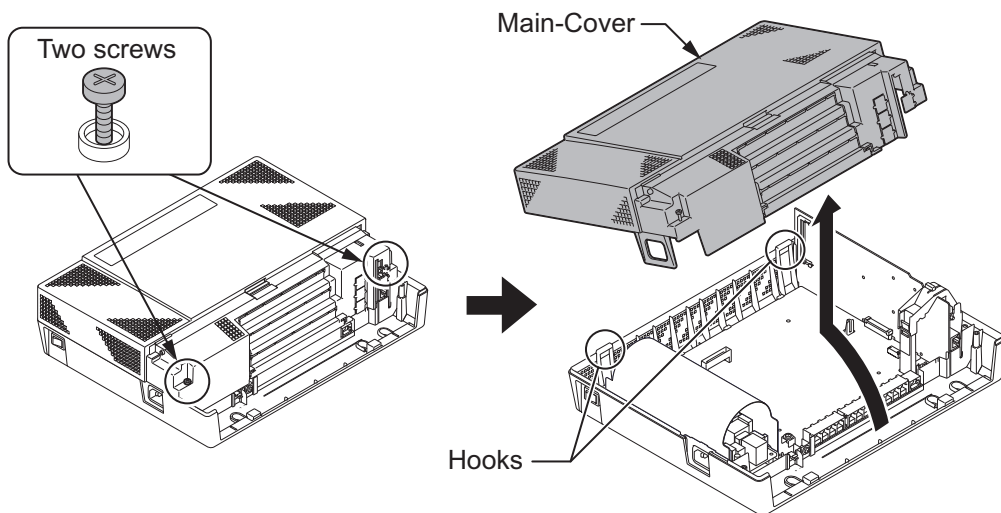
1. Turn off the system power and disconnect AC cord.

2. Open and remove the Sub-Cover.



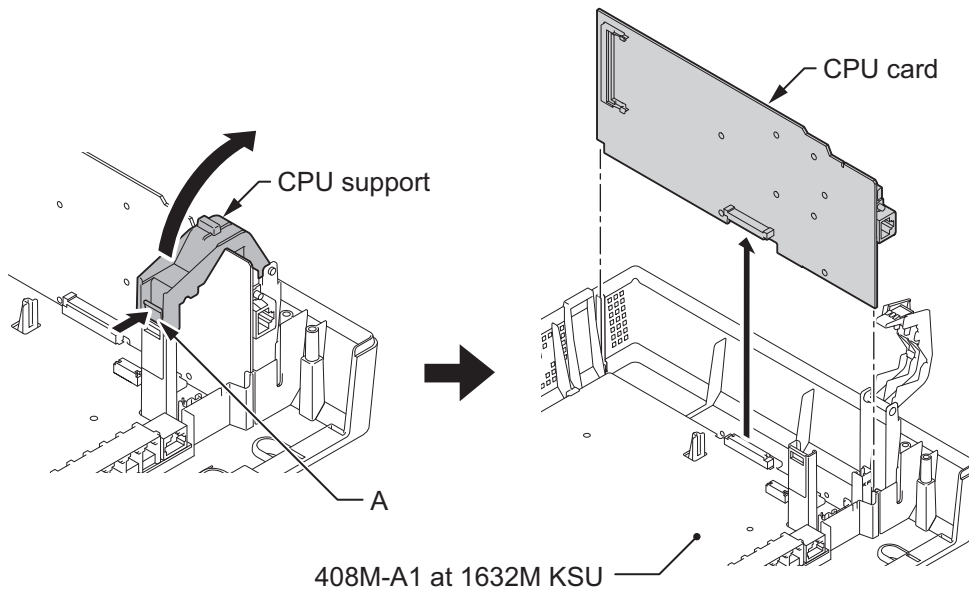
**Figure 2-98 Removing the Sub-Cover**

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



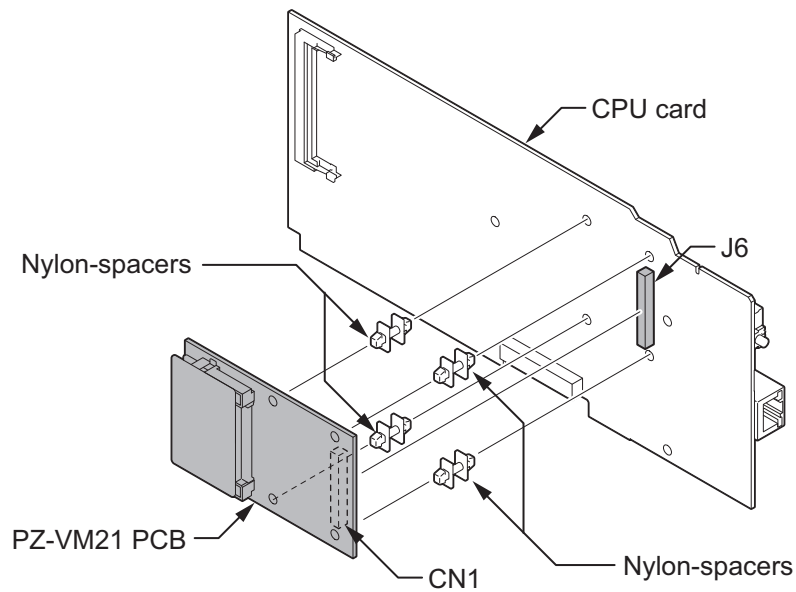
**Figure 2-99 Removing the Main-Cover**

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



**Figure 2-100 Removing the CPU Card**

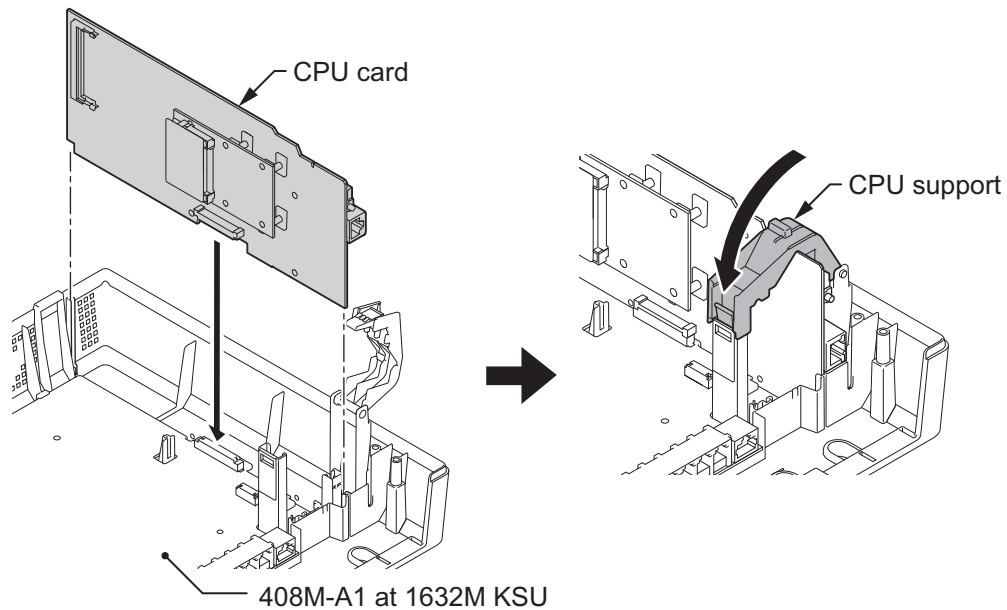
- Connect the PZ-VM21 daughter board to the J6 connector using four Nylon-spacers on the CPU card.



**Figure 2-101 Installing the PZ-VM21 PCB**

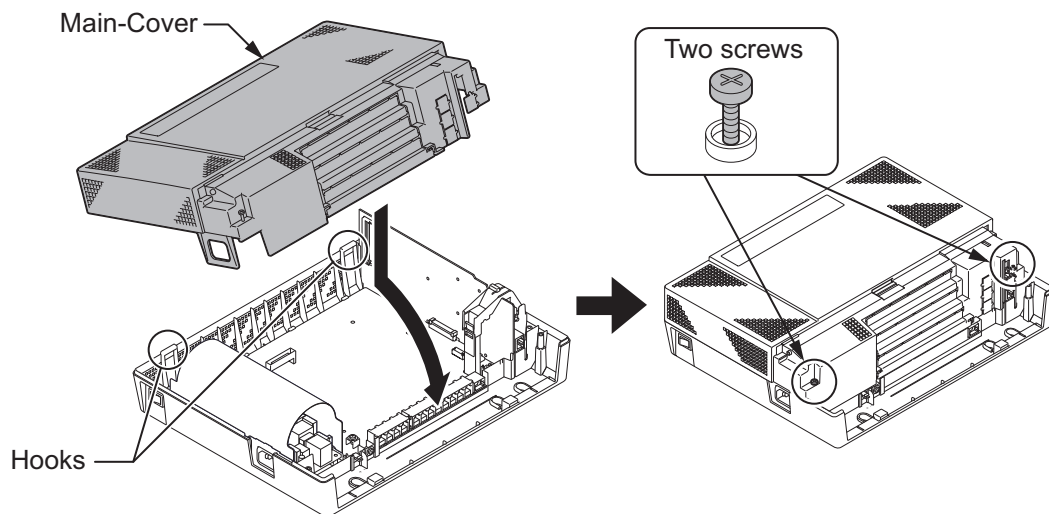


- Reinstall the CPU card into the 408M-A1 mother board, and close the CPU Support making sure tab A locks into place.



**Figure 2-102 Installing the CPU Card**

- Replace the Main-Cover and fasten two screws.



**Figure 2-103 Replacing the Main-Cover**

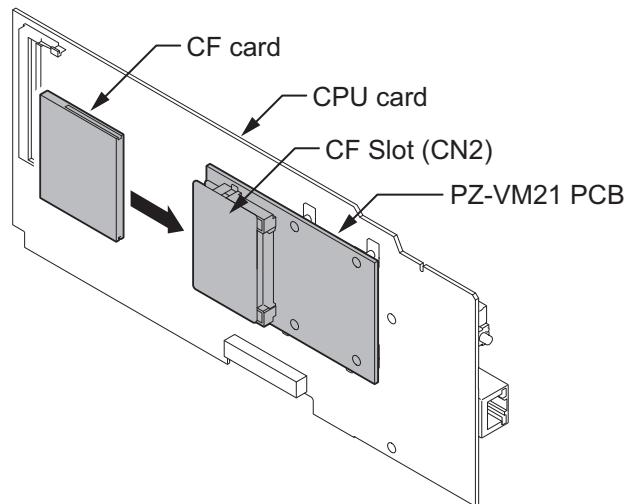
#### 4.4 Installing the CF Card (CFVRS/CFVMS/CFVML)



- 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 3 KSU, Expansion 2 KSU, Expansion 1 KSU and then Main KSU.*
- When installing a compact flash card onto the PZ-VM21 the system MUST be powered off. Never install or uninstall the compact flash card while the system is under power.*

- 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 2-104 Installing the CF Card**

3. Reinstall the CPU card into the 408M-A1 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 SL1000 system.

- IP4WW-12TXH-A-TEL
- IP4WW-24TXH-A-TEL
- IP4WW-24TIXH-C-TEL (IP) (V1.2 Added)

#### 5.1.1 Location of Controls

(24TIXH (IP) is for V1.2 or higher)

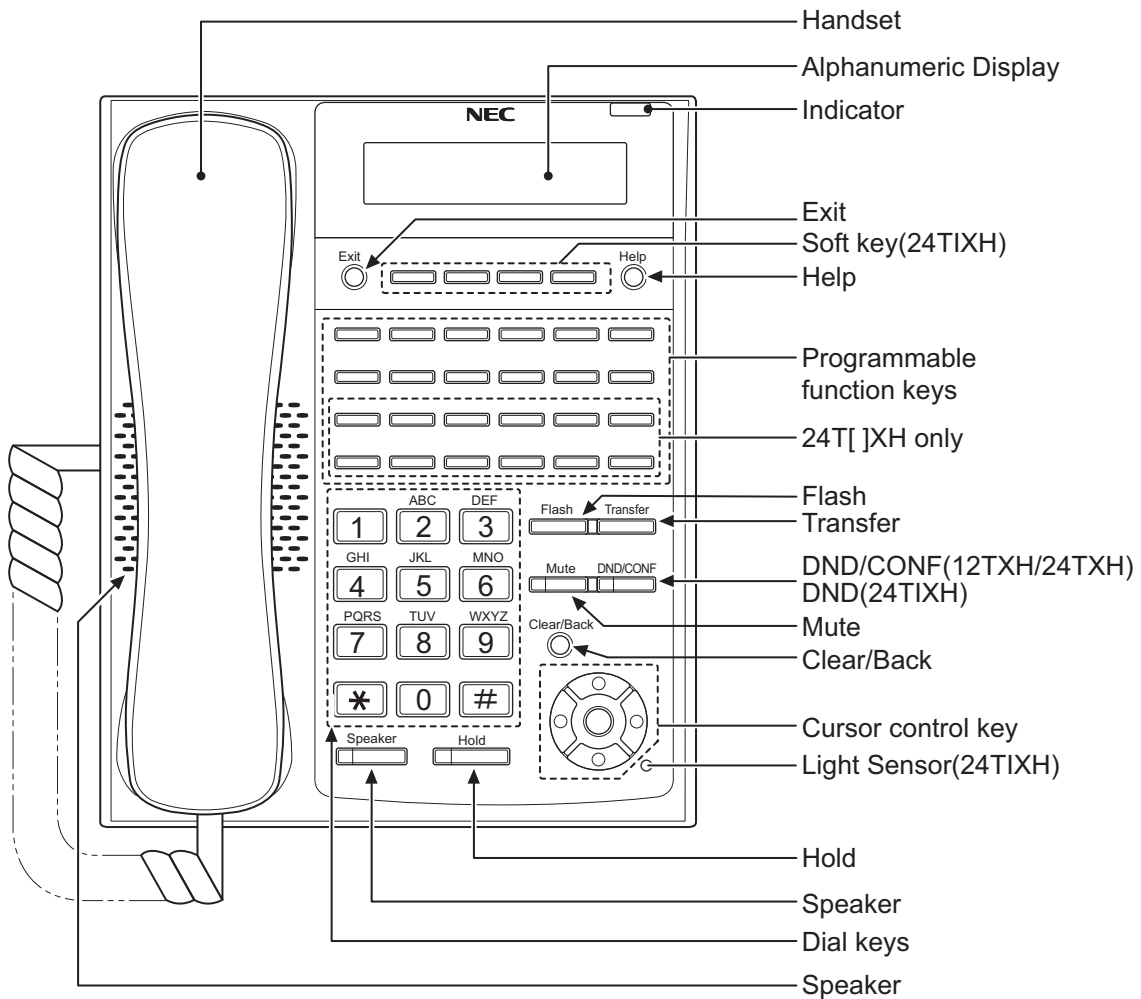


Figure 2-105 Multiline Telephone (12TXH/24TXH/24TIXH (IP))

Table 2-22 Multiline Telephone Functions (12TXH/24TXH/24TIXH (IP))

Functions	12TXH	24TXH	24TIXH
Programmable Keys	12 (Busy lamp field: Red-Green)	24 (Busy lamp field: Red-Green)	24 (Busy lamp field: Red-Green)
Display	16-digit x 2 lines	16-digit x 2 lines	24-digit x 3 lines with Backlit
Handsfree	Half-duplex	Half-duplex	Full-duplex
Wall-Mount Kit	Yes (Built-in)	Yes (Built-in)	Yes (Optional)

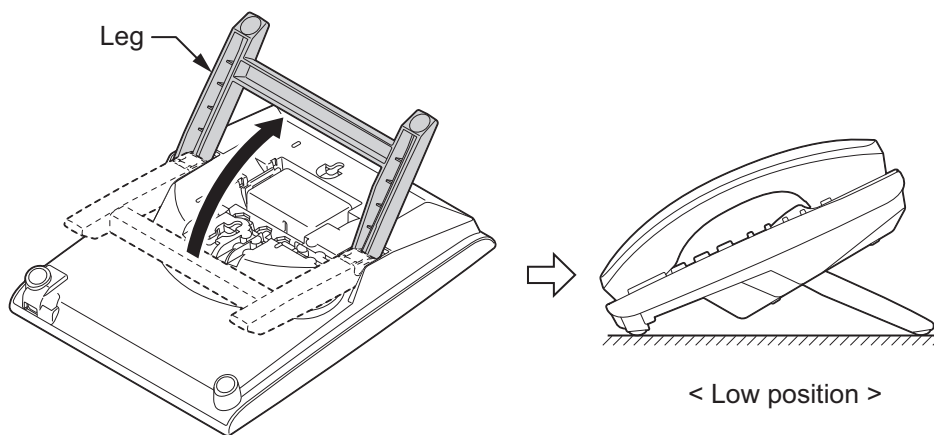
Functions	12TXH	24TXH	24TIXH
SoftKeys	No	No	Yes
Backlit Dial Pad	No	No	Yes
Incoming LED	No	No	2 colors (Red/Green)
Connected to	Hybrid Extension Port	Hybrid Extension Port	Ethernet Port on the Network
Headset Port	No	No	Yes
Power Feeding	-	-	AC Adapter (DC27 V,1 A) or PoE (IEEE802.3af)

### 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).

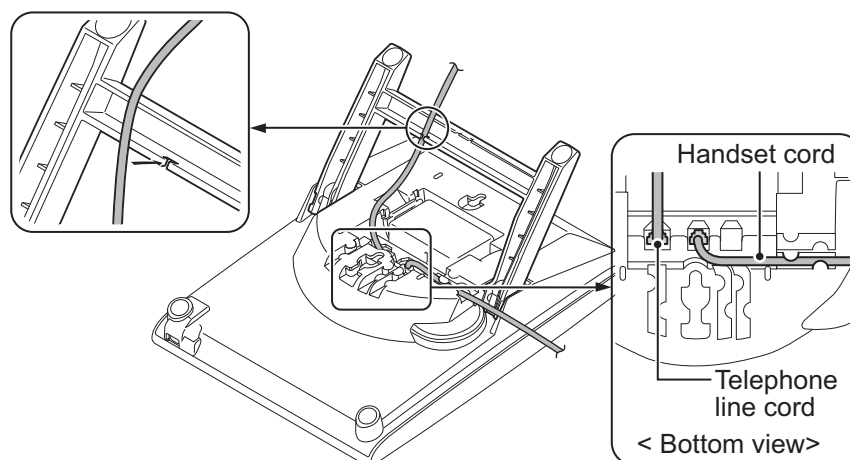
#### 5.1.2.1 Low Position Setting

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



**Figure 2-106 Leg Setting for Low Position**

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

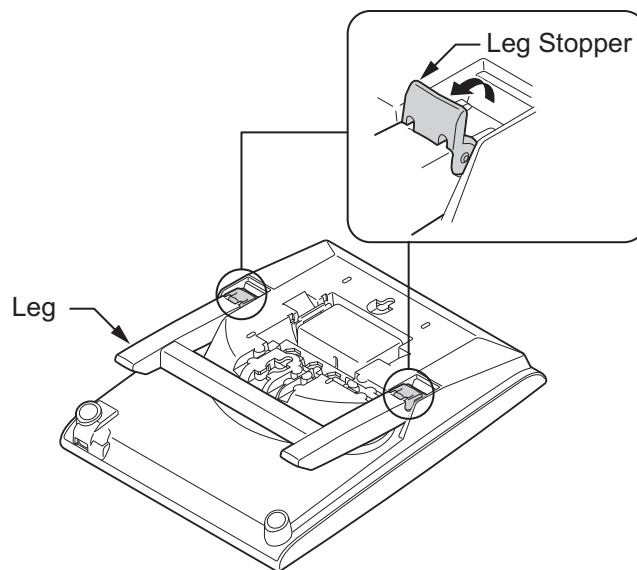


**Figure 2-107 Cabling of Multiline Telephone**

4. Turn telephone over (button side up).

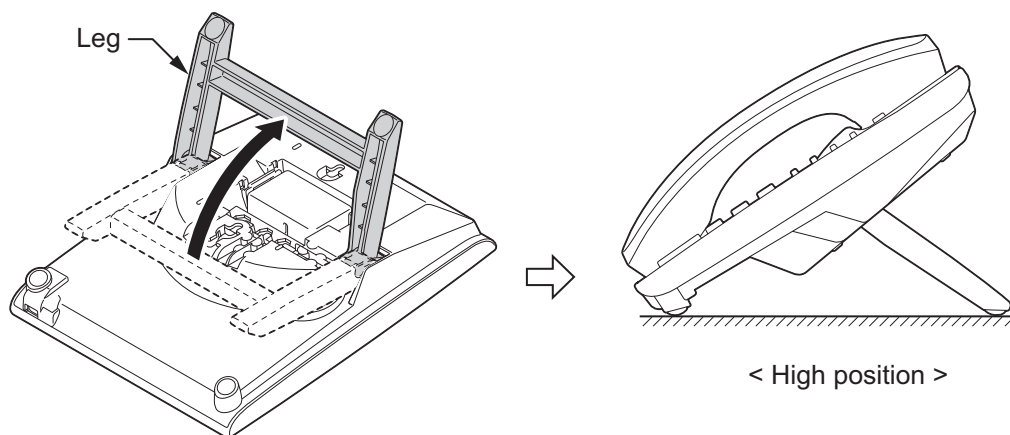
### 5.1.2.2 High position setting

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



**Figure 2-108 Setting for High Position**

3. Adjust the leg to desired height.

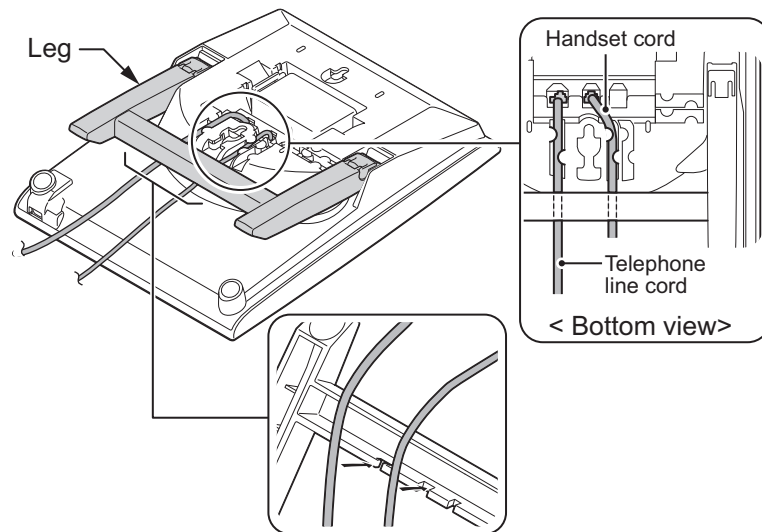


**Figure 2-109 Leg Setting for High Position**

4. Lead the Line and Handset cords through the applicable grooves.  
(Refer to [Figure 2-107 Cabling of Multiline Telephone on page 2-74](#))

### 5.1.3 Wall-Mounting the Multiline Telephone

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

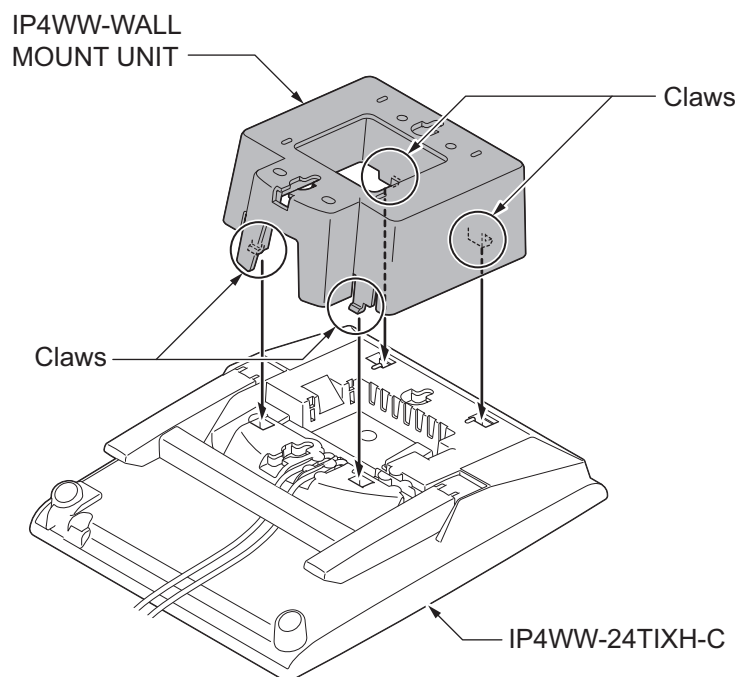


**Figure 2-110 Cabling for Wall-Mount**



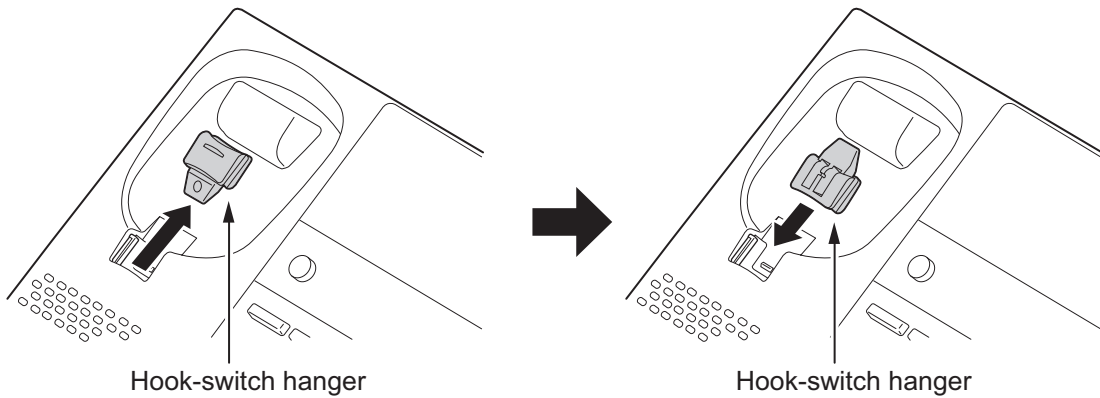
**For IP4WW-24TIXH-C only: (V1.2 Added)**

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



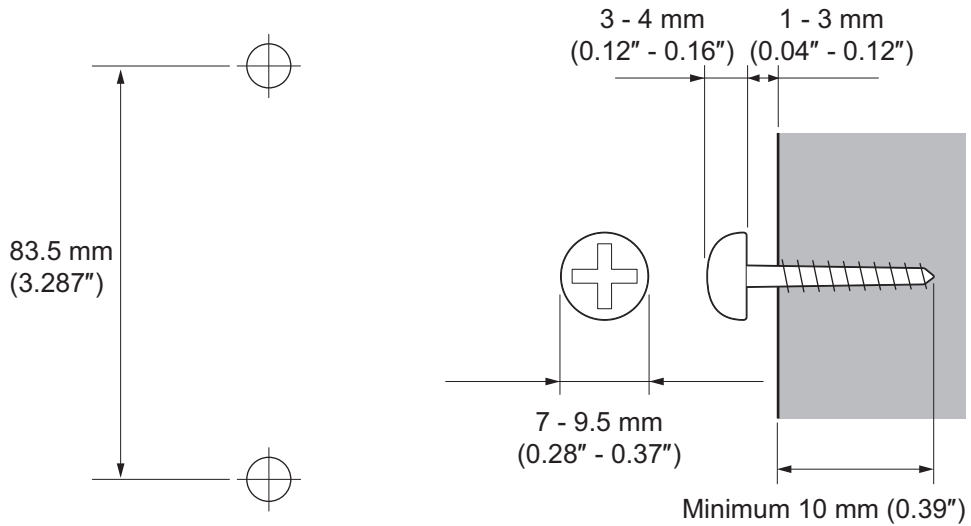
**Figure 2-111 Wall-Mount Unit - 24TIXH-C**

- Remove the switch-hook from the unit. Turn the tab toward the top. Then slide the hook-switch into position. Refer to [Figure 2-112 Hook-Switch Hanger](#) on page 2-77.



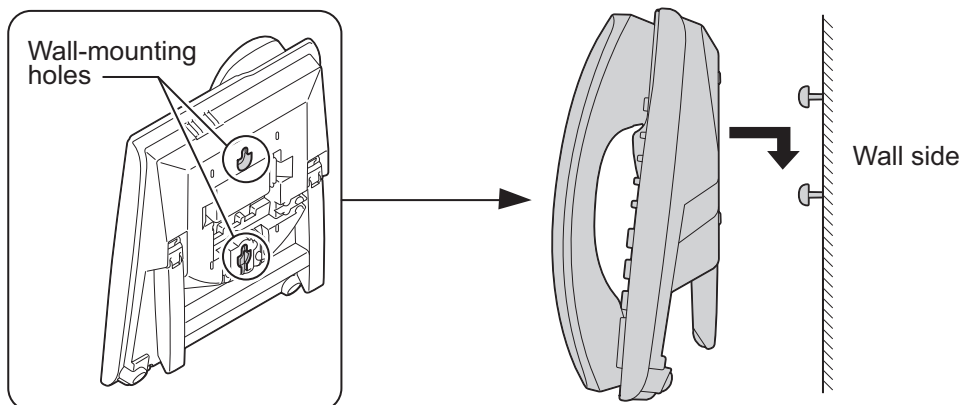
**Figure 2-112 Hook-Switch Hanger**

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



**Figure 2-113 Wall-Mount Screw Guide**

- Mount the telephone on the wall.



**Figure 2-114 Mounting the Multiline Telephone**

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

(This item is for V1.2 or higher)

### 5.2.1 System Connection

The IP Multiline Telephone is connected via HUB.

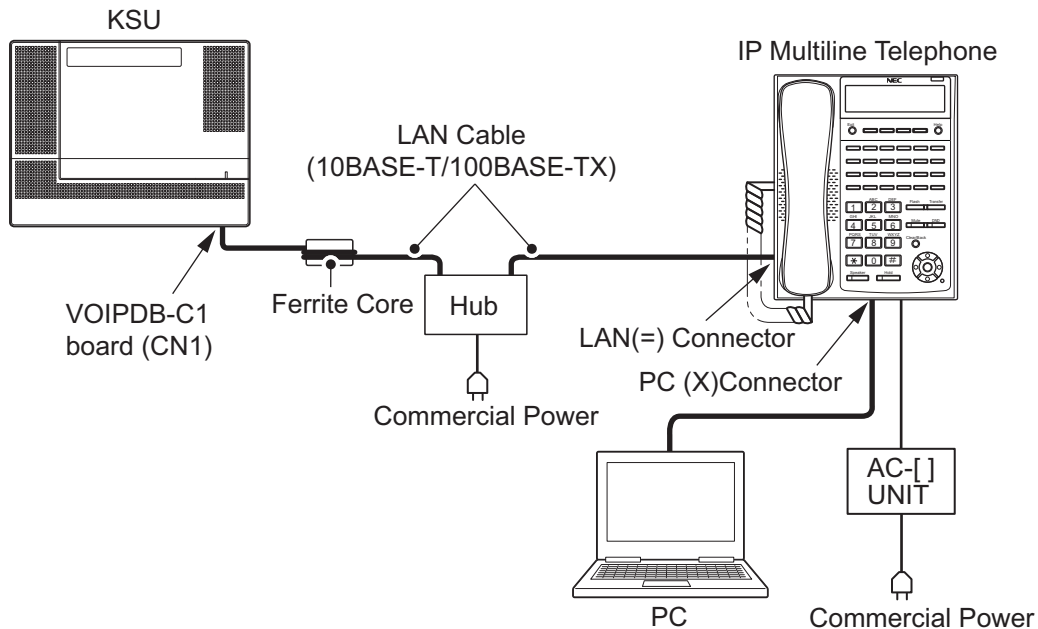


Figure 2-115 IP Multiline Telephone Connection

### 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.

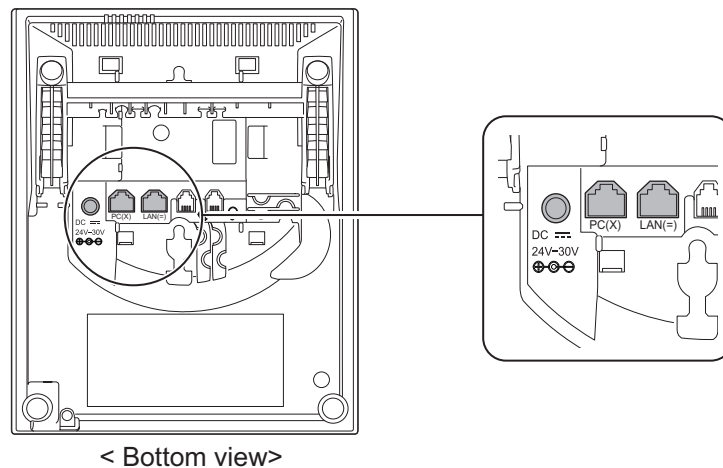


Figure 2-116 IP Multiline Telephone Connectors



### 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-LE 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-A Console can be installed on the last hybrid extension ports (ST8/ST16/ST24) of each 408M-A1/408E-A1/008M-A1 card directly. The pair extension for the DSS Console is assigned using system programming.

### 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.

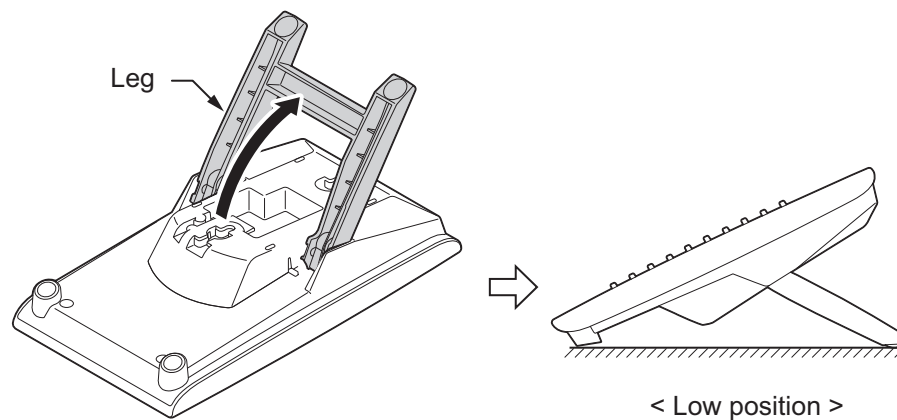
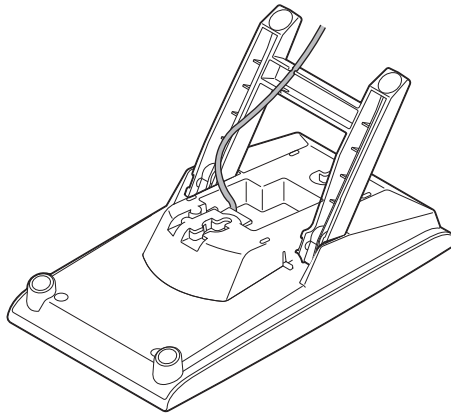


Figure 2-117 Low Position Setting

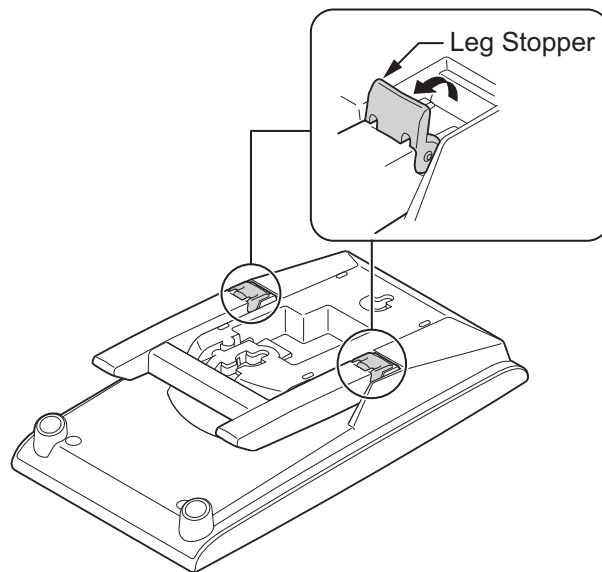
3. Lead the Line cord through the applicable grooves.



**Figure 2-118 Cabling of DSS**

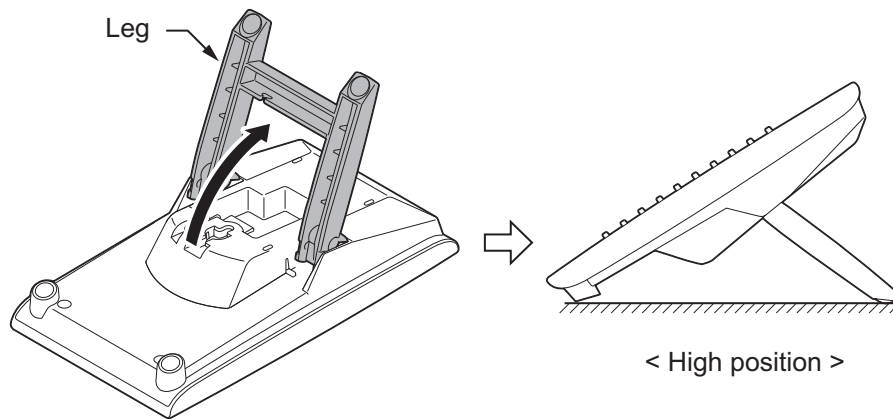
### 5.3.1.2 High position setting

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



**Figure 2-119 Leg Stopper of DSS Console**

3. Adjust the leg to desired height.

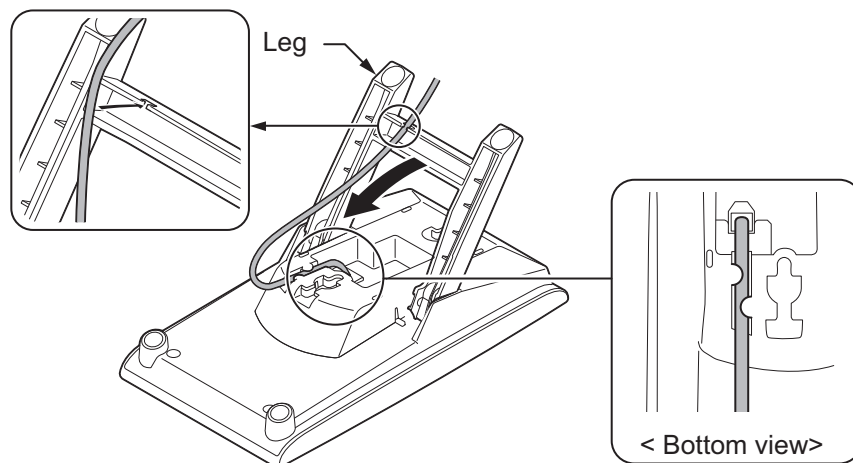


**Figure 2-120 High Position Setting**

4. Lead the Line cord through the applicable grooves.  
(Refer to [Figure 2-118 Cabling of DSS on page 2-80](#))

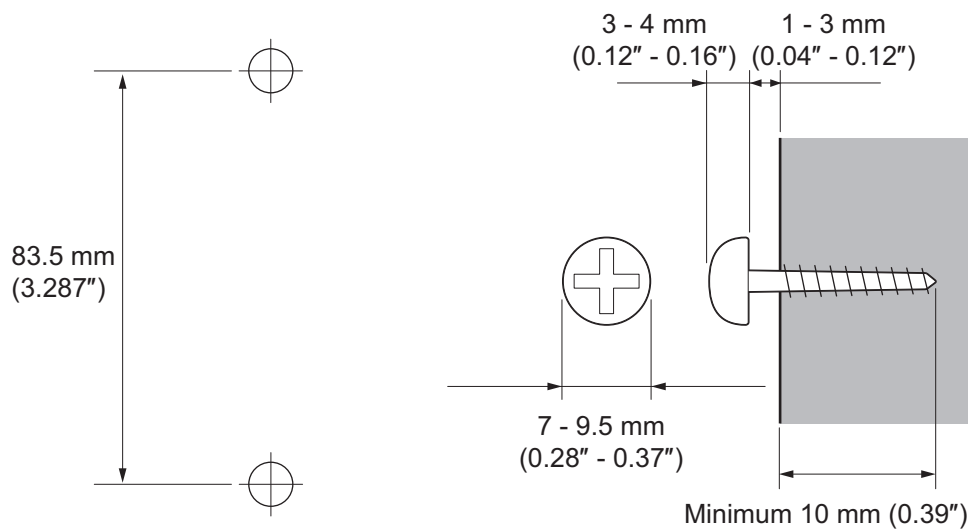
### 5.3.2 Wall-Mounting the DSS Console

1. Lift the leg and lead the cable through the applicable grooves. Refer to [Figure 2-121 Cabling for Wall-Mount](#) on page 2-81. Lower leg to stowed position.



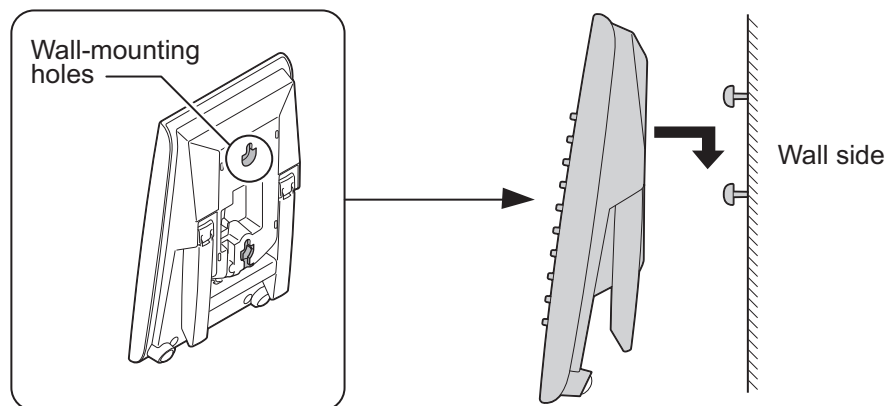
**Figure 2-121 Cabling for Wall-Mount**

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



**Figure 2-122 Wall-Mount Screw Guide**

3. Mount the DSS Console to the wall.



**Figure 2-123 Mounting the DSS**

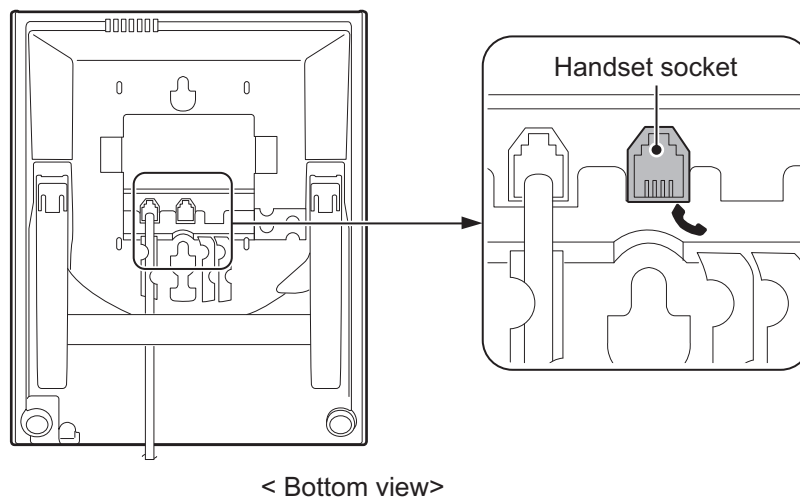
## 5.4 Installing the Headset

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.

### For 4-wire multiline telephone

1. Remove the Handset cord from the Multiline Telephone.

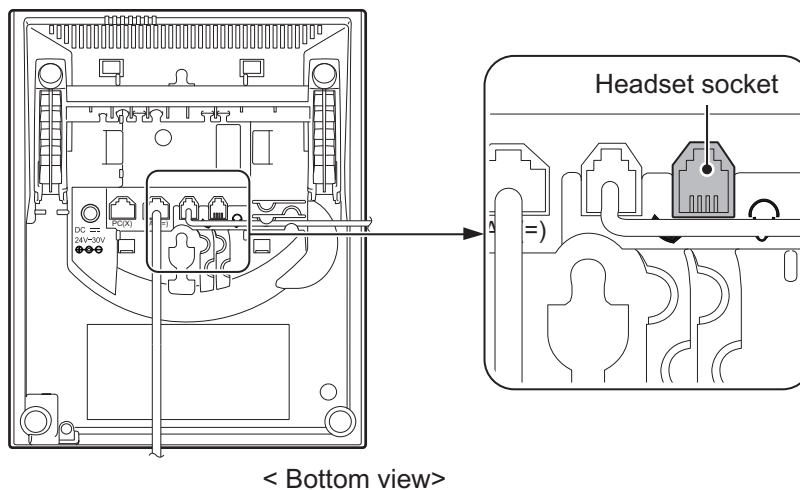
2. Connect the Headset cord into the Handset socket.



**Figure 2-124 Handset Socket**

### For IP multiline telephone (V1.2 or higher)

1. Connect the Headset cord into the Headset socket.



**Figure 2-125 Headset Socket**

#### <Recommended Headset>

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



*For the details of setting and operation, refer to the SL1000 Feature & Specifications Manual. (separate issue)*

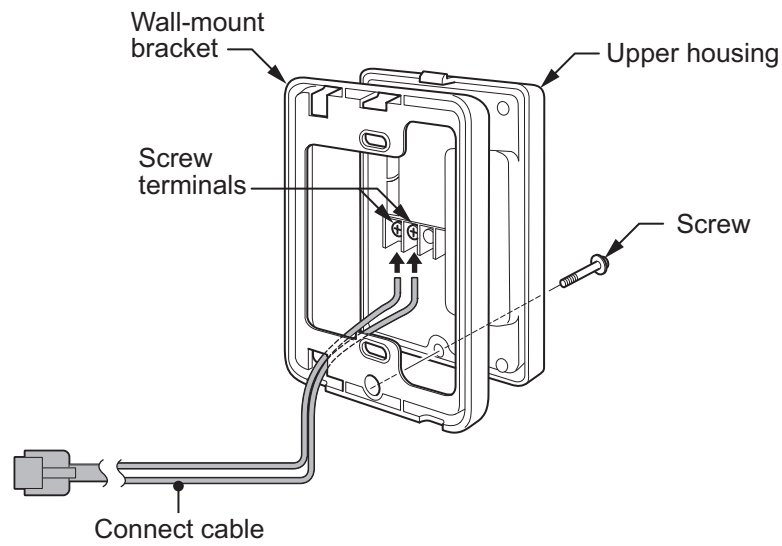
*The headset configuration is assigned using system programming.*

## 5.5 Installing the Doorphone Box

### 5.5.1 Wall-Mounting the Doorphone

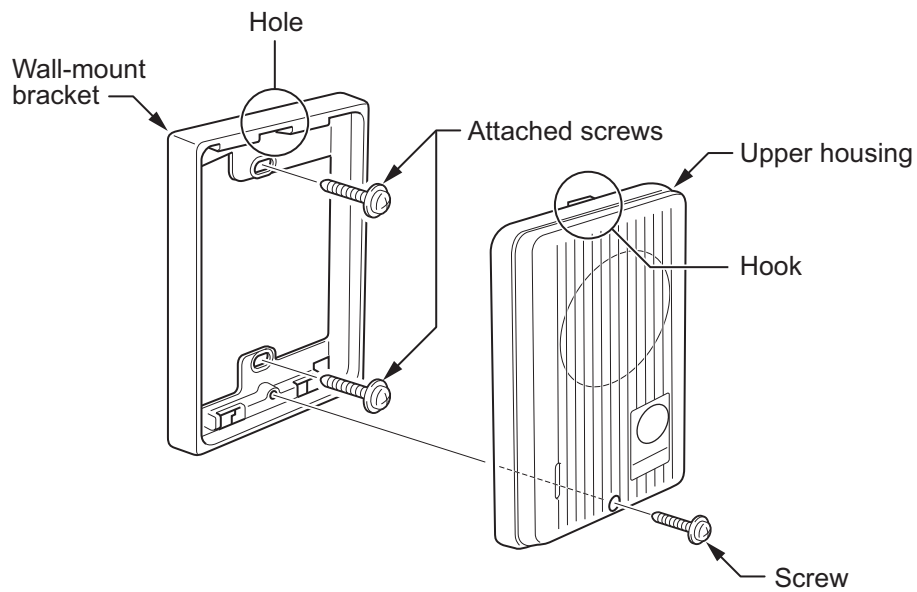
1. Remove the screw on the front of the Doorphone Box.
2. Remove the Wall-Mount bracket from the Doorphone Box.

3. Connect the cable to the screw terminals on the Doorphone box. (No polarity sensitive)



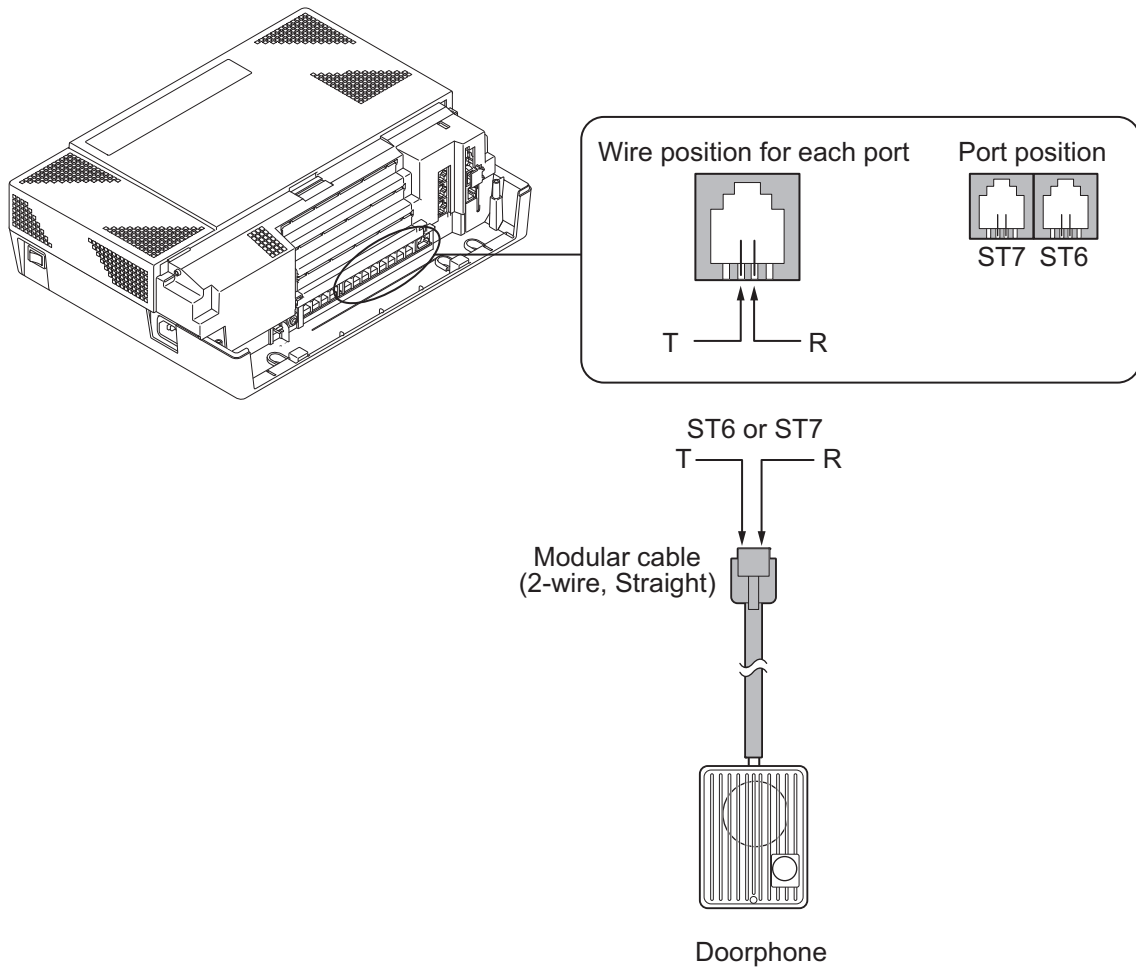
**Figure 2-126 Doorphone Box and Bracket**

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





**Figure 2-127 Doorphone**

### 5.5.2 Connecting the Doorphone



**Figure 2-128 Connecting the Doorphone**

-  *The Doorphone configuration is assigned using system programming.*
-  *The 3<sup>rd</sup> party Doorphone Boxes cannot be connected to the port.*

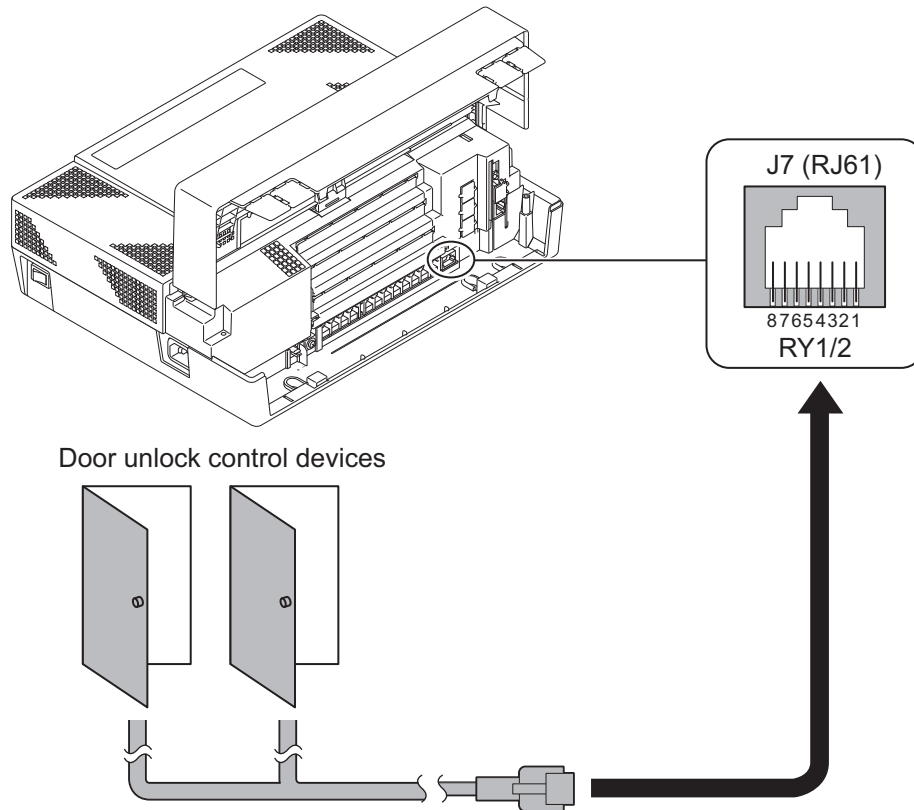
### 5.5.3 Doorphone Interface Specifications

**Table 2-23 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

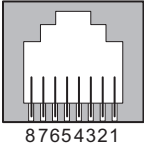
A maximum of two door unlock devices can be connected to each KSU.



**Figure 2-129 Connecting the Door Unlock Device**

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

**Table 2-24 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 2-25 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 trunk ports CO2 to CO4 can be used for audio port (External paging, External MOH, BGM)
- Audio port configuration is assigned using system programming.
- External paging can be set for the 408M-A1 PCB of each KSU except 3rd Expansion KSU.
- The External MOH and BGM can be set for the 408M-A1 PCB of the Main KSU only.

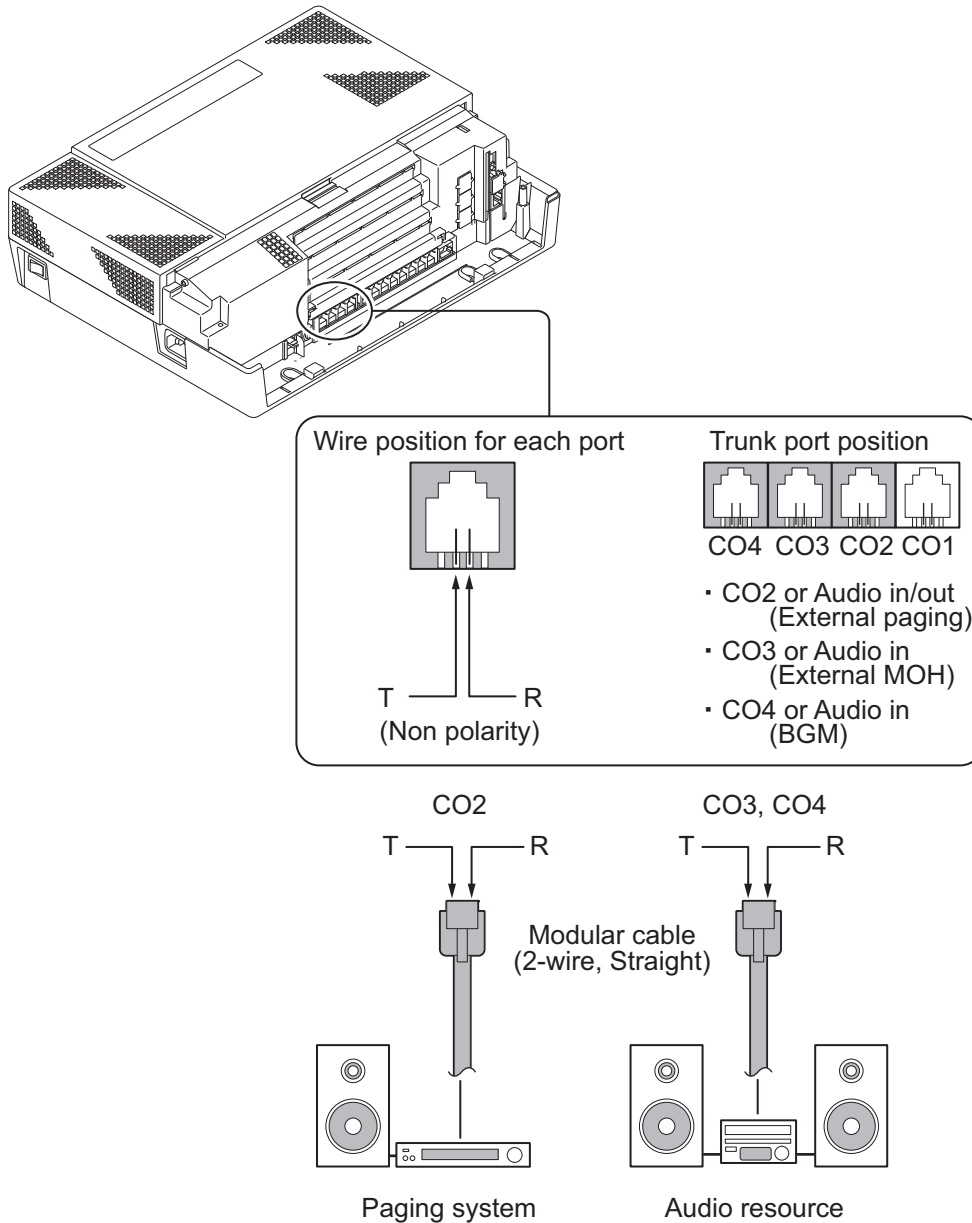


Figure 2-130 Connecting Audio Equipment

### 5.7.2 External Paging Output Specifications

Table 2-26 External Paging Output Specifications

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

Item	Specification
Maximum Output	400 mV RMS

### 5.7.3 BGM/External MOH Source Input Specifications

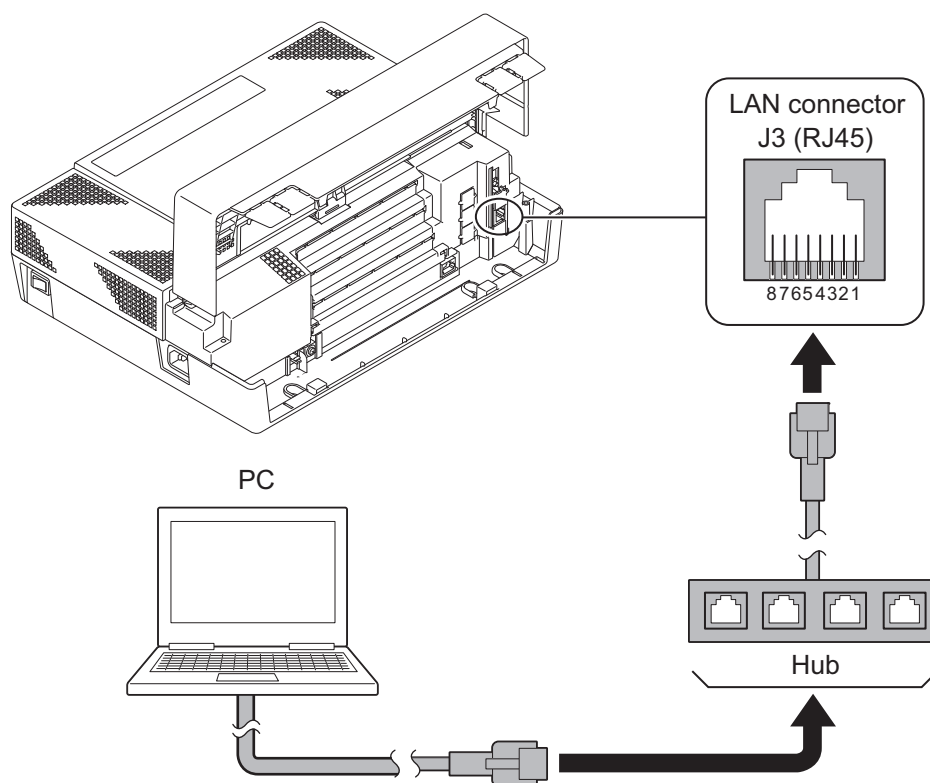
**Table 2-27 BGM/External MOH Source Input Specifications**

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 2-131 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.*

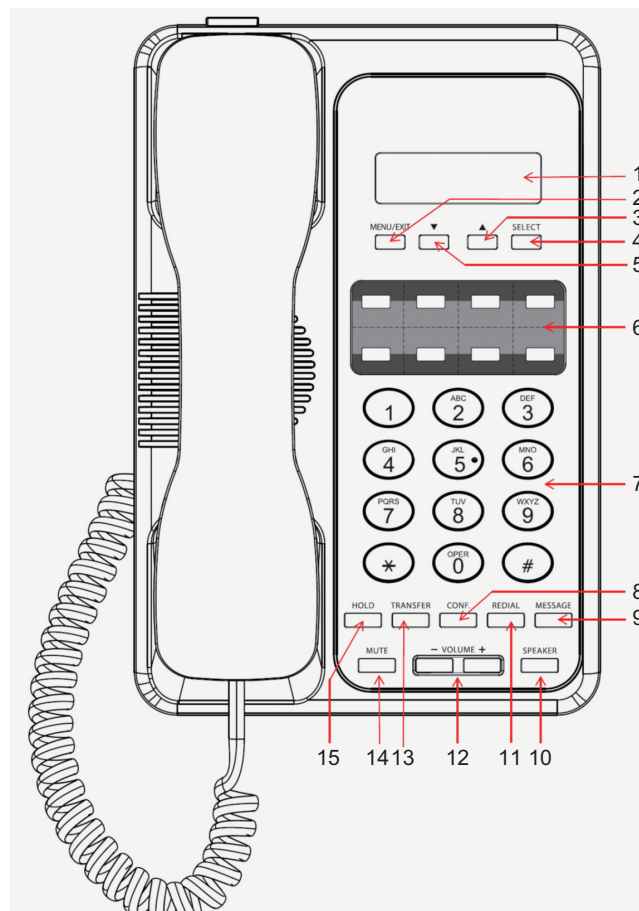
## 5.9 Installing the ITX-1DE-1W(BK) TEL (except for China) (V5.0 or higher)

### 5.9.1 Connecting the Phone

The following SIP phone is available in the SL1000 system.

### 5.9.2 Location of Controls

#### Front View



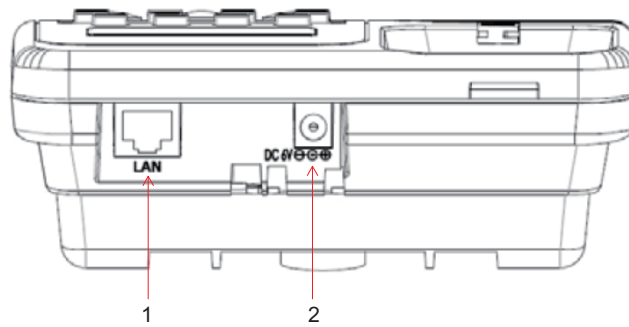
**Figure 2-132 SIP Phone - Front View**

**Table 2-28 Location of Controls (Front Side)**

No.	Name	Description
1	Display screen	Displays calls and status information.
2	MENU/ EXIT	Press to access the menu options or cancel your selection and return to the previous level.
3	UP	Press to scroll through lists and menus on the display.
4	SELECT	Press to enter a menu or confirm a selection.
5	DOWN	Press to scroll through lists and menus on the display.
6	Programmable speed dial keys	Press any of the keys to speed dial the preset contact number. (To write something on the sheet, please remove the plastic cover first)
7	Alphanumerical keys	Press these keys to enter phone numbers and texts.
8	CONF	Press to activate the three-way conference call.

No.	Name	Description
9	MESSAGE key with indicator	Press to listen to voice mail messages. Red light indicates unheard messages.
10	SPEAKER key with indicator	Activates the speakerphone to allow hands free conversations.
11	REDIAL	Press to call the last dialed number.
12	VOLUME	Press to increase or decrease the volume of the ringer tone, handset, or speakerphone.
13	TRANSFER	Press to transfer an active call to another phone on the system.
14	MUTE key with indicator	Press to mute MIC.
15	HOLD key with indicator	Press to put an active call on hold.

**Back View**



**Figure 2-133 SIP Phone - Back View**

**Table 2-29 Location of Controls (Back Side)**

No.	Name	Description
1	LAN port	Connects to switch, or hub
2	DC Jack	DC 6V Power Jack, it is covered by a cap

### 5.9.3 System Connection

1. Connect the LAN Network 10Base-T/100Base-TX cable to the LAN(=) connector via PoE Hub.

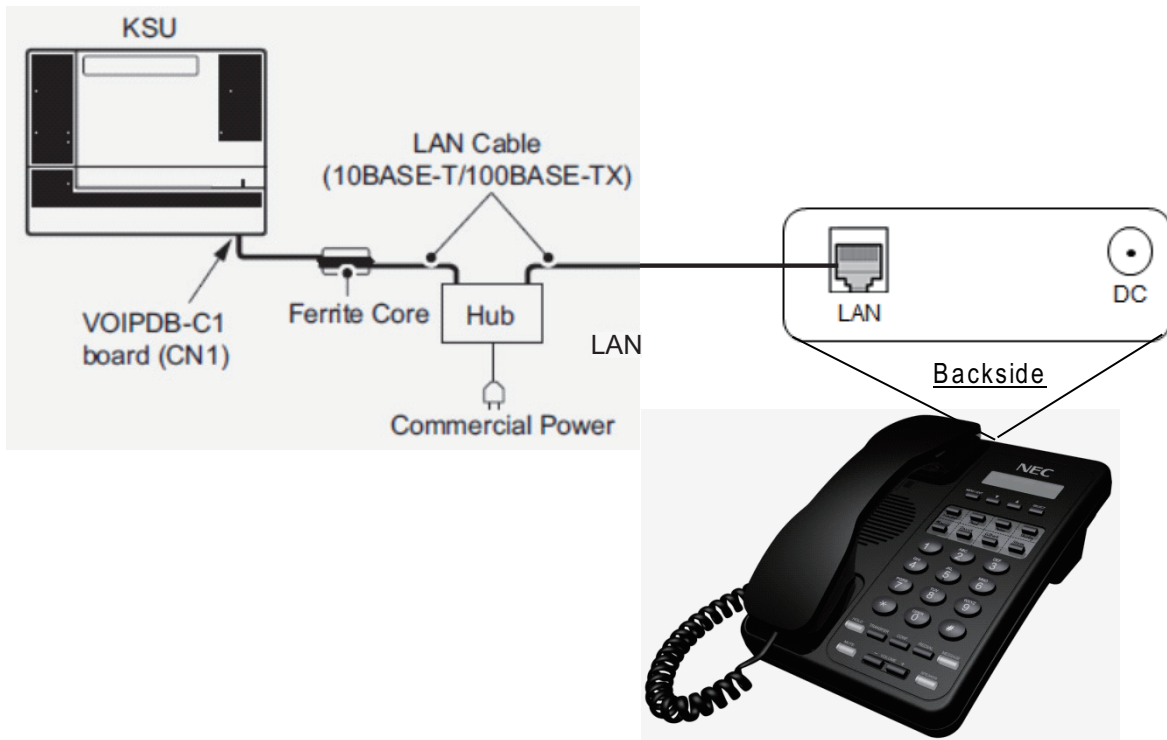


Figure 2-134 System Connection

*MEMO*

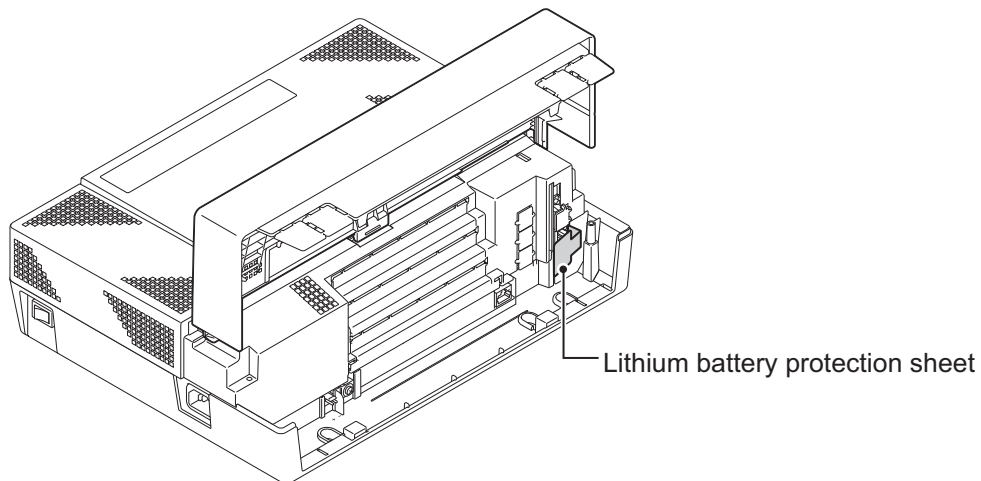
# System Start Up

## 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 3 KSU, 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.	<ul style="list-style-type: none"> <li>• First time start up</li> <li>• System Initialization</li> </ul>
HOT Start	The customer setting data is loaded.	<ul style="list-style-type: none"> <li>• System Reboot</li> </ul>

### 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.



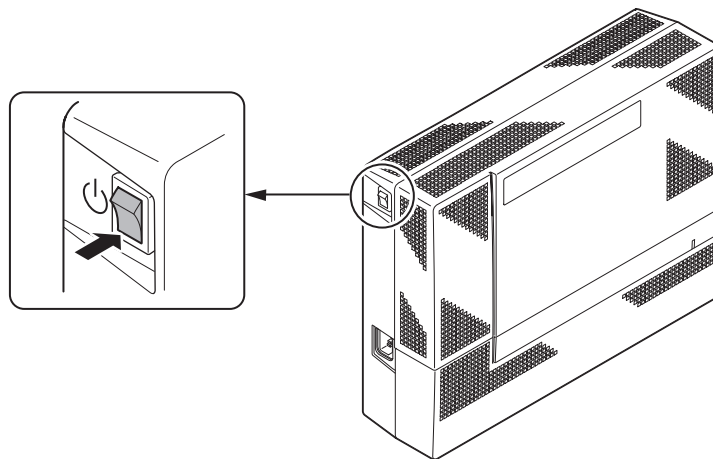
*System software is loaded from flash memory, and the customer data is deleted from RAM memory.*



*If Expansion KSU(s) are installed, turn the power on/off in the order of Expansion 3 KSU, Expansion 2 KSU, Expansion 1 KSU and then Main KSU.*

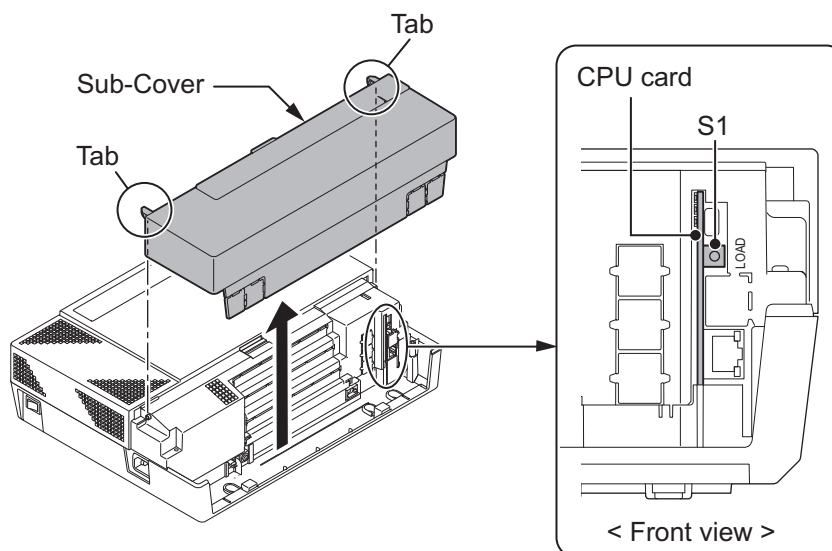
To perform a Cold Start;

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**

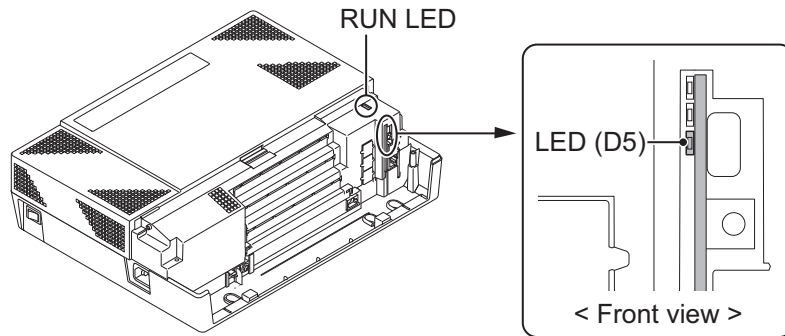
3. Once the system has powered off, push in and hold the **LOAD** button (S1).



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

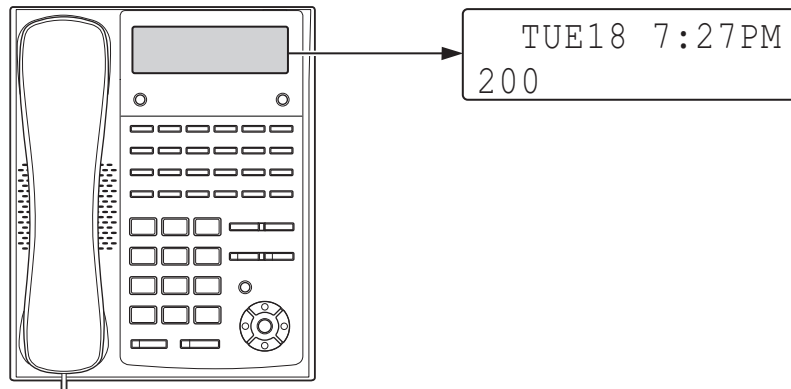


4. Turn the power switch ON at the Main KSU.
5. Continue holding the **LOAD** button (S1) for approximately three seconds or until Status LED (D5) starts flashing red.



**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 3 KSU, 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 page 3-3.

## 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.

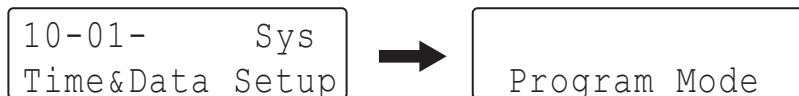


**Figure 3-7 Entering Programming Mode Display 2**

 *For the details of programming, refer to the SL1000 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**

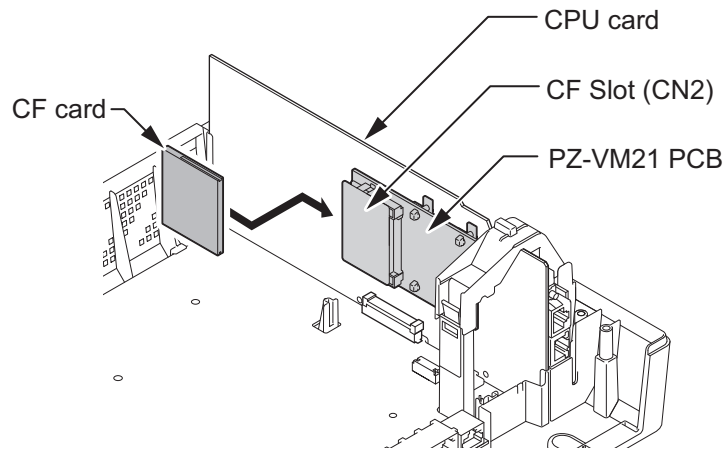
 *The system automatically saves the customer data to the memory which is backed up by lithium battery.*

### 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 PZ-VM21 daughter board must be installed to the CPU card with a **BLANK** CF card inserted.

 For the details of PZ-VM21 daughter board installation, refer to [Installing the PZ-VM21 PCB on page 2-68](#).

1. Turn the system power off, insert the blank CF card (32 MB or larger) to the CF slot on PZ-VM21.



**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.



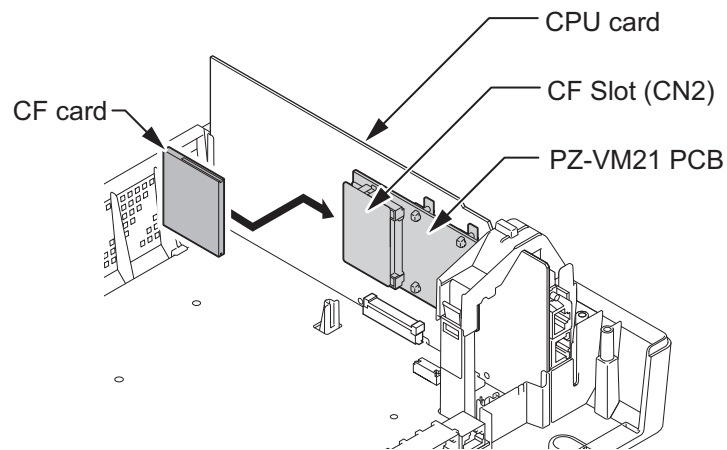
*The saved data on CF Card cannot be edited by the PC.*

## 2.4 Loading the Customer Data

The backed up customer data can be loaded to the system by CF Card. The PZ-VM21 daughter board must be installed to the CPU card with a CF card inserted that the saved customer data loaded.

 For the details of PZ-VM21 daughter board installation, refer to [Installing the PZ-VM21 PCB on page 2-68](#).

1. Turn the power off, insert the Customer Data CF card into the CF Slot on PZ-VM21.



**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.

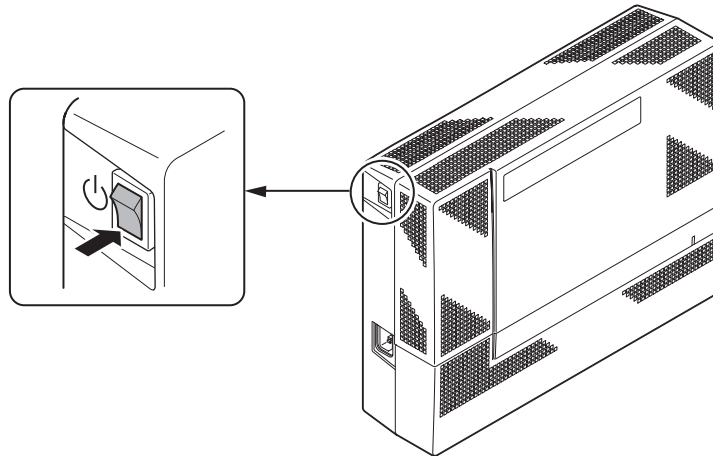


Figure 3-16 Power Switch Location



- *If Expansion KSU(s) are installed, turn the power on/off in the order of Expansion 3 KSU, 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 3 KSU, 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.

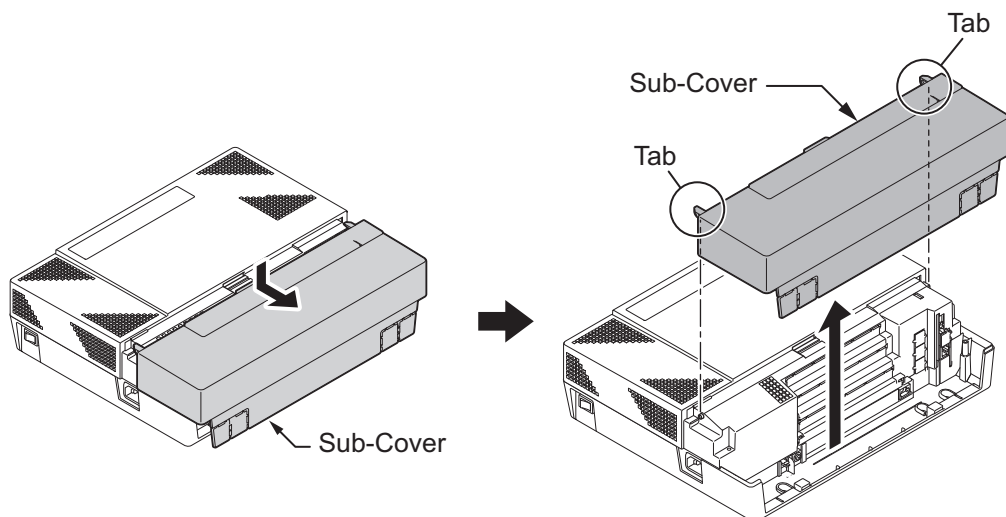
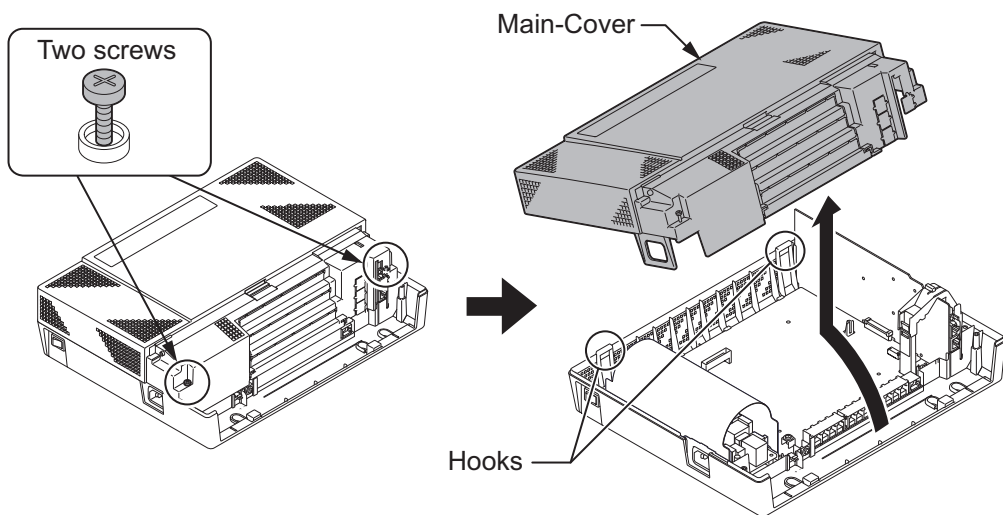


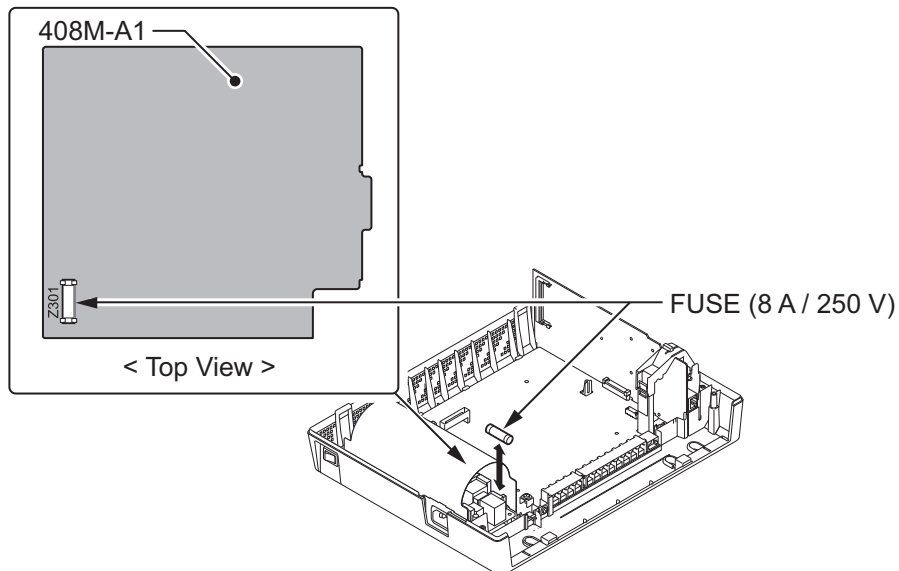
Figure 4-1 Removing the Sub-Cover

- Loosen two screws and remove the Main-Cover.



**Figure 4-2 Removing the Main-Cover**

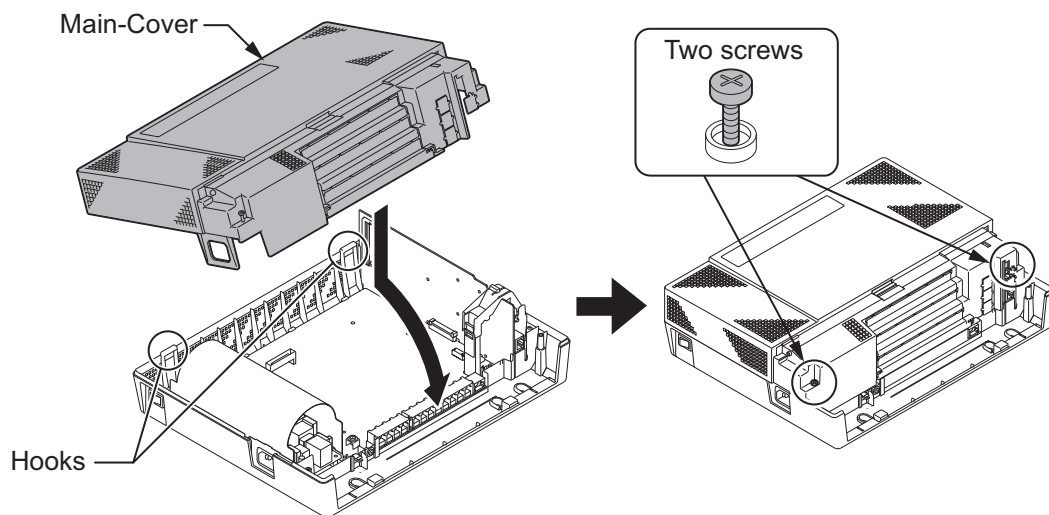
- Exchange the fuse (250 V/8 A) on 408M-A1 PCB.



**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.

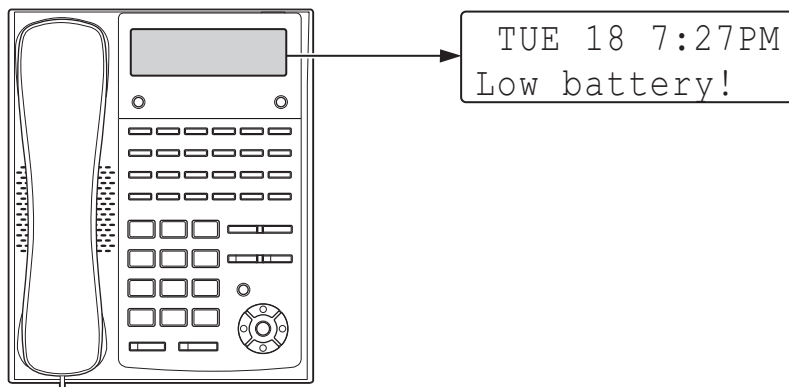


Figure 4-5 Warning of Low Battery

### 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)

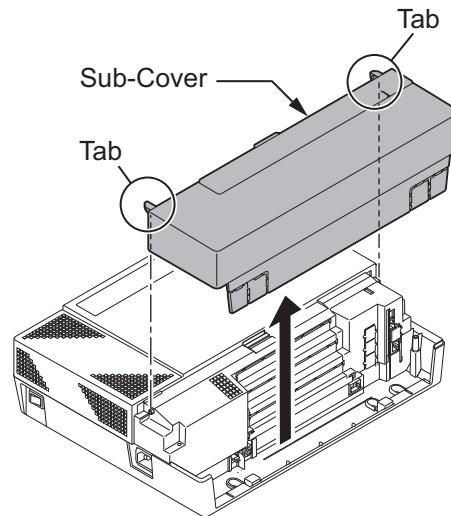


*NEC recommends that a backup of the customer data is performed before powering off the system (either PCPro file or CF card backup) in order to replace the backup battery.*

- *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 3 KSU, 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.

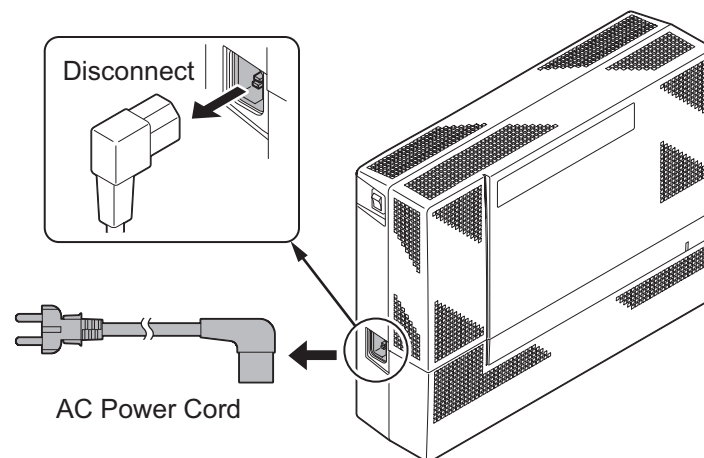


**Figure 4-6 Removing the Sub-Cover**

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

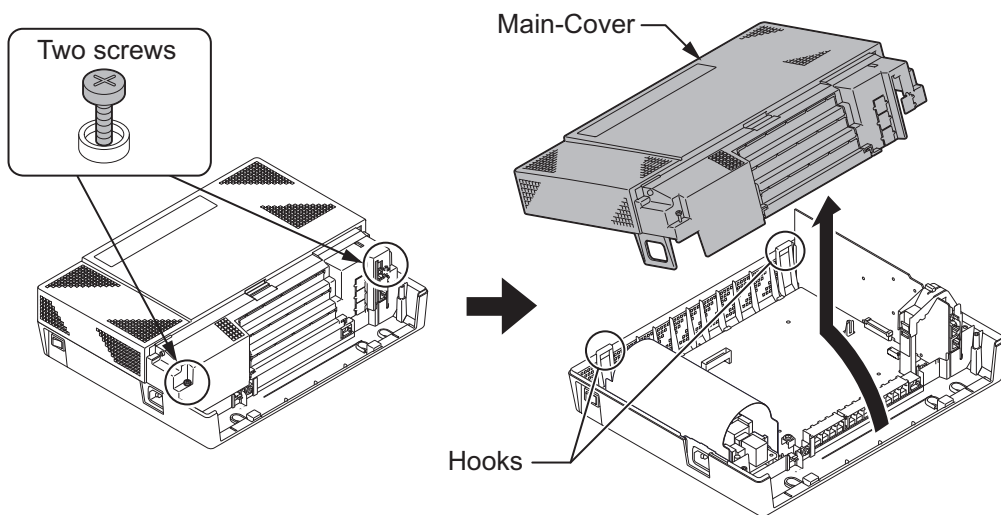


*AC power cord must be disconnected, otherwise the Main-Cover cannot be opened.*



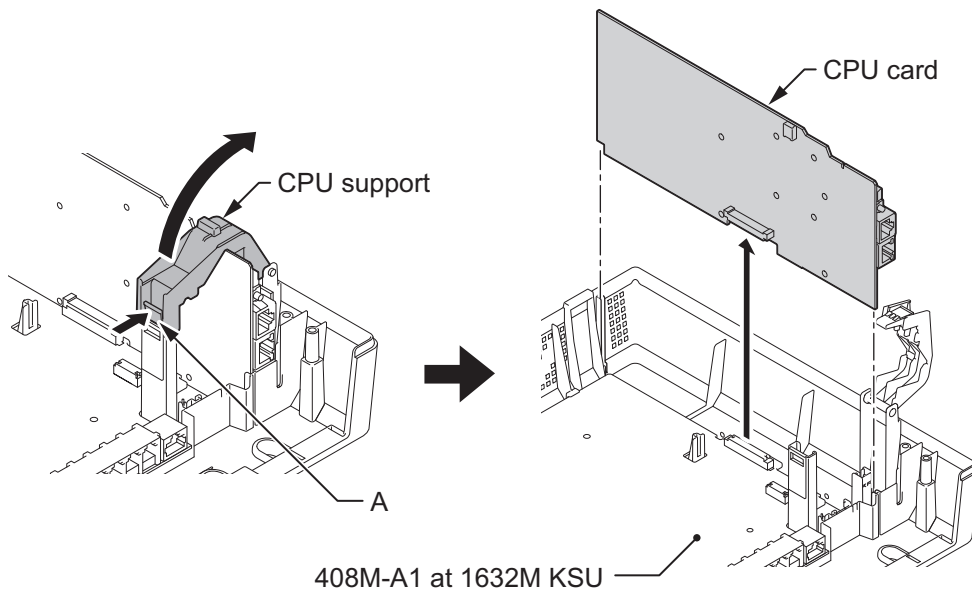
**Figure 4-7 Disconnecting the AC Power Cord**

- Loosen two screws and remove the Main-Cover.



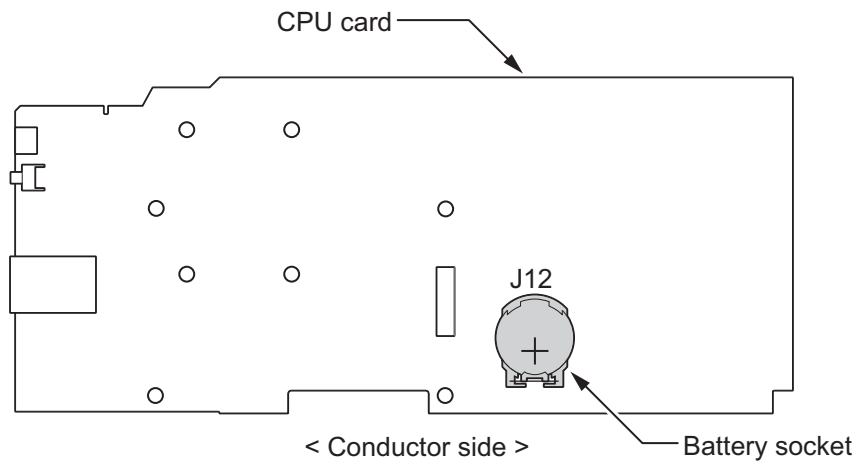
**Figure 4-8 Removing the Main-Cover**

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




**Figure 4-9 Removing the CPU Card**

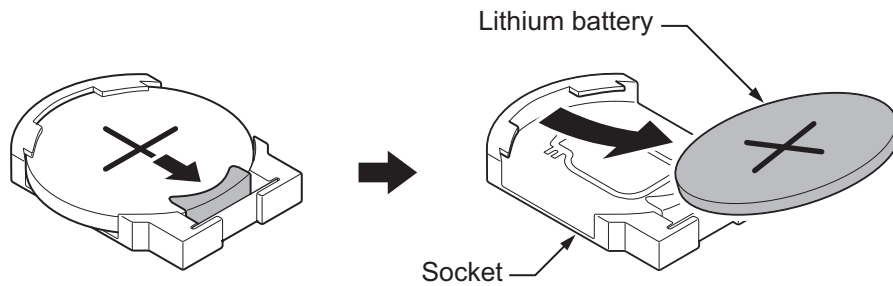
7. Refer to following figure for the Lithium battery location on the CPU card.



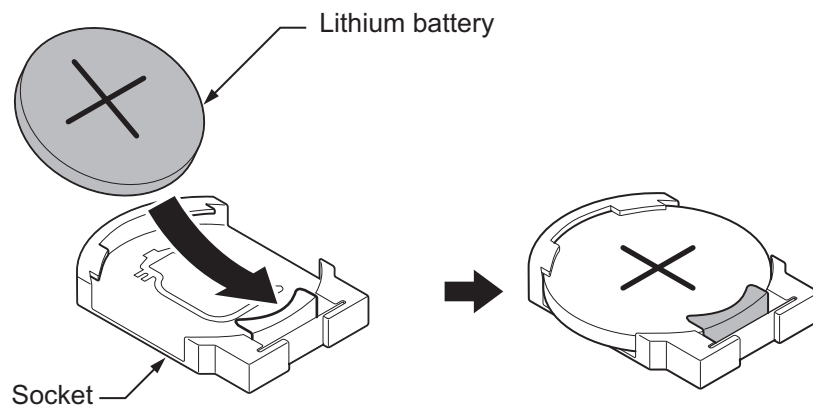
**Figure 4-10 Location of Lithium Battery Socket**

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.*

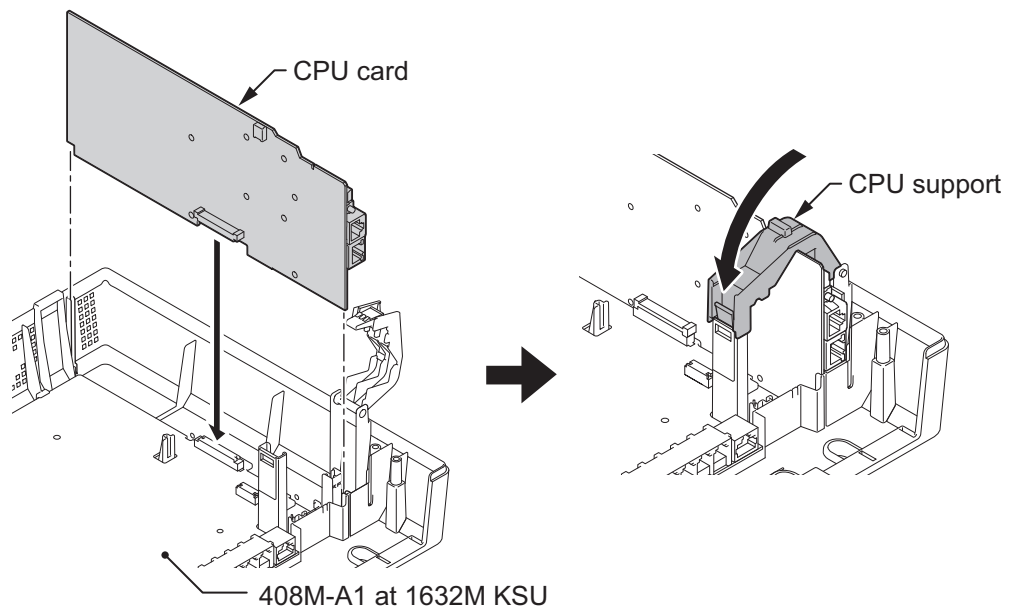


**Figure 4-11 Removing the Lithium Battery**



**Figure 4-12 Inserting the Lithium Battery**

9. Reinstall the CPU card into the 408M-A1 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).**

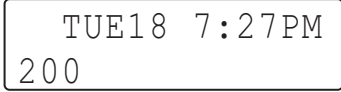
Before upgrading the main system software, the following preparations are necessary.

- 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.)
- Install the PZ-VM21 PCB. (if the system does not have it.)

### 3.3 Main Software Version Confirmation

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

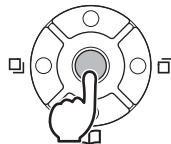

1. On-hook Condition.



```
TUE18 7:27PM
200
```

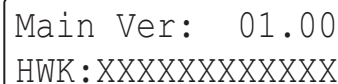
**Figure 4-14 Display of Multiline Telephone**

2. Press Enter Key (Navigation Key).

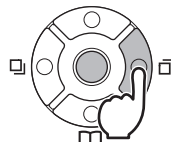
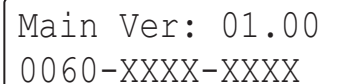
```
100:OPRN LST 1/4
>Call History:00
```

3. Dial **821** to show the Main Software version & Hardware Key Code.



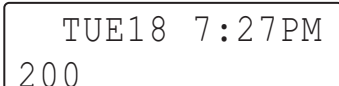
```
Main Ver: 01.00
HWK:XXXXXXXXXXXX
```

4. Press Right Key (Navigation Key) to show the Main Software version & MAC address.


```
Main Ver: 01.00
0060-XXXX-XXXX
```

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

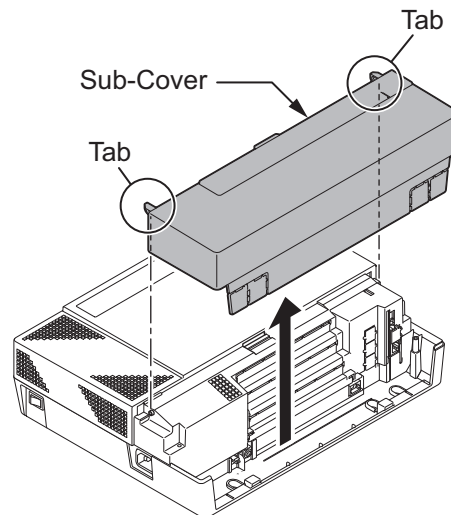


```
TUE18 7:27PM
200
```

### 3.4 Upgrading the Main Software

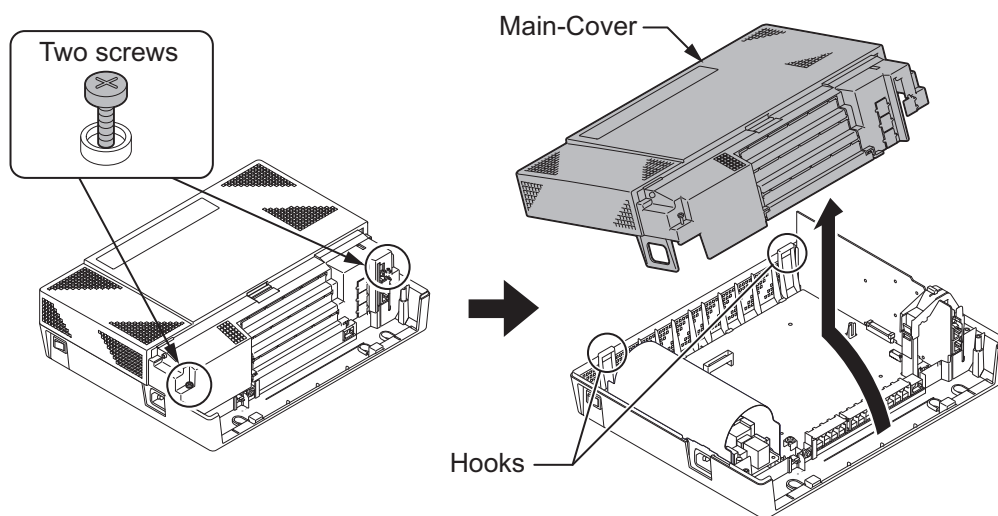
 *If Expansion KSU(s) are installed, turn the power on/off in the order of Expansion 3 KSU, Expansion 2 KSU, Expansion 1 KSU and then Main KSU.*

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**

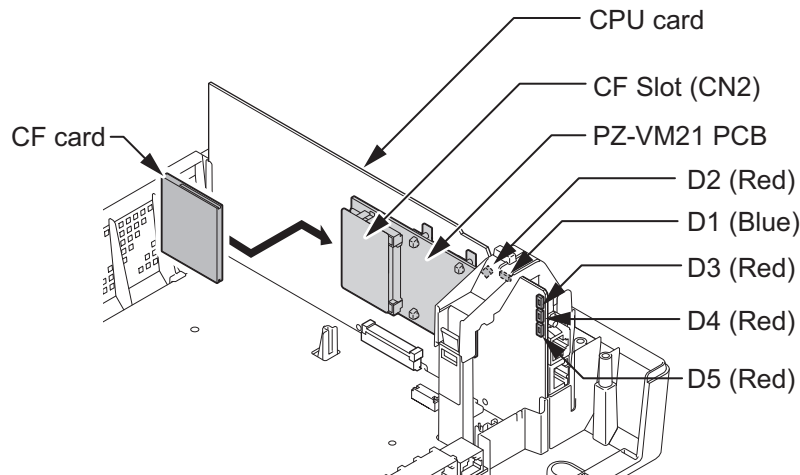
3. Loosen two screws and remove the Main-Cover.



**Figure 4-16 Removing the Main-Cover**

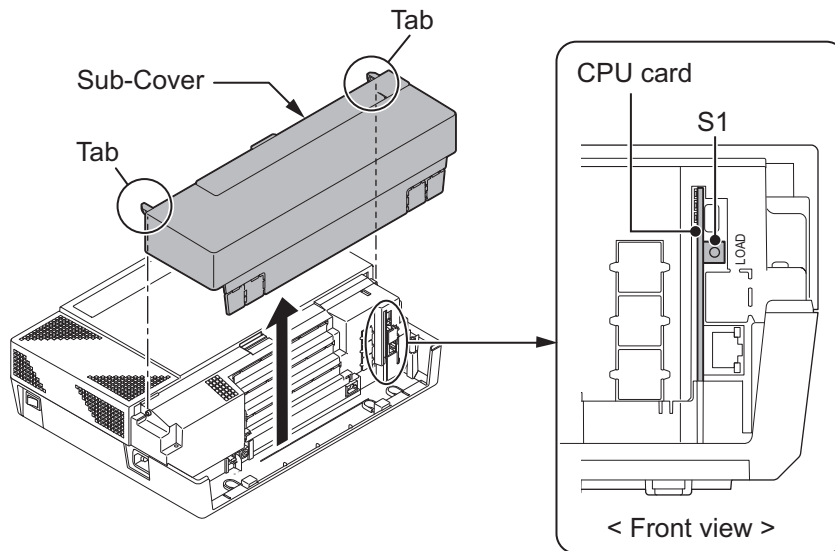


4. Insert the CF card (with the new main system software loaded) to the CF slot on PZ-VM21 daughter board. (PZ-VM21 should be temporary installed if not already fitted.)



**Figure 4-17 Inserting the CF card**

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



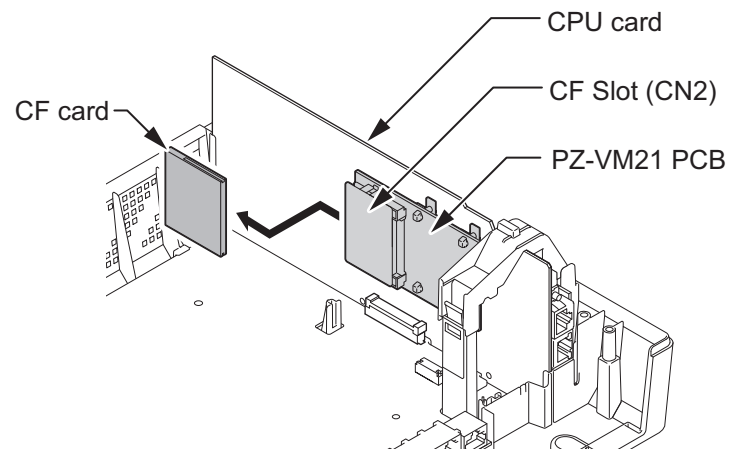
**Figure 4-18 LOAD Button (S1) Location**

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 PZ-VM21.



**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 4-9](#).
  - 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 page 4-13](#) provides a list of each LED and associated operation and status indications. Refer to [Figure 4-17 Inserting the CF card on page 4-11](#) 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

*MEMO*

# Specifications

## SECTION 1 SYSTEM CAPACITY

Table 5-1 System Capacity

Items		1 KSU (1632)	2 KSU (3264)	3 KSU (4896)	4 KSU (64128)	Note
Expansion Slot		3	6	9	12	*4th slot of each KSU can not be used for 4w Key Set. *4th KSU can not be used for COI, 2BRIDB and 1PRIU.
System Maximum Port		66	132	198	230	1KSU: 408M+PRI+408Ex2 2KSU: 408Mx2+PRIx2+408Ex4 3KSU: 408Mx3+PRIx3+408Ex6 4KSU: 408Mx4+PRIx3+408Ex6+008Ex3-400Mx1(4th KSU)
Trunk Port Max.		42	84	126	126	1KSU: 408M+PRIx1+408Ex2 2KSU: 408Mx2+PRIx2+408Ex4 3/4KSU: 408Mx3+PRIx3+408Ex6
Trunk Port	Analog Trunks (COT)	16	32	48	48	1KSU: 408M+408Ex3 2KSU: (408M+408Ex3) x2 3/4KSU: (408M+408Ex3)x3
	BRI	12	24	36	36	1KSU: 2BRlx3 on 008E/000E 2KSU: 2BRlx6 3/4KSU: 2BRlx9
	PRI (E1)	30	60	90	90	<b>Max. 1 PRI/KSU</b> <b>Max. 3 PRI/sys</b>
	IP Trunk (SIP/H. 323)	16				When MEMDB is installed
		32 (V5.1 Added)				When MEMDB and SL-IP-CHANNEL-16 LIC are installed. (V5.1 Added)
	External Paging (Audio Out)	1	2	3	3	1 audio In/Out and 2 audio In circuits on 408M (COI port 2: Paging, 3: MOH, 4: BGM) Need the Program Setting. Alternative use with COT
	External MOH (Audio In)	1				
External BGM (Audio In)	1					
Station Port Max.		32	64	96	128	1KSU: 408M+408Ex3 2KSU: 408Mx2+408Ex6 3KSU: 408Mx3+408Ex9 4KSU: 408Mx4+408Ex12

Items		1 KSU (1632)	2 KSU (3264)	3 KSU (4896)	4 KSU (64128)	Note
Station Port	4W Key Set	24	48	72	96	Max. 24/KSU
	SLT (-28V)	32	64	96	128	1KSU: 408M+408Ex3 2KSU: 408Mx2+408Ex6 3KSU: 408Mx3+408Ex9 4KSU: 408Mx4+408Ex12
	BRI (S-Point)	12	24	36	36	1KSU: 2BR1x3 on 008E/000E 2KSU: 2BR1x6 on 008E/000E 3KSU: 2BR1x9 on 008E/000E 4KSU: 2BR1x12 on 008E/000E
	4W DSS Console	3	6	9	12	Max. 3/KSU Connect to HBI Port 8 at 408M/408E/008E
	Doorphone	2	4	6	8	2DPH I/F on 408M (HBI port 6,7) Needs Program setting. Alternative use with SLT
	SIP-MLT/ SIP Std. terminal	16				When MEMDB is installed
		64 (V5.1 Added)				When MEMDB and SL-IP-CHANNEL-16 LIC are installed. (V5.1 Added)
	VRS Channels	4				CFVRS-C1
		Max. 16				When MEMDB is installed
	VM/VRS Channels	2 VM ports/ 4 VRS ports (default) (Total Max.8 w/o MEMDB or 16 w/ MEMDB)				CFVMS-C1 Port increased by license.
4 VM ports/ 4 VRS ports (default) (Total Max.8 w/o MEMDB or 16 w/ MEMDB)				CFVML-C1 Port increased by license.		
Virtual Extension	50					
Relay	2	4	6	8	2 circuits on 408M	
Power Failure Transfer	4	8	12	12	1PFT circuit on 408M and 408E (COI port 1 and HBI port 8) Needs HW switch change. Alternative use with SLT.	
Ethernet Port	1				1 circuit on CPU	
Built-In Answering Machine Channel	1				1 circuit on CPU	
VoIP Channels	16				When MEMDB is installed	
	32 (V5.1 Added)				When MEMDB and SL-IP-CHANNEL-16 LIC are installed. (V5.1 Added)	
V34 Modem	1				1 circuit on PZ-VM21	
Conference Circuits	32 (Max. 16 parties per Conference)				Mounted on CPU	
DSP Resource <sup>*1</sup>	20				For 1632M KSU (DSP on CPU)	
	16				When PZ-VM21 is installed	
	-	32	64	96	For 1632ME EXP 32ch DSP on each EX- IFE-C1	
DSP Sender <sup>*2</sup>	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**

	110 VAC	220 VAC	230 VAC	240 VAC
<b>Power Requirements</b>	110 VAC@15 A	220 VAC@15 A	230 VAC@15 A	240 VAC@15 A
<b>Power Consumption</b>	Main KSU = 144 VA 4 KSU Total = 576 VA	Main KSU = 172 VA 4 KSU Total = 688 VA	Main KSU = 175 VA 4 KSU Total = 700 VA	Main KSU = 175 VA 4 KSU Total = 700 VA
<b>Input Voltage (Rated Voltage)</b>	90 VAC to 264 VAC (100VAC/120VAC/220VAC/230VAC/240VAC)			

	110 VAC	220 VAC	230 VAC	240 VAC
<b>Frequency</b>	47 Hz - 63 Hz (Rated Frequency:50/60 Hz)			
<b>Phase and Wire</b>	Single Phase, 2 Line + PE Type			
<b>Grounding Re-requirement</b>	No.14 AWG Copper Wire			
<b>Feeding Voltage</b>	SLT: 20 mA/-27 V			
<b>AC Input I</b>	Main KSU = 1.31 A 4 KSU Total = 5.24 A	Main KSU = 0.78 A 4 KSU Total = 3.12 A	Main KSU = 0.76 A 4 KSU Total = 3.04 A	Main KSU = 0.73 A 4 KSU Total = 2.92 A
<b>KWh</b>	Main KSU = 0.144 KWh 4 KSU Total = 0.576 KWh	Main KSU = 0.172 KWh 4 KSU Total = 0.688 KWh	Main KSU = 0.175 KWh 4 KSU Total = 0.700 KWh	Main KSU = 0.175 KWh 4 KSU Total = 0.700 KWh
<b>BTU (KWhx3413)</b>	Main KSU = 491 BTU 4 KSU Total = 1964 BTU	Main KSU = 587 BTU 4 KSU Total = 2348 BTU	Main KSU = 597 BTU 4 KSU Total = 2388 BTU	Main KSU = 597 BTU 4 KSU Total = 2388 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 $\pm$ 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 $\mu$ F


## 2.7 CPU

SL1000		
<b>CONTROL SYSTEM</b>		Digital
<b>MPU</b>	<b>Manufacturer/ Name</b>	Freescale Semiconductor PowerQUICC II Family MPC8248VRMIBA
	<b>MPU Architecture</b>	RISC (Reduced Instruction Set Computer), 32 Bit
	<b>Core Frequency</b>	262.144 MHz
<b>PROGRAM STORAGE</b>	<b>Nor Flash</b>	16 MB
<b>DATA STORAGE</b>	<b>SDRAM</b>	32 MB x 2
	<b>SRAM</b>	512 KB
<b>SWITCHING (Time Division Matrix)</b>		392 x 392 (Non-Blocking)



## 2.8 Traffic Capacity

Traffic Capacity	Basic System Package	Expanded System Package
Traffic Capacity	2540 BHCA	2540 BHCA

 2540 Busy-Hour Call Attempts (BHCA) is based on a Full Capacity.

## 2.9 IP Terminal Power Chart

**Table 5-5 IP Terminal Power Chart**

IP Terminal	IEEE 802.3af Class	Label Indication (Maximum Current with All Options)				Note
		48 VDC		27 VDC		
IP4WW-24TIXH-C TEL	Class 2	130 mA	6.2 W	235 mA	6.3 W	
ITX-1DE-1W(BK) TEL	Class 2	60 mA	2.88 W	-	-	(except for China) (V5.0 Added)

## 2.10 IEEE802.af Class Specification

**Table 5-6 IEEE802.af Class Specification**

IEEE802.af	Minimum	Maximum
Class 2	3.84 W	6.49 W

## 2.11 SLT Ring Signal Specification (V5.0 or higher)

Description		Specification
Normal Current		20 mA
Ring Signal	Voltage	75 VAC
	Frequency	20 Hz or 25 Hz

## 2.12 Mechanical Specifications

**Table 5-7 Mechanical Specifications**

Equipment	Width	Depth	Height	Weight	Note
1632M-A KSU, 1632ME-A 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)	
4W Multiline Telephone	180 mm (7.09 in)	221 mm (8.70 in)	136 mm (5.35 in)	0.85 kg (29.98 oz)	
IP Multiline Telephone	180 mm (7.09 in)	221 mm (8.70 in)	136 mm (5.35 in)	0.90 kg (31.75 oz)	(V1.2 Added)
DSS Console	122 mm (4.80 in)	221 mm (8.70 in)	113 mm (4.45 in)	0.45 kg (15.87 oz)	

Equipment	Width	Depth	Height	Weight	Note
Doorphone	98 mm (3.89 in)	28.5 mm (1.12 in)	130 mm (5.12 in)	0.2 kg (7.05 oz)	
SIP Phone ITX-1DE-1W(BK) TEL	152 mm (5.98 in)	225 mm (8.86 in)	95 mm (3.74 in)	0.72 kg (25.4 oz)	(except for Chi- na) (V5.0 Added)

## 2.13 Optional Unit Mechanical Specifications

**Table 5-8 Optional Unit Mechanical Specifications**

Unit	Width	Depth	Height	Weight	Note
IP4[-]MEMDB-C1	67.5 mm (2.66 in)	32 mm (1.26 in)	2 mm (0.08 in)	0.01 kg (0.3 oz)	
IP4WW-VOIPDB-C1	66 mm (2.60 in)	138 mm (5.43 in)	18 mm (0.71 in)	0.05 kg (1.76 oz)	
PZ-VM21	53 mm (2.09 in)	85 mm (3.35 in)	13 mm (0.51 in)	0.03 kg (1.06 oz)	
IP4WW-408E-A1	160 mm (6.30 in)	198 mm (7.80 in)	32 mm (1.26 in)	0.21 kg (7.41 oz)	
IP4WW-008E-A1	160 mm (6.30 in)	198 mm (7.80 in)	32 mm (1.26 in)	0.18 kg (6.35 oz)	
IP4WW-000E-A1	160 mm (6.30 in)	198 mm (7.80 in)	32 mm (1.26 in)	0.12 kg (4.23 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-2BRIDB-C1	122 mm (4.80 in)	168 mm (6.61 in)	25 mm (0.98 in)	0.09 kg (3.17 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-CFVRS-C1	43 mm (1.69 in)	37 mm (1.46 in)	3.5 mm (0.14 in)	0.01 kg (0.35 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)	

## 2.14 Doorphone Interface Specifications

**Table 5-9 Doorphone Interface Specifications**

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

## 2.15 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

## 2.16 External Paging Output Specifications

**Table 5-11 External Paging Output Specifications**

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

## 2.17 BGM/ExMOH Source Input Specifications

**Table 5-12 BGM/External MOH Source Input Specifications**

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

## 2.18 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.

## 2.19 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

## 2.20 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.

## 2.21 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 / Standard SIP Phone (V4.0 Changed)	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)
1632ME-A EXP	Ethernet Straight Cable (Attached to 1632ME-A EXP)	1.2 m (3.9 ft)

*MEMO*

***SL1000***

**Hardware Manual**

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