iPECS

iPECS eMG100

Hardware Description & Installation Manual

Please read this manual carefully before operating System.
Retain it for future reference.

Regulatory Information

Before connecting iPECS eMG100 to the telephone network, you may be required to notify your local serving telephone company of your intention to use "customer provided equipment". You may further be required to provide any or all of the following information:

PSTN line Telephone numbers to be connected to the system

- Model name: iPECS eMG100
- Local regulatory agency registration number: consult local Ericsson-LG Enterprise representative
- Ringer equivalence: 0.1A
- Registered jack: RJ-45

This equipment complies with the following regulatory standards, that is, the safety requirements of EN60950-1 & EN62368-1, and the EMC requirement of EN55032 and EN55024.

If the telephone company determines that customer provided equipment is faulty and may possibly cause harm or interruption in service to the telephone network, it should be disconnected until repair can be affected. If this is not done, the telephone company may temporarily disconnect service.

The local telephone company may make changes in its communications facilities or procedures. If these changes could reasonably be expected to affect the use of iPECS eMG100 or compatibility with the network, the telephone company is required to give advanced written notice to the user, allowing the user to take appropriate steps to maintain telephone service.

IPECS eMG100 complies with rules regarding radiation and radio frequency emission as defined by local regulatory agencies. In accordance with these agencies, you may be required to provide information such as the following to the end user.

European Union Declarations of Conformity

Ericsson-LG Enterprise Co.,Ltd. declare that the equipment specified in this document bearing the " CE" mark conforms to the European Union, including the Electromagnetic Compatibility Directive(EMCD,2014/30/EU) and Low Voltage Directive(LVD, 2014/35/EU). Copies of these Declarations of Conformity (DoCs) can be obtained by contacting your local sales representative.

FCC/CSA Interference Statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

This device complies with part 15 /RSS-GEN of the FCC/IC rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference; and (2) This device must accept any interference received, including interference that may cause undesired operation.

(1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

This Class A digital apparatus meets the requirements of the Canadian Interference-Causing Equipment Regulations, CAN ICES-3(A)/NMB-3(A)

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

The use of this device in a system operating either partially or completely outdoors may require the user to obtain a license for the system according to the Canadian regulations. For further information contact your Local Industry Canada office.

⚠️ CAUTION

Any changes or modifications in construction of this device which are not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

ATTENTION: Tout changement ou modification dans la construction de cet appareil qui ne sont pas expressément approuvé par la partie responsable de la conformité pourraient annuler l'autorité de l'utilisateur à utiliser l'équipement.

⚠️ WARNING

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

⚠️ WARNING

This equipment will not operate when the power is switched off or fails.

⚠️ WARNING

This equipment generates and uses R.F. energy, and if not installed and used in accordance with the Instruction Manual, it may cause interference to radio communications. It has been tested and found to comply with the appropriate limits for a telecommunication device. The limits are designed to provide reasonable protection against such interference, when operated in a commercial environment. Operation of this equipment in a residential area could cause interference, in which case the user, at their expense, will be required to take whatever measures may be required to correct the interference.

Disposal of Old Appliance

When the displayed symbol (crossed-out wheeled bin) is adhered to a product, it designates the product is covered by the European Directive 2012/19/EC.

- All electric and electronic products should be disposed of only in special collection facilities appointed by government or local/municipal authorities.
- The correct disposal of your old appliance will help prevent potential negative consequences for the environment and human health.
- For detailed information about disposal of your old appliances, please contact your city office, waste disposal service or the place of product purchase.

Revision History

ISSUE	DATE	DESCRIPTION OF CHANGES
1.0	Nov., 2019	Initial Release (S/W Version 3.6.x)
1.1	Feb., 2020	S/W version 4.0.x. - Added 1000i Series
1.2	Sep., 2020	S/W version 4.1.x. - Applied S/W version 4.1.x
1.3	Mar., 2021	S/W version 5.0.x. - Applied S/W version 5.0.x - Added 1080i,1048idss,1048ilss - MISU Caution Update (Related the USB unplug)

Table of Contents

1 Introduction

1.1 Important Safety Instructions

1.1.1 Safety Requirements

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

- Please read and understand all instructions.

- Follow all warnings and instructions marked on the product.

- Unplug this product from the wall outlet before cleaning. A slightly damp cloth should be used for cleaning; do not use liquid or aerosol cleaners.

- Do not use this product near water, such as bathtub, washbowl, kitchen sink or laundry tub, a wet basement, or near a swimming pool.

- Do not place this product on an unstable stand or table. The product may fall, causing serious damage to the product or serious injury.

- Slots and openings in the KSU and the back or bottom are provided for ventilation, to protect it from overheating, these openings must not be blocked or covered. The openings should never be blocked by placing the product on a bed, sofa, or other similar surface. This product should never be placed near or over a radiator or other heat source. This product should not be placed in a built-in installation without proper ventilation.

- This product should be operated only from the type of power source indicated on the product label. If you are not sure of the type of power supply to your location, consult your dealer or local power company.

- Do not allow anything to rest on the power cord. Do not locate this product where the cord could be abused by people walking on it.

- Do not overload wall outlets and extension cords as this can result in the risk of fire or electric shock.

- Never push objects of any kind into this product through KSU slots or connectors as they may touch dangerous voltage points or short out parts that could result in a risk of fire, electric shock or product failure. Never spill liquid of any kind on the product.

- To reduce the risk of electric shock, do not disassemble this product. Instead, take it to a qualified person when service or repair work is required. Opening or removing covers may expose you to dangerous voltages or other risk. Incorrect reassemble can cause electric shock when the appliance is subsequently used.

- Unplug this product from the wall outlet and refer servicing to qualified service personnel under the following conditions:

  - When the power supply cord or plug is damaged or frayed.
  - If liquid has been spilled into the product.
  - If the product has been exposed to rain or water.
  - If the product does not operate normally by following the operating instructions. Adjust only those

controls that are covered by the operating instructions because improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the product to normal operation.

- If the product has been dropped or the KSU has been damaged.
- If the product exhibits a distinct change in performance.

- Avoid using a telephone during an electrical storm. There is a remote risk of electric shock from lightning.
- In the event of a gas leak, do not use the telephone near the leak.

1.1.2 Precaution

- Keep the system away from heating appliances and electrical noise generating devices such as florescent lamps, motors and televisions. These noise sources can interfere with the performance of iPECS eMG100 System.
- This system should be kept free of dust, moisture, high temperature (more than 40 degrees) and vibration and should not be exposed to direct sunlight.
- Never attempt to insert wires, pins, etc. into the system. If the system does not operate properly, the equipment should be repaired by an authorized Ericsson-LG Enterprise service center.
- Do not use benzene, paint thinner, or an abrasive powder to clean the KSU. Wipe it with a soft cloth only.
- This system should only be installed and serviced by qualified service personnel.
- When a failure occurs, which exposes any internal parts, disconnect the power supply cord immediately and return this system to your dealer.
- To prevent the risk of fire, electric shock or failure of the system, do not expose this product to rain or any type of moisture.
- To protect the internal components from static electricity, discharge body static before touching connectors and/or components by touching ground or wearing a ground strap.
- To reduce the risk of fire, use only No. 26 AWG or larger (e.g., 24 AWG) UL Listed or CSA Certified Telecommunication Line Cord.
- The Power supply cord is used as the main disconnect device. Ensure that the socket-outlet is located, installed near the equipment and is easily accessible.
- A supplementary equipment earthing conductor is to be installed between the product or system and earth, that is, in addition to the equipment earthing conductor in the power supply cord.
- Disconnect the Telecom connection before disconnecting the power connection prior to relocating the equipment and reconnect the power first.
- This system is equipped with an earthing contact plug. For safety reasons this plug must only be connected to an earthing contact socket which has been installed according to regulations.

<u>**WARNING**</u>

Risk of Explosion if Battery is replaced by an Incorrect Type. Dispose of Used Batteries According to the Instructions. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions and local disposal requirements.

1.2   About This Manual

This document provides general information covering the description and installation of iPECS eMG100 System hardware. While every effort has been taken to ensure the accuracy of this information, Ericsson-LG Enterprise makes no warranty of accuracy or interpretations thereof.

The document is divided into ten (10) sections as described in the following.

Section 1   Introduction
This section introduces important safety information and the manual.

Section 2   System Overview
Provides general information on iPECS eMG100 System, including the system specifications and capacity.

Section 3   Installation Overview
Describes detailed instructions for planning the installation site and procedures to install iPECS eMG100 System.

Section 4   Board Installation & Description
Provides a description and instructions for installing components of iPECS eMG100.

Section 5   Mounting the KSU
Provides instructions for mounting the KSU.

Section 6   KSU Wiring
Provides instructions on wiring the KSU and 2'nd KSU including Modular jacks for Lines, stations, LAN ports, and Miscellaneous connections as well as Earth Grounding and Battery Backup.

Section 7   Terminal Connections and Wiring
Describes the various terminals, maximum wiring distance, and terminal connections.

Section 8   Starting iPECS eMG100 System
This section provides general information for starting the System, assigning the Nation code, and running the Installation Wizard.

Section 9   Maintenance & Troubleshooting
Provides information on maintenance iPECS eMG100 System, replacing the PSU fuse and deals with common troubleshooting issues.

Section 10   Open Source Software Notice
Provides information on open source software.

2 System overview

2.1 iPECS eMG100 System Highlights

The eMG100 system employs a unique digital and IP converge architecture to deliver an affordable, flexible powerful telecommunications platform for 8 to more than 100 phones that is easy to install, manage and use.

The eMG100 interfaces with analog CO lines, digital and ISDN lines, and SIP trunks.

For flexibility and ease of use, an array of user terminals are available including proprietary digital and IP multi-button phones, as well as standard SLTs and SIP phones.

Also, terminals are available for mobility including IP-DECT cordless and soft clients for smart phones and laptops.

The system installs easily by inserting option boards to meet the customer configuration and wiring with standard modular jacks.

Web based management simplifies the admin process locally or remotely and the Keyset admin is ideal for minor configuration changes desired by the end-user.

The rich feature set spans all the basic features and functions of a modern communications platform such as Transfer, Caller Id, MOH, etc. and delivers advanced functions including an integrated multi-level Auto Attendant and Voice Mail with both mobile and E-mail notification.

In addition, the eMG100 is compatible with Ericsson-LG Enterprise optional advanced communication applications supporting TAPI, desktop softphones, Unified Communication, Call Center operation and more.

Details on these advanced applications are available in the respective product manuals available from Ericsson-LG Enterprise.

2.2 General Cabinet Description

The eMG100 system consists of a Key Service Unit (KSU). KSU consists of a plastic housing, a Main board and Power Supply Unit as well as built-in MISC interfaces and station interfaces.

Optional Interface and Function boards may be equipped in the eMG100 KSU. In addition, on the front of KSU is the connection from the KSU to another KSU.

As shown in Figure 2.2-1, on the left side of the KSU are connections for Battery Backup, AC Power Inlet as well as a Power switch and Earth Ground. On the right side are modular jack connections for Stations, external networks (Analog CO, BRI, and PRI lines), a Miscellaneous jack, a LAN connection for Web Admin access and SIP trunks,.

In addition, a recessed reset button is located between the modular jacks for the external networks and the miscellaneous modular jack.
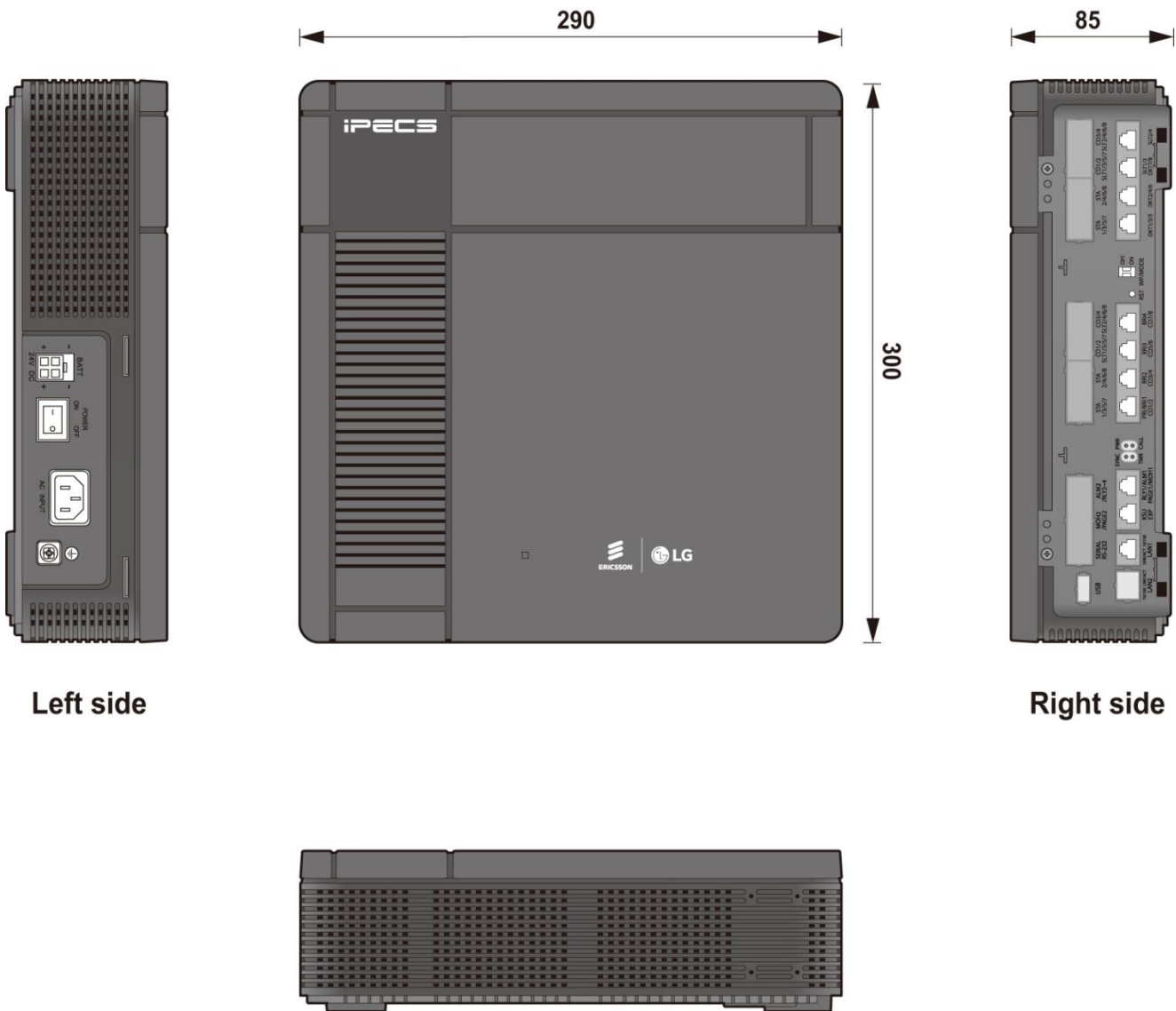
Figure 2.2 KSU Appearance

2.3 System Connection Diagram

The following Figure represents the interconnections available with iPECS eMG100 including external network, terminals, miscellaneous, and admin interfaces.
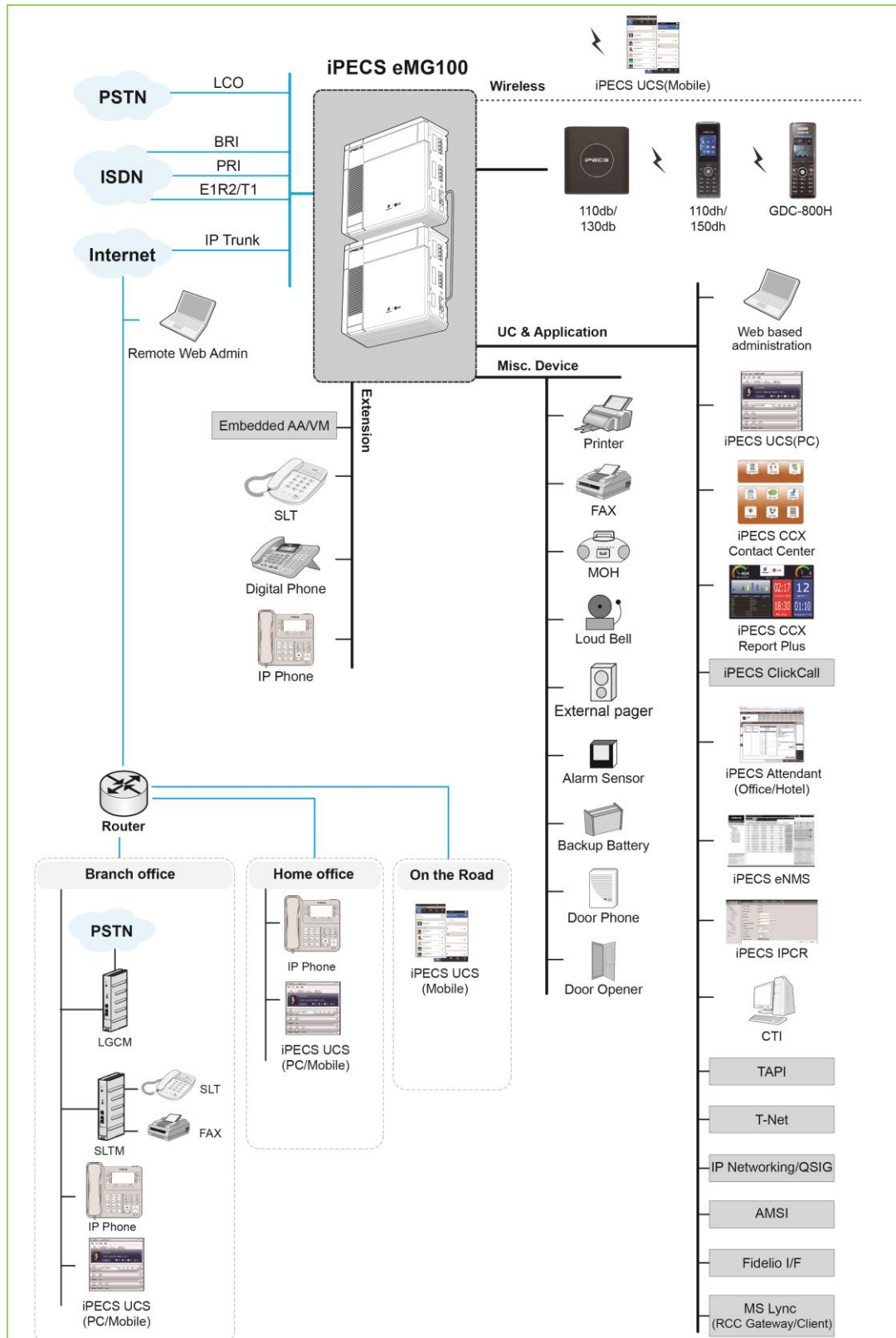

Figure 2.3 System Connection Diagram

2.4   System Components

The KSU can be equipped with one (1) of two (2) Main Boards (MBUD & MBUS) and Trunk & Extension Interface and Function boards. The specific MBU determines the type of extension interfaces, and the optional Interface boards that can be installed in an eMG100 KSU.

The table 2.4-1 below shows all available components for an eMG100 KSU including the various MBUs, and optional Interface and Function boards.

Table 2.4-1 eMG100 Components

Item	Model / Board	Description
KSU (Key Service Unit)	eMG100-KSUD (MBUD)	8DKT and 4 SLT Interfaces Voice Mail (4 channels/2hour default, 16 channels/62 hours Max.) VoIP (2 channels default, 16 channel Max.)
	eMG100-KSUS (MBUS)	2 DKT and 6 SLT Interfaces Voice Mail (4 channels/2hour default, 16 channels/62 hours Max.) VoIP (2 channels default, 16 channels Max.)
	eMG100-KSUSC (MBUSC)	2 DKT and 6 SLT Interfaces Voice Mail (2 channels/2hour default, 16 channels/62 hours Max.) VoIP (0 channel default, 16 channels Max.)
PSU	PSU	Power Supply Unit, pre-installed in each cabinet
Trunk Interface Boards	eMG100-COIU2	2 CO Line Interface Unit
	eMG100-COIU4	4 CO Line Interface Unit
	eMG100-BRIU1	1 BRI (2B channels) Interface Unit
	eMG100-BRIU2	2 BRI (4B channels) Interface Unit
	eMG100-BRIU4	4 BRI (8B channels) Interface Unit
	eMG100-PRIU	1 PRI/E1R2 or T1 (30 or 24 channels) Interface Unit
Extension Interface Boards	eMG100-SLIB8	8 SLT Interface Board
	eMG100-SLIU8	8 SLT Interface Unit
	eMG100-DTIB8	8 DKT Interface Board
Function Boards	eMG100-VOIB48	48 VoIP Interface Board
	eMG100-MEMU	Memory Expansion Module Unit for VM (15 hours expansion)
	eMG100-MEMU2	Memory Expansion Module Unit for VM (60 hours expansion)
	eMG100-MODU	Modem Unit
	eMG100-MISU	Miscellaneous function Unit
RMB	eMG100-RMB	19" Rack Mounting Bracket
KCC	eMG100-KCC	KSU Cord Cover
BATT Cable	eMG100-BATTCABLE	Battery Back-up Cable
Exp. Cable	eMG100-EXPCABLE	KSU Expansion Cable

The table 2.4-2 below indicates the various interface boards available for each KSU as well as the (slave)KSU housed in the 2'nd KSU.

Table 2.4-2 Option Board Compatibility Chart for KSU

Option Board		KSUD	KSUS/KSUSC	(Slave, 2'nd) KSU
Trunk Interface Boards	eMG100-COIU2	Y	Y	Y
	eMG100-COIU4	Y	Y	Y
	eMG100-BRIU1	Y	Y	N
	eMG100-BRIU2	Y	Y	N
	eMG100-BRIU4	Y	Y	N
	eMG100-PRIU	Y	Y	N
Extension Interface Boards	eMG100-SLIB8	Y	Y	Y
	eMG100-SLIU8	Y	Y	Y
	eMG100-DTIB8	Y	Y	Y
Function Boards	eMG100-VOIB48	Y	Y	N
	eMG100-MEMU	Y	Y	Y
	eMG100-MEMU2	Y	Y	Y
	eMG100-MODU	Y	Y	N
	eMG100-MISU	Y	Y	N

2.5   Specifications

2.5.1   General Specifications

Table 2.5.1 General Specifications

Item	Description	Specification
CPU		M82331G, ARM11 dual core (550MHz)
PSU	AC Voltage Input	100~240 +/- 10% Volt AC @ 47-63 Hz
	AC Power consumption	90 Watts
	AC Input Fuse	2A @250 Volt AC
	DC Output Voltage	+5, -5, +27, +30 Volt DC
External Backup Battery	Input Voltage	+24 Volt DC (+12 VDC x 2 each KSU)
	Battery Fuse	5.0A @250 Volts AC, 5AG
	Charging Current	Max. 200 mA
	Battery Load Current	Max. 3A (KSU only), Max. 6A (1'st + 2'nd KSU)
Ring Signal		65 Vrms @ 25Hz
External Relay Contact		1A @30 Volt DC
Music Source Input		0 dBm @600 ohm
External Paging Port		0 dBm @600 ohm
Ring Detect Sensitivity		30 Vrms @16-55 Hz
DTMF Dialing	Frequency Deviation	Less than +/-1.8%
	Signal Rise Time	5 ms
	Tone Duration, on time	Min. 50 ms, Normal 100 ms
	Inter-digit Time	Min. 30 ms, Normal 100 ms
Pulse Dialing	Pulse Rate	10 PPS
	Break/Make Ratio	60/40% or 66/33%
Operating Environment	Temperature	0 (°C) - 40 (°C)
	Humidity	0 - 80% (non-condensing)
Dimension	KSU	290 mm(W) x 300 mm(H) x 85 mm(D)
Weight	KSU	1.75 Kg
MODU	Analog Modem	Bell, ITU-T, V.34 V.32BIS, V.90
	Speed	300 bps up to 33K bps speed rate
	Connection	Automatic rate negotiation
VoIP	LAN Interface	100 Base-T Ethernet (IEEE 802.3)
	Speed	100 Mbps (Auto-Negotiation)
	Duplex	Half or Full Duplex (Auto-Negotiation)
	VoIP Protocol	SIP and H.323 Revision 2
	Voice Compression	G.711/G.726/G.729/G.723.1
	Voice/Fax Switching	T.38
	Echo cancellation	G.165

2.5.2 System Capacity

Three System Capacity charts are provided below. These include the General System Maximum Capacities Table 2.5.2-1, the capacity based on the MBU type Table 2.5.2-2. Note that the maximums are not simultaneously achievable. However, the maximum number of VoIP channels is separate from other external network and station maximums. That is, up to 16 VoIP channels are available in addition to CO, BRI and PRI Lines.

Table 2.5.2-1 General System Capacities

Item	Capacity
CO/Trunk lines	Max. 74
Stations	Max. 140
Attendants	4
LAN port	2 (1 on KSU, 1 on VOIB48)
Modem Channel	1 (MODU)
Serial Port (RS-232C)	1 (KSU or MISU selectable)
USB (2.0) Host port	1 (MISU)
Alarm/Doorbell input	2 (1 on KSU, 1 on MISU)
External Control Relays	4 (1 on KSU, 3 on MISU)
Music Source Inputs	1 Internal: select one of 13 music 2 External source input (1 on KSU, 1 on MISU) 5 SLT ports 3 VSF announcements
Built-in AA/VM - w/MEMU - w/MEMU2	KSUD, KSUS: 16 (4 channels. by default, 12 channels by license), 2hours KSUSC:16(2 channels by default, 14channels by license), 2hour 15 hours (no license needed) 60 hours (no license needed)
Conference channels	148, 3-13 party or unlimited 3-party
Built-in VoIP channels	KSUD, KSUS: 16 (2 channels by default, 14 channels by license) KSUSC:16(0 channel by default, 16channels by license)
VOIB48 VoIP channels	48 (8 channels by default, 40 channels by license)
IP Stations and SIP Trunks	Simultaneously 100 Calls
External Page	2 port (1 on KSU, 1 on MISU)

Table 2.5.2-2 KSU Device Type Maximums

Resource Type	Device Type	1'st KSU	Interface Boards
External Network	CO Line	16	4 COIU4
	BRI Line	8	1 BRIU4
	PRI/E1 Line	30	1 PRIU
	SIP Trunks	64	16 + VOIB48
Stations	DKT	24	KSUD + 2 DTIB8
	SLT	38	KSUS or KSUSC + 2 SLIB8 (with SLIU8)
	LIP/SIP	64	16 + VOIB48

Table 2.5.2-3 KSUD Device Type Maximums

Resource Type	Device Type	1'st KSU	2'nd KSU	Total	Sys Max
External Network	CO Line	16	16	32	74
	BRI Line	8	-	8	
	PRI/E1 Line	30	-	30	
	SIP Trunks	64	16	74	
Stations	DKT	24 (8)	24 (8)	48	140
	SLT	36 (4)	36 (4)	72	
	LIP/SIP	64	-	64	

Table 2.5.2-4 KSUS or KSUSC Device Type Maximums

Resource Type	Device Type	1'st KSU	2'nd KSU	Total	Sys Max
External Network	CO Line	16	16	32	74
	BRI Line	8	-	8	
	PRI/E1 Line	30	-	30	
	SIP Trunks	64	16	74	
Stations	DKT	18 (2)	18 (2)	36	140
	SLT	38 (6)	38 (6)	76	
	LIP/SIP	64	-	64	

* ( ) default number of interfaces

3 Installation overview

3.1   Pre-Installation Guidelines

Prior to installation, please read the following guidelines concerning installation and connection. Be sure to comply with applicable local regulations.

3.1.1 Safety Installation Instructions

When installing the telephone wiring, basic safety precautions, including those below, should always be followed to reduce the risk of fire, electric shock and personal injury:

- Never install the telephone wiring during a lightning storm.
- Never install the telephone jack in wet locations unless the jack is specifically designed for wet locations.
- Never touch non-insulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
- Use caution when installing or modifying telephone lines.
- Anti-static precautions should be taken during installation of optional boards in a KSU.

3.1.2 Installation precautions

IPECS eMG100 KSUs are designed for desktop mounting, wall mounting or a free-standing rack mounting.In no case should one cabinet be mounted on top of the other when desktop mounting. Avoid installing in the following places:

- In direct sunlight and hot, cold, or humid places. Temperature range = 0°C to 40°C.
- Places where shocks or vibrations are frequent or strong.
- Dusty places or places where water or oil may come into contact at the KSU or wiring.
- Near strong RF generating devices such as sewing machines or electric welders.
- On or near computers, fax machines, or other office equipment, as well as microwave ovens or air conditioners.
- Do not obstruct the openings in cabinets of iPECS eMG100.
- Do not stack the optional service boards.

3.1.3 Wiring Precautions

Be sure to follow these precautions when wiring:

- Do not wire the telephone cable in parallel with an AC power source to a computer, fax machine, etc. If the cables are run near such wires, shield the cables with metal tubing or use shielded cables and ground the shields.
- If the cables are run on the floor, use protectors to prevent the wires from being stepped on. Do not place wiring under carpets.
- Avoid using the same power supply outlet for computers, fax machine, and other office equipment to

avoid induction of electrical noise into the system resulting in poor audio quality or static.

- The power and battery switches must be OFF during wiring. Further, while wiring, power must not be connected to the eMG100 KSU. After wiring is completed, the power can be connected, and the switch may be turned ON.
- Incorrect wiring may cause iPECS eMG100 System to operate improperly.
- If an extension does not operate properly, disconnect the telephone from the extension line and then re-connect, or turn the System power OFF and then ON again.
- Use twisted pair cable for connecting CO lines.

3.1.4 Checking Power cord

Checking the power cord at least once a year to prevent fire hazard or electric shock. Be sure to disconnect the power cord from the wall outlet and System's inlet for the following symptoms:

- Burn marks on the plug.
- The prongs on the plug are deformed.
- The power cord's inner wires are exposed, broken, etc.
- The power cord's coating has a crack.
- The power cord is overheating.
- The power cord is damaged.

If the above symptoms find, do not use the power cord and consult your dealer or service representative.

The following is the simple guide to avoid the hazard or disaster:

- Make sure Power cord is properly rated for their intended use, indoor or outdoor, and meet or exceed the power needs of the system being used.
- Inspect cords for damage before use. Check for cracked or frayed sockets, lose or bare wires, and loose connections.
- Never use a cord that feels hot or is damaged in any way.
- Insert plugs fully so that no part of the prongs is exposed when the power cord is in use.

Make sure that the power cord is connected to the system firmly, and then connect the plug to the wall outlet.

3.2   Installation Overview

The installation is conducted in 6 steps as indicated in the below list.

1) Preparation, section 3.3
2) Board installation and description, section 4
3) Mounting the KSU, section 5
4) KSU wiring, section 6
5) Terminal connection and wiring, section 7
6) Starting System & run Wizard, section 8

3.3   Preparation

In preparation for the installation, locate an appropriate site for the KSU installation considering the precautions mentioned in earlier sections, wiring, access to power, etc. Once the mounting site is identified, verify all equipment and wiring charts are available on-site. Unpack the KSU and verify the contents include the items shown in Figure 3.1.

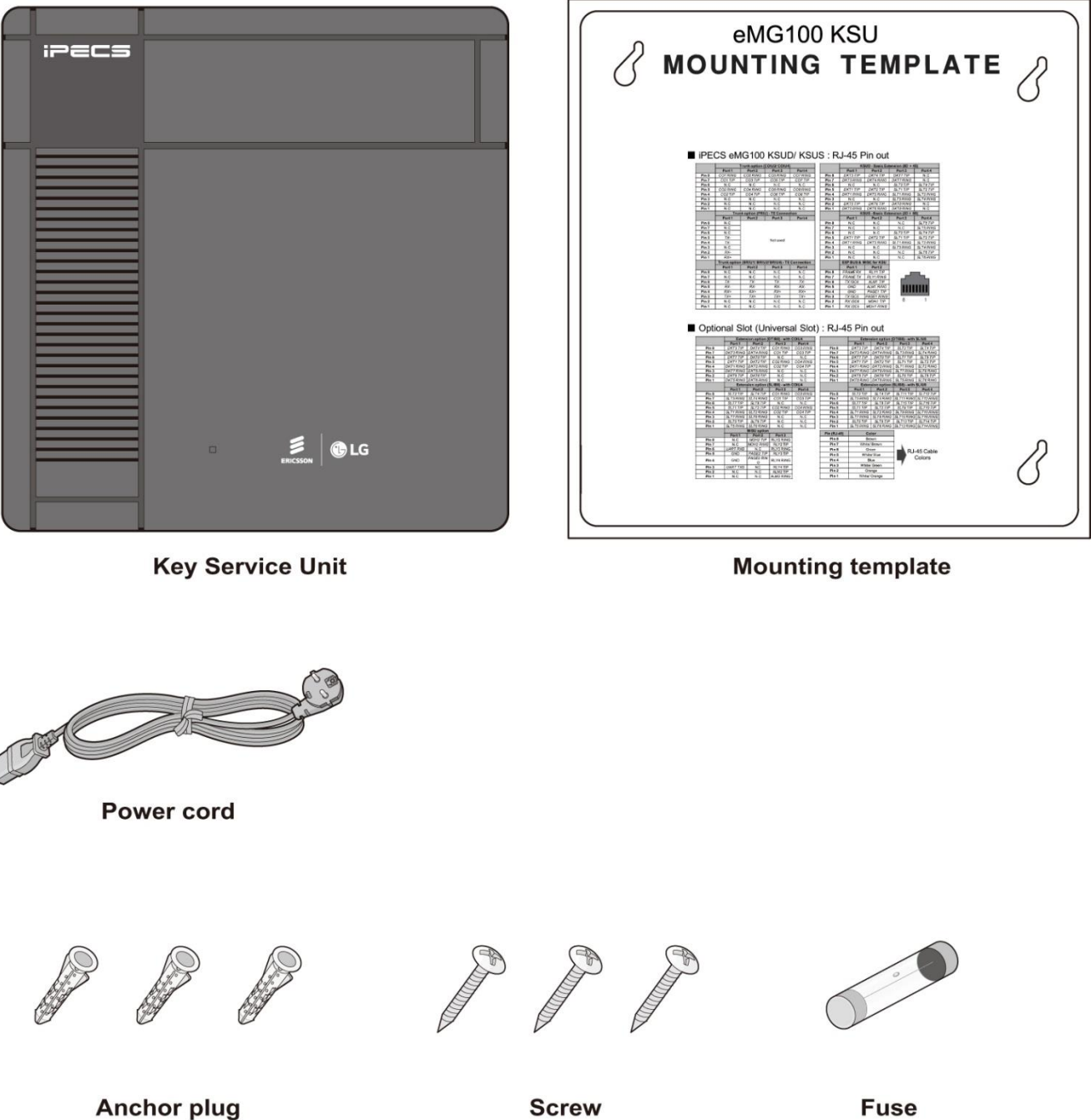Note the Expansion cable is optional for 2'nd KSU expansion.

Key Service Unit

Mounting template

Power cord

Anchor plug   **Screw**   **Fuse**

Figure 3.3 KSU Carton Contents

4   Board installation and description

4.1   General information

The eMG100 KSU houses the Main Board with processor, memory and interface circuitry. Optional Interface boards are installed on the MBU to expand the external network interfaces as well as terminals available. The KSU can be equipped with two (2) optional Interface boards.

In addition, optional Function boards can be installed on the KSU MBU to enhance various system functions. This section provides descriptions of the various components and step by step instructions to mount the option boards.

4.2   Closing and Opening the front cover

Before closing and opening the front cover, you need to prepare the screwdriver.

<u>**Opening the Front Cover**</u>

    1)   Loosen screws on both sides with screwdriver.

    2)   Lift the front cover in the direction of the arrow.
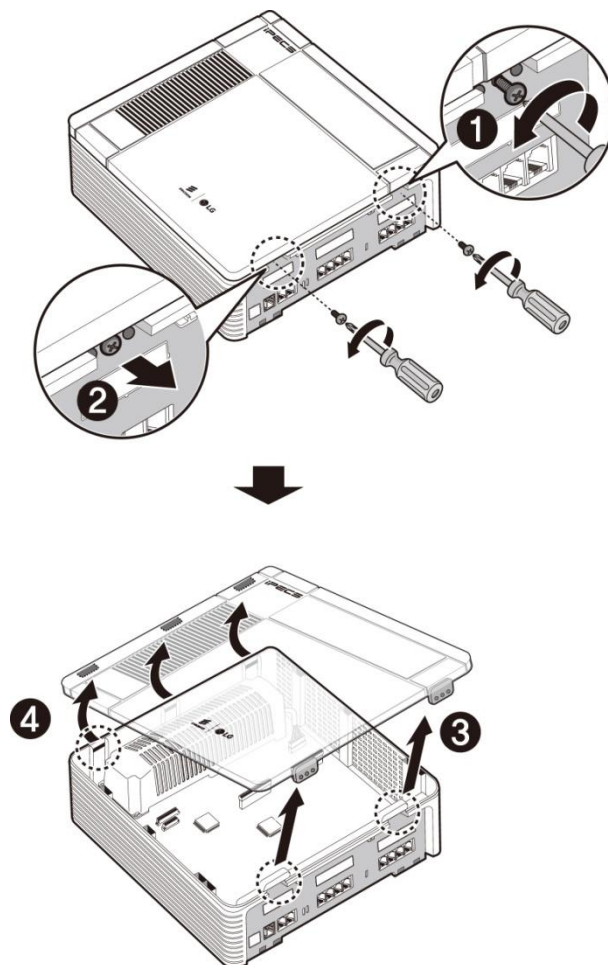
Figure 4.2-1 Opening the Front Cover

Closing the Front Cover

1) Insert the front cover into the slot on the KSU correctly.

2) Then put the front cover down on the KSU in the direction of the arrow.

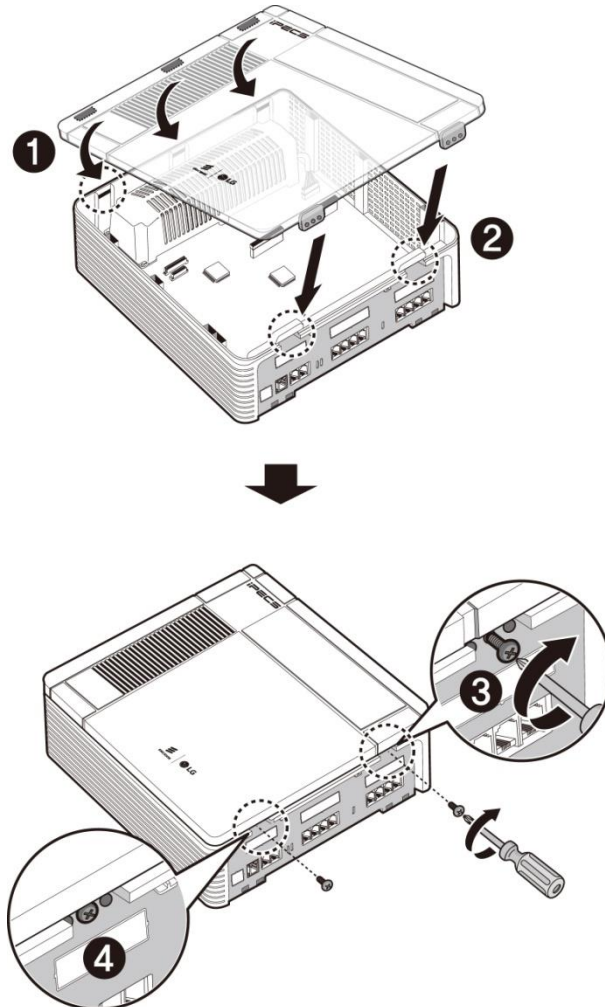3) Insert screws in the middle of tapped hole and then tighten screws with screwdriver to fix the front cover.

Figure 4.2-2 Closing the Front Cover

NOTE

Prior to operation, the front cover must be closed and the screws are tightened for safety.

4.3   Removing and Replacing the KSU & Cord cover

Prior to installing option boards in the KSU, it is necessary to remove the KSU and Cord covers.

To remove the cord & KSU cover and expose the MBU:

1)   Locate and remove the Cord cover hold-down screw as shown in #1 in the below figure.

2)   Press down slightly on the top of the Cord cover to be away from the KSU.

3)   Remove the two screws holding the KSU cover as shown in #3 in the below figure.

4)   Lift the front of the KSU cover in the direction of the arrow.

5)   Remove the cover. Be sure to place both covers in a safe location.
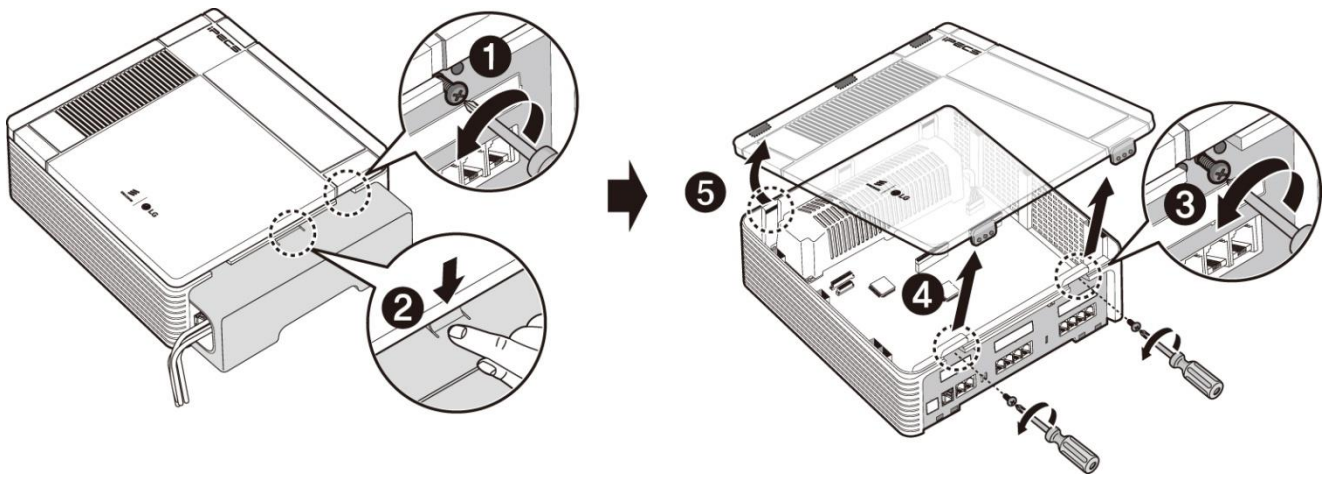
Figure 4.3 Removing and Replacing the KSU and Cord Cover

<u>**NOTE**</u>
For safety, prior to operation, replace the KSU and Cord cover before operating the eMG100.

<u>**To replace the covers**</u>
Reverse the removal procedure as below.

1)   Insert the tabs of the KSU cover into the KSU slots.

2)   Press the KSU cover down on to the KSU.

3)   Insert the screws and tighten screws with screwdriver to fix the front cover.

4)   Install the Cord cover

5)   Insert and tighten the cover hold-down screw.

4.4   Installation of Option Boards

Prior to installing any option board, assure power is OFF. We recommend wearing a wrist-strap connected to a known ground. At a minimum, before touching any board discharge any built-up static charge by touching a grounded object.

4.4.1 General installation

To install a board, perform the following steps as depicted in Figure 4.4.1:

1)   Remove the KSU and Cord cover as detailed in section 4.3.

2)   For an Interface board, remove the modular jack cover plate as shown in #1.

3)   Insert a standoff through the MBU and into the cabinet. Tighten the standoffs with Wrench as shown in #2.

4)   Holding the board as shown in #3, insert the board carefully in the direction of the arrow.

5)   Carefully align the connector on the board with the mating MBU connector pins, then push the board down to fully engage the connectors.

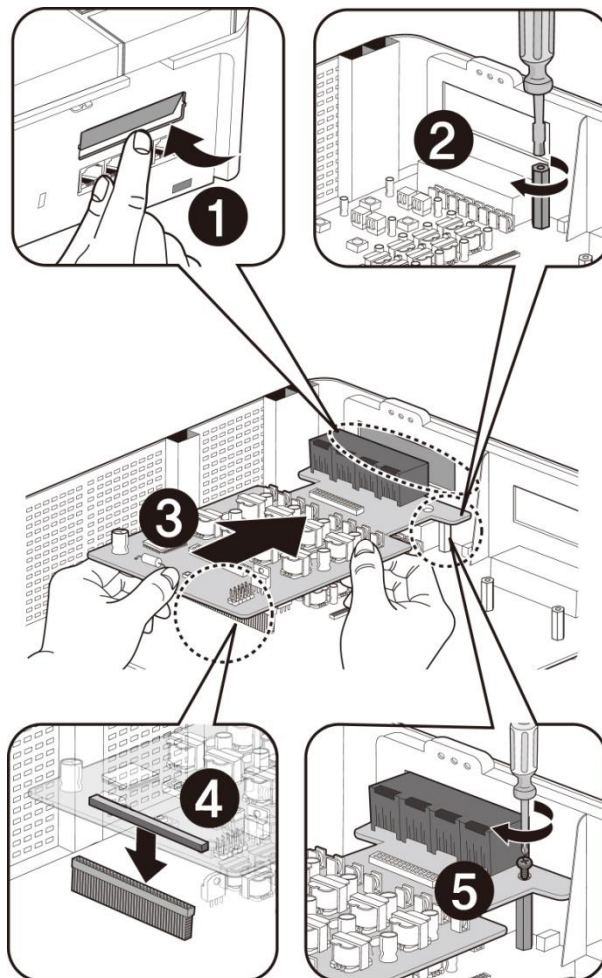6)   To securely fix the board in place, insert and tighten a screw as shown in #5.

Figure 4.4.1 Board Installation

4.4.2 Board to Board Installation

This section shows to install a board on board. Some boards need to assemble the standoff first. Be Careful to align the connector on the board with the mating another board connector pins, and then push the board down to fully engage the connectors.
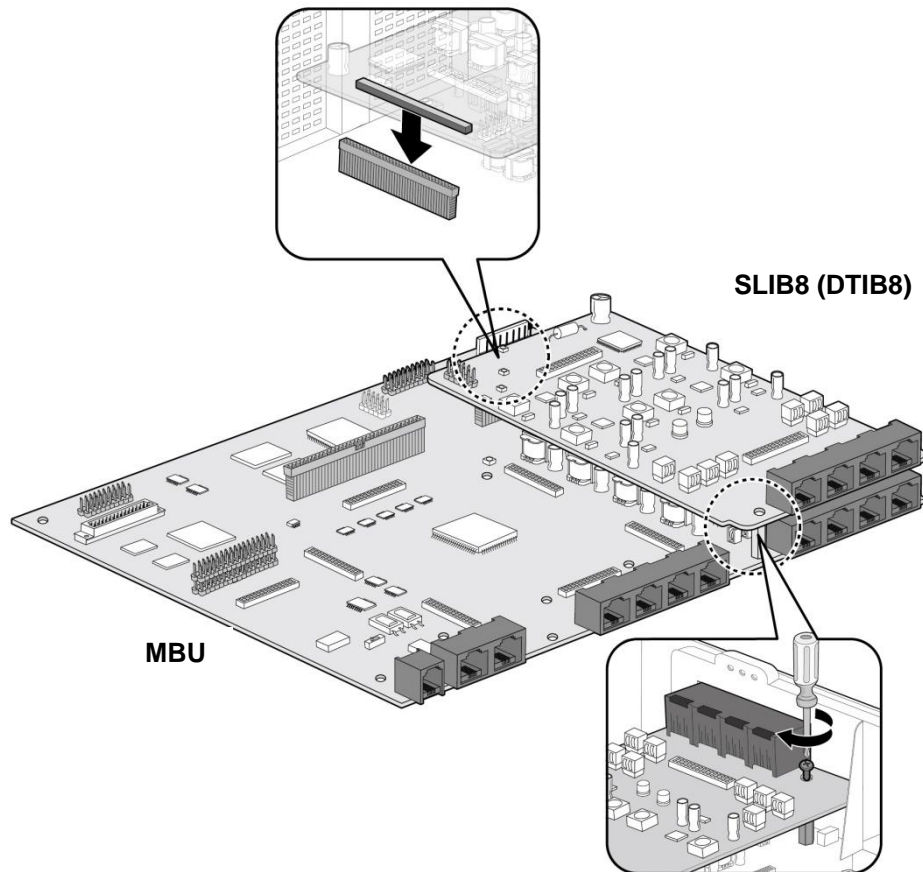
SLIB8(DTIB8) on MBU

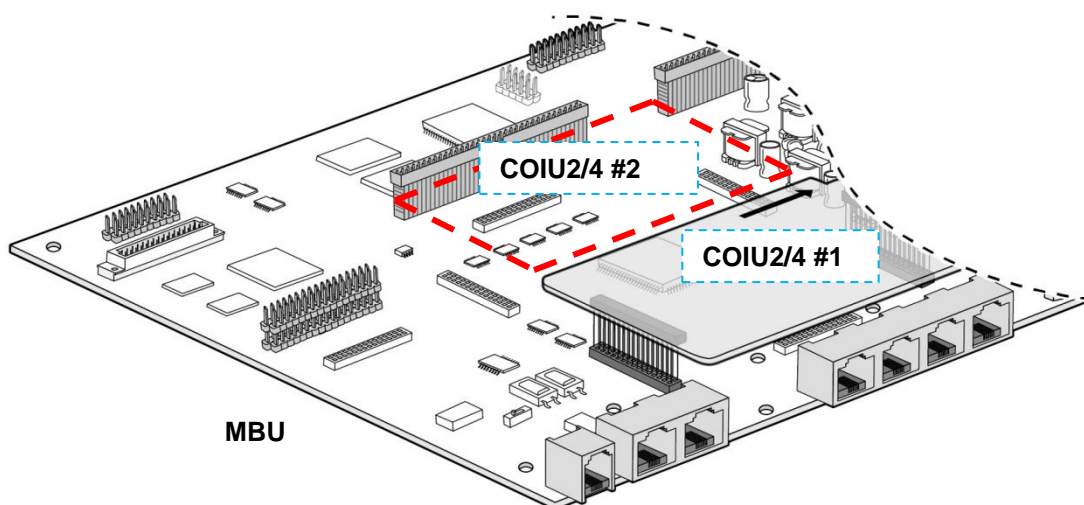**Figure 4.4.2-1 SLIB8 (DTIB8) on MBU Board Installation**

COIU2/4 on MBU

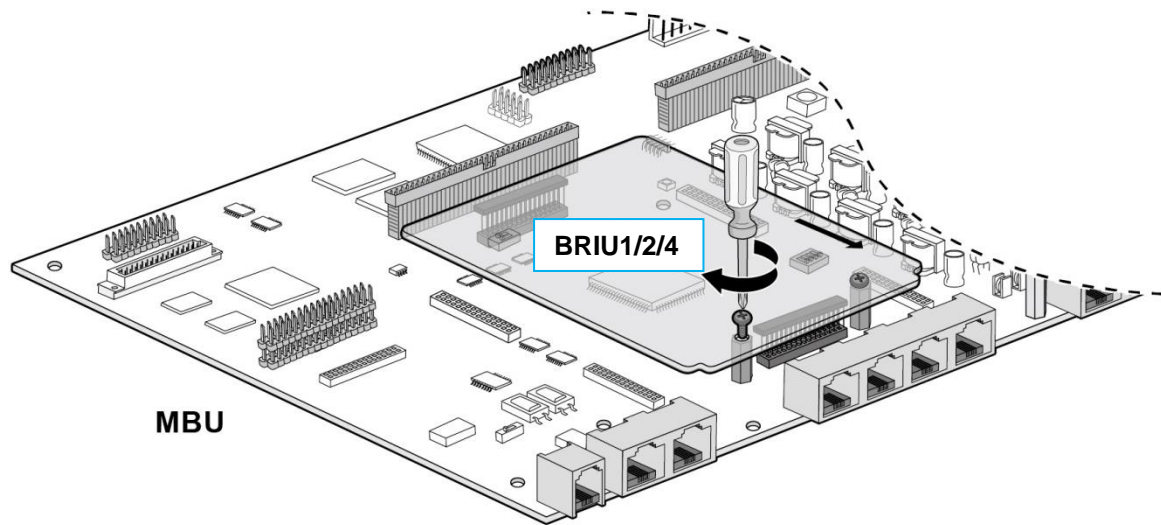**Figure 4.4.2-2 COIU2/4 on MBU Board Installation**

BRIU1/2/4 on MBU
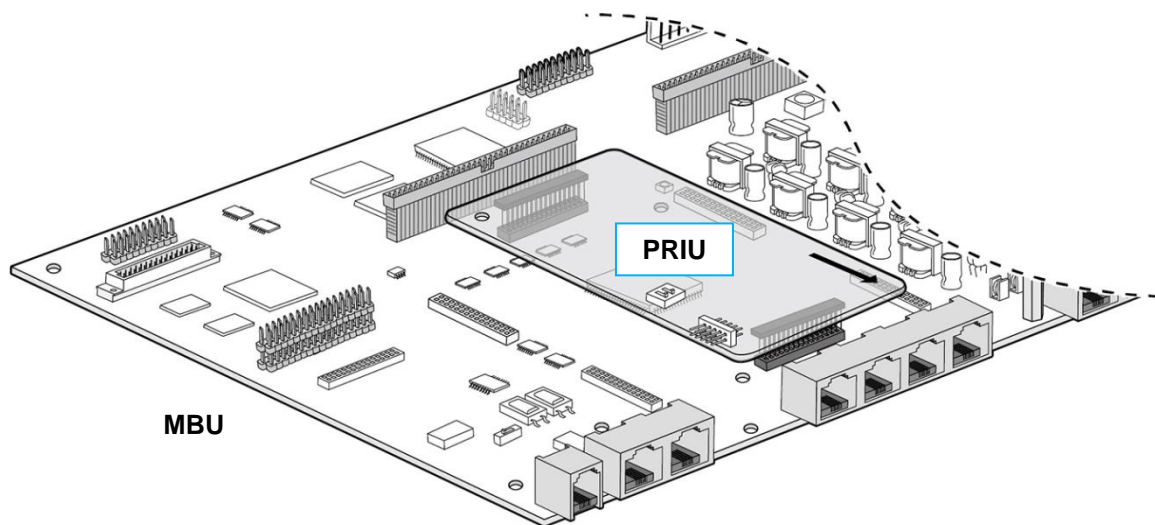

Figure 4.4.2-3 BRIU1/2/4 on MBU Board Installation

PRIU on MBU

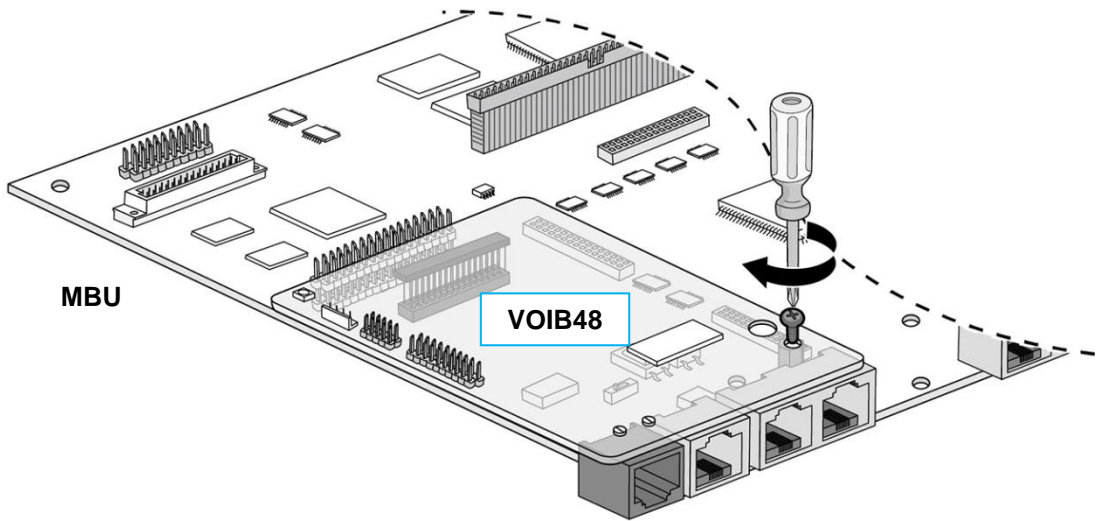**Figure 4.4.2-4 PRIU on MBU Board Installation**

VOIB48 on MBU

Figure 4.4.2-5 VOIB48 on MBU Board Installation
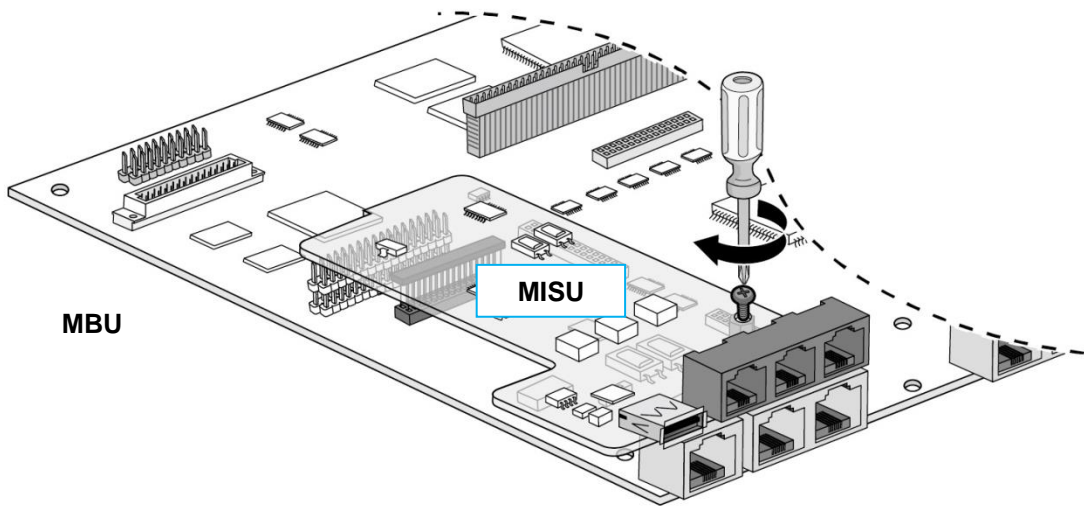
MISU on MBU

Figure 4.4.2-6 MISU on MBU Board Installation

MEMU/MEMU2 on MBU

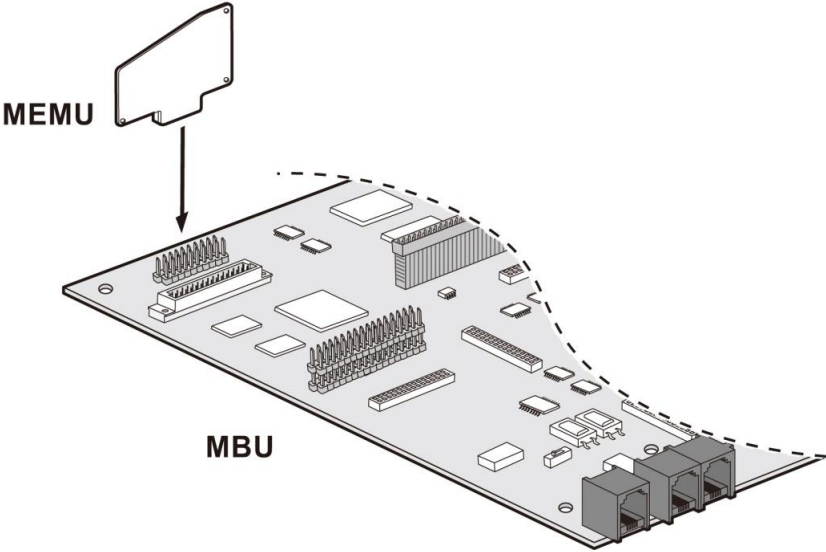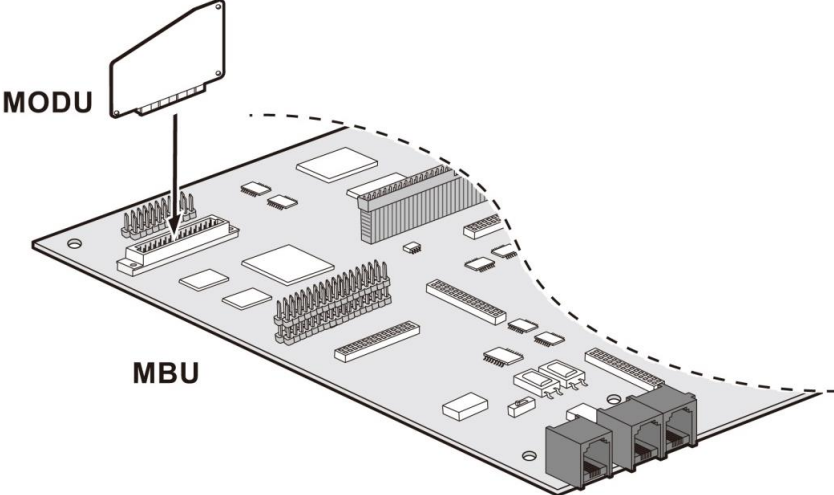**Figure 4.4.2-7 MEMU/MEMU2 on MBU Board Installation**

MODU on MBU

Figure 4.4.2-8 MODU on MBU Board Installation
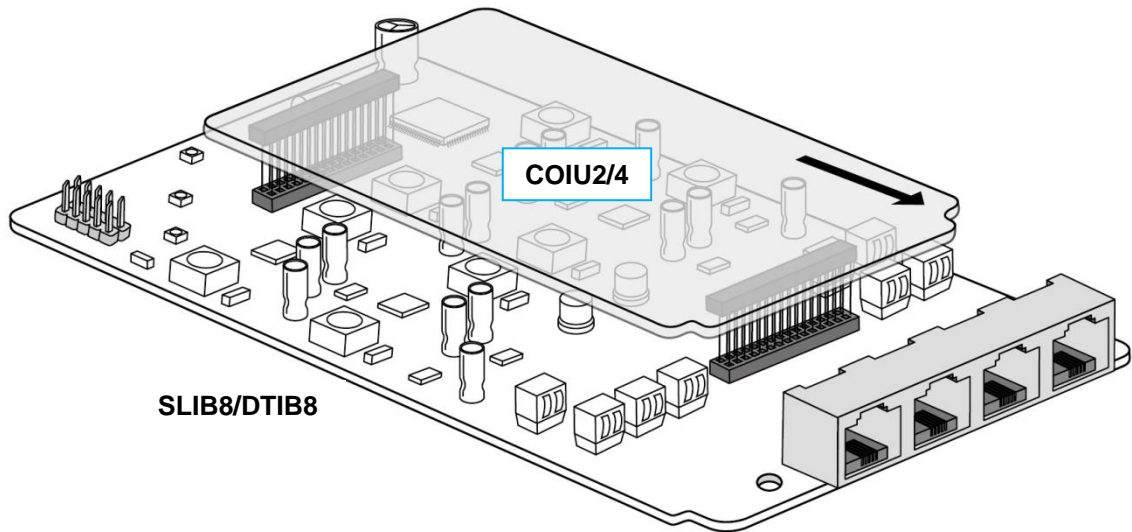
COIU2/4 on SLIB8(DTIB8)

Figure 4.4.2-9 COIU2/4 on SLIB8 (DTIB8) Board Installation
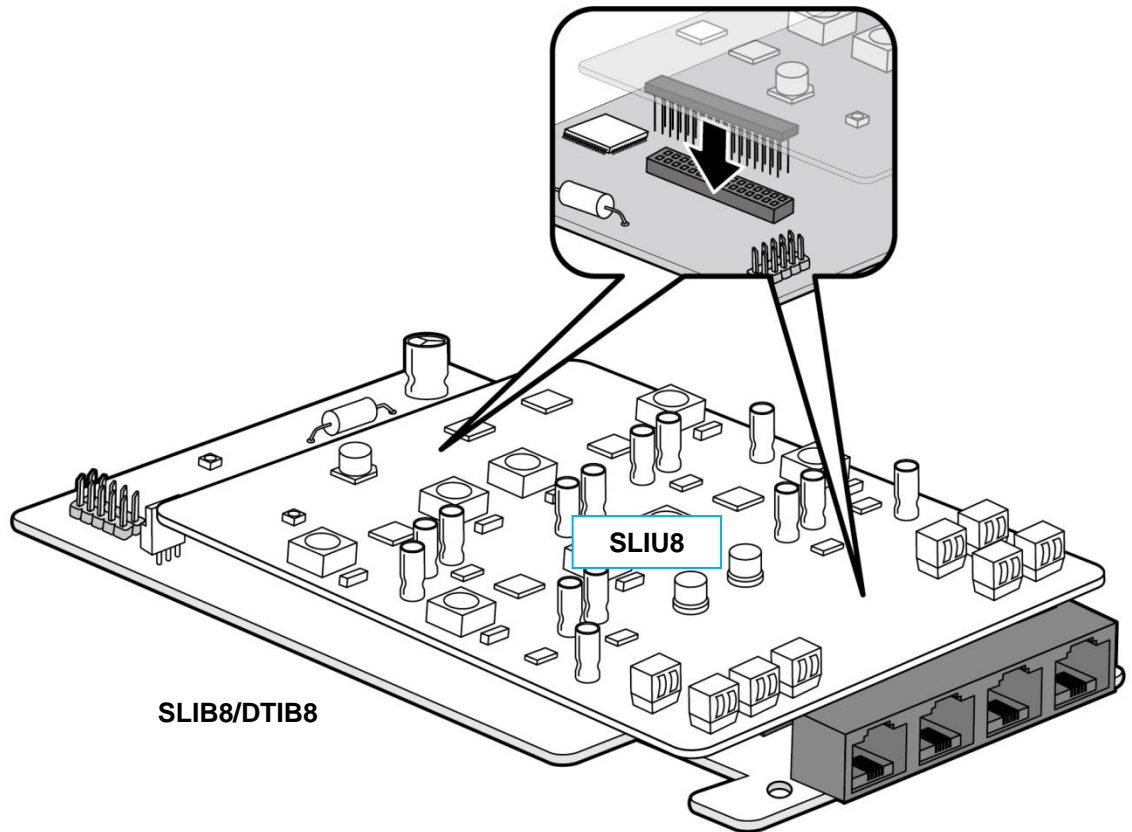
SLIU8 on SLIB8(DTIB8)

Figure 4.4.2-10 SLIU8 on SLIB8 (DTIB8) Board Installation

4.5   KSU Main Board Unit (MBU)

One of two (2) MBUs (MBUD or MBUS) is factory fixed in the KSU. The specifics of each MBU are discribed in sections 4.5.1 to 4.5.2.

4.5.1   MBUD (Main Board Unit)

Description

The MBUD, which is shown in Figure 4.5.1, controls communication between the peripheral interfaces, supervises all resources in the system, controls the gain adjustment of the PCM signals, generates the System tones, and manages System call processing.

The MBUD contains switches for database protection and initialization. A built-in LAN port provides access to the eMG100 Web Admin and basic VoIP channels.

The MBUD have eight(8) DKT and four (4) SLT interfaces, and support two (2) VoIP channels by default.

The SLT line interface supports FSK (ITU-T V.23 or Bell 202) or DTMF (ITU-T Q.23) Caller ID and the Message Wait Indication (MWI), DTMF detection, sinusoidal ringing generator, -48V DC feeding voltage, current limiting and GR-909 Line Testing function.
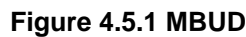
A VoIP channel is required to support each SIP Trunk line, LIP or SIP Phone, and remote user and devices. The two (2) basic VoIP channels on the MBU can be increased to sixteen (16) by license.

As shown in the figure, the MBU has connectors for the various option boards including connector CN1, CN11 which is used to connect optional Interface boards.

Two (2) Interface boards can be installed; the Option #1 is mounted directly on the CN1 connector of the MBU and the Option #2 is mounted directly on the CN11 connector.

Interface boards available for the MBUD include:

- COIU2 - CO Line board, 2 CO ports
- COIU4 - CO Line board, 4 CO ports
- BRIU1 - BRI board, 1 BRI (2B+D channels) port
- BRIU2 - BRI board, 2 BRI (4B+D channels) ports
- BRIU4 - BRI board, 4 BRI (8B+D channels) ports
- PRIU - PRI board, 1 PRI (30 channels) port
- SLIB8 - SLT board, 8 SLT ports
- DTIB8 - DKT board, 8 DKT ports

CN10: FPGA_JTAG
CN9: CPU_JTAG
CN7: PSU
CN1: Option board#1
CN11: Option board#2
CN31 & 32: COIU#2
CN21 & 22: COIU#1
CN2 & 12: PRIU/BRIU2
SW2:System reset button

CN6:MEMU/MEMU2
CN5:MODU
CN4:MISU
CN3:VOIB48

SW3 : Dip Switch
the default is OFF

SW1 : Dip Switch
- Pole 1 : the default is OFF
- Pole 2 : the default is ON

MBUD

Figure 4.5.1 MBUD

The following are included on the MBUD:

- 8 DKT (Digital Key Telephone) interface circuits
- 4 SLT interface circuits
- 1 External Relay contact for LBC or general purpose
- 1 Alarm detection circuit, 1 External Page port, and 1 External MOH port
- Internal MOH (13 music resources)
- Built-in VoIP channels (default 2 channels, maximum 16 channels with license)
- Built-in VM channel (default 4 channels, maximum 16 channels with license)
- Master Clock Generation & PLL circuit
- 1 RS-232C Interface circuit with "GDK-TRC1" box
- 1 LAN Interface
- PCM Voice Processing circuit (ACT2 - ASIC, voice switching, including DSP)
  - PCM Tone Generation and PCM Gain Control
  - Tone (DTMF / CPT / FAX) detection and CID Signal (FSK/DTMF/RUS CID) detection

NOTE
4 pin connector for RS-232C interface on MBU & RJ45 port for RS-232C on MISU is selectable.
It must be used in one interface only. Do not try to use both interfaces at the same time.

Connectors, Jacks and Switches

The following chart lists the various connectors for option boards, RJ45 modular jacks for connecting CO Lines, Stations and miscellaneous functions, and switches on the Main Board.

Table 4.5.1-1 KSU with MBUD Connector, Modular Jack and Switch Function

Connector		Function	Remark
CN1		Option Interface board #1 installation	70 pins
CN11		Option Interface board #2 installation	70 pins
CN21 & CN22		COIU2 or COIU4 #1 Installation	30 pins x 2
CN31 & CN32		COIU2 or COIU4 #2 Installation	30 pins x 2
CN2 & CN12		PRIU or BRIU1/2/4 installation	40 pins x 2
CN3		VOIB48 Installation	40 pins
CN4		MISU Installation	32 pins
CN5		MODU Installation	20 pins
CN6		MEMU/MEMU2 Installation	20 Pins
CN7		PSU Connector	7 pins
CN8		RS-232C Port Connection with GDK-TRC1	4 Pins
CN9		CPU JTAG for development	20 Pins
CN10		FPGA JTAG for development	10 pins
MJ1	MJ1-1	CO lines 1 & 2 / BRI line 1 / PRI line	RJ45, 8 pins
	MJ1-2	CO lines 3 & 4 / BRI line 2	RJ45, 8 pins
	MJ1-3	CO lines 5 & 6 / BRI line 3	RJ45, 8 pins
	MJ1-4	CO lines 7 & 8 / BRI line 4	RJ45, 8 pins
MJ2	MJ2-1	DKT lines 1 & 3 & 5	RJ45, 8 pins
	MJ2-2	DKT lines 2 & 4 & 6	RJ45, 8 pins
	MJ2-3	DKT lines 7 & 8, SLT lines 1 & 3	RJ45, 8 pins
	MJ2-4	SLT lines 2 & 4	RJ45, 8 pins
MJ3		LAN Port	1 LAN, 8 pins
MJ4	MJ4-1	KSU Expansion for Master & Slave	RJ45, 8 pins
	MJ4-2	Relay/Alarm/Page/External MOH Connection	RJ45, 8 pins
SW1		2 pole Database protect switch	
SW2		Push-button System reset switch	
SW3		Clock Master / Slave Mode selection switch	

Switch setting

Table 4.5.1-2 MBUD SW1 – 2-pole Dip switch

Pole	Function	Switch State		Remarks
		ON	**OFF**	
1	Database protection	Protect database, no admin allowed	Unprotect	Default: OFF
2	Initialization for Database	Initialize Database on reset	Use stored Database	Default: ON

Table 4.5.1-3 Clock Master/Slave selection Function SW3

Function	Operating Mode		Remarks
	ON	OFF	
Clock Master / Slave mode	Slave mode	Master mode	Default: OFF

LED Indications

Table 4.5.1-4 MBUD LED Indication

LED	Color	Description
LD1	Green	Flash 300ms ON and OFF, normal operation
LD2	Green	Call Task, Call event status
LD3	Blue	External Clock Synchronization ・ ON : PLL circuit sync to ISDN interface clock ・ OFF : PLL circuit sync to internal clock
LD4	Blue	System Powered ON Indication
LD5	Green	Flash 300ms ON and OFF, normal operation, same as LD1
LD6	Blue	Internal VOIB48 Link status ・ ON : Internal LAN Linked with VOIB48 ・ OFF : Internal LAN Link disconnected

4.5.2 MBUS (Main Board Unit)

<u>**Description**</u>

The MBUS, which is shown in Figure 4.5.1 , controls communication between the peripheral interfaces, supervises all resources in the system, controls the gain adjustment of the PCM signals, generates the System tones, and manages System call processing.

The MBUS contains switches for database protection and initialization. A built-in LAN port provides access to the eMG100 Web Admin and basic VoIP channels.

The MBUS have two(2) DKT and six (6) SLT interfaces, and two (2) VoIP channels.

The SLT line interface supports FSK (ITU-T V.23 or Bell 202) or DTMF (ITU-T Q.23) Caller ID and the Message Wait Indication (MWI), DTMF detection, sinusoidal ringing generator, -48V DC feeding voltage, current limiting and GR-909 Line Testing function.

A VoIP channel is required to support each SIP Trunk line, LIP or SIP Phone, and remote user and devices. The two (2) basic VoIP channels on the MBU can be increased to sixteen (16) by license.

As shown in the figure, the MBU has connectors for the various option boards including connector CN1, CN11 which is used to connect optional Interface boards.

Two (2) Interface boards can be installed; the Option #1 is mounted directly on the CN1 connector of the MBUS and the Option #2 is mounted directly on the CN11 connector.

Interface boards available for the MBUS include:

- COIU2 - CO Line board, 2 CO ports
- COIU4 - CO Line board, 4 CO ports
- BRIU1 - BRI board, 1 BRI (2B+D channels) port
- BRIU2 - BRI board, 2 BRI (4B+D channels) ports
- BRIU4 - BRI board, 4 BRI (8B+D channels) ports
- PRIU - PRI board, 1 PRI (30 channels) port
- SLIB8 - SLT board, 8 SLT ports
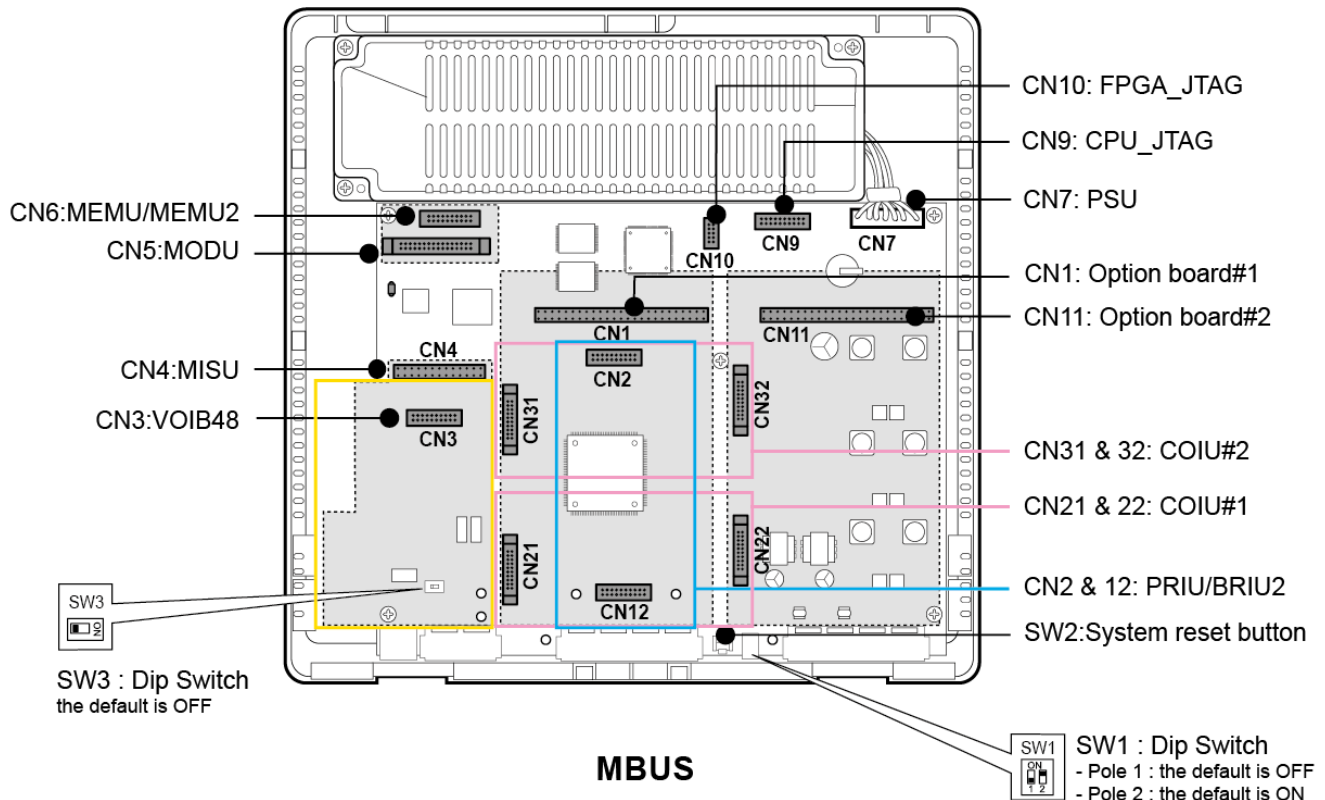- DTIB8 - DKT board, 8 DKT ports

Figure 4.5.2 MBUS

The following are included on the MBUS:

- 2 DKT (Digital Key Telephone) interface circuits

- 6 SLT interface circuits

- 1 External Relay contact for LBC or general purpose

- 1 Alarm detection circuit, 1 External Page port, and 1 External MOH port

- Internal MOH (13 music resources)

- Built-in VoIP channels (default 2 channels, maximum 16 channels with license)

- Built-in VM channel (default 4 channels, maximum 16 channels with license)

- Master Clock Generation & PLL circuit

- 1 RS-232C Interface circuit with "GDK-TRC1" box

- 1 LAN Interface

- PCM Voice Processing circuit (ACT2 - ASIC, voice switching, including DSP)
  - PCM Tone Generation and PCM Gain Control
  - Tone (DTMF / CPT / FAX) detection and CID Signal (FSK/DTMF/RUS CID) detection

NOTE

4 pin connector for RS-232C interface on MBU & RJ45 port for RS-232C on MISU is selectable.It must be used in one interface only. Do not try to use both interfaces at the same time.

Connectors, Jacks and Switches

The following chart lists the various connectors for option boards, RJ45 modular jacks for connecting CO Lines, Stations and miscellaneous functions, and switches on the Main Board.

Table 4.5.2-1 KSU with MBUS Connector, Modular Jack and Switch Function

Connector		Function	Remark
CN1		Option Interface board #1 installation	70 pins
CN11		Option Interface board #2 installation	70 pins
CN21 & CN22		COIU2 or COIU4 #1 Installation	30 pins x 2
CN31 & CN32		COIU2 or COIU4 #2 Installation	30 pins x 2
CN2 & CN12		PRIU or BRIU1/2/4 installation	40 pins x 2
CN3		VOIB48 Installation	40 pins
CN4		MISU Installation	32 pins
CN5		MODU Installation	20 pins
CN6		MEMU/MEMU2 Installation	20 Pins
CN7		PSU Connector	7 pins
CN8		RS-232C Port Connection with GDK-TRC1	4 Pins
CN9		CPU JTAG for development	20 Pins
CN10		FPGA JTAG for development	10 pins
MJ1	MJ1-1	CO lines 1 & 2 / BRI line 1 / PRI line	RJ45, 8 pins
	MJ1-2	CO lines 3 & 4 / BRI line 2	RJ45, 8 pins
	MJ1-3	CO lines 5 & 6 / BRI line 3	RJ45, 8 pins
	MJ1-4	CO lines 7 & 8 / BRI line 4	RJ45, 8 pins
MJ2	MJ2-1	DKT lines 1	RJ45, 8 pins
	MJ2-2	DKT lines 2	RJ45, 8 pins
	MJ2-3	SLT lines 1 & 3	RJ45, 8 pins
	MJ2-4	SLT lines 2 & 4 & 5 & 6	RJ45, 8 pins
MJ3		LAN Port	1 LAN, 8 pins
MJ4	MJ4-1	KSU Expansion for Master & Slave	RJ45, 8 pins
	MJ4-2	Relay/Alarm/Page/External MOH Connection	RJ45, 8 pins
SW1		2 pole Database protect switch	
SW2		Push-button System reset switch	
SW3		Framesync Master / Slave selection switch	

Switch setting

Table 4.5.2-2 MBUS SW1 – 2-pole Dip switch

Pole	Function	Switch State		Remarks
		ON	OFF	
1	Database protection	Protect database, no admin allowed	Unprotect	Default : OFF
2	Initialization for Database	Initialize Database on reset	Use stored Database	Default : ON

Table 4.5.2-3 Clock Master/Slave selection Function SW3

Function	Operating Mode		Remarks
	ON	**OFF**	
Clock Master / Slave mode	Slave mode	Master mode	Default : OFF

LED Indications

Table 4.5.2-4 MBUS LED Indication

LED	Color	Description
LD1	Green	Flash 300ms ON and OFF, normal operation
LD2	Green	Call Task, Call event status
LD3	Blue	External Clock Synchronization ・ ON : PLL circuit sync to ISDN interface clock ・ OFF : PLL circuit sync to internal clock
LD4	Blue	System Powered ON Indication
LD5	Green	Flash 300ms ON and OFF, normal operation, same as LD1
LD6	Blue	Internal VOIB48 Link status ・ ON : Internal LAN Linked with VOIB48 ・ OFF : Internal LAN Link disconnected

4.6   Optional Interface Boards

Optional Interface Boards permit the expansion of the external network and terminal interface ports available in the eMG100 system are mounted on the Main board in the KSU.

Interface boards available are shown in the chart below.

Table 4.6 Optional Interface Boards

Board	Description	Connectors	Cable
COIU2	2 CO Line	RJ45	2-wire
COIU4	4 CO Line	RJ45	2-wire
BRIU1	1 BRI (2 channels)	RJ45	4-wire
BRIU2	2 BRI (4 channels)	RJ45	4-wire
BRIU4	4 BRI (8 channels)	RJ45	4-wire
PRIU	1 PRI (30 channels)	RJ45	4-wire
SLIB8	8 SLT ports	RJ45	2-wire
SLIU8	8 SLT ports	RJ45	2-wire
DTIB8	8 DKT ports	RJ45	2-wire

The CO line ports of the Interface boards support loop start CO lines with detection of supervisory signals including Caller Identification (CID), Polarity Reversal (PR), and Call Progress Tone (CPT).

The SLT interface supports FSK (ITU-T V.23 or Bell 202) or DTMF (ITU-T Q.23) Caller ID and the Message Wait Indication (MWI), DTMF detection, sinusoidal ringing generator, -48V DC feeding voltage, current limiting and GR-909 Line Testing function.

4.6.1 COIU2 (2 CO Line Interface Board)

Description

The COIU2 board has two (2) CO line interface ports. The board may be installed on MBU(CN21 & CN22, CN31 & CN32) or SLIB8(CN3 & CN4) or DTIB8(CN3 & CN4).

To install the board, refer to Section 4.4.
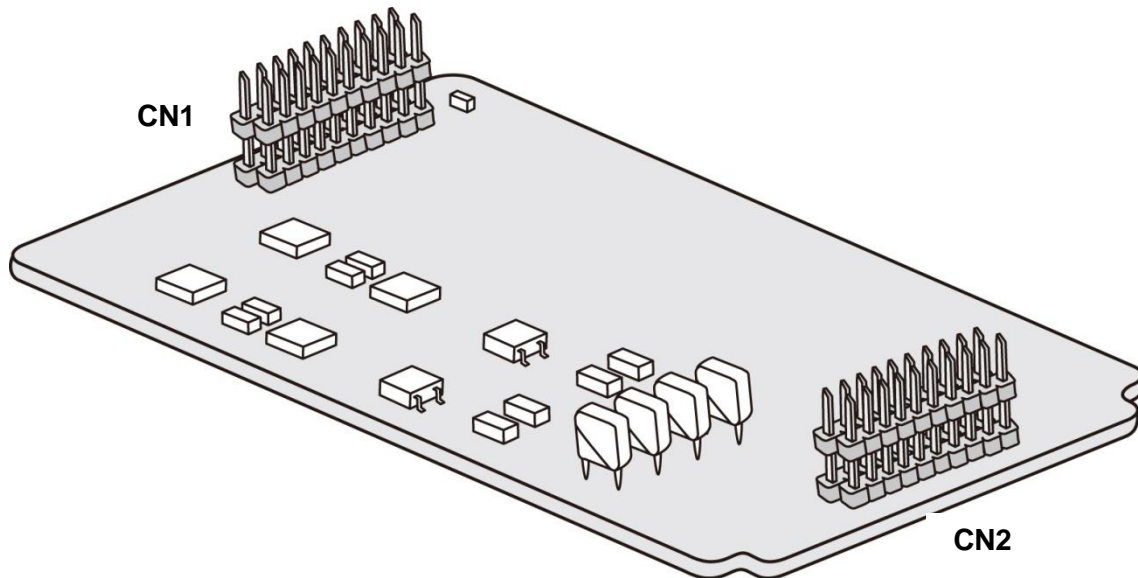
Figure 4.6.1 COIU2

Connector

Table 4.6.1 Connector Jack Function

Connector	Functions	Remark
CN1	Connection to the MBU (CN21 or CN31), SLIB8 (CN3) and DTIB8 (CN3)	26 pins
CN2	Connection to the MBU (CN22 or CN32), SLIB8 (CN4) and DTIB8 (CN4)	26 pins

4.6.2 COIU4 (4 CO Line Interface Board)

<u>Description</u>

The COIU4 board has four (4) CO line interface ports. The board may be installed on the MBU(CN21 & CN22, CN31 & CN32) or SLIB8(CN3 & CN4) or DTIB8(CN3 & CN4).

To install the board, refer to Section 4.4.
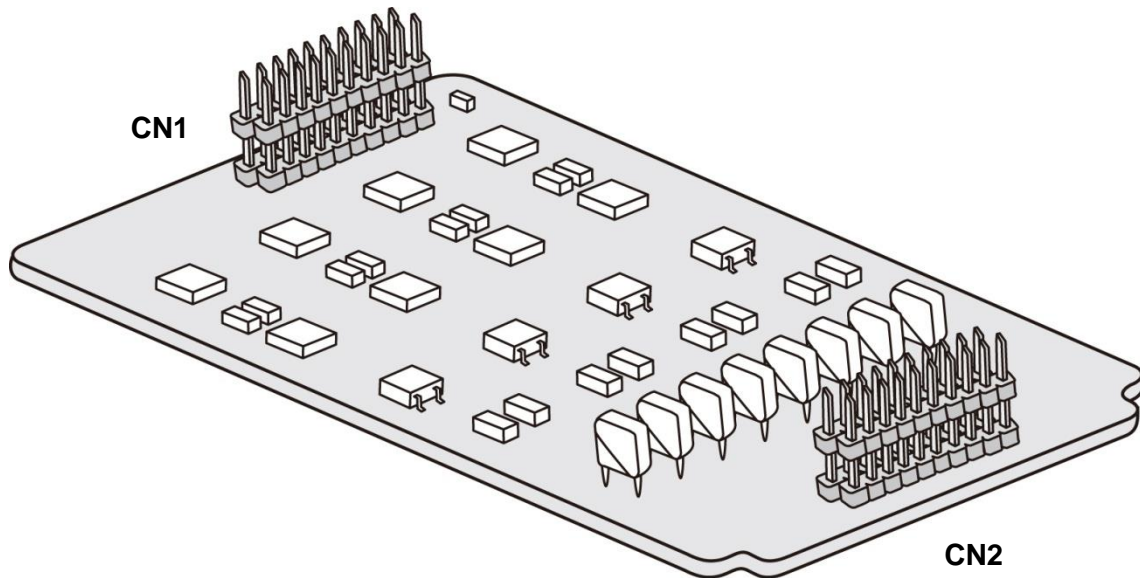
Figure 4.6.2 COIU4

<u>Connector</u>

Table 4.6.2 Connector Function

Connector	Functions	Remark
CN1	Connection to the MBU (CN21 or CN31), SLIB8 (CN3) and DTIB8 (CN3)	26 pins
CN2	Connection to the MBU (CN22 or CN32), SLIB8 (CN4) and DTIB8 (CN4)	26 pins

4.6.3 BRIU1 (1 BRI Interface Board)

<u>Description</u>

The BRIU1 board has one (1) BRI (2B+D) interface ports. The board may be installed on the MBU(CN2 & CN12). The Multiple pole Dip-switches determine the operating mode 'S' or 'T' and termination. The board is provided with two Standoffs that must be installed prior to mounting the board.

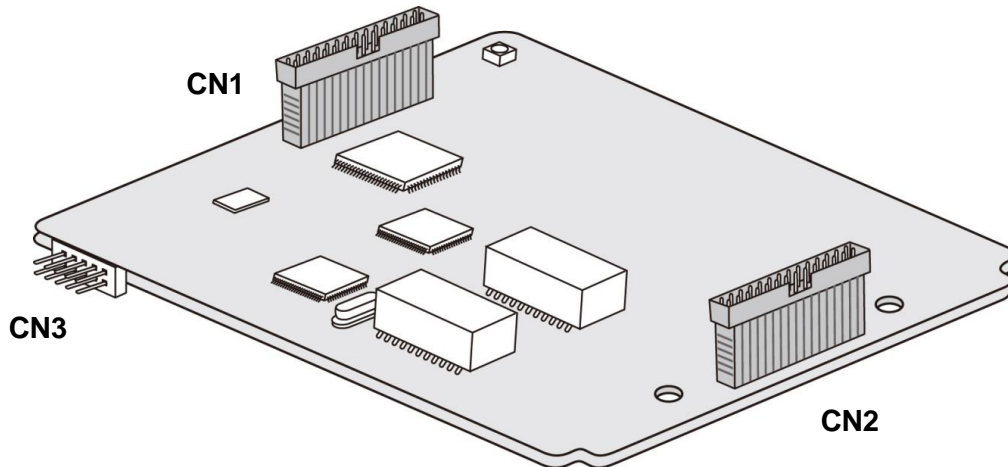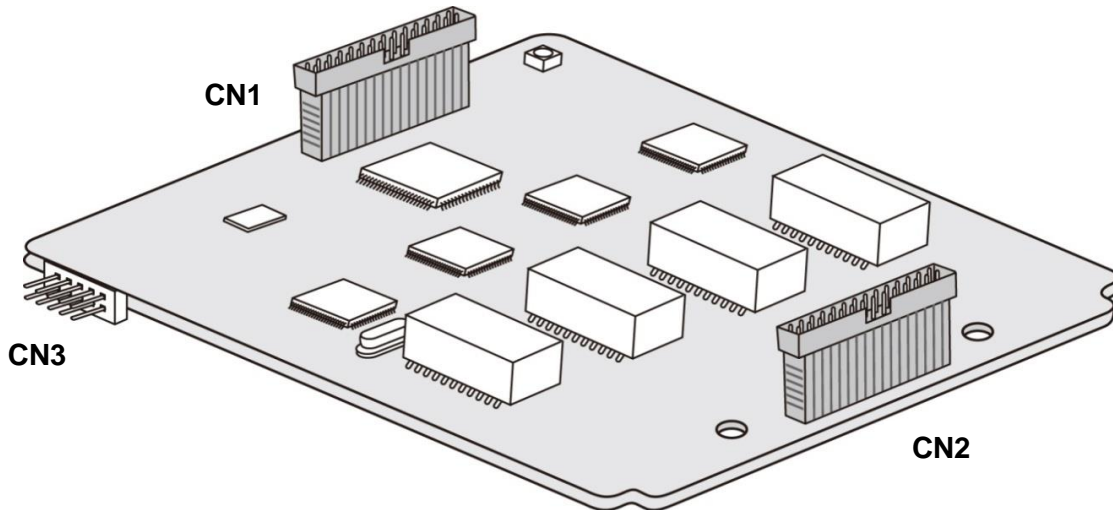To install the board in the KSU, refer to Section 4.4.
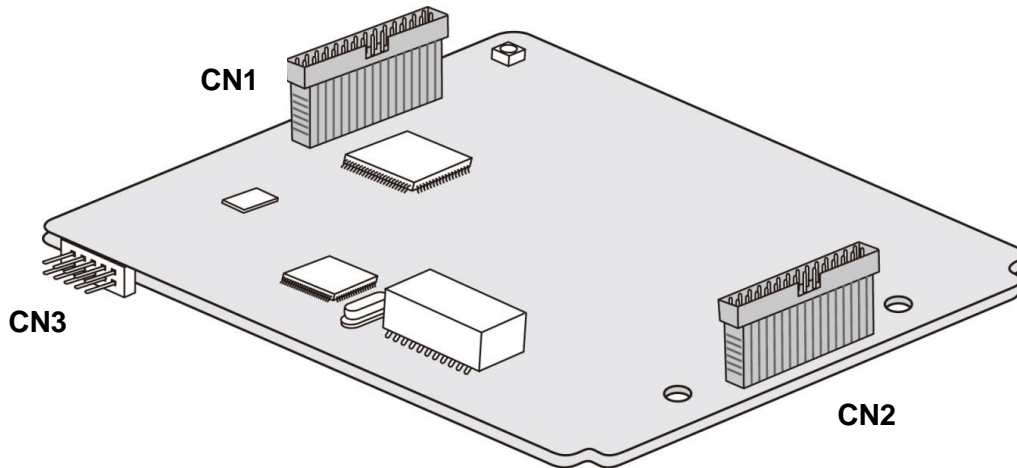
Figure 4.6.3 BRIU1

<u>Connector</u>

Table 4.6.3-1 Connector Function

Connector	Functions	Remark
CN1	Connection to the MBU (CN2)	40 pins
CN2	Connection to the MBU (CN12)	40 pins
CN3	CPLD JTAG for development	10 pins

<u>Switch setting</u>

Table 4.6.3-2 BRIU1 BRI Mode SW1

Pole	Function	Mode		Remarks
		ON	OFF	
1	S or T mode	S mode	T mode	Default : OFF
2	BRI line loopback	Test		

Table 4.6.3-3 BRIU1 BRI Termination SW200

Pole	Function	Termination	Remarks
1 & 2	Termination Resistor	Port 1 Termination Resistor ・ON : Terminate ・OFF : Open	Default : ON
3 & 4	Termination Resistor	Port 2 Termination Resistor ・ON : Terminate ・OFF : Open	Default : ON

LED Indications

Table 4.6.3-4 BRIU1 LED Indication

LED	Color	Description
LD2	Blue	・ON　: a BRI line in use ・OFF : All BRI lines idle
LD3	Red	・ON　: BRI Line Error ・OFF : Normal
LD4	Blue	・ON　: BRI reference clock external ・OFF : BRI reference clock internal

4.6.4 BRIU2 (2 BRI Interface Board)

<u>Description</u>

The BRIU2 board has two (2) BRI (2B+D) interface ports. The board may be installed on the MBU (CN2 & CN12). The Multiple pole Dip-switches determine the operating mode 'S' or 'T' and termination. The board is provided with two Standoffs that must be installed prior to mounting the board.

To install the board in the KSU, refer to Section 4.4.

Figure 4.6.4 BRIU2

<u>Connector</u>

Table 4.6.4-1 Connector Function

Connector	Functions	Remark
CN1	Connection to the MBU (CN2)	40 pins
CN2	Connection to the MBU (CN12)	40 pins
CN3	CPLD JTAG for development	10 pins

<u>Switch setting</u>

Table 4.6.4-2 BRIU2 BRI Mode SW1

Pole	Function	Mode		Remarks
		ON	OFF	
1	S or T mode	S mode	T mode	Default : OFF
2	BRI line loopback	Test		

Table 4.6.4-3 BRIU2 BRI Termination SW200

Pole	Function	Termination	Remarks
1 & 2	Termination Resistor	Port 1 Termination Resistor ・ ON : Terminate ・ OFF : Open	Default : ON
3 & 4	Termination Resistor	Port 2 Termination Resistor ・ ON : Terminate ・ OFF : Open	Default : ON

LED Indications

Table 4.6.4-4 BRIU2 LED Indication

LED	Color	Description
LD2	Blue	・ ON : a BRI line in use ・ OFF : All BRI lines idle
LD3	Red	・ ON : BRI Line Error, BRI 1 or 2 ・ OFF : both BRI lines normal
LD4	Blue	・ ON : BRI reference clock external ・ OFF : BRI reference clock internal

4.6.5 BRIU4 (4 BRI Interface Board)

<u>Description</u>

The BRIU4 board has four (4) BRI (2B+D) interface ports. The board may be installed on the MBU (CN2 & CN12). The Multiple pole Dip-switches determine the operating mode 'S' or 'T' and termination. The board is provided with two Standoffs that must be installed prior to mounting the board.

To install the board in the KSU, refer to Section 4.4.

Figure 4.6.5 BRIU4

<u>Connector</u>

Table 4.6.5-1 Connector Function

Connector	Functions	Remark
CN1	Connection to the MBU (CN2)	40 pins
CN2	Connection to the MBU (CN12)	40 pins
CN3	CPLD JTAG for development	10 pins

<u>Switch setting</u>

Table 4.6.5-2 BRIU4 BRI Mode SW1

Pole	Function	Mode		Remarks
		ON	OFF	
1	S or T mode	S mode	T mode	Default : OFF
2	BRI line loopback	Test		

Table 4.6.5-3 BRIU4 BRI Termination SW200 and SW300

Pole	Function	Termination	Remarks
1 & 2 (SW200)	Termination Resistor	Port 1 Termination Resistor ・ ON : Terminate ・ OFF : Open	Default : ON
3 & 4 (SW200)	Termination Resistor	Port 2 Termination Resistor ・ ON : Terminate ・ OFF : Open	Default : ON

Pole	Function	Termination	Remarks
1 & 2 (SW300)	Termination Resistor	Port 3 Termination Resistor ・ON : Terminate ・OFF : Open	Default : ON
3 & 4 (SW300)	Termination Resistor	Port 4 Termination Resistor ・ON : Terminate ・OFF : Open	Default : ON

LED Indications

Table 4.6.5-4 BRIU4 LED Indication

LED	Color	Description
LD2	Blue	・ON : a BRI line in use ・OFF : All BRI lines idle
LD3	Red	・ON : BRI Line Error, BRI 1 or 2 ・OFF : both BRI lines normal
LD4	Blue	・ON : BRI reference clock external ・OFF : BRI reference clock internal

4.6.6 PRIU (1 PRI/E1R2, 30 Channels Interface Board)

<u>Description</u>

The PRIU board provides a standard PRI or E1R2 interface circuit. The PRIU may be installed on the MBU(CN2 & CN12). The interface circuit complies with ITU-T Recommendations G.704, G.703 and G.823. The PRIU employs the CEPT frame format, which consist of 32, 8-bit time slots at a data rate of 2.048MHz. The time slot TS 0 is allocated to frame alignment, time slot TS 16 is allocated as the signaling channel, and the other 30 time slots are available as Bearer 'B' channels.

The PRIU circuit will extract the reference clock from the incoming PRI circuit. The extracted clock is sent to the PLL circuitry of the MBU to synchronize the main clocks. The PRIU can operate in the TE slave or NT master mode.

The PRIU supports pulse dialing, DTMF dialing, and MFC-R2 register signaling (based on ITU-T Recommendation Q.440-480).

A multiple pole Dip-switch determines the type of interface circuit, PRI or E1R2. The TE and NT operating mode is determined through database configuration.

To install the board in the KSU, refer to section 4.4.
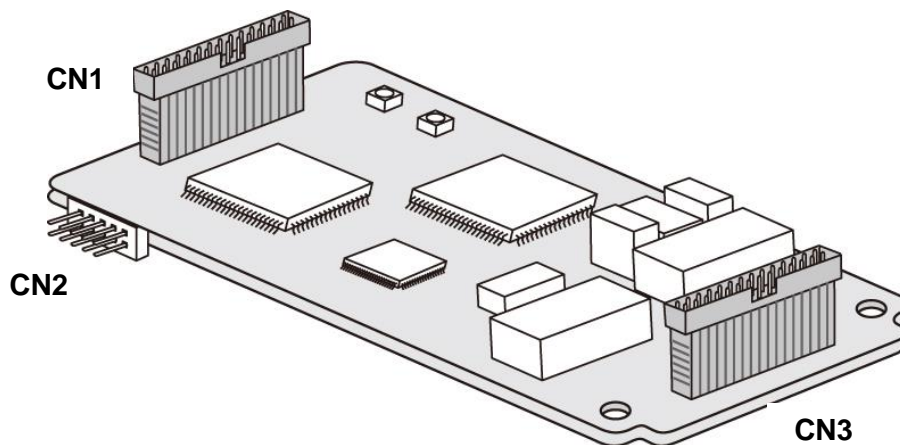
Figure 4.6.6 PRIU (E1)

<u>Connector</u>

Table 4.6.6-1 Connector Function

Connector	Functions	Remark
CN1	Connection to the MBU (CN2)	40 pins
CN3	Connection to the MBU (CN12)	40 pins
CN2	CPLD JTAG for development	10 pins

<u>Switch setting</u>

Table 4.6.6-2 PRIU PRI/E1R2 Function SW1

Pole	Function	Operating Mode		Remarks
		ON	OFF	
1	E1R2 or PRI mode	E1R2	PRI mode	Default : OFF
2	Reserved	-		

LED Indications

Table 4.6.6-3 PRIU LED Indications

LED	Color	Description
LD1	Blue	・ ON　: FPGA programmed ・ OFF : FPGA not programmed
LD2	Blue	・ Flash (500ms): normal
LD3	Blue	・ ON　: PRI channel in use ・ OFF : All PRI channels idle
LD4	Red	・ ON　: Line error ・ OFF : normal

4.6.7 PRIU (1 PRI/T1, 24/23 Channels Interface Board)

<u>Description</u>

The PRIU board provides a North American standard PRI or T1 interface circuit. The PRIU may be installed on the MBU(CN2 & CN12). The PRIU operates with a 125 usec frame at 1.544Mb/s. A multiple pole Dip-switch determines the type of interface circuit, PRI or T1.

In PRI operation, the ISDN standard NII2 (National ISDN Interface 2) 23 Bearer and one (1) Data channel interface is supported. The PRI operation employs ANSI T1.403, T1.601, T1.605, and TR62411 standards.

In T1 operation, the standards EIA/TIA-464-A and TR 41458 24-channel interface supporting DID, TIE Line, and Loop or Ground Start are implemented. The DID and TIE Line operation support Immediate, Delayed and Wink start signaling protocols. The Telco interface must provide BZ8S line coding and Extended Super Frame (ESF) framing.

The PRIU circuit will extract the reference clock from the incoming PRI circuit. The extracted clock is sent to the PLL circuitry of the MBU to synchronize the main clocks. The PRIU can operate in the TE slave or NT master mode. The TE and NT operating mode is determined through database configuration.

To install the board in the KSU, refer to section 4.4.
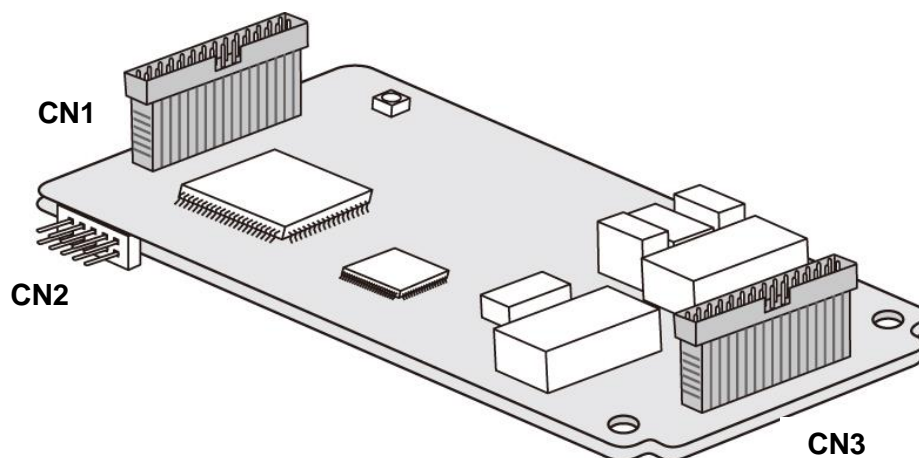
Figure 4.6.7 PRIU (T1)

<u>Connector</u>

Table 4.6.7-1 Connector Function

Connector	Functions	Remark
CN1	Connection to the MBU (CN2)	40 pins
CN3	Connection to the MBU (CN12)	40 pins
CN2	CPLD JTAG for development	10 pins

<u>Switch setting</u>

Table 4.6.7-2 PRIU PRI/T1 Function SW1

Pole	Function	Operating Mode		Remarks
		ON	OFF	
1	T1 or PRI mode	T1	PRI mode	Default : OFF
2	Reserved	-		

LED Indications

Table 4.6.7-3 PRIU LED Indications

LED	Color	Description
LD1	Blue	・ON : FPGA programmed ・OFF : FPGA not programmed
LD2	Blue	・Flash (500ms): normal
LD3	Blue	・ON : PRI channel in use ・OFF : All PRI channels idle
LD4	Red	・ON : Line error ・OFF : normal

4.6.8 SLIB8 (SLT 8 Interface Board)

<u>Description</u>

The SLIB8 board has 8 SLT interface circuits. The board can be installed on the MBU(CN1 or CN11) for expansion.

The board is provided with one Standoff that must be installed prior to mounting the board. To install the board in the KSU, refer to Section 4.4.

The below Interface boards may be installed on the SLIB8(CN3 & CN4).

- COIU2 - CO Line board, 2 CO ports
- COIU4 - CO Line board, 4 CO ports
- SLIU8 - SLT board, 8 SLT ports
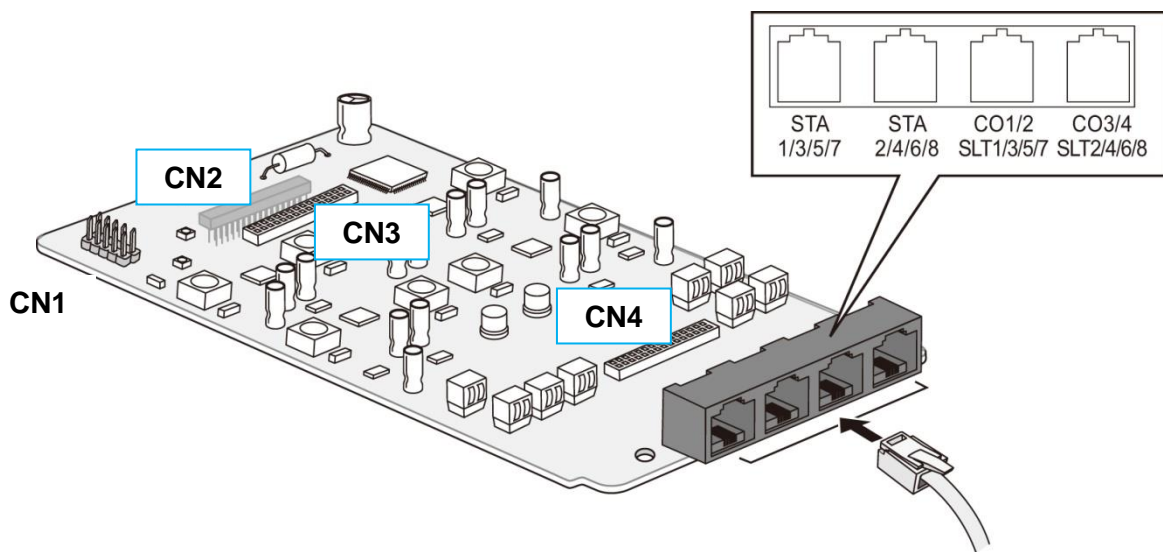
Figure 4.6.8 SLIB8

<u>Connector and Modular jack</u>

Table 4.6.8-1 Connector and Modular Jack Function

Connector	Functions	Remark
CN2	Connection to CN1 or CN11 of MBU	70 pins
CN1	CPLD JTAG for development	10 pins
MJ1	16 SLT, 8 SLT and 4 CO	RJ45
CN3	Connection to CN3 of SLIU8 or CN1 of COIU2/4	
CN4	Connection to CN4 of SLIU8 or CN2 of COIU2/4	

<u>LED Indications</u>

Table 4.6.8-2 SLIB8 LED Indications

LED	Color	Description
LD1	Blue	Station port in use status ・ON : a station port is in use ・OFF : All station ports are idle

4.6.9 SLIU8 (SLT 8 Interface Board)

<u>Description</u>

The SLIU8 board has 8 SLT interface circuits. The board can be installed on the SLIB8 or DTIB8(CN3 & CN4) for expansion.

To install the board on the SLIB8, refer to Section 4.4.

CN3

CN4
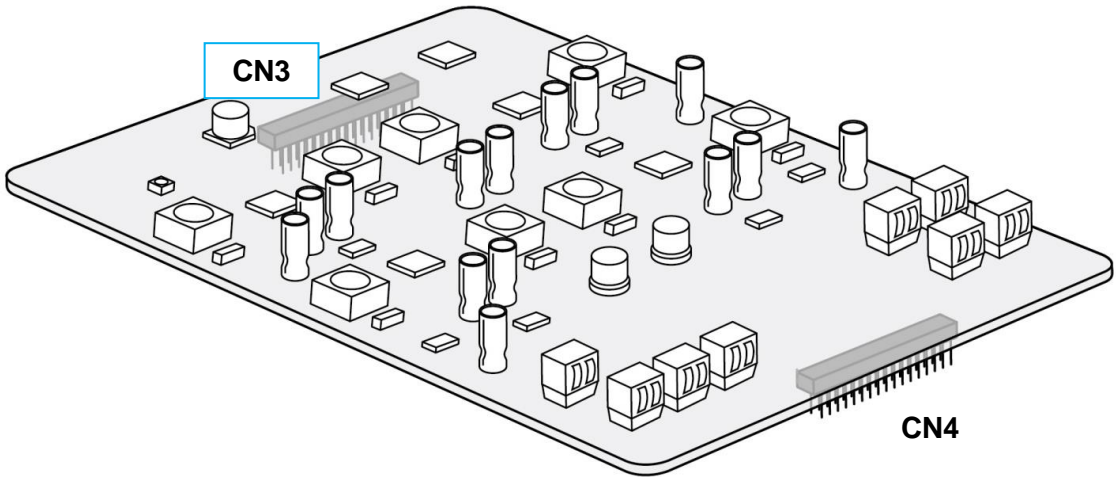
Figure 4.6.9 SLIU8

<u>Connector and Modular jack</u>

Table 4.6.9-1 Connector and Modular Jack Function

Connector	Functions	Remark
CN3	Connection to CN3 connector of the SLIB8 or DTIB8	26pins
CN4	Connection to CN4 connector of the SLIB8 or DTIB8	26pins

<u>LED Indications</u>

Table 4.6.9-2 SLIB8 LED Indications

LED	Color	Description
LD1	Blue	Station port in use status ・ ON : a station port is in use ・ OFF : All station ports are idle

4.6.10 DTIB8 (DKT Interface Board)

Description

The DTIB8 board has 8 DKT interface circuits. The board can be installed on the MBU(CN1 or CN11) for expansion.

The board is provided with one Standoffs that must be installed prior to mounting the board. To install the board in the KSU, refer to Section 4.4.

The below Interface boards may be installed on the DTIB8(CN3 & CN4).

- COIU2 - CO Line board, 2 CO ports
- COIU4 - CO Line board, 4 CO ports
- SLIU8 - SLT board, 8 SLT ports
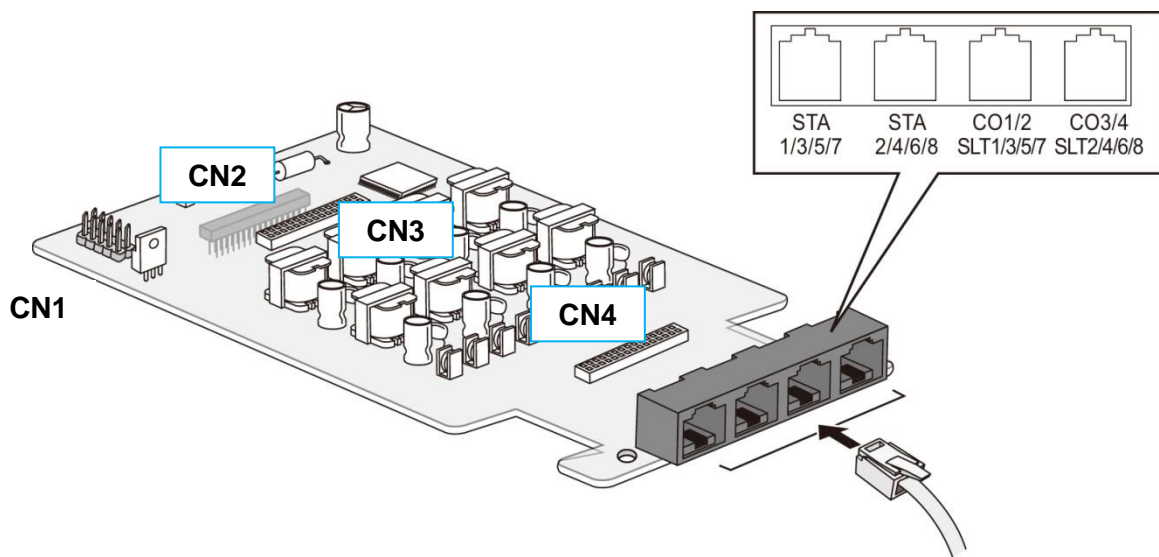
Figure 4.6.10 DTIB8

Connector and Modular jack

Table 4.6.10-1 Connector and Modular Jack Function

Connector	Functions	Remark
CN2	Connection to MBU CN1 or CN11 connector	70 pins
CN1	CPLD JTAG for development	10 pins
MJ1	8 DKT and 8 SLT, 8 DKT and 4 CO	RJ45
CN3	Connection to CN3 of SLIU8 or CN1 of COIU2/4	
CN4	Connection to CN4 of SLIU8 or CN2 of COIU2/4	

LED Indications

Table 4.6.10-2 LED Indications

LED	Color	Description
LD1	Blue	Station port in use status ・ ON　: a station port is in use ・ OFF : All station ports are idle

4.7   Optional Function Boards

The eMG100 KSU can be equipped with several option boards to provide additional or expanded functionality. Each optional Function board is installed on a specific option connector on the MBU as discussed in this section. The optional Function Boards include:

- VOIB48: 48 VoIP Interface Board
- MEMU/MEMU2: Memory Expansion Module Unit (Re-use of eMG80)
- MODU: Modem function Unit (Re-use of eMG80)
- MISU: Miscellaneous function Unit

4.7.1   VOIB48 (48 VoIP Interface Board)

Description

The VOIB48 expands the number of VoIP channels available in the system. In addition, the LAN port equipped on the VOIB48 provides the interface to the VOIB48 VoIP channels and for software applications that can be installed in the eMG100. The VOIB48 is installed on the MBU connectors CN3 as described in section 4.5.
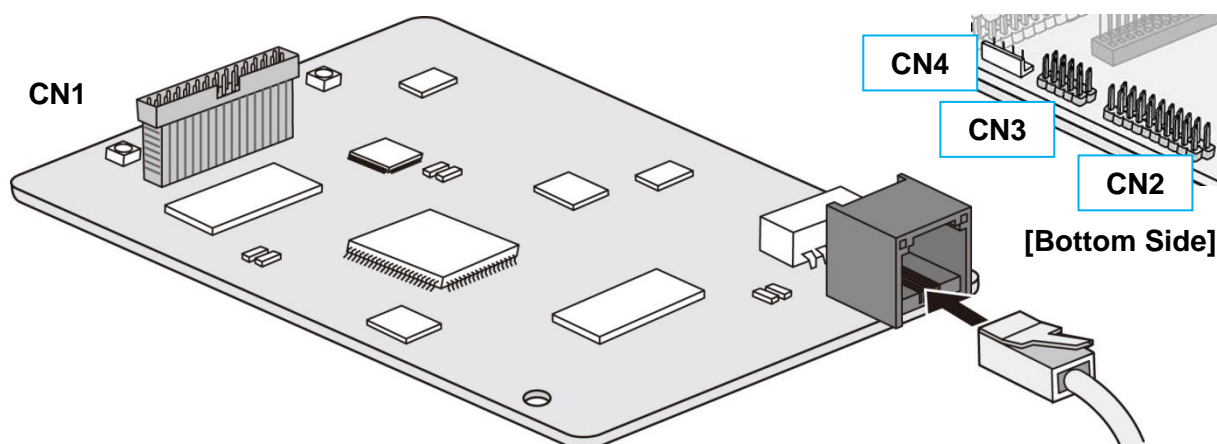
Figure 4.7.1 VOIB48

Table 4.7.1-1 VOIB48 Capacity Chart

Function	Default (without License)	Expansion (with License)	Max
VoIP Channels	8 Ch.	40 Ch.	48 Ch.

Connector and Modular jack

Table 4.7.1-2 Connector and Modular Jack Function

Connector	Functions	Remark
CN1	Connection to CN3 of the MBU	40 Pins
CN2	CPU JTAG for development	20 Pins
CN3	CPLD JTAG for development	10 Pins
CN4	Maintenance Serial port	4 Pins
MJ3	LAN Port	RJ45

Switch setting

Table 4.7.1-3 VOIB48 Push Button Reset SW2

Switch	Functions
SW2	Reset push button

LED Indications

Table 4.7.1-4 VOIB48 LED Indication

LED		Color	Description
LD1		Blue	Flash 100ms ON and OFF, normal operation
LD2		Blue	Channel in use status ・ON　: a VoIP or VM channel in use ・OFF : all VoIP and VM channels idle
MJ1	LD1	Link/Act	・ON　: Link ・Blink : Data Transfer
	LD2	Speed	・ON　: 100Mbps

4.7.2   MEMU/MEMU2 (Memory Expansion Module Unit)

Description

The MEMU/MEMU2 is equipped with Nand Flash memory used to expand the storage capacity of the eMG100 Voice Mail by 60 hours. As with the basic storage, the MEMU/MEMU2 storage is non-volatile and any messages are stored even if power to the eMG100 is lost.

The MEMU/MEMU2 has a single connector for mounting on CN6 of the eMG100 KSU MBU.

There are no other connectors, LEDs or switches on the MEMU/MEMU2.
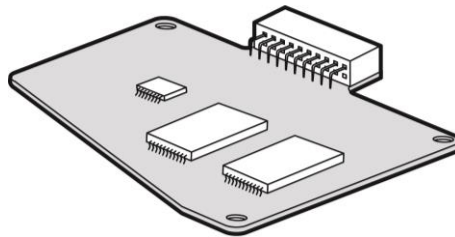
Figure 4.7.2 MEMU2

4.7.3   MODU (Modem Function Unit)

Description

The MODU provides an analog modem interface supporting Bell, ITU-T, V.34, V.32BIS and V.90 protocols at baud rates of 300bps up to 33Kbps with automatic rate negotiation.

The MODU has one connector for installation on the CN5 connector on the KSU MBU. There are no switches or LEDs located on the MODU.
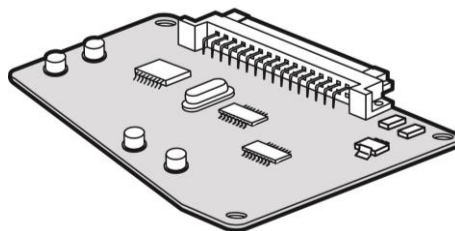
Figure 4.7.3 MODU

4.7.4 MSIU (Miscellaneous function Unit)

Description

The MISU provides one external MOH, one external PAGE, one ALARM port, three Gernal purpose RELAY ports, one RS-232C port, one USB port.

The USB function is up/downloading the Database and upgrading MP SW.

The MISU has one connector for installation on the CN4 connector on the KSU MBU.

LD1 indicate the Power status on MISU.

Caution

For using the USB function, please enter the maintenance mode and use USB functions in system idle time and unplug the USB device when not used.
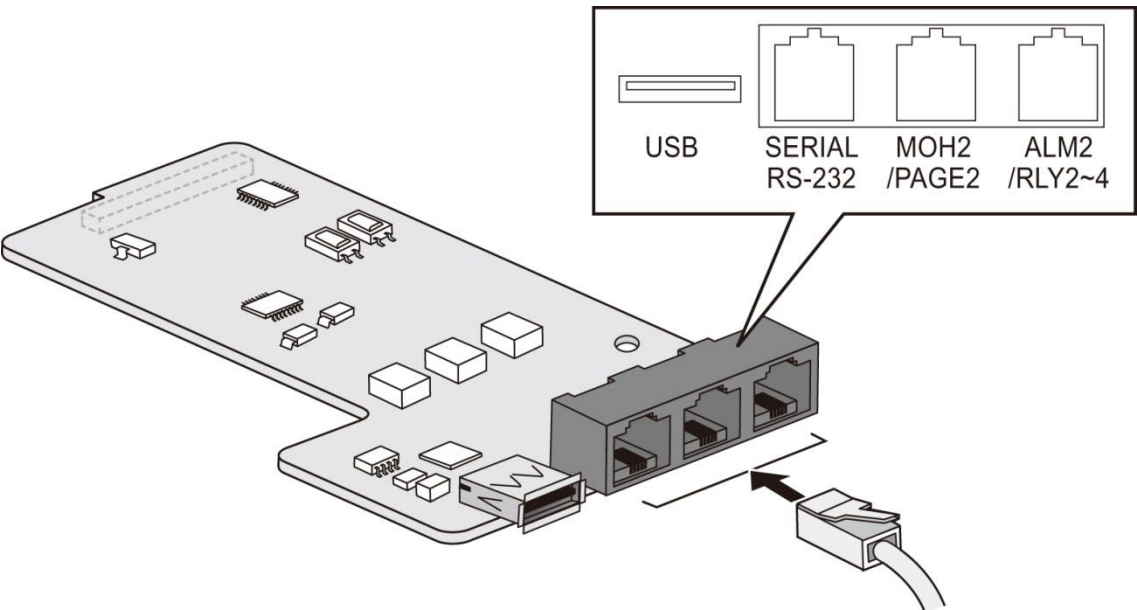
Figure 4.7.4 MSIU

LED Indications

Table 4.7.4 MISU LED Indications

LED	Color	Description
LD1	Blue	Board Powered ON Indication

5 Mounting the KSU

Once all option boards have been installed in the KSU, the KSUs can be mounted.

The KSUs can be desk, wall or rack mounted. While the KSUs may be desk mounted this is general not recommended and Wall and Rack mount provide added safety and optimal operation environment.

NOTE
While access to the interior of the KSU may be required during the initial power up, we recommend that the KSU cover be installed during mounting or moving the KSU.

5.1   KSU Exterior and Dimension

The following Figure 5.1-1 provides the external dimensions of the KSU to determining clearance.
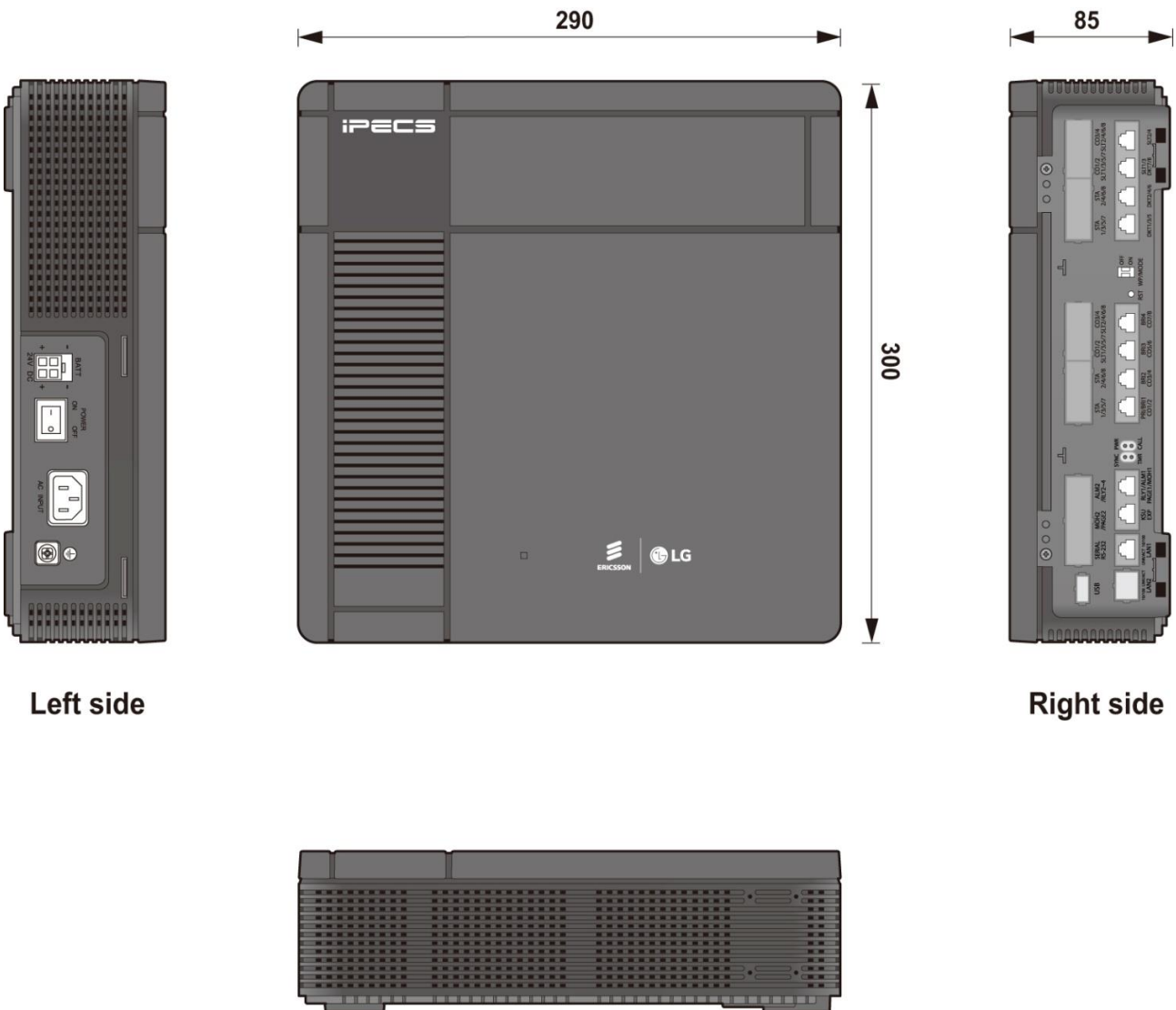
Figure 5.1 KSU Exterior Dimensions

5.2   Desk Mount

Although not recommended, the KSU can be mounted on a desk, shelf or table-top. In this case assure the 1'st KSU and 2'nd KSU are located side by side with a minimum of 5 cm separation.

<u>NOTE</u>

Particularly when multiple optional Interface boards are installed, the KSUs should be wall or rack mounted.

It is important that in no case should 1'st KSU and 2'nd KSU be stacked one on top of the other as this will cause overheating.
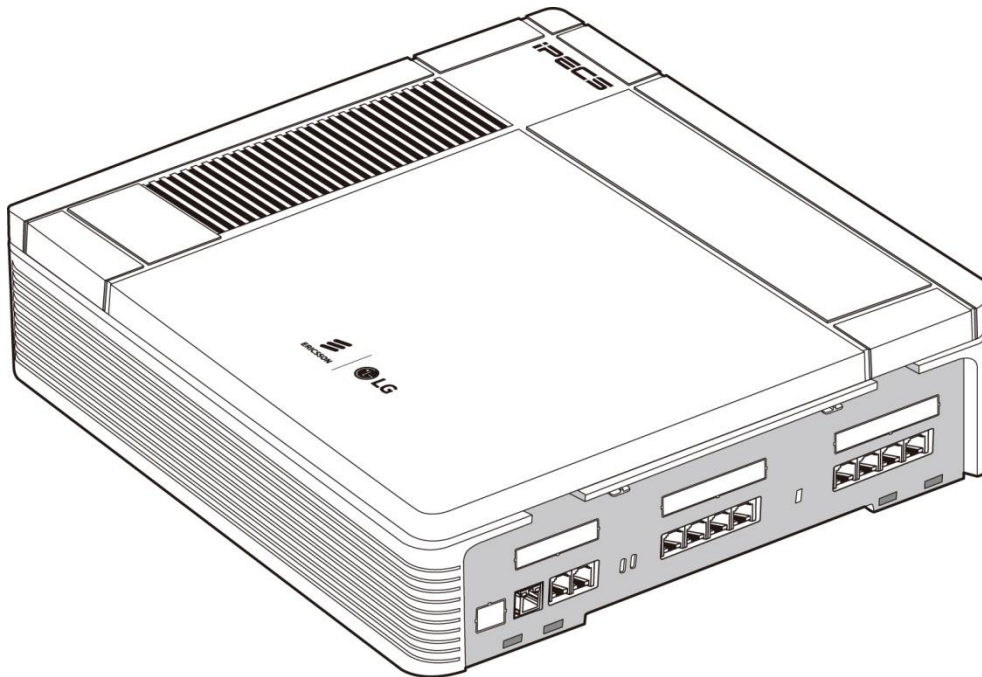
Figure 5.2 Desktop Mount

5.3   Wall Mount

Wall Mounting is the common installation method as shown in Figure 5.3-1. It is recommended that a backboard such as a ¾ inch sheet of plywood be installed and securely fixed to the wall for mounting of the KSUs, terminal blocks and other miscellaneous equipment.

1) Install 3 anchor plugs in the wall using the mounting template included for accurate placement.

2) Insert the 3 screws into the anchor plug and tighten leaving about 1/8 inch of the screw shaft exposed.

3) Hook the KSU onto the screws, making sure that the System slides down securely.

4) Repeat Step 1 through 3 for the 2'nd KSU. Before installing the mounting template for 2'nd KSU, assure the Expansion cable is a sufficient length to connect 1'st KSU and 2'nd KSU. Also assure 1'st KSU and 2'nd KSU are separated by at least 5 cm.
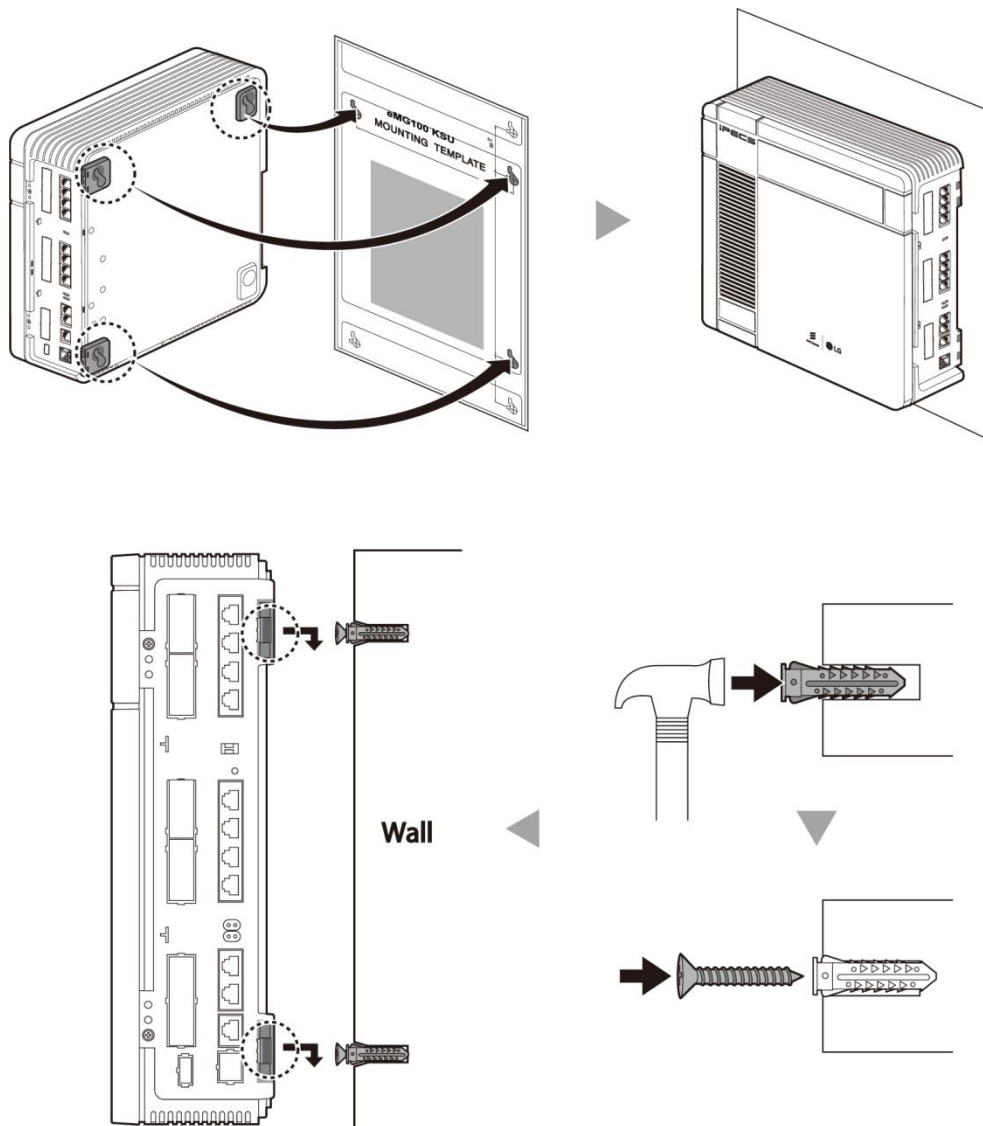
Figure 5.3 Installing Mounting Template and Wall mount

5.4   Rack Mount

The eMG100 can be mounted on a standard 19-inch rack employing the Rack brackets. Before mounting in the rack, assure that ventilation, space, power and grounding are sufficient. Figure 5.4 depicts rack mounting, use the figure and the steps below to rack mount the KSUs.

1)   Align the rack bracket with the two locating slots on the bottom and side of the KSU and attach it to the KSU by moving the bracket in the direction of arrows

2)   Tighten the eight (8) screws to secure the bracket to each side of KSU.

3)   Affix the bracket with the KSU to the rack posts with the four (4) screws provided.

4)   Repeat Step 1 through Step 3 for the 2'nd KSU. Before installing the mounting the 2'nd KSU, assure the Expansion cable is of sufficient length to connect the 1'st KSU and 2'nd KSU. We recommend the space between 1'st KSU and 2'nd KSU be as wide as possible, considering the Expansion cable.
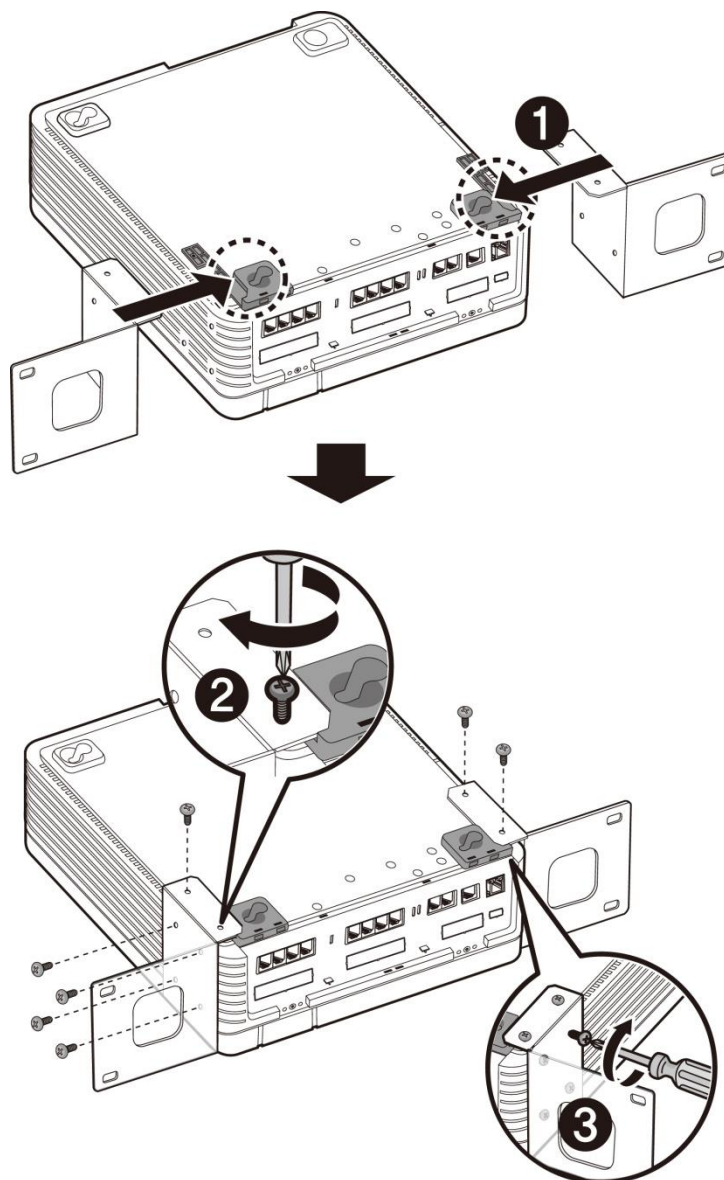
Figure 5.4-1 Installing Rack Bracket on KSU
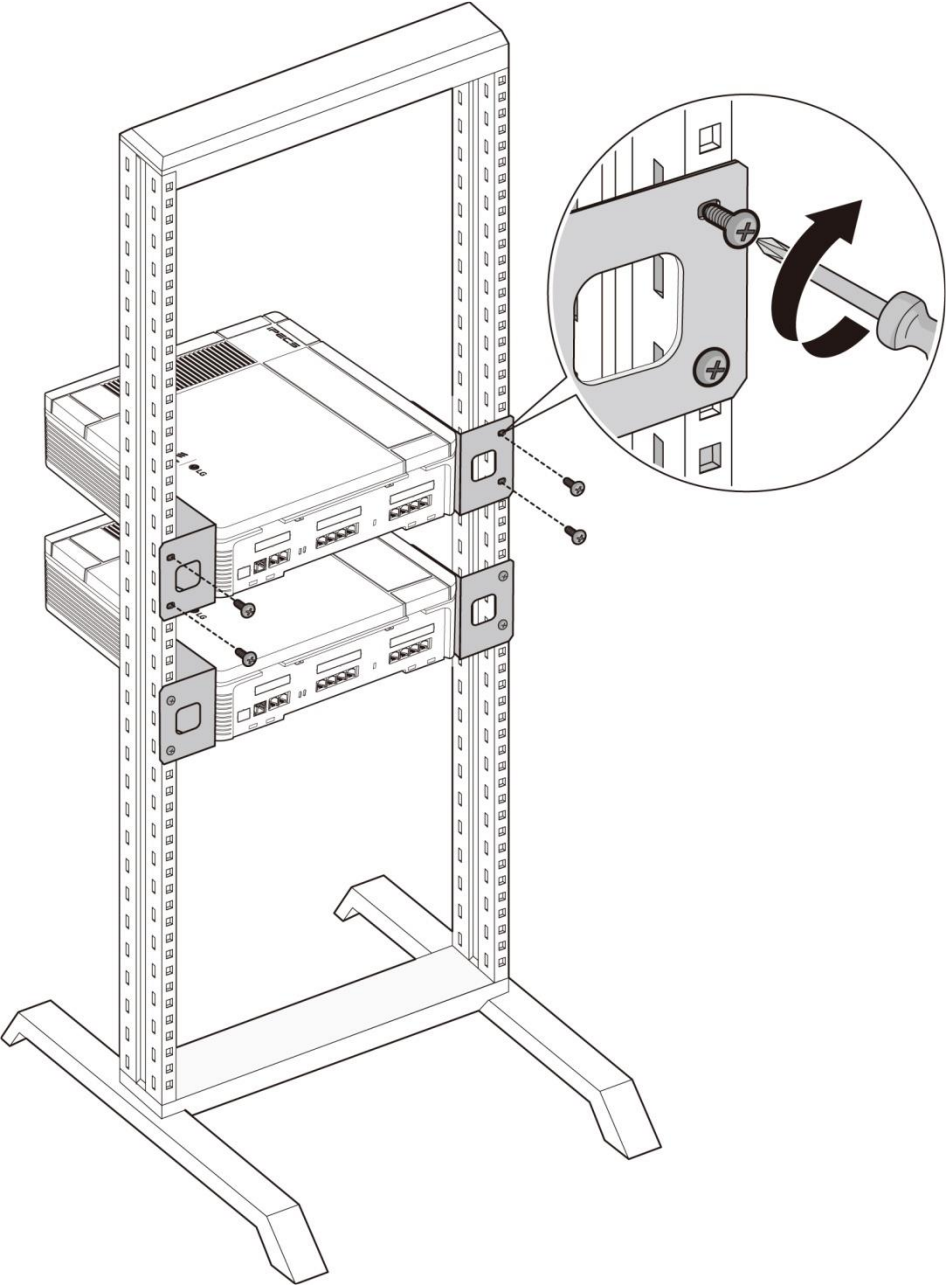
Figure 5.4-2 Installing KSU at Rack Mount

6 KSU wiring

6.1   Connecting the 1′st KSU and 2′nd KSU

If the 2'nd KSU is installed, it must be connected to the KSU for voice communication. The 2'nd KSU must be connected to the 1'st KSU employing the Expansion cabling as shown in Figure 6.1. The Expansion Cable is an optional item.

To connect, perform the following steps:

1)   Connect the expansion cable to both the 1'st KSU and 2'nd KSU "KSU EXP" port at the front.

2)   Connect the LAN cable to both the 1'st KSU and 2'nd KSU.
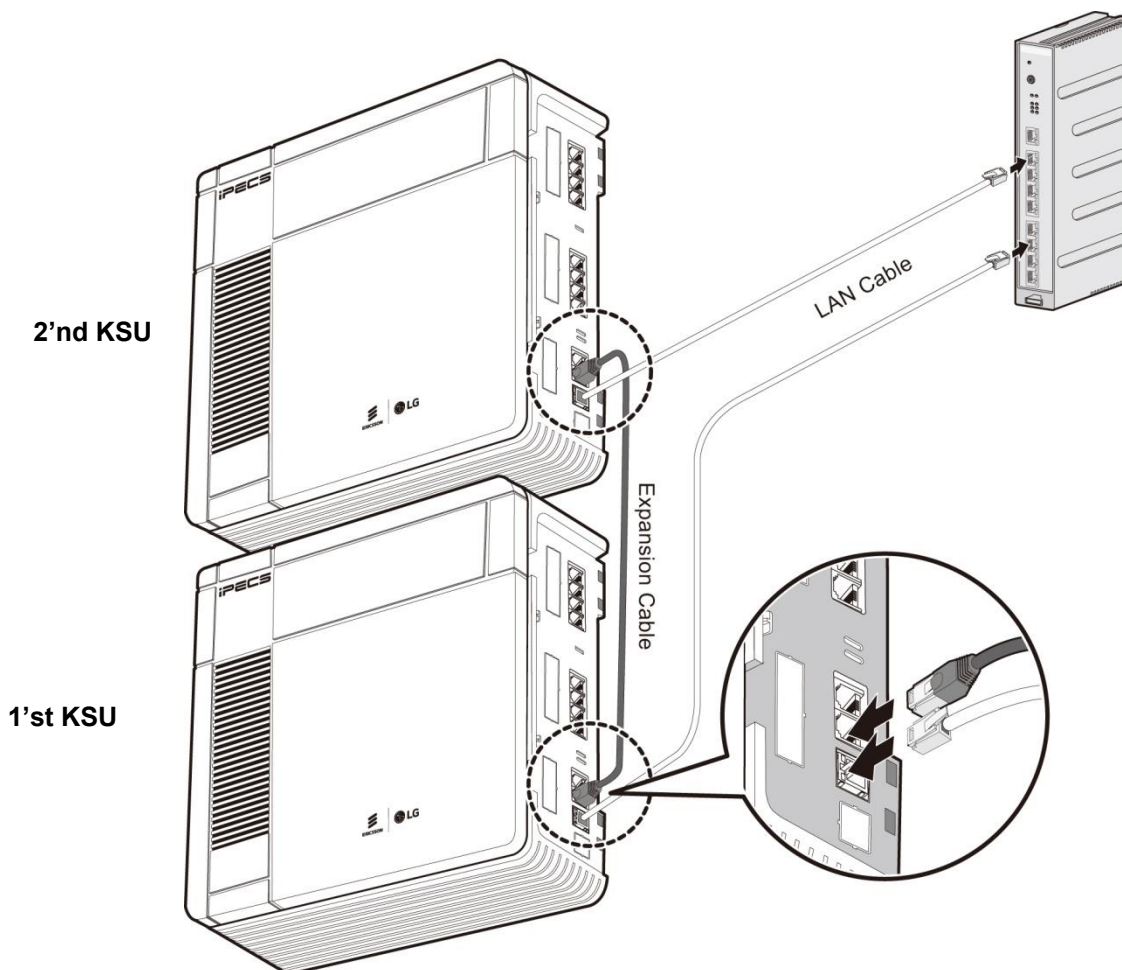
Figure 6.1 KSU Connections for Expansion

To synchronize both system's clock, SW3 on MBU must me "ON" position for Clock Slave system.

6.2   Grounding the KSU

Proper connection of the eMG100 KSU to earth ground is very important to prevent user contact with dangerous voltages and reduce electrical and RF interference. Assure that the KSU are properly grounded as described below and shown in Figure 6.2.

1)   Turn the grounding screw counter clockwise with a screwdriver to loosen.

2)   Insert the grounding wire and tighten the screw securely.

3)   Then connect the grounding wire to an appropriate ground source (refer to Caution below).
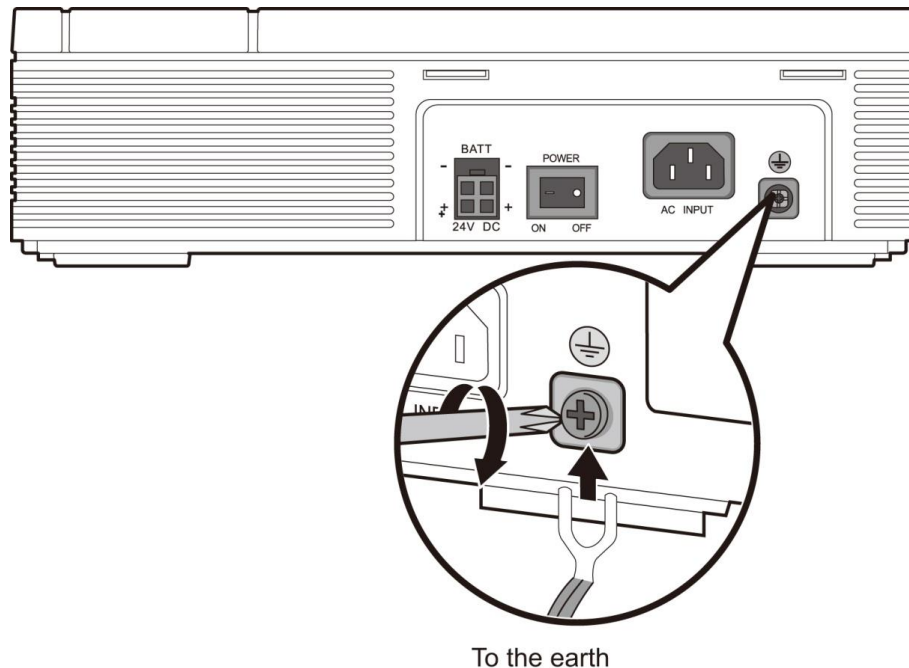
To the earth

Figure 6.2 Grounding to the earth

 CAUTION

* This equipment should be connected to a socket-outlet with a protective ground connection.
* The Earth Ground wire shall have green-and-yellow insulation and the cross-sectional area of the conductor must equal to or greater than UL 1015 AWG#18 (1.0mm).
* Be sure to comply with applicable local regulations.
* HIGH LEAKAGE CURRENT - Connect permanent earthing conductor before connecting telephone lines.
* A supplementary equipment earthing conductor is to be installed between the product or system and earth, that is, in addition to the equipment earthing conductor in the power supply cord.
* The supplementary equipment earthing conductor may not be smaller in size than the unearthed branch-circuit supply conductors. The supplementary equipment earthing conductor is to be connected to the product at the terminal provided and connected to earth in a manner that will retain the earth connection when the power supply cord is unplugged. The connection to earth of the supplementary earthing conductor shall be in compliance with the appropriate rules for terminating bonding jumpers in Part K of Article 250 of the National Electrical Code, ANSI/NFPA 70 and Article 10 of Part 1 of the Canadian Electrical Code, Part 1, C22.1. Termination of the supplementary earthing conductor is permitted to be made to building steel, to a metal electrical raceway system, or to any earthed item that is permanently and reliably connected to the electrical service equipment earthed.

- Bare, covered, or insulated earthing conductors are acceptable. A covered or insulated conductor must have a continuous outer finish that is either green, or green with one or more yellow stripes.
- The separate protective earthing terminal provided on this product shall be permanently connected to earth.

6.3   External Backup Battery Installation

In case of power failure, the external backup batteries automatically maintain uninterrupted power to iPECS eMG100 System.

The external batteries must provide 24V DC; this is generally accomplished by connecting two 12V batteries in a series arrangement as shown in Figure 6.3-1.

It is strongly recommended that a fuse (10A@250Volts) be installed as over-current protection. The KSU should be connected to separate back-up batteries.
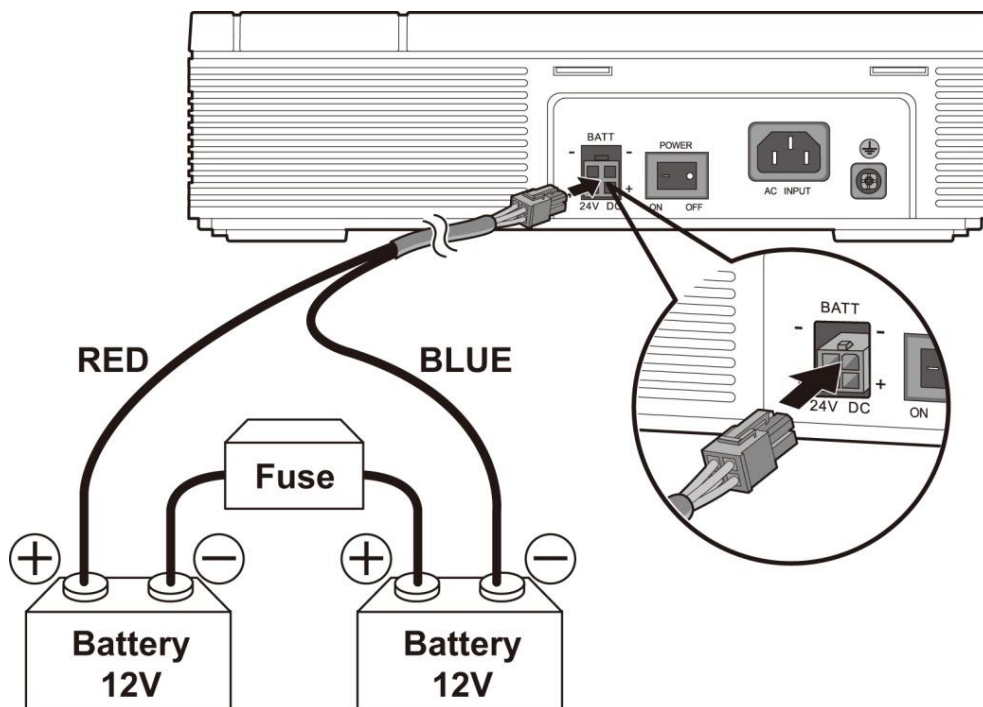
Figure 6.3 External Backup Battery Installation

To wire the Battery Back-up,

1) Using the Battery Back-up cable provided, connect the Red wire to the positive terminal of one of the batteries.

2) Connect the Blue wire of the connector to the negative terminal of the second battery.

3) Connect the non-terminated negative and positive battery terminal s together with a fuse (10 A @ 250 Volts). This series connection will provide the 24 VDC required by the eMG100 Battery Backup circuit.

4) Insert the Battery Backup connector in to the 'BATT' connector.

<u>**NOTE**</u>

Battery operation is controlled by the PSU. The PSU will provide charging current to the batteries during normal AC power operation at a maximum of 200mA.

PSU battery operation will be halted if the AC power is re-connected or if the battery voltage is too low to maintain full-system operation.

The external batteries can maintain System operation for several hours depending on several factors such as battery charge status, condition and capacity of the batteries, and System configuration (active Station ports).

⚠️ **<u>CAUTION</u>**

- It is recommended to use an external backup battery fuse (10A@250V) between the battery and the System.
- Recommended battery capacity is 24V/20AH MF; iPECS eMG100 System should be able to operate more than 3 hours with batteries that are in good condition.
- Carefully check the battery polarity with cable colors (Red and Blue) when connecting the battery to the System.
- Do not short out the external batteries and cables.
- Dispose of used batteries according to the manufacturer's instructions.

6.4   Line and Station Modular Jack Wiring

The MBU and Interface boards determine the type and number of external network and Station connections available. Section 4 provides details on each MBU and Interface boards. The following provides wiring instructions for each of the Interface types.

All wiring of the modular jack terminations should be accomplished with 22 or 24 AWG twisted pair wiring. Cabling for RJ45 should terminate all 4 pairs.

<u>NOTE</u>
In many cases, two interface circuits are terminated to a single modular jack. Thus, carefully wire the jacks with the pin assignments shown otherwise, the interface circuits will not operate properly.

6.4.1 Modular Jack Wiring for Basic Trunk interface slot on MBU

Three types of trunk interface boards are available for the MBU, but only one type of trunk interface board can be installed.
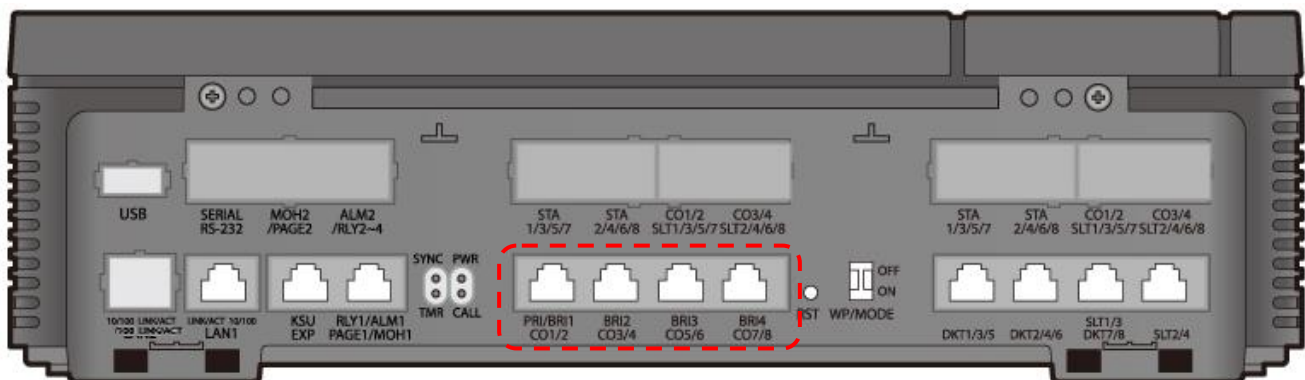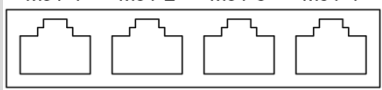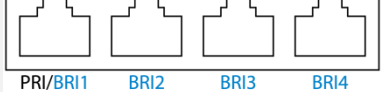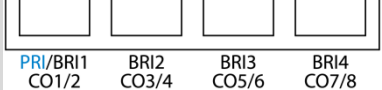
Trunk Interface Board	Modular Jack		Pin assignment	
COIU2/4	MJ1-1 MJ1-2 MJ1-3 MJ1-4 PRI/BRI1 BRI2 BRI3 BRI4 CO1/2 CO3/4 CO5/6 CO7/8		MJ1-1: CO1(7,8), CO2(4,5) MJ1-2: CO3(7,8), CO4(4,5)	1st COIU2/4
			MJ1-3: CO5(7,8), CO6(4,5) MJ1-4: CO7(7,8), CO8(4,5)	2nd COIU2/4
BRIU1/2/4	MJ1-1 MJ1-2 MJ1-3 MJ1-4 PRI/BRI1 BRI2 BRI3 BRI4 CO1/2 CO3/4 CO5/6 CO7/8		MJ1-1: BRI1(3,4,5,6: TX+,RX+,RX-,TX-) MJ1-2: BRI2(3,4,5,6: TX+,RX+,RX-,TX-) MJ1-3: BRI3(3,4,5,6: TX+,RX+,RX-,TX-) MJ1-4: BRI4(3,4,5,6: TX+,RX+,RX-,TX-)	
PRIU	MJ1-1 MJ1-2 MJ1-3 MJ1-4 PRI/BRI1 BRI2 BRI3 BRI4 CO1/2 CO3/4 CO5/6 CO7/8		MJ1-1: PRI1(1,2,4,5: RX+,RX-,TX+,TX-) MJ1-2: Unused MJ1-3: Unused MJ1-4: Unused	

Figure 6.4.1 Modular Jack Wiring for Basic Trunk interface slot on MBU
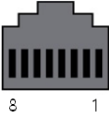
6.4.1.1 Modular Jack Wiring for COIU2/4 on MBU

CO Line modular jacks are terminated with two (2) CO Lines to an RJ45 jack as shown in the chart below.

To wire the CO Line modular jacks,

1) Wire each CO Line modular jack to the termination point.

2) Tag the wiring for future maintenance.

Table 6.4.1.1 Analog CO Line Modular Jack Wiring

Connector	Pin-out	Pin Number	Signal Name
RJ45		1,2,3, 6	Reserved
		4,5	CO2-R, CO2-T
		7,8	CO1-R, CO1-T
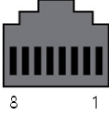
6.4.1.2 Modular Jack Wiring for BRIU1/2/4 on MBU

BRI Line modular jacks are terminated with one BRI line circuit to an RJ45 jack as shown in the chart below.

To wire the BRI Line modular jack,

1) Wire each BRI Line modular jack to the termination point.

2) Tag the wiring for future maintenance.

Table 6.4.1.2 BRI Line Modular Jack Wiring

Connector	Pin-out	Pin Number	Signal Name	Function
RJ45		1,2,7,8	Reserved	
		3	TX+	Transmit Data
		4	RX+	Receive Data
		5	RX-	Receive Data
		6	TX-	Transmit Data

NOTE

If BRI mode is set to S mode, Crossover cable must be used.
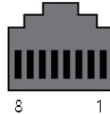
6.4.1.3 PRI Line Modular Jack Wiring

The PRI Line modular jack is terminated with one PRI line circuit to an RJ45 jack as shown in the chart below.

To wire the PRI Line modular jack,

1) Wire each PRI Line modular jack to the termination point.

2) Tag the wiring for future maintenance.

Table 6.4.1.3 PRI Line Modular Jack Wiring

Connector	Pin-out	Pin Number	Signal Name	Function
RJ45		1	RX+ / TX+	TE / NT
		2	RX- / TX-	TE / NT
		4	TX+ / RX+	TE / NT
		5	TX- / RX-	TE / NT
		3, 6, 7, 8	N/A	

6.4.2 Modular Jack Wiring for MBU extension

eMG100 supports extension of two types (KSU-D, KSU-S)

In this section, describe the information about the wiring for extension of KSU-D and KSU-S.
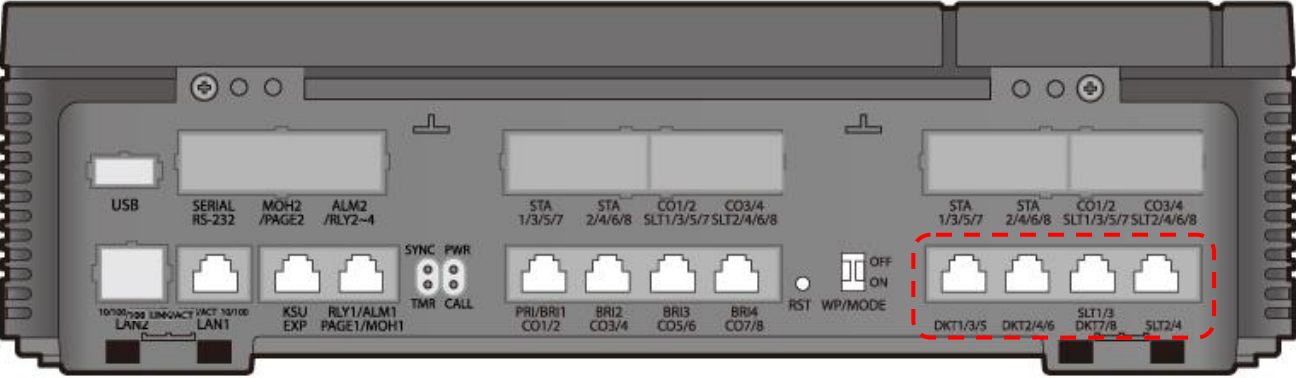
Basic Extension	Modular Jack	Pin assignment
KSUD	MJ2-1 MJ2-2 MJ2-3 MJ2-4 SLT1/3 DKT1/3/5 DKT2/4/6 DKT7/8 SLT2/4	MJ2-1: DKT1(4,5), DKT3(7,8), DKT5(1,2), N.C(3,6) MJ2-2: DKT2(4,5), DKT4(7,8), DKT6(1,2), N.C(3,6) MJ2-3: SLT1(4,5), DKT7(7,8), DKT8(1,2), SLT3(3,6) MJ2-4: SLT2(4,5), N.C(7,8), N.C(1,2), SLT4(3,6)
KSUS/ KSUSC	MJ2-1 MJ2-2 MJ2-3 MJ2-4 DKT1 DKT2 SLT1/3 SLT2/4 SLT5/6	MJ2-1: DKT1(4,5), N.C(7,8), N.C(1,2), N.C(3,6) MJ2-2: DKT2(4,5), N.C(7,8), N.C(1,2), N.C(3,6) MJ2-3: SLT1(4,5), N.C(7,8), N.C(1,2), SLT3(3,6) MJ2-4: SLT2(4,5), SLT5(7,8), SLT6(1,2), SLT4(3,6)

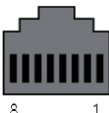**Figure 6.4.2 Modular Jack Wiring for MBU extension**

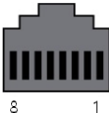### 6.4.2.1   Modular Jack Wiring for Basic extension for KSU-D

KSU-D provides both a Digital and SLT port. These Station modular jacks are terminated with one Digital and one SLT circuit to an RJ45 jack as shown in the chart below.

To wire the SLT and Digital Station modular jacks,

1)   Wire each SLT Station modular jack to the termination point.

2)   Wire each Digital Station modular jack to the termination point.

3)   Tag the wiring for future maintenance.

Table 6.4.2.1 SLT and Digital Station Modular Jack Wiring for KSU-D

Connector	Pin-out	Pin Number	Signal Name
RJ45 (MJ2-1)		4,5	DKT1-T, DKT1-R
		7,8	DKT3-T, DKT3-R
		1,2	DKT5-T, DKT5-R
		3,6	N.C

Connector	Pin-out	Pin Number	Signal Name
RJ45 (MJ2-2)		4,5	DKT2-T, DKT2-R
		7,8	DKT4-T, DKT4-R
		1,2	DKT6-T, DKT6-R
		3,6	N.C

Connector	Pin-out	Pin Number	Signal Name
RJ45 (MJ2-3)		4,5	SLT1-T, SLT1-R
		7,8	DKT7-T, DKT7-R
		1,2	DKT8-T, DKT8-R
		3,6	SLT3-T, SLT3-R

Connector	Pin-out	Pin Number	Signal Name
RJ45 (MJ2-4)		4,5	SLT2-T, SLT2-R
		7,8	N.C
		1,2	N.C
		3,6	SLT4-T, SLT4-R

6.4.2.2   Modular Jack Wiring for Basic extension for KSU-S

KSU-S provides both a Digital and SLT port. These Station modular jacks are terminated with one Digital and one SLT circuit to an RJ45 jack as shown in the chart below.
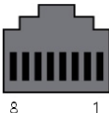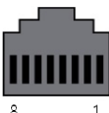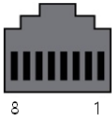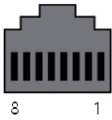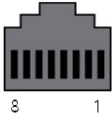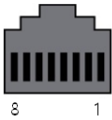
To wire the SLT and DigitalStation modular jacks,

1) Wire each SLT Station modular jack to the termination point.
2) Wire each Digital Station modular jack to the termination point.
3) Tag the wiring for future maintenance.

Table 6.4.2.2 SLT and Digital Station Modular Jack Wiring for KSU-S

Connector	Pin-out	Pin Number	Signal Name
RJ45 (MJ2-1)		4,5	DKT1-T, DKT1-R
		7,8	N.C
		1,2	N.C
		3,6	N.C

Connector	Pin-out	Pin Number	Signal Name
RJ45 (MJ2-2)		4,5	DKT2-T, DKT2-R
		7,8	N.C
		1,2	N.C
		3,6	N.C

Connector	Pin-out	Pin Number	Signal Name
RJ45 (MJ2-3)		4,5	SLT1-T, SLT1-R
		7,8	N.C
		1,2	N.C
		3,6	SLT3-T, SLT3-R

Connector	Pin-out	Pin Number	Signal Name
RJ45 (MJ2-4)		4,5	SLT2-T, SLT2-R
		7,8	SLT5-T, SLT5-R
		1,2	SLT6-T, SLT6-R
		3,6	SLT4-T, SLT4-R

6.4.3 Modular Jack Wiring for Universal slot on MBU

There are four types of option boards that can be extended through the universal slot in the MBU.

In this section, describe the information about the wiring according to the type that can be extended to the universal slot.
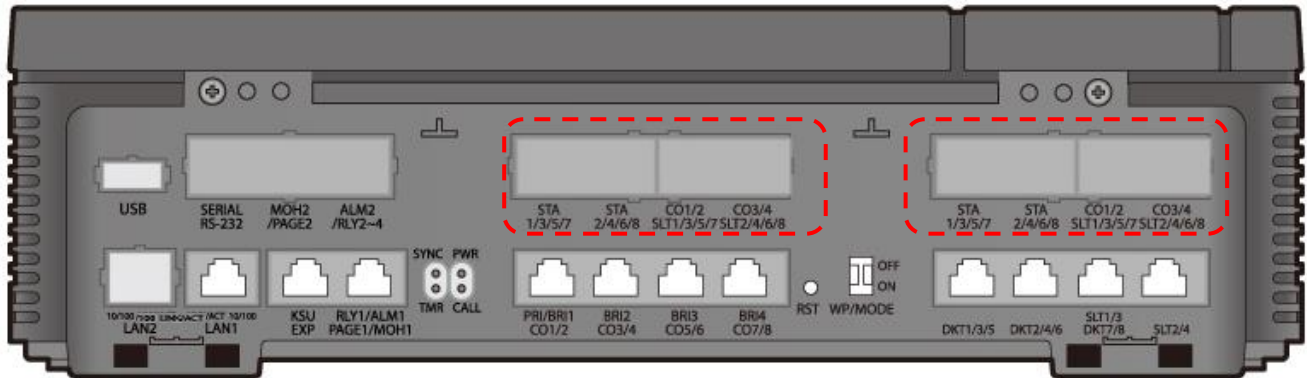
Option board	Modular Jack	Pin assignment
SLIB8 + SLIU8	MJ1-1 MJ1-2 MJ1-3 MJ1-4 STA 1/3/5/7 STA 2/4/6/8 CO1/2 SLT1/3/5/7 CO3/4 SLT2/4/6/8	**MJ1-1: SLT1(4,5), SLT3(7,8), SLT5(1,2), SLT7(3,6)** **MJ1-2: SLT2(4,5), SLT4(7,8), SLT6(1,2), SLT8(3,6)** **MJ1-3: SLT9(4,5), SLT11(7,8), SLT13(1,2), SLT15(3,6)** **MJ1-4: SLT10(4,5), SLT12(7,8), SLT14(1,2), SLT16(3,6)**
SLIB8 + COIU2/4	MJ1-1 MJ1-2 MJ1-3 MJ1-4 STA 1/3/5/7 STA 2/4/6/8 CO1/2 SLT1/3/5/7 CO3/4 SLT2/4/6/8	**MJ1-1: SLT1(4,5), SLT3(7,8), SLT5(1,2), SLT7(3,6)** **MJ1-2: SLT2(4,5), SLT4(7,8), SLT6(1,2), SLT8(3,6)** **MJ1-3: CO1(7,8), CO2(4,5)** **MJ1-4: CO3(7,8), CO4(4,5)**
DTIB8 + SLIU8	MJ1-1 MJ1-2 MJ1-3 MJ1-4 STA 1/3/5/7 STA 2/4/6/8 CO1/2 SLT1/3/5/7 CO3/4 SLT2/4/6/8	**MJ1-1: DKT1(4,5), DKT3(7,8), DKT5(1,2), DKT7(3,6)** **MJ1-2: DKT2(4,5), DKT4(7,8), DKT6(1,2), DKT8(3,6)** **MJ1-3: SLT1(4,5), SLT3(7,8), SLT5(1,2), SLT7(3,6)** **MJ1-4: SLT2(4,5), SLT4(7,8), SLT6(1,2), SLT8(3,6)**
DTIB8 + COIU2/4	MJ1-1 MJ1-2 MJ1-3 MJ1-4 STA 1/3/5/7 STA 2/4/6/8 CO1/2 SLT1/3/5/7 CO3/4 SLT2/4/6/8	**MJ1-1: DKT1(4,5), DKT3(7,8), DKT5(1,2), DKT7(3,6)** **MJ1-2: DKT2(4,5), DKT4(7,8), DKT6(1,2), DKT8(3,6)** **MJ1-3: CO1(7,8), CO2(4,5)** **MJ1-4: CO3(7,8), CO4(4,5)**

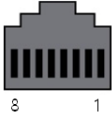**Figure 6.4.3 Modular Jack Wiring for Universal slot on MBU**

6.4.3.1   Modular Jack Wiring for SLIB8 / SLIU8

SLT Station modular jacks are terminated with 4 SLT circuits to an RJ45 jack as shown in the chart below.

To wire the SLT Station modular jacks,

1)   Wire each SLT Station modular jack to the termination point.

2)   Tag the wiring for future maintenance.

Table 6.4.3 SLT Station Modular Jack Wiring

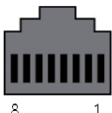| Connector	Pin-out	Pin Number	Signal Name
RJ45		4,5	SLT1-T, SLT1-R
		7,8	SLT2-T, SLT2-R
		1,2	SLT3-T, SLT3-R
		3,6	SLT4-T, SLT4-R

6.4.3.2   Modular Jack Wiring for DTIB8

DKT Station modular jacks are terminated with 4 DKT circuits to an RJ45 jack as shown in the chart below.

To wire the DKT Station modular jacks,

1)   Wire each DKT Station modular jack to the termination point.

2)   Tag the wiring for future maintenance.
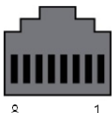
Table 6.4.3.2 DKT Station Modular Jack Wiring

Connector	Pin-out	Pin Number	Signal Name
RJ45		4,5	DKT1-T, DKT1-R
		7,8	DKT2-T, DKT2-R
		1,2	DKT3-T, DKT3-R
		3,6	DKT4-T, DKT4-R

6.4.3.3   Modular Jack Wiring for COIU2/4

CO Line modular jacks are terminated with two (2) CO Lines to an RJ45 jack as shown in the chart below. To wire the CO Line modular jacks,

1)   Wire each CO Line modular jack to the termination point.

2)   Tag the wiring for future maintenance.

Table 6.4.3.3 Analog CO Line Modular Jack Wiring

Connector	Pin-out	Pin Number	Signal Name
RJ45		1,2,3, 6	Reserved
		4,5	CO2-R, CO2-T
		7,8	CO1-R, CO1-T

6.4.4 Modular Jack Wiring for MBU LAN Port & KSU Expansion
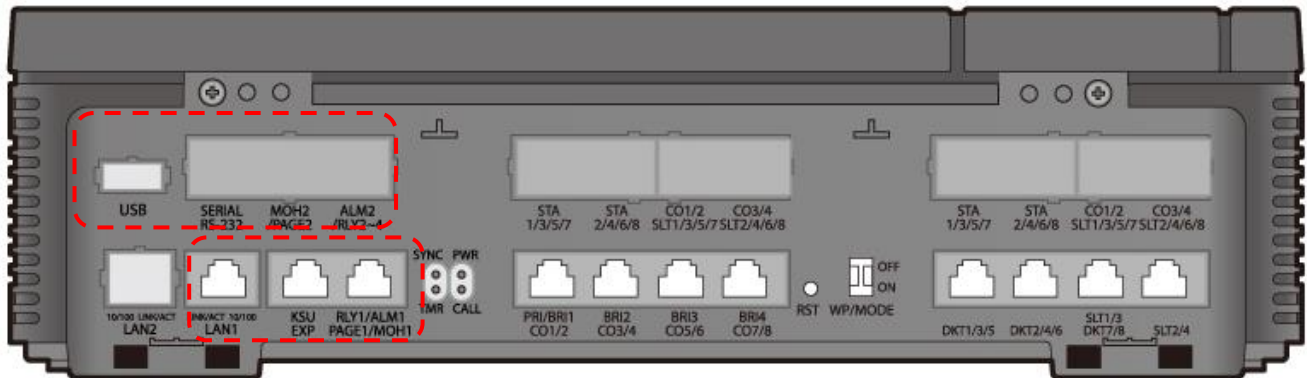
MISC Board	Modular Jack	Pin assignment
MISU	CN2 MJ1-1 MJ1-2 MJ1-3 USB SERIAL RS-232 MOH2 /PAGE2 ALM2 /RLY2~4	**CN2: VBUS(+5V), D-, D+, GND** **MJ1-1: RXD(6), TXD(3), GND(5,4)** **MJ1-2: MOH2(8,7), PAGE2(5,4)** **MJ1-3: RLY2(8,7), RLY3(6,5), RLY4(4,3), ALM2(2,1)**
KSUD/KSUS /KSUSC	MJ3 MJ4-1 MJ4-2 LINK/ACT 10/100 LAN1 KSU EXP RLY1/ALM1 PAGE1/MOH1	**MJ3: 1,2,3,6(TX+, TX-, RX+, RX-)** **MJ4-1: Frame(8,7), ISC6(6,2), ISC5(3,1), GND(5,4)** **MJ4-2: RLY(8,7), ALM(6,5), PAGE(4,3), MOH(2,1)**

Figure 6.4.4 Modular Jack Wiring for MBU LAN Port & KSU Expansion

6.4.4.1   MBU LAN Port Wiring

The MBU incorporate an IEEE 802.3 10/100 Base-T LAN port. The LAN port is terminated in a RJ45 connector with the standard MDI terminations as shown in the chart below.

To wire the LAN port,

1)   Connect each LAN port modular jack to an appropriate LAN port of a LAN switch.

2)   Tag the wiring for future maintenance.

Table 6.4.4.1 MBU LAN Modular Jack Wiring

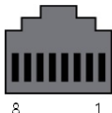| Connector	Pin-out	Pin Numbers	Signal Name	Function
RJ45		4,5,7,8	Reserved	
		1	TX+	Transmit Data
		2	TX-	Transmit Data
		3	RX+	Receive Data
		6	RX-	Receive Data

NOTE

This equipment is indoor use and all the communication wirings are limited to inside of the building.

6.4.4.2   KSU Expansion

eMG100 supports KSU Expansion. If an Expansion KSU is installed, it must be connected to the KSU for voice communication and clock synchronization. Refer to the section 6.1 for more detail information.

Table 6.4.4.2 MBU KSU Expansion Connector MJ4-1 Wiring

Connector	Pin-out	Pin Number	Signal Name	Function
RJ45		8	FRAMERX	Framesync RX signal
		7	FRAMETX	Framesync TX signal
		6	TDM highway tx6	TDM stream TX 6
		5	GND	Ground
		4	GND	Ground
		3	TDM highway tx5	TDM stream TX 5
		2	TDM highway rx6	TDM stream RX 6
		1	TDM highway rx5	TDM stream RX 5

6.4.4.3   Miscellaneous Devices Wiring

The MBU provides connections for an external music source, external page port, relay contact, and alarm detection input. The MISU provides additional connections for additional three relays contact output and a alarm detection input. In both cases, an RJ45 jack is used to terminate the interfaces as shown in Figure 6.4.4.3 below and the wiring charts.

External Music Source

When a call is placed on hold, MOH (Music on Hold) is presented to the caller. MOH can be provided from an internal source or from an external audio source connected to the MOH connector.

External Paging Port wiring

The Page connector allows paging audio to be sent to External Paging equipment. The system will deliver audio as a 0-dBm signal into a 600-ohm load.

Relay Contact Output

The Miscellaneous connector includes connection to an External Control Contact. The External Control Contact activates as a Loud Bell, a Door Open controller, or control for External paging equipment when External Paging is access.

Alarm Sensor and Relay Wiring

The Miscellaneous connector provides access to the Alarm Sensor circuitry. The sensor can be used to monitor an external alarm or doorbell contact.

To wire the miscellaneous connections, referring to Figure 6.4.4.3 and the Modular jack termination charts below,

1)   Wire the Miscellaneous terminations to the appropriate termination point for the external devices.
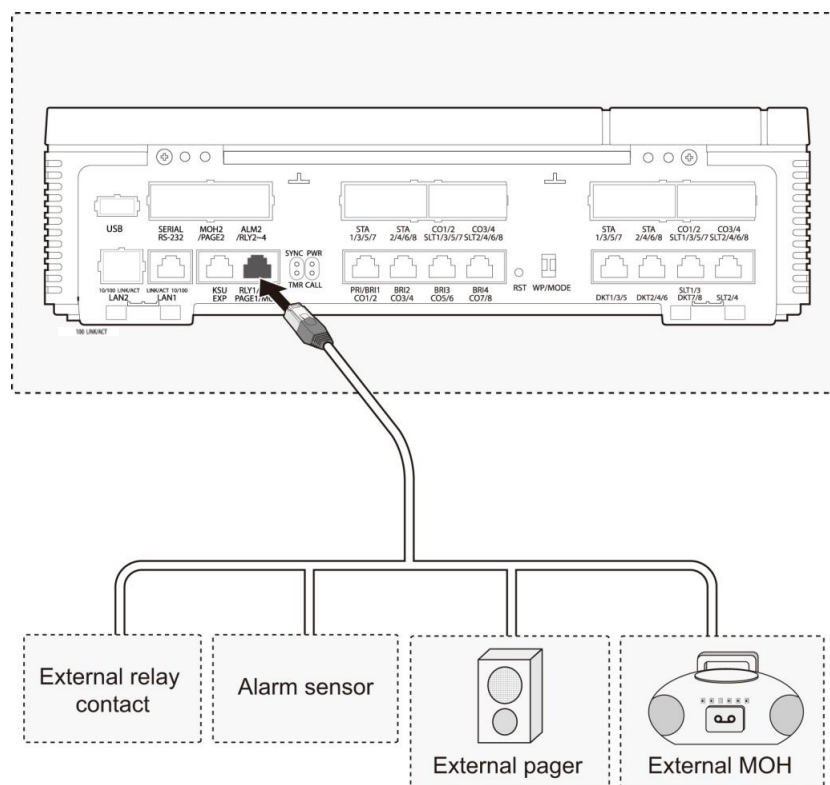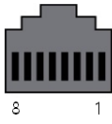
2)   Tag the wiring for future maintenance.

Figure 6.4.4.3 Miscellaneous Connections

Modular Jack Pin Assignment for MBU

Table 6.4.4.3-1 MBU Miscellaneous Connector MJ4-2 Wiring

Connector	Pin-out	Pin Number	Signal Name	Function
RJ45		8	RELAY_T	Relay Contact Tip
		7	RELAY_R	Relay Contact Ring
		6	ALARM_T	Alarm Detection Tip
		5	ALARM_R	Alarm Detection Ring
		4	EXTPAGE_T	External Page Tip
		3	EXTPAGE_R	External Page Ring
		2	EXTMOH_T	External MOH Tip
		1	EXTMOH_R	External MOH Ring

Modular Jack Pin Assignment for MISU

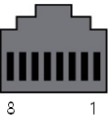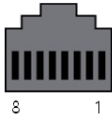**Table 6.4.4.3-2 MISU Miscellaneous Connector MJ1-2 Wiring**

Connector	Pin-out	Pin Number	Signal Name	Function
RJ45		8	EXTMOH_T	External MOH Tip
		7	EXTMOH_R	External MOH Ring
		6	N.C	
		5	EXTPAGE_T	External Page Tip
		4	EXTPAGE_R	External Page Ring
		3,2,1	N.C	

Table 6.4.4.3-3 MISU Miscellaneous Connector MJ1-3 Wiring

Connector	Pin-out	Pin Number	Signal Name	Function
RJ45		8	RELAY2_T	Relay Contact Tip
		7	RELAY2_R	Relay Contact Ring
		6	RELAY3_T	Relay Contact Tip
		5	RELAY3_R	Relay Contact Ring
		4	RELAY4_T	Relay Contact Tip
		3	RELAY4_R	Relay Contact Ring
		2	ALARM_T	Alarm Detection Tip
		1	ALARM_R	Alarm Detection Ring

6.4.4.4   USB port

MISU support a standard USB port. The port is wired as shown in the chart below and any standard USB memory stick can be installed forDB download/upload and SW upagrade operations.
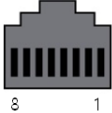
Table 6.4.4.4 USB Termination

Connector	Pin-out	Pin Number	Signal Name	Function
USB		1	VBUS (+5V)	Power
		2	D+	Data signal
		3	D-	Data signal
		4	GND	Ground

6.4.4.5   RS-232 Serial Port Wiring

The RS-232 female connector, which is a DCE (Data Communication Equipment), is used for various output functions (SMDR, Traffic Reports, etc.) and can be used to access the System database and maintenance functions through connection to a local PC. The connector is located on the left side of the Code of the KSU and is terminated as in the below Table.

Table 6.4.4.5 MISU Miscellaneous Connector MJ1-1 Wiring

Connector	Pin-out	Pin Number	Signal Name	Function
RJ45		8,7,	N.C	
		6	RXD	RX data
		5,4	GND	Ground
		3	TXD	TX data
		2,1	N.C	

The RS-232C port on the MPB does not support hardware flow control.
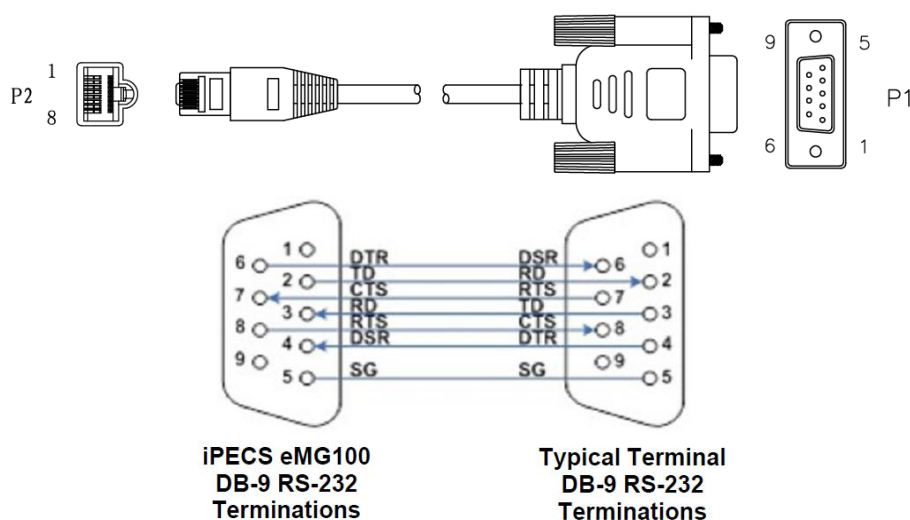

Figure 6.4.4.5 RS-232 DB-9 Connector Terminations

Referring to the pin-out chart and the wiring diagram above,

1)   Wire the RS-232 port to an appropriate DTE (Data Terminal Equipment) connector.
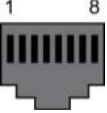2)   Tag or number wiring for maintenance.

6.4.4.6   VOIB48 LAN Port Wiring

The VOIB48 incorporate an IEEE 802.3 100 Base-T LAN port. The LAN port is terminated in a RJ45 connector with the standard MDI terminations as shown in the chart below.

To wire the LAN port,

1)   Connect each LAN port modular jack to an appropriate LAN port of a LAN switch.

2)   Tag the wiring for future maintenance.

Table 6.4.4.6 VOIB48 LAN Modular Jack Wiring

Connector	Pin-out	Pin Number	Signal Name	Function
RJ45		4,5,7,8	Reserved	
		1	TX+	Transmit Data
		2	TX-	Transmit Data
		3	RX+	Receive Data
		6	RX-	Receive Data

<u>**NOTE**</u>

This equipment is indoor use and all the communication wirings are limited to inside of the building.

6.5   Cable Wiring

To provide a neat professional installation, the wiring to the KSU(s) should be "dressed". The wiring cables should be bundled and tie wrapped to the KSU(s) and to the wall or rack.

6.5.1 Dressing the Wall Mount Wiring

To dress wiring for a Wall mount installation,

1) Ensure that all boards are installed, and wiring is completed.
2) Attach the Cord cover to the system.
3) Using the supplied cable ties, tie all wiring to the slot at the bottom-right side of the KSUs as shown in Figure 6.5.1.
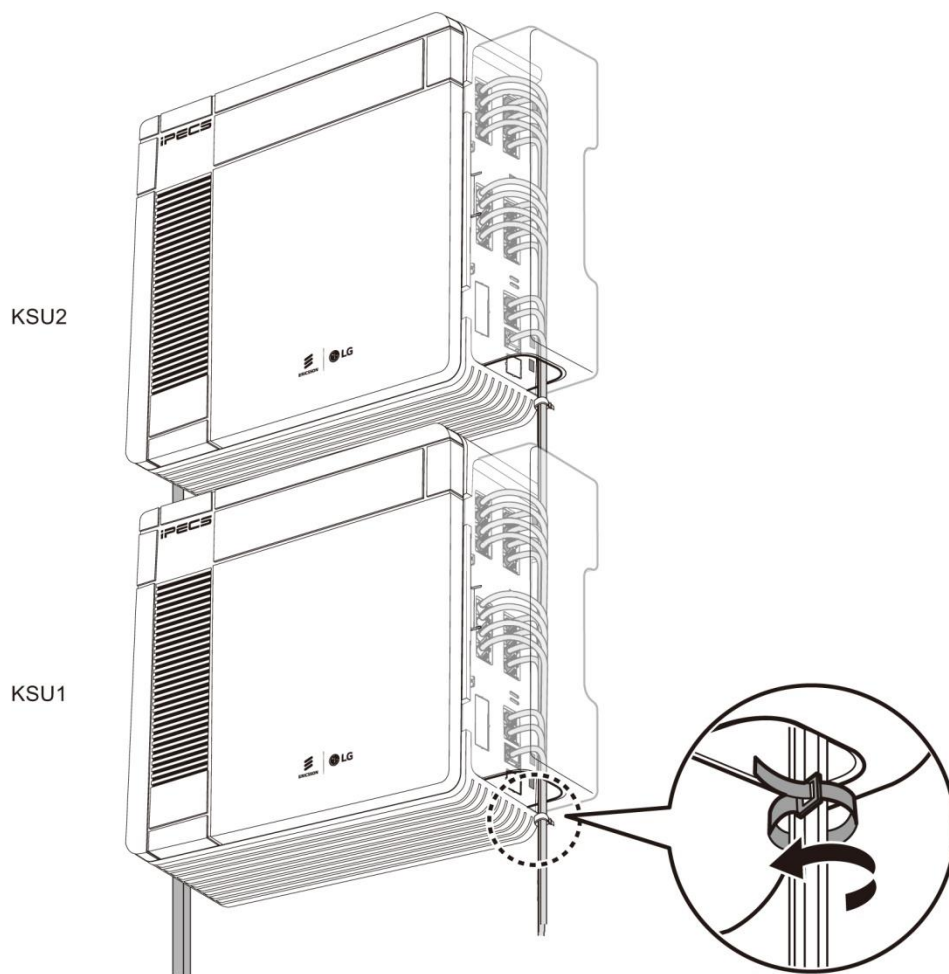

Figure 6.5.1 Dressing the Wall Mount Wiring

6.5.2 Rack Mount Wiring

To dress the wiring for a Rack mount installation,

1)   Ensure all boards are installed and that wiring is completed.

2)   Attach the Cord cover to the system.

3)   Using the supplied cable ties, tie all wiring to the slot at the bottom-right side of the KSUs as shown in Figure 6.5.2.

4)   Using additional cable ties, not provided, tie the bundled cables including Power cord and the Expansion cable using holes in the 19" Rack.

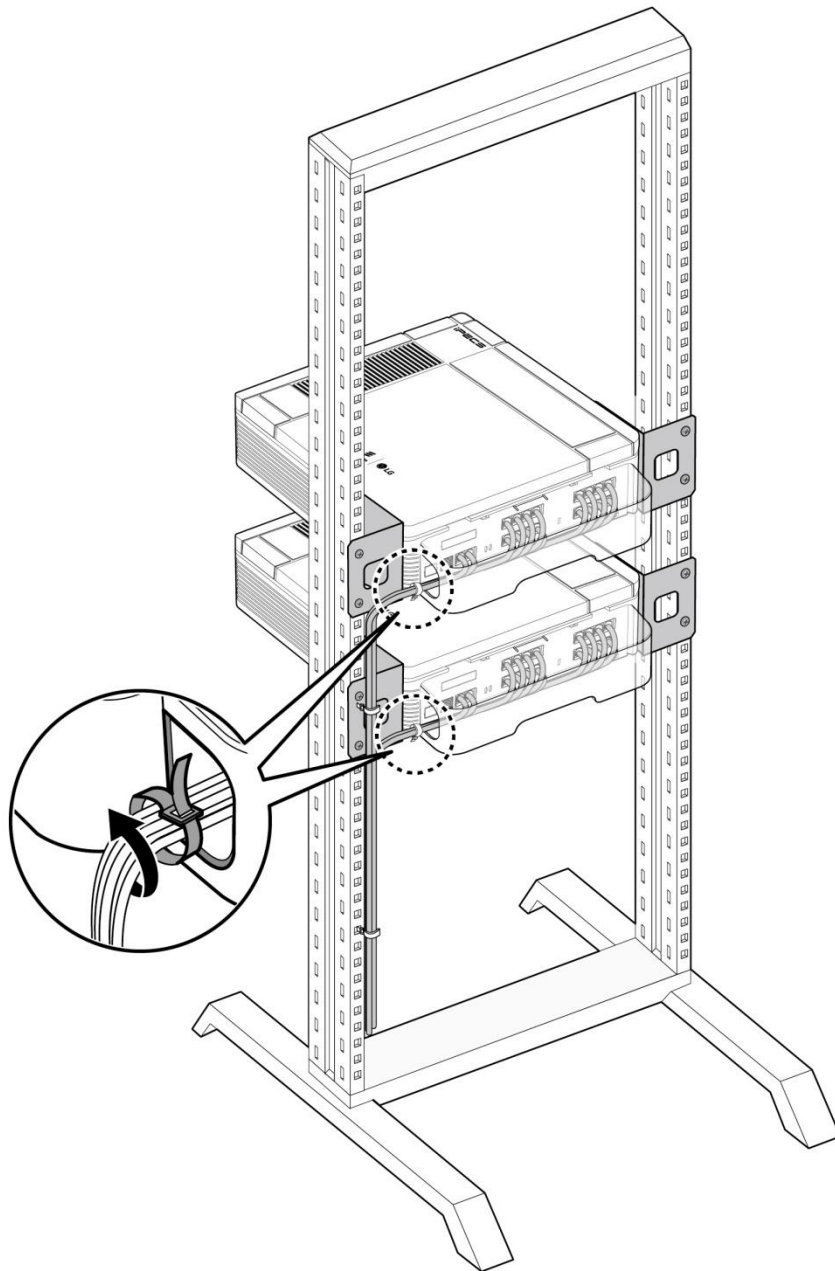5)   Arrange the cable down the rack back to the wiring termination point.

Figure 6.5.2 Rack Mount Wiring

6.5.3 Cord Cover Covering

Once the wiring is complete and dressed, the Cord cover could be placed to minimize accidental damage and the potential of tampering with the wiring. To attach the cover, refer to Figure 6.5.3 and perform the following step,

1)   Position the cover on the side of KSU, locating the cover tabs with the matching slots in the KSU.

2)   Place the tabs in the slots and rotate the cover toward the KSU in the direction of arrows as shown in figure #1.

3)   Press down on the cover near the screw hole as shown in figure #2 to expose the screw hole.

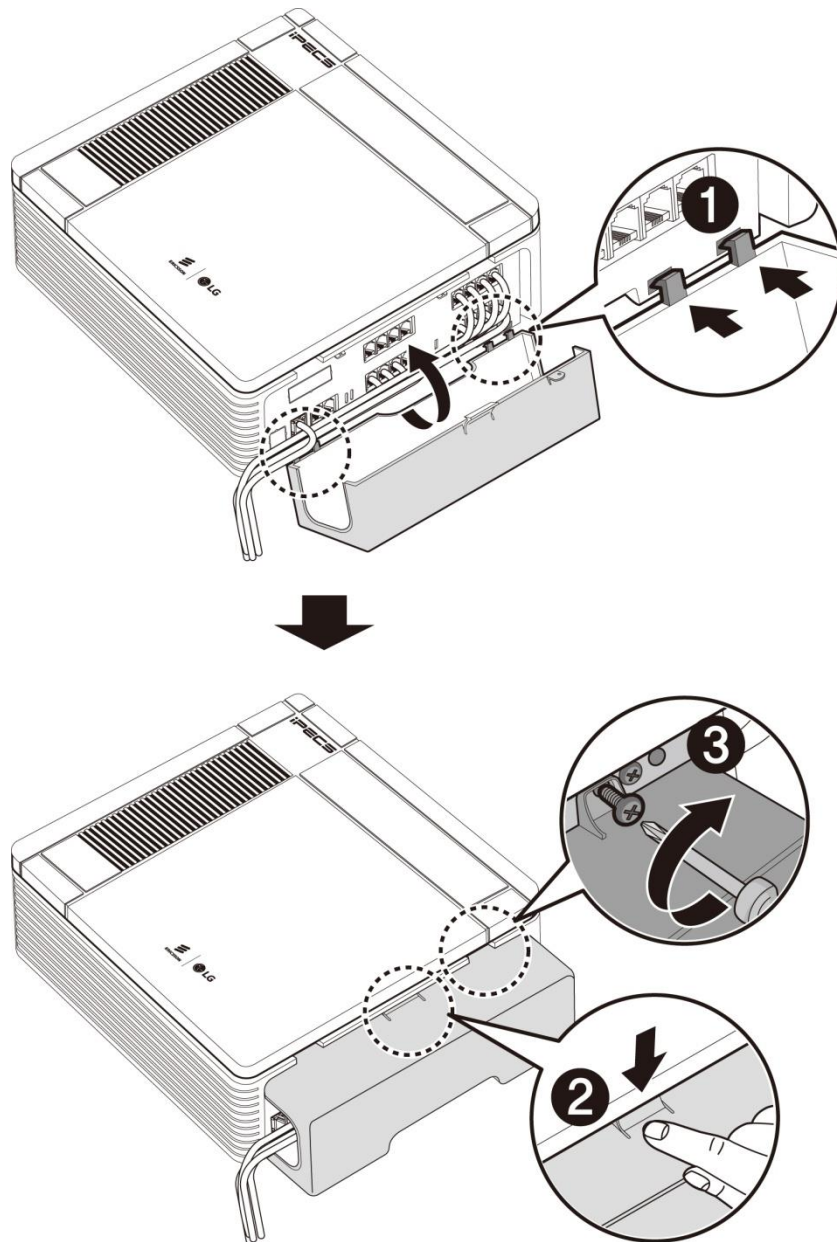4)   Affix the cover with screw provided as shown in figure #3.

Figure 6.5.3 Cord cover Covering

7 Terminal connection and wiring

7.1   Terminal Models

iPECS eMG100 works with a number of telephone types including proprietary LDP digital and LIP phones, standard SLTs, and VoIP phones. The specific model of LDP and LIP phones supported in the eMG100 system are shown in the chart below.

Note

For more detailed information about Phone installation, DSS connection, and Wall mount, etc. refer to User guide of the terminal model.

Table 7.1 Terminal Models

Model	Description
LDP-7004N	4 Flexible Button No display
LDP-7004D	4 Flexible Button w/Display
LDP-7008D	8 Flexible Button w/Display
LDP-7016D	16 Flexible Button w/Display
LDP-7024D	24 Flexible Button w/Display
LDP-7024LD	24 Flexible Button w/Large Display
LDP-7048DSS	48 Button DSS/DLS Console
LDP-DPB	Door Phone Box
LDP-9008D	8 Flexible Button w/Display
LDP-9030D	30 Flexible Button w/Display
LDP-9048DSS	48 Button DSS Console
LDP-9208D	8 Flexible Button Display
LDP-9224D	24 Flexible Button Display
LDP-9224DF	24 Flexible Button, Full duplex
LDP-9240D	24(12*2 page) Flexible Button, Full duplex
LDP-9248DSS	48 Flexible Button DSS Console
LIP-7008D	8 Flexible Button w/Display
LIP-7016D	16 Flexible Button w/Display
LIP-7024D	24 Flexible Button w/Display
LIP-7024LD	24 Flexible Button w/Large Display
LIP-8002	4 Feature Button w/Display
LIP-8004D	4 Flexible Button w/Display
LIP-8008D	8Flexible Button w/Display
LIP-8012D	12 Flexible Button w/Display
LIP-8024D	24 Flexible Button w/Display
LIP-8040L	10 Flexible Button w/Large Display
LIP-8012DSS	12 Button DSS Console / Power supply
LIP-8012LSS	12 Button LSS Console / via keyset up to 2
LIP-8048DSS	48 Button DSS Console / via external up to 4

Model	Description
LIP-8040LSS	48 Button DSS Console w/Display via external or PoE up to 9
LIP-8002E/2AE	4 Feature Button w/Display
LIP-8008E	8 Flexible Button w/Display
LIP-8012E	12 Flexible Button w/Display
LIP-8024E	24 Flexible Button w/Display
LIP-8040E	10 Flexible Button w/Large Display
LIP-8050V	5 Flexible Button, w/Color Display & Video Camera
LIP-8050E	4.3 inches wide color Graphic screen, 5 buttons,
LIP-9002	2-line 128 by 32 dot matrix graphic LCD and 4 flexible buttons.
LIP-9008/8G	4-line 128 by 48 dot matrix graphic LCD, 8 flexible buttons and 3 softkeys.
LIP-9010	3-line 320 by 48 dot graphic LCD and 5 flexible buttons.
LIP-9020	4-line 320 by 80 dot graphic LCD, 10 flexible buttons and 3 soft keys.
LIP-9030	6-line 320 by 112 dot graphic LCD, 8 flexible buttons and 3 soft keys.
LIP-9040	8-line 320 by 144 dot graphic LCD, 12 flexible buttons and 3 soft keys.
LIP-9040C	8-line 480 by 272 dot color LCD, 12 flexible buttons and 3 softkeys.
LIP-9012DSS	12 flexible buttons with tri-color LED
LIP-9024DSS	24 flexible buttons with tri-color LED
LIP-9024LSS	12 flexible buttons with tri-color LED/ two flexible button pages to represent 24 total flexible buttons
LIP-9048DSS	48 flexible buttons with tri-color LED
LIP-9070	Premium Touch Screen IP Phone, 7 Inch TFT color LCD, Android OS, WVGA resolution, Video communications, Soft flexible buttons (48 for SIP/ 30 for iPECS protocol)
LIP-9071	Premium Touch Screen IP Phone, 7 Inch TFT color LCD, Android OS, WVGA resolution, Video communications, Soft flexible buttons (48 for SIP/ 30 for iPECS protocol)
WIT-400HE	iPECS WLAN Phone
GDC-800H	iPECS IP DECT Handset
110dh	iPECS IP DECT Handset
150dh	iPECS IP DECT Handset
1010i	4-line 132 by 64 dot graphic LCD, 4 flexible buttons and 3 softkeys.
1020i	4-line 132 by 64 dot graphic LCD, 8 flexible buttons and 3 softkeys.
1030i	5-line 320 by 240 dot graphic LCD, 6 flexible buttons and 3 softkeys.
1040i	6-line 480 by 320 dot graphic LCD, 8 flexible buttons and 3 softkeys.
1050i	8-line 480 by 272 dot graphic LCD, 12 flexible buttons and 3 softkeys.
1080i	Premium Touch Screen IP Phone, 7 Inch TFT color LCD, Android 10 OS, WVGA resolution, Video communications, Soft flexible buttons (48 for SIP/ 30 for iPECS protocol)
1024idss	24 flexible buttons with tri-color LED, Paper Label
1048ilss	2x24 flexible buttons with tri-color LED, LCD Display
1048idss	48 flexible buttons with tri-color LED, Paper Label

7.2   Terminal Cabling Distance

The figure 7.2 below indicates the wiring distance for Digital Key Telephones and Single Line Telephones, and both must be wired with 22 or 24 AWG twisted pair Cat 3 or Cat 5 cable.

The wiring distance for IP phones is determined by the LAN and can be a maximum distance of 100 meters (328 feet) from the LAN switch.

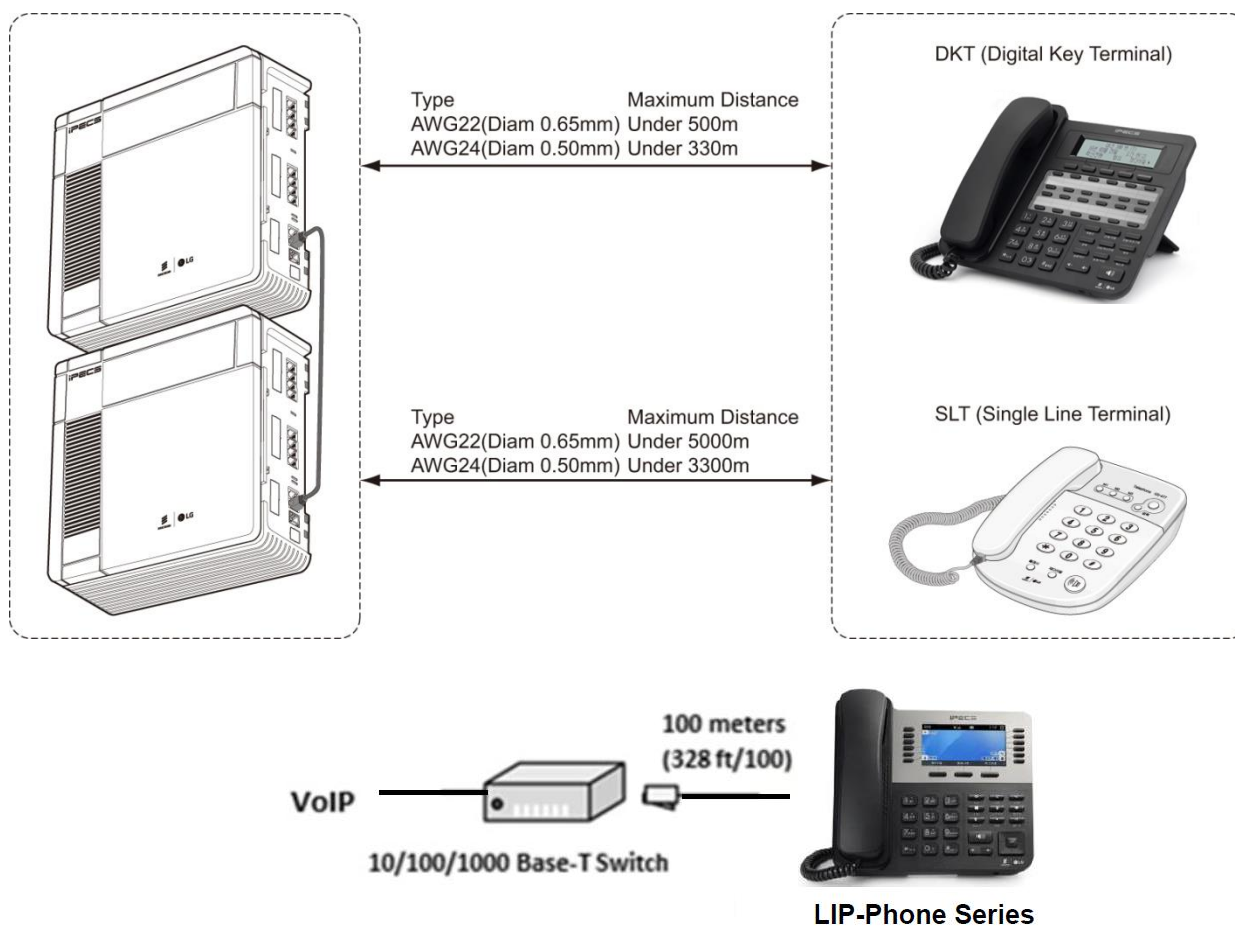The IP phones are wired using Cat 5 cable for 10/100 Base T LANs and Cat5E cable for 1000 Base T LANs.

Figure 7.2 Terminal Wiring Distance

7.3   Terminal Connection

7.3.1 DKTU Wiring

The Digital Key Telephone and digital DSS Console are terminated to a pair of the RJ11 located in the bottom of the unit.
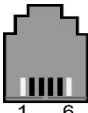
The LDP series phones employ the center pair of modular jack.

The wall outlet for the DKT or Console should be wired to the appropriate termination point for the DKT port in the eMG100 system.

1)   Using the Modular Jack wiring charts below, wire the pair of the wall outlet, as appropriate, to the termination point using UTP cable. Note separate wiring is required for some DSS console (refer to User guide or Quick guide).

2)   Using the line cord provided, connect the DKTU or DSS Console to the wall outlet.

__Modular Jack Pin Assignment__

Table 7.3.1 LDP series (7000, 9000, 9200) Modular Jack Wiring

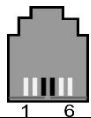| Connector	Pin-out	Pin Number	Signal Name
RJ11		1	N/A
		2	Reserved
		3,4	RING, TIP
		5	Reserved
		6	N/A

7.3.2 SLT Wiring

SLTs are wired to the center pair of the RJ11 jack, typically on the bottom or back of the SLT. The wall outlet should be connected to an appropriate SLT port in the eMG100 system.

1)   Wire the center pair of the wall outlet to the termination point using UTP cable.

2)   Using the line cord provided with the SLT, connect the SLT to the wall outlet.

__Modular Jack Pin Assignment__

Table 7.3.2 SLT Modular Jack Wiring

Connector	Pin-out	Pin Number	Signal Name
RJ11		1,2	N/A
		3,4	TIP, RING
		5,6	N/A

7.3.3 LIP Phone Wiring

iPECS eMG100 supports LIP Phone series. LIP-7008D and LIP-8004D have a single LAN port that is wired to an Ethernet switch port.

Generally all other LIP phone series shown here have two (2) Ethernet ports, a LAN port and a PC port. The LAN port is connected to an Ethernet switch port and the PC port is connected to the LAN port of a PC.

The LIP phones are wired to any 10/100 (or 1000) Base-T Ethernet switch port with access to a VOIP channel. The LIP phones can be powered from a POE compatible Ethernet switch port or using the AC/DC Adaptor-K.
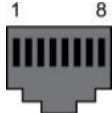
⚠️ **CAUTION**

To power your phone, use either PoE or the AC adaptor, not both. Use the Ericsson-LG Enterprise approved AC power adaptor only. The AC adaptor is ordered separately.

Modular Jack Pin Assignment

Table 7.3.3 LIP Phone Modular Jack Wiring

Connector	Pin-out	Pin Number	Signal Name	Function
RJ45		4,5,7,8	Reserved	
		1	TX+	Transmit Data
		2	TX-	Transmit Data
		3	RX-	Receive Data
		6	RX+	Receive Data

1) Using the above wiring chart, wire the RX and TX pins from the RJ45 Wall outlet, or equal, for the IP Phone to the appropriate Ethernet switch termination point using Cat 5 or, for 1000 Base-T Cat 5e UTP cable. The maximum wire length between the IP Phone and the Ethernet switch port is 100 meters or 328 feet.

2) Use the RJ45 terminated cable provided with the phone to connect the IP Phone LAN port to the Wall outlet.

3) Connect the PC port to a PC LAN port using a CAT 5 cable terminated on each end with an RJ45 connector.

4) If not using a POE switch port, connect the DC connector of an AC Adaptor-K to the DC input on the bottom of the IP Phone and plug the AC plug of the AC adaptor in to a 100-240 VAC outlet.

Once the LIP phone powers up, it will attempt to register with the eMG100. From default, the LIP phone should complete the registration successfully.

If not, the phone will display the "No Response" message shown below.

```
NO RESPONSE FROM MFIM [L]
SET[*] – RETRY[#]
```

This indicates the LIP phone needs to be configured for the local network environment. To configure the phone, perform the following steps.

1) Press '*' to set the network configuration and Enter the password, 147*.
2) Use the Volume Up/Down buttons to scroll through the menu shown below.
3) Enter appropriate values for the local network.
4) When complete, press the Speaker button.
5) Press '*' to exit and restart the LIP Phone.

Menu Display	Description
MODE[R/L] [LOCAL] – CHANGE[#]	Registration mode, use '#' to set Remote mode
PHONE IP ADDRESS (DOT:*)	Use the dial pad to enter the fixed IP address, use DHCP for dynamic addressing
PHONE NET MASK(DOT:*)	Use the dial pad to enter the Subnet mask if using fixed IP addressing
ROUTER IP ADDRESS(DOT:*)	Use the dial pad to enter the default Gateway if using fixed IP addressing
MFIM IP ADDRESS(DOT:*)	Use the dial pad to enter the IP address of the MFIM IP address.
SAME LAN WITH MFIM [YES] – CHANGE[#]	Indicates if the IP Phone and the eMG100 are on the same LAN segment. Use # to change, Yes/No.
INPUT DEVICE NUMBER:	
DHCP ? [DISABLED] – CHANGE[#]	The IP Phone supports fixed or dynamic addressing, use # to change the value.
VLAN CONFIGURATION NOT SET	Not used
WEB PASSWORD	Not used
PHY MODE : AUTO NEGO CHANGE[*] SAVE[#]	Speed and Duplex negotiation, use * to change the selection

8 STARTING IPECS eMG100

8.1   iPECS eMG100 System Initial Power-up

The eMG100 incorporates software initialization routines to automatically configure system gains and tones based on the Nation Code assigned in the system database.

The Nation code is the Country code used for international dialing. Generally, this will be properly set but, prior to any other configuration, the Nation Code must be verified to match the location of the installation.

If not it can be modified and the system initialized with the modified Nation Code.

To initialize the system, perform the following Steps:

1)   Verify the KSU MBU SW1 pole#1 is OFF, and pole#2 is ON. Also verify the AC Power switch is OFF.

2)   Plug the AC power cord into iPECS eMG100 System KSUs and the AC outlet.

3)   Turn the AC Power switches on the KSU and 2'nd KSU ON.

4)   Verify and, if needed, modify, the Nation Code (PGM100) with the DKT (Section 8.2.1) or run the Install Wizard (Section 8.3).

5)   Reset the KSU with either the recessed Reset button or by power cycling (turn the AC Power switch OFF then ON).

6)   After the LEDs indicate normal operation, refer to section 4.5 and change the position of the KSU MBU SW1 pole#2 to the OFF position so the database will not initialize during future power cycling or if the system is reset.

7)   If the DKT was used to set the Nation code, run the Install Wizard then configure the system to the customer needs.

The following sections detail how to verify and change the Nation Code and run the Install Wizard. Once the Nation Code has been set and the system database initialized, the system can be configured without the need to reinitialize.

For detailed information on configuring the eMG100 system, refer to the eMG100 Administration and Programming Manual.

8.2   Verify the Nation Code

There are two methods to verify and modify the Nation code. The first is from the Attendant Station, which is the LDP multi-button phone connected to the first DKT port on the KSU MBU. The second is through the eMG100 Install Wizard, section 8.3.

8.2.1   Using the DKT

1) Press the **[Trans/PGM]** button.

   The LCD displays the User Menu.

2) Dial '*' and '#'.

   The LCD displays 'Admin Program Start'.

3) Press the **[Trans/PGM]** button again and dial 100.

   The LCD displays 'System ID' and requests a Flex key selection.

4) Press the first Flexible button on the phone.

   The LCD indicates 'Country Code' and the code digits.

5) Verify the Nation Code is correct referring to the Nation Code chart below.

6) If the code is not correct, enter the new code.

7) Press the **[Hold/Save]** button.

   The LCD displays the new Country Code.

8) Press the Speaker button.

9) Initialized the system as discussed in Section 8.1 with the new Nation Code.

Table 8.2.1 Nation Code Table

COUNTRY	CODE	COUNTRY	CODE	COUNTRY	CODE
America	1	Argentina	54	Australia	61
Bahrain	973	Bangladesh	880	Belgium	32
Bolivia	591	Brazil	55	Brunei	673
Burma	95	Cameroon	237	Chile	56
China (Taiwan)	886	CIS	7	Colombia	57
Costa Rica	506	Cyprus	357	Czech	42
Denmark	45	Ecuador	593	Egypt	20
El Salvador	503	Ethiopia	251	Fiji	679
Finland	358	France	33	Gabon	241
Germany	49	Ghana	233	Greece	30
Guam	671	Guatemala	502	Guyana	592
Haiti	509	Honduras	504	Hong Kong	852
India	91	Indonesia	62	Iran	98
Iraq	964	Ireland	353	Israel	972
Italy	39	Japan	81	Jordan	962
Kenya	254	Korea	82	Kuwait	965
Liberia	231	Libya	218	Malta	356
Luxembourg	352	Malaysia	60	Morocco	212

COUNTRY	CODE	COUNTRY	CODE	COUNTRY	CODE
Mexico	52	Monaco	377	Nigeria	234
Netherlands	31	New Zealand	64	Pakistan	92
Norway	47	Oman	968	Paraguay	595
Panama	507	P.N.G	675	Portugal	351
Peru	51	Philippines	63	Senegal	221
Qatar	974	Saudi Arabia	966	Spain	34
Singapore	65	South Africa	27	Sweden	46
Sri Lanka	94	Swaziland	268	Tunisia	216
Switzerland	41	Thailand	66	United Kingdom	44
Turkey	90	U.A.E.	971	Y.A.R.	967
Uruguay	598	Venezuela	58		

8.3　Installation Wizard

The Install Wizard is the first and foremost basic configuration tool. In addition to the Nation Code, using the Install Wizard allows quick access to other configuration parameters that often require changing including Station and Flexible Numbering plans, IP addressing information, etc.

The Wizard is part of the eMG100 system Web Admin that is accessed through the LAN port of the KSU. Connect a PC to the LAN connected to the KSU LAN port or directly to the KSU LAN port. Set the IP address of the PC to match the default system address (10.10.10.2) then follow the Steps below.

- System Upgrade
- Nation Code
- System Time & Date
- Station Number
- Flexible Numbering Plan
- CO Ring Assignment
- Maintenance ID & Password
- IP Information
- Config Encryption
- License Upload

1) Open and point a browser to the IP address of the KSU LAN port (10.10.10.2). IPECS eMG100 Web Admin login screen appears.
2) Enter the default User ID (admin) and Password (1234) then click **[Login]**.
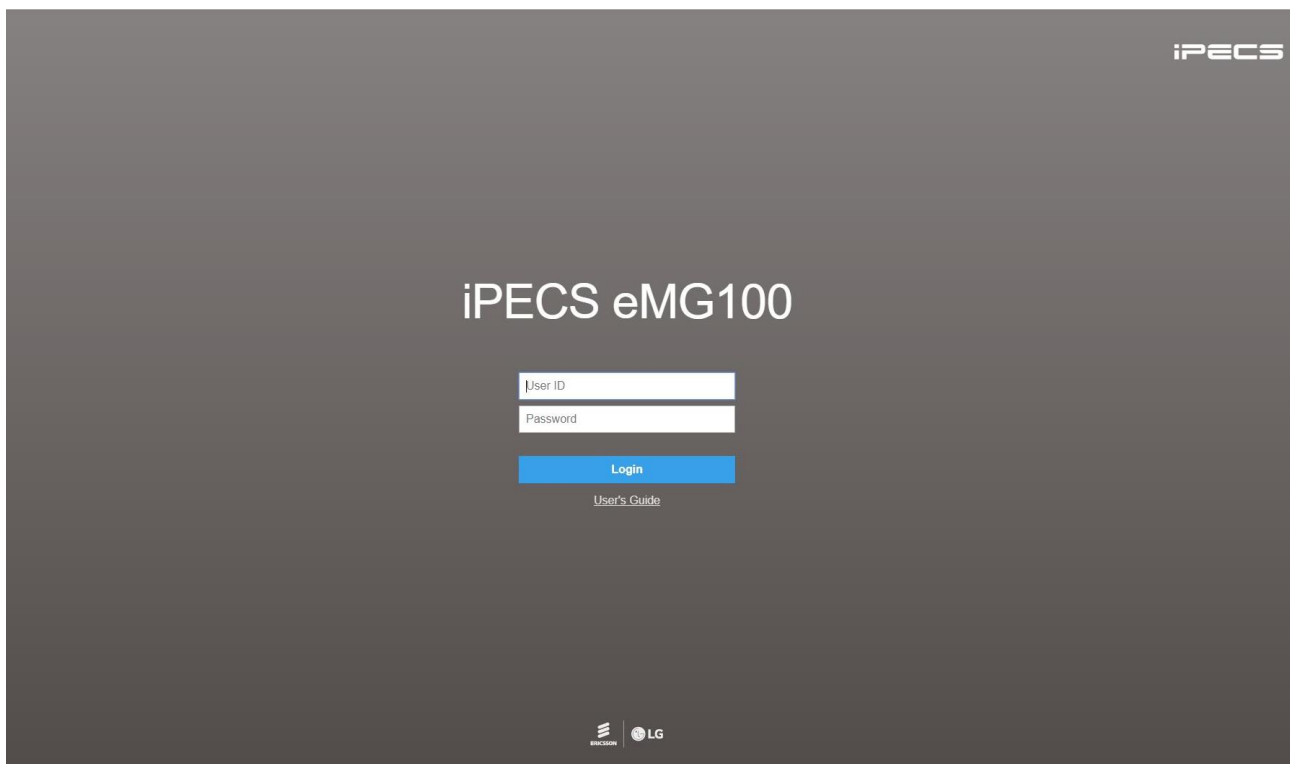
3) Click **[Select files]** button and then open the pop-up folder. Select the desired file to upload to the system's memory and click the **[Start]** button. The file is sent to the system's memory, saved and automatically loaded upon a system reset or restart.

4) During initialization, the system employs the Nation Code to establish the default gains and tones for the various interfaces (analog CO Lines, ISDN lines, etc.), as well as the numbering plans for the specific country. The gains(in particular) must be set to comply with the local regulatory requirements.

Normally, the Nation Code will be set at the factory, however assure the Nation code matches the system location. If not, **turn SW 1 Pole 2 of KSU to ON**, change the Nation Code and save the page. If the code is changed, after saving the page the system will initialize automatically to properly set the gains, tones and numbering plan for the selected country. In addition, all other data will be initialized so, the Nation Code should be properly set prior to other programming.

5) You can set System time and date in this page.

6)   You want to change the current station number to New station number. In this page, you can change the station number.

7)   The Flexible Numbering Plan defines the various digit strings (codes) users may dial to access system resources (outside lines, page zones, etc.) and features. In the wizard, codes for features that commonly may require modification are displayed.

8)   CO Ring Assignment establishes how the system will route incoming calls. The wizard assignments cover all CO/IP Lines in the system and the Ring assignments for Day, Night and Timed Ring modes can be established.

9)   The Wizard includes a password entry page. It is strongly recommended that a unique User ID and strong password be entered to minimize the risk of admin and maintenance access by unauthorized personnel. In order to finish the final step, you should register at least maintenance ID. If not so, the Wizard can't go on to the next. Also, Keyset admin password can be registered in this page.

NOTE

The new information will be in effect immediately upon saving the information. When a new Admin User ID and Password are saved, the Web login screen appears. A new Admin session will be required using the new login credentials.

10)   The IP Information page establishes the IP address scheme. DHCP can be enabled or static addressing can be configured. When the system is behind a firewall, the Firewall address must be entered allowing proper operation with remote users, devise and SIP trunks. A DNS (Directory Name Server) for Domain Name resolution should also be entered on this page. Note that changing any IP address in the system requires a system reset; the reset does not initialize data.

11)   Config Encryption

Passphrase is used for DB encryption. If the value is set, the private date in your system will be encrypted. Therefore, even if the files which include private data are leaked, they cannot be read. When you don't want to this encryption feature, you have to set the passphrase to blank. Note that, before the encryption, it is better backup your DB for emergency case and remember the passphrase. Otherwise, you cannot decrypt the system DB. If the passphrase is assigned, the system DB which includes private data will be encrypted. If the passphrase is lost, you cannot change it or decrypted system DBs,

12)   Before License upload, make sure that the date of system is set correctly. Click **[Select file]** button and then open the pop-up folder. Select a valid license file to upload to the eMG system and click the **[Start]** button. If the file which is sent to the system is "System License File", it will be saved and automatically applied without restart. The enabled features by uploading license file can be shown in "System Overview" page.

9 Maintenance & troubleshooting

9.1 General Maintenance

The eMG100 is a highly reliable communications system and requires no specific general maintenance.

9.2 PSU Fuse Replacement

The PSU is located at the left in the KSU and is pre-installed in iPECS eMG100 KSU. The PSU provides three DC voltage power sources to MBU through the 7-pin connector, CN7.

The fuse, which is a rated as 2A @ 250 Volts is located on the lower left of the PSU board.

To replace the fuse, refer to the figure below and perform the following steps,

1)   Turn OFF the power to the KSU and extract the Power cord Plug.

2)   Remove the KSU cover, refer to section 4.3.

3)   Remove the 3 screws holding the PSU cover and one screw inside in place.

4)   Lift and remove the PSU cover.

5)   Remove the fuse from the fuse clips.

6)   Install the replacement fuse. The replacement fuse must be of the same size and rating as the original, 5mm by 20 mm rated at 2A @ 250 Volts.

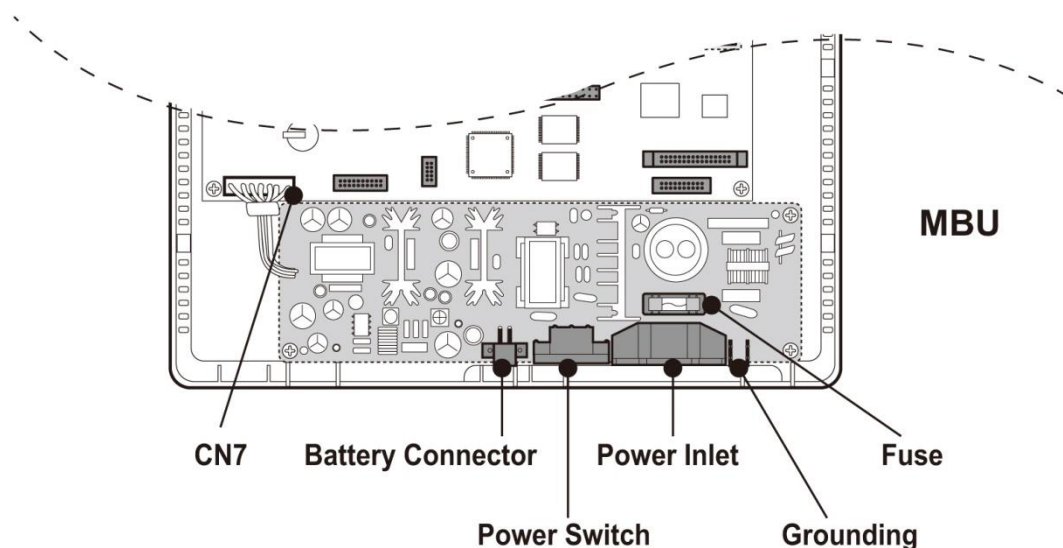7)   Replace the PSU cover, insert and tighten the four screws.

Figure 9.2 PSU Fuse Replacements

9.3   Troubleshooting

Table 9.3 eMG100 Troubleshooting Chart

Problem	Cause/Symptom	Solution
System power failure	Power short circuit in some board(s)	Exchange the malfunctioning board for one in good working condition. Dust each board with a dry cloth. Check the PSU fuse. Replace the PSU with an identical one.
	LD1-3 LEDs on the MBU are All ON or All OFF	
System does not operate	Power short circuit in some board(s)	Check the connection of each board with the MBU. Check the System Clock. Check for a short circuit on the MBU or other boards. Press the Reset button when the DIP switch (SW1 for database protection) is in the default position.
	Bad board connection	
	System database not working	
DKTU does not operate	Bad extension circuit	Exchange the malfunctioning board for one in good working condition.
	Bad connection between the MBU /Option boards and DKT	Check the connection between the SLT line and DKT on MDF and fix any mismatching. Repair any broken connection between the System and DKT.
	Distance of DKT and System	Check the distance between the MBU / Option boards and the DKT.
	Bad DKT	Plug the DKT into another extension port that has been verified as working. If the DKT still does not work properly, replace the DKT.
SLT does not operate	Bad MBU / Option boards	Exchange the board for one in good working condition.
	Bad connection between the MBU / Option boards and SLT	Check that the board connection between the lines of the SLT and DKT on the MDF and fix any mismatching.
CO line operation failure	CID and CPT detection fail	Check the U8 (Voice processing and Tone detection device).
	Bad connection	Check all connections.
Noise on External MOH and Paging port	Induced noise on the wire between the System and the amplifier	Make sure a shielded cable is in use as the connection wire between the system and the amplifier.
	Excessive input level from the external music source	Decrease the output level of the external music source by using the volume control on the music source.

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