



iPECS eMG80

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# Hardware Description & Installation Manual

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

iPECS is an Ericsson-LG Brand



## **Regulatory Information**

Before connecting the iPECS eMG80 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 eMG80
Local regulatory agency registration number	consult local Ericsson-LG Enterprise representative
Ringer equivalence	0.1B
Registered jack	RJ-11

This equipment complies with the following regulatory standards, that is, the safety requirements of EN60950-1, and the EMC requirement of EN55022 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 the iPECS eMG80 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.

The iPECS eMG80 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. declares that the equipment specified in this document bearing the "CE" mark conforms to the European Union Radio and Telecommunications Terminal Equipment Directive(R&TTE 1999/5/EC), including the Electromagnetic Compatibility Directive (2004/108/EC) and Low Voltage Directive (2006/95/EC). 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.

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 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.

### **WARNING**

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

### **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 more detailed information about disposal of your old appliances, please contact your city office, waste disposal service or the place of product purchase.

## ***Revision History***

<b>Issue</b>	<b>Date</b>	<b>DESCRIPTION OF CHANGES</b>
1.0	Sep, 2013	Initial Release
1.1	Dec, 2013	Minor Spec. updates and Changed Ericsson-LG to Ericsson-LG Enterprise

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# **1. INTRODUCTION**

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## **1.1 Important Safety Instructions**

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### **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:
    1. When the power supply cord or plug is damaged or frayed.
    2. If liquid has been spilled into the product.
    3. If the product has been exposed to rain or water.
    4. 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.



5. If the product has been dropped or the KSU has been damaged.
  6. 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 the iPECS eMG80 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.

### **WARNING**

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.

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## **1.2 About This Manual**

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This document provides general information covering the description and installation of the iPECS eMG80 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 nine (9) 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 the iPECS eMG80 System, including the system specifications and capacity.

**Section 3    *Installation Overview***

Describes detailed instructions for planning the installation site and procedures to install the iPECS eMG80 System.

**Section 4    *Board Installation & Description***

Provides a description and instructions for installing components of the iPECS eMG80.

**Section 5    *Mounting the KSU and EKSU***

Provides instructions for mounting the KSU and EKSU.

**Section 6    *KSU and EKSU Wiring***

Provides instructions on wiring the KSU and EKSU 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 other device connections for the terminals.

**Section 8    *Starting the iPECS eMG80 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 the iPECS eMG80 System, replacing the PSU fuse and deals with common troubleshooting issues.

**Section 10   *Open Source Software Notice***

Provides information on open source software.

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## **2. SYSTEM OVERVIEW**

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### **2.1 iPECS eMG80 System Highlights**

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The eMG80 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 eMG80 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 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 eMG80 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.

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### **2.2 General Cabinet Description**

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The eMG80 system consists of a Key Service Unit (KSU) and, if required, an Expansion Key Service Unit (EKSU). Each KSU consists of a plastic housing, a Main board and Power Supply Unit as well as built-in outside line and station interfaces. Optional Interface and Function boards may be equipped in the eMG80 KSU. In addition, on the bottom of each KSU are the connections from the KSU to the EKSU.

As shown in Figure 2.2-1, on the left side of the KSU are connections for Battery Backup, AC Power and Earth Ground as well as a Power switch. On the right side are modular jack connections for Stations, external networks (Analog CO, BRI, and PRI lines), a Miscellaneous jack, a DB9 for the RS232 serial connection and LAN connections 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.

The EKSU, shown in Figure 2.2-2, is similar to the KSU except that on the right side there are no LAN or RS232 connector, and no reset button.

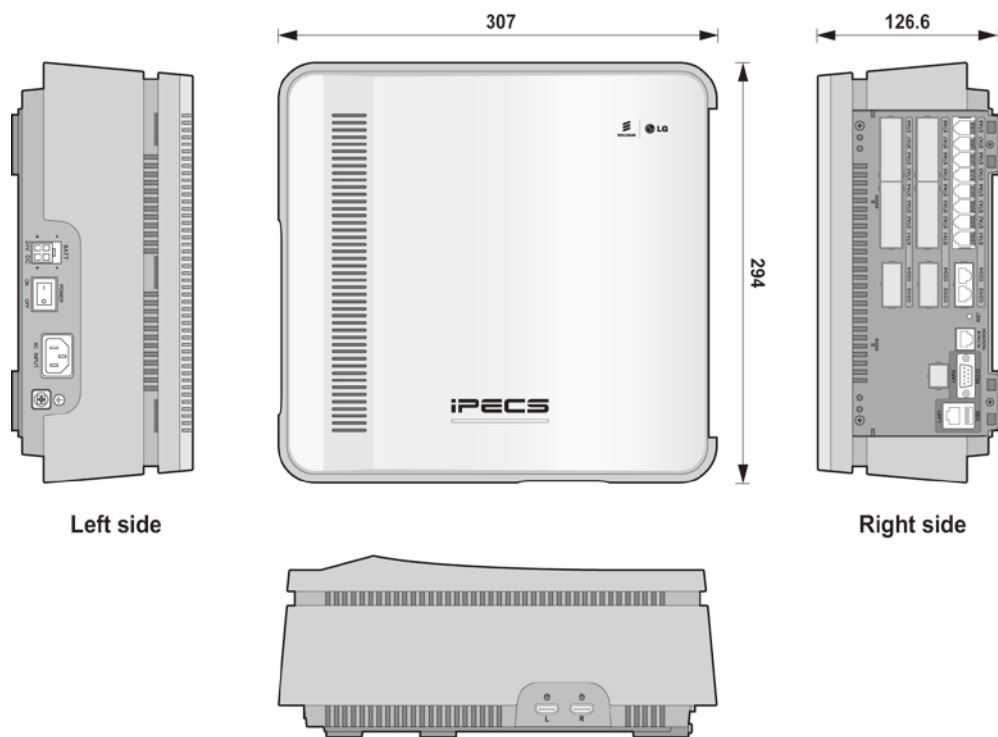


Figure 2.2-1 KSU Appearance

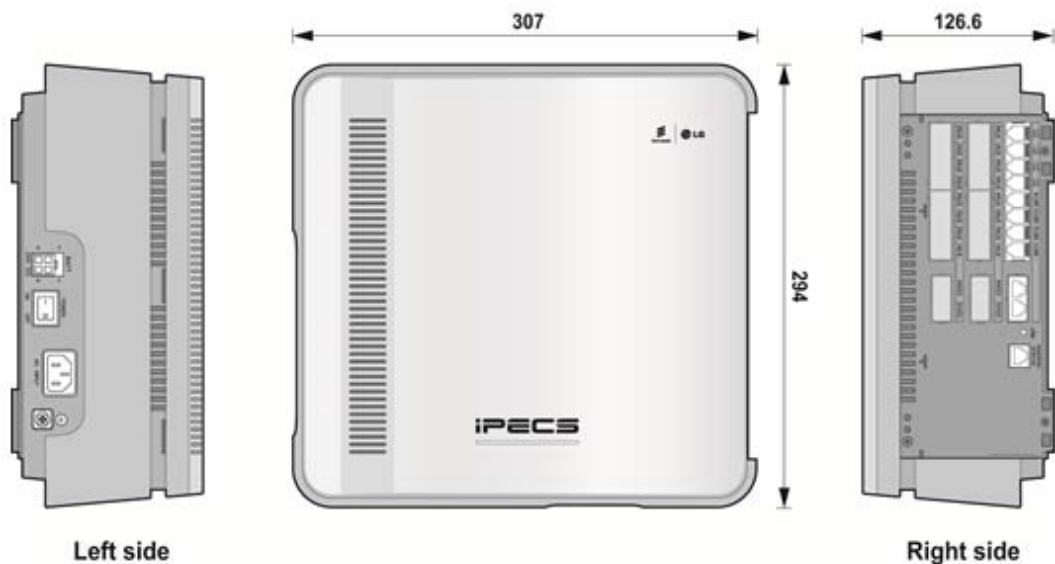
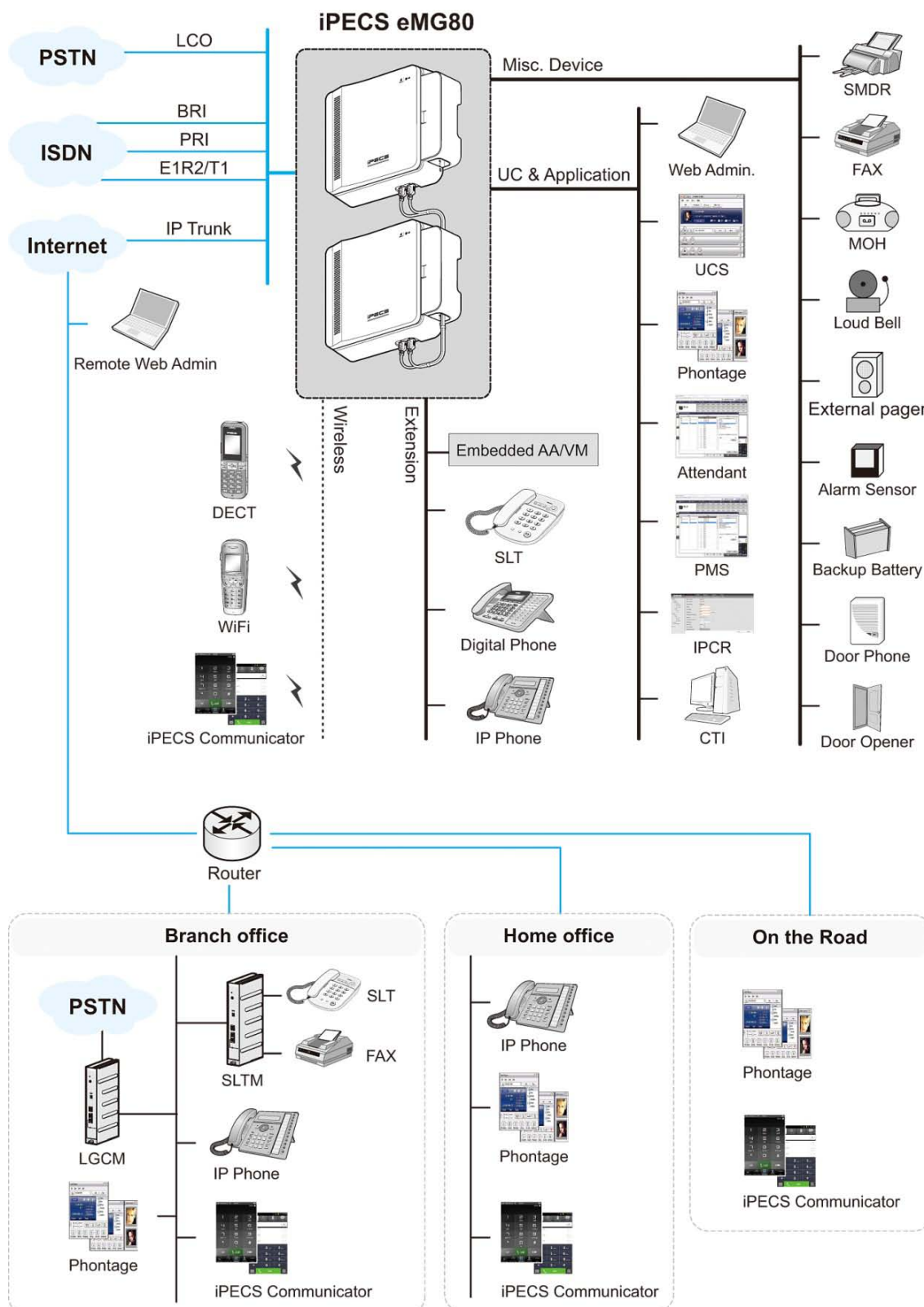


Figure 2.2-2 EKSU Appearance

## 2.3 System Connection Diagram

The following Figure represents the interconnections available with the iPECS eMG80 including external network, terminals, miscellaneous, and admin interfaces.



**Figure 2.2-3 System Connection Diagram**

## 2.4 System Components

The KSU can be equipped with one (1) of five (5) Main Boards (MBUs) and optional Interface and Function boards. The specific MBU determines the type of external network and terminal interfaces, and the optional Interface boards that can be installed in an eMG80 KSU. The table 2.4-1 below shows all available components for an eMG80 KSU including the various MBUs, and optional Interface and Function boards. The table 2.4-2 below indicates the various interface boards available for each MBU as well as the EMBU housed in the Expansion KSU.

**Table 2.4-1 eMG80 Components**

Item	Board	Description
KSU		Key Service Unit, eMG80 cabinet, KSU and EKSU
KSUA	MBUA	4 CO, 1 DKT and 7 Hybrid Interfaces Voice Mail (2-channels/1-Hour default, 8-channel/32-hours max.) VoIP (2-channels default, 16-channel max.)
KSUAD	MBUAD	4 CO, 8 DKT and 4 SLT Interfaces Voice Mail (2-channels/1-Hour default, 8-channel/32-hours max.) VoIP (2-channels default, 16-channel max.)
KSUI	MBUI	1 DKT and 7 Hybrid Interfaces Voice Mail (2-channels/1-Hour default, 8-channel/32-hours max.) VoIP (2-channels default, 16-channel max.)
KSUID	MBUID	8 DKT and 4 SLT Interfaces Voice Mail (2-channels/1-Hour default, 8-channel/32-hours max.) VoIP (2-channels default, 16-channel max.)
EKSU	EMBU	4 CO and 8 Hybrid
PSU		Power Supply Unit, pre-installed in each cabinet
Interface Boards	eMG80-CH204	2 CO Line and 4 Hybrid Interface Board
	eMG80-CH408	4 CO Line and 8 Hybrid Interface Board
	eMG80-CS416	4 CO Line and 16 SLT Interface Board
	eMG80-BH104	1 BRI (2B+D) and 4 Hybrid Interface Board
	eMG80-BH208	2 BRI (2B+D) and 8 Hybrid Interface Board
	eMG80-HYB8	8 Hybrid Interface Board
	eMG80-SLB16	16 SLT Interface Board
	eMG80-PRIU	1 PRI/E1R2 or T1 (30 or 24 channels) Interface Unit
	eMG80-BRIU2	2 BRI (2B+D) Interface Unit
	eMG80-WTIB4	Wireless Terminal Interface Board, supports 4 Base Stations and 24 channels
Function Boards	eMG80-VVMU	8 VoIP, VM Channel (2 channels/1-hour default, 4 channels/16-hour max.), licenses required for VoIP, and VM channel and storage expansion
	eMG80-MEMU	Memory Expansion Module Unit for VM (15 hour expansion)
	eMG80-MODU	Modem Unit
	MG-CMU4	4 Call Metering Unit,, 4 channel daughter board for MBU, EMBU and analog CO Line Interface boards
eMG80-RMB		19" Rack Mounting Bracket (Option)

**Table 2.4-2 Option Board Compatibility Chart for KSU**

Option Board		KSUA	KSUAD	KSUI	KSUID	EKSU
Interface Boards						
	eMG80-CH204	Y	Y	Y	Y	Y
	eMG80-CH408	Y	Y	Y	Y	Y
	eMG80-CS416	Y	Y	Y	Y	Y
	eMG80-BH104	Y	Y	Y	Y	N
	eMG80-BH208	Y	Y	Y	Y	N
	eMG80-PRIU	N	N	Y	Y	N
	eMG80-BRIU2	N	N	Y	Y	N
	eMG80-HYB8	Y	Y	Y	Y	Y
	eMG80-SLB16	Y	Y	Y	Y	Y
	eMG80-WTIB4	Y	Y	Y	Y	N
Function Boards						
	eMG80-VVMU	Y	Y	Y	Y	N
	eMG80-MEMU	Y	Y	Y	Y	N
	eMG80-MODU	Y	Y	Y	Y	N
	MG-CMU4	Y	Y	N	N	Y

**NOTE**

Each KSU permits installation of two (2) Interface boards. However, only one (1) CS416, SLB16 or WTIB4 Interface board may be installed in a KSU.

## 2.5 Specifications

### 2.5.1 General Specifications

**Table 2.5.1-1 General Specifications**

Item	Description	Specification
CPU		M83261G, ARM11 dual core (32bit, 650MHz)
RTC Back-up Battery Duration		7 years
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 (KSU+ EKSU)
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	307 mm(W) x 294 mm(H) x126.6 mm(D)
	Expansion KSU	307 mm(W) x 294 mm(H) x126.6 mm(D)
Weight	KSU	2.03 Kg
	Expansion KSU	1.99 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	10/100 Base-T Ethernet (IEEE 802.3)
	Speed	10/100 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 to Table 2.5.2-5. 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. Also, the 48 DECT stations are separate from other station maximums.

**Table 2.5.2-1 General System Capacities**

Item	Capacity
CO/Trunk lines	Max. 74
Stations	Max. 140
Attendants	4
LAN port	2(1 each, KSU and VVMU)
Modem Channel	1(MODU)
Serial Port(RS-232C)	1
USB(2.0) Host port	1
Alarm/Doorbell input	2 (1 per KSU)
External Control Relays	2 (1 per KSU)
Music Source Inputs	1 Internal: select one of 13 melodies 1 External source input 5 SLT ports 3 VSF announcements
Power Fail Circuit	Max. 6 (1 per KSU, EKSU, CH204, CH408, CS416)
VSF Device 1: Built-in AA/VM w/MEMU	4 channels(2 Chan. by default, 1 Chan. by license), 1 hour 15 hours(no license needed)
VSF Device 2 (VVMU)	4 channels and 15 hours(by license), 1 hour(by default)
Conference channels	148, 3-13 party or unlimited 3-party
WTIB	1
DECT Phones	48
Built-in VoIP channels	8(2 channels by default, 6 channels by license)
VVMU VoIP channels	8(by license)
IP Stations and SIP Trunks	48 port (32 Stations+16 SIP Trunks)
External Page	1 port
Internal Page	35 zones
System Speed Dial	3000 numbers, 23 digits each
System Speed Dial Zones (Groups)	10 zones
Station Speed Dial	100 per station, 23 digits each (max. 4000 numbers)
Last Number Redial	10 numbers, 23 digits each

Item	Capacity
Save Number Redial	1 number of 23 digits
Call Log(Outgoing/Incoming/Missed Call)	15 ~ 50, 23 digits (programmable)
DSS Consoles per Station	3
SMDR buffer	5000
CO Line Groups	20
Station & Hunt Groups	40
Station & Hunt Group Members	70
Pickup Group	50
Pickup Group Member	140
Conference Groups - System	40
Conference Groups - Station	20 per station
Executive/Secretary pairs	36
Authorization Codes	500 (Station: 140, System: 360)

Table 2.5.2-2 KSUA Device Type Maximums

Resource Type	Device Type	Maximum Capacity	Interface Boards
External Network	KSUA: 4 CO & 1 DKT + 7 Hybrid & 2VoIP		
	CO Line	12	2 CH408 or 1 CH408 + 1 CS416
	BRI Line	4 (2B+D) & 4 CO Line	2 BH208
	PRI/E1 Line	0	
	SIP Trunks	16 channels	6-licensed + VVMU Shared w/Local/Remote IP & SIP phones
	EKSU		
	CO Line	12	2 CH408 or 1 CH408 + 1 CS416
	KSUA + EKSU		
	CO Line	24	
	BRI Line	4 (2B+D) & 16 CO Lines	
	PRI Line	0	
	SIP Trunk	16 channels	
Stations	KSUA		
	DKT	24	2 CH408 or BH208 or combination
	SLT	31 & 1-DKT	1 (CH408 or BH208) + 1 CS416
	LIP/SIP	32	6-licensed + VVMU Shared w/SIP Trunks 16 simultaneous calls
	DECT	48	WTIB4 24 simultaneous calls, 6/Base
	EKSU		
	DKT	24	2 CH408
	SLT	32	1 CH408 + 1CS416
	KSUA + EKSU		
	DKT	48	
	SLT	63 & 1-DKT	
	LIP/SIP	32	SIP Phones require per seat license
	DECT	48	

Table 2.5.2-3 KSUAD Device Type Maximums

Resource Type	Device	Maximum Capacity	Interface Boards
External Network	KSUAD: 4 CO & 8 DKT+4 SLT & 2 VoIP		
	CO Line	12	2 CH408 or 1 CH408 + 1 CS416
	BRI Line	4 (2B+D) & 4 CO Line	2 BH208
	PR/E11 Line	0	
	SIP Trunk	16 channels	6-licensed + VVMU Shared w/Local/Remote IP & SIP phones
	EKSU		
	CO Line	12	2 CH408 or 1 CH408 + 1 CS416
	KSUAD + EKSU		
	CO Line	24	
	BRI Line	4 (2B+D) & 16 CO Line	
	PRI Line	0	
	SIP Trunk	16 channels	
Stations	KSUAD		
	DKT	24 & 4 SLT	2 CH408 or BH208 or combination
	SLT	28 & 8-DKT	1 (CH408 or BH208) + 1 CS416
	LIP/SIP	32	6-licensed + VVMU Shared w/SIP Trunks 16 simultaneous calls
	DECT	48	24 simultaneous calls
	EKSU		
	DKT	24	2 CH408
	SLT	32	1 CH408 + 1CS416
	KSUAD + EKSU		
	DKT	48 & 4SLT	
	SLT	60 & 8-DKT	
	LIP/SIP	32	SIP Phones require per seat license
	DECT	48	

Table 2.5.2-4 KSUI Device Type Maximums

Resource Type	Device	Maximum Capacity	Interface Boards
External Network	KSUI: 0 CO & 1 DKT + 7 Hybrid & 2 VoIP		
	CO Line	8	2 CH408 or 1 CH408 + 1 CS416
	BRI Line	6 (2B+D)	2 BH208 + BRIU
	PRI/E1 Line	30 channels	1 PRIU
	SIP Trunk	16 channels	6-licensed + VVMU Shared w/Local/Remote IP &SIP phones
	EKSU		
	CO Line	12	2 CH408 or 1 CH408 + 1 CS416
	KSUI + EKSU		
	CO Line	20	
	BRI Line	6 (2B+D) & 12 CO Line	
	PRI/E1 Line	30 channels	
	SIP Trunk	16 channels	
Stations	KSUI		
	DKT	24	2 CH408 or BH208 or combination
	SLT	31 & 1 DKT	1 (CH408 or BH208) +1CS416
	LIP/SIP	32	6-licensed + VVMU Shared w/SIP Trunks 16 simultaneous calls
	DECT	48	WTIB4 24 simultaneous calls
	EKSU		
	DKT	24	2 CH408
	SLT	32	1 CH408 +1CS416
	KSUI + EKSU		
	DKT	48	
	SLT	63 & 1-DKT	
	LIP/SIP	32	SIP Phones require per seat license
	DECT	48	

Table 2.5.2-5 KSUID Device Type Maximums

Resource Type	Device	Maximum Capacity	Interface Boards
External Network	KSUID: 0 CO & 8 DKT + 4 SLT & 2 VoIP		
	CO Line	8	2 CH408 or 1 CH408 + 1 CS416
	BRI Line	6 (2B+D)	1 BRIU + 2 BH408
	PRI/E1 Line	30 channels	1 PRIU
	SIP Trunk	16 channels	6-licensed + VVMU Shared w/Local/Remote IP &SIP phones
	KSUID		
	CO Line	12	2 CH408 or 1 CH408 + 1 CS416
	KSUID + EKSU		
	CO Line	20	
	BRI Line	6 (2B+D) & 12 CO Line	
	PRI/E1 Line	30 channels	
	SIP Trunk	16 channels	
Stations	KSUID		
	DKT	24 & 4 SLTs	2 CH408 or BH208 or combination
	SLT	28 & 8-DKT	1 (CH408 or BH208) + 1 CS416
	LIP/SIP	32	6-licensed + VVMU Shared w/SIP Trunks 16 simultaneous calls
	DECT	48	WTIB4 24 simultaneous calls
	EKSU		
	DKT	24	2 CH408
	SLT	32	1 CH408 +1CS416
	KSUID + EKSU		
	DKT	48 & 4 SLT	
	SLT	60 & 8-DKT	
	LIP/SIP	32	SIP Phones require per seat license
	DECT	48	

### **2.5.3 Base station specification (GDC-600BE)**

**Table 2.5.3-1 DECT Base Station Specifications**

<b>Item</b>	<b>Specification</b>
Power feeding	+30VDC
Transmission Max Power	250mW
Access Method/Duplex	TDMA/TDD
Frequency Band	1,880 ~ 1,900MHz 1920~1930MHz (USA)
Channel Spacing	1.728MHz
Modulation	GFSK
Data rate	1.152Mbps
Base Station distance to WTIB4	600m (twisted 2-pair cable) maximum

### **2.5.4 Wireless Terminal specification (GDC-450H and GDC-500H)**

**Table 2.5.4-1 DECT Handset Specifications**

<b>Item</b>	<b>Specification</b>
Transmission Power	250mW maximum
Modulation Method	GFSK
Frequency Band	1,880MHz ~ 1,900MHz 1,920MHz ~ 1930MHz (USA)

## **3. *INSTALLATION OVERVIEW***

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### **3.1 Pre-Installation Guidelines**

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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**

The iPECS eMG80 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 with 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 the iPECS eMG80.
- 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 eMG80 KSU. After wiring is completed, the power can be connected and the switch may be turned ON.
- Incorrect wiring may cause the iPECS eMG80 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.

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## **3.2 Installation Overview**

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The installation is conducted in 7 steps as indicated in the below list.

1. Pre-Install preparations, section 3.3
2. Install Interface and Function boards, section 4
3. Mount the KSU and EKSU, section 5
4. Wire the KSU and EKSU, section 6
5. Terminal Installation and Wiring, section 7
6. Power- up & run Wizard, section 8
7. DECT Installation, refer to the DECT manuals, GDC-600TBE (CRS tool) and GDC-600BE Manual, available from the local Ericsson-LG Enterprise representative.

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## **3.3 Preparation**

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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. Also, if installing DECT, locate the best estimated position for the Base Stations. The permanent location of the Base Station will be determined using the GDC-600BTE CSR Tool to perform a RF coverage survey.

Once the mounting site is identified, verify all equipment and wiring charts are available on-site. Unpack the KSU and, if required, the EKSU and verify the contents include the items shown in Figure 3.1 and 3.2.

Note the Expansion cable is provided only with the Expansion KSU.

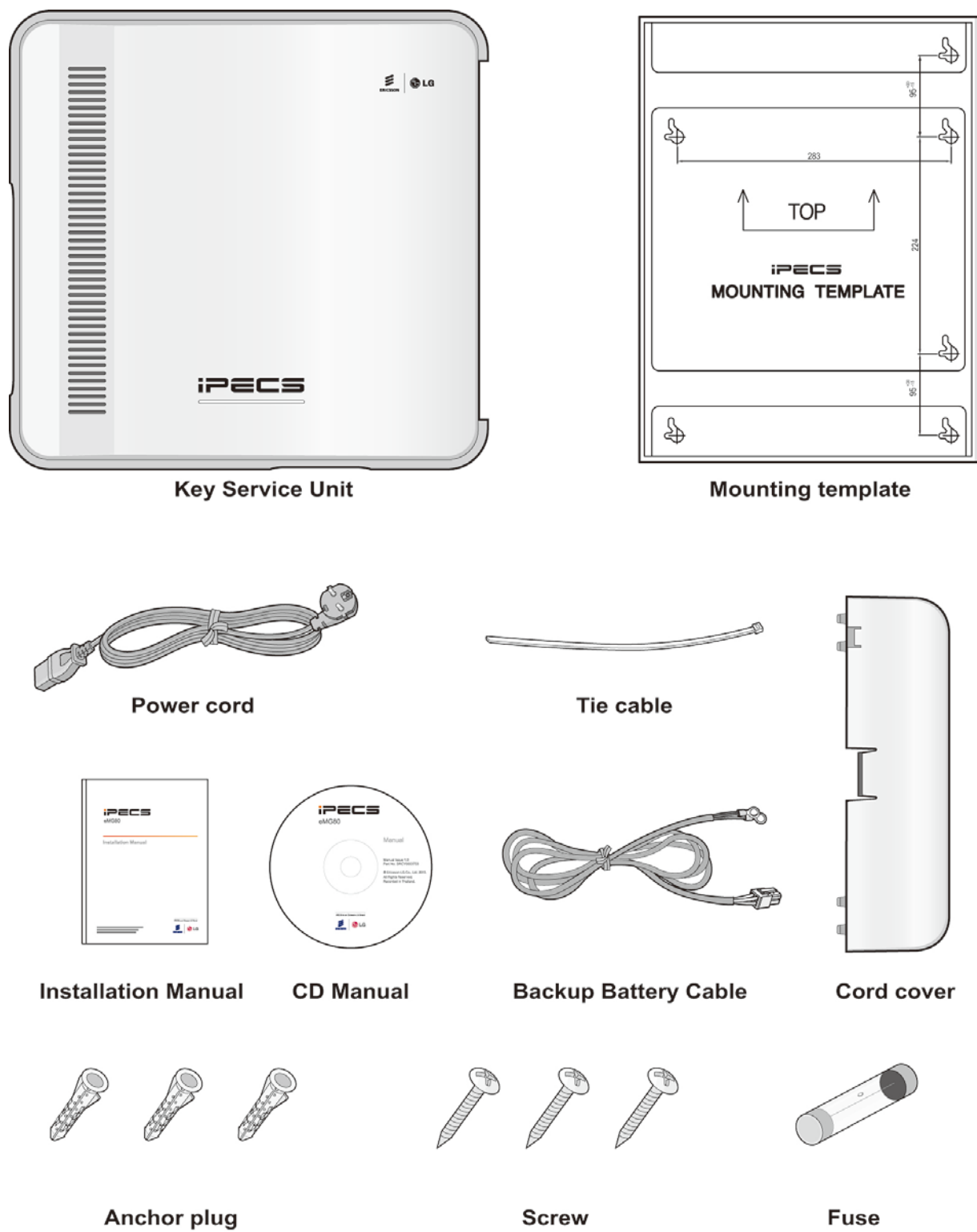


Figure 3.1 KSU Carton Contents

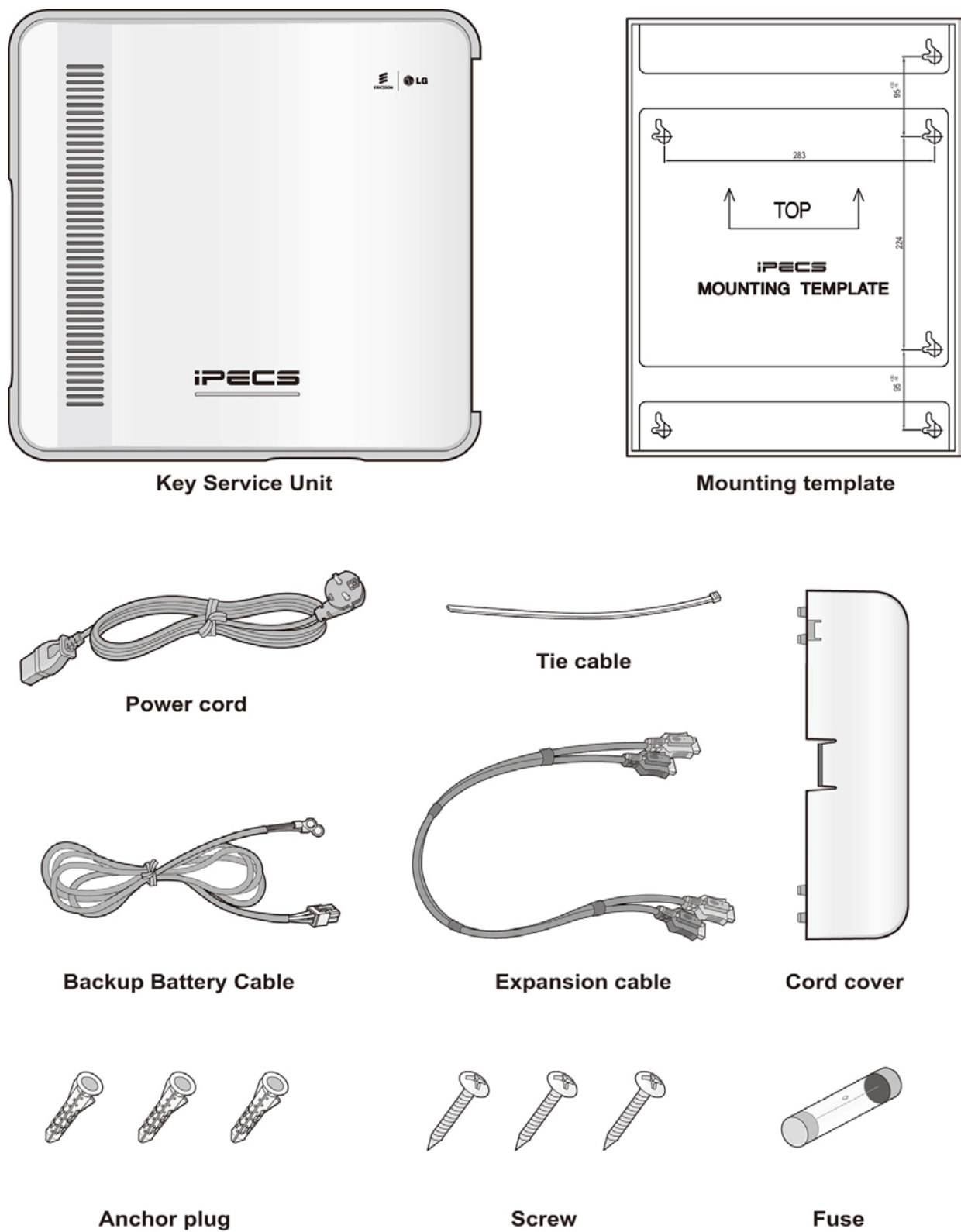


Figure 3.2 EKSU Carton Contents

## 4. BOARD INSTALLATION AND DESCRIPTION

### 4.1 General information

The eMG80 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. Both the KSU and Expansion KSUs 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.

#### Opening the Front Cover

1. Loosen screws on both sides with screwdriver.
2. Lift the front cover in the direction of the arrow.

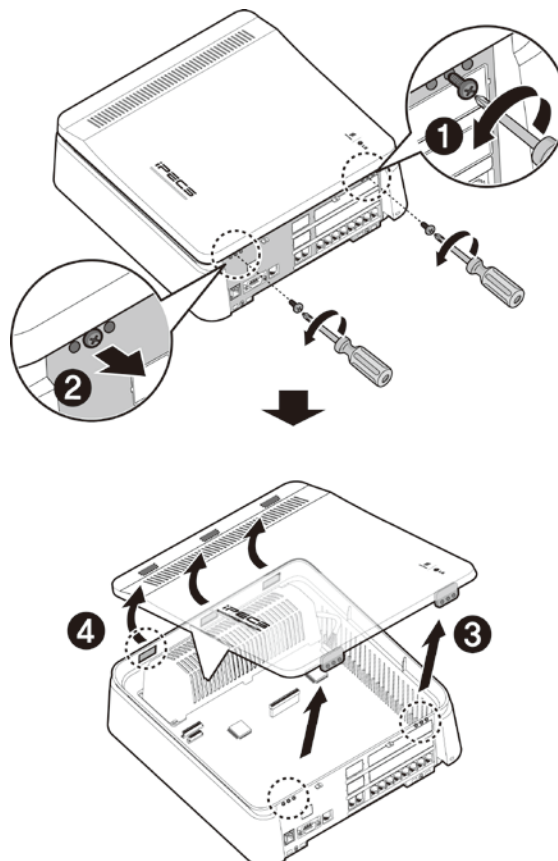
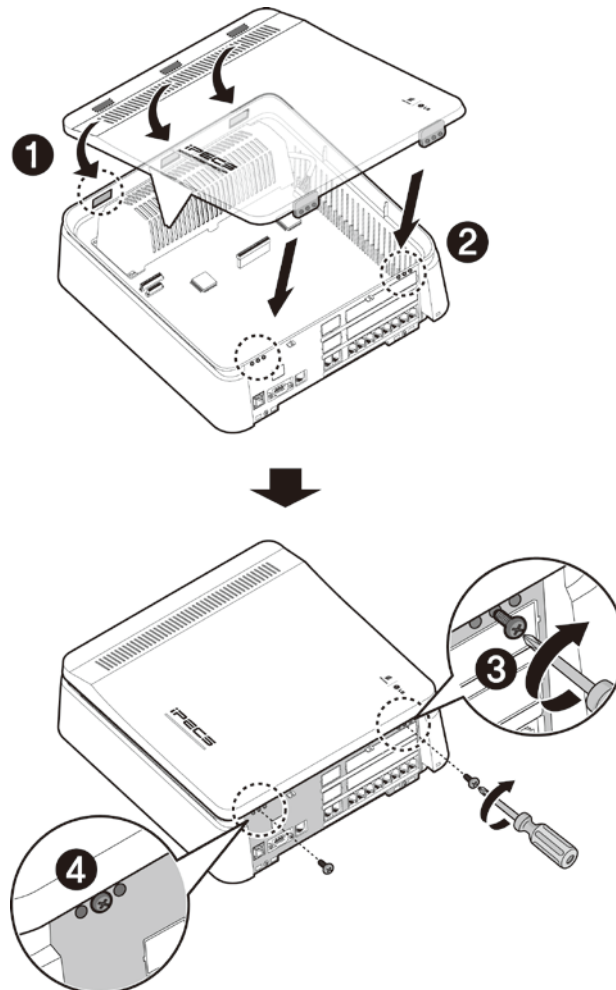


Figure 4.1 Opening the Front Cover

### **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 Closing the Front Cover**

#### **NOTE**

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

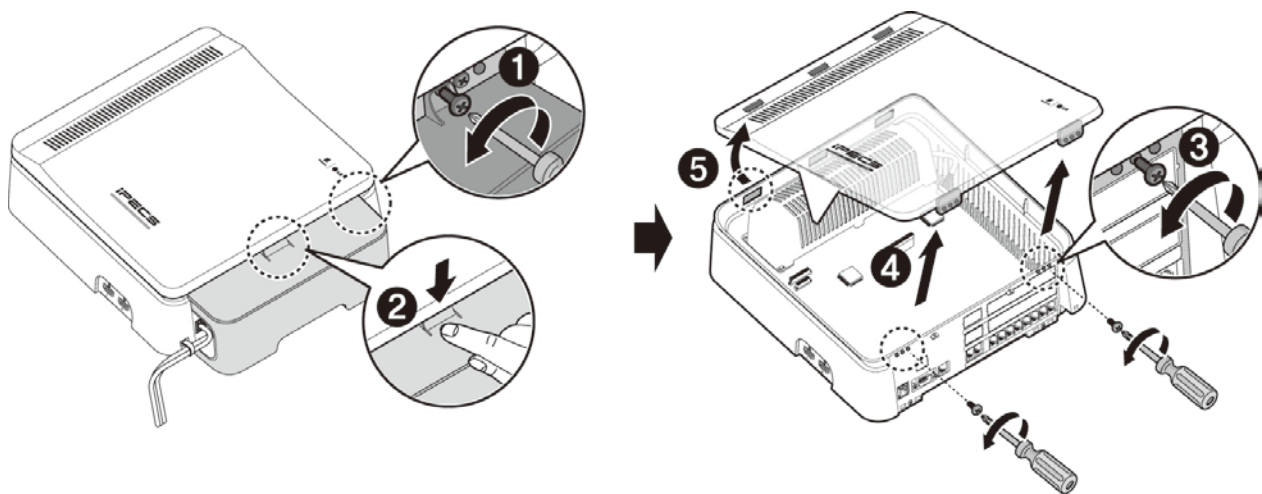
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## **4.3 Removing and Replacing the KSU & Cord cover**

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Prior to installing option boards in the KSU or EKSU, 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 Opening the KSU and Cord Cover**

**NOTE**

For safety, prior to operation, replace the KSU and Cord cover before operating the eMG80. Regarding attaching the cord cover, refer to the section 6.9.3.

To replace the covers, reverse the removal procedure as below.

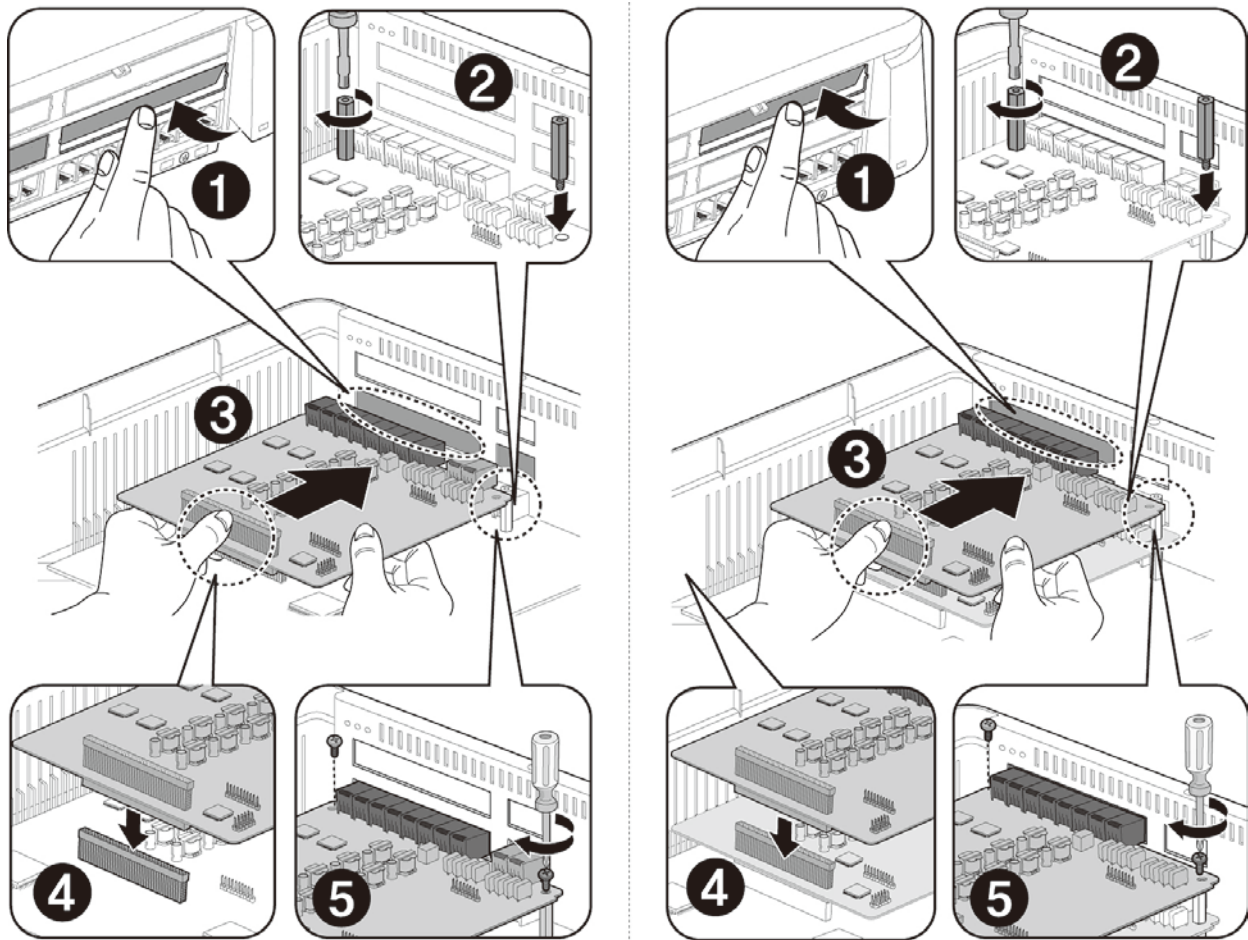
1. Insert the tabs of the KSU cover into the KSU slots.
2. Press the KSU cover down on to the KSU.
3. Insert the screws and tighten screws with screwdriver to fix the front cover.
4. Install the Cord cover
5. Insert and tighten the cover hold-down screw.

## 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.

To install a board, perform the following Steps as depicted in Figure 4.4 below:

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. If the board is provided with standoffs, remove two screws holding the MBU in the locations indicated in the figure.
4. Insert 2 standoffs through the MBU and into the cabinet. Tighten the standoffs with Wrench as shown in #2.
5. Holding the board as shown in #3, insert the board carefully in the direction of the arrow.
6. Carefully align the connector on the board with the mating MBU connector pins, then push the board down to fully engage the connectors.
7. To securely fix the board in place, insert and tighten 2 screws as shown in #5.



**Figure 4.4 Board Installation**

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## **4.5 KSU Main Board Unit (MBU)**

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One of four (4) MBUs (MBUA, MBUAD, MBUI or MBUID) is factory install in the KSU. The specifics of each MBU are discussed in sections 4.5.1 to 4.5.4.

### **4.5.1 MBUA (Main Board Unit)**

#### **Description**

The MBUA, which is shown in Figure 4.5.1-1, 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 MBUA contains switches for database protection and initialization. A built-in LAN port provides access to the eMG80 Web Admin and basic VoIP channels. In addition, a USB port is provided to allow backup and restore of the system database.

The MBUA has 4 (four) analog CO Lines, one DKT and seven (7) Hybrid station interfaces, and two (2) VoIP channels. The CO line ports support loop start CO lines with detection of supervisory signals including Caller Identification (CID), Polarity Reversal (PR), and Call Progress Tone (CPT).

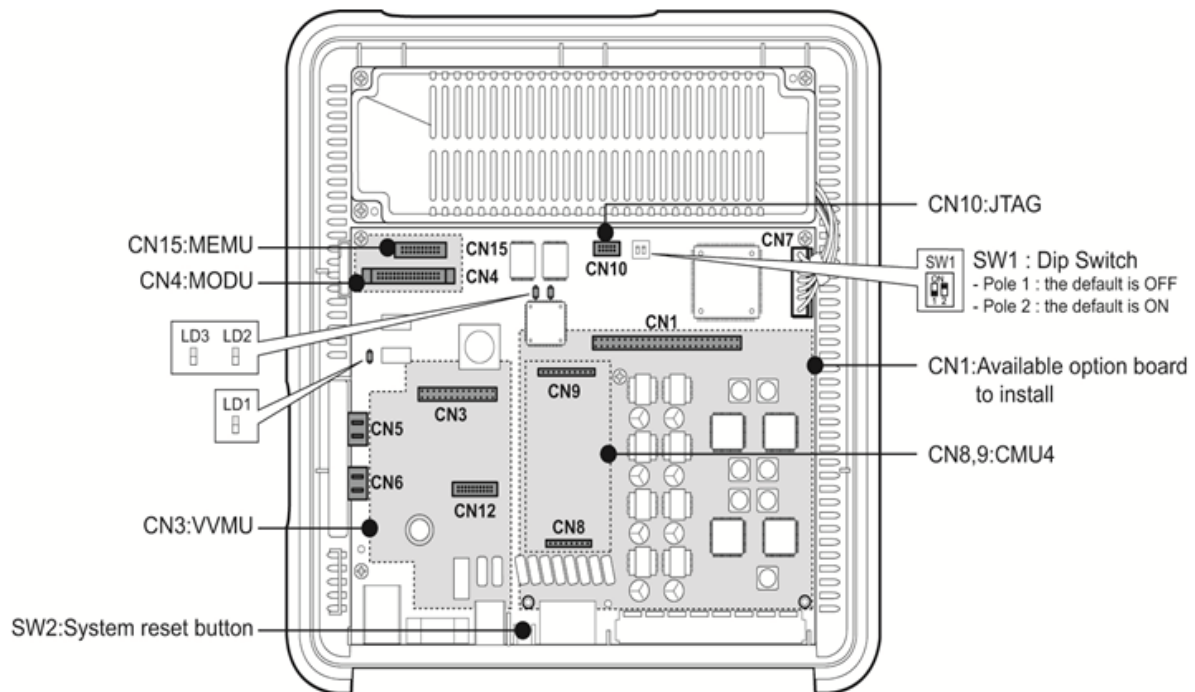
The SLT line interface of the Hybrid ports supports FSK (ITU-T V.23 or Bell 202) or DTMF (ITU-T Q.23) Caller ID and the Message Wait Indication (MWI), DTMF detection, sinusoidal ringing generator, -48V DC feeding voltage, current limiting and GR-909 Line Testing function.

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 eight (8) with an unlock code.

As shown in the figure, the MBU has connectors for the various option boards including connector CN1 which is used to connect optional Interface boards. A maximum of two (2) Interface boards can be installed; the first is mounted directly on the CN1 connector of the MUBA and the second is mounted on the pass-through connector of the first Interface board. Interface boards available for the MBUA include:

- CH204 - CO Line & Hybrid board, 2 CO & 4 Hybrid ports
- CH408 - CO Line & Hybrid board, 4 CO & 8 Hybrid ports
- HYB8 - Hybrid board, 8 Hybrid ports
- CS416 - CO Line & SLT Board, 4 CO & 16 SLT ports
- SLB16 - SLT board, 16 SLT ports
- BH104 - BRI & Hybrid board, 2 BRI (2B+D channels) & 4 Hybrid ports
- BH208 - BRI & Hybrid board, 2 BRI (2B+D channels) & 8 Hybrid ports
- WTIB4 - Wireless Terminal Interface board, 4 Base Station ports





**Figure 4.5.1-1 MBUA**

The following are included on the MBUA:

- 4 CO Line interface circuits
- 1 DKT (Digital Key Telephone) interface circuit for Attendant station 100
- 7 Hybrid (DKT or SLT) interface circuits
- 1 External Relay contact for LBC or general purpose
- 1 Alarm detection circuit, External Page port, and External MOH port
- Internal MOH (13 music resources)
- Built-in VoIP channels (default 2 channels, maximum 8 channels with license)
- Built-in VM channel (default 2 channels, maximum 4 channels with license)
- Master Clock Generation & PLL circuit
- 1 PFT circuit [CO1 connects to the last SLT port (STA8)]
- 1 RS-232C Interface circuit
- 1 LAN Interface
- 1 USB interface circuit
- 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**

Should AC Power fail, the last SLT port on MBU is connected, automatically to CO1.

### **Connectors, Jacks and Switches**

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

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

Connector	Function	Remark
CN1	CO and Station Interface board installation	70 pins
CN3	VVMU Installation	32 pins
CN4	MODU Installation	20 pins
CN5 & CN6	Connection KSU to EKSU with Expansion cable	19 pins x 2
CN7	PSU Connector	7 pins
CN8 & CN9	MG-CMU4 Installation	8 & 10 pins
CN10	FPGA JTAG for development	10 pins
CN11	RS-232C Port Connection	9 Pins
CN12	CPU JTAG for development	20 Pins
CN15	MEMU Installation	20 Pins
MJ1-1 & MJ1-2	CO lines 1 & 2	2 Ports each
	CO lines 3 & 4	
MJ2-1 to MJ2-8	1 DKT and 7 Hybrid DKT or SLT ports	8 ports
MJ3	LAN & USB Port	1 LAN/1 USB
MJ4	Relay/Alarm/Page/External MOH Connection	1 port
SW1	2 pole Database protect switch	
SW2	Push-button System reset switch	

### **Switch setting**

**Table 4.5.1-2 MBUA 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

### **LED Indications**

**Table 4.5.1-3 MUBA LED Indication**

LED	Color	Description
LD1	Blue	Flash 300ms ON and OFF, normal operation
LD2	Blue	Station port in use status ON - A station is in use OFF - All station are idle
LD3	Green	External Clock Synchronization ON: PLL circuit sync to ISDN interface clock OFF: PLL circuit sync to internal clock

## **4.5.2 MBUAD (Main Board Unit)**

### **Description**

The MBUAD, which is shown in Figure 4.5.2-1, controls communication between the peripheral interfaces, supervises all resources in the system, controls the gain adjustment of the PCM signal, generates the System tones, and manages System call processing. The MBUAD contains switches for database protection and initialization. A built-in LAN port provides access to the eMG80 Web Admin and basic VoIP channels. In addition, a USB port is provided to allow backup and restore of the system database.

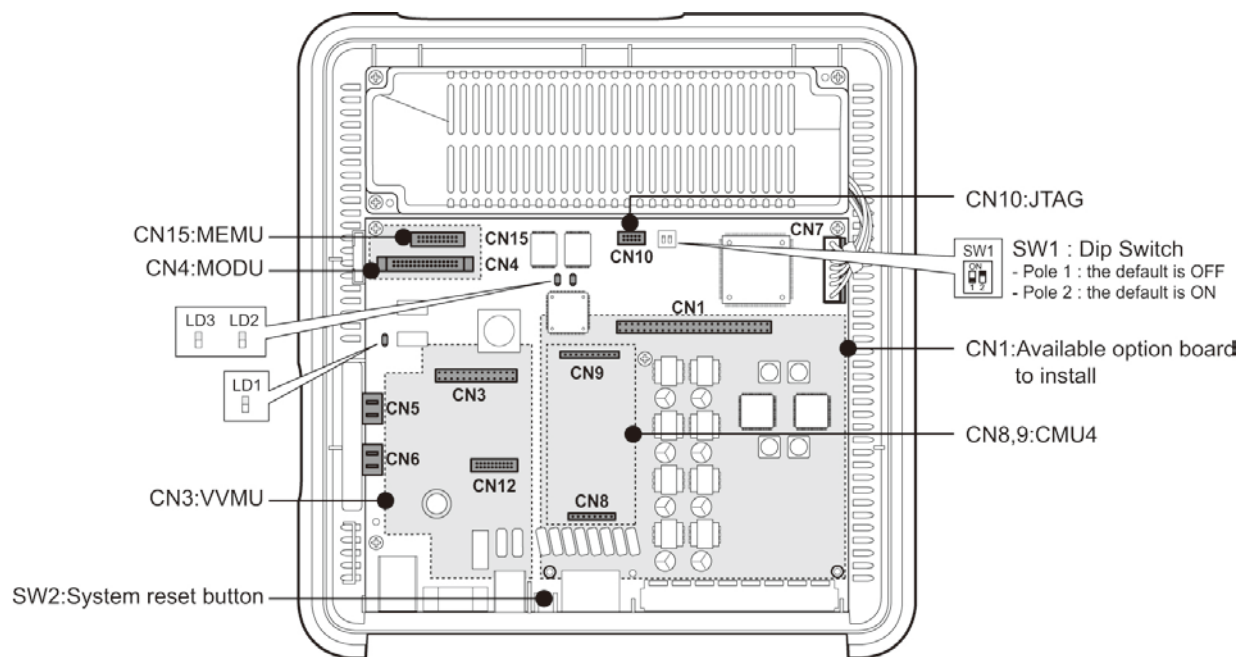
The MBUAD has 4 (four) CO lines, eight (8) DKT station and 4 SLT interfaces, and two (2) VoIP channels. The CO line ports support loop start CO lines with detection of supervisory signals including Caller Identification (CID), Polarity Reversal (PR) and Call Progress Tone (CPT) detection.

The SLT line interface of the Hybrid ports 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 eight (8) with an unlock code.

As shown in the figure, the MBU has connectors for the various option boards including connector CN1 which is used to connect optional Interface boards. A maximum of two (2) Interface boards can be installed with the first board mounted on the CN1 connector of the MBU and the second mounted on the pass-through connector on the first board. Interface boards available for the MBUAD include:

- CH204 - CO Line & Hybrid board, 2 CO & 4 Hybrid ports
- CH408 - CO Line & Hybrid board, 4 CO & 8 Hybrid ports
- HYB8 - Hybrid board, 8 Hybrid ports
- CS416 - CO Line & SLT Board, 4 CO & 16 SLT ports
- SLB16 - SLT board, 16 SLT ports
- BH104 - BRI & Hybrid board, 2 BRI (4 channel) & 4 Hybrid ports
- BH208 - BRI & Hybrid board, 2 BRI (4 channel) & 8 Hybrid ports
- WTIB4 - Wireless Terminal Interface board, 4 Base Station ports



**Figure 4.5.2-1 MBUAD**

The following are included on the MBUAD:

- 4 CO Line interface circuits
- 8 DKT interface circuits
- 4 SLT interface circuits
- 1 External Relay contact for LBC or general purpose
- 1 Alarm detection circuit, External Page port, and External MOH port
- Internal MOH (13 music resources)
- Built-in VoIP channels (default 2 channels, maximum 8 channels with license)
- Built-in VM channel (default 2 channels, maximum 4 channels with license)
- Master Clock Generation & PLL circuit
- 1 PFT circuit [CO1 connects to the last SLT port (STA12)]
- 1 RS-232C Interface circuit
- 1 LAN Interface & USB interface circuit
- 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**

Should AC Power fail, the last SLT port on MBU is connected, automatically to CO1.

**Connectors, Jacks and Switches**

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

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

Connector	Functions	Remark
CN1	CO and Extension board installation	70 pins
CN3	VVMU Installation	32 pins
CN4	MODU Installation	20 pins
CN5 & CN6	Connection KSU to EKSU with Expansion cable	19 pins x 2
CN7	PSU Connector	7 pins
CN8 & CN9	MG-CMU4 Installation	8 pins/10 Pins
CN10	FPGA JTAG for development	10 pins
CN11	RS-232C Port Connection	9 pins
CN12	CPU JTAG for development	20 pins
CN15	MEMU Installation	20 pins
MJ1	CO lines 1 & 2	2 ports each
	CO lines 3 & 4	
MJ2	8 DKT and 4 SLT ports	12 ports
MJ3	LAN & USB Port	1 LAN/1 USB
MJ4	Relay/Alarm/Page/External MOH Connection	1 Port
SW1	2 pole Database protect switch	
SW2	Push-button System reset switch	

**Switch setting****Table 4.5.2-2 MBUAD 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

**LED Indications****Table 4.5.2-3 MBUAD LED Indication**

LED	Color	Description
LD1	Blue	Flash 300ms ON and OFF, normal operation
LD2	Blue	Station port in use status ON - A station is in use OFF - All station are idle
LD3	Green	External Clock Synchronization ON: PLL circuit sync to ISDN interface clock OFF: PLL circuit sync to internal clock

### **4.5.3 MBUI (Main Board Unit)**

#### **Description**

The MBUI, which is shown in Figure 4.5.3-1, controls communication between the peripheral interfaces, supervises all resources in the system, controls the gain adjustment of the PCM signal, generates the System tones, and manages System call processing. The MBUI contains switches for database protection and initialization. A built-in LAN port provides access to the eMG80 Web Admin. In addition, a USB port is provided to allow backup and restore of the system database.

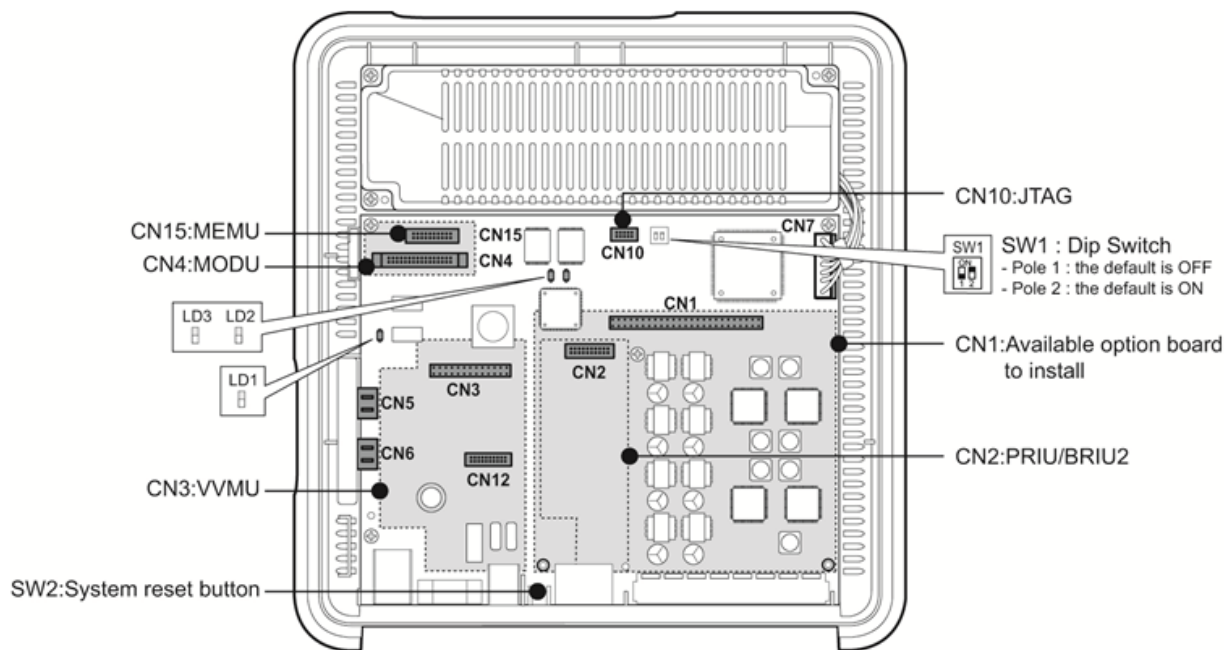
The MBUI has one (1) DKT and seven (7) Hybrid station interfaces port and two (2) VoIP channels. The SLT line interface of the Hybrid ports supports FSK (ITU-T V.23 or Bell 202) or DTMF (ITU-T Q.23) Caller ID and the Message Wait Indication (MWI), DTMF detection, sinusoidal ringing generator, -48V DC 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 eight (8) with an unlock code.

As shown in the figure, the MBU has connectors for the various option boards including connector CN1 which is used to connect optional Interface boards. A maximum of two (2) Interface boards can be installed with the first board mounted on the CN1 connector of the MBU and the second mounted on the pass-through connector on the first board. Interface boards available for the MBUI include:

- CH204 - CO Line & Hybrid board, 2 CO & 4 Hybrid ports
- CH408 - CO Line & Hybrid board, 4 CO & 8 Hybrid ports
- HYB8 - Hybrid board, 8 Hybrid ports
- CS416 - CO Line & SLT Board, 4 CO & 16 SLT ports
- SLB16 - SLT board, 16 SLT ports
- BH104 - BRI & Hybrid board, 2 BRI (4 channel) & 4 Hybrid ports
- BH208 - BRI & Hybrid board, 2 BRI (4 channel) & 8 Hybrid ports
- WTIB4 - Wireless Terminal Interface board, 4 Base Station ports

In addition to the CN1 connector, a PRIU or BRIU2 may be installed on the CN2 connector.



**Figure 4.5.3-1 MBUI**

The following are included on the MBUI:

- 1 DKT interface circuit
- 7 Hybrid (DKT or SLT) interface circuits
- PRIU or BRIU2 interface connector
- 1 External Relay contact for LBC or general purpose
- 1 Alarm detection circuit, External Page port, and External MOH port
- Internal MOH (13 music resources)
- Built-in VoIP channels (default 2 channels, maximum 8 channels with license)
- Built-in VM channel (default 2 channels, maximum 4 channels with license)
- Master Clock Generation & PLL circuit
- 1 RS-232C Interface circuit
- 1 LAN Interface & USB interface circuit
- 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**

Should AC Power fail, the last SLT port on MBU is connected, automatically to CO1.

**Connectors, Jacks and Switches**

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

**Table 4.5.3-1 KSU with MBUI Connector, Modular Jack and Switch Function**

Connector	Functions	Remark
CN1	CO and Extension board installation	70 pins
CN2	PRIU or BRIU2 Installation	40 pins
CN4	MODU Installation	20 pins
CN5 & CN6	Connection KSU to EKSU with Expansion cable	19 pins x 2
CN7	PSU Connector	7 pins
CN10	FPGA JTAG for development	10 pins
CN11	RS-232C Port Connection	9 pins
CN12	CPU JTAG for development	20 pins
CN15	MEMU Installation	20 pins
MJ2	1 DKT and 7 Hybrid DKT or SLT ports	8 ports
MJ3	LAN & USB Port	1 LAN/1 USB
MJ4	Relay/Alarm/Page/External MOH Connection	1 Port
SW1	2 pole Database protect switch	
SW2	Push-button System reset switch	

**Switch setting****Table 4.5.3-2 MBUI 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

**LED Indications****Table 4.5.3-3 MBUI LED Indication**

LED	Color	Description
LD1	Blue	Flash 300ms ON and OFF, normal operation
LD2	Blue	Station port in use status ON - A station is in use OFF - All station are idle
LD3	Green	External Clock Synchronization ON: PLL circuit sync to ISDN interface clock OFF: PLL circuit sync to internal clock



## **4.5.4 MBUID (Main Board Unit)**

### **Description**

The MBUID, which is shown in Figure 4.5.4-1, controls communication between the peripheral interfaces, supervises all resources in the system, controls the gain adjustment of the PCM signal, generates the System tones, and manages System call processing. The MBUID contains switches for database protection and initialization. A built-in LAN port provides access to the eMG80 Web Admin and basic VoIP channels. In addition, a USB port is provided to allow backup and restore of the system database.

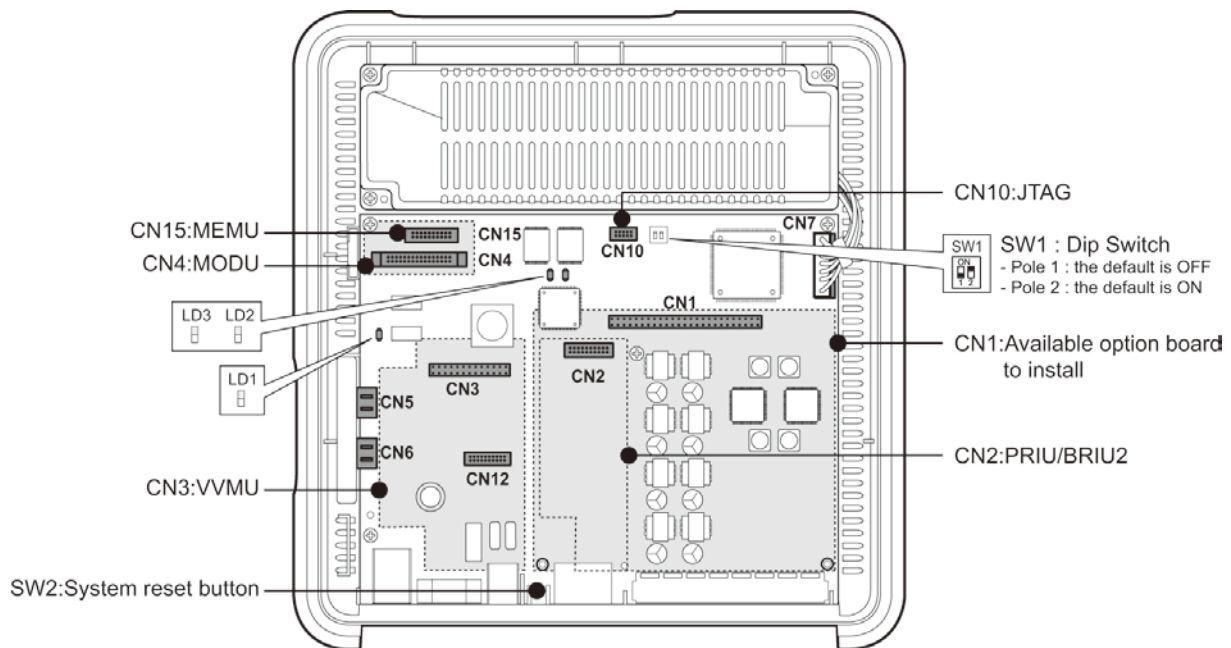
The MBUID has eight (8) DKT and four (4) SLT station interface ports and two (2) VoIP channels. The SLT interfaces support FSK (ITU-T V.23 or Bell 202) or DTMF (ITU-T Q.23) Caller ID and the Message Wait Indication (MWI), DTMF detection, sinusoidal ringing generator, -48V DC feeding voltage, current 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 eight (8) with an unlock code.

As shown in the figure, the MBU has connectors for the various option boards including connector CN1 which is used to connect optional Interface boards. A maximum of two (2) Interface boards can be installed with the first board mounted on the CN1 connector of the MBU and the second mounted on the pass-through connector on the first board. Interface boards available for the MBUID include:

- CH204 - CO Line & Hybrid board, 2 CO & 4 Hybrid ports
- CH408 - CO Line & Hybrid board, 4 CO & 8 Hybrid ports
- HYB8 - Hybrid board, 8 Hybrid ports
- CS416 - CO Line & SLT Board, 4 CO & 16 SLT ports
- SLB16 - SLT board, 16 SLT ports
- BH104 - BRI & Hybrid board, 2 BRI (4 channel) & 4 Hybrid ports
- BH208 - BRI & Hybrid board, 2 BRI (4 channel) & 8 Hybrid ports
- WTIB4 - Wireless Terminal Interface board, 4 Base Station ports

In addition to the CN1 connector, a PRIU or BRIU2 may be installed on the CN2 connector.



**Figure 4.5.4-1 MBUID**

The following are included on the MBUID:

- 8 DKT interface circuits
- 4 SLT interface circuits
- PRIU or BRIU2 interface connector
- 1 External Relay contact for LBC or general purpose
- 1 Alarm detection circuit, External Page port, and External MOH port
- Internal MOH (13 music resources)
- Built-in VoIP channels (default 2 channels, maximum 8 channels with license)
- Built-in VM channel (default 2 channels, maximum 4 channels with license)
- Master Clock Generation & PLL circuit
- 1 RS-232C Interface circuit
- 1 LAN Interface & USB interface circuit
- 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**

Should AC Power fail, the last SLT port on MBU is connected, automatically to CO1.

**Connectors, Jacks and Switches**

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

**Table 4.5.4-1 KSU with MBUID Connector, Modular Jack and Switch Function**

Connector	Functions	Remark
CN1	CO and Extension board installation	70 pins
CN2	PRIU or BRIU2 Installation	40 pins
CN4	MODU Installation	20 pins
CN5 & CN6	Connection KSU to EKSU with Expansion cable	19 pins x 2
CN7	PSU Connector	7 pins
CN10	FPGA JTAG for development	10 pins
CN11	RS-232C Port Connection	9 pins
CN12	CPU JTAG for development	20 pins
CN15	MEMU Installation	20 pins
MJ2	8 DKT and 4 SLT ports	12 ports
MJ3	LAN & USB Port	1 LAN/1 USB
MJ4	Relay/Alarm/Page/External MOH Connection	1 Port
SW1	2 pole Database protect switch	
SW2	Push-button System reset switch	

**Switch setting****Table 4.5.4-2 MBUID 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

**LED Indications****Table 4.5.4-3 MBUID LED Indication**

LED	Color	Description
LD1	Blue	Flash 300ms ON and OFF, normal operation
LD2	Blue	Station port in use status ON - A station is in use OFF - All station are idle
LD3	Green	External Clock Synchronization ON: PLL circuit sync to ISDN interface clock OFF: PLL circuit sync to internal clock

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## **4.6 EKSU Expansion Main Board Unit (EMBU)**

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### **Description**

The EKSU houses the EMBU, which is shown in Figure 4.6-1 and controls communication between the EKSU and the installed optional Interface boards and the KSU that controls the interfaces.

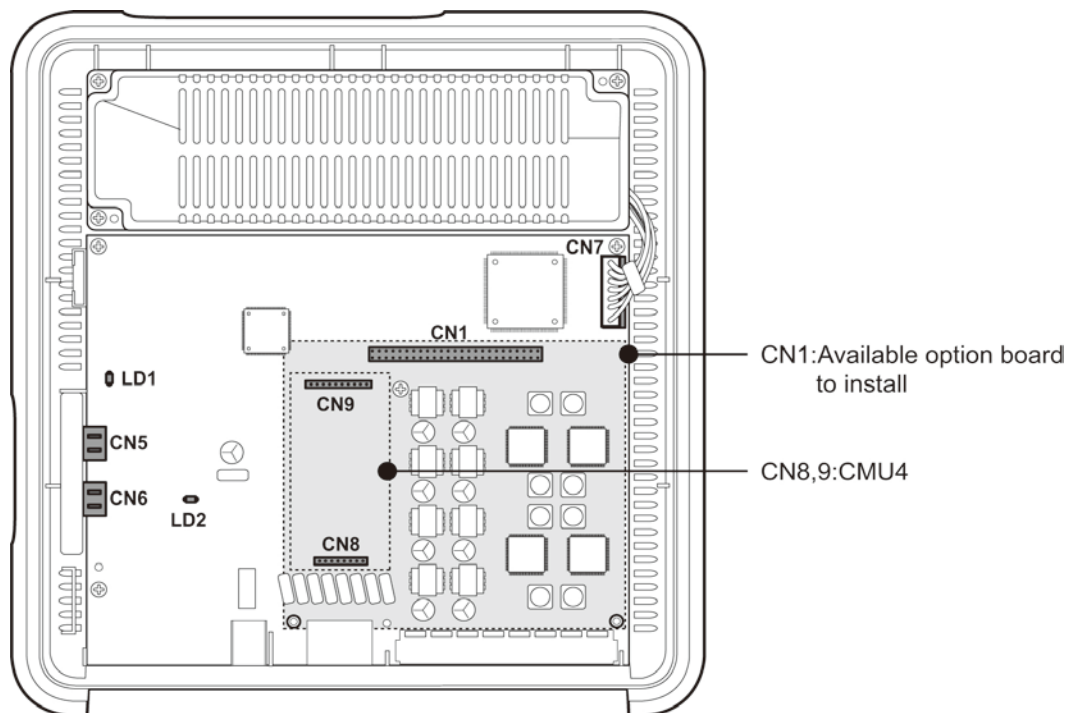
The EKSU has four (4) CO line and eight (8) Hybrid interface ports. The CO line ports support loop start CO lines with detection of supervisory signals including Caller Identification (CID), Polarity Reversal (PR), and Call Progress Tone (CPT).

The SLT interface of the Hybrid ports support 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. The two (2) basic VoIP channels can be increased to eight (8) with an unlock code.

As shown in the figure, the EMBU has connector CN1 for the various Interface boards and connectors, and CN8 and CN9 for installation of the Call metering CO Line daughter board for the built-in CO lines. A maximum of two (2) Interface boards can be installed with the first board mounted on the CN1 connector of the EMBU and the second mounted on the pass-through connector on the first board. Interface boards available for the EMBU include:

- CH204 - CO Line & Hybrid board, 2 CO & 4 Hybrid ports
- CH408 - CO Line & Hybrid board, 4 CO & 8 Hybrid ports
- HYB8 - Hybrid board, 8 Hybrid ports
- CS416 - CO Line & SLT Board, 4 CO & 16 SLT ports
- SLB16 - SLT board, 16 SLT ports



**Figure 4.6-1 EMBU**

The following are included on the EMBU:

- 4 CO Line interface circuits
- 8 Hybrid interface circuits
- 1 External Relay contact for LBC or general purpose
- 1 Alarm Detection circuit
- 1 PFT circuit [CO1 connects to the last SLT port(STA8)]
- 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**

Should AC Power fail, the last SLT port on MBU is connected, automatically to CO1.

**Connectors, Jacks and Switches**

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

**Table 4.6-1 EKSU with EMBU Connector, Modular Jack and Switch Function**

Connector	Functions	Remark
CN1	CO and Extension board installation	70 pins
CN5 & CN6	Connection KSU to EKSU with Expansion cable	19 pins x 2
CN7	PSU Connector	7 pins
CN8 & CN9	MG-CMU4 Installation	8/10 pins
MJ1	1/2 CO line	2 ports each
	3/4 CO line	
MJ2	8 Hybrid DKT or SLT ports	8 ports
MJ4	Relay/Alarm	1 port

**LED Indications**

**Table 4.6-2 EMBU LED Indication**

LED	Color	Description
LD1	Blue	Flash 300ms ON and OFF, normal operation toggle
LD2	Blue	Station port in use status ON - A station is in use OFF - All station are idle

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## **4.7 Optional Interface Boards**

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Optional Interface Boards permit the expansion of the external network and terminal interface ports available in the eMG80 system are mounted on the Main board in the KSU or EKSU. Interface boards available are shown in the chart below. Note that the boards that can be installed in a KSU are dependent on the type of Main Board as discussed in section 4.5.

**Table 4.7-1 Optional Interface Boards**

<b>Board</b>	<b>Description</b>	<b>Connectors</b>	<b>Cable</b>
CH204	2 CO Line & 4 Hybrid ports	RJ45 & RJ11	2-wire
CH408	4 CO Line and 8 Hybrid ports	RJ45 & RJ11	2-wire
CS416	4 CO Line & 16 SLT ports	RJ45 & RJ11	2-wire
BH104	1 BRI & 4 Hybrid ports	RJ45 & RJ11	4-wire & 2-wire
BH208	2 BRI & 8 Hybrid ports	RJ45 & RJ11	4-wire & 2-wire
PRIU	1 PRI (30 channels)	RJ45	4-wire
BRIU2	2 BRI (4 channels)	RJ45	4-wire
HYB8	8 Hybrid ports	RJ11	2-wire
SLB16	16 SLT ports	RJ11	2-wire
WTIB4	4 Base Station ports	RJ11	4-wire

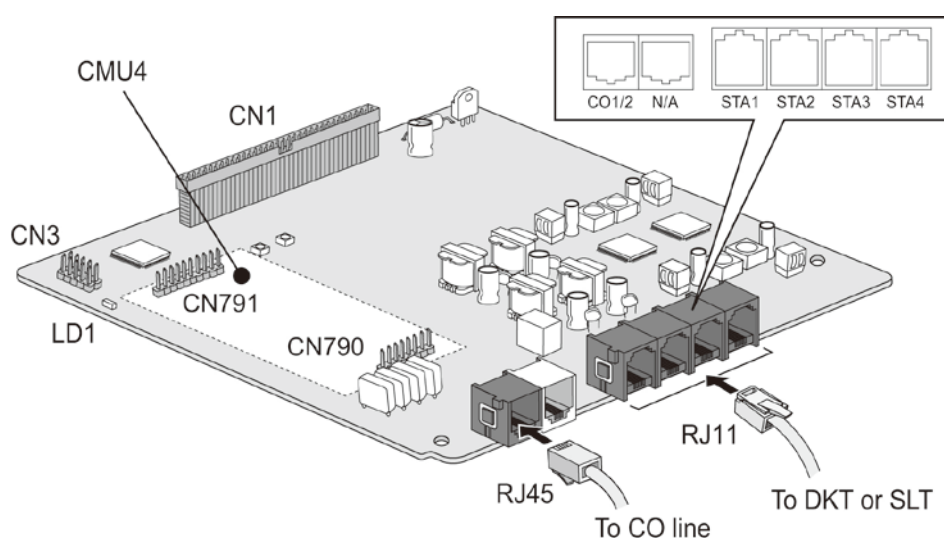
The CO line ports of the Interface boards support loop start CO lines with detection of supervisory signals including Caller Identification (CID), Polarity Reversal (PR), and Call Progress Tone (CPT). The SLT interface of the Hybrid ports support FSK (ITU-T V.23 or Bell 202) or DTMF (ITU-T Q.23) Caller ID and the Message Wait Indication (MWI), DTMF detection, sinusoidal ringing generator, -48V DC feeding voltage, current limiting and GR-909 Line Testing function.

## 4.7.1 CH204 (2 CO Line and 4 Hybrid Interface Board)

### Description

The CH204 board has two (2) CO line and four (4) Hybrid (DKT & SLT) interface ports. The board may be installed on the CN1 connector of the KSU or EKSU. The MG-CMU4 daughter board may be mounted on the CH204 to provide Call Metering. The CMU4 is mounted on connectors CN790 and CN791 as shown in Figure 4.7.1-1 below.

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 4.7.1-1 CH204**

### Connector and Modular jack

The following chart indicates the connectors and modular jacks equipped on the CH204.

**Table 4.7.1-1 Connector and Modular Jack Function**

Connector	Functions	Remark
CN1	Pass through to second Interface board	70 pins
CN2	Connection to CN1 connector of MBU	70 pins
CN3	CPLD JTAG for development	10 pins
CN790 & CN791	MG-CMU4 Installation	8 pins/10 pins
MJ1	1 & 2 CO line	RJ45
MJ2	4 Hybrid DKT or SLT ports	RJ11

### LED Indications

**Table 4.7.1-2 CH204 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



## 4.7.2 CH408 (4 CO Line and 8 Hybrid Interface Board)

### Description

The CH408 board has four (4) CO line and eight (8) Hybrid (DKT & SLT) interface ports. The board can be installed on the CN1 connector of the KSU or EKSU. Also, the MG-CMU4 daughter board for call metering can be installed on connectors CN790 and CN791 as shown in Figure 4.7.2-1 below.

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.

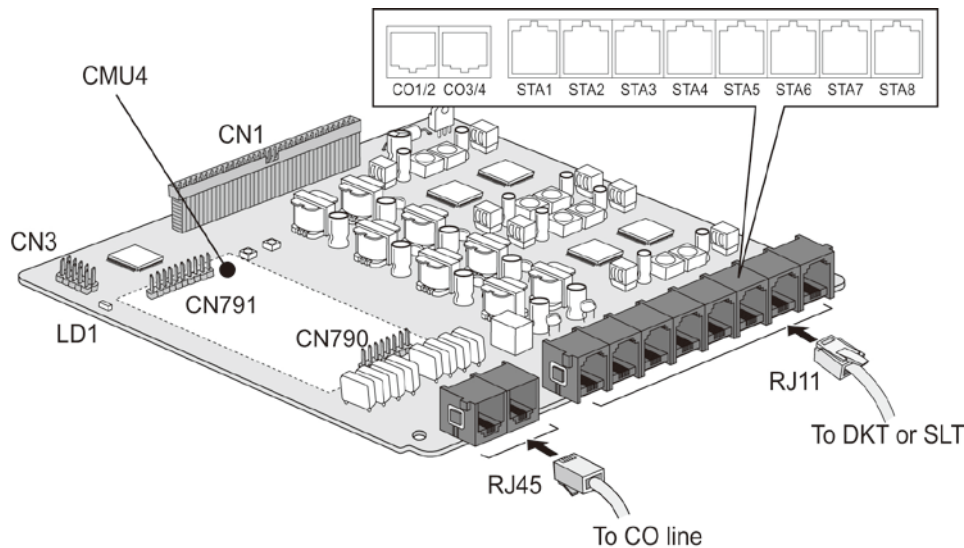


Figure 4.7.2-1 CH408

### Connector and Modular jack

The following chart indicates the connectors and modular jacks equipped on the CH408.

Table 4.7.2-1 Connector and Modular Jack Function

Connector	Functions	Remark
CN1	Pass-through to second Interface board	70 pins
CN2	Connection to CN1 connector of MBU	70 pins
CN3	CPLD JTAG for development	10 pins
CN790 & CN791	MG-CMU4 Installation	8 pins/10 pins
MJ1	1 & 2 CO line	RJ45
	3 & 4 CO line	
MJ2	8 Hybrid DKT or SLT ports	RJ11

### LED Indications

Table 4.7.2-2 CH408 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



## LED Indications

Table 4.7.3-2 CS416 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

## 4.7.4 BH104 (1BRI and 4 Hybrid Interface Board)

### Description

The BH104 board has one (1) BRI (2B+D) and 4 Hybrid (DKT & SLT) interface ports. The board, shown in Figure 4.7.4-1, can be installed on the CN1 connector of only the KSU. There are no option boards for the BH104.

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.

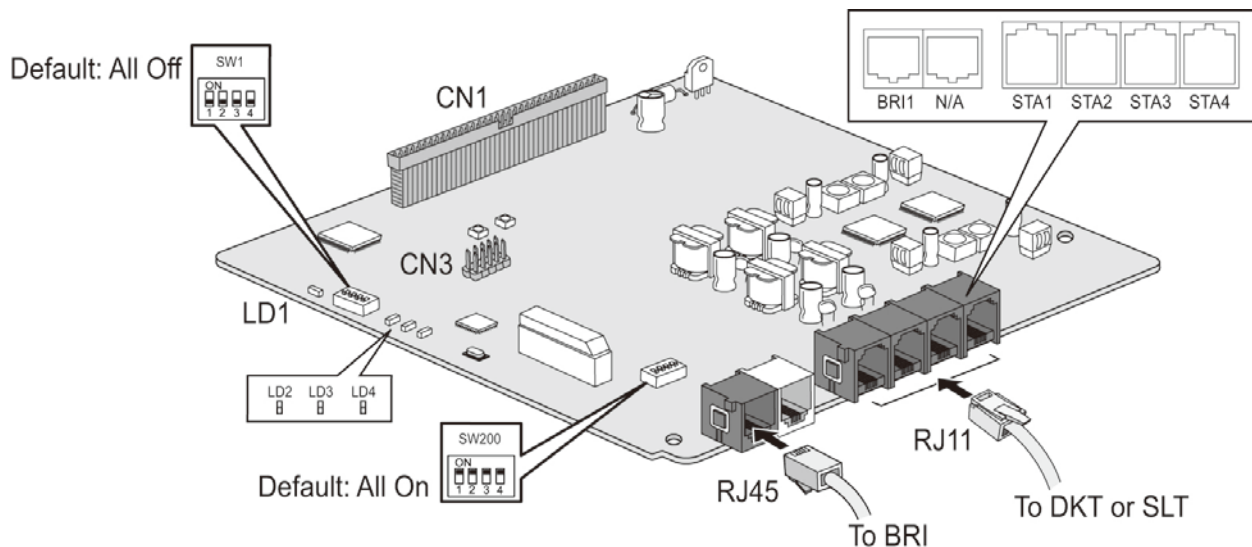


Figure 4.7.4-1 BH104

## Connector and Modular jack

Table 4.7.4-1 Connector and Modular Jack Function

Connector	Functions	Remark
CN1	Connection to second Interface board	70 pins
CN2	Connection to CN1 connector of MBU	70 pins
CN3	CPLD JTAG for development	10 pins
MJ1	1 BRI (2 B+D)	RJ45
MJ4	4 DKT or SLT line	RJ11

### **Switch setting**

**Table 4.7.4-2 BH104 BRI Mode SW1**

Pole	Function	Mode		Remarks
		ON	OFF	
1	S or T mode	S mode	T mode	Default=OFF
2 & 3	Reserved	-	-	
4	BRI line loopback	Test		

**Table 4.7.4-3 BH104 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	

### **LED Indications**

**Table 4.7.4-4 BH104 LED Indication**

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

4.7.5 BH208 (2BRI and 8 Hybrid Interface Board)

Description

The BH208 board has two (2) BRI (2B+D) and 8 Hybrid (DKT & SLT) interface ports. The board, as shown in Figure 4.7.5-1, can be installed on the CN1 connector of only the KSU. There are no option boards for the BH208.

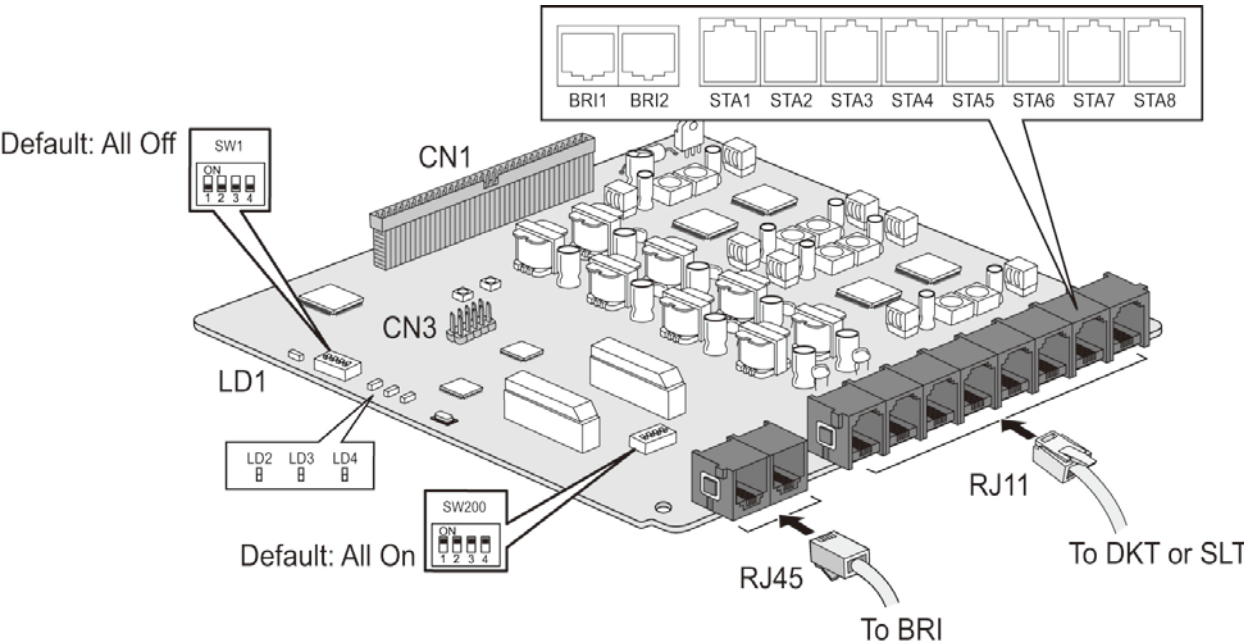


Figure 4.7.5-1 BH208

Connector and Modular jack

Table 4.7.5-1 Connector and Modular Jack Function

Connector	Functions	Remark
CN1	Connection to second Interface board	70 pins
CN2	Connection to CN1 connector of MBU	70 pins
CN3	CPLD JTAG for development	10 pins
MJ1	2 BRI (2 B+D) lines	RJ45
MJ4	8 DKT or SLT line	RJ11

Switch setting

Table 4.7.5-2 BH208 BRI Mode SW1

Pole	Function	Mode		Remarks
		ON	OFF	
1	S or T mode	S mode	T mode	Default=OFF
2 & 3	Reserved	-	-	
4	BRI line loopback	Test		

**Table 4.7.5-3 BH208 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	

### **LED Indications**

**Table 4.7.5-4 BH208 LED Indication**

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

## **4.7.6 PRIU (1 PRI -30 Channels- Interface Board)**

### **Description**

The PRIU board provides a standard PRI or E1 interface circuit. The PRIU, as shown in Figure 4.7.6-1, can be installed only on the CN2 connector of either an MBUI or MBUID. 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 E1. The TE and NT operating mode is determined through database configuration.

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

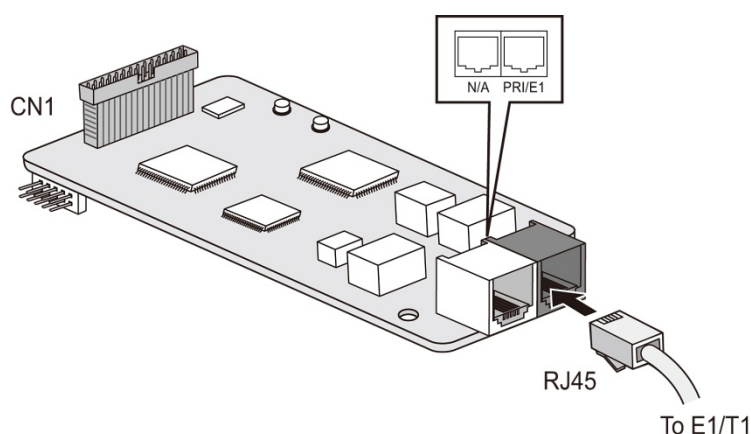


Figure 4.7.6-1 PRIU

### Connector and Modular jack

Table 4.7.6-1 Connector and Modular Jack Function

Connector	Functions	Remark
CN1	Connection for CN2 MBUI or MBUID	40 Pins
MJ1	PRI, E1R2 line	RJ45

### Switch setting

Table 4.7.6-2 PRIU PRI/E1 Function SW1

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

### LED Indications

Table 4.7.6-3 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

4.7.7 BRIU2 (2 BRI -4 Channels- Interface Board)

Description

The BRIU2 board has two (2) BRI (2B+D) interface ports. The board, as shown in Figure 4.7.7-1, can be installed only on the CN2 connector of either an MBUI or MBUID.

Multiple pole Dip-switches determine the operating mode ‘S’ or ‘T’ and termination.

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

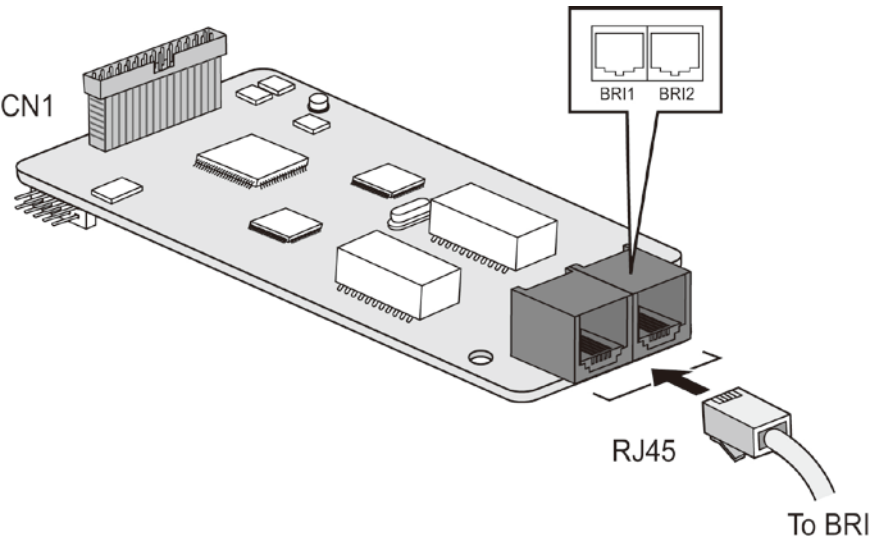


Figure 4.7.7-1 BRIU2

Connector and Modular jack

Table 4.7.7-1 Connector and Modular Jack Function

Connector	Functions	Remark
CN1	Connection for CN2 of MBUI or MBUID	40 pins
MJ1	BRI line	RJ45

Switch setting

Table 4.7.7-2 BRIU2 BRI Mode SW1

Pole	Function	Mode		Remarks
		ON	OFF	
1	S or T mode	S mode	T mode	Default=OFF
2 & 3	Reserved	-	-	
4	BRI line loopback	Test		



**Table 4.7.7-3 BRIU2 BRI Termination SW2**

Pole	Function	Termination	Remarks
1 & 2	Termination Resistor	BRI 1 Termination Resistor ON = Terminate OFF = Open	Default = ON
3 & 4	Termination Resistor	BRI 2 Termination Resistor ON = Terminate OFF = Open	

**LED Indications**

**Table 4.7.7-4 BRIU2 LED Indication**

LED	Color	Description
LD1	Blue	ON: Programming CPLD OFF: No programming CPLD
LD2	Blue	ON: a BRI channel is in use OFF: all BRI lines idle
LD3	Red	ON: BRI line Error OFF: both BRI Lines normal
LD4	Blue	ON: BRI reference clock external OFF: BRI reference clock internal

4.7.8 HYB8 (Hybrid 8 Interface Board)

Description

The HYB8 board is shown in Figure 4.7.8-1 and has 8 Hybrid (DKT & SLT) interface circuits. The board can be installed on the CN1 connector of a KSU or EKSU for expansion. There are no optional daughter boards for the HYB8.

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.

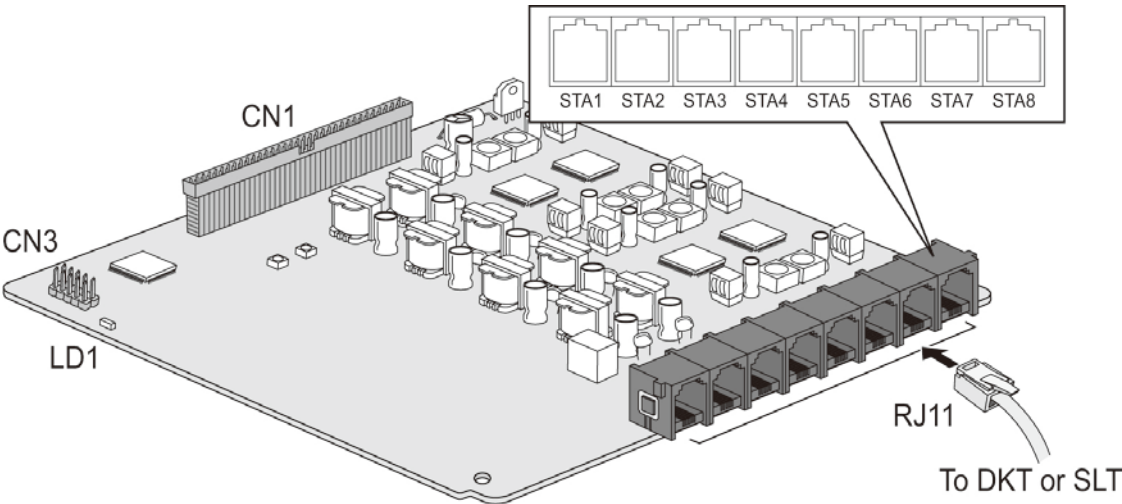


Figure 4.7.8-1 HYB8

Connector and Modular jack

Table 4.7.8-1 Connector and Modular Jack Function

Connector	Functions	Remark
CN1	Connection to second option board	70 pins
CN2	Connection to MBU CN1 connector	70 pins
CN3	CPLD JTAG for development	10 pins
MJ2	8 DKT or SLT line	RJ11

LED Indications

Table 4.7.8-2 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

4.7.9 SLB16 (SLT 16 Interface Board)

Description

The SLB16 board is shown in Figure 4.7.9-1 and has 16 SLT interface circuits. Note that eight of the 16 SLT interface ports are provided from the SLU8 daughter that is factory installed. The board can be installed on CN1 connector of the KSU or EKSU for expansion. 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. Note the SLB16 does not include a pass-through connector and thus should be installed as the top Interface board.

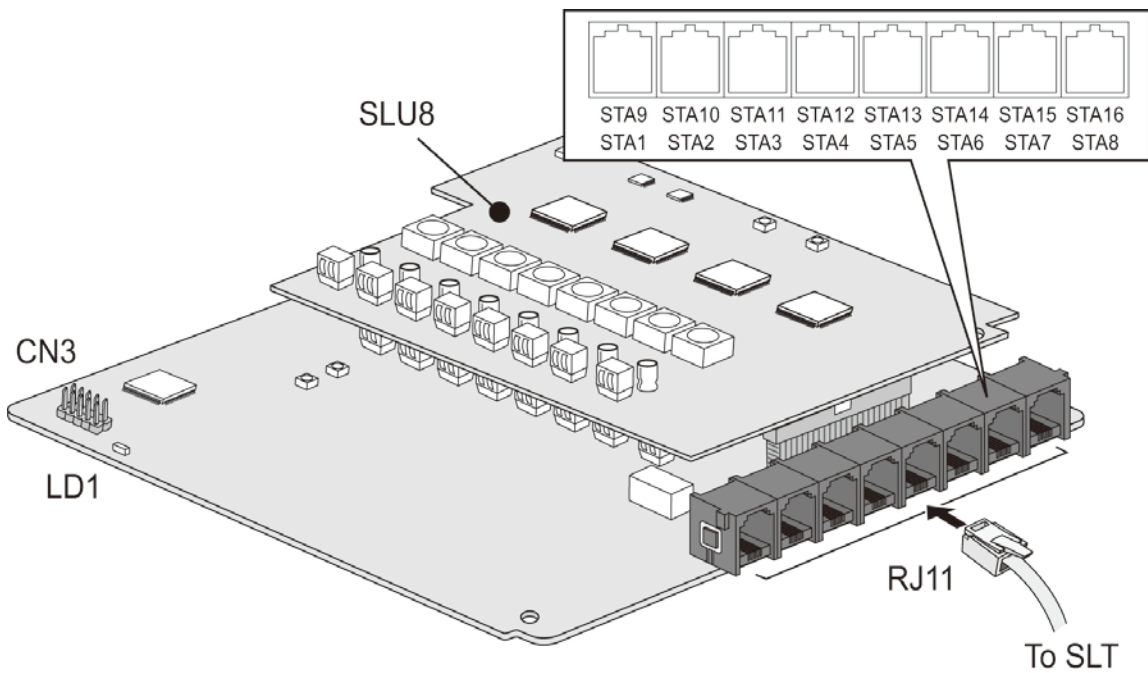


Figure 4.7.9-1 SLB16

Connector and Modular jack

Table 4.7.9-1 Connector and Modular Jack Function

Connector	Functions	Remark
CN2	Connection to CN1 of Interface board	70 pins
CN3	CPLD JTAG for development	10 pins
MJ2	16 SLT line	RJ11

LED Indications

Table 4.7.9-2 SLB16 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

### 4.7.10 WTIB4 Wireless DECT Interface Board

#### Description

The WTIB4, shown in Figure 4.7.10-1, has four (4) interfaces to GDC 600BE multi-channel DECT Base Stations. Only one WTIB4 may be installed in the KSU of an eMG80 system. As access to the WTIB4 board may be required during installation of the Base Stations, we recommend installing the WTIB4 as the second Interface board on the KSU CN1 connector. 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.

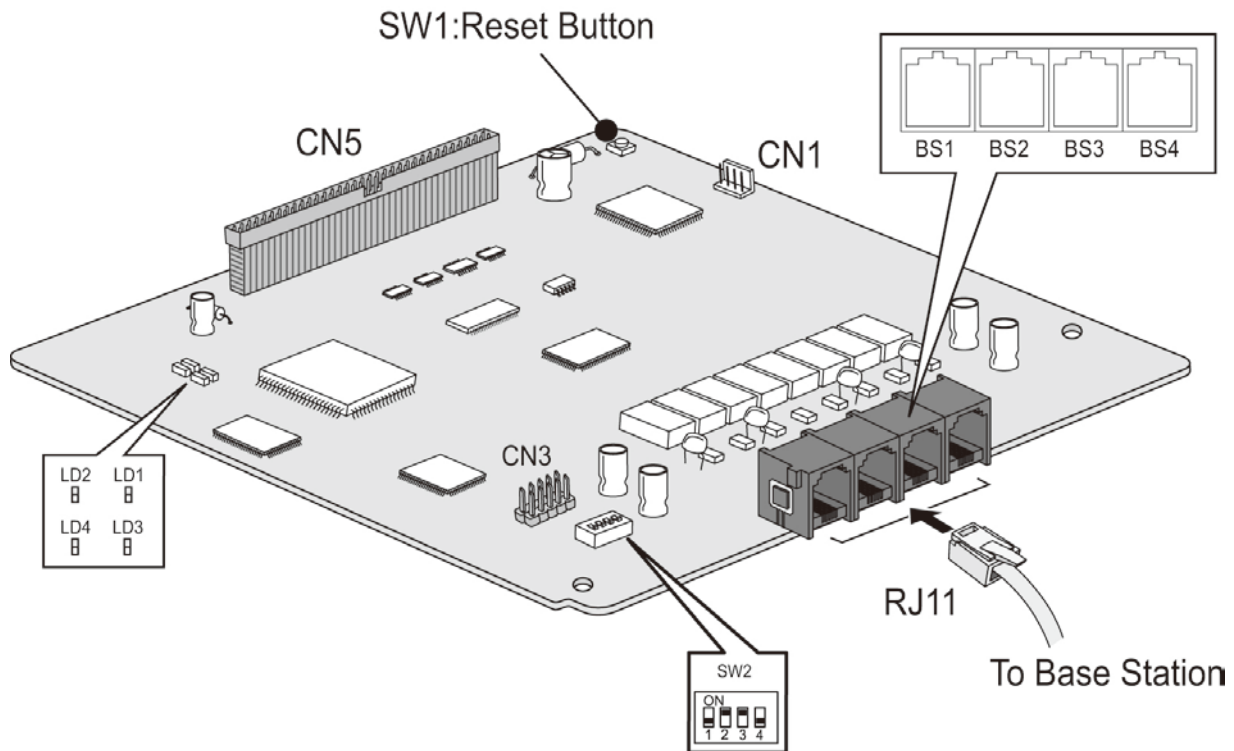


Figure 4.7.10-1 WTIB4

With the WTIB4, a DECT network of four (4) cells (Base Stations) each handling 6 simultaneous calls from up to 48 subscribed stations can be configured. These capacities are depicted in the chart below.

Table 4.7.10-1 WTIB4 Capacity

Item	Capacity
Cells (Base Stations)	4
Voice channels/Cell	6
Registered terminals	48
Simultaneous Wireless calls	24

**Switch setting**

**Table 4.7.10-2 WTIB4 SW1**

Switch	Function	Remark
SW1	Reset Button	Push button

**Table 4.7.10-3 SW2 - DIP Switch**

Pole	Functions	ON	OFF	Default
1	Operation	TBR6 mode	Normal service mode	OFF
2	Echo canceller Control	Echo canceller on	Echo canceller off	ON
3	Reserved	Reserved	Reserved	ON
4	Base reset mode	All base reset	One base reset	OFF

**LED Indications**

**Table 4.7.10-4 LED Indications**

LED	Description
LD1	HDLC Interrupt
LD2	400ms flash
LD3	Reserved
LD4	ON: Echo canceller enable OFF: Echo canceller disable

## 4.8 Optional Function Boards

The eMG80 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:

- VVMU, VoIP and Voice Mail expansion Unit
- MEMU, Memory expansion Unit
- MODU, Modem function Unit
- MG-CMU4, Call Metering Unit with 4 channels

### 4.8.1 VVMU (VoIP & Voice Mail Unit)

#### Description

The VVMU, refer to Figure 4.8.1-1 below, expands the number of VoIP channels available in the system, expands the number of Voice Mail channels and expands the memory for Voice Mail storage. In addition, the LAN port equipped on the VVMU provides the interface to the VVMU VoIP channels and for software applications that can be installed in the eMG80. The VVMU is installed on the KSU MBU connectors CN3 as described in section 4.5.

As shown in the VVMU capacity chart below, the basic eMG80 is equipped with two (2) VoIP channels, which are required for SIP Trunks, IP Phones (LIP or SIP) and IP Networking. The basic system hardware can support an additional six VoIP channels by entry of an unlock code. Unlock codes are available in 1-channel increments. Installation of the VVMU and licenses expands the number of VoIP channels by eight (8) for a maximum total of 16 VoIP channels.

For Voice Mail, the basic eMG80 is equipped with two (2) channels and 1 hour of storage. The eMG80 can support an additional two (2) Voice Mail channels with an unlock code. The VVMU can be added for additional channels and storage. The basic VVMU provides 2 channels and 1 hour of storage, and licenses expand the VVMU capacity adding 2 channels and 15 hours of storage.

**Table 4.8.1-1 VVMU VoIP and Voice Mail Capacity Chart**

Function	Basic	Unlock code	MBU	VVMU	eMG80
VoIP Channels	2	6 (1-channel increment)	8	8	16
Voice Mail					
Channels	2	2	4	4	8
Storage	1 hour		1 hour	1+ 15 hours	17 hours *

#### VoIP

	KSU			VVMU			Total
	Basic	Option	Sub Total	Basic	Option	Sub Total	(KSU + VVMU)
VoIP Channel	2ch	IPCL(1ch) License * 6ea=6ch	8ch	0ch	IPCLV(1ch) license * 8ea=8ch	8ch	16ch

#### Voice Mail

	KSU			VVMU			Total
	Basic	Option	Sub Total	Basic	Option	Sub Total	(KSU + VVMU)
VM Channel	2ch	VMCL(1ch) License * 2ea=2ch	4ch	0ch	VMCLV(1ch) license * 4ea=4ch	4ch	8ch
VM Storage	1hour	15hours (MEMU)	16hours	1hour	15hours (1ea VMMVLV license)	16hours	32 hours

\*VVMU: Common Resource Unit for expanding VoIP Channel, Voice Mail Memory and VM Channel.

- Need License for each required function (IPCLV, VMCLV, VMMLV).
- All functions can be used at the same time with appropriate license.

#### NOTE

The MEMU, refer to section 4.8.2, can be added to the system to expand the Voice Mail storage capacity by 15 hours. With the VVMU and the MEMU installed the Voice Mail storage capacity is 32 hours (basic 1 hour plus VVMU 16 hours, plus MEMU 15 hours). Licenses are required for VoIP, VM channel and VM storage expansion.

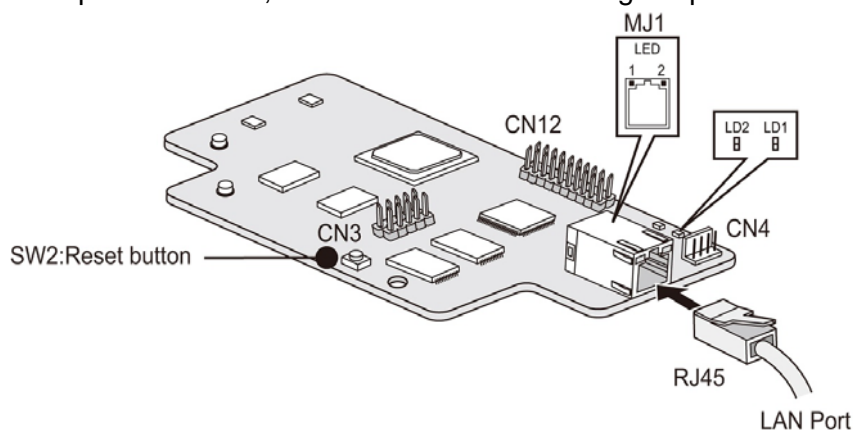


Figure 4.8.1-1 VVMU

### Connector and Modular jack

Table 4.8.1-2 Connector and Modular Jack Function

Connector	Functions	Remark
CN1	Connection to CN3 of the MBU	32 Pins
CN3	CPLD JTAG for development	10 Pins
CN12	CPU JTAG for development	20 Pins
CN4	Maintenance Serial port	4 Pins
MJ1	LAN Port	RJ45

### Switch setting

Table 4.8.1-3 VVMU Push Button Reset SW2

Switch	Functions
SW2	Reset push button

### LED Indications

Table 4.8.1-4 VVMU LED Indication

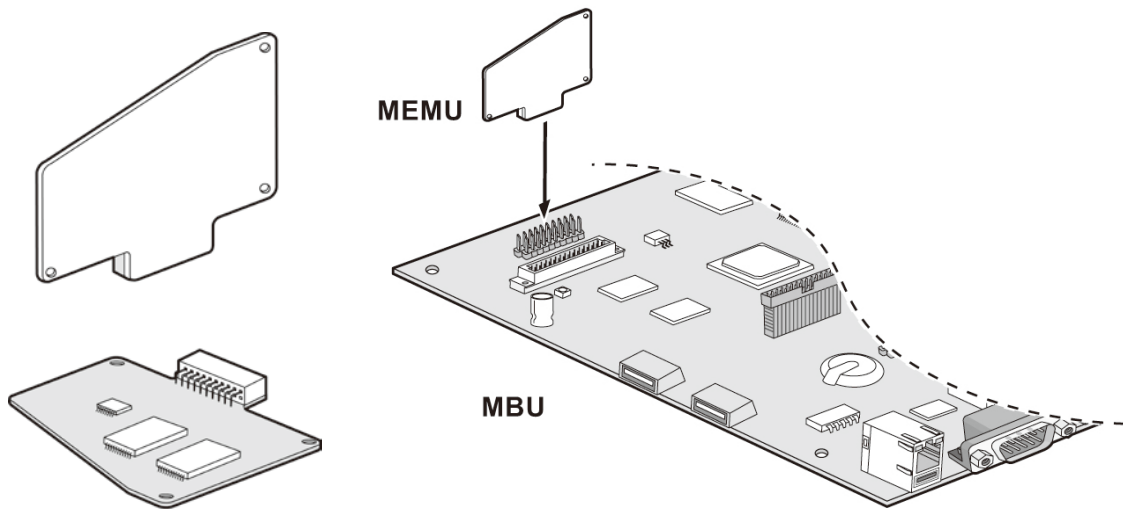
LED	Color	Description
LD1	Blue	Flash 300ms ON and OFF, normal operation
LD2	Blue	Channel in use status ON – a VoIP or VM channel in use OFF – all VoIP and VM channels idle
MJ1	LD1	Link/Act ON – Link, Blink – Data Transfer
	LD2	Speed ON – 100Mbps, OFF – 10Mbps

## **4.8.2 MEMU (Memory Expansion Module Unit)**

### **Description**

The MEMU is equipped with Nand Flash memory used to expand the storage capacity of the eMG80 Voice Mail by 15 hours. As with the basic and VVMU storage, the MEMU storage is non-volatile and any messages are stored even if power to the eMG80 is lost. The MEMU is installed on the CN15 connector of the KSU MBU.

As shown in Figure 4.8.2-1 below, the MEMU has a single connector for mounting on CN15 of the KSU MBU. The MEMU has no other connectors, LEDs or switches.



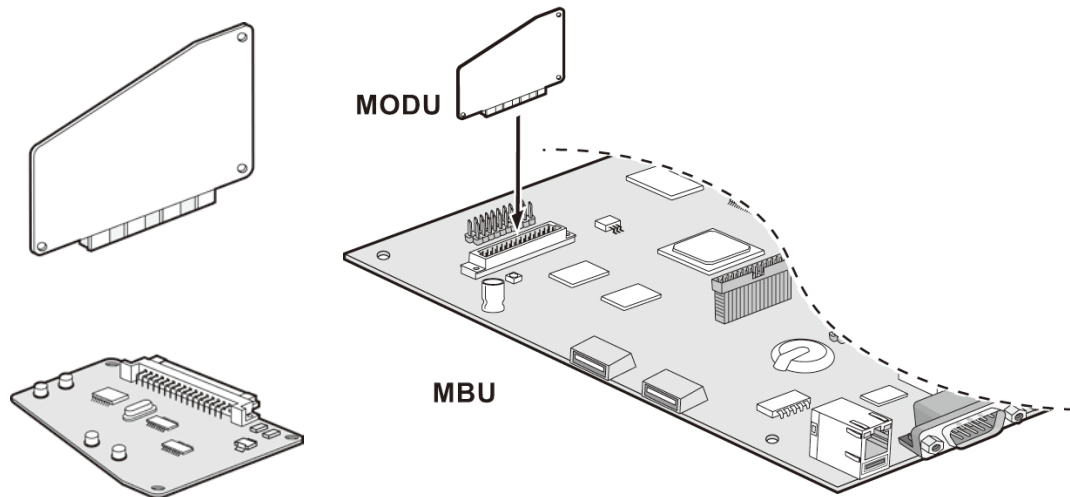
**Figure 4.8.2-1 MEMU**



### **4.8.3 MODU (Modem Function Unit)**

#### **Description**

The MODU, which is shown in Figure 4.8.3-1 below, 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 CN4 connector on the KSU MBU. There are no switches or LEDs located on the MODU.

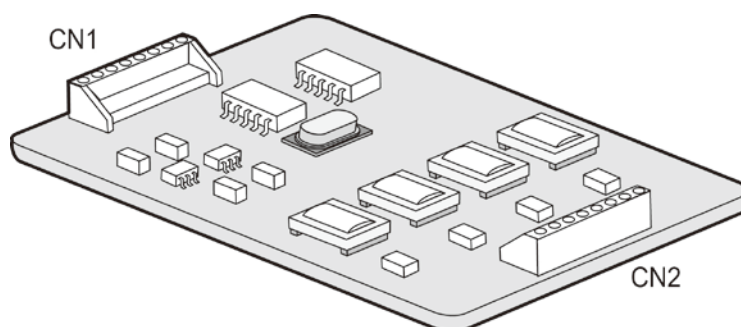


**Figure 4.8.3-1 MODU**

### **4.8.4 MG-CMU4 (Call Metering - 50Hz/12KHz/16KHz Unit)**

#### **Description**

The MG-CMU4, as shown in Figure 4.8.4-1, provides the Call metering function for analog CO lines. The CMU circuitry detects call metering and signaling information sent from the PSTN at 50 Hz, 12 KHz, or 16 KHz. The MG-CMU4 has four (4) circuits each connects to a separate CO line. MG-CMU4 can be installed on the CN8 and CN9 connectors of the KSU MBUA, KSU MBUAD or the EKSU EMBU to support the built-in CO lines. The CMU4 is installed on connectors CN790 and CN791 of optional Interface boards with analog CO lines including the CH204, CH408 and CS416.



**Figure 4.8.4-1 MG-CMU4**

## 5. MOUNTING THE KSU AND EKSU

Once all option boards have been installed in the KSU and EKSU, 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, which are the same for EKSU, to determining clearance.

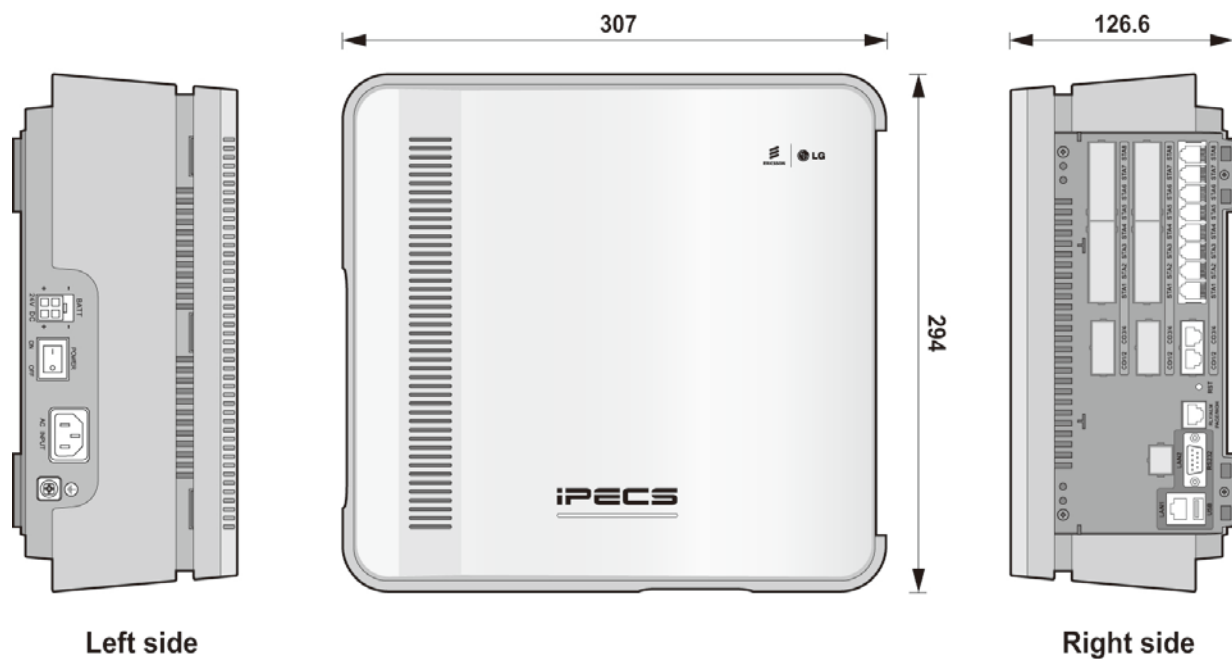


Figure 5.1-1 KSU Exterior Dimensions

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## **5.2 Desk Mount**

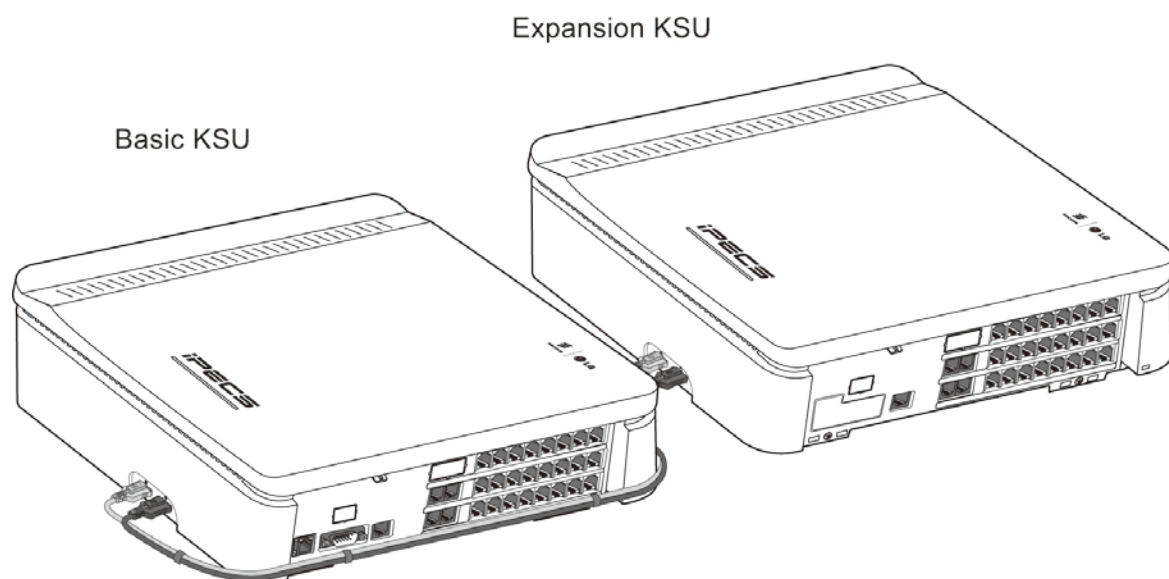
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Although not recommended, the KSU can be mounted on a desk, shelf or table-top. In this case assure the EKSU and KSU are located side by side with a minimum of 5 cm separation.

### **NOTE**

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

It is important that in no case should the KSU and EKSU be stacked one on top of the other as this will cause overheating.

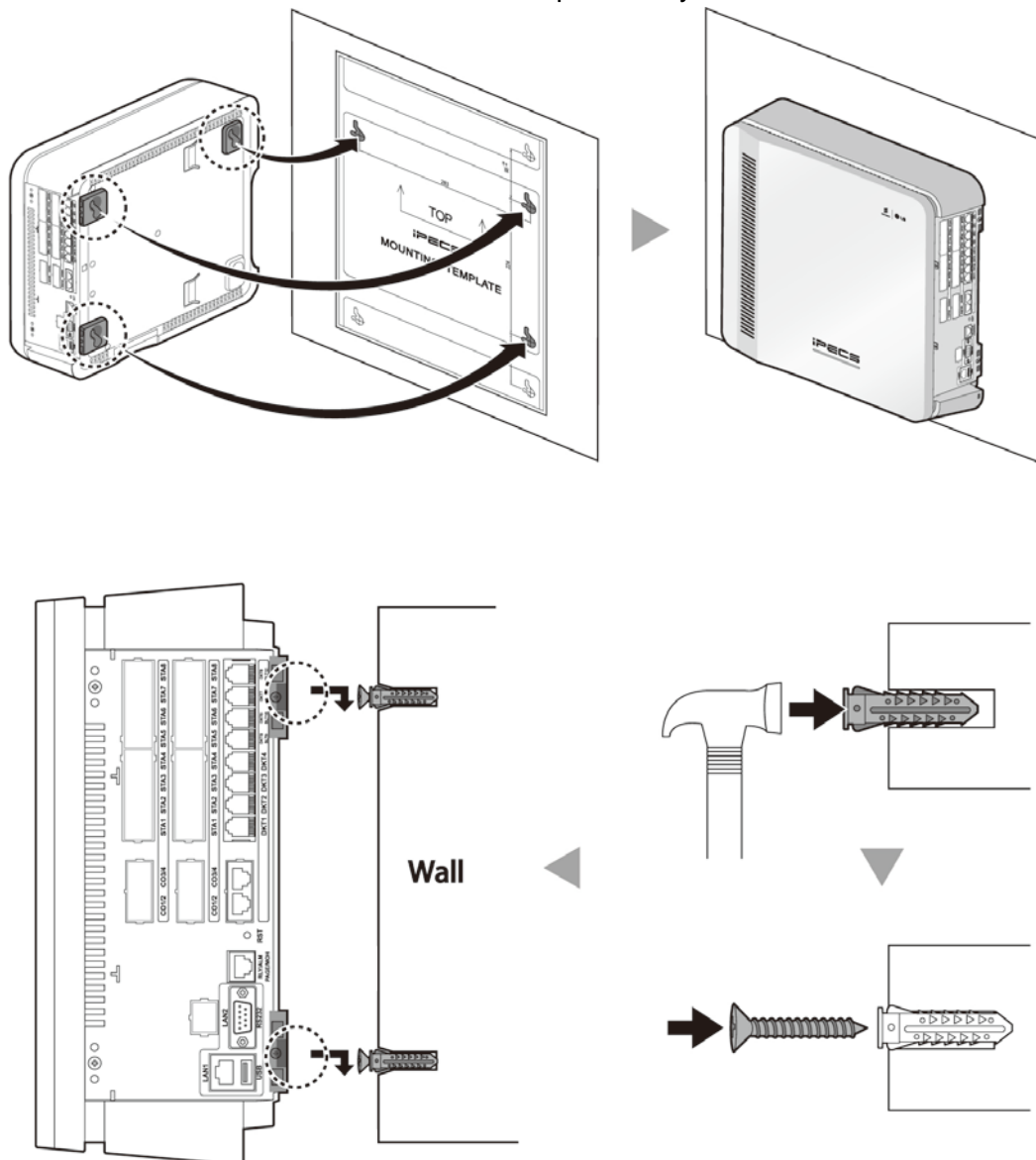


**Figure 5.2-1 Desktop Mount**

## 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  $\frac{3}{4}$  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 EKSU. Before installing the mounting template for EKSU, assure the Expansion cable is a sufficient length to connect the KSU and EKSU. Also assure the KSU and EKSU are separated by at least 5 cm.

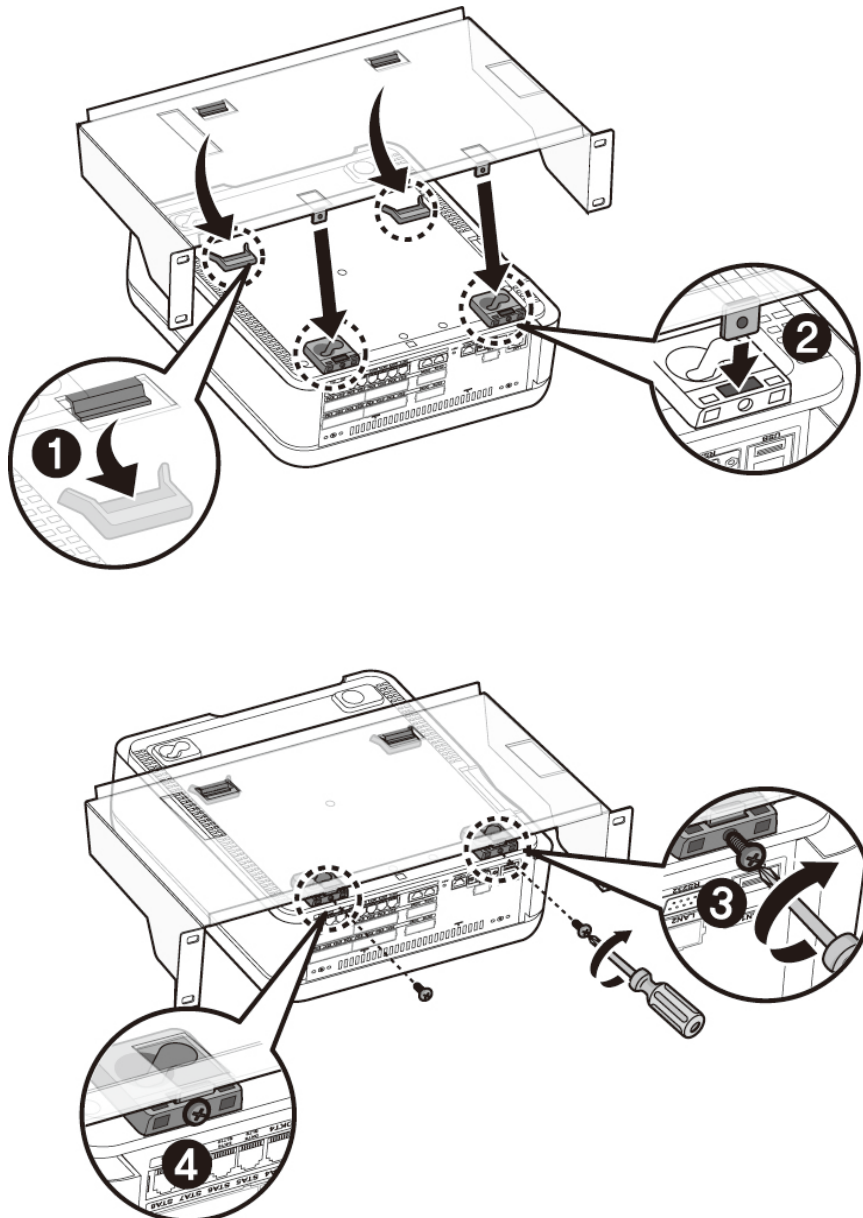


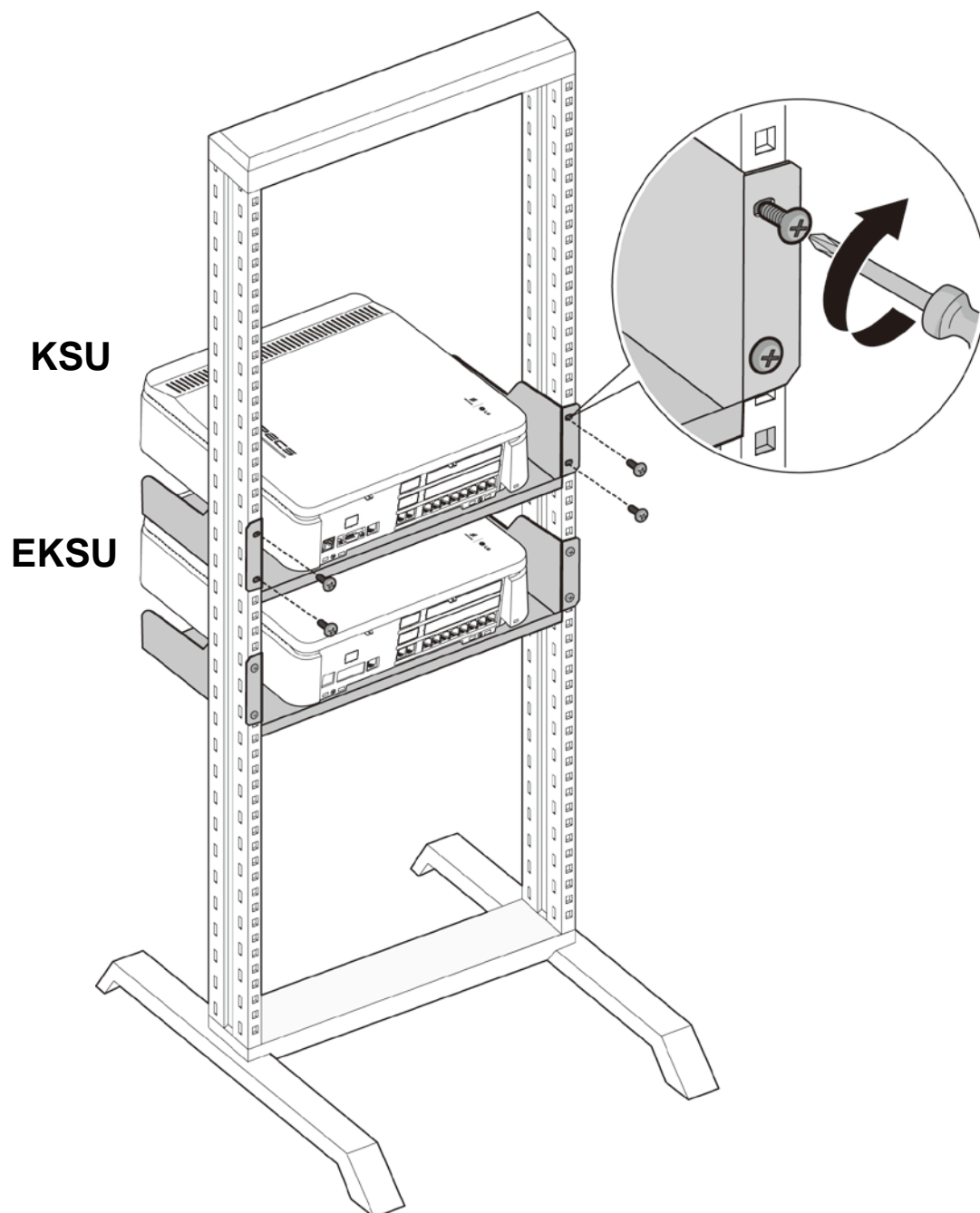
**Figure 5.3-1 Installing Mounting Template and Wall mount**

## 5.4 Rack Mount

The eMG80 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 5.4-1 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 of the KSU and attach it to the KSU by moving the bracket in the direction of arrows
2. Assure the bracket is fully engaging then insert and tighten the two (2) screws to secure the bracket to the 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 EKSU. Before installing the mounting the EKSU, assure the Expansion cable is of sufficient length to connect the KSU and EKSU. We recommends the space between KSU and EKSU be as wide as possible, considering the Expansion cable.





**Figure 5.4-1 Installing Rack Bracket and Rack Mount**

## 6. KSU AND EKSU WIRING

### 6.1 Connecting the Basic and Expansion KSUs

If an Expansion KSU is installed, it must be connected to the KSU for command and control. The EKSU must be connected to the KSU employing the Expansion cabling as shown in Figure 6.1-1. The Expansion Cable is included in the EKSU package and consists of two colored cables terminated at each end in a connector. The grey cable must be connected to the KSU-L and EKSU L ports and black to the KSU-R and EKSU-R ports.

To connect, perform the following steps:

1. Connect the grey cable to both the KSU and EKSU “L” ports.
2. Connect black cable to both the KSU and EKSU “R” ports.
3. To fix the Expansion cable connector securely, tighten the thumbscrews on each connector.

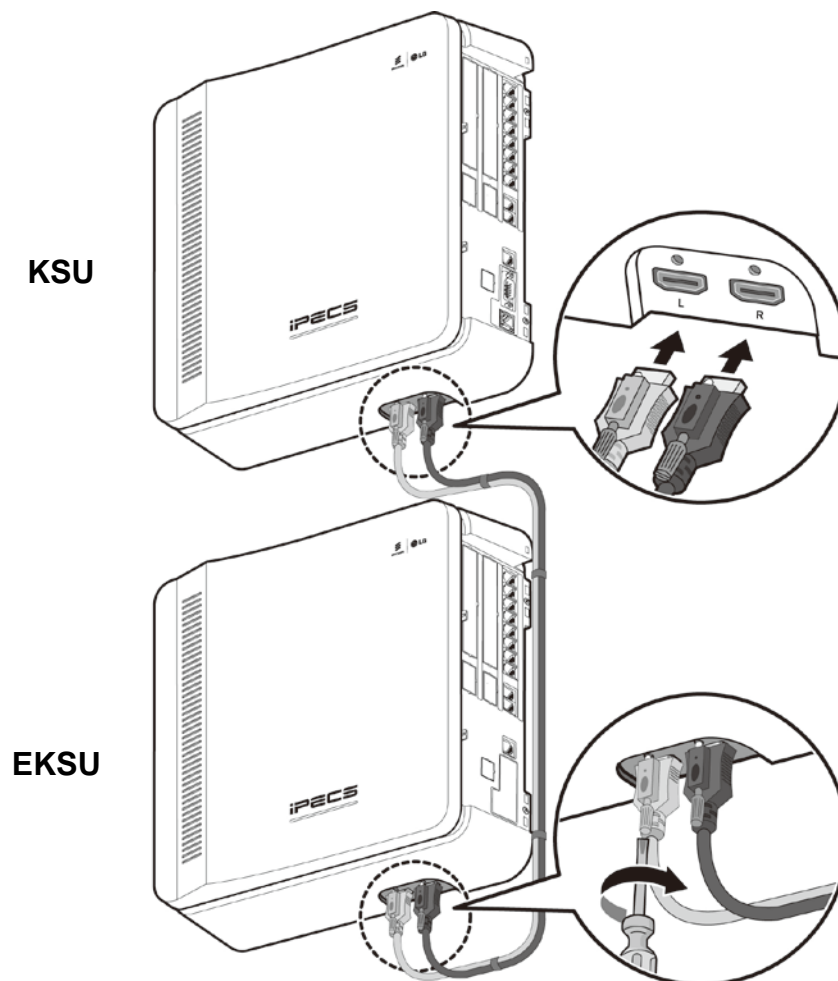


Figure 6.1-1 Expansion KSU to KSU Connection

**NOTE**

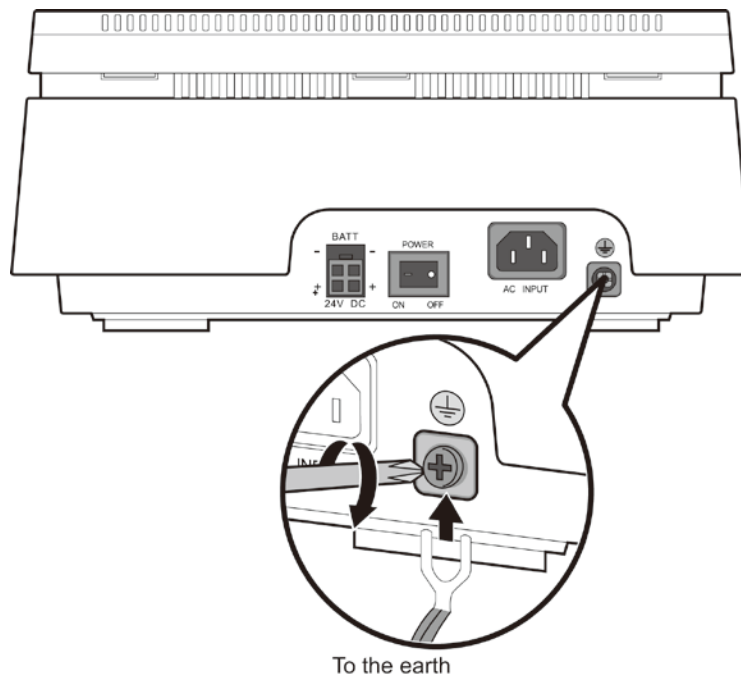
If during normal operation, power to the EKSU is turned OFF and ON, the KSU will restart to reconfigure automatically.



## **6.2 Grounding the KSUs**

Proper connection of the eMG80 KSUs to earth ground is very important to prevent user contact with dangerous voltages and reduce electrical and RF interference. Assure that both the KSU and EKSU are properly grounded as described below and shown in Figure 6.2-1.

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).



**Figure 6.2-1 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.

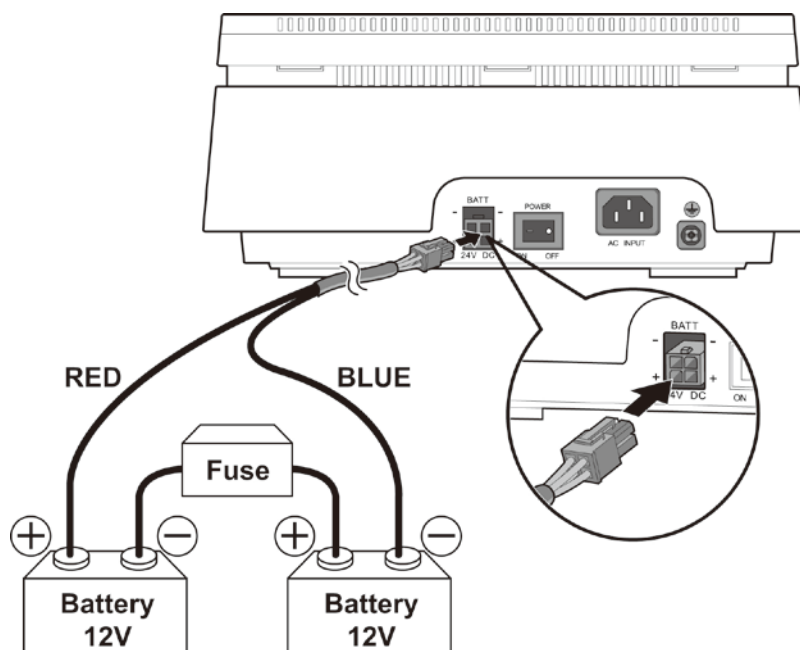
- Bare, covered, or insulated earthing conductors are acceptable. A covered or insulated conductor must have a continuous outer finish that is either green, or green with one or more yellow stripes.
- The separate protective earthing terminal provided on this product shall be permanently connected to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

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## 6.3 External Backup Battery Installation

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In case of power failure, the external backup batteries automatically maintain uninterrupted power to the iPECS eMG80 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. Both the KSU and EKSU should be connected to separate back-up batteries.



**Figure 6.3-1 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 terminals together with a fuse (10 A @ 250 Volts). This series connection will provide the 24 VDC required by the eMG80 Battery Backup circuit.
4. Insert the Battery Backup connector into the 'BATT' connector.
5. Repeat Steps 1 to 4 for the EKSU.

**NOTE**

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).

**CAUTION**

- 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; the iPECS eMG80 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 the RJ11 jacks should use a minimum of 2-pair wiring and the cabling for the RJ45 should terminate all 4 pairs.

### NOTE

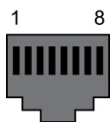
In many cases, two interface circuits are terminated to a single modular jack. Thus, carefully wire the jacks with the pin assignments shown otherwise, the interface circuits will not operate properly.

### 6.4.1 CO Line Modular Jack Wiring

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**

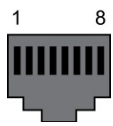
Connector	Pin-out	Pin Number	Signal Name
RJ45		1,2	CO1-R, CO1-T
		3	Reserved
		4,5	CO2-R, CO2-T
		6,7,8	Reserved

### 6.4.2 BRI Line Modular Jack Wiring

BRI Line modular jacks are terminated with one or two BRI lines (2B+D channels each) 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 6.4.2-1 BRI Line Modular Jack Wiring**

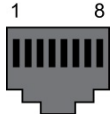
Connector	Pin-out	Pin Number	Signal Name	Function
RJ45		1,2,7,8	Reserved	
		3	TX+	Transmit Data
		4	RX+	Receive Data
		5	RX-	Receive Data
		6	TX-	Transmit Data

### 6.4.3 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 6.4.3-1 PRI Line Modular Jack Wiring**


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

### 6.4.4 Digital Station Modular Jack Wiring

Digital Station modular jacks are terminated with one Digital station circuit to an RJ11 jack as shown in the chart below. To wire the Digital Station modular jack,

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

**Table 6.4.4-1 Digital Station Modular Jack Wiring**

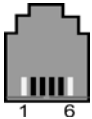
Connector	Pin-out	Pin Number	Signal Name
RJ11		1	N/A
		2	N/A
		3,4	DKT-T, DKT-R
		5	N/A
		6	N/A

### 6.4.5 Hybrid Station Modular Jack Wiring

Hybrid Station modular jacks are terminated with one Digital and one SLT circuit to an RJ11 jack as shown in the chart below. For the Hybrid ports only one of the station circuits, DKT or SLT, can be used. To wire the Hybrid Station modular jack,

1. Wire each Hybrid Station modular jack to the termination point.
2. Tag the wiring for future maintenance.

**Table 6.4.5-1 Hybrid Station Modular Jack Wiring**

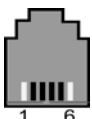
Connector	Pin-out	Pin Number	Signal Name
RJ11		1	N/A
		2	DKT-T
		3,4	SLT-T, SLT-R
		5	DKT-R
		6	N/A

### 6.4.6 DKT/SLT Station Modular Jack Wiring

The last four (4) built-in Station ports of the KSUAD and KSUID provide both a Digital and SLT port. These Station modular jacks are terminated with one Digital and one SLT circuit to an RJ11 jack as shown in the chart below. Both the DKT and SLT interface ports can be wired and used simultaneously. To wire these 'combo' Station modular jacks,

1. Wire each combo Station modular jack to the termination point.
2. Tag the wiring for future maintenance.

**Table 6.4.6-1 DKT/SLT Station Modular Jack Wiring**

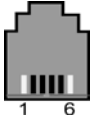
Connector	Pin-out	Pin Number	Signal Name
RJ11		1	N/A
		2	DKT-T
		3,4	SLT-T, SLT-R
		5	DKT-R
		6	N/A

## 6.4.7 SLT Station Modular Jack Wiring

SLT Station modular jacks are terminated with two (2) SLT circuits to an RJ11 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 6.4.7-1 SLT Station Modular Jack Wiring**

Connector	Pin-out	Pin Number	Signal Name
RJ11		1	N/A
		2	SLT-T of SLU8
		3,4	SLT-T, SLT-R
		5	SLT-R of SLU8
		6	N/A

## 6.4.8 WTIB4 Base Station Modular Jack Wiring

The WTIB4 has four RJ11 modular jacks for connection to GDC600BE DECT Base Stations. The connectors are terminated as shown in the chart below. Special care is needed when wiring the WTIB4 modular jacks. As shown in Figure 6.4.8-1, a Ferrite core, which is provided with the Base Station, must be installed on the wiring to each modular jack to minimize induced interference. After completing installation and initial power-up of the eMG80 system, the DECT Base Stations can be located and installed as directed in the DECT Installation manual, GDC-600TBE (CRS tool) user manual. After installing the Base Stations, the DECT handsets can be subscribed to the Base Stations and registered to the system.

To wire the WTIB4 modular jacks,

1. Assure power to the KSU is OFF. Failure to remove power can cause serious damage to the WTIB4, Base Station and the KSU electronics.
2. For each jack, terminate the WTIB4 wiring in an RJ11 modular plug terminated in 2-pair UTP Cat 3 or better wiring following the pin assignments shown in the modular jack wiring chart below.
3. Pass the wiring through the Ferrite core. Creating at least three turns through the core as shown in Figure 6.4.8-1.
4. Terminate the wiring to the Base Station termination point using the terminations as shown in Table 6.4.8-1.
5. Tag or number wiring for maintenance.

### **NOTE**

During installation of the Base Stations access to the WTIB4 may be required. It is recommended that the WTIB4 be mounted on the CN1 connector as the lower optional Interface board.

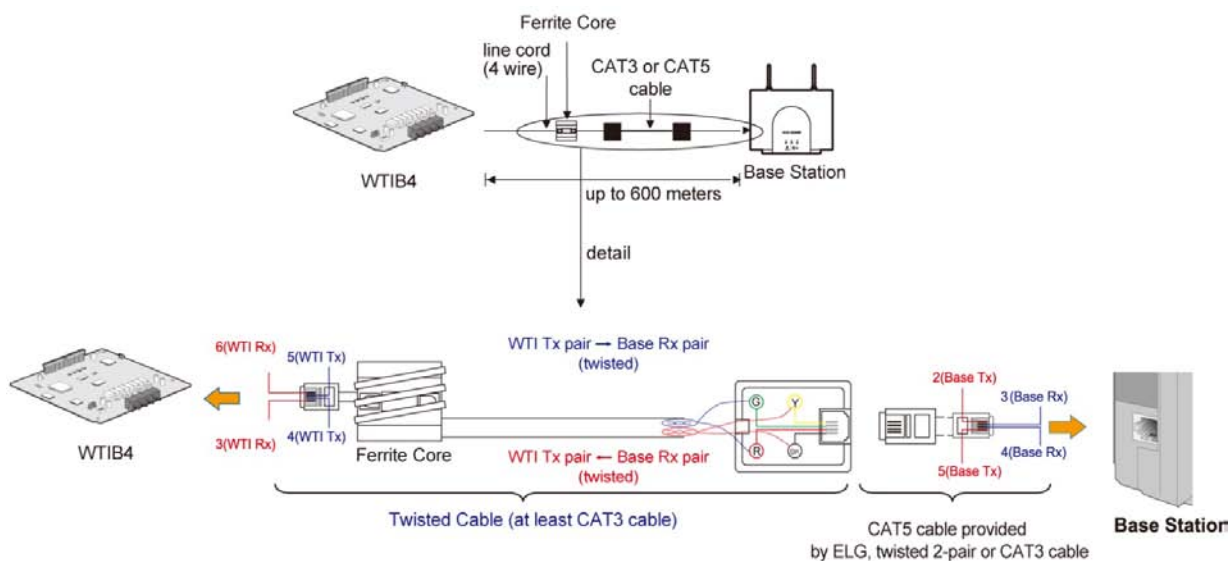


Figure 6.4.8-1 WTIB4 Wiring with Ferrite Core

**CAUTION**  
All wiring between the WTIB4 and the GDC-600BE Base Station must use twisted pair cable, use either Cat 3 or Cat 5 cabling. Use of untwisted pair wiring, even in short lengths will cause faulty operation of the Base Station and the DECT handsets.

**WTIB4 & GDC-600BE Connectors**

Table 6.4.8-1 WTIB & GDC 600BE Modular Jack Wiring

Model	Label	Pin-out	Pin Number	Pin Assignment	Function
WTIB4	WTI1 to WTI4		1, 6	Unused/reserved	
			2	RX (GND)	Receive Data
			3	TX (+30V)	Transmit Data
			4	TX (+30v)	Transmit Data
			5	RX (GND)	Receive Data
GDC-600BE	MJ1		1, 6	Unused/reserved	
			2	Base TX (GND)	Transmit Data
			3	Base RX (+30V)	Receive Data
			4	Base RX (+30v)	Receive Data
			5	Base TX (GND)	Transmit Data

**WTIB4 - Automatic Line Test Function**

The WTIB4 incorporates routines to perform tests of the connection to each Base Station. The Automatic Line Test can be performed manually with Dip switches located on the

WTIB or performed through a Command Line Interface to the system. To perform the Line Test manually,

1. With power to the system OFF, set all Dip switches on the WTIB4 to the ON state.
2. Turn the system power ON. After the system boot, the WTIB4 will conduct the Automatic Line Test. The test requires approximately 5 minutes and during the test cycle the WTIB4 LEDs 1 through 4 will flash at a 1 second on and 1 second off rate.
3. After the test is complete, the LED for each WTIB4 will indicate the results as shown in the chart below.

LED Indication	Result
LED OFF	Normal
LED ON	Fault
LED flash@100ms ON/OFF	Not connected

4. Return the WTIB4 Dip switches to the proper position and press the reset button on the WTIB4.

To perform the Automatic Line Test with the Command Line Interface, follow the procedures outlined in the GDC-600BE Manual available from the local Ericsson-LG Enterprise representative. The results will appear in a format as follows. The display will indicate OK, NOT OK or Base eject (Base not connected).

```
=====
* Welcome to Ericsson-LG Enterprise WTIB4 Liu Test Program Ver 0.a *
=====
E1 Line Test Start !! 01minutes
During Test... 00:59
E1 Line Test End !!
Base eject [01]
Base eject [02]
Base eject [03]
Base eject [04]

LIU Error cnt1 : Link0=0000, Link1=6700, Link2=7229, Link3=8131
                : Link4=8170, Link5=7475, Link6=0000, Link7=0000
LIU Error cnt2 : Link0=0000, Link1=9475, Link2=9646, Link3=4363
                : Link4=2793, Link5=5563, Link6=0000, Link7=000
```

**NOTE**

If using the Telnet interface to view the Line test results, do not make entries in the Command Line Interface, as this may cause false test results.

Changing the Dip switch positions during the test will not affect the Automatic Line Test. After the test is complete, place the DIP switches in the proper position, then press the WTIB4 reset button or reset the eMG80 system.

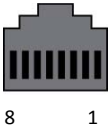


## 6.5 MBU and VVMU LAN Port Wiring

The MBU and VVMU 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 6.5-1 MBU and VVMU 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.

## 6.6 USB port

The KSU MBU incorporates a standard USB port. The port is wired as shown in the chart below and any standard USB memory stick can be installed for backup and restore operations.

**Table 6.6-1 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

---

## **6.7 Connecting Miscellaneous Devices**

---

The KUS MBU provides connections for an external music source, external page port, relay contact, and alarm detection input monitor. The EKSU EMBU provides additional connections for a second relay contact output and alarm detection input. In both cases, an RJ45 jack is used to terminate the interfaces as shown in Figure 6.7-1 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 6.7-1 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.

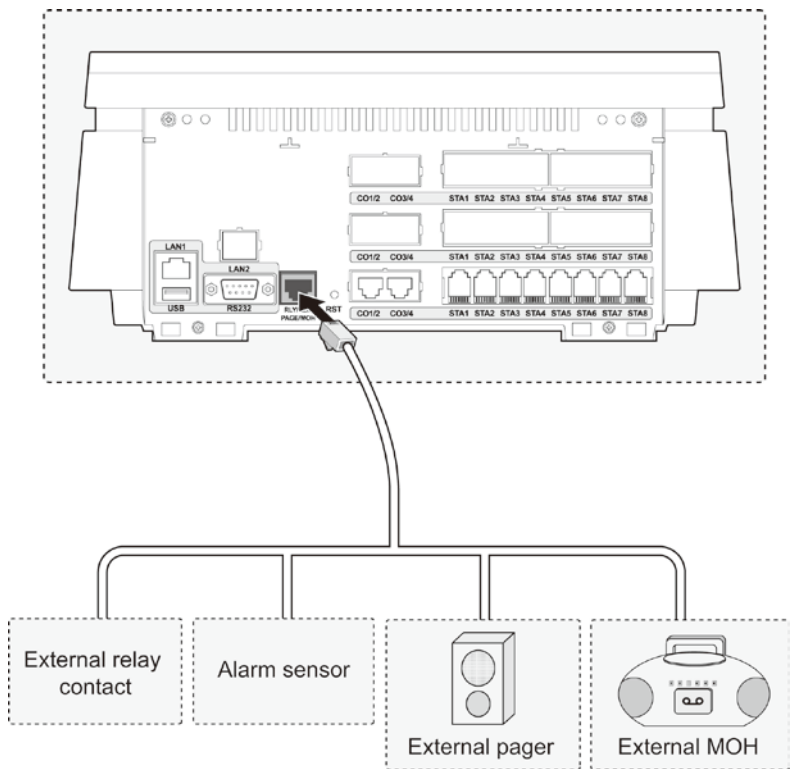


Figure 6.7-1 Miscellaneous Connections

Modular Jack Pin Assignment

Table 6.7-1 KSU Miscellaneous Connector MJ4 Wiring

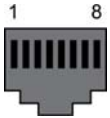
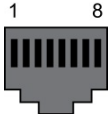
Connector	Pin-out	Pin Number	Signal Name	Function
RJ45		1	RELAY_T	Relay Contact Tip
		2	RELAY_R	Relay Contact Ring
		3	ALARM_T	Alarm Detection Tip
		4	ALARM_R	Alarm Detection Ring
		5	EXTPAGE_T	External Page Tip
		6	EXTPAGE_R	External Page Ring
		7	EXTMOH_T	External MOH Tip
		8	EXTMOH_R	External MOH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

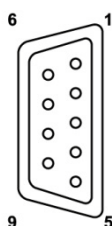
Table 6.7-2 EKSU Miscellaneous Connector MJ4 Wiring

Connector	Pin-out	Pin Number	Signal Name	Function
RJ45		1	RELAY_T	Relay Contact Tip
		2	RELAY_R	Relay Contact Ring
		3	ALARM_T	Alarm Detection Tip
		4	ALARM_R	Alarm Detection Ring
		5 - 8		N/A

## 6.8 RS-232 Serial Port Wiring

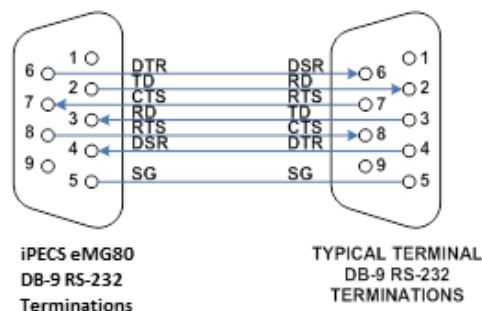
The RS-232 female connector, which is a DCE (Data Communication Equipment), is used for various output functions (SMDR, Traffic Reports, etc.) and can be used to access the System database and maintenance functions through connection to a local PC. The connector is located on the left side of the Code of the KSU and is terminated as in Table 6.8-1.

**Table 6.8-1 RS232 Port Wiring**

Connector	Pin-out	Pin Number	Signal Name	Function
RJ-232C		1	Not used	
		2	TD	Transmitted Data
		3	RD	Received Data
		4	DSR	Data Set Ready
		5	SG	Signal Ground
		6	DTR	Data Terminal Ready
		7	CTS	Clear to Send
		8	RTS	Request to Send
		9	Not used	

**NOTE**

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



**Figure 6.8-1 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.

---

## **6.9 Cable Wiring**

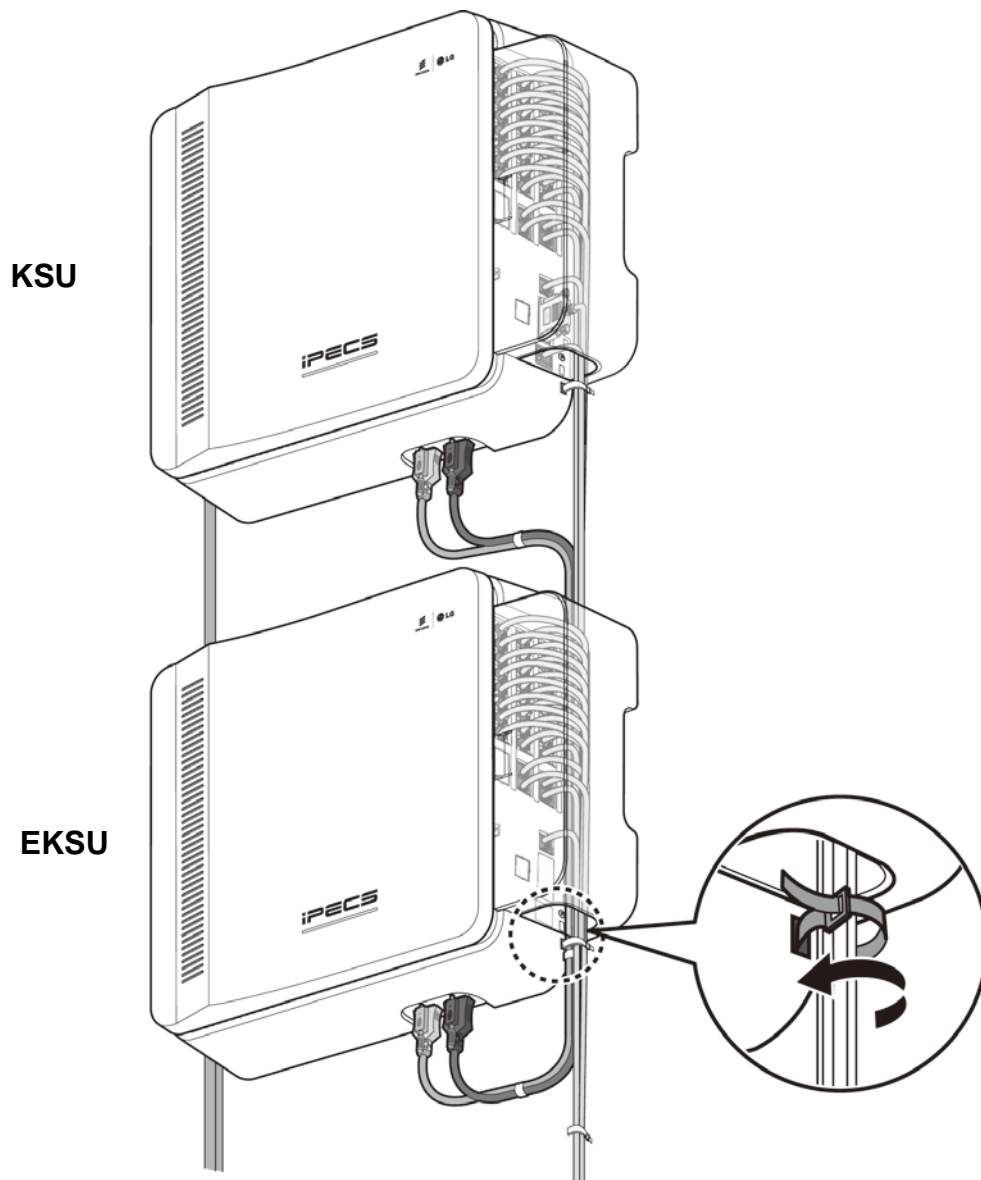
---

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.

### **6.9.1 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 6.9.1-1.

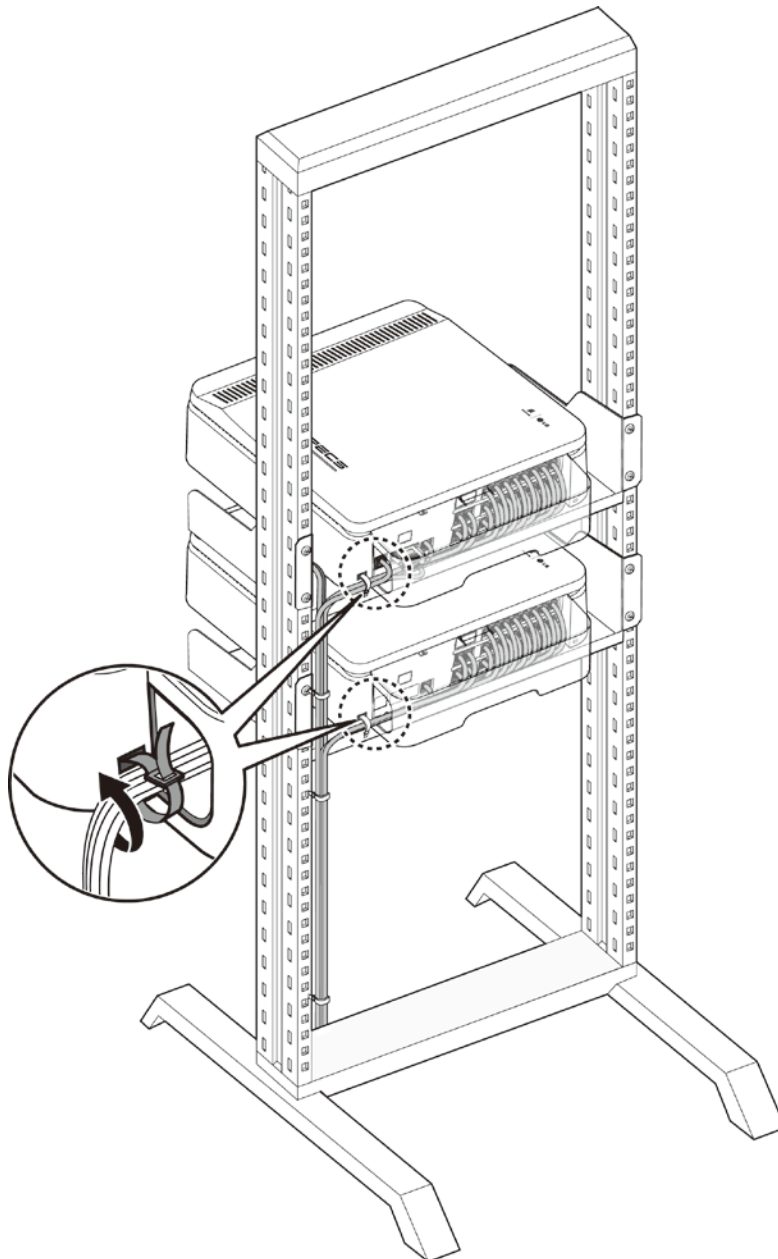


**Figure 6.9.1-1 Dressing the Wall Mount Wiring**

## **6.9.2 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 6.9.2-1.
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.

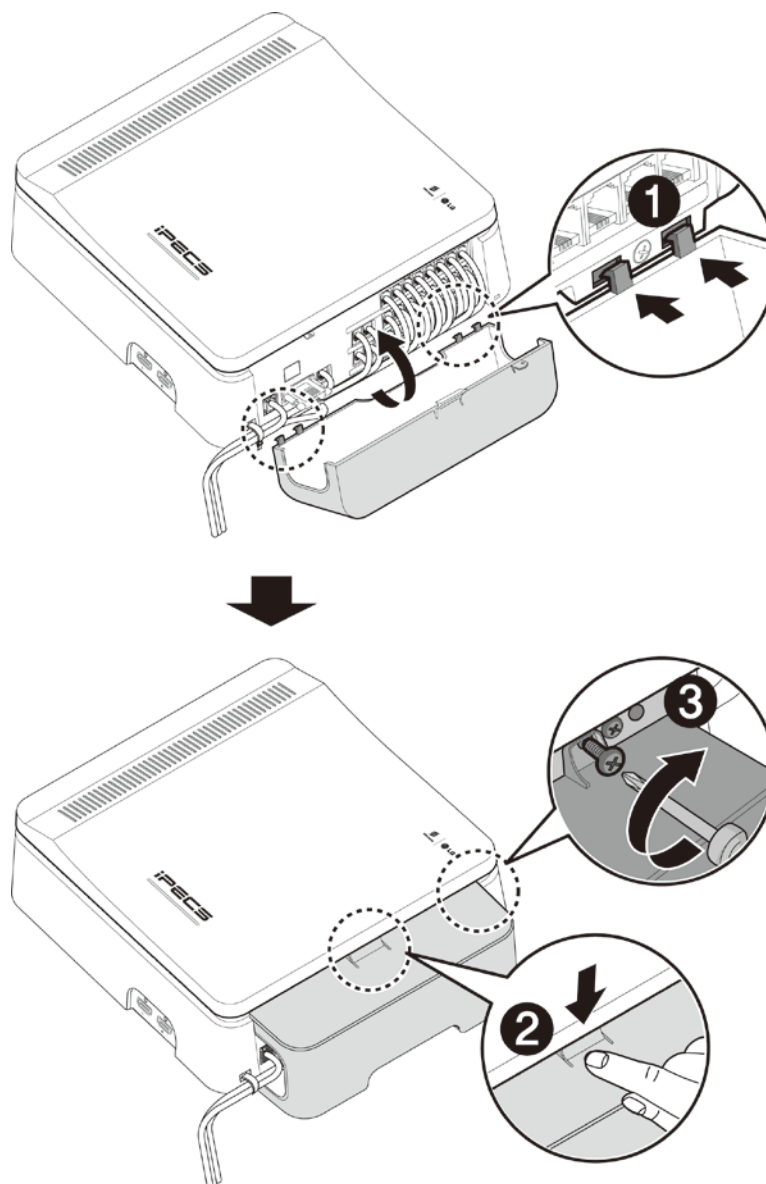


**Figure 6.9.2-1 Rack Mount Wiring**

### **6.9.3 Replace the Cord Cover**

Once the wiring is complete and dressed, the Cord cover should be replaced to minimize accidental damage and the potential of tampering with the wiring. To attach the cover, refer to Figure 6.9.3-1 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 6.9.3-1 Replacing the Cord cover**

## 7. *TERMINAL CONNECTION AND WIRING*

### 7.1 Terminal Models

iPECS eMG80 works with a number of telephone types including proprietary LDP digital and LIP VoIP phones, standard SLTs, and VoIP phones (SIP or H.323 v3). The specific model of LDP and LIP phones supported in the eMG80 system are shown in the chart below.

**Table 7.1-1 Terminal Models Supported**

Model	Description
LDP-7004N	4-Flexible Button DKTU w/o display
LDP-7004D	4 Flexible Button DKTU w/Display
LDP-7008D	8 Flexible Button DKTU w/Display
LDP-7016D	16 Flexible Button DKTU w/Display
LDP-7024D	24 Flexible Button DKTU w/Display
LDP-7024LD	24 Flexible Button DKTU w/Large Display
LDP-7048DSS	48 Button DSS/DLS Console for DKTU
LDP-DPB	Door Phone Box
LDP-7208D	8 Flexible Button DKTU w/Display / Supported only for certain countries
LDP-7216D	16 Flexible Button DKTU w/Display/ Supported only for certain countries
LIP-8002E/2AE	4 Feature Button IP phone w/Display
LIP-8008E	8 Flexible Button IP phone w/Display
LIP-8012E	12 Flexible Button IP phone w/Display
LIP-8024E	24 Flexible Button IP phone w/Display
LIP-8040E	10 Flexible Button IP phone w/Large Display
LIP-8050E	5 Flexible Button, IP phone w/Color Display & Video Camera
LIP-8050V	IP Phone with video, large full color display, 5 programmable keys
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)
LDP-9008D	8 Flexible Button DKTU w/Display
LDP-9030D	30 Flexible Button DKTU w/Display
LDP-9048DSS	48 Button DSS Console for DKTU
ACT-50	iPECS Audio Conference Terminal
WIT-400HE	2 inch TFT LCD / 10 feature keys & 12 programmable keys
GDC-450H/500H	Business DECT, Full color LCD



## 7.2 Terminal Cabling Distance

The Figure 7.2-1 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.

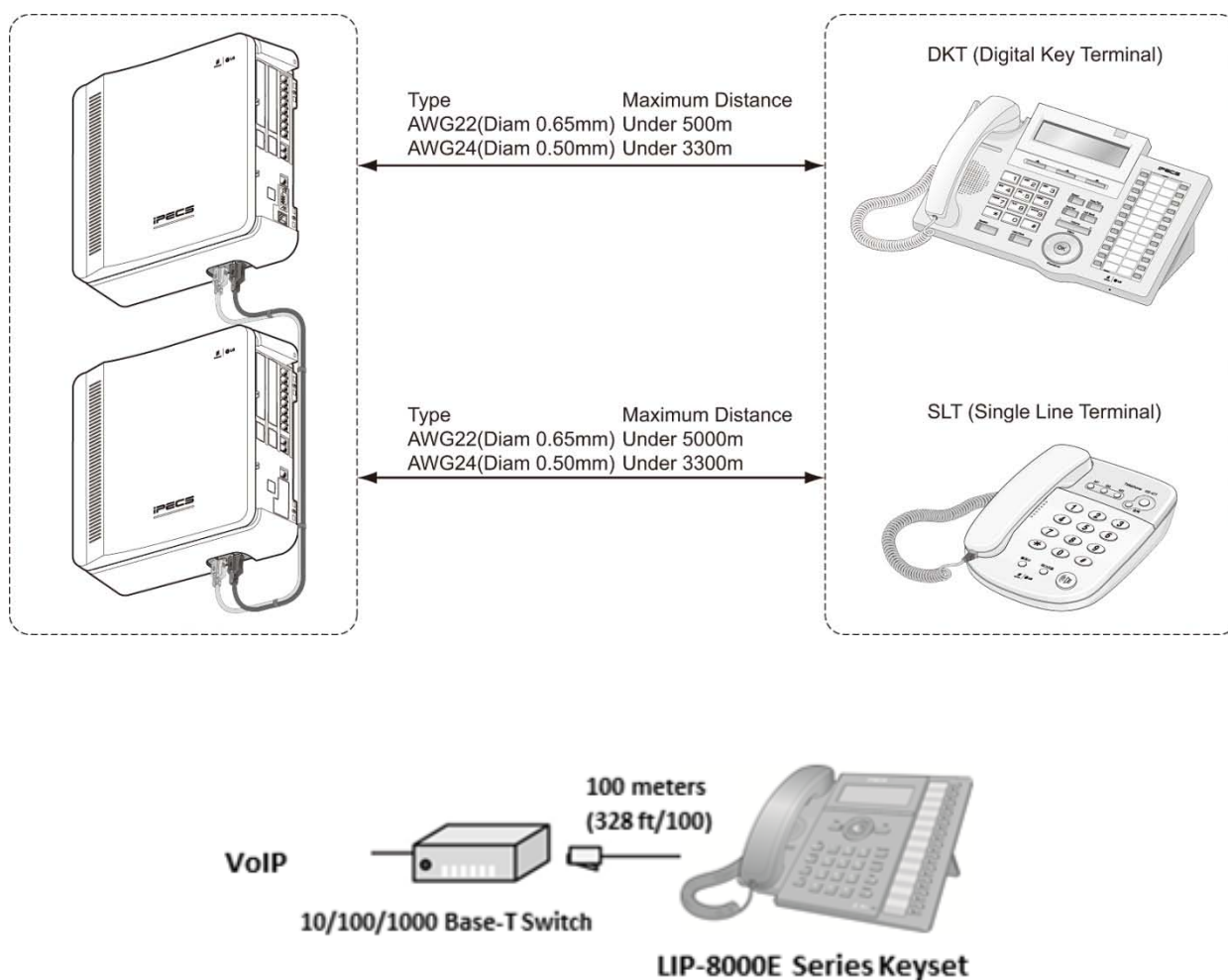


Figure 7.2-1 Terminal Wiring Distance

## 7.3 Terminal Connection

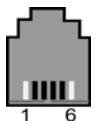
### 7.3.1 DKTU Wiring

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-72xx series phones employ the 2<sup>nd</sup> pair of the modular jack while all other LDP series phones employ the 1<sup>st</sup> or center pair of the modular jack. The wall outlet for the DKT or Console should be wired to the appropriate termination point for the DKT port in the eMG80 system.

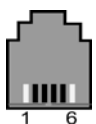
1. Using the Modular Jack wiring charts below, wire the 1<sup>st</sup> or 2<sup>nd</sup> pair of the wall outlet, as appropriate, to the termination point using UTP cable. Note separate wiring is required for the LDP-7048 DSS Console.
2. Using the line cord provided, connect the DKTU or DSS Console to the wall outlet.

#### Modular Jack Pin Assignment

**Table 7.3.1-1 LDP-7200 series Modular Jack Wiring**

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

**Table 7.3.1-2 LDP-7000 and 9000 series 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

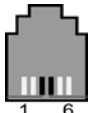
## 7.3.2 SLT Wiring

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 eMG80 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 7.3.2-1 SLT Modular Jack Wiring**

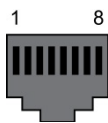
Connector	Pin-out	Pin Number	Signal Name
RJ11		1,2	N/A
		3,4	TIP, RING
		5,6	N/A

## 7.3.3 IP Phone Wiring

The iPECS eMG80 supports the LIP-8000E series IP Phones. LIP-8000E series phones include 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 connection of a PC. The LIP phones are wired to any 10/100/1000 Base-T Ethernet switch port with access to a VoIP channel of the eMG80. The LIP phones can be powered from a POE Class 2 compatible Ethernet switch port or using the AC/DC Adaptor-K.

### Modular Jack Pin Assignment

**Table 7.3.3-1 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 eMG80. 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
2. Enter the password, 147\*.
3. Use the Volume Up/Down buttons to scroll through the menu shown below.
4. Enter appropriate values for the local network.
5. When complete, press the Speaker button.
6. Press '\*' to exit and restart the LIP Phone.

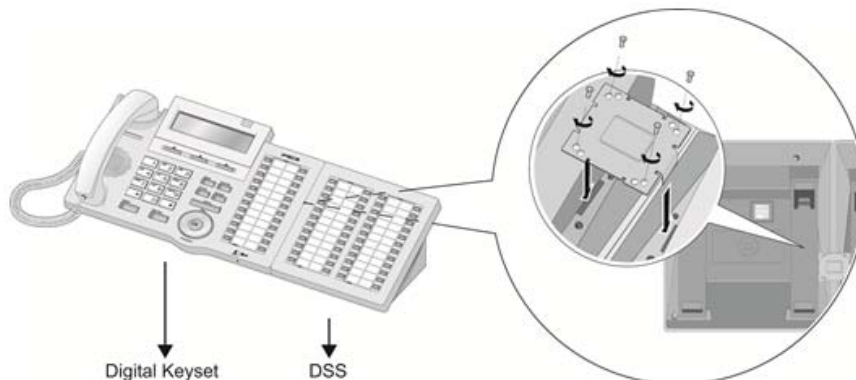
Menu Display	Description
MODE[R/L] [LOCAL] – CHANGE[#]	Registration mode, use '#' to set Remote mode
PHONE IP ADDRESS (DOT:*)	Use the dial pad to enter the fixed IP address, use DHCP for dynamic addressing
PHONE NET MASK(DOT:*)	Use the dial pad to enter the Subnet mask if using fixed IP addressing
ROUTER 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 eMG80 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

### **7.3.4 DSS/BLF Console Installation & Wiring**

#### **LDP-7048 DSS Installation**

The digital LDP-7048 DSS/BLF Console is provided with a phone-mounting bracket so that the console can be securely fastened to the corresponding LDP-7000 phone. To attach the console to the phone, refer to Figure 7.3.4-1 and the following instructions

1. Turn the Console and phone upside down.
2. Place the fastener in position as shown in figure balloon.
3. Insert and tighten screws. Caution, do not over-tighten the screws as this will damage the plastic housing.



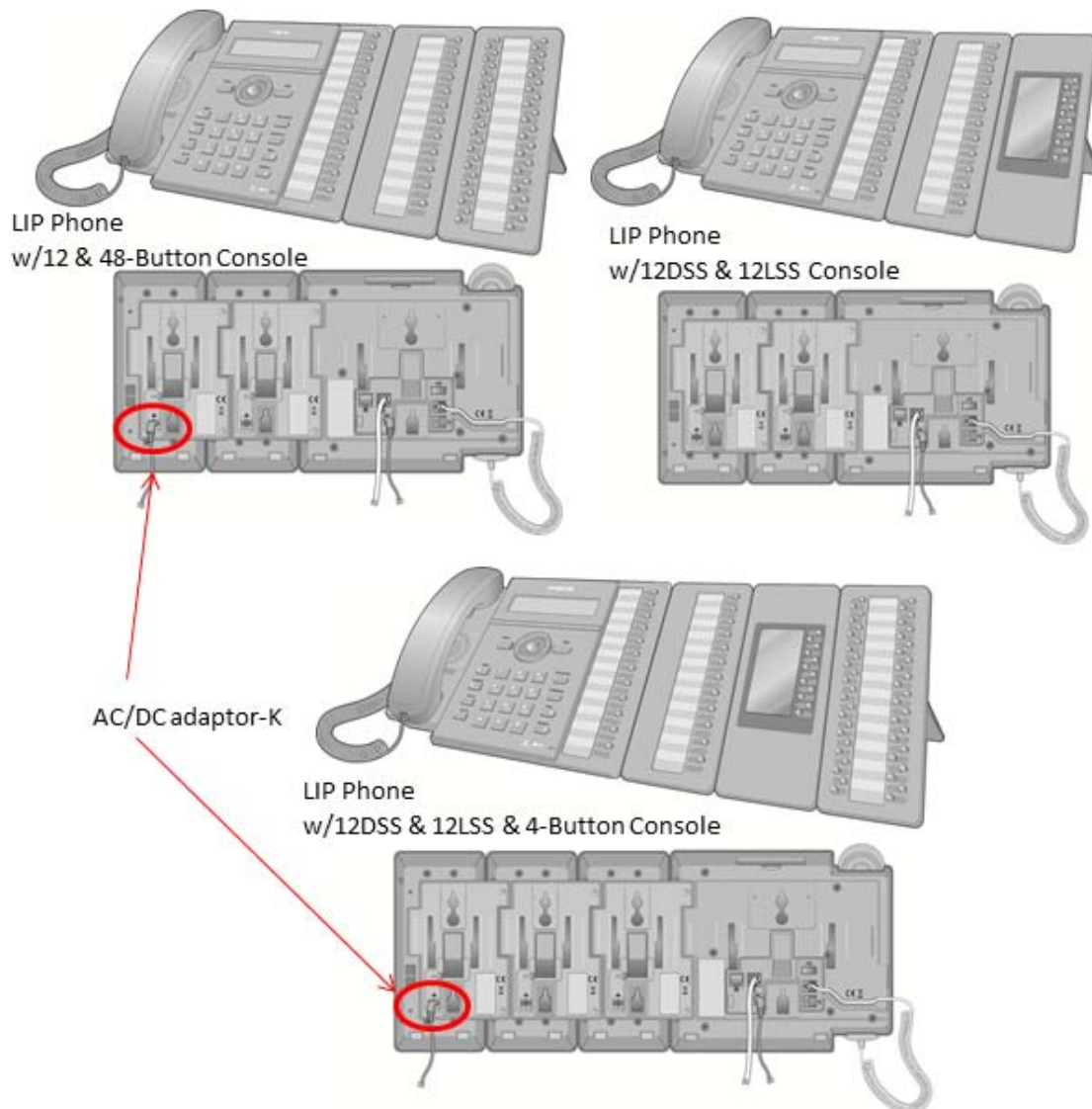
**Figure 7.3.4-1 LDP-7048DSS Console install**

#### **LDP-7048 DSS Console Wiring**

The LDP-7048 DSS Console is wired as a normal Digital Key Telephone to a separate digital port of the eMG80, refer to Section 7.3.1.

#### **LIP-8000 Console Installation and Wiring**

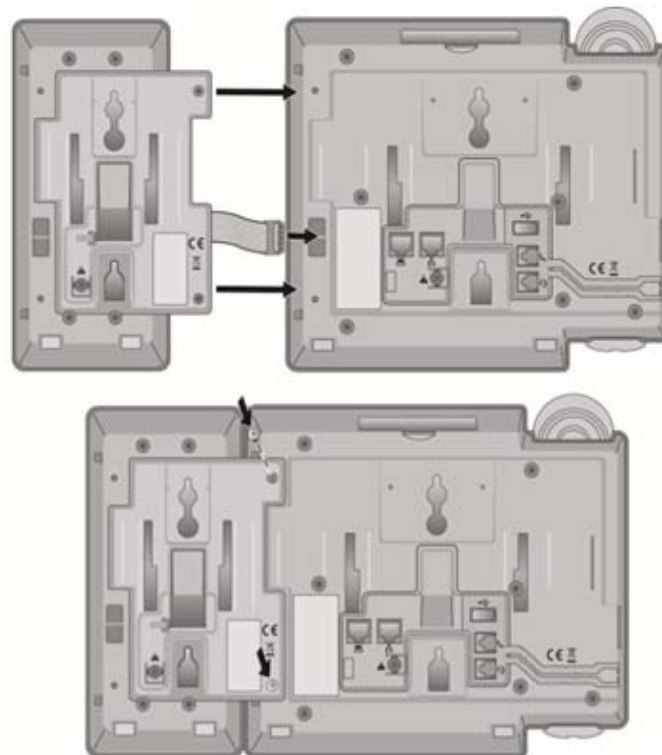
The LIP-8000E Series DSS/BLF Console is available in three (3) models 12 button w/paper labels (LIP-8012DSS), 12-button w/LCD (LIP-8012LSS), and 48-button w/paper labels (LIP-8048DSS). Up to four (4) consoles can be connected to an LIP-8000 series phone using the serial ribbon cable from the console. The LIP-8000E phones will power a maximum two (2) LCD DSS Consoles and, when more than two consoles are connected, one must be the 48-button Console. In all cases, the 48-button Console must be powered by the AC/DC Adaptor-K. The figures below depict installation of various console configurations. Note that in all cases, AC/DC Adaptor-K is attached to the 48-button Console.



**Figure 7.3.4-2 LIP-8000 series Console Configurations**

Referring to Figure 7.3.4-3 below use the following instructions to install and wire the LIP Console to the associated LIP Phone.

1. Turn the LIP phone and Console upside down
2. Remove the rubber plug in the LIP phone protecting the Console serial cable connector.
3. Insert the flat ribbon cable from the Console into the connector in the LIP phone.
4. Insert and tighten two (2) screws through the DSS Console mounting flange into the LIP phone. Caution, do not over-tighten the screws as this may damage the LIP phone housing.
5. For additional Consoles, repeat the procedure connecting one console to the previous console.
6. For each LIP-8048DSS and LIP-8040LSS, insert the DC plug of an AC Adaptor-K to the DC input of the Console and plug the AC plug into an appropriate (110/240 VAC) outlet.



**Figure 7.3.4-3 LIP-8000 DSS Installation**

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## **7.4 Terminal Wall Mount**

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### **7.4.1 LDP-7000 and LDP-9000 series Wall Mount**

The LDP-7000 and LDP-9000 series phones can be mounted on the wall using the appropriate Wall Mount Kit. The Wall Mount Kit is installed as described below. A separate Wall Mount kit, available from Ericsson-LG Enterprise, is required for the LDP-7000 series phones.

1. Using the appropriate Wall Bracket, mark and drill two (2) 7 mm holes for the plastic wall anchors provided.
2. Insert the two (2) anchors into the holes and insert and tighten the 2 screws leaving about 6 mm (¼-inch) exposed.
3. Connect one end of a short cable terminated in RJ11 to the LDP-7000 series Phone, respectively, and then connect the other end in a wall jack.
4. Mount the Wall Mount bracket on the phone.
5. Slide the Wall Mount bracket over the screws, if loose, tighten the screws slightly and mount the Wall Mount bracket again.
6. Insert the Wall Mount handset hook to prevent the handset from slipping when wall mounted.

## 7.4.2 LIP-8000E Wall Mount

The LIP-8000E series phones incorporate wall mount into the base of the phone housing. Using the instructions, mount the LIP-8000E series phone on the wall. An LIP phone with Consoles can be Wall Mounted after the Console is properly connected to the LIP phone, refer to section 7.3.4.

1. Using Figure 7.4.2-1 Mark and drill two (2) 7mm holes for plastic wall anchors.
2. Insert the two (2) anchors into the holes and insert and tighten the 2 screws leaving about 2.5 mm (1/8-inch) exposed. If installing an LIP phone with a Console, also drill anchor holes and insert and tighten screws for the Console Wall Mount slots.
3. Slide the LIP-8000E phone over the screws and assure the phone is secure. It may be necessary to remove the phone and tighten or loosen the screws for a secure mounting.
4. Remove the Handset hook from the phone as shown in the figures below. Reverse the hook and re-install in the LIP-8000E phone so that the hook catches the groove in the handset receiver.

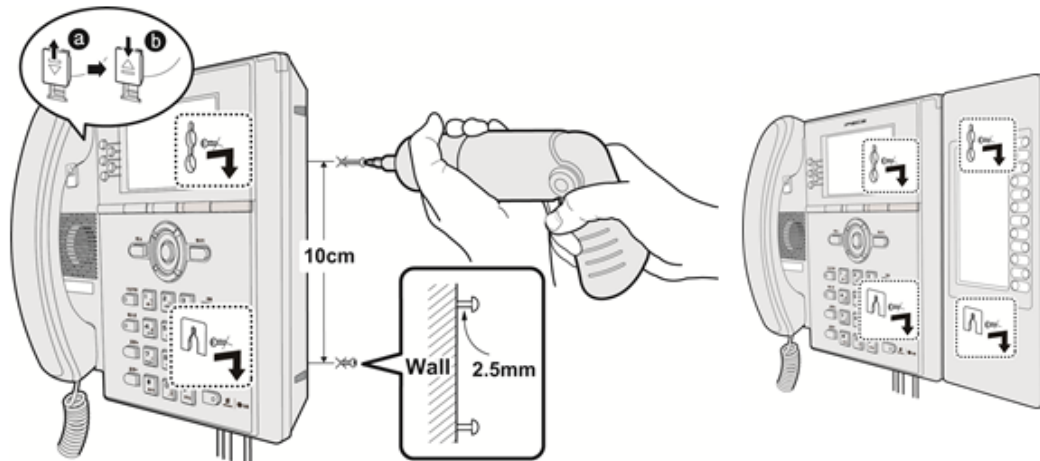


Figure 7.4.2-1 LIP-8000E Series Wall Mount Installation



## **8. *STARTING THE iPECS eMG80***

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### **8.1 iPECS eMG80 System Initial Power-up**

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The eMG80 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 the iPECS eMG80 System KSUs and the AC outlet.
3. Turn the AC Power switches on the KSU and EKSU 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#1 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 in Step 4, 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 eMG80 system, refer to the eMG80 Administration and Maintenance 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 eMG80 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 8.2.1-1 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
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		

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## **8.3 Installation Wizard**

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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 eMG80 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.

Step 1: Set Nation Code.

Step 2: Set IP Information.

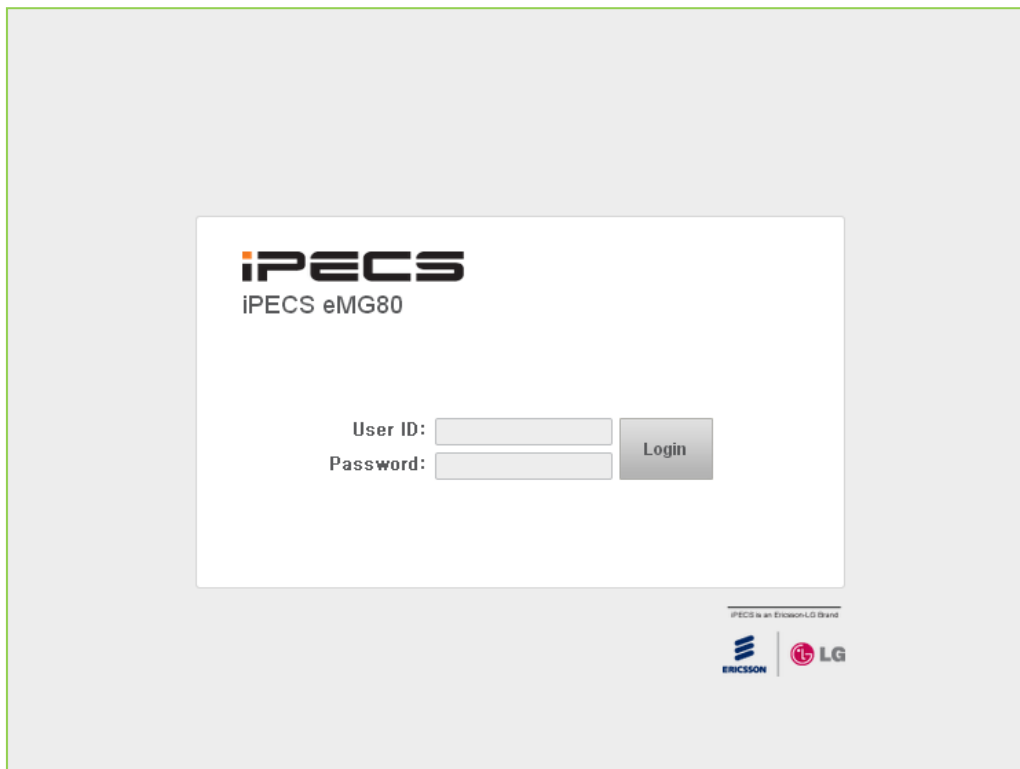
Step 3: Set Station Number.

Step 4: Set Flexible Numbering Plan.

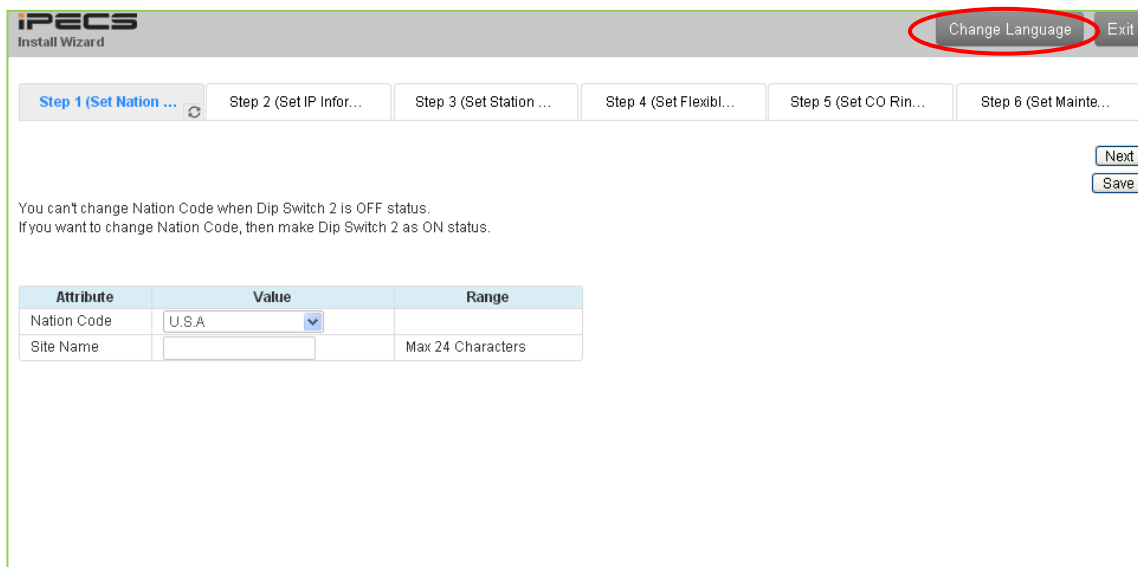
Step 5: Set CO Ring Assignment.

Step 6: Set Maintenance ID/PWD.

1. Open and point a browser to the IP address of the KSU LAN port (10.10.10.2). The iPECS eMG80 Web Admin login screen appears.
2. Enter the default User ID (admin) and Password (1234) then click **[Login]**.



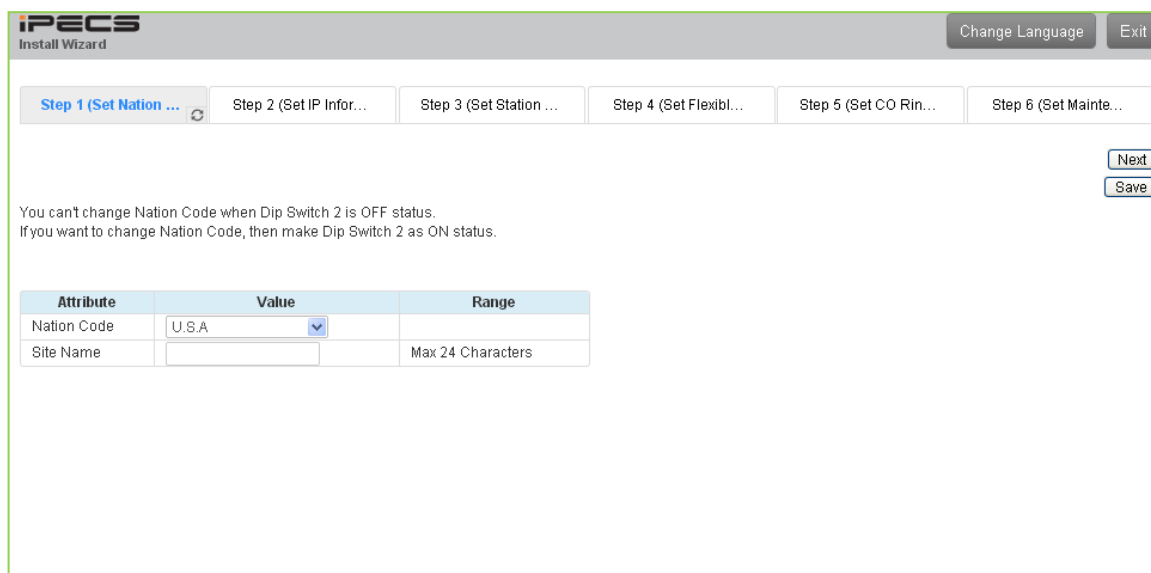
- Click **[Change Language]** at the top of browser and select the desired language and click **[Next]** to continue.



The screenshot shows the iPECS Install Wizard interface. At the top, there is a header bar with the iPECS logo and the text 'Install Wizard'. On the right side of the header bar, there are two buttons: 'Change Language' (which is circled in red) and 'Exit'. Below the header bar, there is a progress bar with six steps: 'Step 1 (Set Nation ...)', 'Step 2 (Set IP Infor...)', 'Step 3 (Set Station ...)', 'Step 4 (Set Flexibl...)', 'Step 5 (Set CO Rin...)', and 'Step 6 (Set Mainte...)'. Below the progress bar, there are two buttons: 'Next' and 'Save'. Below the buttons, there is a message: 'You can't change Nation Code when Dip Switch 2 is OFF status. If you want to change Nation Code, then make Dip Switch 2 as ON status.' Below the message, there is a table with three columns: 'Attribute', 'Value', and 'Range'.

Attribute	Value	Range
Nation Code	U.S.A	
Site Name		Max 24 Characters

- Select the appropriate country from the drop-down selections and enter the site. Click **[Next]** to continue.  
To change the Nation Code SW1 pole #2 must be ON.



The screenshot shows the iPECS Install Wizard interface. At the top, there is a header bar with the iPECS logo and the text 'Install Wizard'. On the right side of the header bar, there are two buttons: 'Change Language' and 'Exit'. Below the header bar, there is a progress bar with six steps: 'Step 1 (Set Nation ...)', 'Step 2 (Set IP Infor...)', 'Step 3 (Set Station ...)', 'Step 4 (Set Flexibl...)', 'Step 5 (Set CO Rin...)', and 'Step 6 (Set Mainte...)'. Below the progress bar, there are two buttons: 'Next' and 'Save'. Below the buttons, there is a message: 'You can't change Nation Code when Dip Switch 2 is OFF status. If you want to change Nation Code, then make Dip Switch 2 as ON status.' Below the message, there is a table with three columns: 'Attribute', 'Value', and 'Range'.

Attribute	Value	Range
Nation Code	U.S.A	
Site Name		Max 24 Characters

5. Set MPB IP address information as below and click **[Next]**.

The screenshot shows the iPECS Install Wizard interface. At the top, there's a header with the iPECS logo and 'Install Wizard' text. On the right, there are buttons for 'Change Language' and 'Exit'. Below the header is a progress bar with six steps: Step 1 (Set Nation ...), Step 2 (Set IP Info...), Step 3 (Set Station ...), Step 4 (Set Flexibl...), Step 5 (Set CO Rin...), and Step 6 (Set Mainte...). Step 2 is currently selected and highlighted. Below the progress bar, there are 'Prev', 'Next', and 'Save' buttons. The main area contains the following configuration fields:

- MPB DHCP :  (with a dropdown arrow)
- MPB IP Address :
- MPB Sub Net Mask :
- Router IP Address :
- Firewall IP Address :
- DNS IP Address :

ATTRIBUTE	DESCRIPTION	DEFAULT
MPB DHCP	Enable/Disable DHCP client function for the MPB.	OFF
MPB IP Address	Public IP Address required for remote user and external VoIP network access. IPv4 format.	10.10.10.2
MPB Subnet Mask	Define the system subnet for MPB IP addresses.	255.255.255.0
Router IP Address	IP Address of router for external network (WAN) access. Required for shared voice and data LAN, external VoIP and remote Web access.	10.10.10.1
Firewall IP Address	When the system is installed behind a NAPT server, the fixed IP Address provided by the NAPT server must be assigned here. Also, use this IP address to identify the MPB in remote devices.	0.0.0.0
DNS IP Address	IP Address of Domain Name Server, which iPECS eMG80 will use to resolve URL to an IP address. The DNS provides the resolution after receiving the name from iPECS.	0.0.0.0

6. Enter Station Index Range and click **[Load]**. Modify station numbering as required by entering the “New Station Number” to change individual station numbers or use the range method. Click **[Next]** to continue.

**iPECS**  
 Install Wizard

[Change Language](#)
[Exit](#)

Step 1 (Set Nation ...)
Step 2 (Set IP Infor...)
**Step 3 (Set Statio...)**
Step 4 (Set Flexibl...)
Step 5 (Set CO Rin...)
Step 6 (Set Mainte...)

Enter Station Index Range (1 - 140) :  [?](#) [Load](#)
[Prev](#)
[Next](#)

Station Index Range 1-50
[Save](#)

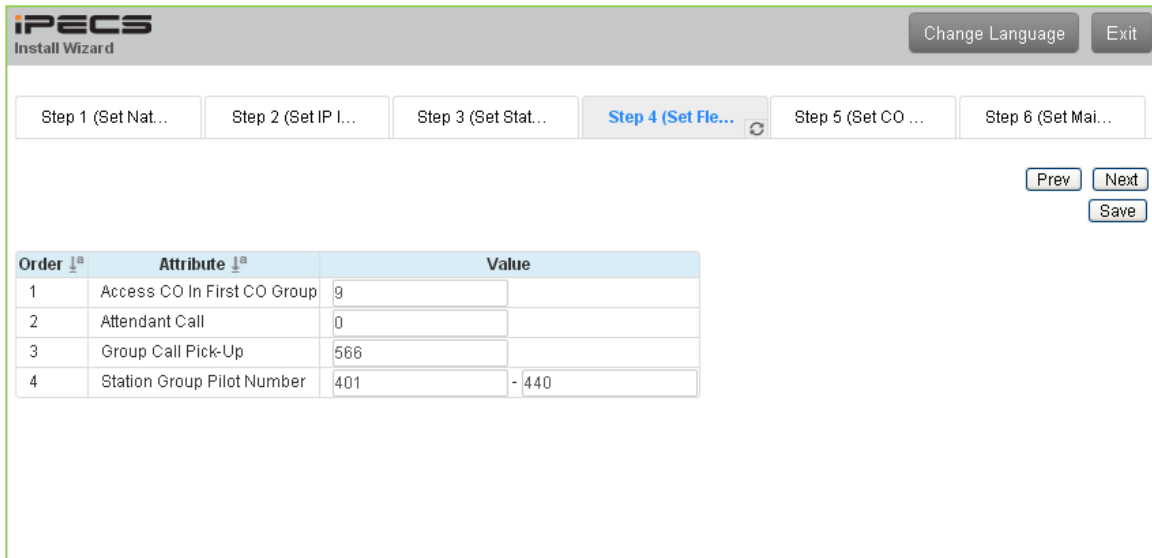
**Multiple Station Number to change**

☐ Enter Ordering Range :  -  Start Station Number :

[Range Save](#)

Index	Station Number	IP Address	MAC Address	New Station Number
1	100	10.10.10.2	b40edcbf5606	100
2	101	10.10.10.2	b40edcbf5606	101
3	102	10.10.10.2	b40edcbf5606	102
4	103	10.10.10.2	b40edcbf5606	103
5	104	10.10.10.2	b40edcbf5606	104
6	105	10.10.10.2	b40edcbf5606	105
7	106	10.10.10.2	b40edcbf5606	106
8	107	10.10.10.2	b40edcbf5606	107
9	108	10.10.10.2	b40edcbf5606	108
10	109	10.10.10.2	b40edcbf5606	109
11	110	10.10.10.2	b40edcbf5606	110
12	111	10.10.10.2	b40edcbf5606	111
13	112	10.10.10.2	b40edcbf5606	112
14	113	10.10.10.2	b40edcbf5606	113
15	114	10.10.10.2	b40edcbf5606	114
16	115	10.10.10.2	b40edcbf5606	115
17	116	10.10.10.2	b40edcbf5606	116
18	117	10.10.10.2	b40edcbf5606	117
19	118	10.10.10.2	b40edcbf5606	118
20	119	10.10.10.2	b40edcbf5606	119
21	120	10.10.10.2	b40edcbf5606	120
22	121	10.10.10.2	b40edcbf5606	121

7. Set the Numbering plan for CO access, Attendant call, Pickup and Hunt groups, then click **[Next]** to continue.



The screenshot shows the iPECS Install Wizard interface. At the top, there's a header with the iPECS logo and 'Install Wizard' text. On the right, there are buttons for 'Change Language' and 'Exit'. Below the header, a progress bar shows six steps: Step 1 (Set Nat...), Step 2 (Set IP I...), Step 3 (Set Stat...), Step 4 (Set Fle...), Step 5 (Set CO ...), and Step 6 (Set Mai...). Step 4 is currently selected and highlighted in blue. To the right of the progress bar, there are buttons for 'Prev', 'Next', and 'Save'. Below the progress bar, there is a table with the following data:

Order	Attribute	Value
1	Access CO In First CO Group	9
2	Attendant Call	0
3	Group Call Pick-Up	566
4	Station Group Pilot Number	401 - 440

- ✓ Access CO in first CO Group: Dial code to access the 1<sup>st</sup> available CO Line in any accessible group.
- ✓ Attendant Call: Dial code to call an Attendant.
- ✓ Group Call Pick-Up: Dial code to activate Group Call Pick-up.
- ✓ Station Group Pilot number: Assign the pilot number on each Station Group

8. Set CO Ring assignment, then click **[Next]** to continue.

Step 1 (Set Nation ...)

Step 2 (Set IP Infor...)

Step 3 (Set Station ...)

Step 4 (Set Flexibl...)

Step 5 (Set CO Rin...)

Step 6 (Set Mainte...)

Change Language

Exit

Prev

Next

Save

Check All	Attribute	Value	Range	Station Delay Value [Station:Delay]
<input type="checkbox"/>	Day	<input checked="" type="radio"/> Station Range	Range : <input type="text"/> - <input type="text"/> Delay : <input type="text"/>	0~9 [100:0]
		<input type="radio"/> Hunt Group	<input type="text"/>	
		<input type="radio"/> VSF	Announcement : <input type="text"/> Auto Drop : <input type="checkbox"/>	0~70
		<input type="radio"/> AA Ring Time	<input type="text"/>	0~30
		<input type="radio"/> Net Station	<input type="text"/>	
<input type="checkbox"/>	Night	<input checked="" type="radio"/> Station Range	Range : <input type="text"/> - <input type="text"/> Delay : <input type="text"/>	0~9 [100:0]
		<input type="radio"/> Hunt Group	<input type="text"/>	
		<input type="radio"/> VSF	Announcement : <input type="text"/> Auto Drop : <input type="checkbox"/>	0~70
		<input type="radio"/> AA Ring Time	<input type="text"/>	0~30
		<input type="radio"/> Net Station	<input type="text"/>	
<input type="checkbox"/>	Timed Ring	<input checked="" type="radio"/> Station Range	Range : <input type="text"/> - <input type="text"/> Delay : <input type="text"/>	0~9 [100:0]
		<input type="radio"/> Hunt Group	<input type="text"/>	
		<input type="radio"/> VSF	Announcement : <input type="text"/> Auto Drop : <input type="checkbox"/>	0~70
		<input type="radio"/> AA Ring Time	<input type="text"/>	0~30
		<input type="radio"/> Net Station	<input type="text"/>	

Each “Normal” CO/IP line is assigned to signal a station, station group or VSF Announcement for an incoming call (Ring). Separate ring assignments are made for Day, Night, and Timed Ring mode. A delay from 1 to 9 Ring cycles can also be assigned, based on this assignment, the station/Hunt group will receive audible ring after a delay of the number of Ring cycles entered. In addition, when assigned to ring a VSF Announcement, the system can be programmed to disconnect after the announcement, ‘Auto Drop’.

When CO/IP Lines are programmed to Ring an external AA/VM, VSF or Feature Server Group as an Automated Attendant, the signal can be on an immediate or delayed basis allowing stations/groups to be assigned Ring and answer prior to signaling the AA. The delay is defined in seconds from 00 to 30.

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9. Set Web Admin User ID and Password.

The screenshot shows the iPECS Install Wizard interface. At the top, there's a header with the iPECS logo and 'Install Wizard' text. On the right, there are buttons for 'Change Language' and 'Exit'. Below the header is a progress bar with six steps: Step 1 (Set Nation ...), Step 2 (Set IP Infor...), Step 3 (Set Station ...), Step 4 (Set Flexibl...), Step 5 (Set CO Rin...), and Step 6 (Set Mainte...). Step 6 is currently selected and highlighted in blue. Below the progress bar, there are 'Prev', 'Finish', and 'Save' buttons. The main content area is titled 'Add User' and contains two input fields: 'User ID' and 'Password'. The 'User ID' field has a tooltip that says 'Max 16 Characters & Digits English Only / First letter must be Alphabet'. The 'Password' field has a 'Show Password' checkbox and a tooltip that says 'Max 16 Characters & Digits'. Below the input fields is a table titled 'User List' with two columns: 'User ID' and 'Privilege'. The table is currently empty.

iPECS eMG80 supports up to 10 system account (ID and password). The Access privilege is determined based on the entered system account (ID/Password). Station user ID and password is managed in PGM 227.

Up to 50 users ID and password can be registered.

Up to 10 users can login to a system simultaneously.

10. Press Save to store the entered information. If the Nation Code in Step 3 was changed, reset the system by pressing the recessed Reset button or power cycling the system.

**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.

## 9. MAINTENANCE & TROUBLESHOOTING

### 9.1 General Maintenance

The eMG80 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 the iPECS eMG80 KSU. The PSU provides three DC voltage power sources to MBU through the 7-pin connector, CN7. The fuse, which is 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 the EKSU 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.

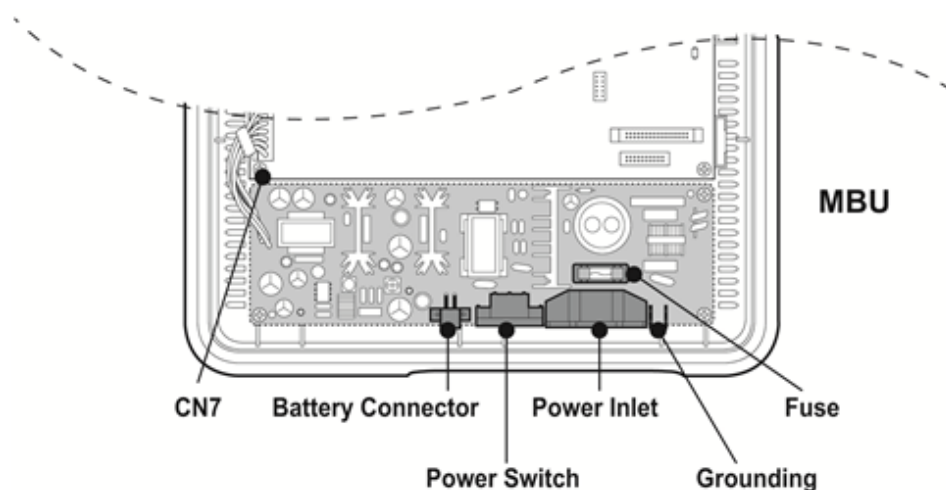


Figure 9.2-1 PSU Fuse Replacement

## 9.3 Troubleshooting

**Table 9.3-1 eMG80 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.
	LD1-3 LEDs on the MBU are All ON or All OFF	Dust each board with a dry cloth. Check the PSU fuse. Replace the PSU with an identical one.
System does not operate	Power short circuit in some board(s)	Check the connection of each board with the MBU.
	Bad board connection	Check the System Clock.
	System database not working	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.
DKTU does not operate	Bad extension circuit	Exchange the malfunctioning board for one in good working condition.
	Bad connection between the MBU/EMBU/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/EMBU/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/EMBU/ Option boards	Exchange the board for one in good working condition.
	Bad connection between the MBU/EMBU/ 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.
Expansion KSU does not operate	Power ON sequence	Turn on the KSU after turning on the Expansion KSU. Then press the Reset button
	Expansion cable connection	Check the Expansion cable to verify the connection and its working condition.
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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