

iPECS

iPECS eMG80

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 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 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.

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

| SW version | Issue | Date | DESCRIPTION OF CHANGES |
|-------------------|--------------|-------------|---|
| 1.0.x | 1.0 | Sep, 2013 | Initial Release |
| | 1.1 | Dec, 2013 | Minor Spec. updates and Changed Ericsson-LG to Ericsson-LG Enterprise |
| 1.2.x | 1.2 | June, 2015 | Added LIP-9000 series. Added Pre-installation guide for power cord. Update Installation wizard. |
| 2.0.X | 1.3 | Jan, 2016 | Added MEMU2, GDC-480H, LDP-9200 Series, LIP-9071 Phone. Updated the Login screen and Install wizard (adding Keypad admin P/W). |
| | | | |

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Table of Contents

| | |
|--|-----------|
| 1. INTRODUCTION | 1 |
| 1.1 Important Safety Instructions | 1 |
| 1.1.1 Safety Requirements | 1 |
| 1.1.2 Precaution | 2 |
| 1.2 About This Manual | 3 |
| 2. SYSTEM OVERVIEW | 4 |
| 2.1 iPECS eMG80 System Highlights | 4 |
| 2.2 General Cabinet Description | 4 |
| 2.3 System Connection Diagram | 6 |
| 2.4 System Components | 7 |
| 2.5 Specifications..... | 9 |
| 2.5.1 General Specifications..... | 9 |
| 2.5.2 System Capacity..... | 10 |
| 2.5.3 Base station specification (GDC-600BE) | 16 |
| 2.5.4 Wireless Terminal specification (GDC-450H/480H/500H)..... | 16 |
| 3. INSTALLATION OVERVIEW..... | 17 |
| 3.1 Pre-Installation Guidelines..... | 17 |
| 3.1.1 Safety Installation Instructions | 17 |
| 3.1.2 Installation precautions | 17 |
| 3.1.3 Wiring Precautions | 18 |
| 3.1.4 Checking Power cord..... | 18 |
| 3.2 Installation Overview | 19 |
| 3.3 Preparation | 19 |
| 4. BOARD INSTALLATION AND DESCRIPTION | 22 |
| 4.1 General information | 22 |
| 4.2 Closing and Opening the front cover | 22 |
| 4.3 Removing and Replacing the KSU & Cord cover | 24 |
| 4.4 Installation of Option Boards..... | 25 |
| 4.5 KSU Main Board Unit (MBU) | 26 |
| 4.5.1 MBUA (Main Board Unit) | 26 |
| 4.5.2 MBUAD (Main Board Unit)..... | 29 |
| 4.5.3 MBUI (Main Board Unit)..... | 32 |
| 4.5.4 MBUID (Main Board Unit)..... | 35 |
| 4.6 EKSU Expansion Main Board Unit (EMBU)..... | 38 |

| | | |
|------------|---|-----------|
| 4.7 | Optional Interface Boards | 41 |
| 4.7.1 | CH204 (2 CO Line and 4 Hybrid Interface Board)..... | 42 |
| 4.7.2 | CH408 (4 CO Line and 8 Hybrid Interface Board)..... | 43 |
| 4.7.3 | CS416 (4 CO and 16 SLT Interface Board) | 44 |
| 4.7.4 | BH104 (1BRI and 4 Hybrid Interface Board) | 45 |
| 4.7.5 | BH208 (2BRI and 8 Hybrid Interface Board) | 47 |
| 4.7.6 | PRIU (1 PRI -30 Channels- Interface Board) | 48 |
| 4.7.7 | BRIU2 (2 BRI -4 Channels- Interface Board) | 50 |
| 4.7.8 | HYP8 (Hybrid 8 Interface Board) | 52 |
| 4.7.9 | SLB16 (SLT 16 Interface Board)..... | 53 |
| 4.7.10 | WTIB4 (Wireless DECT Interface Board)..... | 54 |
| 4.8 | Optional Function Boards | 56 |
| 4.8.1 | VVMU (VoIP & Voice Mail Unit) | 56 |
| 4.8.2 | MEMU (Memory Expansion Module Unit) | 58 |
| 4.8.3 | MEMU2 (Memory Expansion Module Unit) | 58 |
| 4.8.4 | MODU (Modem Function Unit) | 59 |
| 4.8.5 | MG-CMU4 (Call Metering - 50Hz/12KHz/16KHz Unit) | 59 |
| 5. | MOUNTING THE KSU AND EKSU | 60 |
| 5.1 | KSU Exterior and Dimension | 60 |
| 5.2 | Desk Mount..... | 61 |
| 5.3 | Wall Mount..... | 62 |
| 5.4 | Rack Mount..... | 63 |
| 6. | KSU AND EKSU WIRING | 65 |
| 6.1 | Connecting the Basic and Expansion KSUs | 65 |
| 6.2 | Grounding the KSUs..... | 66 |
| 6.3 | External Backup Battery Installation..... | 67 |
| 6.4 | Line and Station Modular Jack Wiring | 69 |
| 6.4.1 | CO Line Modular Jack Wiring | 69 |
| 6.4.2 | BRI Line Modular Jack Wiring..... | 69 |
| 6.4.3 | PRI Line Modular Jack Wiring..... | 70 |
| 6.4.4 | Digital Station Modular Jack Wiring | 70 |
| 6.4.5 | Hybrid Station Modular Jack Wiring | 71 |
| 6.4.6 | DKT/SLT Station Modular Jack Wiring..... | 71 |
| 6.4.7 | SLT Station Modular Jack Wiring..... | 72 |
| 6.4.8 | WTIB4 Base Station Modular Jack Wiring | 72 |
| 6.5 | MBU and VVMU LAN Port Wiring..... | 75 |
| 6.6 | USB port | 75 |
| 6.7 | Connecting Miscellaneous Devices | 76 |

| | | |
|------------|--|------------|
| 6.8 | RS-232 Serial Port Wiring | 78 |
| 6.9 | Cable Wiring | 79 |
| 6.9.1 | Dressing the Wall Mount Wiring..... | 79 |
| 6.9.2 | Rack Mount Wiring | 80 |
| 6.9.3 | Replace the Cord Cover | 81 |
| 7. | TERMINAL CONNECTION AND WIRING | 82 |
| 7.1 | Terminal Models | 82 |
| 7.2 | Terminal Cabling Distance | 84 |
| 7.3 | Terminal Connection | 85 |
| 7.3.1 | DKTU Wiring..... | 85 |
| 7.3.2 | SLT Wiring..... | 85 |
| 7.3.3 | LIP Phone Wiring..... | 86 |
| 7.3.4 | DSS/BLF Console Installation & Wiring | 87 |
| 7.4 | Terminal Wall Mount | 94 |
| 7.4.1 | LDP-7000/9000/9200 series Wall Mount..... | 94 |
| 7.4.2 | LIP-8000/8000E Wall Mount..... | 94 |
| 7.4.3 | LIP-9000 Wall Mount | 95 |
| 8. | STARTING IPECS EMG80 | 96 |
| 8.1 | iPECS eMG80 System Initial Power-up | 96 |
| 8.2 | Verify the Nation Code | 97 |
| 8.2.1 | Using the DKT | 97 |
| 8.3 | Installation Wizard | 98 |
| 9. | MAINTENANCE & TROUBLESHOOTING | 104 |
| 9.1 | General Maintenance | 104 |
| 9.2 | PSU Fuse Replacement | 104 |
| 9.3 | Troubleshooting | 105 |
| 10. | OPEN SOURCE SOFTWARE NOTICE | 106 |

1. INTRODUCTION

1.1 Important Safety Instructions

1.1.1 Safety Requirements

- When using your telephone equipment, basic safety precautions should always be followed to reduce the risk of fire, electric shock and other personal injury, including the following:
 - Please read and understand all instructions.
 - Follow all warnings and instructions marked on the product.
 - Unplug this product from the wall outlet before cleaning. A slightly damp cloth should be used for cleaning; do not use liquid or aerosol cleaners.
 - Do not use this product near water, such as bathtub, washbowl, kitchen sink or laundry tub, a wet basement, or near a swimming pool.
 - Do not place this product on an unstable stand or table. The product may fall, causing serious damage to the product or serious injury.
 - Slots and openings in the KSU and the back or bottom are provided for ventilation, to protect it from overheating, these openings must not be blocked or covered. The openings should never be blocked by placing the product on a bed, sofa, or other similar surface. This product should never be placed near or over a radiator or other heat source. This product should not be placed in a built-in installation without proper ventilation.
 - This product should be operated only from the type of power source indicated on the product label. If you are not sure of the type of power supply to your location, consult your dealer or local power company.
 - Do not allow anything to rest on the power cord. Do not locate this product where the cord could be abused by people walking on it.
 - Do not overload wall outlets and extension cords as this can result in the risk of fire or electric shock.
 - Never push objects of any kind into this product through KSU slots or connectors as they may touch dangerous voltage points or short out parts that could result in a risk of fire, electric shock or product failure. Never spill liquid of any kind on the product.
 - To reduce the risk of electric shock, do not disassemble this product. Instead, take it to a qualified person when service or repair work is required. Opening or removing covers may expose you to dangerous voltages or other risk. Incorrect reassemble can cause electric shock when the appliance is subsequently used.
 - Unplug this product from the wall outlet and refer servicing to qualified service personnel under the following conditions:
 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 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.

1.2 About This Manual

This document provides general information covering the description and installation of 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 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 iPECS eMG80 System.

Section 4 Board Installation & Description

Provides a description and instructions for installing components of 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 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 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.

2. SYSTEM OVERVIEW

2.1 iPECS eMG80 System Highlights

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.

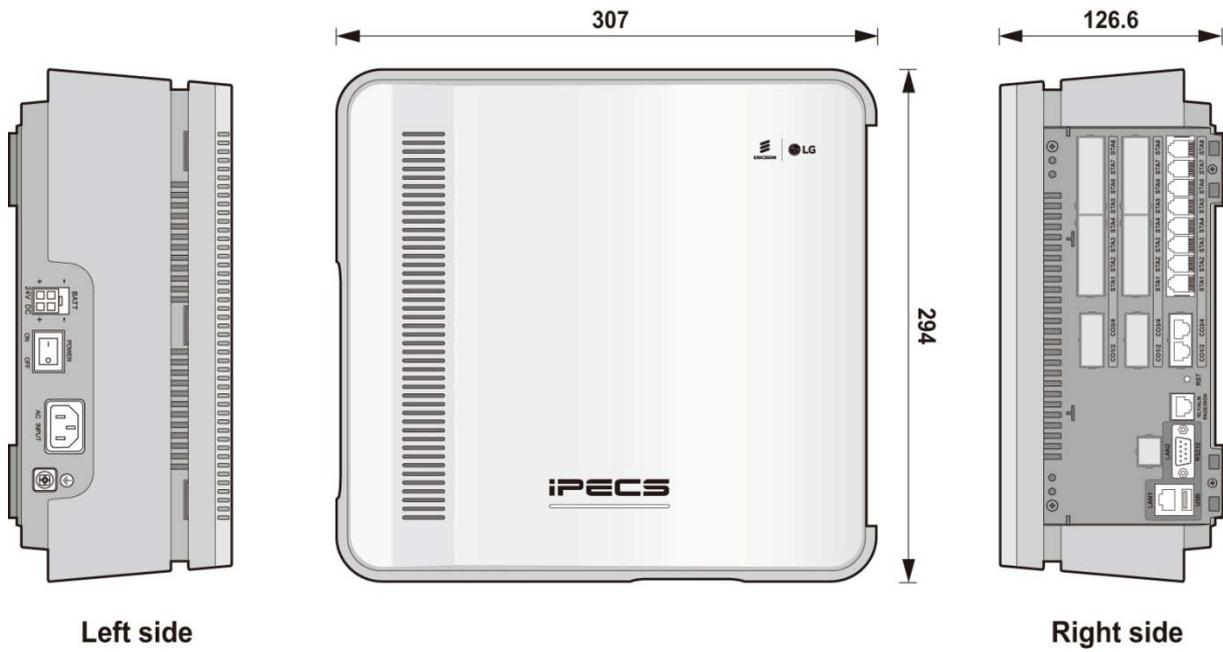
The rich feature set spans all the basic features and functions of a modern communications platform such as Transfer, Caller Id, MOH, etc. and delivers advanced functions including an integrated multi-level Auto Attendant and Voice Mail with both mobile and E-mail notification. In addition, the eMG80 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.

2.2 General Cabinet Description

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.



Left side

Right side

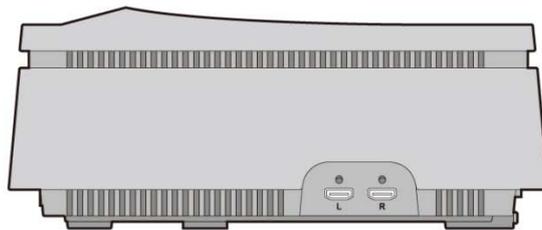
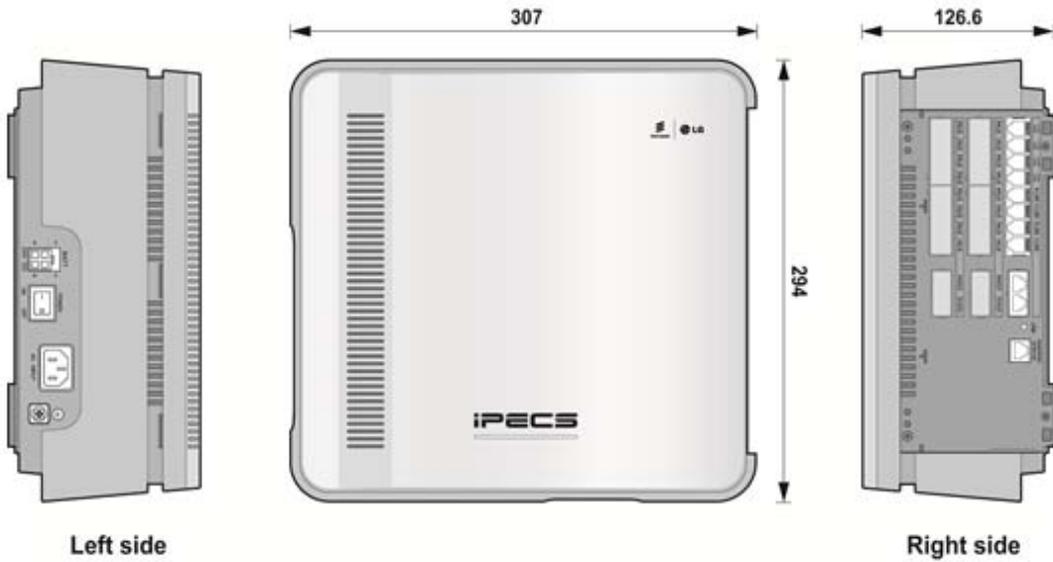


Figure 2.2-1 KSU Appearance



Left side

Right side

Figure 2.2-2 EKSU Appearance

2.3 System Connection Diagram

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

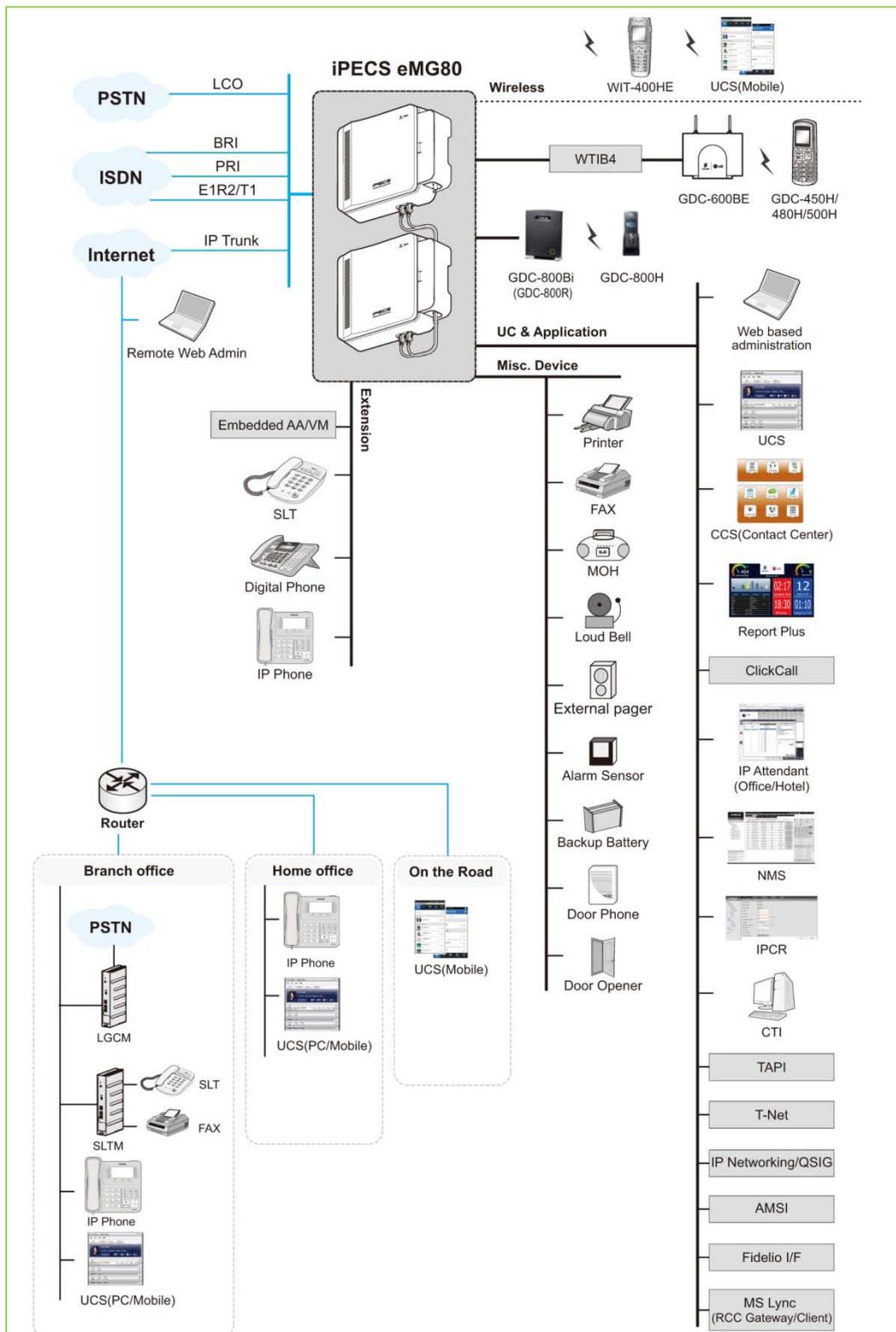


Figure 2.2-3 System Connection Diagram

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 channels/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 channels/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 channels/32 hours Max.) VoIP (2 channels default, 16 channels Max.) |
| KSUID | MBUID | 8 DKT and 4 SLT Interfaces Voice Mail (2 channels/1 hour default, 8 channels/32 hours Max.) VoIP (2 channels default, 16 channels 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 (by license) and 16 hours for storage expansion (1 hour default, 15 hours by license) |
| | eMG80-MEMU | Memory Expansion Module Unit for VM (15 hours expansion) |
| | eMG80-MEMU2 | Memory Expansion Module Unit for VM (60 hours 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-MEMU2 | 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 w/MEMU2 | 8 channels(2 Chan. by default, 1 Channel by license), 1 hour 15 hours(no license needed) 60 hours(no license needed) |
| VSF Device 2 (VVMU) | 8 channels (by license) & 15 hours(by license), 1 hour(by default) |
| Conference channels | 148 channels/13 party per group |
| 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, 25 digits each |
| System Speed Dial Zones (Groups) | 10 zones |
| Station Speed Dial | 100 per station, 25 digits each (Max. 4000 numbers) |

| Item | Capacity |
|---------------------------------|---------------------------------|
| Last Number Redial | 10 numbers |
| Save Number Redial | 1 number |
| DSS Consoles per Station | 3 |
| Serial DSS - System | 100 |
| Serial DSS – Station (LIP-8000) | 4 |
| Serial DSS – Station (LIP-9000) | 1 |
| SMDR buffer | 5000 |
| CO Line Groups | 20 |
| Station & Station Groups | 40 |
| Station & Station 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) |
| Transparent Networking Table | 15 |
| ICLID Routing table | 250 |
| Tenancy (ICM) Group | 15 |
| Attendant Station | 4 |
| DID Digits Analysis | 4 |
| MSN Table | 500 |

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

| Item | Specification |
|--------------------------------|--|
| Power feeding | +30VDC |
| Transmission Max Power | 250mW |
| Access Method/Duplex | TDMA/TDD |
| Frequency Band | 1,880 ~ 1,900MHz 1,920 ~ 1,930MHz (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/480H/500H)

Table 2.5.4-1 DECT Handset Specifications

| Item | Specification |
|--------------------|--|
| Transmission Power | 250mW maximum |
| Modulation Method | GFSK |
| Frequency Band | 1,880MHz ~ 1,900MHz 1,920MHz ~ 1,930MHz (USA) |

3. INSTALLATION OVERVIEW

3.1 Pre-Installation Guidelines

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

3.1.1 Safety Installation Instructions

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

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

3.1.2 Installation precautions

IPECS 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 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 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.

3.1.4 Checking Power cord

Checking the power cord at least once a year to prevent fire hazard or electric shock.

Be sure to disconnect the power cord from the wall outlet and System's inlet for the following symptoms:

1. Burn marks on the plug.
2. The prongs on the plug are deformed.
3. The power cord's inner wires are exposed, broken, etc.
4. The power cord's coating has a crack.
5. The power cord is overheating.
6. The power cord is damaged.

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

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

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

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

3.2 Installation Overview

The installation is conducted in 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.

3.3 Preparation

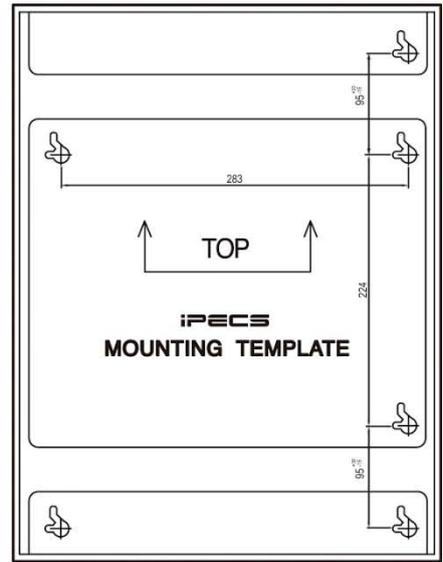
In preparation for the installation, locate an appropriate site for the KSU installation considering the precautions mentioned in earlier sections, wiring, access to power, etc. Also, if installing DECT, locate the best estimated position for the Base Stations. The permanent location of the Base Station will be determined using the GDC-600TBE 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.

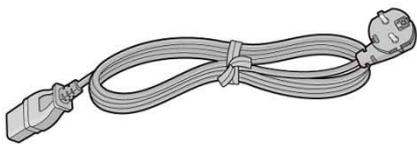
Note the Expansion cable is provided only with the Expansion KSU.



Key Service Unit



Mounting template



Power cord



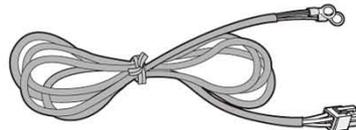
Tie cable



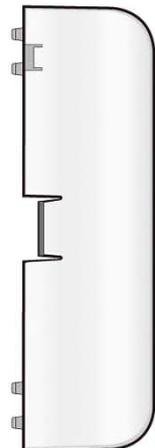
Installation Manual



CD Manual



Backup Battery Cable



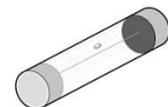
Cord cover



Anchor plug



Screw

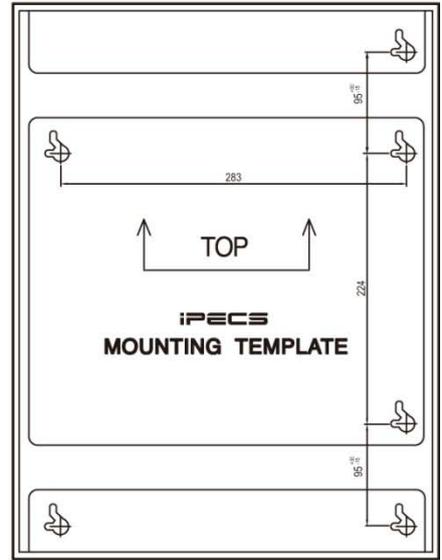


Fuse

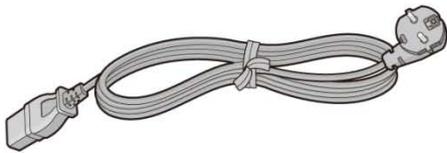
Figure 3.1 KSU Carton Contents



Key Service Unit



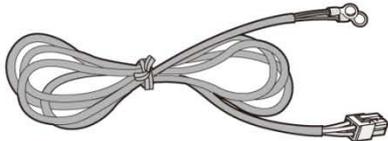
Mounting template



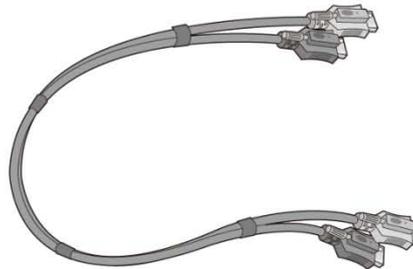
Power cord



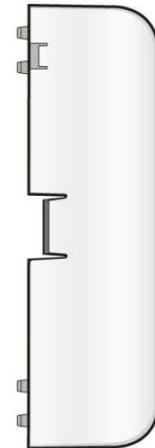
Tie cable



Backup Battery Cable



Expansion cable



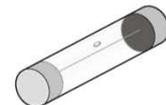
Cord cover



Anchor plug



Screw



Fuse

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.

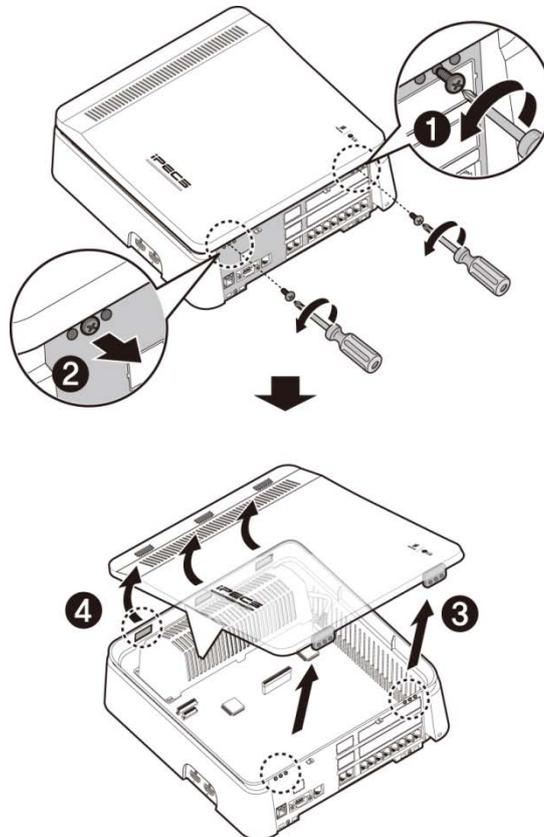


Figure 4.1 Opening the Front Cover

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.

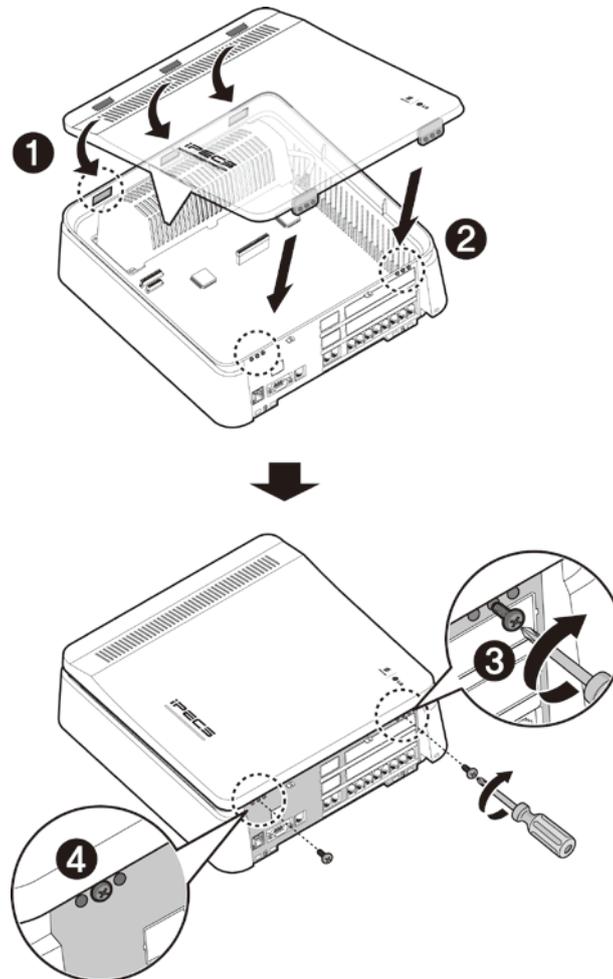


Figure 4.2 Closing the Front Cover

NOTE

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

4.3 Removing and Replacing the KSU & Cord cover

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.

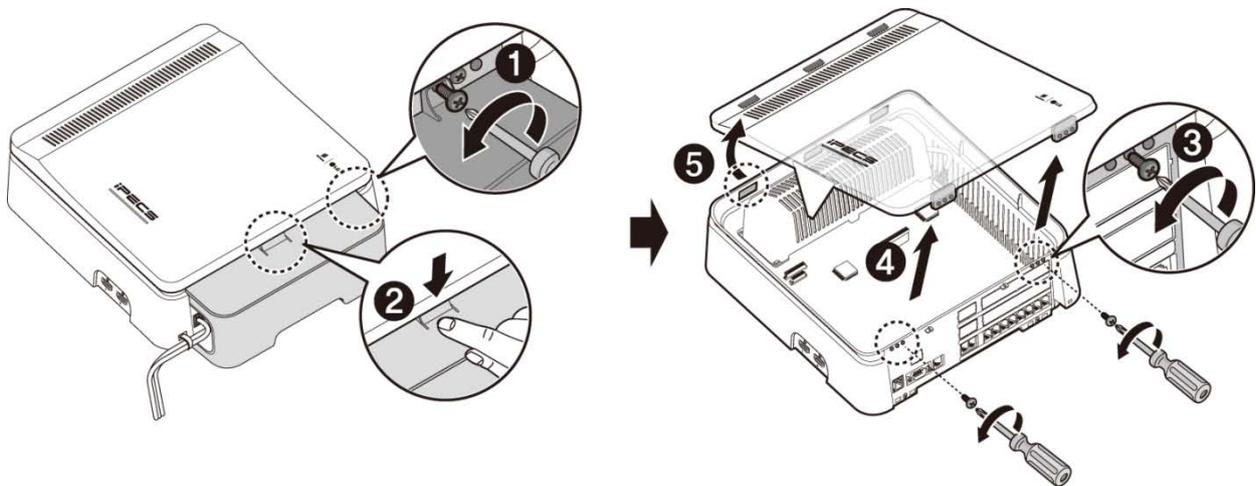


Figure 4.3 Opening the KSU and Cord Cover

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.

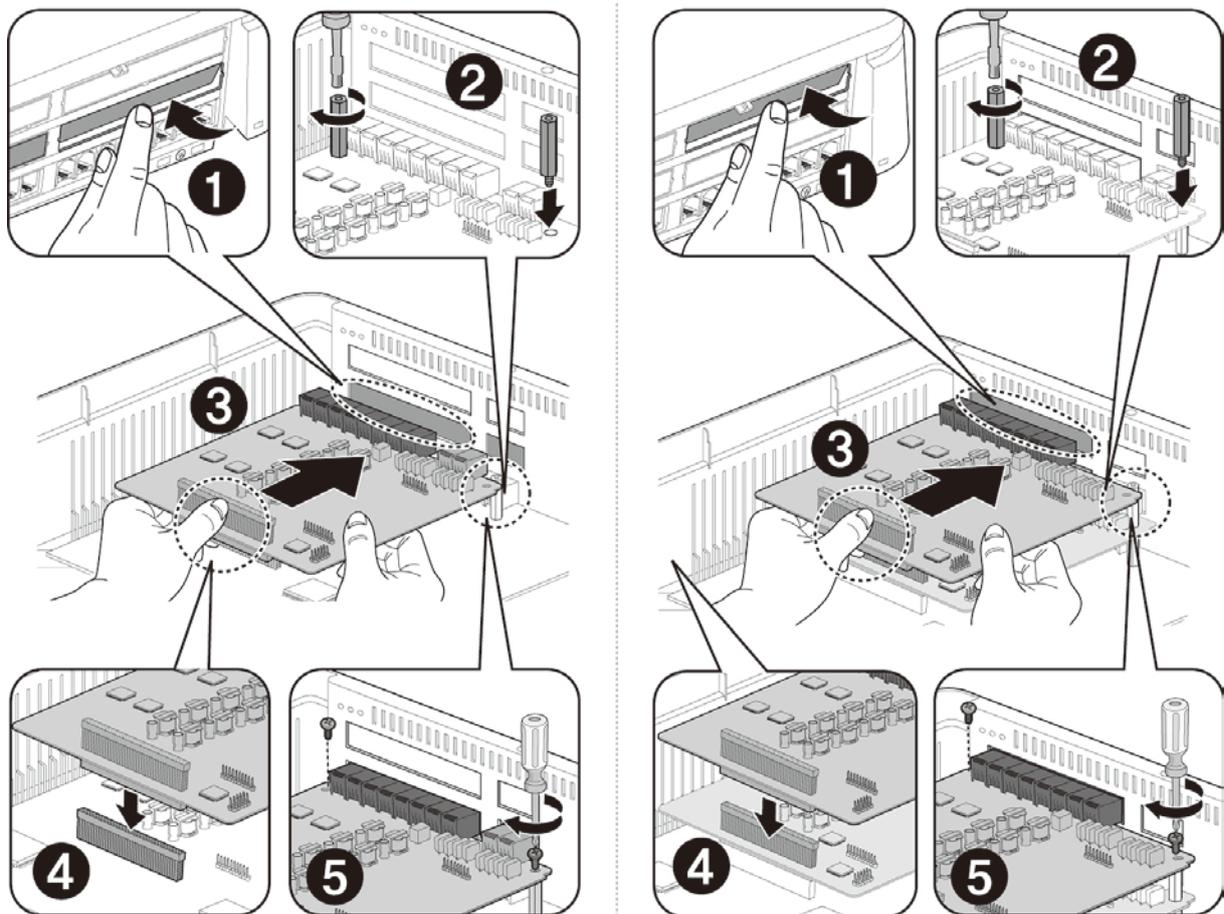


Figure 4.4 Board Installation

4.5 KSU Main Board Unit (MBU)

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

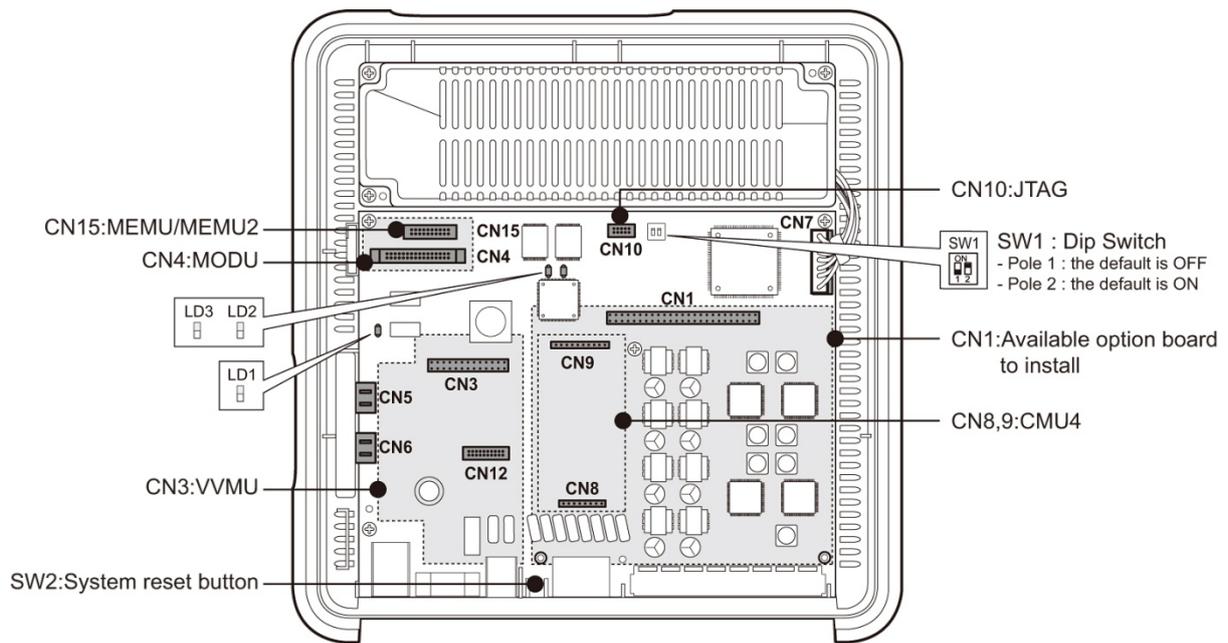


Figure 4.5.1-1 MBUA

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/MEMU2 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

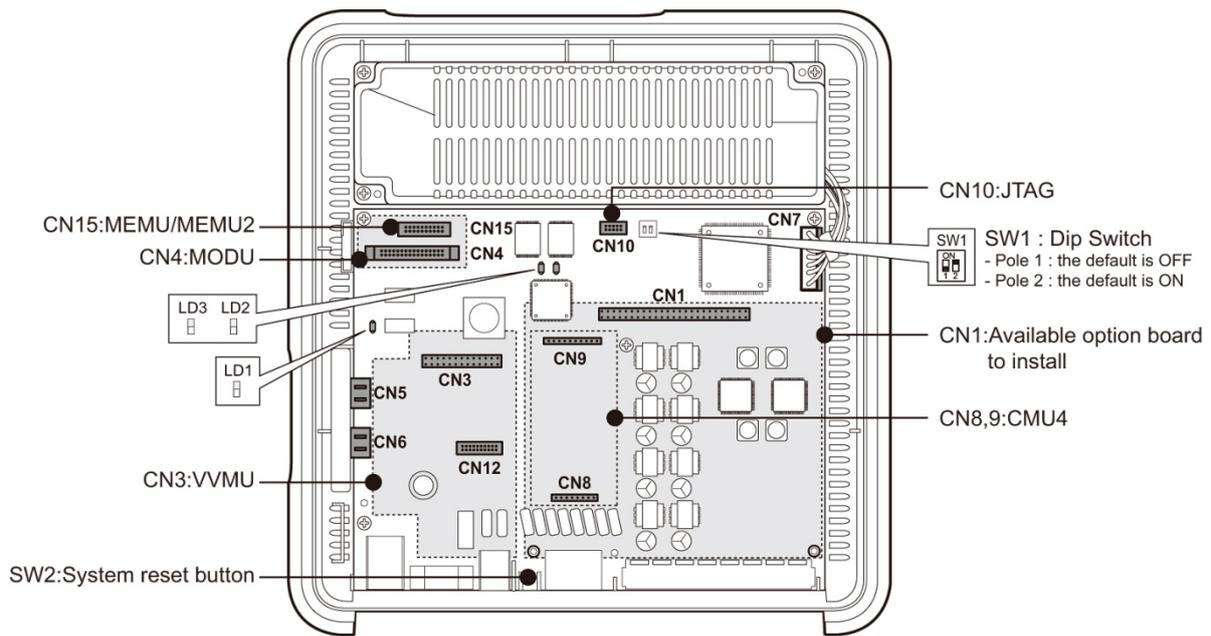


Figure 4.5.2-1 MBUAD

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/MEMU2 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.

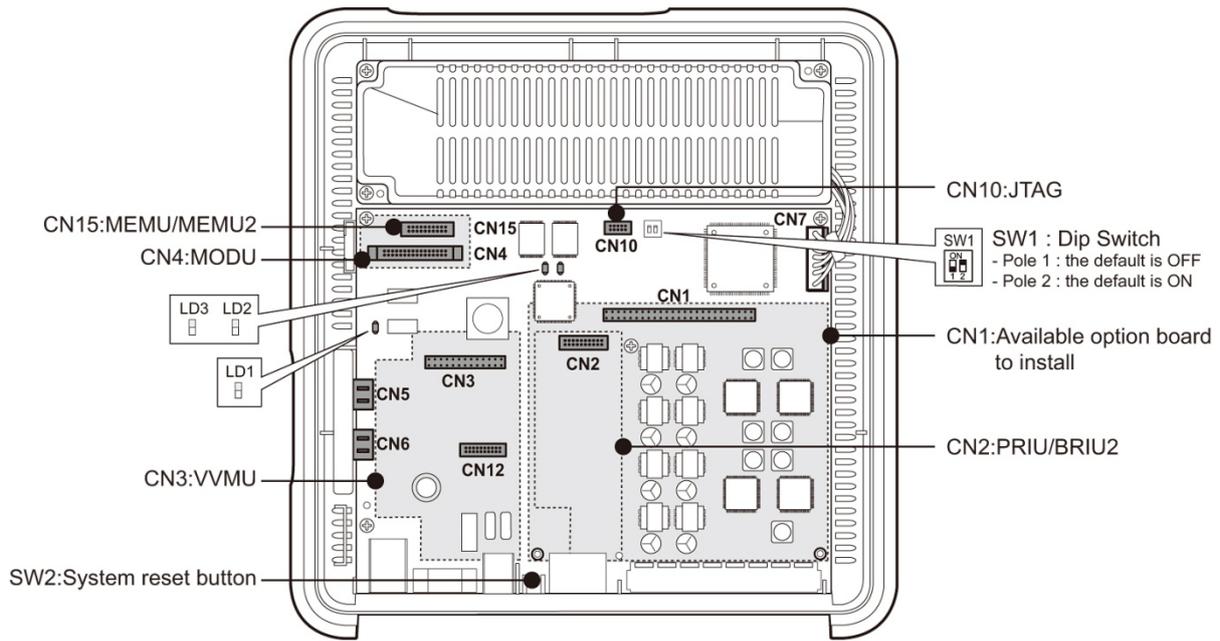


Figure 4.5.3-1 MBUI

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/MEMU2 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.

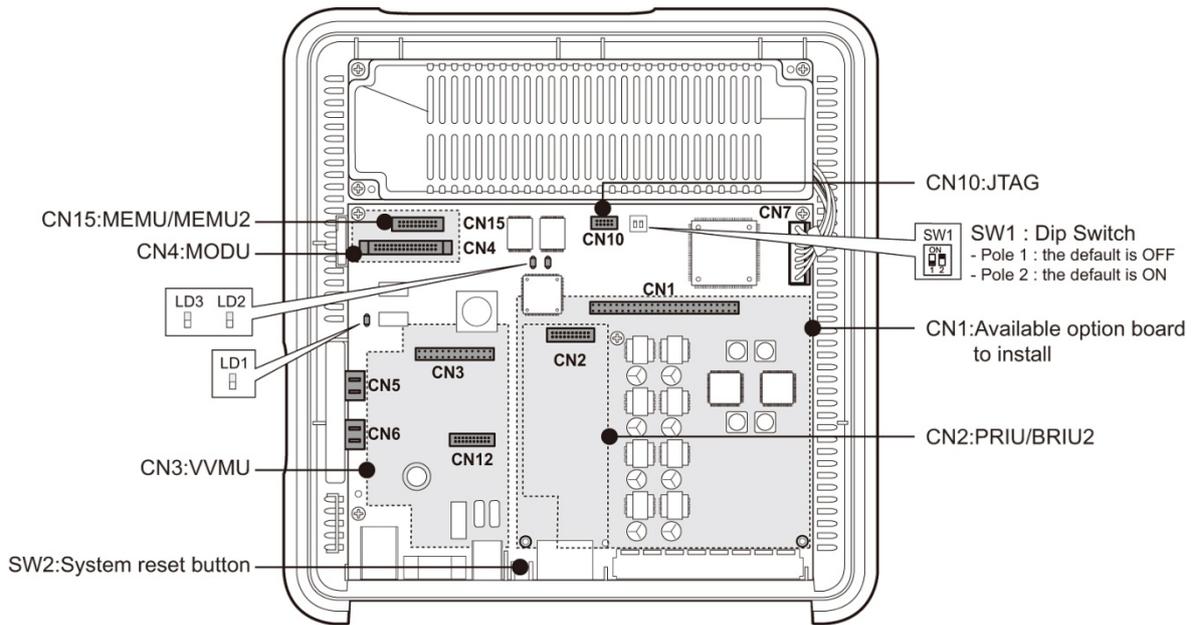


Figure 4.5.4-1 MBUID

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/MEMU2 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 |

4.6 EKSU Expansion Main Board Unit (EMBU)

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

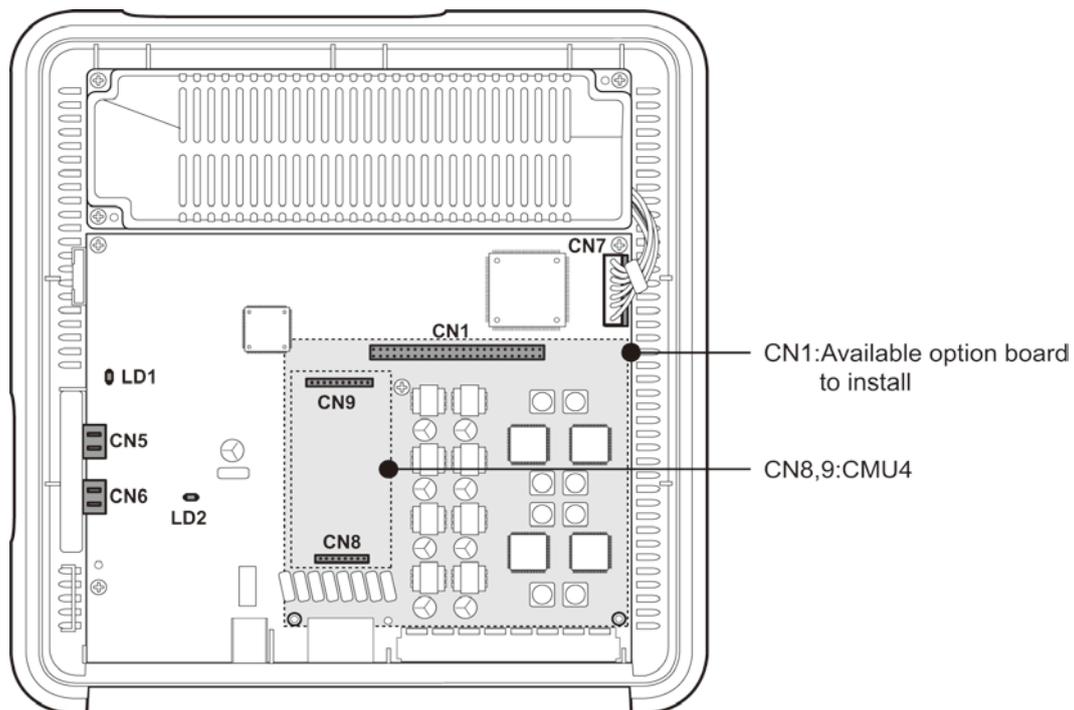


Figure 4.6-1 EMBU

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 |

4.7 Optional Interface Boards

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

| Board | Description | Connectors | Cable |
|--------------|------------------------------|-------------------|-----------------|
| 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.

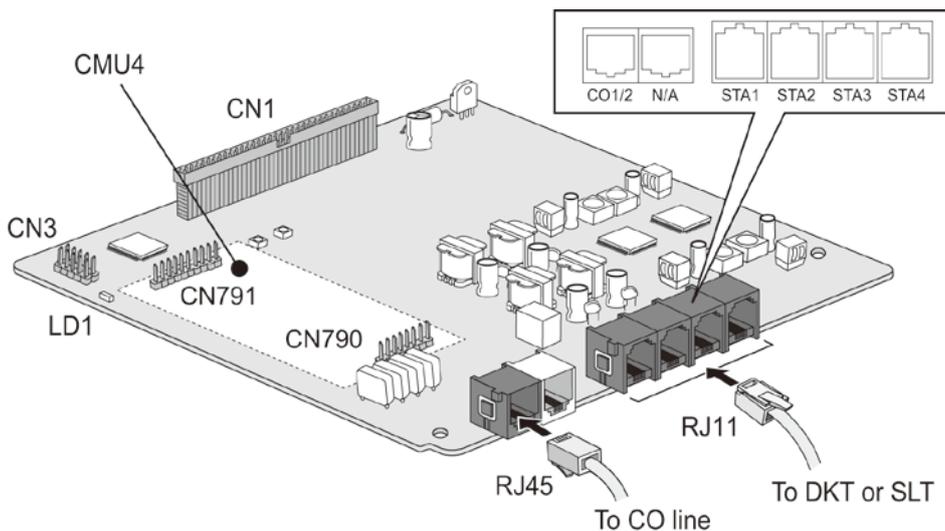


Figure 4.7.1-1 CH204

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.

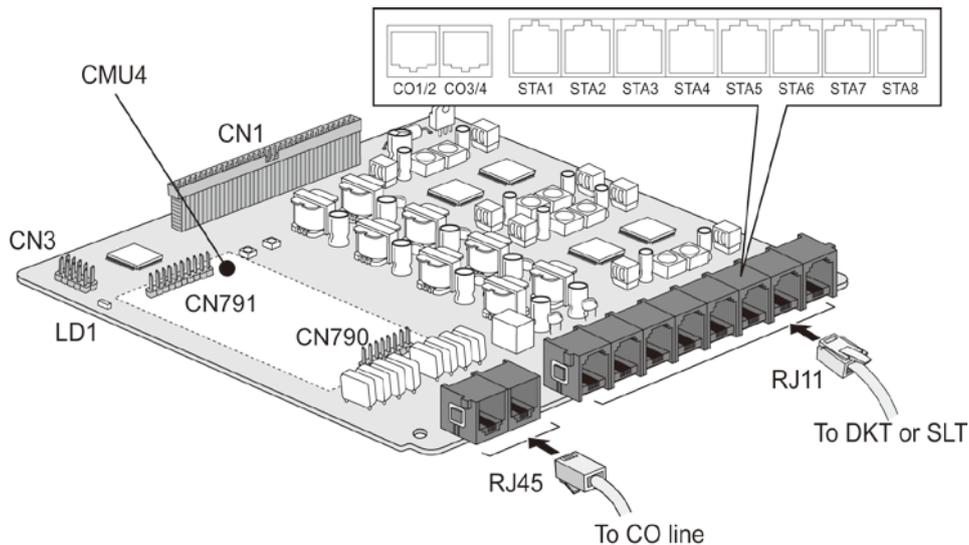


Figure 4.7.2-1 CH408

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 |

4.7.3 CS416 (4 CO and 16 SLT Interface Board)

Description

The CS416 board has four (4) CO line and 16 SLT interface ports. Note that eight of the 16 SLT interface ports are provided from the SLU8 daughter board that is factory installed. The board can be installed on CN1 connector of the KSU or EKSU for expansion. Also, MG-CMU4 daughter board for call metering can be installed on CN790, CN791 as shown in Figure 4.7.3-1 below for call metering.

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 CS416 does not include a pass-through connector and thus should be installed as the top Interface board on connector CN1.

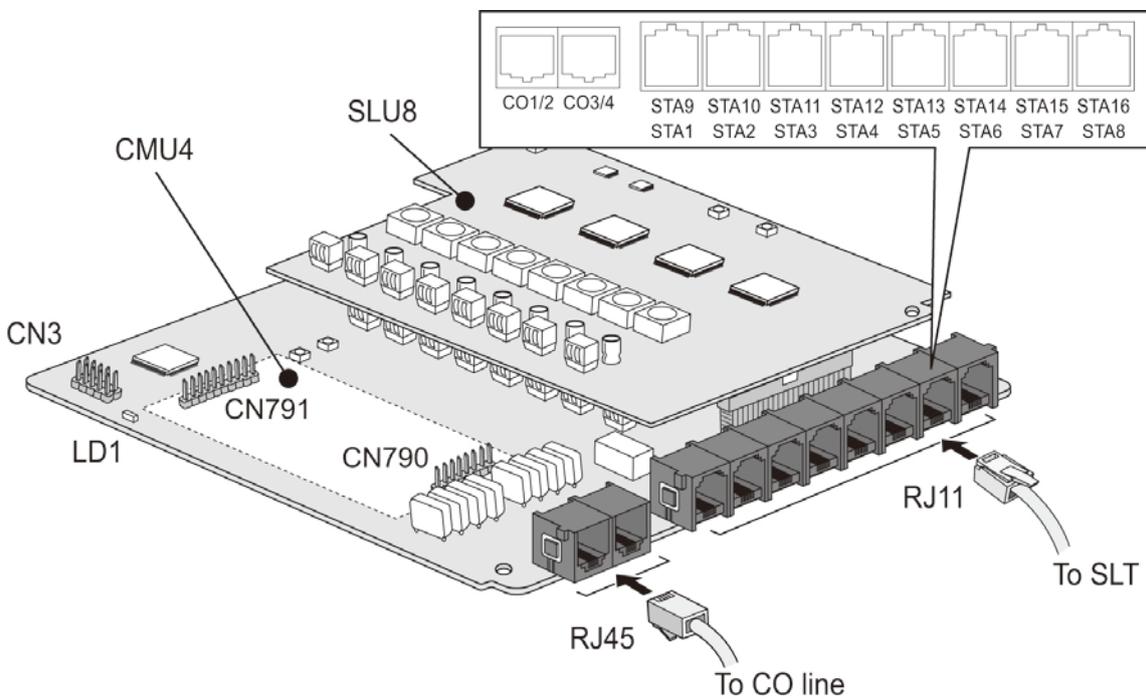


Figure 4.7.3-1 CS416

Connector and Modular jack

The following chart indicates the connectors and modular jacks equipped on the CS416.

Table 4.7.3-1 Connector and Modular Jack Function

| Connector | Functions | Remark |
|---------------|--|----------------|
| CN2 | Connection to CN1 of first Interface board | 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 | 16 SLT lines | RJ11 |

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.

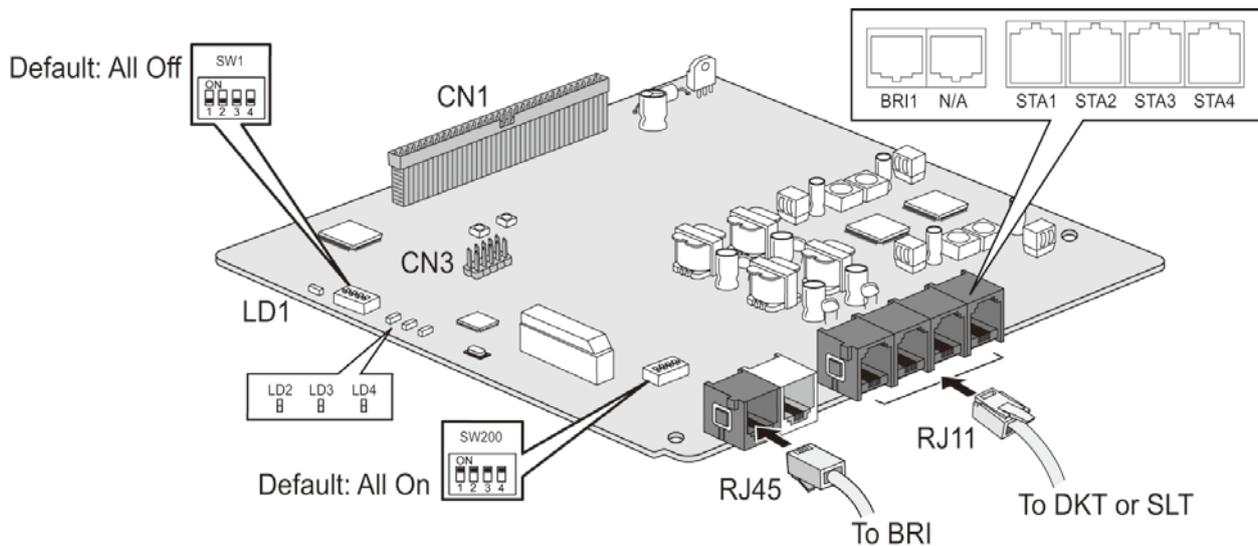


Figure 4.7.4-1 BH104

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.

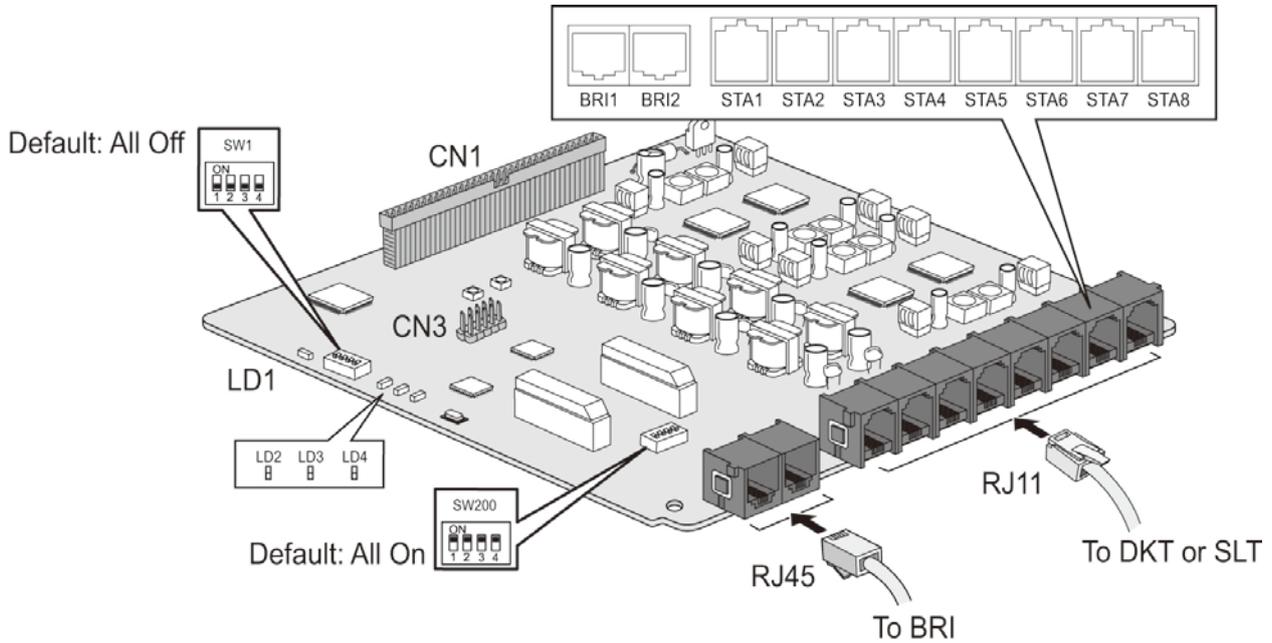


Figure 4.7.5-1 BH208

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.

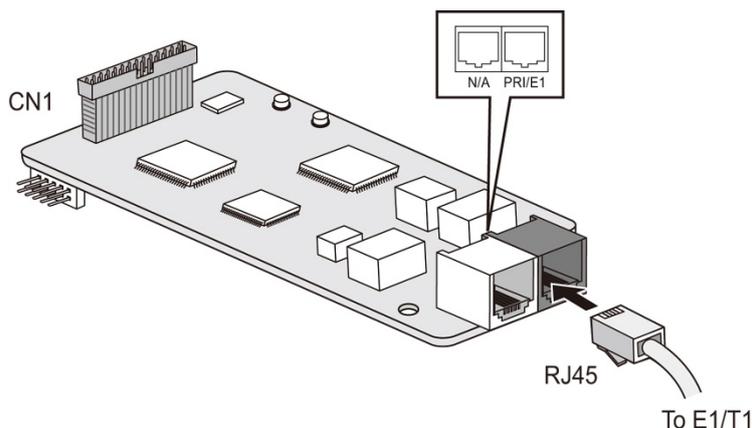


Figure 4.7.6-1 PRIU

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.

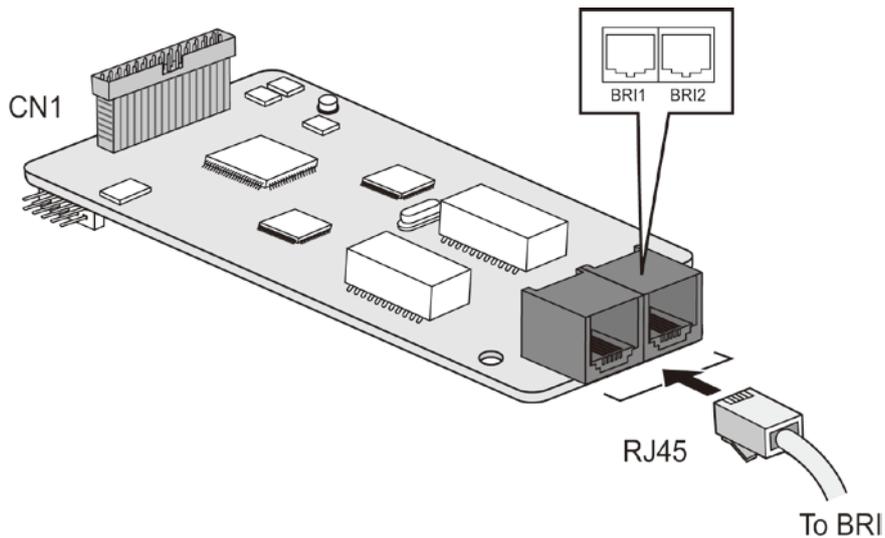


Figure 4.7.7-1 BRIU2

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.

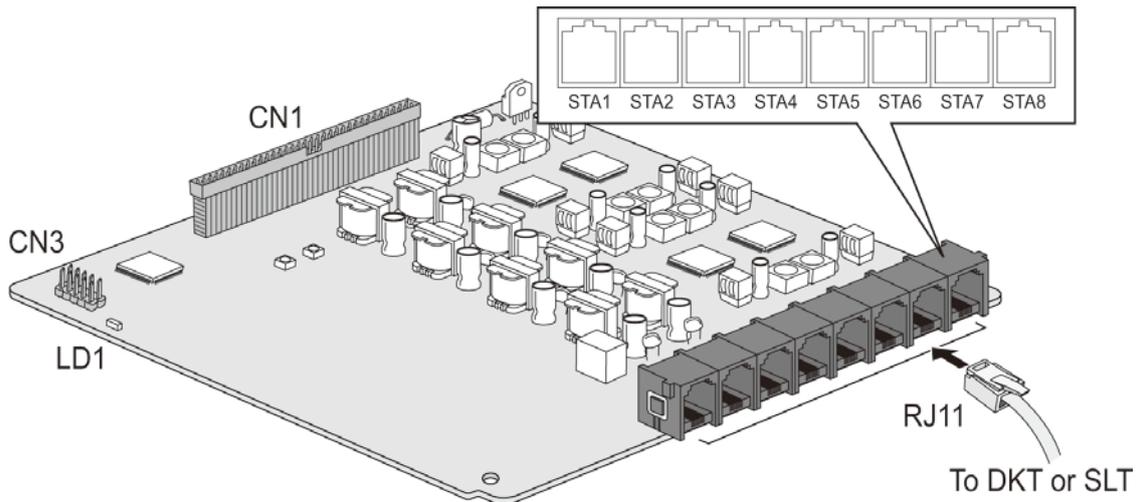


Figure 4.7.8-1 HYB8

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.

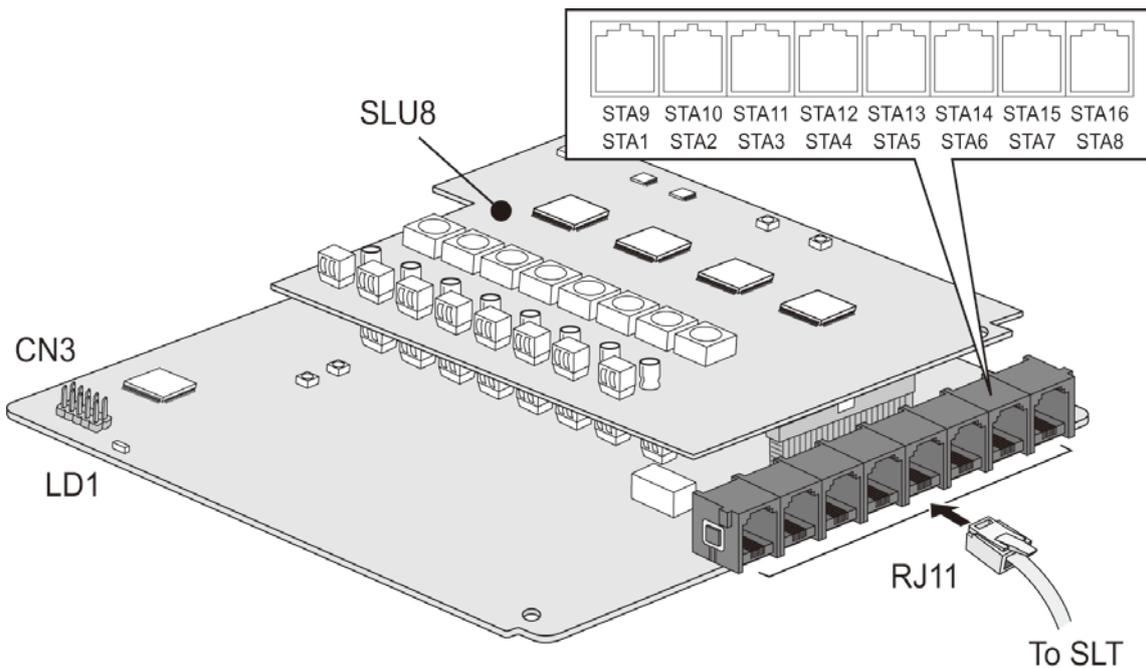


Figure 4.7.9-1 SLB16

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.

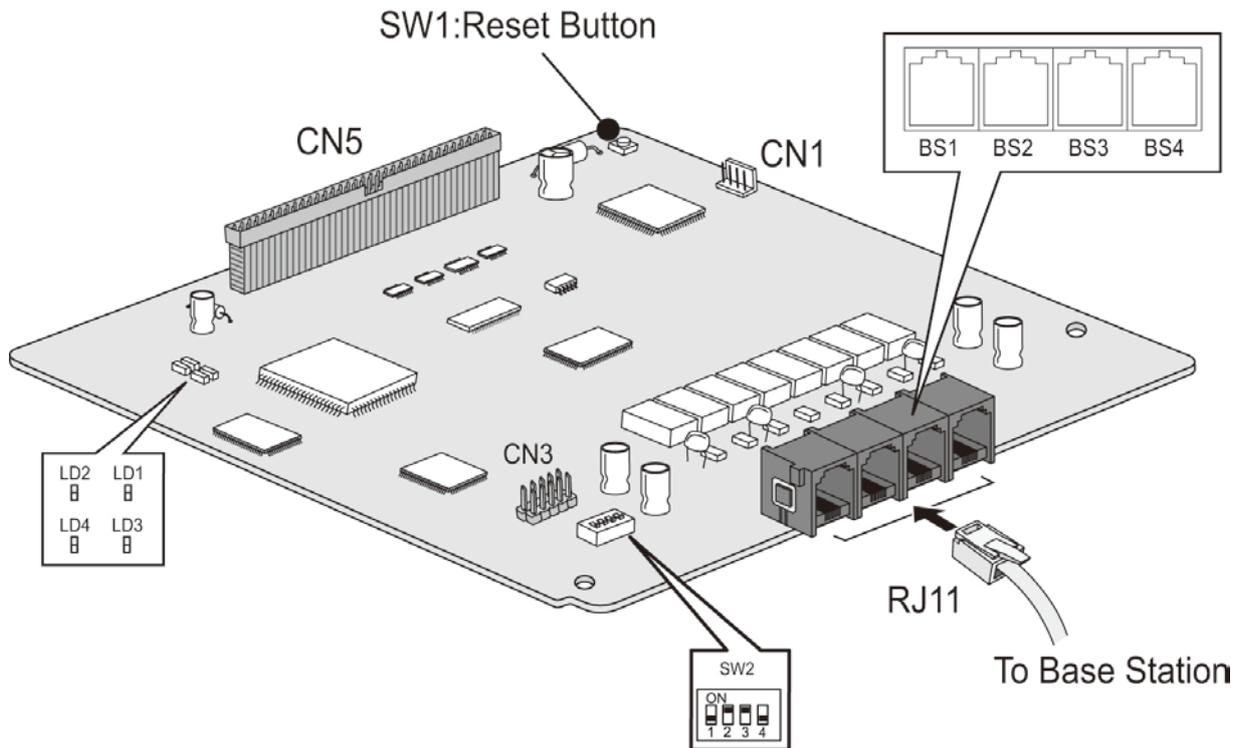


Figure 4.7.10-1 WTIB4

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/MEMU2: 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 (license). Unlock codes are available in 1-channel increments. Installation of the VVMU and licenses expands the number of VoIP channels up to 8 channels.

For Voice Mail, the basic eMG80 (built-in VM) supports two (2) channels and 1 hour of storage. The 8 channels for Voice Mail and 15 hours for storage can be added for additional channels and storage by license.

Table 4.8.1-1 VVMU (VoIP and Voice Mail) Capacity Chart

| Function | Basic | Unlock code (license) | VVMU |
|-----------------|--------------|------------------------------|-------------|
| VoIP Channels | 0 | 8 (1-channel increment) | Max. 8 |
| Voice Mail | | | |
| Channels | 0 | 8 (1-channel increment) | Max. 8 |
| Storage | 1 hour | 15 hours | 16 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/MEMU2 can be added to the system to expand the Voice Mail storage capacity by 15 hours/60 hours. With the VVMU and the MEMU/MEMU2 installed the Voice Mail storage capacity is 32/77 hours (basic 1 hour plus VVMU 16 hours, plus MEMU 15 hours or MEMU2 60 hours).

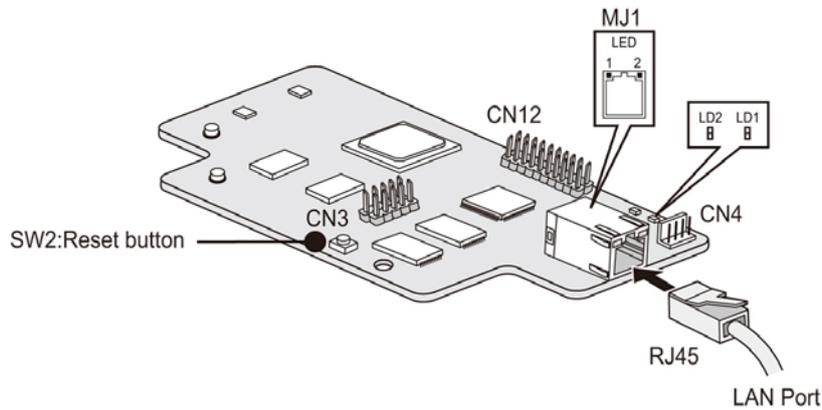


Figure 4.8.1-1 VVMU

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.

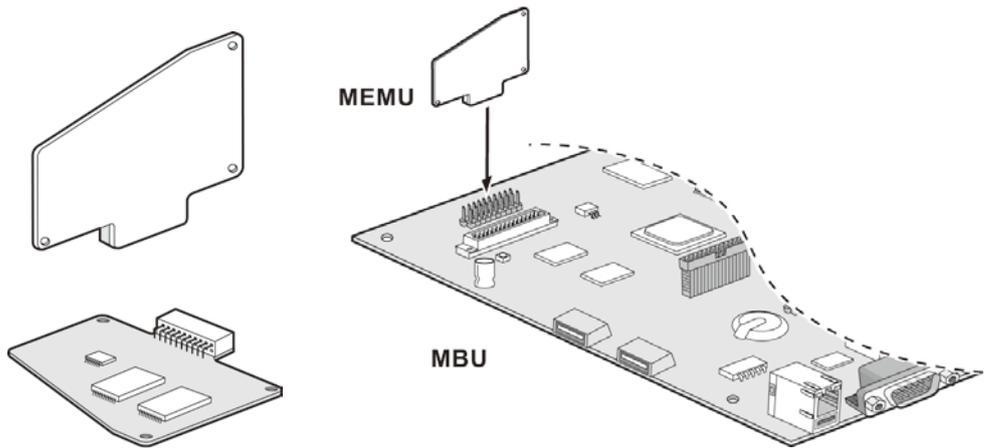


Figure 4.8.2-1 MEMU

4.8.3 MEMU2 (Memory Expansion Module Unit)

Description

The MEMU2 is equipped with Nand Flash memory used to expand the storage capacity of the eMG80 Voice Mail by 60 hours. As with the basic and VVMU storage, the MEMU2 storage is non-volatile and any messages are stored even if power to the eMG80 is lost.

As shown in Figure 4.8.3-1 below, the MEMU2 has a single connector for mounting on CN15 of the eMG80 KSU MBU. The MEMU2 has no other connectors, LEDs or switches.

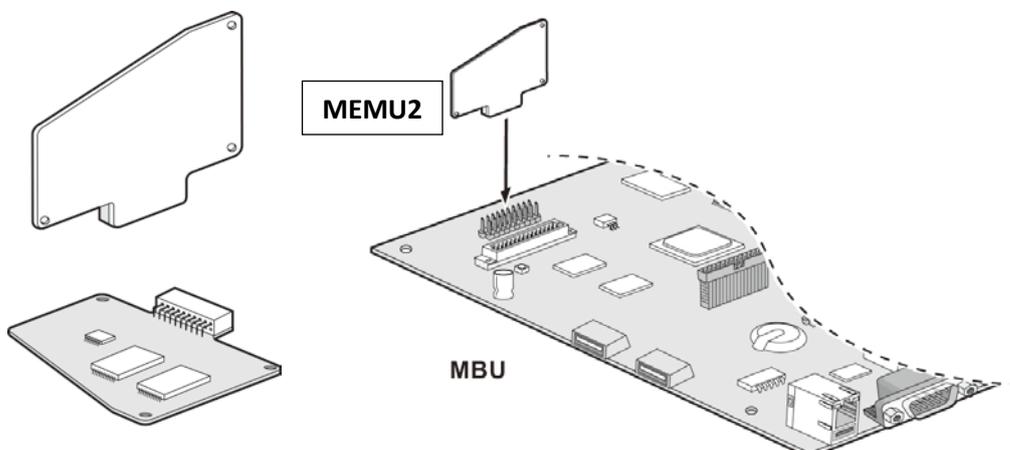


Figure 4.8.3-1 MEMU2

4.8.4 MODU (Modem Function Unit)

Description

The MODU, which is shown in Figure 4.8.4-1 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.

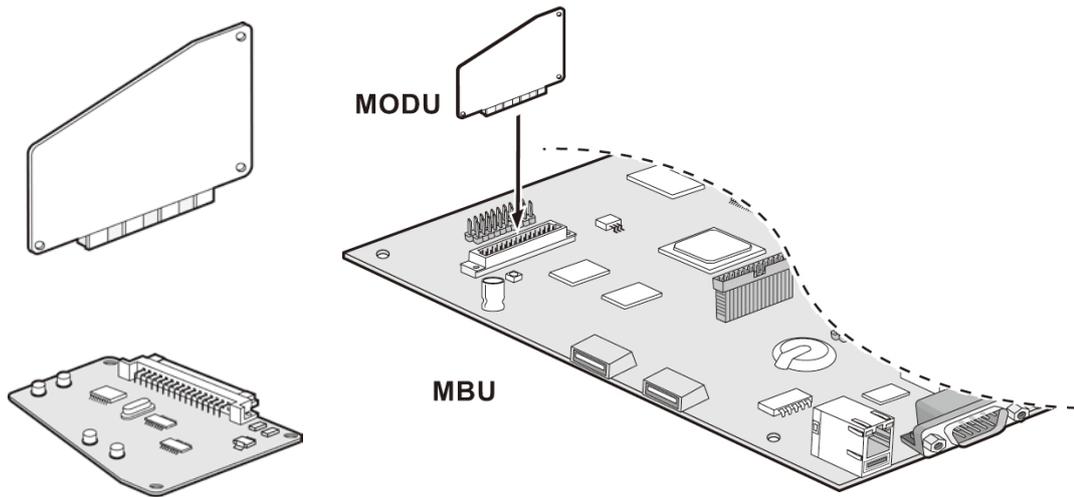


Figure 4.8.4-1 MODU

4.8.5 MG-CMU4 (Call Metering - 50Hz/12KHz/16KHz Unit)

Description

The MG-CMU4, as shown in Figure 4.8.5-1, 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.

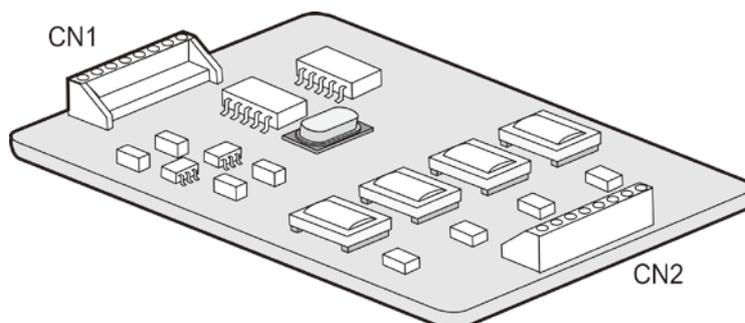


Figure 4.8.5-1 MG-CMU4

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.

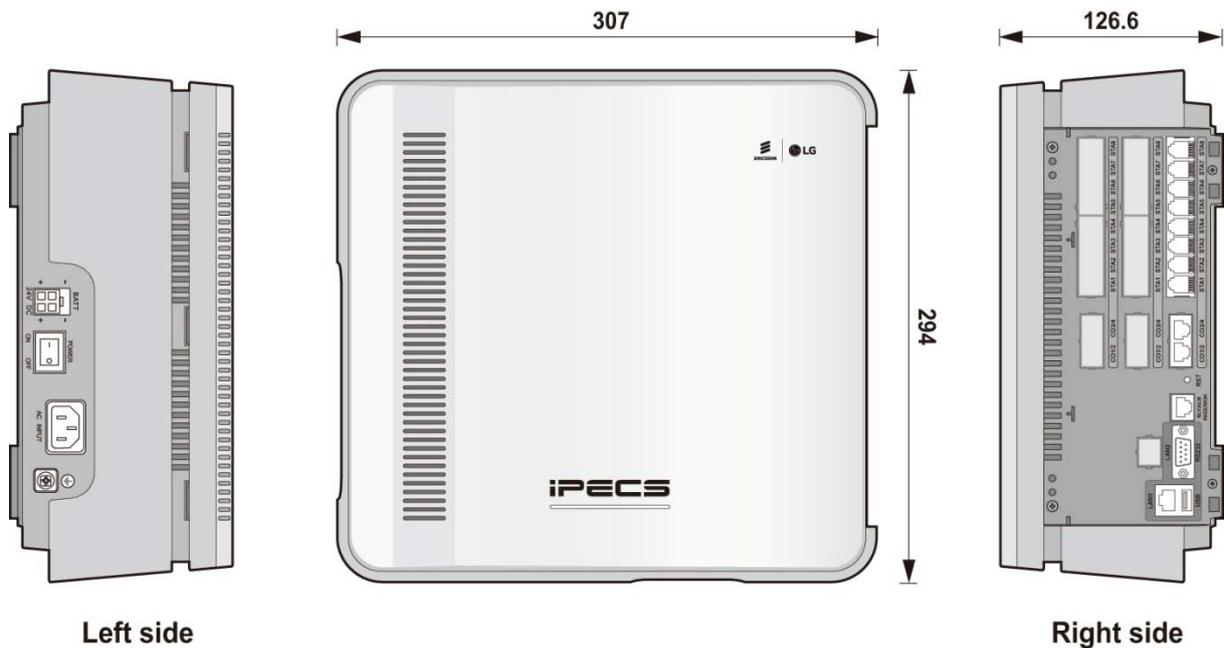


Figure 5.1-1 KSU Exterior Dimensions

5.2 Desk Mount

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.

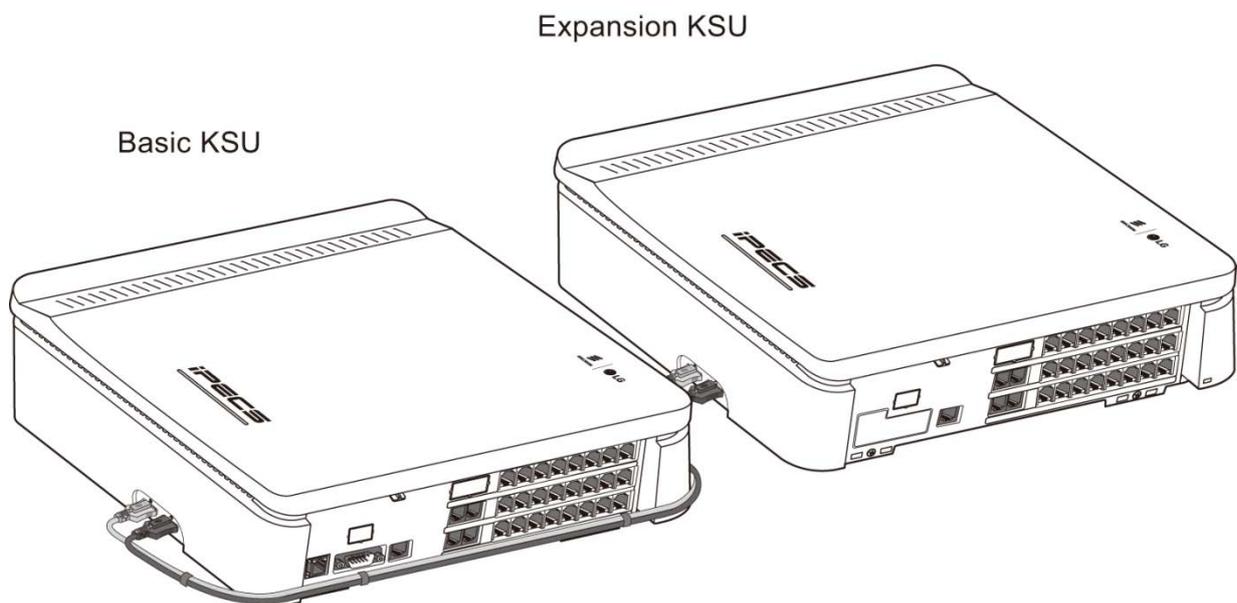


Figure 5.2-1 Desktop Mount

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 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.

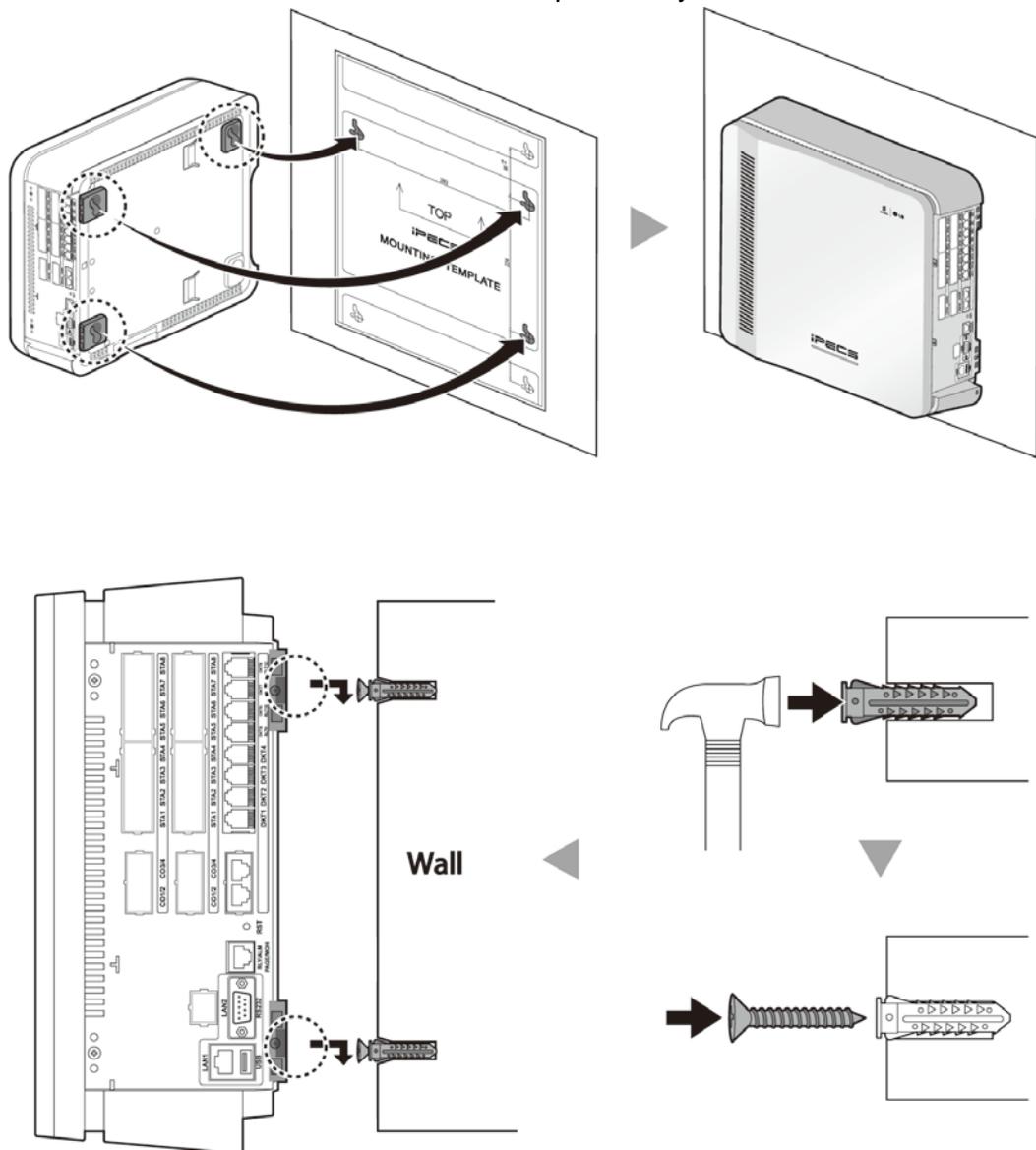
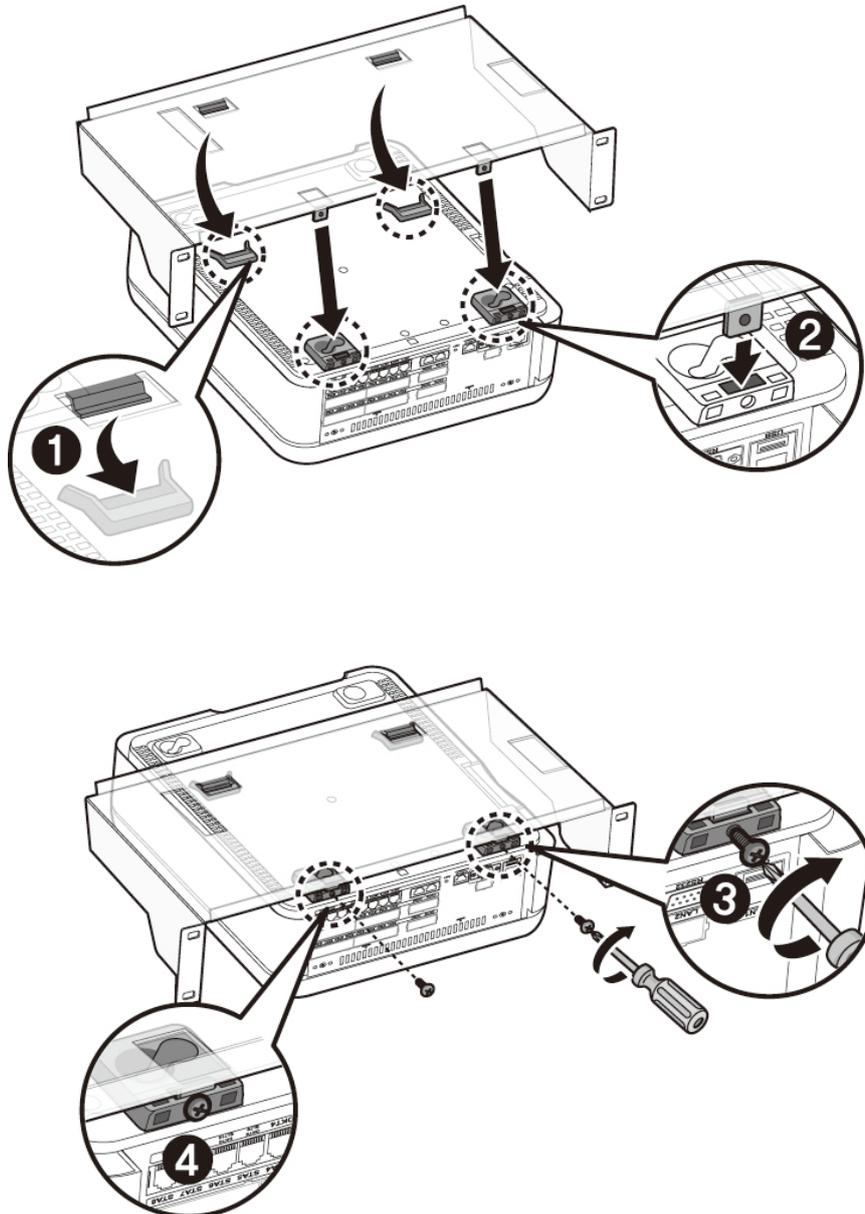


Figure 5.3-1 Installing Mounting Template and Wall mount

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.



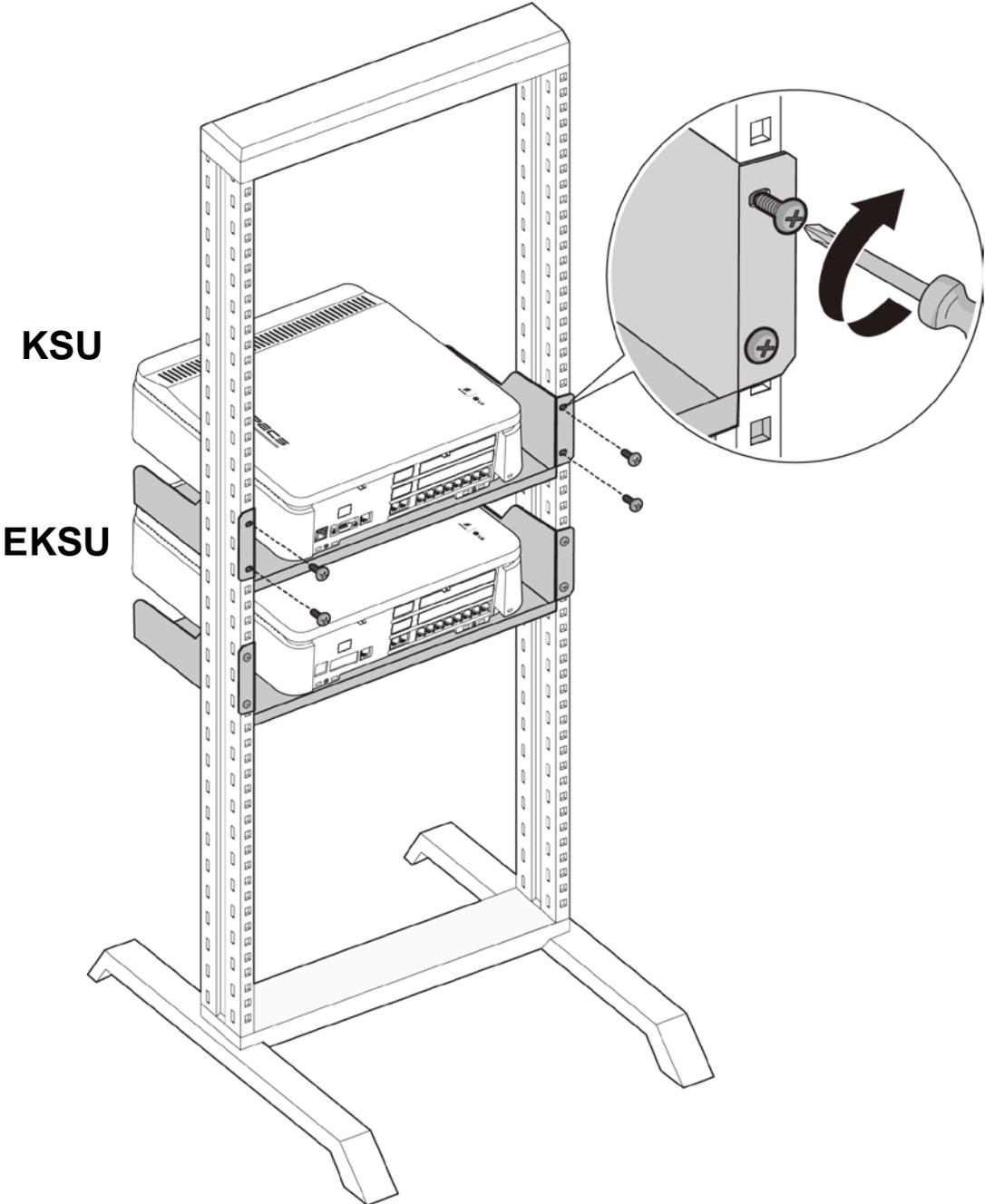


Figure 5.4-1 Installing Rack Bracket and Rack Mount

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.

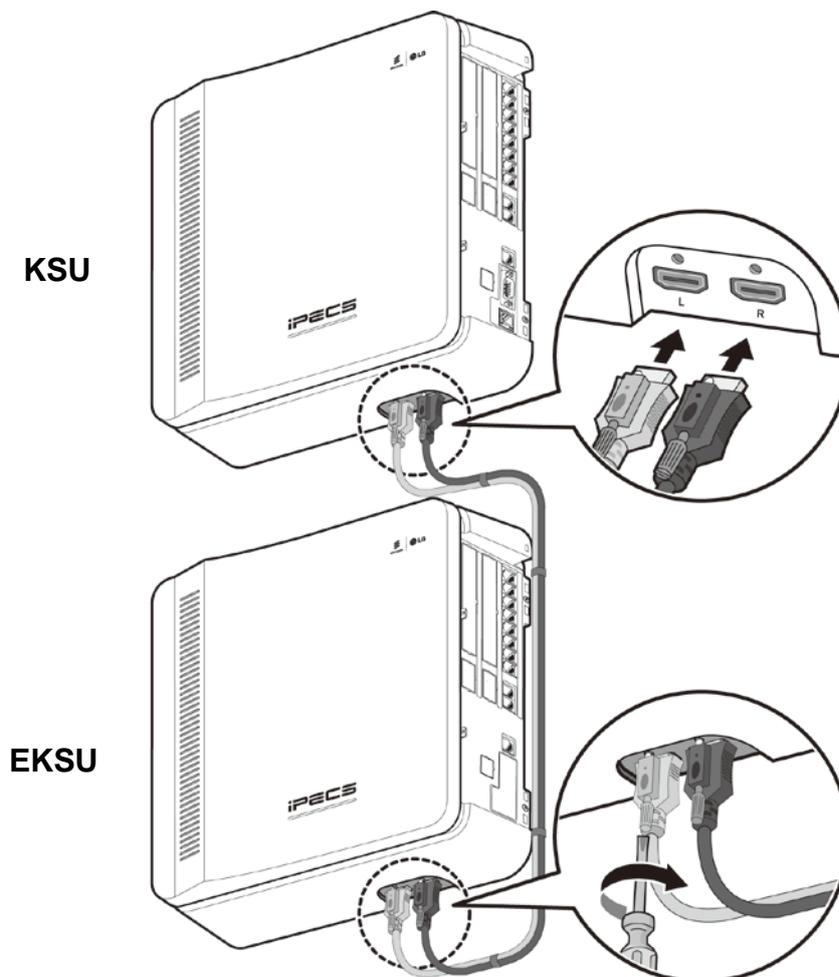


Figure 6.1-1 Expansion KSU to KSU Connection

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).

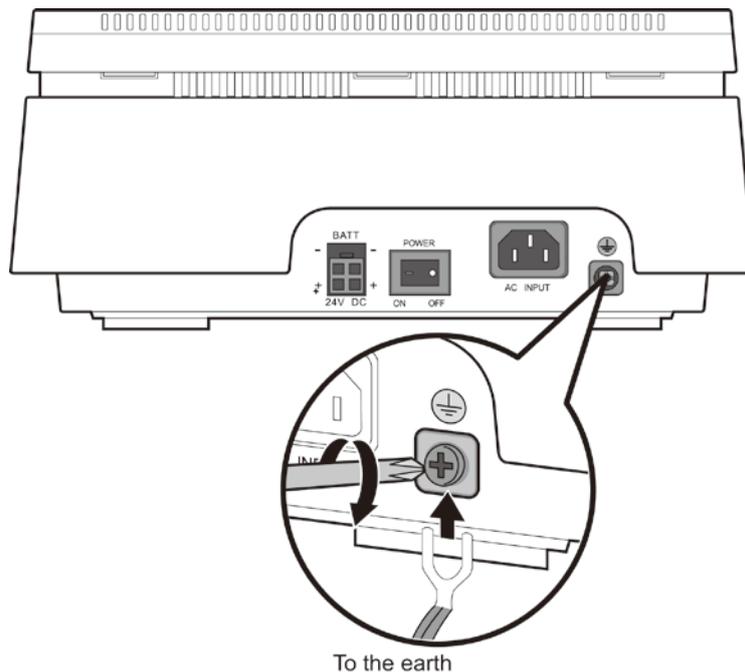


Figure 6.2-1 Grounding to the earth

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.

6.3 External Backup Battery Installation

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

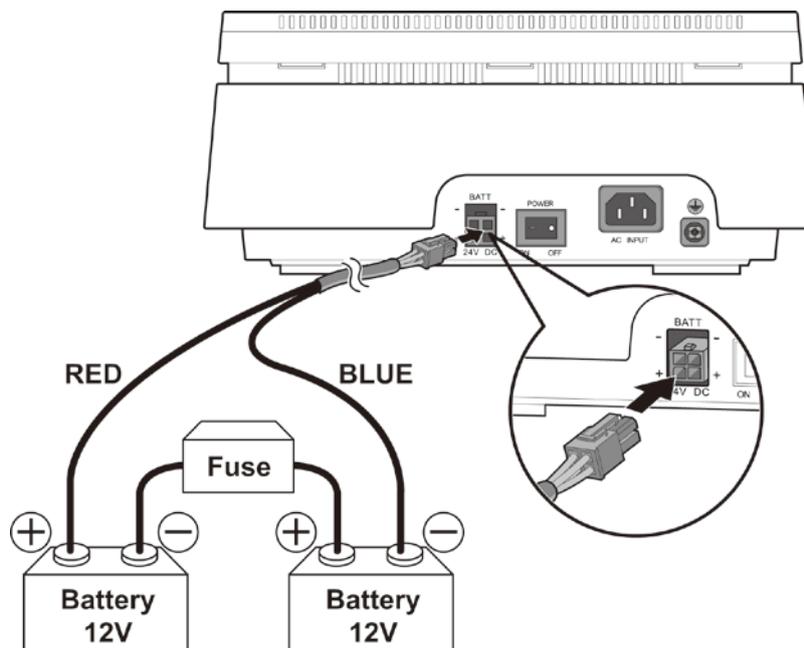


Figure 6.3-1 External Backup Battery Installation

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 in to 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; 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

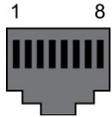
In many cases, two interface circuits are terminated to a single modular jack. Thus, carefully wire the jacks with the pin assignments shown otherwise, the interface circuits will not operate properly.

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

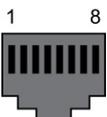
| Connector | Pin-out | Pin Number | Signal Name |
|-----------|---|------------|--------------|
| RJ45 |  | 1,2 | CO1-R, CO1-T |
| | | 3 | Reserved |
| | | 4,5 | CO2-R, CO2-T |
| | | 6,7,8 | Reserved |

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

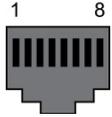
| Connector | Pin-out | Pin Number | Signal Name | Function |
|-----------|---|------------|-------------|---------------|
| RJ45 |  | 1,2,7,8 | Reserved | |
| | | 3 | TX+ | Transmit Data |
| | | 4 | RX+ | Receive Data |
| | | 5 | RX- | Receive Data |
| | | 6 | TX- | Transmit Data |

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

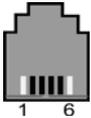
| Connector | Pin-out | Pin Number | Signal Name |
|-----------|---|------------|--------------|
| RJ11 |  | 1 | N/A |
| | | 2 | N/A |
| | | 3,4 | DKT-T, DKT-R |
| | | 5 | N/A |
| | | 6 | N/A |

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

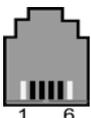
| Connector | Pin-out | Pin Number | Signal Name |
|-----------|---|------------|--------------|
| RJ11 |  | 1 | N/A |
| | | 2 | DKT-T |
| | | 3,4 | SLT-T, SLT-R |
| | | 5 | DKT-R |
| | | 6 | N/A |

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

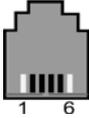
| Connector | Pin-out | Pin Number | Signal Name |
|-----------|---|------------|--------------|
| RJ11 |  | 1 | N/A |
| | | 2 | DKT-T |
| | | 3,4 | SLT-T, SLT-R |
| | | 5 | DKT-R |
| | | 6 | N/A |

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 GDC-600BE 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.

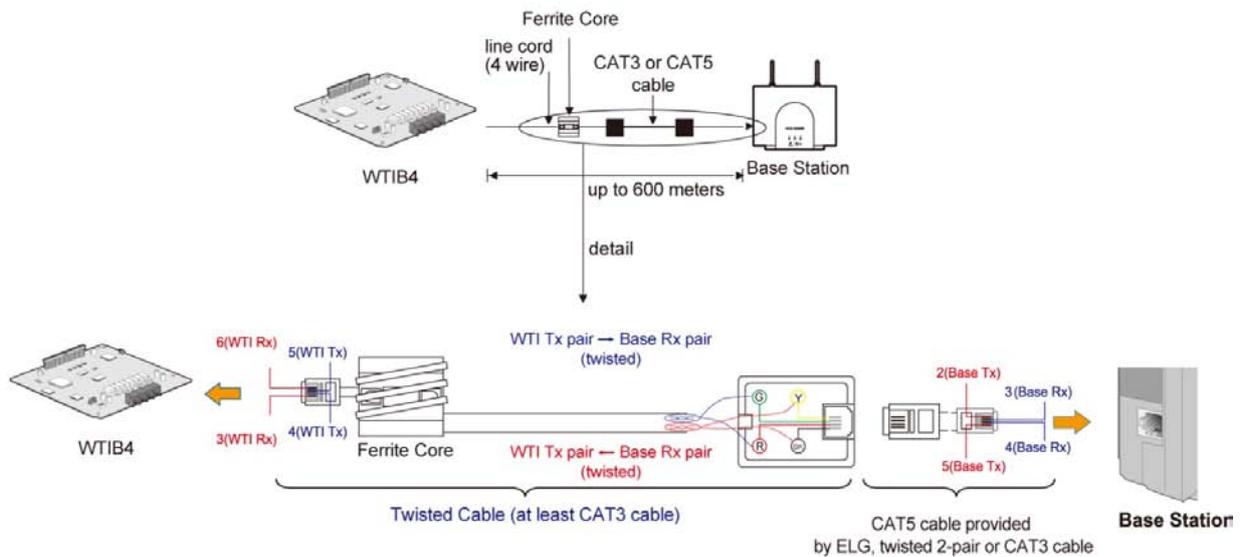


Figure 6.4.8-1 WTIB4 Wiring with Ferrite Core

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.

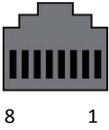
Changing the Dip switch positions during the test will not affect the Automatic Line Test. After the test is complete, place the DIP switches in the proper position, then press the WTIB4 reset button or reset eMG80 system.

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.

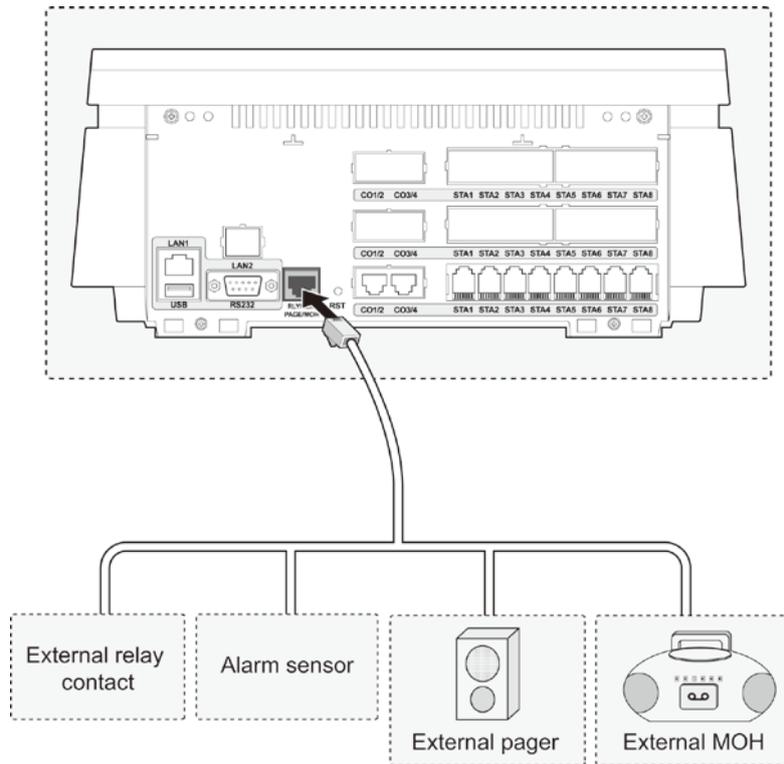


Figure 6.7-1 Miscellaneous Connections

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 |

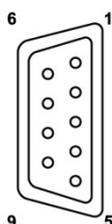
Table 6.7-2 EKSU Miscellaneous Connector MJ4 Wiring

| 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.

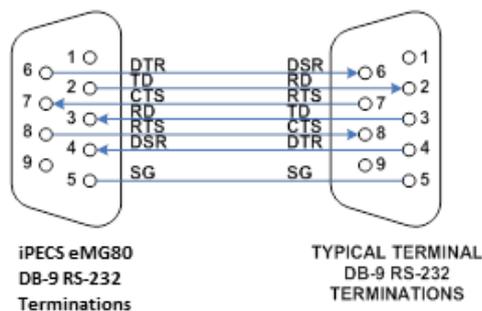


Figure 6.8-1 RS-232 DB-9 Connector Terminations

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.

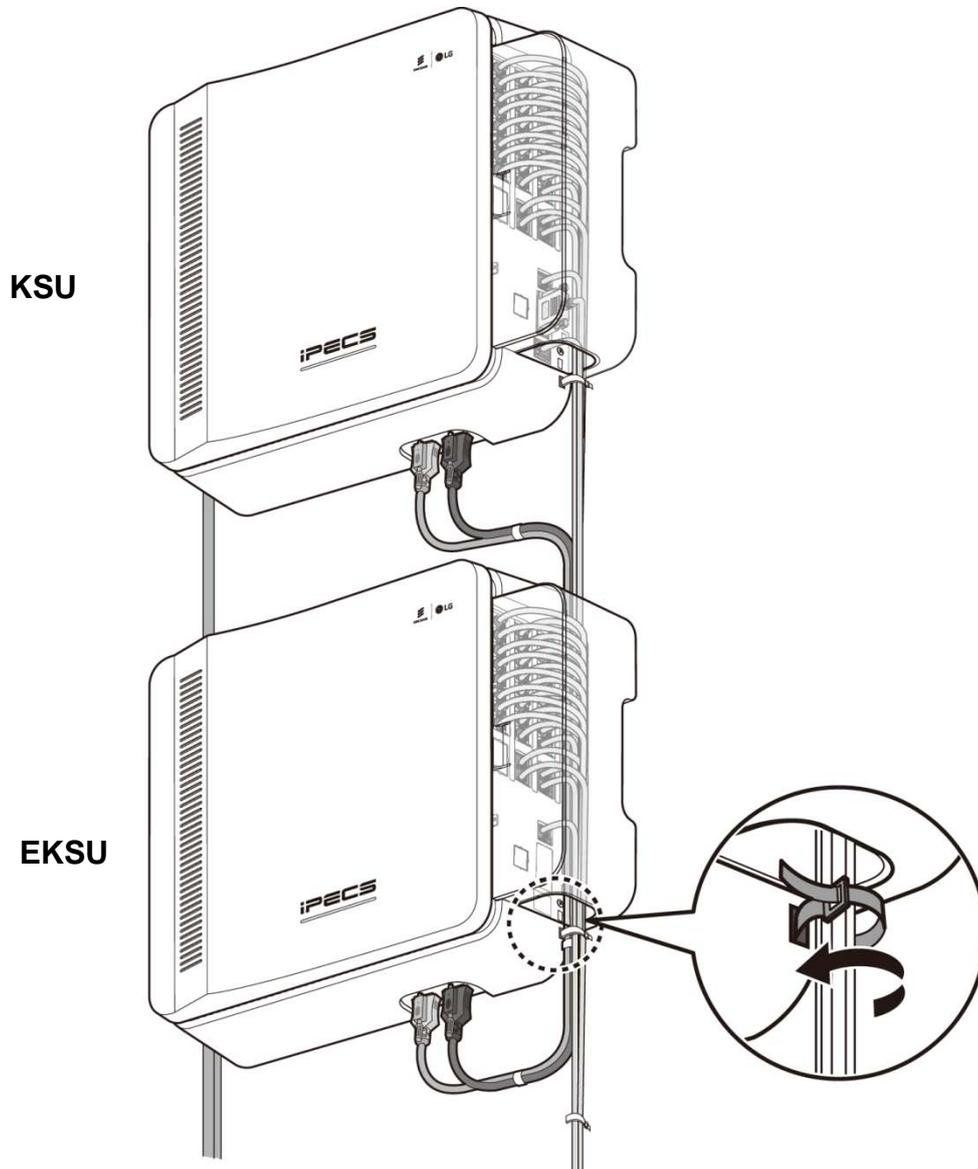


Figure 6.9.1-1 Dressing the Wall Mount Wiring

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.

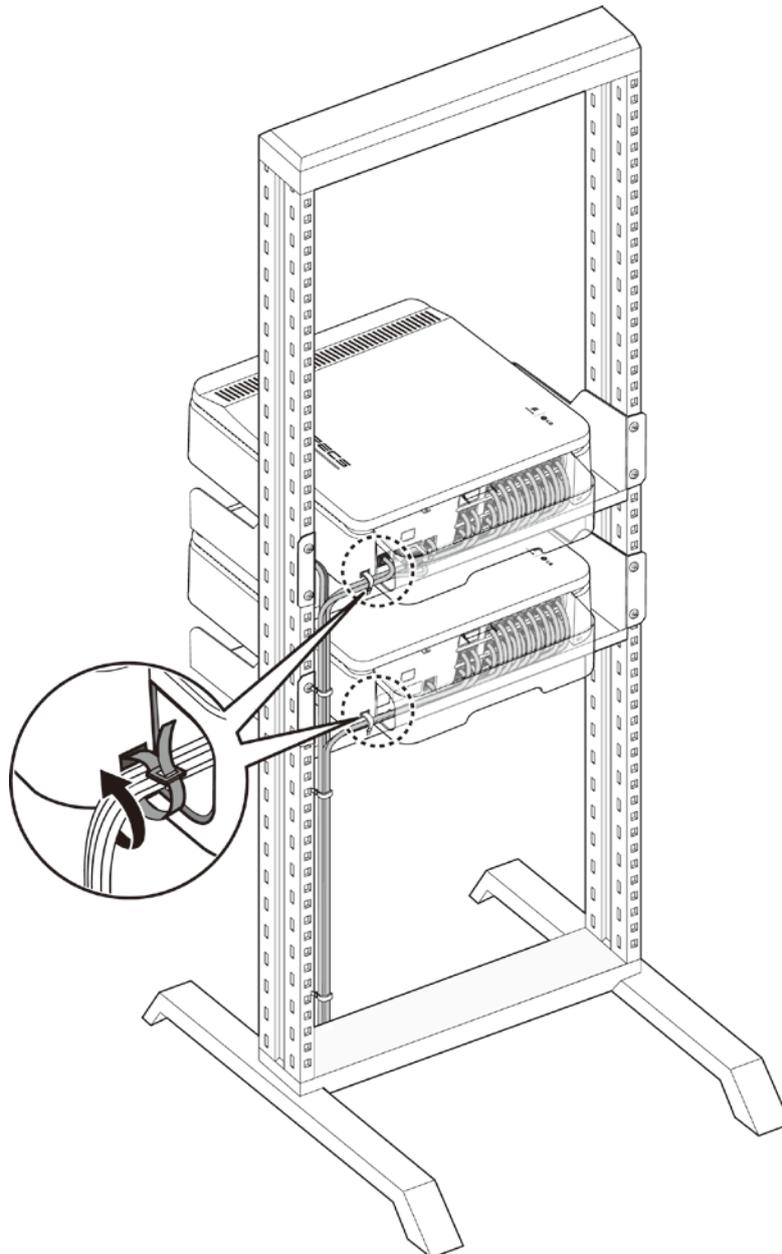


Figure 6.9.2-1 Rack Mount Wiring

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.

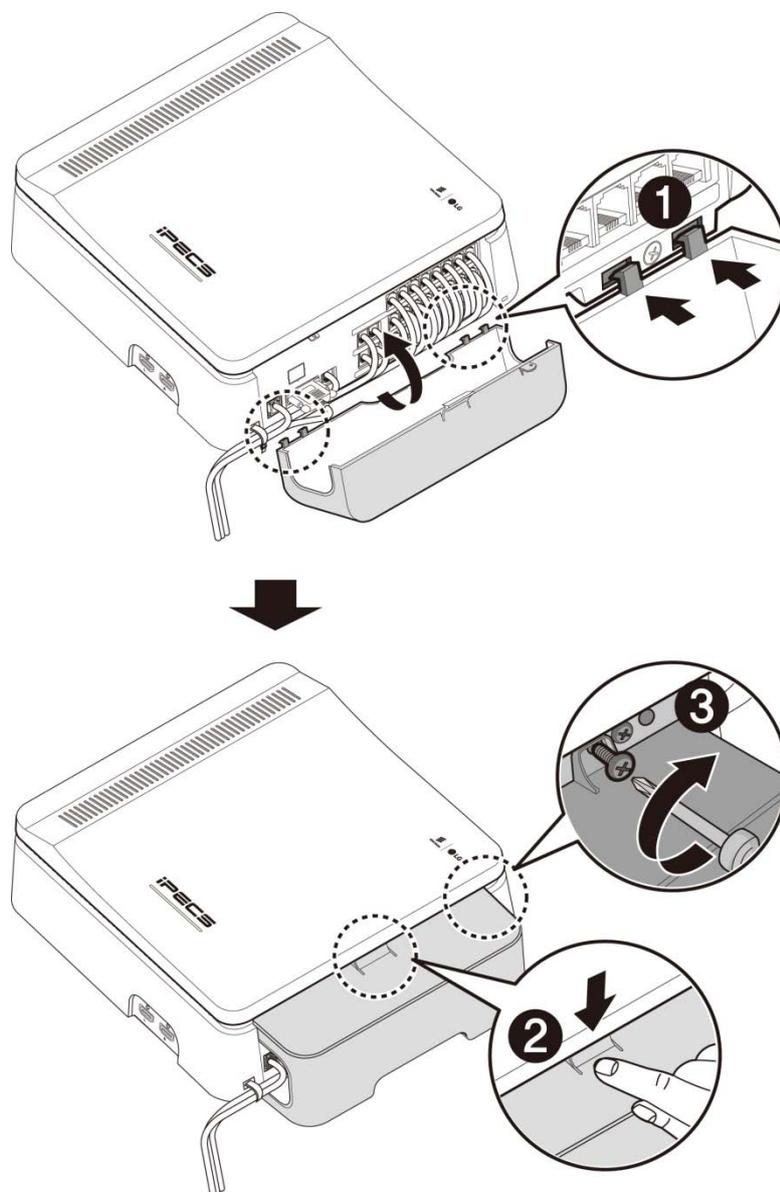


Figure 6.9.3-1 Replacing the Cord cover

7. TERMINAL CONNECTION AND WIRING

7.1 Terminal Models

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

Note

For more detailed information about Phone installation, DSS connection, and Wall mount, etc. refer to User guide or Quick Guide (Quick Installation Guide) of the terminal model.

Table 7.1-1 Terminal Models

| Model | Description |
|---------------|---|
| LDP-7004N | 4 Flexible Button No display |
| LDP-7004D | 4 Flexible Button w/Display |
| LDP-7008D | 8 Flexible Button w/Display |
| LDP-7016D | 16 Flexible Button w/Display |
| LDP-7024D | 24 Flexible Button w/Display |
| LDP-7024LD | 24 Flexible Button w/Large Display |
| LDP-7048DSS | 48 Button DSS/DLS Console |
| LDP-DPB | Door Phone Box |
| LDP-9008D | 8 Flexible Button w/Display |
| LDP-9030D | 30 Flexible Button w/Display |
| LDP-9048DSS | 48 Button DSS Console |
| LDP-9208D | 8 Flexible Button Display |
| LDP-9224D | 24 Flexible Button Display |
| LDP-9224DF | 24 Flexible Button, Full duplex |
| LDP-9240D | 24(12*2 page) Flexible Button, Full duplex |
| LDP-9248DSS | 48 Flexible Button DSS Console |
| LIP-7008D | 8 Flexible Button w/Display |
| LIP-7016D | 16 Flexible Button w/Display |
| LIP-7024D | 24 Flexible Button w/Display |
| LIP-7024LD | 24 Flexible Button w/Large Display |
| LIP-8002 | 4 Feature Button w/Display |
| LIP-8004D | 4 Flexible Button w/Display |
| LIP-8008D | 8Flexible Button w/Display |
| LIP-8012D | 12 Flexible Button w/Display |
| LIP-8024D | 24 Flexible Button w/Display |
| LIP-8040L | 10 Flexible Button w/Large Display |
| LIP-8012DSS | 12 Button DSS Console / Power supply |
| LIP-8012LSS | 12 Button LSS Console / via keyset up to 2 |
| LIP-8048DSS | 48 Button DSS Console / via external up to 4 |
| LIP-8040LSS | 48 Button DSS Console w/Display via external or PoE up to 9 |
| LIP-8002E/2AE | 4 Feature Button w/Display |

| Model | Description |
|-------------------------|--|
| LIP-8008E | 8 Flexible Button w/Display |
| LIP-8012E | 12 Flexible Button w/Display |
| LIP-8024E | 24 Flexible Button w/Display |
| LIP-8040E | 10 Flexible Button w/Large Display |
| LIP-8050V | 5 Flexible Button, w/Color Display & Video Camera |
| LIP-8050E | 4.3 inch wide color Graphic screen, 5 button, |
| LIP-9002 | 4-flexible buttons w/Display |
| LIP-9010 | 3-line 320 by 48 dot graphic LCD and 5 flexible buttons. |
| LIP-9020 | 4-line 320 by 80 dot graphic LCD, 10 flexible buttons and 3 soft keys. |
| LIP-9030 | 6-line 320 by 112 dot graphic LCD, 8 flexible buttons and 3 soft keys. |
| LIP-9040 | 8-line 320 by 144 dot graphic LCD, 12 flexible buttons and 3 soft keys. |
| LIP-9012DSS | 12 flexible buttons with tri-color LED |
| LIP-9024DSS | 24 flexible buttons with tri-color LED |
| LIP-9024LSS | 12 flexible buttons with tri-color LED/ two flexible button pages to represent 24 total flexible buttons |
| LIP-9048DSS | 48 flexible buttons with tri-color LED |
| LIP-9070 | Premium Touch Screen IP Phone, 7 Inch TFT color LCD, Android OS, WVGA resolution, Video communications, Soft flexible buttons(48 for SIP/ 30 for iPECS protocol) |
| LIP-9071 | Premium Touch Screen IP Phone, 7 Inch TFT color LCD, Android OS, WVGA resolution, Video communications, Soft flexible buttons(48 for SIP/ 30 for iPECS protocol) |
| WIT-400HE | iPECS WLAN Phone |
| GDC-450H/480H/500H/800H | 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.

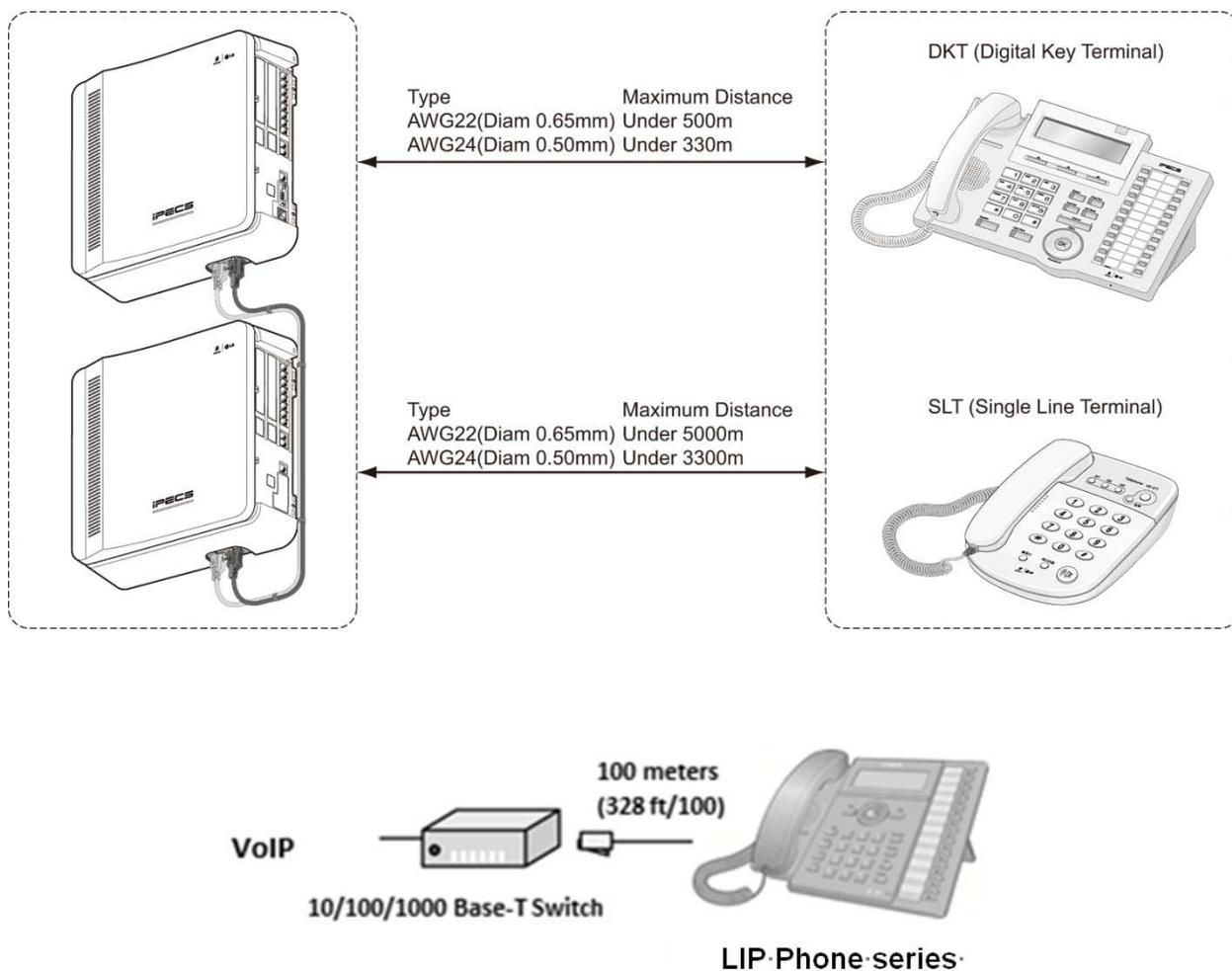


Figure 7.2-1 Terminal Wiring Distance

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 series phones employ the 2nd pair of the modular jack while all other LDP series phones employ the 1st 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 1st or 2nd pair of the wall outlet, as appropriate, to the termination point using UTP cable. Note separate wiring is required for some DSS console (refer to User guide or Quick guide).
2. Using the line cord provided, connect the DKTU or DSS Console to the wall outlet.

Modular Jack Pin Assignment

Table 7.3.1-1 LDP series (7000, 9000, 9200) Modular Jack Wiring

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

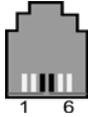
7.3.2 SLT Wiring

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

iPECS eMG80 supports LIP Phone series. LIP-7008D and LIP-8004D have a single LAN port that is wired to an Ethernet switch port. Generally all other LIP phone series shown here have two (2) Ethernet ports, a LAN port and a PC port. The LAN port is connected to an Ethernet switch port and the PC port is connected to the LAN port of a PC. The LIP phones are wired to any 10/100 (or 1000) Base-T Ethernet switch port with access to a VOIP channel. The LIP phones can be powered from a POE compatible Ethernet switch port or using the AC/DC Adaptor-K.



Caution!

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

Modular Jack Pin Assignment

Table 7.3.3-1 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 |

- 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.
- Use the RJ45 terminated cable provided with the phone to connect the IP Phone LAN port to the Wall outlet.
- Connect the PC port to a PC LAN port using a CAT 5 cable terminated on each end with an RJ45 connector.
- 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.

- Press ‘*’ to set the network configuration
- 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 hosing.

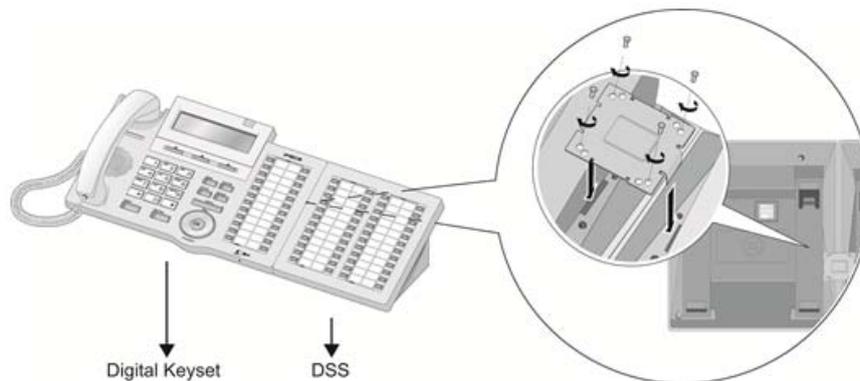


Figure 7.3.4-1 LDP-7048DSS Console install

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

LIP-8000/8000E 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 LIP-8000/8000E series phone using the serial ribbon cable from the console. LIP-8000 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.

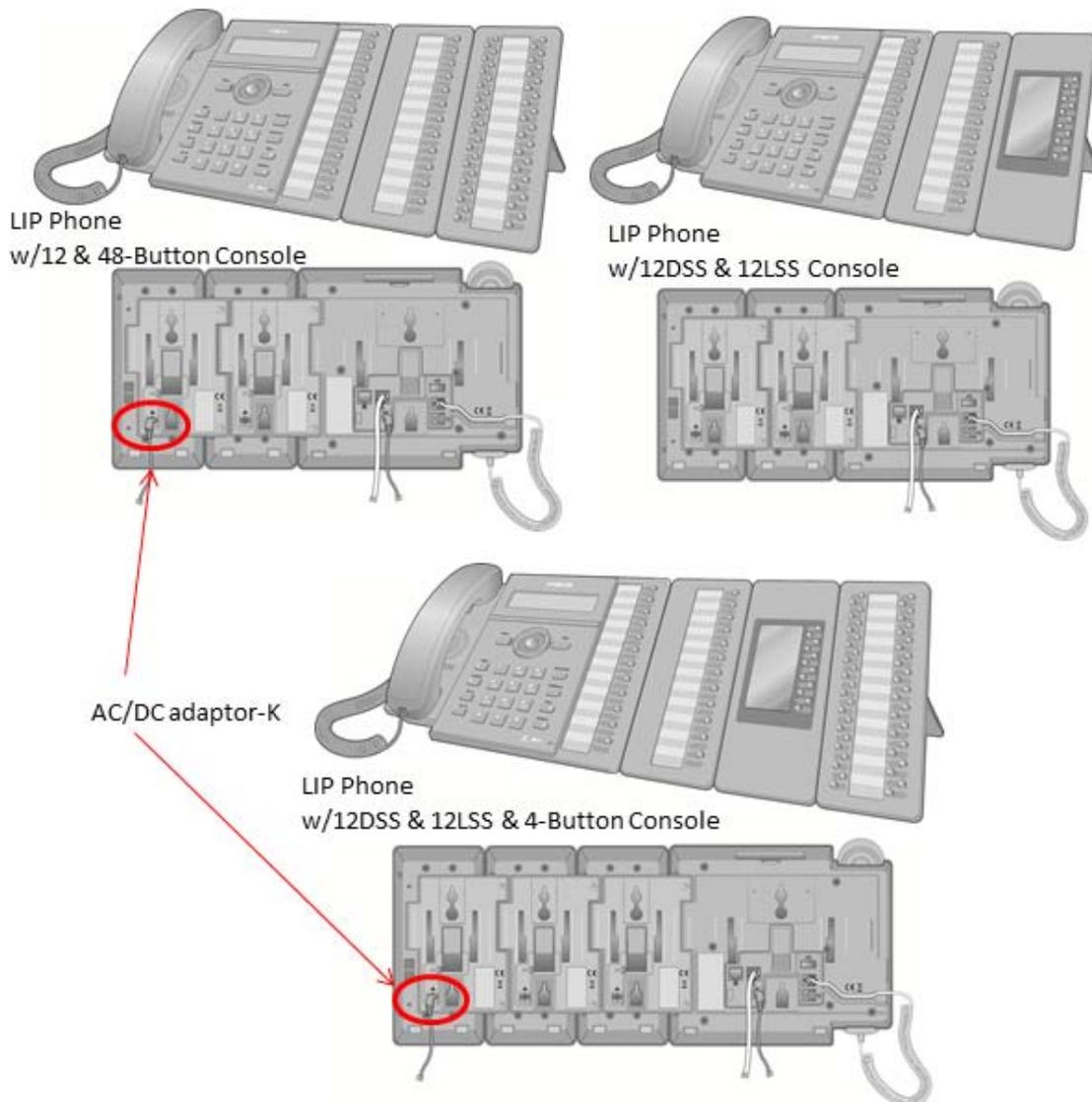


Figure 7.3.4-2 LIP-8000/8000E series Console Configurations

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.

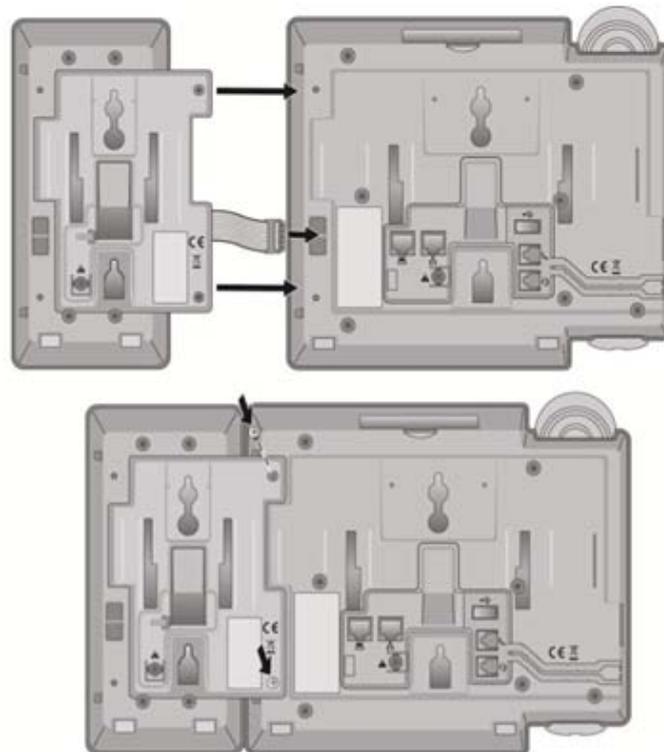


Figure 7.3.4-3 LIP-8000 DSS Installation

LIP-9000 Console Installation

The Button kits for the LIP-9000 Series phone provide 12, 24, or 48 additional flexible buttons. The flexible buttons on the Button kit are used as with the flexible buttons on the phone proper and can be assigned for any of the flexible button functions. One of three Button kits may attach to an LIP-9020, LIP-9030 or LIP-9040 phone, and can be placed on your desktop or can be wall-mounted with the phone.

The available button kits are shown in the below and described as follows.

- **LIP-9012DSS** has 12 flexible buttons with tri-color LED. The DSS button kit uses a paper label for the button designations.
- **LIP-9024DSS** has 24 flexible buttons with tri-color LED. The DSS button kit uses a paper label for the button designations.
- **LIP-9024LSS** has 12 flexible buttons with tri-color LED. The LSS button kit uses an LCD for the button labels and has two flexible button pages to represent 24 total flexible buttons. The two lower buttons control the page view. The page button LED will flash when there is new activity under a button on the page. You can press the page button at any time to change the flexible button page view.
- **LIP-9048DSS** has 48 flexible buttons with tri-color LED. The DSS uses a paper label for the button designations.

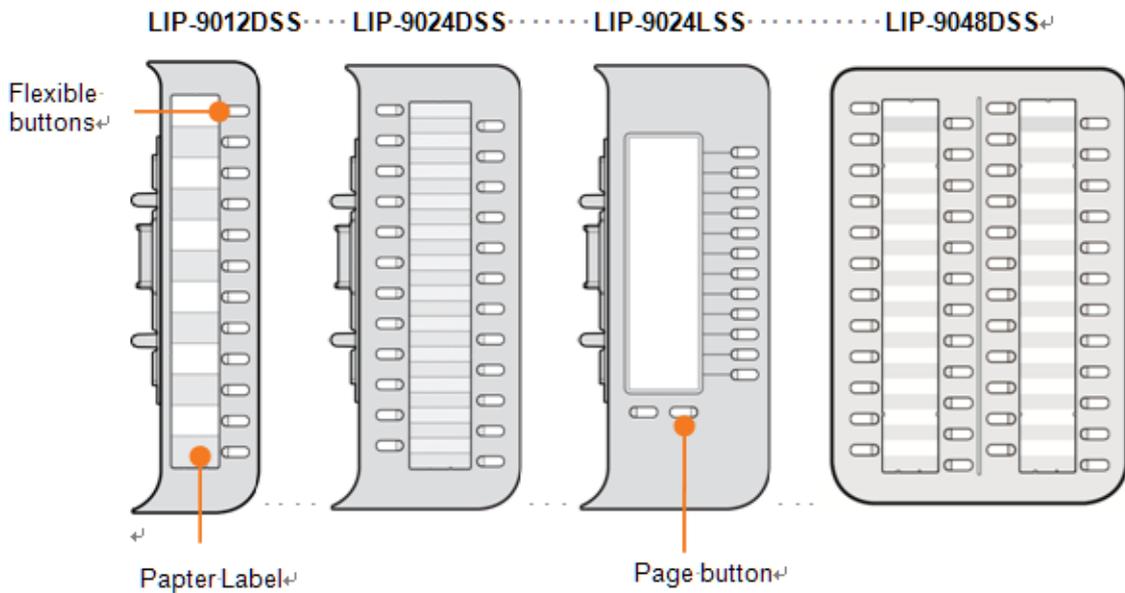
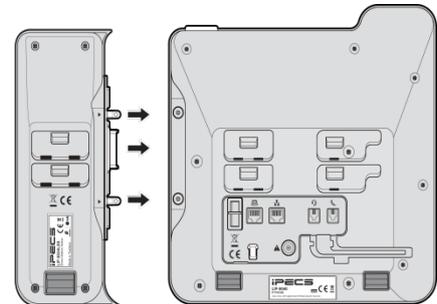


Figure 7.3.4-4 LIP-9000 DSS Installation

The Button kit should be installed on the phone prior to making any connections to the phone. This simplifies the installation.

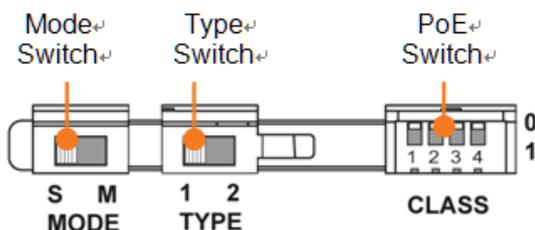
To install the button kit for the LIP-9012 DSS, LIP-9024 DSS and LIP-9024 LSS

1. First, assure the phone is NOT connected to power. For convenience, you may wish to remove the handset and foot-stand; this simplifies the Button kit installation.
2. On the right side of the phone, remove the Button kit cover.
3. Align the Button kit and phone as shown in the drawing.
4. Push the Button kit into the phone until the button kit is fully engaged.
5. Insert the screws provided through the screw tabs in the Button kit and tighten the screws into the phone. Do not over-tighten.



To install the button kit for the LIP-9048DSS

Prepare your LIP-9048DSS for connection depending on the type of LIP phone. The setting switches are hidden on the back of right side of the LIP-9048 DSS. Before you begin, remove protective cover from the LIP-9048 DSS.



Power Mode: The MODE switch is used to choose the power mode between Slave and Master.

| Symbol | Mode | Mode | Description |
|--------|--------|------|--|
| S | Slave | 5V | LIP-9048DSS receives power from another DSS. |
| M | Master | 48V | LIP-9048DSS provides power itself. |

Protocol Type: The TYPE switch is used to choose a call protocol type between iPKTS and SIP.

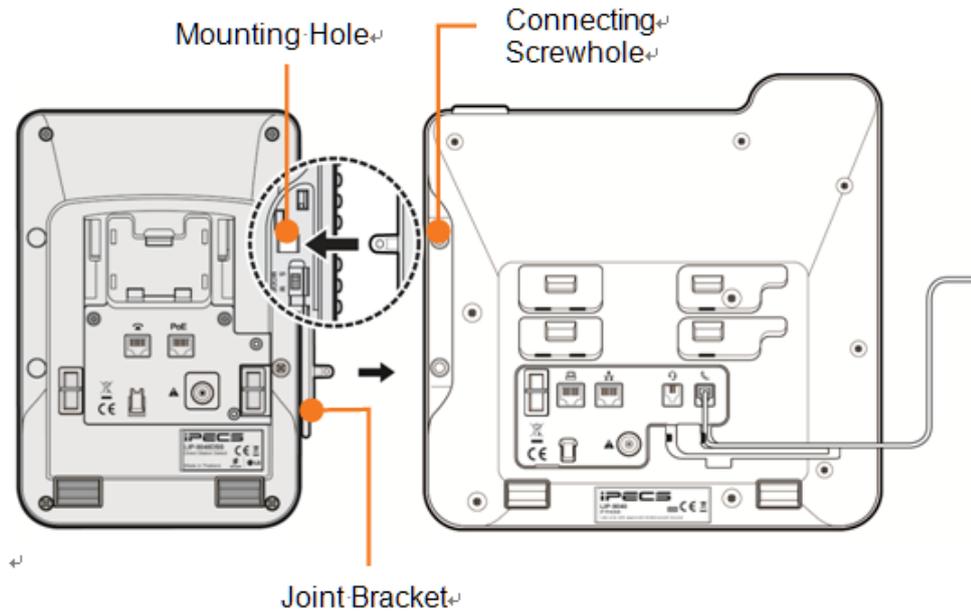
| Symbol | Mode | Description |
|--------|-------|---|
| 1 | iPKTS | iPKTS protocol type of communication supported. |
| 2 | SIP | SIP protocol type of communication supported. |

PoE Class: The PoE (Power over Ethernet) Class is indicated the class of the Powered Device (PD), and CLASS switch is used to select the PoE class. DSS module supports all 4 classes listed in below table.

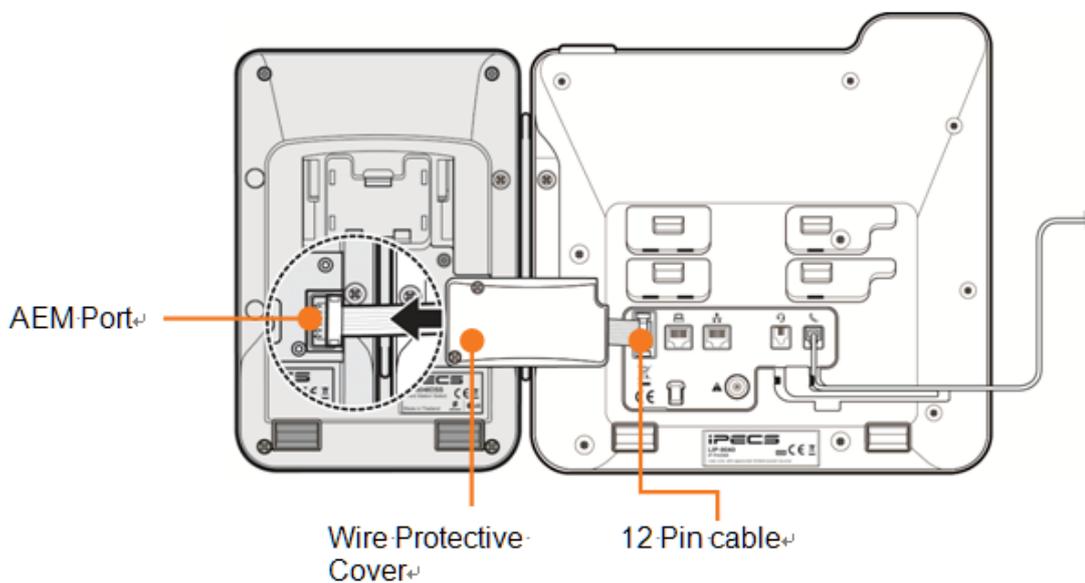
| Class | Power Ranges | Description |
|-------|-----------------|---|
| 1 | 0.44W to 3.84W | - One LIP-9048DSS or two LIP-9048DSS |
| 2 | 0.84W to 6.49W | - One LIP-9048DSS with a LIP-9020 - Two LIP-9048DSS with a LIP-9020 |
| 3 | 0.49W to 12.95W | - One LIP-9048DSS with a LIP-9030 - Two LIP-9048DSS with a LIP-9030 - One LIP-9048DSS with a LIP-9040 - Two LIP-9048DSS with aLIP-9040 |

The default switch position is '0'.

- '0' means the power OFF status and it does not support PoE power.
 - '1' means the power ON status and it does support PoE power.
- 1 Set the power mode, protocol type, and PoE class in advance as described above.
 - 2 Make sure that the Joint Bracket is aligned with the side of the LIP-9048 DSS, and insert the one side of the Joint Bracket into the mounting holes.
 - 3 And insert the other side of the Joint Bracket into the mounting holes on the side of your phone.
 - 4 Use the provided screws to connect the LIP-9048 DSS and phone firmly together.



- 5 At the back of LIP-9048 DSS and phone, remove the rubber plug from the Accessory Expansion Module (AEM) port.
- 6 Plug the 12-Pin cable into the AEM port on LIP-9048 DSS and phone.
- 7 Place the Wire Protective Cover behind the LIP-9048 DSS and align the screw holes with the Wire Protective Cover screw holes on LIP-9048 DSS.
- 8 Tighten the screw to secure the Wire Protective Cover.



See Button kit for the LIP-9000 Series or LIP-9048DSS Quick Installation Guide for more detailed instruction.



Caution!

To avoid damaging the Phone or Button kit, remove power from the phone before installing a Button kit.

7.4 Terminal Wall Mount

7.4.1 LDP-7000/9000/9200 series Wall Mount

LDP-7000/9000/9200 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 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 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-8000/8000E Wall Mount

LIP-8000/8000E series phones incorporate wall mount into the base of the phone housing. Using the instructions, mount LIP-8000/8000E 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.

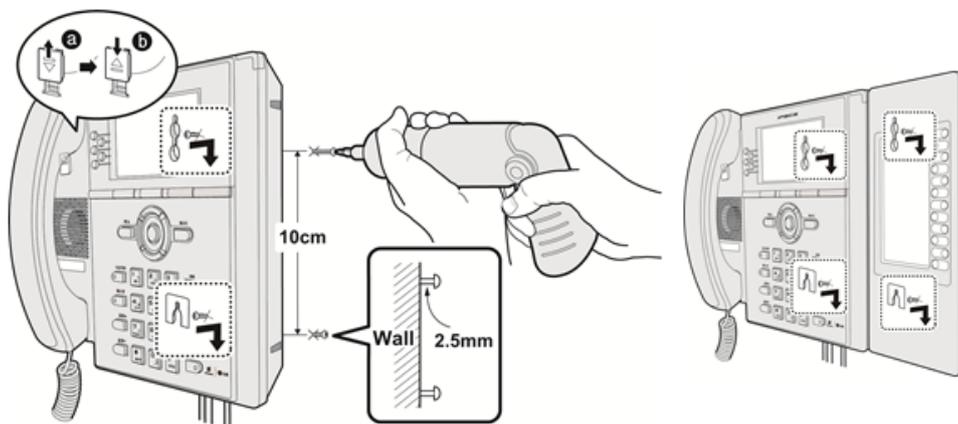
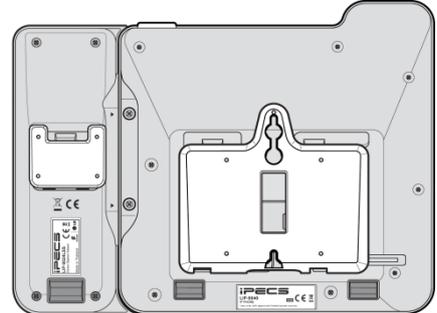


Figure 7.4.2-1 LIP-8000E Series Wall Mount Installation

7.4.3 LIP-9000 Wall Mount

LIP-9000 series phones can be wall mounted as needed. The following instructions describe the wall mount installation. Note the foot-stand must not be installed.

- 1 If installed, remove the foot-stand from the Phone and Button kit.
- 2 Connect all wiring to the Phone. Connect the Phone side wiring only.
- 3 If required, install the Button kit.
- 4 Align the wall-mount bracket (ordered separately) over the back of the phone, then press the bracket onto the phone applying steady pressure until it clicks into place.
- 5 Install the Button kit wall-mount bracket if required, in the same manner as the bracket for the phone.
- 6 Mark and drill two 7mm holes for plastic wall anchors (not included).
- 7 Insert the two anchors into the holes, and insert and tighten the two screws (not included) leaving about 2.5 mm (1/8-inch) exposed.
- 8 Align the key holes in the bracket over the screws and slide the phone down assuring the phone is secure.
- 9 Remove, reverse and re-install the handset hook so that the hook catches the groove in the handset receiver.
- 10 Hang the handset up on the handset hook.
- 11 Complete all wiring connections as described in Quick Installation Guide or User Guide.



NOTE

It may be necessary to remove the phone and tighten or loosen the screws for a secure mounting.

8. STARTING IPECS eMG80

8.1 iPECS eMG80 System Initial Power-up

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 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#2 to the OFF position so the database will not initialize during future power cycling or if the system is reset.
7. If the DKT was used to set the Nation code, run the Install Wizard then configure the system to the customer needs.

The following sections detail how to verify and change the Nation Code and run the Install Wizard. Once the Nation Code has been set and the system database initialized, the system can be configured without the need to reinitialize. For detailed information on configuring the eMG80 system, refer to the eMG80 Administration and Programming Manual.

8.2 Verify the Nation Code

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

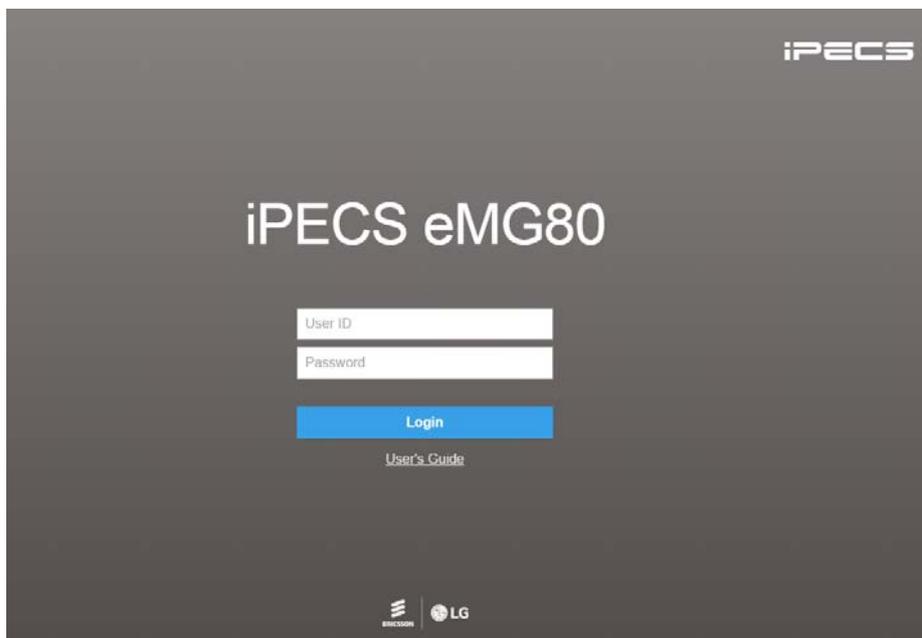
| COUNTRY | CODE | COUNTRY | CODE | COUNTRY | CODE |
|----------------|------|--------------|------|----------------|------|
| America | 1 | Argentina | 54 | Australia | 61 |
| Bahrain | 973 | Bangladesh | 880 | Belgium | 32 |
| Bolivia | 591 | Brazil | 55 | Brunei | 673 |
| Burma | 95 | Cameroon | 237 | 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 | | |

8.3 Installation Wizard

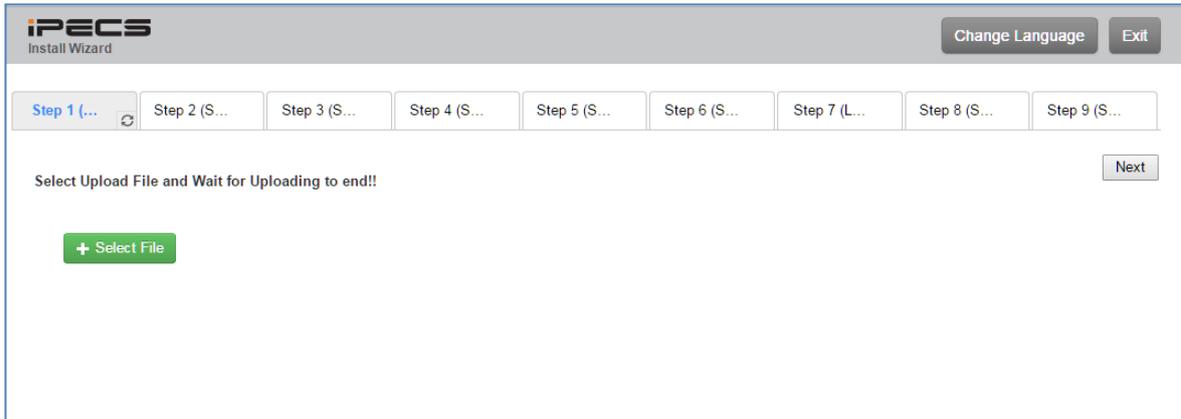
The Install Wizard is the first and foremost basic configuration tool. In addition to the Nation Code, using the Install Wizard allows quick access to other configuration parameters that often require changing including Station and Flexible Numbering plans, IP addressing information, etc. The Wizard is part of the eMG80E 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.

- 1) System Upgrade
- 2) Nation Code
- 3) System Time & Date
- 4) Station Number
- 5) Flexible Numbering Plan
- 6) CO Ring Assignment
- 7) License Upload
- 8) Maintenance ID & Password
- 9) IP Information

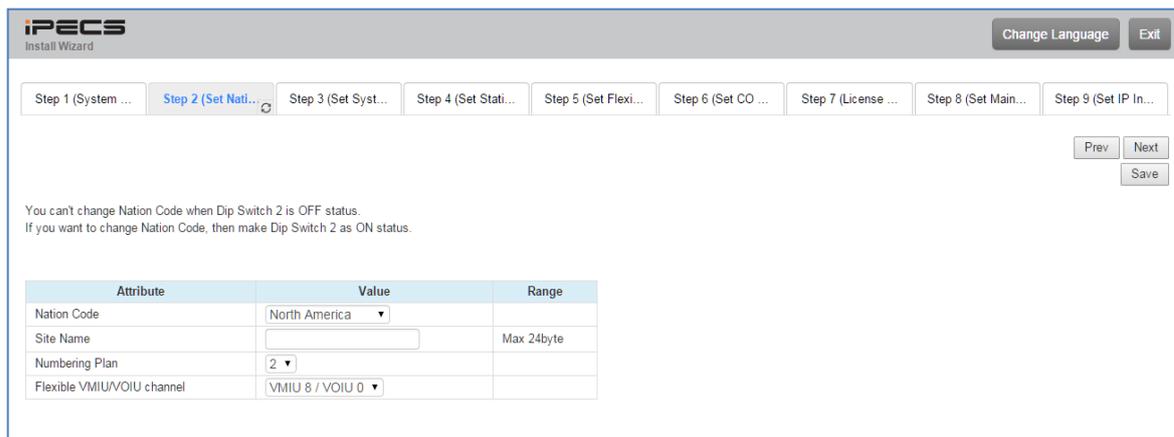
1. Open and point a browser to the IP address of the KSU LAN port (10.10.10.2). IPECS eMG80 Web Admin login screen appears.
2. Enter the default User ID (admin) and Password (1234) then click **[Login]**.



- Click **[Select files]** button and then open the pop-up folder. Select the desired file to upload to the system’s memory and click the **[Start]** button. The file is sent to the system’s memory, saved and automatically loaded upon a system reset or restart.



- During initialization, the system employs the Nation Code to establish the default gains and tones for the various interfaces (analog CO Lines, ISDN lines, etc.), as well as the numbering plans for the specific country. The gains, in particular must be set to comply with the local regulatory requirements. Normally, the Nation Code will be set at the factory, however assure the Nation code matches the system location. If not, **turn SW 1 Pole 2 of KSU to ON**, change the Nation Code and save the page. If the code is changed, after saving the page the system will initialize automatically to properly set the gains, tones and numbering plan for the selected country. In addition, all other data will be initialized so, the Nation Code should be properly set prior to other programming.



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

The screenshot shows the 'iPECS Install Wizard' interface at Step 3. The navigation bar includes 'Step 1 (S...', 'Step 2 (S...', 'Step 3 (...)', 'Step 4 (S...', 'Step 5 (S...', 'Step 6 (S...', 'Step 7 (L...', 'Step 8 (S...', and 'Step 9 (S...'. There are 'Prev', 'Next', and 'Save' buttons. The main content area contains a table for configuring system time and date.

| Order | Attribute | Value | Range | |
|-------|-----------|--------|-------|-------|
| 1 | Time | Hour | 19 | 00-23 |
| | | Minute | 38 | 00-59 |
| 2 | Date | Month | 08 | 01-12 |
| | | Day | 10 | 01-31 |
| | | Year | 15 | 00-99 |

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

The screenshot shows the 'iPECS Install Wizard' interface at Step 4. The navigation bar includes 'Step 1 (S...', 'Step 2 (S...', 'Step 3 (S...', 'Step 4 (...)', 'Step 5 (S...', 'Step 6 (S...', 'Step 7 (L...', 'Step 8 (S...', and 'Step 9 (S...'. There are 'Prev', 'Next', and 'Save' buttons. The main content area includes a text input for 'Enter Station Index Range (1 - 140):' with a 'Load' button, and a section titled 'Multiple Station Number to change' with radio buttons and input fields for 'Enter Index Range' and 'Start Station Number'. Below this is a table for station configuration.

| Index | Station Number | Type | IP Address | MAC Address | New Station Number |
|-------|----------------|------------|------------|--------------|--------------------|
| 1 | 100 | DSIB12 #1 | 10.10.10.2 | b40edcbf55fb | 100 |
| 2 | 101 | DSIB12 #2 | 10.10.10.2 | b40edcbf55fb | 101 |
| 3 | 102 | DSIB12 #3 | 10.10.10.2 | b40edcbf55fb | 102 |
| 4 | 103 | DSIB12 #4 | 10.10.10.2 | b40edcbf55fb | 103 |
| 5 | 104 | DSIB12 #5 | 10.10.10.2 | b40edcbf55fb | 104 |
| 6 | 105 | DSIB12 #6 | 10.10.10.2 | b40edcbf55fb | 105 |
| 7 | 106 | DSIB12 #7 | 10.10.10.2 | b40edcbf55fb | 106 |
| 8 | 107 | DSIB12 #8 | 10.10.10.2 | b40edcbf55fb | 107 |
| 9 | 108 | DSIB12 #9 | 10.10.10.2 | b40edcbf55fb | 108 |
| 10 | 109 | DSIB12 #10 | 10.10.10.2 | b40edcbf55fb | 109 |
| 11 | 110 | DSIB12 #11 | 10.10.10.2 | b40edcbf55fb | 110 |
| 12 | 111 | DSIB12 #12 | 10.10.10.2 | b40edcbf55fb | 111 |
| 13 | 112 | | | | 112 |
| 14 | 113 | | | | 113 |

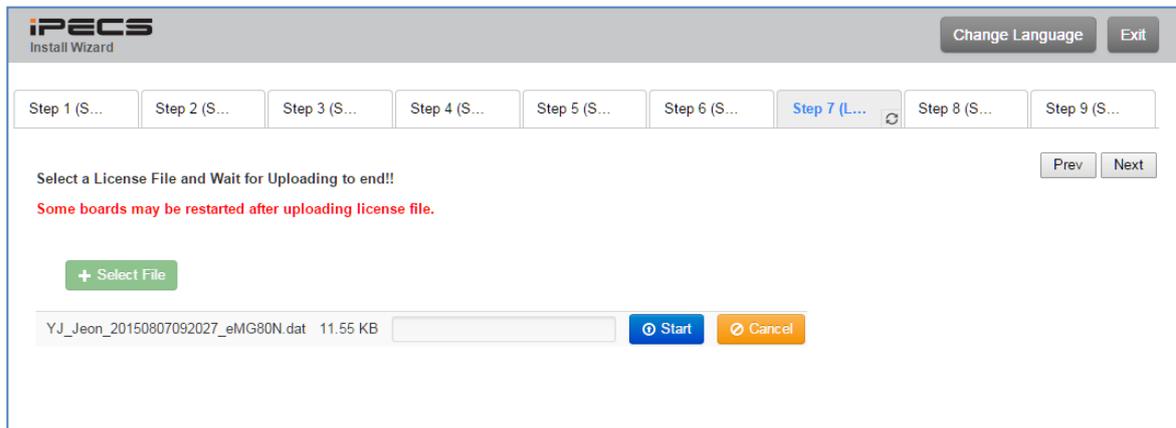
- The Flexible Numbering Plan defines the various digit strings (codes) users may dial to access system resources (outside lines, page zones, etc.) and features. In the wizard, codes for features that commonly may require modification are displayed.

| 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 |

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

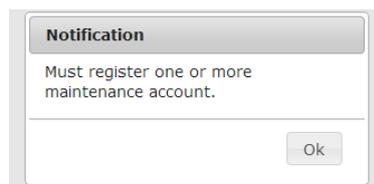
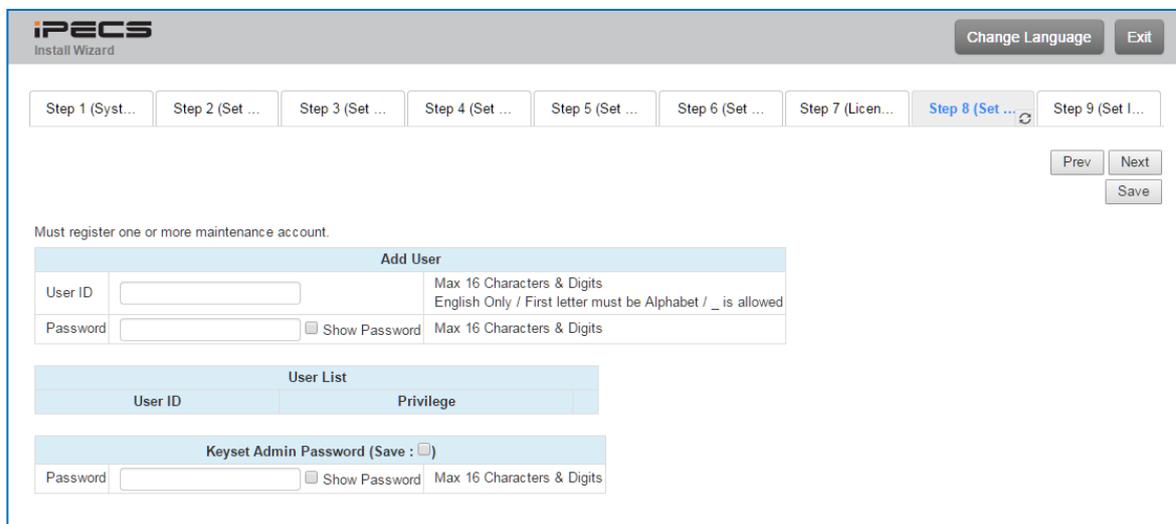
| Check All | Attribute | Value | Range | Station Delay Value [Station:Delay] | |
|--------------------------|------------|--|---|-------------------------------------|---------|
| <input type="checkbox"/> | Day | <input checked="" type="radio"/> Station Range | Range : <input type="text"/> - <input type="text"/> Delay : <input type="text"/> | 0-9 | [100:0] |
| | | <input type="radio"/> Station Group | <input type="text"/> | | |
| | | <input type="radio"/> VSF | Announcement : <input type="text"/> Auto Drop : <input type="checkbox"/> | 0 - 200 (0 : Unused) | |
| | | <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"/> Station Group | <input type="text"/> | | |
| | | <input type="radio"/> VSF | Announcement : <input type="text"/> Auto Drop : <input type="checkbox"/> | 0 - 200 (0 : Unused) | |
| | | <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"/> Station Group | <input type="text"/> | | |
| | | <input type="radio"/> VSF | Announcement : <input type="text"/> Auto Drop : <input type="checkbox"/> | 0 - 200 (0 : Unused) | |
| | | <input type="radio"/> AA Ring Time | <input type="text"/> | 0-30 | |
| | | <input type="radio"/> Net Station | <input type="text"/> | | |

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



10. The Wizard includes a password entry page. **It is strongly recommended that a unique User ID and strong password be entered to minimize the risk of admin and maintenance access by unauthorized personnel.**

In order to finish the final step, you should register at least a maintenance ID. If not so, the Wizard can't go on to the next. Also, Keypad admin password can be registered in this page.



NOTE

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

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

| Check All | Attribute | Value |
|--------------------------|---------------------|----------------------------|
| <input type="checkbox"/> | MPB DHCP | OFF ▾ |
| <input type="checkbox"/> | MPB IP Address | 10.10.10.2 |
| <input type="checkbox"/> | MPB Subnet Mask | 255.255.255.0 |
| <input type="checkbox"/> | Router IP Address | 10.10.10.1 |
| <input type="checkbox"/> | System IP Range | 10.10.10.10 - 10.10.10.254 |
| <input type="checkbox"/> | System Subnet Mask | 255.255.255.0 |
| <input type="checkbox"/> | Firewall IP Address | 0.0.0.0 |
| <input type="checkbox"/> | DNS IP Address | 0.0.0.0 |

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 iPECS eMG80 KSU. The PSU provides three DC voltage power sources to MBU through the 7-pin connector, CN7. The fuse, which is a rated as 2A @ 250 Volts is located on the lower left of the PSU board.

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

1. Turn OFF the power to the KSU and 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.

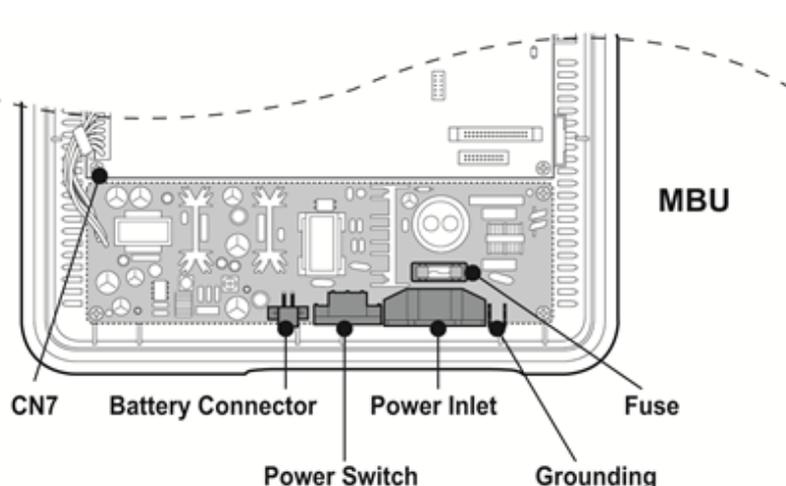


Figure 9.2-1 PSU Fuse Replacement

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. Check for a short circuit on the MBU or other boards. |
| | System database not working | 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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