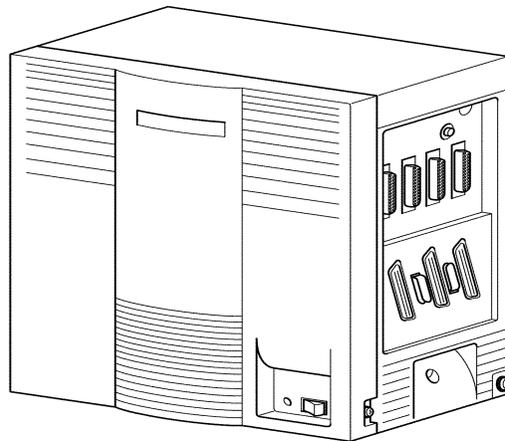


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NEC

ElectraElite[®] 192



SYSTEM HARDWARE MANUAL

CD Stock Number 750347

Issue 8

(Series 9500)

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Technology Development

Preface

GENERAL INFORMATION

Congratulations! You have purchased the NEC Electra Elite 192 System.

The Electra Elite 192 system is a feature-rich key system that provides over 200 features including Computer Telephony Integration, Least Cost Routing, Automatic Call Distribution, T1, ISDN-BRI Voice Trunks, ISDN-PRI Voice Trunks, Voice over Internet Protocol, LAN/KTS Cabling Integration and many others.

The Electra Elite 192 system provides the customer needs today, and as business expands the system can be expanded to grow as well.

The Electra Elite 192 system has a set of manuals that provide all the information necessary to install and support the system. This preface describes these manuals.

THIS MANUAL

This manual contains detailed instructions to install the Electra Elite 192 KSUs, ETUs, Multiline Terminals, and optional equipment in the following chapters.

Chapter 1 – Introduction

Chapter 1 is a brief description of the Electra Elite 192 system and contains a detailed list of equipment available with the system.

Chapter 2 – System Specifications

Chapter 2 contains detailed specifications for the Electra Elite 192 system and should be carefully reviewed by the technician **before** installing the system.

Chapter 3 – Hardware Requirements

Chapter 3 contains the hardware requirements for the Electra Elite 192 system and should be read by the technician **before** installing the system.

Chapter 4 – Installing KSUs

Chapter 4 contains the information necessary to install the basic and expansion KSUs. The technician should become familiar with this section **before** starting installation.

Chapter 5 – Installing Electronic Telephone Units

Chapter 5 contains instructions to install the ETUs in the Basic and Expansion KSUs.

Chapter 6 – Installing Electra Elite and *D^{term}* Series E Multiline Terminals

Chapter 6 describes each available terminal that can be used with the Electra Elite 192 system and includes installation instructions.

Chapter 7 – Installing Optional Equipment

Chapter 7 contains installation instructions for optional equipment that can be added to the system as customer business grows.

Chapter 8 – Installing *D^{term}* Series i Equipment

Chapter 8 describes each DTR terminal, the DCR console, and each adapter that is available to allow peripheral equipment to be attached to Multiline Terminals. Installation instructions are provided where necessary.

Chapter 9 – Installing Electra Professional Equipment

Chapter 9 contains instructions for installing Electra Professional terminals on the Electra Elite 192 system.

Chapter 10 – System Maintenance

Chapter 10 is a guide to help the technician troubleshoot and diagnose problems during and after system installation.

SUPPORTING DOCUMENTS

Other manuals in the set are described below.

Electra Elite 48/192 Features and Specifications Manual

This manual describes each available feature for the system.

Electra Elite 192 General Description Manual

This manual contains general information about the system features, configuration and standards. This overview of the Electra Elite system is useful when presenting information to potential customers.

Electra Elite 48/192 Programming Manual

This manual contains all programming instructions for the Electra Elite system.

Electra Elite Least Cost Routing Manual

This manual contains instructions for the service technician to program the customer system for least cost routing.

Electra Elite Automatic Call Distribution Manual

This manual contains instructions for the service technician to program the ACD. This manual can be used also by the ACD supervisor, at the customer site, to become familiar with the ACD/MIS feature.

Electra Elite 48/192 Job Specifications Manual

This manual contains instructions to install and maintain the Electra Elite 48/192 system and includes job specification worksheets. Completing the worksheets provides all system programming values and configuration information necessary for technicians to maintain the system.

Elite ACD Plus Installation Manual

This manual provides general information about the Elite ACD Plus features, installation procedures and feature programming. The NEC Elite ACD Plus is an Automatic Call Distribution card that supports up to 40 agents and 12 supervisors at one time.

Electra Elite Wireless System Manual

This manual describes the system and provides hardware installation and programming procedures for the Electra Elite Wireless Communication System (WCS).

Electra Elite IPK/Electra Elite System Administration Terminal End-User Manual

This manual describes the operation of the SAT End-User program for the Electra Elite Key Telephone system. This program is a user-friendly Windows application that allows the user to program and configure several features of the Eletra Elite KTS from the PC environment.

Elite VoIP Gateway Card Installation Manual

This manual describes the IPT(4)/(8)-U10 ETU, an optional interface for the Electra Elite KTS, that can combine trunk and tie line calls into Voice over internet Protocol (VoIP) Gateway trunks.

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Regulatory Information

Regulatory Information

GENERAL INFORMATION

Established Federal Communications Commission (FCC) rules permit this telephone system to be directly connected to the telephone network. A jack is provided by the telephone company. Jacks for this type of customer provided equipment are not provided on party lines or coin lines.

The telephone company may change technical operations and procedures. When such changes affect the compatibility or use of the Electra Elite system, the telephone company is required to give adequate notice of the changes.

COMPANY NOTIFICATION

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

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

 When the system is to be installed as a Key Function system (no dial access to Trunk Groups/Route Advance Blocks), use the following number:

NIFMUL-43074-KF-E

 When the system is to be installed as a Multifunction system, use the following number:

NIFMUL-43076-MF-E

 When the system is to be installed as a PBX system, use the following number:

NIFMUL-43075-PF-E

 Ringer Equivalence Number (REN): **2.0B**

 USOC jack required: **RJ21X**

The Facility Interface Code (FIC), Ringer Equivalent Number (REN), Service Order Code (SOC), and Jack for each interface ETU are listed in the following table:

Table 1 FIC, REN, SOC, and Jack Types for Electra Elite System ETUs

Trunk/Station ETU Type	FIC	REN	SOC	Jack
BRT(4)-U() ETU	02IS5	N/A	6.0F	N/A
CAMA Trunk	02RV-O	0.7A	9.0F	RJ21X
COI(4)-U() ETU (Loop Start)	02LS2	0.7A	9.0F	RJ21X
COI(8)-U() ETU (Loop Start)	02LS2	0.7A	9.0F	RJ21X
COI(8)-U() ETU (Ground Start)	02GS2	0.7A	9.0F	RJ21X
COIB(4)-U() ETU for COID/COI Mode (Loop Start)	02LS2	0.7A	9.0F	RJ21X
COIB(4)-U() ETU for COI Mode (Ground Start)	02GS2	0.7A	9.0F	RJ21X
COIB(8)-U() ETU (Loop Start)	02LS2	0.7A	9.0F	RJ21X
COID(4)/(8)-U() ETU (Loop Start)	02LS2	0.7A	9.0F	RJ21X
DID(4)-U() ETU	02RV2T	N/A	9.0F	RJ21X
DTI-U() ETU	04DU9-BN 04DU9-DN 04DU9-1KN 04DU9-1SN	N/A	6.0P	N/A
OPX(2)-U() ETU	0L13C	N/A	9.0F	RJ21X
PRT(1)-U() ETU	04DU9-1SN	N/A	6.0P	N/A
TLI(2)-U() ETU	TL31M	N/A	9.0F	RJ21X

INCIDENCE OF HARM

When the system is malfunctioning, it could harm the telephone network. The telephone system should be disconnected until the problem can be determined and repair is made. When this is not done, the telephone company may temporarily disconnect service.

RADIO FREQUENCY INTERFERENCE

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

IMPORTANT NOTE

“This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the Installation Service Manual, may cause interference to radio communications. This equipment has been tested and approved for compliance with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, that provide reasonable protection against such interference when operated in a commercial environment. Operation of this telephone system in a residential area is likely to cause interference, in which case, the user, at his or her own expense, is required to take whatever measures may be required to correct the interference.”

HEARING AID COMPATIBILITY

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

DIRECT INWARD DIALING

Operating this equipment without providing proper answer supervision is a violation of Part 68 of the FCC rules.

Proper Answer Supervision occurs when:

☎ This equipment returns answer supervision to the Public Switched Telephone Network (PSTN) when Direct Inward Dialing (DID) calls are:

- Ⓐ Answered by the called station.
- Ⓐ Answered by the Attendant.
- Ⓐ Routed to a recorded announcement that can be administered by the Customer Premise Equipment (CPE) user.
- Ⓐ Routed to a dial prompt.

☎ This equipment returns answer supervision on all DID calls forwarded to the Public Switched Telephone Network (PSTN). Permissible exceptions are:

- Ⓐ A call is unanswered.
- Ⓐ A busy tone is received.
- Ⓐ A reorder tone is received.

**VOICE
ANNOUNCEMENT/
MONITORING OVER
DID LINES****CAUTION**

The use of monitoring, recording or listening devices to eavesdrop, monitor, retrieve or record telephone conversations or other sound activities, whether or not contemporaneous with its transmission, may be illegal in certain circumstances under federal or state laws. Legal advice should be sought prior to implementing any practice that monitors or records any telephone conversation. Some federal and state laws require some form of notification to all parties to the telephone conversation, such as using a beep tone or other notification methods, or require the consent of all parties to the telephone conversation, prior to monitoring or recording a telephone conversation. Some of these laws incorporate strict penalties.

MUSIC ON HOLD**IMPORTANT NOTE**

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

**SERVICE
REQUIREMENTS**

When equipment malfunctions, all repairs will be performed by NEC America, Inc. or by an authorized agent. The user must report the need for service to an NEC America, Inc. authorized agent or to NEC America, Inc.

**UL REGULATORY
INFORMATION**

This equipment has been listed by Underwriters Laboratories and complies with all applicable requirements of the standard for telephone equipment UL 1459.

INDUSTRY CANADA REQUIREMENTS

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

1. Your telephone number:
2. IC Certificate number: **140 7942 A**
3. Ringer Equivalence Number (REN) of the equipment: **2.1**

The Industry Canada label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational and safety requirements as prescribed in the applicable Terminal Equipment Technical requirements document(s). The Department does not guarantee that equipment operates to user satisfaction.

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

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

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

CAUTION

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

The Ringer Equivalence Number (REN) assigned to each terminal device provides an indication of the maximum number of terminals allowed to be connected to a telephone interface. The termination of an interface may consist of any combination of devices subject only to the requirement that the sum of the Ringer Equivalent Numbers of all the devices does not exceed 5.

This equipment is listed by the Canadian Standards Association and complies with all applicable requirements of the standard for telephone equipment C 22.2 No. 225.

This equipment meets IC requirements CS03.

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus as regulated by the radio interference regulations of Industry Canada.

Le present appareil numerique n'emet pas de bruits radioelectriques depassant les limites applicables aux appareils numeriques de Classe A prescrites dans le reglement sur le brouillage radioelectrique edicte par Industrie Canada.

BATTERY DISPOSAL

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

Table 2 Battery Types and Quantities for KSUs and ETUs

Unit Name	Type of Battery	Quantity
B64-U10 KSU	Lead Acid	2
CPUB()-U() ETU	Nickel-Cadmium	1
CTI/VP(4)/(8)/(12)/(16)-U()	Lithium	1
DTP-1HM-1 TEL DTP-1HM-2 TEL	Lithium	1
DTP-16HC-1 TEL	Nickel-Cadmium	1
DTR-1HM-1 TEL	Lithium	1
DTH-4R-1/2	Nickel-Cadmium	1
DTR-4R-1/2 TEL	Nickel-Cadmium	1
DTU-4R-1 TEL	Lead Acid	1
ETW-4R-1 TEL	Nickel-Cadmium	1
FMS(2)/(4)/(8)-U() ETU	Nickel-Cadmium	1
MIFA-U()	Nickel-Cadmium	1
MIFM-U()	Nickel-Cadmium	1

The Electra Elite CPUB()-U() ETU provides memory backup for approximately 21 days. The Ni-Cd battery should be replaced about every two years.

IMPORTANT SAFEGUARDS FOR BATTERY DISPOSAL

DO NOT PLACE USED BATTERIES IN YOUR REGULAR TRASH! THE PRODUCT YOU PURCHASED CONTAINS A NICKEL-CADMIUM OR SEALED LEAD BATTERY. NICKEL-CADMIUM OR SEALED LEAD BATTERIES MUST BE COLLECTED, RECYCLED, OR DISPOSED OF IN AN ENVIRONMENTALLY SOUND MANNER.

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

Nickel-Cadmium (or sealed lead) batteries must be returned to a federal or state approved nickel-cadmium (or sealed lead) battery recycler. This may be where the batteries were originally sold or a local seller of automotive batteries. Contact your local waste management officials for other information regarding the environmentally sound collection, recycling and disposal of the battery contained in this product. For Ni-Cd batteries, you can also call 1-800-8-BATTERYSM if further information is required.

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

PRODUCT PACKAGE LABELING



Ni-Cd

CONTAINS NICKEL-CADMIUM BATTERY. BATTERY MUST BE RECYCLED OR DISPOSED OF PROPERLY. MUST NOT BE DISPOSED OF IN MUNICIPAL WASTE.



Pb

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



Ni-MH

CONTAINS NICKEL-METAL HYDRIDE BATTERY. BATTERY MUST BE RECYCLED OR DISPOSED OF PROPERLY. MUST NOT BE DISPOSED OF IN MUNICIPAL WASTE.

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SECTION 1 GENERAL INFORMATION

1.1 Unique Design

The Electra Elite 192 system is a powerful key system that meets the ever changing business communications demands of today. Unique compact design allows it to be easily and quickly installed.

The Electra Elite 192 system can grow with your business. You can easily and economically increase port size when necessary. Two expansion units can be added when the CPUB()-U10 ETU is installed in the basic cabinet. A full-blown system includes the basic and two expansion units that provide a capacity of 192 ports.

Electra Elite 192 is a feature-rich system that provides telephone functions and supports advanced features such as:

- ☎ Automatic Number Indication (ANI)/Caller ID
- ☎ Automatic Call Distribution (ACD)
- ☎ Automatic Route Selection
- ☎ Caller ID Call Return
- ☎ Centralized Voice Mail
- ☎ Computer Telephony Integration (CTI)
- ☎ Dialed Number Indication Service (DNIS)
- ☎ *D^{term}* Analog Cordless Terminal
- ☎ *D^{term}* Cordless II Terminal
- ☎ *D^{term}* Cordless Lite Terminal
- ☎ *D^{term}* Handset Cordless Terminal
- ☎ Elite ACD Plus
- ☎ Emergency 911 – Cut Through
- ☎ Enhanced 911
- ☎ Integrated Digital Voice Mail
- ☎ ISDN-BRI and ISDN-PRI Voice Trunks
- ☎ K-CCIS Common Channel Interoffice Signaling
- ☎ LAN/KTS Cabling Integration
- ☎ Least Cost Routing (LCR)

- ☎ Live Monitoring
- ☎ Live Record
- ☎ Multiline Conference Bridge
- ☎ Multilingual LCD Indication
- ☎ Multiple Music on Hold Using CO Interface
- ☎ PC Attendant Console
- ☎ Unified Messaging
- ☎ Uniform Call Distribution (UCD)
- ☎ Voice over Internet Protocol (VoIP)
- ☎ Wireless
- ☎ Optional 33.6 kbps Modem for Remote Programming and Maintenance

The Electra Elite 192 system offers a variety of compatible 8-line, 16-line, and 32-line Multiline Terminals with/without LCD. A 2-line non-LCD terminal and a 60-line Attendant Console are also available.

A customer with existing Electra Professional terminals can easily connect them to the Electra Elite 192 system to provide inexpensive migration. Most Electra Elite 192 system features are available with the Electra Professional Multiline Terminals.

The Electra Elite 192 system supports a wide range of additional equipment such as Single Line Telephones, external speakers, facsimile machines, external microphones, and headsets that can be connected to the system to accommodate individual customer needs. The diagram in [Figure 1-1 System Configuration Example](#) shows an Electra Elite system with standard and optional equipment (some locally provided).

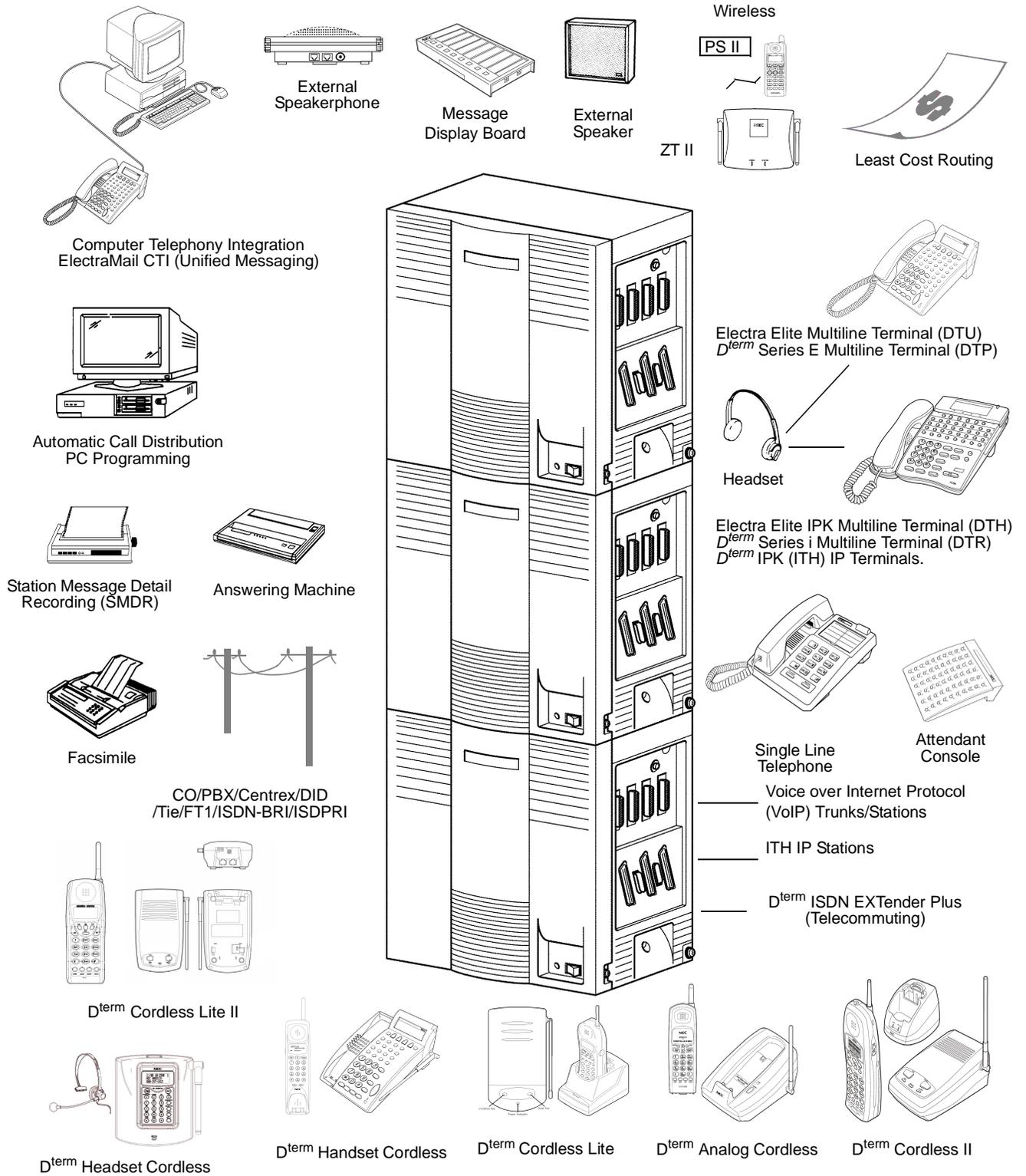


Figure 1-1 System Configuration Example

SECTION 2
EQUIPMENT
DESCRIPTION

2.1 Equipment List

The table below lists all equipment used with the Electra Elite system. The equipment name, a description, and the maximum quantities that are allowed when a Basic KSU, a Basic KSU with one Expansion KSU, and a Basic KSU with two Expansion KSUs are included in the table. The list is alphabetical by category.

- ⓘ The maximum quantity relies on at least one Electronic Station Interface ETU and one Trunk Interface ETU being installed.

Equipment Name	Description	Basic KSU	Basic + 1 Expansion KSU	Basic + 2 Expansion KSUs
Key Service Units, Power Supply Units, and Adapters				
B64-U10 KSU	<p>The Basic Key Service Unit (KSU) for the Electra Elite System provides service for outside lines, Attendant Consoles, and interconnection of the station terminals. The basic KSU provides 64 ports that can be expanded to a maximum of 192 ports with the addition of two expansion KSUs.</p> <p>The basic KSU is also used for the expansion KSUs. System software allows a maximum of 184 ports to be used for stations and trunks. There are two fixed slots and eight flexible slots.</p> <p>The Expansion Key Service Unit (KSU) of the Electra Elite System provides an additional 64 ports. Expansion units can be added to the Basic KSU to provide 128 ports with one expansion unit and 192 ports with two expansion units.</p> <p>Each Expansion KSU provides eight flexible slots and accommodates any interface cards.</p> <p>The P64-U10 PSU (power supply unit), backup batteries, and three PFT relays are included with each KSU.</p>		1 Basic KSU per system	2 expansion KSUs per system
FCE-U10 Unit	The Front Cover Extender Unit is required when an IPT(4/8)-U(), or CTI(4/8)-U() ETU is installed.		1 per KSU	
P64-U10 PSU	The Power Supply Unit is included with the B64-U10 KSU.		1 per KSU	

Equipment Name	Description	Basic KSU	Basic + 1 Expansion KSU	Basic + 2 Expansion KSUs
Common Electronic Telephone Units				
CPUB()-U() ETU	The Central Processing Unit contains a 32-bit microprocessor that has overall control of the system. This ETU communicates with the interface boards and supports up to 192 ports (24 interface cards).	1 CPU per system		
		4 PBR circuits		
		16 voice mail ports (analog) 32 voice mail ports (digital)		
		64 Physical ports	128 Physical ports	192 Physical ports
		8 slots	16 slots	24 slots
		56 Station Ports	120 Station Ports	120 Station Ports
		56 Trunks	64 Trunks	64 Trunks
		32 PC Telephony Boards	32 PC Telephony Boards	32 PC Telephony Boards
		16 Conference Circuits		
CLKG-U() Unit	The Clock Unit provides synchronization for FT1/T1 lines, ISDN-Primary Rate, and ISDN-Basic Rate connections. The unit is piggybacked on the CPUB()-U() ETU and supports the BRT(4)-U(), BSU(2)-U(), DTI-U(), or PRT(1)-U() ETU.	1 per system with FT1, ISDN-BRI, ISDN-PRI or Wireless connections		
EXP-U() ETU	The Expansion KSU Controller controls data transmission between the CPUB()-U() ETU and other ETUs installed in the B64-U10 KSU.	N/A	1 ETU	2 ETUs
KMA(1.0)U	This unit is mounted on the MIFA-U() ETU and adds ACD.	1 per MIFA-U() ETU		
KMM(1.0)U	This unit is mounted on the MIFM-U() ETU and adds LCR and Caller ID scrolling and dialing features.	1 per MIFM-U() ETU		
MIFA-U() ETU	This ETU provides additional memory for processing ACD/UCD. When ACD feature is desired, the KMA(1.0)U must be installed.	1 per system		
MIFM-U() ETU	This ETU provides additional memory for PC programming, SMDR, LCR, Caller ID scrolling, and Wireless programming. When the LCR or Caller ID Scroll functions are desired, the KMM(1.0)U must be installed.	1 per system		

Equipment Name	Description	Basic KSU	Basic + 1 Expansion KSU	Basic + 2 Expansion KSUs
Modem Kit Unit	This unit is installed on the PCT(S)-U() Unit or the MIFM-U() ETU.	1 per system		
Trunk Electronic Telephone Units				
BRT(4)-U10 ETU	<p>This Basic Rate Interface unit provides four channels (eight voice channels) for ISDN-Basic Rate Interface.</p> <p>Caller ID is supported.</p> <p>This ETU is installed in slots S1~S4 in the basic or first expansion B64-U10 KSU (\$7000 or lower). \$8000 or higher has no slot limitations.</p> <p>The maximum number depends on other trunk cards installed. This ETU shares the total number of CO/PBX lines in the system.</p> <p>A CLKG-U() Unit must be installed.</p>	2 ETUs (32 B Channels)	8 ETUs (64 B Channels)	8 ETUs (64 B Channels)
BRT(4)-U20 ETU	<p>This Basic Rate Interface unit provides four channels (eight voice channels) for ISDN-Basic Rate Interface.</p> <p>This ETU uses an S/T-type interface. When connecting to a CO, a locally provided Network Termination unit (NT1) is required.</p> <p>Caller ID is supported.</p> <p>This ETU is installed in slots S1~S4 in the basic or first expansion B64-U10 KSU (\$7000 or lower). \$8000 or higher has no slot limitations.</p> <p>The maximum number depends on other trunk cards installed. This ETU shares the total number of CO/PBX lines in the system.</p> <p>A CLKG-U() Unit must be installed.</p>	2 ETUs (32 B Channels)	8 ETUs (64 B Channels)	8 ETUs (64 B Channels)
COI(4)-U() ETU	<p>Electrical fuses (posistors) are built into this ETU. This ETU supports four outside (CO/PBX) lines and provides circuitry for ring detection, holding, and dialing.</p> <p>The outside lines must be Loop Start DTMF trunks.</p> <p>This ETU is installed in slots S1~S8 in the basic or expansion B64-U10 KSU.</p> <p>This ETU can provide an E911 CAMA trunk.</p> <p>The maximum number depends on other trunk cards installed. This ETU shares the total number of CO/PBX lines in the system.</p>	7 ETUs 28 CO/PBX lines	15 ETUs 60 CO/PBX lines	16ETUs 64 CO/PBX lines

Equipment Name	Description	Basic KSU	Basic + 1 Expansion KSU	Basic + 2 Expansion KSUs
COI(8)-U() ETU	<p>Electrical fuses (posistors) are built into this ETU. This ETU supports eight outside (CO/PBX) lines and provides circuitry for ring detection, holding, and dialing.</p> <p>The outside lines can be any combination of Loop Start or Ground Start DTMF trunks.</p> <p>This ETU is installed in slots S1~S8 in the basic or expansion B64-U10 KSU.</p> <p>This ETU can provide an E911 CAMA trunk.</p> <p>The maximum number depends on other trunk cards installed. This ETU shares the total number of CO/PBX lines in the system.</p>	<p>7 ETUs</p> <p>56 CO/PBX lines</p>	<p>8 ETUs</p> <p>64 CO/PBX lines</p>	<p>8 ETUs</p> <p>64 CO/PBX lines</p>
COIB(4)-U10 ETU	<p>This ETU can function the same as the COI(4)-U() or COID(4)-U() ETU to provide Central Office interface. When ETU is set for COID mode, Loop Start trunks and /or Caller ID trunks are supported. When the ETU is set for COI mode, Loop Start or Ground Start is supported. Caller ID is not supported in COI mode. Connections for Ground Start trunks are polarity sensitive.</p> <p>Only DTMF signaling is supported.</p> <p>This ETU can provide an E911CAMA trunk.</p> <p>The maximum number depends on other Trunk cards installed.</p> <p>☞ COID mode: Caller ID trunks must be installed in slots 1~4 in basic or first expansion KSU (S7000 or lower). S8000 or higher has no slot limitations.</p> <p>This ETU shares the total number of CO/PBX lines in the system.</p> <p>Tip and Ring electrical fuses are provided to comply with UL 1459 requirements.</p>	<p>COI Mode</p> <p>7 ETUs</p> <p>28 CO/PBX Lines</p> <p>COID mode</p> <p>4 ETUs</p> <p>16 CO (Class) lines</p>	<p>COI Mode</p> <p>15 ETUs</p> <p>60 CO/PBX Lines</p> <p>COID mode</p> <p>8 ETUs</p> <p>32 CO (Class) lines</p>	<p>COI Mode</p> <p>16 ETUs</p> <p>64 CO/PBX Lines</p> <p>COID mode</p> <p>8 ETUs</p> <p>32 CO (Class) lines</p>

Equipment Name	Description	Basic KSU	Basic + 1 Expansion KSU	Basic + 2 Expansion KSUs
COIB(4)-U20/U30 ETU	<p>This ETU can function the same as the COI(4)-U() or COID(4)-U() ETU to provide Central Office interface. Only the COIB(4)-U30 can support the CO Message Waiting Indication feature (S9500). This ETU has transmit and receive pad controls. When ETU is set for COID mode, Loop Start trunks and Caller ID trunks are supported. When the ETU is set for COI mode, Loop Start is supported. Ground Start Trunks are not supported. Caller ID is not supported in COI mode. Fax CO Branch support is provided on port 4 only.</p> <p>Only DTMF signaling is supported.</p> <p>This ETU can provide an E911 CAMA trunk on port 3 only.</p> <p>For COI mode: ETUs can be installed in any IF slot.</p> <p>For COID mode: Caller ID trunks must be installed in slots S1~S4 in basic or first expansion KSU (S7000 or lower). S8000 or higher has no slot limitations.</p> <p>The maximum number depends on other Trunk cards installed.</p> <p>This ETU shares the total number of CO/PBX lines in the system.</p> <p>Tip and RIng electrical fuses are provided to comply with UL 1459 requirements.</p>		<p>COI Mode 16 ETUs</p> <p>COID Mode 8 ETUs</p>	

Equipment Name	Description	Basic KSU	Basic + 1 Expansion KSU	Basic + 2 Expansion KSUs
COIB(8)-U20/U30 ETU	<p>This ETU can function the same as the COI(8)-U() or COID(8)-U() ETU to provide Central Office interface. Only the COIB(8)-U30 can support the CO Message Waiting Indication feature (\$9500). When ETU is set for COID mode, Loop Start trunks and Caller ID trunks are supported. When the ETU is set for COI mode, Loop Start is supported. Ground Start Trunks are not supported. Caller ID is not supported in COI mode. Fax CO Branch is not supported.</p> <p>Only DTMF signaling is supported.</p> <p>This ETU can provide an E911 CAMA trunk on port 3 or 7.</p> <p>For COI mode ETUs can be placed in any IF Slot. For COID mode: Caller ID trunks must be installed in slots S1~S4 in Basic and first expansion KSU (\$7000 or lower). \$8000 or higher has no slot limitations.</p> <p>The maximum number depends on other Trunk cards installed.</p> <p>This ETU shares the total number of CO/PBX lines in the system.</p> <p>Tip and RIng electrical fuses are provided to comply with UL 1459 requirements.</p>		COI Mode 8 ETUs	COID Mode 8 ETUs
COID(4)-U() ETU	<p>The Central Office Caller ID ETU detects Caller ID signals from the central office and sends caller identification to the CPUB()-U() ETU.</p> <p>Electrical fuses (posistors) are built into this ETU That supports four outside (CO/PBX) lines and provides circuitry for ring detection, holding, and dialing.</p> <p>This ETU is loop start, DTMF only and is installed in slots S1~S4 in the basic or first expansion B64-U10 KSU (\$7000 or lower). \$8000 or higher has no slot limitations.</p> <p>This ETU can provide an E911 CAMA trunk.</p> <p>The maximum number depends on other trunk cards installed. This ETU shares the total number of CO/PBX lines in the system.</p>	4 ETUs 16 CO (Class) lines	8 ETUs 32 CO (Class) lines	8 ETUs 32 CO (Class) lines

Equipment Name	Description	Basic KSU	Basic + 1 Expansion KSU	Basic + 2 Expansion KSUs
COID(8)-U() ETU	<p>The Central Office Caller ID ETU detects Caller ID signals from the central office and sends caller identification to the CPUB()-U() ETU.</p> <p>Electrical fuses (posistors) are built into this ETU That supports eight outside (CO/PBX) lines and provides circuitry for ring detection, holding, and dialing.</p> <p>This ETU is loop start only and is installed in slots S1~S4 in the basic or first expansion B64-U10 KSU (\$7000 or lower). \$8000 or higher has no slot limitations.</p> <p>This ETU can provide an E911 CAMA trunk.</p> <p>The maximum number depends on other trunk cards installed. This ETU shares the total number of CO/PBX lines in the system.</p>	<p>4 ETUs</p> <p>32 CO (Class) lines</p>	<p>8 ETUs</p> <p>64 CO (Class) lines</p>	<p>8 ETUs</p> <p>64 CO (Class) lines</p>
DID(4)-U() ETU	<p>The Direct Inward Dialing Interface Unit supports up to four DID or four 2-way DID lines. Each DID(4)-U() ETU requires one interface slot position in the KSU.</p> <p>☞ Immediate, wink start, second dial tone, and delay dial signaling can be combined on this ETU.</p> <p>This ETU is installed in slots S1~S8 in any B64-U10 KSU.</p> <p>The maximum number depends on other trunk cards installed. This ETU shares the total number of CO/PBX lines in the system.</p>	<p>7 ETUs</p> <p>28 DID Trunks</p>	<p>15 ETUs</p> <p>60 DID Trunks</p>	<p>16 ETUs</p> <p>64 DID Trunks</p>

Equipment Name	Description	Basic KSU	Basic + 1 Expansion KSU	Basic + 2 Expansion KSUs
DTI-U() ETU (S7000 or lower)	<p>The Digital Trunk Interface ETU allows termination of a Fractional T1 (24 DS-0 channels) line. This ETU contains circuitry for outside ring detection, holding, dialing, control function, Tie line (E&M), and DID signaling.</p> <p>Automatic Number Indication (ANI) is supported.</p> <p>Only the DTI-U30 ETU supports K-CCIS common channel signaling.</p> <p>A combination of Loop Start and Ground Start trunks, DID trunks, or Tie lines can be used on the ETU. Each trunk is assigned in groups of four. DTMF or Dial Pulse dialing is supported.</p> <p>This ETU is installed in slots S1 and S4 in the basic B64-U10 KSU or slot S1 of the first expansion B64-U10 KSU.</p> <p>The maximum number depends on other trunk cards installed. This ETU shares the total number of CO/PBX lines in the system.</p> <p>☞ The maximum combination of DTI-U() and PRT(1)-U() ETUs is 3 per system.</p> <p>A CLKG-U() Unit must be installed.</p>	<p>2 ETUs</p> <p>48 lines</p>	<p>3 ETUs</p> <p>64 lines</p>	<p>3 ETUs</p> <p>64 lines</p>
DTI-U() ETU (S8000 or higher)	<p>Same as above with the following exceptions:</p> <ul style="list-style-type: none"> • S8000 has no slot limitations. • A maximum of 14 of the following 4-port trunk interface ETUs can be installed: <ul style="list-style-type: none"> › COIB(4)-U() installed as COID(4) › COID(4)-U() ETU › DTI-U() installed as DTI4 › IPT(4)-U() installed as COID(4) or DTI4 › PRT(1)-U() installed as PRT4 	<p>8 ETUs</p> <p>64 lines</p>	<p>8 ETUs</p> <p>64 lines</p>	<p>8 ETUs</p> <p>64 lines</p>
EXPT(2)-U() ETU	<p>This ETU allows multiple Electra Elite systems to be connected with a K-CCIS connection, and combines the functionality of the EXP-U ETU and two DTI-U() ETUs (one DTI for system 1 and one DTI for system 2).</p>		<p>1</p>	

Equipment Name	Description	Basic KSU	Basic + 1 Expansion KSU	Basic + 2 Expansion KSUs
IPT(4)-U() ETU	<p>This IP Gateway ETU is an optional Interface that can combine trunk calls into Gateway trunks.</p> <p>This ETU can emulate the following ETUs: TLI(2)-U(), DID(4)-U(), COI(4)/(8)-U(), or COID(4)/(8)-U(). Refer to the applicable ETU assignment for the trunk capacity.</p> <p>This ETU can be installed in KSU slots that support the applicable assigned ETU.</p> <p>The maximum number depends on other trunk cards installed. This ETU shares the total number of CO/PBX lines in the system.</p> <p>When this ETU is installed, the FCE-U10 Unit is required. This ETU shares the total number of station ports in the system.</p>	<p>4 ETUs Variable</p> <p>IP Gateway Trunks 16 lines</p>	<p>4 ETUs Variable</p> <p>IP Gateway Trunks 32 lines</p>	<p>4 ETUs Variable</p> <p>IP Gateway Trunks 48 lines</p>
IPT(8)-U() ETU	<p>This IP Gateway ETU is an optional Interface that can combine trunk calls into Gateway trunks.</p> <p>This ETU can emulate the following ETUs: TLI(2)-U(), DID(4)-U(), COI(4)/(8)-U(), or COID(4)/(8)-U(). Refer to the ETU type assignment for the trunk capacity.</p> <p>This ETU can be installed in KSU slots that support the applicable assigned ETU.</p> <p>The maximum number depends on other trunk cards installed. This ETU shares the total number of CO/PBX lines in the system.</p> <p>When this ETU is installed, the FCE-U10 Unit is required. This ETU shares the total number of station ports in the system.</p>	<p>4 ETUs Variable</p> <p>IP Gateway Trunks</p>	<p>4 ETUs Variable</p> <p>IP Gateway Trunks</p>	<p>4 ETUs Variable</p> <p>IP Gateway Trunks</p>
PRT(1)-U() ETU (S7000 or lower)	<p>The Integrated Service Digital network (ISDN)-Primary Rate Interface (PRI) is a Public Switched Telephone Network (PSTN) service that provides 23 B channels and one D channel (23B + D) for voice call trunking. The B channels provide 23 CO/DID connections.</p> <p>This ETU is installed in slots S1 and S4 in the basic B64-U10 KSU and slot S1 of the first expansion B64-U10 KSU.</p> <p>The maximum number depends on other trunk cards installed. This ETU shares the total number of Trunk lines in the system.</p> <p>☞ The maximum combination of PRT(1)-U() and DTI-U() ETUs is three per system.</p> <p>A CLKG-U() Unit must be installed.</p>	<p>2 ETUs</p> <p>46 lines</p>	<p>3 ETUs</p> <p>62 lines</p>	<p>3 ETUs</p> <p>62 lines</p>

Equipment Name	Description	Basic KSU	Basic + 1 Expansion KSU	Basic + 2 Expansion KSUs
PRT(1)-U() ETU (S8000 or higher)	<p>Same as above with the following exceptions:</p> <ul style="list-style-type: none"> • S8000 has no slot limitations. • A maximum of 14 of the following 4-port trunk interface ETUs can be installed: <ul style="list-style-type: none"> › COIB(4)-U() installed as COID(4) › COID(4)-U() ETU › DTI-U() installed as DTI4 › IPT(4)-U() installed as COID(4) or DTI4 › PRT(1)-U() installed as PRT4 	8ETUs 62 lines	8 ETUs 62 lines	8 ETUs 62 lines
TLI(2)-U() ETU	<p>The Tie Line Interface ETU supports the termination and operation of up to two E&M Tie lines (4-wire, type I and type V, and 10/20 pps Dial Pulse or DTMF).</p> <p>☞ Immediate, wink start, second dial tone, and delay dial signaling can be combined on this ETU.</p> <p>This ETU is installed in slots S1~S8 in the B64-U10 KSU.</p> <p>The maximum number depends on other trunk cards installed. This ETU shares the total number of CO/PBX lines in the system.</p>	7 ETUs 14 Tie lines	15 ETUs 30 Tie lines	16 ETUs 32 Tie lines
Station Electronic Telephone Units				
CNF(8)-U() ETU	<p>The Multiline Conference Bridge allows any intercom user or outside party calling to a port of the CNF(8)-U() ETU to join or make a multiparty Conference Call.</p> <p>Each CNF(8)-U() ETU supports one 8-party conference or two 4-party conferences regulated by a switch setting.</p> <p>This ETU is installed in slots S1~S8 in the B64-U10 KSU.</p> <p>The system recognizes this ETU as SLI(8)-U() ETU. This ETU shares the total number of station ports in the system.</p>	2 ETUs 16 Conference Ports	2 ETUs 16 Conference Ports	2 ETUs 16 Conference Ports
CMS(2)/(4)-U() ETU	<p>This ETU is a Digital Voice Mail system that supports a maximum of four ports. Each system can have one CTI/VP, CMS, FMS, VMS, or IVR ETU.</p>	1 ETU		

Equipment Name	Description	Basic KSU	Basic + 1 Expansion KSU	Basic + 2 Expansion KSUs
CTI/VP(4)/(8)/(12)/(16)-U() ETU	<p>This ETU is a 4-, 8-, 12-, or 16-port Digital Voice Mail system with ports that can support TeLANophy, inbound/outbound faxing, and Hospitality/HVM applications.</p> <p>It can be installed in one of the interface slots.</p> <p>This ETU shares the total number of station ports in the system.</p> <p>Each system can have one CTI/VP, CMS, FMS, VMS, or IVR ETU.</p>	1 ETU		
DPH(4)-U() ETU	<p>The Doorphone interface ETU allows four DP-D-1A Doorphones to be connected. Two simultaneous calls are allowed, and four Door Lock Release relays are provided.</p> <p>This ETU is installed in slots S1~S8 in any KSU.</p>	1 ETU	1 ETU	1 ETU
ESI(8)-U() ETU	<p>The Electronic Station Interface ETU contains eight circuits. Each circuit can support any Attendant Console, Multiline Terminal, or Single Line Telephone adapter.</p> <p>This ETU is installed in slots S1~S8 in the basic B64-U10 KSU or expansion B64-U10 KSU.</p> <p>The maximum number depends on other station cards installed. This ETU shares the total number of extension ports in the system.</p>	7 ETUs 56 Extensions	15 ETUs 120 Extensions	15 ETUs 120 Extensions
FMS(2)/(4)/(8)-U() ETU	<p>This ETU is installed in one of the interface slots. It has two, four or eight channels of built-in Voice Mail.</p> <p>The system recognizes this as a VMS(4)/(8)-U() ETU. Each system can have one CMS, CTI/VP, VMS, or IVR ETU in place of the FMS.</p> <p>This ETU shares the total number of station ports in the system.</p> <p>Each system can have one CTI/VP, CMS, FMS, VMS, or IVR ETU.</p>	1 ETU		
OPX(2)-U() ETU	<p>The Off-Premise Extension ETU allows termination and operation of two off-premise extensions. Each ETU has a built-in ringer (RSG). Up to 1600 ohms of loop resistance (including the Single Line Instrument) is acceptable between the OPX ETU and the Single Line Telephone. Each system can have one CTI/VP, FMS, VMS, or IVR ETU in place of the CMS-U30.</p> <p>This ETU is installed in slots S1~S8 in any B64-U10 KSU. This ETU shares the total number of station ports in the system.</p>	6 ETUs 12 extensions	14 ETUs 28 extensions	22 ETUs 44 extensions

Equipment Name	Description	Basic KSU	Basic + 1 Expansion KSU	Basic + 2 Expansion KSUs
SLI(4)-U() ETU	<p>The Single Line Interface ETU supports a maximum of four Single Line Telephones and/or analog voice mail ports. This ETU provides Ringing Signal Generator (RSG), and Message Waiting (MW) LED voltage to Single Line Telephones.</p> <p>This ETU is installed in slots S1~S8 in any B64-U10 KSU.</p> <p>The maximum number depends on other station cards installed. This ETU shares the total number of station ports in the system.</p>	<p>6 ETUs</p> <p>24 ports</p>	<p>14 ETUs</p> <p>56 ports</p>	<p>22 ETUs</p> <p>88 ports</p>
SLI(8)-U() ETU	<p>The Single Line Interface ETU supports a maximum of eight Single Line Telephones and/or voice mail ports. This ETU provides Ringing Signal Generator (RSG), and Message Waiting (MW) LED voltage to Single Line Telephones.</p> <p>This ETU is installed in slots S1~S8 in any KSU.</p> <p>The maximum number depends on other station cards installed. This ETU shares the total number of station ports in the system.</p>	<p>6 ETUs</p> <p>48 ports</p>	<p>14 ETUs</p> <p>112 ports</p>	<p>14 ETUs</p> <p>112 ports</p>
VMS(2)-U() ETU	<p>This ETU is installed in one of the interface slots. It has two channels of built-in Voice Mail.</p> <p>This ETU shares the total number of station ports in the system.</p> <p>Each system can have one CTI/VP, CMS, FMS, VMS, or IVR ETU.</p>	<p>1 VMS(2), VMS(4), VMS(8)-U() ETU, or VMS-U30 ETU</p>		
VMS(4)-U() ETU	<p>This ETU is installed in one of the interface slots. It has four channels of built-in Voice Mail.</p> <p>This ETU shares the total number of station ports in the system.</p> <p>Each system can have one CTI/VP, CMS, FMS, VMS, or IVR ETU.</p>			
VMS(8)-U() ETU	<p>This ETU is installed in one of the interface slots. It has eight channels of built-in Voice Mail.</p> <p>This ETU shares the total number of station ports in the system.</p> <p>Each system can have one CTI/VP, CMS, FMS, VMS, or IVR ETU.</p>			
Optional Electronic Telephone Units				
ACD(8)-U() ETU	<p>The Automatic Call Distribution ETU interfaces the Elite ACD Plus Server with the Electra Elite KSU.</p> <p>This ETU is installed in slots S1~S8 in any KSU.</p>	<p>1 ETU</p>		

Equipment Name	Description	Basic KSU	Basic + 1 Expansion KSU	Basic + 2 Expansion KSUs
BSU(2)-U() ETU	The Base Station Unit ETU interfaces the KSU with the ZT II Zone Transceiver for wireless communication with a PS II Personal Station. This ETU is installed in slots S1~S8 in any KSU. A CLKG-U() ETU must be installed.	6 ETUs 12 ZT IIs	8 ETUs 16 ZT IIs	8 ETUs 16 ZT IIs
CCH(4)-U() ETU	The Common Channel Handler furnishes four K-CCIS routes to coordinate receiving common channel data from a distant system or to coordinate sending it to a distant system.	1 ETU		
ECR-U() ETU	The External Control Relay ETU provides common audible tone signaling using relay contacts for external ringing equipment and an audible output for external paging systems. Four External Tone Ringer Control relays, one Night Chime relay, three External Paging relays, and two General Purpose relays are provided. This ETU is installed in slots S1~S8 in the basic B64-U10 KSU.	1 ETU		
HUB(8)-U() ETU	This ETU is an optional Ethernet interface for Electra Elite that supports eight Ethernet ports. Each port has two indicators that indicate status and activity. The HUB is a switching point for data from individual ports. A switch regulates transmission and determines the port where the data should be forwarded.	1 ETU		
IAD(8)-U()	This ETU is an optional interface integration device that supports various IP applications such as IP CCH and MEGACO station.	3 ETUs	8 ETUs	14 ETUs for ESI 8 ETUs for DTIU
IPCA()-U() ETU	This ETU is a pure IP switch that can manage call control for up to 30 IP software telephones. The MG(8)-U() ETU is required for IP telephones to communicate with existing telephones or various available trunks.	1 ETU		
IVR(8)-U() ETU	This ETU is an eight-port system that supports IVR applications. Each system can have one CTI/VP, CMS, FMS, VMS, or IVR ETU.	1 ETU		
MG(8)-U() ETU	This ETU is an eight-path gateway ETU between the IP()-U() and the CPUB()-U().	1 ETU		

Equipment Name	Description	Basic KSU	Basic + 1 Expansion KSU	Basic + 2 Expansion KSUs
PBR()-U() ETU	The Push Button Receiver ETU detects and translates DTMF tones generated by Single Line Telephones, modems, or facsimile machines. The PBR provides four circuits for Single Line Telephones only. Four circuits are built in the CPUB()- U() ETU.	1 ETU		
VRS(4)-U() ETU	The Voice Recording Service ETU provides voice recording messages for internal stations, automatic answering on incoming outside calls, Delay Announcement messages for ACD/UCD by a voice recorded message, and receives DTMF tones. This ETU is installed in slots S1~S8 in any KSU.	2 ETUs	2 ETUs	2 ETUs
Terminals				
DCR-60-1 CONSOLE	This Attendant Console is equipped with 60 programmable line keys (each with 2-color LED). Twelve keys can be programmed as Feature Access keys and 48 keys can be programmed as Direct Station Selection or outside line keys.	4		
DCU-60-1 CONSOLE	This Attendant Console is equipped with 60 programmable line keys (each with 2-color LED). Twelve keys can be programmed as Feature Access keys and 48 keys can be programmed as Direct Station Selection or outside line keys.	4		
DP-D-1A	This Doorphone is used when DPH(4)-U() ETU is installed.	4		
DTP-1-1 TEL DTP-1-2 TEL	This Single Line Telephone is a fully modular terminal with a flash key, Redial key, 3-level receive volume control, 2-level ring volume control, data jack, and message waiting lamp. Each terminal requires an SLI(4)/(8)-U() ETU or SLT(1)-U() ADP.	56	118	118
DTR-1-1 TEL	This Single Line Telephone is a fully modular terminal with a flash key, Redial key, 6-level receive volume control, 4-level ring volume control, 3-tone ring pitch, data jack, and message waiting lamp. Each terminal requires an SLI(4)/(8)-U() ETU or SLT(1)-U() ADP.	56	118	118

Equipment Name	Description	Basic KSU	Basic + 1 Expansion KSU	Basic + 2 Expansion KSUs
DTP-1HM-1 TEL DTP-1HM -2 TEL	This Single Line Telephone is a fully modular terminal with a flash key, Redial key, 3-level receive volume control, 2-level ring volume control, data jack, message waiting lamp, and eight programmable Feature/Speed Dial keys. Each terminal requires an SLI(4)/(8)-U() ETU or SLT(1)-U() ADP.	48	112	112
DTR-1HM-1 TEL	This Single Line Telephone is a fully modular terminal with a flash key, Speaker key, Hold key, Redial key, 6-level receive and speaker volume control, 4-level ring volume control, 3-tone ring pitch, data jack, message waiting lamp, and eight programmable Feature/Speed Dial keys. Each terminal requires an SLI(4)/(8)-U() ETU or SLT(1)-U() ADP.	48	112	112
DTP-2DT-1 TEL	This is a fully modular terminal with two Flexible Line keys (each with 2-color LED), eight function keys, built-in Speakerphone, and a large LED to indicate incoming calls and messages. This phone does not support any adapter. Each terminal requires an ESI(8)-U() ETU.	56	118	118
DTR-2DT-1 TEL	This is a fully modular terminal with two Flexible Line keys (each with 2-color LED), nine function keys, built-in Speakerphone, a large LED to indicate incoming calls and messages, and an Analog SLT Port (outgoing only). This phone does not support any adapter. Each terminal requires an ESI(8)-U() ETU.	56	118	118
DTU-4R-1 TEL	This D ^{term} Cordless Lite Terminal can be connected to the Electra Elite System using a tandem connection to a Multiline Terminal. The terminal has a 16-digit, 2-line LCD, dial pad, talk key, chan key, hold key, transfer key, conf key, mute key, vol key, a msg icon, vibrator, and four function keys with red LEDs. The cordless terminal can be switched to the Multiline Terminal connected to it by pressing the Desk key on the base unit of the idle D ^{term} Cordless Lite Terminal.		30	
DTU/DTP-8-1 TEL	This digital Multiline Terminal has eight programmable line keys (each with a 2-color LED), built-in speakerphone, a large LED to indicate incoming calls and messages, headset jack, and compatibility with ADA-U, APA-U, APR-U, CTA-U, CTU(C)-U, CTU(S)-U, or HFU-U Unit.	55	119	119

Equipment Name	Description	Basic KSU	Basic + 1 Expansion KSU	Basic + 2 Expansion KSUs
DTH-8-1 TEL DTR-8-1 TEL	This digital Multiline Terminal has eight programmable line keys (each with a 2-color LED), nine function keys, built-in speakerphone, a large LED to indicate incoming calls and messages, headset jack, and compatibility with AD(A)-R, AP(A)-R AP(R)-R, or CT(A)-R Unit. A Directory button allows Caller ID scrolling, and a Message button allows direct access to voice mail.	55	119	119
DTP-8D-1 TEL DTU-8D-2 TEL	This digital Multiline Terminal has eight programmable line keys (each with a 2-color LED), built-in speakerphone, a large LED to indicate incoming calls and messages, headset jack, and compatibility with ADA-U, APA-U, APR-U, CTA-U, CTU(C)-U, CTU(S)-U, or HFU-U Unit. This terminal is also equipped with a 24-character, 3-line, adjustable Liquid Crystal Display (LCD) and four softkeys.	56	120	120
DTH-8D-1 TEL DTR-8D-1 TEL	This digital Multiline Terminal has eight programmable line keys (each with a 2-color LED), nine function keys, built-in speakerphone, a large LED to indicate incoming calls and messages, headset jack, and compatibility with AD(A)-R, AP(A)-R AP(R)-R, or CT(A)-R Unit. A Directory button allows Caller ID scrolling, and a Message button allows direct access to voice mail. This terminal is also equipped with a 24-character, 3-line, adjustable Liquid Crystal Display (LCD) and four softkeys.	56	120	120
DTP-16HC-1 TEL	This D ^{term} Handset Cordless Terminal is a stand-alone telephone with direct connection to a single port on the ESI(8)-U() ETU. An ACA-U Unit adapter is required for this terminal. Each terminal requires an ESI(8)-U() ETU port.	40		
DTP-16-1 TEL DTU-16-1 TEL	This digital Multiline Terminal has 16 programmable line keys (each with a 2-color LED), a built-in speakerphone, a large LED to indicate incoming calls and messages, headset jack, and compatibility with ADA-U, APA-U, APR-U, CTA-U, CTU(C)-U, CTU(S)-U, or HFU-U Unit.	55	119	119

Equipment Name	Description	Basic KSU	Basic + 1 Expansion KSU	Basic + 2 Expansion KSUs
DTP-16D-1 TEL DTU-16D-2 TEL	These digital Multiline Terminals are equipped with 16 programmable line keys (each with a 2-color LED), a built-in speakerphone, a large LED to indicate incoming calls and messages, headset jack, and compatibility with ADA-U, APA-U, APR-U, CTA-U, CTU(C)-U, CTU(S)-U, or HFU-U Unit. This terminal also has a 24-character, 3-line, adjustable Liquid Crystal Display (LCD) and four softkeys.	56	120	120
DTH-16D-1 TEL DTR-16D-1 TEL	These digital Multiline Terminals are equipped with 16 programmable line keys (each with a 2-color LED), nine functions keys, a built-in speakerphone, a large LED to indicate incoming calls and messages, headset jack, and compatibility with AD(A)-R, AP(A)-R AP(R)-R, or CT(A)-R Unit. A Directory button allows Caller ID scrolling, and a Message button allows direct access to voice mail. This terminal also has a 24-character, 3-line, adjustable Liquid Crystal Display (LCD) and four softkeys.	56	120	120
DTU/DTP-32-1 TEL	This digital Multiline Terminal has 32 programmable line keys (each with a 2-color LED), a built-in speakerphone, a large LED to indicate incoming calls and messages, headset jack, and compatibility with ADA-U, APA-U, APR-U, CTA-U, CTU(C)-U, CTU(S)-U, or HFU-U Unit.	55	119	119
DTP-32D-1 TEL DTU-32D-2 TEL	This digital Multiline Terminal is equipped with 32 programmable line keys (each with a 2-color LED), a built-in speakerphone, a large LED to indicate incoming calls and messages, headset jack, and compatibility with ADA-U, APA-U, APR-U, CTA-U, CTU(C)-U, CTU(S)-U, or HFU-U Unit. This terminal has a 24-character, 3-line, adjustable Liquid Crystal Display (LCD) and four softkeys.	56	120	120
DTH-32D-1 TEL DTR-32D-1 TEL	This digital Multiline Terminal is equipped with 32 programmable line keys (each with a 2-color LED), nine function keys, a built-in speakerphone, a large LED to indicate incoming calls and messages, headset jack, and compatibility with AD(A)-R, AP(A)-R AP(R)-R, or CT(A)-R Unit. A Directory button allows Caller ID scrolling, and a Message button allows direct access to voice mail. This terminal has a 24-character, 3-line, adjustable Liquid Crystal Display (LCD) and four softkeys.	56	120	120

Equipment Name	Description	Basic KSU	Basic + 1 Expansion KSU	Basic + 2 Expansion KSUs
D ^{term} PS II	The Personal Station wireless terminal provides the features and benefits of a desktop telephone without the inconvenience of having to remain close to the desktop.		40	
DTR-1R-1 TEL	The D ^{term} Analog Cordless terminal uses 2.4 GHz Digital Spread Spectrum (DSS) Technology and is connected to an analog port using SLI(4)/(8)-U() or OPX(2)-U() ETU, an SLT(1)-U() ADP, or an APR-U Unit connected to the Multiline Terminal. This terminal does not have an LCD display.		20	
DTR-4R-1 TEL	The D ^{term} Cordless II terminal uses 900 MHz Digital Spread Spectrum (DSS) Technology and is connected in tandem to a Multiline Terminal. This terminal can be switched between cordless and the Multiline Terminal connected to it using a key on the base unit or the Handset. This terminal has a 16-digit by 2-line LCD Display.		10	
ETW-4R-1 TEL	This D ^{term} Cordless Terminal can be connected to the Electra Elite System using tandem connection to a Multiline Terminal. This terminal has a cordless handset, a 10-digit, 2-line LCD, dial pad, TALK key, HOLD key, TRF key, CNF key, SPD key, a MSG LED, optional vibrator, and four function keys with red LED. This D ^{term} Cordless Terminal can be switched to the Multiline Terminal connected to it by pressing the DESK key on the base unit of the idle D ^{term} Cordless Terminal.		9	
ETW-8-1/2 TEL	This terminal is a fully modular instrument with tilt stand, eight Flexible Line keys (each with 2-color LED), eight function keys, built-in speakerphone, ADA compatibility, and a large LED to indicate incoming calls and messages.	55	119	119
ETW-16DC-1/2 TEL	This terminal is a fully modular instrument with tilt stand, 16 Flexible Line keys (each with 2-color LED), eight function keys, built-in speakerphone, ADA compatibility, and a large LED to indicate incoming calls and messages. This terminal has a 16-character by 2-line Liquid Crystal Display (LCD).	56	120	120

Equipment Name	Description	Basic KSU	Basic + 1 Expansion KSU	Basic + 2 Expansion KSUs
ETW-16DD-1/2 TEL	This terminal is a fully modular instrument with tilt stand, 16 Flexible Line keys (each with 2-color LED), eight function keys, 20 programmable One-Touch keys with red LEDs, built-in speakerphone, ADA compatibility, and a large LED to indicate incoming calls and messages. This terminal has a 16-character by 2-line Liquid Crystal Display (LCD).	56	120	120
ETW-24DS-1/2 TEL	This terminal is a fully modular instrument with tilt stand, 24 Flexible Line keys (each with 2-color LED), eight function keys, 12 programmable One-Touch keys, dual-path ability, built-in speakerphone, ADA compatibility, and a large LED to indicate incoming calls and messages. This terminal has a 16-character by 2-line Liquid Crystal Display (LCD).	56	120	120
EDW-48-1/2 CONSOLE	This console has a tilt stand, 48 programmable keys with dual LEDs (green and red) and 12 function keys with red LED. All 48 keys can be assigned as DSS keys, outside line keys, or function keys.		4	
Adapters and Optional Units				
AC-R Unit	The AC Adapter unit connects to the AP(R)-R Unit or to the CT(A)-R Unit when cable distance exceeds 200 feet.	One per Multiline Terminal as required		
ACA-U Unit	The AC Adapter unit connects to one of the following: APR-U Unit, CTA-U Unit, CTU(C)-U Unit, CTU(S)-U Unit, HFU-U Unit, or DTP-16HC-1 TEL.	One per Multiline Terminal as required		
AD(A)-R Unit	This Ancillary Device adapter provides the Digital Multiline Terminal with connection for a tape recorder. This adapter can be installed on any DTH/DTR Multiline Terminal except DTR-2DT-1 TEL.	56	120	120
ADA-U Unit	This Ancillary Device adapter provides the Digital Multiline Terminal with connection for a tape recorder. This adapter can be installed on any DTU/DTP Multiline Terminal except DTP-2DT-1 TEL, DTP-16HC-1 TEL, or Cordless terminals.	56	120	120
ADA(1)-W Unit	This Ancillary Device adapter provides the Electra Professional Multiline Terminal with connection for headset, or audio recorder. This adapter can be installed on any Electra Professional Multiline Terminal.	56	120	120

Equipment Name	Description	Basic KSU	Basic + 1 Expansion KSU	Basic + 2 Expansion KSUs
ADA(2)-W Unit	This Ancillary Device adapter provides the Electra Professional Multiline Terminal with connection for Cordless Telephone. This adapter can be installed on any Electra Professional Multiline Terminal.	56	120	120
AP(A)-R Unit	This Analog Port adapter without ringer is the interface used to install a Single Line Telephone, Modem, Credit Card Reader, Wireless Headset, NEC VoicePoint/VoicePoint Plus Conferencing unit, or other compatible Analog device. This adapter can be installed on any DTH/DTR Multiline Terminal except DTR-2DT-1 TEL.	56	120	120
APA-U Unit	This Analog Port adapter without ringer is the interface used to install a Single Line Telephone, Modem, Credit Card Reader, Wireless Headset, NEC VoicePoint/VoicePoint Plus Conferencing unit, or other compatible Analog device. This adapter can be installed on any DTU/DTP Multiline Terminal except DTP-2DT-1 TEL, DTP-16HC-1 TEL, or Cordless terminals.	56	120	120
AP(R)-R Unit	When this Analog Port Ringer adapter is used, an additional Single Line Telephone or a modem can be connected to a Multiline Terminal. This adapter can be installed on any DTH/DTR Multiline Terminal except DTR-2DT-1TEL.	56	120	120
APR-U Unit	When this Analog Port Ringer adapter is used, an additional Single Line Telephone or a modem can be connected to an Electra Elite Multiline Terminal. This adapter can be installed on any DTU/DTP Multiline Terminal except DTP-2DT-1 TEL, DTP-16HC-1 TEL, or Cordless terminals.	56	120	120
CT(A)-R Unit	TAPI (Microsoft Telephony Application Programming Interface) adapter allows a Multiline Terminal to be connected to a PC. The terminal must be within 5 feet (1.5m) of the PC. When the length of 24AWG twisted 1-pair cable exceeds 200 feet, an AC(A)-R adapter is necessary. This adapter can be installed on any DTH/DTR Multiline Terminal except DTR-2DT-1 TEL.	32	32	32
CTA-U Unit	TAPI (Microsoft Telephony Application Programming Interface) adapter allows an Electra Elite Multiline Terminal to be connected to a PC. This adapter can be installed on any DTU/DTP Multiline Terminal except DTP-2DT-1 TEL, DTP-16HC-1 TEL, or Cordless terminals.	32	32	32

Equipment Name	Description	Basic KSU	Basic + 1 Expansion KSU	Basic + 2 Expansion KSUs
CTU(S)-U Unit	This unit is a CTA adapter for Universal Serial Bus with an ESI(8)-U() ETU connection. This adapter can be installed on any DTU/DTP Multiline Terminal except DTP-2DT-1 TEL, DTP-16HC-1 TEL, or Cordless terminals.	32	32	32
DBM(B)-U10 Box	This Message Display Board is connected to the ESI(8)-U() ETU to provide a message waiting light for voice mail boxes. Each board supports eight message waiting lights.	8	8	8
DBM(E)-U10 Box	Expansion Message Display Board. Each board supports eight message waiting lights. Up to five DBM(E)-U()s can be connected to one DBM(B)-U().	40	40	40
HFU-U Unit	This optional Handsfree Unit provides full-duplex handsfree communication. This unit comes with the handsfree adapter and an external microphone. This adapter can be installed on any DTU/DTP Multiline Terminal except DTP-2DT-1 TEL, DTP-16HC-1 TEL, or Cordless terminals.	56	120	120
PCT(S)-U() Unit	NEC PC Telephony Board (TAPI) without a modem. This unit can be installed on the ISA bus on any IBM-compatible PC.	32	32	32
RAK-U() Unit	This 19" unit is used to simplify installation by rack mounting the Electra Elite 192 system.	1	2	3
SLT(1)-U() ADP	The Single Line Telephone Adapter provides an interface for Single Line Telephones and other similar devices from an ESI ETU channel. This adapter can be connected to any ESI port except 01 and 02.		8	
WM-R Unit	This Wall Mount Unit is used to mount any DTH/DTR Multiline Terminal except DTR-2DT-1 TEL to the wall. This unit connects to the back side of the Multiline Terminal. This unit is required when an AD(A)-R AP(A)-R, AP(R)-R or CT(A)-R Unit is installed.	56	120	120
WMU-U Unit	This Wall Mount Unit is used to mount any Electra Elite Multiline Terminal to the wall. This unit connects to the back side of the Multiline Terminal. This unit is required when an APA-U, APR-U, CTA-U, CTU(C)-U, CTU(S)-U, or HFU-U Unit is installed.	56	120	120

Equipment Name	Description	Basic KSU	Basic + 1 Expansion KSU	Basic + 2 Expansion KSUs
WMU-W Unit	This universal Wall Mount Unit is used to mount any Electra Professional Multiline Terminal or DTP-2DT-1 TEL to the wall.	56	120	120
ZT II	The Zone Transceiver maintains radio communication with the PS II terminals.	12	16	16
Software				
SAT S/W (END USER) S9500	System Administration Terminal Software for End User		1	
SAT S/W (TECH) S9500	System Administration Terminal Software for Technician		1	
SAT LCR Version 2.00	System Administration Terminal Software for Least Cost Routing		1	
Wireless Service Console (WSC)	Wireless Service Console (WSC) Administration Terminal Software		1	
IP Configurator	VoIP Administration Terminal (VAT) Software		1	

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System Specifications

SECTION 1 GENERAL INFORMATION

This chapter provides detailed specifications for the Electra Elite 192 system technician. The technician should review this information carefully **before** installing the system.

SECTION 2 SYSTEM BLOCK DIAGRAM

[Figure 2-1 System Block Diagram](#) shows the ETUs that can be installed in the KSU and the number of channels supported when the ETU is installed. [Table 2-1 List of Abbreviations](#) lists abbreviations used in the diagram.

Table 2-1 List of Abbreviations

Abbreviation	Description
ACD	Automatic Call Distribution
AMP	Amplifier
APR	Analog Port Ringer
BRT	Basic Rate Trunk Interface
BSU	Base Station Unit
CCH	Common Channel Handler (K-CCIS)
CNF	Multiline Conference Bridge
COI	Central Office Interface
COIB	Central Office Interface (COI/COID mode)
COID	Central Office Caller ID
COM	Communication
CPU	Central Processing Unit
CTA	Computer Telephony Adapter
CTI/VP/FMS/CMS/ VMS	Voice Mail
DID	Direct Inward Dialing
DPH	Doorphone

Table 2-1 List of Abbreviations (Continued)

Abbreviation	Description
DTI	Digital Trunk Interface
ECR	External Control Relay
ESI	Electronic Station Interface
HDLC	High Level Data Link Control
HFU	Handsfree Unit
HUB	Optional HUB Ethernet Interface
IAD	Optional Integration Device
IPCA	Pure IP Switch
IPT	Internet Protocol Trunk for VoIP
ISDN	Integrated Services Digital Network
LAN	Local Area Network
MDF	Main Distribution Frame
MG	Gateway Between IPCA ETU and CPUB ETU
MIC	Microphone
MIF	Multipurpose Interface
MOH	Music On Hold
OPX	Off-Premise Extension
PBR	Push Button Receiver
PC	Personal Computer
PCM	Pulse Code Modulation
PCT (C)	PC Telephony Board (Coreline Interface)
PCT (S)	PC Telephony Board (without Modem)
PRT	Primary Rate Trunk
PS II	Personal System Wireless Terminal
SLI	Single Line Interface
SLT	Single Line Telephone
SPK	Speaker
TLI	Tie Line Interface
VDD	Voice Data Digital Adapter
VDH	Voice Data Hub

Table 2-1 List of Abbreviations (Continued)

Abbreviation	Description
VM	Voice Mail
VoIP	Voice over Internet Protocol
VRS	Voice Recording Service
ZT II	Zone Transceiver

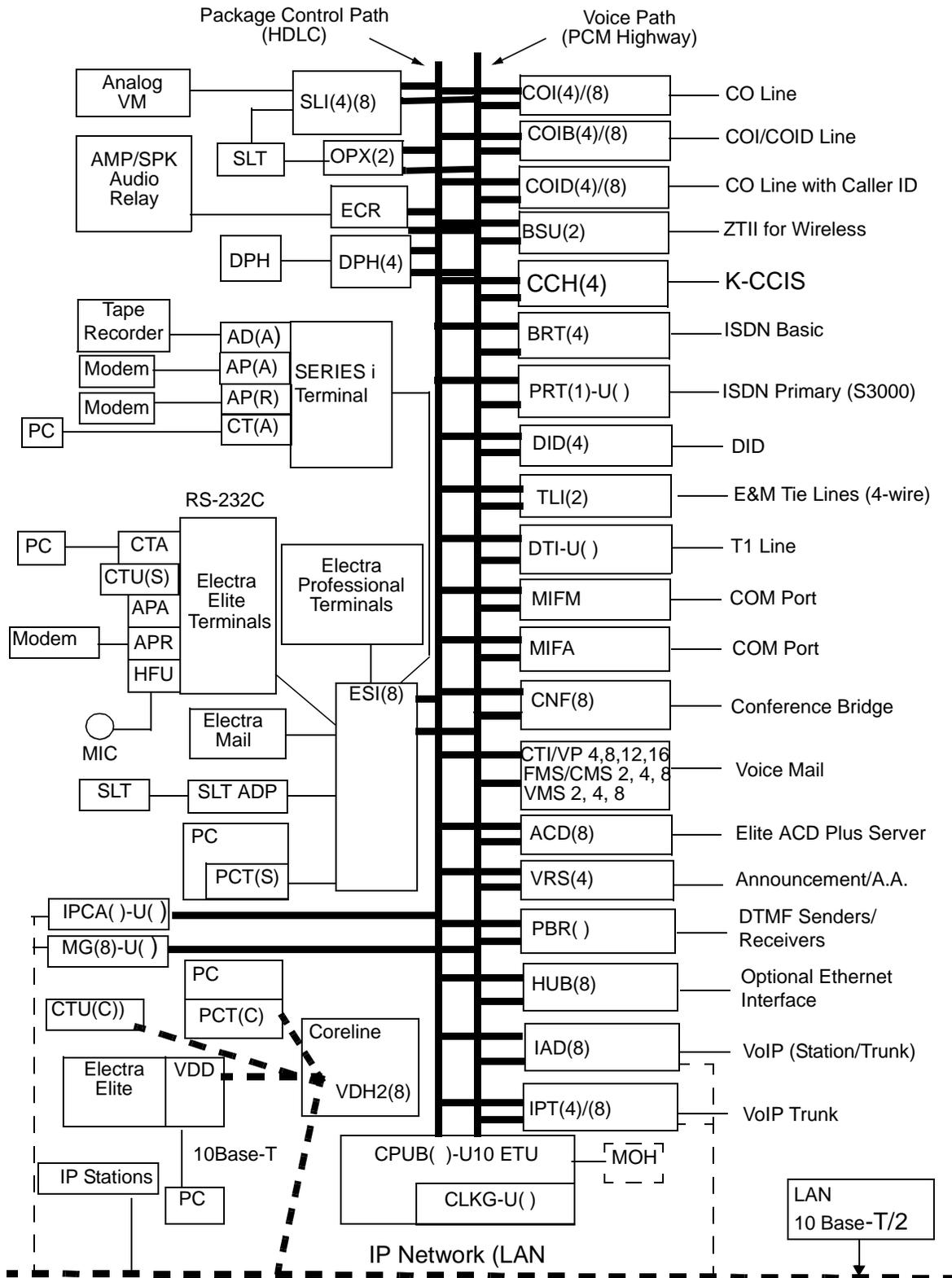


Figure 2-1 System Block Diagram

SECTION 3 MAXIMUM SYSTEM CAPACITIES

The maximum capacities available in the Electra Elite System are shown in [Table 2-2 Maximum System Capacities](#).

Table 2-2 Maximum System Capacities

Item	Basic KSU	Basic +1 Expansion KSU	Basic +2 Expansion KSUs
ACD(8)-U10 ETU		1	
AD(A)-R Unit	56	120	120
ADA-U Unit	56	120	120
AP(A)-R/AP(R)-R Unit	56	120	120
APA-U/ APR-U Unit	56	120	120
BRT(4)-U()ETU	4	8	8
BSU(2)-U() ETU	6	8	8
CCH(4)-U() ETU		1	
CLKG-U() Unit		1	
CNF(8)-U() ETU		2	
COI(4)-U() ETU	7	15	16
COI(8)-U()ETU	7	8	8
COIB(4)-U()ETU	COI mode: 7 COID: 4 (S7000) COID: 7 (S8000)	COI mode: 15 COID: 8 (S7000) COID: 14 (S8000)	COI mode: 16 COID: 8 (S7000) COID: 14 (S8000)
COIB(8)-U() ETU	COI mode: 7 COID mode: 4	COI mode: 8 COID mode: 8	COI mode: 8 COID mode: 8
COID(4)-U() ETU	4 (S7000) 7 (S8000)	8 (S7000) 15 (S8000)	8 (S7000) 16 (S8000)
COID(8)-U() ETU	4 (S7000) 7 (S8000)	8	8
CPUB()-U()ETU	1	1	1
CT(A)-R Unit	32	32	32
CTA-U Unit	32	32	32
CTI/VP(4)/(8)/(12)/(16)- U() ETU		1	
CTU(C)/(S)-U Unit	32	32	32
DBM(B)-U()Box	8	8	8
DBM(E)-U() Box	40	40	40
DID(4)-U()ETU	4	14	14

Table 2-2 Maximum System Capacities (Continued)

Item	Basic KSU	Basic +1 Expansion KSU	Basic +2 Expansion KSUs
DPH(4)-U() ETU		1	
D ^{term} Analog Cordless	20	20	20
D ^{term} Cordless II	10	10	10
D ^{term} Handset Cordless	40	40	40
D ^{term} Personal Station II	40	40	40
DTI-U() ETU	2 (S7000) 7 (S8000)	3 (S7000) 8 (S8000)	3 (S7000) 8 (S8000)
ECR-U() ETU		1	
ESI(8)-U() ETU	7	15	15
EXPT(2)-U() ETU		1	
FMS(2)/(4)/(8)-U() ETU	1	1	1
HFU-U Unit	56	120	120
HUB(8)-U() ETU		1	
IAD(8)-U() ETU	3	14	14
IPCA()-U() ETU		1	
IVR(8)-U() ETU		1	
IPT(4)-U() ETU	Variable	Variable	Variable
IPT(8)-U() ETU	Variable	Variable	Variable
MG(8)-U() ETU		1	
MIFA-U() Unit		1	
MIFM-U() Unit		1	
OPX(2)-U() ETU	6	14	22
PBR()-U() ETU		1	
PCT(C)/(S)-U() Unit	32	32	32
PRT(1)-U() ETU	2 (S7000) 7 (S8000)	3 (S7000) 8 (S8000)	3 (S7000) 8 (S8000)
SLI(4)-U() ETU	7	14	22
SLI(8)-U() ETU	7	14	14
TLI(2)-U() ETU	7	15	16
VDD-U Unit	24	48	72
VDH2(8)-U() ETU	3	6	9
VMS(2)/(4)/(8)-U() ETU	1	1	1

Table 2-2 Maximum System Capacities (Continued)

Item	Basic KSU	Basic +1 Expansion KSU	Basic +2 Expansion KSUs
VMS/FMS/CMS()-U30	1		
VRS(4)-U() ETU	2		
ZT II	12	16	16

☞ Only one FMS, VMS, CMS, or CTI/VP can be installed in the system at one time.

SECTION 4 SYSTEM REQUIREMENTS AND SPECIFICATIONS

4.1 Cabling Requirements and Specifications

The KSU is connected with each Multiline Terminal and Single Line Telephone by a separate twisted 1-pair cable or 2-pair cable (only for Multiline Terminals). Refer to [Table 2-3 Multiline Terminal Loop Resistance and Cable Length](#), [Table 2-4 Cable Connection Between the Analog Port and the Single Line Equipment](#), [Table 2-5 Cable Connection Between ESI/VDH and PCT Board](#), [Table 2-6 Cabling Requirements](#), and [Table 2-7 Zone Transceiver II Range](#).

Table 2-3 Multiline Terminal Loop Resistance and Cable Length

Terminal or Adapter	Maximum Loop Resistance (Ohms)	Maximum Feet by Twisted 1-Pair Cable	Maximum Feet by Twisted 2-Pair Cable
		24 AWG	24 AWG
DBM(B)-U() Box	N/A	900	900
DCR-60-1 CONSOLE	N/A	1000	1000
DCU-60-1 CONSOLE	N/A	1000	1000
DTR-2DT-1 TEL	35 (26 *)	600 (450 *)	1000 (900 *)
DTU 4R-1 TEL	N/A	650	1000
DTP-8-1 TEL DTU-8-1 TEL	35	600	1000
DTH-8-1 TEL DTR-8-1 TEL	36	630	1000
DTP-8D-1 TEL DTU-8D-2 TEL	35	600	1000
DTH-8D-1 TEL DTR-8D-1 TEL	36	630	1000
DTP-16-1 TEL DTU-16-1 TEL	26	450	900
DTP-16D-1 TEL DTU-16D-2 TEL	26	450	900
DTH-16D-1 TEL DTR-16D-1 TEL	35	600	1000
DTP-16HC-1 TEL	57	1083	
DTP-32-1 TEL DTU-32-1 TEL	21	360	720
DTP-32D-1 TEL DTU-32D-2 TEL	21	360	720

Terminal or Adapter	Maximum Loop Resistance (Ohms)	Maximum Feet by Twisted 1-Pair Cable	Maximum Feet by Twisted 2-Pair Cable
		24 AWG	24 AWG
DTH-32D-1 TEL DTR-32D-1 TEL	26	450	900
DTR-1R-1 TEL	35	600	1000
DTR-4R-1 TEL	N/A	650	1000
ETW-8-1/2 TEL	35	600	1000
ETW-16DC-1/2 TEL	26	450	900
ETW-16DD-1/2) TEL	21	360	720
ETW-24DS-1/2 TEL	26	450	900
ETW-4R-1(BK) TEL	N/A	650	650
EDW-48-1 DSS/BLF with AC Adapter	N/A	1000	1000
SLT(1)-U() ADP	35	600	1000

- ☞ An AC Adapter is required when installing the following devices: DTP-16HC-1 TEL, Electra Elite DCU/DCR 60, or Electra Professional EDW 48 Attendant Console.
- ☞ The length for the specified SLT Adapter is the length between the SLT Adapter and the ESI.
- ☞ The values (number of ohms and feet of cable) specified with the * include the DTR-2DT-1 TEL *plus* the Single Line Telephone.

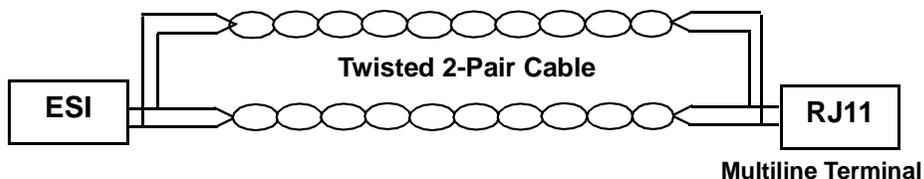


Figure 2-2 Connecting the ESI Using Twisted 2-Pair Cable

Table 2-4 Cable Connection Between the Analog Port and the Single Line Equipment

Connected Equipment	Cable	Maximum Loop Resistance (24 AWG) from Connected Equipment to Telephone
AD(A)-R Unit	Twisted Pair	10 feet
ADA(2)-W Unit	Twisted Pair	10 feet
AP(A)-R or AP(R)-R Unit	Twisted Pair	50 feet
APA-U Unit or APR-U Unit	Twisted Pair	50 feet
OPX(2)-U() ETU	Twisted Pair	1,600 ohms
SLI(4)/(8)-U() ETU	Twisted Pair	300 ohms
SLT(1)-U() ADP	Twisted Pair	50 feet

☞ Mixing digital and analog ports through the same 25-pair cable runs is not recommended.

Table 2-5 Cable Connection Between ESI/VDH and PCT Board

Connected Equipment	Cable	Maximum Loop Resistance (Ohms)	Attached Telephone
PCT(C)-U() Unit	10 Base-T	35	Connected
		31	Not Connected
PCT(S)-U() Unit	Twisted 1-Pair	35	Connected
		31	Not Connected

Table 2-6 Cabling Requirements

Connected Equipment	Cable
External Amplifier	Hi-Fi Shielded Audio Cable
Music on Hold and Background Music Sources	Hi-Fi Shielded Audio Cable

Table 2-7 Zone Transceiver II Range

Connected Equipment	Range
ZT II-U Unit without ACA-U Unit	3,000 feet
ZT II-U Unit with ACA-U Unit	16,404 feet

4.2 Cabling Precautions

4.2.1 Cable Placement

When selecting cables and Main Distribution Frame (MDF), future expansion or assignment changes should be considered. Avoid running cables in the following places:

- Ⓢ A place exposed to wind or rain.
- Ⓢ A place near heat radiating equipment or where the quality of station cable covering could be affected by gases and chemicals.
- Ⓢ An unstable place subject to vibration.

4.2.2 Environmental Conditions

Temperature

- Ⓢ Operating: +32°F ~ +104°F (0°C ~ 40°C)
- Ⓢ Long Term: +50°F ~ +90°F (10°C ~ 32.2°C)

Humidity

- Ⓢ Operating: 10% ~ 90% noncondensing

4.3 Power Requirements

4.3.1 Power Supply Inputs

AC input requirements for the system are listed below.

AC Input (P64-U10 PSU)

- Ⓢ 117 Vac \pm 10%
- Ⓢ 60 Hz \pm 10%
- Ⓢ Single Phase
- Ⓢ 7.5A circuit
- Ⓢ A dedicated outlet, separately fused and grounded

4.3.2 Power Supply Consumption

The power consumption for the Electra Elite 192 system is listed in [Table 2-8 Power Consumption](#).

Table 2-8 Power Consumption

KSU	Maximum RMS Current	Watts Used (Idle)	Watts Used (Maximum)
Basic KSU – B64-U10 KSU	2.5 A	120	230
Basic KSU + Expansion KSU	5.0 A	240	460
Basic KSU + 2 Expansion KSUs	7.5 A	360	690

4.3.3 Fuse Replacement

When replacing fuses, refer to the specifications in [Table 2-9 Fuse Replacement](#).

Table 2-9 Fuse Replacement

Unit	Fuse Number	Specifications	Description	Dimensions
P64-U10 PSU	F1	125V, 6.0A	AC Input	1/4" x 1 1/4"
P64-U10 PSU	F101	250V, 10A	Battery Input	1/4" x 1 1/4"

All fuses are normal blown glass tube.



Do not use slow blow fuses. Replace with a fuse of the same type and rating.

4.4 Outside Line Types

The following outside lines can be used with the Electra Elite 192 system.

- ④ 2-wire, Loop Start or Ground Start Trunks
- ④ 2-wire, 2-way DID Lines (Dial Pulse or DTMF)
- ④ 4-wire, E&M Tie Lines (Type I or V, Dial Pulse, or DTMF)
- ④ Digital Trunk FT1 (Loop Start, Ground Start, Tie Line (E&M), or DID Signaling)
- ④ ISDN-BRI Trunks
- ④ ISDN-PRI Trunks
- ④ VoIP Trunks (Internet Protocols)

Refer to [Table 1 FIC, REN, SOC, and Jack Types for Electra Elite System ETUs](#) in the Regulatory Information section in this manual for a detailed list of Facility Interface Codes, Ringer Equivalence Numbers, Service Order Codes and Jack Types.

4.5 Transmission, Network, and Control Specifications

4.5.1 Transmission

- ④ Data Length
 - From Multiline Terminal to ESI(8)-U() ETU: 23 bits
 - From ESI(8)-U() ETU to Multiline Terminal: 23 bits
- ④ Data Transmission Rates:
 - Between ESI(8)-U() ETU and Multiline Terminal: 184K bps (voice and signaling)
- ④ Scanning Time for each Multiline Terminal: 32 ms.

4.5.2 Network

Time Division Multiplexing allows transmission of a number of separate data, voice and/or video simultaneously over one communications medium. The information below indicates the specifications the Electra Elite 192 system uses for switching, clock, data bus, timeframe.

- ④ TDM Switching: PCM (μ Law)
- ④ TDM Clock: 2.048 MHz

- ⌚ TDM Data Bus: 8 bit
- ⌚ TDM Timeframe: 125 μ s.

4.5.3 Control

This section indicates the speed or capacity.

- ⌚ Control: Stored program with distributed processing
- ⌚ Central Processor: 32-bit microprocessor
- ⌚ Clock: 16.384 MHz
- ⌚ Interface ETU: 8-bit or 16-bit microprocessor
- ⌚ Optional ETUs: 16- or 32-bit microprocessor
- ⌚ Multiline Terminal: 8-bit microprocessor
- ⌚ Attendant Console: 4-bit microprocessor
- ⌚ SLT Adapter: 4-bit microprocessor

4.5.4 Electra Elite Terminals and Equipment

The voltage, current, ring signal information for the Elite Multiline Terminals, Single Line Telephone equipment, and APA-U/APR-U Unit are listed below.

- ⌚ Multiline Terminal
 - Voltage: -11 ~ -26 Vdc
 - Maximum Current: 250 mA
 - 🗨 Acoustical characteristics meet Electronic Industry Association (EIA) standard proposal SP-1286 and standard EIA RS-470.

- ⌚ Single Line Telephone
 - Standard 2500 Set: 500 type network
 - Nominal Current: 35 mA
 - Ring Signal: 56 Vac RMS @ 20 Hz

- ⌚ SLT(1)-U() ADP
 - Standard 2500 Set: 500 type network
 - Nominal Current: 30 mA
 - Ring Signal: 56 Vac RMS @ 20 Hz

- ⌚ APA-U Unit
 - Standard 2500 Set: 500 type network
 - Nominal Current: 30 mA

- ⓘ APR-U Unit
 - Standard 2500 Set: 500 type network
 - Nominal Current: 30 mA
 - Ring Signal: 56 Vac RMS @ 20 Hz

4.5.5 Electra Elite IPK and Series i Terminals and Equipment

The voltage, current, ring signal information for the D^{term} Series i Multiline Terminals, Single Line Telephone equipment, and AP(A)-R/AP(R)-R unit are listed below.

- ⓘ Multiline Terminal (Series i)
 - Voltage: -11 ~ -48 Vdc
 - Maximum Current: 250 mA
 - 🔊 Acoustical characteristics meet Electronic Industry Association (EIA) standard proposal SP-1286 and standard EIA RS-470.
- ⓘ Single Line Telephone
 - Standard 2500 Set: 500 type network
 - Nominal Current: 35 mA
 - Ring Signal: 56 Vac RMS @ 20 Hz
- ⓘ SLT(1)-U() ADP
 - Standard 2500 Set: 500 type network
 - Nominal Current: 30 mA
 - Ring Signal: 56 Vac RMS @ 20 Hz
- ⓘ AP(A)-R Unit
 - Standard 2500 Set: 500 type network
 - Nominal Current: 30 mA
- ⓘ AP(R)-R Unit
 - Standard 2500 Set: 500 type network
 - Nominal Current: 30 mA
 - Ring Signal: 56 Vac RMS @ 20 Hz

4.6 Dialing Specifications

4.6.1 Dial Pulse Address Signaling

Dial Pulse address Signaling uses dial pulses (regular momentary interruptions) to signal the equipment. In the Electra Elite 192 system, the following Dial Pulse specifications are used.

- ① Pulse Rate: 10 ± 0.5 pps/ 20 ± 1.0 pps
- ① Percent Break: $60 \pm 1.5\%$
- ① Interdigit Interval: 10 pps/20 pps 500 ms. ~ 800 ms.

4.6.2 Dual-Tone Multifrequency (DTMF) Address Signaling

DTMF signaling describes push button or Touchtone dialing. When a key on a telephone is pushed, two tones (one high frequency and one low frequency) are provided. In the Electra Elite 192 system, the following DTMF specifications are used.

- ① Frequencies

Two sinusoidal frequencies are provided, one from the high frequency group and one from the low frequency group.

- ① Frequency Deviation: Less than $\pm 1.0\%$

- ① Signal Level:

Nominal level per frequency: -6 ~ -4 dBm

Minimum level per frequency:

Low Group: -10 dBm

High Group: -8 dBm

Maximum level per frequency: 0 dBm

- ① Rise Time: Within 5 ms.

- ① Duration of Dual Frequency Signal:

110 ms. default/60 ms. minimum

⌚ Interdigital Time: 80 ms. default/70 ms. minimum

		Nominal High Group Frequencies (Hz)		
		1209	1336	1477
Nominal Low Group Frequencies (Hz)	697	1	2	3
	770	4	5	6
	852	7	8	9
	941	*	0	#

4.7 Battery Backup

The Electra Elite system has two battery backup functions: one for system backup and one for memory backup.

4.7.1 System Backup

During power failure, the system is backed up using a rechargeable battery. This battery backup supports all of the system operations for approximately 30 minutes.

4.7.2 Memory Backup

The CPUB()-U() ETU has a battery installed to provide backup of system memory. When the battery is fully charged, system memory (customer data) is retained. for approximately 21 days.

4.8 Weights and Dimensions

[Table 2-10 Weights and Dimensions](#) indicates the shipping weight, height, width, and depth of each of the Electra Elite 192 KSUs, ETUs, Multiline Terminals, and adapters.

Table 2-10 Weights and Dimensions

Unit	Shipping Weight*	Height	Width	Depth
AC-R Unit	5.6 oz (158 g)	3.61" (92 mm)	6.87" (175mm)	4.2" (107 mm)
ACA-U Unit	22.5 oz (638 g)	3.4" (86 mm)	4.2" (107 mm)	5.2" (133 mm)
ACD(8)-U() ETU	102.4 oz ** (2903 g)	1.89" (48 mm)	11.47" (290 mm)	8.46" (214 mm)
AD(A)-R Unit	4.0 oz (113 g)	2.25" (56.25 mm)	2.75" (68.75mm)	5.5" (137.5 mm)
ADA-U Unit	2.3 oz (65 g)	1.1" (29 mm)	2.3" (59 mm)	3.9" (99 mm)
AP(A)-R Unit or AP(R)-R Unit	5.6 oz (158 g)	2.25" (56.25 mm)	2.75" (68.75mm)	5.5" (137.5 mm)
APA-U Unit or APR-U Unit	4.3 oz (122 g)	2.4" (60 mm)	2.3" (59 mm)	4.8" (121 mm)
B64-U() KSU	460.8 oz (13063 g)	13.1" (312 mm)	13.7" (348 mm)	18" (457 mm)
BRT(4)-U10 ETU	14.6 oz (414 g)	1.97" (50 mm)	9.45" (240 mm)	7.68" (195 mm)
BRT(4)-U20 ETU	11.3 oz (320 g)	1.97" (50 mm)	9.45" (240 mm)	7.68" (195 mm)
BS(F)-R Unit	3.46 oz (98 g)	5.04" (128 mm)	4.25" (108 mm)	1.02" (26 mm)
BS(S)-R Unit	3.46 oz (98 g)	5.04" (128 mm)	4.25" (108 mm)	1.02" (26 mm)
BSU(2)-U() ETU	13.2 oz (374 g)	1.97" (50 mm)	9.45" (240 mm)	7.68" (195 mm)
CCH(4)-U() ETU	12.0 oz (340 g)	1.97" (50 mm)	9.45" (240 mm)	7.68" (195 mm)
CMS(2)/(4)-U() ETU	102.4 oz (2903 g)	1.89" (48 mm)	11.47" (290 mm)	8.46" (214 mm)
CNF(8)-U() ETU	12.0 oz (340 g)	1.89" (48 mm)	11.47" (290 mm)	8.46" (214 mm)
COI(4)-U() ETU	13.6 oz (385 g)	1.97" (50 mm)	9.45" (240 mm)	7.68" (195 mm)
COI(8)-U() ETU	16.6 oz (471 g)	1.97" (50 mm)	9.45" (240 mm)	7.68" (195 mm)
COIB(4)/(8)-U() ETU	14.4 oz (408 g)	1.97" (50 mm)	9.45" (240 mm)	7.68" (195 mm)

Unit	Shipping Weight*	Height	Width	Depth
COID(4)-U() ETU	14.4 oz (408 g)	1.97" (50 mm)	9.45" (240 mm)	7.68" (195 mm)
COID(8)-U() ETU	17.3 oz (490 g)	1.97" (50 mm)	9.45" (240 mm)	7.68" (195 mm)
CPUB()-U() ETU	13.4 oz (380 g)	1.97" (50 mm)	9.45" (240 mm)	7.68" (195 mm)
CT(A)-R Unit	4.0 oz (113 g)	2.25" (56.25 mm)	2.75" (68.75mm)	5.5" (137.5 mm)
CTA-U Unit	4.3 oz (122 g)	2.4" (60 mm)	2.3" (59 mm)	4.8" (121 mm)
CTI/VP(4)/(8)/(12)/(16)-U() ETU	192 oz** (5443 g)	1.89" (48 mm)	11.47" (290 mm)	8.46" (214 mm)
CTU(C)-U Unit	9.5 oz (270 g)	2.4" (60 mm)	4.3" (110 mm)	4.4" (112 mm)
CTU(S)-U Unit	9.5 oz (270 g)	2.4" (60 mm)	4.3" (110 mm)	4.4" (112 mm)
DBM(B)-U() Box	74.4 oz (2109 g)	2.75" (70 mm)	13.5" (343 mm)	9.75" (248 mm)
DBM(E)-U() Box	74.4 oz (2109 g)	2.75" (70 mm)	13.5" (343 mm)	9.75" (248 mm)
DCR-60-1 Console	53 oz (1503 g)	4.2" (107mm)	12.8" (326 mm)	7.14" (182mm)
DCU-60-1 Console	53 oz (1503 g)	3.6" (92 mm)	8.8" (223 mm)	10.6" (270 mm)
DID(4)-U() ETU	15.5 oz (439 g)	1.97" (50 mm)	9.45" (240 mm)	7.68" (195 mm)
DP-D-1A Doorphone	8.4 oz (238 g)	1.5" (38 mm)	5.5" (140 mm)	\$.75" (121 mm)
DPH(4)-U() ETU	12.1 oz (343 g)	1.97" (50 mm)	9.45" (240 mm)	7.68" (195 mm)
DTH-8-1 DTR-8-1	41.0 oz (1163 g)	4.78" (122 mm)	10.2" (260 mm)	9.8" (250 mm)
DTH-8D-1 DTR-8D-1	43.5 oz (1233 g)	4.78" (122 mm)	10.2" (260 mm)	9.8" (250 mm)
DTH-16D-1 DTR-16D-1	43.5 oz (1233 g)	4.78" (122 mm)	10.2" (260 mm)	9.8" (250 mm)
DTH-32D-1 DTR-32D-1	48.0 oz (1361 g)	4.78" (122 mm)	10.2" (260 mm)	9.8" (250 mm)
DTI-U() ETU	13.2 oz (374 g)	1.89" (48 mm)	11.47" (290 mm)	8.46" (214 mm)

Unit	Shipping Weight*	Height	Width	Depth
DTP-1-1/DTP-1-2 TEL DTP-1HM-1/DTP-1HM-2 TEL	26.8 oz (760 g)	2.36" (60 mm)	6.22" (158 mm)	8.81" (224 mm)
DTR-1-1 TEL DTR-1HM-1 TEL	26.8 oz (760 g)	2.47" (100 mm)	7.65" (195 mm)	9.54" (243 mm)
DTP-2DT-1 TEL	41 oz (1163 g)	4.8" (123 mm)	7.8" (197mm)	9.3" (235 mm)
DTR-2DT-1 TEL	41 oz (1163 g)	2.47" (100 mm)	7.65" (195 mm)	9.54" (243 mm)
DTU-4R-1 TEL	15.4 oz (437 g)	2.25" (57 mm)	4.25" (108)	7.5" (191)
DTP-8-1 TEL DTU-8-1 TEL	41.0 oz (1163 g)	4.8" (123 mm)	7.8" (197 mm)	9.3" (235 mm)
DTP-8D-1 TEL DTU-8D-2 TEL	43.5 oz (1233 g)	4.8" (123 mm)	7.8" (197 mm)	9.3" (235 mm)
DTP-16HC-1 TEL	53 oz (1503 g)	6.00" (152 mm)	9.08" (230 mm)	8.04" (204 mm)
DTP-16-1 TEL DTU-16-1 TEL	41 oz (1162 g)	4.8" (123 mm)	7.8" (197 mm)	9.3" (235 mm)
DTP-16D-1 TEL DTU-16D-2 TEL	43.5 oz (1233 g)	4.8" (123 mm)	7.8" (197 mm)	9.3" (235 mm)
DTP-32-1 TEL DTU-32-1 TEL	46 oz (1304 g)	4.8" (123 mm)	8.7" (220 mm)	9.3" (235 mm)
DTP-32D-1 TEL DTU-32D-2 TEL	48 oz (1361 g)	4.8" (123 mm)	8.7" (220 mm)	9.3" (235 mm)
DTR-1R-1 TEL	14.4oz (408 g)	4.5" (114 mm)	6.1" (153 mm)	8.62" (218 mm)
DTR-4R-1 TEL	15.4 oz (437 g)	2.25" (57 mm)	4.25" (108)	7.5" (191)
ECR-U() ETU	21.2 oz (344 g)	1.97" (50 mm)	9.45" (240 mm)	7.68" (195 mm)
EDW-48-1/2 TEL	49 oz (1389 g)	2.72" (69 mm)	6.89" (175 mm)	8.81" (223 mm)
ESI(8)-U() ETU	14.5 oz (411 g)	1.97" (50 mm)	9.45" (240 mm)	7.68" (195 mm)
ETW-4R-1 TEL	26oz (737 g)	3.42" (87 mm)	5.51" (140 mm)	7.48" (190 mm)
ETW-8-1/2 TEL	32 oz (907 g)	3.98" (101mm)	6.89" (175 mm)	8.81" (223 mm)
ETW-16DC-1/2 TEL	35 oz (992 g)	3.98" (101mm)	6.89" (175 mm)	8.81" (223 mm)

Unit	Shipping Weight*	Height	Width	Depth
ETW-16DD-1/2 TEL	39 oz (1106 g)	3.98" (101mm)	8.07" (205 mm)	8.81" (223 mm)
ETW-24DS-1/2 TEL	39 oz (1106 g)	3.98" (101mm)	8.07" (205 mm)	8.81" (223 mm)
EXP-U() ETU	14.6 oz (414 g)	1.89" (48 mm)	11.47" (290 mm)	8.46" (214 mm)
EXPT(2)-U() ETU	14.7 oz*** (417 g)	1.97" (50 mm)	9.45" (240 mm)	7.68" (195 mm)
FMS(2)/(4)/(8)-U() ETU FMS/VMS/CMS-U() ETU	6.4 lbs** (2903 g)	1.89" (48 mm)	11.47" (290 mm)	8.46" (214 mm)
HFU-U Unit	7.1 oz (201 g)	2.4" (60 mm)	4.2" (107 mm)	5.2" (133 mm)
HUB(8)-U() ETU	10.4 oz (294 g)	1.97" (50 mm)	9.45" (240 mm)	7.68" (195 mm)
IAD(8)-U() ETU	8.11 oz (230 g)	7.5" (190 mm)	6.3" (160 mm)	0.87" (22mm)
IPT(4)/(8)-U() ETU	32 oz (907 g)	5.0" (127 mm)	10" (254 mm)	10" (254 mm)
ITH-8D-2 TEL ITH-16D-2 TEL	50.92 oz (1445 g)	9.84" (250 mm)	10.31 " (262 mm)	4.76" (121 mm)
IVR(8)-U() ETU	14.6 oz (414 g)	1.75 " (44 mm)	10.5" (266 mm)	8.62" (219 mm)
MG(8)-U() ETU	14.6 oz (414 g)	1.75 " (44 mm)	10.5" (266 mm)	8.62" (219 mm)
MIFA-U() ETU	12.1 oz (343 g)	1.97" (50 mm)	9.45" (240 mm)	7.68" (195 mm)
MIFM-U() ETU	12.3 oz (349 g)	1.97" (50 mm)	9.45" (240 mm)	7.68" (195 mm)
OPX(2)-U() ETU	13.4 oz (380 g)	1.97" (50 mm)	9.45" (240 mm)	7.68" (195 mm)
PBR()-U() ETU	10.7 oz (303 g)	1.97" (50 mm)	9.45" (240 mm)	7.68" (195 mm)
PRT(1)-U() ETU	13.2 oz (374 g)	1.97" (50 mm)	9.45" (240 mm)	7.68" (195 mm)
PS(A)-R Unit	7.32 oz (205 g)	5.43" (138 mm)	5.04" (128 mm)	2.28" (58 mm)
RAK-U10 Unit	20 lbs 9072g	20" (507 mm)	15 (380 mm)	8.5 (216 mm)
SLI(4)-U() ETU	13.0 oz (370 g)	1.97" (50 mm)	9.45" (240 mm)	7.68" (195 mm)

Unit	Shipping Weight*	Height	Width	Depth
SLI(8)-U() ETU	14.1 oz (400 g)	1.97" (50 mm)	9.45" (240 mm)	7.68" (195 mm)
SLT(1)-U() ADP	9 oz. (255 g)	1.8" (45 mm)	2.8" (70 mm)	4.8" (120 mm)
TLI(2)-U() ETU	13.8 oz (391 g)	1.97" (50 mm)	9.45" (240 mm)	7.68" (195 mm)
VMS(2)/(4)/(8)-U() ETU	6.4 lbs** (2903 g)	1.89" (48 mm)	11.47" (290 mm)	8.46" (214 mm)
VRS(4)-U() ETU	12.0 oz (340 g)	1.97" (50 mm)	9.45" (240 mm)	7.68" (195 mm)
WM-R Unit	10.6 oz (301 g)	4.1" (104 mm)	5.9" (151 mm)	7.1" (180 mm)
WMU-U Unit	10.6 oz (301 g)	4.1" (104 mm)	5.9" (151 mm)	7.1" (180 mm)
WMU-W Unit	20 oz (567 g)	5.75" (147 mm)	5.75" (147 mm)	2.5" (63 mm)

* Shipping weight includes the shipping carton.

** Shipping weight includes the shipping carton and documentation.

*** Includes cable for connection of two KSUs.

4.9 External Equipment Interface

Input signal levels, impedance, contact ratings, and connector types are listed for externally connected equipment.

4.9.1 Music on Hold/Station Background Music

- ⌚ Auxiliary Input: 0.6V PPS Signal Level
- ⌚ Input Impedance: 600 Ω
Music for Station BGM via
COIB/COI()-U() ETU
- ⌚ Auxiliary input: 0.6 V PPS Signal Level
- ⌚ Input Impedance: 600 Ω

4.9.2 External Paging (Audio)

- ⌚ Output Power: -10 dBm Signal Level
- ⌚ Output Impedance: 600 Ω
- ⌚ Relay Contact Rating: 500 mA, 24 Vdc

4.9.3 External Tone Ringer/Night Chime Output

- ⌚ Output Power: -10 dBm
- ⌚ Output Impedance: 600 Ω
- ⌚ Relay Contact Rating: 500 mA, 24 Vdc

4.9.4 SMDR Output

- ⌚ Female Connector (System Output):
Standard RS-232C (straight)

4.9.5 PC Connection

- ⌚ Female Connector (System Output):
Standard RS-232C (straight)

4.9.6 ACD/MIS Connector

- ⌚ Female Connector (System Output):
Standard RS-232C

4.9.7 Relay Contact

- ⌚ All Relay Contact Ratings: 500 mA, 24 Vdc

4.10 Audible and Visual Indications

The tables in this section provide the audible and visual indications used in the Electra Elite 192 systems.

4.10.1 Tone Patterns

Tones are used in the Electra Elite 192 systems to inform the station user of various system functions such as, dial tone, busy tone, or ringback tone. [Table 2-11 Tone Patterns](#) lists the frequency and the pattern for the tones used in the Electra Elite 192 system.

4.10.2 LED Flash Patterns

The Electra Elite 192 system provides 2-color LEDs. Green is used primarily for I-Use conditions and for outside calls. Red is used primarily for Other Use conditions and internal calls. Refer to [Table 2-12 Multiline Terminal LED Flash Pattern](#).

Table 2-11 Tone Patterns

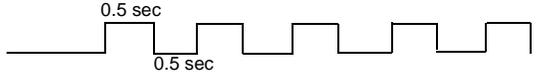
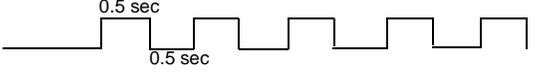
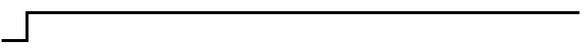
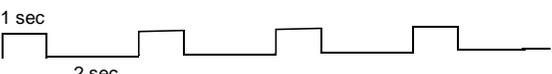
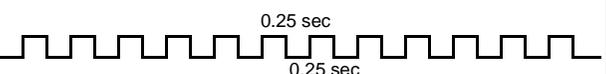
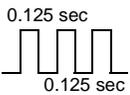
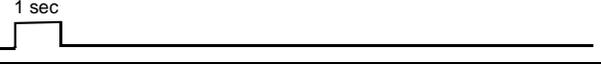
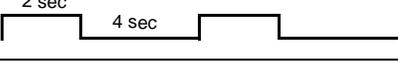
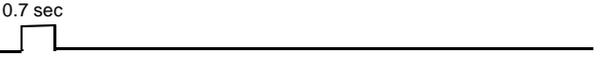
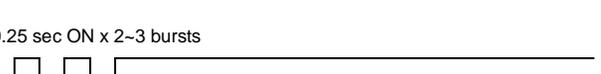
System Tone (Fixed)	Frequency (Hz) (Fixed)	Intermit (Default)	Cycle
Busy Tone	480/620	60 IPM	
Call Waiting Tone	440	60 IPM	
Second Dial Tone	350/440	120 IPM	
Howler Tone	2400 Modulation (16 Hz)	Continuous	
Internal Dial Tone	350/440	Continuous	
Internal Ringback Tone	440/480	1 sec On 2 sec Off	
LCR Dial Tone	440	Continuous	
Reorder Tone	480/620	120 IPM	
Service Set Tone	440	Continuous	
Special Dial Tone	440	240 IPM	
Tone Burst 1 Tone	440	Continuous	
Tone Burst 2 Tone	620	Continuous	
Tie/DID Ringback Tone	440/480	2 sec On 4 sec Off	
Camp-On Tone Call Alert Notification Attendant Tone Override	440	Continuous	
DIT Alert Tone	480/620	Continuous	
Call Forward Alert Tone Call Forward Configuration Tone	350/440	120 IPM	

Table 2-12 Multiline Terminal LED Flash Pattern

LED	Condition	Color	Flash Patterns				
	I-Use	Green	[Solid bar]				
	Busy	Red	[Solid bar]				
	Incoming Call	Red	[Dashed bar]	[Dashed bar]	[Dashed bar]	[Dashed bar]	[Dashed bar]
	I-Hold	Green	[Solid bar]				
	Call Hold	Red	[Solid bar]				
	Hold Recall	Green	[Solid bar]				
	Transfer Recall	Green	[Solid bar]				
	Live Monitoring Mode	Green	[Solid bar]				
	Message Waiting on Line Key	Red	[Dashed bar]	[Dashed bar]	[Dashed bar]	[Dashed bar]	[Dashed bar]
		ON	Red	[Solid bar]			
ON (Electra Elite IPK/Series i)		Red	[Solid bar]				
 	I-Use	Red	[Solid bar]				
	ICM Incoming Call	Red	[Dashed bar]	[Dashed bar]	[Dashed bar]	[Dashed bar]	[Dashed bar]
	Voice Over Broker	Red	[Dashed bar]	[Dashed bar]	[Dashed bar]	[Dashed bar]	[Dashed bar]
	Incoming Internal Call	Red	[Dashed bar]	[Dashed bar]	[Dashed bar]	[Dashed bar]	[Dashed bar]
	Incoming Outside Call	Green	[Dashed bar]	[Dashed bar]	[Dashed bar]	[Dashed bar]	[Dashed bar]
	Message from Attendant	Green	[Dashed bar]	[Dashed bar]	[Dashed bar]	[Dashed bar]	[Dashed bar]
	Voice Mail Message	Red	[Dashed bar]	[Dashed bar]	[Dashed bar]	[Dashed bar]	[Dashed bar]
	ON	Red	[Solid bar]				
	System Data Entry	Red	[Dashed bar]	[Dashed bar]	[Dashed bar]	[Dashed bar]	[Dashed bar]
	Conference in Progress/Barge In	Red	[Solid bar]				
	All Conference Circuits Used	Red	[Solid bar]				
	Hold Conference Call	Red	[Dashed bar]	[Dashed bar]	[Dashed bar]	[Dashed bar]	[Dashed bar]
	ICM Call Hold	Red	[Dashed bar]	[Dashed bar]	[Dashed bar]	[Dashed bar]	[Dashed bar]
	SPD Confirmation	Red	[Dashed bar]	[Dashed bar]	[Dashed bar]	[Dashed bar]	[Dashed bar]
	Incoming Trunk	Red	[Dashed bar]	[Dashed bar]	[Dashed bar]	[Dashed bar]	[Dashed bar]
	Exclusive Hold	Green	[Dashed bar]	[Dashed bar]	[Dashed bar]	[Dashed bar]	[Dashed bar]
	User Ringing Line Preference	Red	[Dashed bar]	[Dashed bar]	[Dashed bar]	[Dashed bar]	[Dashed bar]
	Voice Over with Broker's Call	Green	[Dashed bar]	[Dashed bar]	[Dashed bar]	[Dashed bar]	[Dashed bar]
	Callback Set	Red	[Dashed bar]	[Dashed bar]	[Dashed bar]	[Dashed bar]	
	Auto Repeat Set	Red	[Dashed bar]	[Dashed bar]	[Dashed bar]	[Dashed bar]	
	ON (to set function)	Red	[Dashed bar]	[Dashed bar]	[Dashed bar]	[Dashed bar]	
	Call FWD - All Calls Set	Red	[Dashed bar]	[Dashed bar]	[Dashed bar]	[Dashed bar]	
 	Use, Hold	Red	[Solid bar]				
	DND, Call FWD-All Calls Set	Red	[Dashed bar]	[Dashed bar]	[Dashed bar]	[Dashed bar]	[Dashed bar]
	Special Mode (while pressing  or going off-line)	Red	[Dashed bar]	[Dashed bar]	[Dashed bar]	[Dashed bar]	[Dashed bar]

0 0.5 1.0 1.5 2.0 sec.

Hardware Requirements

SECTION 1 GENERAL INFORMATION

The technician should be familiar with the Electra Elite 192 system **before** attempting to install it. Review this chapter carefully.

SECTION 2 PROGRAMMING STATIONS

Two programming positions are available in the Electra Elite 192 system. Station equipment that is connected to the first ESI(8)-U() ETU is automatically set as a programming position that must have a display Multiline Terminal.

SECTION 3 ATTENDANT STATIONS

An unlimited number of Attendant positions can be assigned in the Electra Elite 192 system. An Attendant Position can have one to four DCU-60-1 Consoles attached. Each Attendant Console must be supported by an ESI(8)-U() ETU. A maximum of **four** Attendant Consoles can be installed in each Electra Elite 192 system.

SECTION 4 PROGRAMMING FROM A PC

Electra Elite 192 systems can be programmed using a personal computer. The Menu Programming option available with PC Programming allows the technician/end-user easy access to all information that can be programmed on the Electra Elite 192 system. The PC must be a 486 or higher and have Windows 95 or higher to be compatible with the Electra Elite 192 system.

SECTION 5

PROGRAMMING FROM A MULTILINE TERMINAL

Programming for the Electra Elite 192 system is accomplished through PC Programming. As an added convenience, programming can be accomplished using Electra Elite or Electra Professional Multiline Terminals with LCD. Programming should be used after the system is installed and initial assignments are made. Using the Multiline Terminal is a quick way to access system data and make changes. To program from a Multiline Terminal one of the following terminals is required.

- Ⓞ DTP/DTH/DTR-8D-1 TEL
- Ⓞ DTU-8D-2 TEL
- Ⓞ DTP/DTH/DTR-16D-1 TEL
- Ⓞ DTU-16D-2 TEL
- Ⓞ DTP/DTH/DTR-32D-1 TEL
- Ⓞ DTU-32D-2 TEL
- Ⓞ DTH-16LD-1 TEL
- Ⓞ ITH-8D-2 TEL
- Ⓞ ITH-16D-2 TEL
- Ⓞ ETW-16DC-1/2 TEL
- Ⓞ ETW-16DD-1/2 TEL
- Ⓞ ETW-24DS-1/2 TEL

SECTION 6

ELECTRA ELITE REMOTE PC PROGRAMMING

The Electra Elite 192 system can be programmed from a remote location using a personal computer.

6.1 Remote Programming

To provide remote programming the following hardware is required:

- Ⓞ Analog CO Trunk or system SLT Port (not needed if the optional internal modem is used)

- ④ Straight RS-232C cable and adapter (provided with the MIFM-U() ETU) cable to connect a locally provided modem (not needed if the optional internal modem is used)
- ④ MIFM-U() ETU installed in the Electra Elite 192 system

SECTION 7

DETERMINING REQUIRED EQUIPMENT

To determine equipment type and quantity to be installed, the technician must be familiar with available station equipment and interface ETUs.

7.1 Station Equipment

The station equipment that can be installed with the Electra Elite 192 system is listed below.

Equipment	Description
DBM(B)-U10 Box	Basic Message Display Board with 8 LEDs
DBM(E)-U10 Box	Expansion Message Display Board with 8 LEDs
DCR-60-1/DCU-60-1 CONSOLE	Attendant Console with 60 programmable line keys
DTP/DTH/DTR-2DT-1 TEL	2-line digital Multiline Terminal without LCD
DTP/DTH/DTR/DTU-8-1 TEL	8-line digital Multiline Terminal without LCD
DTP/DTH/DTR-8D-1 TEL DTU-8D-2 TEL	8-line digital Multiline Terminal with LCD and softkeys
DTP/DTU-16-1 TEL	16-line digital Multiline Terminal without LCD
DTP/DTH/DTR-16D-1 TEL DTU-16D-2 TEL	16-line digital Multiline Terminal with LCD and softkeys
DTP-16HC-1 TEL	16-line digital stand alone terminal with direct connection to a single port on the ESI(8)-U10 ETU
DTP/DTU-32-1 TEL	32-line digital Multiline Terminal without LCD

Equipment	Description
DTP/DTH/DTR-32D-1 TEL DTU-32D-2 TEL	32-line digital Multiline Terminal with LCD and softkeys
DTR-1R-1 TEL	D ^{term} Multiline Cordless Telephone without LCD
DTR-4R-1 TEL	D ^{term} Multiline Cordless Telephone with LCD
DTU-4R-1TEL	Multiline Cordless Telephone with LCD
ETW-8-1/2 TEL	8-line Multiline Terminal without LCD
ETW-16DC-1/2 TEL	16-line Multiline Terminal with LCD
ETW-16DD-1/2 TEL	16-line Multiline Terminal with LCD
ETW-24DS-1/2 TEL	24-line Multiline Terminal with LCD
ETW-4R-1 TEL	Multiline Cordless Telephone with LCD
EDW-48-1/2 DSS/BLF	48-line DSS/BLF or outside lines with 12 function keys.
SLT(1)-U10 ADP	Single Line Telephone Interface Adapter

7.2 Interface ETUs

The slots in the Electra Elite 192 KSUs are flexible except for the first slot in each KSU that is reserved for the CPUB/I()-U() ETU or EXP-U10 ETU. [Figure 3-1 Interface Slot and System Port Numbers for an Electra Elite System](#) shows the slot and port numbers.

The MIFA-U() ETU must be installed in the AP slot for MIS to work.

The MIFA-U() ETU with KMA(1.0)U must be installed in the AP slot for ACD to work.

MIFM-U() ETU must be installed in S1 or S2 for the internal socket modem to work. It can be installed in the AP slot or S1/S2 if a locally provided external modem is used.

The MIFM-U() ETU with KMM(1.0)U must be installed in the AP, S1, or S2 slot for LCR and Caller ID scrolling and dialing to work.

Basic and Expansion KSUs for CPUB-U() ETU

EXP (KSU2)		136	144	152	160	168	176	184	192
		135	143	151	159	167	175	183	191
		134	142	150	158	166	174	182	190
		133	141	149	157	165	173	181	189
		132	140	148	156	164	172	180	188
		131	139	147	155	163	171	179	187
		130	138	146	154	162	170	178	186
		129	137	145	153	161	169	177	185
		S1	S2	S3	S4	S5	S6	S7	S8
EXP (KSU1)		72	80	88	96	104	112	120	128
		71	79	87	95	103	111	119	127
		70	78	86	94	102	110	118	126
		69	77	85	93	101	109	117	125
		68	76	84	92	100	108	116	124
		67	75	83	91	99	107	115	123
		66	74	82	90	98	106	114	122
		65	73	81	89	97	105	113	121
		S1	S2	S3	S4	S5	S6	S7	S8
(BASIC KSU)	AP BUS SLOT	8	16	24	32	40	48	56	64
		7	15	23	31	39	47	55	63
		6	14	22	30	38	46	54	62
		5	13	21	29	37	45	53	61
		4	12	20	28	36	44	52	60
		3	11	19	27	35	43	51	59
		2	10	18	26	34	42	50	58
		1	9	17	25	33	41	49	57
		S1	S2	S3	S4	S5	S6	S7	S8

Figure 3-1 Interface Slot and System Port Numbers for an Electra Elite System

7.2.1 Determining Telephone and CO Port Numbers

Telephone and CO Ports numbers are provided with the Electra Elite 192 system to count the station numbers and trunk numbers when programming System Data. The example below indicates how the CO and trunk numbers can be used.

The following ETUs are installed for the [Figure 3-2 Telephone and CO Port Numbering Example](#).

Slot	ETU
S1	DTI-U() (16 channels used)
S2	Open
S3	ESI(8)-U()
S4	TLI(2)-U()
S5	COI(8)-U()
S6	SLI(8)-U()
S7	DID(4)-U()
S8	Open

CO Ports 1 ~ 8	Open CO Ports 9 ~ 16	Telephone Ports 1 ~ 8	CO Ports 17 ~ 18	CO Ports 19 ~ 26	Telephone Ports 9 ~ 16	CO Ports 27~ 30	Open
S1	S2	S3	S4	S5	S6	S7	S8

Figure 3-2 Telephone and CO Port Numbering Example

7.2.2 Determining the Number of Required Interface ETUs

[Table 3-1 Number of Required Interface ETUs](#) lists each feature and the associated hardware necessary for the operation of the feature.

Table 3-1 Number of Required Interface ETUs

Feature	Required ETU	Required Feature Key	Maximum ETUs per System
ANI/Caller ID *	MIFM-U()	KMM(1.0)U	1
Automatic Call Distribution	MIFA-U()	KMA(1.0)U	1
ACD Plus Automatic Call Distribution	MIFM-U()	None	**
Least Cost Routing	MIFM-U()	KMM(1.0)U	1
PC Programming	MIFM-U()	None	1
SMDR	MIFM-U()	None	1
Uniform Call Distribution	MIFA-U()	None	1
Wireless Service Console (WSC)	MIFM-U()	None	1**

* The Caller ID feature works without the MIFM-U() ETU. However, the Caller ID scrolling and dialing both require the MIFM-U() ETU with KMM(1.0)U attached.

** An MIFM-U() ETU is required during installation and servicing

7.2.3 PBR Requirements

The Electra Elite 192 system has four built-in Push Button Receiver (PBR) circuits on the CPUB()-U() ETU. The PBR circuit detects and translates DTMF tones generated by Single Line Telephones, facsimile machines, modems, or analog voice mail ports. Incoming DTMF signals can also be detected from a CO trunk using the DISA feature. The system Auto Attendant feature and DISA feature must use the CPUB()-U() ETU PBR circuits.

An optional PBR()-U() ETU that provides an additional four circuits can be installed. The number of PBR()-U() ETUs needed depends on the number of Single Line Telephones, facsimile machines, modems, and analog voice mail ports needed. Automated Attendant and DISA trunks connected to the system must also be considered.

☞ When the optional PBR()-U() ETU is installed, these PBR circuits can be used only for SLI ports connected to the system.

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SECTION 1 GENERAL INFORMATION

This chapter contains the necessary information to help the technician install the KSUs for the Electra Elite 192 system. The technician should be familiar with this section before installing any equipment.

SECTION 2 SITE PREPARATION AND MDF/IDF CONSTRUCTION

Preinstallation planning is essential. Advanced planning minimizes installation time, cost, and disruption of the customer business activities.

2.1 Precautionary Information



Observe the following warnings during installation.

1. Never install telephone wiring during a lightning storm.
2. Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.
3. Never touch uninsulated telephone wires or terminals unless the telephone line is disconnected at the network interface.
4. Use caution when installing or modifying telephone lines.

2.2 Surveying the Customer Site

In most cases, a survey of the customer site is necessary to determine the proper placement of the Main Distribution Frame (MDF), the exact dimensions of the area selected for the MDF, cabling requirements, and possible Intermediate Distribution Frame (IDF) locations.

The information obtained at the customer site can permit the installer to partially assemble the MDF before installation at the customer premise. This can help reduce the time spent installing at the customer site to reduce downtime.

2.3 Selecting the Best Location for Proper Installation

2.3.1 Selecting the KSU Installation Site

When a site is selected for the installation of the KSU, consider the following conditions to ensure proper installation.

- ① KSUs are normally wall mounted to protect against accident or flooding.
- ① The KSU should not be located directly beneath pipes. Leaks or condensation could damage the Electra Elite system equipment.
- ① The area where the KSU is located must be free of corrosive and inflammable gases, excessive chemical or industrial dusts, and other materials that could cause a hazard to personnel or to the proper functioning of the equipment.
- ① The operating ambient temperature and humidity must be within the limits specified in 4.2.2 Environmental Conditions in Chapter 2 System Specifications.
- ① The operation of the system is virtually noiseless and allows wide selection of installation sites. Take care to ensure the KSUs do not present a hazard to office traffic. To minimize cabling costs, a centralized location must be chosen.
- ① Locate the KSU at a site where a dedicated AC power source is readily available.
- ① Connect the KSU **only** to a dedicated AC receptacle that is not being used for any other device such as a computer, copier, or facsimile machine.

2.3.2 Selecting a Permanent MDF Location

When selecting a permanent site for the MDF, the technician may encounter some of the following conditions.

- ① Limited space is available but must be used.
- ① The available space may pose one or more environmental hazards.
- ① The proposed location has limitations such as insufficient lighting or the lack of a suitable ground for the KSUs.
- ① The technician that encounters these conditions must provide the best possible solution for installing the equipment. This document cannot cover all possible situations, precautions, and actions.

2.3.3 Selecting a Site for Installing the Telephones

When a site is selected for telephone installation, consider the following conditions to ensure proper installation.

- ① Ensure that the cable length and line resistance (loop), between the KSU and the telephones, comply with the specifications show in [Table 2-3 Multiline Terminal Loop Resistance and Cable Length](#).
- ① Select a place where devices that require an external power supply can be easily connected to an AC outlet.

2.4 Constructing the Main Distribution Frame (MDF)

The Main Distribution Frame (MDF) consists of two different standard quick-connect terminal blocks that are mounted on a 3/4" plywood backboard. Mounting these blocks on standoffs for ease of access is recommended. The recommended blocks are 66B50 for termination of the MDF Cable Assembly and 66M50 for termination of the station cables.

The Intermediate Distribution Frame (IDF) requires the 66M50 blocks only.

Both the MDF and the IDF use standard bridging clips for each terminal block. The bridging clips mate the left half of the terminal block (terminated cable run) to the right half of the terminal block (crossconnection wire) to the terminal block (crossconnection wire). The bridging clips are also useful during troubleshooting to help isolate the cable runs and terminals/telephones from the central equipment and the Central Office Network from the system. Refer to [Figure 4-1 Typical Full MDF Layout](#).

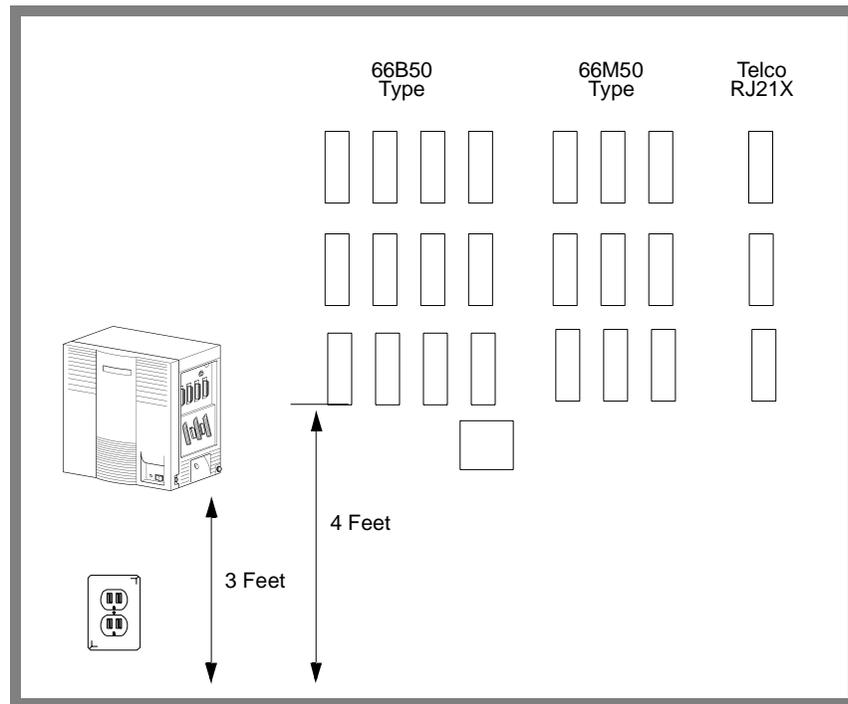


Figure 4-1 Typical Full MDF Layout

The Electra Elite 192 KSU is connected to each of the Multiline Terminals, Single Line Telephones, optional equipment, CO/PBX, DID, ISDN, 4-wire E&M Tie lines (Types I and V), and FT1 digital trunks by separate twisted-pair cable through the MDF. The 4-wire E&M Tie lines, FT1 lines, and ISDN lines require multiple twisted-pair cabling. [Table 4-1 MDF Cable Connections](#) provides the necessary cabling information.

Table 4-1 MDF Cable Connections

MDF Pin NO.	Running Cable	Station Cable DTU	Station Cable ETW	ESI	SLI (8)	SLI (4)	OPX	COI/COID (8)	COI COIB or COID (4)	DID	TLI	DTI/PRT	BRT	ECR	DPH	BSU
<i>First ETU</i>																
26 1	WH-BL BL-WH	GN RD	BK YL	T R	T R	T R	T R	T R	T R	T R	GND —	TA TB	TA-1 TB-1	EP Zone 3	DP 1	ZT II 1
27 2	WH-OR OR-WH	GN RD	BK YL	T R	T R	T R	T R	T R	T R	T R	E-1 M-1	RA RB	RA-1 RB-1	EP Zone 2	DP 2	
28 3	WH-GN GN-WH	GN RD	BK YL	T R	T R	T R	— —	T R	T R	T R	T-1 R-1	— —	TA-2 TB-2	EP Zone 1	DP 3	ZT II 2
29 4	WH-BR BR-WH	GN RD	BK YL	T R	T R	T R	— —	T R	T R	T R	T1-1 R1-1	— —	RA-2 RB-2	Night Chime	DP 4	
30 5	WH-SL SL-WH	GN RD	BK YL	T R	T R	— —	— —	T R	— —	— —	GND —	— —	TA-3 TB-3	External Tone Ringer 4	DLR 1	
31 6	RD-BL BL-RD	GN RD	BK YL	T R	T R	— —	— —	T R	— —	— —	E-2 M-2	— —	RA-3 RB-3	External Tone Ringer 3	DLR 2	
32 7	RD-OR OR-RD	GN RD	BK YL	T R	T R	— —	— —	T R	— —	— —	T-2 R-2	— —	TA-4 TB-4	External Tone Ringer 2	DLR 3	
33 8	RD-GN GN-RD	GN RD	BK YL	T R	T R	— —	— —	T R	Fax Brnch	— —	T1-2 R1-2	— —	RA-4 RB-4	External Tone Ringer 1	DLR 4	

Table 4-1 MDF Cable Connections (Continued)

MDF Pin NO.	Running Cable	Station Cable DTU	Station Cable ETW	ESI	SLI (8)	SLI (4)	OPX	COI/COID (8)	COI COIB or COID (4)	DID	TLI	DTI/PRT	BRT	ECR	DPH	BSU
Second ETU																
34 9	RD-BR BR-RD	GN RD	BK YL	T R	T R	T R	T R	T R	T R	T R	GND —	TA* TB*	TA-1 TB-1	EP Zone 3	DP 1	ZT II 1
35 10	RD-SL SL-RD	GN RD	BK YL	T R	T R	T R	T R	T R	T R	T R	E-1 M-1	RA* RB*	RA-1 RB-1	EP Zone 2	DP 2	
36 11	BK-BL BL-BK	GN RD	BK YL	T R	T R	T R	— —	T R	T R	T R	T-1 R-1	— —	TA-2 TB-2	EP Zone 1	DP 3	ZT II 2
37 12	BK-OR OR-BK	GN RD	BK YL	T R	T R	T R	— —	T R	T R	T R	T1-1 R1-1	— —	RA-2 RB-2	Night Chime	DP 4	
38 13	BK-GN GN-BK	GN RD	BK YL	T R	T R	— —	— —	T R	— —	— —	GND —	— —	TA-3 TB-3	External Tone Ringer 4	DLR 1	
39 14	BK-BR BR-BK	GN RD	BK YL	T R	T R	— —	— —	T R	— —	— —	E-2 M-2	— —	RA-3 RB-3	External Tone Ringer 3	DLR 2	
40 15	BK-SL SL-BK	GN RD	BK YL	T R	T R	— —	— —	T R	— —	— —	T-2 R-2	— —	TA-4 TB-4	External Tone Ringer 2	DLR 3	
41 16	YL-BL BL-YL	GN RD	BK YL	T R	T R	— —	— —	T R	Fax Brnch	— —	T1-2 R1-2	— —	RA-4 RB-4	External Tone Ringer 1	DLR 4	

* Series 8000 or higher

Table 4-1 MDF Cable Connections (Continued)

MDF Pin NO.	Running Cable	Station Cable DTU	Station Cable ETW	ESI	SLI (8)	SLI (4)	OPX	COI/ COID (8)	COI COIB or COID (4)	DID	TLI	DTI/ PRT	BRT	ECR	DPH	BSU
Third ETU																
42	YL-OR	GN	BK	T	T	T	T	T	T	T	GND	TA*	TA-1	EP Zone 3	DP 1	ZT II 1
17	OR-YL	RD	YL	R	R	R	R	R	R	R	—	TB*	TB-1			
43	YL-GN	GN	BK	T	T	T	T	T	T	T	E-1	RA*	RA-1	EP Zone 2	DP 2	
18	GN-YL	RD	YL	R	R	R	R	R	R	R	M-1	RB*	RB-1			
44	YL-BR	GN	BK	T	T	T	—	T	T	T	T-1	—	TA-2	EP Zone 1	DP 3	ZT II 2
19	BR-YL	RD	YL	R	R	R	—	R	R	R	R-1	—	TB-2			
45	YL-SL	GN	BK	T	T	T	—	T	T	T	T1-1	—	RA-2	Night Chime	DP 4	
20	SL-YL	RD	YL	R	R	R	—	R	R	R	R1-1	—	RB-2			
46	VI-BL	GN	Bk	T	T	—	—	T	—	—	GND	—	TA-3	External Ringer 4	DLR 1	
21	BL-VI	RD	YL	R	R	—	—	R	—	—	—	—	TB-3			
47	VI-OR	GN	BK	T	T	—	—	T	—	—	E-2	—	RA-3	External Ringer 3	DLR 2	
22	OR-VI	RD	YL	R	R	—	—	R	—	—	M-2	—	RB-3			
48	VI-GN	GN	BK	T	T	—	—	T	—	—	T-2	—	TA-4	External Ringer 2	DLR 3	
23	GN-VI	RD	YL	R	R	—	—	R	—	—	R-2	—	TB-4			
49	VI-BR	GN	BK	T	T	—	—	T	Fax Brnch	—	T1-2	—	RA-4	External Tone Ringer 1	DLR 4	
24	BR-VI	RD	YL	R	R	—	—	R		—	R1-2	—	RB-4			
50	—	—	—	—	—	—	—	—	—	—	—	—	—			
25	—	—	—	—	—	—	—	—	—	—	—	—	—			

* Series 8000 or higher

- ☞ PFT circuits are only connected to AMP3.
- ☞ AMP1 is connected to S1, S2, and S3.
- ☞ AMP2 is connected to S4, S5, and S6.
- ☞ AMP3 is connected to S7 and S8.

Table 4-2 MDF PFT Connections (J3 Only)

MDF Pin Number	PFT Connection	
26	Not Used	Not Used
1	Not Used	Not Used
27	Not Used	Not Used
2	Not Used	Not Used
28	Not Used	Not Used
3	Not Used	Not Used
29	Not Used	Not Used
4	Not Used	Not Used
30	Not Used	Not Used
5	Not Used	Not Used
31	Not Used	Not Used
6	Not Used	Not Used
32	Not Used	Not Used
7	Not Used	Not Used
33	Not Used	Not Used
8	Not Used	Not Used
34	Not Used	Not Used
9	Not Used	Not Used
35	Not Used	Not Used
10	Not Used	Not Used
36	Not Used	Not Used
11	Not Used	Not Used
37	Not Used	Not Used
12	Not Used	Not Used
38	Not Used	Not Used
13	Not Used	Not Used
39	Not Used	Not Used
14	Not Used	Not Used
40	Not Used	Not Used
15	Not Used	Not Used
41	Not Used	Not Used
16	Not Used	Not Used

Table 4-2 MDF PFT Connections (J3 Only) (Continued)

MDF Pin Number	PFT Connection	
42	PFT1 – CO (Tip)	POWER FAILURE TRANSFER RELAY 1 (Amp 3 Connections Only)
17	PFT1 – CO (Ring)	
43	PFT1 – SLI (Tip)	
18	PFT1 – SLI (Ring)	
44	PFT1 – SLT (Tip)	
19	PFT1 – SLT (Ring)	
45	PFT2 – CO (Tip)	
20	PFT2 – CO (Ring)	
46	PFT2 – SLI (Tip)	
21	PFT2 – SLI (Ring)	
47	PFT2 – SLT (Tip)	
22	PFT2 – SLT (Ring)	
48	PFT3 – CO (Tip)	
23	PFT3 – CO (Ring)	
49	PFT3 – SLI (Tip)	
24	PFT3 – SLI (Ring)	
50	PFT3 – SLT (Tip)	
25	PFT3 – SLT (Ring)	

- ☞ PFT circuits are only connected to AMP3.
- ☞ AMP1 is connected to S1, S2, and S3.
- ☞ AMP2 is connected to S4, S5, and S6.
- ☞ AMP3 is connected to S7 and S8.

2.5 Power Failure Transfer

The Power Failure Transfer relay is located in the KSU. When selecting a Single Line Telephone for power failure transfer, make sure it matches the CO line dialing type (10 pps, 20 pps, or DTMF) where it is connected. A Single Line Telephone with a ground button must be used with Ground Start Trunks. [Figure 4-2 Power Failure Transfer Connections](#) is a relay diagram. The relay is shown with the power ON.

☞ There are three PFT Circuits for each B64-U10 KSU.

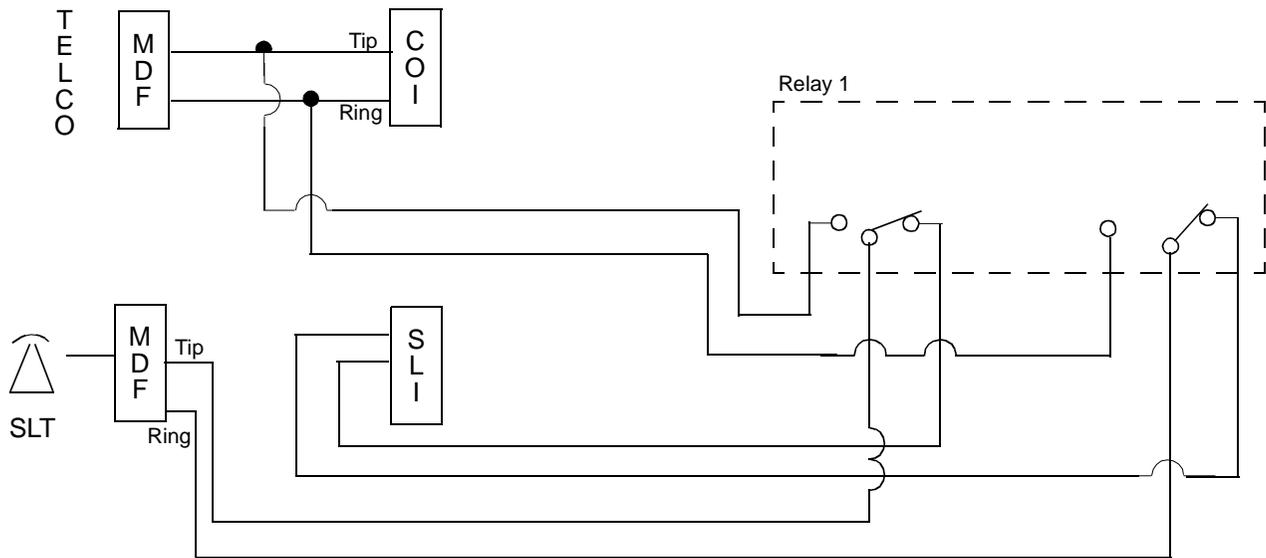


Figure 4-2 Power Failure Transfer Connections

2.6 Fax CO Branch Connection

This connection is made via the fourth port on any COI(4)-U(), COIB(4)-U(), or COID(4)-U() ETU. Refer to [Figure 4-3 Fax CO Branch Connection](#). The facsimile machine is connected to the eighth port for the slot where the COI(4)-U(), COIB(4)-U(), or COID(4)-U() ETU is installed.

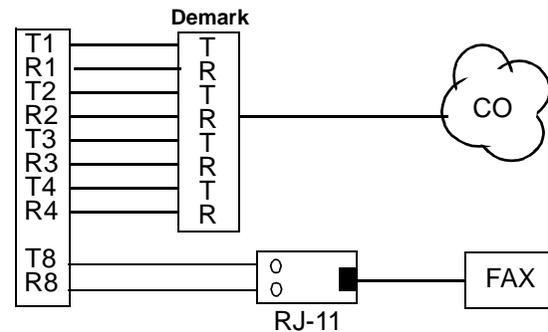


Figure 4-3 Fax CO Branch Connection

SECTION 3 INSTALLING BASIC AND EXPANSION KSUs

The compact design of the Electra Elite 192 KSU provides easy installation. The KSUs can be floor mounted or wall mounted. Only the Basic KSU can be floor mounted. The floor mounting option is for demonstration purposes only. The information in this section provides detailed instructions for installing the KSU.



Before installing the system; observe the following precautions.

- ⚠ Before beginning installation, ensure that the Power Supply Unit (PSU) is **OFF** and that the power cord is disconnected from the AC outlet.
- ⚠ Do not touch the soldered surfaces of the ETUs.

3.1 General Information

3.1.1 Basic KSU

The B64-U10 KSU provides service for outside lines, Attendant Consoles, and interconnection of the station terminals. The B64-U10 KSU provides 64 ports and has two fixed and eight flexible slots. The first fixed slot is reserved for the CPUB()-U() ETU in the basic KSU or for the EXP-U10 ETU in expansion KSUs. The second fixed slot is for the MIFA-U() or MIFM-U() ETU. A Power Supply Unit (P64-U10 PSU) and backup batteries are provided with the basic KSU.

3.1.2 Expansion KSUs

The B64-U10 KSU is also used as the expansion unit that can be attached to the basic KSU to provide an additional 64 ports. Two expansion units can be added to the Electra Elite 192 system, providing a maximum of 192 ports. Each expansion KSU provides eight flexible slots and accommodates 8-channel interface cards. A Power Supply Unit (P64-U10 PSU) and backup batteries are included with each expansion unit.

The installation instructions provided in this chapter apply to the basic B64-U10 KSU and the expansion B64-U10 KSUs unless otherwise specified.

3.2 Removing the KSU Cover

To access the battery, cables, and ETU slots, the front cover must be removed.

1. Loosen the screw that is located near the ON/OFF switch, on the right side of the KSU. Do not remove screw from the unit.

2. To remove the front panel, slide it to the right and pull.

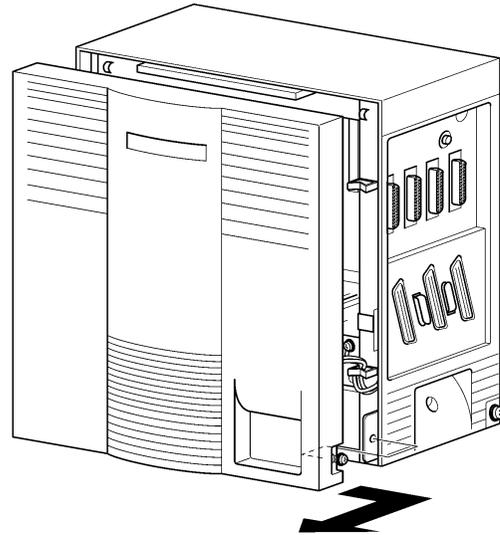


Figure 4-4 Removing the Front Panel of the KSU

3.3 Installing a Front Cover Extender (FCE-U10 Unit)

When installing a VDH2(8)-U() ETU, a Front Cover Extender is required to allow for the cabling.

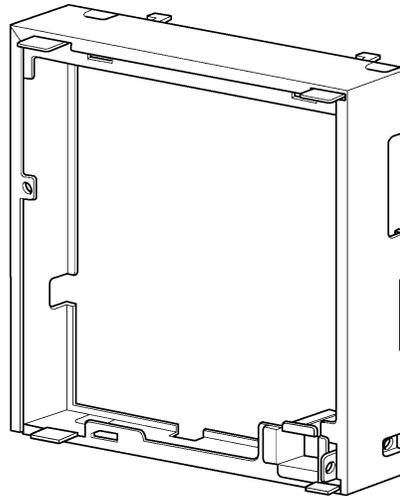


Figure 4-5 Front Cover Extender (FCE-U10 Unit)

1. Install the ETU in the KSU and connect the applicable cables.

When installing a VDH2(8)-U() ETU, install the cable clamp on the KSU frame as shown in [Figure 4-6 Mounting the Cable Clamp on the KSU Frame](#).

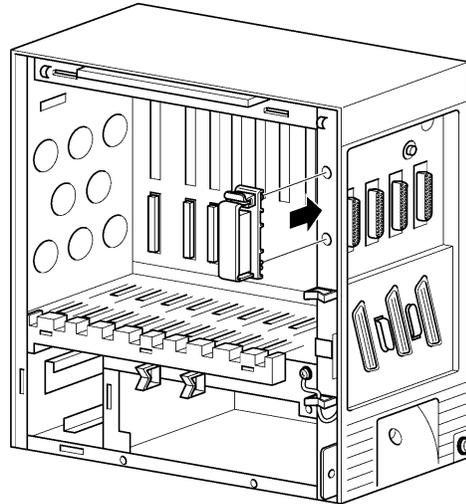


Figure 4-6 Mounting the Cable Clamp on the KSU Frame

2. Attach the sponge (provided) to the inner surface of the clamp lining and close the clamp over the cables as shown in [Figure 4-7 Attaching the Sponge to the Clamp](#).

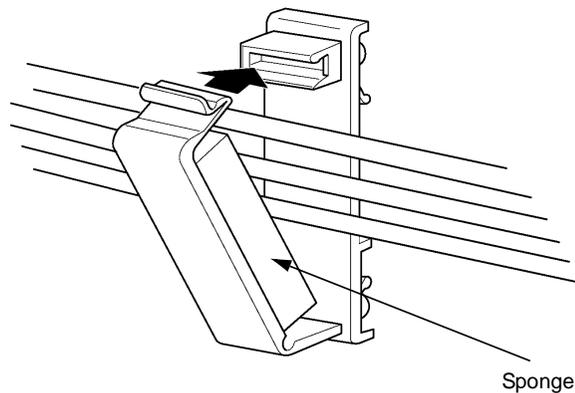


Figure 4-7 Attaching the Sponge to the Clamp

3. Place the hooks at the top of the cover (previously removed) into the hangers on the extender and slide left to engage. Attach the front cover to the front cover extender using the two screws. Refer to [Figure 4-8 Attaching the Front Cover and Front Cover Extender](#).

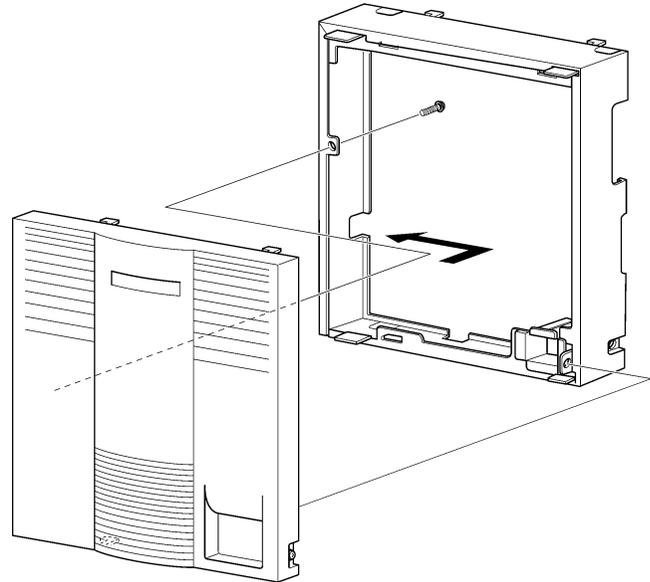


Figure 4-8 Attaching the Front Cover and Front Cover Extender

4. To install the front cover and front cover extender on the KSU, place the hooks at the top of the front extender in the KSU slots and slide left to engage. Install the provided screw. Refer to [Figure 4-9 Attaching the Front Cover and the Front Cover Extender to the KSU](#).

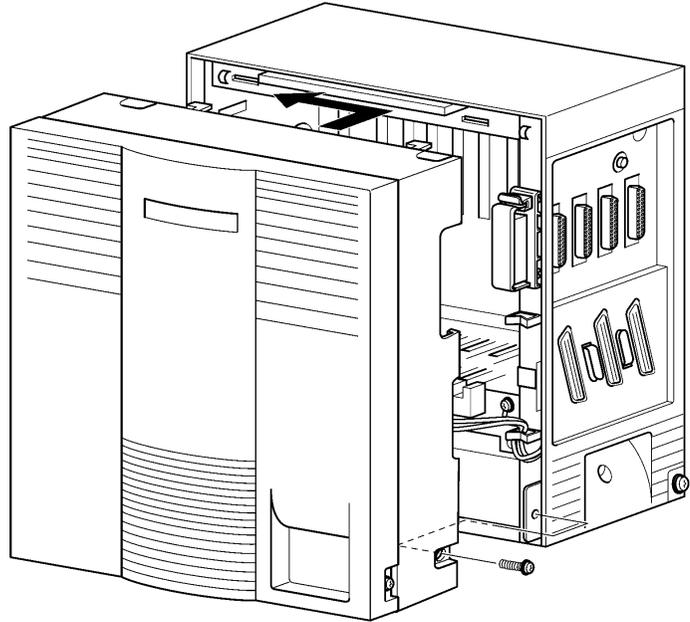


Figure 4-9 Attaching the Front Cover and the Front Cover Extender to the KSU

3.4 Securing Cables Using the Velcro Strap

Amphenol cables attached to the side of the KSU can be secured using the provided velcro strap. When wall mounting, this should be done prior to attaching the KSU to the wall mount bracket.

1. Thread the velcro strap through the hook on the back side of the KSU.

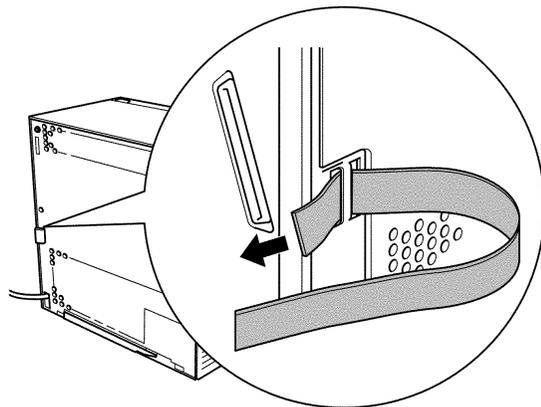


Figure 4-10 Threading the Velcro Strap Through the Hook on the KSU

2. To install Expansion KSUs, use the Expansion Cable (included with the EXP-U10 ETU) to connect the CPUB()-U() ETU to the Expansion ETU. Secure the Expansion Cable to the KSU Frame using tie wraps. To only install a basic KSU, proceed to the next step.

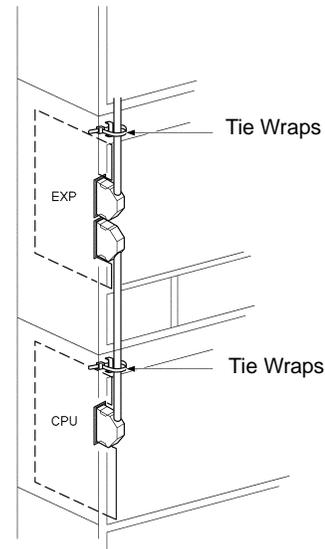


Figure 4-11 Connecting the Expansion Cable

3. When one or two amphenol cables are attached to the KSU, the velcro strap can be threaded around the cable and through the hooks.

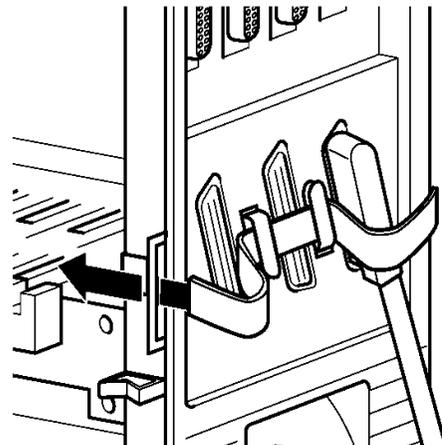


Figure 4-12 Threading the Velcro Strap to Secure One or Two Amphenol Cables

4. When all three amphenol cables are used, the velcro strap is threaded around the cables and attached to the KSU.

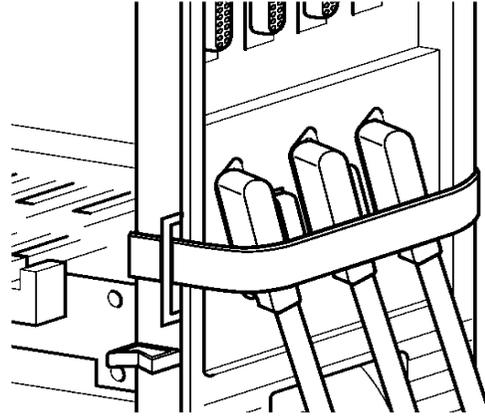


Figure 4-13 Threading the Velcro Strap to Secure Three Amphenol Cables

3.5 Wall Mounting the Basic KSU

1. Before wall mounting the KSU, Use the four (locally provided) screws to attach the wall mount bracket to the wall as shown in [Figure 4-14 Attaching the Wall Mount Bracket](#).

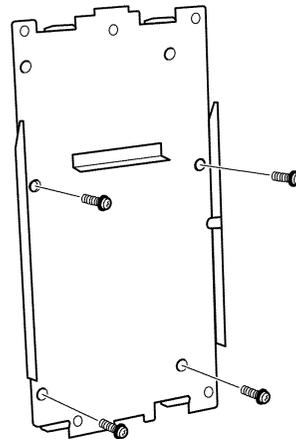


Figure 4-14 Attaching the Wall Mount Bracket

2. After the bracket is mounted to the wall, peel off the spacer backing. Place and adhere the spacer to the position shown in [Figure 4-15 Attaching the Wall Mount Bracket with Spacer](#).

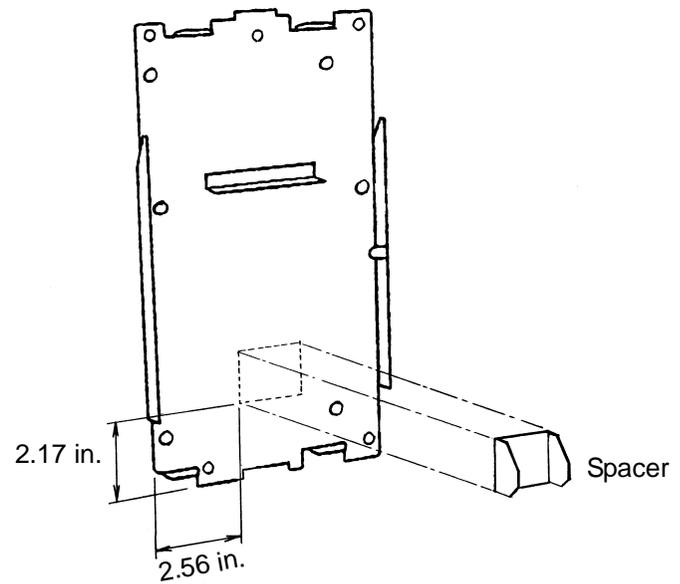


Figure 4-15 Attaching the Wall Mount Bracket with Spacer

3. Hang the KSU on the two hooks protruding from the wall mount bracket as shown in [Figure 4-16 Hanging the Basic KSU on the Bracket](#).

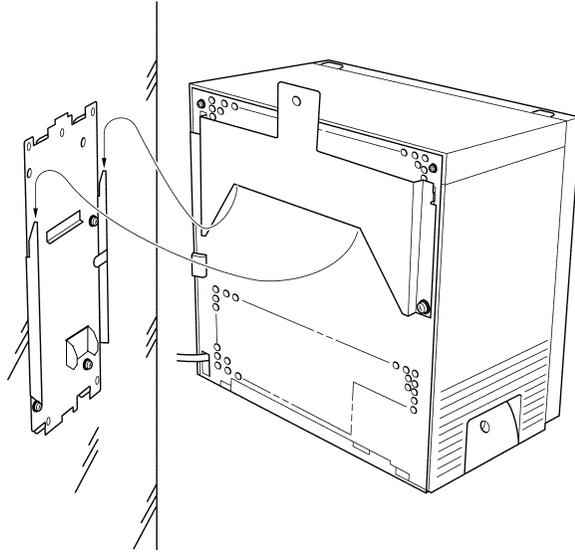


Figure 4-16 Hanging the Basic KSU on the Bracket

4. Secure the KSU to the wall by placing a screw (locally provided) and washer into the hole in the center of the wall mount bracket as shown in [Figure 4-17 Securing the Basic KSU to the Wall](#).

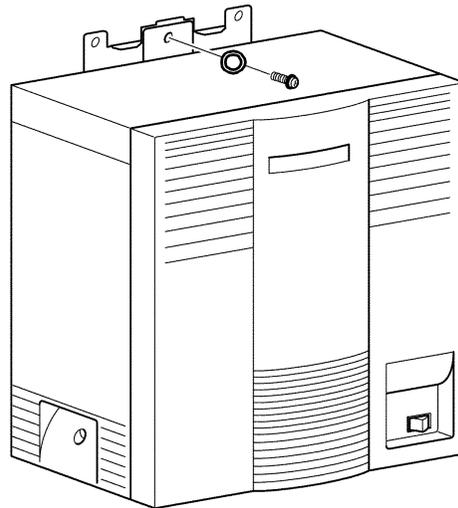


Figure 4-17 Securing the Basic KSU to the Wall

3.6 Wall Mounting the Expansion KSU

1. Fit the bottom of the Expansion Wall Mount Bracket to the top of the Basic Wall Mount Bracket. Refer to [Figure 4-18 Attaching the Expansion Wall Mount Bracket to the Basic Wall Mount Bracket](#).

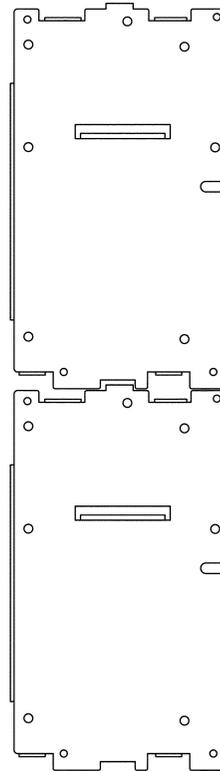


Figure 4-18 Attaching the Expansion Wall Mount Bracket to the Basic Wall Mount Bracket

2. Hang the KSU on the two hooks protruding from the expansion wall mount bracket as shown in [Figure 4-16 Hanging the Basic KSU on the Bracket](#).
3. To secure the KSU to the wall, install a screw (locally provided) in the hole in the center of the wall mount bracket as shown in [Figure 4-24 Securing the KSU to the Floor Mounting Bracket](#).

3.7 Rack Mounting the Basic KSU

1. Mount the RAK-U10 Unit to the equipment rack using the six provided screws. Refer to [Figure 4-19 RAK-U10 Unit and KSU](#). Use three screws on the right side (at **1**, **2**, and **3**) and three screws on the left side.

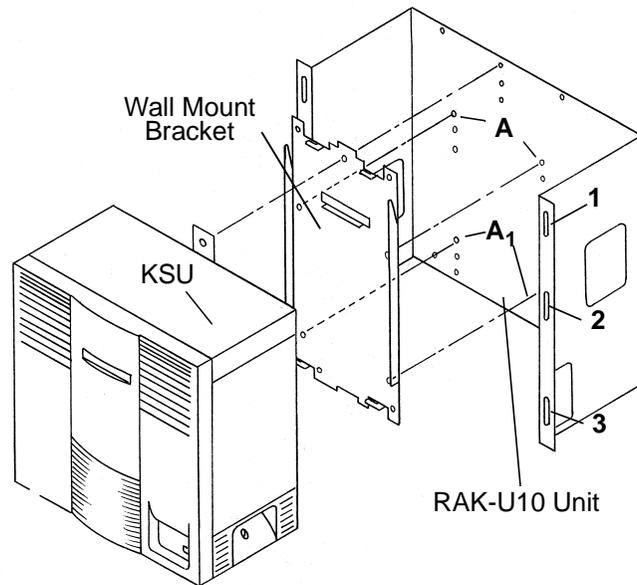


Figure 4-19 RAK-U10 Unit and KSU

2. Mount the Wall Mount Bracket onto the RAK-U10 Unit using the four provided screws. Install two screws in the upper holes (at **A**) and two screws in the lower holes (at **A₁**).

3. After the bracket is mounted to the RAK-U10 Unit, hang the KSU on the two hooks protruding from the Wall Mount Bracket, as shown in [Figure 4-20 Hanging the KSU on the Bracket](#).

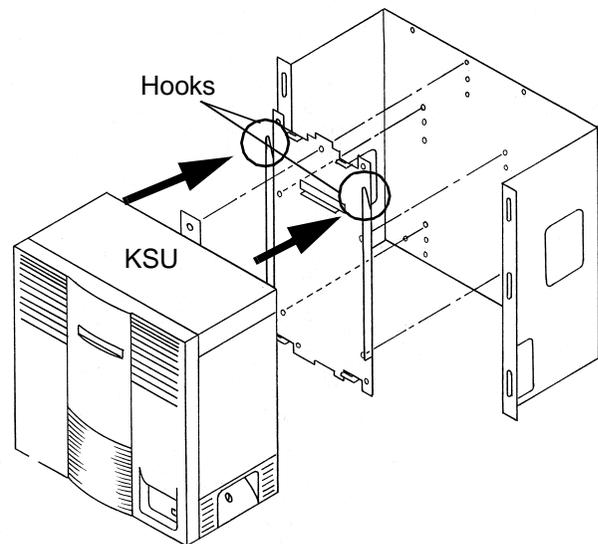


Figure 4-20 Hanging the KSU on the Bracket

4. Secure the KSU to the RAK-U10 Unit by installing a provided screw into the KSU tab and bracket hole **A₂**. Refer to [Figure 4-21 Securing the KSU to the RAK-U10 Unit](#).

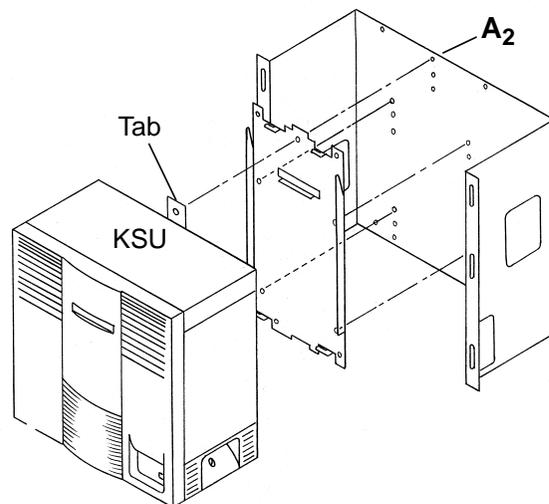


Figure 4-21 Securing the KSU to the RAK-U10 Unit

3.8 Rack Mounting the Expansion KSU

1. Refer to [Figure 4-22 Location for Rack Mounting the KSUs](#), for the proper location of rack mounting the Basic KSU and the Expansion KSUs.

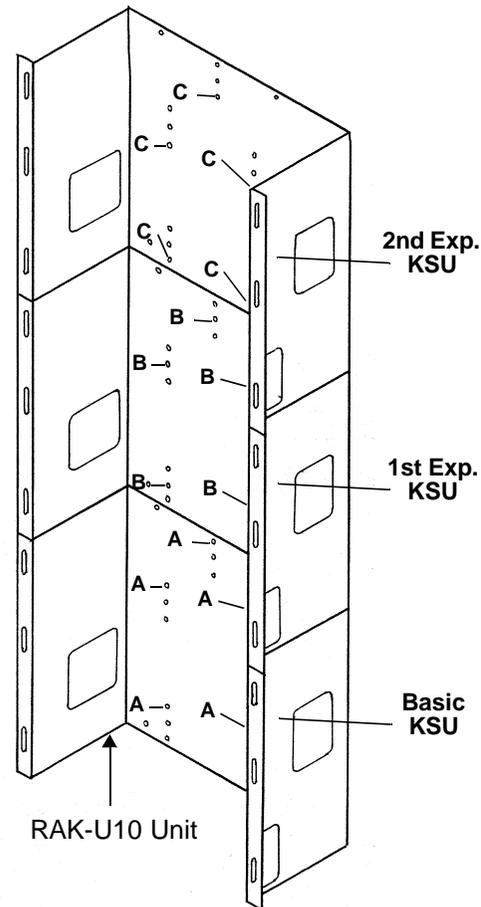


Figure 4-22 Location for Rack Mounting the KSUs

2. The Basic KSU is installed in the lower position of the rack mounting bracket. The Basic KSU is secured using the five threaded screw holes marked **A**.
3. The 1st Expansion KSU is installed in the center position and is secured using the five threaded screw holes marked **B**.
4. The 2nd Expansion KSU is installed in the upper position and is secured using the five threaded screw holes marked **C**.

3.9 Floor Mounting the Basic KSU

Only the B64-U10 KSU with no expansion KSU can be floor mounted.

1. Use the four locally provided screws to attach the floor mount bracket to the floor.
2. Slide the KSU over the four hooks protruding from the floor mount bracket as shown in [Figure 4-23 Floor Mounting the Basic KSU](#).

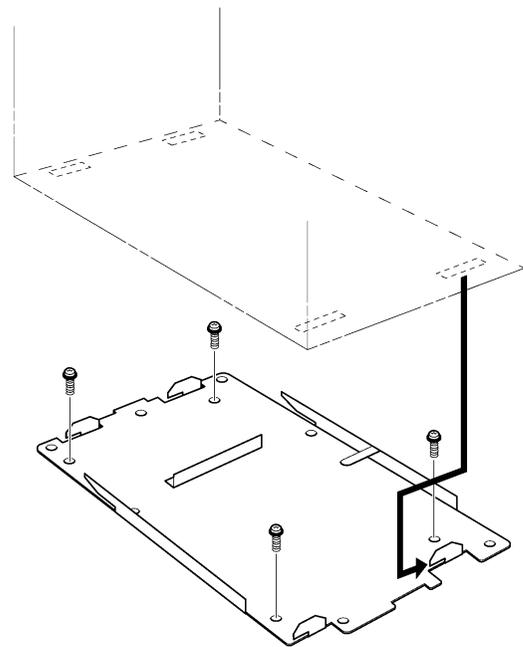


Figure 4-23 Floor Mounting the Basic KSU

3. To secure the KSU to the floor mounting bracket, install the two screws as indicated in [Figure 4-24 Securing the KSU to the Floor Mounting Bracket](#).

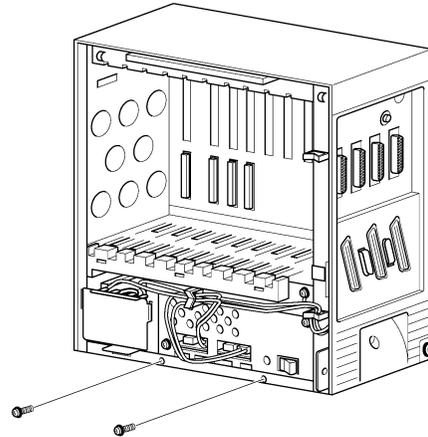


Figure 4-24 Securing the KSU to the Floor Mounting Bracket

3.10 Cable Routing

3.10.1 Connecting the Battery Expansion Cables on the KSU

1. Use the DC Expansion Cable (included with the EXP-U ETU) to connect the **BATTERY EXT** on the Basic KSU to the **BATTERY EXT** of the Expansion KSU.

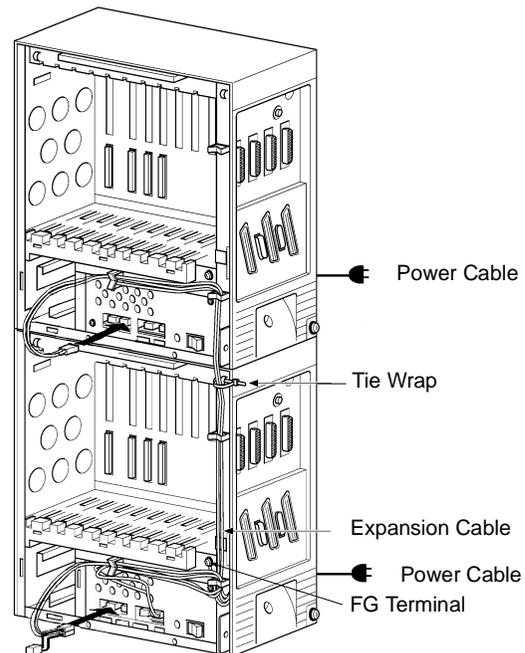


Figure 4-25 Connecting DC Expansion Cables

2. To connect an Expansion KSU, use the two screws to attach the FG plate to the Basic and Expansion KSUs. Refer to [Figure 4-26 Attaching the Frame Ground Plate](#). (When installing a second Expansion KSU, another FG plate is required.)

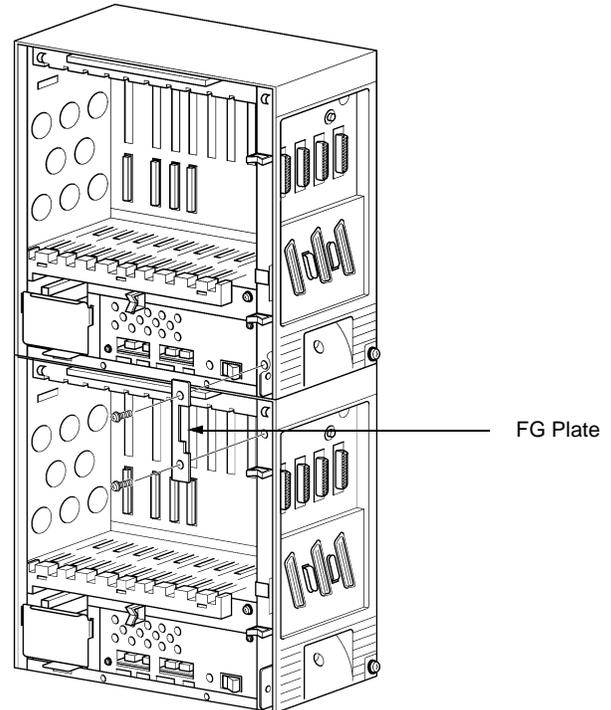


Figure 4-26 Attaching the Frame Ground Plate

3.10.2 Grounding Requirements

The KSUs must be properly grounded. The Electra Elite KSUs are provided with a typical AC third-wire ground. If this ground is questionable, an alternative ground must be provided.

1. Connect the grounding cable (green wire) to the ground terminal on the right side of the Basic KSU. *The locally provided grounding cable AWG must be greater than #16.*

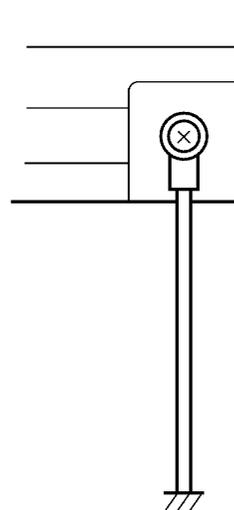


Figure 4-27 KSU Grounding

2. Provide a suitable ground inside of a building in accordance with local telephone company procedures.
3. When no suitable ground is available, a ground rod should be installed in accordance with the operating procedures of the local telephone company.

3.11 Replacing the Power Supply Unit in the KSU

The Electra Elite 192 system has a P64-U10 PSU for each KSU. The Power Supply Unit has a battery backup interface and accepts 117 Vac and outputs +5V and -24V to the system.



Before replacing the PSU, remove the defective PSU and verify that the power cord on the replacement PSU is unplugged.

3.11.1 Connecting the Power Supply Unit to the Basic KSU

1. Connect the 8-wire cable from the PSU to the connector on the backboard of the KSU.

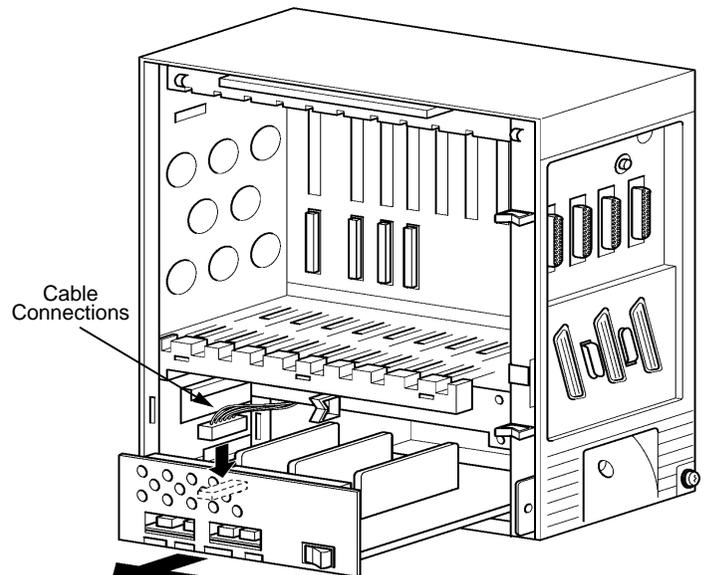


Figure 4-28 Connecting Wires to the PSU

2. Install the P64-U10 PSU into the bottom space of the KSU and attach to the KSU using the two provided screws.

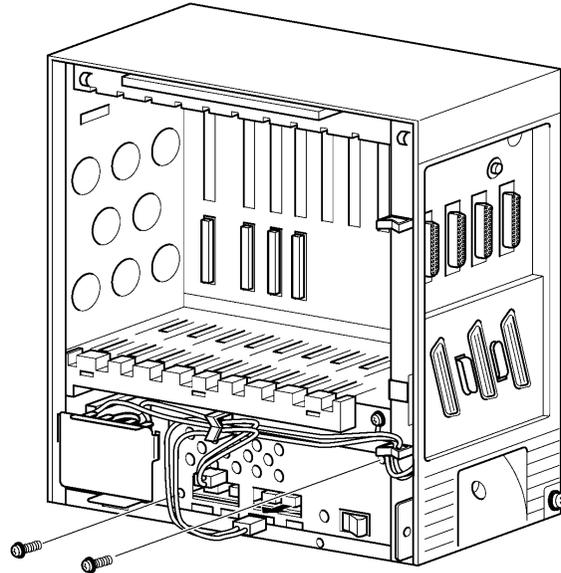


Figure 4-29 Mounting the PSU onto the KSU

3. Lead the KSU power cable through the clamp and connect the PSU as shown in [Figure 4-30 Connecting the PSU Power Cable to the Basic KSU](#).

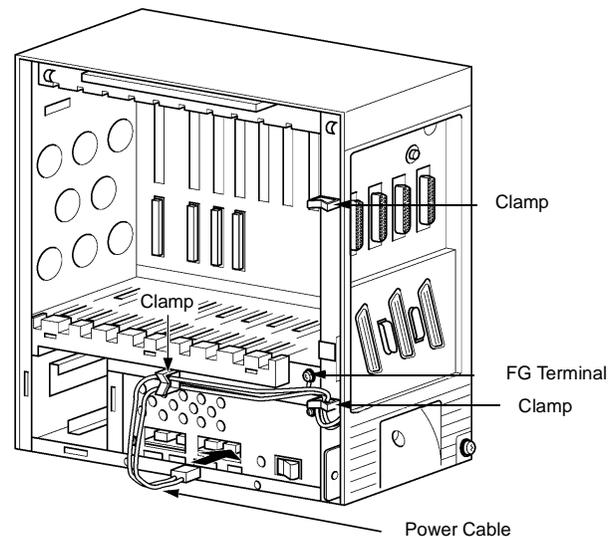


Figure 4-30 Connecting the PSU Power Cable to the Basic KSU

3.11.2 Connecting Battery Expansion Cables to the Expansion KSU

1. Lead the Battery Expansion Cables (included in the Expansion KSU) through the clamps and tie them to the KSU with a tie wrap on the expansion KSU.

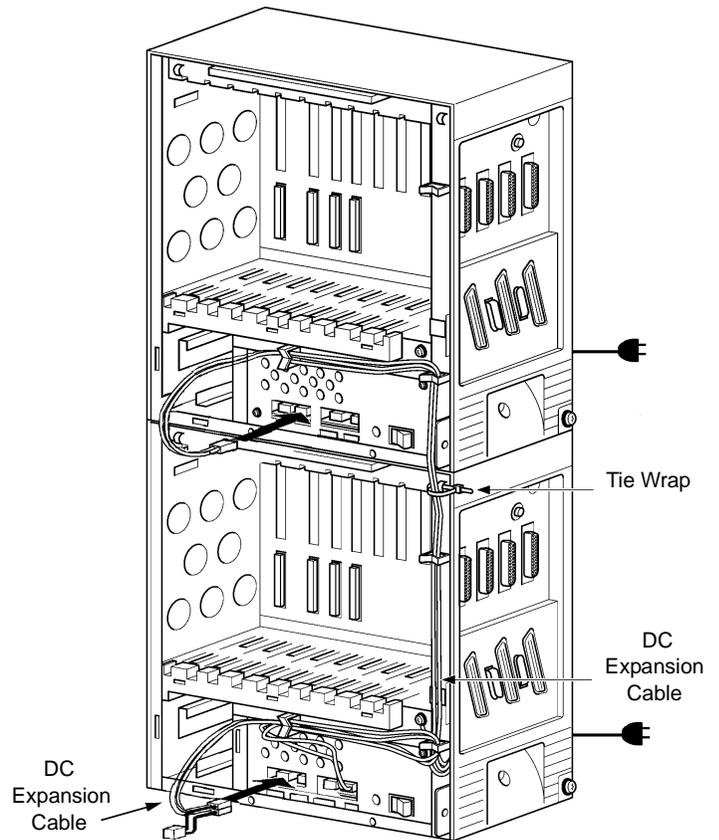


Figure 4-31 Connecting Battery Expansion Cables to the Expansion KSU

2. When using two expansion KSUs, connect the PSU of each expansion KSU with the Battery expansion cables, lead the cables through the clamps, and tie them with a tie wrap.

3.11.3 Fuse Replacement



For continued protection against risk of fire, replace fuses with the same type and rating originally installed.

1. Turn off the power switch and remove the front cover on the KSU. (Refer to [Figure 4-4 Removing the Front Panel of the KSU.](#))
2. Pull out the drawer that holds the PSU and disconnect the cable as shown in [Figure 4-32 Removing the PSU from the KSU.](#)

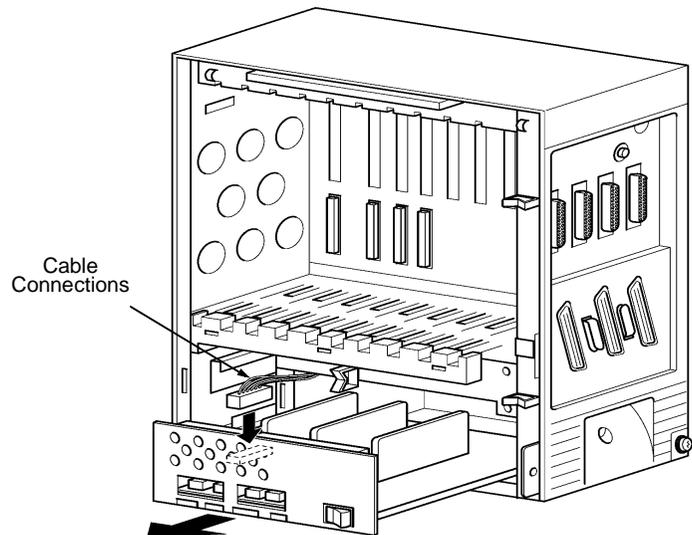


Figure 4-32 Removing the PSU from the KSU

3. Replace the fuses as necessary and return the PSU to the KSU. Fuse **F1** is a 125V, 6A fuse for AC input. Fuse **F101** is a 125V, 6.0A fuse for DC input.

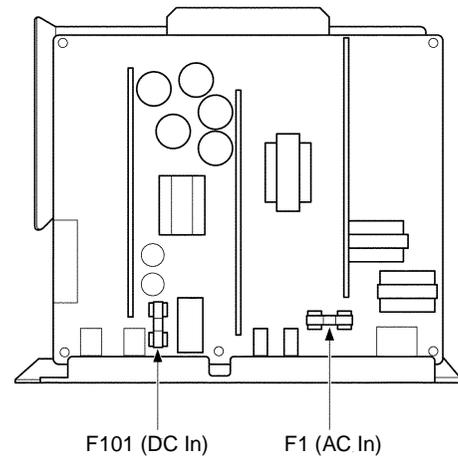


Figure 4-33 PSU Fuse Replacement

3.12 Installing Built-In and External Batteries in the KSU

3.12.1 Built-In Battery Installation

1. Connect the two batteries in series as shown in [Figure 4-34 Connecting Built-In Batteries](#). The red cord attaches to the **red** terminal and the black cord attaches to the **black** terminal.



Be careful, and properly connect the terminals of the batteries.

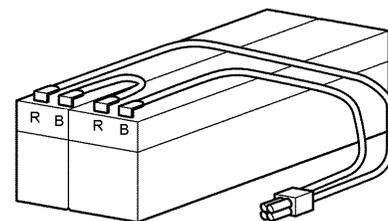


Figure 4-34 Connecting Built-In Batteries

2. Install the batteries into the bottom space at the left side the KSU. Refer to [Figure 4-35 Placing the Batteries into the KSU](#).
3. Install the battery cover as illustrated in [Figure 4-35 Placing the Batteries into the KSU](#).

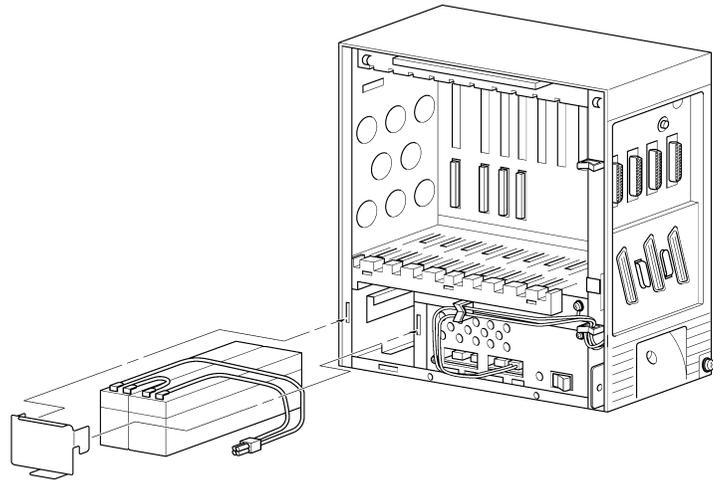


Figure 4-35 Placing the Batteries into the KSU

4. Connect the cable to the **BATTERY INT** connector of the PSU as shown in [Figure 4-36 Connecting the Batteries to the Power Supply Unit](#).

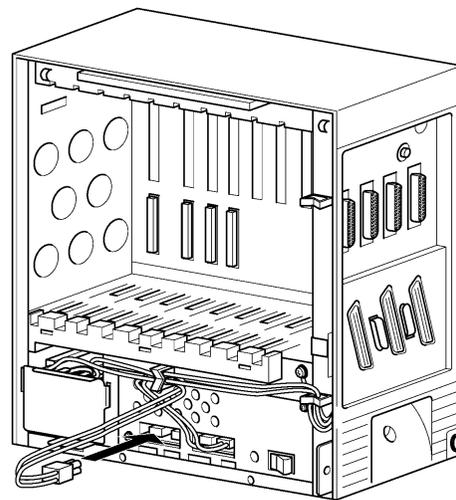


Figure 4-36 Connecting the Batteries to the Power Supply Unit

3.12.2 External Battery Installation

Batteries that are purchased locally can be connected to the system as external batteries.



When installing external batteries, disconnect the battery cable for the built-in batteries from the BATTERY EXT connector of each KSU. When the built-in batteries are connected with the external batteries, a large charging current could flow from the external batteries to the built-in batteries and burn the battery cables.

3.12.2.1 Basic KSU

1. Connect cabling to the external batteries as shown in [Figure 4-37 Connecting Cables for External Batteries in the Basic KSU](#).

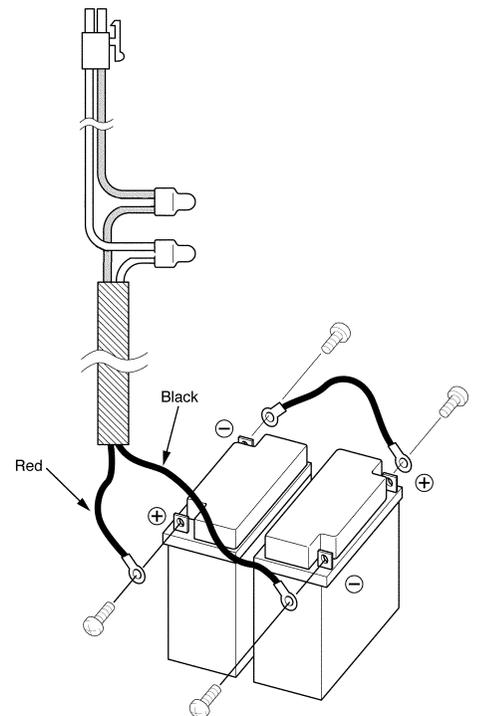


Figure 4-37 Connecting Cables for External Batteries in the Basic KSU

2. Connect the external batteries to the KSU in the location shown in [Figure 4-38 Connecting the External Battery to the Basic KSU](#). Connect the external battery cable to the **EXT** connector on the PSU of the Basic KSU. Bundle any extra cabling together.

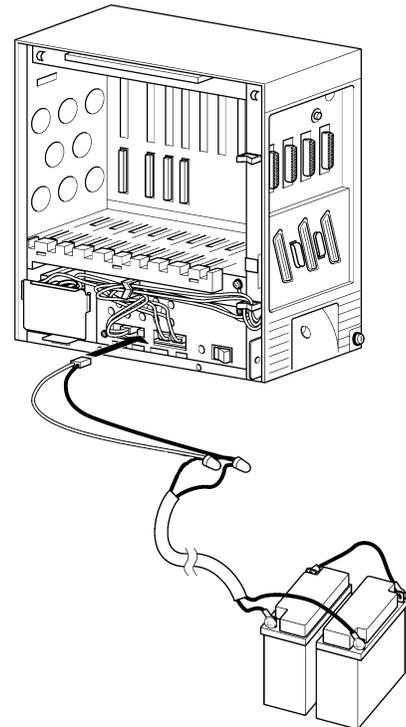


Figure 4-38 Connecting the External Battery to the Basic KSU

3. Route the cables through the clamps on the KSU as shown in [Figure 4-39 Threading the Cables Through the Clamps on the Basic KSU](#).

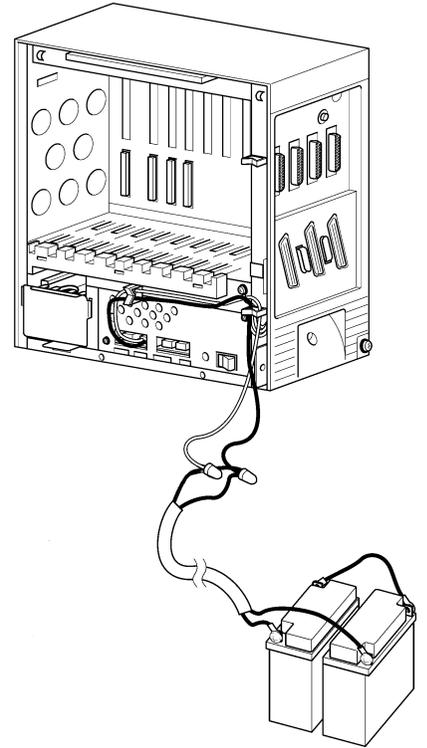


Figure 4-39 Threading the Cables Through the Clamps on the Basic KSU

4. Before putting the cover on the Basic KSU, remove the knockout (indicated by the arrow) with nippers. Refer to [Figure 4-40 Removing the Knockout on the Cover of the Basic KSU](#).

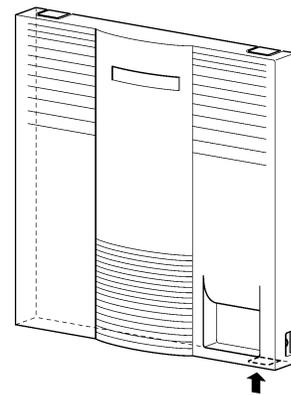


Figure 4-40 Removing the Knockout on the Cover of the Basic KSU

5. Lead the battery cables through the knockout and secure the front cover on the Basic KSU. Refer to [Figure 4-41 Leading the Battery Cables out of the Basic KSU](#).

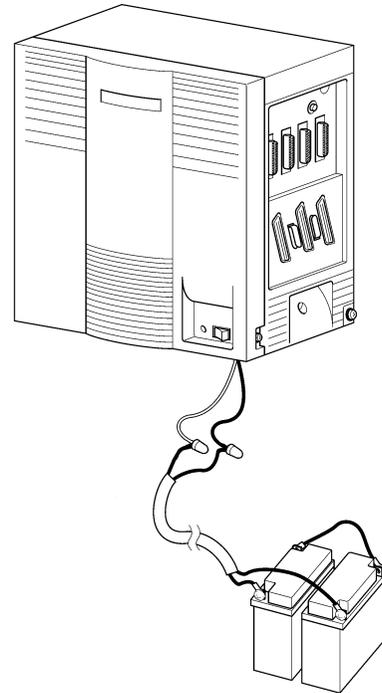


Figure 4-41 Leading the Battery Cables out of the Basic KSU

3.12.2.2 Expansion KSU

When connecting batteries to the Expansion KSUs, connections that must also be made to the Basic KSU are noted in the following instructions. Although a 3-cabinet drawing is not provided, the third KSU draws its external battery power by connecting a cable to the **EXT** connection of the second KSU. This provides a daisy-chain connection between all three KSUs.

1. Connect cabling provided by NEC to the external batteries as shown in [Figure 4-37 Connecting Cables for External Batteries in the Basic KSU](#).

2. Connect the external battery cable to the **EXT** connector on the PSU of the Basic KSU and the Expansion KSU as shown in [Figure 4-42 External Battery Cable Installation](#). Bundle any extra cabling together.



Connecting this cable to PSU EXT connector solves voltage drop problems.

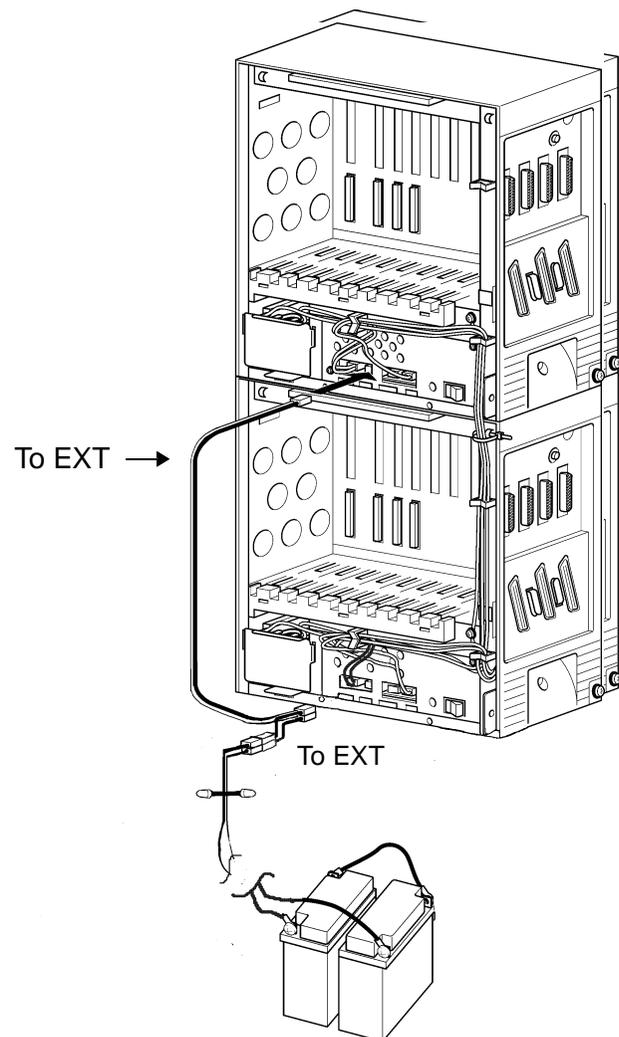


Figure 4-42 External Battery Cable Installation

3. Connect the battery cable that comes from the Expansion KSU to the Basic KSU to the **EXT** connector on the PSU of the Basic KSU. Route the cables through the clamps on the Basic and Expansion KSUs as shown in [Figure 4-43 Threading the Cables through the Clamps on the Basic and Expansion KSUs](#).

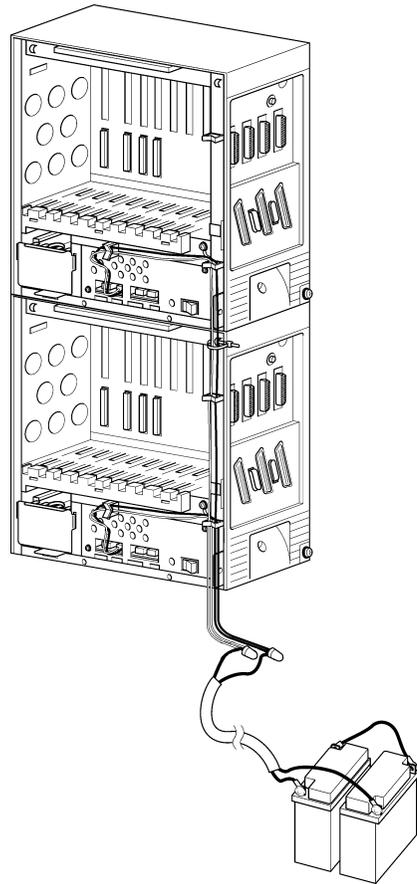


Figure 4-43 Threading the Cables through the Clamps on the Basic and Expansion KSUs

4. Connect the battery cable that comes from the Basic KSU to the extra battery connector of the battery cable above. Before putting the covers on the Basic and Expansion KSUs, remove the knockouts (indicated by the arrows) with nippers. On the Basic KSU, knockouts must be removed from the top and the bottom of the KSU cover. On the Expansion KSU, only the bottom knockout is removed. Refer to [Figure 4-44 Removing the Knockouts on the Covers of Basic and Expansion KSUs](#).

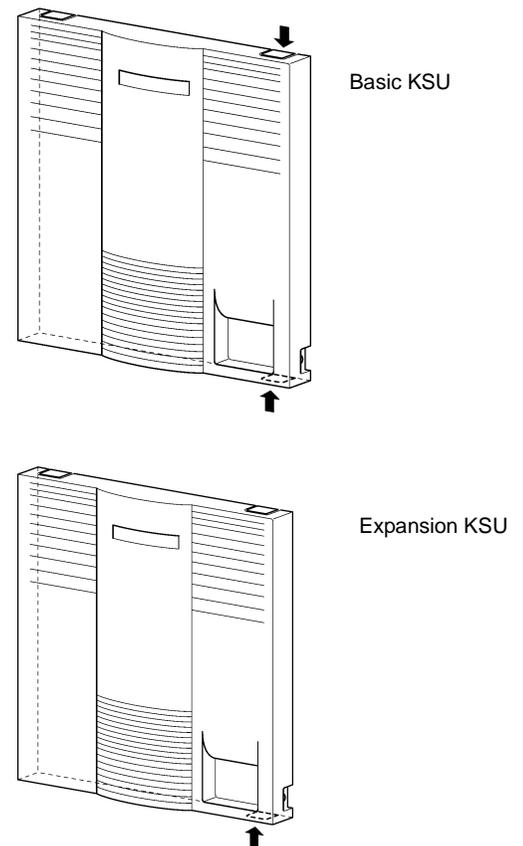


Figure 4-44 Removing the Knockouts on the Covers of Basic and Expansion KSUs

5. Lead the battery cables through the knockouts on the Basic and Expansion KSUs and secure the front covers on the KSUs. Refer to [Figure 4-45 Leading the Battery Cables out of the Basic and Expansion KSUs](#).

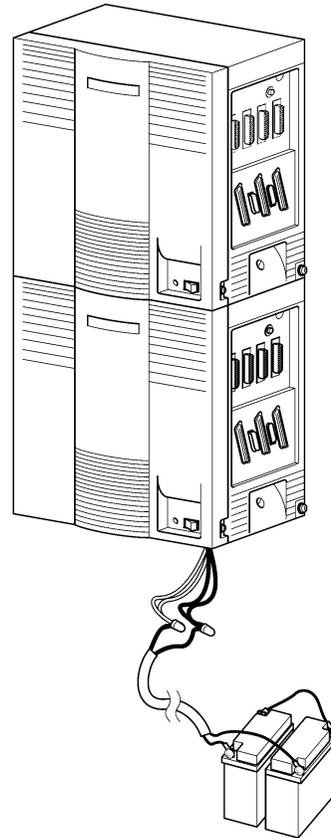


Figure 4-45 Leading the Battery Cables out of the Basic and Expansion KSUs

Installing Electronic Telephone Units

SECTION 1 GENERAL INFORMATION

Each Electronic Telephone Unit (ETU) is installed in a slot in the Basic or Expansion KSU.

The B64-U10 KSU has 10 slots that are divided into three categories.

CPU/EXP Slot

This is the first slot on the left in the KSU. A CPUB()-U() ETU must be installed in this slot in the Basic KSU and an EXP-U10 ETU must be installed in this slot in the Expansion KSU.



When the CPUB()-U() ETU is installed in slots S1~S8, it will be damaged!

ISA/– Slot

This slot, the second slot in the KSU, is reserved for the MIFA-U() or MIFM-U() ETU.

☞ Do not install a CPU or EXP ETU in this slot in the Expansion KSU.

Interface Slots (S1~S8)

In the B64-U10 KSU, interface slots are physically located in slots 3~10 but are labeled S1~S8 on the KSU. All other interface ETUs can be installed in any of these slots.

Slots S1 and S2 of the B64-U10 KSU are universal slots that support the MIFA-U() ETU or MIFM-U() ETU.

This chapter describes each ETU and the installation procedures.

SECTION 2 INSTALLATION

2.1 Installation Precautions



Observe the following precautions when installing the ETUs to avoid static electricity damage to hardware or exposure to hazardous voltages.

- ⌚ The ETUs used in this system make extensive use of CMOS technology that is very susceptible to static; therefore, extreme care must be taken to **avoid static discharge** when handling ETUs.
- ⌚ Make all switch setting changes on the ETU before inserting it into the KSU.
- ⌚ When installed, the component side of all ETUs must face the left side of the KSU. Ejector tabs are always on top. Refer to [Figure 5-1 Inserting the ETU into the KSU](#).

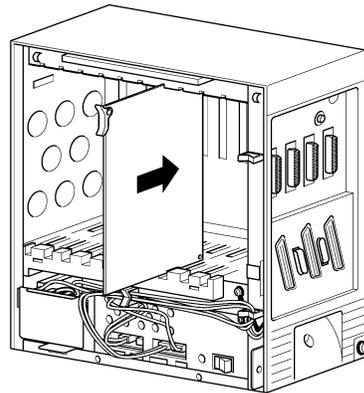


Figure 5-1 Inserting the ETU into the KSU

- ⌚ When carrying an ETU, keep it in a conductive polyethylene bag to prevent damage due to static electricity.
- ⌚ When handling an ETU, the installer must wear a grounded wrist strap to protect the ETU from static electricity.

- ⓘ When inserting or removing an ETU, be sure the wrist strap is connected to the Frame Ground Terminal on the KSU.

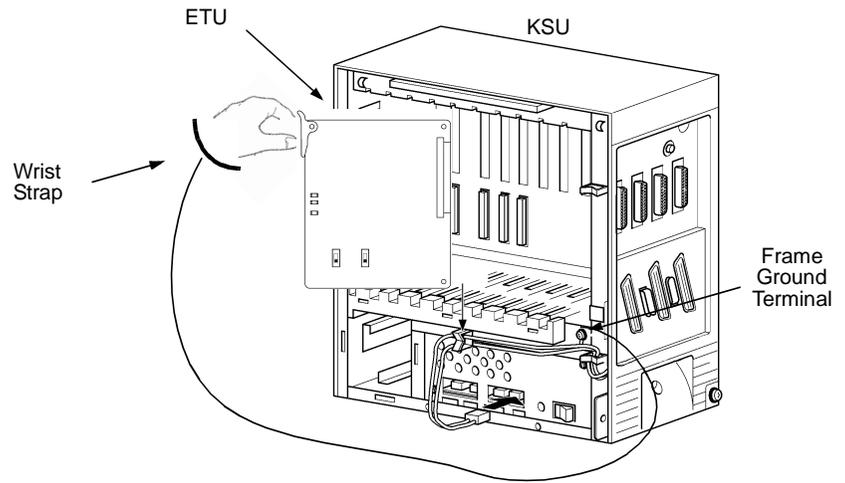


Figure 5-2 Inserting or Removing ETUs from the KSU

- ⓘ When holding an ETU, do not touch the components or the soldered surfaces with your bare hands. Place one hand under the bottom corner of the ETU and with the other hand hold the ejector tab (located in the top corner of the ETU).

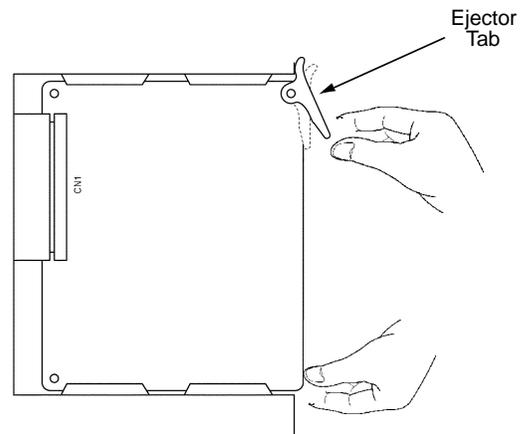


Figure 5-3 Handling an ETU

- ⚡ When setting switches on the ETU, wear a wrist strap and stand on a grounded conductive work surface to avoid static electricity.

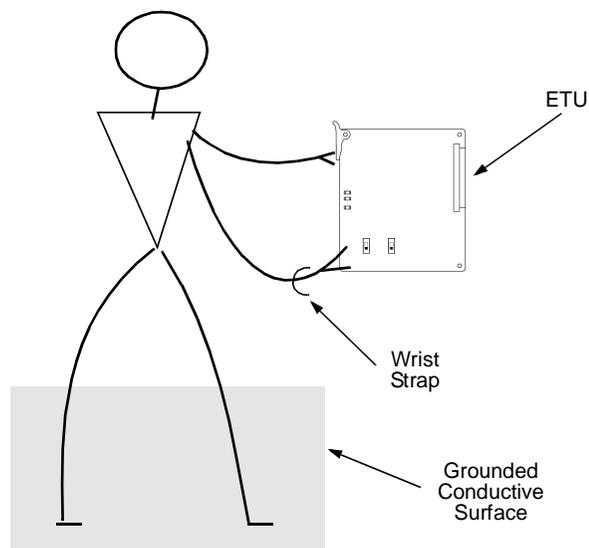


Figure 5-4 Safety Precautions when Setting Switches on an ETU

- ⚡ Do not touch the surface of the ETU. A small screw driver can be used to change the switch settings when the installer follows the recommended safety precautions.

2.2 Inserting an ETU into the KSU Slots

1. To unlock the ETUs slots, move the slide bar to the left.
2. Slide the ETU into the proper slot in the KSU.
3. After the ETU is pushed all the way to the back of the KSU, move the slide bar to the right to lock the ETU slots.

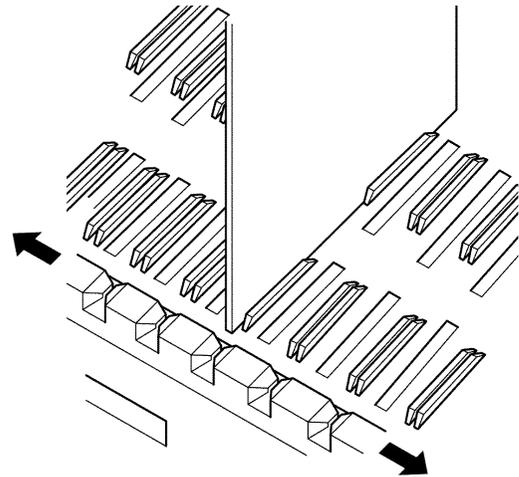


Figure 5-5 Sliding the ETU into the KSU Slot

2.3 Removing an ETU from the KSU

1. To unlock the ETUs, move the slide bar to the left.
2. Lift the ejector tab on the ETU and pull the ETU out of the slot.

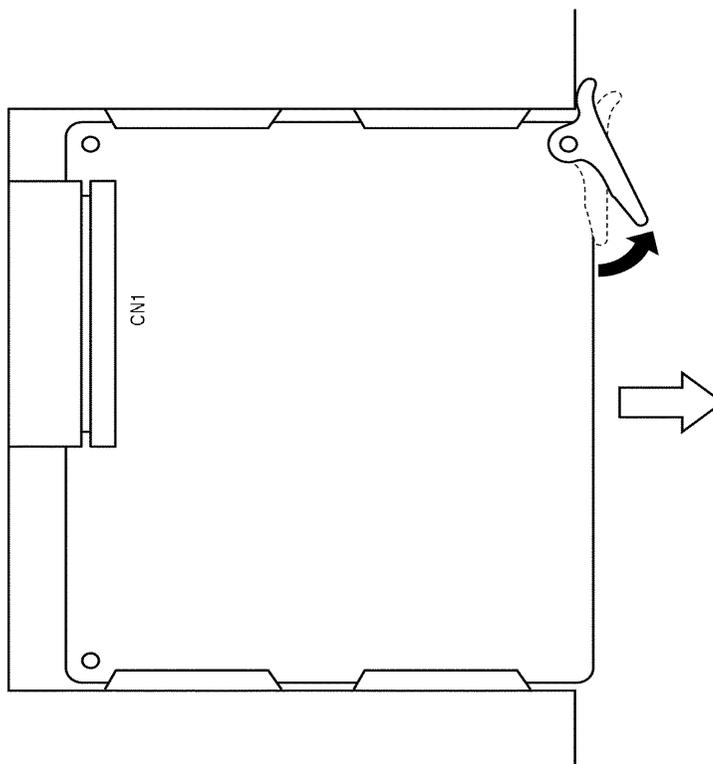


Figure 5-6 Lifting the Ejector Tabs on the ETU

3. To secure remaining ETUs, move slide bar to the right.

SECTION 3 COMMON CONTROL UNITS

The Electronic Telephone units described in this section control the common functions of the KSU.

3.1 CPUB()-U() ETU

3.1.1 Description

The CPUB()-U() ETU is the Central Processing Unit for the system. This ETU has a Central Processing Unit and a Microprocessing Unit and supports a maximum of 192 ports for the Electra Elite system.

A 32-bit microprocessor executes the programs stored on the Flash ROM ICs of the MPU unit. This controls the entire system when data is transferred to and from other ETUs.

This ETU provides the following items:

- ⌚ Time Division Switch (TDSW)
- ⌚ Static Random Access Memory (SRAM)
- ⌚ 32-bit Processor
- ⌚ 4-channel DTMF Receiver (PBR)
- ⌚ Sixteen 4-party Conference Circuits
- ⌚ Internal (digital music) Music-on-Hold source
- ⌚ External Music-on-Hold input (also used for station background music)
- ⌚ Flash ROM
- ⌚ Call Progress and DTMF Tone Generator
- ⌚ Memory Backup Battery (Retains memory for approximately 21 days)
- ⌚ Key Function (KF)/Multifunction (MF) Registration

3.1.2 Installation

Each system must have a CPUB()-U() ETU in the CPU/EXP slot of the basic B64-U10 KSU. Refer to [Figure 5-7 CPUB\(\)-U\(\) ETU](#).



When the CPUB()-U10 ETU is installed in slots S1~S8, it will be damaged!

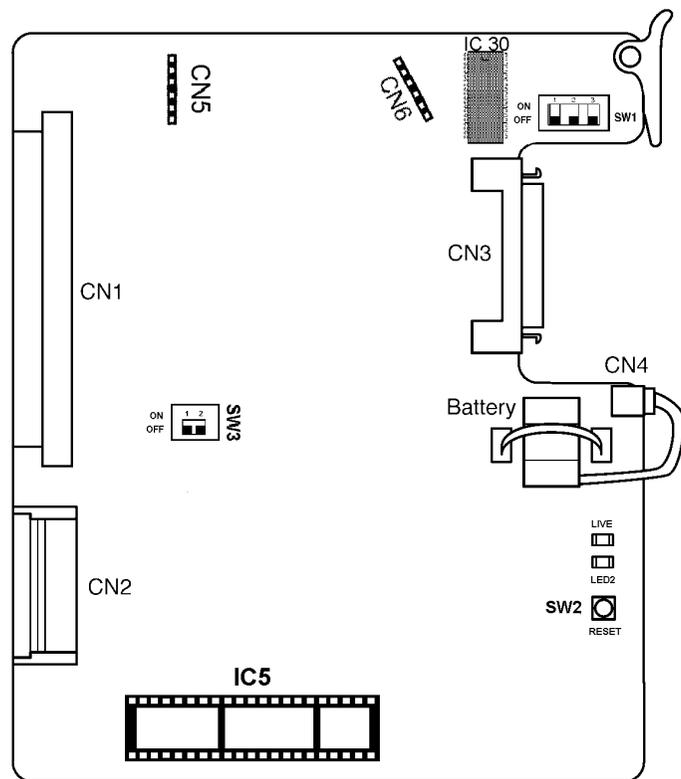


Figure 5-7 CPUB()-U() ETU

3.1.3 Switch Settings

Refer to [Table 5-1 CPUB\(\)-U\(\) ETU Default Switch Settings](#).

Table 5-1 CPUB()-U() ETU Default Switch Settings

SW1-1	SW1-2	Description
Off	Off	Normal Operation
On	Off	Flash ROM load from COM1 port
Off	On	Factory Test
On	On	Flash ROM load from EPROM

SW1-3	Description
Off	MF Mode
On	KF Mode

SW2	Description
Momentary Switch	System Reset

SW3-1	Description
On	System boot by EPROM
Off	System boot by Flash ROM

SW3-2	Description
N/A	Not Used



Pressing SW2 interrupts all service and causes a second initialization. Use this switch only as a last resort.

3.1.4 Connectors

Before programming System Data, the battery must be connected to **CN4** to allow memory retention if a power failure or brownout occurs. If a brownout or power failure does occur, and the battery backup circuit is not activated, System Data resets to the default values, all stations in the system reset to the default values, and all data programmed on individual stations is cleared.

When a CPUB()-U() ETU is installed in the system, the clock/calendar must be set. This also applies when battery backup fails for any reason.

When CPUB()-U() ETU is removed for long term storage, disconnect the battery from **CN4**. This prevents the battery from discharging completely. The fully charged battery retains memory for approximately 21 days.

The CPUB()-U() ETU has the following connectors:

- ④ CN1 Connects to the backboard
- ④ CN2 Connects to the ISA-bus
- ④ CN3 Connects to CN2 on the EXP-U10 ETU using the expansion cable
- ④ CN4 Connects to the memory backup battery using the battery cable (factory installed)
- ④ CN5 Connects to CN1 of the CLKG-U() Unit
- ④ CN6 Connects to CN2 of the CLKG-U() Unit

3.1.5 LED Indications

Table 5-2 CPUB()-U() ETU LED Indications

LED	Description	On	Flashing	Off
LIVE	CPU status	Operation stopped (Power On)	Normal Operation	No Power
LED2	Power status	System Power On	Not Used	System Power Off

3.1.6 Replacing Memory Backup Battery

The CPUB()-U() ETU provides memory backup for approximately 21 days. The Ni-Cad battery should be replaced about every two years.

1. Remove the battery cable from CPUB()-U() ETU CN4. Refer to [Figure 5-7 CPUB\(\)-U\(\) ETU](#).
2. Connect the cable from the new battery to CN4 on the CPUB()-U() ETU.
3. Turn off the KSU power.
4. Remove the CPUB()-U() ETU from the slot in the KSU.
5. Using a suitable cutting tool, cut the tie wrap and remove the old the battery.
6. Fasten the new battery with a tie wrap.
7. Install the CPUB()-U() ETU again.
8. Turn on the KSU power.

3.2 CLKG-U() Unit

3.2.1 Description

The CLKG-U() Unit provides clock synchronization for FT1 lines, ISDN-BRI lines, ISDN-PRI, and Wireless lines that are connected to the system.

This unit works with DTI-U(), BRT(4)-U(), PRT(1)-U() and BSU(2)-U() ETUs and is piggybacked on the CPUB()-U() ETU.

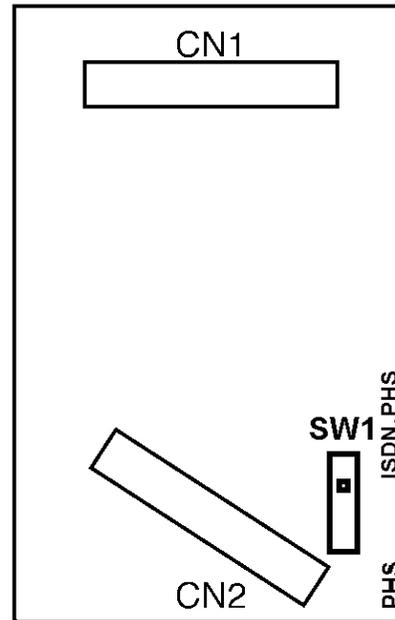


Figure 5-8 CLKG-U() Unit

3.2.2 Installation

Only one CLKG-U() Unit can be installed.

3.2.3 Connectors

The CLKG-U() Unit has two connectors:

- ① CN1 Connects to CN5 on the CPUB()-U() ETU
- ① CN2 Connects to CN6 on the CPUB()-U() ETU

3.2.4 Switch Settings

Leave SW1 set to **ISDN.PHS** when ISDN/T1 or ISDN/T1 and Wireless trunks are installed.

When only Wireless trunks are installed, set SW1 to **PHS**.

3.3 EXP-U() ETU

3.3.1 Description

The EXP-U() ETU is the Expansion KSU Controller. This ETU controls transmission between the CPUB()-U() ETU and the other ETUs installed in the expansion KSU if it is installed.

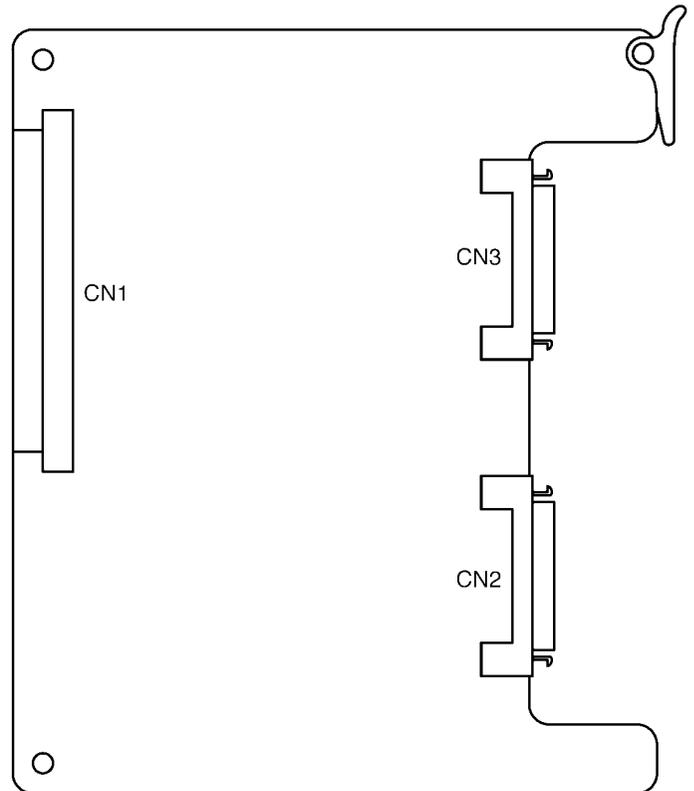


Figure 5-9 EXP-U10 ETU

3.3.2 Installation

Turn system power off, and install the EXP-U10 ETU in the CPU slot of the expansion KSU.

3.3.3 Connectors

The EXP-U10 ETU has three connectors:

- ① CN1 Connects to the backboard
 - ② CN2 Connected to CN3 on the CPUB()-U() ETU or CN3 on EXP-U10 ETU (installed in the first expansion cabinet) using an expansion cable
 - ③ CN3 Connected to the CN2 on the EXP-U10 ETU installed in the third expansion cabinet using the expansion cable
- ☞ Not used when the EXP-U10 ETU is installed in the last Expansion KSU.

3.4 KMA(1.0)U

3.4.1 Description

The KMA(1.0)U is a feature module that is installed on the MIFA-U() ETU to provide ACD with MIS.

3.4.2 Installation

Like all ICs, this unit has a notch on one side. Find the notch on the IC6 silkscreen, and align the KMA(1.0)U so the notches are on the same side before installing.

3.5 KMM(1.0)U

3.5.1 Description

The KMM(1.0)U is a feature module that is installed on the MIFM-U() ETU to provide LCR or Caller ID scrolling and dialing features.

3.5.2 Installation

Like all ICs, this unit has a notch on one side. Find the notch on the IC6 silkscreen, and align the KMM(1.0)U so that the notches are on the same side before installing.

3.6 MIFA-U() ETU

3.6.1 Description

The MIFA-U() provides additional memory and processing power to support UCD and ACD with MIS features. UCD is standard with this ETU, but the ACD with MIS requires a KMA(1.0)U to be installed on the MIFA-U() ETU.

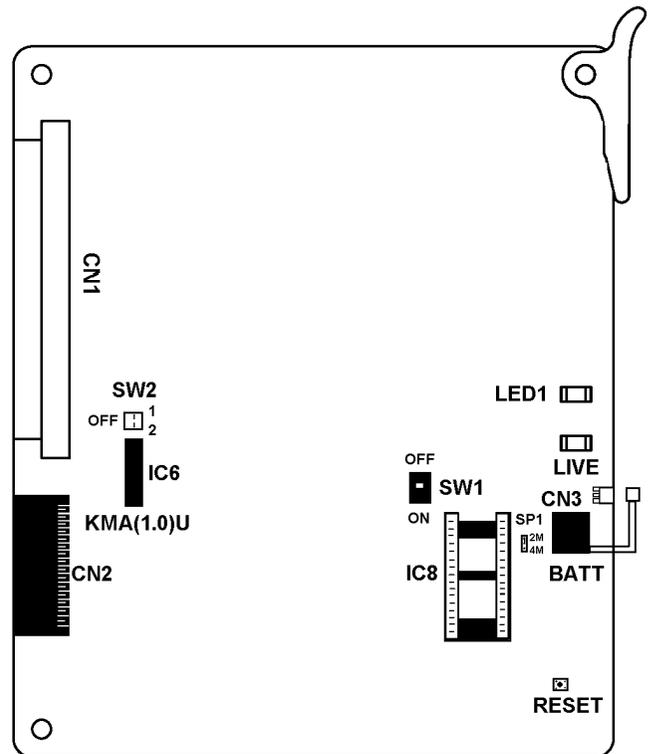


Figure 5-10 MIFA-U() ETU

3.6.2 Installation

Only one MIFA-U() can be installed in the system. When ACD MIS is used, the MIFA-U() must be installed in the ISA slot and have the KMA(1.0)U installed on it. The MIFA-U10 ETU can be installed in the first or second IF slot of the basic B-64 KSU if KMA(1.0)U is not installed.

3.6.3 Switch Settings

Refer to [Table 5-3 MIFA-U\(\) Default Switch Settings](#).

Table 5-3 MIFA-U() Default Switch Settings

SW2-1	SW2-2	Description
Off	Off	Normal Operation
On	Off	Factory Test
Off	On	Not Used
On	On	Flash ROM load from EPROM

SW1	Description
On	System boot by Flash ROM
Off	System boot by EPROM

3.6.4 LED Indications

Table 5-4 MIFA-U() LED Indications

LED	Description	On	Flashing	Off
LIVE	ETU status	Operation stopped (Power On)	Normal Operation	No Power
LED1	Programming status	Problem when loading Flash ROM or PC or LCR Programming connected	Loading Flash ROM from EPROM	Not Used

3.6.5 Connectors

The MIFA-U()ETU has four connectors:

- ① CN1 Connects to the backboard
- ① CN2 Connects to the backboard
- ① CN3 Used to connect the ETU backup battery during installation, and disconnect the battery when storing the ETU
- ① IC6 Socket for the optional KMA(1.0)U

The ACD MIS cable connects at the COM4, a standard female RS-232C DCE port, on the KSU that contains the MIFA-U() ETU. A straight RS-232C cable is required.

3.7 MIFM-U() ETU

3.7.1 Description

This ETU provides additional memory and processing power for PC Programming, Wireless activation, SMDR, LCR, and ANI/Caller ID. PC Programming/Wireless activation and SMDR are standard with this ETU. LCR and Caller ID scrolling and dialing require installation of the KMM(1.0)U on the MIFM-U() ETU.

When the MIFM-U() ETU is installed in an IF slot (as opposed to the ISA slot) the Modem Kit Unit can be mounted on the MIFM-U() ETU. This method is desirable because the Modem Kit Unit does not require external cabling analog ports.

The MIFM-U() can be installed in the ISA slot or the first or second IF slot in the basic B64 KSU.

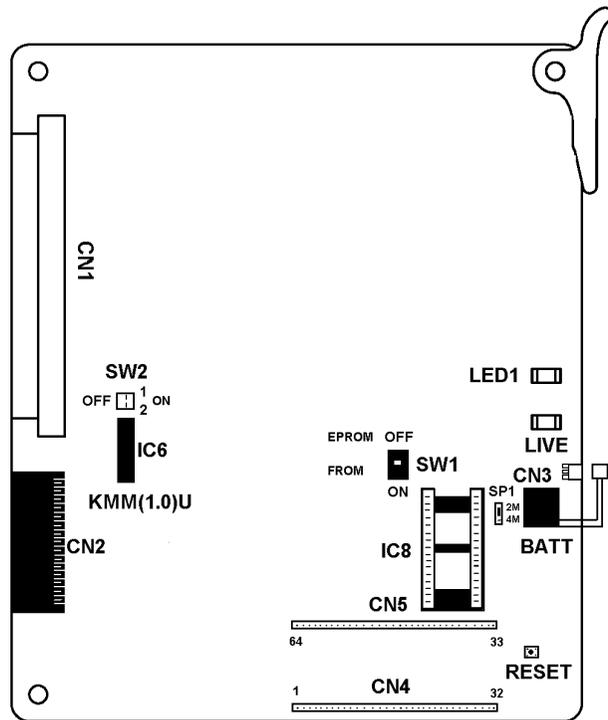


Figure 5-11 MIFM-U() ETU

3.7.2 Installation

Only one MIFM-U() ETU can be installed in the system.

3.7.3 Switch Settings

Refer to [Table 5-5 MIFM-U\(\) Default Switch Settings](#).

Table 5-5 MIFM-U() Default Switch Settings

SW2-1	SW2-2	Description
Off	Off	Normal Operation
On	Off	Factory Test
Off	On	Not Used
On	On	FROM (Flash ROM) load from EPROM (Erasable Programmable Read Only Memory)

SW1	Description
On	System boot by Flash ROM
Off	System boot by EPROM

3.7.4 LED Indications

Table 5-6 MIFM-U() LED Indications

LED	Description	On	Flashing	Off
LIVE	ETU status	Operation stopped (Power On)	Normal Operation	No Power
LED1	Programming status	Problem when loading Flash ROM or PC or LCR Programming connected	Loading Flash ROM from EPROM	Not Used

3.7.5 Connectors

The MIFM-U() ETU has six connectors:

- ① CN1 Connects to the Backboard
- ① CN2 Connects to the Backboard
- ① CN3 Used to connect the ETU backup battery during installation

 **Always disconnect the battery when storing the ETU.**

- ① CN4,5 Connectors for the optional Modem Kit Unit
- ① IC6 Socket for the optional KMM(1.0)U

SMDR and PC Programming connections are made (via COM ports) on the side of the KSU that contains the MIFM-U() ETU.

- ① COM1 PC/LCR/Wireless Programming
- ① COM2 SMDR

Both COM ports are standard female RS-232C DCE ports. A straight cable is required.

When an external modem is used, connect the modem to COM1 port via the modem cable adapter. A straight RS-232C cable is required.

3.8 Modem Kit Unit

3.8.1 Description

This optional modem mounts on the MIFM-U() ETU or PCT(S)-U() Unit and does not require analog port connection. The MIFM-U() must be installed in IF slot S1 or S2 of the Basic KSU for this on-board modem to work.

3.8.2 Installation

The Modem Kit Unit pins and the pins of the CN4 and CN5 socket are labeled. Align the Modem Kit Unit pins before installing the unit. Installing it backward could damage the Modem Kit Unit.

SECTION 4 TRUNK ETUS

The Electronic Telephone Units described in this section provides a link between trunks in the Electra Elite 192 system and outside equipment. All ETUs are installed in the interface slots of the KSU.

4.1 BRT(4)-U10 ETU

4.1.1 Description

The Basic Rate Trunk (BRT) Interface ETU terminates ISDN Basic Rate Trunk lines and supports four ISDN-BRI circuits. Each trunk supports two B channels. These eight B channels can be used for CO trunks with DTMF signaling. Tip and Ring electrical fuses are provided to comply with UL 1459 requirements.

This ETU uses an S/T-type interface. When connecting to a CO, a locally provided Network Termination unit (NT1) is required. Caller ID is supported.

One BRT ETU provides a maximum of four ISDN circuits that provide eight B channels to use as trunks.

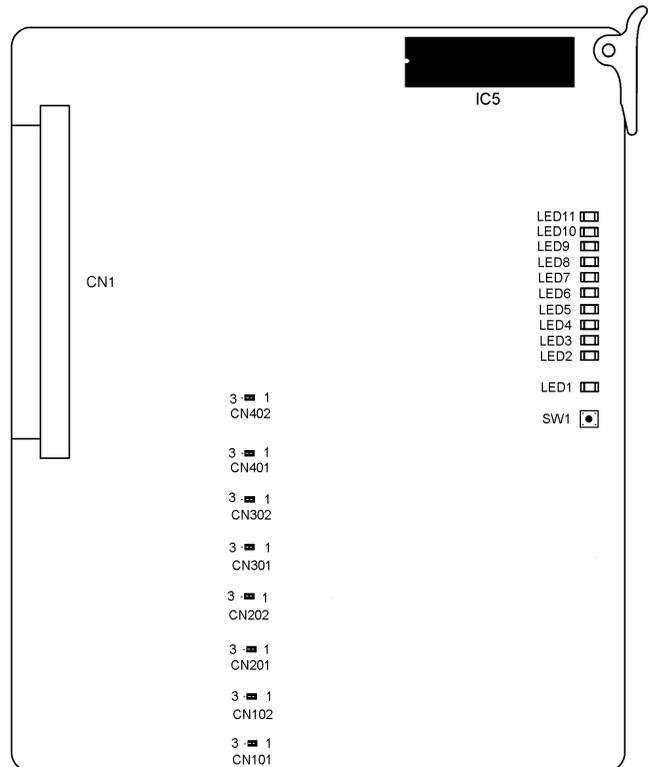


Figure 5-12 BRT(4)-U10 ETU

4.1.2 Installation

When a BRT(4)-U() ETU is installed, a CLKG-U() Unit must be installed on the CPUB()-U() ETU.

A maximum of 8 BRT(4)-U() ETUs can be installed in slots S1~S4 in the basic or first expansion KSU in the system (**S7000 or lower**).

Using S8000 or higher, a maximum of eight BRT(4)-U() ETUs can be installed in any interface slot in the system, limited by 64 trunks.

4.1.3 Switch Settings

SW1 is the reset switch.

4.1.4 Jumpers

CN101 and CN102

- ⓘ Set the 100 Ω termination to On or Off for Channel 1. Jumper Pins 1 and 2 are shorted together at the factory to turn on the 100 Ω terminal.

CN201 and CN202

- ⓘ Set the 100 Ω termination to On or Off for Channel 2. Jumper Pins 1 and 2 are shorted together at the factory to turn on the 100 Ω terminal.

CN301 and CN302

- ⓘ Set the 100 Ω termination to On or Off for Channel 3. Jumper Pins 1 and 2 are shorted together at the factory to turn on the 100 Ω terminal.

CN401 and CN402

- ⓘ Set the 100 Ω termination to On or Off for Channel 4. Jumper Pins 1 and 2 are shorted together at the factory to turn on the 100 Ω terminal.

4.1.5 LED Indications

Table 5-7 BRT(4)-U() ETU LED Indications

LED	Description	On	Flashing	Off
LED1	ETU status	Operation stopped (Power On)	Normal Operation	No Power
LED2	L1 status - BRI CKT1	L1 working	Not Used	L1 idle
LED3	L1 status - BRI CKT2	L1 working	Not Used	L1 idle
LED4	L1 status - BRI CKT3	L1 working	Not Used	L1 idle
LED5	L1 status - BRI CKT4	L1 working	Not Used	L1 idle
LED6	B1 or B2 status Channel 1	Busy	Not Used	Idle
LED7	B1 or B2 status Channel 1	Busy	Not Used	Idle
LED8	B1 or B2 status Channel 1	Busy	Not Used	Idle
LED9	B1 or B2 status Channel 1	Busy	Not Used	Idle
LED10	Communication or self-diagnostics	Communication error or Self-diagnostics in progress	Not Used	Normal
LED11	Communication or self-diagnostics	Communication error or Self-diagnostics in progress	Not Used	Normal

4.1.6 Connectors

The BRT ETU has one connector:

- ① CN1 Connects to the backboard

4.1.7 Connections

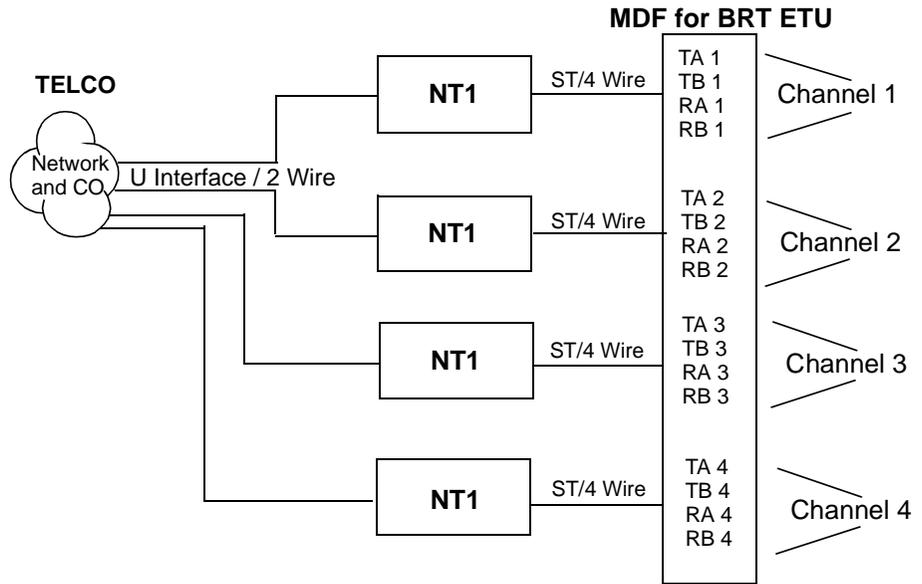


Figure 5-13 BRT(4)-U() ETU Connections

4.2 BRT(4)-U20 ETU

4.2.1 Description

The Basic Rate Trunk (BRT) Interface ETU terminates ISDN Basic Rate Trunk lines and supports four ISDN-BRI circuits. Each trunk supports two B channels. These eight B channels can be used for CO trunks with DTMF signaling.

This ETU uses an S/T-type interface. When connecting to a CO, a locally provided Network Termination unit (NT1) is required. Caller ID is supported.

One BRT ETU provides a maximum of four ISDN circuits that provide eight B channels to be used as trunks.

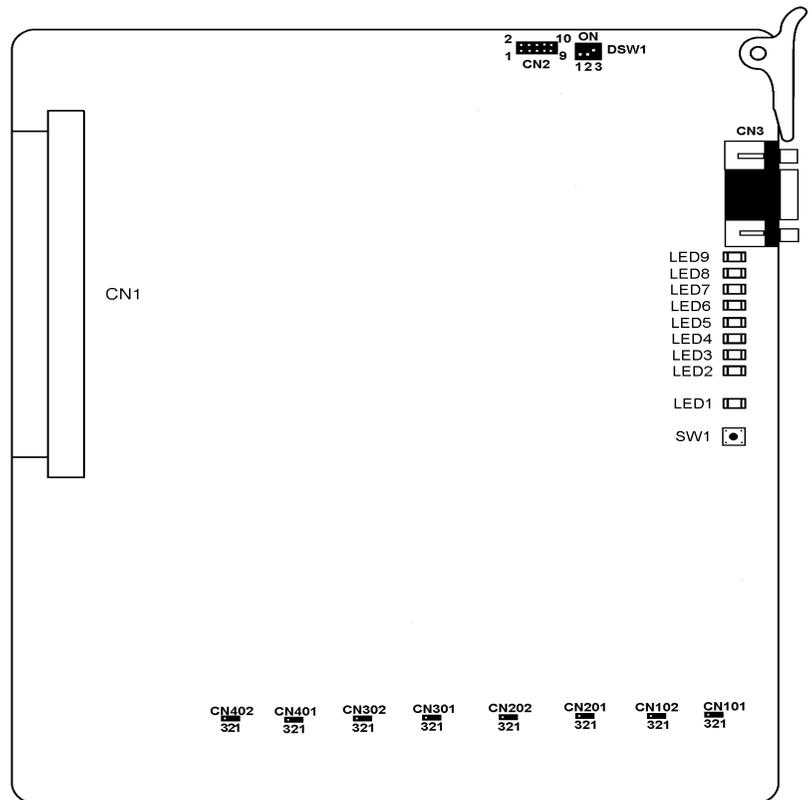


Figure 5-14 BRT(4)-U20 ETU

4.2.2 Installation

When a BRT(4)-U20 ETU is installed, a CLKG-U() Unit must be installed on the CPUB()-U() ETU.

A maximum of eight BRT(4)-U20 ETUs can be installed in any interface slot in the system. The system limitation is 64 trunks.

The maximum number of BRT(4)-U20 ETUs depends on other trunk cards installed. This ETU shares the total number of CO/PBX lines in the system.

4.2.3 Switch Settings

SW1 is the reset switch.

DSW1 is used for maintenance. Normal operation is all 3 Off.

4.2.4 Jumpers

CN101 and CN102

- Ⓒ Set the 100 Ω termination to On or Off for Circuit 1. Jumper Pins 1 and 2 are shorted together at the factory to turn on the 100 Ω terminal.

CN201 and CN202

- Ⓒ Set the 100 Ω termination to On or Off for Circuit 2. Jumper Pins 1 and 2 are shorted together at the factory to turn on the 100 Ω terminal.

CN301 and CN302

- Ⓒ Set the 100 Ω termination to On or Off for Circuit 3. Jumper Pins 1 and 2 are shorted together at the factory to turn on the 100 Ω terminal.

CN401 and CN402

- ⓘ Set the 100 Ω termination to On or Off for Circuit 4. Jumper Pins 1 and 2 are shorted together at the factory to turn on the 100 Ω terminal.

4.2.5 LED Indications

Refer to [Table 5-8 BRT\(4\)-U20 LED Indications](#).

Table 5-8 BRT(4)-U20 LED Indications

LED	Description	On	Flashing	Off
LED 1	ETU status	Operation stopped (Power On)	Normal Operation	No Power
LED 2	L1 status - BRI CKT1	L1 working	Not Used	L1 idle
LED 3	L1 status - BRI CKT2	L1 working	Not Used	L1 idle
LED 4	L1 status - BRI CKT3	L1 working	Not Used	L1 idle
LED 5	L1 status - BRI CKT4	L1 working	Not Used	L1 idle
LED 6	B1 or B2 status Circuit 1	Busy	Not Used	Idle
LED 7	B1 or B2 status Circuit 2	Busy	Not Used	Idle
LED 8	B1 or B2 status Circuit 3	Busy	Not Used	Idle
LED 9	B1 or B2 status Circuit 4	Busy	Not Used	Idle

4.2.6 Connectors

The BRT(4)-U20 ETU has the following connectors:

- ⓘ CN1
Connects to the backboard
- ⓘ CN3
DB9 Pin Male connector used for maintenance

4.2.7 Connections

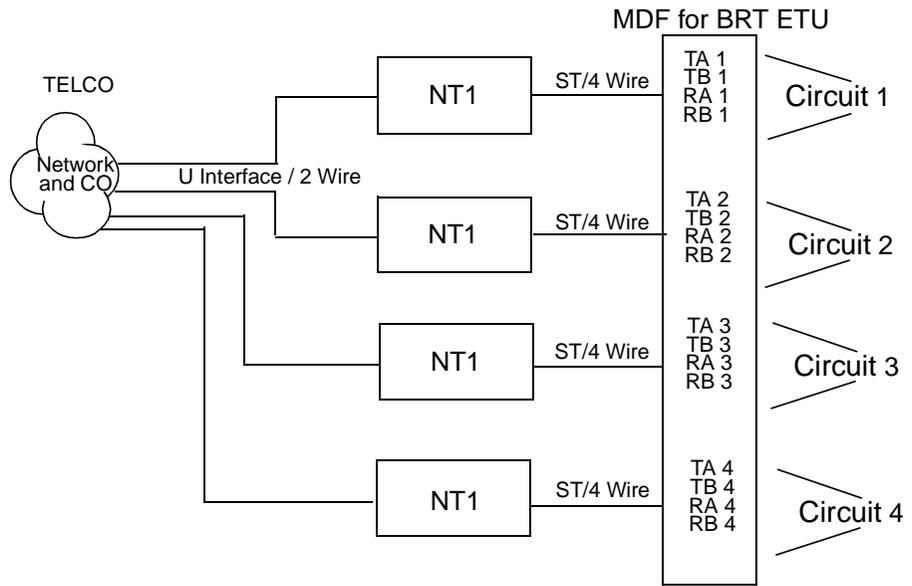


Figure 5-15 BRT(4)-U20 Connections

4.3 COI(4)/(8)-U() ETU

4.3.1 Description

The COI(4)/(8)-U() ETU provides the Central Office interface. The COI ETU contains circuitry for outside ring detection, holding, dialing, and control functions.

This ETU can provide a CAMA trunk for Enhanced E911.

The COI(8)-U() ETU provides identical circuits to serve up to eight CO trunks that can be any combination of Loop Start or Ground Start with DTMF signaling. The COI(4)-U() is for Loop Start trunks with DTMF signaling only. ETU Tip and Ring electrical fuses are provided to comply with UL 1459 requirements. Refer to [Figure 5-16 COI\(8\)-U\(\) ETU](#).

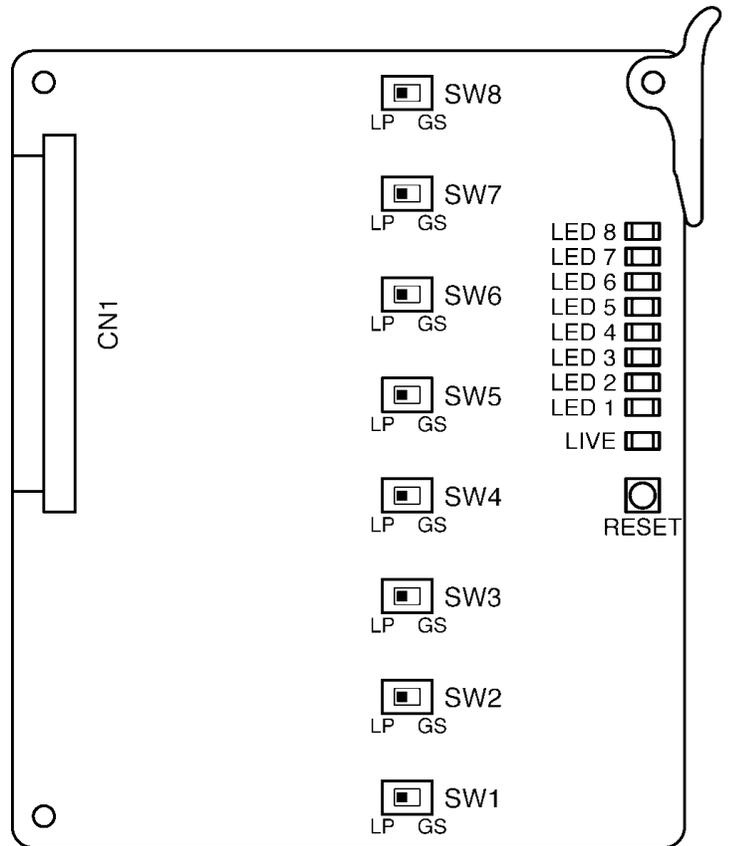


Figure 5-16 COI(8)-U() ETU

4.3.2 Installation

A maximum of 16/8 COI(4)/(8)-U() ETUs can be installed in any IF slot in the system, limited by 64 trunks.

4.3.3 Switch Settings

Refer to [Table 5-9 COI\(4\)/\(8\)-U\(\) ETU Default Switch Settings](#).

Table 5-9 COI(4)/(8)-U() ETU Default Switch Settings

Switch	Setting	Description
SW1~8	Set according to the line type. Default Setting: LP	Switches between Loop Start (LP) or Ground Start (GS) Trunks on Lines 1~8 of COI(8)-U() ETU.
SW1~4	LP only	Always LP for COI(4)-U() ETU
Reset	N/A	Resets the COI ETU

4.3.4 LED Indications

Table 5-10 COI(4)/(8)-U() ETU LED Indications

LED	Description	On	Flashing	Off
LIVE	ETU status	Operation stopped (Power On)	Normal Operation	No Power
LED 1	Line 1 status COI(4)/COI(8)	Busy	Not Used	Idle
LED 2	Line 2 status COI(4)/COI(8)	Busy	Not Used	Idle
LED 3	Line 3 status COI(4)/COI(8)	Busy	Not Used	Idle
LED 4	Line 4 status COI(4)/COI(8)	Busy	Not Used	Idle
LED 5	Line 5 status COI(8)	Busy	Not Used	Idle
LED 6	Line 6 status COI(8)	Busy	Not Used	Idle
LED 7	Line 7 status COI(8)	Busy	Not Used	Idle
LED 8	Line 8 status COI(8)	Busy	Not Used	Idle

4.3.5 Connectors

The COI(4)/(8)-U() ETU has one connector:

- Ⓢ CN1 Connects to the backboard

4.3.6 Connections

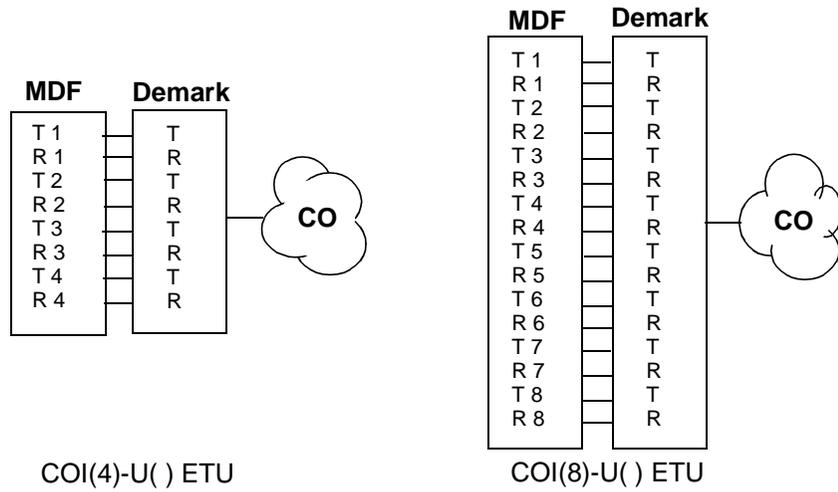


Figure 5-17 COI(4)/(8)-U() ETU Connections

4.4 COIB(4)-U10 ETU

4.4.1 Description

This ETU can function the same as the COI(4)-U() or COID(4)-U() ETU to provide Central Office Interface. When the ETU is set for COID mode, Loop Start trunks and/or Caller ID trunks are supported. When the ETU is set for COI mode, Loop Start or Ground Start is supported. Caller ID is **not** supported in the COI mode. Connections for Ground Start Trunks are polarity sensitive.

This ETU contains circuitry for outside ring detection, holding, dialing, and control functions. It can also provide a CAMA trunk for E911.

When functioning as a COI(4)-U() or COID(4)-U() ETU only DTMF signaling is supported. Tip and Ring electrical fuses are provided to comply with UL 1459 requirements. Refer to [Figure 5-18 COIB\(4\)-U10 ETU](#).

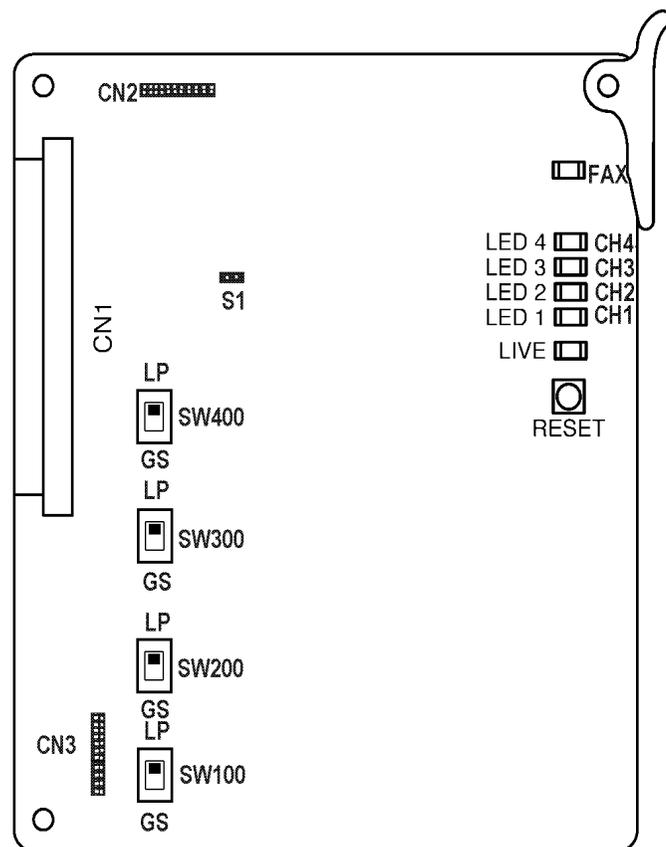


Figure 5-18 COIB(4)-U10 ETU

4.4.2 Installation

In COI mode, a maximum of 16 COIB(4)-U() ETUs can be installed in any IF slot in the system limited by 64 trunks. When used for Caller ID trunks in COID mode it must be installed in slots S1~S4 in the basic and first expansion B64-U10 KSUs (**\$7000 or lower**).

Using \$8000 or higher, a maximum of 14 COIB(4)-U() ETUs can be installed in any interface slot in the system, limited by 64 trunks.

4.4.3 Switch Settings

Refer to [Table 5-11 COIB\(4\)-U\(\) ETU Default Switch Settings](#).

Table 5-11 COIB(4)-U() ETU Default Switch Settings

Switch	Setting	Description
SW100 ~400	Set for line type. Default Setting: LP	Switches between Loop Start (LP) or Ground Start (GS) Trunks.
S1	Open for COI Shorted (default) for COID	Selects the function for COIB(4)-U() ETU between COI or COID mode
Reset	N/A	Resets the COIB(4)-U() ETU

4.4.4 LED Indications

Table 5-12 COIB(4)-U10 ETU LED Indications

LED	Description	On	Flashing	Off
LIVE	ETU status	Operation stopped (Power On)	Normal Operation	No Power
LED 1/CH1	Channel 1 status	Busy	Not Used	Idle
LED 2/CH2	Channel 2 status	Busy	Not Used	Idle
LED 3/CH3	Channel 3 status	Busy	Not Used	Idle
LED 4/CH4	Channel 4 status	Busy	Not Used	Idle
FAX	FAX status)	Busy	Not Used	Idle

☛ Switch SW400 must be set to Loop Start for FAX CO function to work.

4.4.5 Connectors

The COIB(4)-U() ETU has the following connectors:

- Ⓛ CN1 Connects to the backboard
- Ⓛ CN2 Future
- Ⓛ CN3 Future

4.4.6 Connections

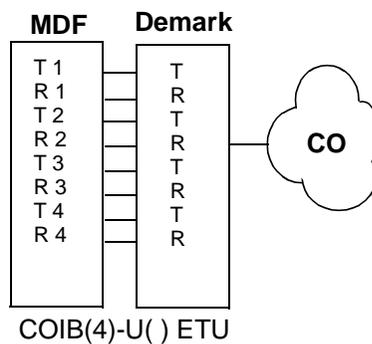


Figure 5-19 COIB(4)-U10 Connections

4.5 COIB(4)-U20/U30 ETU

4.5.1 Description

This ETU can function the same as the COI(4)-U() or COID(4)-U() ETU to provide Central Office Interface. Transmit and receive pad controls have been added to the COIB(4)-U20 ETU. Only the COIB(4)-U30 ETU can support the CO Message Waiting Indication Feature **(S9500). Ground Start trunks are not supported.** When the ETU is set for COID mode, Loop Start trunks and Caller ID trunks are supported. Caller ID does not work in the COI mode. Fax CO Branch support is provided on the COIB(4)-U20 port 4 only.

This ETU contains circuitry for outside ring detection, holding, dialing, and control functions.

This ETU can provide a CAMA trunk for E911.

CAMA trunk support is provided on COIB(4)-U20 port 3.

When functioning as a COI(4)-U() or COID(4)-U() ETU only DTMF signaling is supported. Tip and Ring electrical fuses are provided to comply with UL 1459 requirements. Refer to [Figure 5-20 COIB\(4\)-U20/U30 ETU](#).

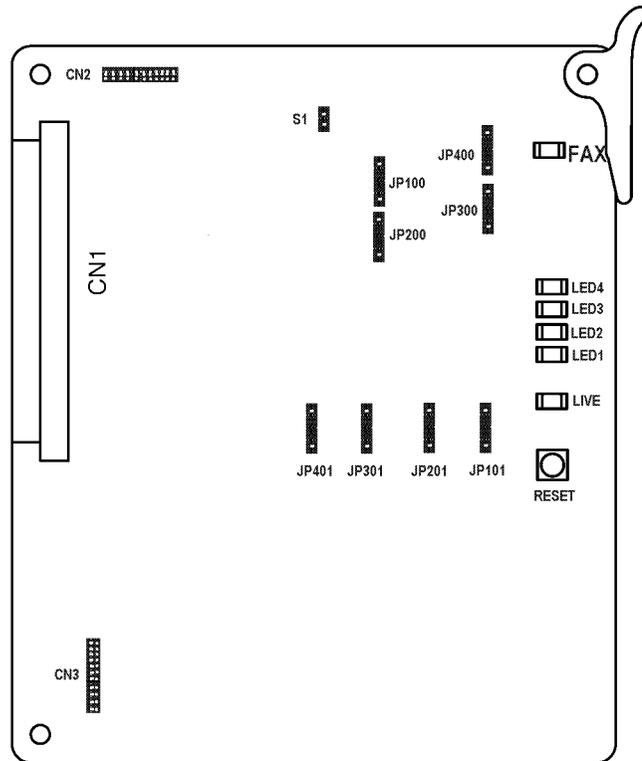


Figure 5-20 COIB(4)-U20/U30 ETU

4.5.2 Installation

In COI mode, a maximum of 16 COIB(4)-U20/30 ETUs can be installed in IF slots in the Electra Elite 192 system limited by 64 trunks.

For Caller ID in COID mode, a maximum of eight COIB(4)-U20 ETUs can be installed in slots S1~S4 in the basic or first expansion KSU (**\$7000 or lower**).

Using \$8000 or higher, a maximum of 14 COIB(4)-U20/30 ETUs can be installed in any interface slot in the system, limited by 64 trunks.

4.5.3 Switch Settings

Refer to [Table 5-13 COIB\(4\)-U20/30 ETU Default Switch/Jumper Settings](#).

Table 5-13 COIB(4)-U20/30 ETU Default Switch/Jumper Settings

Switch/Jumper	Setting	Description
JP100~400	Jumpers 1-2 shorted 6dB increase Jumpers 2-3 shorted (default) No Gain Jumpers 3-4 shorted 6dB decrease	Receive pad for related channel.
JP101~401	Jumpers 1-2 shorted 6dB increase Jumpers 2-3 shorted (default) No Gain Jumpers 3-4 shorted 6dB decrease	Transmit pad for related channel.
S1	Open for COI Shorted (default) for COID	Selects the function for COIB(4)-U20 ETU between COI or COID mode
Reset	N/A	Resets the COIB(4)-U20 ETU

4.5.4 LED Indications

Table 5-14 COIB(4)-U20/U30 ETU LED Indications

LED	Description	On	Flashing	Off
LIVE	ETU status	Operation stopped (Power On)	Normal Operation	No Power
LED 1	Channel 1 status	Busy	Not Used	Idle
LED 2	Channel 2 status	Busy	Not Used	Idle
LED 3	Channel 3 status	Busy	Not Used	Idle
LED 4	Channel 4 status	Busy	Not Used	Idle
FAX	FAX status	Busy	Not Used	Idle

4.5.5 Connectors

The COIB(4)-U20/30 ETU has the following connectors:

- Ⓢ CN1 Connects to the backboard
- Ⓢ CN2 Future
- Ⓢ CN3 Future

4.5.6 Connections

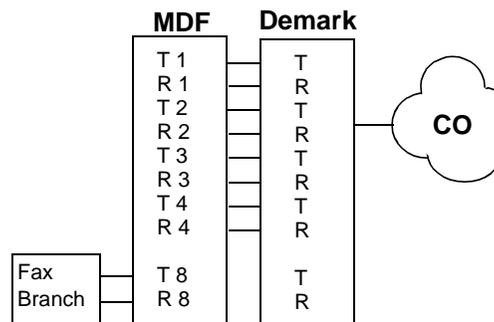


Figure 5-21 COIB(4)-U20/U30 ETU Connections

4.5.7 ETU Feature Chart

ETU	Caller ID (See Note)	CO Message Waiting indicate	Pad Control	Loop Start	Ground Start	Fax Branch	CAMA Trunk
COI(4)-U()				X		X	X
COI(8)-U()				X	X		X
COID(4)-U()	X			X		X	X
COID(8)-U()	X			X			X
COIB(4)-U()	X			X	X	X	X
COIB(4)-U20	X		X	X		X	X
COIB(4)-U30	X	X	X	X		X	X
COIB(8)-U()	X		X	X			X
COIB(8)-U30	X	X	X	X			X

- ☞ Caller ID is not supported for Ground Start trunks.
- ☞ CAMA trunk support is provided on COIB(4)-U20/U30 port 3. Other ETUs listed, except COIB(8)-U() ETU, support CAMA trunks on all ports.

4.6 COIB(8)-U20/U30 ETU

4.6.1 Description

This ETU can function the same as the COI(8)-U() or COID(8)-U() ETU to provide Central Office Interface. Only the COIB(8)-U20/U30 ETU can support the CO Message Waiting Indication Feature. Transmit and receive pad controls have been added to the COIB(8)-U20/U30 ETU (**S9500**). **Ground Start trunks are not supported.** When the ETU is set for COID mode, Loop Start trunks and Caller ID trunks are supported. Caller ID does not work in the COI mode.

This ETU contains circuitry for outside ring detection, holding, dialing, and control functions.

This ETU can provide a CAMA trunk for E911.

CAMA trunk support is provided on COIB(8)-U() ports 3 and 7 only.

When functioning as a COI(8)-U() or COID(8)-U() ETU only DTMF signaling is supported. Tip and Ring electrical fuses are provided to comply with UL 1459 requirements. Refer to [Figure 5-22 COIB\(8\)-U20/U30 ETU](#).

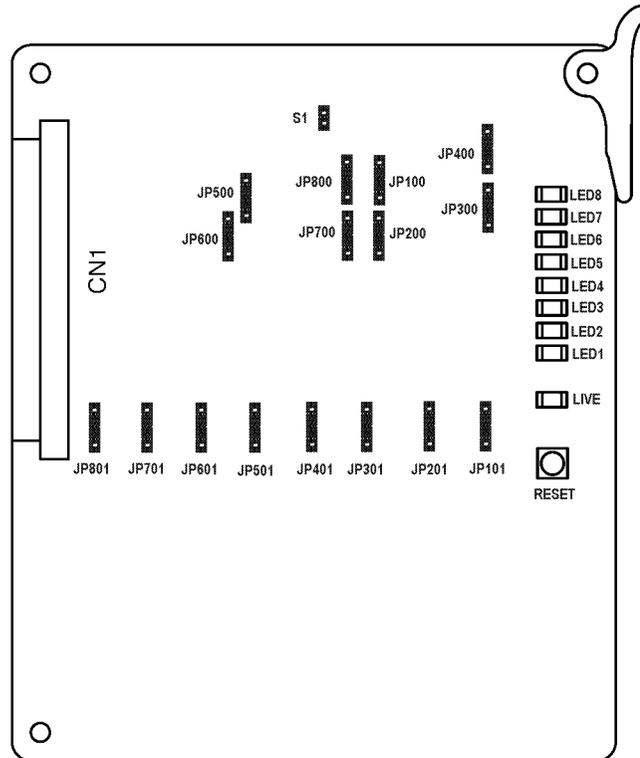


Figure 5-22 COIB(8)-U20/U30 ETU

4.6.2 Installation

In COI mode, a maximum of eight COIB(8)-U20/U30 ETUs can be installed in IF slots in the Electra Elite 192 system limited by 64 trunks.

For Caller ID In COID mode, eight COIB(8)-U20/U30 ETUs can be installed in slots S1~S4 in the basic or first expansion KSU (**\$7000 or lower**).

Using \$8000 or higher, a total of eight COIB(8)-U20/U30 ETUs can be installed in any interface slot in the system, limited by 64 trunks.

4.6.3 Switch Settings

Refer to [Table 5-15 COIB\(8\)-U20/U30 ETU Default Switch/Jumper Settings](#).

Table 5-15 COIB(8)-U20/U30 ETU Default Switch/Jumper Settings

Switch/Jumper	Setting	Description
JP100~800	Jumpers 1-2 shorted 6dB increase Jumpers 2-3 shorted (default) No Gain Jumpers 3-4 shorted 6dB decrease	Receive pad for related channel
JP101~801	Jumpers 1-2 shorted 6dB increase Jumpers 2-3 shorted (default) No Gain Jumpers 3-4 shorted 6dB decrease	Transmit pad for related channel
S1	Open for COI Shorted (default) for COID	Selects the function for the COIB(8)-U20/U30 ETU between COI or COID mode
Reset	N/A	Resets the COIB(8)-U20/U30 ETU

4.6.4 LED Indications

Table 5-16 COIB(8)-U20/U30 ETU LED Indications

LED	Description	On	Flashing	Off
LIVE	ETU status	Operation stopped (Power On)	Normal Operation	No Power
LED 1	Channel 1 status	Busy	Not Used	Idle
LED 2	Channel 2 status	Busy	Not Used	Idle
LED 3	Channel 3 status	Busy	Not Used	Idle
LED 4	Channel 4 status	Busy	Not Used	Idle
LED 5	Channel 5 status	Busy	Not Used	Idle
LED 6	Channel 6 status	Busy	Not Used	Idle
LED 7	Channel 7 status	Busy	Not Used	Idle
LED 8	Channel 8 status	Busy	Not Used	Idle

4.6.5 Connectors

The COIB(8)-U20/U30 has the following connector:

- ① CN1 Connects to the backboard

4.6.6 Connections

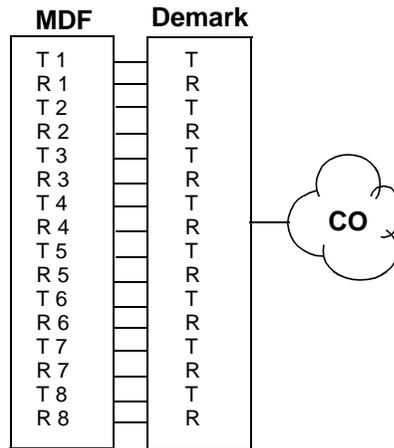


Figure 5-23 COIB(8)-U20/U30 ETU Connections

4.6.7 ETU Feature Chart

ETU	Caller ID See Note	CO Message Waiting indicate	Pad Control	Loop Start	Ground Start	Fax Branch	CAMA Trunk
COI(4)-U()				X		X	X
COI(8)-U()				X	X		X
COID(4)-U()	X			X		X	X
COID(8)-U()	X			X			X
COIB(4)-U()	X			X	X	X	X
COIB(4)-U20	X		X	X		X	X
COIB(4)-U30	X	X	X	X		X	X
COIB(8)-U()	X		X	X			X
COIB(8)-U30	X	X	X	X			X

☞ Caller ID is not supported for Ground Start trunks.

☞ CAMA trunk support is provided on COIB(4)-U20/U30 port 3. Other ETUs listed, except COIB(8)-U20/U30) ETU, support CAMA trunks on all ports.

4.7 COID(4)/(8)-U() ETU

4.7.1 Description

The COID(4)/(8)-U() ETU is the Central Office interface for Caller ID Detection. This ETU provides circuitry for outside ring detection, hold, dialing, Caller ID detection, and control functions.

This ETU can provide a CAMA trunk for Enhanced 911.

The COID(4)/(8)-U() ETU provides four/eight trunks that are Loop Start with DTMF signaling only. Tip and Ring electrical fuses are provided to comply with UL 1459 requirements.

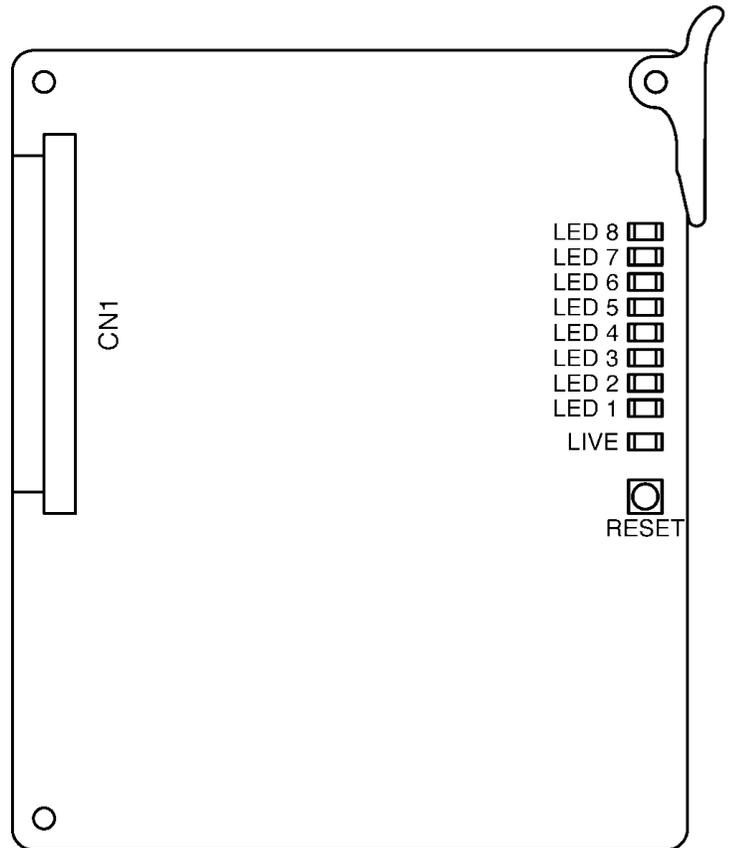


Figure 5-24 COID(8)-U() ETU

4.7.2 Installation

A maximum of 8 COID(4)/(8)-U() ETUs can be installed in slots S1~S4 in the basic and first expansion B64-U10 KSUs (**\$7000 or lower**).

Using \$8000 or higher, 14 COID(4)-U() or eight COID(8)-U() ETUs can be installed in any interface slot in the system, limited by 64 trunks.

4.7.3 Switch Settings

The **RESET** switch resets the unit.

4.7.4 LED Indications

Table 5-17 COID(4)/(8)-U() ETU LED Indications

LED	Description	On	Flashing	Off
LIVE	ETU status	Operation stopped (Power On)	Normal Operation	No Power
LED 1	Line 1 status COID(4)/COID(8)	Busy	Not Used	Idle
LED 2	Line 2 status COID(4)/COID(8)	Busy	Not Used	Idle
LED 3	Line 3 status COID(4)/COID(8)	Busy	Not Used	Idle
LED 4	Line 4 status COID(4)/COID(8)	Busy	Not Used	Idle
LED 5	Line 5 status COID(8)	Busy	Not Used	Idle
LED 6	Line 6 status COID(8)	Busy	Not Used	Idle
LED 7	Line 7 status COID(8)	Busy	Not Used	Idle
LED 8	Line 8 status COID(8)	Busy	Not Used	Idle

4.7.5 Connectors

The COID()-U() has one connector:

- ① CN1 Connects to the backboard

4.7.6 Connections

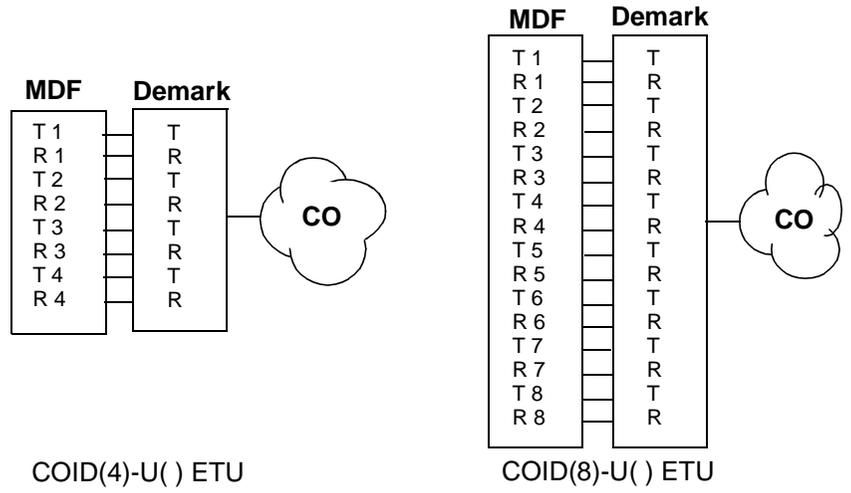


Figure 5-25 COID(4)/(8)-U() ETU Connections

4.8 DID(4)-U() ETU

4.8.1 Description

The DID(4)-U() ETU is the interface for Direct Inward Dialing lines and 2-way DID lines. This ETU provides a maximum of four DID lines. Wink start, delay start, immediate start, and second Dial Tone are accommodated with this ETU. Dial Pulse and DTMF are also supported. There are four built-in DTMF signal detectors. Tip and Ring electrical fuses are provided to comply with UL 1459 requirements.

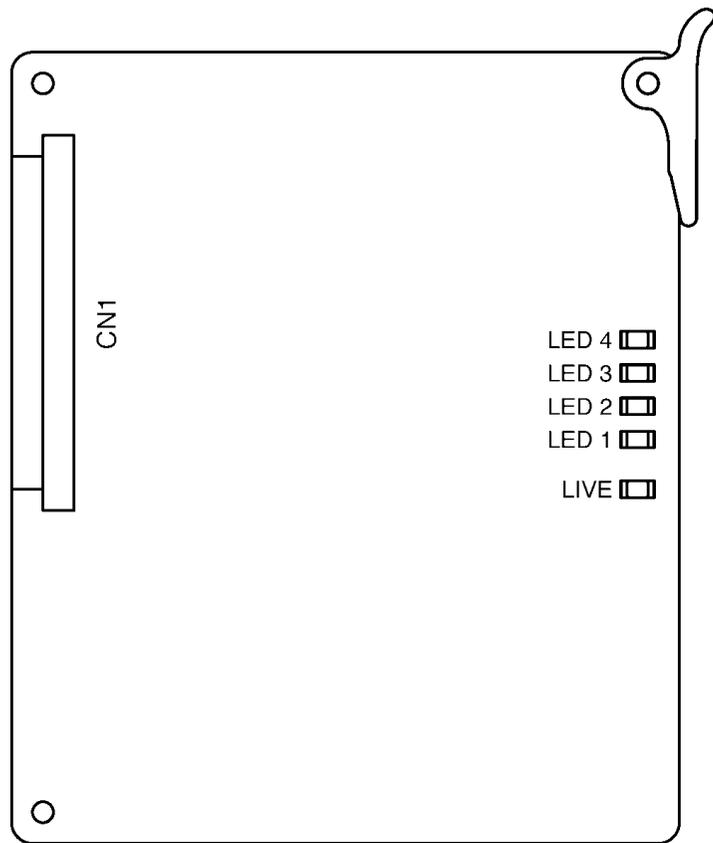


Figure 5-26 DID(4)-U() ETU

4.8.2 Installation

A maximum of 16 DID(4)-U() ETUs can be installed in slots S1~S8 in any system KSU.

4.8.3 LED Indication

Table 5-18 DID(4)-U() ETU LED Indications

LED	Description	On	Flashing	Off
LIVE	ETU status	Operation stopped (Power On)	Normal Operation	No Power
LED 1	Line 1 status	Busy	Not Used	Idle
LED 2	Line 2 status	Busy	Not Used	Idle
LED 3	Line 3 status	Busy	Not Used	Idle
LED 4	Line 4 status	Busy	Not Used	Idle

4.8.4 Connectors

The DID(4)-U() ETU has one connector:

- ① CN1 Connects to the backboard.

4.8.5 Connections

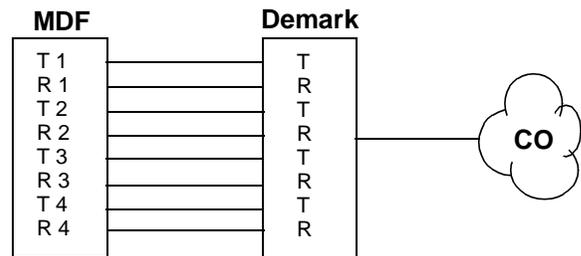


Figure 5-27 DID(4)-U10 ETU Connections

4.9 DTI-U() ETU

4.9.1 Description

The DTI-U() ETU is a Digital Trunk Interface that provides for the termination of FT1 trunks (up to 24 DS-0 channels) that support K-CCIS and Automatic Number Indication (ANI) on T1.

A combination of Loop Start and Ground Start signaling can be used on the DTI-U() ETU. DTMF, Dial Pulse dialing, Tie line (E&M), and DID are supported. The DTI-U() ETU has 24 built-in DTMF detectors. Tip and Ring electrical fuses are provided to comply with UL 1459 requirements.

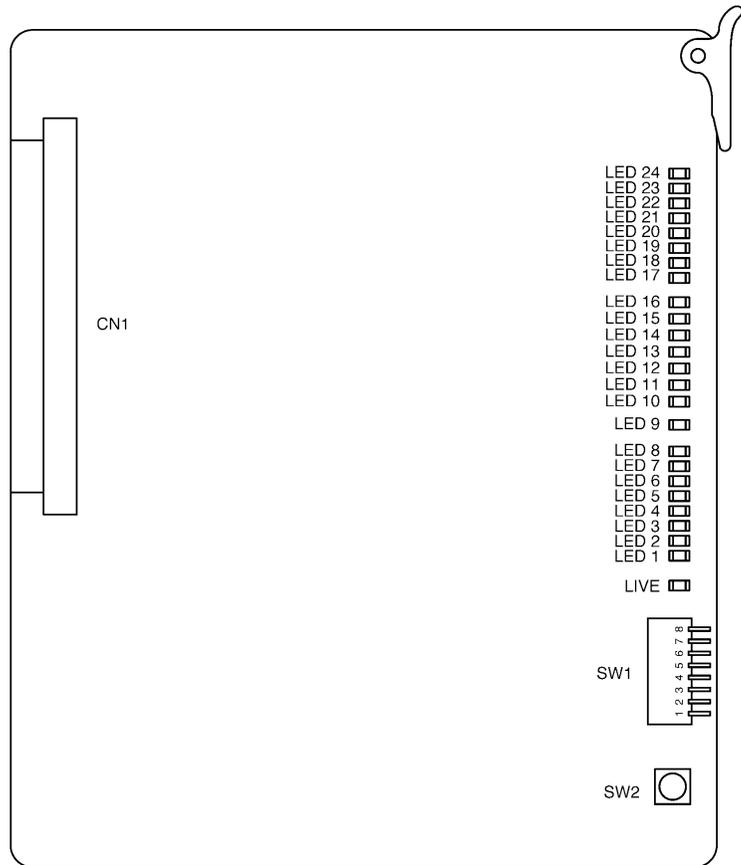


Figure 5-28 DTI-U() ETU

When channels are assigned to ANI, the DTI-U10 supports Feature Group D incoming only signaling using **System Software S3000**. The DTI-U20 supports Feature Group D incoming MF/outgoing DTMF signaling using **System Software S4500** or higher.

Only the DTI-U30 can support the K-CCIS feature with point-to-point E&M Tie lines. System Software S7000 or higher is required.

4.9.2 Installation

When a DTI-U() ETU is installed, a CLKG-U() Unit must be installed on the CPUB()-U() Unit.

A maximum of three DTI-U() ETUs can be installed in Slot S1 or S4 in the B64-U10 KSU or Slot S1 of the first expansion KSU in the system (**S7000 or lower**).

Using S8000 or higher, a maximum of eight DTI-U() ETUs can be installed in any interface slot in the system, limited by 64 trunks.

4.9.3 Switch Settings

Refer to [Table 5-19 DTI-U\(\) ETU Default Switch Settings](#).

Table 5-19 DTI-U() ETU Default Switch Settings

Switch	Setting	Description
SW1-1	On: Indicates channel alarm or loopback status. Off: Indicates channel is busy or idle (Default)	Used to assign LED Indications
SW1-2	On: Loopback on Off: Loopback off (Default)	Switches Loopback on and off
SW1-3	On: DTE Software Loopback in the DTI ETU Off: Line Loopback to CO (Default)	Sets Loopback This switch is active only when SW1-2 is On.
SW1-4	On: Test Mode Off: Normal Operation (Default)	Switches between normal operation and test mode
SW1-5	N/A	N/A
SW1-6	N/A	N/A
SW2	N/A	Resets the DTI ETU

4.9.4 LED Indications

Table 5-20 DTI-U() ETU LED Indications

LED	Description	On	Flashing	Off
LIVE	ETU status	Operation stopped (Power On)	Normal Operation	No Power
LED	Channel Status	On Switch SW1-1 Off	On Switch SW1-1 On	Off
LED 1	Channel 1	Busy	LSA Alarm	Idle
LED 2	Channel 2	Busy	AIS Alarm	Idle
LED 3	Channel 3	Busy	OOF Alarm	Idle
LED 4	Channel 4	Busy	RAI Alarm	Idle
LED 5	Channel 5	Busy	CRC Alarm	Idle
LED 6	Channel 6	Busy	BPV Alarm	Idle
LED 7	Channel 7	Busy	SLIP Alarm	Idle
LED 8	Channel 8	Busy	N/A	Idle
LED 9	Channel 9	Busy	TSC Alarm	Idle
LED 10	Channel 10	Busy	ESA Alarm	Idle
LED 11	Channel 11	Busy	LOS Alarm	Idle
LED 12	Channel 12	Busy	N/A	Idle
LED 13	Channel 13	Busy	N/A	Idle
LED 14	Channel 14	Busy	N/A	Idle
LED 15	Channel 15	Busy	N/A	Idle
LED 16	Channel 16	Busy	N/A	Idle
LED 17	Channel 17	Busy	Line Loopback On	Idle
LED 18	Channel 18	Busy	DTE Loopback On	Idle
LED 19	Channel 19	Busy	N/A	Idle
LED 20	Channel 20	Busy	N/A	Idle
LED 21	Channel 21	Busy	N/A	Idle
LED 22	Channel 22	Busy	N/A	Idle
LED 23	Channel 23	Busy	N/A	Idle
LED 24	Channel 24	Busy	N/A	Idle

4.9.5 Alarm Conditions

A brief description of each alarm condition is given below.

⌚ Alarm Indication Signal (AIS) Detection

On red when the system is receiving an Alarm Indication Signal from an FT1 trunk.

⌚ Controlled Slip Event Detection (SLIP)

On red when the timing difference between a synchronous receiving terminal and the received signal exceeds the buffering ability of the terminal.

⌚ Cyclic Redundancy Check (CRC) Error Event Detection

On red when a CRC Error occurs.

⌚ Excessive Bipolar Violation (BPV) Detection

On red when excessive BPV is detected.

⌚ Line Synchronization Alarm (LSA) Detection

On red when an FT1 trunk loses frame synchronization.

⌚ Out-of-Frame (OOF) Condition Detection

On red when two of the four or five framing data bits received are in error.

⌚ Remote Alarm Indication (RAI) Detection

On red when RAI is received.

4.9.6 Connectors

The DTI-U() ETU has one connector:

⌚ CN1 Connects to the backboard

4.9.7 Connections

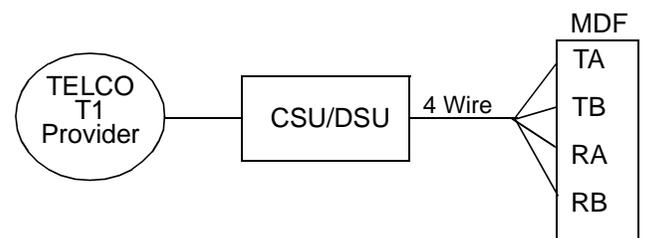


Figure 5-29 DTI-U() ETU Connector

4.10 EXPT(2)-U() ETU

4.10.1 Description

The EXPT(2)-U() ETU allows multiple IPK systems to be connected with a K-CCIS connection. This ETU combines the functionality of the EXP-U ETU and two DTI-U() ETUs (one DTI for system 1 and one DTI for system 2).

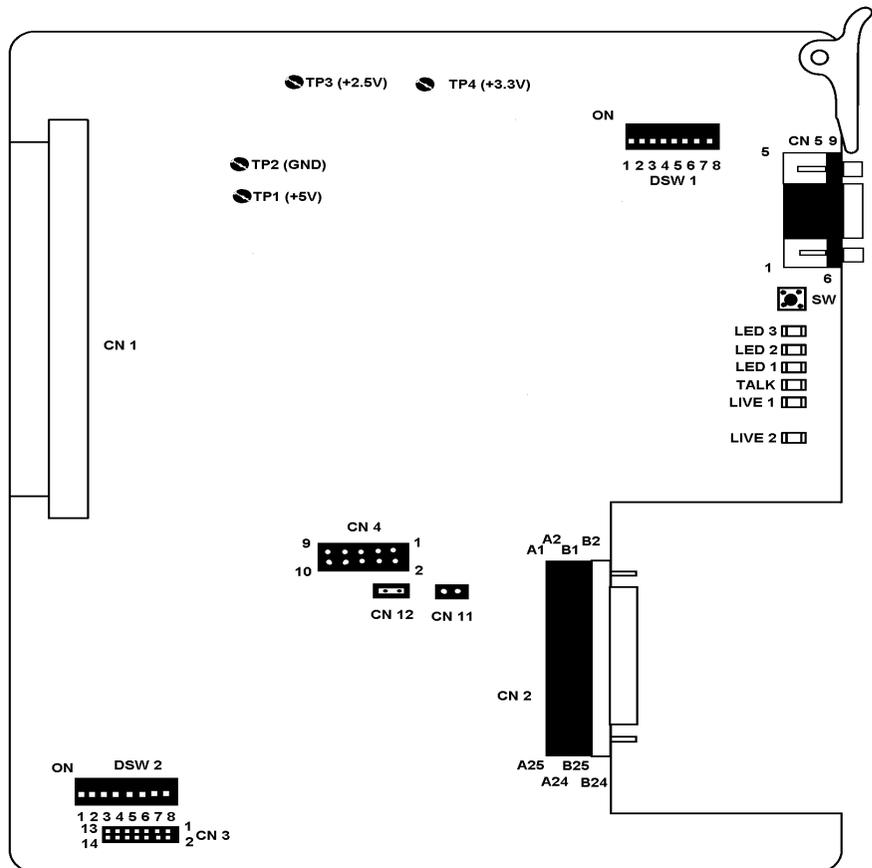


Figure 5-30 EXPT(2)-U() ETU

4.10.2 Installation

One EXPT(2)-U() ETU can be installed only in S1 of the basic cabinet of system 2. A maximum of four cabinets can be connected.

4.10.3 Switch Settings

Switch	Setting	Description	
DSW 1	1	On	Manufacture inspection mode
		Off	Normal Operation (default)
	2	On	For maintenance use
		Off	Normal Operation (default)
	3	On	For maintenance use
		Off	Normal Operation (default)
	4	On	For maintenance use
		Off	Normal Operation (default)
	5	On	For maintenance use
		Off	Normal Operation (default)
	6	On	For maintenance use
		Off	Normal Operation (default)
	7	On	For maintenance use
		Off	Normal Operation (default)
	8	On	For maintenance use
		Off	Normal Operation (default)

Do Not change the factory default settings for this switch.

Switch		Setting	Description
DSW 2	1	On	Manufacture inspection mode
		Off	Normal Operation (default)
	2	On	For maintenance use
		Off	Normal Operation (default)
	3	On	For maintenance use
		Off	Normal Operation (default)
	4	On	For maintenance use
		Off	Normal Operation (default)
	5	On	For maintenance use
		Off	Normal Operation (default)
	6	On	For maintenance use
		Off	Normal Operation (default)
	7	On	For maintenance use
		Off	Normal Operation (default)
	8	On	For maintenance use
		Off	Normal Operation (default)

Do Not change the factory default settings for this switch.

SW	Description
Momentary Switch	Resets ETU operation

4.10.4 Jumper Settings

Jumper		Setting
CN 11	1	Open: Normal Operation (default)
	2	Short: Maintenance mode

Jumper		Setting
CN 12	1	Open: Maintenance mode
	2	Short: Normal Operation (default)

Do Not change the factory default settings.

4.10.5 LED Indications

Refer to [Table 5-21 EXPT\(2\)-U\(\) ETU LED Description](#).

Table 5-21 EXPT(2)-U() ETU LED Description

LED	Description	On	Flashing	Off
Live 2	Host Side	Operation Stopped	Connected	Not Connected
Live 1	Remote Side	Operation Stopped	Connected	Not Connected
Talk	Channel Activity	Active	N/A	Idle
LED 1	For manufacture inspection	N/A	N/A	N/A
LED 2	For manufacture inspection	N/A	N/A	N/A
LED 3	For manufacture inspection	N/A	N/A	N/A

4.10.6 Connectors

- ④ CN 1
Connects to the backboard
- ④ CN 2
Connects to CN3 on the CPUB()-U() ETU or CN 3 on the EXP-U() ETU (Installed in the first expansion cabinet using an expansion cable).
- ④ CN 3
For Maintenance
- ④ CN 4
For Maintenance
- ④ CN 5
RS232 COM Port for manufacture inspection

4.10.7 Connections

Examples of configurations allowed for the EXPT(2)-U() ETU are shown below:

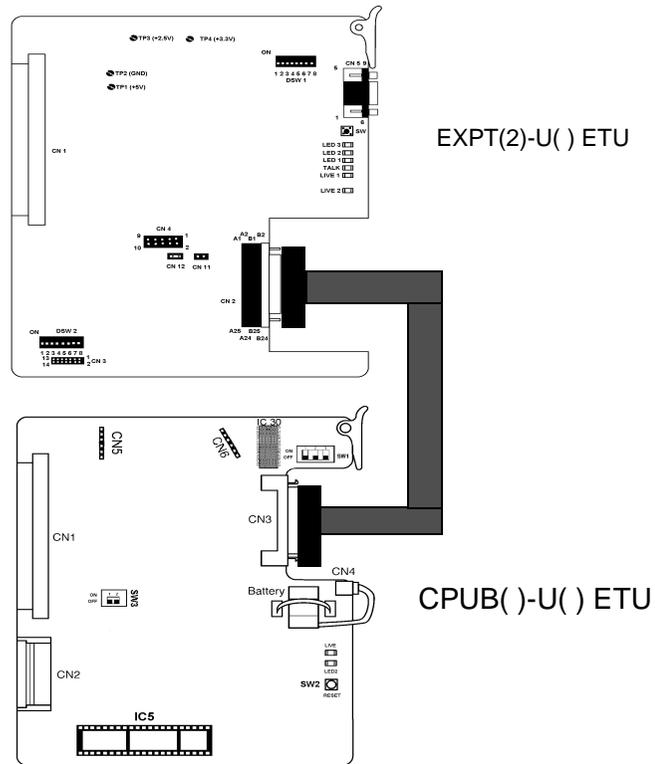


Figure 5-31 Connect EXPT ETU to CPUB ETU

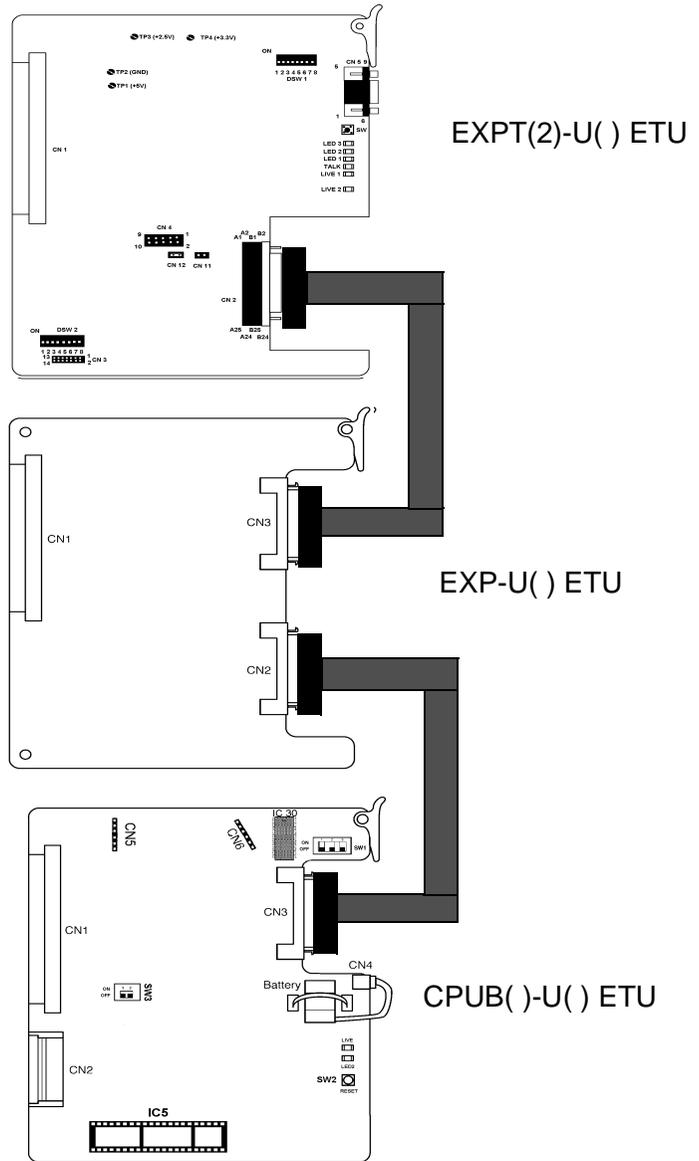


Figure 5-32 Connect EXPT to EXP to CPUB ETU

4.11 IPT(4)/(8)-U() ETU

4.11.1 Description

The IP Gateway IPT(4)/(8)-U() ETU is an optional interface for the Electra Elite KSU that can combine various trunk and Tie line calls into Gateway trunks.

This ETU can be assigned as a 2-port TLI(2)-U(), 4-port DID(4)-U()/COI(4)-U()/COID(4)-U() ETU, or 8-port COI(8)/COID(8)-U() ETU.

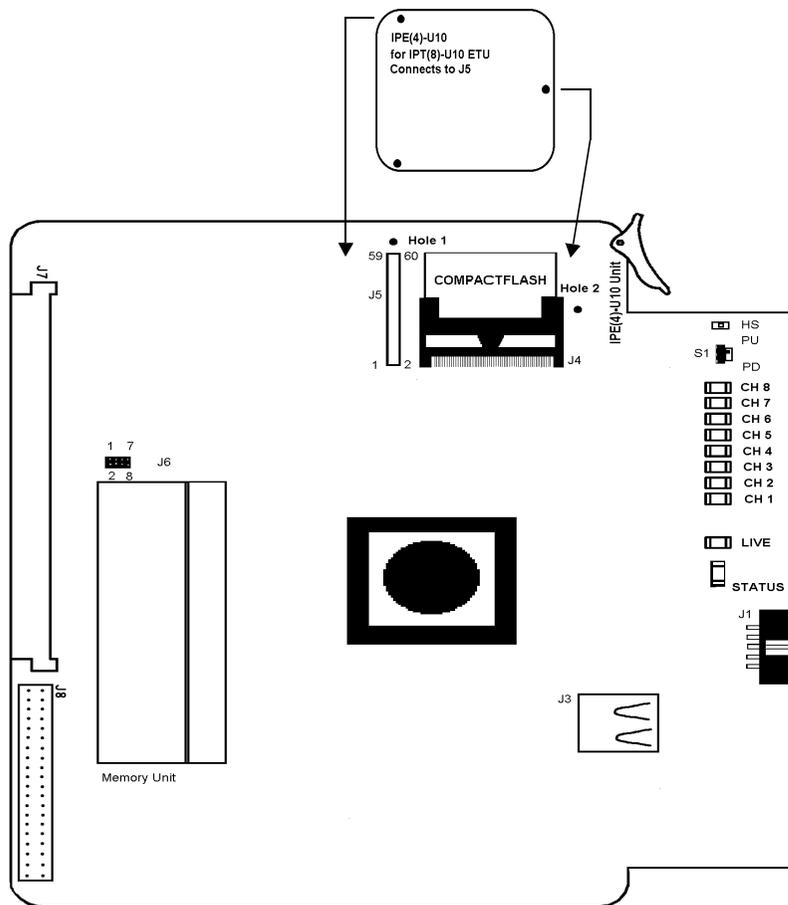


Figure 5-33 IPT(8)-U() ETU

The IP Gateway trunk board has the following options:

Table 5-22 IP Gateway Options

#	Configuration	Number of Ports		Installation Slot	
		IPT(4)	IPT(8)	Elite 48	Elite 192
1	COI	4	8	S3~S7	S1~S8
2	COID	4	8	S3/S4	S1~S4*
3	DID	4	4	S3~S7	S1~S8
4	TLI	2	2	S3~S7	S1~S8

* S8000 or higher allows slots S1~S8.

4.11.2 Installation

The Gateway ETU can be installed in KSU slots that support the applicable ETU simulated.

The IPT(4)-U() ETU is converted to IPT(8)-U() by installing daughter board IPE(4)-U() Unit.

Refer to Elite IP Gateway Card Installation Manual.

4.11.3 LED Indications

ⓘ HS

When Switch S1 is placed to PD, this LED lights red. The IPT ETU starts shutdown. When shut down is complete, this LED goes off along with all others to indicate that the ETU can be removed from the KSU.

ⓘ CH8~1

Indicates the status of associated channel or trunk as in COID/DID as follows:

Trunk Status	COID LED	DID LED
Not Installed or Idle	Off	Off
Incoming	Off	On
Busy	On	On

ⓘ Live

Flashes red when KSU power is received.

④ Ethernet Status

Two built-in LEDs (one green and one yellow) on the RJ-45 indicate Ethernet connection status. The yellow LED is On when the Ethernet link is up. The green LED flashes to indicate activity.

④ Status

This bi-color (red and green) LED shows status of all Gateway trunks. When an error is detected, the location is indicated by the following table.

Trunk Status	LED Condition	Error Location
Power On	Off	BIOS, Hardware
Start DSP download	Red	DSP Driver
DSP download OK	Red and Green	DSP Download
Successful Application Start	Green	Application Load

4.11.4 IPT(4)-U() to IPT(8)-U() ETU Conversion

The IPE(4)-U() Unit is attached to the IPT(4)-U() ETU to convert it to the IPT(8)-U() ETU. This unit comes with two attached standoffs with an extra screw in the bottom.

1. Remove the screw from the bottom of each standoff.
2. Line up the IPE(4)-U() Unit standoffs with Holes 1 and 2 and connector J1 with IPT(4)-U() ETU connector J5, and press down until the IPE(4)-U() Unit is firmly attached to the IPT(4)-U() ETU.
3. Install the two previously removed screws through holes 1 and 2 to Connect the standoffs to the IPT(4)-U() ETU.

4.11.5 Connectors

The IPT(4)/(8)-U() ETU has two connectors:

- ④ CN1 Connects to the backboard
- ④ RJ-45 Connects to the Ethernet

4.11.6 Switch S1

Switch S1 must be in power down (PD) for ETU installation, and placed in power up (PU) to activate the ETU. After the ETU is activated, S1 is placed in PD to power down the ETU for removal.

4.11.7 Connections

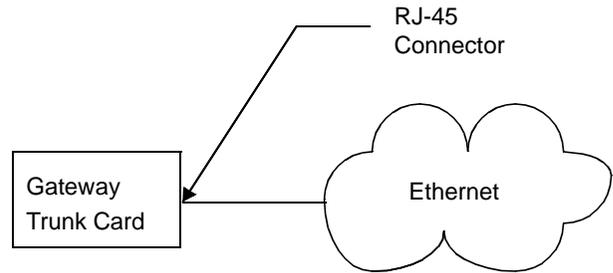


Figure 5-34 IPT(4)/(8)-U() ETU Connections

4.12 PRT(1)-U() ETU

4.12.1 Description

The PRT(1)-U() ETU is a Digital Trunk Interface that provides for the termination of an ISDN-PRI line for voice service only.

The PRT(1)-U() ETU supports AT&T 4ESS (Custom), AT&T 5ESS (Lucent), DMS-100 (Custom or National ISDN) and NI-2 protocols. Call-by-Call and Universal call handling are also supported. Tip and Ring electrical fuses are provided to comply with UL 1459 requirements.

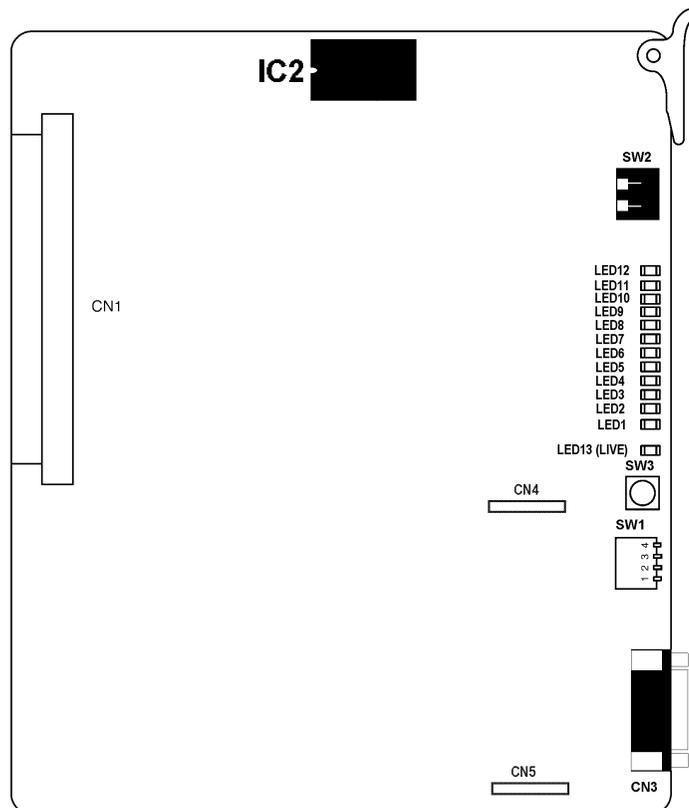


Figure 5-35 PRT(1)-U() ETU

4.12.2 Installation

When a PRT(1)-U() ETU is installed, a CLKG-U() Unit must be installed on the CPUB()-U10 ETU.

The PRT(1)-U() ETU (3 maximum) can be installed in slots S1 and S4 of the basic B64-U10 KSU and Slot S1 of the first expansion KSU in the system (**S7000 or below**).

Using S8000 or higher, a maximum of eight PRT(1)-U() ETUs can be installed in any interface slot in the system, limited by 64 trunks.

4.12.3 Switch Settings

SW1, a 4-position DIP switch, assigns the application. Refer to [Table 5-23 PRT\(1\)-U\(\) ETU SW1 Settings](#).

 SW1-4 is not used and must be OFF.

Table 5-23 PRT(1)-U() ETU SW1 Settings

SW1-1	SW1-2	SW1-3	SW1-4	Application
ON	ON	ON	OFF	NI-2
OFF	ON	ON	OFF	4ESS (AT&T Custom)
OFF	OFF	ON	OFF	AT&T 5ESS (Lucent Custom)
ON	ON	OFF	OFF	DMS-100 (Custom) *
ON	OFF	ON	OFF	DMS-100 (National ISDN) **

* Nortel Specification NIS-A211-1

** Nortel Specification NIS-A233-1

Switch SW2 is an 8-position rotary switch that can be set even during operation. A small flat screwdriver can be used to set positions as follows:

Position 0	Alarm Indications
Position 1	B Channels 01~12 Status Indication using LEDs 1~12
Position 2	B Channels 13~23 Status Indication using LEDs 1~12
Positions 3	CO Trunks 01~12 assigned to PRT ETU Status Indication using LEDs 1~12
Positions 4	CO Trunks 13~23 assigned to PRT ETU Status Indication using LEDs 1~12

Positions 5 & 6 Not Used

Position 7 Inspection Mode in production line

4.12.4 LED Indications

Table 5-24 PRT(1)-U() ETU LED Indications

LED	Description	On	Flashing	Off
LIVE	ETU status	Operation stopped (Power On)	Normal Operation	No Power
LED	Channel/Trunk Status	On (Alarms) SW2 Position 0	On SW2 Position 1	On SW2 Position 3
LED 1	Channel 1	Layer 1 Active	Channel Busy	CO Trunk 1 Busy
LED 2	Channel 2	SLIP	Channel Busy	CO Trunk 2 Busy
LED 3	Channel 3	RAI	Channel Busy	CO Trunk 3 Busy
LED 4	Channel 4	LOF	Channel Busy	CO Trunk 4 Busy
LED 5	Channel 5	AIS	Channel Busy	CO Trunk 5 Busy
LED 6	Channel 6	CRC Error	Channel Busy	CO Trunk 6 Busy
LED 7	Channel 7	Active Call	Channel Busy	CO Trunk 7 Busy
LED 8	Channel 8	Not Used	Channel Busy	CO Trunk 8 Busy
LED 9	Channel 9	Not Used	Channel Busy	CO Trunk 9 Busy
LED 10	Channel 10	Not Used	Channel Busy	CO Trunk 10 Busy
LED 11	Channel 11	Not Used	Channel Busy	CO Trunk 11 Busy
LED 12	Channel 12	Not Used	Channel Busy	CO Trunk 12 Busy
LED	Channel/Trunk Status	N/A	On SW2 Position 2	On SW2 Position 4
LED 1	Channel 13	N/A	Channel Busy	CO Trunk 13 Busy
LED 2	Channel 14	N/A	Channel Busy	CO Trunk 14 Busy
LED 3	Channel 15	N/A	Channel Busy	CO Trunk 15 Busy
LED 4	Channel 16	N/A	Channel Busy	CO Trunk 16 Busy
LED 5	Channel 17	N/A	Channel Busy	CO Trunk 17 Busy
LED 6	Channel 18	N/A	Channel Busy	CO Trunk 18 Busy
LED 7	Channel 19	N/A	Channel Busy	CO Trunk 19 Busy
LED 8	Channel 20	N/A	Channel Busy	CO Trunk 20 Busy
LED 9	Channel 21	N/A	Channel Busy	CO Trunk 21 Busy
LED 10	Channel 22	N/A	Channel Busy	CO Trunk 22 Busy

Table 5-24 PRT(1)-U() ETU LED Indications (Continued)

LED	Description	On	Flashing	Off
LED 11	Channel 23	N/A	Channel Busy	CO Trunk 23 Busy
LED 12	Not Used	N/A	Not Used	Not Used

4.12.5 Alarm Conditions

A brief description of each alarm condition referred to under the SW2, position 0 alarm indications is given below.

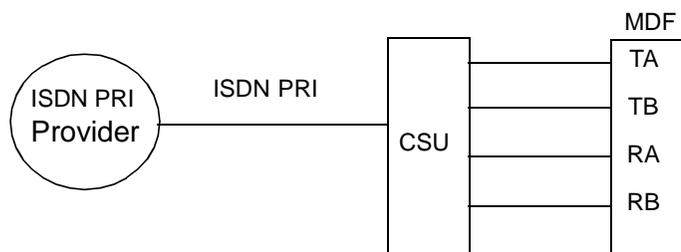
- ④ Layer 1 Status
LED Lights red when layer 1 is active. The LED is off when layer 1 is inactive.
- ④ Controlled Slip indication (SLIP)
When the difference between the timing of a synchronous receiving terminal and the received signal exceeds the buffering ability of the synchronous terminal, the LED lights red.
- ④ Remote Alarm Indication (RAI) Detection
When RAI is received the LED lights red.
- ④ Loss of Frame (LOF) Condition Detection
When two of the four or five framing data bits received are in error, the LED lights red.
- ④ Alarm Indication Signal (AIS) Detection
When the system is receiving an Alarm Indication Signal from a PRT trunk, the LED lights red.
- ④ Cyclic Redundancy Check (CRC) Error Event Detection
When a CRC Error occurs, the LED lights red.
- ④ Active Call
LED Lights red to indicate an active call.

4.12.6 Connectors

The PRT(1)-U()ETU has two connectors:

- Ⓒ CN1 Connects to the backboard
- Ⓒ CN3 9-pin RS-232C connector used for maintenance

4.12.7 Connections



The CSU may not always be required.

Figure 5-36 PRT(1)-U() ETU Connector

4.13 TLI(2)-U() ETU

4.13.1 Description

The TLI(2)-U() ETU provides for the termination and operation of a maximum of two E&M Tie lines (4-wire, Type I, or Type V, 10 pps or 20 pps, Dial Pulse, or DTMF). Immediate Start, Delay Start, Wink Start, and second Dial Tone signaling are also provided. The TLI(2)-U() ETU has two built-in DTMF signal detectors.

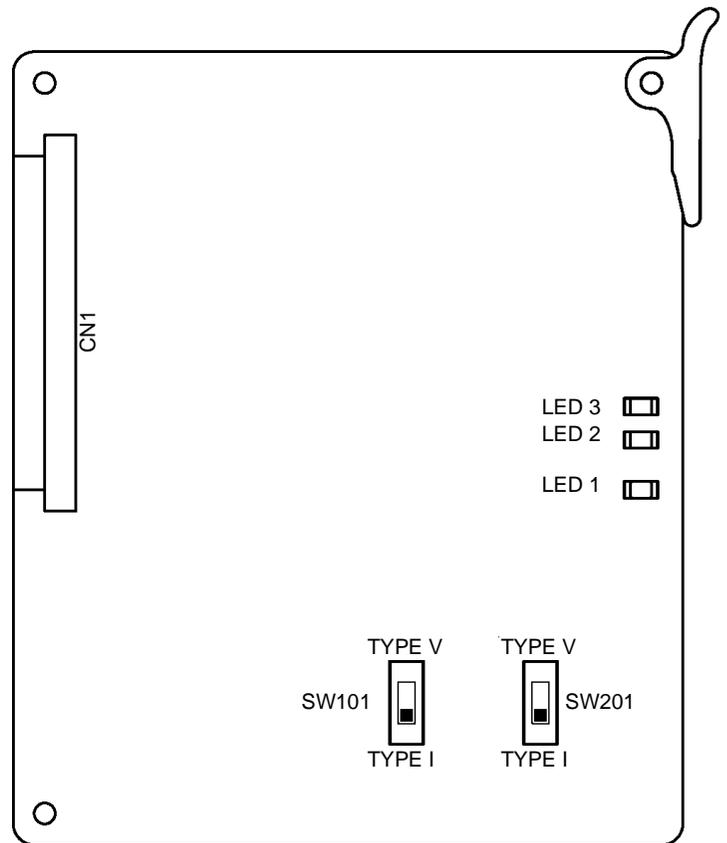


Figure 5-37 TLI(2)-U() ETU

4.13.2 Installation

A maximum of 16 TLI(2)-U() ETUs can be installed in Slots S1~S8 in any system KSU.

4.13.3 Switch Settings

Refer to [Table 5-25 TLI\(2\)-U\(\) ETU Default Switch Settings](#).

Table 5-25 TLI(2)-U() ETU Default Switch Settings

Switch	Setting	Description
SW101	When lines provided by this unit are used for back-to-back connections, set to Type V. When connection is to a Central Office, set to Type I. Default: Type V	Switch Type I or Type V for Line 1
SW201	When lines provided by this unit are used for back-to-back connections, set to Type V. When connection is to a Central Office, set to Type I. Default: Type V	Switch Type I or Type V for Line 2

4.13.4 LED Indications

Table 5-26 TLI(2)-U() ETU LED Indications

LED	Description	On	Flashing	Off
LED 1	ETU status	Operation stopped (Power On)	Normal Operation	No Power
LED 2	Line 1 status	Busy	Not Used	Idle
LED 3	Line 2 status	Busy	Not Used	Idle

4.13.5 Connectors

The TLI(2)-U() ETU has one connector:

- ① CN1 Connects to the backboard

4.13.6 Connections

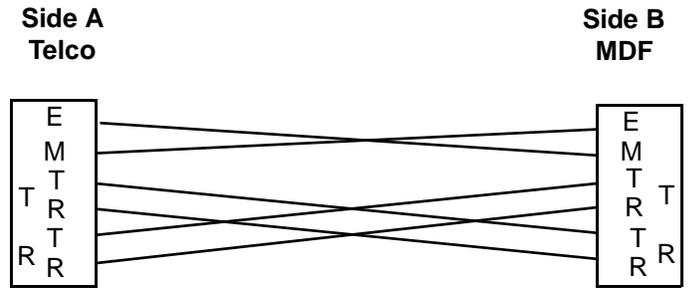


Figure 5-38 TLI(2)-U() ETU Connections

SECTION 5
STATION ETUs

The station Electronic Telephone Units are installed in the interface slots of the KSU.

5.1 CNF(8)-U() ETU

5.1.1 Description

The Multiline Conference Bridge allows any intercom user and any outside party calling to a port of the CNF(8)-U() ETU to make a multiparty conference call. One 8-party conference or two 4-party conferences are supported and regulated by a switch setting.

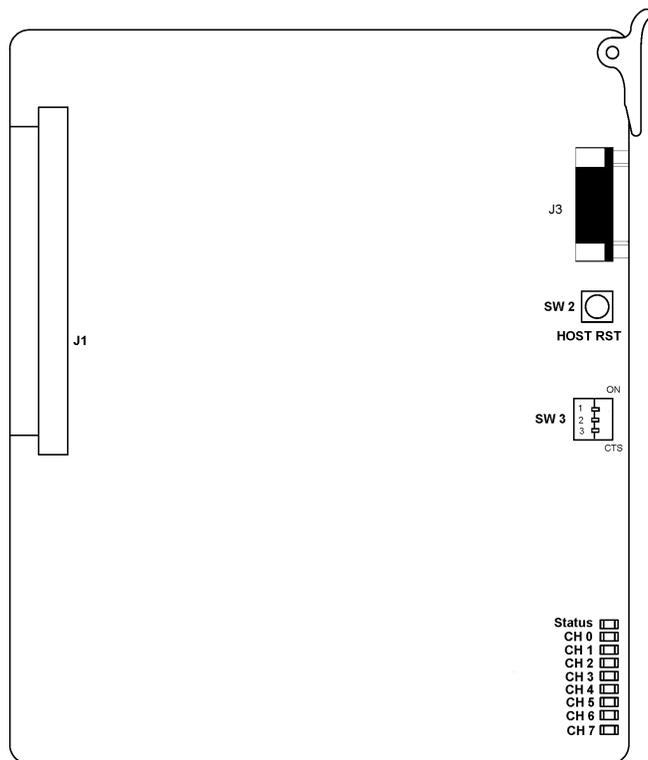


Figure 5-39 CNF(8)-U() ETU

5.1.2 Installation

Only two CNF(8)-U() ETUs can be installed in slots S1~S8 in any KSU.

5.1.3 Switch Settings

Table 5-27 CNF(8)-U() ETU Reset Switches

Switch	Setting	Description
SW2	Press to Reset	Host Reset Switch

Table 5-28 CNF(8)-U() ETU Maximum Conference Time Switch

Switch	Setting		Max Conference Time
CTS	SW3-2	SW3-3	N/A
	ON	ON	1 Hour
	ON	OFF	2 Hour
	OFF	ON	3 Hour
	OFF	OFF	No Limit

Table 5-29 CNF(8)-U() ETU Party Size Switch

Switch	Setting	Description
SW3-1	ON	1 8-Party Conference
SW3-1	OFF	2 4-Party Conferences

5.1.4 LED Indications

Table 5-30 CNF(8)-U() ETU LED Indications

LED	Description	On	Flashing	Off
STATUS	ETU status	Operation stopped (Power On)	Normal Operation	No Power
CH 0	Status	Busy	Not Used	Idle
CH 1	Status	Busy	Not Used	Idle
CH 2	Status	Busy	Not Used	Idle
CH 3	Status	Busy	Not Used	Idle
CH 4	Status	Busy	Not Used	Idle
CH 5	Status	Busy	Not Used	Idle
CH 6	Status	Busy	Not Used	Idle
CH 7	Status	Busy	Not Used	Idle

5.1.5 Connectors

This ETU has three connectors:

- ① J1 Connects to the backboard
- ① J2 Not currently used
- ① J3 9-pin RS-232C connector for maintenance

5.2 DPH(4)-U() ETU

5.2.1 Description

The DPH(4)-U() ETU provides connection for four Doorphones (DP-D-1A), and also provides the associated four Door Lock Release relays.

Doorphones and relays are paired together so that a station user talking into a doorphone, controls only that Door Lock Release relay when the feature code is dialed.

The DPH(4)-U() has two audio paths to be shared by four doorphones. Two simultaneous doorphone calls are allowed. Doorphones 1/3 and 2/4 are paired together.

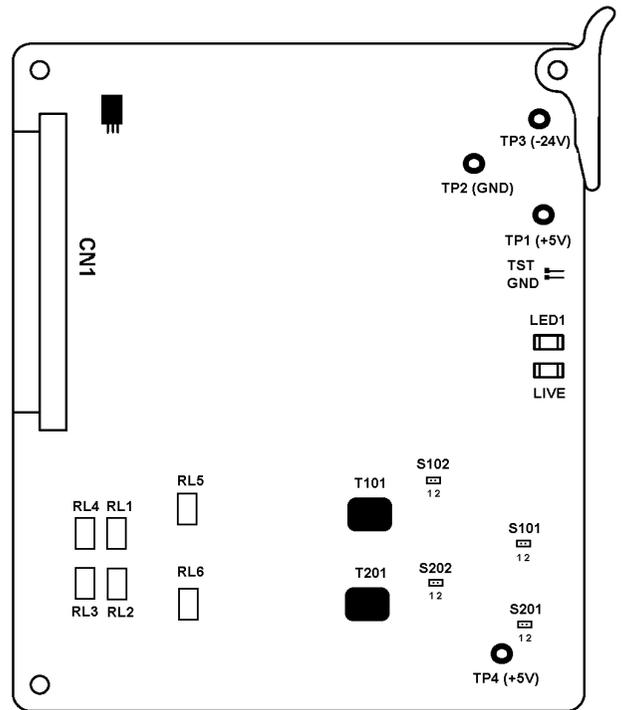


Figure 5-40 DPH(4)-U() ETU

5.2.2 Installation

Only one DPH(4)-U() ETU can be installed in any S1~S8 slot in any system KSU.

The DP-D-1A Doorphone that is connected to the ETU has the following dimensions:

- ⌚ Height: 5.125 in. 130.18 mm
- ⌚ Width: 3.875 in. 98.43 mm
- ⌚ Depth: 1.00 in. 25.4 mm

5.2.3 Switch Settings

Refer to [Table 5-31 DPH\(4\)-U\(\) Default Jumper Settings](#).

Table 5-31 DPH(4)-U() Default Jumper Settings

Jumper	Setting	Description
S101	Shorted	Remove short bar to increase DP1 and DP3 volume by 6 dB.
S201	Shorted	Remove short bar to increase DP2 and DP4 volume by 6 dB.
S102	Shorted	Remove short bar to increase DP1 and DP3 transmit volume by 6 dB.
S202	Shorted	Remove short bar to increase DP2 and DP4 transmit volume by 6 dB.

5.2.4 LED Indications

Live LED indications are listed below.

- ⌚ Blinking Red Normal Operation
- ⌚ Steady Red Operation Stopped (power On)
- ⌚ Off No Power

LED 1 indication are listed below.

- ⌚ Steady Red A Circuit Is Busy
- ⌚ Off All Circuits Are Idle

5.2.5 Connectors

The DPH(4)-U() ETU has three connectors:

- ④ CN1 Connects to the Backboard
- ④ Relay Connections Provided at the MDF
- ④ Doorphone Connections Provided at the MDF Connection

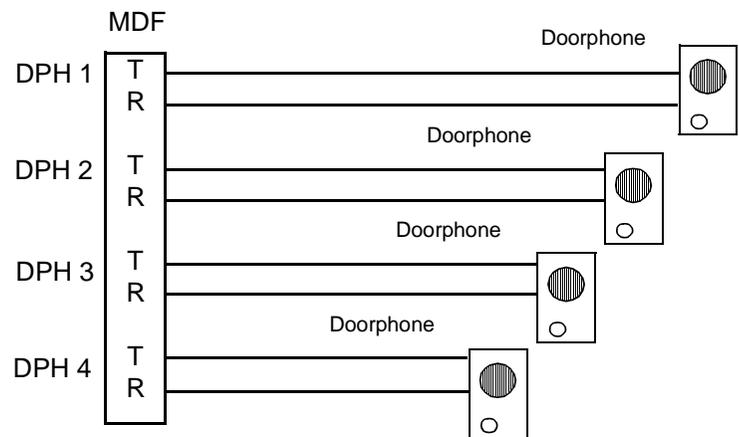


Figure 5-41 DPH(4)-U() ETU Doorphone Connections

5.2.6 Specifications

- ④ Relay contacts are 24 Vdc at 500 mA

5.3 ESI(8)-U() ETU

5.3.1 Description

The Electronic Station Interface ETU provides an 8-port interface for Multiline Terminals, ElectraMail CTI, Attendant Consoles, Single Line Telephone Adapter SLT(1)-U() ADP, and DBM(B)-U() Box.

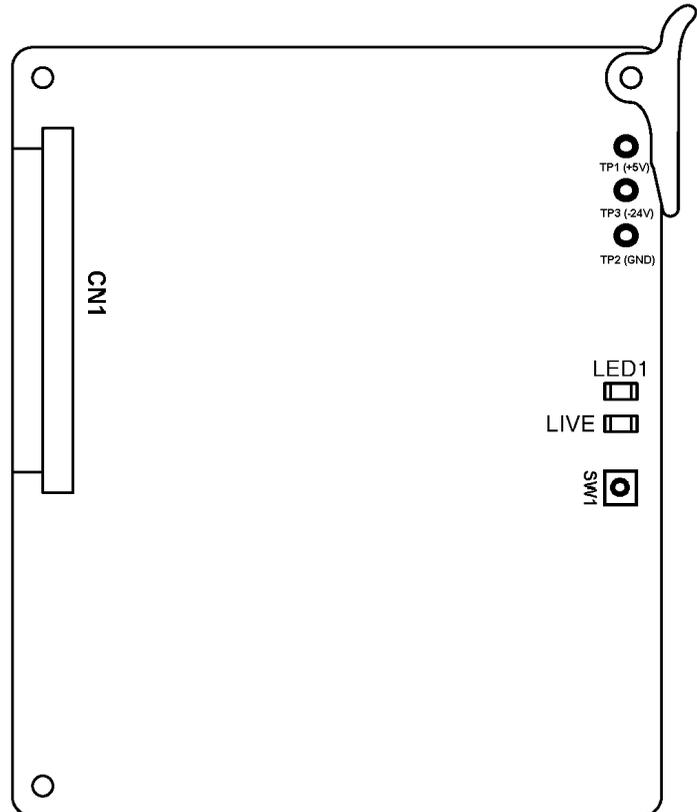


Figure 5-42 ESI(8)-U() ETU

5.3.2 Switch Settings

SW1 resets the ETU.

5.3.3 Installation

A maximum of 15 ESI(8)-U() ETUs can be installed in slots S1~S8 in any system KSU.

5.3.4 LED Indications

Live LED indications are listed below.

- 🔦 Blinking Red Normal Operation
- 🔦 Steady Red Operation Stopped (power On)
- 🔦 Off No Power

LED1 indications are listed below.

- 🔦 Steady Red Some port(s) busy
- 🔦 Off All ports idle

5.3.5 Connectors

The ESI(8)-U() ETU has one connector:

- 🔦 CN1 Connects to the backboard

5.3.6 Connections

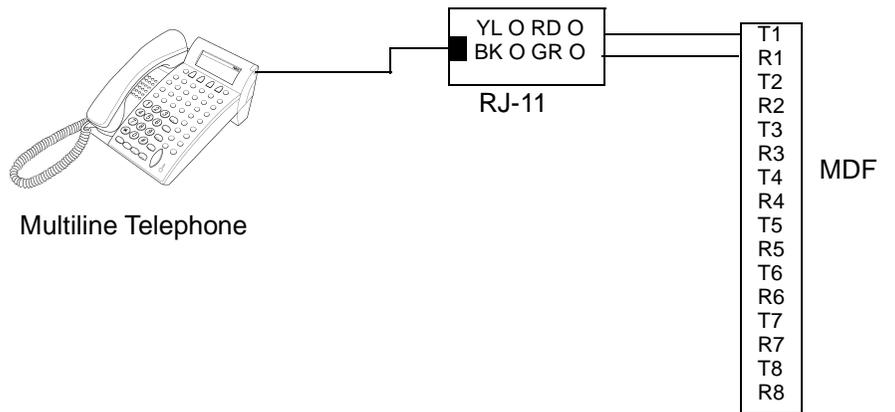


Figure 5-43 ESI(8)-U() ETU Connection

5.4 SLI(4)/(8)-U() ETU

5.4.1 Description

The SLI(4)/(8)-U() ETU is the interface for Single Line Telephones and for analog voice mail units. It has a built-in ringing generator (RSG) and supports Single Line Telephones or analog Voice Mail ports.

This ETU also provides circuitry for loop status detection, talk battery, sending ringing signals, message waiting, and loop disconnect for dial pulse signal detection.

- ☞ The PBR circuit in the CPUB()-U() ETU or PBR()-U() ETU is required with Voice Mail or DTMF Single Line Telephones.

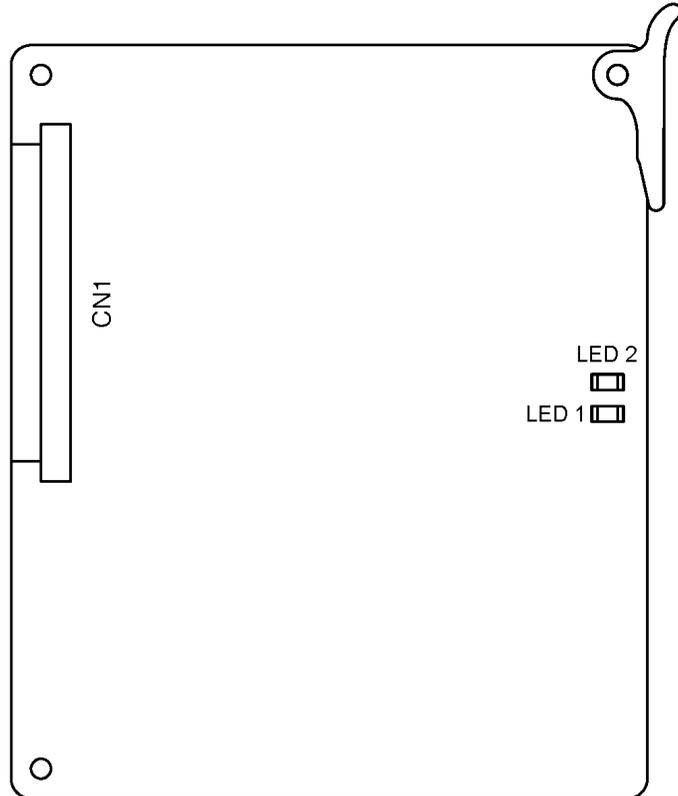


Figure 5-44 SLI(8)-U() ETU

5.4.2 Installation

A maximum of 14 SLI(8)-U() ETUs or 22 SLI(4)-U() ETUs can be installed in Slots S1~S8 in any system KSU.

5.4.3 LED Indications

Live LED indications are listed below.

- Ⓛ Blinking Red Normal Operation
- Ⓛ Steady Red Operation Stopped (power On)
- Ⓛ Off No Power

BUSY indications are listed below.

- Ⓛ Steady Red Some port(s) busy
- Ⓛ Off All ports idle

5.4.4 Connectors

The SLI(4)/(8)-U() ETU has one connector:

- Ⓛ CN1 Connects to the backboard

5.4.5 Connections

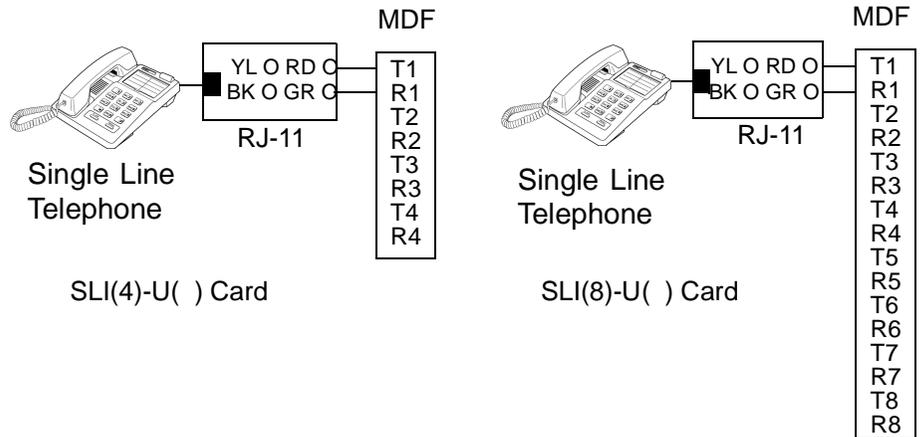


Figure 5-45 SLI(4)/(8)-U() ETU Connections

5.5 VDH2(8)-U() ETU

5.5.1 Description

The VDH2(8)-U() ETU integrates both LAN and station cabling. This is a standard ESI ETU with additional circuitry for the LAN integration function.

Key Telephones and Attendant Consoles can be connected to the VDH2(8)-U() ETU using a VDD-U Unit.

Each VDH2(8)-U() ETU has a built-in HUB facility that has eight ports (IEEE 802.3 10Base-T).

A VDD-U Unit adapter is required at each digital station or Attendant Console. Refer to Installing a VDD-U Unit on a Multiline Terminal in [Chapter 7 Installing Optional Equipment](#).

5.5.2 Specifications

Refer to [Table 5-32 VDH2\(8\)-U\(\) ETU Specifications](#).

Table 5-32 VDH2(8)-U() ETU Specifications

Description	Specifications
General Specifications	
Access Method	CSMA/CD Method (IEEE 802.3)
Transmission Speed	10 Mbps
Transmission Interface	10Base-2: 1 port 10Base-T + <i>D^{term}</i> Interface: 8 ports
Transmission Interface Connectors	
10Base-2	BNC (coaxial cable)
10Base-T + <i>D^{term}</i> Interface	RJ-45 (modular for 10Base-T)
Transmission Cable Type and Maximum Cable Length	
10Base-2	Coaxial Cable – 606.8 feet (185 meters)
10Base-T + <i>D^{term}</i> Interface	Twisted Pair Cable (LAN Category 3 or higher) – 328 feet (100 meters) for 10Base-T technology.

5.5.3 Cabling

The information listed below applies when connecting the VDH2(8)-U() ETU.

- ④ Normally the 10Base-T cables connected to the VDH2(8)-U() ETU cannot be directly connected to another HUB or to a LAN terminal. A set of jumpers is provided on the VDH2(8)-U() to turn off the station abilities for ports 1~7. In this case LAN terminals can be connected directly to the VDH2(8)-U() ETU. Refer to [Figure 5-46 VDH2\(8\)-U\(\) ETU Jumpers](#) for the layout of jumpers on the KTU.
- ④ Port 8 is unique because the station abilities cannot be separated by changing a jumper setting like ports 1~7. Port 8 is to be used for cascading HUBs. Connect Port 8 either to another VDH2(8)-U() (Port 1~7) or an external HUB. In this case be sure to set SW2 on the VDH2(8)-U() to =. If SW2 is set to X, then Port 8 is used as a regular coreline connection. Refer to [Figure 5-47 10Base-T Cable Connections](#).
- ④ The VDH2(8)-U() ETU can be used with 10Base-2 and 10Base-T cables. VDH2(8)-U() ETU HUBs can be cascaded using 10Base2 cables. The 10Base2 connector can also be used to connect the VDH2(8)-U() ETU to a LAN backbone. (Refer to [Figure 5-48 VDH2\(8\)-U\(\) ETU](#).) In this case, the 8 port is still used for coreline. The 10Base2 cable interconnecting VDH2(8)-U() ETUs must be greater than 0.5 meters. Care should be taken so the 10Base2 cables are neatly coiled. When the 10Base2 cables are connected to the VDH2(8)-U() BNC connector, a terminating plug must be used if this is the last device on the cable. Refer to [Figure 5-49 VDH2\(8\)-U\(\) ETU Connections](#).
- ④ The preferred method of cascading VDH2(8)-U() ETU hubs is using the 10Base-2 cables because it does not reduce the quantity of station ports that the ETU can provide.

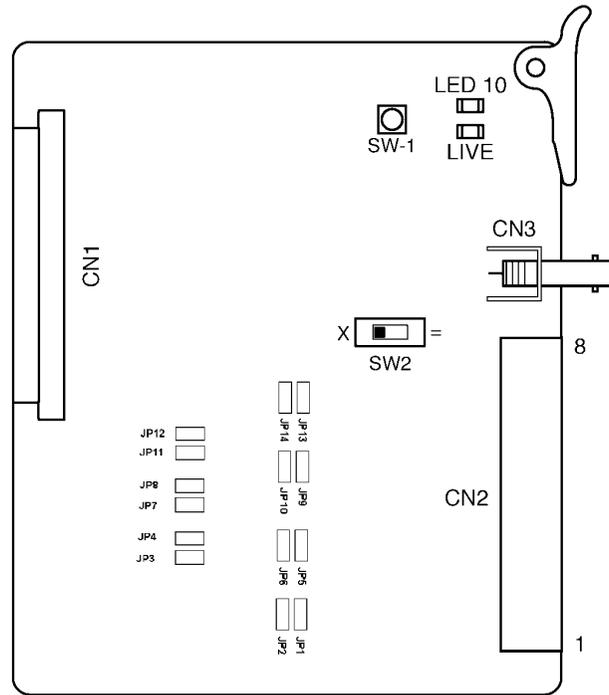


Figure 5-46 VDH2(8)-U() ETU Jumpers

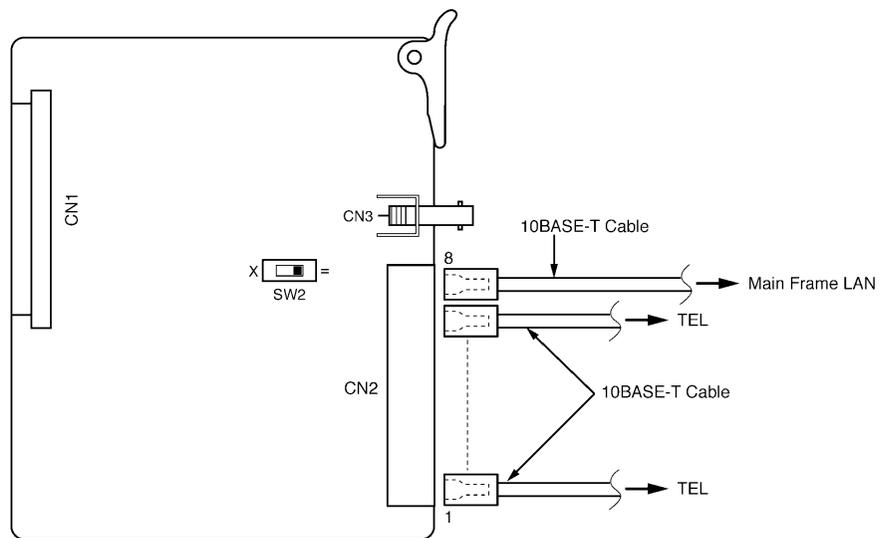


Figure 5-47 10Base-T Cable Connections

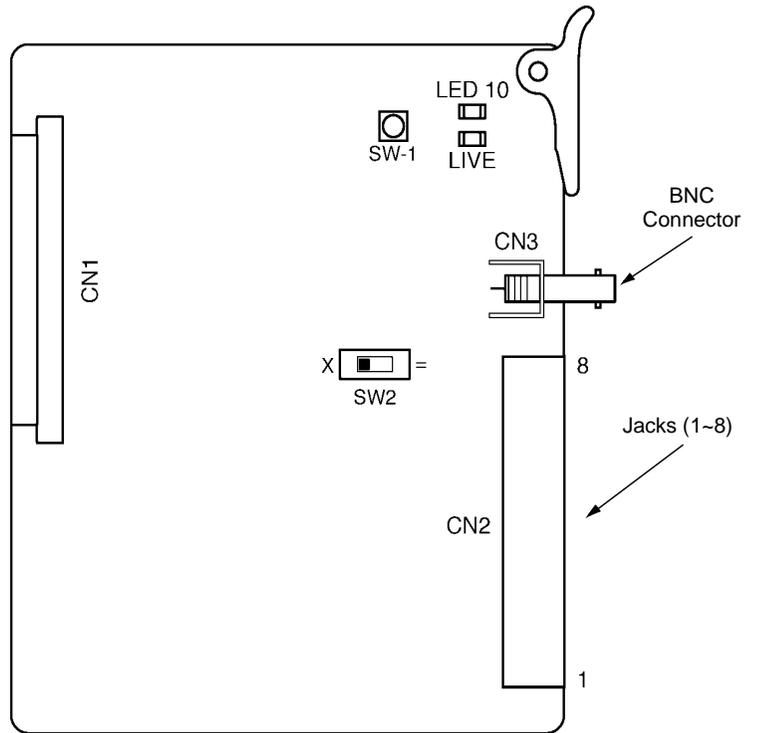


Figure 5-48 VDH2(8)-U() ETU

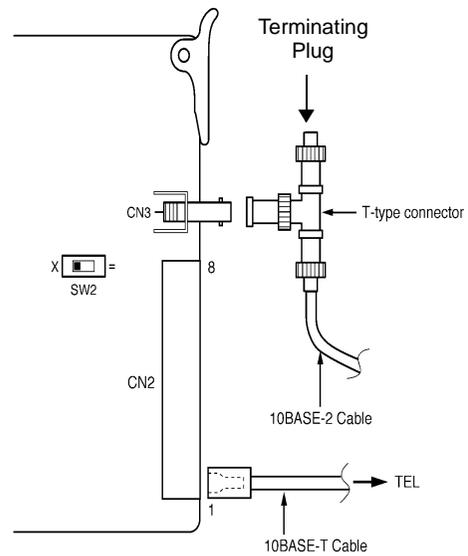


Figure 5-49 VDH2(8)-U() ETU Connections

5.5.4 Installing the VDH2(8)-U()

- ⓘ The 10Base-T ports on the VDH2(8)-U() ETU use 4-wire polar cables.
- ⓘ When connecting a VDH2(8)-U() ETU to a Multiline Terminal, avoid using under-carpet cables because the device becomes susceptible to outside noises. It is better to use EIA/TIA round cables instead of flat cables. When under-carpet cables are used, you must follow the installation instructions provided by the cable manufacturer. Also consider these precautions:
 - Limit the under-carpet cable length to 65 feet.
 - When using multiple pair cabling to connect the VDH2(8)-U() units to the multiline terminal, do not include analog lines in the same cable.
- ⓘ When connecting a VDH2(8)-U() ETU, use the FCE-U10 Unit for proper wiring. Lead the cable connected to the ETUs out through the clamp on the KSU as shown in [Figure 5-50 Front Cover Extender for VDH2\(8\)-U\(\) ETUs](#). Refer to [3.3 Installing a Front Cover Extender \(FCE-U10 Unit\)](#) in [Chapter 4](#) on page 4-13.
- ⓘ A maximum of 9 VDH2(8)-U() ETUs can be installed in Slots S1~S8 in any system KSU.

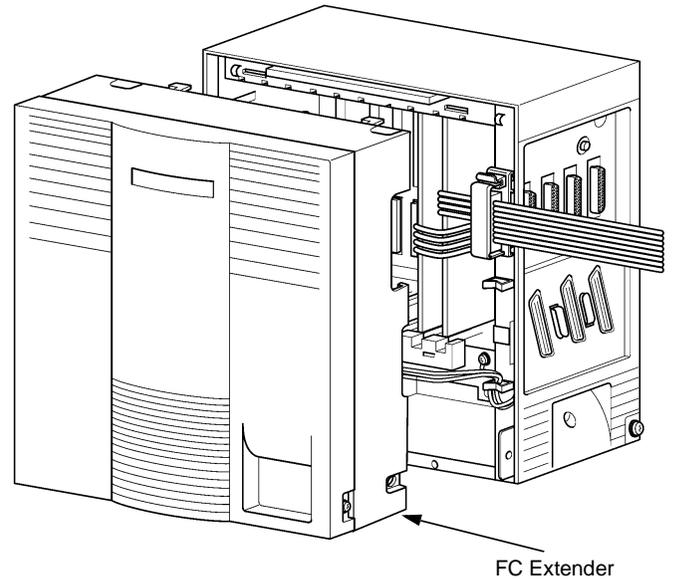


Figure 5-50 Front Cover Extender for VDH2(8)-U() ETUs

[Figure 5-47 10Base-T Cable Connections](#) shows cable connections to the LAN using 10Base-T cabling. Use an EIA/TIA category 3 (or higher) unshielded twisted pair cable.

 **Do not use 10Base-T cable for overhead or outdoor wiring.**

5.5.5 Switch Settings and Jumpers

Refer to [Table 5-33 VDH2\(8\)-U\(\) ETU Default Switch Settings](#) and [Table 5-34 Jumper Settings](#).

Table 5-33 VDH2(8)-U() ETU Default Switch Settings

Switch	Setting	Description
SW1	N/A	Reset Switch
SW2	<p>X Port 8 Normal Use Mode (LAN Cable Integration)</p> <p>= Port 8 10Base-T cascades to another VDH2(8)-U() ETU or HUB</p>	Defines Port 8 communication mode.

Table 5-34 Jumper Settings

Port	Jumper	Setting
1	JP1 JP2	Both 1 and 2 LAN connection only Both 2 and 3 LAN station integration (default)
2	JP3 JP4	Both 1 and 2 LAN connection only Both 2 and 3 LAN station integration (default)
3	JP5 JP6	Both 1 and 2 LAN connection only Both 2 and 3 LAN station integration (default)
4	JP7 JP8	Both 1 and 2 LAN connection only Both 2 and 3 LAN station integration (default)
5	JP9 JP10	Both 1 and 2 LAN connection only Both 2 and 3 LAN station integration (default)
6	JP11 JP12	Both 1 and 2 LAN connection only Both 2 and 3 LAN station integration (default)
7	JP13 JP14	Both 1 and 2 LAN connection only Both 2 and 3 LAN station integration (default)

5.5.6 LED Indications

LED indications are located on both sides of the ETU as shown in [Figure 5-51 VDH2\(8\)-U\(\) LED Indications](#).

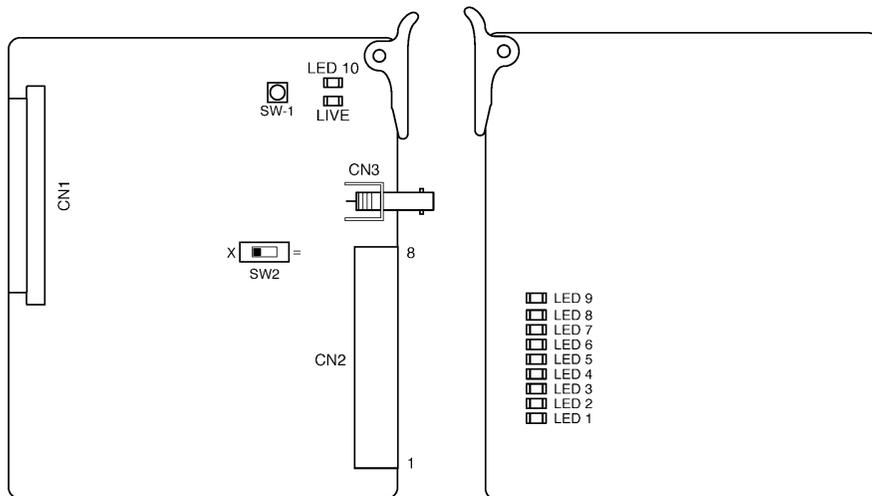


Figure 5-51 VDH2(8)-U() LED Indications

Table 5-35 VDH2(8)-U() ETU LED Indications

LED	Description	On	Flashing	Off
LIVE	ETU status	Stopped, power on	Normal Operation	No Power
1	LAN connection	Green LAN Connection established Orange Terminal is Transmitting	Not Used	LAN inactive
2	LAN connection		Not Used	LAN inactive
3	LAN connection		Not Used	LAN inactive
4	LAN connection		Not Used	LAN inactive
5	LAN connection		Not Used	LAN inactive
6	LAN connection		Not Used	LAN inactive
7	LAN connection		Not Used	LAN inactive
8	LAN connection		Not Used	LAN inactive
9	10Base2 status	10Base2 sending	Not Used	10Base2 inactive
10	Intercom status	Intercom channel on some channel in use	Not Used	No intercom terminal used.

5.5.7 Connectors

The VDH2(8)-U() ETU has three connectors:

- ④ CN1 Connects to the backboard.
- ④ CN2 – CH1~7 Connects to Multiline Terminals.
- ④ CN2 – CH8 Connects to Multiline Terminal or cascades to another HUB.
- ④ CN3 Connects 10Base-2 cascade cables from another HUB or mainframe LAN.

When SW2 is set to **X**, the following table indicates the pin assignments for the RJ-45 pins for CN2 ~ CH8.

- ☞ In the tables below, TD indicates Transmit Data and RD indicates Receive Data.

Normal

Pin	Signaling
6	TD-
3	TD+
2	RD-
1	RD+

When SW2 is set to **=**, the following table indicates the pin assignments for the RJ-45 pins for CN2 ~ CH8.

Cascade

Pin	Signaling
6	RD-
3	RD+
2	TD-
1	TD+

- ☞ Cables that connect a terminal to a HUB are straight, and cables that connect HUB-to-HUB are crossed. Coreline uses straight cables only.

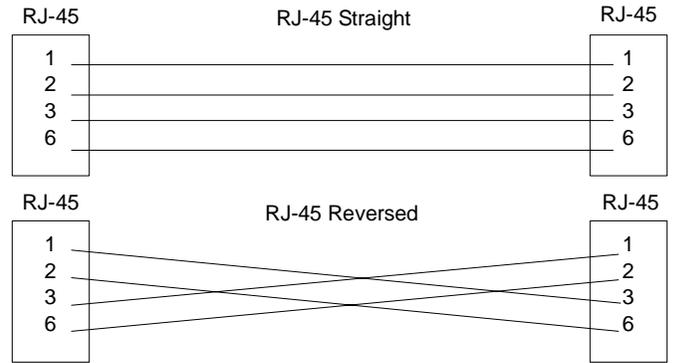


Figure 5-52 Cable Connection Comparison

SECTION 6

VOICE MAIL ETUs

6.1 CMS(2)/(4)-U() ETU

6.1.1 Description

The CMS(2)/(4)-U() ETU is a Digital Voice Mail system that supports a maximum of four ports.

This ETU is a PC platform installed in the Electra Elite that contains Flash ROM data storage for voice recording and application software. A digital signal processor/voice processing section handles the following functions:

- Ⓢ DTMF detection
- Ⓢ DTMF generation
- Ⓢ General tone detection
- Ⓢ FAX CNG tone detection
- Ⓢ PCM compression for audio recording/playback
- Ⓢ Automatic gain control (AGC)
- Ⓢ A serial port (direct connect speeds up to 19.2 Kbps)

This ETU provides 2 or 4 ports for digital voice mail. Refer to [Table 5-36 Configuration Support Table](#).

Table 5-36 Configuration Support Table

Function	Configuration Support
Applications	Automated Attendant/Voice Mail with call forwarding (release transfer) Automated Attendant/Voice Mail without call forwarding (await answer transfer) Voice Mail only (No transfer)
Call Forwarding	Supported
Connections	Connects to backplane connector of the KSU
Hardware	One CMS(2)/(4)-U() ETU
Message Notification	Through message waiting lamp
Operator Console	100 (default) Positive disconnect: Digital Signal
MDM-F-20 Unit	Used for remote connection

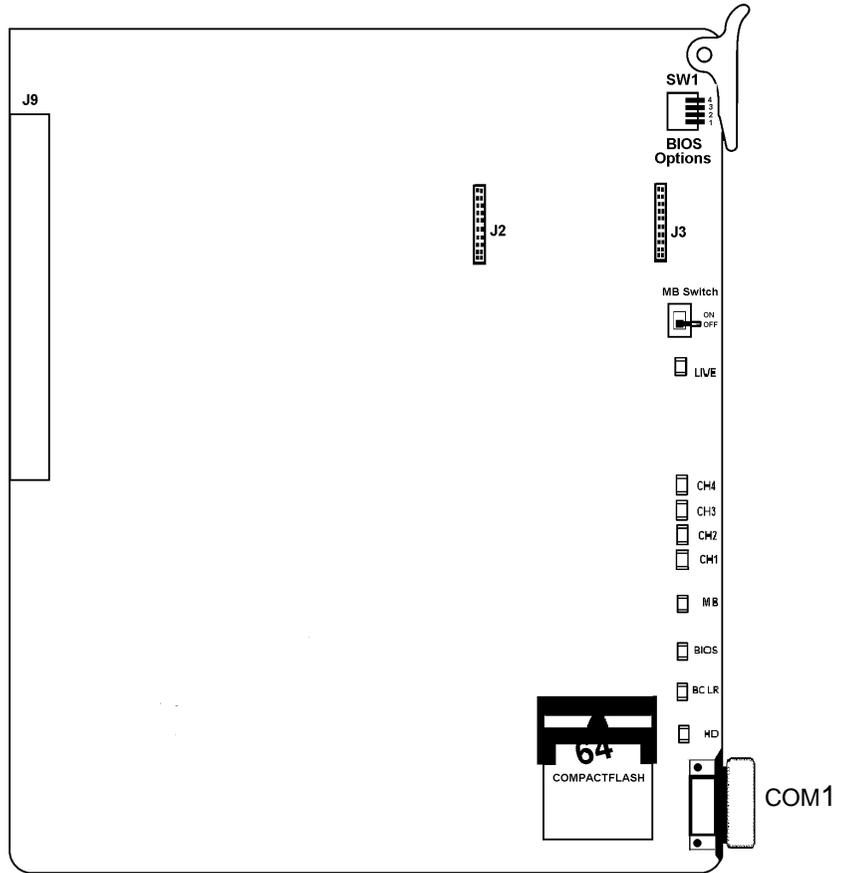


Figure 5-53 CMS(2)/(4)-U() ETU

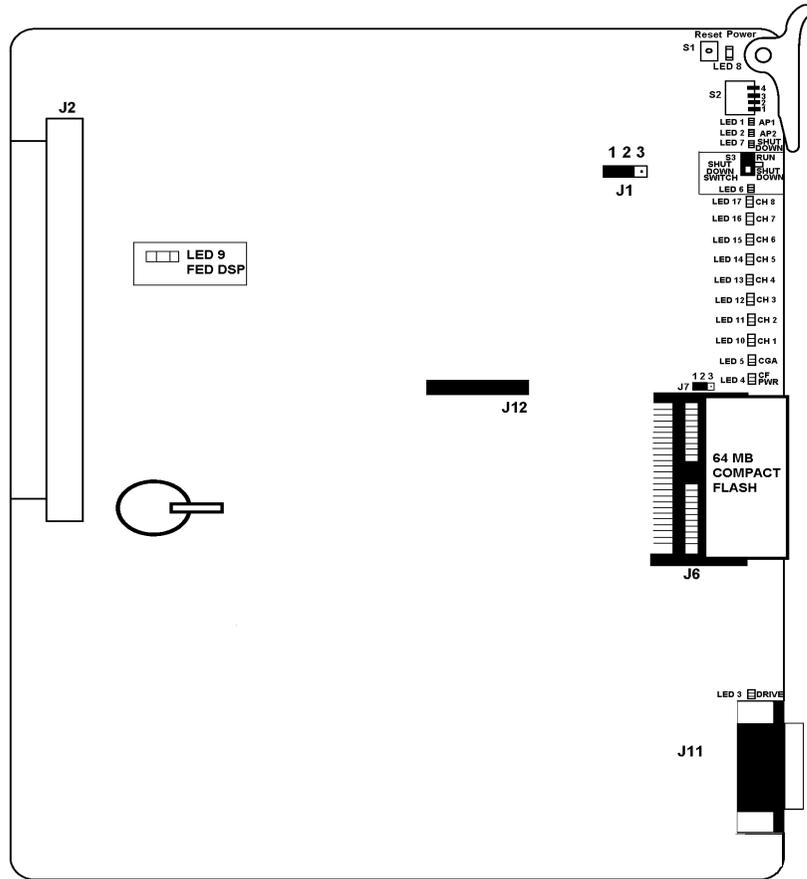


Figure 5-54 CMS-U30 ETU

6.1.2 Installation

Only one CMS(2)/(4)-U() ETU or one CMS-U30 ETU can be installed in slots S1~S8.

- ☞ Each system can have one CTI/VP, CMS, FMS, VMS, or IVR ETU.



When installing this ETU, make all ETU DIP switch setting changes before inserting it in the KSU. Ensure that KSU is off.

6.1.3 Switch Settings

For Revision Q00431 v 6.68 or higher, refer to [Table 5-37 CMS\(2\)/\(4\)-U\(\) ETU DIP Switch Functions](#).

Table 5-37 CMS(2)/(4)-U() ETU DIP Switch Functions

DIP 1	DIP 2	DIP 3	DIP 4	Description
ON				To enable HostKey and run Manufacturing Test (NEC Production only)
ON	ON			To enable HostKey with floppy disk redirection and run Manufacturing Test (NEC Production only)
		ON		To connect to CoSession using modem instead of direct cable connection
			ON	To start BRU Host with direct cable connection
		ON	ON	To start BRU Host with modem connection
	ON		ON	To connect to CoSession using direct cable connection but not start voice mail software (Troubleshooting or Maintenance Mode)

 Used for Revision Q00431 v 6.68 or higher.

6.1.4 LED Indications

Refer to [Table 5-38 CMS\(2\)/\(4\)-U\(\) ETU LED Indications](#).

Table 5-38 CMS(2)/(4)-U() ETU LED Indications

LED	Description	On	Flashing	Off
LIVE	ETU status	Receiving Power	Not Used	No Power
CH1	Port Status	Busy	Not Used	Idle/Not Used
CH2	Port Status	Busy	Not Used	Idle/Not Used
CH3	Port Status	Busy	Not Used	Idle/Not Used
CH4	Port Status	Busy	Not Used	Idle/Not Used
MB	MB Switch Status	ON	Not Used	OFF
BIOS	DOS Status	BIOS Error	Not Used	No error
BCLR	Application Status	Red DOS started (VM Not Ready) Green VM Running Orange Error	Not Used	Idle
	<p> <i>If BCLR LED is orange, check error type on console screen. After error is corrected, LED automatically changes to green. Do Not connect link between console and ETU until BCLR turns green during booting.</i></p>			
HD	Flash Status	Not Used	Compact Flash Disk Active	Flash Inactive

 *Do not reset the ETU while the HD LED is flashing.*

Refer to [Table 5-39 CMS-U30 ETU LED Indications](#).

Table 5-39 CMS-U30 ETU LED Indications

LED	Name	Description
LED 1	APP1	Indicates status of voice mail application software Green Application running without errors Amber Application running with errors Red Application not running
LED 2	APP 2	Not Used
LED 3	Drive	HDD active light is red when the hard drive is accessed  Do not reset the ETU while this switch is on.
LED 4	CF Power	On when shutdown switch in Run to indicate power on the ETU
LED 5	ICGA	Live LED flashes every 125 ms during normal operation
LED 6	Shut Down Switch	Indicates that the switch has no software control. On red only when SHUTDOWN switch is in Run
LED 7	Shutdown	On red when SHUTDOWN switch is in SHUT DOWN to indicate that voice mail can be safely removed from the KSU
LED 8	Power	On red when ETU is receiving power from the KSU
LED 9	FED DSP	Used only for development purposes
LED 10	CH 1	On red when voice channel 1 is Off Hook
LED 11	CH 2	On red when voice channel 2 is Off Hook
LED 12	CH 3	On red when voice channel 3 is Off Hook
LED 13	CH 4	On red when voice channel 4 is Off Hook
LED 14	CH 5	On red when voice channel 5 is Off Hook
LED 15	CH 6	On red when voice channel 6 is Off Hook
LED 16	CH 7	On red when voice channel 7 is Off Hook
LED 17	CH 8	On red when voice channel 8 is Off Hook

 The first four channel LEDs are also used during startup to show that the BICOM driver is loaded (LED 1), Scan disk successfully completed (LED 2), CoSession Host successfully Loaded (LED 3), and voice mail started successfully (LED 4). After the system is up and running and all channels are ready to receive calls, these LEDs are Off. When voice mail does not start successfully, all eight channel LEDs and LED 1 are On.

6.1.5 CMS(2)/(4)-U() ETU Connectors

- ④ J2 and J3
Used to install the MDM-F-20 Unit
- ④ J9
Connects to the backboard
- ④ 9-pin RS-232 (COM2)
Not used (MDM-F-20 Unit)
- ④ RJ-11 modem port (COM2)
Remote connector on serial interface (MDM-F-20 Unit)
- ④ 9-pin RS-232 (COM1)
Local serial connector on main ETU for direct connection

6.1.6 CMS-U30 ETU Jumper Settings

J1	Used only on FMS/CMS
1 - 2	No external modem connected (default)
2 - 3	External modem connected

6.1.7 CMS-U30 ETU Connectors

- ④ J2
Connects to the backplane
- ④ J6
Used for Compact flash drive on FMS
- ④ J10
Not used.
- ④ J11)
COM port for console programming connection
- ④ J12
Port expansion connector for DSP-U30

6.2 CTI/VP(4)/(8)/(12)/(16)-U() ETU

6.2.1 Description

The CTI/VP(4)/(8)/(12)/(16)-U() ETU is a 4-, 8-, 12-, or 16-port Digital Voice Mail system that can support TeLANophy, inbound or outbound faxing and Hospitality/HVM applications.

The EliteMail VP cannot support TeLANophy or faxing and Hospitality/HVM applications, but it can be upgraded to EliteMail CTI when these features are required.

For a 4- or 8-port system, only the System Board and one slot are required. For the 12- or 16-port system, the Daughter Board that attaches to the System board, and the Port Expansion Board that requires another slot are also required.

This ETU is a PC platform, installed in the Electra Elite IPK system, that contains hard disk space for voice recording storage and application software. A digital signal processor/voice processing section handles the following functions:

- ① DTMF detection/generation
- ① General tone detection
- ① FAX CNG tone detection
- ① PCM compression for audio recording/playback
- ① Automatic gain control
- ① A serial port (direct connect speeds up to 115,200 bps) used for direct connection console programming and backup/restore
- ① A LAN port with an RJ-45 connector (activated only with CTI)
- ① Up to two fax ports (activated only with CTI)
- ① A built-in modem for remote console programming that supports up to 19.2 Kbps

Table 5-40 Configuration Support

Function	Support
Applications	Automated Attendant/Voice Mail with call forwarding (release transfer) Automated Attendant/Voice Mail without call forwarding (await answer transfer) Voice Mail only (no transfer)
Call Forwarding	Supported
Connections	Connects to backplane of the KSU RJ-45 LAN connection RJ-11 Modem connection VGA connection for monitor support PS2 Keyboard and Mouse connections
Hardware	One CTI/VP(4)/(8)/(12)/(16)-U() ETU
Message Notification	Uses message waiting lamp
Operator Console	100 (default) Positive connect: Digital signal

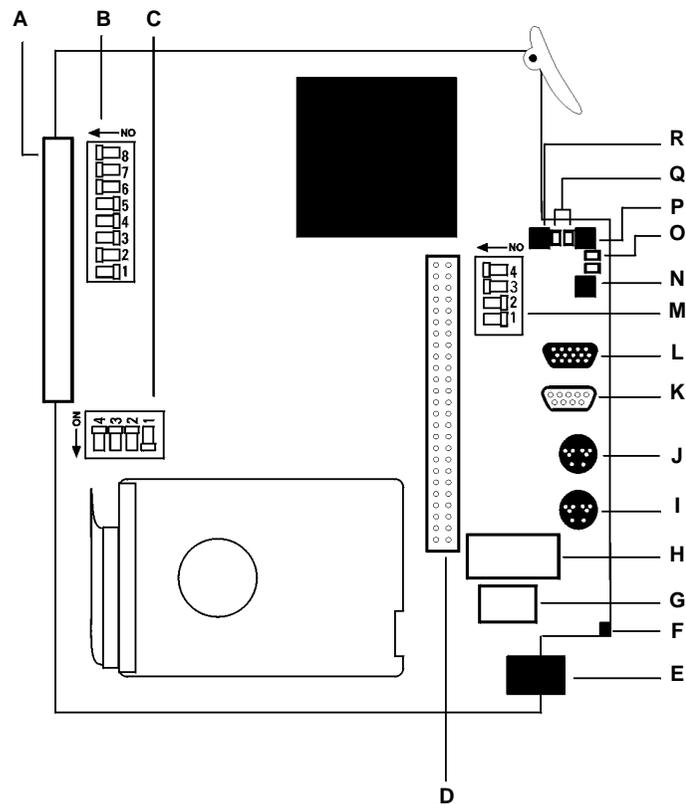


Figure 5-55 EliteMail CTI System Board

6.2.1.1 System Board Components

The components identified in [Figure 5-55 EliteMail CTI System Board](#) are listed and described in [Table 5-41 System Board Components](#).

Table 5-41 System Board Components

Item	Description
A	Backplane connector
B	Switch SW2 Not used. Keep indicated default settings.
C	Switch SW1 Not used. Keep indicated default settings.
D	Port Expansion Board (PEB) cable
E	Modem connector
F	Hard Drive (HD) LED
G	Universal Serial Bus (USB) connector
H	Local Area Network (LAN) connector
I	Keyboard connector
J	Mouse connector
K	COM Serial Port connector
L	VGA Monitor connector
M	Switch SW3 DIP switch 1 default is Off so the voice messaging application starts when the board is turned On. Set this switch On to start OS/2 software only. DIP switch 2 default is Off for direct serial remote access connections. Set this switch On for modem connections. DIP switches 3 and 4 are not used and should be left On.
N	The power button cuts the power to the board from the PC and the hard drive and should not be used.
O	Voice messaging software LED. Green when software is active Amber when active with possible application problem Red when inactive or shut down

Table 5-41 System Board Components (Continued)

Item	Description
P	Shutdown switch Default is On. Place Off to shut down the software and system board properly before turning off the telephone system and disconnecting the system board. Place On before restarting – The board restarts only when the switch is On.
Q	Shutdown LED Red when switch is On Green when switch is Off After the LED goes off, turn off power to the KSU and disconnect the board.
R	Make Busy switch and LED Do not use. Must always be On with a red LED.

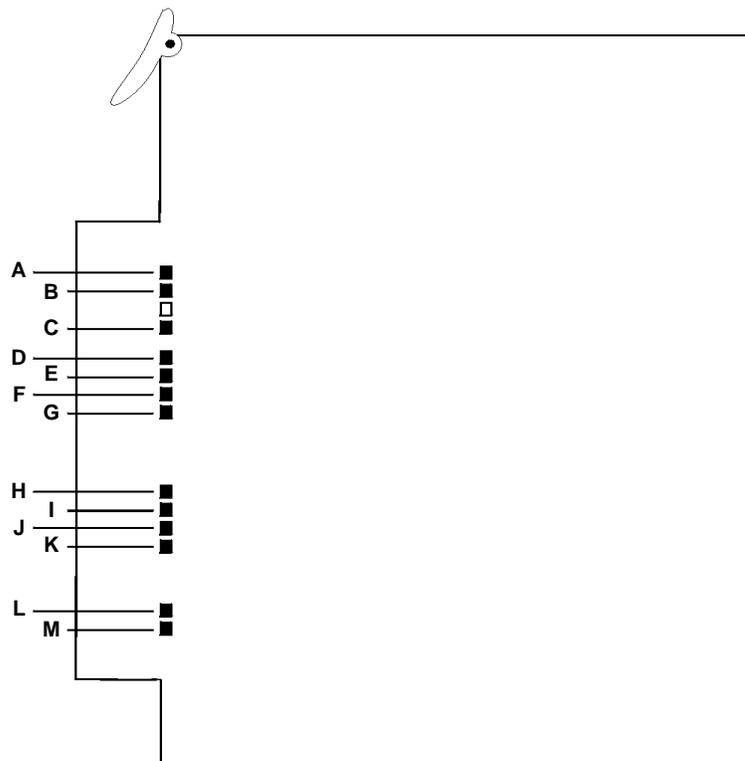


Figure 5-56 EliteMail CTI Daughter Board

6.2.1.2 Daughter Board Components

The components identified in [Figure 5-56 EliteMail CTI Daughter Board](#) are listed and described in [Table 5-42 Daughter Board Components](#).

Table 5-42 Daughter Board Components

Item	Description
A	F206 LED
B	CGA LED
C	Application LED
D~K	VM Channel LEDs 1~8 respectively
L, M	Fax Channel LEDs Channel 1, Channel 2

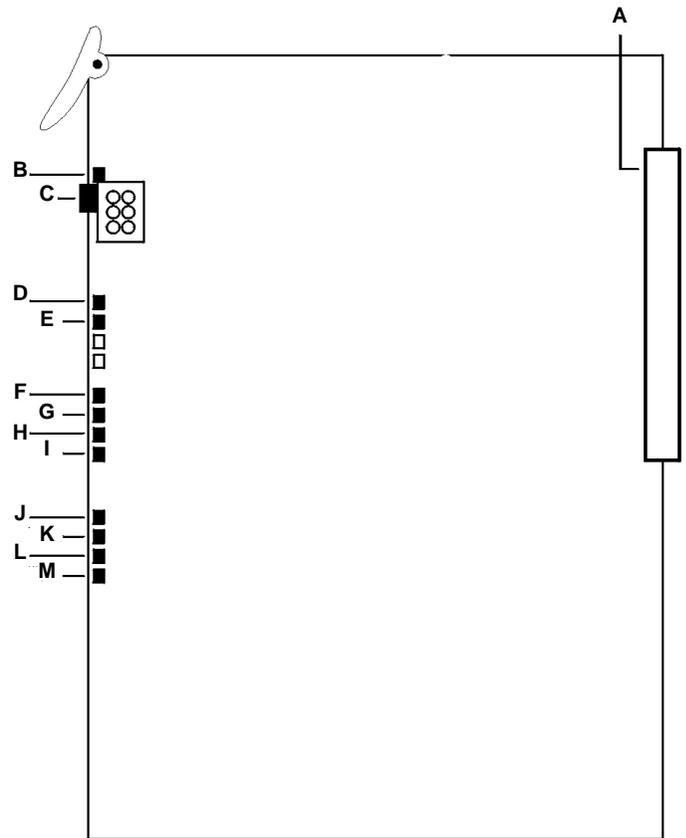


Figure 5-57 EliteMail CTI Port Expansion Board

6.2.1.3 Port Expansion Board

The components identified in [Figure 5-57 EliteMail CTI Port Expansion Board](#) are listed and described in [Table 5-43 Port Expansion Board Components](#).

Table 5-43 Port Expansion Board Components

Item	Description
A	Backplane connector
B	MB LED – Always On when board is installed
C	MB switch – Do not use, leave On
D	F206 LED
E	CGA Live LED
F~M	VM Channels 9~16, respectively

6.2.2 Installation

Only one CTI/VP(4)/(8)/(12)/(16)-U() ETU can be installed in a system.

This ETU shares the total number of station ports in the system.

- ☞ Each system can have one CTI/VP, CMS, FMS, VMS, or IVR ETU.



When installing this ETU, make all ETU DIP switch setting changes before inserting it in the KSU. Ensure that KSU is off.

6.2.3 LED Indications

The HD LED flashes red when the hard drive is active.

- ☞ Do not reset the ETU when the HD LED is flashing.

6.3 FMS(2)/(4)/(8)-U() ETU

6.3.1 Description

The FMS(2)/(4)/(8)-U() ETU is a Digital Voice Mail system that supports a maximum of eight ports.

This ETU is a PC platform installed in the Electra Elite that contains Flash ROM data storage for voice recording and application software. A digital signal processor/voice processing section handles the following functions:

- ① DTMF detection
- ① DTMF generation
- ① General tone detection
- ① FAX CNG tone detection
- ① PCM compression for audio recording/playback
- ① Automatic gain control (AGC)
- ① A serial port (direct connect speeds up to 19.2 Kbps)

This ETU provides 2-, 4-, or 8-ports for digital voice mail. Refer to [Table 5-44 Configuration Support Table](#).

Table 5-44 Configuration Support Table

Function	Configuration Support
Applications	Automated Attendant/Voice Mail with call forwarding (release transfer) Automated Attendant/Voice Mail without call forwarding (await answer transfer) Voice Mail only (No transfer)
Call Forwarding	Supported
Connections	Connects to backplane connector of the KSU
Hardware	One FMS(2)/(4)/(8)-U() ETU
Message Notification	Through message waiting lamp
Operator Console	100 (default) Positive disconnect: Digital Signal
MDM-F-20 Unit	Used for remote connection

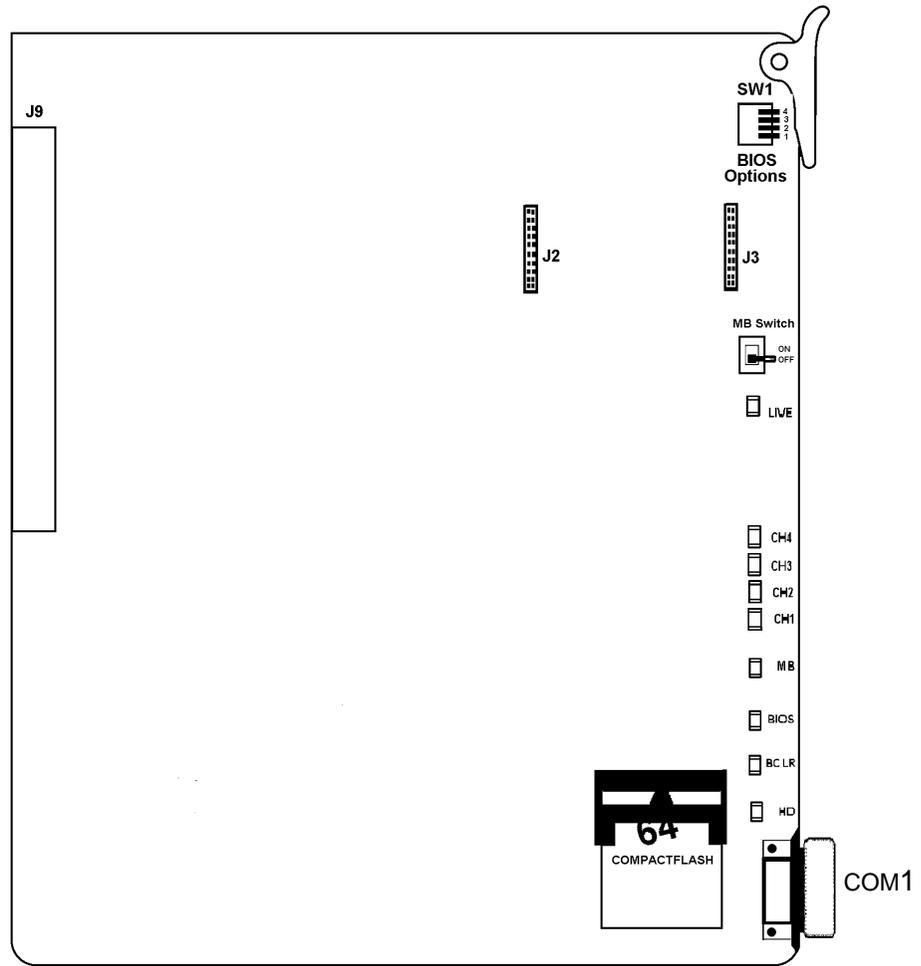


Figure 5-58 FMS(2)/(4)-U() ETU

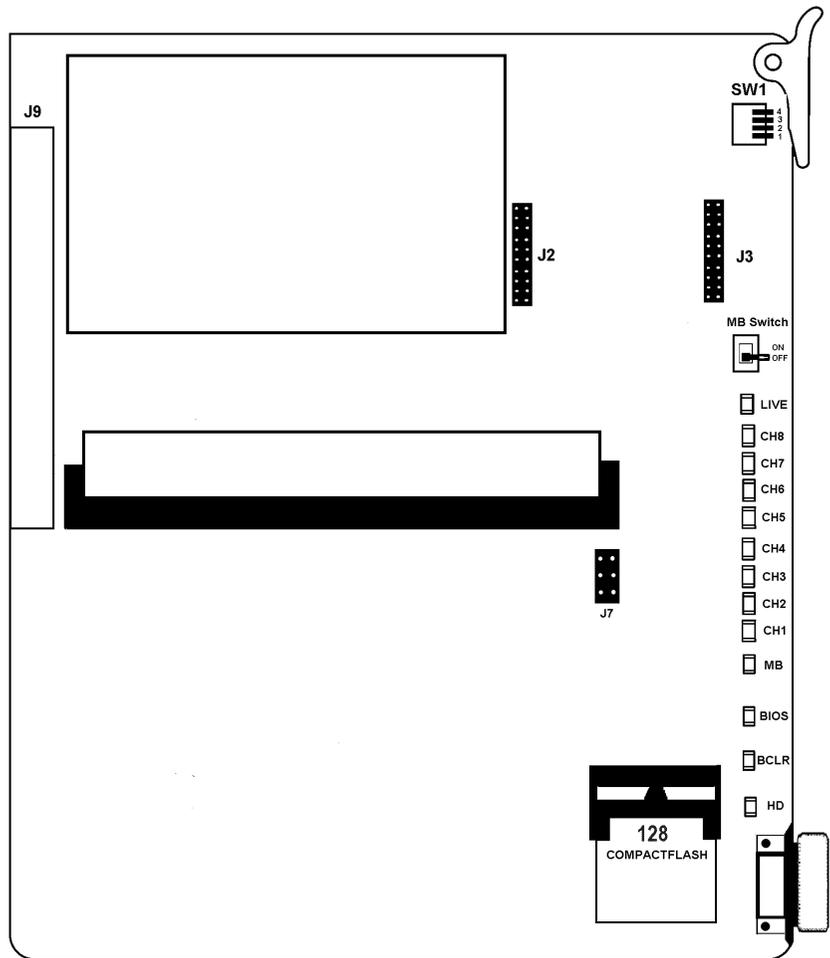


Figure 5-59 FMS(8)-U() ETU

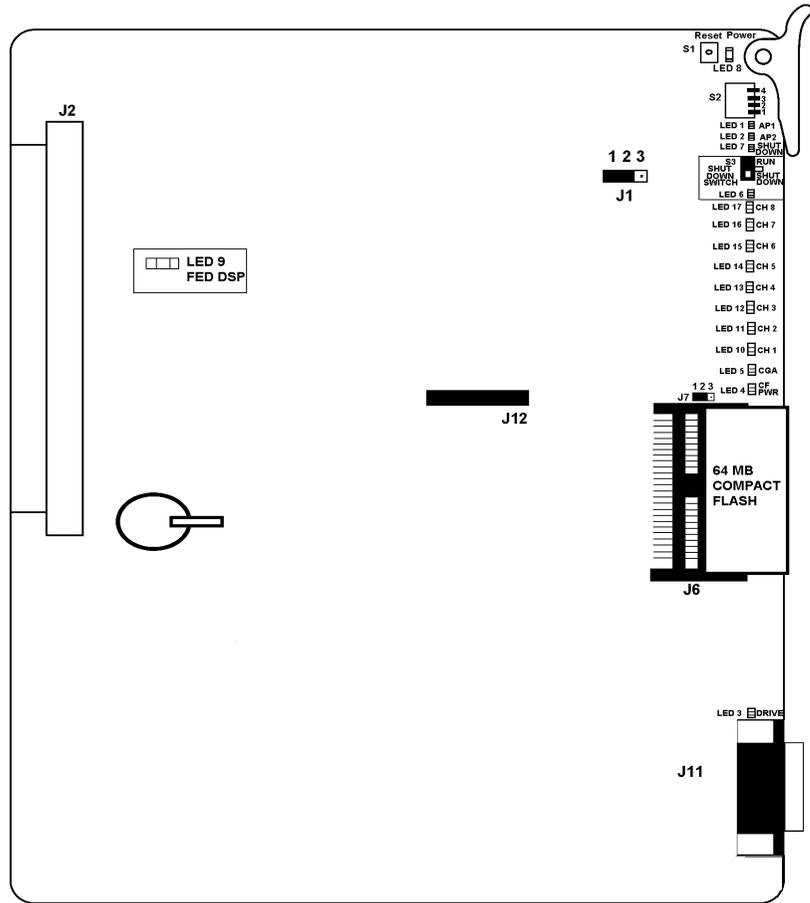


Figure 5-60 FMS-U30 ETU

6.3.2 Installation

Only one FMS(2)/(4)/(8)-U() ETU or one FMS-U30 ETU can be installed in slots S1~S8.

This ETU shares the total number of station ports in the system.

 Each system can have one CTI/VP, CMS, FMS, VMS, or IVR ETU.



When installing this ETU, make all ETU DIP switch setting changes before inserting it in the KSU. Ensure that KSU is off.

6.3.3 Switch Settings

Refer to [Table 5-45 FMS\(2\)/\(4\)/\(8\)-U\(\) ETU Switch Settings](#), for Revision Q26031 v 6.65 or lower. for Revision Q26031 v 6.68 or higher, refer to [Table 5-46 FMS\(2\)/\(4\)/\(8\)-U\(\) ETU DIP Switch Functions](#).

Table 5-45 FMS(2)/(4)/(8)-U() ETU Switch Settings

Switch	Description
1	Normally Off (On to enable COM1)
2	Normally Off When 1 and 2 are both On, COM1 is enabled for HOSTKEY and the VM application is stopped for Maintenance.
3	On to enable COM2 for remote RS-232/RJ-11. Off to allow COM1 local connection.
4	Not Used

 Used for Revision Q26031 v 6.65 or lower.

Table 5-46 FMS(2)/(4)/(8)-U() ETU DIP Switch Functions

DIP 1	DIP 2	DIP 3	DIP 4	Description
ON				To enable HostKey and run Manufacturing Test (NEC Production only)
ON	ON			To enable HostKey with floppy disk redirection and run Manufacturing Test (NEC Production only)
		ON		To connect to CoSession using modem instead of direct cable connection
			ON	To start BRU Host with direct cable connection
		ON	ON	To start BRU Host with modem connection
	ON		ON	To connect to CoSession using direct cable connection but not start voice mail software (Troubleshooting or Maintenance Mode)

 Used for Revision Q05631 v 6.68 or higher.

6.3.4 LED Indications

Refer to [Table 5-47 FMS\(2\)/\(4\)/\(8\)-U\(\) ETU LED Indications](#).

Table 5-47 FMS(2)/(4)/(8)-U() ETU LED Indications

LED	Description	On	Flashing	Off
LIVE	ETU status	Receiving Power	Not Used	No Power
CH1	Port Status	Busy	Not Used	Idle/Not Used
CH2	Port Status	Busy	Not Used	Idle/Not Used
CH3	Port Status	Busy	Not Used	Idle/Not Used
CH4	Port Status	Busy	Not Used	Idle/Not Used
CH5	Port Status	Busy	Not Used	Idle/Not Used
CH6	Port Status	Busy	Not Used	Idle/Not Used
CH7	Port Status	Busy	Not Used	Idle/Not Used
CH8	Port Status	Busy	Not Used	Idle/Not Used
MB	MB Switch Status	ON	Not Used	OFF
BIOS	DOS Status	BIOS Error	Not Used	No error
BCLR	Application Status	Red DOS started (VM Not Ready) Green VM Running Orange Error	Not Used	Idle

 If BCLR LED is orange, check error type on console screen. After error is corrected, LED automatically changes to green. Do Not connect link between console and ETU until BCLR turns green during booting.

HD	Flash Status	Not Used	Compact Flash Disk Active	Flash Inactive
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 Do not reset the ETU while the HD LED is flashing.

Refer to [Table 5-48 FMS-U30 ETU LED Indications](#).

Table 5-48 FMS-U30 ETU LED Indications

LED	Name	Description
LED 1	APP1	Indicates status of voice mail application software Green Application running without errors Amber Application running with errors Red Application not running
LED 2	APP 2	Not Used
LED 3	Drive	HDD active light is red when the hard drive is accessed  Do not reset the ETU while this switch is on.
LED 4	CF Power	On when shutdown switch in Run to indicate power on the ETU
LED 5	ICGA	Live LED flashes every 125 ms during normal operation
LED 6	Shut Down Switch	Indicates that the switch has no software control. On red only when SHUTDOWN switch is in Run
LED 7	Shutdown	On red when SHUTDOWN switch is in SHUT DOWN to indicate that voice mail can be safely removed from the KSU
LED 8	Power	On red when ETU is receiving power from the KSU
LED 9	FED DSP	Used only for development purposes
LED 10	CH 1	On red when voice channel 1 is Off Hook
LED 11	CH 2	On red when voice channel 2 is Off Hook
LED 12	CH 3	On red when voice channel 3 is Off Hook
LED 13	CH 4	On red when voice channel 4 is Off Hook
LED 14	CH 5	On red when voice channel 5 is Off Hook
LED 15	CH 6	On red when voice channel 6 is Off Hook
LED 16	CH 7	On red when voice channel 7 is Off Hook
LED 17	CH 8	On red when voice channel 8 is Off Hook

 The first four channel LEDs are also used during startup to show that the BICOM driver is loaded (LED 1), Scan disk successfully completed (LED 2), CoSession Host successfully Loaded (LED 3), and voice mail started successfully (LED 4). After the system is up and running and all channels are ready to receive calls, these LEDs are Off. When voice mail does not start successfully, all eight channel LEDs and LED 1 are On.

6.3.5 FMS(2)/(4)/(8)-U() ETU Connectors

- ④ J2 and J3
Used to install the MDM-F-20 Unit
- ④ J9
Connects to the backboard
- ④ 9-pin RS-232 (COM2)
Not used (MDM-F-20 Unit)
- ④ RJ-11 modem port (COM2)
Remote connector on serial interface (MDM-F-20 Unit)
- ④ 9-pin RS-232(COM1)
Local serial connector on main ETU for direct connection
- ④ S3
SHUTDOWN switch to stop application

6.3.6 LED Indications

6.3.7 FMS-U30 Jumper Settings

J1	Used only on FMS/CMS
1 - 2	No external modem connected (default)
2 - 3	External modem connected

6.3.8 FMS-U30 ETU Connectors

- ④ J2
Connects to the backplane
- ④ J6
Used for Compact flash drive on FMS
- ④ J11)
COM port for console programming connection
- ④ J12
Port expansion connector for DSP-U30

6.4 VMS(2)/(4)/(8)-U() ETU

6.4.1 Description

The VMS(2)/(4)/(8)-U() ETU is a 2-, 4-, or 8-port Digital Voice Mail system.

This ETU is a PC platform installed in the Electra Elite and contains hard disk space for voice recording storage and application software. A digital signal processor/voice processing section handles the following functions:

- ④ DTMF detection
- ④ DTMF generation
- ④ General tone detection
- ④ FAX CNG tone detection
- ④ PCM compression for audio recording/playback
- ④ Automatic gain control (AGC)
- ④ A serial port (direct connect speeds up to 19.2 Kbps) to connect external modem

This ETU provides 2-, 4-, or 8-ports for digital voice mail. The 2- and 4-port require the included digital signal processor (DSP); the 8-port configuration requires a DSP-F-21 Unit. Refer to [Table 5-49 Configuration Support Table](#).

Table 5-49 Configuration Support Table

Function	Configuration Support
Applications	Automated Attendant/Voice Mail with call forwarding (release transfer) Automated Attendant/Voice Mail without call forwarding (await answer transfer) Voice Mail only (No transfer)
Call Forwarding	Supported
Connections	Connects to backplane connector of the KSU
Hardware	One VMS(2)/(4)/(8)-U() ETU
Message Notification	Through message waiting lamp
MDM-F-20 Unit	Used for remote connection

8-port VMS(8)-U() ETU shown with 4-port auxiliary DSP installed. For VMS(2)/(4)/(8)-U() ETU, the auxiliary is not required.

Option Kit required for remote maintenance is purchased separately.

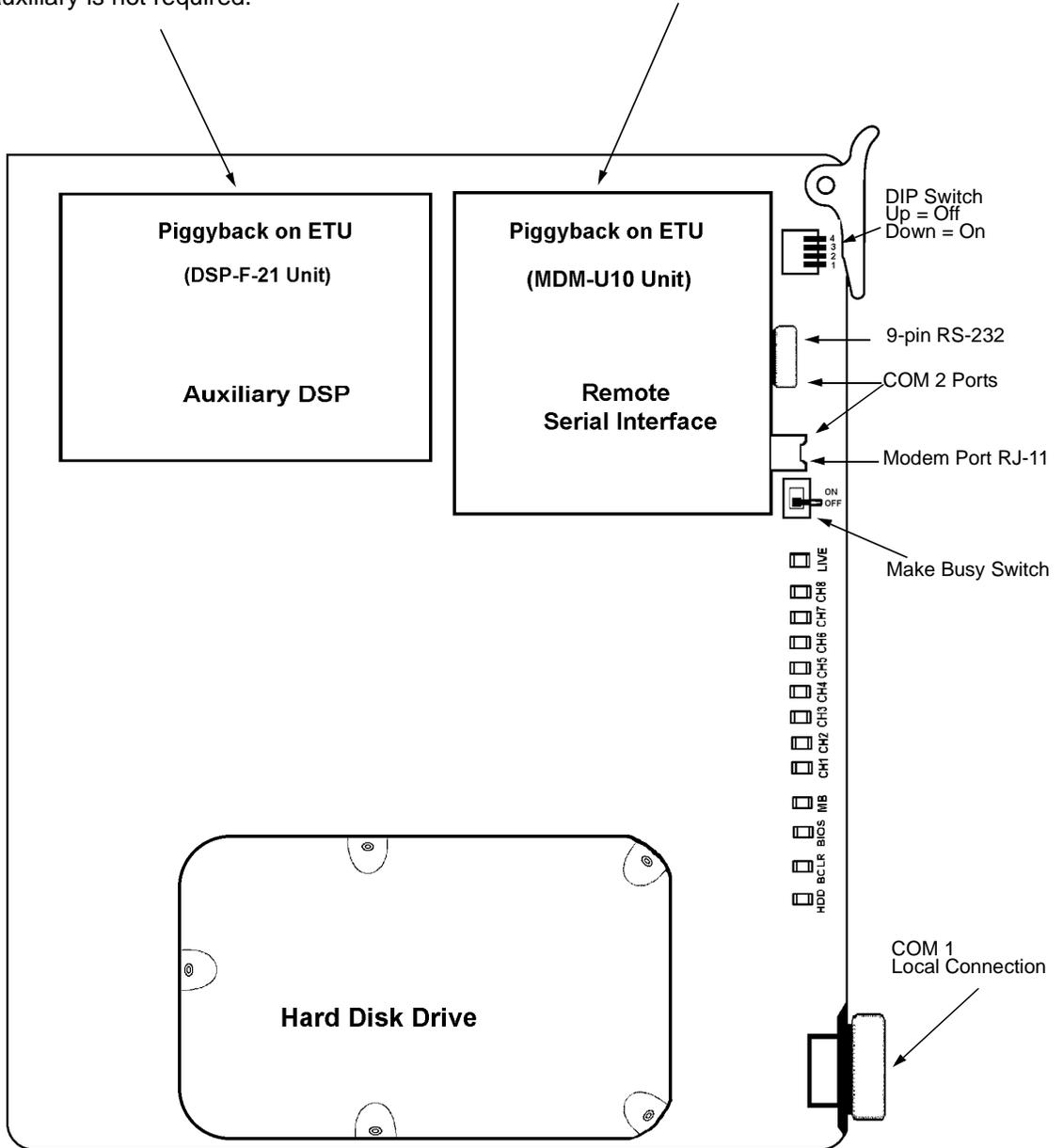


Figure 5-61 VMS(2)/(4)/(8)-U() ETU

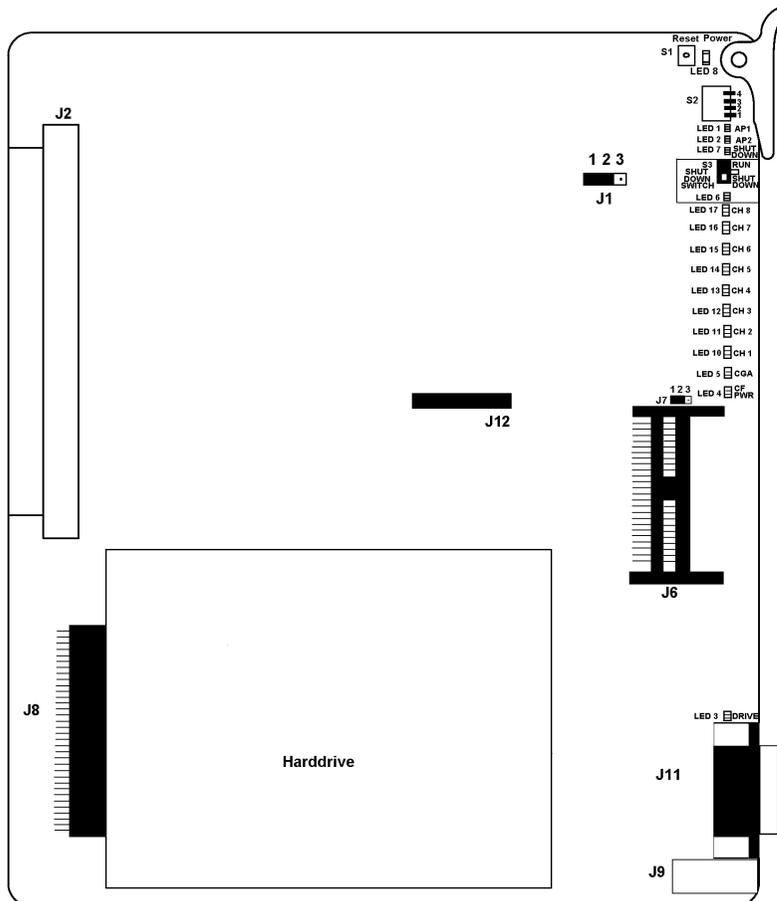


Figure 5-62 VMS-U30 ETU

6.4.2 Installation

The VMS(2)-U10 ETU has two channels of built-in Voice Mail.

The VMS(4)-U10 ETU has four channels of built-in Voice Mail.

The VMS(8)-U10 ETU has eight channels of built-in Voice Mail.

Only one VMS(2)/(4)/(8)-U() ETU or VMS-U30 ETU can be installed in each system in slots S1~S8.

This ETU shares the total number of station ports in the system.

 Each system can have one CTI/VP, CMS, FMS, VMS, or IVR ETU.



When installing this ETU, make all ETU DIP switch setting changes before inserting it in the KSU. Ensure that KSU is off.

6.4.3 Switch Settings

Refer to [Table 5-50 VMS\(2\)/\(4\)/\(8\)-U\(\) ETU DIP Switch Settings](#). (Revision Q30931 v 6.65 or lower). For Revision Q30931 v 6.68 or higher, refer to [Table 5-51 VMS\(2\)/\(4\)/\(8\)-U\(\) ETU DIP Switch Functions](#).

Table 5-50 VMS(2)/(4)/(8)-U() ETU DIP Switch Settings

Switch	Description
1	Normally Off (On to enable COM1)
2	Normally Off When 1 and 2 are both On, COM1 is enabled for HOSTKEY and the VM application is stopped for Maintenance.
3	On to enable COM2 for remote RS-232/RJ-11. Off to allow COM1 local connection.
4	Not Used

 Used for Revision Q30931 v 6.65 or lower.

Table 5-51 VMS(2)/(4)/(8)-U() ETU DIP Switch Functions

DIP 1	DIP 2	DIP 3	DIP 4	Description
ON				To enable HostKey and run Manufacturing Test (NEC Production only)
ON	ON			To enable HostKey with floppy disk redirection and run Manufacturing Test (NEC Production only)
		ON		To connect to CoSession using modem instead of direct cable connection
			ON	To start BRU Host with direct cable connection
		ON	ON	To start BRU Host with modem connection
	ON		ON	To connect to CoSession using direct cable connection but not start voice mail software (Troubleshooting or Maintenance Mode)

 Used for Revision Q00631 v 6.68 or higher.

6.4.4 LED Indications

Refer to [Table 5-52 VMS\(2\)/\(4\)/\(8\)-U\(\) ETU LED Indications](#).

Table 5-52 VMS(2)/(4)/(8)-U() ETU LED Indications

LED	Description	On	Flashing	Off
LIVE	ETU status	Receiving power	Not Used	No Power
CH1	Port status	Busy	Not Used	Idle/Not used
CH2	Port status	Busy	Not Used	Idle/Not used
CH3	Port status	Busy	Not Used	Idle/Not used
CH4	Port status	Busy	Not Used	Idle/Not used
CH5	Port status	Busy	Not Used	Idle/Not used
CH6	Port status	Busy	Not Used	Idle/Not used
CH7	Port status	Busy	Not Used	Idle/Not used
CH8	Port status	Busy	Not Used	Idle/Not used
MB	MB Switch status	ON	Not Used	OFF
BIOS	BIOS Error Status	BIOS Error	Not Used	No error
BCLR	Application status	Red DOS started (VM not ready) Green VM running Orange Error	Not Used	Idle

 If BCLR LED is orange, check error type on console screen. After error is corrected, LED automatically changes to green. Do Not connect link between console and ETU until BCLR turns green during booting.

HDD	Hard Disk status	Not Used	Hard Disk active	Hard Disk inactive
-----	------------------	----------	------------------	--------------------

 Do not reset the ETU while the HDD LED is flashing.

Refer to [Table 5-53 VMS-U30 ETU LED Indications](#)

Table 5-53 VMS-U30 ETU LED Indications

LED	Name	Description
LED 1	APP1	Indicates status of voice mail application software Green Application running without errors Amber Application running with errors Red Application not running
LED 2	APP 2	Not Used
LED 3	Drive	HDD active light is red when the hard drive is accessed  Do not reset the ETU while this switch is On.
LED 4	CF Power	On when shutdown switch in Run to indicate power on the ETU
LED 5	ICGA	Live LED flashes every 125 ms during normal operation
LED 6	Shut Down Switch	Indicates that the switch has no software control. On red only when SHUTDOWN switch is in Run
LED 7	Shutdown	On red when SHUTDOWN switch is in SHUT DOWN to indicate that voice mail can be safely removed from the KSU
LED 8	Power	On red when ETU is receiving power from the KSU
LED 9	FED DSP	Used only for development purposes
LED 10	CH 1	On red when voice channel 1 is Off Hook
LED 11	CH 2	On red when voice channel 2 is Off Hook
LED 12	CH 3	On red when voice channel 3 is Off Hook
LED 13	CH 4	On red when voice channel 4 is Off Hook
LED 14	CH 5	On red when voice channel 5 is Off Hook
LED 15	CH 6	On red when voice channel 6 is Off Hook
LED 16	CH 7	On red when voice channel 7 is Off Hook
LED 17	CH 8	On red when voice channel 8 is Off Hook

 The first four channel LEDs are also used during startup to show that the BICOM driver is loaded (LED 1), Scan disk successfully completed (LED 2), CoSession Host successfully Loaded (LED 3), and voice mail started successfully (LED 4). After the system is up and running and all channels are ready to receive calls, these LEDs are Off. When voice mail does not start successfully, all eight channel LEDs and LED 1 are on.

6.4.5 VMS(2)/(4)/(8)-U() ETU Connectors

④ CN1

Connects to the backboard

④ 9-pin RS-232(COM2)

Not used (MDM-F-20 Unit)

④ RJ-11 modem port(COM2)

Remote connector on serial interface (MDM-F-20 Unit)

④ 9-pin RS-232(COM1)

Local Serial connector on main ETU for direct connection

6.4.6 VMS-U30 Jumper Settings

J7	Used only on VMS
1 - 2	Compact flash is master drive
2 - 3	Hard Drive is master drive (default)

6.4.7 VMS-U30 ETU Connectors

- ④ J2
Connects to the backplane
- ④ J6
Used for Compact flash drive on FMS
- ④ J8
Used for Harddrive
- ④ J9
RJ-45 LAN connector for network connection
- ④ J11)
COM port for console programming connection
- ④ J12
Port expansion connector for DSP-U30

SECTION 7

OPTIONAL ETUS

This section describes optional Electronic Telephone Units that provide additional functions for an Electra Elite system.

7.1 ACD(8)-U() ETU

7.1.1 Description

The ACD(8)-U() ETU interfaces the Elite ACD Plus Server to the Electra Elite KSU. Elite ACD Plus provides Windows-based software programs to enhance the ACD features of the Electra Elite Key Telephone System.

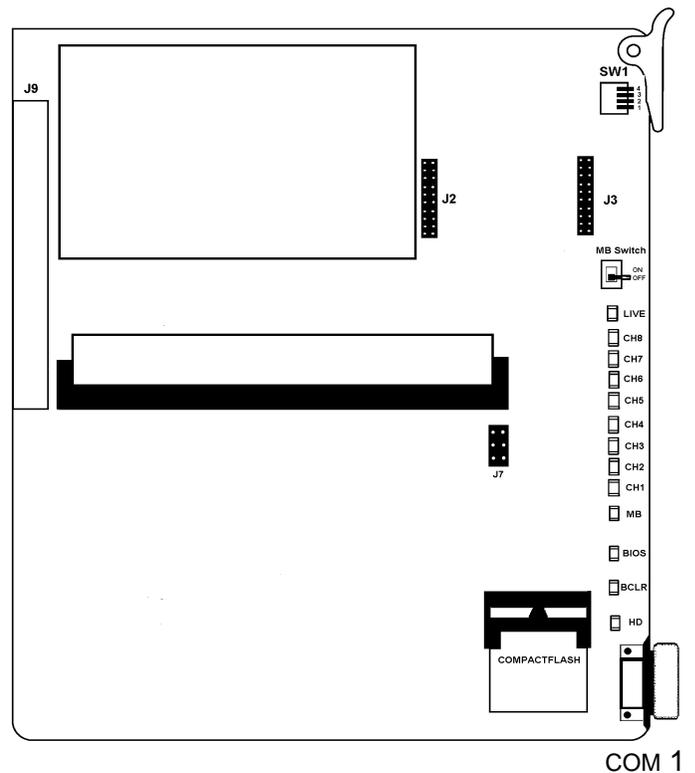


Figure 5-63 ACD(8)-U() ETU

7.1.2 Installation

Only one ACD(8) can be installed in slot S1~S8 in any system KSU.

7.1.3 LED Indications

Table 5-54 ACD(8)-U() ETU LED Indications

LED	Description	On	Flashing	Off
LIVE	ETU status	Receiving power	Not Used	No Power
CH1	Port status	Busy	Not Used	Idle/Not used
CH2	Port status	Busy	Not Used	Idle/Not used
CH3	Port status	Busy	Not Used	Idle/Not used
CH4	Port status	Busy	Not Used	Idle/Not used
CH5	Port status	Busy	Not Used	Idle/Not used
CH6	Port status	Busy	Not Used	Idle/Not used
CH7	Port status	Busy	Not Used	Idle/Not used
CH8	Port status	Busy	Not Used	Idle/Not used
MB	MB Switch status	ON	Not Used	OFF
BIOS	BIOS Error status	BIOS Error	Not Used	No error
BCLR	Application status	Red DOS started (ACD not ready) Green ACD running	Not Used	Idle
If BCLR LED is orange, check error type on console screen. After error is corrected, LED automatically changes to green. Do Not connect link between console and ETU until BCLR turns green during booting.				
HD	Compact Flash status	Not Used	Compact Flash active **	Compact Flash inactive

 *Do not reset the ETU while the HD LED is flashing.*

7.1.4 Connectors

The ACD(8)-U() ETU has two connectors:

-  J9 Connects to the backboard
-  9-pin RS-232(COM1) Local Serial connector for direct connection.

7.1.5 Installation Precautions

The ETUs make extensive use of CMOS technology that is very susceptible to static electricity.

☞ Static discharge must be avoided when handling ETUs.

Always use the following precautions:

- ① Wear a grounding strap anytime you handle the ETU.
- ① Make all ETU DIP switch setting changes before inserting it in the KSU. Ensure that Make Busy switch is off.
- ① Carry ETU in a conductive polyethylene bag to prevent static electricity damage.

7.2 BSU(2)-U() ETU

7.2.1 Description

The BSU(2)-U() ETU provides the connection for Zone Transceivers.

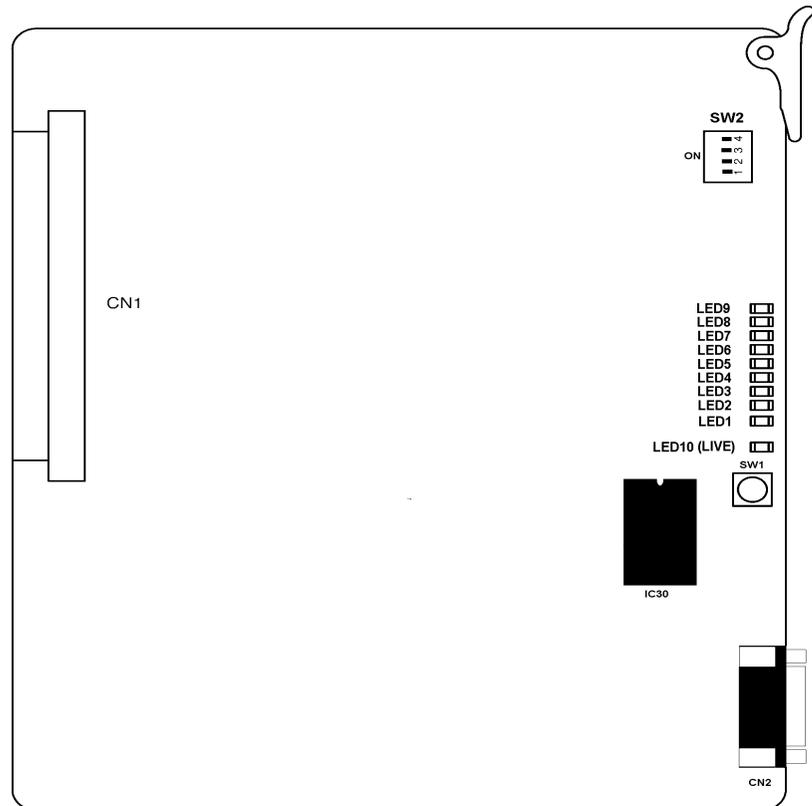


Figure 5-64 BSU(2)-U() ETU

7.2.2 Installation

Up to eight ETUs can be installed in slots S1~S8 in any system KSU.

7.2.3 Switch Settings

The default switch settings are shown in [Table 5-55 BSU\(2\)-U\(\) ETU Default Switch Settings](#).

Table 5-55 BSU(2)-U() ETU Default Switch Settings

SW1	Description
Momentary Switch	BSU ETU Reset

SW2-1	Description
Off	Reports BSU ID to Main S/W (Master)
On	Does not report BSU ID to Main S/W (Slave)

SW2-2	Description
Off	Boot by Flash memory (Default)
On	Boot from E-Prom (IC30)

SW2-3	Description
Off	Normal Operation (Default)
On	Test Mode

SW2-4	Description
Off	Watch Dog Timer On (Default)
On	Watch Dog Timer Off



Pressing SW1 interrupts all Wireless users connected to the BSU(2)-U() ETU. Use *this switch only as a last resort.*

7.2.4 LED Indications

Table 5-56 LED Indications

LED	Description	On	Flashing	Off
1	Link Status for ZT1	Layer 1: Up Layer 2: Up	Layer 1: Up Layer 2: Down	Layer 1: Down Layer 2: Down
2	Link Status for ZT2	Layer 1: Up Layer 2: Up	Layer 1: Up Layer 2: Down	Layer 1: Down Layer 2: Down
3	Not used	Always Off		
4				
5	Status for ZT1	Refer to Table 5-57 ZT Status Table for LEDs 5 and 6		
6	Status for ZT2			
7	Not used	Always Off		
8				
9	BSU Status	Alarm	Normal Operation	Not Operating
10	LIVE	Operation stopped (Power still on)	Normal Operation	No Power

Table 5-57 ZT Status Table for LEDs 5 and 6

<p>Lamp Off Line is not Connected</p> <p>Lamp On indications are shown below.</p> <p>No Flicker (ZT is in standby)</p> <p>On _____ Lamp</p> <p>Off Time (0.2s)</p>
<p>Flash cycle is 0.1 seconds (Not Supported)</p> <p>On _____ Lamp</p> <p>Off Time (0.2s)</p>
<p>Flash cycle is 0.2 seconds. Remaining indications depend on the number of PS connections.</p> <p>1 PS connection</p> <p>On _____ Lamp</p> <p>Off Time (0.2s)</p>
<p>2 PS connections</p> <p>On _____ Lamp</p> <p>Off Time (0.2s)</p>
<p>3 PS Connections (ZT is busy)</p> <p>On _____ Lamp</p> <p>Off Time (0.2s)</p>

7.2.5 Connectors

The BSU(2)-U() ETU has two connectors:

- Ⓛ CN1 Connects to the backboard
- Ⓛ CN2 For future use

7.2.6 ZT II Connections

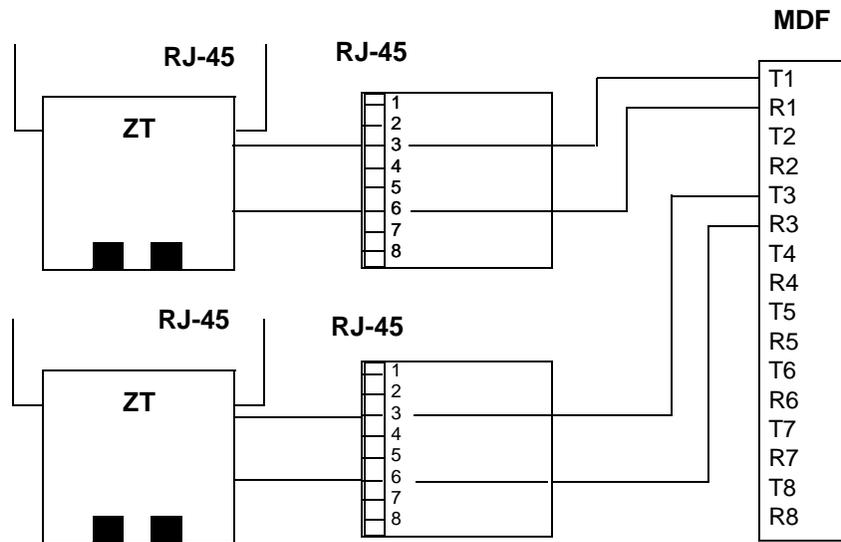


Figure 5-65 BSU(2)-U() ETU Connections

7.3 CCH(4)-U() ETU

7.3.1 Description

The Common Channel Handler is an optional Interface ETU that provides a common channel signal through the DTI-U30 ETU to a K-CCIS network and controls the signaling between the KTS and the CPU. Each CCH ETU supports four K-CCIS links.

Only one CCH(4)-U() ETU can be installed in each system.

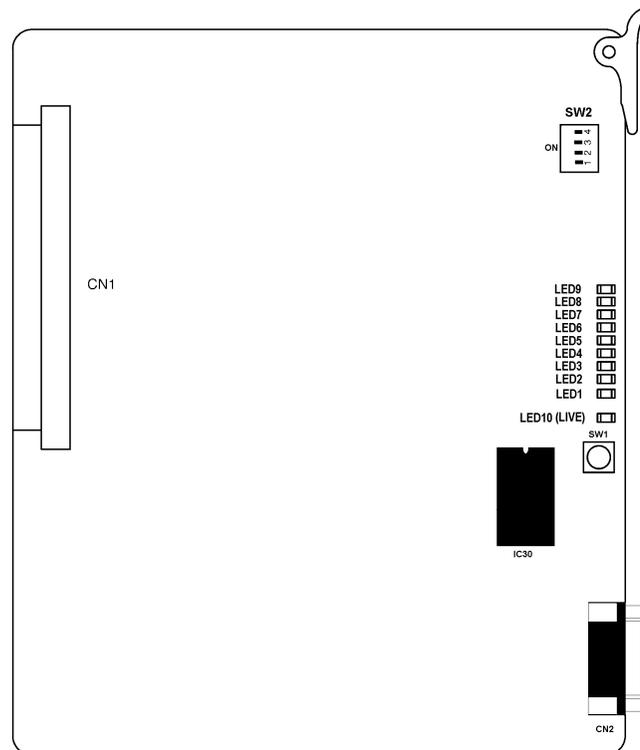


Figure 5-66 CCH(4)-U10 ETU

7.3.2 Installation

The CCH(4)-U() ETU can be installed in any IF slot in the basic B64-U10 KSU or any expansion KSU in the Elite 192 system. Only one CCH(4)-U() ETU can be installed in a system.

7.3.3 Switch Settings

Default switch settings are shown in the following table.

Table 5-58 CCH(4)-U() ETU Default Switch Settings

Switch	Setting/Description
SW1	Momentary Switch to reset the CCH ETU. When this switch is pressed, all K-CCIS users connected to the CCH ETU are interrupted. <i>Use this switch only after all other options have failed.</i>
SW2-1	Off: Normal Operation (Default) On: Test Mode
SW2-2	Off: Boot from Flash Memory (Default) On: Boot from E-PROM (IC30)
SW2-3	Off: Normal Operation (Default) On: Test Mode
SW2-4	Off: Watch Dog Timer On (Default) On: Watch Dog Timer Off

7.3.4 LED Indications

Table 5-59 CCH(4) LED Indications

LED	Description	On	Flashing	Off
1	Link status for CCH1	Layer 2: Up	Not Used	Layer 2: Down
2	Link status for CCH2	Layer 2: Up	Not Used	Layer 2: Down
3	Link status for CCH3	Layer 2: Up	Not Used	Layer 2: Down
4	Link status for CCH4	Layer 2: Up	Not Used	Layer 2: Down
5	Link status for CCH1	Data sent/received	Not Used	Idle
6	Link status for CCH2	Data sent/received	Not Used	Idle
7	Link status for CCH3	Data sent/received	Not Used	Idle
8	Link status for CCH4	Data sent/received	Not Used	Idle
9	CCH status	Alarm	Normal Operation	Not Operating
10	LIVE	Operation stopped (Power still on)	Normal Operation	No Power

7.3.5 Connectors

The CCH(4)-U() ETU has two connectors:

- ① CN1 Connects to the backboard
- ② CN2 Performs maintenance functions

7.3.6 Connections

Physical connections to the MDF are not required for the CCH ETU.

7.4 ECR-U() ETU

7.4.1 Description

The ECR-U() ETU provides external relay control for Zone Paging systems (3 relays), External Ringing control (4 relays), Night Chime ringing control (1 relay), and two general purpose relays.

There are two audio jacks. One provides the both-way audio-for-paging system. The other provides a tone output for External Tone Ringing and Night Chime.

7.4.2 Installation

Only one ECR-U() can be installed in slots S1~S8 in the system.

7.4.3 LED Indications

Live LED indications are listed below.

- | | | |
|---|--------------|------------------------------|
| Ⓛ | Blinking Red | Normal Operation |
| Ⓛ | Steady Red | Operation Stopped (power On) |
| Ⓛ | Off | No Power |

Busy LED indications are listed below.

- | | | |
|---|------------|----------------------|
| Ⓛ | Steady Red | Some Relays Are Busy |
| Ⓛ | Off | All Relays Are Idle |

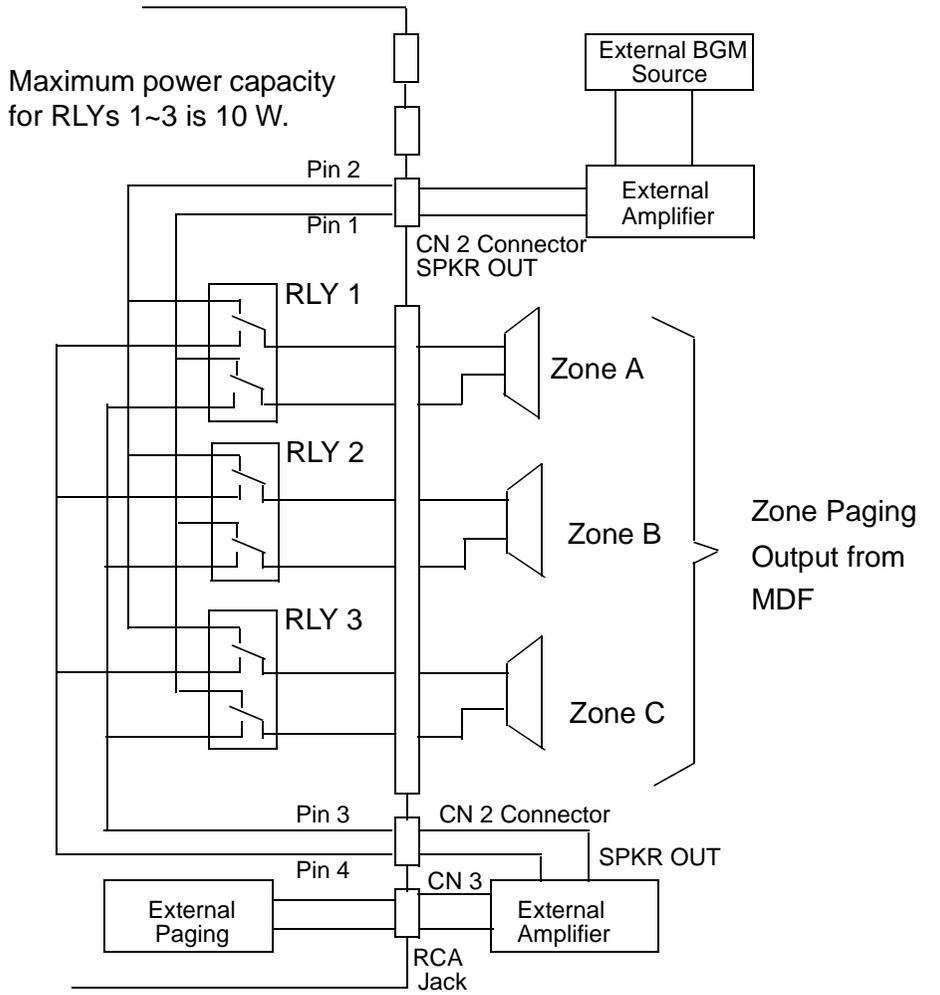


Figure 5-67 ECR-U() Block Diagram

7.4.4 Connectors

Refer to [Table 5-60 Connector Descriptions \(CN2\)](#) and [Figure 5-68 ECR-U\(\) ETU](#).

The ECR-U10 ETU has four connectors:

- ④ CN1 Connects to the Backboard
- ④ CN2 Contacts for Relays
- ④ CN3 Both-way Audio Connection for External Paging
- ④ CN4 Audio output for Tone Ringer and Night Chime

Table 5-60 Connector Descriptions (CN2)

Pin Number	Description
13~16	Not Used
12	General Purpose Relay #1
11	
10	General Purpose Relay #0
9	
5~8	Not Used
4	Zone Paging Audio Input
3	
2	External Paging BGM input
1	

Refer to [Table 4-1 MDF Cable Connections](#) for all other ECR-U() cable connections.

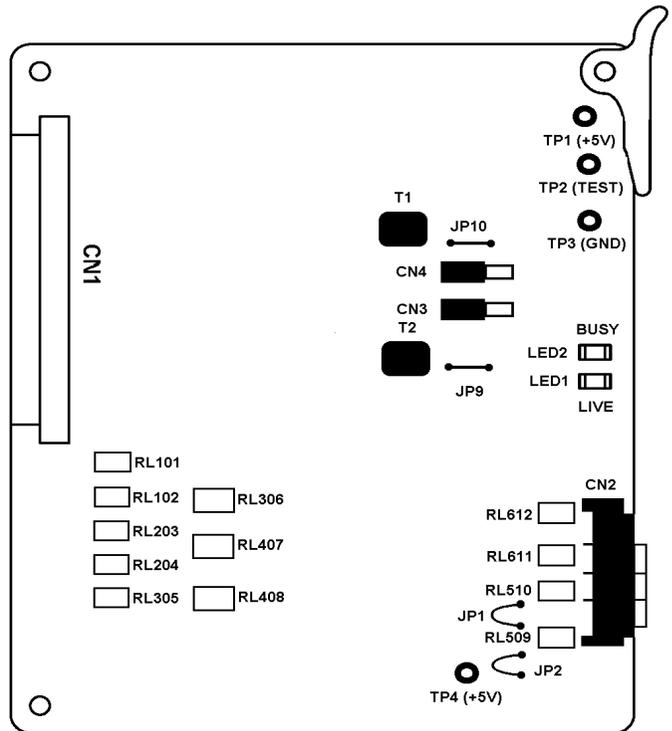


Figure 5-68 ECR-U() ETU

7.4.5 Specifications

- ⌚ Relays All relays are rated 24 Vdc at 500 mA
- ⌚ External Tone Output Power -10 dBm
- ⌚ Ringer/Night Chime Output Impedance 600Ω
- ⌚ External Paging Output power -10 dBm
- ⌚ Output Impedance 600Ω

7.5 HUB(8)-U() ETU

7.5.1 Description

The HUB(8)-U() ETU is an optional Ethernet interface for the Electra Elite KSU that supports eight Ethernet ports. Each port has two LEDs that indicate status and activity.

A HUB is a switching point for data that comes together from individual ports. A switch determines the port where the data should be forwarded and regulates transmission. The HUB(8)-U() ETU provides an efficient platform when multiple ETUs that require Ethernet connection are installed in the Electra Elite KSU. One port can be a source port, and another port can be set as a target port to mirror the source and monitor data traffic.

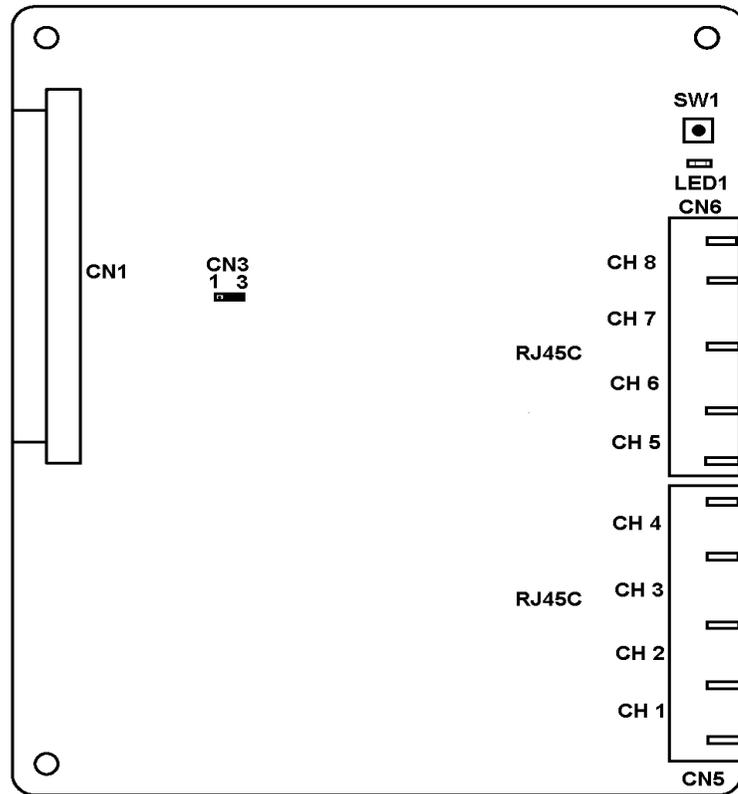


Figure 5-69 HUB(8)-U() ETU

7.5.2 Installation

The HUB(8)-U() ETU cannot be installed in a KSU that contains EliteMail VP and IVR or CTI and IVR systems.

- ☞ This ETU has an attached green cable that must be connected to frame ground.

Only one HUB(8)-U() ETU can be installed in slots S1~S8.

The system is limited by 120 stations. This ETU shares the total number of station ports in the system.

7.5.3 Switch Settings

Press switch SW1 to Reset the HUB(8)-U() ETU.

7.5.4 LED Indications

Refer to [Table 5-61 HUB\(8\)-U\(\) LEDS](#).

Table 5-61 HUB(8)-U() LEDS

LED	ON	OFF	Blinking
LED1		No Power to ETU	Normal Operation
RJ45C Yellow	100 Mbps	10 Mbps	N/A
RJ45C Green	LINK	No Link	Data Tx/Rx

7.5.5 Connectors

The HUB(8)-U-() ETU the following connectors:

- ① CN1
Connects to the Backboard
- ① CN3
Three pin Jumper. Pins 2 and 3 are shorted for Normal operation
- ① CN5
Channel 1~4 RJ45C Connectors
- ① CN6
Channel 5~8 RJ45C Connectors

7.6 IAD(8)-U()

7.6.1 Description

The IAD(8)-U() ETU is an optional interface integration device ETU for the Electra Elite KSU. The IAD(8)-U() ETU supports various IP applications such as the IP CCH ETU application and the MEGACO Station Application. Currently used configurations are indicated in [Table 5-62 IAD\(8\)-U\(\) Configurations](#).

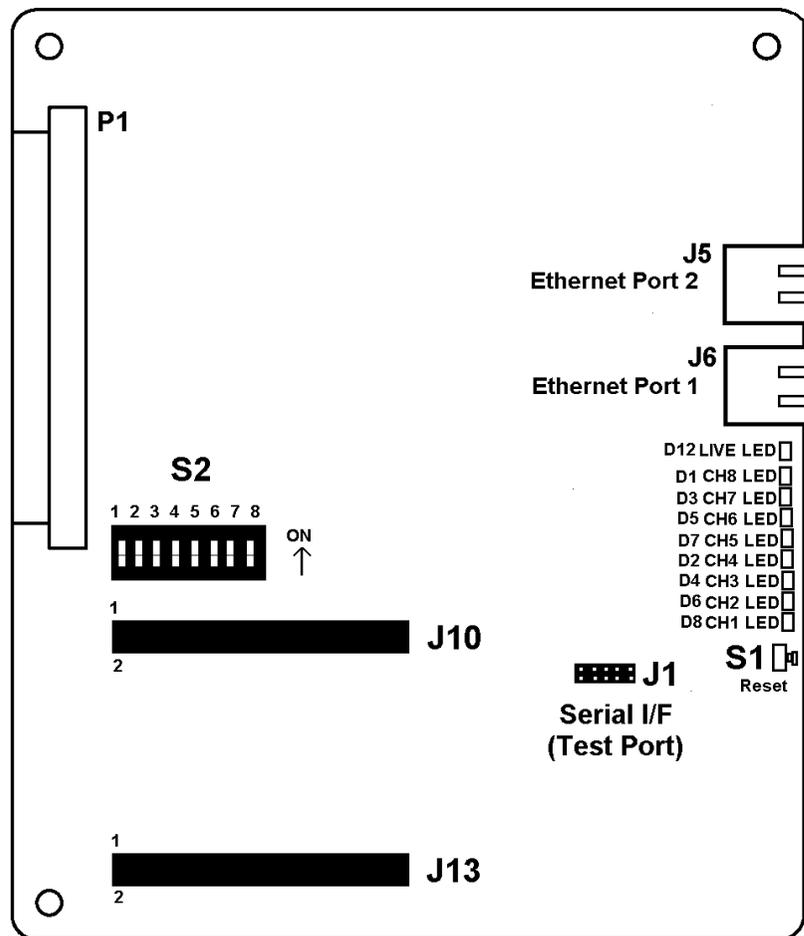


Figure 5-70 IAD(8)-U() ETU

Table 5-62 IAD(8)-U() Configurations

Configuration	Ports	Installation slot Electra Elite IPK	Application
DTI(8)-U-U()	8	S1~S8	IP CCH ETU
ESI(8)-U()	8	S1~S8	Megaco Station ETU

7.6.2 Boot Up Sequence Status Identification

Status of the IAD(8)-U() ETU during boot up is shown in [Table 5-63 IAD\(8\)-U\(\) LED Boot Sequence Indications](#).

Table 5-63 IAD(8)-U() LED Boot Sequence Indications

State	D8 CH 1	D6 CH 2	D4 CH 3	D2 CH 4	D7 CH 5	D5 CH 6	D3 CH 7	D1 CH 8	*D12 LIVE	Approximate Time
1	Off	Flash	1 second (from Cold Boot)							
2	ON	ON	ON	ON	Off	Off	Off	Off	Flash	5 seconds
3	Off	Flash	3 seconds							
4	Off	Off	Off	Off	ON	ON	Off	Off	Flash	5 seconds
5	Off	Off	Off	Off	Off	Off	ON	ON	Flash	5 seconds
6	Off	Flash	5 seconds							

* LIVE LED D12 also flashes when ETU is receiving power from the KSU.

7.6.3 Installation

This ETU can be installed in any KSU slot that supports the applicable ETU simulated.

A maximum of 14 IAD(8)-U() ETUs can be installed in slots S1~S8 when used as an ESI.

A maximum of eight IAD(8)-U() ETUs can be installed in slots S1~S8 when used as a DTI-U.

7.6.4 Switch Settings

Refer to [Table 5-64 IAD\(8\)-U\(\) ETU Switches](#).

Table 5-64 IAD(8)-U() ETU Switches

Switch	Setting	Description
S1	Press to Reset	Host Reset Switch
S2	Shown below	Eight-position DIP Switch
S2-1~3	Always Off	Reserved
S2-4	On (default) to enable Off to disable	Auto Card Discovery Selection - On only for first power on to recognize ETU and set defaults or for ESI(8)-U() ETU simulation
S2-5	Always On to enable 8 ports (Off enables 4 ports)	Number of Voice Ports Selection
S2-6~8	S2-6 and S2-7 On for DTI mode. S2-6 On for ESI Mode	IAD(8)-U() ETU Mode Selection to show simulated ETU

7.6.5 Ethernet Status

Two Built-in LEDs (One green and one yellow) on the front of each RJ-45 Connector indicate Ethernet connection status. The yellow LED is On when the link is up; the green LED is On to indicate activity.

7.6.6 Connectors

This ETU has the following connectors:

- ① P1
Connects to the backboard
- ① J1, J10, J11
Reserved for future use
- ① J5
RJ-45 Ethernet connector for future use
- ① J6
Default RJ-45 Ethernet connector

7.7 IPCA()-U() ETU

7.7.1 Description

The IPCA()-U() ETU is a pure IP switch ETU for use with the Electra Elite KSU. The IPCA()-U() ETU can manage call control for a maximum of 30 IP software telephones. The MG(8)-U() ETU is required for IP telephones to communicate with existing Electra Elite telephones or various available trunks.

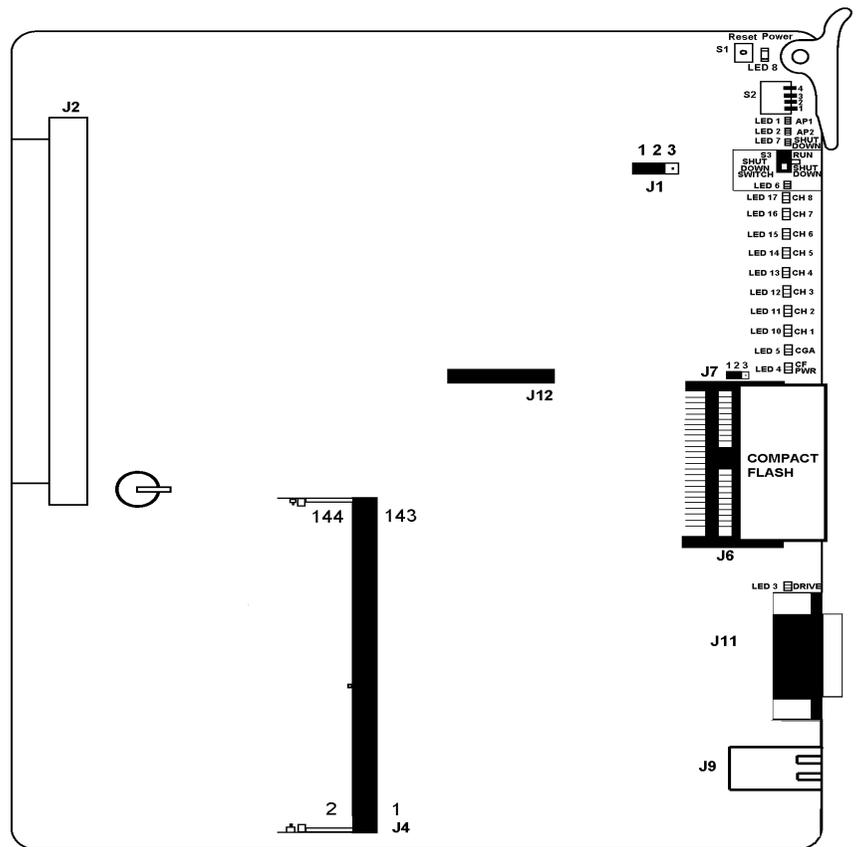


Figure 5-71 IPCA()-U10

7.7.2 Installation

Only one IPCA()-U() ETU can be installed in slots S1~S8.

The system is limited by 120 stations. This ETU shares the total number of station ports in the system.

7.7.3 Installation Procedure



When installing this ETU, make all ETU DIP switch setting changes before inserting it in the KSU.

7.7.4 Installation Procedure

1. Ensure that Switch S3 is in SHUTDOWN.
2. Insert IPCA-U() ETU in Electra Elite IPK KSU.
3. Connect LAN cable to the LAN.
4. Ensure that Switch S3 is in RUN.
5. Wait for the green AP1 LED to come On.

7.7.5 Shut Down Procedure

1. Ensure that Drive LED is not flashing.
2. Place Switch S3 in SHUTDOWN.
3. Wait for red SHUT DOWN LED to come On.
4. Remove the IPCA-U() from the KSU.

7.7.6 Switch Settings

ⓘ S1

Resets ETU

ⓘ S2-1

Normal Off. On to set default networking values.

☞ When IP address setting is lost, the IPCA-U() can be rebooted with switch S2-1 On to set temporary default networking values:

- › IPC IP Address Assignment: 192.168.0.1
- › IPC Subnet Mask Assignment: 255.255.255.0
- › IPC Router Address Assignment: 0.0.0.0
- › DHCP Client Assignment: Disable
- › IPC Host Name: mgc

ⓘ S2-2

Used to enable (ON) or disable (OFF) Log File for troubleshooting

ⓘ S2-3/4

Not used

ⓘ S3

SHUTDOWN switch to start or stop the application

7.7.7 LED Indications

Refer to [Table 5-65 IPCA\(\)-U\(\)ETU LED Indications](#).**Table 5-65 IPCA()-U()ETU LED Indications**

LED	Name	Color	Controller	ON	OFF
1	AP1	Green	AP	Application on Normal	Application stopped (default)
2	AP2	Red	AP	MG ETU registered	MG ETU not registered (default)
3	Drive	Red	BIOS	Accessing drive	Not accessing drive (default)
4	CF PWR	Red		Compact Flash power On	Compact Flash power Off
6	Switch S3 LED	Red	Hardware	Switch S3 in RUN	Switch S3 in SHUT DOWN (default)
7	SHUT DOWN	Red	BIOS	Application shut down – OK to remove ETU	Application Running – Do not remove ETU
10	CH 1	Red	AP	Channel used	Channel not used (default)
11	CH 2	Red	AP	Channel used	Not used (default)
12	CH 3	Red	AP	Channel used	Not used (default)
13	CH 4	Red	AP	Channel used	Not used (default)
14	CH 5	Red	AP	Channel used	Not used (default)
15	CH 6	Red	AP	Channel used	Not used (default)
16	CH 7	Red	AP	Channel used	Not used (default)
17	CH 8	Red	APP	Channel used	Not used (default)

7.7.8 Jumper Settings

- J1
Not Used
- J7
Not Used

7.7.9 Connectors

The IPCA()-U() ETU has the following connectors:

- J2
Connects to the backplane
- J4
Connection for SODimm Memory card
- J6
Used for Compact Flash drive on FMS
- J9
RJ45 LAN connector for network connection
- J11
Serial Port
- J12
Not Used

7.8 IVR(8)-U() ETU

7.8.1 Description

The Electra Elite IVR is an 8-port system that can support IVR applications.

This ETU is a PC platform, installed in the Electra Elite system, that contains hard disk space for voice recorded prompts and script templates.

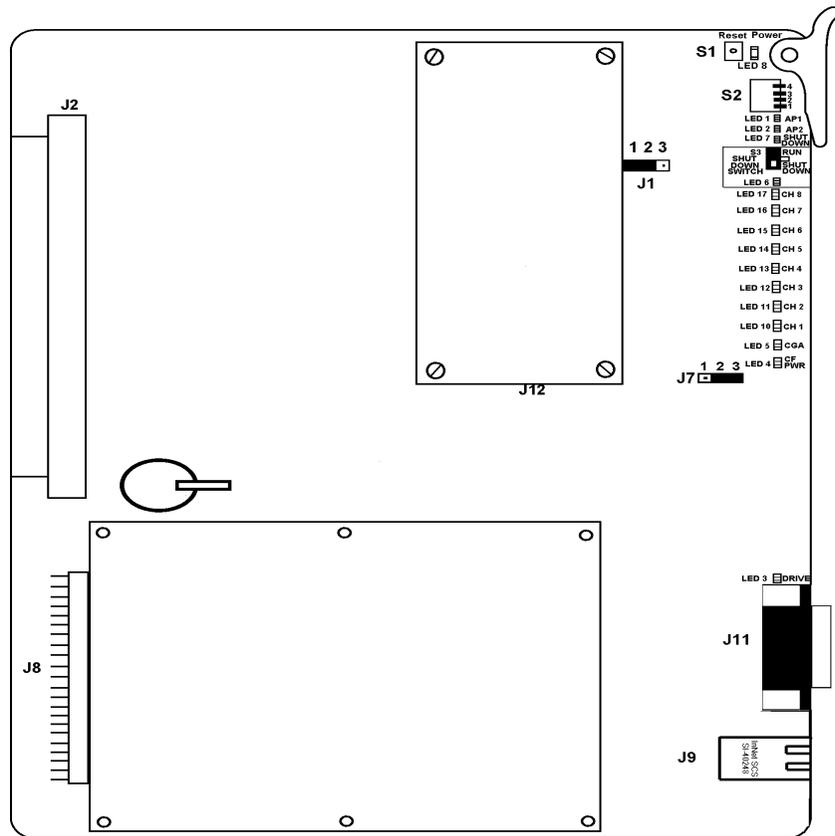


Figure 5-72 IVR(8)-U() ETU

7.8.2 Installation

Only one IVR(8)-U() ETU can be installed in slots S1~S8.

This ETU shares the total number of station ports in the system. The system is limited by 120 stations.

 Each system can have one CTI/VP, CMS, FMS, VMS, or IVR ETU.



When installing this ETU, make all ETU DIP switch setting changes before inserting it in the KSU. Ensure that KSU is off.

7.8.3 Switch Settings

Refer to [Table 5-66 IVR\(8\)-U\(\) ETU Switch Settings](#).

Table 5-66 IVR(8)-U() ETU Switch Settings

Switch	Default	Description
SW1	Off	Resets the ETU. Leave at factory default setting.
SW2-1	Off	Not used for IVR ETU. Leave at factory default setting.
SW2-2	Off	Restores the ETU to factory default settings when set to ON. Leave at factory default unless factory defaults must be restored, then set SW2-2 and SW2-3 to On.
SW2-3	Off	Restores the ETU to factory default settings when set to ON. Leave at factory default unless factory defaults must be restored, then set SW2-2 and SW2-3 to On.
SW3	ON	Toggles to switch the IVR between Off and On.

7.8.4 LED Indications

Refer to [Table 5-67 IVR\(8\)-U\(\) ETU LED Indications](#)**Table 5-67 IVR(8)-U() ETU LED Indications**

LED	Description	On	Flashing	Off
LED 1, AP1 Application Software	Running without errors Running with errors Not Running	Green Amber Red	Not Used	Not Used
LED 2, AP2	Not Used	Not Used	Not Used	Not Used
LED 3, DRIVE	Hard Drive Access	Red if accessed	Not Used	When not accessed
LED 4, CF PWR	Power to the ETU	Red if power is on	Not Used	No power to ETU
LED 5, ICGA	Live LED	Not Used	Red every 125ms during operation	Operation is shut down
LED 6, Switch S3 Indication	Do not remove Voice Mail from KSU	Red when S3 in RUN	Not Used	S3 not in RUN position
LED 7, SHUT DOWN	Safe to remove Voice Mail from KSU	Red when S3 in SHUT DOWN	Not Used	S3 not in SHUT DOWN position
LED 8, Power	Receiving KSU power	Red if power is on	Not Used	No KSU power
LED 9, FED DSP	For development only	Not Used	Not Used	Not Used
LED 10, CH1	OFF/ON HOOK status	Red for Off-hook	Not Used	On Hook
LED 11, CH2	OFF/ON HOOK status	Red for Off-hook	Not Used	On Hook
LED 12, CH3	OFF/ON HOOK status	Red for Off-hook	Not Used	On Hook
LED 13, CH4	OFF/ON HOOK status	Red for Off-hook	Not Used	On Hook
LED 14, CH5	OFF/ON HOOK status	Red for Off-hook	Not Used	On Hook
LED 15, CH6	OFF/ON HOOK status	Red for Off-hook	Not Used	On Hook
LED 16, CH7	OFF/ON HOOK status	Red for Off-hook	Not Used	On Hook
LED 17, CH8	OFF/ON HOOK status	Red for Off-hook	Not Used	On Hook

The first four channel LEDs are also used during startup to signify:

LED 1 - BICOM driver loaded

LED 2 - Scandisk completed successfully

LED 4 - IVR(8)-U() ETU started successfully

After system is up and running these LEDs are turned off, and all channels are ready to receive calls.

When the IVR(8)-U() ETU fails to start, all eight channel LEDs and the BCLR LEDs (AP1) are on.

[Table 5-68 IVR\(8\)-U\(\) ETU Ready LED Indications](#) shows the status of the IVR(8)-U() ETU after it has been installed, initialized and is ready to process calls.

Table 5-68 IVR(8)-U() ETU Ready LED Indications

LED	Description	Status
LED 1, AP1 Application Software	Running without errors	Solid Green
LED 4, CF PWR	Power to the ETU	Solid Red
LED 5, ICGA	Live LED	Blinking Red
LED 7, SHUT DOWN	Initialized application	Solid Green
LED 8, Power	Receiving KSU power	Solid Red

7.8.5 Jumper Settings

J1	Setting
Pin 1 to Pin 2	IVR(8)-U() ETU Integration (default)
Pin 2 to Pin 3	Not Used

J7	Setting
Pin 1 to Pin 2	Not Used
Pin 2 to Pin 3	Hard Drive is master drive (default)

7.8.6 Connectors

The IVR(8)-U() ETU has the following connectors:

- Ⓛ J2
Connects to the backplane
- Ⓛ J8
Connects to Hard Disk memory
- Ⓛ J9
RJ45 LAN connector for network connection
- Ⓛ J11
9-pin RS232 local serial connector for direct connection
- Ⓛ J12
Port expansion connector for DSP-U30

7.9 MG(8)-U() ETU

7.9.1 Description

The MG(8)-U() ETU is an eight-path gateway ETU between the IPCA()-U10 and the CPUB()-U().

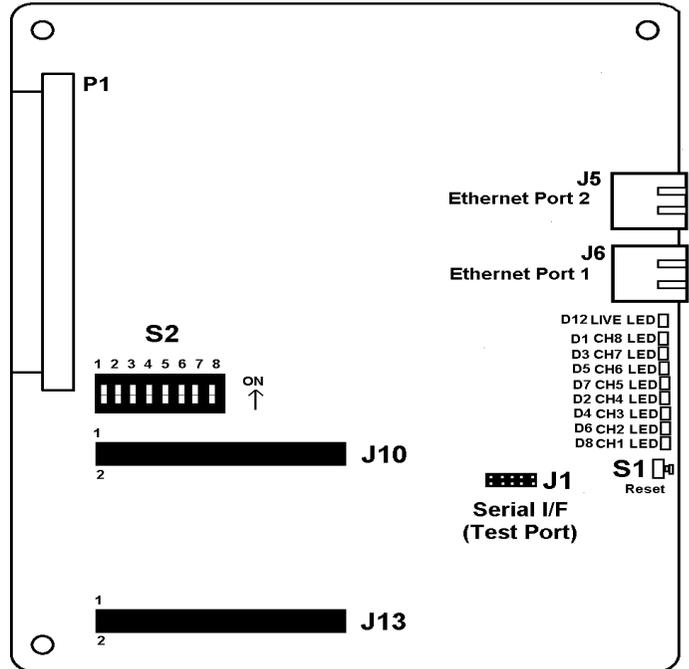


Figure 5-73 MG(8)-U() ETU

7.9.2 Installation

Only one MG(8)-U() ETU can be installed in slots S1~S8.

The system is limited by 120 stations. This ETU shares the total number of station ports in the system.

7.9.3 Switch Settings

① S1

Reset Switch

① S2

Eight position DIP switch.

☞ Refer to [Table 5-69 MG\(8\)-U\(\) ETU S2 Switch Settings](#).

Table 5-69 MG(8)-U() ETU S2 Switch Settings

S2	Description	Default
1	ETU Type Selection. Refer to Table 5-70 ETU Common Settings for the IAD platform	
2		
3		
4	Four/eight channel Assignment: On: 8 channel, Off: 4 channel	On
5	On to Enable 1st Power On	On
6	Default IP Address Setting On/Off	Off
☞	<p><i>When MG(8)-U10 ETU is booted with Switch 6 On, the following defaults are set:</i></p> <ul style="list-style-type: none"> ■ MG IP Address Assignment: 192.168.0.2 ■ MG Subnet Mask Assignment: 255.255.255.0 ■ MG Router Address Assignment: 0.0.0.0 ■ DHCP Client Assignment: Disable 	
7	On to output Log data for system communications. Used for troubleshooting.	Off
8	On to output Log data for MEGACO. Used for troubleshooting.	Off

Table 5-70 ETU Common Settings for the IAD platform

ETU Type	Switch 1	Switch 2	Switch 3
COI	On	On	On
COID	On	On	Off
DID	On	Off	On
TLI	On	Off	Off
DTI	Off	On	On
MG	Off	On	Off
ESI	Off	Off	On
Not Used	Off	Off	Off

7.9.4 LED Indications

7.9.4.1 Normal State

Refer to [Table 5-71 Normal State LEDs](#).

Table 5-71 Normal State LEDs

LED	ON	FLASHING	OFF
Channel LEDs 1~8 Status	Busy		Idle
Live Led	Operation Stopped Power On	Normal Operation	Power Off

7.9.4.2 For Initialization

Refer to [Table 5-72 Initialization LEDs](#)

Table 5-72 Initialization LEDs

Condition	LED 1	LED 2	LED 3	LED 4	LED 5	LED 6	LED 7	LED 8
Power On	On	On	On	On	On	On	On	On
Searching IPCA()-U10	On	Off	On	Off	On	Off	On	Off
Initialized	Off							

7.9.5 Connectors

The MG(8)-U() ETU has the following connectors:

- Ⓢ P1 Connects to the backplane
- Ⓢ J1 Serial Interface Test Port
- Ⓢ J5 Ethernet Port 2 (Not Used)
- Ⓢ J6 Ethernet Port 1 Connects to LAN
- Ⓢ J10 Not used
- Ⓢ J13 Not used

7.10 PBR()-U() ETU

7.10.1 Description

The Pushbutton Receiver (PBR) ETU detects and translates DTMF tones generated by Single Line Telephones, modems, or facsimile machines. This ETU is required when the four built-in CPUB()-U() ETU PBR channels are not enough to support all the PBR requirements of the system, or the CPUB()-U() ETU PBRs are dedicated to the VRS(4)-U() ETU.

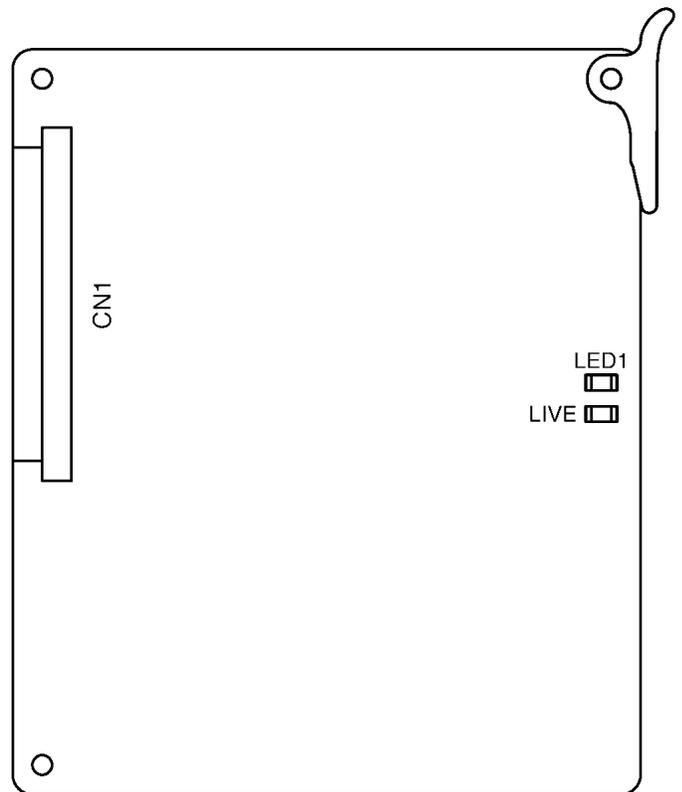


Figure 5-74 PBR()-U() ETU

7.10.2 Installation

Only one PBR()-U() ETU can be installed in slots S1~S8 to provide four PBR circuits. Four circuits are built-in on the CPUB()-U() for a maximum of eight PBR circuits.

7.10.3 LED Indications

Live LED indications are listed below.

- Ⓛ Blinking Red Normal Operation
- Ⓛ Steady Red Operation Stopped (power On)
- Ⓛ Off No Power

LED 1 indications are listed below.

- Ⓛ On Some circuit(s) are receiving DTMF signaling
- Ⓛ Off All PBR(s) are idle

7.10.4 Connectors

The PBR()-U() ETU has one connector:

- Ⓛ CN1 Connects to the backboard

7.11 VRS(4)-U() ETU

7.11.1 Description

The Voice Recording Service ETU provides record/playback of voice messages for the Automated Attendant, Voice Prompt, and Delay Announcement features. The VRS(4)-U() ETU must use the built-in PBR circuits on the CPUB()-U() ETU for Automated Attendant or DISA.

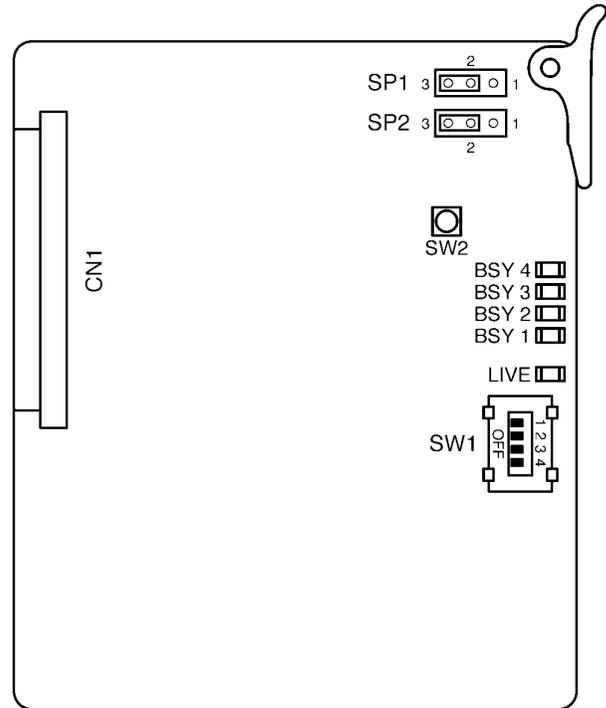


Figure 5-75 VRS(4)-U() ETU

Each VRS(4)-U() ETU has four record/playback channels. The maximum voice recording time for each channel is 240 seconds. The technician can select one of four message lengths. The available message lengths and the maximum number of messages that can be recorded are listed in the table below.

Message Length	Maximum Number of Recorded Messages
15 seconds	16
30 seconds	8
60 seconds	4
120 seconds	2

7.11.2 Installation

A maximum of two VRS(4)-U() ETUs can be installed in slots S1~S8 in any system KSU.

7.11.3 Switch Settings

Refer to [Table 5-73 VRS\(4\)-U\(\) ETU Default Switch Settings](#).

Table 5-73 VRS(4)-U() ETU Default Switch Settings

Switch Settings			Function
SW1-1	SW1-2	SW1-3	Recording decibel adjustment
Off	Off	Off	0 decibels (default)
On	Off	Off	1 decibel
Off	On	Off	2 decibels
On	On	Off	3 decibels
Off	Off	On	4 decibels
On	Off	On	5 decibels
Off	On	On	6 decibels
On	On	On	7 decibels

SW1-4	On	Record Gain
	Off	Record Pad (default)

SW2	N/A	Test/Reset Switch
------------	-----	-------------------

7.11.4 LED Indications

Table 5-74 VRS(4) LED Indications

LED	Description	On	Flashing	Off
BSY 1	Channel 1 status	Busy	Not Used	Idle
BSY 2	Channel 2 status	Busy	Not Used	Idle
BSY 3	Channel 3 status	Busy	Not Used	Idle
BSY 4	Channel 4 status	Busy	Not Used	Idle
LIVE	ETU status	Operation stopped (Power On)	Normal operation	No power

7.11.5 Connectors

The VRS(4)-U() ETU has one connector:

① CN1 Connects to the backboard

7.11.6 Pins

Two pins, **SP1** and **SP2**, are located on the top right of the VRS ETU. These short pins are for maintenance. **Do not** change the factory default settings on these pins. Pins 2 and 3 are short-circuited.

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Installing Electra Elite Multiline Terminals

SECTION 1 GENERAL INFORMATION

The Electra Elite192 system provides several different Multiline Terminals, an Attendant Console, and several adapters that allow peripheral equipment to be attached to the Multiline Terminals. With the exception of the VDD-U Unit, the adapters can also be used with D^{term} Series E Multiline Terminals. This chapter describes each terminal, console, and adapter and provides applicable installation instructions.

SECTION 2 MULTILINE TERMINALS

2.1 DTP-2DT-1 TEL

This digital nondisplay Multiline Terminal has two programmable line keys (each with a 2-color LED), eight function keys, a built-in speakerphone, headset connection, and a large LED to indicate incoming calls and messages.

A maximum of 119 DTP-2DT-1 TELs can be installed in the Electra Elite 192 system.

The combined total of all Electra Elite Multiline Terminals that can be installed in an Electra Elite 192 system is 120.

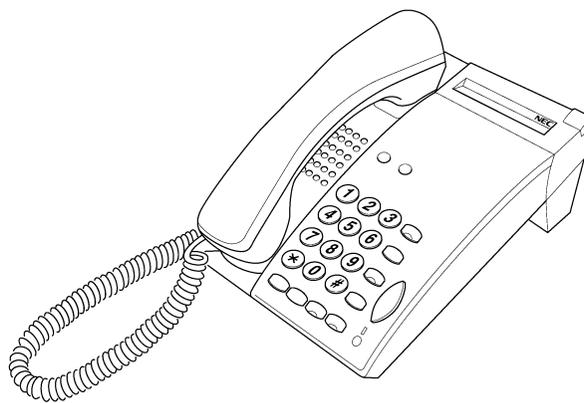


Figure 6-1 DTP-2DT-1 TEL

2.2 DTU-8-1 TEL

This digital nondisplay Multiline Terminal has eight programmable line keys (each with a 2-color LED), eight function keys, a built-in speakerphone, headset jack, a large LED to indicate incoming calls and messages, and compatibility with ADA-U, APA-U, APR-U, CTA-U, CTU(C), CTU(S), HFU-U, or VDD-U Unit.

The DTP-8-1 TEL is comparable and can also be used with the Electra Elite system.

A maximum of 119 DTU/DTP-8-1 TELs can be installed in the Electra Elite 192 system.

The combined total of all Electra Elite Multiline Terminals that can be installed in an Electra Elite 192 system is 120.

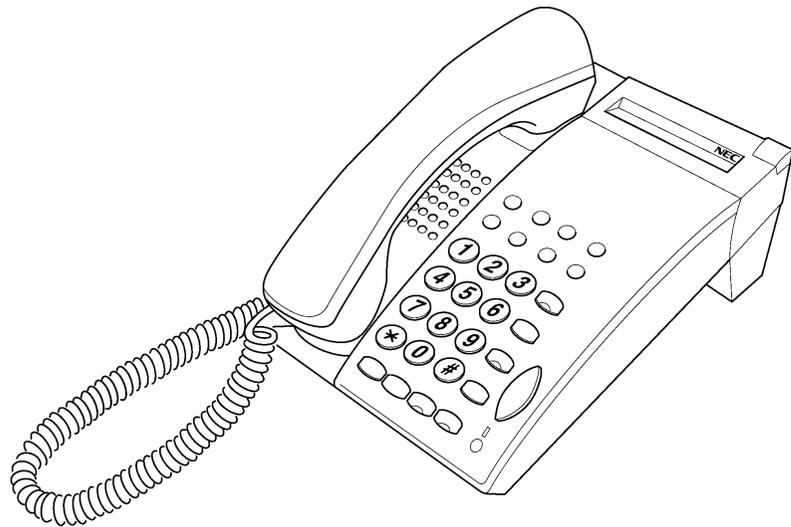


Figure 6-2 DTU-8-1 TEL Multiline Terminal

2.3 DTU-8D-2 TEL

This digital Multiline Terminal has eight programmable line keys (each with the 2-color LED), eight function keys, a built-in speakerphone, headset jack, a Large LED to indicate incoming calls and messages, and compatibility with ADA-U, APA-U, APR-U, CTA-U, CTU(C), CTU(S), HFU-U, or VDD-U Unit.

This terminal also has a 3-line, 24-character, adjustable Liquid Crystal Display (LCD) and four softkeys.

The DTP-8D-1 TEL is comparable and can also be used with the Electra Elite system.

A maximum of 120 DTU-8D-2/DTP-8D-1 TELs can be installed in the Electra Elite 192 system.

The combined total of all Electra Elite Multiline Terminals that can be installed in the Electra Elite 192 system is 120.

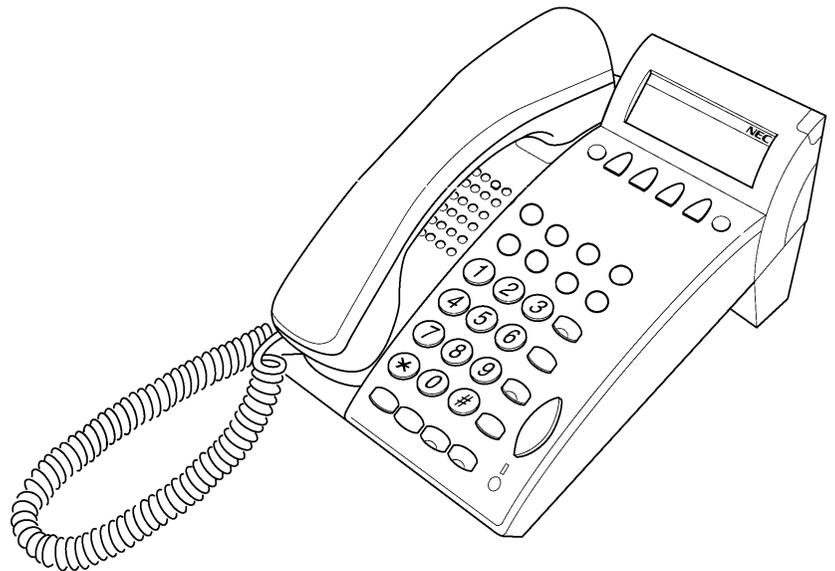


Figure 6-3 DTU-8D-2 TEL Multiline Terminal

2.4 DTU-16-1 TEL

This digital nondisplay Multiline Terminal has 16 programmable line keys (each with a 2-color LED), eight function keys, a built-in speakerphone, headset jack, a large LED to indicate incoming calls and messages, and compatibility with ADA-U, APA-U, APR-U, CTA-U, CTU(C), CTU(S), HFU-U, or VDD-U Unit.

The DTP-16-1 TEL is comparable and can also be used with the Electra Elite system.

A maximum of 119 DTU/DTP-16-1 TELs can be installed in an Electra Elite 192 system.

The combined total of all Electra Elite Multiline Terminals that can be installed in an Electra Elite 192 system is 120.



Figure 6-4 DTU-16-1 TEL Multiline Terminal

2.5 DTU-16D-2 TEL

This digital Multiline Terminal has 16 programmable line keys (each with a 2-color LED), eight function keys, a built-in speakerphone, headset jack, a large LED to indicate incoming calls and messages, and compatibility with ADA-U, APA-U, APR-U, CTA-U, CTU(C), CTU(S), HFU-U, or VDD-U Unit.

The DTP-16D-1 TEL is comparable and can also be used with the Electra Elite system.

This terminal also has a 3-line, 24-character, adjustable Liquid Crystal Display (LCD) and four softkeys.

A maximum of 120 DTU-16D-2/DTP-16D-1 TELs can be installed in an Electra Elite 192 system.

The combined total of all Electra Elite Multiline Terminals that can be installed in an Electra Elite 192 system is 120.



Figure 6-5 DTU-16D-2 TEL Multiline Terminal

2.6 DTU-32-1 TEL

This digital nondisplay Multiline Terminal has 16 programmable line keys (each with a 2-color LED), 16 one-touch keys, eight function keys, a built-in speakerphone, headset jack, a large LED to indicate incoming calls and messages, and compatibility with ADA-U, APA-U, APR-U, CTA-U, CTU(C), CTU(S), HFU-U, and VDD-U Units.

The DTP-32-1 TEL, is comparable and can also be used with the Electra Elite system.

System software can be changed so this Multiline Terminal can have 24 programmable line keys and 8 one-touch keys.

A maximum of 119 DTU/DTP-32-1 TELs can be installed in an Electra Elite 192 system.

The combined total of all Electra Elite Multiline Terminals that can be installed in an Electra Elite 192 system is 120.

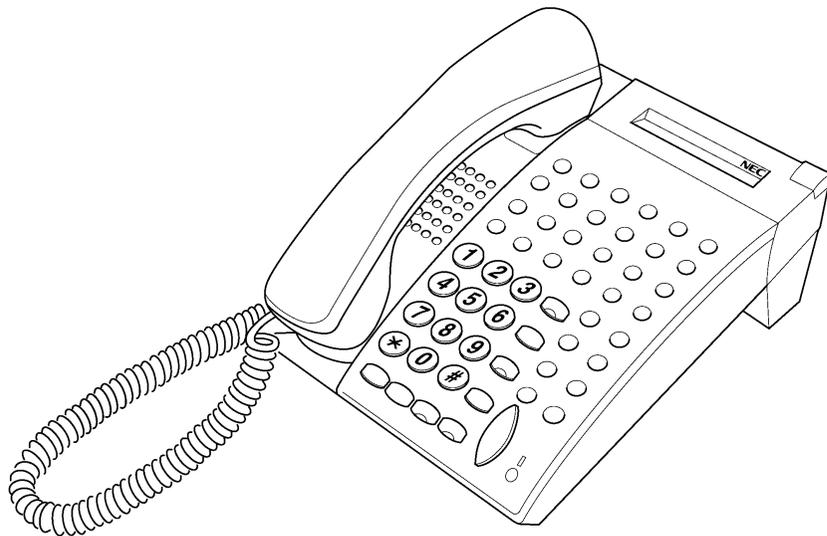


Figure 6-6 DTU-32-1 TEL Multiline Terminal

2.7 DTU-32D-2 TEL

This digital Multiline Terminal has 16 programmable line keys (each with a 2-color LED), 16 one-touch keys, eight function keys, a built-in speakerphone, headset jack, a large LED to indicate incoming calls and messages, and compatibility with ADA-U, APA-U, APR-U, CTA-U, CTU(C), CTU(S), HFU-U, or VDD-U Unit.

This terminal also has a 3-line, 24-character, adjustable Liquid Crystal Display (LCD) and four softkeys.

System software can be changed so this Multiline Terminal can have 24 programmable line keys and eight one-touch keys.

The DTP-32D-1 TEL is comparable and can also be used with the Electra Elite system.

A maximum of 120 DTU-32D-2/DTP-32D-1 TELs can be installed in an Electra Elite 192 system.

The combined total of all Electra Elite Multiline Terminals that can be installed in an Electra Elite 192 system is 120.

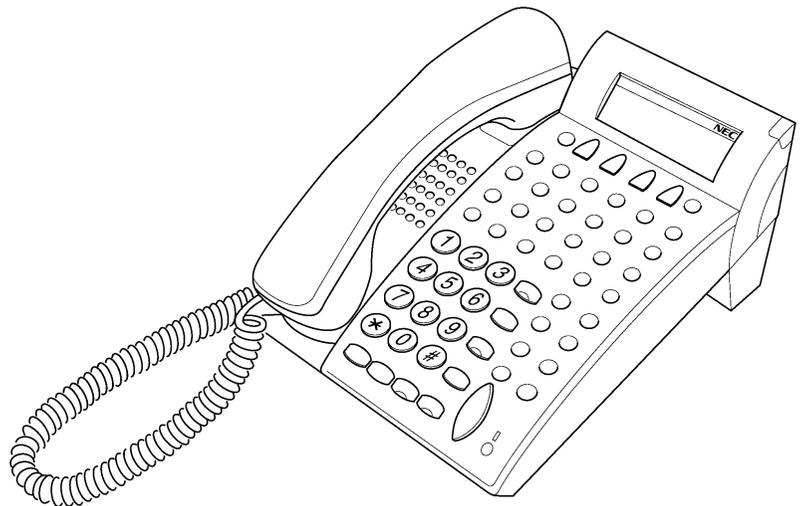


Figure 6-7 DTU-32D-2 TEL Multiline Terminal

2.8 DCU-60-1 CONSOLE

The Attendant Console has 60 programmable line keys (each with a 2-color LED). These 60 line keys can be programmed as Direct Station Selection keys, function keys, or as outside line keys. An external power supply (AC adapter) is provided with the Attendant Console.

A maximum of four DCU-60-1 Consoles can be installed in any Electra Elite 48/192 system. An Attendant Position can have four associated DCU-60-1 Consoles.

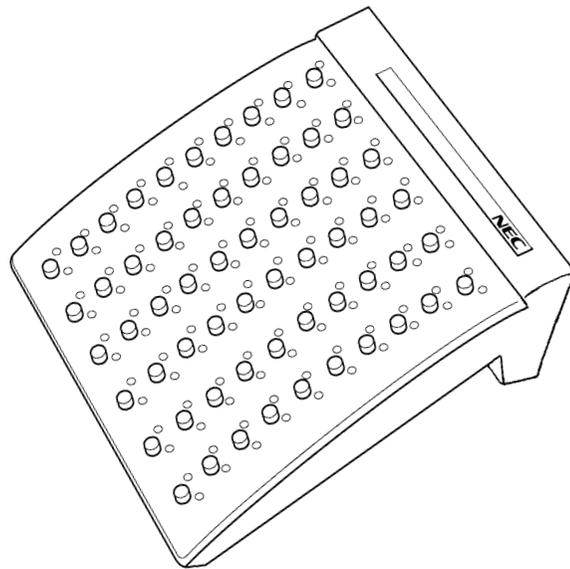


Figure 6-8 DCU-60-1 Console

SECTION 3 SINGLE LINE TELEPHONES

3.1 DTP-1-1 or DTP-1-2 TEL

The Single Line Telephone is a fully modular terminal with a Flash key, redial key, 3-level receive volume control, 2-level ring volume control, data jack, and message waiting lamp. Each terminal requires an SLT(1)-U10 ADP or SLI(4)/(8)-U10 ETU.

A maximum of 118 DTP-1-1 or DTP-1-2 TELs can be installed in the Electra Elite 192 system.



Figure 6-9 DTP-1-1 TEL Single Line Telephone

- ☞ The H switch setting for the receive volume control should only be used by hearing impaired individuals, otherwise hearing damage may occur. This telephone complies with HAC (Hearing Aid Compatible) volume control defined by section 68.317 of the FCC Rules and Regulations, 1996 edition.
- ☞ The H switch setting for the receive volume control should only be used by hearing impaired individuals, otherwise hearing damage may occur. This telephone complies with HAC (Hearing Aid Compatible) volume control defined by section 68.317 of the FCC Rules and Regulations, 1996 edition.

3.2 DTP-1HM-1 or DTP-1HM-2 TEL

The Single Line Telephone is a fully modular terminal with a flash key, redial key, 3-level receive volume control, 2-level ring volume control, data jack, message waiting lamp, and eight programmable Feature Access/Speed Dial keys. Each terminal requires an SLT(1)-U10 ADP or SLI(4)/(8)-U10 ETU.

A maximum of 112 DTP-1HM-1 or DTP-1HM-2 TELs can be installed in the Electra Elite 192 system.



Figure 6-10 DTP-1HM-1 TEL Single Line Telephone

- ☞ The H switch setting for the receive volume control should only be used by hearing impaired individuals, otherwise hearing damage may occur. This telephone complies with HAC (Hearing Aid Compatible) volume control defined by section 68.317 of the FCC Rules and Regulations, 1996 edition.
- ☞ The H switch setting for the receive volume control should only be used by hearing impaired individuals, otherwise hearing damage may occur. This telephone complies with HAC (Hearing Aid Compatible) volume control defined by section 68.317 of the FCC Rules and Regulations, 1996 edition.

SECTION 4

CONNECTING A DTU/ DTP TERMINAL TO THE SYSTEM

The instructions for connecting a Multiline Terminal to the system applies to all of the Electra Elite Multiline Terminals.

1. Plug the telephone cord into the modular jack on the bottom side of the Multiline Terminal. The handset is also attached to the bottom side of the Multiline Terminal.

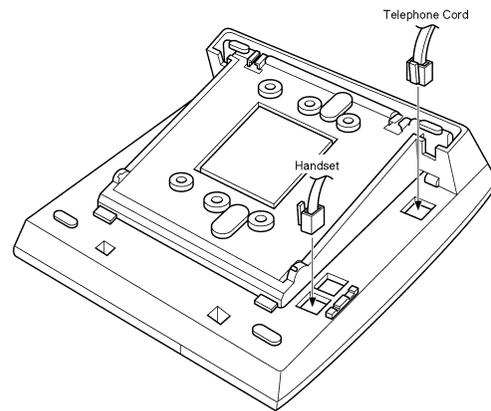


Figure 6-11 Connecting a Multiline Terminal to the System

2. Lead the telephone and handset cords through the appropriate grooves.

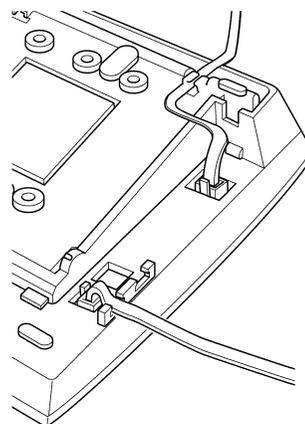


Figure 6-12 Leading Line Cords on a Multiline Terminal

SECTION 5

CONNECTING DCU ATTENDANT CONSOLE TO A MULTILINE TERMINAL

An Attendant Console can be attached to a Multiline Terminal using the following procedures.

1. Turn the Multiline Terminal and the Attendant Console face down.
2. Using the joining plate provided with the Attendant Console, attach the plate to the Multiline Terminal and the Attendant Console.
3. Connect the line cord and the AC adapter to the indicated locations on the bottom of the Attendant Console.

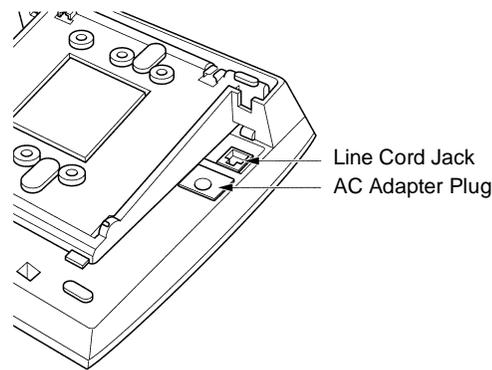


Figure 6-13 Connecting the Line Cord and AC Adapter when Installing a DCU Attendant Console

4. When the Attendant Console and the Multiline Terminal are properly connected, they sit side-by-side as shown in [Figure 6-14 DCU Attendant Console and Multiline Terminal](#).
5. Make sure that the AC adapter, supplied with the Attendant Console, is used. Using a different AC adapter may cause problems. Check that the supplied voltage matches that specified for the adapter and plug it in an outlet.

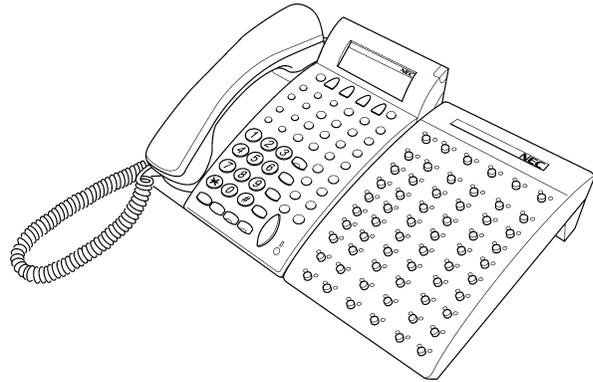


Figure 6-14 DCU Attendant Console and Multiline Terminal

SECTION 6 ADJUSTING THE DTU/ DTP LCD

Electra Elite display Multiline Terminals have an adjustable Liquid Crystal Display (LCD). The LCD can be adjusted by pushing down or pulling up as desired.

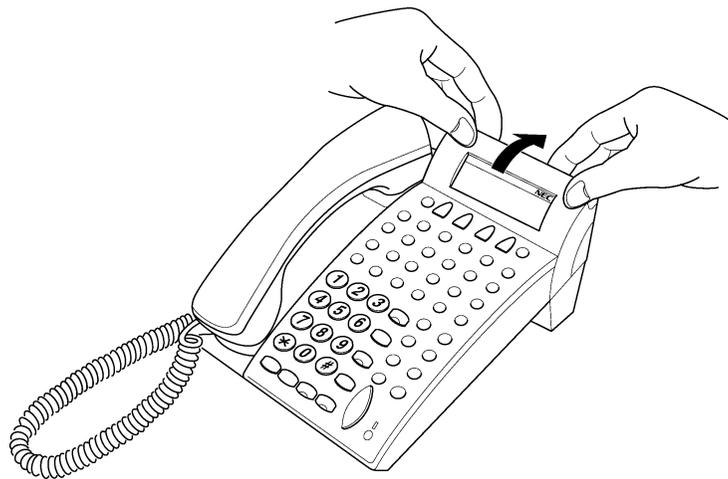


Figure 6-15 Adjusting the DTU/DTP LCD

SECTION 7

INSTALLING DTU/DTP LINE CARDS AND PLASTIC PANELS

7.1 Line Card and Plastic Panel Installation

Line key designations are entered on the Line Card that is then placed on the Multiline Terminal to provide a quick reference of key designations. The Line Cards can be changed as necessary. The Plastic Panel is placed on top of the Line Card to hold it in place.

1. Place the Line Card over the keys on the Multiline Terminal.
2. Place the tabs on the bottom of the plastic panel in the grooves at the terminal bottom, and press top right and left ends to secure plastic panel to the Multiline Terminal. Refer to [Figure 6-16 Installing Line Card and Plastic Panel on a DTU/DTP Multiline Terminal](#) and [Figure 6-17 Installing Plastic Panel on a DTU/DTP Multiline Terminal](#).

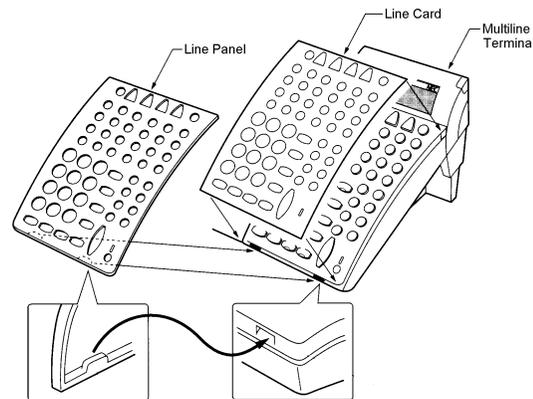


Figure 6-16 Installing Line Card and Plastic Panel on a DTU/DTP Multiline Terminal

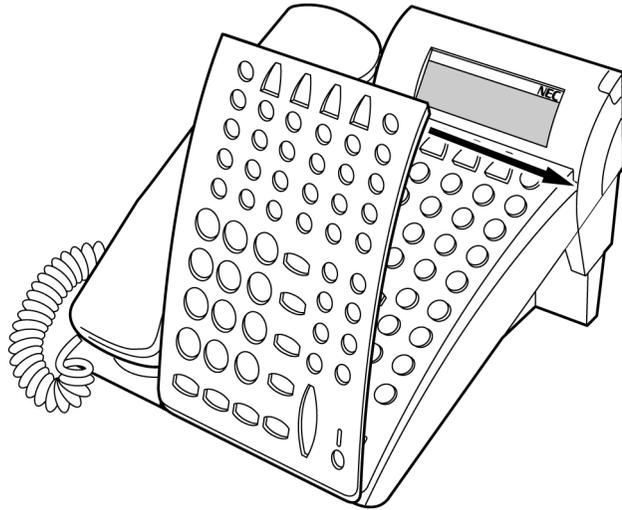


Figure 6-17 Installing Plastic Panel on a DTU/DTP Multiline Terminal

7.2 Plastic Panel Removal

Lift the right corner, raise the panel, and slide the bottom away from the Multiline Terminal.



Pulling on the bottom of the plastic panel to remove it could cause panel damage.

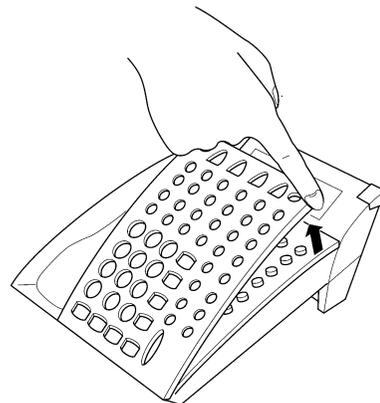


Figure 6-18 Removing the Plastic Panel from the DTU/DTP Multiline Terminal

SECTION 8

REMOVING DTU/DTP SOFTKEYS

If the softkeys on the Multiline Terminal are not used, they can be removed using the following procedure:

1. Remove the softkeys by pulling the softkey plate upward as shown in [Figure 6-19 Removing DTU/DTP Softkeys](#).

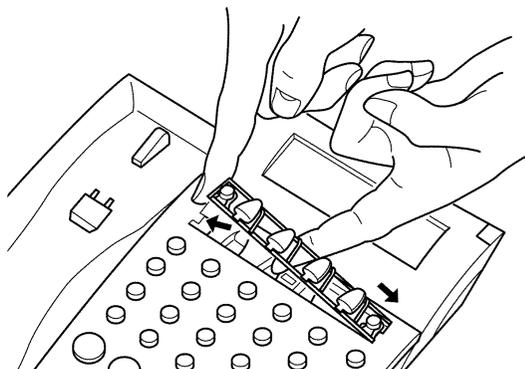


Figure 6-19 Removing DTU/DTP Softkeys

SECTION 9

ADJUSTING DTU/DTP MULTILINE TERMINAL HEIGHT

The base plate on the Electra Elite Multiline Terminal is hinged to allow adjustment to raise or lower the terminal.

1. Turn the Multiline Terminal upside down and locate the tabs as shown in [Figure 6-20 Locating the Adjustment Tabs on the DTU/DTP Multiline Terminal](#).

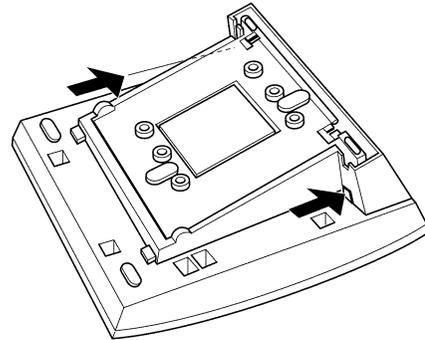


Figure 6-20 Locating the Adjustment Tabs on the DTU/DTP Multiline Terminal

2. Push the adjustment tabs and raise the base plate until it locks.

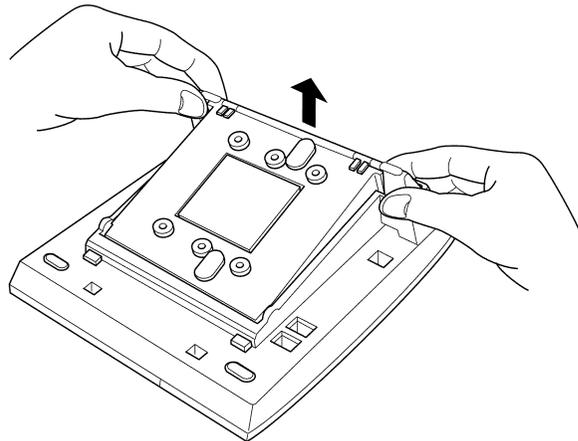


Figure 6-21 Raising the Base Plate on the DTU/DTP Multiline Terminal

3. The length of the cord can be adjusted by pulling the line cord through the groove in the bottom of the Multiline Terminal.

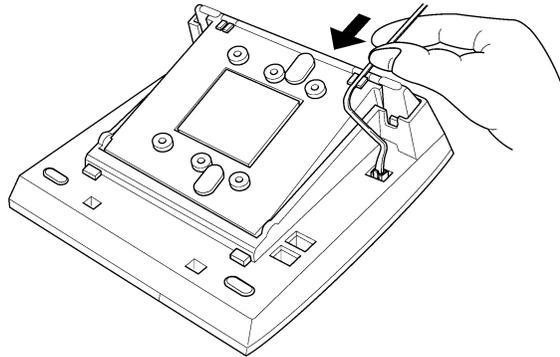


Figure 6-22 Adjusting the Line Cord Length

4. To lower the base plate on the Multiline Terminal, push on the adjustment tabs and push the base plate downward.

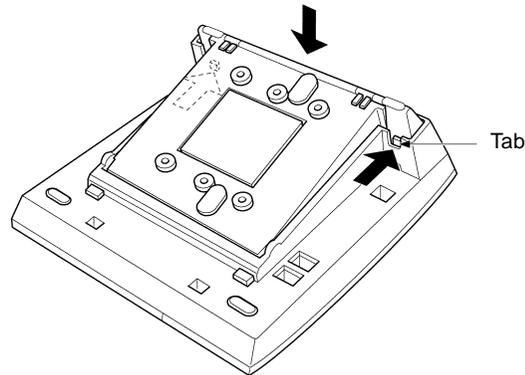


Figure 6-23 Lowering the Base Plate on the Multiline Terminal

SECTION 10
INSTALLING A D^{term}®
CORDLESS LITE OR
D^{term}® CORDLESS II
TERMINAL

10.1 Selecting an Installation Location

Select a location to avoid excessive heat or humidity. The base unit should be placed on a desk or tabletop near a standard 120 Vac outlet and within reach of the telephone line connection on the Electra Elite Multiline Terminal. Keep the base unit and the handset away from sources of electrical noise (e.g. fluorescent lighting).

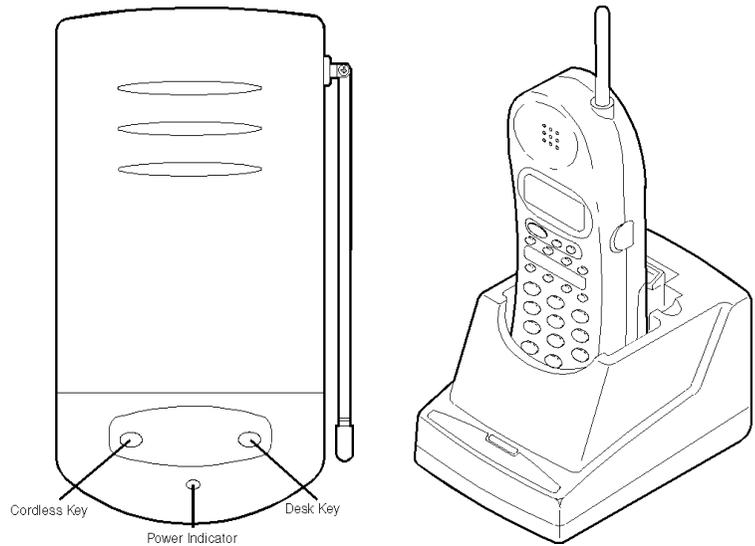


Figure 6-24 D^{term} Cordless Lite Terminal

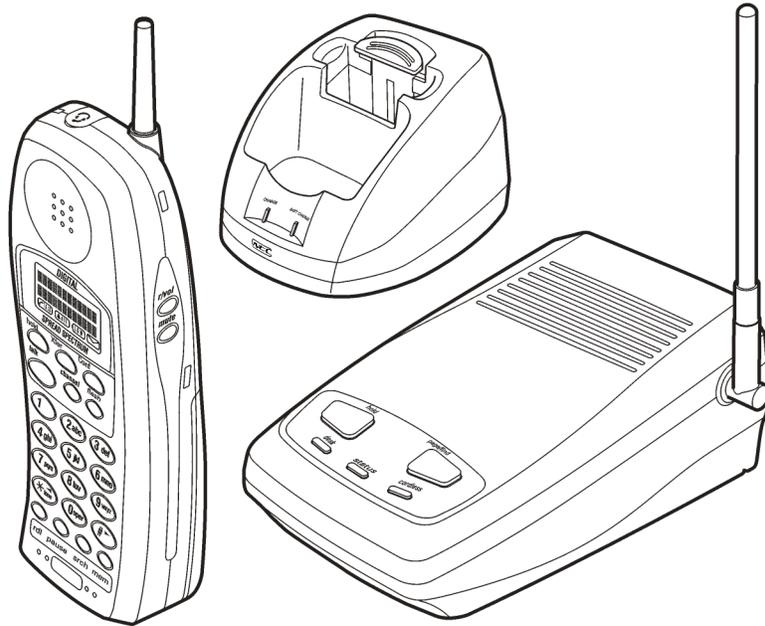


Figure 6-25 D^{term} Cordless II

10.2 Connecting the Telephone Cords

The D^{term} Cordless Lite or Cordless II terminal is connected to the telephone line and to the host telephone using two telephone line jacks on the back of the Base Unit: LINE IN and LINE OUT.



Observe the following warnings during installation.

- ⚡ Never install telephone wiring during a lightning storm.
 - ⚡ Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
 - ⚡ Use caution when installing or modifying telephone lines.
1. Unplug the telephone line cord from the host telephone, and connect it to the LINE IN jack.
 2. Using the telephone line cord supplied with the D^{term} Cordless Terminal, connect the LINE OUT jack to the host telephone jack.

Depending on your environment, the maximum number of cordless devices used without interference varies.

10.3 Applying Power to the Base Unit

1. Plug the AC Adapter cord into the AC Adapter input jack on the Base Unit.
 - ☞ Use only the AC Adapter supplied with the D^{term} Handset Cordless Terminal.
2. Plug the AC Adapter into a standard 120 Vac wall outlet.
3. Route the power cord where it does not create a trip hazard or where it could become chafed and create a fire or other electrical hazards.
 - ☞ The AC Adapter furnished with this phone can be equipped with a polarized line plug (a plug having one blade wider than the other). This plug fits into the power outlet only one way. When you cannot insert the plug fully into the outlet, reverse the plug. When the plug still does not fit, contact your facilities coordinator about replacing the obsolete plug. Do not alter the shape of the blades of the polarized plug.

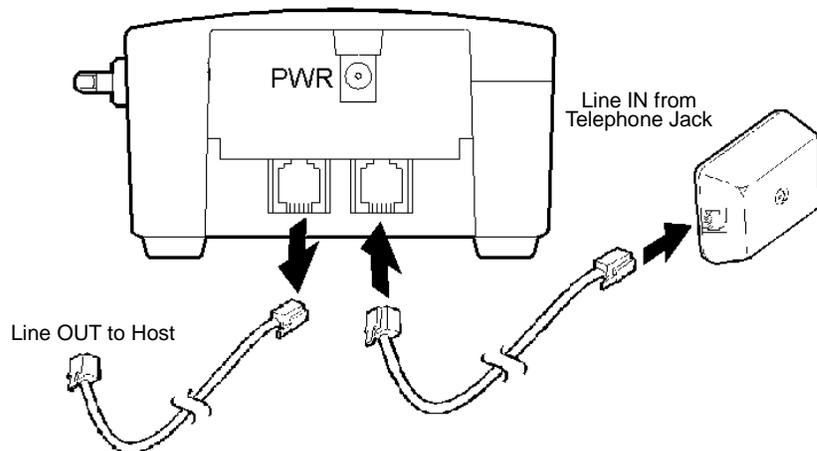


Figure 6-26 Connecting the Base Unit

SECTION 11

INSTALLING D^{term}® HANDSET CORDLESS TERMINAL

11.1 Selecting an Installation Location

Select a location for the DTP-16HC-1 TEL to avoid excessive heat or humidity. The base unit should be placed on a desk or tabletop near a standard 120 Vac outlet and within reach of the telephone line connection on the Electra Elite Multiline Terminal. Keep the base unit and the handset away from sources of electrical noise (e.g., fluorescent lighting).

Depending on your environment, the maximum number of cordless devices used without interference varies.

11.2 Connecting the Telephone Cord

The Base Unit of the DTP-16HC-1 Tel has two jacks on the back: LINE and DC24V.



Observe the following warnings during installation.

- ⌚ Never install telephone wiring during a lightning storm.
- ⌚ Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
- ⌚ Use caution when installing or modifying telephone lines.

Using the telephone line cord supplied with the terminal, connect the LINE jack to the telephone line.

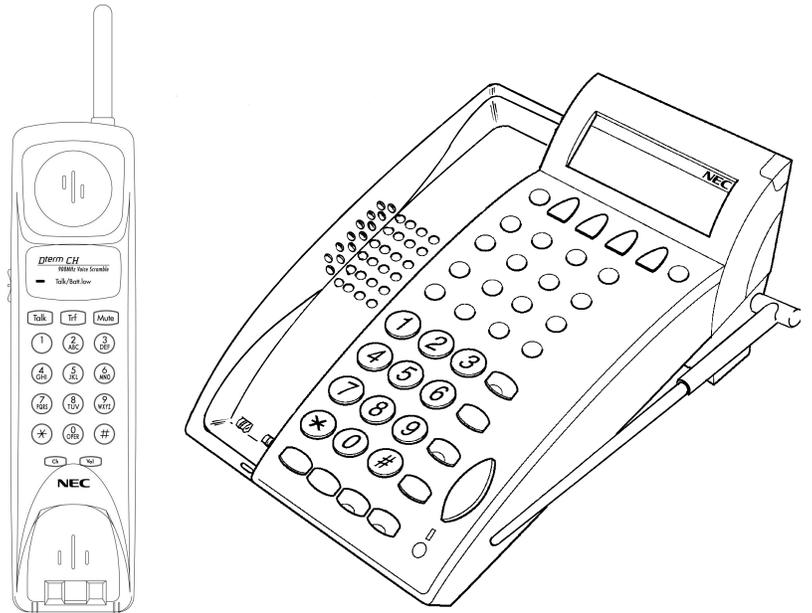


Figure 6-27 D^{term} Handset Cordless Terminal

11.3 Applying Power to the Base Unit

1. Power to charge the battery is supplied from the Telephone line.
2. An ACA-U Unit must be installed in the optional DC24V jack on the Base Unit to provide power for the D^{term} Handset Cordless terminal.
3. Plug the ACA-U Unit into a standard 120 Vac wall outlet.
4. The power level between the Handset and the Base is 10mW.
5. When the ACA-U Unit is used, route the power cord where it does not create a trip hazard or where it could become chafed and create a fire or electrical hazard.

SECTION 12

INSTALLING A D^{term}® ANALOG CORDLESS TERMINAL

12.1 Selecting an Installation Location

Select a location to avoid excessive heat or humidity. The base unit should be placed on a desk or tabletop near a standard 120 Vac outlet and within reach of the telephone line connection on the Electra Elite Multiline Terminal. Keep the base unit and the handset away from sources of electrical noise (e.g. fluorescent lighting).

Depending on your environment, the maximum number of cordless devices used without interference varies.

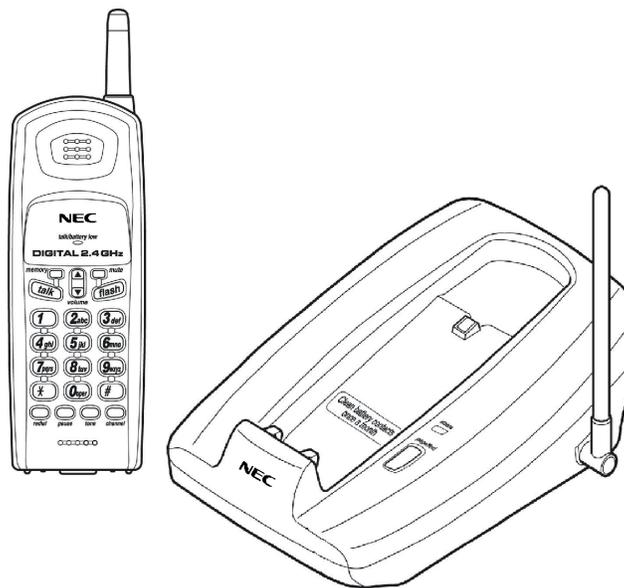


Figure 6-28 D^{term} Analog Cordless Terminal

12.2 Connecting the Telephone Cord

The DTR-1R-1 D^{term} Analog Cordless terminal is connected to an analog port on the KSU using one of the following: SLI(4)/(8)-U() or OPX(2)-U() ETU, SLT(1)-U() ADP, or APR-U Unit connected to the multiline terminal. A TEL LINE jack is located on back of the base unit of the D^{term} Analog Cordless terminal.



Observe the following warnings during installation.

- ⓘ Never install telephone wiring during a lightning storm.
- ⓘ Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
- ⓘ Use caution when installing or modifying telephone lines.

Using the telephone line cord supplied with the D^{term} Analog Cordless terminal, connect the TEL LINE to the telephone line.

12.3 Applying Power to the Base Unit

1. Plug the AC Adapter connector in the DC IN 9V jack.
2. Route the power cord where it does not create a trip hazard or where it could become chafed and create a fire or other electrical hazards.
3. Plug the AC Adapter in a standard 120 Vac wall outlet.
 - ⓘ The AC Adapter furnished with this phone should be equipped with a polarized line plug (a plug having one blade wider than the other). This plug fits into the power outlet only one way. When you cannot insert the plug fully into the outlet, reverse the plug. When the plug still does not fit, contact your facilities coordinator about replacing the obsolete plug. Do not alter the shape of the blades of the polarized plug.

SECTION 13**D^{term}® PS II****13.1 Description**

This terminal has wireless communication with a Zone Transceiver (ZT II) that is directly connected to the system. Refer to [Figure 6-29 D^{term} PS II Wireless Terminal](#).

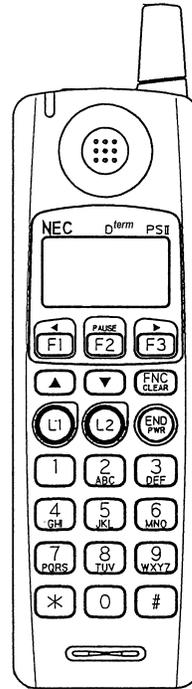


Figure 6-29 D^{term} PS II Wireless Terminal

SECTION 14
WALL MOUNTING THE
DTP-1-1 OR DTP-1-2
TEL AND DTP-1HM-1
OR DTP-1HM-2 TEL

14.1 Hanger Hook

1. Remove the hook from the unit.

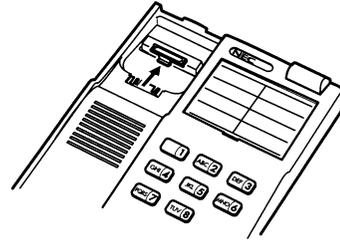


Figure 6-30 Removing the DTP Hook

2. Turn the hook over (back to the front) with the tab toward the top.



Figure 6-31 Turning the Hook Over

2. Replace the plate and screw in the two positions. (One remaining screw can be screwed in at the original third position.)

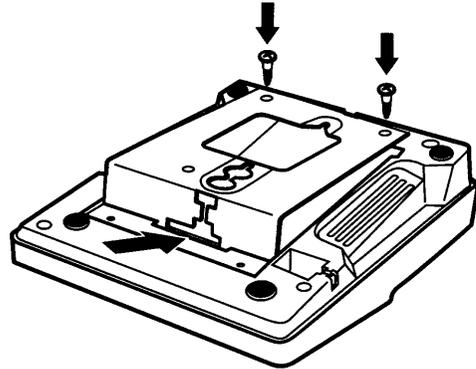


Figure 6-34 Replacing the Plate and Screw

3. Loosen the screws on the wall telephone plate to protrude a bit.

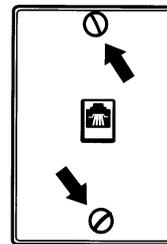


Figure 6-35 Protruding Screws

4. Install the telephone with the plate on the protruding screws.

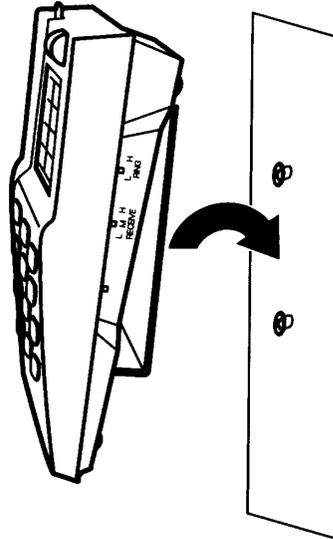


Figure 6-36 Mounting the Telephone

Installing Optional Equipment

SECTION 1 GENERAL INFORMATION

Optional equipment enhances the Electra Elite 192 system. This equipment can be purchased separately from the system and added as the customer business grows. Except as noted, these adapters can be installed on Electra Elite Multiline Terminals. With the exception of the VDD-U Unit, the adapters can also be used with D^{term} Series E Multiline Terminals.

A Multiline Terminal can have up to three adapters installed at the same time. When attaching an APR-U, CTA-U, CTU(C)-U, CTU(S)-U, HFU-U, or VDD-U Unit, an external power supply is required. Only **one** power supply is needed even when more than one adapter is installed. When an adapter is installed for the first time into a telephone, the base cover on the Multiline Terminal may have to be modified. The base cover has two access panels that are removed before the cover can be closed over the adapters to complete the installation.

SECTION 2 PREPARING MULTILINE TERMINAL FOR ADAPTER INSTALLATION

To prepare the Multiline Terminal for adapter installation:

1. Unplug the telephone cord from the terminal.
2. Turn the terminal upside down. Push the tabs indicated in [Figure 7-1 Raising the Base Plate](#), and raise the inner area of the base plate.

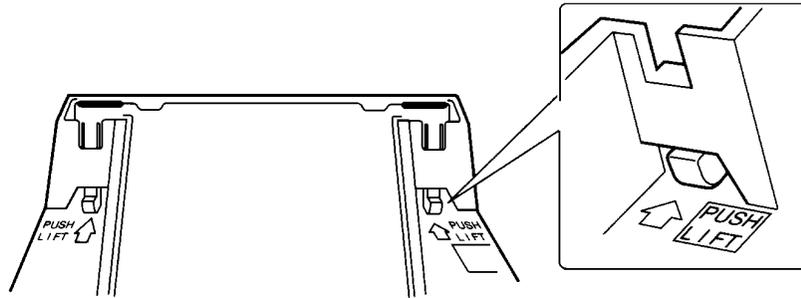


Figure 7-1 Raising the Base Plate

3. Insert a flat head screwdriver into A in [Figure 7-2 Unlocking Tab](#) and press straight down until tab unlocks.

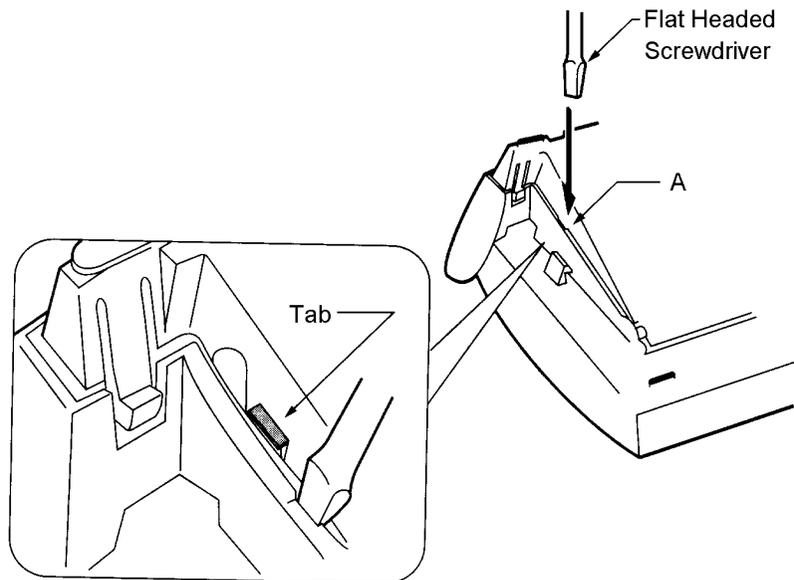


Figure 7-2 Unlocking Tab

4. Lightly press the right side of leg shown as B in [Figure 7-3 Releasing Right Tab](#), insert a flat head screwdriver at C. Press straight down until other tab unlocks.

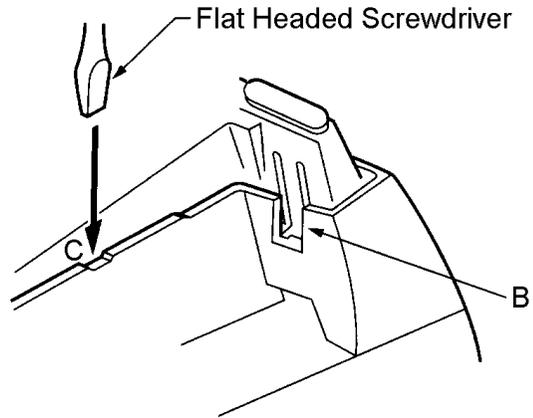


Figure 7-3 Releasing Right Tab

5. Open and remove the bottom cover by rotating counterclockwise as shown in [Figure 7-4 Removing Bottom Cover](#).

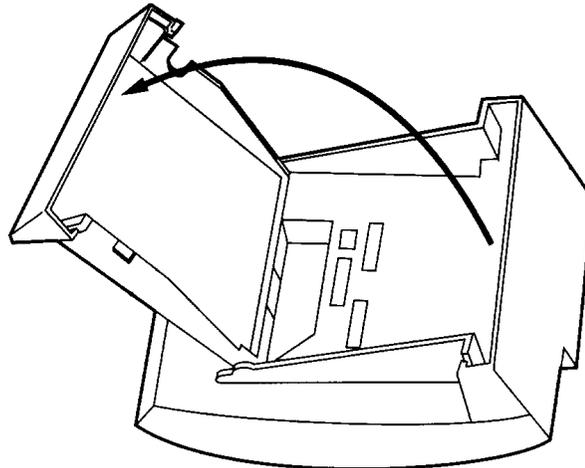


Figure 7-4 Removing Bottom Cover

- When an adapter is being installed, press tabs A and B to remove the dummy end from the base plate as shown in [Figure 7-5 Removing Base Plate Dummy End](#).

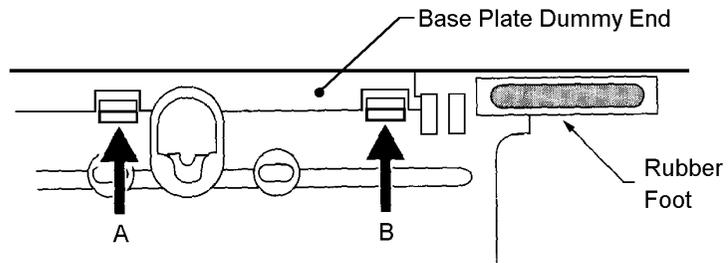


Figure 7-5 Removing Base Plate Dummy End

- Cut the dummy end in half as shown in [Figure 7-6 Cutting Dummy End in Half](#).

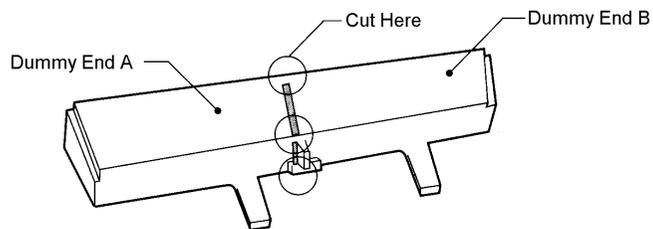


Figure 7-6 Cutting Dummy End in Half

8. When the adapter is installed in connector 1 as shown in [Figure 7-7 Installing Adapter in Connector 1](#), Install the dummy end B as shown in [Figure 7-8 Installing Dummy End B](#).

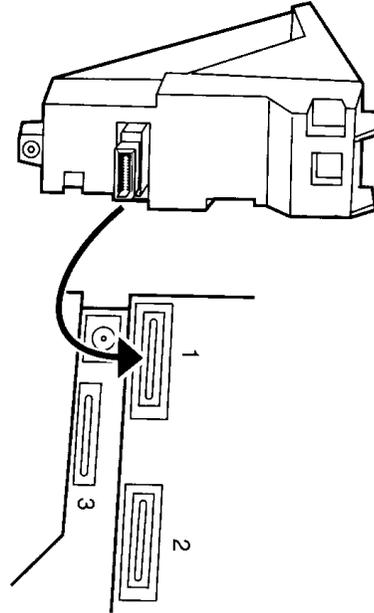


Figure 7-7 Installing Adapter in Connector 1

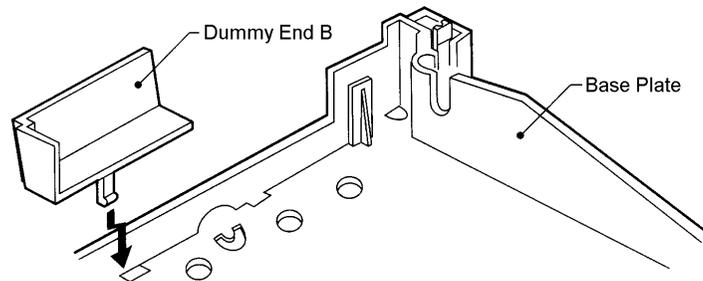


Figure 7-8 Installing Dummy End B

9. When the Adapter is installed in Connector 2, install dummy end A in the other slot.

SECTION 3 INSTALLATION PROCEDURES

3.1 ACA-U Unit (AC Adapter)

This unit provides power to ancillary devices, Attendant Consoles, or the DTP-16HC-1 TEL. Except for the DTP-16HC-1 TEL, the ACA-U Unit must be connected to an adapter that is installed on a Multiline Terminal. When more than one adapter is installed on a Multiline Terminal, only one ACA-U Unit is necessary.

The power requirements for the ACA-U Unit are:

- Ⓒ Input: 120V AC, 60 Hz, 30W
- Ⓒ Output: 24V DC, 750 mA
- Ⓒ Polarity: \ominus ————— \rightarrow ————— \dot{Y}

3.1.1 Connecting the ACA-U Unit

1. Unplug the line cord from the Multiline Terminal and unplug the ACA-U Unit from the AC outlet. (Failing to do this can damage the unit and/or the Multiline Terminal.)
2. Prepare Multiline Terminal for adapter installation. Refer to [Section 2 Preparing Multiline Terminal for Adapter Installation](#).
3. Locate the AC Adapter plug on the ancillary device that is connected to the bottom of the Multiline Terminal and plug in the AC Adapter.

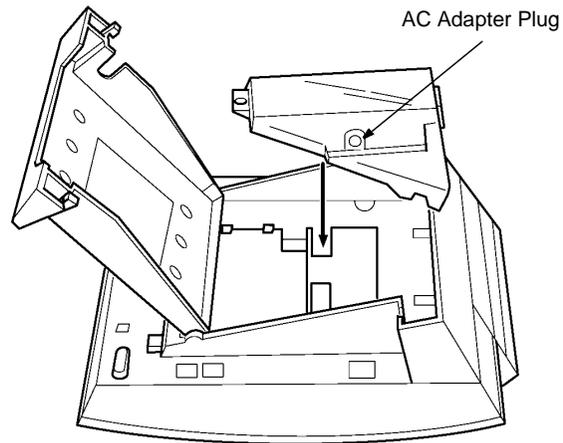


Figure 7-9 ACA-U Unit Connection

3.2 ADA-U Unit (Ancillary Device Adapter)

Ancillary Device Adapters allow connection of a tape recorder to all DTP/DTU Multiline Terminals except DTP-2DT-1 and DTP-16HC-1.

When installing an ADA-U Unit, first connect the cables to the ADA-U Unit, set the dip switches, and then install the ADA-U Unit on the Multiline Terminal.

3.2.1 Installing an ADA-U Unit on a Multiline Terminal

1. Unplug the telephone cord from the Multiline Terminal.
2. Prepare Multiline Terminal for adapter installation. Refer to [Section 2 Preparing Multiline Terminal for Adapter Installation](#).
3. Plug the ADA-U Unit connector into the receptacle connector on the back of the Multiline Terminal. Snap the ADA-U Unit into the hooks on the Multiline Terminal to secure it.

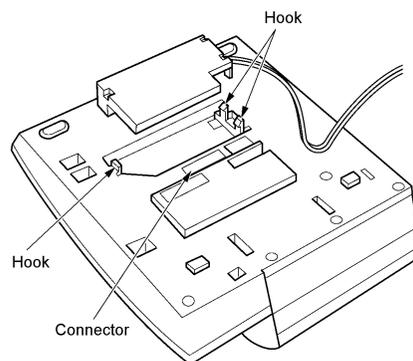


Figure 7-10 Attaching the ADA-U Unit to the Multiline Terminal

4. Replace base plate.
5. Lead the audio cable out through the groove on the base cover. Connect the telephone cord.

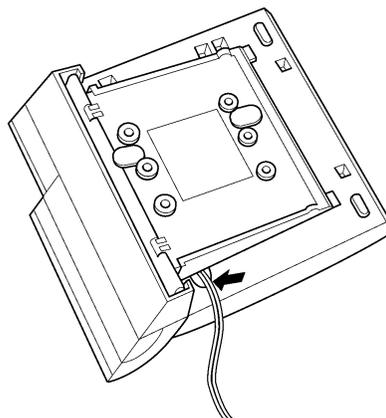


Figure 7-11 Leading the Audio Cable Out from the ADA-U Unit

3.2.2 Connecting Cables to the ADA-U Unit

Cable terminal connectors are located on the right side of the ADA-U Unit. Cables should be connected to this unit before installing the unit on the Multiline Terminal.

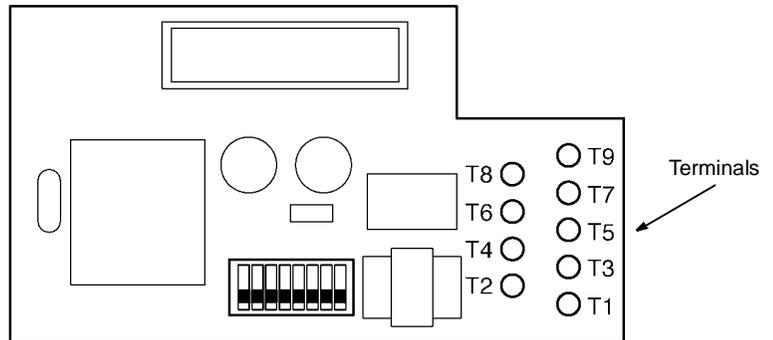


Figure 7-12 ADA-U Unit

1. Cut off the plug on one end of the cable.
2. Locate the adapter terminals on the right side of the unit as illustrated in [Figure 7-12 ADA-U Unit](#).
3. Remove the cap on the adapter terminal to expose the metal receptacle. Push the cable in the applicable receptacle, and replace the cap. Line up the slot on the cap with the slot on the metal receptacle to ensure proper contact. Refer to [Figure 7-13 Attaching Cables to the ADA-U Unit](#).

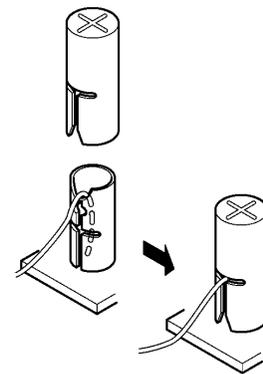


Figure 7-13 Attaching Cables to the ADA-U Unit

4. Insulate the end of the cable that needs to be shielded with insulating tape.

[Table 7-1 ADA-U Cable Connections](#) provides a list of cable connections to ADA-U ADP terminals and describes the specifications for the terminals.

Table 7-1 ADA-U Cable Connections

Terminal Number	Cables to Connect	Terminal Specifications
T1	When warning tone is not being sent from the recorder, connect wire pair input from tone generator to T1:T2. The warning tones from the generator are sent to T1:T2 on a dedicated wire pair while the speech path is sent from the ADA-U on T3:T4 over a separate wire pair to the recorder.	Input Terminal: T1 and T2 are enabled for tone generating device when switches SW1-3 and SW1-4 are OFF.
T2		(When switches SW1-3 and SW1-4 are ON, a humming sound may be recorded due to impedance mismatch.) Input Impedance on T1 and T2: 100K Ω Input Level on T1 and T2: -15 dB ~ 40 dB
T3:T4	Connect recorder device wire pair speech input to T3:T4. When the recorder used supplies a warning tone, this tone may also be sent over the T3:T4 wire pair back to the terminal.	Input/Output Terminal: Refer to dip switch settings in Table 7-2 ADA-U Unit Switch Settings .
T5	Connect the bare end of the control cable.	When a Multiline Terminal is idle, this contact is closed. When the Multiline Terminal goes off-hook (using the handset, headset, or speakerphone), this contact is open. When recorder owner manual specifies start on open circuit, connect T5 and T6.
T6	Connect the shielded end of the control cable.	Provides common connection for control cable.
T7	Connect the bare end of the control cable.	When the Multiline Terminal is idle, this contact is open. When the Multiline Terminal is busy (using the handset, headset, or speakerphone), this contact is closed. When recorder owner manual specifies start on closed circuit, connect T6 and T7.
T8	Unused	
T9		

Table 7-1 ADA-U Cable Connections (Continued)

Notes:

- ☞ When recording in handsfree (half-duplex) mode using the built-in speakerphone, the record warning tone may not be audible to the far-end party.
- ☞ The transmit recording level is lower than the receiving voice level for intercom calls; the transmit recording level for CO calls is normal.
- ☞ Depending on the recording device(s), separate cables may be required for the warning tone and speech path. In this case, connect the warning tone cables to input terminals T1 and T2 on the ADA-U Unit. (T3 and T4 are used as the tape recorder input.)
- ☞ When remote control of the recorder is necessary, the record start/stop control is provided by connecting to T5 (or T7) and T6 on the ADA-U Unit. (Connecting to T5 or T7 is determined by the specifications of the recorder.)
- ☞ When a warning Tone is provided from the recording equipment, it should be input via T3 and T4 on ADA-U Unit. **Do not use T1 and T2 to input Beep Tone.**
- ☞ Conversations cannot be recorded from terminals connected to an APR-U Unit. Speakerphone calls through the HFU-U Unit cannot be recorded.

3.2.3 Switch Settings

The DIP Switch is located at the bottom center of the ADA-U Unit. The DIP Switch allows a technician to configure the board to specific settings. [Figure 7-14 ADA-U Unit Switch Settings](#) shows the default settings.

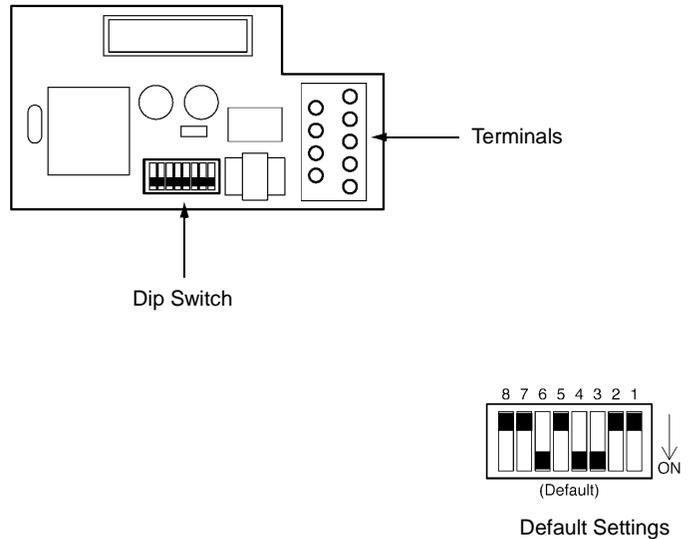


Figure 7-14 ADA-U Unit Switch Settings

The following switch settings should be made on the ADA-U Unit to enable or disable the record start warning tone. Switch settings should be made before installing the ADA-U Unit in the Multiline Terminal. Refer to [Table 7-2 ADA-U Unit Switch Settings](#).

Table 7-2 ADA-U Unit Switch Settings

Switch	Setting		Description
SW1-1	Off		When the ADA-U provides control to the recorder, SW1-1 must be On.
SW1-2	Off		Leave Off
SW1-3 and SW1-4	SW1-3 ON	SW1-4 ON	Warning Tone from recording device over same wire pair as speech path.
	SW1-3 OFF	SW1-4 OFF	Warning Tone from recorder or generator equipment on dedicated wire pair to recorder MIC input
SW1-5 and SW1-6	SW1-5 OFF	SW1-6 ON	Input impedance is 600 Ω
	SW1-5 ON	SW1-6 OFF	Input impedance is less than 30 Ω
SW1-7	ON		When warning tone from any device is sent to telephone
SW1-8	Off		Leave Off

 Do not connect T1 and T2 when switches SW1-3 and SW1-4 are ON.

3.3 APA-U Unit (Analog Port Adapter)

The Analog Port Adapter without Ringer is the interface for installing Single Line Telephones, Modems, Credit Card Readers, Wireless Headsets, NEC VoicePoint/VoicePoint Plus Conferencing unit, and other compatible analog devices. The APA-U Unit does not generate a ringing signal. One user-adjustable switch with two settings is provided on the adapter. Setting 1 allows impedance to be set to 600 Ω for devices such as modems. Setting 2 is used for complex impedance devices such as a Single Line Telephone.

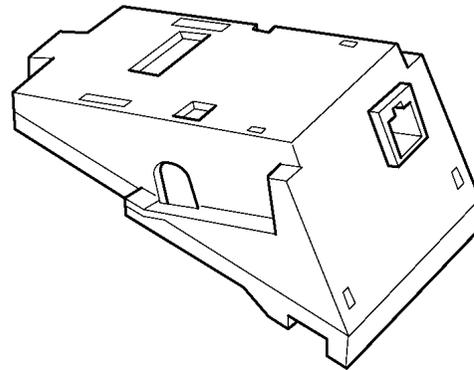


Figure 7-15 APA-U Unit

- 3.3.1 Installing APA-U Unit on any DTP/DTU Multiline Terminal except DTP-2DT-1 and DTP-16HC-1
1. Prepare Multiline Terminal for adapter installation. Refer to [Section 2 Preparing Multiline Terminal for Adapter Installation](#).
 2. Plug the unit into the receptacle connector inside the base plate. Refer to [Figure 7-16 Attaching the Unit to the Multiline Terminal](#).
-  The APA-U Unit **does not** require an ACA-U Unit to supply external power.

3. Close the base plate, and snap the cover in place.

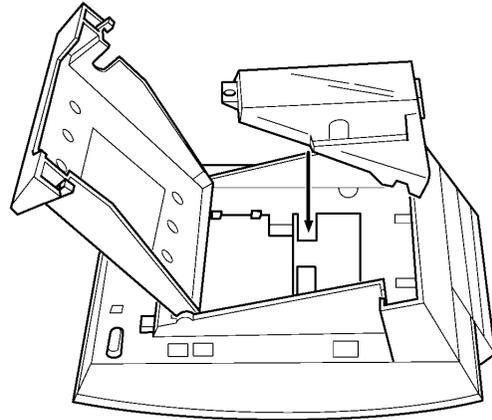


Figure 7-16 Attaching the Unit to the Multiline Terminal

4. Install a ferrite core (provided with the APA-U Unit) by looping line cord through the core between the terminal (1 inch from the terminal) and ESI(8)-U10 ETU. This core is only used with the APA-U Unit.
5. Plug in the power cord on the AC adapter and the telephone cord in the jack.

3.3.2 Switch Settings

The APA-U Unit has one switch.

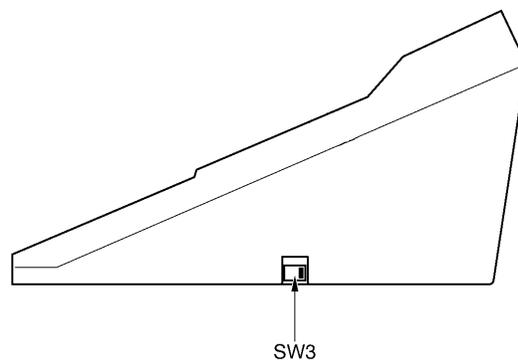


Figure 7-17 APA-U Unit Switches

Refer to [Table 7-3 APA-U Unit Switch Settings for SW3](#).

Table 7-3 APA-U Unit Switch Settings for SW3

Switch	Description
SW3-1	Sets impedance to 600Ω for devices such as modems or facsimile machines
SW3-2	Used for complex impedance devices such as Single Line Telephones.

3.3.3 Connecting Cables on the APA-U Unit

Plug the telephone cord from the Single Line Telephone into the modular jack on the APA-U Unit. Refer to Figure 7-18.

Limit the cable length from the APA-U Unit to the Single Line Telephone to a maximum of 50 feet.

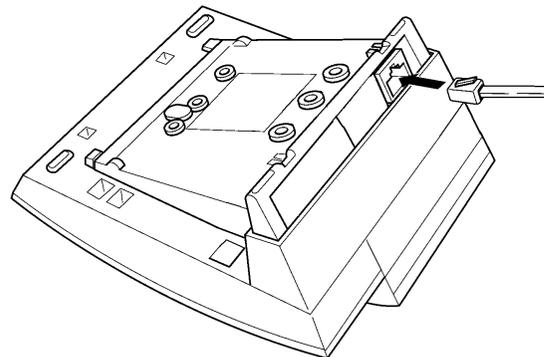


Figure 7-18 Connecting Cables on the APA-U Unit

3.4 APR-U Unit (Analog Port Ringer)

The Analog Port Adapter with Ringing is the interface for installing Single Line Telephones, modems, NEC VoicePoint/VoicePoint Plus Conferencing unit, and other compatible analog devices. The APR-U Unit also generates ringing signals. By providing ring generation, the user can install a personal fax machine or an answering machine for convenience. Two user-adjustable switches are provided on the adapter; one allows for 600 Ω or a complex impedance interface to devices such as a modem or Single Line Telephone, the second switch (SW1) is set to position 2.

An AC Adapter is required.

If a CTA-U, CTU(C)-U, CTU(S)-U, HFU-U or VDD-U Unit and an APR-U Unit are both installed, only one AC Adapter is required.

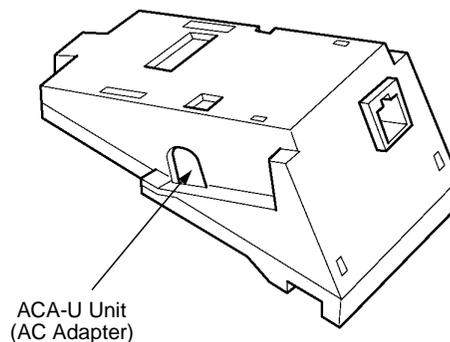


Figure 7-19 APR-U Unit

3.4.1 Installing an APR-U Unit on any DTP/DTU Multiline Terminal except DTP-2DT-1 and DTP-16HC-1

1. Prepare Multiline Terminal for adapter installation. Refer to [Section 2 Preparing Multiline Terminal for Adapter Installation](#).
2. Plug the unit into the receptacle connector inside the base plate. Refer to [Figure 7-20 Attaching the Unit to the Multiline Terminal](#).

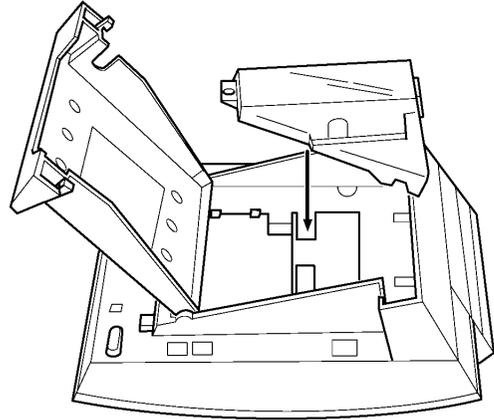


Figure 7-20 Attaching the Unit to the Multiline Terminal

3. Plug the cord of the ACA-U Unit (AC adapter) into the jack on the APR-U Unit. Lead the telephone cord out through the groove in the base as shown in [Figure 7-21 Leading the Telephone Cord Out from the Unit](#).

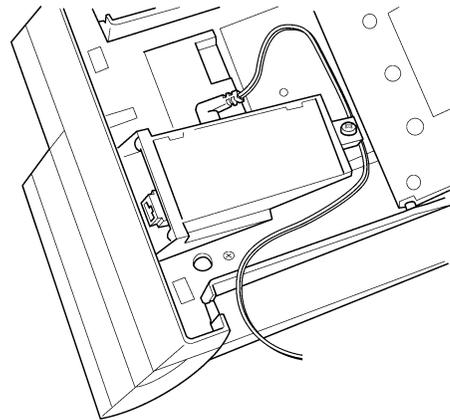


Figure 7-21 Leading the Telephone Cord Out from the Unit

4. Close the base plate, lead the AC adapter cord out through the hole, and snap the cover in place.

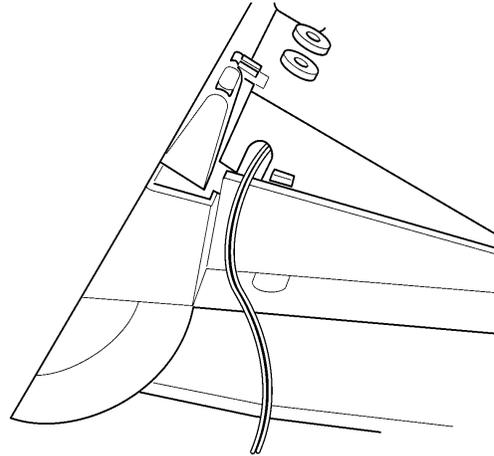


Figure 7-22 Closing the Base Plate Cover

5. Install a ferrite core (provided with the APR-U Unit) by looping line cord through the core between the terminal (1 inch from the terminal) and ESI(8)-U() ETU. This core is only used with the APR-U Unit.
6. Plug in the power cord on the AC adapter and the telephone cord in the jack.

3.4.2 Switch Settings

The APR-U Unit has two switches.

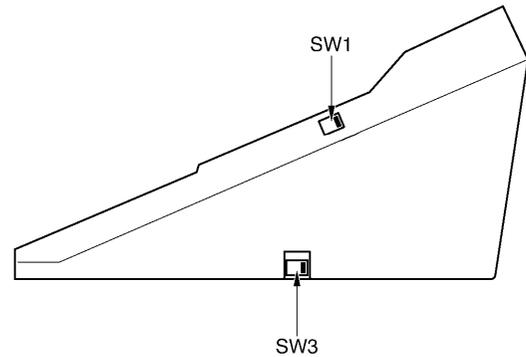


Figure 7-23 APR-U Unit Switches

Refer to [Table 7-4 APR-U Unit Switch Settings for SW1 and SW3](#).

Table 7-4 APR-U Unit Switch Settings for SW1 and SW3

Switch	Description
SW1-1	Do not use
SW1-2	A Single Line Telephone and Multiline Terminal are used alternately. (The Multiline Terminal and the APR-U Unit share the same B1 channel.)
SW3-1	Sets impedance to 600Ω for devices such as modems or facsimile machines.
SW3-2	Used for complex impedance devices such as Single Line Telephones.

3.4.3 Connecting Cables on the APR-U Unit

Plug the telephone cord from the Single Line Telephone in the modular jack on the APR-U Unit.

Limit the cable length from the APR-U Unit to the Single Line Telephone to a maximum of 50 feet.

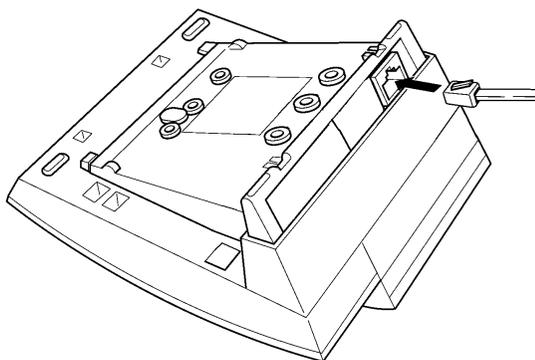


Figure 7-24 Connecting Cables on the APR-U Unit

3.5 CTA-U Unit (Computer Telephony Application)

Computer Telephony Application allows a DTP or DTU Multiline Terminal connection to a PC. The PC can perform all Multiline Terminal functions using a TAPI-compatible application software.

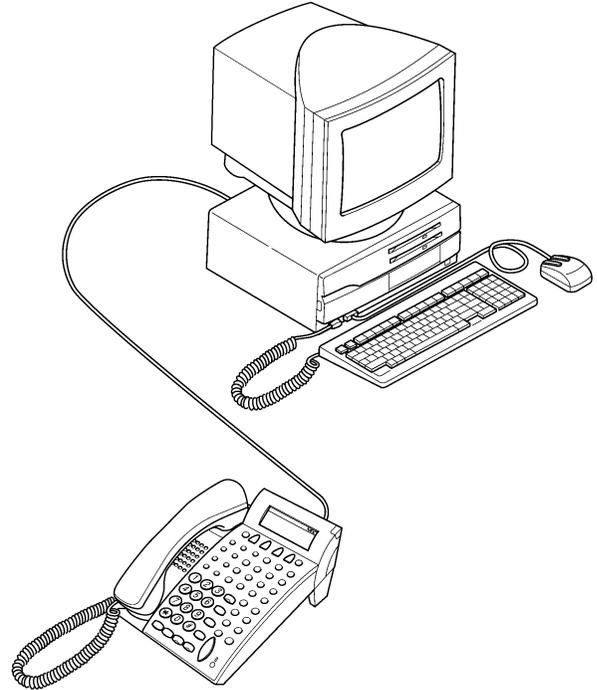


Figure 7-25 Attaching an Electra Elite Multiline Terminal to a PC

The CTA-U Unit is attached to the bottom of any DTP/DTU Multiline Terminal except DTP-2DT-1 and DTP-16HC-1.

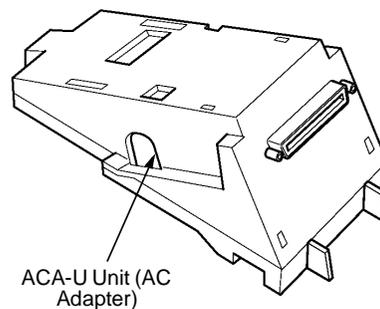


Figure 7-26 CTA-U Unit

3.5.1 Installing the CTA-U Unit

1. Prepare Multiline Terminal for adapter installation. Refer to [Section 2 Preparing Multiline Terminal for Adapter Installation](#).
2. Plug the unit into the receptacle connector inside the base plate on the Multiline Terminal. Refer to [Figure 7-27 Attaching the Unit to the Multiline Terminal](#).

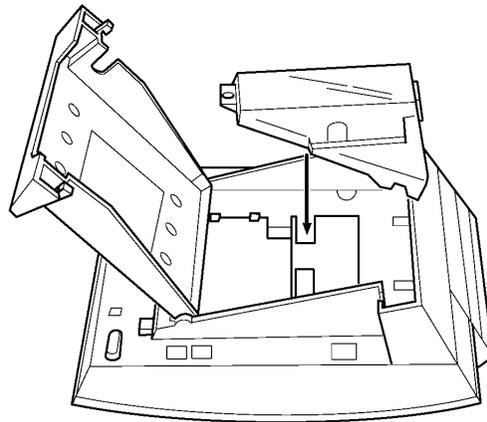


Figure 7-27 Attaching the Unit to the Multiline Terminal

3. Close the base plate.

3.5.2 Connecting the Cables on the CTA-U Unit

Connect the RS-232C cable from the computer to the connector on the CTA-U Unit as shown in [Figure 7-28 Connecting the RS-232C Cable to the CTA-U Unit on the Multiline Terminal](#).

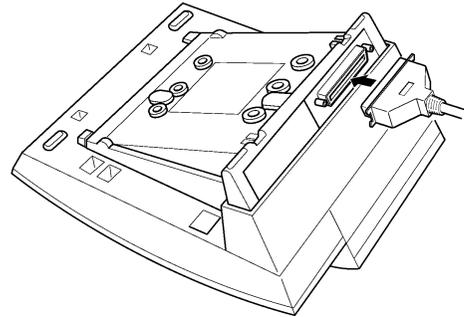


Figure 7-28 Connecting the RS-232C Cable to the CTA-U Unit on the Multiline Terminal

3.5.3 Installing the Driver on the PC

Using the setup disk provided with the CTA-U Unit install the driver on your PC. Refer to the product installation guide.

3.6 Computer Telephony Adapter with USB Interface

The CTU adapter connects to a PC USB port to provide telephony and sound device control. The general functions of the CTU include:

① Telephony Control

The application is based on the Microsoft Telephony Application Programming Interface (TAPI) and provides call handling on the PC (e.g., call, answer, Hold, Transfer, Conference, or Caller ID).

① User Interface to support D^{term} Emulation

This function provides the functions of D^{term} such as normal telephone indications, LCD, Line keys, or Hookswitch.

① Sound Support

Allows voice recording or recording playing on an audio device assigned to the PC. Voice Mail and Live Record are supported on the PC.

① Supports Plug and Play

Ⓢ Headset Operation

When user uses CTU and TAPI and sets data for Telephony Service Provider (TSP), the headset button can be controlled by TSP.

Ⓢ USB Interface

This adapter uses Full Speed (12Mbps) as defined in the USB Specification.

3.6.1 CTU(C)-U Unit Connections

This unit is a Computer Telephony Application adapter to connect a Universal Serial Bus to a Coreline port on the VDH2(8)-U() ETU and can be connected to any DTP/DTU Multiline Terminal except DTP-2DT-1 and DTP-16HC-1.

A required AC Adapter is provided with the unit.

The following connections are required:

- Ⓢ AC Adapter
- Ⓢ Multiline Terminal jack labeled LINE
- Ⓢ PC USB port
- Ⓢ Coreline interface to VDH2(8)-U() ETU
- Ⓢ LAN cable to PC

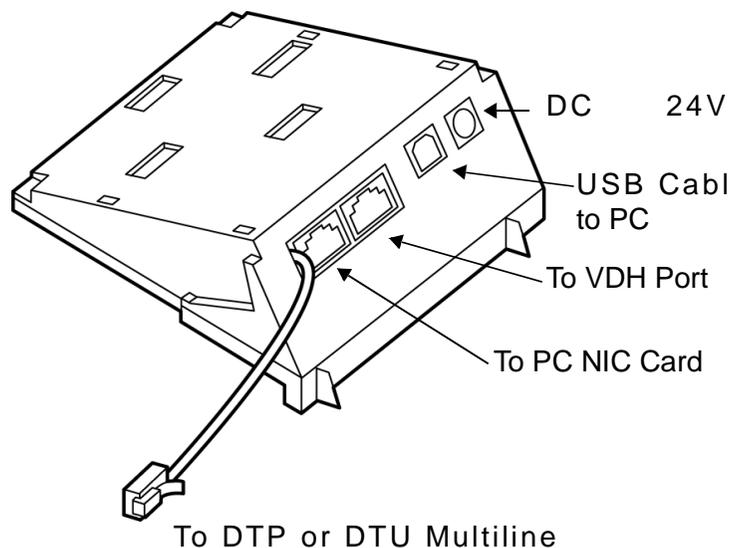


Figure 7-29 CTU (C)-U Unit

3.6.2 CTU(S) Unit Connections

This unit is a Computer Telephony Application adapter to connect a Universal Serial Bus to an ESI(8)-U() ETU and can be connected to any DTP/DTU Multiline Terminal except DTP-2DT-1 and DTP-16HC-1.

A required AC Adapter is provided with the unit.

The following connections are required:

- ① AC Adapter
- ① Multiline Terminal jack labeled LINE
- ① PC USB port
- ① ESI port to ESI(8)-U() ETU

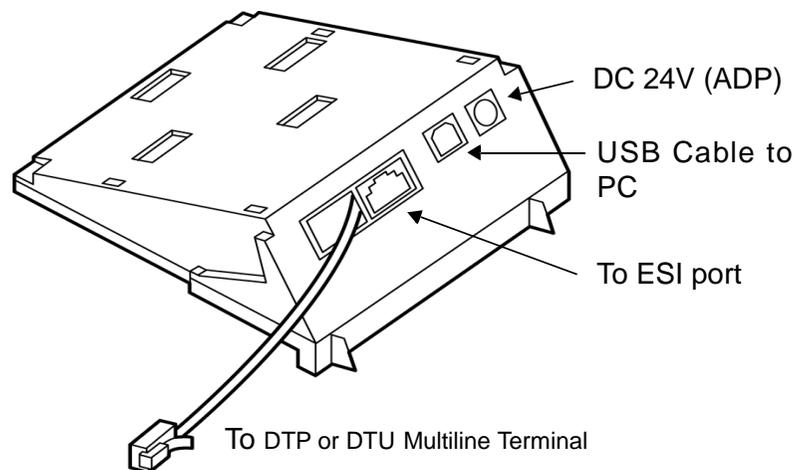


Figure 7-30 CTU (S)-U Unit

3.7 DBM(B)-U10 Box and DBM(E)-U10 Box Message Display Boards

The DBM(B)-U10 basic Message Display Board is connected to the ESI(8)-U10 ETU to provide a message waiting LED for voice mailboxes of personnel without a normal telephone. Each board has eight message waiting LEDs, and up to eight boards can be installed in the Electra Elite 192 system to support 64 LEDs.

The DBM(E)-U10 expansion Message Display Board has eight message waiting LEDs and is connected to the DBM(B)-U10 or another expansion board. Each DBM(B)-U10 basic board can support up to five expansion boards and 40 additional LEDs.

The total number of LEDs is 384, but the Electra Elite 192 System can only support up to 200 mailbox indications. Multiple locations of the same mailbox are permitted. Refer to [Figure 7-31 DBM\(B\)-U\(\) and DBM\(E\)-U\(\) Message Display Boards](#) and [Figure 7-32 Maximum Display Indications](#).

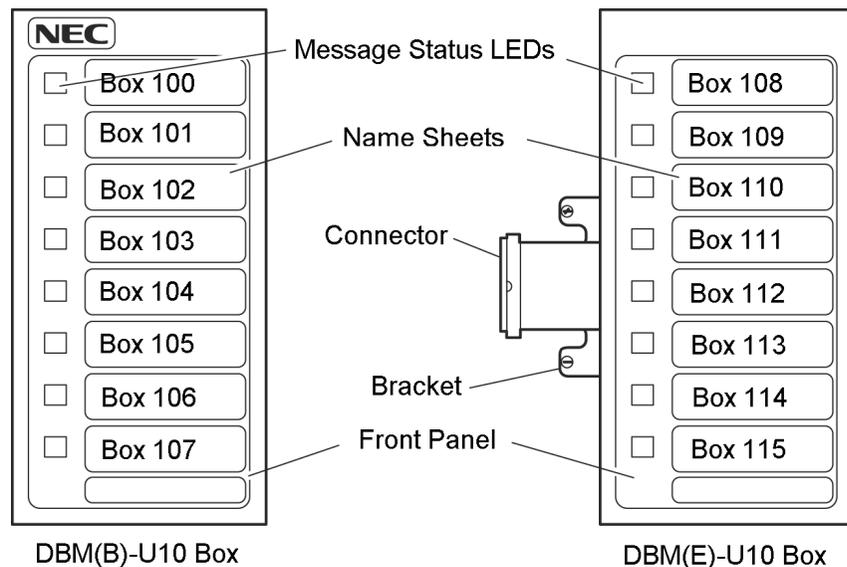


Figure 7-31 DBM(B)-U() and DBM(E)-U() Message Display Boards

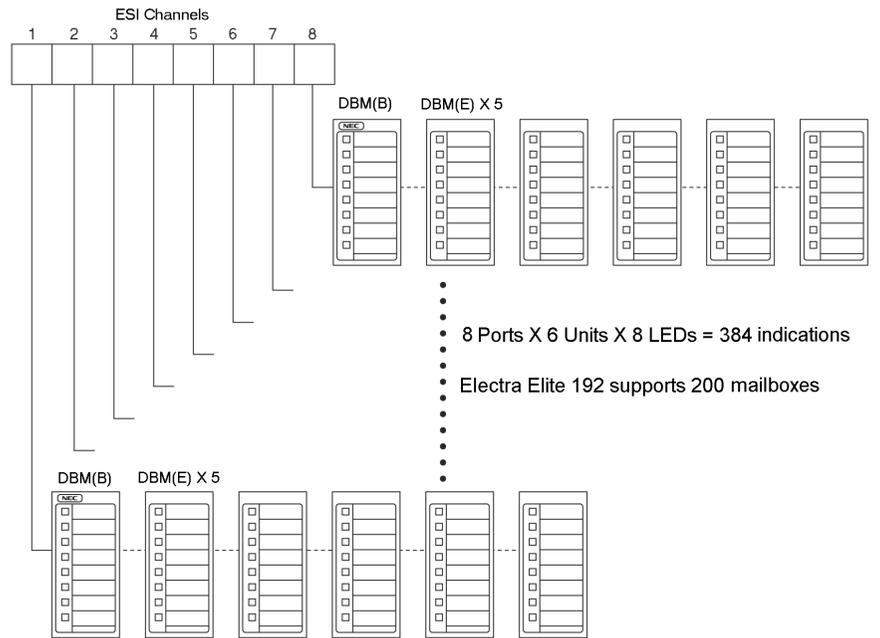


Figure 7-32 Maximum Display Indications

3.7.1 Connecting DBM(E)-U() Box to DBM(B)-U() Box or Another DBM(E)-U() Box

1. Use wire cutters to remove the cutout on right side of DBM(B)/(E) cover. Refer to [Figure 7-33 Removing Cutout](#). Place the provided edge protector on the top of the cutout.

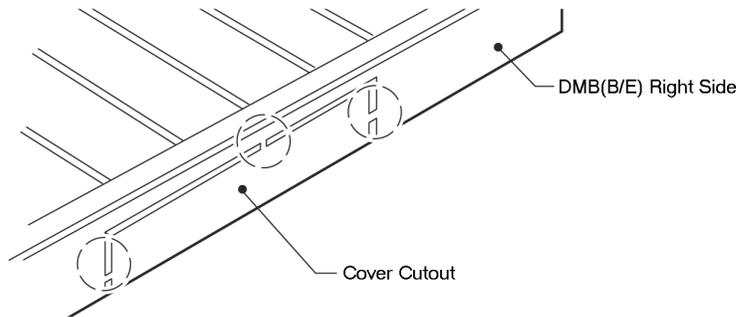


Figure 7-33 Removing Cutout

2. Remove the display plate from DBM(B)/(E) and DBM(E), and peel off the cover sheet on both.
3. Insert protruding side of the cable from the DBM(E) in DBM(B) CN7 or in CN7 of the previous DBM(E).
4. Slide the bracket on DBM(E) being installed into the groves on DBM(B)/(E) and tighten the nuts and bolts. Refer to [Figure 7-34 Connecting the Bracket](#).

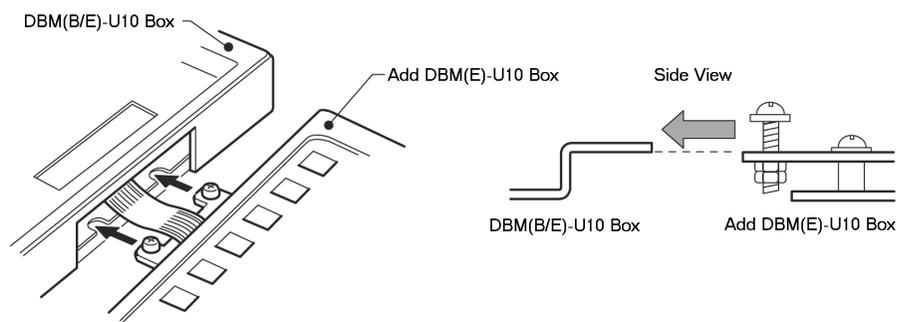


Figure 7-34 Connecting the Bracket

5. Ensure that the internal end of the cable is connected to DBM(E) CN2.
 - ☞ The second expansion board must have this cable connected internally to DBM(E) CN3 and externally to the first DBM(E) CN7. The third, fourth, and fifth expansion board cables are connected externally to the previous DBM(E) CN7 and internally to CN4, CN5, and CN6 respectively.
6. After all expansion boards are connected, place the white cover sheets back on the DBM(B)-U() and all expansion boards, and install the display panels.

3.7.2 Wall Mounting DBM(B)-U10 and Expansion Boards

1. Refer to the template, and thread the included screw into the wall at location for the top hole of the DBM(B)-U() Box. Leave screw extended 1/8 inch. Refer to [Figure 7-35 Threading Screw into Wall](#).

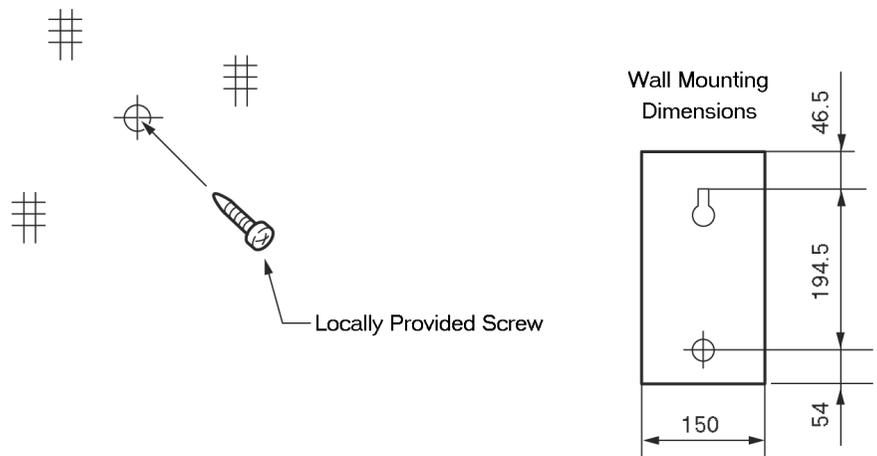


Figure 7-35 Threading Screw into Wall

2. Place hole for mounting over the screw, and Hang the DBM(B)-U10 on the screw. Refer to [Figure 7-36 Hanging DBM\(B\)-U\(\) on Screw](#).

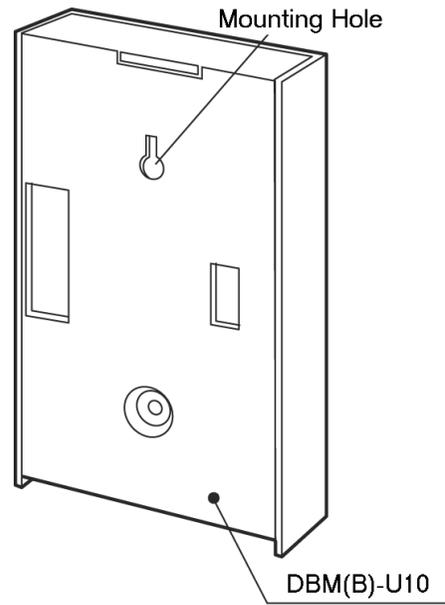


Figure 7-36 Hanging DBM(B)-U() on Screw

3. Remove the display panel to access screws, and thread the **in place** bottom screws on the outside boards into the wall. Refer to [Figure 7-37 Installing Bottom Screws](#).

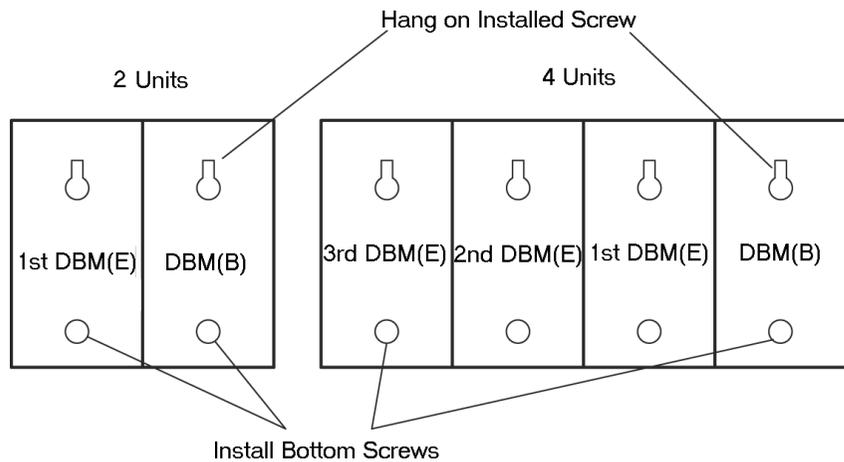


Figure 7-37 Installing Bottom Screws

4. Tighten the top screw on the DBM(B)-U() Box.
 - ☞ When four or five expansion boards are used, install the bottom screw on the middle unit as well.

3.7.3 Connecting the DBM(B) to Power and ESI

1. Refer to [Figure 7-38 Connecting DBM\(B\)-U\(\)](#), and Connect provided AC Adapter to the DBM(B)-U().

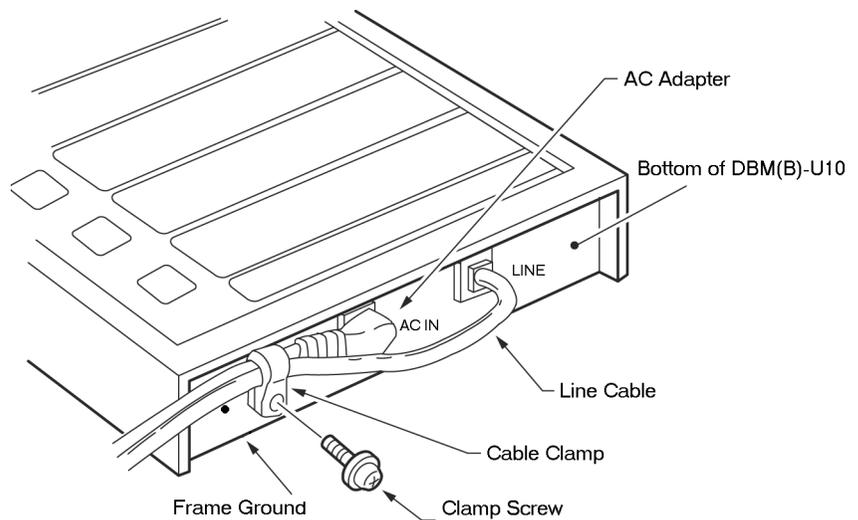


Figure 7-38 Connecting DBM(B)-U()

2. Connect the line cable to the DBM(B)-U().
3. Place the clamp around the cables, insert the clamp screw, and attach clamp to the DBM(B)-U().
4. Refer to [Figure 7-39 Connecting DBM\(B\)-U\(\) to ESI Port](#), and connect the display board system to ESI.

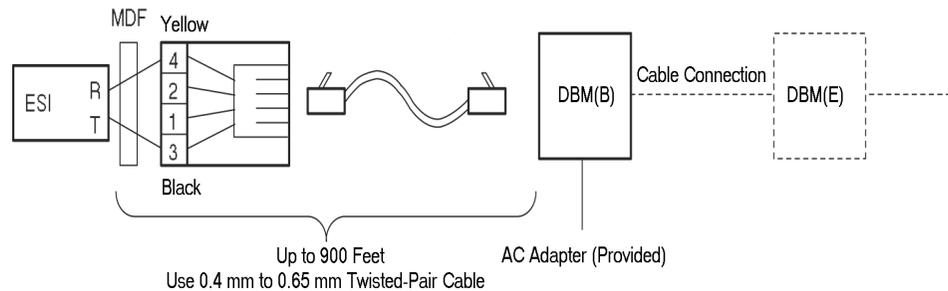


Figure 7-39 Connecting DBM(B)-U() to ESI Port

3.8 HFU-U Unit (Handsfree Unit)

The Handsfree Unit provides full-duplex handsfree communication. Large areas may cause poor full-duplex operation. This unit comes with the handsfree adapter and an external microphone. With terminal upside down, facing from the bottom of the open cover, install this unit in Telephone Slot 1.

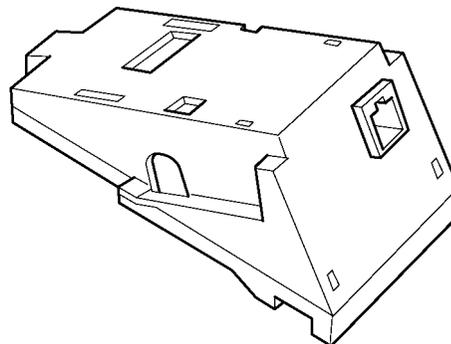


Figure 7-40 HFU-U Unit

3.8.1 Installing an HFU-U Unit on any DTP/DTU Multiline Terminal except DTP-2DT-1 and DTP-16HC-1

Refer to [3.4.1 Installing an APR-U Unit on any DTP/DTU Multiline Terminal except DTP-2DT-1 and DTP-16HC-1](#). The instructions for installing these units are the same.

3.8.2 Installing the External Microphone

An external microphone can be installed on the HFU-U Unit. These instructions apply to the external microphone obtained from NEC. The microphone is equipped with a mute button.

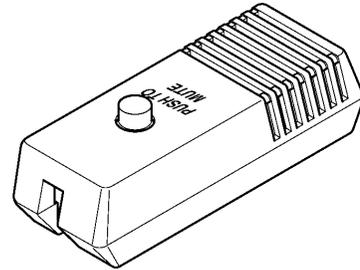


Figure 7-41 Microphone with Mute

1. Plug the microphone cord into the jack on the HFU-U Unit as shown in [Figure 7-42 Attaching a Microphone to a Multiline Terminal](#).
 - ☞ The microphone should be between one foot and three feet away from the Multiline Terminal.

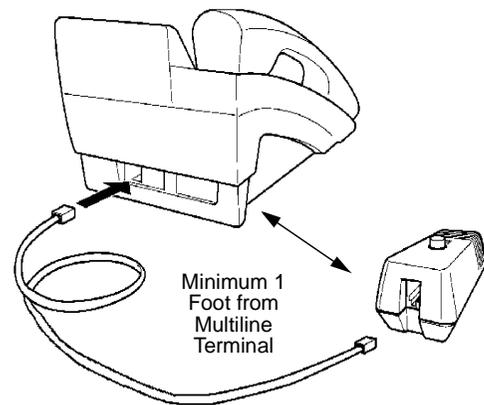


Figure 7-42 Attaching a Microphone to a Multiline Terminal

3.8.3 Switch Settings

The HFU-U Unit uses 2-position switches SW1 and SW2.

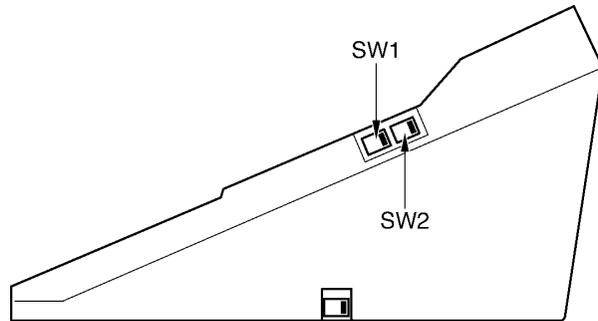


Figure 7-43 HFU-U Unit Switches

Refer to [Table 7-5 HFU-U Unit Switch Settings](#).

Table 7-5 HFU-U Unit Switch Settings

SW1		SW2		Description
Position 1	Position 2	Position 1	Position 2	
OFF	ON	OFF	ON	Full Duplex (Default)
ON	OFF	OFF	ON	Half Duplex (6db mix ratio)
OFF	ON	ON	OFF	Half Duplex (12db mix ratio)
ON	OFF	ON	OFF	Half Duplex (18db mix ratio)

- ☞ Full Duplex: In some large areas or noisy locations half duplex should be used. The echo canceling ability of the HFU-U is limited.
- ☞ Half Duplex: When voice clipping occurs, use a lower decibel setting.

3.9 PCT()-U() Unit (PC Telephony Board)

The NEC PC Board is a multifunction PC-AT add-in card with telephone, sound system, fax, and modem abilities and combines multimedia audio, Telephone Application Programming Interface (TAPI), and a 33.6K fax/data modem. The board is available with/without the built-in modem.

The PC Board replaces an NEC desk set as the primary telephone device; the telephone line from the wall now plugs directly into the PC board instead of the desk set. The desk set can be connected to the PC board and used as an adjunct or auxiliary telephone. An external microphone and external speakers can also be connected to the PC Board.

The PC Board allows telephone operations with a headset or microphone and has the following audio abilities:

- ① Records audio from the calling or called party of a telephone conversation
- ① Records audio from both parties of a telephone conversation
- ① Records audio (or music) from a microphone, line-level device, or CD player
- ① Plays live or recorded audio (or music) through an adjunct telephone, handset or stereo speakers

The PC Board uses Computer Technology Integration (CTI) technology through Microsoft Windows 95 or higher to support speech and data transmission, allow a variety of attachment devices, and support complex calling features such as conference calls, call waiting, and voice mail.

The PC Board supports the following terminals:

- ① D^{term} Series III Multiline Terminals
- ① D^{term} Series E Multiline Terminals
- ① Electra Professional Multiline Terminals
- ① Electra Elite Multiline Terminals

The NEC PC Telephony board can be installed on the ISA bus on any IBM-compatible PC.

Refer to the PCT Installation Guide provided with the PCT-U for installation instructions.

3.9.1 Connecting a MIC/Line-In

- ① When using the microphone input (MIC), connect an electric condenser microphone. Phantom power (-2.2 Vdc) is supplied.
- ① When using the line-level input (Line-In), connect to a line-level device such as a CD or cassette player.

3.10 SLT(1)-U() ADP (Single Line Telephone)

The Single Line Telephone adapter provides an interface for Single Line Telephones and other similar devices from an ESI ETU channel. This adapter can be connected to any ESI port.

3.10.1 Connecting the SLT(1)-U() ADP to the System

1. Connect one end of the RJ-11 to the ESI port on the KSU and one end to the **ESI** jack on the SLT Adapter.
2. Connect one end of a second RJ-11 to the **TEL** jack on the SLT Adapter and the other end to the Single Line Telephone.

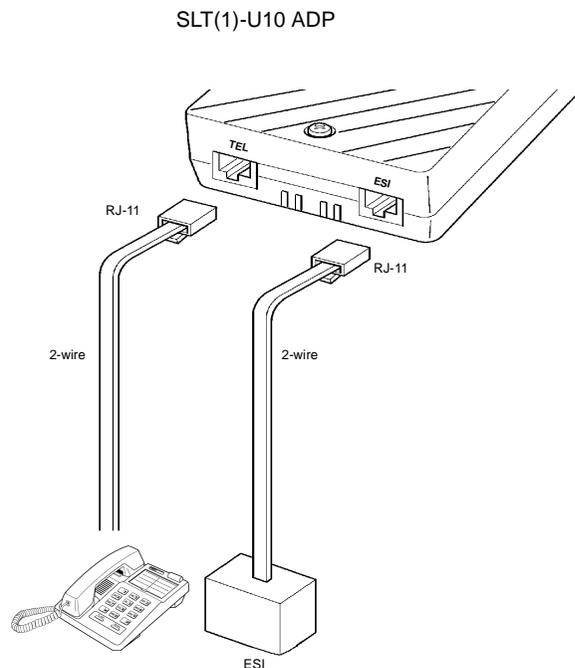
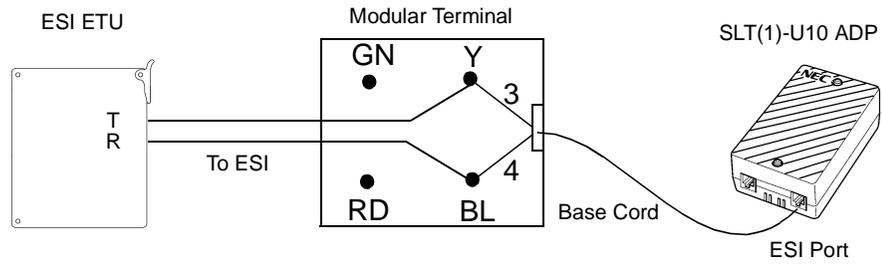
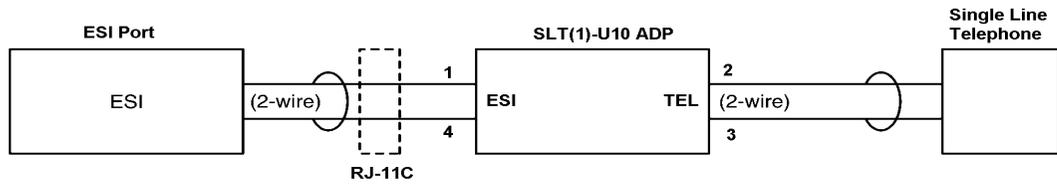


Figure 7-44 Connecting a Single Line Telephone to the System Using an SLT(1)-U() ADP



Modular Terminal Connections



Single Line Telephone Connections

Figure 7-45 Connecting the SLT(1)-U() ADP

3.10.2 Wall Mounting the SLT(1)-U() ADP

1. Remove the two screws from the top to open the SLT Adapter as shown in [Figure 7-46 Removing Screws from SLT\(1\)-U\(\) ADP](#).

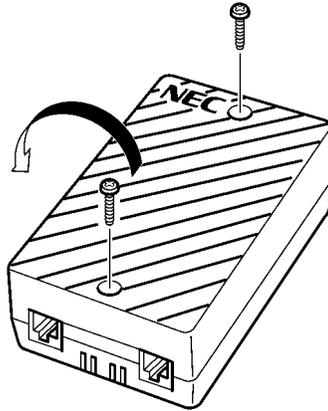


Figure 7-46 Removing Screws from SLT(1)-U() ADP

2. Using the two provided wood screws, attach the unit to the wall. Close the unit and secure with the two screws that were previously removed.

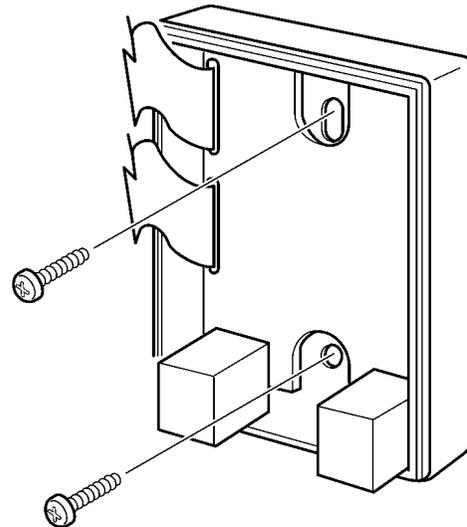


Figure 7-47 Attaching the SLT(1)-U10 ADP to the Wall

3.11 VDD-U Unit (Voice/Data Unit for Digital Terminals)

This unit provides the station and LAN split for digital terminals. This adapter can be installed on any Electra Elite Multiline Terminal except DTP-2DT-1 and DTP-16HC-1. It is used when LAN and telephone lines are incorporated into one cable.

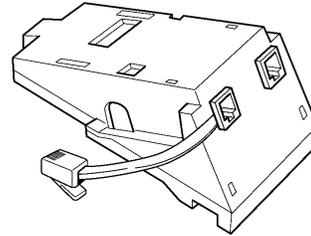


Figure 7-48 VDD-U Unit

3.11.1 Installing a VDD-U Unit on a Multiline Terminal

Refer to [3.5 CTA-U Unit \(Computer Telephony Application\)](#). The instructions for installing these units are the same.

3.11.2 Connecting Cables to the VDD-U Unit

1. If the Multiline Terminal is already connected to the ESI(8)-U() ETU, unplug the telephone cord.
2. Plug the cable from the VDH2(8)-U() ETU and from the PC LAN board into the modular jacks on the VDD-U Unit. The jacks are labeled. Plug the cable from the VDD-U Unit into the modular jack on the Multiline Terminal.

Limit the cable length from the VDH to the PC via the VDD to a maximum of 328 feet (100 meters).

- ☞ When LAN cables are reversed on the VDD-U Unit, the unit is not damaged, but the Multiline Terminal does not operate.

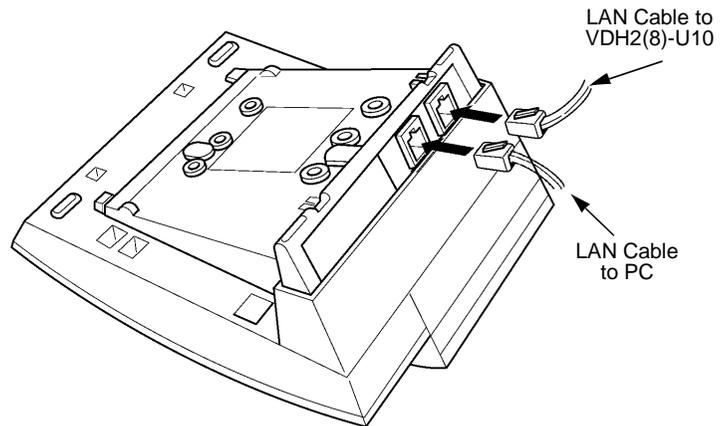


Figure 7-49 Connecting the Cables on the VDD-U Unit

3.12 Wall Mounting

Any Electra Elite Multiline Terminal can be mounted on a wall. Multiline Terminals can be wall mounted by using the base unit that comes with the Multiline Terminal or by using the WMU-U Unit to accommodate adapters that are installed on the Multiline Terminal.

3.12.1 Removing and Remounting the Handset Hanger

1. Remove the hanger by sliding it out of the slot.
2. Install it back in its original position so that the hanger protrudes providing a rest for the handset. (This procedure applies when using either the base unit or the WMU-U Unit.) Refer to [Figure 7-50 Positioning the Handset Hanger](#) for the steps for removing and remounting the handset hanger.

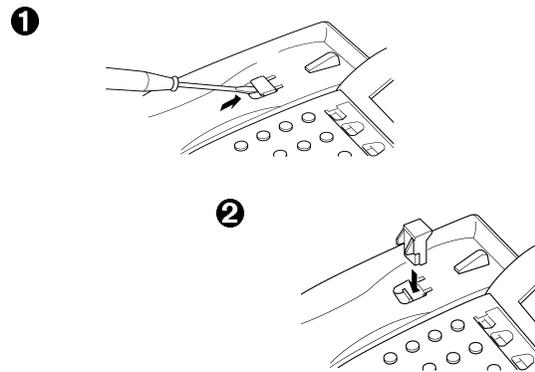


Figure 7-50 Positioning the Handset Hanger

3.12.2 Wall Mounting using the Base Unit

1. Refer to [Section 2 Preparing Multiline Terminal for Adapter Installation](#), and perform Steps 1~5.
2. Press both sides of the base cover and turn it left to remove it.
3. Rotate base cover 180°, and install it again on the Multiline Terminal.
4. Remove the shaded base plate knockout shown on [Figure 7-51 Removing the Knockout](#) with nippers.

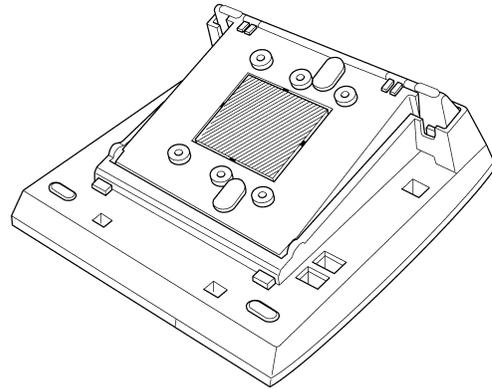


Figure 7-51 Removing the Knockout

5. Assemble the base plate and base cover.
6. As illustrated in [Figure 7-52 Attaching the Base Plate to the Wall](#), attach the base plate and base cover assembly (wide end down) to the posts on the locally provided and installed wall plate. Place locally provided screws in the nodes on the base plate and secure the assembly to the wall.

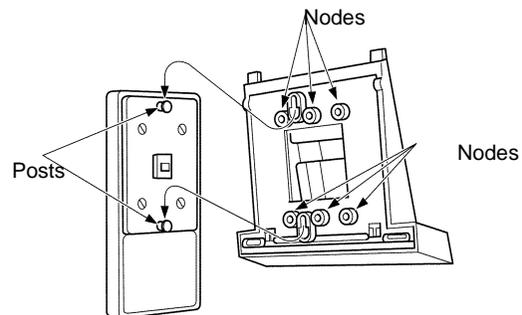


Figure 7-52 Attaching the Base Plate to the Wall

When using a modular jack instead of a wall plate, put the modular jack inside the base unit as shown in [Figure 7-53 Wall Mounting Using a Modular Jack](#). Use the locally provided screws to attach the base unit directly to the wall.

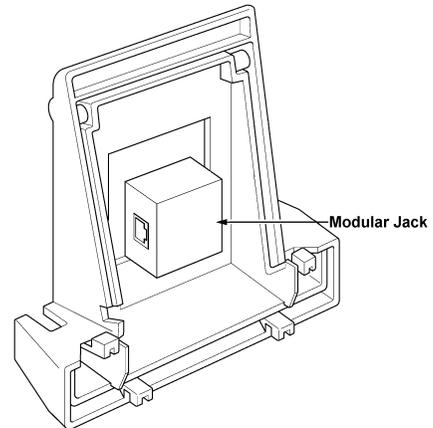


Figure 7-53 Wall Mounting Using a Modular Jack

Plug the line cord into the jack on the wall plate, wrap the extra cord and secure it with a tie wrap, and lead the line cord out through the groove in the side of the base unit.

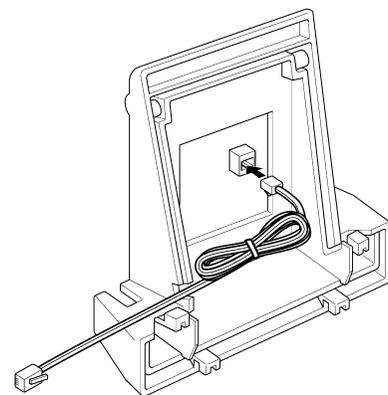


Figure 7-54 Plugging in the Line Cord Using a Wall Jack

When using a modular jack instead of a wall plate, plug the line cord into the modular jack, wrap the extra cord and secure it with a tie wrap, and lead the line cord out through the groove in the side of the base unit.

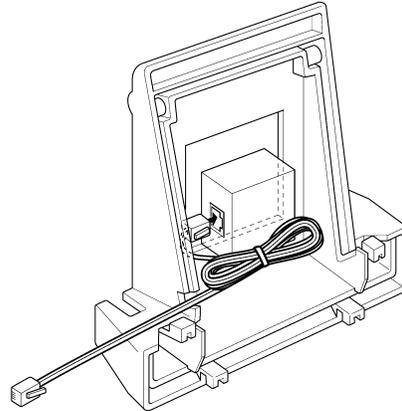


Figure 7-55 Plugging in the Line Cord Using a Modular Jack

7. With the base plate and base cover assembly attached to the wall, hook the two bottom tabs on the base cover into the tab slots on the base of the Multiline Terminal.

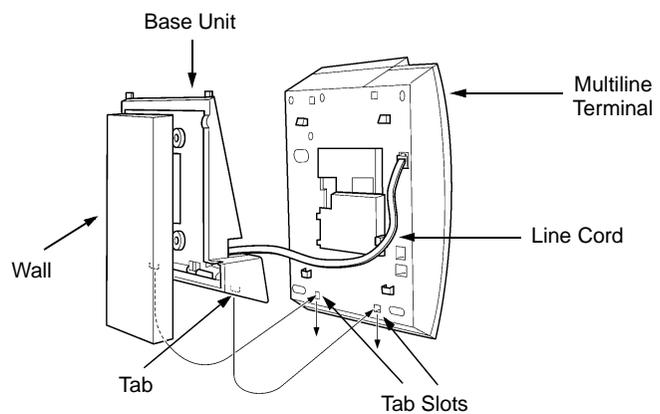


Figure 7-56 Attaching the Bottom Tabs of the Multiline Terminal to the Base Cover

8. Push up on the Multiline Terminal and lock the top tabs on the base cover into the tab slots on the base of the Multiline Terminal. Turn terminal slightly clockwise to interface with base cover. [Figure 7-57 Attaching the Top Tabs of the Multiline Terminal to the Base Plate](#) shows how the Multiline Terminal is attached.

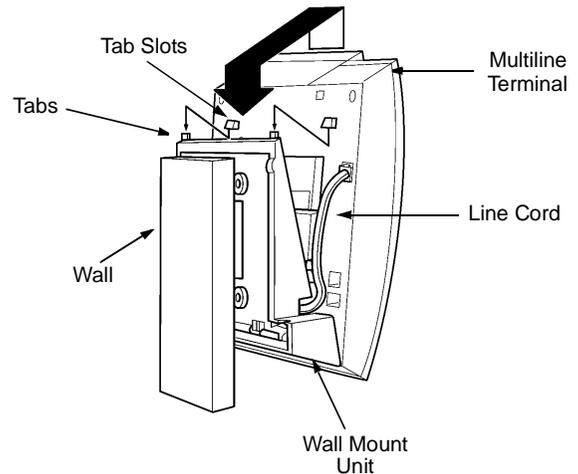


Figure 7-57 Attaching the Top Tabs of the Multiline Terminal to the Base Plate

9. When properly installed, the wall-mounted Multiline Terminal looks similar to the one shown in [Figure 7-58 Installed Wall Mount Unit](#).
 - ☞ Do not adjust the tilt panel after the Multiline Terminal is mounted on the wall.

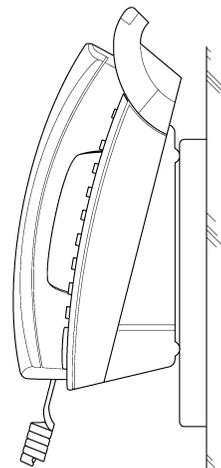


Figure 7-58 Installed Wall Mount Unit

3.12.3 Installing the Wall Mount Unit and Mounting the Multiline Terminal Using the WMU-U Unit

When installing any Adapter unit, a separate WMU-U Unit must be purchased to accommodate this unit.

1. Remove the line cord, base plate and base cover from the Multiline Terminal as shown in the previous section.

2. Cut off the tabs on the adapter as shown in [Figure 7-59 Removing the Tabs from the Adapter](#).

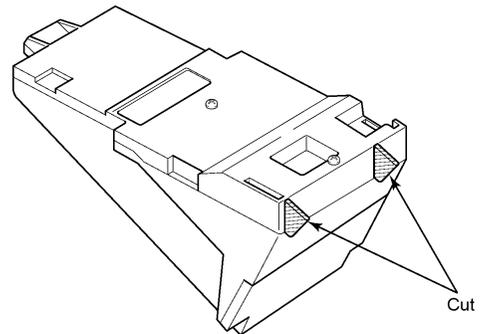


Figure 7-59 Removing the Tabs from the Adapter

3. Remove the tabs from the WMU-U Unit as shown in [Figure 7-60 Removing the Tabs from the WMU-U Unit](#). (Tabs removed depends on the Multiline Terminal type.)

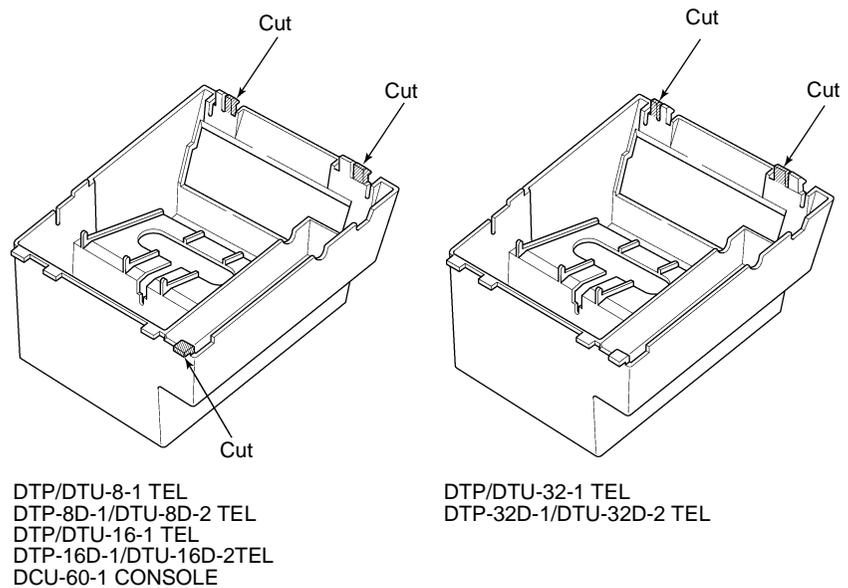


Figure 7-60 Removing the Tabs from the WMU-U Unit

4. Bundle the cord from the modular jack leaving about eight inches. Use a tie wrap to secure the bundled cord.

5. Place the bundled line cord in the space between the WMU-U Unit and the wall. Lead the line cord out through the slits as shown in [Figure 7-61 Leading the Line Cord out of the WMU-U Unit](#).

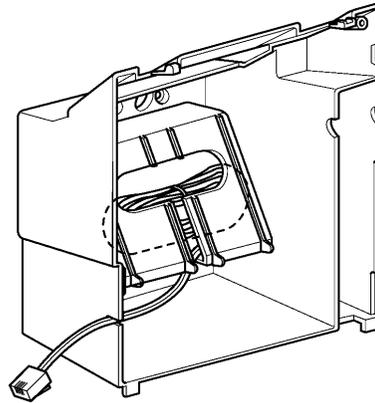


Figure 7-61 Leading the Line Cord out of the WMU-U Unit

6. Attach the WMU-U Unit to the posts on the wall plate (locally provided). Place locally provided screws in the nodes on the WMU-U Unit and secure the WMU-U Unit to the wall.

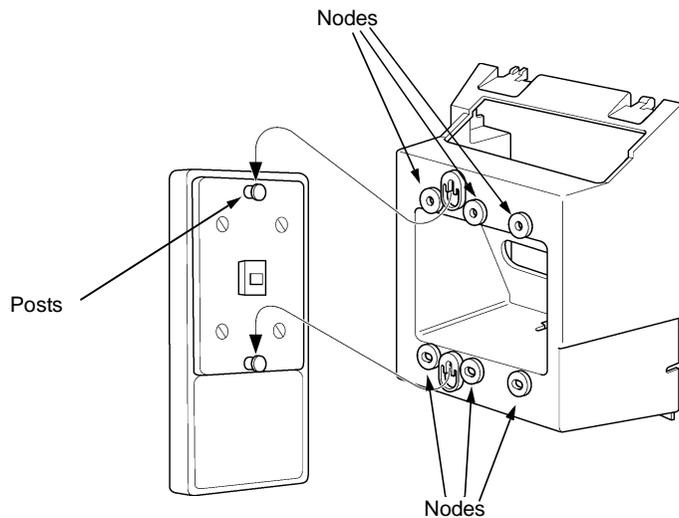


Figure 7-62 Attaching the Wall Mount Unit to the Wall

7. Connect the line cord to the Multiline Terminal.
8. With the WMU-U Unit attached to the wall, hook the two bottom tabs on the WMU-U Mount Unit in the tab slots on the Multiline Terminal. Then push the two top tabs on the WMU-U Unit into the tab slots on the Multiline Terminal. When the adapter has a power supply, lead the AC adapter cord out through the opening at the bottom of the Multiline Terminal. Refer to [Figure 7-63 Attaching the Multiline Terminal to the WMU-U Unit](#).

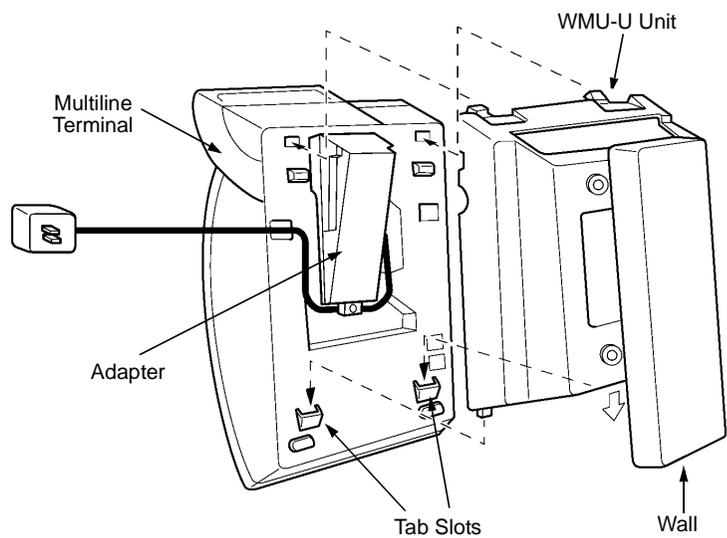


Figure 7-63 Attaching the Multiline Terminal to the WMU-U Unit

3.12.4 Removing the Multiline Terminal from the Base Cover

To remove the Multiline Terminal from the base cover, lift the Multiline Terminal to disengage top tabs, turn it slightly counter clockwise to unlock lower tabs on base cover, and remove it.

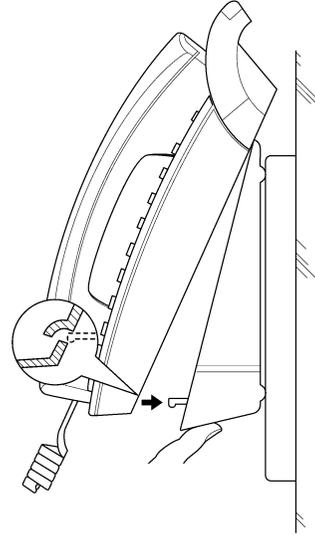


Figure 7-64 Removing the Multiline Terminal from the Base Cover

3.12.5 Removing the Multiline Terminal from the WMU-U Unit

To remove the Multiline Terminal from the WMU-U Unit, lift the Multiline Terminal to disengage top tabs and lower the terminal from the WMU-U Unit.

3.13 Music on Hold

The Electra Elite 192 KSU allows a Music on Hold source to be connected to the Electra Elite system. Internal or external music sources can be used. When an internal music source is used (digital music), external music on hold is not available.

3.13.1 Connecting Audio Sources to the KSU

Connect the plug end into the audio jack on the side of the base KSU.

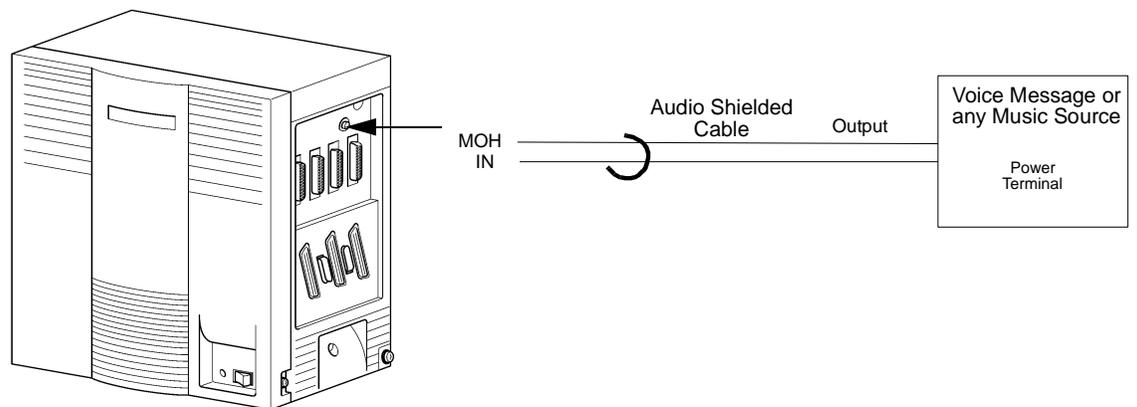


Figure 7-65 Music Source Connections

3.14 Station Background Music

Station Background Music can be provided using an internal or an external source. The same connection method used for Music on Hold is used for Station Background Music.

3.15 Paging Connections

When connecting background music, the ECR-U() ETU is used for the interface with Paging In/Out, Background Music (External Speaker) Out and/or External Tone Ringer/Night Chime Out.

3.16 Connecting a KSU to a Personal Computer

To use the Automatic Call Distribution (ACD), Least Cost Routing (LCR), Wireless, and PC Programming, specialized software must be installed in the user PC and the PC must be connected via a serial port to the KSU.

3.16.1 Connecting the PC to the KSU

Using RS-232C straight cable, connect the PC to one of the COM ports on the side of the KSU. Refer to [Figure 7-66 Connecting a PC to the KSU](#).

The functions and the communication port connections are:

Function	Port
Least Cost Routing (LCR)	COM 1
PC Programming	COM 1
Wireless Programming	COM 1
Station Message Detail Recording (SMDR)	COM 2
Automatic Call Distribution (ACD)	COM 4

Serial-port characteristics include:

Characteristic	Value
Baud Rate	38.4 K (maximum)
Parity	None
Stop Bit	1 stop bit
Data Bit	8 bits
Port Type	DCE

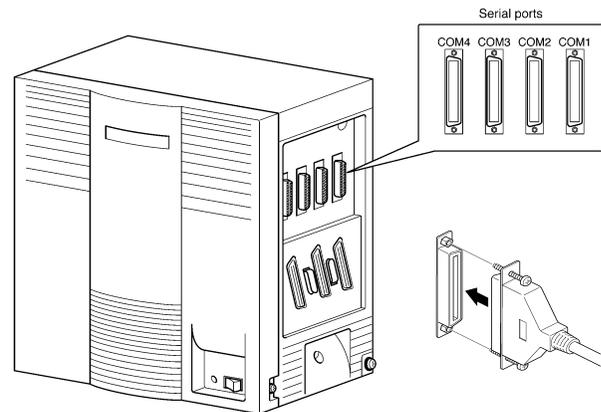


Figure 7-66 Connecting a PC to the KSU

3.16.2 Connecting the Printer to the KSU

When using the charge control ability, connect the printer to the KSU to allow the printing of the charge data. Connect the printer to the serial port on the side of the KSU with an RS-232C straight cable. Use the COM 2 port to connect the printer.

3.16.3 Remote Programming Using the Built-in Modem (Modem Kit Unit)

PC programming abilities include Remote Programming.

Connect the CO line to the modem extension number. The following characteristics apply to the built-in modem.

Characteristic	Value
Baud Rate	14.4Kpbs
Parity	None
Stop Bit	1
Data Bit	8

3.17 *D*^{term} Voice Security Recorder

3.17.1 Description

The VSR Extension Recorder is a Universal Serial Bus (USB) device that taps across the digital extension pair of a *D*^{term} Digital extension port and includes software that enables the user to manage stored calls. VSR hardware connects in-line at the user desktop. Power is not required because the connection is a metallic wiring of the in and out connections. The recorder does nothing to affect operation of the Digital Telephone.

This device meets all applicable FCC and UL requirements for this type of communication device.



Figure 7-67 *D*^{term} Voice Security Recorder

3.17.2 Connectors

- ① One connector that allows USB cable connection to the PC USB connector to provide power and stream all speech and control channel information to the host PC and desktop software.
- ① Two digital telephone line connectors that passively tap across the connection between the Electra Elite IPK KSU and a DTH Digital Telephone to “listen” in high impedance mode to the signaling on the line.

3.17.3 Requirements for installation

The VSR is packaged with everything necessary for installation including:

- ① Software CD
- ① USB Cable
- ① Telephone connection lead
- ① Quick-start installation manual

3.17.4 Installation Procedures for Windows 98 or ME

1. Run the Setup.exe program file from the NEC installation CD **before** connecting the telephone interface unit to your PC.
2. Connect the VRS UBC interface connector to your PC using the provided USB cable.
3. Connect your telephone to either VSR port.
4. Connect the other VSR port to the telephone system, and recording is enabled.

3.17.5 Installation procedure for Windows 2000 or XP

1. Using the provided USB cable, connect the VRS USB interface to your PC.
2. Windows automatically detects the new hardware and displays a Wizard dialog box.

3. Select **Install from a list or specific location (Advanced)**, and select **Next**.



Figure 7-76 Wizard Welcome Screen

4. The next screen is displayed:

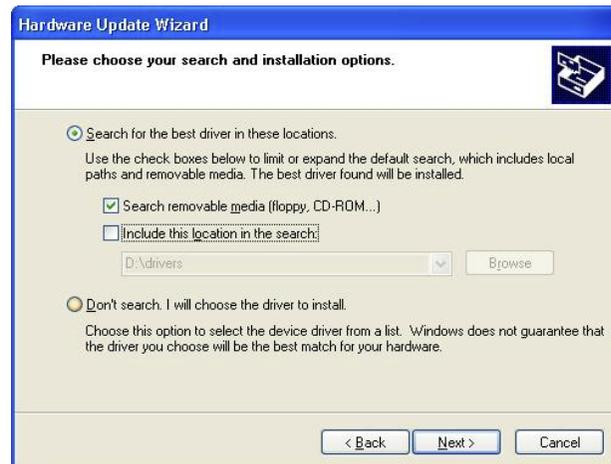


Figure 7-77 Search and Installation Options

5. When files are downloaded from the Internet, uncheck *Search Removable Media*, and check *Include this location in the search*, and enter the

location where the downloaded files are to be stored (e.g., C:\My Documents).

6. Select Next and the next screen is displayed.

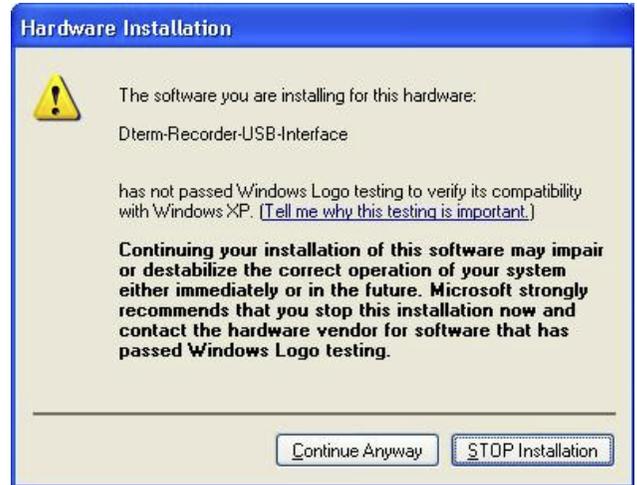


Figure 7-78 Software Not Compatible Warning

7. The software is fully tested , but has not been sent to Microsoft for approval. Select Continue Anyway and the next screen is displayed



Figure 7-79 Hardware Update Completed

8. The necessary device drivers are installed.
9. Select Finish to close the dialogue.
10. Now run Setup.exe on your NEC installation CD to install necessary application software on your PC.
11. Connect a telephone to the VSR ports, and you can record.
 - ☞ Ports are interchangeable between multiline terminal and Electra Elite System

3.17.6 VSR Application Software

The VSR software is delivered on a Compact Disk using a self-starting install shield. The CD contains all applicable files and installation procedures to operate to this specification, including USB device drivers, software application, and Help files.

A quick-start instruction sheet and a pre-recorded user guide that steps the user through the various options are provided.

The VSR application supports Microsoft Operating Systems that support USB devices. the following systems meet this requirement:

- Ⓢ WIN 98SE
- Ⓢ WIN Millennium Edition (ME)
- Ⓢ WIN 2000
- Ⓢ WIN XP (all variants)
- ☞ VRS does not support WIN 95 and below, or WIN NT.

3.17.7 VRS User Interface Tab Options

VRS has the following tabs to allow the user to select features and options:

- Ⓢ Playback allows various playback features of recorded conversations.
- Ⓢ Record allows control of recording.
- Ⓢ About provides software version information.
- Ⓢ Options to set-up controls such as recording format.
- Ⓢ File Management allows the user to manage disk space used by the VSR.

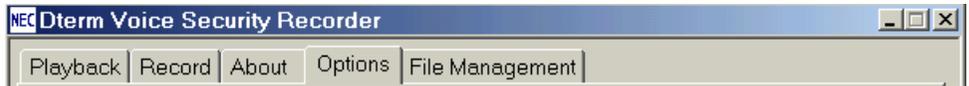


Figure 7-80 VSR Playback Tab

3.17.8 VSR Playback Tab

This Tab allows the user to list and play recorded conversations. A graphical presentation of the volume level of the call with a cursor to indicate the current playback position is displayed. The cursor can be dragged forward or backward to allow rapid selection of the applicable section.

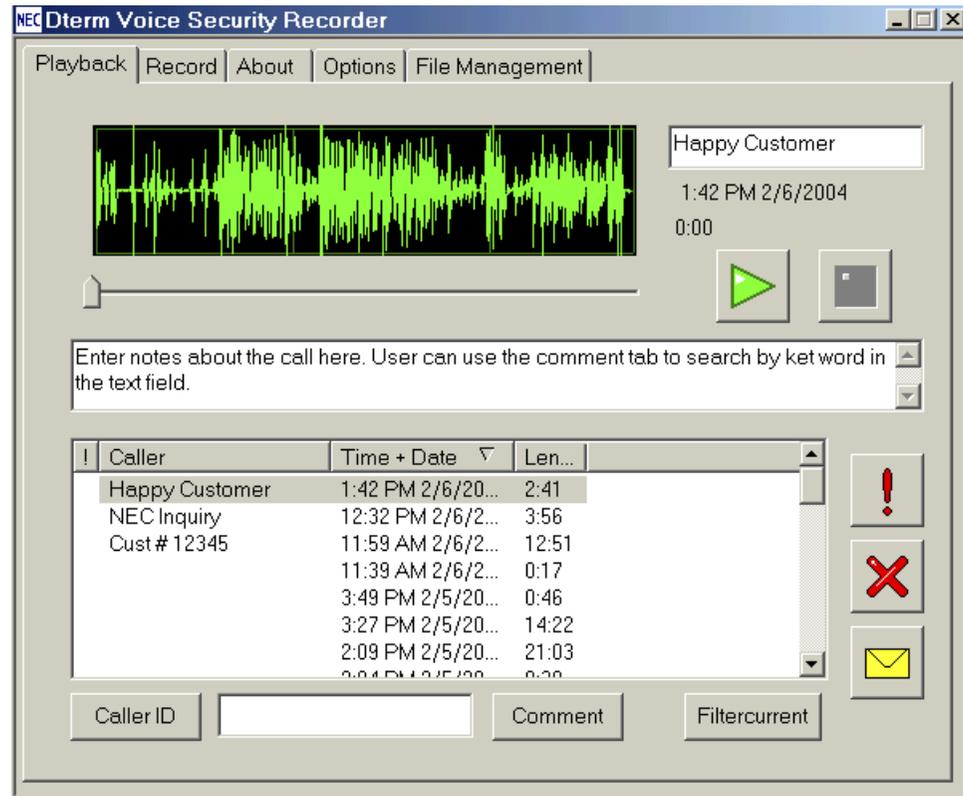


Figure 7-81 Caller ID or Comment Editor

The user can edit the Caller ID or the Comments field when viewing an existing recording.

- ☞ Caller ID and number dialed are not available on the first release. Check with NEC for release date.

The user can list recordings in order of importance (using exclamation mark) with Caller ID, Time + Date, or duration.

The Caller ID and Comment buttons allow the user to filter out all recordings with the required Caller ID or text in the Comments field.

Playback, Pause, and Stop buttons allow the user to control the Playback.

The Red exclamation mark allows recording to be identified as important for future listing or ensures that the recording cannot be overwritten.

The Red X allows recordings to be manually deleted.

The envelope button generates an e-mail with the recording inserted for mailing to a colleague.

3.17.9 VRS Record Tab

This Tab allows the user to view recording levels and control the recording.

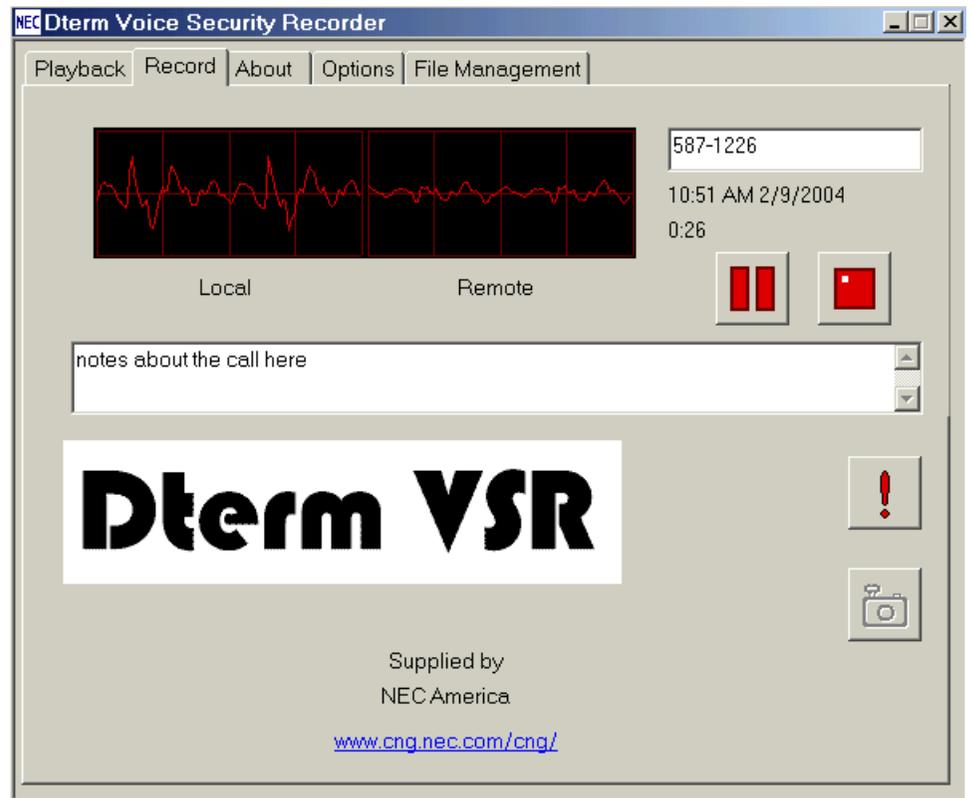


Figure 7-82 View Levels and Control Recording

The Oscilloscope shows the local and remote levels on the line separately (Microphone is the user level and speaker is the distant party level).

The Caller ID field is for future versions, but information can be entered or overwritten by the user.

Manual Start, Stop, and Pause buttons control the recording status.

The user can add notes and mark important recordings with an exclamation point to avoid deleting the conversation.

The camera button allows a user to snapshot record conversation to the current point while continuing to record the entire conversation. This feature is important for emergency centers where an operator can replay an important part while continuing to record.

3.17.10 Options Tab

This Tab allows the user to select various setup options of the VSR.

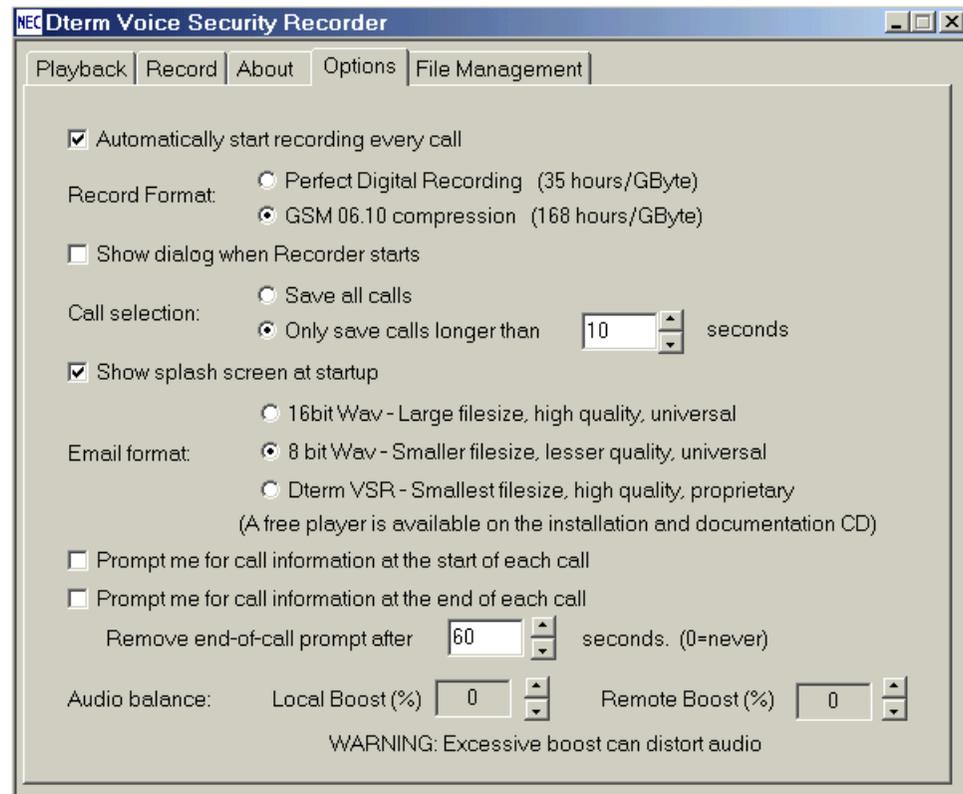


Figure 7-83 Select VSR Setup Options

- ① Automatically start recording every call

Starts the recording when a call, including internal extension calls, is made.

Ⓢ Recorded format

Perfect Digital Recording stores the recording in PCM format directly from the digital line. But the highest quality requires significant space (35 hours per Gbyte) on the PC disk.

GSM 06.10 uses a compression technique to store 168 Hours per Gbyte. The quality difference is negligible so this becomes the default selection.

Ⓢ Show dialog when Recorder starts

Selecting this default option brings the Record Tab to the front of the user screen when record is activated.

Ⓢ Call Selection

Saves all calls or only those that exceed an established limit.

Ⓢ Show splash screen at startup

When selected, the VSR logo is shown for five seconds when the application is started.

Ⓢ Email format

Allows the user to select the type of file inserted in an e-mail when the user selects the e-mail button on the Playback Tab to send the VSR format to other users that have this application or to convert it to a .wav format for replay by any PC.

D^{term} VSR selection automatically adds the Caller ID, time, date and comments fields to any e-mail.

Ⓢ Prompt for call information at the start of each call

When selected, the Record screen is displayed when a call is made to allow the user to enter information.

Ⓢ Prompt for call information at the end of each call

When selected, a screen is shown to allow the user to manage calls at completion. The user can save or erase the call, add notes, or mark important calls using the red ! in the upper right corner of the screen.

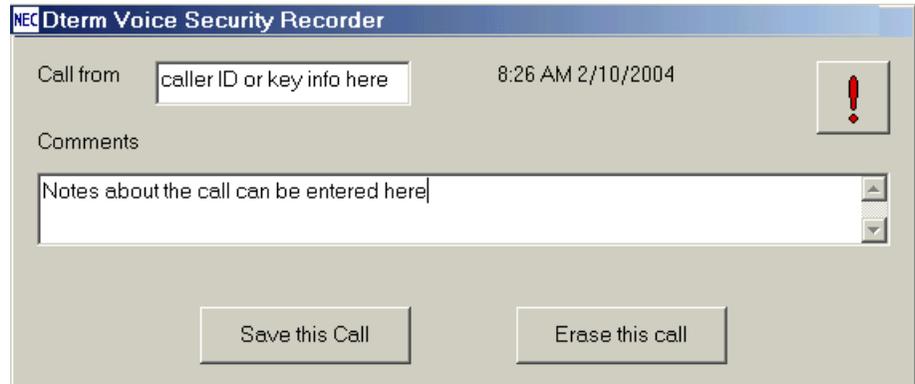


Figure 7-84 Manage Calls at Completion

3.17.11 File Management Tab

File management is necessary when the user makes many telephone calls and stores each conversation. The selections are self-explanatory.

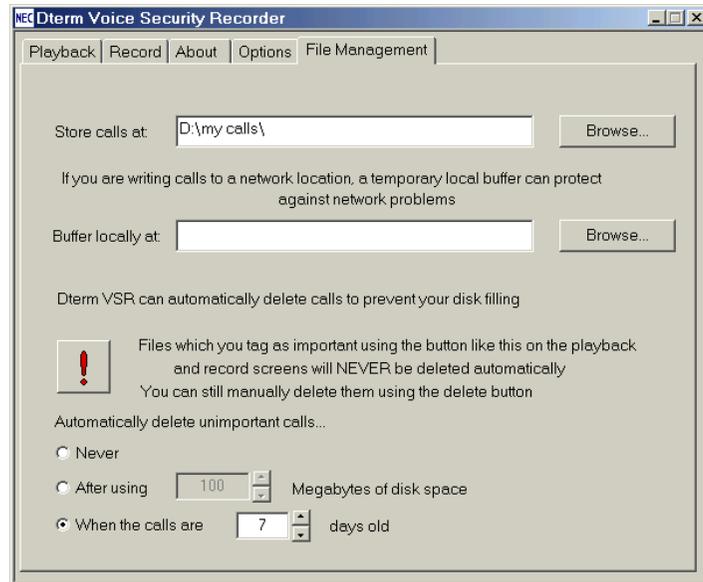


Figure 7-85 File Management Tab

3.17.12 Custom Program Settings

Convergent provides the dealer or user the option of making additional adjustments.

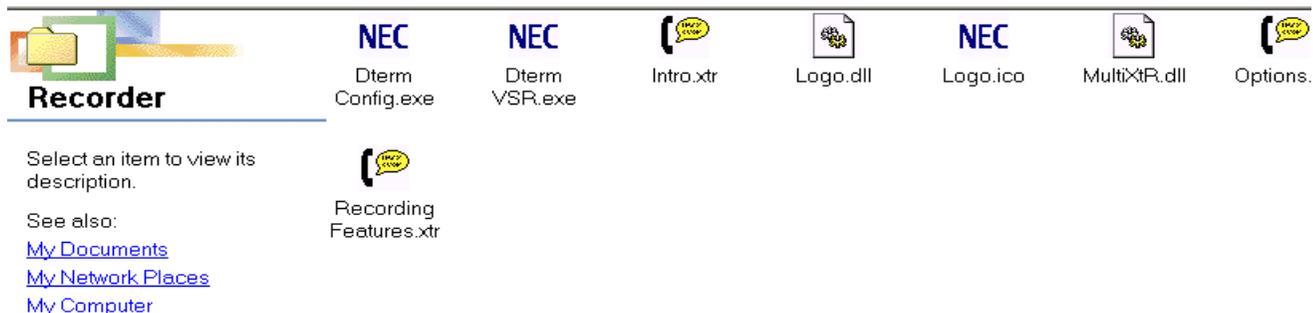


Figure 7-86 Convergent Options for Additional Adjustment

This special configuration program can only be accessed by browsing to the installation location (default C:\Program Files\Convergent\XtRecorder), and then click on the NEC Dterm Config.exe.

- ☞ The customer takes all responsibility to ensure they meet legal requirements. Convergent provides the user option settings to meet customer demands and cannot be responsible for misapplication of the product.

Several settings can be customized to meet requirements of the application.

- Ⓒ Display splash screen at the start of every call
Reminds user that recording is taking place by splashing a screen with every call.
- Ⓒ Show Dterm Recorder dialog at the start of every call
Displays application record screen anytime a call is being recorded.

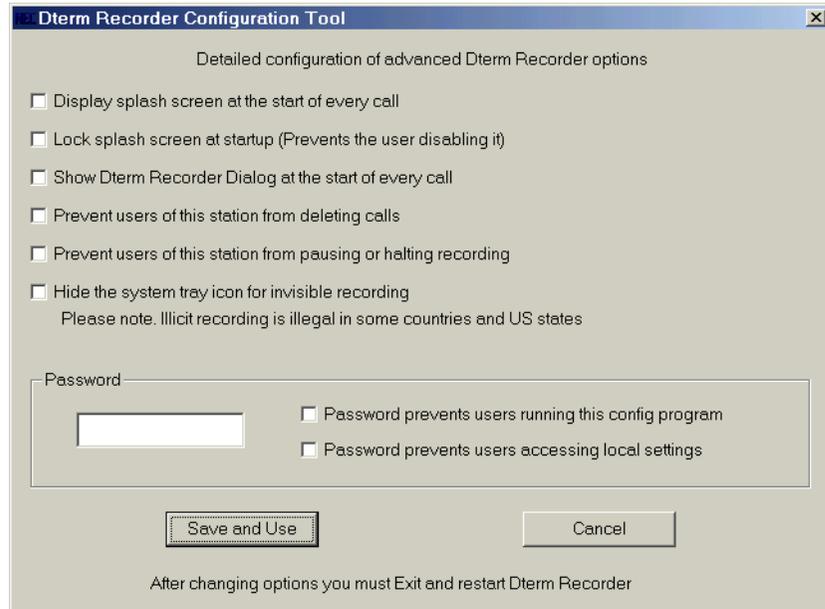


Figure 7-87 Customizing Application to Meet Requirements

- 🕒 Prevent users of this station from deleting calls
Disables the delete key.
 - 🕒 Prevent users of this station from pausing or halting recording
Disables pause and stop controls.
 - 🕒 Hide the system tray icon for invisible recording
Hides the small icon that appears in the system tray and flashes blue when recording.
 - 🕒 Password
Locks access to these settings and those at the user level.
- 👉 When using this program area to make changes, the application must be closed and started again to become effective.

Installing Electra Elite IPK and D^{term} Series i Equipment

**SECTION 1
GENERAL
INFORMATION**

The Electra Elite 192 system supports the Electra Elite IPK and D^{term} Series i Multiline Terminals, an Attendant Console, and several adapters that allow peripheral equipment to be attached to the Multiline Terminals. This chapter describes each terminal, console, and adapter and provides applicable installation instructions.

**SECTION 2
MULTILINE TERMINALS**

2.1 DTR-2DT-1 TEL

This digital Multiline Terminal has two programmable line keys (each with a 2-color LED), nine function keys, a built-in speakerphone, a Large LED to indicate incoming calls and messages, and a data jack to connect analog SLT.

Optional adapters cannot be installed in this terminal.

A maximum of 119 DTR-2DT-1 TELs can be installed in the Electra Elite 192 system.



Figure 8-1 DTR-2DT-1 TEL Multiline Terminal

2.2 DTH/DTR-8-1 TEL

This DTH (for Electra Elite IPK) or DTR (for Series i) digital non-display Multiline Terminal has eight programmable line keys (each with a 2-color LED), nine function keys, a built-in speakerphone, headset jack, a large LED to indicate incoming calls and messages, and compatibility with AD(A)-R, AP(A)-R, AP(R)-R, or CT(A)-R Unit.

A Directory button is provided to perform scrolling for Caller ID, and a Message button is provided to directly access voice mail.

A maximum of 119 DTH/DTR-8-1 terminals can be installed in the Electra Elite 192 system.

The combined total of all Electra Elite Multiline Terminals that can be installed in an Electra Elite 192 system is 120.



Figure 8-2 DTH/DTR-8-1 TEL Multiline Terminal

2.3 DTH/DTR-8D-1 TEL

This DTH (for Electra Elite IPK) or DTR (for Series i) digital Multiline Terminal has eight programmable line keys (each with the 2-color LED), nine function keys, a built-in speakerphone, headset jack, a Large LED to indicate incoming calls and messages, and compatibility with AD(A)-R, AP(A)-R, AP(R)-R, or CT(A)-R Unit.

A Directory button is provided to perform scrolling for Caller ID, and a Message button is provided to directly access voice mail.

This terminal also has a 3-line, 24-character, adjustable Liquid Crystal Display (LCD) and four softkeys.

A maximum of 120 DTH/DTR-8D-1 terminals can be installed in the Electra Elite 192 system.

The combined total of all Electra Elite Multiline Terminals that can be installed in the Electra Elite 192 system is 120.



Figure 8-3 DTH/DTR-8D-1 TEL Multiline Terminal

2.4 DTH/DTR-16D-1 TEL

This DTH (for Electra Elite IPK) or DTR (for Series i) digital Multiline Terminal has 16 programmable line keys (each with a 2-color LED), nine function keys, a built-in speakerphone, headset jack, a large LED to indicate incoming calls and messages, and compatibility with AD(A)-R, AP(A)-R, AP(R)-R, or CT(A)-R Unit.

A Directory button is provided to perform scrolling for Caller ID, and a Message button is provided to directly access voice mail.

This terminal also has a 3-line, 24-character, adjustable Liquid Crystal Display (LCD) and four softkeys.

A maximum of 120 DTH/DTR-16D-1 terminals can be installed in an Electra Elite 192 system.

The combined total of all Electra Elite Multiline Terminals that can be installed in an Electra Elite 192 system is 120.



Figure 8-4 DTH/DTR-16D-1 TEL Multiline Terminal

2.5 DTH/DTR-32D-1 TEL

This DTH (for Electra Elite IPK) or DTR (for Series i) digital Multiline Terminal has 16 programmable line keys (each with a 2-color LED), 16 one-touch keys, nine function keys, a built-in speakerphone, headset jack, a large LED to indicate incoming calls and messages, and compatibility with AD(A)-R, AP(A)-R, AP(R)-R, or CT(A)-R Unit.

A Directory button is provided to perform scrolling for Caller ID, and a Message button is provided to directly access voice mail.

This terminal also has a 3-line, 24-character, adjustable Liquid Crystal Display (LCD) and four softkeys.

System software can be changed so this Multiline Terminal can have 24 programmable line keys and eight one-touch keys.

A maximum of 120 DTH/DTR-32D-1 terminals can be installed in an Electra Elite 192 system.

The combined total of all Electra Elite Multiline Terminals that can be installed in an Electra Elite 192 system is 120.



Figure 8-5 DTH/DTR-32D-1 TEL Multiline Terminal

2.6 DCR-60-1 CONSOLE

The Attendant Console has 60 programmable line keys (each with a 2-color LED) that can be programmed as Direct Station Selection keys, function keys, or as outside line keys. An external power supply (AC adapter) is provided with the Attendant Console.

A maximum of four DCR-60-1 Consoles can be installed in an Electra Elite 192 system. An Attendant Position can have four DCR-60-1 Consoles associated with it.

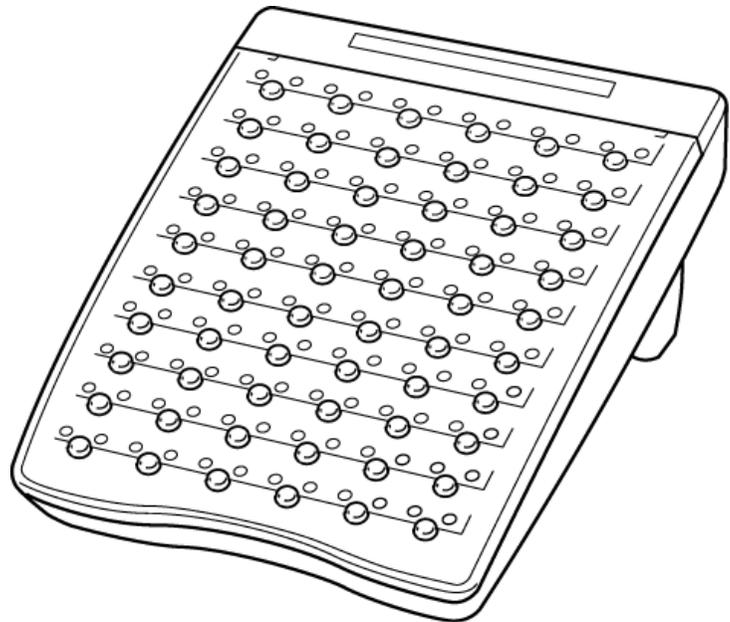


Figure 8-6 DCR-60-1 Console

SECTION 3 SINGLE LINE TELEPHONES

3.1 DTR-1-1 TEL

The Single Line Telephone is a fully modular terminal with a Flash key, redial key, 6-level receive volume control, 4-level ring volume control, 3-tone ring pitch, data jack, and message waiting lamp. Each terminal requires an SLT(1)-U() ADP or SLI(4)/(8)-U() ETU.

A maximum of 24 DTR-1-1 TELs can be installed in an Electra Elite 48 system.



Figure 8-7 DTR-1-1 TEL Single Line Telephone

- ☞ The H switch setting for the receive volume control should only be used by hearing impaired individuals, otherwise hearing damage may occur. This telephone complies with HAC (Hearing Aid Compatible) volume control defined by section 68.317 of the FCC Rules and Regulations, 1996 edition.

3.2 DTR-1HM-1 TEL

The Single Line Telephone is a fully modular terminal with a flash key, Redial key, Speaker key, Hold key, 6-level receive and speaker volume control, 4-level ring volume control, 3-tone ring pitch, data jack, message waiting lamp, and eight programmable Feature Access/Speed Dial keys. Each terminal requires an SLT(1)-U() ADP or SLI(4)/(8)-U() ETU.

A maximum of 119 DTR-1HM-1 TELs can be installed in an Electra Elite 192 system.



Figure 8-8 DTR-1HM-1 TEL Single Line Telephone

- ☞ The H switch setting for the receive volume control should only be used by hearing impaired individuals, otherwise hearing damage may occur. This telephone complies with HAC (Hearing Aid Compatible) volume control defined by section 68.317 of the FCC Rules and Regulations, 1996 edition.

SECTION 4

CONNECTING ELECTRA ELITE IPK AND SERIES i TERMINALS TO THE SYSTEM

To connect a DTH/DTR Multiline Terminal Multiline to the system proceed as follows:

1. Plug the telephone cord in the modular jack on the bottom side of the Multiline Terminal. The handset is also attached to the bottom side of the Multiline Terminal.

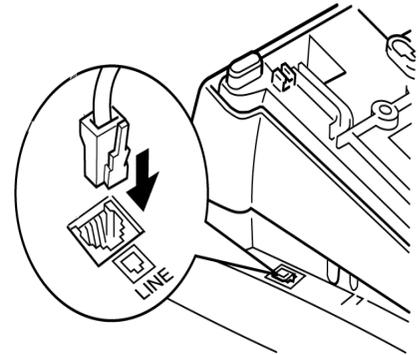


Figure 8-9 Connecting a DTH/DTR Terminal to the System

2. Attach the telephone cord through the groove shown on [Figure 8-10 Leading Line Cord on a DTH/DTR Terminal](#).

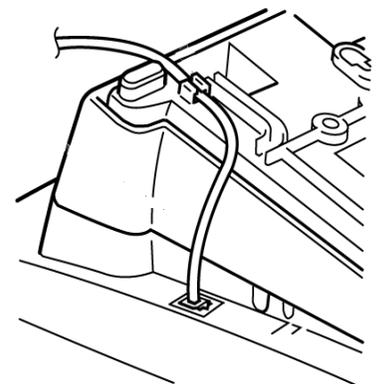


Figure 8-10 Leading Line Cord on a DTH/DTR Terminal

SECTION 5

CONNECTING DCR ATTENDANT CONSOLE TO A MULTILINE TERMINAL

An Attendant Console can be attached to a Multiline Terminal using the following procedures.

1. Turn the Multiline Terminal and the Attendant Console face down.
2. Using the joining plate provided with the Attendant Console, attach the plate to the Multiline Terminal and the Attendant Console. Refer to [Figure 8-11 Joining DCR Console to a Terminal](#).

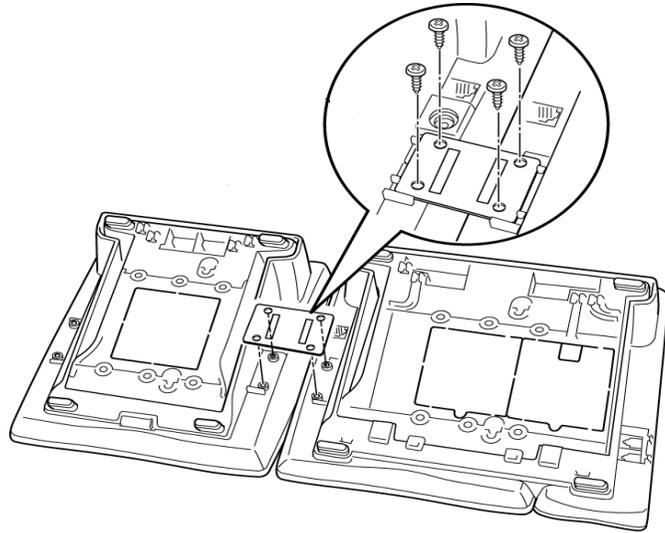


Figure 8-11 Joining DCR Console to a Terminal

3. Connect the line cord and the AC adapter to the indicated locations on the bottom of the Attendant Console. Refer to [Figure 8-12 Connecting the Line Cord and AC Adapter When Installing a DCR Attendant Console](#).

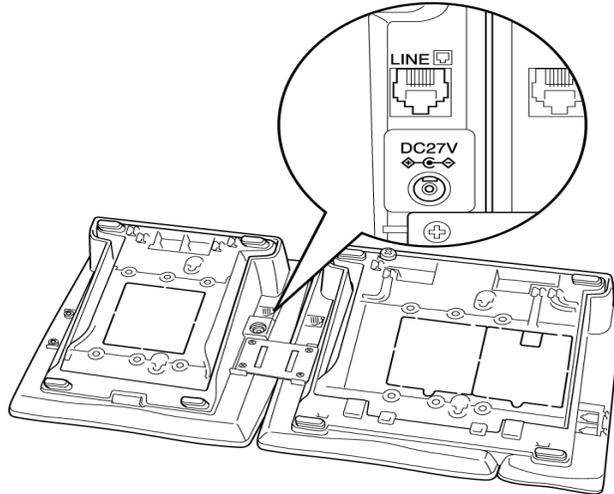


Figure 8-12 Connecting the Line Cord and AC Adapter When Installing a DCR Attendant Console

4. When the Attendant Console and the Multiline Terminal are properly connected, they sit side-by-side as shown in [Figure 8-13 DCR Attendant Console and Multiline Terminal](#).

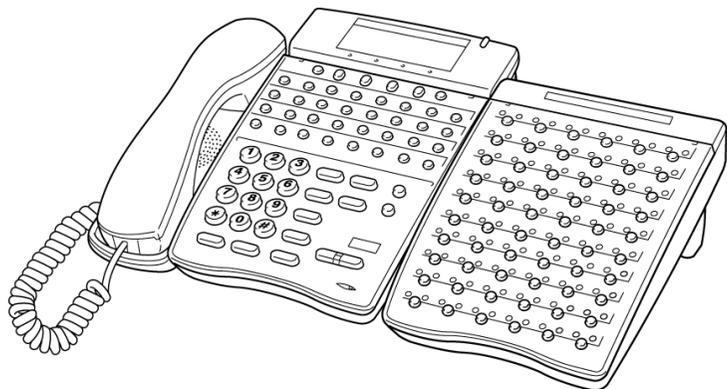


Figure 8-13 DCR Attendant Console and Multiline Terminal

- ☞ Ensure that the AC adapter, supplied with the Attendant Console, is used. Using a different AC adapter may cause problems. Check that the supplied voltage matches that of the adapter and plug it in an outlet.

SECTION 6 ADJUSTING THE DTH/ DTR LCD

DTH/DTR display Multiline Terminals have an adjustable Liquid Crystal Display (LCD). The LCD can be adjusted by pushing downward or upward as desired.

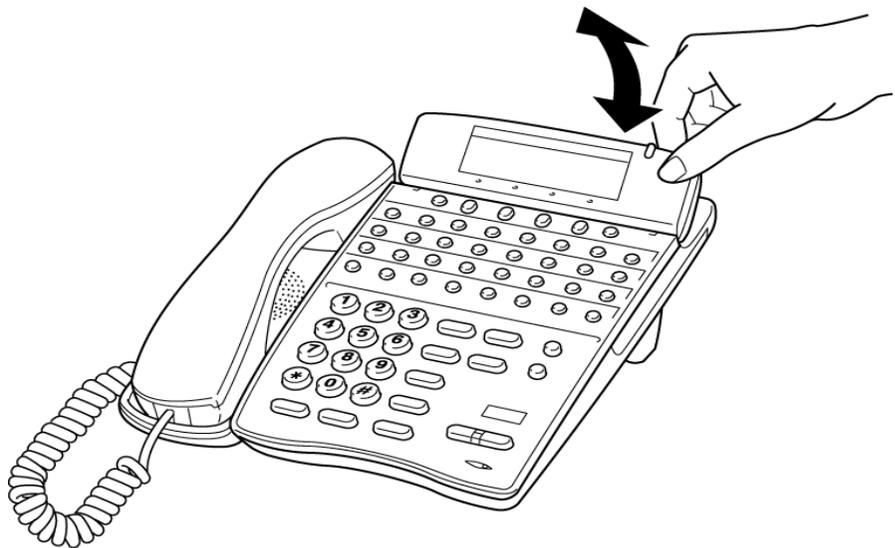


Figure 8-14 Adjusting the DTH/DTR LCD

SECTION 7 INSTALLING DTH/ DTR LINE CARDS AND PLASTIC PANELS

Line key designations are entered on the Line Card that is then placed on the Multiline Terminal to provide a quick reference of key designations. The Line Card can be changed as necessary. The Plastic Panel is placed on top of the Line Card to hold it in place.

Refer to [Figure 8-15 Removing the Line Panel](#), and lift to remove the Line Panel.

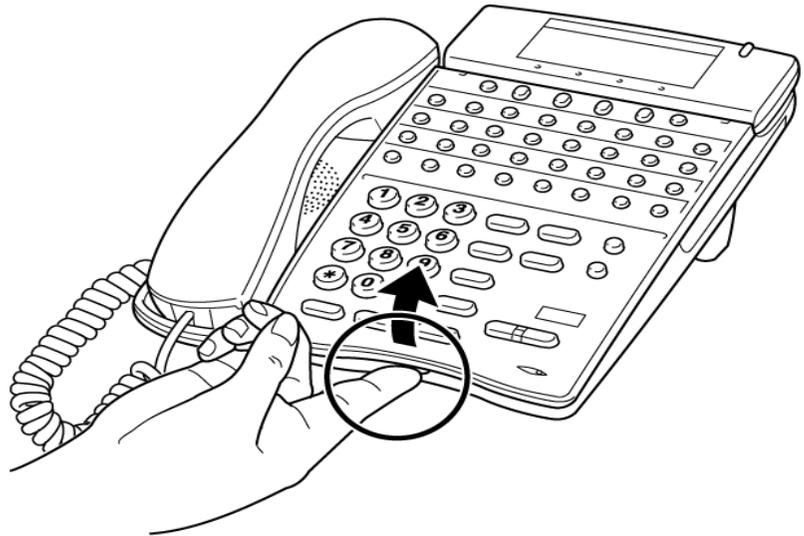


Figure 8-15 Removing the Line Panel

5. Place the Line Card over the keys on the Multiline Terminal.

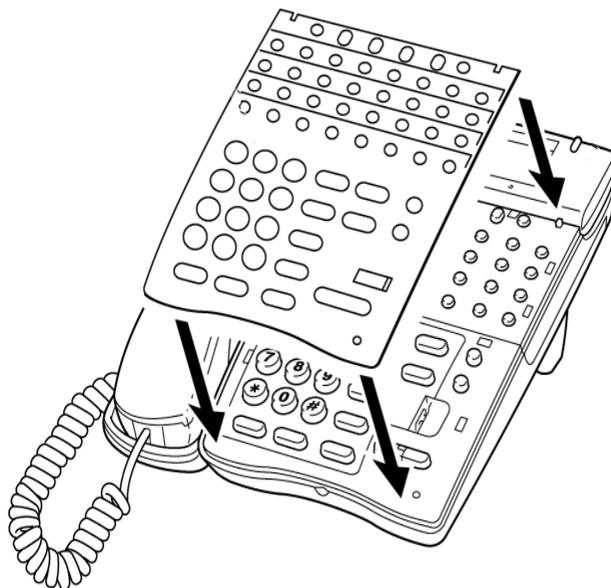


Figure 8-16 Placing Line Card on the Line Panel

6. Install the plastic panel over the line card and push the corners of the Plastic panel until they click in place. Refer to [Figure 8-17 Installing Plastic Panel on DTH/DTR Multiline Terminal](#).

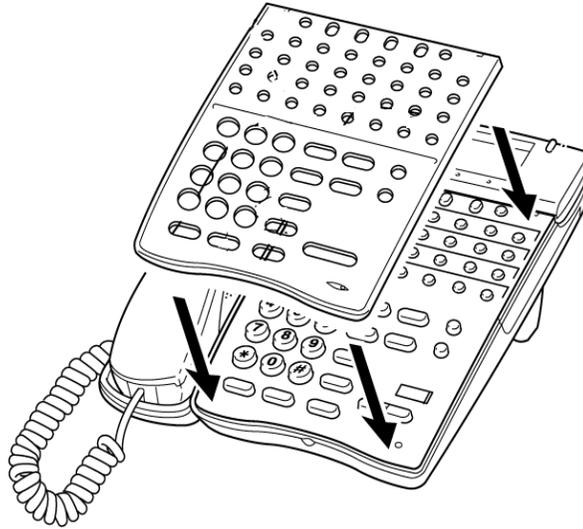


Figure 8-17 Installing Plastic Panel on DTH/DTR Multiline Terminal

SECTION 8 ADJUSTING DTH/DTR MULTILINE TERMINAL HEIGHT

The base plate on DTH/DTR Multiline Terminals is hinged. The bottom part can be adjusted to raise or lower the terminal height.

1. Turn the Multiline Terminal upside down, grasp as shown in [Figure 8-18 Raising DTH/DTR Multiline Terminal Height](#), and pull up until the Base Cover latches click.

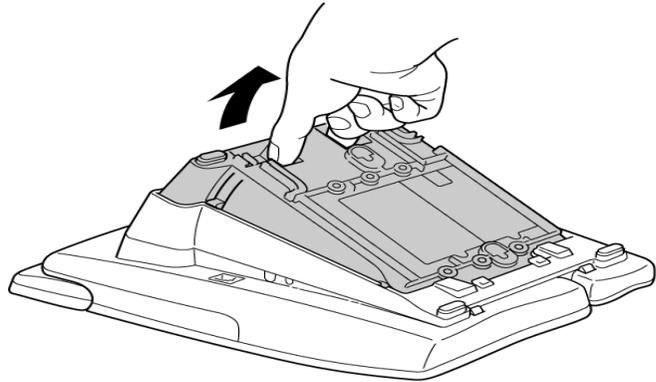


Figure 8-18 Raising DTH/DTR Multiline Terminal Height

2. To lower the Base Cover, press the indicated left and right tabs inward and press down. Refer to [Figure 8-19 Lowering the DTH/DTR Multiline Terminal Base Cover](#).

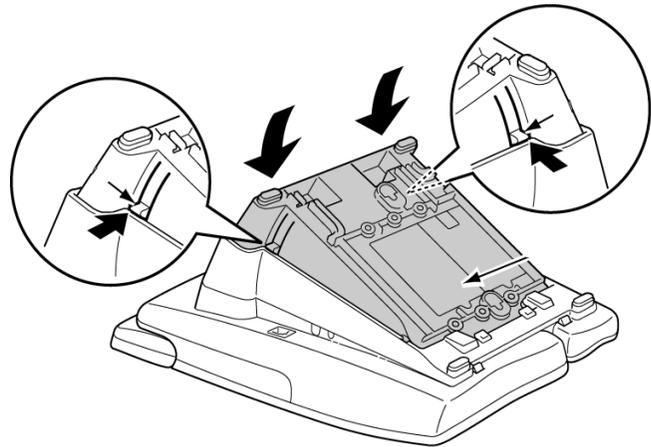


Figure 8-19 Lowering the DTH/DTR Multiline Terminal Base Cover

SECTION 9

REMOVING OR INSTALLING THE BASE COVER

To remove the Base Cover proceed as follows:

1. Extend the Base Cover.
2. Press tabs shown on [Figure 8-20 Removing Base cover](#), and slide the Base Cover in the arrow direction until it clicks.

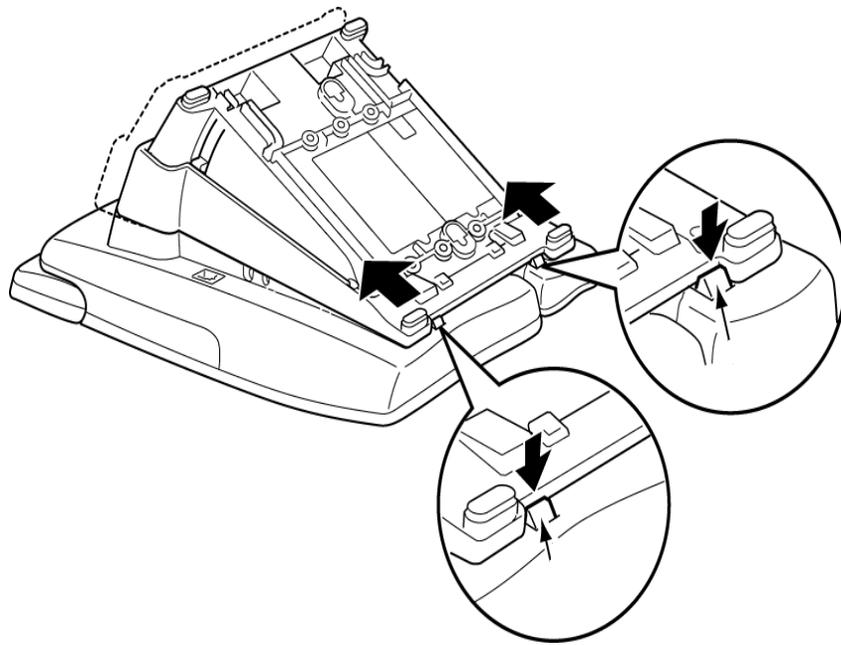


Figure 8-20 Removing Base Cover

To install the Base Cover, place the four tabs in their applicable slots, and pull the cover in the direction of the arrows until it clicks in place.

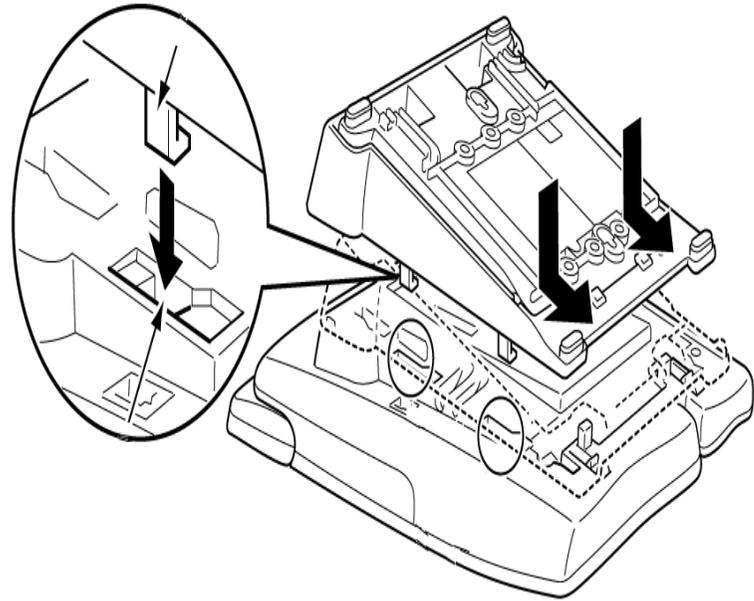


Figure 8-21 Installing Base Cover

SECTION 10
INSTALLING
ABBREVIATED DIALING
TABLE

Assemble the abbreviated dialing table as shown in [Figure 8-22](#) [Assembling the Abbreviated Dialing Table](#).

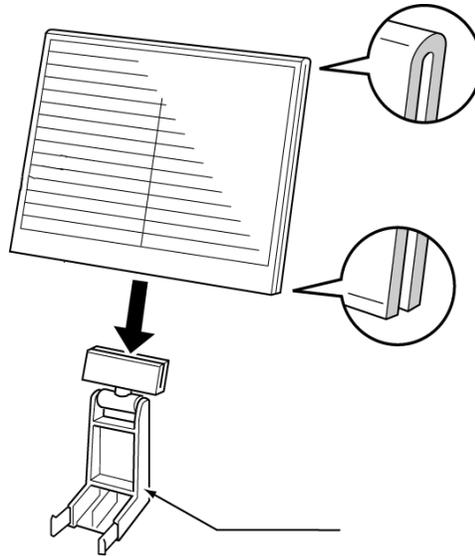


Figure 8-22 Assembling the Abbreviated Dialing Table

Install abbreviated dialing table on the terminal as shown in [Figure 8-23 Installing Abbreviated Dialing Table on the Terminal](#).

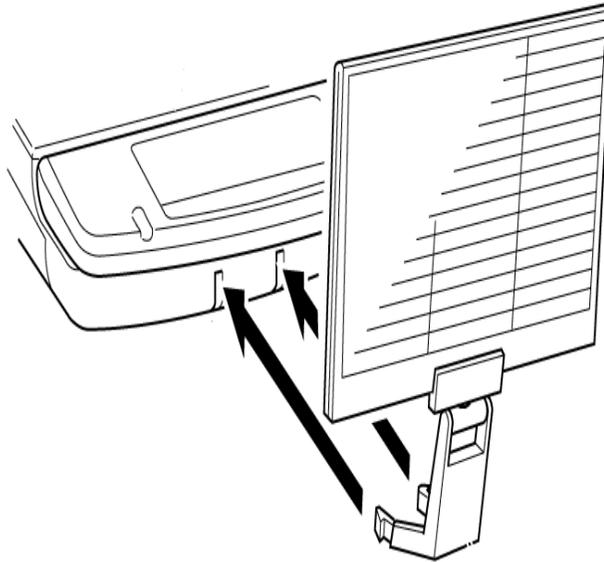


Figure 8-23 Installing Abbreviated Dialing Table on the Terminal

SECTION 11 WALL MOUNTING THE DTH/DTR TELEPHONE

11.1 Hanger Hook

1. Remove the hook from the unit.

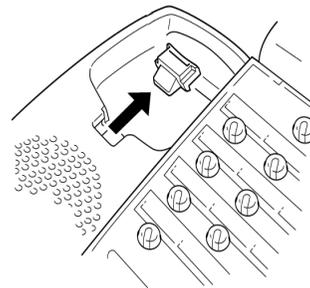


Figure 8-24 Removing the Hook

2. Turn the hook with the tab toward the top.
3. Slide the hook on its glides back down into position forming the hanger hook for the handset.

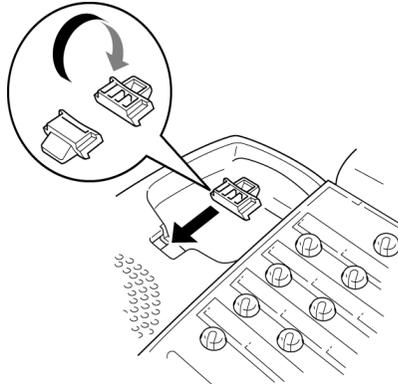


Figure 8-25 Sliding the Hook into Position

11.2 Installing the Base Cover on the Wall

1. Raise and remove the Base Cover. Refer to [Section 9 Removing or Installing the Base Cover](#).
2. Remove cutout shown in [Figure 8-26 Removing Cutout](#) with nippers.

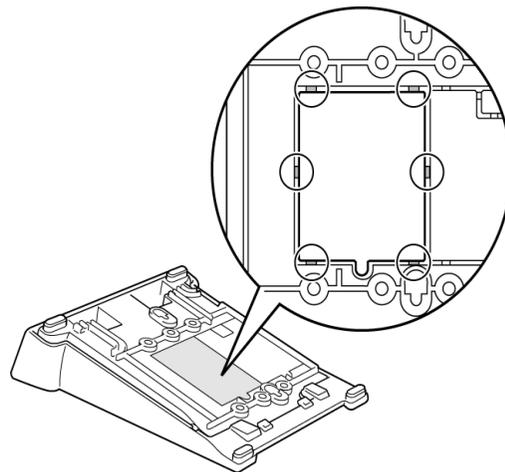


Figure 8-26 Removing Cutout

3. Plug line cord in the wall receptacle, leave about 8 inches of cord and bundle the rest as shown in [Figure 8-27 Bundling Line Cord](#).

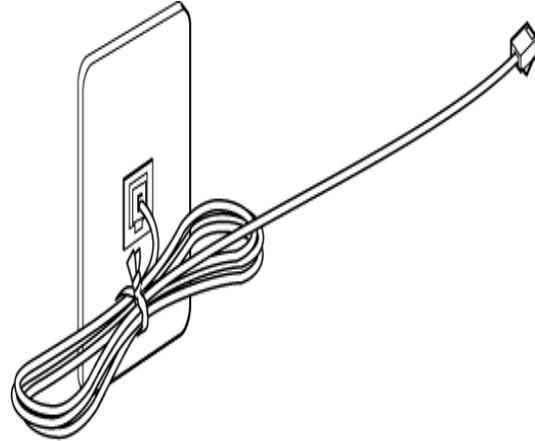


Figure 8-27 Bundling Line Cord

4. Turn the Base Cover upside down, feed the line cord in the cutout and attach it to the wall using 6 screws as shown in [Figure 8-28 Installing Base Cover](#).

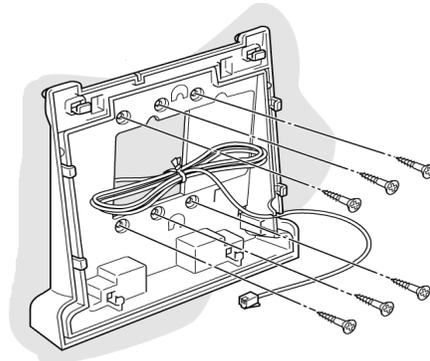


Figure 8-28 Installing Base Cover

5. Install the telephone over the four tabs on the Base Cover, and push down until it clicks in place.

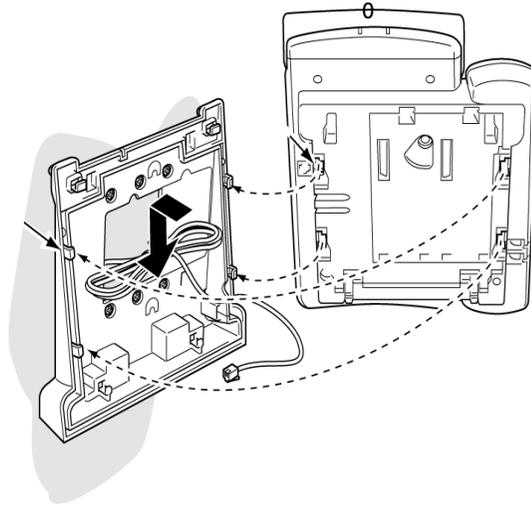


Figure 8-29 Installing the Telephone

6. Install the Line cord as shown in [Figure 8-30 Plugging in Line Cord](#).

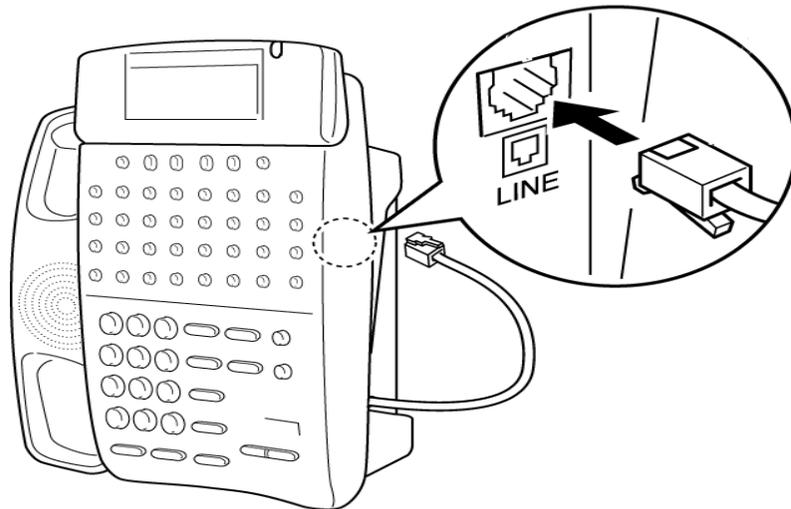


Figure 8-30 Plugging in Line Cord

7. Push spare line cord behind the telephone as shown in [Figure 8-31 Hiding Excess Cord](#).

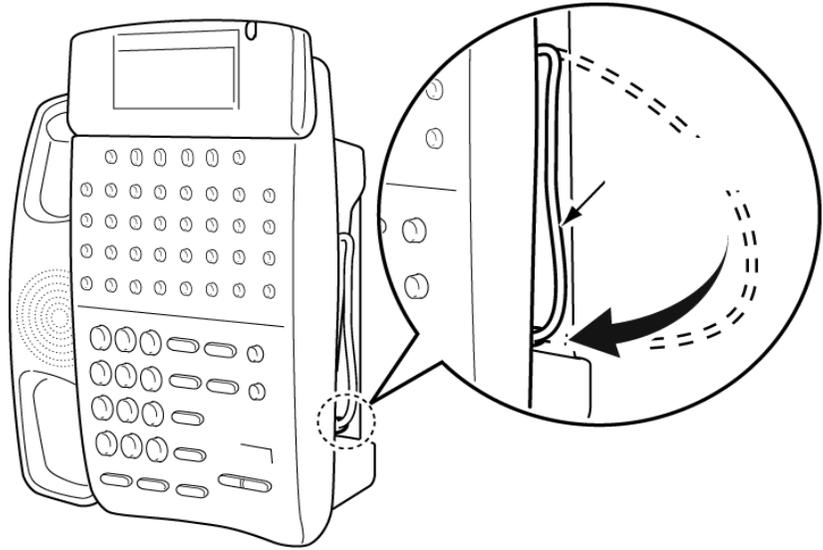


Figure 8-31 Hiding Excess Cord

8. To remove the telephone, press the tabs at the bottom as shown in [Figure 8-32 Removing the Telephone](#), and push up on the Telephone until it comes loose.

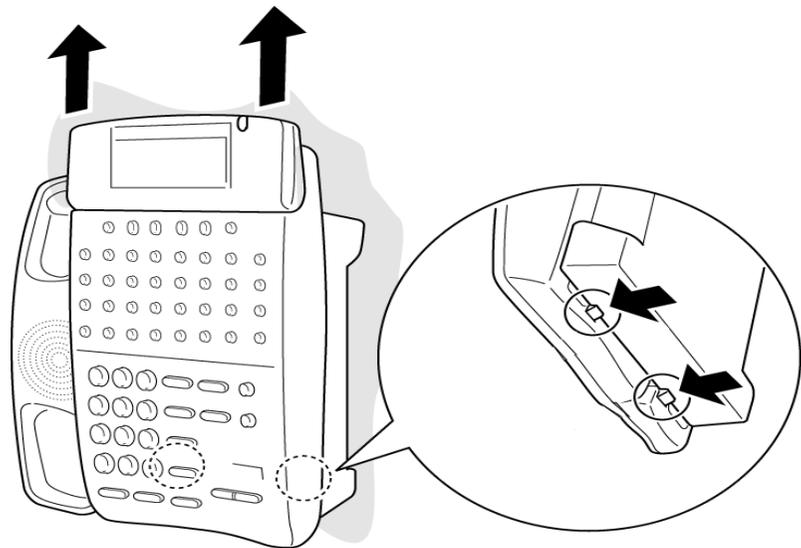


Figure 8-32 Removing the Telephone

11.3 Installing Base Cover on a Switch Box

1. Install the Base Cover as shown in [Figure 8-33 Installing Base Cover on Switch Box](#).

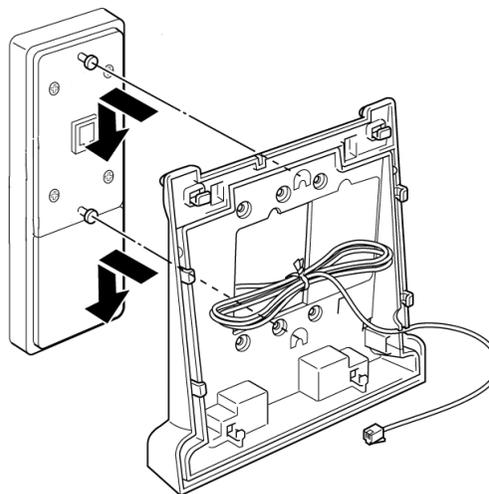


Figure 8-33 Installing Base Cover on Switch Box

2. Install telephone.

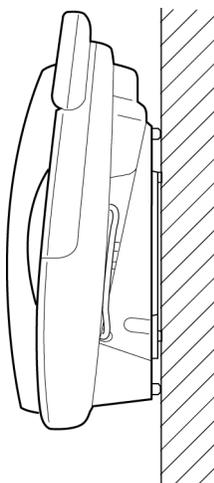


Figure 8-34 Wall Installation Complete

11.4 Installing Telephone Using WM-R Unit

When adapters are used, the telephone must be installed on the wall using the WM-R Unit.

1. Attach WM-R Unit using 6 screws as shown in [Figure 8-35 Installing WM-R Unit on the Wall](#). Place excess line cord in the space in the back of the WM-R Unit.

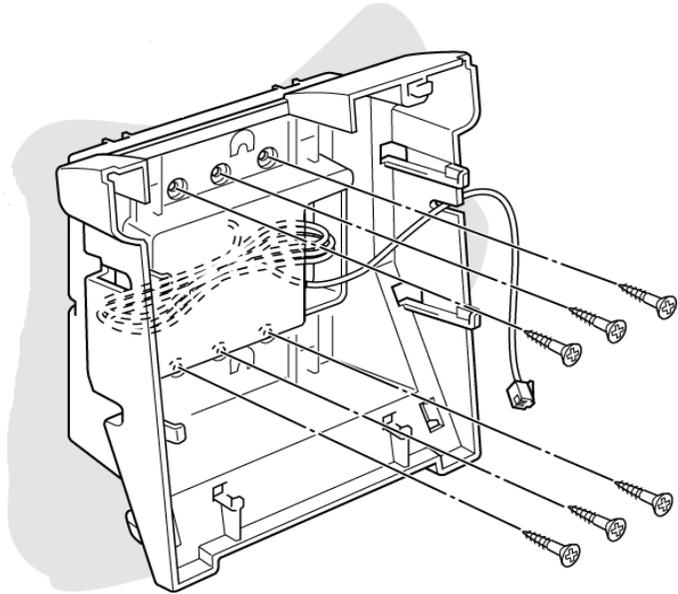


Figure 8-35 Installing WM-R Unit on the Wall

2. Install the telephone as shown in [Figure 8-36 Installing Telephone on WM-R Unit](#).

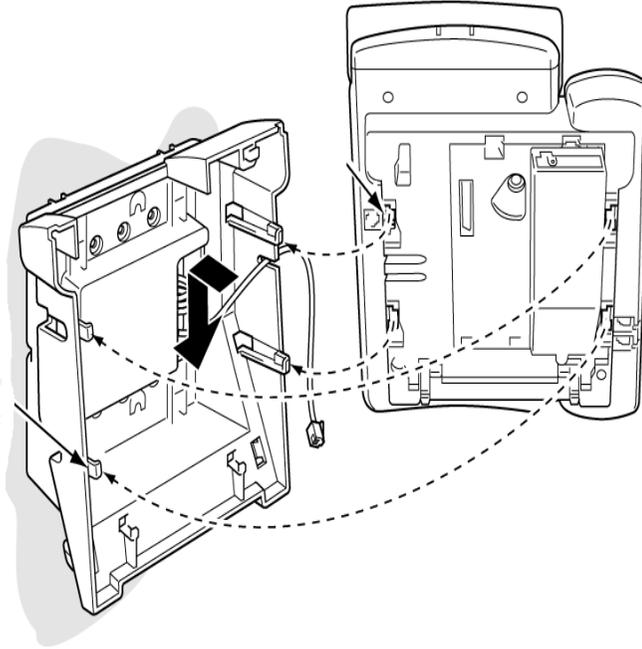


Figure 8-36 Installing Telephone on WM-R Unit

SECTION 12 INSTALLING DTH/DTR OPTIONAL EQUIPMENT

Optional equipment for the DTH/DTR Multiline Terminals enhances the Electra Elite 192 system. This equipment can be purchased separately from the system and added as the customer business grows.

DTH/DTR Multiline Terminals can have up to two adapters installed at the same time.

When attaching an AP(R)-R Unit, an external power supply is required. Only **one** power supply is needed even if more than one adapter is installed.

SECTION 13

PREPARING DTH/DTR MULTILINE TERMINAL FOR ADAPTER INSTALLATION

To prepare the DTH/DTR Multiline Terminal for adapter installation:

1. Unplug the telephone cord from the terminal.
2. Turn the terminal upside down.
3. Grasp in the middle of the hollow spaces at the top and pull up until; the retaining tabs click to raise the base plate. Refer to [Figure 8-37 Raising the Base Plate](#).

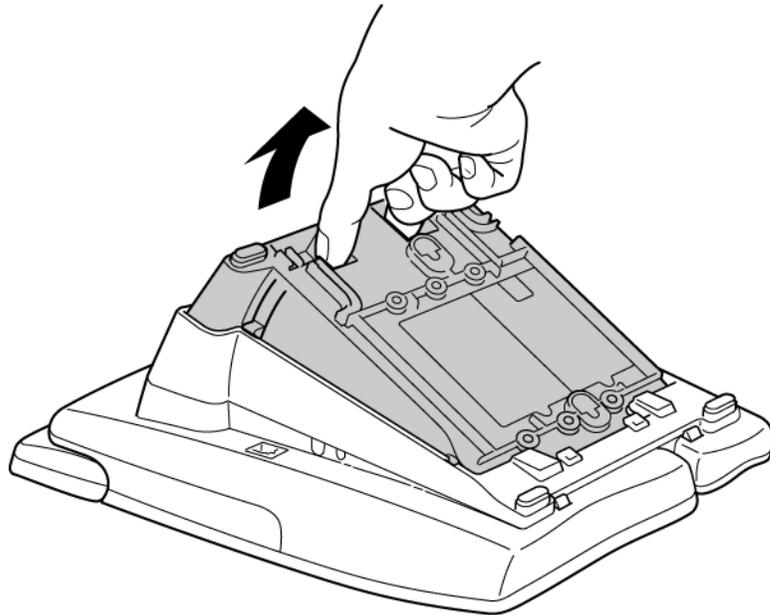


Figure 8-37 Raising the Base Plate

4. Press down on the tabs indicated in [Figure 8-38 Removing the DTH/DTR Base Plate](#), and push forward on the base plate to remove it.

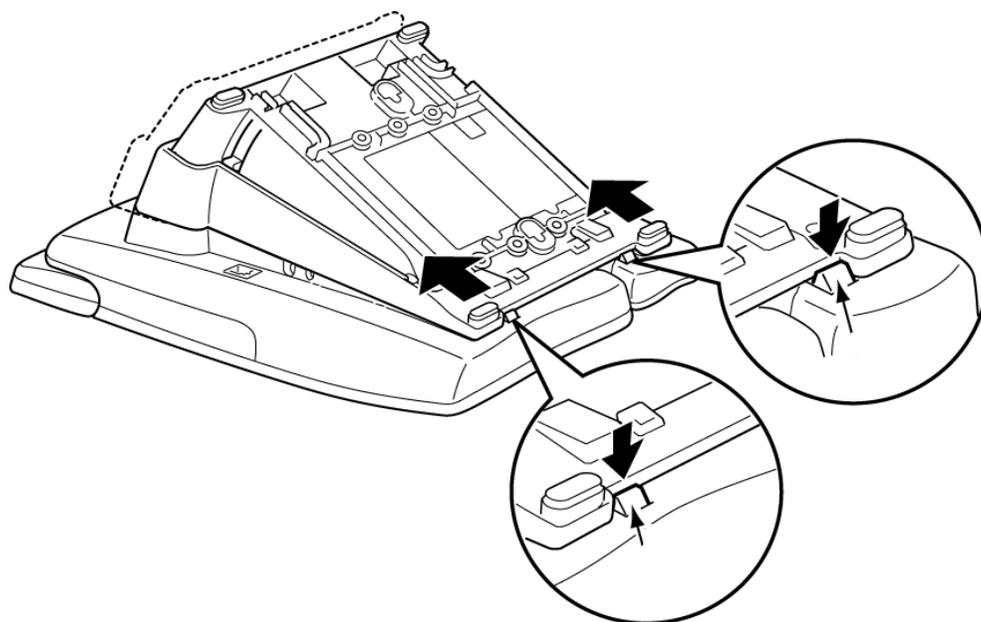


Figure 8-38 Removing the DTH/DTR Base Plate

5. When an adapter is installed for the first time in a terminal, the base cover on the Multiline Terminal must be modified. Two adapters can be installed in the terminal, and two separate cutouts are provided. Remove the applicable cutout/cutouts on the bottom of the base plate with nippers. When only one adapter is being installed and it needs an AC-R Unit for power, remove only the Right cutout as shown in [Figure 8-39 Modifying Base Cover](#).

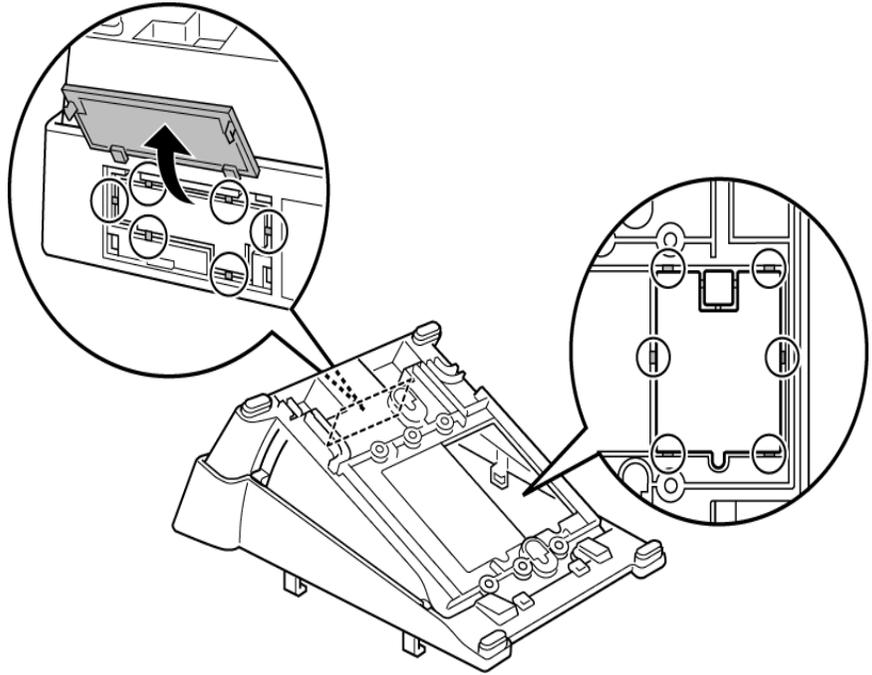


Figure 8-39 Modifying Base Cover

6. Turn the base plate with bottom down and release two tabs at the top for each end cover (shown shaded) corresponding to applicable base plate cutout/cutouts and remove the cover/covers.
7. Remove the applicable dummy end/ends with nippers.
8. When An AC-R Unit is required for power, remove the cutout on the right side of the base plate (with the bottom facing up) to accommodate the power adapter cord.

SECTION 14 INSTALLATION PROCEDURES

14.1 AC-R Unit (AC Adapter)

This unit shown on [Figure 8-40 AC-R Unit](#) provides power to ancillary devices or DTR Attendant Consoles. The AC-R Unit must be connected to an adapter that is installed on a Multiline Terminal. When more than one adapter is installed on a Multiline Terminal, only one AC-R Unit is necessary.

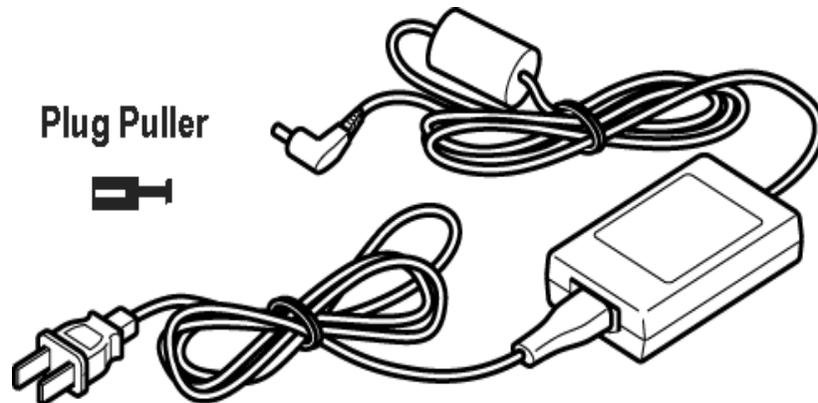


Figure 8-40 AC-R Unit

The power requirements for the AC-R Unit are:

- ① Input: 110~240V AC, 50/60 Hz, 45 VA
- ① Output: 27V DC, 750 mA
- ① Polarity: \ominus ————— \oplus

14.1.1 Connecting the AC-R Unit

1. Unplug the AC-R Unit from the AC outlet. (Failing to do this can damage the unit and/or the Multiline Terminal.)
2. Prepare Multiline Terminal for adapter installation. Refer to [Section 13 Preparing DTH/DTR Multiline Terminal for Adapter Installation on page 8-27](#).

3. The Plug Puller shown in [Figure 8-40 AC-R Unit](#) is a hollow cylindrical sleeve with a post and a circular rim on the base. The plug of the adapter is inserted in this hole, and the sleeve is pulled over the back of the plug to seat the post that can then be used to unplug the adapter.
4. Locate the plug on the ancillary device that is connected to the bottom of the Multiline Terminal and plug in the AC Adapter.

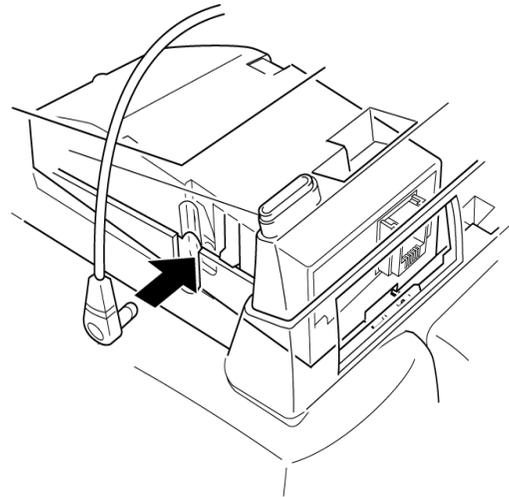


Figure 8-41 AC-R Unit Connection to Adapter

14.2 AD(A)-R Unit (Ancillary Device Adapter)

This Ancillary Device Adapter, shown on [Figure 8-42 AD\(A\)-R Unit](#), allows connection of a tape recorder to all DTH/DTR Multiline Terminals except DTR-2DT-1 as shown on [Figure 8-43 Connecting DTH/DTR to Recorder](#).

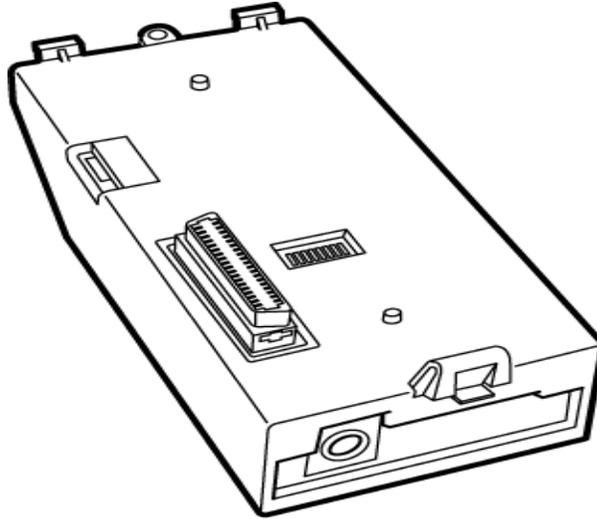


Figure 8-42 AD(A)-R Unit

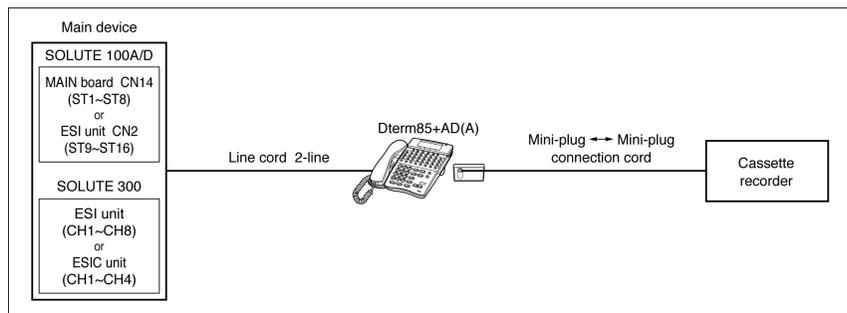


Figure 8-43 Connecting DTH/DTR to Recorder

14.2.1 Switch Settings and Wiring

When voice calls are only recorded, Remove the cover for the DSW Switch with nippers, and set the switches as shown in [Figure 8-44 AD\(A\)-R Switch With Default Settings](#) and wire between the AD(A) and recorder as shown in [Figure 8-46 DSW Switch Settings for Sending Voice Calls to Terminal](#).

[Table 8-1 AD\(A\)-R Unit Switch Settings](#) provides a breakdown of the DSW switch settings.

Table 8-1 AD(A)-R Unit Switch Settings

Switch	Default Settings		Description
DSW 1	Off		When the AD(A)-R provides control to the recorder, DSW 1 must be On.
DSW 2	Off		Warning Tone from any device is sent to terminal when DSW 2 is On.
DSW 3 and DSW 4	DSW 3 On	DSW 4 On	To get a warning Tone from the recording device over same wire pair as speech path, both switches must be Off.
	DSW 3 On	DSW 4 On	To get a warning Tone from the recorder or generator equipment on dedicated wire pair to recorder MIC input, DSW 3 must be Off.
DSW 5	On		DSW 5 must be Off for debugging.
DSW 6~ 8	Off		DSW 6~ 8 must be On to Upgrade Firmware.
SW1	SW1-1		Connects to Series i DTR. SW1-2 selects IP Phone-IRT
SW2	SW2-1		600 Ω Input Impedance. SW2-2 selects Complex Impedance for SLTs.
SW3	Not Installed		

 Do not connect T1 and T2 when DSW switches 3 and 4 are On.

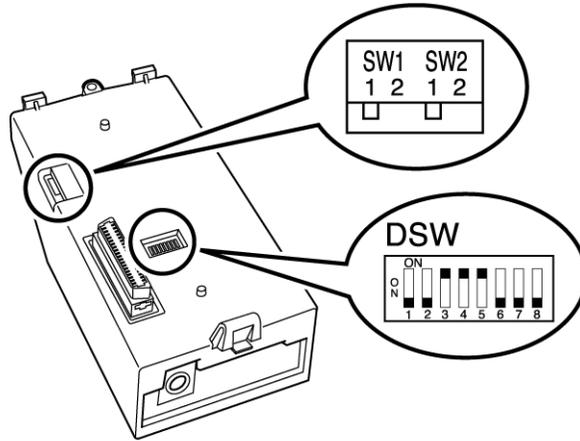


Figure 8-44 AD(A)-R Switch With Default Settings

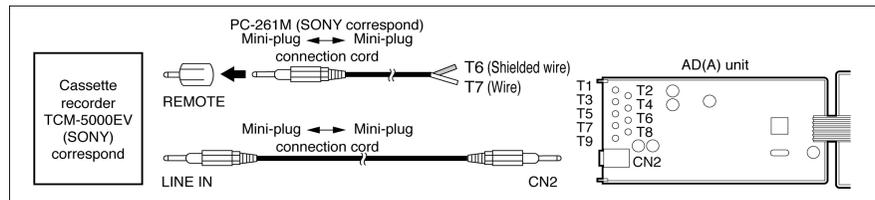


Figure 8-45 AD(A) Connection for Recording Only

- When sending recorded calls to the terminal, Set the DSW Switch to settings shown in [Figure 8-46 DSW Switch Settings for Sending Voice Calls to Terminal](#) and connect wiring to recorder as shown in [Figure 8-47 Connections for Sending Calls to The Terminal](#).

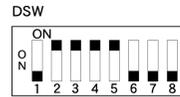


Figure 8-46 DSW Switch Settings for Sending Voice Calls to Terminal

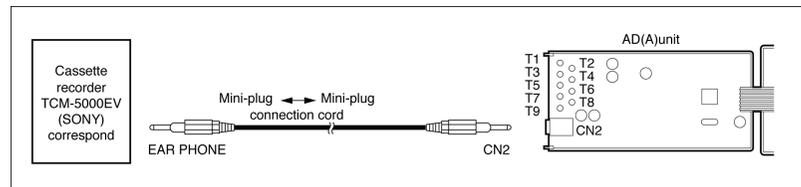


Figure 8-47 Connections for Sending Calls to The Terminal

14.2.2 Installing Core and Shielded Cable

- Remove the screw shown on [Figure 8-48 Removing Cover](#) and carefully open the AD(A)-R Unit.

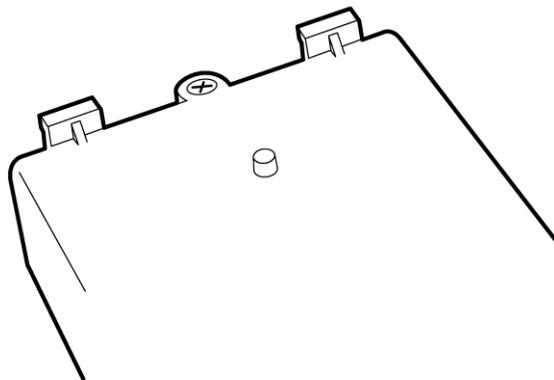


Figure 8-48 Removing Cover

2. Insert cable into the AD(A)-R Unit terminal, fit a cap (included with the Unit) over the cable and push to anchor it as shown in [Figure 8-49 Core Cable Installation](#). The core cable should be inserted with its cover. The shielded cable should be bundled before inserting it in the terminal.
3. Feed the installed cable out through the CN2 window as shown in [Figure 8-50 Cable Access Port](#).

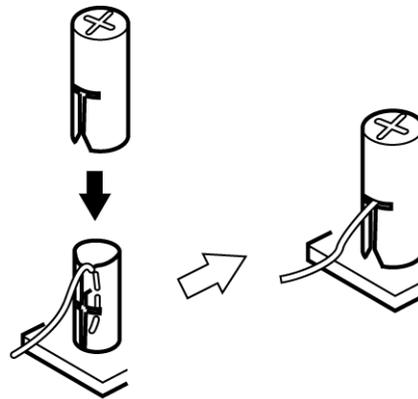


Figure 8-49 Core Cable Installation

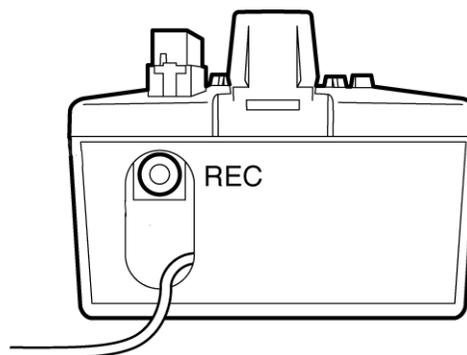


Figure 8-50 Cable Access Port

14.2.3 Installing the AD(A)-R Unit on a DTH/DTR Multiline Terminal

1. Unplug the telephone cord (and the AC-R Unit cord if installed) from the Multiline Terminal.
2. Prepare Multiline Terminal for adapter installation. Refer to [Section 13 Preparing DTH/DTR Multiline Terminal for Adapter Installation](#).
3. Plug the A and B tabs in adapter slots as shown on [Figure 8-51 Attaching the AD\(A\)-R Unit to the Multiline Terminal](#), and press down on the adapter until it clicks into place.

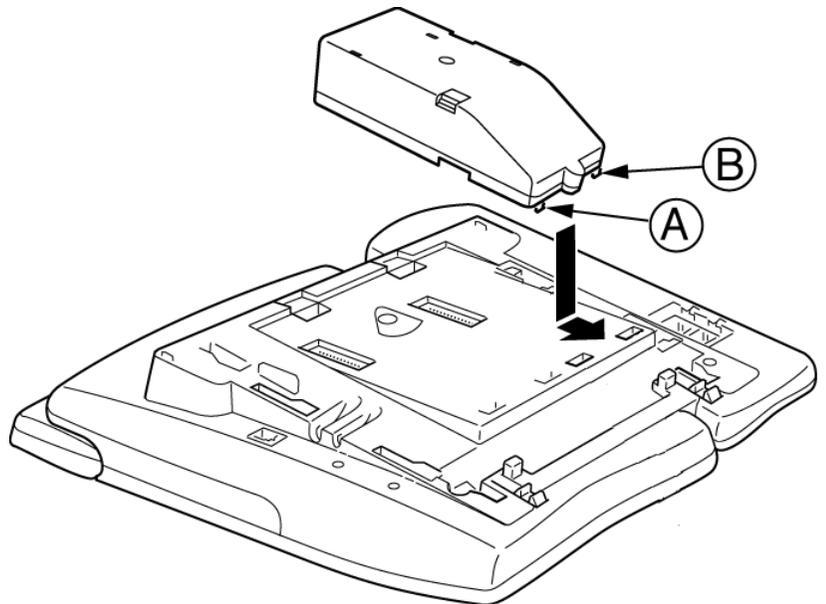


Figure 8-51 Attaching the AD(A)-R Unit to the Multiline Terminal

4. Install the Base Cover and the line cord.

14.2.4 AD(A)-R Connections and Specifications

[Table 8-2 AD\(A\)-R Cable Connections](#) provides a cable connections list and describes the specifications for the AD(A)-R Unit.

Table 8-2 AD(A)-R Cable Connections

Terminal Number	Cables to Connect	Terminal Specifications
T1 T2	When warning tone is not being sent from the recorder, connect wire pair input from tone generator to T1:T2. The warning tones from the generator are sent to T1:T2 on a dedicated wire pair while the speech path is sent from the Input/Output Terminal: Refer to dip switch settings in Table 8-1 AD(A)-R Unit Switch Settings . on T3:T4 over a separate wire pair to the recorder.	Input Terminal: T1 and T2 are enabled for tone generating device when DSW switches 3 and 4 are OFF. (When DSW switches 3 and 4 are ON, a humming sound may be recorded due to impedance mismatch.) Input Impedance on T1 and T2: 100K Ω Input Level on T1 and T2: -15 dB ~ 40 dB
T3:T4	Connect recorder device wire pair speech input to T3:T4. When the recorder used supplies a warning tone, this tone may also be sent over the T3:T4 wire pair back to the terminal.	Input/Output Terminal: Refer to dip switch settings in Table 8-1 AD(A)-R Unit Switch Settings .
T5	Connect the bare end of the control cable.	When a Multiline Terminal is idle, this contact is closed. When the Multiline Terminal goes off-hook (using the handset, headset, or speakerphone), this contact is open. When recorder owner manual specifies start on open circuit, connect T5 and T6.
T6	Connect the shielded end of the control cable.	Provides common connection for control cable.
T7	Connect the bare end of the control cable.	When the Multiline Terminal is idle, this contact is open. When the Multiline Terminal is busy (using the handset, headset, or speakerphone), this contact is closed. When recorder owner manual specifies start on closed circuit, connect T6 and T7.
T8	Unused	
T9	Unused	
REC Jack	Connect recorder device wire pair speech input to REC Jack. When the recorder used supplies a warning tone, this tone may also be sent through the REC Jack wire pair back to the terminal.	Input/Output Terminal: Refer to dip switch settings in Table 8-1 AD(A)-R Unit Switch Settings .

Table 8-2 AD(A)-R Cable Connections (Continued)**Notes:**

- ☞ When recording in handsfree (half-duplex) mode using the built-in speakerphone, the record warning tone may not be audible to the far-end party.
- ☞ The transmit recording level is lower than the receiving voice level for intercom calls; the transmit recording level for CO calls is normal.
- ☞ Depending on the recording device(s), separate cables may be required for the warning tone and speech path. In this case, connect the warning tone cables to input terminals T1 and T2 on the AD(A)-R Unit. (T3 and T4 are used as the tape recorder input.)
- ☞ When remote control of the recorder is necessary, the record start/stop control is provided by connecting to T5 (or T7) and T6 on the ADA-U Unit. (Connecting to T5 or T7 is determined by the specifications of the recorder.)
- ☞ When a warning Tone is provided from the recording equipment, it should be input via T3 and T4 on AD(A)-R Unit. (Do not use T1 and T2 to input Beep Tone.)
- ☞ Conversations cannot be recorded from terminals connected to an AP(R)-R Unit.
- ☞ **System Software S7000 or higher is required.**

14.3 AP(A)/AP(R)-R Unit (Port Adapter)

The Analog Port Adapter without Ringer AP(A) or Analog Port Adapter with Ringer AP(R) is the interface for installing Single Line Telephones, Modems, Credit Card Readers, Wireless Headsets, NEC VoicePoint/VoicePoint Plus Conferencing unit, and other compatible analog devices. The AP(R)-R Unit generates ringing signals and requires an AC-R Unit. Refer to [Figure 8-52 AP\(A\)/AP\(R\)-R Unit and Switches](#). Refer to [Figure 8-53 Typical Connection](#) for an example.

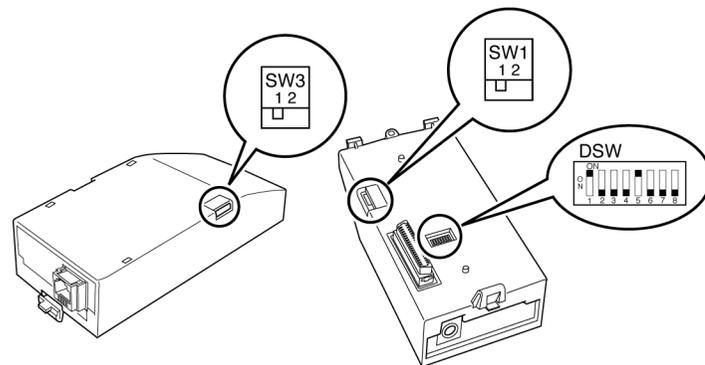


Figure 8-52 AP(A)/AP(R)-R Unit and Switches

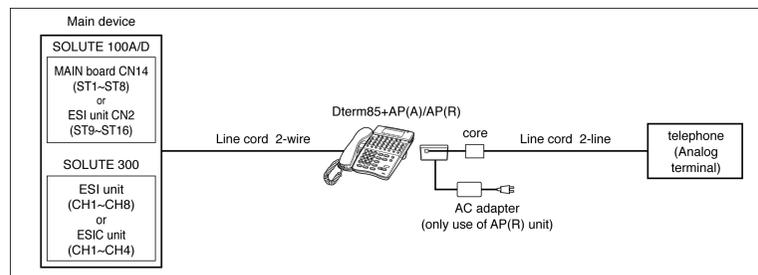
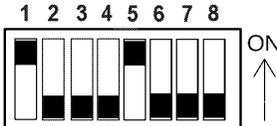


Figure 8-53 Typical Connection

14.3.1 Installing AP(A)-R or AP(R)-R Unit on any DTH/DTR Multiline Terminal except DTR-2DT-1

1. Prepare Multiline Terminal for adapter installation. Refer to [Section 13 Preparing DTH/DTR Multiline Terminal for Adapter Installation](#).
2. Set the SW1, SW3 and DSW switches to default settings shown in [Table 8-3 AP\(A\)-R/AP\(R\)-R Unit Switch Settings](#). Use nippers to remove the cover over the DSW switch.

Table 8-3 AP(A)-R/AP(R)-R Unit Switch Settings

Switch	Setting/Description
SW1	1 (default)
SW3-1	Sets impedance to 600Ω for devices such as modems or facsimile machines
SW3-2	Used for complex impedance devices such as Single Line Telephones.
DSW	<div style="text-align: center;">  <p>(Default)</p> </div>

3. Hook tabs A and B in the slots on the Multiline Terminal as shown in [Figure 8-54 Attaching the AP\(A\)/AP\(R\)-R Unit to the Multiline Terminal](#), and press down until the unit clicks into place.

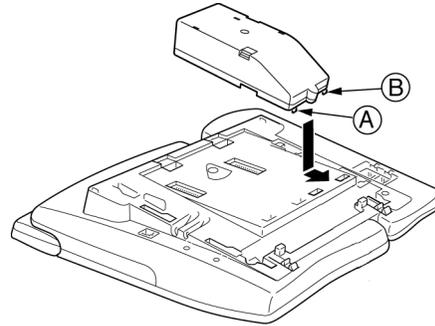


Figure 8-54 Attaching the AP(A)/AP(R)-R Unit to the Multiline Terminal

4. Close the base plate, and snap the cover in place.
5. Install the ferrite core (provided with either Unit) about 2 inches from the line cord plug as shown in [Figure 8-55 Installing Ferrite Core](#).
6. Connect the line cord to the unit. Limit the cable length from the AP(A)/AP(R)-R Unit to the Single Line Telephone to a maximum of 50 feet.

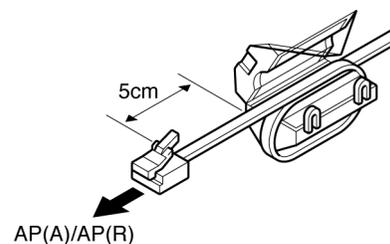


Figure 8-55 Installing Ferrite Core

7. For the AP(R)-R only, plug the AC adapter power cord in the indicated AP(R)-R Unit receptacle and connect it to a power source.
8. Install the extended base plate.

14.4 CT(A)-R Unit (Computer Telephony Adapter)

Computer Telephony Adapter shown in [Figure 8-56 CT\(A\)-R Unit](#) allows a DTH/DTR Multiline Terminal connection to a PC. The PC can perform all Multiline Terminal functions using a TAPI-compatible application software.

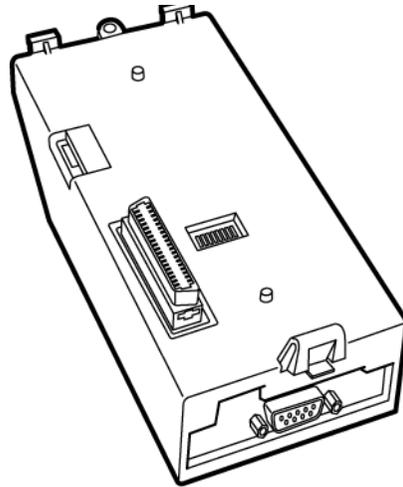


Figure 8-56 CT(A)-R Unit

14.4.1 Typical Connection using an ESI/ESIC

Refer to [Figure 8-57 Typical Connection for ESI/ESIC](#).

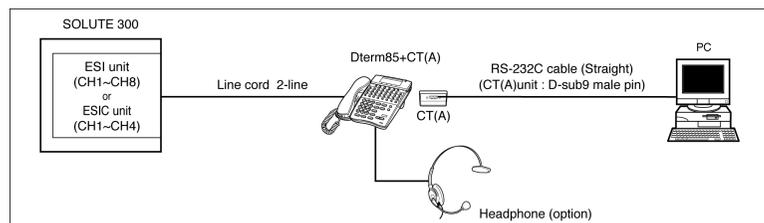


Figure 8-57 Typical Connection for ESI/ESIC

14.4.2 Typical Connection using VDH ETU

Refer to [Figure 8-58 Typical Connection Using VDH ETU](#).

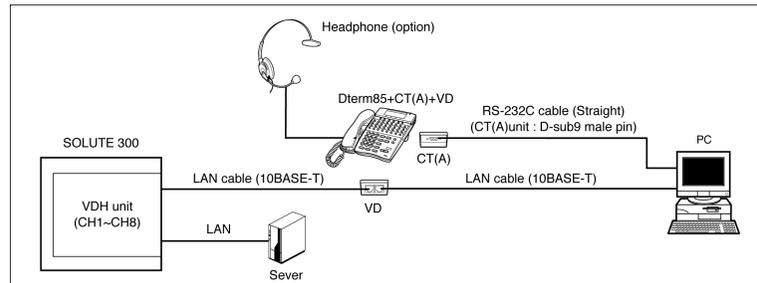


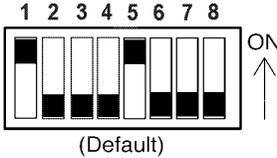
Figure 8-58 Typical Connection Using VDH ETU

14.4.3 Installing the CT(A)-R Unit

1. Prepare Multiline Terminal for adapter installation. Refer to [Section 13 Preparing DTH/DTR Multiline Terminal for Adapter Installation](#).

- Set CT(A)-R Unit switches to default settings. Refer to [Table 8-4 CT\(A\)-R Unit Switch Settings](#).

Table 8-4 CT(A)-R Unit Switch Settings

Switch	Setting/Description
SW1	1 (default)
SW3-1	Sets impedance to 600Ω for devices such as modems or facsimile machines.
SW3-2	Used for complex impedance devices such as Single Line Telephones.
DSW	 <p>(Default)</p>

- Hook tabs A and B in the slots on the Multiline Terminal as shown in [Figure 8-59 Attaching the CT\(A\)-R Unit to the DTH/DTR Multiline Terminal](#), and press down until the unit clicks into place.

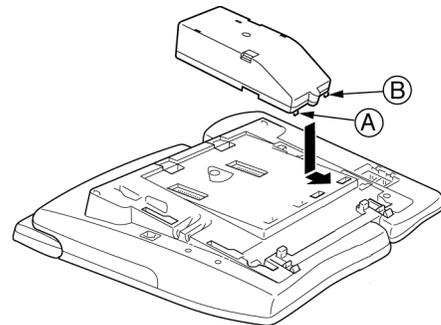


Figure 8-59 Attaching the CT(A)-R Unit to the DTH/DTR Multiline Terminal

- Install the extended base cover.

5. Install the line cord.
6. Install the headset and anchor it in the cord slot as shown in [Figure 8-60 Installing and Anchoring Headset](#).

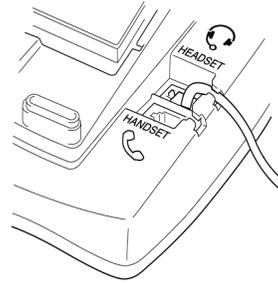


Figure 8-60 Installing and Anchoring Headset

7. Connect the RS-232C cable from the computer to the connector on the CT(A)-R Unit as shown in [Figure 8-61 Connecting the RS-232C Cable to the CT\(A\)-R Unit on the Multiline Terminal](#).

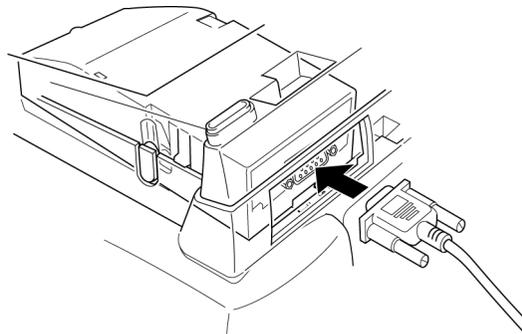


Figure 8-61 Connecting the RS-232C Cable to the CT(A)-R Unit on the Multiline Terminal

14.4.4 Installing the Driver on the PC

Using the setup disk provided with the CT(A)-R Unit install the driver onto your PC. Refer to the *CT(A) installation Guide* for instructions on installing CT(A) setup disks.

14.5 Removing or Installing BS(E)-R Key Unit

To remove this unit:

1. Remove the Line Card and Line Panel from the Multiline Terminal.
2. Pull the tab on the right side of the key unit and lift out the unit to the left as shown in [Figure 8-62 Removing Key Unit](#).

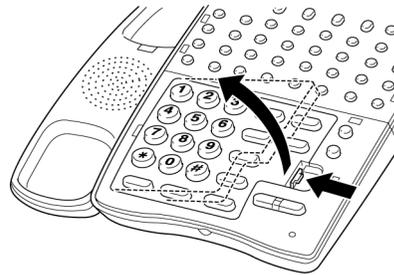


Figure 8-62 Removing Key Unit

To install this unit:

1. Insert the two tabs on the left of the key unit in the slots as shown in [Figure 8-63 Installing Key Unit](#).

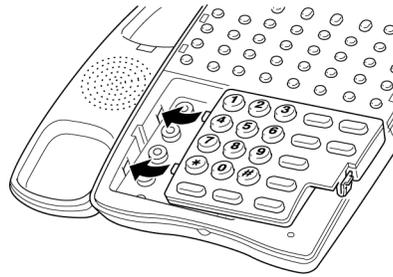


Figure 8-63 Installing Key Unit

2. Push the unit to the left and press down until it clicks into place.
3. Install the Line Card and Line Panel.

Installing Electra Professional Equipment

**SECTION 1
GENERAL
INFORMATION**

Electra Professional Multiline Terminals can be installed on an Electra Elite 192 system providing inexpensive migration to the Electra Elite system. This chapter provides instructions for connecting these terminals to the Electra Elite 192 system.

**SECTION 2
ELECTRA
PROFESSIONAL
MULTILINE TERMINALS**

The following Electra Professional Multiline Terminals can be connected to the Electra Elite system.



ETW-8-1/2 TEL



ETW-16DC-1/2 TEL



ETW-16DD-1/2 TEL



ETW-24DS-1/2 TEL



EDW-48-1/2 DSS/BLF Console

SECTION 3
CONNECTING AN
ELECTRA
PROFESSIONAL
MULTILINE TERMINAL
TO THE ELECTRA
ELITE SYSTEM

3.1 Modular Terminal Connections

3.1.1 Connecting Multiline Terminals, Attendant Add-On Consoles, and SLT Adapters

When connecting Electra Professional Multiline Terminals, Attendant Add-On Consoles, or SLT Adapters to the MDF or IDF, individually twisted 1-pair cabling must be used. Refer to [Figure 9-1 Modular Terminal Connections for Multiline Terminals and Attendant Add-On Consoles](#) for an illustration of connections.

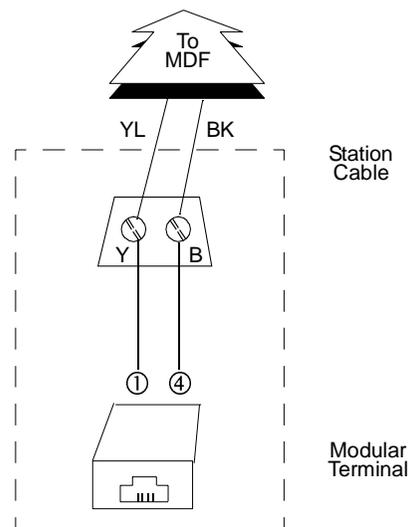


Figure 9-1 Modular Terminal Connections for Multiline Terminals and Attendant Add-On Consoles

3.2 Attach a Multiline Terminal to the System

1. Plug a telephone cord into the modular jack on the bottom side of the Multiline Terminal.
2. Lead the cord out through the cord groove as shown in [Figure 9-2 Connect an Electra Professional Multiline Terminal to the Electra Elite 192 System](#).

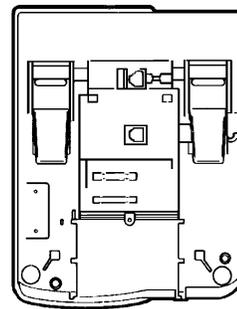


Figure 9-2 Connect an Electra Professional Multiline Terminal to the Electra Elite 192 System

SECTION 4 INSTALLING AN ANCILLARY DEVICE ADAPTER IN THE MULTILINE TERMINAL

4.1 Ancillary Device Adapter Installation

The ADA(1)-W Unit or the ADA(2)-W Unit can be installed in any Electra Professional multiline terminal in the system.

1. Unplug the line and headset cords.
2. Turn the multiline terminal upside down and place it on a dry surface.
3. Remove the knockout shown in [Figure 9-3 Removing Knockout](#).

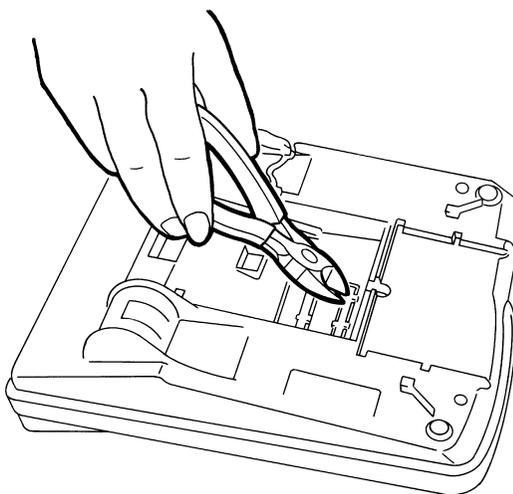


Figure 9-3 Removing Knockout

4. Plug the CN-1 connector on the adapter unit in the CN-4 jack on the main board. [Refer to Figure 9-4 Unit Installation.](#)

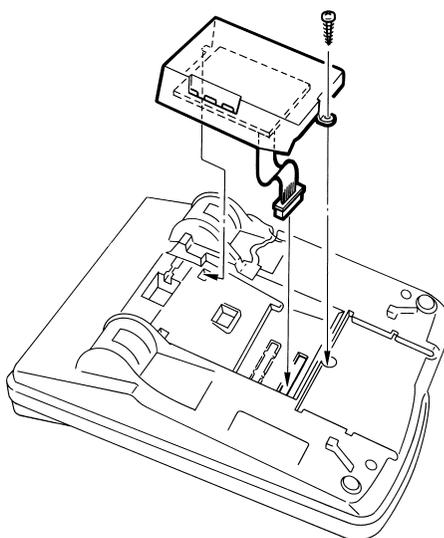


Figure 9-4 Unit Installation

5. Install the ADA component side down in the multiline terminal using the provided screw.
6. Connect external device (e.g., fax, modem, or answering machine) using the information provided in ETIs.
7. When installing ADA(2)-W Unit, plug the AC/DC adapter in the jack on the side of the unit.
8. Test multiline terminal operation, and then test external device operation.

SECTION 5

CONNECTING AN ATTENDANT CONSOLE TO A MULTILINE TERMINAL

An Attendant Console can be attached to a Multiline Terminal using the following procedures.

1. Turn the Multiline Terminal and the Attendant Console face down.
2. Using the joining plate provided with the Attendant Console, attach the plate to the Multiline Terminal and the Attendant Console.

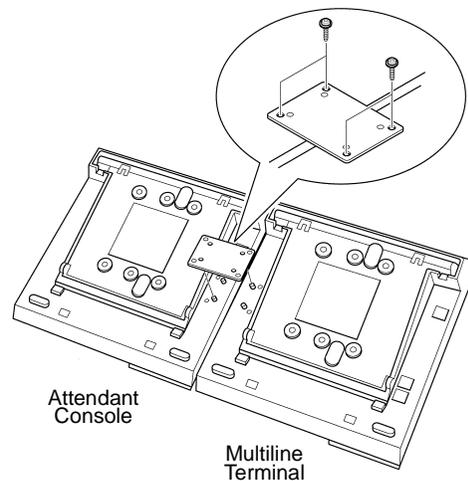


Figure 9-5 Connecting an Attendant Console to a Multiline Terminal

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SECTION 1 INTRODUCTION

The technician can use this chapter to troubleshoot and diagnose problems during and after system installation. The troubleshooting flow charts and general test procedures aid the technician to identify possible causes of the problem by defining the problem area.

Using the System Data Upload/Download feature, all System Programming and Speed Dial data can be stored on disk for safe keeping. After all System Programming is completed, it should be downloaded to a disk for backup. If system memory fails, this data on the disk can be uploaded and the memory restored.

SECTION 2 OPERATIONAL CURRENT AND VOLTAGE CHECKS

The effectiveness of this maintenance section depends on the technician. Due to external factors, the technician should not make any assumptions. For example, don't assume that a new power supply used to replace another power supply is working properly. Check the output of the power supply with a volt meter.

The ESI(8)-U10 ETU allows the measurement of +5V and -24V. This ETU can be used in the expansion KSU for the power output measurements. Refer to [Table 10-1 Voltage Measurement](#). Before the technician can troubleshoot, the correct tools must be available. Some of these are listed below.

- ① Digital or Analog Multimeter that can read DC and AC current and voltage and DC Resistance.
- ① Test Set (lineman) that has termination and monitor modes and DTMF and DP dialing.

- ⌚ Hand tools such as:
 - Screwdrivers (flat and Phillips head)
 - Pliers (long nose and diagonal)
 - Punch down tool

SECTION 3 OPERATIONAL TEST PROCEDURES

3.1 General Information

When an Electra Elite 192 system is first powered up, an initialization is performed. During this process the CPUB()-U() ETU, located in the Basic KSU, scans each interface slot to determine the hardware configuration used. This information is stored in the resident system program memory with the system default values. This section provides test procedures that are used before, during, and after the initialization process.

3.2 Before Initializing

The technician must follow these steps before initializing the system.

3.2.1 Cable Connections

All wiring for power supplies or flat cable connectors should be checked for solid connections.

3.2.2 AC/DC Power

Check all power with an AC/DC multimeter. (Refer to [Table 10-1 Voltage Measurement](#).) Run this test with only the CPUB()-U() ETU and the ESI(8)-U() ETU installed.

Table 10-1 Voltage Measurement

Voltages	Tolerance	Measuring Points
ESI(8)-U10 ETU +5V -24V	+5 \pm 0.25V -24 \pm 0.25V	ESI(8)-U10 TP1 +5V TP2 GND TP3 -24V
AC Voltage (117 Vac) Line to Neutral Line to Conduit Ground Neutral to Conduit Ground	117 Vac \pm 15% 117 Vac \pm 15% .05 Vac (maximum)	AC Terminal Strip Line L to N Line L to G Line N to G
Ring Generator (SLT)	70 ~ 120 Vac @ 20 Hz *	Across Tip and Ring of Ringing SLT
CO Line Off-hook line current	25 ~ 50 mA	In series with Tip side of the CO line at the MDF

* Ring voltage may be lower if the meter measures only 60 Hz signals.

3.2.3 Initialization Check

To determine if the system is initializing correctly, only the Basic KSU, CPUB()-U() ETU, one ESI(8)-U() ETU, and terminals should be installed on the system. After initialization, all the terminals assigned to the ESI(8)-U() ETU can be used for internal calls to one another. (By default, these stations are assigned station numbers 100~107).

3.3 System Initialization

After the steps described in Section [3.2 Before Initializing](#) are performed and verified, the entire system should be initialized.

With power OFF, all interface and option cards can be installed in the basic KSU. The technician can then power up the system to perform a First Initialization. After the initialization, each station display shows default time and date indications.

For example: **12:00 AM WED 1**

3.4 After Initialization



Ensure the battery on the CPUB()-U()ETU is connected to CN4 on the CPU.

Before any programming is attempted, connect the battery on the CPUB()-U() ETU to CN4 on the CPU. This prevents loss of previously programmed data if the system loses power.

Check all ETU slots in software to ensure the initialization process scanned the installed hardware correctly.

A general system operation check should be performed using default values prior to system programming.

After all previous steps are performed and any problems corrected, system programming is complete.

After System Programming is finished, the technician should perform a Second Initialization. Performing the First Initialization a second time causes all programming memory to be lost. Second Initialization refreshes the system RAM without losing any memory.

This completes the installation procedure for the Electra Elite 192 system. The technician should check the operation of each Multiline Terminal to ensure the system is working properly.

**SECTION 4
TROUBLESHOOTING****4.1 Remote Administration and Maintenance**

The Maintenance and Diagnostics feature can remotely access the Electra Elite 192 system for maintenance and diagnostics. The remote PC and the system are connected via a modem (built-in or external).

4.2 Problem Solving

To find the cause, consider all problem symptoms carefully. As each aspect of the problem is considered, the technician is guided to a probable solution. The problem must be defined as accurately as possible, so that the most efficient steps to the solution can be taken. Flowcharts in the next section help define the problem.

4.2.1 System Down

This term describes one of the following situations:

- ① No access to internal dial tone on any Multiline Terminal or Single Line Telephone is installed.
- ① No LED indication, display indication, or Multiline Terminal is installed.
- ① No system tones are generated.

4.2.2 Partial Operation

This term refers to any situation that cannot be completely described under the System Down conditions.

4.2.3 Reset

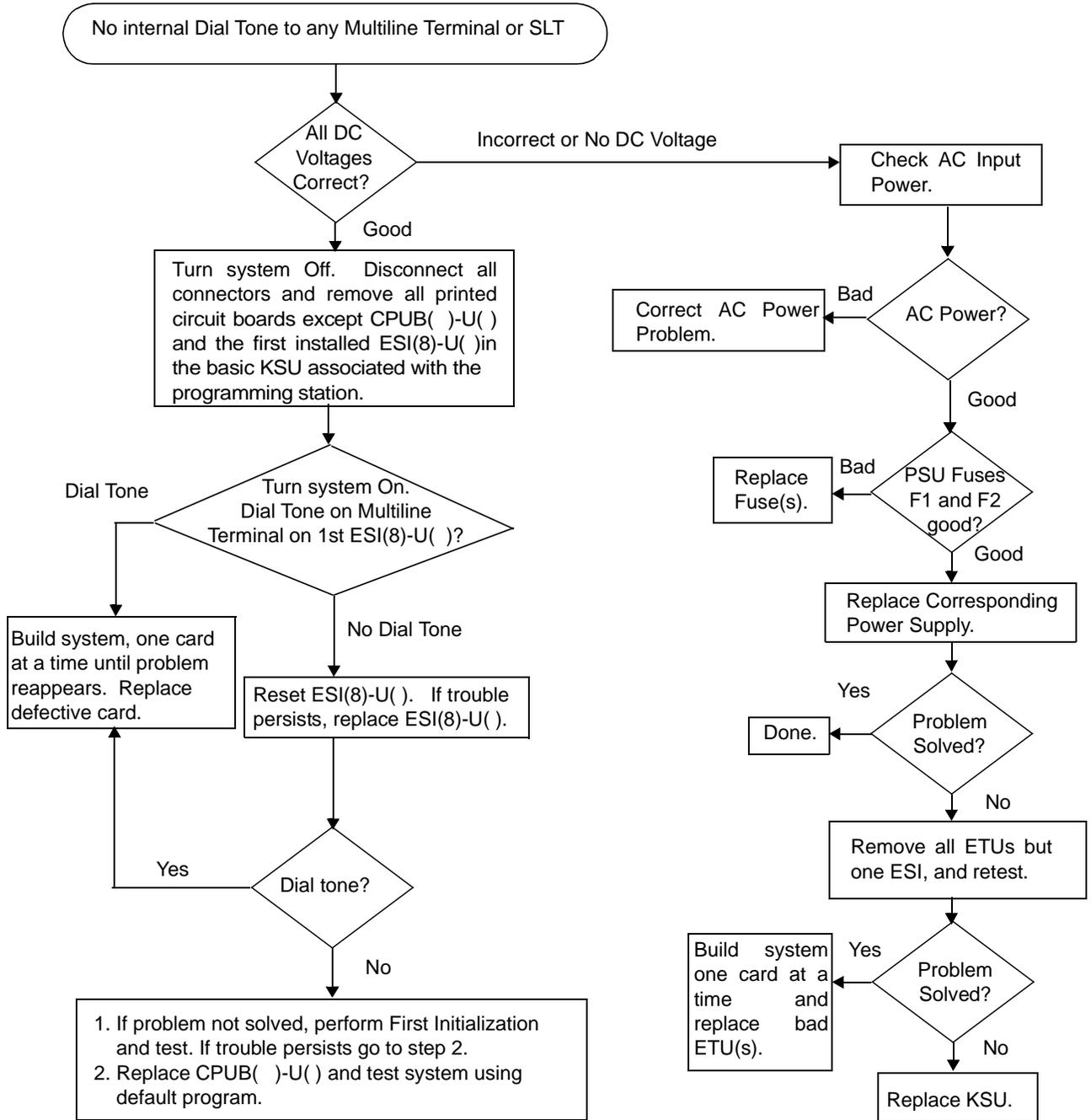
At times, the station and/or the ETU must be reset. The following resets are used in the system.

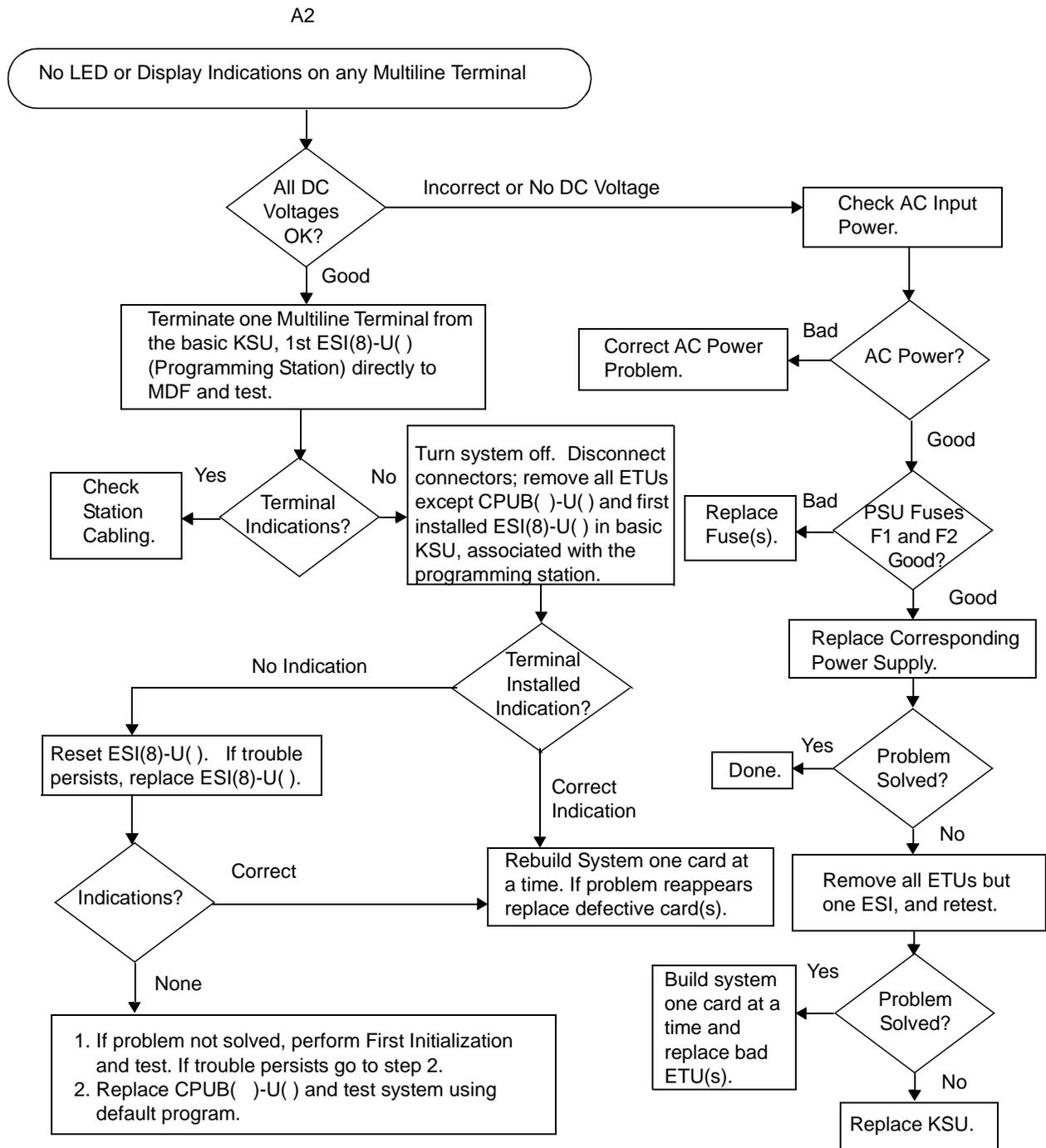
- ① Terminal Reset – Unplug the station line cord from the station and then plug it back into the station.
- ① ETU Reset – Press the RESET switch.

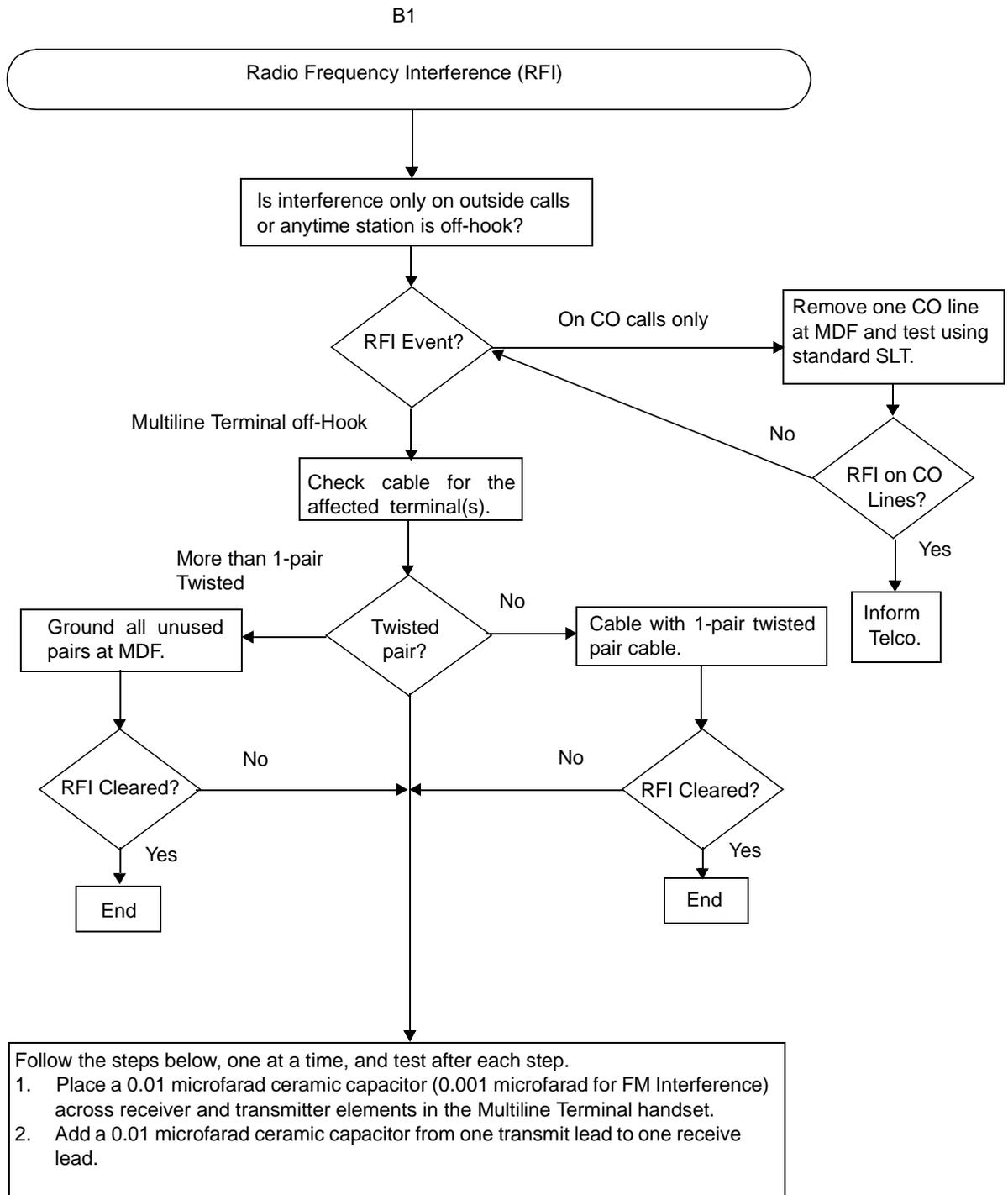
4.3 Flowcharts

Condition	Flowchart	Page
A. System Down		
1. No Internal Dial Tone to any Multiline Terminal or SLT	A1	10-7
2. No LED or Display Indications on any Multiline Terminal	A2	10-8
B. Partial Operations		
1. Radio Frequency Interference	B1	10-9
2. No or Intermittent CO/PBX Ring	C1	10-10
3. Call Dropping	C2	10-11
4. No Outside Dial Tone Access	C3	10-12
5. CO/PBX Dialing Problem: Cannot Dial Out on CO	C4	10-13
C. Multiline Terminal Problems		
1. Multiline Terminal Function	D1	10-14
2. Multiline Terminal Ringing	D2	10-15
3. Multiline Terminal Dial Tone Access	D3	10-16
D. Single Line Telephone Problems		
1. No Dial Tone Access on SLT	E1	10-17
2. No Ringing on SLT	E2	10-18
3. No Dial Access to SLT Features	E3	10-19
E. Low Volume Problems	F1	10-20
F. External Paging Problems	G1	10-21
G. SMDR Output Problems No Call Accounting System	H1	10-22

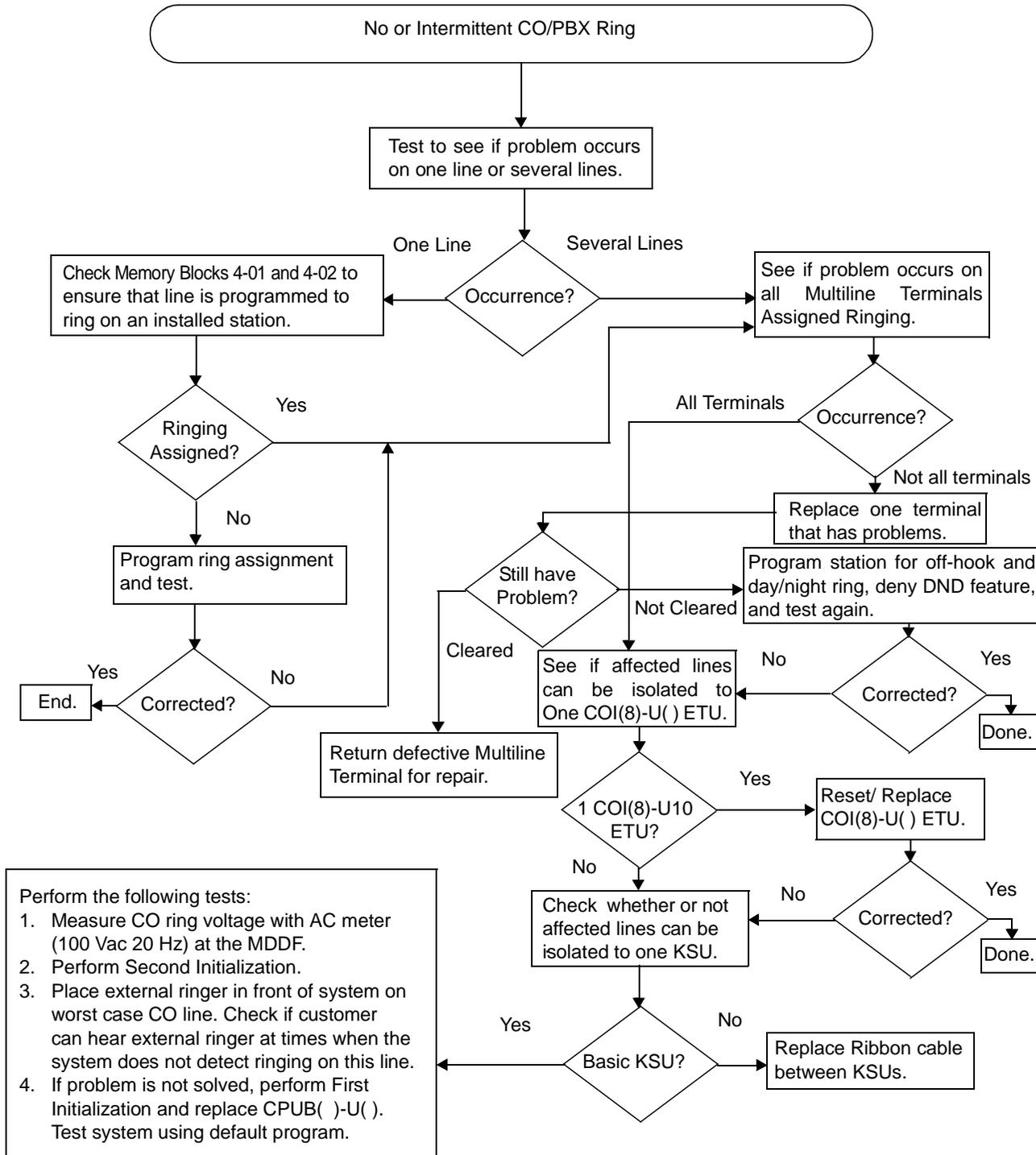
A1

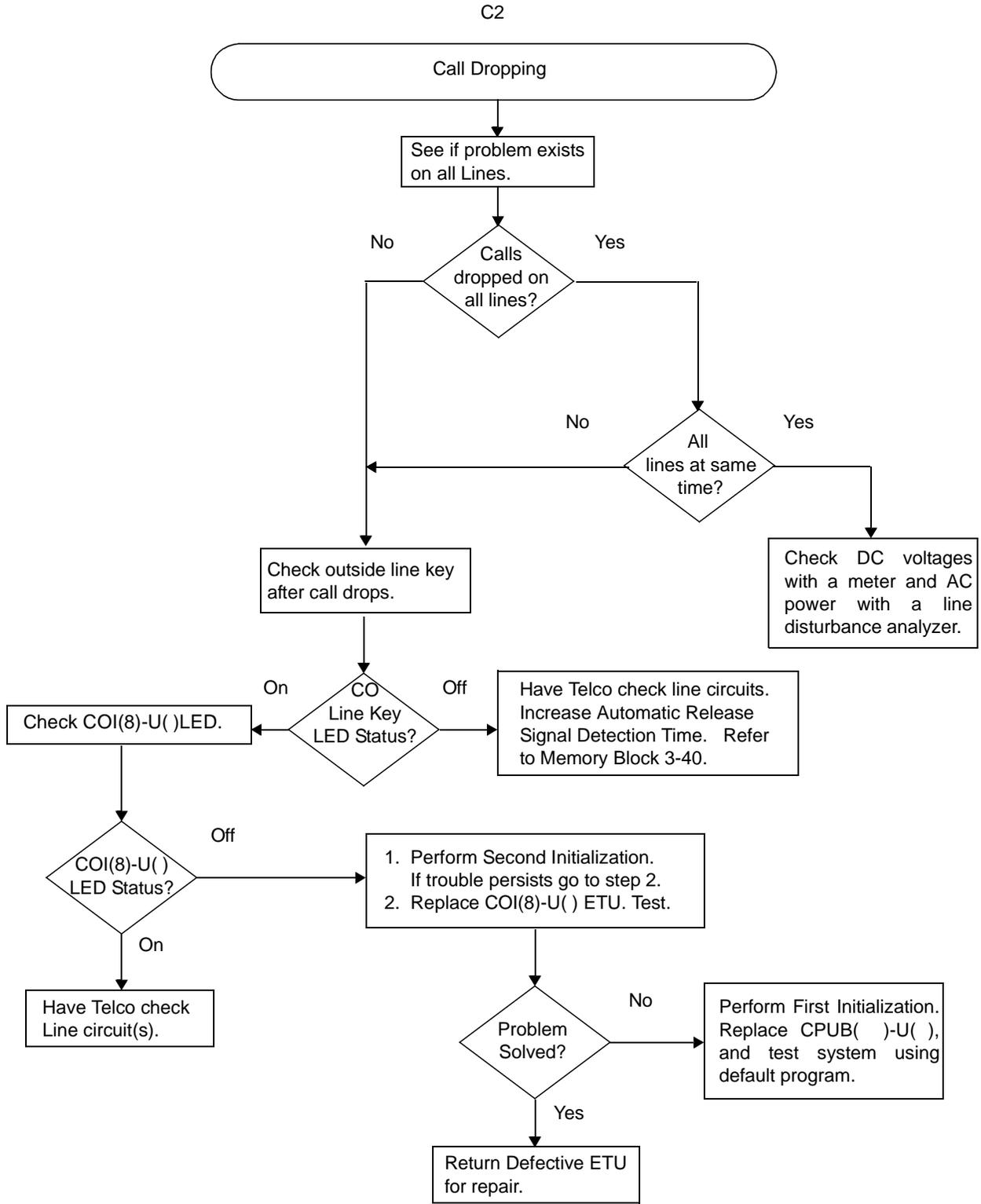




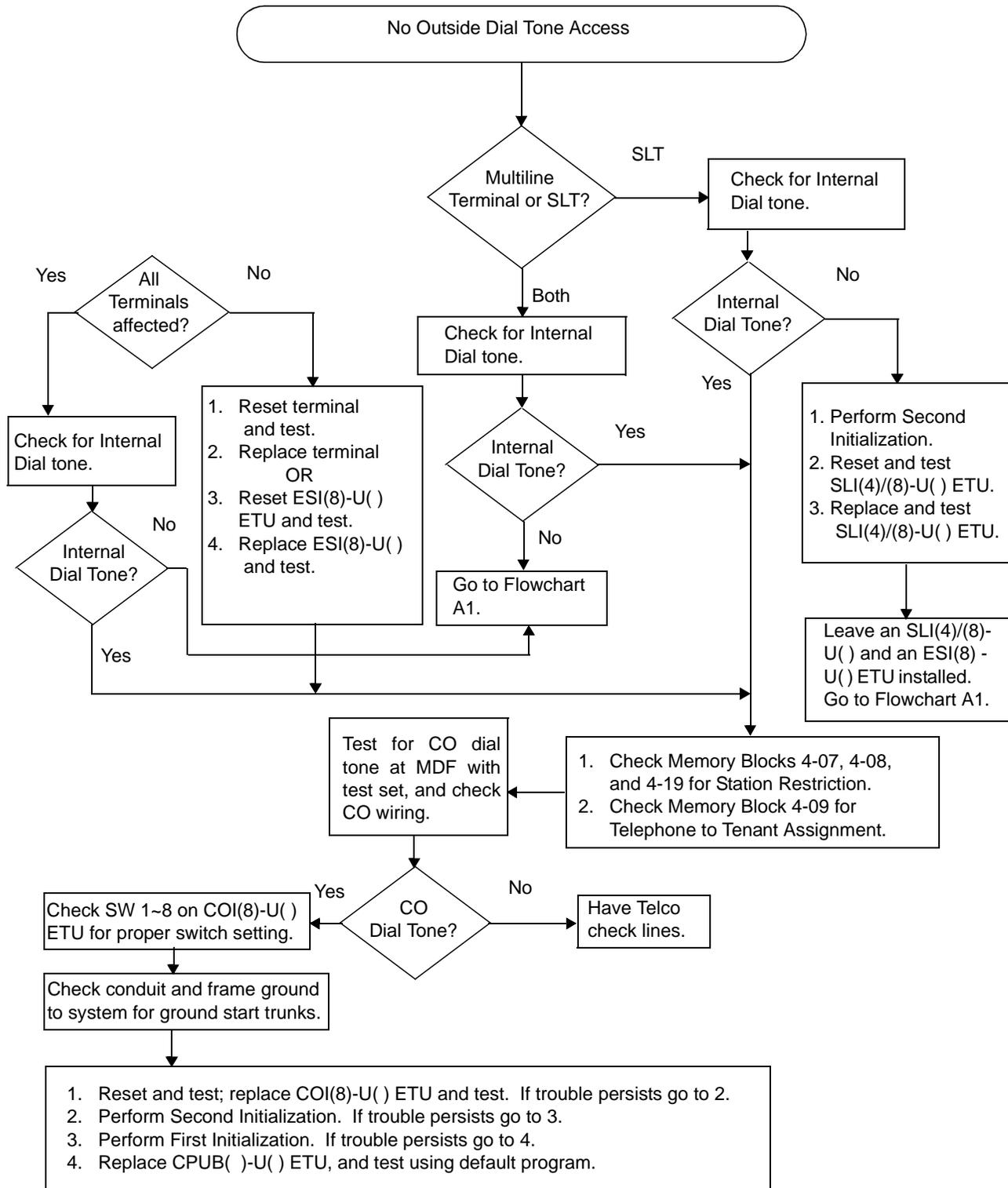


C1

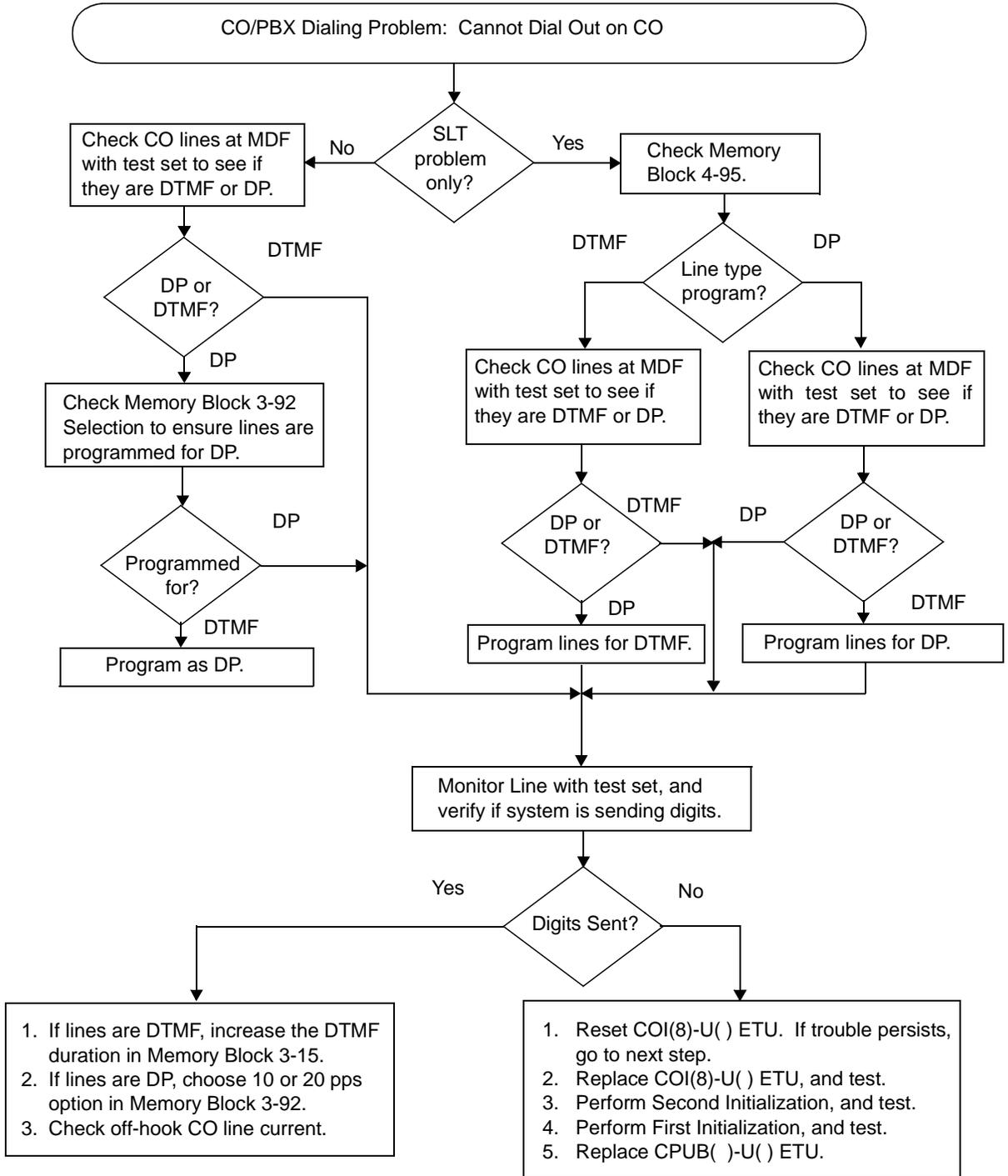




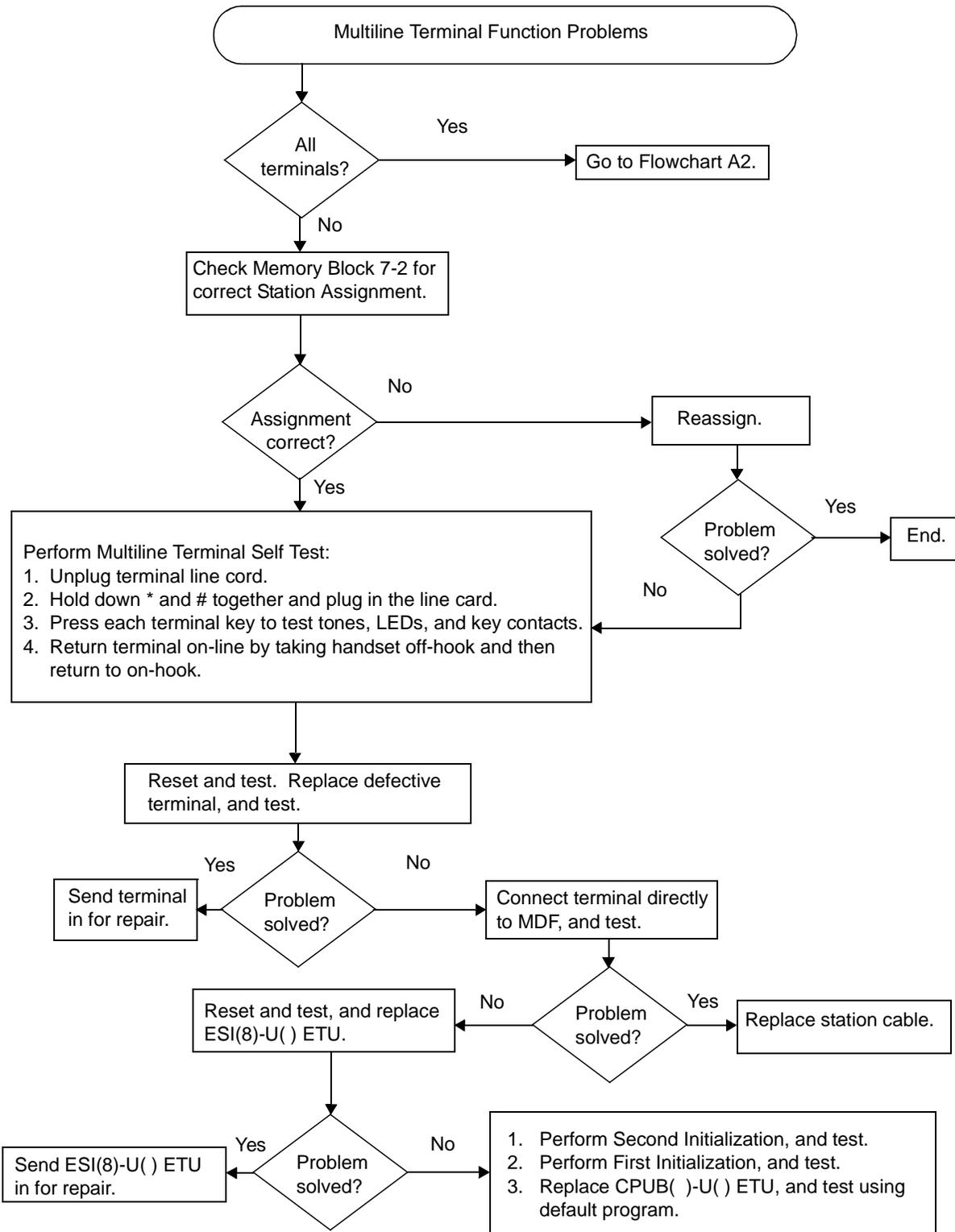
C3

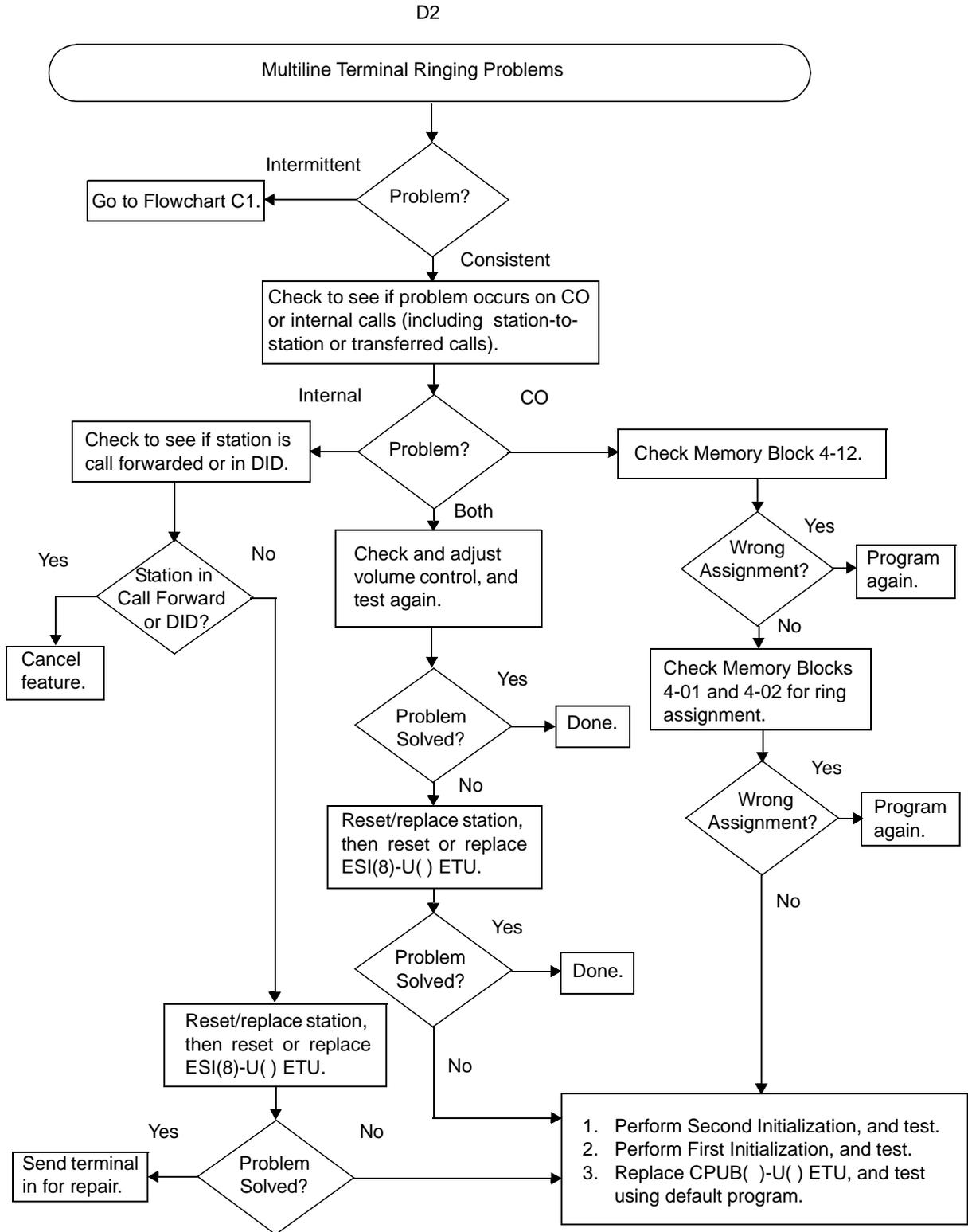


C4

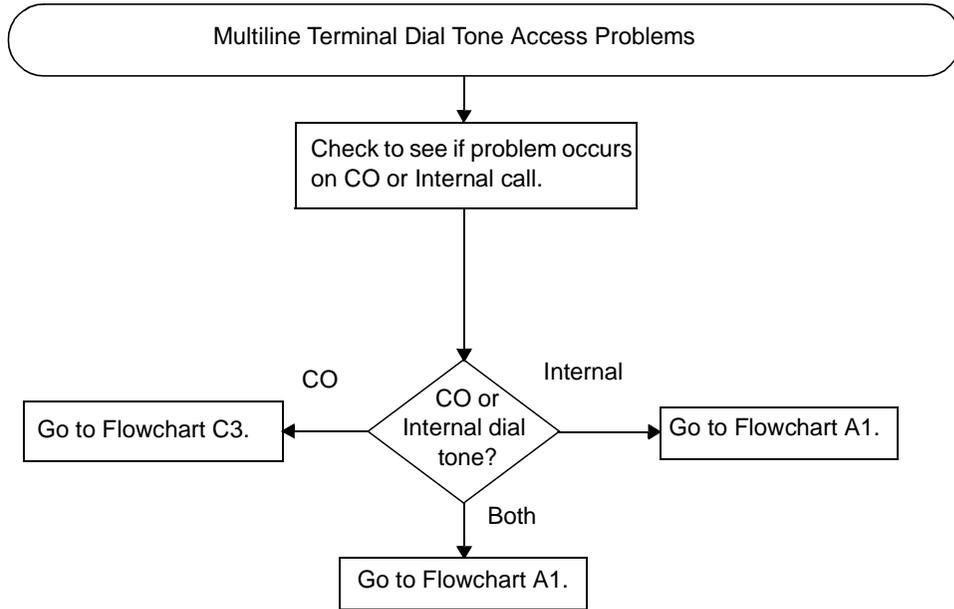


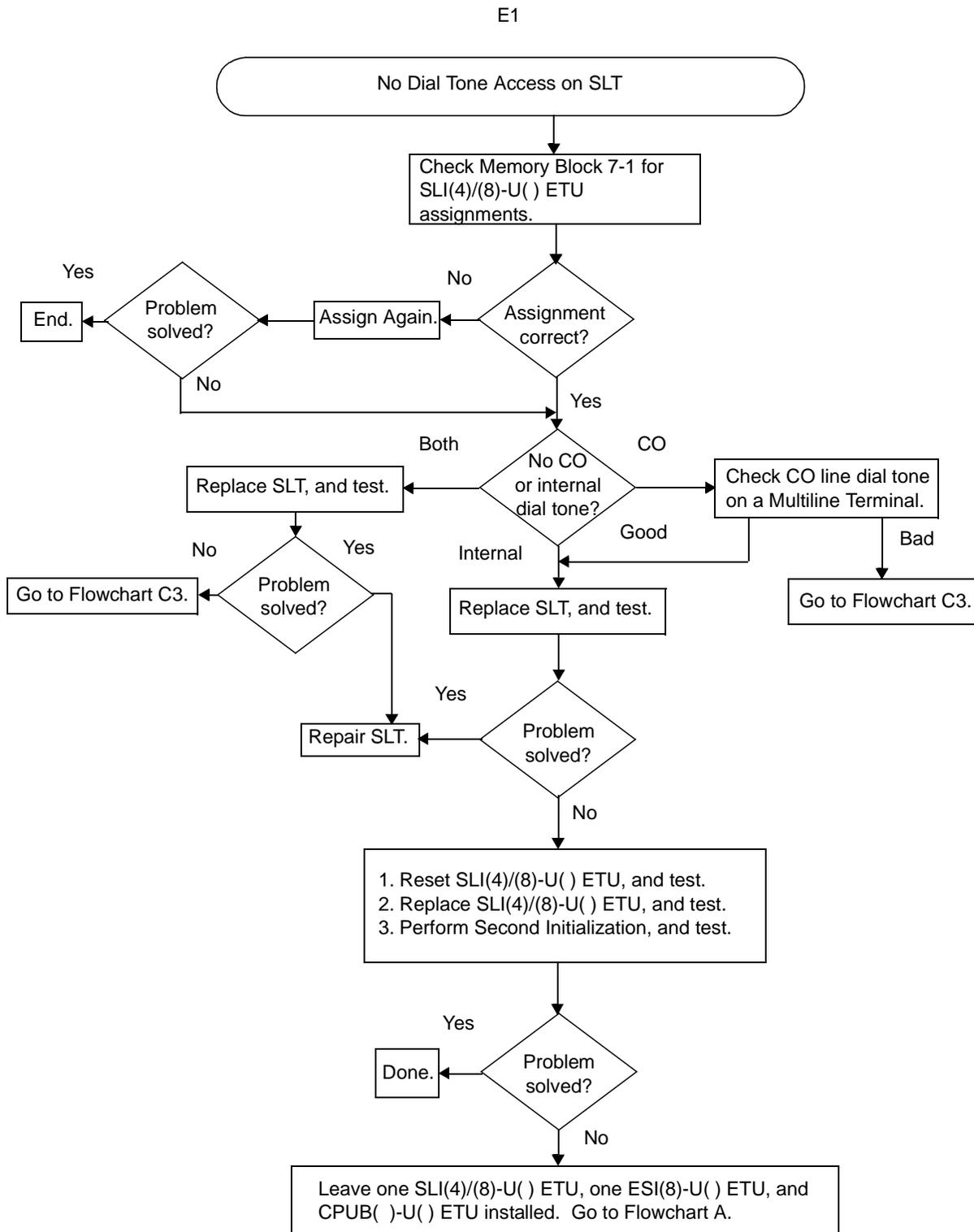
D1

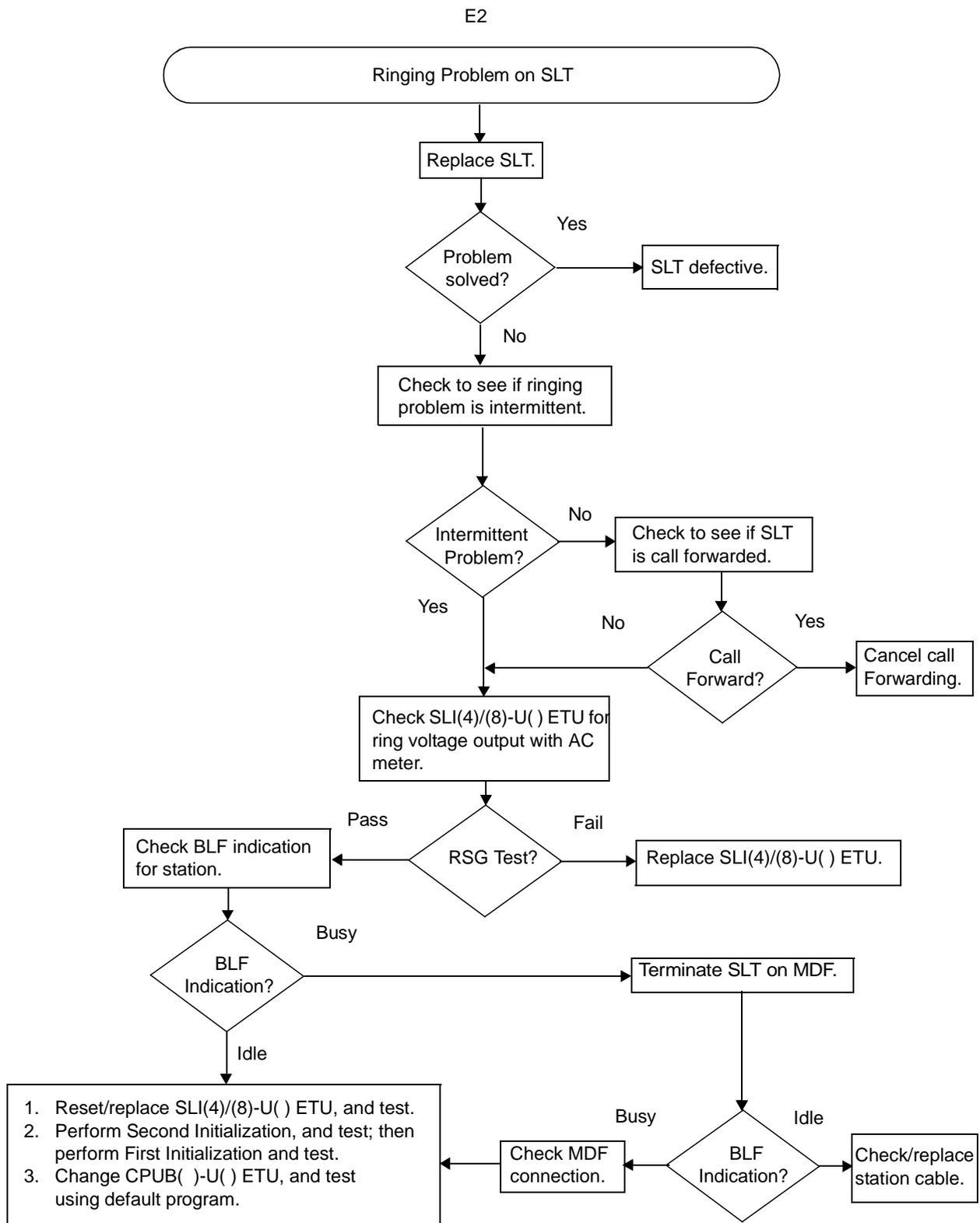


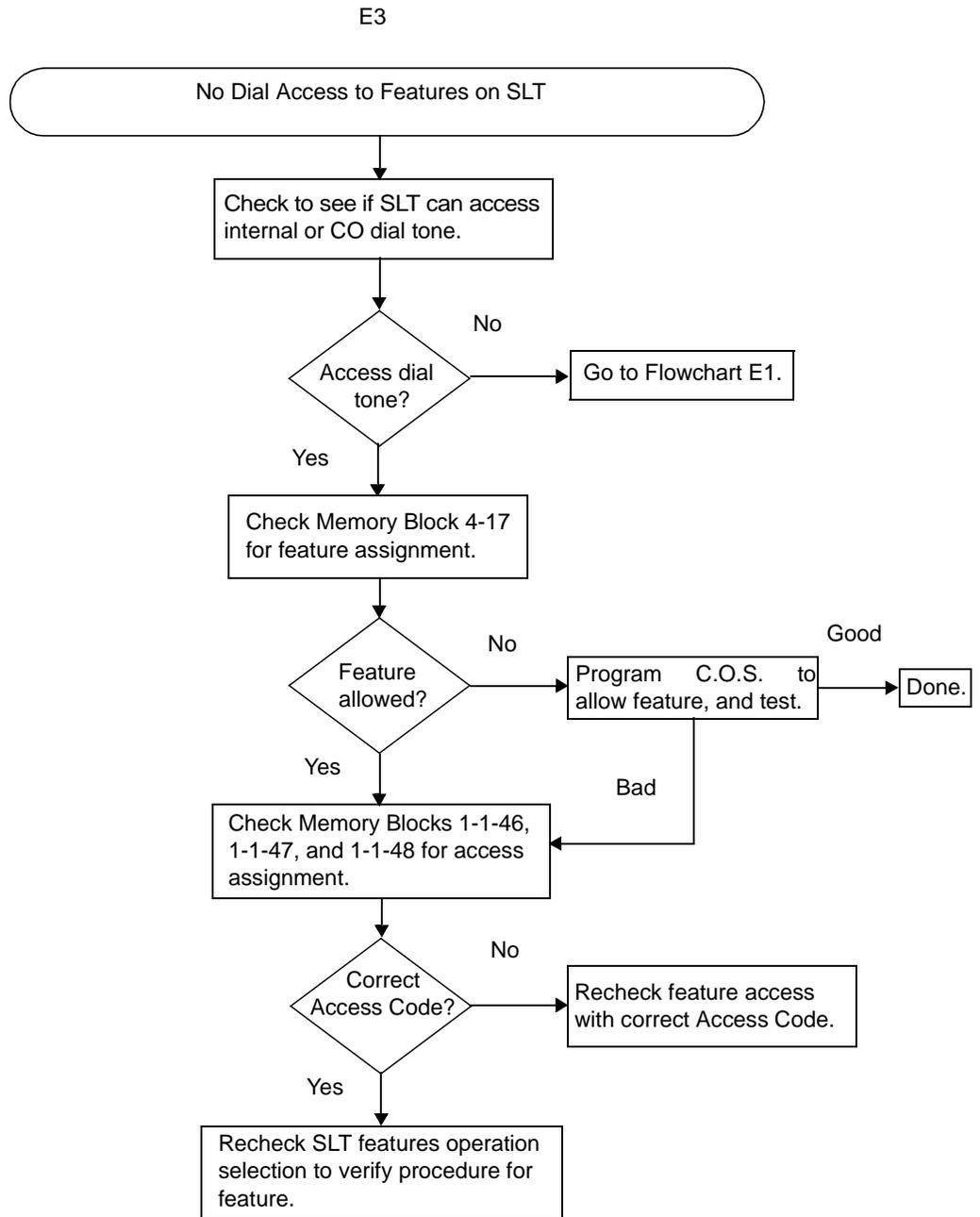


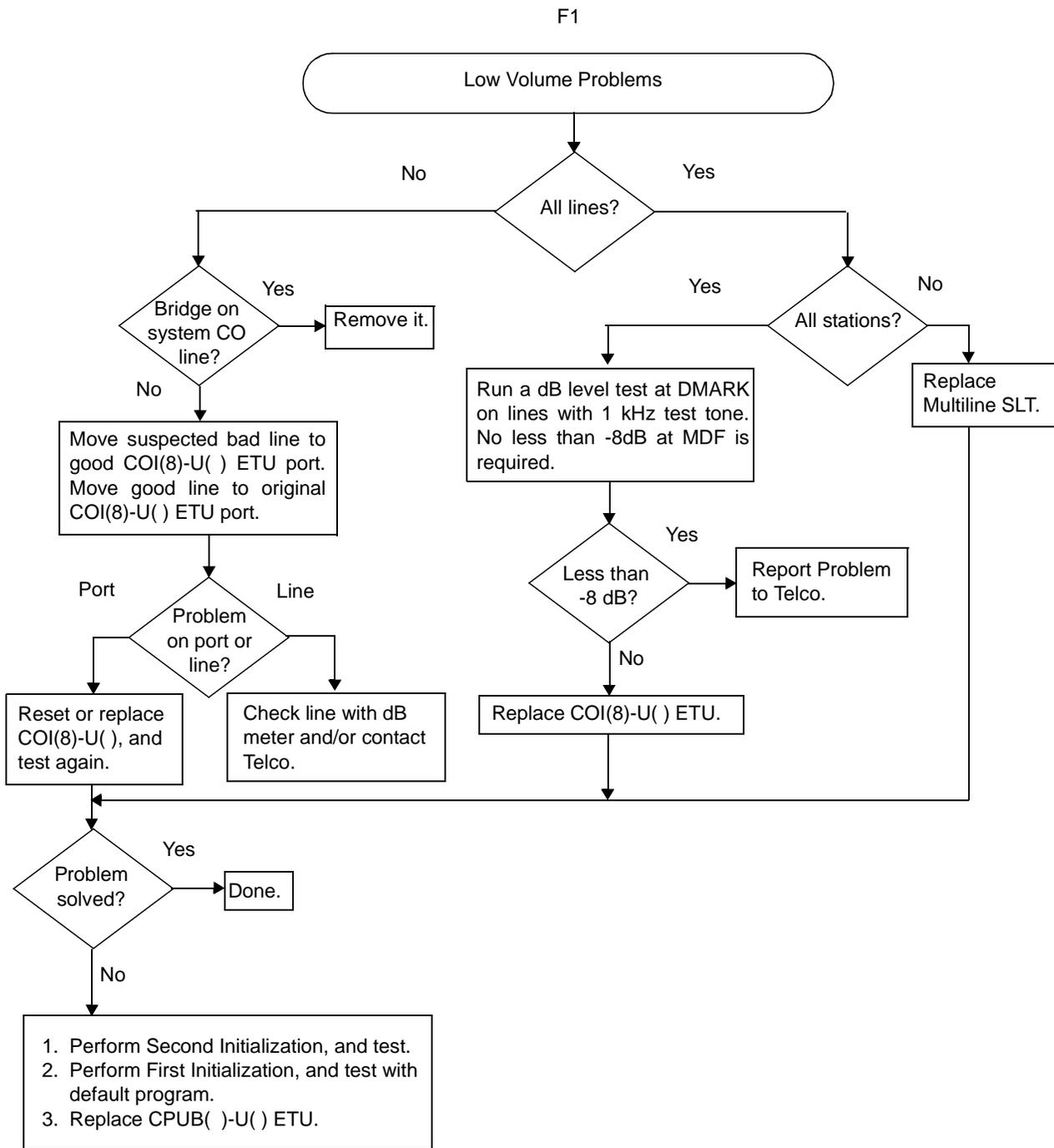
D3

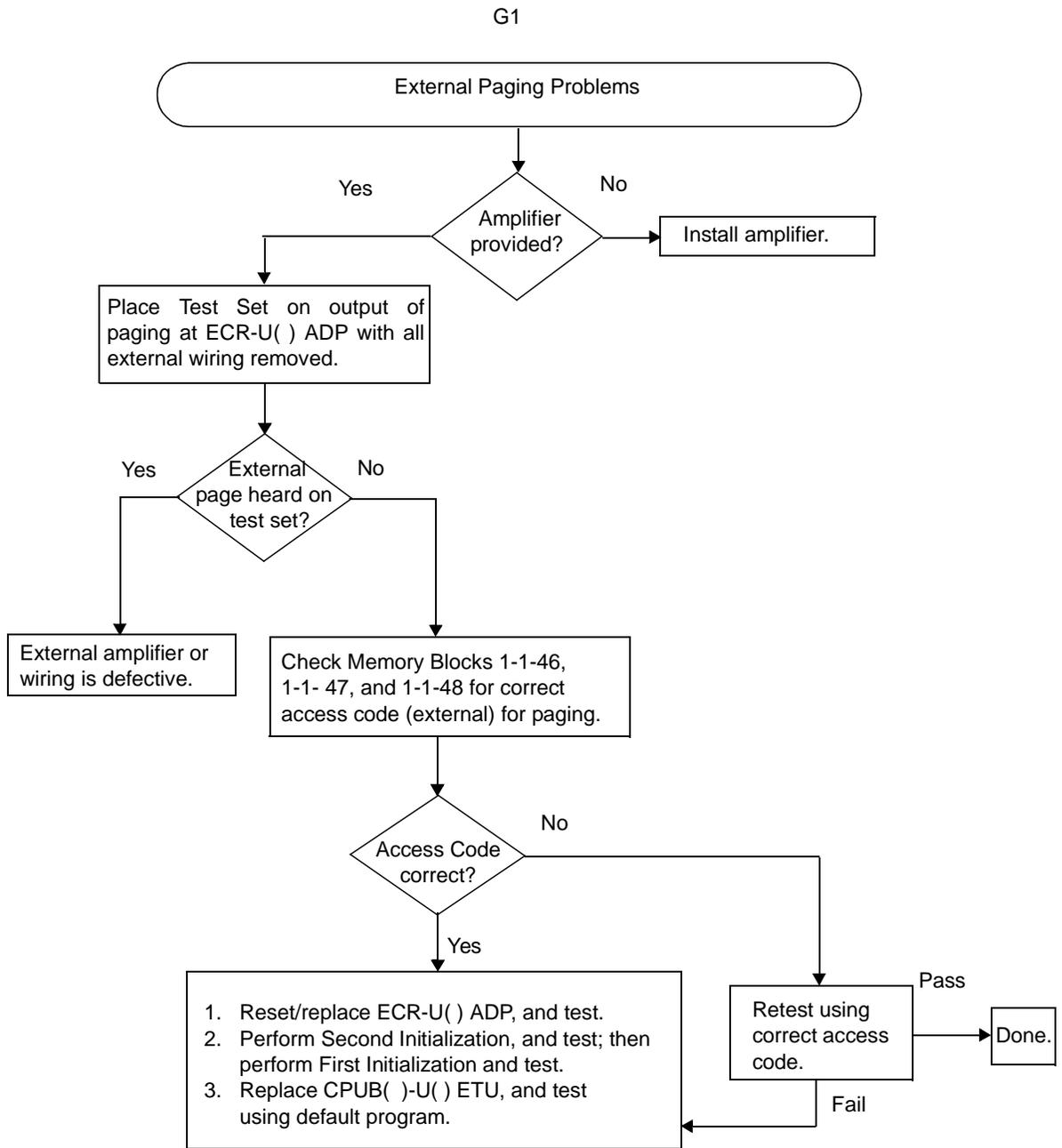


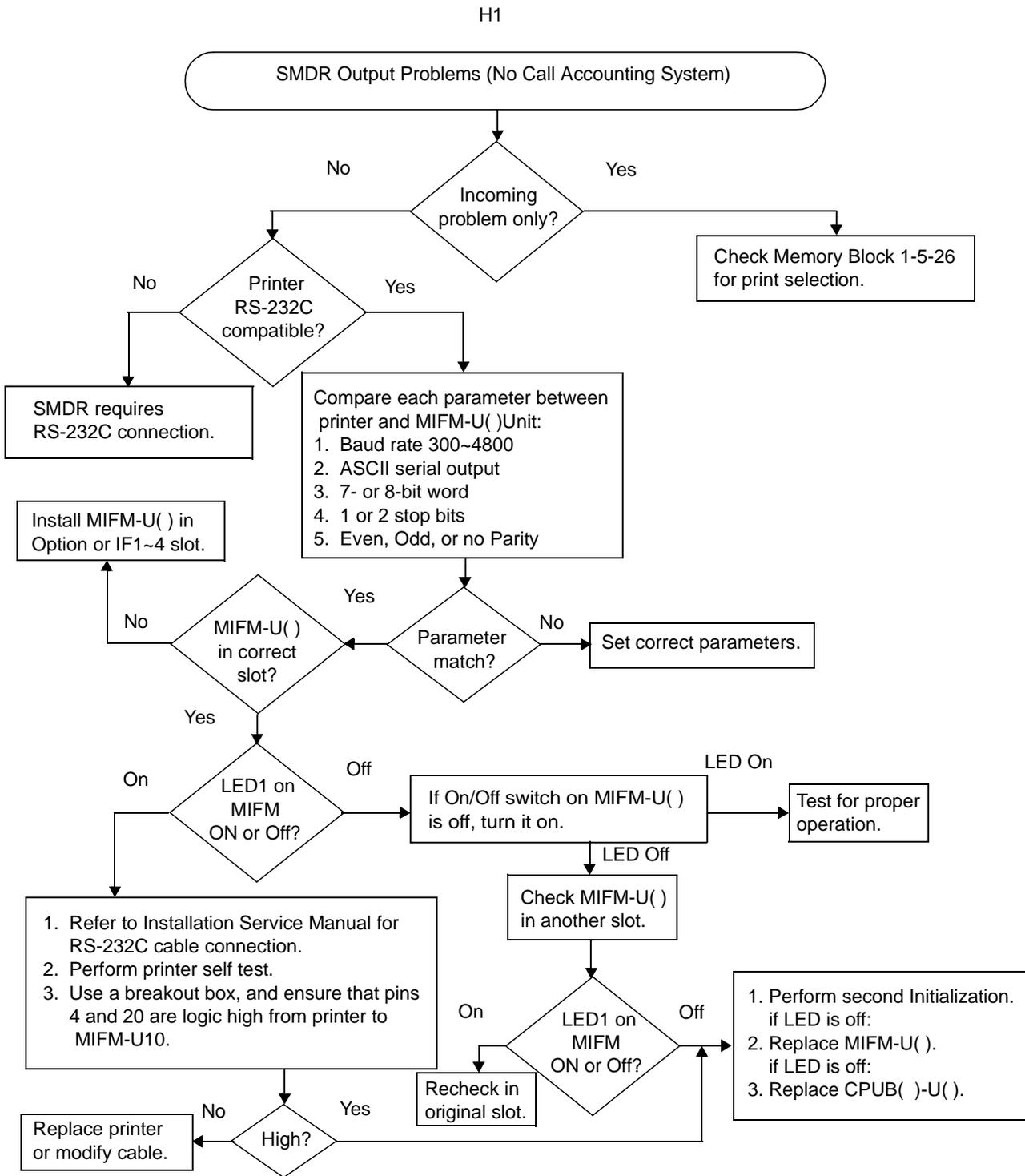












Glossary of Abbreviations

APPENDIX A

The following table includes common abbreviations used throughout this document that are listed in alphabetical order.

Abbreviations	Definition
ACD	Automatic Call Distribution Provides a cost-effective method for supervising incoming telephone traffic and associated staff activity.
AIS	Alarm Indication Signal Replaces the normal traffic signal when a maintenance alarm indication is activated. An AIS signal is transmitted downstream to indicate an upstream failure was detected.
BNC	Bayonet-Neill-Concelman Connector for slim coaxial cables. This is similar to ones used with Ethernet.
BPV	Bipolar Violation Indicates the presence of two consecutive one bits of the same polarity on a T carrier line.
BRI	Basic Rate Interface ISDN subscriber interface. BRI has two bearer B-channels at 64 Kbps per second and a D-channel at 16 Kbps per second. The bearer B-channels are provided for PCM voice, video conferencing, group 4 facsimile machines, and other similar types of transmissions. The data D-channel is used to bring in information about incoming calls and take out information about outgoing calls. BRI can also be used to access slow-speed data networks such as videotex and packet switched networks. BRI has two standards: U Interface for 2-wire T Interface for 4-wire

Abbreviations	Definition
CRC	<p>Cyclic Redundancy Check</p> <p>CRC is a common method to establish that the data is correctly received in data communications. This process checks the integrity of a data block. A CRC character is generated at the transmission end. Its value depends on the hexadecimal value of the number of ones in the data block. The transmitting device calculates the value and appends it to the data block. The receiving end makes a similar calculation and compares its results with the added character. If there is a difference, the recipient requests retransmission.</p>
DN	<p>Directory Number</p> <p>Unique number (phone number) assigned to each telephone or data terminal.</p>
ISDN	<p>Integrated Services Digital Network</p> <p>An international plan to migrate the public switched network to the universal implementation of standard digital technology.</p>
LSA	<p>Line Synchronization Alarm Detection</p> <p>An FT1 trunk loses frame synchronization. Frame synchronization occurs when a given digital channel (time slot) at the receiving end is aligned with the corresponding channel (time slot) of the transmitting end as it occurs in the received signal. Usually extra bits (frame synchronization bits) are inserted at regular intervals to indicate the beginning of a frame and for use in frame synchronization.</p>
LCR	<p>Least Cost Routing</p> <p>A feature that automatically chooses the lowest cost phone line to the destination.</p>
OOF	<p>Out-of-Frame Condition</p> <p>During FT1 transmission, an Out-of-Frame error occurs when two or more of four consecutive framing bits are in error. When this condition exists for more than 2.5 seconds a Red alarm is sent by the OOF detecting unit. Equipment that receives this Red alarm responds with a Yellow alarm.</p>
OPX	<p>Off-Premise Extension</p> <p>A telephone that is located in a different office or building from the mail phone system. The OPX is connected by a dedicated telephone line. This extension has all abilities of the mail phone system.</p>

Abbreviations	Definition
PRI	<p>Primary Rate Interface</p> <p>ISDN subscriber interface. PRI has 23 bearer B-channels at 64 Kbps per second and a D-channel at 64 Kbps per second. The bearer B-channels are provided for PCM voice, video conferencing, group 4 facsimile machines, and other similar types of transmissions. The data D-channel is used to bring in information about incoming calls and take out information about outgoing calls. PRI can also be used to access slow-speed data networks such as videotex and packet switched networks.</p> <p>PRI has two standards:</p> <ul style="list-style-type: none"> U Interface for 2-wire T Interface for 4-wire
SLIP	<p>Serial Line Internet Protocol</p> <p>An Internet protocol is used to run IP over serial lines such as telephone circuits. IP is the Internet Protocol; the most important of all protocols on which the Internet is based. This protocol allows a packet to traverse multiple networks before it reaches its final destination.</p>
SMDR	<p>Station Message Detail Recording</p> <p>A feature that collects and records information on outgoing calls by station.</p>
SPID	<p>Service Profile Identifier</p> <p>ISDN service is ordered with certain parameters. The SPID is an 8- to 12-digit number that uniquely identifies the service ordered. The phone company assigns an SPID for every phone number. Each ISDN BRI line usually has two phone numbers.</p> <p>The SPID is a label identifier that points to a particular location on the telephone company central office memory that stores the details of the ISDN services ordered. This number is necessary for the operation of the ISDN phone, fax, or PC software. Without this number, ISDN services cannot be accessed.</p>
VoIP	<p>Voice over Internet Protocol</p> <p>The ability to carry normal telephone-style voice over an IP-based internet with POTS-like functionality, reliability, and voice quality.</p> <p>The Public Switched Telephone Network (PSTN) connects to the LAN IP network through a VoIP gateway. Digitized speech is transported through IP packets and can include real-time conversation or voice mail. The IP network can be public or private, and voice transport can be telephone-to-telephone, computer-to-telephone, or computer-to-computer.</p>

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ElectraElite[®] 192

SYSTEM HARDWARE MANUAL

NEC Unified Solutions, Inc.

Issue 8

(Series 9500)

