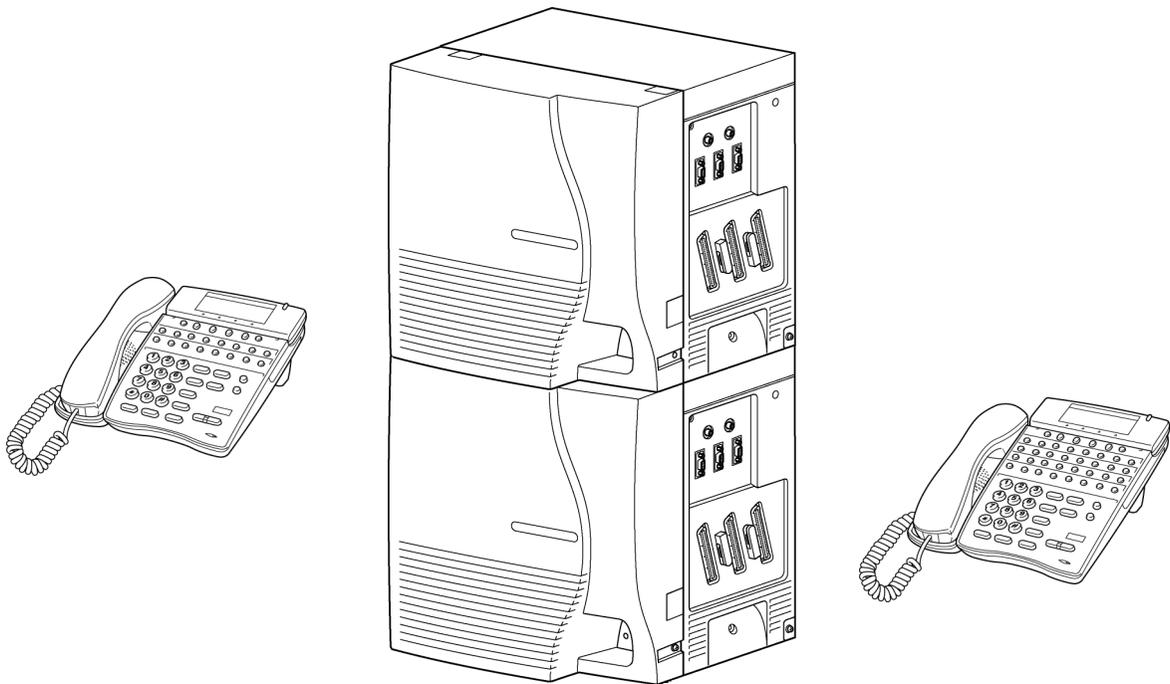# NOTICE

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NEC

Electra **Elite**®IPK

SYSTEM HARDWARE MANUAL

INT-1025 (IPK)

Document Revision 4

(Release 4000/4500)

PREFACE

GENERAL
INFORMATION   **Congratulations! You have purchased the NEC Electra Elite IPK System.**

The feature-rich Electra Elite IPK key system 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, and many others.

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

The Electra Elite IPK 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 IPK KSUs, ETUs, Multiline Terminals, and optional equipment in the following chapters.

Chapter 1 – Regulatory Information

This chapter provides important regulatory information.

Chapter 2 – Introduction

This chapter provides an overview of the Electra Elite IPK system.

Chapter 3– System Specifications

This chapter contains detailed specifications for the Electra Elite IPK system and should be carefully reviewed by the technician *before* installing the system.

Chapter 4 – Hardware Requirements

This chapter contains the hardware requirements for the Electra Elite IPK system and should be read by the technician *before* installing the system.

Chapter 5 – Installing KSUs

This chapter contains the information necessary for installing the basic and expansion KSUs. The technician should become familiar with this section **before** starting installation.

Chapter 6 – Installing ETUs (Circuit Cards)

This chapter contains instructions to install the Electronic Telephone Units (ETUs) in the Basic and Expansion KSUs.

Chapter 7 – Installing Electra Elite IPK KSU Common Optional Equipment

This chapter provides information regarding Music on Hold, Station Background Music and external paging.

Chapter 8 – Installing Electra Elite IPK Multiline Terminals

This chapter describes the Electra Elite IPK Multiline Terminals that can be used with the Electra Elite IPK system and provides installation instructions for each telephone.

Chapter 9 – Installing Electra Elite IPK Optional Terminal Equipment

This chapter contains installation instructions for Electra Elite IPK optional equipment that can be added to the system as a customer's business grows.

Chapter 10– Installing Electra Elite Multiline Terminals

This chapter describes the available Electra Elite Multiline Terminals that can be used with theElectra Elite IPK system and provides installation instructions for each telephone.

Chapter 11 – Installing Electra Elite Optional Terminal Equipment

This chapter contains installation instructions for installing Electra Elite optional equipment that can be added to the Electra Elite IPK as a customer's business grows.

Chapter 12 – Installing Single Line Telephones

This chapter describes the single line telephones that are compatible with the Electra Elite IPK system. Installation instructions are provided where necessary.

Chapter 13 – Installing Cordless and Wireless Telephones

This chapter describes the cordless and wireless telephones that are compatible with the Electra Elite IPK system and provides installation instructions where necessary.

Chapter 14 – System Maintenance

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

Appendix A – Glossary of Abbreviations

This chapter provides a list of commonly used abbreviations that are found throughout the manual.

SUPPORTING DOCUMENTS

Other manuals in the set are described below.

Electra Elite IPK Features and Specifications Manual

This manual describes each available feature for the system.

Electra Elite IPK General Description Manual

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

Electra Elite IPK Programming Manual

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

Electra Elite IPK Job Specifications Manual

This manual contains job specification worksheets. Completing the worksheets provides all system programming values and configuration information necessary for technicians to maintain the system.

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

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

Electra Elite IPK and Electra Elite System Administration Terminal Technician Manual

This manual describes the operation of the SAT Technician program for the Electra Elite IPK and Electra Elite key telephone systems. This program is a user-friendly Windows application that allows the technician to program and configure the features of the Electra Elite IPK KTS using a PC.

Electra Elite IPK Key-Common Channel Interoffice Signaling (K-CCIS) Manual

This manual provides information for installing and programming the Key-Common Channel Interoffice Signaling (K-CCIS) System.

Electra Elite IPK Wireless System Manual

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

Electra Elite IPK and Electra Elite Least Cost Routing Manual

This manual provides instructions to the service technician for programming the customer site for least cost routing for Electra Elite IPK and Electra Elite key telephone systems.

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LIST OF TABLES
CHAPTER 1

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Regulatory Information   CHAPTER 1

SECTION 1   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 IPK system, the telephone company is required to give adequate notice of the changes.

SECTION 2   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 jacks required: **RJ21X** and **RJ2GX**

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 1-1 FIC, REN, SOC, and Jack Types for Electra Elite IPK 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(10) ETU for COI/COID Mode (Loop Start)	02LS2	0.7A	9.0F	RJ21X
COIB(4)-U(10) ETU for COI Mode (Ground Start)	02GS2	0.7A	9.0F	RJ21X
COIB(4)-U(20) ETU for COID/COI Mode (Loop Start)	02LS2	0.7A	9.0F	RJ21X
COIB(8)-U( ) ETU for COI/COID Mode (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

SECTION 3   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.

SECTION 4   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 System Hardware Manual, may cause interference to radio communications. This equipment has been tested and approved for compliance with the limits for a Class B (except as noted below) 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."

✎   *When equipped with the B64-U30 KSU and P64-U20 PSU, the Electra Elite IPK can be operated as a Class B device except when using one of the ETUs in the following table. The system then becomes a Class A device that may not be used in a residential area.*

ACD(8)-U10	CMS(2)/(4)-U30	FMS(2)/(4)/(8)-U30	IPCA( )-U10
CCH(4)-U-10	EXPT(2)-U10	HUB(8)-U10	VMS(2)/(4)/(8)-U30
SPE(M)-U( )			

SECTION 5   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.

SECTION 6   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.

SECTION 7   VOICE ANNOUNCEMENT/MONITORING OVER DID LINES

CAUTION

The use of monitoring, recording or listening devices to eavesdrop, monitor, <u>retrieve</u> or record telephone conversations or other sound activities, <u>whether or not contemporaneous with its transmission</u>, may be illegal in certain circumstances under federal or state laws. Legal advise 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.

SECTION 8   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 Unified Solutions, Inc., hereby disclaims any liability arising out of the failure to obtain such a license."

SECTION 9   SERVICE REQUIREMENTS

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

SECTION 10   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.

SECTION 11   **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.

SECTION 12   BATTERY DISPOSAL

The Electra Elite IPK 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 1-2 Battery Types and Quantities for KSUs and ETUs

Unit Name	Type of Battery	Quantity
B64-U20 KSU	Lead Acid	2
CPUI( )-U( ) ETU	Nickel-Cadmium	1
CTI/VP(4)/(8)/(12)/(16)-U( ) ETU	Lithium	1
IVR(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 TEL	Nickel-Cadmium	1
DTR-4R-1/2 TEL	Nickel-Cadmium	1
DTU-4R-1 TEL	Lead Acid	1
FMS(2)/(4)/(8)-U( ) ETU	Nickel-Cadmium	1
MIFA-U10 ETU	Nickel-Cadmium	1
MIFM-U10 ETU	Nickel-Cadmium	1
VMS(2)/(4)/(8)-U( ) ETU	Lithium	1

The Electra Elite IPK CPUI( )-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-BATTERY^{SM} if further information is
required.

The packaging for the Electra Elite IPK 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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Introduction

CHAPTER 2

SECTION 1   GENERAL INFORMATION

1.1   Unique Design

The Electra Elite IPK 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 IPK system can grow with your business. You can easily and economically increase port size when necessary. Two expansion units can be added when the CPUI( )-U( ) ETU is installed in the basic cabinet. A full-blown system includes the basic and two expansion units.

Electra Elite IPK 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 II Terminal

❑ D^{term} Handset Cordless

❑ D^{term} Headset Cordless

❑   Emergency 911 – Cut Through

❑   Enhanced 911

❑   Integrated Digital Voice Mail

❏ ISDN-BRI and ISDN-PRI Voice Trunks

❏ K-CCIS Common Channel Interoffice Signaling

❏ 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

❏ Voice over Internet Protocol (VoIP)

❏ Wireless

The Electra Elite IPK 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 Elite terminals can easily connect them to the Electra Elite IPK system to provide inexpensive migration. Most Electra Elite IPK system features are available with the Electra Elite Multiline Terminals.

The Electra Elite IPK 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 2-1 System Configuration Example shows an Electra Elite IPK system with standard and optional equipment (some locally provided).

External
Speakerphone

Message
Display Board

External
Speaker

Wireless

PS II

ZT II

Least Cost Routing

Computer Telephony Integration
ElectraMail CTI (Unified Messaging)

Electra Elite Multiline Terminal (DTU)
D^{term} Series E Multiline Terminal (DTP)

Headset

Automatic Call Distribution
PC Programming

Electra Elite IPK Multiline Terminals (DTH)
D^{term} Series i Multiline Terminal (DTR)
D^{term} IPK (ITH) IP Terminals

Station Message Detail
Recording (SMDR)

Answering Machine

Facsimile

CO/PBX/Centrex/DID
/Tie/FT1/ISDN-BRI/ISDN-PRI

Single Line
Telephone

Attendant
Console

ITH IP Stations

Voice over Internet Protocol (VoIP)
Trunks/Stations

D^{term} ISDN EXTender Plus
(Telecommuting)

D^{term} Cordless Lite II

D^{term} Headset Cordless

D^{term} Handset Cordless

D^{term} Cordless Lite

D^{term} Analog Cordless

D^{term} Cordless II

Figure 2-1 System Configuration Example

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CHAPTER 3

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CHAPTER 3

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System Specifications   CHAPTER 3

SECTION 1   GENERAL INFORMATION

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

SECTION 2   SYSTEM BLOCK DIAGRAM

Figure 3-1 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 3-1 List of Abbreviations lists abbreviations used in the diagram.

Table 3-1 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 Interface with Caller ID
COM	Communication
CPU	Central Processing Unit
CTA	Computer Telephony Adapter
CTI/VP, FMS, VMS,CMS/IVR	Voice Mail

Table 3-1 List of Abbreviations (Continued)

Abbreviation	Description
DID	Direct Inward Dialing
DPH	Doorphone
DTI	Digital Trunk Interface
ECR	External Control Relay
ETU	Electronic Telephone Unit
ESI	Electronic Station Interface
FT1	Fractional T1
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( )-U10 ETU and CPUI( )-U( ) ETU
MIC	Microphone
MIFA, MIFM	Multipurpose Interface
MOH	Music On Hold
OPX	Off-Premise Extension
PBR	Push Button Receiver
PC	Personal Computer
PCM	Pulse Code Modulation
PKU	Port Key Unit
PRT	Primary Rate Trunk
PS II	Personal Station (Wireless Terminal)
SLI	Single Line Interface
SLT	Single Line Telephone

Table 3-1 List of Abbreviations (Continued)

Abbreviation	Description
SPE	Single Point of Entry
SPK	Speaker
TLI	Tie Line Interface
VM	Voice Mail
VoIP	Voice over Internet Protocol
VRS	Voice Recording Service
ZT II	Zone Transceiver

Package Control Path (HDLC)

Voice Path (PCM Highway)

Analog VM

SLI(4)(8)

COI(4)/(8) — CO Line

SLT

OPX(2)

COIB(4)/(8) — CO Line / CO Line with Caller ID

AMP/SPK Audio Relay

ECR

COID(4)/(8) — CO Line with Caller ID

DPH

DPH(4)

BSU(2) — ZTII for Wireless

MIC

HF-R

CCH(4) — K-CCIS (C Channel Handler)

Tape Recorder

AD(A)

Electra Elite IPK and D^{term} Series i Terminals

BRT(4) — ISDN BRI

Modem

AP(A)

AP(R)

PRT(1)-U( ) — ISDN PRI

PC

CT(A)

CT(U)

DID(4) — Analog DID Line

PC

CTA

CTU(S)

TLI(2) — E&M Tie Lines (4-wire)

Modem

APA

APR

Electra Elite Terminals

DTI-U( ) — T1/FT1 Lines

MIC

HFU

MIFA — COM Port (3)

Tape Recorder

ADA

MIFM | MODEM — COM Port (1 & 2)

ESI(8)
EISB(8)
ESIE(8)

SPE(M)

Electra Mail Electra Mail CTI

CNF(8) — Conference Bridge

SLT

SLT ADP

CTI/VP/IVR, FMS, VMS, CMS — Digital Voice Mail

PC

PCT(S)

ACD(8) — Elite ACD Plus

VRS(4) — Announcement/A.A.

PBR( ) — DTMF Senders/Receivers

IPCA( )-U10

HUB(8) — Optional Ethernet Interface

MG(8)-U10

IAD(8) — VoIP (Station/Trunk)

IPT(4)/(8) — VoIP (Trunk)

IP Stations

MOH

CPUI( )-U( ) ETU

D^{term} IPK (ITH)

AD(A)-2R

SPK

CLKG-U( )

Tape Recorder

IP Network (LAN)

Figure 3-1 System Block Diagram

SECTION 3   MAXIMUM SYSTEM CAPACITIES

The maximum capacities available in the Electra Elite IPK system are shown Table 3-2 Maximum System Capacities for Station Interface ETUs, Table 3-3 Maximum System Capacities for Trunk Interface ETUs and Table 3-4 Maximum System Capacities for Application Interface ETUs.

Table 3-2 Maximum System Capacities for Station Interface ETUs

Station Interface ETUs	Description	Maximum Capacities		Notes
		Basic Port Package	Expanded Port Package	
ACD(8)-U( ) ETU	8-Port ACD System	1	1	Note 1, 7, 10
CMS(2)/(4)-U( ) ETU	2- or 4-Port Digital Voice Mail System	1	1	Note 1, 3, 4, 5
CNF(8)-U( ) ETU	8-Port Conference Unit	2	2	Note 1, 8, 9
CTI(4)/(8)-U( ) ETU	4- or 8-Port Digital CTI System	1	1	Note 1, 4, 5, 10
CTI(12)/(16)-U( ) ETU	12- or 16-Port Digital CTI System	1	1	Note 1, 4, 5, 6, 10
ESI(8)-U( ) ETU	8-Port Electronic Station Interface	4	15	Note 1, 10
ESIB(8)-U( ) ETU	8-Port Electronic Station Interface	4	15	Note 1, 2, 10
ESIB(8)-U( ) ETU with ESIE(8)-U( ) ETU	16-Port Electronic Station Interface	2	7	Note 1, 2, 10
FMS(2)/(4)-U( ) ETU	2- or 4-Port Digital Voice Mail System	1	1	Note 1, 3, 4, 5
FMS(8)-U( ) ETU	8-Port Digital Voice Mail System	1	1	Note 1, 4, 5
OPX(2)-U( ) ETU	2-Port Off-Premise Extension Interface	6	22	Note 1, 3
SLI(4)-U( ) ETU	4-Port Single Line Interface	6	22	Note 1, 10
SLI(8)-U( ) ETU	8-Port Single Line Interface	3	14	Note 1, 10
SLIB(4)-U( ) ETU	4-Port Single Line Interface	6	22	Note 1, 10
SLIB(4)-U( ) ETU with SLIE(4)-U( ) ETU installed	8-Port Single Line Interface	3	14	Note 1, 10
VMS(2)/(4)-U( ) ETU	2- or 4-Port Digital Voice Mail System	1	1	Note 1, 3, 4, 5, 10
VMS(8)-U( ) ETU	8-Port Digital Voice Mail System	1	1	Note 1, 4, 5, 10

Table 3-2 Maximum System Capacities for Station Interface ETUs (Continued)

Station Interface ETUs	Description	Maximum Capacities		Notes
		Basic Port Package	Expanded Port Package	
VP(4)/(8)-U( ) ETU	4- or 8-Port Digital Voice Mail System	1	1	Note 1, 4, 5, 10
VP(12)/(16)-U( ) ETU	12- or 16-Port Digital Voice Mail System	1	1	Note 1, 4, 5, 6, 10

Note 1:   Calculating maximum capacities are based on the system having a minimum of eight Electronic Station Interface (ESI) ports and four trunk ports.

Note 2:   When seven ESIB(8)-U( ) ETUs with seven ESIE(8)-U( ) ETUs are installed, eight additional station ports are available.

Note 3:   When 2-port Station Interface ETUs are installed, the system uses four ports from its maximum port capacity.

Note 4:   Only one CMS, FMS, VMS, VMP, VP, CTI, IVR system can be installed in one Electra Elite IPK system.

Note 5:   A maximum of 32 Digital Voice Mail ports are available in Memory Block 7-2 (Telephone Type Assignment).

Note 6:   Two physical Interface Slots are used for the EliteMail VP 12/16-port system and the EliteMail CTI 12/16-port system.

Note 7:   The ACD(8)-U( ) ETU is assigned as VMS 8 in Memory Block 7-1 (Card Interface Slot Assignment), and as Digital VM in Memory Block 7-2 (Telephone Type Assignment).

Note 8:   The CNF(8)-U( ) ETU is assigned as SLI 8 in Memory Block 7-1 (Card Interface Slot Assignment), and as YS (VM) in Memory Block 4-35 (Voice Mail/SLT Selection).

Note 9:   A maximum of 16 analog Voice Mail ports are available in Memory Block 4-35 (Voice Mail/SLT Selection).

Note 10:   Refer to the KSU power-based ETU quantity limitations in Table 3-5 For Systems Without EliteMail VP/CTI or CTI ETU Loaded with Q-Master Application and Table 3-6 For Systems with EliteMail VP/CTI or CTI ETU Loaded with Q-Master Application.

Table 3-3 Maximum System Capacities for Trunk Interface ETUs

Trunk Interface ETUs	Description	Maximum Capacities		Notes
		Basic Port Package	Expanded Port Package	
BRT(4)-U( ) ETU	4-Port ISDN Interface for 8 trunks	2	8	Note 1
COI(4)-U( ) ETU	4-Port CO/PBX Line Interface	4	16	Note 1
COI(8)-U( ) ETU	8-Port CO/PBX Line Interface	2	8	Note 1
COIB(4)-U( ) ETU	4-Port (COI or COID) CO/PBX Line Interface	4	14	Note 1, 5
COIB(8)-U( ) ETU	8-Port (COI or COID) CO/PBX Line Interface	2	8	Note 1

Table 3-3 Maximum System Capacities for Trunk Interface ETUs (Continued)

Trunk Interface ETUs	Description	Maximum Capacities		Notes
		Basic Port Package	**Expanded Port Package**	
DID (4)-U( ) ETU	4-Port Direct Inward Dialing Interface	4	16	Note 1
DTI-U( ) ETU	T1/FT1 Trunk Interface	4	8	Note 1, 3, 4, 5
EXPT(2)-U ETU	T1/FT1 Trunk Interface	1	1	Note 1, 6
IPT(4)-U( ) ETU	4-Port Voice over Internet Protocol Trunk Interface	4	14	Note 1, 5
IPT(8)-U( ) ETU	8-Port Voice over Internet Protocol Trunk Interface	2	7	Note 1
PRT(1)-U( ) ETU	ISDN-Primary Rate Trunk Interface	4	8	Note 1, 3, 4, 5
TLI (2)-U( ) ETU	2-Port Tie Line Interface	4	16	Note 1, 2

Note 1:   Calculating maximum capacities are based on the system having a minimum of eight Electronic Station Interface (ESI) ports and four Trunk ports.

Note 2:   When 2-port Trunk Interface ETUs are installed, the system uses four ports from its maximum port capacity.

Note 3:   With the Basic Port Package, a maximum of four DTI-U( ) ETUs, PRT(1)-U( ) ETUs, or a combination of both can be installed. If four DTI or PRT ETUs or a combination of both are installed, up to four trunks each can be assigned.

Note 4:   With the Expanded Port Package, a maximum of eight DTI-U( ) or PRT(1)-U( ) ETUs, or a combination of both can be installed. When eight DTI or PRT ETUs or a combination of both are installed, up to eight trunks each can be assigned.

Note 5:   With the Electra Elite IPK Expanded Port Package, a maximum of 14 of the following 4-port trunk-type interface ETUs can be installed:

  ❍   COIB(4)-U( ) ETU [installed as COID(4)-U( ) ETU]

  ❍   DTI-U( ) ETU (installed as DTI4)

  ❍   IPT(4)-U( ) ETU [installed as COID(4)-U( ) ETU or DTI4]

  ❍   PRT(1)-U( ) ETU (installed as PRT4)

Note 6:   The EXPT(2)-U ETU is assigned as a DTI8 in Memory Block 7-1 (Card Interface Slot Assignment).

Table 3-4   Maximum System Capacities for Application Interface ETUs

Application Interface ETUs	Description	Maximum Capacities		Notes
		Basic Port Package	**Expanded Port Package**	
BSU(2)-U10 ETU	2-Channel - Base Station Unit for Wireless	8	8	
BSU(4M)-U20 ETU	Master 4-Base Station Unit for Wireless	1	1	Notes 6, 7

Table 3-4   Maximum System Capacities for Application Interface ETUs (Continued)

Application Interface ETUs	Description	Maximum Capacities		Notes
		Basic Port Package	Expanded Port Package	
BSU(2S)-U20 ETU	Slave 2-Base Station Unit for Wireless	2	2	Notes 6, 7
BSU(6S)-U20 ETU	Slave 6-Base Station Unit for Wireless	2	2	Notes 6, 7
CCH(4)-U( ) ETU	4-Channel - Common Channel Handler (CCH) for K-CCIS	1	1	
DPH(4)-U( ) ETU	4-Channel - Door Phone Interface Unit	1	1	
ECR-U( ) ETU	External Control Relay Unit	1	1	
HUB(8)-U( ) ETU	8-Port Switching HUB	1	1	
IAD(8)-U( ) ETU	Optional Interface Integration Device	4	8 for DTI 15 for ESI	Note 4
IVR Application	Interactive Voice Response System to Support IVR Application			Note 5
IPCA( )-U( ) ETU	Pure IP Switch	1	1	
MG(8)-U( ) ETU	8-Path Gateway from (IPCA( )-U10 ETU to CPUI( )-U( ) ETU.	1	1	Note 4
MIFA-U( ) ETU	Multiple Interface Unit for UCD/ACD	1	1	Note 1, 3
MIFM-U10 ETU	Multiple Interface Unit for Multifunction	1	1	Note 1, 2
MIFM-U20 ETU	Multiple Interface Unit for Multifunction	1	1	Note 1, 2, 5
PBR( )-U( ) ETU	4-Channel - Push Button Receiver Unit	1	1	
SPE(M)-U( ) ETU	Single Point of Entry	1	1	Note 1, 2, 5
VRS(4)-U( ) ETU	4-Channel - Voice Recording Service Unit	2	2	

Note 1:   The MIFM-U( ), MIFA-U( ), or SPE(M)-U( ) ETU must be installed in the AP slot, slot S1, or slot S2 of the first B64-U( ) KSU.

Note 2:   The MIFM-U( ) ETU/SPE(M)-U( ) ETU has an optional modem that works only when the MIFM/SPE(M) ETU is installed in slot S1 or slot S2 of the first B64-U( ) KSU.

Note 3:   The MIFA-U( ) ETU (with KMA(1.0)U installed) has an ACD-MIS output that works only when the MIFA-U( ) ETU is installed in the AP slot. When ACD-MIS and remote SAT PC programming are required, install the ACD-MIS in the AP slot and the MIFM-U( ) ETU in slot S1 or slot S2 of the first B64-U( ) KSU.

Note 4:   **R1500 or higher** is required.**R3000/3500** is required.

Note 5:   **R3000/3500** is required.

Note 6:   **R4000/4500** only.

Note 7:   A maximum of one BSU(M) Master and two BSU(2S)/(6S) Slave ETUs can be installed

SECTION 4   KSU POWER-BASED ETU QUANTITY LIMITATIONS

Refer to Table 3-5 For Systems Without EliteMail VP/CTI or CTI ETU Loaded with Q-Master Application, and Table 3-6 For Systems with EliteMail VP/CTI or CTI ETU Loaded with Q-Master Application.

Table 3-5   For Systems Without EliteMail VP/CTI or CTI ETU Loaded with Q-Master Application

Number of ESI(8) ETUs ✴	Number of ESI Ports	Either EliteMail VP or CTI	Maximum NO. of ACD+/CMS/FMS/VMS/ VMP/IPC/MG/IVR/IPT/ IAD/SLI/OPX/BSU(4M)/ BSU(2S)/BSU(6S) or DID ETUs	Other ETUs
10	80	0	2	No Limitation
9	72	0	2	No Limitation
8	64	0	3	No Limitation
7	56	0	4	No Limitation
6	48	0	5	No Limitation
5	40	0	5	No Limitation
4	32	0	6	No Limitation
3	24	0	6	No Limitation
2	16	0	7	No Limitation
1	8	0	7	No Limitation

✴   The number of 8-port ETUs installed Including ESI(8)-U( ) ETU, ESIB(8)-U( ) ETU, or ESIE(8)-U( ) ETU.

✎   When the SPE(M)-U( ) ETU or MIFM-U20 with Ethernet option is installed in the AP slot, the HUB or EliteMail CTI/VP must be installed in a different cabinet.

✎   Only one CTI ETU can be installed in a KSU (EliteMail, VP, or Q-Master).

Table 3-6   For Systems with EliteMail VP/CTI or CTI ETU Loaded with Q-Master Application

Number of ESI(8) ETUs ✱	Number of ESI Ports	Either EliteMail VP or CTI	Maximum NO. of ACD+/CMS/FMS/VMS/ VMP/IPC/MG/IVR/IPT/ IAD/SLI/OPX/BSU(4M)/ BSU(2S)/BSU(6S) or DID ETUs	Other ETUs
9	72	1	0	No Limitation
8	64	1	0	No Limitation
7	56	1	1	No Limitation
6	48	1	2	No Limitation
5	40	1	2	No Limitation
4	32	1	3	No Limitation
3	24	1	4	No Limitation
2	16	1	4	No Limitation
1	8	1	5	No Limitation

✱   The number of 8-port ETUs installed Including ESI(8)-U( ) ETU, ESIB(8)-U( ) ETU, or ESIE(8)-U( ) ETU.

✎   When the SPE(M)-U( ) ETU or MIFM-U20 with Ethernet option is installed in the AP slot, the HUB or EliteMail CTI/VP must be installed in a different cabinet.

✎   Only one CTI ETU can be installed in a KSU (EliteMail, VP, or Q-Master).

SECTION 5   SYSTEM REQUIREMENTS AND SPECIFICATIONS

5.1   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 3-7 Electra Elite IPK/D^{term} Series i Multiline Terminal Loop Resistance and Cable Length, Table 3-8 Electra Elite/D^{term} Series E Multiline Terminal Loop Resistance and Cable Length, Table 3-9 Cable Connection Between the Analog Port and the Single Line Equipment, Table 3-10 Cabling Requirements, and Table 3-11 Zone Transceiver II Range.

Table 3-7 Electra Elite IPK/D^{term} Series i Multiline Terminal Loop Resistance and Cable Length

Terminal or Adapter	Maximum Loop Resistance (Without AC Adapter) (Ohms)	By Twisted 1-Pair (Without AC Adapter) 24 AWG	By Twisted 2-Pair (Without AC Adapter) 24 AWG	Maximum Loop Resistance (With AC Adapter) (Ohms)	By Twisted 1-Pair (With AC Adapter) 24 AWG	By Twisted 2-Pair (With AC Adapter) 24 AWG
DTH-8-1 TEL DTR-8-1 TEL	37	700	1400	107	2000	2000
DTH-8D-1 TEL DTR-8D-1 TEL ITH-8D-2 TEL	37	700	1400	107	2000	2000
DTH-16-1 TEL DTR-16-1 TEL	35	660	1320	107	2000	2000
DTH-16D-1 TEL DTR-16D-1 TEL ITH-16D-2 TEL	35	660	1320	107	2000	2000
DTH-32-1 TEL DTR-32-1 TEL	26	500	1000	107	2000	2000
DTH-16LD-1 TEL	37	700	1400	107	2000	2000
DCR-60-1 cONSOLE ✶	–	–	–	107	2000	2000

✶ AC Adapter is required.

Table 3-8 Electra Elite/D^{term} Series E Multiline Terminal Loop Resistance and Cable Length

Terminal or Adapter	Maximum Loop Resistance (Ohms)	Maximum Feet by Twisted 1-Pair Cable 24 AWG	Maximum Feet by Twisted 2-Pair Cable 24 AWG
DBM(B)-U( ) Box	N/A	900	900
DCU-60-1 CONSOLE ✶	N/A	1000	1000
DTU-8-1 TEL DTP-8-1 TEL	35	600	1000
DTU-8D-2 TEL DTP-8D-1 TEL	35	600	1000

Table 3-8   Electra Elite/D^{term} Series E Multiline Terminal Loop Resistance and Cable Length

Terminal or Adapter	Maximum Loop Resistance (Ohms)	Maximum Feet by Twisted 1-Pair Cable 24 AWG	Maximum Feet by Twisted 2-Pair Cable 24 AWG
DTU-16-1 TEL DTP-16-1 TEL	26	450	900
DTU-16D-2 TEL DTP-16D-1 TEL	26	450	900
DTP-16HC-1 TEL∗	57	1083	
DTU-32-1 TEL DTP-32-1 TEL	21	360	720
DTU-32D-2 TEL DTP-32D-1 TEL	21	360	720
DTR-2DT-1 TEL	35	600	1000
DTR-4D-1 TEL	37	700	1400
DTR-4R-1/2 TEL	N/A	650	1000
DTH-4R-1/2 TEL	N/A	650	1000
SLT(1)-U( ) ADP∗∗	35	600	1000
DP-D-1	20	410	820

∗   An AC Adapter is required for the DTP-16HC-1 TEL or 60-button Attendant Console DCU-60-1.

∗∗   The length for the specified SLT Adapter is the length between the SLT Adapter and the ESI.
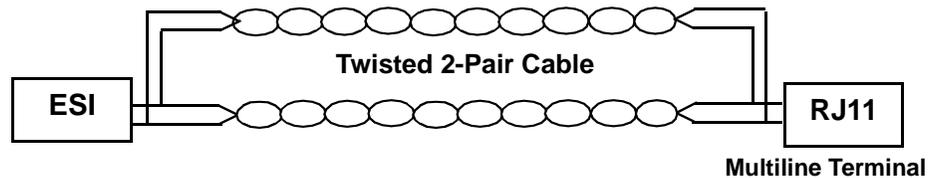
Figure 3-2 Connecting the ESI Using Twisted 2-Pair Cable

Table 3-9   Cable Connection Between the Analog Port and the Single Line Equipment

Connected Equipment	Cable	Maximum Distance or Impedance Between Equipment and Telephone
AD(A)-R/AD(A)-2R 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
SLIB(4)/SLIE(4)-U10 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 3-10 Cabling Requirements

Connected Equipment	Cable
External Amplifier	Hi-Fi Shielded Audio Cable
Music on Hold and Background Music Sources	Hi-Fi Shielded Audio Cable
ITH Cabling	Cat 5 Straight Data Network cable 100 meters maximum distance

Table 3-11 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

5.2   Cabling Precautions

5.2.1   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.

5.2.2   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

5.3   Power Requirements

5.3.1   Power Supply Inputs

AC input requirements for the system are listed below.

AC Input (P64-U( ) PSU)

❍   117 Vac ± 10%

❍   60 Hz ± 10%

❍   Single Phase

❍   7.5A circuit

❍   A dedicated outlet, separately fused and grounded

5.3.2   Power Supply Consumption

The power consumption for the Electra Elite IPK system is listed in Table 3-12 Power Consumption.

Table 3-12 Power Consumption

KSU	Maximum RMS Current	Watts Used (Idle)	Watts Used (Maximum)
Basic KSU – B64-U( ) 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

When replacing fuses, refer to the specifications in Table 3-13 Fuse Replacement.

Table 3-13 Fuse Replacement

Unit	Fuse Number	Specifications	Description	Dimensions
P64-U( ) PSU	F1	125V, 6.0A	AC Input	1/4" x 1 1/4"
P64-U( ) 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.

5.4   Outside Line Types

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

❑   2-wire, Loop Start or Ground Start Trunks

❑   2-wire, 2-way DID Lines (Dial Pulse or DTMF)

❑   4-wire, E&M Tie Lines (Type I or V, Dial Pulse, or DTMF)

❑   Digital Trunk T1/FT1 (Loop Start, Ground Start, Tie Line (E&M), or DID Signaling)

❑   ISDN-BRI Trunks

❑   ISDN-PRI Trunks

❑   VoIP Trunks (Internet Protocols)

Refer to Table 1-1 FIC, REN, SOC, and Jack Types for Electra Elite IPK 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.

5.5   Transmission, Network, and Control Specifications

5.5.1   Transmission

❍   Data Length:

From Multiline Terminal to ESI(8)-U( ) ETU: 23 bits

From ESI(8)-U( ) ETU to Multiline Terminal: 23 bits

❍   Data Transmission Rates:

Between ESI(8)-U( ) ETU and Multiline Terminal: 184K bps (voice and signaling)

❍   Scanning Time for each Multiline Terminal: 32 ms.

5.5.2   Network

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

❍   TDM Switching: PCM (µ Law)

❍   TDM Clock: 2.048 MHz

❍   TDM Data Bus: 8 bit

❍   TDM Timeframe: 125 µs.

5.5.3   Control

This section indicates the speed or capacity.

❍   Control: Stored program with distributed processing

❍   Central Processor: 32-bit microprocessor

❍   Clock: 25 MHz

❍   Interface ETU: 8-bit or 16-bit microprocessor

❍   Optional ETUs: 16- or 32-bit microprocessor

❍   Multiline Terminal (TDM):   8-bit microprocessor

❍   Multiline Terminal (IP):   32-bit microprocessor

❍   IP Adapter: 32-bit microprocessor

❍   Attendant Console: 4-bit microprocessor

❍   SLT Adapter: 4-bit microprocessor

5.5.4   Electra Elite IPK Terminals and Equipment

The voltage, current, ring signal information for the Electra Elite IPK
Multiline Terminals, Single Line Telephone equipment, and AP(A)-R/
AP(R)-R Units 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

❍   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

5.5.5   Series i Terminals

The voltage and current information for the D^{term} Series i Multiline Terminals 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.

❍   Voltage, current, and ring signal information for Single Line Telephone equipment, AP(A)-R Unit, and AP(R)-R Unit are the same as those listed in the previous paragraph.

5.6   Dialing Specifications

5.6.1   Dial Pulse Address Signaling

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

❍   Pulse Rate: 10 ± 0.5 pps/20 ± 1.0 pps

❍   Percent Break: 60 ± 1.5%

❍   Interdigit Interval: 0 pps/20 pps 500 ms. ~ 800 ms.

5.6.2   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 IPK system, the following DTMF specifications are used.

❍   Frequencies

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

❍   Frequency Deviation: Less than ±1.0%

❍   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

❍   Rise Time: Within 5 ms.

❍   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**
697	1	2	3
770	4	5	6
852	7	8	9
941	✱	0	#

Nominal **Low** Group Frequencies (Hz)

5.7   Battery Backup

The Electra Elite IPK system has battery backup functions for system backup and for memory backup.

5.7.1   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.

5.7.2   Memory Backup

The CPUI( )-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.

5.8   Weights and Dimensions

Table 3-14 Weights and Dimensions indicates the shipping weight, height, width, and depth of each Electra Elite IPK KSU, ETU, Multiline Terminal, or adapter.

Table 3-14 Weights and Dimensions

Unit	Shipping Weight*	Height	Width	Depth
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)
AC-R Unit	5.6 oz (158 g)	3.61" (92 mm)	6.87" (175 mm)	4.2" (107 mm)
AD(A)-R Unit	4.0 oz (113 g)	2.25" (56.25 mm)	2.75" (68.75 mm)	5.5" (137.5 mm)
AD(A)-2R Unit	4.0 oz (113 g)	2.25" (56.25 mm)	2.75" (68.75 mm)	5.5" (137.5 mm)
ADA-U Unit	4.0 oz (113 g)	2.25" (56.25 mm)	2.75" (68.75 mm)	5.5" (137.5 mm)
AP(A)-R Unit	5.6 oz (158 g)	2.25" (56.25 mm)	2.75" (68.75 mm)	5.5" (137.5 mm)
AP(R)-R Unit	5.6 oz (158 g)	2.25" (56.25 mm)	2.75" (68.75 mm)	5.5" (137.5 mm)
APA-U Unit	4.3 oz (122 g)	2.4" (60 mm)	2.3" (59 mm)	4.8" (121 mm)
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)
BSU(4M)-U20 ETU	14.8 oz (419 g)	1.97" (50mm)	8.27" (210 mm)	11,47" (290 mm)

Table 3-14 Weights and Dimensions

Unit	Shipping Weight*	Height	Width	Depth
BSU(2S)-U20 ETU	13.4 oz (381 g)	1.97" (50mm)	8.27" (210 mm)	11,47" (290 mm)
BSU(6S)-U20 ETU	15 oz (423 g)	1.97" (50mm)	8.27" (210 mm)	11,47" (290 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)
CMS/FMS/VMS-U30 ( ) 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)-U( ) ETU	14.4 oz (408 g)	1.97" (50 mm)	9.45" (240 mm)	7.68" (195 mm)
COIB(8)-U( ) ETU	16.6 oz (471 g)	1.97" (50 mm)	9.45" (240 mm)	7.68" (195 mm)
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	16.6 oz (471 g)	1.97" (50 mm)	9.45" (240 mm)	7.68" (195 mm)
CPUI( )-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" (68.75 mm)	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)
CT(U)-R Unit	8.4 oz (239 g)	2.25" (56.25 mm)	2.75" (68.75 mm)	5.5" (137 mm)
DBM(B)-U( ) Box	74.4 oz (2109 g)	2.75" (70 mm)	13.5" (343 mm)	9.75" (248 mm)

Table 3-14 Weights and Dimensions

Unit	Shipping Weight*	Height	Width	Depth
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" (107 mm)	12.8" (326 mm)	7.14" (182 mm)
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-16D-1 TEL DTR-16D-1 TEL	43.5 oz (1233 g)	4.78" (122 mm)	10.2" (260 mm)	9.8" (250 mm)
DTH-8-1 TEL DTR-8-1 TEL	41.0 oz (1163 g)	4.78" (122 mm)	10.2" (260 mm)	9.8" (250 mm)
DTH-8D-1 TEL DTR-8D-1 TEL	43.5 oz (1233 g)	4.78" (122 mm)	10.2" (260 mm)	9.8" (250 mm)
DTH-32D-1 TEL DTR-32D-1 TEL	48 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)
DTI-U40 ETU	5.99 oz (170 g)	1.89" (48 mm)	11.47" (290 mm)	8.46" (214 mm)
DTP-1-1 TEL DTP-1-2 TEL DTP-1HM-1 TEL DTP-1HM-2 TEL	26.8 oz (760 g)	2.36" (60 mm)	6.22" (158 mm)	8.81" (224 mm)
DTU-16-1 TEL DTP-16-1 TEL	41 oz (1162 g)	4.8" (123 mm)	7.8" (197 mm)	9.3" (235 mm)
DTU-16D-2 TEL DTP-16D-1 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-2DT-1 TEL	41 oz (1163 g)	4.8" (123 mm)	7.8" (197 mm	9.3" (235 mm)
DTU-32-1 TEL DTP-32-1 TEL	46 oz (1304 g)	4.8" (123 mm)	8.7" (220 mm)	9.3" (235 mm)
DTU-32D-2 TEL DTP-32D-1 TEL	48 oz (1361 g)	4.8" (123 mm)	8.7" (220 mm)	9.3" (235 mm)

Table 3-14 Weights and Dimensions

Unit	Shipping Weight*	Height	Width	Depth
DTU-8-1 TEL DTP-8-1 TEL	41.0 oz (1163 g)	4.8" (123 mm)	7.8" (197 mm)	9.3" (235 mm)
DTU-8D-2 TEL DTP-8D-1 TEL	43.5 oz (1233 g)	4.8" (123 mm)	7.8" (197 mm)	9.3" (235 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)
DTR-1R-1 TEL	14.4oz (408 g)	4.5" (114 mm)	6.1" (153 mm)	8.62" (218 mm)
DTR-2DT-1 TEL	41 oz (1163 g)	2.47" (100 mm)	7.65" (195 mm)	9.54" (243 mm)
DTR-4D-1 TEL	44 oz (1250 g)	5.98" (152 g)	8.54" (217 g)	9.65" (245 mm)
DTR-4R-1 TEL	15.4 oz (437 g)	2.25" (57 mm)	4.25" (108 mm)	7.5" (191 mm)
DTU-4R-1 TEL	15.4 oz (437 g)	2.25" (57 mm)	4.25" (108 mm)	7.5" (191 mm)
D16(LD)-R ADM	27 oz (770 g)	4.33" (110 mm)	10.24" (260 mm)	7.09" (180 mm)
ECR-U( ) ETU	21.2 oz (344 g)	1.97" (50 mm)	9.45" (240 mm)	7.68" (195 mm)
ESI(8)-U( ) ETU	14.5 oz (411 g)	1.97" (50 mm)	9.45" (240 mm)	7.68" (195 mm)
ESIB(8)-U( ) ETU	11.1 oz (315 g)	1.97" (50 mm)	9.45" (240 mm)	7.68" (195 mm)
ESIE(8)-U( ) ETU	9.9 oz (280 g)	1.97" (50 mm)	9.45" (240 mm)	7.68" (195 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	102.4 oz** (2903 g)	1.89" (48 mm)	11.47" (290 mm)	8.46" (214 mm)
HF-R Unit	9.9 oz (280 g)	2.9' (74 mm)	4.2' (106 mm)	5.6' (141 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" (22 mm)
IPT(4)-U( ) ETU	32 oz (907 g)	5.0" (127 mm)	10" (254 mm)	10" (254 mm)

Table 3-14 Weights and Dimensions

Unit	Shipping Weight*	Height	Width	Depth
IPT(8)-U( ) ETU	32 oz (907 g)	5.0" (127 mm)	10" (254 mm)	10" (254 mm)
ITH-8D-2/3 TEL	50.92 oz (1445 g)	9.84" (250 mm)	10.31" (262 mm)	4.76" (121 mm)
ITH-16D-2/3 TEL	50.92 oz (1445 g)	9.84" (250 mm)	10.31" (262 mm)	4.76" (121 mm)
IVR Application VMP(4)/(8)-U( ) ETU with IVR HDD	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-U( ) Unit	320 0z (9072 g)	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)
SLI(8)-U( ) ETU	14.1 oz (400 g)	1.97" (50 mm)	9.45" (240 mm)	7.68" (195 mm)
SLIB(4)-U10 ETU	13.0 oz (370 g)	1.97" (50 mm)	9.45" (240 mm)	7.68" (195 mm)
SLIE(4)-U10 ETU	10.7 oz (303 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)
SPE(M)-U( ) ETU	12.3 oz (349 g)	10.5" (268.7 mm)	8.5" (220.6 mm)	1.75" (44.8 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	102.4 oz** (2903 g)	1.89" (48 mm)	11.47" (290 mm)	8.46" (214 mm)
VMP(2)/(4)/(8)-U( ) ETU	102.4 oz** (2903 g)	1.89" (48 mm)	11.47" (290 mm)	8.46" (214 mm)

Table 3-14 Weights and Dimensions

Unit	Shipping Weight*	Height	Width	Depth
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)

*   Shipping weight includes the shipping carton.
** Shipping weight includes the shipping carton and documentation.
*** Includes cable for connection of two KSUs.

5.9   External Equipment Interface

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

5.9.1   Music on Hold/Station Background Music

- ❍   Auxiliary Input: 0.6V PPS Signal Level
- ❍   Input Impedance: 600 Ω

5.9.2   Music for Station BGM using Analog CO Trunk ETU (COI, COIB, or COID)

- ❍   Auxiliary input: 0.6 V PPS Signal Level
- ❍   Input Impedance: 600 Ω

5.9.3   External Paging (Audio)

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

5.9.4   External Tone Ringer/Night Chime Output

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

5.9.5   SMDR Output

- ❍   Female Connector (System Output):
       Standard DB-9 (straight)

5.9.6   PC Connection

- ❍   Female Connector (System Input/Output):
       Standard DB-9 (straight)

5.9.7   ACD/MIS Connector

- ❍   Female Connector (System Output):
       Standard DB-9 (straight)

5.9.8   Relay Contact

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

5.10   Audible and Visual Indications

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

5.10.1   Tone Patterns

Tones are used in the Electra Elite IPK systems to inform the station user of various system functions such as, dial tone, busy tone, or ringback tone. Table 3-15 Tone Patterns lists the frequency and the pattern for these tones.

5.10.2   LED Flash Patterns

The Electra Elite IPK system has 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 3-16 Multiline Terminal LED Flash Patterns.

Table 3-15   Tone Patterns

System Tone (Fixed)	Frequency (Hz) (Fixed)	Intermit (Default)	Cycle
Busy Tone	480/620	60 IPM	0.5 sec / 0.5 sec
Call Waiting Tone	440	60 IPM	0.5 sec / 0.5 sec
Second Dial Tone	350/440	120 IPM	0.25 sec / 0.25 sec
Howler Tone	2400 Modulation (16 Hz)	Continuous	
Internal Dial Tone	350/440	Continuous	
Internal Ringback Tone	440/480	1 sec On 2 sec Off	1 sec / 2 sec
LCR Dial Tone	440	Continuous	
Reorder Tone	480/620	120 IPM	0.25 sec / 0.25 sec
Service Set Tone	440	Continuous	
Special Dial Tone	440	240 IPM	0.125 sec / 0.125 sec
Tone Burst 1 Tone	440	Continuous	1 sec
Tone Burst 2 Tone	620	Continuous	1 sec
Tie/DID Ringback Tone	440/480	2 sec On 4 sec Off	2 sec / 4 sec
Camp-On Tone Call Alert Notification Attendant Tone Override	440	Continuous	0.7 sec
DIT Alert Tone	480/620	Continuous	0.5 sec
Call Forward Alert Tone Call Forward Configuration Tone	350/440	120 IPM	0.25 sec ON x 2~3 bursts
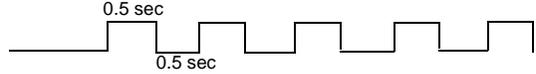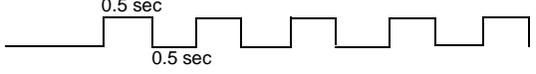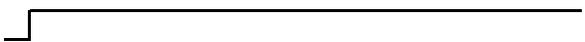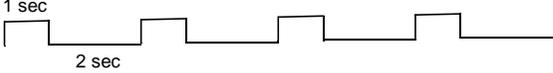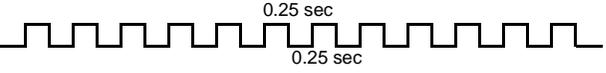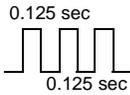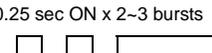
Table 3-16   Multiline Terminal LED Flash Patterns

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

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0        0.5       1.0       1.5       2.0 sec.
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Hardware Requirements CHAPTER 4

SECTION 1 **GENERAL INFORMATION**

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

SECTION 2 **PROGRAMMING STATIONS**

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

SECTION 3 **ATTENDANT STATIONS**

Any Multiline Terminal with display can be programmed as an Attendant position in the Electra Elite IPK system. An Attendant Position can have up to four DCR-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 IPK system.

SECTION 4 **PROGRAMMING FROM A PC**

Electra Elite IPK 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 IPK system. The PC must be a Pentium PC or higher and have Windows 95 or higher to be compatible with the System Administration Terminal (SAT) Technician or end-user.

SECTION 5   PROGRAMMING FROM A MULTILINE TERMINAL

Programming can be accomplished using Electra Elite IPK or Electra Elite Multiline Terminals equipped with an 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.

- ◇ DTH-8D-1( ) TEL
- ◇ DTH-16D-1( ) TEL
- ◇ DTH-16LD-1( ) TEL
- ◇ DTH-32D-1( ) TEL
- ◇ DTR-8D-1( ) TEL
- ◇ DTR-16D-1( ) TEL
- ◇ DTR-32D-1( ) TEL
- ◇ DTP-8D-1 TEL

- ◇ DTU-8D-2 TEL
- ◇ DTP-16D-1 TEL
- ◇ DTU-16D-2 TEL
- ◇ DTP-32D-1 TEL
- ◇ DTU-32D-2 TEL
- ◇ ITH-8D-2 TEL
- ◇ ITH-16D-2 TEL

SECTION 6   ELECTRA ELITE IPK REMOTE PC PROGRAMMING

The Electra Elite IPK 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:

❑   External Modem
MIFM-U( ) ETU
MIFM Dongel (provided with ETU 0)
Analog Extension or Analog trunk
SPE (M)-U10 ETU

❑   Internal Modem
MIFM-U( ) ETU installed in Slot S1 or S2 in the first cabinet
Available Trunk in the system
SPE (M)-U10 ETU

❑   LAN Programming
MIFM-U( ) ETU
Available Network
SPE (M)-U10 ETU

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 IPK 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-2DT-1 TEL DTR-2DT-1 TEL	2-line digital Multiline Terminal without LCD
DTU-8-1 TEL DTP-8-1 TEL DTH-8-1 TEL DTR-8-1 TEL	8-line digital Multiline Terminal without LCD
DTP-8D-1 TEL DTH-8D-1 TEL DTR-8D-1 TEL DTU-8D-2 TEL ITH-8D-2 TEL	8-line digital Multiline Terminal with LCD and softkeys
DTP-16-1 TEL DTU-16-1 TEL DTH-16-1 TEL	16-line digital Multiline Terminal without LCD
DTP-16D-1 TEL DTH-16D-1 TEL DTR-16D-1 TEL DTU-16D-2 TEL ITH-16D-2 TEL	16-line digital Multiline Terminal with LCD and softkeys
DTH-16LD-1 TEL	16-line digital Multiline Terminal with three LCDs (one for telephone information and two areas for recording line key information)
DTP-16HC-1 TEL	16-line digital Multiline Terminal with LCD, softkeys and a cordless handset

Equipment	Description
DTP-32-1 TEL DTU-32-1 TEL	32-line digital Multiline Terminal without LCD
DTP-32D-1 TEL DTH-32D-1 TEL DTR-32D-1 TEL DTU-32D-2 TEL	32-line digital Multiline Terminal with LCD and softkeys
DTR-1-1 TEL	Single Line Telephone with Message Waiting Indicator and data port
DTR-1(HM)-1 TEL	Single Line Telephone with Message Waiting Indicator and data port, eight programmable speed dial buttons, and Hold and Monitor keys
DTR-1R-1 TEL	D^{term} Multiline Cordless Telephone without LCD
DTR-4R-1/2 TEL	D^{term} Multiline Cordless Telephone with LCD
DTH-4R-1/2TEL	D^{term} Multiline Cordless Telephone with LCD
SLT(1)-U( ) ADP	Single Line Telephone interface Adapter

7.2 Interface ETUs

The slots in the Electra Elite IPK KSU are flexible except for the CPU/EXP and AP slots in the first cabinet. The CPU/EXP slot is reserved for the CPUI( )-U( ) ETU, and the AP slot is reserved for the MIFA-U( ), MIFM-U10/20 ETU, or SPE(M)-U( ) ETU. Figure 4-1 Interface Slot and System Port Numbers for an Electra Elite IPK System shows the slot and port numbers.

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

The SPE(M)-U( ) ETU must be installed in slot S1 or S2 for the MOD-U10 Unit to work. It can be installed in the AP slot when the optional modem unit is not used.

The MIFM-U10 ETU, with KMM(1.0)U installed for LCR and Caller ID scrolling and dialing to work, must be installed in the AP, S1, or S2 slot. When the Modem Kit Unit is installed, this ETU must be placed in the S1, or S2 slot.

The MIFM-U20 ETU, with KMM-U20 installed for LCR and Caller ID scrolling and dialing to work, must be installed in the AP, S1, or S2 slot. When the MOD-U10 Unit is installed, this ETU must be placed in the S1, or S2 slot.

Basic and Expansion KSUs for CPUI( )-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)		8	16	24	32	40	48	56	64
	AP	7	15	23	31	39	47	55	63
		6	14	22	30	38	46	54	62
	BUS	5	13	21	29	37	45	53	61
		4	12	20	28	36	44	52	60
	SLOT	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 4-1 Interface Slot and System Port Numbers for an Electra Elite IPK System

7.2.1   Determining Telephone and CO Port Numbers

Telephone and CO Ports numbers are provided with the Electra Elite IPK 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 4-2 Telephone and CO Port Numbering Example.

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

CO Ports 1 ~ 16	Telephone Ports 1 ~ 16	CO Ports 17 ~ 20 (See Note)	CO Ports 21 ~ 28	Telephone Ports 17 ~ 24	CO Ports 29~32	Telephone Ports 25~32	Open
S1	S2	S3	S4	S5	S6	S7	S8

✎   The TLI(2)-U( ) ETU has two E&M Tie lines, however, four of the system CO ports are used.

Figure 4-2 Telephone and CO Port Numbering Example

7.2.2   Determining the Number of Required Interface ETUs

Table 4-1 Number of Required Interface ETUs lists each feature and the associated hardware necessary for the operation of the feature.

Table 4-1 Number of Required Interface ETUs

Feature	Required ETU	Required Feature Key	Maximum ETUs per System
ANI/Caller ID[Note 1]	MIFM-U10 MIFM-U20 SPE(M)-U10 ETU	KMM(1.0)U KMM-U20	1
Automatic Call Distribution	MIFA-U( ) ETU	KMA(1.0)U	1
ACD Plus Automatic Call Distribution	MIFM-U( ) ETU SPE(M)-U( ) ETU	None	(Note 2)
Least Cost Routing	MIFM-U10 ETU MIFM-U20 ETU SPE(M)-U( ) ETU	KMM(1.0)U KMM-U20	1
PC Programming	MIFM-U( ) ETU SPE(M)-U( ) ETU	None	1
SMDR	MIFM-U( ) ETU SPE(M)-U( ) ETU	None	1
Uniform Call Distribution	MIFA-U( ) ETU	None	1
Wireless Service Console (WSC)	MIFM-U( ) ETU SPE(M)-U( ) ETU	None	1 [Note 2]

Note 1:   The Caller ID feature works without the MIFM-U( ) ETU. However, the Caller ID scrolling and dialing both require the MIFM-U10 ETU with KMM( )U installed, the MIFM-U20 ETU with KMM-U20 installed, or the SPE(M)-U( ) ETU.

Note 2: An MIFM-U( ) ETU or SPE(M)-U( ) ETU is required during installation and servicing.

7.2.3   PBR Requirements

The Electra Elite IPK system has four built-in Push Button Receiver (PBR) circuits on the CPUI( )-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 DAP feature. The system Auto Attendant feature and DAP feature must use the CPUI( )-U( ) ETU PBR circuits.

DTMF signals can also be detected from a CO trunk using the DAP feature. The system Auto Attendant feature and DAP feature must use the CPUI( )-U( ) ETU PBR circuits.

An optional PBR(4)-U( ) ETU that provides an additional four circuits can be installed. The number of PBR(4)-U( ) ETUs needed depends on the number of Single Line Telephones, facsimile machines, modems, and analog voice mail ports needed. Automated Attendant and ADP trunks connected to the system must also be considered.

✎   When the optional PBR(4)-U( ) ETU is installed, these PBR circuits can be used only for SLI ports connected to the system.

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CHAPTER 5

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CHAPTER 5

Installing KSUs

SECTION 1   **GENERAL INFORMATION**

This chapter contains information to help the technician install the KSUs for the Electra Elite IPK 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 reduce the time spent installing at the customer site and reduce downtime.

2.3 Selecting the Best Location for Proper Installation

2.3.1   Selecting the KSU Installation Site

When selecting an installation site for the KSU, consider the following conditions to ensure proper installation.

❍   KSUs are normally wall mounted to protect against accident or flooding.

❍   The KSU should not be located directly beneath pipes. Leaks or condensation could damage the Electra Elite IPK system equipment.

❍   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.

❍   The operating ambient temperature and humidity must be within the limits specified in 5.2.2 Environmental Conditions in Chapter 3 System Specifications.

❍   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.

❍   Locate the KSU at a site where a dedicated AC power source can be easily accessed.

❍   Connect the KSU 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.

❍   Limited space is available but must be used.

❍   The available space may pose one or more environmental hazards.

❍   The proposed location has limitations such as insufficient lighting or the lack of a suitable ground for the KSUs.

❍   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 being selected for telephone installation, consider the following conditions to ensure proper installation.

❍   Ensure that the cable length and line resistance (loop), between the KSU and the telephones, comply with the specifications listed in Table 3-7 Electra Elite IPK/D^{term} Series i Multiline Terminal Loop Resistance and Cable Length on page 3-11 and Table 3-8 Electra Elite/D^{term} Series E Multiline Terminal Loop Resistance and Cable Length on page 3-11.

❍   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) has 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 5-1 Typical Full MDF Layout.
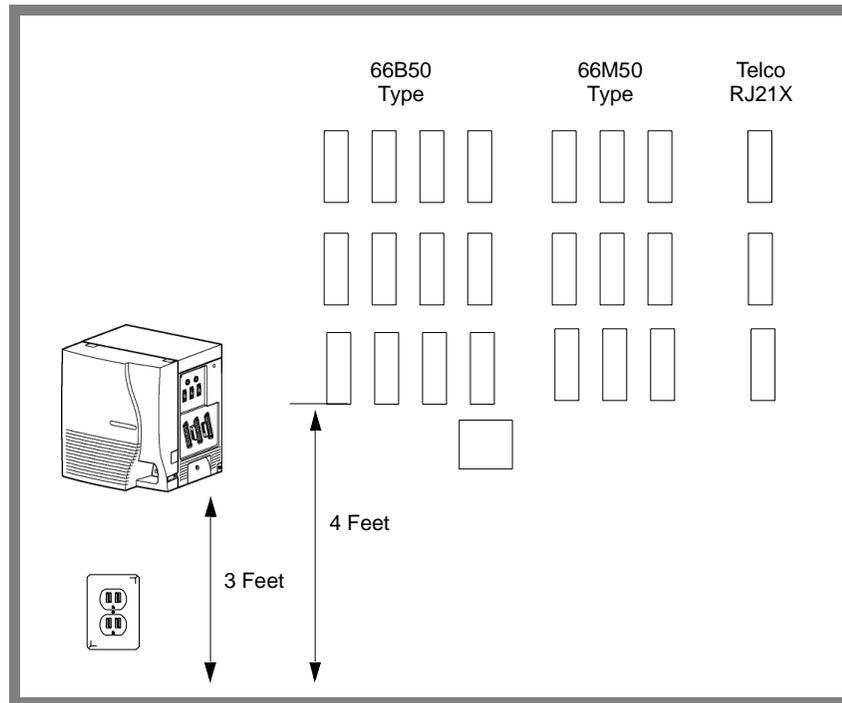
Figure 5-1 Typical Full MDF Layout

The Electra Elite IPK 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 5-1 MDF Cable Connections provides the necessary cabling information.

Table 5-1 MDF Cable Connections

MDF Pin N0.	Running Cable	Station Cable DTH	ESI	SLI (8)	SLI (4)	OPX	COI/ COIB/ COID (8)	COI/ COIB/ COID (4)	DID	TLI	DTI/ PRT	BRT	ECR	DPH	BSU
							First ETU								
26	WH–BL	GN	T	T	T	T	T	T	T	GND	TA	TA-1	EP Zone 3	DP 1	ZT II 1
1	BL–WH	RD	R	R	R	R	R	R	R	—	TB	TB-1			
27	WH–OR	GN	T	T	T	T	T	T	T	E-1	RA	RA-1	EP Zone 2	DP 2	
2	OR–WH	RD	R	R	R	R	R	R	R	M-1	RB	RB-1			
28	WH–GN	GN	T	T	T	—	T	T	T	T-1	—	TA-2	EP Zone 1	DP 3	ZT II 2
3	GN–WH	RD	R	R	R	—	R	R	R	R-1	—	TB-2			
29	WH–BR	GN	T	T	T	—	T	T	T	T1-1	—	RA-2	Night Chime	DP 4	
4	BR–WH	RD	R	R	R	—	R	R	R	R1-1	—	RB-2			
30	WH–SL	GN	T	T	—	—	T	—	—	GND	—	TA-3	External Tone Ringer 4	DLR 1	
5	SL–WH	RD	R	R	—	—	R	—	—	—	—	TB-3			
31	RD—BL	GN	T	T	—	—	T	—	—	E-2	—	RA-3	External Tone Ringer 3	DLR 2	
6	BL–RD	RD	R	R	—	—	R	—	—	M-2	—	RB-3			
32	RD-OR	GN	T	T	—	—	T	—	—	T-2	—	TA-4	External Tone Ringer 2	DLR 3	
7	OR–RD	RD	R	R	—	—	R	—	—	R-2	—	TB-4			
33	RD–GN	GN	T	T	—	—	T	Fax Brnch	—	T1-2	—	RA-4	External Tone Ringer 1	DLR 4	
8	GN–RD	RD	R	R	—	—	R		—	R1-2	—	RB-4			
							Second ETU								
34	RD–BR	GN	T	T	T	T	T	T	T	GND	TA	TA-1	EP Zone 3	DP 1	ZT II 1
9	BR–RD	RD	R	R	R	R	R	R	R	—	TB	TB-1			
35	RD–SL	GN	T	T	T	T	T	T	T	E-1	RA	RA-1	EP Zone 2	DP 2	
10	SL–RD	RD	R	R	R	R	R	R	R	M-1	RB	RB-1			
36	BK–BL	GN	T	T	T	—	T	T	T	T-1	—	TA-2	EP Zone 1	DP 3	ZT II 2
11	BL–BK	RD	R	R	R	—	R	R	R	R-1	—	TB-2			
37	BK–OR	GN	T	T	T	—	T	T	T	T1-1	—	RA-2	Night Chime	DP 4	
12	OR–BK	RD	R	R	R	—	R	R	R	R1-1	—	RB-2			
38	BK–GN	GN	T	T	—	—	T	—	—	GND	—	TA-3	External Tone Ringer 4	DLR 1	
13	GN–BK	RD	R	R	—	—	R	—	—	—	—	TB-3			
39	BK–BR	GN	T	T	—	—	T	—	—	E-2	—	RA-3	External Tone Ringer 3	DLR 2	
14	BR–BK	RD	R	R	—	—	R	—	—	M-2	—	RB-3			
40	BK–SL	GN	T	T	—	—	T	—	—	T-2	—	TA-4	External Tone Ringer 2	DLR 3	
15	SL–BK	RD	R	R	—	—	R	—	—	R-2	—	TB-4			
41	YL–BL	GN	T	T	—	—	T	Fax Brnch	—	T1-2	—	RA-4	External Tone Ringer 1	DLR 4	
16	BL–YL	RD	R	R	—	—	R		—	R1-2	—	RB-4			

Table 5-1 MDF Cable Connections (Continued)

MDF Pin N0.	Running Cable	Station Cable DTH	ESI	SLI (8)	SLI (4)	OPX	COI/ COIB/ COID (8)	COI/ COIB/ COID (4)	DID	TLI	DTI/ PRT	BRT	ECR	DPH	BSU
							Third ETU								
42	YL–OR	GN	T	T	T	T	T	T	T	GND	TA	TA-1	EP Zone 3	DP 1	ZT II
17	OR–YL	RD	R	R	R	R	R	R	R	—	TB	TB-1			1
43	YL–GN	GN	T	T	T	T	T	T	T	E-1	RA	RA-1	EP Zone 2	DP 2	
18	GN–YL	RD	R	R	R	R	R	R	R	M-1	RB	RB-1			
44	YL–BR	GN	T	T	T	—	T	T	T	T-1	—	TA-2	EP Zone 1	DP 3	ZT II
19	BR–YL	RD	R	R	R	—	R	R	R	R-1	—	TB-2			2
45	YL–SL	GN	T	T	T	—	T	T	T	T1-1	—	RA-2	Night Chime	DP 4	
20	SL–YL	RD	R	R	R	—	R	R	R	R1-1	—	RB-2			
46	VI–BL	GN	T	T	—	—	T	—	—	GND	—	TA-3	External Tone Ringer 4	DLR 1	
21	BL–VI	RD	R	R	—	—	R	—	—	—	—	TB-3			
47	VI–OR	GN	T	T	—	—	T	—	—	E-2	—	RA-3	External Tone Ringer 3	DLR 2	
22	OR–VI	RD	R	R	—	—	R	—	—	M-2	—	RB-3			
48	VI–GN	GN	T	T	—	—	T	—	—	T-2	—	TA-4	External Tone Ringer 2	DLR 3	
23	GN–VI	RD	R	R	—	—	R	—	—	R-2	—	TB-4			
49	VI–BR	GN	T	T	—	—	T	Fax	—	T1-2	—	RA-4	External Tone Ringer 1	DLR 4	
24	BR–VI	RD	R	R	—	—	R	Branch	—	R1-2	—	RB-4			
50	—	—	—	—	—	—	—	—	—	—	—	—			
25	—	—	—	—	—	—	—	—	—	—	—	—			

➢   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.

MDF Pin Number	PFT Connection	
42	PFT1 – CO (Tip)	
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)	Power Failure Transfer Relay 1 (Amp 3 Connections Only)
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 5-2 Power Failure Transfer Connections is a relay diagram. The relay is shown with the power ON.

✎   There are three PFT Circuits for each B64-U( ) KTU.
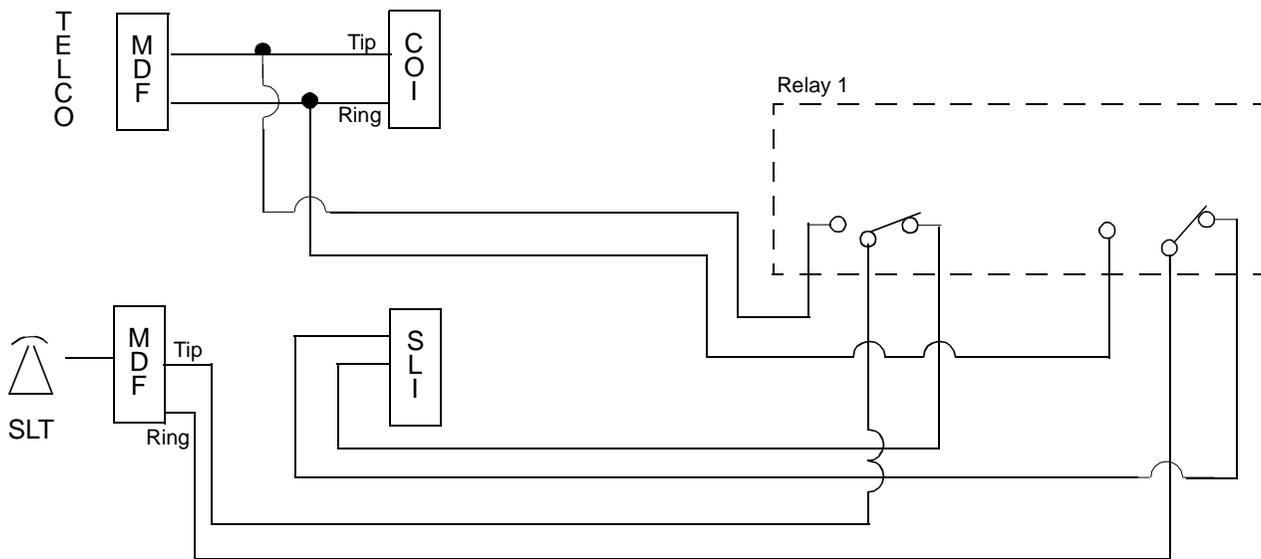
Figure 5-2 Power Failure Transfer Connections

2.6   Fax CO Branch Connection

This connection is made via the fourth port on any four port analog ETU (COI, COIB, or COID). Refer to Figure 5-3 Fax CO Branch Connection. The facsimile machine is connected to the eighth port for the specified slot where the Analog CO ETU is installed.
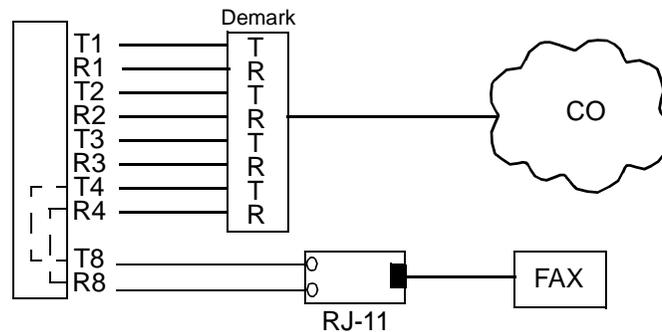
Figure 5-3 Fax CO Branch Connection

SECTION 3   INSTALLING BASIC AND EXPANSION KSUS

The compact design of the Electra Elite IPK 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-U( ) KSU provides service for outside lines, Attendant Consoles, and interconnection of the station terminals. The B64-U( ) KSU has two fixed and eight flexible slots. The first fixed slot is reserved for the CPUI( )-U( ) ETU in the basic KSU or for the EXP-U( ) ETU in expansion KSUs. The second fixed slot is for the MIFA-U( ) ETU, MIFM-U( ) ETU, or SPE(M)-U( ) ETU.

The P64-U10 PSU (power supply unit), backup batteries, and three PFT relays are included with each KSU.

3.1.2   Expansion KSUs

The B64-U( ) KSU is also used as the expansion unit that can be attached to the basic KSU to provide additional ports. Two expansion units can be added to the Electra Elite IPK system. Each expansion KSU provides eight flexible slots and accommodates 8-, 16-, or 24-channel interface cards. The P64-U10 PSU (power supply unit), backup batteries, and three PFT relays are included with each KSU.

The installation instructions provided in this chapter apply to the basic B64-U( ) KSU and the expansion B64-U( ) 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 the screw from the unit.

2.   To remove the front panel, slide it to the right and pull.
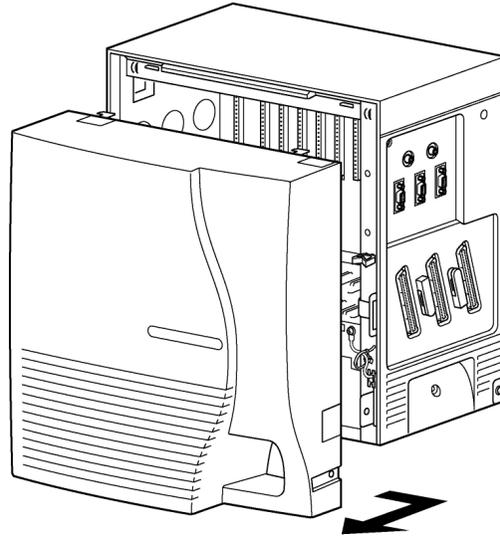
Figure 5-4 Removing the Front Panel of the KSU

3.3   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.   When one or two amphenol cables are attached to the KSU, the velcro
strap can be threaded around the cable and through the hooks to secure
the cables.
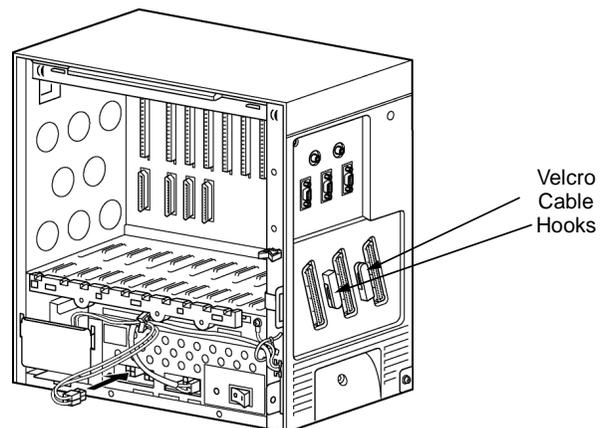
Velcro
Cable
Hooks

Figure 5-5 Threading the Velcro Strap to Secure Amphenol Cables

2.   When all three amphenol cables are used, the velcro strap is threaded
      around the cables, instead of through the hooks, and attached to the
      KSU.
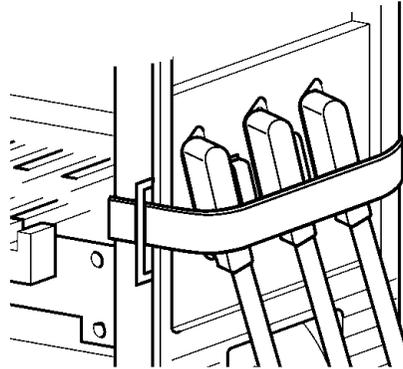
**Figure 5-6 Threading the Velcro Strap to Secure Three Amphenol
Cables**

3.4   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 5-7
      Attaching the Wall Mount Bracket.
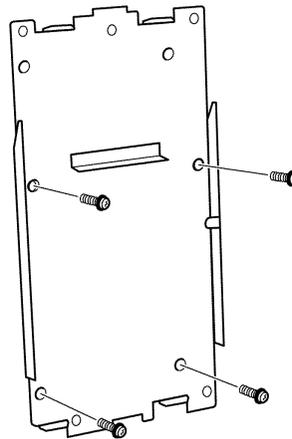
Figure 5-7 Attaching the Wall Mount Bracket

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 5-8 Attaching the Wall Mount Bracket with Spacer.

✎   All wall and rack mounted KSUs must have the Spacer Bracket added to the Wall Mount Bracket.
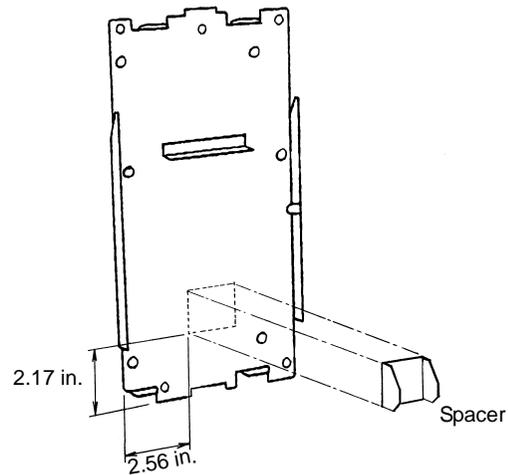
Figure 5-8 Attaching the Wall Mount Bracket with Spacer

3.   Hang the KSU on the two hooks protruding from the wall mount bracket as shown in Figure 5-9 Hanging the Basic KSU on the Bracket.
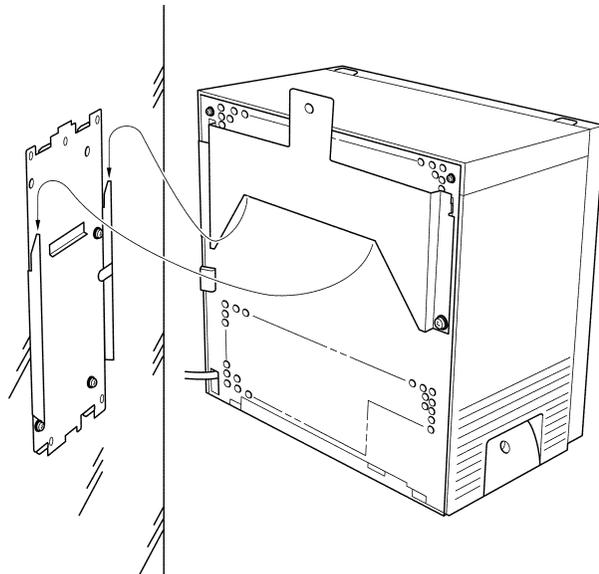
Figure 5-9 Hanging the Basic KSU on the Bracket

4.   Secure the KSU to the wall by placing a locally provided screw and washer in the hole in the center of the wall mount bracket as shown in Figure 5-10 Securing the Basic KSU to the Wall.
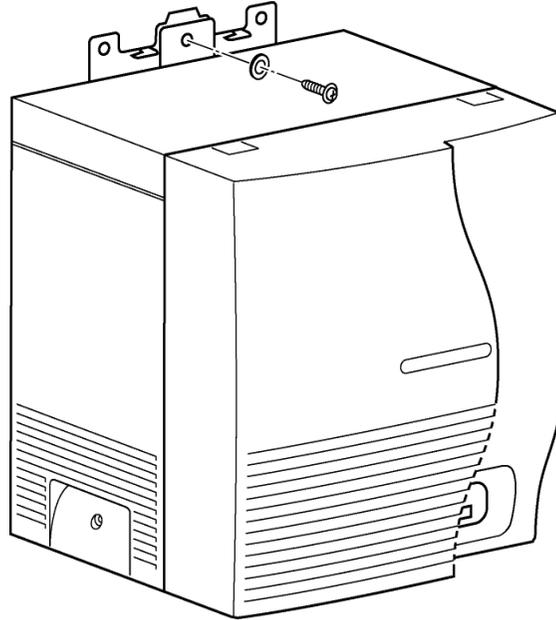
Figure 5-10 Securing the Basic KSU to the Wall

3.5   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 5-11 Attaching the Expansion Wall Mount Bracket to the Basic Wall Mount Bracket.
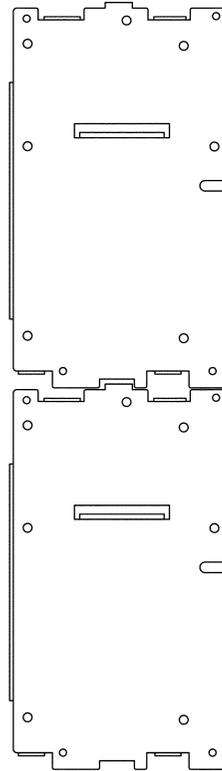
Figure 5-11   Attaching the Expansion Wall Mount Bracket to the Basic Wall Mount Bracket

2.   Hang the KSU on the two hooks protruding from the expansion wall mount bracket as shown in Figure 5-9 Hanging the Basic KSU on the Bracket.

3.   To secure the KSU to the wall, install a locally provided screw in the hole in the center of the wall mount bracket as shown in Figure 5-10 Securing the Basic KSU to the Wall on page 5-14.

3.6   Rack Mounting the Basic KSU

The RAK-U( ) Unit is a 19 inch unit used to simplify installation by rack mounting the Electra Elite IPK system.

1.   Mount the RAK-U( ) Unit to the equipment rack using the six provided screws. Refer to Figure 5-12 RAK-U( ) Unit and KSU. Use three screws on the right side (at 1, 2, and 3) and three screws on the left side.
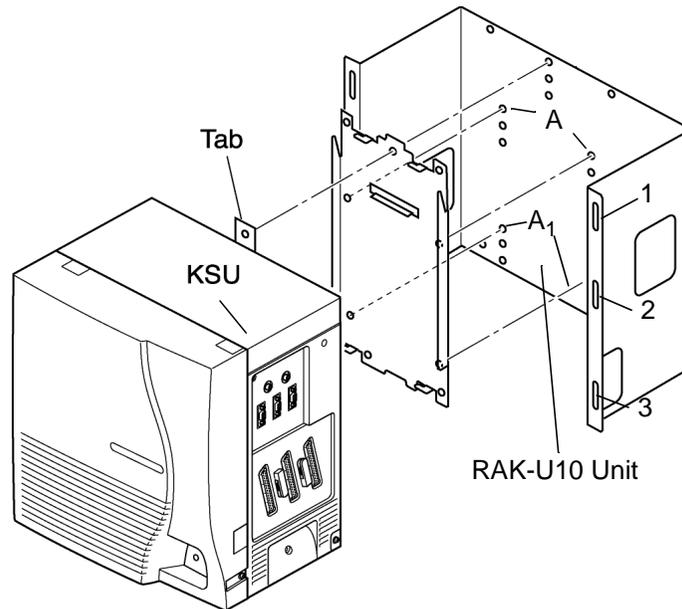
Figure 5-12 RAK-U( ) Unit and KSU

2.   Mount the Wall Mount Bracket onto the RAK-U( ) Unit using the four provided screws. Install two screws in the upper holes (at **A**) and two screws in the lower holes (at **A$_1$**).

3.   After the bracket is mounted to the RAK-U( ) Unit, hang the KSU on the two hooks protruding from the Wall Mount Bracket, as shown in Figure 5-13 Hanging the KSU on the Bracket.
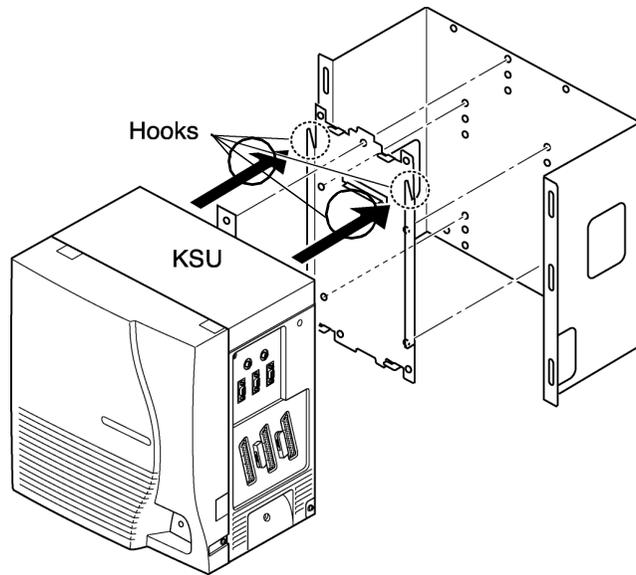
Figure 5-13 Hanging the KSU on the Bracket

4.   Secure the KSU to the RAK-U( ) Unit by installing a provided screw into
        the KSU tab and bracket hole **A₂**. Refer to Figure 5-14 Securing the KSU
        to the RAK-U( ) Unit.
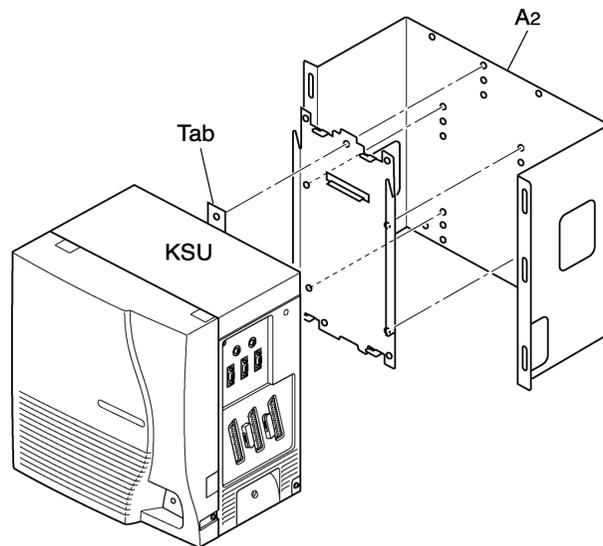
Figure 5-14 Securing the KSU to the RAK-U( ) Unit

3.7   Rack Mounting the Expansion KSU

1.   Refer to Figure 5-15 Location for Rack Mounting the KSUs, for the proper location of rack mounting the Basic KSU and the Expansion KSUs.
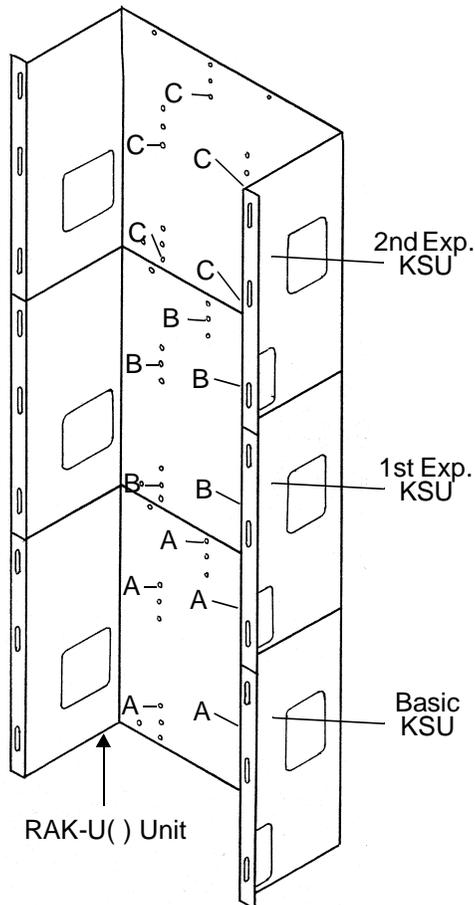
Figure 5-15 Location for Rack Mounting the KSUs

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**.

3.8   Floor Mounting the Basic KSU

Only the B64-U( ) 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 5-16 Floor Mounting the Basic KSU.
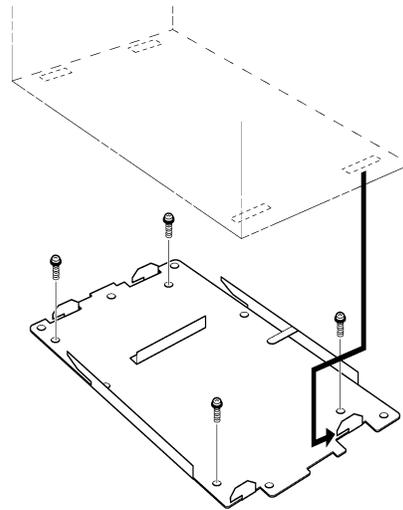
Figure 5-16 Floor Mounting the Basic KSU

3.   To secure the KSU to the floor mounting bracket, install the two screws as indicated in Figure 5-17 Securing the KSU to the Floor Mounting Bracket.
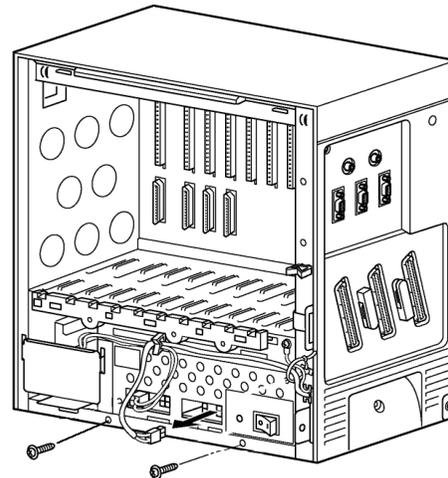
Figure 5-17 Securing the KSU to the Floor Mounting Bracket

3.9 Cable Routing

3.9.1 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.
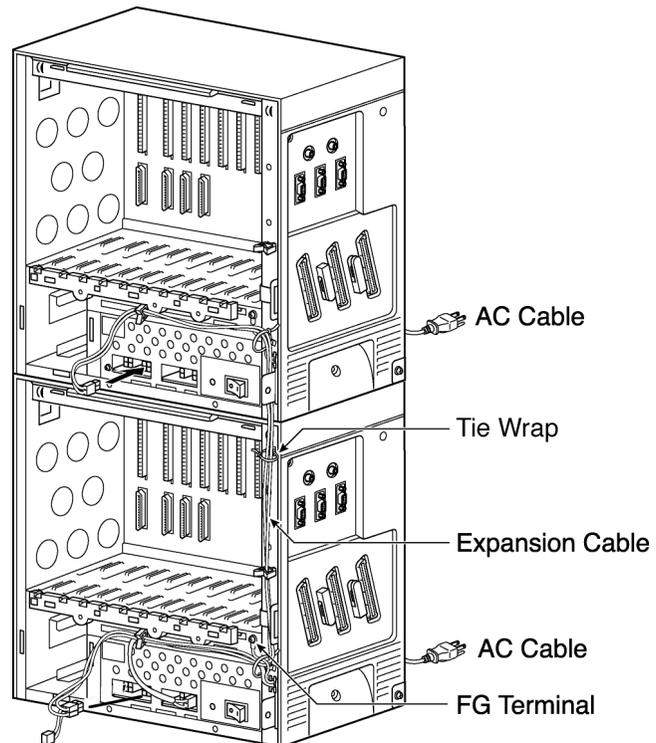
Figure 5-18 Connecting DC Expansion Cables

2. To connect an Expansion KSU, use the two screws to attach the FG plate to the Basic and Expansion KSUs. Refer to Figure 5-19 Attaching the Frame Ground Plate. (When installing a second Expansion KSU, another FG plate is required.)
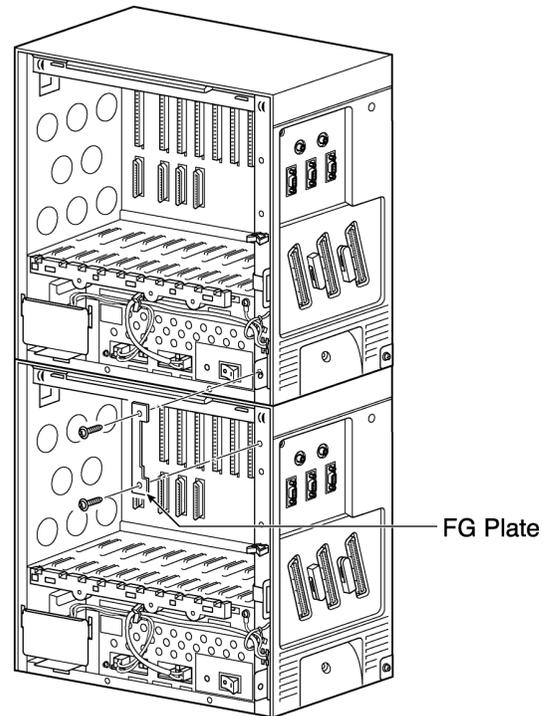
Figure 5-19 Attaching the Frame Ground Plate

3.9.2   Grounding Requirements

The KSUs must be properly grounded. The Electra Elite IPK 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.*
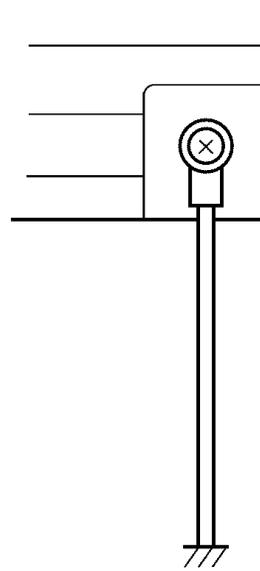
Figure 5-20 KSU Grounding

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.

3.10   Replacing the Power Supply Unit in the KSU

The Electra Elite IPK system has a P64-U( ) 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.

The Power Supply Unit is included with the B64-U( ) KSU.

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

3.10.1   Connecting the Power Supply Unit to the Basic KSU

1.   Connect the 8-wire cable from the PSU to the connector on the
backplane of the KSU.
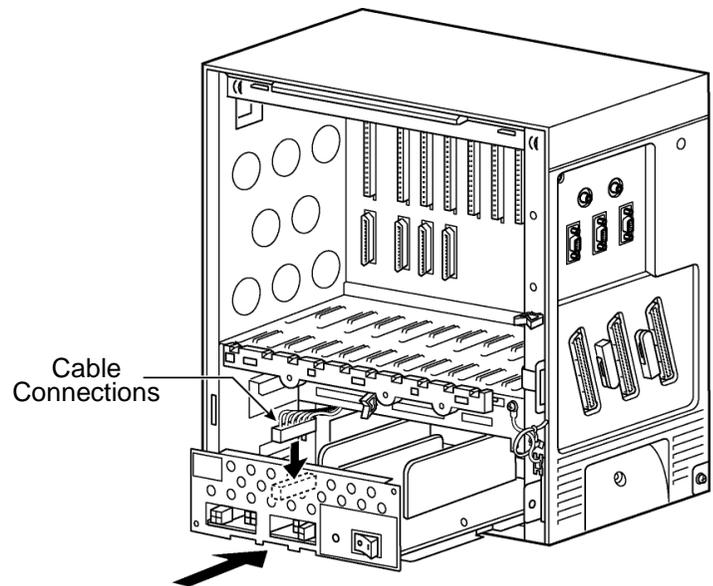
Cable
Connections

Figure 5-21 Connecting Wires to the PSU

2.   Install the P64-U( ) PSU into the bottom space of the KSU and
attach to the KSU using the two provided screws.
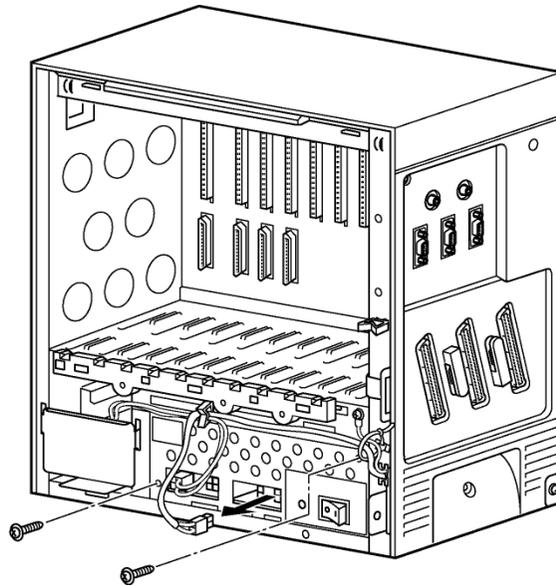
Figure 5-22 Mounting the PSU onto the KSU

3.   Lead the KSU power cable through the clamp and connect the PSU as shown in Figure 5-23 Connecting the PSU Power Cable to the Basic KSU.

Clamp

FG Terminal

Tie Wrap
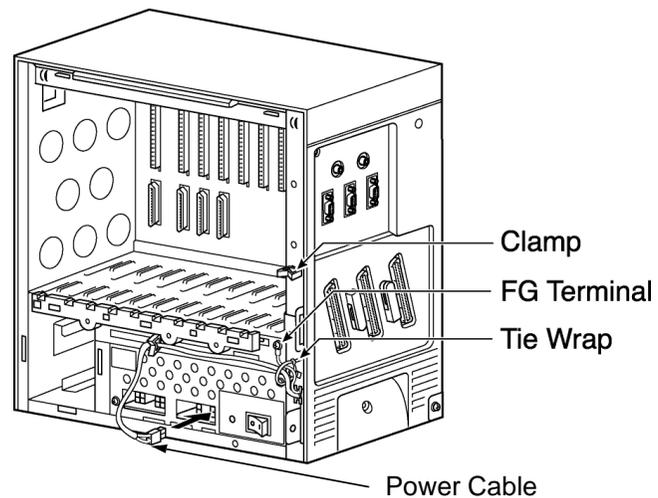
Power Cable

Figure 5-23 Connecting the PSU Power Cable to the Basic KSU

3.10.2   Connecting Battery Expansion Cables to the Expansion KSU

1.   Lead the Battery Expansion Cables (included with the
      EXP-U( ) ETU) through the clamps and tie them to the KSU
      with a tie wrap on the expansion KSU.
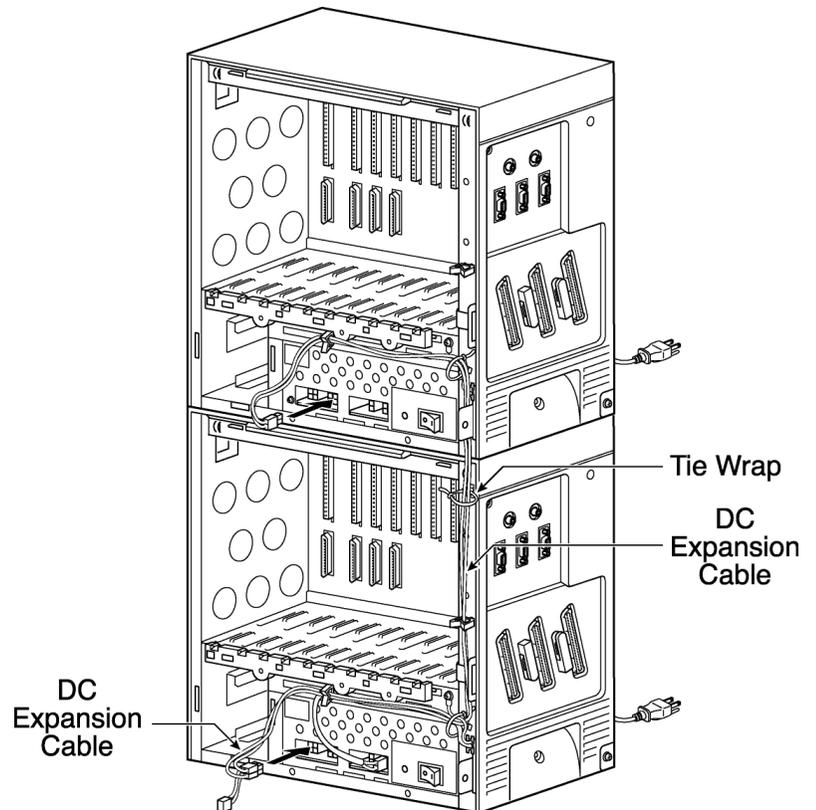
**Figure 5-24   Connecting Battery Expansion Cables to the
Expansion KSU**

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.

3.10.3   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 5-4 Removing the Front Panel of the KSU.)

2.   Pull out the drawer that holds the PSU and disconnect the cable as shown in Figure 5-25 Removing the PSU from the KSU.

Cable
Connections
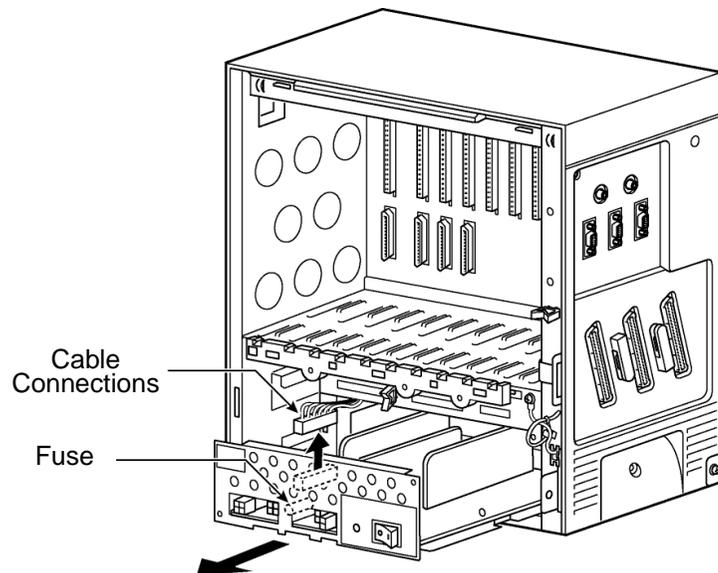
Fuse

Figure 5-25 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.

F101 (DC In)   F1 (AC In)
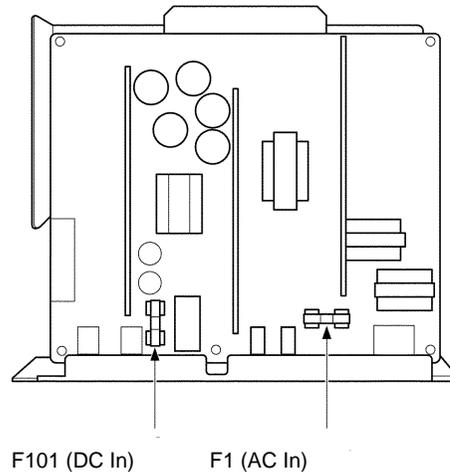
Figure 5-26 PSU Fuse Replacement

3.11   Installing Built-In and External Batteries in the KSU

3.11.1   Built-In Battery Installation

1.   Connect the two batteries in series as shown in Figure 5-27 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.
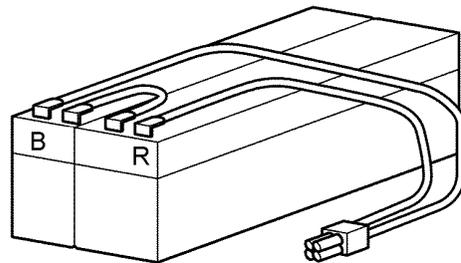
Figure 5-27 Connecting Built-In Batteries

2.   Install the batteries into the bottom space at the left side the KSU. Refer to Figure 5-28 Placing the Batteries into the KSU.

3.   Install the battery cover as illustrated in Figure 5-28 Placing the Batteries into the KSU.
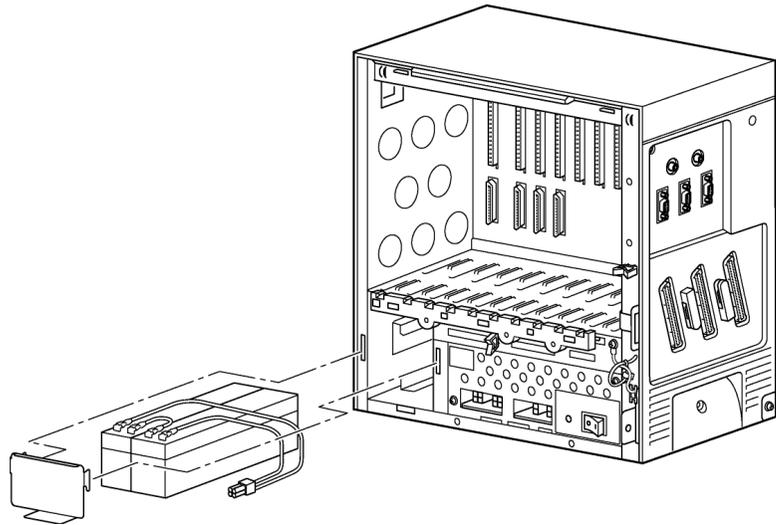
Figure 5-28 Placing the Batteries into the KSU

4.   Connect the cable to the **BATTERY INT** connector of the PSU as shown in Figure 5-29 Connecting the Batteries to the Power Supply Unit.
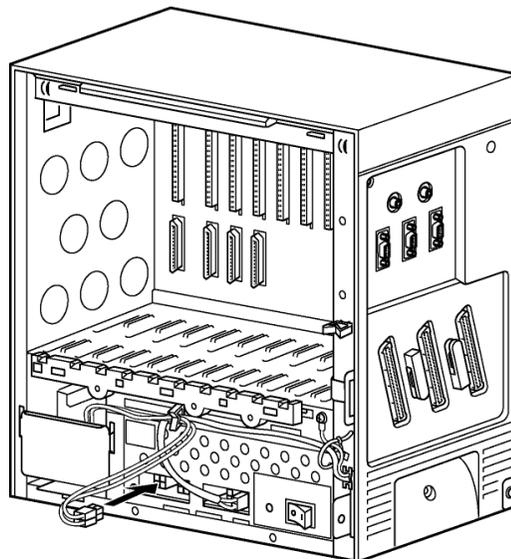
Figure 5-29 Connecting the Batteries to the Power Supply Unit

3.11.2   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 INT 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.*

3.11.2.1 Basic KSU

1.   Connect cabling to the external batteries as shown in .
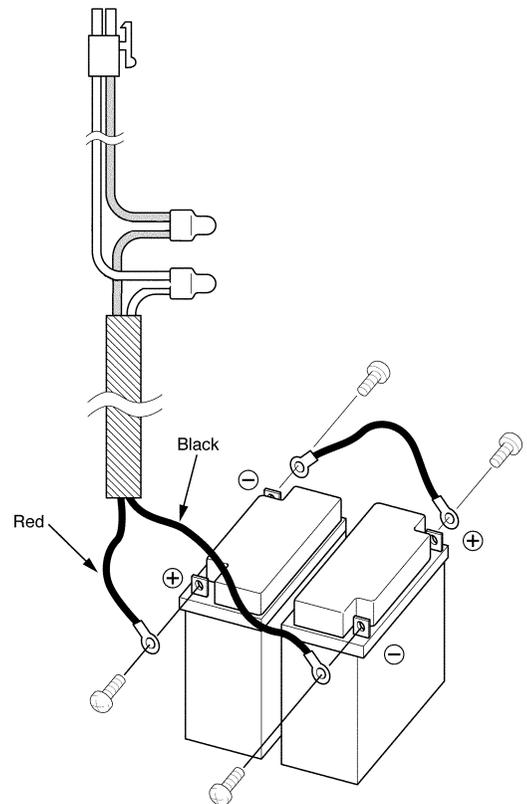
Figure 5-30   Connecting Cables for External Batteries in the Basic KSU

2.   Connect the external batteries to the KSU in the location shown in Figure 5-31 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.
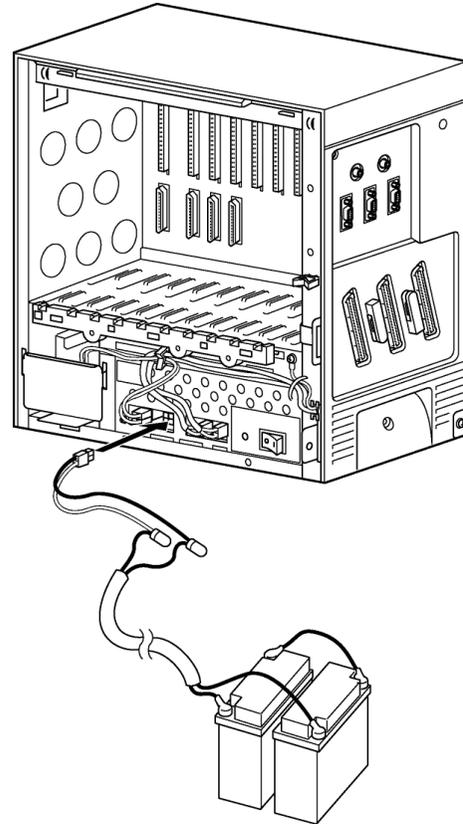
Figure 5-31   Connecting the External Battery to the Basic KSU

3.   Route the cables through the clamps on the KSU as shown in Figure 5-32 Threading the Cables through the Clamps on the Basic KSU.
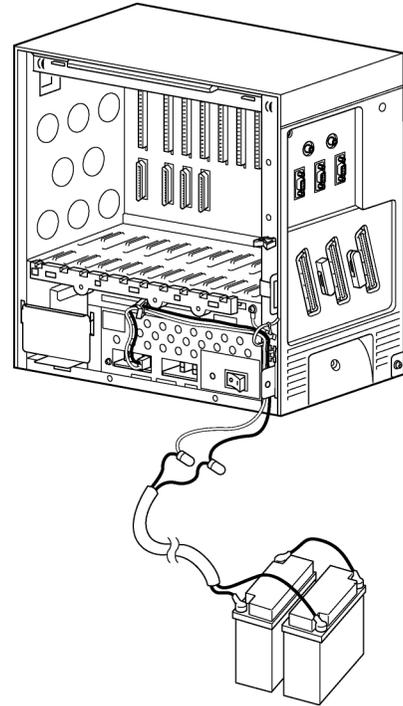
**Figure 5-32   Threading the Cables through the
                     Clamps on the Basic KSU**

4.   Before putting the cover on the Basic KSU, remove
      the knockout (indicated by the arrow). Refer to
      Figure 5-33 Removing the Knockout on the Cover of
      the Basic KSU.
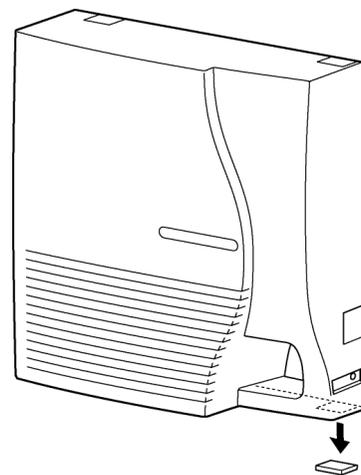
**Figure 5-33   Removing the Knockout on the
                     Cover of the Basic KSU**

5. Lead the battery cables through the knockout and secure the front cover on the Basic KSU. Refer to Figure 5-34 Leading the Battery Cables out of the Basic KSU.
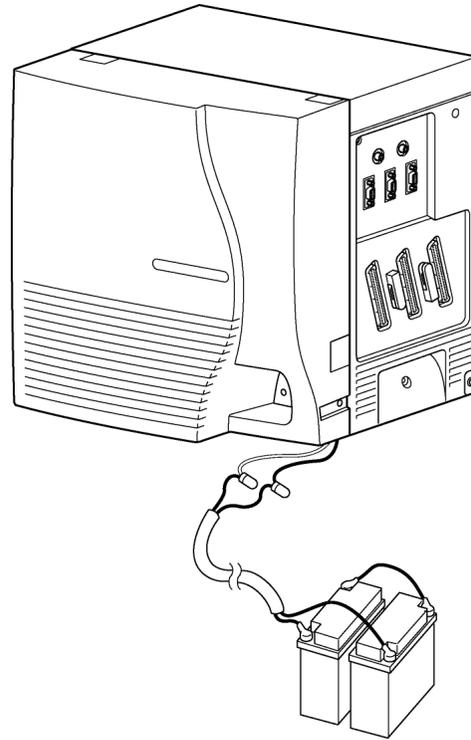
Figure 5-34   Leading the Battery Cables out of the Basic KSU

3.11.2.2   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 5-30 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 KSUs as shown in Figure 5-35 External Battery Cable Installation. Bundle any extra cabling together.

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

To EXT

To EXT
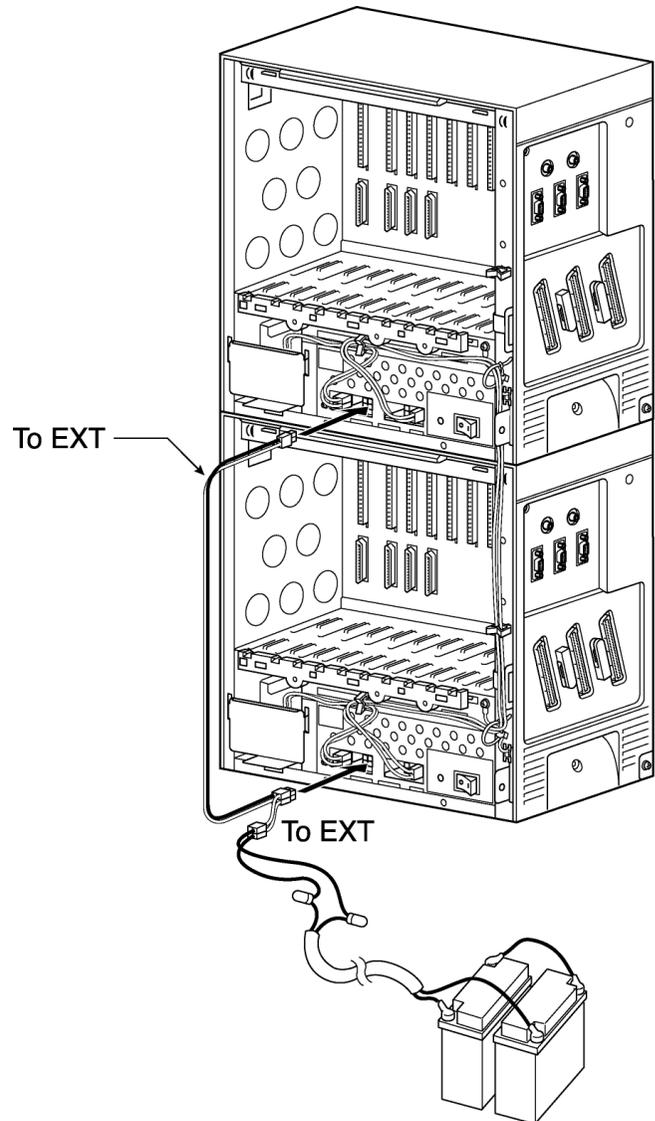
Figure 5-35 External Battery Cable Installation

3. Route the cables through the clamps on the Basic and Expansion KSUs as shown in Figure 5-36 Threading the Cables through the Clamps on the Basic and Expansion KSUs.
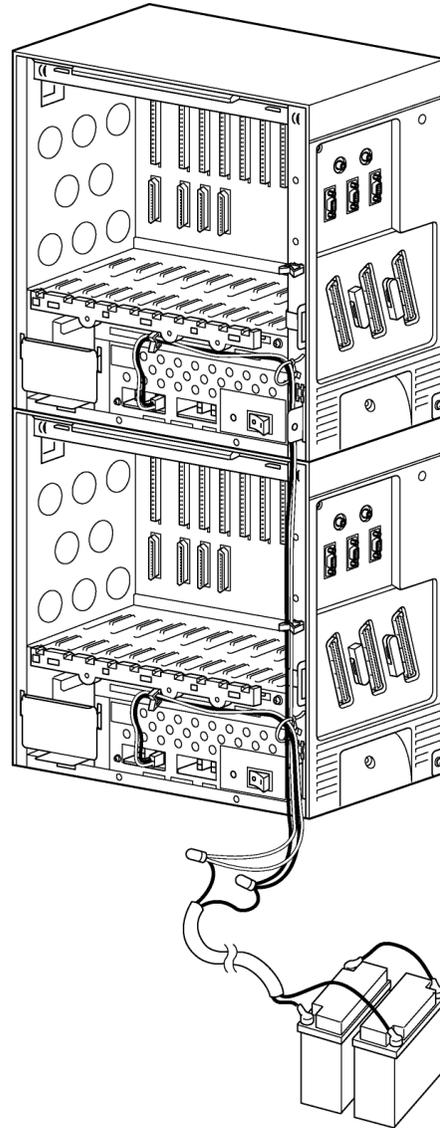
Figure 5-36   Threading the Cables through the Clamps on the Basic and Expansion KSUs

4. Before putting the covers on the Basic and Expansion KSUs, remove the knockouts (indicated by the arrows). 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 5-37 Removing the Knockouts on the Covers of Basic and Expansion KSUs.

Basic KSU
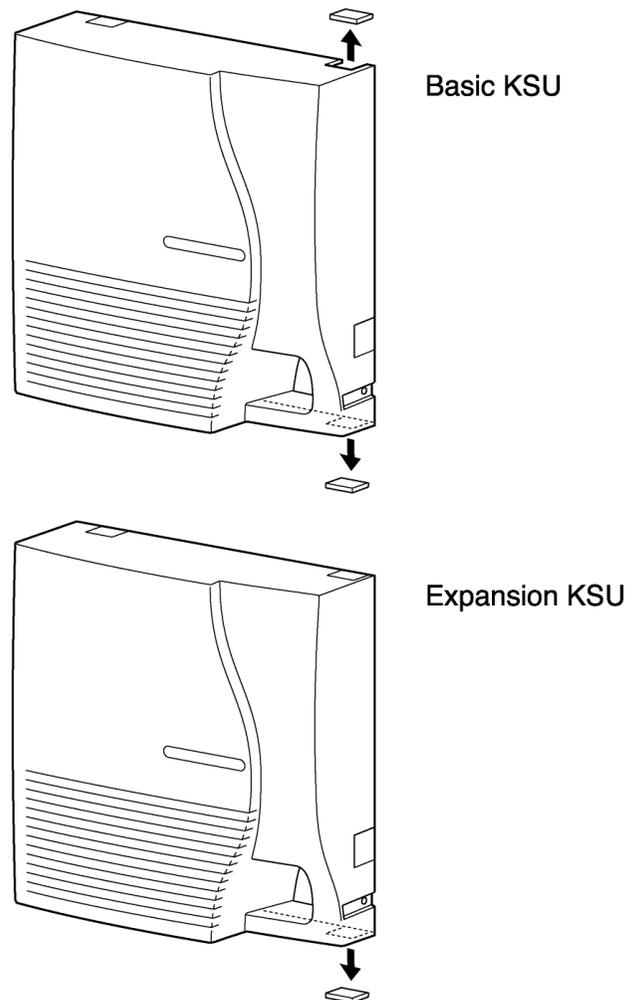
Expansion KSU

Figure 5-37   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 5-38 Leading the Battery Cables out of the Basic and Expansion KSUs.
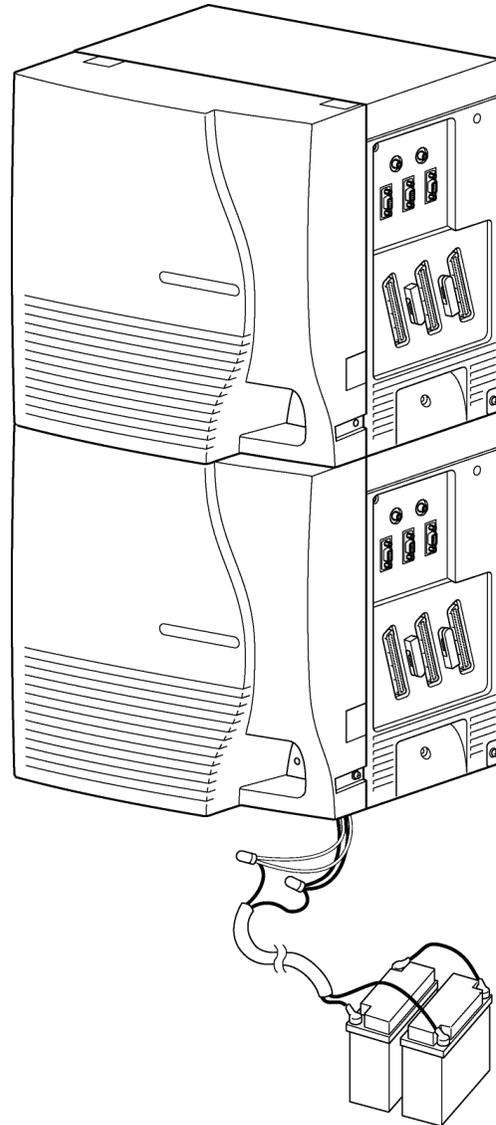
Figure 5-38   Leading the Battery Cables out of the Basic and Expansion KSUs

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Installing ETUs (Circuit Cards) CHAPTER 6

SECTION 1 **GENERAL INFORMATION**

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

The B64-U20 KSU has 10 slots that are divided into three categories:

◇ CPU/EXP Slot

◇ AP Slot

◇ Interface (IF) Slot

CPU/EXP Slot

This is the first slot from the left in the KSU. A CPUI( )/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.

> *The CPUI( )/U( ) ETU is damaged when installed in slots S1~S8!*

AP Slot

The second slot from the left in the KSU, is reserved for the MIFA-U( ) ETU, MIFM-U( ) ETU, or SPE(M)-U( ) ETU.

> *Do not install a CPU or EXP ETU in this slot in the Expansion KSU!*

Interface Slots (S1~S8)

Any interface ETU can be installed in these slots.

Slots S1 and S2 of the B64-U20 KSU are universal slots that also support the MIFA-U( ) ETU, MIFM-U( ) ETU, or SPE(M)-U( ) ETU.

The remainder of this chapter describes installation procedures for each ETU.

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.

❑   CMOS technology that is very susceptible to static is extensively used in the ETUs in this system ; therefore, extreme care must be taken to **avoid static discharge** when handling ETUs.

❑   Make all switch setting changes on the ETU before inserting it in 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 6-1 Inserting the ETU into the KSU

❑   Carry an ETU in a conductive polyethylene bag to prevent static electricity.

❑   The ETU installer must wear a grounded wrist strap to protect the ETU from static electricity.

❑ When you insert or remove an ETU, be sure the wrist strap is connected to the Frame Ground Terminal on the KSU.
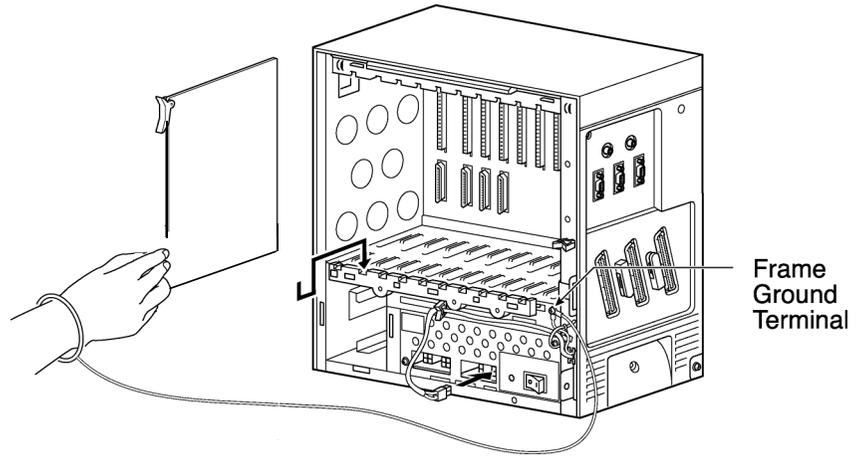
Figure 6-2 Inserting or Removing ETUs from the KSU

❑ When you hold an ETU, do not touch the components or the soldered surfaces with 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).
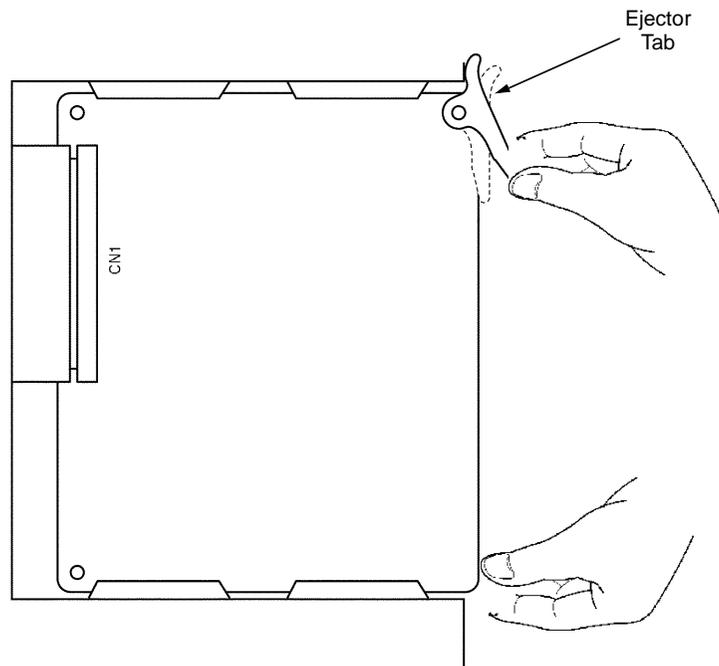
Figure 6-3 Handling an ETU

❑   When you set switches on the ETU, wear a wrist strap and stand on a grounded conductive work surface to avoid static electricity.

ETU

Wrist
Strap

Grounded
Conductive
Surface
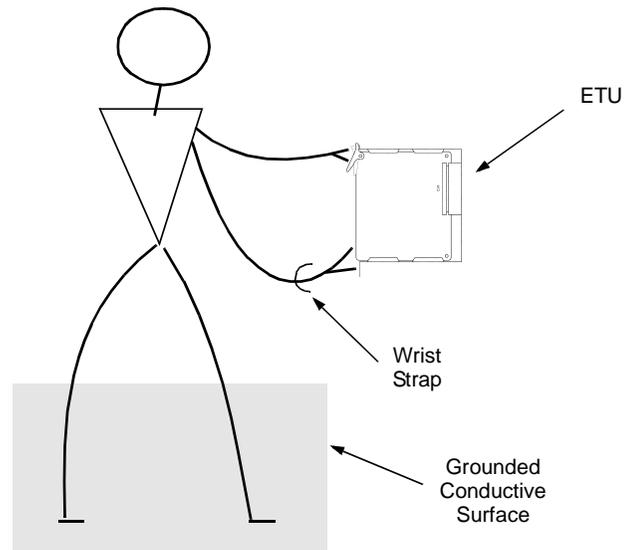
Figure 6-4 Safety Precautions when Setting Switches on an ETU

❑   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.
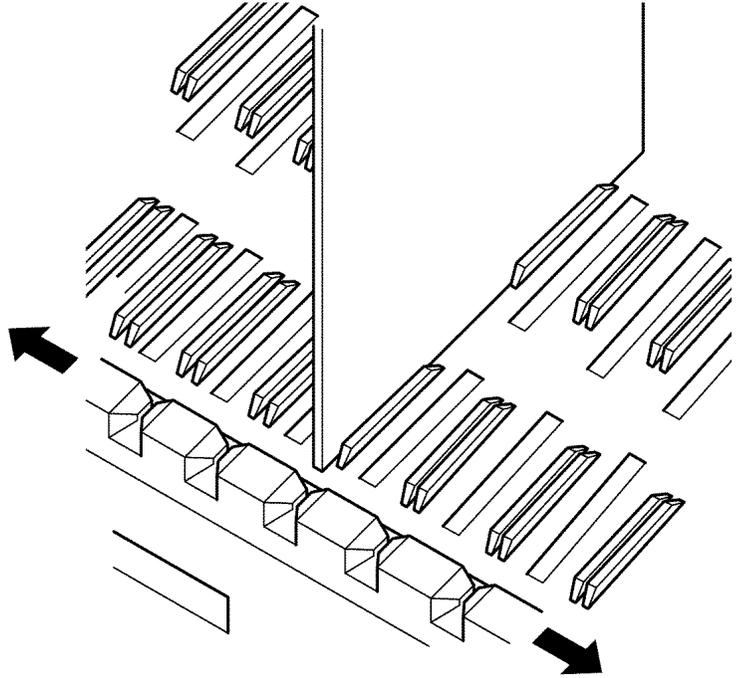
Figure 6-5 Sliding the ETU into the KSU Slot

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.
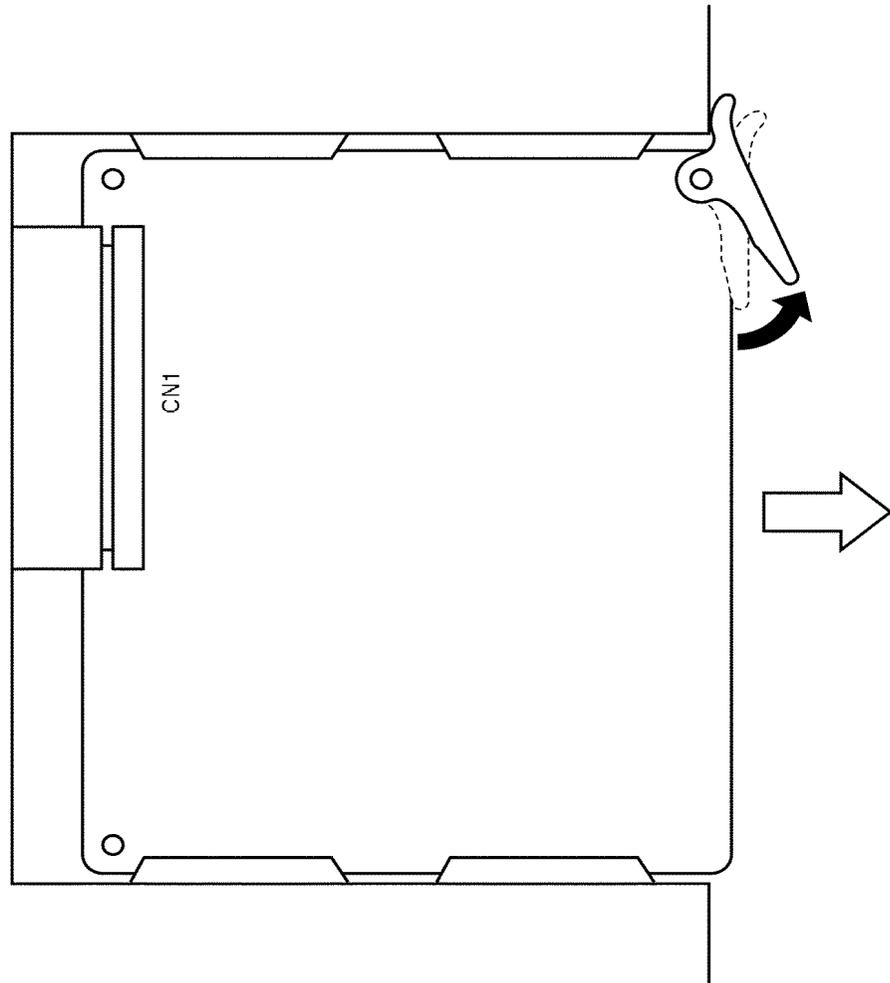
Figure 6-6 Lifting the Ejector Tabs on the ETU

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

SECTION 3   COMMON CONTROL ETUS

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

3.1   CPUI( )/U( ) ETU

3.1.1   Description

The CPUI( )/U( ) ETU is the Central Processing Unit for the system. This ETU has a Central Processing Unit and a Microprocessing Unit (MPU).

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

❍   25 MHz Clock

❍   4-channel DTMF Push Button 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 (FROM)

❍   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 this ETU in the CPU/EXP slot of the basic B64-U20 KSU. Each system has one CPUI( )/U( ) ETU. Refer to Figure 6-7 CPUI( )/U( ) ETU on page 6-8.

The CPUI( )/U( ) ETU is severely damaged when installed in slots S1~S8.
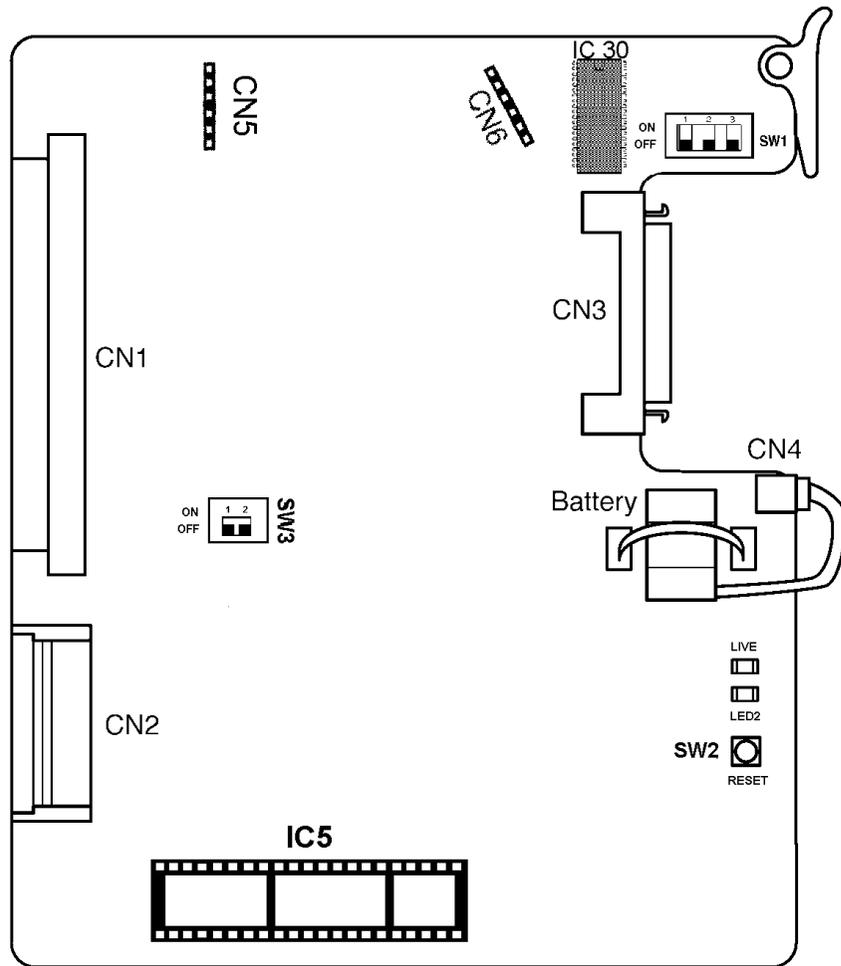
Figure 6-7 CPUI( )/U( ) ETU

3.1.3   Switch Settings

Refer to Table 6-1 CPUI( )/U( ) ETU Default Switch Settings.

Table 6-1 CPUI( )/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

Table 6-1 CPUI( )/U( ) ETU Default Switch Settings (Continued)

SW1-1	SW1-2	Description
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 CPUI( )/U( ) ETU is installed in the system or battery backup fails for any reason, the clock/calendar must be set.

When CPUI( )/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 CPUI( )/U( ) ETU has the following connectors:

❍ CN1   Connects to the backplane.

❍ CN2   Connects to the AP-bus.

❍ CN3   Connects to CN2 on the EXP-U( ) ETU via the expansion cable or CN2 of the EXPT(2)-U( ) ETU.

❍ CN4   Connects to the memory backup battery via the battery cable (factory installed).

❍ CN5   Connects to CN1 of the CLKG-U( ) Unit.

❍ CN6   Connects to CN2 of the CLKG-U( ) Unit.

3.1.5   LED Indications

Refer to .

Table 6-2 CPUI( )-U10 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

The CPUI( )/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 CPUI( )/U( ) ETU CN4. Refer to .

2.   Connect the cable from the new battery to CN4 on the CPUI( )/U( ) ETU.

3.   Turn off the KSU power.

4.   Remove the CPUI( )/U( ) ETU from the KSU.

5. Using a suitable cutting tool, cut the tie wrap, and remove the old battery.

6. Fasten the new battery with a tie wrap.

7. Install the new CPUI( )/U( ) ETU.

8. Turn on the KSU power.

3.2   CPUI( )-U20 ETU

3.2.1   Description

The CPUI( )-U20 ETU is the Central Processing Unit for the system (**R2.01 or higher**). This ETU has a Central Processing Unit and a Microprocessing Unit (MPU).

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

❍ 25 MHz Clock

❍ 4-channel DTMF Push Button 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 (FROM)

❍ Call Progress and DTMF Tone Generator

❍ Memory Backup Battery (Retains memory for approximately 21 days)

❍ Key Function (KF)/Multifunction (MF) Registration

3.2.2   Installation

Each system must have this ETU in the CPU/EXP slot of the basic B64-U20 KSU. Each system has one CPUI( )-U20 ETU. Refer to Figure 6-8 CPUI( )-U20 ETU.

The CPUI( )-U20 is severely damaged when installed in slots S1~S8.
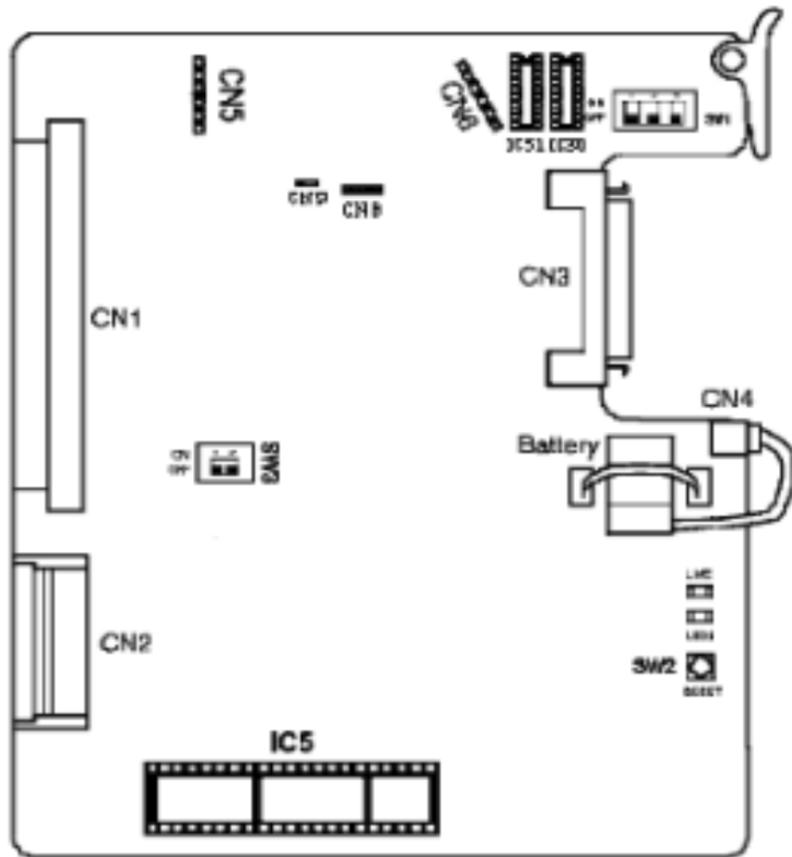
Figure 6-8 CPUI( )-U20 ETU

3.2.3   Switch Settings

Refer to Table 6-3 CPUI( )-U20 ETU Default Switch Settings.

Table 6-3 CPUI( )-U20 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.*

3.2.4   Connectors

Before programming System Data, the battery must be connected to **CN4** to allow memory retention when a power failure or brownout occurs. When 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 CPUI( )-U20 ETU is installed in the system or battery backup fails for any reason, the clock/calendar must be set.

When CPUI( )-U20 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 following connectors are included:

❍   CN1   Connects to the backplane.

❍   CN2   Connects to the AP-bus.

❍   CN3   Connects to CN2 on the EXP-U( ) ETU using the expansion cable or CN2 of the EXPT(2)-U( ) ETU.

❍   CN4   Connects to the memory backup battery using the battery cable (factory installed).

❍   CN5   Connects to CN1 of the CLKG-U( ) Unit.

❍   CN6   Connects to CN2 of the CLKG-U( ) Unit.

3.2.5   LED Indications

Refer to Table 6-4 CPUI( )-U20 LED Indications.

Table 6-4 CPUI( )-U20 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

3.2.6   Replacing Memory Backup

The CPUI( )-U20 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 CPUI( )-U20 ETU CN4. Refer to Figure 6-8 CPUI( )-U20 ETU on page 6-12.

2.   Connect the cable from the new battery to CN4 on the CPUI( )-U20 ETU.

3.   Turn off the KSU power.

4.   Remove the CPUI( )-U20 ETU from the KSU.

5.   Using a suitable cutting tool, cut the tie wrap, and remove the old battery.

6.   Fasten the new battery with a tie wrap.

7.   Install the new CPUI( )-U20 ETU.

8.   Turn on the KSU power.

3.3   PKU 192-U (Port Key Unit)

When the Port Key Unit is installed, the system is configured as an Expanded Port Package. When the PKU 192-U is not installed, the system is configured as a Basic Port Package.

The PKU 192-U is installed in the IC30 socket of the CPUI( )/U( ) ETU.

Table 6-5 PKU 192-U Configuration

Description	Basic Port Package	Expanded Port Package
Basic Terminals (Telephones)	32	120✷
Shared Call Arrival (CAR) Keys with Basic Terminal	24	112
Dedicated Call Arrival (CAR) Keys	40	0
Basic Terminals + Call Arrival (CAR) Keys	72	120
Basic Trunks	16	64
Universal Slots	24	24
Shared MIF Slots with Universal Slots	2	2
Dedicated MIF Slot	1	1

✷   Basic Terminal telephones include Wireless (PSII) and Voice Mail stations.

3.4   CLKG-U( ) Unit

3.4.1   Description

The CLKG-U( ) Unit synchronizes the clock for T1/FT1 lines, ISDN-BRI lines, ISDN-PRI, and Wireless stations that are connected to the system.

This unit works with the DTI-U, BRT(4)-U20, PRT(1)-U( ), and BSU(2)-U( ) ETUs and is piggybacked on the CPUI( )/U( ) ETU.
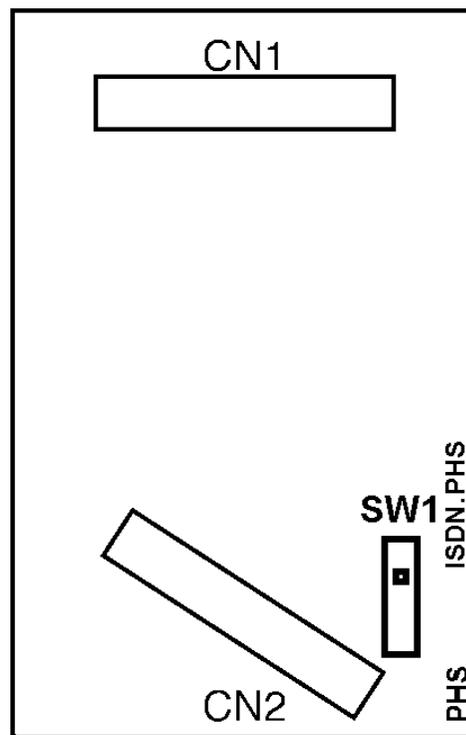
Figure 6-9 CLKG-U( ) Unit

3.4.2   Installation

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

3.4.3   Connectors

The following connectors are included:

❍   CN1   Connects to CN5 on the CPUI( )/U( ) ETU.

❍   CN2   Connects to CN6 on the CPUI( )/U( ) ETU.

3.4.4   Switch Settings

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

When only Wireless is installed, set SW1 to **PHS**.

3.5   EXP-U( ) ETU

3.5.1   Description

The EXP-U( ) ETU is the Expansion KSU Controller. This ETU controls transmission between the CPUI( )/U( ) ETU and the other ETUs installed in the expansion KSU when it is installed.
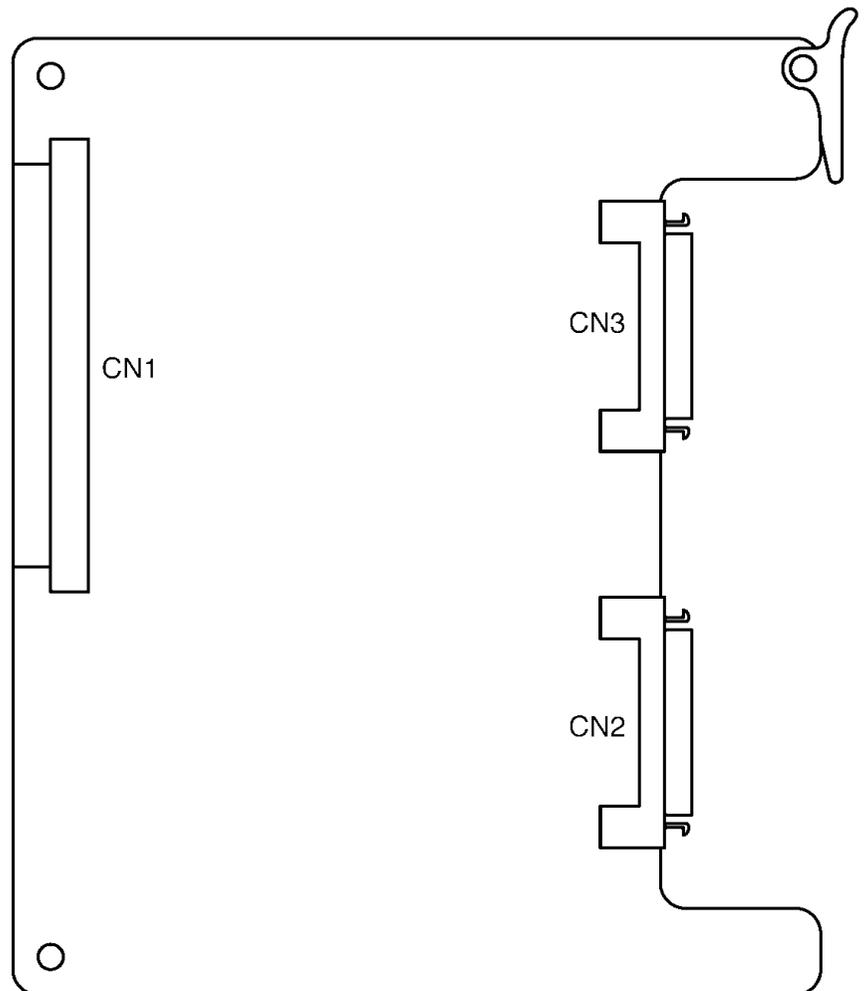
Figure 6-10 EXP-U( ) ETU

3.5.2   Installation

Turn system power off, and install the EXP-U( ) ETU in the CPU/EXP slot of the expansion KSU.

3.5.3   Connectors

The following connectors are included:

❍   CN1   Connects to the backplane.

❍   CN2   Connected to CN3 on the CPUI( )/U( ) ETU or CN3 on EXP-U( ) ETU (installed in the first expansion cabinet) using an expansion cable.

❍   CN3   Connected to the CN2 on the EXP-U( ) ETU installed in the third expansion cabinet using the expansion cable or to CN2 of the EXPT(2)-U( ) ETU.

✎   Not used when the EXP-U( ) ETU is installed in the last Expansion KSU.

3.6   KMA( )U

3.6.1   Description

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

3.6.2   Installation

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

3.7   KMM( )U

3.7.1   Description

The KMM( )U is a feature module that is installed on the MIFM-U10 ETU to provide LCR and/or Caller ID scrolling and dialing features.

3.7.2   Installation

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

3.8   KMM-U20

3.8.1   Description

The KMM-U20 upgrade chip is a feature module that is installed on the MIFM-U20 ETU to provide LCR and/or Caller ID scrolling and dialing features.

3.8.2   Installation

Like all ICs, this unit has a guide on one side. Install the KMM-U20 with the missing corner in the bottom left corner.

3.9   MIFA-U( ) ETU

3.9.1   Description

The MIFA-U( ) ETU 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( )U to be installed on the MIFA-U( ) ETU.
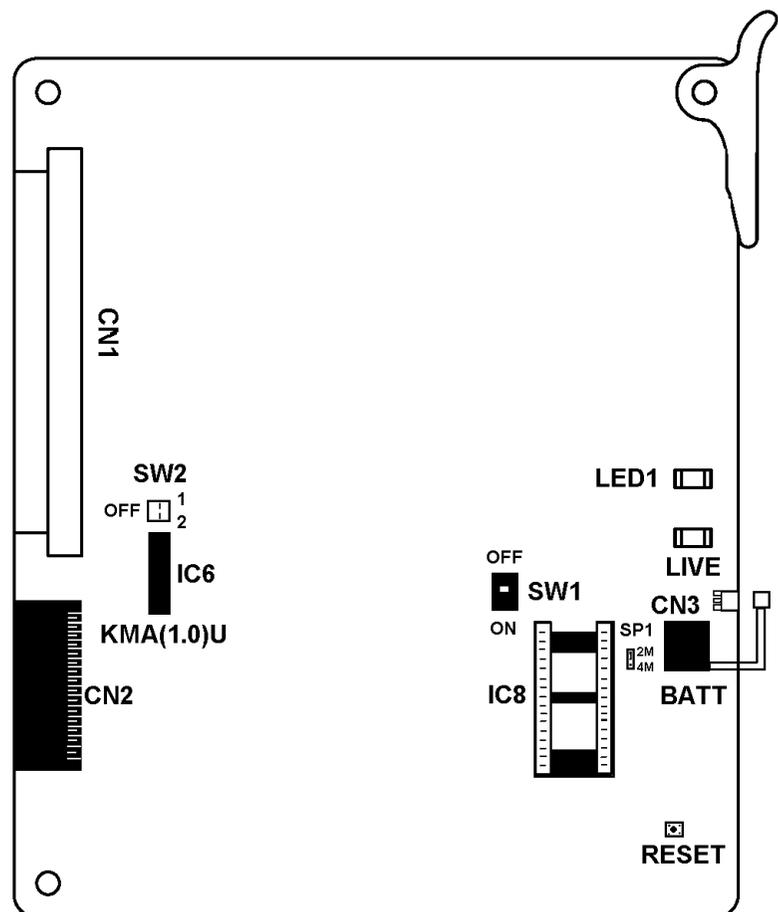
Figure 6-11 MIFA-U( ) ETU

3.9.2   Installation

Only one MIFA-U( ) ETU can be installed in the system. When ACD MIS is used, the MIFA-U( ) ETU must be installed in the AP slot and have the KMA( )U installed on it. The MIFA-U( ) ETU can be installed in the first or second IF (interface) slot of the basic B64-U20 KSU when KMA( )U is not installed.

3.9.3   Switch Settings

Refer to Table 6-6 MIFA-U( ) ETU Default Switch Settings.

Table 6-6 MIFA-U( ) ETU 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

3.9.4   LED Indications

Refer to Table 6-7 MIF-A-U( ) LED Indications.

Table 6-7 MIF-A-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	Loading Flash ROM from EPROM	Not Used

3.9.5   Connectors

The following connectors are included:

❍   CN1   Connects to the backplane.

❍   CN2   Connects to the backplane.

❍   CN3   Used to connect the ETU backup battery during installation, and disconnect the battery when storing the ETU.

❍   IC6   Socket for the optional KMA( )U

The ACD/MIS cable connects at the COM3, a standard female DB-9 DCE port, on the KSU that contains the MIFA-U( ) ETU. A straight DB-9 cable is required.

3.10   MIFM-U10 ETU

3.10.1   Description

This ETU provides additional memory and processing power for PC Programming, Wireless activation, SMDR, LCR, and ANI/Caller ID scrolling. PC Programming/Wireless activation and SMDR are standard with this ETU. LCR and Caller ID scrolling requires the KMM( )U to be installed on the MIFM-U10 ETU.

When the MIFM-U10 ETU is installed in IF slot S1 or S2 (as opposed to the AP slot) the Modem Kit Unit can be mounted on the MIFM-U10 ETU.

The MIFM-U10 ETU can be installed in the AP slot or the first or second IF slot in the basic B64-U20 KSU.
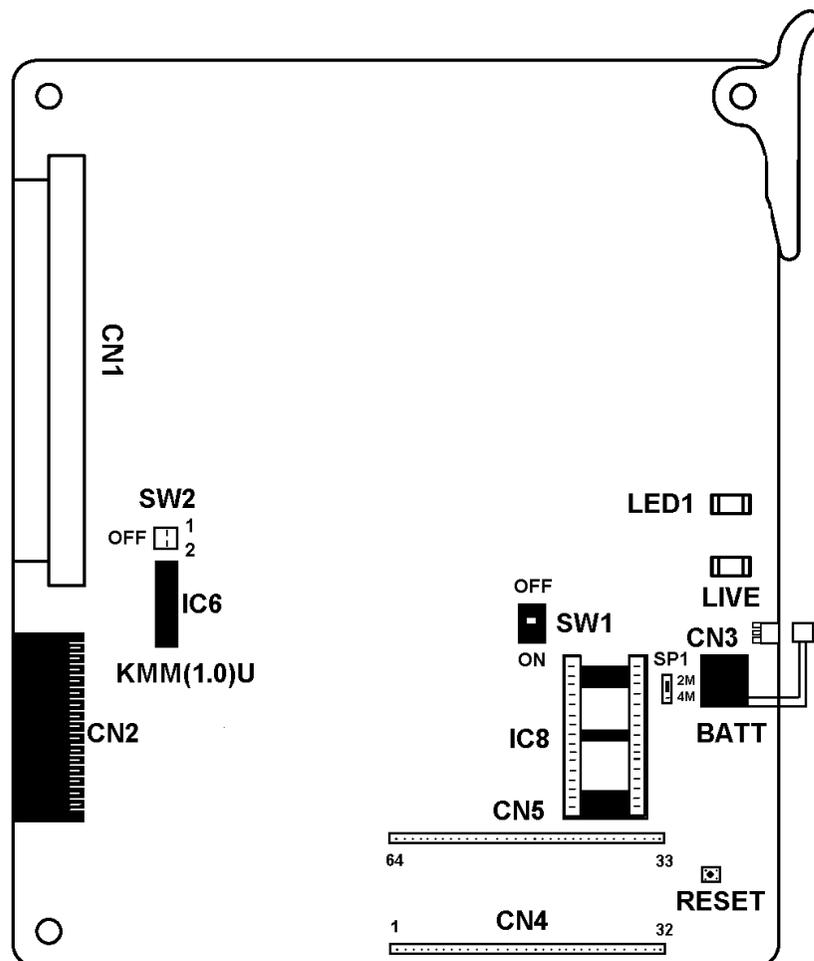
Figure 6-12 MIFM-U10 ETU

3.10.2   Installation

Only one MIFM-U10 ETU can be installed in the system.

3.10.3   Switch Settings

Refer to Table 6-8 MIFM-U10 Default Switch Settings.

Table 6-8   MIFM-U10 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

3.10.4   LED Indications

Refer to Table 6-9 MIFM-U10 LED Indications.

Table 6-9   MIFM-U10 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 or SMDR is outputting call records	Loading Flash ROM from EPROM	Not Used

3.10.5   Connectors

The following connectors are included:

❍   CN1   Connects to the backplane.

❍   CN2   Connects to the backplane.

❍   CN3   Used to connect the ETU backup battery during installation.

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

❍   CN4, CN5   Connectors for the optional Modem Kit Unit

❍   IC6   Socket for the optional KMM( )U

SMDR and PC Programming connections are made (using COM ports) on the side of the KSU that contains the MIFM-U10 ETU.

❍   COM1   PC/LCR/Wireless Programming

❍   COM2   SMDR

Both COM ports are standard female DB-9 DCE ports. A straight cable is required.

When an external modem is used, connect the modem to COM1 port using the provided modem cable adapter. A straight DB-9 to DB-25 cable (9-pin male to 25-pin male) is required.
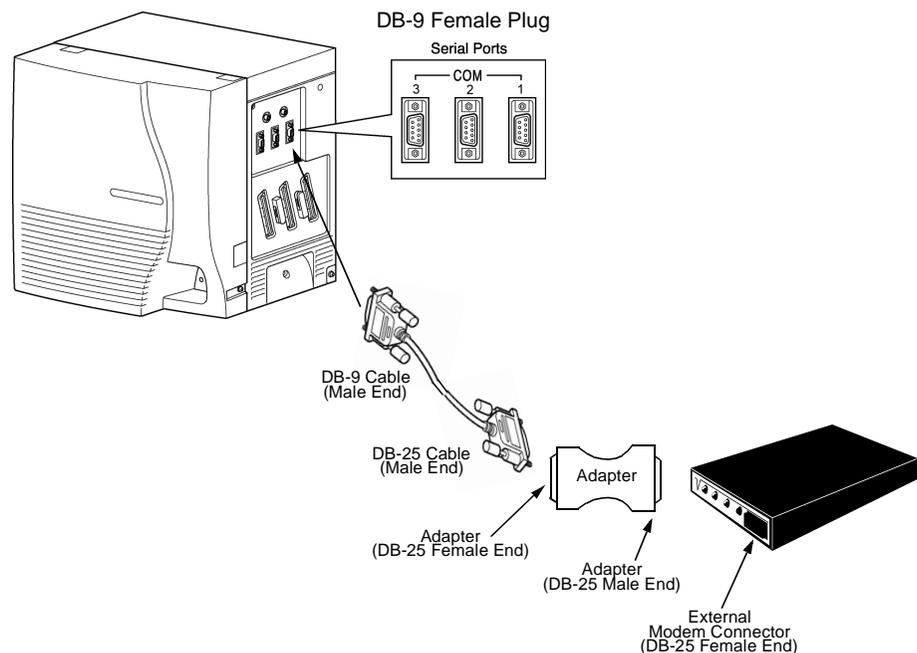
Figure 6-13 Connecting a Modem to the B64-U20 KSU

3.11   MIFM-U20 ETU

3.11.1   Description

This ETU provides additional Memory and Processing Power for PC Programming, Wireless activation, SMDR, LCR, and ANI/Caller ID scrolling. It provides all the features of the MIFM-U10 plus an optional Ethernet Port. PC Programming/Wireless and SMDR are standard with this ETU. LCR and Caller ID scrolling require installation of the KMM-U20 Upgrade chip on this ETU.
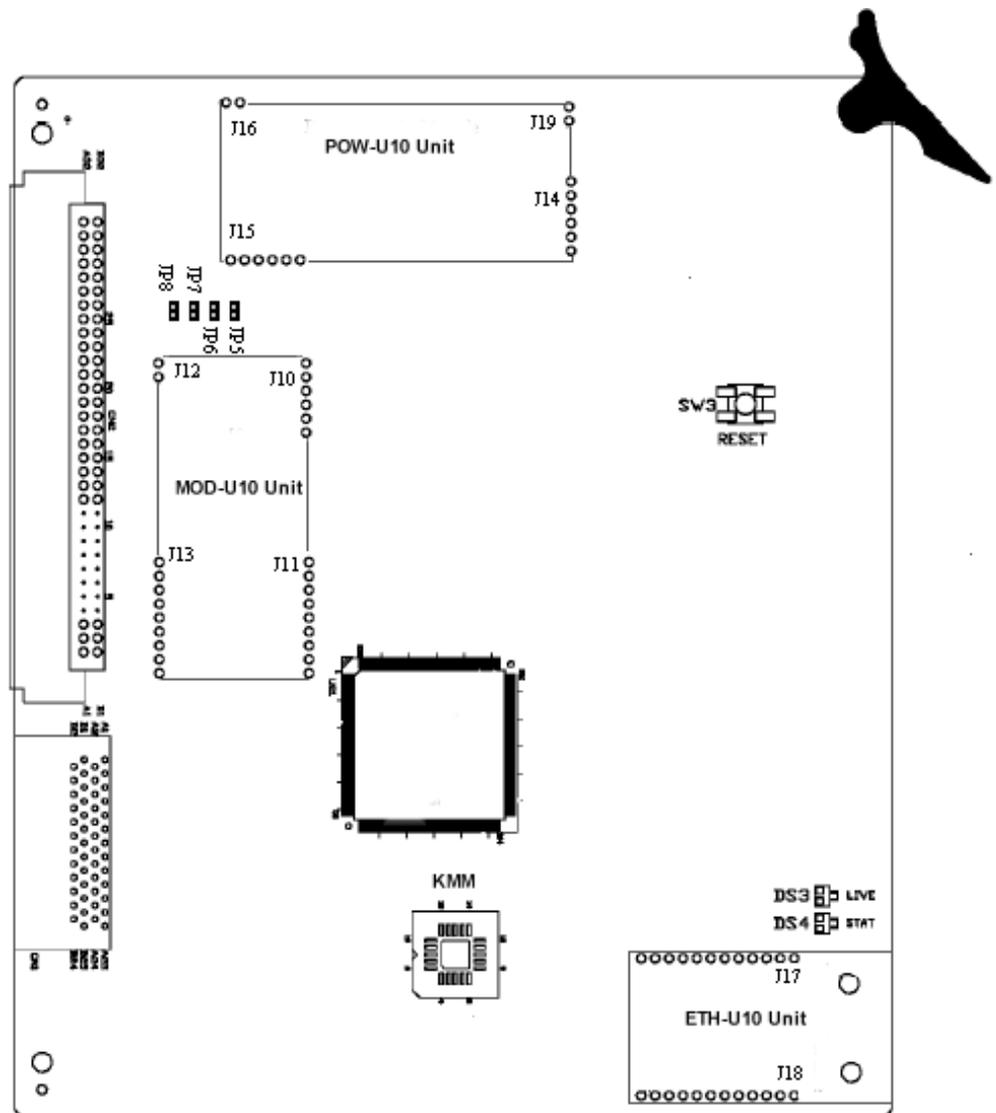
Figure 6-14 MIFM-U20 ETU

3.11.2   Installation

Only one MIFM-U20 ETU can be installed in the system in the AP slot or IF Slot S1 or S2.

When this ETU is installed in IF slot S1 or S2, the MOD-U10 Unit (Serial Socket Modem) can be installed on the MIFM-U20 ETU.

3.11.3   Configuration Options

Options include the following:

❍   Basic Model

❍   Basic Module with MOD-U10 Unit

❍   Basic Module with ETH-U10 Unit

   ✎   The POW-U10 Unit must be used with the ETH-U10 Unit.

❍   Basic Module with MOD-U10 Unit, ETH-U10 Unit, and POW-U10 Unit

The optional Units can be installed in the field. Power must be off.

3.11.4   Optional Units

The following units are optional:

❍   ETH-U10 (Ethernet Unit)

❍   MOD-U10 (Modem) Unit

❍   POW-U10 (Power) Unit

❍   KMM-U20 Upgrade Chip

ETH-U10 Unit

This unit is installed on the MIFM-U20 ETU to provide a LAN connection and must be installed in connectors J17, J18, J20, and J21.
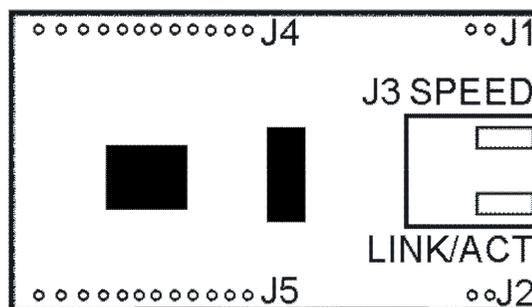
Figure 6-15 ETH-U10 Unit

The ETH-U10 pins and the sockets of the MIFM-U20 ETU are labeled.   Line up ETH unit connector J2 with MIFM J20 and unit connector J5 with MIFM J18, and carefully plug in the unit.

✎   The POW-U10 Unit is required when using the ETH-U10 Unit.

MOD-U10 Unit

This unit is installed on the MIFM-U20 ETU to provide a modem and must be installed in connectors J10, J11, J12, and J13.
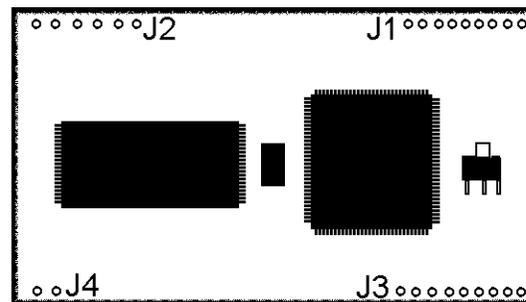
Figure 6-16 MOD-U10 Unit

The MOD-U10 Unit pins and the sockets of the MIFM-U20 ETU are labeled. Line up MOD unit connector J1 with MIFM J11 and MOD unit J2 with MIFM J10, and carefully plug in the unit.

POW-U10 Unit

This unit is installed on the MIFM-U20 ETU to provide power for the Ethernet ETH-U10 Unit and must be installed in connectors J14, J15, J16, and J19.
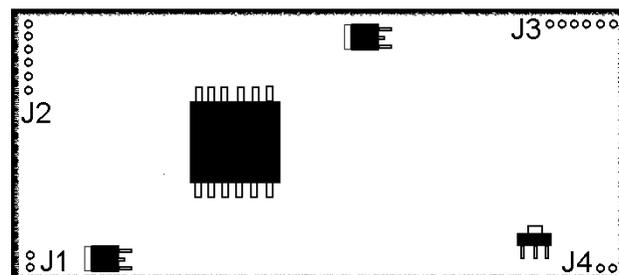
Figure 6-17 POW-U10 Unit

The POW-U10 Unit pins and the sockets of the MIFM-U20 ETU are labeled. Line up POW unit connector J1 with MIFM-U20 ETU J15 and POW unit J2 with MIFM J16, and carefully plug in the unit.

3.11.5   Jumper Settings

Refer to Table 6-10 MIFM-U20 Jumper Settings.

Table 6-10 MIFM-U20 Jumper Settings

Jumper	Name	Description	Pins not Connected	Pins Connected
JP5	DFLTS	Sets factory defaults during power up	No Action	Forces factory default settings
JP6	WD DIS	Enables/disables Watchdog Timer	Watchdog Enabled	Watchdog Disabled
JP7	Console (Log)	Displays Bootup messages on COM 1	No Messages	Messages on COM 1
JP8	CLI (ETH)	Sets SPE Mode	MIFM Mode	SPE Mode

3.11.6   LED indications

LED 1 (on back of the ETU behind LIVE LED)

❍   Off   SMDR Idle, No Flash ROM write is occurring

❍   On steady   Flash ROM write error

❍   Flashing   Outputting SMDR REcords using KSU COM 2 or TCP Connection/Writing to Flash ROM

LED 3 (on back of the ETU behind STAT LED)

❍   On   SPE Application connected or LAN PC Programming

❍   Off   No SPE or LAN PC Programming

❍   Flashing   Not Used

LIVE LED

❍   On   Indicates problem

❍   Off   Indicates problem

❍   Flashing   Normal Operation

STAT LED

❍   ON   SPE ETU initialization successfully completed

❍   Flashing   Initialization error

3.11.7 Connectors

The following connectors are included:

- ❍ CN1   Connects to the backplane
- ❍ CN2   Connects to the backplane
- ❍ J10   Connects to the MOD-U10 Unit
- ❍ J11   Connects to the MOD-U10 Unit
- ❍ J12   Connects to the MOD-U10 Unit
- ❍ J13   Connects to the MOD-U10 Unit
- ❍ J14   Connects to the POW-U10 Unit
- ❍ J15   Connects to the POW-U10 Unit
- ❍ J16   Connects to the POW-U10 Unit
- ❍ J19   Connects to the POW-U10 Unit
- ❍ J17   Connects to the ETH-U10 Unit
- ❍ J18   Connects to the ETH-U10 Unit
- ❍ J20   Connects to the ETH-U10 Unit
- ❍ J21   Connects to the ETH-U10 Unit
- ❍ U49   Socket for optional KMM-U20 Upgrade Chip

3.12   Modem Kit Unit

3.12.1   Description

This optional modem mounts on the MIFM-U10 ETU or PCT(S)-U( ) Unit and does not require analog port connection. The MIFM-U10 must be installed in slot S1 or S2 of the Basic KSU for this on-board modem to work.

3.12.2   Installation

The Modem Kit Unit pins and the pins of the CN4 and CN5 socket are labeled. The Modem Kit has one row of pins that is missing a pin. Align the modem so the empty pin space is lined up with the socket that has that pin connection blocked.
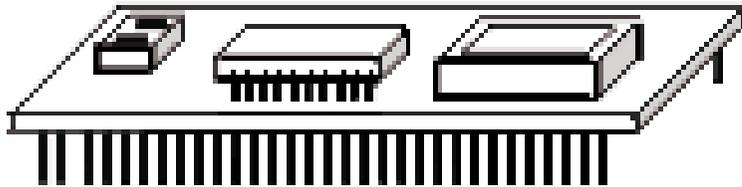
Figure 6-18 Modem Kit

3.13   SPE(M)-U( ) ETU

3.13.1   Description

The Single Point of Entry ETU provides a single, remote or direct access point for configuring the system and individual ETUs.   It contains all the functionality of the MIFM-U10 ETU with the Activation key, KMM( )U, installed or the MIFM-U20 with the KMM-U20 installed, and comes with a standard built-in modem.   An Ethernet port is provided to allow programming over a network using TCP/IP.

The SPE(M)-U ( ) ETU has six physical COM ports. The COM1 port for PC Programming and COM2 port for SMDR go through the backplane on the side of the KSU that contains the MIFM-U20 ETU. The COM-A, COM-B, COM-C, and COM-D ports are accessible along the front of the ETU and allow interfacing to other programmable ETUs (e.g., VMS).

The SPE(M)-U ( ) ETU communicates with the Electra Elite IPK or Electra Elite 48/192 systems using the following methods:

❍   Serial – Using COM1 on the KSU chassis

❍   Modem – v.34 @ 33.6 baud

❍   Ethernet – 10/100Mbps LAN/WAN Connection
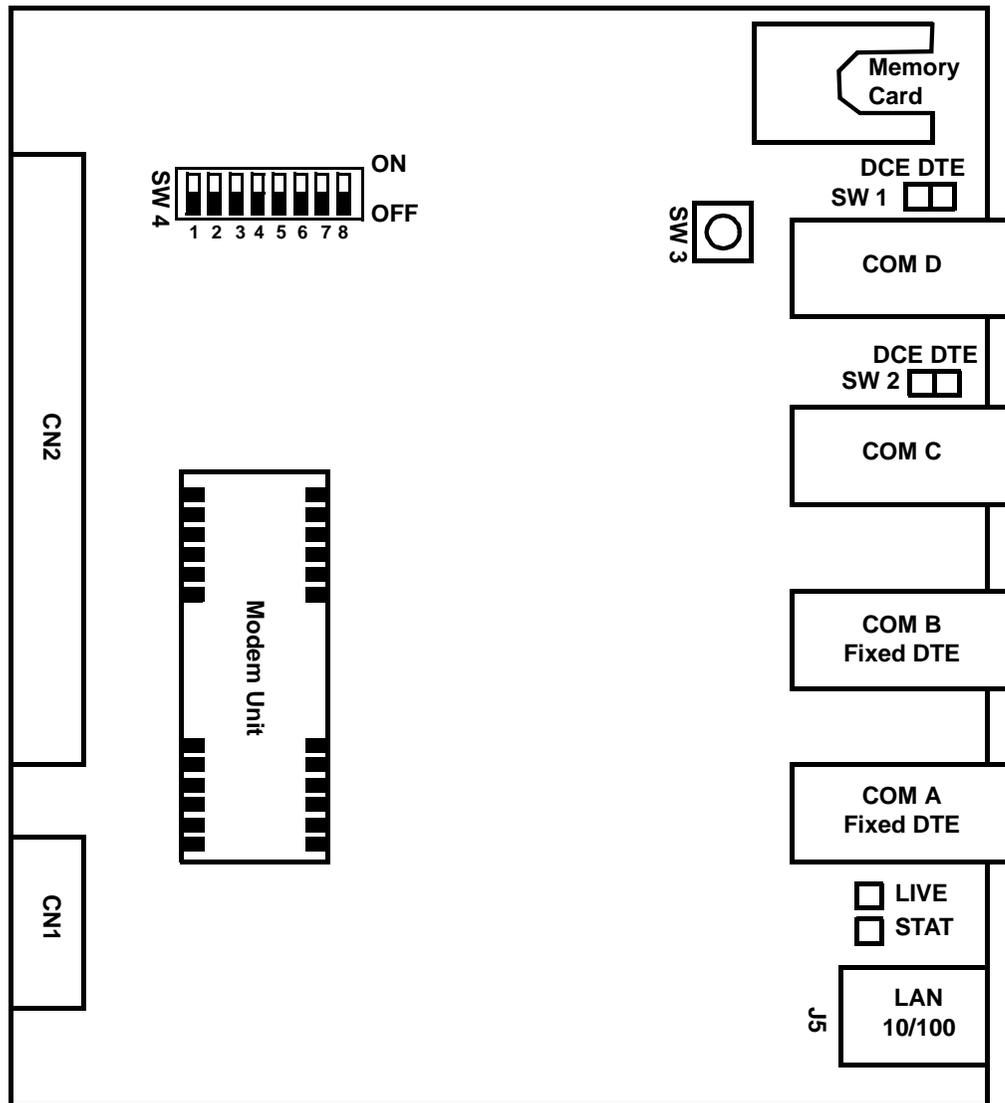
Note: The detail on this board may not appear exactly like the board.

Figure 6-19 SPE(M)-U( ) ETU (Front)

MMC
Detect

MMC
Idle

LED 1

LED 3
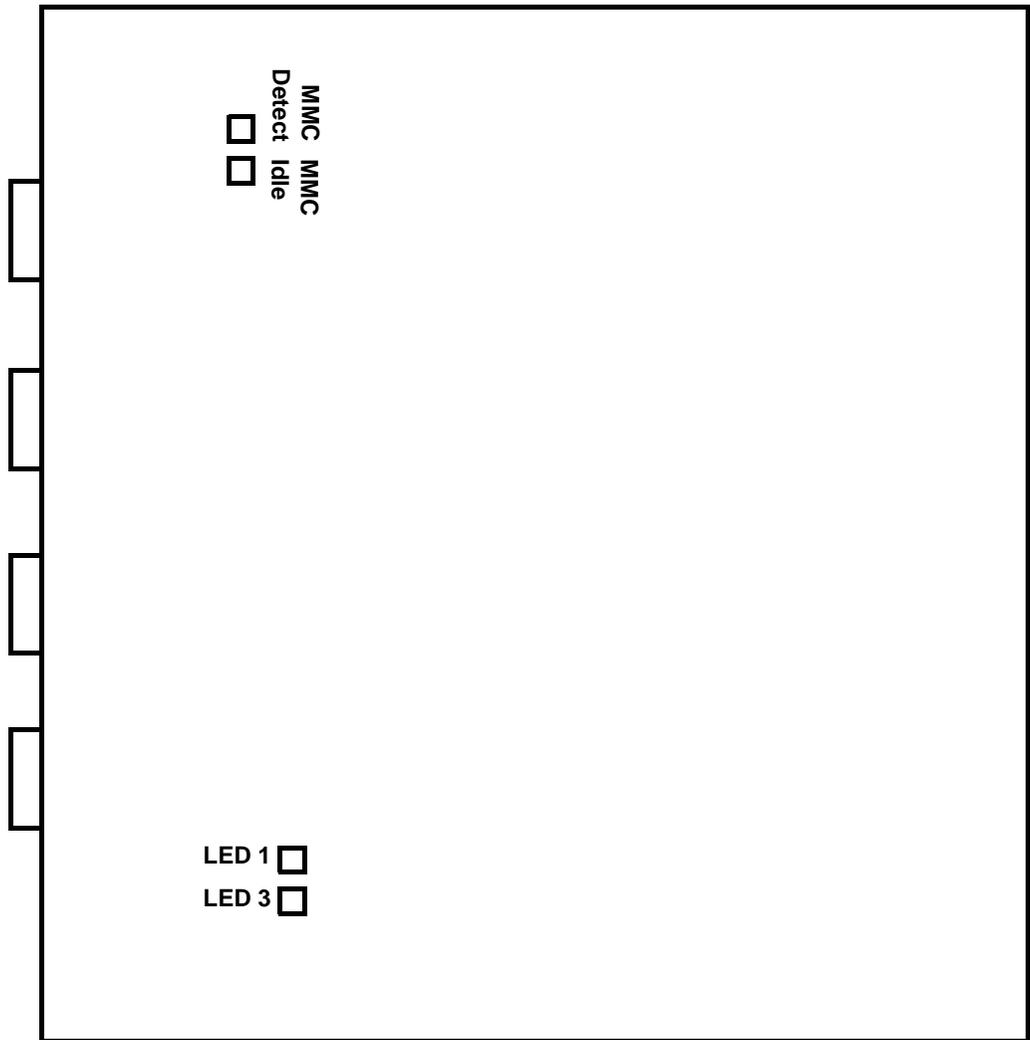
Figure 6-20 SPE(M)-U( ) ETU (Back)

3.13.2   Comparison of SPE(M)-U( ) ETU to MIFM-U10/20 ETU

Refer to .

Table 6-11 SPE(M)-U( ) to MIFM-U10/U20 ETU Comparison

Feature	MIFM-U10 ETU	MIFM-U20 ETU	SPE(M)-U( ) ETU
Hardware Components	MIFM-U10 ETU KMM( )U PAL chip Modem Kit Unit	MIFM-U20 with KMM-U20 upgrade chip and the MOD-U10, POW-U10, and ETH-U10 Units.	SPE(M)-U( ) ETU with Soft Modem Activation Key
SAT Serial Programming	Yes	Yes	Yes
SAT Modem Programming	Yes (Optional)	Yes (Optional)	Yes (Standard)
Maximum Modem Speed	38.4K	38.4K	38.4K
SAT Ethernet (Intra/Internet) Programming	Yes (Optional) with Elite LAN PC Programming Device)	Yes (Optional) for MIFM-U20 using ETH-U10 and POW-U10 Units)	Yes
LCR Serial Programming	Yes	Yes	Yes
LCR Modem Programming	Yes	Yes	Yes
LCR Ethernet Programming	No	Yes	Yes
Serial SMDR	Yes	Yes	Yes
Ethernet SMDR	No	Yes (simultaneous on serial also)	Yes (simultaneous on serial also)
SMDR Record Storage when Printer is not connected	Approximately 100 call records	Maximum of 200 records in non-volatile Memory	Maximum of 200 records in non-volatile Memory
Caller ID Storage	50 per Station	50 per Station in non-volatile Memory	50 per Station in non-volatile Memory
VM CoSession using KSU serial port	No	No	Yes
VM CoSession using modem not on VM ETU	No	No	Yes
VM CoSession using Ethernet	No	No	Yes
BRT/PRT/CCH Remote Debugging	No	No	Yes

3.13.3   Installation

Only one SPE(M)-U( ) ETU can be installed in the system in an AP, S1, or S2 slot. When the Modem is used, this ETU must be installed in slot S1 or S2.

3.13.4   Switch Settings

Refer to Table 6-12 SPE(M)-U( )Switch Settings.

Table 6-12 SPE(M)-U( )Switch Settings

Switch	Setting	Description
SW1	Off	COM - D acting as DCE (Default)
	On	COM - D acting as DTE
SW2	Off	COM - C acting as DCE (Default)
	On	COM - C acting as DTE
SW3	N/A	Reset the SPE(M)-U( ) ETU
SW 4-1	On	Not Used
	Off	Not Used (Default)
SW 4-2	On	Restores ETU to Factory Defaults
	Off	Save Settings (Default)
SW 4-3	On	Not Used
	Off	Not Used (Default)
SW 4-4	On	Not Used
	Off	Not Used (Default)
SW 4-5	On	Not Used
	Off	Not Used (Default)
SW 4-6	On	Not Used
	Off	Not Used (Default)
SW 4-7	On	Enables Debug through KSU COM 1
	Off	Disables Debug through KSU COM 1 (Default)
SW 4-8	On	MIFM Mode only (Emulates MIFM; SPE Mode disabled).
	Off	SPE Mode (Default)

3.13.5   LED Indications

Ethernet LED Indications

Table 6-13 Ethernet LED Indications

LED	Green	Yellow
ON	Link Detected	100 Mbps
OFF	Link Not Detected	10 Mbps
Flashing	Activity	N/A

Initial Boot Indications

All LEDs except the flashing LIVE LED remain On continuously during boot up. After the SPE(M)-U( ) ETU finishes the boot up process all other LEDs go off momentarily, but the LIVE LED continues to flash.

Normal Run Time LEDs

LIVE LED

❍   On   Problem indicated

❍   Off   Problem indicated

❍   Flashing   Normal operation

STAT LED

❍   On   SPE ETU initialization successful.

❍   Flashing   Initialization error

LED 1

❍   On   SPE application connection or LAN PC Programming

❍   Off   No SPE application connection or LAN PC Programming

❍   Flashing   Not used

LED 3

❍   On   Stays on for Flash ROM Write error

❍   Off   SMRD idle, no Flash ROM write

❍   Flashing   Outputting SMDR records through KSU COM 2 or TCP connection/Writing to Flash ROM

Firmware upload

The green LED on the Ethernet connector is on when data is being transferred through the Ethernet port. When upload data is being stored in nonvolatile memory, LED 3 flashes.

3.13.6   Connectors or Ports

❍   CN1   Connects to backplane,

❍   CN2   Connects to backplane

❍   J5   10/100 Mbps Ethernet connector used by SPE ETU for connection with System Administration Terminal (SAT), Least Cost Routing (LCR), or SPE application

❍   COM A   Always Configured as DTE device

❍   COM B   Always Configured as DTE device

❍   COM C   Default configured as DCE device
                       Switch SW 2 used to configure for DTE device when needed

❍   COM D   Default configured as DCE device
                       Switch SW 1 used to configure for DTE device when needed

❍   Memory   For future use

SECTION 4   TRUNK ETUS

The Electronic Telephone Units described in this section provide a link between trunks in the Electra Elite IPK 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 be used as trunks.
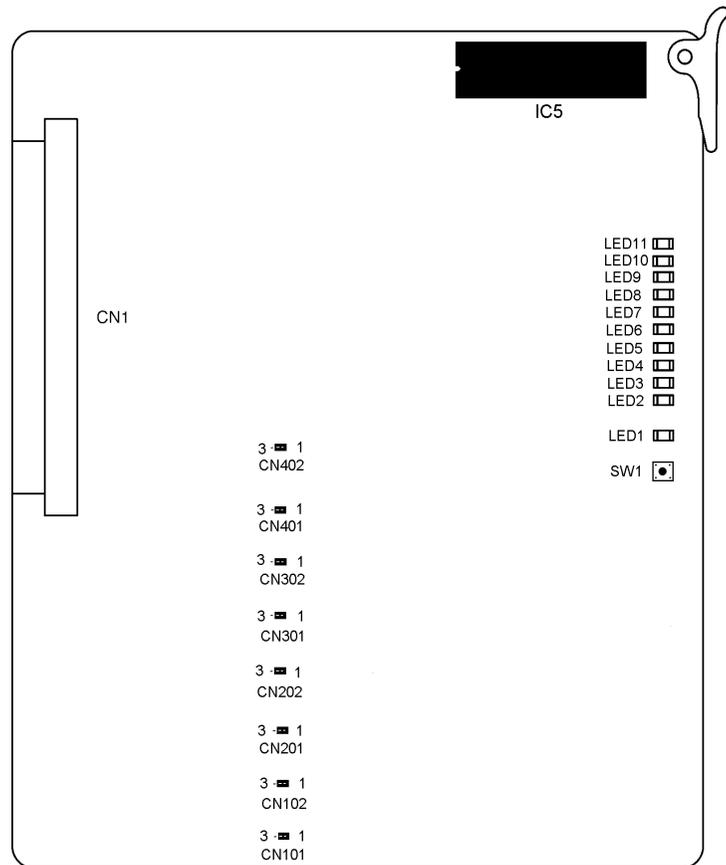
Figure 6-21 BRT(4)-U10 ETU

4.1.2   Installation

When a BRT(4)-U10 ETU is installed, a CLKG-U( ) Unit must be installed on the CPUI( )/U( ) ETU.

Basic Port Package

A maximum of two BRT(4)-U10 ETUs can be installed in any interface slot in the system. The system limitation is 16 trunks.

The maximum number of BRT(4)-U10 ETUs depends on other trunk cards installed. This ETU shares the total number of CO/PBX lines in the system.

Expanded Port Package

A maximum of eight BRT(4)-U10 ETUs can be installed in any interface slot in the system. The system limitation is 64 trunks.

The maximum number of BRT(4)-U10 ETUs depends on other trunk cards installed. This ETU shares the total number of CO/PBX lines in the system.

4.1.3   Switch Settings

SW1 is the reset switch.

4.1.4   Jumpers

CN101 and CN102

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

CN201 and CN202

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

CN301 and CN302

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

CN401 and CN402

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

4.1.5   LED Indications

Refer to Table 6-14 BRT(4)-U10 ETU LED Indications.

Table 6-14 BRT(4)-U10 ETU 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 CKT 1	Busy	Not Used	Idle
LED 7	B1 or B2 status CKT 2	Busy	Not Used	Idle
LED 8	B1 or B2 status CKT 3	Busy	Not Used	Idle
LED 9	B1 or B2 status CKT 4	Busy	Not Used	Idle
LED 10	Communication or self-diagnostics	Communication error or Self-diagnostics in progress	Not Used	Normal
LED 11	Communication or self-diagnostics	Communication error or Self-diagnostics in progress	Not Used	Normal

4.1.6   Connectors

The following connector is included:

CN1Connects to the backplane.

4.1.7   Connections

MDF for BRT ETU

TELCO

Network and CO

U Interface / 2 Wire

NT1   ST/4 Wire   TA 1 / TB 1 / RA 1 / RB 1   Circuit 1

NT1   ST/4 Wire   TA 2 / TB 2 / RA 2 / RB 2   Circuit 2

NT1   ST/4 Wire   TA 3 / TB 3 / RA 3 / RB 3   Circuit 3

NT1   ST/4 Wire   TA 4 / TB 4 / RA 4 / RB 4   Circuit 4
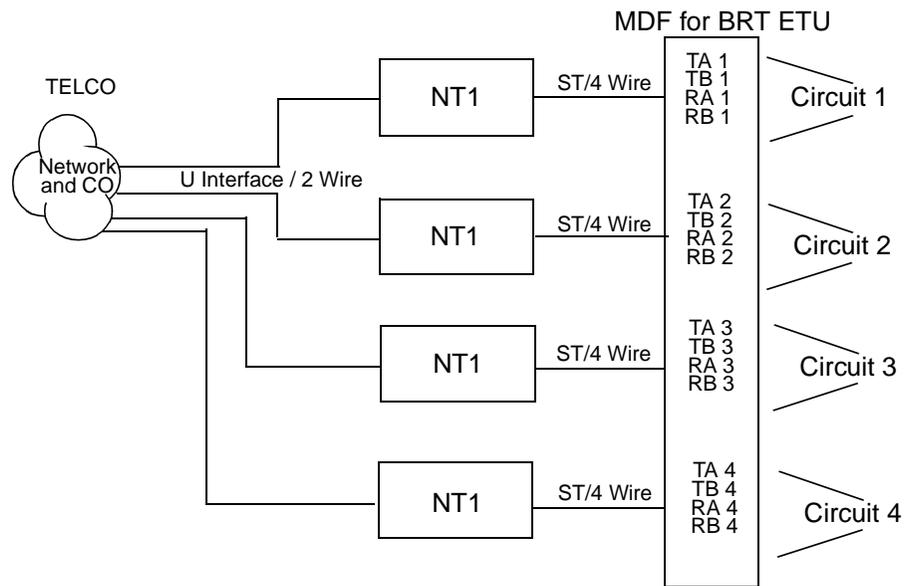
Figure 6-22 BRT(4)-U10 Connections

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.
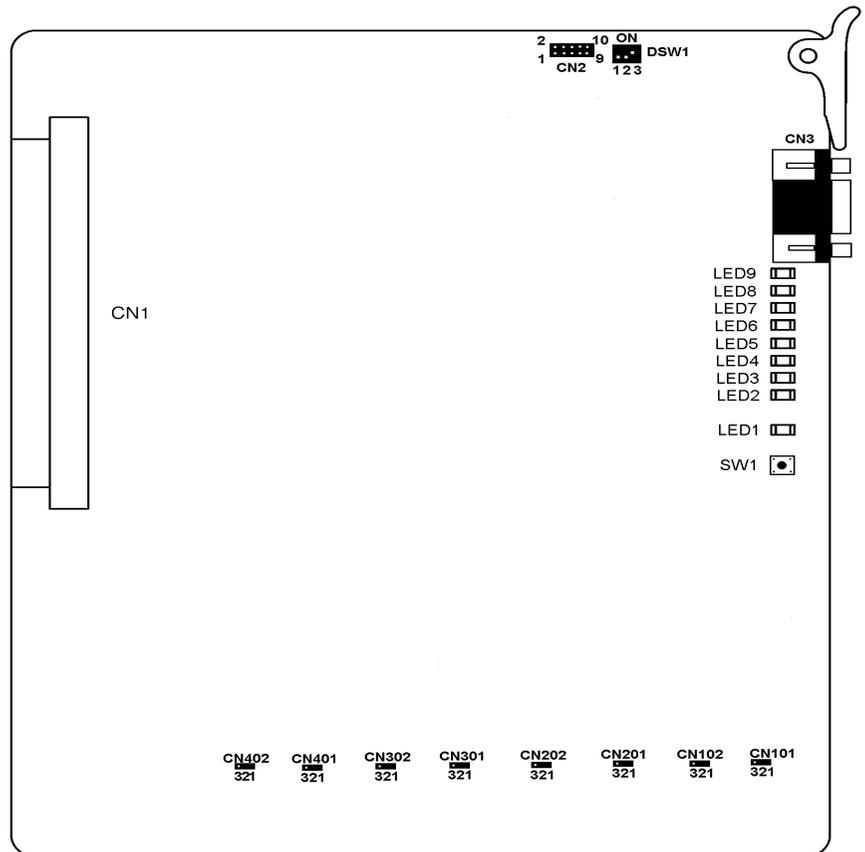
Figure 6-23 BRT(4)-U20 ETU

4.2.2   Installation

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

Basic Port Package

A maximum of two BRT(4)-U20 ETUs can be installed in any interface slot in the system. The system limitation is 16 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.

Expanded Port Package

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

CN201 and CN202

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

CN301 and CN302

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

CN401 and CN402

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

4.2.5   LED Indications

Refer to Table 6-15 BRT(4)-U20 LED Indications.

Table 6-15 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 following connectors are included:

❍   CN1   Connects to the backplane.

❍   CN3   DB9 Pin Male connector used for maintenance

4.2.7   Connections
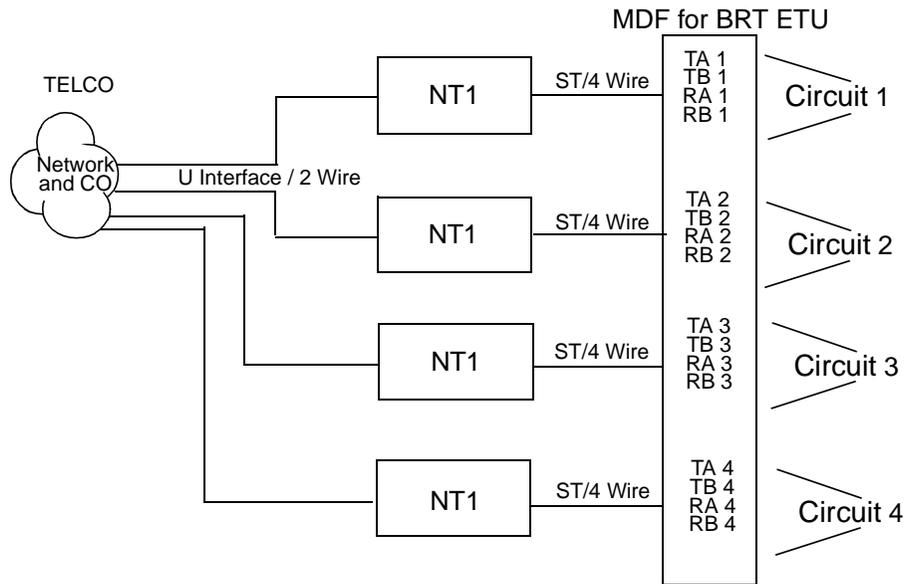
Figure 6-24 BRT(4)-U20 Connections

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

4.3.1   Description

The COI(4)/(8)-U( ) ETU is 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 has 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( ) ETU 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 6-25 COI(8)-U( ) ETU.
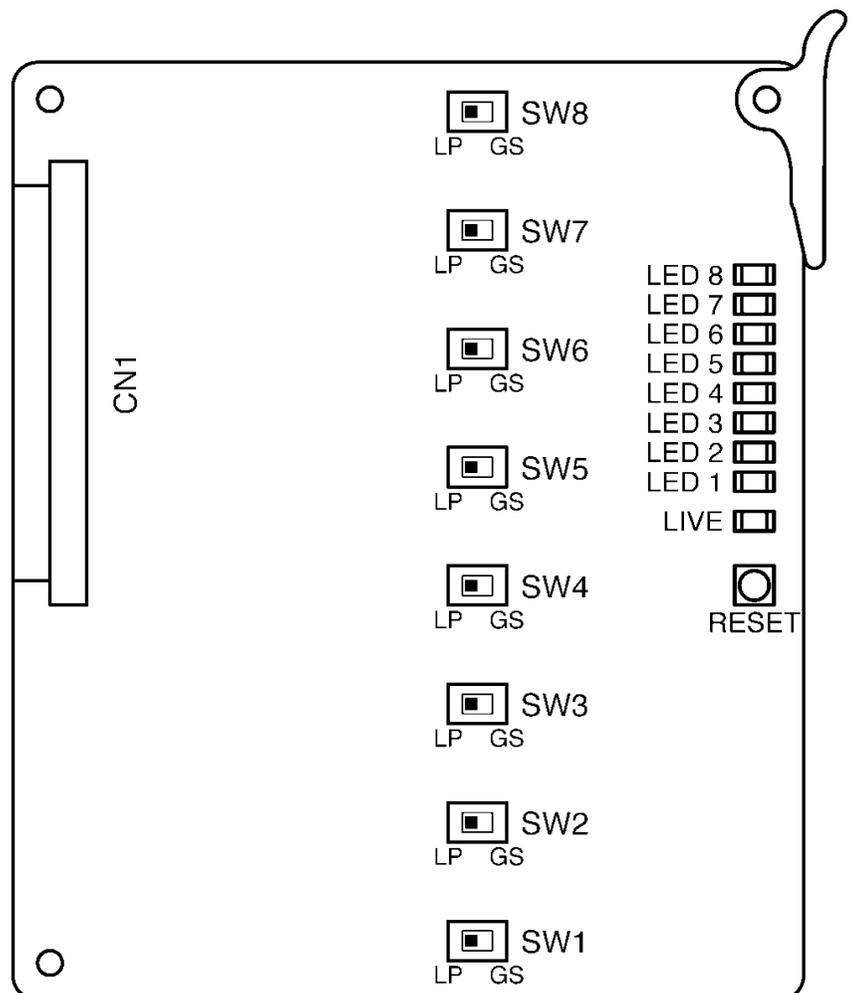
Figure 6-25 COI(8)-U( ) ETU

4.3.2   Installation

Basic Port Package

A maximum of four COI(4)-U( ) ETUs or two COI(8)-U( ) ETUs can be installed in any interface slot. The system limitation is 16 trunks.

The maximum number COI(4)/(8)-U( ) ETUs depends on other trunk cards installed. This ETU shares the total number of CO/PBX lines in the system.

Expanded Port Package

A maximum of 16 COI(4)-U( ) ETUs or eight COI(8)-U( ) ETUs can be installed in any interface slot. The system limitation is 64 trunks.

The maximum number COI(4)/(8)-U( ) ETUs depends on other trunk cards installed. This ETU shares the total number of CO/PBX lines in the system.

4.3.3   Switch Settings

Refer to Table 6-48 CMS(2)/(4)-U( ) ETU LED Indicators.

Table 6-16 COI(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)-U10 ETU.
Reset	N/A	Resets the COI ETU

4.3.4   LED Indications

Refer to Table 6-16 COI(8)-U( ) ETU LED Indications.

Table 6-17 COI(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

Table 6-17 COI(8)-U( ) ETU LED Indications

LED	Description	On	Flashing	Off
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 following connector is included:

❍   CN1   Connects to the backplane.

4.3.6   Connections
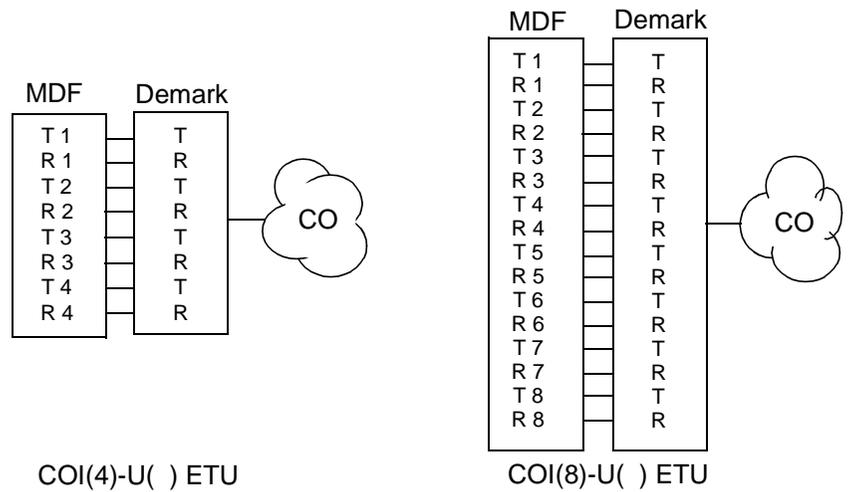
COI(4)-U( ) ETU   COI(8)-U( ) ETU

Figure 6-26 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( ) ETU or COID(4)-U( ) ETU to provide a 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 COI mode. Connections for Ground Start trunks are polarity sensitive.

Fax CO Branch Support is provided on Port 4 only.

Only DTMF signaling is supported.

This ETU can provide an E911 CAMA trunk.

Tip and Ring electrical fuses are provided to comply with UL 1459 requirements.

Figure 6-27 COIB(4)-U10 ETU

4.4.2   Installation

Basic Port Package

A maximum of four COIB(4)-U10 ETUs can be installed in any interface slot. The system is limited by 16 trunks.

The maximum number of COIB(4)-U10 ETUs depends on other trunk cards installed. This ETU shares the total number of CO/PBX lines in the system.

Expanded Port Package

A maximum of 16 COIB(4)-U10 ETUs can be installed in any interface slot when configured as COID ETUs. A maximum of 16 COIB(4)-U10 ETUs can be installed in any interface slot when configured as COI ETUs.   The system is limited by 64 trunks.

The maximum number of COIB(4)-U10 ETUs depends on other trunk cards installed. This ETU shares the total number of CO/PBX lines in the system.

4.4.3   Switch Settings

Refer to Table 6-18 COIB(4)-U10 ETU Default Switch Settings.

Table 6-18 COIB(4)-U10 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)-U10 ETU between COI or COID mode
Reset	N/A	Resets the COIB(4)-U10 ETU

4.4.4   LED Indications

Refer to Table 6-19 COIB(4)-U10 ETU LED Indications.

Table 6-19 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 following connectors are included:

❍   CN1   Connects to the backplane.

❍   CN2   Future

❍   CN3   Future

4.4.6   Connections
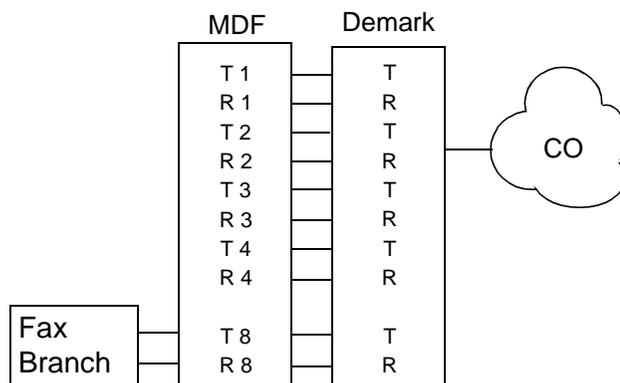
Figure 6-28 COIB(4)-U10 ETU Connections

4.5   COIB(4)-U20/U30 ETU

4.5.1   Description

These ETUs functions are similar to the COI(4)-U( ) or COID(4)-U( ) ETU to provide a Central Office interface. Only the COIB(4)-U30 can support the CO Message Waiting Indication feature **(R2000 or higher**). These ETUs have transmit and receive pad controls. When the 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.

Only DTMF signaling is supported.

This ETU can provide an E911 CAMA trunk on port 3 only.

Tip and RIng electrical fuses are provided to comply with UL 60950 requirements.
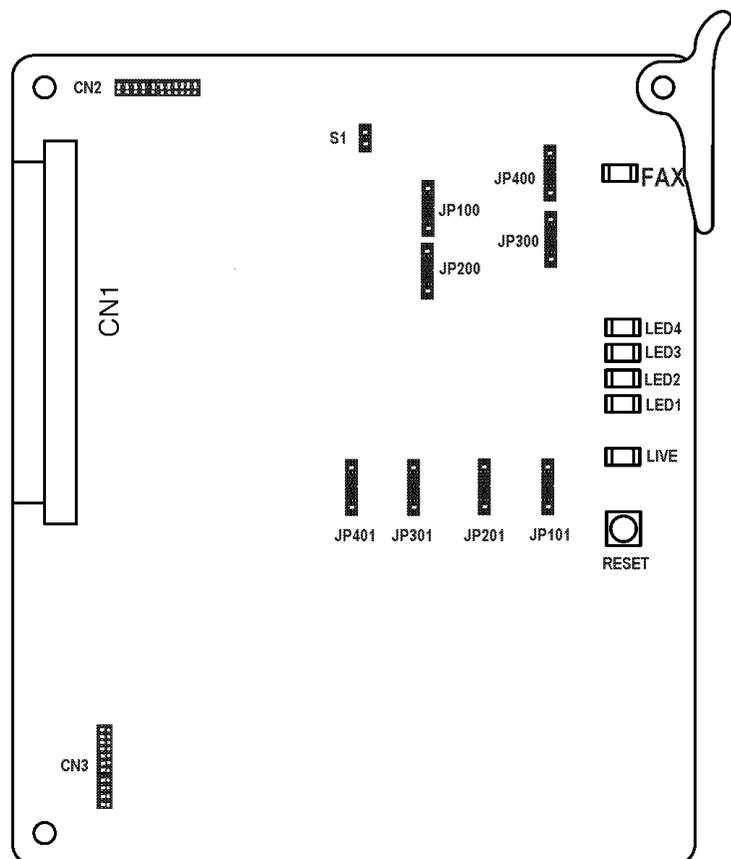
Figure 6-29 COIB(4)-U20/U30 ETU

4.5.2   Installation

Basic Port Package

A maximum of four COIB(4)-U20/U30 ETUs can be installed in any interface slot. The system is limited by 16 trunks.

The maximum number of COIB(4)-U20/U30 ETUs depends on other trunk cards installed. This ETU shares the total number of CO/PBX lines in the system.

Expanded Port Package

A maximum of 16 COIB(4)-U20/U30 ETUs can be installed in any interface slot when configured as COID ETUs . A maximum of 16 COIB(4)-U20 ETUs can be installed in any interface slot when configured as COI ETUs.   The system is limited by 64 trunks.

The maximum number of COIB(4)-U20/U30 ETUs depends on other trunk cards installed. This ETU shares the total number of CO/PBX lines in the system.

4.5.3   Switch Settings

Refer to Table 6-20 COIB(4)-U20/U30 ETU Default Switch/Jumper Settings.

Table 6-20 COIB(4)-U20/U30 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 6-21 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 following connectors are included:

❍   CN1   Connects to the backplane.

❍   CN2   Future

❍   CN3   Future

4.5.6   Connections
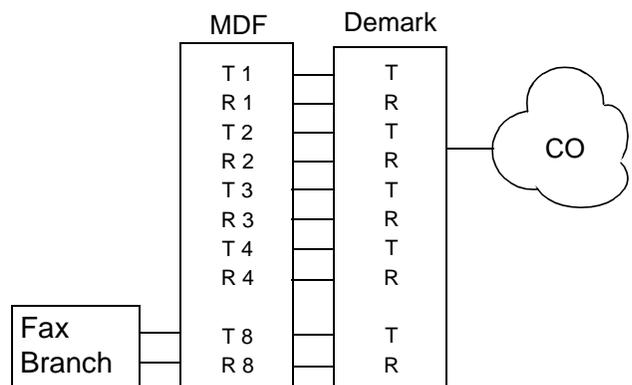
Figure 6-30 COIB(4)-U20/U30 ETU Connections

4.5.7   ETU Feature Chart

Refer to Table 6-22 COIB(4)-U20/U30 ETU Feature Chart.

Table 6-22   COIB(4)-U20/U30 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)-U10	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.

➢   The COIB(4)-U20/U30 ETU supports CAMA trunks on port 3 and the COIB(8)-U20/U30 ETU supports CAMA trunks on ports 3 and 7. Other ETUs listed in this table (with the exception of COIB(8)-U( ), support CAMA trunks on all ports.

➢   **R2000 or higher** is required for CO Message Indication on COIB(4)/(8)-U30.

4.6   COIB(8)-U20/U30 ETU

4.6.1   Description

These ETU functions are similar to the COI(8)-U( ) or COID(8)-U( ) ETU to provide Central Office Interface. Only the COIB(8)-U30 ETU can support the CO Message Waiting Indication Feature (**R2000 or higher**). Transmit and receive pad controls have been added to the COIB(8)-U20/U30 ETU. When the 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. Only DTMF signaling is supported.

This ETU can provide a CAMA trunk for E911.

CAMA trunk support is provided on COIB(8)-U20/U30 ports 3 or 7 only.

Tip and Ring electrical fuses are provided to comply with UL 60950 requirements. Refer to Figure 6-31 COIB(8)-U20/U30 ETU.
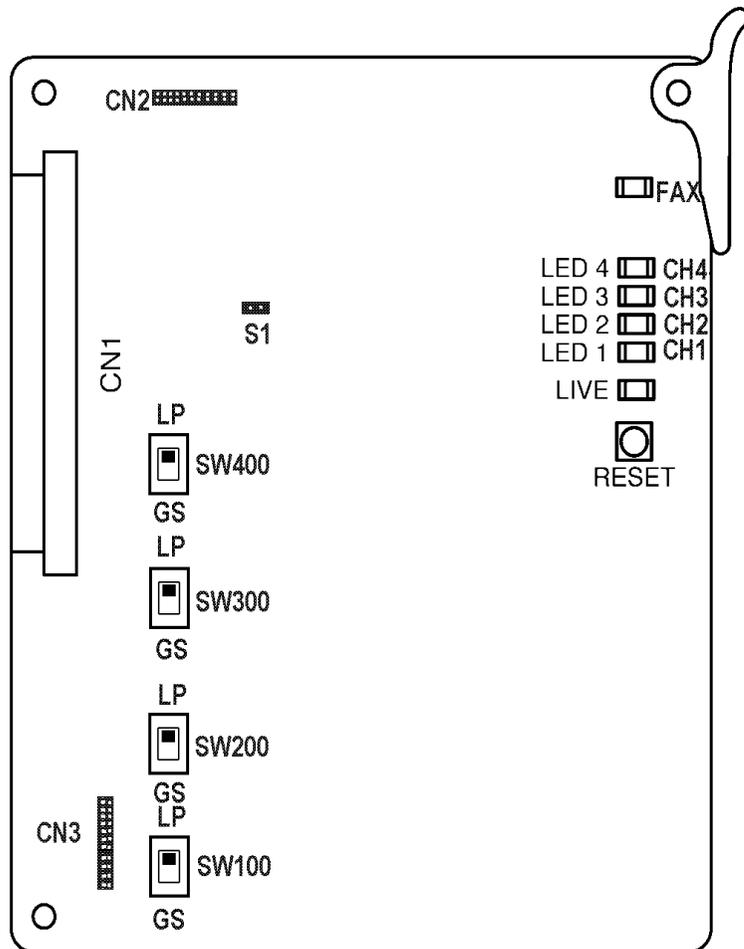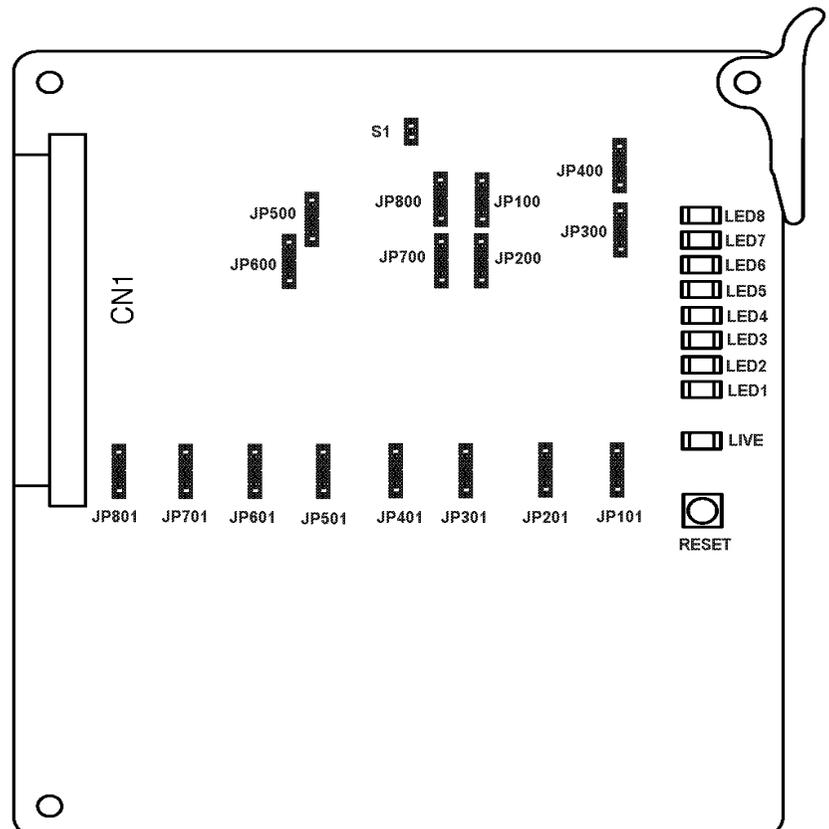

Figure 6-31 COIB(8)-U20/U30 ETU

4.6.2   Installation

Basic Port Package

A maximum of two COIB(8)-U20/U30 ETUs can be installed in any interface slot. The system is limited by 16 trunks.

The maximum number of COIB(8)-U20/U30 ETUs depends on other trunk cards installed. This ETU shares the total number of CO/PBX lines in the system.

Expanded Port Package

A maximum of eight COIB(8)-U20/U30 ETUs can be installed in any interface slot when configured as COID ETUs . A maximum of eight COIB(8)-U20/U30 ETUs can be installed in any interface slot when configured as COI ETUs.   The system is limited by 64 trunks.

The maximum number of COIB(4)-U20/U30 ETUs depends on other trunk cards installed. This ETU shares the total number of CO/PBX lines in the system.

4.6.3   Switch Settings

Refer to Table 6-23 COIB(8)-U20/U30 ETU Default Switch/Jumper Settings.

Table 6-23 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

Refer to Table 6-24 COIB(8)-U20/30 ETU LED Indications.

Table 6-24   COIB(8)-U20/30 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 following connector is included:

❍   CN1   Connects to the backplane.

4.6.6   Connections
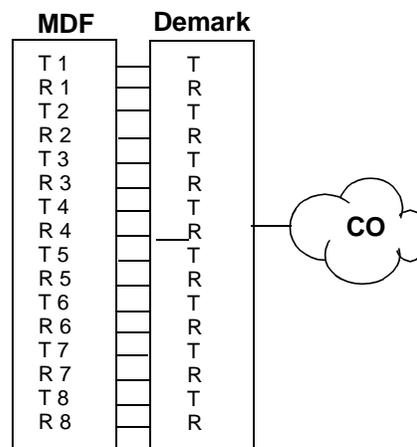
Figure 6-32   COIB(8)-U20/U30 ETU Connections

4.6.7   ETU Feature Chart

Refer to Table 6-25 COIB(8)-U20/U30 ETU Feature Chart.

Table 6-25   COIB(8)-U20/U30 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)-U10	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.

➢   The COIB(4)-U20/U30 ETU supports CAMA trunks on port 3 and the COIB(8)-U20/U30 ETU supports CAMA trunks on ports 3 and 7. Other ETUs listed in this table (with the exception of COIB(8)-U( ), support CAMA trunks on all ports.

➢   **R2000 or higher** is required for COIB(4)/(8)-U30 ETU.

4.7   DID(4)-U( ) ETU

4.7.1   Description

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.

Immediate, wink start, second dial tone, and delay dial signaling can be combined on this ETU.
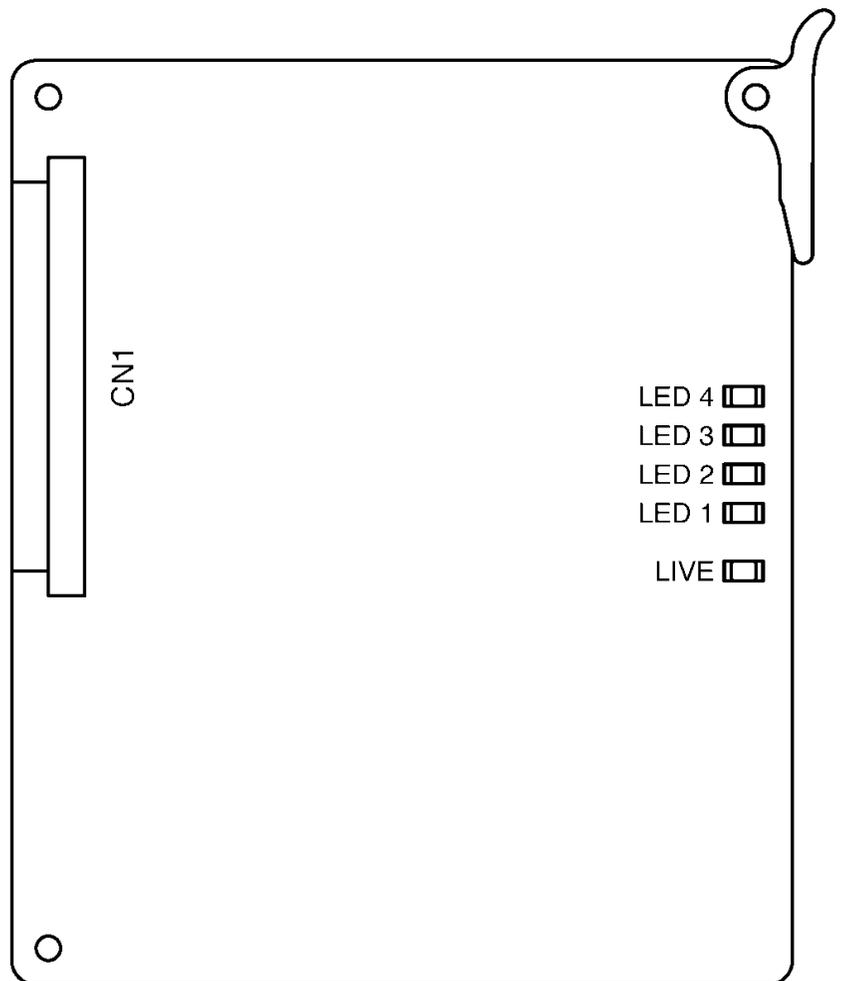
Figure 6-33 DID(4)-U( ) ETU

4.7.2   Installation

Basic Port Package

A maximum of four DID(4)-U( ) ETUs can be installed in slots
S1~S8.

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

Expanded Port Package

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

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

4.7.3   LED Indications

Refer to Table 6-26 DID(4)-U( ) ETU LED Indications.

Table 6-26 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

4.7.4   Connectors

The following connector is included:

❍   CN1   Connects to the backplane.

4.7.5   Connections

Figure 6-34 DID(4)-U( ) ETU Connections

4.8   DTI-U10~30 ETU

4.8.1   Description

The DTI-U10~30 is a Digital Trunk Interface that terminates 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 ETU. Dial Pulse dialing, DTMF, Tie line (E&M) and DID are supported. The DTI ETU has 24 built-in DTMF detectors. Each trunk is assigned in groups of four.

Only the DTI-U20 ETU supports Automatic Number Indication (ANI). When channels are assigned to ANI, the DTI-U20 ETU supports Feature Group D. The DTI-U20 ETU also supports Feature Group D incoming MF/outgoing DTMF signaling.

The DTI-U30 ETU supports the K-CCIS common channel signaling feature with point-to-point E&M Tie lines.

Figure 6-35 DTI-U10~30 ETU

4.8.2   Installation

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

Basic Port Package

A maximum of four DTI ETUs can be installed in any slot. The system is limited by 16 trunks.

The maximum number of DTI ETUs depends on other trunk cards installed. This ETU shares the CO/PBX lines in the system.

Expanded Port Package

A maximum of eight DTI ETUs can be installed in any slot. The system is limited by 64 trunks.

The maximum number of DTI ETUs depends on other trunk cards installed. This ETU shares the CO/PBX lines in the system.

The maximum number of DTI ETUs and PRT(1)-U( ) ETUs that can be installed is 14 per system.

4.8.3   Switch Settings

Refer to .

Table 6-27 DTI-U10~30 ETU Default Switch Settings

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

4.8.4   LED Indications

Refer to Table 6-28 DTI-U10~30 ETU LED Indications.

Table 6-28 DTI-U10~30 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

4.8.5   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.

4.8.6   Connectors

The following connector is included:

❍   CN1   Connects to the backplane.
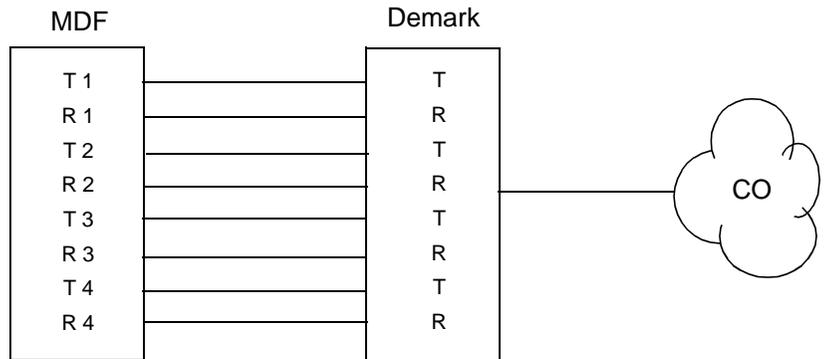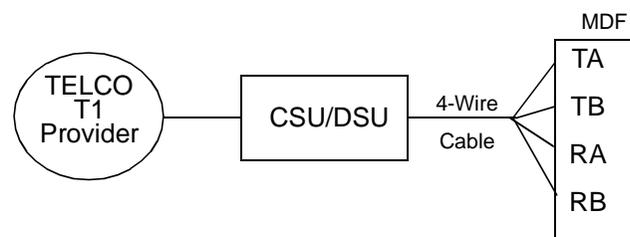
Figure 6-36 DTI-U( ) ETU Connector

4.9   DTI-U40 ETU

4.9.1   Description

The DTI-U40 ETU is a Digital Trunk ETU that terminates FT1 trunks (up to 24 DS-0 channels). This ETU supports K-CCIS, ANI/DNIS trunks, and CSU Less Function on T1. On-site firmware upgrade is supported.

A combination of Loop Start and Ground Start signaling can be used on the DTI-U40 ETU. Dial Pulse dialing, DTMF, Tie line (E&M) and DID are supported. The DTI-U40 ETU has 24 built-in DTMF detectors. Each trunk is assigned in groups of four.

When channels are assigned to ANI, the DTI-U40 ETU supports Feature Group D. The DTI-U40 ETU also supports Feature Group D incoming MF/outgoing DTMF signaling.

The DTI-U40 ETU supports the K-CCIS common channel signaling feature with point-to-point E&M Tie lines.
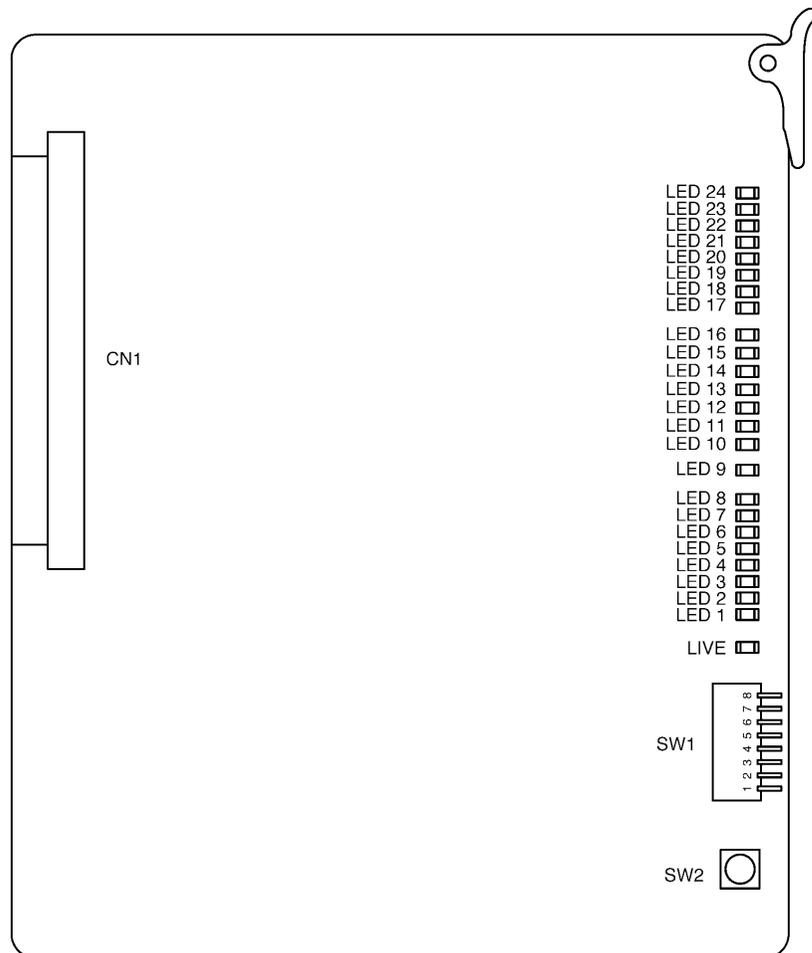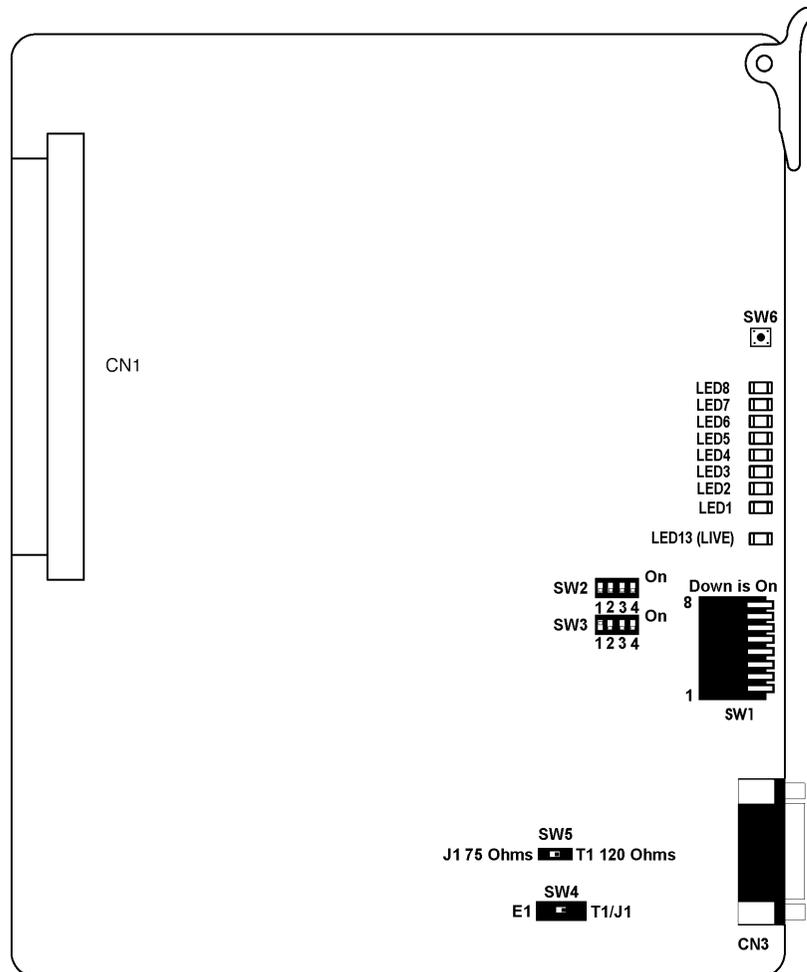

Figure 6-37   DTI-U40 ETU

4.9.2   Installation

When a DTI-U40 ETU is installed, a CLKG-U( ) Unit must be installed on the CPUI( )/U( ) ETU.

Basic Port Package

A maximum of four DTI-U40 ETUs can be installed in any slot. The system is limited by 16 trunks.

The maximum number of DTI-U40 ETUs depends on other trunk cards installed. This ETU shares the CO/PBX lines in the system.

Expanded Port Package

A maximum of eight DTI-U40 ETUs can be installed in any slot. The system is limited by 64 trunks.

The maximum number of DTI-U40 ETUs depends on other trunk cards installed. This ETU shares the CO/PBX lines in the system.

The maximum number of DTI-U40 ETUs and PRT(1)-U( ) ETUs that can be installed is 14 per system.

4.9.3   Switch Settings

Refer to Table 6-29 DTI-U40 Default Switch Settings.

Table 6-29 DTI-U40 Default Switch Settings

Switch	Setting		Description
SW1–1	ON: Use channel indication by LEDs 1~8 OFF: Line State indication by LEDs 1~8 (**Default**)		Used to assign LED Indications
SW1–2 SW1–3	When SW1-1 is ON: SW1-2 SW1-3		
	ON	ON	Not Applicable
	OFF	OFF	CH1~ CH8 indication (**Default**) ON Used
	ON	OFF	CH9~ CH16 indication ON Used
	OFF	ON	CH17~ CH24 indication ON Used

Table 6-29 DTI-U40 Default Switch Settings (Continued)

Switch	Setting	Description
SW1-4	ON: DS-1 Mode (T1 with CSU Function; external CSU not required) OFF: DSX-1 Mode (T1 without CSU Function; external CSU required) When the system is connected behind an external Channel Service Unit (CSU), this switch must be ON. ➢ DSX-1 interfaces T1 between the PBX and CSU. Digital Signal Crossconnect Level 1 (DS-1) interfaces T1 between the PBX and network with no CSU (CSU less). Both are standard interfaces accepted by Telco. Both have the same electrical characteristics recommended by EIA/TIA 464, but DSX-1 is preferred because most PBXs have a CSU/DSU (DSX-1 interface) installed at the customer site for T1 line protection and ease of measurements and troubleshooting.	
SW1-5 SW1-6	When SW1-4 is ON SW1-5 SW1-6	
	OFF OFF	When LBO = 0dB
	ON OFF	When LBO = -7.5dB
	OFF ON	When LBO= -15dB
	ON ON	When LBO = -22.5dB
	➢ LBO (Line Build Out) adds a combination of induction, capacitance, and resistance to a cable pair so its electrical length may be increased by a desired level of impedance and loss characteristics.	
SW1-7 SW18	When SW1-4 is ON SW1-7 SW1-8	
	OFF OFF	Normal Mode (Default)
	ON OFF	Line Loop Back Mode
	OFF ON	DTE Loop Back Mode
	ON ON	Local Loop Back Mode
	➢ In Local Loop Back, data goes through the entire transmit and receive process. Line Loop Back allows user to check transmission line continuity.	

Table 6-29 DTI-U40 Default Switch Settings (Continued)

Switch	Setting		Description
SW2-1 SW2-2	Select Running Mode SW2-1	SW2-2	
	ON	ON	Test program mode
	ON	OFF	Not Used
	OFF	ON	F/W upgrade mode (on-site upgrade)
	OFF	OFF	Normal operation (Default)
SW2-3	ON: To be determined OFF: Normal operation (Default)		
SW2-4	ON: Watch Timer OFF OFF: Watch Timer ON (Default)		

Switch	Setting	Description
SW3-1	ON: T1 mode (Default) OFF: No operation	
SW3-2	ON: To be determined OFF: No operation (Default)	
SW3-3	ON: To be determined OFF: No operation (Default)	
SW3-4	ON: To be determined OFF: No operation (Default)	
	➢ The DTI-U40 works only with the SW3 Default settings.	

SW4/5	SW4	SW5	Termination mode
	T1/J1	T1 120Ω	T1 mode (Default)
	T1/J1	J1 75Ω	J1 mode
	E1	T1 120Ω	E1 mode (120Ω termination)
	E1	J1 75Ω	E1 mode (75Ω termination)
	➢ E1 Services are not supported		
SW6			Reset Switch

4.9.4   LED Indications

Refer to Table 6-30 DTI-U40 ETU LED Indications.

Table 6-30   DTI-U40 ETU LED Indications

LED	SW1-1 OFF	With SW1-1 ON
LED 1	Link Indication ON = Activated	CH1 or CH9 or CH17 Indication ON = Used
LED 2	LSA Error Indication ON = Error	CH2 or CH10 or CH18 Indication ON = Used
LED 3	AIS Error Indication ON = Error	CH3 or CH11 or CH19 Indication ON = Used
LED 4	OOF Error Indication ON = Error	CH4 or CH12 or CH20 Indication ON = Used
LED 5	RAI Error Indication ON = Error	CH5 or CH13 or CH21 Indication ON = Used
LED 6	Loop Back Indication ON = Loop Back mode	CH6 or CH14 or CH22 Indication ON = Used
LED 7	Self-Test Indication ON = Testing	CH7 or CH15 or CH23 Indication ON = Used
LED 8	Used CH Indication ON = Using a channel	CH8 or CH16 or CH24 Indication ON = Used
LED 9	LIVE Indication ON = Activate	

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 following connector is included:

❍   CN1   Connects to the backplane.

❍   CN3   Serial Port DB-9

4.9.7   Connections

Although the DTI-U40 ETU can connect directly to the Telco TI Smart Jack, your Telco may require you to purchase and install a separate Channel Service Unit (CSU) between the Smart Jack and the DTI-U40 ETU.
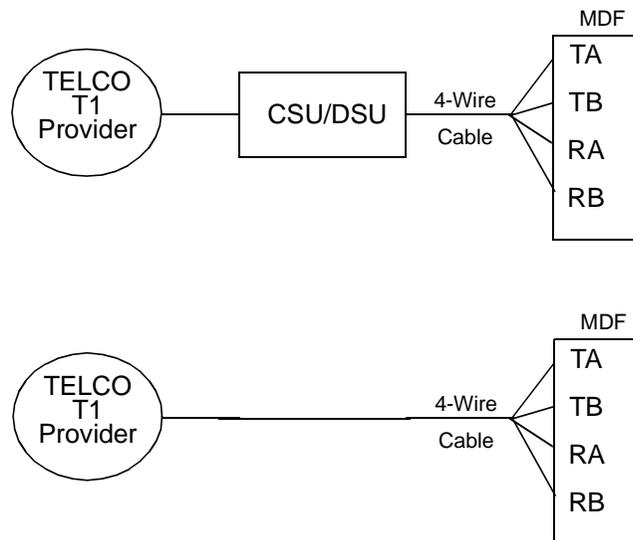
Figure 6-38 DTI-U40 ETU Connectors

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).
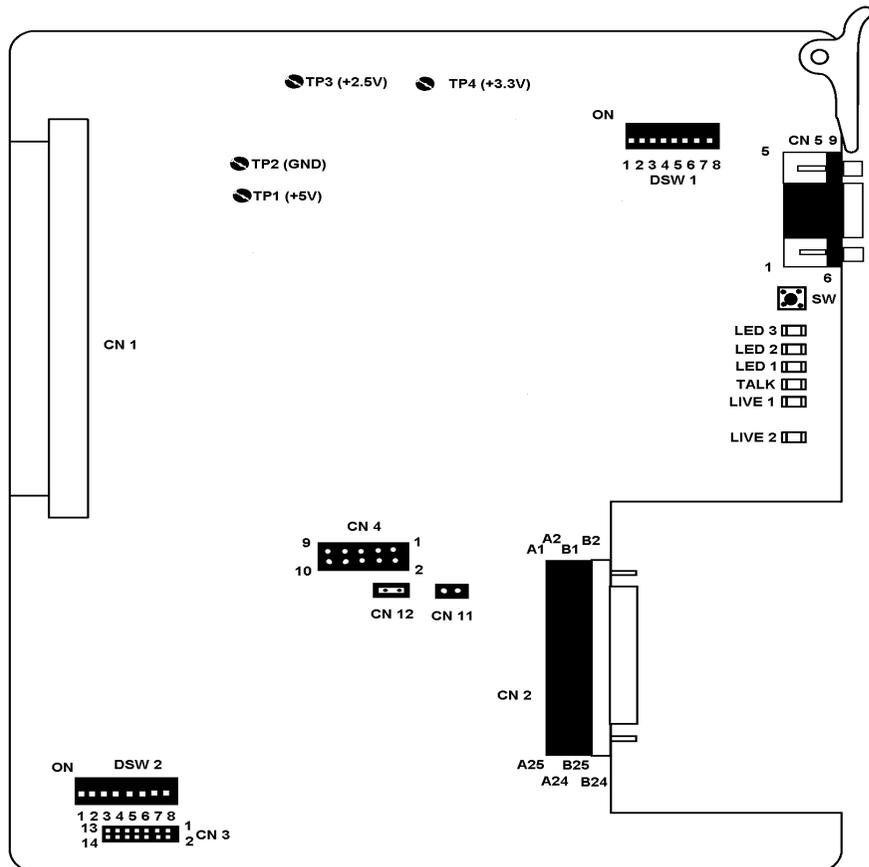
Figure 6-39 EXPT(2)-U( ) ETU

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

Table Table 6-31 EXPT(2)-U( ) ETU DSW 1 Switch Settings shows the switch settings for DSW 1 and Table 6-32 EXPT(2)-U( ) ETU DSW 2 Switch Settings shows the DSW 2 switch settings.

Table 6-31 EXPT(2)-U( ) ETU DSW 1 Switch Settings

Switch		Setting	Purpose
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.

Table 6-32 EXPT(2)-U( ) ETU DSW 2 Switch Settings

Switch		Setting	Purpose
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

Table 6-33 EXPT(2)-U( ) ETU Jumper Settings

Jumper	Setting	Purpose
CN 11	Open	Normal Operation (**default)**
	Short:	Maintenance mode
CN 12	Open	Maintenance mode
	Short:	Normal Operation (**default)**

Do Not change the factory default settings.

4.10.5   LED Indications

Refer to Table 6-34 EXPT(2)-U( ) ETU LED Description.

Table 6-34 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

The following connectors are included:

CN 1   Connects to the backplane.

CN 2   Connects to CN3 on the CPUI( )-U( ) ETU or CN 3 on the EXP-U( ) ETU (Installed in the first expansion cabinet using an expansion cable).

CN 3   For Maintenance

CN 4   For Maintenance

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:
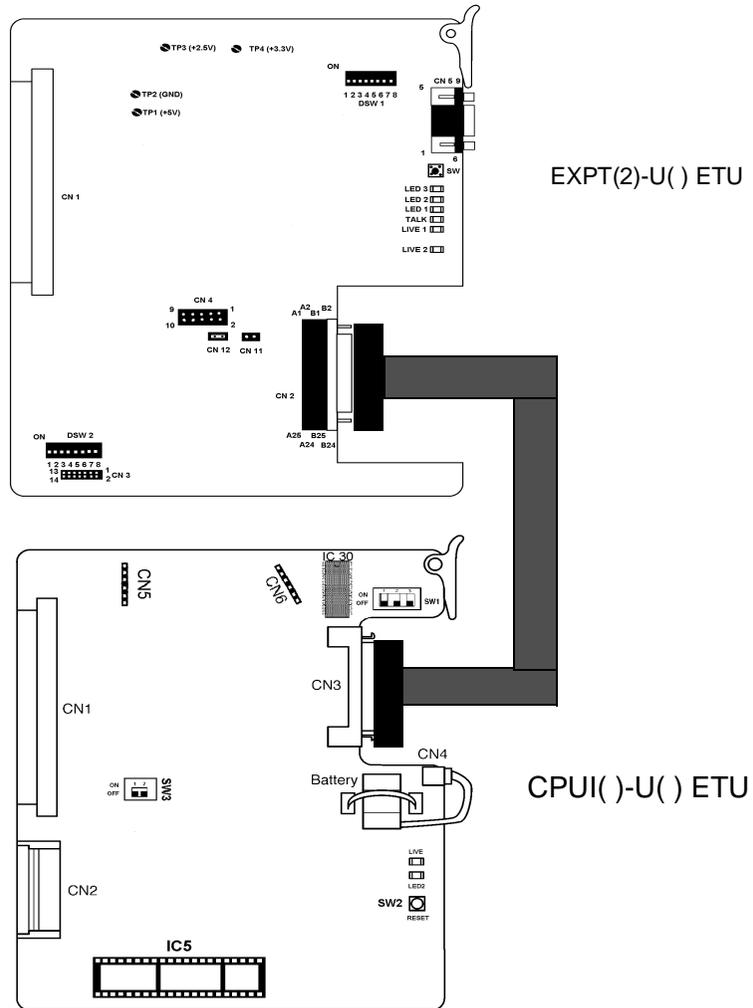
Figure 6-40 Connect EXPT ETU to CPUI ETU
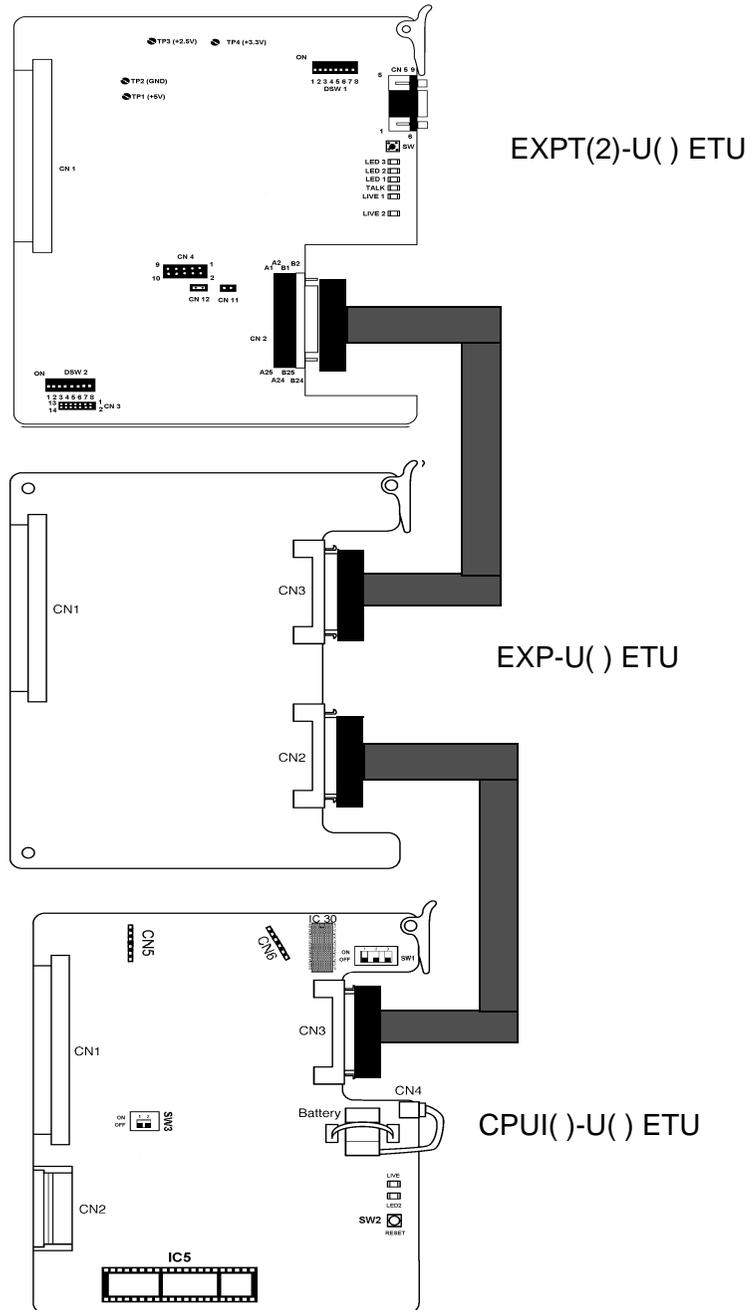
Figure 6-41 Connect EXPT to EXP to CPUI ETU

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

4.11.1   Description

IPT(4)-U10 ETU

This IP Gateway ETU is an optional Interface that can combine trunk calls into Gateway trunks.

This ETU can emulate TLI(2)-U, DID(4)-U( ), COI(4)-U( ), COID-U( ), or DTI-U( ) ETU.   Refer to the applicable ETU assignment for the trunk capacity.

IPT(8)-U10 ETU

This IP Gateway ETU is an optional Interface that can combine trunk calls into Gateway trunks.

This ETU can emulate COI(8)-U( ), COID(8)-U( ), or DTI-U( ) ETU. Refer to the applicable ETU assignment for the trunk capacity.
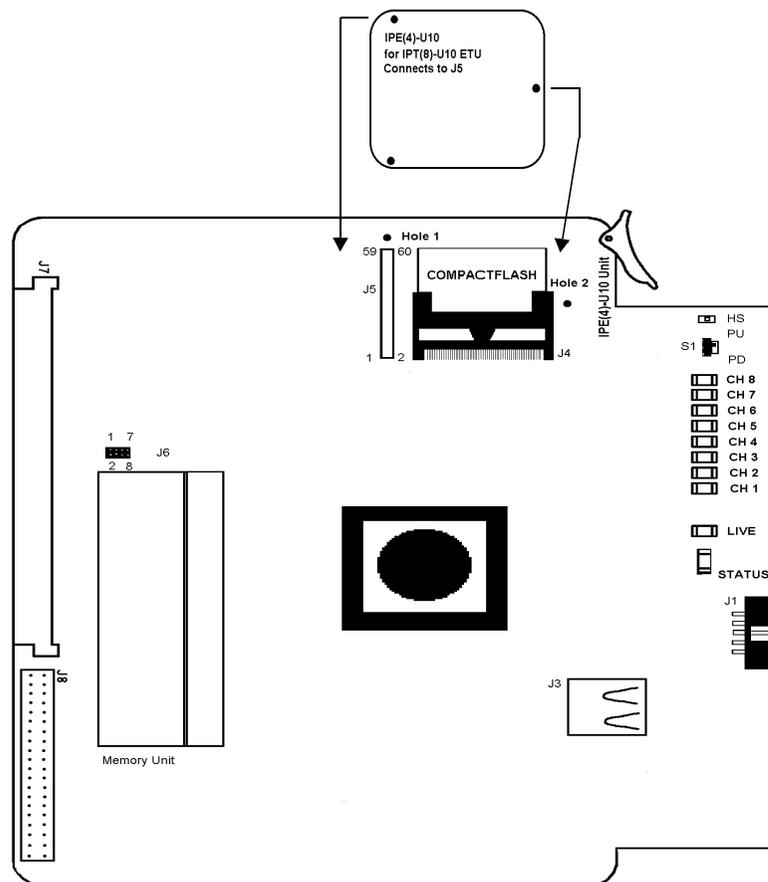
Figure 6-42 IPT(8)-U( ) ETU

4.11.2   Options

Refer to Table 6-35 IP Gateway Options.

Table 6-35 IP Gateway Options

No.	Configuration	Number of Ports		Installation Slot	
		IPT(4)	IPT(8)	Basic	Expansion
1	COI	4	8	S1~S8	S1~S8
2	COID	4	8	S1~S8	S1~S8
3	DID	4	4	S1~S8	S1~S8
4	TLI	2	2	S1~S8	S1~S8
5	DTI	4	8	S1~S8	S1~S8

4.11.3   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 for detailed instructions.

Basic Port Package

A maximum of four IPT(4)-U( ) ETUs can be installed in any slot. The system is limited by 16 trunks.

A maximum of two IPT(8)-U( ) ETUs can be installed in any slot. The system is limited by 16 trunks.

The maximum number of IPT(4)/(8)-U( ) ETUs that can be installed depends on other trunk cards installed. This ETU shares the CO/PBX lines in the system.

Expanded Port Package

A maximum of 15 IPT(4)-U( ) ETUs can be installed in any slot. The system is limited by 64 trunks.

A maximum of seven IPT(8)-U( ) ETUs can be installed in any slot. The system is limited by 64 trunks.

The maximum number of IPT(4)/(8)-U( ) ETUs that can be installed depends on other trunk cards installed. This ETU shares the CO/PBX lines in the system.

4.11.4   Switch Settings

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

4.11.5   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.

❍   CH 1~8

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 ETU is receiving power from the KSU.

❍   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.

❍   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

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

The IPE(4)-U10 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)-U10 Unit standoffs with Holes 1 and 2 and
      connector J1 with IPT(4)-U( ) ETU connector J5, and press
      down until the IPE(4)-U10 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.

4.11.7   Connectors

The following connectors are included:

❍   CN1   Connects to the backplane.

❍   RJ-45   Connects to the Ethernet.

4.11.8   Connections
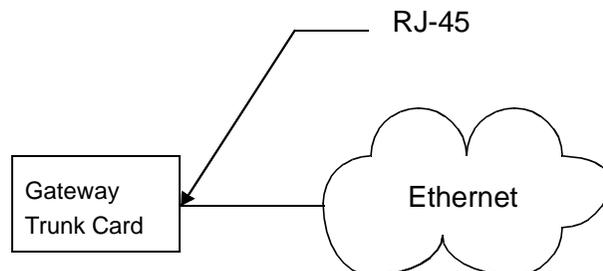
Figure 6-43 IPT(4)/(8)-U( ) ETU Connections

4.12   PRT(1)-U( ) ETU

4.12.1   Description

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.
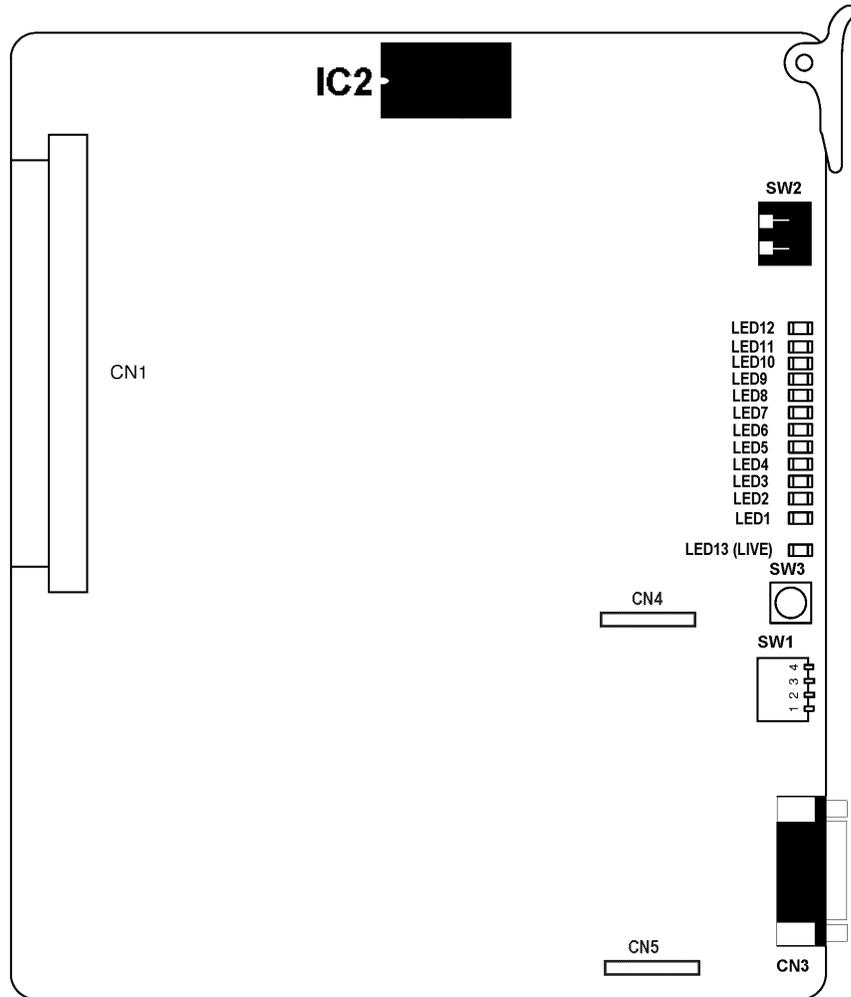
Figure 6-44 PRT(1)-U( ) ETU

4.12.2   Installation

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

Basic Port Package

A maximum of four PRT(1)-U( ) ETUs can be installed in any slot.

The maximum number of PRT(1)-U( ) ETUs that can be installed depends on other trunk cards installed. The system is limited by 16 trunks.

Expanded Port Package

A maximum of eight PRT(1)-U( ) ETUs can be installed in any slot.

The maximum number of PRT(1)-U( ) ETUs that can be installed depends on other trunk cards installed. The system is limited by 64 trunks.

✎   The maximum number of PRT(1)-U( ) ETU and DTI-U( ) ETUs that can be installed is 14 per system.

4.12.3   Switch Settings

SW1, a 4-position DIP switch, assigns the Protocol. Refer to Table 6-36 PRT(1)-U( ) ETU SW1 Settings.

✎   SW1-4 is not used and must be OFF.

Table 6-36 PRT(1)-U( ) ETU SW1 Settings

SW1−1	SW1−2	SW1−3	SW1−4	Protocol
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

Refer to Table 6-37 PRT(1)-U( ) ETU LED Indications.

Table 6-37 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

Table 6-37 PRT(1)-U( ) ETU LED Indications

LED	Description	On	Flashing	Off
LED	Channel/ Trunk Status	Not Used	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
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.

❍   Layer 1 Status

LED Lights red when layer 1 is active. The LED is off when layer 1 is inactive.

❍   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.

❍   Remote Alarm Indication (RAI) Detection

When RAI is received the LED lights red.

❍   Loss of Frame (LOF) Condition Detection

When two of the four or five framing data bits received are in error, the LED lights red.

❍   Alarm Indication Signal (AIS) Detection

When the system is receiving an Alarm Indication Signal from a PRT trunk, the LED lights red.
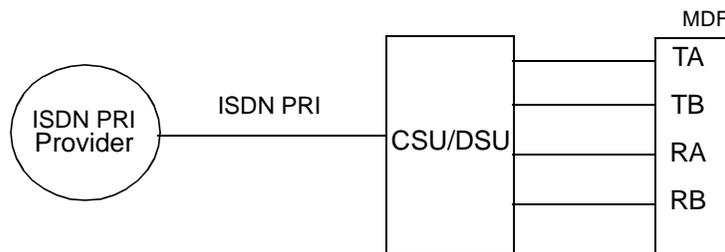
❍   Cyclic Redundancy Check (CRC) Error Event Detection

When a CRC Error occurs, the LED lights red.

❍   Active Call

LED Lights red to indicate an active call.

4.12.6   Connectors

The following connectors are included:

❍   CN1   Connects to the backplane.

❍   CN3   9-pin RS-232C connector used for maintenance

4.12.7   Connections

The CSU may not always be required.

Figure 6-45 PRT(1)-U( ) ETU Connector

4.13   TLI(2)-U( ) ETU

4.13.1   Description

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).

✎   Immediate, wink start, second dial tone, and delay dial signaling can be combined on this ETU.
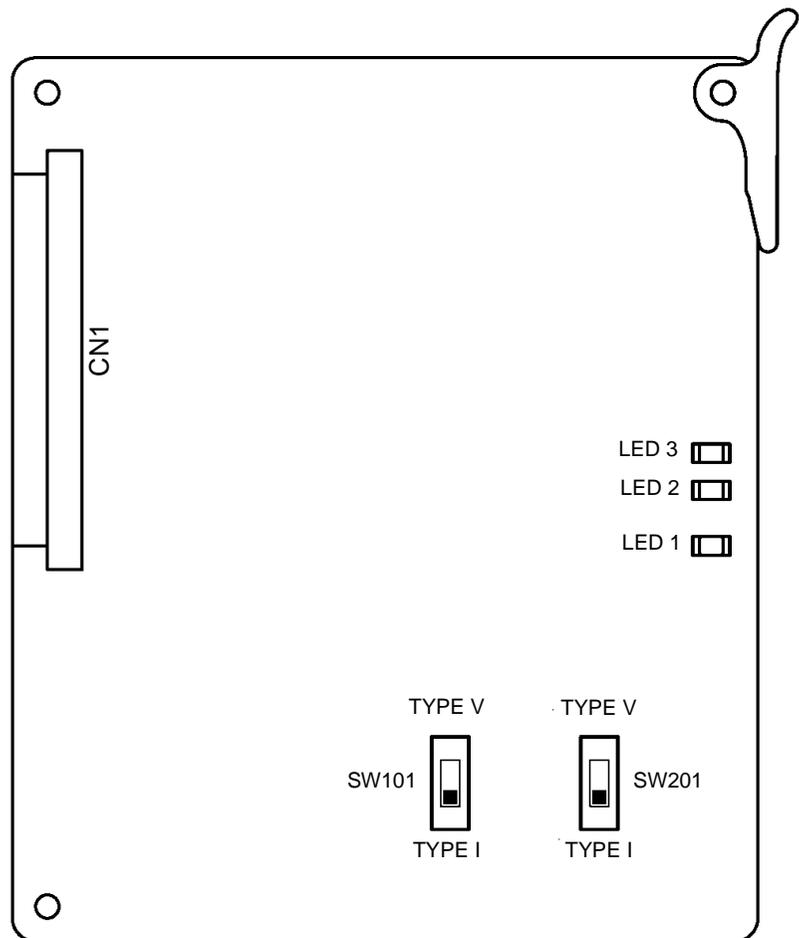

Figure 6-46 TLI(2)-U( ) ETU

4.13.2   Installation

Basic Port Package

A maximum of four TLI(2)-U( ) ETUs can be installed in slots S1~S8.

The maximum number of TLI(2)-U( ) ETUs that can be installed for the depends on other trunk cards installed. The system is limited by 16 trunks.

Expanded Port Package

A maximum of 16 TLI(2)-U( ) ETUs can be installed in slots S1~S8.

The maximum number of TLI(2)-U( ) ETUs that can be installed for the depends on other trunk cards installed. The system is limited by 64 trunks.

4.13.3   Switch Settings

Refer to Table 6-38 TLI(2)-U( ) ETU Default Switch Settings.

Table 6-38 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

Refer to Table 6-39 TLI(2)-U( ) ETU LED Indications.
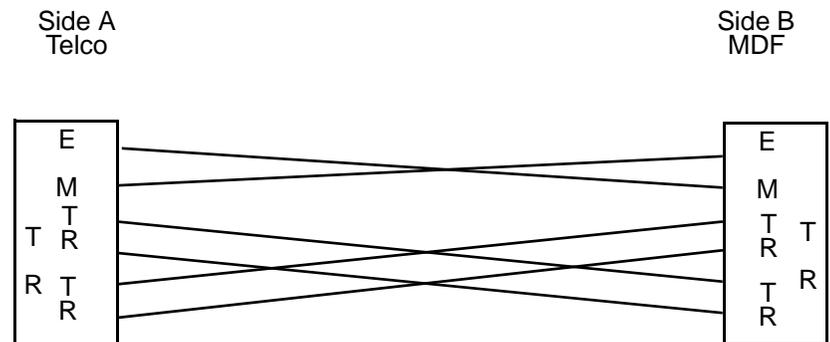
Table 6-39 TLI(2)-U( ) ETU LED Indications

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 following connector is included:

❍   CN1   Connects to the backplane.

4.13.6   Connections

Figure 6-47 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   DPH(4)-U( ) ETU

5.1.1   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( ) ETU 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.
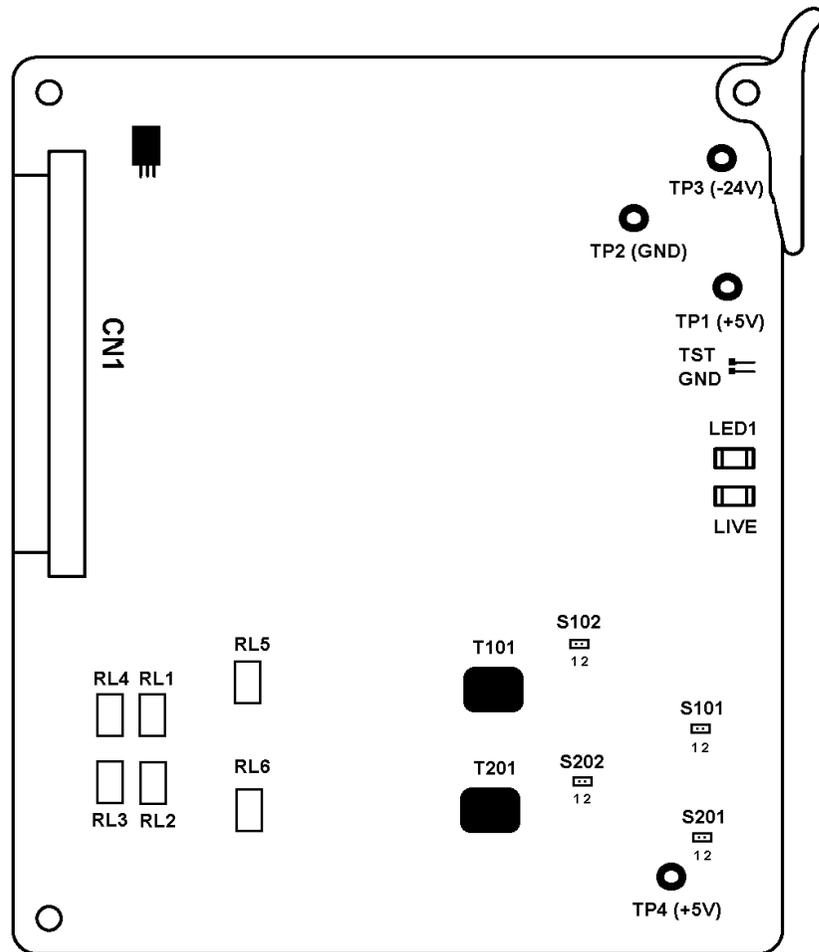

Figure 6-48 DPH(4)-U( ) ETU

5.1.2   Installation

Basic Port Package

Only one DPH(4)-U( ) ETU can be installed in slots S1~S8.

Expanded Port Package

Only one DPH(4)-U( ) ETU can be installed in slots S1~S8.

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

5.1.3   Switch Settings

Refer to Table 6-40 DPH(4)-U( ) ETU Default Jumper Settings.

Table 6-40 DPH(4)-U( ) ETU Default Jumper Settings

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

5.1.4   LED Indications

Live LED indications are listed below.

❍   Blinking Red   Normal Operation

❍   Steady Red   Operation Stopped (Power On)

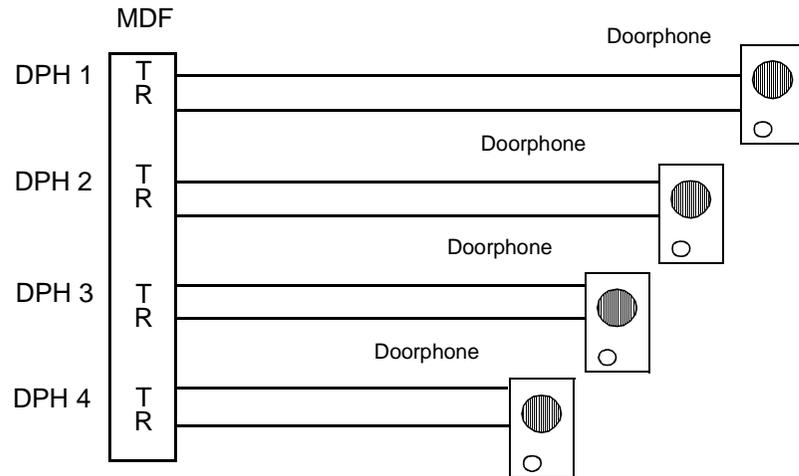❍   Off   No Power

LED 1 indication are listed below.

❍   Steady Red   A Circuit is Busy.

❍   Off   All Circuits are Idle.

5.1.5   Connectors

The following connectors are included:

❍   CN1   Connects to the backplane.

❍   Relay   Connections are Provided at the MDF.

❍   Doorphone   Connections are Provided at the MDF.

Figure 6-49 DPH(4)-U( ) ETU Doorphone Connections

5.1.6   Specifications

❍   Relay contacts are 24 Vdc at 500 mA.

5.2   ESI(8)-U( ) ETU

5.2.1   Description

The Electronic Station Interface ETU contains eight circuits. Each circuit can support any Attendant Console, Multiline Terminal, or Single Line Telephone adapter.
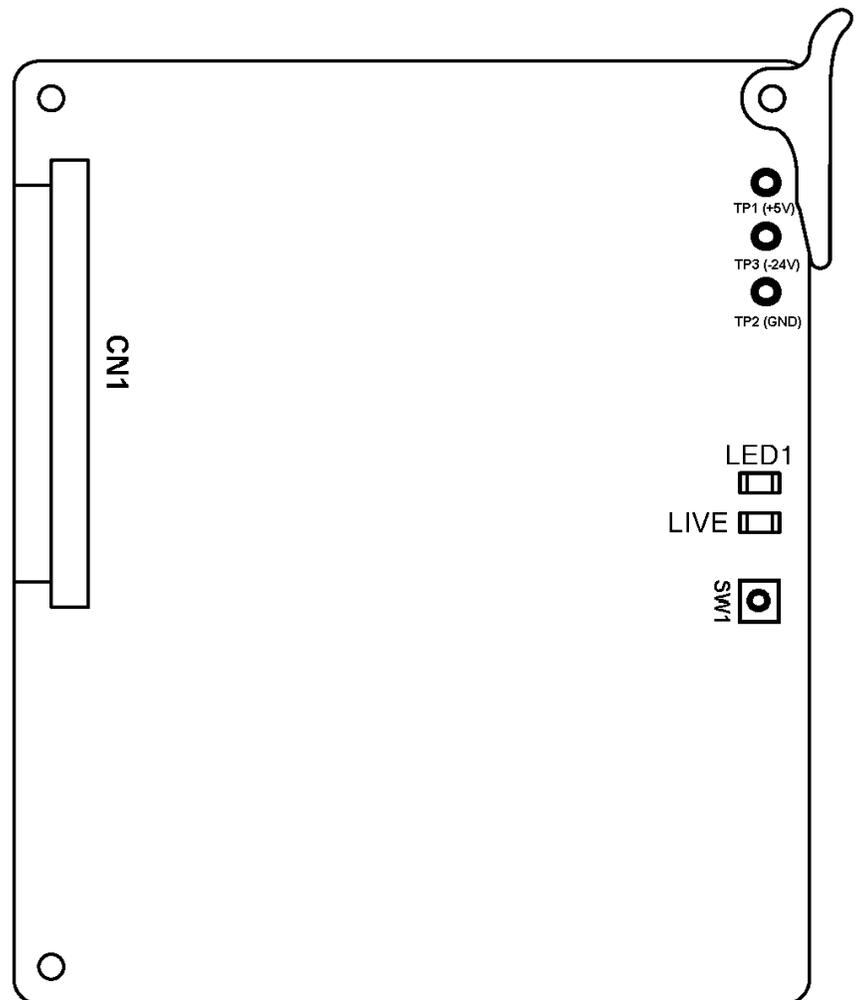

Figure 6-50 ESI(8)-U( ) ETU

5.2.2   Installation

Basic Port Package

A maximum of four ESI(8)-U( ) ETUs can be installed in slots S1~S8.

The maximum number of ESI(8)-U( ) ETUs that can be installed depends on other station cards installed. The system is limited by 32 stations. This ETU shares the total number of station ports in the system.

Expanded Port Package

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

The maximum number of ESI(8)-U( ) ETUs that can be installed depends on other station cards installed. The system is limited by 120 stations. This ETU shares the total number of station ports in the system.

5.2.3   Switch Settings

SW1 resets the ETU.

5.2.4   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

5.2.5   Connectors

The following connector is included:

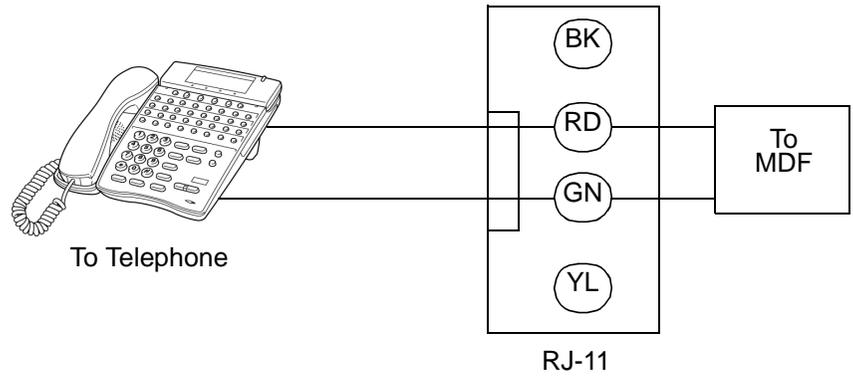❍   CN1   Connects to the backplane.

5.2.6   Connections

RJ-11

Figure 6-51 ESI(8)-U( ) ETU Connection

5.3   ESIB(8)-U( ) ETU

5.3.1   Description

The ESIB(8)-U( ) ETU is the basic Electronic Station Interface ETU that provides an 8-channel interface for Multiline Terminals, Attendant Consoles, Single Line Telephone Adapter SLT(1)-U( ) ADP and DBM(B)-U( ) Box. This ETU can be expanded to 16 channels by installing the ESIE(8)-U( ) ETU.
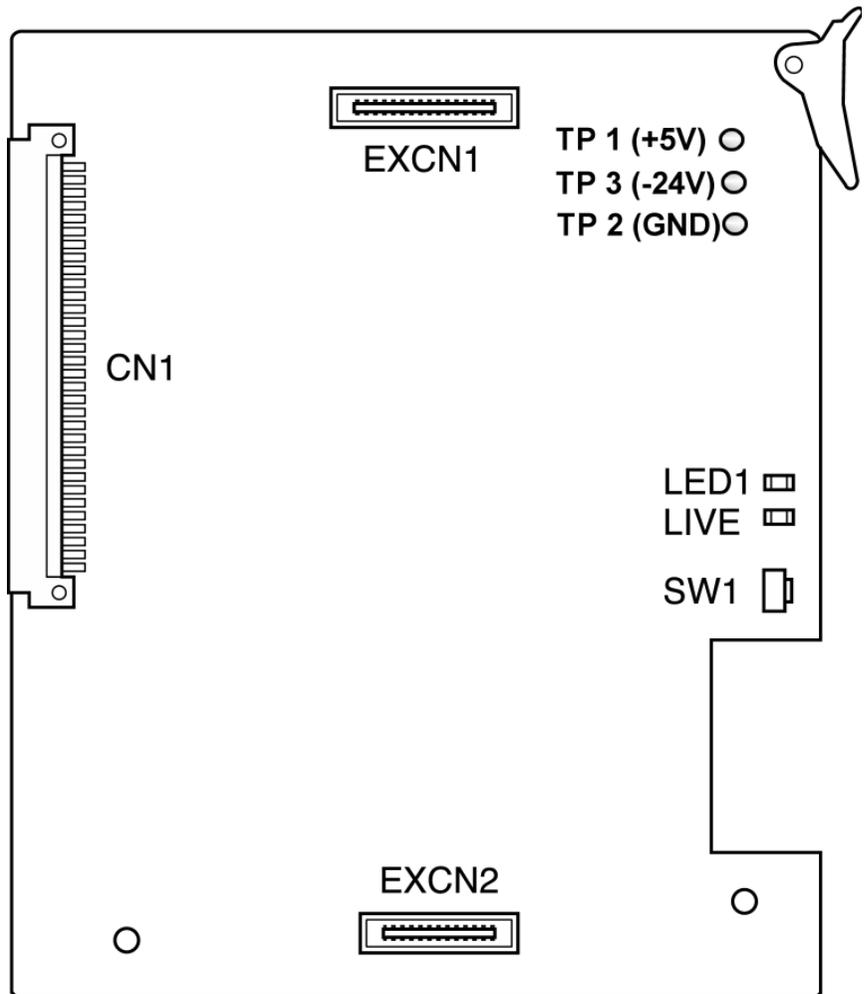

Figure 6-52 ESIB(8)-U( ) ETU

5.3.2   Installation

Basic Port Package

A maximum of four ESIB(8)-U( ) ETUs can be installed in slots S1~S8.

The maximum number of ESIB(8)-U( ) ETUs that can be installed depends on other station cards installed. The system is limited by 32 stations. This ETU shares the total number of Station ports in the system.

Expanded Port Package

A maximum of 15 ESIB(8)-U( ) ETUs can be installed in slots S1~S8.

The maximum number of ESIB(8)-U( ) ETUs that can be installed depends on other station cards installed. The system is limited by 120 stations. This ETU shares the total number of Station ports in the system.

Chapter 3 System Specifications, Section 4 KSU Power-Based ETU Quantity Limitations on page 3-9 for Universal Slots.

5.3.3   Switch Settings

SW1 resets the ETU.

5.3.4   LED Indications

Live LED indications are listed below.

❍   Blinking Red   Normal Operation

❍   Steady Red   Operation Stopped (power On)

❍   Off   No Power
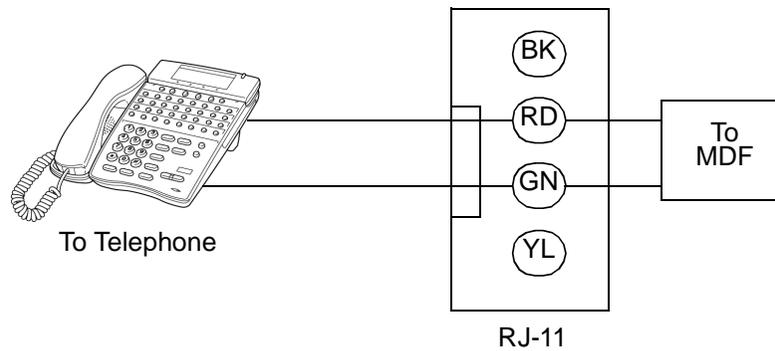
LED1 indications are listed below.

❍   Steady Red   Some port(s) busy

❍   Off   All ports idle

5.3.5   Connectors

The following connectors are included:

❍   CN1   Connects to the backplane.

❍   EXCN1   Connects to EXCN1 on the ESIE(8)-U( ) ETU.

❍   EXCN2   Connects to EXCN2 on the ESIE(8)-U( ) ETU.

5.3.6   Connections

Figure 6-53 ESIB(8)-U( ) ETU Connection

5.4   ESIE(8)-U( ) ETU

5.4.1   Description

The ESIE(8)-U( ) ETU is the expansion Electronic Station Interface ETU that provides an additional 8-channel interface for Multiline Terminals, Attendant Consoles, Single Line Telephone Adapter SLT(1)-U10 ADP, and DBM(B)-U10 Box. This expansion ESI ETU is piggybacked on the ESIB(8)-U( ) ETU.
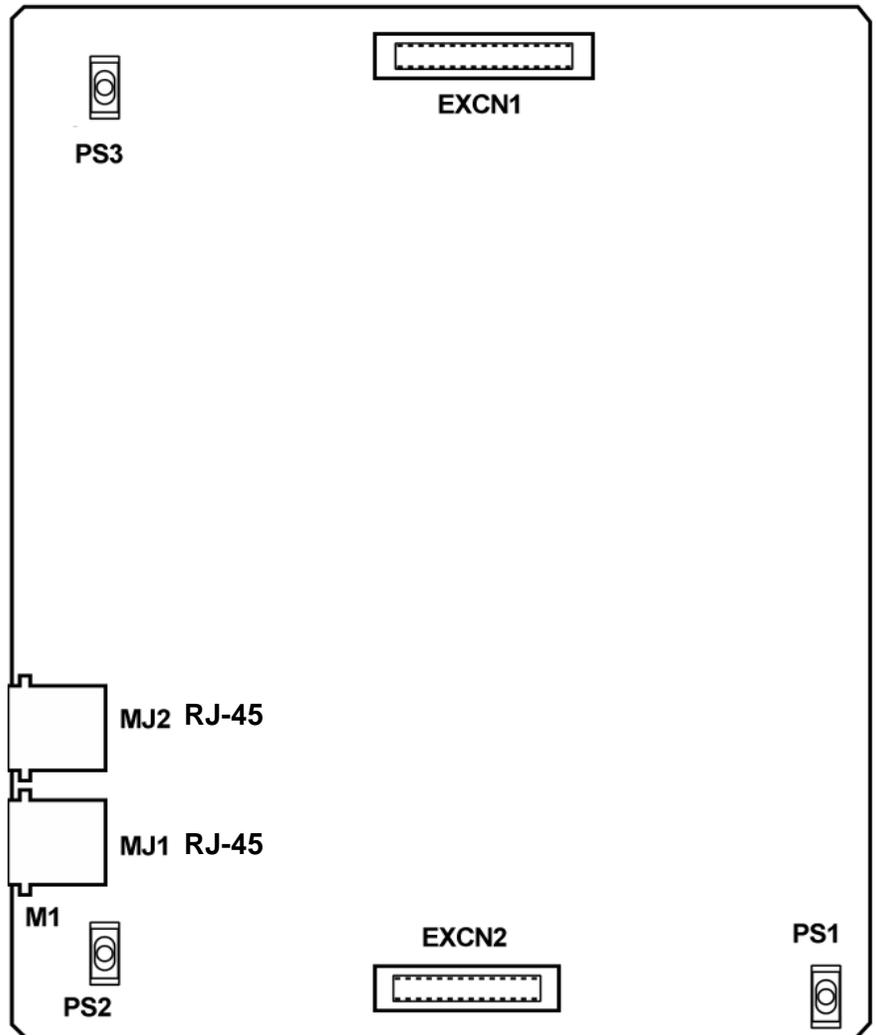

Figure 6-54 ESIE(8)-U( ) ETU

5.4.2   Installation

Basic Port Package

A maximum of two ESIE(8)-U( ) ETUs can be installed in slots S1~S8. The system is limited by 32 stations.

The maximum number of ESIE(8)-U( ) ETUs that can be installed depends on other station cards installed.   This ETU shares the total number of stations in the system.

Expanded Port Package

A maximum of five ESIE(8)-U( ) ETUs, piggybacked on an ESIB(8), can be installed in slots S1~S8. The system is limited by 120 stations.

The maximum number of ESIE(8)-U( ) ETUs that can be installed depends on other station cards installed.   This ETU shares the total number of stations in the system.
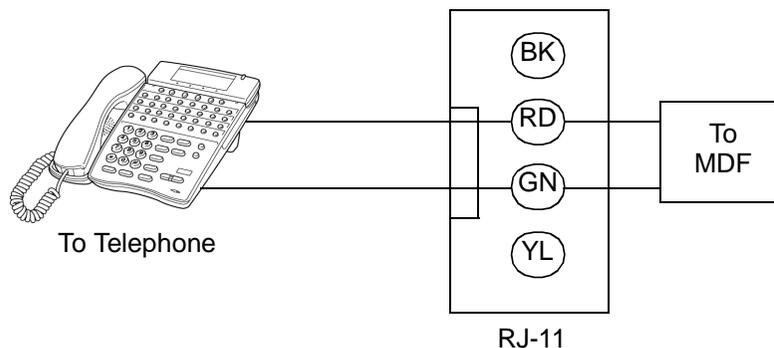
Chapter 3 System Specifications,Section 4 KSU Power-Based ETU Quantity Limitations on page 3-9 for Universal Slots.

5.4.3   Connectors

The following connectors are included:

❍   EXCN1   Connects to EXCN1 on the ESIB(8)-U( ) ETU**.**

❍   EXCN2   Connects to EXCN2 on the ESIB(8)-U( ) ETU.

❍   MJ1   Connects to MDF RJ-61 (four ESI ports 1~4).

❍   MJ2   Connects to MDF RJ-61 (four ESI ports 5~8).

5.4.4   Connections

Figure 6-55 ESIE(8)-U( ) ETU Connection

5.4.5   Pin Assignments

The pin assignments are for connecting eight Multiline Terminals to the ESIE(8)-U( ) ETU.   Refer to Table 6-41 ESIE(8)-U( ) ETU MJ1 Pin Assignments and Table 6-42 ESIE(8)-U( ) ETU MJ2 Pin Assignments.

Table 6-41 ESIE(8)-U( ) ETU MJ1 Pin Assignments

MJ1 Pin (RJ-61)	Signal	Signal Name	Pin Color
1	T4	CH3–Tip	WHT–BRN
2	T3	CH2–Tip	WHT–GRN
3	T2	CH1–Tip	WHT–ORN
4	R1	CH0–Ring	BLU–WHT
5	T1	CH0–Tip	WHT–BLU
6	R2	CH1–Ring	ORN–WHT
7	R3	CH2–Ring	GRN–WHT
8	R4	CH3–Ring	BRN–WHT

Table 6-42 ESIE(8)-U( ) ETU MJ2 Pin Assignments

MJ2 Pin (RJ-61)	Signal	Signal Name	Pin Color
1	T8	CH7–Tip	WHT–BRN
2	T7	CH6–Tip	WHT–GRN
3	T6	CH5–Tip	WHT–ORN
4	R5	CH4–Ring	BLU–WHT
5	T5	CH4–Tip	WHT–BLU
6	R6	CH5–Ring	ORN–WHT
7	R7	CH6–Ring	GRN–WHT
8	R8	CH7–Ring	BRN–WHT

5.5 OPX(2)-U( ) ETU

5.5.1 Description

The OPX(2)-U( ) ETU is the interface for two off-premise extensions. This ETU has a built-in ringing signal generator (RSG). A maximum of 1600Ω of loop resistance (including the Single Line Telephone) is acceptable between the OPX(2)-U( ) ETU and a Single Line Telephone.

This ETU also provides circuitry for loop status detection, talk battery, sending ringing signals from the RSG unit to the Single Line Telephones, and dial pulse detection.

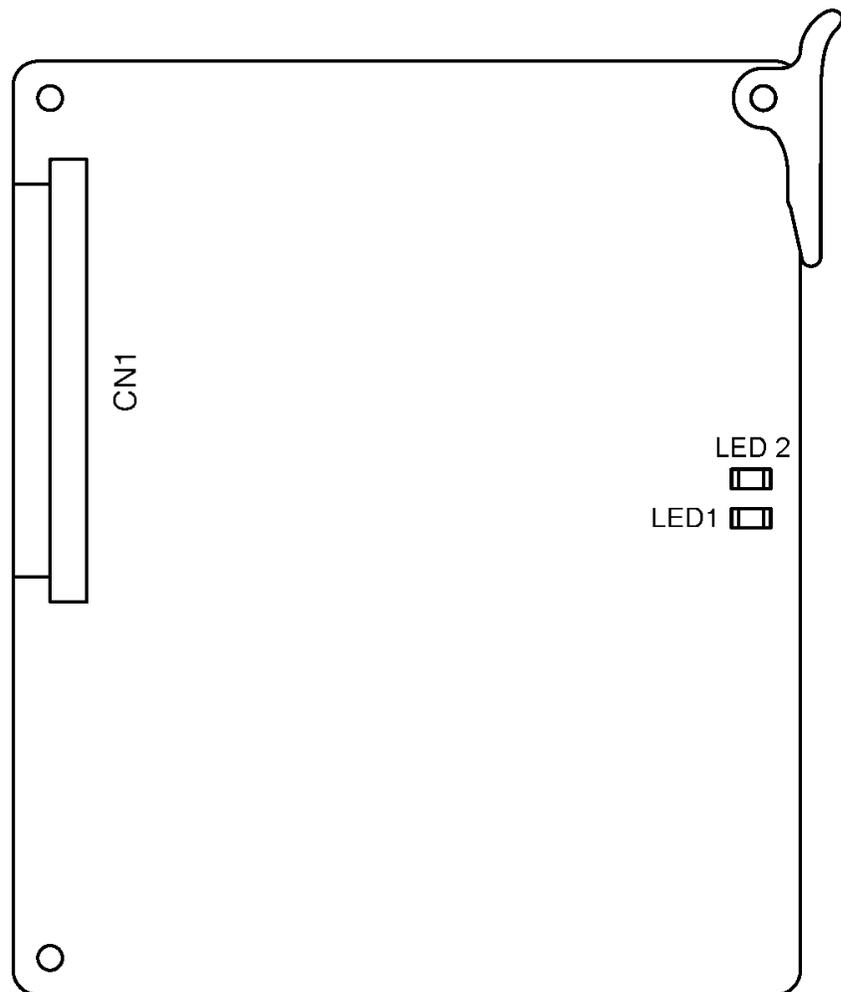✎ The PBR circuit in the CPUI( )/U( ) ETU or the PBR( )-U( ) ETU is required with Single Line Telephone Connection.

Figure 6-56 OPX(2)-U( ) ETU

5.5.2   Installation

The extension can be run up to approximately three miles (5 km) using 24 AWG wiring.

Basic Port Package

A maximum of six OPX(2)-U( ) ETUs can be installed in slots S1~S8.

The maximum number of OPX(2)-U( ) ETUs that can be installed depends on other station cards installed. The system is limited by 32 stations. This ETU shares the total number of station ports in the system.

Expanded Port Package

A maximum of 22 OPX(2)-U ETUs can be installed in slots S1~S8.

The maximum number of OPX(2)-U( ) ETUs that can be installed depends on other station cards installed. The system is limited by 120 stations. This ETU shares the total number of station ports in the system.

5.5.3   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   One port busy

❍   Off   All ports idle

5.5.4   Connectors

The following connector is included:

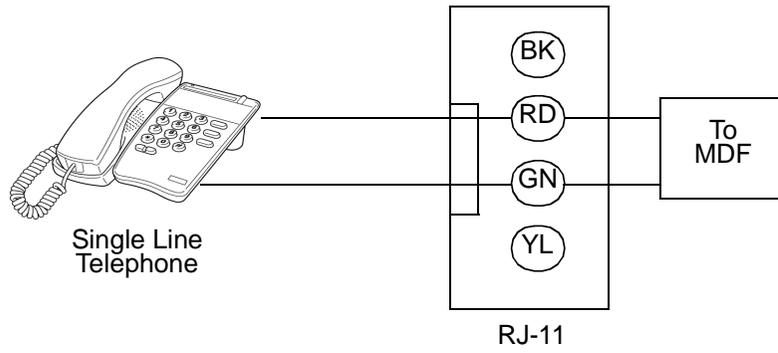❍   CN1   Connects to the backplane.

5.5.5   Connections

Figure 6-57 OPX(2)-U( ) ETU CN1 Connection

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

5.6.1   Description

SLI(4)-U( ) ETU

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.

SLI(8)-U( ) ETU

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.
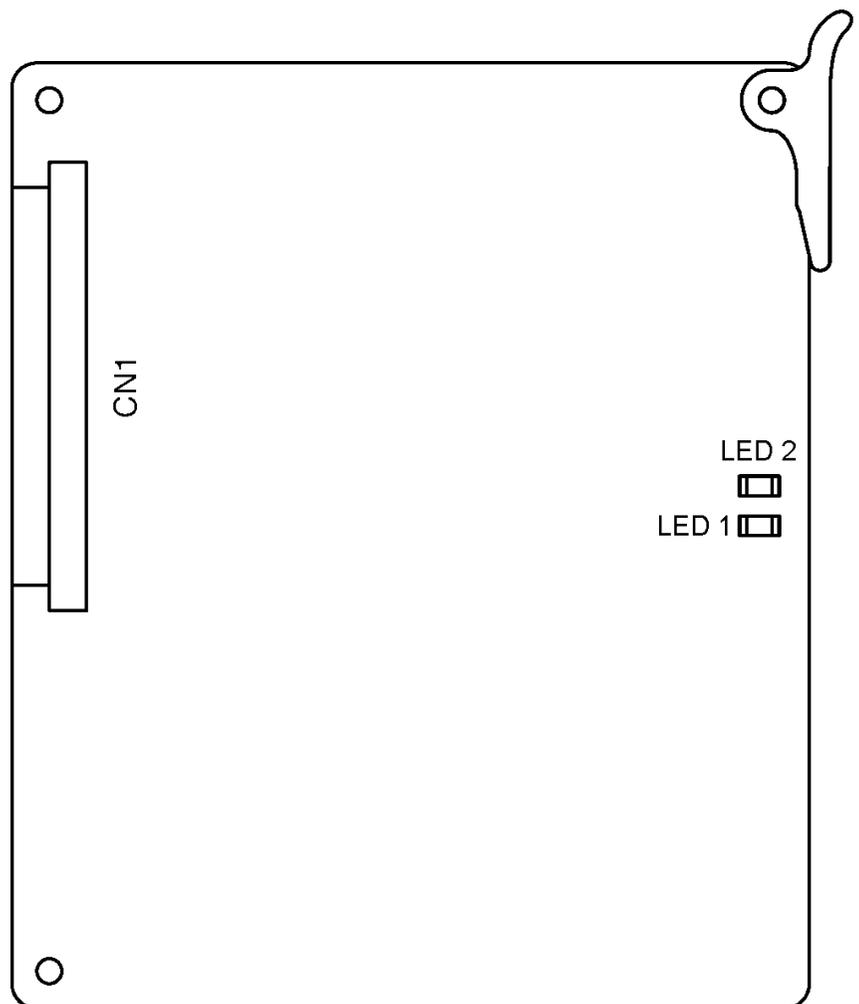
Figure 6-58 SLI(4)/(8)-U( ) ETU

5.6.2   Installation

Basic Port Package

A maximum of six SLI(4)-U( ) ETUs can be installed in slots S1~S8.

A maximum of three SLI(8)-U( ) ETUs can be installed in slots S1~S8.

The maximum number of SLI(4)/(8)-U( ) ETUs that can be installed depends on other station cards installed. The system is limited by 32 stations of which 8 would be ESI ports. This ETU shares the total number of station ports in the system.

Expanded Port Package

A maximum of 22 SLI(4)-U( ) ETUs can be installed in slots S1~S8.

A maximum of 14 SLI(8)-U( ) ETUs can be installed in slots S1~S8.

The maximum number of SLI(4)/(8)-U( ) ETUs that can be installed depends on other station cards installed. The system is limited by 120 stations of which 8 would be ESI ports. This ETU shares the total number of station ports in the system.

5.6.3   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

5.6.4   Connectors

The following connector is included:

❍   CN1   Connects to the backplane.

5.6.5   Connections
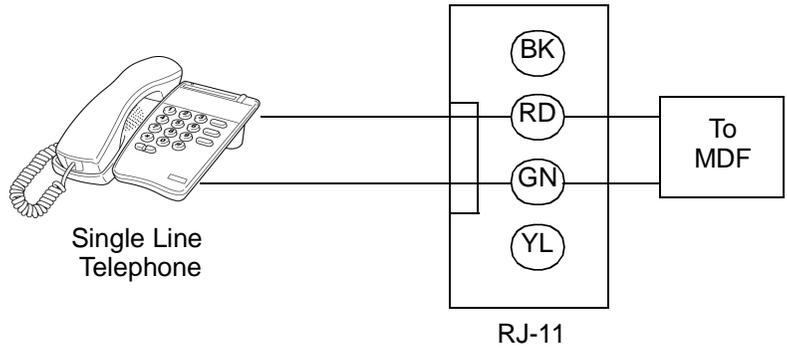

Single Line
Telephone

RJ-11

To
MDF

Figure 6-59 SLI(4)/(8)-U( ) ETU Connections

5.7   SLIB(4)-U10 ETU

5.7.1   Description

The SLIB(4)-U( ) ETU is the basic Single Line Interface ETU that provides a 4-channel interface for a Single Line Telephone, and also provides Ringing Signal Generator (RSG), Message Waiting (MW) LED voltage, and Caller ID to Single Line Telephones.

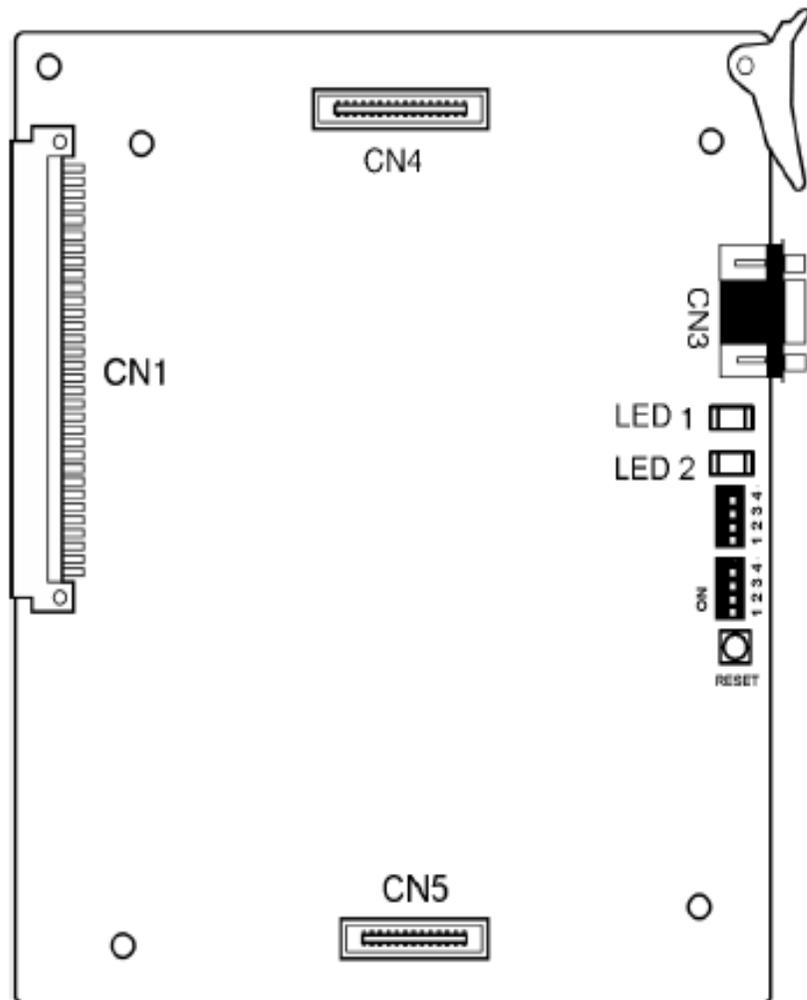This ETU can be expanded to eight channels by installing the SLIE(4)-U10 ETU.

Figure 6-60 SLIB(4)-U10 ETU

5.7.2   Installation

Basic Port Package

A maximum of six SLIB(4)-U10 ETUs can be installed in slots S1~S8.

The maximum number of SLIB(4)-U10 ETUs that can be installed depends on other station cards installed. The system is limited by 32 stations of which 8 would be ESI ports. This ETU shares the total number of station ports in the system.

Expanded Port Package

A maximum of 14 SLIB(4)-U10 ETUs can be installed in slots S1~S8 in any KSU.

The maximum number of SLIB(4)-U10 ETUs that can be installed depends on other station cards installed. The system is limited by 120 stations of which 8 would be ESI ports. This ETU shares the total number of station ports in the system.

✎   When initially installing the SLIB(4)-U10 ETU, it may be necessary to press the RESET switch for the ETU to boot up properly.

5.7.3   Switch Settings

Table 6-43 SLIB(4)-U10 ETU SW2 Switch Settings

Switch		Setting	Purpose
SW2	1	ON	4 Channels (**Default)**
		OFF	8 Channels
	2	ON	See Table below for SW2-2 and SW2-3 details
		OFF	
	3	ON	
		OFF	
	4	ON	SLI(4)/(8) -U10 Mode (Caller-ID Disable) (**Default**)
		OFF	SLIB/SLIE(4)-U( ) Mode (Caller-ID Enable)

➢   **R2500 or lower** requires SW2-4 to be ON for the SLIB(4)-U( ) to operate. **R3000 or higher** requires SW2-4 to be OFF for the SLIB(4)-U( ) to operate.

Table 6-44 SW2-2/SW2-3 Details

SW 2-2	SW 2-3	Function
ON	ON	Factory Test
OFF	ON	Firmware Upgrade
ON	OFF	Not Used
OFF	OFF	Normal Operation **(Default)**

Table 6-45 SLIB(4)-U10 ETU SW3 Switch Settings

SW 3-1	SW 3-2	SW 3-3	SW 3-4	Country Selection
ON	OFF	OFF	ON	**North America (Default)**

5.7.4   LED Indications

LED 1 (LIVE) indications are:

❍   Flashing Red (Normal Operation)

❍   Steady Red (Operation Stopped, Power On.)
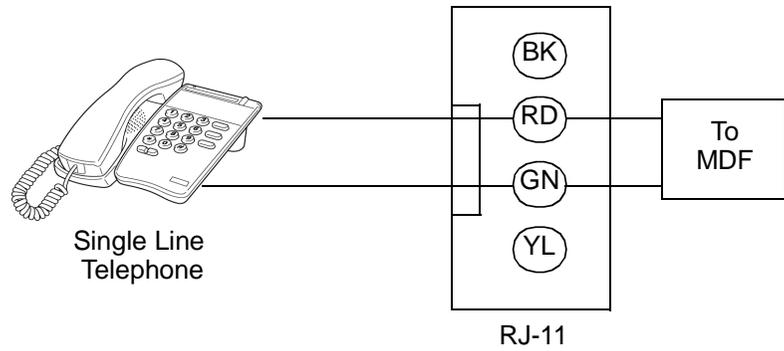
❍   Off (No Power)

LED 2 (BUSY) indications are:

❍   Steady Red (Some ports Busy

❍   Off (All ports idle)

5.7.5   Connectors

The following connectors are included:

❍   CN1   Connects to the backplane.

❍   CN4   Connects to CN4 on the SLIE(4)-U( ) ETU.

❍   CN5   Connects to CN5 on the SLIE(4)-U( ) ETU.

5.7.6   Connections

Figure 6-61 SLIB(4)-U10 ETU Connections

5.8   SLIE(4)-U10 ETU

5.8.1   Description

The SLIE(4)-U10 ETU is the expansion Single Line Interface ETU That plugs into the SLIB(4)-U10 ETU to provide an additional 4-channel interface for a Single Line Telephone, and also provides Ringing Signal Generator (RSG) and Message Waiting (MW) LED voltage to Single Line Telephones.
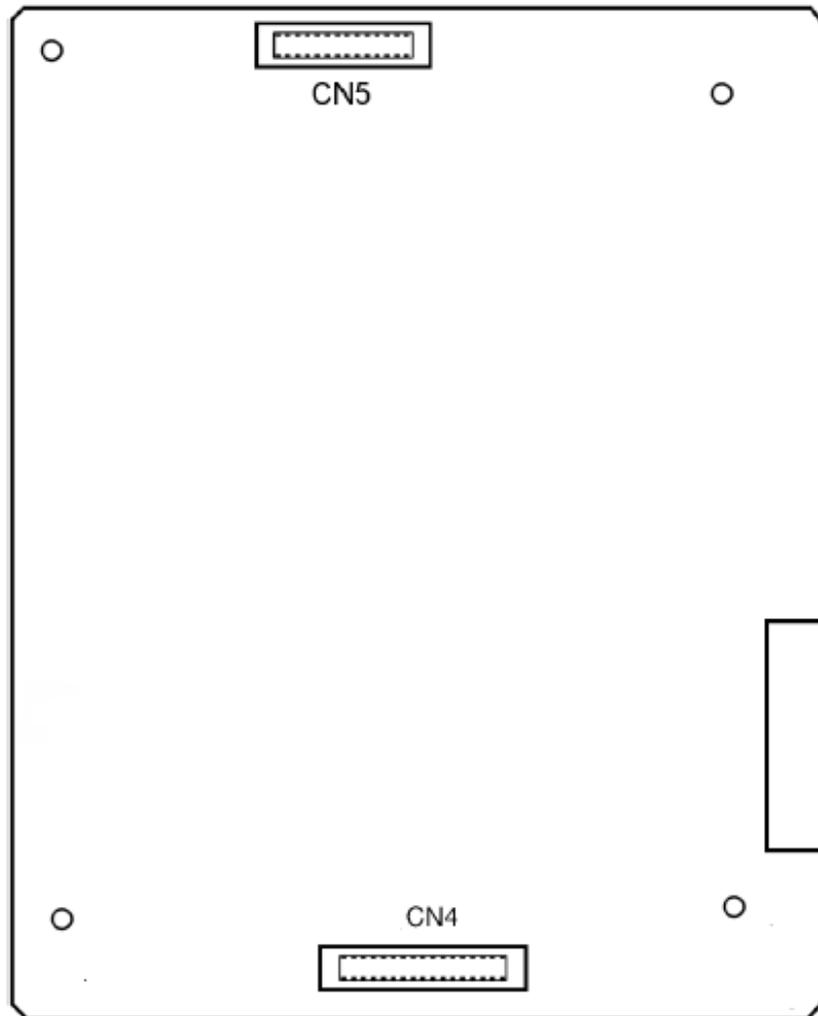

Figure 6-62 SLIE(4)-U10 ETU

5.8.2   Installation

Basic Port Package

A maximum of three SLIB(4)-U10 ETUs with the SLIE(4)-U10 ETU installed can be installed in slots S1~S8.

The maximum number of SLIB(4)-U10 ETUs with the SLIE(4)-U10 ETU installed depends on other station cards installed. The system is limited by 32 stations of which eight would be ESI ports. This ETU shares the total number of station ports in the system.

Expanded Port Package

A maximum of 14 SLIB(4)-U10 ETUs with the SLIE(4)-U10 ETU installed can be installed in slots S1~S8 in any KSU.

The maximum number of SLIB(4)-U10 ETUs with the SLIE(4)-U10 ETU installed depends on other station cards installed. The system is limited by 120 stations of which eight would be ESI ports. This ETU shares the total number of station ports in the system.

5.8.3   Connectors

The following connectors are included:

❍   CN4   Connects to CN4 on the SLIB(4)-U( ) ETU.

❍   CN5   Connects to CN5 on the SLIB(4)-U( ) ETU.

5.8.4   Connections
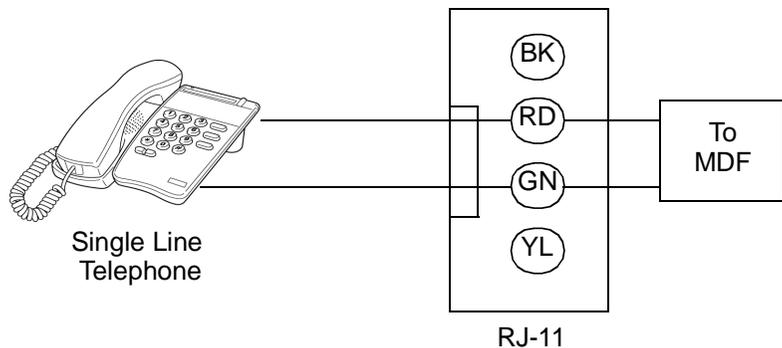
Figure 6-63 SLIB(4)-U10 ETU Connections

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 IPK 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 6-46 Configuration Support Table.

Table 6-46 Configuration Support Table

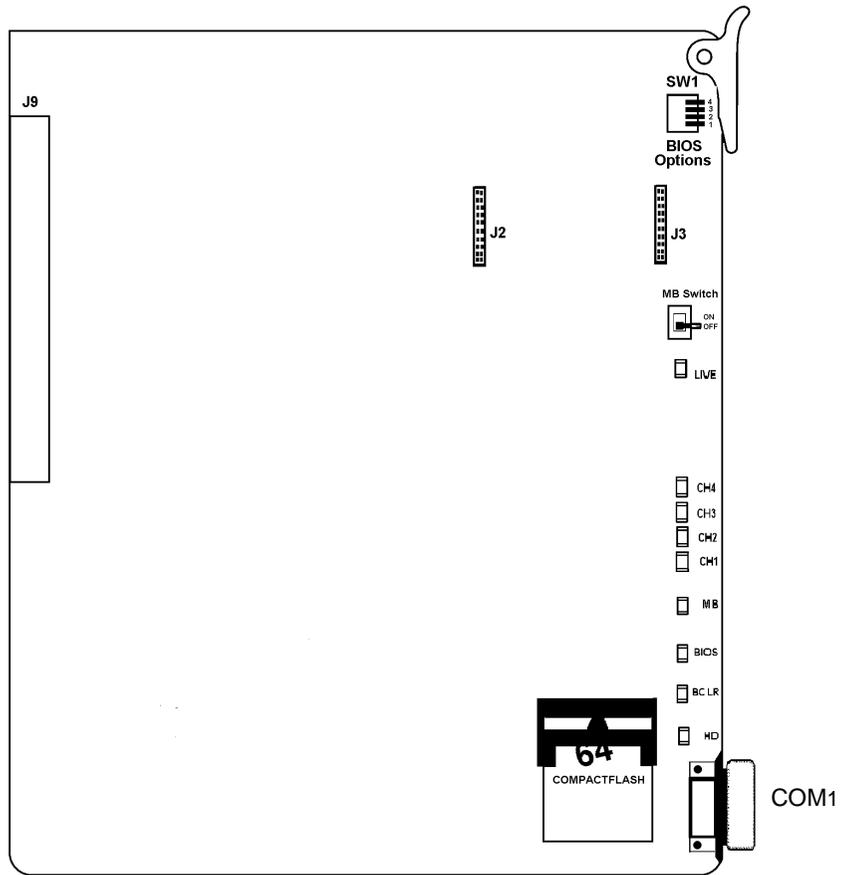| Function	Configuration Support
Applications	Automated Attendant/Voice Mail with call forwarding (release transfer) Automated Attendant/Voice Mail without call forwarding (await answer transfer) Voice Mail only (No transfer)
Call Forwarding	Supported
Connections	Connects to backplane connector of the 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.

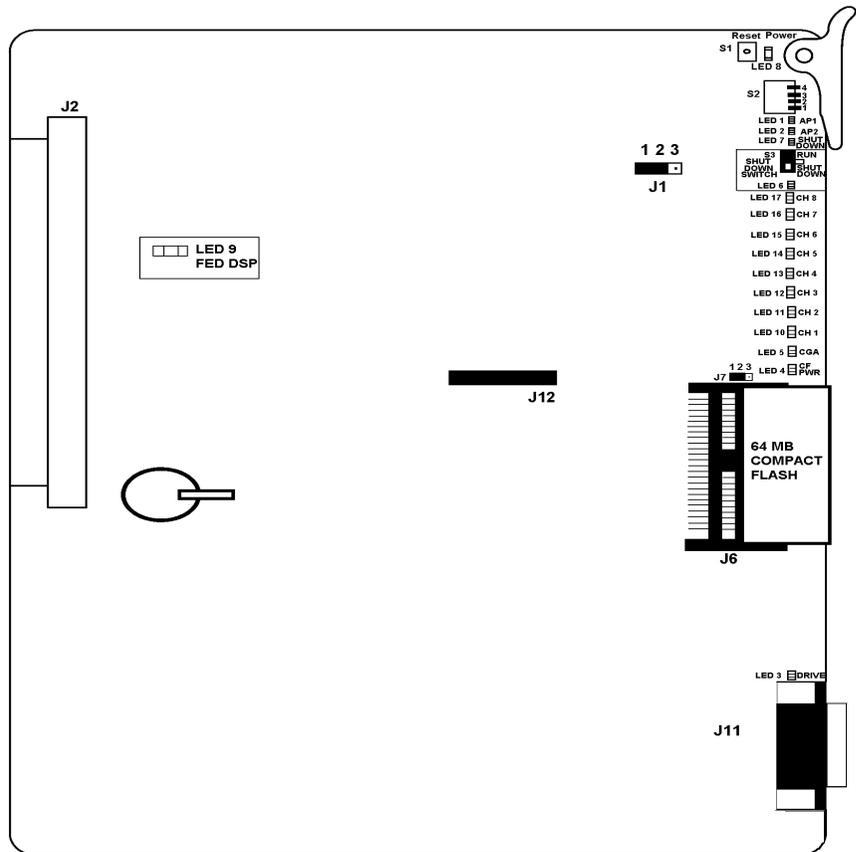**Figure 6-64 CMS(2)/(4)-U( ) ETU**

Figure 6-65 CMS-U30 ETU

6.1.2   Installation

Basic Port Package

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

Expanded Port Package

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

✎   Each system can support only one CMS, CTI/VP, FMS, VMS, or VMP 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 6-47 CMS(2)/(4)-U( ) ETU DIP Switch Functions.

Table 6-47 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 6-48 CMS(2)/(4)-U( ) ETU LED Indicators.

Table 6-48 CMS(2)/(4)-U( ) ETU LED Indicators

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

> ➤ *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

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

Table 6-49 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 form 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   Connectors

The following connectors are included:

❍   J2 and J3

Used to install the MDM-F-20 Unit.

❍   J9

Connects to the backplane.

❍   9-pin RS-232 (COM2)

Connector is not used (MDM-F-20 Unit).

❍   RJ-11 modem port (COM2)

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

❍   9-pin RS-232 (COM1)

Local serial connector on main ETU for direct connection.

6.1.6   Jumper Settings

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

6.1.7   Connectors

The following connectors are included:

❍   J2

Connects to the backplane.

❍   J6

Used for Compact flash drive on FMS.

❍   J10

Not used.

❍   J11)

COM port for console programming connection

❍   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:

❍   DTMF detection/generation

❍   General tone detection

❍   FAX CNG tone detection

❍   PCM compression for audio recording/playback

❍   Automatic gain control

❍   A serial port (direct connect speeds up to 115,200 bps) used for direct connection console programming and backup/restore

❍   A LAN port with an RJ-45 connector (activated only with CTI)

❍   Up to two fax ports (activated only with CTI)

❍   A built-in modem for remote console programming that supports up to 19.2 Kbps

Table 6-50 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	KSU backplane connection 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
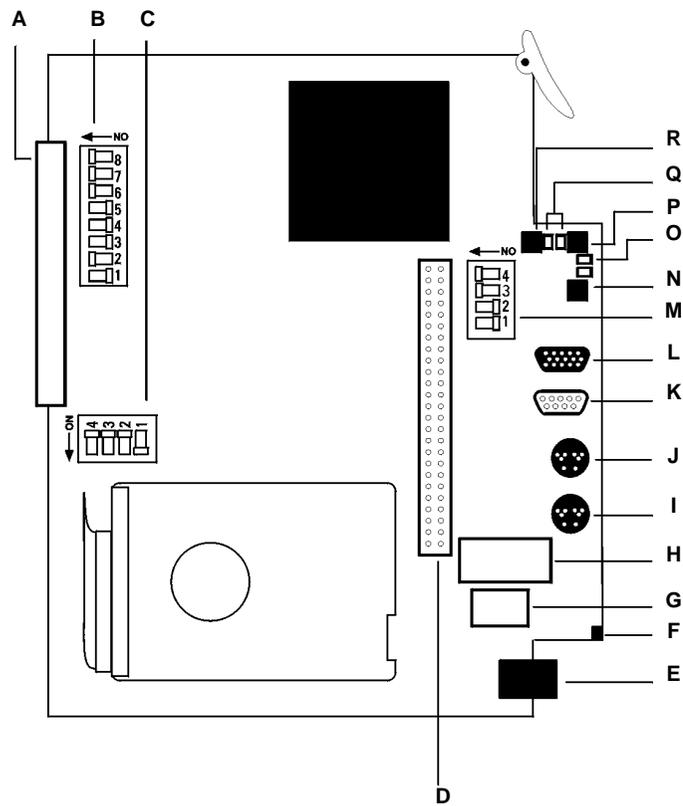
Figure 6-66 EliteMail CTI System Board

6.2.1.1   System Board Components

The components identified in Figure 6-66 EliteMail CTI System Board are listed and described in Table 6-51 System Board Components.

Table 6-51 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 6-51 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.
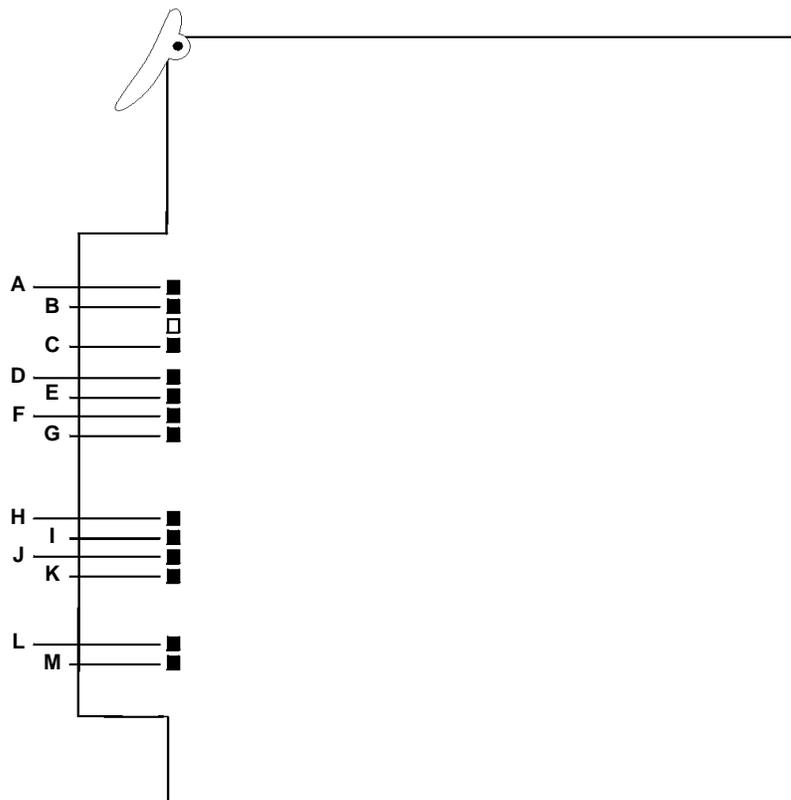
Figure 6-67 EliteMail CTI Daughter Board

6.2.1.2   Daughter Board Components

The components identified in Figure 6-68 EliteMail CTI Port Expansion Board are listed and described in Table 6-52 Daughter Board Components.

Table 6-52 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
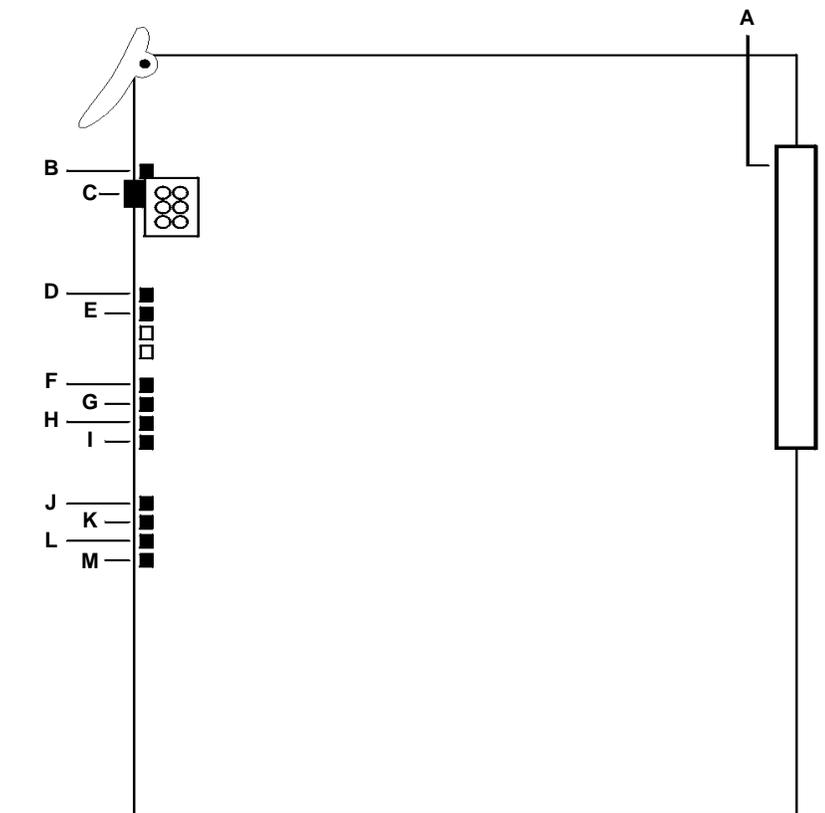
Figure 6-68 EliteMail CTI Port Expansion Board

6.2.1.3   Port Expansion Board

The components identified in Figure 6-68 EliteMail CTI Port Expansion Board are listed and described in Table 6-53 Port Expansion Board Components.

Table 6-53 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

Basic Port Package

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.

Expanded Port Package

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 support only one CMS, CTI/VP, FMS, VMS, or VMP 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( )

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 IPK 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-, 4-, or 8-ports for digital voice mail.   Refer to Table 6-54 Configuration Support Table.

Table 6-54 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 6-69 FMS(2)/(4)-U( ) ETU
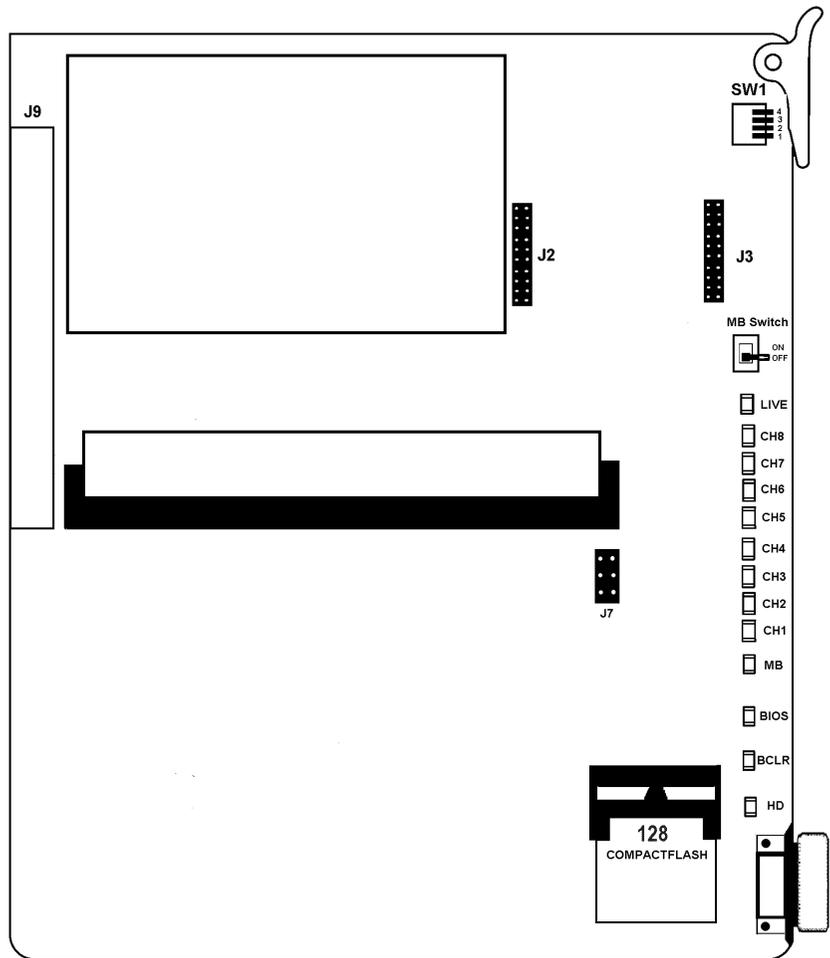
Figure 6-70 FMS(8)-U( ) ETU
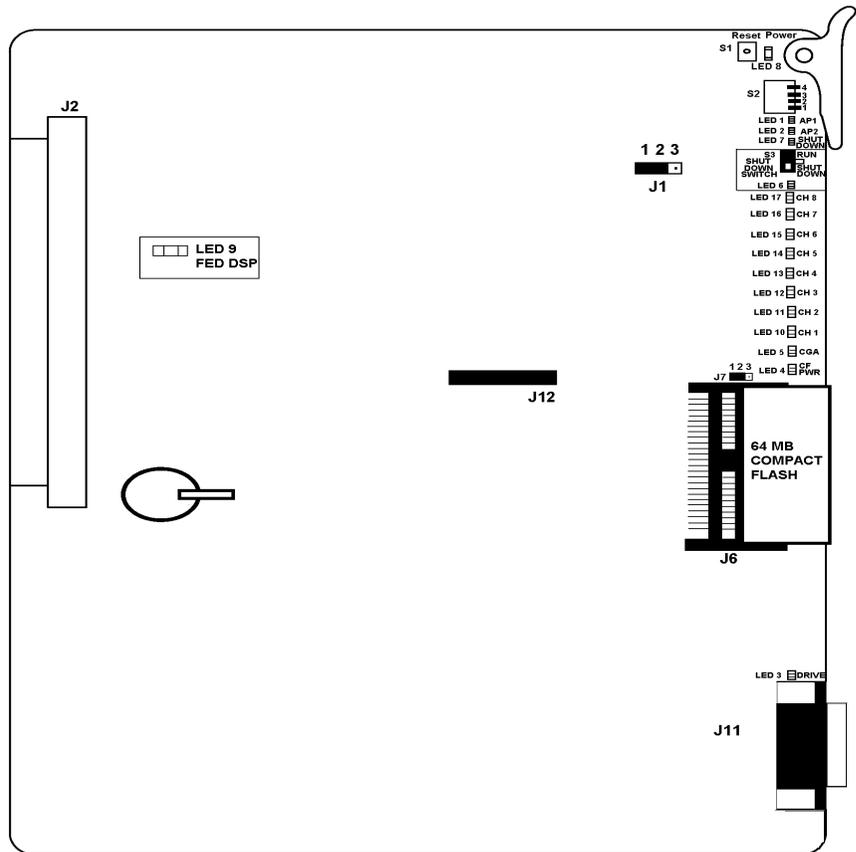
Figure 6-71 FMS-U30 ETU

6.3.2   Installation

Basic Port Package

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

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

Expanded Port Package

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

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

✎   Each system can support only one CMS, CTI/VP, FMS, VMS, or VMP 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 6-55 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 6-56 FMS(2)/(4)/(8)-U( ) ETU DIP Switch Functions.

Table 6-55 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 6-56 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 6-57 FMS(2)/(4)/(8)-U( ) ETU LED Indications.

Table 6-57 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

Table 6-57 FMS(2)/(4)/(8)-U( ) ETU LED Indications (Continued)

LED	Description	On	Flashing	Off
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.

LED	Description	On	Flashing	Off
HD	Flash Status	Not Used	Compact Flash Disk Active	Flash Inactive

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

Table 6-58 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

Table 6-58 FMS-U30 ETU LED Indications (Continued)

LED	Name	Description
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 form 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

The following connectors are included:

❍   J2 and J3

Used to install the MDM-F-20 Unit.

❍   J9

Connects to the backplane.

❍   9-pin RS-232 (COM2)

Not used (MDM-F-20 Unit).

❍   RJ-11 modem port (COM2)

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

❍   9-pin RS-232(COM1)

Local serial connector on main ETU for direct connection

6.3.6   FMS-U30 ETU Jumper Settings

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

6.3.7   FMS-U30 ETU Connectors

The following connectors are included:

❍   J2

Connects to the backplane.

❍   J6

Used for Compact flash drive on FMS.

❍   J11

COM port for console programming connection

❍   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 IPK and contains hard disk space for voice recording storage 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) 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 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 6-59 Configuration Support Table.

Table 6-59 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.

Piggyback on ETU

(DSP-F-21 Unit)

Auxiliary DSP

Piggyback on ETU

(MDM-U10 Unit)

**Remote
Serial Interface**

DIP Switch
Up = Off
Down = On

9-pin RS-232

COM 2 Ports

Modem Port RJ-11

ON
OFF

Make Busy Switch

LIVE CH8 CH7 CH6 CH5 CH4 CH3 CH2 CH1 MB BIOS BCLR HDD

COM 1
Local Connection

Hard Disk Drive
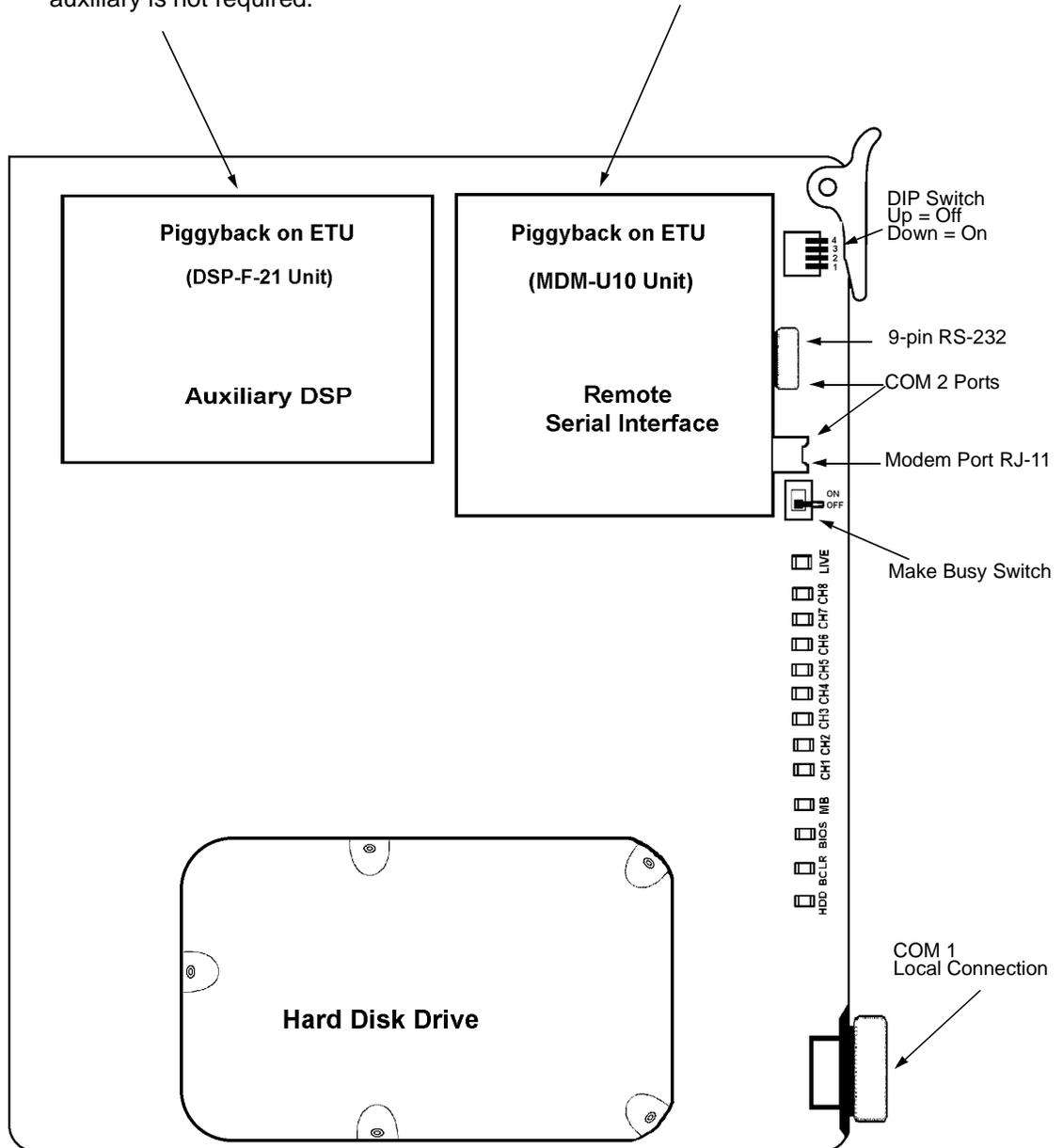
Figure 6-72 VMS(2)/(4)/(8)-U( ) ETU
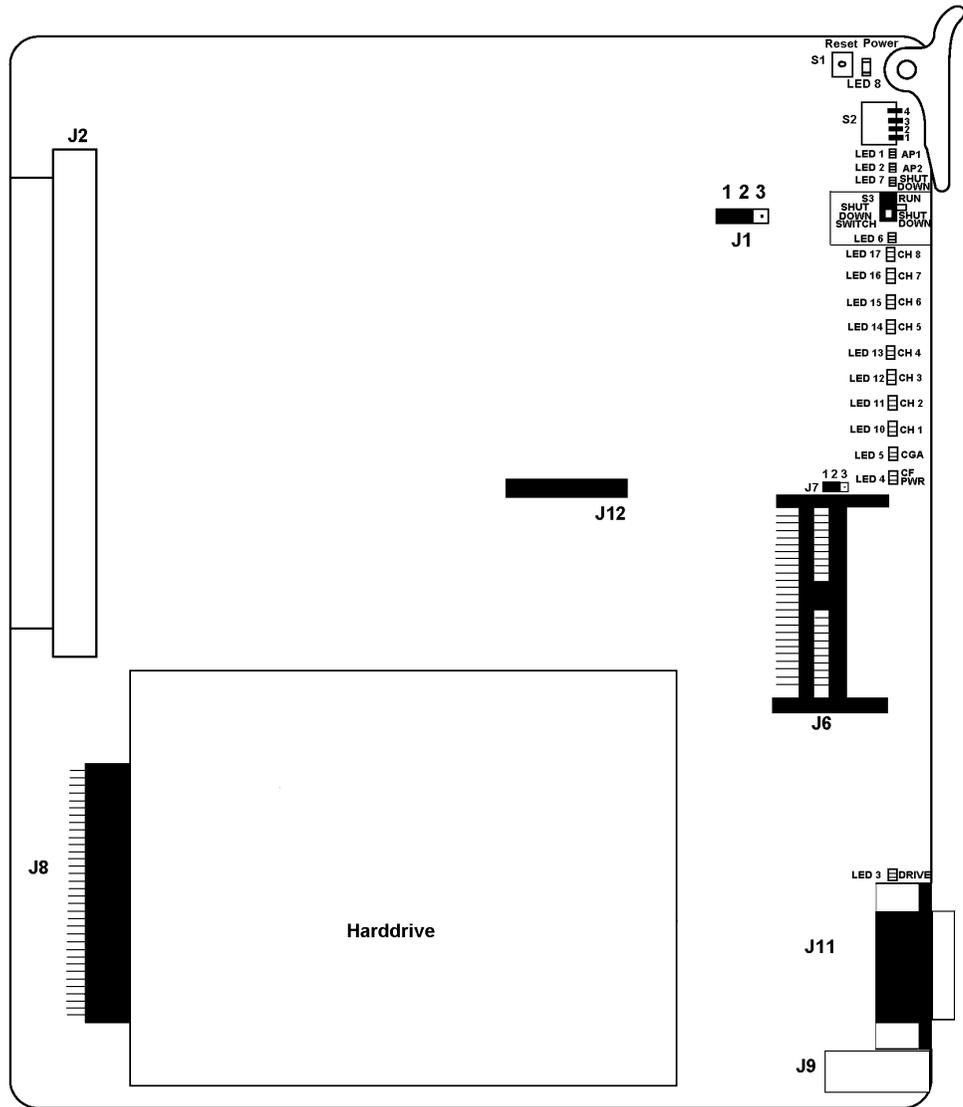
Figure 6-73 VMS-U30 ETU

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.

Basic Port Package

Only one VMS(2)/(4)/(8)-U( ) ETU or one 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.

Expanded Port Package

Only one VMS(2)/(4)/(8)-U( ) ETU or one 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 support only one CMS, CTI/VP, FMS, VMS, or VMP ETU.

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

6.4.3   Switch Settings

Refer to Table 6-60 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 6-61 VMS(2)/(4)/(8)-U( ) ETU DIP Switch Functions.

Table 6-60 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 6-61 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 6-62 VMS(2)/(4)/(8)-U( ) ETU LED Indications.

Table 6-62 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 6-63 VMS-U30 ETU LED Indications.

Table 6-63 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 form 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

The following connectors are included:

❍   CN1

Connects to the backplane.

❍   9-pin RS-232 (COM2)

Not used (MDM-F-20 Unit)

❍   RJ-11 modem port (COM2)

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

❍   9-pin RS-23 (COM1)

Local Serial connector on main ETU for direct connection

6.4.6   VMS-U30 ETU Jumper Settings

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

6.4.7   VMS-U30 ETU Connectors

The following connectors are included:

❍   J2

Connects to the backplane.

❍   J6

Used for Compact flash drive on FMS.

❍   J9

RJ-45 LAN connector for network connection

❍   J11

COM port for console programming connection

❍   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 IPK system.

7.1   ACD(8)-U( ) ETU

7.1.1   Description

The Automatic Call Distribution ETU interfaces the Elite ACD Plus Server with the Electra Elite IPK KSU.
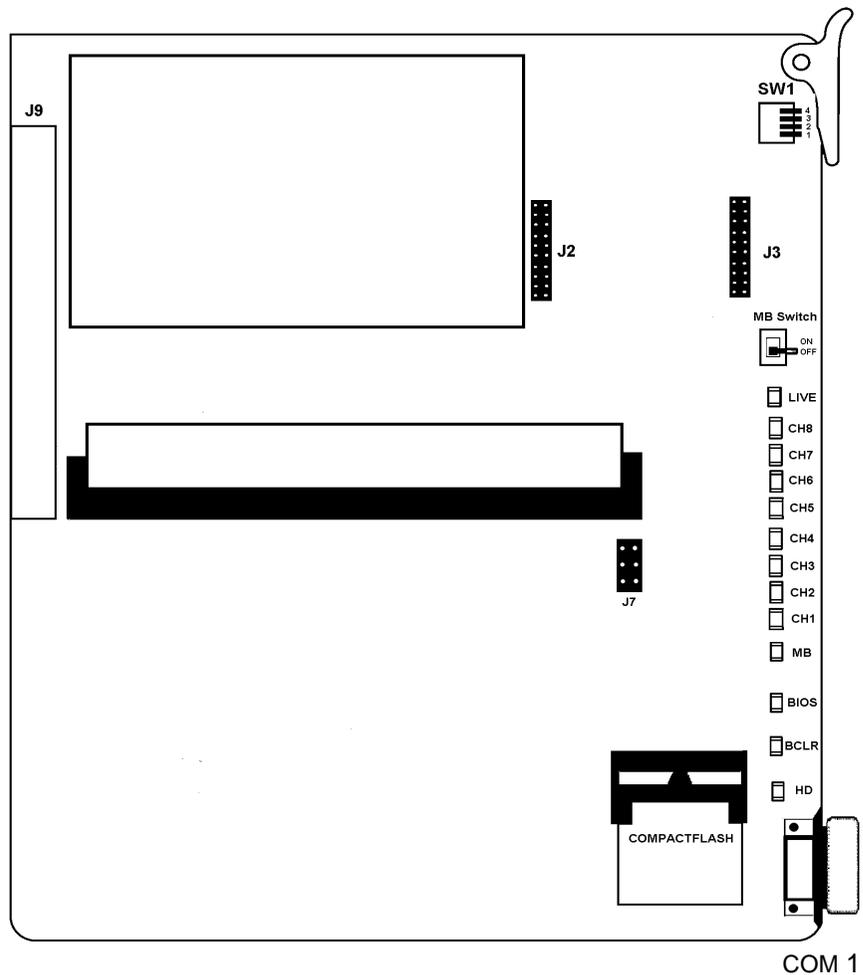
Figure 6-74 ACD(8)-U( ) ETU

7.1.2   Installation

Basic Port Package

Only one ACD(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 32 stations.

Expanded Port Package

Only one ACD(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.

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

7.1.3   LED Indications

Refer to

Table 6-64 ACD(8)-U10 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

Table 6-64 ACD(8)-U10 LED Indications (Continued)

LED	Description	On	Flashing	Off
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 following connectors are included:

❍   J9   Connects to the backplane.

❍   COM1   9-pin RS-232 Local Serial connector for direct connection

7.2   ACD(8)-U30 ETU

7.2.1   Description

The Automatic Call Distribution ETU interfaces the Elite ACD Plus Server with the Electra Elite IPK KSU.
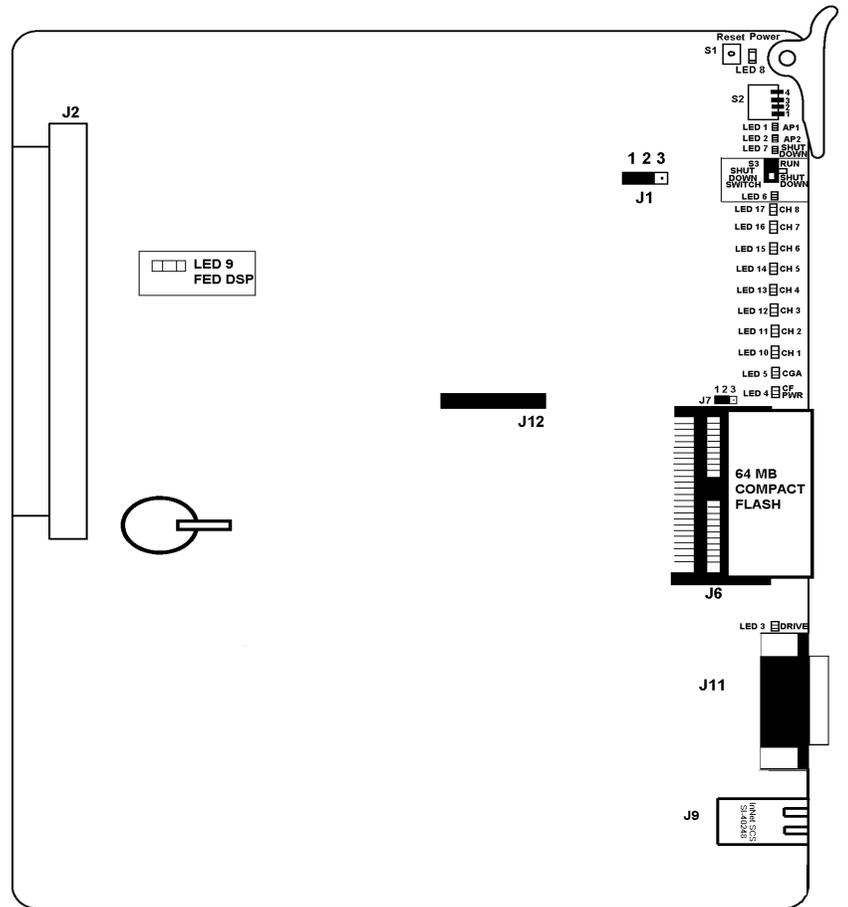
Figure 6-75 ACD(8)-U30 ETU

7.2.2   Installation

Basic Port Package

Only one ACD(8)-U30 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 32 stations.

Expanded Port Package

Only one ACD(8)-U30 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.

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

7.2.3   Switch Settings

❍   S1   Resets ETU.

❍   S2   Dip Switch 2 is used for ETU startup in DOS mode without loading drivers.
                   Dip Switch 3 is used for ETU startup in DOS mode and loading drivers.
                   Dip Switches 1 and 3 are not used.

❍   S3   SHUTDOWN switch is used to start or stop the application.

7.2.4   LED Indications

Refer to Table 6-65 ACD(8)-U30 ETU LED Indications.

Table 6-65 ACD(8)-U30 ETU LED Indications

LED	Name	Description
LED 1	APP1	Indicates status of voice mail application software Green ACD application running Red DOS started but ACD Application is not ready
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 LED is on.
LED 4	CF Power	On when SHUTDOWN switch is 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 ACD(8)-U30 ETU can be safely removed form 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

7.2.5   Jumper Settings

❎   J1   Not Used

❎   J7   Not Used

7.2.6   ACD(8)-U30 ETU Connectors

The following connectors are included:

❎   J2

Connects to the backplane.

❎   J6

Used for Compact flash drive on FMS.

❎   J9

RJ45 LAN connector is used for network connection.

❎   J11

9-pin RS232 local serial connector is used for direct connection.

❎   J12

Port expansion connector is used for DSP-U30 installation.

7.3   BSU(2)-U( ) ETU

7.3.1   Description

The Base Station Unit ETU interfaces the KSU with the ZT II Zone Transceiver for wireless communication with a PS II Personal Station.
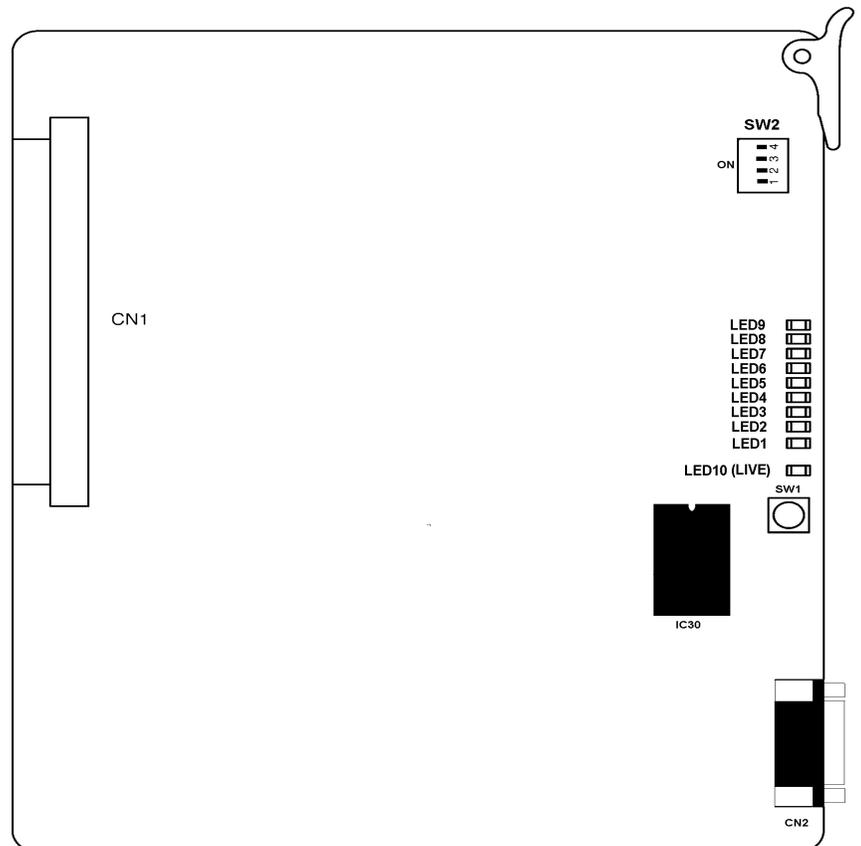
Figure 6-76 BSU(2)-U( ) ETU

7.3.2   Installation

When a BSU(2)-U( ) ETU is installed, a CLKG-U( ) Unit must be installed on the CPUI( )/U( ) ETU.

Basic Port Package

A maximum of three BSU(2)-U( ) ETUs can be installed in slots S1~S8.

Expanded Port Package

A maximum of eight BSU(2)-U( ) ETUs can be installed in slots S1~S8.

7.3.3   Switch Settings

Refer to Table 6-66 BSU(2)-U( ) ETU Default Switch Settings.

Table 6-66   BSU(2)-U( ) ETU Default Switch Settings

SW1	Description
Momentary Switch	BSU ETU Reset

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

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

7.3.4   LED Indications

Refer to Table 6-67 BSU(2)-U( ) ETU LED Indications.

Table 6-67 BSU(2)-U( ) ETU 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 6-68 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 6-68 ZT Status Table for LEDs 5 and 6

Lamp Off Line is not Connected

Lamp On indications are shown below.

   No Flicker (ZT is in standby)

On ──────────────────────────────── Lamp

Off ┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄ Time (0.2s)
   ┼┼

   Flash cycle is 0.1 seconds (Not Supported)

On ┌┐┌┐┌┐┌┐┌┐┌┐┌┐┌┐┌┐┌┐┌┐┌┐┌┐ Lamp

Off ┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄ Time (0.2s)
   ┼┼

   Flash cycle is 0.2 seconds. Remaining indications depend on the number of PS connections.

   1 PS connection

On ┌┐   ┌┐   ┌┐ Lamp

Off ┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄ Time (0.2s)
   ┼┼

---

   2 PS connections

On ┌┐┌┐   ┌┐┌┐   ┌┐┌┐ Lamp

Off ┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄ Time (0.2s)
   ┼┼

---

   3 PS Connections (ZT is busy)

On ┐┌──────┐┌──────┐┌────── Lamp

Off ┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄ Time (0.2s)
   ┼┼

7.3.5   Connectors

The following connectors are included:

❍   CN1   Connects to the backplane.

❍   CN2   For future use.

7.3.6   Connections
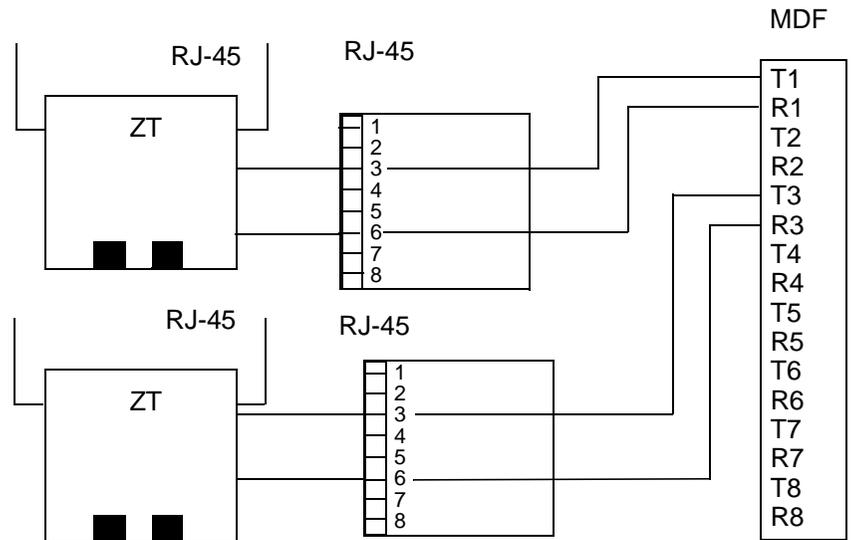
Figure 6-77 BSU(2)-U( ) ETU Connections

7.4   BSU(4M)-U20 ETU

7.4.1   Description

The BSU(4M)-U20 ETU is the Master Base Station Interface Unit ETU that provides connection for four Base Stations and up to 16 simultaneous calls on the Electra Elite IPK Wireless – DECT feature.

Only one BSU(4M)-U20 ETU can be installed in the Basic or Expanded Electra Elite IPK system.
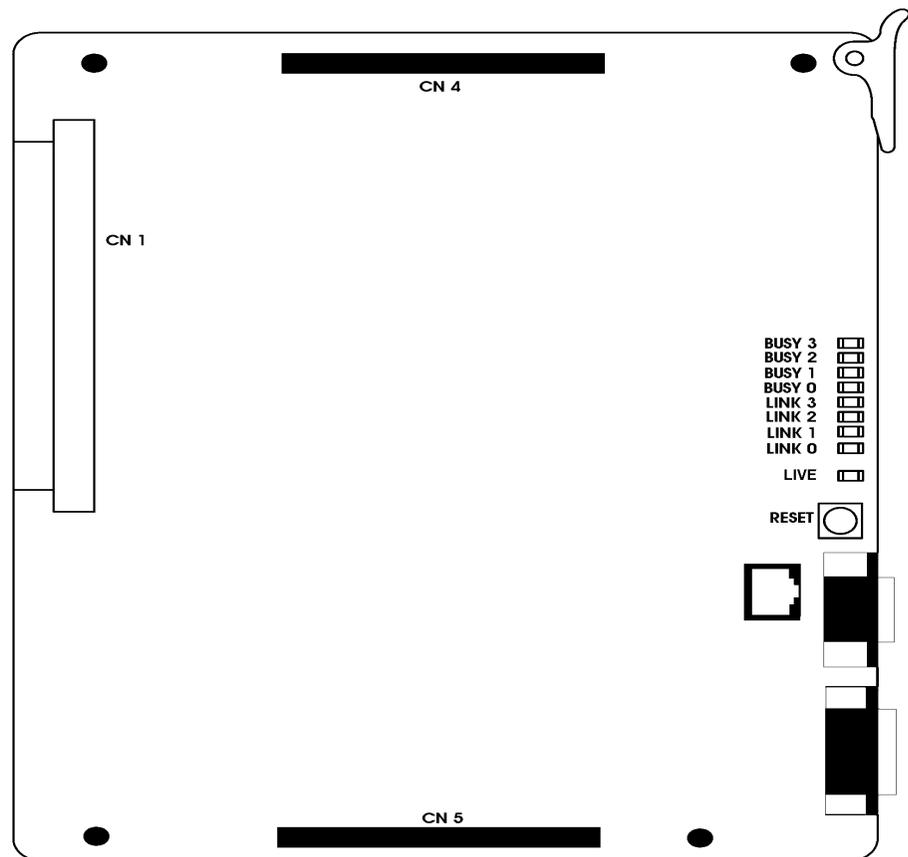
Figure 6-78 BSU(4M)-U20 ETU

7.4.2   Installation

As a single unit, the BSU(4M)-U20 ETU (Master) can be installed in slots S1~S8 in any KSU. Two Slave ETUs [BSU(2S) or BSU(6S)] can be cascaded on four corner posts to the Left of the BSU(4M) in accordance with the tables on the next page. The complete assembly requires three adjacent slots and limits installation of the BSU(4M) to slots S3~S8.

No.	Slot N-2	Slot N-1	Slot N	No. of Base Stations	Note
1	None	None	BSU(4M) ETU	4	
2	None	BSU(2S) ETU	BSU(4M) ETU	6	
3	None	BSU(6S) ETU	BSU(4M) ETU	10	
4	BSU(2S) ETU	BSU(2S) ETU	BSU(4M) ETU	8	
5	BSU(6S) ETU	BSU(2S) ETU	BSU(4M) ETU	12	
6	BSU(2S) ETU	BSU(6S) ETU	BSU(4M) ETU	12	
7	BSU(6S) ETU	BSU(6S) ETU	BSU(4M) ETU	16	

Base Station number assignments are shown in the table below:

Slot	ETU	Channel	BS No.	Note
N	BSU(4M) ETU	1	1	
		2	2	
		3	3	
		4	4	
N-1	BSU(6S) ETU	1	5	
		2	6	
		3	7	When BSU(2S) ETU is installed, these numbers are not assigned.
		4	8	
		5	9	
		6	10	
N-2	BSU(6S) ETU	1	11	
		2	12	
		3	13	When BSU(2S) ETU is installed, these numbers are not assigned.
		4	14	
		5	15	
		6	16	

7.4.3   LED Indications

LIVE LED (Red)   On indicates communication between this ETU and the Main CPU.

LINK (0~3) LED   On indicates Layer 1 and Layer 2 link between the Wireless – DECT and the indicated Base Station (1~4).

Flashes (0.5sec ON-0.5sec OFF) when Layer 1 Link between Wireless – DECT and BSU ETU is established, but not Link 2.

Off indicates that Link 1 is not established.

Busy (0~3) LED   Flashes when the indicated Base Station (1~4) is busy. Refer to Figure 6-81 Busy LED Flash Pattern.
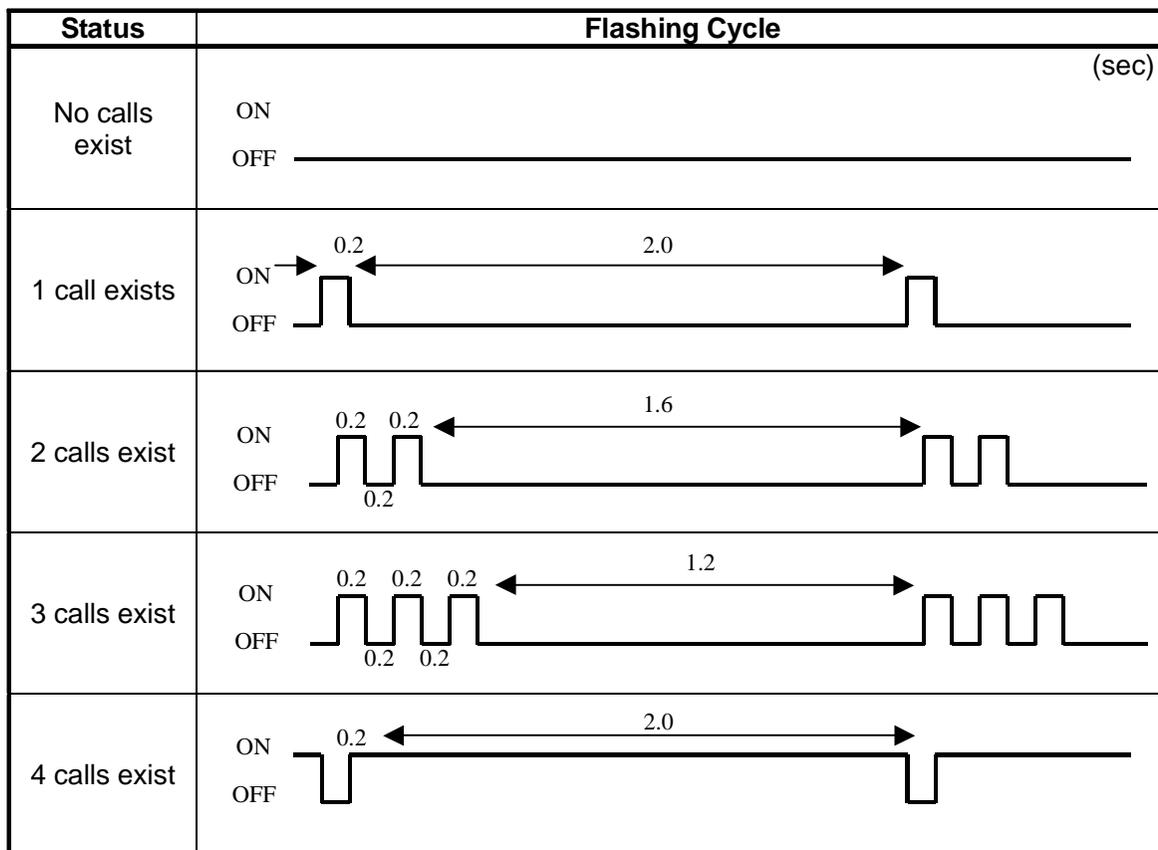
Figure 6-79 Busy LED Flash Pattern

7.4.4   Connectors

CN 1   Connects to the backboard

CN 4   Connects to RJ-45 connector at mid-top of the BSU(2S) or BSU(6S) ETU.

CN 5   Connects to RJ-45 connector at mid-bottom of the BSU(2S) or BSU(6S) ETU.

The BSU(4M) has two serial interfaces: The upper port is for KGAP Applications, Cable Delay Measurement, and IPK to Wireless Card administration. The lower port is for Applications, telephone registration, and system information. The "Administration Program" is used to communicate with ether port, depending on operation required. The specifications for the Serial Ports are as follows:

Specification	RS-232C
Connector	DB-9 Female
DCE/DTE	DCE (connected by straight cable to PC)
Speed	19200 bps
Data Length	8 bits
Parity	None
Stop Bit	None
Flow Control	Hardware Handshake

7.5   BSU(2S)-U20 ETU

7.5.1   Description

The BSU(2S)-U20 ETU is the Base Station Interface Unit Slave ETU that provides connection for two additional Base Stations when connected to the BSU(4M)-U20 (Master) ETU.

A maximum of two BSU(2S)-U20 ETUs can be installed in the Basic or Expanded Electra Elite IPK system.
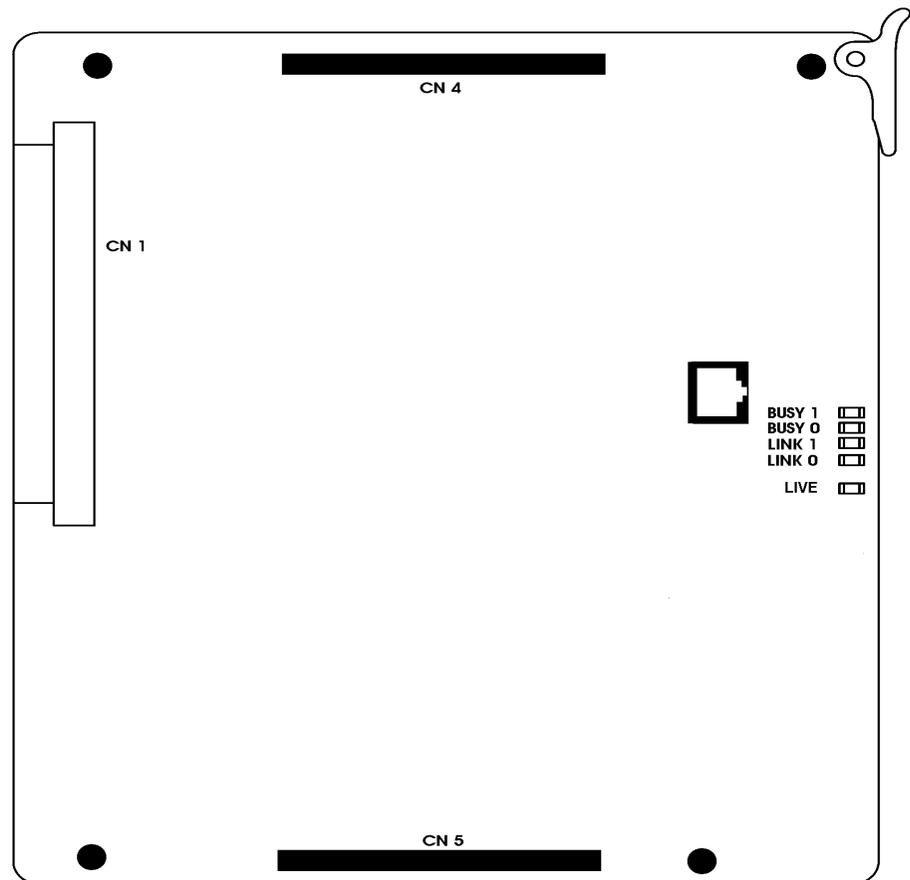
Figure 6-80 BSU(2S)-U20 ETU

7.5.2   Installation

The BSU(2S)-U20 ETU (Slave) is installed on four corner posts on the front of a BSU(4M)-U20 ETU or on the front of a BSU(6S)-U20 or on front of another BSU(2S). Slave ETUs are cascaded on posts to the left of the BSU(4M)-U20 in accordance with the tables on the next page.

No.	Slot N-2	Slot N-1	Slot N	No. of Base Stations	Note
1	None	None	BSU(4M) ETU	4	
2	None	BSU(2S) ETU	BSU(4M) ETU	6	
3	None	BSU(6S) ETU	BSU(4M) ETU	10	
4	BSU(2S) ETU	BSU(2S) ETU	BSU(4M) ETU	8	
5	BSU(6S) ETU	BSU(2S) ETU	BSU(4M) ETU	12	
6	BSU(2S) ETU	BSU(6S) ETU	BSU(4M) ETU	12	
7	BSU(6S) ETU	BSU(6S) ETU	BSU(4M) ETU	16	

Base Station number assignments are shown in the table below:

Slot	ETU	Channel	Base Station No.	Note
N	BSU(4M) ETU	1	1	
		2	2	
		3	3	
		4	4	
N-1	BSU(6S) ETU	1	5	
		2	6	
		3	7	When BSU(2S) ETU is installed, these numbers are not assigned.
		4	8	
		5	9	
		6	10	
N-2	BSU(6S) ETU	1	11	
		2	12	
		3	13	When BSU(2S) ETU is installed, these numbers are not assigned.
		4	14	
		5	15	
		6	16	

7.5.3   LED Indications

LIVE LED (Red)   On indicates communication between this ETU and the Main CPU.

LINK (0 or 1) LED   On indicates Layer 1 and Layer 2 link between the Wireless – DECT and the indicated Base Station (5/6 or 11/12) is established.

Flashes (0.5 sec. ON-0.5 sec. OFF) when Layer 1 Link between Wireless – DECT and BSU ETU is established, but not Link 2.

Off indicates that Link 1 is not established.

Busy (0 or 1) LED   Flashing when the indicated Base Station (5/6 or 11/12) is busy. Refer to Figure 6-81 Busy LED Flash Pattern.

Status	Flashing Cycle
NO calls exist	
1 call exists	
2 calls exist	
3 calls exist	
4 calls exist	
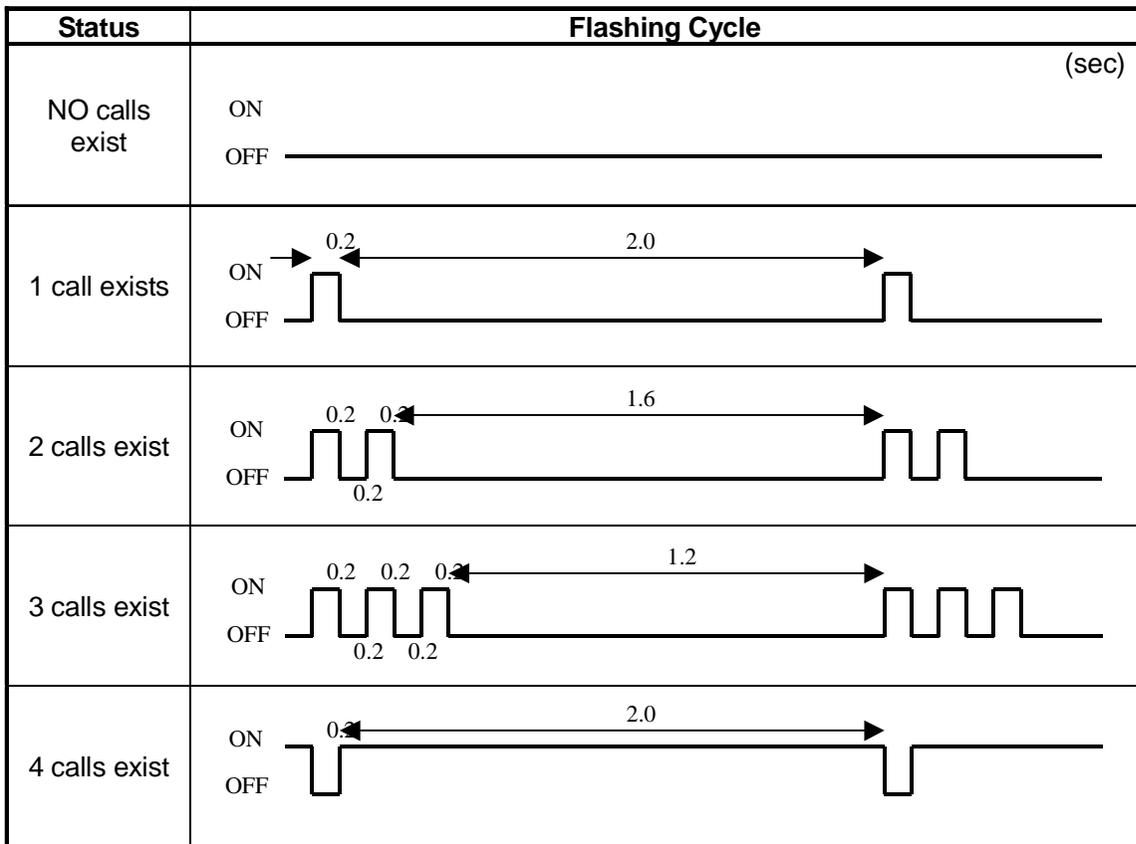
Figure 6-81 Busy LED Flash Pattern

7.5.4   Connectors

CN 1   Connects to the backboard

CN 4   Connects to RJ-45 connector at mid-top of another
BSU(2S), BSU(6S), or BSU(4M) ETU.

CN 5   Connects to RJ-45 connector at mid-bottom of another
BSU(2S), BSU(6S), or BSU(4M) ETU.

7.6   BSU(6S)-U20 ETU

7.6.1   Description

The BSU(6S)-U20 ETU is the Base Station Interface Unit slave ETU that provides connection for an additional six Base Stations when used with the BSU(4M)-U20 (Master) ETU

A maximum of two BSU(6S)-U20 ETUs can be installed in the Basic or Expanded Electra Elite IPK system.
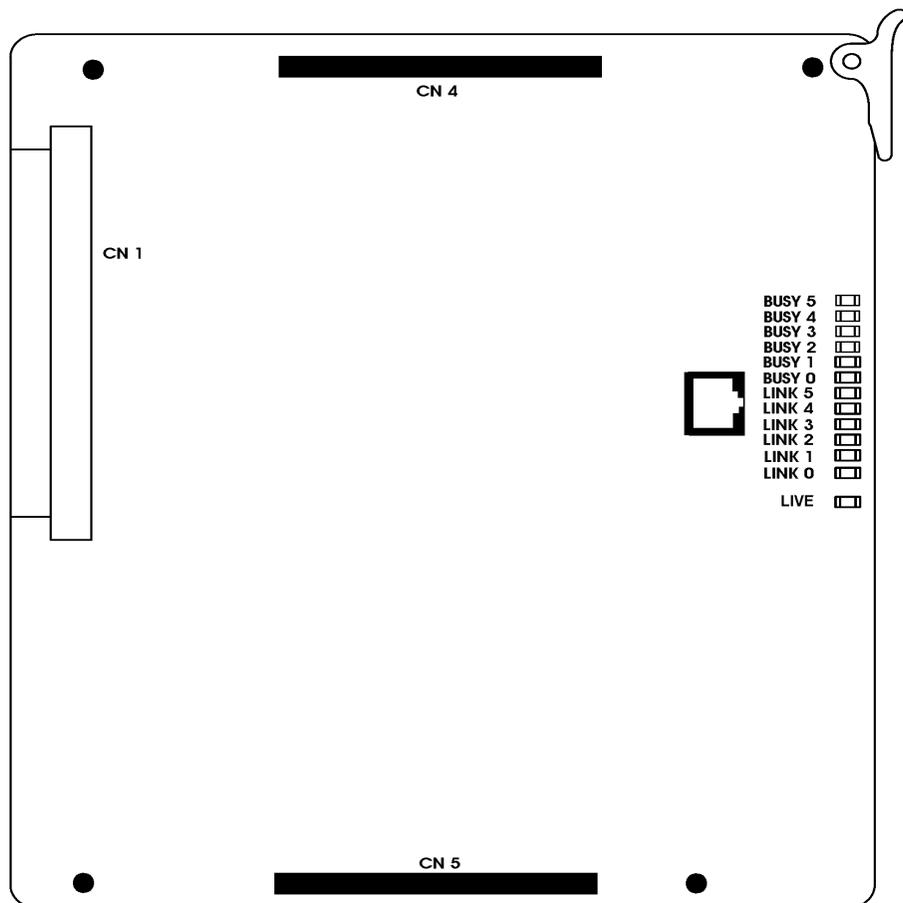
Figure 6-82 BSU(6S)-U20 ETU

7.6.2   Installation

The BSU(6S)-U20 ETU (Slave) is installed on four corner posts on the front of a BSU(4M)-U20 ETU or on the front of a BSU(2S)-U20 or on front of another BSU(6S). Slave ETUs are cascaded on posts to the left of the BSU(4M)-U20 in accordance with the tables on the next page.

No.	Slot N-2	Slot N-1	Slot N	No. of Base Stations	Note
1	None	None	BSU(4M) ETU	4	
2	None	BSU(2S) ETU	BSU(4M) ETU	6	
3	None	BSU(6S) ETU	BSU(4M) ETU	10	
4	BSU(2S) ETU	BSU(2S) ETU	BSU(4M) ETU	8	
5	BSU(6S) ETU	BSU(2S) ETU	BSU(4M) ETU	12	
6	BSU(2S) ETU	BSU(6S) ETU	BSU(4M) ETU	12	
7	BSU(6S) ETU	BSU(6S) ETU	BSU(4M) ETU	16	

Base Station number assignments are shown in the table below:

Slot	ETU	Channel	BS No.	Note
N	BSU(4M) ETU	1	1	
		2	2	
		3	3	
		4	4	
N-1	BSU(6S) ETU	1	5	
		2	6	
		3	7	When BSU(2S) ETU is installed, these numbers are not assigned.
		4	8	
		5	9	
		6	10	
N-2	BSU(6S) ETU	1	11	
		2	12	
		3	13	When BSU(2S) ETU is installed, these numbers are not assigned.
		4	14	
		5	15	
		6	16	

7.6.3   LED Indications

LIVE LED (Red)   On to indicate communication between this ETU and the Main CPU.

LINK (0~5) LED   On to indicate Layer 1 and Layer 2 link between the Wireless – DECT and indicated Base Station (5~10 or 11~16).

Flashes (0.5sec ON-0.5sec OFF) when Layer 1 Link between Wireless – DECT and BSU ETU is established, but not Link 2.

Off to indicate that Link 1 is not established.

Busy (0~5) LED   Flashing when the indicated Base Station (5~10 or 11~16) is busy. Refer to Figure 6-83 Busy LED Flash Pattern.

Status	Flashing Cycle
NO calls exist	(sec) ON / OFF —
1 call exists	ON 0.2 ← 2.0 → / OFF
2 calls exist	ON 0.2 0.2 ← 1.6 → / OFF 0.2
3 calls exist	ON 0.2 0.2 0.2 ← 1.2 → / OFF 0.2 0.2
4 calls exist	ON 0.2 ← 2.0 → / OFF
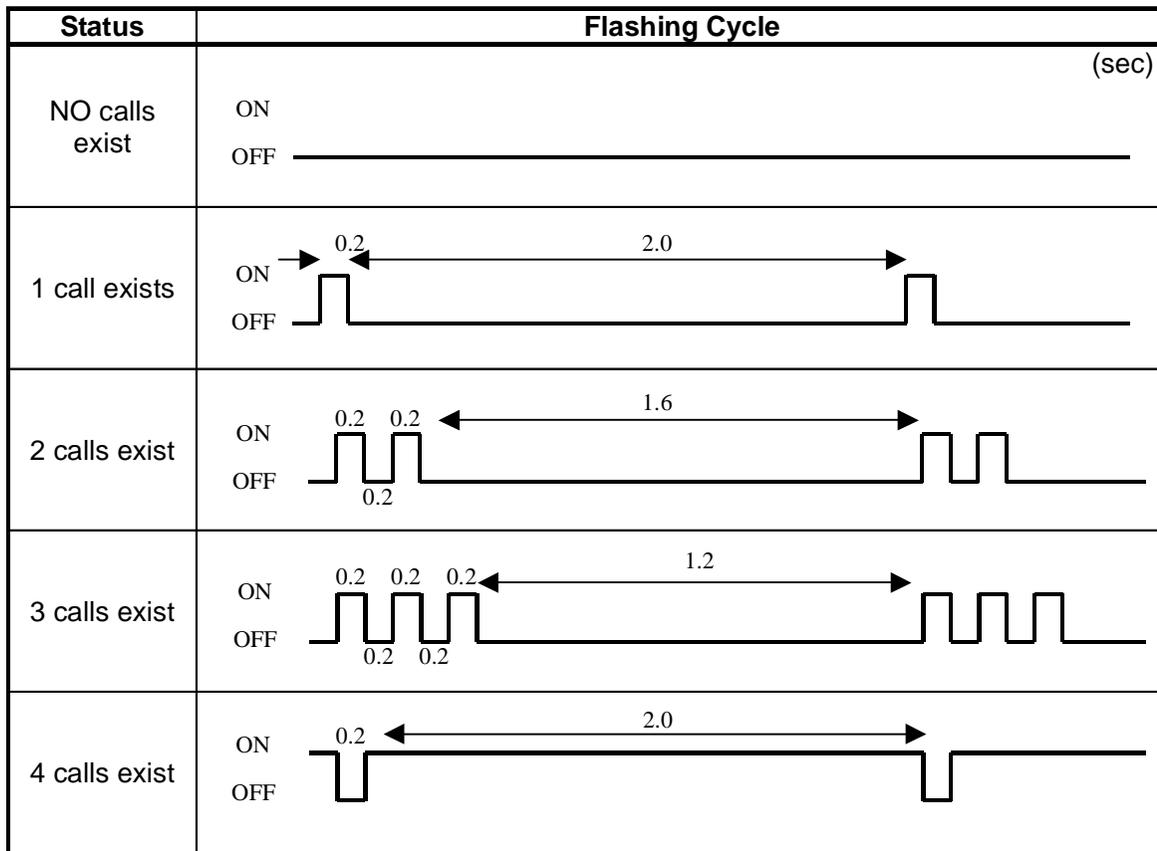
Figure 6-83 Busy LED Flash Pattern

7.6.4 Connectors

CN 1   Connects to the backboard

CN 4   Connects to RJ-45 connector at mid-top of the BSU(2S), another BSU(6S), or BSU(4M) ETU.

CN 5   Connects to RJ-45 connector at mid-bottom of the BSU(2S), another BSU(6S), or BSU(4M) ETU.

7.7   CCH(4)-U( ) ETU

7.7.1   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.

✎   CCH(4)-U( ) ETU firmware V2.0 or higher is required for Electra Elite IPK compatibility.
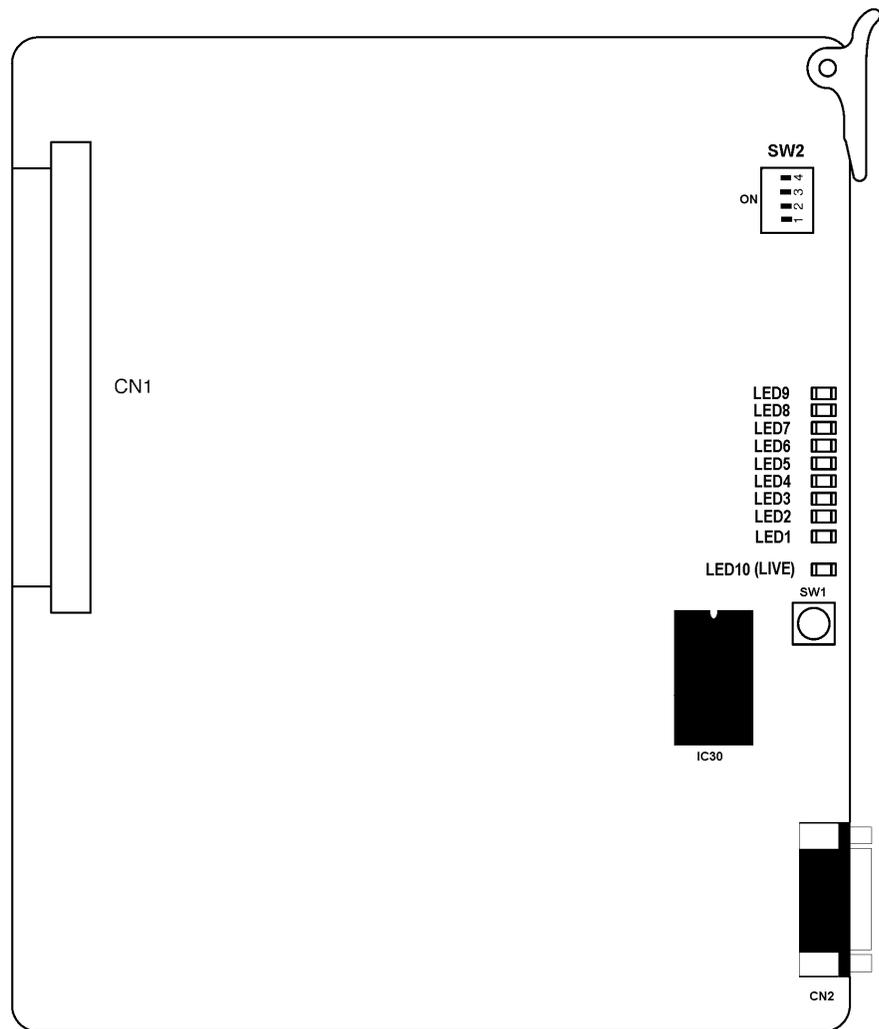
Figure 6-84 CCH(4)-U( ) ETU

7.7.2   Installation

Basic Port Package

Only one CCH(4)-U( ) ETU can be installed in any interface slot.

Expanded Port Package

Only one CCH(4)-U( ) ETU can be installed in any interface slot.

7.7.3   Switch Settings

Refer to Table 6-69 CCH(4)-U( ) ETU Default Switch Settings.

Table 6-69 CCH(4)-U( ) ETU Default Switch Settings

Switch	Setting/Description
SW1	Momentary Switch Resets the CCH ETU. When this switch is pressed, all K-CCIS users connected to the CCH ETU are interrupted. ***Use this switch only after all other options have failed.***
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

7.7.4   LED Indications

Refer to Table 6-70 CCH(4)-U( ) ETU LED Indications.

Table 6-70 CCH(4)-U( ) ETU 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

Table 6-70 CCH(4)-U( ) ETU LED Indications (Continued)

LED	Description	On	Flashing	Off
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

7.7.5   Connectors

The following connectors are included:

❍   CN1   Connects to the backplane.

❍   CN2   Performs maintenance functions.

7.7.6   Connections

There are no physical connections to the MDF for the CCH(4)-U( ) ETU.

7.8   CNF(8)-U( ) ETU

7.8.1   Description

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.

Each CNF(8)-U( ) ETU supports one 8-party conference or two 4-party conferences regulated by a switch setting.

The system recognizes this ETU as SLI(8)-U( ) ETU. This ETU shares the total number of station ports in the system.
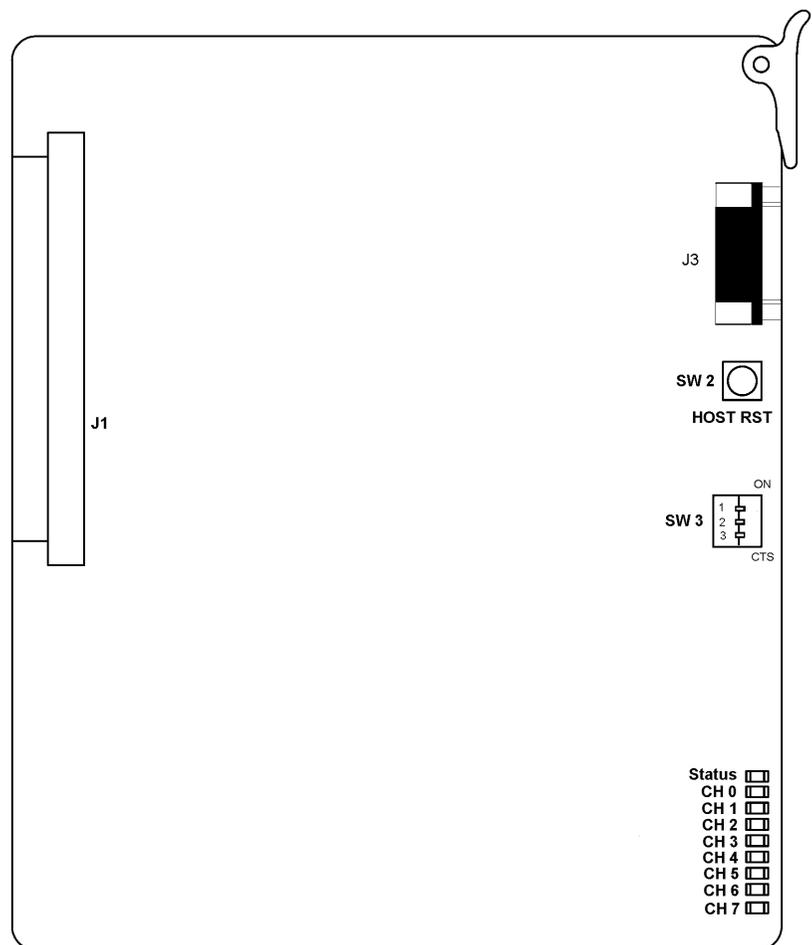
Figure 6-85 CNF(8)-U( ) ETU

7.8.2   Installation

Basic Port Package

A maximum of two CNF(8)-U( ) ETUs can be installed in slots S1~S8.

The maximum number of CNF(8)-U( ) ETUs that can be installed depends on other station cards installed. The system is limited by 32 stations.   This ETU shares the total number of station ports in the system.

Expanded Port Package

A maximum of two CNF(8)-U( ) ETUs can be installed in slots S1~S8.

The maximum number of CNF(8)-U( ) ETUs that can be installed depends on other station cards installed. The system is limited by 120 stations. This ETU shares the total number of station ports in the system.

7.8.3   Switch Settings

The CNF(8)-U( ) ETU has the following switches.

❍   Reset Switch

Refer to Table 6-71 CNF(8)-U( ) ETU Reset Switch.

❍   Conference Time Switch

Refer to Table 6-72 CNF(8)-U( ) ETU Maximum Conference Time Switch.

❍   Party Size Switch

Table 6-71 CNF(8)-U( ) ETU Reset Switch

Switch	Setting	Description
SW2	Press to Reset	Host Reset Switch

Table 6-72 CNF(8)-U( ) ETU Maximum Conference Time Switch

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

Table 6-73 CNF(8)-U( ) ETU Party Size Switch

Switch	Setting	Description
SW3-1	ON	1 Eight-Party Conference
SW3-1	OFF	2 Four-Party Conferences

7.8.4   LED Indications

Refer to Table 6-74 CNF(8)-U( ) ETU LED Indications.

Table 6-74 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

7.8.5   Connectors

The following connectors are included:

❍   J1   Connects to the backplane.

❍   J2   Not currently used

❍   J3   Nine-pin RS-232C connector for maintenance

7.9   ECR-U( ) ETU

7.9.1   Description

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.

Figure 6-86 ECR-U( ) ETU

External BGM Source

Maximum Power Capacity
for RLYs 1~3 is 10 W

Pin 2

Pin 1

CN2 Connector
SPKR OUT

External Amplifier

RLY 1

Zone A

RLY 2

Zone B

Zone Paging Output from MDF

RLY 3

Zone C

Pin 3   CN 2 Connector

Pin 4   CN 3

SPKR OUT

External Paging

External Amplifier

RCA Jack
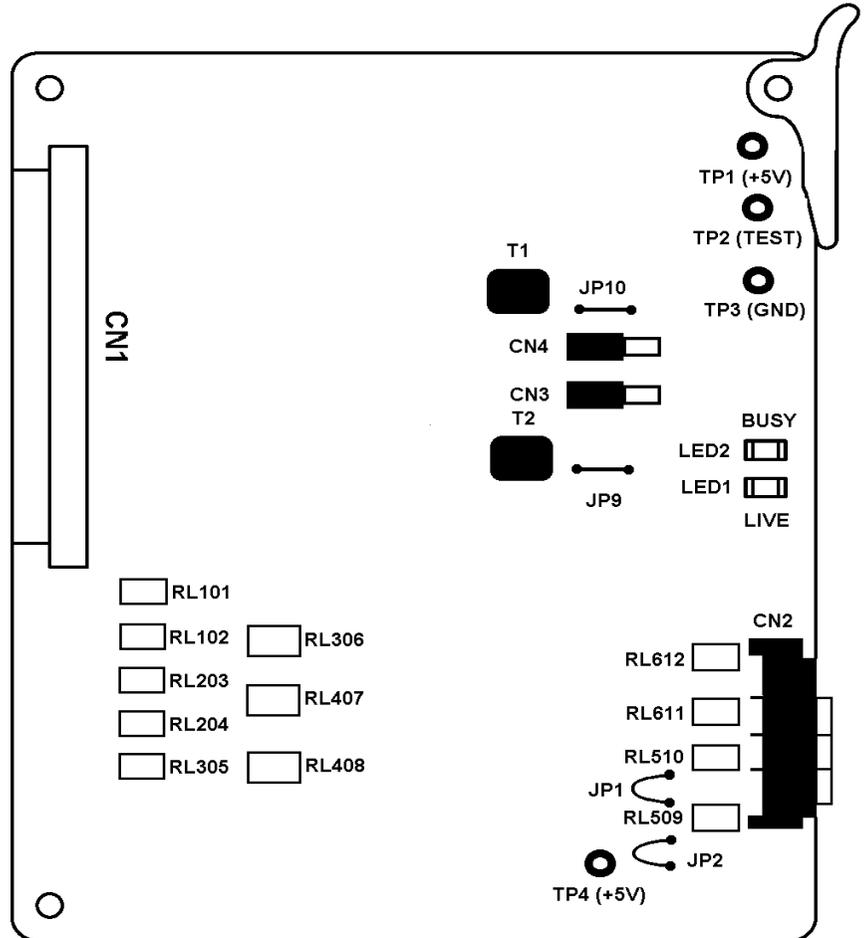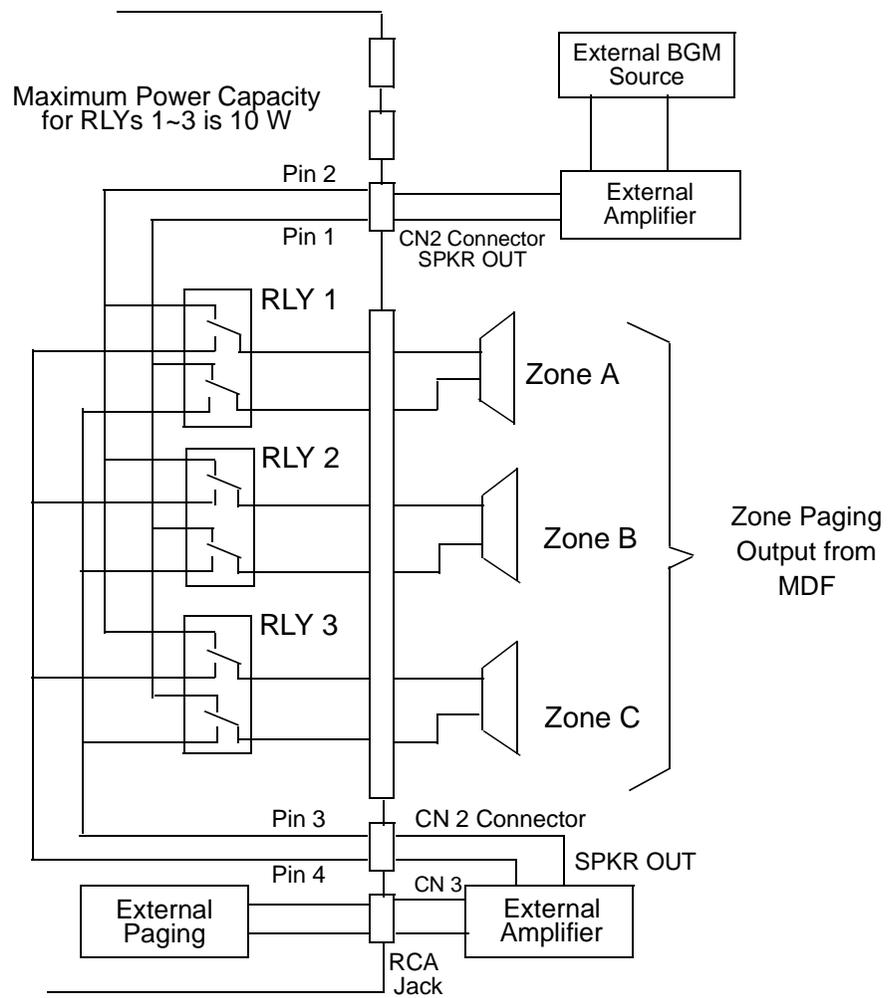
Figure 6-87 ECR-U( ) ETU Block Diagram

7.9.2   Installation

Basic Port Package

Only one ECR-U( ) ETU can be installed in slots S1~S8.

Expanded Port Package

Only one ECR-U( ) ETU can be installed in slots S1~S8.

7.9.3   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.

7.9.4   Connectors

The following connectors are included:

- ❍   CN1   Connects to the backplane.
- ❍   CN2   Contacts are used for Relays.

  Refer to CN4 below.

- ❍   CN3   Both-way Audio Connection is used for External Paging.

- ❍   CN4   Audio output is used for Tone Ringer and Night Chime.

Table 6-75 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 for all other ECR-U( ) ETU cable connections.

7.9.5   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

7.10 HUB(8)-U( ) ETU

7.10.1   Description

The HUB(8)-U( ) ETU is an optional Ethernet interface for the Electra Elite IPK 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 IPK 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.
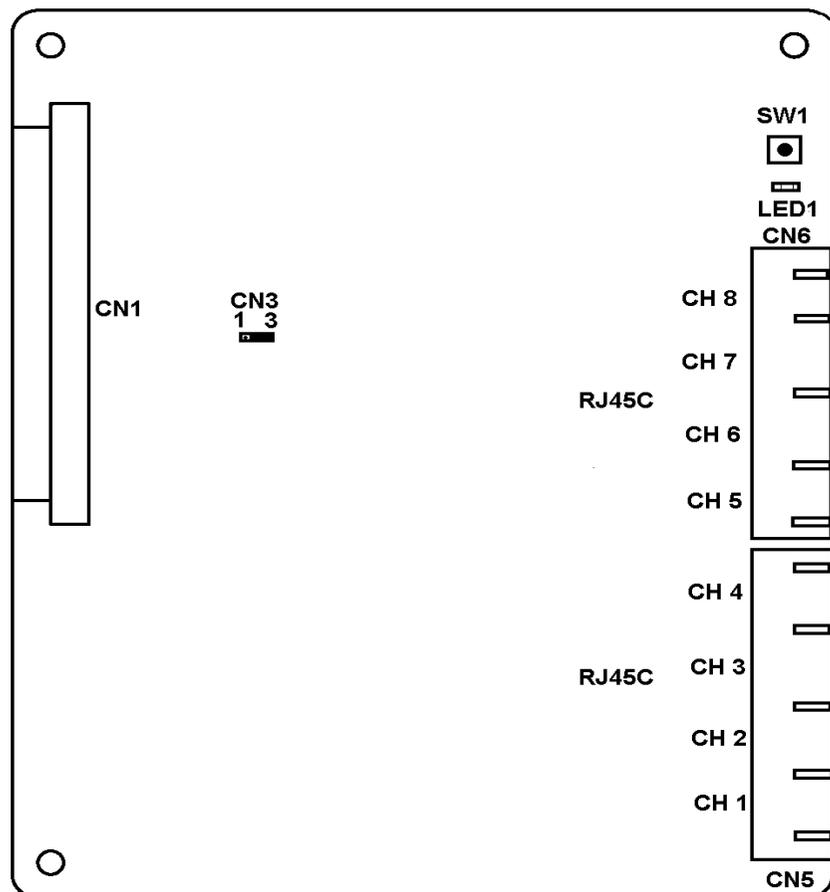
Figure 6-88 HUB(8)-U( ) ETU

7.10.2   Installation

The HUB(8)-U( ) ETU cannot be installed in a KSU that contains an EliteMail VP or CTI system.

✎   This ETU has an attached green cable that must be connected to frame ground.

Basic Port Package

Only one HUB(8)-U( ) ETU can be installed in slots S1~S8.

The system is limited by 32 stations.   This ETU shares the total number of station ports in the system.

Expanded Port Package

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.

7.10.3   Switch Settings

Press switch SW1 to Reset the HUB(8)-U( ) ETU.

7.10.4   LED Indications

Refer to Table 6-76 HUB(8)-U( ) LEDS on page 6-182.

Table 6-76 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

7.10.5   Connectors

The following connectors are included:

❍   CN1   Connects to the backplane.

❍   CN3   Three pin Jumper. Pins 2 and 3 are shorted for Normal operation.

❍   CN5   Channel 1~4 RJ45C Connectors

❍   CN6   Channel 5~8 RJ45C Connectors

7.11   IAD(8)-U( )

7.11.1   Description

The IAD(8)-U( ) ETU is an optional interface integration device ETU for the Electra Elite IPK 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 Figure 6-89 IAD(8)-U( ) ETU on page 6-183.
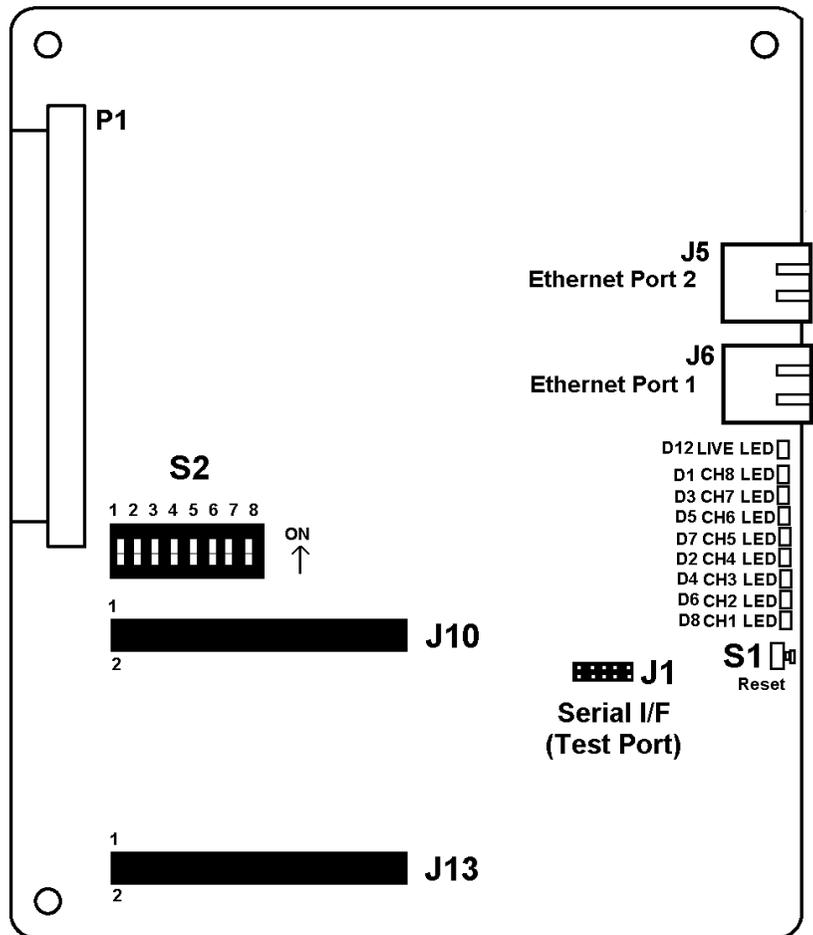
Figure 6-89 IAD(8)-U( ) ETU

Table 6-77 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

7.11.2   Boot Up Sequence Status Identification

Status of the IAD(8)-U( ) ETU during boot up is shown in Table 6-78 IAD(8)-U( ) ETU LED Boot Sequence Indications.

Table 6-78 IAD(8)-U( ) ETU 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	Off	Off	Off	Off	Off	Off	Off	Flash	1 second (from Cold Boot)
2	**ON**	**ON**	**ON**	**ON**	Off	Off	Off	Off	Flash	5 seconds
3	Off	Off	Off	Off	Off	Off	Off	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	Off	Off	Off	Off	Off	Off	Off	Flash	5 seconds

* LIVE LED D12 also flashes when ETU is receiving power from the KSU.

7.11.3   Installation

This ETU can be installed in any KSU slot that supports the applicable ETU simulated.

Basic Port Package

A maximum of three IAD(8)-U( ) ETUs can be installed in slots S1~S8 when used as an ESI or DTI-U.

Expanded Port Package

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.

7.11.4   Switch Settings

Refer to Table 6-79 IAD(8)-U( ) ETU Switches.

Table 6-79 IAD(8)-U( ) ETU Sw**itches**

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

7.11.5   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.

7.11.6   Connectors

The following connectors are included:

❍   P1   Connects to the backplane.

❍   J1, J10, J11   Reserved for future use.

❍   J5   RJ-45 Ethernet connector for future use

❍   J6   Default RJ-45 Ethernet connector

7.12 IPCA( )-U( ) ETU

7.12.1   Description

The IPCA( )-U( ) ETU is a pure IP switch ETU for use with the Electra Elite IPK 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 IPK telephones or various available trunks.
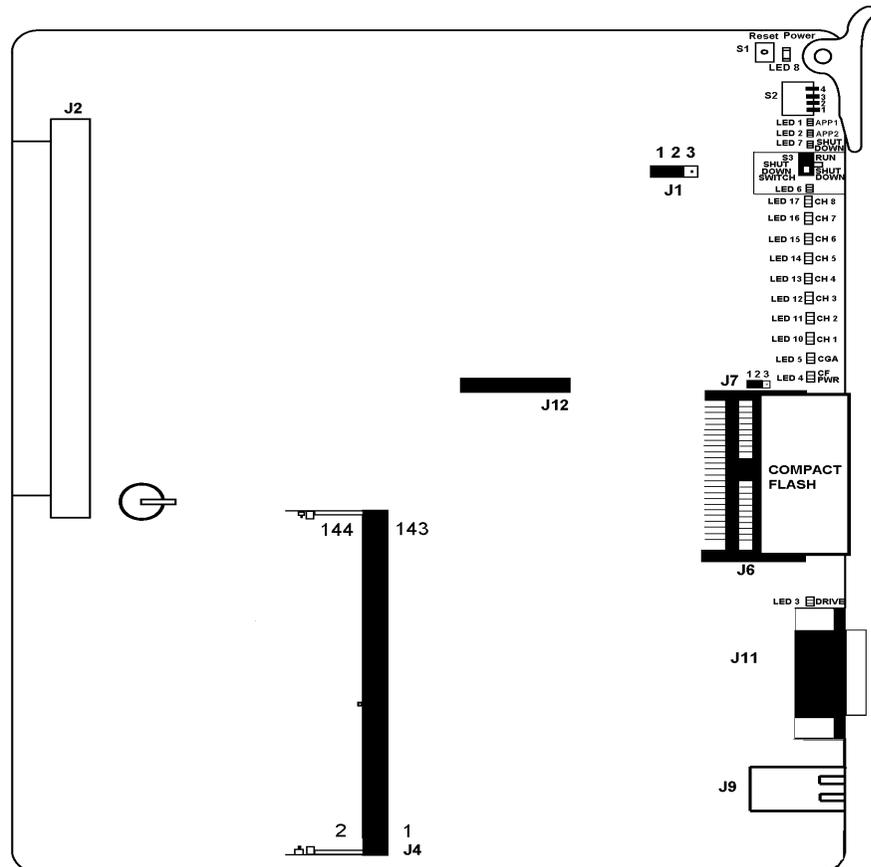
Figure 6-90 IPCA( )-U10

7.12.2   Installation

Basic Port Package

Only one IPCA( )-U( ) ETU can be installed in slots S1~S8.

The IPC system is limited by 30 IP stations.   This ETU shares the total number of station ports in the system.

Expanded Port Package

Only one IPCA( )-U( ) ETU can be installed in slots S1~S8.

The IPC system is limited by 30 IP stations. This ETU shares the total number of station ports in the system.

> *When installing this ETU, make all ETU DIP switch setting changes before inserting it in the KSU.*

7.12.3   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.

7.12.4   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.

7.12.5   Switch Settings

❍   S1   Used to Reset the 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 used to start or stop the application

7.12.6   LED Indications

Refer to Table 6-80 IPCA( )-U( )ETU LED Indications.

Table 6-80 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)

7.12.7   Jumper Settings

❍   J1   Not Used.

❍   J7   Not Used.

7.12.8   Connectors

The following connectors are included:

❍   J2

Connects to the backplane.

❍   J4

Connection is used for SODimm Memory card.

❍   J6

Used for Compact Flash drive on FMS.

❍   J9

RJ45 LAN connector is used for network connection.

❍   J11

Serial Port

❍   J12

Not Used

7.13 IVR Application

7.13.1   Description

The EliteApps – Interactive Voice Response application is a man-machine interface that uses scripting language to play prompts that guide a caller to select different available options using a touchtone telephone key pad (DTMF tones).

This application is implemented using a VMP(4)-U( ) ETU and an IVR Hard Disk Drive Kit to support four ports for IVR applications. When the DSP-U( ) module is attached eight ports are available.
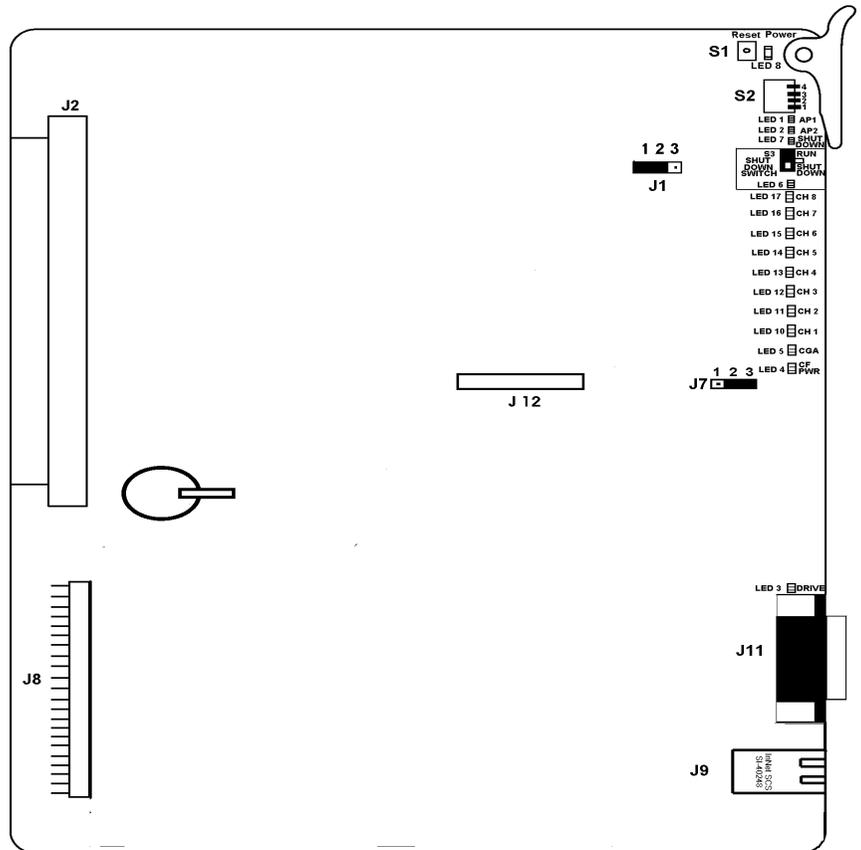
Figure 6-91 VMP(8)-U( ) ETU With IVR HDD

7.13.2   Installation

Basic Port Package

Only one VMP 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 32 stations.

Expanded Port Package

Only one VMP 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.

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

7.13.3   Switch Settings

The following default switch settings are used for the VMP(4)/(8)-U( ) ETU. Typically these settings should remain at factory default.

Table 6-81 Switch Settings for VMP(4)/(8)-U( ) ETU

Switch	Default Setting	Description
SW 1	Off	Resets the ETU. Leave at factory default setting.
SW 2-1	Off	Not used for IVR ETU. Leave at factory default setting.
SW 2-2	Off	Restores the ETU to factory default settings if 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 if set to On. Leave at factory default unless factory defaults must be restored, then set SW2-2 and SW2-3 to On.
SW3	Off	Toggles to switch the IVR application On or Off.

7.13.4   LED Indications

Refer to Table 6-82 VMP(4)/(8)-U( ) ETU LED Indications.

Table 6-82 VMP(4)/(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 - Application started successfully

✎   After system is up and running these LEDs are turned off, and all channels are ready to receive calls.

✎   When the VMP(4)/(8) fails to start, all eight channel LEDs and the BCLR LED (AP1) are on.

Table 6-83 VMP(4)/(8)-U( ) ETU Ready LED Indications shows the status of the VMP(4)/(8)-U( ) ETU after it has been installed, initialized and is ready to process calls.

Table 6-83 VMP(4)/(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

7.13.5   Jumper Settings

The following jumper settings apply.

J1	Setting
Pin 1 to Pin 2	IVR 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)

7.13.6   Connectors

The following connectors are included:

❍   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-U( ) module

7.14   MG(8)-U( ) ETU

7.14.1   Description

The MG(8)-U( ) ETU is an eight-path gateway ETU between the IPCA( )-U10 and the CPUI( )-U( ).
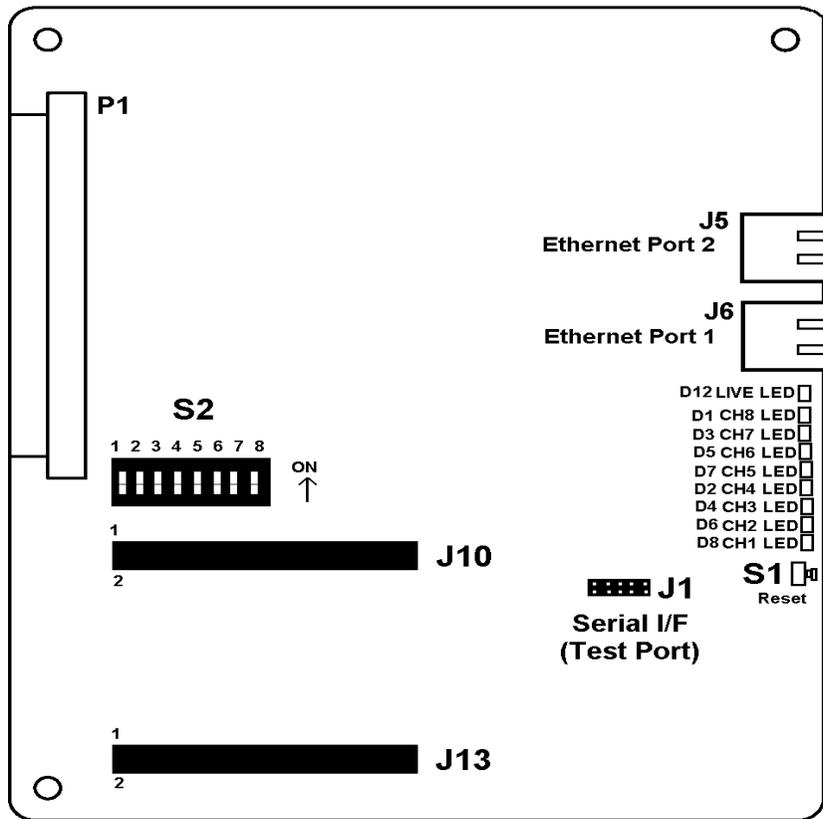
Figure 6-92 MG(8)-U( ) ETU

7.14.2   Installation

Basic Port Package

Only one MG(8)-U( )ETU can be installed in slots S1~S8.

The system is limited to 16 trunks.   This ETU does not take away from the total number of trunks in the system, but dedicates these trunks as CO ports 17~24.

Expanded Port Package

Only one MG(8)-U( ) ETU can be installed in slots S1~S8.

The system is limited to 64 trunks. This ETU shares the total number of trunk ports in the system.

7.14.3   Switch Settings

❍   S1   Reset Switch

❍   S2   Eight position DIP switch

Refer to Table 6-84 MG(8)-U( ) ETU S2 Switch Settings.

Table 6-84 MG(8)-U( ) ETU S2 Switch Settings

S2	Description	Default
1	ETU Type Selection. Refer to Table 6-85 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

➢   When MG(8)-U10 ETU is booted with Switch 6 On, the following defaults are set:

■   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 6-85 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

7.14.4   LED Indications

7.14.4.1   Normal State

Refer to Table 6-86 Normal State LEDs.

Table 6-86 Normal State LEDs

LED	ON	FLASHING	OFF
Channel LEDs 1~8 Status	Busy		Idle
Live Led	Operation Stopped Power On	Normal Operation	Power Off

7.14.4.2   For Initialization

Refer toTable 6-87 Initialization LEDs.

Table 6-87 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	Off	Off	Off	Off	Off	Off	Off

7.14.5   Connectors

The following connectors are included:

❍   P1   Connects to the backplane.

❍   J1   Used for Serial Interface Test Port.

❍   J5   Ethernet Port 2 is not used.

❍   J6   Ethernet Port 1 is used to connect to the LAN.

❍   J10   Not used

❍   J13   Not used

7.15   PBR( )-U( ) ETU

7.15.1   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 CPUI( )/U( ) ETU PBR channels are not enough to support all the PBR requirements of the system, or the channels on the CPUI( )/U( ) ETU are assigned for the Automated Attendant and DISA features.
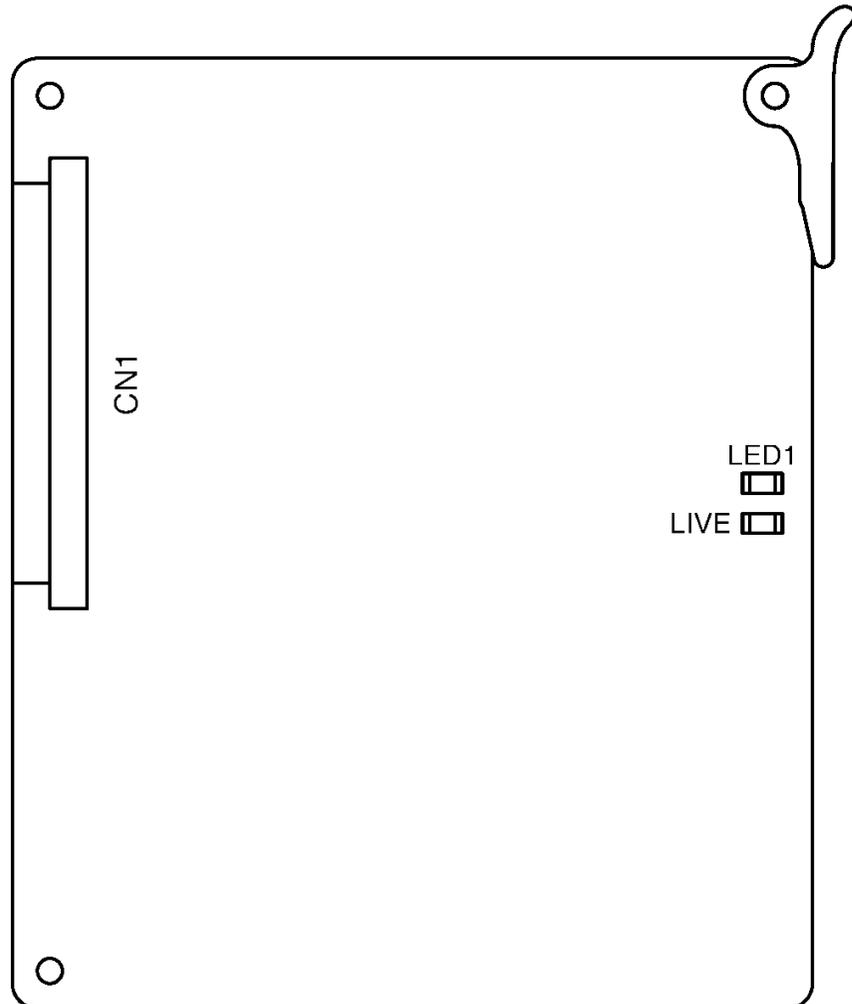
Figure 6-93 PBR( )-U( ) ETU

7.15.2   Installation

Basic Port Package

Only one PBR( )-U( ) ETU can be installed in slots S1~S8 to provide four circuits. Four circuits are built-in on the CPUI( )/U( ) ETU for a maximum of eight PBR circuits.

Expanded Port Package

Only one PBR( )-U( ) ETU can be installed in slots S1~S8 to provide four circuits. Four circuits are built-in on the CPUI( )/U( ) ETU for a maximum of eight PBR circuits.

7.15.3   LED Indications

Live LED indications are listed below.

- ❍   Blinking Red   Indicates Normal Operation.
- ❍   Steady Red   Operation is Stopped with power On.
- ❍   Off   Power is Off.

LED 1 indications are listed below.

- ❍   On   Some circuit(s) are receiving DTMF signaling.
- ❍   Off   All PBR(s) are idle.

7.15.4   Connectors

The following connector is included:

- ❍   CN1   Used to Connect to the backplane.

7.16   VMP( )-U40 ETU

7.16.1   Description

This ETU is a PC-platform that contains disk space for voice recording storage and application software. It can be configured as a 2-port, 4-port, or 8-port interface.

The 2- or 4-port interface includes one digital signal processor (DSP); a DSP-U30 Unit must be installed for the 8-port interface.

Major features include:

❍   A faster running 486-based processor allows quicker boot and faster operation.

❍   Cosession direct connection speed of 57,000 baud is supported as the only direct connection speed for all U40 ETUs.

❍   Port upgrades are performed by replacing the Compact Flash drive with another drive with the needed port configuration.

❍   All ETUs have a built-in modem for remote console programming. An external modem and single-line port can also be used for remote programming. The internal modem is accessed from the automated attendant by dialing the modem extension ID that is only an ID used by voice mail, *not* an extension on the telephone system.

❍   The voice mail application efficiently shuts down after active calls are completed, and the ETU turns off when the shutdown switch is placed in SHUTDOWN (Q51231 or higher database is required).

❍   The system manager can select a special language for a particular subscriber at the console, and the subscriber hears the language when login is complete. The default language must be the system default language (Q51231 or higher database is required).

❍   A database entity, the Language Selection Box, allows outside callers to choose a language. Each database entity (*e.g.*, personal message box) also has the selected language associated with it (Q51231 or higher database is required).
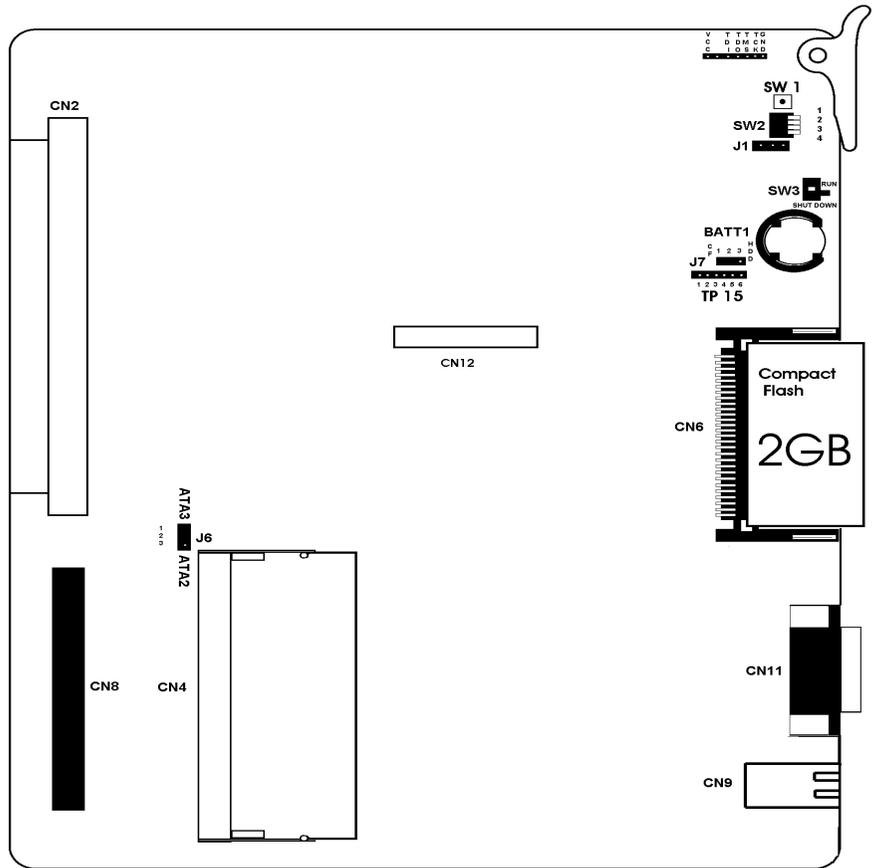
Figure 6-94 VMP( )- U40 ETU

7.16.2   Installation

The VMP(2)-U40 ETU has two channels of built-in Voice Mail.

The VMP(4)-U40 ETU has four channels of built-in Voice Mail.

The VMP(8)-U40 ETU has eight channels of built-in Voice Mail.

Only one VMP(2)/(4)/(8)-U40 ETU can be installed in any interface slot in the Basic or Expanded Port Package of the Electra Elite IPK system.

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

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

7.16.3   Installing Flash Drive on the VMP( )-U40 ETU

Use the following instructions to install the Flash Drive.

1.   Remove the VMP( )-U40 ETU and selected Flash Drive from the box.

2.   Locate slot CN6 on VMP( )-U40 ETU.

3.   The side with the SanDisk name in large red letters should be facing up, as shown in Figure 6-95 Installing the Flash Drive on the VMP( )-U40 ETU.
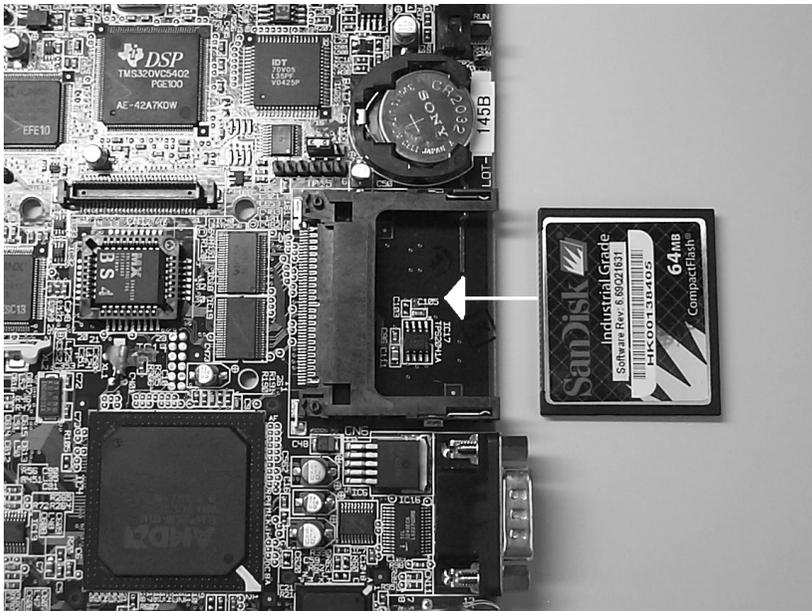
Figure 6-95 Installing the Flash Drive on the VMP( )-U40 ETU

✎   The Flash Drive goes in only one way, and does not take much force to insert it.

4.   Push the drive in until it is fully seated, as shown in Figure 6-96 Flash Drive Seated on VMP( )-U40 ETU.
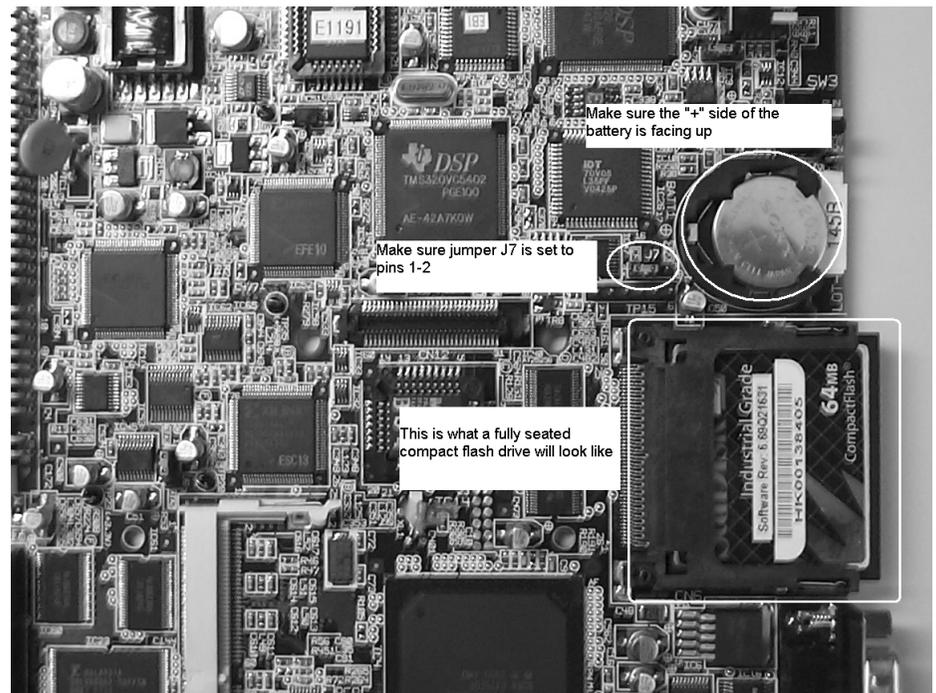
Figure 6-96 Flash Drive Seated on VMP( )-U40 ETU

5.   Ensure that jumper J1 is set across pins 1 and 2.

6.   Ensure that jumper J7 is set across pins 1 and 2.

7.   Insert Sony battery CR-2032 into BATT1 connector with the + sign facing up as shown in Figure 6-96 Flash Drive Seated on VMP( )-U40 ETU on page 6-205.   When an eight port ETU is used go to 7.16.5 Installing DSP( )-U30 on VMP( )-U40 ETU on page 6-210, otherwise your voice mail ETU is ready for installation.

7.16.4   Installing Hard Drive on the VMP( )-U40 ETU

Warning! Handle the hard drive carefully! Do not drop the drive or apply pressure to it! Do not touch the printed circuit board of the drive or ETU unnecessarily. Doing so can make a drive inoperable!

This unit makes extensive use of CMOS technology that is very susceptible to static; therefore, extreme care must be taken to avoid static discharge when handling.

1.   Before mounting the drive make note of the connection to the hard drive, notice the four pins to the left of the drive, These pins are not connected for normal operation, see Figure 6-97 Connecting the Hard Drive.
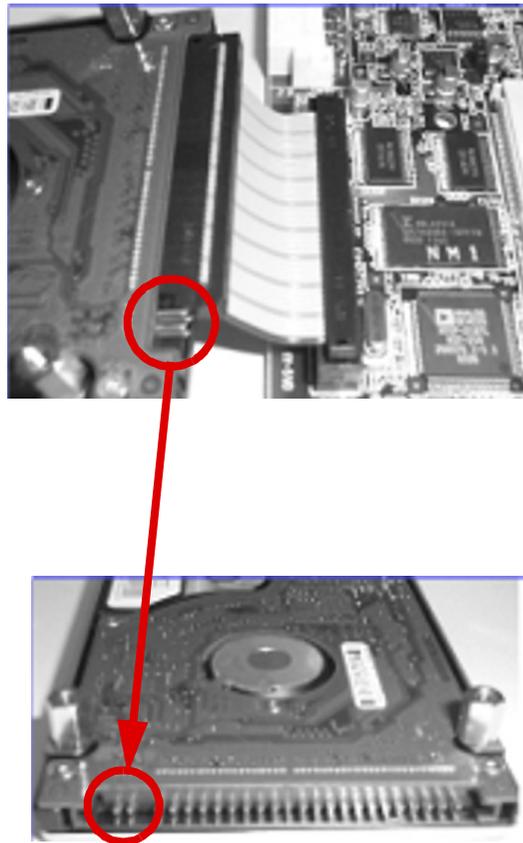
Figure 6-97 Connecting the Hard Drive

2.   Check jumper J-7 and make sure it is on pins 2-3, see Figure 6-98 Plus Sign on Battery Displayed Up.

3.   Check jumper J-1 and make sure it is on pins 1-2, see Figure 6-98 Plus Sign on Battery Displayed Up.

4.   Insert Sony battery CR-2032 into BATT1 connector, the **+** sign should be facing up as shown in Figure 6-98 Plus Sign on Battery Displayed Up.

J-1 — make sure it is set to pins 2-3.

BATT1 Connector — install battery with the + facing up.

J-7 — make sure it is set to pins 2-3 for hard drive.
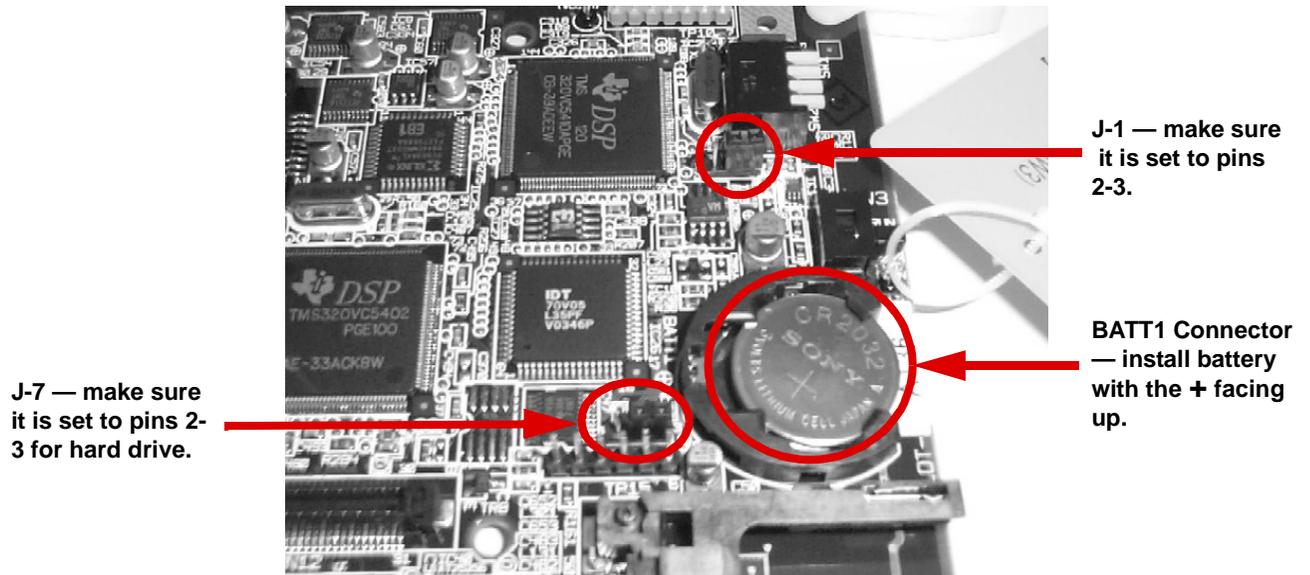
Figure 6-98 Plus Sign on Battery Displayed Up

5.   Insert keyed end of ribbon cable into connector CN8, the keyed connector only goes into connector CN8 one way and should not be forced. The red stripe of the cable is towards the bottom of the ETU as given in Figure 6-99 Connecting the Ribbon Cable on page 6-208.

Notice the four pins to the left of the drive. These pins are not connected for normal operation.

Red Stripe
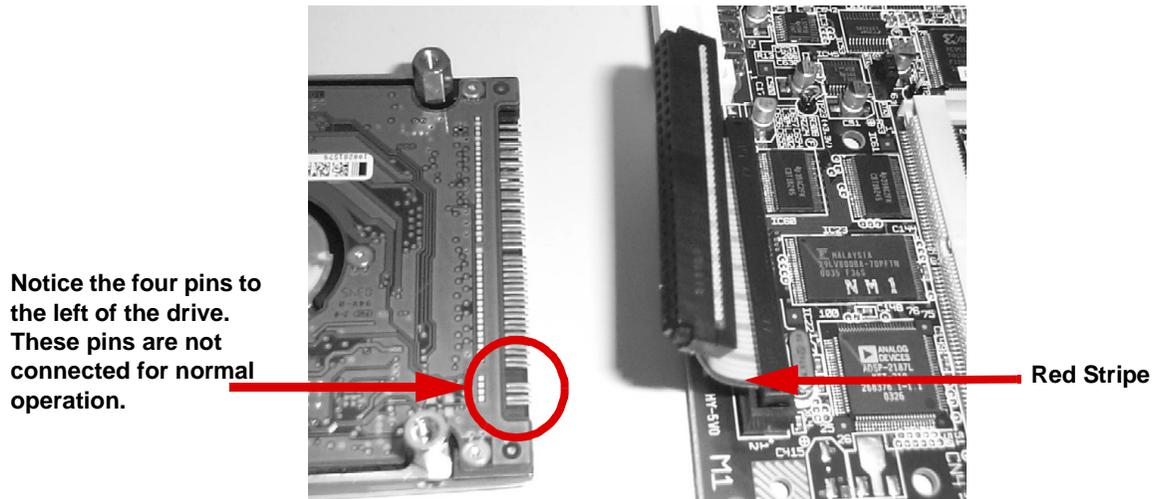
Figure 6-99 Connecting the Ribbon Cable

6.   Place hard drive on table with printed circuit board side up and the pins facing the card as shown in Figure 6-99 Connecting the Ribbon Cable.

7.   Connect the hard drive to the cable making sure that the four pins on right side of the drive are not connected as shown in Figure 6-100 Leaving Four Pins Unconnected.

Notice the four pins to the left of the drive. These pins are not connected for normal operation.
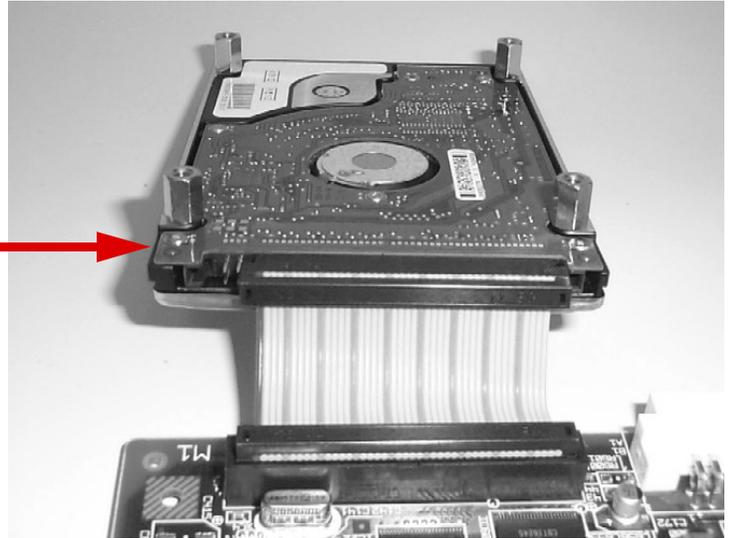
Figure 6-100 Leaving Four Pins Unconnected

8.   Carefully place the hard drive on the ETU as shown in Figure 6-101 Placing the Hard Drive on the ETU.

Figure 6-101 Placing the Hard Drive on the ETU

9.   Holding the drive so it does not move turn the ETU over and put the four mounting screws in place as shown in Figure 6-102 Placing the Four Mounting Screws. The screws only need to be lightly torque down. *Over Tightening The Screws Can Damage The Board*.

Figure 6-102 Placing the Four Mounting Screws

7.16.5   Installing DSP( )-U30 on VMP( )-U40 ETU

For an 8-port VMP( )-U40 ETU, the DSP-U30 must be installed. Refer to Figure 6-103 Installing the DSP-U30 on the VMP( )-U40 ETU.

1.   Wearing a grounding strap, remove the VMP( )-U40 and DSP-U30 from the box and lay on a flat work surface.

2.   Locate connector CN12 in the center of the ETU and position the DSP-U30 over it. Press down firmly on the DSP-U30 unit until a secure connection is made. Ensure that all the standoffs are snapped completely.

3.   Place Switch SW3 in **RUN**.

4.   Install the ETU in the KSU.

5.   Turn **ON** the KSU system power.

6.   Wait for the APP1 LED to turn green, then connect the support
      PC to the VMP(8)-U40 ETU.

7.   Verify that eight ports are shown on the banner screen.

8.   When the unit is to be installed at another location, shut down
      the voice mail application by pressing the **ESC** key.

9.   Enter **Y** for yes, and enter the password (default is **nec**).

10.   From the Utility menu enter **x** to exit to DOS.

11.   Disconnect from the system.

12.   Place SW3 in **SHUT DOWN**.

13.   Wait for the SHUT DOWN LED to light red.

14.   Turn **OFF** the KSU power and remove the ETU from the KSU.

15.   Make sure to transport the ETU in the original packaging.
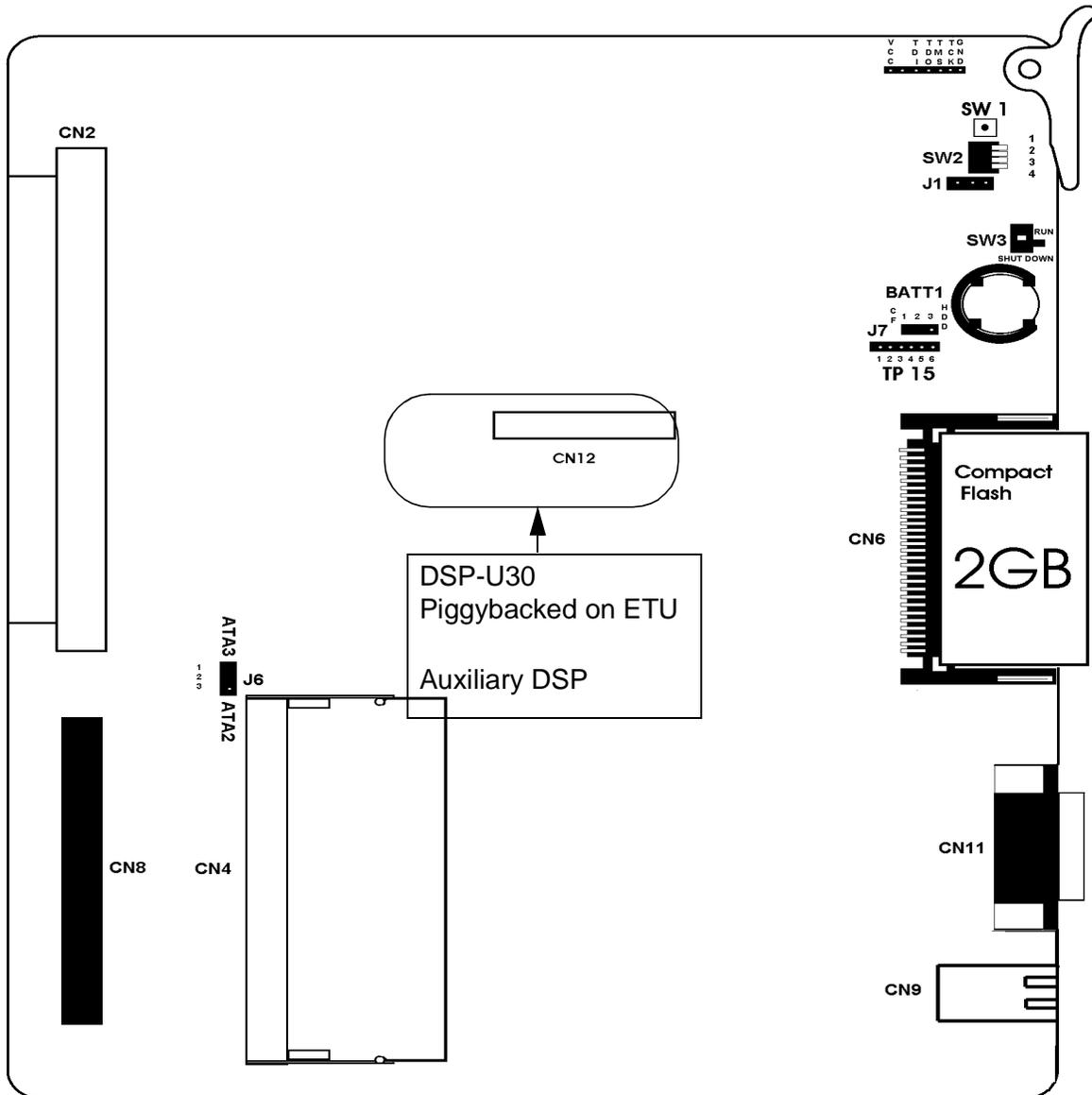
Figure 6-103 Installing the DSP-U30 on the VMP( )-U40 ETU

7.16.6   Switch Settings

Table 6-88 VMP( )-U40 ETU Switch Settings

Reset Power Switch SW1				Used for development only
DIP Switch SW2				
1	**2**	**3**	**4**	**Description**
ON				Enable HostKey and run Manufacturing Test (NEC Production use only.
ON	ON			Enable HostKey with floppy disk redirection and run Manufacturing Test (NEC Production use only.Production use only.
		ON		Connect to Cosession using modem instead of direct cable.
			ON	Start BRU host with direct cable connection
		ON	ON	Start BRU host with modem connection
	ON		ON	Connect to Cosession using direct cable connection, but do not start voice mail software (for troubleshooting and maintenance only)
SHUTDOWN Switch SW3				Used to identify the position of SW3
RUN				LED 6 is on red.
SHUT DOWN				LED 7 is on red.

7.16.7   Jumper Settings

Table 6-89 VMP( )-U40 ETU Jumper Settings

J1	
1-2	External modem not connected (**default**)
2-3	External modem connected
J7	
1-2	Compact Flash is master drive
2-3	HDD is master drive (**default**)

7.16.8   VMP( )-U40 LED Indications

Table 6-90 VMP( )-U40 ETU LED Indications (on back of ETU

LED No.	Name	On	Flashing	Off
1	AP1 Application Software	Green (Run no errors) Amber (Run with errors) Red (Not running)	Not Used	Not Used
2	AP2	Not Used	Not Used	Not Used
3	DRIVE access	Red for access	Not Used	Not accessed
4	CF POWER	Red (Receiving ETU power)	Not Used	No ETU power
5	LIVE	Not Used	Red every 125ms during operation	Operation shutdown
6	SW3 in RUN	Red (**don't remove ETU**)	Not Used	Not in RUN
7	SW3 in SHUTDOWN	Red (**ETU can be removed**)	Not Used	Not SHUTDOWN
8	Power	Red (ETU Receiving KSU power)	Not Used	No KSU power
9	Development only	Not Used	Not Used	Not Used
10	CH1	Red (Off Hook)	Not Used	On Hook
11	CH2	Red (Off Hook)	Not Used	On Hook
12	CH3	Red (Off Hook)	Not Used	On Hook
13	CH4	Red (Off Hook)	Not Used	On Hook
14	CH5	Red (Off Hook)	Not Used	On Hook
15	CH6	Red (Off Hook)	Not Used	On Hook
16	CH7	Red (Off Hook)	Not Used	On Hook
17	CH8	Red (Off Hook)	Not Used	On Hook

CH LEDs 1~4 light during startup to indicate:
LED1   BICOM driver loaded
LED2   Scandisk completed successfully
LED3   CoSession Host loaded successfully
LED4   Voice Mail started successfully
After the system is up and running these LEDs are off, and channels can receive calls.
When Voice Mail fails to start, all CH LEDs and the AP1 LED are on.

7.16.9   Connectors

Table 6-91 VMP( )-U40 ETU Connectors

Connector	
CN2	Backplane connector
CN4	SO-MIDD memory connector
CN6	Compact Flash Connector
CN8	Hard Drive connector
CN9	Ethernet Port
CN11	COM port for console programming connection
CN12	Port expansion connector for DSP-U30 Unit

7.17   VRS(4)-U( ) ETU

7.17.1   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 CPUI( )/U( ) ETU for Automated Attendant or DISA.
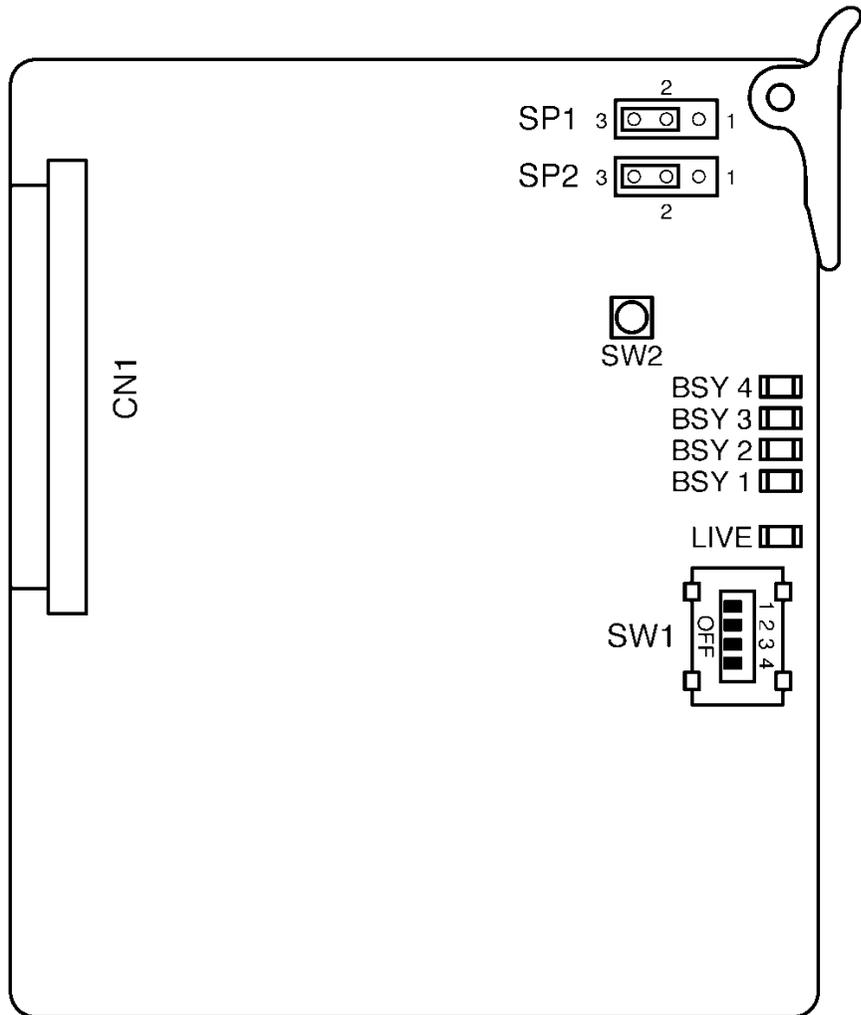
Figure 6-104 VRS(4)-U( ) ETU

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

7.17.2   Installation

Basic Port Package

A maximum of two VRS(4)-U( ) ETUs can be installed in slots S1~S8.

Expanded Port Package

A maximum of two VRS(4)-U( ) ETUs can be installed in slots S1~S8.

7.17.3   Switch Settings

Refer to Table 6-92 VRS(4)-U( ) ETU Default Switch Settings.

Table 6-92 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

Table 6-92 VRS(4)-U( ) ETU Default Switch Settings (Continued)

Switch Settings		Function
SW1-4	On	Record Gain
	Off	Record Pad (default)
SW2	N/A	Test/Reset Switch

7.17.4   LED Indications

Refer to Table 6-93 VRS(4)-U( ) ETU LED Indications.

Table 6-93 VRS(4)-U( ) ETU 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

7.17.5   Connectors

The following connector is included:

❍   CN1   Connects to the backplane.

7.17.6   Pins

Two pins, *SP1* and *SP2*, are located on the top right of the VRS ETU. These pins are for maintenance. *Do not* change the factory default settings on these pins. Pins 2 and 3 are short-circuited (default).

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Installing Electra Elite IPK KSU
Common Optional Equipment   CHAPTER 7

SECTION 1 GENERAL INFORMATION

The Electra Elite IPK system supports Music on Hold, Station Background Music and external paging. This chapter provides information regarding these options.

SECTION 2 MUSIC ON HOLD

The Electra Elite IPK KSU allows an internal or external Music on Hold source to be connected to the Electra Elite IPK **system**. When an internal music source is used (digital music), external music on hold is not available.

2.1 Connecting Audio Sources to the KSU

Connect the plug end into the audio jack on the side of the base KSU.
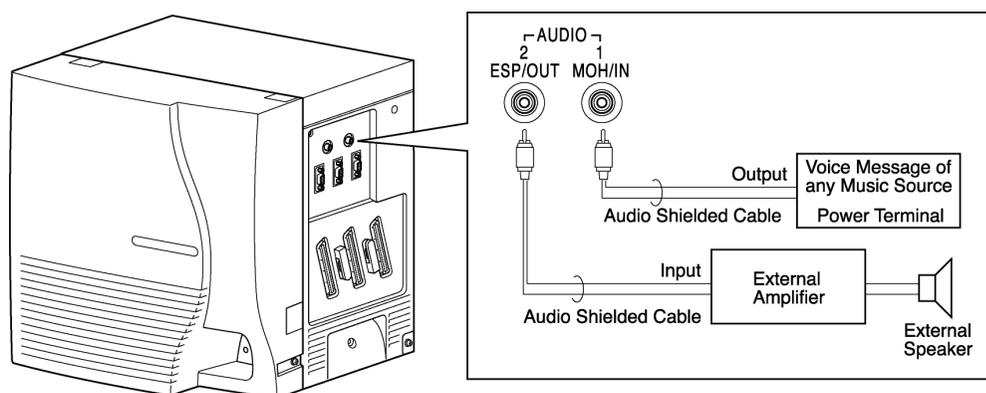
Figure 7-1 Music Source Connections

SECTION 3 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.

SECTION 4   PAGING CONNECTIONS

When connecting External Paging, the ECR-U( ) ETU is the interface with Paging In/
Out, Background Music (External Speaker) Out and/or External Tone Ringer/Night
Chime Out.

SECTION 5   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 installed in the user PC and the PC
must be connected via a serial port to the KSU.

5.1   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 7-2 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 3

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
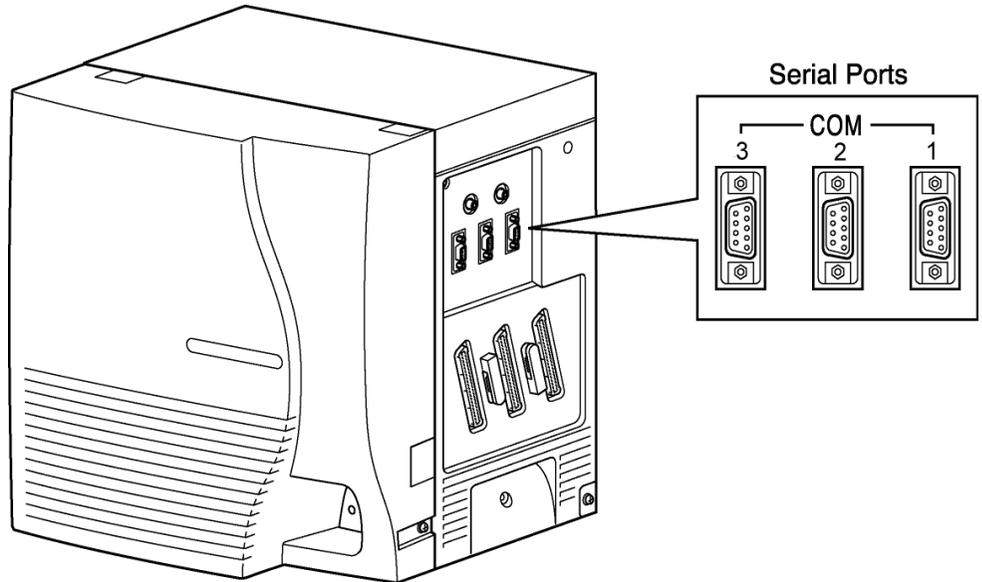
Figure 7-2 Connecting a PC to the KSU

5.2   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.

5.3   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

5.4   Elite LAN PC Programming Device

5.4.1   Dimensions

The diagram to the
right indicates the
dimensions for the
LAN PC Programming
Device.
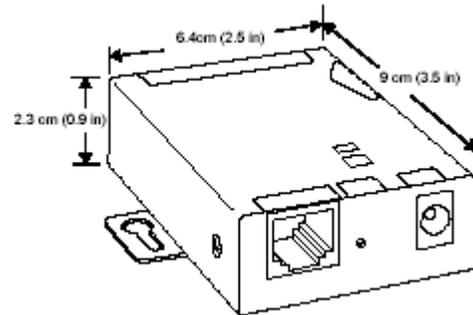
5.4.2   Power Requirements

The LAN PC
Programming Device
is shipped with a
12Vdc, 1A power
supply.
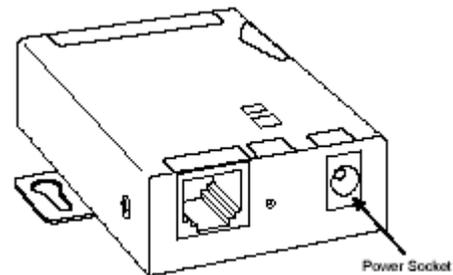
5.4.3   Reset Switch

The LAN PC
Programming Device
has a reset switch that
is located next to the
RJ-45 connector. The
reset switch reboots
the device when
pressed.
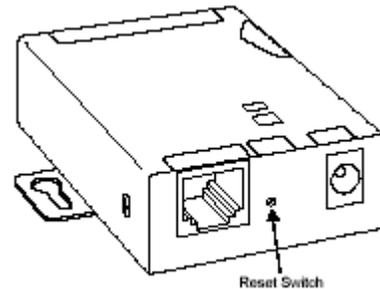
5.4.4   Serial Interface

The LAN PC Programming Device has a female DCE DB-25 serials port that supports the RS-232 serial standards.
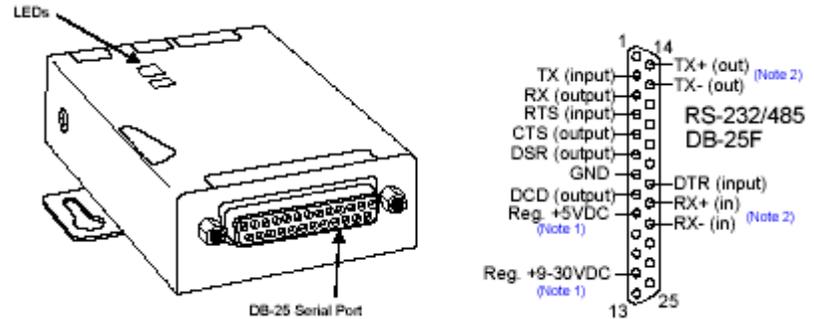
Note 1   The device server can alternately be powered up via the serial port using one of these pins.

Note 2   The minus (-) is sometimes shown as A (TXA), and the plus sign is sometimes shown as B (TXB).

5.4.5   RJ-45 Ethernet Interface

The back panel on the LAN PC Programming Device contains a 9-30 Vdc power plug, a reset switch, and an RJ-45 (10Base-T) Ethernet port that supports up to 10 Mbps.
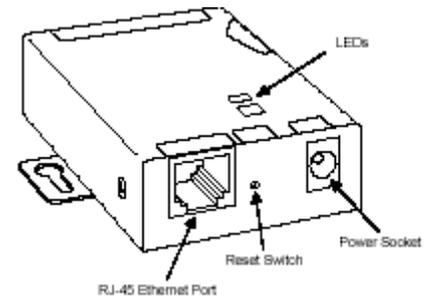
5.4.6   Ethernet Cable
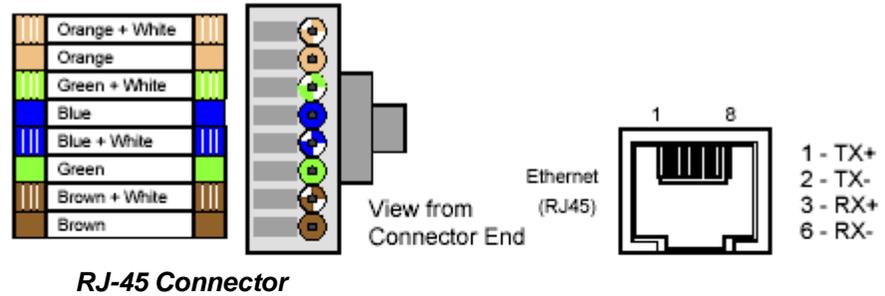
RJ-45 Connector

Ethernet Interface Signals

Signal Name	DIR	PIN	Primary Function
TX+	Out	1	Transmit Data +
TX-	Out	2	Transmit Data -
RX+	In	3	Differential Ethernet Receive Data +
RX-	In	6	Differential Ethernet Receive Data -

This drawing shows a typical RJ-45 connector. The color indications are not standard but are typical of an Ethernet patch cable. Pin 1 is located at the top of the connector (Orange + White). The drawn view is from the end of the connector.

5.4.7   LED Information

The LAN PC Programming Device has the following LEDs:

Link (Green)

Net Tx/Rx (Yellow)

Collision (Red)

Diagnostic (Red)

Status (Green)

LED	Meaning
L (Green)	On to indicate the network port is connected to the network.
Net Tx/Rx (Yellow)	Flashes to indicate the network packets are transmitting and receiving.
Collision (Red)	On to indicate network collisions.
Diagnostic (Red)	On or flashes in combination with the Status LED to indicate error detection. On, Status LED flashes: 1x: EPROM checksum error 2x: RAM error 3x: Token Ring error 4x: EEPROM checksum error 5x: Duplicated IP address on the network Flashes, Status LED flashes: 4x: Faulty network connection 5x: No DHCP response received
Status (Green)	On to indicate that the physical serial port does not have a connection to or from the network. Flashes to indicate that the physical serial port has a connection to or from the network.

5.4.8   Connecting to the Electra Elite IPK/Elite 48/192

The LAN PC Programming Device allows the system to be
programmed via a LAN or WAN. Refer to the diagram below.

Elite LAN PC
Programming Device

Null Adapter

LAN/WAN NETWORK
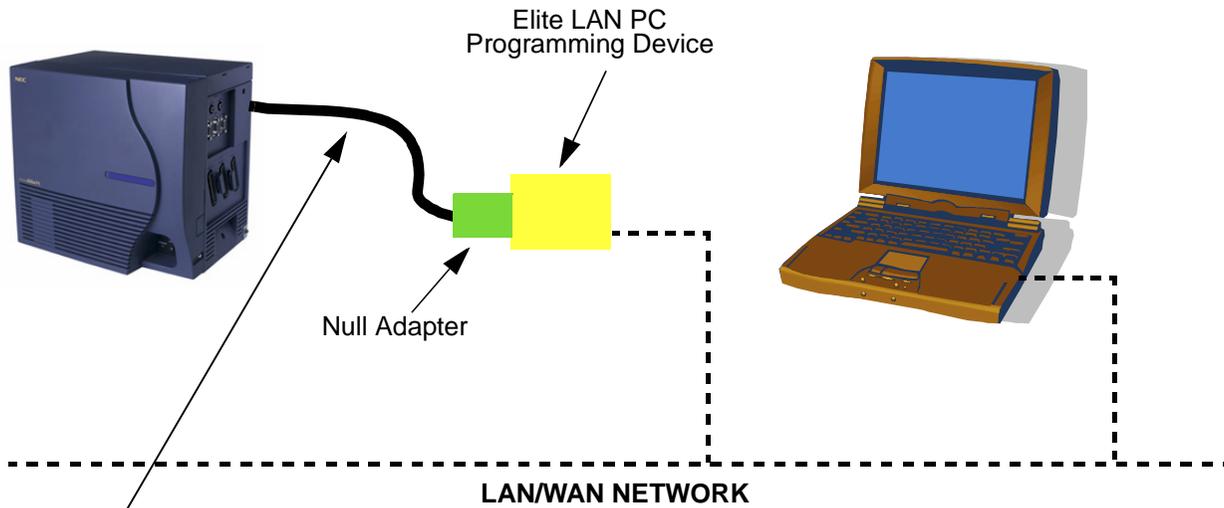
The Electra Elite IPK uses a DB9 cable.

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Installing Electra Elite IPK Multiline Terminals

Cʜᴀᴘᴛᴇʀ 8

Sᴇᴄᴛɪᴏɴ 1   Gᴇɴᴇʀᴀʟ Iɴꜰᴏʀᴍᴀᴛɪᴏɴ

The Electra Elite IPK system supports several different Electra Elite IPK and Electra Elite Multiline Terminals and an Attendant Console. This chapter describes each terminal and the console and provides instructions for attaching the terminals to the system and for wall mounting.

Sᴇᴄᴛɪᴏɴ 2   Mᴜʟᴛɪʟɪɴᴇ Tᴇʀᴍɪɴᴀʟs

2.1   DTR-2DT-1 TEL

This digital nondisplay Multiline Terminal has two programmable line keys (each with a 2-color LED), nine function keys, a built-in speakerphone, and a large LED to indicate incoming calls and messages. This terminal is available in black or white.

This terminal has a built-in data port that is available for analog devices. Each terminal requires a digital port.

✎   The DTR-2DT-1 TEL does not support adapters.

Basic Port Package

A maximum of 31 DTR-2DT-1 TELs can be installed in the Basic Port Package. The combined total of all Electra Elite IPK Multiline Terminals that can be installed is 32.

Expanded Port Package

A maximum of 119 DTR-2DT-1 TELs can be installed in the Expanded Port Package. The combined total of all Electra Elite IPK Multiline Terminals that can be installed is 120.

Figure 8-1 DTR-2DT-1 TEL

2.2   DTR-4D-1 TEL

This digital display Multiline Terminal has four multifunction keys, four programmable line keys (each with a 2-color LED), nine function keys, two volume keys, four softkeys a built-in speakerphone, and a large LED to indicate incoming calls and messages. This terminal is available in black only.

Basic Port Package

A maximum of 31 DTR-4D-1 TELs can be installed in the Basic Port Package. The combined total of all Electra Elite IPK Multiline Terminals that can be installed is 32.

Expanded Port Package

A maximum of 119 DTR-4D-1 TELs can be installed in the Expanded Port Package. The combined total of all Electra Elite IPK Multiline Terminals that can be installed is 120.
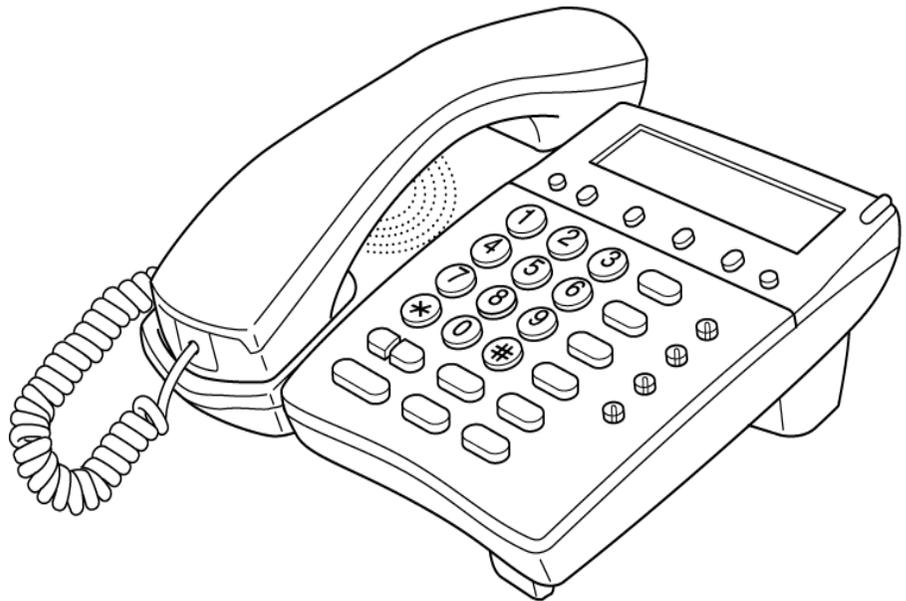
Figure 8-2 DTR-4D-1 TEL

2.3   DTH-8-1 TEL

This digital nondisplay Multiline Terminal has eight programmable line keys (each with a 2-color LED), 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, CT(A)-R, CT(U)-R, or HF-R, Unit. This terminal is available in black or white.

The DTR-8-1 TEL is similar to the DTH-8-1 TEL and can also be used with the Electra Elite IPK system.

Basic Port Package

A maximum of 31 DTH-8-1/DTR-8-1 TELs can be installed in the Electra Elite IPK system. The combined total of all Electra Elite IPK Multiline Terminals that can be installed is 32.

Expanded Port Package

A maximum of 119 DTH-8-1/DTR-8-1 TELs can be installed in the Electra Elite IPK system. The combined total of all Electra Elite IPK Multiline Terminals that can be installed is 120.

Figure 8-3 DTH-8-1 TEL Multiline Terminal

2.4   DTH-8D-1 TEL

This digital Multiline Terminal has eight programmable line keys (each with the 2-color LED), 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, CT(A)-R, CT(U)-R, HF-R, or IP-R(IPK) Unit. This terminal is available in black or white.

This terminal also has a 3-line, 24-character, adjustable Liquid Crystal Display (LCD) and four softkeys.

The DTR-8D-1 TEL is similar to the DTH-8D-1 TEL and can also be used with the Electra Elite IPK system.

Basic Port Package

A maximum of 32 DTH-8D-2/DTR-8D-1 TELs can be installed in the Electra Elite IPK system. The combined total of all Electra Elite IPK Multiline Terminals that can be installed is 32.

Expanded Port Package

A maximum of 120 DTH-8D-1/DTR-8D-1 TELs can be installed in the Electra Elite IPK system. The combined total of all Electra Elite IPK Multiline Terminals that can be installed is 120.

Figure 8-4 DTH-8D-1 TEL Multiline Terminal

2.5   DTH-16-1 TEL

This digital nondisplay Multiline Terminal has 16 programmable line keys (each with a 2-color LED), 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, CT(A)-R, CT(U)-R, or HF-R, Unit. This terminal is available in black or white.

The DTR-16-1 TEL is similar to the DTH-16-1 TEL and can also be used with the Electra Elite IPK system.

Basic Port Package

A maximum of 31 DTH-16-1/DTR-16-1 TELs can be installed in the Electra Elite IPK system. The combined total of all Electra Elite IPK Multiline Terminals that can be installed is 32.

Expanded Port Package

A maximum of 119 DTH-16-1/DTR-16-1 TELs can be installed in the Electra Elite IPK system. The combined total of all Electra Elite IPK Multiline Terminals that can be installed is 120.

Figure 8-5 DTH-16-1 TEL Multiline Terminal

2.6   DTH-16D-1 TEL

This digital Multiline Terminal has 16 programmable line keys (each with a 2-color LED), 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, CT(A)-R, CT(U)-R, HF-R, or IP-R (IPK) Unit. This terminal is available in black or white.

This terminal also has a 3-line, 24-character, adjustable Liquid Crystal Display (LCD) and four softkeys.

The DTR-16D-1 TEL is similar to the DTH-16D-1 TEL and can also be used with the Electra Elite IPK system.

Basic Port Package

A maximum of 32 DTH-16D-1/DTR-16D-1 TELs can be installed in an Electra Elite IPK system. The combined total of all Electra Elite IPK Multiline Terminals that can be installed is 32.

Expanded Port Package

A maximum of 120 DTH-16D-1/DTR-16D-1 TELs can be installed in an Electra Elite IPK system. The combined total of all Electra Elite IPK Multiline Terminals that can be installed is 120.

Figure 8-6 DTH-16D-1 TEL Multiline Terminal

2.7   DTH-16(BL)-1 TEL

This digital Multiline Terminal has 16 programmable line keys (each with a 2-color LED), a built-in half-duplex speakerphone, headset jack, a large LED to indicate incoming calls and messages, and compatibility with AD(A)-R, AP(A)-R, AP(R)-R, CT(A)-R, CT(U)-R, HF-R, or IP-R (IPK) Unit. This terminal is available in black or white.

This terminal also has a 3-line, 24-character, adjustable Back-Lighted (BL) Liquid Crystal Display (LCD) and four softkeys.

The DTR-16(BL)-1 TEL is similar to the DTH-16(BL)-1 TEL and can also be used with the Electra Elite IPK system.

Basic Port Package

A maximum of 32 DTH-16(BL)-1/DTR-16(BL)-1 TELs can be installed in an Electra Elite IPK system. The combined total of all Electra Elite IPK Multiline Terminals that can be installed is 32.

Expanded Port Package

A maximum of 120 DTH-16(BL)-1/DTR-16(BL)-1 TELs can be installed in an Electra Elite IPK system. The combined total of all Electra Elite IPK Multiline Terminals that can be installed is 120.

Figure 8-7   DTH-16(BL)-1 TEL Multiline Terminal

2.8   DTH-16LD-1 TEL

This digital Multiline Terminal has 16 programmable line 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, CT(A)-R, CT(U)-R, HF-R or IP-R (IPK) Unit. This terminal is available in black or white.

This terminal also has a 3-line, 24-character, adjustable Liquid Crystal Display (LCD) and four softkeys.

This terminal is equipped with two additional 8-character LCDs. These can be programmed to identify the line key designations.

The DTR-16LD-1 TEL is similar to the DTH-16LD-1 TEL and can also be used with the Electra Elite IPK system.

Basic Port Package

A maximum of 31 DTH-16LD-1/DTR-16LD-1 TELs can be installed in an Electra Elite IPK system.   The combined total of all Electra Elite IPK Multiline Terminals that can be installed is 32.

Expanded Port Package

A maximum of 119 DTH-16LD-1/DTR-16LD-1 TELs can be installed in an Electra Elite IPK system.   The combined total of all Electra Elite IPK Multiline Terminals that can be installed is 120.

Figure 8-8 DTH-16LD-1 TEL Multiline Terminal

2.9   DTH-32D-1 TEL

This digital Multiline Terminal has 16 programmable line keys (each with a 2-color LED), 16 one-touch 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, CT(A)-R, CT(U)-R, HF-R, or IP-R (IPK) Unit. This terminal is available in black or white.

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 DTR-32D-1 TEL is similar to the DTH-32D-1 TEL and can also be used with the Electra Elite IPK system.

Basic Port Package

A maximum of 32 DTH-32D-1/DTR-32D-1 TELs can be installed in an Electra Elite IPK system. The combined total of all Electra Elite IPK Multiline Terminals that can be installed is 32.

Expanded Port Package

A maximum of 120 DTH-32D-1/DTR-32D-1 TELs can be installed in an Electra Elite IPK system. The combined total of all Electra Elite IPK Multiline Terminals that can be installed is 120.
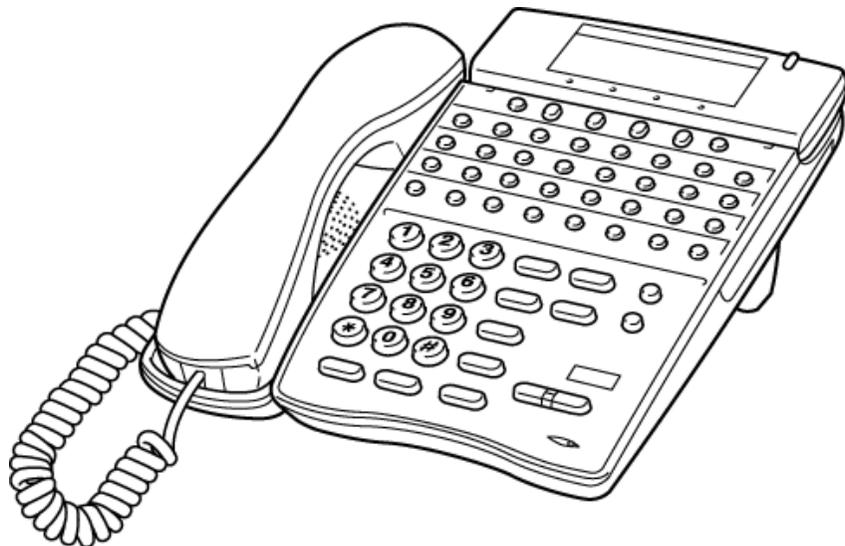
Figure 8-9 DTH-32D-1 TEL Multiline Terminal

2.10   ITH-8D-2/3 TEL

This IP Multiline Terminal has 16 programmable line keys (each with a 2-color LED), 16 one-touch keys, a built-in full-duplex speakerphone, headset jack, a large LED to indicate incoming calls and messages, and compatibility with AD(A)-2R or PS(A)-R Unit. This terminal is available in black or white.

This terminal also has a 3-line, 24-character, adjustable Liquid Crystal Display (LCD) and four softkeys.

Basic Port Package

A maximum of 24 ITH-8D-2/3 TELs can be installed in an Electra Elite IPK system. The combined total of all Electra Elite IPK/IP Multiline Terminals that can be installed is 32.

Expanded Port Package

A maximum of 112 ITH-8D-2/3 TELs can be installed in an Electra Elite IPK system. The combined total of all Electra Elite IPK/IP Multiline Terminals that can be installed is 120.

✎   ACR or in-line power is required.

✎   Some headsets introduce hum or echo on IP terminals.

Figure 8-10 ITH-8D-2/3 TEL Multiline Terminal

2.11   ITH-16D-2/3 TEL

This IP Multiline Terminal has 16 programmable line keys (each with a 2-color LED), 16 one-touch keys, a built-in full-duplex speakerphone, headset jack, a large LED to indicate incoming calls and messages, and compatibility with AD(A)-2R or PS(A)-R Unit. This terminal is available in black or white.

This terminal also has a 3-line, 24-character, adjustable Liquid Crystal Display (LCD) and four softkeys.

Basic Port Package

A maximum of 24 ITH-16D-2/3 TELs can be installed in an Electra Elite IPK system. The combined total of all Electra Elite IPK/IP Multiline Terminals that can be installed is 32.

Expanded Port Package

A maximum of 112 ITH-16D-2/3 TELs can be installed in an Electra Elite IPK system. The combined total of all Electra Elite IPK/IP Multiline Terminals that can be installed is 120.

✎   ACR or in-line power is required.

✎   Some headsets introduce hum or echo on IP terminals.
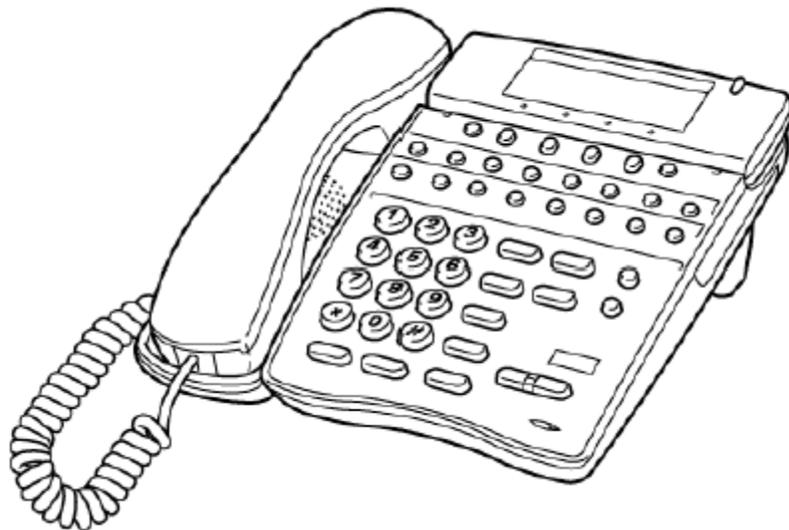
Figure 8-11 ITH-16D-2/3 TEL Multiline Terminal

2.12   DCR-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 48 Direct Station Selection keys, 12 function keys, or as outside line keys. An AC adapter is required and provided with the Attendant Console.

Basic Port Package

A maximum of four DCR-60-1 Consoles can be installed in any Electra Elite IPK system. An Attendant Position can have four associated DCR-60-1 Consoles.

Expanded Port Package

A maximum of four DCR-60-1 Consoles can be installed in any Electra Elite IPK system. An Attendant Position can have four associated DCR-60-1 Consoles.
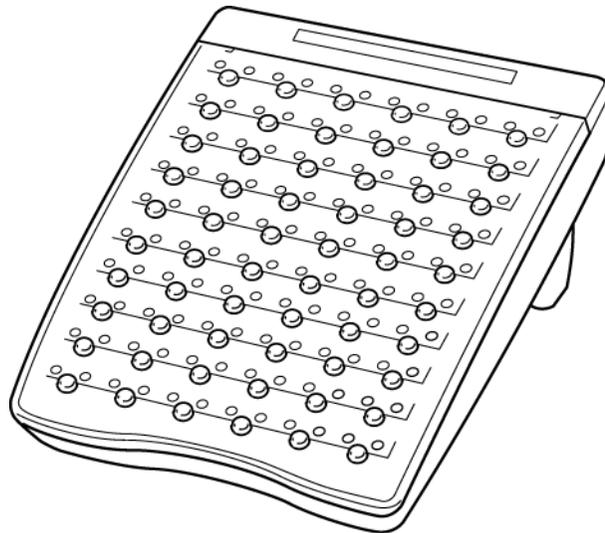
Figure 8-12 DCR-60-1 Console

SECTION 3   CONNECTING A MULTILINE TERMINAL TO THE SYSTEM

This instruction applies to all DTH/DTR/IP Electra Elite IPK Multiline Terminals
except DTR-2DT-1 TEL.

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.
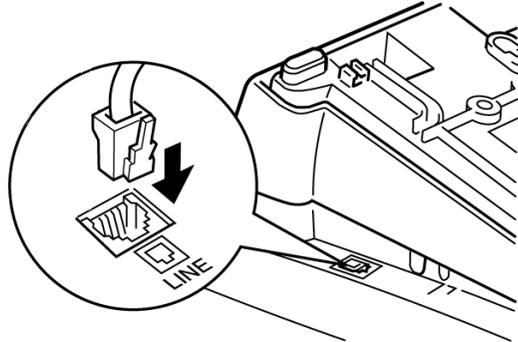
Figure 8-13 Connecting a Multiline Terminal to the System

2.   Lead the telephone and handset cords through the appropriate grooves.
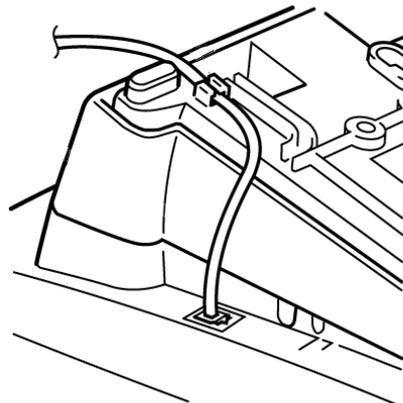
Figure 8-14 Leading Line Cords on a Multiline Terminal

SECTION 4   APPLYING POWER TO IP TERMINALS

The ITH-8D/16D-2 terminals support two different methods to power the terminal:

❍   AC-R

Plug the optional AC-R AC Adapter input Jack in the terminal base unit, and plug the 2-prong wall plug of the AC Adapter in a standard 120 Vac wall outlet.
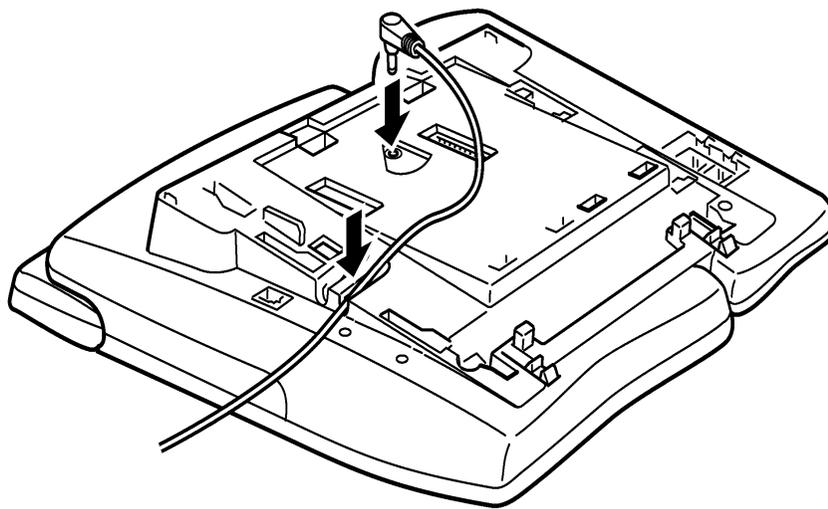
Figure 8-15 Plug in AC-R Adapter

❍   POE (Power Over Ethernet)

Power Over Ethernet (sometimes called In-Line Power) is a LAN technology that allows standard 10/100 Base-T data cables to pass electrical current from a power source to a requesting end device.

Refer to Table 8-1 Power Configuration Switch Settings and Figure 8-16 Switch SW2 Position to allow different power sources for the ITH-8D/16D-2 terminals.

❍   Power Configuration Switch Settings

Table 8-1 Power Configuration Switch Settings

Power Method	Equipment Used	Switch SW2 Position
AC Adapter	NEC AC-R AC Adapter (27V 750 mA)	1 Default
NEC POE Equipment	NEC POWER PATCH PANEL (SN1604 PWRMS) NEC BF200/24 POE Switching Hub	
Cisco Equipment (CDP)	Cisco Catalyst PRW series CISCO POWERED PATCH PANEL	2
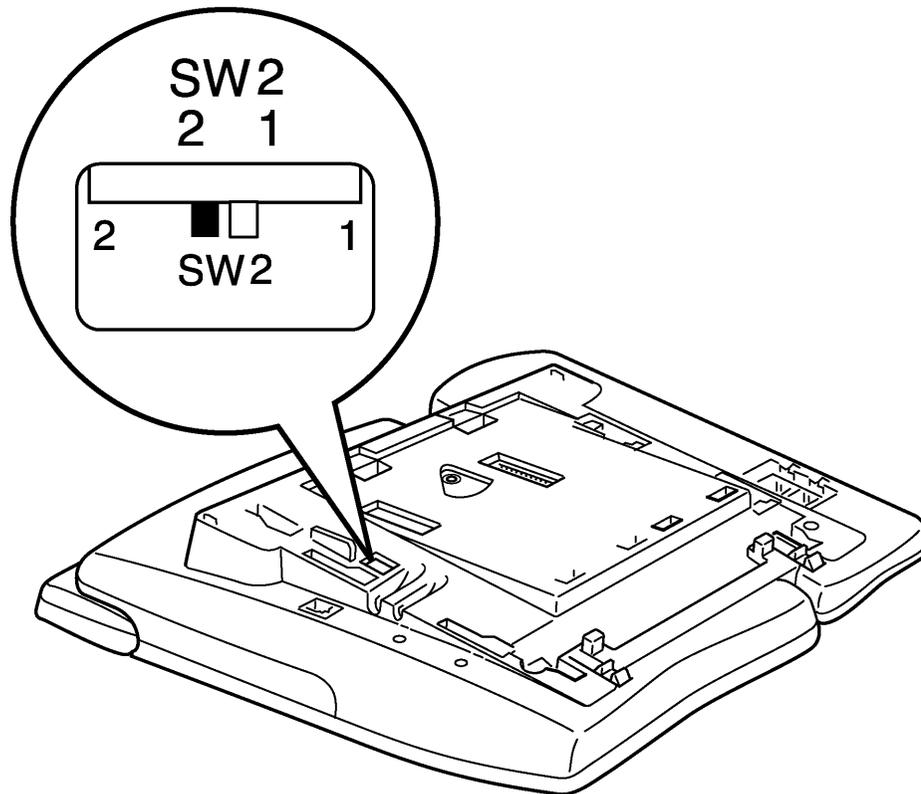
Figure 8-16 Switch SW2 Position

SECTION 5   CONNECTING AN IP MULTILINE TERMINAL TO THE NETWORK AND PC

These instructions for connecting an IP Multiline Terminal to the Network and PC apply to ITH-8D/16D-2 Multiline Terminals. Refer to Figure 8-17 IP Terminal Rear Connector Locations.

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

2. The IP terminal has a switching HUB to connect a PC to the LAN Network. Connect the 10/100 Base-T/TX straight cable used for this connection to the PC(x) connector and to the PC.

REAR VIEW

LAN(=) PC(x)

to LAN   to PC
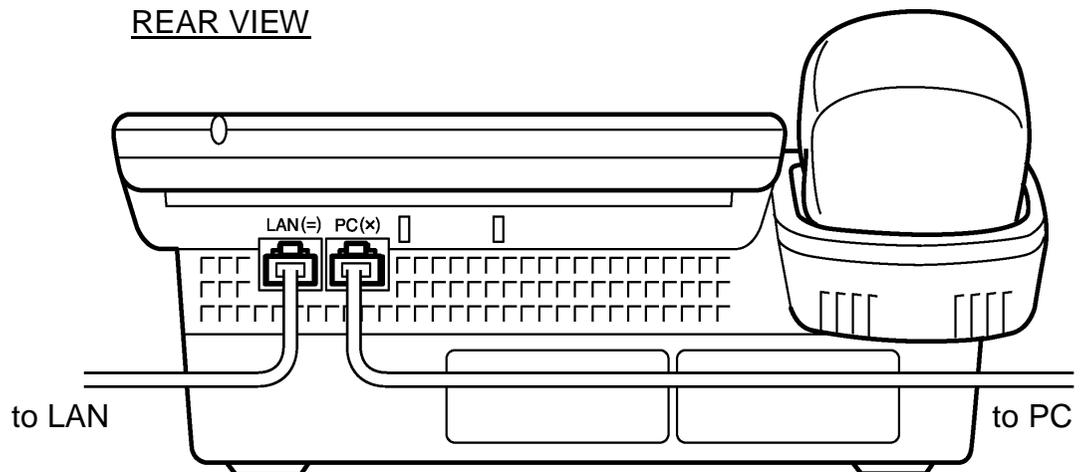
Note: *The PC connector on the IP terminal is exclusively for a PC connection, not a second IP terminal.*

Figure 8-17   IP Terminal Rear Connector Locations

Refer to Figure 8-18 Typical Network IP Connection.
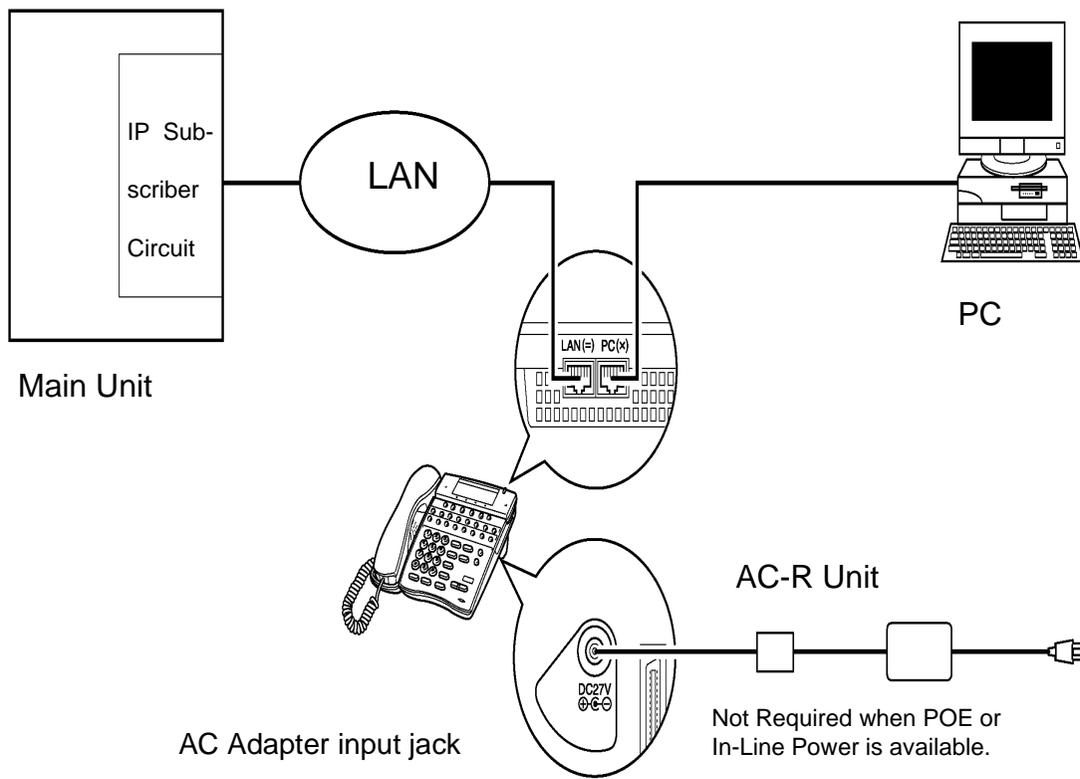
Figure 8-18 Typical Network IP Connection

SECTION 6   CONNECTING THE ATTENDANT CONSOLE TO A MULTILINE TERMINAL

An Attendant DCR-60-1 Console can be attached to a Multiline Terminal using the following procedure.

1.   Place 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.
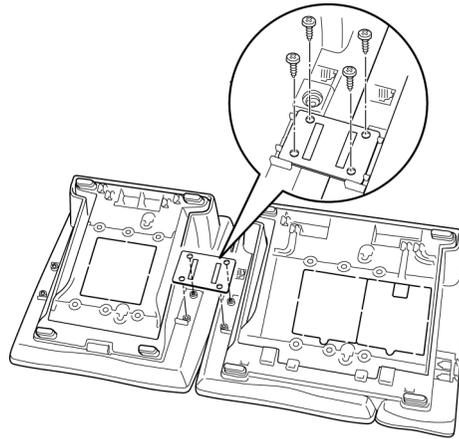
Figure 8-19 Connecting the DCR Console to a Multiline Terminal

3.   Connect the line cord and the AC adapter to the indicated locations on the bottom of the Attendant Console.
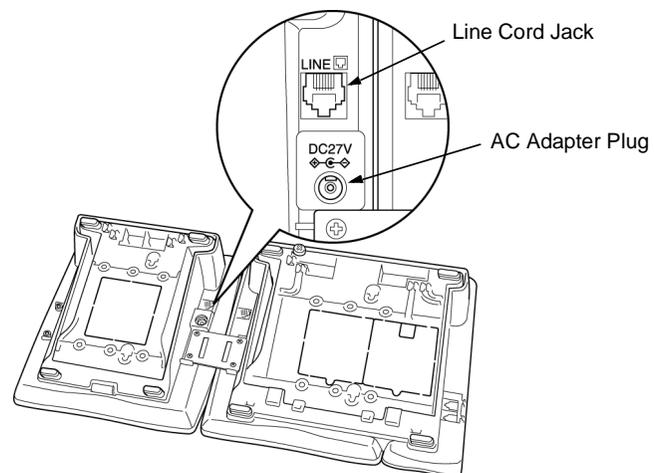
Figure 8-20   Connecting the Line Cord and AC Adapter when Installing a DCR Attendant Console

4. When the Attendant Console and the Multiline Terminal are properly connected, they sit side-by-side as shown in Figure 8-21 Attendant Console and Multiline Terminal.

✎ Use only the AC adapter, provided with the Attendant Console. 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.
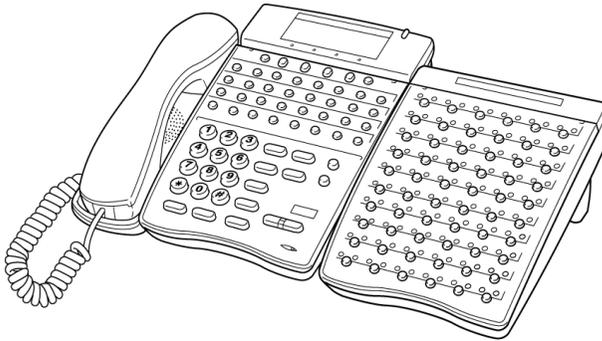
Figure 8-21   Attendant Console and Multiline Terminal

SECTION 7   ADJUSTING THE LCD ON A MULTILINE TERMINAL

Electra Elite IPK display Multiline Terminals have an adjustable Liquid Crystal Display (LCD). The LCD can be adjusted by pulling up or pushing down as desired.
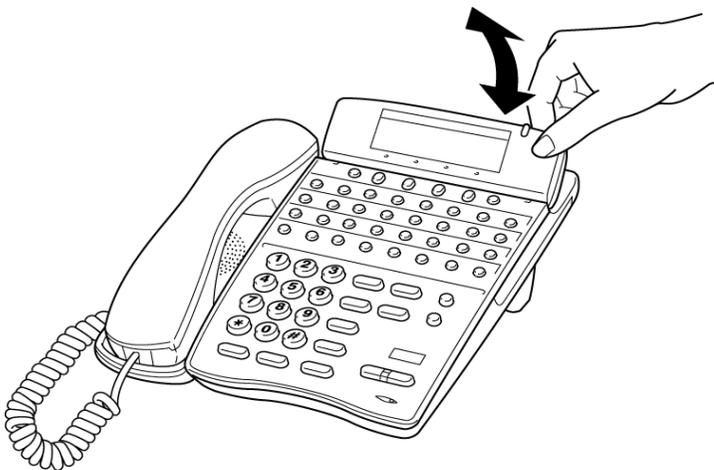
Figure 8-22 Adjusting the LCD on a Multiline Terminal

SECTION 8   INSTALLING LINE CARDS AND PLASTIC PANELS

8.1   Installing the Line Card and Plastic Panel

Line key designations are entered on the line card that is then placed on the telephone 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.

✎   When replacing an existing plastic panel or line card refer to paragraph 8.2 Removing the Plastic Panel.
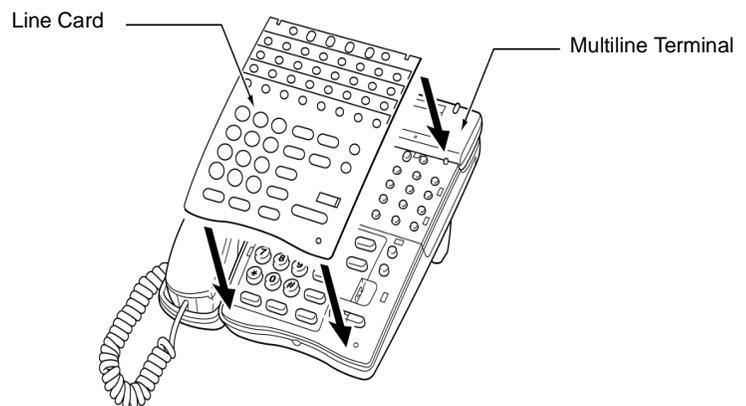
Figure 8-23 Installing Line Card and Plastic Panel on a Multiline Terminal

2.   Place the plastic panel over the line card and push the corners of the plastic panel until they click into place.
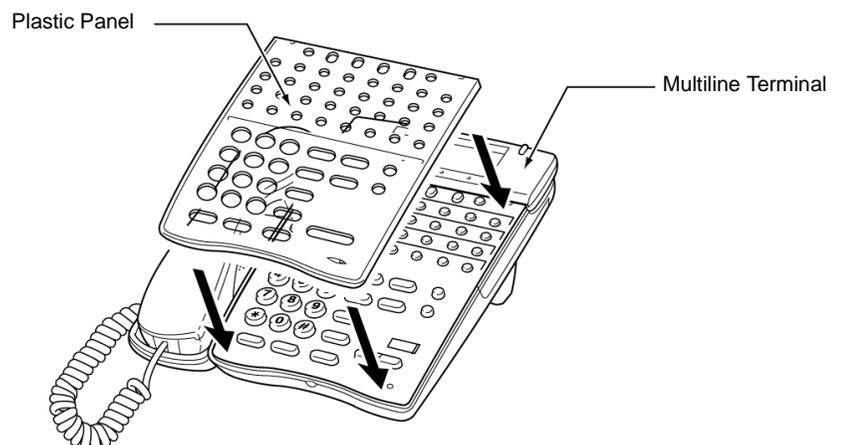
Figure 8-24 Installing Plastic Panel on a DTH/DTR Multiline Terminal

8.2   Removing the Plastic Panel

Lift up on the plastic panel as illustrated in Figure 8-25 Removing the Plastic Panel from the Multiline Terminal and remove it from the telephone.
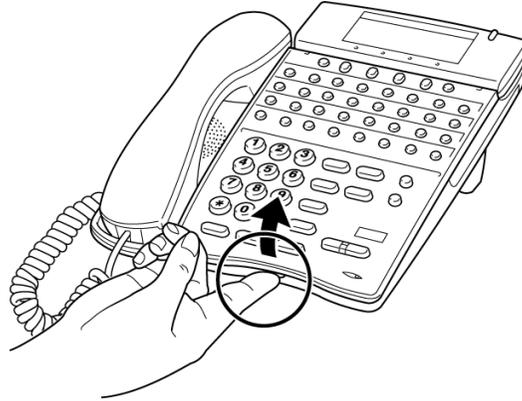
Figure 8-25 Removing the Plastic Panel from the Multiline Terminal

SECTION 9   INSTALLING A DIRECTORY CARD ON A MULTILINE TERMINAL

A directory card can be attached to DTH/DTR/ITH Multiline Terminals. The directory card can be used to record often dialed numbers or other important information.

1.   After recording the information on the lined insert, reinsert it between the plastic panels of the directory card. Attach the directory card to the directory card holder as illustrated in Figure 8-26 Attaching Directory Card to Directory Card Holder. Note that the open end slides into the directory card holder.

Directory Card

Directory Card
Holder
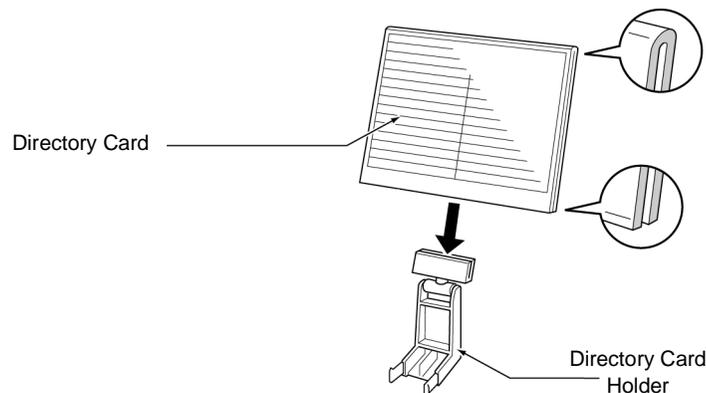
Figure 8-26 Attaching Directory Card to Directory Card Holder

2.   Locate the two grooves on the top of the telephone as illustrated in Figure 8-27 Attaching Directory Card Holder to the Multiline Terminal. Push the directory card holder into the grooves on the Multiline Terminal until they snap into place.

✎   To remove the directory card, press the two sides of the directory card holder inward until the tabs release and pull the holder out of the grooves.
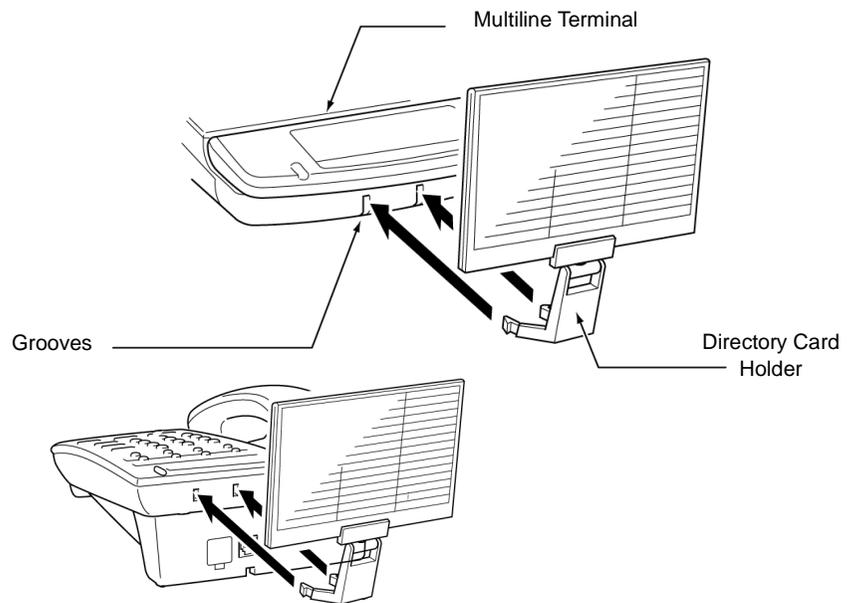
Figure 8-27 Attaching Directory Card Holder to the Multiline Terminal

SECTION 10   INSTALLING A BUTTON SET ON A MULTILINE TERMINAL

The BS( )-R Unit button set can be installed on a Multiline Terminal to accommodate French and Spanish languages. The keypad provides the appropriate language designations.

1.   Remove the plastic cover. (Refer to paragraph .)

2.   Pull up on the tab and lift the button pad away from the telephone to remove the existing button.
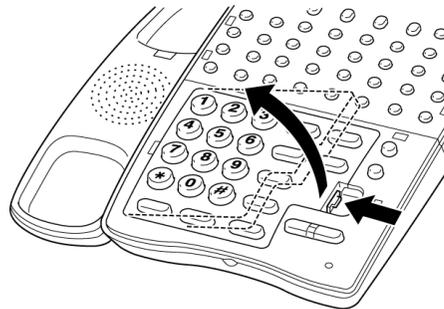
Figure 8-28 Removing the Button Set from a Multiline Terminal

3.   Slide the new button set into the grooves located on the inside of the telephone, then press down on the button set to snap it into place.
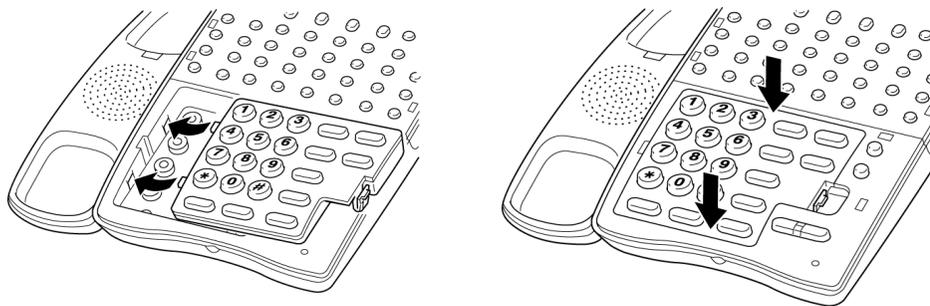
Figure 8-29 Inserting a New Button Set into a Multiline Terminal

4.   Insert the line card and plastic panel on the Multiline Terminal.

SECTION 11   ADJUSTING THE HEIGHT ON A MULTILINE TERMINAL

The base plate on the Electra Elite IPK Multiline Terminal is hinged to allow the height of the terminal to be raised or lowered.

1.   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 8-30 Raising the Height on the DTH/DTR/ITH Multiline Terminal.
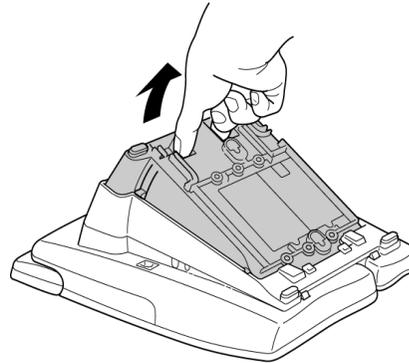
Figure 8-30 Raising the Height on the DTH/DTR/ITH Multiline Terminal

2.   After the height is adjusted, pull the line cord though the groove in the bottom of the Multiline Terminal and adjust it.

3.   Push on the adjustment tabs on the side of the stand and push downward to lower the base plate. Refer to Figure 8-31 Lowering the Base Plate on the Multiline Terminal.
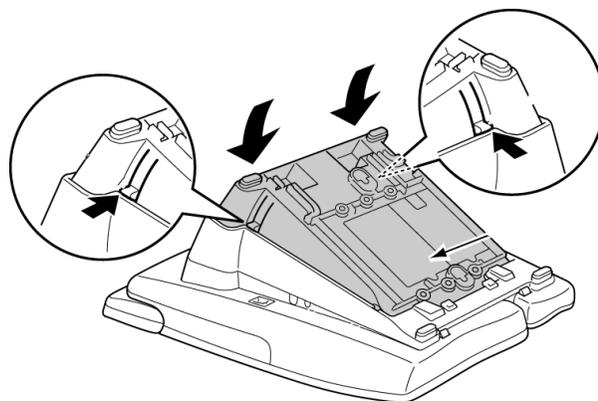
Figure 8-31 Lowering the Base Plate on the Multiline Terminal

SECTION 12   REMOVING OR INSTALLING THE BASE PLATE ON A MULTILINE TERMINAL

DTH/DTR/ITH Multiline Terminals come equipped with a base cover.

12.1   Removing the Base Plate

1.   Extend the base plate to maximum height.

2.   Press the tabs as illustrated in Figure 8-32 Removing Base Plate, and slide the base cover in the direction of the arrows until it clicks.
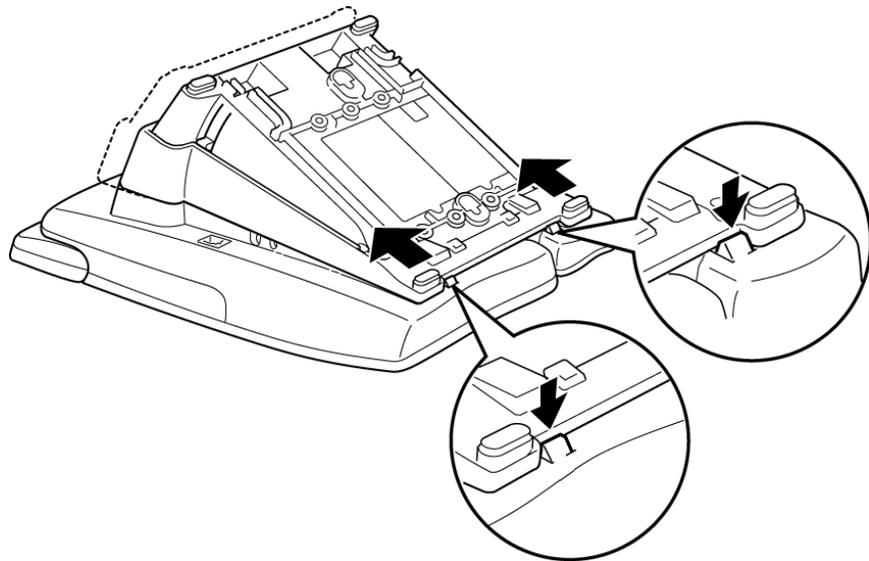
Figure 8-32 Removing Base Plate

12.2   Installing the Base Plate

1.   Line up the four tabs on the extended base cover with corresponding slots on the Multiline Terminal as illustrated in Figure 8-33 Installing Base Plate.

2.   Slide the cover in the direction of the arrows until it clicks in place.
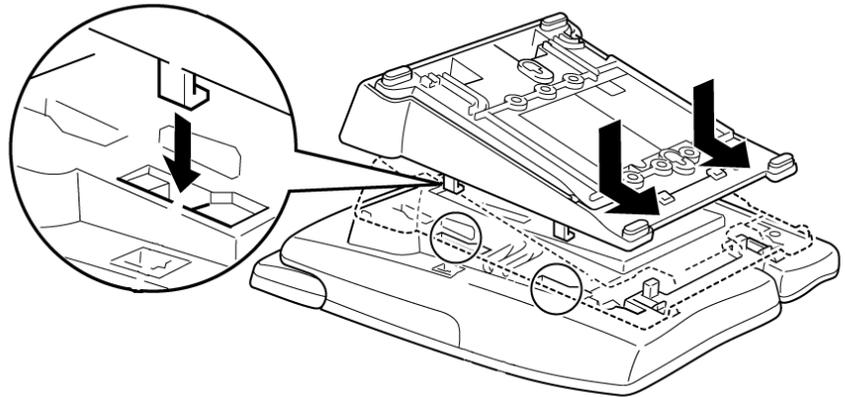
Figure 8-33 Installing Base Plate

SECTION 13   WALL MOUNTING MULTILINE TERMINALS

You can wall mount a DTH/DTR/IP connection Multiline Terminal (except for DTR-2D-1 TEL) using the base cover or an optional wall mount unit. A wall mount unit must be used if adapters are installed on the Multiline Terminal.

13.1   Wall Mounting a Multiline Terminal using the Base Plate

13.1.1   Adjusting the Hanger Hook

1.   Remove the hook from the unit.
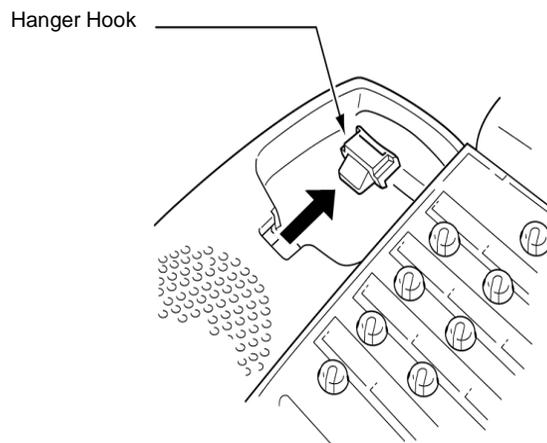
Figure 8-34 Removing the Hanger Hook on a Multiline Terminal

2.   Turn the hook with the tab toward the top.

3.   Slide the hook until it glides into position forming the hanger hook for the handset.
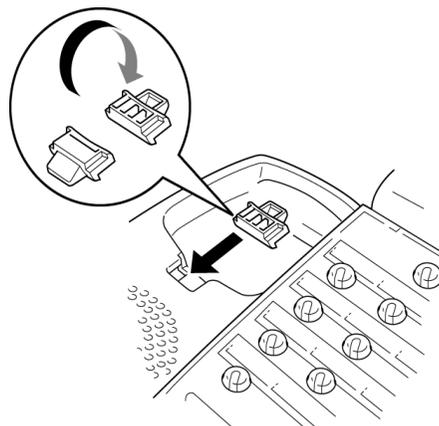
Figure 8-35 Sliding the Hanger Hook into Position

13.1.2   Wall Mounting the Telephone

1.   Extend and remove the base cover from the telephone. Refer to Section 12 Removing or Installing the Base Plate on a Multiline Terminal.

2.   Remove cutout shown in Figure 8-36 Removing the Cutout.
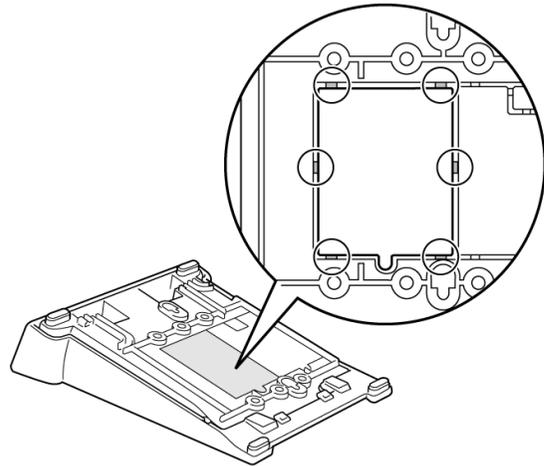
Figure 8-36 Removing the Cutout

3.   Plug line cord in the wall receptacle. Leave about 8 inches of cord and bundle the rest as shown in Figure 8-37 Bundling the Line Cord.
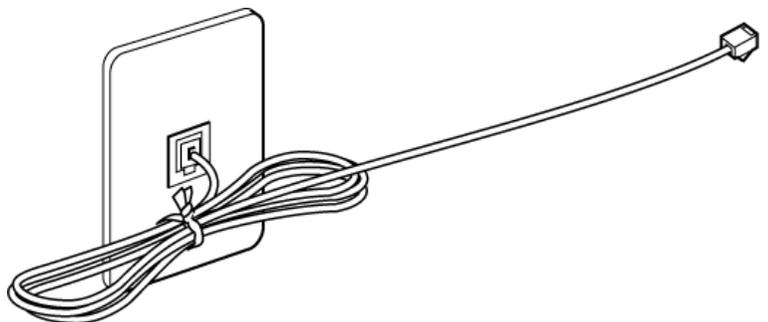
Figure 8-37 Bundling the Line Cord

4. Turn the base cover upside down, feed the line cord through the cutout and attach the cover to the wall using six screws as shown in Figure 8-38 Wall Mounting the Base Plate.
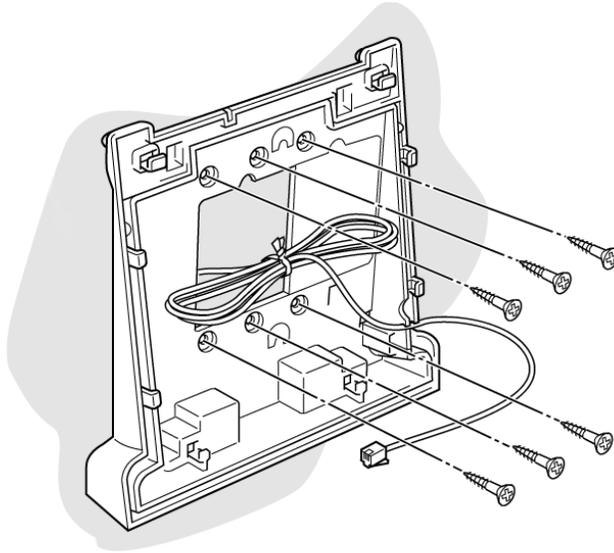
Figure 8-38 Wall Mounting the Base Plate

5. Install the Multiline Terminal over the four tabs on the base cover, and push down until it clicks in place.
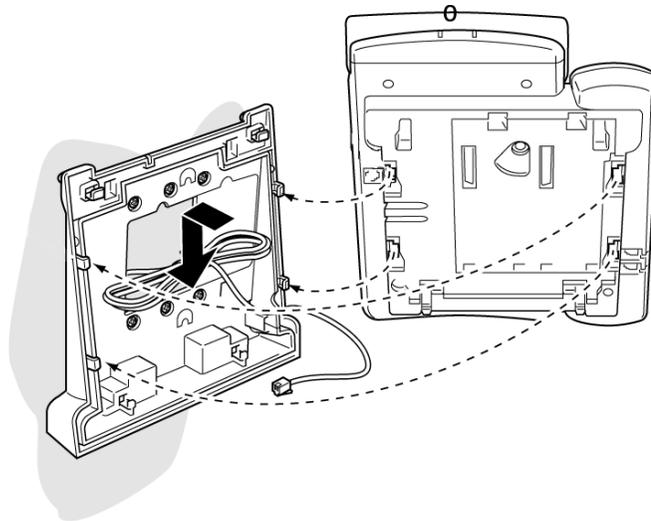
Figure 8-39 Installing the Multiline Terminal

6. Plug the line cord into the Multiline Terminal as illustrated in
    Figure 8-40 Plugging in Line Cord.
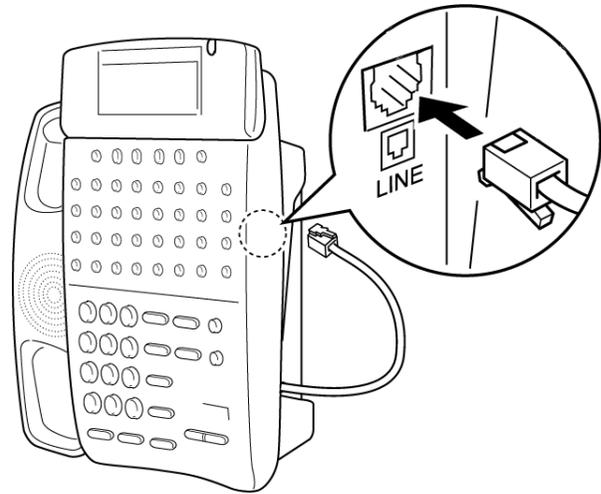
Figure 8-40 Plugging in Line Cord

7. Push spare line cord behind the Multiline Terminal as shown in
    Figure 8-41 Hiding Excess Cord.

Line Cord
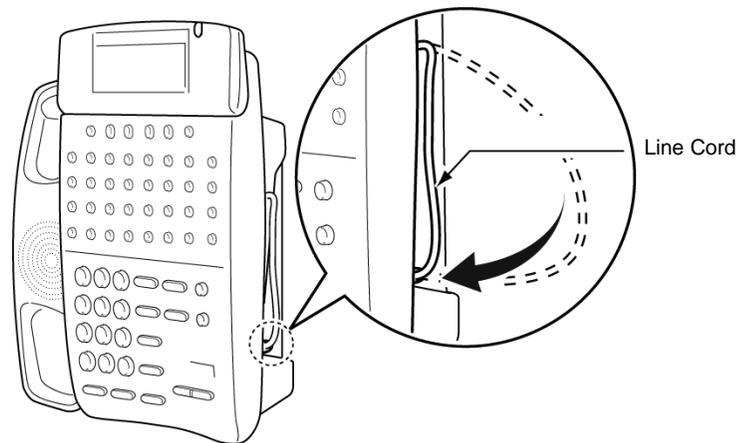
Figure 8-41 Hiding Excess Cord

13.1.3   Removing the Wall Mounted Multiline Terminal from the Base Plate

To remove the Multiline Terminal, press the tabs at the bottom as shown in Figure 8-42 Removing the Multiline Terminal, and push up on the Telephone until it comes loose.
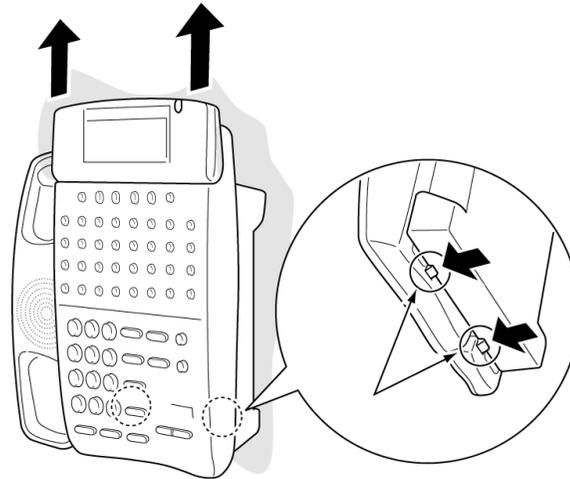
Figure 8-42   Removing the Multiline Terminal

13.1.4   Wall Mounting the Base Plate on a Switch Box

1.   Locate the screw holes on the base cover and hang the cover over the screws on the switch box as illustrated in Figure 8-43 Wall Mounting Base Plate on Switch Box.
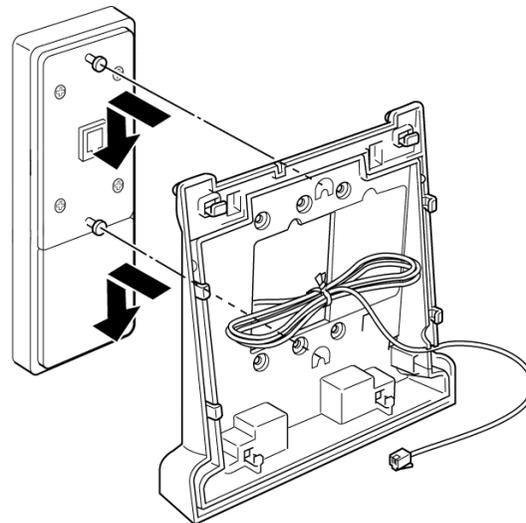
Figure 8-43   Wall Mounting Base Plate on Switch Box

2.   Hang the Multiline Terminal on the base cover.
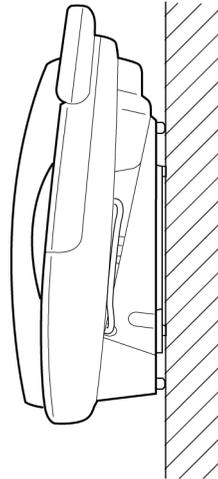
Figure 8-44 Wall Mounted Multiline Terminal

✎   Because of strength variation in switch boxes, this method is
not recommended.

13.2 Wall Mounting a Multiline Terminal using the Wall Mount Unit (WM-R Unit)

The Wall Mount Unit is used to attach any DTH/DTR/IP connection Multiline Terminal (except the DTR-2DT-1 TEL) to the wall. This unit connects to the back side of the telephone.

When adapters are used, the Multiline Terminal must be installed on the wall using the WM-R Unit.

1.   Plug line cord in the wall receptacle. Leave about 8 inches of cord and bundle the rest.

2.   Feed the line cord through the opening in the wall mount unit as illustrated in Figure 8-45 Attaching the Wall Mount Unit to the Wall.

3.   Attach the WM-R Unit using six screws.
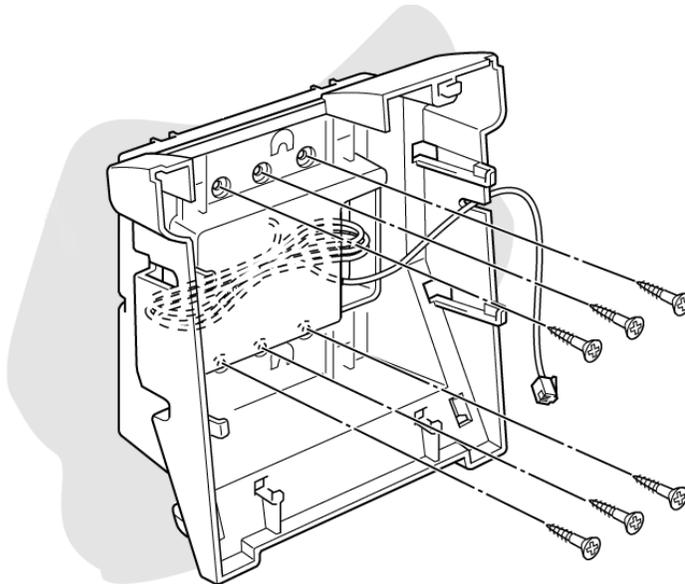
Figure 8-45 Attaching the Wall Mount Unit to the Wall

4.   Install the Multiline Terminal over the four tabs on the base cover, and push down until it clicks in place as illustrated in Figure 8-46 Attaching the Multiline Terminal to the Wall Mount Unit.
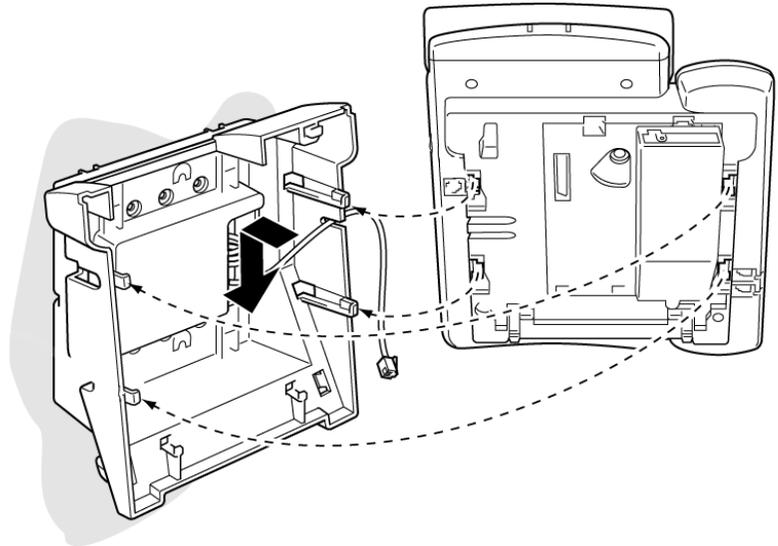
Figure 8-46 Attaching the Multiline Terminal to the Wall Mount Unit

5.   Plug the line cord into the Multiline Terminal as illustrated in
      Figure 8-47 Plugging in Line Cord.
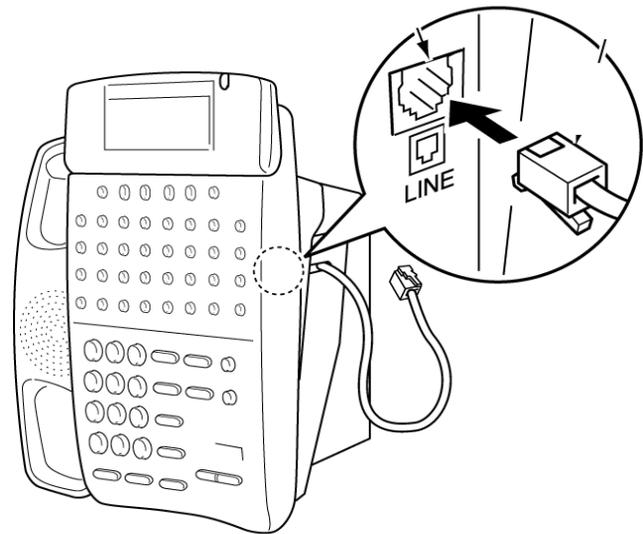
Figure 8-47 Plugging in Line Cord

6. Push spare line cord behind the Multiline Terminal as shown in Figure 8-48 Hiding Excess Cord Behind the Wall Mount Unit.
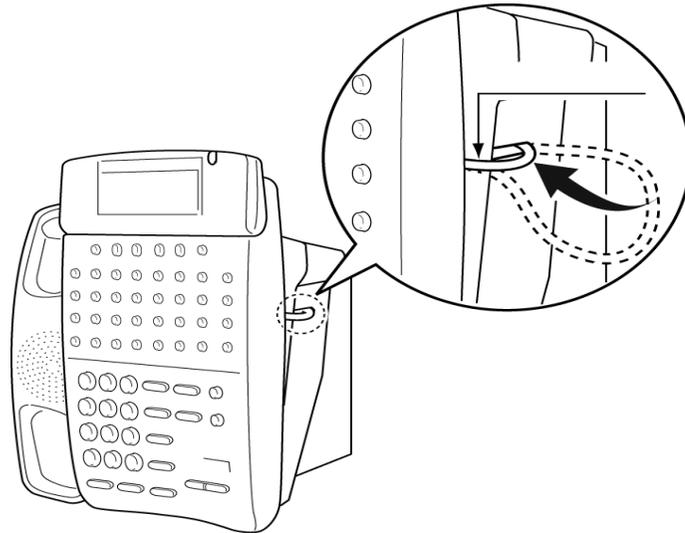
Figure 8-48 Hiding Excess Cord Behind the Wall Mount Unit

13.2.1 Removing the Wall Mounted Multiline Terminal from the Wall Mount Unit

To remove the Multiline Terminal, press the tabs at the bottom as shown in Figure 8-49 Removing Multiline Terminal from the Wall Mount Unit, and push up on the Multiline Terminal until it comes loose.
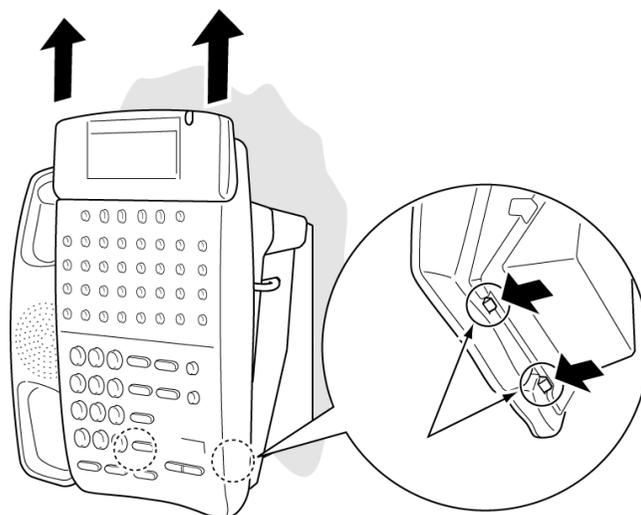
Figure 8-49 Removing Multiline Terminal from the Wall Mount Unit

13.2.2   Mounting the Wall Mount Unit on a Switch Box

1.   Locate the screw holes on the wall mount unit and hang the cover over the screws on the switch box as illustrated in Figure 8-50 Mounting Wall Mount Unit on the Switch Box.

✎   This method is not recommended because of varied strength of switch boxes.
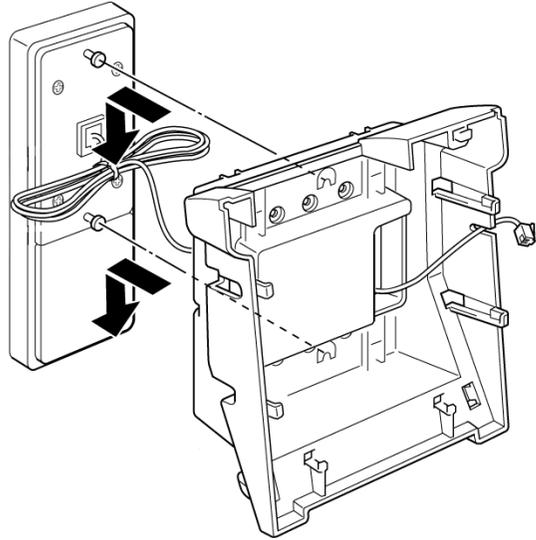
Figure 8-50 Mounting Wall Mount Unit on the Switch Box

2.   Hang the Multiline Terminal on the base cover.
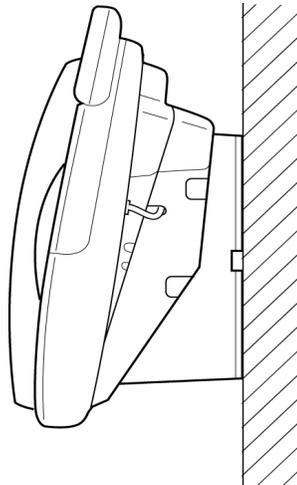
Figure 8-51 Wall Mounted Multiline Terminal

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CHAPTER 9

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Installing Electra Elite IPK Optimal Terminal Equipment CHAPTER 9

SECTION 1   GENERAL INFORMATION

The Electra Elite IPK system provides several adapters that allow peripheral equipment to be attached to the Multiline Terminals. This optional equipment enhances the Electra Elite IPK system and can be purchased separately as a customer business grows. Each Electra Elite IPK Multiline Terminal (except DTR-2DT-1) can have up to two adapters installed at the same time. Only one IP-R(IPK) Unit or IPW-2U Unit is allowed per terminal. This chapter describes each adapter and provides applicable installation instructions.

SECTION 2   PREPARING ELECTRA ELITE IPK MULTILINE TERMINAL FOR ADAPTER INSTALLATION

To prepare the Electra Elite IPK Multiline Terminal for adapter installation:

1. Unplug the telephone line from the terminal.

2. 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 9-1 Raising the Base Plate.
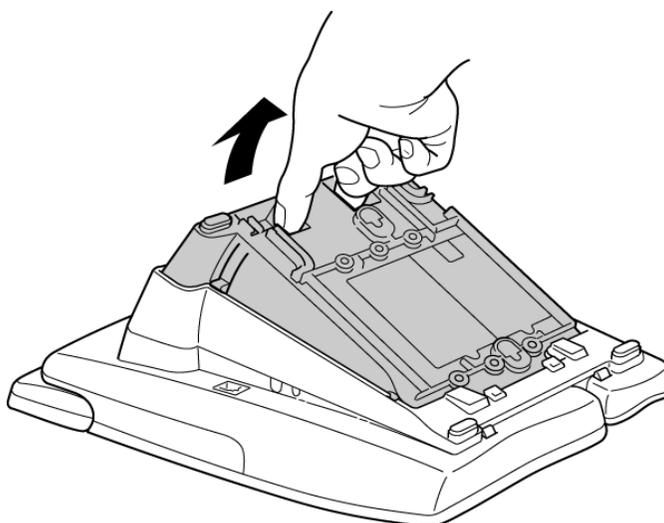
Figure 9-1 Raising the Base Plate

3.   Press down on the tabs indicated in Figure 9-2 Removing the Multiline Terminal Base Plate, and push forward on the base plate to remove it.
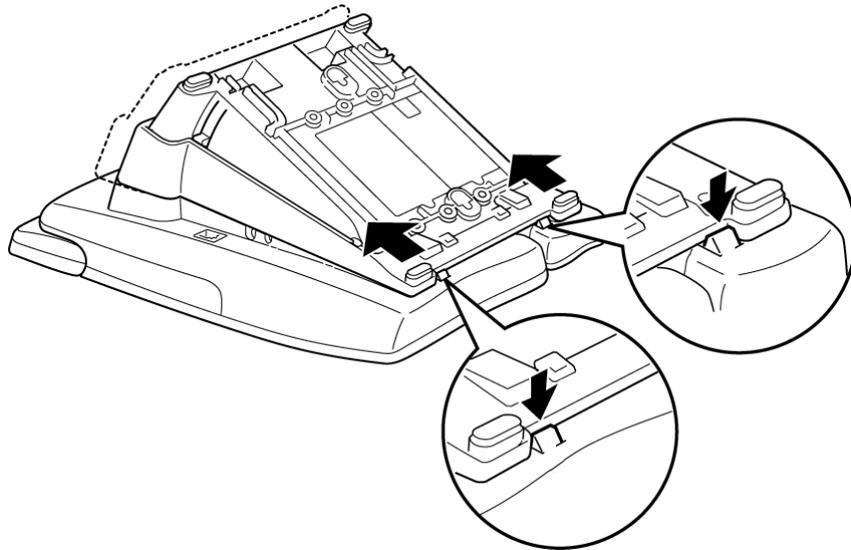
Figure 9-2 Removing the Multiline Terminal Base Plate

4.   When an adapter is installed for the first time, the base cover on the Multiline Terminal must be modified. Two adapters can be installed in the Multiline Terminal, and two separate cutouts are provided. Remove the applicable cutout/cutouts on the bottom of the base plate. 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 9-3 Modifying Base Plate for Adapter Installation.
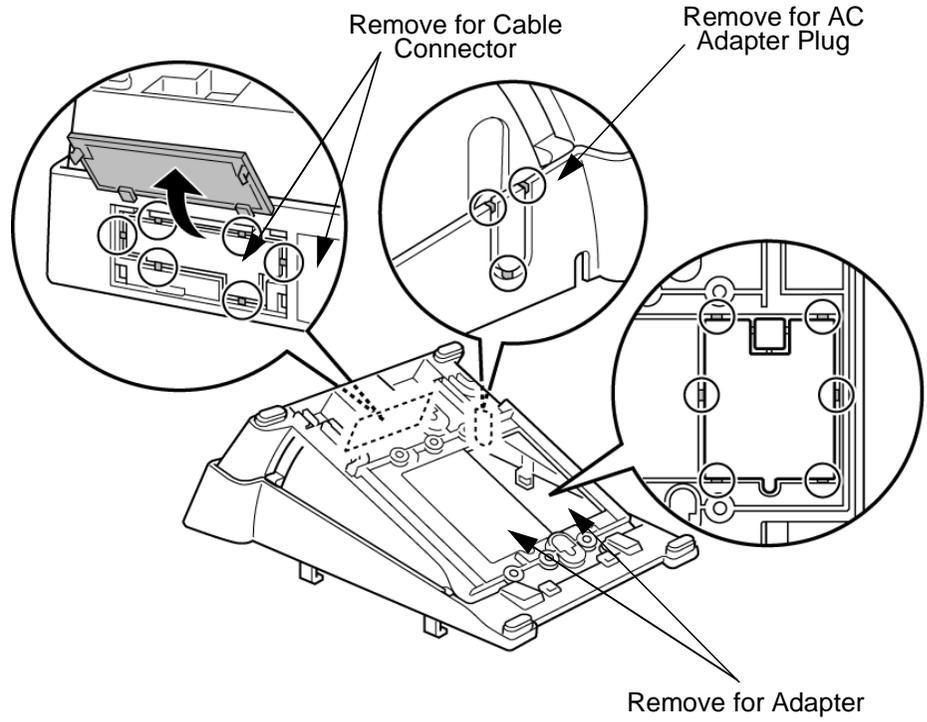
Figure 9-3 Modifying Base Plate for Adapter Installation

SECTION 3   INSTALLING ADAPTERS

3.1   AC-R Unit (AC Adapter)

This unit shown on Figure 9-4 AC-R Unit (AC Adapter) provides power to ancillary devices or to an Attendant Console. The AC-R Unit must be connected to some adapters that are installed on a Multiline Terminal. When more than one adapter is installed on a Multiline Terminal, only **one** AC-R Unit is necessary.
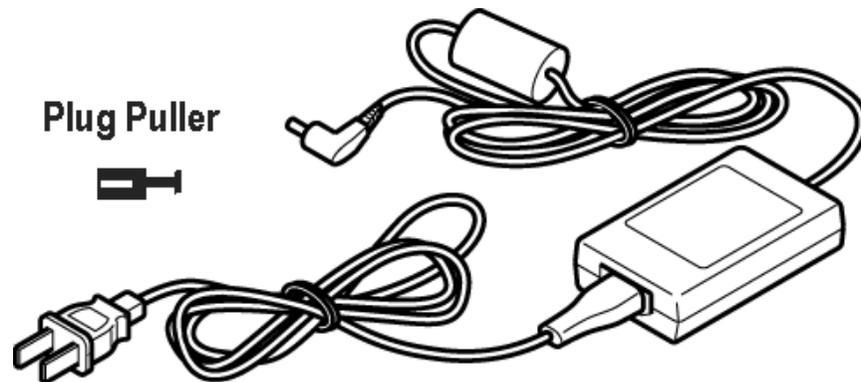
Figure 9-4 AC-R Unit (AC Adapter)

The power requirements for the AC-R Unit are:

❏   Input: 110~240 Vac, 50/60 Hz, 45 VA

❏   Output: 27 Vdc, 750 mA

❏   Polarity: $\ominus$———— • ———— $\oplus$

3.1.1   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 2 Preparing Electra Elite IPK Multiline Terminal for Adapter Installation on page 9-1.

3.   The Plug Puller shown in Figure 9-4 AC-R Unit (AC Adapter) 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.
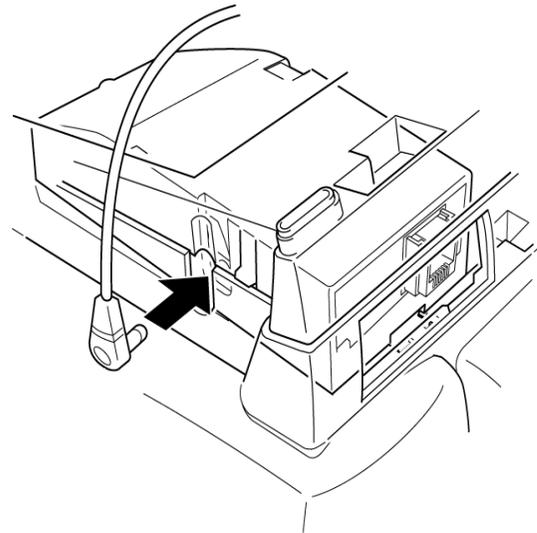
Figure 9-5 Connecting the AC Adapter to an Installed Adapter

3.2   AD(A)-R/AD(A)-2R Unit (Ancillary Device Adapter)

This Ancillary Device Adapter, shown on Figure 9-6 AD(A)-R/AD(A)-2R Unit, allows connection of a tape recorder to all Electra Elite IPK Multiline Terminals except the DTR-2DT-1. The AD(A)-2R is used with ITH-8D/16D-2 Multiline Terminals.
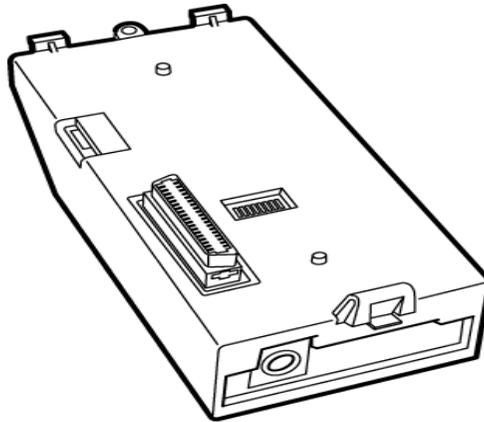
Figure 9-6 AD(A)-R/AD(A)-2R Unit

Figure 9-7 Connecting a Multiline Terminal to a Recording Device using an AD(A)-R Unit (Example) illustrates how the AD(A)-R Unit is connected to the ESI(8)-U( ) ETU and to the recording device.
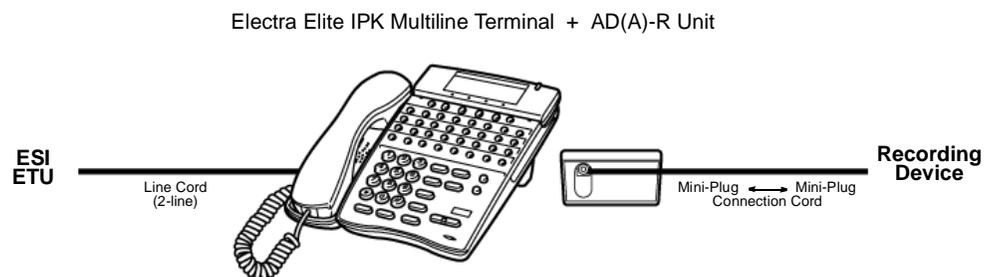
Electra Elite IPK Multiline Terminal + AD(A)-R Unit

ESI
ETU

Line Cord
(2-line)

Recording
Device

Mini-Plug ←→ Mini-Plug
Connection Cord

**Figure 9-7   Connecting a Multiline Terminal to a Recording Device using
                    an AD(A)-R Unit (Example)**

When installing the AD(A)-R Unit, connect the cables to the AD(A)-R Unit, set the dip switches, and then install the AD(A)-R Unit on the Multiline Terminal.

3.2.1   Connecting Cables to the AD(A)-R Unit

The first step in installing the AD(A)-R Unit is to connect the cables between the recording device and the AD(A)-R Unit.

Cable terminal connectors are located on the side of the AD(A)-R Unit. Cables should be connected on this unit *before* installing the unit on the Multiline Terminal.

Cables can be connected to determine whether or not pause control is provided for the recording.
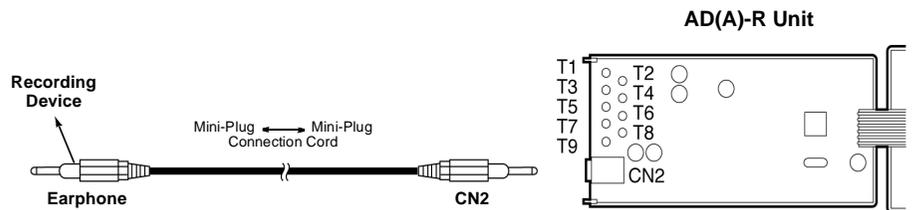
Figure 9-8 AD(A)-R Unit Connection without Pause Control
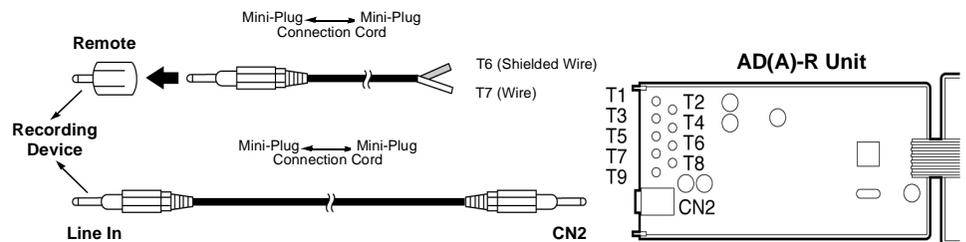
Figure 9-9 AD(A)-R Unit Connection with Pause Control

To connect the cables:

1.   Cut off the plug on one end of the cable.

2.   Remove the screw as illustrated in Figure 9-10 Removing AD(A)-R Unit Cover and open the unit cover.

Remove Screw
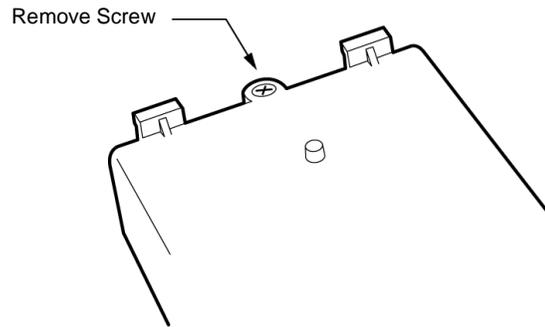
Figure 9-10 Removing AD(A)-R Unit Cover

3.   Locate the adapter terminals on the unit.

4.   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 9-11 Attaching Cables to the AD(A)-R Unit.

Attach the cables to the AD(A)-R Unit according to Table 9-1 AD(A)-R Unit Cable Connections.
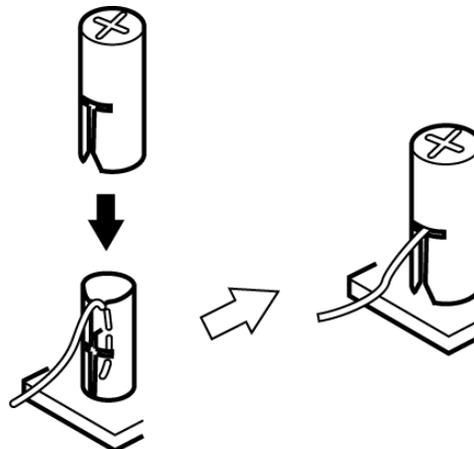
Figure 9-11 Attaching Cables to the AD(A)-R Unit

Table 9-1 AD(A)-R Unit 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 AD(A)-R 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. 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 9-2 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 recording device owner's 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 recording device owner's manual specifies start on closed circuit, connect T6 and T7.
T8 T9	Unused	

Table 9-1 AD(A)-R Unit Cable Connections (Continued)

Terminal Number	Cables to Connect	Terminal Specifications

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. Then connect the warning tone cables to input terminals T1 and T2 on the AD(A)-R Unit (T3 and T4 are used as the recording device 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 AD(A)-R Unit. (Connecting to T5 or T7 is determined by the specifications of the recording device.)

➢ 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)/AP(A)-R Unit.

➢ Speakerphone calls through the HF-R Unit cannot be recorded**.**

5.   Insulate the end of the cable that needs to be shielded with insulating tape.

6.   Feed the installed cable through the cable access port, located on the back of the unit, as illustrated in Figure 9-12 AD(A)-R Unit Cable Access Port.

Cable Access Port

REC
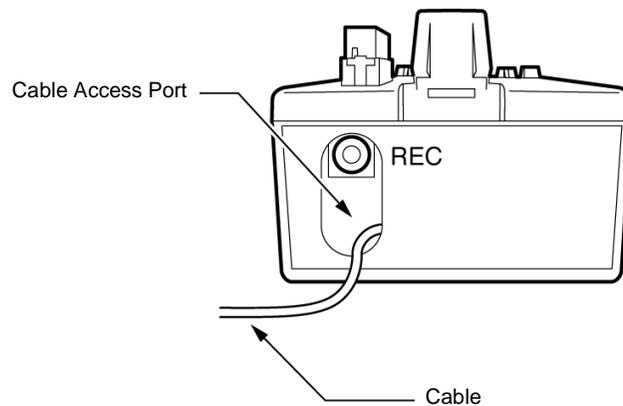
Cable

Figure 9-12 AD(A)-R Unit Cable Access Port

3.2.2   Switch Settings

The AD(A)-R Unit has two switch locations; SW1/SW2 and the DSW switches. The location of the switches on the AD(A)-R Unit is illustrated in Figure 9-13 AD(A)-R Switch Default Settings. The dip switches (DSW) allow a technician to configure the unit for specific settings.
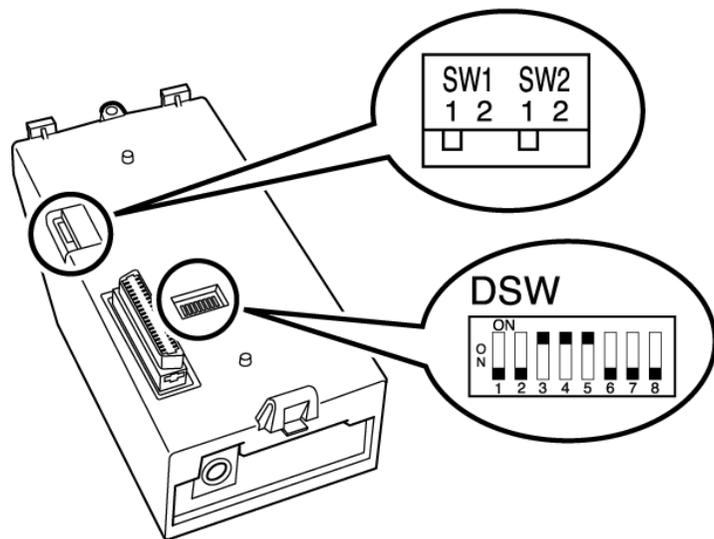
Figure 9-13 AD(A)-R Switch Default Settings

To provide control to the recorder or to enable/disable the record start warning tones, refer to Table 9-2 AD(A)-R Unit Switch Settings.

Table 9-2 AD(A)-R Unit Switch Settings

Switch		Description/Settings
SW1	SW1-1	Connects to Multiline Terminal Connect = Default
	SW1-2	Not Used
SW2	SW2-1	Sets External Equipment Impedance to 600 Ω
	SW2-2	Used for Complex Impedance Devices (< 30 Ω Input Impedance)

Dip Switches (DSW)	DSW 1	Output Hook Signal to External Device On = Output Off = No Output (Default)
	DSW 2	Record Confirmation Tone On = Tone On Off = Tone Off (Default)
	DSW 3 and DSW 4	Use T1/T2 On = Disable (Default) Off = Enable
	DSW 5	Reset Signal Upgrade On = Normal (Default) Off = Debugging
	DSW 6~8	Firmware Upgrade On = Firmware Upgrade Off = Disable (Default)

➢ *Do not connect T1 and T2 when DSW switches 3 and 4 are On.*

3.2.3   Installing the AD(A)-R Unit on a Multiline Terminal

The AD(A)-R Unit should be installed *after* the cables have been connected and the switches set.

✎   If wall mounting the Multiline Terminal, a WM-R Unit must be used. Refer to Section 13 Wall Mounting Multiline Terminals on page 8-28.

1.   Unplug the telephone cord (and the AC-R Unit cord if installed) from the Multiline Terminal.

2. Plug the tabs marked **A** and **B** into adapter slots, then snap the tab on the other end of the adapter into the receptacle marked **C**. Refer to Figure 9-14 Attaching the AD(A)-R Unit to the Multiline Terminal.
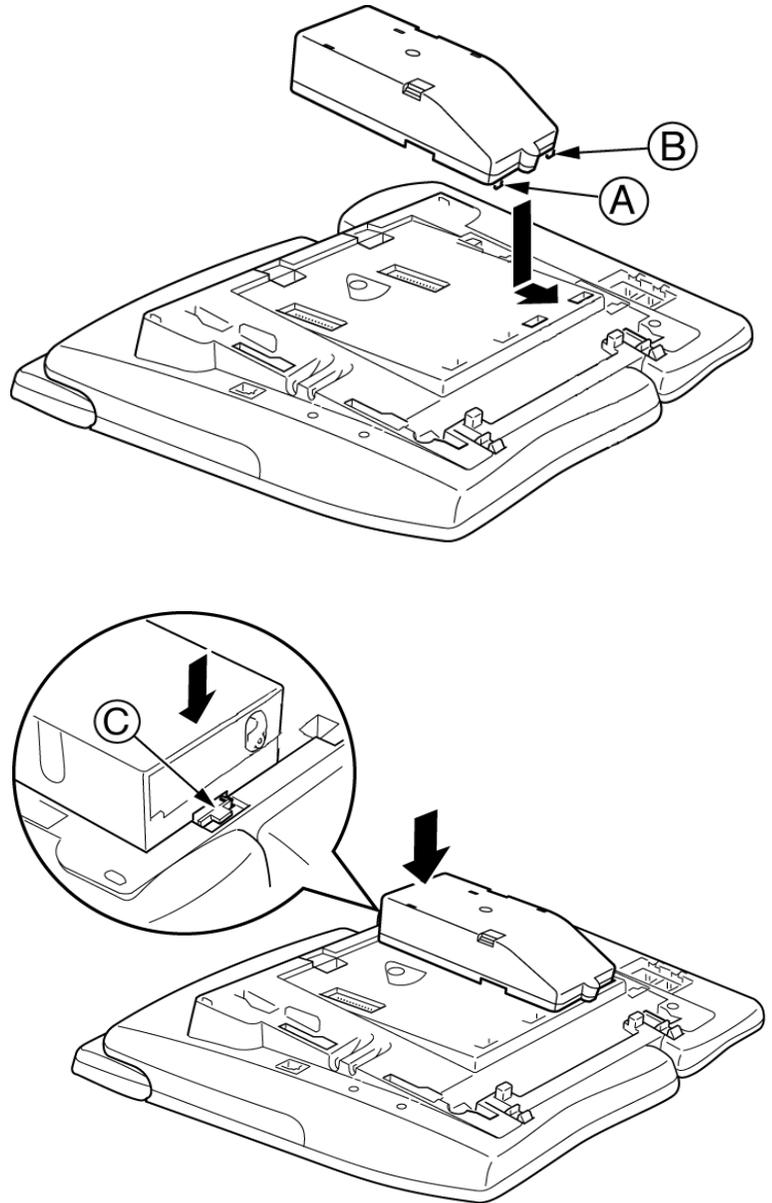
Figure 9-14 Attaching the AD(A)-R Unit to the Multiline Terminal

3. Replace the base plate (or wall mount unit) and attach the line cord. Refer to Section 3 Connecting a Multiline Terminal to the System on page 8-14.

3.3   AP(A)-R Unit/AP(R)-R Unit (Port Adapters)

The AP(A)-R Unit Analog Port Adapter without Ringer and the AP(R)-R Unit Analog Port Adapter with Ringer are used to install a Single Line Terminal, Modem, Credit Card Reader, Wireless Headset, or other compatible analog device.

The AP(R)-R Unit generates ringing signals and requires an AC-R Unit.

The AP(A)-R Unit and the AP(R)-R Unit can be installed on all Multiline Terminals except the DTR-2DT-1 and ITH-8D/16D-2.

Figure 9-15 Connecting a Multiline Terminal to an Analog Telephone using an AP(A)-R Unit/AP(R)-R Unit (Example) illustrates how the AP(A)-R Unit/ AP(R)-R Unit is connected to the ESI(8)-U( ) ETU and to an analog telephone.
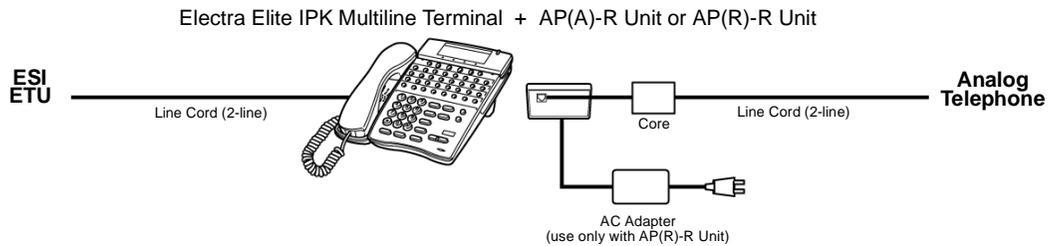
Figure 9-15   Connecting a Multiline Terminal to an Analog Telephone using an AP(A)-R Unit/AP(R)-R Unit (Example)

3.3.1   Switch Settings

The AP(A)-R Unit and AP(R)-R Unit have three switch locations. Refer to Table 9-3 AP(A)-R/AP(R)-R Unit Switch Settings for a description of each switch and an explanation of the settings.
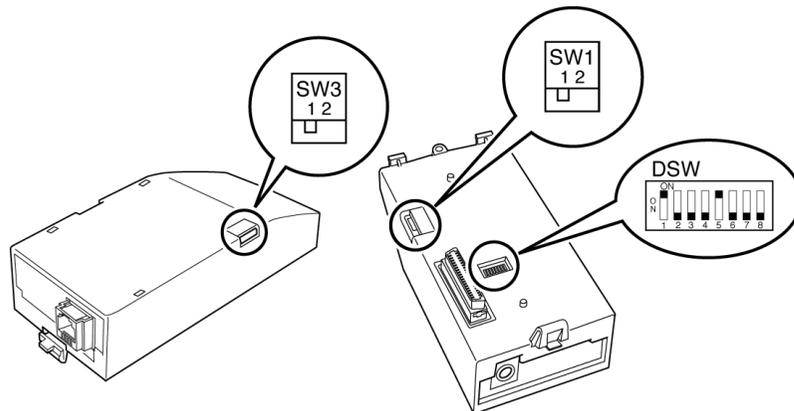
Figure 9-16 AP(A)-R Unit/AP(R)-R Unit Switches

Table 9-3 AP(A)-R/AP(R)-R Unit Switch Settings

Switch		Description/Settings
SW1	SW1-1	Connects to Multiline Terminal (Default).
	SW1-2	Not Used
SW3	SW3-1	Sets impedance to 600 Ω for devices such as modems or facsimile machines.
	SW3-2	Used for complex impedance devices such as Single Line Telephones.

Dip Switches (DSW)	DSW 1~8	Leave switches at default.

3.3.2   Installing AP(A)-R or AP(R)-R Unit on a Multiline Terminal

The AP(A)-R and AP(R)-R Units should be installed *after* the switch settings have been set.

✎   If wall mounting the Multiline Terminal, a WM-R Unit must be used. Refer to Section 13 Wall Mounting Multiline Terminals on page 8-28.

1.   Prepare Multiline Terminal for adapter installation. Refer to Section 2 Preparing Electra Elite IPK Multiline Terminal for Adapter Installation on page 9-1.

2.   Plug the tabs marked *A* and *B* into adapter slots, then snap the tab on the other end of the adapter into the receptacle marked *C.* Refer to Figure 9-17 Attaching the AP(A)-R/AP(R)-R Units to the Multiline Terminal.
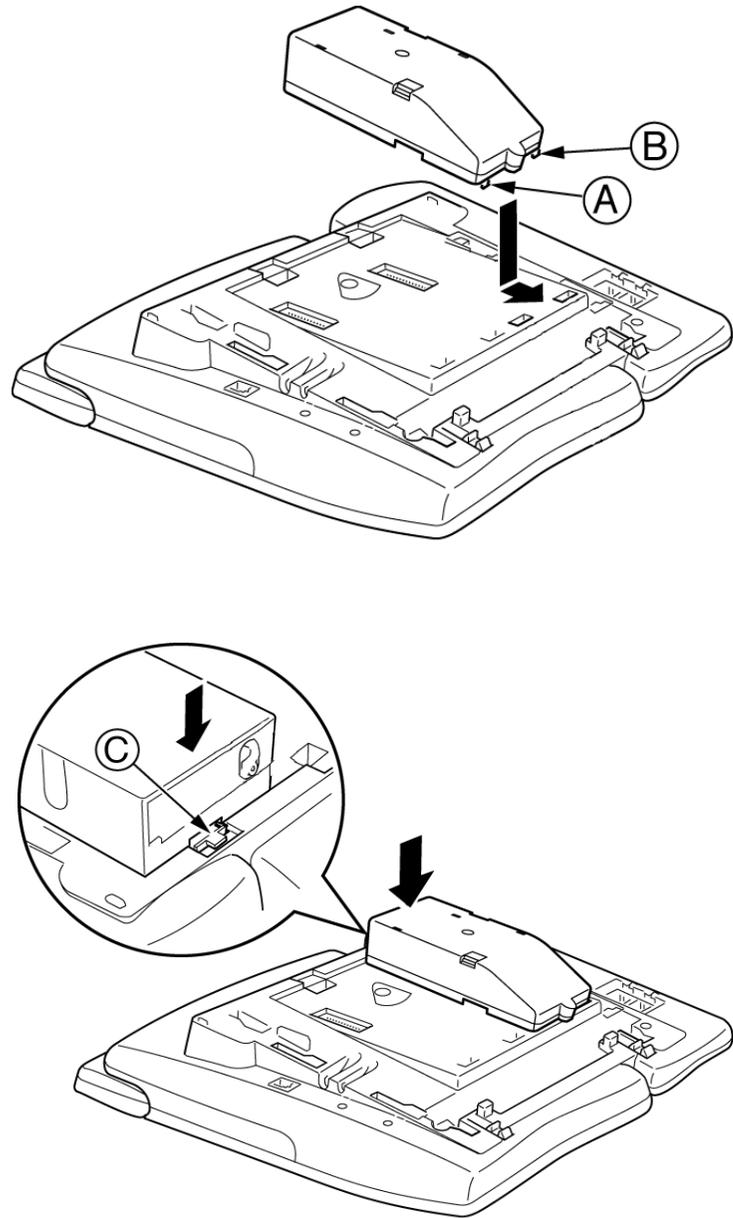
**Figure 9-17   Attaching the AP(A)-R/AP(R)-R Units to the
Multiline Terminal**

3.   Install the ferrite core (provided with the unit) about two inches from the line cord plug.

AP(A)-R Unit
or
AP(R)-R Unit
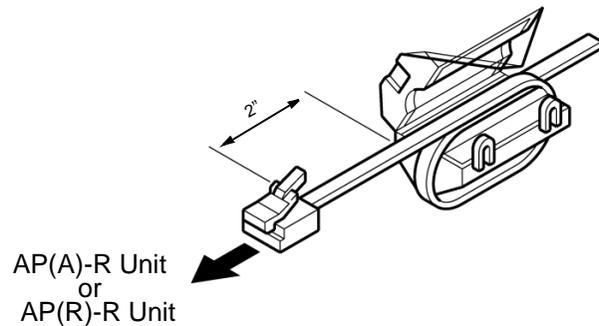
Figure 9-18   Installing the Ferrite Core on the AP(A)-R/ AP(R)-R Units

4.   Connect the line cord to the unit, limiting the cable length from the AP(A)/AP(R)-R Unit to the Single Line Telephone to a maximum of 50 feet.

   ✎   If only installing the AP(R)-R Unit, plug the AC Adapter (AC-R Unit) power cord into the indicated AP(R)-R Unit receptacle and connect it to a power source. (Refer to Figure 9-5 Connecting the AC Adapter to an Installed Adapter on page 9-5.)

5.   Replace the base plate (or wall mount unit) and attach the line cord. (Refer to Section 3 Connecting a Multiline Terminal to the System on page 8-14.)

3.4   CT(A)-R Unit (Computer Telephony Adapter)

The Computer Telephony Adapter, CT(A)-R Unit allows a Multiline Terminal to be connected to a PC. The PC can perform all Multiline Terminal functions using a TAPI-compatible application software (Microsoft Telephony Application Programming Interface).

The Multiline Terminal must be located within five feet (1.5 m) of the PC. An AC-R Unit is necessary.

This adapter can be installed on any Electra Elite IPK Multiline Terminal except the DTR-2DT-1 TEL and ITH-8D/16D-2.
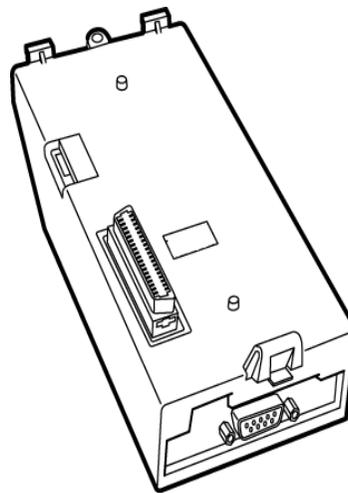
Figure 9-19 CT(A)-R Unit

Figure 9-20 Connecting a Multiline Terminal to a PC using a CT(A)-R Unit (Example) shows how the CT(A)-R Unit is connected to the ESI(8)-U( ) ETU and to the PC. The required AC-R Unit adapter is not shown.

Electra Elite IPK Multiline Terminal + CT(A)-R Unit   **PC**

**ESI
ETU**

Line Cord (2-line)   RS-232C Cable (Straight)
                                    CT(A)-R Unit   [CT(A)-R Unit: D-sub9 Male Pin]

Optional Headset
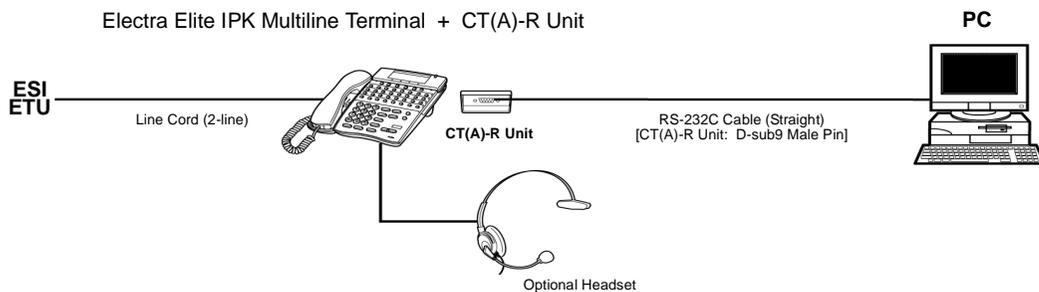
Figure 9-20 Connecting a Multiline Terminal to a PC using a CT(A)-R Unit (Example)

3.4.1   Installing the CT(A)-R Unit

The CT(A)-R Unit should be installed *before* connecting the PC and *before* connecting the ESI port to the Multiline Terminal.

✎   If wall mounting the Multiline Terminal, a WM-R Unit must be used. Refer to Section 13 Wall Mounting Multiline Terminals on page 8-28.

1.   Prepare Multiline Terminal for adapter installation. Refer to Section 2 Preparing Electra Elite IPK Multiline Terminal for Adapter Installation on page 9-1.

2.   Plug the tabs marked *A* and *B* into adapter slots, then snap the tab on the other end of the adapter into the receptacle marked *C*. Refer to Figure 9-21 Attaching the CT(A)-R Unit to the Terminal.
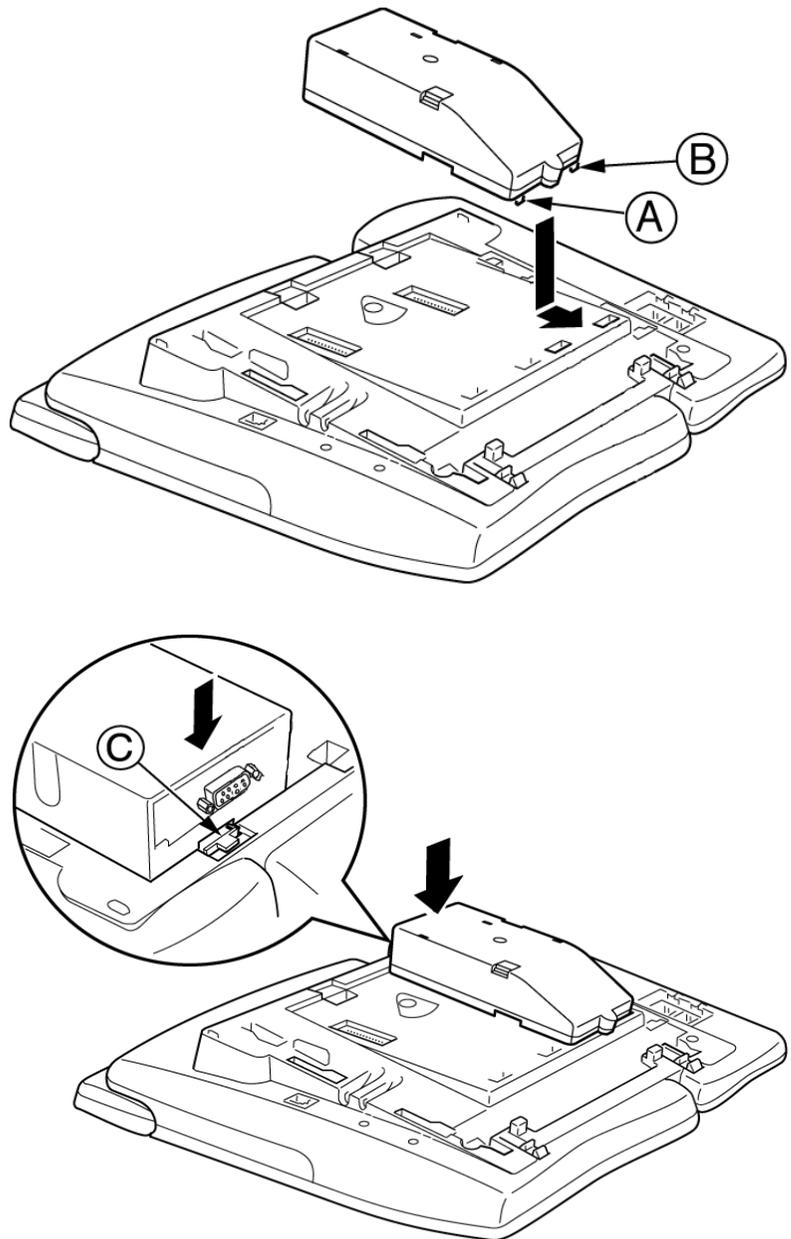
Figure 9-21 Attaching the CT(A)-R Unit to the Terminal

3. Replace the base plate (or wall mount unit) and attach the line cord. Refer to Section 3 Connecting a Multiline Terminal to the System on page 8-14.

3.4.2 Connecting the CT(A)-R Unit to the PC

Connect RS-232C cable from the PC to the CT(A)-R Unit as shown in Figure 9-22 Connecting the RS-232C Cable to the CT(A)-R Unit.
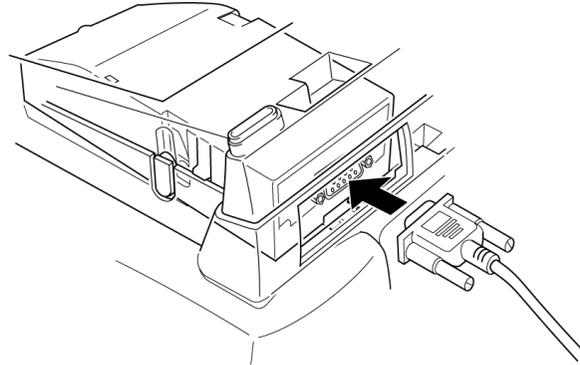
Figure 9-22 Connecting the RS-232C Cable to the CT(A)-R Unit

3.4.3 Installing the Optional Headset

Install the headset and anchor it in the cord slot on the Multiline Terminal as shown in Figure 9-23 Attaching the Headset to the Multiline Terminal.
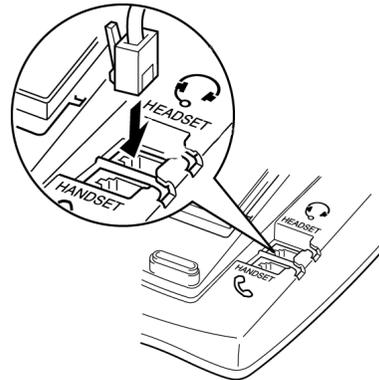
Figure 9-23 Attaching the Headset to the Multiline Terminal

✎   Headsets that have open style receivers (*i.e.,* Mirage, Duoset and Duopro) can cause echo problems on ITH-8D/16D-2 telephones. The echo suppression and receiver gain of the telephone determines the severity of the echo when using any headset.

Due to the environment where the telephones or headsets are located, ambient noise may affect performance. Please contact NEC for the recommended headset to use with VoIP applications.

3.4.4   Installing the Driver on the PC

Using the download from Web provided with the CT(A)-R Unit install the driver onto your PC.   Refer to the CT(A)-R Unit installation instructions for installing the driver.

3.5   CT(U)-R Unit (Computer Telephony Adapter)

The CT(U)-R Unit Computer Telephony Adapter allows a Multiline Terminal to be connected to a PC using the PC USB port.

Connecting using the USB port provides telephony and sound device control. The general functions of the CT(U)-R Unit include:

❑   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).

❑   User Interface to Support D^{term} Emulation

This interface provides the functions of the D^{term} such as normal telephone indications, LCD, line keys or hookswitch.

❑   Sound Support

Allows voice recording or recording playing on an audio device assigned to a PC. Voice Mail and Live Record are supported on the PC.

❑   Plug and Play

An AC-R Unit is necessary when using this unit.

This adapter can be installed on any Electra Elite IPK Multiline Terminal except the DTR-2DT-1 TEL and ITH-8D/16D-2.

Figure 9-24 CT(U)-R Unit

shows how the CT(U)-R Unit is connected to the ESI(8)-U( ) ETU and to the PC. The required AC-R Unit is not shown.

Electra Elite IPK Multiline Terminal + CT(U)-R Unit   **PC**

ESI
ETU

Line Cord (2-line)   **CT(U)-R Unit**   USB Cable
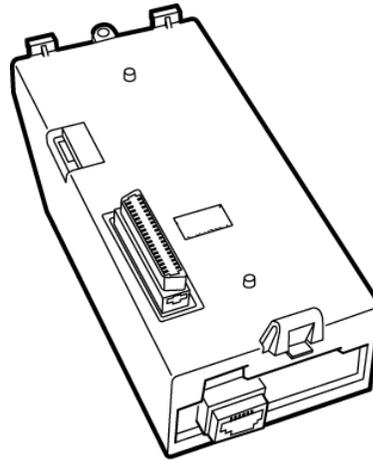
Optional Headset
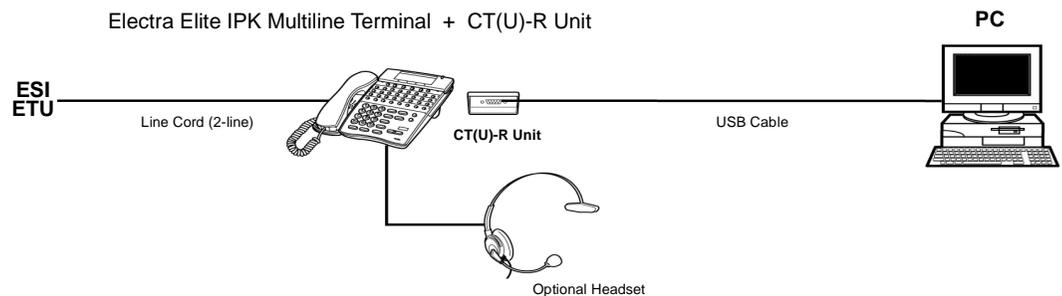
Figure 9-25 Connecting a Multiline Terminal to a PC using a CT(U)-R Unit (Example)

3.5.1   Installing the CT(U)-R Unit

The CT(U)-R Unit should be installed *after* the switch settings have been set.

✎   If wall mounting the Multiline Terminal, a WM-R Unit must be used. Refer to Section 13 Wall Mounting Multiline Terminals on page 8-28.

1. Prepare Multiline Terminal for adapter installation. Refer to Section 2 Preparing Electra Elite IPK Multiline Terminal for Adapter Installation on page 9-1.

2. Plug the tabs marked *A* and *B* into adapter slots, then snap the tab on the other end of the adapter into the receptacle marked *C*. (Refer to Figure 9-26 Attaching the CT(U)-R Unit to the Multiline Terminal.)
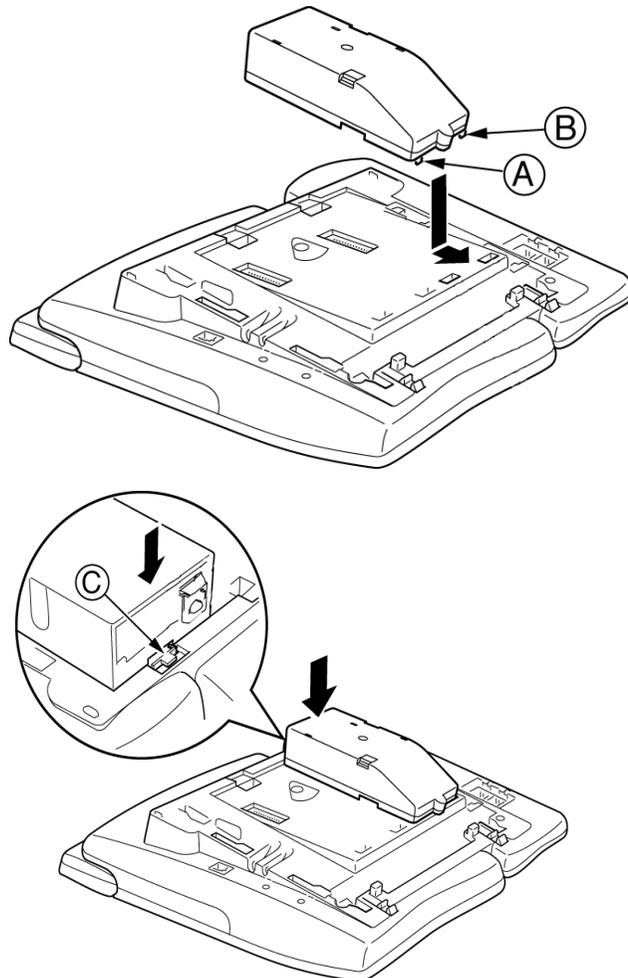
Figure 9-26 Attaching the CT(U)-R Unit to the Multiline Terminal

3. Replace the base plate (or wall mount unit) and attach the line cord. Refer to Section 3 Connecting a Multiline Terminal to the System on page 8-14.

4.   Attach the AC-R to the CT(U)-R Unit. Refer to Figure 9-5
Connecting the AC Adapter to an Installed Adapter on page
9-5.

3.5.2   Connecting the CT(U)-R Unit to the PC

Connect USB cable from the PC to the CT(U)-R Unit as shown in
Figure 9-27 Connecting the USB Cable to the CT(U)-R Unit.
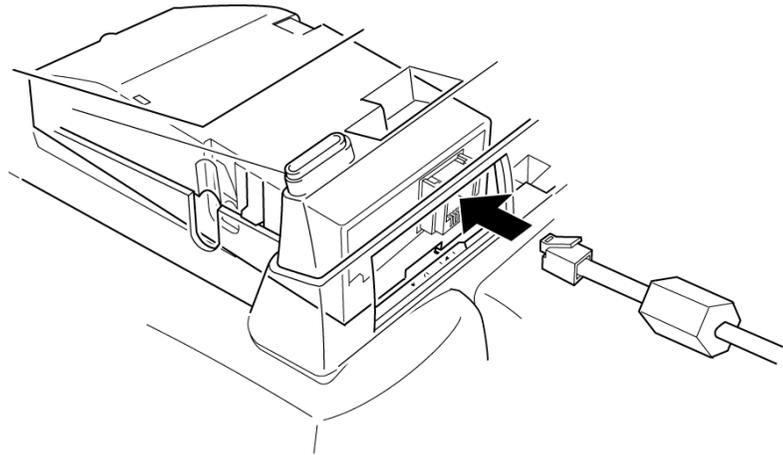
Figure 9-27 Connecting the USB Cable to the CT(U)-R Unit

3.5.3   Installing the Optional Headset

Install the headset and anchor it in the cord slot on the Multiline
Terminal as shown in Figure 9-23 Attaching the Headset to the
Multiline Terminal on page 9-21.

3.5.4   Installing the Driver on the PC

Using the download from Web with the CT(U)-R Unit install the driver
onto your PC.   Refer to the CT(U)-R Unit installation instructions for
installing the driver.

3.6   HF-R Unit (Handsfree Unit)

The Handsfree Unit provides full-duplex handsfree communication for a desktop user. Large or enclosed areas may cause poor full-duplex operation. This unit comes with the handsfree adapter and an external microphone unit.

This adapter can be installed on any DTR/DTH Multiline Terminal except DTR-2DT-1 and ITH-8D/16D-2 (**R1500 or higher)**.

3.6.1   Installing an HF-R Unit on any DTR/DTH Multiline Terminal (except DTR-2DT-1 and ITH-8D/16D-2

1.   With terminal upside down, facing from the bottom of the open cover, install this unit in terminal adapter Slot 1.
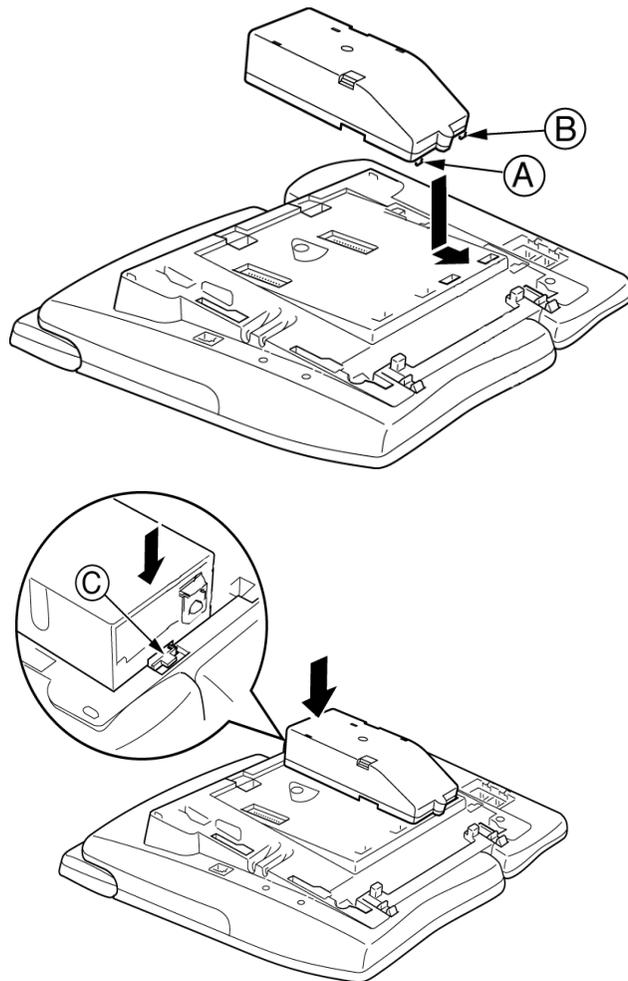
Figure 9-28 Attaching the HF-R Unit to the Multiline Terminal

2.   Plug the tabs marked *A* and *B* into adapter slots, then snap the tab on the other end of the adapter into the receptacle marked *C*. Refer to Figure 9-28 Attaching the HF-R Unit to the Multiline Terminal.

3.   Replace the base plate (or wall mount unit) and attach the line cord. Refer to Section 3 Connecting a Multiline Terminal to the System on page 8-14.

3.6.2   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 locking mute button and a red LED indicator that is off when the microphone is in mute.
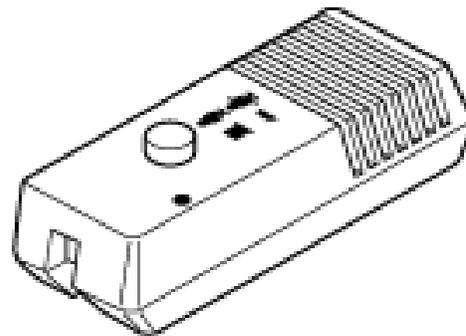
Figure 9-29 Microphone with Mute

1.   Plug the microphone cord into the jack on the HF-R Unit.

✎   The microphone should be one~three feet away from the Multiline Terminal with the Mic grate facing the user.

3.7   IP-R(IPK) Unit

The Elite IP-R(IPK) Unit allows connection to an IAD(8)-U( ) ETU with a MEGACO Station Package in the Electra Elite IPK.

Installing the IP-R(IPK) Unit in the plug-in socket located at the bottom of the Electra Elite IPK Terminal transforms a DTH Multiline Terminal into an IP station. The user can also connect a PC to the LAN through an RJ-45 Ethernet jack on the IP-R(IPK) Unit that acts as a switching hub.

Any Electra Elite IPK Terminal (8D/16D/32D-1) with an IP-R(IPK) Unit installed, in conjunction with the IAD(8)-U() ETU (MEGACO Station Package), enables IP Telephony stations for the Electra Elite IPK System. The IP stations can provide connectivity with the Corporate Elite over the local LAN (Ethernet).

3.7.1   IP-R(IPK) Unit Specifications

Refer to Table 9-4 IP-R(IPK) Unit Specifications.

Table 9-4 IP-R(IPK) Unit Specifications

Feature	Specification
Interface	10/100 Base-T (IEEE 802.3), RJ-45
Protocol	Voice (UDP, RTP, and RTCP)
	Signal (TCP, H.225 and H.245)
Jitter Buffer	Max 90 ms
Quality of Station (QOS)	Network Managed switches supporting Type of Service (TOS) field and VLAN support
Local Power	27 V 750 mA via AC Adapter Base
Applications	TFTP (Client), DHCP Client, Megaco (H.248)
Standards	UL1459, FCC Part 68
Voice Specifications	G.711 (PCM Mu-law/A-law) G.729
Mountable D^{term}	D^{term} 8D, 16D, 32D-type telephone

3.7.2   Applying Power to the IP-R(IPK) Unit

Power is provided to the IP-R(IPK) Unit using an AC-R Unit or Power Over the Ethernet.
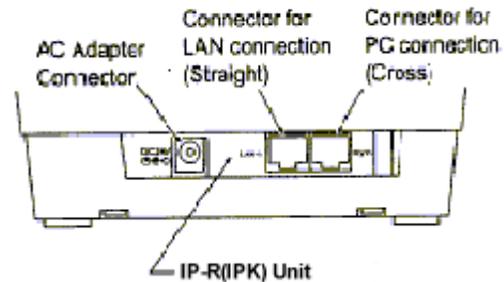

Figure 9-30 IP Terminal Rear Connector Locations

❍   AC-R Unit (AC Adapter)

Plug the optional AC-R Unit input jack in the AC Adapter connection shown in Figure 9-30 IP Terminal Rear Connector Locations.

❍   Power over the Ethernet (POE)

POE sometimes called In-Line Power, is a LAN technology that allows standard 10/100 Base-T data cables to pass current from a power source to a requesting-end device. Refer to Figure 9-31 IP-R(IPK) Unit SW1 Setting for Power Source.
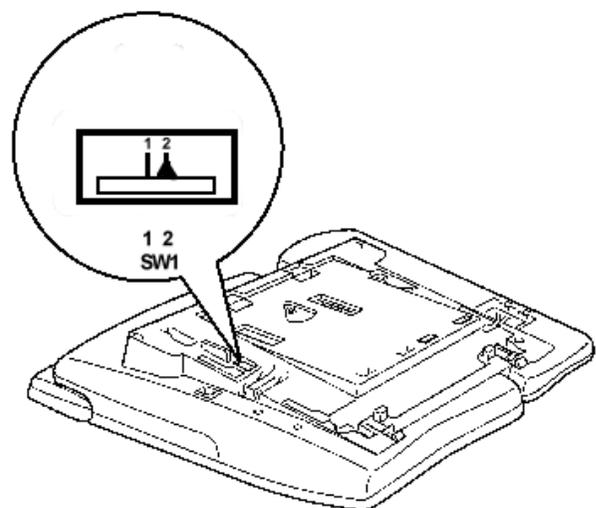
Figure 9-31 IP-R(IPK) Unit SW1 Setting for Power Source

The IP-R(IPK) Unit switch SW1 indicates to the system how the adapter is powered.

To set Switch SW1 for the applicable power source, Refer to Table 9-5 Switch SW1 Setting for Power Configuration.

Table 9-5 Switch SW1 Setting for Power Configuration

Switch (SW1) Settings	Power Method	Equipment Used
1	AC Adapter	NEC AC-R AC Adapter (27V, 750 mA)
	NEC POE Equipment	❍ NEC Power Patch Panel SN1604 PRWMS (Stock No. 59022) ❍ NEC BF200/24 POE Switching Hub
2 (Default)	CICSO Equipment (CDP)	❍ Cisco Catalyst PRW Series ❍ Cisco Powered Patch Panel

3.7.3   Installing the IP-R(IPK) Unit on the Electra Elite IPK Terminal

The IP-R(IPK) Unit can be installed on any DTH-8D/16D/32D-1 Electra Elite IPK Multiline Terminal as shown below.

1.   Unplug the telephone line from the terminal. Turn the terminal upside down, press the areas indicated on the diagram and raise the base plate until the retaining tabs click.
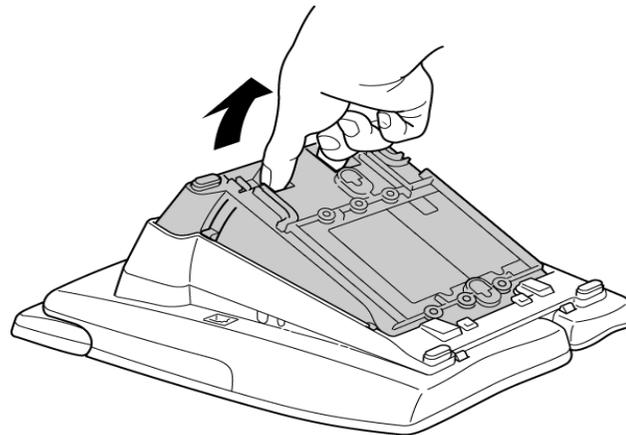
Figure 9-32 Raising the Base Plate

2.   Press down on the tabs as shown in Figure 9-33 Removing the Base Plate and push the base plate forward to remove it.
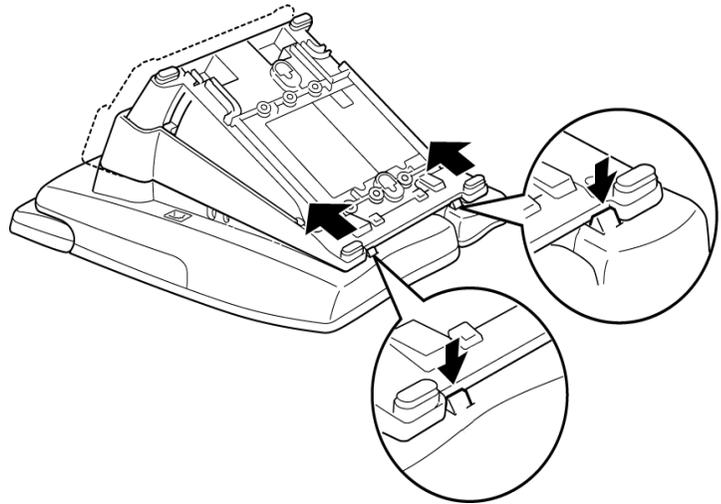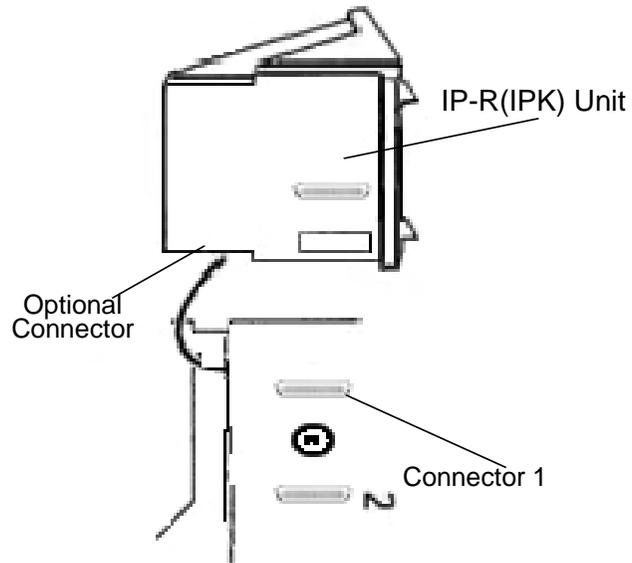

Figure 9-33 Removing the Base Plate

3.   When an IP-R(IPK) Unit is installed for the first time in a terminal, the base cover on the Multiline Terminal must be modified as shown in Figure 9-34 Removing Cutouts. Remove all cutouts on the bottom and back of the terminal base plate before installing the IP-R(IPK) Unit.


Remove all four cutouts
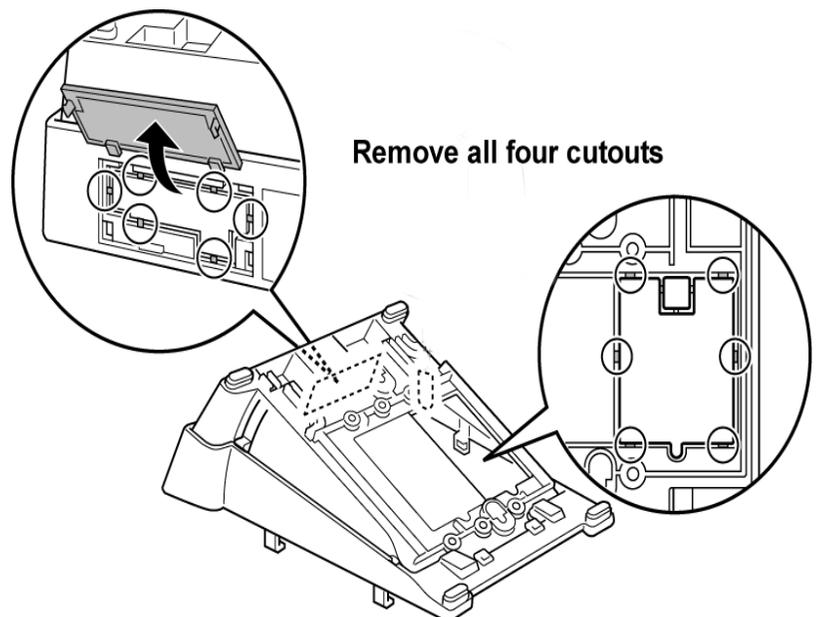
Figure 9-34 Removing Cutouts

4.   Plug the IP-R(IPK) Unit in Connector 1 on the Elite IPK
      Terminal (DTH-8D/16D/32D-1) as shown in Figure 9-35
      Plugging in the IP-R(IPK) Unit.

Figure 9-35 Plugging in the IP-R(IPK) Unit

5.   Attach the base plate by lining up the four tabs on the base
      cover with corresponding slots on the terminal as shown in
      Figure 9-36 Attaching the Base Plate, and slide the cover in the
      direction of the arrows until it clicks in place.
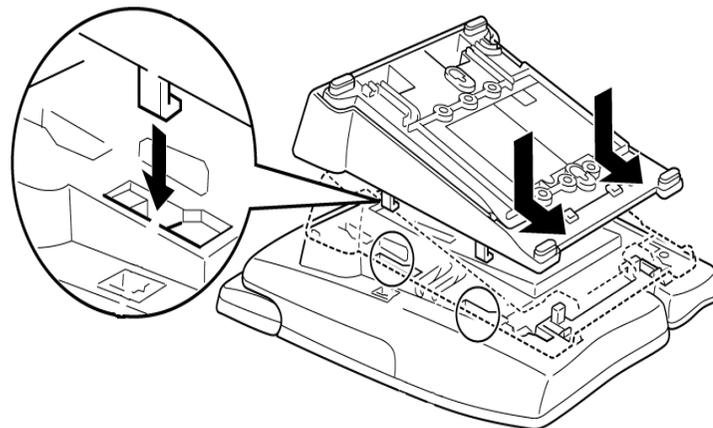
Figure 9-36 Attaching the Base Plate

3.7.4   Connection Example

Refer to Figure 9-37 Connection Example.
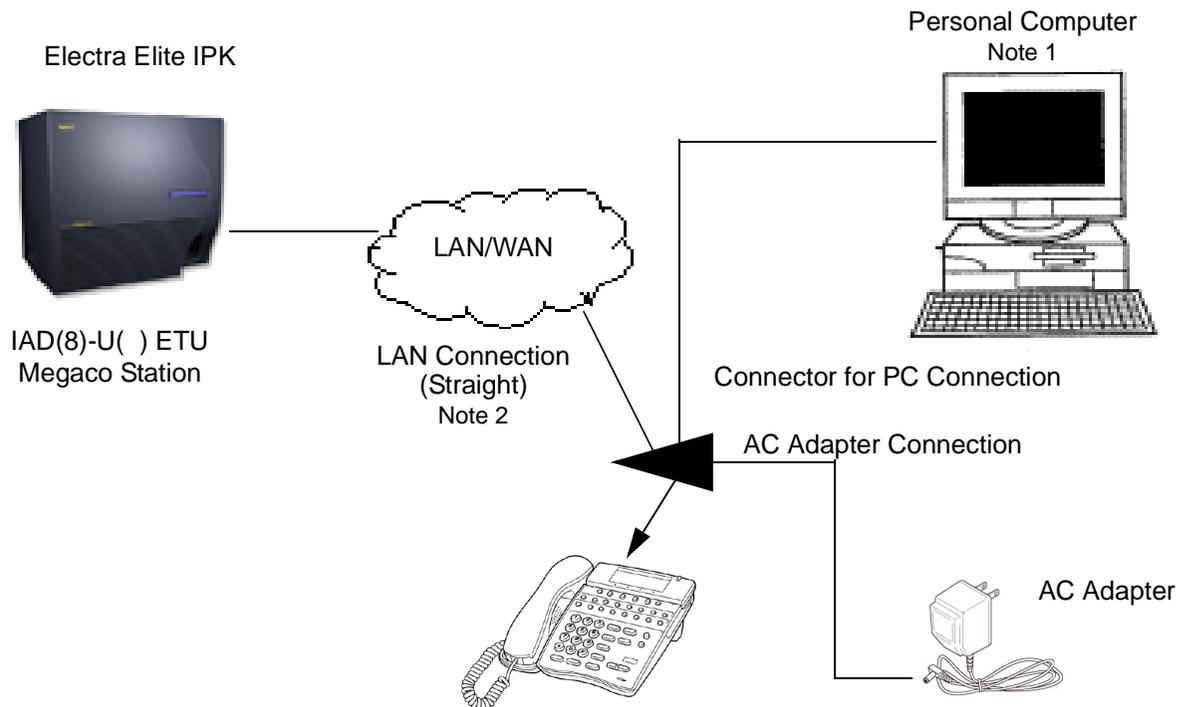
Note 1:   The IP-R(IPK) Unit is equipped with a switching Hub function, enabling connection to personal computers.

Note 2:   When using 10 Base-T, a straight cable category 3 or higher is required (maximum length 100 meters). When using 100 Base-TX, a straight cable category 5 or higher is required (maximum length 100 meters).

Figure 9-37 Connection Example

3.7.5   Quick Setup and Configuration Procedures

This section provides step-by-step procedures for setting up and configuring the IP-R(IPK) Unit.

1.   Connect the LAN port of the IP-R(IPK) Unit to the network and the PC port to an optional PC at your workstation. Plug in the AC-R Unit.

2.   The IP-R(IPK) Unit automatically attempts to locate the DHCP server when powered up. Wait until the server lookup times out, and *DHCP Server is Not Found* is displayed on the terminal, and then begin programming.

3.   Press (Hold), (Transfer), (✳), and (#) to enter the basic
        programming mode.

4.   The *Programming Menu* is displayed. Press (1) to display the
        Network Settings options. This enables you to configure IP
        settings for IP Terminals.

5.   Press (1) (DHCP mode is displayed). Press the
        corresponding digit (*1* or *2*) to enable or disable DHCP mode;
        then press the softkey that corresponds with *Set* on the LCD.

6.   When DHCP is not used (Static IP assignment), select **1**
        (Disable), then select *Set*, and proceed to step 7. When DHCP
        is used, select *2* (Enable - factory default) and proceed to step
        10.

7.   From the *Network Settings* option, press (2 ABC) and enter the IP
        Address (XXX.XXX.XXX.XXX); then press the softkey
        that corresponds with *Set* on the LCD.

8.   From the *Network Settings* option, press (3 DEF) and enter the
        Subnet Mask (XXX.XXX.XXX.XXX); then press the softkey that
        corresponds with *Set* on the LCD.

9.   From the *Network Settings* option, press (4 GHI) and enter the
        Router IP Address (XXX.XXX.XXX.XXX); then press the
        softkey that corresponds with *Set* on the LCD. To return to
        Programming Menu, press the softkey that corresponds with
        Prev on the LCD.

10.   Press (2 ABC) from the *Programming Menu* to access the MGC
        (Media Gateway Controller) IP Address and enter the IP
        Address for IAD(8)-U( ) or IPCA( )-U( ) ETU Megaco Station
        (XXX.XXX.XXX.XXX); then press the softkey that corresponds
        with *Set* on the LCD.

11.   Press (3 DEF) from the *Programming Menu* to access the
        Extension Number option. Enter the extension number and
        press the softkey that corresponds with *Set* on the LCD.

12.   The extension number is used to register the IP terminal with
        the IAD(8)-U( ) Megaco Station Card or IPCA( )-U( ) ETU.
        These settings must match the Electra Elite IPK Programming
        Station Number Assignment in Memory Block 4-10.   *This entry
        is required if DHCP mode is enabled.*

13.   Press ⑨(wxyz) from the *Programming Menu* to access *Advanced Settings* option.

14.   Select *3, DRS Settings*.

15.   Select *1, DRS Mode*, and *Disable this function*.

      ✎   This function must be Disabled prior to saving configuration.

16.   Select Save; the system stores the new configuration and performs a software reset.

17.   After the unit performs the software reset, the IP-R(IPK) Unit searches for the MGC. After the unit locates the MGC, the terminal LCD restores the system time and the softkeys for System, Station, Up, and Down are restored.

18.   The ITH 8D/16D-2 Telephone or the IP-R(IPK) Unit installed is now ready for operation.

3.8   *D^{term}* Voice Security Recorder

3.8.1   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 9-38 *D^{term}* Voice Security Recorder

3.8.2   Connection Configuration

The configuration connection is shown in Figure 9-39 VSR Connection Configuration.

3.8.3 Connectors

❍ One PC USB connector that provides power and streams all speech and control channel information to the host PC and desktop software.

❍ Two digital telephone line connections that passively tap across the D^{term} digital connection and "listen" in high impedance mode to the signaling on the line.

IPK KSU

VSR

D^{term} Telephone

USB

Computer
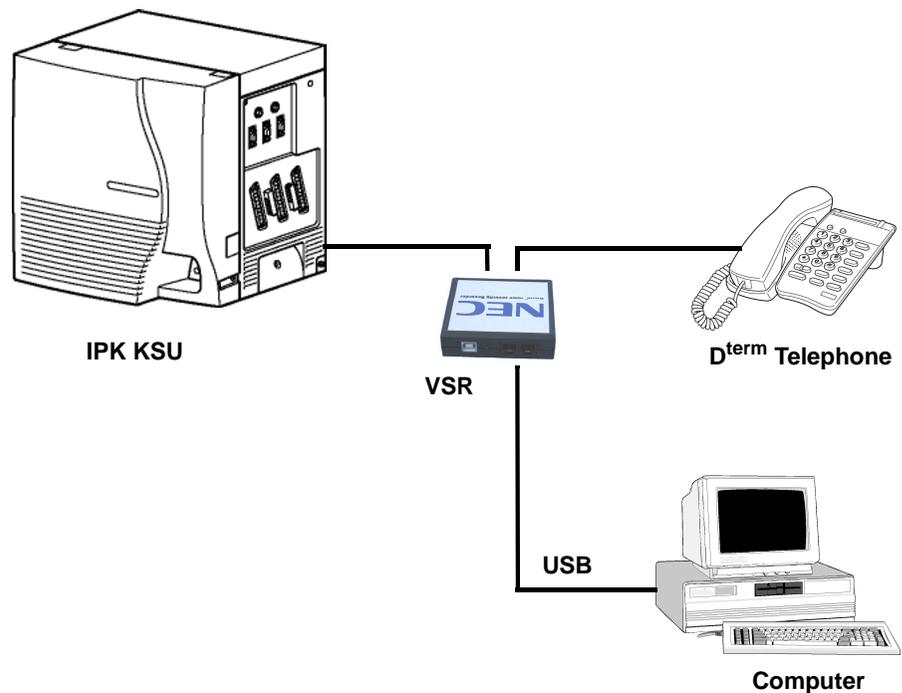
Figure 9-39 VSR Connection Configuration

3.8.4 Requirements for Installation

The VSR is packaged with everything necessary for installation including:

❍ Software CD

❍ USB Cable

❍ Telephone connection lead

❍ Quick-start installation manual

3.8.5   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.

3.8.6   Installation Procedures 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 9-40 Wizard Welcome Screen

4.   The next screen is displayed.
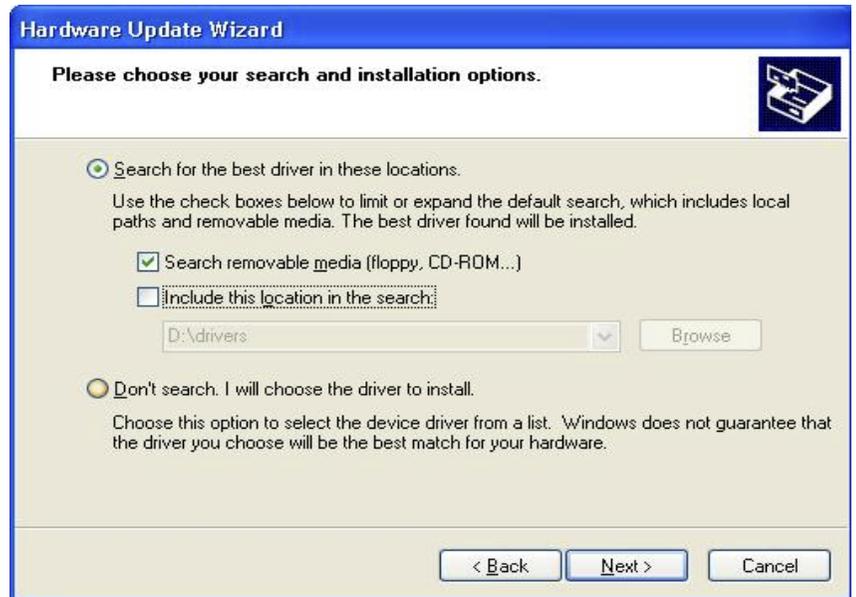
Figure 9-41 Search and Installation Options

5.   If files were 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 9-42 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 9-43 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 your telephone to the VSR ports, and you are ready to record.

3.8.7   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.**

3.8.8   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.
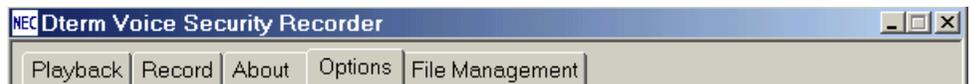
Figure 9-44 VSR User Interface Tab Options

3.8.9   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.
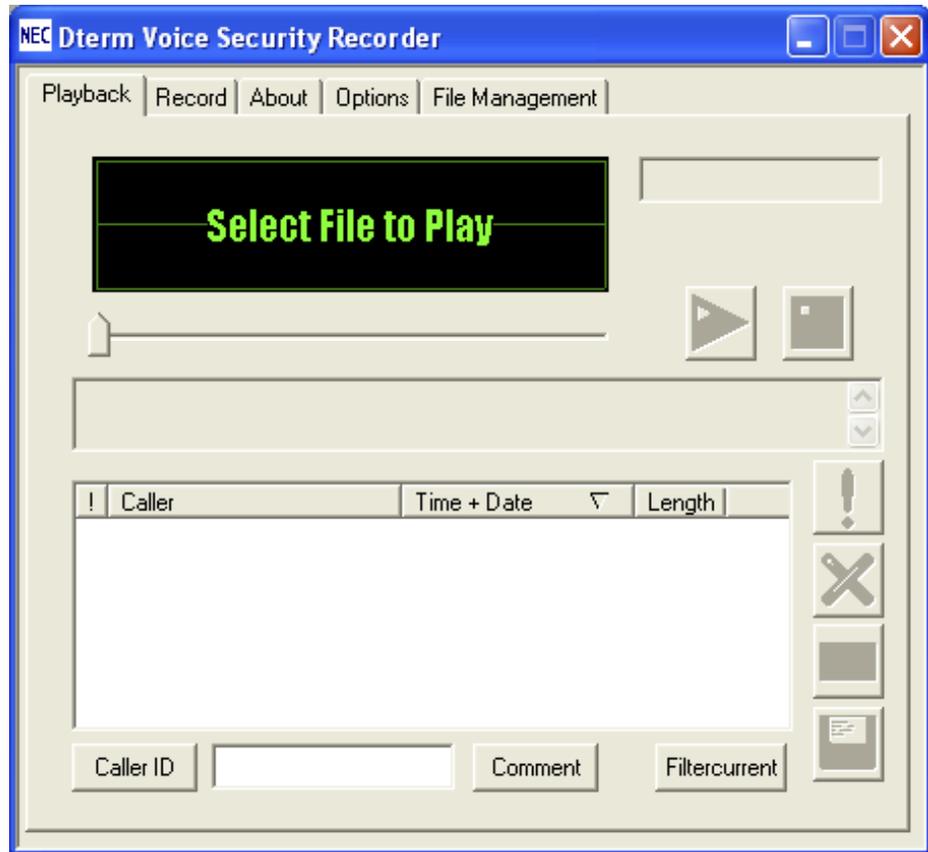
Figure 9-45 VSR Playback Tab
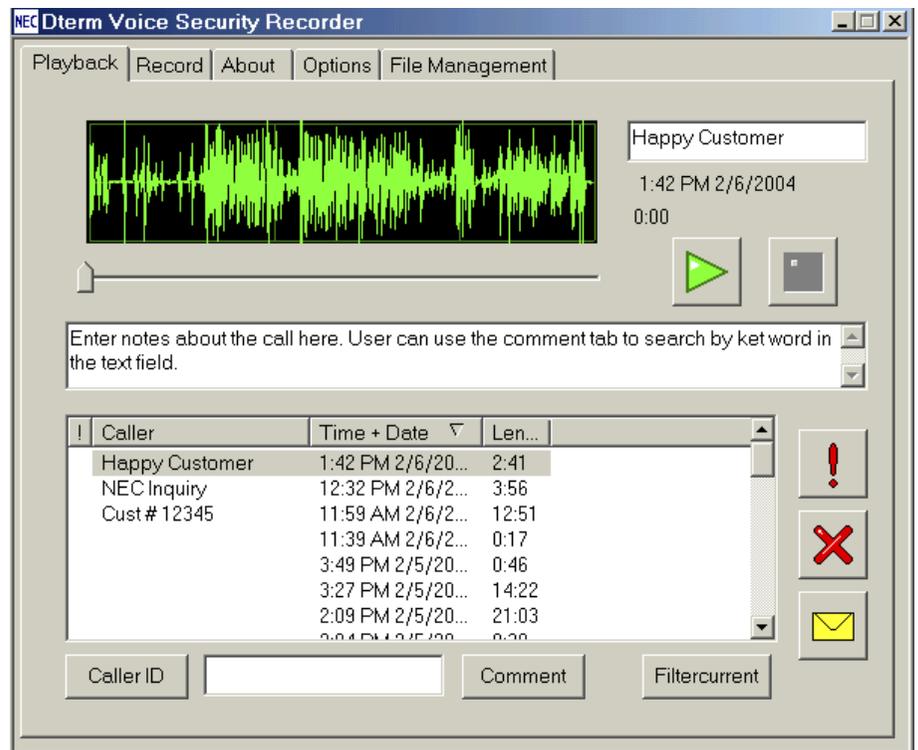
Figure 9-46 Caller ID or Comment Editor

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.

3.8.10   VRS Record Tab

This Tab allows the user to view recording levels and control the recording.

Figure 9-47 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 to allow an operator to quickly reply to an important part while continuing to record.

3.8.11   About Tab

This tab provides version and manufacturer information.
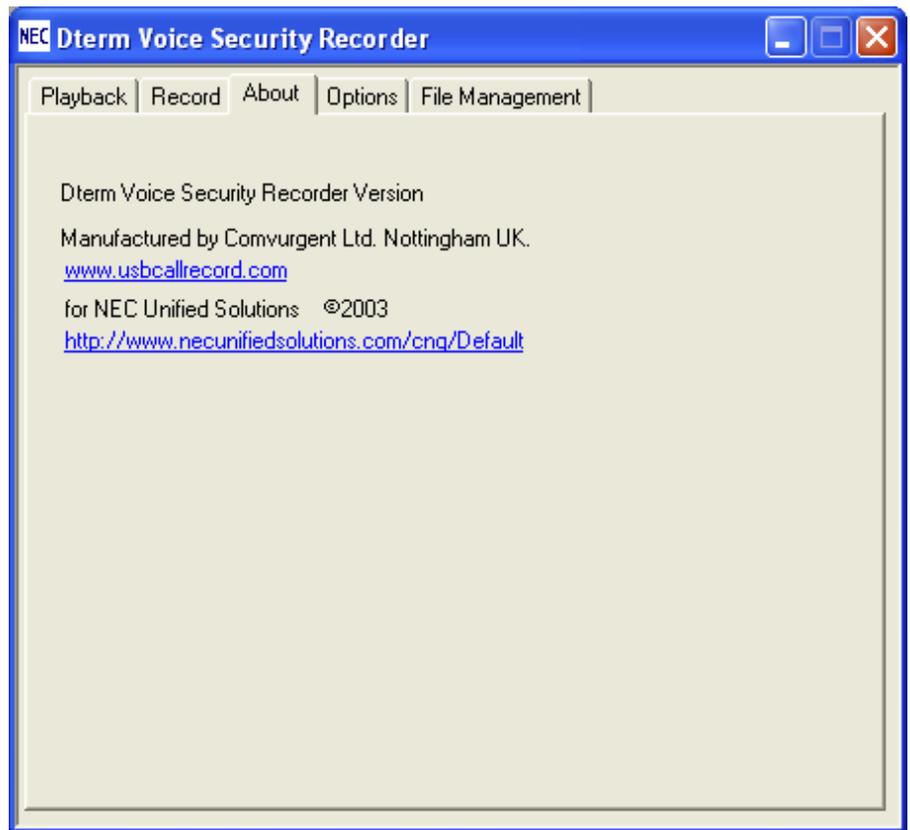
Figure 9-48 VRS About Tab

3.8.12   Options Tab

This Tab allows the user to select various setup options of the VSR.
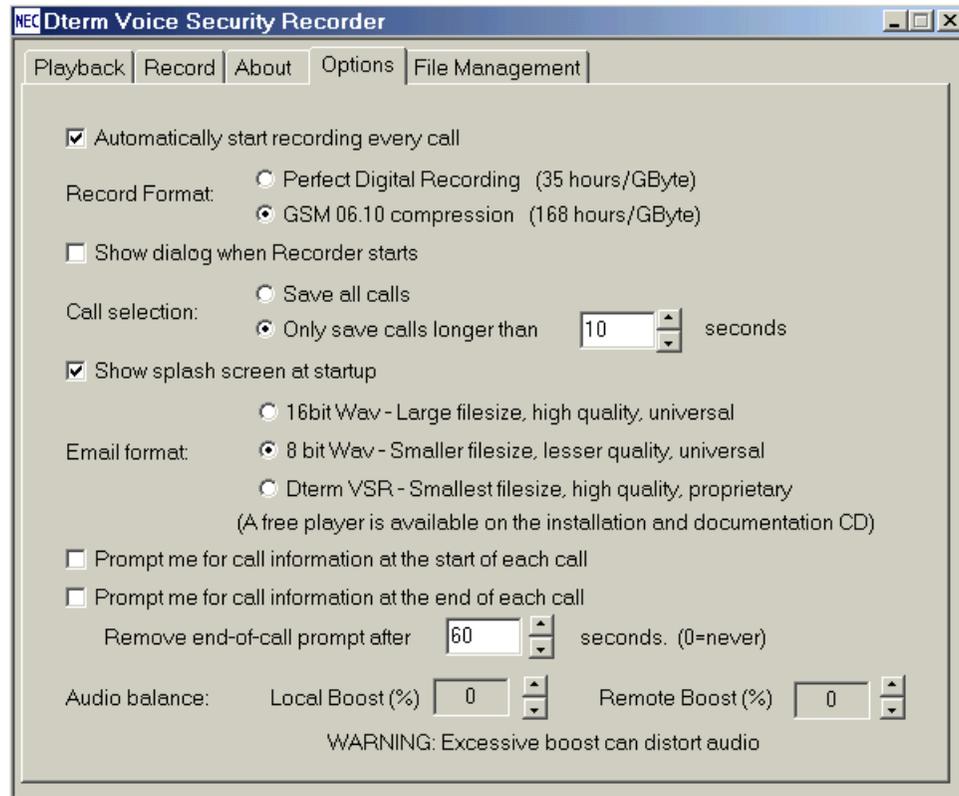
Figure 9-49 Select VSR Setup Options

❍   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 taken 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, the screen shown below is displayed to allow the user to manage calls at the point of completion. The user can save or erase the call, add notes, or mark important calls using the red key shown below.

Figure 9-50 Manage Calls at Completion

3.8.13   File Management Tab

File management is necessary when the user makes many telephone calls and stores each conversation. The selections are self-explanatory.
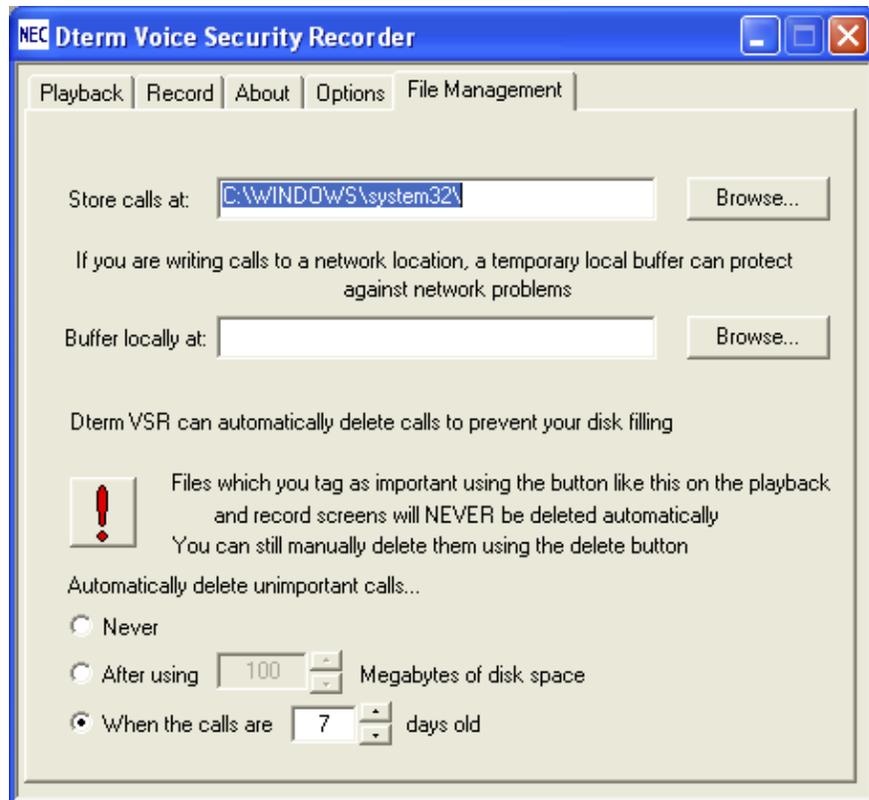
Figure 9-51 File Management Tab

3.8.14   Custom Program Settings

Comvurgent provides the dealer or user the option of making additional adjustments.
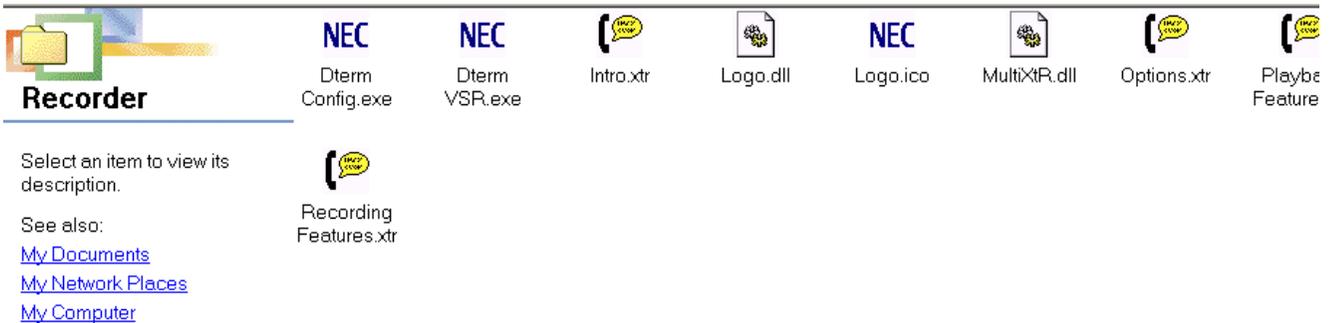
Figure 9-52 Comvurgent Options for Additional Adjustments

This special configuration program can only be accessed by browsing to the installation location (default C:\Program Files\Comvurgent\XtRecorder), and then click on the NEC Dterm Config.exe.

✎   The customer takes all responsibility to ensure they meet legal requirements Comvurgent 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 as shown in Figure 9-53 Customizing Application to Meet Requirements.
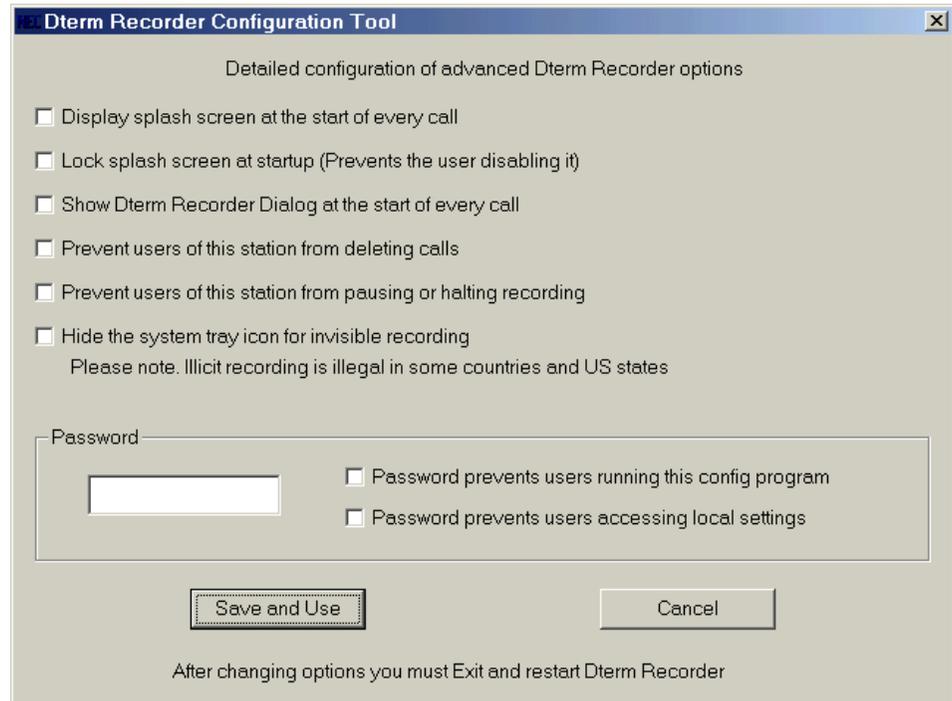
Figure 9-53 Customizing Application to Meet Requirements

❍   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.

❍   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 red when recording.

❍   Password

     Locks access to these settings and those at the user level.

✎   When making changes, the application must be closed and started
     again to become effective.

3.9   Installing Add on Module (ADM)

The D16(LD)-R ADM creates a 16 button Phonebook directory. The interface for this unit shown in Figure 9-54 ADM Interface Unit is connected in the right adapter connector for the applicable multiline terminal.   When another adapter needs to be added, this interface must be moved to the left adapter connector to preserve the cable integrity.
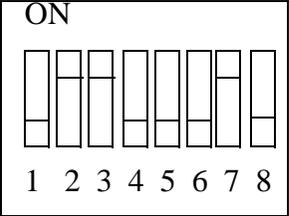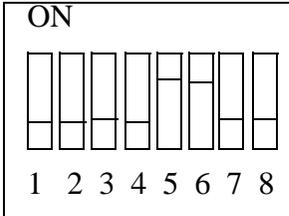
**DSW1
Position**

DSW1

ON

1 2 3 4 5 6 7 8
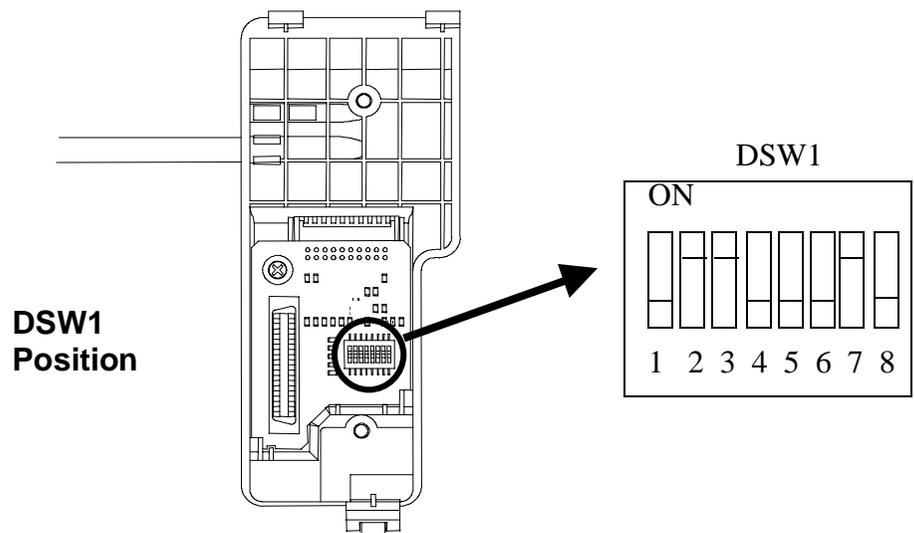
Figure 9-54 ADM Interface Unit

3.9.1   Connecting the Interface Unit:

1.   Set DSW1 to the pattern for the applicable multiline terminal as shown in Table 9-6 DSW1 Switch Positions on the next page.

2.   Place the ADM and multiline terminal upside down and remove the Base Units.

Table 9-6 DSW1 Switch Positions

Series	Keyset Name	DSW1 Switch Positions
D^{term} Series i	DTR/H-(8)/(16)D-2( ) TEL DTR/H -16LD-2( ) TEL DTR/H-16D(BL)-2( ) TEL	
D^{term} IP	ITR/H-(*8)/(16)-2( ) TEL	
	ITR/H(8)/(16)-3 ( ) TEL ITR/H-16LD-3( ) TEL	
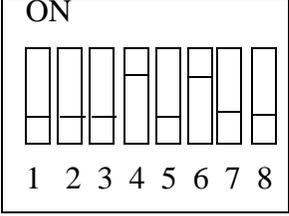
3.   Plug the interface unit into the right adapter connection as
     shown on Figure 9-55 ADM and Multiline Terminal with Base
     Covers Removed on the next page.
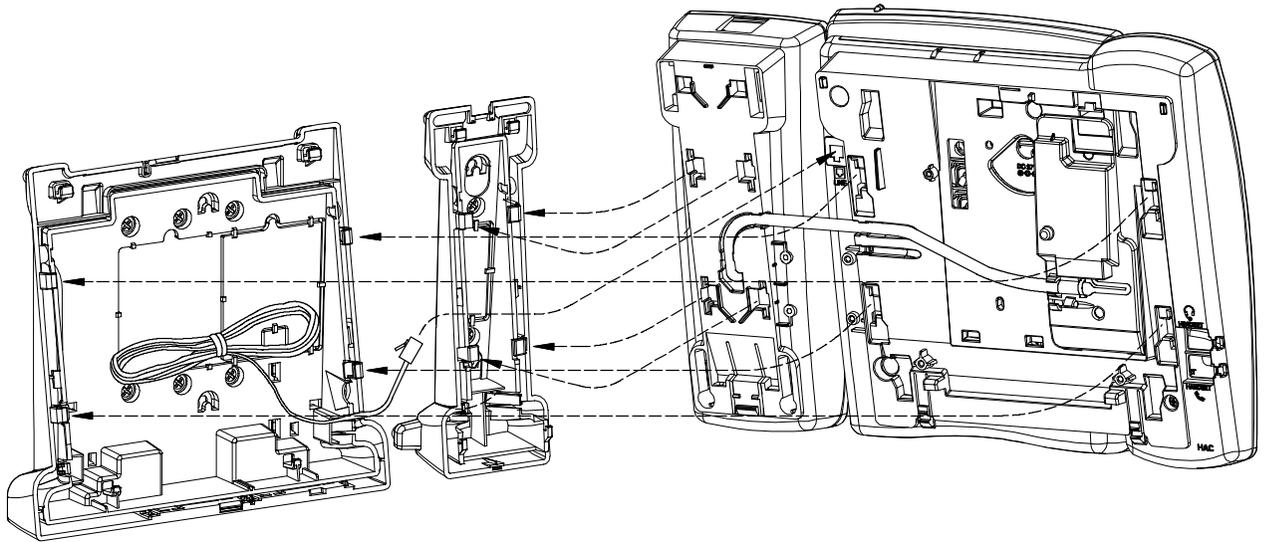
Figure 9-55 ADM and Multiline Terminal with Base Covers Removed

4. Place the interface unit cable in the cable channels on the ADM and multiline terminal.

5. Install the connector plate provided with the ADM as shown in on the next page.

   ✎   The connector plate cannot be used with Inaset terminals.
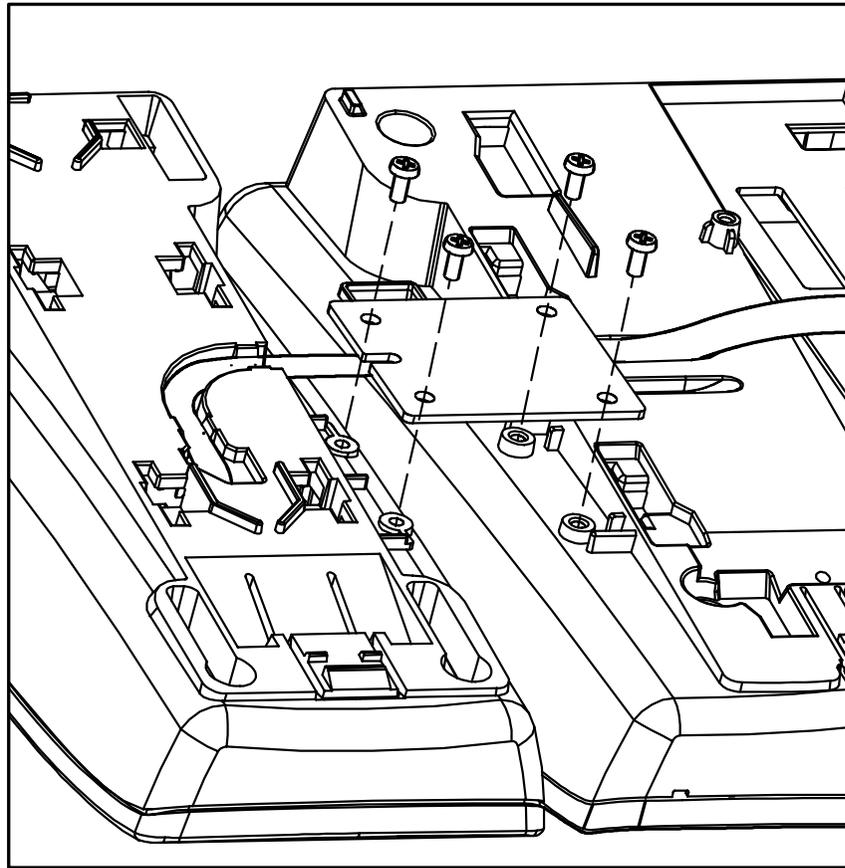
Figure 9-56 Installing the Connector Plate

6.   Replace the base units as shown in Figure 9-55 ADM and Multiline Terminal with Base Covers Removed.

3.9.2   Wall Mounting ADM and Multiline Terminal

1.   Remove both Base Units.

2.   Remove the Multiline Terminal Base Unit cutout shown in Figure 9-57 Installing Base Units on the Wall.

3.   Install the base units on the wall using the eight screws.

4.   Install the ADM and Multiline Terminal as shown on Figure 9-55 ADM and Multiline Terminal with Base Covers Removed.
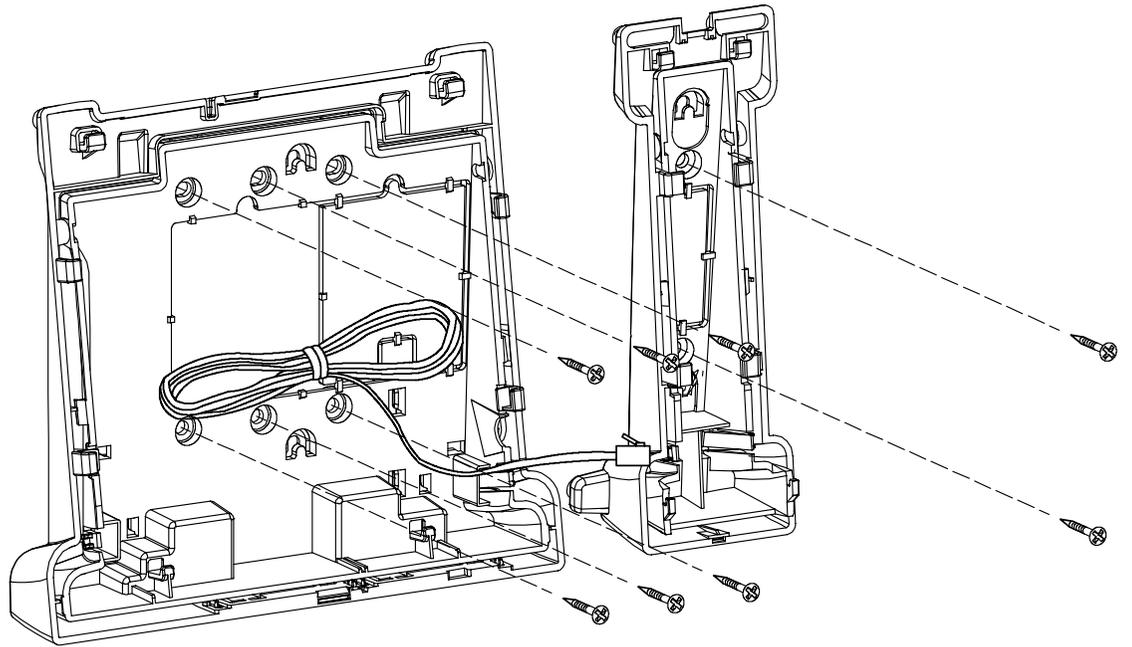
Figure 9-57 Installing Base Units on the Wall

3.10   NEC Conference Max™

3.10.1   Description

This expandable conferencing telephone provides premium, full-duplex audio to small conference rooms as a single unit or to larger rooms when expanded by up to three units that also expand microphone access and loudspeaker coverage with even distribution of sound.
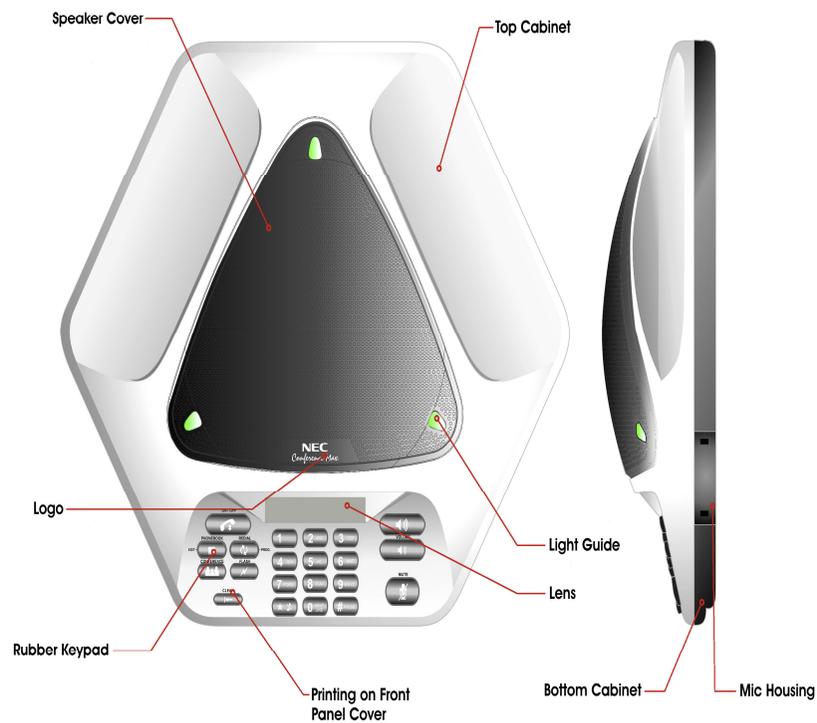

Figure 9-58 NEC Conference Max™

3.10.2   Installation

1.   Connect the provided 25' Cat. 5 cable between the LINK OUT jack of the base unit and the LINK IN jack of the conferencing pod.

2.   Connect the provided RJ-11 cable between the base unit and the telephone jack.

3.   Connect the power cord to the base unit and plug it in an electrical outlet.

4.   To connect additional units, connect a 12' Cat. 5 cable between the LINK OUT jack of the unit connected to the base unit and the LINK IN jack of the second unit and repeat the connection of another 12' Cat. 5 cable between the LINK OUT jack of each unit to the LINK IN of the next unit in sequence.

3.10.3   Keypad Functions

Refer to Table 9-7 Keypad Functions.

Table 9-7 Keypad Functions

Key	Function
ON/OFF key (telephone icon)	Press to activate the telephone and access dial tone. Press again to hang up and return to standby mode.
PHONEBOOK (book icon)	Press to dial stored numbers. Press and hold two seconds to enter Phonebook Edit mode.
REDIAL (circular arrow icon)	Press once to dial the last number called. Press and hold two seconds to enter Program mode.
CONFERENCE (three person icon)	Press to dial the conferencing service provider. This feature must be programmed.
FLASH (lightning flash icon)	Press to enable call forwarding, call waiting, or three-way calling when supported by telephone service.
CLEAR (vertical line and left arrow icon)	Press to clear the last digit entered or press and hold to clear all numbers. Press to exit programming mode.
VOLUME (loud and dim speaker icons)	Press during call to adjust call volume or press while telephone is ringing or in standby mode to adjust ringer volume.
MUTE (mike with diagonal line icon)	

3.10.4   Programming Options

To enter Programming mode, press and hold REDIAL until a diamond arrow is displayed on the LCD. Then press the applicable key and follow the instruction in Table 9-8 Programming Options.

Table 9-8 Programming Options

Menu Option	Key	Programming
Ringer Melody	1	Press REDIAL. The current melody selection flashes. Press 1~5 to change melody. Press REDIAL to save the selection.
Dialing Mode	2	Press REDIAL. The current dialing selection flashes. Press 1 for tone or 2 for pulse. Press REDIAL to save the selection.
Flash Duration	3	Press REDIAL. The current duration flashes. Press 1~5 to select duration as follows: 1 = 600 ms 2 = 300 ms 3 = 150 ms 4 = 100 ms 5 = 80 ms Press REDIAL to save the selection.
Local Number✱	4	Press REDIAL. Enter the telephone number that you want displayed on the LCD in standby mode. Press REDIAL to save the number.
Conference✱	5	Press REDIAL. Enter the telephone number you want the conference key to dial. Press REDIAL to save the number.
Service✱	6	Press REDIAL. Enter the telephone number you want the O key to dial. Press REDIAL to save the number.
Country	7	Press REDIAL. Press number key for country as follows: 1 US/Canada/China/Japan/Mexico/Singapore 2 Europe CTR 21 3 Australia 4 S. Africa 5 Brazil 6 New Zealand 7 South Korea Press REDIAL to save the country setting.

CLEAR   Press to return the previous menu.
            Press and hold to exit programming without saving changes.

✱   Press and hold 1 to enter hyphen or ✱ to enter a space in the number.
        Press CLEAR before entering a new number.

3.10.5   Compliance

This product is in compliance with the following regulations and requirements:

❍   FCC Part 15/ICES-003

This product has been tested and complies with the limits for a Class A digital device

❍   FCC Part 68

US:FBIMT01B910158015 Ringer Equivalence Number (REN):0.1B(ac)

❍   Industry of Canada (IC)

IC: 1970A-158015: REN:0.1B(ac)

❍   European

Council Directive 1999/5/EC

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Installing Electra Elite Multiline Terminals

CHAPTER 10

SECTION 1   GENERAL INFORMATION

The Electra Elite IPK system provides several Electra Elite Multiline Terminals, an Attendant Console, and several adapters that attach peripheral equipment to the Multiline Terminals. The adapters can be used with D^{term} Series E Multiline Terminals also. 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.

Basic Port Package

A maximum of 31 DTP-2DT-1 TELs can be installed. The combined total of all Electra Elite Multiline Terminals that can be installed is 32.

Expanded Port Package

A maximum of 119 DTP-2DT-1 TELs can be installed. The combined total of all Electra Elite Multiline Terminals that can be installed is 120.

Figure 10-1 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), 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(S), or HFU-U.

The DTP-8-1 TEL is comparable and can also be used with the Electra Elite IPK system.

Basic Port Package

A maximum of 31 DTU-8-1/DTP-8-1 TELs can be installed. The combined total of all Electra Elite Multiline Terminals that can be installed is 32.

Expanded Port Package

A maximum of 119 DTU-8-1/DTP-8-1 TELs can be installed. The combined total of all Electra Elite Multiline Terminals that can be installed is 120.

Figure 10-2   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), 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(S), or HFU-U.
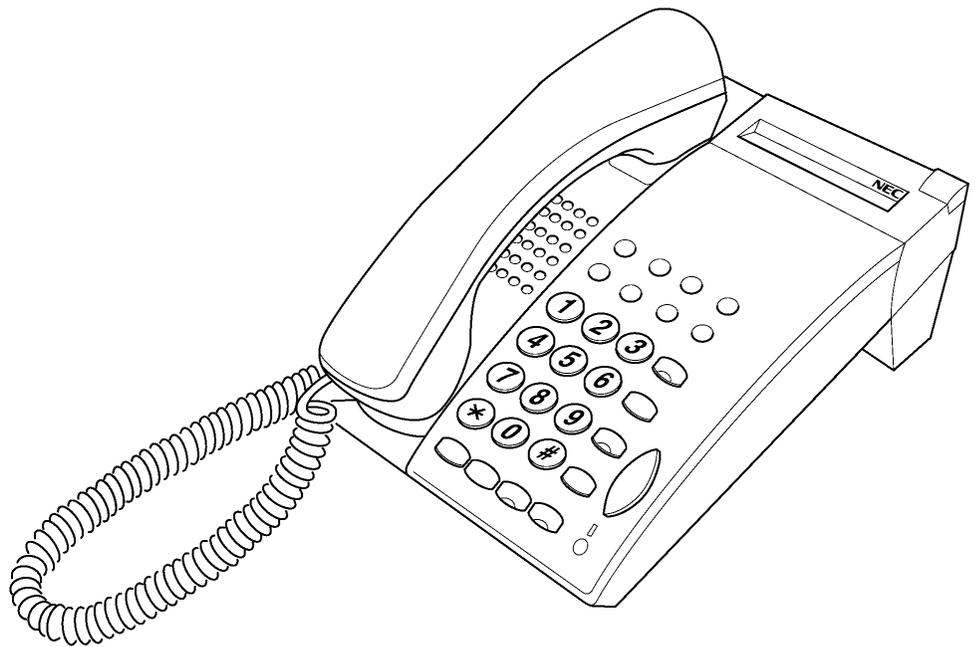
This terminal also has a 3-line, 24-character, adjustable Liquid Crystal Display (LCD) and four softkeys.

The DTP-8D-1 TEL is comparable and can also be used with the Electra Elite IPK system.

Basic Port Package

A maximum of 32 DTU-8D-2/DTP-8D-1 TELs can be installed. The combined total of all Electra Elite Multiline Terminals that can be installed is 32.

Expanded Port Package

A maximum of 120 DTU-8D-2/DTP-8D-1 TELs can be installed. The combined total of all Electra Elite Multiline Terminals that can be installed is 120.
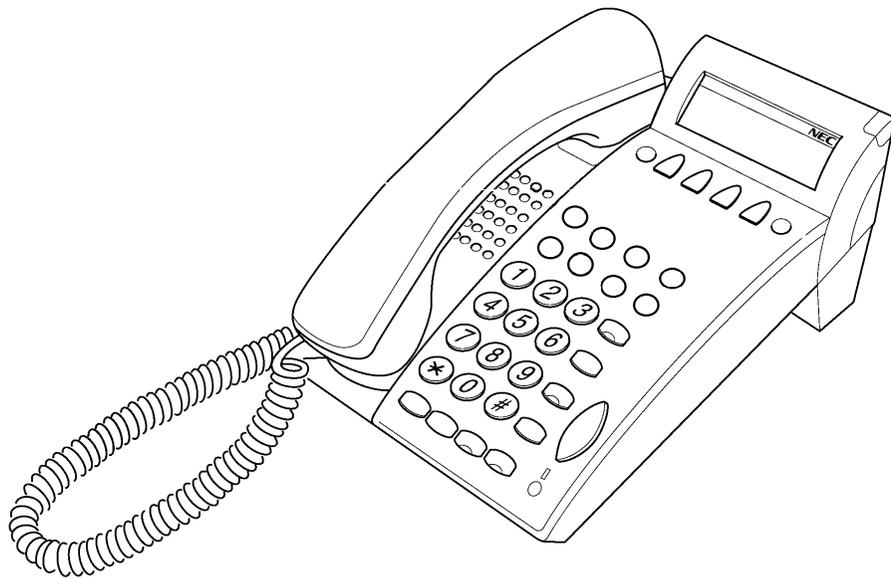
Figure 10-3 DTU-8D-2 TEL Multiline Terminal

2.4   DTU-16-1 TEL

This digital nondisplay Multiline Terminal has 16 programmable line keys (each with a 2-color LED), 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(S) or HFU-U Unit.

The DTP-16-1 TEL is comparable and can also be used with the Electra Elite IPK system.

Basic Port Package

A maximum of 31 DTU-16-1/DTP-16-1 TELs can be installed. The combined total of all Electra Elite Multiline Terminals that can be installed is 32.

Expanded Port Package

A maximum of 119 DTU-16-1/DTP-16-1 TELs can be installed. The combined total of all Electra Elite Multiline Terminals that can be installed is 120.

Figure 10-4 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), 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(S), or HFU-U.

This terminal also has a 3-line, 24-character, adjustable Liquid Crystal Display (LCD) and four softkeys.

The DTP-16D-1 TEL is comparable and can also be used with the Electra Elite IPK system.

Basic Port Package

A maximum of 32 DTU-16D-2/DTP-16D-1 TELs can be installed. The combined total of all Electra Elite Multiline Terminals that can be installed is 32.

Expanded Port Package

A maximum of 120 DTU-16D-2/DTP-16D-1 TELs can be installed. The combined total of all Electra Elite Multiline Terminals that can be installed is 120.

Figure 10-5   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, 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(S), or HFU-U.

System software can be changed so this Multiline Terminal can have 24 programmable line keys and 8 one-touch keys.

The DTP-32-1 TEL, is comparable and can also be used with the Electra Elite IPK system.

Basic Port Package

A maximum of 31 DTU-32-1/DTP-32-1 TELs can be installed. The combined total of all Electra Elite Multiline Terminals that can be installed is 32.

Expanded Port Package

A maximum of 119 DTU-32-1/DTP-32-1 TELs can be installed. The combined total of all Electra Elite Multiline Terminals that can be installed is 120.

Figure 10-6 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, 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(S), or HFU-U.

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 IPK system.

Basic Port Package

A maximum of 32 DTU-32D-2/DTP-32D-1 TELs can be installed. The combined total of all Electra Elite Multiline Terminals that can be installed is 32.

Expanded Port Package

A maximum of 120 DTU-32D-2/DTP-32D-1 TELs can be installed. The combined total of all Electra Elite Multiline Terminals that can be installed is 120.
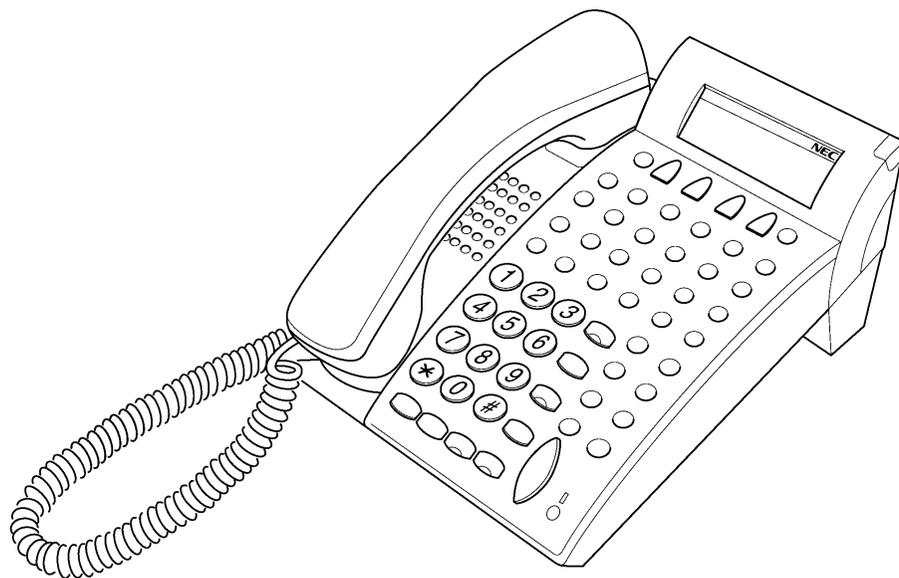

Figure 10-7 DTU-32D-2 TEL Multiline Terminal

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.

Basic Port Package and *Expanded Port Package*

A maximum of four DCU-60-1 CONSOLEs can be installed in an any Electra Elite IPK system. An Attendant Position can have four associated DCU-60-1 CONSOLEs.
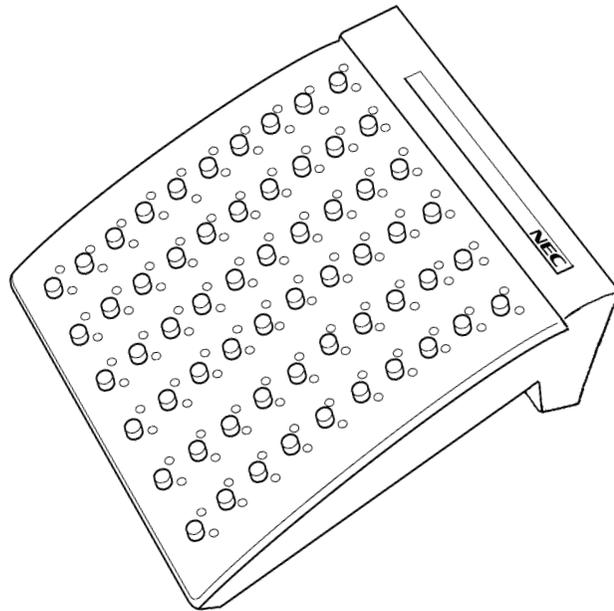
Figure 10-8 DCU-60-1 CONSOLE

SECTION 3   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 IPK 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.
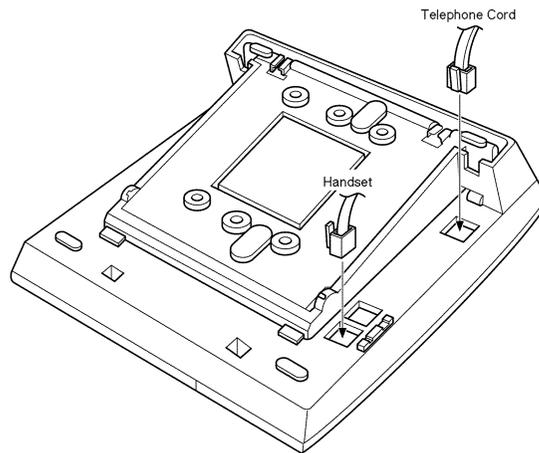
Figure 10-9 Connecting a Multiline Terminal to the System

2.   Lead the telephone and handset cords through the appropriate grooves.
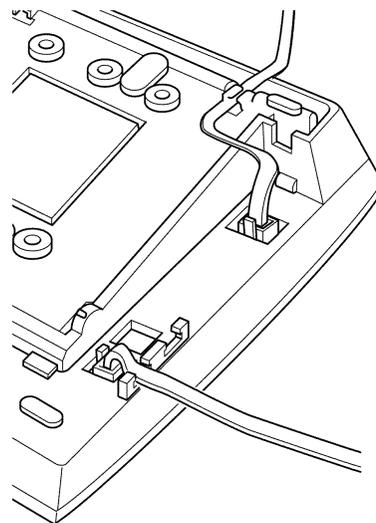
Figure 10-10 Leading Line Cords on a Multiline Terminal

SECTION 4   CONNECTING 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.

Line Cord Jack
AC Adapter Plug
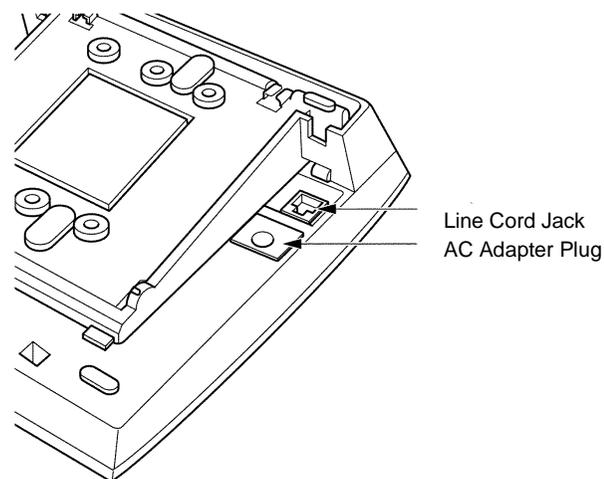
Figure 10-11   Connecting the Line Cord and AC Adapter when Installing a DCU Attendant Console

4.   When the Attendant Console and the Multiline Terminal are properly connected, they sit side-by-side as shown in Figure 10-12 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.
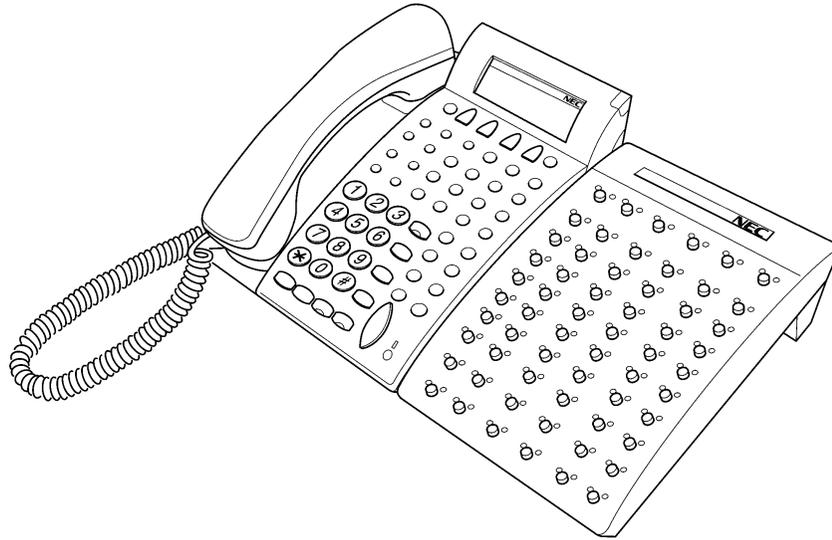
Figure 10-12 DCU Attendant Console and Multiline Terminal

SECTION 5 ADJUSTING THE DTU/DTP LCD

Electra Elite IPK display Multiline Terminals have an adjustable Liquid Crystal Display (LCD). The LCD can be adjusted by pushing down or pulling up as desired.
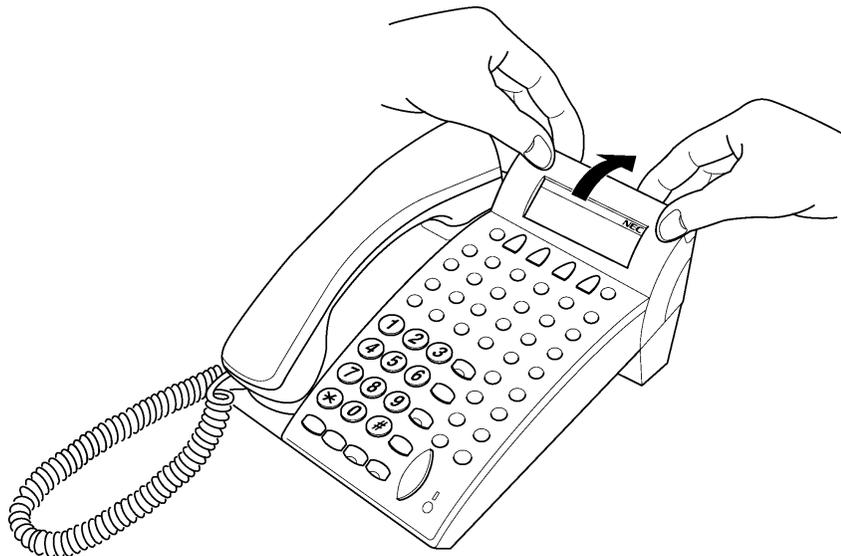
Figure 10-13 Adjusting the DTU/DTP LCD

SECTION 6   INSTALLING DTU/DTP LINE CARDS AND PLASTIC PANELS
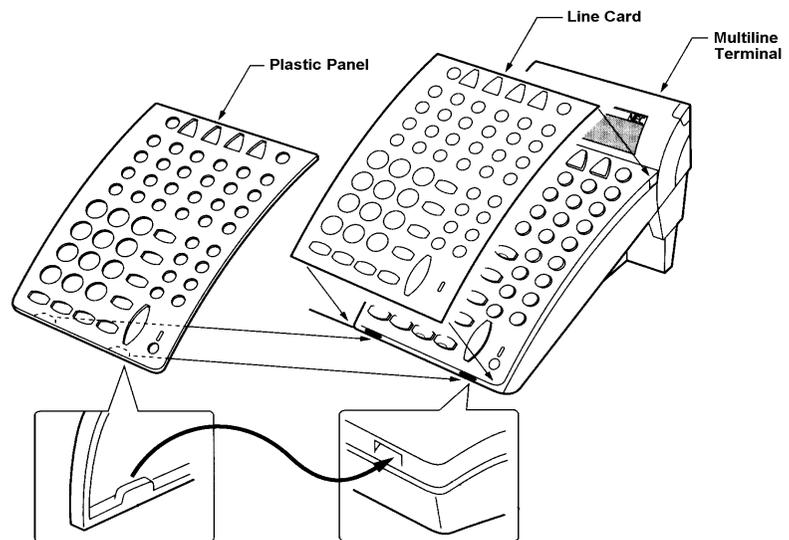
6.1   Line Card and Plastic Panel Installation

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 10-15 Installing Plastic Panel on a DTU/DTP Multiline Terminal.

Figure 10-14   Installing Line Card and Plastic Panel on a DTU/DTP Multiline Terminal
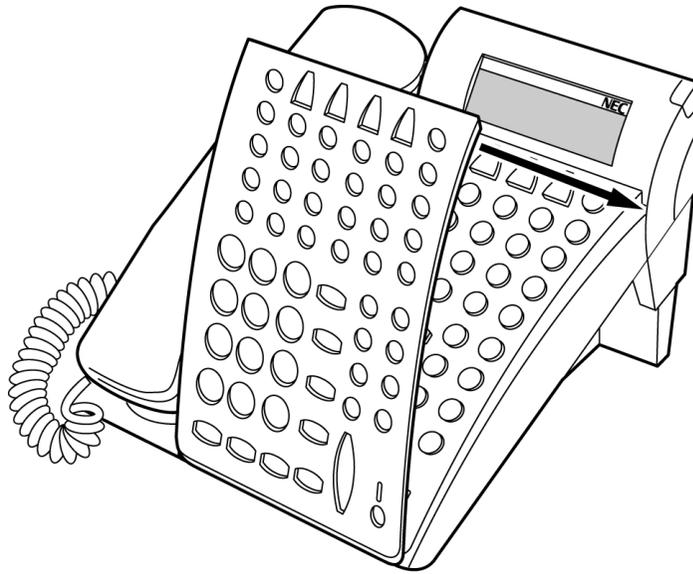
Figure 10-15 Installing Plastic Panel on a DTU/DTP Multiline Terminal

6.2   Plastic Panel Removal

Lift the right corner, raise the panel, and slide the bottom away from the Multiline Terminal.

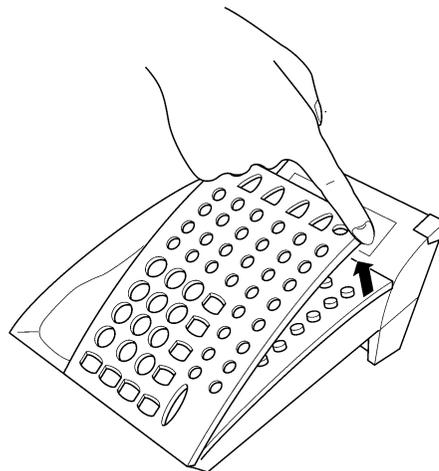**Never pull on the bottom of the plastic panel to remove it; the plastic panel could be damaged.**

Figure 10-16 Removing the Plastic Panel from the DTU/DTP Multiline Terminal

SECTION 7   REMOVING DTU/DTP SOFTKEYS

When 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 10-17 Removing DTU/DTP Softkeys.
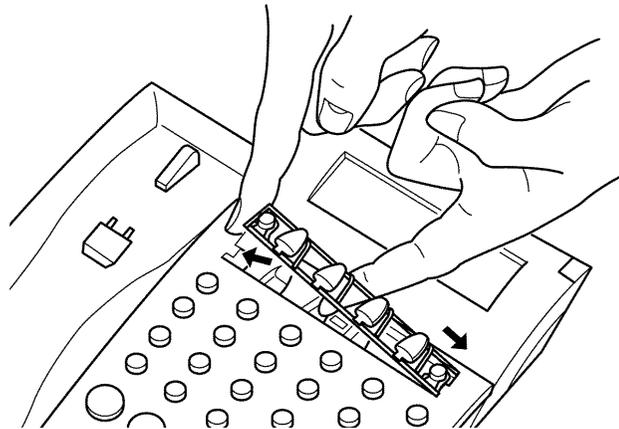
Figure 10-17 Removing DTU/DTP Softkeys

SECTION 8   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 10-18 Locating the Adjustment Tabs on the DTU/DTP Multiline Terminal.
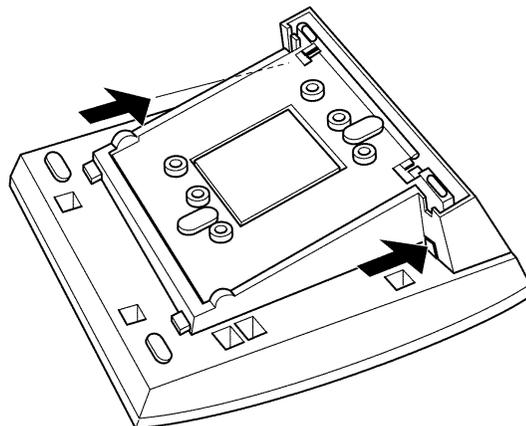
Figure 10-18 Locating the Adjustment Tabs on the DTU/DTP Multiline Terminal

2.   Push the adjustment tabs and raise the base plate until it locks.
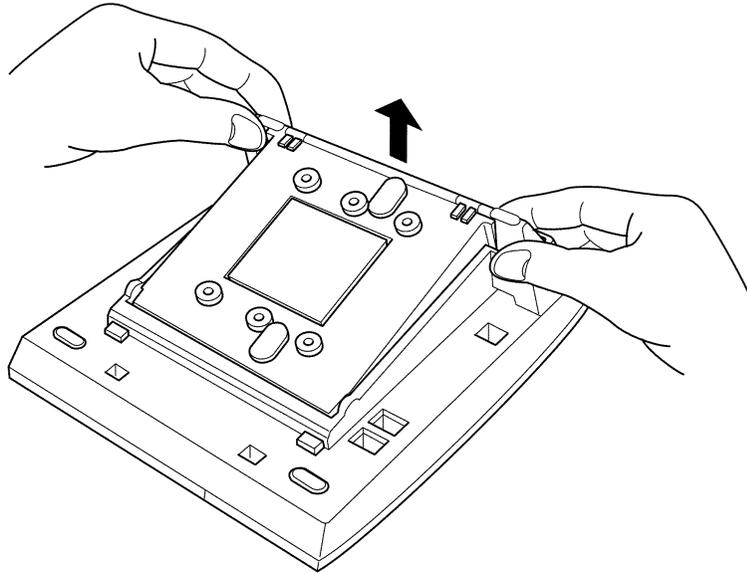
Figure 10-19 Raising the Base Plate on the DTU/DTP Multiline Terminal

3.   The length of the cord can be adjusted by pulling the line cord though the groove in the bottom of the Multiline Terminal.
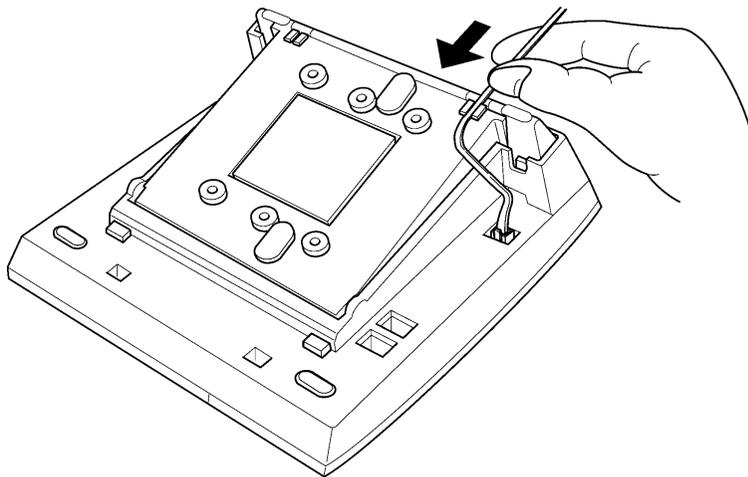
Figure 10-20 Adjusting the Line Cord Length

4. To lower the base plate on the Multiline Terminal, push on the adjustment tabs and push the base plate downward.

Tab
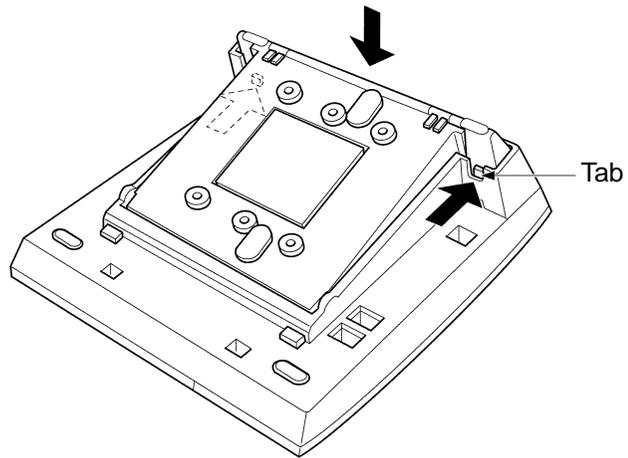
Figure 10-21 Lowering the Base Plate on the Multiline Terminal

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Installing Electra Elite
Optional Terminal Equipment CHAPTER 11

SECTION 1   GENERAL INFORMATION

The Electra Elite optional 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. The adapters can also be used with D^{term} Series E (DTP) Multiline Terminals.

A Multiline Terminal can have up to three adapters installed at the same time. When attaching an APR-U, CTA-U, CTU(S)-U, or HFU-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 terminal, 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 11-1 Raising the Base Plate, and raise the inner area of the base plate.
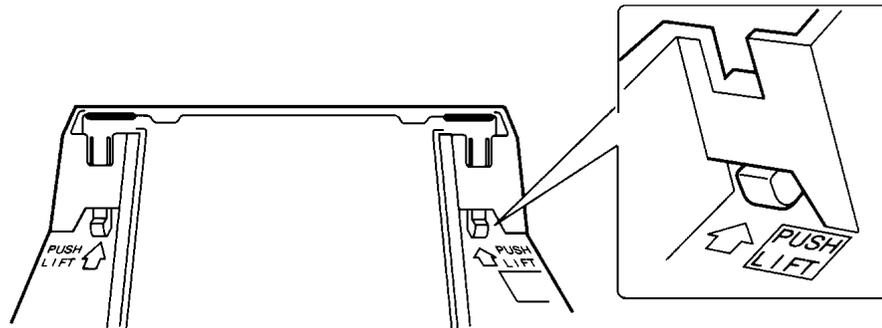
Figure 11-1 Raising the Base Plate

3.   Insert a flat head screwdriver into A in Figure 11-2 Unlocking Tab and press
      straight down until tab unlocks.
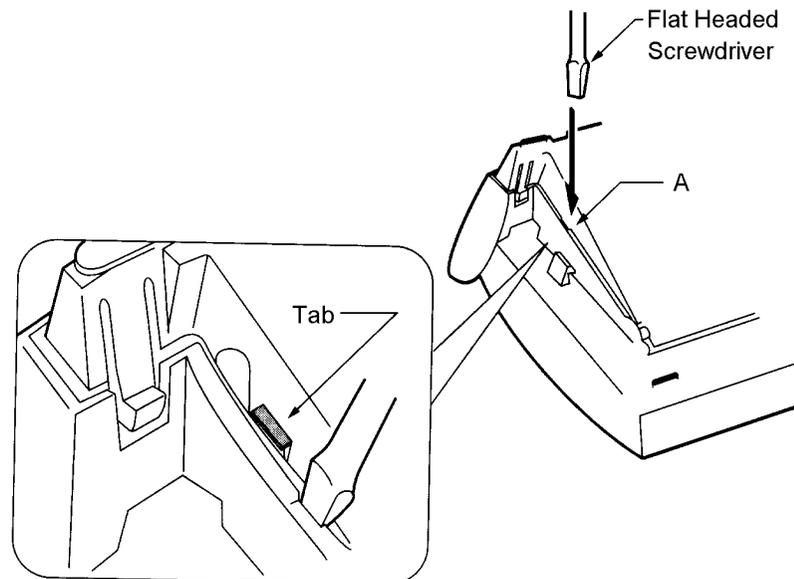
Figure 11-2 Unlocking Tab

4.   Lightly press the right side of leg shown as B in Figure 11-3 Releasing Right
      Tab, insert a flat head screwdriver at C. Press straight down until other tab
      unlocks.

Flat Headed Screwdriver

C

B
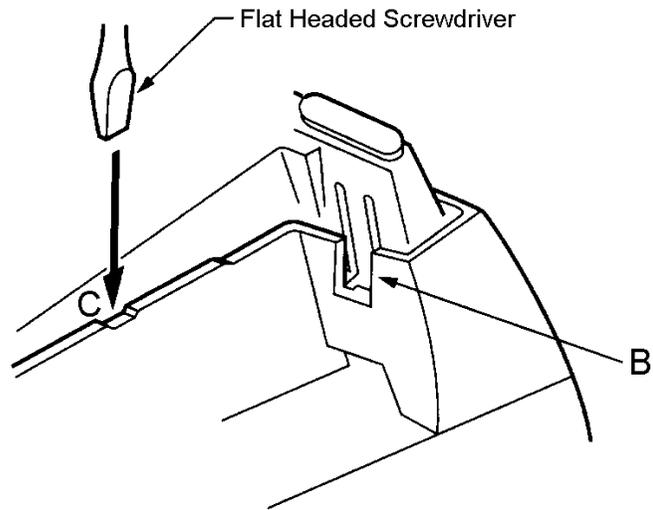
Figure 11-3 Releasing Right Tab

5.   Open and remove the bottom cover by rotating counterclockwise as shown in
       Figure 11-4 Removing Bottom Cover.
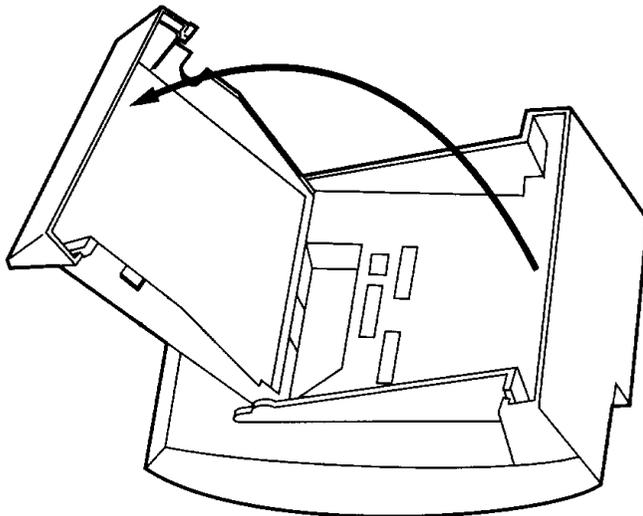
Figure 11-4 Removing Bottom Cover

6. When an adapter is being installed, press tabs A and B to remove the dummy end from the base plate as shown in Figure 11-5 Removing Base Plate Dummy End.
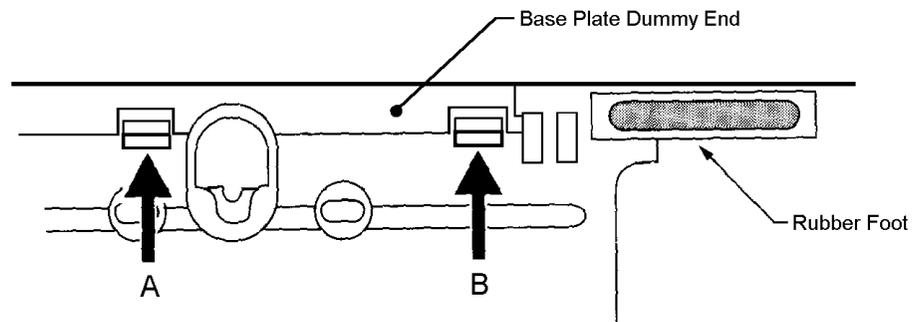
Figure 11-5 Removing Base Plate Dummy End

7. Cut the dummy end in half as shown in Figure 11-6 Cutting Dummy End in Half.
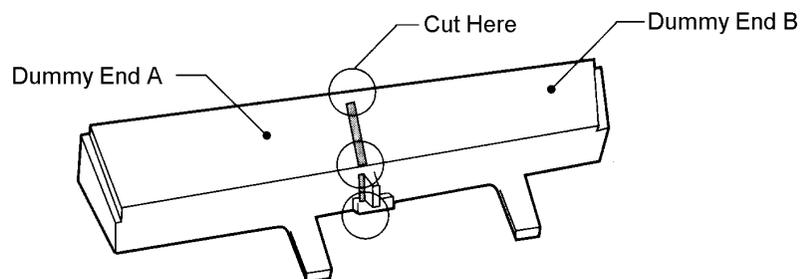
Figure 11-6 Cutting Dummy End in Half

8. When the adapter is installed in connector 1 as shown in Figure 11-7 Installing Adapter in Connector 1, Install the dummy end B as shown in Figure 11-8 Installing Dummy End B.
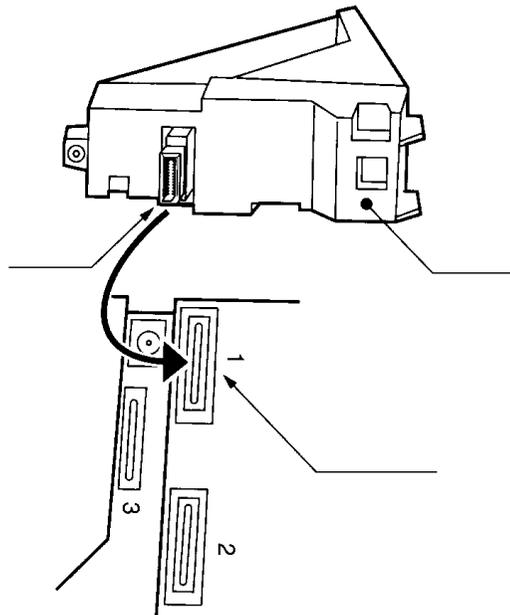
Figure 11-7 Installing Adapter in Connector 1
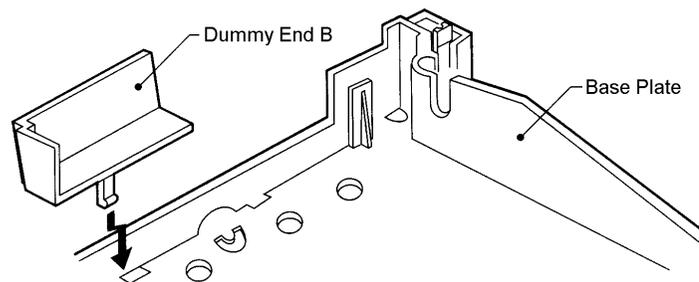
Figure 11-8 Installing Dummy End B

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 connects to one of the following adapters installed on a Multiline Terminal: APR-U Unit, CTA-U Unit, CTU(S)-U Unit or HFU-U Unit. 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: 120 Vac, 60 Hz, 30W

❑ Output: 24 Vdc, 750 mA

❑ Polarity: ⊖———————◦>—————⊕

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.

AC Adapter Plug
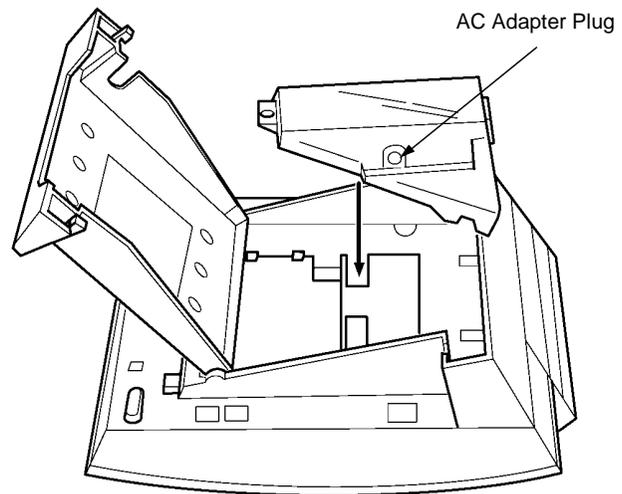
Figure 11-9 ACA-U Unit Connection

3.2   ADA-U Unit (Ancillary Device Adapter)

Ancillary Device Adapters allow connection of a tape recorder to all DTU/DTP 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.
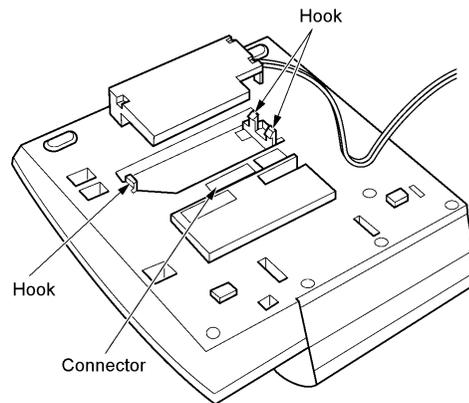
Figure 11-10 Attaching the ADA-U Unit to the Multiline Terminal

4.   Replace base plate.

5.   Lead the audio cable out through the groove on the base cover.
      Connect the telephone cord.

6.   Connect the Telephone cord.
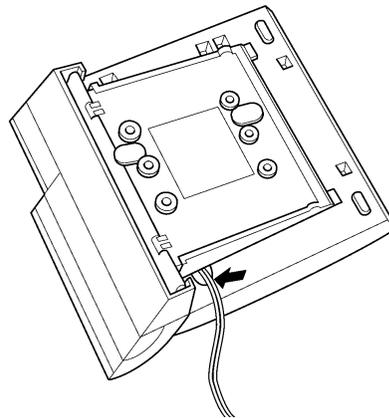
Figure 11-11 Leading the Audio Cable out from the ADA-U Unit

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 on this unit before installing the unit on the Multiline Terminal.
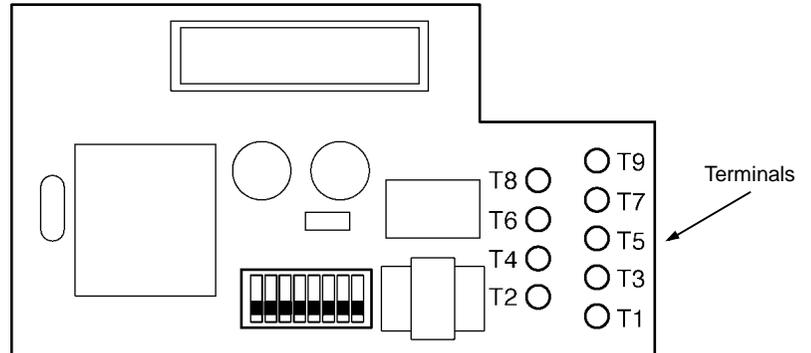
Figure 11-12 ADA-U Unit

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 11-12 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 11-13 Attaching Cables to the ADA-U Unit.
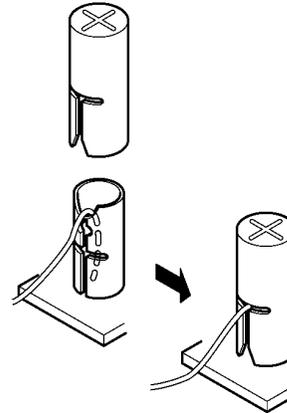
Figure 11-13 Attaching Cables to the ADA-U Unit

4.   Insulate the end of the cable that needs to be shielded with insulating tape.

Table 11-1 ADA-U Cable Connections provides a list of cable connections to ADA-U ADP terminals and describes the specifications for the terminals.

Table 11-1 ADA-U 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 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.

(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 |

Table 11-1 ADA-U Cable Connections (Continued)

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 11-2 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		

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.)

Table 11-1 ADA-U Cable Connections (Continued)

Notes:

➢ 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/APA-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 11-14 ADA-U Unit Switch Settings shows the default settings.
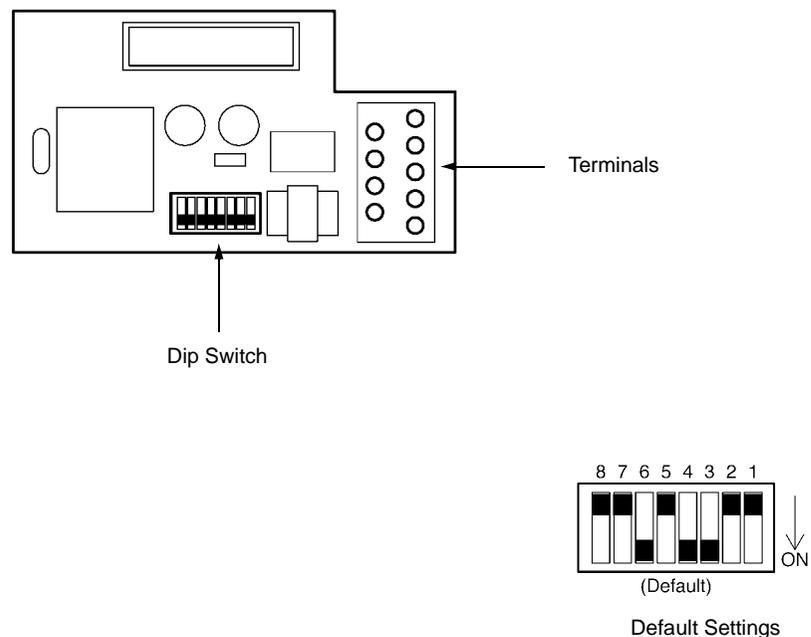
Figure 11-14 ADA-U Unit Switch Settings

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 11-2 ADA-U Unit Switch Settings.

Table 11-2 ADA-U Unit Switch Settings

Switch	Setting		Description
SW1–1	On		When the ADA-U provides control to the recorder, SW1-1 should be set to On, otherwise set it to Off.
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 30Ω
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 600Ω for devices such as modems. Setting 2 is used for complex impedance devices such as a Single Line Telephone.

This adapter can be installed on any DTP or DTU Multiline Terminal except DTP-2DT-1 TEL, DTP-16HC-1 TEL, or cordless terminals.
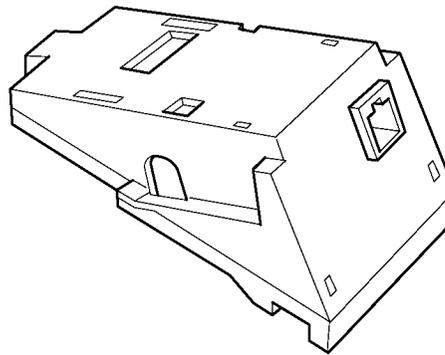
Figure 11-15 APA-U Unit

3.3.1   Installing APA-U Unit on any DTU/DTP 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 11-16 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.
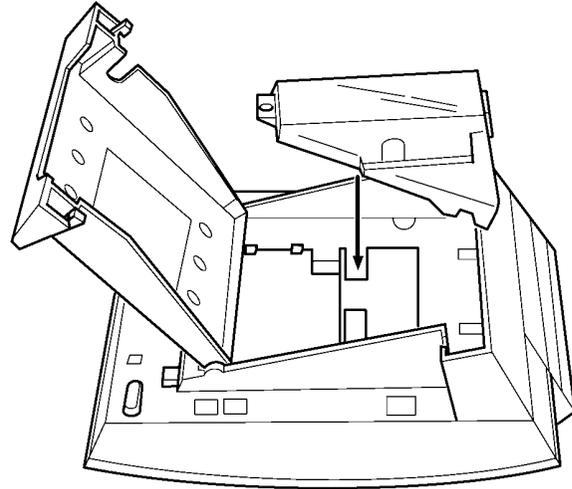
Figure 11-16 Attaching the Unit to the Multiline Terminal

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 the telephone cord in the jack.

3.3.2   Switch Settings

The APA-U Unit has one switch.

SW3
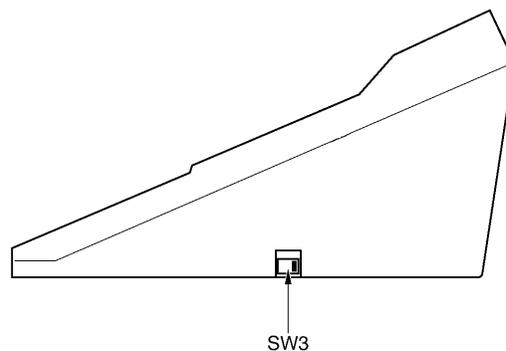
Figure 11-17 APA-U Unit Switches

Refer to Table 11-3 APA-U Unit Switch Settings for SW3.

Table 11-3 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 11-18 Connecting Cables on the APA-U Unit.

Limit the cable length from the APA-U Unit to the Single Line Telephone to a maximum of 50 feet.
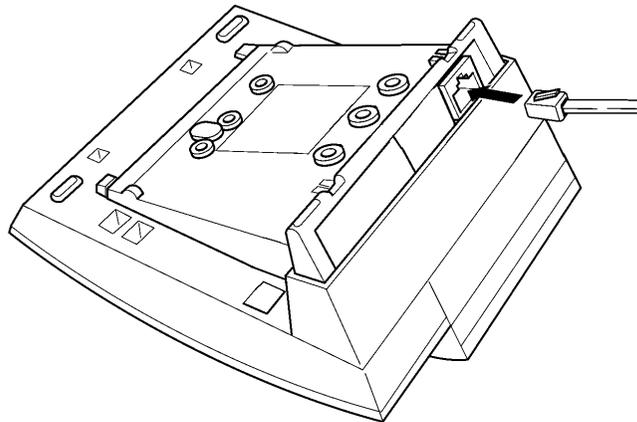
Figure 11-18 Connecting Cables on the APA-U Unit

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 600Ω or a complex impedance interface to devices such as a modem or Single Line Telephone, the second switch (SW1) is set to position 2. When this Analog Port Ringer adapter is used, an additional Single Line Telephone or a modem can be connected to an Electra Elite IPK Multiline Terminal.

If a CTA-U, CTU(S)-U, or HFU-U and an APR-U Unit are both installed, only one AC Adapter is required.

This adapter can be installed on any DTP or DTU Multiline Terminal except DTP-2DT-1 TEL, DTP-16HC-1 TEL, or Cordless terminals.

ACA-U Unit
(AC Adapter)
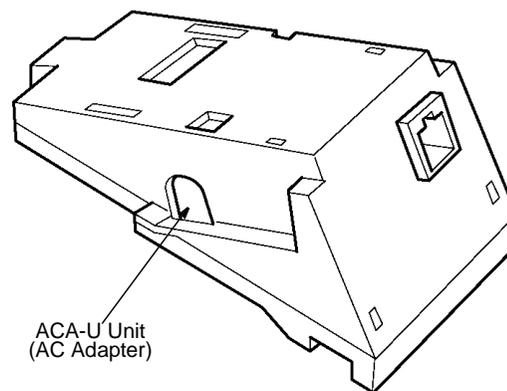
Figure 11-19 APR-U Unit

3.4.1   Installing an APR-U Unit on any DTU/DTP 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 11-20 Attaching the Unit to the Multiline Terminal.
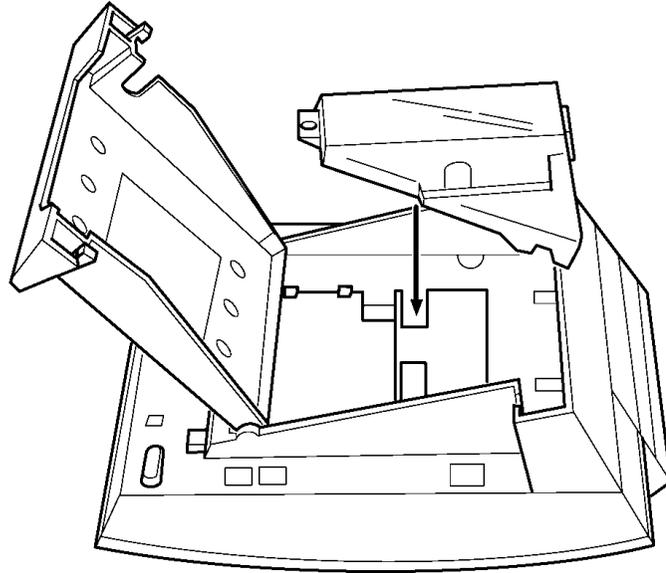
Figure 11-20 Attaching the Unit to the Multiline Terminal

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 11-21 Leading the
     Telephone Cord out from the Unit.
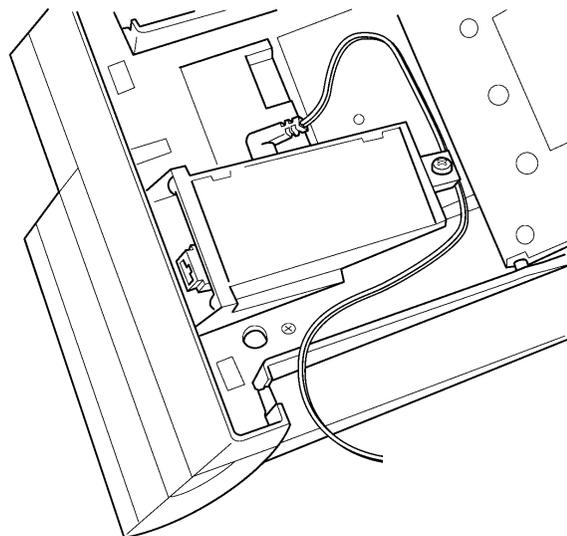
Figure 11-21 Leading the Telephone Cord out from the Unit

4.   Close the base plate, lead the AC adapter cord out through the hole, and snap the cover in place.
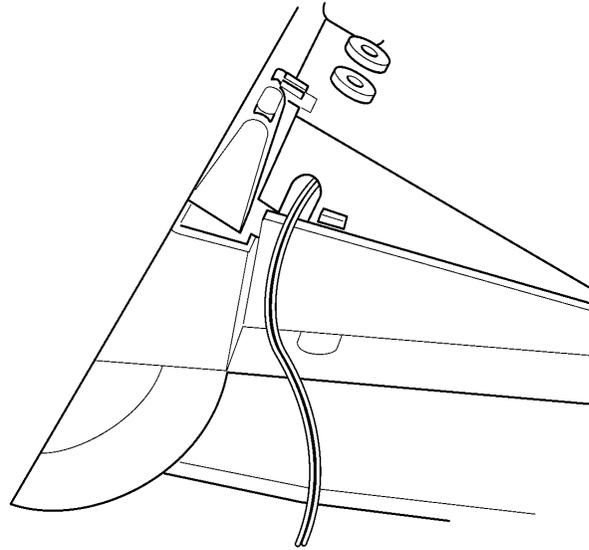
Figure 11-22 Closing the Base Plate Cover

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)-U10 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.
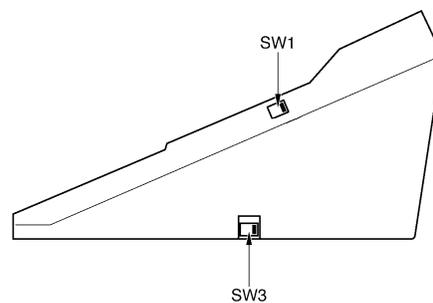
Figure 11-23 APR-U Unit Switches

Refer to .

Table 11-4 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.
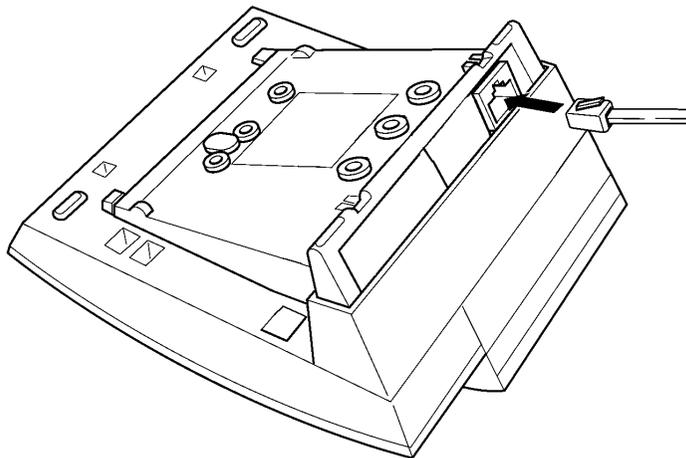
Figure 11-24 Connecting Cables on the APR-U Unit

3.5   CTA-U Unit (Computer Telephony Application)

Computer Telephony Application allows a DTU or DTP Multiline Terminal to be connected to a PC using the TAPI (Microsoft Telephony Application Programming Interface) adapter.   The PC can perform all Multiline Terminal functions using a TAPI-compatible application software.

This adapter can be installed on any DTU or DTP Multiline Terminal except DTP-2DT-1 TEL, DTP-16HC-1 TEL, or Cordless Terminals.
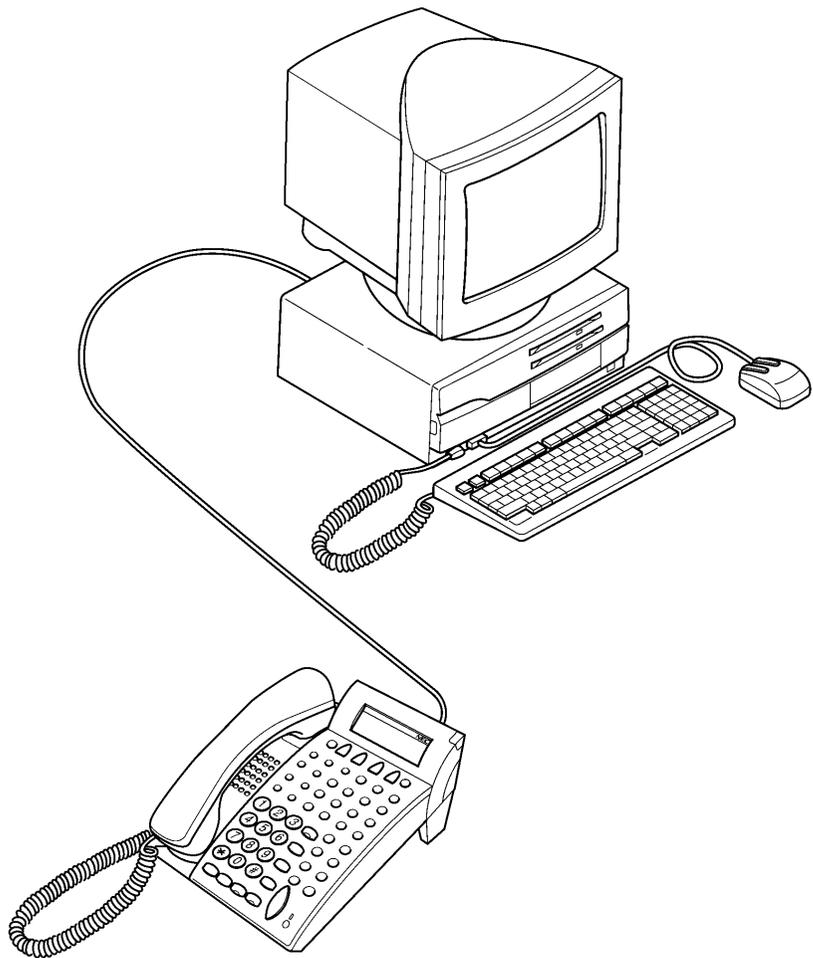
Figure 11-25 Attaching an Electra Elite Multiline Terminal to a PC

The CTA-U Unit is attached to the bottom of any DTU/DTP Multiline Terminal except DTP-2DT-1 and DTP-16HC-1.

ACA-U Unit
(AC Adapter)
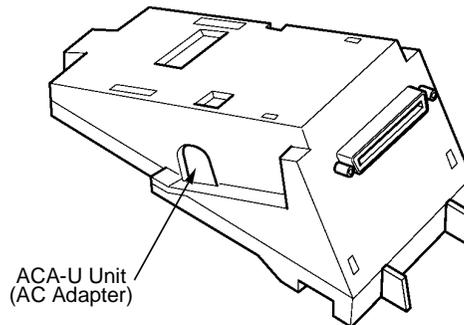
Figure 11-26 CTA-U Unit

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 11-27 Attaching the Unit to the Multiline Terminal.
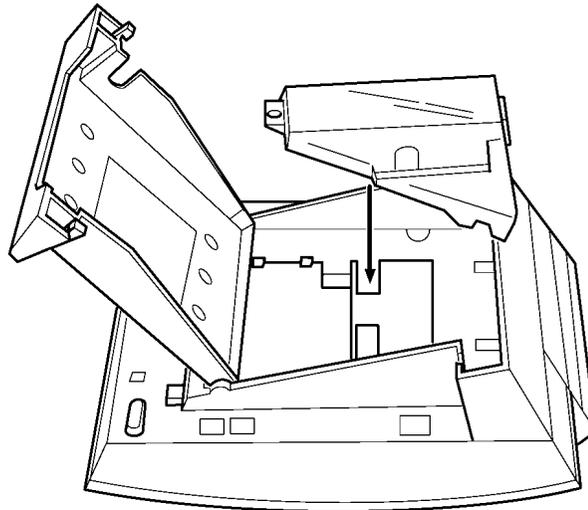
Figure 11-27 Attaching the Unit to the Multiline Terminal

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 11-28 Connecting the RS-232C Cable to the CTA-U Unit on the Multiline Terminal.
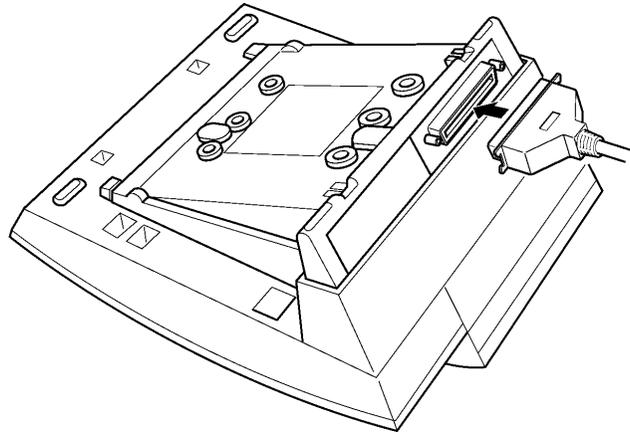
Figure 11-28 Connecting the RS-232C Cable to the CTA-U Unit on the Multiline Terminal

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 *CTA installation Guide* for instructions on installing CTA setup disks.

3.6   Computer Telephony Adapter, CTU(8)-U Unit, 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:

❑   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).

❑   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.

❑   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.

❑   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(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 DTU/DTP Multiline Terminal except DTP-2DT-1, DTP-16HC-1 or Cordless terminals.

A required AC Adapter is provided with the unit.

The following connections are required:

❍   AC Adapter

❍   Multiline Terminal jack labeled LINE

❍   PC USB port

❍   ESI port to ESI(8)-U( ) ETU
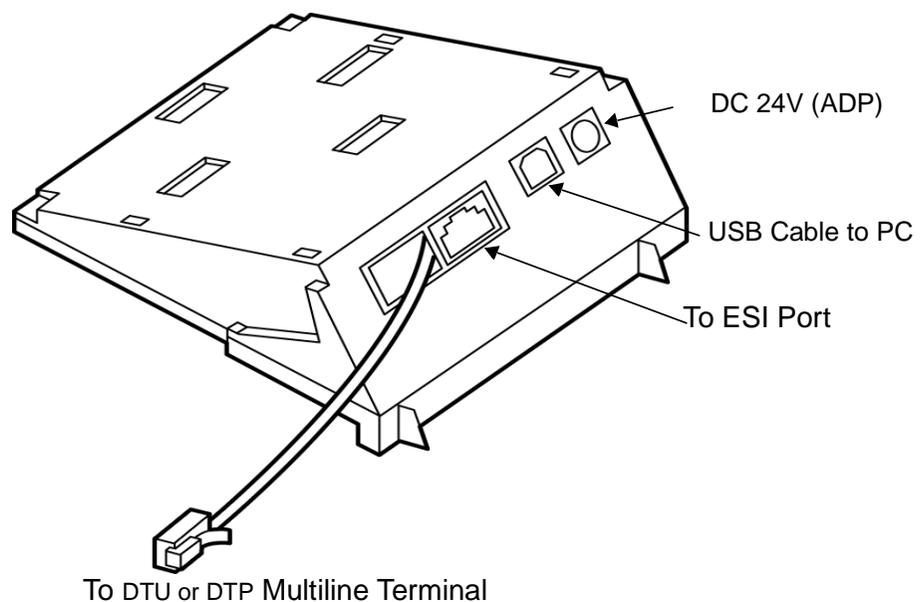
Figure 11-29 CTU (S)-U Unit

3.7   DBM(B)-U( ) Box and DBM(E)-U( ) Box Message Display Boards

The DBM(B)-U( ) basic Message Display Board is connected to the ESI(8)-U( ) 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 IPK system to support 64 LEDs.

The DBM(E)-U( )expansion Message Display Board has eight message waiting LEDs and is connected to the DBM(B)-U( ) or another expansion board. Each DBM(B)-U( ) basic board can support up to five expansion boards and 40 additional LEDs.

The total number of LEDs is 384, but the Electra Elite IPK system can only support up to 200 mailbox indications. Multiple locations of the same mailbox are permitted. Refer to Figure 11-30 DBM(B)-U( ) and DBM(E)-U( ) Message Display Boards and Figure 11-31 Maximum Display Indications.
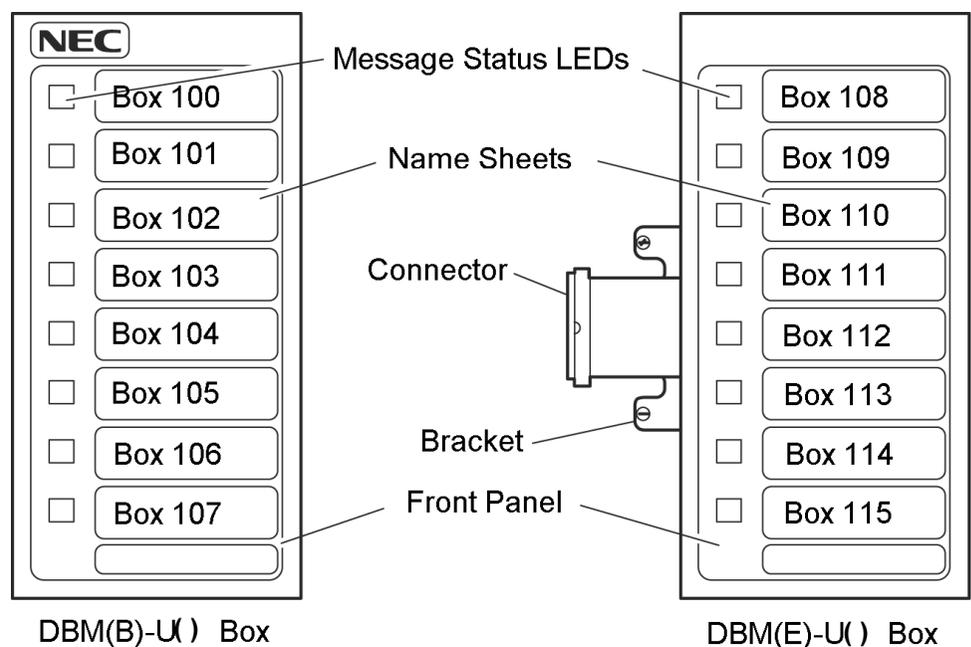
Figure 11-30 DBM(B)-U( ) and DBM(E)-U( ) Message Display Boards
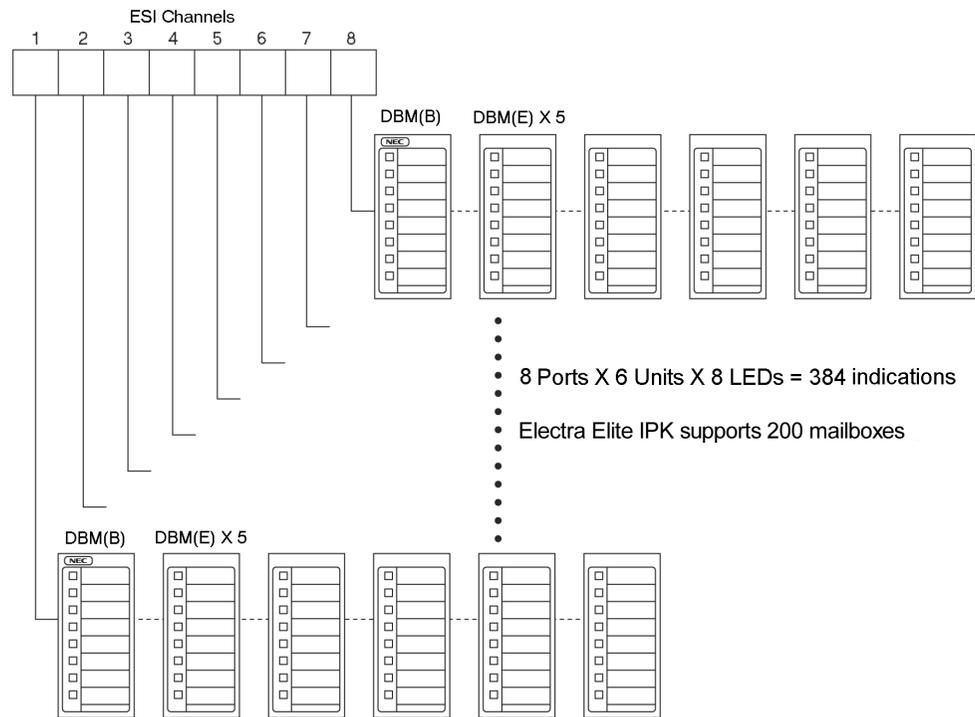
Figure 11-31 Maximum Display Indications

3.7.1   Connecting DBM(E)-U( ) Box to DBM(B)-U( ) Box or Another
         DBM(E)-U10 Box

         1.   Use wire cutters to remove the cutout on right side of
               DBM(B)/(E) cover. Refer to Figure 11-32 Removing Cutout.
               Place the provided edge protector on the top of the cutout.
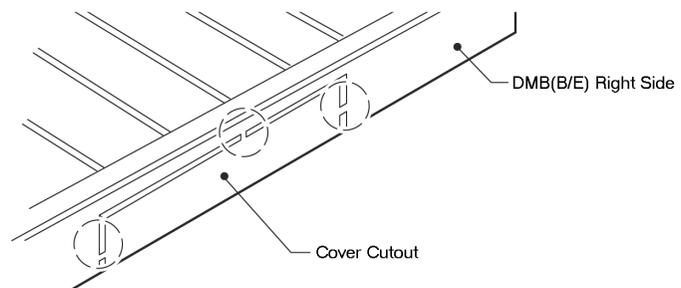
Figure 11-32 Removing Cutout

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 11-33 Connecting the Bracket.
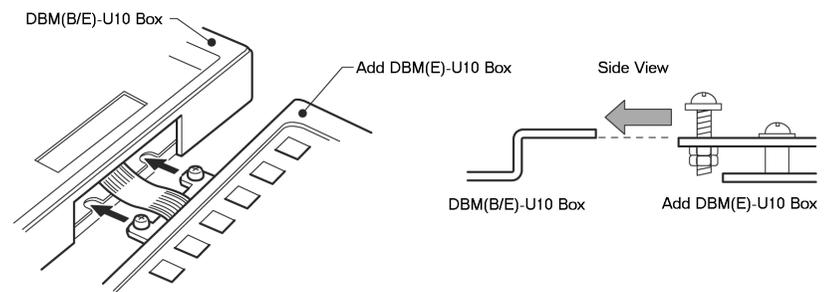
Figure 11-33 Connecting the Bracket

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)-U( ) 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 11-34 Threading Screw into Wall.
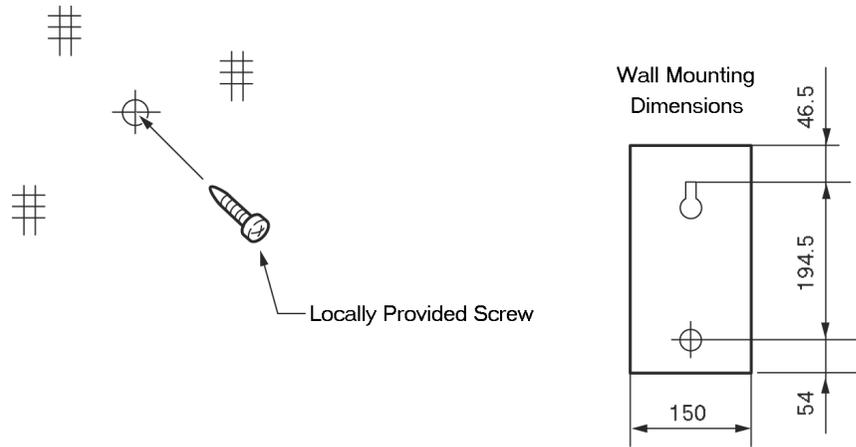
Figure 11-34 Threading Screw into Wall

2. Place hole for mounting over the screw, and Hang the DBM(B)-U( ) on the screw. Refer to Figure 11-35 Hanging DBM(B)-U( ) on Screw.
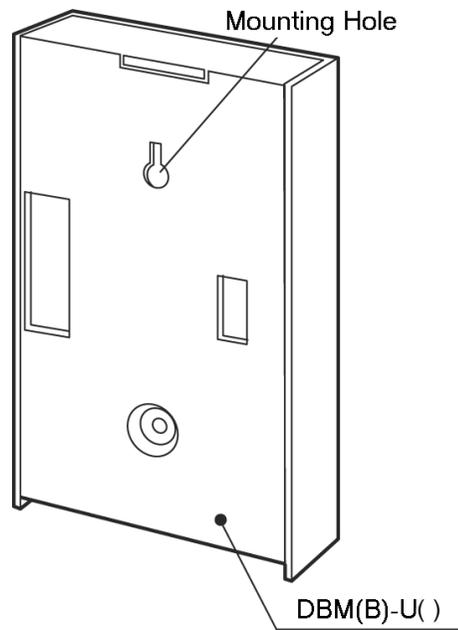
Figure 11-35 Hanging DBM(B)-U( ) on Screw

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 11-36 Installing Bottom Screws.
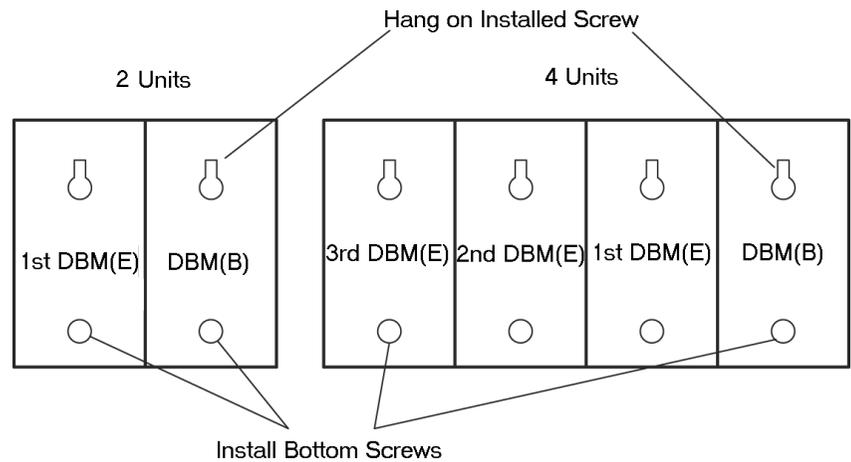
Figure 11-36 Installing Bottom Screws

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 11-37 Connecting DBM(B)-U( ), and connect the provided AC Adapter to the DBM(B)-U( ).
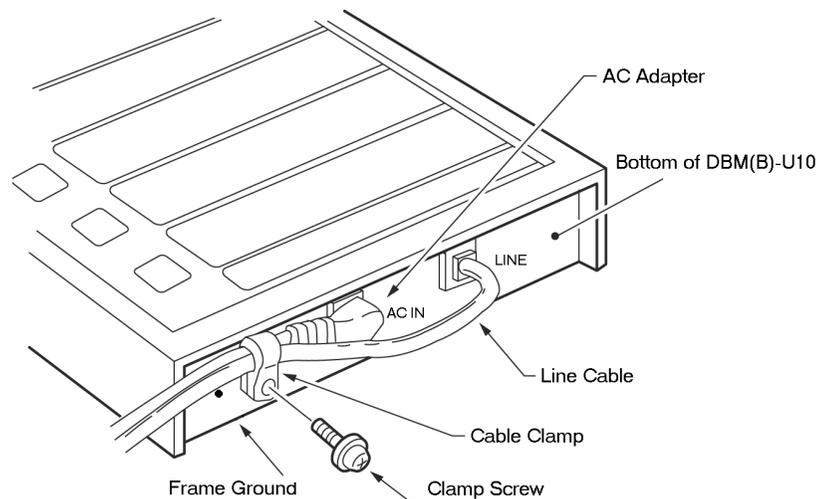
Figure 11-37 Connecting DBM(B)-U( )

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 11-38 Connecting DBM(B)-U( ) to ESI Port, and connect the display board system to ESI.
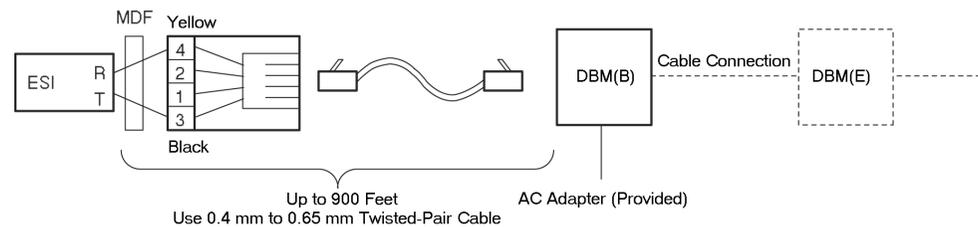
Figure 11-38 Connecting DBM(B)-U( ) to ESI Port

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.

This adapter can be installed on any DTP or DTU Multiline Terminal except DTP-2DT-1 TEL or DTP-16HC-1 TEL.
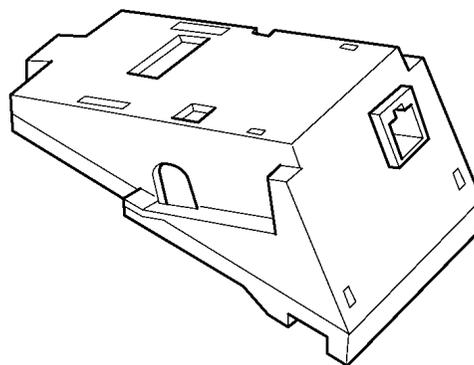
Figure 11-39 HFU-U Unit

3.8.1   Installing an HFU-U Unit on any DTU/DTP Multiline Terminal (except DTP-2DT-1 and DTP-16HC-1)

With terminal upside down, facing from the bottom of the open cover, install this unit in Telephone Slot 1.

Refer to 3.4.1 Installing an APR-U Unit on any DTU/DTP 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.
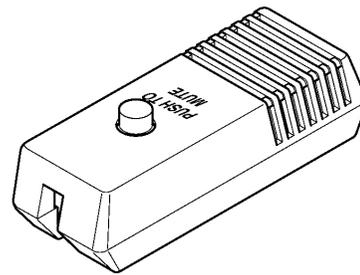
Figure 11-40 Microphone with Mute

1.   Plug the microphone cord into the jack on the HFU-U Unit as shown in Figure 11-41 Attaching a Microphone to a Multiline Terminal.

✎   The microphone should be between one foot and three feet away from the Multiline Terminal.

Minimum 1 Foot
from Multiline
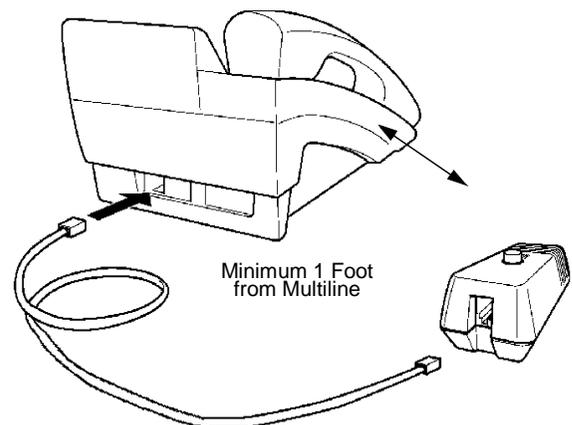
Figure 11-41 Attaching a Microphone to a Multiline Terminal

3.8.3   Switch Settings

The HFU-U Unit uses 2-position switches SW1 and SW2.
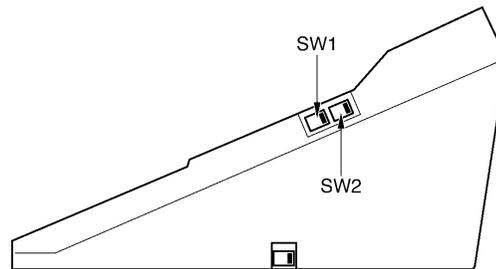
Figure 11-42 HFU-U(BK)/(WH) Unit Switches

Refer to Table 11-5 HFU-U Unit Switch Settings.

Table 11-5 HFU-U Unit Switch Settings

SW1		SW2		
Position 1	Position 2	Position 1	Position 2	Description
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   SLT(1)-U10 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 except 01 and 02.

3.9.1   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.
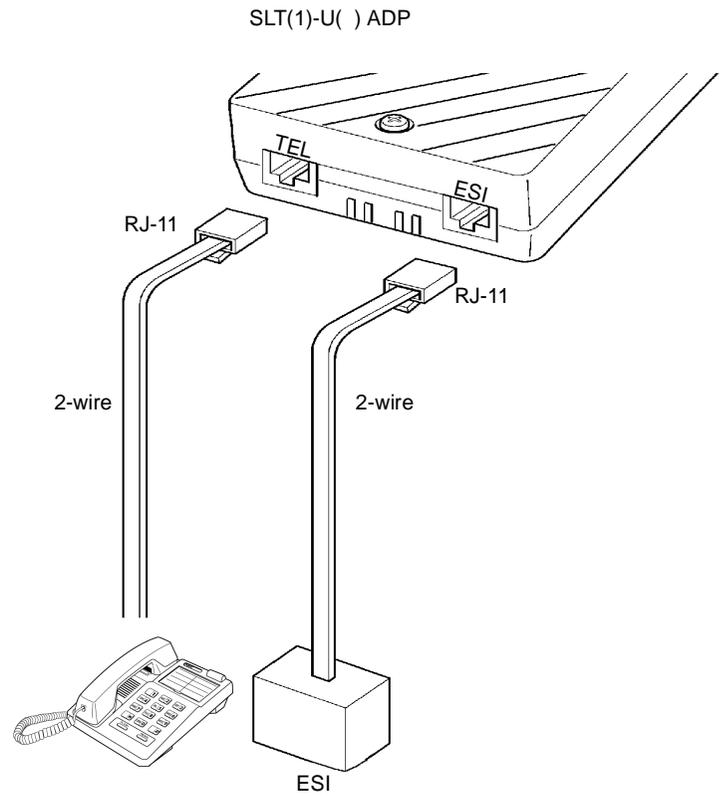
SLT(1)-U( ) ADP

**Figure 11-43 Connecting a Single Line Telephone to the
System using an SLT(1)-U( ) ADP**

ESI ETU   Modular Terminal   SLT(1)-U( ) ADP
                  GN   Y
                                    3
            T
            R
                  To ESI   4
                  RD   BL   Base
                                      Cord   ESI Port
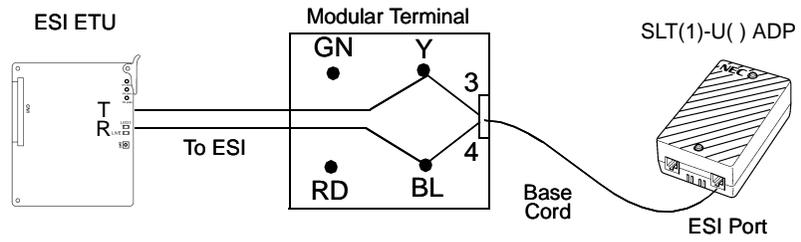
Modular Terminal Connections

ESI Port   SLT(1)-U( ) ADP   Single Line
                                                         Telephone

ESI   (2-wire)   1   ESI   TEL   (2-wire)   2
                       4   3
                  RJ-11C
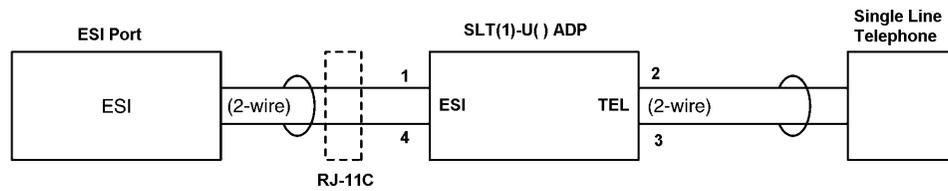
Single Line Telephone Connections

Figure 11-44 Connecting the SLT(1)-U( ) ADP

3.9.2   Wall Mounting the SLT(1)-U( ) ADP

1.   Remove the two screws from the top to open the SLT Adapter as shown in Figure 11-45 Removing the Screws from the SLT(1)-U( ) ADP.
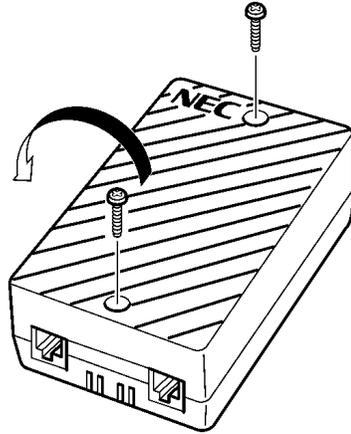
Figure 11-45 Removing the Screws from the SLT(1)-U( ) ADP

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.
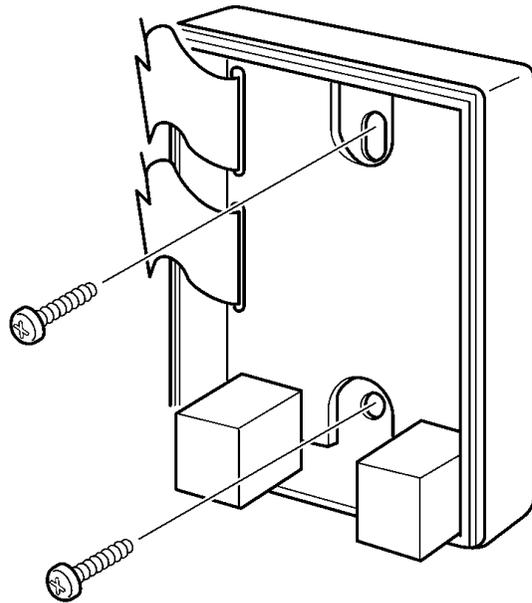
Figure 11-46 Attaching the SLT(1)-U( ) ADP to the Wall

3.10   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.

The Wall Mount Unit is required when an APA-U, APR-U, CTA-U, CTU(S)-U or HFU-U Unit is installed.

3.10.1   Removing and Remounting the Handset Hanger

1.   Remove the hanger by sliding it out of the slot. (Refer to Figure 11-47 Positioning the Handset Hanger.)

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 11-47 Positioning the Handset Hanger for the steps for removing and remounting the handset hanger.

A

B
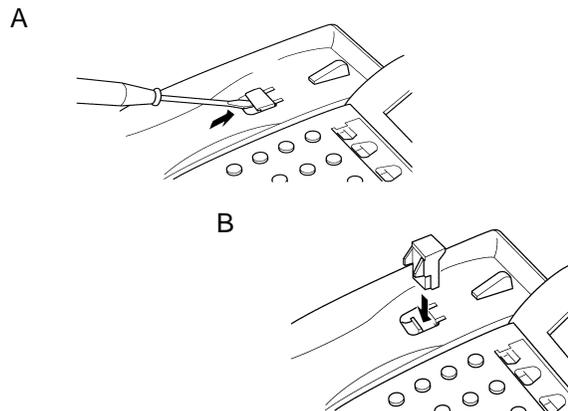
Figure 11-47 Positioning the Handset Hanger

3.10.2   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
     11-48 Removing the Knockout.
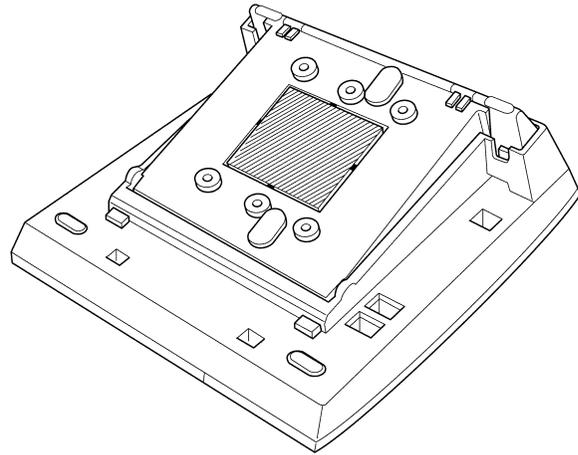
Figure 11-48 Removing the Knockout

5.   Assemble the base plate and base cover.

6.   As illustrated in Figure 11-49 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.
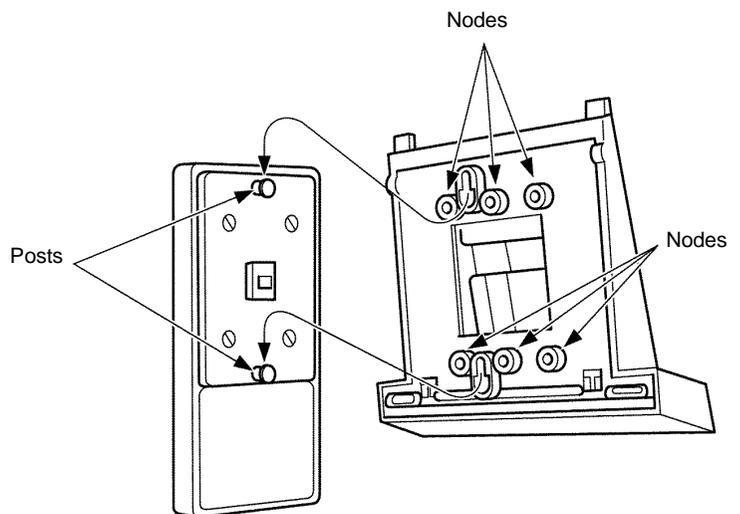
Figure 11-49 Attaching the Base Plate to the Wall

7. 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.
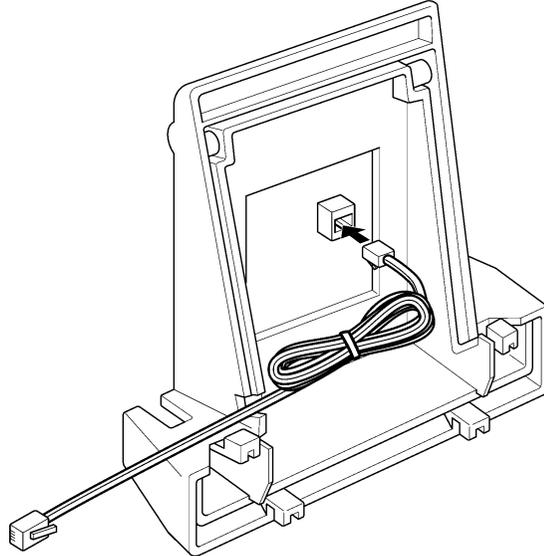
Figure 11-50 Plugging in the Line Cord using a Wall Jack

8. 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.
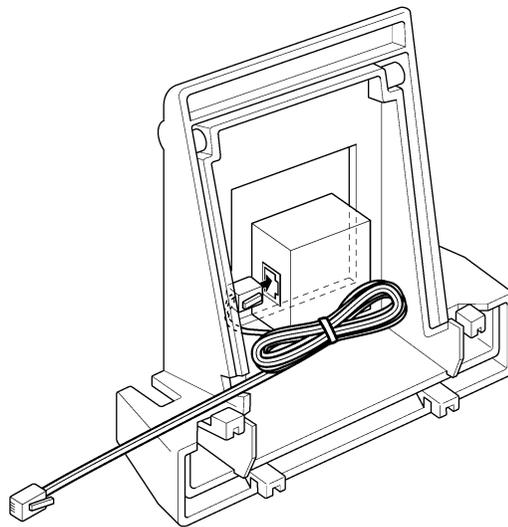
Figure 11-51 Plugging in the Line Cord Using a Modular Jack

9. With the base unit attached to the wall, hook the two bottom tabs in the tab slots on the Multiline Terminal base.
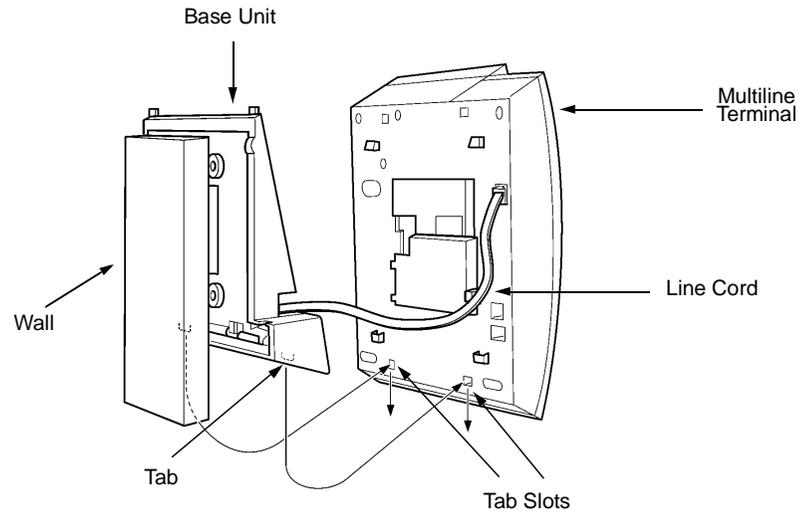
Figure 11-52 Attaching the Bottom Tabs of the Multiline Terminal to the Base Plate

10. Push up on the Terminal and lock the top base unit tabs in the top slots on the terminal . shows how the Multiline Terminal is attached.
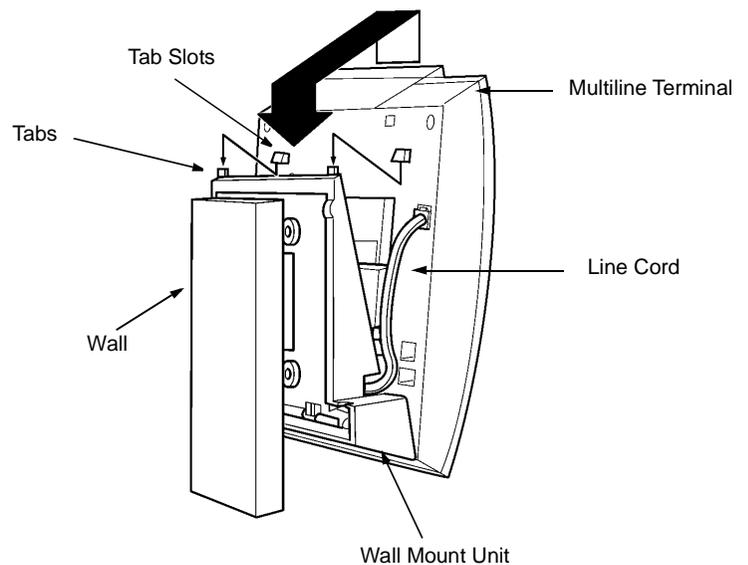
Figure 11-53   Attaching the Top Tabs of the Multiline Terminal to the Base Plate

11. When properly installed, the wall-mounted Multiline Terminal looks similar to the one shown in Figure 11-54 Installed Wall Mount Unit.

✎ Do not adjust the tilt panel after the Multiline Terminal is mounted on the wall.
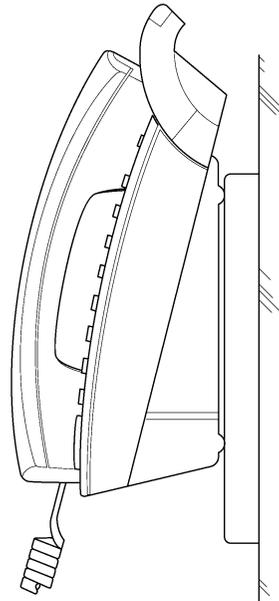
Figure 11-54 Installed Wall Mount Unit

3.10.3 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 11-55 Removing the Tabs from the Adapter.
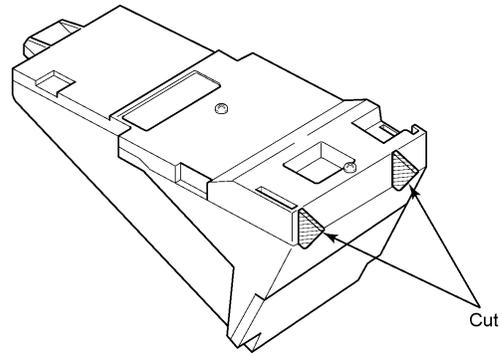
Figure 11-55 Removing the Tabs from the Adapter

3. Remove the tabs from the WMU-U Unit as shown in Figure 11-56 Removing the Tabs from the WMU-U Unit. (The Tabs that are removed depend on the Multiline Terminal type.)
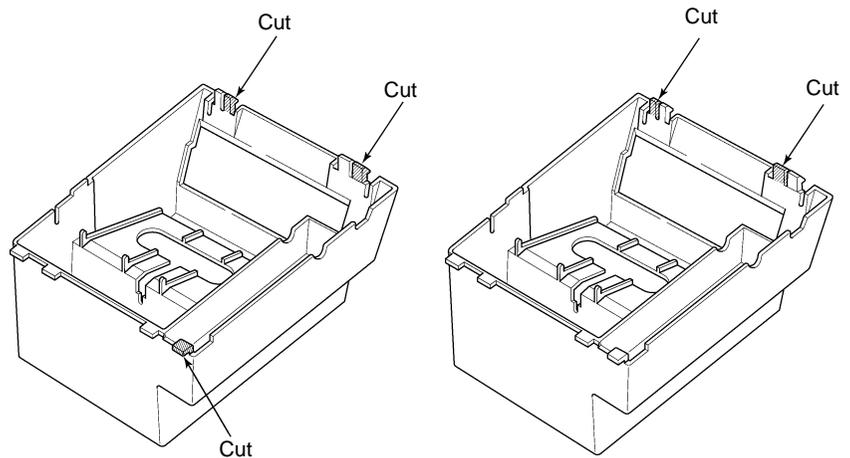
DTU/DTP-8-1 TEL
DTP-8D-1/DTU-8D-2 TEL
DTU/DTP-16-1 TEL
DTP-16D-1/DTU-16D-2TEL
DCU-60-1 CONSOLE

DTU/DTP-32-1 TEL
DTP-32D-1/DTU-32D-2 TEL

Figure 11-56 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 between the WMU-U Unit and the wall. Lead the line cord out through the slits as shown in Figure 11-57 Leading the Line Cord out of the WMU-U Unit.
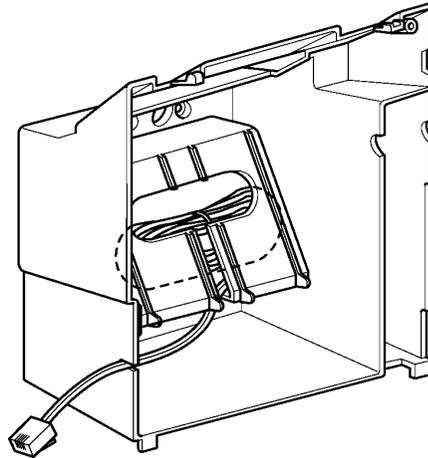
Figure 11-57 Leading the Line Cord out of the WMU-U Unit

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.
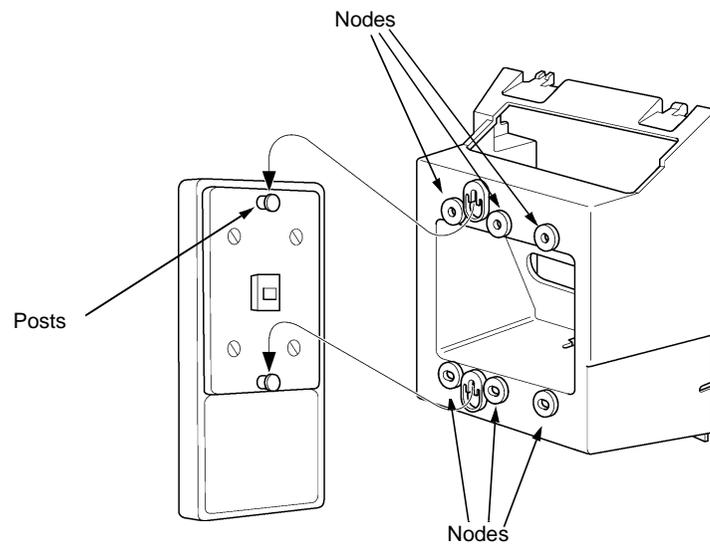
Figure 11-58 Attaching the Wall Mount Unit to the Wall

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 11-59 Attaching the Multiline Terminal to the WMU-U Unit.
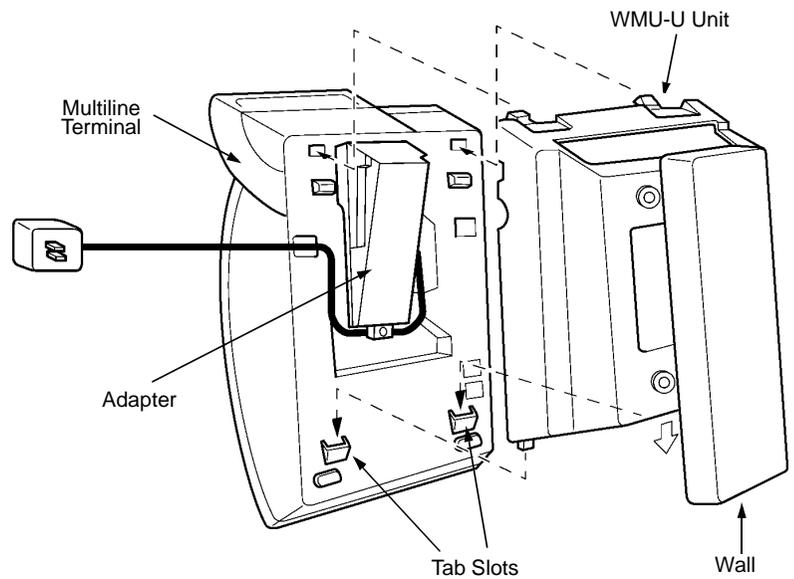
Figure 11-59 Attaching the Multiline Terminal to the WMU-U Unit

3.10.4   Removing the Multiline Terminal from the Base Plate

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.
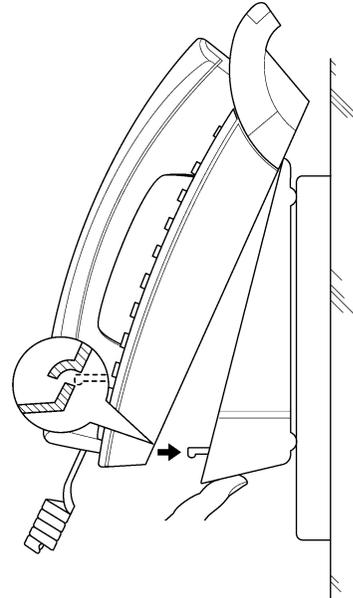
Figure 11-60 Removing the Multiline Terminal from the Base Plate

3.10.5   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.

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CHAPTER 12

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Installing Single Line Telephones

SECTION 1   GENERAL INFORMATION

The Electra Elite IPK system supports several different Single Line Telephones.

◇   DTR-1-1 TEL/DTR-1HM-1 TEL

Both of the Electra Elite IPK DTR Single Line Telephones come in black or white.

◇   DTP-1-1 TEL/ DTP-1HM-1 TEL

Both the DTP-1-1 TEL and DTP-1HM-1 TEL come in black or white.

SECTION 2   SINGLE LINE TELEPHONES

2.1   DTR-1-1 TEL

The DTR-1-1TEL is a fully modular terminal that has DTMF and Pulse Dialing compatibilities and offers Flash key, redial key functionality. A Message Waiting Indicator, that also functions as Incoming Call Indication, is a standard feature of this telephone. This telephone comes equipped with a 6-level receive volume control (3 increased levels and 2 decreased levels), a 4-level ring volume control (Off, Soft, Medium, Loud) and three ring patterns (Slow, Medium, Fast). The DTR-1-1 TEL has a data port and a built-in wall mount adapter.

Basic Port Package

A maximum of 24 DTR-1-1 TELs can be installed. The total number of all Electra Elite Multiline Terminals that can be installed is 32.

Expanded Port Package

A maximum of 112 DTR-1-1 TELs can be installed. The total number of all Electra Elite Multiline Terminals that can be installed is 120.

Each terminal requires an SLT(1)-U( ) ADP or SLI(4)/(8)-U( ) ETU.

✎   The volume up/down 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.

Figure 12-1 DTR-1-1 TEL Single Line Telephone

2.2   DTR-1HM-1 TEL

The DTR-1HM-1 TEL is a fully modular terminal that has DTMF and Pulse Dialing abilities and offers Flash key and Redial key functionality. A Message Waiting Indicator, that also functions as an Incoming Call Indicator, is a standard feature of this telephone. The DTR-1HM-1 TEL has eight programmable speed dial buttons and has Hold and monitor function keys. This telephone comes equipped with a 6-level receive volume control (3 increase levels and 2 decrease levels), a 4-level ring volume control (Off, Soft, Medium, Loud) and three ring patterns (Slow, Medium, Fast). The DTR-1HM-1 TEL has a data port and a built-in wall mount adapter.

Basic Port Package

A maximum of 24 DTR-1HM-1 TELs can be installed. The total number of all Electra Elite Multiline Terminals that can be installed is 32.

Expanded Port Package

A maximum of 112 DTR-1HM-1 TELs can be installed. The total number of all Electra Elite Multiline Terminals that can be installed is 120.

 Each terminal requires an SLT(1)-U( ) ADP or SLI(4)/(8)-U( ) ETU.

✎   The volume up/down 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.

Figure 12-2 DTR-1HM-1 TEL Single Line Telephone

SECTION 3   WALL MOUNTING DTR-1-1 TEL/DTR-1HM-1 TEL SINGLE LINE TELEPHONES

Single Line Telephones are wall mounted using the metal base that comes attached to the telephone.

3.1   Adjusting the Hanger Hook

1.   Remove the hook from the unit.
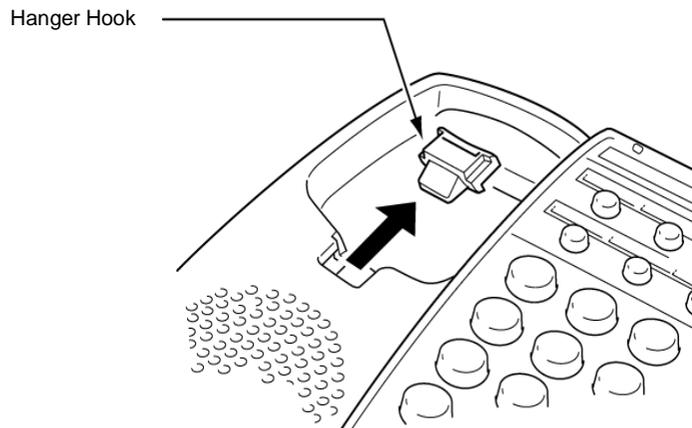
Hanger Hook

Figure 12-3 Removing the Hanger Hook on a Single Line Telephone

2.   Turn the hook with the tab toward the top.

3.   Slide the hook in the slot to form the hanger hook for the handset.
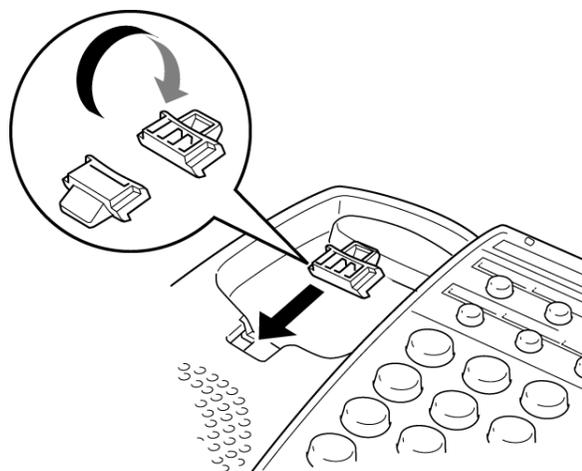
Figure 12-4   Sliding the Hanger Hook on a Single Line Telephone into Position

3.1.1   Wall Mounting the Telephone

1.   Remove the metal base from the telephone by removing the two screws as illustrated in Figure 12-5 Removing the Metal Base.

Note Position of Tabs
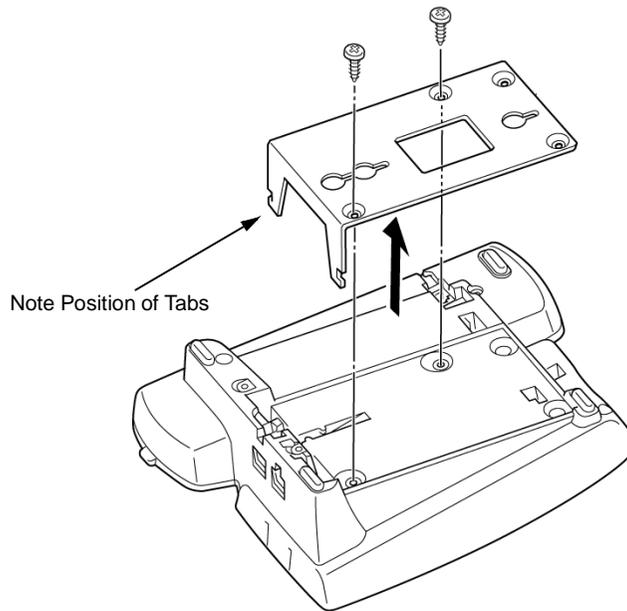
Figure 12-5 Removing the Metal Base

2.   Lift the metal plate and note the direction of the tabs so that they can be correctly reversed.

3.   Flip the metal base around as illustrated in Figure 12-6 Reattaching the Metal Base. Insert the tabs into the receptacles marked **(A)** and reattach to the telephone using the two screws that were previously removed.

✎   Because of manufacturing variations in wall-mount brackets, installing the terminal wall mount with optional screws offers the most reliable fit.
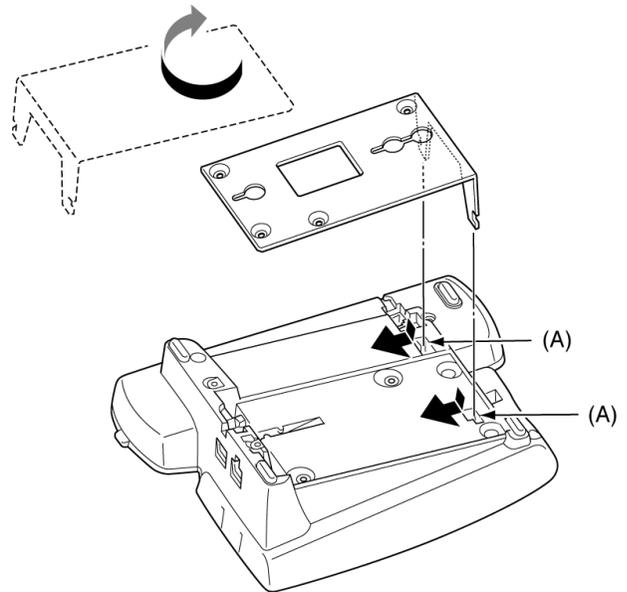
Figure 12-6 Reattaching the Metal Base

4.   Hang the telephone on the wall by sliding the holes in the metal
      base over the wall posts.

3.2   Using Hanger Hooks on the Single Line Telephone

Once the Single Line Telephone has been wall mounted, the handset can be hung from one of two hanger hooks.

When the handset is placed on the hanger hook, located below the switchook, the telephone is on-hook.

Hanging the handset from the hook located on the top of the telephone (labeled **(C)** in the diagram) allows the telephone to remain off-hook.
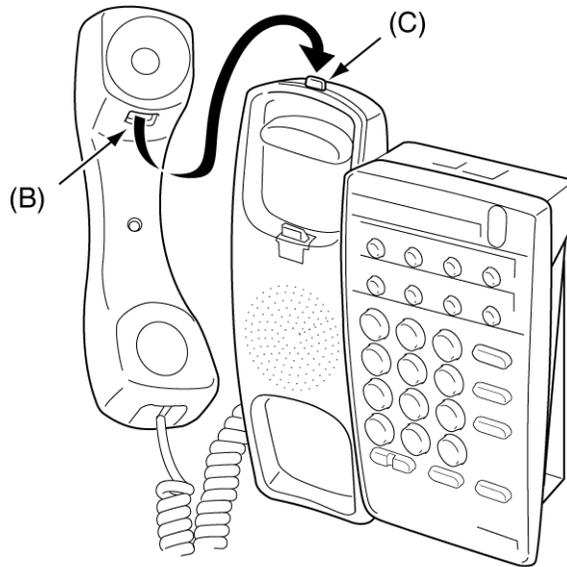
Figure 12-7 Hanger Hooks on the Single Line Telephone

3.3   DTP-1-1 TEL/ DTP-1-2 TEL

The DTP 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.

Basic Port Package

A maximum of 24 DTP-1-1 or DTP-1-2 TELs can be installed. The total number of all Electra Elite Multiline Terminals that can be installed is 32.

Expanded Port Package

A maximum of 112 DTP-1-1 or DTP-1-2 TELs can be installed. The total number of all Electra Elite Multiline Terminals that can be installed is 120.

Each terminal requires an SLT(1)-U( ) ADP or SLI(4)/(8)-U( ) ETU.

Figure 12-8 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.

3.4   DTP-1HM-1/ 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.

Basic Port Package

A maximum of 24 DTP-1HM-1 or DTP-1HM-2 TELs can be installed. The total number of all Electra Elite Multiline Terminals that can be installed is 32.

Expanded Port Package

A maximum of 112 DTP-1HM-1 or DTP-1HM-2 TELs can be installed. The total number of all Electra Elite Multiline Terminals that can be installed is 120.

Each terminal requires an SLT(1)-U( ) ADP or SLI(4)/(8)-U( ) ETU.

Figure 12-9 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.

SECTION 4   WALL MOUNTING THE DTP-1-1 OR DTP-1-2 TEL AND DTP-1HM-1 OR DTP-1HM-2 TEL

4.1   Hanger Hook

1.   Remove the hook from the unit.
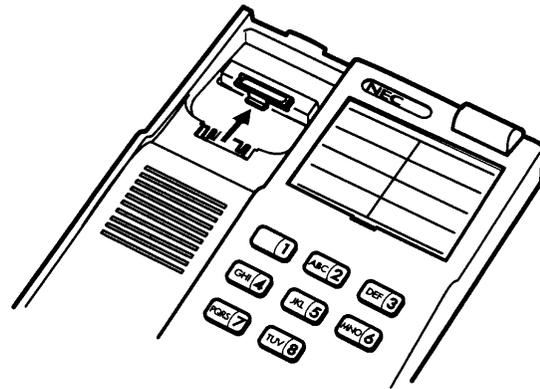
Figure 12-10 Removing the DTP Telephone Hanger Hook

2.   Turn the hook over (back to the front) with the tab toward the top.
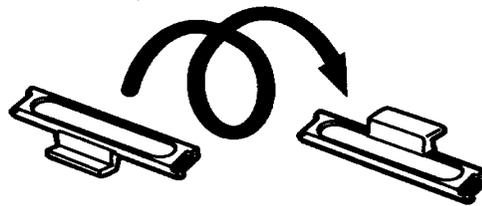
Figure 12-11 Turning the Hook Over

3.   Slide the hook on its glides back down into position forming the hanger
      hook for the handset.
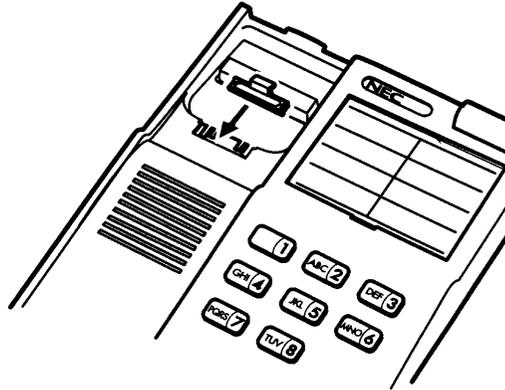
Figure 12-12 Sliding the Hook into Position

4.2   Using Installed Modular Wall Plate

1.   Unscrew the three screws on the unit to remove the plate.
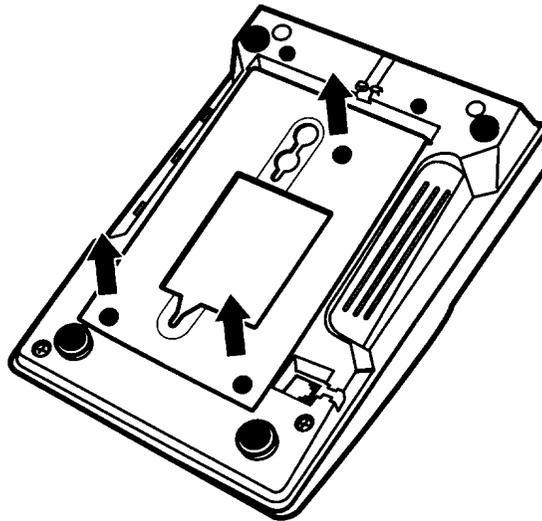
Figure 12-13 Removing the Screws

2.   Replace the plate and screw in the two positions. (One remaining screw can be screwed in at the original third position.)
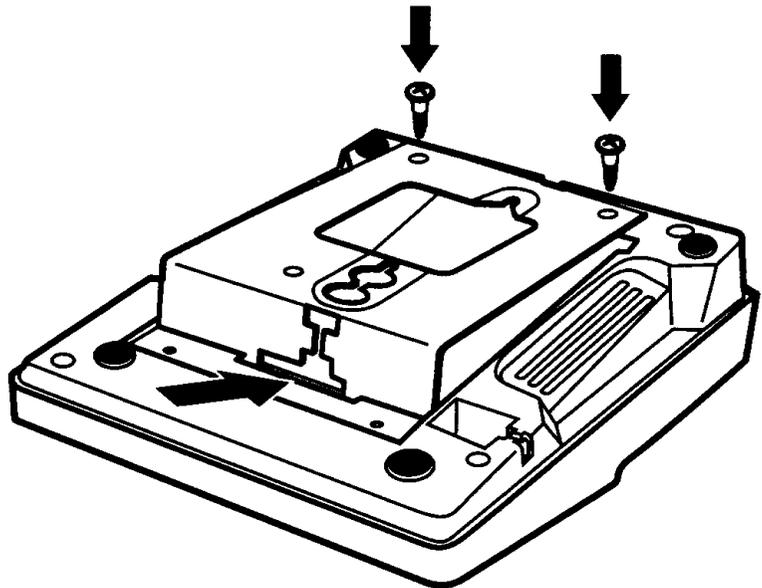
Figure 12-14 Replacing the Plate and Screw

3.   Loosen the screws on the wall telephone plate to protrude a bit.
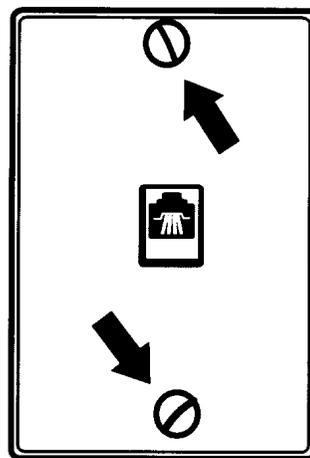
Figure 12-15 Protruding Screws

4. Install the telephone with the plate on the protruding screws.
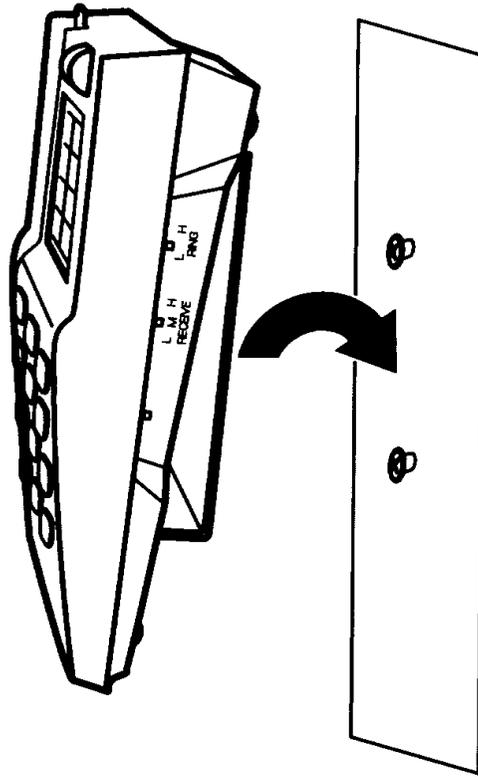
Figure 12-16 Mounting the Telephone

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CHAPTER 13

Installing Cordless and Wireless Telephones

SECTION 1   **GENERAL INFORMATION**

This chapter provides information regarding cordless telephones which can be used in conjunction with the Electra Elite IPK system.

SECTION 2   **RADIO FREQUENCY INTERFERENCE**

When using these cordless RF devices some interference can take place when operating the cordless telephones in the same environment as other wireless devices that operate in the same frequency spectrum.

Depending on your environment, the maximum number of cordless devices used without interference varies.

SECTION 3 D^{term} ® **HEADSET CORDLESS TERMINAL**

3.1   Description

The D^{term} Headset Cordless telephone is a convenient, pocket-sized telephone that allows the user to speak and listen in handsfree mode.   This telephone has a 3-line, 16-character backlit handset display. Tone/Pulse dialing, handset ear piece and ringer volume control, up to 100 phonebook locations, one-touch dialing, mute, flash, pause, handset find, are some of the features that this telephone provides. Two headsets, a belt clip and holster are also included with this telephone.

This telephone has a 2.4 GHz frequency range and provides secure
conversation and reduces interference from other cordless telephones.
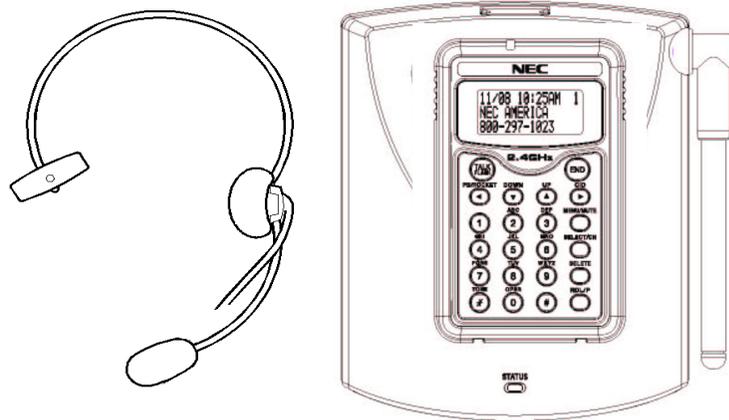
Figure 13-1 *D*^term^ Headset Cordless Telephone

3.2   Selecting an Installation Location

Before choosing a location for your new telephone, there are some important
guidelines you should consider:

❑   The location should be close to both a telephone jack and continuous
     power outlet. (A continuous power outlet is an AC outlet which does not
     have a switch to interrupt its power.)

❑   Keep the base and handset away from sources of electrical noise such
     as motors or fluorescent lighting.

❑   Be sure there is sufficient space to fully extend the base antenna.

❑   The base can be placed on a desk or tabletop or mounted on a standard
     telephone wall plate.

You should charge your new telephone for 15~20 hours before completing the
installation or using the handset.

3.3   Connecting the Base Unit

1.   Connect the AC adapter to the *DC IN 9 V* jack and to a standard 120V AC wall outlet.
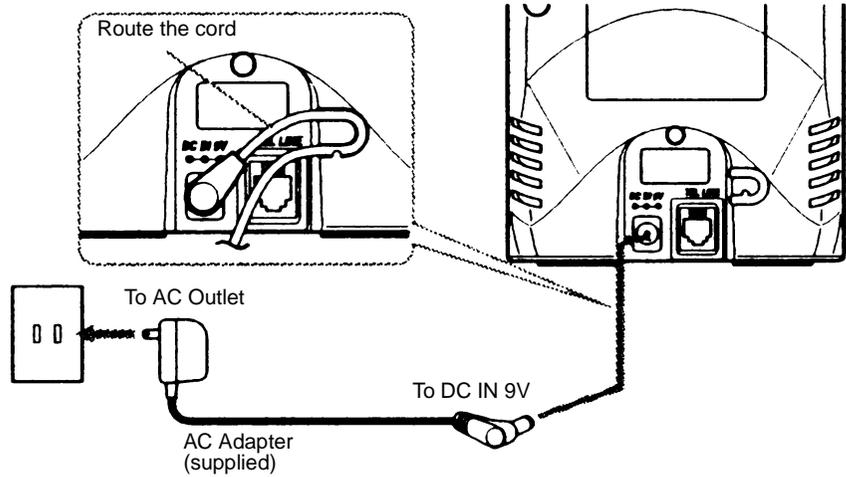
Figure 13-2   Connecting the *D^{term}* Headset Cordless Base Unit to the Adapter

2.   Set the base on a desk or tabletop, and place the handset in the base unit as shown.
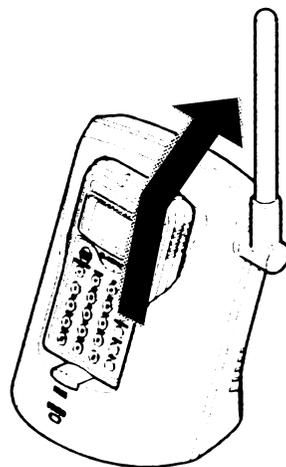
Figure 13-3   Raising the Antenna on the *D^{term}* Headset Cordless Base Unit

3.   Raise the antenna to a vertical position.

4.   Make sure the status LED illuminates. If the LED does not illuminate, check to see that the AC adapter is plugged in and that the handset makes good contact with the base charging contacts.

❑   Use only the supplied AC adapter (730627). Do not use any other AC adapter.

❑   Connect the AC adapter to a continuous power supply.

❑   Place the base unit close to the AC outlet so that you can unplug the AC adapter easily.

❑   After installing the battery pack in the handset, charge the handset at least three to five hours before plugging it into the telephone line.

5.   Connect the telephone line cord to the *TEL LINE* jack and the other end into the AP(R)-R Unit. Refer to paragraph 3.3 AP(A)-R Unit/AP(R)-R Unit (Port Adapters) on page 9-14 for detailed instructions for installing the AP(R)-R Unit. This unit can also be connected using an SLI(4)/(8)-U( ) ETU.

AP(R)-R Unit

To TEL LINE

Telephone Line Cord
(supplied)
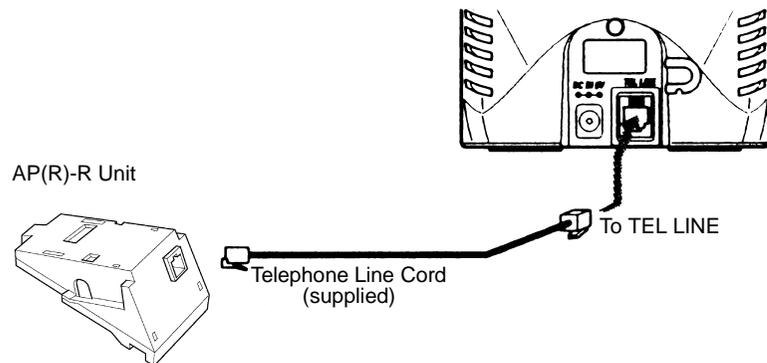
Figure 13-4   Connecting the D^{term} Headset Cordless Telephone Cord to the AP(R)-R Unit

Place the power cord so that it does not create a trip hazard or where it could become chafed and create a fire or electrical hazard.

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.

SECTION 4 $D^{term\ \circledR}$ CORDLESS LITE OR $D^{term\ \circledR}$ CORDLESS II TERMINAL

4.1   Description

D^{term} **Cordless Lite**

This D^{term} Cordless Lite Terminal can be connected to the Electra Elite IPK 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.

In an ideal state, 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.

D^{term} **Cordless II**

The D^{term} Cordless II terminal uses 900 MHz Digital Spread Spectrum (DSS) Technology and is connected in tandem to a Multiline Terminal.

In an ideal state, this terminal can be switched between cordless and the Multiline Terminal connected to it using a key on the base unit or handset.

This terminal has a 16-digit by 2-line LCD Display.
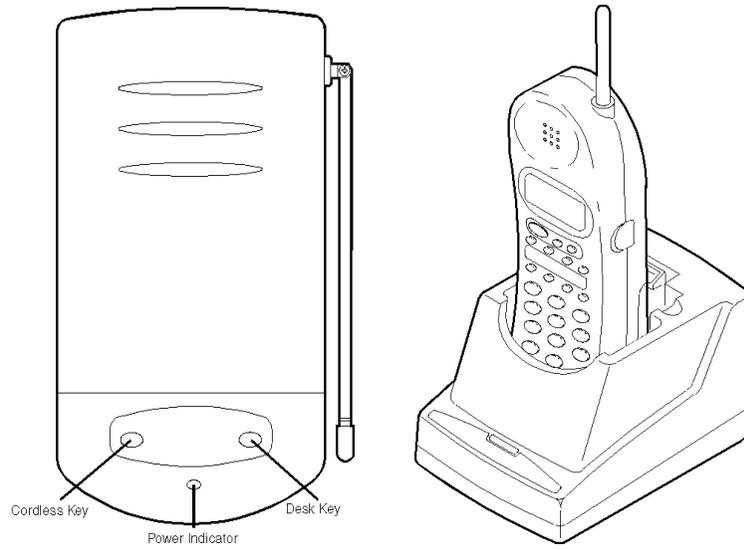
Figure 13-5 *D*^*term* Cordless Lite Terminal
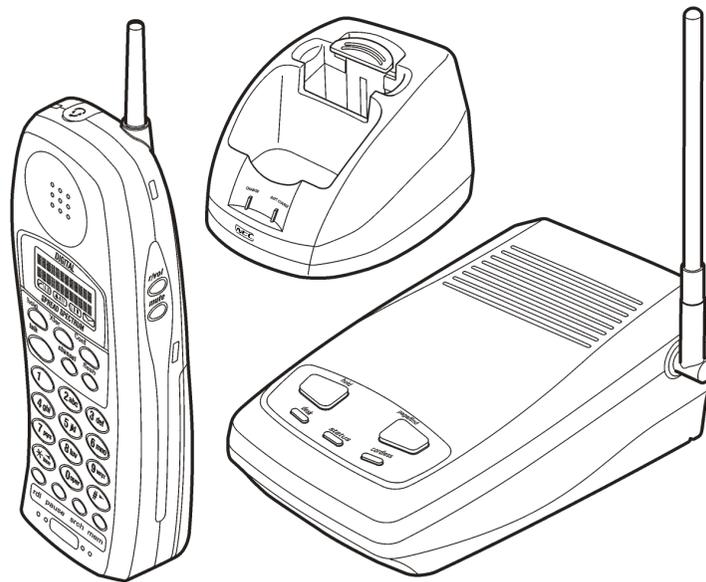
Figure 13-6 *D*^*term* Cordless II

4.2   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 IPK Multiline Terminal. Keep the base unit and the handset away from sources of electrical noise (*e.g.* fluorescent lighting).

4.3   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.

To connect the D^{term} Cordless Terminal to the host telephone:

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.

4.4   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 telephone 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.
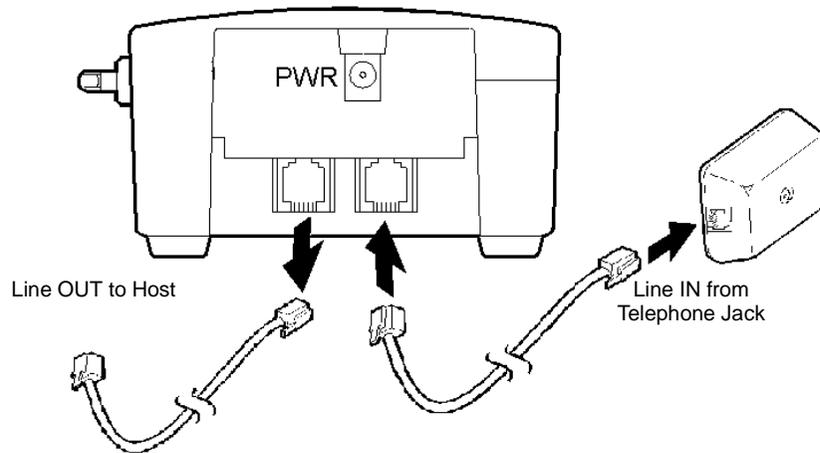
Figure 13-7 Connecting the Base Unit

SECTION 5   INSTALLING $D^{term\,®}$ HANDSET CORDLESS TERMINAL

5.1   Description

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.

5.2   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 IPK Multiline Terminal. Keep the base unit and the handset away from sources of electrical noise (*e.g.*, fluorescent lighting).

5.3   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.
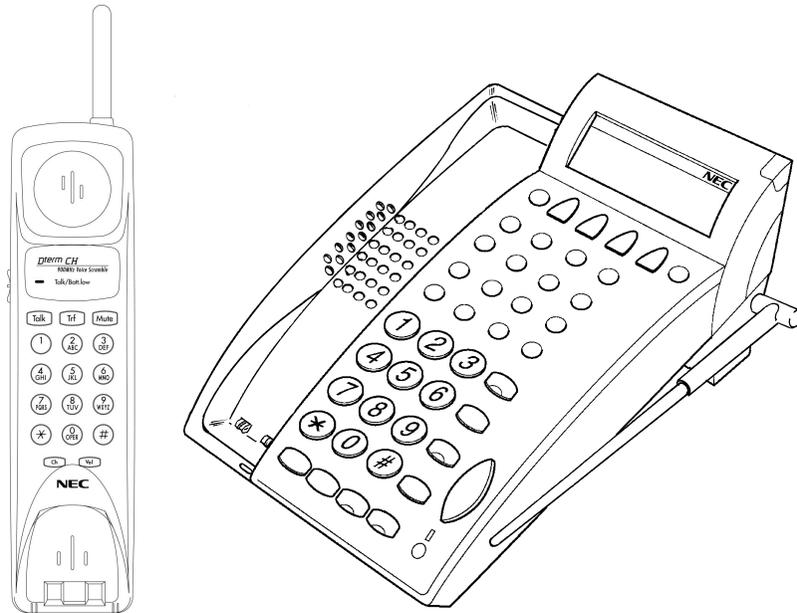
Figure 13-8 D^{term} Handset Cordless Terminal

5.4   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 6   INSTALLING A D^{term} ® ANALOG CORDLESS TERMINAL

6.1   Description

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( ) ETU or OPX(2)-U( ) ETU, an SLT(1)-U( ) ADP, or an APR-U/AP(R)-R Unit connected to the Multiline Terminal.

This terminal does not have an LCD display.

6.2   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 IPK Multiline Terminal. Keep the base unit and the handset away from sources of electrical noise (*e.g.* fluorescent lighting).

Figure 13-9 D^{term} Analog Cordless Terminal

6.3   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.

6.4   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 telephone 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. If 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 7   *D^term ®* PS II

7.1   Description

This terminal has wireless communication with a Zone Transceiver (ZT II) that is directly connected to the system.

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.
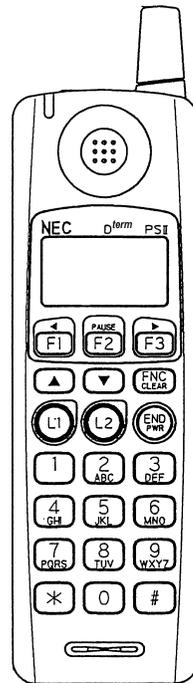
Figure 13-10   *D^term* PS II Wireless Terminal

SECTION 8 D^{term} CORDLESS LITE II

8.1 Description

This cordless terminal achieves a maximum range of 50~150 feet for transmitting and receiving in according with the highest specifications set by the FCC and IC Part 15. Range is limited by environment, and too many variables preclude a standard determination. The range quoted is for reference as a means to compare with other range claims.

Radio interference can be caused by external sources such as TV, fluorescent lighting, electrical storms, or other wireless devices. The base unit should not be plugged into a circuit with a connection to a major appliance, and the antenna should always be fully extended.

8.2 Installing the D^{term} CORDLESS LITE II

8.2.1 Selecting a Location

Select a location for the D^{term} CORDLESS LITE II terminal to avoid excessive heat or humidity. The base unit of the terminal can be placed on a desk or tabletop near a standard 120 Vac outlet and telephone line jack. The base unit can also be mounted on a standard wall plate using the wall mount adapter. Keep the base unit and handset away from sources of electrical noise (motors, fluorescent lighting, computers, PC monitor).

8.2.2 Controls and Indicators

Controls and Indicators are shown in the illustration on the next page.
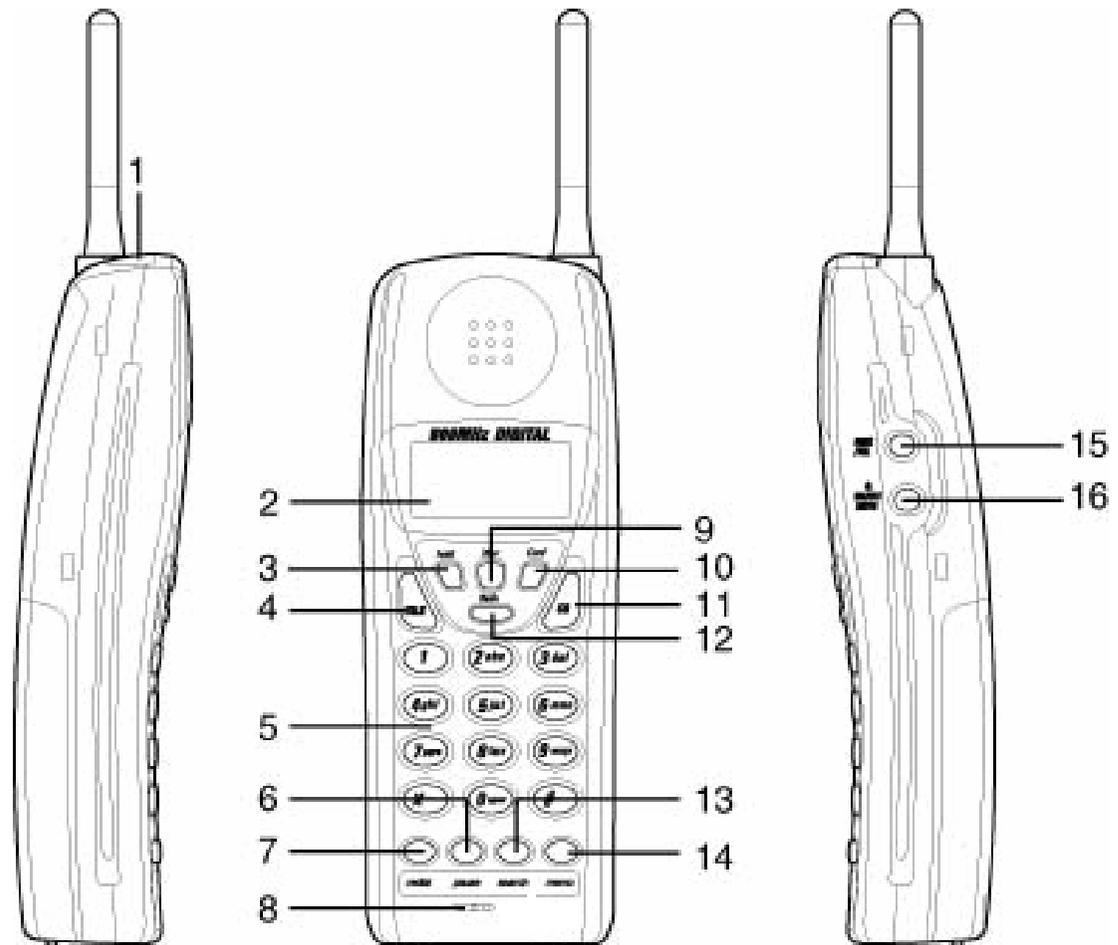
1	Headset Jack	9.	Conference (**CONF**) Key
2.	LCD Message Display	10.	Transfer (**TRANSFER**) Key
3.	Hold (**HOLD**) Key	11.	Channel (CH) Key
4.	Talk (**TALK**) Key	12.	Redial (**REDIAL**) or Desk/Cordless Softkey Switch Key
5.	Numeric Keypad	13.	F3
6.	F2	14.	F4
7.	F1	15.	Ringer/Volume (**Ring/Vol**) Key
8.	Microphone	16.	Mute (**MUTE**) Key

Figure 13-11 D^{term} **Cordless Lite II Controls and Indicators**
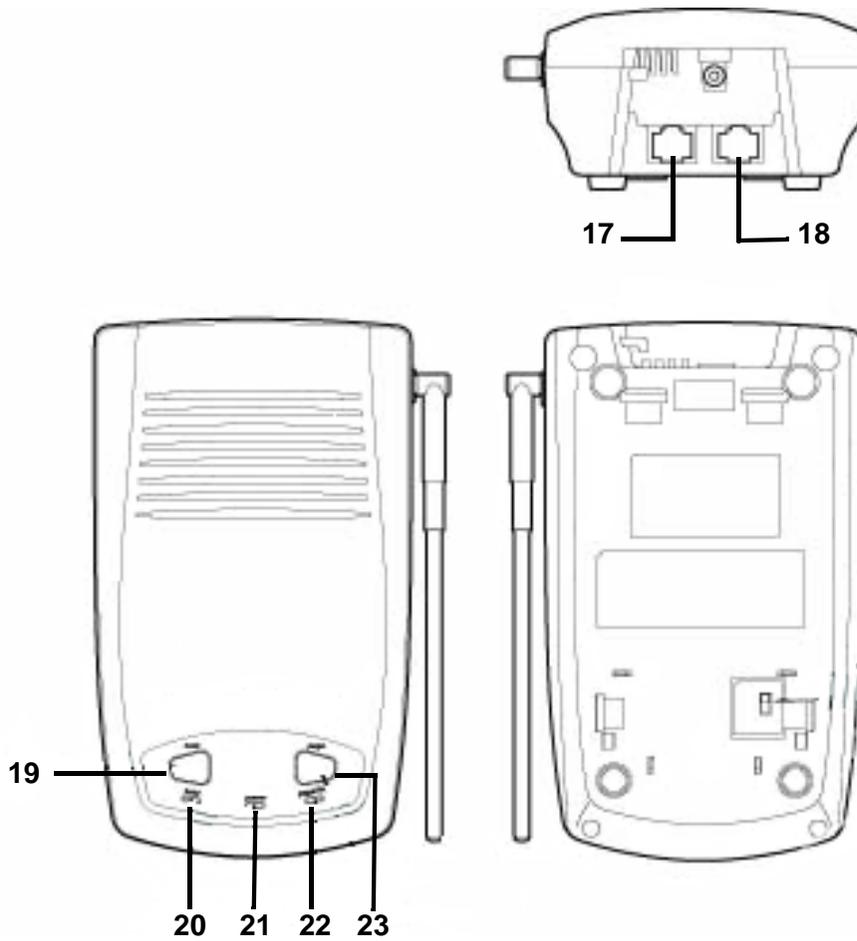
17. Line Out	21. Power
18. Line In	22. Desk LED
19. Cordless	23. Desk
20. Cordless LED	

Figure 13-11 *D^term* **Cordless Lite II Controls and Indicators (Continued)**

8.3   Installation Precautions

To ensure optimum performance follow these guidelines:

❑   Each base unit must be placed at least 15 feet apart.

❑   The base antenna should be raised to the vertical position.

❑   Always place the base unit on top of a desk or on higher shelves. Avoid locations surrounded by metal surfaces.

❑   Place the base away from any electrical component such as a PC, monitor and other telephone.

8.4   Connecting the Telephone Cords

When connecting the telephone cords, observe the following precautions:

❑   Never install telephone wiring during a lightning storm.

❑   Never touch bare telephone wires or terminals unless the telephone line has been disconnected at the network interface.

❑   Use caution when installing or modifying telephone lines.

To connect the telephone cords:

1.   Connect the cord from the telephone jack to the Base Unit LINE IN jack.

Line in From
Telephone Jack
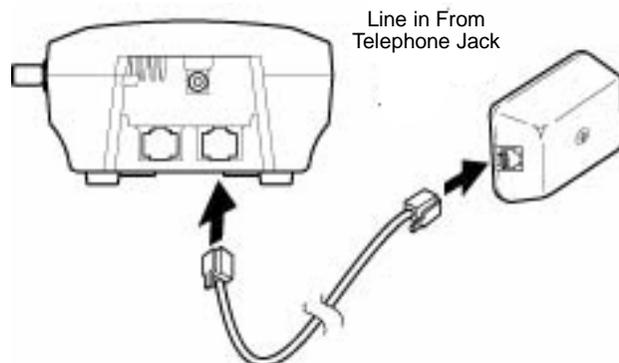
Figure 13-12 Connecting Base Unit to the Telephone Jack

2.   Connect a qualified NEC digital Multiline Terminal to the LINE OUT jack.
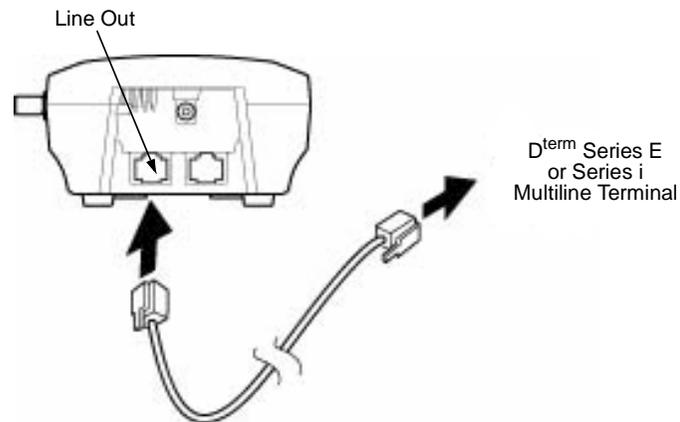
Figure 13-13 Connecting the Base Unit to the Multiline Terminal

8.5   Applying Power to the Charging Unit

The unique design of the telephone allows the user to place the handset in the charging unit with or without the belt clip attached. The battery pack is recharged automatically in the handset unit.
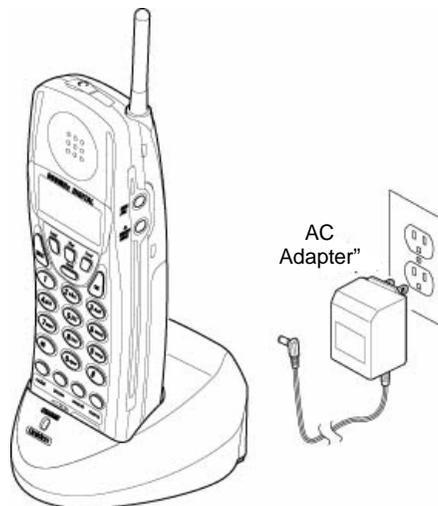
Figure 13-14 Applying Power to the Charging Unit

  Use only the supplied AC adapter for the charging unit.

The AC adapter furnished with this telephone may 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 are unable to insert the plug fully into the outlet, try reversing the plug. Refer to Figure 13-15 Polarized Plug.

When you cannot plug the AC adapter into the outlet, the outlet may need to be replaced.

AC Adapter

Wide Blade
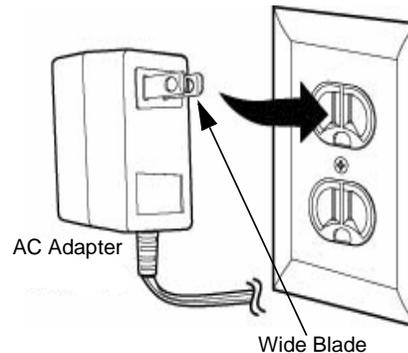
Figure 13-15 Polarized Plug

Route the power cord where it cannot create a trip hazard, or where it could become chafed and create a fire or other electrical hazards.

8.6   Wall Installation

8.6.1   Standard Wall Plate Mounting

The base unit can be mounted on standard wall plate. To attach the wall mount stand to the base unit:

1.   Slide the wall mount stand into the notches at the top of the base unit. Rotate the wall mount stand down and snap it into place.
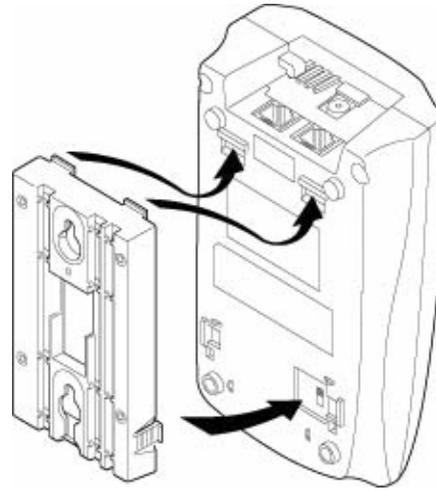
Figure 13-16 Attaching the Wall Mount Stand to the Base Unit

2.   Plug the AC adapter into the base unit.

3.   Place the AC adapter cord inside the molded channel of the
        wall mount stand.
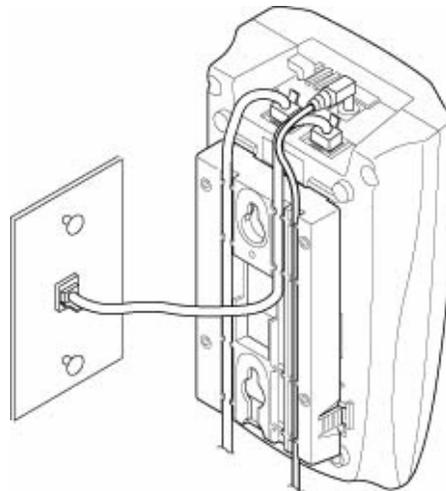
Figure 13-17 Placing the AC Adapter Cord In the Wall Mount Stand

4.   Plug one end of the short telephone cord (locally supplied) in
        the ***LINE IN*** jack on the base unit. Plug one end of the NEC
        digital multiline telephone into the ***LINE OUT*** jack. Place the
        telephone cords inside the molded channels on the bottom of
        the wall mount stand.

5.   Plug the other end of the short telephone cord into the modular wall jack in the center of the wall plate.

6.   Place the base unit on the posts of the wall plate and push down until it is firmly seated.
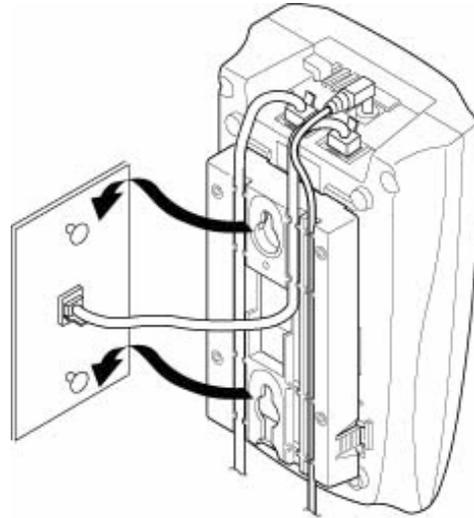
Figure 13-18 Placing the Base Unit on the Posts of the Wall Plate

7.   Plug the AC adapter into a standard 120 Vac wall outlet.

✎   Do not use an outlet controlled by a wall switch.
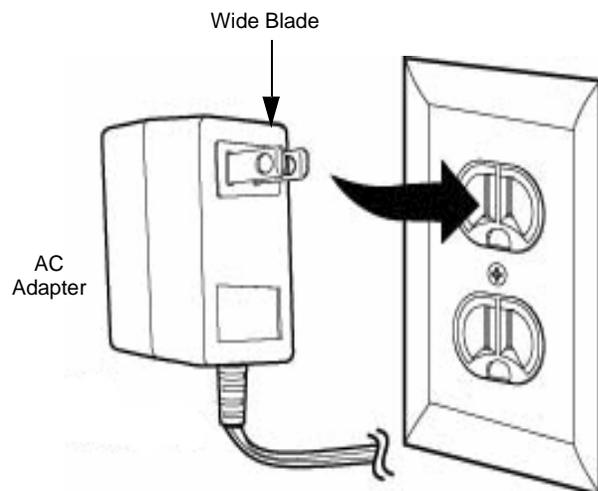
Figure 13-19 Plugging the AC Adapter into the AC Wall Outlet

8.7   Direct Wall Mounting

If a standard wall plate is not available, mount the telephone directly on the wall. Before mounting the telephone, consider the following:

❏   Select a location away from electrical cables, pipes, or other items behind the mounting location that could cause a hazard when inserting screws into the wall.

❏   Make sure the wall material can support the weight of the base unit.

❏   Use #10 screws with anchoring devices suitable for the wall material.

To mount the telephone:

1.   Insert two mounting screws 3-15/16 inches apart. Allow about 3/16 of an inch between the wall and screw heads for mounting the telephone.
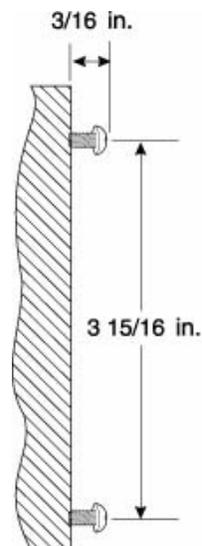
Figure 13-20   Inserting Screws into the Wall for Wall Mounting the Telephone

2.   Plug in and secure the AC adapter.

3.   Plug the AC adapter into the base unit.

4.   Plug one end of the short telephone cord in the *LINE In* JACK on the base unit. Then plug an Electra Elite IPK multiline terminal line in the *LINE OUT* jack. Place the telephone cords inside the molded channels on the bottom of the wall mount stand.
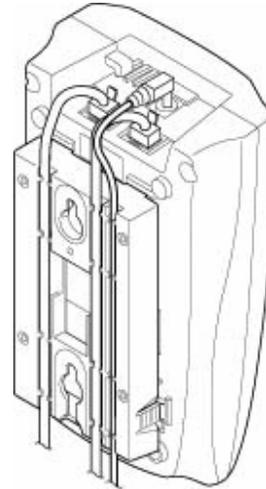
Figure 13-21 Placing the Telephone Cords in the Wall Mount Stand

5.   Place the base unit on the posts of the wall screws and push down until it is firmly seated.
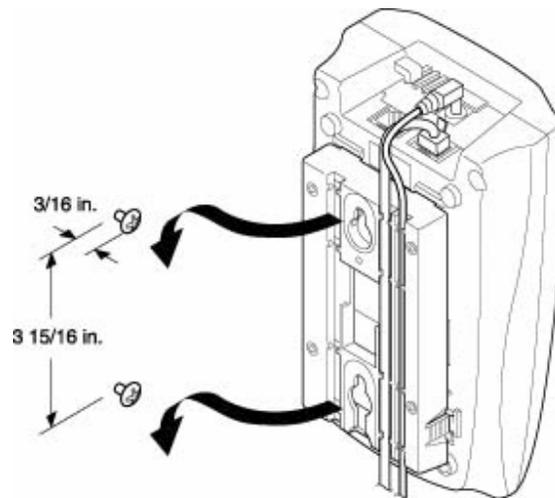
Figure 13-22 Attaching the Wall Mount Unit to the Wall

6.   Plug the other end of the short telephone cord into a telephone wall jack.

7.   Plug the AC adapter into a standard 120 Vac wall outlet. Refer to Figure 13-19 Plugging the AC Adapter into the AC Wall Outlet on page 13-21.

        ✎   Do not use an outlet controlled by a wall switch.

8.8   Charging Unit Wall Mounting

The charging unit can be wall mounted. Before installing, consider the following:

❑   Select a location away from electrical cables, pipes, or items behind the mounting location that could cause a hazard when inserting screws.

❑   Make sure the wall material can support the weight of the charging unit.

❑   Use #10 screws with anchoring devices suitable for the wall material.

To mount the charging unit:

1.   Insert two mounting screws one inch apart. Allow about 3/16 of an inch between the wall and screw heads for mounting the telephone.

TOP

3/16 in.

1 3/16 in.
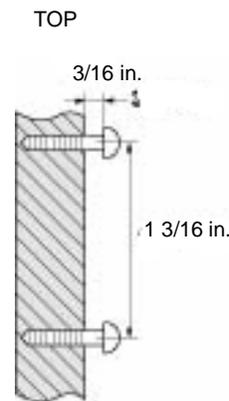
Figure 13-23 Inserting Screws for Wall Mounting

2.   Plug the AC adapter into the charging unit. Wrap the AC adapter cord around the strain relief.
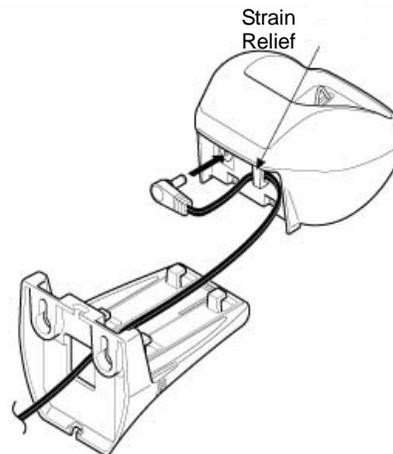
Strain
Relief

Figure 13-24 Wrapping AC Adapter Cord Around the Strain Relief Clip

3.   Plug the AC adapter into a standard 120 Vac wall outlet.

8.9   Attaching and Removing the Belt Clip

A belt clip can be used to attach the handset to a belt or pocket for convenient portability.

1.   Slide the clip into the tab slots. Press firmly until it snaps into place. The belt clip fits snugly on the handset.
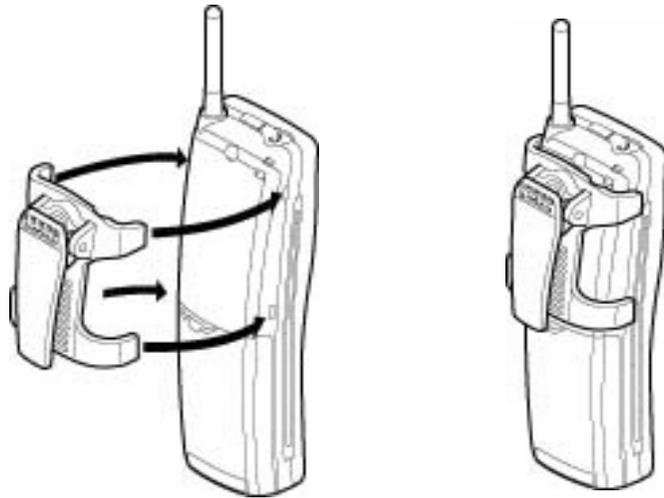
Figure 13-25 Attaching the Belt Clip to the Handset

2.   To remove the clip, press the retaining clip in toward the belt clip blade and slide the clip up at the same time.
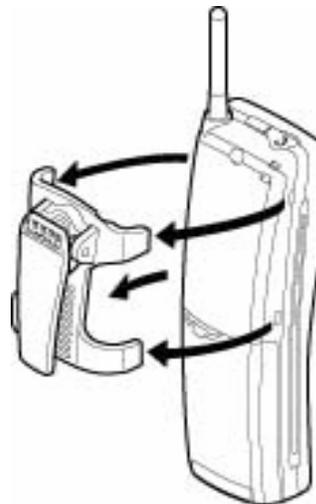
Figure 13-26 Removing the Belt Clip

8.10   Installing the Handset Battery Pack

Before installing batteries, refer to *Chapter 1 Specifications and Safety Information, Chapter 1 Specifications and Safety Information on page 1-1*. Follow safety regulations when handling batteries.

1.   To remove the battery cover, press the latch and slide the cover down and off the handset.
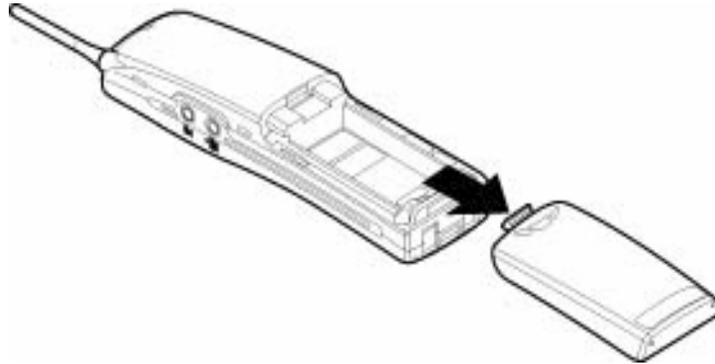
Figure 13-27 Removing the Battery Cover

2.   Slide the battery pack down into the handset.

✎   It may be necessary to remove the old battery at this time.
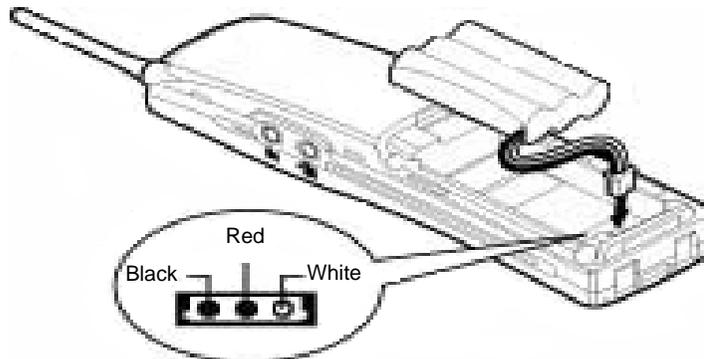
Figure 13-28 Replacing the Battery Pack

3.   Replace the cover and slide it forward until it latches.
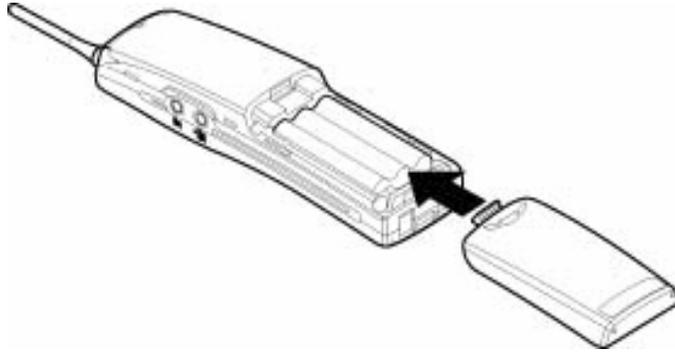
Figure 13-29 Replacing the Battery Cover

8.11   Charging the Handset Battery Pack

The rechargeable battery pack must be fully charged before using the D^{term} Cordless Lite II handset for the first time.

✎   Charge the battery pack without interruption for five to eight hours.

1.   Place the handset in the slot of the charging unit.

2.   Make sure the *CHARGE* indicator lights. If the *CHARGE* LED does not come on, check to see if the AC adapter is plugged in and that the handset is making good contact with the charging contacts on the charging unit.

   ✎   The *CHARGE* LED lights red during and after charging the handset with the battery.

8.12   Battery Hot Swap

The battery can be hot swapped while a conversation is taking place. The battery must be changed within 20 seconds otherwise, connection will be lost.

8.13   Low Battery Indications

The handset has visual and audible indicators to warn of a low battery condition. The indicators are different for standby mode and talk mode.

8.13.1   Standby Mode

The handset display turns on the battery low icon. All LEDs are turned off and LCD messages are cleared. A battery low alert tone will be emitted every 15 seconds and lasts for three minutes.
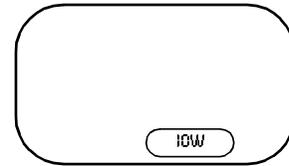
8.13.2   Talk Mode

The handset display turns on the battery low icon. All keys and functions are available. The battery low alert tone will be emitted every three seconds as long as conversation continues. After conversation is completed, the handset returns to the battery low condition in standby mode.

When you receive the low battery indication, return the handset to the base unit for charging or replace the handset battery pack with another charged battery pack.

The following table indicates what occurs and the action to be taken during a call or in standby mode when low battery indication is displayed.

Table 13-1 Low Battery

On a Call	In Standby Mode
When *batt low* is displayed:	
Only the *TALK* key operates	None of the keys operate
Handset beeps once every three seconds	Handset beeps every 15 seconds for 15 minutes
Action:	
Complete the call as quickly as possible	Cannot make a call
Replace the battery pack within 20 seconds to continue a call	Replace the battery pack before making another call

8.14   Cleaning the Battery Charge Contacts

To maintain a good charge, clean all charging contacts on the handset and charging unit about once a month. Use a pencil eraser or other contact cleaner. *Do not use liquids or solvents*.
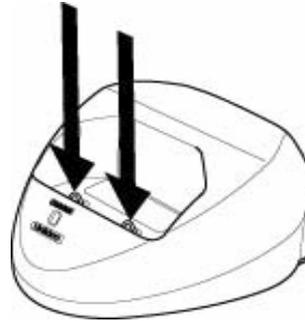
Figure 13-30 Cleaning Battery Charge Contacts

8.15   Antenna

Before using the Cordless II telephone raise the antenna to the vertical position as illustrated in Figure 13-31 Raising the Base Unit Antenna.
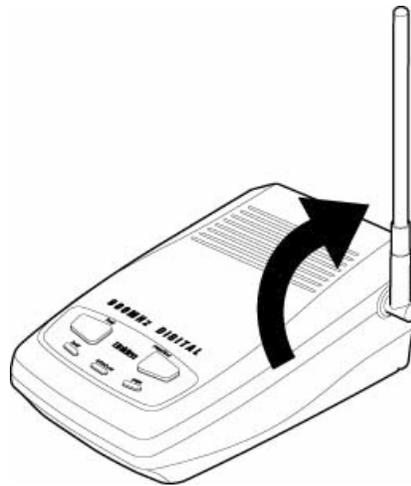
Figure 13-31 Raising the Base Unit Antenna

8.16   NEC Conference Max Plus

8.16.1   Dual Wireless Conferencing System

This dual (two conferencing pods) wireless conferencing system is ideal for small conference rooms with up to eight participants. Max Plus provides wireless One-Touch Conferencing convenience without compromising audio quality or call security. Max Plus uses either Worldwide Digital Cordless Telecommunications (WDCT) or Digital Enhanced Cordless Telecommunication (DECT) wireless standards depending on the model.

Each pod contains a rechargeable battery pack with nickel metal hydride batteries (7.2 Volts, 2200 mAh) that allows 12 hours of continuous talk time. A Base Unit that is connected to a power source and to the telephone service is required for operation of the conferencing pods
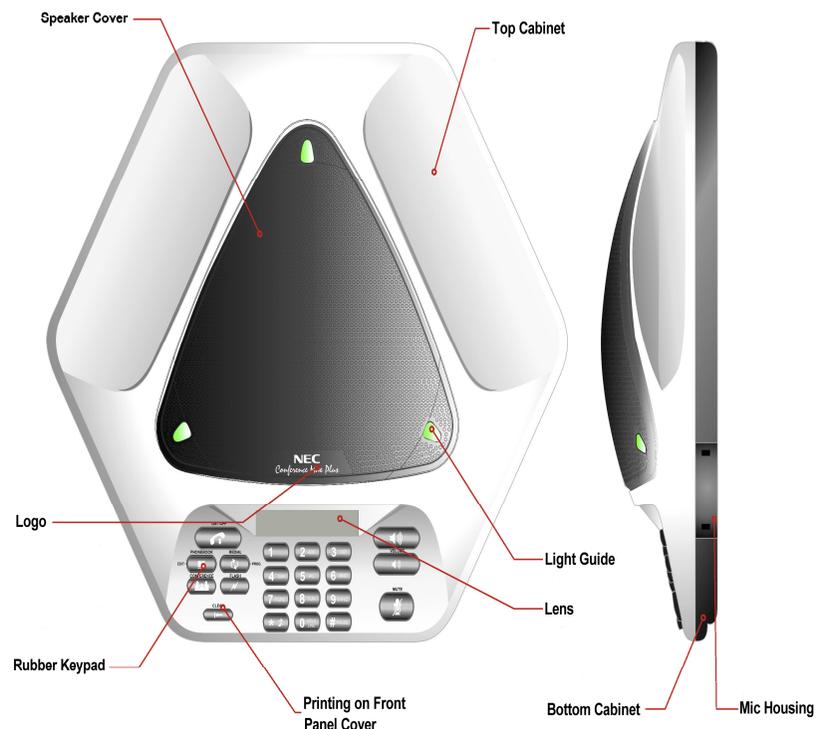
Figure 13-32 NEC Conference Max Plus

8.16.2   Installing the Base Unit

1.   Connect the provided RJ-11 cable between the Base Unit and the telephone jack.

2.   Connect the power cord to the Base Unit and plug it in an electrical outlet.

3.   If desired, Connect a recording device to the 2.5mm audio jack.

8.16.3   Connecting And Charging Batteries

1.   Slide the cover off the battery compartment on the bottom of one pod.

2.   Connect the battery pack plug in the port in the compartment and install the battery pack.

3.   Slide the cover back in place.

4.   Connect the power supply/charger to the conferencing pod and plug it in an electrical outlet.

    ✎   Charge batteries for 15 hours prior to first use.

5.   Repeat steps 1~4 for the other pod.

8.16.4   Keypad Functions

Refer to .

Table 13-2 Keypad Functions

Key	Function
ON/OFF key (telephone icon)	Press to activate the telephone and access dial tone. Press again to hang up and return to standby mode.
PHONEBOOK (book icon)	Press to dial stored numbers. Press and hold two seconds to enter Phonebook Edit mode.
REDIAL (circular arrow icon)	Press once to dial the last number called. Press and hold two seconds to enter Program mode.
CONFERENCE (three person icon)	Press to dial the conferencing service provider. This feature must be programmed.
FLASH (lightning flash icon)	Press to enable call forwarding, call waiting, or three-way calling when supported by telephone service.
CLEAR (vertical line and left arrow icon)	Press to clear the last digit entered or press and hold to clear all numbers. Press to exit programming mode.
VOLUME (loud and dim speaker icons)	Press during call to adjust call volume or press while telephone is ringing or in standby mode to adjust ringer volume.
MUTE (mike with diagonal line icon)	

8.16.5   Programming Options

To enter Programming mode, press and hold REDIAL until a diamond arrow is displayed on the LCD. Then press the applicable key and follow the instruction in Table 13-3 Programming Options.

Table 13-3 Programming Options

Menu Option	Key	Programming
Ringer Melody	1	Press REDIAL. The current melody selection flashes. Press 1~5 to change melody. Press REDIAL to save the selection.
Dialing Mode	2	Press REDIAL. The current dialing selection flashes. Press 1 for tone or 2 for pulse. Press REDIAL to save the selection.

Table 13-3 Programming Options (Continued)

Menu Option	Key	Programming
Flash Duration	3	Press REDIAL. The current duration flashes. Press 1~5 to select duration as follows: 1 = 600 ms 2 = 300 ms 3 = 150 ms 4 = 100 ms 5 = 80 ms Press REDIAL to save the selection.
Local Number✱	4	Press REDIAL. Enter the telephone number that you want displayed on the LCD in standby mode. Press REDIAL to save the number.
Conference✱	5	Press REDIAL. Enter the telephone number you want the conference key to dial. Press REDIAL to save the number.
Service✱	6	Press REDIAL. Enter the telephone number you want the O key to dial. Press REDIAL to save the number.

CLEAR   Press to return the previous menu.
             Press and hold to exit programming without saving changes.

✱   Press and hold 1 to enter hyphen or ✱ to enter a space in the number.
       Press CLEAR before entering a new number.

8.16.6   Compliance

This product is in compliance with the following regulations and requirements:

❍   FCC Part 15/ICES-003

    This product has been tested and complies with the limits for a Class A digital device

❍   FCC Part 68

    US:FBIMT01B910158015 Ringer Equivalence Number (REN):0.1B(ac)

❍   Industry of Canada (IC)

    IC: 1970A-158015: REN:0.1B(ac)

❍   European

    Council Directive 1999/5/EC

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System Maintenance

CHAPTER 14

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. When 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, do not 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)-U( ) 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 14-1 Voltage Measurement. Before the technician can troubleshoot, the correct tools must be available. Some of these are listed below:

❏   Digital or analog multimeter that can read DC and AC current and voltage and DC resistance.

❏   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 IPK system is first powered up, an initialization is performed. During this process the CPUI( )-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 14-1 Voltage Measurement.) Run this test with only the CPUI( )-U( ) ETU and the ESI(8)-U( ) ETU installed.

Table 14-1 Voltage Measurement

Voltages	Tolerance	Measuring Points
ESI(8)-U( ) ETU +5V −24V	+5 ± 0.25V −24 ± 0.25V	ESI(8)-U( ) ETU TP1 +5V TP2 GND TP3 −24V
AC Voltage (117 Vac) Line to Neutral Line to Conduit Ground Neutral to Conduit Ground	117 Vac ± 15% 117 Vac ± 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 (Refer to ➢.)	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, CPUI( )-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 CPUI( )-U( ) ETU is connected to CN4 on the CPU.

Before any programming is attempted, connect the battery on the CPUI( )-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 IPK 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 IPK 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:

❍   No access to internal dial tone on any Multiline Terminal or Single Line Telephone is installed.

❍   No LED indication, display indication, or Multiline Terminal is installed.

❍   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:

❍   Terminal Reset – Unplug the station line cord from the station and then plug it back into the station.

❍   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	14-7
2. No LED or Display Indications on any Multiline Terminal	A2	14-8
B. Partial Operations		
1. Radio Frequency Interference	B1	14-9
2. No or Intermittent CO/PBX Ring	C1	14-10
3. Call Dropping	C2	14-11
4. No Outside Dial Tone Access	C3	14-12
5. CO/PBX Dialing Problem: Cannot Dial Out on CO	C4	14-13
C. Multiline Terminal Problems		
1. Multiline Terminal Function	D1	14-14
2. Multiline Terminal Ringing	D2	14-15
3. Multiline Terminal Dial Tone Access	D3	14-16
D. Single Line Telephone Problems		
1. No Dial Tone Access on SLT	E1	14-17
2. No Ringing on SLT	E2	14-18
3. No Dial Access to SLT Features	E3	14-19
E. Low Volume Problems	F1	14-20
F. External Paging Problems	G1	14-21
G. SMDR Output Problems No Call Accounting System	H1	14-22

A1

No internal Dial Tone to any Multiline Terminal or SLT

All DC Voltages Correct?

Incorrect or No DC Voltage

Check AC Input Power.

Good

Turn system Off. Disconnect all connectors and remove all printed circuit boards except CPUI( )-U( ) ETU and the first installed ESI(8)-U( ) ETU in the basic KSU associated with the programming station.

Bad

Correct AC Power Problem.

AC Power?

Good

Dial Tone

Turn system On. Dial Tone on Multiline Terminal on 1st ESI(8)-U( ) ETU?

Bad

Replace Fuse(s).

PSU Fuses F1 and F2 good?

Good

Build system, one card at a time until problem reappears. Replace defective card.

No Dial Tone

Replace Corresponding Power Supply.

Reset ESI(8)-U10. If trouble persists, replace ESI(8)-U( ) ETU.

Yes

Done.

Problem Solved?

Yes

Dial tone?

No

No

Remove all ETUs but one ESI, and retest.

Build system one card at a time and replace bad ETU(s).

Yes

Problem Solved?

1. If problem not solved, perform First Initialization and test. If trouble persists go to step 2.
2. Replace CPUB( )-U10 and test system using default program.

No

Replace KSU.

A2

No LED or Display Indications on any Multiline Terminal

All DC Voltages OK?

Incorrect or No DC Voltage → Check AC Input Power.

Good

Terminate one Multiline Terminal from the basic KSU, 1st ESI(8)-U10 (Programming Station) directly to MDF and test.

AC Power?

Bad → Correct AC Power Problem.

Good

Turn system Off. Disconnect connectors; remove all ETUs except CPUB( )-U10 and first installed ESI(8)-U10 in basic KSU, associated with the programming station.

Terminal Indications?

Yes → Check Station Cabling.

No

PSU Fuses F1 and F2 Good?

Bad → Replace Fuse(s).

Good

Replace Corresponding Power Supply.

Terminal Installed Indication?

No Indication → Reset ESI(8)-U10. If trouble persists, replace ESI(8)-U( ).

Correct Indication

Problem Solved?

Yes → Done.

No

Indications?

Correct → Rebuild System one card at a time. If problem reappears replace defective card(s).

None

Remove all ETUs but one ESI, and retest.

Problem Solved?

Yes → Build system one card at a time and replace bad ETU(s).

No

Replace KSU.

1. If problem not solved, perform First Initialization and test. If trouble persists go to step 2.
2. Replace CPUB( )-U10 and test system using default program.

B1

Radio Frequency Interference (RFI)

Is interference only on outside calls or anytime station is off-hook?

RFI Event?

On CO calls only

Remove one CO line at MDF and test using standard SLT.

No

Multiline Terminal off-Hook

RFI on CO Lines?

Check cable for the affected terminal(s).

Yes

More than 1-pair Twisted

No

Inform Telco.

Ground all unused pairs at MDF.

Twisted pair?

Cable with 1-pair twisted pair cable.

No

No

RFI Cleared?

RFI Cleared?

Yes

Yes

End

End

Follow the steps below, one at a time, and test after each step.
1.   Place a 0.01 microfarad ceramic capacitor (0.001 microfarad for FM Interference) across receiver and transmitter elements in the Multiline Terminal handset.
2.   Add a 0.01 microfarad ceramic capacitor from one transmit lead to one receive lead.

C1

No or Intermittent CO/PBX Ring

Test to see if problem occurs on one line or several lines.

One Line — Occurrence? — Several Lines

Check Memory Blocks 4-01 and 4-02 to ensure that line is programmed to ring on an installed station.

See if problem occurs on all Multiline Terminals Assigned Ringing.

Ringing Assigned? — Yes

Occurrence? — All Terminals

Occurrence? — Not all terminals

No

Program ring assignment and test.

Replace one terminal that has problems.

Still have Problem? — Not Cleared

Program station for off-hook and day/night ring, deny DND feature, and test again.

Cleared

Yes — Corrected? — No

End.

Return defective Multiline Terminal for repair.

See if affected lines can be isolated to One COI(8)-U10 ETU.

No — Corrected? — Yes

Done.

1 COI(8)-U10 ETU? — Yes

Reset/ Replace COI(8)-U10 ETU.

No

Check whether or not affected lines can be isolated to one KSU.

No — Corrected? — Yes

Done.

Perform the following tests:
1. Measure CO ring voltage with AC meter (100 Vac 20 Hz) at the MDDF.
2. Perform Second Initialization.
3. Place external ringer in front of system on worst case CO line. Check if customer can hear external ringer at times when the system does not detect ringing on this line.
4. If problem is not solved, perform First Initialization and replace CPUB( )-U10. Test system using default program.

Yes — Basic KSU? — No

Replace Ribbon cable between KSUs.

C2

Call Dropping

See if problem exists
on all Lines.

No   Calls
dropped on   Yes
all lines?

No   All
lines at same   Yes
time?

Check outside line key
after call drops.

Check DC voltages with
a meter and AC power
with a line disturbance
analyzer.

On   CO   Off
Check COI(8)-U10 LED.   Line Key
LED Status?

Have Telco check line circuits.
Increase Automatic Release
Signal Detection Time.   Refer to
Memory Block 3-40.

Off
COI(8)-U10
LED Status?

1. Perform Second Initialization.
    If trouble persists go to step 2.
2. Replace COI(8)-U10 ETU. Test.

On

Have Telco check
Line circuit(s).

No
Problem
Solved?

Perform First Initialization.
Replace CPUB( )-U10, and
test system using default
program.

Yes

Return Defective ETU
for repair.

C3

No Outside Dial Tone Access

Multiline Terminal or SLT?

SLT → Check for Internal Dial tone.

Both ↓

All Terminals affected?

Yes ↓

Check for Internal Dial tone.

Internal Dial Tone?

No

1. Reset terminal and test.
2. Replace terminal OR Reset ESI(8)-U10 ETU and test.
3. Replace ESI(8)-U10 and test.

Check for Internal Dial tone.

Internal Dial Tone?

Yes →

No

Go to Flowchart A1.

Internal Dial Tone?

No →

Yes

1. Perform Second Initialization.
2. Reset and test SLI(4)/(8)-U10 ETU.
3. Replace and test SLI(4)/(8)-U10 ETU.

Leave an SLI(4)/(8)-U( ) ETU and an ESI(8)-U( ) ETU installed. Go to Flowchart A1.

1. Check Memory Blocks 4-07, 4-08, and 4-19 for Station Restriction.
2. Check Memory Block 4-09 for Telephone to Tenant Assignment.

Test for CO dial tone at MDF with test set, and check CO wiring.

CO Dial Tone?

Yes

No → Have Telco check lines.

Check SW 1~8 on COI(8)-U10 ETU for proper switch setting.

Check conduit and frame ground to system for ground start trunks.

1. Reset and test; replace COI(8)-U10 ETU and test. If trouble persists go to step 2.
2. Perform Second Initialization. If trouble persists go to step 3.
3. Perform First Initialization. If trouble persists go to step 4.
4. Replace CPUB( )-U10 ETU, and test using default program.

C4

CO/PBX Dialing Problem: Cannot Dial Out on CO

SLT problem only?

No — Check CO lines at MDF with test set to see if they are DTMF or DP.

Yes — Check Memory Block 4-95.

DP or DTMF?

DTMF

DP — Check Memory Block 3-92 Selection to ensure lines are programmed for DP.

Programmed for?

DP

DTMF — Program as DP.

Line type program?

DTMF — Check CO lines at MDF with test set to see if they are DTMF or DP.

DP — Check CO lines at MDF with test set to see if they are DTMF or DP.

DP or DTMF?

DTMF

DP

DP — Program lines for DTMF.

DP or DTMF?

DTMF — Program lines for DP.

Monitor Line with test set, and verify if system is sending digits.

Digits Sent?

Yes

No

1. If lines are DTMF, increase the DTMF duration in Memory Block 3-15.
2. If lines are DP, choose 10 or 20 pps option in Memory Block 3-92.
3. Check off-hook CO line current.

1. Reset COI(8)-U1- ETU. If trouble persists, go to next step.
2. Replace COI(8)-U1- ETU, and test.
3. Perform Second Initialization, and test.
4. Perform First Initialization, and test.
5. Replace CPUB( )-U10 ETU.

D1

```
                    ( Multiline Terminal Function Problems )
                                    │
                                    ▼
                                  ◇ All                    Yes
                                    terminals?  ──────────────►  [ Go to Flowchart A2. ]
                                  ◇
                                    │ No
                                    ▼
                    [ Check Memory Block 7-2 for
                      correct Station Assignment. ]
                                    │
                                    ▼
                                  ◇ Assignment    No
                                    correct?   ──────────────►  [ Reassign. ]
                                  ◇                                    │
                                    │ Yes                             ▼
                                                              ◇ Problem      Yes
                                                                solved?   ──────►  [ End. ]
                                                              ◇
                                                                │ No
```

Perform Multiline Terminal Self Test:
1. Unplug terminal line cord.
2. Hold down * and # together and plug in the line card.
3. Press each terminal key to test tones, LEDs, and key contacts.
4. Return terminal on-line by taking handset off-hook and then return to on-hook.

```
                                    │
                                    ▼
                    [ Reset and test.  Replace defective
                      terminal, and test. ]
                                    │
              Yes                   ▼              No
[ Send terminal  ◄──────────── ◇ Problem  ──────────────►  [ Connect terminal directly
  in for repair. ]               solved?                      to MDF, and test. ]
                                 ◇                                    │
                                                                     ▼
                                            No          ◇ Problem      Yes
[ Reset and test.  Replace  ◄────────────────────────────  solved?   ──────►  [ Replace station cable. ]
  faulty ESI(8)-U10 ETU. ]                               ◇
              │
              ▼
   Yes      ◇ Problem     No         [ 1.  Perform Second Initialization, and test.
[ Send ESI(8)-U10 ETU in  ◄── solved? ──────────────────►   2.  Perform First Initialization, and test.
  for repair. ]            ◇                                  3.  Replace CPUB( )-U10 ETU, and test using
                                                                 default program. ]
```

D2

Multiline Terminal Ringing Problems

Intermittent

Go to Flowchart C1. ← Problem?

Consistent

Check to see if problem occurs on CO or internal calls (including station-to-station or transferred calls).

Internal   CO

Check to see if station is call forwarded or in DID. ← Problem? → Check Memory Block 4-12.

Both

Yes   No

Yes   Check and adjust volume control, and test again.   Wrong Assignment? → Program again.

Station in Call Forward or DID?

No

Cancel feature.

Yes

Problem Solved? → Done.   Check Memory Blocks 4-01 and 4-02 for ring assignment.

No

Reset/replace station, then reset or replace ESI(8)-U10 ETU.   Yes

Wrong Assignment? → Program again.

Yes

Problem Solved? → Done.   No

Reset/replace station, then reset or replace ESI(8)-U10 ETU.

No

Yes   No

Send terminal in for repair. ← Problem Solved? →

1. Perform Second Initialization, and test.
2. Perform First Initialization, and test.
3. Replace CPUB( )-U10 ETU, and test using default program.

D3

Multiline Terminal Dial Tone Access Problems

Check to see if problem occurs
on CO or Internal call.

CO

CO or
Internal dial
tone?

Internal

Go to Flowchart C3.

Go to Flowchart A1.

Both

Go to Flowchart A1.

E1

No Dial Tone Access on SLT

Check Memory Block 7-1 for
SLI(4)/(8)-U10 ETU assignments.

Assignment correct?

No → Assign Again. → Problem solved?

Problem solved? — Yes → End.

Problem solved? — No → (continue down)

Assignment correct? — Yes →

No CO or internal dial tone?

Both → Replace SLT, and test.

CO → Check CO line dial tone on a Multiline Terminal.

Replace SLT, and test. → Problem solved?

Problem solved? — No → Go to Flowchart C3.

Problem solved? — Yes → Repair SLT.

Internal → Replace SLT, and test.

Check CO line dial tone on a Multiline Terminal. — Good →

Check CO line dial tone on a Multiline Terminal. — Bad → Go to Flowchart C3.

Replace SLT, and test. → Problem solved?

Problem solved? — Yes → Repair SLT.

Problem solved? — No →

1. Reset SLI(4)/(8)-U10 ETU, and test.
2. Replace SLI(4)/(8)-U10 ETU, and test.
3. Perform Second Initialization, and test.

Problem solved?

Problem solved? — Yes → Done.

Problem solved? — No →

Leave one SLI(4)/(8)-U10 ETU, one ESI(8)-U10 ETU, and
CPUB( )-U10 ETU installed. Go to Flowchart A1.

E2

Ringing Problem on SLT

Replace SLT.

Problem solved?

Yes → SLT defective.

No

Check to see if ringing problem is intermittent.

Intermittent Problem?

No → Check to see if SLT is call forwarded.

Yes

Call Forward?

No

Yes → Cancel call Forwarding.

Check SLI(4)/(8)-U10 ETU for ring voltage output with AC meter.

RSG Test?

Pass → Check BLF indication for station.

Fail → Replace SLI(4)/(8)-U10 ETU.

BLF Indication?

Busy → Terminate SLT on MDF.

Idle

1. Reset/replace SLI(4)/(8)-U10 ETU, and test.
2. Perform Second Initialization, and test; then perform First Initialization and test.
3. Change CPUB( )-U10 ETU, and test using default program.

BLF Indication?

Busy → Check MDF connection.

Idle → Check/replace station cable.

E3

No Dial Access to Features on SLT

Check to see if SLT can access internal or CO dial tone.

Access dial tone?

No → Go to Flowchart E1.

Yes

Check Memory Block 4-17 for feature assignment.

Feature allowed?

No → Program C.O.S. to allow feature, and test. → Good → Done.

Yes

Bad

Check Memory Blocks 1-1-46, 1-1-47, and 1-1-48 for access assignment.

Correct Access Code?

No → Recheck feature access with correct Access Code.

Yes

Recheck SLT features operation selection to verify procedure for feature.

F1

```
                          ┌─────────────────────────────────┐
                          │      Low Volume Problems         │
                          └─────────────────────────────────┘
                                          │
            No                            ◆                          Yes
      ┌───────────────────────────  All lines?  ───────────────────────────┐
      │                                                                      │
      ◆                Yes          ┌──────────┐         Yes      ◆           No
 Bridge on      ──────────────────► │ Remove it.│              All stations? ────┐
 system CO                          └──────────┘                                 │
 line?                                                                           │
      │ No                                                                       │
      ▼                          ┌──────────────────────────┐            ┌──────────────┐
┌─────────────────────────┐      │ Run a dB level test at   │            │ Replace      │
│ Move suspected bad line  │     │ DMARK on lines with 1 kHz │           │ Multiline SLT.│
│ to good COI(8)-U10 ETU   │     │ test tone. No less than   │           └──────────────┘
│ port. Move good line to  │     │ -8dB at MDF is required.  │
│ original COI(8)-U10 ETU  │     └──────────────────────────┘
│ port.                    │                   │
└─────────────────────────┘                   ▼
      │                                        ◆              Yes    ┌──────────────┐
  Port │           Line              Less than -8 dB?  ───────────►  │ Report Problem│
      ◆                                        │                     │ to Telco.     │
  Problem                                   No │                     └──────────────┘
  on port or                                   ▼
  line?                           ┌──────────────────────────┐
      │        │                  │ Replace COI(8)-U10 ETU.  │
      ▼        ▼                  └──────────────────────────┘
┌───────────┐ ┌──────────────┐
│ Reset or  │ │ Check line    │
│ replace   │ │ with dB meter │
│ COI(8)-U10,│ │ and/or contact│
│ and test  │ │ Telco.        │
│ again.    │ └──────────────┘
└───────────┘
      │
      ▼
      ◆            Yes    ┌──────┐
  Problem   ───────────►  │ Done.│
  solved?                 └──────┘
      │
   No │
      ▼
┌─────────────────────────────────────────────┐
│ 1. Perform Second Initialization, and test.  │
│ 2. Perform First Initialization, and test    │
│    with default program.                     │
│ 3. Replace CPUB(  )-U10 ETU.                 │
└─────────────────────────────────────────────┘
```

G1

External Paging Problems

Amplifier provided?

Yes

No

Install amplifier.

Place Test Set on output of paging at ECR-U10 ADP with all external wiring removed.

External page heard on test set?

Yes

No

External amplifier or wiring is defective.

Check Memory Blocks 1-1-46, 1-1- 47, and 1-1-48 for correct access code (external) for paging.

Access Code correct?

No

Yes

1. Reset/replace ECR-U10 ADP, and test.
2. Perform Second Initialization, and test; then perform First Initialization and test.
3. Replace CPUB( )-U10 ETU, and test using default program.

Retest using correct access code.

Pass

Done.

Fail

H1

SMDR Output Problems (No Call Accounting System)

Incoming problem only?

No

Yes → Check Memory Block 1-5-26 for print selection.

Printer RS-232C compatible?

No → SMDR requires RS-232C connection.

Yes → Compare each parameter between printer and MIFM-U10 Unit:
1. Baud rate 300~4800
2. ASCII serial output
3. 7- or 8-bit word
4. 1 or 2 stop bits
5. Even, Odd, or no Parity

Install MIFM-U10 in Option or IF1~4 slot.

MIFM-U10 in correct slot?

No → (Install MIFM-U10 in Option or IF1~4 slot.)

Yes

Parameter match?

Yes

No → Set correct parameters.

LED1 on MIFM ON or Off?

On

Off → If On/Off switch on MIFM-U10 is off, turn it on.

LED On → Test for proper operation.

LED Off → Check MIFM-U1 in another slot.

1. Refer to Installation Service Manual for RS-232C cable connection.
2. Perform printer self test.
3. Use a breakout box, and ensure that pins 4 and 20 are logic high from printer to MIFM-U10.

LED1 on MIFM ON or Off?

On → Recheck in original slot.

Off →
1. Perform second Initialization. if LED is off:
2. Replace MIFM-U10. if LED is off:
3. Replace CPUB( )-U10.

High?

No → Replace printer or modify cable.

Yes

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Glossary of Abbreviations   APPENDIX A

The following table includes common abbreviations used throughout this document that are listed in alphabetical order.

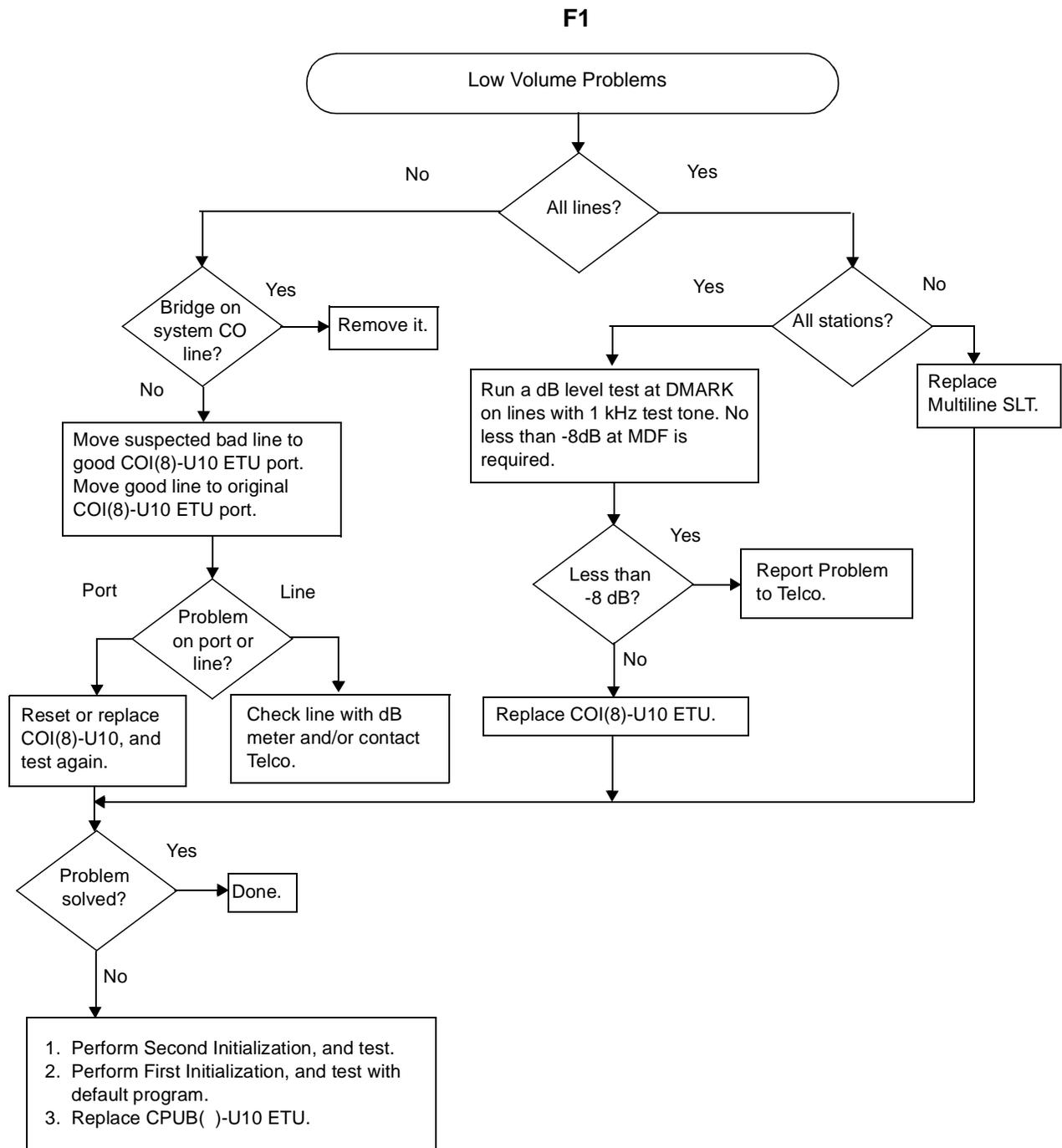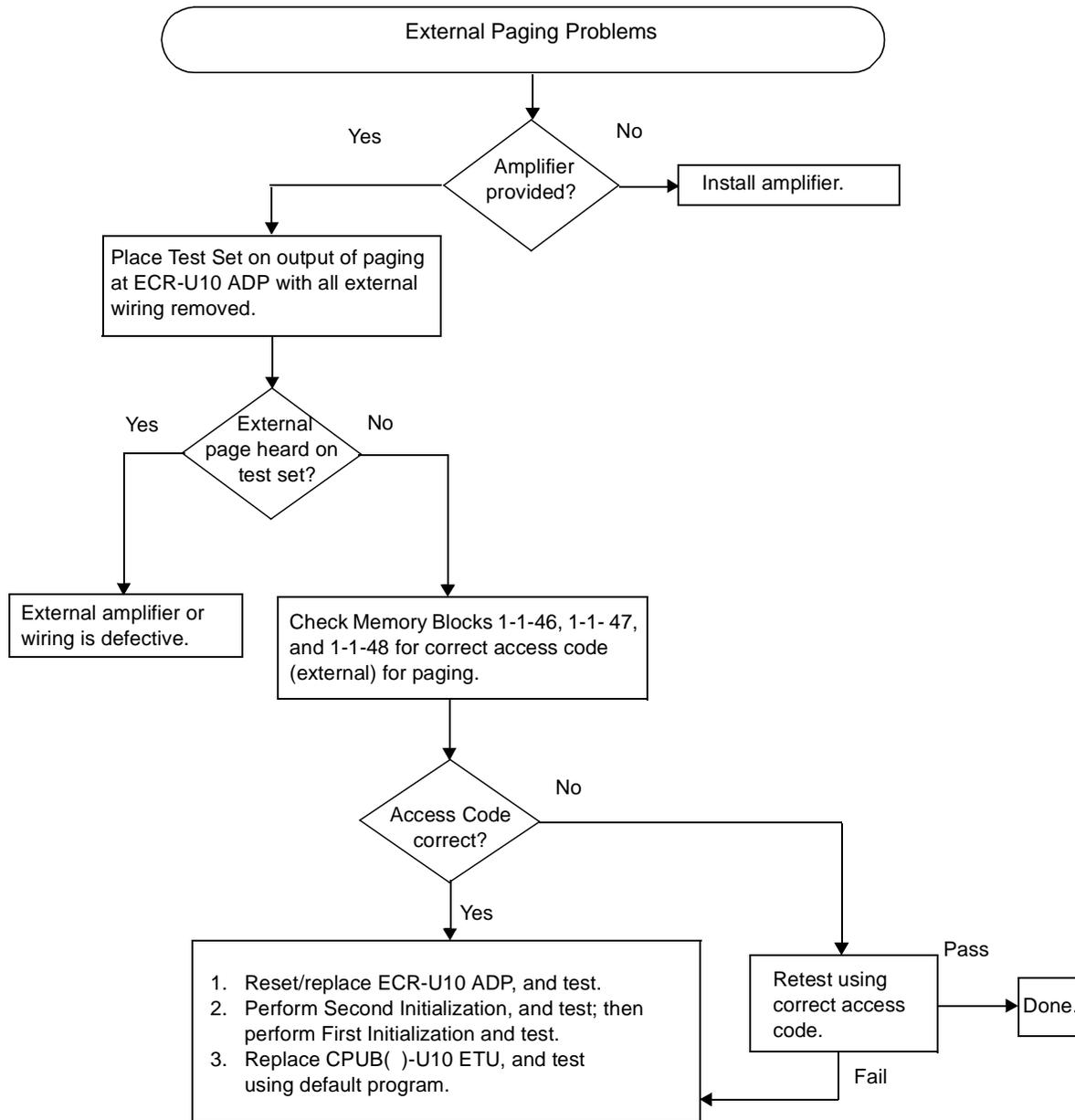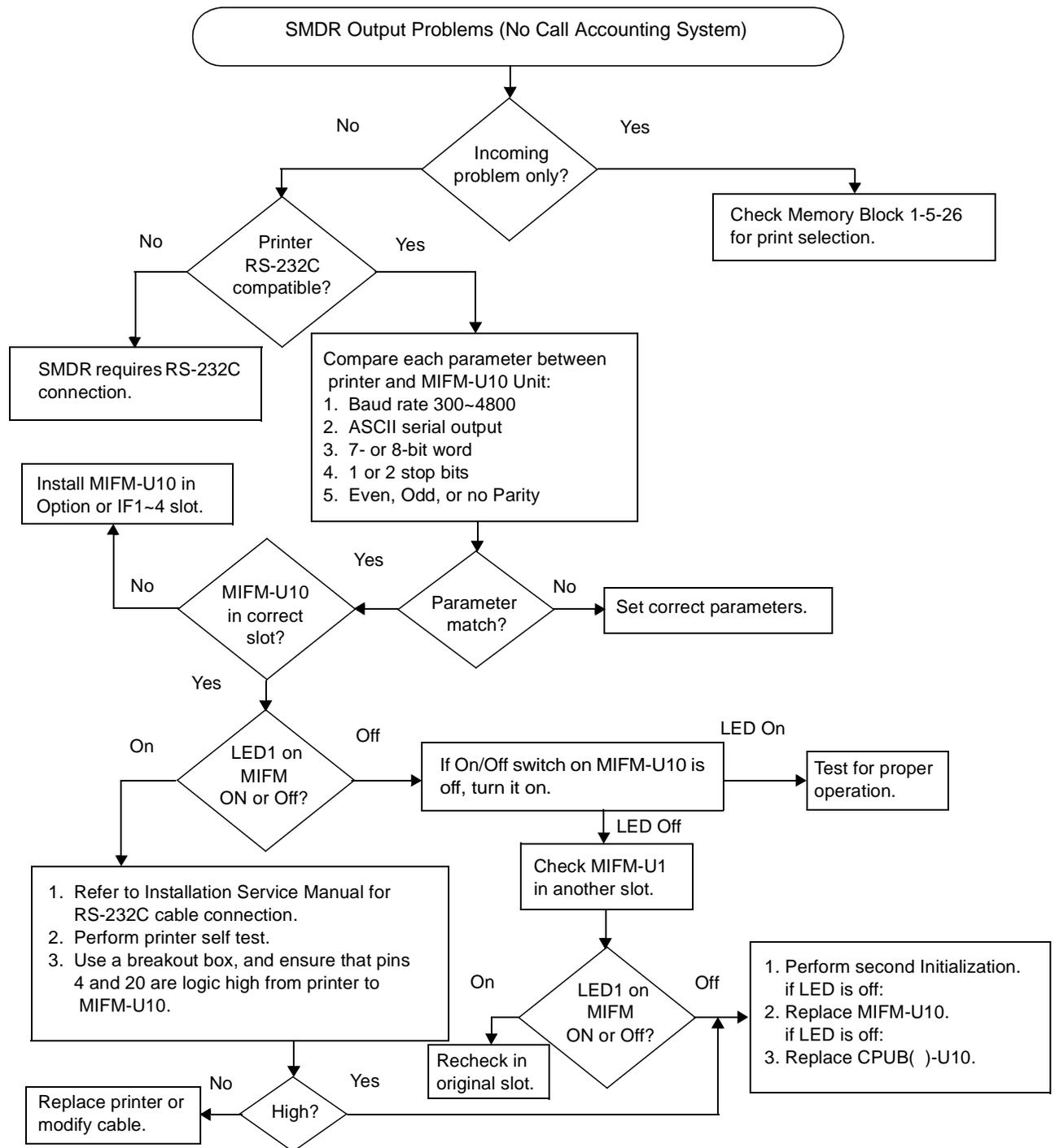| Abbreviations	Definition
ACD	Automatic Call Distribution Provides a cost-effective method for supervising incoming telephone traffic and associated staff activity.
AIS	Alarm Indication Signal Replaces the normal traffic signal when a maintenance alarm indication is activated. An AIS signal is transmitted downstream to indicate an upstream failure was detected.
BHCA	Business-Hour Call Attempts The number of times a telephone call is attempted during the busiest hour of the day.
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	Cyclic Redundancy Check 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.
DN	Directory Number Unique number (telephone number) assigned to each telephone or data terminal.
ISDN	Integrated Services Digital Network An international plan to migrate the public switched network to the universal implementation of standard digital technology.
LBO-Line Build Out	A combination of induction, capacitance, and resistance is added to a cable pair to increase its electrical length by a desired level of impedance and loss characteristics.
Local Loop Back	An internal process where data goes through the entire chip during Transmit and Receive cycles.
Line Loop Back	Allows the user to check Transmission Line Continuity.
LSA	Line Synchronization Alarm Detection An FT1 trunk looses 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.
LCR	Least Cost Routing A feature that automatically chooses the lowest cost telephone line to the destination.
OOF	Out-of-Frame Condition 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.
OPX	Off-Premise Extension A telephone that is located in a different office or building from the main phone system. The OPX is connected by a dedicated telephone line. This extension has all abilities of the telephone system.

Abbreviations	Definition

PRI	Primary Rate Interface
	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.
	PRI has two standards:
	    U Interface for 2-wire
	    T Interface for 4-wire

SLIP	Serial Line Internet Protocol An Internet protocol is used to run IP over serial lines such as telephone circuits. IP is 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.
SMDR	Station Message Detail Recording A feature that collects and records information on outgoing calls by station.
SPID	Service Profile Identifier ISDN service is ordered with certain parameters. The SPID is an 8- to 12-digit number that uniquely identifies the service ordered. The telephone company assigns an SPID for every phone number. Each ISDN BRI line usually has two telephone numbers. 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 telephone, fax, or PC software. Without this number, ISDN services cannot be accessed.
VoIP	Voice over Internet Protocol The ability to carry normal telephone-style voice over an IP-based internet with POTS-like functionality, reliability, and voice quality. 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.

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NEC

Electra**Elite** IPK