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Electra™

PROFESSIONAL

LEVEL I

GENERAL DESCRIPTION MANUAL

November 1998

NEC America, Inc.

ND-021201

Issue 5

THIS MANUAL
This General Description Manual provides general information about the Electra Professional Level I system, its features, configuration, service features, specifications, and **standards.**

This General Description Manual will serve as a valuable tool when selecting a customized configuration for your specific requirements.

SUPPORTING
DOCUMENTS
In addition to the General Description Manual, the Electra Professional Level I system is supported by the following manuals:

Electra Professional Level I Features and Specifications Manual
(Stock No. 722001)

Provides expanded descriptions of each feature that are available to the Electra Professional Level I system. In addition, the Features and Specifications Manual provides Station Applications, Operating Procedures, and Service Conditions.

Electra Professional Level I Installation Service Manual (Stock No. 722002)

Designed and developed for the Service Technician, the Installation Service Manual provides detailed instructions for system installation, programming, and maintenance.

Electra Professional Level I Station Operations Manual (Stock No. 722003)

This manual explains in detail the station operations for all station user features. This manual is designed for use by installers and end users.

Electra Professional Level I Job Specifications Manual (Stock No. 722004)

Used in conjunction with the Installation Service Manual, the Job Specifications Manual is designed for the Service Technicians who are responsible for planning the system installation, maintaining the system, and keeping records of system programming and configuration. (This manual is included with each KSU.)

REGULATORY INFORMATION

**GENERAL
INFORMATION**

The Federal Communications Commission (FCC) has established rules that 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 will not be provided on party lines or coin lines.

The telephone company may make changes in its technical operations and procedures. If such changes affect the compatibility or use of the system, the telephone company is required to give adequate notice of the changes.

**COMPANY
NOTIFICATION**

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

1. Your telephone number.

2. FCC registration number:

    ı   If the system is to be installed as a Key System (no dial access to outside lines), use the following number:

    ### AY5THA-74138-KF-E

    ı   If the system is to be installed as a Multi-Function System (dial access), use the following number:

    ### AY5THA-74139-MF-E

    ı   Ringer equivalence number:

    ### 2.0B

    ı   USOC jack required:

    ### RJ11C, RJ21X

    ı   Facility Interface Code (FIC):

    ### 02LS2

**INCIDENCE
OF HARM**

If the system is malfunctioning, it may also be causing harm to the telephone network. The telephone system should be disconnected until the source of the problem can be determined and the repairs can be made. If this is not done, the telephone company may temporarily disconnect service.

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

IMPORTANTNOTE

"This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the Installation Service Manual, may cause interference to radio communications. This equipment has *been tested and approved for compliance with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to 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, will be required to take whatever measures may be required to correct the interference."*

HEARING ,
AID
COMPATIBILITY   The NEC Multiline Terminals and Single Line Telephones that are 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. FCC rules prohibit the use of non-hearing aid compatible telephones (after August 16, 1989).

SERVICE
REQUIREMENTS   In the event of equipment malfunction, all repairs must be performed by an authorized agent of NEC America, Inc. or by NEC America, Inc. to keep the equipment warranty in effect. It is the responsibility of users requiring service to report the need for service to one of NEC America, Inc.'s authorized agents or to NEC America, Inc.

UL REGULATORY
INFORMATION   This equipment has been listed by Underwriters Laboratories and found to comply with all applicable requirements of the standard for telephone equipment UL 1459 2nd Edition.

BATTERY
DISPOSAL

The Electra Professional Level I system includes the following batteries. When disposing of these batteries, KSUs and/or KTUs, you must comply with the rules and regulations of your state regarding proper disposal procedures.

Unit Name	Type of Battery	Quantity
ESF-C-10 KSU	Lead Acid	2
	Lithium	1
VRS-C(1)-11 KTU	NiCad	1
SMDR-C-10 KTU	NiCad	1

IMPORTANT SAFEGUARDS FOR BATTERY DISPOSAL

The product that you have purchased contains a rechargeable battery. The battery must be recycled or disposed of properly. At the end of its useful life, under various state and local laws, it may be illegal to dispose of this battery into the municipal waste stream. Check with your local solid waste officials for details in your area for recycling options or proper disposal.

Nickel-Cadium (or sealed lead) batteries must be returned to a federal or state approved Nickel-Cadium (or sealed lead) battery recycler. This may be where the batteries were originally sold or a local seller of automotive batteries. In Minnesota call 1-800-225-PRBA if further disposal information is required, or call l-800-232-9632 for further information.
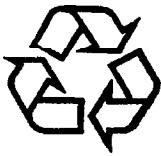
BATTERY AND PACKAGE LABELING

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

Ni-Cd

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

Pb

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INTRODUCTION

SECTION 1   CORPORATE OVERVIEW

Founded in 1899, NEC is the only corporation in the world to be consistently ranked among the top 10 vendors of computers, communications, and integrated circuits.

NEC America, Inc., a subsidiary of NEC Corporation, was founded in 1963. From that single sales office in downtown Manhattan, NEC now has multiple sales and service locations to serve all of the United States, Canada, and Puerto Rico with a diverse portfolio of telecommunications products. NEC America was the first telecommunications manufacturer to offer skinny-wire and digital key telephone systems.

SECTION 2 .   SYSTEM OVERVIEW

The Electra Professional Level I system is a complete communications system which enhances productivity and controls costs. Its design objectives were based on four **"E"s** -- Easy to Install, Easy to Maintain, Easy to Expand, and Easy to Use -- all at a reasonable price. The Electra Professional Level I system, like all NEC communications products, is user-friendly, reliable, and cost-effective,

- *Easy to Install*
  With the Electra Professional Level I system, NEC has reduced the number of hardware components, making the system easier to install. For convenience and versatility, end-user programming is provided for some system features.

I *Easy to Maintain*
  If power is lost, the Electra Professional Level I system will continue to function for approximately 10 minutes or until power is restored.

a *Easy to Expand*
  The Electra Professional Level I system offers a basic Key Service Unit (**KSU**) plus expansion modules providing easy and cost-effective growth.

  The Electra Professional Level I KSU (**ESF-C-10**), offers four **CO/PBX** lines and eight stations. The expansion modules COI-C(2)-10, **COI-C(2A)-10**, and **ESI-C(8)-11 KTUs** can be added to expand the system to a maximum of eight **CO/PBX** lines and 16 stations. The system software version 3.0 or higher is required to expand beyond six **CO/PBX** lines.

I *Easy to Use*
  The Electra Professional Level I system is **Centrex** compatible, allowing maximum flexibility and ease of use. One-Touch key access can be programmed for most features, including **Centrex** options and Speed Dial capabilities. Voice Mail integration and Automated Attendant gives the system that personal touch so important in a well run business. Most types of communication equipment can be connected to the system including facsimile machines and modems.

● *User Interface*

The Electra Professional Level I system offers a choice of six terminals, available in black and soft white: an 8-line key and a 16-line key display type (with and without DSS/BLF keys). Speakerphones are standard, providing full handsfree operation. The large Liquid Crystal Display (LCD) provides call status data and programming information.

SECTION 3   SYSTEM DESCRIPTION

The Electra Professional Level I system is based on a fixed port concept. A total of 24 ports can be equipped. Telephones, outside lines, and other circuits and devices are supported by the KSU. The maximum number of devices that can be supported by the system include:

● Fixed Ports:	24 max.
● Outside (CO/PBX) Lines:	8 max.
● Multiline Terminals:	16 max.
● Internal Talk Paths (Multiline Terminal):	Non-Blocking
● Single Line Telephone Adaptors:	4 max.*

     * Each Single Line Telephone adaptor uses a Multiline Terminal port.

● Facsimile Connection:	1 max.

Design Technologies:

● Non-blocking time division switching for Multiline Terminals

● Stored program control

● Distributed processing based on the use of microprocessors

Design Goals:

● Modular Growth

● Variety of Terminals

● Ease of Use

The Electra Professional Level I system is a microprocessor based, stored program controlled, digital communication system, using the Pulse Code Modulation (PCM) technique.

The system is composed of a central equipment cabinet and telephones located throughout the installation site. The central equipment cabinet is composed of the Key Service Unit (KSU). One KSU is required for each system as shown in Figure 1-1 - Electra Professional Level I KSU.

The KSU is designed for modular growth. It can be wall mounted and quickly interconnected. Printed circuit boards, called Key Telephone Units (KTUs), are available to provide interface to equipment that is external to the KSU.

Interface KTUs are installed in the KSU to support the various telephones, outside lines, and other devices or features. The Basic KSU provides the interface to four CO/PBX lines and eight stations. The KSU can be expanded to accommodate up to eight CO/PBX lines and 16 stations.
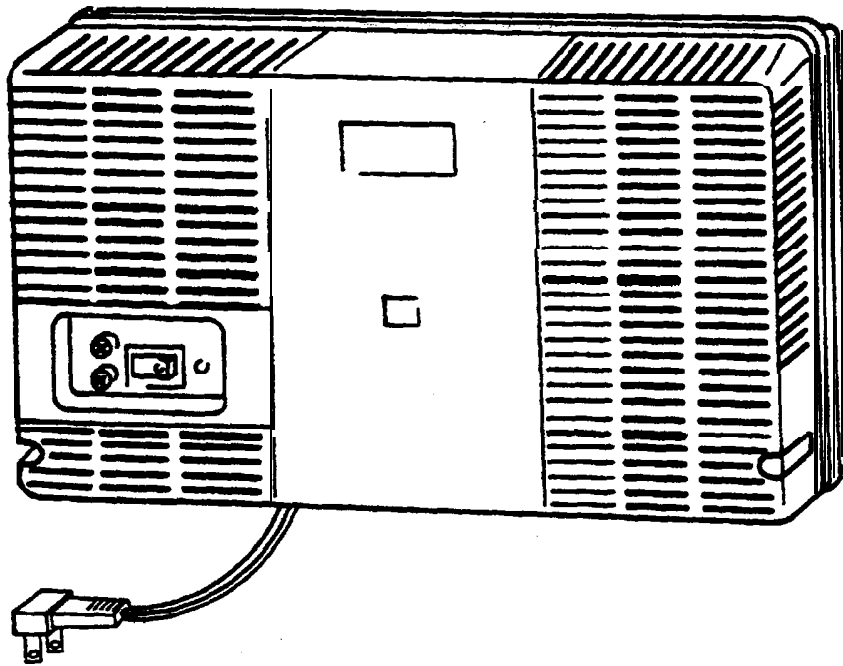
Figure 1-1   Electra Professional Level I KSU

The Electra Professional Level I system allows a variety of telephones to be connected to the system. The different needs of the customer may require various types of telephones. The following Electra Professional and Electra El ite telephones can be installed in the system:

Electra   Professional   Terminals

● **8-line** Multiline Terminal without display, available in black ETW-8-1 **(BK)** TEL and soft white ETW-8-l (SW) TEL.

● **16-line** Multiline Terminal with display, available in black **ETW-16DC-1 (BK)** TEL and soft white **ETW-16DC-1** (SW) TEL.

● l&line **Multiline** Terminal with display and DSS keys, available in black **ETW-16DD-1 (BK)** TEL **and** soft white **ETW-16DD-1** (SW) TEL.

● Single Line Telephone with DTMF dial, with or without a message waiting lamp.

Electra Elite Terminals

- **8-line** Multiline Terminal without display, available in black **DTU-8-( )** (BK) TEL and soft white **DTU-8-( )** (WH) TEL.

- **16-line** Multiline Terminal without display, available in black DTU-18( ) (BK) TEL and soft white **DTU-16-( )** (WH) TEL.

- **16-line** Multiline Terminal with display, available in black **DTU-16D-( )** (BK) TEL and soft white **DTU-16D-( )** (WH) TEL.

- **32-line** Multiline Terminal without display and 16 programmable One-Touch keys,, available in black DTU-32-( ) (BK) TEL and soft white DTU-32-( ) (WI-I) TEL.

- **32-line** Multiline Terminal with display and 16 programmable One-Touch keys **DTU-32D-( )** (BK) TEL and soft white **DTU-32D-( )** (WH) TEL.

Comparison of Electra Professional and Electra Elite Terminals

The Electra Professinal terminals and Electra Elite terminals have similar capabilities. However, there are a few differences which are listed below:

- Electra Elite Multiline Terminals use the green/red pair at the wall jack instead of the yellow/black pair used with the Electra Professional Multiline Terminals.

- The Electra Professional **ETW-8-( )** and Electra Elite **DTU-16D-( )** have the same line capacities.

- The Electra Professional **ETW-16DC-( )** and Electra Elite **DTU-16D-( )** have the same line capacities.

- The Electra Elite **DTU-32D-( )** has four fewer One-Touch keys when compared to the **ETW-16DD-1.**

- The Electra Elite Multiline Terminal provides the full-duplex speakerphone option with push-to-mute capability.

- The Electra Elite Multiline Terminal has a builit-in headset jack.

I The Electra Elite Multiline Terminal has a built-in wall mount unit.

- The Electra Elite Multiline Terminal has a longer handset cored (12 feet).

- The Electra Elite Multiline Terminal has snap-in opiton units for easy installation.

- The FNC key on the Electra Professional Multiline Terminal performs the same operation as the Feature key on the Electra Elite Multiline Terminal.

- The **LNR/SPD** key on the Electra Professional Multiline Terminal performs the same operation as the Redial key on the Electra Elite Multiline Terminal.

- Handset/Headset Mute is not supported on Electra Elite Multiline Terminals.

- The Electra Elite Multiline Terminal display adjusts to a greater angle.

- The Electra Elite **Multiline** Terminal has a matte finish.

[Refer to Figure l-2 ▪ Electra Professional Multiline Terminals, Figure 1-3 ▪ Electra Elite Mulitiline Terminals, Figure 1-4 ▪ Single Line Telephones, and Figure 1-5 ▪ Hotel/Motel Telephones.]

ETW-8-1(BK)/(SW) TEL   ETW-16DC-1(BK)/(SW) TEL

ETW-16DD-1(BK)/(SW) TEL

Figure 1-2   Electra Professional Multiline Terminals
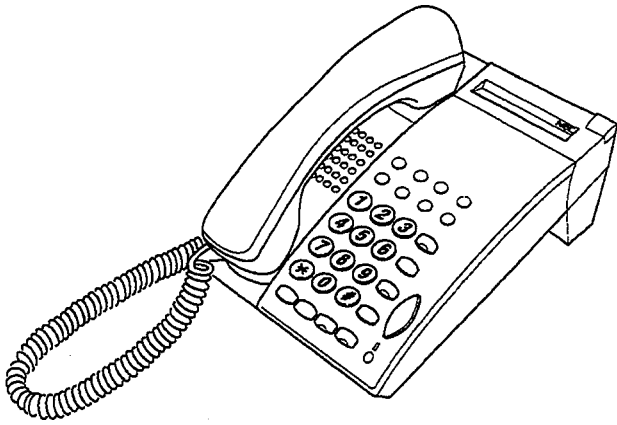
DTU-8-( ) (BK)/(WH) TEL
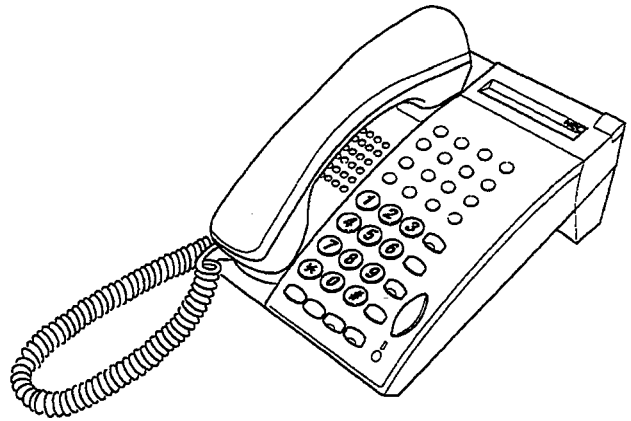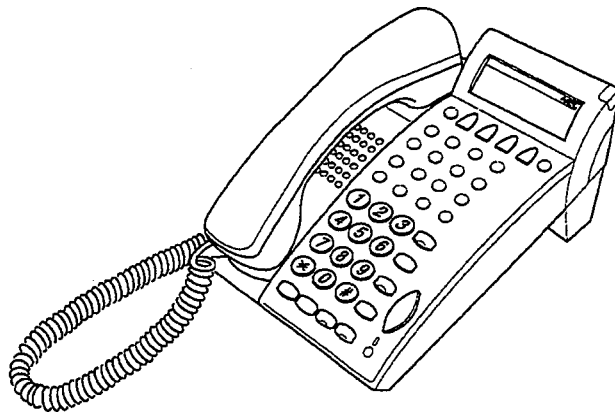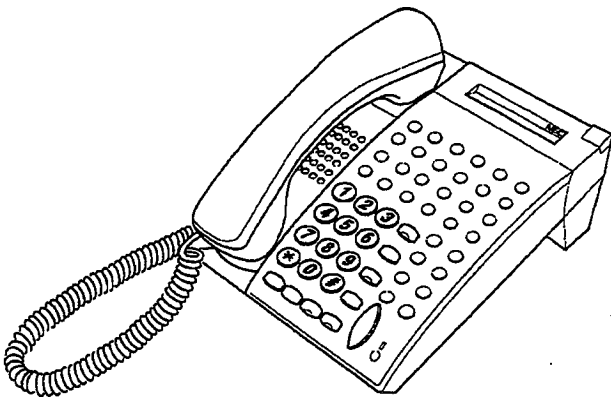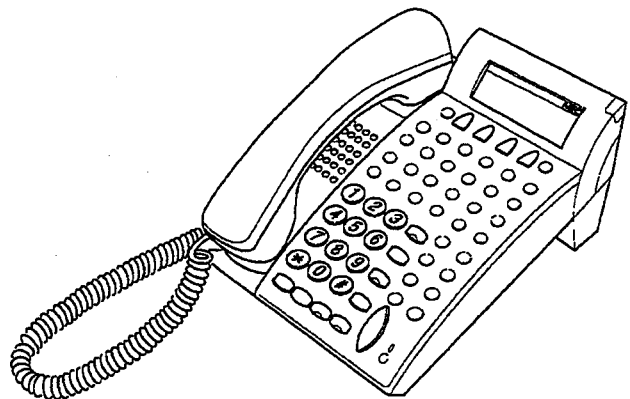
DTU-16-( ) (BK)/(WH) TEL

DTU-16D-( ) (BK)/(WH) TEL

DTU-32-( ) (BK)/(WH) TEL

DTU-32D-( ) (BK)/(WH) TEL

Figure 1-3   Electra Elite Multiline Terminals

ETE-1-2 TEL

ETJ-l-1 (SW) TEL

Figure 1-4   Single Line Telephones
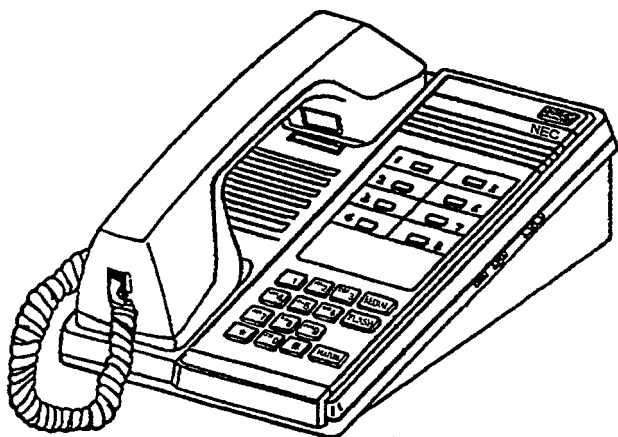
ETE-1HM-2J TEL

ETJ-1HM-1 (SW) TEL

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v-4   VRS - Hold Message

v-5   VRS - Internal Message

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SECTION 2   FEATURES DESCRIPTION

A-l   ADD-ON CONFERENCE

The Add-On Conference feature allows a conference call with a maximum of four parties with various combinations of CO/PBX lines and stations. This increases efficiency by allowing multiple parties to enter into a conversation. Up to two, 4-party conferences are allowed with no more than two outside lines per conference.

A-2   ALL CALL PAGE

The All Call Page feature allows simultaneous paging (internal and external) of all idle Multiline Terminals in a system over their built-in speakers and over the External Paging speaker. This enables a person, away from their desk but within hearing distance of a Multiline Terminal or external speaker, to respond to the paging call.

A-3   ALPHANUMERIC DISPLAY

The 16-key Multiline terminals are each equipped with a 16-character by 2-line Liquid Crystal Display (LCD). These displays are used to provide information such as: date/time, elapsed call time on outside calls, digits dialed, internal calling party number, and Speed Dial entries.

A-4   ANCILLARY DEVICE CONNECTION

The Ancillary Device Connection feature allows installation of selected peripheral (ancillary) devices such as an amplified handset, headset, or external speakerphone for use on any Multiline Terminal with an optional ADA(l)-W (BK)/(SW) Unit. This feature enhances operation for which the peripheral devices are designed. A headset frees the user's hands for order entry, checking files, etc. In addition, an ADA(2)-W (BK)/(SW) Unit allows connection of single line equipment such as a cordless Single Line Telephone, modem, facsimile machine, automatic dialer, or answering machine. Version 2.0 or higher software is required to install an ADA(2)-W (BK)/(SW) Unit.

A-5   ANSWER HOLD

The Answer Hold feature enables Multiline Terminal users to answer incoming ringing calls on a CO line key by pressing the flashing ANS key. If the Multiline Terminal user is already engaged in a call, the first call is automatically placed on Non-Exclusive Hold when the second call is answered. Answer Hold is particularly useful at Attendant Positions or other central answering positions. Use of the ANS key speeds call handling, while Answer Hold prevents accidental call dropping.

A-6   ANSWER KEY

Multiline Terminals are equipped with an ANS key and an associated LED. The ANS key LED flashes when the Multiline Terminal user receives an incoming outside ringing call in the same tenant. When multiple calls are received, the ANS key is used to pick up the first call. The ANS key continues flashing until the last unanswered call is answered. Pressing the ANS key during a call will hold the current call and allow the next call to be answered.

A-7   ATTENDANT POSITIONS

The Attendant Positions feature allows assignment of Multiline Terminals to serve as Attendant Positions in the system. These positions have access to distinct Attendant features. Attendant features such as setting Night Mode and System Speed Dial memory programming apply.

A-8   AUTOMATED   ATTENDANT

The Automated Attendant answers incoming **CO/PBX** calls and sends a greeting message for calling parties. When the caller enters a l-digit number from the dial pad as instructed in the greeting message, the Automated Attendant then transfers the call to a designated station or a group of stations. This feature requires installation of a **VRS-C(1)-11** KTU and PBR-C(4)-11 KTU, and version 1.5 or higher software is required to support this feature.

A-9   AUTOMATIC   CALLBACK

After receiving a Call Waiting tone from a busy station, Multiline Terminal users can set an Automatic Callback. When both stations are idle, the system signals the Automatic Callback originator **first** and, after answered, signals the called station.

A-10 AUTOMATIC   DAY/NIGHT MODE SWITCHING

This feature allows the system to be programmed to switch automatically into and out of the Night Mode at a preprogrammed time. This eliminates the need to manually set/reset the Night Mode on a daily basis. After a preprogrammed time, the system automatically switches back to Day Mode.

A-11 AUTOMATIC   HOLD

The Automatic Hold feature works when a Multiline Terminal user presses a DSS key (programmed for a station), Doorphone key, or Page Access while engaged in an outside call. Multiline Terminal users, engaged in an outside call, use Automatic Hold by pressing a Feature Access key or One-Touch key, which is programmed for Direct Station Selection or Direct Paging Access. This feature reduces the risk of accidentally disconnecting a call due to incorrect operation and simplifies access to various features by reducing the operational steps required.

A-12 AUTOMATIC   REDIAL

The Automatic Redial feature **simplifies** repetitive dialing to a busy or no answer party. When receiving a busy tone or no answer while attempting to make an outside call **(CO/PBX),** the Multiline Terminal user can activate this feature. The system periodically redials the party's number while the station user monitors the call for completion,

A-13   AUTOMATIC   RELEASE

The Automatic Release feature releases the outside line circuit when an outside party has abandoned the call. For this feature to work, the **CO/PBX** providing the outside line must provide a timed disconnect signal.

B-1   BACKGROUND MUSIC • EXTERNAL SPEAKER

Background Music **(BGM)** is provided to the locally provided external paging speaker. Background Music to the external speaker will be interrupted during an external page.

B-2   BACKGROUND MUSIC • MULTILINE SPEAKER

Multiline Terminal users can listen to music through the station speaker when the station is idle.

B-3   BARGE-IN

This programmable feature allows selected Multiline Terminal users, in the system, to override another Multiline Terminal user's conversation with or without alerting that station user (programmable). This feature does not apply to Private Lines.

B-4   BATTERY BACKUP ▪ SYSTEM MEMORY

A battery is provided to retain System Program Memory in the event of a power outage. A fully charged battery will maintain system memory for approximately 18 months. System Data, Speed Dial Memories, and Clock/Calendar are among the functions protected by the backup battery. When power is restored, the system will return to normal operation.

B-5   BATTERY BACKUP ▪ SYSTEM POWER

A built-in battery provides complete system operating power for approximately 10 minutes during commercial power outages. If optional (locally provided) batteries are connected and fully charged, full system operation can be maintained for an extended time period. Actual length of time will depend on system configuration, traffic conditions, and the capacity of the batteries being used.

B-6   BUSY LAMP FIELD ON MULTILINE TERMINALS

The Busy Lamp Field (**BLF**) on Multiline Terminals indicates station status with an LED. The LED lights, for stations programmed for this feature, on their line keys for all Multiline Terminals and on the One-Touch keys, programmed as Direct Station Selection (**DSS**) keys on the **ETW-16DD-1 (BK)/(SW)** TEL Multiline Terminals. This allows Multiline Terminal users to determine at a glance if a station is in use.

C-l   CALLBACK REQUEST

Callback Request can be set to any Multiline Terminal to notify the user that someone wants a call returned. Users of Multiline Terminals can receive a maximum of three Callback Requests from other station users. Non-display Multiline Terminal users receive a flashing Function (**FNC**) LED indication when a Callback Request is set. Single Line Telephone users cannot receive a Callback Request.

C-2   CALL FORWARD ▪ ALL CALLS

The Call Forward ▪ All Calls feature is used to forward all transferred and internal calls, that are normally directed to a station, to another station or to the Attendant. This permits more **efficient** call processing by allowing a station to be left unattended and have the user answer calls at another location. Call Forward ▪ All Calls can be set or canceled at the forwarding or Attendant station. Only Attendant Positions can cancel Call Forward ▪ All Calls system-wide.

c-3   CALL FORWARD ▪ BUSY/NO ANSWER

The Call Forward ▪ Busy/No Answer feature is used to forward all transferred and internal calls to another station or to the Attendant Position when there is a Busy or Ring No Answer condition. This permits more efficient call processing by allowing all busy calls to be routed to another station or to an Attendant Position,

C-4   CALL PICKUP

Any station user can answer a call intended for another **station user** in or out of their programmed Call Pickup Group (Tenant Assignment). Incoming ringing outside line (**CO/PBX**) calls to a station can be answered from any other station in the Call Pickup Group. The system can be subdivided into four separate Tenant Groups, each with its own outside line assignments.

c-5   CALL TRANSFER

The Call Transfer feature allows any station user in the system to transfer any type of call to any other station user. Outside calls can be transferred to other stations.   The Call Transfer is initiated by pressing the TRF key, the HOLD key, or the One-Touch key on a Multiline Terminal or by using the hookflash on a Single Line Telephone. The transfer is completed by pressing the TRF key on a Multiline Terminal or by pressing the hookswitch on a Single Line Telephone.

C-6   CLASS OF SERVICE

Class of Service allows the user to access various service features.   Class of Service combinations can be programmed, then stations are assigned to these different Class of Service assignments.

c-7   CLOCK/CALENDAR DISPLAY

The Clock/Calendar display feature is available on Multiline Terminals with **LCDs.** This feature displays the time and day of the week on the LCD. It is programmable from an Attendant Position.

C-8   CODE RESTRICTION

The Code Restriction feature is an advanced system of restricting outgoing calls based on the first eight digits dialed. Code Restriction denies placement of outside calls based on Trunk Groups and accommodates equal access to Other Common Carriers **(OCC).** This eliminates unauthorized calls and configures system calling functions to -provide cost control.

c-9   **CO/PBX** DIGIT RESTRICTION

The **CO/PBX** Digit Restriction feature provides the capability to restrict the number of digits that can be dialed from a station on an outside line. This can be used to eliminate unauthorized calls.

c-10   CONSECUTIVE SPEED DIAL

The Consecutive Speed Dial allows System Speed Dial, Station Speed Dial, and manual dialing for all stations to be used consecutively. Complicated dialing sequences are virtually eliminated. This feature eases access to secondary common carriers, credit card verification, and other applications requiring entry of authorization codes, customer numbers, etc.

c-11   CORDLESS TELEPHONE CONNECTION

With an **ADA(2)-W(BK)/(SW)** Unit, a cordless telephone (2500 type) can be connected to a Multiline Terminal. Dialing an Access Code defines whether or not the cordless telephone will ring when calls are directed to the Multiline Terminal associated with it. In addition to the Cordless Telephone Connection, the ADA(S)-W **(BK)/(SW)** Unit allows connection of other Single Line Telephone equipment such as modems, facsimile machines, answering machines, etc. Version 2.0 software or higher is required for this feature.

D-l   DELAYED RINGING TO VOICE MAIL

When an incoming CO call first rings in to the system it can be assigned to ring at a telephone or group of telephones. After a programmable elapsed time (maximum of 48 seconds), CO ringing to the telephones stop and ringing starts at the voice mail pilot number. This feature is used most often as a back up attendant.

D-2   DIAL 0 FOR ATTENDANT

Station users can access an associated Attendant Position by dialing 0.

D-3   DIRECT PAGING ACCESS

The programmable Feature Access and One-Touch keys on the Multiline Terminals can allow direct access to each of the internal page zones and the external page.

D-4   DIRECT STATION SELECTION

The Direct Station Selection (DSS) feature allows all Multiline Terminal users to make station calls by pressing only one key.

D-5   DISTINCTIVE RINGING

The Distinctive Ringing feature distinguishes between internal and incoming outside calls. This feature provides one distinct type of CO audible signal.

D-6   DOOR LOCK RELEASE

A locally provided door lock can be released from any Multiline Terminal in the system via a software-controlled relay. An external relay (locally provided) receives a dry contact closure from the basic KSU when the station user, engaged in a doorphone call, dials the Access Code.

Single Line Telephones cannot access the Door Lock Release feature.

D-7   **DOOR/MONITOR PHONE**

Up to two optional Doorphone (DP-D-1A) Units can be installed in the system. These units can provide 2-way communication with a location, such as a front door area, or listen to an area as a Room Monitor.

When the unit is used as a Doorphone, assigned Multiline Terminals can be signaled when the Doorphone key is pressed. Any Multiline Terminal in the system can be used to originate or answer the call and talk with the person at the Doorphone. Single Line Telephones can only be used to originate doorphone calls.

When the unit is used as a Room Monitor, any station can be used to access the unit and listen to the area where the monitor is located.

D-8   DO NOT DISTURB

The Do Not Disturb (DND) feature temporarily eliminates all audible signals for incoming calls to the station. This temporarily isolates the station from other stations in the system and allows the user time for more detailed or confidential work.

D-9   DP TO DTMF SWITCHING

This feature provides connection for sending transmissions to data receiving units requiring Dual Tone Multi-Frequency (DTMF) signaling. This feature is used for systems that are connected to Dial Pulse (DP) lines, but require the capability to communicate with equipment (computers) that demands DTMF signaling.

D - 1 0   **DROP KEY**

The Drop Key is used to abandon a call while retaining the CO/PBX line for originating another call. The Drop Key is provided by programming a Feature Access Code on a Feature Access key or a One-Touch key.

E-1   ELAPSED CALL TIMER

The Elapsed Call Timer feature provides each Multiline Terminal with an indication on the LCD showing how long the station has been connected to an outside line.

E-2   ELECTRONIC VOLUME CONTROL

The Electronic Volume Control, which is provided with all Multiline Terminals, allows easy changes to the following: LCD contrast, off-hook ringing volume, station ringing volume, handset receiver volume, and station speaker volume control.

E-3   EQUAL ACCESS ACCOMMODATION

The Equal Access Accommodation feature permits Speed Dial memories and Code Restriction processes to be applied to CO/PBX lines, which provide access to Specialized Common Carriers (SCC).

E-4   EXTERNAL PAGING (MEET-ME)

The External Paging (Meet-Me) feature provides External Paging to quickly locate personnel. A l-way amplifier must be installed to provide this feature. An external speaker can be installed in a noisy area where a terminal would not be appropriate. External Paging enables emergency announcements to be made to the area quickly. The Meet-Me feature allows the paged party to respond quickly to the paged call.

E-5   EXTERNAL RING CONTROL

The External Ring Control feature is provided with the basic KSU. It provides an interrupted relay contact closure during incoming CO/PBX calls to a control relay (locally provided) that can be used for controlling a tone source or loud ringing bell. This feature is used for loud ringing in noisy locations or for a wide area coverage. It can be set for Day mode.

E-6   EXTERNAL TONE RINGER VIA EXTERNAL SPEAKER

An External Ringer can be made available through the common use of the External Paging Speaker and a built-in tone source. An interrupted tone (440/480 Hz) at a rate of 1 sec. ON / 2 sec. OFF is provided. External paging takes priority over the Tone Ringer.

F-1   FACSIMILE CONNECTION

FAX-C(1)-11 KTU provides for the direct connection of a locally provided facsimile machine. Additional dedicated CO/PBX lines are not required for the facsimile to operate. The facsimile shares usage of the fourth CO/PBX terminated line. Version 2.0 or higher software is required for this feature.

F-2   FEATURE ACCESS KEYS ▪ USER PROGRAMMABLE

The User Programmable ▪ Feature Access keys and One-Touch keys on the Multiline Terminals are used to directly access system features instead of dialing Access Codes.

F-3   FLEXIBLE LINE KEYS

The unused CO/PBX line keys on each Multiline Terminal can be reassigned and used for other features. The line keys can be reassigned as Direct Station Selection, Speed Dial, and/or Feature Access keys.

F-4   FLEXIBLE RINGING ASSIGNMENT

Incoming outside (CO/PBX) calls may be programmed to ring at specified stations. Separate day and night incoming ring assignments are available.

F-5   FLEXIBLE STATION NUMBERING PLAN

A Flexible Station Numbering Plan is automatically assigned by the Resident System Program when the system power is first turned on. The Flexible Station Numbering Plan may be changed via System Programming to fit the customer's needs.

F-6   FLEXIBLE TIMEOUT

The Flexible Timeout feature provides a variety of timeouts in the Resident System Program in order to allow the system to operate without initial programming. The system timeouts can be changed to meet the customer's needs according to the requirements of the system application.

F-7   FULL HANDSFREE OPERATION

Full **Handsfree** capability is included with all Multiline Terminals for internal and outside calls. A microphone control key and Feature Access Code allows muting of the microphone.

G-l   GENERAL PURPOSE RELAYS

Four General Purpose Relays are built into the basic KSU. These relays can be individually programmed as Facsimile Relay, **2-Door** Lock Relays, Night Chime/External Ring Relay, External Amplifier Control Relay, External **MOH/BGM** Relay, and Extended Speaker Relay.

H-l   HANDSET MICROPHONE CONTROL

During an internal or outside conversation, an Access Code can be dialed to cut off (mute) the transmitter of the handset. This allows for the monitoring of conversations without interruption.

H-2   HANDSFREE   ANSWERBACK

Each Multiline Terminal is equipped with a microphone for **Handsfree** Answerback of internal voice calls. Microphone status is indicated by a **MIC** LED located on each Multiline Terminal. The Feature Access key, programmed for MIC control, is used to cut off (mute) the microphone to ensure privacy.

H-3   HANDSFREE DIALING AND MONITORING

The Handsfree Dialing and Monitoring feature enables all Multiline Terminal users to dial and monitor calls without using. the handset. This feature **frees** the user to perform other tasks while waiting for a call to be answered or while on hold.

H-4   HEADSET CONNECTION VIA ADA(l)-W **(BK)/(SW)** UNIT

A headset can be connected to a Multiline Terminal via the ADA(l)-W **(BK)/(SW)** Unit. This eliminates the need for an external headset switch. The SPKR key becomes the Headset ON/OFF key to allow easy operation of the headset.

H-5   HOLD FREE TRANSFER

This feature allows Multiline Terminal users to complete a transfer of a **CO/PBX** call to another station without pressing the HOLD key.

H-6   HOLD WITH RECALL (EXCLUSIVE AND NON-EXCLUSIVE)

Station users can place a call on Hold, freeing the station for other calls. Multiline Terminal users can use either Exclusive Hold (a held line can only be picked up at the station that put the line on hold) or Non-Exclusive Hold (a held line can be picked up at any station that has access to that line). Single Line Telephone users can only place calls on Exclusive Hold. A call on hold for longer than a preprogrammed interval generates a recall at the originating station. When the recalled station is idle, an audible signal and an LCD indication (if equipped) is provided, indicating which line is recalling.

H-7   HOWLER TONE SERVICE

The Howler Tone Service feature provides a Howler Tone when a station has been left off-hook after a call has been completed or after going off-hook. This feature is for Multiline Terminals and Single Line Telephones.

I-1   I-HOLD INDICATION

The I-Hold feature provides a green LED indication for calls held at a station using a Multiline Terminal. Other stations with the same line appearance will provide a red LED indication. This feature allows easy identification of calls that were placed on hold at a station.

I-2   INCOMING CALL IDENTIF'ICATION

The Incoming Call Identification feature identifies incoming calls on Multiline Terminals equipped with an LCD. Internal calls are identified by showing station number.

I-3   INTERNAL VOICE/TONE SIGNALING

The Internal Voice/Tone Signaling feature allows Multiline Terminal users to be signaled on incoming internal calls by voice announcement or by ringing, based on System Programming. The caller can dial an additional digit to switch a voice announcement call to a ringing call, or switch a ringing call to voice announcement. This feature allows Voice/Tone switching from the calling side.

I-4   INTERNAL ZONE PAGING (MEET-ME)

The Internal Zone Paging feature enables call announcements to be made into large areas without external equipment being installed. Three zones, consisting of Multiline Terminals, can be separately paged over their internal speakers, or all zones can be paged at once. Any station user within the called zone can answer the page and speak privately to the originator of the page with the Meet-Me feature.

I-5   I-USE INDICATION

The I-Use Indication feature provides a green LED indication for the line being used on Multiline Terminals. Other busy line keys are shown with red **LEDs.** This enables quick identification of the line being used.

K-1   KEY FUNCTION/MULTI-FUNCTION REGISTRATION

The system can be set **as either** a Key Function (**KF**) or a Multi-Function (**MF**) telephone system. This feature is set on the main board in the basic KSU at the time of installation.

L-1   LARGE LED INDICATION

All Multiline Terminals are equipped with a Large LED to indicate an internal call, voice mail messages, VRS messages, or an outside call.

L-2   LAST NUMBER REDIAL

The Last Number Redial feature is used to redial the last outside number dialed by pressing the **LNR/SPD** key and pressing the * key. This is useful when a Busy or No Answer is received when trying to place a call. The Trunk Access Code is stored with the number.

L-3   **LNR/SPD** KEY

Station users can redial the last **CO/PBX** (outside) number they dialed by pressing the LNR/SPD key and pressing the * key. Users can also access Speed Dial by pressing the **LNR/SPD** key and dialing the Speed Dial buffer number.

M-1   MICROPHONE CONTROL

The Microphone Control feature allows microphone control with status indication on all Multiline Terminals. A programmed line key or Trunk Group Access Code is used to mute the microphone for privacy during incoming voice announcement calls and during calls using the built-in speakerphone.

M-2   MULTIPLE TRUNK GROUPS

The Multiple Trunk Group feature allows a maximum of three Trunk Groups to be assigned. Each group can have a separate Access Code. Assigning Trunk Groups provides differentiation of **different** types of outside trunks.   With Tenant Service, different tenants can be programmed to access only the trunks assigned to their Trunk Group.

M-3   MUSIC ON HOLD

A locally provided music source or an internal music source can be used to supply music to parties on hold, providing them with assurance that they are still connected to the system.

N-1   NESTING DIAL

Multiline Terminal users may store up to five Speed Dial (System or Station Speed Dial) buffer numbers in one Station Speed Dial buffer. These numbers can then be successively transmitted by pressing the **LNR/SPD** key and dialing the Station Speed Dial buffer number. Single Line Telephones cannot be used to access Nesting Dial.

N-2   NIGHT CHIME

The Night Chime feature is used after normal working hours to alert night personnel of incoming calls. Locally provided external bells and/or amplifiers are required and are controlled by the system.

N-3   NIGHT TRANSFER

The Attendant Positions may be used to place the system into (or out of) Night Mode. This provides a change in the ring assignment of **CO/PBX** lines, class assignments, and code restrictions.

O-1   OFF-HOOK RINGING

The Off-Hook Ringing feature signals a Multiline Terminal to indicate an incoming outside call while the station user is off-hook on another call.   Off-Hook Ringing is provided through the built-in speaker of the Multiline Terminal at a lower volume than On-Hook Ringing.

o-2   ONE-TOUCH FEATURE ACCESS

One-Touch Feature Access is provided with Multiline Terminals. This feature allows Multiline Terminal users to make calls and access system features by pressing one key without going off-hook first,

P-1   POWER FAILURE TRANSFER

The Power Failure Transfer feature ensures that a customer always has access to the central **office** network during a power outage.   **CO/PBX** line 1 is automatically transferred to a preselected Single Line Telephone. The preselected Single Line Telephone can only be used during Power Failure Transfer conditions.

P-2   PRIME LINE ASSIGNMENT

Prime Line Assignment allows a station user to go off-hook and originate an outside call from the trunk assigned as the Prime Line, without pressing the line key.

P-3   PRIVACY ON ALL CALLS

The system provides Privacy On All Calls.   No station user may enter another's conversation unless allowed via Add-On Conference, Barge-In, Privacy Release, or Voice Over Split.

P-4   PRIVACY RELEASE

Multiline Terminal users can release the privacy on an outside call by pressing the FNC key and dialing 7. The privacy of an ongoing **CO/PBX** call at that terminal is eliminated. Another Multiline Terminal user can then simply press the same **CO/PBX** line key at the terminal to join the conversation. A maximum of three stations may participate. Single Line Telephones can be included in a Privacy Release call by dialing the specified line seizure Access Code.

P-5   PRIVATE LINES

The system allows two outside lines to be programmed as private.   Only the Multiline Terminal that has been programmed for a Private Line can have access to that line.   The LED status indication for the Private Line does not appear on any other Multiline Terminal.

P-6   PROGRAMMING FROM **MULTILINE** TERMINALS

System Programming can be performed from designated Multiline Terminals (with an LCD) in the first two electronic station ports. Some programming changes can be entered while the system is operating; other programming changes will occur when the affected telephones and circuits are idle.

P-7   PUSH BUTTON DIAL ▪ DTMF OR DP

The Push Button Dial ▪ DTMF or DP feature is provided on all Multiline Terminal stations for simplified and faster calling. Trunks are assigned on a per trunk basis to generate either Dual-Tone Multi-Frequency (**DTMF)** or Dial Pulse (**DP)** dialing signals.

R-l   R E C A L L   K E Y

The RECALL Key feature is used to generate a hookflash to access features provided by the outside exchange, or to abandon a call while retaining the outside line for origination of another call. Each Multiline Terminal is equipped with a RECALL key.

R-2   RESIDENT SYSTEM PROGRAM

When power is supplied to the system, the hardware configuration is scanned and Resident System Program (default) values are assigned. This enables immediate operation, even before the system is programmed, to accommodate the individual site requirements.

R-3   RESTRICTION (OUTGOING)

The Restriction (Outgoing) feature denies stations the capability to originate outside calls on a per station or per trunk basis. At stations where outgoing access is denied, users can continue to answer incoming calls, pick up held calls, and place or receive internal calls. The number of digits dialed on CO/PBX lines may also be restricted on a per station basis.

R-4   RING TONE VARIATION

Multiline Terminal users may choose one of three ringing tone frequencies (low, medium, or high). The tone choice may be selected at each Multiline Terminal or by off-line programming at port 10 or 11. The tone volume is variable and may be adjusted at each Multiline Terminal.

R-5   RINGING LINE PREFERENCE

The Ringing Line Preference feature allows Multiline Terminal users to answer any line that is ringing by going off-hook without having to press the ANS key or the Flexible Line key associated with the ringing line.

R-6   ROOM MONITOR TERMINAL

By dialing an Access Code, a Multiline Terminal user can monitor the room area around another Multiline Terminal in the system. Only one terminal at a time can be active as a Room Monitor Terminal.

s-1   SAVE AND REPEAT

The Save and Repeat feature allows a Multiline Terminal user to save the last number dialed in system memory for reuse.

s-2   SEIZED TRUNK NUMBER DISPLAY

The Seized Trunk Number Display feature displays the telephone number (assigned in System Programming) of each trunk in the system. These numbers appear on the Multiline Terminal LCD when a Flexible Programmable Line key, which is programmed as a trunk, is seized.

s-3   SINGLE LINE TELEPHONE ACCESS

The system provides for the connection of a maximum of four Single Line Telephones (SLT). Single Line Telephone users can make CO/PBX calls, internal calls, and paging calls. This option requires an SLT-F(1G)-10 ADP or SLT-F(1G)-20 ADP.

s-4   SLT ADAPTOR

The Single Line Telephone (SLT) Adaptor allows the electronic station ports to support Single Line Telephones. A Single Line Telephone can be connected to the electronic station ports via the SLT Adaptor using a single pair cable. A maximum of four SLT-F(1G)-( ) ADPs can be installed.

s-5 **SOFTKEYS**

The **Softkeys** provide the user of an Electra Elite Display Multiline Terminal (DTU-32D-2 or DTU-16D-2) easy one touch access to four commonly used features. The **Softkeys** are MIC, MUTE, DND, PAGE.

S-6 SPEED DIAL . STATION

Each station in the system is assigned 20 Station Speed Dial buffers. Each Station Speed Dial buffer may contain a maximum of 24 digits or five other buffer numbers (Nesting Dial). System Speed Dial codes may be stored in a Station Speed Dial memory to increase capacity.

s-7 SPEED DIAL . SYSTEM

Attendant Positions can be used to program up to 80 System Speed Dial memories. Forty of the System Speed Dial memories may be set to override or not override Code Restriction assignments. Each System Speed Dial buffer may contain a maximum of 24 digits.

S-8 STATION CAMP-ON

The Station Camp-On feature allows a call to be transferred to a busy station. Pressing the TRF key sends a distinct tone (Camp-On tone) to the busy station where the **CO/PBX** call was transferred. When the busy station becomes idle, that **Multiline** Terminal will ring and be connected to the waiting camped-on call. If the camped-on call is not answered within a preprogrammed time period, it recalls to the originating station.

s-9 STATIONHTJNTING

The Station Hunting feature routes calls to multiple stations that are preset to forward to other stations within a Station Hunt Group. When a station number, programmed as a Station Hunting Master Number, is dialed and this station is busy, the call is distributed to the next station that is programmed to answer.

s-10 STATION MESSAGE DETAIL RECORDING **(SMDR)**

An optional SMDR-C-10 KTU provides detailed, external call records of system telephone usage. This supports cost control by identifying telephone users, trunk usage, digits dialed, etc. SMDR enables connection of call accounting equipment that provides a means for auditing local telephone usage.

s-11 STEP CALL

If the caller receives a call waiting tone during an internal call, the caller may access the next available station number in the same 10s group (e.g. **10~19, 20~29**) by dialing the digit 1 (default). (The next higher station number that is available is accessed by the system.)

s-12 STORE AND REPEAT

The Store and Repeat feature allows a Multiline Terminal user **to** store any dialed telephone number into memory (while talking on a **CO/PBX** line) for later use.

s-13 STORED HOOKFLASH

The Stored Hookflash feature allows any Multiline Terminal user to store a **hookflash** in a Speed Dial buffer that allows one-step access to certain **Centrex** or PBX features.

s-14   SYNCHRONOUS RINGING

The Synchronous Ringing feature provides CO/PBX incoming ringing, synchronized with the incoming ringing pattern from a Central Office or PBX.

T-1   TENANT SERVICE

Tenant Service provides the capability to subdivide the system into a maximum of four Tenants. Each Tenant may have its own outside line access.

T-2   THREE-MINUTE REMINDER

This feature provides the Multiline Terminal user, who has originated or answered an outside call, a tone reminder every three minutes. This feature provides the user with an indication of the length of the call.

T-3   TIMED ALARM

A Timed Alarm (reminder) may be set at any Multiline Terminal. At the programmed time, the system automatically signals the station at which the alarm was set.

T-4   TONE OVERRIDE

Multiline Terminal users calling a busy station are able to generate an Override Tone that is heard only by the calling and called parties. Multiline Terminal users may answer the Override by placing the existing call on hold.

T-5   TRUNK QUEUING

The Trunk Queuing feature allows a station user to increase call processing efficiency. When all outside lines are busy, the station users are able to queue onto the busy lines. When a line becomes available, the system provides an incoming internal ring to the queuing station, If the line is no longer needed before the line becomes available, the queue request is canceled by dialing an Access Code. Each station can be queued on a CO/PBX line by selecting the specific trunk in the queue procedure. This feature allows a station user to set trunk queuing to a specified trunk or Trunk Group.

T-6   TRUNK-TO-TRUNK TRANSFER

The Trunk-to-Trunk Transfer feature allows any Multiline Terminal user to establish Trunk-to-Trunk Transfers between two CO/PBX line calls (a disconnect signal must be provided).

T-7   TWO-COLOR LEDS

Multiline Terminals are equipped with two-color LEDs for Flexible Line key, LNR/SPD key, and Large LED indications. Green is used to indicate I-Hold (Exclusive and Non-Exclusive), I-Use, and recall conditions. Other functions are indicated with a red LED.

U-l   UNSUPERVISED CONFERENCE (TANDEM)

The Unsupervised Conference feature permits an existing 3-party conference (two CO/PBX lines and one internal party) to become a Trunk-to-Trunk Unsupervised Conference by allowing the internal party to hang up. The internal party may reenter the conference at any time. The system allows a maximum of two Unsupervised Conferences.

u-2   USER PROGRAMMING CAPABILITY

Station users can perform some programming functions at their stations. Some of the features that are programmable from a station include: Ring Tone Variation, Ringing

Line Preference, Feature Access **and/or** One-Touch keys (Speed Dial or Direct Station Selection, etc.).

V-l   VOICE MAIL INTEGRATION

The Voice Mail Integration feature provides the necessary interface between the system and a locally provided Voice Mail system. When a station is forwarded to the Voice Mail system and a station calls the forwarded station, the call goes directly to the individual's personal mail box. The system can support a maximum of four ports for Voice Mail (each port requires an SLT adaptor).

v-2   VOICE OVER SPLIT

By dialing an Access Code, a station user can voice override the conversation between another station user and an internal/outside party. When the conversation is interrupted, the internal/outside party cannot hear the Voice Over.

v-3   VRS · AUTOMATIC/MANUAL ANSWER

This feature allows incoming outside **CO/PBX** calls to be answered automatically by a voice recorded message. After the incoming call is answered, one of three voice recorded messages (night/day/weekend) is played to the outside party. After the voice recorded message is completed, the outside party is disconnected. Manual Answer is activated by a station user while off-hook on a **CO/PBX** call. The selected **CO/PBX** line is answered by a recorded message and then placed on hold.

v-4   VRS · HOLD MESSAGE

With a VRS-C(l)-11 KTU installed, a customized hold message (up to 120 seconds) can be sent to the outside party when the **CO/PBX** call is placed on hold. After the message is sent to the outside party, Music On Hold is provided until the held call is picked up. Version 2.0 or higher software is required for this feature.

v-5   VRS -INTERNAL MESSAGE

This feature allows any internal Multiline Terminal user to record and store a voice message. A user can send a recorded message to any other internal Multiline Terminal within the system. The Multiline Terminal receiving the message receives a visual prompt to indicate a recorded voice message has been received.

CHAPTER 3
EQUIPMENT

SECTION 1   EQUIPMENT LIST

<u>Kes Service Units and Power **Supply** Units</u>

ESF-C-10 KSU	System KSU with PSF-C-10 PSU and batteries. Includes circuitry for: Tone Generator (TNG), Central Processing Unit (CPU), 4-channel Central Office Interface, 8-channel Station Interface, Conference, External Paging, Power Failure Transfer, two Doorphones, MOH/BGM, and four General Purpose Relays.
PSF-C-10 PSU	System Power Supply Unit (Spare)

<u>Station Expansion Kev **Telephone** Units</u>

ESI-C(8)-11 KTU	8-channel (2-wire) Station Interface Unit

<u>Trunk Expansion **Key** Telephone Units</u>

COI-C(2)-10 KTU	2-channel Central Office Interface Unit
COI-C(2A)-10 KTU	2-channel Central Office Interface Unit (software version 3.0 or higher)

<u>Optional **Key** Telephone Units</u>

PBR-C(4)-11 KTU	4-channel Push Button Receiver
VRS-C(1)-11 KTU	l-channel Voice Recording Service
SMDR-C-10 KTU	Station Message Detailed Recording (SMDR)
FAX-C(1)-11 KTU	l-channel Facsimile Connection (software 2.0 version or higher)

<u>Multiline Terminals and Associated **Equipment**</u>

ETW-8-1 (BK)/(SW) TEL	8-line non-display with built-in speakerphone, ADA interface, and large LED
ETW-16DC-1(BK)/(SW)TEL	l&line Display Compact with built-in speakerphone, ADA interface, large LED, and eight function keys
ETW-16DD-1(BK)/(SW) TEL	16-line Display Deluxe with built-in speakerphone, ADA interface, large LED, eight function keys, and 20 programmable One-Touch keys with red LED
ADA(l)-W (BK)/(SW) Unit	Ancillary Device Adaptor, headset, -tape recorder, external speakerphone, etc.
ADA(2)-W (BK)/(SW) Unit	Ancillary Device Adaptor, cordless telephone, Single Line Telephone, facsimile machine, modem or answering machine, etc.
WMU-W (BK)/(SW) Unit	Wall Mount Unit - Multiline Terminal

Telephone   Adaptor

SLT-F(1G)-10 ADP   l-channel Single Line Telephone Adaptor

SLT-F(1G)-20 ADP   l-channel Single Line Telephone Adaptor with loop open disconnect signal.

Doorphone   Equipment

DP-D-1A Unit   Doorphone

SECTION 2   EQUIPMENT DESCRIPTION

2.1   Key Service Units and Power Supply Units

ESF-C-10 KSU
The Key Service Unit (**KSU**) provides service for outside **CO/PBX**, internal lines, and connection of Multiline Terminals. The basic KSU provides for the connection of four **CO/PBX** lines and eight stations and can be expanded to eight **CO/PBX** lines and 16 stations with expansion modules. A PSF-C-10 PSU Power Supply Unit and internal batteries are included with the KSU.

Fixed slots are intended for COI-C(2)-10, **COI-C(2A)-10**, ESI-C(B)-11, PBR-C(4)-11, VRS-C(l)-11, FAX-C(l)-11, and SMDR-C-10 **KTUs.**

PSF-C-10 PSU
The power supply unit is provided with the KSU.   It has a battery interface cable for battery backup, accepts 117 **Vac** and outputs **+5V** and + 28V to the system.

2.2   Station Interface Key Telephone Units

ESI-C(8)-11 KTU
The Electronic Station Interface KTU contains eight circuits, each of which can support three types of Multiline Terminals or an SLT Adaptor.

One **ESI-C(8)-11** KTU can be installed in the KSU.

2.3   Trunk Interface Key Telephone Units

COI-C(2)-10   KTU
The Central Office Interface KTU complies with UL 1459 **2nd** Edition requirements. Electrical fuses (**posistors**) are built into this KTU. The COI-C(2)-10 KTU supports two outside (**CO/PBX**) lines and provides circuitry for ring detection, holding, and dialing. The outside lines can be any combination of loop start, DTMF, or Dial Pulse dialing trunks.

One **COI-C(2)-10** KTU can be installed in the KSU.

COI-C(2A)-10 BTU
The Central Office Interface KTU complies with UL 1459 **2nd** Edition requirements. Electrical fuses (**posistors**) are built into this KTU. The **COI-C(2A)-10** KTU supports two outside (**CO/PBX**) lines and provides circuitry for ring detection, holding, and dialing. The outside lines can be any combination of loop start, DTMF, or Dial Pulse dialing trunks.

One **COI-C(2A)-10** KTU can be installed in the KSU (software version 3.00 or higher is required).

2.4   Optional Key Telephone Units

PBR-C(4)-11   KTU
The Push Button Receiver (PBR) 4-Channel KTU detects and translates DTMF tones received by the Automated Attendant and generated by Single Line Telephones, modems, facsimile machines, etc.

The interface slots can accommodate one PBR-C(4)-11 KTU for a maximum of four circuits per system.

VRS-C(1)-11 KTU
The Voice Recording Service KTU provides voice recording-messages for Automated Attendant, internal stations, manual messages, hold messages and automatic/manual answering of incoming **CO/PBX** calls by a voice recorded message.

One **VRS-C(1)-11** KTU can be installed in the KSU.

SMDR-C-10   KTU
The Station Message Detail Recording KTU stores and generates detailed call records for all outgoing **CO/PBX** calls.

Information provided by SMDR-C-10 KTU includes:

- Calling party's station number
- **CO/PBX** line used for the call
- Start time of call
- End time of call
- Number dialed
- Date of call

One SMDR-C-10 KTU can be installed in the KSU.

The SMDR-C-10 KTU mounts onto the main printed circuit board of the system (maximum of one **per** system).

A serial printer or other peripheral recording device must be locally supplied and terminated to the RS-232C connector from the SMDR-C-10 KTU.

FAX-C(1)-11 KTU
The Fax KTU provides for the direct connection of a locally provided facsimile machine. Additional dedicated **CO/PBX** lines are not required for the facsimile to operate. The facsimile shares usage of the fourth **CO/PBX** terminated line.

One **FAX-C(1)-11** KTU can be installed in the KSU (software 2.0 version or higher is required).

2.5   Multiline Terminals, Single Line Telephones, and Associated Equipment

ETW-8-1 (BK)/(SW) TEL
This Multiline Terminal is a fully modular instrument with eight Flexible Line keys (each with a two-color LED), eight function keys, built-in speakerphone, ADA interface, and a large LED to indicate incoming calls and messages. This multiline Terminal comes in two colors: black [**ETW-8-1 (BK)** TEL] and soft white [**ETW-8-1** (SW) TEL].

A maximum of 15 ETW-8-l **(BK)/(SW) TELs** can be installed in a system.

ETW-16DC-1 (BK)/(SW) TEL
This Multiline Terminal is a fully modular instrument with 16 Flexible Line keys (each with a two-color LED), eight function keys, built-in speakerphone, a **16-character** Liquid Crystal Display (LCD), ADA compatibility, and a large LED to indicate incoming calls and messages. This Multiline Terminal comes in two colors: black [**ETW-16DC-1 (BK)** TEL] and soft white [**ETW-16DC-1** (SW) TEL].

A maximum of 16 **ETW-16DC-1 (BK)/(SW) TELs** can be installed in a system.

ETW-16DD-1 (BK)/(SW) TEL
This Multiline Terminal is a fully modular instrument with 16 Flexible Line keys (each with a two-color LED), eight function keys, built-in speakerphone, 20 programmable One-Touch keys with **LEDs,** ADA compatibility, and a large LED to indicate incoming calls and messages. This Multiline Terminal comes in two colors: black [ADA(l)-W **(BK)**] and soft white [ADA(l)-W **(SW)**].

A maximum of 16 **ETW-16DD-1 (BK)/(SW) TELs** can be installed in a system.

ETJ-l-1 (SW) TEL
This Single Line Telephone is a fully modular terminal with a Flash key, Redial key, three-level ring volume control, data jack, Message Waiting Lamp, and eight programmable Feature/Speed Dial keys. Each terminal requires a **SLT-F(1G)-10** ADP or **SLT-F-(1G)-20ADP.** This terminal is available in soft white only.

ETJ-1HM-1 (SW) TEL
This Single Line Telephone is a fully modular terminal with a Flash key, Redial key, three-level ring volume control, data jack, and Message Waiting Lamp. Each terminal requires a **SLT-F(1G)-10** ADP or **SLT-F(1G)-20ADP.** This terminal is available in soft white only.

ADA(l)-W **(BK)/(SW)** Unit
The ADA(l)-W **(BK)/(SW)** Unit (Ancillary Device Adaptor) provides the Multiline Terminal with connection for a headset, external speakerphone, or other ancillary devices. An ADA(l)-W **(BK)/(SW)** Unit can be installed in any Multiline Terminal. This Multiline Terminal comes in two colors: black [ADA(l)-W **(BK)**] and soft white [ADA(l)-W **(SW)**].

A maximum of 16 ADA(l)-W **(BK)/(SW)** Units can be installed in a system, one per Multiline Terminal.

ADA(2)-W (BK)/(SW) Unit
The ADA(S)-W **(BK)/(SW)Unit** (Ancillary Device Adaptor) provides the Multiline Terminal with connection for single line equipment such as a cordless telephone, Single Line Telephone, modem, facsimile machine, or answering machine. An ADA(B)-W **(BK)/(SW)** Unit can be installed in any Multiline Terminal. This Multiline Terminal comes in two colors: black [ADA(l)-W **(BK)**] and soft white [ADA(l)-W (SW)].

A maximum of 16 ADA(B)-W **(BK)/(SW)** Units can be installed in a-system, one per **Multiline** Terminal.

WMU-W **(BK)/(SW)** Unit.
The WMU-W is a universal Wall Mount Unit, which can be used to mount any Multiline Terminal on a wall. This Multiline Terminal unit comes in two colors: black [WMU-W **(BK)**] and soft white [WMU-W (SW)].

2.6 Telephone Adaptor

SLT-F(1G)-10 ADP

The Single Line Telephone Adaptor provides an interface for a Single Line Telephone, voice mail, or similar device from an ESI-C(8)-11 KTU channel.

A maximum of four **SLT-F(1G)-10** ADP adaptorscan be installed in a system.

SLT-F(1G)-20 ADP

The Single Line Telephone Adaptor provides an interface for a Single Line Telephone, voice mail, or similar device from an ESI-C(8)-11 KTU channel. The **SLT-F(1G)-20** ADP can provide a loop open disconnect signal when main software version 2.72 or higher is used and the port is assigned as voice mail.

A maximum of four **SLT-F(1G)-20** ADP adaptors can be installed in a system.

2.7 Doorphone Equipment

DP-D-1A Unit

This unit is used as a doorphone to originate a tone signal to preassigned Multiline Terminals via a call button. This unit is generally installed at front and rear doors of secured work areas. The DP-D-1A Unit can also be used as a l-way room monitor to listen to an area.

A maximum of two weather resistant DP-D-1A Units can be installed in a system.

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CHAPTER 4
INSTALLATION, PROGRAMMING, AND MAINTENANCE OVERVIEW

SECTION 1   INSTALLATION

Reduced Installation Time

The system uses modularity and connectorization throughout to reduce installation time and labor. Most internal connections are made with plug and jack connections.

In addition to reducing the labor required for installation, the use of modularity and connectorization increases reliability. No wiring changes are made in the KSUs and all connectors are factory tested.

The power supply unit and the battery backup unit comes installed in the KSU and allow easy connection to additional battery backup units.

Connection to telephones, outside lines, and other external devices are made via telephone cable connectors.

Resident System Program

A Resident System Program is provided when the system first receives power. The CPU scans the KSU and recognizes the KTUs and Multiline Terminals that are connected to the system. Standard values (called default values) are assigned in System Programming for all system and device parameters. This allows the system to operate immediately after initialization before programming is done.

The assignments provided by the Resident System Program can be altered to fit the requirements of a particular installation. The means of changing programming assignments is the function of one or two preassigned Multiline Terminals. Flexible Line keys and the dial pad are used to enter new values, while the display provides the necessary information for programming.

Multiline Terminals and Single Line Telephones

A variety of telephones can be connected to satisfy the requirements of a particular installation. All Multiline Terminals are fully modular and are powered from the central unit. Twisted l-pair cabling is used for proprietary Multiline Terminals and Single Line Telephones.

SECTION 2   PROGRAMMING

From Multiline Terminals

Programming is accomplished from an ETW-16DC-1 (BK)/(SW) TEL or ETW-16DD-1 (BK)/(SW) TEL Multiline Terminal. The first two electronic station ports are automatically assigned programming capability.

When a programming Multiline Terminal is off-line in the program mode, the rest of the system continues to function. Most program changes can be entered at any time, but some changes will not take effect until the affected stations and circuits are idle. This avoids disrupting any calls in progress.

Battery Backup

Battery backup of System Programming, Speed Dial memories, etc., is provided. Approximately 18 months of power loss can be withstood when the lithium batteries are fully charged. This prevents the need to reprogram the system after a sustained power outage.

User Programmable Features

Multiline Terminal users can also program the following features from their stations:

- Ringing Line Preference
- Feature Access and/or One-Touch keys (Speed Dial or Direct Station Selection, *etc.*)
- Ring Tone Variation

Multiline Terminals and Single Line Telephones can be used to program Station Speed Dial memories. Attendant Positions can be used to program System Speed Dial memories and the System Clock/Calendar.

CHAPTER 5
HARDWARE SPECIFICATIONS

SECTION 1   SYSTEM CAPACITY

The central equipment of this system is composed of up to four units.

1. KSU: 4 CO/PBX lines, 8 stations
2. KSU + COI-C(2)-10: 6 CO/PBX lines, 8 stations
3. KSU + COI-C(2)-10 KTU + COI-C(2A)-10 KTU: 8 CO/PBX lines, 8 stations
4. KSU + ESI-C(8)-11 KTU: 4 CO/PBX lines, 16 stations
5. KSU + COI-C(2)-10 + ESI-C(8)-11 KTU: 6 CO/PBX lines, 16 stations
6. KSU + COI-C(2)-10 KTU + COI-C(2A)-10 KTU + ESI-C(8)-11 KTU: 8 CO/PBX lines, 16 stations

Some of the capacities of the Electra Professional Level I system are:

l   **Multiline** Terminal Equipment

    KSU: 8 stations maximum

    KSU + Expansion KTU: 16 stations maximum

l   Single Line Telephone Adaptor

    4 stations maximum (total per system>

    Note: Single Line Telephone adaptors use **Multiline** Terminal ports.

l   Tenant

    Tenant Groups: **4 maximum**

l   System Speed Dial

    Total Per System: 80 numbers (24 digits each)

l   Station Speed Dial

    Total Per System: 20 numbers each station
                        (24 digits each number)

SECTION 2   CABLING REQUIREMENTS

The following KTUs are equipped with quick connectors for connection to the Main Distribution Frame (MDF).

l   **ESF-C-10 KTU** *   One S-position, one 4-position, two 2-position and five (4 CO lines,
                                    1 PFT) RJ11 connectors

l   **COI-C(2)-10** KTU   Two RJ1 1 connectors

l   **COI-C(2A)-10** KTU   Two RJ11 connectors

l   **ESI-C(8)-11** KTU *   One S-position connector

    * A 25-pair (12, %-position connectors) can be used to support these KTUs. NEC provides these connectors with the system.

Maximum loop resistance and cable length using 24 AWG are listed in the following table.

Table 5-l   Multiline Terminal Loop Resistance and Cable Length

Terminal or Adaptor	Maximum **Loop** Resistance	**Maximum Feet by Twisted 1-Pair Cable**	**Maximum Feet by Twisted 2-Pair Cable**
		24AWG	24AWG
ETW-8-l (BK)/(SW) TEL	61	600	1500
ETW-16DC-1 (BK)/(SW) TEL	46	450	1300
ETW-16DD-1 (BK)/(SW) TEL	37	360	820
SLT-F(1G)-10 ADP / SLT-F(1G)-20 ADP	61	600	1200
DP-D-IA Unit	20	410	820

Note 1:   The length for the specified SLT Adaptor is the length between the ESI KTU and the SLT Adaptor.

Note 2:   When additional length is required between the ESI and the Multiline Terminal or the SLT Adaptor, use twisted 2-pair cable.

The following types of cabling are required for the equipment listed below:

l   Multiline Terminal: Twisted l-pair
l   Single Line Telephone: Twisted l-pair
l   MOH/BGM Source: Hi-fi type shielded audio cable
l   External Amplifier: Hi-fi type shielded audio cable
l   Doorphones: Twisted l-pair

SECTION 3   POWER REQUIREMENTS

AC Input (for PSF-C-10 PSU)

● 120Vac ± 10%
● 60 Hz ± 10%
l   Single Phase
l   Maximum Current: 2.3A
l   A dedicated outlet, separately fused and grounded, is required.

Power Dissipation

l   Maximum RMS Current: 0.6A
l   Watts Used (Idle):   2ow
l   Watts Used (Maximum): 52W

SECTION 4   ENVIRONMENTAL CONDITIONS

Temperature

● Operating: 50" F ~ 104°F (10° C ~ 40°C)

ı   Recommended Long Term: 50°F ~ 90°F (10° C ~ 32.2" C)

Humidity

ı Operating Humidity: 10% ~ 90% noncondensing

SECTION 5   WEIGHTS AND DIMENSIONS

Table 5-2   Weights and Dimensions

Unit	Shipping Weight *	'Height	Width	Depth
ESF-H-10 KSU	37 lbs. 6 oz. (17 kg)	14.4 inches (360 mm)	15.92 inches (398 mm)	9.2 inches (230 mm)
PSF-H-20 PSU	4 lbs. 13 oz. (2.2 kg)	14.96 inches (380 mm)	3.54 inches (90 mm)	7.09 inches (180 mm)
DTU-8-( ) (BK)/(WH) TEL	2 Ibs. (0.9 kg)	4.4 inches (109.9 mm)	7 inches (177 mm)	8.8 inches (223.7 mm)
DTU-16-t) (BK)/(WH) TEL	2 lbs. 3 oz. (1 kg)	4.4 inches (109.9 mm)	7.9 inches (210 mm)	8.8 inches (223.7 mm)
DTU-16D-( ) (BK)/(WH) TEL	2 lbs. 4 oz. (1 kg)	4.4 inches (109.9 mm)	7 inches (177 mm)	9.1 inches (229 mm)
DTU-32-( ) (BK)/(WH) TEL	2 lbs. 7 oz. (1.1 kg)	4.4 inches (109.9 mm)	7 inches (177 mm)	8.8 inches (223.7 mm)
DTU-32D-( ) (BK)/(WH) TEL	2 lbs. 7 oz. (1.1 kg)	4.4 inches (109.9 mm)	7.9 inches (210 mm)	9.1 inches (229 mm
ESF-C-10 KSU	Approximately 9 lbs.	13 inches (325 mm)	19 inches (475 mm)	4.16 inches (104 mm)
ETW-8-1 (BK)/(SW) TEL	2 Ibs. (0.9 kg)	3.98 inches (101 mm)	6.89 inches (175 mm)	8.81 inches (223 mm)
ETW-16DC-1 (BK)/(SW) TEL	2 lbs. 3 oz. (1 kg)	3.98 inches (101 mm)	6.89 inches (175 nun)	8.81 inches (223 mm)
ETW-16DD-1 (BK)/(SW) TEL	2 lbs. 7 oz. (1.1 kg)	3.98 inches (101 mm)	18.07 inches (205 mm	8.81 inches (223 mm)

*   Shipping weight includes the shipping carton.

Table 5-2   Weights and Dimensions (cont.)

Unit	shipping Weight *	Height	Width	Depth
ETJ-l-1 (SW) TEL	2 lbs. (0.9 kg)	3.98 inches (101 mm)	6.89 inches (175 mm)	8.81 inches (223 mm)
ETJ-1HM-1(SW) TEL	2 lbs. 3 oz. (1 kg)	3.98 inches (101 mm)	6.89 inches (175 mm)	8.81 inches (223 mm)
ETE-l-2 TEL	1 lb. 14 oz. (0.10 kg)	3.15 inches (80 mm)	6.30 inches (160 mm)	9.06 inches (230 mm)
ETE-1HM-2J TEL	1 lb. 10 oz. (0.7 kg)	2.36 inches (60 mm)	6.30 inches (160 mm)	9.06 inches (230 mm)

*   Shipping weight includes the shipping carton.

SECTION 6   VISUAL INDICATIONS
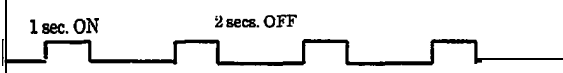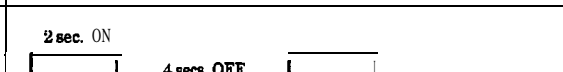
Table 5-3   Multiline Terminal LED Flash Patterns

LED	Condition	Color	Flash Patterns
Line Key	I-Use Busy Incoming Call I-Hold Call Hold Hold Recall Transfer Recall	Green Red Red Green Red Green Green	
Microphone	ON Monitored	Red Red	
ICM	I-Use ICM Incoming Call	Red Red	
Large LED	Incoming Internal Call Incoming CO Line Voice Mail Message VRS Message	Red Green Red Red	
Speaker	ON System Data Entry Monitor	Red Red Red	
Conference	Conference in Progrea All Conference Circuits Used Hold Conference Call ICM Call Hold SPD Confirmation	Red Red Red Red Red	
Answer	Incoming Trunk Voice Over Split Preset	Red Green Red	
Function	Callback Set DND, Call FWD Auto Redial Set ON (to Set Function)	Red Red Red Red	
LNR/SPD	CO Line Key Seized Exclusive Hold	Green Green	
BLF or DSS Key	Use, Hold, ICM Called DND, Call FWD All Set Special Mode (While pressing FNC key or going off-line)	Red Red Red	

```
0          0.5          1.0          1.5          2.0 sec.
```

SECTION 7   TONE PATTERNS

Table 5-4 Tone Patterns

Tone	Frequency (Hz)	Tone Patterns
Dial Tone	350/440	
Second Dial Tone	350/440	120 IPM
Busy Tone	480/620	60 IPM
Call Waiting Tone	440	60 IPM
Ringback Tone	4401480	1 sec. ON 2 secs. OFF
Reorder Tone	4801620	120 IPM
Tone Override Camp-On Tone	440	0.5 sec.
Confirmation	440	1 sec. ON
Recall Tone	1024	60 IPM
CO/PBX Ring Tone	600/700 or 102411285	2 sec. ON 4 secs. OFF
ICM Ring Tone	500	1 sec. ON 2 secs. OFF
Voice Page Alert Tone (Tone Burst)	440	0.5 sec.
Howler Tone	2400	16 Hz Modulation
Barge-In Tone	440	1 sec. ON
Voice Over	440	0.5 sec.

SECTION 8   OUTSIDE LINE TYPE

- **2-wire,** Loop Start Trunks

SECTION 9   NETWORK AND CONTROL

Control Section

l   Control: Stored program with distributed processing

- Central Processor: B-bit microprocessor
- Clock: 8 MHz

l   Multiline Terminal: **4-bit,** 1 chip microprocessor

l   SLT Adaptor: **4-bit,** 1 chip microprocessor

Transmission

l   Data Length:

From Multiline Terminal to Electronic Station Port:	23 bits
From Electronic Station Port to Multiline Terminal:	23 bits

l   Data Transmission Rates:

Between Electronic Station Port and Multiline Terminal:	512 **Kbits/sec.**

- **Scannin**g Time for Each Multiline Terminal: 64 ms.

Network

l   TDM Switching: PCM (μ Law)

l   **TDM Clock:**   2.048 MHz

l   TDM Slot Period: 125 **μs./32**

l   TDM Data Bus: 8 bits

l   TDM Timeframe: 125 **μs.**

Telephones

l   Multiline Terminal:

Voltage:	**+11 ~** + 28 Vdc
Maximum Current:	200 **mA**

l   Single Line Telephone Adaptor (**SLT-F(1G)-10** ADP / **SLT-F(1G)-20** ADP):

Standard 2500 Set:	500 type network
Nominal Current:	**30 mA**
Ring Signal:	56 **Vac RMS** @ 20 Hz

SECTION   10   DIALING   SPECIFICATIONS

Dial Pulse Address Signaling

● **Pulse Rate:**   10 ± 0.8 **pps**/20 ± 1.6 pps

l   Make Ratio: 39 ± 3% or 33 ± 3%

●   Interdigit Interval: 800 ms.

l   Minimum Pause: 600 ms. **(10 pps)**

                             450 ms. **(20 pps)**

DTMF   Address   Signaling

l   Frequencies: Low Group: 697 Hz, 770 Hz

                                      852 Hz, 941 Hz

                     High Group: 1209 Hz, 1336 Hz

                                      1477 Hz

l   Frequency Deviation: ± 1.5% maximum

l   Nominal Level
    per Frequency: $-6\,\mathbf{dBM} \sim -4\,\mathbf{dBM}$

l   Minimum Level
    per Frequency: Low Group: -10 **dBM**

                            High Group: -8 **dBM**

l   **Rise Time:**   Within 5 ms.

l   Duration: 70 ms. (default), 70 ms. (min.), 900 ms. (max.)

l   Interdigit: 60 ms. (default), 60 ma. (min.), 200 ms. (max.)

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

Nominal Low Group Frequencies **(Hz)**

SECTION 11   EXTERNAL EQUIPMENT CONNECTION

Music On Hold (MOH)/Background Music (BGM)

- Connector: 4-position, quick connector
- Auxiliary Input: 1. OV RMS Signal Level max./min.
- Input Impedance: 600 Ω

Station Message Detail Recording (SMDR)

- Female connector (system output) standard RS-232C (serial output)

External Paging

- Output Level: — 15.0 dBm Signal Level, + 4 dBm max.
- Output Impedance: 600 Ω

General Purpose Relays

- Contact Rating: 1 A @ 24 Vdc
                      150 mA @ 48 Vdc

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