

EXCEL

308/816

**GENERAL DESCRIPTION
INSTALLATION
AND PROGRAMMING MANUAL**



**MACROTEL
INTERNATIONAL
CORPORATION**

**GENERAL DESCRIPTION
INSTALLATION
AND PROGRAMMING MANUAL
EXCEL 308/816**

FCC REG. #E4K5MR-17441-KF-E

REN 1.3B

P/N: 2208022

**MACROTEL INTERNATIONAL CORPORATION
3540 N.W. 56TH STREET
FT. LAUDERDALE, FLORIDA 33309**

CHANGE CONTROL

September 26, 1988.....Issue 1
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NOTICE

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CUSTOMER INFORMATION SHEET

CUSTOMER NAME: _____

MAIN TELEPHONE NUMBER OF CUSTOMER: _____

MANUFACTURER: MACROTEL INTERNATIONAL CORPORATION

MODEL: EXCEL 308

MODEL: EXCEL 816

FCC: #EK45MR-17441-KF-E

REN: 1.3B

FACILITY INTERFACE CODE:

SERVICE ORDER CODE:

REQUIRED NETWORK INTERFACE JACK: RJ 11

MODEL #: _____

SERIAL #: _____

TABLE OF CONTENTS

	PAGE
CUSTOMER INFORMATION SHEET	2
1.0 PURPOSE OF MANUAL	
General Description.....	6
Installation.....	6
Programming.....	6
Troubleshooting.....	6
2.0 GENERAL F.C.C. INFORMATION	
Radio Frequency Interference.....	7, 8
3.0 GENERAL DESCRIPTION	
Overview.....	9
General Description of KSU.....	9
CPU Processor Unit (diagram included on this page).....	9
Network Control (diagram included on this page).....	10
Power Supply.....	11
System Components.....	11
Electronic Telephone Sets.....	12
Doorphone.....	12
2 C.O. Line Expansion Cards.....	12
LCD Display Kit.....	12
Off-Hook Announce Adaptor.....	12
Wall Mount Kit.....	13
Battery Backup.....	13
308 Telephone Set (Figure 1).....	14
816 Telephone Set (Figure 2).....	15
System Capacities.....	16
Electrical Specifications.....	17
Environmental Specifications.....	18
4.0 INSTALLATION	
Overview.....	19
Installation Precautions.....	20
Equipment Verification.....	21
System Components Excel 308/816.....	21
Installation Location Checklist.....	22
Tools Checklist.....	23
KSU Connections 308 KSU (Figure 3).....	24
308 Facilities Location (Figure 4).....	25

TABLE OF CONTENTS - CONTINUED:	PAGE
KSU Connections 816 KSU (Figure 5).....	26
816 Facilities Location (Figure 6).....	27
Mount the Main Distribution Frame (MDF).....	28
System Cabling.....	28
Station Cables.....	28
Terminate Station Cables at the MDF.....	28
Terminate Cables at Keypad Locations.....	28
Mount the KSU (Figure 7).....	29
Frame Ground Connections (Figure 8).....	30
Install the Keypads.....	31
Connection of the Excel Series Telephone (Figure 9).....	32
Central Office Line.....	33
Key System Unit.....	33
Before Mounting the KSU.....	33
Central Office Line for 308/816 Connection (Figure 10).....	34
Memory Battery Initialize (Figure 11).....	35
Installation of Doorphone in 308 KSU (Figure 12).....	36
Installation of 2 Line Expansion PCB in 816 KSU (Figure 13).....	37
Music on Hold Installation (Figure 14).....	38
Off-Hook Call Announce Adaptor (Figure 15).....	39
Battery Back-Up (Figure 16).....	40
Connection of External Paging Speaker (Figure 17).....	41
LCD Display Kit Installation.....	42
LCD Installation Diagrams (Figure 18).....	43
Table 1 Excel 308 Connectors.....	44
Table 2 Excel 816 Connectors.....	45

5.0 PROGRAMMING INSTRUCTIONS

Overview.....	46
Entering/Exiting System Programming Mode (#20).....	47
Modification of Password (#21).....	48
DTMF Muting to Station User (#22).....	49
Dial Pulse Make/Break Ratio (#23).....	50
Software Version of System and Telephone (#24).....	51
System Initialization (#25).....	52
Station Class of Service (#30).....	53
C.O. Line Access by Station User (#31).....	54
Internal Paging - Allow or Deny (#32).....	55
Class of Service - Toll Restriction.....	56
Deny Codes for Class of Service 1 (#33).....	57
Allow Codes for Class of Service 1 (#34).....	58
Deny Codes for Class of Service 2 (#35).....	59

TABLE OF CONTENTS - CONTINUED:	PAGE
Allow Codes for Class of Service 2 (#36).....	60
Allow Codes for Class of Service 3 (#37).....	61
Central Office Incoming/Outgoing Denial (#40).....	62
C.O. Line Dial Mode Selection (Tone/Pulse) (#42).....	63
C.O. Line Enabled for Service (#43).....	64
C.O. Line Definition (#44).....	65
C.O. Flash Timing (#50).....	66
PABX Flash Timing (#51).....	67
Hold Recall Time Definition (#52).....	68
Transfer Recall Time Definition (#53).....	69
Alarm Time Duration (#54).....	70
Time & Date Display (#55).....	71
C.O. Line Ringing Mode (#60).....	72
Night Mode Ringing (#61).....	73
Day Mode Ringing (#62).....	74
Night Ring Over External Page (#63).....	75
Attendant Keypad Designation (#70).....	76
System Speed Dial Programming.....	77
System Dial Toll Restriction (#71).....	78
Boss/Secretary Combination (#73).....	79
Soft Key Programming (#80).....	80
Customer Database Programming Sheets.....	81 - 86
System Speed Dialing Sheet.....	87, 88
 6.0 TROUBLESHOOTING	
During Installation.....	89, 90

1.0 PURPOSE OF MANUAL

This manual details the instructions and procedures required to install, program and maintain the EXCEL 308/816 Series Electronic Key Telephone System. For convenience, the manual has been written in several sections. They are as follows:

GENERAL DESCRIPTION: Provides an overview of system operation, capacities and physical characteristics.

INSTALLATION: Detailed installation instructions to enable the installer to complete the installation of the KSU and associated equipment.

PROGRAMMING: Step by step procedures are provided to allow the installer to program the customer database. Also, blank programming forms are included so that a hard copy of the customer database can be maintained and left on site.

TROUBLESHOOTING: The last section covers troubleshooting procedures to be followed should the installer encounter any difficulties.

2.0 TELEPHONE COMPANY AND F.C.C. REQUIREMENTS AND RESPONSIBILITIES

In compliance with the requirements of Part 68 of the F.C.C. Rules and Regulations for connection of terminal system (this device is classified as a terminal system) to the telephone network and for your convenience, the following information is presented:

1. Notification to the Telephone Company

Customers connecting terminal equipment to the telephone network shall, upon request of the Telephone Company, inform the Telephone Company of the particular line(s) to which such connection is made, the F.C.C. registration number (see label on side of unit) and ringer equivalence number (REN) of the registered terminal equipment.

The REN is useful to determine the quantity of devices you may connect to your telephone line and still have all of those devices ring when your telephone number is called. In most, but not all areas, the sum of the REN's of all devices connected to one line should not exceed five (5.0). To be certain of the number of devices you may connect to your line, as determined by the REN, you should contact your local telephone company to determine the maximum REN for your calling area.

2. Direct Connection to a Party-Line or Coin-Operated Telephone Line is Prohibited.

3. Incidence of Harm to the Telephone Lines

Should terminal equipment cause harm to the Telephone Network, the Telephone Company shall, where practical, notify the customer that service may be temporarily discontinued. However, where prior notice is not practical, the Telephone Company may temporarily discontinue service forthwith, if such action is reasonable in the circumstances. In case of such un-notified temporary discontinuance of service, the Telephone Company shall:

- (a) Promptly notify the customer of such temporary discontinuance of service.
- (b) Afford the customer the opportunity to correct the situation which gave rise to the temporary discontinuance.
- (c) Inform the customer of the right to bring a complaint to the Commission pursuant to the procedures set out in Subpart E of Part 68 of FCC Telephone Equipment Rules.

4. Compatibility of the Telephone Network and Terminal Equipment

- (a) Availability of telephone interface information.

Technical information concerning interface parameters and specifications not specified in FCC Rules, including the number of Ringers which may be connected to a particular line, which is needed to permit Terminal Equipment to operate in a manner compatible with Telephone Company communications facilities, shall be provided by the Telephone Company upon customer's request.

- (b) Changes in Telephone Company Communications Facilities, Equipment, Operations and Procedures.

The Telephone Company may make changes in its communications facilities, equipment, operations or procedures, where such action is reasonably required in the operation of its business and is not inconsistent with the rules and regulations in FCC Part 68 of the FCC Rules and Regulations. If such changes can be reasonably expected to render any customer Terminal Equipment incompatible with Telephone Company Communications Facilities, or require modification or alteration of such Terminal Equipment, or otherwise materially affect its use or performance, the customer shall be given adequate notice in writing to allow the customer an opportunity to maintain uninterrupted service.

RADIO FREQUENCY INTERFERENCE

This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. It has been type-tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-Reorient the receiving antenna
-Relocate the equipment with respect to the receiver
-Move the equipment away from the receiver
-Plug the equipment into a different outlet so that equipment and receiver area are on different branch circuits.

3.0 GENERAL DESCRIPTION

OVERVIEW

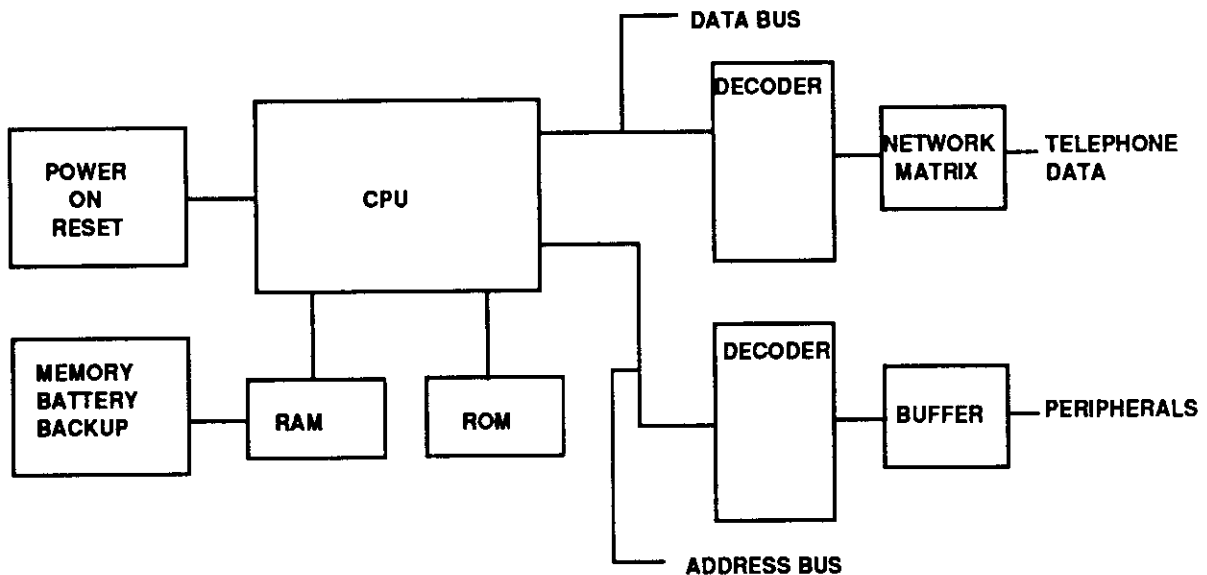
The general description section provides detailed information of the operation of the Excel 308/816 Electronic Key Telephone System. The CPU, network interface and system components are described in order to provide a working knowledge of the equipment and it's operation.

GENERAL DESCRIPTION OF KSU

The system architecture of the Excel series is designed with "state of the art" components and high quality design criteria. The system is organized into three major sections: The Central Processing Unit, the Speech Path Network and Interface, and the Power Supply section.

CPU PROCESSOR UNIT

The heart of the system is controlled by a Z80-A Microprocessor.



When the AC power is turned on, the power-on reset initializes the CPU. The CPU, in turn, requests instructions from the ROM to start call detection and processing. Temporary data is stored in the RAM along side user programmed data.

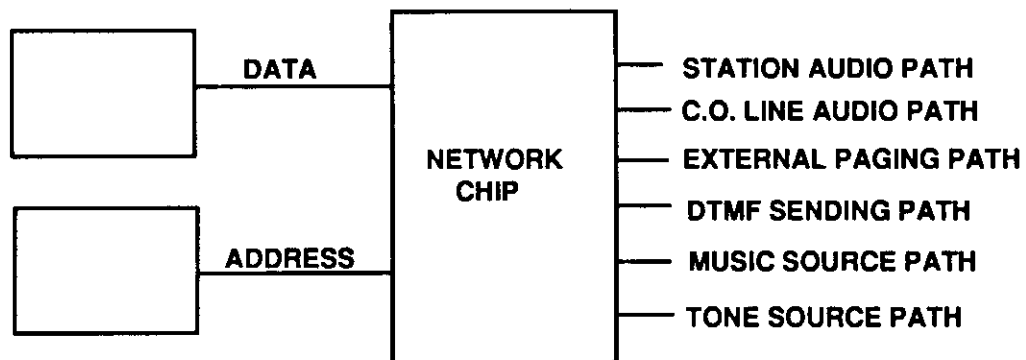
The user programmed data is backed up by a 3.7 Volt NICAD battery that is under constant trickle charge by the KSU power supply. The NICAD is also used to provide backup voltage for the real time clock. The NICAD battery will protect the speed dial numbers and customer database until the accumulated power outage exceeds approximately 40 hours. When the AC power is turned on, the NICAD recharges.

Memory power backup circuitry is monitored by voltage detecting circuitry controlled by the CPU and, in turn, works with the power supply circuitry, which monitors the DC output of the power supply.

NETWORK CONTROL

The network is designed using solid state, space division architecture to insure low loss and channel flexibility.

Audio Channels	308	816
Common Path	4	8
Doorphone	1	0
DTMF	1	1
MOH	1	1
Internal Tones	1	1
External Page	1	1



The 12 x 8 cross point supports common audio channels, DTMF sending channel, music source channel, and the external paging source channel. In the event that all common channels are busy and an incoming call is ringing, the system will select the external page channel and ring the appropriate phone(s). If that channel is busy, the system will notify the system operator via the alarm tone. When the power-on sequence takes place, the matrix is instructed to connect all stations with music. This checks the data connection showing the digital communication is working between the KSU microprocessor and the telephone microprocessor. It also checks that the audio path from the KSU network is communicating with the telephone network.

POWER SUPPLY

The power supply section consists of components which change 110/220 AC voltage into DC voltage which the integrated circuits use. Working in conjunction with this circuitry, the Excel series employs an on-line monitoring circuit which detects under voltage and over voltage.

In the event the system loses the AC voltage and system battery backup has been installed, the system detects when the batteries have discharged to such a rate that the KSU is no longer usable. Instead of allowing the batteries to completely discharge which may damage the batteries, the system disconnects the batteries.

When the AC voltage is restored to the KSU, the circuitry also monitors the charging of the batteries. Charging will take place until the monitor circuit detects the batteries is in a charged state; which, in turn, turns off the charging circuit thereby preventing the batteries from being over-charged.

SYSTEM COMPONENTS

308 KSU - The 308 KSU provides for 3 central office lines and 8 electronic telephones. It is a single PCB that contains:

- Main PCB
- Z80-A Microprocessor
- Associated Logic & Memory Circuitry
- Real Time Clock
- RAM Battery Backup
- System Timers
- Speech Path Network Circuitry
- External Paging Circuitry
- Music on Hold Circuitry
- Power Supply & Associated Circuitry

816 KSU - The 816 KSU provides for 6 central office lines and 16 electronic telephones. It contains 2 PCB's, 1 main equipment and 1 power supply, and the following:

- Main PCB
- Z80-A Microprocessor
- Associated Logic & Memory Circuitry
- Real Time Clock
- RAM Battery Backup
- System Timers
- Speech Path Network Circuitry
- External Paging Circuitry
- Music on Hold Circuitry

POWER SUPPLY

AC to DC rectification
External system battery backup monitoring and control
DC battery input fuse
Battery backup

ELECTRONIC TELEPHONE SETS

There are 2 models of telephones. The 308 telephones support 3 C.O. lines and 8 stations. It has a built-in speaker phone and an optional LCD unit may be installed at a later date. Any phone location may be used to program the system database as long as the correct security code is entered. All phones support dual color LED's to distinguish active lines and utilize separate volume controls for C.O. line ringing and hands-free conversation. All phones are equipped with magnetic receiver transducers compatible with most hearing aid pick-up coils.

The 308 telephones have the capability to use 8 personal speed dialing numbers.

The 816 telephones utilize the same features as the 308, but support 8 C.O. lines and 16 stations.

The 816 telephones have the capability to use 16 personal speed dialing numbers.

DOORPHONE

The 308 KSU supports 1 Doorphone PCB which is connected to the 308 KSU. Calling to and from the KSU is standard and also a door lock relay contact is provided. The user, after answering the call, may depress the door key which, in turn, activates the relay. Programming in the database activates the hardware.

2 C.O. LINE EXPANSION CARDS

The 816 KSU supports a 2 C.O. line expansion card which adds 2 additional C.O. lines giving a total of 8 C.O. lines. This card is connected to the 816 main equipment. Programming database activates the 2 additional C.O. lines. In addition, the 2 lines can also be configured as tie lines or ring down circuits.

LCD DISPLAY KIT

The LCD Display Kit is field installed and allows the user to upgrade to a display telephone without having to replace the original telephone. No programming is needed to enable this feature.

OFF-HOOK CALL ANNOUNCE ADAPTOR

The Ex-ACA adaptor and announce equipment provides the user with off-hook voice announce capability on a per station basis. The unit simply snaps onto the base of the 308 or 816 telephone and is connected to customer provided optional external equipment at the KSU location. One trunk port is used to restrict or allow access to this channel.

WALL MOUNT KIT

The WMK is a dual function kit which allows the phone to be attached to a wall in a vertical manner or by reversing the unit, provides a 28 degree elevation to the telephone.

BATTERY BACKUP

The battery backup consists of two maintenance-free lead acid 12 volt DC batteries connected in series which provides 24 volts DC to the 308/816 key system unit when commercial power has failed. The batteries are monitored and charged by circuitry contained within the KSU. When fully charged, the batteries will supply power for 6 to 8 hours. The batteries may be purchased individually or in an easy to install wall mount rack kit with all necessary cables included.

308 TELEPHONE SET

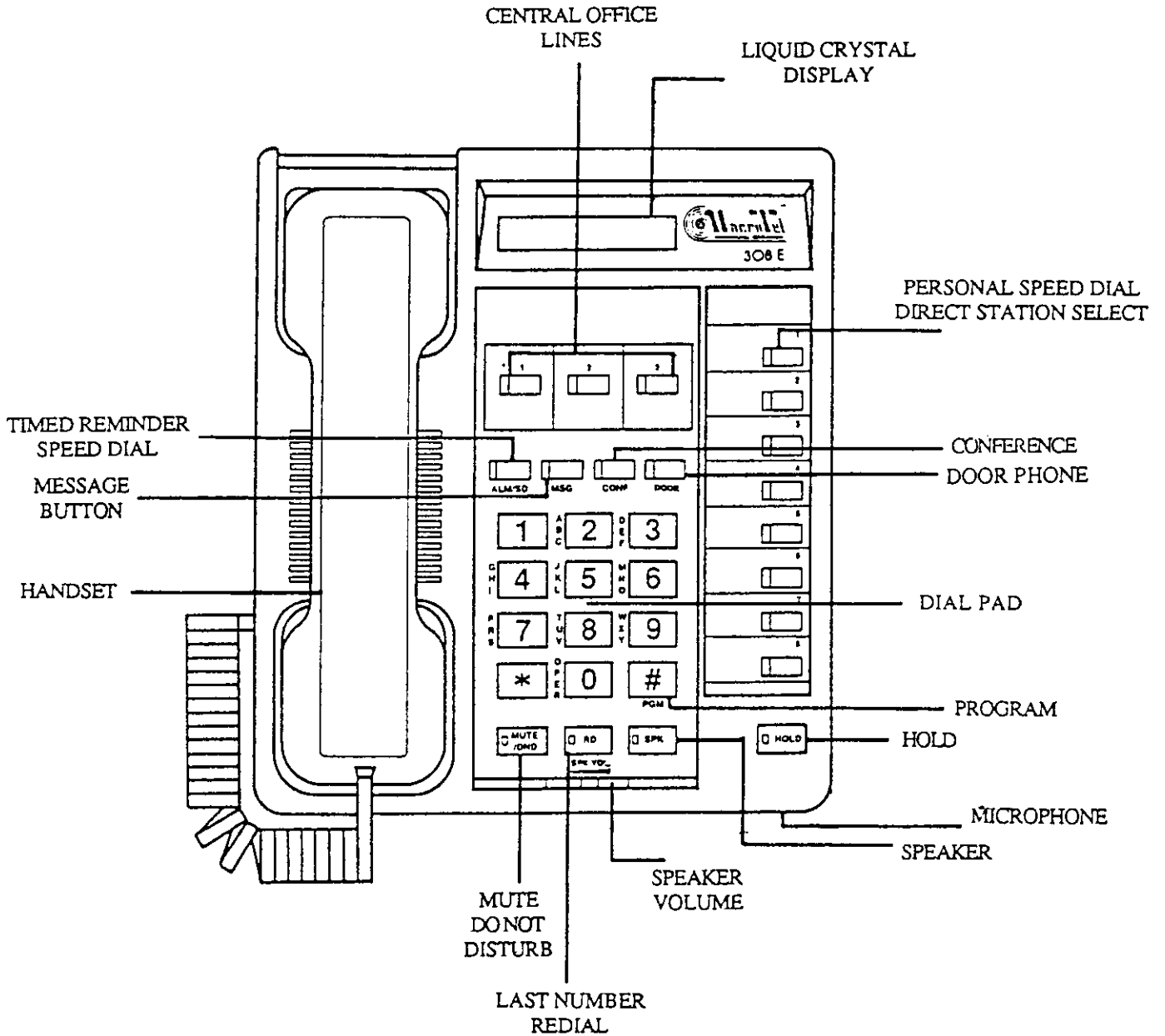


Figure 1

816 TELEPHONE SET

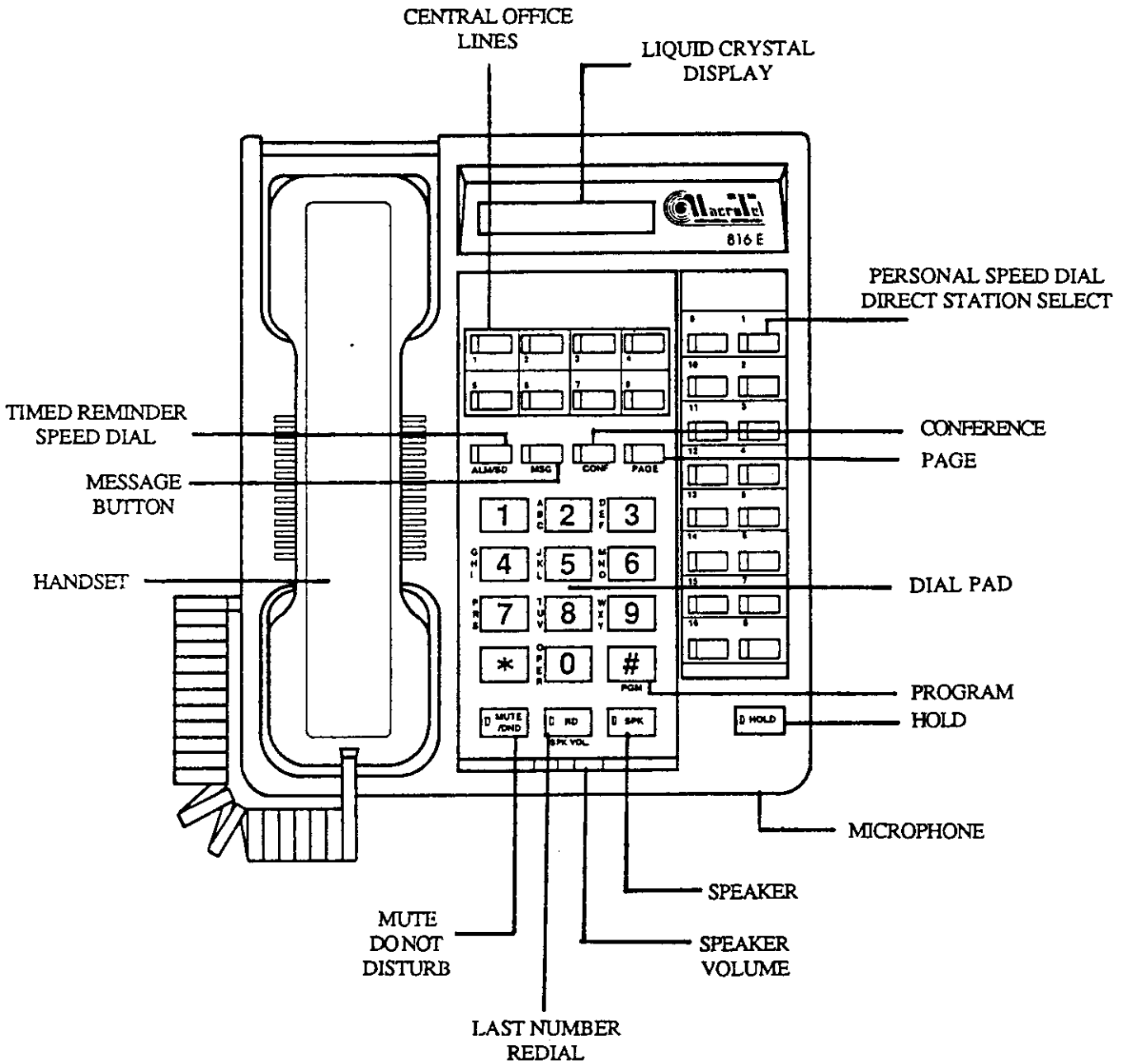


Figure 2

SYSTEM CAPACITIES

	Excel 308	Excel 816
* Main Board	1	1
* Power PCB	0	1
* Optional PCB	1 (Doorphone)	1(2C.O. Lines)
* Line	3	6
* Optional Lines	0	2
* Stations	8	16
* Doorphone	1	0
* Ringing Stations		
Day	8	8
Night	8	8
External Page Zone	1	1
Internal Page Zone	1	1
* Speed Calling		
Personal (30 Digits)	8	16
System (30 Digits)	90	90
* Conference Calls		
Number of Parties	5	5
Simultaneous Conferences	4	8
* Forwarded Stations	8	16
* Toll Restricted Classes	5	5
* Boss/Secretary Station	1	1
* Control Method	Z80A	Z80A
Stored Program		

ELECTRICAL SPECIFICATIONS**INPUT PRIMARY****INPUT**

308 - 110/220 VAC 60 HZ 25 WATTS

816 - 110/220 VAC 60 HZ 45 WATTS

OUTPUT - SECONDARY	+ 6 VDC, + 24 VDC
CIRCUIT VOLTAGE	+ 5 VDC, + 12 VDC, + 24 VDC
STATION VOLTAGE	+ 24 VDC

MUSIC ON HOLD SPECIFICATIONS

INPUT LEVEL	600 OHMS
INPUT VOLTAGE MAXIMUM	250 mV (NOMINAL) @ -10 dbm
OUTPUT MAXIMUM	1 VOLT RMS
USE JOHNSON PLUG	MINIATURE 1/8" (3.5mm)

EXTERNAL PAGING SPECIFICATIONS

OUTPUT LEVEL	250 mV (NOMINAL) @ -10 dbm
OUTPUT MAXIMUM	400 mVRMS

HANDSET	DYNAMIC TRANSDUCERS
----------------	----------------------------

BATTERY SPECIFICATIONS

LOAD SIDE	
308	1.5A @ + 24 VDC
816	2.5A @ + 24 VDC
MINIMUM BATTERY SIZE	6 AH
MAXIMUM BATTERY SIZE	40 AH

Note: 6 AH battery provides about 8 hours of service with 8 telephones. Recharge of 6 AH battery supply is approximately 24 hours.

KSU PHYSICAL CHARACTERISTICS

	<u>Weight</u>	<u>Dimensions</u>
308	9 lbs.	15"H x 11.5"W x 4.25"D
816	10 lbs.	15"H x 11.5"W x 4.25"D

ENVIRONMENTAL SPECIFICATIONS

TO PROVIDE OPTIMAL PERFORMANCE OF THE EQUIPMENT, THE FOLLOWING GUIDELINES SHOULD BE FOLLOWED:

AMBIENT ROOM TEMPERATURES

KSU - OPERATING RANGE

308 - 5°C (41°F) - 40°C (104°F) *

816 - 5°C (41°F) - 40°C (104°F) *

RELATIVE HUMIDITY

NOT MORE THAN 90% NON CONDENSING

VENTILATION

*This equipment uses state of the art components which generate very little heat. Although it does not require strict environmental conditions, it is strongly suggested that the equipment (mainly the KSU) be in a controlled environmental area. Places such as garages, cleaning rooms, etc., have high heat, dust and/or corrosive air which reduces the life of any equipment.

4.0 INSTALLATION

OVERVIEW

To complete the installation of the Excel series KSU and associated equipment, in a timely and efficient manner, it is essential to establish a complete installation plan. Be sure to complete the customer data programming sheets before getting started.

The following sections offer a detailed pictorial view on installation of the equipment with remarks, as needed.

Please completely read through the Installation and Programming sections before attempting to install the equipment.

INSTALLATION PRECAUTIONS

- * DO NOT run cables parallel to fluorescent light fixtures or AC lines. If unavoidable, run the cable across at 90 degree (right) angles.
- * DO NOT run station cables inside electrical conduit already occupied by an AC power cable. This will induce AC voltage into the cable and also is in violation of the National Electrical Code.
- * DO NOT exceed 25 OHMS for each station cable length.
- * Avoid installing in the following places. (Doing so may result in malfunction, noise, or discoloration.)
- * In direct sunlight and hot, cold, or humid places. (Temperature range: 41° F - 104° F.)
- * Due to sulfuric gases produced in areas where there are thermal springs, etc., damage to the equipment or contacts may occur.
- * Places in which shock or vibration are frequent or strong.
- * Dusty places, or areas where water or oil may come into contact with the unit.
- * Near high-frequency sewing machines, electric welders, copy machines or motors.
- * On or near computer, telexes, or other office equipment, as well as microwave ovens or air conditioners. (It is preferable not to install in the same room with the above equipment.)
- * Near radio broadcast antennas (including short wave).
- * Install at least 5 feet from radios and televisions.
- * DO NOT OBSTRUCT AREA AROUND THE ELECTRONIC KSU SWITCHING SYSTEM. (FOR REASONS OF MAINTENANCE AND INSPECTION - BE ESPECIALLY CAREFUL TO ALLOW SPACE FOR COOLING ABOVE AND AT THE SIDES OF THE KSU.)

EQUIPMENT VERIFICATION

Verify that all components on the packing slip are included in the boxes. For reference, utilize the chart below to assure that all components have been received. Any damaged material should immediately be reported to the carrier. Report any discrepancies of required equipment to the manufacturer.

SYSTEM COMPONENTS EXCEL 308/816

UNIT	PART NUMBER	DESCRIPTION
308 KSU	2208001	Electronic Switching System (3x8)
Doorphone PCB	2208007	Doorphone Interface PCB
308 Telephone	2208004	3 Line/8 Station Speakerphone
816 KSU	2208002	Electronic Switching System (6x16)
2 Line Exp. PCB	2208003	2 Line Expansion PCB (C.O. line, tie line, ring down circuits)
816 Telephone	2208005	8 Line/16 Station Speakerphone
LCD Display	2208006	LCD Display Module
WMK	2208015	Wall Mount Kit
Ex-ACA	2208020	Off-Hook Call Announce Adaptor
12 v.d.c. Battery	2208021	Quantity of two required for battery backup
Battery Backup Kit	2208022	Wall Mount Kit, 2 batteries and associated cables

INSTALLATION LOCATION CHECKLIST

1. Select the KSU location to minimize station cable run lengths. **DO NOT** exceed measurements of 25 ohms or 1310 feet , using 24 AWG wire. The ohm value is the loop measurement. The length is the maximum one way measurement from the KSU.
2. Select a wall that is strong enough to support twice the weight of the equipment and plywood to be mounted.
3. The main distribution frame (MDF) requires a minimum 3 x 4 foot, 3/4 inch plywood backboard. The KSU is mounted on this backboard, along with connecting block(s) and modular jack assemblies.

Allow room near the KSU for the paging amplifier, battery back-up equipment, and the external music source, if used. To avoid interference, the music source should be placed a minimum of 5 feet away from the KSU.

Place the KSU within 9 feet of an isolated, dedicated, 110/220 VAC, single-phase, commercial power source. DO NOT use an extension cord. This MUST be an isolated, dedicated, AC circuit for proper operation. The ground wire must be dedicated to this outlet. Run the power, neutral, and ground wires directly from a separate circuit in the breaker box to the KSU outlet. DO NOT plug any other equipment into this outlet. Make sure there are AC outlets for a music source and a paging amplifier, if they are to be installed. These outlets MUST NOT be on the same circuit as the outlet for the KSU.

Prepare a floor plan for the keyset locations, using a star (home-run) configuration. Include each keyset's intercom number 1-8. Intercom number 4 is assigned to the system attendant in software programming 1-8 (1-16).

The system location should not be exposed to direct sunlight, high humidity, heat, dust, or strong magnetic fields (such as heavy motors or large copy machines).

Simple air space should be provided for the KSU since the power supply is convection cooled. DO NOT block the cooling vents located on the top of the KSU. Never place anything on top of the KSU.

TOOLS CHECKLIST

1. A high-impedance, digital multimeter is required to ensure the correct wiring and voltage on the keyset modular jack assembly.
2. Standard telephone hand tools.
3. 2-pair (4 conductor) twisted cable to run from the MDF to each keyset location.
4. 4-conductor modular jack assemblies for terminating the station cables at keyset locations.
5. Punch down tool, Phillips head screwdriver, flat head screwdriver, and drill and bit set.

KSU CONNECTIONS

308 KSU

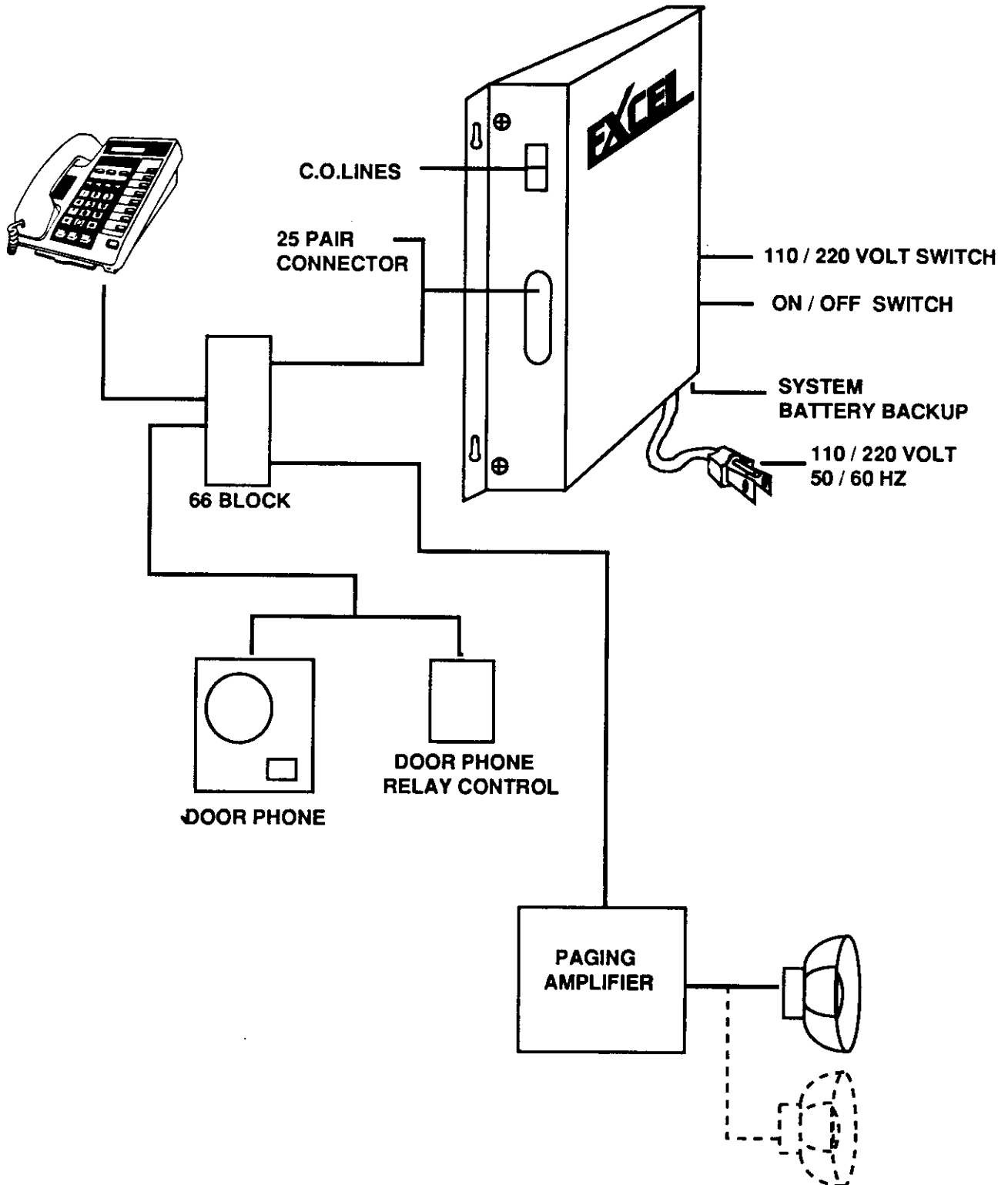
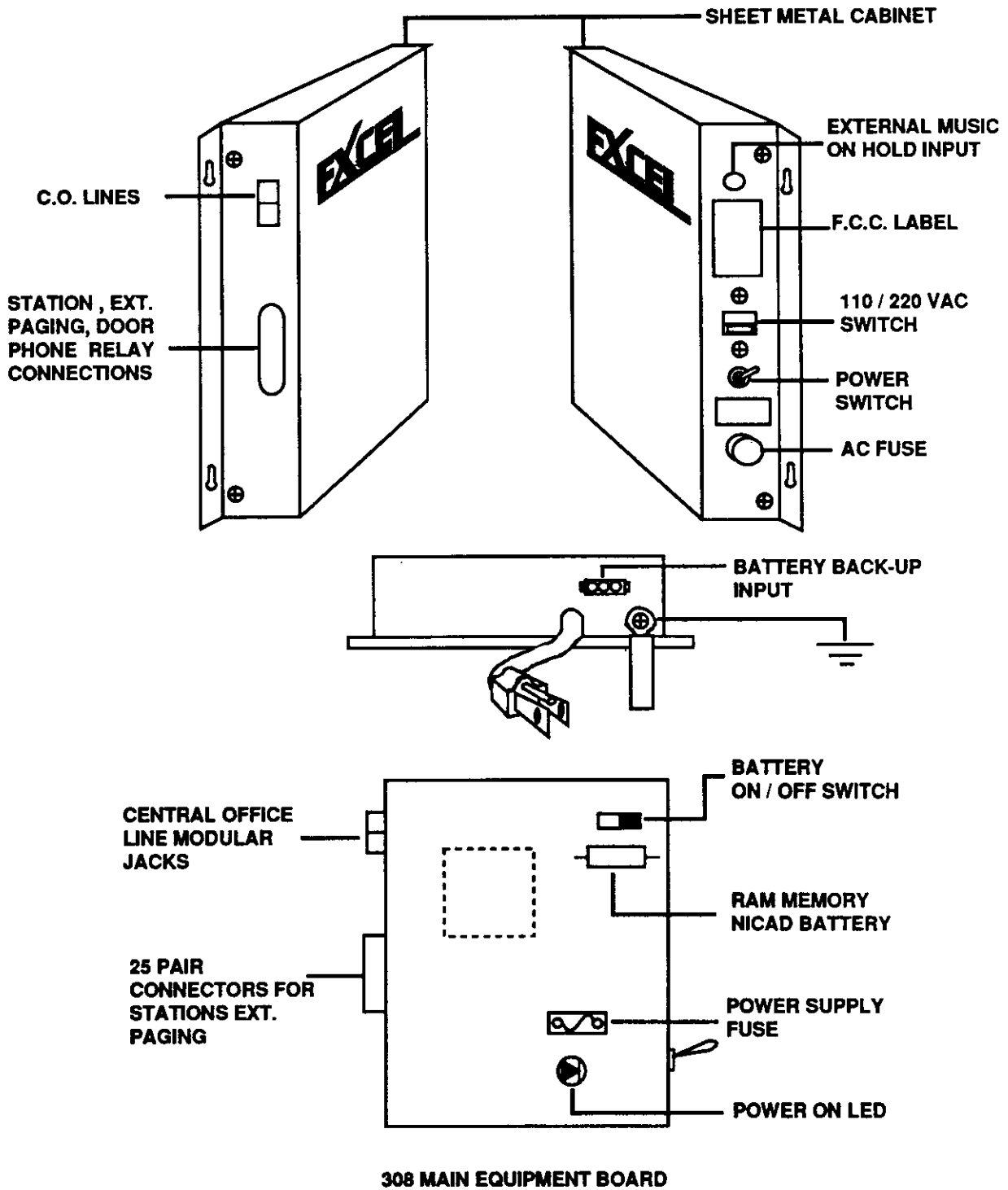


Figure 3

308 FACILITIES LOCATION



INSTALLATION

Figure 4

KSU CONNECTIONS

816 KSU

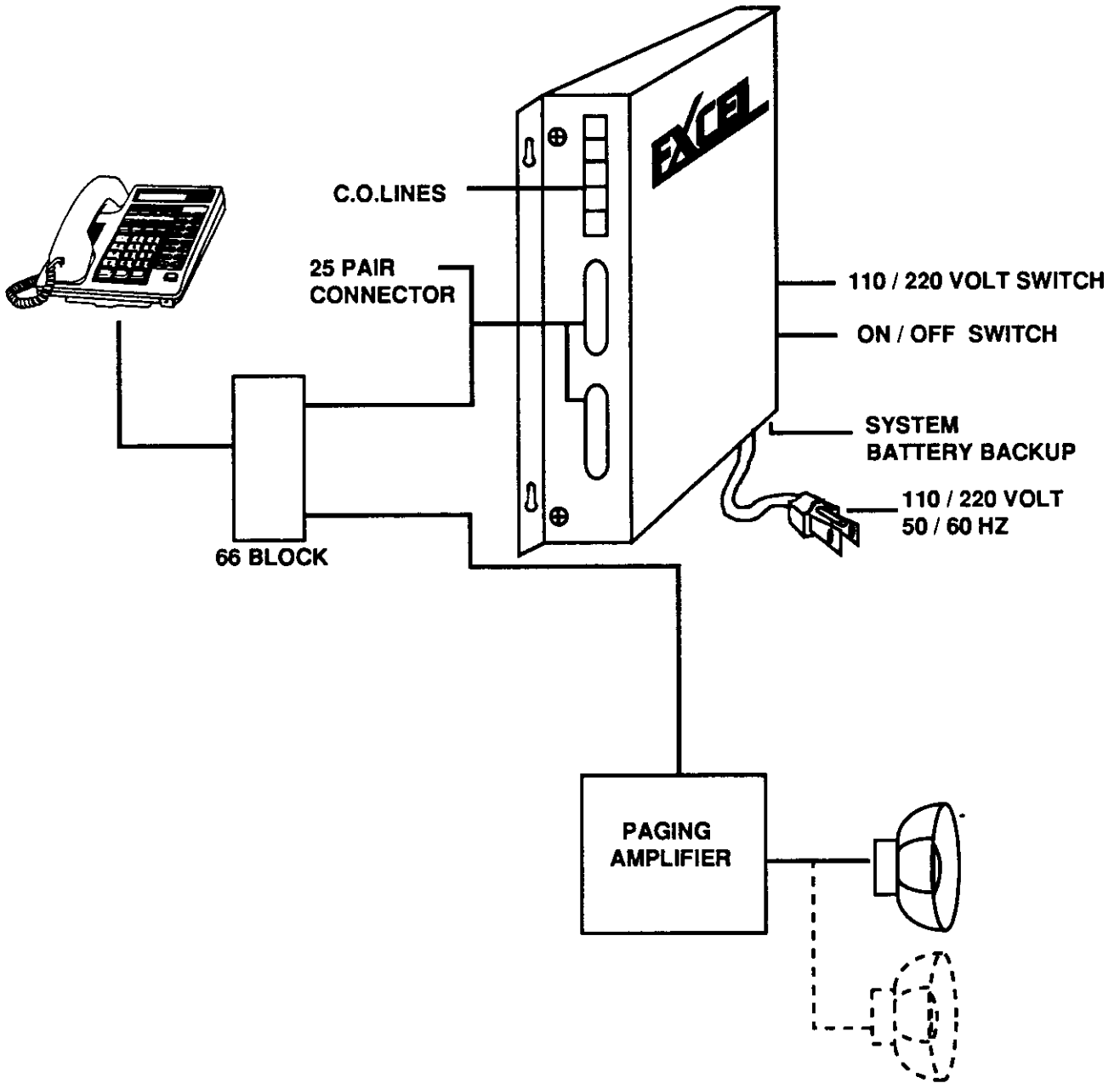
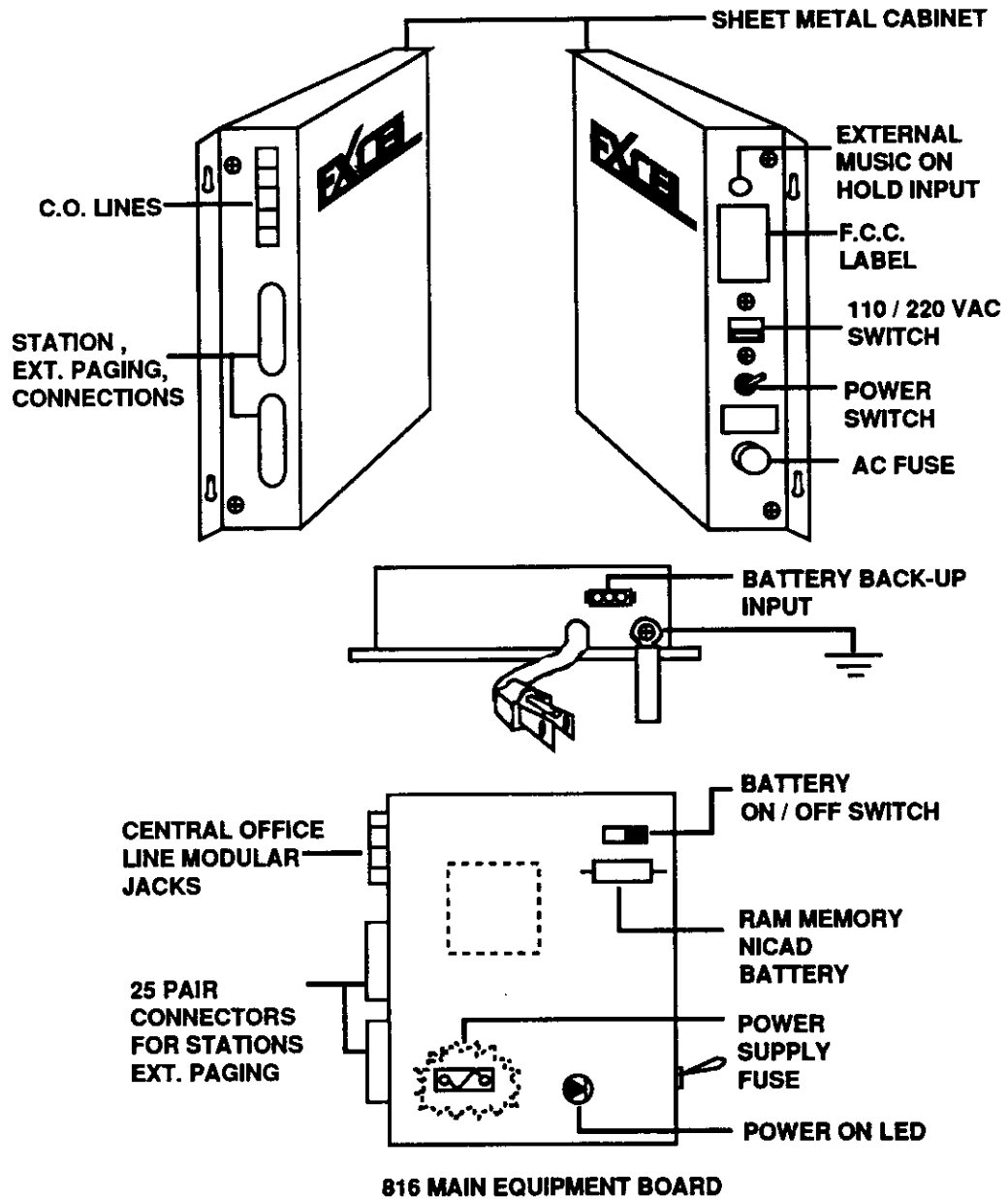


Figure 5

816 FACILITIES LOCATION



INSTALLATION

Figure 6

MOUNT THE MAIN DISTRIBUTION FRAME (MDF)

Plan the location for the 66 blocks, central office connectors, KSU and any other assemblies included in the installation. Be sure to connect the frame ground.

SYSTEM CABLING

STATION CABLES

Using the floor plan developed in pre-installed planning, run 2-pair twisted cable (3-pair if installing Ex-ACA) from the MDF to each keyset location. Label both ends of every cable with the keyset intercom number (1-8 or 1-16). Follow these guidelines when running cable:

Avoid cable runs parallel to fluorescent light fixtures or AC lines not in conduit. If these obstacles are unavoidable, run the cable across them at right angles.

DO NOT run station cables inside electrical conduit already occupied by the AC power cable. To do so is a violation of the National Electrical Code.

DO NOT run station cables near equipment with electric motors or past strong magnetic fields (copy machines, heavy motors, welding equipment, etc.).

DO NOT place station cables where they can be rolled over by office furniture or stepped on.

DO NOT allow the station cable length to exceed 25 ohms, using 24 AWG wire. The ohm value is the loop measurement; the foot (meter) length is the maximum one-way measurement from the KSU.

TERMINATE STATION CABLES AT THE MDF

Terminate each station cable at the MDF as described below:

1. Mount the station 66 block assembly on the MDF backboard.
2. Ensure that each station cable is correctly labeled with the keyset intercom number.
3. Using the punch down tool, terminate the cables for each set in accordance with Table 1 or 2.

TERMINATE STATION CABLES AT KEYSSET LOCATIONS

Terminate the keyset end of each station cable on a 4-conductor modular jack assembly as shown in Figure 3.

MOUNT THE KSU

Mount the KSU using the diagram shown below.

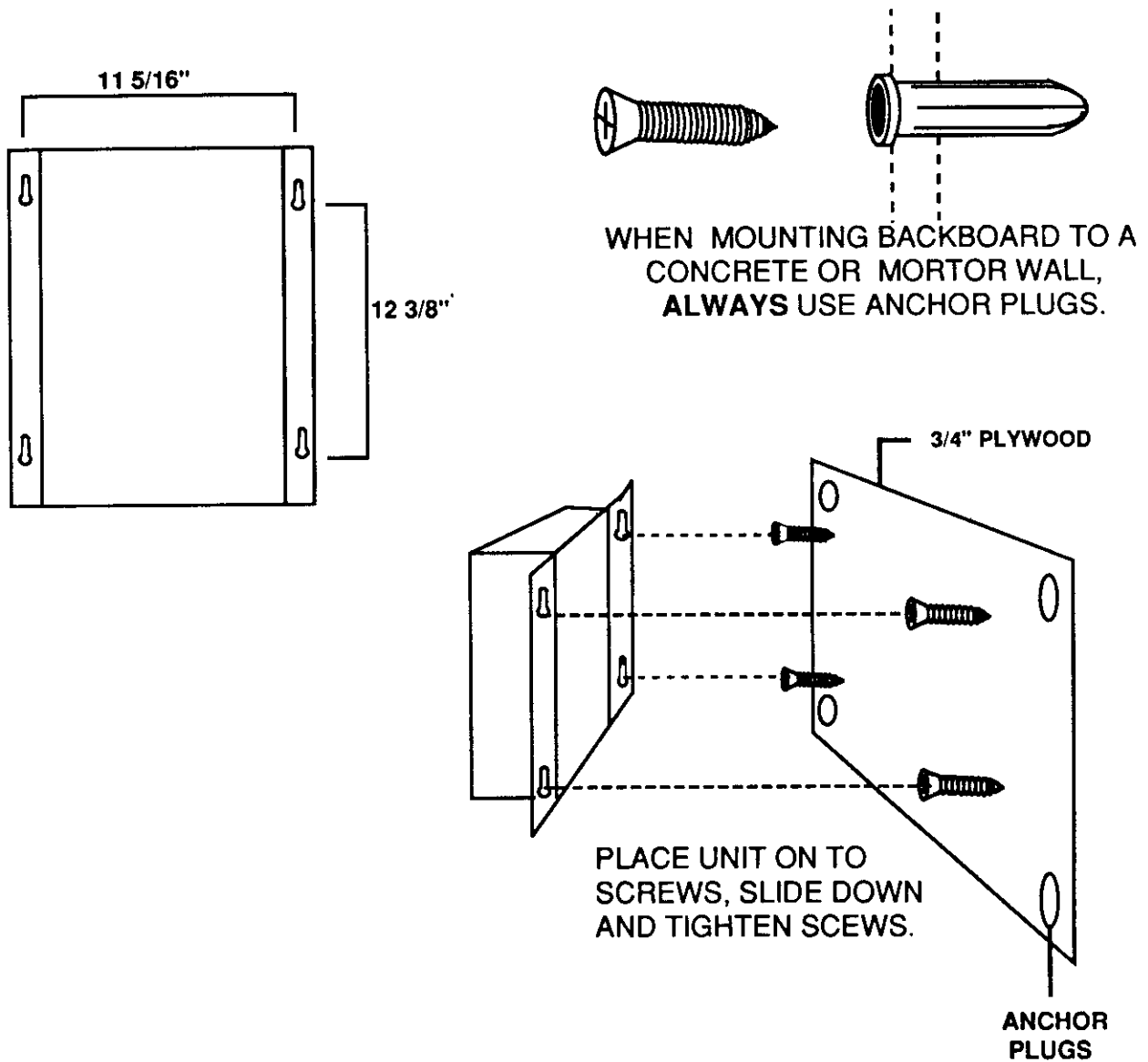


Figure 7

FRAME GROUND CONNECTIONS

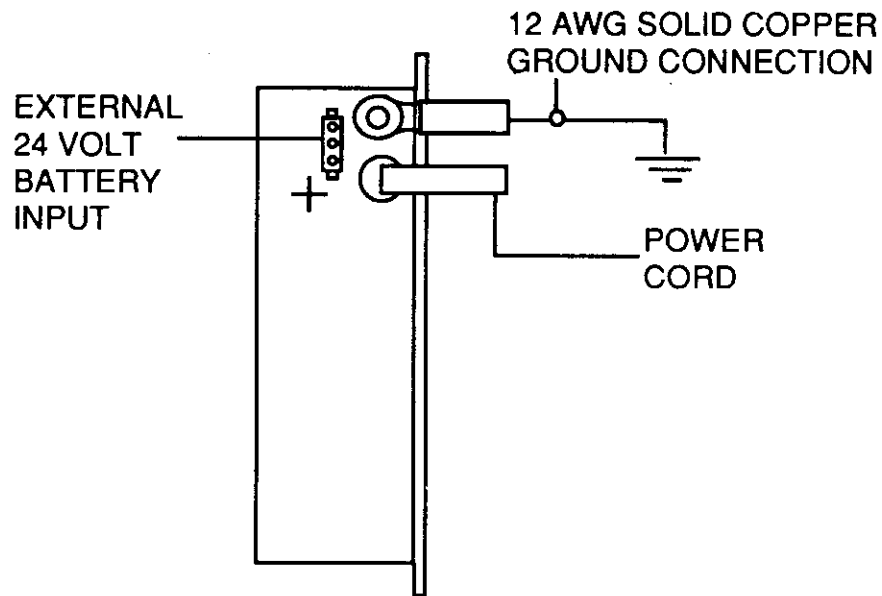


Figure 8

110/220 VOLTAGE CONNECTION:

1. Determine the proper voltage of the AC wall receptacle using a meter, if necessary.
2. Move the switch on the bottom of the KSU to the proper location.

INSTALL THE KEYSETS

Unpack and inspect each keyset for damage. Along with the keyset, the box should contain a 6-foot line cord, a coiled handset cord, a handset, and a plastic bag of key designation labels.

With the KSU AC power on, check the voltage on each modular jack assembly as follows:

- a. Measure the voltage on the YELLOW (+24) terminal with respect to the RED (GND) terminal. Place the common probe of the voltmeter on the RED terminal. It must measure $+24V \pm 5VDC$. If $-24VDC$ is measure, check the cabling for a reversed pair.
- b. Check the voltage on the BLACK (+24) and GREEN (GND). The voltage condition is the same.

Connect all keysets to their respective connectors with the provided modular cord.

CONNECTION OF THE EXCEL SERIES TELEPHONE

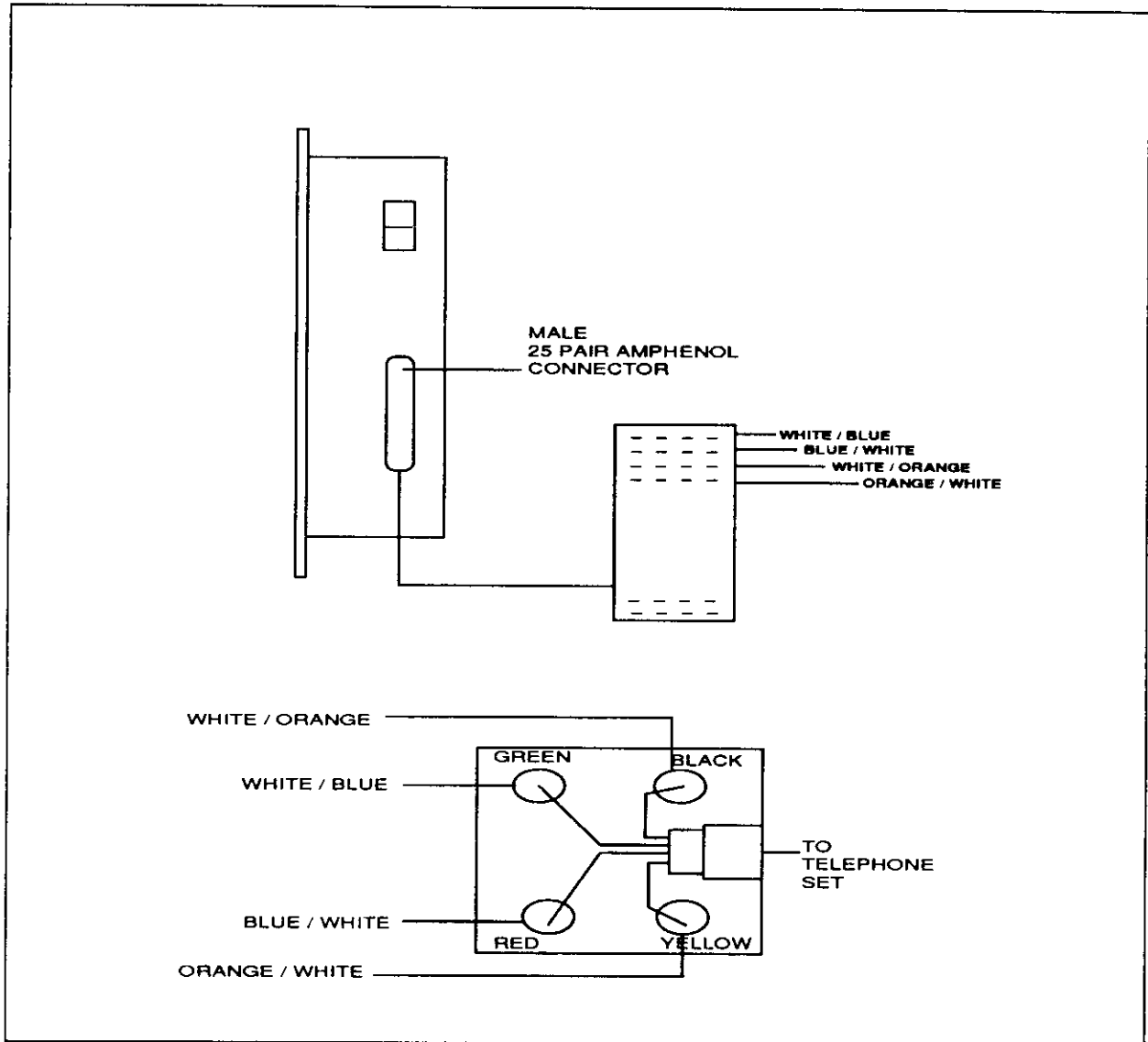


Figure 9

NOTE:

1. Use 2 or 3 pair twisted wire to prevent the possibility of cross-talk.
2. Review Installation Precautions as listed on page 20.
3. Refer to Table 1 (308) and Table 2 (816) for 25 pair connector station assignment.

CENTRAL OFFICE LINE

Assure that the central office lines have been installed on the backboard. These lines will be connected to the KSU with a modular cord after the KSU has been mounted. Follow the diagram on Figure 10.

KEY SYSTEM UNIT

BEFORE MOUNTING THE KSU

Unpack the KSU and lay it on a flat surface with the cover facing up. Open it by removing the four retaining screws and lifting off the cover. The PCBs contain static-sensitive components. Lift them only by the edges and carefully handle the components while inspecting them in the next step. Always use a static wrist strap for protection.

Inspect the fuses for the correct voltage and current rating. The AC fuse (3A, 250V, fast-acting) is accessible from the outer right side of the KSU. The DC fuse (3A, 250V, fast-acting) is mounted on the lower left corner of the Main Control PCB. Ensure that the ROM integrated circuits are properly seated in their sockets.

If the KSU or any of its components are damaged, contact MacroTel International Corporation.

******IMPORTANT******

You **MUST** activate the NICAD battery by setting the BACK-UP switch (2 pin DIP) to the "ON" position. Otherwise, the database memory will not be protected during a power outage. Refer to Figure 11 for location of back-up switch.

CENTRAL OFFICE LINE FOR 308/816 CONNECTION

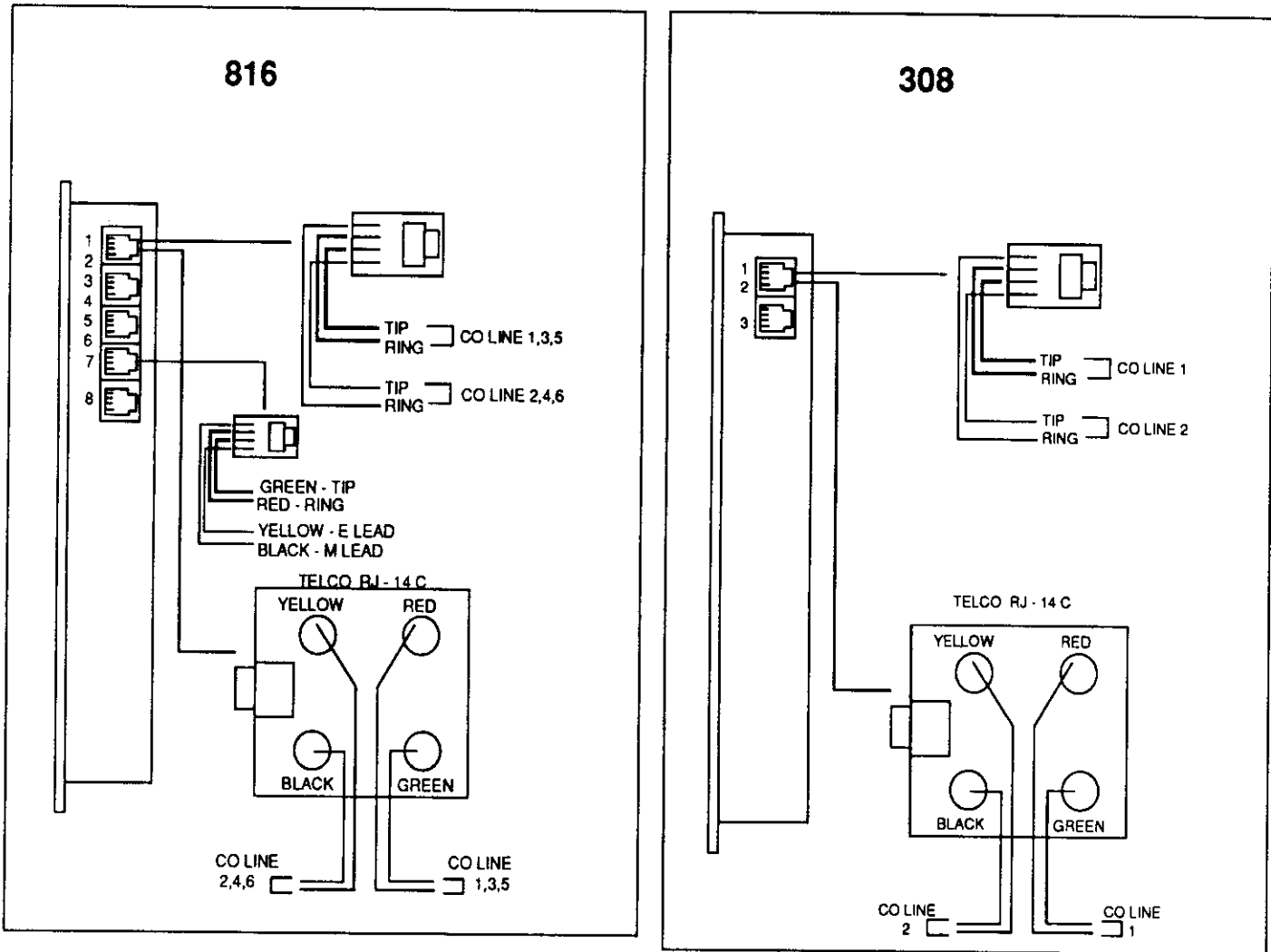


Figure 10

NOTE:

1. Incorrect wiring of C.O. may cause the Excel KSU to malfunction. If so, refer to the Troubleshooting section for corrective procedures.

MEMORY BATTERY INITIALIZE

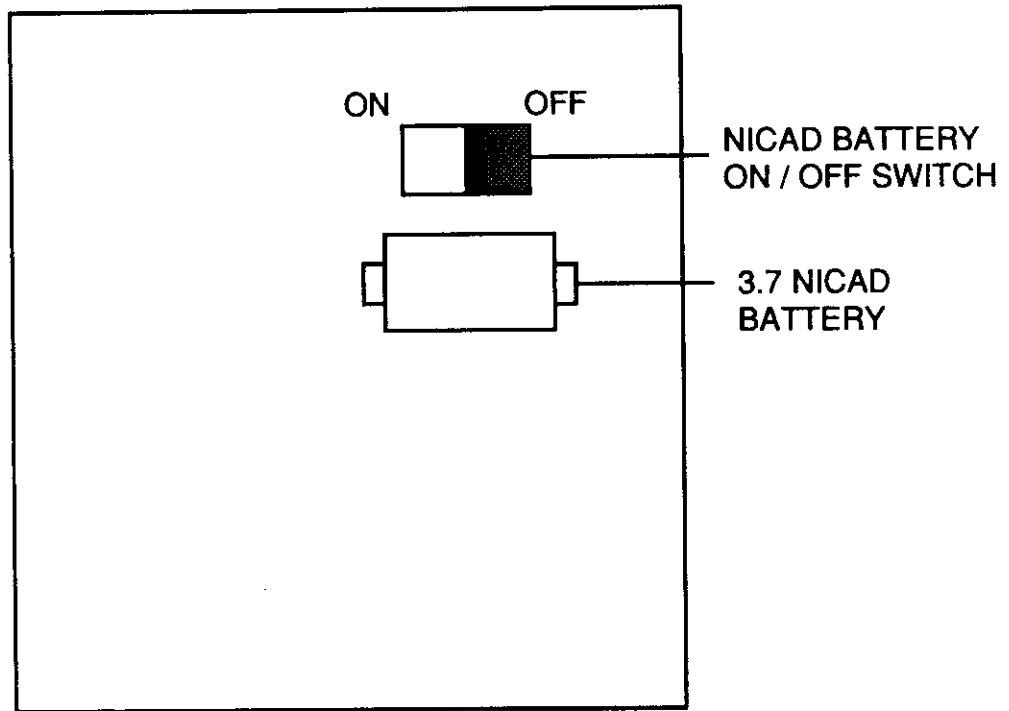


Figure 11

NOTE:

1. Remove the cover from the unit.
2. Locate the battery on/off switch and turn the switch on.
3. The battery will normally last 40 hours during power outage, if it is fully charged.

INSTALLATION OF DOORPHONE IN 308 KSU

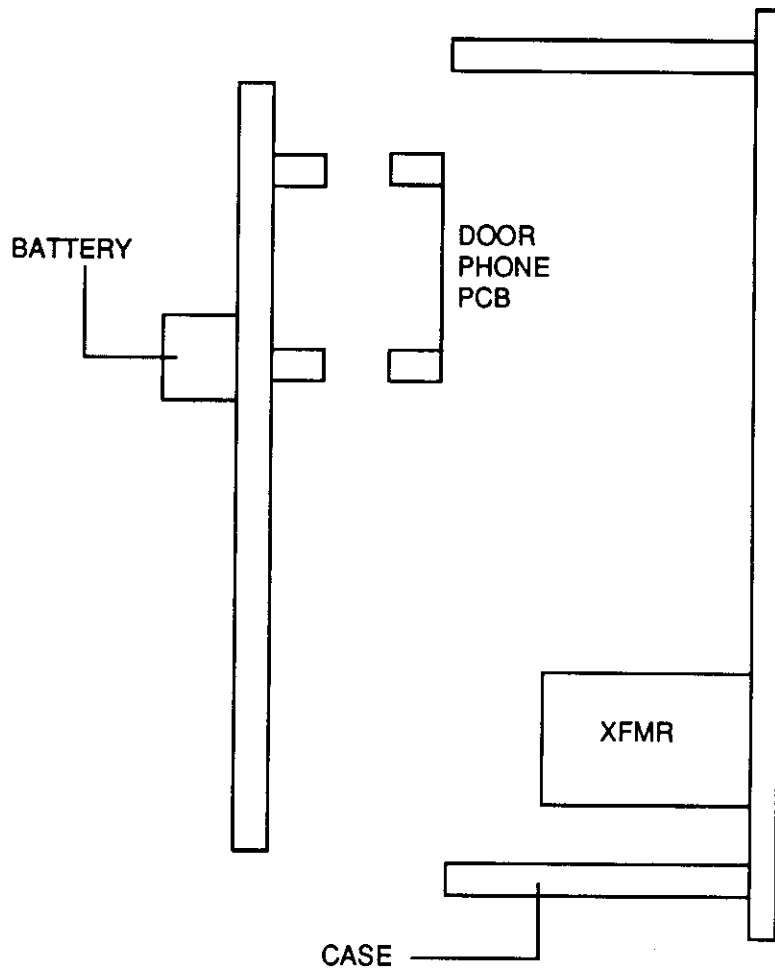
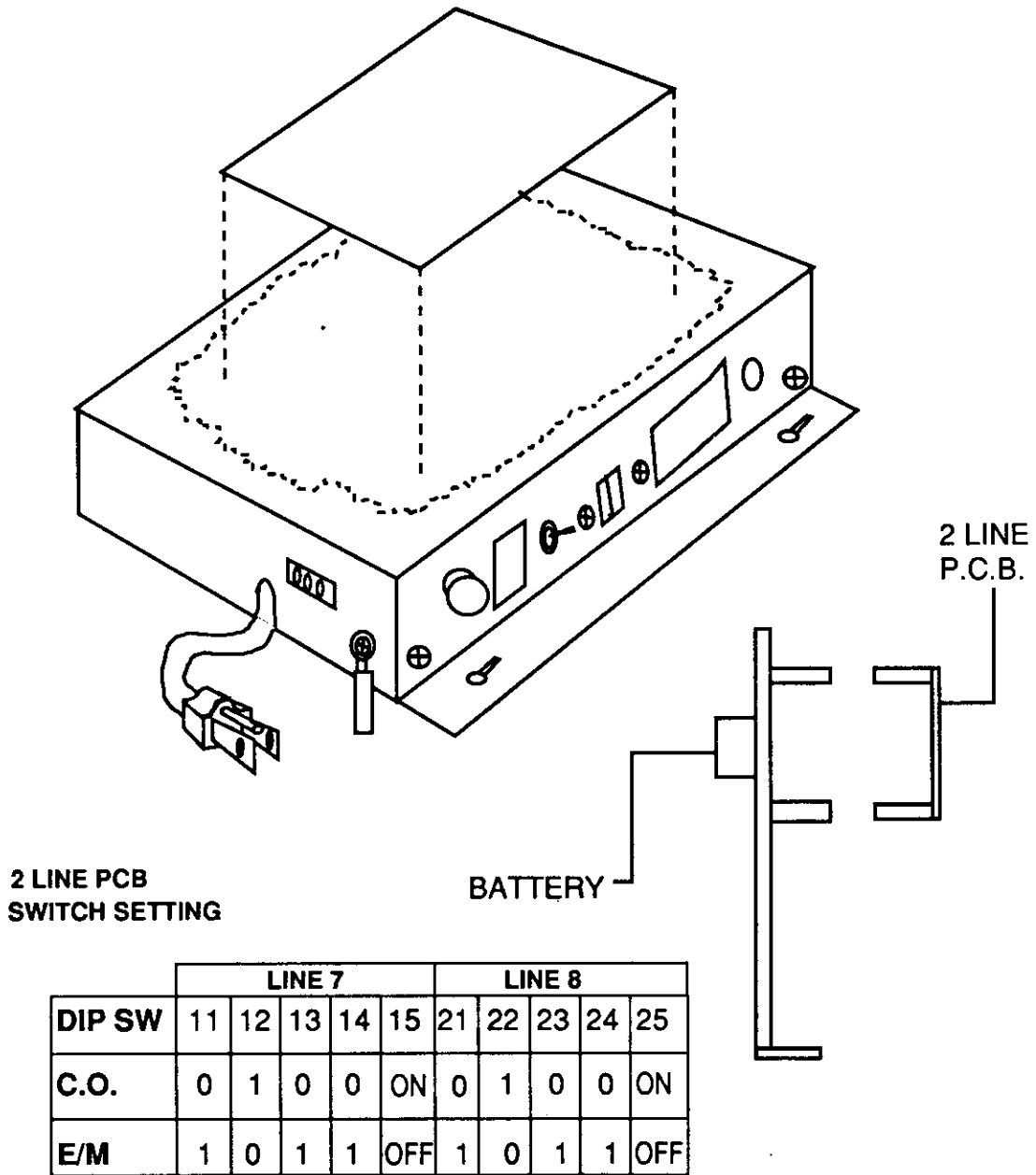


Figure 12

INSTALLATION OF 2 LINE EXPANSION PCB IN 816 KSU



INSTALLATION

Figure 13

MUSIC ON HOLD INSTALLATION

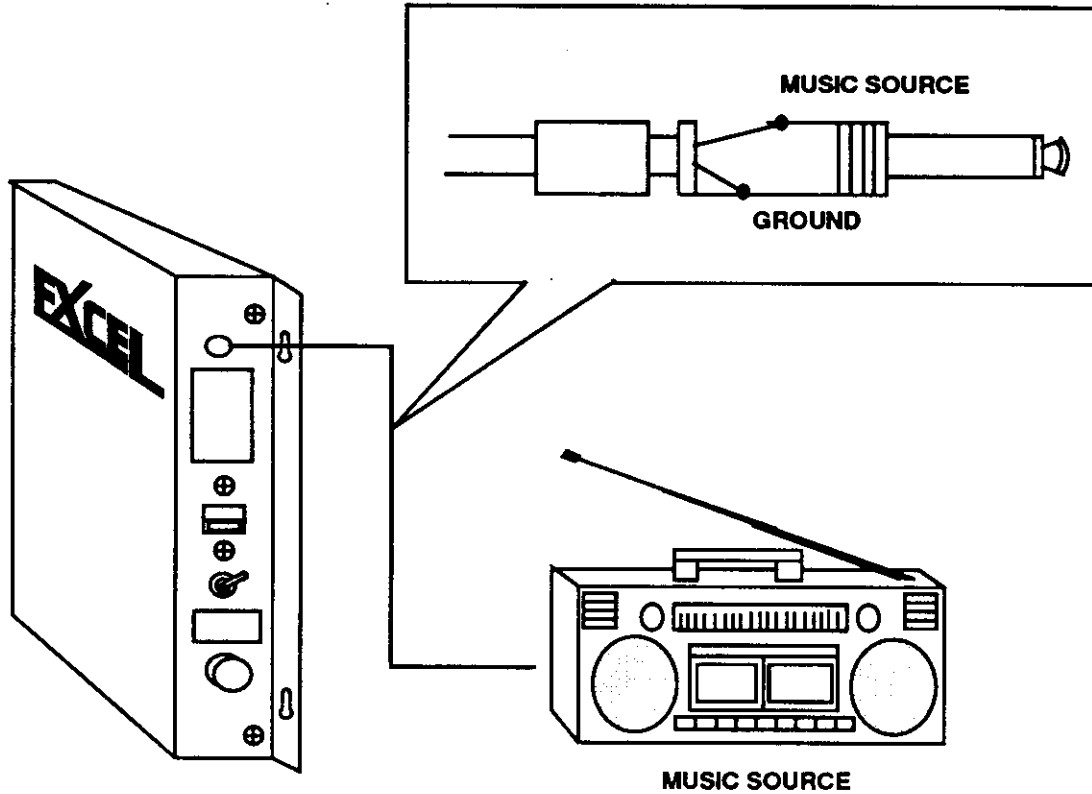
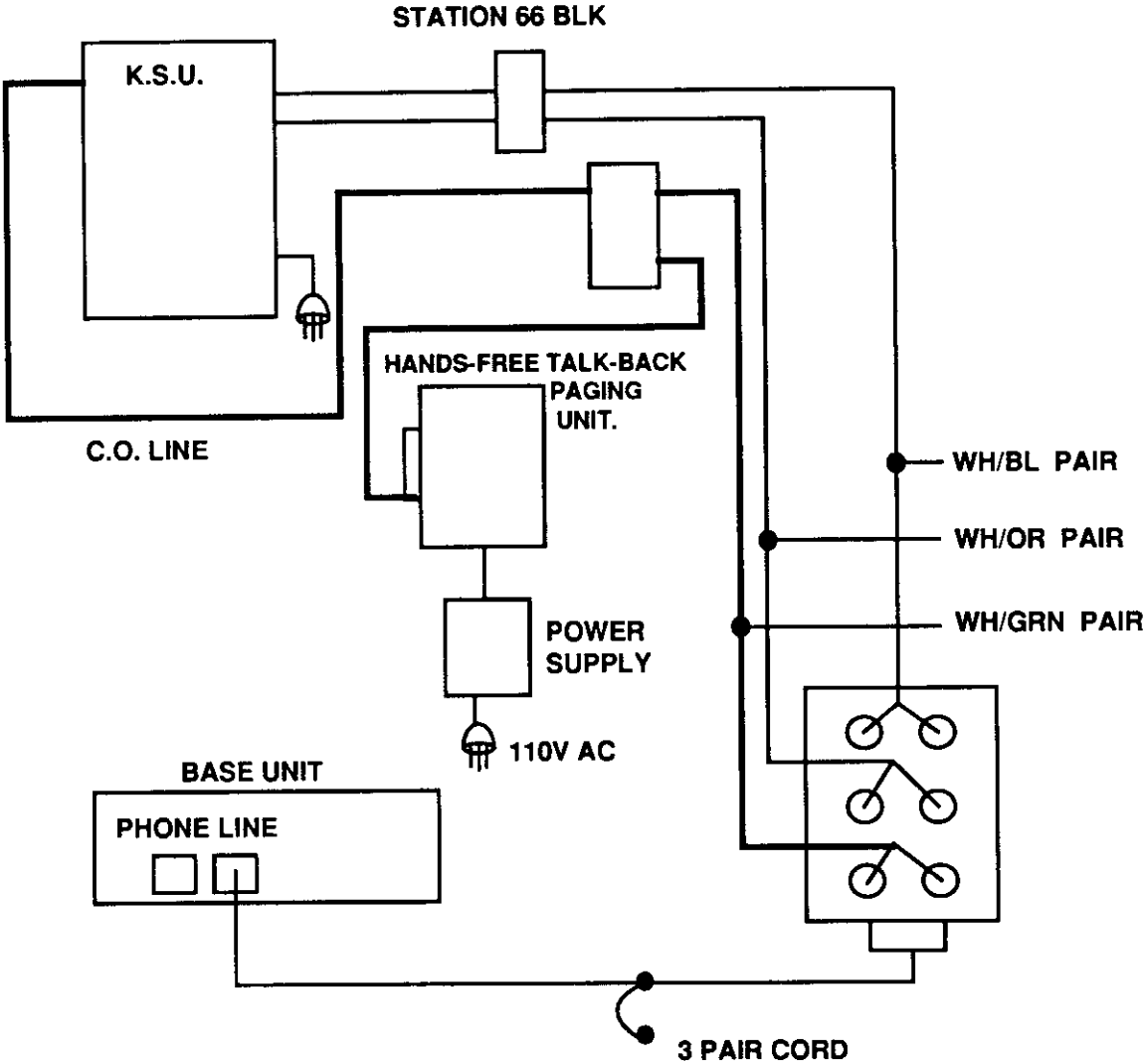


Figure 14

NOTE:

1. Always used shielded cable.
2. Do not connect radio source to same AC outlet as KSU.
3. Locate music source a minimum of 5 feet away from KSU to prevent RFI interference.
4. A chime tone will automatically be connected to circuits placed on hold or the background music channel unless a miniature phone plug is placed in the music source jack.

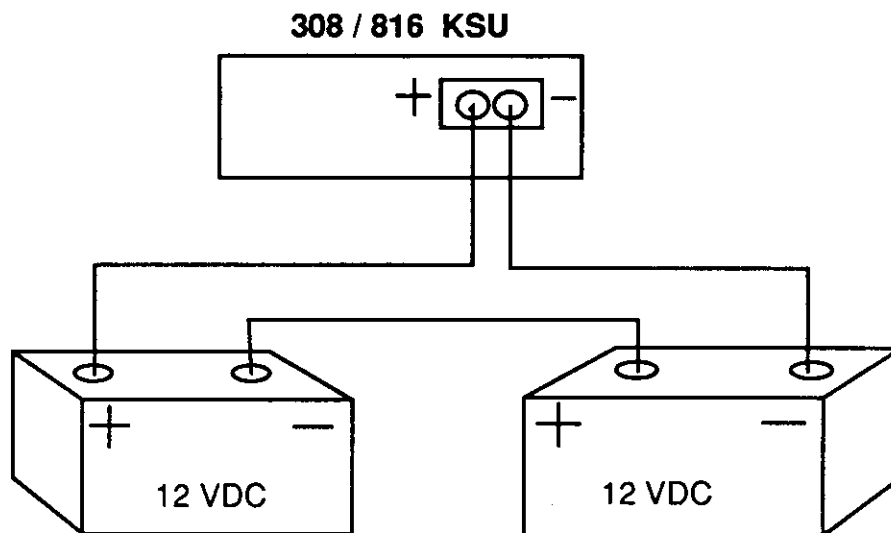
OFF-HOOK CALL ANNOUNCE ADAPTOR



INSTALLATION

Figure 15

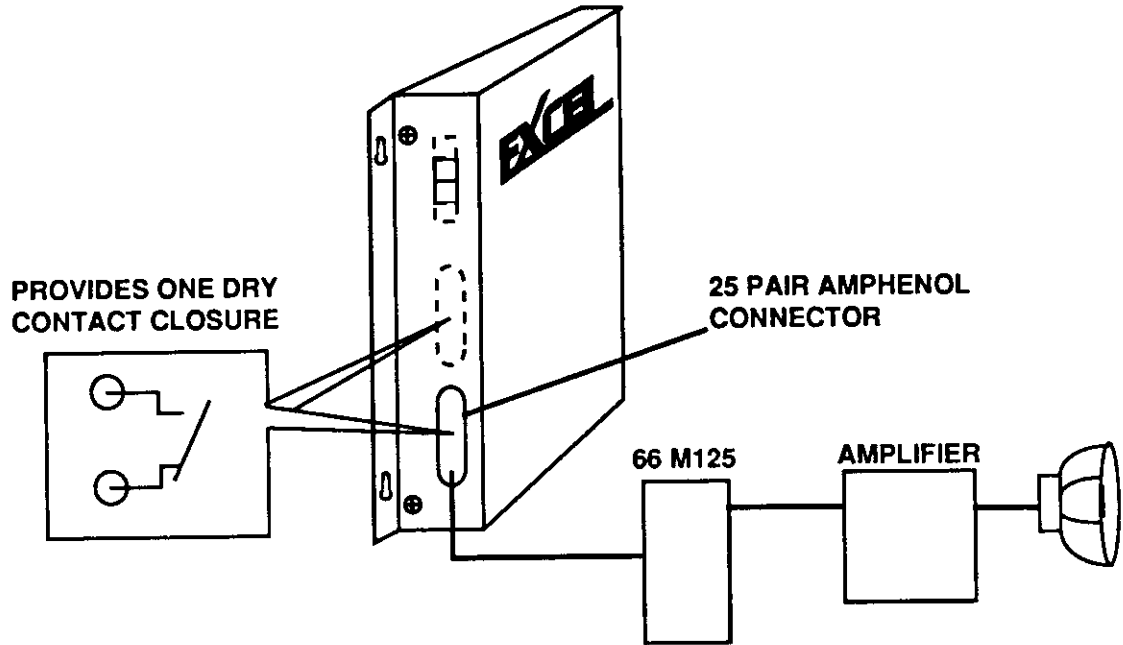
BATTERY BACK-UP



12 v.d.c. battery - P/N 2208021
Battery backup kit - P/N 2208022

Figure 16

CONNECTION OF EXTERNAL PAGING SPEAKER



INSTALLATION

816

	CN-1	CN-2	
AUDIO		ORANGE / YELLOW	17
		YELLOW / ORANGE	42
CONTACTS	GREEN / YELLOW		18
	YELLOW / GREEN		43

308

	CN-1	
AUDIO	GREEN / VIOLET	23
	VIOLET / GREEN	48
CONTACTS	ORANGE / VIOLET	22
	VIOLET / ORANGE	47

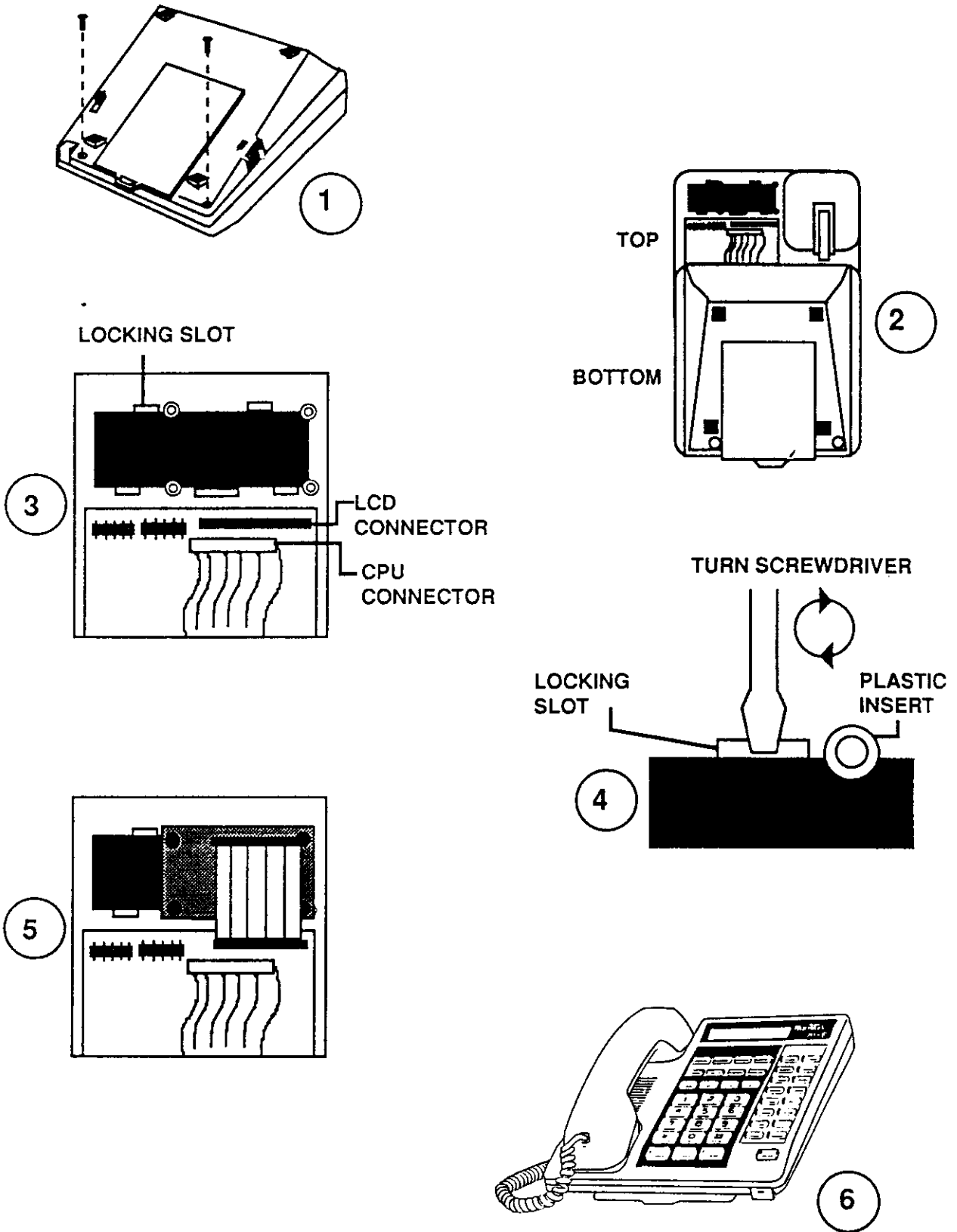
Figure 17

LCD DISPLAY KIT INSTALLATION

CAUTION - use a wrist strap when performing this installation.

1. Remove the two Phillips head screws on base of telephone.
2. Gently open the phone by lifting the top of phone in the area of the volume adjuster slide. Remove the CPU flat cable from the top unit and lay the top on it's back.
3. Take a flat head screwdriver and insert the flat blade into the locking slot as shown in the diagram.
4. While pushing down on the plastic insert, gently turn the screwdriver clock wise enough to allow the plastic insert to push out.
5. Replace with the clear plastic insert that comes with the LCD kit. Insert this part from the front side of the telephone.
6. Place LCD unit in from the back and use four Phillips head screws to attach it to the top. **MAKE SURE THE FLAT CABLE HOLDERS ARE LINED UP.**
7. Insert flat cables so that the conductors of the flat cable are touching the flat cable holder's conductors.

LCD INSTALLATION DIAGRAMS



INSTALLATION

Figure 18

**TABLE #1
EXCEL 308 CONNECTORS**

STN CONNECTOR #1

TERM #	WIRE COLOR	KEYSET #	FUNCTION	REMARKS
26	WH/BL	STATION 1	VOICE	VOICE GREEN
01	BL/WH		VOICE	VOICE RED
27	WH/OR		DATA -	DATA - BLACK
02	OR/WH		DATA +	DATA + YELLOW
28	WH/GR	STATION 2	VOICE	
03	GR/WH		VOICE	
29	WH/BR		DATA -	
04	BR/WH		DATA +	
30	WH/SL	STATION 3	VOICE	
05	SL/WH		VOICE	
31	RD/BL		DATA -	
06	BL/RD		DATA +	
32	RD/OR	STATION 4	VOICE	
07	OR/RD		VOICE	
33	RD/GR		DATA -	
08	GR/RD		DATA +	
34	RD/BR	STATION 5	VOICE	
09	BR/RD		VOICE	
35	RD/SL		DATA -	
10	SL/RD		DATA +	
36	BK/BL	STATION 6	VOICE	
11	BL/BK		VOICE	
37	BK/OR		DATA -	
12	OR/BK		DATA +	
38	BK/GR	STATION 7	VOICE	
13	GR/BK		VOICE	
39	BK/BR		DATA -	
14	BR/BK		DATA +	
40	BK/SL	STATION 8	VOICE	
15	SL/BK		VOICE	
41	YL/BL		DATA -	
16	BL/YL		DATA+	
42	YL/OR	DOORPHONE		AUDIO PAIR TO DOORPHONE
17	OR/YL			
43	YL/GR	DOORPHONE		AUDIO PAIR TO DOORPHONE
18	GR/YL			
44	YL/BR			
19	BR/YL			
45	YL/SL	DOOR LOCK	DRY CONTACT CLOSURE	MAX AMPERAGE 0.4A
20	SL/YL			
46	VL/BL			
21	BL/VL			
47	VL/OR	CONTACT	DRY CONTACT	RATED AT 0.4A
22	OR/VL	CONTACT	DRY CONTACT	
48	VL/GR	AUDIO-PAGE OUT	VOICE OUTPUT	PAGING OUTPUT
23	GR/VL	AUDIO-PAGE OUT	VOICE OUTPUT	PAGING OUTPUT
49	VL/BR			
24	BR/VL			
50	VL/SL			
25	SL/VL			

**TABLE #2
EXCEL 816 CONNECTORS**

TERM #	WIRE COLOR	CN-1 STA 1-STA 8	CN-2 STA 9-STA 16	FUNCTION
26 01 27 02	WH/BL BL/WH WH/OR OR/WH	STATION 1	STATION 9	GREEN RED BLACK YELLOW
28 03 29 04	WH/GR GR/WH WH/BR BR/WH	STATION 2	STATION 10	VOICE VOICE DATA - DATA +
30 05 31 06	WH/SL SL/WH RD/BL BL/RD	STATION 3	STATION 11	VOICE VOICE DATA - DATA +
32 07 33 08	RD/OR OR/RD RD/GR GR/RD	STATION 4	STATION 12	VOICE VOICE DATA - DATA +
34 09 35 10	RD/BR BR/RD RD/SL SL/RD	STATION 5	STATION 13	VOICE VOICE DATA - DATA +
36 11 37 12	BK/BL BL/BK BK/OR OR/BK	STATION 6	STATION 14	VOICE VOICE DATA - DATA +
38 13 39 14	BK/GR GR/BK BK/BR BR/BK	STATION 7	STATION 15	VOICE VOICE DATA - DATA +
40 15 41 16	BK/SL SL/BK YL/BL BL/YL	STATION 8	STATION 16	VOICE VOICE DATA - DATA +
42 17 43 18	YL/OR OR/YL YL/GR GR/YL	CONTACT CONTACT	AUDIO PAGE OUT AUDIO PAGE OUT	PAGE CONTROL MAX. AMPERAGE 0.4A
44 19 45 20	YL/BR BR/YL YL/SL SL/YL			
46 21 47 22	VL/BL BL/VL VL/OR OR/VL			
48 23 49 24	VL/GR GR/VL VL/BR BR/VL			
50 25	VL/SL SL/VL			

INSTALLATION

5.0 PROGRAMMING INSTRUCTIONS

OVERVIEW

Programming of the Excel 308/816 is a simple and easy exercise which can be performed from any display set. This section describes all programming options available to the installer and includes applicable notes where required. The program is broken down into three basic categories:

1. System-wide programming requiring a password to allow entry of the command.
2. System-wide programming not requiring a password to allow entry of the command.
3. System speed dialing input.

Before programming for the first time from a display, it is best to initialize the system by entering Program 25.

1. Sta. x = Depress “#”
2. Dial 20
“MMC Disabled” is displayed
3. Dial 1 2 3 4 1
4. Depress “#”
5. Depress “#”
6. Dial 25
7. Dial 1 2 3 4 2
8. Depress “#”

Conditions:

- ◆ Entering “2” clears all “scratch-pad” RAM memory and battery back-up RAM.
- ◆ All program are set to default values. Refer to Customer Database Programming Sheets for values.
- ◆ All call processing is reset to idle status.

ENTERING/EXITING SYSTEM PROGRAMMING MODE (PROGRAM 20)

Description:

Allows programmer to gain access to programming mode for system-wide or individual software changes.

Programming:

1. Depress “#”
“Programming” is displayed
2. Dial 20
“MMC Disabled” is displayed
3. Enter password (Default is 1234)
“MMC Disabled” is displayed
4. Dial 0 to Exit program mode
Dial 1 to Enter program mode
Dial 2 Enables “Dial 9” for any idle C.O. line
Dial 3 Disables “Dial 9” for any idle C.O. line
Dial 4 Sets clock to 12 hour mode
Dial 5 Sets clock to 24 hour mode
5. Depress “#”

Conditions:

- ◆ Default Value - “MMC Disabled” and “Dial 9” Disabled; 24 hour clock.
- ◆ The phone must be in the On-Hook mode.
- ◆ The unit will automatically go out of the programming mode if no data is entered in 4 minutes.
- ◆ Data is entered into working memory after exiting the programming mode.
- ◆ To verify programming is possible, follow steps 1 and 2. “MMC Enabled” is displayed.

MODIFICATION OF PASSWORD (PROGRAM 21)

Description:

This feature enables the system programmer the flexibility to modify the system password. This controls unauthorized entry into the database.

Programming:

1. During on hook; depress “#”
“Programming” is displayed
2. Dial 21
“Old Password” is displayed
3. Enter in current password
“New Password” is displayed
4. Enter in new password
5. Depress “#”

Conditions:

- ◆ Default value is 1234.
- ◆ Valid entries are 0-9 and the first 6 DSS keys. The DSS keys 1-6 represent the letters A, B, C, D, E and F.
- ◆ If a valid 4 digit password is entered, the password will be changed.
- ◆ Loss of RAM memory will initialize the password to default value (1234).

DTMF MUTING TO STATION USER (PROGRAM 22)

Description:

This feature enables the system to mute the DTMF tones to the station user that is dialing on a central office line.

Programming:

1. Depress “#”
“Programming” is displayed
2. Dial 22
“DTMF MUTED” or “DTMF-ON” is displayed
3. Enter password
4. Dial 0 to enable user to hear DTMF
Dial 1 to deny user to hear DTMF
5. Depress “#”

Conditions:

- ◆ Default is “1” (DTMF muted).
- ◆ If the password is incorrect, the display will show “ERROR” and the system will exit the programming mode.
- ◆ DTMF level is not adjustable.

DIAL PULSE MAKE/BREAK RATIO (PROGRAM 23)

Description:

This feature enables the system programmer to define the dial pulse make/break ratio of a C.O. line circuit that is classed as a rotary line.

Programming:

1. Depress “#”
“Programming” is displayed
2. Dial 23
“Make Ratio” is displayed
3. Enter password
“Make xx” is displayed
4. Enter time by 2 digits
“Break: xx” is displayed
5. Enter break time by 2 digits
“Break 66: xx” is displayed
6. Depress “#”

Conditions:

- ◆ Default dial pulse make/break ratio is 33/66.
- ◆ x = any number.
- ◆ Make/break time standards are normally 33/66 or 40/60.
- ◆ Dial pulse (pps) is set at 10 pps.

SOFTWARE VERSION OF SYSTEM AND TELEPHONE (PROGRAM 24)

Description:

This feature displays the current level of software being used in the main equipment. It also displays the version of current software in the telephone set.

Programming:

1. Depress “#”
“Programming” is displayed
2. Dial 24
“Version” is displayed
3. Enter password
“KSU: xx KTS: xx” is displayed (version of software)
4. Depress “#”

Conditions:

- ◆ If the password is incorrect, the display will show “Error” and the system will exit the programming mode.
- ◆ x = 0 thru 9, A thru Z.

NOTE: Maintain this data in your office for future reference.

SYSTEM INITIALIZATION (PROGRAM 25)

Description:

This enables the system programmer the ability to initialize the system without turning the system power off. There are 2 levels of initialization.

Level 1 initializes scratch pad data in RAM.

Level 2 initializes scratch pad data and battery backed-up data in RAM.

Programming:

1. Depress "#"
"Programming" is displayed
2. Dial 25
3. Enter password
4. Enter 0; Do not initialize
Enter 1;
Enter 2;
5. Depress "#"

Conditions:

- ◆ All current data should be validated against programming sheets.

STATION CLASS OF SERVICE (PROGRAM 30)

Description:

This enables the system user the flexibility to assign individual classes of service to each extension.

Programming:

1. Depress “#”
“Programming” is displayed
2. Dial 30
“STN Toll Class” is displayed

For 308 “xxxxxxx” is displayed
For 816 “xxxxxxxxxxxxxxxxx” is displayed
3. Enter new class of service(s) to be modified. “New data” is displayed.
4. Depress “#”

Conditions:

- ◆ There are 5 classes of service: (0-4)
 - 0 = unrestricted
 - 1 = uses Program 33 and 34 (Deny/Allow)
 - 2 = uses Program 35 and 36 (Deny/Allow)
 - 3 = uses Program 37 (Allow only)
 - 4 = Internal calls only
- ◆ Default Data is 0.
- ◆ THIS PROGRAM REQUIRES THAT ALL DIGITS FOR THAT FIELD MUST BE ENTERED REGARDLESS IF THE DATA IS TO BE CHANGED. AN INCORRECT ENTRY WILL NOT CHANGE THE DATA; UPON EXITING THE PROGRAM, THE OLD DATA WILL NOT BE MODIFIED.
- ◆ System abbreviated dialing overrides toll restriction if Program #71 is enabled.
- ◆ If a line is programmed as a PABX line, no toll restriction is applied except for class 4.
- ◆ Field definition:

	Station Number															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
C.O.S Data	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x