VODAVI

VODAVI COMMUNICATIONS SYSTEMS

STARPLUS 1224EX

ELECTRONIC KEY SYSTEM

GENERAL DESCRIPTION INSTALLATION AND MAINTENANCE MANUAL

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VODAVI COMMUNICATIONS SYSTEMS

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1224EX ISSUE CONTROL

ISSUE	DATE	CHANGE
1	Feb 1988	First draft
2		Add Canadian Regulatory Information
	July 1989	Add phone box, DSS console and BBU drawings

100 INTRODUCTION

100.1 PURPOSE

This manual provides the information necessary to program, install, operate and maintain the STARPLUS 1224 Key Telephone System.

100.2 REGULATORY INFORMATION (FCC)

The Federal Communications Commission (FCC) has established rules which allow the direct connection of the STARPLUS 1224 Key Telephone System to the telephone network. Certain actions must be undertaken or understood before the connection of customer provided equipment is completed.

A. TELCO NOTIFICATION

Before connecting the STARPLUS 1224 Key Telephone System to the telephone network, the local serving telephone company must be given advance notice of intention to use customer provided equipment (CPE) and provided with the following information:

1. The telephone numbers to be connected to the system.
2. The FCC Registration Number located on the Key Service Unit (KSU): DLP82V-19889-MF-E*
3. The Ringer Equivalence Number also located on the KSU: 0.5B
4. The USOC jack required for direct interconnection with the telephone network: RJ21X
5. The 1224EX KSU is UL listed, file number 42U5.

***NOTE**: If no key telephones are programmed to have a pooled group button FCC# DLP82V-19891-KF-E may be used.

B. INCIDENCE OF HARM

If the telephone company determines that the customer provided equipment (CPE) is faulty and possibly causing harm or interruption to the telephone network, it should be disconnected until repair can be made. If this is not done, the telephone company may temporarily disconnect service.

C. CHANGES IN SERVICE

The local telephone company may make changes in its communications facilities or procedures. If these changes should affect the use of the 1224 or compatibility with the network, the telephone company must given written notice to the user to allow uninterrupted service.

D. MAINTENANCE LIMITATIONS

Maintenance on the 1224 Key Telephone System is to be performed only by the manufacturer or its authorized agent. The user may not make any changes and/or repairs except as specifically noted in this manual. If unauthorized alterations or repairs are performed, any remaining warranty may be voided.

E. NOTICE OF COMPLIANCE

The 1224 Key Telephone complies with rules regarding radiation and radio frequency emissions by Class A computing devices. In accordance with FCC Standard 15 (Subpart J) the following information must be supplied to the end user:

"WARNING:

This equipment generates and uses R.F. energy and if not installed and used in accordance with the Instruction Manual, it may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device, pursuant to Subpart J of Part 15 of the FCC Rules, which are designed to provide reasonable protection against such interference, when operated in a commercial environment.

Operation of this equipment in a residential area is likely to cause interference, in which case the user, at his own expense, will be required to take whatever measures may be required to correct the interference."

F. HEARING AID COMPATIBILITY

The 1224 Key Telephone is Hearing Aid compatible as defined in Section 68.316 of Part 68 FCC Rules.

100.3 CANADIAN REGULATORY INFORMATION

Department of Communications (DOC)

Certification Number: 676 2581A

Load Number: 16

Ancillary Equipment Number: CA21A

File Number: LR57228

A. NOTICE

The Canadian Department of Communications label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational and safety requirements. The Department *does not guarantee the equipment will operate to* the user's satisfaction. Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the company's inside wiring associated with single line individual service may be extended by means of a certified connector assembly (telephone extension cord). The customer should be aware that compliance with the above condition may not prevent degradation of service in some situations.

NOTE: The Load Number (LN) assigned to each terminal device denotes the percentage of the total load to be connected to a telephone loop which is used by the device to prevent overloading. The termination on a loop may consist of any combination of devices subject only to the requirement that the total of the load numbers of all the devices does not exceed 100.

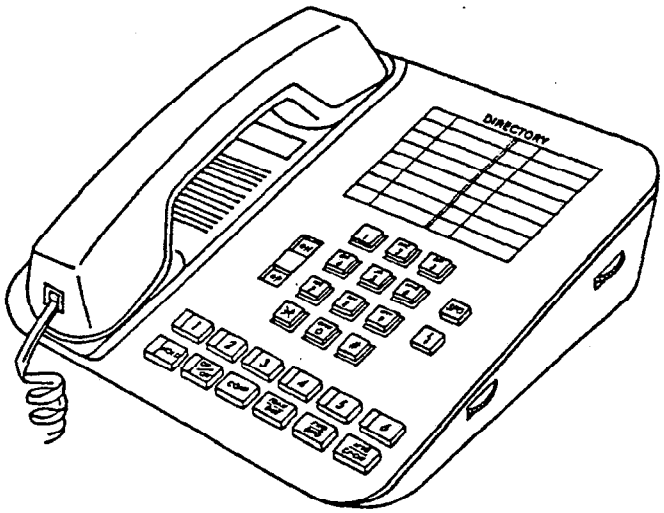
Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier.

Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

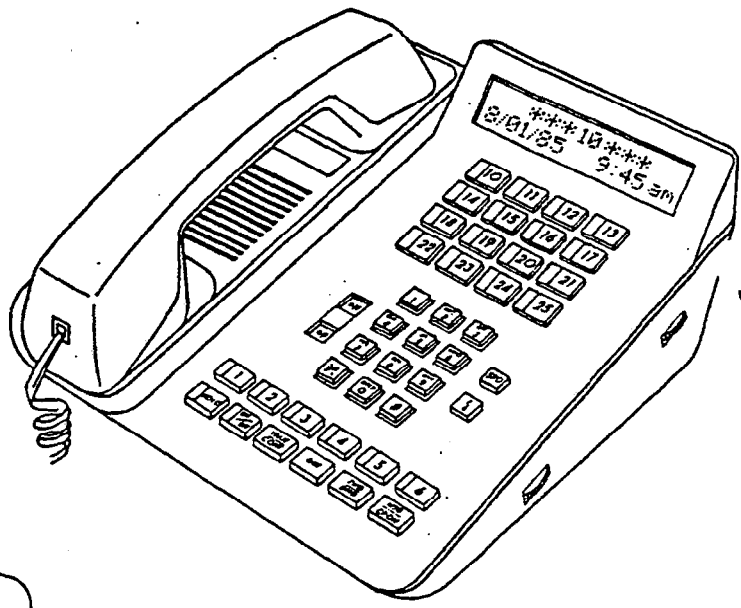
Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

CAUTION: Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority or electrician, as appropriate.

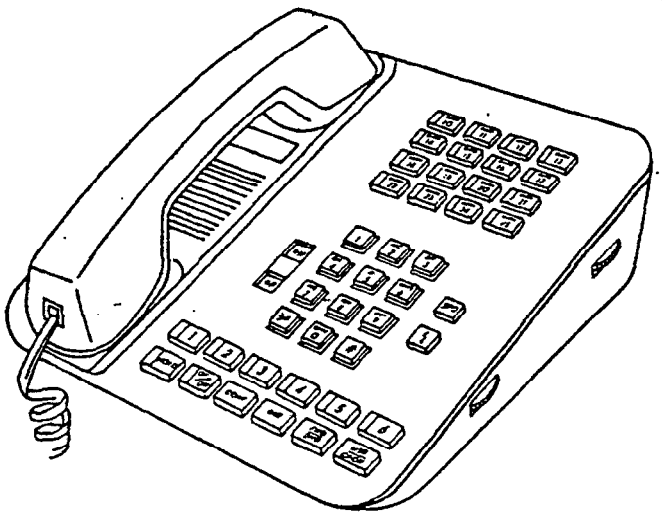
BASIC TELEPHONE



EXECUTIVE TELEPHONE



ENHANCED TELEPHONE



200 FEATURE DESCRIPTION

A-LEAD INDICATION

There are 4 contacts which may be individually programmed as either A-lead indication (to control ancillary equipment) or Loud Bell Control. When programmed as A-Lead indication & assigned to a CO line, the corresponding contact will close whenever that CO line is accessed by a station.

ACCOUNT CODES

Account codes can be entered by the user during a call; this code can be used with SMDR information for billing purposes. It can be 8 digits in length.

ALARM SIGNALING

The system can recognize either an open or closed loop from an external relay and transmit an alarm signal. This signal can be sent to all programmed stations with either a single or repeated tone. The type of alarm tone is selected in system programming.

This feature can be used as an entry door alarm.

ALL CALL PAGING

Stations allowed to make pages may make voice paging announcements to all idle stations, phone boxes and external paging ports at the same time.

ATTENDANT OVERFLOW

(Refer to Call Forward-Preset) System programming allows the attendant station to be programmed so that if the attendant is busy or not there, the call will be automatically forwarded to another predetermined station after a programmed period of time.

ATTENDANT POSITION

Any key telephone station may be assigned as the system attendant. The assigned attendant will receive unattended line recalls and will initiate NIGHT SERVICE.

AUTOMATIC PRIVACY

Privacy is automatically provided on all calls. The system may be programmed to eliminate privacy, allowing another station to join in on existing CO (outside) line conversations.

AUTOMATIC SELECTION

The user can select an outside line, intercom station or speed dial button or dial a feature & automatically place the phone in the dialing mode without pressing the ON/OFF button or lifting the handset.

AUTOMATIC PAUSE INSERTION

If a flash is programmed into system and station speed dial numbers, and last number redial numbers, a pause will automatically be inserted after the flash. A pause will also be automatically inserted after a PBX dialing code has been used & after a pulse to tone switchover is programmed into speed dial numbers.

BACKGROUND MUSIC

Key telephone & phone box users may receive music over their speaker when an optional music source has been connected to the system. The music can be turned on or off and the volume adjusted at each individual telephone or phone box. The maximum loudness level can be adjusted on the KSU.

Phone boxes that are denied DND in data base programming, can receive music through their speaker.

This feature can be allowed or denied on a per station basis by programming.

BATTERY BACK-UP (MEMORY)

A long life lithium battery is provided inside the KSU to prevent loss of system programming in the event of a power outage or the system power being turned off.

BATTERY BACK-UP (SYSTEM)

An optional battery package (BBU) & cabling can be connected to the KSU to maintain complete system operation in the event of an AC power failure. Calls in progress will continue without interruption when commercial power fails.

CALLING STATION INDICATOR

(Busy Lamp Field) Buttons programmed as station buttons on a telephone also serve as a Busy

Lamp Field to display the status of other telephones within the system.

CALL ANNOUNCING

Each telephone user can select the way that calls to their phone are voice announced. By selecting the "P" position on the intercom signal switch, the user can receive voice announced intercom calls without the calling party hearing conversations in progress. By selecting the "H" position, the user can reply handsfree to voice announced intercom calls. Basic model telephones cannot use the handsfree (H) mode.

CALL FORWARD-STATION

Each key telephone user may direct intercom calls, transferred outside lines and incoming outside lines to be forwarded to another station in the system. A forwarded call will signal in the TONE mode regardless of the way the intercom signaling switch was set. A station with calls forwarded to it can forward its calls to another station; a call will forward in this manner an unlimited number of times; however the last station in a chain cannot use DND.

CALL FORWARD-PRESET

System programming allows incoming outside lines, that are programmed to ring a particular station, to be forwarded to another predetermined station after a programmed period of time. This occurs when the station normally receiving the outside ring is busy or does not answer the call. Preset forward can be chained an unlimited number of times. Each station in the system can have a preset forward station.

CALL PICKUP (GROUP)

Stations can be placed in one, both or neither of 2 pickup groups. Stations within the same group can pick up tone ringing intercom calls, recalling or transferred CO line calls for another station, and message wait call backs by dialing the pickup code.

CALL TRANSFER

An outside line can be transferred from one keyset to another. By pressing the STATION button of the desired party, or pressing the TRANS/QUE button and then dialing that 2 digit station number, unscreened or screened transfers with an announcement can be made. The line being transferred rings on the keyset and gives a flash indication to the receiving party's keyset. Several attempts can be made to find someone at different keysets without losing the call. If a line is transferred to a busy station, that station will receive muted ringing.

CAMP ON (Call Waiting)

A busy station may be alerted that an outside line is on hold and waiting for them by pressing the MSG/CP.ON button. The called station will receive two muted rings, and a flashing CP.ON button if the camp-on initiator is waiting to announce the transfer. The busy party can press the MSG/CP.ON button. This will automatically place on hold any outside line he's currently using and allow him to converse with the camp-on initiator.

CO LINE ACCESS

Each telephone can be programmed to be allowed or denied an appearance to individual outside lines or a pool of outside lines. Telephones denied this appearance can have that line transferred to them by another station and the call will appear on the loop button.

Any station may be programmed to ring for any combination of lines during the day and different stations can be programmed to ring on those lines at night.

CO LINE GROUPING

CO (outside) lines can be in one of up to 8 groups to separate line types such as local, PBX, FX, etc. Stations are then individually assigned access to these lines via either a pooled group key or by a direct line key.

CO LINE QUEUING

When all outside (CO) lines in a group are busy, stations can be placed on a list awaiting that line to become available. Users are signaled when a line becomes available. If the waiting station is busy when the queued CO line becomes available, the station is placed at the bottom of the queue list. If a station doesn't answer a queue callback within 15 seconds it will be dropped from the queue list.

CONFERENCE

A) Multi Line

One internal station can engage in a conference with 2 external parties. The internal station may place the conference on HOLD by pressing the HOLD button. The two external parties can be

placed in an unsupervised conference by the initiator pressing the CONF button.

B) Add-On Conference

Two internal stations can engage in conference with 1 external party or 3 internal parties can set up a conference. There is no limit to the number of add-on conferences, except for the total number of CO lines connected to the system.

COMMON AUDIBLE RINGING

(Loud Bell Control) Incoming CO line ringing can be directed to relay controlled contacts. There are 4 sets of dry contacts that can be assigned to stations as LBC or to CO lines for A-lead indication. An external power source and ringing device or other ancillary is required.

DIAL PULSE/DTMF SIGNALING

Each outside line can be individually programmed to provide dial pulse or DTMF tone sending.

DIAL PULSE TO TONE SWITCHOVER

The signaling on an outside line can be changed from dial pulse to tone (DTMF). This allows lines set for pulse signaling to use common carriers which require DTMF signaling. This feature can be stored and used with speed dial numbers.

DIRECT STATION SELECT

The user with a flexible button assigned as a DSS button on his key telephone can call an intercom station by simply pressing the appropriate DSS button. The called station is automatically signaled.

DO NOT DISTURB

Placing a key telephone in DND will eliminate incoming CO line ringing, intercom calls, CO line transfers, All Call Page announcements and Camp-Ons. Pressing the DND button twice while the telephone is ringing will eliminate that ringing. The secretary in an EXECUTIVE/SECRETARY pair can override the Executive DND by using the Camp-On feature. A station in DND can still use the telephone to make normal outgoing calls. A station can be denied this feature through programming.

EMERGENCY TRANSFER

In the event of commercial power failure or central processor failure, the system will automatically connect the first 3 outside lines to single line telephones which have been installed for that purpose.

EXECUTIVE/SECRETARY TRANSFER

Four pairs of key telephones can be designated as executive/secretary pairs. Whenever the executive phone is in DND or busy, transferred CO lines and intercom calls will be directed to the secretary station. If the secretary station is busy, busy tone will be received by the calling party. There are 3 combinations possible:

1. 4 Executive/Secretary pairs
2. 1 Executive with 1-4 secretaries
3. 1 Secretary for 1-4 Executives

The secretary station can signal the Executive in DND by using the Camp On feature.

EXTERNAL PAGING

Any station that is allowed access to paging can make voice paging announcements to the external paging port by either dial code or direct button access.

The external page port can be connected to a two way paging system.

FLASH

The Flash button is used to re-establish dial tone or to transfer a PBX call. Flash can be programmed in speed dial for Centrex feature operation.

FLEXIBLE STATION NUMBERS

The intercom number assigned to a station can be changed without moving the telephone. However station circuit 01 always remains the programming station.

FLEXIBLE BUTTONS

On the Enhanced/Executive phones there are 6 fixed feature buttons and 22 flexible buttons. The Basic telephone has 6 fixed feature buttons and 6 flexible buttons. The flexible buttons can be programmed in one of the following ways:

1. Outside line - automatically access assigned line

2. Multi Function Key - the station user may program his/her own phone to have DSS/BLF, speed dial bin, page key or mute button.

3. Pool Key - some or all outside lines can be grouped; pressing this button gives access the highest numbered unused CO line in that group; outgoing dialing only.

4. Loop - used to answer transferred call on a line for which a station user does not have a button programmed on his phone.

HOLD PREFERENCE

Either exclusive hold or system hold can be programmed to be the primary hold. A line on exclusive hold prohibits anyone from picking up a call placed on hold by another station.

An outside line placed on system hold can be retrieved by any other telephone in the system that has access to that line.

INTERCOM SIGNALING

The key telephone user can select the method of receiving intercom calls at their station. A slide switch located on the telephone is used to select the mode. The choices are:

1. Tone Ringing (T)

   A standard tone ring notifies the party of an incoming call.

   The called station answers by lifting the handset.

2. Privacy (P)

   The station user receives a tone burst and a voice announcement over the speaker. The microphone is deactivated, providing privacy. The person who is called must lift the handset to get the call or switch the selector to handsfree.

3. Handsfree (H)

   The station user, upon hearing a tone burst & voice announcement over the speaker, can reply handsfree ("H" position).

   (Basic model key telephones do not have this feature.)

INTERNAL ZONE PAGE

Stations programmed to make pages can make voice announcements to idle stations in both internal zones at the same time or to either one of the 2 internal zones separately. A flexible button can be programmed for one button page operation by the station user.

LAST NUMBER REDIAL

Permits the automatic redialing of the last phone number dialed on an outside line including a number in speed dial.

MEET ME PAGE

Users may answer a page call by going to the nearest telephone, dialing a code and be connected to the calling party. A flexible button can be programmed for one button answer by a station user to a meet me page.

MESSAGE WAITING

A station user who calls another station and receives ringing, busy tone or DND tone and no answer can activate a "message waiting" lamp at that station to indicate this call. The station user who missed the call can then press his MSG/CP.ON flashing button and ring the party leaving the message. Up to 5 messages may be left at each phone. A station with a message waiting can be reminded at a timed interval with a tone.

MUSIC ON HOLD

An optional music source can be connected directly to the system to provide all calls on hold with music.

The same source provides background music.

MUTE

A flexible button can be programmed to operate as a mute key. During handsfree speakerphone operation, the key telephone microphone can be disabled for stations requiring privacy of transmission or in areas where there are high ambient noise levels.

NIGHT SERVICE

The attendant places the system in night service by pressing her DND button.* This allows specific phones to ring at night that may or may not ring during the day. A dial code is provided for Universal Night Answer; a direct CO line button appearance or a loop key is required for this feature.

* The attendant does not have the DND feature.

OFF HOOK SIGNALING

If a station has been programmed to receive direct outside line ringing and is busy on another call, that station will receive muted ring to indicate another call is ringing in.

ON HOOK DIALING

A telephone user can place calls without lifting the handset and can monitor the call while the called party's phone is ringing or on hold. The receiver must be lifted to converse when using a basic key telephone.

ON LINE PROGRAMMING

Changes to the system data base with the exception of flexible button programming can be made without interrupting normal system operation. Programming is done at station port 01.

PBX DIALING CODES

Four 2 digit PBX access codes can be programmed into the system. When an outside line is selected and one of these codes is dialed, toll restriction will be applied beginning with the digit dialed after the code. If one of these codes is not dialed, toll restriction doesn't apply. This allows the dialing of PBX extensions 100, 110, 111, etc. on an outside line. (The line must be assigned as a PBX line.)

PAGE ACCESS RESTRICTION

Individual stations can be programmed to be allowed or denied the ability to make page announcements.

PHONE BOX

A phone box may be substituted for a telephone on a one for one basis. The phone box can be used to receive intercom announcements and also provide handsfree response. There is also a CALL button which will signal all stations programmed to receive alarm ringing. One of these stations can respond to this signal by pressing the DSS/BLF button or dialing the intercom number of the phone box station. Two way conversation is then possible.

PREFERRED LINE ANSWER

A station with preferred line answer can answer any assigned ringing outside line, line queues, outside line transfers and transfer recalls by simply lifting the handset or pressing the ON/OFF button. The outside line button doesn't have to be pressed for automatic line answer.

PRIVATE LINE

A station can be programmed to have a private line. A line designated as a private line can transfer calls to other stations and can be forwarded to another station. When placed in night service the UNA code will not pick up this ringing line. A private line cannot have a preset forward station.

REAL TIME

This hardware option allows the system time and date to continue functioning in case of a power failure.

Also provides the time source for information used by SMDR and display phones.

SPEAKERPHONE

Enhanced & Executive model phones are equipped with a unit that enables the telephone to be used handsfree in two-way conversations on both intercom and outside lines.

STATION MESSAGE DETAIL RECORDING

A hardware option which allows connection to an external RS232C compatible printer or call accounting device. Programming allows the system to track all calls, both incoming and outgoing, local and long distance; or just outgoing long distance calls only. It is also possible to print out data base programming with this module. The system records calls by outside line, number dialed, time of day, date, station that placed the call and duration of the call. The output can be programmed for either a 29 or 80 character format.

Account codes may also be entered.

STATION SPEED DIAL

Each station user can program up to 20 individual speed dial numbers of up to 16 digits in length. These numbers may contain pause commands, flash commands and pulse to tone switchover commands. Each one of these commands takes up digit space. The numbers are dialed by use of the SPEED button and a 2 digit code (00-09, 90-00) or the station user can program a flexible button as a speed button.

Both the asterisk (*) and pound (#) are sent as DTMF tones; this makes the speed dial feature compatible with Centrex operation.

SYSTEM SPEED DIAL

Up to 40 commonly dialed numbers can be programmed into System Speed Dial for use by stations allowed this feature. The numbers can be up to 16 digits in length and may contain pauses, flash commands and pulse to tone switchover commands. Each one of these commands takes up digit space. The numbers are accessed by the SPEED button and a 2 digit code (10-49) or the user can program under a flexible button. The last 20 bins are not monitored by toll restriction. System speed numbers are programmed at the assigned attendant station.

Both the asterisk (*) and the pound (#) are sent as DTMF tones.

TOLL RESTRICTION OVERRIDE

An outside line can be programmed to allow toll restricted stations to dial on that line.

TOLL RESTRICTION

The system provides a flexible means of providing toll restriction to individual stations. By assigning a "class of service" to each station, long distance calls can be limited at certain stations through entries into the Allow/Deny Tables.

UNIVERSAL NIGHT ANSWER

CO lines not marked as a Private Line have Universal Night Answer (UNA), which provides key telephones access to incoming CO calls when the system is in night service by dialing the UNA code.

VOLUME CONTROLS

Each key telephone user can adjust both speaker and ring volume independently by using the 2 volume controls located on the right side of the keyset.

WALL TELEPHONE

Any key telephone can be adapted for wall mounting. The wall mount kit must be provided for wall mounting.

FEATURE INDEX

Feature	Availability	Internal Equipment Required	External Equipment Required
A-Lead Indication	S	N	N
Account Codes	S	N	N
Alarm Signaling	S	N	Alarm System
All Call Page	S	N	N
Attendant Overflow	S	N	N
Attendant Position	S	N	N
Automatic Privacy	S	N	N
Automatic Selection	S	N	N
Automatic Pause Insertion	S	N	N
Background Music	S	N	Music Source
Battery Back-up (memory)	S	N	N
Battery Back-up (system)	O	N	Starplus BBU
Busy Lamp Field	S	N	N
Call Announcing	S	N	N
Call Forward - station	S	N	N
Call forward - preset	S	N	N
Call Pickup (group)	S	N	N
Call Transfer	S	N	N
Camp On (call waiting)	S	N	N
CO Line Access	S	N	N
CO Line Grouping	S	N	N
CO Line Queuing	S	N	N
Conference	S	N	N
Common Audible Ringing	S	N	Bell/Ring Gen.
Dial Pulse/DTMF Signaling	S	N	N
Dial Pulse to Tone Switchover	S	N	N
Direct Station Select	S	N	N
Do Not Disturb	S	N	N
Emergency Transfer	S	N	SLT's
Executive/Secretary Transfer	S	N	N
External Paging	S	N	Paging Equip.
Flash	S	N	N
Flexible Station Numbers	S	N	N
Flexible Buttons	S	N	N
Hold Preference	S	N	N
Intercom Signaling	S	N	N
Internal Zone Page	S	N	N
Last Number Redial	S	N	N
Meet Me Page	S	N	N
Message Waiting	S	N	N
Music On Hold	S	N	Music Source
Mute	S	N	N
Night Service	S	N	N
Off Hook Signaling	S	N	N
On Hook Dialing	S	N	N
On Line Programming	S	N	N
PBX Dialing Codes	S	N	N
Page Access Restriction	S	N	N
Phone Box	O	N	Phone Box
Perferred Line Answer	S	N	N
Private Line	S	N	N
Real Time	S	RCU	N
Speakerphone	O	Enh/Exec Phone	N
Station Message Detail Recording	O	SIU/RCU	Printer
Station Speed Dial	S	N	N
System Speed Dial	S	N	N

Feature	Availability	Internal Equipment Required	External Equipment Required
Toll Restriction Override	S	N	N
Toll Restriction	S	N	N
Universal Night Answer	S	N	N
Volume Controls	S	N	N
Wall Telephone	O	N	Wall Mount Kit

S = standard O = optional N = none

LIQUID CRYSTAL DISPLAY (LCD)

The display is arranged into an upper and lower field.

The upper field displays the current activity of the telephone. The lower field is divided into 2 sections.

The left section of the lower field displays the date, speed bin number, connected intercom station or outside line number. The right section of the lower field displays current time or elapsed time on an outside call.

FUNCTION	CALLING STATION'S DISPLAY	CALLED STATION'S DISPLAY
Idle Station	*** 10 *** MM/DD/YY HH:MM am	
Manually Dialing Outgoing Calls	18005551212 LINE 05 00:00:05	
Recalling Line from Hold	LINE RECALLING LINE 01 HH:MM am	
Recalling Line from Another Station	RECALL FROM 14 LINE 01 00:00:05	
Connected to an Incoming CO Line		*** 10 *** LINE 02 00:00:10
Intercom Call	CALL TO STA 10 MM/DD/YY HH:MM am	CALL FROM STA 12 MM/DD/YY HH:MM am
Camp-On		CAMP-ON FROM 12 LINE 02 HH:MM am
Conference	CONFERENCE MM/DD/YY HH:MM am	CONFERENCE MM/DD/YY HH:MM am

FUNCTION	CALLING STATION'S DISPLAY	CALLED STATION'S DISPLAY
Internal Page	INTERNAL PAGE ZONE 1 HH:MM am	PAGE FROM 10 MM/DD/YY HH:MM am
External Page	EXTERNAL PAGE MM/DD/YY HH:MM am	
All Call Page	ALL CALL PAGE MM/DD/YY HH:MM am	PAGE FROM 14 MM/DD/YY HH:MM am
Message Waiting		MSG: 10 11 15 13 18 MM/DD/YY HH:MM am
Reply to a Message Waiting	CALL TO 12 MM/DD/YY HH:MM am	CALL FROM 14 MM/DD/YY HH:MM am
Station Call Forward (Originating Station)	***FORWARD TO 16 *** MM/DD/YY HH:MM	
Forwarded Call	FORWARD TO 16 FROM 14 MM/DD/YY HH:MM am	STA 10 FORWARD FROM 1 MM/DD/YY HH:MM am
Preset Forward		FORWARD FROM 14 LINE 02 HH:MM am
CO Line Queuing	QUEUED ON LINE LINE 02 HH:MM am QUEUE CALLBACK LINE 02 HH:MM am	

FUNCTION	CALLING STATION'S DISPLAY	CALLED STATION'S DISPLAY
Outside Line Transfer		TRANSFER FROM 09 LINE 02 HH:MM am
Programmed Flash Command (F)	F*12 STA SPEED 15 00:00:05	
Programmed Pause Command (P)	9500777p1234567 SPEED 10 00:00:05	
Programmed Pulse-to-Tone Switchover (*)	9500777*1234567 SPEED 10 00:00:05	

300 OPERATION

For some features there is more than one way to use the feature depending on how the telephone is programmed. Both options will be listed.

300.1 PLACING AN OUTSIDE CALL (Automatic Line Selection)

- Press outside line button.
- ON/OFF button will light & you will hear dial tone.
- Dial desired party.
- When called party answers, lift handset to converse or use speakerphone.

300.2 ANSWERING AN OUTSIDE CALL

- Lift handset.
- Press slow flashing outside line button.
- (If your phone has been programmed with Preferred Line Answer, you may answer an outside line by just lifting the handset.)

300.3 SPEAKERPHONE (optional)

- Press station key of desired party OR
- Press available outside line button & dial number.
- Speakerphone is activated.
- Press ON/OFF button to end call.

300.4 VOLUME CONTROLS

- There are 2 volume control wheels on the right side of the key phone. Rotating the wheel toward you will decrease the volume.
- Front wheel - voice, background music & speakerphone.
- Back wheel - tone ringing volume

300.5 MUTE BUTTON (optional)

- Provides privacy during speakerphone or handset operation by disabling the microphone.
- If you have a programmed mute button, press while off hook to activate. (LED lights)
- Press again to deactivate. (LED extinguishes)

300.6 BACKGROUND MUSIC (optional)

- Press 8 on the dial pad (music is heard).
- Press 8 again and music is discontinued.
- (When you pick up the handset or press the ON/OFF button, music is discontinued automatically)

300.7 PLACING OUTSIDE LINE ON HOLD

- If your system is programmed to have exclusive hold preferred, press HOLD button once for exclusive hold and twice for system hold.
- If your system is programmed to have system hold preferred, press HOLD button once for system hold and twice for exclusive hold.

300.8 ANSWERING A RECALL

- When an outside line has remained on hold for an extended period of time, you will be reminded with a recalling ring.
- Press outside line button flashing at very fast rate.
- Lift handset to converse.

300.9 FLASH

- Disconnects present outside line reseizes outside line dial tone. When connected to an outside line, press FLASH button.

300.10 PBX TRANSFER

- While connected to an outside line (PBX), press FLASH button Receive PBX transfer dial tone
- Dial PBX station number
- Hang up to complete transfer

300.11 CALL PICK-UP

- You must be in the same pick-up group as the ringing telephone to pick up the call. Tone ringing intercom calls only can be picked up.
- You hear an unattended phone ringing.
- Lift handset and dial 6.
- You will be connected to the calling party.

300.12 PLACING AN INTERCOM CALL

- Press station key of party you wish to call (if programmed at your phone). OR
- Lift handset & dial station number (10-33).
- You will hear:
  - Ringing if called station is in "T" answering mode.
  - 3 bursts of tone if called station is in "H" or "P" position.
  - Lift handset or use speakerphone when tone bursts stop.
- Hang up to end call.

300.13 ANSWERING AN INTERCOM CALL

With your intercom signal switch in the:

- T mode, you will hear repeated intercom tone ringing & your HOLD button will slow flash. Lift handset or press ON/OFF button to answer. Hang up to end call.
- P mode, you will hear 3 bursts of tone & a one way announcement. The HOLD button will slow flash.
- H mode, you will hear 3 bursts of tone and an announcement. Reply handsfree or lift handset for privacy.

NOTE: If you have a programmed station button for the calling party, that button will flash. If you receive a call from a phone box, you must press that station button to answer the call.

300.14 CAMP ON

- You call a station that is busy & wish to alert them to your call,
- Press the MSG/CP.ON button twice.
- Called station will receive two bursts of ringing.
- Wait for their response.

NOTE: If a station is in DND, only the attendant can camp-on.

300.15 ANSWERING A CAMP ON

- If you are on a connected call, hear 2 bursts of muted ringing & your MSG/CP.ON button is flashing, you have a call waiting for you.
- To answer, press the MSG/CP.ON button. Any outside line you are connected to will be placed on hold. You may converse with the station placing the call.

300.16 LEAVING A MESSAGE WAITING INDICATION

Up to 5 messages can be left at any one key station.

- If you dial a station that is busy, unattended or in DND, you can leave a callback message indication.
- Press the MSG/CP.ON button once.
- Called party's MSG button will slow flash.
- Hang up.

300.17 ANSWERING A MESSAGE WAITING INDICATION

The first message left will be the first one called.

- If your MSG/CP.ON button is flashing at a slow rate, you have a message waiting for you.
- Pick up handset.
- Press flashing MSG/CP.ON button.
- Station that left message will be signaled with tone ringing.
- If called station doesn't answer, press MSG button once to leave message.

300.18 CALL TRANSFER

- Outside lines can be transferred from one phone to another within the system.
- The transfer can be either screened (announced) or unscreened to either an idle or busy station.

SCREENED TRANSFER

- While connected to an outside line, press station button where call is to be transferred (if programmed on your phone) OR
- Press TRANS button & dial station number (10-33).
- The called extension signals according to the intercom signal switch position.
- When that extension answers, announce the transfer.
- Hang up to complete transfer.

UNSCREENED TRANSFER

- Once the called extension begins to signal, hang up to transfer the call. (Recall timer starts.)

TRANSFER SEARCH

- When attempting to locate a party, you can press a station button to signal a station. If the party is not located, press another station button to continue the search. OR
- Press the TRANS button & dial the station number. If the party is not located, press the TRANS button again & dial another station to continue the search.
- When the called party answers, hang up to complete the transfer.

ANSWERING A SCREENED TRANSFER

- Your intercom will be signaling according to the intercom signal switch position.
- Answer the intercom & receive transfer notice.
- Press the outside line button or loop button flashing on hold.

300.19 EXECUTIVE/SECRETARY TRANSFER

- If you are designated the EXECUTIVE station & your phone is busy or in DND, all calls will be routed to the SECRETARY station.
- If you are the designated SECRETARY station, you can signal the EXECUTIVE that is busy or in DND by using the Camp On feature.

300.20 CONFERENCE COMBINATIONS

- 2 internal and 1 external or 3 party internal - Add On Conference 1 internal and 2 external - Multi Line Conference

ESTABLISHING A CONFERENCE

A maximum of 3 parties can be included in a conference.

- Lift handset.
- Select intercom station or dial desired outside party.
- When called party answers, press CONF button.
- Add next conference party by selecting another outside line or intercom station.
- When party answers, press CONF button.
- All parties are connected.

EXITING A CONFERENCE (controller only)

There are 3 methods of exiting a conference:

- Press the ON/OFF button to ON & replace handset (to monitor a conference).
- Press HOLD button to place outside parties on hold. Hold timer starts. If one of the 2 parties is internal that party will be dropped.
- Press CONF to leave the other conference parties still connected in an unsupervised conference. CONF button will flash & timer will start. There will be a warning tone before the other parties are dropped.

RE-ENTERING A CONFERENCE

- When the controller re-enters the conference, the disconnect timer is reset.
- Lift handset to re-enter a monitored conference.
- To re-enter a conference placed on hold, repeat steps for establishing a conference.
- To re-enter an unsupervised conference, lift handset (multi-line).
- To re-enter an unsupervised conference, lift handset & press flashing CONF button (add-on).
- CONF button lights steady & you hear confirmation tone.

TERMINATING A CONFERENCE

- Replace handset or push ON/OFF button to off. You must be actively in the conference.

300.21 ACTIVATING DO NOT DISTURB

- If you have been given the ability to place your phone in Do Not Disturb, press the DND button (DO NOT lift handset). DND button lights steady.
- You can press the DND button while your phone is ringing & stop the ringing.

REMOVING DO NOT DISTURB

- Remain on-hook.
- Press DND button.
- The button LED extinguishes.

300.22 QUEUING

- A station can queue only 1 line at a time.
- You see that a particular outside line is busy & wish to be placed on a list waiting for that line to become available.
- Lift handset.
- Press desired busy outside line button.
- Press QUE button.
- Hang up.

TO CANCEL A QUEUE

- Lift handset or press ON/OFF button.
- Press QUE button.
- Dial tone will be heard.

ANSWERING A QUEUE

- You hear ringing & an outside line of the line group you queued is slow flashing.
- Lift handset.

- Press flashing outside line button to answer.
- (If your station has been programmed for Preferred Line Answer, you will have the line automatically upon lifting the handset.)

300.23 STORING SPEED NUMBERS

- Press SPD button.
- Press asterisk (*) key once.
- Dial speed bin location. 00-09, 90-99 = station speed numbers; 10-49 = system speed numbers.
- Select desired outside line or one will be chosen automatically.
- Dial telephone number.
- Press HOLD button.
- Hang up.
  - Dialing an * initiates a pulse to tone switchover.
  - Dialing the TRANS/QUE during number storage inserts a pause.
  - Pressing the FLASH key inserts a flash into the speed number.
  - Pressing the CONF button will program a "No Display".

DIALING A SPEED NUMBER

- If no outside line has been specified in programming, one will be chosen automatically or you can choose one now.
- Press SPD button & dial bin location. OR
- Press programmed speed bin button. 00-09, 90-99 are station speed numbers; 10-49 are system speed numbers.
- When called party answers, pick up handset or use speakerphone.

300.24 LAST NUMBER REDIAL

- Press pound (#) key.
- The last number dialed over an outside line will be automatically redialed.

300.25 PAGING

- Stations off-hook or in DND will not hear the page.
- Lift handset & dial 2 digit paging code OR
- Press programmed button.
- Speak in normal tone of voice to deliver message.
  - 70 Internal All Call
  - 71 Internal Zone 1
  - 72 Internal Zone 2
  - 73 External Zone
  - 74 All Call
- Hang up.

MEET ME PAGE

- You wish to have another party call you.
- Pick up handset & dial "74" or press programmed button.
- Request that party meet you on the page.
- DO NOT hang up; wait for the requested party to answer.

ANSWERING A MEET ME PAGE

- Go to the nearest keyphone & dial "75" or press pre-programmed button.
- You will be connected to the party that paged you.

300.26 CALL FORWARDING (Station)

- If you have been given the ability to forward your calls:
- Lift handset or press ON/OFF button.
- Press FWD/DND button.
- Press station button or dial intercom number, within 5 seconds, where your calls are to be forwarded.
- Hang up.

TO REMOVE CALL FORWARDING

- Lift handset or press ON/OFF button.
- Press FWD/DND button.
- Press your own station button OR
- Dial your own intercom number.
- Hang up.

300.27 NIGHT SERVICE

- Attendant presses DND button at that station.
- To remove, press DND button again.

NOTE: Attendant does not have DND feature.

300.28 SETTING SYSTEM TIME AND DATE

Set at programmed attendant station.

- Press SPD button.
- Press asterisk (*) once.
- Dial "50".
- Enter date & time as follows

YYMMDDHHMM

- YY = year 80-99
- MM = month 01-12
- DD = day 01-31
- HH = hour 00-23
- MM = minute 00-59

300.29 ALARM

If you hear alarm signals on your telephone:

- Reset alarm condition.
- Go off-hook.
- Dial "9".
- If you hear alarm signals on your telephone, it may be a signal from a phone box.
- Press station button programmed for that phone box.

NOTE: If no station button has been programmed, you may dial the phone box intercom number to answer the call.

300.30 USING ACCOUNT CODES

- You are on an existing call.
- Press FWD/DND button.
- Dial account code up to 8 digits. (The other party will not hear the digits being dialed.)

NOTE: If the account code is less than 8 digits, dial an * to indicate account code entry if finished.

300.31 TO PROGRAM FLEXIBLE BUTTONS

- Press asterisk (*) once.
- Press button to be programmed (it must have been programmed in the data base as a flexible button).
- Dial desired code.
- Press HOLD.

BUTTON PROGRAMMING CODES

DSS/BLF		10-33
Speed Bin		SPD plus 2 digit number 00-09, 90-99 = station speed 10-49 = system speed
Mute		40
Paging:		
	Internal Zone 1	71
	Internal Zone 2	72
	Internal All Call	70
	External Zone	73
	System All Call	74
	Meet Me Pge Ans	75

NOTE: The speed bin must be programmed with a number before a flexible button can be assigned as a speed button.

400 GENERAL DESCRIPTION

400.1 TECHNOLOGY

The STARPLUS 1224EX Key Telephone System is a microprocessor controlled solid state electronic switch which distributes communications in a blocking format. All control, switching and interface circuitry is condensed onto 2 single printed circuit boards (PCB) located inside the key service unit (KSU). Refer to Figures 4.2 and 4.3.

Switching is accomplished through an unbalanced space division type CMOS matrix that provides voice path connection for 12 central office lines, 24 key telephones and 8 intercom channels.

The central microprocessor is a Z-80 and controls the communications between slave microprocessors located in each key telephone.

The 1224 KSU contains all system memory which is composed of 64K of Read Only Memory (ROM) and 16K of Random Access Memory (RAM). The RAM is subdivided so that 8K is used as CPU (Central Processor Unit) working area and 8K is used for customer data base. The customer data base memory is protected from loss by a long life lithium battery. A Program Module contains the operating instructions for the system. This module can be easily removed and replaced which allows for easy upgrading of software features.

The system power is regulated by a switching power supply. This technology provides high efficiency with low heat. A shielded transformer converts the 117 VAC into logic voltages on a separate power supply PCB mounted within the KSU cabinet. Each key telephone contains a microprocessor & circuitry to monitor button activity and to control lamp (LED) indications. A built-in speaker permits voice or tone calling to the station.

Basic, Enhanced and Executive model key telephones are all equipped with 6 feature buttons. The Basic phone has 6 flexible buttons in addition and the Enhanced and Executive phones have 22 flexible buttons.

Flexible buttons can be programmed as: outside (CO) lines, DSS buttons, speed dial buttons, loop key, pool key or certain other features.

In addition the Enhanced and Executive Models have speakerphones. The Executive model telephone is also equipped with an LCD as standard equipment. A 3 position slide switch provides easy selection of intercom signaling modes. There are also separate tone ringing and voice volume controls.

Single line telephones can be installed to provide emergency service in case of a commercial power failure or if the system CPU fails. The system will automatically switch to these single line phones when the power fails. These phones can both make and receive calls.

400.2 CAPACITY

The 1224 Key Service Unit (KSU) is housed in a wall mountable cabinet that contains the Main Board Unit (MBU), power supply and pre-wired connectors for station and CO (outside) line interface. The system comes fully configured for 12 CO lines, 24 key telephones and 8 intercom channels. One external page port provides two-way external paging capability. Four control contacts offer programmable external signaling. One Music-On-Hold input allows connection of an external music source for MOH and background music. Separate MOH and background music adjustments are provided on the KSU. One alarm input allows connection of an external alarm or other sensing device. An RJ11C connector allows the connection of 3 single line telephones which are cut over upon loss of AC power to the first 3 CO lines in the system. Phone boxes or DSS/BLF consoles may be substituted for key telephones on a one-for-one basis.

The system contains the necessary interface circuitry to install complete system battery backup. In the event of commercial AC power interruption, a 24 volt DC battery assembly provided by the customer will ensure uninterrupted system operation. The battery source requires external charging.

400.3 SYSTEM COMPONENTS

The following are the components that make up the 1224 key telephone system:

- Key Service Unit (KSU)

- Key Telephone (Basic, Enhanced or Executive)
- Wall Mount Kit
- DSS/BLF Console
- Program Module
- Phone Box
- Serial Interface Unit (SIU)
- Real Clock Unit (RCU)

1224EX BASIC KEY SERVICE UNIT (KSU)

The KSU is a self contained unit. Connections are made externally through amphenol-type plugs, modular jacks, etc. A program Module allows easy expansion of software features. A cut-out hole for an RS232C port is provided for future capability. An SIU (Serial Interface Unit) and an RCU (Real Clock Unit) can also be installed. They support SMDR and Executive (display) phone capability.

BASIC MODEL KEY TELEPHONE

A fully modular, multi-line keyset with voice and tone ringing volume controls. Contains 6 feature buttons and 6 flexible buttons, a dial pad and an intercom mode selection switch. All buttons are of the non-locking type with easy to see LED's for quick identification. There is no speakerphone operation. Flexible buttons can be programmed as outside line buttons, station buttons, page buttons, speed buttons, loop key or pool key. Comes in 4 colors.

ENHANCED MODEL KEY TELEPHONE

A fully modular, multi-line keyset with voice and tone ringing volume controls. Contains 6 feature buttons, 22 flexible buttons and a speakerphone to provide handsfree operation. Flexible buttons can be programmed as outside line buttons, station buttons, loop key, pool key, speed buttons or page buttons. Comes in 4 colors.

EXECUTIVE MODEL KEY TELEPHONE

Identical to the Enhanced Key Telephone with the addition of an interactive LCD display. Displayed features include calls to and from other extensions, number dialed, line used, camp-on, etc.

WALL MOUNT KIT

Provides an attractive modular means of attaching the STARPLUS key telephone to any vertical surface.

PHONE BOX

Allows handsfree conversations to and from locations that do not need dialing privileges. Phone boxes may be substituted for key telephones on a one-for-one basis. Ash color only.

SERIAL INTERFACE UNIT (SIU)

This optional unit must be installed using an RS232C connector & allows the customer to track incoming and outgoing, local and/or long distance calls (SMDR).

An RCU is also required for time and date.

REAL CLOCK UNIT (RCU)

This optional unit must be installed to provide telephones that have an LCD with a time and date display and to protect the time and date from commercial AC power failure.

PROGRAM MODULE

This plug-in unit provides the basic operational instructions for the system.

This module also provides for SMDR, RCU operation and supports Executive (display) telephones.

DSS/BLF CONSOLE

The Direct Station Selector/Busy Lamp Field (DSS/BLF) is a 48 button Console. The DSS/BLF will provide direct access to stations as well as serve as a Busy Lamp Field. Only the first 24 buttons will be operational since the additional 24 buttons will be used on the larger Starplus 2448 system. The 1224 can support a DSS/BLF unit on any of the abailable 24 station ports. Since each DSS/BLF requires a key station port and must be used together with a key telephone; a maximum of 12 units can be used on a 1224 system.

Activating a DSS/BLF button programmed on a key telephone will light that LED on the DSS/BLF unit.

ELECTRICAL SPECIFICATIONS

AC Input to Power Supply	117 VAC +/- 10% 60 Hz
Power Consumption	1.5 Amp, 180 Watts (max)
Output Voltage	28 V DC +/- 10%, 3.5 Amp
Station/Phone Box Cable Lengths (max) (twisted 2-pair)	500 ft. of 26 AWG Cable 1000 ft. of 24 AWG Cable 1500 ft. of 22 AWG Cable
Fuse - AC Input	1.5 A, 250 V
Music Source (Input)	2 mW max at 0 dBm
Contact Rating	
External Page Control	1.0 A, 24 VDC
Loud Bell Control	1.0 A, 24 VDC
External Page Port	
Output Impedance	600 Ohms at 0 dBm
Output Power	1 mW maximum
Alarm Sensing (programmable)	Open or closed loop
UL Listing	File Number 42U5

DIMENSIONS AND WEIGHT

KEY SERVICE UNIT	
Height	22 inches (56 cm)
Width	13.5 inches (34 cm)
Depth	3 inches (8 cm)
Weight	20 pounds (9 kg)
KEY TELEPHONE	
Height	3.5 inches (9 cm)
Width	8 inches (20 cm)
Depth	9 inches (23 cm)
Weight	2.6 pounds (1 kg)
PHONE BOX	
Height	5.5 inches (14 cm)
Width	4.25 inches (11 cm)
Depth	1.75 inches (4 cm)
Weight	1 pound (.5 kg)

DIALING SPECIFICATIONS

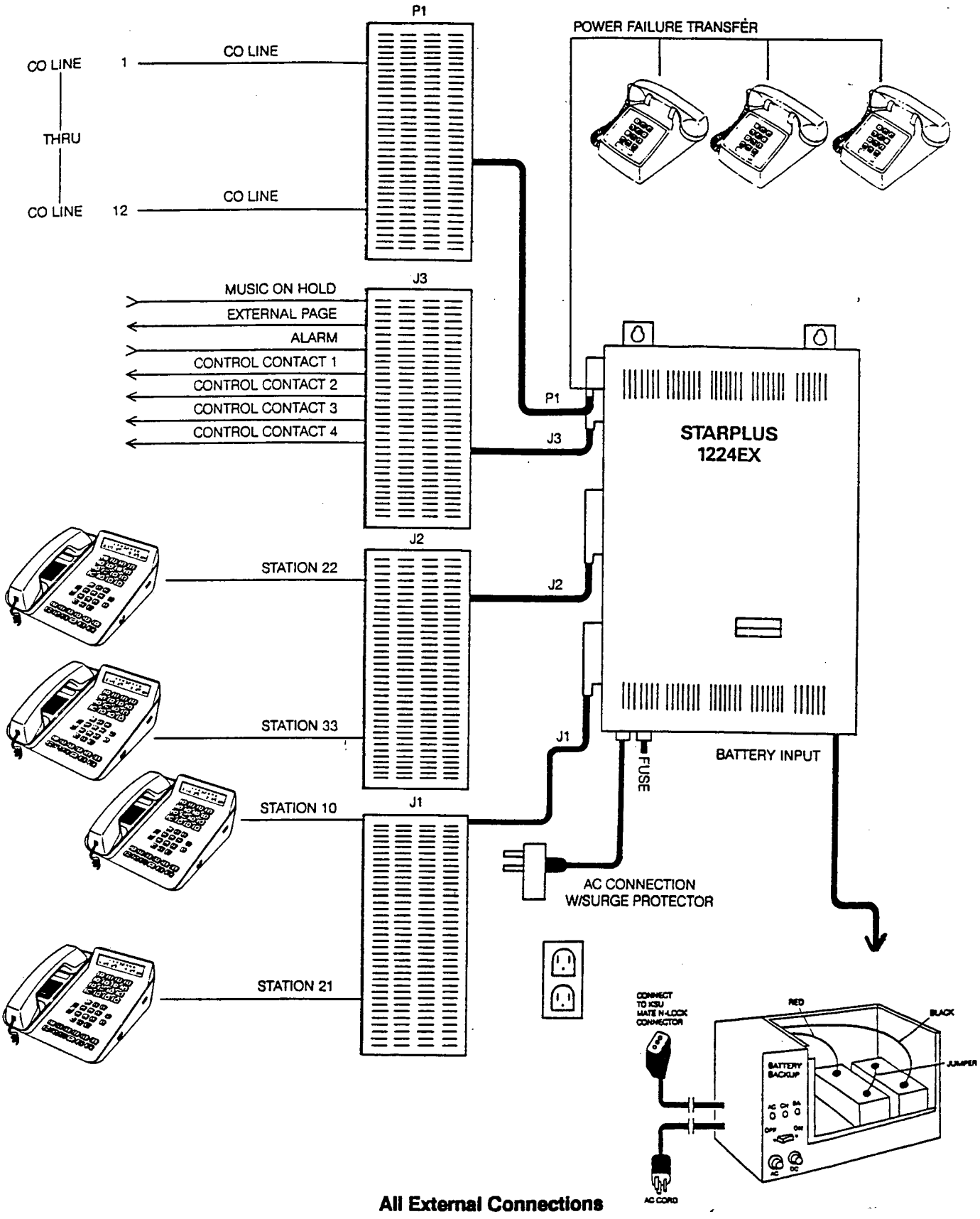
DTMF DIALING	
Frequency Deviation	+/- 1 Hz
Rise Time	3 msec.
Duration of DTMF Signal	100 msec minimum
Interdigit Time	100 msec minimum
PULSE DIALING	
Pulse Dialing Rate (programmable)	10 or 20 pps
Percent Break/Make (programmable)	60/40 or 66/33
DIALING MEMORY	
System Speed Dialing	40 numbers (16 digit)
Station Speed Dialing	20 numbers/station (16 digit)
Last Number Redial	1 number/station (32 digit)
Save Number Redial	1 number/station (32 digit)
CO Type	Loop start

ENVIRONMENTAL SPECIFICATIONS

Operating Temperature	32-104^0 F (0-40^{0}C)
Recommended Temperature	70-78^0 F (21-25^{0}C)
Humidity	5-90% (non condensing)
Heat Dissipation	620 BTUs

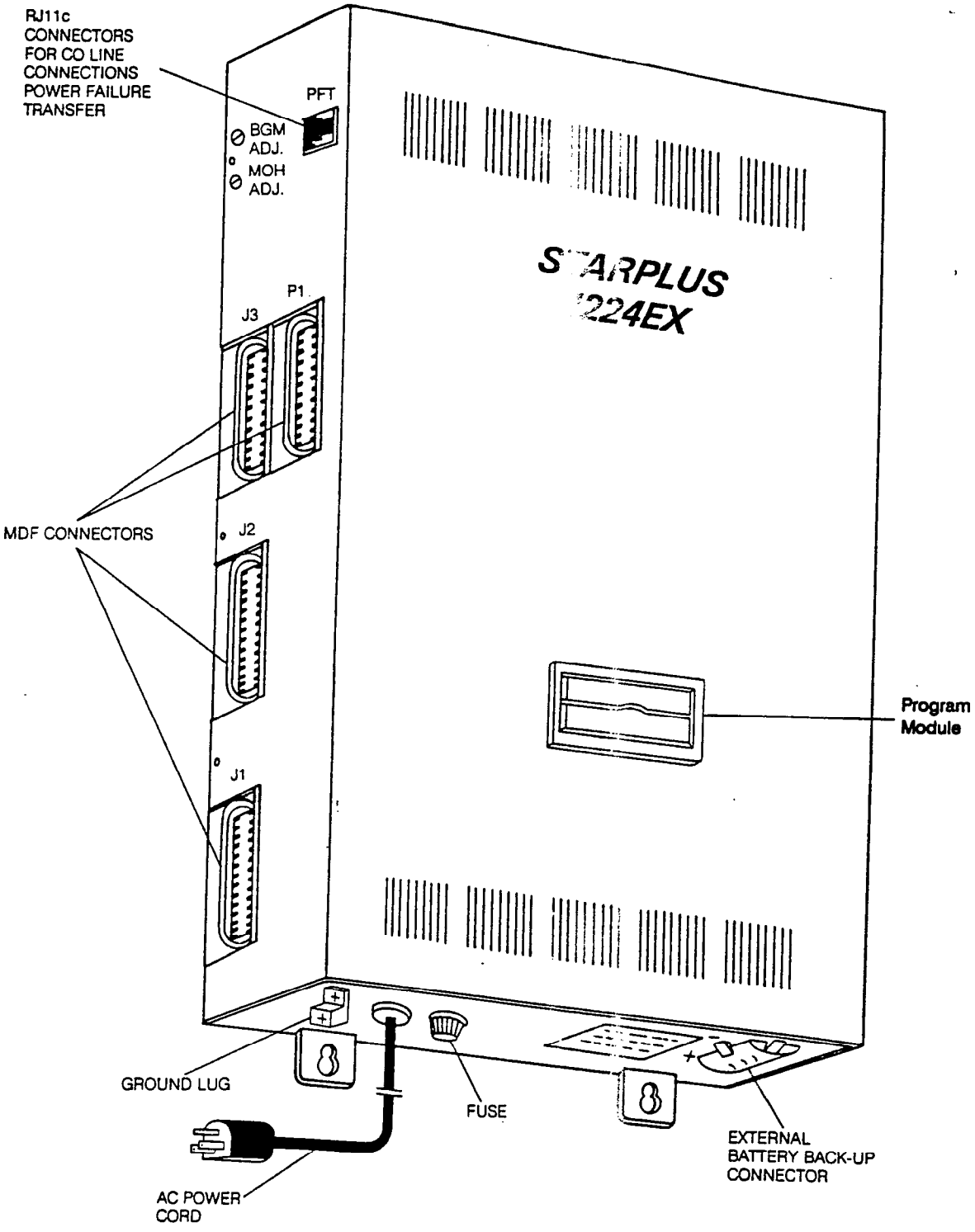
RS232C PORT (optional)

Data Format	8 bits, 2 stop bits, no parity
SMDR	
Standard format	80 characters, single-line printout
29-character format	29 characters, 3-line printout



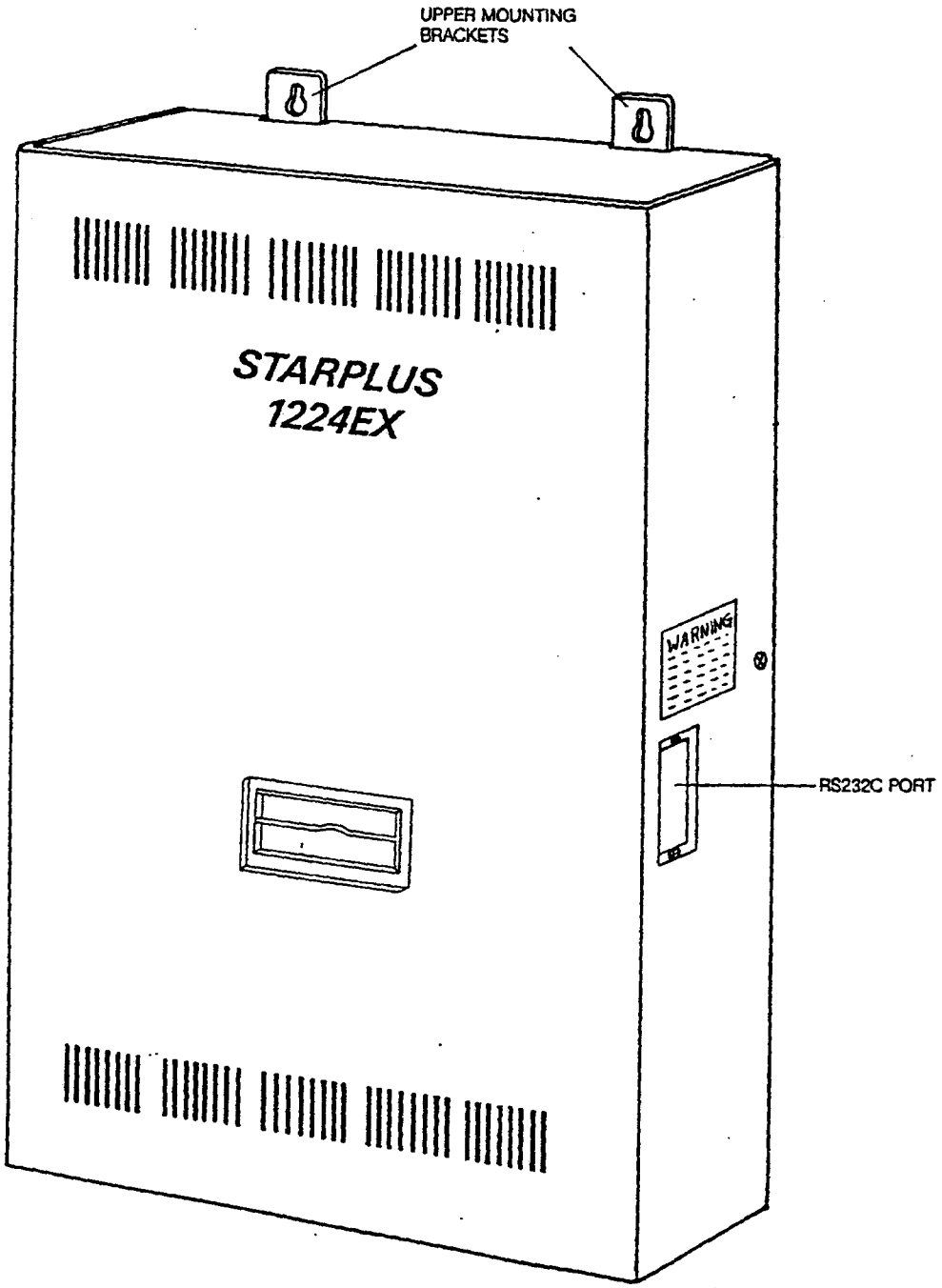
All External Connections

Figure 4.1



KSU - left side

Figure 4.2



KSU - right side

Figure 4.3

500 INSTALLATION

500.1 SITE PLANNING

The STARPLUS 1224EX Electronic Key Telephone System, like most electronic office equipment, should not be subjected to harsh environmental conditions. To assure easy servicing and reliable operation, several factors must be considered when planning the system installation. Always consider the following BEFORE installing the KSU and wiring:

A. The KSU is designed for wall mounting only.

B. The internal power supply operates with 117 VAC, 60 Hz, single phase electricity. A 3-wire (parallel blade with ground) receptacle must be provided on a dedicated, separately fused 15 AMP circuit.

C. Location(s) of telephone conduits or cable runs.

D. The KSU should be within 25' of the telephone company RJ21X. The KSU should be centrally located and assurances should be made to stay within prescribed cable lengths.

- 500' 26 AWG twisted pair
- 1000' 24 AWG twisted pair
- 1500' 22 AWG twisted pair

E. A well ventilated area having a recommended temperature range of 70-78 degrees F and a humidity range of 5-90% (non condensing).

F. Lighting and accessibility of KSU for servicing.

G. Protection from flooding, flammable materials, excessive dust and vibration.

H. Proximity of radio transmitting equipment, arc-welding devices, copying machines and other electrical equipment that are capable of generating electrical interferences.

I. Access to a good earth ground such as a metallic COLD water pipe. Inspect the pipe for non-metallic joints.

500.2 UNPACKING THE KSU

Remove the KSU from the shipping carton and place it on a level working surface, face up. Inspect the KSU for physical damage.

500.3 KSU GROUNDING

To ensure that the system will operate properly, a good earth ground is recommended. A metallic COLD water pipe will usually provide a reliable ground path. Carefully check that the pipe does not contain insulated joints that could isolate the ground. In the absence of the cold water pipe, a ground rod or other source may be used. A No. 8 AWG copper wire should be used between the ground source and the KSU.

THE GROUND WIRE SHOULD BE KEPT AS SHORT AS POSSIBLE AND SHOULD BE CONNECTED TO THE GROUND LUG LOCATED ON THE BOTTOM OF THE KSU.

500.4 KSU INSTALLATION

A. The KSU is designed for wall mounting only. It should not be mounted directly on a masonry surface.

If the KSU is to be mounted on a masonry surface, a wooden backboard of sufficient size should be attached to the wall and the KSU mounted on the backboard.

B. Mount the KSU on the backboard using 4 fasteners. (The fasteners should be selected carefully so as to be capable of supporting the KSU). Refer to Figure 5.1 for KSU dimensions

C. Install the ground using an insulated 8 AWG copper wire. Attach one end to the ground lug on the KSU cabinet and the other end to a good earth ground. See Figure 4.2.

D. The KSU power supply is located within the KSU and all electrical connections are provided externally. The AC power cord exits the KSU on the bottom.

Also on the bottom is a fuse holder that contains a 1.5 Amp slow-blow fuse.

Power for the system is distributed internally.

E. The AC power cord should not be used with a 3-wire-to-2-wire plug adapter. Do not use extension cords. A power line surge protector should be used to protect the power supply from electrical surges. The surge protector should be installed in accordance with the manufacturer's instructions and applicable electrical codes.

WARNING: DO NOT PLUG IN THE POWER CORD AT THIS TIME.

500.5 KSU CABLING

Four amphenol type connectors are provided on the left side of the KSU. The male connector called P-1 is for the 12 CO lines. Also on the left side of the KSU are 3 female connectors labeled J-1, J-2 and J-3. These connectors require male ended plug cables for proper attachment.

When connecting cable tails to the KSU, make sure the designation on the AMP hood matches the designation at the connector's input on the KSU.

After plugging in the required cables, a "horse shoe" fastener should be placed around the mated AMP connectors to secure the cable to the KSU connector provided.

Verify that the wires are properly cross-connected. Observe telephone standard wiring color codes wherever necessary. See Figure 5.2.

Cabling should be routed to avoid fluorescent light fixtures, electric motors and generators, welding equipment and radio transmitters. Also, care should be taken to avoid hot locations such as steam pipes and furnaces, and areas where wiring is subject to abrasion.

CAUTION

It is NOT recommended that AC power be applied to the system during the cable termination process.

500.6 LIGHTNING PROTECTION

The 1224 should have central office lines protected with proper lightning surge arrestors. The central office lines are exposed to damaging surges induced by direct or non-direct lightning strikes. The protection should contain a complement of 3-element gas discharge tubes which ground high potential surges and associated circuits to absorb and filter lower-level surge potentials. Care should be taken to ensure that not more than one set of protectors be installed on central office lines at installation premises. Improper installation of line protection can present a serious safety hazard.

500.7 KEY TELEPHONE INSTALLATION

A maximum of 24 key telephones may be installed with the 1224 key system. Each key telephone requires 2 pair (4 wires) for proper wiring. It is required that 3 pair twisted cable be used to connect the telephones to the system on a "home run" basis. The telephone end of the cable should be terminated on a modular jack. At the MDF end of the home run, the cable should be terminated on a separate station connecting block (66M1-50) for cross connection to the "J" cables. This method of cabling will allow for easy isolation of station equipment during trouble shooting procedures.

500.8 WALL MOUNT KIT INSTALLATION

All connections to the key telephones are fully modular. To wall mount the key telephone, it is necessary to have one Wall Mount Kit and one 630-A type modular wall mount jack assembly equipped with 2 mounting lugs.

A. Remove the mounting cord from the telephone. This cord will no longer be needed but should be retained for maintenance purposes.

B. Substitute the short modular cord on the wall mount baseplate for the mounting cord removed in A.

C. Rotate the plastic number retainer upwards to expose the screw underneath. Remove the screw and slide the cover plate under the number retainer towards the hook switch.

D. Replace the cover plate with the handset retainer tab that is mounted in the wall mount baseplate and secure with the screw from C above.

E. Rotate the plastic number retainer downward and snap into place.

F. Align the mounting tab on the outer edges of the wall mount base with the holes on the key telephone base. Snap shut and fasten with the screw.

G. The telephone can now be mounted to the wall by matching the 2 keyhole slots on the baseplate with the lugs on the modular cover assembly. Check to make sure that the modular connector on the baseplate is firmly connected to the wall jack.

500.9 PHONE BOX INSTALLATION

The 1224 Phone Box can make calls to preassigned stations as well as receive intercom calls. The unit should be located in weather protected areas where paging or monitoring is required.

The Phone Box consists of a top housing and bottom mounting plate. The top housing has a speaker microphone, wire terminals and electronic circuitry. The housings are separated by inserting a thin, flat-edged tool at the bottom rim of the assembly. By pressing inward on the recessed retaining tab, the assembly will open.

The connection of the Phone Box(es) to the KSU is identical to that of the key telephone. Refer to Section 500.7.

The bottom plate of the Phone Box assembly is fastened to the wall by mounting with customer supplied No. 8 or larger pan head screws. The cable is routed through the cable-entry holes provided on the bottom plate and is connected to the screw terminal strip on the upper housing. Four screw terminals are identified by wire color on the silkscreened printed circuit board to correspond with the wiring sequence at the punchdown connector at the MDF.

The slack wiring should be pulled back through the bottom mounting plate and the top housing snapped shut. Refer to Section 600.6 (station class of service) to program phone boxes.

WARNING: Make connection at the phone box before punching down on the MDF.

500.10 DSS/BLF CONSOLE INSTALLATION

Each DSS/BLF requires 2 pair (4 wires) for proper installation. Three-pair twisted cable is recommended to connect the DSS/BLF units on a "home run" basis. Each DSS/BLF must be used together with a key telephone, therefore a maximum of 12 units can be used in the system. Refer to the programming instructions.

500.11 EXTERNAL MUSIC SOURCE

Music-on-hold as well as Background music can be connected using a customer provided music source. Separate Music-On-Hold and background music volume adjustments are provided on the KSU. (Figure 4.2).

Background music (BGM) levels are also adjustable at each key telephone set. Connections are made on the J-3 connector, the MOH pair. See Table 5-3.

500.12 ALARM INSTALLATION

An alarm signal can be transmitted to each station (except phone boxes) in the system. When activated by an external alarm system, a continuous or repeated tone is transmitted to the station speakers. Leads from the external alarm are connected to the J-3 terminals ALMT and ALMR (Figure 5.5). See Section 600 for programming alarm states. After the alarm has sounded, the system must be reset by first clearing the alarm condition on the external system and then lifting the handset an any station programmed to receive alarm and dialing "9".

500.13 EXTERNAL PAGING

An amplifier for external paging can be connected to the 1224 key telephone system. Any telephone in the system can access this paging equipment by using a dial code. There is one External Paging Zone (without amplifier) provided in the 1224 system.

The output impedance of the paging zone is 600 Ohms. The low level voice signal output is specified at 5 milliwatts. Dry contact control is provided to switch on the external amplifier equipment or to momentarily remove background music, if externally supplied to the paging device. All connections are made on the J-3 punchdown connector. The voice output from the key telephone system is provided on the EPVT and EPVR pair. The "make" contacts are identified as pair EPCTL. The paging port can be connected to a two way paging system.

500.14 LOUD BELL CONTROL/A-LEAD INDICATION

The STARPLUS 1224 system provides relay contact closure to activate external signaling equipment during incoming CO line ringing. The station or CO line that is to signal is selected by programming (see Section 600).

There are 4 control contacts which can be assigned to any combination of stations and/or CO lines. Locate the control contacts on the terminals of the connecting block. Two wires are connected to these terminals and routed to customer provided signaling equipment. Refer to Figure 5.5.

500.15 EMERGENCY TRANSFER

In the event of a commercial AC power interruption, the first 3 CO/PBX lines will automatically transfer to single line telephones (if installed) for emergency communications. These SLTs should be equipment with ringers. They can be DTMF type instruments or rotary dial. Connection is made on the modular 6-conductor located directly above the J-3/P-1 connectors. See Figure 5.4.

500.16 HEADSET INSTALLATION

The STARPLUS key telephone has been designed to operate with industry standard modular headset adapters and operator headsets. To modify a key telephone to use an external headset:

A. Plus the headset adapter cord into the vacant headset jack on the key telephone base.

B. Plug the telephone handset cord into the headset adapter box where indicated by the headset manufacturer's instructions.

C. Turn to the programming section of this manual. Enable the headset option for that particular station.

Speakerphone operation is automatically disabled and such features as On-Hook Dialing and Handsfree speakerphone become inoperable. However, incoming page/voice announcements, tone ringing and background music will still be heard over the key telephone speaker.

500.17 POWER-UP AND INSTALLATION CHECKLIST

Prior to actual power-up and initialization, the key system should be checked over to avoid start up delays or improper loading. A step-by-step checklist is provided for this purpose:

A. Make sure that the KSU is properly grounded according to the instructions in Section 500.3.

B. Inspect the MDF for shorted wiring or improper polarity that would affect the key telephones.

C. Make sure that plug-ended MDF cables to the KSU are secure and are plugged into the correct position.

D. Plug the AC power cord into the dedicated 117 VAC outlet.

500.18 SIU MODULE INSTALLATION

A. Turn OFF the KSU power by removing the plug from the AC outlet.

B. Remove the Program Module from the KSU.

C. Unscrew the 6 screws holding the KSU cover and remove the cover.

D. Open the SIU module box and verify the following components are included:

- 1 each SIU printed circuit board (PCB)
- 1 each 16-conductor ribbon cable
- 1 each RS232C adapter cable

E. Push the ribbon cable into the socket on the underside (solder side) of the SIU board. Make sure the contact "fingers" of the cable align with the contacts of the connector.

F. Hold the SIU so that the ribbon cable is on the right bottom side extending downwards. Gently push the free end of the ribbon cable into the SIU socket (CN 1) on the KSU.

G. Remove the RS232 mounting hole screws and cover on the right hand side of the KSU. Install the SIU into the mounting hole and secure with the 2 screws.

H. Replace the KSU cover.

Installation is now complete.

NOTE: Any RS232C compatible printer may now be connected to the RS232C port on the

KSU. The baud rate is programmable in data base programming (300 or 1200 baud).

5.19 RCU INSTALLATION

A. Turn OFF power to KSU by unplugging from AC outlet.

B. Remove program module.

C. Remove screws holding the KSU cover. Remove the cover.

D. Open the RCU box and verify the contents:

- 1 each RCU module
- 1 each battery
- 1 each plastic beaded tiewrap

E. Locate the battery. The end with the color ring is negative.

Install the battery into the battery socket of the RCU being careful to match the polarity of the battery with the polarity of the socket.

F. Push the beaded tiewrap through the hole in the RCU next to the battery. Pull the tiewrap around the battery and through the cinch end to secure the battery.

G. Refer to Figure 5.9. Locate the RCU socket (CN-2); note the top (notched end) of the socket.

H. Hold the RCU so that the battery socket end is facing toward you (battery on the bottom of the RCU) and away from the top of the RCU socket.

I. Insert the pins on the bottom of the RCU into the RCU socket (CN-1) being careful to align all of the pins with the socket. Apply pressure in the middle of the RCU (not the ends) to avoid breakage while seating the RCU into the socket. Replace KSU cover.

RCU installation is now complete.

5.20 BATTERY BACK-UP UNIT (BBU)

I. INTRODUCTION

The STARPLUS 1224EX can be fully supported for complete operation during a power failure. An externally provided 24 VDC battery package (gel type) and float charger is required. A convenient plug for battery connection is located on the bottom of the KSU.

The BBU houses two 12 V batteries connected in series which provide 24 V of DC power. The BBU also contains an AC input cord which provides charging power when the batteries are not in use. Batteries are NOT included.

A 10" 14 gauge jumper wire is provided for interconnection of the two 12 V batteries. Four adapter wires (approximately 2") are provided for matching the exact battery terminal size. A plastic tiewrap is provided for securing the batteries once installed.

Any UL recognized battery may be used with the BBU. The larger amp hour the battery, the longer it will take to recharge.

II. DESCRIPTION

A Capacity

The following table shows the approximate times for a fully charged supply to reach 90% voltage under different load conditions.

Battery Amp Hour	Configuration		
	4 x 8	8 x 16	12 x 24
7 AH	5 Hr	2 1/2 H	1 Hr
14 AH	10 Hr	5 Hr	2 1/2 H
40 AH	24 Hr	14 Hr	8 Hr

NOTE: All electronic key systems will begin to operate intermittently below a certain input voltage. Typically reliable operation will be maintained to 90% of full voltage.

B. Dimensions

- 8" high, 13.5" wide, 7.75" deep
- Weight without batteries: 11 lb

C. Specifications

- Output fused at 4 A, 250 V
- Current limited, constant voltage charger
- Gel type batteries
- Charger float voltage is 27.6 V
- Cut off voltage point is 21 V

D. Power Requirements

- Input: 117 VAC, 60 Hz
- Fused at 0.5 A, 250 V

E. Environment

- Temperature: 0-50 C
- Humidity: 0-90%

III. INSTALLATION

A. Introduction

See Figure 5.8 for the location of the input socket. The input socket of the key system must be a female Mate-N-Lok type connector.

B. Installation Checklist

The following items are required to install the BBU:

- 1 BBU with wire kit (5 wires) and tiewrap
- 4 No. 12 panhead screws (if wall mounted)
- Screwdriver
- Backboard or wall shelf if applicable

C. Mounting

The BBU must be located within 6' of an AC receptacle and 2' of the KSU. It can be placed on a wall shelf or it can be wall mounted.

To wall mount the BBU:

- The BBU is designed to be mounted on a backboard, either the backboard the KSU is mounted on or one specifically for the BBU.
- Mark for screw placement, either by measuring (the 2 top keyhole mounting slots are 8 3/4" on center) or by placing the BBU against the backboard (before installing batteries) & marking the location of the 2 top slots.
- Partially insert 2 No. 12 panhead sheet metal screws into the backboard.
- Suspend the BBU on these 2 screws. The large section of the keyhole will allow the unit to easily pass over the screwhead.
- Slowly lower the BBU so the small section of the keyhole is directly behind the screwhead.
- Tighten each screw so the unit fits snugly against the backboard. Insert 2 more screws into the bottom of the BBU where 2 more keyhole mounting slots are located.

IV. GROUNDING

To ensure that the BBU will operate properly, a good earth ground is recommended. A metallic COLD water pipe will usually provide a reliable ground path. Carefully check that the pipe does not contain insulated joints that could isolate the ground. In the absence of the cold water pipe, a ground rod or other source may be used. A No. 8 AWG copper wire should be used between the ground source and the KSU.

THE GROUND WIRE SHOULD BE KEPT AS SHORT AS POSSIBLE AND SHOULD BE CONNECTED TO THE GROUND LUG LOCATED ON THE BOTTOM OF THE KSU.

V. CONNECTIONS

Before connecting the batteries, make sure the BBU is unplugged and the ON/OFF switch is turned off.

A. Remove the BBU cover by turning the 4 screw locks and lifting the cover.

B. Install the two 12 VDC batteries in the battery compartment. Thread the plastic tiewrap through the vent holes in the side of the battery compartment and fasten around both batteries. Cinch the tiewrap tight.

C. Connect one of the adapter wires to the black 10" jumper wire.

Now install this jumper wire assembly between the NEG (-) terminal of battery 1 and the POS (+) terminal of battery 2.

D. Connect another adapter wire to the BBU red battery wire.

Now connect this wire to the POS (+) terminal of battery 1.

E. Connect the BBU black battery wire to the NEG (-) terminal of battery 2.

F. Make sure the key system being connected is turned on. Then connect the BBU

DC output cable to the battery input of the key system KSU.

G. Make sure the BBU power switch is in the OFF position. Then plug in the AC power cord.

H. Turn the power switch on the BBU to ON.

Installation of the BBU is now complete.

5.21 SMDR PRINTOUT

Station Message Detail Recording provides a detailed record of all outgoing and/or incoming, all calls or long distance only calls exceeding 30 seconds. This feature is enabled in database programming. If enabled, information begins recording when the call starts and terminates when the call ends. If the call was longer than 30 seconds, the information is queued for printing.

The SMDR record contains the following information:

2 digits - station originating the call

2 digits - CO line used

5 digits - call duration (hours, minutes)

8 digits - time of day call originated (hour, minute, seconds)

8 digits - date call originated (month, day, year)

24 digits - telephone number dialed

8 digits - account code

80 Character Format

The standard format is an 80 character/single line printout with automatic carriage return (CR) and line feed (LF) to advance paper.

AABBHH:MMHH:MM:SSMM/DD/YYCCCCCCCCCC:EEEEEE

AA = station placing the call

BB = CO line used

HH:MM = duration of the call

HH:MM:SS = time call started

MM/DD/YY = date call was placed

CC..CC = telephone number dialed

EE = account code

29 Character Format

This format is 29 character/3 line printout with automatic carriage return (CR) and line feed (LF) at the end of each line.

AABBHH:MMHH:MM:SSMM/DD/YY
CCCCCCCCCCCCCCCCCCCC
EEEEEEEE

SMDR will retain a queue of the last 16 "requests". This ensures that the most recent records are retained in the event of terminal failure. If you are using a printer to display the customer database, call records will continue to print in between the display of the database. A header containing information on the SMDR printout will print every 66 records. This header will be: CO TOTAL START DATE DIALED ACCOUNT CODE

The following are sample printouts:

10 01 00:01 08:48:55 04/26/88 :12345678

10 01 00:01 08:51:11 04/26/88 123456:

12 02 00:01 08:51:21 04/26/88 1234567890 :1234

or

10 01 00:01 08:53:46 04/26/88
12345678

10 01 00:01 08:54:42 04/26/88
1234567890
12

14 02 00:01 08:54:42 04/26/88
12345678901234567 89
12345678

Table 5-1

J-1 STATION WIRING

PAIR	PIN	COLOR	DESIG	DESCRP
1	26	WH/BL	VT 1	STA 10
	1	BL/WH	VR 1	
2	27	WH/OR	DT 1	
	2	OR/WH	DR 1	
3	28	WH/GN	VT 2	STA 11
	3	GN/WH	VR 2	
4	29	WH/BN	DT 2	
	4	BN/WH	DR 2	
5	30	WH/SL	VT 3	STA 12
	5	SL/WH	VR 3	
6	31	RD/BL	DT 3	
	6	BL/RD	DR 3	
7	32	RD/OR	VT 4	STA 13
	7	OR/RD	VR 4	
8	33	RD/GN	DT 4	
	8	GN/RD	DR 4	
9	34	RD/BN	VT 5	STA 14
	9	BN/RD	VR 5	
10	35	RD/SL	DT 5	
	10	SL/RD	DR 5	
11	36	BK/BL	VT 6	STA 15
	11	BL/BK	VR 6	
12	37	BK/OR	DT 6	
	12	OR/BK	DR 6	
13	38	BK/GN	VT 7	STA 16
	13	GN/BK	VR 7	
14	39	BK/BN	DT 7	
	14	BN/BK	DR 7	
15	40	BK/SL	VT 8	STA 17
	15	SL/BK	VR 8	
16	41	YL/BL	DT 8	
	16	BL/YL	DR 8	
17	42	YL/OR	VT 9	STA 18
	17	OR/YL	VR 9	
18	43	YL/GN	DT 9	
	18	GN/YL	DR 9	
19	44	YL/BN	VT 10	STA 19
	19	BN/YL	VR 10	
20	45	YL/SL	DT 10	
	20	SL/YL	DR 10	
21	46	VI/BL	VT 11	STA 20
	21	BL/VI	VR 11	
22	47	VI/OR	DT 11	
	22	OR/VI	DR 11	
23	48	VI/GN	VT 12	STA 21
	23	GN/VI	VR 12	
24	49	VI/BN	DT 12	
	24	BN/VI	DR 12	
25	50	VI/SL	—	SPARE
	25	SL/VI	—	

Table 5-2

J-2 STATION WIRING

PAIR	PIN	COLOR	DESIG	DESCRP
1	26	WH/BL	VT 13	STA 22
	1	BL/WH	VR 13	
2	27	WH/OR	DT 13	
	2	OR/WH	DR 13	
3	28	WH/GN	VT 14	STA 23
	3	GN/WH	VR 14	
4	29	WH/BN	DT 14	
	4	BN/WH	DR 14	
5	30	WH/SL	VT 15	STA 24
	5	SL/WH	VR 15	
6	31	RD/BL	DT 15	
	6	BL/RD	DR 15	
7	32	RD/OR	VT 16	STA 25
	7	OR/RD	VR 16	
8	33	RD/GN	DT 16	
	8	GN/RD	DR 16	
9	34	RD/BN	VT 17	STA 26
	9	BN/RD	VR 17	
10	35	RD/SL	DT 17	
	10	SL/RD	DR 17	
11	36	BK/BL	VT 18	STA 27
	11	BL/BK	VR 18	
12	37	BK/OR	DT 18	
	12	OR/BK	DR 18	
13	38	BK/GN	VT 19	STA 28
	13	GN/BK	VR 19	
14	39	BK/BN	DT 19	
	14	BN/BK	DR 19	
15	40	BK/SL	VT 20	STA 29
	15	SL/BK	VR 20	
16	41	YL/BL	DT 20	
	16	BL/YL	DR 20	
17	42	YL/OR	VT 21	STA 30
	17	OR/YL	VR 21	
18	43	YL/GN	DT 21	
	18	GN/YL	DR 21	
19	44	YL/BN	VT 22	STA 31
	19	BN/YL	VR 22	
20	45	YL/SL	DT 22	
	20	SL/YL	DR 22	
21	46	VI/BL	VT 23	STA 32
	21	BL/VI	VR 23	
22	47	VI/OR	DT 23	
	22	OR/VI	DR 23	
23	48	VI/GN	VT 24	STA 33
	23	GN/VI	VR 24	
24	49	VI/BN	DT 24	
	24	BN/VI	DR 24	
25	50	VI/SL	—	SPARE
	25	SL/VI	—	

Table 5-3

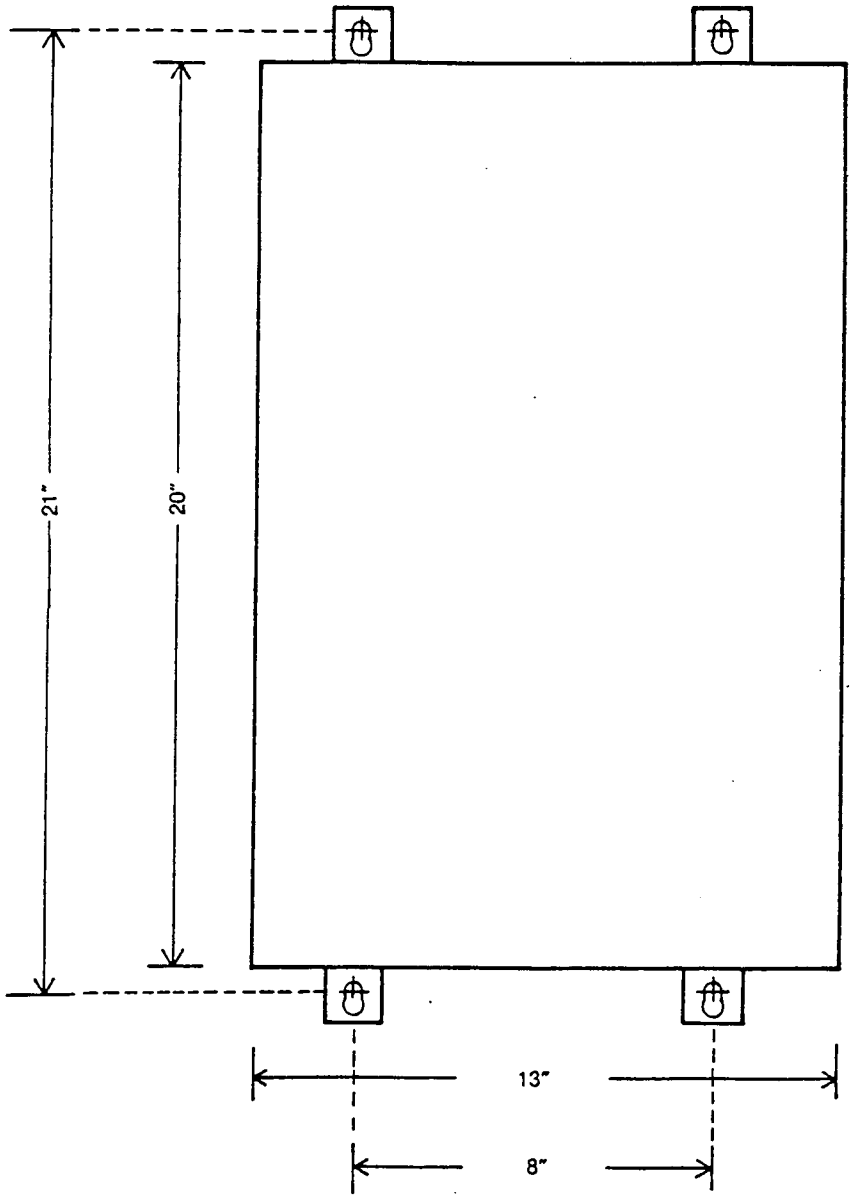
J-3 MISCELLANEOUS

PAIR	PIN	COLOR	DESIG	DESCRP
1	26	WH/BL	MOHT	MUSIC
	1	BL/WH	MOHR	INPUT
2	27	WH/OR	EPVT	EXT.
	2	OR/WH	EPVR	PAGE
3	28	WH/GN	EPCTL	PAGE
	3	GN/WH	EPCTL	CONTACT
4	29	WH/BN	ALMT	ALARM
	4	BN/WH	ALMR	INPUT
5	30	WH/SL	CNTL1T	CONTROL
	5	SL/WH	CNTL12	CONTROL1
6	31	RD/BL	CNTL2T	CONTROL
	6	BL/RD	CNTL2R	CONTROL2
7	32	RD/OR	CNTL3T	CONTROL
	7	OR/RD	CNTL3R	CONTROL3
8	33	RD/GN	CNTL4T	CONTROL
	8	GN/RD	CNTL4R	CONTROL4
9	34	RD/BN	SPARE	SPARE
	9	BN/RD		
10	35	RD/SL		
	10	SL/RD		
11	36	BK/BL		
	11	BL/BK		
12	37	BK/OR		
	12	OR/BK		
13	38	BK/GN		
	13	GN/BK		
14	39	BK/BN		
	14	BN/BK		
15	40	BK/SL		
	15	SL/BK		
16	41	YL/BL		
	16	BL/YL		
17	42	YL/OR		
	17	OR/YL		
18	43	YL/GN		
	18	GN/YL		
19	44	YL/BN		
	19	BN/YL		
20	45	YL/SL		
	20	SL/YL		
21	46	VI/BL		
	21	BL/VI		
22	47	VI/OR		
	22	OR/VI		
23	48	VI/GN		
	23	GN/VI		
24	49	VI/BN		
	24	BN/VI		
25	50	VI/SL		
	25	SL/VI		

Table 5-4

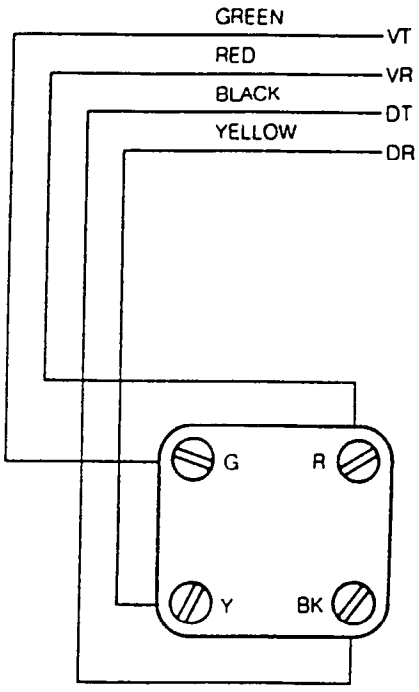
P-1 CO LINE WIRING

PAIR	PIN	COLOR	DESIG	DESCRP
1	26	WH/BL	T1	CO1
	1	BL/WH	R1	
2	27	WH/OR	T2	CO2
	2	OR/WH	R2	
3	28	WH/GN	T3	CO3
	3	GN/WH	R3	
4	29	WH/BN	T4	CO4
	4	BN/WH	R4	
5	30	WH/SL	T5	CO5
	5	SL/WH	R5	
6	31	RD/BL	T6	CO6
	6	BL/RD	R6	
7	32	RD/OR	T7	CO7
	7	OR/RD	R7	
8	33	RD/GN	T8	CO8
	8	GN/RD	R8	
9	34	RD/BN	T9	CO9
	9	BN/RD	R9	
10	35	RD/SL	T10	CO10
	10	SL/RD	R10	
11	36	BK/BL	T11	CO 11
	11	BL/BK	R11	
12	37	BK/OR	T12	CO 12
	12	OR/BK	R12	
13	38	BK/GN	SPARE	SPARE
	13	GN/BK		
14	39	BK/BN		
	14	BN/BK		
15	40	BK/SL		
	15	SL/BK		
16	41	YL/BL		
	16	BL/YL		
17	42	YL/OR		
	17	OR/YL		
18	43	YL/GN		
	18	GN/YL		
19	44	YL/BN		
	19	BN/YL		
20	45	YL/SL		
	20	SL/YL		
21	46	VI/BL		
	21	BL/VI		
22	47	VI/OR		
	22	OR/VI		
23	48	VI/GN		
	23	GN/VI		
24	49	VI/BN		
	24	BN/VI		
25	50	VI/SL		
	25	SL/VI		

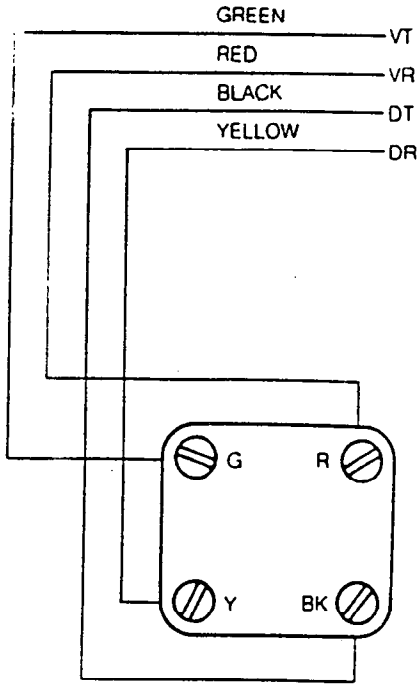


KSU Mounting Dimensions

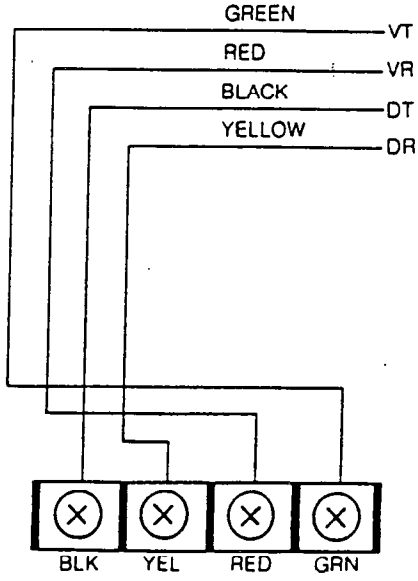
Figure 5.1

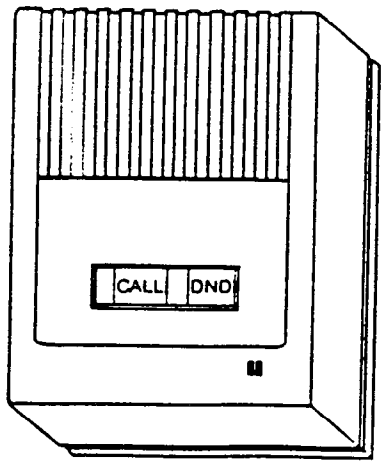


Key Telephone Wiring



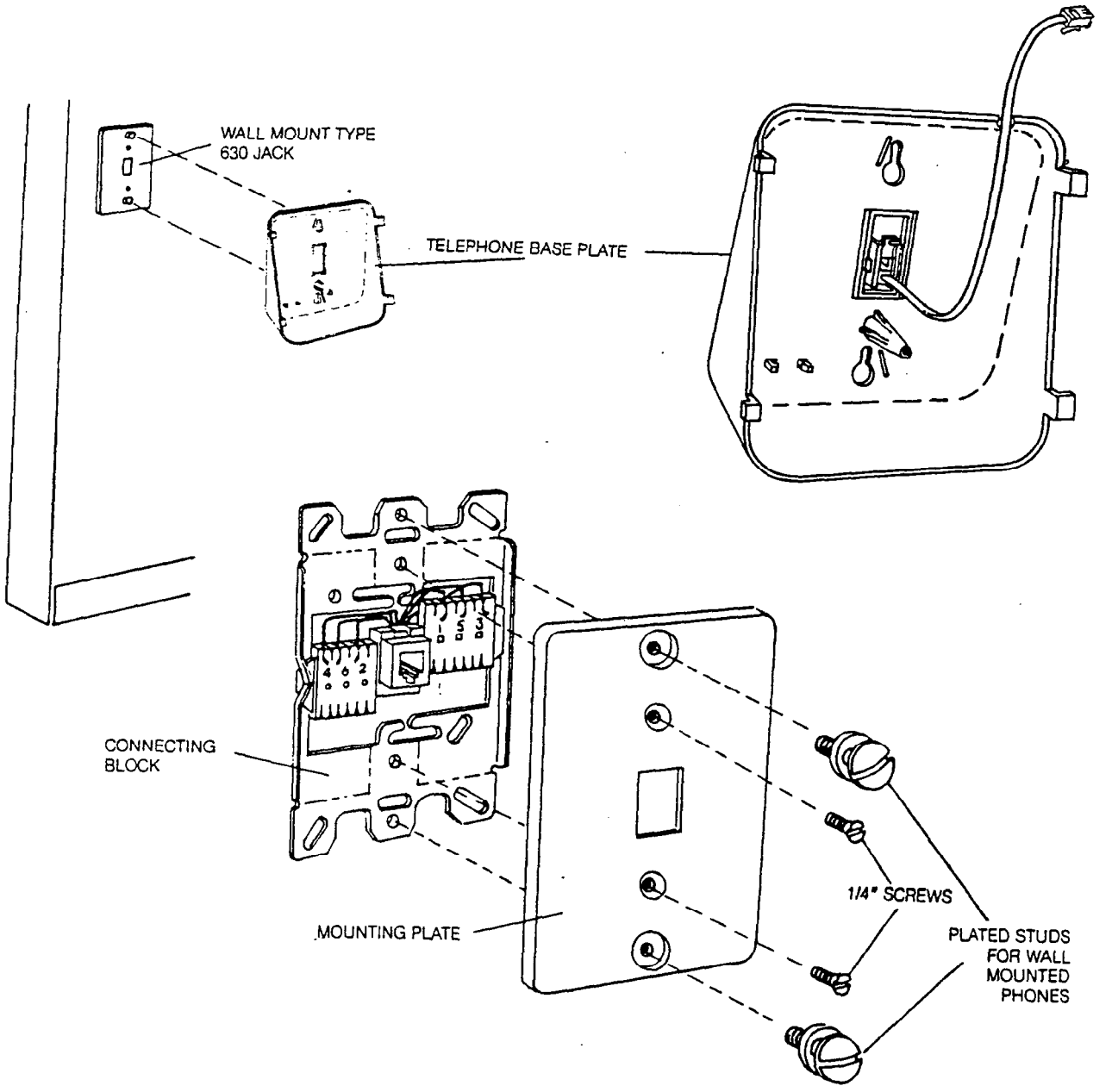
DSS Wiring





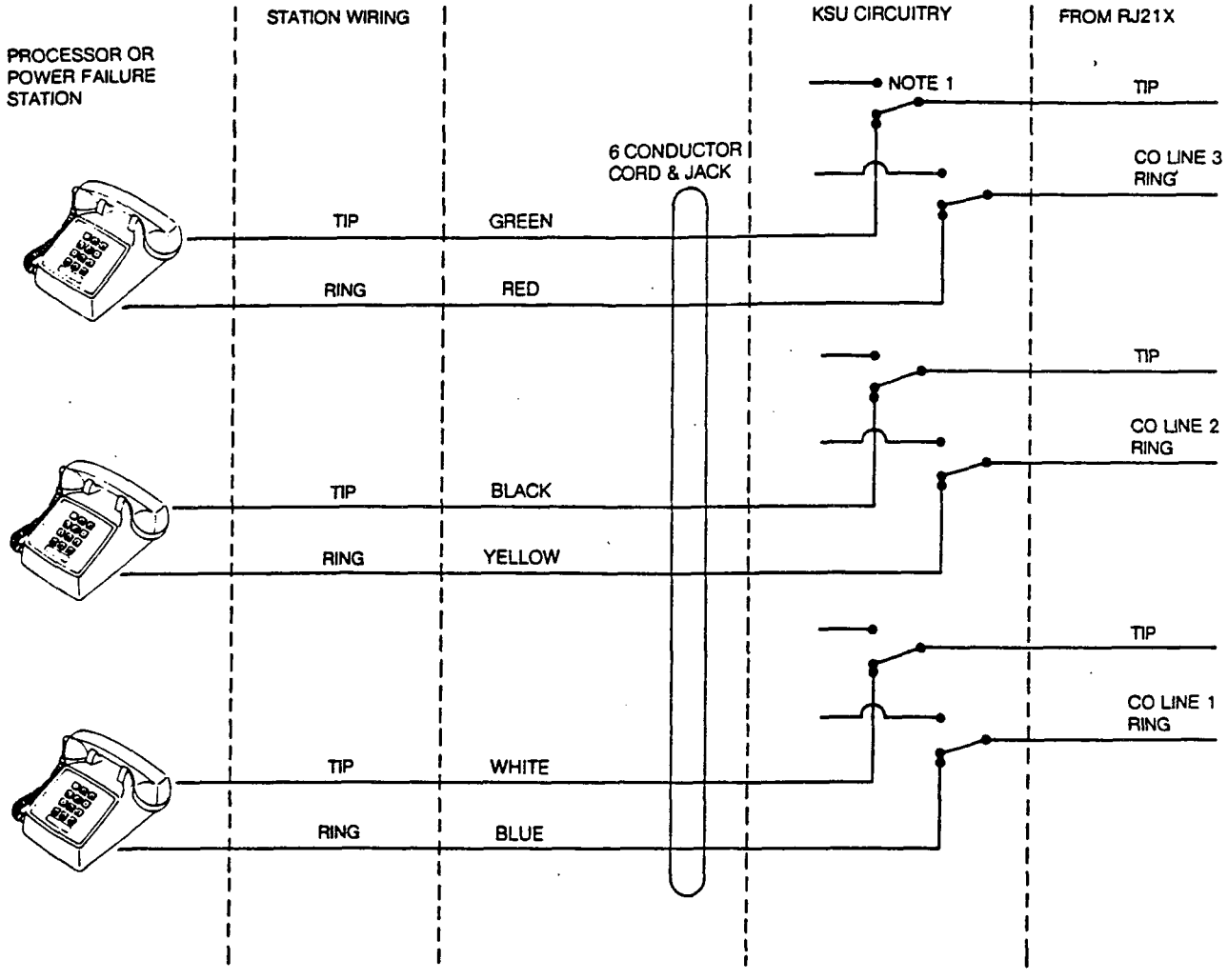
Key Telephone Wiring

Figure 5.2



Wall Mounting the Telephone

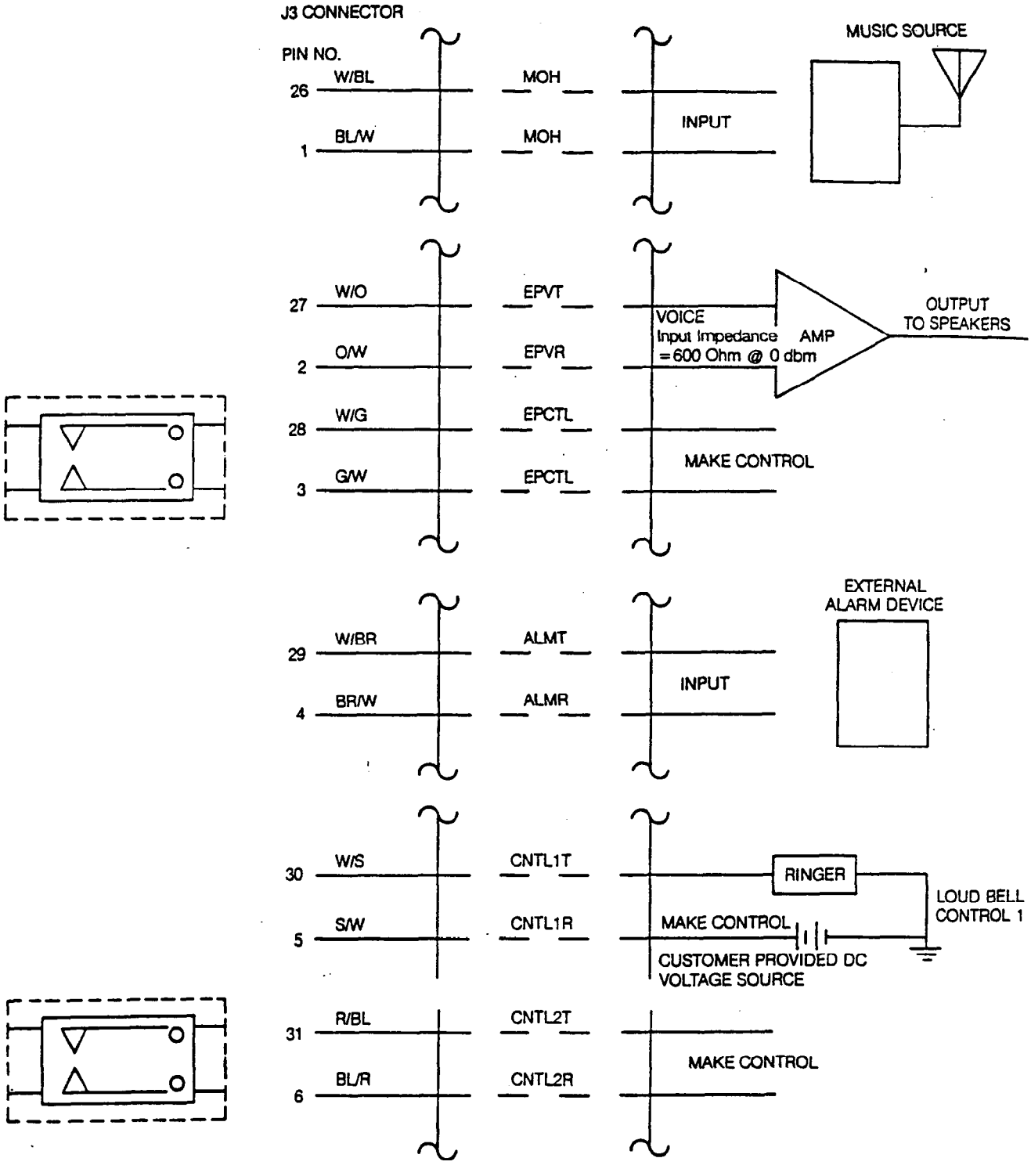
Figure 5.3



Note1: Contacts are shown in power failure mode.

Processor or Power Failure Transfer

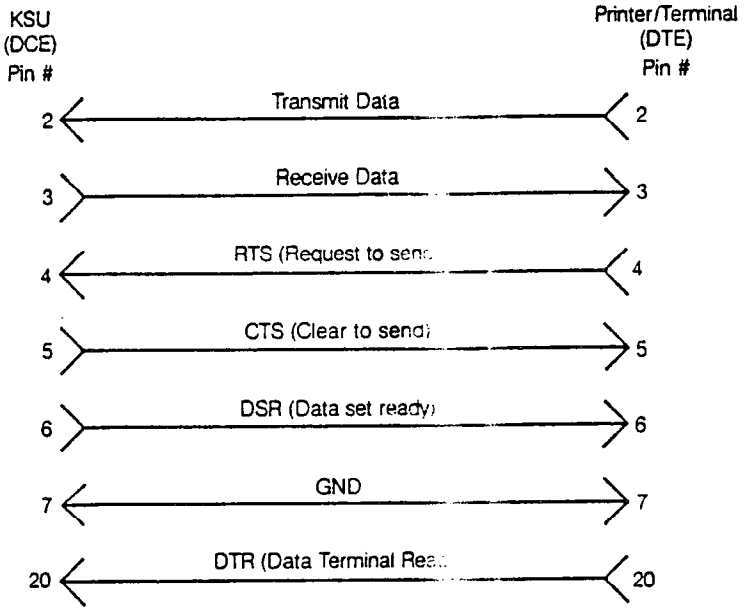
Figure 5.4



NOTE: There are four control contacts.

External Connections

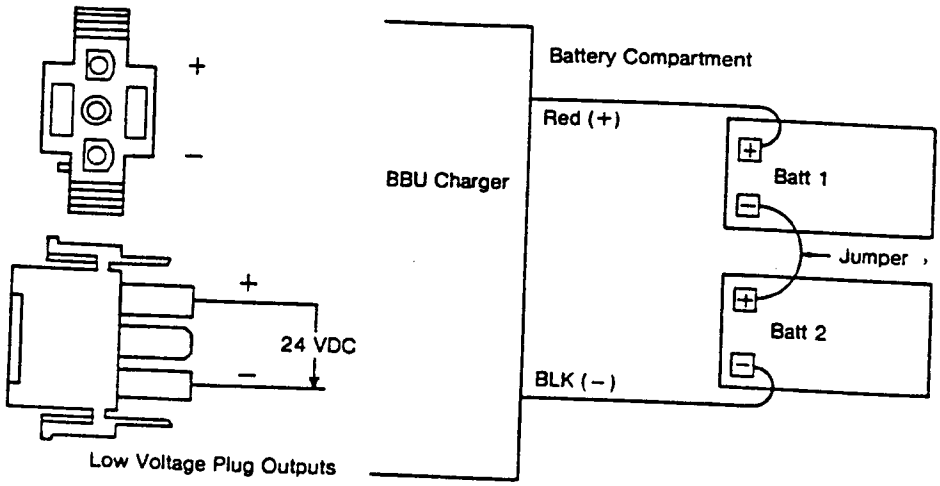
Figure 5.5

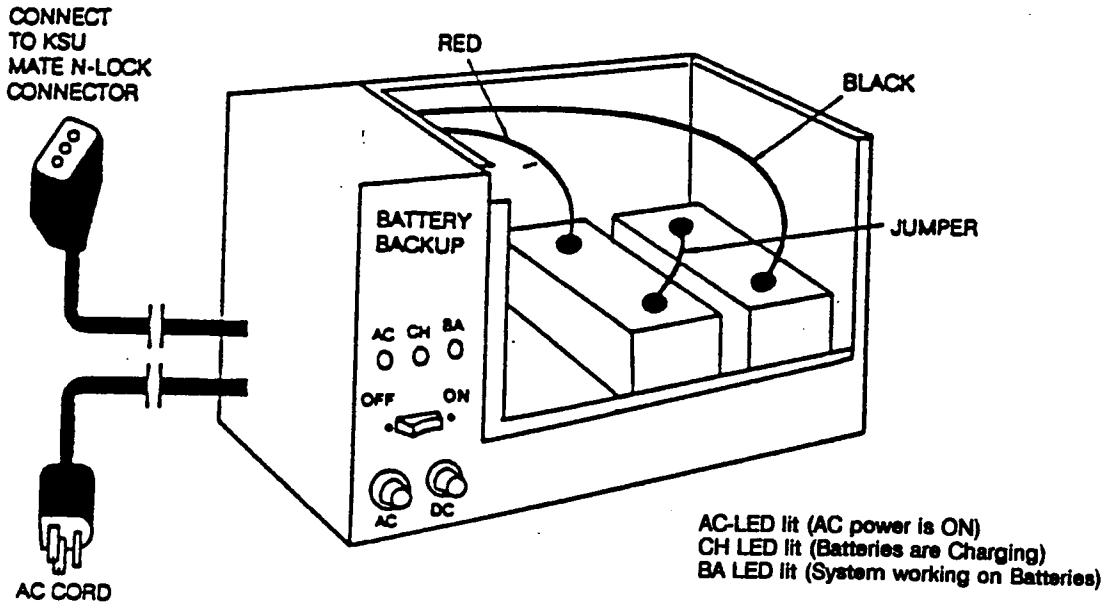


RS-232C PINOUT
Data Communication Requirements are :
- Serial Port Compatible
- ASCII Code Compatible
- 7 Data Bits and 1 Stop Bit
- No Parity

RS232C Connections

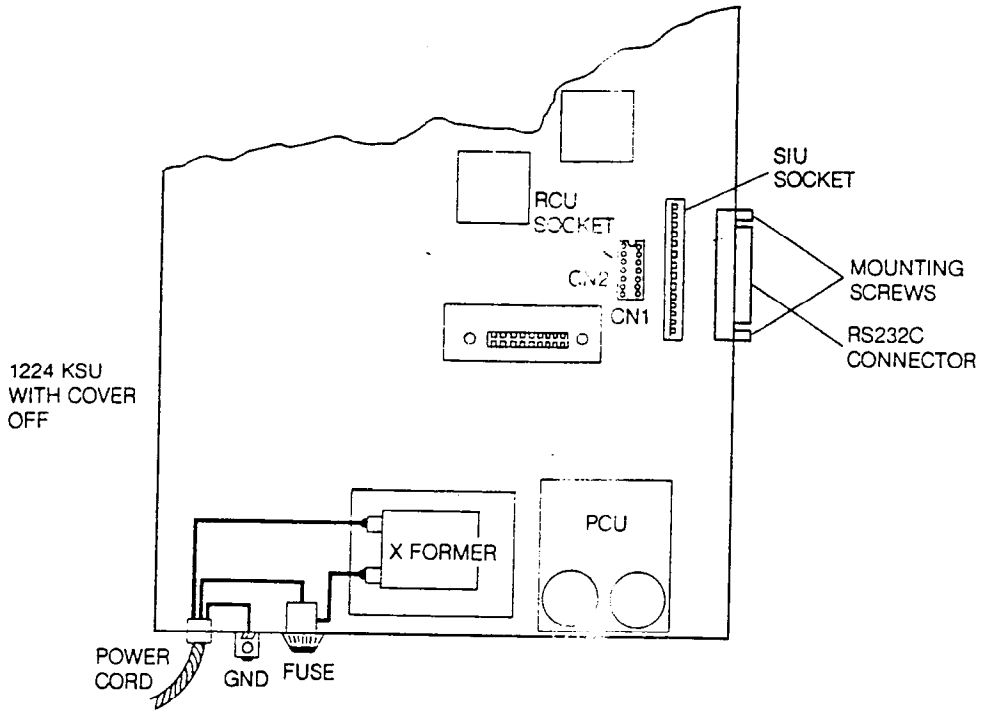
Figure 5.6

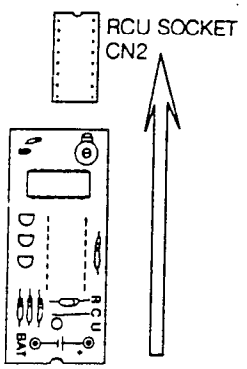


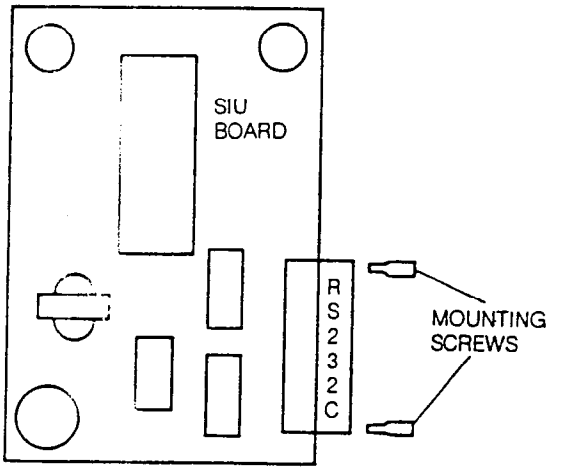


BBU Installation

Figure 5.7







RCU & SIU Installation

Figure 5.8

600 CUSTOMER DATA BASE PROGRAMMING

600.1 INTRODUCTION

The 1224 Key Telephone system can be programmed to meet each customer's individual needs. All programming is done at station 10 using the Enhanced or Executive model key telephone as the programming instrument.

A BASIC model telephone cannot be used.

It is strongly recommended that the Executive telephone be used to make programming easier.

When the program mode is entered, the key telephone being used no longer operates as a telephone but as a programming instrument with all of the buttons redefined. The keys of the dial pad are used to enter data fields (program codes) associated with system, station and CO line features. CO line buttons and station buttons are used to determine CO line access, assign class of service, determine station features, indicate stations, line group numbers, CO line configuration, system features, toll tables, etc.

At the time the system is installed it must be initialized to load default data into memory. See Table 6-1 for default data. If this pre-programming suits the customer, initialization is all that is needed.

Any time data is to be changed, the program mode must be entered and then the individual data field (program code). A data field can be entered to determine current programming or to change a specific feature within that field.

During programming, the other key telephones in the system operate normally. If a data field is entered but nothing is changed, or changed but not entered into memory (pressing HOLD), the previous data will remain intact upon leaving that data field. Data fields can be entered at random.

In many of the data fields, programming is sequential, i.e. upon completing the programming of one CO line or one station, the next line or station will automatically light up for programming. If no changes are to be made in the next line or station, simply exit the data field by either leaving the program mode (pressing the ON/OFF button to OFF) or entering another data field. This is done by pressing the asterisk (*) and entering that program code.

When programming features, tones are provided to help the programmer determine if a correct or incorrect entry has been made. A solid one second tone indicates the data was accepted. An interrupted tone means an error was made. When this occurs, re-enter the data field and try again. Until new data is entered and accepted, the system will continue to operate under default or previously entered values.

When the hold button is pressed to enter data, that data will be stored in a temporary buffer area. Data is not entered into system memory and has no effect on telephone operation until the program mode is exited. This is done by pressing the ON/OFF button to OFF. Then the data in the temporary buffer is copied into permanent memory. It is at this point that programming affects telephone operation. Until the programming mode has been exited, the system will operate under default or previously programmed data.

Some features must have more than one data field programmed for that feature to work. Where this is the case, it will be stated in the instructions.

600.2 CUSTOMER DATA WORKSHEETS

Before any attempt at programming is made, it is strongly recommended that customer data worksheets be prepared. These worksheets should become part of the permanent record of customer programming. Refer to the following sections when preparing the worksheets.

600.3 DATA BASE FIELDS

The data fields are used to set system timers, determine central office line features and key telephone features. Table 6-1 lists the default values, which are pre-programmed into the system, and the data fields (program codes). When entering CO line data and station data, be sure to enter the exact number of digits specified. The data fields and features are further described in the following paragraphs.

600.4 PROGRAM MODE ENTRY

Programming is always done at station port 01 using either the Enhanced or Executive key telephone. The Basic Telephone cannot be used for programming. Programming is always done at this station regardless of the class of service or intercom number assigned to this station or which station has been assigned as the attendant.

To enter the program mode, the programmer must first verify that the key telephone is properly connected to station port 01.

STEP 1

Press ON/OFF button to ON (button lights & intercom dial tone is heard).

STEP 2

On the dial pad, press the asterisk (*) twice.

STEP 3

On the dial pad, enter 5-6-2-3 (LOAD). Confirmation tone is heard. Dial tone is removed.

STEP 4

The HOLD button & the ON/OFF button will be lit.

The system is ready to program (other key telephones connected to the system continue to operate normally).

** Initialize here if necessary.

STEP 5

Press the asterisk (*) once.

STEP 6

Dial the 2 digit program code for the desired data field.

STEP 7

Enter customer data.

STEP 8

To load the entered data, press the HOLD button. A burst of one second confirmation tone should be heard. If an interrupted (error) tone is heard, re-enter the data starting with step 5.

STEP 9

Repeat from step 5 until all data has been stored.

To exit the program mode, press the ON/OFF button (light will extinguish). All new data now become effective and operational.

600.5 INITIALIZATION

The system has been pre-programmed with certain features which are called default data. These features are loaded into memory when the system is initialized. The system should be initialized when installed or at any time the data base has been corrupted.

To initialize the system to default values:

STEP 1

Enter the programming mode.

(Refer to steps 1-4, Sec. 600.4).

STEP 2

Press the asterisk (*) once.

STEP 3

On the dial pad, enter the numbers 4-6-4-8 (INIT).

STEP 4

Press the HOLD button.

Confirmation tone is heard.

Default data is now loaded.

To defatul only certain parts of the database, use the following program codes instead of the initialization code.

*41 will initialize toll tables only.

*21 will initialize system data only.

*10 will initialize CO line data only.

*00 will initialize station data only.

*30 will initialize flexible button programming only.

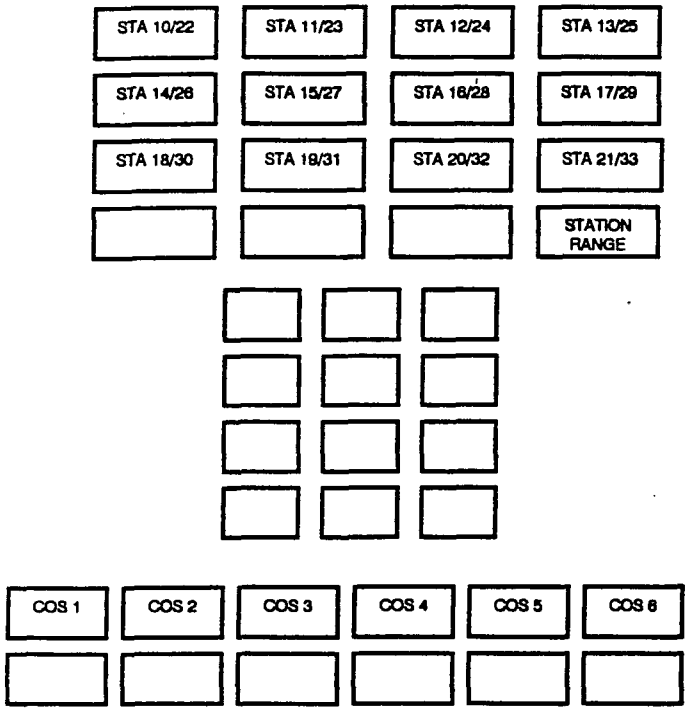
600.6 STATION CLASS OF SERVICE

PROGRAMMING STEPS

Make sure you have entered the programming mode (Sec. 600.4).

- If you wish to change the class of service of a station, dial an (*) asterisk & 01 on the dial pad.
- Press the button of the station to be assigned a class of service. If the station is 22-33, press STATION RANGE button first.
- Then press appropriate button for the class of service being assigned to that station - see below. Bydefault all stations are assigned Class of Service 1 (unrestricted).
- Press HOLD to enter data.

The next station button will light for programming.



DESCRIPTION

Each station must be assigned a class of service which determines the type of calls a station may make. There are 2 Toll Restriction tables labeled A and B in which you may enter long distance numbers to be allowed or denied (Refer to Section 600.31).

Class 1 = unrestricted

Class 2 = governed by Table A

Class 3 = governed by Table B

Class 4 = 7 digits maximum, no "0" or "1" can be dialed as the first digit

Class 5 = intercom & paging only

Class 6 = receive only/no dialing

When a CO line is marked PBX, COS restrictions apply to the station only if one of 4 codes are dialed first (see sec. 600.22).

Stations must be programmed to receive phone box/alarm signaling (see sec. 600.7) and must also be programmed with the corresponding station button of the phone box (sec 600.9).

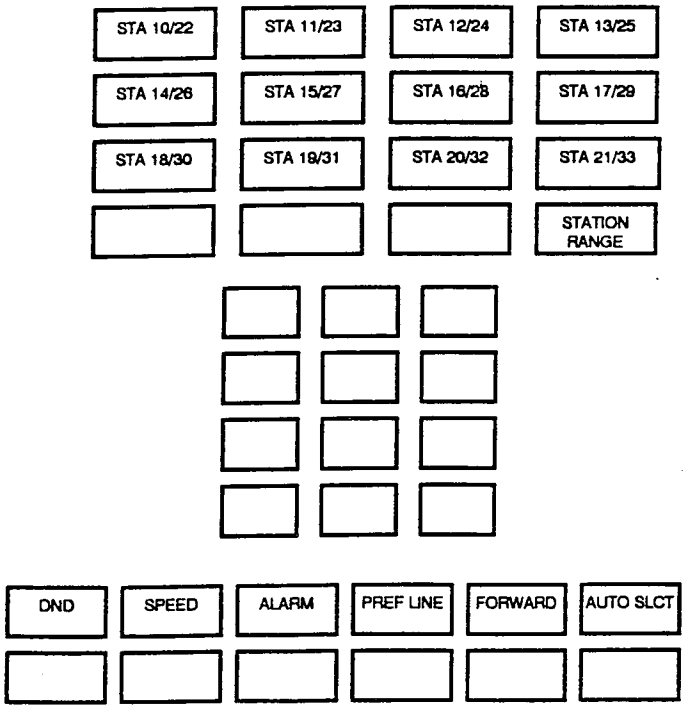
NOTE: When the STATION RANGE button is lit, the station indicated is in the upper range (22-33). For example, station button 16/28 is lit - if the STATION RANGE button is lit, station 28 is being programmed; if STATION RANGE button is not lit, station 16 is being programmed.

600.7 STATION PROGRAMMING

PROGRAMMING STEPS

If you are in the programming mode, continue using the program codes. If you are starting to program here, enter the program mode first (Sec. 600.4).

- If station features are to be changed, dial an asterisk (*) and 02 on the dial pad.
- Press the button of the station to be programmed. If stations 22-33 are being programmed, press STATION RANGE button first (LED will light).
- Then toggle on or off the following program buttons depending on what features that station is to be given.
- If the LED is lit, that feature is enabled; if not lit, that feature is denied to that station.
- Press HOLD to enter.



DESCRIPTION

Station features are described as follows:

Do Not Disturb (DND)

A yes entry (LED on) indicates this station is allowed the Do Not Disturb feature. The programmed Attendant cannot have DND. Allowed by default.

Speed Dial (System)

A yes entry (LED on) indicates this station is allowed access to system speed dial numbers. Default allows system speed. The last 20 numbers (bins 30-49) are not monitored by toll restriction. Refer to toll restriction tables, section 600.31, and programming system speed numbers, section 600.37.

Alarm/Door Signal

Stations can be designated to receive alarm signals through the telephone speaker. These stations will also receive alert tone from a phone box. Default gives no stations this feature (LED off). NOTE: A STATION BUTTON MUST BE ASSIGNED TO PHONES RECEIVING PHONE BOX RINGING (Section 600.9).

Refer also to section 600.19 to enable alarm signaling and to program alarm detection & signaling.

Preferred Line Answer

Stations can be given the ability to answer incoming outside line calls, transferred & recalling lines and line queues by simply going off-hook.

Disabled by default (LED off).

Call Forward (Station)

Stations can be allowed or denied the ability to have incoming, intercom and transferred outside lines forwarded to another station. This feature is allowed by default (LED on).

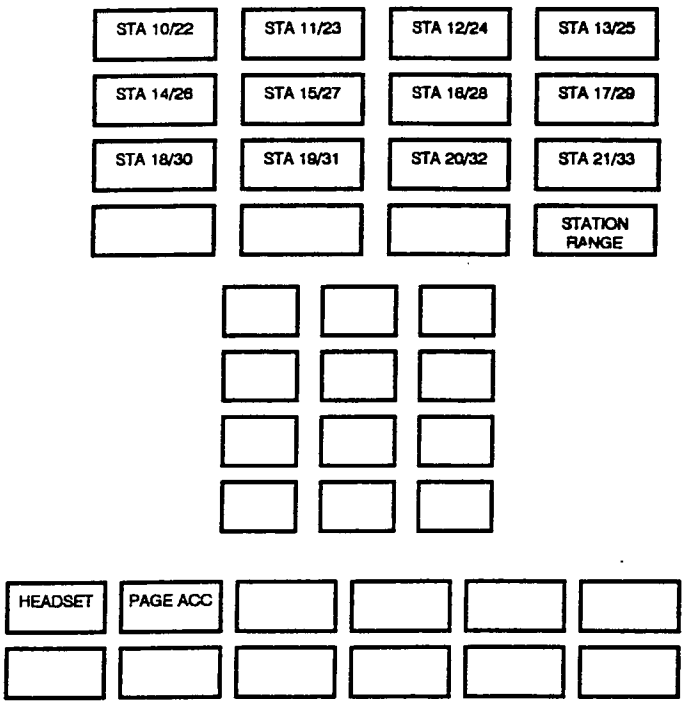
Auto Select

This feature allows a user to press an idle CO line button and have that line automatically seized and dial tone received through the speaker. The user can then dial manually or

PROGRAMMING STEPS

- To program further station features, dial an asterisk (*) and 03 on the dial pad.
- Press the button of the station to be programmed. If station 22-33 are being programmed, press STATION RANGE button first.
- Then toggle on or off the following program buttons depending on what features that station is to be given.
- Press HOLD to enter.

The next station button will light for programming.



DESCRIPTION

select a station or speed number. Refer to Section 600.9, flexible button programming.

Allowed by default (LED on).

Headset

This feature disables the speakerphone and must be enabled if the telephone is to be equipped with a headset.

Disabled by default (LED off).

Page Access

Stations can be denied the ability to make page announcements. If a station is to be denied paging access, do not use Class of Service 6 to accomplish this.

Allowed by default (LED on).

NOTE: If the STATION RANGE button is lit, it means that the station indicated is in the upper range (22-33). For example, station button 16/28 is lit - if the STATION RANGE button is lit, station 28 is being programmed; if STATION RANGE button is not lit, station 16 is being programmed.

600.8 FLEXIBLE STATION NUMBERS

PROGRAMMING STEPS

If you are in the programming mode, continue using the program codes. If you are starting to program here, enter the program mode first.

- If station intercom numbers are to be changed, dial an asterisk (*) and 04 on the dial pad.

If you have a display phone, you will see the following display:

FLEXIBLE STATION ASSIGN
PORT 01 = STA 10

- Press the button of the station whose intercom number is to be changed (LED will flash). If the station number is between 22 and 33, press STATION RANGE button first.
- Press the button of the station number it is to be changed to. You will hear confirmation tone and the LED will be lit solid.
- When all changes have been made, press HOLD button.

Display will now update.

FLEXIBLE STATION ASSIGN
PORT 01 = STA 16

DESCRIPTION

By default station 1 is assigned intercom number 10, station 2 is assigned intercom number 11, etc.

This feature allows one person to move from one station to another without changing phones and yet take all their individual station data including intercom number with them.

However, station port 01 always remains the programming port regardless of the intercom number assigned to it.

The system does not allow duplicate or unassigned numbers. If this happens, error tone will be heard when entering the data.

For example, if a station with an intercom number of 16 is moved to where station intercom number 10 was; then station intercom number 10 must be moved somewhere. 10 could be moved to where 23 was and 23 moved to where 16 was. This way all circuits have a unique intercom number.

NOTE: The entire system must be idle before changes made in station numbers will take effect.

600.9 FLEXIBLE BUTTONS

PROGRAMMING STEPS

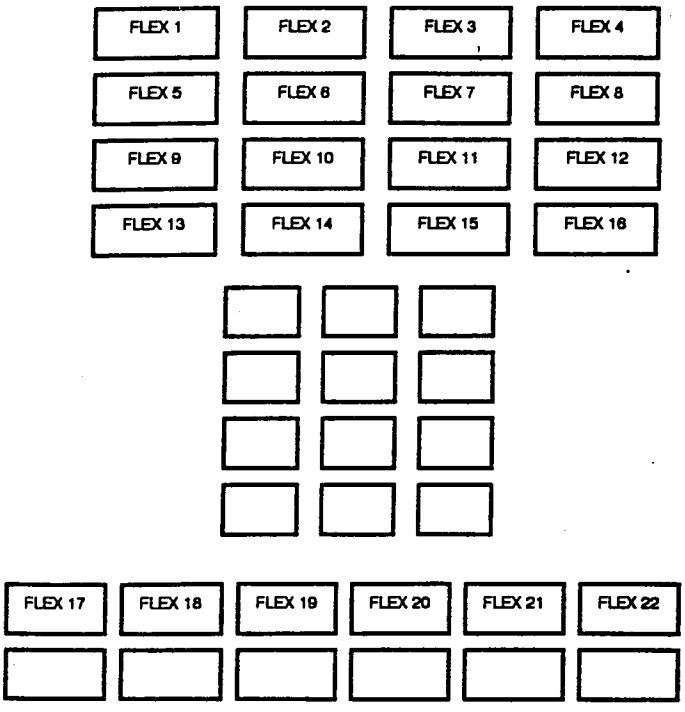
If you are in the programming mode, continue using program codes. If you are starting to program here, enter the program mode first.

- To program your flexible buttons, dial an asterisk (*) and 05 on the dial pad.

If you have a display phone, you will see the following display:

FLEX BUTTON ASSIGN ENTER STA #, PRESS HOLD

- Dial the 2 digit station number (10-33).
- Press any button which you want to change. See the following program buttons:



DESCRIPTION

Each flexible button may be given a general assignment such as multi function button, station button, CO line button, loop key or pool key.

Multi function buttons are programmed by each individual user to be a DSS (station) button, speed dial button, page button or mute button.

When programming a button as a CO line button, the line number must also be specified. When programming a pool button, the line group number must also be entered.

By default, flexible buttons are assigned as follows:

BASIC Telephone

- Buttons 1-5 = CO lines 1-5
- Button 6 = loop button

ENHANCED/EXECUTIVE Telephone

- Buttons 1-14 = stations 10-24
- Buttons 15-16 = CO lines 7-8
- Buttons 17-22 = CO lines 1-6

NOTE: You cannot program the buttons of a keyset that is in use. When attempting to program a keyset in use, all LED's will light to indicate no programming will be accepted.

NOTE: A multi function button can be programmed in the system data base as a station button. After entering a "1", enter the station number desired, and press HOLD. The station user can erase this programming.

When programming a button as a CO line button, refer to CO line ringing (Sec. 600.15). By default station 10 will ring on a line. However, if station 10 is not given button access to a line, another station must be programmed to ring on that line.

4 X = POOLED GROUP # A

PROGRAMMING STEPS

You will see a display like the following:

```
FLEX BUTTON ASSIGN
STA 10 FELX 01 = DSS 10
```

- Dial the desired code to assign button function.
  - 1 = multi (user programmable)*
  - 2XX = CO line (XX is a 2 digit line number)
  - 3 = loop
  - 4X = pooled group (X is a 1 digit line group number)
- Press HOLD button. Confirmation tone is heard.

The next sequential button will light for programming or press the next button to be programmed. Display will now update such as in the following examples:

```
FLEX BUTTON ASSIGN
STA 10 FLEX 01 = CO 4
```

Continue programming buttons until the station is completed, then go back, redial the program code,

```
FLEX BUTTON ASSIGN
STA 10 FLEX 09 = DSS 22
```

and dial the next station number to program that station's buttons.

NOTE: To program the flexible buttons on a Basic Telephone, refer to section 600.12.

DESCRIPTION

When programming a button as a pooled group button, refer to CO line group programming. Pooled group numbers match CO line group numbers.

All stations should be given a loop button so they can receive a transferred call on a line for which they have no button access.

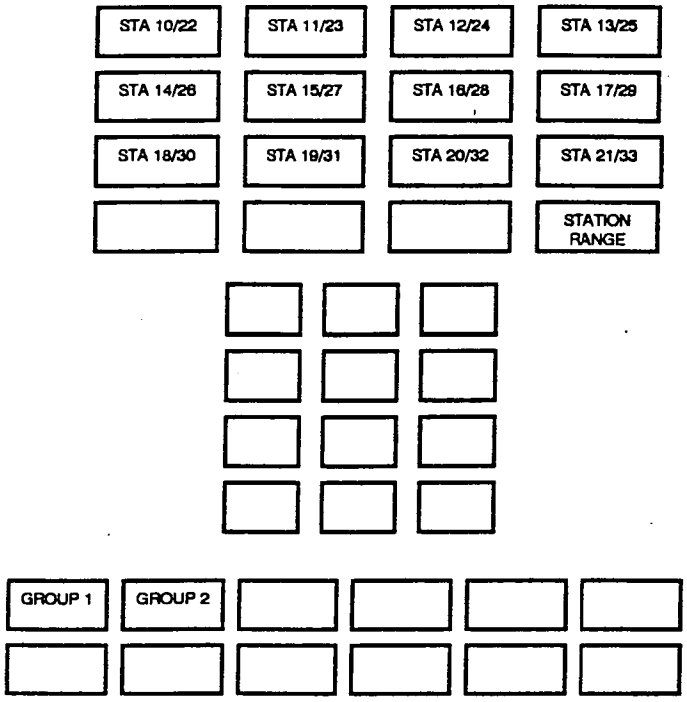
A DSS button MUST be assigned to stations receiving phone box ringing.

600.10 PAGE GROUPS

PROGRAMMING STEPS

If you are in the programming mode, continue using the program codes. If you are starting programming here, enter the program mode first.

- If page groups are to be changed, dial an asterisk (*) and 06 on the dial pad.
- Press the station button of the station to be changed. Press STATION RANGE button first for station 22-33 (LED will light).
- Toggle on or off the program button for the desired page group. See below.
  - LED lit = enabled
  - LED unlit = disabled
- Press HOLD to enter.



DESCRIPTION

Each station can be assigned to page groups for the purpose of receiving page announcements.

There are 2 page groups. Stations can be assigned to either one or both of the groups or not be assigned to a group at all and thereby receive no pages.

Stations not assigned to a page group can still make page announcements if allowed in station programming (Sec. 600.7). Stations can be assigned to a page group but not allowed to make pages (see Station programming, Sec. 600.7).

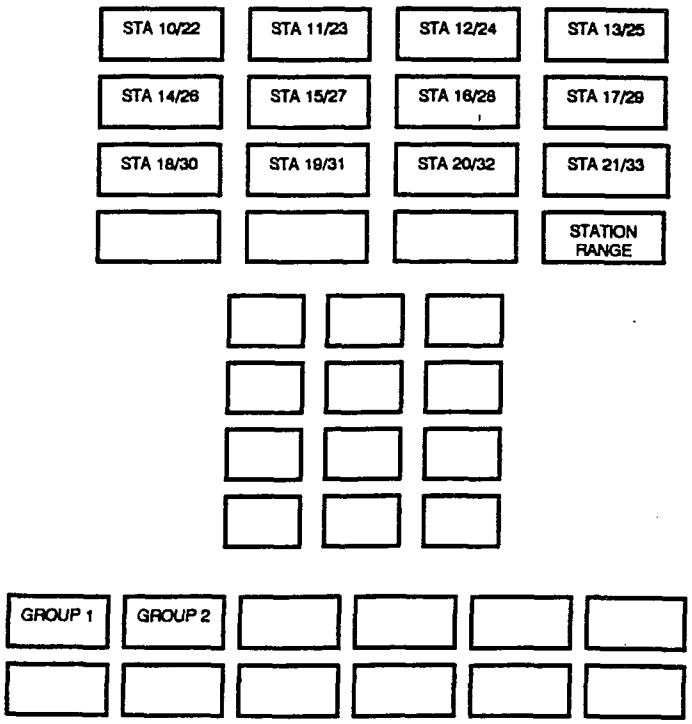
NOTE: If the STATION RANGE button is lit, it means that the station indicated is in the upper range (22-33). For example, station button 16/28 is lit - if the STATION RANGE button is lit, station 28 is being programmed; if STATION RANGE button is not lit, station 16 is being programmed.

600.11 PICKUP GROUPS

PROGRAMMING STEPS

If you are in the programming mode, continue using the program codes. If you are starting programming here, enter the program mode first.

- If pickup groups are to be changed, dial an asterisk (*) and 07 on the dial pad.
- Press the station button of the station to be changed. Press STATION RANGE button first for stations 22-33.
- Toggle on or off the program button for the desired pickup group. See below.
  - LED lit = enabled
  - LED unlit = disabled
- Press HOLD to enter.



DESCRIPTION

Each station can be assigned to pickup groups in order to pick up tone ringing calls at another station in the same group. Incoming CO line calls are excluded.

There are 2 pickup groups. Stations can be assigned to either one or both of the groups or not be assigned to a group at all and be unable to pickup calls ringing at other stations or have calls picked up from their station.

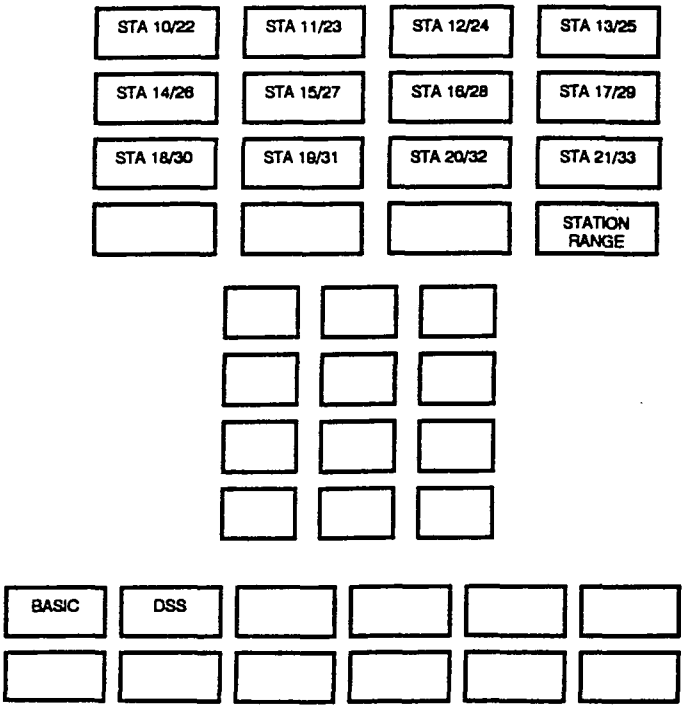
By default all stations are assigned to group 1.

600.12 PROGRAMMING BASIC TELEPHONES

PROGRAMMING STEPS

If you are in the programming mode, continue using the program codes. If you are starting to program here, enter the program mode first.

- Dial an asterisk (*) and 08 on the dial pad.
- Press the station button of the station being assigned a Basic telephone.
- Press the program button indicated below.
- Press HOLD to enter.
- To assign DSS/BLF press station button of station port the DSS console is wired on.
- Press program button indicated below.
- Press station button of the phone the DSS will operate with.
- Press HOLD.



DESCRIPTION

If a Basic telephone is to operate properly, it is necessary to program which stations have this telephone.

The following are the flexible buttons on a Basic Telephone; refer to section 600.9 for programming flexible buttons. Refer to flexible button programming to determine the function of these buttons.

All station ports will be assigned as key telephones upon system initialization. The DSS/BLF provides direct access and visual indication of all station on the 1224. See Figure XX for button mapping.

A DSS/BLF can be assigned to any port and designated to work with any key telephone on the 1224 system.

To remove a DSS/BLF assignment, press the station button of the port programmed as the DSS, then press button 2. Then press the button of the DSS port again and press HOLD. The display will now show N/A.

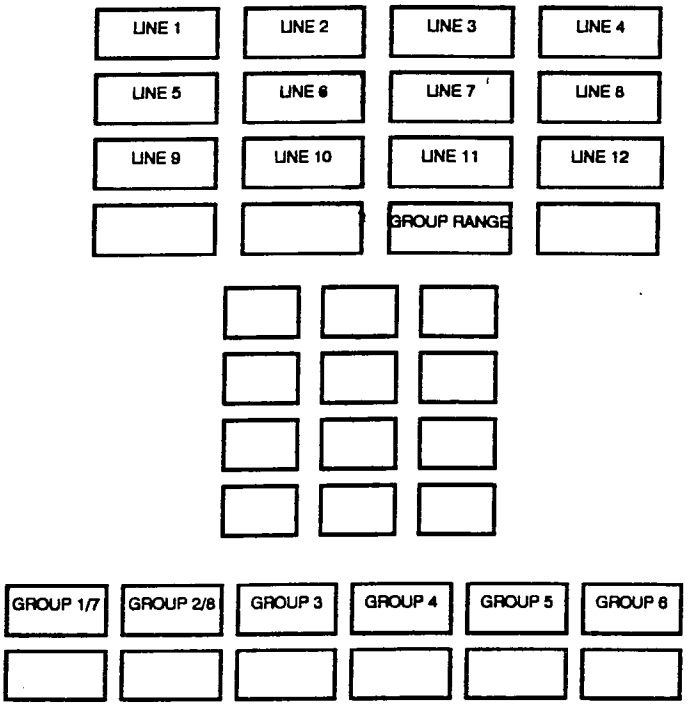
600.13 CO LINE GROUPS

PROGRAMMING STEPS

If you are in the programming mode, continue using the program codes. If you are starting to program here, enter the program mode first.

- To assign CO line groups, dial an asterisk (*) and 11 on the dial pad.
- Press the CO line as indicated in the program buttons below. For CO line groups 7 and 8, press GROUP RANGE button first.
- Then press the button for the CO line group into which that CO line is to be placed.
- Press HOLD to enter.

Continue programming CO lines until they have all been placed in a group.



DESCRIPTION

Eight line groups are available for CO line assignment. Groups should be assigned according to type (local, FX, WATS, etc.).

All lines are placed in line group 1 by default.

Line grouping affects queuing; if you queue on a line, any line in that same group may be made available to you.

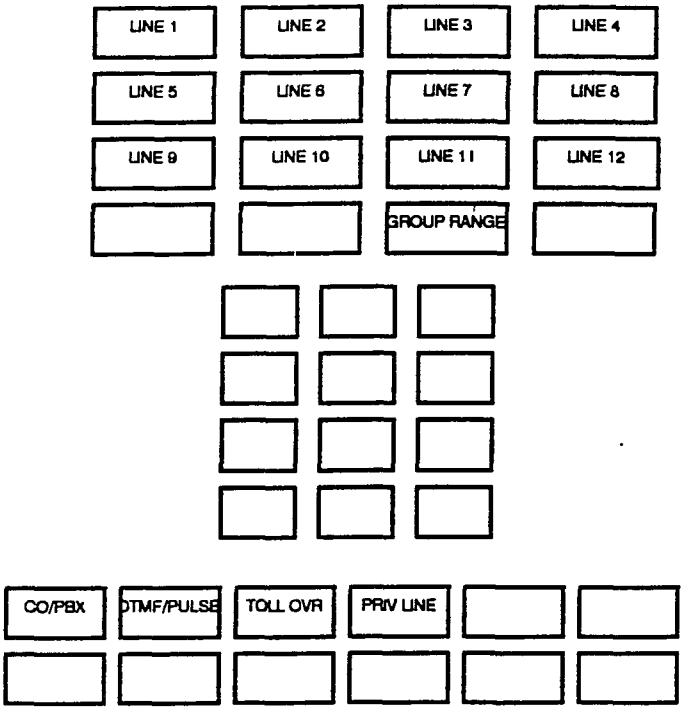
Line groups are used primarily for flexible buttons assigned as pooled group buttons (Section 600.9).

600.14 CO LINE DATA

PROGRAMMING STEPS

If you are in the programming mode, continue using program codes. If you are starting to program here, enter the program mode first.

- If any CO line features are to be changed, dial an asterisk (*) and 12 on the dial pad.
- Press the CO line button of the line to be programmed.
- Toggle the program buttons on or off so the LED's light up or extinguish.
- Press HOLD to enter data.



DESCRIPTION

Line Type (CO/PBX)

Each individual outside line can be programmed to be either a CO line or a PBX line. By default all are CO lines (LED on).

When programming line type, refer also to CO line group programming (sec. 600.13); flexible button programming (sec 600.9), CO line ringing (sec. 600.15), flash timer (sec. 600.16), and recall timers (sec. 600.20). When marked PBX a one or two digit dial code may be entered after which toll restriction is applied. Sec. 6.23.

Signaling (DTMF/Pulse)

Each individual line can also be programmed as either DTMF (tone) or dial pulse. By default all are set for DTMF (LED on).

When a line is assigned as dial pulse, you can program the break/make ratio and dial speed (sec. 600.18). Refer also to the ring detect timer (sec. 600.17).

Toll Override

An outside line may be marked for Toll Override which allows even restricted stations to dial on this line. By default no lines are marked for toll override (LED off).

This feature allows you to give a station a restrictive COS and also give them a line they can make long distance calls over. This feature also affects system speed dial by allowing certain speed numbers to be programmed on a specific line.

Private Line

A line can be marked as a private line. A private line cannot be picked up with Universal Night Answer and will not preset call forward.

The same station can have other CO (outside) lines that are not marked private which can be programmed to preset forward.

A private line is created by programming flexible button assignments so that the private line appears at one station only. To restrict

other stations from accessing the private line, consideration must also be given to Pool button & CO line group assignments. Assign the private line to a separate CO line Group. See flexible button programming (sec. 600.9).

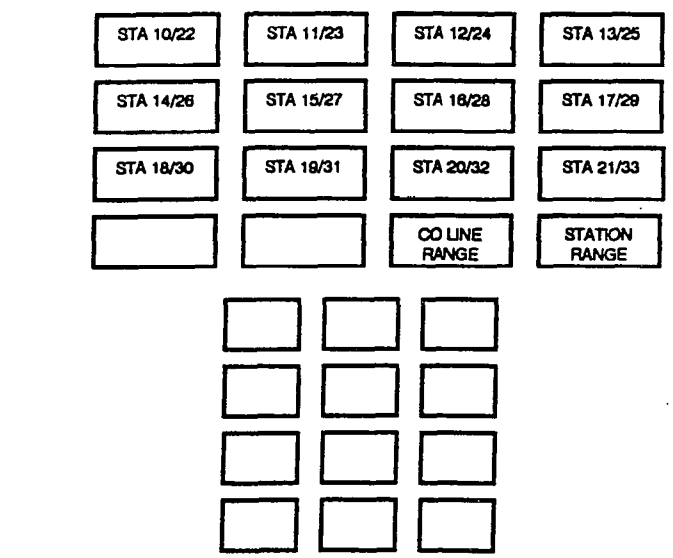
By default no lines are marked as private lines (LED off).

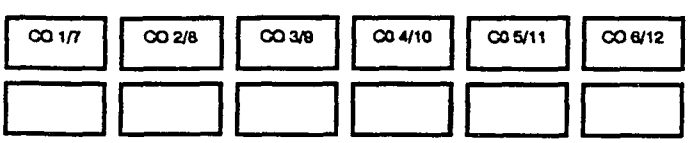
600.15 CO LINE RINGING

PROGRAMMING STEPS

If you are in the programming mode, continue using the program codes. If you are starting to program here, enter the program mode first.

- Dial an asterisk (*) and 13 on the dial pad for day ringing stations (14 for night ringing stations).
- Press outside line that is to be programmed.
- Then press station buttons for stations that are to ring on that line (each button will light).
- When all stations have been entered, press HOLD to enter data.





DESCRIPTION

Telephones can be assigned to receive incoming outside line ringing during the day and/or during the night.

Telephones that ring during the day do not automatically ring at night. They require night ringing programming.

Any number of phones can be assigned to ring during the day and/or during the night.

By default, all lines ring at station 10 in both day & night mode.

Program Code 14 operates the same as Program Code 13 and is used to assign night ringing stations.

To display which stations have been programmed, press STATION RANGE button 2 times to scroll through all stations.

At least one station should be programmed to ring on a line. See Flexible Button Programming, Sec. 600.9. Make sure that any station programmed for Loud Bell Control is assigned ringing for that line.

NOTE: If the STATION RANGE button is lit, it means that the station indicated is in the upper range (22-33). For example, station button 16/28 is lit - if the STATION RANGE button is lit, station 28 is being programmed; if STATION RANGE button is not lit, station 16 is being programmed. The same is true for CO LINE RANGE.

600.16 FLASH TIMER

PROGRAMMING STEPS

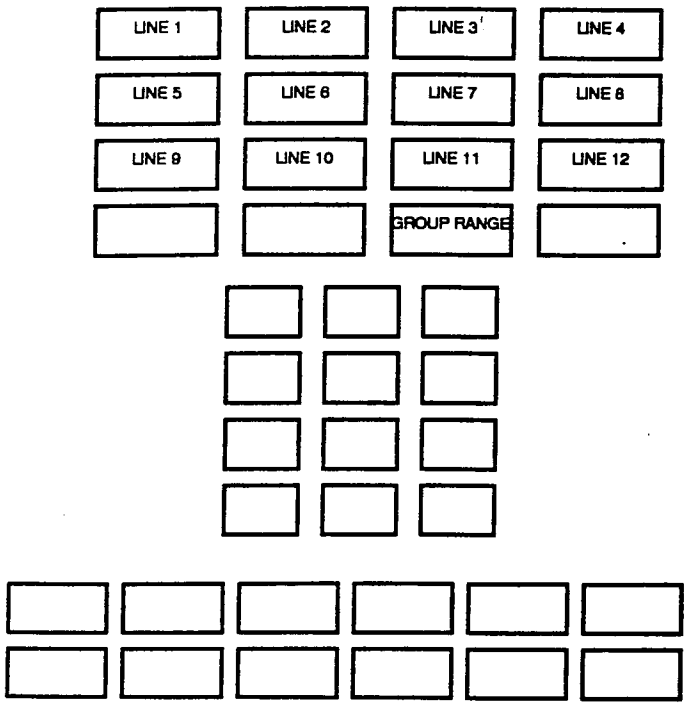
If you are in the programming mode, continue using the program codes. If you are starting to program here, enter the program mode first.

- If the flash timer is to be changed, dial an asterisk (*) and 15 on the dial pad.

If you have a display phone, you will see:

FLASH TIMER
2.0 SECONDS

- Press the CO line which is to be programmed (see following program buttons).
- Enter the 2 digit timer value on the dial pad (01-99) which corresponds to 0.1 to 9.9 seconds.
- Press HOLD to enter the data.



DESCRIPTION

Flash is a programmable opening on a line for signaling. When using an outside line, flash allows a user to obtain new dial tone without losing the line. This is particularly useful behind a PBX. (See Sec. 600.14, Line Type).

Default value for all lines is 2.0 seconds.

Each CO line is individually programmed for a flash time. The flash timer is programmed on a per line basis.

600.17 CO RING DETECT

PROGRAMMING STEPS

If you are in the programming mode, continue using the program codes. If you are starting to program here, enter the program mode first.

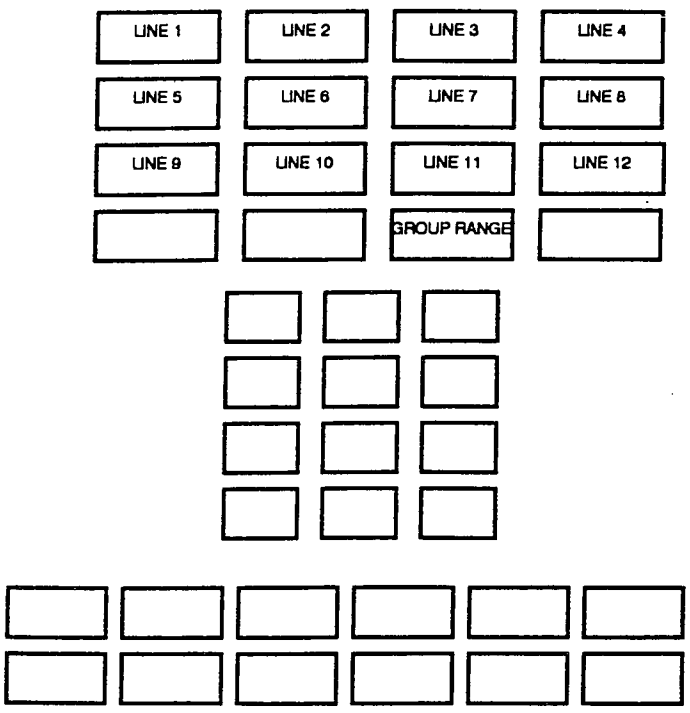
- If CO Ring Detect timing is to be changed, dial an asterisk (*) and 16 on the dial pad.

If you have a display phone, you will see:

CO RING DETECT
CO 01 = 300 MSEC

- Press CO line button for which timer will work.
- Enter 1 digit timer value (2-9).
  - 2 = 200 msec, etc.
- Press HOLD to enter data.

Continue entering timer values for CO lines which require them.



DESCRIPTION

The duration of the ringing signal from the CO or PBX is matched with ringing detection circuitry in the KSU. The ring detect can range from 200 - 900 milliseconds divided into 100 msec. increments.

When programming CO ring detect, refer to CO line signaling (Sec. 600.14) and CO line ringing programming (Sec. 600.15).

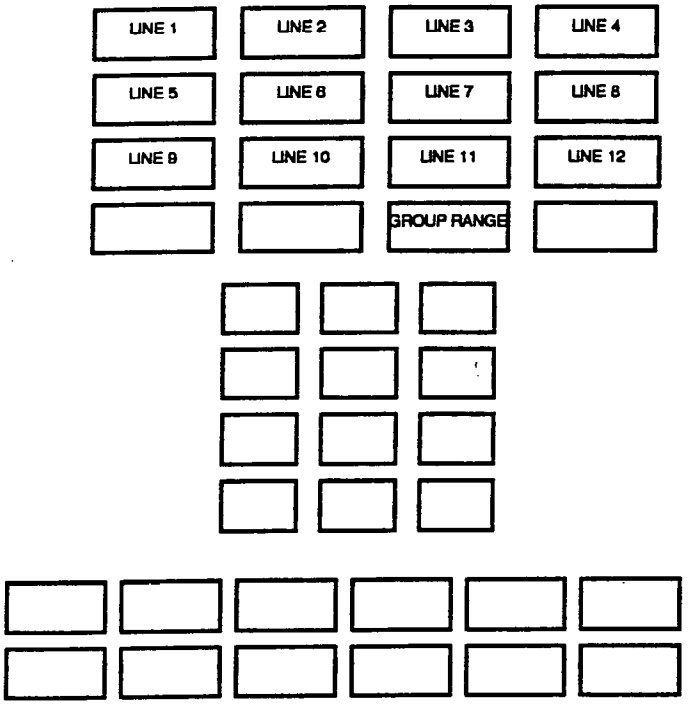
Default value for each line is 300 msec. Ring detect time is programmed on a per CO line basis.

600.18 DIAL PULSE

PROGRAMMING STEPS

- If pulses per second (pps) and break/make ratios need to be changed, press the (*) & dial 17 on the dial pad.
- Press CO line button for line which is to be assigned dial pulse. Then press the appropriate program button.
- Press HOLD to enter data.

The next outside line button will light for programming.



DESCRIPTION

Each CO (outside) line can send dial pulse signals to the receiving central office. The break/make ratio and pulses per second are programmable.

Default is 10 pps and 60/40 break/make ratio.

This program code is only used when an outside (CO) line has been programmed for dial pulse (Sec. 600.14).

Default assigns all CO lines as DTMF.

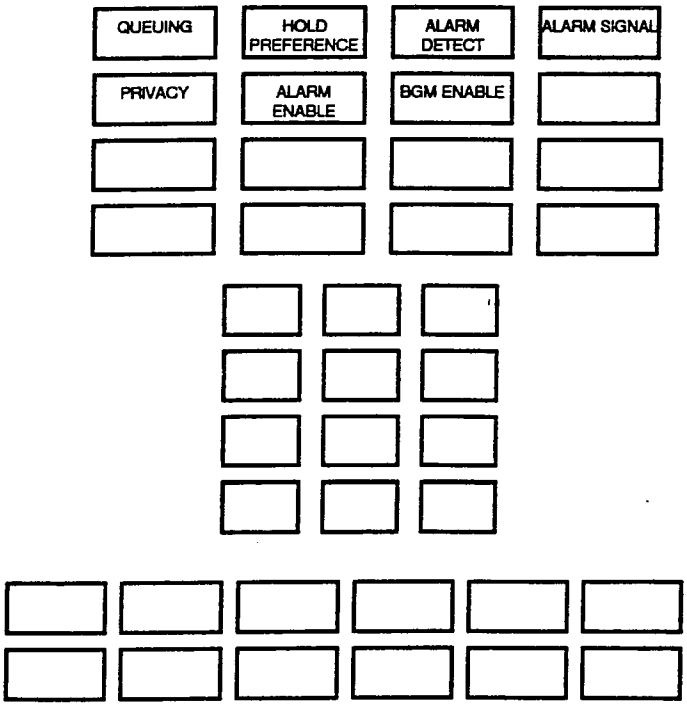
When used in Canada, DOC regulations do NOT allow dial pulse signaling speed to exceed 11 pps with a minimum of 33 msec. make interval and 54-68 msec. break interval. These requirements are met when the system database is initialized.

600.19 SYSTEM DATA

PROGRAMMING STEPS

If you are in the programming mode, continue using the program codes. If you are starting to program here, enter the program mode first.

- To change any system data, dial an asterisk (*) and 21 on the dial pad.
- Toggle the program buttons on or off so the LED's light or extinguish for desired features.
  - LED on = enabled
  - LED off = disabled
- Press HOLD to enter data.



DESCRIPTION

Line Queuing

If this button is lit, CO line queuing is allowed on a system basis. Stations queuing a line are recalled according to the line group requested. By default queuing is allowed (LED on).

Refer to CO line group programming since queuing follows line groups, not individual lines. See Sec. 600.13. Also, refer to flexible button programming for access to individual lines or groups of lines. See Sec. 600.9.

Hold Preference

The system can be programmed to have either exclusive hold or system hold preferred. If exclusive hold is preferred, the HOLD button is pressed once for exclusive hold and twice for system hold when placing a call on hold. For system hold this is reversed.

Refer to system timer programming for recall times for both system and exclusive hold.

Transfer and conference calls are always placed on exclusive hold. Default is system hold (LED on).

Alarm Detection

This feature determines the type of alarm signal received form an external source. If the LED is lit, it means the system will detect a closed loop, unlit means the system will detect an open loop. Default is closed loop (LED on).

Refer to station programming, alarm receive to determine who will receive alarm signals. Also refer to signaling and alarm enable in this section.

Alarm Signaling

This feature determines the type of signaling received by the stations. If the LED is lit, it means a repeated tone will be given; LED unlit means a single tone will be given. Default is repeated tone (LED on).

Automatic Privacy

A yes entry (LED lit) means that privacy is automatically provided on all communications in the system. To eliminate privacy, toggle the button so the LED extinguishes. Privacy is enabled by default (LED on).

If privacy is eliminated, only one other station may join in on an existing conversation.

Alarm Enable

A yes entry (LED lit) means the system is programmed for alarm. Stations must then be programmed to receive the alarm signal (see Sec. 600.18). You must also choose alarm signaling and alarm detection. This feature is disabled by default (LED off).

Background Music (BGM)

This feature must be enabled if background music is supplied to the system. Background music is disabled by default (LED off).

Refer to Sec. 500.10.

600.20 TIMERS

PROGRAMMING STEPS

If you are in the program mode, continue using the program codes. If you are starting to program here, enter the program mode first.

DESCRIPTION

Exclusive Hold Recall

- To change this timer, dial an (*) asterisk and 22 on the dial pad.

If you have a display phone, you will see the following:

EXCLUSIVE HOLD RECALL
060 SECONDS

- Dial 3 digit number between 000 and 255 (seconds). An entry to 000 will disable the timer.
- Press HOLD to enter data.

Display will now update.

This reflects the time before an outside line placed on exclusive hold will recall the initiating station. If the call is unanswered for an additional equal amount of time, it will recall the attendant and if unanswered by the attendant will recall all phones in the system.

Default is 060 seconds.

System Hold Recall

- To change this timer, dial an (*) and 23 on the dial pad.

If you have a display phone, you will see:

SYSTEM HOLD RECALL
060 SECONDS

- Dial 3 digits between 000 and 255 (seconds). 000 will disable the timer.
- Press HOLD to enter.

Display will now update.

This timer reflects the amount of time before an outside line placed on system hold will recall the initiating station. If the call is unanswered for an additional equal amount of time, it will recall the attendant and if unanswered by the attendant will recall all phones in the system.

Default is 060 seconds.

PROGRAMMING STEPS	DESCRIPTION
Transfer Recall • To change this timer, dial an (*) asterisk and 24 on the dial pad. If you have a display phone, you will see the following: TRANSFER HOLD RECALL 030 SECONDS • Dial 3 digit number between 000 and 255 (seconds). 000 will disable the timer. • Press HOLD to enter data. Display will now update.	This timer reflects the amount of time before an unanswered transfer is recalled to the station that initiated it. If the call is still unanswered for an additional equal amount of time, it will recall the attendant and if unanswered by the attendant will recall all phones in the system. Default is 030 seconds.
Message Wait Reminder Tone • To change this timer, dial an (*) asterisk and 25 on the dial pad. If you have a display phone, you will see the following: MSG Reminder Tone Timer 00 MINUTES • Dial a 2 digit entry between 00 and 99 (minutes). 00 disables the timer. • Press HOLD to enter. Display will now update.	A station with a message waiting can be reminded at a timed interval with a tone. The tone will continue until all messages have been answered. The interval can be programmed between 00 and 99 minutes. By default the timer is disabled.

PROGRAMMING STEPS	DESCRIPTION
Pause Timer • To change this timer, dial an (*) asterisk and 26 on the dial pad. If you have a display phone, you will see the following: PAUSE TIMER 2 SECONDS • Dial a 1 digit entry between 1 and 9 (seconds). • Press HOLD to enter data. Display will now update.	When dialing a speed number, a timed pause in digit sending can be inserted into the number. The length of the pause is controlled by the pause timer and can be from 1 to 9 seconds. The length of the pause is important in both system and station speed dial numbers. Default is 2 seconds.

600.21 EXECUTIVE/SECRETARY ASSIGNMENTS

PROGRAMMING STEPS

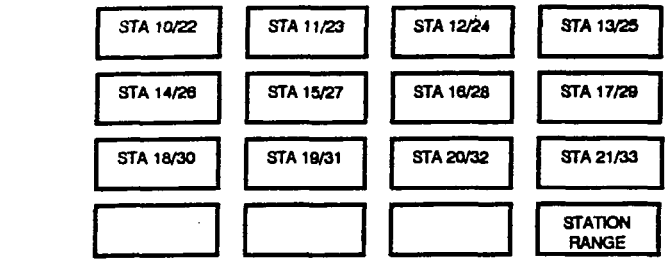
If you are in the programming mode, continue using the program codes. If you are starting to program here, enter the program mode first.

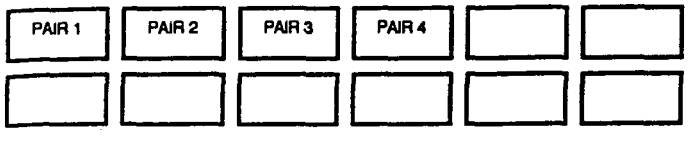
- To program executive/secretary assignments, dial an asterisk (*) and 27 on the dial pad.

If you have a display phone, you will see:

```
EXECUTIVE/SECRETARY
/ / / /
```

- Press button for desired executive/secretary pair assignment.
- Press the station button to select the desired executive station (LED lights steady).*
- Press the station button to select the desired secretary station (LED flashes).*





- Press HOLD to enter.

DESCRIPTION

There are 4 sets of Executive/Secretary pairs available for assignment. When the Executive is busy or in DND, intercom calls and transferred calls will be automatically routed to the secretary.

One executive can go to 4 secretaries, 1 secretary can answer for 4 executive or 1 executive can be assigned 1 secretary, etc.

*NOTE: If either station is number 22-33, press STATION RANGE button first.

By default there are no pairs assigned.

600.22 LOUD BELL/A-LEAD

PROGRAMMING STEPS

If you are in the programming mode, continue using the program codes. If you are starting to program here, enter the program mode first.

- Dial an asterisk (*) and 28 on the dial pad.

If you have a display phone, you will see:

CONTROL CONTACT 1 LBC: STA XX

CONTROL CONTACT 1 A-LEAD: CO XX

- Press the button of the contact to be programmed.
- Press the LBC or A-Lead button to indicate which is being programmed.
- Then press station (LBC), or CO line (A-Lead) button to be assigned. If the station being assigned is in the 22-33 number range, press STATION RANGE button first.
- Press HOLD to enter.

DESCRIPTION

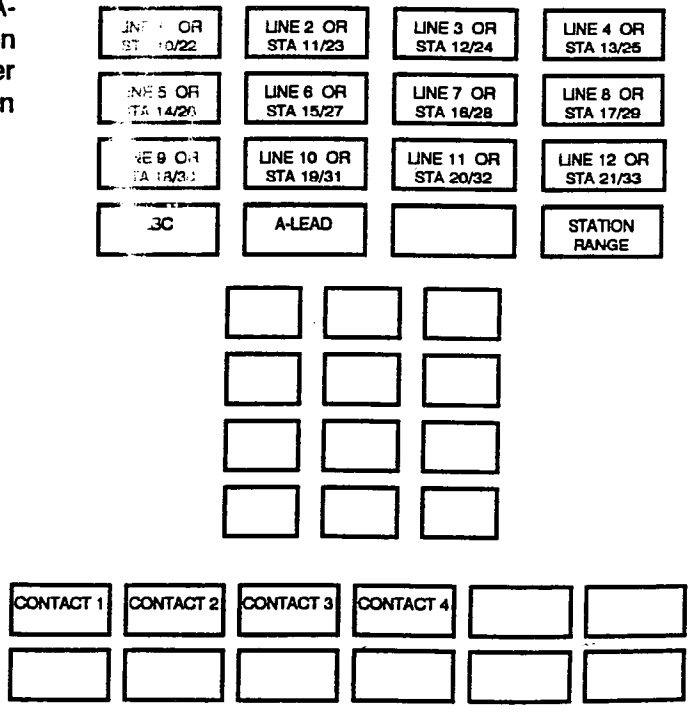
Four contacts are available to be assigned either as loud bell control or as A-Lead indication.

A Loud Bell contact can be assigned to any stations and will follow the ringing assignments of the assigned station including tone ringing intercom, recalling and transferred CO lines.

A A-Lead contact can be assigned to any CO li

Remember to assign ringing to any station programmed for Loud Bell Control, Sec. 60 5. Also a station programmed for A-Lead inc tion, must be given that CO line appea nce, Sec. 600.9.

To re ove an LBC or A-Lead assignment, toggle the station or CO line and press HOLD.



600.23 PBX DIALING CODES

PROGRAMMING STEPS

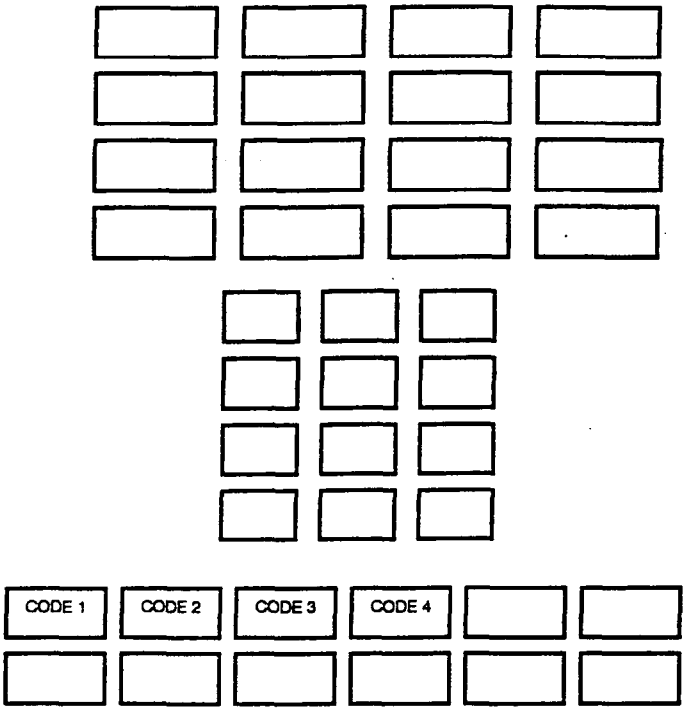
If you are in the programming mode, continue using the program codes. If you are starting to program here, enter the program mode first.

- To enter PBX Dialing codes, dial an asterisk (*) and 31 on the dial pad.

If you have a display phone, you will see:

PBX CODES: #1,#2,#3,4
XX XX XX XX

- Press the program button to assign the first code.
- Enter the 1 or 2 digit number on the dial pad.
- Press HOLD to enter data.



DESCRIPTION

Four 1 or 2 digit PBX access codes can be entered into system memory. When dialed they signal the system that an access code is being dialed and that toll restriction is to be applied at the next dialed digit.

Otherwise toll restriction does not apply.

This allows dialing of PBX extensions 100, 110, 111, etc.

Lines must be programmed as PBX lines (Sec. 600.14) before these codes will apply.

A one digit code may be used.

By default, no codes have been assigned.

600.24 ATTENDANT POSITION

PROGRAMMING STEPS

If you are in the programming mode, continue using the program codes. If you are starting to program here, enter the program mode first.

- If you wish to change the attendant position, dial an asterisk (*) and 32 on the dial pad.
- Press the station button of the station to be assigned as the system attendant. If the station is between 22 and 33, press the STATION RANGE button first.
- Press HOLD to enter data.

DESCRIPTION

One station must be assigned as the attendant for CO line recalls and placing the system into night service by pressing the DND button. Therefore attendant position does not have the Do Not Disturb feature.

System speed numbers are entered at the attendant station. The attendant can override stations in DND with the Camp On feature.

Refer to Do Not Disturb programming (Sec. 600.7), recall timers (Sec. 600.20), and line ring assignments (Sec. 600.15).

By default, station 10 is assigned as the attendant position.

600.25 PRESET FORWARD RING TIMER

PROGRAMMING STEPS

If you are in the programming mode, continue using the program codes. If you are starting to program here, enter the program mode first.

- If you wish to set this timer, dial an asterisk (*) and 33 on the dial pad.

If you have a display phone, you will see the following display:

PRESET FWD RING TIMER
30 SECONDS

- Dial a 2 digit number between 01 and 99.
- Press HOLD to enter data.

DESCRIPTION

This timer determines the amount of time a call will ring into a station before automatically forwarding to the predetermined station.

Default sets the timer at 30 seconds.

Refer to preset forward station programming (Sec. 600.26).

An entry of 00 will disable the timer. If the timer is disabled, the preset forward will NOT work. The call will not forward.

600.26 PRESET CALL FORWARD

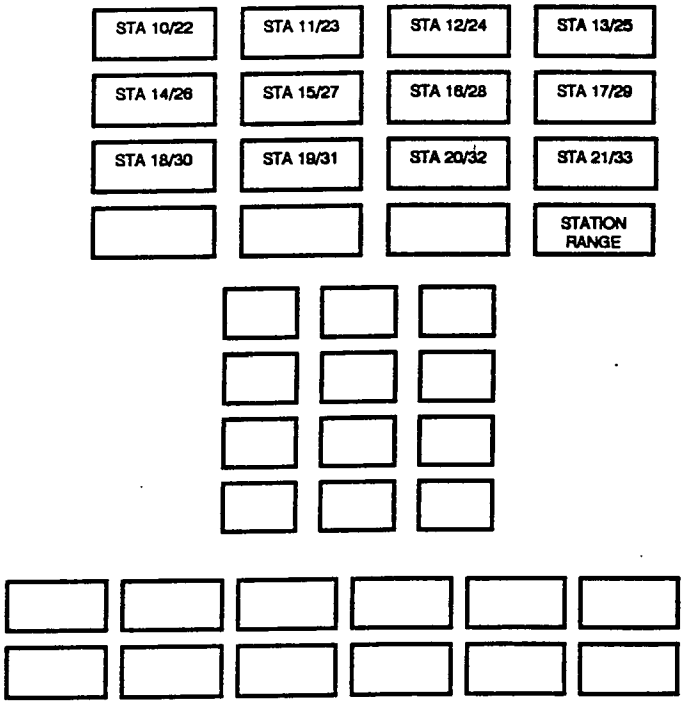
PROGRAMMING STEPS

- If you wish to assign a preset forward position to a station, dial an (*) asterisk and 34 on the dial pad.

If you have a display phone, you will see:

PRESET FWD STA ASSIGN STA 10 TO STA XX

- Press the station button for the station being given a preset forward position.*
- Then press the station button of the station which is to receive the forwarded ringing.*
- Press HOLD to enter.



DESCRIPTION

Ringing CO lines can be forwarded to another predetermined station if the original station is busy or does not answer. These lines will ring for a programmed period of time before forwarding. During this time the busy station will hear muted ringing.

By default no stations are assigned a preset forward station.

An unlimited number of assignments can be made but an individual station can have only one preset forward assignment. A station may receive an unlimited number of forwards.

To remove an assignment, first press the station with the preset forward assignment, then press that station a second time and press HOLD.

Refer to flexible button programming (Sec. 600.9). If a station has a preset forward to another station, that station must be programmed to have access to the forwarded line. Also that station must be programmed to ring on that line (Sec. 600.15).

*NOTE: If the STATION RANGE button is lit, it means that the station indicated is in the upper range (22-33). For example, station button 16/28 is lit - if the STATION RANGE button is lit, station 28 is being programmed; if STATION RANGE button is not lit, station 16 is being programmed.

600.27 CONFERENCE TIMER

PROGRAMMING STEPS

If you are in the programming mode, continue using the program codes. If you are starting to program here, enter the program mode first.

- If you wish to change the conference timer, dial an asterisk (*) and 35 on the dial pad.

If you have a display phone, you will see the following display:

CONF TIME-OUT TIMER
15 MINUTES

- Dial a 2-digit number between 01 and 99.
- Press HOLD to enter data.

DESCRIPTION

This timer reflects the amount of time a conference circuit will remain active if the initiator of the conference is no longer in a multi line conference.

A warning tone will be sounded to the remaining users 15 seconds prior to shutdown.

By default the conference timer is set at 15 minutes.

An entry of 00 will disable the timer.

600.28 SMDR

PROGRAMMING STEPS

If you are in the programming mode, continue using the program codes. If you are starting to program here, enter the program mode first.

- If you wish to disable SMDR, dial an asterisk (*) and 36 on the dial pad.
- Press CO line(s) for which SMDR is to be disabled or enabled.
  - LED on = enabled
  - LED off = disabled

To determine what calls are to be recorded, baud rate and print format, dial an asterisk (*) and 37 on the dial pad.

- Press the program button to determine when all calls are to be recorded or just long distance calls.
  - LED off = long distance
  - LED on = all calls

DESCRIPTION

Station Message Detail Recording is an optional feature that allows customers to keep track of either all calls or only long distance calls both incoming and outgoing by CO line, number dialed, time of day, date, station that placed the call, duration of call and account code if used.

By default all CO (outside) lines are enabled for SMDR recording. NOTE: An RCU and an SIU must be installed for this feature to work. Refer to Sec. 500 (Installation).

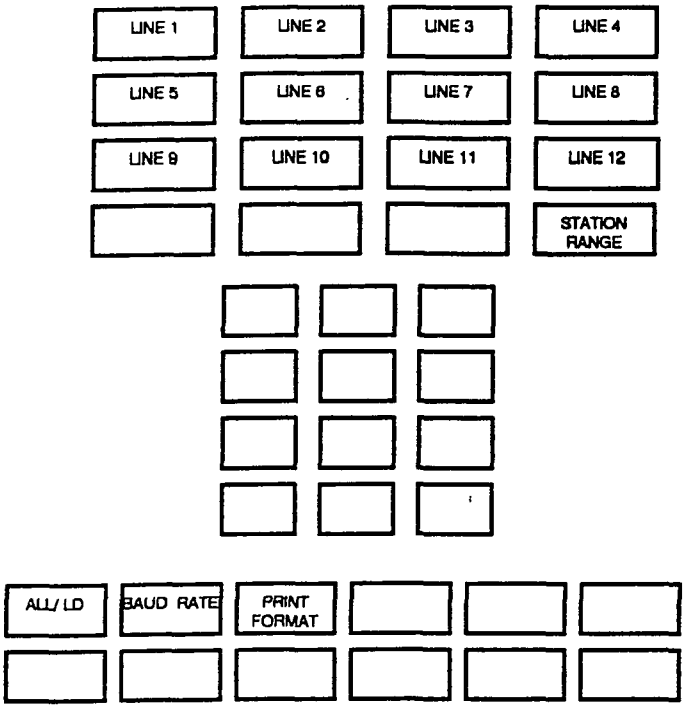
SMDR can be programmed to record all calls, both incoming and outgoing or it can be programmed to record only outgoing long distance.

Long distance calls are calls of over 7 digits or calls that begin with a "0" or a "1".

By default all calls are recorded.

PROGRAMMING STEPS

- Press the program button to determine baud rate.
  - LED off = 1200 baud
  - LED on = 300 baud
- Press the program button to determine print format.
  - LED off = 29 character
  - LED on = 80 character
- Press HOLD to enter data.



DESCRIPTION

The baud rate can be set at 300 or 1200 baud. By default the baud rate is set at 300 (LED on).

Print format can be set at either 29 characters or 80 characters. By default format is 29 characters (LED off).

FORMATS

29 Character

AABBHH:MMHH:MM:SSMM/DD/YY

CC.....CC

DD.....DD

80 Character

AABBHH:MMHH:MM:SSMM/DD/YYCC...CC

DD.....DD

AA = 2 digit originating station

BB = 2 digit line number

HH:MM = call duration

HH:MM:SS = time call originated

MM/DD/YY = date call originated

CC.....CC = telephone number dialed

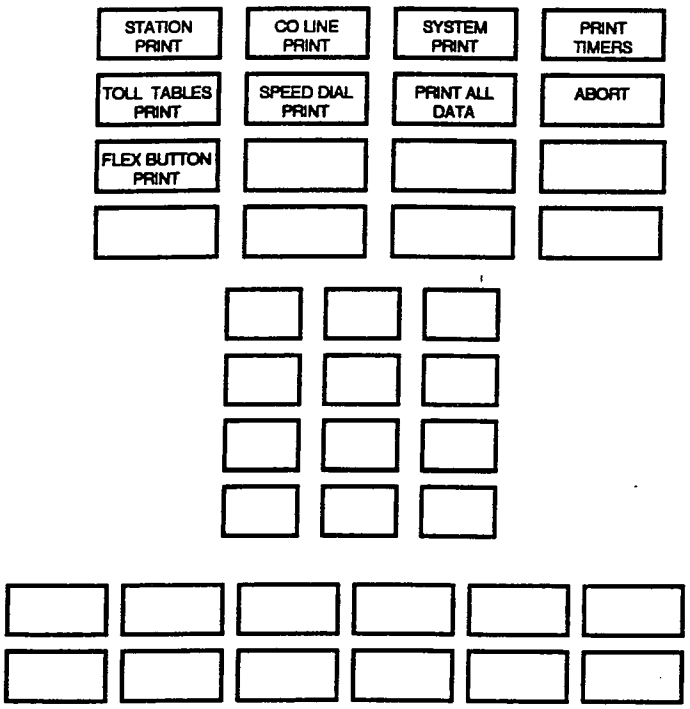
DD.....DD = account code (8 digits maximum)

600.29 DATA BASE PRINTOUT

PROGRAMMING STEPS

If you are in the programming mode, continue using the program codes. If you are starting to program here, enter the program mode first.

- If you wish to print out a copy of the data base, or any part of the data base, dial an asterisk (*) and 38 on the dial pad.
- Press one of the following program buttons depending on what information is needed in the printout.
- Press HOLD to begin printing.



DESCRIPTION

Requires the SMDR Module be installed in the KSU.

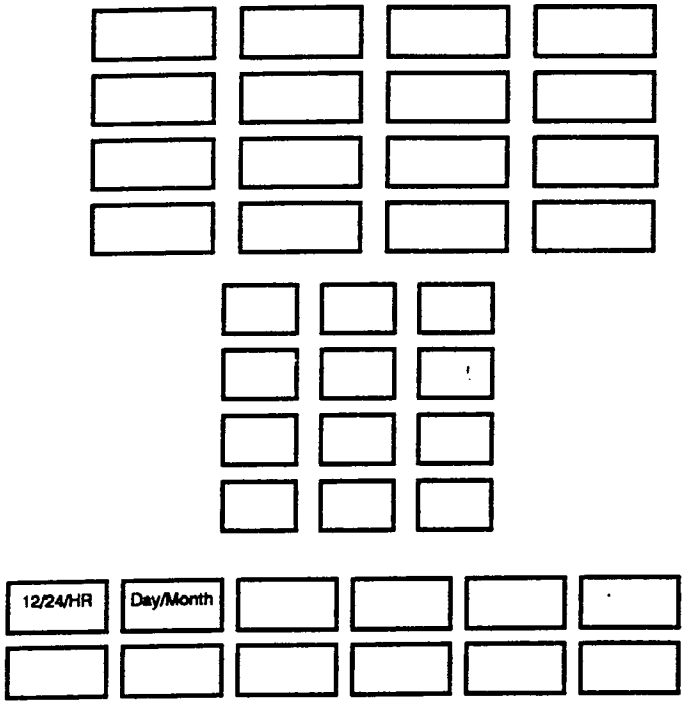
Also requires an RS232C compatible printer.

600.30 LCD DISPLAY

PROGRAMMING STEPS

If you are in the programming mode, continue using the program codes. If you are starting to program here, enter the program mode first.

- If you wish to change the format of the LCD display, dial an asterisk (*) and 39 on the dial pad.
- Press the desired program button to determine the display format.
- Press HOLD to enter.



DESCRIPTION

This program controls the display format of the time and date on the LCD.

By default the time is set at the 12 hour clock with a range of 1-12 (LED on). This feature can be changed so the range is 00 through 24 (military time).

By default the date will read month/day/year (LED on). The display can be changed to read day/month/year.

Requires that an RCU be installed. Refer to Sec. 500 (Installation).

The actual time and date is programmed at the attendant station.

600.31 TOLL RESTRICTION TABLES

PROGRAMMING STEPS

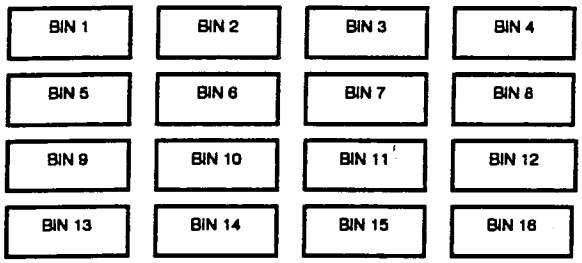
Make sure you have entered the programming mode.

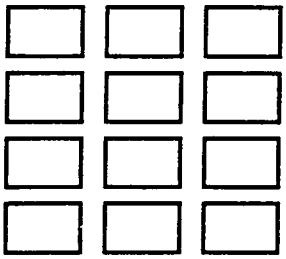
- To enter numbers into the toll tables, press the asterisk (*) and dial the following:
  - Allow Table A = 41
  - Deny Table A = 42
  - Allow Table B = 43
  - Deny Table B = 44

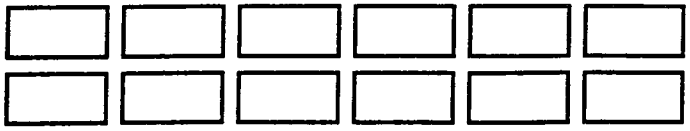
If you have a display phone, you will see:

ALLOW TOLL TABLE A
#01

- Press desired bin number location. See the following program buttons:







- Dial the allow/deny number including don't cares (8 digits maximum).
- Press HOLD. Continue programming bins.

DESCRIPTION

The Allow/Deny tables are organized into 2 sets of tables to allow the 1224 system to support 2 different toll plans at one installed site. Allow/Deny Table A is referenced whenever a station is assigned Class of Service 2. Allow/Deny Table B is referenced whenever a station is assigned Class of Service 3.

Each table may contain up to 16 numbers of up to 8 digits each. Any number of digits up to 8 maximum may be entered. Less than 8 digits may be entered. For example, the programmer needs only to dial "0" and press HOLD to program operator restriction.

The following rules should be remembered when setting up the Allow/Deny tables.

If nothing is assigned in either the allow or deny table, no restriction is applied.

If entries are made in the allow table and only there, then only the numbers in the table are allowed. All other numbers will be denied (Allow Only Restriction).

If entries are made in the deny table and only there, then only the numbers in the table are denied (Deny Only).

If there are entries in both tables, the allow table is searched first and if the dialed number is found, it is allowed. If it is not found in the allow table, the deny table is searched. If the number is found there, it is denied; if it is not found there, it is allowed.

Exchange Codes can be blocked by specific entries in the Deny lists or allowed by specific entries in the Allow lists.

When the FWD/DND button is used, it enters a don't care character. This will allow or deny any digit 0-9 in that location.

When a CO line is marked PBX, COS restrictions apply to the station only if one of 4 PBX codes are dialed first. Refer to Sec. 600.14 (CO line data) and Sec. 600.23 (PBX codes).

The Allow/Deny tables are reserved for COS 2 and 3 respectively. A CO line marked Toll Restriction Override is not subject to restriction of COS 2, 3 or 4.

The pound (#) and asterisk (*) can be used as Allow/Deny digits.

Press the HOLD button twice to erase a bin. When viewing a bin but not entering or changing anything in that bin, the HOLD button must be pressed to exit the bin. No confirmation tone will be heard.

600.32 STATION SPEED DIAL

Each telephone has 20 unique speed dial numbers. These numbers are entered and stored by the user and can be recalled by the user at any time. The asterisk (*) is used to program pulse to tone switchover; the TRANS/QUE is used to program a pause and the flash button is used to program a flash command. To program a "No Display", press the CONF button.

To program a station speed number:

- Press SPD button.
- Press the asterisk (*).
- Enter speed bin number (00-09, 90-99).
- Press outside line button if desired.
- Enter telephone number.
- Press HOLD button.

To program additional numbers, repeat programming from step 2.

600.33 PULSE TO TONE SWITCHOVER

The user can command the system to change the signaling on a CO line from dial pulse to DTMF tone thereby allowing the use of common carriers behind a dial pulse line.

This can be done either manually or programmed into a speed dial number.

To manually command a switchover, the user, while connected to an outside line, dials an asterisk (*). The switchover occurs and the succeeding digits are sent DTMF.

When using speed dial numbers, the asterisk (*) is stored and sent with the number. The system will automatically insert a pause and then switch over to DTMF sending for the remaining digits.

600.34 FLASH WITH SPEED DIAL

During the dialing of a station or system speed number, a flash can be programmed into the number. A pause will automatically be inserted after the flash before the remaining digits are sent.

When programming a speed number, pressing the FLASH button will program a flash command. This is counted as a digit. The flash length and pause following are determined by programming.

600.35 NUMBERING PLAN

10-33	Intercom Numbers
5	Universal Night Answer
70	Internal All Call Page
71	Internal Zone 1 Page
72	Internal Zone 2 Page
73	External Zone Page
74	All Call Page
6	Call Pickup
8	Music
9	Alarm Reset
0	Attendant
#	Last Number Redial
75	Meet Me Page
*	Pulse to Tone Switchover

600.36 NIGHT SERVICE

The 1224EX system is placed into night service by the attendant pressing the DND button at her key telephone.

To remove night service, the attendant reverses the procedure. When the system is in night service, stations marked to ring at night will function according to access and ring assignments programmed in Sec. 600.14.

600.37 SYSTEM SPEED DIAL

System speed dial numbers can be entered into the data base at the designated attendant station.

A CO line can be programmed into a speed number. There can be 16 digits in the number including pause, pulse to tone switchover and flash commands. The asterisk (*) is used to indicate a pulse to tone switchover, the TRANS/QUE to insert a pause command, and the Flash button to program a flash command. To program a "No Display", press the CONF button.

Speed bins 10-29 are subject to the class of service and line access restrictions assigned to the station that uses the number. Speed bins 30-49 will not be monitored by toll restriction.

To program system speed numbers:

- At the attendant station,
- Press SPD button.
- Dial an asterisk (*).
- Dial speed bin location (10-49).
- Press specific CO line if desired.
- Dial telephone number including pauses, flash commands & pulse to tone switchover.
- Press HOLD button.

To continue programming additional numbers, repeat from step 2.3.

600.38 SETTING SYSTEM TIME & DATE

System date and time can be set only from the attendant station and must be done in the following manner:

- Press SPEED button.
- Dial an asterisk (*).
- Dial "50".
- Enter date & time as follows:

  YYMMDDHHMM

  YY = year 80-99

  MM = month 01-2

  DD = day 01-31

  HH = hour 00-23

  MM = minute 00-59

DATA FIELDS AND DEFAULT VALUES

DESCRIPTION	PROG CODE	DEFAULT ENTRY
Station Class of Service	01	All stations assigned COS 1
Station Configuration		
Do Not Disturb	02	Allowed at all stations
System Speed Dial	02	Access allowed at all stations
Alarm/Phone Box Signal	02	No stations assigned
Preferred Line Answer	02	Disabled at all stations
Call Forward	02	Allowed at all stations
Auto Select	02	Enabled at all stations
Headset	03	Disabled at all stations
Page Access	03	Access allowed at all stations
Flexible Station Numbers	04	Sequential
Flexible Buttons	05	Buttons 1-14 = stations 10-24 Buttons 15-16 = CO lines 7-8 Buttons 17-22 = CO lines 1-6
Page Groups	06	All stations in group 1
Pickup Groups	07	All stations in group 1
Basic Telephones	08	None assigned
DSS Console	08	None assigned
CO Line Groups	11	All stations in group 1
CO Line Configuration		
Line Type	12	All lines are CO lines
Line Signaling	12	All lines DTMF
Toll Override	12	Disabled on all lines
Private Line	12	None assigned
CO Line Ringing (Day)	13	All lines ring at station 10
CO Line Ringing (Night)	14	All lines ring at station 10
Flash Timer	15	2 seconds
CO Ring Detect	16	300 msec.
Dial Pulse	17	10 pps and 60/40
System Configuration		
Line Queuing	21	Enabled
Hold Preference	21	System
Alarm Detection	21	Closed loop
Alarm Signaling	21	Continuous tone
Automatic Privacy	21	Enabled
Alarm Enable	21	Disabled
Background Music	21	Disabled
Exclusive Hold Recall Timer	22	060 seconds
System Hold Recall Timer	23	060 seconds
Transfer Recall Timer	24	030 seconds
Message Wait Reminder Tone	25	Disabled
Pause Timer	26	2 seconds
Executive/Secretary Pairs	27	None assigned
Loud Bell Control/A-Lead	28	None assigned
PBX Dial Codes	31	None assigned
Attendant Position	32	Station 10 (port 01)
Preset Forward Ring Timer	33	30 seconds
Preset Call Forward	34	None assigned
Conference Timer	35	15 minutes
SMDR	36	Enabled for all lines
SMDR/Baud Rate	37	All calls/300 baud
Toll Table Allow A	41	None assigned
Toll Table Deny A	42	None assigned
Toll Table Allow B	43	None assigned
Toll Table Deny B	44	None assigned

STATION PROGRAMMING

	Program Code	STATION NUMBER							BTN	DEF
Class of Service	01								1-6	COS 1
Do Not Disturb	02								1	YES
Speed Dial	02								2	YES
Alarm Receive	02								3	NO
Preferred Line Answer	02								4	NO
Auto Select	02								5	YES
Call Forward	02								6	YES
Headset	03								1	NO
Page Access	03								1	YES
Page Group	06								1-2	1
Pickup Group	07								1-2	1
Basic Telephone	08								1	NO

FLEXIBLE BUTTON PROGRAMMING

STA 10

1	2	3	4	5		
6	7	8	9	10		
11	12	13	14	15		
16	17	18	19	20	21	22

STA 11

STA 12

STA 13

STA 14

STA 15

STA 16

STA 17

STA 18

STA 19

STA 20

STA 21

STA 22

Multi Function = 1
CO = 2XX (XX = CO line 1-12)
Loop = 3
Pool = 4X (X = group 1-8)

CO LINE PROGRAMMING

	Line Grp	Line Type	Signal	Toll Ovr	Private Line	Day Ring	Nite Ring	Flash Time	Ring Dect	Dial Plse	SMDR
Prog Code	11	12	12	12	12	13	14	15	16	17	36
Prog Button	1-6/ 1-2	1	2	3	4	NA	NA	Key Pad	Key Pad	Key Pad	NA
CO 1											
CO 2											
CO 3											
CO 4											
CO 5											
CO 6											
CO 7											
CO 8											
CO 9											
CO 10											
CO 11											
CO 12											
DEFAULT	Grp 1	CO	DTMF	No	None	All Ring Attendant		2 sec.	300 msec.	60/40 10pps	Yes

SYSTEM PROGRAMMING

Prog Button	Prog Code	Feature	Format	Default	New
1	21	CO Line Queuing	Yes/No	Yes	
2	21	Hold Preference	System/Exclusive	System	
3	21	Alarm Detection	Open/Closed	Closed	
4	21	Alarm Signaling	Repeated/Single	Single	
5	21	Automatic Privacy	Yes/No	Yes	
6	21	Alarm Enable	Yes/No	No	
7	21	Background Music Enable	Yes/No	No	
Key Pad	22	Exclusive Hold Recall	000-255 sec.	060 sec	
	23	System Hold Recall	000-255 sec.	060 sec	
	24	Transfer Recall Timer	000-255 sec.	030 sec.	
	25	Message Reminder Tone	00-99 min.	00	
	26	Pause Timer	1-9 sec.	2 sec.	
NA	27	Executive/Secretary	4 pairs STA #, STA #	None	
1-4	28	Loud Bell/A-Lead	4 sets STA #	None	
1-4	31	PBX Codes	4 numbers 1 or 2 digit	None	
NA	32	Attendant Position	10-33	STA 10	
	33	Ring Timer-Preset Fwd	10-99 sec.	15 sec.	
NA	34	Station - Preset Fwd	Unlimited; STA #, STA #	None	
Key Pad	35	Conference Timer	00-99 min	15 min	
1-2	36	SMDR/Baud Rate/Printer	All calls/LD; 300/1200; 29/80 character	All Calls 300 baud 29 character	

SYSTEM SPEED DIAL

Programmed at attendant station.

Digits *up to 16)

Bin 10	Bin 30
Bin 11	Bin 31
Bin 12	Bin 32
Bin 13	Bin 33
Bin 14	Bin 34
Bin 15	Bin 35
Bin 16	Bin 36
Bin 17	Bin 37
Bin 18	Bin 38
Bin 19	Bin 39
Bin 20	Bin 40
Bin 21	Bin 41
Bin 22	Bin 42
Bin 23	Bin 43
Bin 24	Bin 44
Bin 25	Bin 45
Bin 26	Bin 46
Bin 27	Bin 47
Bin 28	Bin 48
Bin 29	Bin 49

EXCEPTION TABLES

Code 41 - Allow Table A

BIN 1	
BIN 2	
BIN 3	
BIN 4	
BIN 5	
BIN 6	
BIN 7	
BIN 8	
BIN 9	
BIN 10	
BIN 11	
BIN 12	
BIN 13	
BIN 14	
BIN 15	
BIN 16	

Code 42 - Deny Table A

BIN 1	
BIN 2	
BIN 3	
BIN 4	
BIN 5	
BIN 6	
BIN 7	
BIN 8	
BIN 9	
BIN 10	
BIN 11	
BIN 12	
BIN 13	
BIN 14	
BIN 15	
BIN 16	

Code 43 - Allow Table B

BIN 1	
BIN 2	
BIN 3	
BIN 4	
BIN 5	
BIN 6	
BIN 7	
BIN 8	
BIN 9	
BIN 10	
BIN 11	
BIN 12	
BIN 13	
BIN 14	
BIN 15	
BIN 16	

Code 44 - Deny Table B

BIN 1	
BIN 2	
BIN 3	
BIN 4	
BIN 5	
BIN 6	
BIN 7	
BIN 8	
BIN 9	
BIN 10	
BIN 11	
BIN 12	
BIN 13	
BIN 14	
BIN 15	
BIN 16	

DATABASE PRINTOUT

CKT	NUM	COS	DND	SPD	ALM	PFL
01	10	0	Y	Y	N	N
CF	DSLT	PAGE	BNA	PKUP	PAC	HST
Y	Y	1	15	1,2	Y	N

CKT	NUM	COS	DND	SPD	ALM	PFL
02	11	4	Y	Y	N	Y
CF	DSLT	PAGE	BNA	PKUP	PAC	HST
Y	Y	12	N		N	N

and so on through the rest of the stations

CKT	=	circuit number or station port
NUM	=	intercom number
COS	=	class of service assignment
DND	=	Do Not Disturb
SPD	=	access to system speed numbers
ALM	=	alarm tone/door box ringing
PFL	=	preferred line answer
CF	=	station call forward
DSLT	=	direct select operation
PAGE	=	page zones
BNA	=	preset forward station assigned
PKUP	=	pickup zones
PAC	=	page access restriction
HST	=	headset option

STATION RECORD

CO	GRP	TYPE	SIGL	TRO	PVL	FLSH
1	1	CO	DTMF	N	N	07
RDT	DIAL-PLS		PBX CODES		SMDR	
3	60/40;10		00 00 00 00		Y	

DAY RING:
10 11 12 .. 14 .. .. ..
18 .. ..
.. ..

NIGHT RING:
10 .. ..
.. ..
.. ..

and so on through the rest of the CO lines

CO	=	line number
GRP	=	group this line assigned to
TYPE	=	CO or PBX
SIGL	=	DTMF or Dial Pulse
TRO	=	toll restrict override
PVL	=	private line
FLSH	=	flash timer
RDT	=	ring detect timer
DIAL-PLS	=	break/make ratio & pulses per second
PBX CODES	=	programmable codes
SMDR	=	call accounting printout
DAY RING	=	stations assigned to ring during the day
NIGHT RING	=	stations assigned to ring at night

CO LINE RECORD

QUE	HOLD	ALM:DT	SIGL:ENBL
Y	EX	CL	REPT N
PRV	ATTD	SMDR BAUD	PRNT BGM
Y	10	ALL 1200	80 Y

LBC:1	LBC:2	LBC:3	LBC:4
B24	A12	..	..

EX/SC1	EX/SC2	EX/SC3	EX/SC4
12/10	14/12	..	..

SMDR LINE ENABLE
01 02 03 04 05 06 07 08.. .. .. ..

QUE = queue callback
HOLD = type of hold preferred
ALM = alarm
DT = detection
SIGL = signal
ENBL = enabled or disabled
PRV = privacy
ATTD = assigned attendant
SMDR = all calls or long distance only
BAUD = baud rate
LBC = loud bell control (B) or A-lead indication (A)
BGM = background music
SMDR LINE ENABLE = CO lines assigned to report call information
EX/SC = executive/secretary pair

ALLOW TABLE A

01 ..	09 ..
02 ..	10 ..
03 ..	11 ..
04 ..	12 ..
05 ..	13 ..
06 ..	14 ..
07 ..	15 ..
08 ..	16 ..

DENY TABLE A

01 ..	09 ..
02 ..	10 ..
03 ..	11 ..
04 ..	12 ..
05 ..	13 ..
06 ..	14 ..
07 ..	15 ..
08 ..	16 ..

SYSTEM DATA RECORD

EXCEPTION TABLES RECORD

ERCL	SRCL	TRCL	MSG-TNE	PAUSE
060	060	030	00	2

RING-FWD	CNFTO
30	15

ERCL = exclusive hold recall time
SRCL = system hold recall time
TRCL = transfer recall time
MSG-TNE = message wait reminder tone
PAUSE = pause length
RING-FWD = preset forward timer
CNFTO = conference time-out for unsupervised conference

TIMERS RECORD

SYSTEM SPEED

10 ..	30 ..
11 ..	31 ..
12 ..	32 ..
13 ..	33 ..
14 ..	34 ..
15 ..	35 ..
16 ..	36 ..
17 ..	37 ..
18 ..	38 ..
19 ..	39 ..
20 ..	40 ..
21 ..	41 ..
22 ..	42 ..
23 ..	43 ..
24 ..	44 ..
25 ..	45 ..
26 ..	46 ..
27 ..	47 ..
28 ..	48 ..
29 ..	49 ..

SYSTEM SPEED NUMBERS RECORD

STATION 10 FLEX BUTTON ASSIGN

BTN	FUNCTION	BTN	FUNCTION
01	DSS/BLF 10	12	CO LINE 01
02	DSS/BLF 11	13	CO LINE 02
03	DSS/BLF 12	14	CO LINE 03
04	DSS/BLF 13	15	CO LINE 04
05	DSS/BLF 14	16	CO LINE 05
06	DSS/BLF 15	17	CO LINE 06
07	DSS/BLF 16	18	CO LINE 07
08	DSS/BLF 17	19	CO LINE 08
09	DSS/BLF 18	20	POOL 1
10	DSS/BLF 19	21	LOOP
11	DSS/BLF 20	22	POOL 2

STATION 11 FLEX BUTTON ASSIGN

BTN	FUNCTION	BTN	FUNCTION
01	CO LINE 1	12	IN PG 1
02	CO LINE 5	13	MEET ME
03	CO LINE 6	14	SPEED 00
04	CO LINE 10	15	SPEED 01
05	POOL 1	16	SPEED 02
06	POOL 2	17	SPEED 03
07	LOOP	18	SPEED 04
08	MUL	19	SPEED 05
09	MUL	20	SPEED 06
10	MUL	21	SPEED 07
11	MUL	22	SPEED 08,

and so on through the rest of the stations

NOTE: MUL will be printed only if the station user has assigned no function to the button.

INT AC PG = Internal All Call Page

INT PG 1(2) = Internal Page Zone 1 or 2

MEET ME PAGE = Meet Me Page Answer

EXT PAGE = External Page

AC PAGE = All Call Page

MUTE = Mute Button

SPEED 10 = Speed Bin 10

700 SYSTEM CHECKO T PROCEDURES

700.1 FUNCTIONAL TEST PROCEDURES

This section describes the procedures that should be followed during system start-up. The installer will also find these tests to be helpful int he event of system mal-function and trouble shooting. System trouble shooting will be confined to replacement of key telephone sets & fuses.

700.2 PRELIMINARY CHECKLIST

Before starting the functional test procedures, it is recommended that the following checklist be completed. This is designed to save time and possibly elliminate the need for more detailed trouble shooting.

C ck:

- Station cables for proper connections and olarity.
- Central office line connections.
- Earth ground connections.
- AC power cable.
- Music source connections (if provided).

Alarm connections (if provided).

700.3 KEY STATION TESTING

OPERATIONAL TEST	RESULT	PROCEDURE
1. Connect the modular cord to the instrument.	1.1 ON/OFF LED momentarily lights. 1.2 DND button flashes.	1.1 Normal 1.2 Check station wiring.
2. Press the ON/OFF button on the telephone.	2.1 ON/OFF LED lights. 2.2 That station's DSS LED lights. 2.3 No reaction.	2.1 Normal 2.2 Normal 2.3.1 Make sure line cord is plugged in. 2.3.2 Check K connector inside the telephone.
3. Background music 3.1 With the telephone in an idle state, press "8" on the dial pad.	3.1.1 Background music is heard. 3.1.2 No reaction.	3.1 Normal 3.1.2 Is handset on-hook? Check music connections on the KSU.
3.2 Adjust voice volume (front) knob on telephone.	3.2.1 Volume is increased or decreased as desired. 3.2.2 No reaction 3.2.3 Low background music (BGM) volume	3.2.1 Normal 3.2.2 Check volume control (VL2) in telephone. 3.2.3 Adjust BGM adjustment on left side of KSU.
3.3 Press "8" again.	3.3 Music is turned off.	3.3 Normal
4. Do Not Disturb 4.1 Press FWD/DND button. Telephone must be on-hook.	4.1.1 DND LED is lit steady. 4.1.2 No reaction	4.1.1 Normal 4.1.2 Check phone connections 4.1.3 Verify station is allowed DND in programming.
4.2 Press DND button again.	4.2.1 DND LED is extiguished.	4.2.1 Normal
5. Tone ringing volume Telephone must be in "T" mode. 5.1 From another telephone, place an intercom call to the set being tested.	5.1.1 Two bursts of tone are heard. Adjust volume if necessary. 5.1.2 HOLD button LED flashes. 5.1.3 DSS of calling station flashes (if programmed). 5.1.4 Two bursts of tone ringing are not heard.	5.1.1 Normal 5.1.2 Normal 5.1.3 Normal 5.1.4 Check phone connections.
6. Transmitting Data Signals 6.1 When incorrect or no data signals are transmitted between KSU and the telephone.	6.1.1 Only ON/OFF LED lights when pressed, remaining LEDs do not light or they flash randomly.	6.1.1 Check cabling to telephone and J-1 wiring. 6.1.2 Replace phone.

700.4 INTERCOM STATION TESTING

OPERATIONAL TEST	RESULT	PROCEDURE
1. Making an intercom call.		
1.1 Press DSS button or dial station number of desired party. If called phone is a speakerphone and is placed in H (voice) mode:	1.1.1 ON/OFF LED lights.	1.1.1 Normal
	1.1.2 DSS LED of called party is lit (if programmed).	1.1.2 Normal
	1.1.3 Busy tone is heard.	1.1.3 Normal if called party is in DND, not installed, or is off-hook.
	1.1.4 Three tones are heard if called station is a speaker-phone and in H mode.	1.1.4 Normal
	1.1.5 HOLD button flashes at called station (30 ipm)	1.1.5 Normal
	1.1.6 Intercom call is not connected.	1.1.6 Consult troubleshooting guide (Section 8).
	1.1.7 Intercom ringing is heard instead of 3 bursts of tone.	1.1.7 Normal for station not in H or P mode.
	1.1.8 Handsfree conversation at called phone is not possible.	1.1.8 Check phone connections.
1.2 If called station answers by lifting the handset.	1.2.1 Flashing HOLD LED of the called party is extin-guished.	1.2.1 Normal
	1.2.2 DSS of calling station changes from flashing to steady (if programmed).	1.2.2 Normal
2. Call Pickup		
2.1 Press DSS button or dial station number of desired party.	2.1 Intercom ringing or CO ringing heard at the called station.	2.1 Normal
2.2 To answer at another station, lift handset or press ON/OFF button.	2.2 Intercom dial tone heard.	2.2 Normal
2.3 Dial Pickup Code "6".	2.3 Called station returns to idle state. HOLD LED is extinguished. Intercom conversation between calling station & answering station is possible. Station LED is lit.	2.3 Normal
3. Intercom Conference		
31. During an intercom con-versation, press CONF button.	3.1 Intercom dial tone is heard, CONF button LED is lit steady.	3.1 Normal
3.2 Press DSS button of third party to be added.	3.2 Ringing tone is heard.	3.1 Normal
3.3 When third party answers, initiator presses CONF button again.	3.3 All 3 parties are connected together. CONF LED at third party station is lit steady.	3.3 Normal

700.4 INTERCOM STATION TESTING

OPERATIONAL TEST	RESULT	PROCEDURE
5. Camp On (Call Waiting)		
5.1 Lift handset or press ON/OFF button, then press DSS button or dial desired station number. Receive busy on outside (CO) or intercom call.	5.1 Busy tone is heard through handset or station speaker. Station ON/OFF LED is lit steady.	5.1 Called phone is busy - normal.
5.2 Press MSG/CP.ON button.	5.2 Ringing tone is heard at calling station & 2 bursts of tone are heard over speaker at called station. MSG/CP.ON LED and DSS of calling station are flashing at called station at 60 ipm.	5.2 Normal
	5.3 Busy tone heard continuously.	5.3 Second camp-on request is being made at same station.
6. Executive/Secretary		
6.1 Transferring intercom calls to an Executive/Secretary phone. Incoming intercom call is routed to Secretary when Executive station is busy.	6.1 Incoming intercom call is automatically transferred to secretary station.	6.1 Normal
	6.2 Incoming intercom call is not transferred.	6.2 Confirm programming of Exec/Sec assignment.
7. Paging		
7.1 Lift handset, dial "74" on dial pad and make paging announcement.	7.1 All call warning tone is heard over key phone speaker. HOLD LED lights steady at stations receiving the page, not at page initiator. All idle phones not in DND or busy are paged.	7.1 Normal
	7.2 DSS of paging station is lit steady at all stations where DSS is programmed to appear.	7.2 Normal
	7.3 Paging does not occur.	7.3 Check programming for page zones or change telephone.
	7.4 Hang up. Page is terminated and all stations not off-hook return to idle status.	7.4 Normal

700.5 CO LINE FUNCTIONS TEST

OPERATIONAL TEST	RESULT	PROCEDURE
1. Outgoing calls		
1.1 Lift handset or press ON/OFF button & press CO line button.	1.1.1 The CO line LED is lit steady.	1.1.1 Normal
	1.1.2 Station OF/OFF button LED is lit steady. All stations where DSS is programmed to appear are lit steady. Dial tone is heard.	1.1.2 Normal
	1.1.3 CO LED is not lit.	1.1.3 Check line access programming.
	1.1.4 Dial tone is not heard.	1.1.4 Check CO line connections at RJ-21X on the KSU.
2. Incoming calls		
2.1 Incoming CO ringing	2.1.1 Co ringing is heard.	2.1.1 Normal
	2.1.2 CO ringing is not heard but that line is flashing.	2.1.2 Check programming for ring assignment (day/night). Check CO line connections at RJ-21X on the KSU.
2.2 Press flashing CO line button.	2.1.3 CO line LED or loop button LED is flashing at 30 ipm.	2.1.3 Normal
	2.2 CO line LED or loop button is lit steady.	2.2 Normal
3. Transferring a CO line call		
3.1 During a CO line coversation, press TRANS/QUE and dial station number to which CO line is to be transferred or press that station's DSS button.	3.1.1 The CO line is placed on Exclusive Hold automatically.	3.1.1 Normal
	3.1.2 CO line LED is flashing at transferring station but remains steady at all other stations having line access.	3.1.2 Normal
	3.1.3 At receiving phone, the CO line or loop button LED is flashing at Exclusive Hold.	3.1.3 Normal
	3.1.4 Hang up after dialing station number or pressing DSS button for unscreened transfer; announce call to receiving station before hanging up for screened transfer.	3.1.4 Normal
	3.1.5 Music-on-hold is transmitted to external CO line.	3.1.5 Normal, if provided.
	3.1.6 No Music-on-hold is transmitted to external CO line caller.	3.1.6 Check music connections on KSU.
	3.1.7 Low Music-on-hold volume	3.1.7 Adjust MOH adjustment on left side of KSU.

700. INTERCOM STATION TESTING

OPERATIONAL TEST	RESULT	PROCEDURE
3.2 At phone receiving the transfer, press flashing CO line button or loop button.	3.2.1 CO line LED is now steady at all phones in the system. 3.2.2 CO line call is not transferred to desired station.	3.2.1 Normal 3.2.2 Check if called station is in DND.
4. Add-On Conference 4.1 During a CO line conversation, press the CONF button.	4.1 CO line is placed on Exclusive hold automatically, receiving MOH if provided.	4.1 Normal
4.2 Press DSS button of 3rd party to be added to the conversation.	4.2 Ringing is heard.	4.2 Normal
4.3 When 3rd party answers, initiator presses CONF button again.	4.3 All 3 parties are connected together. CONF LED at both internal stations is lit.	4.3 Normal
4.4 Hang up handset at first station to terminate conference call.	4.4 CONF LED will extinguish.	4.4 Normal
5. Multi-line Conference 5.1 Place an outgoing CO line call.	5.1 Ringing is heard	5.1 Normal
5.2 When party answers & is notifed of conference request, initiator presses the CONF button.	5.2 Party B is placed automatically on Exclusive Hold, hearing MOH if provided. Initiator hears intercom dial tone.	5.2 Normal
5.3 Initiator presses another CO line button & makes another outgoing call to party C.	5.3 CONF LED is lit steady & ringing is heard.	5.3 Normal
5.4 Initiator presses CONF button again.	5.4 All 3 parties are connected and both CO line LEDs are lit steady. CONF button LED is lit steady.	5.4 Normal
6. Flash 6.1 When completing a CO line conversation, press the FLASH button.	6.1 New CO dial tone is heard.	6.1 Normal

800 MAINTENANCE AND TROUBLESHOOTING

800.1 GENERAL INFORMATION

This section provides common maintenance, troubleshooting and repair instructions for the STARPLUS Key Telephone System. It is advisable to use the latest issue manual and supporting documentation whenever possible.

The 1224 architecture is designed such that all solid state circuitry is enclosed in the KSU. The only modular or replaceable type printed circuit boards located inside the KSU are the SIU and PCU. Therefore unless installing or replacing these boards, the KSU cover should not be removed.

Isolating problems in the replaceable units such as the key telephones or any external devices requires no special knowledge of solid state electronics or micro-processor programming techniques. The 1224 system requires no involved or complicated mechanical procedures for installation or removal of peripherals.

800.2 PREVENTIVE MAINTENANCE

A regular preventive maintenance program is essential to reduce the possibility of system failures. General type servicing such as cleaning and inspecting should be done yearly. If the KSU is located in an area of humidity, dust, etc., servicing should be done more frequently. General servicing should include:

- Hardware and cabling. Check for general mechanical integrity, loose or broken wires, plugs or connectors. Tighten or repair as necessary.
- KSU. Inspect air vents located in front and on top of the KSU cabinet for unrestricted air passage.
- MDF/cabling. Inspect the MDF for loose wires, obstructions, dust and dirt.

800.3 TEST EQUIPMENT AND TOOLS

The following test equipment and tools are necessary in performing maintenance and repair on the 1224 system.

- voltmeter
- DTMF/dial pulse hand held test telephone
- standard telephone repairman's hand tools

800.4 SPARE PARTS

The troubleshooting and repair instructions are based on the assumption that spare key telephones and KSU are available to the repairman, either on-site or at a central warehouse/storeroom location. In addition, spare fuses, jacks, wire and terminal block should be available.

800.5 FIELD SERVICE ENGINEERING

Installation, troubleshooting and repair are described in detail within this manual. However, field service type questions such as application requirements and troubleshooting assistance arise which require support. Such services are available through STARPLUS field service. Call 1-800-356-7279 (in Arizona call 998-2200).

800.6 FAULT CLASSIFICATION

Reported problems come from a variety of people under differing conditions, therefore all trouble reports should be thoroughly examined so that the exact problem is understood. Do not always suspect the 1224 equipment. Be sure to check external interface equipment such as the MDF, interconnection points, cabling, central office or programming. To help isolate a fault from the reported description, the following information should be investigated to further define the fault source.

A. Were any changes made recently to the customer database assignments that could cause the problem?

B. Were any changes made recently to cabling that could cause the problem?

C. Is the trouble condition associated with one circuit, a particular section or sections of circuits (i.e., CO lines, stations) or common to all circuits?

D. Is the trouble intermittent or continuous?

E. Could the trouble be caused by "cross symptoms" such that 2 failures mask the symptoms associated with a particular fault?

800.7 SYSTEM FAILURES

Various problems will affect the entire system. These are normally related to power failures, central processor failures, or memory failures. Where central processor or memory failures occur, the KSU must be replaced. When loss of power occurs, steps can be taken to localize the problem.

800.8 POWER FAILURES

The loss of commercial power will shut the system down unless external battery backup is provided. This loss of power could come from tripped circuit breakers, AC cords unplugged, or a fuse blown. When a power failure occurs, working toward the source, test for voltage. The power monitor LED will remain lit when power is present. Since the processor or power failure will cause switchover to the power failure telephone, the LED should be used to determine whether it is a power failure or processor failure. It can be seen through the bottom air vents located on the front cover of the KSU.

800.9 KEY TELEPHONE FAILURES

The following statements should be considered when isolating & categorizing key telephone failures:

Is the reported fault:

- Present on one telephone only? Check wiring, programming, telephone and KSU. Move telephone to a good working position to eliminate possible telephone failure.
- Common to station numbers in pairs (1-2, 3-4, 5-6, etc.)? Check wiring polarity & KSU.
- Common to all station numbers? Check programming & KSU.
- Associated with a key telephone that was recently moved? Check wiring, programming, telephone & KSU.
- Associated with programming changes made recently? (Ringing, CO line access, etc.) Check for proper & accurate programming.
- Occurring intermittently? Set up a test to duplicate the problem.
- Accompanying a software failure? Test the feature operation, programming & KSU.

800.10 CO/PBX LINE FAILURES

Problems with CO/PBX lines can be isolated and categorized by the following statements:

Is the reported fault:

- Present on one CO line only? Check the affected line, wiring, plug connections & KSU.
- Common to 2 or more CO lines? Check the lines, wiring & KSU.
- Associated with a key telephone? Check programming, telephone & KSU.
- Associated with signaling (DTMF, dial pulse)? Check programming, CO line & KSU.
- Associated with CO incoming ringing? Check programming & KSU.
- Occurring intermittently? Set up test to duplicate problem. Once the problem can be duplicated, check programming, telephone, CO line or KSU.

800.11 FEATURE OPERATION FAILURES

All operational features are controlled by software and specific database assignments. Most features are provided exclusively by software. However some require supporting equipment. For this reason, database assignments should be checked before corrective maintenance is performed. Also check for

proper usage by the customer, as feature failures are often the fault of the user. Features that use supporting equipment could have faulty equipment. This should be checked.

The following is a list of features that use additional equipment:

- Alarm - alarm system
- Background Music - music source connections
- Battery Back-up - battery package & charger
- Loud Bell Control - external power source & ringing device
- A-Lead - ancillary equipment
- Power Failure Transfer - telephone wiring
- External Paging - amplifier, speaker & connections

POWER TEST

PROCEDURE	RESULT
1. Inspect installation	1. CO line connected to proper RJ21X connector. 2. MDF cabling punched down correctly on 66M1-50 block. 3. External connections properly connected. 4. Music source wiring securely connected.
2. Plug in AC cord	1. Power LED on. 2. AC power input voltage 106-128 VAC. 3. MDF voltage for station. VT(-) to DT(+) = 28 VDC + 15% VR(-) to DR(+) = 28 VDC + 15%
3. Feature verification	1. System programming according to desired feature operation. (section 600) 2. Features function as described. (section 200)

PART NUMBERS FOR STARPLUS 1224EX

SP1200-00	1224EX BASIC KSU
SP1220-01	PROGRAM CARTRIDGE GENERIC 1
SP61630-00	RCU KIT
SP61632-00	SIU KIT
VC61101	BATTERY BACKUP UNIT
SP61610-00	BASIC KEY TELEPHONE-BLACK
SP61610-44	BASIC KEY TELEPHONE-ASH
SP61610-54	BASIC KEY TELEPHONE-GRAY
SP61610-60	BASIC KEY TELEPHONE-BURGUNDY
SP61612-00	ENHANCED KEY TELEPHONE-BLACK
SP61612-44	ENHANCED KEY TELEPHONE-ASH
SP61612-54	ENHANCED KEY TELEPHONE-GRAY
SP61612-60	ENHANCED KEY TELEPHONE-BURGUNDY
SP61614-00	EXECUTIVE KEY TELEPHONE-BLACK
SP61614-44	EXECUTIVE KEY TELEPHONE-ASH
SP61614-54	EXECUTIVE KEY TELEPHONE-GRAY
SP61614-60	EXECUTIVE KEY TELEPHONE-BURGUNDY
SP61616-44	PHONE BOX-ASH
SP2410-00	DSS CONSOLE-BLACK
SP2410-44	DSS CONSOLE-ASH
SP2410-54	DSS CONSOLE-GRAY
SP2410-60	DSS CONSOLE-BURGUNDY
SP1250-00	STARPLUS 1224EX INSTALLATION MANUAL
SP1252-00	STARPLUS 1224 STATION USER GUIDE
SP2453-00	STARPLUS 1224/2448 ATTENDANT USER GUIDE
SP61664-01	DIRECTORY SHEET FOR BASIC KEY TELEPHONE
SP61664-00	BLANK DESIGNATION TABS FOR STARPLUS TELEPHONES
SP1260-00	SP1224EX NUMBERED KEY DESIGNATION TABS
SP61640-00	WALL MOUNT KIT-BLACK
SP61640-44	WALL MOUNT KIT-ASH
SP61640-54	WALL MOUNT KIT-GRAY
SP61640-60	WALL MOUNT KIT-BURGUNDY
SP61660-00	REPLACEMENT HANDSET-BLACK
SP61660-44	REPLACEMENT HANDSET-ASH
SP61660-54	REPLACEMENT HANDSET-GRAY
SP61660-60	REPLACEMENT HANDSET-BURGUNDY
SP61666-54	12 FOOT HANDSET CORD-GRAY
SP61666-60	12 FOOT HANDSET CORD-BURGUNDY
P14108-54	25 FOOT HANDSET CORD-GRAY
P14108-60	25 FOOT HANDSET CORD-BURGUNDY
SP61662-00	BUTTON CAPS (1 RED, 9 CLEAR)
SP61668-00	DIRECTORY WINDOW FOR BASIC KEY TELEPHONE
SP1290-00	SP1224EX DEMO KIT