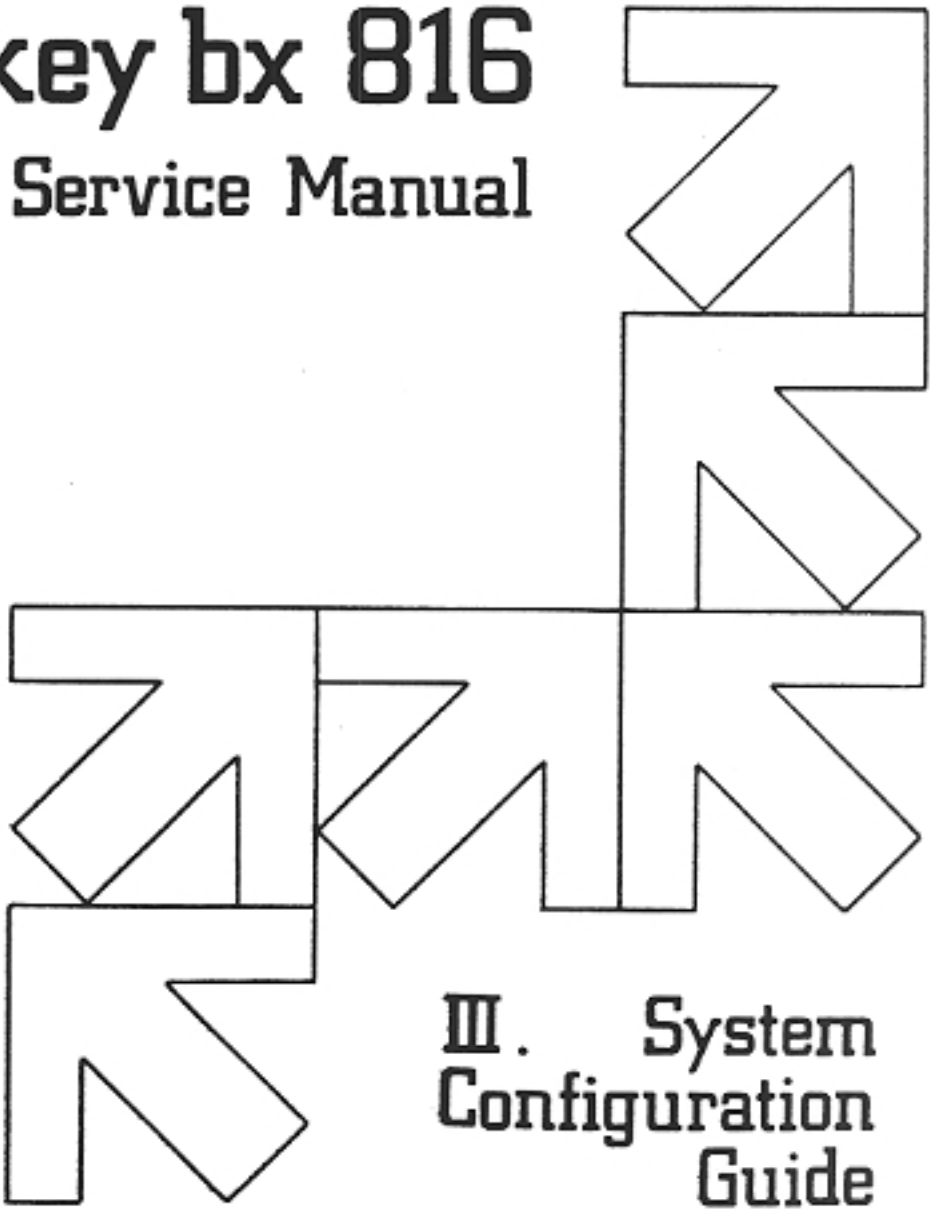
TLRD-784-261-110
Issue 1. July 1984

key bx 816

Customer Service Manual



III. System Configuration Guide

Telrad

key bx 816

Customer Service Manual

Part 3: System Configuration Guide

TLRD-784-261 110
Issue 1, July 1984

key bx 816
Office Telephone Systems
Customer Service Manual

Part 3: System Configuration Guide

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NOTICE

This manual is applicable to the **key bx** 816 software version C. Telrad, Ltd., reserves the right to make changes in the equipment described, and in this manual, without notification. However, changes in the equipment do not necessarily render this manual invalid.

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Section 1
HARDWARE DESCRIPTION

1.1 Introduction

Designing a **key bx** 816 system for a particular application involves three stages:

- hardware provisioning -- determination of the hardware required to meet the application requirements;
- system layout -- planning the locations of all extensions and common equipment;
- configuration -- customizing system features to meet the specific needs of the user.

In order to determine hardware provisioning requirements and design the physical layout of the **key bx** 816, you must have a basic understanding of the functioning of the **key bx** hardware. This Section explains the function of each piece of common equipment in the **key bx** 816.

1.2 KSU Hardware

1.2.1 **Maximum Configuration.** A completely equipped KSU contains the following printed circuit boards:

- 1 Main Card;
- 3 Trunk and Line (TLC) Cards (for stations, or Trunk and Single-Line Cards -- TSC -- for Single-Line Telephones);
- 1 add-on ID card for impulse dialing;
- 1 Option card, for interface with the system's optional features.

Figure 1-1 shows a KSU with card locations indicated.

1.2.2 **Main Card (MC).** This is the primary processing card. It contains the central processing unit (CPU) and interface to 4 stations and 2 CO lines. The MC performs all the logical decisions, passes control signals, operates the DTMF code transmitter for CO lines utilizing this signaling method, provides dial tone and HFTB tone burst, and furnishes the strobe signals for operating the switching matrixes. The Main Card stores in its memory the management programs for the entire system, system configuration and speed-dial data, as well as the status of all stations at any given time. A 3.5-V lithium battery backs up the MC to prevent memory loss in case of power failure. This battery also provides

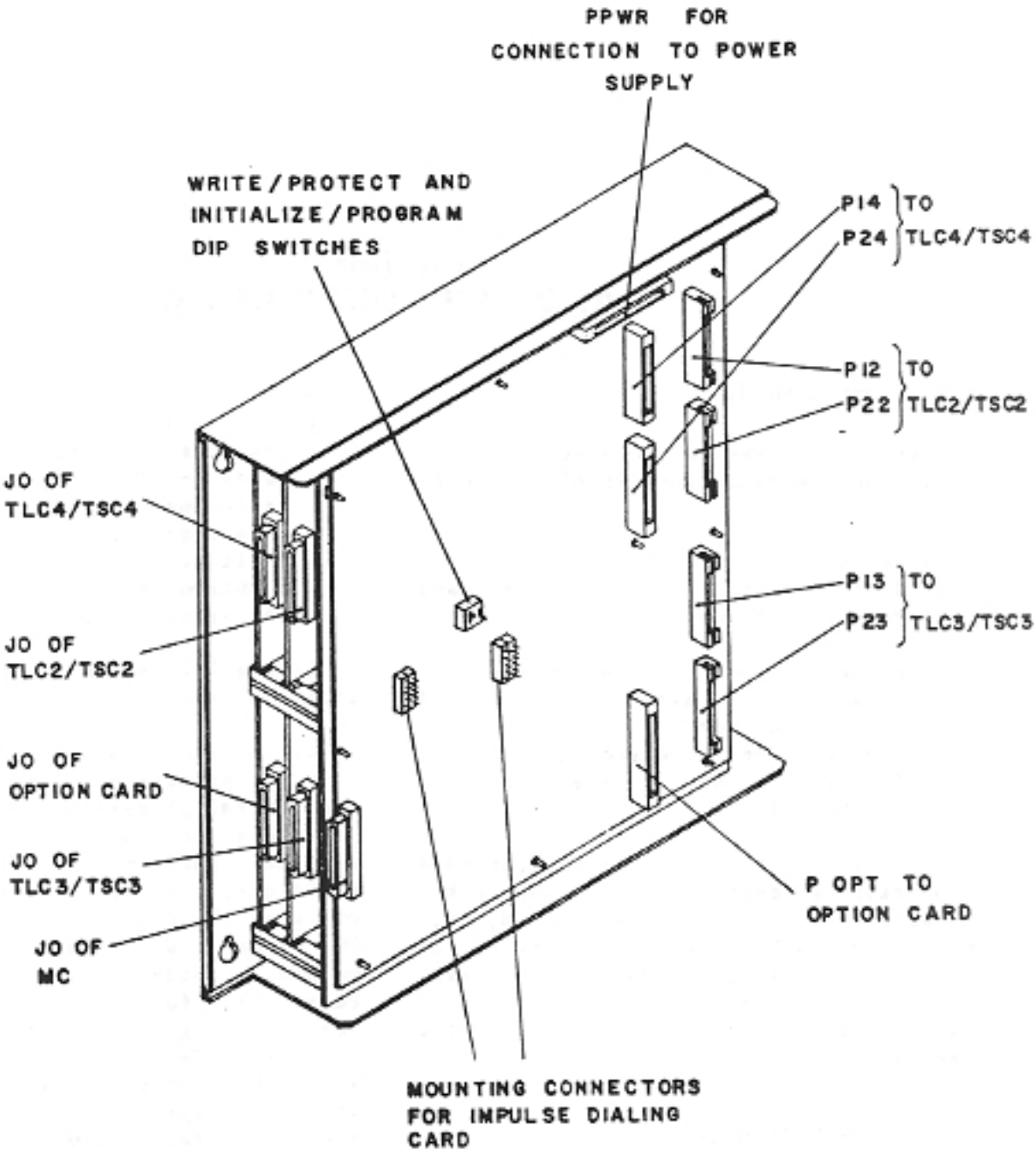


Figure 1-1 Key Switching Unit (KSU)

backup for system and station speed dialing functions located on the Memory card.

Two switches on the Main Card of the KSU enable programming of system configuration and protect the program from accidental erasure. The retention of the program in the memory requires that these switches be in the PROTECT and PROG positions.

A reset switch on the board initializes the system and resets all system functions in case of a fault. It does not, however, erase any of the system programming.

The Main Card supplies operating power to the stations by means of a phantom bridge across the Hands-Free and data pairs of the extension circuits.

1.2.3 Trunk/Line Cards (TLC). Three TLCs can be installed in a **key bx** 816 KSU. Each card serves two CO lines and four extensions. The card has CO line interface circuits, audio, HFTB and dial tone matrixes, and loop and mask relays. Distribution of CO lines and extensions to the TLCs is as follows:

- TLC2 serves lines 3 and 4 and extensions 24 through 27;
- TLC3 serves lines 5 and 6 and extensions 28 through 31;
- TLC4 serves lines 7 and 8 and extensions 32 through 35.

An incoming outside call ring is sensed by the TLC. The TLC sends a pulse that is detected and interpreted as a command by the MC. A strobe is subsequently sent by the MC, which causes the trunk to connect to an internal link at the matrix. The MC also transmits a strobe to provide relay closure of the loop.

The TLC also supplies operating current to the stations by means of a phantom bridge across the HF and data pairs via the MDF. In addition, the TLC transfers data (control information) from stations to the MC for message reception or data from the MC to stations.

The TLC also provides a DTMF path for outside dialing.

If Single-Line Telephones (SLTs) are installed instead of **key bx** stations, TSC cards are used instead of TLC.

1.2.4 Impulse Dial Card. This card, mounted on the Main Card, provides dialing impulses for telephone networks which use this kind of signaling.

1.2.5 Option Card. This card serves two primary functions -- it controls external relays, used for door units, music on hold, background music, and other functions; and it has an RS-232C (V.24) interface to connect the system to a printer or computer for Call Detail Recording (CDR). There are several optional configurations of the card. It may be installed with or without the RS-23 port, and without all the available relays installed.

1.3 Power Equipment

DC power and current source is supplied by an external power supply. The supply operates directly from 110 or 220-V ac power. The supply can be connected to an optional battery backup unit for protection against power failure. The power supply connects to the KSU by means of a ribbon cable. There is a ground stud on the frame of the power supply.

WARNING

The ground stud of the power supply must be connected to a frame ground. Failure to ground the supply could endanger equipment and people who touch the supply in case of a malfunction.

The supply has internal fuses for all current and power sources. The fuses are readily accessible under the cover.

The supply can be strapped for long or short lines, by means of jumpers easily installed on the panel of the supply, under the cover. Up to four extensions can be strapped for long lines, of up to 330 meters (1000 feet).

1.4 Power Backup Equipment

The Power Failure Unit (PFU) is an optional module required for the installation of power failure emergency telephones. It contains a transfer relay that automatically connects emergency telephone lines to CO lines in the event of power failure. The PFU is supplied with 24V dc power by the KSU.

Any commercially marketed battery backup unit which supplies a stabilized 24V output may be installed. The power supply has a terminal strip under the cover on the left side of the supply; a cable clamp on the housing holds the wires from the backup unit in place.

1.5 Interconnect Equipment

Cables and distribution blocks are required to install the **key bx** 816. Cables required include 25-pair cables, with standard telephone connectors at one end and unterminated at the other end; and 24-AWG insulated wire for connecting external equipment, such as the PFU, music on hold units, and door units. If the Call Detail Recording option is installed, a cable with D24 connector is required to interface the system to an external printer or computer. Only to pins of the connector -- pin 2 (TD) and pin 7 (GD) need be connected; other pins are not used by the **key bx**.

Installation instructions for the **key bx** 816 are based on the use of 66M150 split-terminal distribution blocks.

Section 2
PROVISIONING AND LAYOUT

2.1 Hardware Provisioning

Common equipment requirements depend on the number of extensions to be installed. **key bx** 816 installation is planned to require only a minimum of interconnect equipment -- a full installation with 8 CO lines and 16 extensions, in addition to all external equipment (external relays, CDR, and so on) requires only four distribution blocks. Table 13-1 shows the equipment requirements for the number of extensions to be installed.

2.2 System Layout

In the initial stages of planning the system, the customer service representative, the customer and a member of the engineering staff or installation staff should review a floor plan of the installation and determine locations for extensions and common equipment. The following principles must be taken into account.

2.2.1 Common Equipment. The common equipment must be installed in a location that is dry, cool, and relatively clean. It should be away from water pipes which can sweat, and away from high-voltage conduits which can cause electromagnetic disturbances. It should preferably be installed as near as practical to the building OSP cabling entrance, to make cutover of CO lines easy. However, it must not be too far from the locations of the extensions, so that cabling to the extensions is not overly long. All but four of the extensions must be within 160 meters (500 feet) of the common equipment.

There must be enough space to install all the common equipment. Since the equipment must be spaced apart on the wall to prevent overheating, the installation takes up about 6 square meters (54 square feet) of wall space (2 X 3 meters, or 6 X 9 feet).

The common equipment must be installed within 6 feet of a standard 110-V outlet (with a 15-amp fuse). If a Power Failure Unit or battery backup unit is installed, an additional outlet, with a separate fuse, is required.

2.2.2 Extensions. The location of each extension should be marked on the floor plan. The following principles should guide the planning:

- Up to four of the extensions may be connected with long lines of up to 1000 feet (330 m). The remaining extensions can be up to 500 feet (160 meters) from the KSU.

- Extensions 20 and 21 should be located as close together as possible. This is to make it possible to install a DSS, which works in conjunction with station 20. Even if no DSS is installed initially, the extensions should be near each other, to make possible later installation if desired.
- The lowest extension numbers should be assigned to the most senior users. This is because the key bx has a built-in priority system of providing telephone service. When trunk queuing, if two extensions request an outside line simultaneously, the lowest-numbered extension is granted the line. Extension 20 should be assigned to the receptionist, or whoever will serve as the telephone attendant. This extension has certain special features -- for example, lost calls automatically ring at this extension, and it works with the DSS console when one is installed in station 21.

2.2.3 Emergency telephone locations. If emergency telephones are to be installed, their locations should be determined in the initial planning stage. You should plan for emergency telephones, even if none are installed during the initial installation.

TABLE 2-1
HARDWARE PROVISIONING

Number of extensions	Cards Required		Cabling Required		Distribution Blocks Required	
	With options	Without options	With options	Without options	With options	Without options
4	MC + OPT	MC	2 25-pair 1 wire for RS-232	1 25-pair	3	2
8	MC, OPT, TLC2(1)	MC, TLC2	3 25-pair 1 wire for RS-232	2 25-pair	3	2
12	MC, OPT, TLC2, TLC3	MC, TLC2, TLC3	4 25-pair 1 wire for RS-232	3 25-pair	4	3
16	MC, OPT, TLC2, TLC3 TLC4	MC, TLC2, TLC3, TLC4	5 25-pair 1 wire for RS-232	4 25-pair	4	

(1) If Single-Line Telephones are installed, TSC cards are installed instead of TLC.

Section 3
FEATURE CONFIGURATION

3.1 Introduction

Once physical layout of the installation has been planned, you can decide the configuration of all the **key bx** telephone features and system features. System characteristics can be tailored to the client's specific needs. This configuration is done using seven pages of programming forms, shown in Figures 3-1 to 3-7. An additional set of blank forms is included in Appendix A.

When the **key bx** is first powered up, there is a default configuration for all the programmable features. The programming forms in the Figures are filled out according to the default program. Most of the **key bx** features can be left in their default states for most installations, but in every case some of the features must be programmed.

You may want to program the system to serve special functions, such as private line service, direct extension access, tenant service, or other functons. These special configurations are explained in Sections 3, 4, and 5.

3.2 CO Line-Station Applied Features Set-Up

The first page of the programming forms is a matrix table, showing the relationships between CO lines and stations. Use this page to determine where CO lines ring or flash, and to program access restrictions to CO lines.

3.2.1 CO Line Access Restriction. Place an X in this column opposite each station which is to be restricted from access to this CO line. CO Line Access Restriction is explained in Section 6.2 of the System Description.

3.2.2 Toll Restriction. Place an X in this column opposite each station which is to be toll restricted on this CO Line. See Section 6 of the System Description for an explanation.

3.2.3 Incoming Call Ringing (Day). Place an X in this column opposite each station at which incoming calls on this CO Line are to ring at day time.

Incoming calls on a given CO Line can ring at no more than four stations (they can flash at any number of stations).

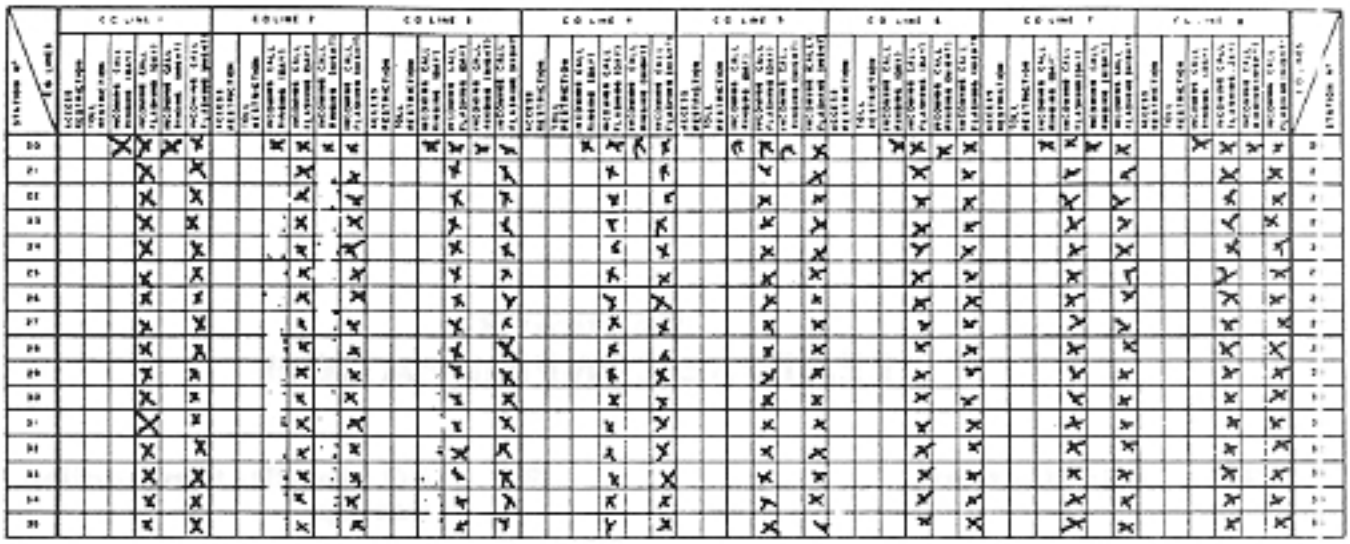


Figure 3-1 Trunk-station features form (page 1).

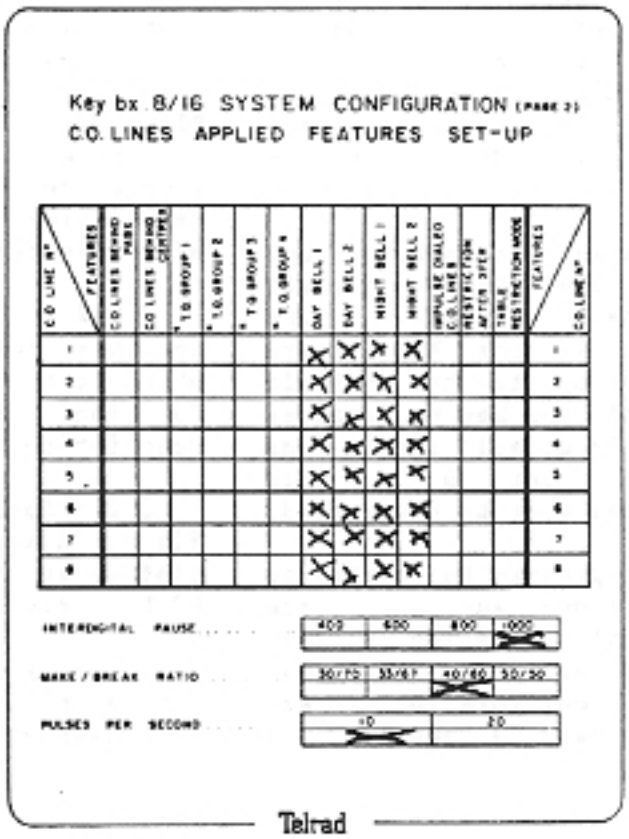


Figure 3-2 Trunk features form (page 2).

However, if one of the stations is extension 20, then the total number of ringing stations is reduced to three. This is to enable an additional ringing station to be activated when the Day Alert button is pressed on the DSS.

Incoming Call Ringing (Day) is explained in Sections 4.1 of the System Description.

3.2.4 Incoming Call Flashing (Day). Place an X in this column opposite each station at which incoming calls on this CO line are to ring or flash when the system is in day service (day service is explained in Section 4.3 of the System Description).

3.2.5 Incoming Call Ringing (Night). Same as 3.2.3, except that this column is for ringing at night service. (See Sections 4.1 and 4.3 of the System Description for explanation.)

3.2.6 Incoming Call Flashing (Night). Same as 3.2.4, except that this column is for flashing at night service. (See Sections 4.1 and 4.3 of the System Description for explanation.)

3.3 CO Line Applied Features Set-up

The second page of the programming form is for features which configure CO lines -- how they are grouped, the type of lines, signaling methods, and other features.

3.3.1 CO Lines Behind PABX. Place an X in this column opposite each CO line which is to be programmed to be behind a PABX line. The features behind PABX and behind CENTREX are explained in detail in Section 3.5 of the System Description.

3.3.2 CO Lines Behind CENTREX. Place an X in this column opposite each CO line which is to be programmed to be a behind CENTREX line. (See Section 3.5 of the System Description.)

NOTE: A CO line cannot be programmed as both behind PABX and behind CENTREX. If you try to program both these features, the last one you program will be the one which is entered in the system configuration.

3.3.3 Four Trunk Queue Groups. Place an X in the column of the desired CO line queue group opposite each CO line which is to be included in this group. Trunk queuing is explained in Section 5.13 of the System Description.

3.3.4 Day Bells. Place an X in the column of the desired external bell (up to two) opposite each CO line on which incoming calls are to ring at this external bell at day time. (See Section 4.4 of the System Description.)

3.3.5 Night Bells. Same as 3.3.4 except that this column is for ringing at night service. (See Section 4.4 of the System Description.)

3.3.6 Transfer Restriction. If an extension is prohibited access to a CO line according to the access restriction feature (Section 3.2.1), it may still be able to dial on the line if the line has been transfered to the extension. You can prevent the extension from dialing on the CO line with the transfer restriction feature. Place an X in this column opposite each CO line to be transfer restricted.

Note that you may want to configure a CO line as access restricted, but not transfer restricted. For example, the guard at the front desk of a building may have a **key bx** extension which is access restricted to all CO lines -- the extension is used as an intercom phone only. If the guard must make an outside call, he can ask the **key bx** attendant to transfer an outside line to his extension. If the CO line is not transfer restricted, he can then make an outside call from his extension.

See Section 6 of the System Description for explanation of Transfer Restriction.

3.3.7 Impulse Dialing CO Lines. Place an X in this column opposite each CO line which has Impulsed Dialing. See Section 3.8 of the System Description for explanation.

3.3.8 Table Restriction Mode. Place an X in this column opposite each CO line to be toll restricted according to toll tables. There are two types of toll restrictions offered by the **key bx** -- table restriction and 0/1 restriction. These are explained in Section 6 of the System Description.

3.3.9 Interdigital Pause. At the bottom of the form is space to fill in all the signaling parameters of impulse dialing, if this signaling method is used. This part of the form need be filled in only if impulse dial lines are installed.

Interdigital pause denotes the minimum time of the pause duration between two digits while impulse dialing on a CO line. Explanation appears in Section 3.8 of the System Description.

3.3.10 Make/Break Ratio. This denotes the ratio between Make and Break while impulse dialing on a CO line. See Section 3.8 of the System Description.

3.3.11 Pulses Per Second. This denotes the number of pulses per second while impulse dialing on a CO line. See Section 3.8 of the System Description.

3.4 Station Applied Features Set-up

Page 3 of the programming forms is used to define the characteristics of each extension in the system.

3.4.1 Paging Access. Each of the six sub-columns in the main Paging Access column denotes one paging zone (internal - 40-41 or external - 42-45). Place an X in the desired zone column opposite each station which is to have access to that zone. If an extension does not have access to a page zone, the user will hear an error tone if he tries to dial the zone code.

An explanation of Paging Access appears in Sections 4.7 of the System Description, and 2.15 and 4.2.2 of the Operating Instructions.

3.4.2 Page Routing. Each of the two sub-columns in the main Page Routing column denotes one internal paging zone. Place an X in the desired zone column opposite each station or external zone which it is desired to include in that zone.

Note that zones can be overlapping, i.e. a given station or external zone may be included in both zones.

Usually one zone is designated as an "all page zone." This means that all the stations in the system are included in the zone.

If your system has Single Line Telephone (SLT) extensions (including Off-premise extensions), they may not be included in a page zone. If you try to program an SLT extension in a page zone, the system will reject the attempt. See Section 4.7 of the System Description for an explanation on Paging.

3.4.3 OPX DTMF. Place an X in this column opposite each station which is to be a DTMF Single-Line Telephone (SLT).

The following extensions may not be programmed as SLT extensions: 20, 21, 22, 23, speed-dial table entry station and time-setting station. If you try to program one of these extensions as SLT, the attempt will be rejected.

3.4.4 OPX Rotary. Place an X in this column opposite each station which is to be a Rotary SLT station.

The same restrictions which apply to DTMF SLTs also apply to rotary dial SLTs.

3.4.5 DND Access. Place an X in this column opposite each station which is to have access to DND feature. DND Access is explained in Sections 5.9 of the System Description and 2.21 of the Operating Instructions.

3.4.6 DND Forward. Write in this column the two digit number of the station to which internal calls are to be forwarded when the station opposite this square is in the Do-Not-Disturb (DND) mode.

If you do not program the DND forward feature, a caller to a station in DND hears a busy signal after two rings. An explanation of DND Forward appears in Section 4.8 of the System Description.

3.4.7 Manager/Secretary. In the Manager/Secretary column, write the two digit number of the station to which the station opposite this square is to be linked by a Manager/Secretary speech path.

The manager/secretary function is described in Section 5.3 of the System Description.

3.4.8 Two Pick Up Groups (Future Option). Place an X in the column of the desired pick up group opposite each station which is to be included in this group.

3.4.9 Background Music Access. Place an X in this column opposite each station which is to have access to the background music feature. See Section 3.10 of the System Description for more information about this feature.

3.4.10 System Speed Restriction. Place an X in this column opposite each station which is to be restricted from system speed dialing. See Section 6 of the System Description for explanation.

3.4.11 System Speed Toll Restriction. Place an X in this column opposite each station which is to be toll restricted on system speed dialing. See Section 6 of the System Description for explanation.

3.4.12 411 Restriction. Place an X in this column opposite each station which is to be restricted from dialing 411/1411. See Section 6 of the System Description for explanation on 411 Restriction.

3.4.13 Automatic Answer. Place an X in this column opposite each station which is to be able to answer incoming or recall CO Line ringing by only lifting the handset (without pressing the CO line button). An explanation of Automatic Answer appears in Section 5.4 of the System Description.

3.4.14 Flash Access. Place an X in this column opposite each station which is to have access to CO line Flash feature. See Section 5.7 of the System Description for an explanation.

3.4.15 All Intrusion. Place an X in this column opposite each station in which verbal intrusion is to be permitted (on-hook or off-hook). For an explanation, see Section 5.1 of the System Description.

3.4.16 On-Hook Verbal Intrusion. Place an X in this column opposite each station in which verbal intrusion is to be permitted while on-hook only. For an explanation, see Sections 5.1 of the System Description.

3.4.17 DSS Barge In (Future Option). Place an X in this column opposite each station for which DSS barge-in is to be permitted. See Section 5.14 of the System Description for an explanation of barge-in.

3.4.18 DND Intrusion. DND intrusion and ICM restriction (Section 3.4.19) appear on page 4 of the programming

forms. For DND intrusion,The 16 columns are for the prime stations - the stations which can intrude on other stations in DND mode. For each prime station, place an X in the row of each station on which the prime station can intrude. See Section 5.9 of the System Description.

3.4.19 ICM Restriction. Each of the 16 sub-columns is used to define a prime station.

Place an X in the selected sub-column opposite each station which is to be restricted from calling this prime station. See Sections 5.1 and 5.9 of the System Description for explanation of ICM Restriction.

3.5 System Applied Features Set-up

This page of the programming forms is for setting timing parameters of the system, and for setting other system-wide functions.

3.5.1 Hold Time. This denotes the time (in minutes and seconds) that is required before a call on hold recalls to the station which placed it on hold. Write in this line the required hold time in minutes and seconds (up to a maximum of 9.50 min. in steps of 10 sec.).

You can program the hold time as unlimited. In this case, a call will remain on hold indefinitely. To do this, put an X in the UL column. See Sections 3.2 and 5.2 of the System Description for an explanation on Hold.

3.5.2 Day Recall Time. This denotes the required time duration (in minutes and seconds) of recall at the station that put the call on hold at day time, from completion of the hold period until the call recalls automatically to the attendant station if not answered meanwhile. Write in this line the required day recall time in minutes and seconds (up to a maximum of 0.50 min. in steps of 10 sec.). See Programmable System Times in Section 3.2 of the System Description.

Put an X in the UL column if day recall time is to be unlimited.

3.5.3 Night Recall Time. This denotes the required time duration (in minutes and seconds) of recall at the station that put the call on hold (at night service), from completion of the hold period until the call is automatically disconnected if not answered meanwhile. Write in this line the required night recall time in minutes and seconds (up to a maximum of 9.50 min. in steps of 10 sec.). See Programmable System Times in Section 3.2 of the System Description.

Put an X in the UL column if night recall time is to be unlimited.

3.5.4 DSS Recall Time. This denotes the required time duration (in minutes and seconds) of recall at the DSS, from the completion of the recall period at the station that put the call on hold at day time, until the call is automatically disconnected if not answered meanwhile. Write in this line the required DSS recall time in minutes and seconds (up to a maximum of 9.50 min. in steps of 10 sec.). See Section 3.2 of the System Description.

Put an X in the UL column if DSS recall time is to be unlimited.

3.5.5 Unscreened Transfer Recall Time. This denotes the required time duration (in minutes and seconds) of recall at the station to which a call was transfered unscreened, from the moment of transfer, until the call recalls automatically - if not answered meanwhile - to the attendant station (at day time) or to the station that transferred the call (at night service). Write in this line the required unscreened transfer recall time in

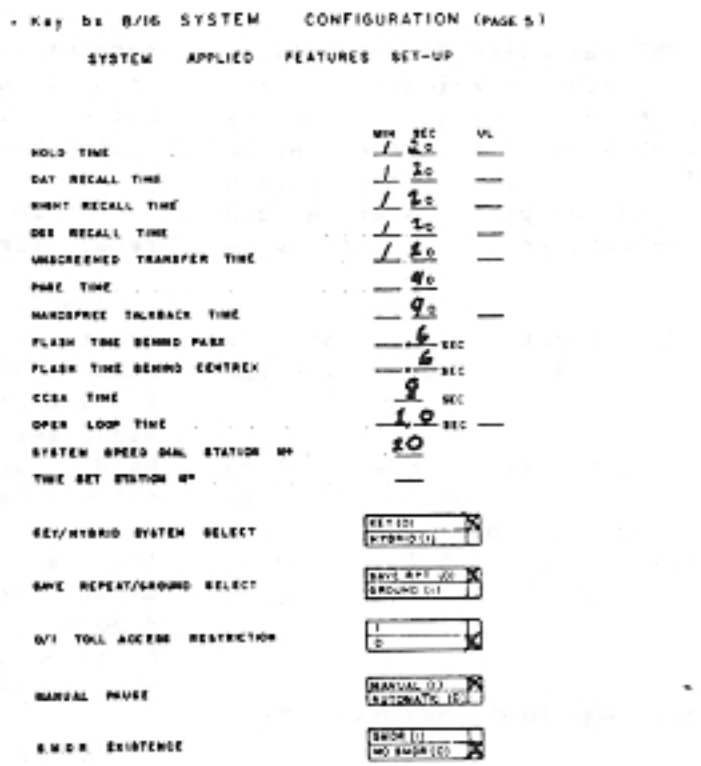


Figure 3-5 System features form (page 5)

minutes and seconds (up to a maximum of 9.50 min. in steps of 10 sec.).

This time can also be set to unlimited.

For an explanation on Unscreened Transfer Recall Time, see Sections 3.2 of the System Description.

3.5.6 Page Time. This denotes the maximum time duration (in minutes and seconds) that is required until a page announcement (internal or external) is automatically disconnected. Write in this line the required page time in minutes and seconds (up to a maximum of 4.50 min. in steps of 10 sec.). See Section 4.7 of the System Description for an explanation of paging.

Page time cannot be set to unlimited.

3.5.7 Handsfree Talkback Time. This denotes the maximum time duration (in minutes and seconds) that is required until a handsfree talkback conversation is automatically disconnected. Write in this line the required handsfree talkback time in minutes and seconds (up to a maximum of 4.50 min. in steps of 10 sec.).

Handsfree talkback time can be set to unlimited. See Sections 2.5 to 2.8 of the Operating Instructions for an explanation on using the key bx hands-free.

3.5.8 Flash Time (For "Behind PABX" Lines Only). This denotes the required time duration of the CO line disconnection when pressing the "FLASH" button. Write in this line the required flash time in sec. and tenths of sec.

(up to a maximum of 9.6 sec. in steps of approximately 1/3 sec.). See Section 3.2 of the System Description for an explanation of Programmable System Times.

3.5.9 Flash Time (For "Behind CENTREX" Lines Only). Same as 3.5.8.

3.5.10 CCSA Time. This denotes the required time duration (in seconds) of the pause between dialed digits if # was entered into a speed dial number (or manual pause if allowed by programming - see "manual pause" feature paragraph 17) between the desired digits. Write in this line the required CCSA Time in sec. (up to a maximum of 19 sec. in steps of 1 sec.).

For an explanation of Speed Dialing CCSA Codes, see Section 5 of the Operating Instructions.

3.5.11 Open Loop Time. This denotes the minimum CO line open loop time which will cause an automatic disconnection of the CO line in the following cases:

- o trunk on hold.
- o Second trunk in conference.
- o trunk call to impulse dialed SLT.

Write in this line the required open loop time in seconds and tenths of a second (up to a maximum of 4.9 seconds in steps of 0.1 second).

The automatic disconnection can be canceled by programming an unlimited time - see note 1 above.

3.5.12 System Speed-Dial Programming Station. Write in this line the two digit number of the station that is required to have the ability to load the 90 system speed-dial numbers.

A Single Line Telephone cannot be programmed to load the system speed-dial numbers.

For an explanation on Speed Dialing, see Section 5.5 of the System Description.

3.5.13 Time Setting Station. Write in this line the two digit number of the station that is required to have the ability to set the time.

A Single Line Telephone cannot be programmed as the time-setting station. Stations No. 20 and 21 are allowed to set the time without programming.

3.5.14 Key/Hybrid System Select. Place an X in the square marked Key System if single line telephone operation is as a key telephone. Otherwise, place an X in the square marked Hybrid System - the single line telephone operates as a PABX telephone. Section 3.9 of the System Description is an explanation of Hybrid Configuration.

3.5.15 Save Repeat / Ground Select. Place an X in the square marked Save Repeat to use the save repeat feature from stations, or place an X in the square marked Ground to use the ground feature from station. See Section 3.5 of the System Description for an explanation of ground signaling; Section 5.5 of the System Description describes Save/Repeat Dialing.

3.5.16 Toll Access Restriction. In areas where a prefix '1' is required before dialing the area code for toll calls, place an X in the square marked "1". In all other areas, place an X in the square marked "0". See Section 6 of the System Description for an explanation on Toll Access Restriction.

3.5.17 Manual Pause. If, when dialing # manually (on a CO line) as second, third or fourth digit, a pause between the adjacent digits is to be provided (for use behind PABX, etc.), place an X in the square marked "Yes". If, on the other hand, the # is to be dialed out, place an X in the square marked "No". See Section 3.5 of the

System Description for an explanation of Manual Pause.

3.5.18 SMDR Existence. Place an X in the square marked "Yes" if the system has SMDR. Otherwise, place an X in the square "No." See Section 3.4 of the System Description for an explanation on Call Detail Recording.

3.6 CDR Features Set-up

Page 6 of the programming forms is for configuring the optional RS-232 port for use with a printer or mass storage device for Call Detail Recording. You can also use this page to determine the format of the CDR output.

Any ASCII asynchronous serial printer can be used for CDR.

Section 3.4 is an explanation of Call Detail Recording.

3.6.1 Baud Rate. Place an X in the square for the required CDR printer baud rate (available baud rates are 110, 150, 300, 600 and 1200).

3.6.2 Parity. Place an X in the square for the required CDR printer parity (odd or even).

3.6.3 Header. Place an X in the square marked "Yes" if CDR header lines are to be printed out. Otherwise, place an X in the square marked "No" (only the terminating station will be printed out in this case).

3.6.4 Blank Line. Place an X in the square marked "Yes" if a blank line is to be left after every line printed out by the CDR. Otherwise, place an X in the square marked "No".

3.6.5 Page Length. Write in this line the required number of printed-out lines in CDR page (excluding blank lines at end of page).

If separation into pages is not required -- for example, if you have connected the RS-232 port to a computer or mass storage device -- place an X in the column marked "UL". In this case, continuous print-out will be provided.

3.6.6 End of Page. Write in this line the required number of blank lines at end of page (0-9).

3.6.7 Participating Stations. Place an X in the square marked "Yes" if all the participating stations in a CO line call (conferenced or transferred) are to be listed by the CDR printer. Otherwise, place an X in the square marked "No" (only the terminating station will be printed out in this case).

3.6.8 Minimum Time - Incoming Call. This denotes the required minimum time duration of a CO line incoming call that will cause the CDR to print out the call. Write in this line the required minimum time in minutes (0-99).

If you set this time to 0 all the incoming calls will be recorded.

3.6.9 Minimum Time - Local Call. This denotes the required minimum time duration of a CO line outgoing local (not more than seven digits) call that will cause the SMDR to print-out the call (depends also on number of dialed out digits). Write in this line the required minimum time in minutes (0-99).

If you set this time to 0, all local calls will be printed out.

3.6.10 Minimum Time - Long Distance Call. This denotes the required minimum time duration of a CO line outgoing long-distance (more than 7 digits) call that will cause the SMDR to print out the call (depends also on number of dialed out digits - see paragraph 3.6.11). Write in this line the required minimum time in minutes (0-99)

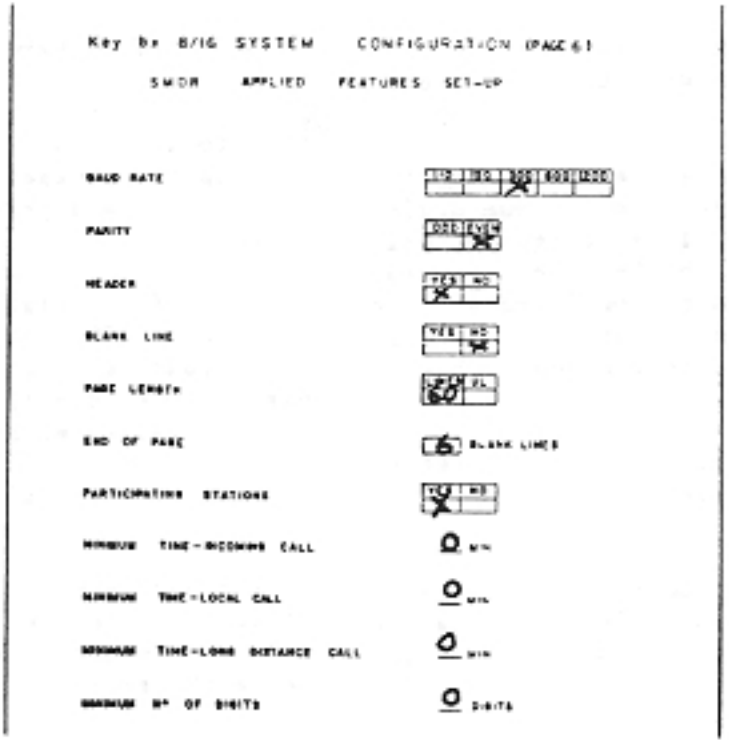


Figure 3-6 CDR features form (page 6).

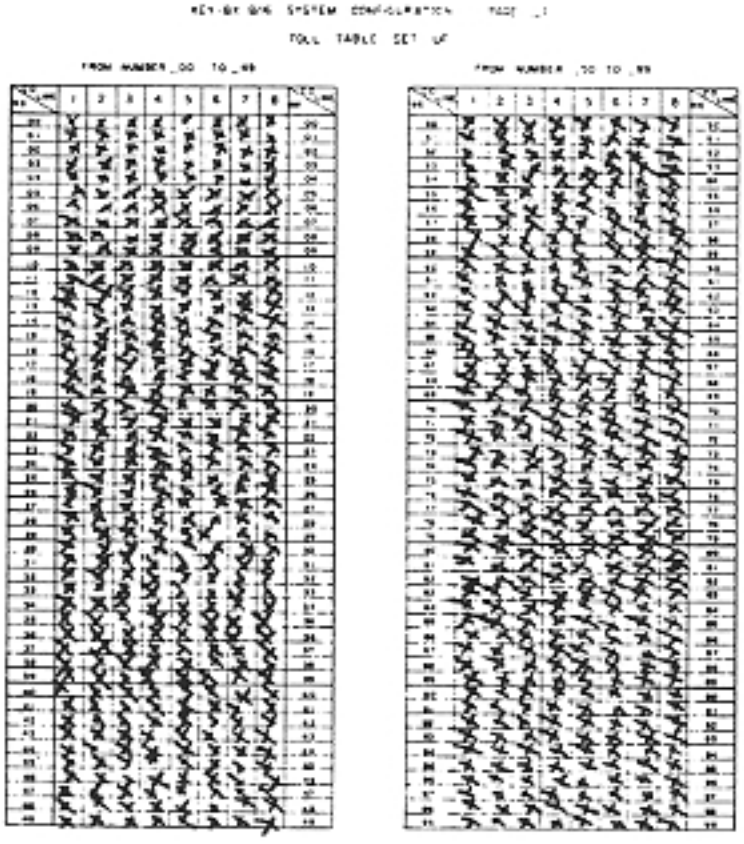


Figure 3-7 Toll restriction table (page 7).

If you set this time to 0, all long-distance calls will be printed out.

3.6.11 Minimum Number of Digits. This denotes the required minimum dialed out digits on a CO line outgoing call that will cause the SMDR to print out the call (if time duration is more than the programmed minimum time). Write in this line the required minimum number of dialed out digits (0-24).

If you set this to 0, all outgoing calls will be recorded.

3.6.12 Forced Account Code. Place an X in this column opposite each station which is required to print an account code.

3.7 Toll Table Set-up

Pages 7 and on are used for planning the toll tables of the system. You may need up to 16 pages of toll tables, if you write a separate table for each CO line.

Each of the eight CO lines has a toll table with 800 combinations (200 - 999). These combinations are the first three dialed out digits on a CO line. (In case of table restriction, see 3.3.8.)

Fill in the table for each CO line as follows:

For each combination that is to be denied, place an X in the square. For each combination that is to be allowed, leave the square blank.

Section 4
PROGRAMMING: INTRODUCTION

4.1 Programming Equipment

Determining the configuration of the **key bx** 816 is easily mastered. No knowledge of programming or computers is necessary; there are no complex codes, and no special terminal is required.

In order to set the system configuration, you need the following things:

- o a Direct Station Select console. This is the standard equipment for the attendant position of the system, which is converted to a system programmer by means of a switch on the back.
- o two programming overlays. These overlays simplify the programming procedure.
- o the programming forms, described in Section 14. There are 8 different pages of forms.
- o access to the Key Switching Unit (KSU) of the **key bx**. Note that, unlike in other electronic key systems, you need not connect any special devices to the KSU, and you needn't be near it in order to program. However, there is a switch on the KSU which you must set in order to use the DSS console as a programmer.

4.1.1 DSS Console. You use the DS console to configure all the features of th **key bx**. On the rear of the unit (see Figur 4-1) is a slit, with a switch inside th case. Normally, this switch is in the "DSS position. To turn the console into programmer, insert a screwdriver or othe long object into the slit, and push th switch to the "PROG" position.

4.1.2 Programming Forms. These forms ar described in detail in Section 14. Yo should carefully fill out these forms befor attempting to program. Use the blank form in Appendix B of this manual. Once you hav finished programming, keep the forms in safe place -- either with this manual, o inside the KSU. They are a ready referenc of the complete configuration of you system. If you change the programming o the system at any time, be sure to mark th change on the form.

4.1.3 Programming Overlays. Figure 4- shows the overlays. They fit over the fron panel of the DSS console, and indicate th function of each button on the console.

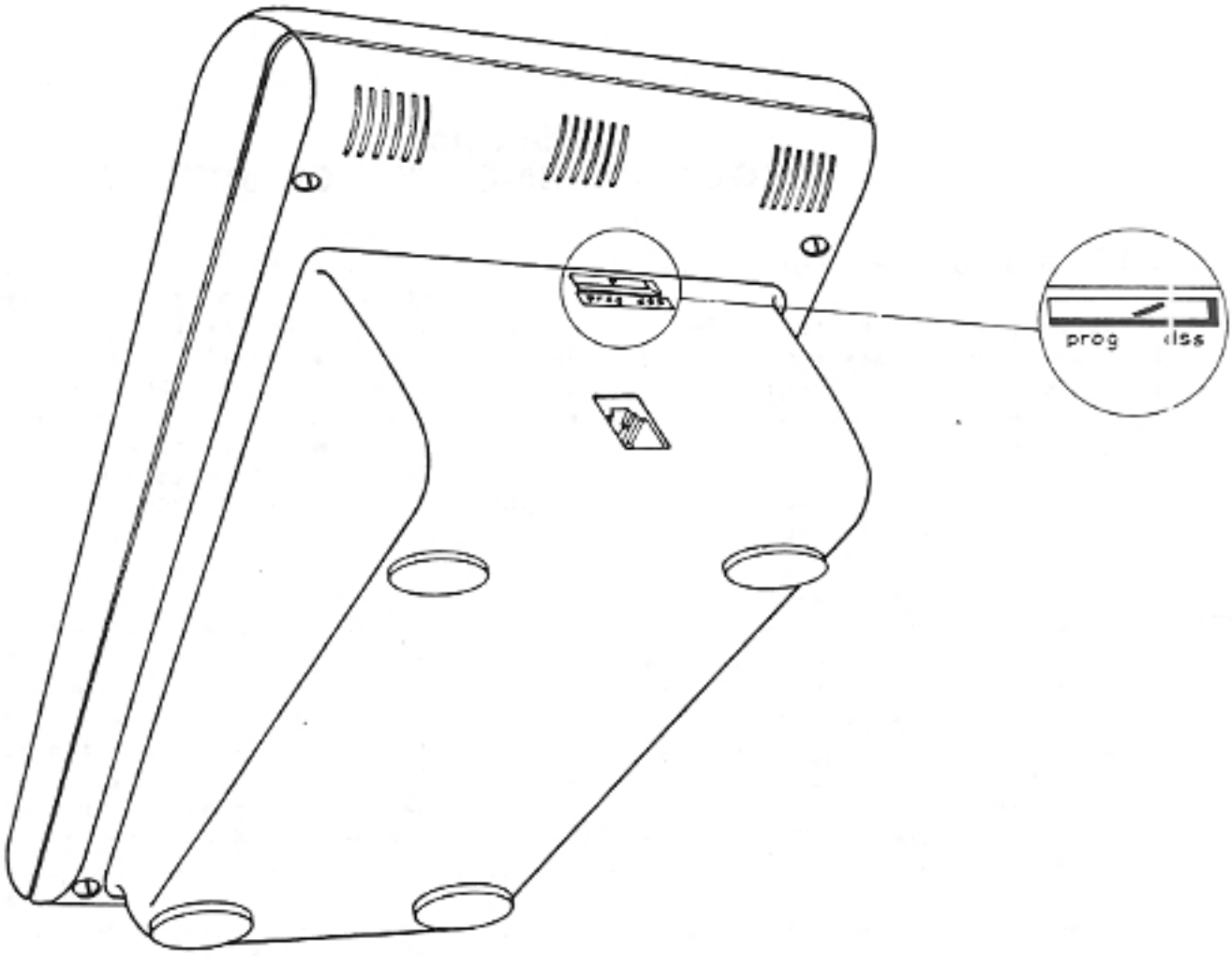


Figure 4-1 Direct Station Select (DSS) console, rear view.

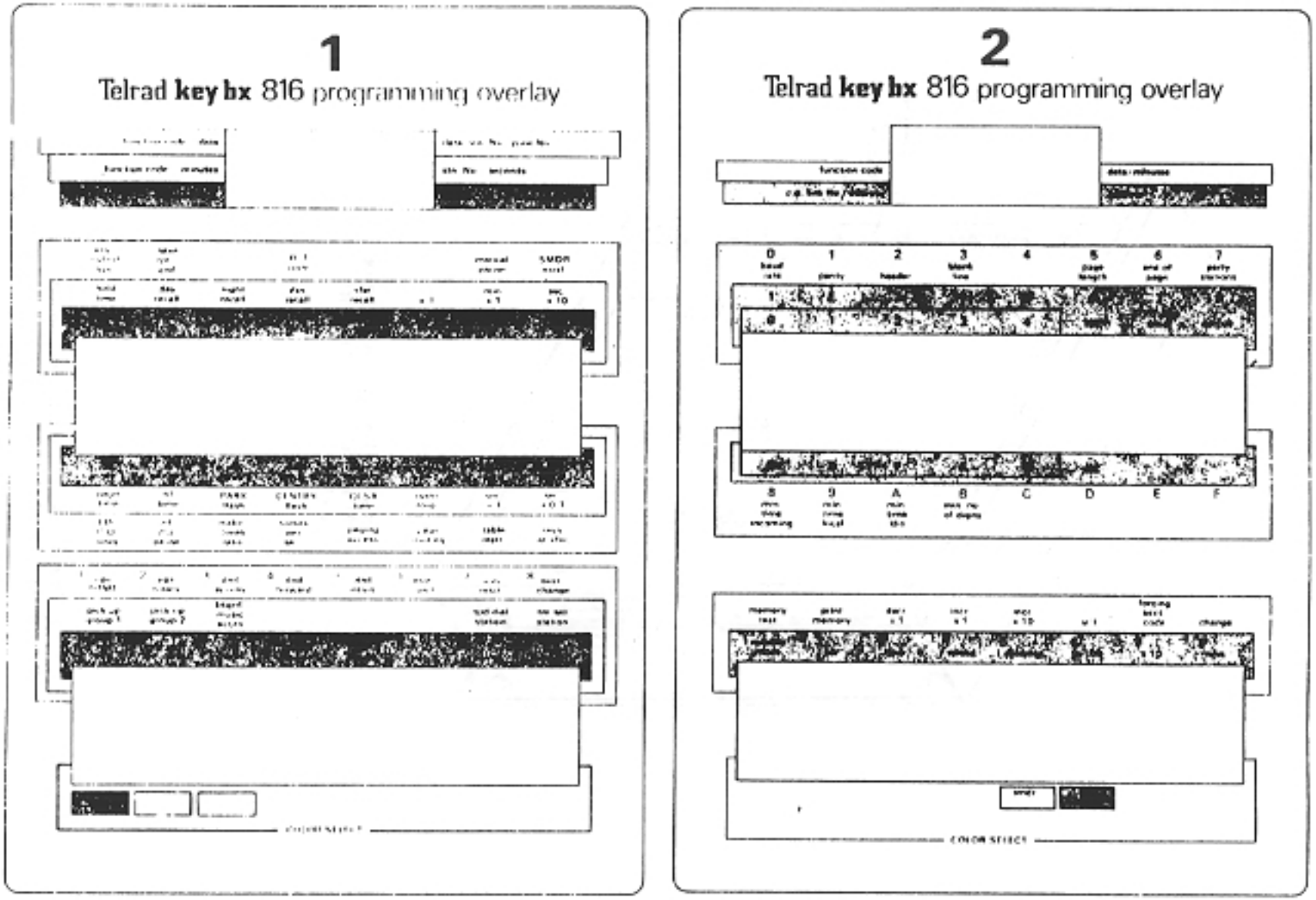


Figure 4-2 Programming overlays.

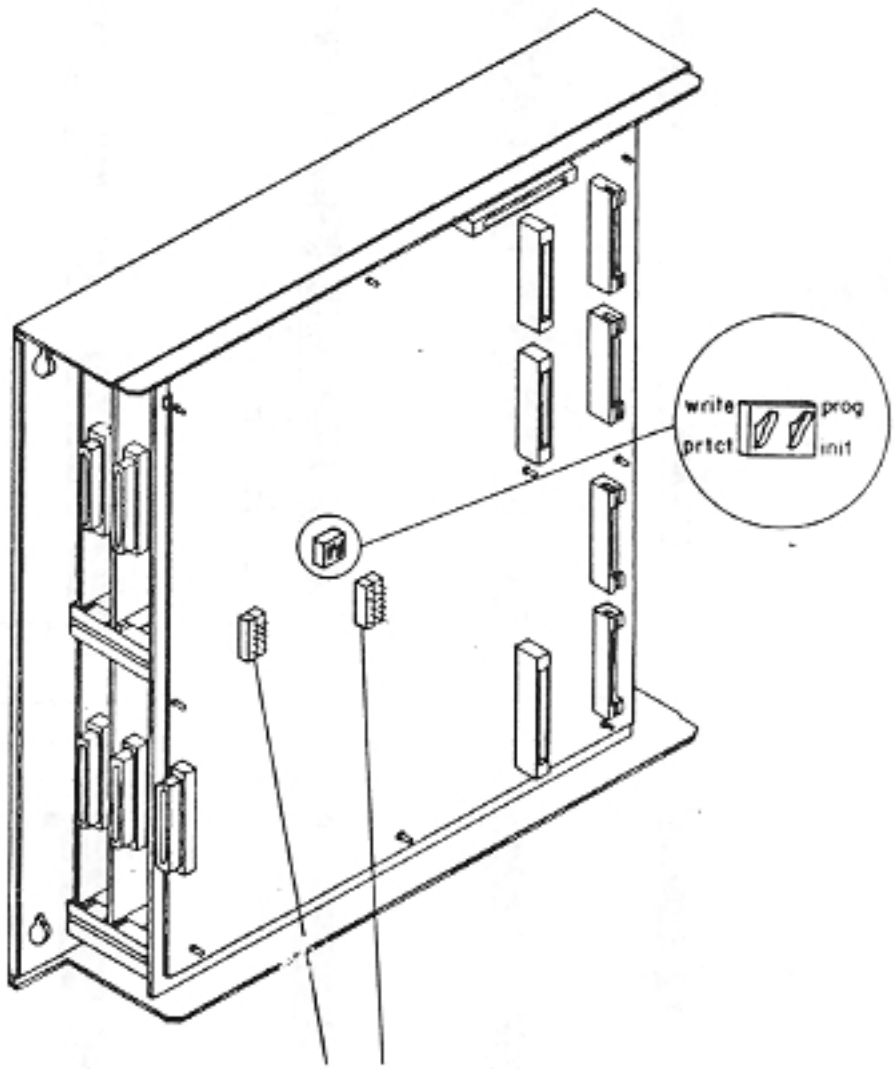


Figure 4-3 Switches on KSU.

4.2 The Programming Process

Programming the **key bx** consists of four stages:

- setting up the system for programming;
- selecting the feature you want to program;
- entering the configuration of the feature;
- storing the configuration.

4.2.1 Setting up. Follow these steps to set up the system for programming:

1. Get the equipment together -- the DSS, the programming forms, and the programming overlay.

2. Set the switch on the back of the DSS to the PROG position. When you do so, the bottom left button on the DSS lights, and in the display appears "OL 1".

3. Open the KSU. On the main board of the KSU, located left of the center of the board, are two switches SW1. Set them in the WRITE and PROG positions (see Figure 4-3).

The two switches on the KSU are to protect the system from accidental erasure of the configuration you enter, and to prevent unauthorized persons from changing the configuration. The first switch has two positions:

- WRITE -- permits programming from the DSS console;
- PROTECT -- causes the system to reject any changes in configuration.

The second switch also has two positions:

- PROGRAM -- preserves the configuration you enter in case of a power failure or system reset;
- INIT -- causes the system to load the default system configuration after a power failure or reset. In this case, all the configuration you may have entered will be lost, and you must enter it anew.

4.2.2 Programming. As you program, the buttons of the DSS serve different functions. At first, they are used to select the feature group and the feature you want to configure. Then they may represent extensions or trunks, so you can selectively apply the feature you selected to different trunks or extensions.

The features are divided into five groups. Each group is represented by a color on the programming overlays (see the Figure). The green, yellow and pink features are on the first overlay; the white and the blue features on the second.

Select the feature group using the first five buttons in the bottom row of the DSS. So, for example, if you want to program access to page zones, do the following:

1. Put the first overlay on the DSS.

2. Press the green color select button (the third button in the bottom row).

3. Press "paging access" (the fifth button in the second row).

The paging access feature is now ready to be programmed. You will use the top field of buttons to select the extensions which can access each page group. The state of the lights in the buttons tells you which extensions have access and which are denied. (Detailed instructions for programming this feature are in Section 7)

Two feature groups appear on the second programming overlay -- those which deal with the RS-232 port for printing CDR reports, and the toll tables which determine which long distance calls may and may not be dialed. If you select one of these two

feature groups, the display of the DSS shows "OL 2".

When you have finished configuring a particular feature, you store the configuration by repressing the feature button, or by selecting a different feature. Each time you advance to a new feature, the feature you just configured is stored in system memory.

When you are done programming the system, you must do the following things:

1. Set the switch at the back of the DS to "DSS".
2. Set the switches on the KSU to "PROTECT" and "PROGRAM".
3. Be sure to update the programming forms.

Table 4-1 shows the general procedure for setting up, programming and concluding the programming.

TABLE 4-1
PROGRAMMING SET-UP

Step	Action	Verification
1	On the rear of the DSS console, set the switch to the PROG position (see Figure 4-1).	The display of the DSS shows OL 1 and the first button in the bottom row lights.
2	On the front of the DSS, place the programming overlay with the features you want to program: green, yellow and pink feature groups..... overlay 1 blue and white feature groups (SMDR and toll restriction features only).. overlay 2	
3	Go to the Key Switching Unit (KSU). Open the cover by loosening the screw at the bottom, and lifting the cover out and off. Set the two switches on the main board to the WRITE and PROG positions (see Figure 4-4).	
4	Program the feature or features according to the programming forms filled out for the system. Follow the instructions in the Tables in the following Sections. If you change original configuration, be sure to update the programming forms.	As you program, the buttons of the DSS will light, and the display will indicate the changes you are making. These indications are described in the following Sections.
5	As you program a feature, the changes you configured are stored in the permanent memory of the system.	

(continued)

Table 4-1 (continued)

Step	Action	Verification
5	(continued) Sometimes the changes are stored when you pass from one step to the next in the programming process; sometimes when you complete programming a feature, and go on to another feature. NOTE: You should not switch out of programming mode without completing the programming of the last feature, and exiting the feature as described in the programming table. Otherwise, some of the changes you made may not be stored in permanent memory.	
6	When you have finished programming, reset the switch on the back of the DSS to DSS position.	The display and lights of the DSS return to their usual display during functioning as an attendant console.
7	At the KSU, return the two switches to the PROG and PROTECT positions.	

Section 5
TRUNK-STATION FEATURES

This section explains how to configure trunk-station applied features -- those features that determine the relationship between the station and each CO line. There are six of these features:

- access restriction;
- toll restriction;
- day ring;
- day flash;
- night ring;
- night flash

All six features are programmed in essentially the same way.

5.1 Access Restriction

Table 5-1 shows the programming procedure for access restriction. When this feature has been applied to an extension, the extension is denied access to a CO line. The feature is explained in Section 6 of the System Description.

Note that Single-Line Telephones (SLTs) that use DTMF dialing cannot dial on impulse-dialed trunks. Therefore, you must restrict access for these extensions to impulse-dialed trunks.

5.2 Toll Restriction

This function determines whether toll restrictions defined for a CO line are to be applied to an extension or not. If the feature is applied, the extension will be unable to dial some or all toll calls. Section 6 of the System Description describes this feature.

The programming procedure for this feature is the same as for access restriction. Follow the instructions in Table 5-1, but select function 21, instead of function 20.

5.3 Day Ringing

This feature defines which CO lines ring at which extensions. See Section 4.3 of the System Description.

It is programmed the same as access restriction. Follow the instructions in Table 5-1. In step 2 select feature 22.

Note this important limitation: you can configure a CO line to ring at only four extensions; if one of the extensions is station 20, the line can ring at only three extensions. If you try to configure any more extensions to ring on a single CO line, the display of the DSS will show

Err

indicating that you have made an error. This display remains until you delete one of the extensions, or exit the feature.

5.4 Day Flashing

This feature (Section 4.3 of the System Description) defines which CO lines flash at which extensions.

Follow the instructions in Table 5-1. In step 2, select feature 23.

When you select the CO line, some of the buttons in the extension field will flash; some may light steadily. The buttons which flash are those which have been configured to ring for that CO line. You cannot configure these buttons. If you try, the DSS display will show

Err

indicating that you have made an error. The display will remain until you press another button.

5.5 Night Ringing

This feature, described in Section 4.3 of the System Description, defines which CO lines ring where when the system is in night service. To configure it, follow Table 5-1. In step 2, select feature 24.

As with day ringing, you can configure a CO line to ring at only four extensions -- three if one of the extensions is station 20. If you try to program more, the DSS display will show

Err

indicating you have made an error.

5.6 Night Flashing

This feature (see Section 4.3 of the System Description) is the same as day flashing, but for night service. Follow the procedure in Table 5-1, but in step 2, select feature 25.

As with day flashing, when you select a CO line, some of the buttons in the extension field will flash. These are the extensions that have been configured to ring at night. You cannot configure these buttons -- if you try, the DSS will display the error message.

TABLE 5-1
STATION-TRUNK FEATURE PROGRAMMING

For:
- access restriction
- toll restriction
- day ring
- day flash
- night ring
- night flash

Step	Action	Verification
1	Prepare the **key bx** for programming, as described in Table 4-1.	When the DSS is set to PROG mode, the display shows OL 1 and the first button in the bottom row lights. This indicates that the pink group of features is selected for programming.
2	Select the feature you want to configure as follows: • access restriction.. 20 • toll restriction.... 21 • day ring..... 22 • day flash..... 23 • night ring..... 24 • night flash..... 25	The button you pressed lights, and in the display of the DSS appears XY __ where XY is the number of the feature you selected.
3	Select the CO line you want to configure. The top row of the bottom field represents the 8 CO lines. So, for example, if you wish to configure CO line 1, press the first button.	The button you pressed lights, and the display shows the feature and the CO line number. For example: XY 1 Also, buttons in the top field of the DSS may light, and some may flash. The steady lights indicate the extensions to which the feature has already been applied. Flashing lights indicate extensions for which you may not configure this feature.

(continued)

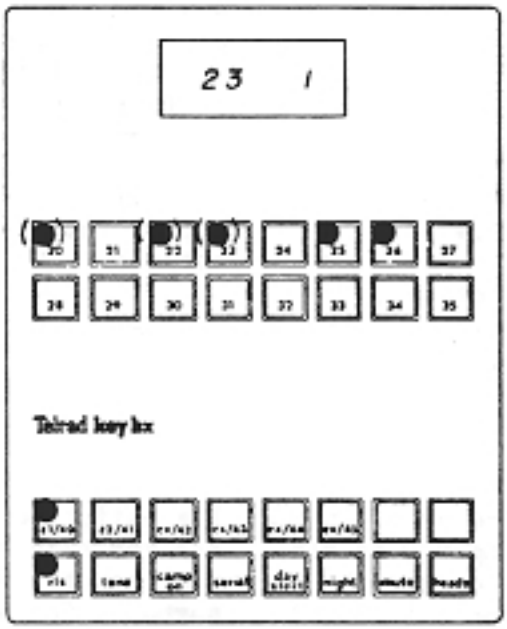


Figure 5-1 Day flash configuration example

Table 5-1 (continued)

Step	Action	Verification
3	(continued)	For example, in Figure 5-1, feature 23 (day flash) is being programmed for CO line 1. In the display appears 23 1 The feature has been applied to extensions 25 and 26 -- buttons 25 and 26 are lit. Buttons 20, 22, and 23 flash -- these are the extensions at which CO 1 rings; they cannot be configured not to flash (see note below).
4	To apply a feature to a CO line, press the button for that extension.	The button lights, indicating the feature has been applied.
5	To cancel a feature applied to an extension, press the lit button of the extension.	The light in the button goes out, indicating that the feature is no longer applied to the extension.
NOTE	DAY AND NIGHT RING ONLY: you can configure up to four extensions to ring for each CO line -- three if one of the extensions is 20.	If you attempt to press another extension button, the DSS displays XY Er indicating you have made an error. The display remains until you press a permissible button.
NOTE	DAY AND NIGHT FLASHING: You cannot cancel flashing of a CO line at any extension where that CO line rings.	If you press a flashing extension button, the DSS display shows XY Er indicating an error. The display remains until you press a permissible button.

(continued)

Table 5-1 (continued)

Step	Action	Verification
6	When you have configured the first CO line, you can go on to the next. Press another button in the bottom field.	The previous CO line button goes out, and the button of the new CO line lights. lights. In the display appears the number of the feature, and the number of the CO line you have selected: XY 2 Again, some of the buttons in the extension field of the DSS may light, and some may flash
7	When you have finished programming this feature, repress the lit CO line button.	The light in the CO line button goes out. The display shows OL 1 The button for the pink feature group is lit; all other buttons are extinguished.

Section 6
CO LINE FEATURES

This section explains how to configure CO line features. There are 16 features which determine configuration of the key bx trunks:

- CO lines behind PABX;
- CO lines behind CENTREX;
- four trunk groups;
- two day bells;
- two night bells;
- impulse-dialed CO lines;
- interdigital pause (impulse-dialed CO lines only);
- make-break ratio (impulse-dialed CO lines only);
- pulses per secont (impulse-dialed CO lines only);
- transfer restriction for CO lines;
- table restriction for CO lines.

The procedures for configuring these features are essentially the same.

6.1 CO Lines Behind PABX

Table 6-1 shows the procedure for configuring CO lines behind PABX. This feature is explained in Section 3.5 of the System Description.

Note this important limitation: a CO line cannot be configured as both behind PABX and behind CENTREX. If you try to configure both these features for a single trunk, the last one you configure will be the one which is stored.

6.2 CO Lines Behind.CENTREX

Section 3.5 of the System Description explains this feature. To configure it, follow the instructions in Table 6-1. In step 2, press button 27, which selects this feature.

You cannot program a single line to be both behind CENTREX and behind PABX. If you try, only the last feature you program will be stored by the system.

6.3 Trunk Groups

Trunk groups are used for trunk queuing, explained in Section 5.13 of the System Description. The feature is programmed using the procedure in Table 6-1. In step 2, select the trunk group you want to program as follows:

- trunk group 1 -- button 28
- trunk group 2 -- button 29
- trunk group 3 -- button 30
- trunk group 4 -- button 31

A CO line can belong to only one trunk group. If you attempt to configure a trunk to belong to more than

one group, only the last one you enter will be stored.

6.4 Bells

CO lines can be configured to ring external bells, a feature described in Section 4.4 of the System Description. To configure this feature, use the procedure in Table 6-1. In step 2, select the bell you wish to configure as follows:

- day bell 1 -- button 32
- day bell 2 -- button 33
- night bell 1 -- button 34
- night bell 2 -- button 35

There is no limitation on the number of CO lines which can ring at any bell. A CO line can ring both bells during day and night, if desired.

6.5 Impulse-Dialed CO Lines

Section 3.8 of the System Description describes the possibilities for configuring the system to dial on impulse-dial CO lines. To configure a CO line for impulse dialing, follow the procedure in Table 6-1.

- In step 1, select the green feature group (the third button in the bottom row of the DSS).
- In step 2, select feature 28 (I.D. C.O. LINES).

CO lines can be configured as impulse dialed only if the optional impulse dial card is installed in the KSU. This is a future option.

Note that if DTMF Single-Line Telephones (SLTs) are installed in the system, they cannot dial on impulse-dialed CO lines.

6.6 Interdigital Pause

On impulse-dialed trunks, the interdigital pause can be configured to match PTT or telephone company specifications. Sections 3.2 and 3.8 of the System Description explain this feature.

Table 6-2 describes the procedure for configuring the interdigital pause.

This feature can be configured only if the impulse dial option card is installed in the KSU.

6.7 Make-Break Ratio

The make-break ratio can be configured on impulse-dialed trunks to meet line specifications (see Section 3.8 of the System Description). Follow the procedure in Table 6-2. In step 2, select feature 30. In step 3, you can select the following ratios by pressing NEXT:

- 30/70 -- the display of the DSS shows 3070;
- 33/67 -- the display shows 3367;
- 40/60 -- the display shows 4060;
- 50/50 -- the display shows 5050.

Note that you cannot configure this feature if the impulse dial option board is not installed in the KSU.

6.8 Pulses Per Second

Impulse-dialed lines can be configured for either 10 or 20 pulses per second, to meet line specifications (see Section 3.8 of the System Description). Follow the procedure in Table 6-2; in step 2, select feature 31. In step 3, select the pulse rate you want by pressing NEXT.

You cannot configure this feature if the impulse dial option board is not installed in the KSU.

6.9 Dial Restriction After Transfer

The restriction after transfer feature is described in Section 4.1.2 of the System Description. It is configured following the procedure in Table 6-1. Select the green feature group in step 1. Select feature 35 in step 2.

There are no limitations on this feature.

6.10 Table Restriction

This feature determines whether dialing restrictions on a CO line will be by means of the general 0/1 restriction, or by a user-determined toll table. This feature is explained in Section 6 of the System Description.

To configure a CO line as Table restricted, follow the procedure in Table 6-1. In step 1, select the green feature group. Select feature 35 in step 2.

TABLE 6-1
CO LINES FEATURES PROGRAMMING

For:

behind PABX
behind CENTREX
trunk groups 1 through 4
day bells 1 and 2
night bells 1 and 2
impulse-dialed CO lines
transfer restriction
table restriction

Step	Action	Verification
1	Prepare the **key bx** for programming, as described in Table 4-1.	When the DSS is set to PROG mode, the display shows OL 1 and the first button in the bottom row lights. This indicates that the pink group of features is selected for programming.
2	Select the feature group and feature you want to program, as follows: behind PABX..... pink 26 behind CENTREX.. pink 27 trunk group 1... pink 28 trunk group 2... pink 29 trunk group 3... pink 30 trunk group 4... pink 31 day bell 1..... pink 32 day bell 2..... pink 33 night bell 1.... pink 34 night bell 2.... pink 35 impulse-dialed CO lines..... green 28 table restriction.... green 34 transfer restriction.... green 35	When you select the color group, the button you press lights. When you select the feature, the button you press lights and the display shows XY __ where XY is the number of the feature you selected.

(continued)

Table 6-1 (continued)

Step	Action	Verification
3	To apply the feature to a trunk, press the unlit button 1 through 8 corresponding to the trunk you want to configure.	The button lights.
4	To cancel application of a feature to a trunk, press the lit trunk button.	The light in the button goes out.
NOTE	BEHIND PABX AND CENTREX ONLY: A trunk cannot be configured as both behind PABX and behind CENTREX. When you configure one of these, the other is automatically cancelled.	
NOTE	TRUNK GROUPS ONLY: A trunk can belong to only one trunk group. If you include it in a second trunk group, it is automatically deleted from the first.	
NOTE	IMPULSE-DIALED CO LINES ONLY: You can configure this feature only if the optional impulse-dial card is installed in the Key Switching Unit.	If you try to configure a trunk as impulse dialed when the card is not installed, the display of the DSS shows 28 Er
NOTE	IMPULSE-DIALED CO LINES ONLY: If DTMF SLT telephones are installed in the system, they cannot dial on impulse-dialed trunks, for technical reasons. Therefore, you must block these extensions from accessing impulse-dialed trunks.	

(continued)

Table 6-1 (continued)

Step	Action	Verification
5	When you are done configuring the feature, exit the feature in one of two ways:	
	(a) Press the lit button of the feature you have been programming.	The light in button 26 goes out. In the display appears OL 1
	(b) Press the button of a different feature.	The light in button of the feature you were programming goes out, and the button of the new feature you have selected lights. In the display appears the number of the feature you have selected.

TABLE 6-2
TRUNK FEATURE PROGRAMMING — IMPULSE DIAL PARAMETERS

For:

Interdigital pause
make-break ratio
pulses per second

Step	Action	Verification
1	Prepare the **key bx** for programming, as described in Table 4-1. Select the green feature group.	When the DSS is set to PROG mode, the display shows OL 1 and the third button in the bottom row lights. This indicates that the green group of features is selected for programming.
2	Select the feature group and feature you want to program, as follows: interdigital pause..... 29 make-break ratio..... 30 pulses per second..... 31	When you select the color group, the button you press lights. When you select the feature, the button you press lights. The display shows the value of the dial pulse parameter you have selected. For example, if you select pulses per second (feature 31), the display shows either 10 or 20 -- the number of pulses per second sent by the system when outpulsing.
3	To change the value of the dial pulse parameter you have selected, press the next/change button (button number 8).	The value shown in the display of the DSS changes to the next selection. When the value reaches the maximum, repressing next/change selects the minimum value.
NOTE	INTERDIGITAL PAUSE ONLY: you may select 400, 600, 800 or 1000 milliseconds for this parameter (0.4, 0.6, 0.8, or 1.0 seconds).	

(continued)

Table 6-2 (continued)

Step	Action	Verification
NOTE	MAKE-BREAK RATIO ONLY: you may select 30/70, 33/67, or 50/50 as the make-break ratio.	
NOTE	PULSES PER SECOND ONLY: you may select 10 or 20 pulses per second.	

Section 7
EXTENSION FEATURES PROGRAMMING

This section explains configuration of the features applied to the extension. These features appear on pages 3 and 4 of the programming forms. They include:

page 3:

- paging access, for each extension, to the five page zones of the **key bx**;
- page routing of the two internal page zones of the **key bx**;
- DTMF-dialed Off-Premise Extensions (OPXs);
- rotary-dialed OPXs;
- DND access;
- DND forward;
- manager-secretary;
- pick-up groups (future option);
- background music access;
- system speed-dial restriction;
- system speed toll restriction;
- 411 restriction;
- automatic answer;
- flash access;
- all intrusion;
- on-hook verbal intrusion;
- DSS barge-in (future option);

page 4:

- ICM (intercom) restriction
- DND intrusion

7.1 Paging Access

This feature, described in Section 4.7 of the System Description, determines which stations may make page announcements using the **key bx** paging feature. Table 7-1 describes how to program this feature.

7.2 Page Routing

This feature determines which stations are included in each of the two internal page zones of the **key bx**. It is described in Section 4.7 of the System Description.

Table 7-2 shows how to program the page routing feature. Note that you can include both stations and external page zones in an internal page zone.

You cannot include SLT sets in page zones. If you try, the DSS display will show

Err

indicating you have made an error. The display remains until you press a valid button.

7.3 OPX DTMF and OPX Rotary

When SLTs are installed with a **key bx** system, they may be either DTMF or pulse dialed. You must configure the system for the type of SLT installed. Follow the instructions in Table 7-3.

You cannot configure an extension as an Off-Premise Extension (OPX) unless a Single-Line Telephone (SLT) is actually installed in the **key bx**. This means that extensions 20, 21, 22, and 23 cannot be configured as OPX in any case, since these extensions must be **key bx** stations. Other extensions can be configured as OPX only if an SLT card is installed in the Key Switching Unit.

Rotary dialing can be configured for an OPX only if the impulse dial card is installed in the Key Switching Unit.

The **key bx** software is very intelligent -- it won't let you make a mistake. If you try to configure an extension as SLT where none is installed, the DSS displays the error message, and your attempt is rejected.

7.4 DND Access

You can designate which extensions can use the Do Not Disturb feature. This feature is described in detail in Section 5.9 of the System Description.

Table 7-3 shows how to configure DND access for each extension.

If the DND forward feature (Section 7.5) is configured for an extension, DND access is automatically granted. You cannot take away the DND access as long as the extension has DND forward. If you try, the DSS displays the error message.

7.5 DND Forward and Manager-Secretary

These two features are programmed in the same way, according to Table 7-4. The DND forward feature is described in detail in Section 5.9 of the System Description. Manager-secretary (also called executive intercom) is explained in the same section.

Note that when you configure an extension to forward calls in DND mode, the DND access feature (Section 7.4) is automatically granted.

7.6 Pick-up Groups

This feature is a future option. It cannot be programmed.

7.7 Background Music Access

This feature is described in Section 3.10 of the System Description. It is configured according to Table 7-5.

Note that you cannot configure an SLT set to have access to background music. If you try, the DSS displays an error message.

7.8 System Speed-Dial and Speed-Dial Toll Restrictions

You can determine which extensions have access to the system speed dial directory, and which extensions have toll restrictions applied when they dial system speed-dial numbers. These features are extremely useful when you want to limit dialing privileges of key

bx users. These features are described in detail in Section 6 of the System Description.

Follow Table 7-3 to configure this feature.

7.9 411 Restriction

This feature is described in Section 6 of the System Description. Follow Table 7-3 to configure the 411 restriction.

7.10 Automatic Answer

This feature is described in Section 5-4 of the System Description. Follow Table 7-5 to configure automatic answer.

The **key bx** automatically configures all SLT extensions for automatic answer. This is because SLTs have no trunk buttons, so automatic answer is a requirement. The **key bx** software will not let you take automatic answer away from an SLT. If you try, the DSS displays the error message.

7.11 Flash Access

You can determine which stations can use the flash button. This is useful in installations where there is a shortage of trunks, and there is heavy demand for trunk access. The flash access feature is described in greater detail in Section 5.7 of the System Description.

Follow Table 7-3 to configure the flash access feature.

7.12 All Intrustion

This feature is described in Section 5.1 of the System Description. Follow Table 7-5 to configure the feature.

You cannot configure this feature for SLT extensions, since SLTs have no internal speakers. If you try to grant all intrusion to an SLT, the DSS rejects the attempt with an error message.

There is a reciprocal relationship between all intrusion and the on-hook intrusion feature (Section 7.13). When you configure all intrusion for a station, the **key bx** automatically configures on-hook intrusion for that station. If you cancel on-hook intrusion, all intrusion is automatically canceled. In other words, you cannot have all intrusion without on-hook intrusion as well. If you try, the **key bx** automatically fixes the situation. (You can, however, have on-hook intrusion without all intrusion.)

7.13 On-Hook Verbal Intrusion

This feature is described in Section 5.1 of the System Description. Follow Table 7-5 to configure the feature.

SLT extensions cannot have on-hook intrusion, since they have no internal speaker. If you try to configure intrusion for an SLT, the DSS displays the error message.

Note that if all intrusion is configured for an extension, on-hook intrusion is also automatically configured. If you cancel on-hook intrusion, the **key bx** automatically cancels all intrusion as well.

7.14 DSS Barge-In

This feature is a future option. Although it appears on the programming overlay, it is not implemented.

You cannot configure DSS barge-in for SLT extensions, since they have no speaker. If you try, the DSS displays the error message.

7.15 ICM Restriction

This feature is described in detail in Section 3.6 of the System Description.

This feature appears on page 4 of the programming forms. Programming of this feature is described in Table 7-6.

7.16 DND Intrusion

This feature is described in Section 5-9 of the System description. It appears on page 4 of the programming forms. Table 7-6 describes programming of the feature.

TABLE 7-1
PAGING ACCESS CONFIGURATION

Step	Action	Verification
1	Prepare the key bx for programming, as described in Table 4-1.	When the DSS is set to PROG mode, the display shows OL 1 and the first button in the bottom row lights. This indicates that the pink group of features is selected for programming.
2	Select the green feature group by pressing the third button in the bottom row.	The button lights.
3	Press button 32. This selects the page access feature.	Button 32 lights. In the display appears 32 _
4	Select the page zone you want to configure, by pressing one of the zone buttons in the bottom field of the DSS.	The light in the page zone button lights. In the display appears 32 XY where XY is the number of the page zone you selected. Also, some of the buttons in the extension field of the DSS may light. These indicate the extensions which have access to the selected page zone. For example, in Figure 7-1, extensions 20, 22, and 23 have access to page zone 40. No other extensions can make paging announcements to this page zone.

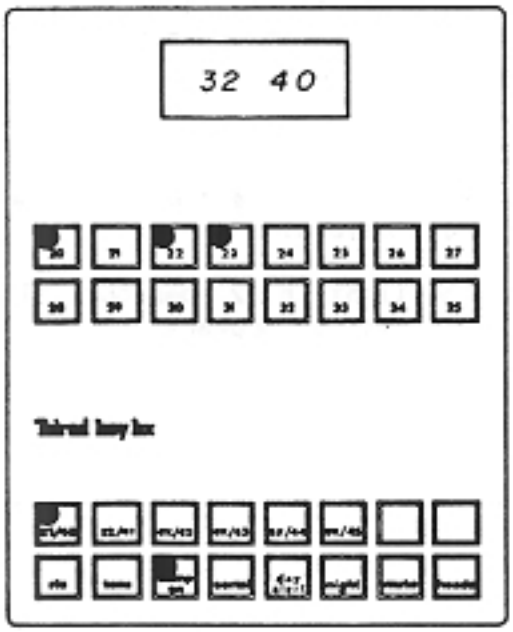


Figure 7-1 Page access example

(continued)

Table 7-1

Step	Action	Verification
5	To permit an extension access to the page zone, press the unlit button of the extension.	The button of the extension lights.
6	To deny an extension access to a page zone, press the lit button of the extension.	the light in the button goes out.
7	When you have configured one page zone, go to the next page zone by pressing the next page zone button.	The light in the button for the first zone goes out, and the new button lights. In the display appears 32 AB where AB is the number of the new page zone.
8	To finish configuring this feature, press the lit button of the page zone you have just configured. You can now:	The light in the button goes out, and the display shows 32 __
	(a) select another feature in the green feature group, or	The light in button 32 goes out, and the new button you pressed lights. In the display appears XY where XY is the number of the new feature.
	(b) press button 32.	The light in 32 goes out. In the display appears OL 1

TABLE 7-2
INTERNAL PAGE ROUTING CONFIGURATION

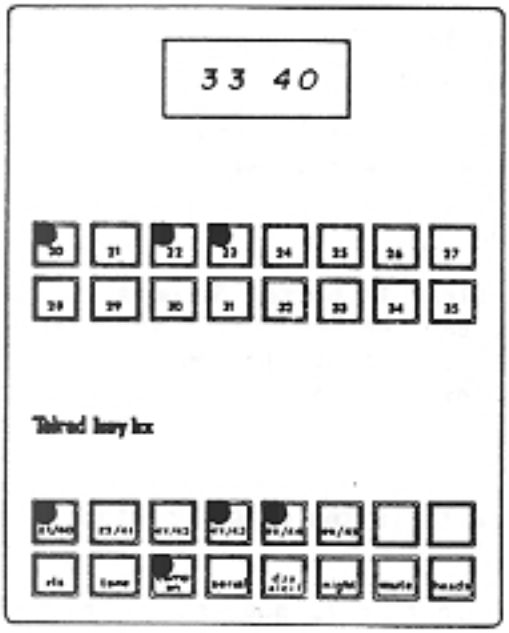
Step	Action	Verification
1	Prepare the **key bx** for programming, as described in Table 4-1.	When the DSS is set to PROG mode, the display shows OL 1 and the first button in the bottom row lights. This indicates that the pink group of features is selected for programming.
2	Select the green feature group by pressing the third button in the bottom row.	The button lights.
3	Press button 33. This selects the page routing feature.	Button 33 lights. In the display appears 33 __
4	Select the internal page zone you want to configure, by pressing one of the zone buttons in the bottom field of the DSS. 	The light in the page zone button lights. In the display appears 33 XY where XY is the number of the page zone you selected. Also, some of the buttons in the extension field of the DSS may light. These indicate the extensions which are included in the selected page zone. Some of the external page zones may also light. External page speakers may be included in internal zones. For example, in Figure 7-2, extensions 20, 22, and 23 and external zones 43 and 44 are included in page zone 40.

Figure 7-2 Page routing example

(continued)

Table 7-2 (continued)

Step	Action	Verification
5	To include an extension or an external page speaker in a page zone, press the unlit button of the extension or external page zone.	The button lights.
6	To exclude an extension or external page speaker from a page zone, press the lit button of the extension or external zone.	the light in the button goes out.
NOTE	You cannot include an SLT extension in a page zone, since SLTs have no internal speakers.	Buttons of SLT extensions flash. If you press a flashing button, the display indicates an error. The display remains until you press a valid button.
7	When you have configured one page zone, go to the next page zone by pressing the next page zone button.	The light in the button for the first zone goes out, and the new button lights. In the display appears 33 AB where AB is the number of the new page zone.
8	To finish configuring this feature, press the lit button of the page zone you have just configured. You can now:	The light in the button goes out, and the display shows 33 _
	(a) select another feature in the green feature group,	The light in button 33 goes out, and the new button you pressed lights. In the display appears
	or	XY where XY is the number of the new feature.
	(b) press button 33.	The light in 33 goes out. In the display appears OL 1

TABLE 7-3
EXTENSION FEATURES CONFIGURATION

for:
- DTMF-dialed OPXs
- rotary-dialed OPXs
- DND access
- system speed-dial restriction
- system speed toll restriction
- 411 restriction
- flash access

Step	Action	Verification
1	Prepare the **key bx** for programming, as described in Table 4-1.	When the DSS is set to PROG mode, the display shows OL 1 and the first button in the bottom row lights. This indicates that the pink group of features is selected for programming.
2	Select the feature group and the feature you want to program, as follows: DTMF-dialed OPXs.. green 1 rotary-dialed OPXs..... green 2 DND access..... green 3 system speed-dial restriction..... pink 1 system speed toll restriction..... pink 2 411 restriction... pink 3 flash access..... pink 5	When you select the feature group, the light in the button you press lights. When you select the feature, the button you press lights, and the display shows Y __ where Y is the feature you selected. In the extension field of the DSS, some of the buttons may light and others may flash. The lit buttons are those to which the feature has been applied. The flashing buttons are those extensions which cannot be configured.
3	To apply a feature to an extension, press an unlit button in the extension field of the DSS.	The button lights.

(continued)

Table 7-3 (continued)

Step	Action	Verification
4	To cancel application of a feature to an extension, press the lit button of the extension.	The light in the button of the extension goes out.
NOTE	OPX FEATURES: You can configure an extension as an OPX only if the necessary hardware is installed in the Key Switching Unit. Section 1.2.4, Configuration Guide, describes the card that must be used to interface to Single-Line Telep	If you attempt to configure an extension as OPX without the required hardware, the DSS will display Y Er indicating an error.
NOTE	DND ACCESS ONLY: You cannot deny access to the DND feature to an extension which has DND forward. You must first cancel the DND forward (see Table 7-5).	If you press a flashing extension button (one which has DND forward), the display will show 3 Er indicating you have made an error. The display will remain until you press a valid button.
5	To finish configuring this feature,	
	(a) repress the button of the feature you have been configuring, or	The light in the button goes out, and the display shows OL 1
	(b) press any other button from 1 to 8. This selects a new feature for programming.	The light in the button you were configuring goes out, and the new button you pressed lights. In the display appears X __ where X is the number of the new feature.

TABLE 7-4
EXTENSION FEATURES CONFIGURATION

for:
DND forward
manager-secretary

Step	Action	Verification
1	Prepare the **key bx** for programming, as described in Table 4-1.	When the DSS is set to PROG mode, the display shows OL 1 and the first button in the bottom row lights. This indicates that the pink group of features is selected for programming.
2	Select the green feature group by pressing the third button in the bottom row.	The button lights.
3	Select the feature you want to program, as follows: DND forward..... 4 manager-secretary.. 6	The button you pressed lights. In the display appears X __ where X is the number of the feature you have selected.
4	Press the button of the first extension you want to configure.	The light in the button you pressed flashes, and the display shows the number of the extension you selected. If the feature has already been configured for this extension, a second button will light with a steady light. This is the forward extension (when programming DND forward), or the manager°s station (when programming manager-secretary).

(continued)

Table 7-4 (continued)

Step	Action	Verification
4	(continued)	For example, in Figure 7-3, the DND forward function is being configured. Extension 22 forwards calls to extension 31 when 22 is in DND mode.

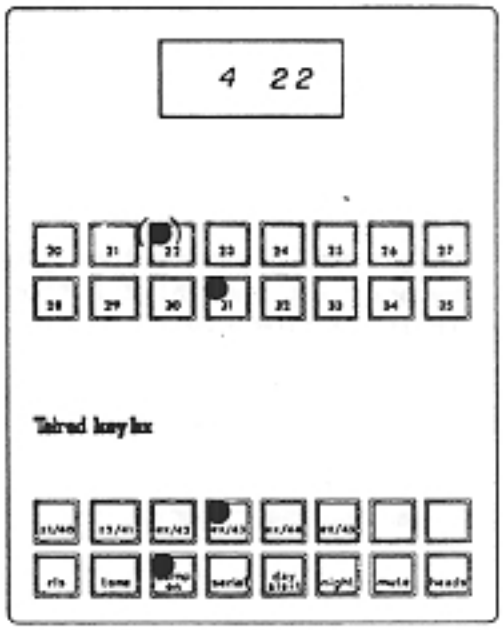


Figure 7-3 DND forward example

5	Press the button of the extension you want to be the forward, or manager, extension.	The button of the extension lights with a steady light.
NOTE	DND FORWARD ONLY: If the DND access feature was not programmed for the extension you just configured, the **key bx** automatically grants the extension access.	If you return to the programming procedure for DND access (Table 7-4) you will see that the button for the extension you gave DND forward will flash.

(continued)

Table 7-4 (continued)

Step	Action	Verification
6	If you want to change the forward or manager station, press the unlit button of the new extension.	The steady light in the previously configured extension goes out, and the button you pressed lights.
7	If you wish to cancel DND forward or manager-secretary for an extension, press the steadily lit button.	The light in the button goes out.
8	When you have configured the feature for the first extension, you can select another extension by:	
	(a) pressing NEXT/CHANGE (button number 8). This selects the next extension in order for configuration,	The light in the button for the first extension you configured goes out, and the next button lights. In the display appears
	or	X AB
		where AB is the number of the next extension.
	(b) pressing the flashing extension button, and	The flashing light goes out, and
	pressing another extension button.	the button you pressed flashes.
9	To finish configuring this feature,	
	(a) repress the feature button,	The light in the button goes out, and the display shows
	or	OL 1
	(b) press any other button from 1 to 8. This selects a new feature for programming.	The light in button 4 goes out, and the new button you pressed lights. In the display appears the number of the new feature.

TABLE 7-5
EXTENSION FEATURES CONFIGURATION

for:
- automatic answer
- all intrusion
- on-hook intrusion
- DSS barge-in

Step	Action	Verification
1	Prepare the **key bx** for programming, as described in Table 4-1.	When the DSS is set to PROG mode, the display shows OL 1 and the first button in the bottom row lights. This indicates that the pink group of features is selected for programming.
2	Select the feature you want to program, as follows: automatic answer... 4 all intrusion..... 6 on-hook intrusion.. 7 DSS barge-in..... 8	When you select the feature, the button you press lights, and the display shows Y __ where Y is the feature you selected. In the extension field of the DSS, some of the buttons may light and others may flash. The lit buttons are those to which the feature has been applied. The flashing buttons are those extensions which cannot be configured.
3	To apply a feature to an extension, press an unlit button in the extension field of the DSS.	The button lights.

(continued)

Table 7-5 (continued)

Step	Action	Verification
4	To cancel application of a feature to an extension, press the lit button of the extension.	The light in the button of the extension goes out.
NOTE	ALL FEATURES: None of the features in this table can be configured for SLT extensions.	When you select the feature, the buttons of SLT extensions flash. If you press a flashing button, the display of the DSS shows X Er where X is the number of the feature you are programming. The display remains until you press a valid button.
NOTE	INTRUSION ONLY: When you configure all Intrusion for a station, on-hook intrusion is automatically granted. When you cancel on-hook intrusion for a station, all intrusion is automatically canceled.	
5	To finish configuring this feature, (a) repress the button of the feature you have been configuring, or (b) press any other button from 1 to 8. This selects a new feature for programming.	The light in the button goes out, and the display shows OL 1 The light in the button you were configuring goes out, and the new button you pressed lights. In the display appears X _ where X is the number of the new feature.

TABLE 7-6
ICM RESTRICTION AND DND INTRUSION CONFIGURATION

Step	Action	Verification
1	Prepare the key bx for programming, as described in Table 4-1.	When the DSS is set to PROG mode, the display shows OL 1 and the first button in the bottom row lights. This indicates that the pink group of features is selected for programming.
2	Select the green feature group by pressing the third button DS in the bottom row.	The button lights.
3	Select the feature you want to program, as follows: DND intrusion..... 5 ICM restriction.... 7	The button you pressed lights. In the display appears X _ where X is the number of the feature you selected.
4	Select a prime extension -- one which you don't want other extensions to call (ICM restriction), or the extension that can intrude during DND (DND intrusion).	The button you pressed flashes. In the display appears X AB where AB is the extension you selected. Also, the buttons of some other extensions may light with a steady light. These are the secondary extensions: those which are restricted from calling the prime extension (ICM restriction) or those which the prime station can always call (DND intrusion).

(continued)

Table 7-6 (continued)

Step	Action	Verification
4	(continued)	For example, in Figure 7-4, extensions 20, 22, and 23 are ICM restricted from calling extension 30.

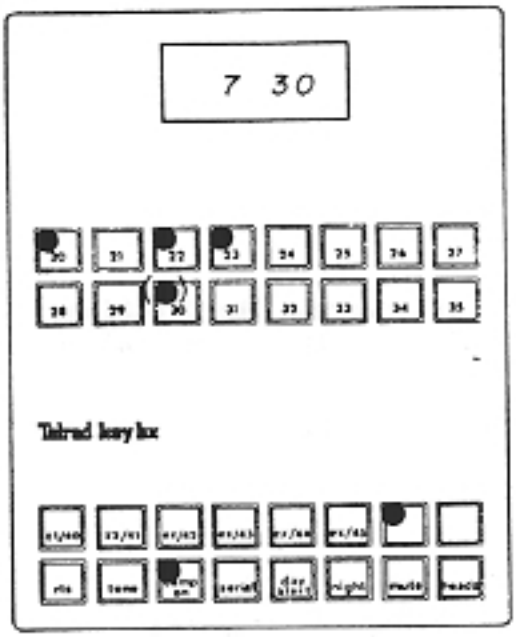


Figure 7-4 ICM restriction example

5	To select a secondary station, press the unlit button of the extension.	The button of the extension lights with a steady light.
6	To cancel secondary status of an extension, press the lit button of the extension.	The light in the button goes out.
7	When you have configured one prime extension, go to the next extension you want to program by:	

(continued)

Table 7-6 (continued)

Step	Action	Verification
7	(continued) (a) pressing NEXT/CHANGE (button number 8), or	The flashing button goes out, as well as all the other lit buttons. The next button in order starts to flash, and any ICM-restricted extensions to that extension light with a steady light. In the display appears X AB where AB is the new prime extension.
	(b) repress the flashing button of the prime station, and press another extension button.	All the lights in the extension field go out, and the new extension flashes, and any secondary extensions light with a steady light. In the display appears the number of the new prime extension.
8	To finish configuring this feature, you can: (a) repress the flashing prime extension button. Now you can select another feature in the green feature group, or select a different feature group; or	The light in the button goes out, and the display shows X _
	(b) select another feature in the green feature group directly.	The light in the button of the feature you were programming goes out, and the new button you pressed lights. In the display appears XY where XY is the number of the new feature.

Section 8
SYSTEM FEATURES CONFIGURATION

This section describes configuration of all the programmable system parameters. These include:

- all timing parameters, such as hold time, recall time, and so on;
- speed dial and time set stations;
- key-hybrid configuration;
- save-repeat or ground selection;
- 0 or 1 toll access restriction;
- manual or automatic pause;
- existence of Call Detail Recording.

These features are on page 5 of the programming forms.

8.1 Call Routing Times

There are seven time parameters relating to call routing and connection duration. These are:

- hold time;
- day recall time;
- night recall time;
- DSS recall time;
- unscreened transfer time;
- page time;
- handsfree talkback time.

These times are explained in Section 3-2 of the System Description. They are all configured the same way, using Table 8-1.

8.2 Interface Parameters

Four time parameters have to do with the system interface with trunks and CO services. These are

- flash time behind PABX;
- flash time behind CENTREX;
- CCSA time;
- open loop time.

These time parameters are explained in Sections 3.5 and 3.7 of the System Description. Program them by following Table 8-2.

8.3 Privileged Stations

You can configure one station, in addition to stations 20 and 21, to set system time, and you can select the station which enters system speed dial numbers.

Follow the instructions in Table 8-3 to configure these features. Note that you cannot grant these privileges to any extension which is not a **key bx** station. If you try to configure an SLT extension as the time set or speed dial station, the DSS console display will show the error message.

8.4 System Function Configuration

There are five system functions which you can configure:

- key or hybrid system operation (Section 3.9, System Description);
- whether the **key bx** sends ground signal on trunks configured as behind PABX (see Section 3.5 of the System Description);
- configuration of the toll access restriction, depending on the numbering plan of the Central Office (see Section 6 of the System Description);
- availability of manual pause (Section 3.5, System Description);
- existence of Call Detail Recording (Section 3.4, System Description).

The procedure for configuring these features is in Table 8.3.

TABLE 8-1
CALL ROUTING TIMES CONFIGURATION

Step	Action	Verification
1	Prepare the **key bx** for programming, as described in Table 4-1.	When the DSS is set to PROG mode, the display shows OL 1 and the first button in the bottom row lights. This indicates that the pink group of features is selected for programming.
2	Select the yellow feature group by pressing the second button in the bottom row.	The button lights.
3	Select the time parameter you want to configure: • hold time..... 20 • day recall..... 21 • night recall.... 22 • DSS recall..... 23 • transfer recall. 24 • page time..... 28 • handsfree time.. 29	The button you pressed lights. In the display appears the time, in minutes and seconds, that has been configured for the parameter. For example, in Figure 8-1, hold time is set to 1 minute 20 seconds.

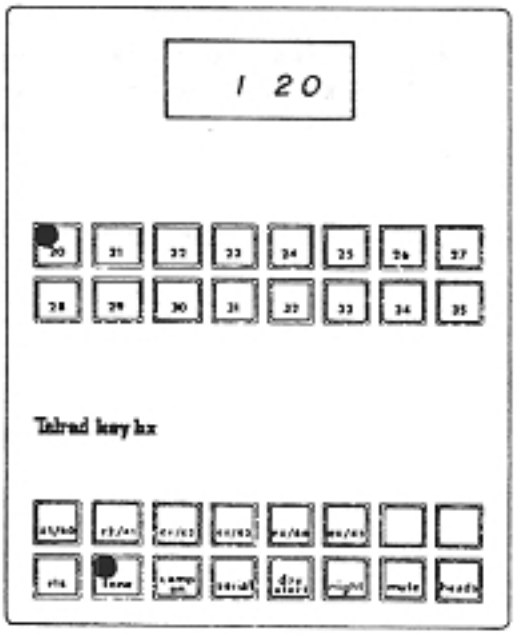


Figure 8-1 Hold time example

(continued)

Table 8-1 (continued)

Step	Action	Verification
4	Change the minutes by pressing the min X 1 button (button 26).	Each time you press the button, the minutes digit increases by one. Minutes increases to 9, then returns to 0.
5	Change the seconds by pressing the sec X 10 button (27).	Each time you press, the seconds increase by 10. Seconds increase to 50, then return to 00.
NOTE	The minimum time you can program is 10 seconds.	If the display shows 0 50 when you press the sec X 10 button, the display goes to 0 10
6	To set the time to unlimited, press u/l.	The display shows UL
7	Exit the feature by selecting another yellow feature or by repressing the button you have selected.	The button for the feature you were configuring goes out.

TABLE 8-2
INTERFACE TIME PARAMETERS CONFIGURATION

Step	Action	Verification
1	Prepare the **key bx** for programming, as described in Table 4-1.	When the DSS is set to PROG mode, the display shows OL 1 and the first button in the bottom row lights. This indicates that the pink group of features is selected for programming.
2	Select the yellow feature group by pressing the second button in the bottom row.	The button lights.
3	Select the interface parameter you want to configure: • PABX flash time... 30 • CENTREX flash..... 31 • CCSA (pause) time. 32 • open loop time.... 33	The button you pressed lights. In the display appears the time, in seconds and tenths of a second, that has been configured for the parameter. For example, in Figure 8-2, open loop time is set to 2.5 seconds.

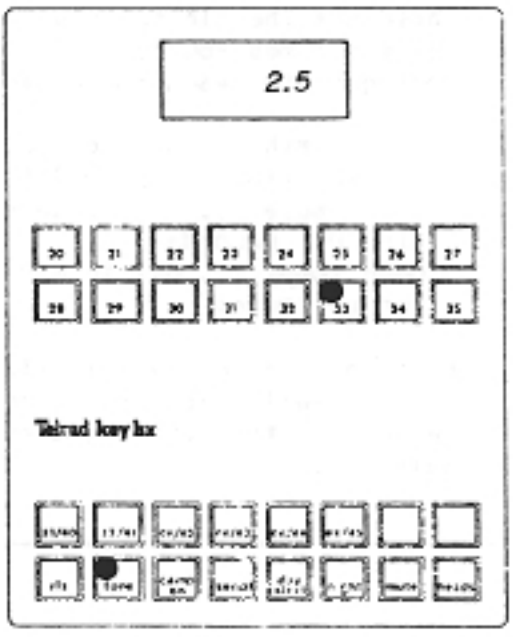


Figure 8-2 Open loop example

Table 8-2 (continued)

Step	Action	Verification
4	Change the seconds by pressing the sec. X 1 button (button 34).	Each time you press the button, the seconds digit increases by one. When the number of seconds reaches the allowable maximum, it returns to 0.
5	Change the tenths of a second by pressing the sec. X 0.1 button (35).	Each time you press, the -tenths of seconds increases b a set amount, as follows: for PABX and CENTREX flash: from .0 to .3 to .6, and back to .0 for other times: by increments of 0.1 second.
6	OPEN LOOP TIME ONLY: If you want to set open loop time to unlimited, press the u/l button (25).	The display shows UL
NOTE	These are the minimum and maximum times you can configure for each parameter: PABX flash.... 0.3 to 9.6 CENTREX flash. 0.3 to 9.6 CCSA pause.... 1 to 9 secs (no 0.1 seconds) open loop..... 0.1 to 4.9 or unlimited	
7	Exit the feature by selecting another yellow feature or by repressing the button you have selected.	The button for the feature you were configuring goes out.

TABLE 8-3
PRIVILEGED STATIONS CONFIGURATION

Step	Action	Verification
1	Prepare the key bx for programming, as described in Table 4-1.	When the DSS is set to PROG mode, the display shows OL 1 and the first button in the bottom row lights. This indicates that the pink group of features is selected for programming.
2	Select the yellow feature group by pressing the second button in the bottom row.	The button lights.
3	In the bottom field of the DSS, select the feature you want to configure: button 7 for speed dial station, or 8 for time setting station.	The button you pressed lights. In the extension field, one of the buttons may light, and several may flash. The lit button is the extension which is configured as the privileged station; the flashing buttons are those extensions which may not be programmed as privileged stations. In the display appears X AB where X is the number of the feature you selected, and AB is the privileged extension (if no extension has been configured, these digits do not appear).
4	To configure a privileged station, press the unlit extension button.	The button lights.
NOTE	You may not grant a privilege to an extension which is flashing. This may be station 20 or 21 (for time setting only), or any SLT extension.	If you press a flashing button, the display shows X Er

(continued)

Table 8-3

Step	Action	Verification
5	Exit the feature by selecting another yellow feature or by repressing the button you have selected.	The button for the feature you were configuring goes out.

TABLE 8-4
SYSTEM FUNCTION CONFIGURATION

Step	Action	Verification
1	Prepare the **key bx** for programming, as described in Table 4-1.	When the DSS is set to PROG mode, the display shows OL 1 and the first button in the bottom row lights. This indicates that the pink group of features is selected for programming.
2	Select the green feature group by pressing the third button in the bottom row.	The button lights.
3	Select the time parameter you want to configure: • key/hybrid..... 20 • save-repeat/ground..... 21 • 0/1 restriction..... 23 • manual pause/no manual pause..... 26 • CDR/no CDR..... 27	The button you pressed lights. In the display appears XY A where XY is the number of the feature you selected, and A is either 0 or 1 -- 0 for the first choice and one for the second.
4	To reconfigure the parameter, press NEXT/CHANGE.	The display changes from 0 to 1, or from 1 to 0.
5	Exit the feature by selecting another green feature or by repressing the button you have selected.	The button for the feature you were configuring goes out.

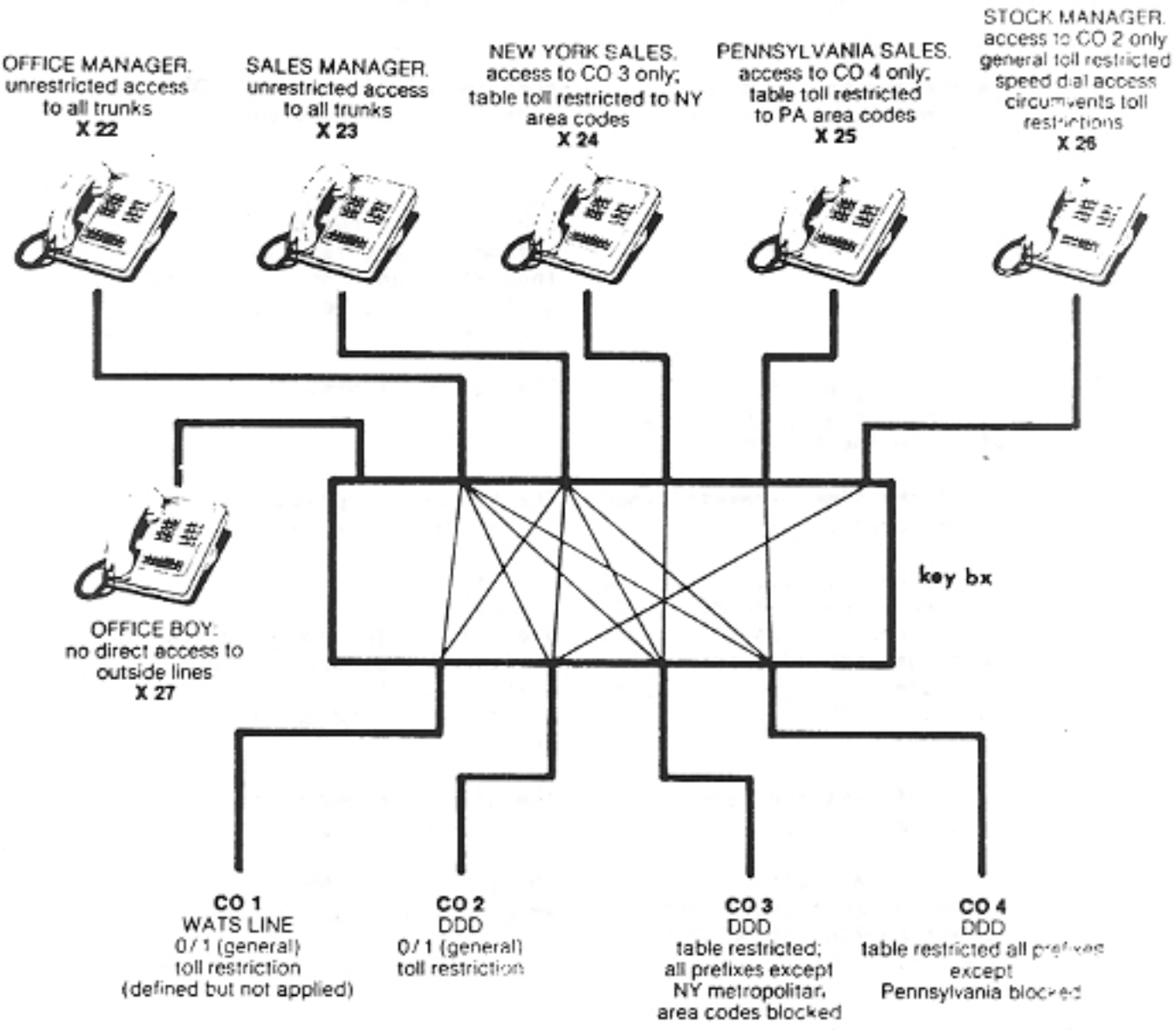


Figure 9-1 Dial restriction configuration example

Section 9
TOLL RESTRICTION CONFIGURATION

9.1 General

The toll tables of the **key bx** 816 are a powerful tool for controlling telephone costs. A complete explanation of the methods of managing dialing privileges appears in Section 8. This section explains how to enter toll tables for each CO line.

There are two methods of entering toll tables -- CO line mode and number mode. In CO line mode, you set restrictions per CO line; in number mode, you set them per area code, for all CO lines at once. You will probably find that when you are entering the tables for the first time, the CO line mode will be the easiest method; when checking the tables, or making minor changes, you may prefer the number mode. We recommend that you read the following general explanation of the two methods, read through Tables 9-1 and 9-2, and then do the example in Section 9.2. This will make you proficient in the two methods, and show you the relationship between them.

Note that both the examples in the tables, and in Section 9.2, assume that the toll tables are in the default configuration -- that is, all area codes are restricted on all the tables. If you are learning to configure the tables for the first time, you can make sure the tables are in default configuration by initializing the system. To do this, set the DIP switches on the main board of the KSU to WRITE and INIT (see Section 4.2.1 of the Configuration Manual) and disconnect power momentarily. When power is resumed, the entire system returns to default state. But beware -- all configuration you have done up to now is erased. You have to completely reconfigure the system.

In general, when the DSS is programming toll tables, the buttons in the top field of the DSS represent area codes. When the button is lit, the area code is set -- that is, the CO line is restricted from dialing it. When the button is unlit, the area code is clear -- it is permitted for dialing. Using either method, you can set or clear single area codes. You can also set or clear groups of area codes. If you make a mistake, you usually can reload the original configuration with the reload key. This cancels any changes you have made, but have not yet stored in system memory.

Section 6, System Description, and Section 3.7, System Configuration, explain the structure of the toll tables. The tables include area codes from 200 to 999, and then skip to 1200. They include 1200 through 1219, then skip to 1300, include 1319 and skip to 1400, and so on. Here is a list of all the numbers in the table:

200
201
202
...
999

1200
1201
1202
...
1219

1300
1301
1302
...
1319

...

1900
1901
...
1919

9.2 Example

The following example is the same as the example in Section 6.3 of the System Description. You should read that section before trying this example. Figure 9-1 (which is identical to Figure 6-2 of the System Description) shows the configuration of the toll restrictions.

Toll tables must be written for CO lines 3 and 4. CO 3 is restricted to all area codes except 914, 201, and 212 (the New York metropolitan area). CO 4 is restricted to all areas except Pennsylvania -- 215 and 717. To enter these tables, follow the instructions in Tables 9-1 or 9-2.

You must now define table restriction (instead of 0/1 restriction) for these CO lines. This is function 34 (green). Table 6-1 of this booklet explains how to program the function.

You must also program access restrictions and transfer restrictions. The New York salesman may dial only on CO 3 -- so restrict his access to all the other CO lines. The Pennsylvania salesman may dial on CO 4 only. The stock manager has access to CO 2 only. The receptionist is access restricted to all lines. All lines except CO 2 are transfer restricted. Follow Table 5-1 to program access restrictions; follow Table 6-1 to program transfer restriction.

To whom are the toll restrictions for each CO line applied? To the salesmen, the stock manager, and the receptionist. Apply the restrictions to these extensions by following the instructions in Table 5-1.

One more thing remains to be done -- enable the stock manager to phone the warehouse in Alexandria, Virginia. Enter the number of the warehouse -- say 703-932-4557 -- in the system speed dial directory, following the instructions in Section 2.19 of the System Operating Instructions. Now program the stock manager's extension so that toll restrictions do not apply to speed dial numbers -- Table 7-3.

If you followed all the instructions, you have configured the system so that each user can place only those calls he must for business purposes.

TABLE 9-1
TABLE METHOD

Step	Action	Verification
1	Prepare the **key bx** for programming, as described in Table 4-1. Place overlay 2 on the DSS. Select the blue features by pressing the sixth button in the bottom row.	The button lights. In the display appears OL 2 indicating that overlay 2 has been selected.
2	Select the CO line you want to program. Press "CO line select" and the number of the CO line in the bottom field of buttons.	When you press the CO line select button, it lights. When you select the CO line, the button of the line you selected lights. The display alternates back and forth between the CO line number and the first area code to be programmed. For example, if you selected CO 1, the display alternates like this: 1 2 00 In the top field of the DSS, 10 of the buttons indicate the status of the first 10 area codes, from 200 to 209. A lit button indicates the area code is set -- dialing is restricted to it. An unlit button means the code is clear -- dialing the code is permitted. In Figure 9-2, CO 1 has been selected. Area codes 200 to 209 are set -- restricted -- on CO 1.

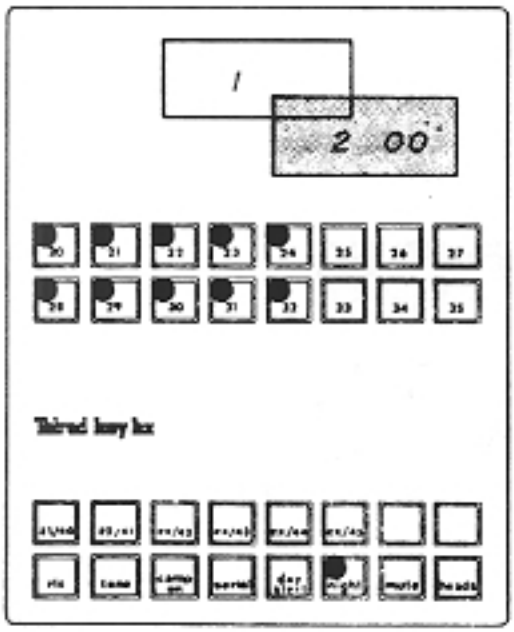


Figure 9-2 Table method, example 1

(continued)

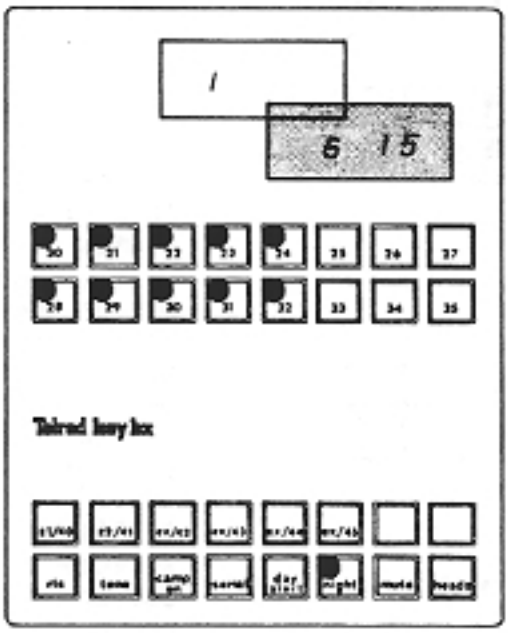


Figure 9-3 Table method, example 2

Table 9-1 (continued)

Step	Action	Verification
NOTE	This is the confusing part: the 10 buttons in the top field serve two functions. The lights in the buttons indicate the states of 10 area codes. The buttons are also used to enter area codes. The following steps make these two uses clear.	
3	Clear area code 203 (using the example shown in Figure 9-2). On the 10 numbered buttons, press buttons 2 , 0 , 3 .	When you press 2 , the lights in the 10 buttons go out. In the display appears 1 2 When you have entered all three numbers, the display shows 1 2 03 and the 10 buttons relight.
	Now press "Clear" (in the bottom field).	The light in the button for area code 203 goes out.
4	Now clear area code 615. On the 10 numbered buttons, press 6 , 1 , 5 .	When you have entered the number, all the buttons should light, and the display shows 1 6 15 The lights in the buttons represent area codes 610 to 619 (see Figure 9-3). If they are all lit, this means that area codes 610 to 619 are set (restricted).
	Now press "Clear".	The light representing 615 goes out.

(continued)

Table 9-1 (continued)

Step	Action	Verification
5	Clear all area codes from 1200 to 1519.	
	(a) Enter the number 1200.	When you have entered the number, the display shows 1 12 00 and all the numbered buttons should light. These buttons now represent the states of area codes 1200 to 1209.
	(b) Press "TIII" (in the top field of buttons).	"TIII" lights.
	(c) Enter the last area code -- 1519.	The "TIII" button goes out. The display shows 1 15 19 The lit buttons now signify the states of area codes 1510 to 1519.
	(d) Press "Clear".	All the lit buttons go out. This means that area codes 1510 to 1519 have been cleared.
	(e) Go back and check that the area codes from 1200 have been cleared. Enter 1200 on the numbered buttons.	The buttons should be unlit, signifying that area codes 1200 to 1209 are cleared.

(continued)

Table 9-1 (continued)

Step	Action	Verification
5	(continued)	
	(f) Press "X10" in the bottom field of buttons.	In the display appears 1 12 10 Indicating that you have selected area code 1210. The numbered buttons represent area codes 1210 to 1219. They should be unlit, indicating that these area codes are cleared (you just cleared them, remember?).
	(g) Press "X100" in the bottom button field.	The display shows 1 13 10 Indicating that you have selected area code 1310. the numbered buttons should be unlit.
6	If you make a mistake, you can usually recover using the "reload" button. Try the following example:	
	(a) Set area code 203. Enter area code on the numbered buttons.	The display shows 1 2 03 and the lights in the numbered button field light, except for button 3 (which you cleared when you did step 3).
	(b) Press "set".	The button representing area code 203 lights. This means the area code has been set.

(continued)

Table 9-1 (continued)

Step	Action	Verification
6	(continued)	
	(c) Oops! You didn't want to set 203 after all. So press "reload".	The light representing 203 goes out, indicating that the change you entered -- setting 203 -- has been canceled and the original configuration is reloaded.
NOTE	The reload button works only on the last change you entered. If you enter a series of changes, you can cancel only the last one with reload.	
7	Select another CO line. Press CO line select, and a CO line button in the bottom field.	The display now shows the new CO line number you selected: 2 2 00 The numbered buttons show the states of area codes 200 to 209 for that CO line.
8	Exit the toll table function. Press "CO line select" and then select another color using the bottom "color select" row of buttons in the bottom field.	
NOTE	You cannot exit the toll table function without first pressing CO line select.	

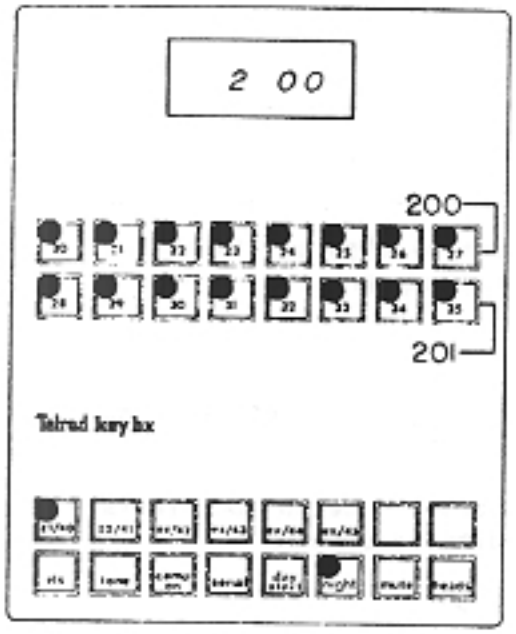


Figure 9-4 Table method, example 3

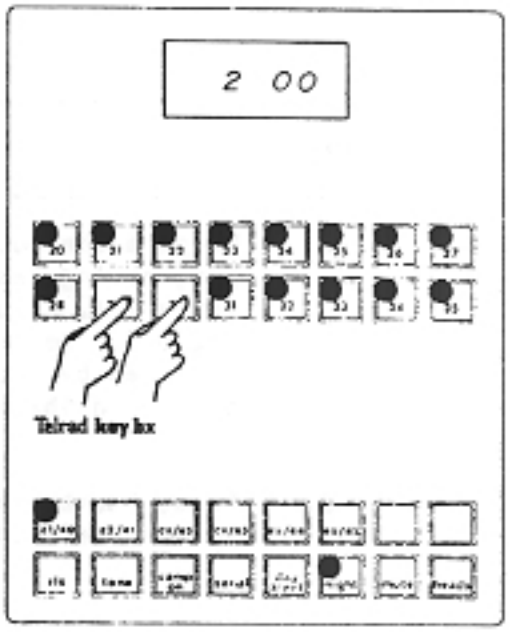


Figure 9-5 Table method, example 4

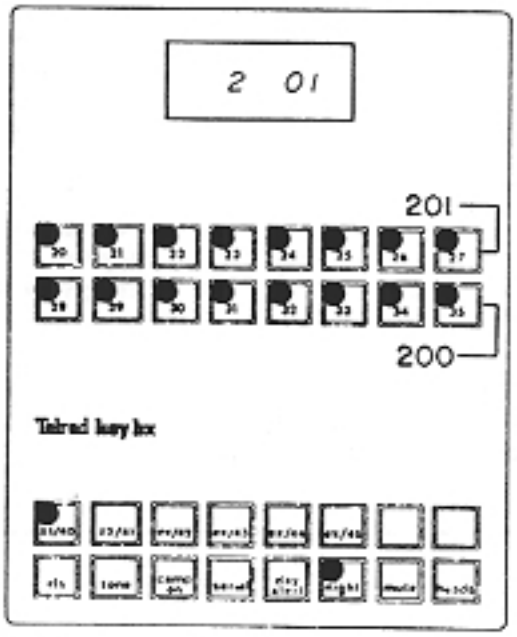


Figure 9-6 Table method, example 5

TABLE 9-2
NUMBER METHOD

Step	Action	Verification
1	Prepare the **key bx** for programming, as described in Table 4-1. Place overlay 2 on the DSS. Select the blue features by pressing the sixth button in the bottom row.	The button lights. In the display appears OL 2 indicating that overlay 2 has been selected.
2	Press "number mode" in the bottom field of buttons.	The number mode button lights. The display shows 2 00 and some or all the buttons in the top field light. Let's assume for a minute that the toll tables are in their default state -- that is, all area codes set (if you just finished doing the examples in the previous table, this is not the case!). Then all the buttons in the top field are lit. They signify the status of area codes 200 and 201 for CO lines 1 through 8. See Figure 9-4. The top row of buttons always represents the area code that appears in the display. The second row always signifies the next area code.
3	Clear area code 201 for CO lines 2 and 3, by pressing the buttons shown in Figure 9-5.	The buttons go out.

(continued)

Table 9-2 (continued)

Step	Action	Verification
4	Press "Next".	The display shows 2 01 and the two unlit buttons move up to the top row. The top row now represents area code 201 and the second row area code 202 (see Figure 9-6).
5	Scroll through the toll table one number at a time, by pressing "next" repeatedly.	The number in the display increases by one each time you press "next". The top row of buttons always represents the area code shown in the display.
6	You can scroll through the tables by 10 or by 100, by pressing "X10" and "X100".	Each time you press "X10" the number in the display increases by 10; press "X100" and it increases by 100.
NOTE	If you scroll after 999, whether by "next", "X10" or "X100", the display jumps to 1200 -- the next number in the tables. It jumps again from 1219 to 1300, from 1319 to 1400, and so on.	
7	Scroll backwards through the tables. Press "decrease" and "next", "X10" and "X100".	The "decrease" button lights. Each time you scroll, you decrease the area code by one, 10 or 100.
8	Press "decrease" again to resume forward scrolling.	The light in the button goes out.
9	Scroll through the tables to 200. Press "clear".	All the buttons go out. You have cleared area codes 200 and 201 for all eight CO lines.
10	Press "set".	All the buttons light. You have set area codes 200 and 201 for all the CO lines.

(continued)

Table 9-2 (continued)

Step	Action	Verification
11	Press "reload".	This cancels the last action. In this case, the last action was to set area codes 200 and 201. So these buttons are now cleared, and all the lights go out.
12	To exit this function, you may press "number mode" -- in which case you return to line mode -- or you can simply select another group of features with the color select buttons.	

APPENDIX A
CONFIGURATION SUMMARY

APPENDIX A

Feature: Access Restriction
Code: 20
Procedure: Table 5-1
Limitations: None
Description of feature: Section 6, System Description

Feature: All Intrusion
Code: 6 (pink)
Procedure: Table 7-5
Limitations: (1) This feature cannot be configured for SLT extensions because SLTs have no internal speakers. (2) It is not possible to have all intrusion without on-hook intrusion as well.
Description of feature: Section 5.1, System Description

Feature: Automatic Answer
Code: 4 (pink)
Procedure: Table 7-5
Limitations: All SLT extensions are automatically configured for automatic answer. key bx software will not allow this feature to be removed from an SLT.
Description of feature: Section 5.4, System Description

Feature: Background Music Access
Code: 3 (yellow)
Procedure: Not available
Limitations: An SLT set cannot be configured to have access to background music.
Description of feature: Section 3.10, System Description

Feature: Behind CENTREX
Code: 27 (pink)
Procedure: Table 6-1
Limitations: A trunk cannot be configured as both behind CENTREX and behind PABX.
Description of feature: Section 3.5, System Description

Feature: Behind PABX
Code: 26 (pink)
Procedure: Table 6-1
Limitations: A trunk cannot be configured as both behind PABX and behind CENTREX.
Description of feature: Section 3.5, System Description

Configuration Summary (continued)

Feature: CCSA Pause
Code: 32 (yellow)
Procedure: Table 8-2
Limitations: The minimum and maximum time configuration for this feature is 1 second to 9 seconds.
Description of feature: Section 5.3, Operating Instructions

Feature: CDR/no CDR
Code: 27 (green)
Procedure: Table 8-4
Limitations: None
Description of feature: Section 3.4, System Description

Feature: CENTREX flash
Code: 31 (yellow)
Procedure: Table 8-2
Limitations: The minimum and maximum time configuration for this feature is 0.3 seconds to 9.6 seconds.
Description of feature: Sections 3.2 and 3.5, System Description

---

Feature: DND Access
Code: 3 (green)
Procedure: Table 7-4
Limitations: If the DND forward feature is configured for an extension, DND access is automatically granted and cannot be taken away.
Description of feature: Sections 5.9, System Description and 2.21, Operating Instructions

---

Feature: DND Forward
Code: 4 (green)
Procedure: Table 7-5
Limitations: None
Description of feature: Sections 4.8 and 5.9 in System Description; 2.21 in Operating Instructions

---

Feature: DND Intrusion
Code: 5 (green)
Procedure: Table 7-6
Limitations: None
Description of feature: Section 5.9, System Description

Configuration Summary (continued)

Feature: DSS Barge-in
Code: 8 (pink)
Procedure: Table 7-5
Limitations: DSS barge-in cannot be configured for SLT extensions because SLTs have no speaker.
Description of feature: Section 5.14, System Description

Feature: DSS Recall Time
Code: 23 (yellow)
Procedure: Table 8-1
Limitations: Time can be set from 10 seconds to 9 minutes 50 seconds, or unlimited.
Description of feature: Section 3.2, System Description

Feature: Day Bell 1 & 2
Code: 32 & 33 (pink)
Procedure: Table 6-1
Limitation: None
Description of feature: Section 4.4, System Description

Feature: Day Flashing
Code: 23
Procedure: Table 5-1
Limitations: Extensions where a CO line rings must also flash. An extension cannot be configured to ring without flashing.
Description of feature: Section 4.3, System Description

Feature: Day Recall Time
Code: 21 (yellow)
Procedure: Table 8-1
Limitations: Time can be set from 10 seconds to 9 minutes 50 seconds, or unlimited.
Description of feature: Section 3.2, System Description

Feature: Day Ringing
Code: 22
Procedure: Table 5-1
Limitations: (a) A CO line can ring at only four extensions.
(b) If a CO line rings at extension 20, it can be configured to ring at only two other extensions (three all together).
Description of feature: Section 4.3, System Description

Configuration Summary (continued)

Feature: Flash Access
Code: 5 (pink)
Procedure: Table 7-3
Limitations: None
Description of feature: Section 5.7, System Description

Feature: Forced Account Coding
Code: 7 (white)
Procedure: Not available
Limitations: Future opiton
Description of feature: (not included)

Feature: Handsfree Talkback Time
Code: 29 (yellow)
Procedure: Table 8-1
Limitations: Time can be set from 10 seconds to 9 minutes 50 seconds, or unlimited.
Description of feature: Section 3.2, System Description

Feature: Hold Time
Code: 20 (yellow)
Procedure: Table 8-1
Limitations: Time can be set from 10 seconds to 9 minutes 50 seconds, or unlimited.
Description of feature: Section 3.2, System Description

Feature: ICM Restriction
Code: 7 (green)
Procedure: Table 7-6
Limitations: None
Description of feature: Sections 5.1 and 5.9, System Description

---

Feature: Impulse-dialed CO line
Code: 28 (green)
Procedure: Table 6-1
Limitations: future option
Description of feature: Section 3.8, System Description

Configuration Summary (continued)

Feature: Interdigital Pause
Code: 29 (green)
Procedure: Table 6-2
Limitations: Interdigital pause can be configured only if the impulse dial option board is installed. This is a future option.
Description of feature: Sections 3.2 and 3.8, System Description

---

Feature: Key/Hybrid
Code: 20 (green)
Procedure: Table 8-4
Limitations: None
Description of feature: Section 3.9 System Description

Feature: Make-Break Ratio
Code: 30 (green)
Procedure: Table 6-2
Limitations: Make-break ratio can be configured only if the impulse dial option card has been installed. This is a future option.
Description of feature: Section 3.8, System Description

Feature: Manager/Secretary
Code: 6 (green)
Procedure: Table 7-5
Limitations: None
Description of feature: Section 5.3, System Description

Feature: Manual Pause/No Manual Pause
Code: 26 (green)
Procedure: Table 8-4
Limitations: None
Description of feature: Section 3.5.17 System Configuration Guide

---

Feature: Night Bell 1 & 2
Code: 34 & 35 (pink)
Procedure: Table 6-1
Limitation: None
Description of feature: Section 4.4, System Description

Configuration Summary (continued)

Feature: Night Flashing
Code: 25
Procedure: Table 5-1
Limitations: Extensions where a CO line rings must also flash. An extension cannot be configured to ring without flashing.
Description of feature: Sections 4.3, System Description and 4.5, Operating Instructions

---

Feature: Night Recall Time
Code: 22 (yellow)
Procedure: Table 8-1
Limitations: Time can be set from 10 seconds to 9 minutes 50 seconds, or unlimited.
Description of feature: Section 3.2, System Description

Feature: Night Ringing
Code: 24
Procedure: Table 5-1
Limitations: (a) A CO line can ring at only four extensions.
(b) If a CO line rings at extension 20, it can be configured to ring at only two other extensions (three all together).
Description of feature: Sections 4.3, System Description and 4.5, Operating Instructions

---

Feature: OPX DTMF
Code: 1 (green)
Procedure: Table 7-3
Limitations: An extension cannot be configured as OPX unless a SLT is installed in the key bx.
Description of feature: Section 1.5.2(c), System Description

Feature: OPX Rotary
Code: 2 (green)
Procedure: Table 7-3
Limitations: (1) An extension cannot be configured as OPX unless a SLT is installed in the key bx.

(2) Rotary dialing can be configured for an OPX only if the impulse dial card is installed in the KSU.
Description of feature: Section 1.5.2(c), System Description

Feature: On-hook Verbal Intrusion
Code: 7 (pink)
Procedure: Table 7-5
Limitations: (1) This feature cannot be configured for SLT extensions because SLTs have no internal speakers.
(2) If all intrusion is configured for an extension, on-hook intrusion is automatically configured. If on-hook intrusion is cancelled, the key bx automatically cancels all intrusion as well.
Description of feature: Section 5.1, System Description

Configuration Summary (continued)

Feature:	Open Loop
Code:	33 (yellow)
Procedure:	Table 8-2
Limitations:	The minimum and maximum time configuration for this features is 0.1 second to 4.9 seconds.
Description of feature:	Section 3.7, System Description

Feature:	PABX Flash Time
Code:	30 (yellow)
Procedure:	Table 8-2
Limitations:	The minimum and maximum time configuration for this feature is 0.3 seconds to 9.6 seconds.
Description of feature:	Sections 3.2 and 3.5, System Description

---

Feature:	Page Routing
Code:	33 (green)
Procedure:	Table 7-2
Limitations:	SLT sets cannot be included in page zones.
Description of feature:	Section 4.7, System Description

Feature:	Page Time
Code:	28 (yellow)
Procedure:	Table 8-1
Limitations:	Time can be set from 10 seconds to 9 minutes 50 seconds, or unlimited.
Description of feature:	Section 3.2, System Description

Feature:	Paging Access
Code:	32 (green)
Procedure:	Table 7-1
Limitations:	None
Description of feature:	Sections 4.7 in System Description and 2.15 and 4.2.2 in Operating Instructions.

Feature:	Pick-up Groups
Code:	1 & 2 (yellow)
Procedure:	Not available
Limitations:	Future option
Description of feature:	Section 4.5, System Description

Configuration Summary (continued)

Feature: Privileged Stations
Code: See Table 8-3
Procedure: Table 8-3
Limitations: Privilege may not be granted to a flashing extension.
Description of feature: Section 8.3, System Configuration

Feature: Pulses per Second
Code: 31 (green)
Procedure: Table 6-2
Limitations: Pulses per second can be configured only if the impulse dial option card has been installed. This is a future option.
Description of feature: Section 3.8, System Description

Feature: Save-Repeat/Ground
Code: 21 (green)
Procedure: Table 8-4
Limitations: None
Description of feature: Section 3.5.15, System Configuration

Feature: Speed-dial Toll Restriction
Code: 2 (pink)
Procedure: Table 7-7
Limitations: None
Description of feature: Section 6.1, System Description

Feature: System Speed-dial Restriction
Code: 1 (pink)
Procedure: Table 7-7
Limitations: None
Description of feature: Section 6.1, System Description

Feature: Table Restriction
Code: 34 (green)
Procedure: Table 6-1
Limitations: none
Description of feature: Section 6, System Description

Configuration Summary (continued)

Feature: Toll Restriction
Code: 21
Procedure: Table 5-1
Limitations: None
Description of feature: Section 6, System Description

Feature: Transfer Recall
Code: 24 (yellow)
Procedure: Table 8-1
Limitations: Time can be set from 10 seconds to 9 minutes 50 seconds, or unlimited.
Description of feature: Section 3.2, System Description

Feature: Transfer Restriction
Code: 35 (green)
Procedure: Table 6-1
Limitations: none
Description of feature: Section 4.1.2, System Description

Feature: Trunk Groups 1, 2, 3 & 4.
Code: 28, 29, 30 & 31 (pink)
Procedure: Table 6-1
Limitations: A trunk can belong to only one trunk group. If it is included in a second trunk group, it is automatically deleted from the first.
Description of feature: Section 5.13, System Description

Feature: 0/1 Restriction
Code: 23 (green)
Procedure: Table 8-4
Limitations: None
Description of feature: Section 6

Feature: 411 Restriction
Code: 3 (pink)
Procedure: Table 7-3
Limitations: None
Description of feature: Section 6, System Description
