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Executech™

MODEL 2232 HYBRID/KEY SYSTEM

- INSTALLATION
- PROGRAMMING
- MAINTENANCE

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INSTALLATION AND MAINTENANCE INFORMATION FOR THE Executech MODEL 2232 KSU HYBRID/KEY SYSTEM

SERIAL NUMBER_____

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CHAPTER 1
INTRODUCTION

MANUAL SCOPE

This publication contains installation, programming, and maintenance information for the Model 2232 KSU electronic key system and associated electronic key telephone stations.

NOTE

Minor corrections and up-dates have been added to this manual. They are noted where applicable on pages l-l, 2-4, 2-9, 2-18, 3-5, and 3-8.

This key system is fully protected, and therefore the installation does not require the services of an authorized agent. However, the installation procedures detailed in this manual should only be performed by individuals familiar with general telephone installation procedures.

The end user may perform routine maintenance procedures, such as the following listed ones, but all other servicing must be performed by factory authorized personnel.

@Place or replace any designation strips on the face of the telephone stations.

@Replace the line cord or handset coiled cord.

- Replace complete stations and station handsets. The handset is a special Comdial type. Other handset types will not work properly.
- Relocate the station when it is plugged into the proper system jacks.

RELATED INFORMATION

- IMI 01-001, Compliance Kequirements To FCC Rules and Regulations Part 68 and 15
- IMI 01-005, Handling Of Electrostatically Sensitive Components
- GCA 40-028, General Information, Electronic Key System
- GCA 70-057, User's Guide for Multiline Station
- GCA 70-058, User's Guide for Single Line Station
- GCA 70-066, User's Guide for DSS/BLF Console
- GCA 48-002, Service Policy

STATION TYPES

This Key Service Unit supports the operation of the following stations:

- 22 Line/Feature Keyset
- Reused 3/8 Line Keyset
- Single-Line Keyset
- DSS/BLF Console 32-Key, 40-Key, and 70-Key

INSTALLER/USER INFORMATION REGARDING FCC RULES AND REGULATIONS

This electronic key system complies with Federal Communications Commission (FCC) Rules, Part 68.

The FCC registration label on the KSU contains the FCC registration number, the ringer equivalence number, the model number, and the serial number or production date of the system.

NOTIFICATION TO TELEPHONE COMPANY

Unless a telephone operating company provides and installs the system, the telephone operating company which provides the lines must be notified before a connection is made to them. The lines (telephone numbers) involved, the FCC registration number, and the ringer equivalence number must be provided to the telephone company. The FCC registration number and the ringer equivalence number of this equipment are provided on the label attached to the KSU.

The user/installer is required to notify the telephone company when final disconnection of this equipment from the telephone company line occurs.

DUAL REGISTRATION NOTIFICATION

This equipment can be hardware configured by the installer/dealer as either a key system or as a multifunction (hybrid) system. Configuration procedures can be found in the installation section of this publication. Because of this versatility, the FCC has granted a dual registration to the system. The installer/dealer must notify the telephone operating company of the new or changed registration number that reflects the configuration that this equipment is currently arranged to provide. The installer/dealer may be required to certify in writing to the telephone operating company how the system is configured. The telephone operating company may conduct an on-site inspection to verify the system configuration.

COMPATIBILITY WITH TELEPHONE NETWORK

When necessary, the telephone operating company provides information on the maximum number of telephones or ringers that can be connected to one line, as well as any other applicable technical information. The telephone operating company can temporarily discontinue service and make changes which could effect the operation of this equipment. They must, however, provide adequate notice, in writing, of any future equipment changes that would make the system incompatible.

INSTALLATION REQUIREMENTS

Connection of the electronic key system to the telephone lines must be through a universal service order code (USOC) outlet jack supplied by the telephone operating company. If the installation site does not have the proper outlet, ask the telephone company business office to install one. The correct outlet jack for this system is a type RJ21X.

PARTY LINES AND COIN LINES

Local telephone company regulations may not permit connections to party lines and coin lines by anyone except the telephone operating company.

TROUBLESHOOTING

If a service problem occurs, first try to determine if the trouble is in the on-site system or in the telephone company equipment. Disconnect all equipment not owned by the telephone company. If this corrects the problem, the faulty equipment must not be reconnected to the telephone line until the problem has been corrected. Any trouble that causes improper operation of the telephone network may require the telephone company to discontinue service to the trouble site after they notify the user of the reason.

REPAIR AUTHORIZATION

FCC regulations do not permit repair of customer owned equipment by anyone except the manufacturer, their authorized agent, or others who might be autnorized by the FCC. However, routine repairs can be made according to the maintenance instructions in this publication, provided that all FCC restrictions are obeyed.

RADIO FREQUENCY INTERFERENCE

The electronic key system contains incidental radio frequency generating circuitry and, if not installed and used properly, may cause interference to radio and television reception. This equipment has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules. These limits are designed to provide reasonable protection against such interference when operated in a commercial environment.

Operation of this equipment in a residential area may cause interference to radio and television reception; in which case the user is encouraged to take whatever measures may be required to correct the interference.

If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures: Reorient the television or radio's receiving antenna, and/or relocate the KSU, the individual telephone stations, and the radio or TV with respect to each other.

If necessary, the user should consult the manufacturer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful: "How to Identify and Resolve Radio-TV Interference Problems." This booklet is available from the Government Printing Office, Washington D.C. 20402. Stock No. 004-000-00345-4.

RINGER EQUIVALENCE NUMBER

The REN of each line of the KSU is 0.4B. The FCC requires the installer to determine the total REN for each line, and record it at the equipment.

CHAPTER 2
INSTALLATION

MOUNTING CONSIDERATIONS

- The KSU and power supply cabinets should be attached vertically to any sturdy, flat, surface. They may be vertically rack mounted if desired. The power supply cabinet can be mounted so that the power connector and fuses are facing either toward the right side or toward the left side of the mounting location.

- The power interconnection cable is four feet in length. Locate the cabinets with respect to each other so that this cable will reach between the cabinet connectors. Do not locate the cabinets closer than within six inches of each other.

- The power supply must be located within six (6) feet of a proper electrical outlet. The power supply requires a dedicated 117VAC 15 AMP circuit, with a third-wire ground, supplied to a NEMA 5-15R electrical outlet.

- The distance between the KSU and the TELCO/PBX jacks must be 25 feet or less as per FCC requirements. A nominal distance of 7 feet is recommended.

- The mounting location must be secure and dry and have adequate ventilation. The temperature range of the location must be within 32-122 degrees F (0-50 degrees C), and the relative humidity must be less than 90 percent non-condensing.

- If the mounting surface is damp or if it is concrete or masonry material, a backboard must be attached to the mounting surface to be used for KSU mounting. Suitable mounting backboards are available commercially or can be constructed out of 1/2-inch plywood cut to size.

Tools and hardware required for mounting the KSU cabinet include:

@Fasteners - wood screws (1/4 x l-inch round head), toggle bolts, or wall anchors
*Screwdriver - to match fasteners
@Electric drill - if prepared holes are required
- Connecting tool - for fastening wires to a type-66 connector block.
@Crimping tool - for 623-type modular plugs

MOUNTING PROCEDURE

1. Unpack, and carefully inspect the KSU, power supply, and stations for shipping damage. Notify the shipper immediately of any damages found. Verify that the packages contain all parts and accessories needed for proper installation and operation.

2. If a backboard is required at the mounting location, attach it securely to provide a stable mounting surface for the equipment.

3. Full scale mounting templates are supplied in the packing boxes. Hold or tape them to the mounting surface, and mark the location of the mounting holes on the mounting surface as they are located on the templates. The mounting dimensions and general equipment locations are shown on Figure 2-l.

4. Drill holes in the mounting surface of a proper size to accommodate the hardware being used. If necessary, prepare these holes with inserts, anchors or other attachment devices as dictated by the type of mounting surface.

5. Attach the KSU and power supply cabinets to the mounting surface with four (4) screws installed through the KSU mounting flange and into the mounting surface holes. Note that the flange holes are elongated with an enlargement at one end. This feature allows the mounting screws to be partially installed in the mounting surface before the cabinets are hung on them. The flange holes on the power supply cabinet have an enlargement at the center of the elongated holes to allow the cabinet to be mounted with the power connector and fuses facing either toward the right side or toward the left side of the mounting location.

6. Place the individual telephone stations as desired and in keeping with accepted industry and office standards. A telephone station can be wall mounted if necessary as they are desk/wall reversible. Refer to Chapter 4, Maintenance, for instructions in preparing a desk/wall reversible station for wall mounting.

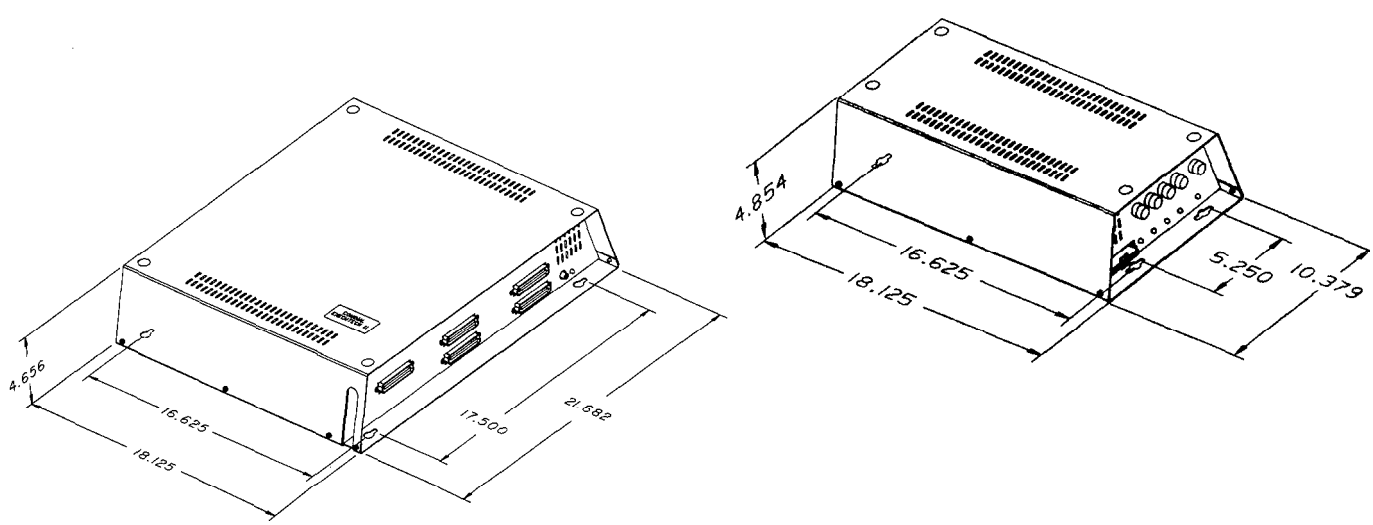


Figure 2-1. Mounting Dimensions'

SYSTEM WIRING

System cabling may be routed concealed or visible as the installation location requires. Good engineering practices must be observed and all applicable building codes must be adhered to. Tables 2-l through 2-5 and Figures 2-2 through 2-5 illustrate the system wiring and connection points.

AC Power Connection

Connect the power interconnection cable between the power supply and the KSU.

CAUTION

Do not connect or disconnect the power interconnection cable while the AC power cord is connected to the AC outlet.

To apply AC power to the power supply, connect the AC power cord to the NEMA 5-15R outlet which supplies the dedicated 117VAC @ 15 AMP electrical power. A plug-in, power line surge protector should be installed between the KSU power cord and the AC outlet.

CAUTION

Do not connect the AC power cord until the installation has been checked per the SYSTEM CHECKOUT instructions given later in this chapter.

Line Connections

The KSU interface connection for the TELCO or PBX lines is a 50-pin, male connector. A 25-pair cable, properly terminated, must be connected from the KSU connector to the demarcation point connector (typically a 66M-xx connector).

CAUTION

To help insure that foreign voltages, which could appear on the TELCO lines, do not damage the system, verify that gas discharge tubes or similar protection devices are installed, and properly grounded, in all connected TELCO lines.

Station Connections

Connections between the KSU and the stations are typically via type 66M-xx connector blocks which are cable connected to the KSU 50-pin male connector. The maximum distance allowed from the KSU to the station is 1500 feet using #24 gauge, twisted-pair cable.

If spare conductors exist in the cables that are run between the KSU 66M-xx connector block and the station jacks, it is a good practice to connect them to earth ground. Doing this may help prevent them from inducing radio frequency and/or AC interference into the system.

CAUTION

The polarity between the individual wires in a particular voice or data pair is not critical; however, do not connect the voice circuits to the data circuits.

IMPORTANT NOTE

Station ports are programmed for the type of equipment that is to be connected to them. A 22 Line/Feature Keyset must be installed at station port 10 and/or station port 11 as Class Of Service programming is performed from those ports.

DSS/BLF Console Connections

The system provides two console ports. The console ports are associated with companion station ports asfollows:

CONSOLE PORT	STATION PORT
10	10
11	11

Power Failure Station Connections

The system provides four tip and ring pairs connected to lines 1, 2, 3, and 4 as emergency, power failure circuits. These power failure pairs are located as detailed on Table 2-4 and Figure 2-4. A power failure pair is only active during a power failure. An industry standard, single-line telephone, such as a type 2500, can be connected to a power failure pair and used to provide communications capability should the AC power to the system be interrupted.

Station Auxiliary Jack Connections

For those stations equipped with an auxiliary jack, pins 3 and 4 (tip and ring leads) of this jack are connected to pins 1 and 6 of the station line jack. A 6-conductor station line cord is used, and the third pair is designated as the auxiliary-pair.

Refer to Figure 2-5 for an illustration of a typical auxiliary-pair wiring connection, and note the following wiring considerations:

- Wire a type 625A2-6 modular jack to be used as the station wall jack.
- @Connect 3-pair cable between the station wall jack and an auxiliary 66M-xx connector block.
- Connect the voice-pair and data-pair from the auxiliary connector block to the station connector block.

*Connect the auxiliary-pair from the auxiliary connector block to the desired termination.

@Connect an appropriate line cord between the auxiliary jack and the auxiliary source equipment.

A-Lead Control Device Connections

The KSU can detect an A-lead (A and Al) control signal when it is applied to lines 13 - 16. An A-lead control device can be bridge-connected to these lines via terminal clips on the J-4 station connector block. Refer to Table 2-4 and Figure 2-4 for connection details.

Data Device Connections

When a serial data printer is used for SMDR and COS printout, or a video display terminal (VDT) is used to perform class of service programming connect the data device to terminal clips on the J-4 auxiliary connector block. The maximum distance between the device and the KSU must not exceed 50 feet. Refer to Table 2-4 for connection details.

When preparing a cable for connection to a data device, refer to the manufacturer's manual for the equipment being interfaced, and make the following wiring connections:

- Wire the KSU RD line (data from device to KSU) to the device TD (transmit data) output pin.

@Wire the KSU TD (data to device from KSU) pin to the device RD (receive data) pin.

- Wire the KSU SG (signal ground) pin to the device SG (signal ground) pin.

- Wire the KSU CTS (clear-to-send status from device to KSU) pin to the device RTS (request-to-send) output pin. NOTE: The KSU requires a positive voltage, with respect to signal ground, in order to send data.

- If required, wire the KSU RTS (request-to-send status signal from the KSU to the device) pin to the device DSR (data-set-ready) input pin.

- If required, wire the KSU PG (protective ground) line(s) to the device protective ground pin(s).

The system defaults to 7-bit data with no parity at a baud rate of 1200. Configure the device, per the manufacturer's instructions, to match the data format and baud rate that is set by COS programming.

System Grounding

It is required that a grounding wire, separate from the three wire AC line cord, be used. A ground stud is located on the KSU and on the power supply for this purpose. Wire #10 or #12, insulated, solid copper wires between these ground studs and a reliable earth ground such as a metal cold water pipe or a building frame ground.

Common Audible and Auxiliary Station Interface

Two sets of relay closure dry-contact points are available at the J-l and J-2 station connector blocks.

- One set (J-l connections) provides a dry-contact closure whenever any of the TELCO/PBX lines, connected to the KSU, ring.
- The other set (J-2 connections) provides a dry-contact closure whenever system station port 17 rings.

These contact closures track the ringing pattern in both cases. The contacts are closed during the ringing period and are open during the silent period.

A typical connection is illustrated in Figure 2-2. Refer to the paragraph headed Area Paging Interface for a discussion for using these terminals i-is-alternate paging function.

CAUTION

Do not exceed a 1 amp at 24 volts (.5 amp at 48 volts) load on these control terminals. If the load requirements exceed this limit, connect the load through an external slave relay. DO NOT CONNECT THESE CONTROL TERMINALS DIRECTLY TO THE 117VAC LINE.

Area Paging Interface - Station PA Port

Any unused station port can be programmed to be a PA port instead Of a telephone station port (see Chapter 3 for programming details).

- The audio input of an external paging amplifier can be connected to the audio pair of the station port as illustrated in Figure 2-3.
- The audio input connection must be isolated with a 600 ohm to 600 ohm audio matching transformer. Terminate the audio input of the PA system with a 620 ohm (nominal value) resistor.
- If station port 39 is programmed as a PA port, the Common Audible contact points are automatically reconfigured as PA enable terminals. The contact closure now occurs when PA station 39 is dialed. The normal common audible function, as discussed previously, is disabled as long as station 39 is a PA station.
- If station port 41 is programmed as a PA port, the Auxiliary Station Interface (station port 17 audible) contact points are automatically reconfigured as PA enable terminals. The contact closure now occurs when PA station port 41 is dialed. The normal auxiliary station interface function, as discussed previously, is disabled as long as station port 41 is a PA station.

Area Paging Interface - Line Port

A line port can be configured by class of service programming to be an AUXILIARY port. As an AUXILIARY port, it can be used to couple a station voice path to an external device. This is done from any allowed station by pressing the proper line key to select the AUXILIARY port. DTMF tones or dial pulses can be dialed through the auxiliary port as needed.

If direct access area paging is to be part of the system, connect the audio input of a paging amplifier to the line that is programmed to be an AUXILIARY port. The input impedance of this port is approximately 600 ohms. A tone select, zone-paging amplifier can be employed if desired. If used, the zone-select code must be dialed after the AUXILIARY port line select key is pressed.

Key System/Multifunction (Hybrid) Configuration

The system can be configured to operate as either a key system or as a multifunction (hybrid) system.

Configuration is by way of a wire strap placed between clip terminals 27 and 28 of station connector block J-4.

The KSU is shipped from the factory as a key system (KF). To convert operation over to the multifunction (MF) system, add the strap.

The KF and MF designations are equipment type catagories as stipulated in FCC rules and regulations, Part 68, and appear as part of the FCC Registration Number on the equipment label. The appropriate registration number must be reported to the telephone company at the time of connection along with other FCC mandated information. (Refer to Installer/User Information Regarding FCC Rules and Regulations found in Chapter 1 of this manual.)

Operationally, the multifunction (hybrid) configuration enables a PBX feature which may incur a higher monthly tariff to the telephone company. This feature allows dial access to (automatic selection of) outgoing lines. The specific Executech feature that is enabled by the multifunction (hybrid) configuration is:

- Line Group (Including Dial Access)

Music Interface

If music is to be part of the system, connect a KX registered music source to the KSU input jack (phono jack) provided for this purpose. The impedance of this input is approximately 500 ohms. Level adjustment of the music source may be necessary. This may be done during system checkout.

Cassette Tape Recorder Interface

A customer provided, audio cassette, tape recorder can be connected to the music interface jack. Class of service programming can be both stored and loaded via the recorder through this interface. This action is controlled from station 10 as detailed in Chapter 3, System Programming.

Table 2-1. Wiring For Station Connector Block J-l

SYSTEM INTERCONNECTION FOR KSU J1						
KSU INTERFACE CONNECTOR WIRING			CONNECTION BLOCK WIRING			
25-PAIR CABLE CONNECTIONS			ASSIGNMENT (DEFAULT EXTENSION SHOWN)		4-WIRE CABLE CONNECTIONS	
WIRE COLOR	PAIR	PIN NO.			COLOR	CLIP TERM.
WHITE-BLUE	1	26	STATION PORT 10 EXT. 110	VOICE PAIR	GREEN	1
BLUE-WHITE		1			RED	2
WHITE-ORANGE	2	27		DATA PAIR	YELLOW	3
ORANGE-WHITE		2			BLACK	4
WHITE-GREEN	3	28	CONSOLE PORT 10	POWER PAIR	GREEN	5
GREEN-WHITE		3			RED	6
WHITE-BROWN	4	29		DATA PAIR	YELLOW	7
BROWN-WHITE		4			BLACK	8
WHITE-SLATE	5	30	STATION PORT 11 EXT. 111	VOICE PAIR	GREEN	9
SLATE-WHITE		5			RED	10
RED-BLUE	6	31		DATA PAIR	YELLOW	11
BLUE-RED		6			BLACK	12
RED-ORANGE	7	32	RESERVED		GREEN	13
ORANGE-RED		7			RED	14
RED-GREEN	8	33			YELLOW	15
GREEN-RED		A			BLACK	16
RED-BROWN	9	34	STATION PORT 12 EXT. 112	VOICE PAIR	GREEN	17
BROWN-RED		9			RED	18
RED-SLATE	10	35		DATA PAIR	YELLOW	19
SLATE-RED		10			BLACK	20
BLACK-BLUE	11	36	CONSOLE PORT 11	POWER PAIR	GREEN	21
BLUE-BLACK		11			RED	22
BLACK-ORANGE	12	37		DATA PAIR	YELLOW	23
ORANGE-BLACK		12			BLACK	24
BLACK-GREEN	13	38	STATION PORT 13 EXT. 113	VOICE PAIR	GREEN	25
GREEN-BLACK		13			RED	26
BLACK-BROWN	14	39		DATA PAIR	YELLOW	27
BROWN-BLACK		14			BLACK	28
BLACK-SLATE	15	40	RESERVED		GREEN	29
SLATE-BLACK		15			RED	30
YELLOW-BLUE	16	41			YELLOW	31
BLUE-YELLOW		16			BLACK	32
YELLOW-ORANGE	17	42	STATION PORT 14 EXT. 114	VOICE PAIR	GREEN	33
ORANGE-YELLOW		17			RED	34
YELOW-GREEN	18	43		DATA PAIR	YELLOW	35
GREEN-YELLOW		18			BLACK	36
YELLOW-BROWN	19	AA	STATION PORT 15 EXT. 115	VOICE PAIR	GREEN	37
BROWN-YELLOW		19			RED	38
YELLOW-SLATE	20	45		DATA PAIR	YELLOW	39
SLATE-YELLOW		20			BLACK	40
VIOLET-BLUE	21	46	STATION PORT 16 EXT. 116	VOICE PAIR	GREEN	41
BLUE-VIOLET		21			RED	42
VIOLET-ORANGE	22	47		DATA PAIR	YELLOW	43
ORANGE-VIOLET		22			BLACK	44
VIOLET-GREEN	23	48	STATION PORT 17 EXT. 117	VOICE PAIR	GREEN	45
GREEN-VIOLET		23			RED	46
VIOLET-BROWN	24	49		DATA PAIR	YELLOW	47
BROWN-VIOLET		24			BLACK	48
VIOLET-SLATE	25	50	COMMON AUDIBLE		GREEN	49
SLATE-VIOLET		25			RED	50

Table 2-2. Wiring For Station Connector Block J-2

SYSTEM INTERCONNECTION FOR KSU J2						
KSU INTERFACE CONNECTOR WIRING			CONNECTION BLOCK WIRING			
25-PAIR CABLE CONNECTIONS			ASSIGNMENT (DEFAULT EXTENSION SHOWN)		4-WIRE CABLE CONNECTIONS	
WIRE COLOR	PAIR	PIN NO.			COLOR	CLIP TERM.
WHITE-BLUE	1	26	STATION PORT 18 EXT. 118	VOICE PAIR	GREEN	1
BLUE-WHITE		1			RED	2
WHITE-ORANGE	2	27		DATA PAIR	YELLOW	3
ORANGE-WHITE		2			BLACK	4
WHITE-GREEN	3	28	STATION PORT 19 EXT. 119	POWER PAIR	GREEN	5
GREEN-WHITE		3			RED	6
WHITE-BROWN	4	29		DATA PAIR	YELLOW	7
BROWN-WHITE		4			BLACK	8
WHITE-SLATE	5	30	STATION PORT 20 EXT. 120	VOICE PAIR	GREEN	9
SLATE-WHITE		5			RED	10
RED-BLUE	6	31		DATA PAIR	YELLOW	11
BLUE-RED		6			BLACK	12
RED-ORANGE	7	32	STATION PORT 21 EXT. 121	VOICE PAIR	GREEN	13
ORANGE-RED		7			RED	14
RED-GREEN	8	33		DATA PAIR	YELLOW	15
GREEN-RED		8			BLACK	16
RED-BROWN	9	34	STATION PORT 22 EXT. 122	VOICE PAIR	GREEN	17
BROWN-RED		9			RED	18
RED-SLATE	10	35		DATA PAIR	YELLOW	19
SLATE-RED		10			BLACK	20
BLACK-BLUE	11	36	STATION PORT 23 EXT. 123	VOICE PAIR	GREEN	21
BLUE-BLACK		11			RED	22
BLACK-ORANGE	12	37		DATA PAIR	YELLOW	23
ORANGE-BLACK		12			BLACK	24
BLACK-GREEN	13	38	STATION PORT 24 EXT. 124	VOICE PAIR	GREEN	25
GREEN-BLACK		13			RED	26
BLACK-BROWN	14	39		DATA PAIR	YELLOW	27
BROWN-BLACK		14			BLACK	28
BLACK-SLATE	15	40	STATION PORT 25 EXT. 125	VOICE PAIR	GREEN	29
SLATE-BLACK		15			RED	30
YELLOW-BLUE	16	41		DATA PAIR	YELLOW	31
BLUE-YELLOW		16			BLACK	32
YELLOW-ORANGE	17	42	STATION PORT 26 EXT. 126	VOICE PAIR	GREEN	33
ORANGE-YELLOW		17			RED	34
YELLOW-GREEN	18	43		DATA PAIR	YELLOW	35
GREEN-YELLOW		18			BLACK	36
YELLOW-BROWN	19	44	STATION PORT 27 EXT. 127	VOICE PAIR	GREEN	37
BROWN-YELLOW		19			RED	38
YELLOW-SLATE	20	45		DATA PAIR	YELLOW	39
SLATE-YELLOW		20			BLACK	40
VIOLET-BLUE	21	46	STATION PORT 28 EXT. 128	VOICE PAIR	GREEN	41
BLUE-VIOLET		21			RED	42
VIOLET-ORANGE	22	47		DATA PAIR	YELLOW	43
ORANGE-VIOLET		22			BLACK	44
VIOLET-GREEN	23	48	STATION PORT 29 EXT. 129	VOICE PAIR	GREEN	45
GREEN-VIOLET		23			RED	46
VIOLET-BROWN	24	49		DATA PAIR	YELLOW	47
BROWN-VIOLET		24			BLACK	48
VIOLET-SLATE	25	50	STATION 17 AUXILIARY INTERFACE		GREEN	49
SLATE-VIOLET		25			RED	50

Table 2-3. Wiring For Station Connector Block J-3

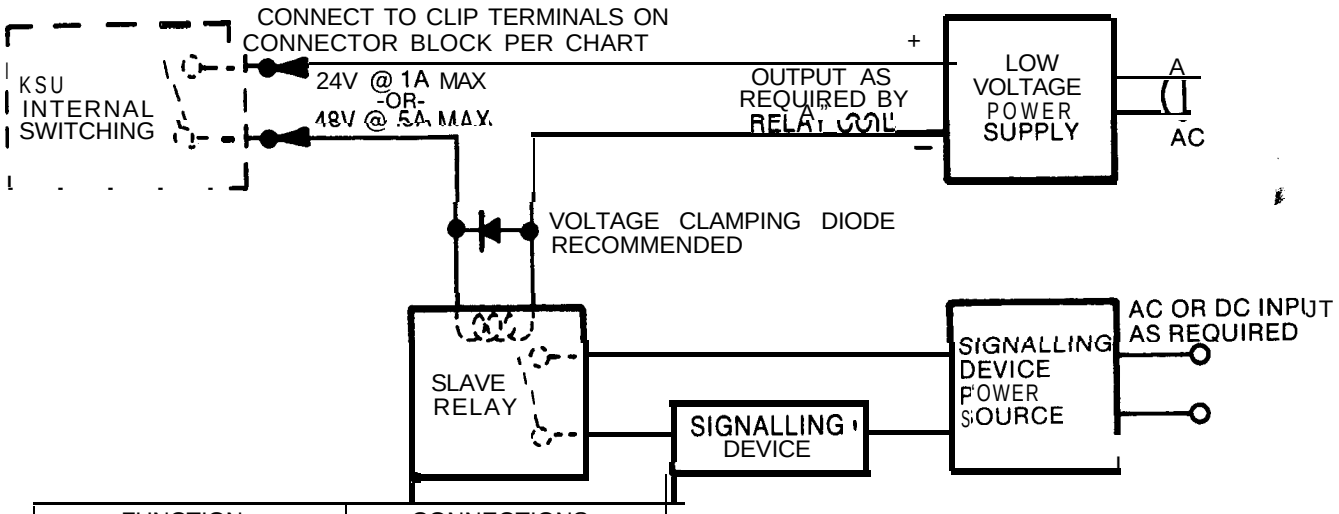
SYSTEM INTERCONNECTION FOR KSU J3						
KSU INTERFACE CONNECTOR WIRING			CONNECTION BLOCK WIRING			
25-PAIR CABLE CONNECTIONS			ASSIGNMENT (DEFAULT EXTENSION SHOWN)		4-WIRE CABLE CONNECTIONS	
WIRE COLOR	PAIR	PIN NO.			COLOR	TERM
WHITE-BLUE	1	26	STATION PORT	VOICE PAIR	GREEN	1
BLUE-WHITE		1			RED	2
WHITE-ORANGE	2	27	30 / 130 EXT.	DATA PAIR	YELLOW	3
ORANGE-WHITE		2			BLACK	4
WHITE-GREEN	3	28	STATION PORT 31 / 131 EXT.	VOICE PAIR	GREEN	5
GREEN-WHITE		3			RED	6
WHITE-BROWN	4	29		DATA PAIR	YELLOW	7
BROWN-WHITE		A			BLACK	8
WHITE-SLATE	5	30	STATION PORT 32 / 132 EXT.	VOICE PAIR	GREEN	9
SLATE-WHITE		5			RED	10
RED-BLUE	6	31		DATA PAIR	YELLOW	11
BLUE-RED		6			BLACK	12
RED-ORANGE	7	32	STATION PORT 33 / 133 EXT.	VOICE PAIR	GREEN	13
ORANGE-RED		7			RED	14
RED-GREEN	8	33		DATA PAIR	YELLOW	15
GREEN-RED		8			BLACK	16
RED-BROWN	9	34	STATION PORT 34 / 134 EXT.	VOICE PAIR	GREEN	17
BROWN-RED		9			RED	18
RED-SLATE	10	35		DATA PAIR	YELLOW	19
SLATE-RED		10			BLACK	20
BLACK-BLUE	11	36	STATION PORT 35 / 135 EXT.	VOICE PAIR	GREEN	21
BLUE-BLACK		11			RED	22
BLACK-ORANGE	12	37		DATA PAIR	YELLOW	23
ORANGE-BLACK		12			BLACK	24
BLACK-GREEN	13	38	STATION PORT 36 / 136 EXT.	VOICE PAIR	GREEN	25
GREEN-BLACK		13			RED	26
BLACK-BROWN	14	39		DATA PAIR	YELLOW	27
BROWN-BLACK		14			BLACK	28
BLACK-SLATE	15	40	STATION PORT 37 / 137 EXT.	VOICE PAIR	GREEN	29
SLATE-BLACK		15			RED	30
YELLOW-BLUE	16	41		DATA PAIR	YELLOW	31
BLUE-YELLOW		16			BLACK	32
YELLOW-ORANGE	17	42	STATION PORT 38 / 138 EXT.	VOICE PAIR	GREEN	33
ORANGE-YELLOW		17			RED	34
YELLOW-GREEN	18	43		DATA PAIR	YELLOW	35
GREEN-YELLOW		18			BLACK	36
YELLOW-BROWN	19	44	STATION PORT 39 / 139 EXT.	VOICE PAIR	GREEN	37
BROWN-YELLOW		19			RED	38
YELLOW-SLATE	20	45		DATA PAIR	YELLOW	39
SLATE-YELLOW		20			BLACK	40
VIOLET-BLUE	21	46	STATION PORT 40 / 140 EXT.	VOICE PAIR	GREEN	41
BLUE-VIOLET		21			RED	42
VIOLET-ORANGE	22	47		DATA PAIR	YELLOW	43
ORANGE-VIOLET		22			BLACK	44
VIOLET-GREEN	23	48	STATION PORT 41 / 141 EXT.	VOICE PAIR	GREEN	45
GREEN-VIOLET		23			RED	46
VIOLET-BROWN	24	49		DATA PAIR	YELLOW	47
BROWN-VIOLET		24			BLACK	48
VIOLET-SLATE	25	50	SPARE		GREEN	49
SLATE-VIOLET		25			RED	50

Table 2-4. Wiring For Auxiliary Connector Block J-4

SYSTEM INTERCONNECTION FOR KSU J4							
KSU INTERFACE CONNECTOR WIRING			CONNECTION BLOCK WIRING				
25-PAIR CABLE CONNECTIONS			ASSIGNMENT (DEFAULT EXTENSION SHOWN)			4-WIRE CABLE CONNECTIONS	
WIRE COLOR	PAIR	PIN NO.				COLOR	CLIP TERM.
WHITE-BLUE	1	26	POWER FAIL STA. 1	TIP			1
BLUE-WHITE		1		RING			2
WHITE-ORANGE	2	27	POWER FAIL STA. 2	RING			3
ORANGE-WHITE		2		TIP			4
WHITE-GREEN	3	28	POWER FAIL STA.3	TIP			5
GREEN-WHITE		3		RING			6
WHITE-BROWN	4	29	POWER FAIL STA. 4	TIP			7
BROWN-WHITE		4		RING			8
WHITE-SLATE	5	30	AUX. EQUIP. INTERFACE TO CO LINE 13	TIP		GREEN	9
SLATE-WHITE		5		RING		RED	10
RED-BLUE	6	31		A		YELLOW	11
BLUE-RED		6		A1		BLACK	12
RED-ORANGE	7	32	AUX. EQUIP. INTERFACE TO CO LINE 14	TIP		GREEN	13
ORANGE-RED		7		RING		RED	14
RED-GREEN	8	33		A		YELLOW	15
GREEN-RED		8		A1		BLACK	16
RED-BROWN	9	34	AUX. EQUIP. INTERFACE TO CO LINE 15	TIP		GREEN	17
BROWN-RED		9		RING		RED	18
RED-SLATE	10	35		A		YELLOW	19
SLATE-RED		10		A1		BLACK	20
BLACK-BLUE	11	36	AUX. EQUIP. INTERFACE TO CO LINE 16	TIP		GREEN	21
BLUE-BLACK		11		RING		RED	22
BLACK-ORANGE	12	37		A		YELLOW	23
ORANGE-BLACK		12		A1		BLACK	24
BLACK-GREEN	13	38	SPARE				25
GREEN-BLACK		13					26
BLACK-BROWN	14	39	KEY/MULTIFUNCTION STRAP (OUT FOR KEY)				27
BROWN-BLACK		14					28
BLACK-SLATE	15	40	SPARE				29
SLATE-BLACK		15					30
YELLOW-BLUE	16	41	RESERVED				31
BLUE-YELLOW		16					32
YELLOW-ORANGE	17	42	RESERVED				33
ORANGE-YELLOW		17					34
YELLOW-GREEN	18	43	RESERVED				35
GREEN-YELLOW		18					36
YELLOW-BROWN	19	44	SPARE				37
BROWN-YELLOW		19					38
YELLOW-SLATE	20	45	SMDR PRINTER INTERFACE	RD			39
SLATE-YELLOW		20		SPARE			40
VIOLET-BLUE	21	46		TD			41
BLUE-VIOLET		21		SG			42
VIOLET-ORANGE	22	47		RTS			43
ORANGE-VIOLET		22		CTS			44
VIOLET-GREEN	23	48		PG			45
GREEN-VIOLET		23		PG			46
VIOLET-BROWN	24	49	SPARE				47
BROWN-VIOLET		24					48
VIOLET-SLATE	25	50	SPARE				49
SLATE-VIOLET		25					50

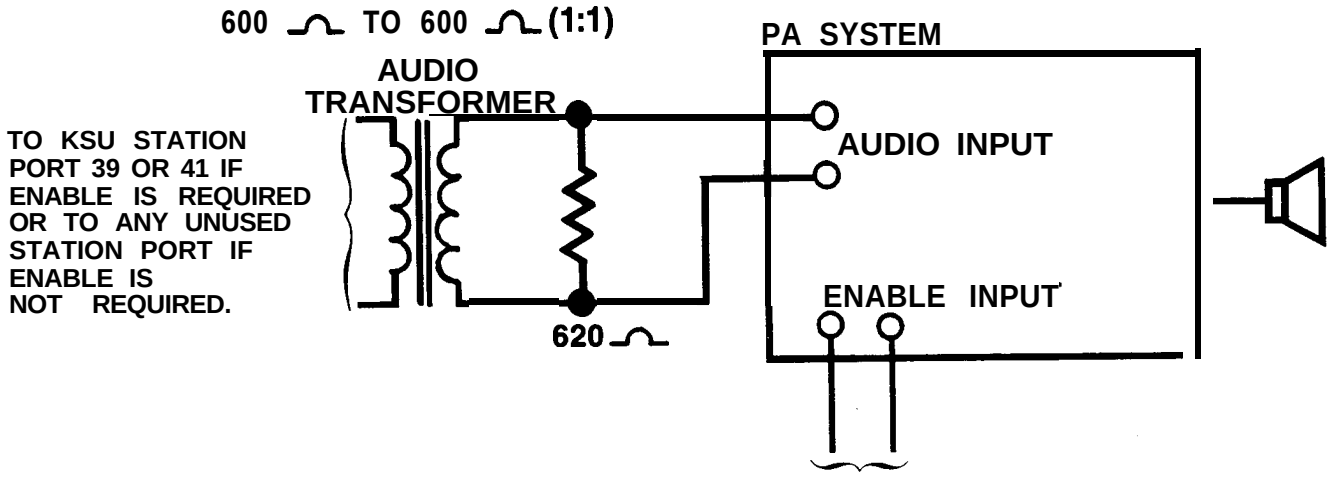
Table 2-5. Wiring For CO/PBX Connector Block J-5

SYSTEM INTERCONNECTION FOR KSU J5						
KSU INTERFACE CONNECTOR WIRING			CONNECTION BLOCK WIRING			
25-PAIR CABLE CONNECTIONS			ASSIGNMENT (DEFAULT EXTENSION SHOWN)		4-WIRE CABLE CONNECTIONS	
WIRE COLOR	PAIR	PIN NO.			COLOR	CLIP TERM.
WHITE-BLUE	1	26	CO LINE 1	TIP		1
BLUE-WHITE		1		RING		2
WHITE-ORANGE	2	27	CO LINE 2	TIP		3
ORANGE-WHITE		2		RING		4
WHITE-GREEN	3	28	CO LINE 3	TIP		5
GREEN-WHITE		3		RING		6
WHITE-BROWN	4	29	CO LINE 4	TIP		7
BROWN-WHITE		4		RING		8
WHITE-SLATE	5	30	CO LINE 5	TIP		9
SLATE-WHITE		5		RING		10
RED-BLUE	6	31	CO LINE 6	TIP		11
BLUE-RED		6		RING		12
RED-ORANGE	7	32	CO LINE 7	TIP		13
ORANGE-RED		7		RING		14
RED-GREEN	8	33	CO LINE 8	TIP		15
GREEN-RED		8		RING		16
RED-BROWN	9	34	CO LINE 9	TIP		17
BROWN-RED		9		RING		18
RED-SLATE	10	35	CO LINE 10	TIP		19
SLATE-RED		10		RING		20
BLACK-BLUE	11	36	CO LINE 11	TIP		21
BLUE-BLACK		11		RING		22
BLACK-ORANGE	12	37	CO LINE 12	TIP		23
ORANGE-BLACK		12		RING		24
BLACK-GREEN	13	38	CO LINE 13	TIP		25
GREEN-BLACK		13		RING		26
BLACK-BROWN	14	39	CO LINE 14	TIP		27
BROWN-BLACK		14		RING		28
BLACK-SLATE	15	40	CO LINE 15	TIP		29
SLATE-BLACK		15		RING		30
YELLOW-BLUE	16	41	CO LINE 16	TIP		31
BLUE-YELLOW		16		RING		32
YELLOW-ORANGE	17	42	CO LINE 17	TIP		33
ORANGE-YELLOW		17		RING		34
YELLOW-GREEN	18	43	CO LINE 18	TIP		35
GREEN-YELLOW		18		RING		36
YELLOW-BROWN	19	44	CO LINE 19	TIP		37
BROWN-YELLOW		19		RING		38
YELLOW-SLATE	20	45	CO LINE 20	TIP		39
SLATE-YELLOW		20		RING		40
VIOLET-BLUE	21	46	CO LINE 21	TIP		41
BLUE-VIOLET		21		RING		42
VIOLET-ORANGE	22	47	CO LINE 22	TIP		43
ORANGE-VIOLET		22		RING		44
VIOLET-GREEN	23	48	SPARE			45
GREEN-VIOLET		23				46
VIOLET-BROWN	24	49	SPARE			47
BROWN-VIOLET		24				48
VIOLET-SLATE	25	50	SPARE			49
SLATE-VIOLET		25				50



FUNCTION	CONNECTIONS
COMMON AUDIBLE	J-I CLIPS 49, 50
STATION 17 RINGING	J-2 CLIPS 49, 50

Figure 2-2. Common Audible/Auxiliary Station Interface Wir .ng (Typical Connection)



FOR PA ENABLING, CONNECTTO CLIP TERMINALS ON CONNECTOR BLOCK

- **BLOCK J-I CLIPS 49 & 50 FOR STATION PORT 39 PA ENABLE**
- **BLOCK J-2 CLIPS 49 & 50 FOR STATION PORT 41 PA ENABLE**

Figure 2-3. PA Connections

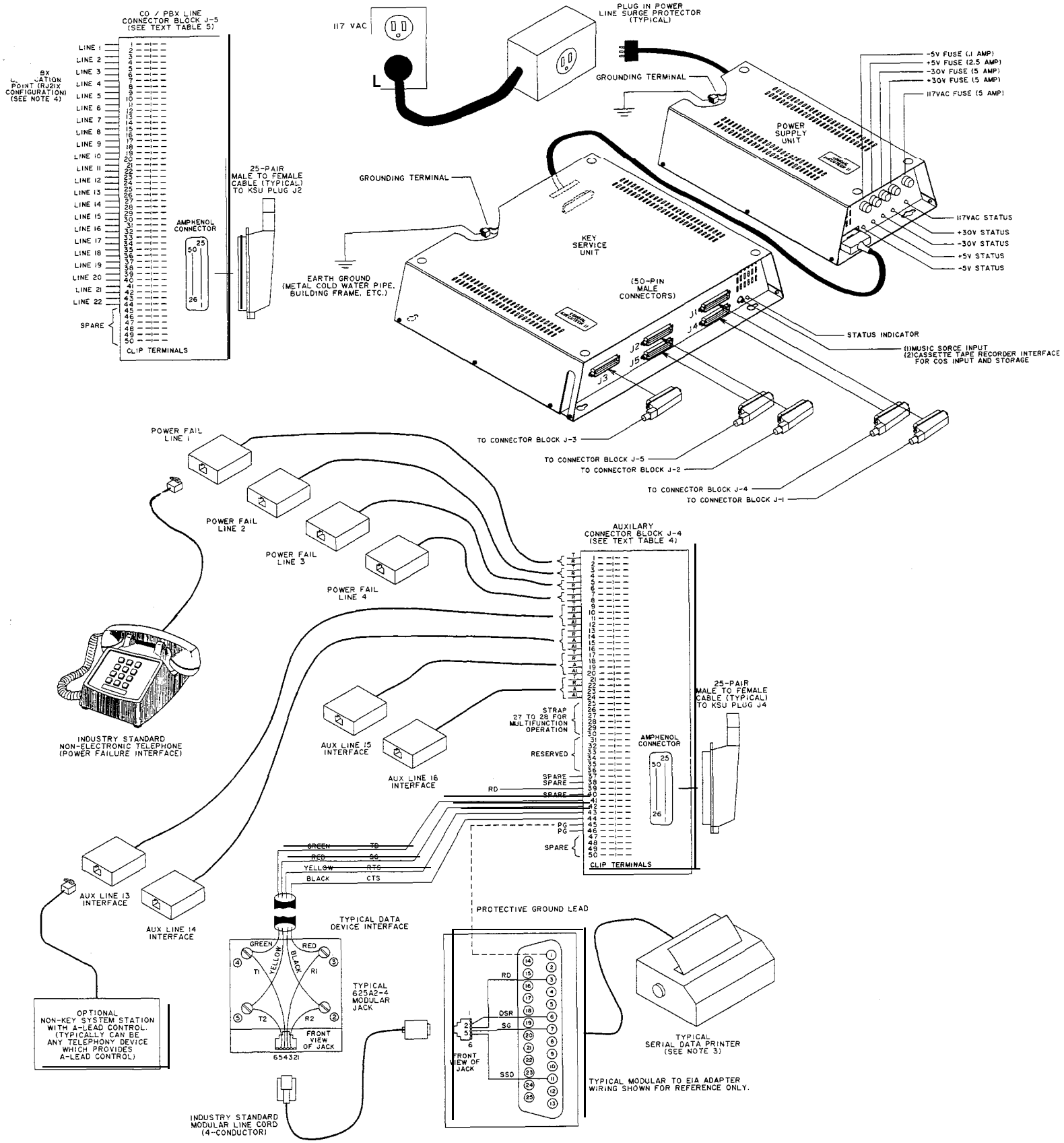


Figure 2-4a. System Interconnection - Typical Connections

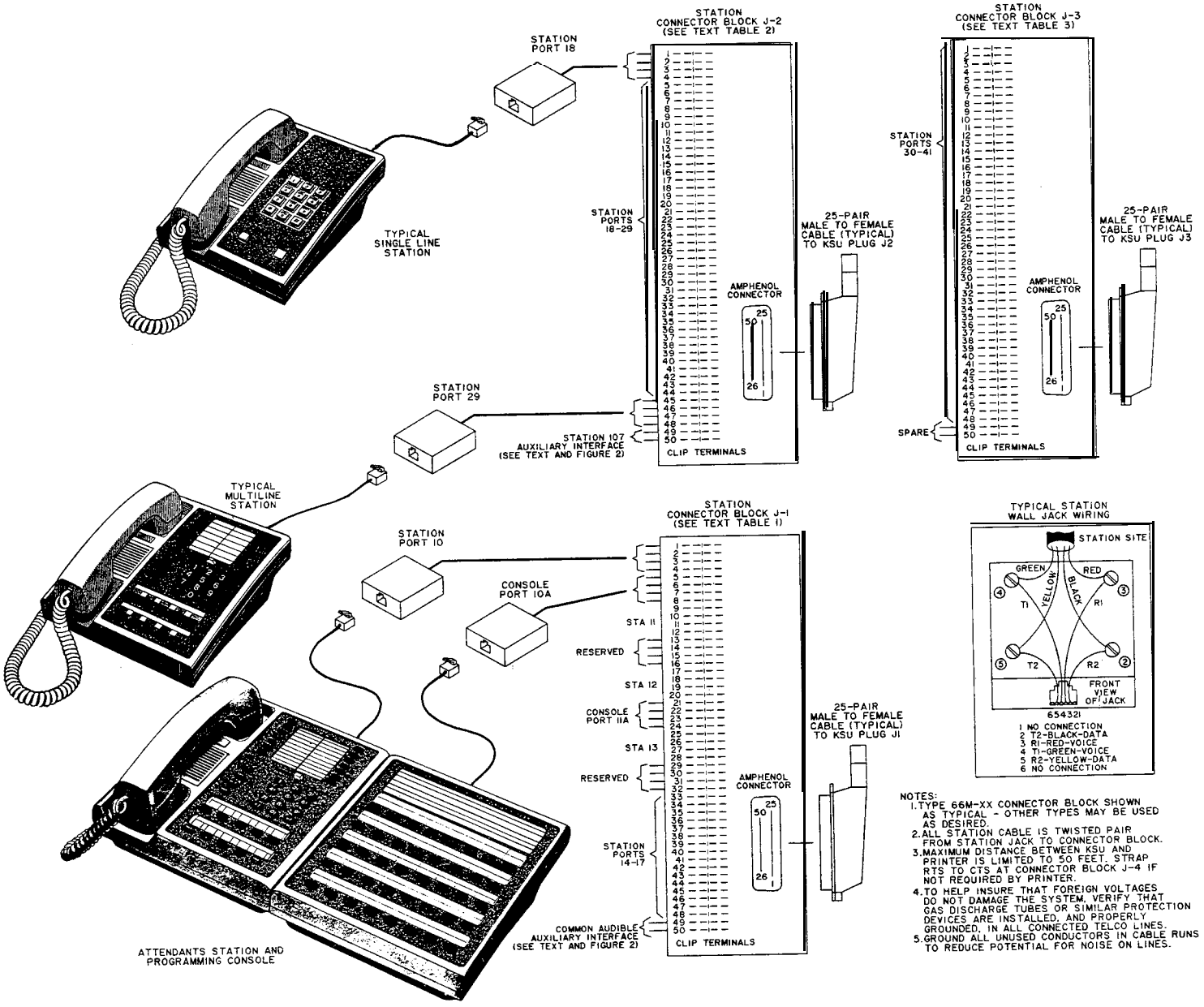


Figure 2-4b. System Interconnection - Typical Connections

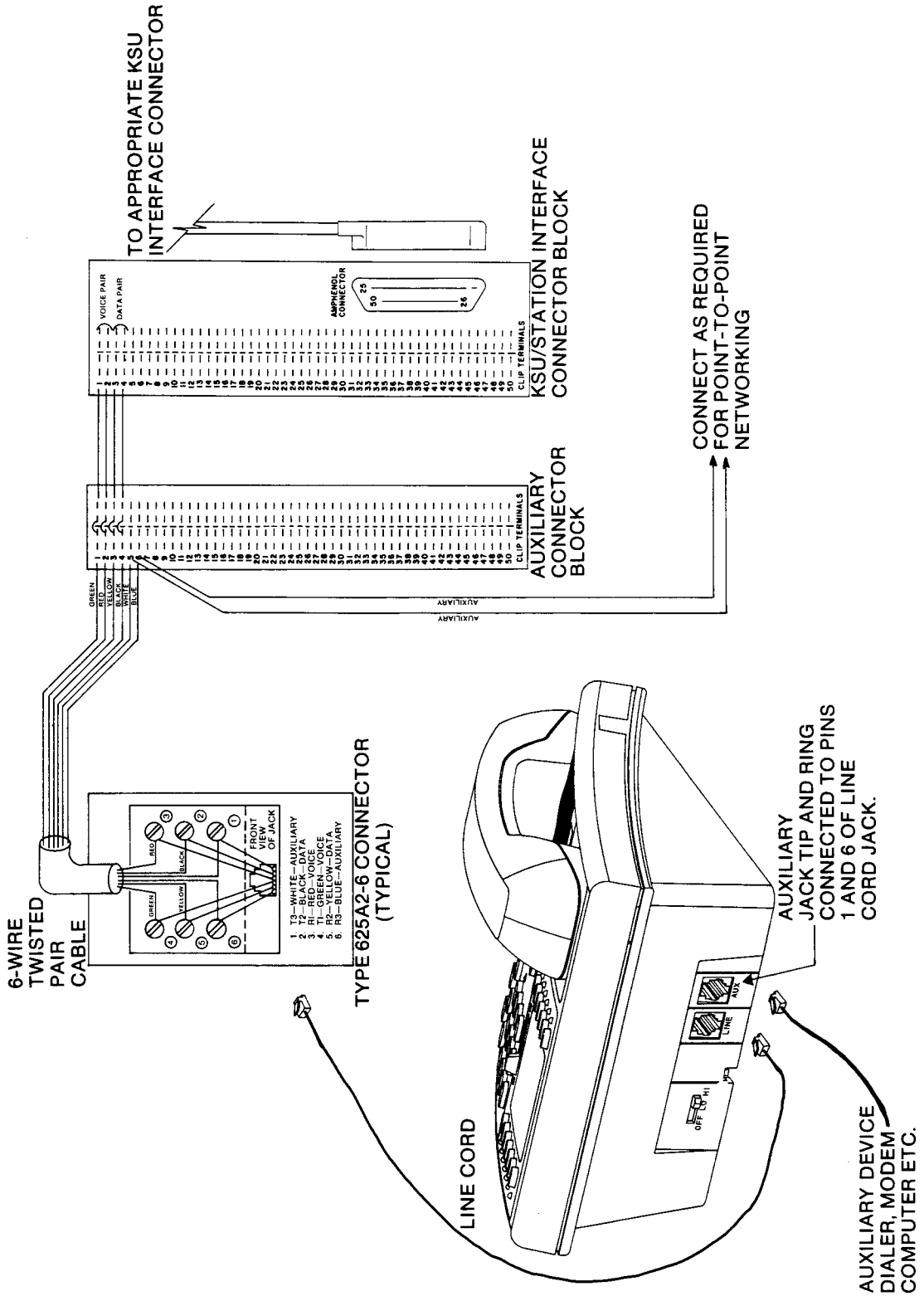


Figure 2-5. Typical 6-Wire, Auxiliary-Pair Wiring

SYSTEM CHECKOUT

Initial Condition

The system operating features are set to a set of default conditions at initial power up. These conditions provide a basic operating system with a known set of parameters, and the system should be initially checked out with the default conditions in place. At anytime while the system is operating, default conditions can be reset from station port 10 or 11 per the instructions provided in Chapter 3.

Check Out

Check the KSU and telephone installation for proper operation by performing the following resistance and voltage measurements.

Resistance Check

Make the following resistance measurements at the station connector blocks under the following conditions.

- KSU AC power cord disconnected from electrical outlet.
- Power interconnection cable connected between KSU and power supply.
- KSU connected to station connector blocks.
- Stations wired, and wiring punched down on blocks.
- Bridging clips removed from blocks to isolate stations from KSU.

1. Measure the resistance of each installed station and wiring from the station side of the connector blocks. Resistance values will vary with cable length and station type but should be within the following limits.

MEASURED PAIR	MEASURED STATION RESISTANCE IN OHMS			
	22 LINE/ FEATURE	3 AND 8 LINE	SINGLE LINE	DSS/BLF CONSOLE
VOICE PAIR	40 - 150	40 - 150	40 - 150	0.3 - 100
DATA PAIR	0.3 - 100	40 - 150	0.3 - 100	0.3 - 100
AUX PAIR	OPEN	OPEN	N/A	N/A

2. Measure the resistance of the KSU and cables from the KSU side of the station connector blocks. Resistance values should be within the following limits.

MEASURED PAIR	MEASURED KSU RESISTANCE IN OHMS
VOICE PAIR	40 - 50
DATA PAIR	0.3 - 0.5

Voltage Check

Make the following voltage measurements at the station connector blocks under the following conditions

- Bridging clips installed
- AC power connected to the KSU

Measure the voltage across one voice line and one data line and then across the other voice line and the other data line for each even and odd station. The measured voltage must be as follows:

UNIT UNDER TEST	66M-xx BLOCK CONNECTION	METER LEAD POLARITY	MEASURED VOLTAGE
TYPICAL EVEN STATION	Voice 1	(+)	
	Data 3	(-)	+33 +/- 5 VDC
Repeat for each even sta.	Voice 2	(+)	
	Data 4	(-)	+33 +/- 5 VDC
TYPICAL ODD STATION	Voice	(+)	
	Data 11	(-)	-33 +/- 5 VDC
Repeat for each odd sta.	Voice 10	(+)	
	Data 12	(-)	-33 +/- 5 VDC

Variant readings can indicate a possible wiring, station, or KSU problem.

General Check

1. Check the red light emitting diode (LED) system status indicator. Be sure that it is on steady. If it is off or flashing, disconnect and reconnect the AC power plug. If the indicator is still not on steady, refer to the Failure Analysis Flow Chart found in Chapter 4.

2. Refer to the station User's Guide for operating information. Perform a general operational test of the system by exercising the system features from station port 10 or 11. Operational parameters are per the system default conditions as detailed in Chapter 3 until Class Of Service (COS) programming is performed.

3. Once the basic system is verified as operational, perform the COS programming.

CHAPTER 3
SYSTEM PROGRAMMING

GENERAL INFORMATION

- Class Of Service (COS) programming consists of the following major categories: General System COS, Toll Table Entry, Line COS, and Station COS.

- All COS programming commands must originate at a 22 Line/Feature Keyset installed at station port 10 or 11 and a companion DSS/BLF Console installed at console port 10a or lla respectively. No COS programming commands -will be accepted from any other stations connected to the system.

- Programming overlays are included with each system for use in identifing the keys required for COS programming. One overlay fits over the keys of the station installed at station port 10 or 11 and designates the A-field and B-field keys. The other overlay fits over the keys of the console installed at console port 10a or lla and designates the C-field keys.

- System and line COS programming do not require that a sequential process be followed once the base level program entry mode has been established except where noted herein. Station COS programming does follow a sequential process.

- Prior to taking any programming action, determine the system, line and station COS conditions and all toll restriction requirements. Record this data on the programming reference tables included within the programming procedures.

- A set of COS values can be recorded on cassette tape from a programmed system and later re-loaded into the same system or into another system. This method of programming can be employed in lieu of using the step-by-step programming sequence.

- A complete or a partial printed record of the COS program values can be obtained with a serial data printer connected to the SMDR output lines of the KSU. Complete details concerning this procedure are included at the end of this chapter.

SPECIAL PROGRAMMING REQUIREMENTS FOR SINGLE-LINE KEYSETS

Several programming steps under COS programming must be observed for proper operation of a Single-Line Keyset.

@When the system is strapped for key system configuration, the Single-Line Keyset is an intercom only station. It can be configured for private line only by programming the applicable station port for the prime line automatic feature. When the port is programmed with the prime line automatic feature, the Single-Line Keyset cannot be programmed with station speed dial numbers.

- When the system is strapped for the multifunction (hybrid) system configuration, to originate outside calls with a Single-Line Keyset, one or more lines must be programmed into a line group.

- In order to receive outside calls on a Single-Line Keyset, the call must be answered by an attendant using a multiline station and transferred to the single-line station. Otherwise, the Single-Line Keyset station port must be programmed to have the ringing line preference feature with ringing enabled on all desired lines. Alternately it can be programmed to have the prime line automatic feature with ringing enabled at the prime line.

BASE LEVEL PROGRAM ENTRY MODE

The first step in any COS programming sequence is to enter the base level programming mode from station port 10 or 11. Once in this mode, COS can be set as desired.

To enter base level:

1. Press the ITCM key. The dial tone will sound.

2. Press the following keys in sequence: * 7 4 6

   Note that the dial tone stops and a tone burst sounds to indicate that the base level programming mode is entered.

3. Press the * key. The dial tone will return as a confirmation that the base level mode is active.

4. Proceed from this point to program the system, line, or station COS and the toll restriction tables.

CLASS OF SERVICE DEFAULT

The system can be defaulted to a standard class of service per the following procedure. The default conditions are listed at the beginning of each COS programming procedure and shaded on the programming reference charts.

1 Press ITCM * 7 4 6 *

2 Press program key C38

3 Press keypad key(s) to choose default settings

1 = system COS default
2 = line COS default
3 = station COS default
4 = pulse dialing - all lines
5 = tone dialing - all lines
6 = flexible key/function default
# = One 80 column SMDR line
8 = Two 40 column SMDK lines
RECALL = Tape baud rate of 100
SAVE = Tape baud rate of 50
7051684 = master default (CAUTION: resets all values and clears all stored memory - Do not perform while system is in use)

4 Press * MONITOR

PROGAMMING OVERLAYS

Several different telephone and console overlays are packed with the system. The overlay to be used is dependent upon the particular models of equipment connected to the programming station port (10 or 11) and the respective console port (10a or 11a). The programming overlays are illustrated in Figure 3-l. Full-scale copies of the overlays are also included at the end of this chapter. The full-scale copies can be removed and prepared for use if needed.

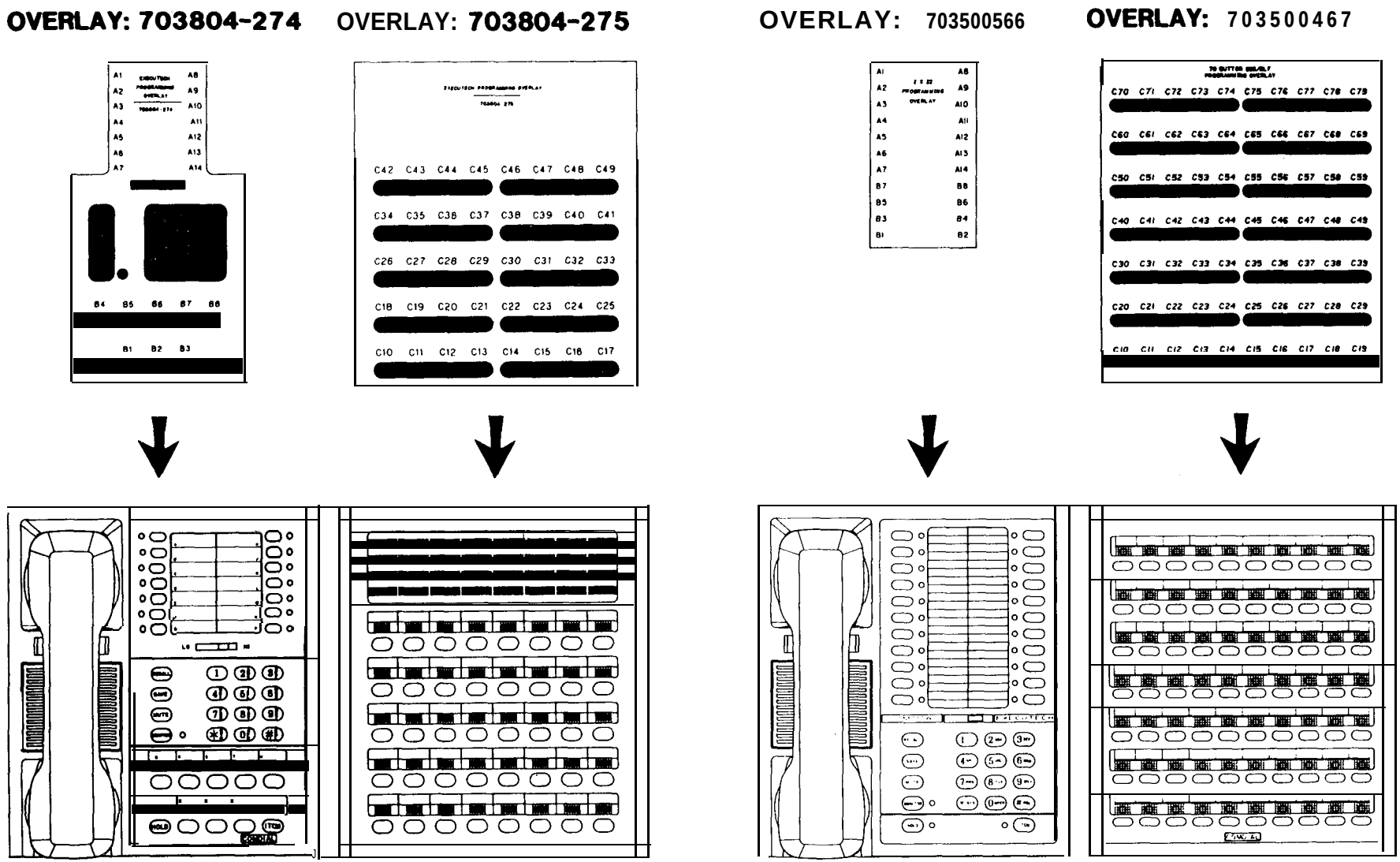


Figure 3-1. Programming Overlay Identification

SYSTEM COS PROGRAMMING PROCEDURE

SYSTEM DEFAULTS

- Recall/flash time = 2 seconds
- Pause time = 1 second
- Timed Hold recall time = 60 seconds
- Intercom signalling = voice first
- Central message Desk = not assigned
- Unanswered call transfer = 20 seconds
- Printer baud rate = 1200 baud, 7-bit data
- Print length = 40 Col.
- Port Assignments: All station ports= 22 Line/Feature Keyset
  All console ports = 40-Key DSS/BLF Consoles
- Tape baud rate = 100

PROCEDURE

1 Press ITCM * 7 4 6 * (base level entry if not active)

2 Set recall/flash time
- Press program key C34
- Press keypad key for time
- Press *

3 Set pause time.
- Press program key C35
- Press keypad key for time
- Press *

4 Set timed hold recall time
- Press program key C36
- Press keypad key for time
- Press *

5a Set the baud rate of printout
- Press program key C39
- Set baud rate with keypad
- Press *

5b Set line length of printout
- Press program key C38
- Press # for one 80 col.
  -or-
- Press 8 for two 40 col.
- Press *

6 Choose intercom first signalling
- Press RECALL for voice
- press SAVE for tone
- Press *

7 Specify central message desk (one per system allowed)
- Press #
- Press keypad keys 010 - 041 to choose port 10 - 41
- Press *

8 Set recall time for unanswered call transfer
- Press program key C33
- Press keypad keys for time
- Press *

9 Specify station type for each station port
- Press keypad keys 010 - 073 to identify station port 010 - 073
- Press console key to specify station type
  C18 = 32-Key Console without call announce
  C19 = 32-Key Console with call announce
  C20 = LCD Telephone
  C22 = Single-Line Keyset (hotel telephone)
  C25 = Single-Line Keyset (administrative telephone)
  C23 = 3 and 8 Line Keyset C24 = 22 Line/Feature Keyset
- Dial 3-digit code (100 - 399) to assign extension number (optional)
- Press * and repeat steps for each active station port

NOTE: The step 9 action sets STATION COS for IDed port to the DEFAULT conditions for that type of station.

-continued

System COS programming procedure-continued

10 Specify console type for each console port
- Press console program key C10 to enable port selection
- Press console program key to specify console port
  C10 = console port 10a
  C11 = console port 11a
- Press console program key to specify console type
  C10 = 70-Key console
  C14 = 40-Key console
  C15 = 32-Key console
- Repeat port and console selection steps for all required ports

11 Select baud rate of tape data
- Press program key C38
- Press RECALL for 100 baud
- Press SAVE for 50 baud
- Press *

12 Press *

13 Press MONITOR to exit or proceed to next COS

SYSTEM COS PROGRAMMING REFERENCE TABLE

@Shading denotes system default conditions
● Check off values chosen for system being programmed

BASE LEVEL ITCM * 7 4 6 *

2 C34 RECALL/FLASH TIME

KEY	TIME	ENTRY
1	80 MSEC.	
2	300 MSEC.	
3	500 MSEC.	
4	600 MSEC.	
5	750 MSEC.	
6	875 MSEC.	
7	1.0 SEC.	
8	1.5 SEC.	
9	2.0 SEC.	
0	3.0 SEC.	

3 C35 PAUSE TIME

KEY	TIME	ENTRY
1	.5 SEC.	
2	1.0 SEC	
3	1.5 SEC	
4	2.0 SEC	
5	3.0 SEC	
6	5.0 SEC	
7	7.5 SEC	
8	10.0 SEC	
9	15.0 SEC	
0	20.0 SEC	

4 C36 HOLD RECALL TIME

KEY	TIME	ENTRY
1	30 SEC.	
2	60 SEC.	
3	90 SEC.	
4	120 SEC.	
5	180 SEC.	
6	240 SEC.	
7	300 SEC.	
8	360 SEC.	
9	420 SEC.	
0	DISABLED	

Note: 0 program selection (disabled) enables exclusive hold condition (when set at station) to place line on hold that cannot be released at any other station.

5A C39 BAUD RATE FOR COS AND SMDR DATA

KEY	DATA SPEED	ENTRY
1	110 BAUD, 7 BITS	
2	150 BAUD, 7 BITS	
3	300 BAUD, 7 BITS	
4	600 BAUD, 7 BITS	
5	1200 BAUD, 7 BITS	
6	2400 BAUD, 7 BITS	
7	3600 BAUD, 7 BITS	
8	4800 BAUD, 7 BITS	
9	9600 BAUD, 7 BITS	
0	19200 BAUD, 7 BITS	

5B C38 PRINT OUT LINE LENGTH

#	80 COLUMN 1 LINE
8	40 COLUMN 2 LINES

6

INTERCOM FIRST CHOICE SIGNALLING	
RECALL VOICE	
SAVE TONE	

7 # CENTRAL MESSAGE DESK

STATION PORT ASSIGNED.	
* NONE ASSIGNED	

8 C33 RECALL TIME UNANSWERED CALL TRANSFER

KEY	TIME	ENTRY
1	10 SEC.	
2	20 SEC.	
3	25 SEC.	
4	30 SEC.	
5	45 SEC.	
6	60 SEC.	
7	90 SEC.	
8	120 SEC.	
9	180 SEC.	
0	240 SEC.	

9

PORT ID	STATION TYPE C18 = 32-KEY CON. W/O C.A. C19 = 32-KEY CON. W/ C.A. C20 = LCD PHONE C22 = S-L (HOTEL) C23 = 3 AND 8 LINE C24 = 22 LINE C25 = S-L (ADMIN.)	DIALING EXTENSION	LOCATION OF STATION
010		110	
011		111	
012		112	
013		113	
014		114	
015		115	
016		116	
017		117	
018		118	
019		119	
020		120	
021		121	
022		122	
023		123	
024		124	
025		125	
026		126	
027		127	
028		128	
029		129	
030		130	
031		131	
032		132	
033		133	
034		134	
035		135	
036		136	
037		137	
038		138	
039		139	
040		140	
041		141	

10

(C10) SPECIFY CONSOLE TYPE FOR EACH CONSOLE PORT	
CHOOSE PORT	CHOOSE CONSOLE TYPE
(C10) PORT 10a	(C10) 70-KEY CONSOLE
(C11) PORT 11a	(C14) 40-KEY CONSOLE
	(C15) 32-KEY CONSOLE

11

(C38) BAUD RATE OF TAPE DATA		
KEY	BAUD RATE	ENTRY
(RECALL)	100	
(SAVE)	50	

TOLL RESTRICTION PROGRAMMING

In order for toll restriction to take effect, the following three-fold process must occur.

- One or more toll tables must be entered.
- Toll tables must be assigned to all appropriate lines.
- Toll tables must be assigned to all appropriate stations.

Only the toll table(s) which are entered and assigned to both a line and a station using that line will invoke any toll restriction.

TABLE ENTRY PROCEDURE

1. Determine the types of dialing restrictions which must be imposed on the system. Typically, this includes access codes which result in toll charges, and certain local numbers as desired.
2. If the restricted dialing codes will be imposed consistently on most or all stations in the system, list them on one or two tables. If wide variation in the dialing restrictions is planned, spread the listing out across several tables.
3. Strategically group the listings on the tables so that a list of restrictions can be applied to a particular station or group of stations.
4. Designate each table as a DENY table or as an ALLOW table. The numbers entered in a DENY table are prevented from being dialed. ALLOW tables take precedence over DENY tables. Therefore, an entry in an ALLOW table will provide an explicit exception to an entry in a DENY table. *Note that the system a/ways permits the dialing of any number not explicitly denied. Also, system speed dial numbers will not be toll restricted unless specified by station COS programming.*
   - Example A: Provide a simple and broad toll restriction format by creating a DENY table with two entries: Entry (1) = 1 Entry (2) = 0. This format prevents all long distance and operator calls.
   - Example B: Prevent the dialing of all numbers within the (804) area code, while allowing the dialing of one specific number within that area code, by entering 1804 in a DENY table and 18049782200 in an ALLOW table. Alternately, allow all numbers in the 978 exchange by entering 1804978 in an ALLOW table.
5. Press the # key in place of a particular digit to condense a range of numbers into one entry. The # character is a “match-anything” digit, and can be included in an entry in either a DENY table or an ALLOW table.
   - Example A: If 357, 377, 387, and 397 dialing is to be prohibited, list one entry of 3#7 on a DENY table to cover them all.
   - Example B: Since area codes typically have a 1 or a 0 as a middle digit, prevent long distance calls to those area codes by entering 1 #1# and 1#0# in a DENY table.
6. Since it is important that emergency numbers never be restricted, always create an ALLOW table with entries of 911 and 1911 to override any DENY tables that have been created.
7. If the system is installed behind a PBX, include an access code as part of every table entry.
8. Once these tables are completely filled out, enter the restriction planning tables on the line, and station programming reference charts to record the planned toll restrictions for the system.

TOLL RESTRICTION PROGRAMMING PROCEDURE

1 Press ITCM * 7 4 6 * (base level entry if not active)

2 Press program key C37 (enter toll program mode)

3 Press console key C10 - C25 to select table number (1 - 16)

KEY	C10	C11	C12	C13	C14	C15	C16	C17
TABLE	1	2	3	4	5	6	7	8
KEY	C18	C19	C20	C21	C22	C23	C24	C25
TABLE	9	10	11	12	13	14	15	16

4 Select table type
- Deny - press program key C38
- Allow - press program key C39

5 Select table entry
- Press program key A1 - A4 to select entry 1 - 4

KEY	A1	A2	A3	A4
ENTRY	1	2	3	4

6 Dial number (16 digits max.) (Press # for "match anything" digit)

7 Repeat steps 5 and 6 until all numbers are programmed in table.

8 Repeat steps 3 through 7 until all tables are programmed

9 Press *

10 Press MONITOR to exit or proceed to next COS programming step.

TOLL RESTRICTION PROGRAMMING REFERENCE TABLES

RESTRICTION TABLE 1

TYPE: ALLOW _____ DENY _____

ENTRY	ENTRY NUMBER (16 MAXIMUM)															
	1	2	3	4	5	6	7	6	9	10	11	12	13	14	15	16
1																
2																
3																
4																

TABLE ASSIGNMENT: LINES _____ STATIONS _____

RESTRICTION TABLE 2

TYPE: ALLOW _____ DENY _____

ENTRY	ENTRY NUMBER (16 MAXIMUM)															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1																
2																
3																
4																

TABLE ASSIGNMENT: LINES _____ STATIONS _____

RESTRICTION TABLE 3

TYPE: ALLOW _____ DENY _____

ENTRY	ENTRY NUMBER (16 MAXIMUM)															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1																
2																
3																
4																

TABLE ASSIGNMENT: LINES _____ STATIONS _____

RESTRICTION TABLE 4

TYPE: ALLOW _____ DENY _____

ENTRY	ENTRY NUMBER (16 MAXIMUM)															
	,	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1																
2																
3																
4																

TABLE ASSIGNMENT: LINES _____ STATIONS _____

RESTRICTION TABLE 5

TYPE: ALLOW _____ DENY _____

ENTRY	ENTRY NUMBER (16 MAXIMUM)															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1																
2																
3																
4																

TABLE ASSIGNMENT. LINES _____ STATIONS _____

RESTRICTION TABLE 6

TYPE. ALLOW _____ DENY _____

ENTRY	ENTRY NUMBER (16 MAXIMUM)															
	,	2	3	4	5	6	7	(6	9	10	11	(12	13	14	15	16
1																
2																
3																
4																

TABLE ASSIGNMENT: LINES _____ STATIONS _____

RESTRICTION TABLE 7

TYPE: ALLOW _____ DENY _____

ENTRY	ENTRY NUMBER (16 MAXIMUM)															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1																
2																
3																
4																

TABLE ASSIGNMENT: LINES _____ STATIONS _____

RESTRICTION TABLE 6

TYPE: ALLOW _____ DENY _____

ENTRY	ENTRY NUMBER (16 MAXIMUM)															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1																
2																
3																
4																

TABLE ASSIGNMENT: LINES _____ STATIONS _____

RESTRICTION TABLE 9

TYPE. ALLOW _____ DENY _____

ENTRY	ENTRY NUMBER (16 MAXIMUM)															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1																
2																
3																
4																

TABLE ASSIGNMENT: LINES _____ STATIONS _____

RESTRICTION TABLE 10

TYPE: ALLOW _____ DENY _____

ENTRY	ENTRY NUMBER (16 MAXIMUM)															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1																
2																
3																
4																

TABLE ASSIGNMENT: LINES _____ STATIONS _____

RESTRICTION TABLE 11

TYPE: ALLOW _____ DENY _____

ENTRY	ENTRY NUMBER (16 MAXIMUM)															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1																
2																
3																
4																

TABLE ASSIGNMENT: LINES __ STATIONS _____

RESTRICTION TABLE 12

TYPE: ALLOW _____ DENY _____

ENTRY	ENTRY NUMBER (16 MAXIMUM)															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1																
2																
3																
4																

TABLE ASSIGNMENT: LINES _____ STATIONS _____

RESTRICTION TABLE 13

TYPE: ALLOW _____ DENY _____

ENTRY	ENTRY NUMBER (16 MAXIMUM)															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1																
2																
3																
4																

TABLE ASSIGNMENT. LINES __ STATIONS _____

RESTRICTION TABLE 14

TYPE: ALLOW _____ DENY _____

ENTRY	ENTRY NUMBER (16 MAXIMUM)															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1																
2																
3																
4																

TABLE ASSIGNMENT: LINES _____ STATIONS _____

RESTRICTION TABLE 15

TYPE: ALLOW _____ DENY _____

ENTRY	ENTRY NUMBER (16 MAXIMUM)															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1																
2																
3																
4																

TABLE ASSIGNMENT: LINES _____ STATIONS _____

RESTRICTION TABLE 16

TYPE: ALLOW _____ DENY _____

ENTRY	ENTRY NUMBER (16 MAXIMUM)															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1																
2																
3																
4																

TABLE ASSIGNMENT: LINES _____ STATIONS _____

LINE COS PROGRAMMING

LINE DEFAULTS

- Line type = TELCO
- Dial Mode = DTMF
- Toll Tables = none assigned
- Line groups = none assigned
- Privacy status = private
- Abandoned Hold Timeout = 50 msec.

PROCEDURE

1 Press ITCM * 7 4 6 * (base level entry if not now active)

2 Select line to be programmed.
Perform all applicable steps.
- Press program key per chart below to choose line 1 - 22

LINE	KEY	LINE	KEY	LINE	KEY
1	B1	9	A7	17	A3
2	B2	10	A14	18	A10
3	B3	11	A6	19	A2
4	B4	12	A13	20	A9
5	B5	13	A5	21	A1
6	B6	14	A12	22	A8
7	B7	15	A4		
8	B8	16	A11		

3 Select line type
Press program key:
- Disabled = key C38
- Auxiliary = key C39
- CO/PBX = key C40

5 Select dialing mode
Press program key:
- Pulse/tone = key C26
- Tone only = key C27

4 Select line group
Press program key:
(multifunction config. only)
- None = key C41
- Gp 1 = key C34
- Gp 2 = key C35
- Gp 3 = key C36
- Gp 4 = key C37

7 Assign toll tables
Press program key(s)
- Clear all = key C33
- Assign = keys C10 - C25

TABLE	KEY	TABLE	KEY
1	C10	9	C18
2	C11	10	C19
3	C12	11	C20
4	C13	12	C21
5	C14	13	C22
6	C15	14	C23
7	C16	15	C24
8	C17	16	C25

6 Select privacy mode
Press program key:
- Private = key C28
- Non-private = key C29

8 Set abandoned hold timeout period
Press program key
- 300 msec. = key C30
- 50 msec. = key 31

9 Repeat steps 2 - 8 for each line

10 Press *

11 Press MONITOR to exit or proceed to next COS programming step.

LINE COS PROGRAMMING REFERENCE TABLE

- Shading denotes line default conditions.
- Check off or enter the values chosen for the lines being programmed.

	SELECT LINE FEATURE		B1 1 *	B2 2 *	B3 3 *	B4 4 *	B5 5	B6 6	B7 7	B8 8	A7 9	A14 10	A6 11	A13 12	A5 13 **	A12 14 **	A4 15 **	A11 16 **	A3 17	A10 18	A2 19	A9 20	A1 21	A8 22
3	SELECT LINE	C38 DISABLED																						
		C39 AUXILIARY																						
		C40 CO/PBX																						
4	GROUPS MULTIFUNCTION SYSTEMS ONLY)	C34 GROUP 1																						
		C35 GROUP 2																						
		C36 GROUP 3																						
		C37 GROUP 4																						
		C41 NONE ASSIGNED																						
5	DIAL MODE	C26 PULSE/TONE																						
		C27 TONE ONLY																						
6	PRIVACY MODE	C28 NON-PRIVATE																						
		C29 PRIVATE																						
7	TOLL RESTRICTION TABLE ASSIGNMENT	C10 1																						
		C11 2																						
		C12 3																						
		C13 4																						
		C14 5																						
		C15 6																						
		C16 7																						
		C17 8																						
		C18 9																						
		C19 10																						
		C20 11																						
		C21 12																						
		C22 13																						
		C23 14																						
		C24 15																						
		C25 16																						
		NONE																						
	ABANDONED HOLD TIMEOUT	C30 300 MSEC																						
		C31 90 MSEC																						
	CO/PBX NUMBERS AND STATION ASSIGNMENTS																							

* Power Fail Lines (1, 2. 3, and 4)
** A-Lead Control Lines (13. 14. 15, and 16)

STATION COS PROGRAMMING

STATION DEFAULTS

- PA port = disabled
- Ringing line preference =disabled
- Personal ringing tone = tone 1
- Toll tables = none assigned
- Line access denied = none
- Idle line preference = none
- All-call receive = enabled
- All-call originate = enabled
- Zone page receive = disabled
- Zone page originate = disabled
- Automatic hold = disabled
- System speed dial toll restric. = disabled
- Voice announce block = disable-
- Privacy status = private
- Executive override = disabled
- Prime line/group = none
- Single Line Keyset accesses intercom
- Ringing assignment = all lines ring on stations 10, 17, 39, and 41
- Origination denied = none
- Night transfer = all lines ring on stations 10, 17, 39 and 41
- Reserved intercom link = none
- Message originate = disabled
- Line/key assignment:

  3 and 8 Line Keyset
  B-Field keys (B1-B8) = lines 1-8

  22 Line/Feature Keyset
  A-Field keys = lines 9 = 22
  B-Field keys = lines 1 = 8

PROCEDURE

- Perform all steps in sequence.
- Skip those steps not required.

1 Press ITCM * 7 4 6 * (base level entry)

2 Press program key C41 (program entry)

3 Specify station to be programmed and perform applicable steps
- Press keypad keys 010-041 to select station port 010 - 041

Action defaults following settings:
- PA port
- Prime line
- Voice blocking
- Executive override
- Message wait-originate
- Automatic hold
- System speed dial toll rest.
- Ringing line preference

4 Enable PA port (DO NOT PROCEED BEYOND THIS STEP - IF PERFORMED)
- Press program key C10
- Return to step 2

5 Block voice announced intercom calls
- Press C11

6 Enable executive override
- Press program key C12

7 Enable toll table restriction on system speed dial numbers
- Press program key C13

- continued

Station COS - continued

8 Choose personal ringing tones (22 Line/Feature Keysets)
- TONE 1 = program key Cl4
- TONE 2 = program key Cl5
- TONE 3 = program key Cl6
- TONE 4 = program key Cl7

10 Enable message wait originate
- Press program key C27

9 Set automatic hold
- Press program key C26

11 Select prime line or prime group
- Press program key per chart to select line 1 - 22 or press ITCM to select intercom line
- Press program key per chart to choose prime group

LINE	KEY	LINE	KEY	LINE	KEY
1	B1	9	A7	17	A3
2	B2	10	A14	18	A10
3	B3	11	A6	19	A2
4	B4	12	A13	20	A9
5	B5	13	A5	21	A1
6	B6	14	A12	22	A8
7	B7	15	A4		
8	B8	16	A11		

GROUP	KEY
1	C34
2	C35
3	C36
4	C37

12 Set ringing line preference
- Press program key C40

13 Select ringing assignments
RINGING
- Press console key Cl8 (clears previous settings)
- Press program key(s) per chart in step 11

DELAYED RINGING
- Press console key Cl9 (clears previous settings)
- Press program key(s) per chart in step 11.

14 Select Night Transfer (ringing)
- Press console key C20 (clears previous settings)
- Press program key(s) per chart in step 11.

15 Select automatic privacy release
- Press console key C21 (clears previous settings)
- Press program key(s) per chart in step 11.

16 Select access denied
- Press console key C22 (clears previous settings)
- Press program key(s) per chart in step 11.

17 Select call origination denied
- Press console key C23 (clears previous settings)
- Press program key(s) per chart in step 11.

18 Select idle line preference
- Press console key C24 (clears previous settings)
- Press program key(s) per chart in step 11.

-continued

Station COS - continued

19a Enter toll table assignment mode
To clear all toll tables assigned
- Press program key C25

19b Specify toll tables
- Press program key C10-25

KEY	C10	C11	C12	C13	C14	C15	C16	C17
TABLE	1	2	3	4	5	6	7	8
KEY	C18	C19	C20	C21	C22	C23	C24	C25
TABLE	9	10	11	12	13	14	15	16

20 Reserve intercom link
- Press #
- Press keypad key l-7 to reserve link l-7

-or-

- Press 0 key for no reserved link
- Press console key Cl8 to continue with next step

21 Select all-call and/or zone paging
- Press #
- Press RECALL to disable all paging assignments (if desired)

ALL-CALL
- Press program key A4 to originate
- Press program key A8 to receive
- Press console key Cl8 to continue with next program step

ZONES A, B, AND C
- Press #
- Press program keys Al-A3 and A5-A7 to enable zones

	ORIGINATE			RECEIVE		
KEY	A1	A2	A3	A5	A6	A7
ZONE	A	B	C	A	B	C

- Press console key Cl0 to continue with next program step

- continued

Station COS - continued

22 Specify flexible key/function assignment (non-square configuration), if required.

3 AND 8 LINE KEYSET

- Press program key C39
- Press program key C34 - C41 to choose line keys 1 - 8 - Fast tone bursts will ♦□◆■♧
- Press program key per step 11 chart to assign lines 1 - 22

-or-

* Press RECALL key to disable line appearance - Tone bursts stop
- Repeat for each line assigned

22 LINE/FEATURE KEYSET

- Press program key C39

Assign Lines To Keys
- Press key to be assigned (A or B field) - Fast tone bursts sound
- Press program key per step 11 chart to-assign lines 1 - 22 - Tone bursts stop
- Repeat for all keys requiring line appearance

Disable Line Appearance At Keys (clears any prior assignment)
- Press key to be denied appearance - Fast tone bursts sound
- Press RECALL key - tone bursts stop
- Repeat procedure for all required key locations

Assign DSS To Keys
- Press key to be assigned (A or B field) - Fast tone bursts sound
- Press keypad keys 010 - 041 to choose station ports 10 - 41 - Tone bursts stop
- Repeat for all keys requiring DSS assignment

Assign Autodial To Keys (clears any prior assignment)
- Press key to be assigned (A or B field) - Fast tone bursts sound
- Press RECALL key - tone bursts stop
- Repeat procedure as required for all autodial keys

Assign Dynamic Loop Keys (clears any prior assignment)
- Press key B1, B2, or B3 - Fast tone bursts sound
- Press RECALL key - tone bursts stop
- Repeat for B2 and B3 if required

- continued

Station COS - continued

23 Press *

24a Choose next station port for programming
- Press program key c41
- Press keypad keys 010 - 041

-or-

24b Block program a group of stations with same COS as previously programmed station
- Press HOLD
- Press keypad keys to specify model station
- Press keypad keys to specify first station in block
- Press keypad keys to specify last station in block.

Note: Flexible key/function assignments for station port 10 or 11 cannot be changed 'by block programming.

25 If block programming of step 24b is not performed, repeat steps 5 through 24a for each station in system.

26 Press * MONITOR to exit programming.

- end

STATION COS PROGRAMMING REFERENCE TABLE
(Copy This Page To Provide Additional Reference Sheets)

- Shading denotes line default conditions.
- Check off or enter the values chosen for the fines being programmed.

BASE LEVEL (ITCM) (*) (7) (4) (6) (*)
STATION PROGRAMMING MODE (C41)

STATION ID (REF. SYSTEM COS CHART)	
PORT	
STA. TYPE	
EXTENTION	
LOCATION	

4

PA PORT	
	DISABLED
(C10)	ENABLED

		ENABLED	DISABLED
5	(C11) VOICE BLOCK		
6	(C12) EXECUTIVE OVERRIDE		
7	(C13) SYS. SPEED TOLL		
9	(C26) AUTOMATIC HOLD		
10	(C27) MESSAGE WAIT-ORIG.		

8

PERSONAL RINGING			
TONE 1	TONE 2	TONE 3	TONE 4
(C14)	(C15)	(C16)	(C17)

11

PRIME LINE-AUTOMATIC																						
NONE	ITCM	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
	(ITCM)	(B1)	(B2)	(B3)	(B4)	(B5)	(B6)	(B7)	(B8)	(A7)	(A14)	(A6)	(A13)	(A5)	(A12)	(A4)	(A11)	(A3)	(A10)	(A2)	(A9)	(A1)	(A8)

GROUP			
1	2	3	4
(C34)	(C35)	(C36)	(C37)

12

RINGING LINE PREFERENCE	
(C40)	ENABLED

13-14

RINGING ASSIGNMENT FOR LINES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
(C18) RINGING																						
(C19) DELAYED RINGING																						
(C20) NIGHT RINGING																						

DEFAULTS TO RINGING ON ALL LINES FOR STATIONS 10, 17, 39, AND 41.

15-18

	NONE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
(C21) AUTO PRIVACY REL.																							
(C22) ACCESS DENIED																							
(C23) ORIG. DENIED																							
(C24) IDLE LINE PREF.																							

LINE SELECT KEYS			
1	B1	12	A13
2	B2	13	A5
3	B3	14	A12
4	B4	15	A4
5	B5	16	A11
6	B6	17	A3
7	B7	18	A10
8	B8	19	A2
9	A7	20	A9
10	A14	21	A1
11	A6	22	A8

19

(C25) TOLL TABLE ASSIGNMENT																
NONE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	(C10)	(C11)	(C12)	(C13)	(C14)	(C15)	(C16)	(C17)	(C18)	(C19)	(C20)	(C21)	(C22)	(C23)	(C24)	(C25)

21

ALL-CALL AND ZONE PAGING				
	ZONE A	ZONE B	ZONE C	ALL-CALL
RECEIVE	(A5)	(A6)	(A7)	(A8)
ORIGINATE	(A1)	(A2)	(A3)	(A4)
(RECALL) CLEARED				
PRESS (C18) TO CONTINUE				

20

(#) RESERVE INTERCOM LINKS							
NONE	1	2	3	4	5	6	7
(0)	1	2	3	4	5	6	7
PRESS (C16) TO CONTINUE							

22

(C39) KEY MAPPING—3 AND 8 LINE KEY SET								
MAPPED KEY	(C34)	(C35)	(C36)	(C37)	(C38)	(C39)	(C40)	(C41)
LINE ASSIGNED								
DISABLED (RECALL)								

		(C39) KEY MAPPING-22 LINE/FEATURE KEYSET																				
	MAPPED KEY	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	B1	B2	B3	B4	B5	B6	B7	B8
SELECTION CHART KEY	LINE ASSIGNED																						
	DSS STA. ASSIGNED																						
RECALL	AUTO DIAL ASSIGNED																						
	UNASSIGNED																						
	DYNAMIC LOOP KEY																						

LINE SELECT KEYS			
1	B1	12	A13
2	B2	13	A5
3	B3	14	A12
4	B4	15	A4
5	B5	16	A11
6	B6	17	A3
7	B7	18	A10
8	B8	19	A2
9	A7	20	A9
10	A14	21	A1
11	A6	22	A8

COS AND SMDR PRINTOUT

COS PRINTOUT

When a data printer is connected to the system, it can be commanded, from station port 10 or 11, to print the class of service (COS) programming configuration. Partial or complete printouts can be obtained. When the printer is being used to obtain a COS printout, the Station Message Detail Recording (SMDK) function is temporarily halted. SMDR data collection is continued by the system during a COS printout operation; however, if more than two calls are logged for any one line, call records may be lost.

1 Press ITCM * 7 4 6 * (base level entry if not active)

2 Press program key C39

3 Choose desired printout
- Press program key per chart

PRINTOUT	PROGRAM KEY
All COS	C37
System COS	C38
Line COS	C39
Toll Tables	C40
All station COS	c41
One Station COS	c34 plus 010 - 041 to choose station port

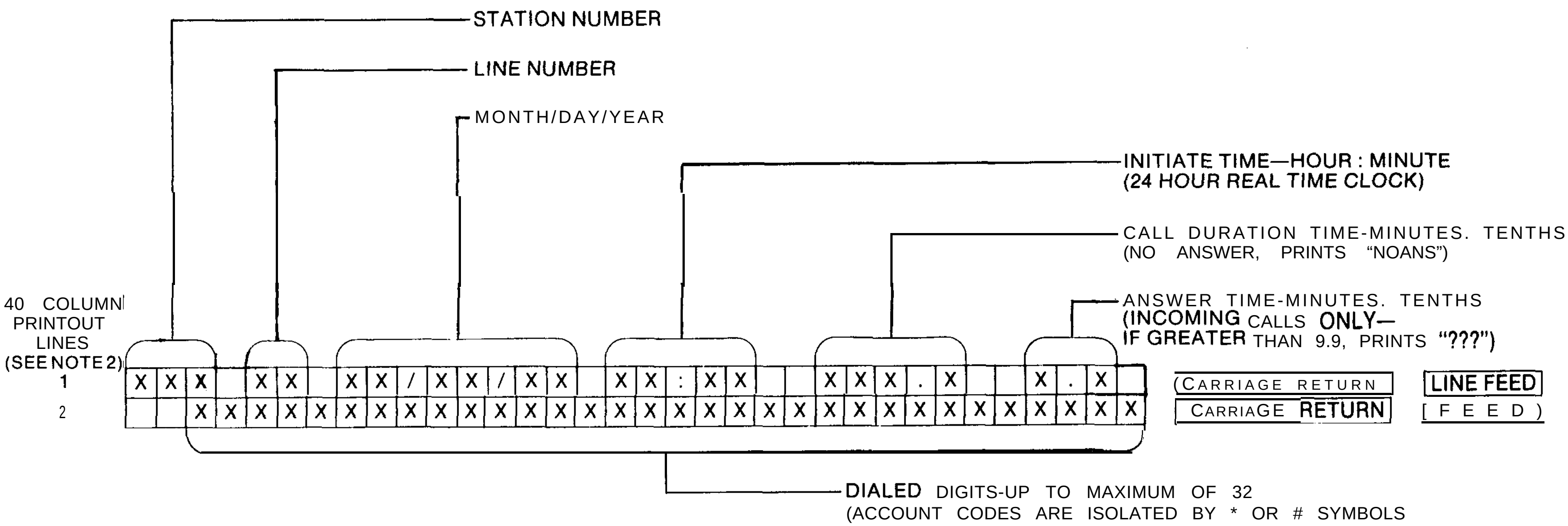
4 COS printout begins immediately

- To abort printout, press program key C40.

5 Press * MONITOR (ends procedure)

SMDR PRINTOUT

The SMDR printout data is provided automatically as it is generated. No intervention is required to obtain the printout. The data is formatted as shown in Figure 3-2. Either an 80-column or a 40-column printout line can be selected through the SYSTEM COS programming.



NOTES

1. CARRIAGE RETURN AND LINE FEED IMMEDIATELY FOLLOW LAST PRINTED CHARACTER ON EACH LINE. ALSO SEE NOTE 2.
2. ILLUSTRATED PRINTOUT IS40 COLUMN, TWO-LINE FORMAT. FOR 80 COLUMN ONE-LINE PRINTOUT FORMAT, CARRIAGE RETURN AND LINE FEED CHARACTERS AT END OF LINE 1 ARE REPLACED BY TWO SPACES FOLLOWED BY ENTIRE CONTENTS OF LINE 2.
3. OUTGOING CALL MUST BE OFF HOOK FOR 20 SECONDS MINIMUM OR NO RECORDING OCCURS.

PRINTOUT EXAMPLES	
UNANSWERED INCOMING CALL	1 12/05/86 16:51 NOANS 0.6
ANSWERED INCOMING CALL	16 1 12/05/86 16:52 1.6 0.2
ANSWERED INCOMING CALL (WITH CALLER ID ADDED BY STATION DURING CALL)	24 1 12/05/86 16:53 1.2 0.2 "1234
OUTGOING CALL (LOCAL)	16 2 12/05/86 16:58 2.0 9782200
OUTGOING CALL (WITH ACCOUNT CODES)	2 4 2 12/05/86 17:01 .5 11233456789*0#*7412580#9631*#
AC POWER FAILURE AND RESTORATION	OFF TIME . * 12/05/86 17:03 ** 12/05/86 17:08

Figure 3-2. SMDK Printout Details

CASSETTE TAPE RECORD OF COS VALUES

- Connect audio cassette tape recorder to music interface on side of KSU.
- DO not perform other programming action while tape system is active.
- Program baud rate of tape data to be 100 or SO baud as desired. (See System COS programming discussion for details.)
- If the system includes a data printer, appropriate response messages will be printed during the recording and loading of COS data.

RECORDING COS DATA TO TAPE

To record currently stored COS program values on cassette tape for later use, proceed as follows:

1. Install blank cassette tape, and prepare recorder for recording.
2. Cause recorder to begin recording blank cassette tape from beginning.
3. Press ITCM * 7 4 6 * ITCM
4. Press appropriate program key to start recording process.
   - C37 = COS FEATURES
   - C34 = ALL SPEED DIALS
   - C35 = AUTODIALS (STA 010 - 025)
   - C36 = AUTODIALS (STA 026 - 041)
5. To abort procedure (if required),
   - Press ITCM * 7 4 6 * ITCM
   - Press program key C41.

COS recording requires approximately 12 minutes. Station port 10 or 11 will ring when recording is complete.

COMPARING RECORDED DATA (Requires Data Printer)

To compare recorded values with system values,
- Rewind cassette tape, and prepare recorder for playback.
- Press ITCM * 7 4 6 * ITCM
- Press program key C38
- Start tape playback
- Printer will print status as follows:
  - COMPARE TAPE TO COS DATA
  - COMPARE TAPE COMPLETE
  - COMPARE TAPE DATA ERROR

VERIFING TAPE DATA (Requires Data Printer)

To verify previously recorded cassette tape,

- Rewind pre-recorded cassette tape, and prepare recorder for play-back.
- Press ITCM * 7 4 6 * ITCM
- Start tape playback
- Press program key C39
- Printer will print status as follows:
  VERIFY COS DATA TAPE
  VERIFY TAPE DATA COMPLETE
  VERIFY TAPE DATA ERROR

LOADING COS DATA FROM TAPE

To load previously recorded COS program values into system to replace current program values, proceed as follows:

1. Install pre-recorded cassette tape, and prepare recorder for playback

2. Press ITCM * 7 4 6 * ITCM

3. To load COS features,
   - Press HOLD

   -or-

   To load memory dialing numbers,
   - Press RECALL

4. Start tape playback.

5. To abort the procedure (if required),
   - Press ITCM * 7 4 6 * ITCM
   - Press program key C41.

COS loading requires approximately 10 minutes. Station port 10 or 11 will ring when loading is complete.

SYSTEM CLOCK INFORMATION

All clock setting and adjustment **must** be performed from station port 10 or 11.

SETTING THE CLOCK

1. Press ITCM , then dial * #

2. Dial the clock date with the key pad keys

   YEAR MONTH DAY HOUR MINUTE

NOTE
Values less than 10 must be dialed as OX.
Hours must be expressed in the 24-hour format.

3. If the SMDR printer is installed and operating, the clock date will be printed as follows.

   ** 01/08/86 16:OO (Example)

4. Reset the minutes setting, if necessary, as follows:

   a. Repeat step 1.
   b. Dial the new minutes digits, and press the # key.
   c. A new clock date printing will occur.

5. To obtain a printing of the current clock date, press ITCM * # #

Printing will occur automatically once each 24-hour period.

** MO/DY/YR 00:00 (current date and 00:00 hours)

POWER INTERRUPTION

The system clock will continue to run for at least 30 minutes after AC power has been removed from the system. If power is restored within the 30-minute backup period, the following printing sequence will occur:

LAST VALID CLOCK = MO/DY/YR HR:MN (time of power outage)
MO/DY/YR HR:MN (time of power return)

If power is not restored within the backup period, the following printing sequence will occur when the power is restored.

CLOCK NOT VALID
12/01/86 00:00 (default clock date)

The clock will begin running from the default date. It must be reset to the current date per the instructions above.

SYSTEM SPEED DIAL PROGRAMMING

Fifty (50) system speed dial numbers can be stored from station port 10 or 11 for use at all stations in the system. System speed dial numbers will not be toll restricted unless specified by station COS programming.

- Press ITCM *
- Press SAVE
- Dial storage location (10 - 59)
- Choose line or group preselection (multifunction (hybrid) system only)
  - Dial 1 - 4 for group

    -or-

  @ Press a line key for line

    Note: Key-to-line assignment per programming arrangement. Refer to station COS programming reference chart for station port 10 key-to-line assignments.

    -or-

  - Dial 0 for no group or line preselection
- Dial speed dial number (up to 32 digits)
  - Dial 1 - 0, #, and *
  - Press HOLD to store pause if required
  - Press RECALL to store flash if required
- Press SAVE and repeat procedure for each number.
- Press MONITOR to end procedure

SYSTEM SPEED DIAL INDEX

*10	*27	*45
*11	*28	*46
*12	*29	*47
*13	*30	*48
*14	*31	*49
*15	*32	*50
*16	*33	*51
*17	*34	*52
*18	*35	*53
*19	*36	*54
*20	*37	*55
*21	*38	*56
*22	*39	*57
*23	*40	*58
*24	*41	*59
*25	*43	
*26	*44	

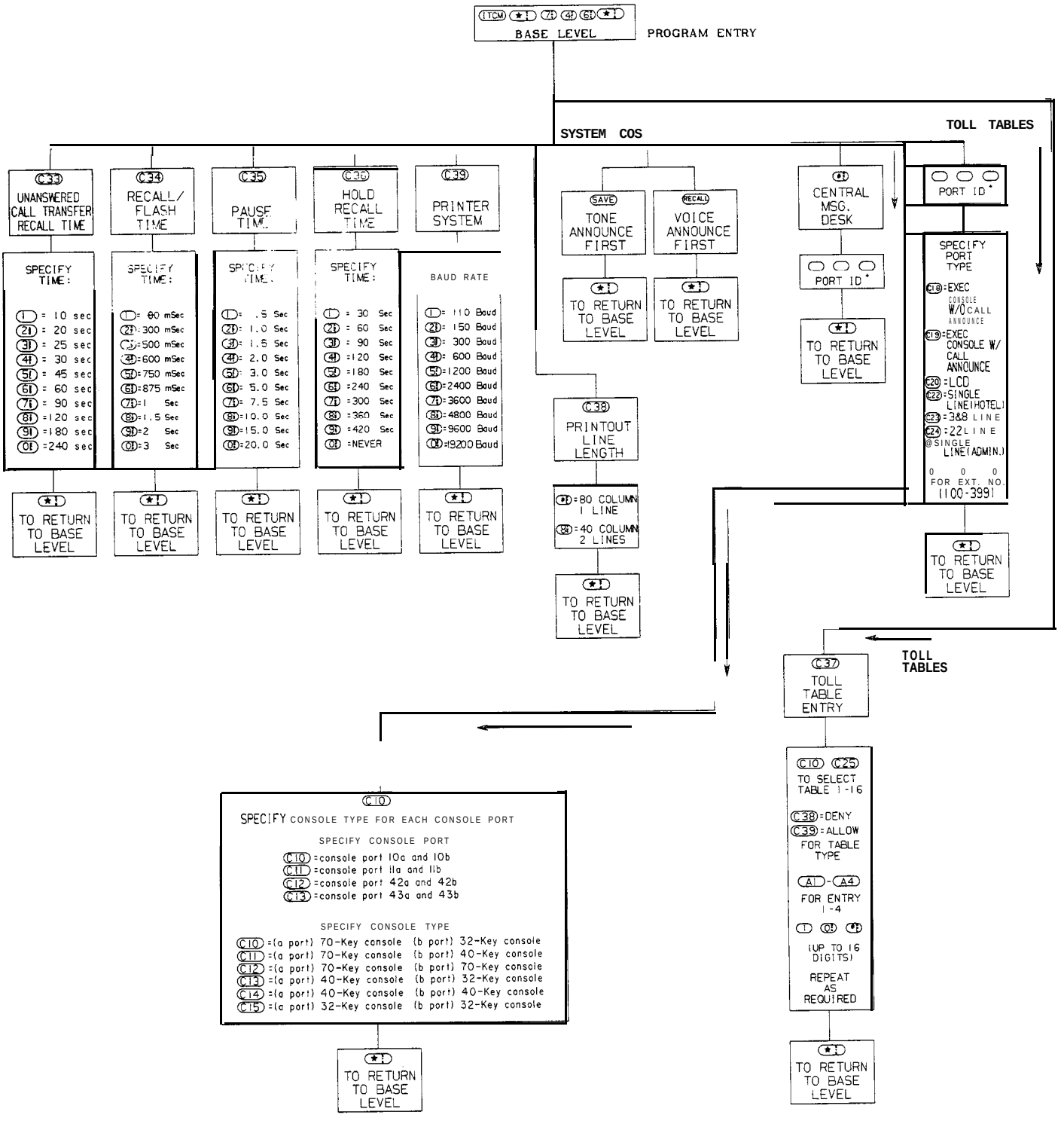
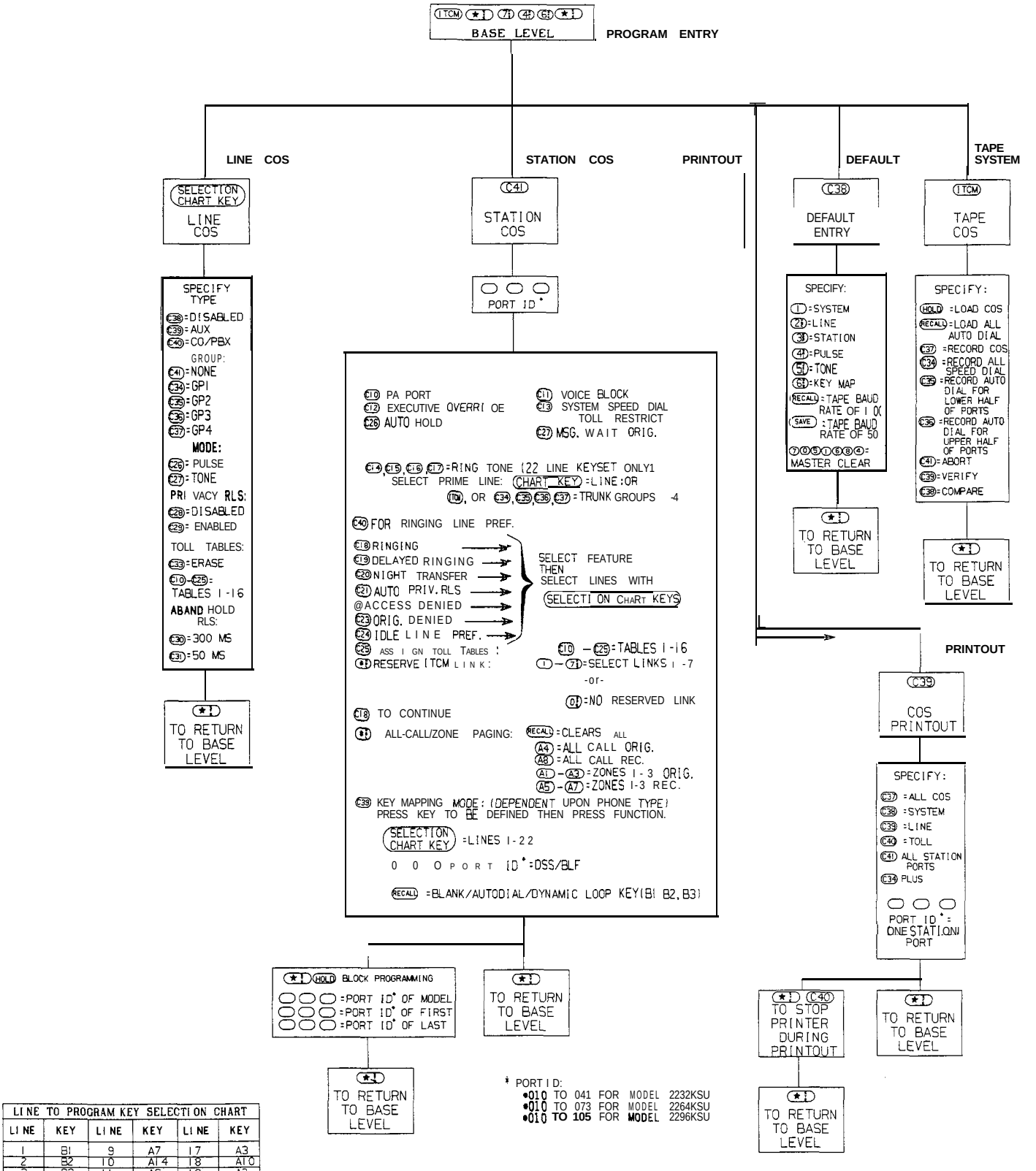


Figure 3-3a. Programming Reference Chart



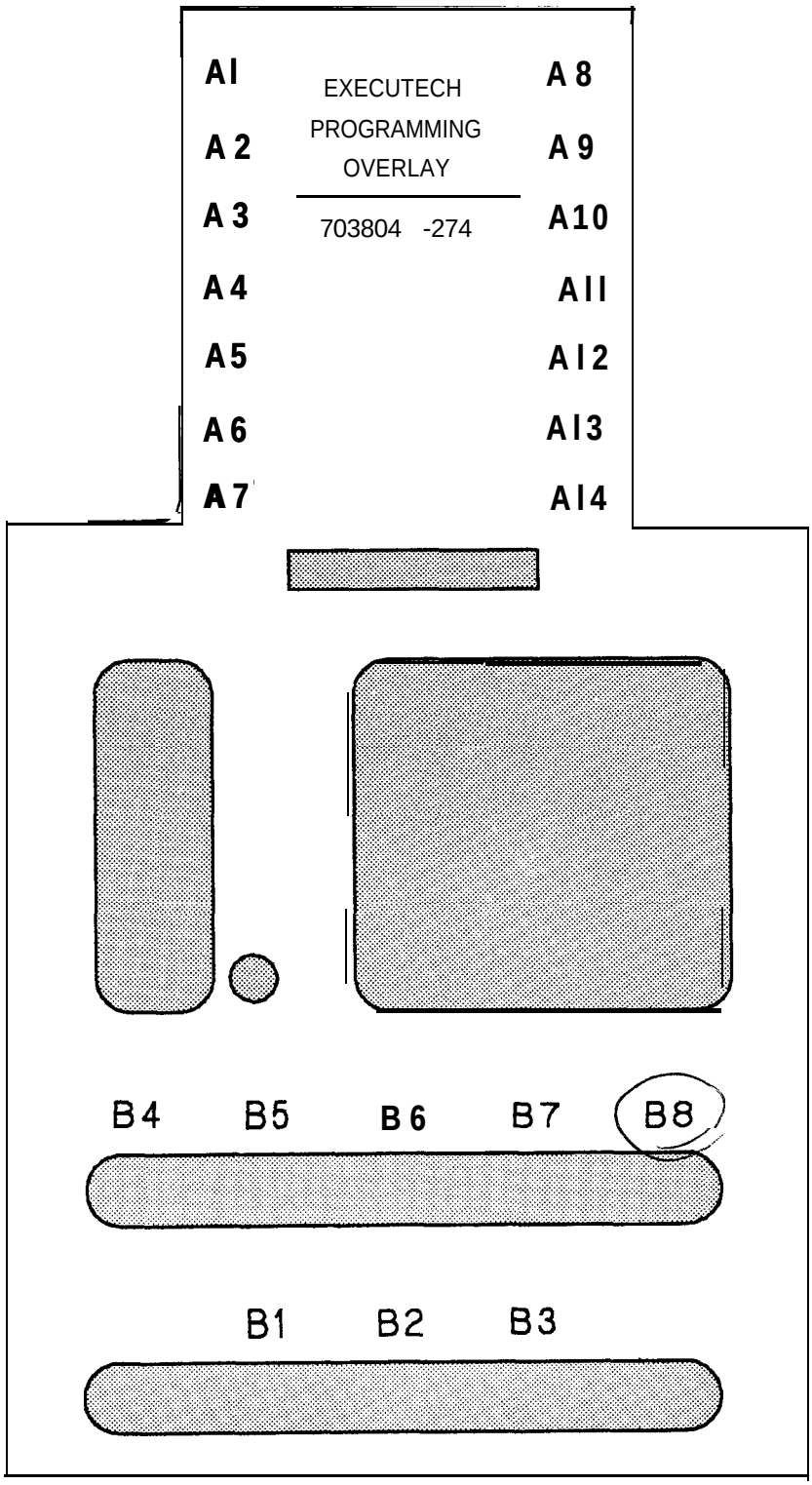
LINE TO PROGRAM KEY SELECTION CHART

LINE	KEY	LINE	KEY	LINE	KEY
1	B1	9	A7	17	A3
2	B2	10	A14	18	A10
3	B3	11	A6	19	A2
4	B4	12	A13	20	A9
5	B5	13	A5	21	A1
6	B6	14	A12	22	A8
7	B7	15	A4		
8	B8	16	A11		

Figure 3-3b. Programming Reference Chart

STATION 10 - PROGRAMMING OVERLAY

- Cut out along border.
- Cut out shaded openings.
- Fit over station faceplate.



STATION 10 - PROGRAMMING OVERLAY

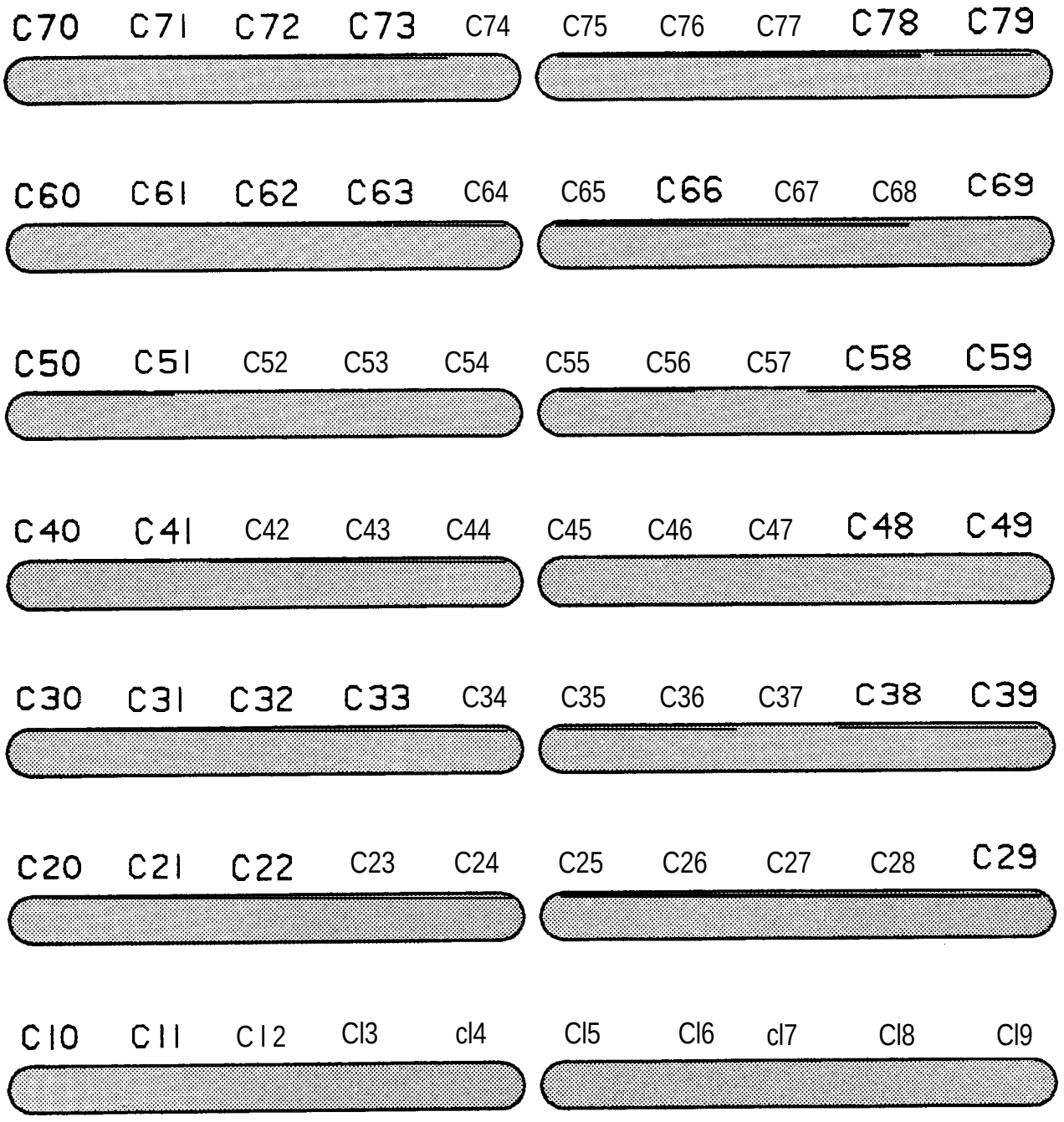
- Cut out along border.
- Cut out shaded openings.
- Fit over station faceplate.

A1		A 8
A 2	703500-566 PROGRAMMING OVERLAY	A 9
A 3		A10
A 4		A11
A 5		A12
A 6		A13
A 7		A14
0 7		B8
B 5		B 6
B3		B4
B1		B2

CONSOLE - PROGRAMMING OVERLAY

- Cut out along border.
- Cut out shaded openings.
- Fit over console faceplate.

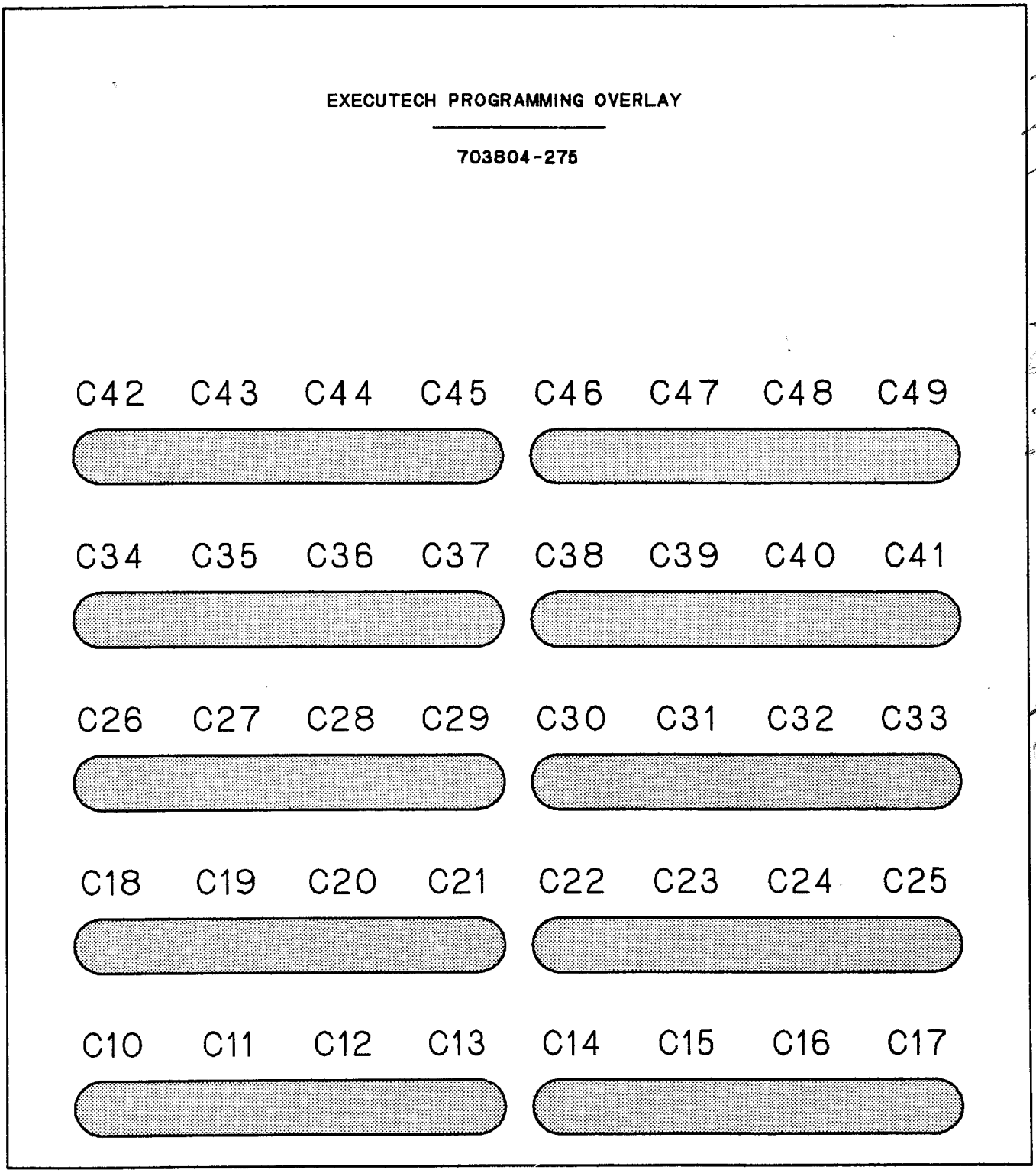
703500-567
PROGRAMMING OVERLAY



993 5353

CONSOLE - PROGRAMMING OVERLAY

- Cut out along border.
- Cut out shaded openings.
- Fit over console faceplate.



CHAPTER 4
MAINTENANCE

TECHNICAL ASSISTANCE AND REPAIR SERVICE

Technical Assistance

Should you experence difficulty with installation, checkout, or programming, and have made an attempt to isolate the problem using information provided herein; or should you encounter problems at a later date which cannot be resolved by refering to this manual, call the Comdial Technical Service staff. They can be reached at 800-431-4345 (in Virginia: 800-654-3345) between the hours of 8:00 AM and 8:00 PM Eastern time, Monday through Friday.

When calling for technical assistance, you should be at the job site and you should have in your possession, as a minimum, an accurate volt-ohm meter and a copy of this manual.

Repair Service

If your KSU or an individual station needs repair, subsequent to the warranty period, it may be returned to Comdial. Comdial will, at their option, either repair the defective equipment or replace it with a remanufactured unit. This repair will be done for a fixed charge. For information on this charge, please call or write to the address given below.

Comdial
1180 Seminole Trail
P.O. Box 7266
Charlottesville, VA 22906-7266
Attention: Repair Department
Telephone: (804) 978-2400

When returning equipment for repair, pack it carefully to prevent damage. Any damages during shipment will be the responsibility of the purchaser. The equipment should be shipped freight or postage prepaid.

FUSE LOCATION

The system is protected against short circuit damage by fuses located on the power supply chassis. Fuse location and values are as shown in Figure 4-1. Always replace a fuse with one of the same value and type, otherwise, equipment damage could result.

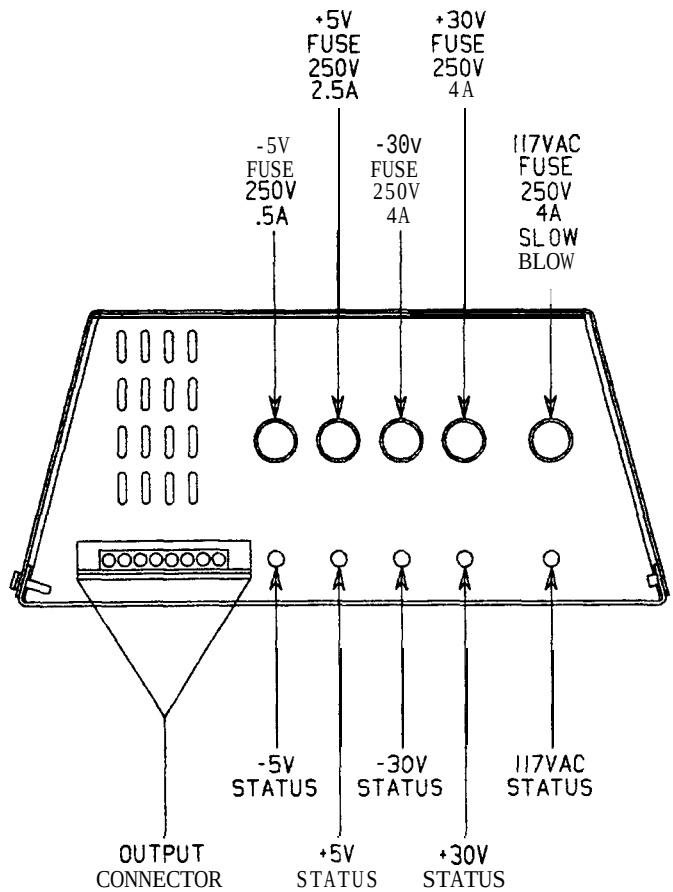


Figure 4-l. Fuse Locations And Values

FAILURE ISOLATION

Wiring

Refer to the installation check out procedure for instructions for testing the system wiring for possible failure.

System Status Indicators

The power supply contains five red LED indicators. When these LEDs are on, they indicate that their corresponding power supply voltages are operational.

A red LED located near the cassette/music port is the system status indicator. This indicator is turned on steady when power is applied to the KSU. If the indicator flashes after power up, it could be indicating a processor failure. Unplug and reconnect the AC power to the power supply and observe the LED indication. If it still shows a flashing indication, refer to Figure **4-2.**

Station Self Test

The multiline stations can be self tested for proper operation per the following instructions.

1. Disconnect the line cord at the station base.

IMPORTANT NOTE

THE ADJACENT ODD OK EVEN STATION WILL BE DISABLED DURING THE TIME THAT THE STATION LINE CORD IS BEING DISCONNECTED OR RECONNECTED.

2. Press and hold the MUTE key, and reconnect the line cord to the station connector. The station will automatically perform a Self test routine. Release the MUTE key as soon as the test begins. The sequence of the test is as follows:

3 AND 8 LINE KEYSET

SEQUENCE	INDICATION
1	B-Field indiactors light in turn and stay on
2	ITCM indicator lights
3	MONITOR indicator lights
4	All indicators extinguish in same order as lighted
5	Ringer sounds (be sure volume is set to med. or high)

22 LINE/FEATURE KEYSET

SEQUENCE	INDICATION
1	MONITOR indicator lights
2	B-Field indicators light in turn and stay on
3	HOLD indicator lights
4	ITCM indicator lights
5	A-Field indicators light in turn and stay on
6	All indicators extinguish
7	Ringer sounds (be sure volume is set to med. or high)

3. Replace any station that does not pass the self test.

DSS/BLF Console Self Test

Test the DSS/BLF Console for proper lamp operation per the following procedure.

1. Disconnect the console line cord plug from the line.

2. Press and hold console key C10 while reconnecting the line cord plug to the line.

IMPORTANT NOTE

THE COMPANION STATION WILL BE DISABLED DURING THE TIME THAT THE CONSOLE IS BEING DISCONNECTED AND RECONNECTED.

3. Release console key C10, and note that the BLF indicators will each turn on in sequence beginning with the station 10 indicator. The indicators will then turn off and the console will become operational.

Paired Stations

Station ports 10 through 41 are paired for data and for overload protection as shown below. Console ports 10a and 11a are not paired with any other port.

DATA PAIRING	OVERLOAD PAIRING
10 - 11	10 - 12
CON 10a	11 - 13
12 - 13	14 - 16
CON 11a	15 - 17
14 - 15	18 - 20
16 - 17	19 - 21
18 - 19	22 - 24
20 - 21	23 - 25
22 - 23	26 - 28
24 - 25	27 - 29
26 - 27	30 - 32
28 - 29	31 - 33
30 - 31	34 - 36
32 - 33	35 - 37
34 - 35	38 - 40
36 - 37	39 - 41
38 - 39	
40 - 41	

If erratic light indications or ring signals occur at a paired station, an open data pair at either station may be the fault. A station with an open data line may work properly on a short loop but fail on a long loop. Test the wiring of stations showing this symptom per the checkout procedure given in Chapter 2.

If a fault occurs which causes more than 300 ma. of current to be drawn, the overload paired stations are disabled by circuit action. Disconnect the disabled stations and reconnect them one at a time to isolate the faulty one.

Failure Analysis

KSU And Station

Figure 4-2 details a failure analysis flow chart to assist a service technician in isolating a failure in a defective system. One way to isolate a failure is to substitute a known good assembly for a suspected one. This is the recommended failure isolation method to use with the system.

Connecting and disconnecting stations to the system does not affect the stored station auto/speed dial memory data. This data is stored in the KSU memory and not at the individual stations. Replacing the KSU, however, causes all stored memory to be lost. This includes all memory dialing numbers as well as all COS programming data.

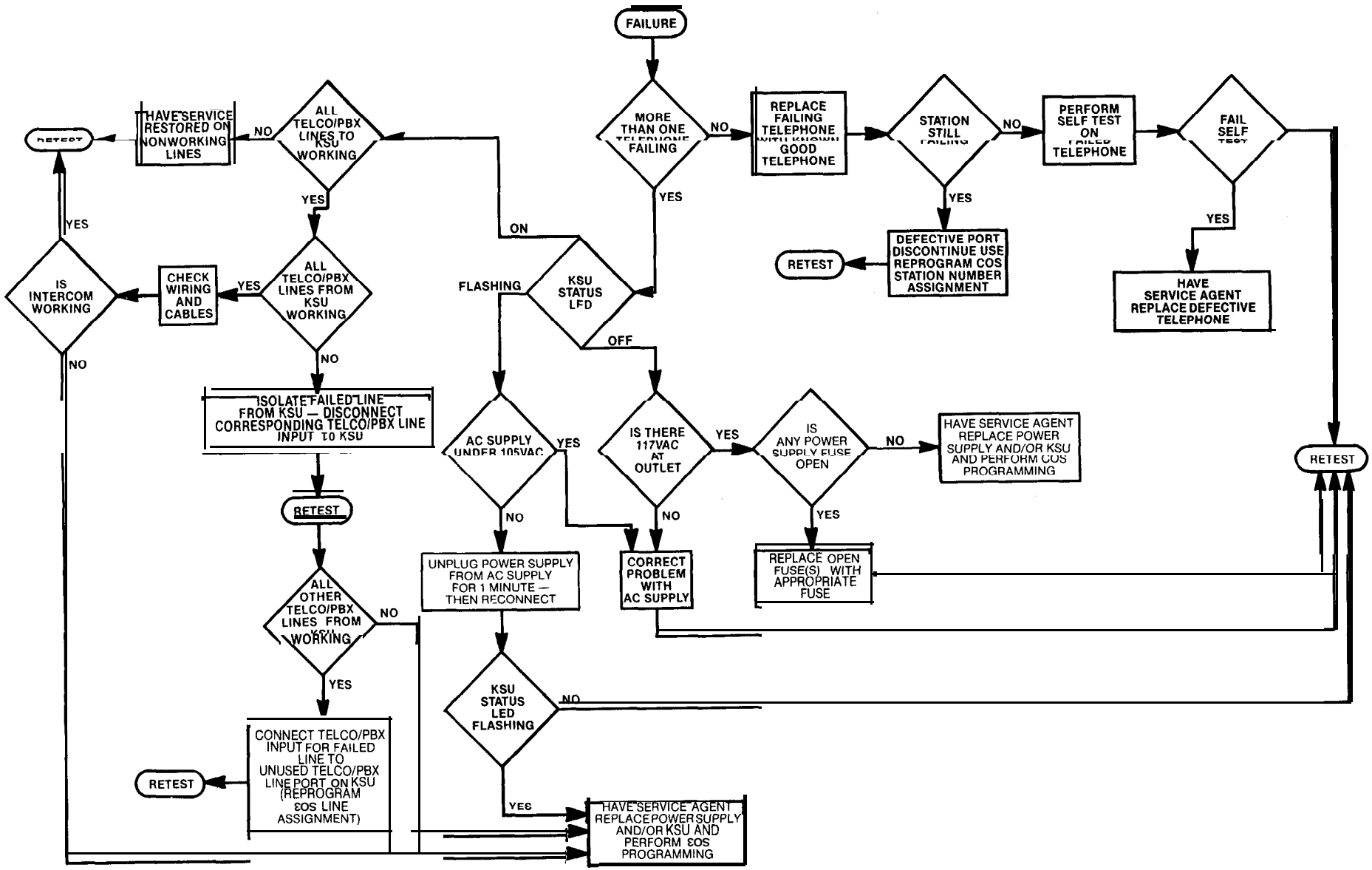


Figure 4-2. Failure Analysis Flow Chart

DESK/WALL REVERSAL AND WALL MOUNTING
(22 Line/Feature Keyset and Single-Line Keyset, Only)

Conversion

To convert a station from a standard desk model to one which can be hung on the wall, follow the procedure outlined below.

1. Remove and discard the pull out directory (22 Line/Feature Keyset, only).

2. Remove the lower housing of the station, and rotate it 180 degrees.

CAUTION

The PWB contains circuitry which is sensitive to static electricity discharge. Be sure that your body and the workplace are properly grounded to avoid any static electricity discharge while performing the desk/wall reversal.

3. Remove the knockouts from the desired mounting holes as illustrated in Figure 4-3.

4. Replace the lower housing. Make sure that all wires are clear.

Wall Mounting

Mount the station directly on the wall using two, #10, panhead screws (obtained locally), or mount it on a wall jack cover plate.

1. Thread the #10 screws into the wall within 1/8-inch of the surface. Refer to Figure 4-3 for the spacing dimensions.

2. Insure that the housing is converted properly for a wall mounting installation (see above instructions).

3. Pull out the latching lever.

4. Position the keyhole shaped holes in the bottom of the station over the #10 screws or the cover plate studs. Slide the station down until a slight click is felt.

5. Push the latching lever in to lock the station in place.

6. To remove the station, pull out the latching lever, lift to unsnap both screws or studs from the bottom housing, and lift the station away from the wall.

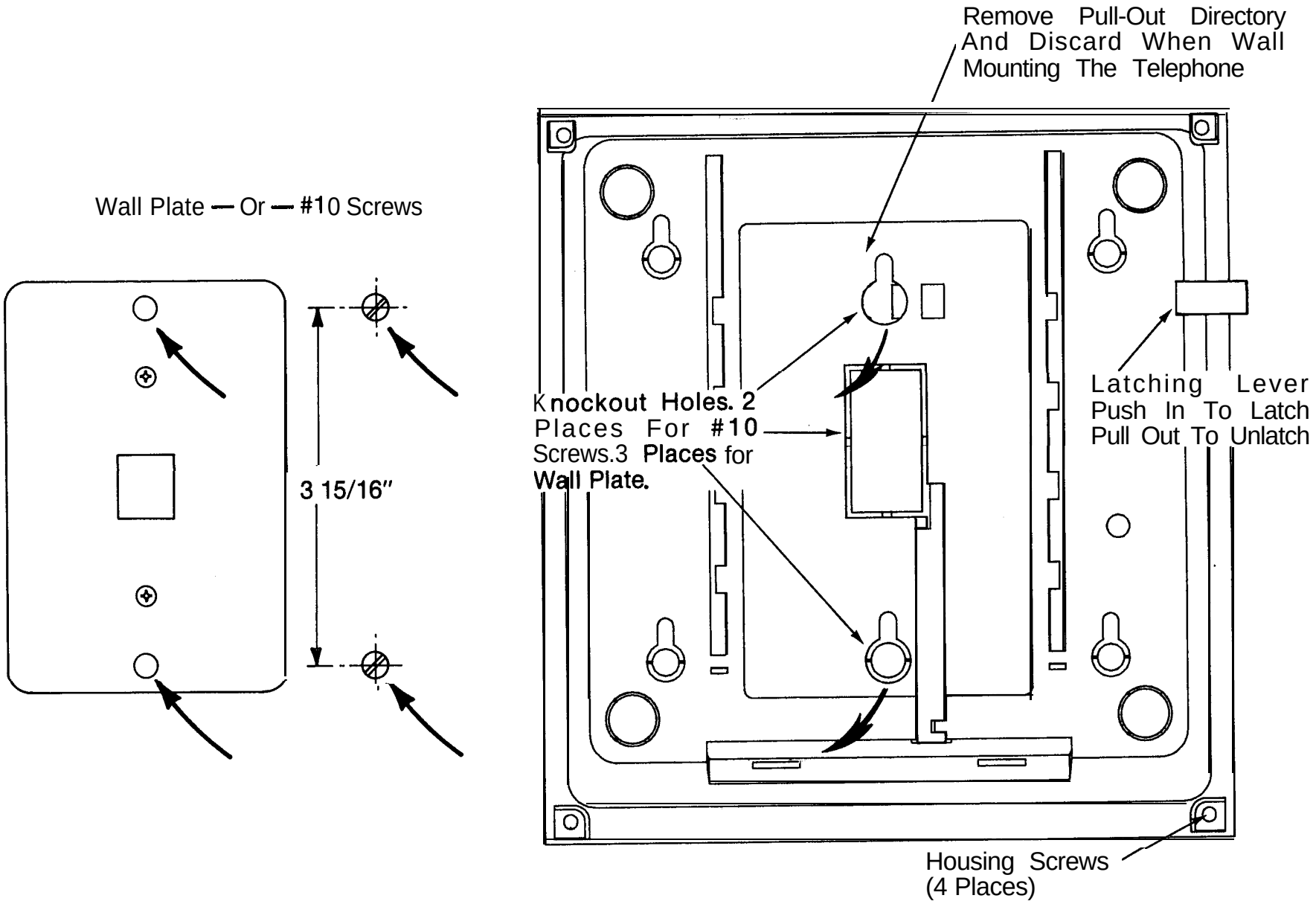


Figure 4-3. Station Wall Mounting Details
(Note: 22 Line/Feature Keyset shown - Single-Line Keyset similar)

REPLACEMENT PARTS LIST

ORDER CODE	DESCRIPTION OF PART
2232 KSU	Key Service Unit, 22 Lines, 32 Stations
2232-PS	Power supply Assembly - Required with 2232 KSU
	22 Line/Feature Keyset Desk/Wall Reversible:
3500-XX-CT-000S	Speakerphone, 10x14 Key Field
3502-XX-CT-000M	Monitor, 10x14 Key Field
3614-XX-CT-000M	Monitor, 10x14 Key Field
3614-XX-CT-000S	Speakerphone, 10x14 Key Field
3614-XX-CT-LCDS	Speakerphone, 10x14 Key Field, LCD Display
3614-XX-DG-000M	Monitor, 10x14 Key Field, Data Jack
3614-XX-DG-000S	Speakerphone, 10x14 Key Field, Data Jack
3614-XX-DG-LCDS	Speakerphone, 10x14 Key Field, Data Jack, LCD Display
3620-XX-DG-000M	Monitor, 5x20 Key Field, Data Jack
3620-XX-DG-000S	Speakerphone, 5x20 Key Field, Data Jack
3622-XX-CT-000M	Monitor, 2x22 Key Field
3622-XX-CT-000S	Speakerphone, 2x22 Key Field
3622-XX-DG-000M	Monitor, 2x22 Key Field
3622-XX-DG-000S	Speakerphone, 2x22 Key Field
	Single-Line Keyset (Proprietary); Desk/Wall Reversible:
3600-XX-CT-000M	Message Waiting Light, Hold Key
3600-XX-CT-009M	Message Waiting Light
3600-XX-CT-579M	Message Waiting Light, Hold Key, Tap Key
	DSS/BLF Console:
DSS-BLF-32-XX	32-Key DSS, 32-LED BLF
DSS-BLF-40-XX	40-Key DSS, 40-LED BLF
DSS-BLF-70-XX	70-Key DSS, 70-LED BLF
KA-M-XX	Handset
	Handset Cord
H4DU-6-M-xx	6-foot length
H4DU-9-M-xx	9-foot length
H4DU-12-M-xx	12-foot length
	Line Cord, 6-Wire, Flat
703508-868	10-Inch
703027-040	-?-Foot
703027-027	14-Foot
703508-867	25-foot
703500-550	Cable Assembly, Data Printer
703508-869	Designation Strip Package, includes 50 number cards 50 autodial index cards/design. strips 50 pull-out reference index cards 5 number card covers 5 autodial index covers 5 designation strip covers
703500-560	Lens Assembly, Pull Out Directory

XX = COLOR (See parts catalog for details)

-continued

Publication Index - continued

Publication Index - continued

-end

Cut along Line

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This warranty gives you specific legal rights and you may also have other rights which may vary from state to state. Some states do not allow limitations on how long an implied warranty lasts or the exclusion or limitation of incidental or consequential damages, so the above limitations may not apply to you.

If the Magnuson-Moss Act should be held to apply to the sale of the Equipment by a court of competent jurisdiction, the implied warranty of fitness for a particular purpose shall extend for one year from the date of manufacture.

No Comdial dealer nor any other person or entity other than Comdial may extend or modify this warranty, and no such modification or extension shall be effective unless it is in writing.

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