INSTRUCTION, OPERATION, AND SERVICE MANUAL

FOR THE

MARATHON™ 6, 18, AND 30 BUTTON

ELECTRONIC KEY TELEPHONE SYSTEM

WALKER
Telecommunications Corporation

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AFTER HOURS
EMERGENCY # (516) 351-7297
FOR THE MARATHON™

1800283787

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L I S T O F T A B L E S

W A R R A N T Y

For twelve (12) months from the date of original installation, Walker Telecommunications Corp. (WTC) warrants that the Material will be free from defects in material and workmanship, and WTC's liability is limited solely to the repair or replacement, at WTC's option, of such defective parts which are:

(i) returned, shipping and handling charges prepaid, to the warehouse designated by WTC, properly packed and in good mechanical condition, together with a statement describing the defect; and

(ii) proven to be defective upon WTC's inspection.

The cost of labor to inspect and remove defective parts shall be borne by the installing or servicing party.

The above Warranty does not apply to Materials used outside of the Territory or to parts normally consumed in operation.

SECTION 1
INTRODUCTION

GENERAL

This manual contains installation, operation, programming and servicing instructions for the MARATHON^{tm} (from this point on, MARATHON^{tm} will be referred to as "MARATHON") Electronic Key Telephone System.

MARATHON is a stored program microprocessor controlled space division switching system that can be installed on Rotary or Dual Tone Multi Frequency "DTMF" dialing lines, or a combination of the two. MARATHON has many features, most of which are program controlled. The system is delivered with a permanent factory program that may be modified at the time of installation to suit customer requirements. Program changes are performed from the station connected to port 1 of the KSU (Extension 10).

The MARATHON Key Service Unit "KSU" is equipped with printed wiring boards to support a maximum of six Central Office "CO" lines, 12 stations, and two intercom "ICM" paths. (See figure 1-1)

In addition, two optional Line Expansion Service Units "ESUs" may be added to expand the MARATHON to 30 CO lines, 60 stations, and 10 intercom paths. Each ESU is capable of supporting 12 CO lines, 24 stations, and four intercom paths. Adding the first ESU allows the MARATHON to grow to 18 CO lines, 36 stations and six intercom paths. Adding the second ESU allows the MARATHON to grow to 30 CO lines, 60 stations, and 10 intercom paths. (See figure 1-2)

The MARATHON supports 6 CO button, 18 CO button and 30 CO button and 18 CO button executive telephones. Each telephone, except the executive telephone, can be equipped with an optional speakerphone module. The executive telephone is equipped with a speakerphone as standard equipment.

The KSU can support a maximum of one set of Direct Station Select "DSS" consoles (one for the first group of 30 stations and one for the second group of 30 stations). Each ESU can support 2 sets of DSS consoles in the same configuration as the KSU. Total sets of DSS consoles are five. (A maximum of ten DSS/BLF units)

IMPORTANT PRELIMINARY CONSIDERATIONS

The following paragraphs describe equipment and regulations regarding the Federal Communications Commission "FCC" and local telephone company that must be considered before installation:

FCC REQUIREMENTS

The FCC has established rules which permit the Electronic Key Telephone System to be connected directly to the telephone network. The jack for connection is provided by the telephone company.

TELEPHONE COMPANY IDENTIFICATION

Before installing the device to the telephone network, the telephone company must be provided with the following:

- o Your customer's telephone number;
- o The FCC registration number - BAQ9IT-15578-KF-E;
- o The ringer equivalence number - 1.0B; and
- o The USOC jack required - RJ-11C (one per CO trunk)

WARNING: This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to subpart J. of part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user (at his own expense) will be required to take whatever measures may be required to correct the interference.

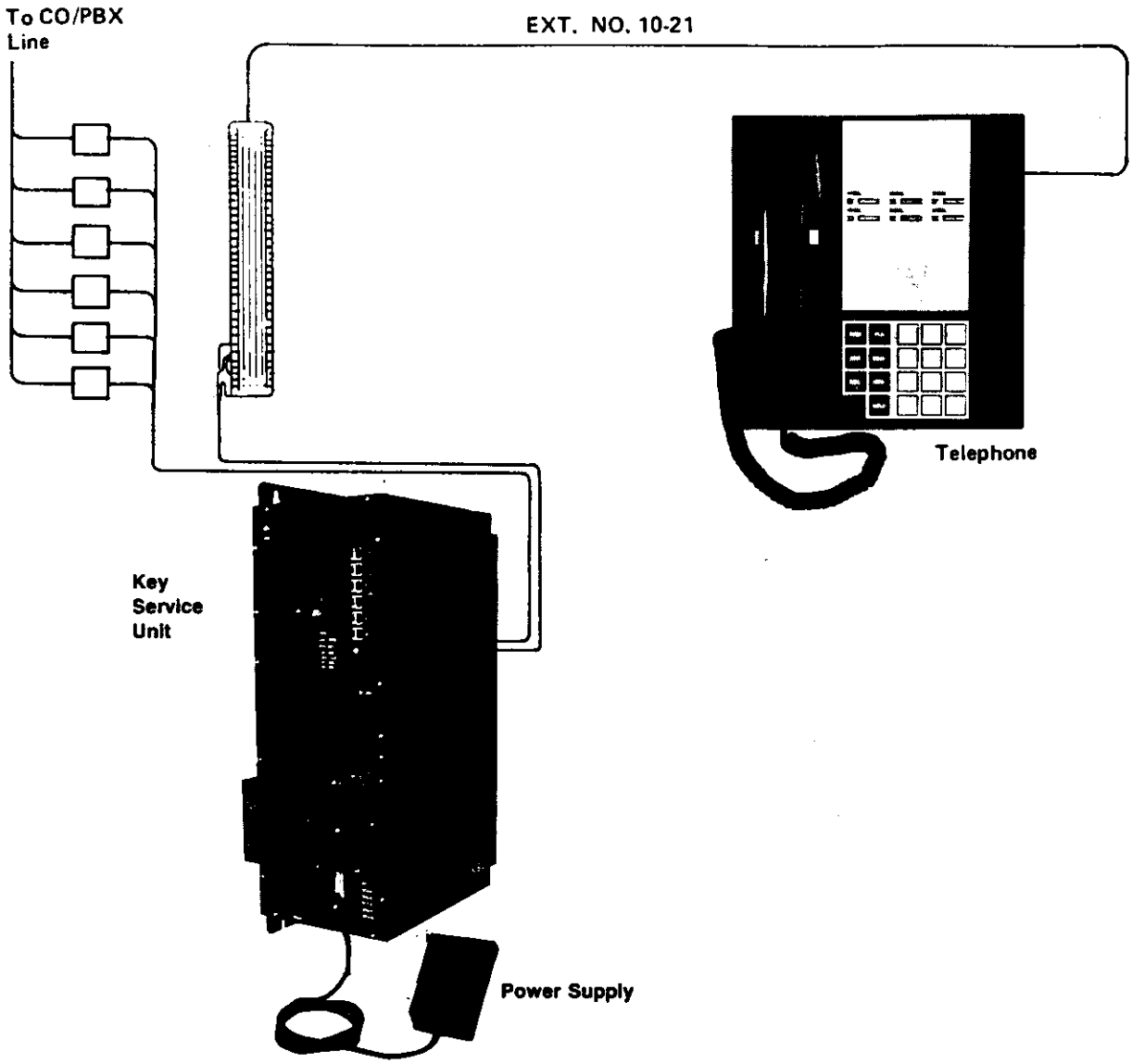


Figure 1-1. MARATHON Electronic Key Telephone System. (KSU)

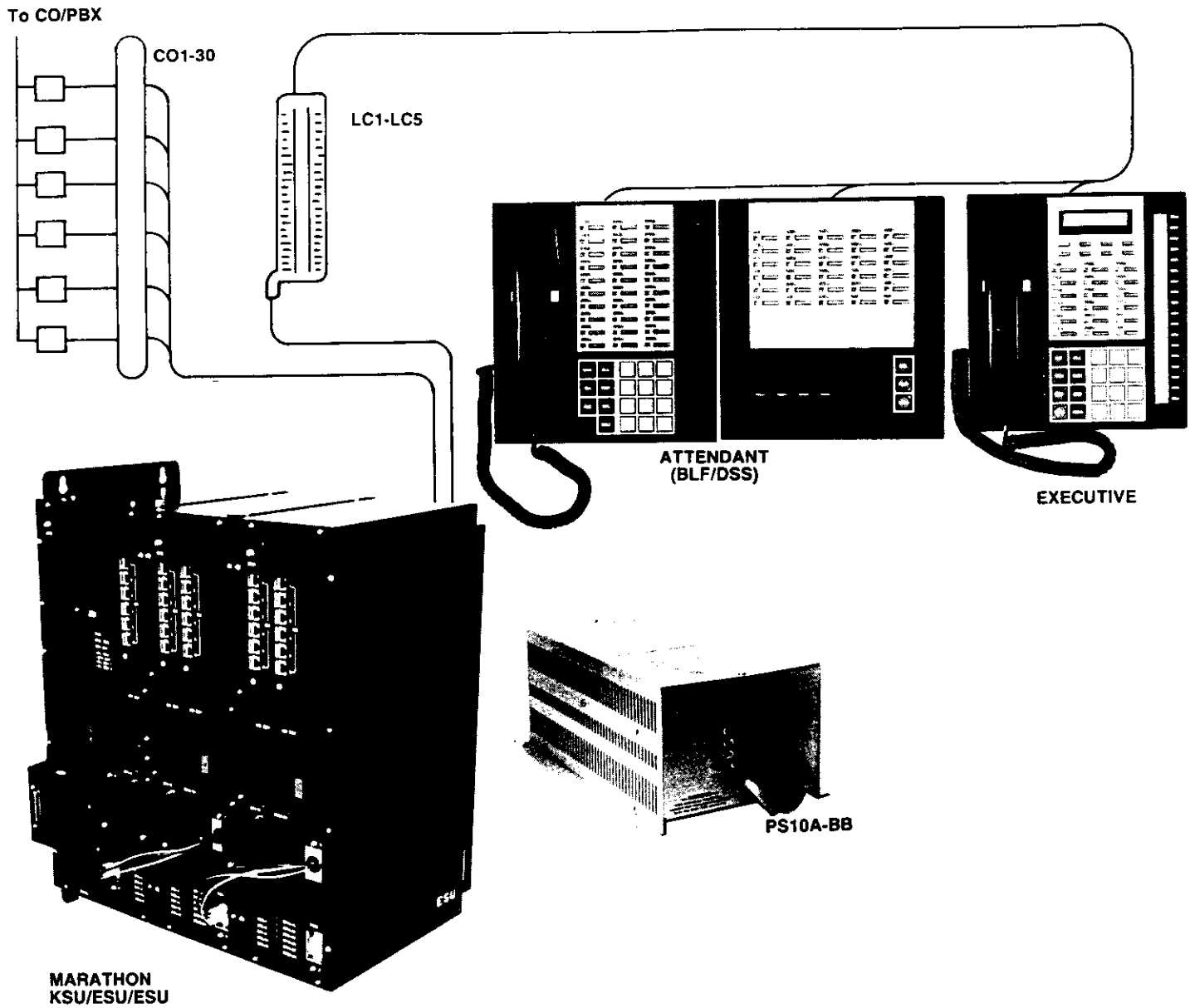


Figure 1-2. Marathon Electronic Key Telephone System. (KSU/ESU/ESU)

If MARATHON develops a malfunction, it could damage the telephone network. The system must be disconnected until the source of the problem can be determined and the necessary repair made. NOTE: If the malfunction causing interference is not corrected, the telephone company may temporarily disconnect service. The telephone company can change its technical operations and procedures. If these changes affect the compatability or use of the device, the telephone company must provide adequate notice of the changes.

SERVICE REQUIREMENTS

On-site trouble shooting may be performed by the installing company (refer to page 2-59 for Trouble Shooting Guide) with corrective action being limited to replacement of printed circuit boards, power supplies, cable, or telephones only. For all integral repairs required to the above-mentioned parts, these parts must be returned to the manufacturer for service.

ENVIRONMENTAL SPECIFICATIONS

This section defines environmental considerations for MARATHON.

1. Temperature

   Continuous operating temperature: 32°-104°F (0°-40°C)

   Storage Temperature: 0°-150°F (-17.9°-65°C)

2. Relative Humidity

   Continuous operating relative humidity: 10%-90% (non-condensating)

3. Heat Dissipation

   6 x 12 (KSU only): 31 BTUs Max

   30 x 60: 133 BTUs Max

   PS2A Power Supply: 41 BTUs Max @ Rated Power

   PS10A BB Power Supply: 355 BTUs Max @ Rated Power

TELEPHONE DIMENSIONS

The telephone is 8.12 inches (199.1 mm) wide by 8.75 inches (214 mm) long by 2.58 inches (65.5 mm) high when the handset is not in the cradle. (All telephones and the DSS console have the same dimensions.)

TECHNICAL SPECIFICATIONS

See Table 1-1 which defines technical and operational parameters for the MARATHON System.

SYSTEM SPECIFICATONS

See Table 1-2 which defines the system specifications.

KSU DIMENSIONS AND SPECIFICATIONS

Length: 18.5 inches
Width: 9.5 inches
Depth: 6.35 inches

See Table 1-3 which defines the KSU specifications.

ESU DIMENSIONS AND SPECIFICATIONS

Length: 18.5 inches
Width: 9.5 inches
Depth: 4.5 inches

See Table 1-4 which defines the ESU specifications.

Table 1-1

TECHNICAL SPECIFICATIONS

Type of Equipment:	MARATHON Electronic Key Telephone Systems
Control:	Stored Program, Microprocessor Control
Switching:	Space Division Digital
Transmission:	Analog

Electrical Characteristics

Input Power:	117 VAC, 60Hz + or - 10%
Output Power:	24 VDC + or - 10%

Central Office Interface Characteristics

AC Impedance at CO Interface:	600 ohms
DC Resistance at CO Interface:	300 ohms

Key service Unit must be within 25 feet of CO interface.

Connection and Cable Requirements

Telephone Company Connections:	FCC approved RJ-11C(USOC) connectors, provided by the Telephone Company 1 per CO trunk
Connection Blocks:	Standard type 66 M1-50
Cable Requirements:	One 25-pair minimum per (STU) station line card (from STU to 66 M1-50) One 2-pair (Quad J-K or equivalent) from the 66 M1-50 to each station One 2-pair flat ribbon cable per CO line
Telephone Station Connections: (including DSS/BLF)	Type 625 modular jack (2 pair)
Maximum Station Cable Length*: (No. 24 AWG x 2 pair)	6-button telephone = 2000 ft 18-button telephone = 1500 ft 30-button telephone = 1000 ft DSS/BLF = 1000 ft Executive = 1000 ft

*NOTE: Maximum Station Cable Length may vary depending on environmental conditions.

Table 1-2

SYSTEM SPECIFICATIONS

Specifications		Descriptions
Max. CO/PBX Lines	30	for tone and/or outpulsing 6 circuits per one (COU) CO card.
Max. Intercom Links	10	2 ICM paths are standard with the KSU. 2 additional ICM paths are provided with each (STU) station card. 5 (STU) station cards may be used per system for a total of 10 ICM paths.
Max. Station Codes	60	12 station codes per (STU) station card. 5 (STU) station cards per system totalling 60 station codes (8 Executive telephones per STU total 40).
Max. DSS/BLF Console	5-pair	2 DSS/BLF ports per station (STU) card. 5 sets of 2 DSS consoles each. Each console supports 30 stations connected to port #2 and #3 of each STU for sequential access to approx. 60 stations (Depending upon the number of DSS/BLFs in the system). Reduces station capacity on one-for-one basis. Also reduces Executive station capacity on one-for-one basis.
Executive Telephone	40	8 per STU (first 8 ports of each STU only).
Control	Decentralized Microprocessor Common Control from KSU	
Switching	Space Division	C-MOS Analog

Table 1-3

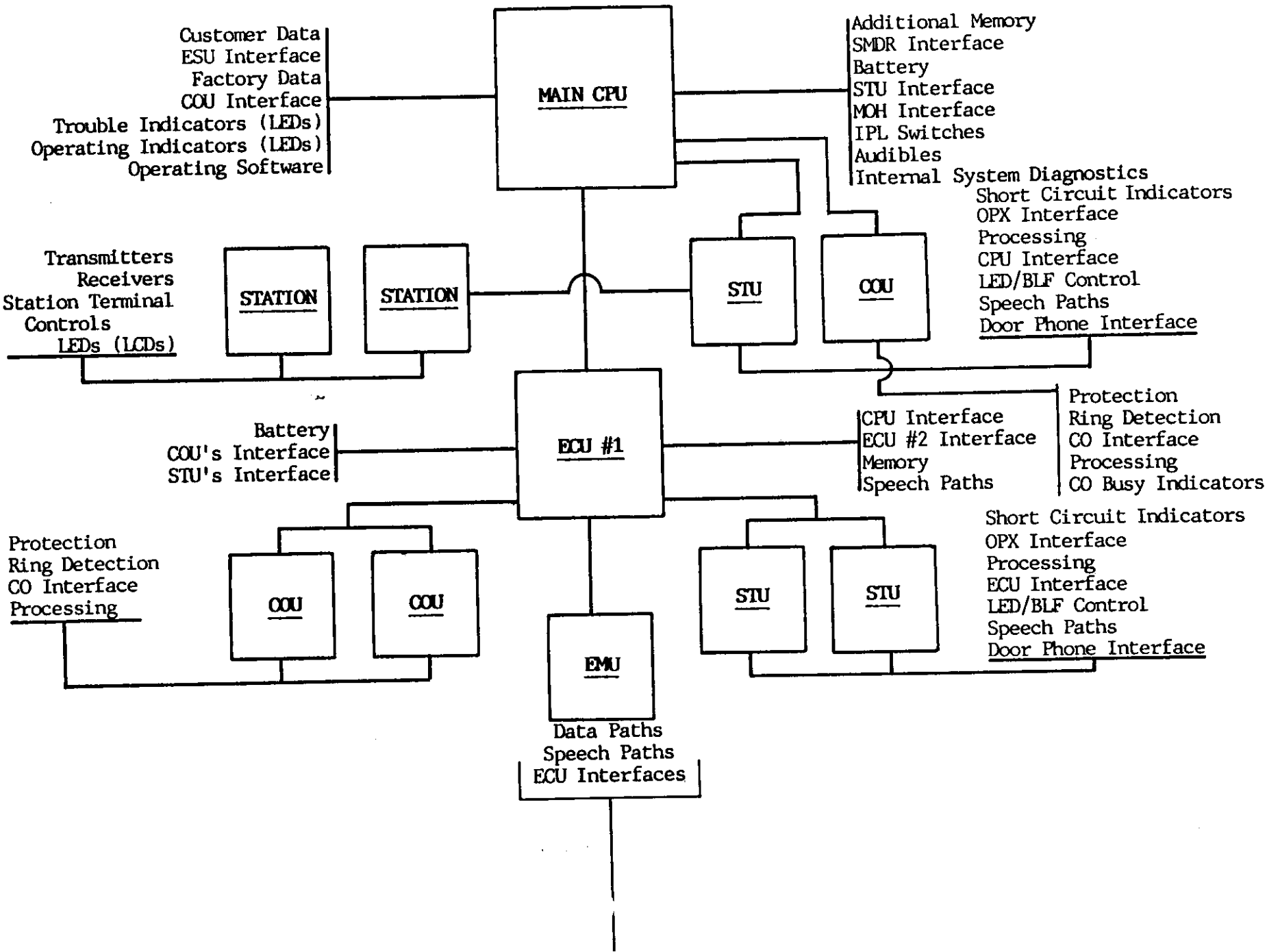
KSU SPECIFICATIONS

Specifications		Descriptions
Max. CO/PBX Lines	6	for tone and/or outpulsing, 6 circuits per 1 (COU) CO card.
Max. Intercom Links	2	2 ICM paths are standard with the KSU.
Max. Station Codes	12	12 stations per 1 card - 8 stations may be Executive telephones.
Max. DSS/BLF Console	1 pair	reduces station capacity on one-for-one basis. Each DSS/BLF provides access to 30 stations. Also reduces executive station capacity on one-for-one basis. DSS/BLF connects to port #2 (port #3 may also be used for systems with stations in excess of 30).
Max. Executive Telephones	8	first 8 ports

Table 1-4

ESU SPECIFICATIONS

Max. CO/PBX Lines	12	for tone and/or outpulsing 6 circuits per (COU) CO card.
Max. Intercom Links	4	2 ICM paths are standard with the KSU. 2 additional ICM paths are provided with each (STU) station card. 5 (STU) station cards may be used per system for a total of 10 ICM paths.
Max. Stations Codes	24	12 station codes per (STU) station card. 5 (STU) station cards per system, totalling 60 station codes. (8 Executive telephones per STU total 40.)
Max. DSS/BLF Console	2-pair per ESU	2 DSS/BLF ports are standard with the KSU (port #2 and Port #3). 2 additional DSS/BLF ports are provided with each station card (also port #2 and port #3 of each STU). 5 STU station cards per system totalling 5 sets of 2 DSS consoles each. Each console supports 30 stations. One console may be connected to port #2 and another for port #3 of each STU for sequential access to approx. 60 stations (depending on how many DSS/BLFs are used in the system).
Executive Telephone	16	8 per STU (first 8 ports of each STU)


Customer Data
ESU Interface
Factory Data
COU Interface
Trouble Indicators (LEDs)
Operating Indicators (LEDs)
Operating Software
MAIN CPU
Additional Memory
SMDR Interface
Battery
STU Interface
MOH Interface
IPL Switches
Audibles
Internal System Diagnostics
Transmitters
Receivers
Station Terminal
Controls
LEDs (LCDs)
STATION
STATION
STU
COU
Short Circuit Indicators
OPX Interface
Processing
CPU Interface
LED/BLF Control
Speech Paths
Door Phone Interface
Battery
COU's Interface
STU's Interface
ECU #1
CPU Interface
ECU #2 Interface
Memory
Speech Paths
Protection
Ring Detection
CO Interface
Processing
CO Busy Indicators
Protection
Ring Detection
CO Interface
Processing
COU
COU
STU
STU
Short Circuit Indicators
OPX Interface
Processing
ECU Interface
LED/BLF Control
Speech Paths
Door Phone Interface
EMU
Data Paths
Speech Paths
ECU Interfaces

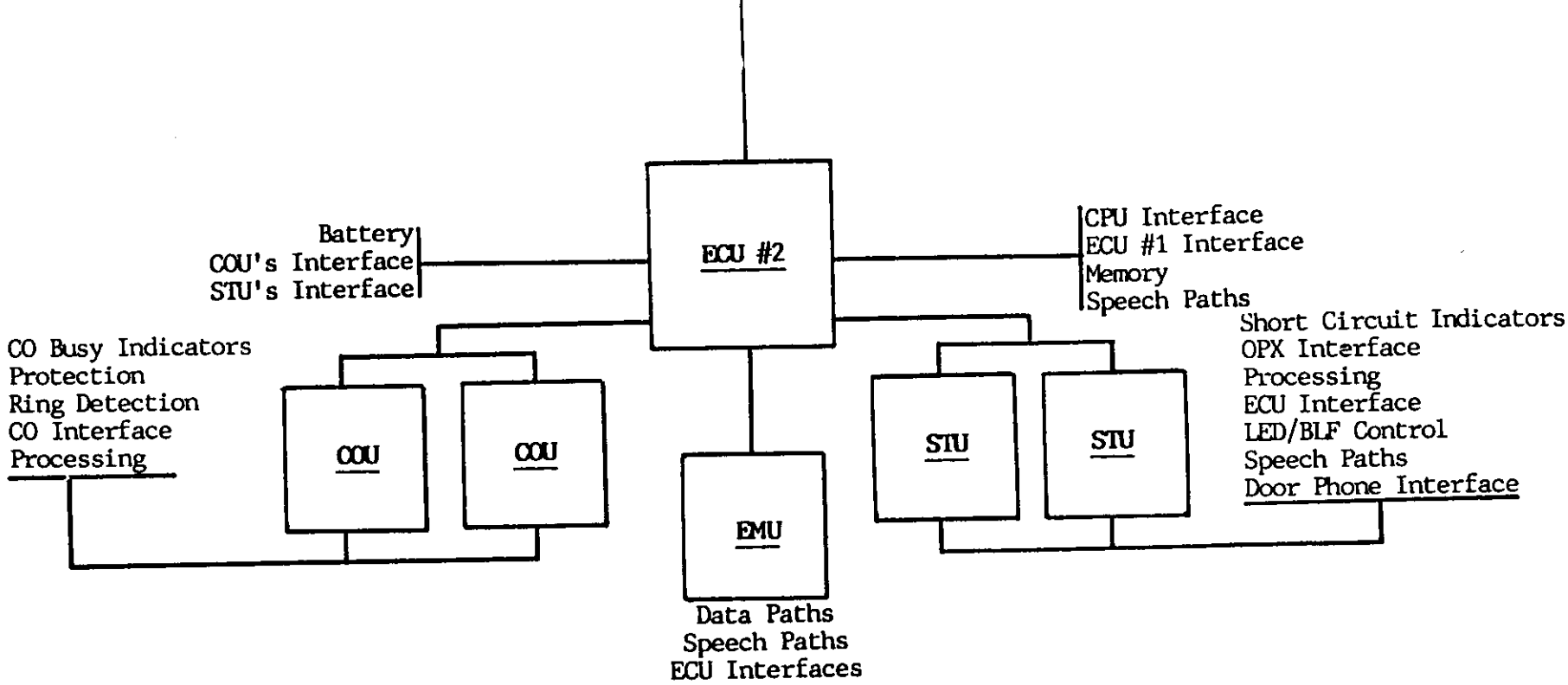


Figure 1-3. Basic System Electronic Architecture.

MARATHON CONFIGURATOR

The information provided in Table 1-5 is designed to assist you in configuring a system. Upon initial inspection, and before installation, compare your inventory with the table below in order to determine the necessary electronics for this installation.

Table 1-5
MARATHON CONFIGURATOR

CO Lines	COU	KSU	ESU	EMU	CPU
6	1	1	0	0	1
12	2	1	1	0	1
18	3	1	1	0	1
24	4	1	2	1-2nd ESU	1
30	5	1	2	1-2nd ESU	1

Stations	STU	KSU	ESU	EMU	CPU
12	1	1	0	0	1
24	2	1	1	0	1
36	3	1	1	0	1
48	4	1	2	1-1st ESU	1
60	5	1	2	1-1st ESU	1

NOTES:

- PS2A is required for a 6 x 12.
- The PS2A must be replaced with a PS10A-BB for systems with one or more ESUs or when battery-backed system operation is required.
- Each ESU is shipped from the factory equipped with one ECU circuit.

SECTION 2
INSTALLATION

GENERAL

This section provides installation instructions for the MARATHON Electronic Key Telephone System. The contents of the section are arranged in the recommended order of installation.

UNPACKING

Remove all equipment from the cartons as follows:

1. Carefully open all cartons. (It is highly recommended that you affix a grounding strap to your wrist or arm before unpackaging electronic circuit cards.)
2. Remove packing material and shipping receipts.
3. Check equipment for damage:
   a. Inspect circuit cards for cracks and/or damage.
   b. Inspect housings and cabinets for any damage which may have been incurred during shipping.
   c. Inspect station terminals for external damage.

CAUTION--All circuit cards are static sensitive. Before handling any circuit card, perform one of the following two precautions:

- Discharge the static electricity from your body by touching metal that is earth grounded.
- Attach a grounding strap (wire) to your wrist which is secured to an earth ground such as a cold water pipe.

LOCATION SELECTION

Consider the following when selecting a location for MARATHON:

1. Availability of a 117 VAC, 60-Hz single-phase dedicated power outlet capable of safely delivering 12 Amps.(An isolated outlet is recommended.)
2. It is also highly recommended that a high quality surge protector be used on the power line to protect the system against damage from lightning surges on the power line. In addition, precautions should be taken in accordance with local practices.
3. The location of the Central Office/Private Branch Exchange "CO/PBX" line terminations must be within 25 feet of the Central Office interface. The system uses a single two-pair cable per CO line for connecting to the telephone company lines. These cables plug into FCC approved RJ-11C (USOC code) connectors provided by the telephone company, and the modular jacks at the KSU.
4. Ventilation and temperature: the equipment is designed to operate within 32°-104°F (0°-40°C).
5. The key service unit must not be placed near a strong magnetic field such as a heavy motor or generator, copying machine, high power cable, etc.
6. The system must not be placed in an environment where a high concentration of radio frequency energy is present, due to the possibility of interference with the equipment.
7. The equipment must not be exposed to hazards such as flammable materials, caustic fluids, possible flooding, etc.
8. Provide adequate lighting and space for operation and maintenance.

EQUIPMENT ARRANGEMENT

See Table 2-1 which describes the equipment arrangement for the MARATHON system.

Table 2-1

EQUIPMENT ARRANGEMENT

UNIT DESIGNATION	DESCRIPTION	MAXIMUM QUANTITY	BASIC OR OPTIONAL
MARATHON KSU	Key Service Unit	1	Basic
MARATHON ESU	Expansion Service Unit	2	As Required "A/R"
MARATHON 6-TEL	6 CO Key Telephone	60	Basic A/R
MARATHON 18-TEL	18 CO Key Telephone	60	A/R
MARATHON 30-TEL	30 CO Key Telephone	60	A/R
MARATHON EXEC	18 CO Executive Key Telephone	40	A/R
MARATHON DSS/BLF	30 Button Direct Station Select/Busy Lamp Field	5 sets 2 each	A/R
STU	12 Circuit Station Line Card	5	Basic A/R
COU	6 Circuit CO/PBX Line Card for DTMF or Dialpulse Dialing	5	Basic A/R
PS2A	24 Volt Power Supply	1	Basic
PS10A-BB	24 Volt Power Supply with Battery Back-Up Switch Circuit	1	Option*

*Required for ESU or Battery-Backed system power. It is necessary to use only the PS10A-BB (omit PS2A) for systems equipped with ESU.

KEY SERVICE UNIT MOUNTING

The KSU is designed for wall mounting and may not be floor mounted. Figure 2-1 shows the mounting hole spacing dimensions for wall mounting the key service unit. Use appropriate fasteners that can safely sustain the weight of a fully loaded (with two ESU's piggybacked) 40 pound unit.

CAUTION:

1. Ensure that the KSU cabinet is connected to a good earth ground, and that the ESUs are grounded (wired) to the KSU using the appropriate grounding screws. The ESU must be grounded to the KSU; otherwise a problem may occur due to varying ground potentials.
2. Make sure to leave adequate room (12") on <u>each</u> side of KSU from any obstructions for ease of removing PC boards and interface.

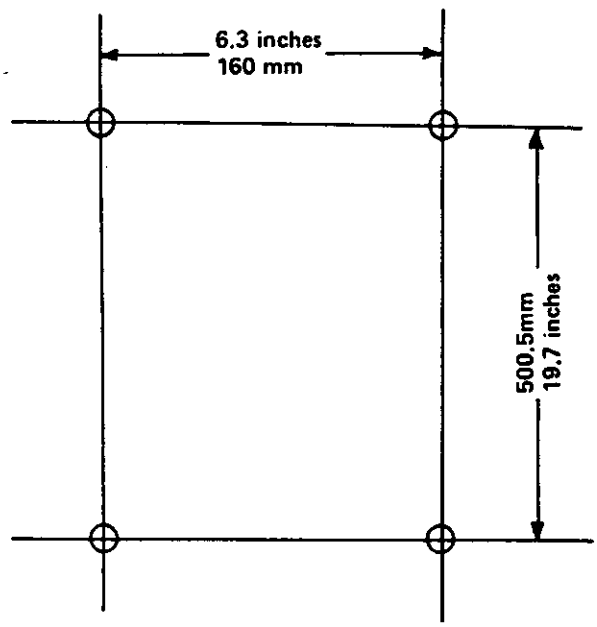


Figure 2-1. KSU Mounting Holes

GROUNDING THE SYSTEM

The KSU and power supply must be properly grounded to an earth ground. A screw on the left side of KSU must be connected to a good earth ground such as a metallic cold-water pipe using AWG 14 or larger. Do not use the ground (green) wire of the AC cord for KSU earth ground. A screw on the left side of the ESU should be bridged to the KSU grounding screw with a jumper wire. If two ESUs are required, a second jumper should be used between the ESUs to completely ground all three cabinets as shown below. In addition, star washers are provided with the ESU mounting screws to insure grounding continuity between cabinets.

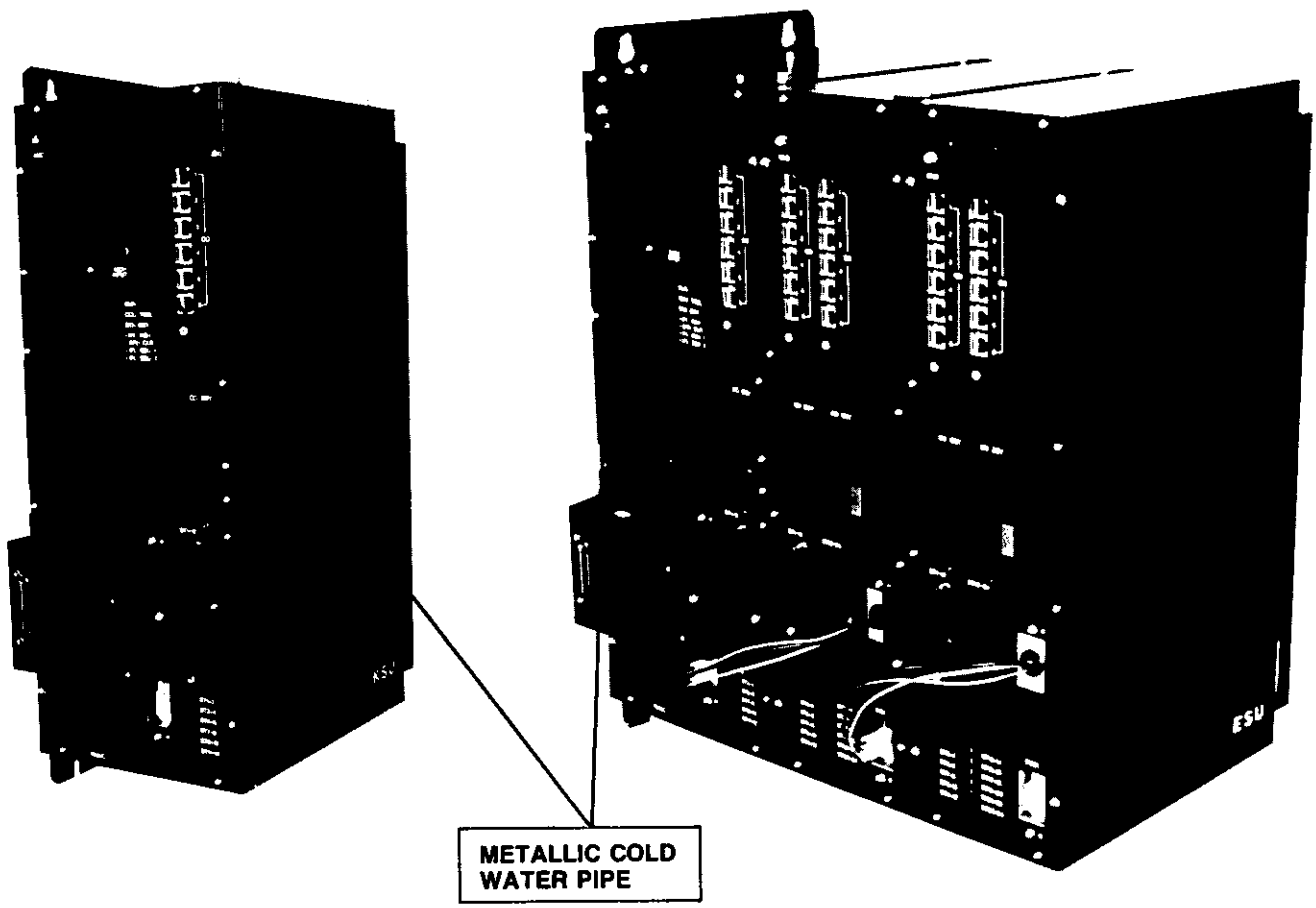


Figure 2-2. System Grounding.

EXPANSION SERVICE UNIT (ESU) MOUNTING

The ESUs are designed for piggyback mounting and may not be individually located or floor mounted. Figure 2-3 shows the mounting arrangement. Use the bolts provided as fasteners in the designated locations so as to insure secure mounting when the system is fully loaded (weight approximately 40 lbs). Four bolts are provided with each ESU (taped to the power cord). The two cylindrical studs are to be used at the top end of the ESU and the two remaining screws (standard phillips) on the bottom side.

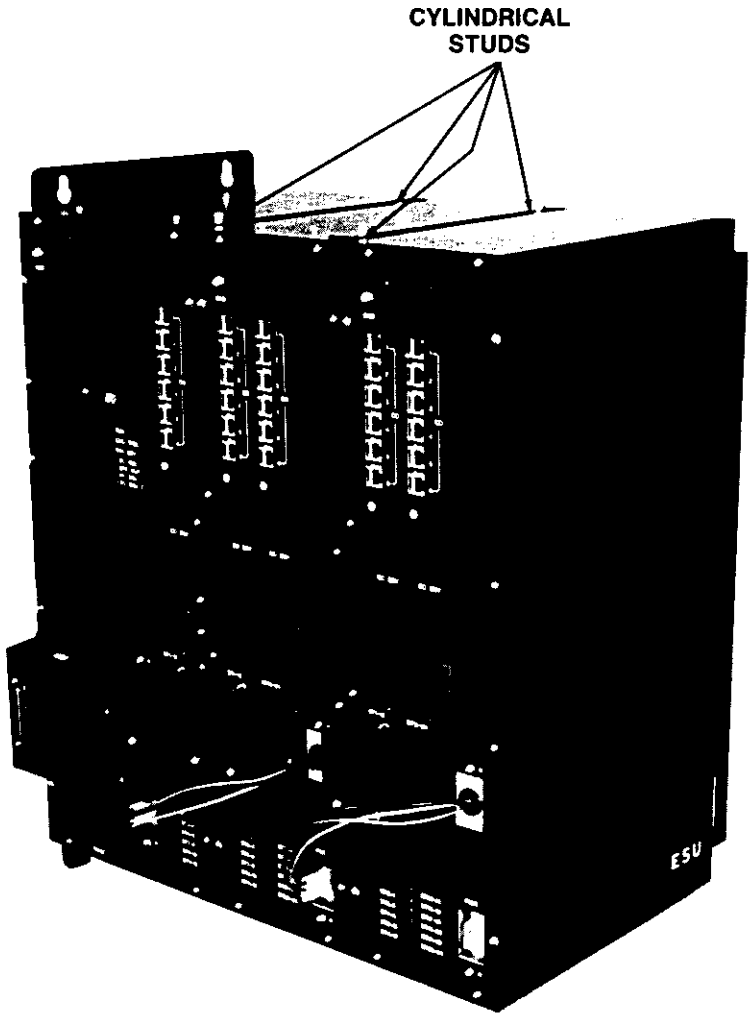


Figure 2-3. ESU Mounting Arrangement.

CABLE INSTALLATION

Table 2-2 lists the cables required to install MARATHON. The cables are interconnected as shown in Figure 2-4 for a KSU and Figure 2-5 for KSU plus ESU. One 25-pair cable is connected between the KSU/ESU connecting blocks and the KSU/ESU 25-pair connectors. The male connector of this cable mates with the female connectors of the KSU/ESU. The KSU/ESU 25-pair connectors are located on the left side of each KSU and ESU (1 per STU card). The other end of these cables have individual wires which are terminated at the station blocks (66M1-50). Up to six two-pair modular cables are connected between the KSU and CO/PBX interface. Up to 12 two-pair modular cables are connected between each ESU and the CO/PBX interface. Figure 2-6 shows the KSU connector locations, and Figure 2-7 shows the KSU/ESU connector locations.

Table 2-2

CABLE REQUIREMENTS

Quantity	Cable Type	From	To
Per number of COs (30 maximum)	2-Pair modular (25 ft maximum)	CO/PBX (RJ 11C) 6 per COU	KSU/ESU connectors (COU)
Per number of STU (5 maximum)	25-Pair A25B or equivalent	Connecting Block 66M1-50 1 per STU	KSU/ESU connectors (STU)
Per number of stations (60 maximum)	2-Pair per telephone station	Connecting Block 66M1-50	Telephone stations type 625A modular jacks

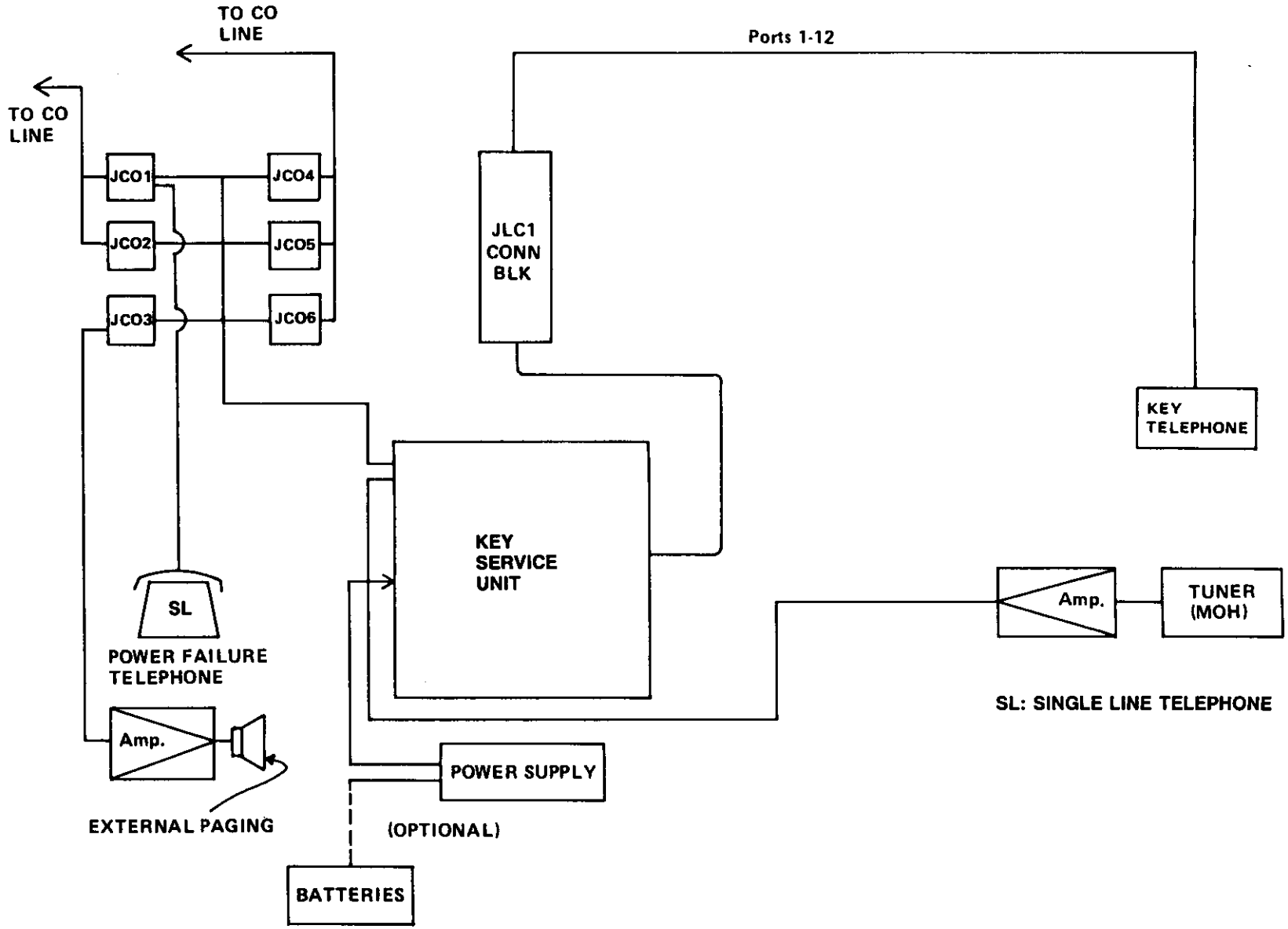


Figure 2-4. MARATHON KSU Interconnection Diagram.

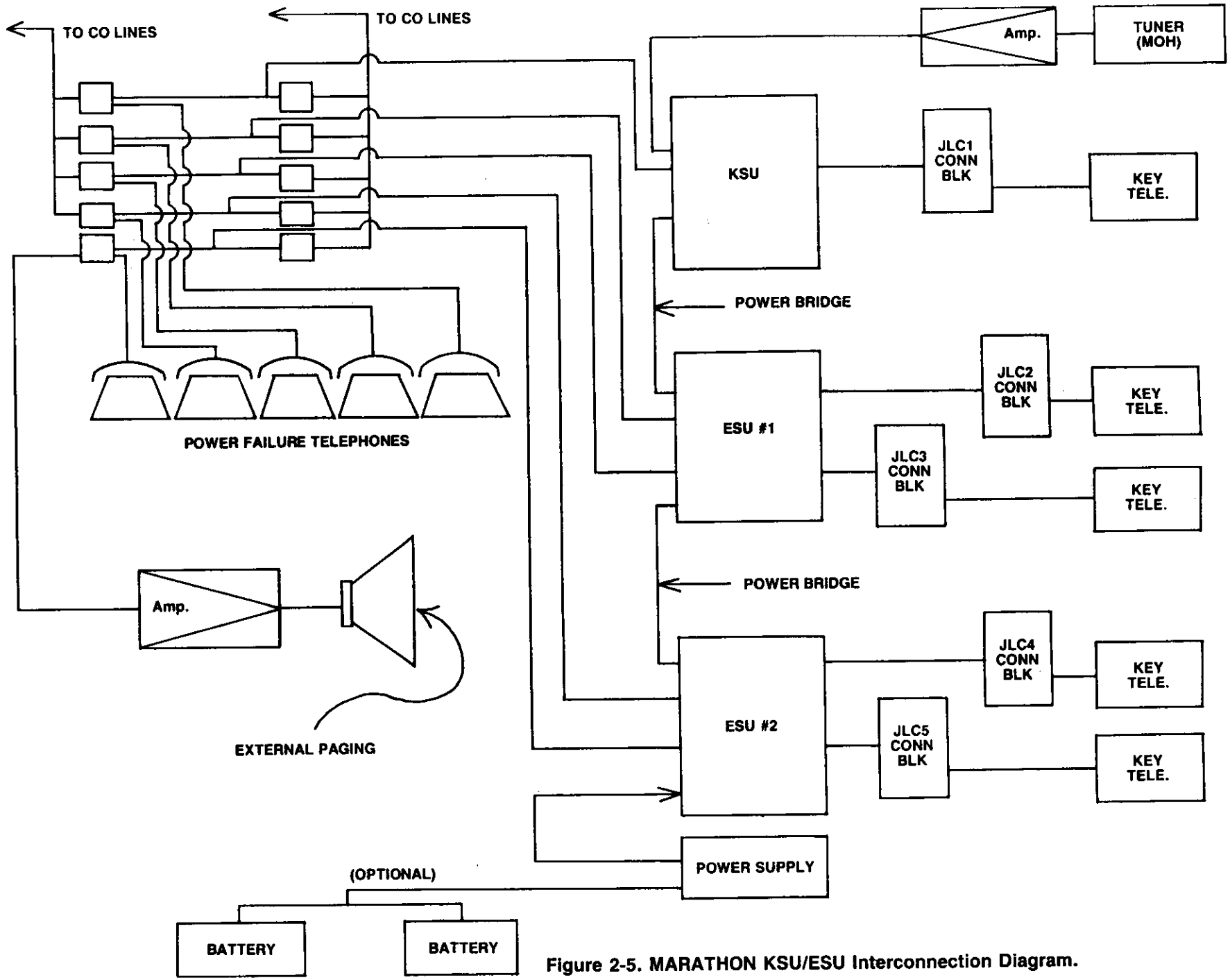


Figure 2-5. MARATHON KSU/ESU Interconnection Diagram.

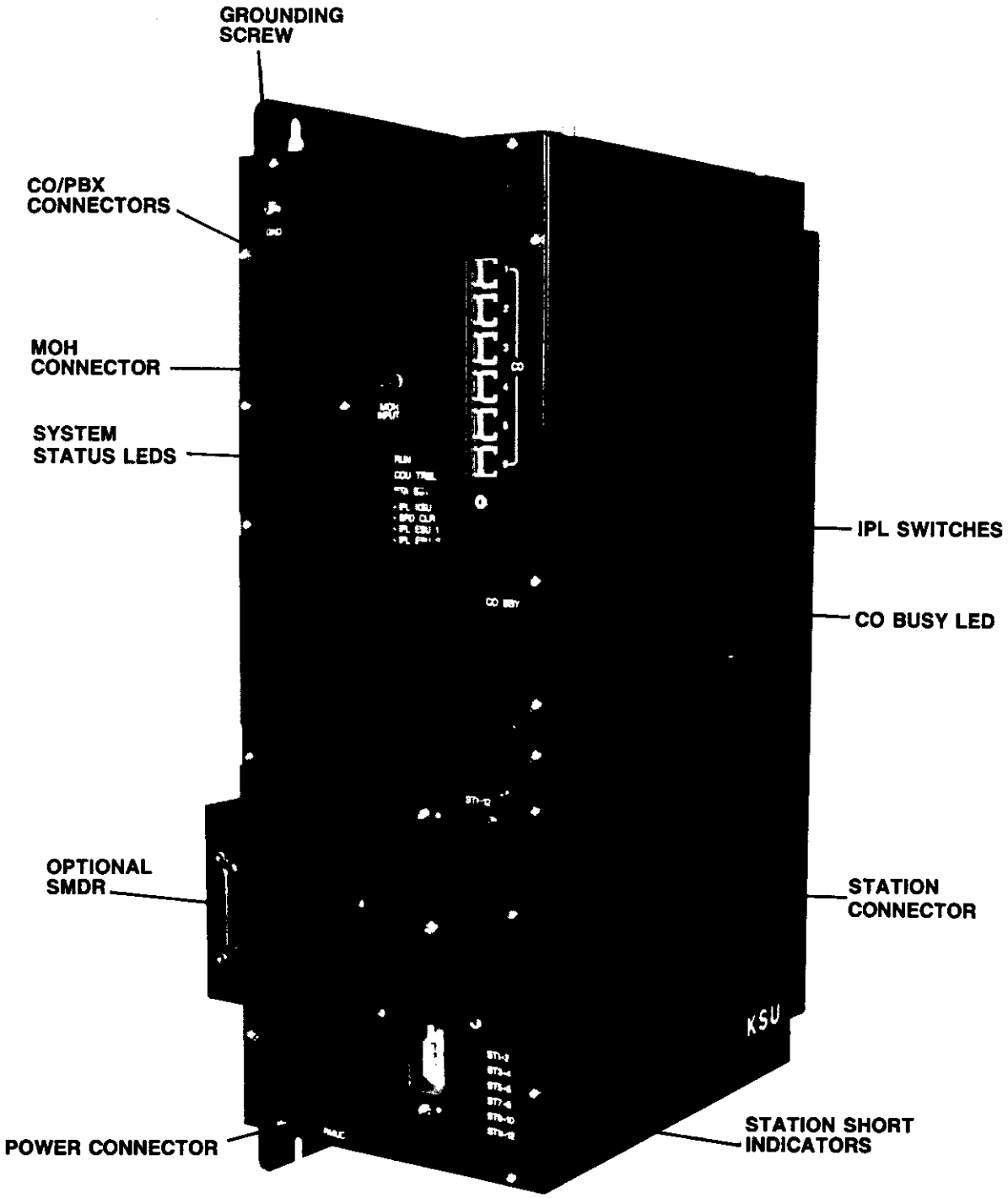


Figure 2-6. KSU Layout and Connector Location.

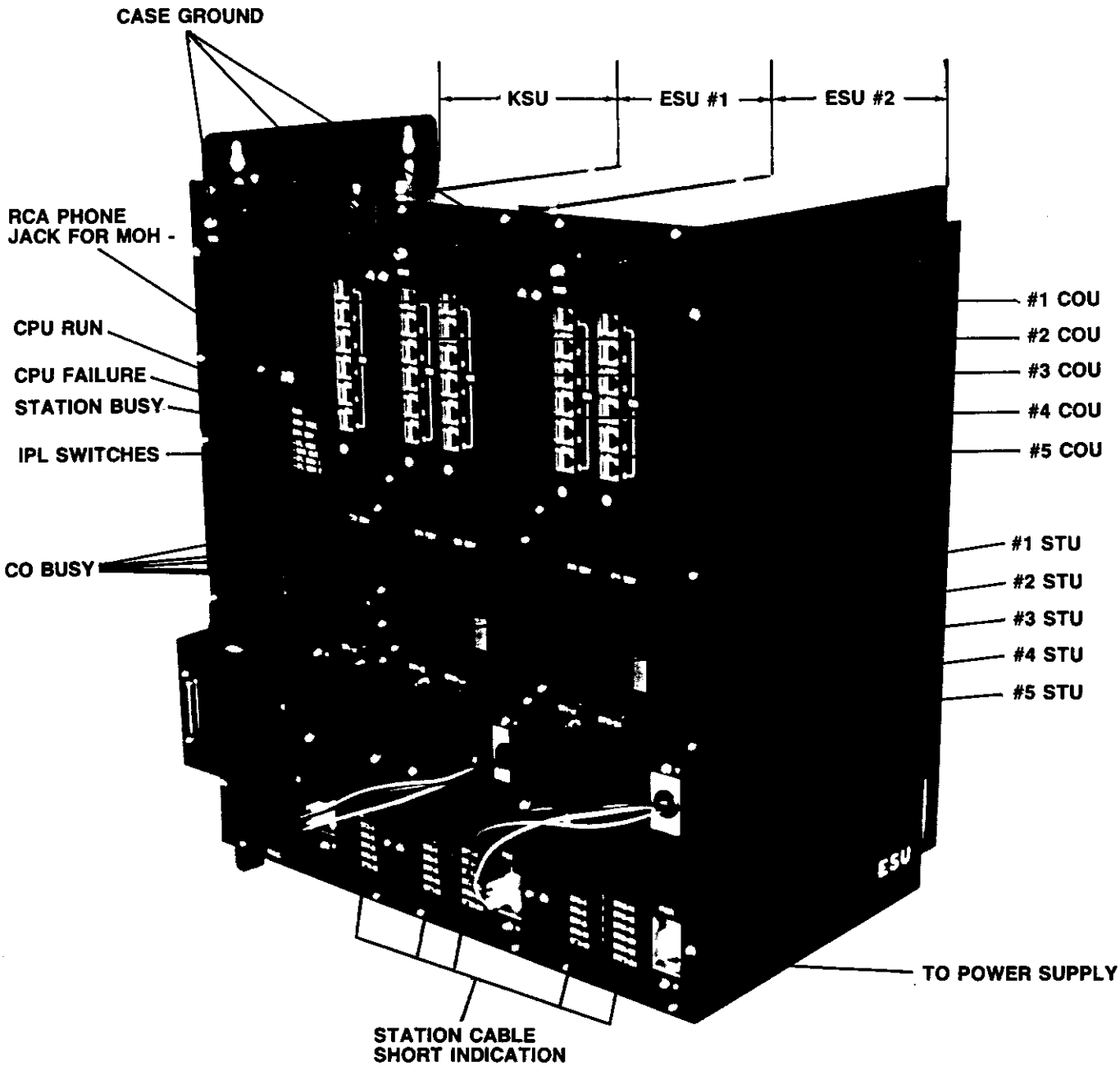


Figure 2-7. KSU/ESU/ESU Layout and Connector Location.

CONNECTING BLOCKS

Standard type 66M1-50 connecting blocks provide the tie points between each KSU and ESU and the station equipment (Figure 2-8 and 2-9). Standard type RJ-11C modular connectors provide the tie points between the KSU/ESU and the CO interface (See Figures 2-8 and 2-9).

CABLING BETWEEN THE LC CONNECTING BLOCKS AND THE KSU/ESUs

The 25-pair cable mates with the associated connectors on the side of each KSU and ESU. The other end of the cable has individual wires which are connected to each connecting block. One cable and one connecting block are required for each 50 pin connector. Table 2-3 lists all cabling connections between the LC connecting blocks and each KSU/ESU. Figure 2-10 illustrates station line connections.

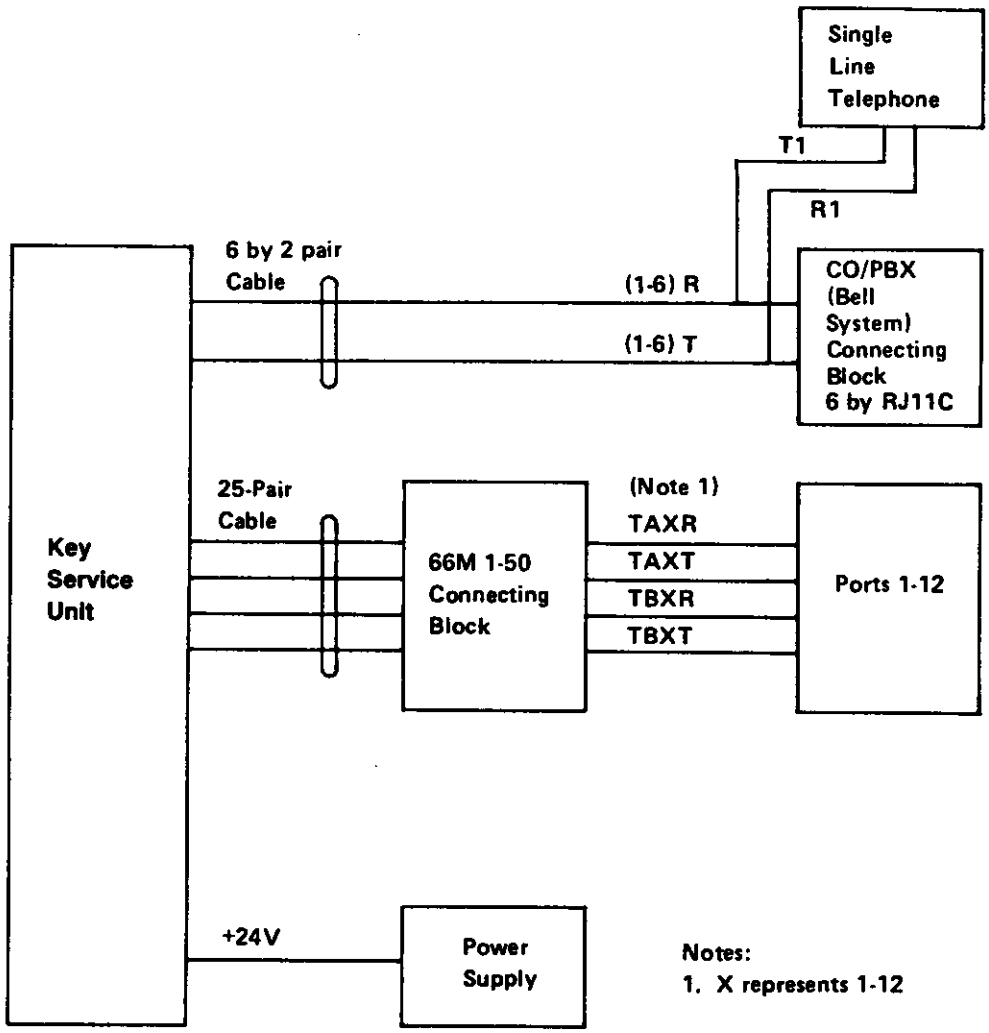


Figure 2-8. Cable Connections from Connecting Block to Equipment (KSU).

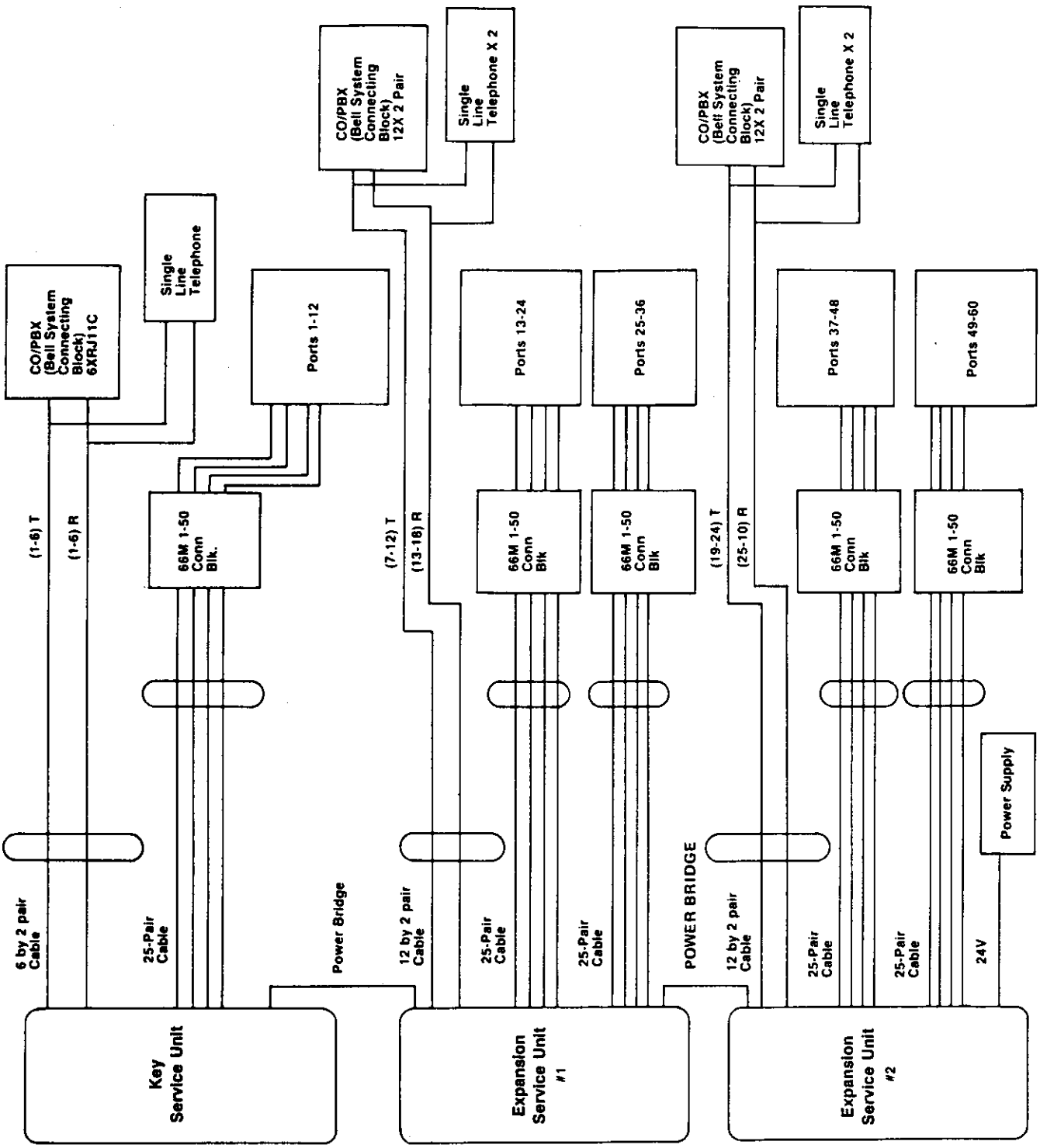


Figure 2-9. Cable Connections From Connecting Block to Equipment. (ESU)

TABLE 2-3 STATION BLOCK CONNECTIONS

STU #1

PORT NUMBER	TELE-PHONE EXT. NUMBER	LEAD DESIG.	JACK J1 CONN PIN NO.	B25B CONN CABLE COLOR	CONN BLK ROW NO.	P-6, 18 OR 30 TEL ANY PORT	EXEC TELS PORT 1-8	DSS CONSOLES PORT 2&3
1	(10)	VT1	26	W-BL	1			
		VR1	1	BL-W	2			
		DTA1	27	W-O	3			
		DTB1	2	O-W	4			
2	DSS #1 (11)	VT2	28	W-G	5			BLF FOR STA. 10-39
		VR2	3	G-W	6			
		DTA2	29	W-BR	7			
		DTB2	4	BR-W	8			
3	DSS #2 (12)	VT3	30	W-S	9			BLF FOR STA. 40-69
		VR3	5	S-W	10			
		DTA3	31	R-BL	11			
		DTB3	6	BL-R	12			
4	(13)	VT4	32	R-O	13			
		VR4	7	O-R	14			
		DTA4	33	R-G	15			
		DTB4	8	G-R	16			
5	(14)	VT5	34	R-BR	17			
		VR5	9	BR-R	18			
		DTA5	35	R-S	19			
		DTB5	10	S-R	20			
6	(15)	VT6	36	BK-BL	21			
		VR6	11	BL-BK	22			
		DTA6	37	BK-O	23			
		DTB6	12	O-BK	24			
7	(16)	VT7	38	BK-G	25			
		VR7	13	G-BK	26			
		DTA7	39	BK-BR	27			
		DTB7	14	BR-BK	28			
8	(17)	VT8	40	BK-S	29			
		VR8	15	S-BK	30			
		DTA8	41	Y-BL	31			
		DTB8	16	BL-Y	32			
9	(18)	VT9	42	Y-O	33			
		VR9	17	O-Y	34			
		DTA9	43	Y-G	35			
		DTB9	18	G-Y	36			
10	(19)	VT10	44	Y-BR	37			
		VR10	19	BR-Y	38			
		DTA10	45	Y-S	39			
		DTB10	20	S-Y	40			
11	(20)	VT11	46	V-BL	41			
		VR11	21	BL-V	42			
		DTA11	47	V-O	43			
		DTB11	22	O-V	44			
12	(21)	VT12	48	V-G	45			
		VR12	23	G-V	46			
		DTA12	49	V-BR	47			
		DTB12	24	BR-V	48			
SPARE			50	V-S	49			
			25	S-V	50			

TABLE 2-3 STATION BLOCK CONNECTIONS (CON'T)

STU #2

PORT NUMBER	TELE-PHONE EXT. NUMBER	LEAD DESIG.	JACK J1 CONN PIN NO.	B25B CONN CABLE COLOR	CONN BLK ROW NO.	P-6, 18 OR 30 TEL ANY PORT	EXEC TELS PORT 1-8	DSS CONSOLES PORT 2&3
13	(22)	VT1	26	W-BL	1			
		VR1	1	BL-W	2			
		DTA1	27	W-O	3			
		DTB1	2	O-W	4			
14	DSS #3 (23)	VT2	28	W-G	5			BLF FOR STA. 10-39
		VR2	3	G-W	6			
		DTA2	29	W-BR	7			
		DTB2	4	BR-W	8			
15	DSS #4 (24)	VT3	30	W-S	9			BLF FOR STA. 40-69
		VR3	5	S-W	10			
		DTA3	31	R-BL	11			
		DTB3	6	BL-R	12			
16	(25)	VT4	32	R-O	13			
		VR4	7	O-R	14			
		DTA4	33	R-G	15			
		DTB4	8	G-R	16			
17	(26)	VT5	34	R-BR	17			
		VR5	9	BR-R	18			
		DTA5	35	R-S	19			
		DTB5	10	S-R	20			
18	(27)	VT6	36	BK-BL	21			
		VR6	11	BL-BK	22			
		DTA6	37	BK-O	23			
		DTB6	12	O-BK	24			
19	(28)	VT7	38	BK-G	25			
		VR7	13	G-BK	26			
		DTA7	39	BK-BR	27			
		DTB7	14	BR-BK	28			
20	(29)	VT8	40	BK-S	29			
		VR8	15	S-BK	30			
		DTA8	41	Y-BL	31			
		DTB8	16	BL-Y	32			
21	(30)	VT9	42	Y-O	33			
		VR9	17	O-Y	34			
		DTA9	43	Y-G	35			
		DTB9	18	G-Y	36			
22	(31)	VT10	44	Y-BR	37			
		VR10	19	BR-Y	38			
		DTA10	45	Y-S	39			
		DTB10	20	S-Y	40			
23	(32)	VT11	46	V-BL	41			
		VR11	21	BL-V	42			
		DTA11	47	V-O	43			
		DTB11	22	O-V	44			
24	(33)	VT12	48	V-G	45			
		VR12	23	G-V	46			
		DTA12	49	V-BR	47			
		DTB12	24	BR-V	48			
SPARE			50	V-S	49			
			25	S-V	50			

TABLE 2-3 STATION BLOCK CONNECTIONS (CON'T)

STU #3

PORT NUMBER	TELE-PHONE EXT. NUMBER	LEAD DESIG.	JACK J1 CONN PIN NO.	B25B CONN CABLE COLOR	CONN BLK ROW NO.	P-6, 18 OR 30 TEL ANY PORT	EXEC TELS PORT 1-8	DSS CONSOLES PORT 2&3
25		VT1	26	W-BL	1			
		VR1	1	BL-W	2			
		DTA1	27	W-O	3			
	(34)	DTB1	2	O-W	4			
26		VT2	28	W-G	5			
	DSS #5	VR2	3	G-W	6			BLF FOR STA. 10-39
	(35)	DTA2	29	W-BR	7			
		DTB2	4	BR-W	8			
27		VT3	30	W-S	9			
	DSS #6	VR3	5	S-W	10			BLF FOR STA. 40-69
	(36)	DTA3	31	R-BL	11			
		DTB3	6	BL-R	12			
28		VT4	32	R-O	13			
		VR4	7	O-R	14			
		DTA4	33	R-G	15			
	(37)	DTB4	8	G-R	16			
29		VT5	34	R-BR	17			
		VR5	9	BR-R	18			
		DTA5	35	R-S	19			
	(38)	DTB5	10	S-R	20			
30		VT6	36	BK-BL	21			
		VR6	11	BL-BK	22			
		DTA6	37	BK-O	23			
	(39)	DTB6	12	O-BK	24			
31		VT7	38	BK-G	25			
		VR7	13	G-BK	26			
		DTA7	39	BK-BR	27			
	(40)	DTB7	14	BR-BK	28			
32		VT8	40	BK-S	29			
		VR8	15	S-BK	30			
		DTA8	41	Y-BL	31			
	(41)	DTB8	16	BL-Y	32			
33		VT9	42	Y-O	33			
		VR9	17	O-Y	34			
		DTA9	43	Y-G	35			
	(42)	DTB9	18	G-Y	36			
34		VT10	44	Y-BR	37			
		VR10	19	BR-Y	38			
		DTA10	45	Y-S	39			
	(43)	DTB10	20	S-Y	40			
35		VT11	46	V-BL	41			
		VR11	21	BL-V	42			
		DTA11	47	V-O	43			
	(44)	DTB11	22	O-V	44			
36		VT12	48	V-G	45			
		VR12	23	G-V	46			
		DTA12	49	V-BR	47			
	(45)	DTB12	24	BR-V	48			
SPARE			50	V-S	49			
			25	S-V	50			

TABLE 2-3 STATION BLOCK CONNECTIONS (CON'T)

STU #4

PORT NUMBER	TELE-PHONE EXT. NUMBER	LEAD DESIG.	JACK J1 CONN PIN NO.	B25B CONN CABLE COLOR	CONN BLK FOW NO.	P-6, 18 OR 30 TEL ANY PORT	EXEC TELS PORT 1-8	DSS CONSOLES PORT 2&3
37	(46)	VT1	26	W-BL	1			
		VR1	1	BL-W	2			
		DTA1	27	W-O	3			
		DTB1	2	O-W	4			
38	DSS #7 (47)	VT2	28	W-G	5			BLF FOR STA. 10-39
		VR2	3	G-W	6			
		DTA2	29	W-BR	7			
		DTB2	4	BR-W	8			
39	DSS #8 (48)	VT3	30	W-S	9			BLF FOR STA. 40-69
		VR3	5	S-W	10			
		DTA3	31	R-BL	11			
		DTB3	6	BL-R	12			
40	(49)	VT4	32	R-O	13			
		VR4	7	O-R	14			
		DTA4	33	R-G	15			
		DTB4	8	G-R	16			
41	(50)	VT5	34	R-BR	17			
		VR5	9	BR-R	18			
		DTA5	35	R-S	19			
		DTB5	10	S-R	20			
42	(51)	VT6	36	BK-BL	21			
		VR6	11	BL-BK	22			
		DTA6	37	BK-O	23			
		DTB6	12	O-BK	24			
43	(52)	VT7	38	BK-G	25			
		VR7	13	G-BK	26			
		DTA7	39	BK-BR	27			
		DTB7	14	BR-BK	28			
44	(53)	VT8	40	BK-S	29			
		VR8	15	S-BK	30			
		DTA8	41	Y-BL	31			
		DTB8	16	BL-Y	32			
45	(54)	VT9	42	Y-O	33			
		VR9	17	O-Y	34			
		DTA9	43	Y-G	35			
		DTB9	18	G-Y	36			
46	(55)	VT10	44	Y-BR	37			
		VR10	19	BR-Y	38			
		DTA10	45	Y-S	39			
		DTB10	20	S-Y	40			
47	(56)	VT11	46	V-BL	41			
		VR11	21	BL-V	42			
		DTA11	47	V-O	43			
		DTB11	22	O-V	44			
48	(57)	VT12	48	V-G	45			
		VR12	23	G-V	46			
		DTA12	49	V-BR	47			
		DTB12	24	BR-V	48			
SPARE			50	V-S	49			
			25	S-V	50			

TABLE 2-3 STATION BLOCK CONNECTIONS (CON'T)

STU #5

PORT NUMBER	TELE-PHONE EXT. NUMBER	LEAD DESIG.	JACK J1 CONN PIN NO.	B25B CONN CABLE COLOR	CONN BLK ROW NO.	P-6, 18 OR 30 TEL ANY PORT	EXEC TELS PORT 1-8	DSS CONSOLES PORT 2&3
49		VT1	26	W-BL	1			
		VR1	1	BL-W	2			
	(58)	DTA1	27	W-O	3			
		DTB1	2	O-W	4			
50		VT2	28	W-G	5			BLF FOR STA. 10-39
	DSS #9 (59)	VR2	3	G-W	6			
		DTA2	29	W-BR	7			
		DTB2	4	BR-W	8			
51		VT3	30	W-S	9			BLF FOR STA. 40-69
	DSS #10 (60)	VR3	5	S-W	10			
		DTA3	31	R-BL	11			
		DTB3	6	BL-R	12			
52		VT4	32	R-O	13			
		VR4	7	O-R	14			
	(61)	DTA4	33	R-G	15			
		DTB4	8	G-R	16			
53		VT5	34	R-BR	17			
		VR5	9	BR-R	18			
	(62)	DTA5	35	R-S	19			
		DTB5	10	S-R	20			
54		VT6	36	BK-BL	21			
		VR6	11	BL-BK	22			
	(63)	DTA6	37	BK-O	23			
		DTB6	12	O-BK	24			
55		VT7	38	BK-G	25			
		VR7	13	G-BK	26			
	(64)	DTA7	39	BK-BR	27			
		DTB7	14	BR-BK	28			
56		VT8	40	BK-S	29			
		VR8	15	S-BK	30			
	(65)	DTA8	41	Y-BL	31			
		DTB8	16	BL-Y	32			
57		VT9	42	Y-O	33			
		VR9	17	O-Y	34			
	(66)	DTA9	43	Y-G	35			
		DTB9	18	G-Y	36			
58		VT10	44	Y-BR	37			
		VR10	19	BR-Y	38			
	(67)	DTA10	45	Y-S	39			
		DTB10	20	S-Y	40			
59		VT11	46	V-BL	41			
		VR11	21	BL-V	42			
	(68)	DTA11	47	V-O	43			
		DTB11	22	O-V	44			
60		VT12	48	V-G	45			
		VR12	23	G-V	46			
	(69)	DTA12	49	V-BR	47			
		DTB12	24	BR-V	48			
SPARE			50	V-S	49			
			25	S-V	50			

STATION AND MODULAR JACK CONNECTIONS

A two-pair cable is required between the connecting block and the type 625A modular jack of each telephone station port. A modular line cord is connected between the type 625A modular jack and the telephone set. Figure 2-10 illustrates the station line connections. Table 2-4 lists the station modular jack connections.

Table 2-4

STATION MODULAR JACK CONNECTIONS

Modular Jack Color	Two-Pair Cable Color	Connecting Block Terminal Designation
Bk (Black)	Black	DTA 2-12
R (Red)	Red	VR 1-12
G (Green)	Green	VT 1-12
Y (Yellow)	Yellow	DTB 1-12

CABLING BETWEEN THE CO CONNECTING BLOCKS AND THE KSU

Up to six two-pair modular cables are required for connection to the telephone company provided connector(s) RJ-11C jacks(s) in accordance with FCC rules, part 68. Figure 2-11 illustrates the CO/PBX line connections, and Table 2-5 lists all cabling connections between the KSU/ESUs and the CO/PBX interface.

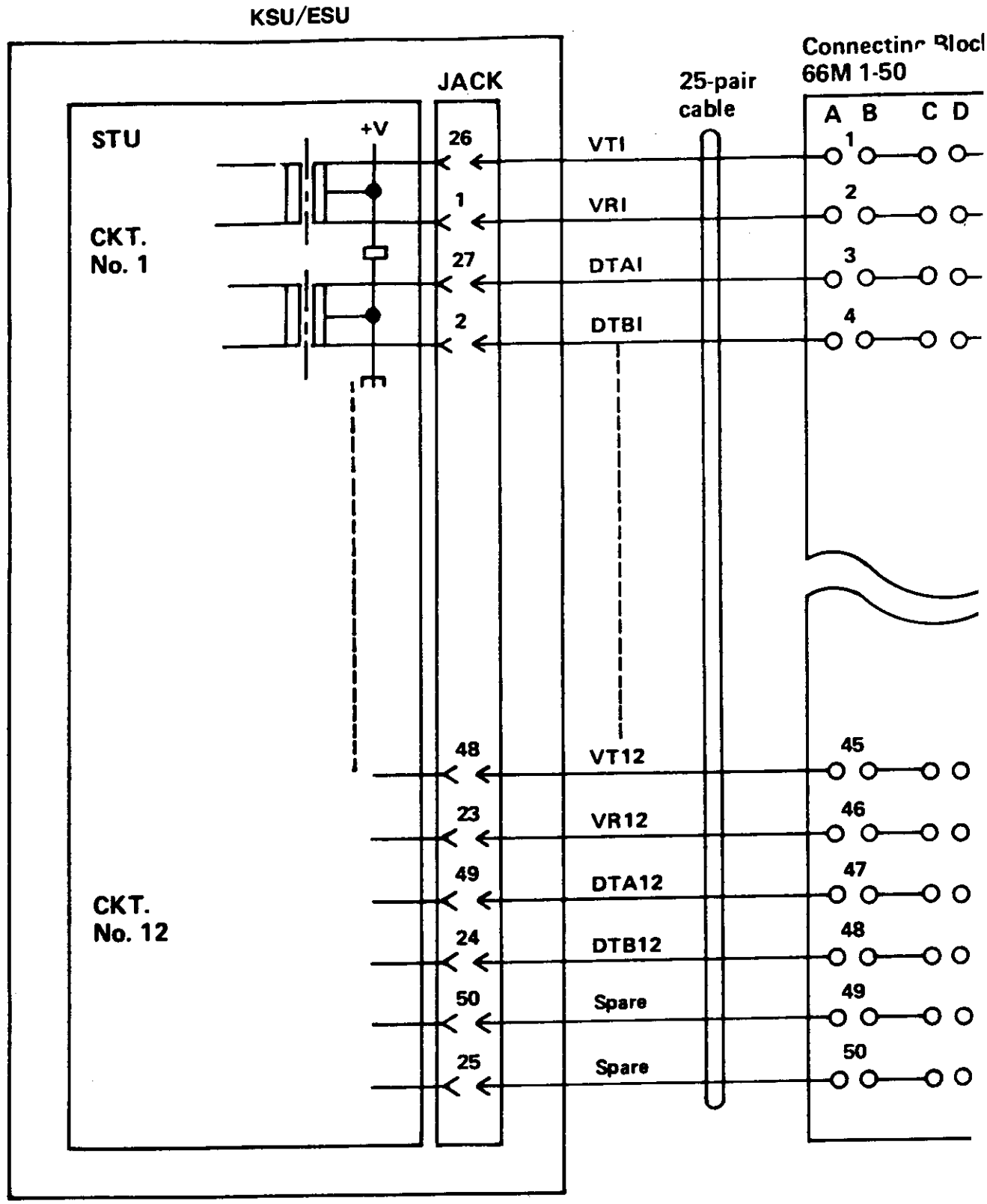
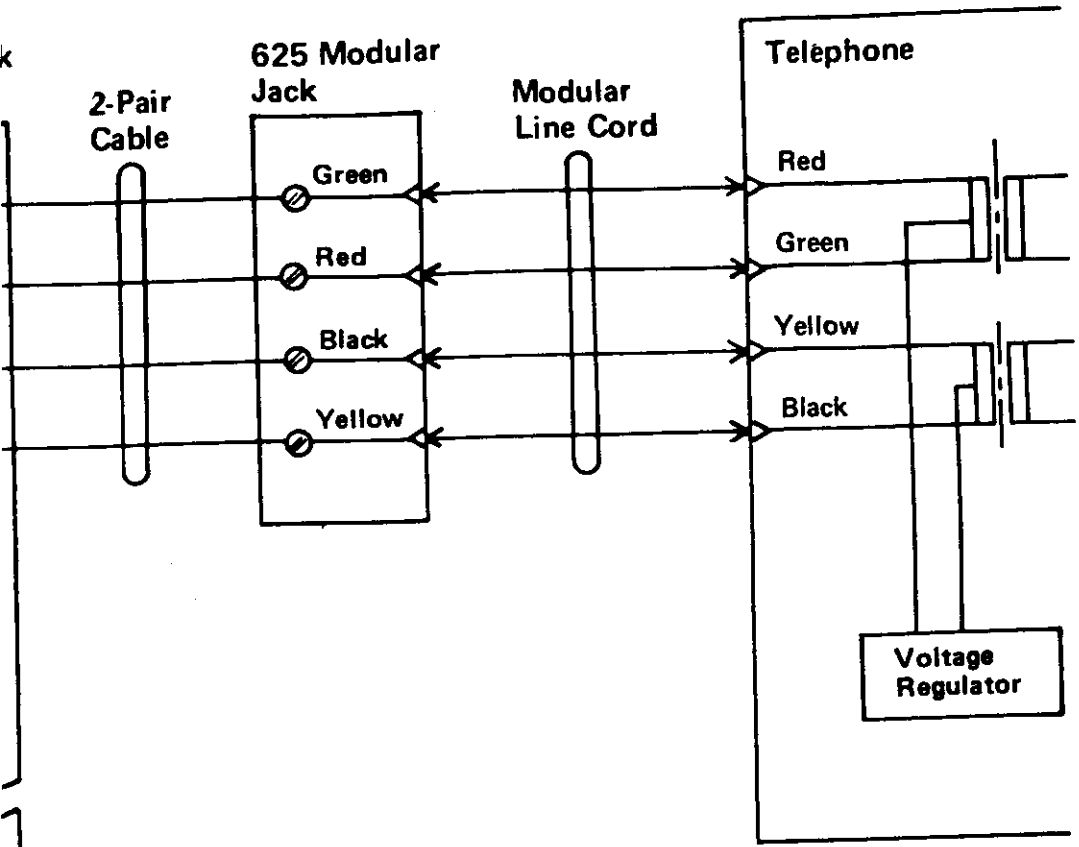
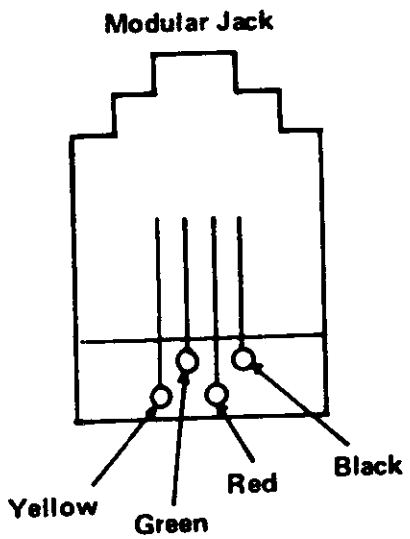


Figure 2-10. Station Interconnect Diagram.


2-Pair Cable
625 Modular Jack
Modular Line Cord
Telephone
Green
Red
Black
Yellow
Red
Green
Yellow
Black
Voltage Regulator


Modular Jack
Yellow
Green
Red
Black

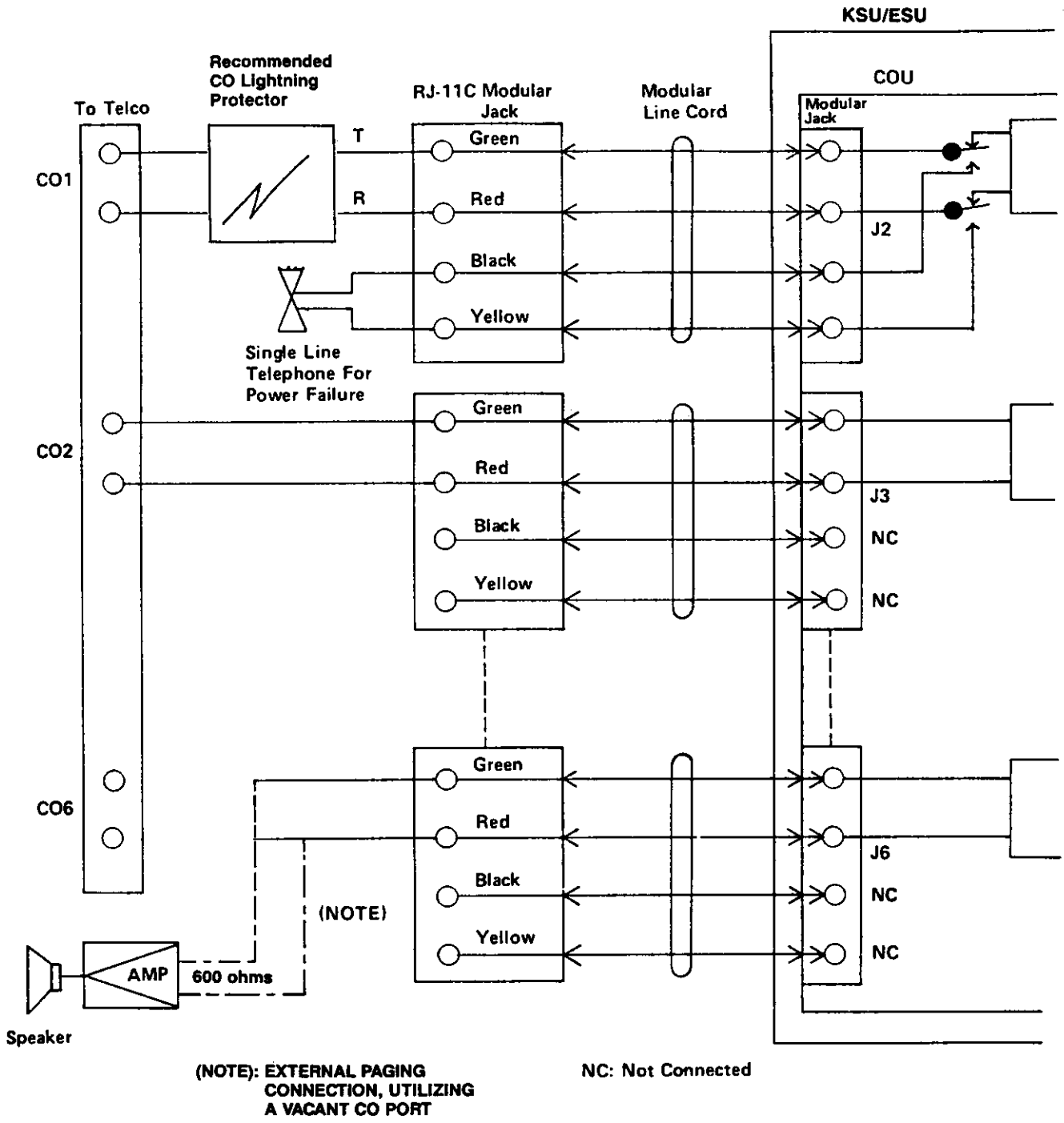


Figure 2-11. CO/PBX Line Connections.

TABLE 2-5
CONNECTIONS FOR CO/PBX LINE

KSU				TRUNK NO.	LEAD DESIG.	MODULAR LINE CORD
POWER FAILURE TRUNK	1PF	YELLOW	COU #1	1	1T	GREEN
	2PF	BLACK			1R	RED
				2	2T	GREEN
					2R	RED
				3	3T	GREEN
					3R	RED
				4	4T	GREEN
					4R	RED
				5	5T	GREEN
					5R	RED
				6	6T	GREEN
ESU #1					6R	RED
POWER FAILURE TRUNK	1PF	YELLOW	COU #2	7	7T	GREEN
	2PF	BLACK			7R	RED
				8	8T	GREEN
					8R	RED
				9	9T	GREEN
					9R	RED
				10	10T	GREEN
					10R	RED
				11	11T	GREEN
					11R	RED
				12	12T	GREEN
					12R	RED
POWER FAILURE TRUNK	1PF	YELLOW	COU #3	13	13T	GREEN
	2PF	BLACK			13R	RED
				14	14T	GREEN
					14R	RED
				15	15T	GREEN
					15R	RED
				16	16T	GREEN
					16R	RED
				17	17T	GREEN
					17R	RED
				18	18T	GREEN
ESU #2					18R	RED
POWER FAILURE TRUNK	1PF	YELLOW	COU #4	19	19T	GREEN
	2PF	BLACK			19R	RED
				20	20T	GREEN
					20R	RED
				21	21T	GREEN
					21R	RED
				22	22T	GREEN
					22R	RED
				23	23T	GREEN
					23R	RED
				24	24T	GREEN
					24R	RED

TABLE 2-5
CONNECTORS FOR CO/PBX LINE (cont.)

ESU #2				TRUNK NO.	LEAD DESIG.	MODULAR LINE CORD
POWER FAILURE TRUNK	1PF	YELLOW	COU #5	25	25T	GREEN
	2PF	BLACK			25R	RED
				26	26T	GREEN
					26R	RED
				27	27T	GREEN
					27R	RED
				28	28T	GREEN
					28R	RED
				29	29T	GREEN
					29R	RED
				30	30T	GREEN
					30R	RED

TELEPHONE INSTALLATION

To install the telephone, connect the four-conductor line cord provided with the telephone between the telephone and the modular jack, as shown in Figure 2-12. If speakerphone is required, see Appendix B for installation instructions. If wall mount is required, see Appendix C.

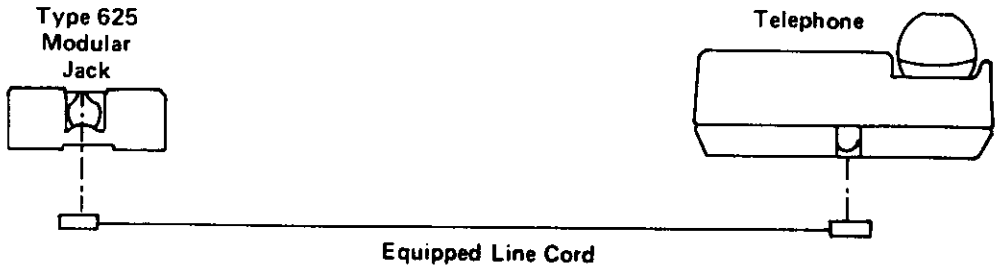


Figure 2-12. Station Connection.

Figure 2-13. MARATHON Telephone Dimensions.

POWER SUPPLY CONNECTIONS

As the power supply is equipped with a connector-ended cable, this cable must be connected to the three-conductor connector provided on the KSU. The three-conductor power connector is located on the left side of the KSU. The power supply connects directly to the KSU connector. (A PS2A may be used except when Battery Backed System operation is required, or when an ESU is added. See Figure 2-14 for power connection required for ESU operation--PS 10A-BB must be used in this case.)

BATTERY BACKED SYSTEM OPERATION

This type of power backup allows full system operation. The power supply has two terminals, one positive (+) and one negative (-). These terminals are the connections for the batteries to be terminated. The system requires two 12 VDC, 40 amp-hour wet cell or two 80 amp-hour gel cell type batteries. Wire the positive from the first battery to the negative of the second battery. Now take the positive from the first battery and connect to the power supply positive terminal and wire negative from the second battery to the negative terminal of power supply. At this point, you will have 24 VDC that will provide approximately four hours of system operation if A/C power is lost. A PS10A-BB power supply must be used for this type operation. See Figure 2-15.

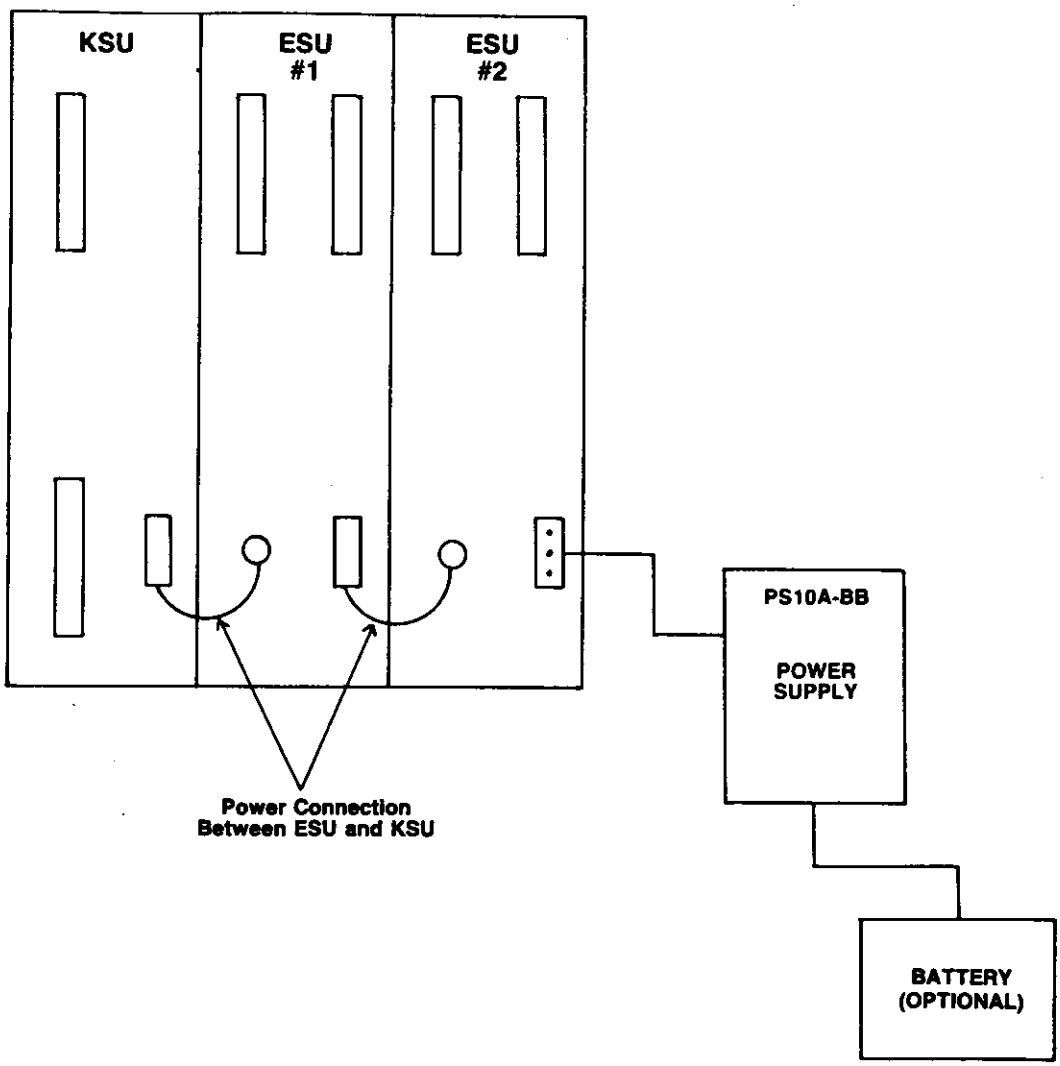


Figure 2-14. Power Supply Connections.

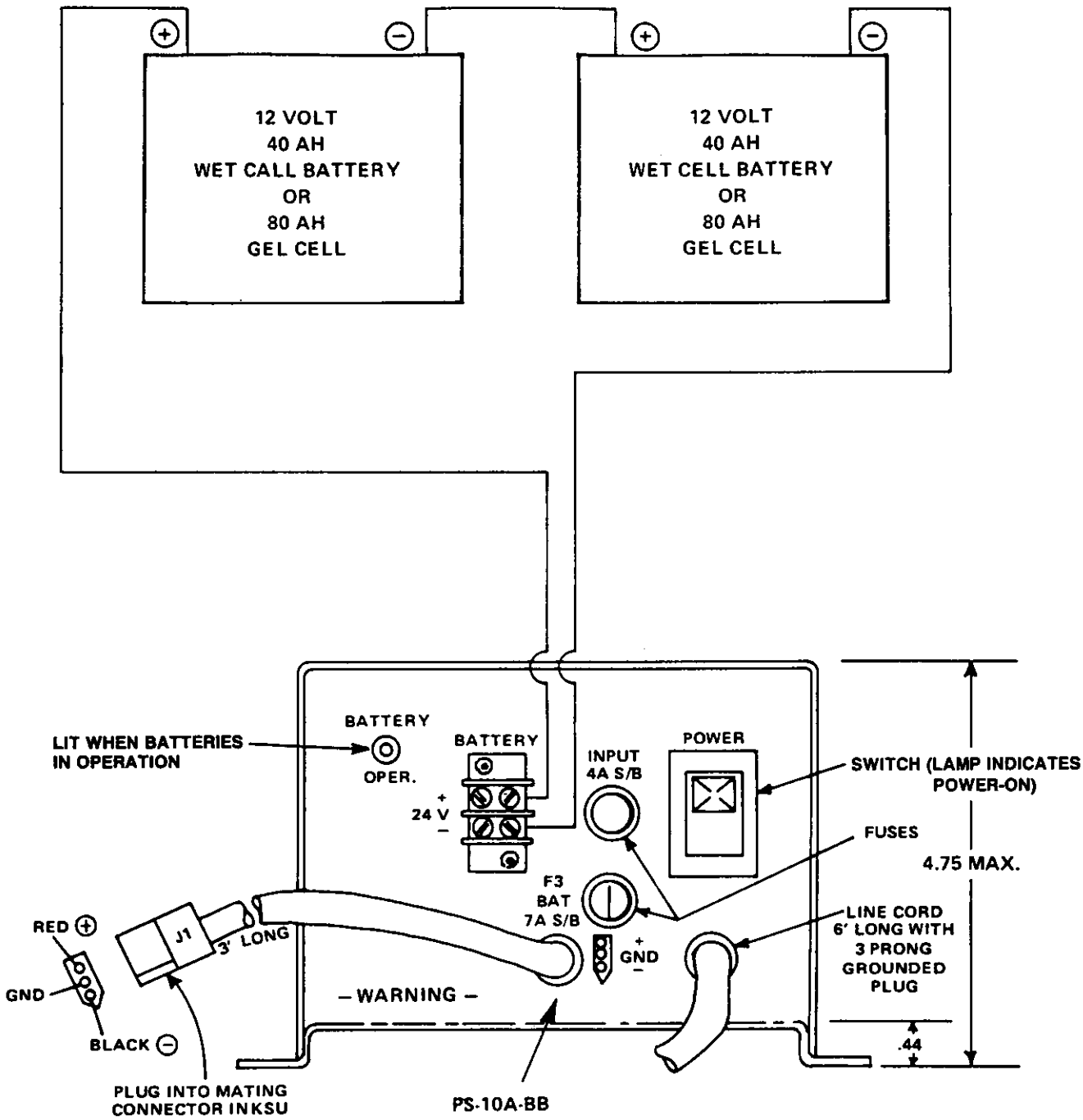


Figure 2-15. Wiring For Battery Back-Up Utilizing PS-10A-BB Power Supply.

POWER FAILURE CONNECTIONS

The first line of the COU is equipped for power failure connection to a standard single line telephone. In the event of a power failure, Tip and Ring of the first line of each COU will automatically be transferred from the inside conductors of the RJ-11C to the outside conductors for connection to a single line telephone. To provide power failure connection to a single-line instrument, connect a type 267A parallel adaptor to the line 1 RJ-11C jack, as shown in Figure 2-16. Remove the cover of the standard single-line telephone and connect the black and yellow wires to the same connections as the red and green wires, as shown in Figure 2-17. Reassemble the single-line telephone. Connect the modular cord from the single-line telephone to one side of the parallel adaptor, and connect the line one modular cord from the COU card to the other side of the parallel adaptor, as shown in Figure 2-16.

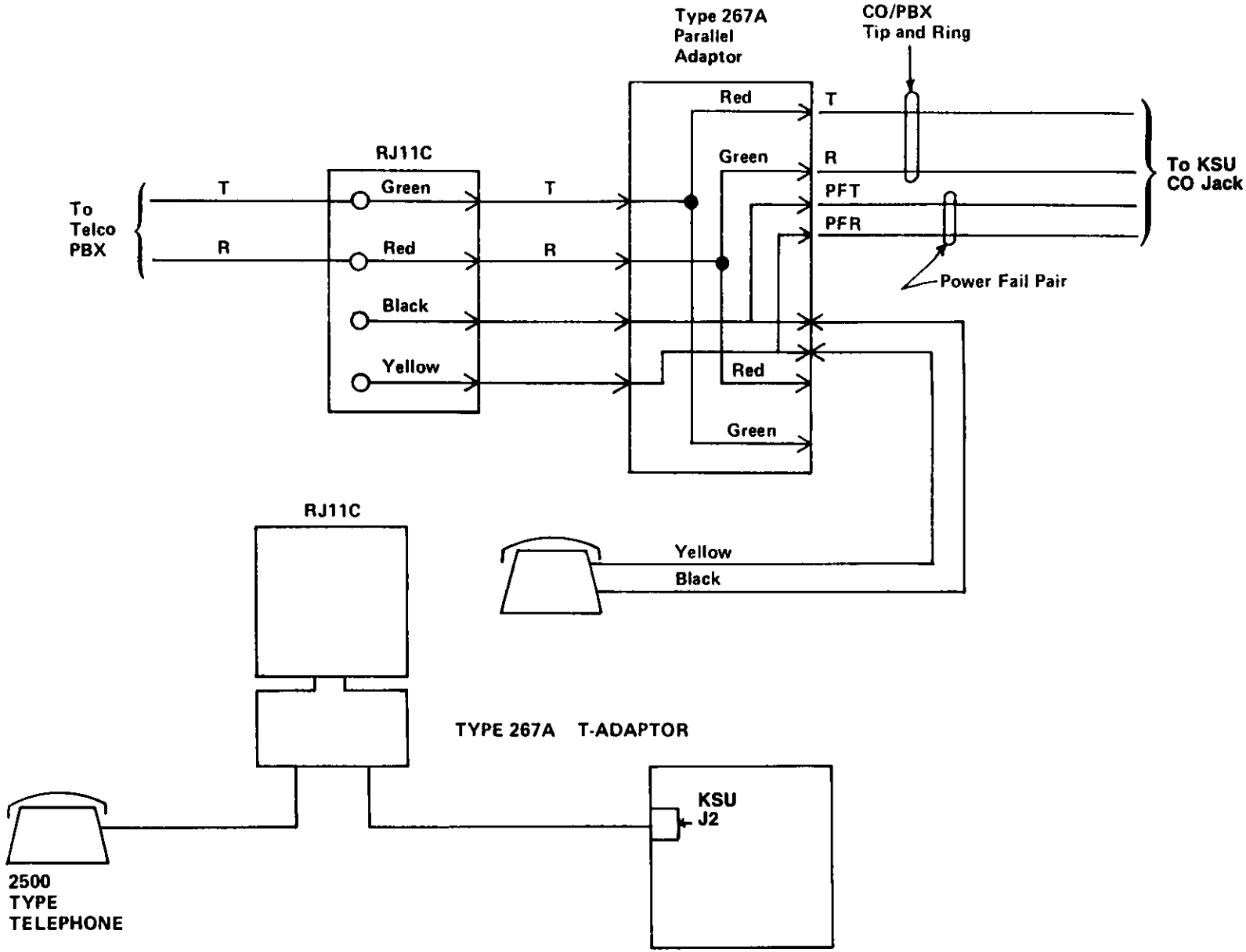


Figure 2-16. CO Line Wiring For Power Failure.

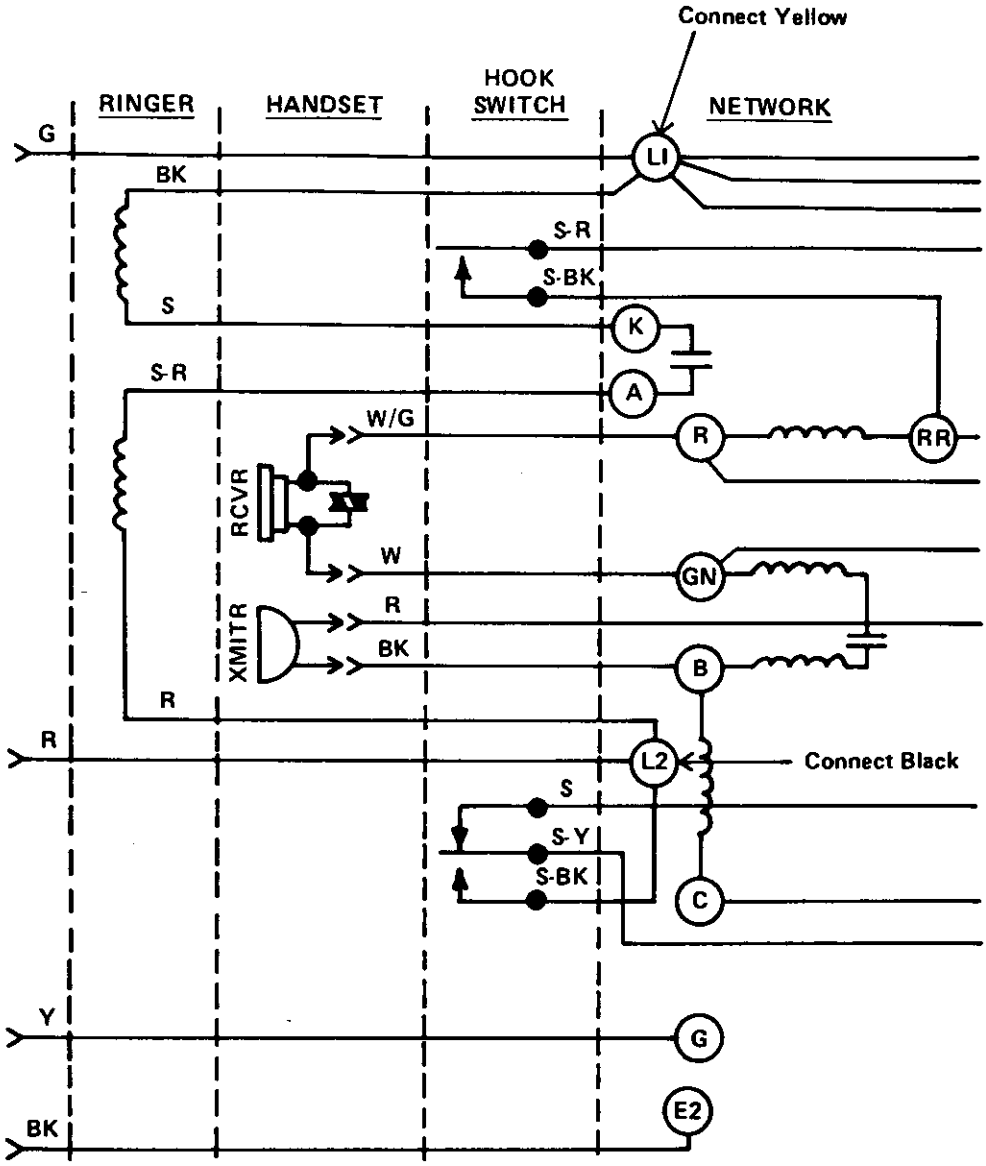


Figure 2-17. Typical 2500 Telephone Wiring Diagram.

MUSIC-ON-HOLD CONNECTIONS

The CPU card is equipped with Music-on-Hold interface circuitry. When Music-on-Hold is required, connect the RCA jack marked MOH on the KSU to the customer provided music source output terminals. One-pair shielded cable is recommended for connections. The recommended output for the MOH source is 8 ohms, amplified (2-5 watts). When a radio is used as a music source, the radio must be located a minimum of ten feet from the main service unit, since the radio receivers generate radio frequencies which may cause interference to the system.

NOTE: Consult Walker Technical Service Department for additional information concerning other possible music sources and amplifiers.

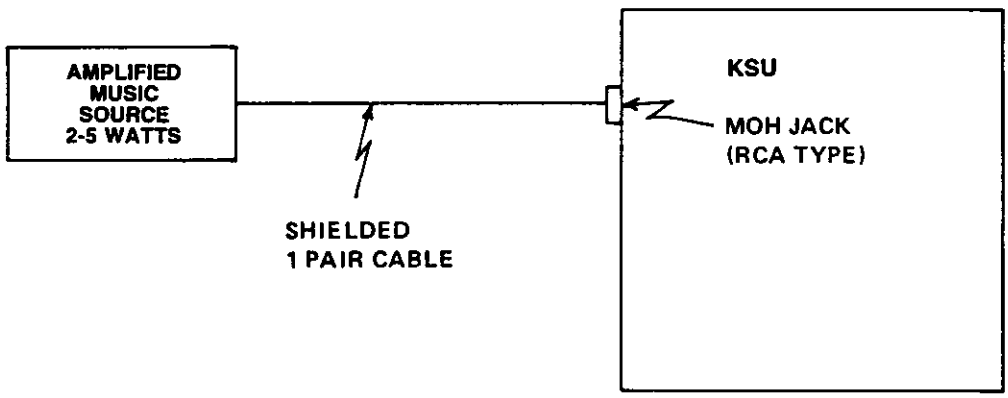


Figure 2-18. Music-On-Hold Connections.

EXTERNAL PAGING CONNECTIONS

A spare port is required for external paging. When external paging is required, connect the paging equipment (600 ohm interface) to the modular jack associated with the spare CO output. There is no "ON/OFF" control for external paging amplifiers. The input to the paging amplifier may be controlled via the CO line key associated with the paging port. One-pair shielded cable is recommended for paging amplifier connections.

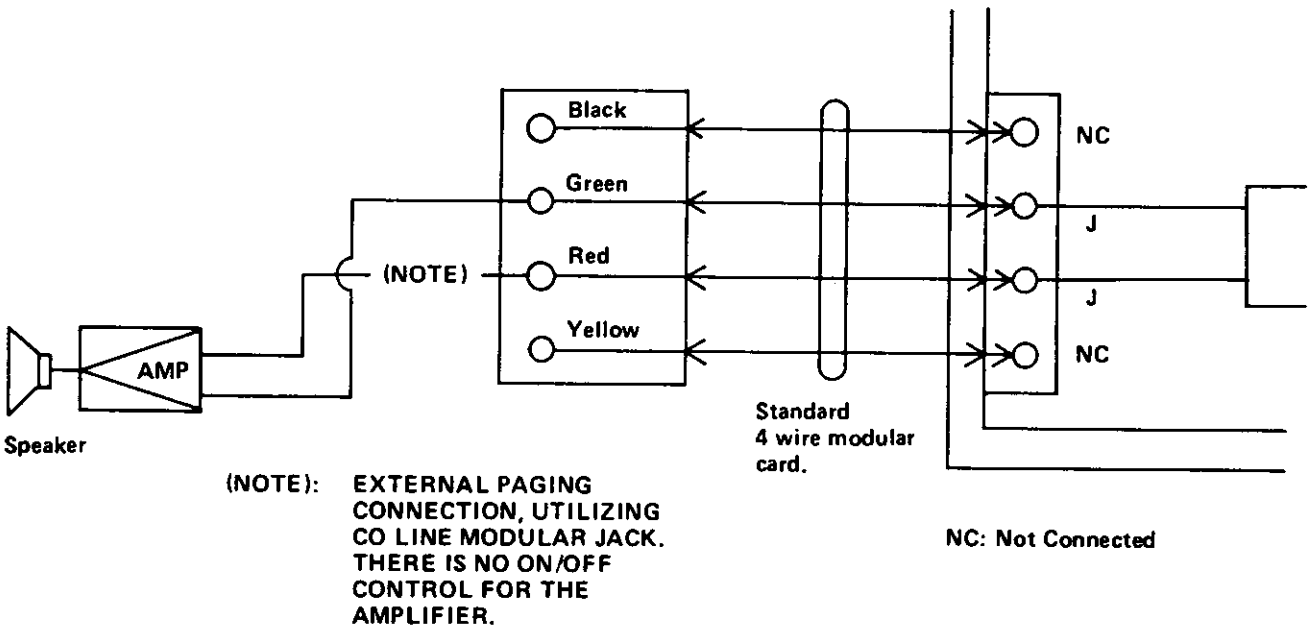


Figure 2-19. External Page Connections.

CIRCUIT CARD INSTALLATION KSU

The following paragraphs provide a brief description and installation instructions for each basic and optional circuit card for connection to the KSU. The Central Processing Unit "CPU" card has DIP switches which may be set before the card is installed. The options and associated switch settings are described on the following pages. The circuit cards are listed below and Figure 2-20 indicates the location of the cards in the key service unit.

CIRCUIT CARDS FOR KSU

CPU- Central Processing Unit
COU- Central Office Unit (6 CO Lines Max.)
STU- Station Unit (Line Card for 12 Stations)
SMU*- Station Message Detail Recording Unit
*(optional/1 per system)

CAUTIONS:

1. REMOVE ALL POWER BEFORE INSTALLING THE CIRCUIT CARDS.
2. ALL CIRCUIT CARDS ARE STATIC SENSITIVE. Before handling any circuit card, perform one of the following two precautions:
   - o Discharge the static electricity from your body by touching a metal that is earth grounded.
   - o Attach a wire from an earth grounded metal to your wrist which is secured by tape or a clip.
3. WHEN INSTALLING THE CIRCUIT CARDS, CHECK THAT THE CARDS ARE PROPERLY POSITIONED IN THE CARD FILE TRACKS. Ensure that all cables are properly connected before fully inserting the cards into the cabinet. Inserting a card that is not positioned correctly or connected correctly will damage the card. See Figure 2-21 for proper card positioning.

Figure 2-20. MARATHON Key Service Unit Internal Construction.

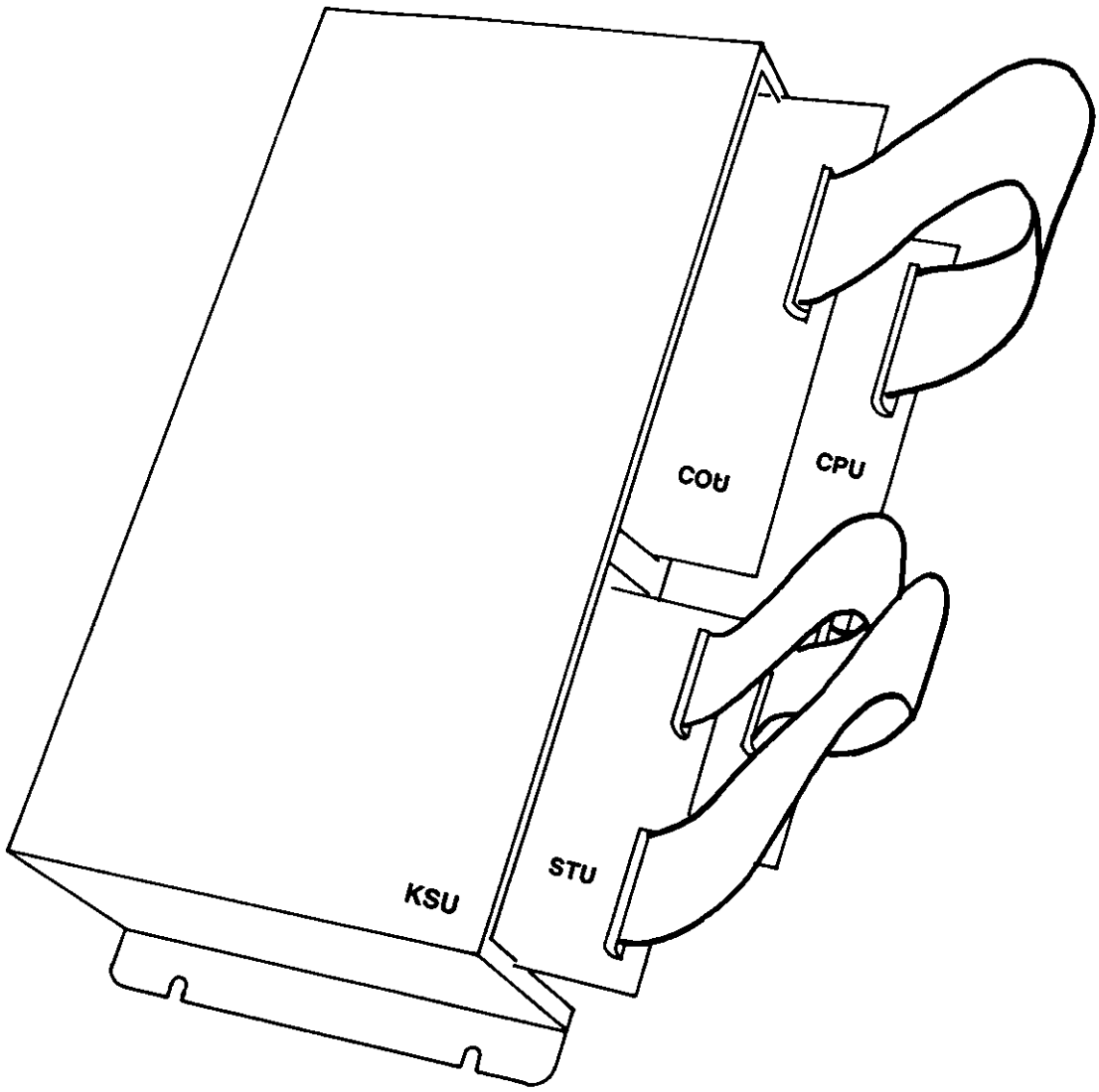


Figure 2-21. Circuit Card Positioning (KSU).

CPU CARD

This circuit card is the central processing and control unit. One CPU Card (See Figure 2-23) is required in any system regardless of its configuration. The primary function of the CPU card is to supervise and maintain control of the system. The CPU accomplishes this by processing and communicating stored data, or stored programs, which it accesses from Eprom.

The main data base contains the system's operational and factory data, which is used for basic system operations. The main data base is permanently stored in integrated circuits (Eprom Chips) located on a 2 x 5 inch printed circuit board which is retrofitted (mounted) face down in a piggback fashion onto the main CPU's circuit board. The factory data must be transferred (loaded) into the CPU main memory (RAM) upon power-up and before normal operation of the system can take place. This transfer or Initial Program Load "IPL" is performed upon initial power-up with the use of a 4 Bit Switch "SW1" located on the CPU board. ("SW3" for ESU #1 and "SW4" for ESU #2).

A customer data base is determined by the end user when modifications are made to the factory (default) data. Subsequently, the customer data may be a combination of unmodified factory (default) data and customer data, and is stored in Random Access Memory (RAM).

Upon initialization "Booting up the System" (by way of SW1-see Table 2-6 which outlines the Switch SW1 Functions), the factory data base is loaded into system Random memory (RAM) located on the main CPU board and the ECU boards. If the system is not initialized properly (see Initialization Flow Chart), erratic operation will occur. Once the factory data base is loaded into system RAM, then modification (programming) of the customer data base may take place.

The secondary function of the CPU is to provide common audibles (tone signals) to the integral parts of the system (except DTMF), and to serve as a voice and data communications network to the various intercom paths, internal paging links, ECUs, STUs, COUs, and SMU. Some of the integral parts of the main CPU are described as follows:

1. CPU
   8 bit microprocessor and control logic.

2. Random Access Memory
   Used for storing operational software and customer or factory data bases.

3. DIP Switches
   SW1 Bits 1-4--Used for system initialization and speed dial (system and station except for Executive) clearing. Also controls system use of factory data or both customer and factory data by allowing or disallowing customer programming mode.

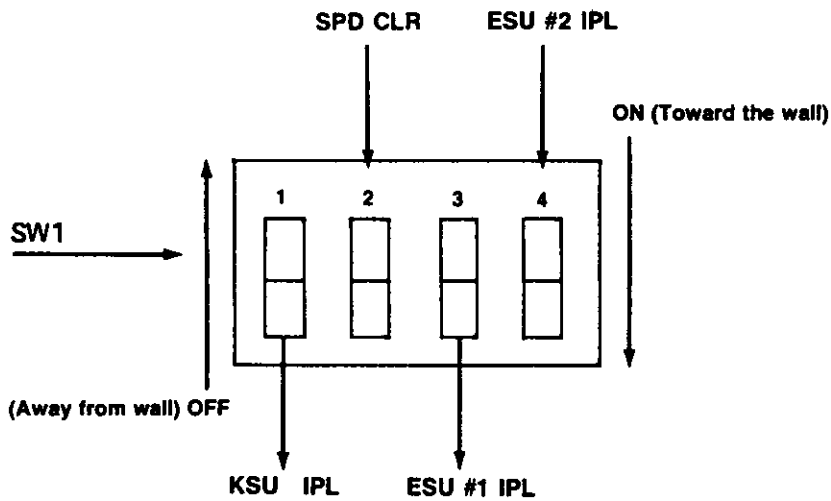


Table 2-6

SWITCH SW1 FUNCTIONS

SELECTOR #	Switch SW1 State OFF	ON
1	CPU run by Customer program entered	CPU run by Factory program (Initial KSU program load)
1+2	System/Station and Station/Station SPD Banks program	All KSU System and Station SPD banks clear
3	ESU #1 Run by Customer data	ESU #1 Run by Factory Data (Initial ESU #1 program load)
4	ESU #2 Run by Customer data	ESU #2 Run by Factory Data (Initial ESU #2 program load)
2+3	ESU #1 Station/Station SPD Banks program	ESU #1 Run by Factory Data and ESU #1 Station/Station SPD banks clear
2+4	ESU #2 Station/Station SPD Banks program	ESU #2 Run by Factory Data and ESU #2 Station/Station SPD banks clear

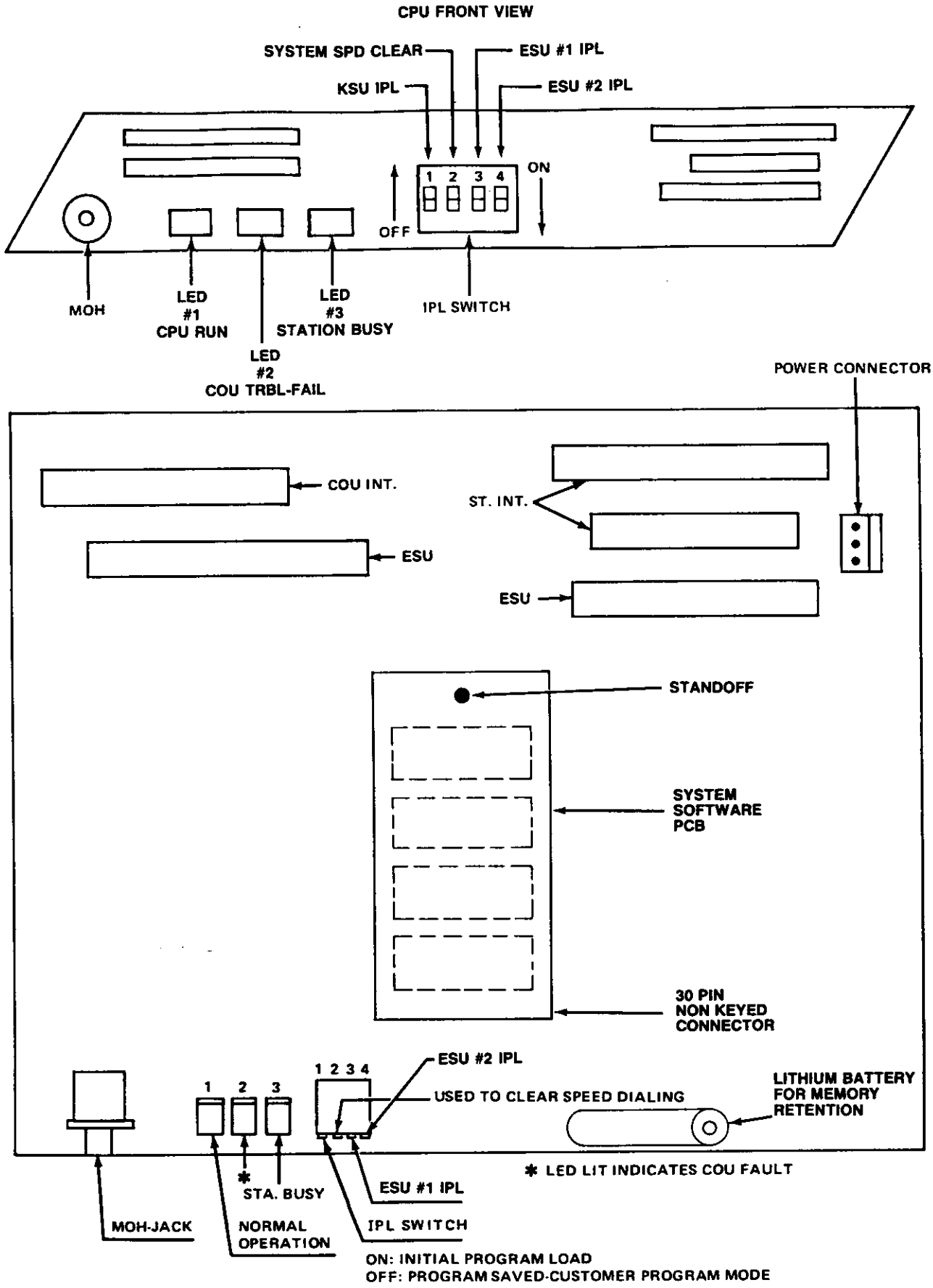
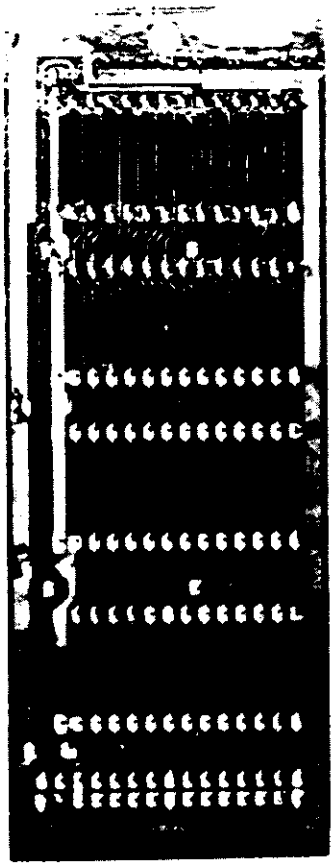
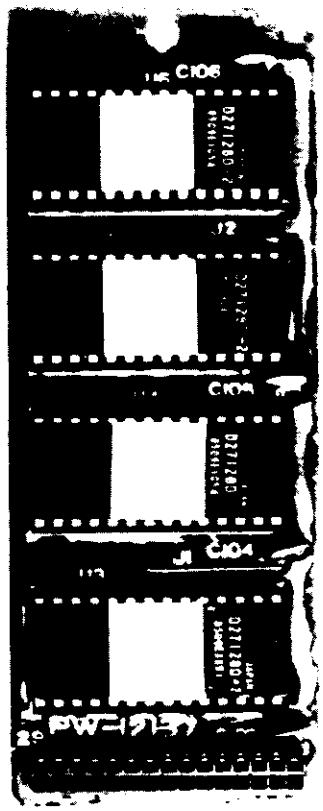


Figure 2-22. MARATHON CPU Card.

4. Operational Software Circuit Card - (Eprom)

This card mounts face down on the CPU card in a piggybacked fashion. It connects via a 40 pin non-keyed dual in-line connector and a plastic standoff pushdown plug. This card provides operational software and factory data base in the form of read only memory to be loaded into system memory upon initialization.





5. Connectors (Interfaces)

CNA--60 pin connector for connection to CNO of #1 ECU Board or SMU

CNB--40 pin connector for connection to CN1 of #1 ECU Board

CNC--50 pin connector for connection to J1 of #1 STU Board

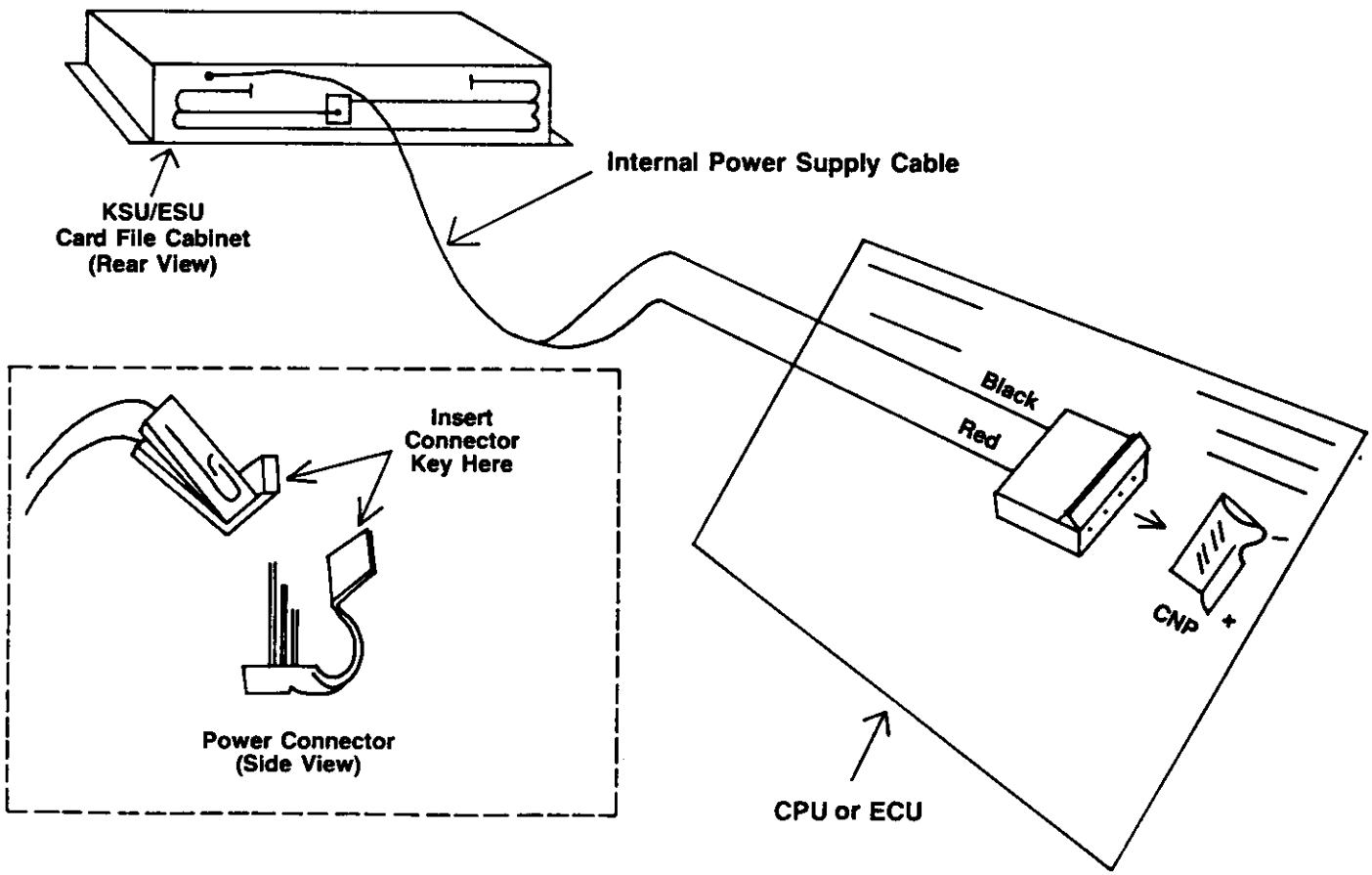
CND--34 pin connector for connection to J2 of #1 STU Board

CNE--50 pin connector for connection to J1 of #1 COU Board

6. Power Interface

Connects power jack from inside KSU cabinet to main power converter located on P.C. board.

Figure 2-23 Internal Power Interface



7. MOH Jack

Female RCA type jack which interfaces once CPU is mounted into KSU card file to music on hold amplified source (radio, etc.)

8. Light Emitting Diodes (LEDs)

There are three LEDs associated with the CPU as follows:

- o #1 LED--CPU Run Indicator: Lights steady to show CPU normal operation. Will flash upon system reset or power failure.
- o #2 LED-COU Fault Indicator: Will flash to indicate COU trouble due to software programming errors, or malfunctioning COU computer.
- o #3 LED--Lights solid to indicate system is busy. Flashes to indicate STU trouble due to software programming errors or STU computer failure.

9. Battery

A 3-volt lithium battery is supplied for maintaining CPU random memory during storage and/or power failure. The battery will provide power to the CPU memory continuously for up to one year. Under normal system operation the lithium battery will last approximately 5 years.

COU CARD

The COU card provides control for six CO lines. All modular jacks (USOC code RJ 11C) and connections for six CO/PBX interfaces are found on the COU Card. The first of six CO/PBX jacks is a power failure port which facilitates the use of the outside pair of conductors for direct connection to the CO/PBX line in the case of a power failure. This card can be programmed by system option for either dial pulse output signalling and/or DTMF output signalling (it is factory programmed for DTMF). An associated LED indicates a busy condition on any one of the CO/PBX lines on the COU card. See Figure 2-24. The KSU comes equipped with one COU. (None are provided with ESU).

STU CARD

The STU card provides control for up to 12 stations. A RJ21X type connector is provided for station interface. The KSU comes equipped with one STU. (None are provided with the ESU.) See Figure 2-25.

LEDs ST 1-2 -- ST 11-12

These LEDs are provided on the STU card and indicate a short circuit condition on the power and transmission path for each key telephone. One LED incorporates two stations for trouble indicating either one or both stations associated with each LED as shown on Table 2-7. If an LED is lit, a short is present and must be found and corrected. (It is highly recommended that both stations associated with the trouble LED be disconnected immediately.) After the short has been cleared, both stations associated with the trouble LED must be disconnected to extinguish the LED. There is no need to replace fuses since positive temperature coefficiant varistors "PTC's" are used for faster response time and higher reliability.

Table 2-7

STATION LINE SHORT-CIRCUIT

LED Lamp	Short-Circuited Station
ST 1-2	Station 1, 2
ST 3-4	Station 3, 4
ST 5-6	Station 5, 6
ST 7-8	Station 7, 8
ST 9-10	Station 9, 10
ST 11-12	Station 11, 12

STATION MESSAGE UNIT (SMU)

This is an optional Station Message Detail Recording "SMDR" card. It will provide an output, to a printer or call accounting system, of complete call records for both incoming and outgoing calls.

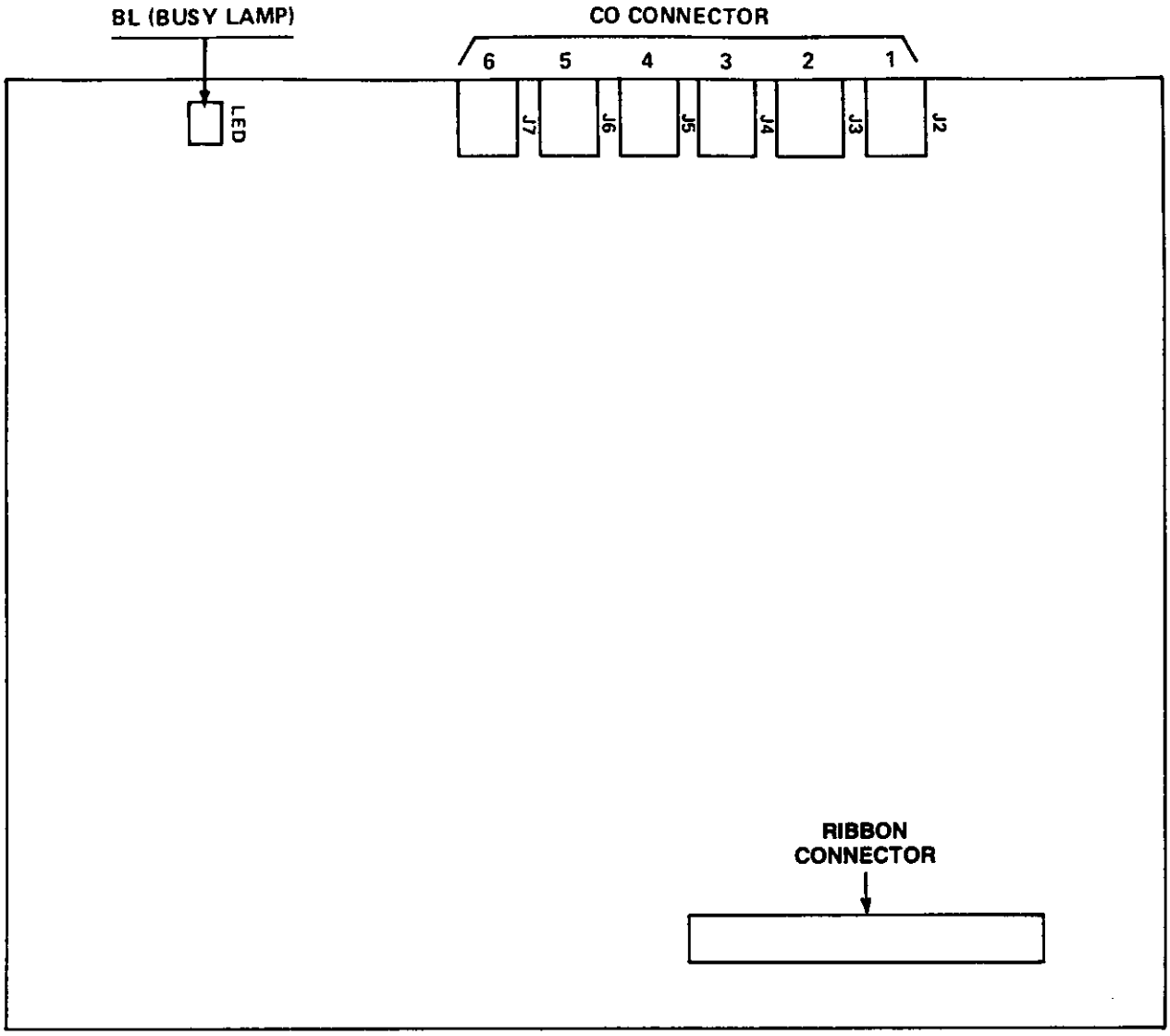


Figure 2-24. MARATHON COU Card.

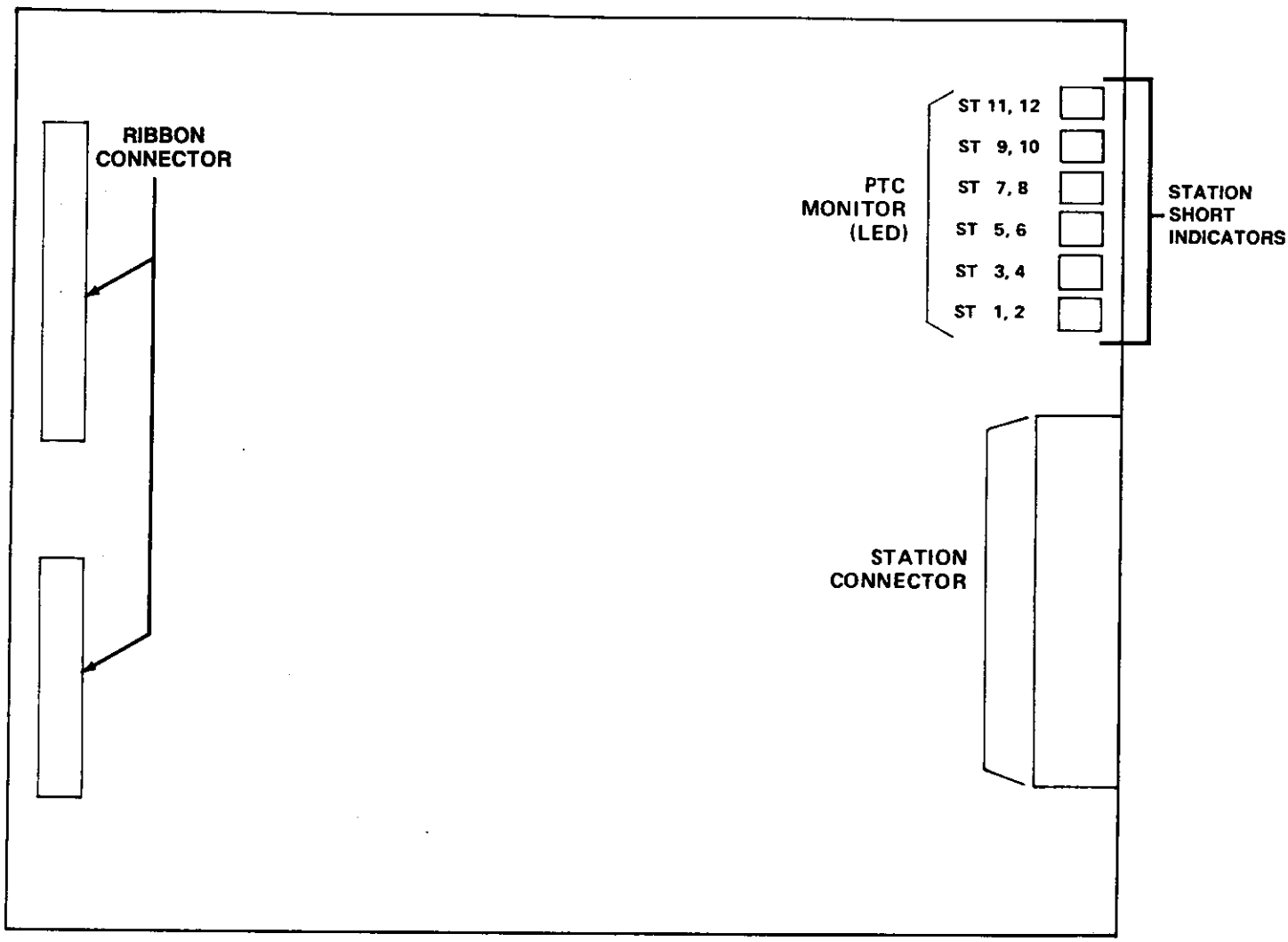


Figure 2-25. MARATHON STU Card.

CIRCUIT CARD INSTALLATION (ESU)

The following paragraphs provide a brief description of as well as installation instructions for the basic and optional cards in the ESU and how they interface with the KSU. The ESU cabinet is a card file type cabinet with an internal/external power supply interface. The circuit cards associated with the ESU are to be inserted in the appropriate place as indicated on the ESU card file tracks. The circuit cards are interfaced with ribbon cables. (The ribbon cables are preferred, and more dependable replacement for a main distribution frame "MDF".) Table 2-8 lists the circuit cards in the ESU and the cable designations and interface. Figure 2-26 illustrates the internal construction of the ESU. Figure 2-27 shows the positioning of the cards. Figure 2-28 shows the proper cable connections between each ESU and the KSU.

CAUTIONS:

1. REMOVE ALL POWER BEFORE INSTALLING THE CIRCUIT CARDS.
2. ALL CIRCUIT CARDS ARE STATIC SENSITIVE. Before handling any circuit card, perform one of the following two precautions:
   - o Discharge the static electricity from your body by touching a metal that is earth grounded.
   - o Affix a grounding strap (wire) from an earth grounded metal to your wrist.
3. WHEN INSTALLING THE CIRCUIT CARDS, CHECK THAT THE CARDS ARE PROPERLY POSITIONED IN THE CARD FILE TRACKS. Ensure that all cables are properly connected before fully inserting the cards into the cabinet. Inserting a card that is not positioned or connected correctly will damage the card. Secure all cards with the card file sliding bracket. See Figure 2-24 for proper card positioning.

Table 2-8*

LIST OF CABLE DESIGNATIONS AND INTERFACE

Circuit Card	Card File	Connector Designation (From)	Connector Designation (To)	Interface to Circuit (Card Designation)	Cabinet (Card File)
CPU	KSU	CNA	CNO	ECU #1	ESU #1
		CNB	CN1	ECU #1	ESU #1
		CNC	J1	STU #1	KSU
		CND	J2	STU #1	KSU
		CNE	J1	COU #1	KSU
STU #1		J1	CNC	CPU	KSU
		J2	CND	CPU	KSU
COU #1		J1	CNE	CPU	KSU
ECU #1	ESU #1	CNO	CNA	CPU	KSU
		CN1	CNB	CPU	KSU
		CN2	CNO	ECU #2	ESU #2
		CN3	CN1	ECU #2	ESU #2
		CN4	J1	STU #3	ESU #1
		CN5	J2	STU #3	ESU #1
		CN6	J1	STU #2	ESU #1
		CN7	J2	STU #2	ESU #1
		CN8	J1	COU #3	ESU #1
		CN9	J1	COU #2	ESU #1
		CN10	CN11	ECU #2	ESU #2
		CN11	CN10	ECU #2	ESU #2
EMU #1	ESU #1	N/A	CN12	ECU #1	ESU #1
		N/A	CN13	ECU #1	ESU #1
STU #2	ESU #1	J1	CN6	ECU #1	ESU #1
		J2	CN7	ECU #1	ESU #1
COU #2	ESU #1	J1	CN9	ECU #1	ESU #1
STU #3	ESU #1	J1	CN4	ECU #1	ESU #1
		J2	CN5	ECU #1	ESU #1
COU #3	ESU #1	J1	CN8	ECU #1	ESU #1

*Also see Figure 2-28

Table 2-8* (continued)

LIST OF CABLE DESIGNATIONS AND INTERFACE

ECU #2	ESU #2	CNO	CN2	ECU #1	ESU #1
		CN1	CN3	ECU #1	ESU #1
		CN2	Empty		
		CN3	Empty		
		CN4	J1	STU #5	ESU #2
		CN5	J2	STU #5	ESU #2
		CN6	J1	STU #4	ESU #2
		CN7	J2	STU #4	ESU #2
		CN8	J1	COU #5	ESU #2
		CN9	J1	COU #4	ESU #2
		CN10	CN11	ECU #1	ESU #1
		CN11	CN10	ECU #1	ESU #1
EMU #2	ESU #2	XXX	CN12	ECU #2	ESU #2
		XXX	CN13	ECU #2	ESU #2
STU #4	ESU #2	J1	CN6	ECU #2	ESU #2
		J2	CN7	ECU #2	ESU #2
STU #5	ESU #2	J1	CN4	ECU #2	ESU #2
		J2	CN5	ECU #2	ESU #2
COU #4	ESU #2	J1	CN9	ECU #2	ESU #2
COU #5	ESU #2	J1	CN8	ECU #2	ESU #2

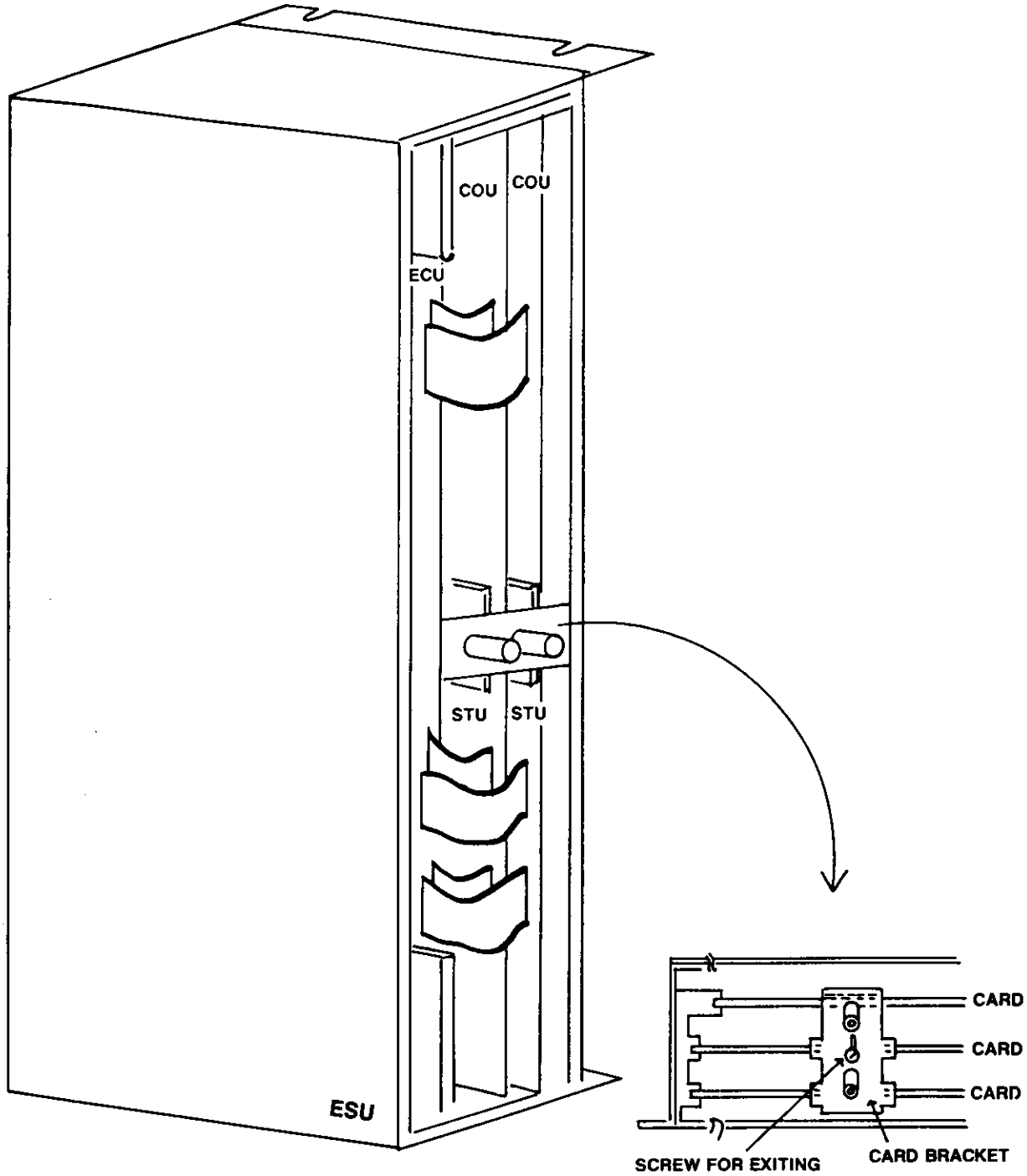


Figure 2-26. ESU Internal Construction

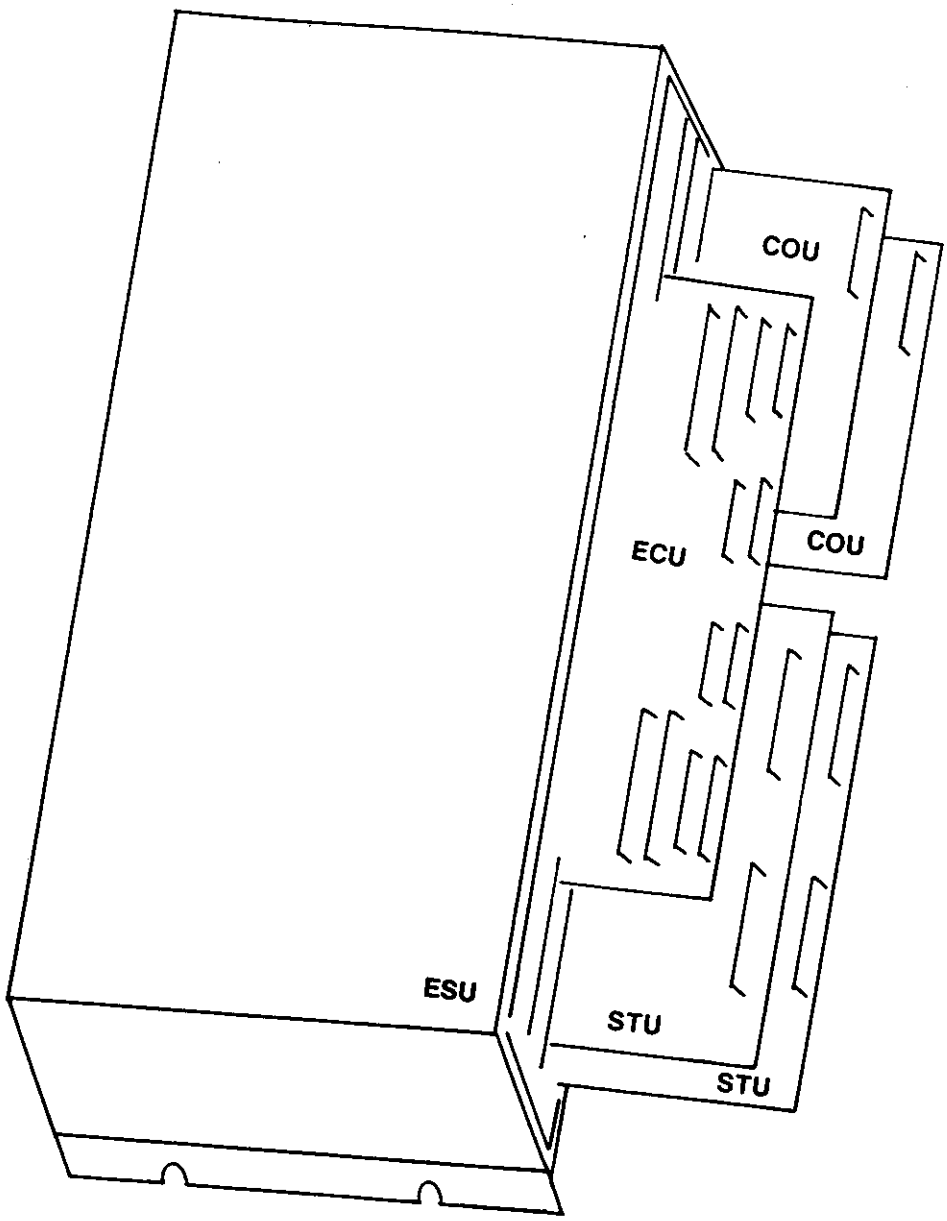


Figure 2-27. Circuit Card Positioning. (ESU)

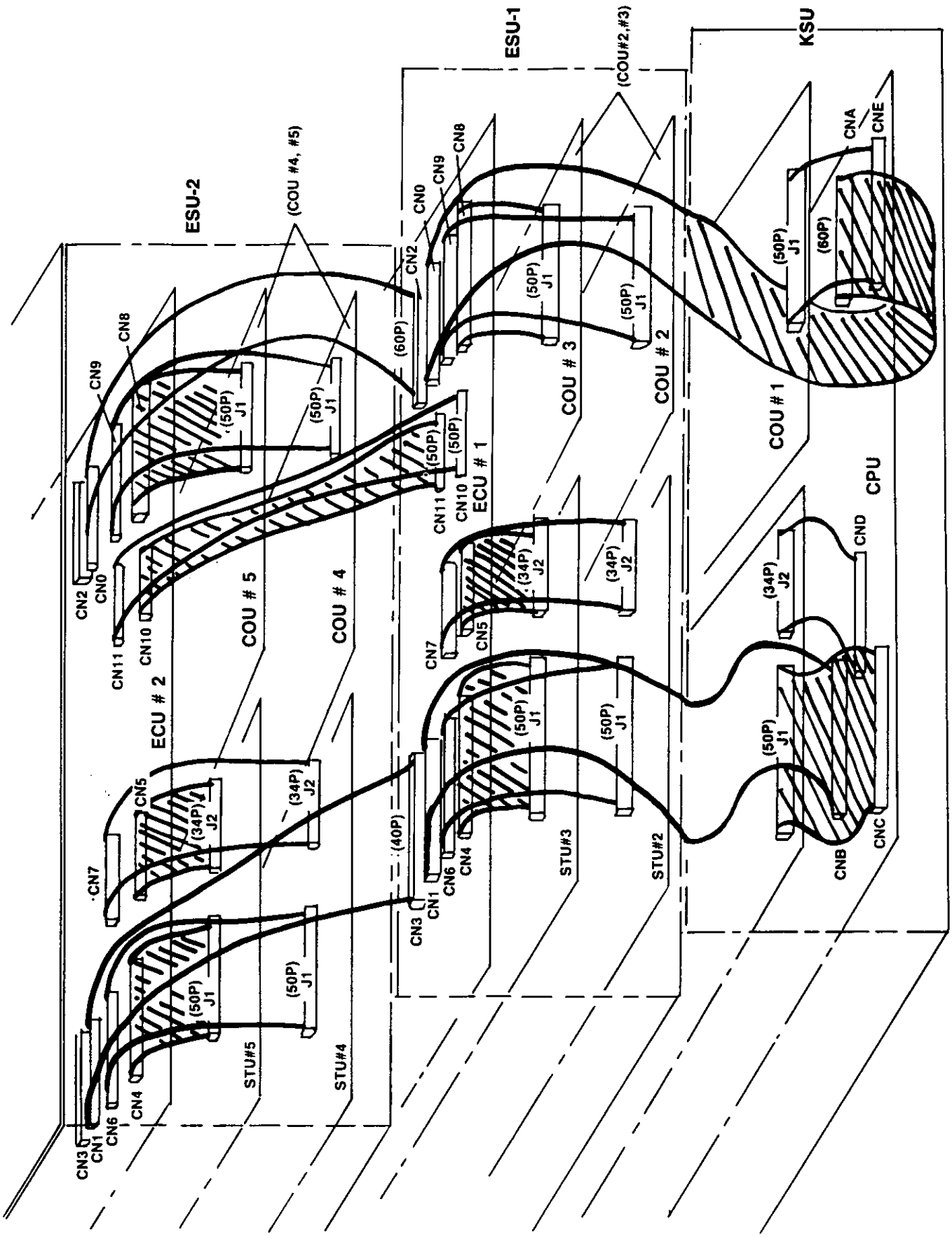


Figure 2-28. Cabling Between the ESU/ESU and KSU.

EXPANSION CONTROL UNIT (ECU)

This card is the decentralizing control unit for the ESU. Its primary function is to communicate with the CPU card in the KSU as it maintains control of the COU cards and STU cards in the ESU. It also provides expansion matrices for station additions. Figure 2-29 shows the basic construction of the ECU. It will be necessary to interface the power cable provided inside the ESU with the power connector on the ECU card while installing the ECU into the card file. Note the standoffs provided on the ECU card. These standoffs will be used for interface with the EMU described in the following paragraph. Table 2-8 lists the cable interfaces for installation of the ECU.

EXPANSION MATRIX UNIT (EMU)

The EMU provides additional crosspoint matrices which are only necessary when additional CO lines and/or additional stations are utilized in a system. In the case where four or more STUs are present in the system, one EMU is required to be installed in the #1 ESU. In the case where four or more COUs are present in the system, one EMU is required to be installed in the #2 ESU. Table 2-8 lists the cable interfaces for the EMU. Figure 2-30 shows the layout of the EMU. The EMU is to be installed in a piggyback configuration onto the ECU. (See Figure 2-31 utilizing the snap-on type standoffs provided on the ECU.)

COU CARD

See Figure 2-24. Each ESU can be equipped with up to two COU cards. Refer to Table 2-8 for cable interfacing designations.

STU CARD

See Figure 2-25. Each ESU can be equipped with up to two STU cards. Refer to Table 2-8 for cable interfacing designations.

*Three cables are provided with each ESU. When installing one ESU, a spare 50 pin cable and connectors will remain unused. Save this cable as it will be required when expanding with ESU #2 takes place.

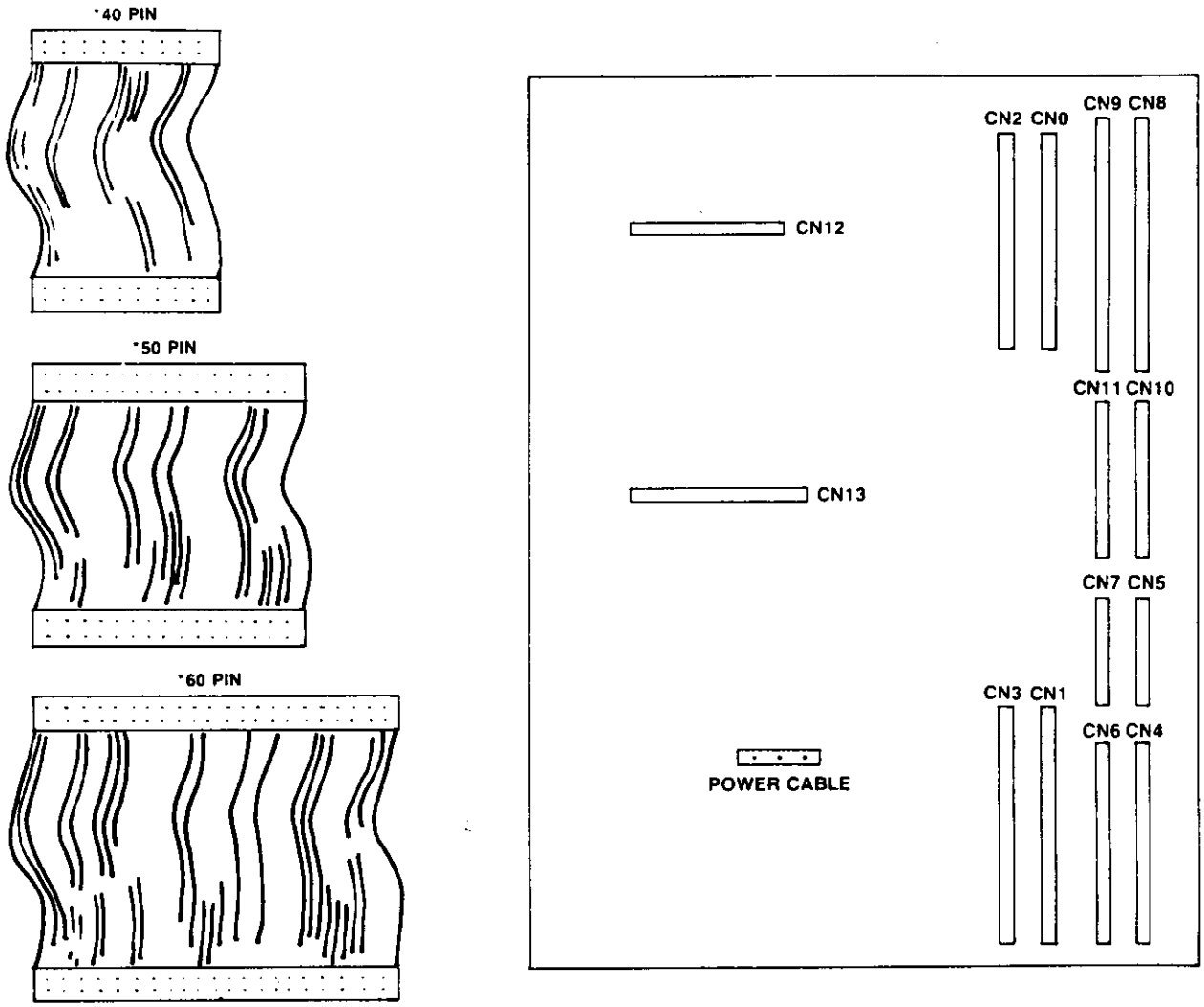


Figure 2-29. Expansion Control Unit.

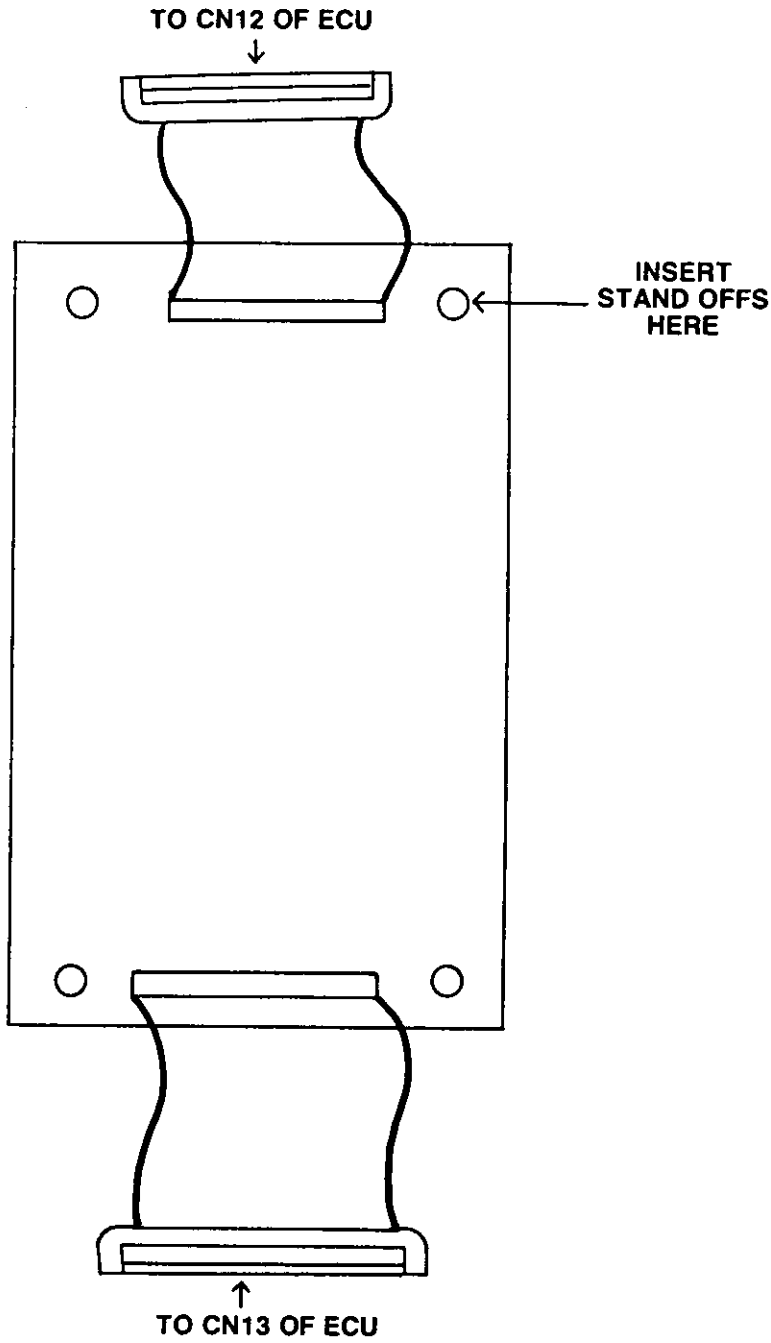


Figure 2-30. Expansion Matrix Card.

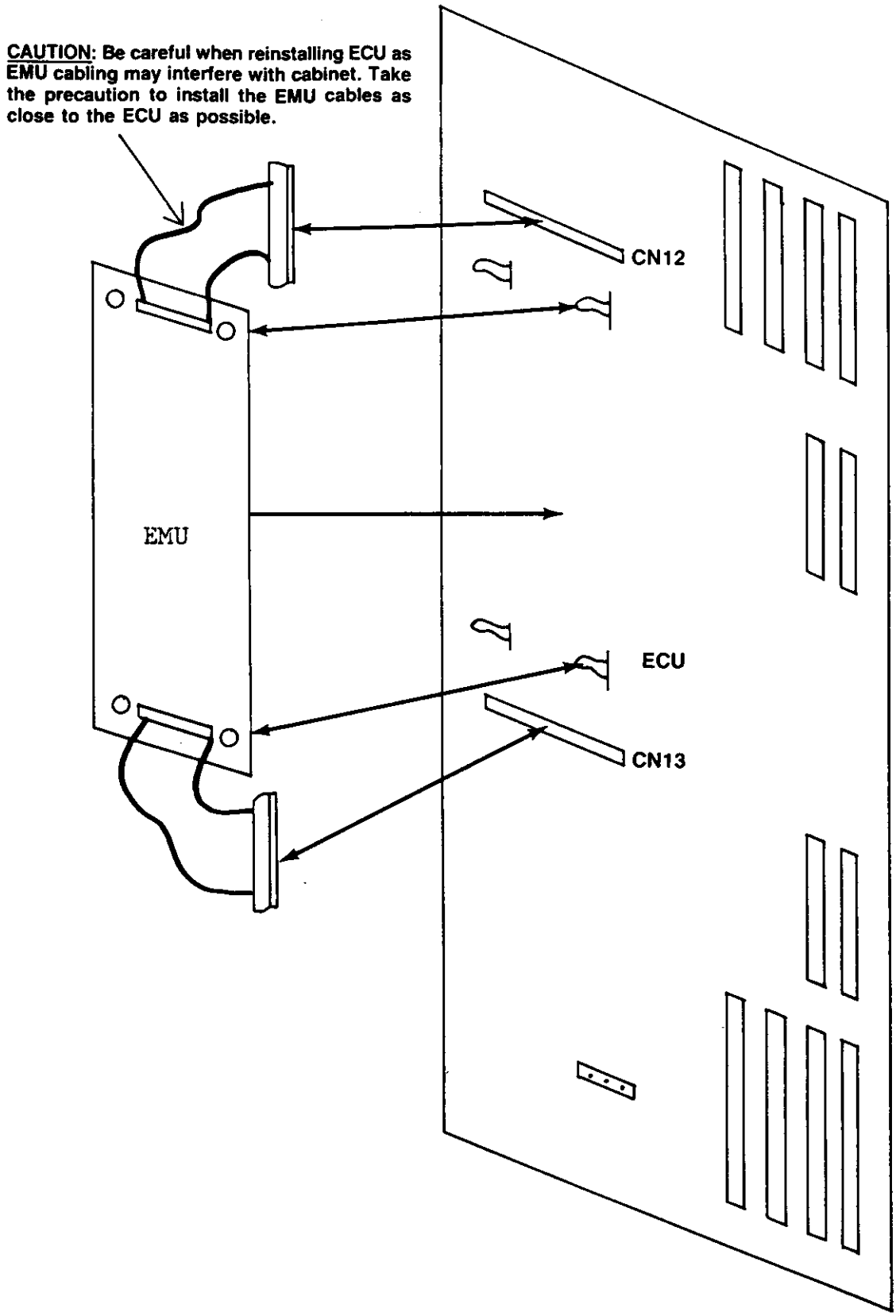


Figure 2-31. Installation of the EMU.

TROUBLESHOOTING GUIDE

Symptom	Possible Cause	Possible Solution
1. Erratic operation	1. System not intialized properly.	1. Re-initialize in accordance with installation manual
2. DSS operation same as if 30 button telephone (DSS buttons) operate as CO line keys or DSS LEDs erratic.	1. DSS connected to wrong port i.e. can only be connected to port #2 and #3 of each STU	1. Re-connect DSS to port #2 &3
3. CPU run light/COU busy light flashing together. Station in continuous reset condition.	1. Defective power supply i.e. incorrect voltage or fluctuating voltage	1. Connect line monitor to AC input to verify clean input
	2. Low AC voltage	2. Measure DC output voltage of power supply
		3. Verify input voltage to power supply
4. CPU run light off. steady	1. Operational software (E-Proms U3-U6) not installed properly	1. Check installation of Eproms and PC board
	2. Bad DC/DC converter	2. Change CPU card to verify defective parts
	3. Damaged CPU i.e. cards plugged in with power on or cabling is short or wrong	3. Same as #2
	4. Power connector on CPU board is backwards	4. Re-connect internal power interface
	5. Power supply not connected to ESU #1, ESU #2, or internal power interface not connected to ECU	5. Re-confirm proper connect of all power interfaces

Symptom	Possible Cause	Possible Solution
5. COU failure/TRBL light steady or flashing	1. COU malfunction	1. Swap-out for verfication of malfunction
	2. COU communication error between CPU and COU	2. Same as #1
	3. System initialization required	3. Re-initialize system in accordance with installation manual
6. Lost Data--system assumed operation on factory data for specific programming originally thought to be programmed by the user	1. Programming on-line while stations are in use (off-hook) requires you to re-enter data. See "Programming Tips". There is no indication on DSS when customer data is not expected, only multiple beep-tones when pressing (#).	1. Review data for ring assignment program #22 & #23
7. System Reset (frequently/ infrequently)	1. Improper system	1. Re-initialize
	2. Power fluctuation initialization	2. Install Isolation transformer or power regulator. Relocate to dedicated power source
	3. Defective power supply	3. Replace power supply
	4. AC line noise	4. AC line filter
	5. Power surges	5. Surge protector
	6. Lightning	6. Same as #4
	7. Electrical or mechanical interference	7. Consult Walker technical service department
	8. Radio frequency interference	8. Install RFI filter
	9. System ground	9. Check star washer and ground

Symptom	Possible Cause	Possible Solution
8. Erratic operation-system reset/stations randomly accessing CO lines	1. Corrupted data in system RAM (Random Accessed Memory) due to system not initialized or initialized improperly	1. Re-initialize system
	2. Soft data due to defective software	2. Replace Software
	3. Defective CPU RAM or ECU RAM/Defective CPU battery or ECU battery	3. Consult Walker technical service department
9. 1KHZ (1000 cycle) continuous tone and all LEDs lit steadily on telephone station terminal (for E-6, E-18 & E-30)	1. Key short (out of box failure)	1. Consult Walker technical service department for return and repair procedure
	2. Key depressed simultaneously while connecting the station line cord	2. Reset station by unplugging and replugging line cord
	3. Faulty station electronics	

Symptom	Possible Cause	Possible Solution
10. Cyclic repetition of station diagnostic sequence (resetting) LEDs sequencing, two beep tones after each cycle. LCD on Execs not functioning properly i.e. all 88888888 displayed	1. Key short (out of box failure)	1. Consult Walker technical service department for return and repair procedure
	2. Keys depressed simultaneously while connecting the station line cord	2. Reset station by unplugging and replugging line cord
	3. Proper initialization procedure not followed	3. Refer to installation manual for proper initialization
	4. ECU cabling to CPU improper or STU plugged in with power ON	4. Refer to installation manual for proper cabling procedure
	5. Bad STU hardware	5. Swap-out STU with spare to verify this, then return to Walker for repair
	6. Mis-communication between STU and CPU (possibly due to defective STU processor)	6. Same as #5
	7. Low DC Voltage at power input to KSU (from power supply)	7. Measure output voltage (DC) of power supply-voltage s/b approximately 29 volts unloaded
11. Station completes diagnostics and LEDs remain steady after two beep tones	1. Data pair reversed polarity	1. Correct data pair polarity
	2. STU lock up because of communication errors. STU unable to rectify problem internally	2. Swap-out STU with spare to verify this, then consult Walker for advice on return and/or repair
12. Executive station has no function	1. Data pair reversed polarity	1. Correct data pair polarity
	2. Data pair open (no connection)	2. Reconnect data pair

Symptom	Possible Cause	Possible Solution
13. E-6 Tel, E-18 Tel, E-30 Tel, Exec and DSS are nonfunctioning	1. Data pair short circuit	1. Eliminate shorting cable and/or interface
14. No voice communication	1. Tip and Ring short	1. Check for short location. Eliminate shorting cable and/or interface
	2. EMU not installed or installed incorrectly	2. Consult installation manual for correct installation and proper location of EMU cards
15. Station non-functional station trouble LED lights steady	1. DTA to T or R short	1. Locate Short 2. Eliminate short from cabling and/or interface
16. Same as #7	1. DTB to T or R short	1. Same as #7 2. Same as #7
17. One way communication to calling station from called station-low receive level	1. Tip or Ring disconnect at called station	1. Check cable for continuity
	2. Cable capacitance problem	2. Consult Walker technical service department
	3. Bad transmitter or defective receiver or STU	3. Swap-out faulty (suspected) part to verify defective operation
18. No LEDs flashing to indicate internal remote diagnostics	1. Station clock malfunction	1. Swap-out station to confirm this malfunction, then consult Walker technical service for return/repair

Symptom	Possible Cause	Possible Solution
19. Station busy light on	1. Steady-a station is busy	1. This is normal
	2. FLASHING-"STU TRBL", "Communication Error", "STU CPU Failure", "STU Harware Failure", "Station or Terminal Communication Malfunction", No STU Communciation between CPU"	2. Check STU cabling, then change STU to verify malfunctioning part
20. Station TRBL light on	1. Cable short circuit	1. Verify proper cable connect
	2. Cross Connection	2. Check for cable continuity
		3. Two stations must be unplugged to reset LED
21. BLF/Station CO LED's on steady	1. Damaged ECU card	1. Replace ECU
	2. ECU cabling incorrect	2. Check ECU cabling for verification with installation manual
	3. System not re-initialized upon adding ESU	3. Re-initialize system in accordance with installation
		4. Swap-out ECU to verify part is malfunctioning

Symptom	Possible Cause	Possible Solution
22. Improper or no access to COs	1. Line Key disabled	1. Re-program Line Key
	2. No COU card interfaced (In this case, busy tone heard)	2. Connect COU Card
	3. COU incorrectly connected to ECU	3. Re-connect COU according to installation manual cabling diagram
	4. No EMU Card installed in ESU #2 (In this case, busy tone heard)	4. Install EMU in ESU #2
23. Misdialing	1. Defective dial oscillator i.e. COU basis	1. Replace COU
	2. Defective dialpad	2. Replace station terminal
	3. DTMF tone burst duration too short	3. Consult Walker technical staff for service information
24. No transmission on ICM card or one way transmission	1. No EMU	1. Add EMU card to proper ECU
	2. EMU plugged into incorrect board	2. Unplug EMU and replug into proper ECU board
25. No LCD display (DSS/BLF)	1. Display control button off	1. Depress DISP CONT
26. No ring at attendant station	1. NA button on	1. Depress NA button
	2. CO not programmed to ring	2. Re-program ring assignment
	3. NA Mode activated by primary station (message light will be lit)	3. Go off-hook & depress "0"

Symptom	Possible Cause	Possible Solution
27. Phantom Ringing	1. Station queued on and forgotten	1. Pick up hand set and make connection, then hang up
	2. High off-hook voltage on trunks and voltage supervised lines	2. Consult Walker technical staff for advice on how to verify this with local operating company
	3. Ring timeout program for too long a period of time	3. Shorten Ring-timeout period-consult programming manual
	4. RFI-Radio Frequency Interference	4. Consult Walker technical staff for information on FCC requirements
	5. Electro Magnetic Interference due to electric motors, etc.	5. Consult Walker technical staff for solution
	6. Peripheral equipment interfaced with trunks causing induced noise and false ringing due to surges (i.e. call diverters, call sequencers, call routers, speed dialers, etc.)	6. Consult Walker technical staff for information on equipment compatability

Symptom	Possible Cause	Possible Solution
28. Cannot activate MSG waiting function	1. No station connected to port-MSG LED extinguished	1. Connect station terminal
	2. When activating MSG, must depress station DSS within 5 seconds of MSG button	2. Depress MSG and try again
	3. Each MSG button associated with own DSS only. i.e. must use 2 MSG buttons for 60 stations-not true of NA and CBU	3. Depress correct MSG associated with that DSS only
29. Erratic ringing	1. Primary station accidentally put in night mode (even when DSS used)	1. Go off-hook on Ext #10, then dial "0"
	2. Programming performed with stations in use without using proper procedure	2. Review and correct programmed data/Re-enter program data
	3. Step by step Central Offices	3. Consult Walker technical service department
30. Executive Telephone LCD "0000" (Access to first 6 CO's only)	1. Executive	1. Executive must be connected to Port 1 through 8 only of each STU

SECTION 3

FEATURE DESCRIPTION AND OPERATION

SYSTEM INITIALIZATION

When installation is completed, the system must be initialized before operation. MARATHON is delivered with a permanent factory program, which is stored in a read only memory "ROM" in the form of a retrofittable circuit board which is mounted on the main CPU board. When the system is initialized, the contents of the ROM are transferred to a random access memory "RAM", which controls the operation of the system. The contents of the RAM can be modified as indicated in Section 4, "Programming". Any part of the RAM may be modified without causing a change in the remaining factory provided data. However, even after the contents of the RAM are modified, the original permanent factory program can be reinserted in place of the modified program by performing the following initialization procedure. If the system is not initialized properly (see Figure 3-1-System Initialization Flow Chart), erratic operation will result, possibly causing the system to reset and/or crash.

METHOD OF VALIDATING PROGRAM AND DEFAULT (FACTORY) CONFIGURATION

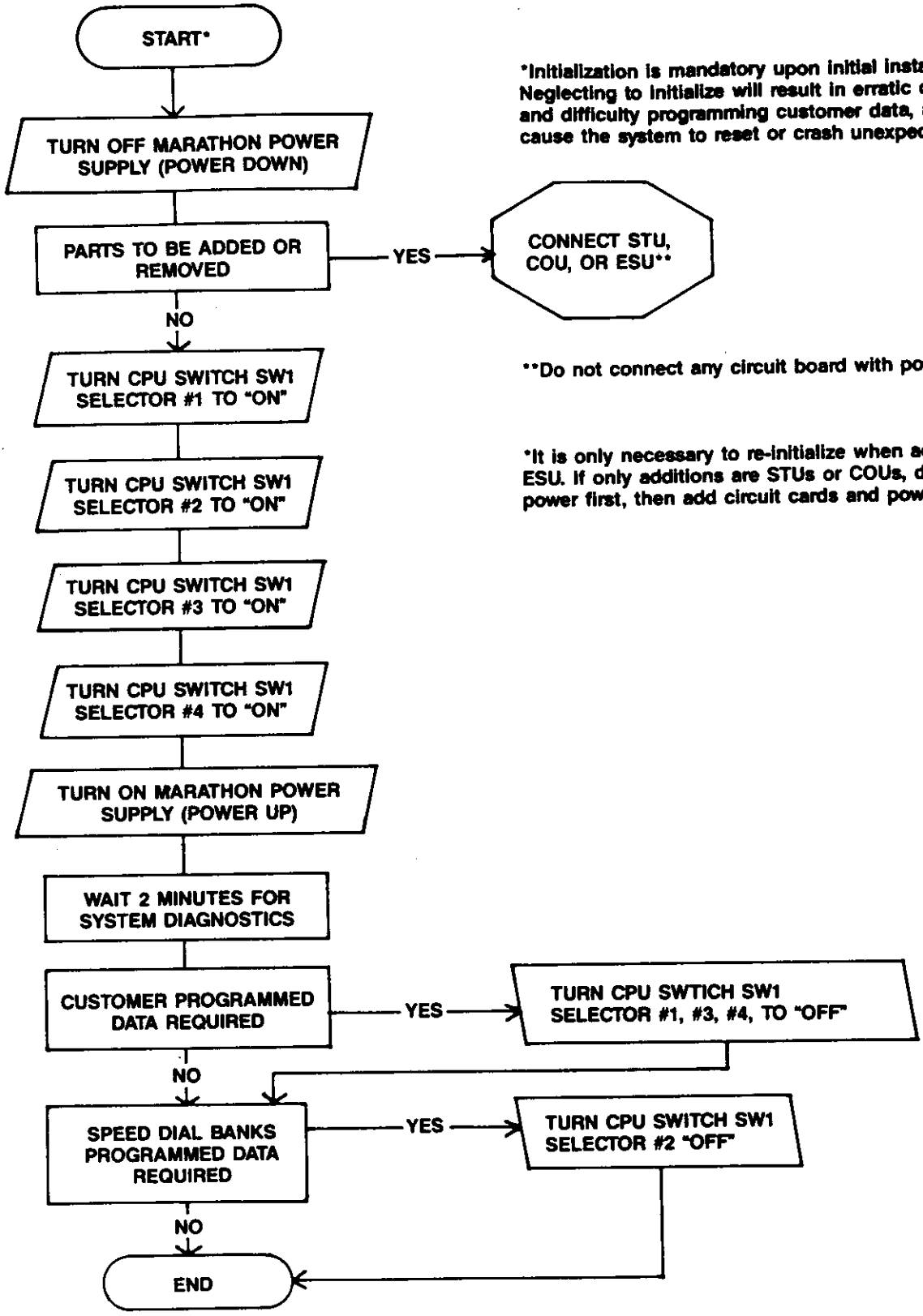
Upon power-up, the system CPU checks the status of the Initial Program Load "IPL" switch--SW1 Selectors #1, 3, 4 (See Figure 3-2 -- Initialization Chart). If the IPL selectors are not set to the "ON" position, the system will assume the configuration dictated by the RAM (customer data or random data). If the IPL switches are set to the "ON" position, then the system will assume a basic configuration as follows:

a. Auto H-Flash Timing = 3 seconds
b. Ring Timeout = 8 seconds

c. Dial Pulse Break Ratio = 60%
d. Intercom Priority = Voice
e. 1st Depression of Hold = System Hold
f. Dial Pulse Speed = 10 pps
g. Hold Recall = No Timeout
h. CO Type Dial = DTMF
i. Trunk Group Assignment = All COs to #1 Group
j. Station Class of Service = COS #1 (all Stations) No restrictions on dialing
k. Forbidden Speaker Page = "0" = Allowed
l. Default Ring Assignment = Station #10, 21, 22, 34, 46, and 58
m. Night Answer = Station #10 and 21 on all COs
n. Toll Restriction Type per Trunk Group = #13 (non restricted)
o. CO Line Assignment to Station = Squared Operation = all key enabled

   CO Line Keys (non squared) operation -- (Any line may be assigned to any line key.) All telephones have access to all lines appearing at the telephone
p. DND Allow/Disallow = All stations allowed

Initial system power-up must be done with the IPL switch in the "on" position. When adding parts such as ESU and EMU, the IPL procedure must be performed for the ESU (SW1 bits 3 and 4) and if custom programming is required, the system must be programmed. If the system is not initialized, additions will not be recognized correctly by the main CPU.

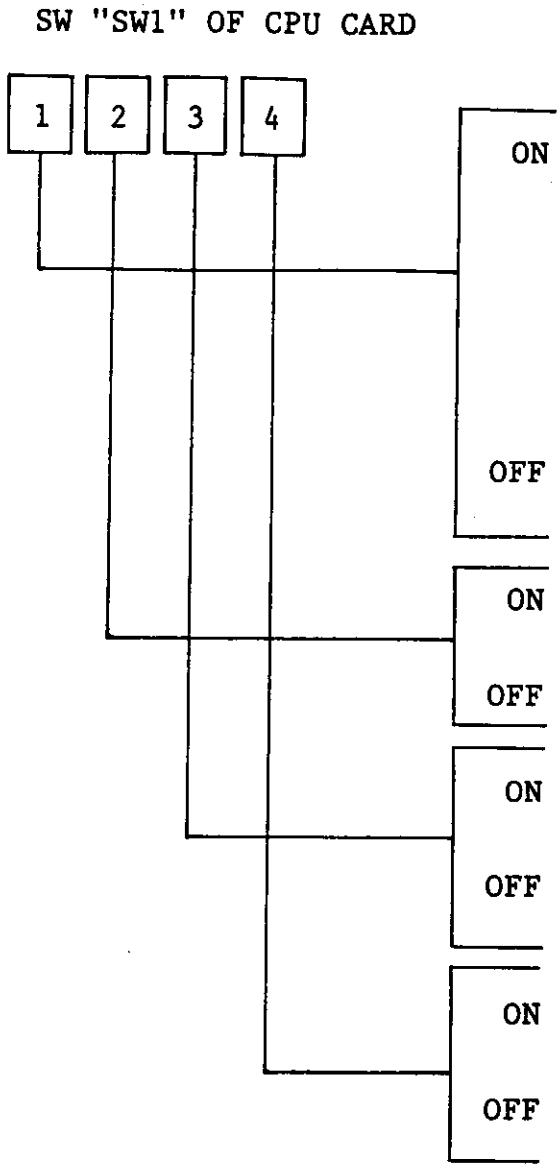


*Initialization is mandatory upon initial installation. Neglecting to initialize will result in erratic operation and difficulty programming customer data, and may cause the system to reset or crash unexpectedly.

**Do not connect any circuit board with power on.

*It is only necessary to re-initialize when adding an ESU. If only additions are STUs or COUs, disconnect power first, then add circuit cards and power-on.

Figure 3-1
SYSTEM INITIALIZING FLOW CHART



WHEN KSU IS POWERED ON, INITIALIZATION WILL BE CONTROLLED BY "SW1" ON THE CPU CARD.

SWITCH #1

ON (Toward the wall) All KSU factory data will be initialized by factory program. With this condition, system data cannot be programmed. Therefore, when programming is required, this selector must be turned to "OFF" position.

OFF System data can now be programmed.

SWITCH #2

ON (Toward wall) SPD memory will be cleared.

OFF SPD memory will be retained.

SWITCH #3

ON Factory data load for ESU #1. (#2 + #3 for SPD clear ESU #1)

OFF System programming can now take place.

SWITCH #4

ON Factory data load for ESU #2. (#2 + #4 for SPD clear ESU #2)

OFF System programming can now be programmed.

Figure 3-2. Initialization Chart.

ON-LINE PROGRAMMING FOR SYSTEM DATA

In the case where programming operation is performed while the system is call processing:

- Call processing before system data is changed will be performed based upon old system data.
- Call processing after system data is changed will be performed upon new system data.

FEATURES OPERATION

The Operating Procedures for 60 Features and their capabilities are described in the following pages.

Notes:

1. Systems are supplied with a digital key pad. The following operating procedures use the term "dial" to indicate dialing a number or entering the number by pressing the digital keys.
2. An idle CO line is a line whose indicator is not lit.

The Features and their associated page numbers are:

AUTOMATIC HOLD OF CO CALL

This feature allows any station user to automatically place a CO call on hold by pressing the ICM line button while on a CO line.

AUTOMATIC PRIVACY OF CO/PBX CALL

This feature protects the busy station from an accidental or intentional interruption of a telephone call. The station user is completely assured of privacy on all types of outside calls. This feature is especially useful in a shared tenant environment.

AUTOMATIC PRIVACY OF INTERCOM CALL

This feature protects the busy station from accidental or intentional interruption of an intercom call. The station user on an intercom call is completely guaranteed of the privacy of the call.

AUTOMATIC TIMED RECALL OF HELD CALL (FIRST RECALL)

A held call which has remained unanswered for a specific time is automatically recalled to the initiating station. The unanswered or recall time period can be set at 30 second intervals from 30 seconds to 9.5 minutes. The system may also be programmed to eliminate (no) recall entirely.

BUILT-IN SPEAKERPHONE (OPTIONAL)

A "built-in" speakerphone is available as an optional printed circuit board and can be installed in 6, 18, and 30 button sets (Executive phones are factory equipped with speakerphone) to allow fully switched handsfree operation and two-way communication on CO Lines.

CALL BACKUP

The Call Backup feature allows an attendant to activate all CO incoming (ringing) calls at a specified backup station. Since there are five possible attendant positions available in the system, programming for five call backup stations is provided.

To activate the Call Backup feature, depress the CBU button located on the DSS/BLF. Any or all attendants may activate a backup station (assigned by system programming) to answer calls in their absence. A LED associated with the CBU button will light indicating that incoming calls assigned to ring at the DSS/BLF will also ring at the backup station. The DSS station will continue to receive ringing or call waiting signals.

CALL FORWARDING

This feature allows a station user to forward (divert) ICM calls to any of 60 stations by the following procedure:

To forward incoming ICM calls to another station, press the MON button, then press (#) and dial "1" on the dialpad. Dial the station number you wish to have your calls forwarded to. The Executive stations will display "CF" on the LCD. The message lamp will flash to indicate call forwarding has been initiated. Press MON button to activate the call forward. To cancel the forwarding, press MON and dial (#) then "0" on the dialpad and press the MON button. The call forwarded station is also indicated by a flashing LED on the DSS/BLF at the forwarded station's location.

CALL SPLIT

A station user may choose to answer a station camp-on (call waiting tone in the speaker) while on a CO call. Putting the CO on hold automatically connects the user to the camped-on station. If the originating ICM station is transferring a call, the CO call will automatically be connected after the new caller has announced the call and returns the handset to the cradle (the previously held call will remain on hold). For example:

To split from a CO call to a camped-on call, press HOLD to place the CO call on hold and be automatically connected to the originating station. After the new caller has spoken with you, they may hang up, thus you are connected to the transferred outside caller while the original call remains on "HOLD". The previously held call will remain on hold. To reconnect the previously held call, press the CO button associated with the held call.

CO LINE KEYS

Any station user may originate or receive a call to or from the CO by pressing the line button associated with the CO line. The line button may be pressed before or after the handset is lifted. If the CO button is depressed before picking up the handset, the CO line will automatically be seized and the station will be in the monitor mode.

CONFERENCING--EXTERNAL

To establish a conference call with two COs and one station, first establish a CO call, then press HOLD to place the first CO on hold. Select an idle CO and place your second call. In order to connect the COs in a conference, you must press the FEAT button and then the HOLD button and a three-way conference call will be established.

To release either CO from the conference at any time, press the button associated with the CO to be released.

To establish a conference call with one CO and two stations, first establish an outside call, then press the ICM to automatically place the CO on hold and connect to ICM dialtone. Dial the EXT code (two digits). When the called station answers, instruct the user of your intention to conference. (The called station must lift the handset.) Press the FEAT button and then the HOLD button, and a three-way conference is now established. If you wish to release the conference, press the CO button and the CO will be released.

CONFERENCING--INTERNAL

To establish a conference call with three internal stations, first initiate an ICM call. Then press "FEAT" + "HOLD" to put the called station on hold temporarily. Press the ICM key and dial the second station ICM number. Finally, press FEAT and then HOLD and a three-way internal conference will be established. All stations must lift the handset in order for conference to operate.

DIAL CALL PICKUP

To use the dial call pickup function to access a call, press the (*) key, then dial the two-digit station code number of the station where the call is on exclusive hold, unscreened transfer ringing or incoming CO ringing. In order to access the call, the CO line must appear at that station. (This is also the preferred method to answer an unscreened transfer.)

DIRECT STATION SELECT/BUSY LAMP FIELD

This feature allows one button direct selection of ICM and transferred calls to any of 60 stations. By use of a DSS/BLF, access to 30 stations is available. Two DSS/BLFs (pair) will facilitate access to all 60 stations. There are five pairs of DSS/BLFs allowed in the system. Port #2 and Port #3 on each station card (STU) will each support a 30 station DSS. Two DSS/BLFs are required in sequence for 60 stations.

DO-NOT-DISTURB

By engaging this procedure, any call (including paging, intercom calls, intercom call waiting, and DSS calls) directed from another station will receive a busy back from the DND station. All off-hook ringing signals (including camp-on, transfer recall, and request to split, excepting hold recall) will be cancelled at the DND station. The DO-NOT-DISTURB feature is programmable in system programming on a per station basis and may be denied or allowed for use at a particular station.

To engage DND, go off hook, press the "#" button twice. The station will automatically be put into DND and the MON LED will flash. The DSS LED associated with the DND station will flash. The DND station may make outgoing and select incoming CO calls while remaining in the DND mode.

To disengage DND, go off hook and press "#", "*".

ENHANCED TOLL RESTRICTION

An enhanced toll restriction package is provided which incorporates 19 types of toll restrictions, 16 classes of service, two 4-digit/40 entry semi-restrict allow tables, and two 4-digit/40 entry semi-restrict disallow tables. Toll restrictions are configured on a trunk group class of service, per-station basis. 5-digit, 7-digit, 8-digit forced OCC, 0, 1411, 411, non-restrict, and outgoing restrictions are also provided.

EXECUTIVE SPEED DIALING

Executive telephones are provided with 18 auto soft keys which allow the user one touch dialing on outgoing CO calls and Direct Station Select for ICM calls. After a station user selects a CO, pressing the auto buttons will automatically access the speed dial banks.

When a station user chooses to place an ICM call, the auto keys automatically become direct station select keys. A total of 27 stations speed banks are also provided for dial-up speed dialing. These banks are 20 digits and designated 10-36. Along with the 14 available system speed call banks (00-13), and two system special speed banks (50 and 51), the executive stations have 77 provided station effective speed dial banks.

EXTERNAL PAGE ACCESS

Spare CO line appearances may be used for direct connection to external paging equipment with an input impedance of 600 ohms. Paging equipment is directly accessed by the same procedure as is used to directly access CO Lines.

To access external paging equipment, press a CO key corresponding to the spare CO line to which the external paging equipment is connected. The paging equipment is directly connected to the CO port, and thereby connected to the station user through the CO switching matrix.

FLEXIBLE STATION RINGING ASSIGNMENT

This feature allows any station, including the primary station, to receive incoming ringing assignments. CO ringing is assignable on a per line, per station basis, with a maximum of six stations per CO line. (See System Programming, Program #22.)

FORBIDDEN INTERNAL ALL OR ZONE PAGE

By system option, a station may be programmed to accept or not accept an internal page through the station speaker. (See System Program #21.)

FORBIDDEN OFF-HOOK SIGNALLING

Off-hook signalling for incoming CO calls may be allowed or disallowed on a per station basis.

To disallow off-hook signalling at a station, lift handset, press the "*" key, then dial "04" on the dialpad.

To allow off-hook signalling at a station, lift handset, press the "*" key, then dial "05" on the dialpad.

FORBIDDEN SPEAKER PAGE (Disallow ICM Voice Call)

An incoming ICM call may be controlled to ring at all times as an alternative to the voice (HF answerback) announced call (which is programmed on a system wide basis for either voice or tone at all stations).

To disallow voice call at a station, lift handset, press the (*) button, then dial 03 on the dialpad.

To allow voice call at a station, lift handset, press the (*) button, then dial 02 on the dialpad.

NOTE: This procedure does not affect internal paging which is allowed or disallowed on a per station basis by system programming (see Program #21).

INTERCOM CALL

To call another station, lift the handset and press the ICM button. Listen for ICM dial tone, then dial the two-digit station number. When a splash tone is heard, the calling station may make an announcement and the called station may respond hands free. (The calling station must lift the handset to place an ICM hands free answerback call.) The called station may also lift the handset to initiate handset conversation. If the calling station dials any additional digit after the station number, the hands free operation is disabled and tone signals are sent to the called station. To respond to this type of intercom call, the called station must lift the handset to speak.

A station user on an outside line can receive an intercom call but cannot respond hands free. Instead, the user will receive an intercom call-waiting tone through the station speaker. The user may split to the intercom call by depressing the Hold button. The called station is then automatically connected to the calling party.

A station user not wishing to respond hands free on an intercom call may turn off the microphone (the microphone off is indicated by the microphone LED "ON" or lighted) to disallow a voice call. (See Forbidden Speaker Page)

INTERCOM CALL FORWARDING

This feature allows a station user to re-route an incoming ICM call to any desired station. A distinctive LED flash rate (approximately 100 flashes per minute) on the DSS indicates that the station is in the "call forwarding" mode.

A station can be put into the Call Forward mode by going off-hook and depressing (#), "1" then the ICM code associated with the forwarded-to station. C.O. calls transferred to a station in call forward mode will be forwarded providing the C.O. line is assigned to the forwarded-to station.

INTERCOM HOLD

To place an intercom on hold, press the HOLD button. The called station must lift handset in order for Hold to operate. To go back to party on hold, press ICM.

INTERNAL PAGING

Any station user may make a paging announcement to all idle stations simultaneously (via a dedicated paging path to the speakers built into the telephone) by lifting the handset and dialing the proper code number.

All Page--To page all stations simultaneously, dial "80". This initiates one-way internal paging to all idle stations allowed to receive an internal speaker page.

Zone Page--To page one of five fixed zones, dial "81-85". The second number dialed (1-5) indicates which zone is being paged. Zones are set up by station port assignment:

DIAL	ZONE	STATION NUMBERS
80	All	STA - 10 to STA - 69
81	1	STA - 10 to STA - 21
82	2	STA - 22 to STA - 33
83	3	STA - 34 to STA - 45
84	4	STA - 46 to STA - 57
85	5	STA - 58 to STA - 69

Meet-me Answer--To answer a page, pick up the handset, press the (*) button, then dial "8". You will then be automatically connected to the paging path.

LED INDICATORS

All lamp indicators on the face of the telephone are long lasting, light-emitting diodes, and provide system feature distinctive indications. (See System Distinctive Signalling.)

LINE KEYS

Any station user may originate or receive a call to or from the CO or ICM path by pressing the line key associated with the CO or ICM line. The line key may be pressed before or after the handset is lifted. If the CO button is depressed before picking up the handset, the CO line will automatically be seized and the station will be in the monitor mode.

MANUAL EXCLUSIVE OR NON-EXCLUSIVE HOLD OF CO/PBX AND ICM CALL

Any station can place either an incoming or an outgoing CO call on hold by pressing the HOLD key. Depending on system programming, either one or two pushes of the HOLD button will allow for system or exclusive hold. (Factory program is one push for system hold.)

MESSAGE WAITING

All telephones are equipped with a message lamp which may be activated by the attendant at any time to indicate that there is a message waiting at the attendant console. The message LED will flash at a rate of approximately 60 indications per minute.

To activate the message waiting feature, depress the MSG key on the DSS/BLF and the DSS key associated with the Message Waiting Station. A message lamp is provided at each station except for the Executive telephones. The Executive telephones will display "CALL OP" on the LCD. The station receiving the message waiting indication (indicated by a flashing message light at the top of the station) call the operator (attendant) by going off-hook and dialing "0" (or ext. 10, 22, 34, 46, 58). At this point, the LCD on the DSS/BLF will display the number of the station calling. To cancel the message waiting, the attendant presses the message key and the DSS button associated with the message waiting. MSG can be activated from all (5) DSS/Attendant locations.

MICROPHONE MUTE

The station user may disable the built in answer back microphone by pressing the MIC off key. The station will then receive an ICM voice announcement, but the user must lift the handset or turn on the microphone to reply. The microphone LED will light to indicate that the microphone has been muted (off).

MULTI-LINK/SINGLE-BUTTON INTERCOM

A single ICM key is provided on all station instruments to allow access to all stations via multiple intercom links. Any station may call another station by pressing the ICM key and dialing a two-digit code (i.e. 10-69).

MUSIC-ON-HOLD INTERFACE

The system provides terminals (RCA type jack) for connection to a 600 ohm (amplified) external music source, allowing an outside party placed on hold by any station user to hear music.

NIGHT ANSWER

This feature allows a flexible night ringing mode which can be programmed to distribute incoming ring signals to any station. Each CO/PBX line can be assigned a maximum of two night answer stations.

To activate the Night Answer Feature, press the NA button on the DSS/BLF. The associated LED will light, and incoming calls will be diverted to ring at the stations programmed for night ringing (by system program option). The night answer mode may be initiated by the DSS NA control or by the #10 extension. In the case where a DSS/BLF is not configured in the system, night ringing may be activated from the Port #1 (ICM #10) station by going off-hook and pressing "0" on the dialpad.

The message lamp will light steady to indicate "NA" mode. To deactivate the night answer, go off-hook and press "0". The message lamp will be extinguished. In the case where more than one primary DSS is used in the system, consult Walker Technical Field Support for configuration.

NON-LOCKING BUTTONS

All buttons on the face are non-locking with long life LED lamps.

NON-SQUARED OPERATION

This feature allows flexible CO/PBX line key assignment. Any CO/PBX line may be assigned to appear and operate at any station on any CO button and in any order.

OFF-HOOK CO RINGING

Each ring assigned station has off-hook ringing. This is accomplished by a call waiting tone received through the station speaker.

If the station is assigned for incoming CO calls and is off-hook, then the station will receive a call waiting tone to indicate an incoming CO call, if the station is not in forbidden off-hook ringing mode. The LED associated with the incoming call will flash at the normal rate.

OFF-HOOK SIGNALLING

This feature allows a called station, when off-hook, to receive an audible signal through the station speaker indicating a waiting CO or ICM call.

OFF PREMISE EXTENSION (OPX) (Available with OPX hardware option)

Standard 2500 type telephones may be connected to the system as an OPX by the use of optional hardware. These single-line instruments may initiate and receive CO calls and ICM calls.

ON-HOOK DIALING

By pressing any CO line button, a station user automatically enters the monitor condition and accesses a CO dial tone. A CO number can then be dialed with the handset on-hook.

To preselect a line for a CO or ICM call, press either a CO key or the ICM key, depending on whether a CO or an ICM call is being made. When the key is pressed, the station is automatically connected to the CO or ICM line.

If the optional speakerphone board is installed in the station, performing the hands free dialing function allows two-way conversation without lifting the handset. The MIC/ON button can be used for transmit muting. When the "MIC" LED is on, the microphone is muted.

ON-HOOK MONITOR

A station user can monitor a call in progress by pressing the monitor button and placing the handset on-hook. To engage the monitor function, press the MON button and place the handset in the cradle. The monitor function enables listening to the called station through the built-in speaker. To speak to the called station, the handset must be lifted. If the station user lifts the handset while the MON button is engaged, the monitor speaker is turned off automatically. Note that if the station is equipped with a speakerphone, the microphone is active unless the MIC/ON LED is lighted.

OUTSIDE CALLS

To place an outside call, lift the handset and press an idle CO line button. When the dial tone is heard, dial the desired outside number.

To answer an incoming call, lift the handset and press the flashing outside CO line button. The LED associated with the incoming call will flash at a rate of 60 indications per minute.

To transfer a call while on an outside line, press the ICM

button to automatically place the call on hold. Listen for ICM dial tone, then dial the desired station number. When the called station answers, announce the call. You may wait for the called party to answer by picking up the handset, or you may hang up. The called station will automatically be connected to the outside line if the called station answers the calling station by going off-hook (screened transfer) before the calling station hangs up. If the calling station goes on-hook before the called station lifts the handset (unscreened transfer) the called station may have access to the transferred call by dialing (*) and its own ICM (EXT) Code (i.e. 10-69) or, the called station may directly select the call by depressing the associated CO line key. The LED associated with a transferred call flashes at a rate of 100 indications per minute. The called station will automatically be connected to the outside line if the called station goes off-hook with the handset before the calling party goes on-hook.

PAUSE AND WAIT

A one second pause may be programmed into a station or system speed dial bank by pressing the FLA key while programming a speed bank. To increase the duration of the pause, program multiple pauses (each pause = one digit in length). A wait may also be programmed into speed banks by depressing HOLD while programming the speed bank. The wait may be released during speed dialing by depressing (#). (More than one pause can be programmed into the speed call location. However, each pause reduces speedcall digits by one.)

POOLED LINE ACCESS (P-KEY) OPERATION

This feature allows a station user to have access to any trunk within a particular trunk group which is assigned to a P-Key (CO buttons #6, 18) by depressing the P-Key. The station user may perform any function associated with CO/PBX type calls including transferring, queuing, conferencing, call split, forwarding, hold

etc., providing the trunk is assigned to the station. Trunks are accessed in the order of the highest numbered to the lowest numbered, next available outgoing trunk assigned to the P-Key trunk group. Consequently, the lowest numbered trunks remain available for incoming calls.

To place an outside call, lift the handset and press the P-Key (CO buttons #6 or #18). (Only one P-Key per telephone may be assigned.) Alternatively, you may perform this function on-hook by preselecting the CO (P-Key). If all trunks are busy within the P-Key trunk group, a busy tone will be heard. (There is no visual indication of a busy P-Key trunk group.) You may then choose to queue onto the trunk group by following the "Trunk Group Queuing" procedure. Outgoing trunks are automatically accessed in order of the highest numbered trunk to the lowest numbered trunk, i.e., leaving lowest order trunks available for incoming calls.

To answer an incoming call ring assigned to the P-Key, lift the handset and press the P-Key. You will automatically be connected with the incoming CO. (The P-Key LED will flash at the incoming CO rate--approximately 60 flashes per minute--and the station will ring.) If your station is equipped with a speakerphone, you may perform this function while on-hook by pressing the P-Key.

To transfer a CO call assigned to a P-Key, refer to Outside Call transfer procedure. If a call has been transferred under a P-Key, the called station may put the call on hold and regain access to the held call by direct selection of the P-Key. Calls may not be "stacked" for future or sequential access under the P-Key.

POWER FAILURE TRANSFER

The first trunk on each COU card has been designed as a power failure line. This line provides for direct connection to 500/2500 type telephone if a power failure condition exists (see Section 2 "Installation").

PROGRAMMABLE RECALL/HOOK FLASH

This feature allows you the option of programming the "Flash" key on a system basis for any timeout required. This becomes necessary when working in conjunction with CO/PBX and Centrex lines which may require a specific hook-flash timing.

Recall/Hook Flash is activated by the station user by depressing the FLA key. In a stand-alone key system, this button is used to re-access the dial tone on the CO line button controlled by the user station. Behind a PBX, this button will automatically provide hook switch flash timing, regardless of the amount of time the FLASH button is depressed.

Hook Flash timing is factory programmed for three seconds and may be programmed (Program #16) by system option for several different timing options at the time of installation. 700 ms to 1 second is typically used where modern central office equipment and/or PBX equipment is used.

REMOTE CALL PICKUP

The station user may pick up a call on exclusive hold, a transferred call or an incoming call to the user's phone from another phone by pressing the (*) button and dialing the proper ICM number.

SAVE LAST NUMBER REDIAL

Any station user may save the last CO number dialed by depressing the FEAT button and the (*) button on the pushbutton dialpad before going on hook. The number can be redialed when the station user re-accesses the CO line and presses the SPD button and the (*) button on the push button dialpad. The "Save Last Number Dialed" may be moved to a station speed dial location for permanent storage by the "Station Speed Dial" programming procedure. This must be done before saving any future dialed numbers or before any future speed call numbers are stored.

To save a phone number, press the FEAT button and the (*) button before hanging up the phone.

To dial the saved number, select an idle CO line, press the SPD button and the (*) button.

To permanently store a saved number, press the FEAT button, followed by the SPD button, the two-digit location code, the SPD button, and the MON button.

SCREEN TRANSFER CO CALLS

If there is voice contact between a station transferring a CO call and the station receiving the call (cannot be handsfree; handset must be used), the call is automatically transferred, without having to press the CO line key, to the receiving station. A call may be transferred by depressing the "ICM" key and dialing the two digit station code or by depressing the DSS key associated with the called station. The call will then be put on temporary hold until the called station accepts the call. If the called station does not wish to accept the call, the calling station may retrieve the call by depressing the associated CO key or by dialing "*" and the calling station's two digit "ICM" code.

SECOND RECALL OF HELD CALL

If the initiating station does not answer a recall of a held call, after a period of twice the hold recall timeout, a second recall tone will go to all primary stations (as well as to the initiating station). If there is a DSS/BLF available in the system, the LCD will display (flash) the CO and originating Station number. If there is more than one CO on second Hold Recall, the CO and Station number will appear in sequential order on the DSS/LCD. In the transition from the first Hold Recall period to the second Hold Recall period, a CO originally on exclusive hold or transfer hold at a station will automatically be put on system hold. In addition, the Executive station will display (flash on LCD) the CO number on second Hold Recall.

SPEAKERPHONE

All telephones in the system have hands free answerback capability. An optional speakerphone module is available for full speakerphone capability on outside calls. The Executive telephone comes factory equipped with full speakerphone capability.

SPECIAL SPEED BANKS

System and Station "Special Speed Banks" are provided for OCC access. In the case where a station is assigned one of the following types of dial restrictions, access to "Special Speed Banks" is allowed in order to force usage of OCC's and to override dial restrictions.

1 - SR7	4 - SR10	7 - NR
2 - SR8	5 - SR11	8 - OCC8
3 - SR9	6 - SR12	9 - OCC7

Once a station user has accessed a "System Special Speed Bank" (50 or 51/system), depending on the restriction type, he or she may be allowed to continue dialing any number of digits, or chain dial "Station Special Speed Banks" or any other speed banks according to the following specifications:

1 - User must use "System Special Speed Banks" first (before dialing any other digits).

2 - Restriction types SR7 - SR12 restrict outward dialing and allow access to "System Special Speed Banks", providing the programmed digits in the "System Special Speed Banks" appear in the allow (or disallow) tables. Once access to "System Special Speed Banks" has been completed, dialing thereafter will be allowed (or disallowed) by table.

3 - Any "Special" bank may be repeated at least once during one call.

4 - Restriction types OCC7 and OCC8 allow non-restricted dialing once a "System Special Speed Bank" has been accessed.

SPEED DIALING - STATION

All individual station users may store up to 14 frequently called numbers of up to 20 digits each, and 2 special banks of 20 digits each. Each stored CO telephone number is identified by a two-digit code. If the system is used behind a PBX, a wait or a one second pause may be stored between the PBX access code number and the CO telephone number. The wait state must be manually released from the dial pad. The station user may piggyback two speed-dial telephone numbers over the same CO line for convenient use of authorized common carrier codes. Two additional speed dial banks are reserved for seven digit OCC access.

To program a station speed call number, press the FEAT key followed by the SPD key. (The MON light will come on.) Then dial the two-digit storage location code (60-73) and dial the phone number (up to 20 digits, including pauses and waits. (Pause = one digit, Wait = one digit) Finally, press the SPD and MON key. Location 88 and 89 are provided for Station OCC access codes and are seven digits in length. (See Special Speed Banks).

To program a pause, press the FLASH button. The duration of the pause is one second. To extend the overall pause time, program multiple pauses.

To program a wait, press the HOLD button. For dialpulse systems, an automatic switch to DTMF occurs upon release of the wait. To release wait, push the (#) on the dialpad. An automatic switch back to dialpulse will occur by going back on-hook.

To dial out (the stored number), press an idle CO line button followed by the SPD button and the two-digit storage location code.

SPEED DIALING - SYSTEM

This feature also allows any station user to access up to 14 system speed dial numbers of up to 20 digits in each number, and two special banks of twenty digits in length. The station user may piggyback system and individual station speed dial numbers.

To program system speed dial location 00-13, follow the procedure for station speed call programming by using the port 1 station. Any station allowed by class of service may access system speed dial by the same procedure as station speed dialing. Location 50 and 51 are provided for System OCC access codes and are 20 digits in length. (See Special Speed Banks).

SQUARE OPERATION

The MARATHON system is factory programmed for square operation. Upon power-up, and original initialization of the system, every CO line appears in the same location on every station. For example, CO line 1 appears on the first line key of every station.

STATION CAMP-ON

A calling station, upon placing an intercom call to a station that is off-hook, will receive a busy tone and may be camped onto the busy station. If the calling station goes on-hook, the camp-on will automatically be cancelled. The called station will receive a camp-on tone to indicate another incoming call. The calling station, after camping onto a busy station, will automatically call that station when it becomes free.

To camp onto a station which is busy on a CO call, press ICM and dial the station number by the normal procedure. A busytone will be returned. Press (#) on the dialpad to activate the camp-on function. The busytone will then be removed if the camp-on is accepted. The called station will then hear the camp-on tone through the station speaker, and may answer the camp-on by the "Call Split" procedure. Going to the on-hook condition by the calling station cancels the camp-on function.

STATION DISTINCTIVE SIGNALLING

Differences in LED appearance, flash rates, and audible signals allow the station user to distinguish between incoming CO, intercom, call-waiting or call-announce calls. See Table 3-1 which describes the Station Signalling characteristics.

STATION QUEUING

This feature allows a station to queue onto another station which is busy on a CO line or ICM call. Once the dialed station resumes an idle condition, the calling station receives a ring tone. The calling station then lifts the handset and is automatically connected to the called station.

To queue onto a station, dial a station on ICM by the normal procedure. If the called station is busy, a busytone will be returned. Press (*) and the busytone will be removed if the queue is accepted. Go on-hook. When the busy station becomes idle, the queuing station will receive a ringback tone. Lift the handset and without taking any other action, a warning tone will be heard after which a call announce can be made and you may begin speaking.

TONE-PULSE SWITCHABLE DIALING

The system is programmable on a system basis per CO line to outpulse DTMF or dialpulse. The default mode is DTMF. When the system is in the "dialpulse" mode, it reverts to DTMF on a per line basis by dialing the (#) button on the dialpad. The line remains in the DTMF mode until the station connected to the CO line either goes into an idle state or reseizes another CO line.

To switch a CO line which is programmed for dialpulse to DTMF, press the (#) button. The (#) may be used to switch to DTMF for computer access, OCC access or any service requiring DTMF signalling. The CO line reverts back to dialpulse when the station goes on-hook.

TRUNK GROUP QUEUING

This feature allows a station user to queue onto a trunk group if all trunks in that group are busy. As soon as a trunk becomes available, the queued on station will receive a ringing tone at which time the user may lift the handset or press the MON key to be connected to the available trunk.

When a station presses a trunk key in a busy trunk group, it can queue onto that trunk group by pressing the (*) button on the dialpad. When any trunk in that group becomes available, the station will receive a ringing tone, and upon lifting the handset, will receive CO dial tone.

To queue onto a trunk group, press any busy CO button associated with the trunk group to be queued onto (indicated by a solidly lit lamp). Then listen for the busytone and press (*) on the dialpad. If the queue is allowed, the busytone will be removed. You may then go on-hook. The first idle trunk will be indicated by a flashing LED (60 flashes per minute) and the station will receive a special ringing signal. If your station becomes busy, you will not receive a queue signal when the trunk becomes available. To answer the queue, lift the handset or press the MON. You will then receive a dialtone. The queue will timeout and be removed within ten seconds.

UNSCREEN TRANSFER CO CALLS

If there is no voice contact between a station transferring a CO call and the station receiving the call, the receiving station is alerted to the call by a ring and a distinctive lamp indication on a key telephone, after the calling station goes on-hook. On a single-line telephone, the call is automatically transferred to the receiving station. A handsfree answerback is not considered voice contact and is therefore an unscreened transfer.

Table 3-1
STATION DISTINCTIVE SIGNALLING

E-6, 18 30, EXEC	LED FLASH INTERVALS										ORIGINATING STATION VISUAL
	ORIGINATING STATION					ALL OTHER STATIONS					
	*ON	OFF	ON	OFF	IPM**	ON	OFF	ON	OFF	IPM**	
											OO (LED)
I-Use	840	120	120	120	50					System Clock Start ►	
Busy (In Use)					Steady					Steady	XXXXXXXXXX XX XXXXXXXXXX
Line Hold Recall	120	480	120	480	10					Steady	XXXXXXXXXXXXXXXXXXXXXXXXX
Transferred Call	120	480	120	480	10					Steady	XX XX XX XX
Exclusive Hold	120	120	120	120	250					Steady	XX XX XX XX
I-Hold	480	120	480	120	100	120	120	120	120	250	XX XX XX XX XX XX
Incoming Call	480	480	480	480	62.5	480	480	480	480	62.5	XXXXX XXXXX XXXXX XXXXX
System Hold	120	120	120	120	250	120	120	120	120	250	XXXXX XXXXX
CO Group Que											XX XX XX XX XX XX
Call Back	840	120	120	120	50					Steady	XXXXXXXXXX XX XXXXXXXXXX
											ICM (LED)
I-Hold	480	120	480	120	100					►	
I-Use	840	120	120	120	50					None	XXXXX XXXXX XXXXX XXXXX
Incoming Call	480	480	480	480	62.5					None	XXXXXXXXXX XX XXXXXXXXXX
All Paths Busy					Steady					None	XXXXX XXXXX
Station Que										Steady	XXXXXXXXXXXXXXXXXXXXXXXXX
Call Back	840	120	120	120	50					Steady	XXXXXXXXXX XX XXXXXXXXXX

DSS/BLF							STATIONS BLF/LCD
Busy (In Use)				Steady		N/A	XXXXXXXXXXXXXXXXXXXXXXXXX
Line Hold Recall			LCD FLASH IN ORDER OF RECALL				CO/STATION
MSG Waiting	480	480	480	480	62.5	N/A	XXXXX XXXXX
ICM Call Forwarded	120	480	120	480	100	N/A	XX XX XX
NA						Steady	XXXXXXXXXXXXXXXXXXXXXXXXX
Incoming Call						N/A	XXXXXXXXXXXXXXXXXXXXXXXXX
Call Backup						Steady	
EXECUTIVE							LCD DISPLAY
Incoming ICM Call							"Incoming Extension No."
Call Forward						N/A	CF
Message Waiting						N/A	CALL OP
OTHERS							MESSAGE LAMP
Message Waiting	480	480	480	480	62.5	N/A	XXXXX XXXXX
ICM Call Forward	120	480	120	480	100	N/A	XX XX XX
Night Answer					Steady	Primary Station Only	XXXXXXXXXXXXXXXXXXXXXXXXX

* Milliseconds

** Indications Per Minute

TELEPHONE OPERATING CONTROLS

All telephone operating controls, with the exception of the Hook-Switch and volume control, are constructed of a very durable and flexible conductive material. Unlike mechanical type controls, the MARATHON telephone operating controls have no moving parts; therefore defects due to mechanical failures are non-existent. In addition, the controls have been proven to have a useable operating life of more than ten million cycles (ten million depressions). The controls also feature noiseless switching (unlike mechanical switches).

The below listed figures are provided as an accurate illustration and description of the MARATHON telephone operating controls:

Figure 3-3 -- 6-Button Electronic Key Telephone
Figure 3-4 -- 18-Button Electronic Key Telephone
Figure 3-5 -- 30-Button Electronic Key Telephone
Figure 3-6 -- Executive Station Electronic Key Telephone
Figure 3-7 -- Direct Station Select/Busy Lamp Field

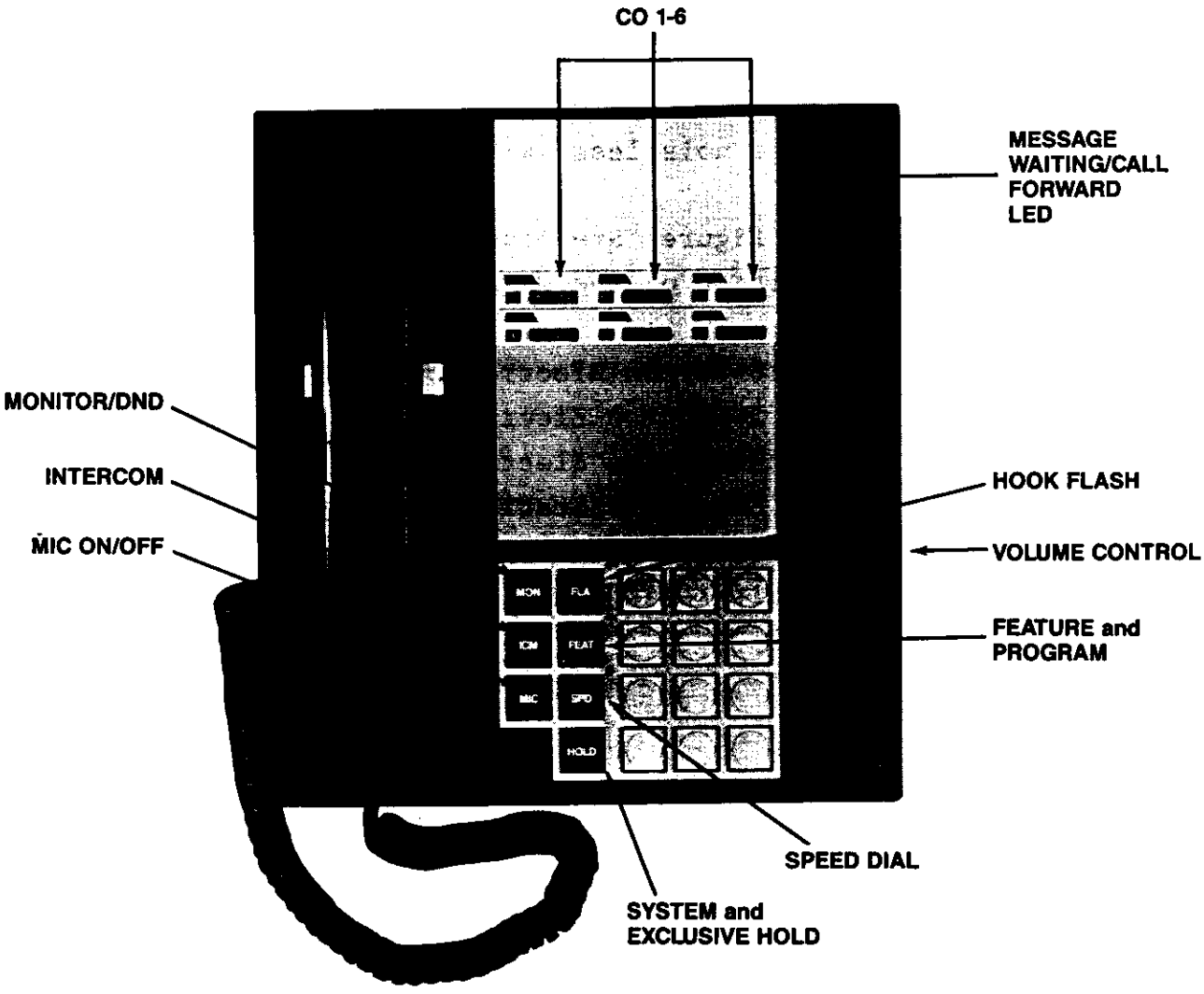


Figure 3-3. 6-Button Electronic Key Telephone.

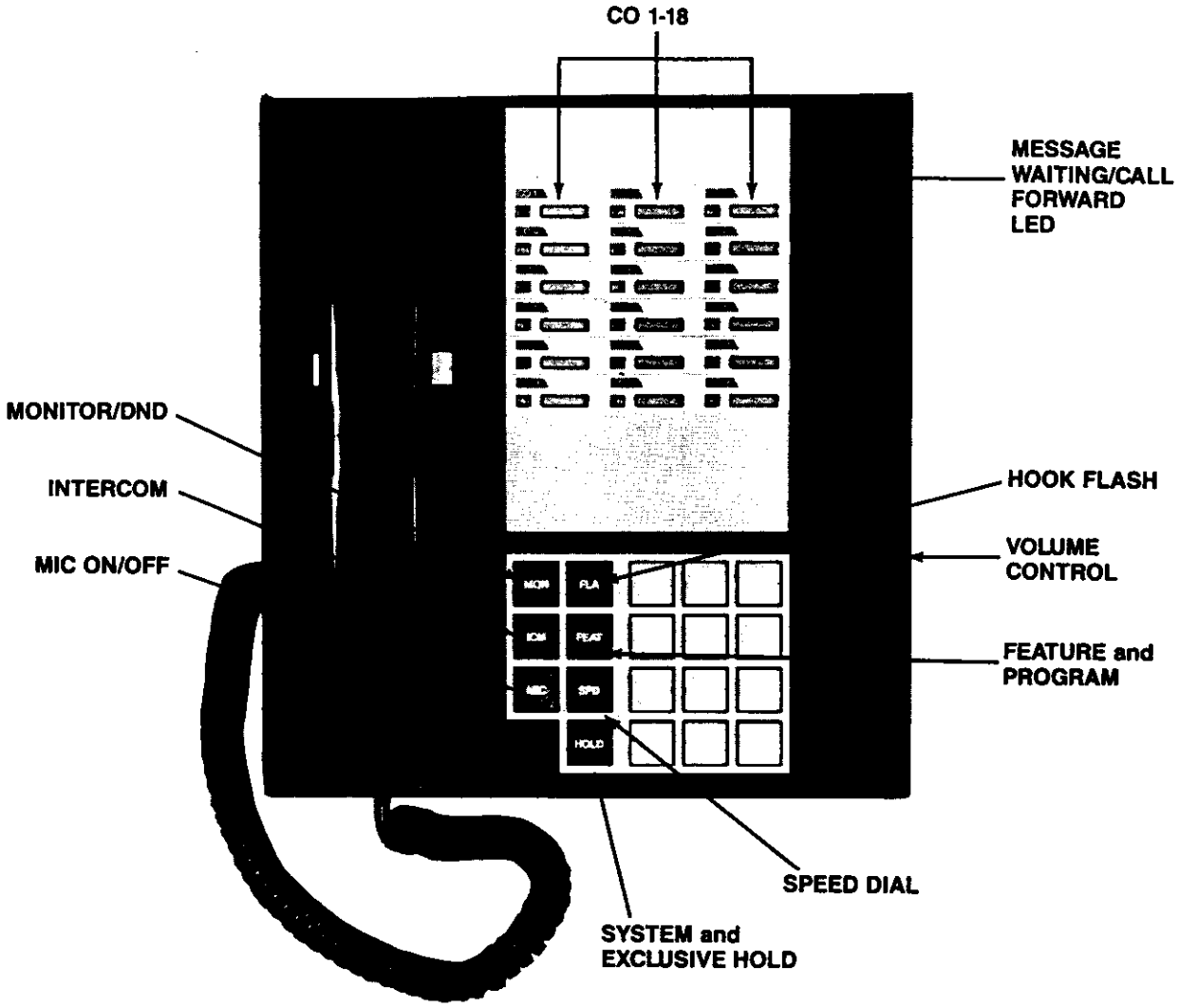


Figure 3-4. 18-Button Electronic Key Telephone.

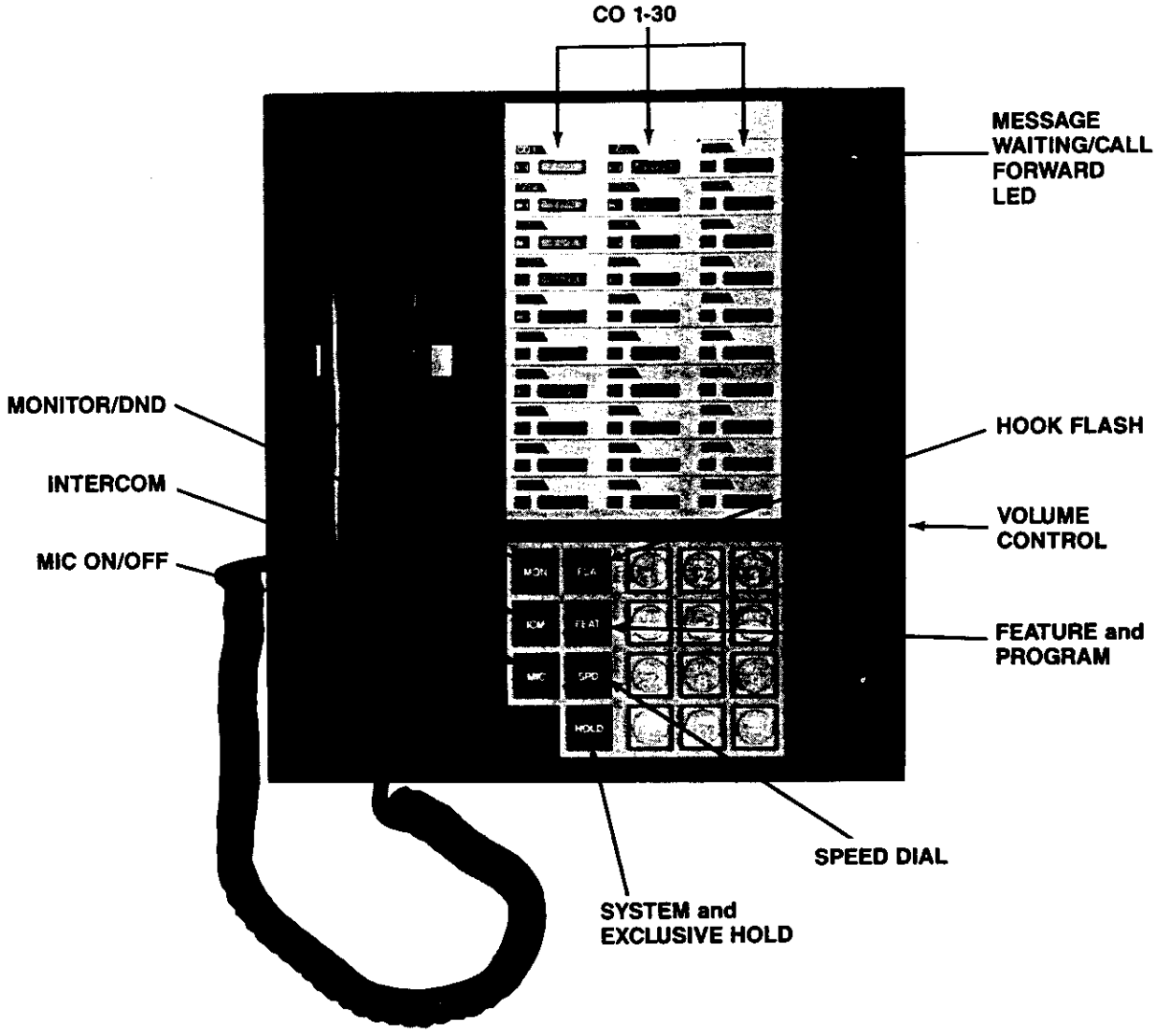


Figure 3-5. 30-Button Electronic Key Telephone.

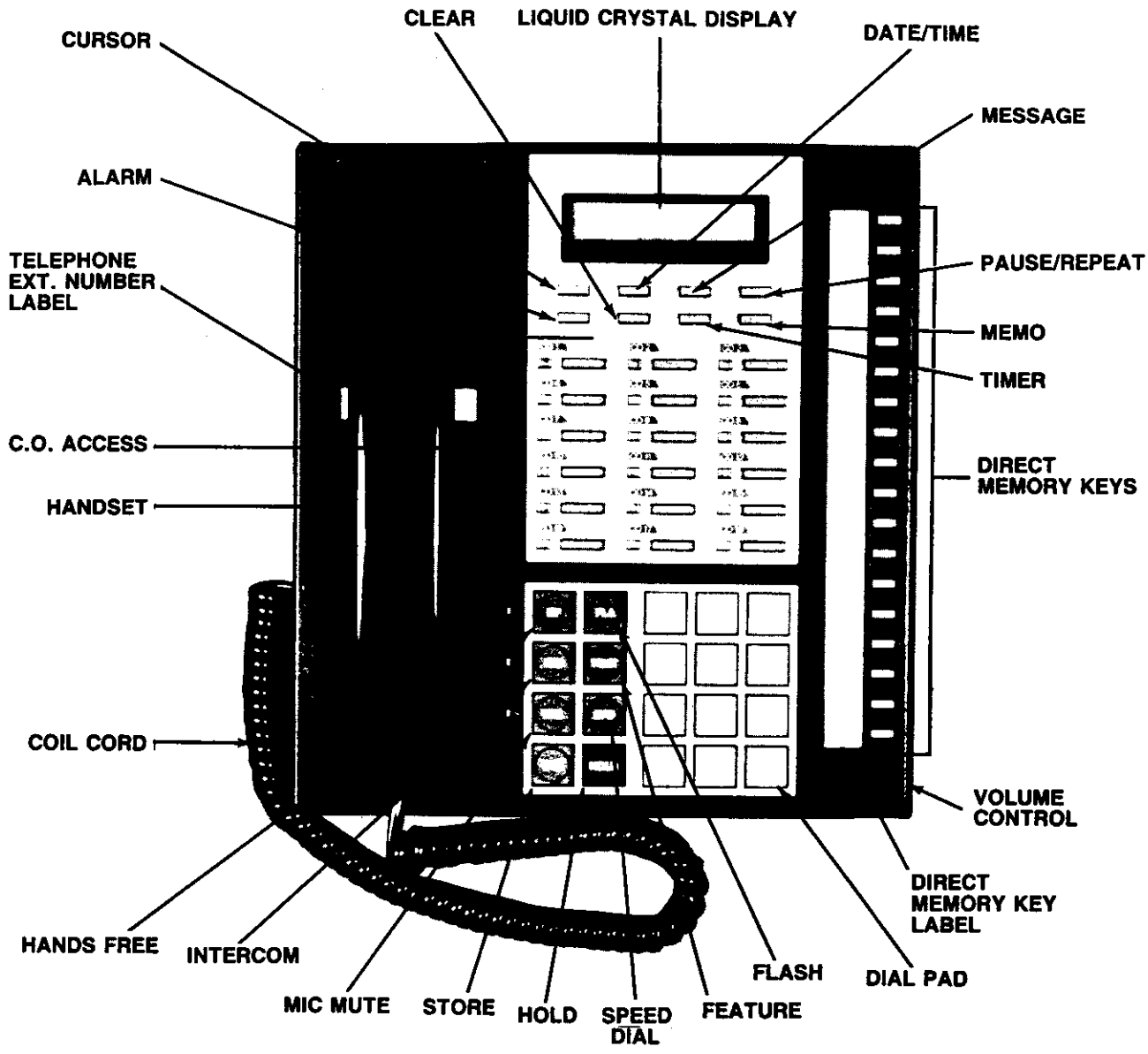


Figure 3-6. Executive Station Electronic Key Telephone.

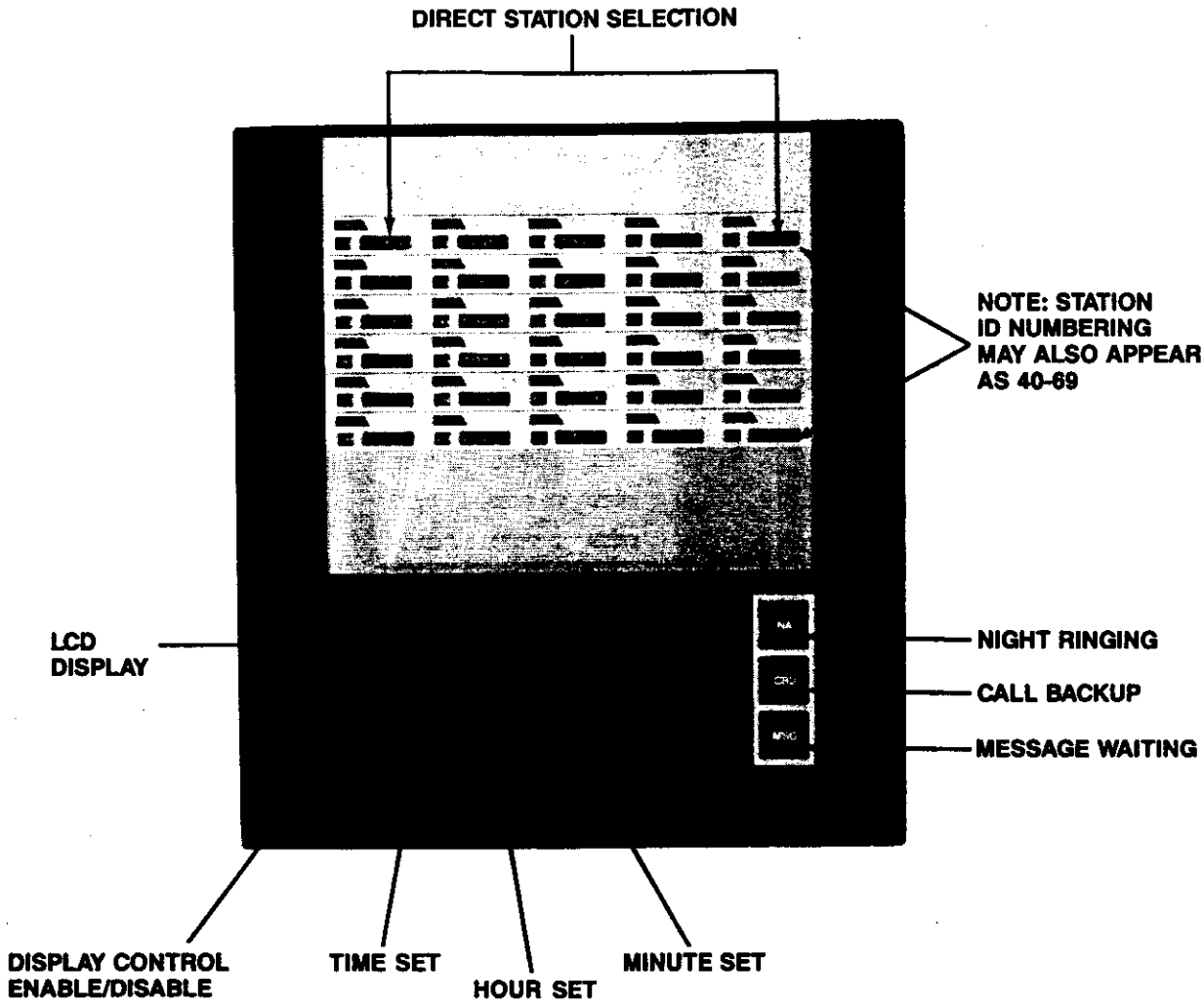


Figure 3-7. Direct Station Select/Busy Lamp Field.

SECTION 4
SYSTEM PROGRAMMING

GENERAL

This section describes the permanent factory program and contains programming information using the primary (Ext #10) station.

PERMANENT FACTORY PROGRAMMING

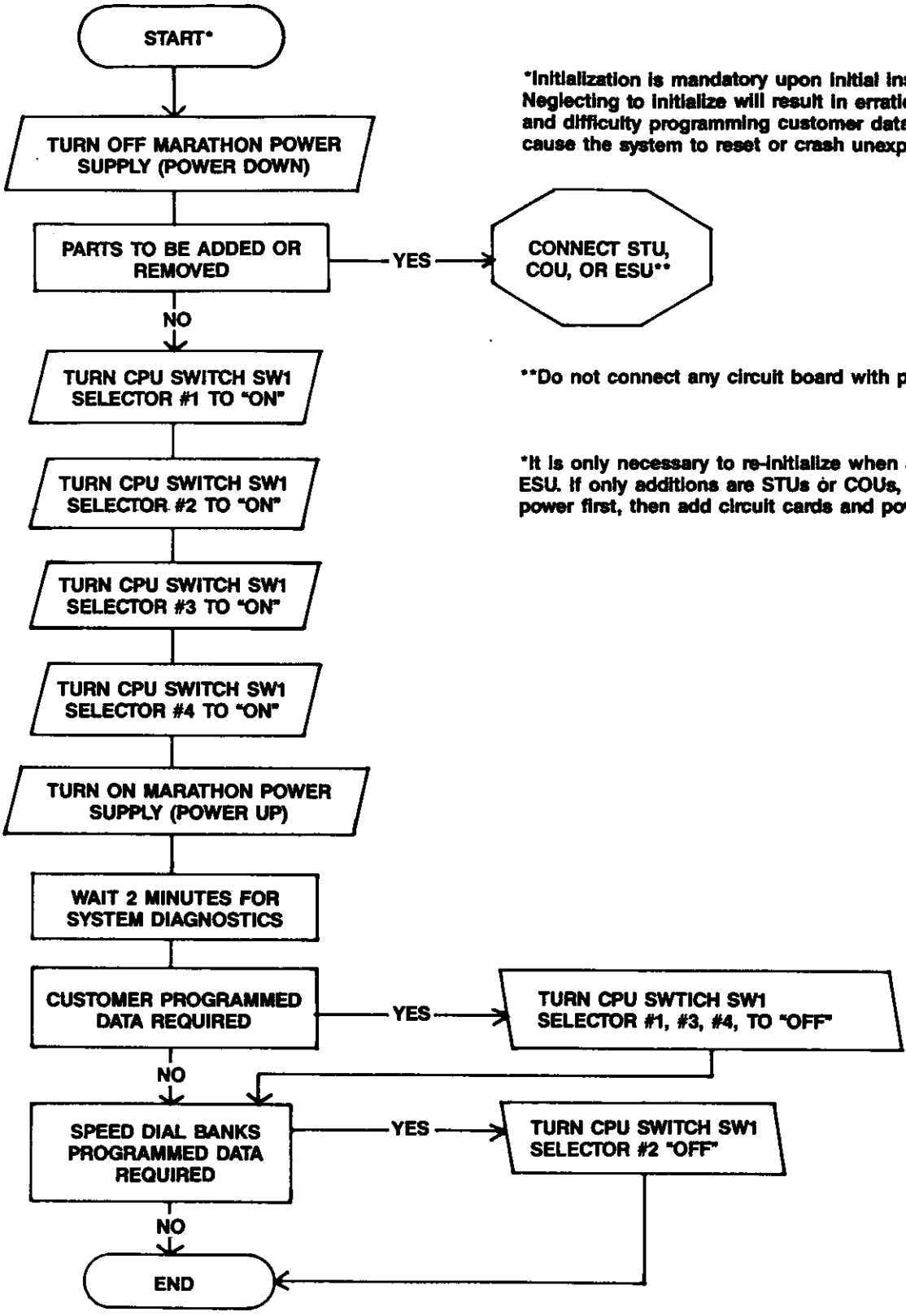
MARATHON is delivered with a permanent factory program (See Table 4-1 Factory Program Data), stored in a read only memory (ROM). This program must be loaded when first powering the system up or when adding an ESU to insure proper system operation. When the system is initialized, the contents of the ROM are transferred to a random access memory (RAM), which controls the operation of MARATHON. This RAM can be modified according to customer requirements by using the port 1 station. Modifying the program data will not erase already existing factory data. However, even after the contents of the RAM are modified, the original permanent factory program can be reinserted in place of the modified program by performing the initialization procedure as indicated in Figure 4-1, "System Initialization Flow Chart". The permanent factory program that resides in the ROM is described in programming operations and lists the program numbers, title, and factory program description.

NOTE: IT IS IMPORTANT TO FOLLOW THE PROPER INITIALIZATION PROCEDURE WHEN INSTALLING MARATHON OR WHEN ADDING AN ESU.

Table 4-1

FACTORY (DEFAULT) PROGRAM DATA

	Program		Default Data	Program No.
1.	Auto H-Flash Timing	=	3 Seconds	16
2.	Ring Timeout	=	8 Seconds	17
3.	Dial Pulse Break Ratio	=	60%	20
4.	Intercom Priority	=	Voice	13
5.	1st Depression of Hold	=	System Hold	14
6.	Dial Pulse Speed	=	10pps	19
7.	Hold Recall	=	No Timeout	15
8.	CO Type Dial	=	DTMF	18
9.	Trunk Group Assignment	=	All COS to #1 Group	25
10.	Station Class of Service	=	COS #1 (all stations)	27
11.	Forbidden Speaker Page	=	"0" = allowed	21
12.	Ring Assignment	=	Station #10, 21, 22	
			34, 46, 58	22
13.	Night Answer	=	Station #10, 21	23
14.	Toll Restriction Type			
	per Trunk Group	=	#13 (non restricted)	28 to 31
15.	CO Line Assignment to			
	Station CO Line Keys			
	(non squared) operation	=	Squared Operation	32
16.	DND Allow/Disallow	=		33
17.	Trunk Group Class of	=	13 All Groups	26
	Service		Non Restricted	
18.	Assignment of Class of Service Per Station	=	01 All Stations	27



*Initialization is mandatory upon initial installation. Neglecting to initialize will result in erratic operation and difficulty programming customer data, and may cause the system to reset or crash unexpectedly.

**Do not connect any circuit board with power on.

*It is only necessary to re-initialize when adding an ESU. If only additions are STUs or COUs, disconnect power first, then add circuit cards and power-on.

Figure 4-1
SYSTEM INITIALIZING FLOW CHART

SYSTEM PROGRAM ENTRY

All system programming is performed from the port 1 station. If a DSS/BLF is available in the system, programmed data will be displayed on the DSS/BLF's liquid crystal display. WTC strongly recommends using a DSS console for programming. Programming is performed by using the "FEAT" and the dialpad only, while in the "Monitor" mode. All other buttons are inactive during the programming function. Error entry is indicated by a split-warning tone (multiple beep-like tones). Valid entry is indicated by a confirmation tone (single beep-like tone). All program modifications can be performed while the system is fully operational. Refer to Appendix A for some useful "Programming Tips."

PROGRAMMING USING THE PORT 1 STATION

The primary station communicates with MARATHON to enable access to each piece of stored information in the system memory and to modify the memory contents.

To start (enter) the system programming mode, perform the following from the port 1 station (ICM-10):

1. Press MON button;
2. Press the (*) button and dial "0" and "1" on the keypad
3. Press the (#) button and the "FEAT" button twice. (At this point, confirmation tone should be heard.)
4. If busy tone is heard, check factory program SW1 positions 1, 3, and 4. They must be off (away from the wall) to enter programming mode.

At this point in the programming sequence, all other stations remain active. [(*), 01, (#), FEAT, FEAT)]

To terminate (exit) the system programming mode, press the MON button from the port 1 station (ICM 10):

PROGRAMMING HINTS

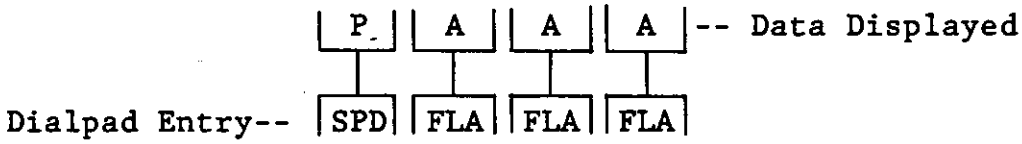
1. Confirmation tones will be heard after pressing (♯) and FEAT buttons when entering programming mode.
2. Multiple warning tones will be heard if:
   a. Invalid entry such as invalid program, illegal value for the program data is entered, etc.
   b. End of a programming sequence such as last key entry for station button assignment, ring assignment, etc.
   c. Station off-hook while attempting to change the station data of that station. (See Programming Tips - Appendix A)
3. On-Line Programming
   a. On-line programming can be performed while the system is in any state except the IPL state (DIP switch 1 of the CPU "ON" or toward the wall).
   b. When trying to change the program of an off-hook station, a warning tone (multiple beep-like tones) will be heard the first time an attempt is made to enter the data. If it is necessary to enter the data when the station is off-hook, simply re-enter the affected data.
4. The use of "X" as a Program Data Variable:
   a. In many instances, a choice of customer data for use is available by the end user in accordance with a particular program. Therefore, the alphanumeric symbol "X" is used to denote an unknown digit (variable). A variable (unknown) character will only become known once the data has been decided upon by the end user.
   b. Often, multiple variables are required to be programmed. In this case, the character "X" is followed by a number indicating the order in which the data is to be entered by the user. For instance:

X1,	X2,	X3
First Variable Unknown	Second Variable Unknown	Third Variable Unknown

5. The Purpose of Programs 28-31:

   a. To allow the user to formulate reference tables for semi-restrictions (outward dialing restrictions).

   b. These tables are used by the system to determine what telephone numbers, area codes, and central office exchanges which may be allowed or disallowed from outward dialing at a particular station. Depending on the trunk group class of service (Programs #26 and #27) assigned to a particular station, the system may reference one or two combination of tables for dialing information. Since the system analizes the first four digits dialed (in the semi-restrict mode), it will be necessary to input only four digits (for area, toll and exhange) in each entry (1-40) of a particular table. For customer convenience, wild card digits have been provided for use when the digits 0-9 or 2-9, * and # are to be restricted or allowed in a four digit sequence. For example, all area codes beginning with the digits 2-9 with subsequent digits 0-9 may be entered as follows:



6. Program Groups

All programs in this system are grouped into four categories. Access to each program requires that two digits be entered into the dialpad. For example:

Table 4-2
Program Profile

Program No.	Data Entered	Group
1	01	0
11	11	1
12	12	1
13	13	1
14	14	1
15	15	1
16	16	1
17	17	1
18	18	1
19	19	1
20	20	2
21	21	2
22	22	2
23	23	2
24	24	2
25	25	2
26	26	2
27	27	2
28	28	2
29	29	2
30	30	3
31	31	3
32	32	3
33	33	3

7. Program 26 (Class of Service Configuration)
   a. The purpose of this program is to allow the user to formulate classes of service for dialing restrictions. Since in most applications specific COs (trunks) are assigned to particular departments or tenants, trunk (CO) groups may be formed (see Program 25 to simplify class of service (dial restriction) assignments).
   b. There are 16 available classes of service provided which may be custom designed by the user (on a trunk group basis) for later assignment (see Program 27 on a per station basis).
   c. When trunks (COs) have been assigned to trunk groups, (see Program 25) dial restrictions (01-19) may be assigned to each trunk group (1-9) in a particular class of service (01-16) by use of the "Trunk Group Class of Service Restrictions" (Table 4-4).
8. Figure 4-28 has been provided as a quick reference to primary Customer programmed data. Once the worksheets (tables) are completed by the programmer the fold-out can be used to "eye-ball" current system data.

PROGRAM ENTRY CHARTS

The program charts on the following pages describe the procedure for modifying the system data. Table 4-3 provides a list of these programs.

Table 4-3
Program Charts

PROGRAM #1 ENTRY TO PROGRAMMING MODE

1. This program allows entry to the programming mode from the port 1 station (Extension #10). In order to program, the system main CPU switch, SW 1 Selector #1, #3 and #4 must be in the off position (away from wall). Selector #2 should also be off if speed dial is to be retained.

2. System programming must be performed from the port 1 station (Extension #10) including System SPD Dial banks (00-13), (50 and 51) are system special banks. Station speed dial banks are 60-73, 88 and 89 are station special banks.

3. The entry code takes the following form and must be entered from the dial pad with the monitor button in the "ON" condition (LED on):

   (*), 01, (#), FEAT FEAT

   A confirmation tone should be heard upon depressing the (#) button and upon depressing the FEAT button (second time). If a busy tone is heard, check the initialization DIP switches to insure they are in the proper position ("OFF" or away from the wall) and then re-enter the program.

4. Once the system is in the programming mode, any program sequence may be accessed.

5. All programming is on-line and does not affect the operation of the system. However, the port 1 station will remain inactive while in the programming mode.

6. When programming a particular station (other than EXT #10) while it is in use, it may be necessary to enter specific data twice. If error tones are heard during normal programming, refer to Appendix "A" Programming Tips for further details.

PROGRAM 1

SEQ. NO.	DIAL PAD	DATA ENTERED	LCD DISPLAY	DISPLAY DEFINITION	NEXT IN SEQ.	NOTE
1	*				2	
2	0				3	
3	1				4	
4	#				5	
5	Feat				6	
6	Feat					End of programming sequence
7						
8						
9						
10						
11						
12						

Figure 4-2. Procedure For Entry To Programming Mode

PROGRAM #11--CLEAR ALL PROGRAM DATA

1. This program step is used to clear the present system data, and replace it with factory (default) data.

2. Caution must be taken since this procedure completely destroys all customer data and reloads factory data.

3. The program sequence takes the following form:

(*), 11, 00, (#), FEAT, FEAT

If "00" is not entered here, the system will not perform the procedure.

NOTE: This program is not a substitute for System Initialization.

PROGRAM #11

SEQ. NO.	DIAL PAD	DATA ENTERED	LCD DISPLAY	DISPLAY DEFINITION	NEXT IN SEQ.	NOTE
1	*				2	
2	1	Prog. No.	1		3	
3	1		1 1	Prog. No.	4	
4	0	Clear Code	0		5	To clear all program data
5	0		0 0	Clear Code	6	
6	#				7	
7	Feat				8	End program sequence
8	Feat					Exit program
9						
10						
11						
12						

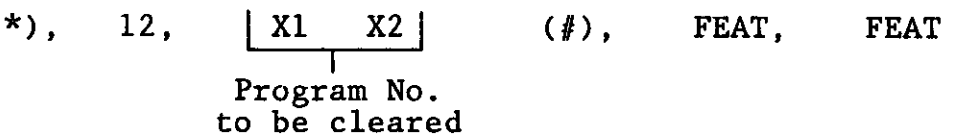
Figure 4-3. Procedure For Clearing All Program Data.

PROGRAM #12-- CLEAR SELECTED PROGRAM DATA

1. This program step is used to clear the data of specific programs. In some instances, factory (default) data is reloaded in place of the customer data. In other instances "00" is inputted in place of factory data. See Note below.

2. Caution must be taken since this procedure completely destroys selected customer data.

3. The Clear Selected Program Data code takes the following form:



Note:
In some instances this program completely clears the selected program. The selected program must be re-entered after clearing it.

Only the following programs may be completely cleard:

Program (XX)	Description
32	(Completely Cleared)
All other Programs	Factory data

PROGRAM #12

SEQ. NO.	DIAL PAD	DATA ENTERED	LCD DISPLAY	DISPLAY DEFINITION	NEXT IN SEQ.	NOTE
1	*				2	
2	1	Prog. No.	1		3	
3	2		12		4	
4	X1	Prog. No. to be Cleared	X1		5	
5	X2		X1X2	Prog. No. Cleared	5	Go to 5 to change Prog. No.
					6	Go to 6 to continue sequence
6	#				5	Next Prog. No. to be cleared
					7	Clearing sequence completed
7	Feat				8	
8	Feat					End of program sequence
9						
10						
11						
12						

Figure 4-4. Procedure For Clearing Selected Program Data.

PROGRAM #13--CHANGE IN PRIORITY OF ICM CALLS

1. This program allows changing ICM call priority system wide from Voice to Tone or Tone to Voice.

2. The program sequence takes the following form:

   (*), 13, [X1,] (#), FEAT, FEAT

   ICM ID

3. The system is factory programmed for Voice priority on all ICM calls (Handsfree Answerback).

   NOTE: Origination of a handsfree ICM call must be performed by using the handset (off-hook).

	I.D.	Definition
X1	0	Voice Call
	1	Tone Call

PROGRAM #13

SEQ. NO.	DIAL PAD	DATA ENTERED	LCD DISPLAY	DISPLAY DEFINITION	NEXT IN SEQ.	NOTE
1	*				2	
2	1	Prog. No.	1		3	
3	3		1 3	Prog. No. I.D.	4	
4	X1	ICM Signalling Priority I.D.	X1	I.D.	5	Ø = Priority is Voice Call 1 = Priority is Tone Call
5	#				6	
6	Feat				7	
7	Feat					End of program sequence
8						
9						
10						
11						
12						

Figure 4-5. Procedure For Changing Priority Of ICM Calls.

PROGAM #14--DEFINITION OF FIRST DEPRESSION OF THE HOLD BUTTON AS SYSTEM HOLD OR EXCLUSIVE HOLD

1. This program defines the first depression of the HOLD Button as System Hold or Exclusive Hold.

2. The program sequence takes the following form:

(*), 14, [X1,] (#), FEAT, FEAT
HOLD ID

3. The system is factory programmed for the first depression of the HOLD Button to be System Hold.

	I.D.	Definition
X1	0	E-hold
	1	System-Hold

PROGRAM #14

SEQ. NO.	DIAL PAD	DATA ENTERED	LCD DISPLAY	DISPLAY DEFINITION	NEXT IN SEQ.	NOTE
1	*				2	
2	1	Prog. No.	1		3	
3	4		1 4	Prog. No.	4	
4	X1	System/ E-Hold I.D.	X1	I.D.	5	Ø = E-hold with 1st hold depression 1 = System with 1st hold depression
5	#				6	
6	Feat				7	
7	Feat					End of program sequence
8						
9						
10						
11						
12						

Figure 4-6. Procedure For Defining The First Depression Of The Hold Button As System Hold Or Exclusive Hold.

PROGRAM #15--CHANGING HOLD RECALL TIMEOUT PERIOD

1. This program allows changing of the (first and second) Hold Recall Timeout. The second Hold Recall Timeout is automatically determined as twice the duration of the (first) Hold Recall Timeout.

2. The program sequence takes the following form:

   (*), 15, [X1 X2,] (#), FEAT, FEAT

   Hold Recall ID

3. The system is factory programmed for no timeout.

Example: * 15, [25] #, FEAT, FEAT

Hold Recall ID

with this program entry of "25" hold recall would be 2 min. 30 sec.

NOTE: Second Hold Recall = After two hold recall time periods, the hold recall tone will also be heard at all primary (attendant) stations.

	I.D.	Timeout
X1, X2	00	No Timeout
	05	30 sec.
	10	1 min.
	15	1.5 min.
	20	2.0 min.
	25	2.5 min.
	30	3.0 min.
	35	3.5 min.
	40	4.0 min.
	45	4.5 min.
	50	5.0 min.
	55	5.5 min.
	60	6.0 min.
	65	6.5 min.
	70	7.0 min.
	75	7.5 min.
	80	8.0 min.
	85	8.5 min.
	90	9.0 min.
	95	9.5 min.

PROGRAM #15

SEQ. NO.	DIAL PAD	DATA ENTERED	LCD DISPLAY	DISPLAY DEFINITION	NEXT IN SEQ.	NOTE
1	*				2	
2	1	Prog. No.	1		3	
3	5		1 5	Prog. No. | I.D.	4	
4	X1	Hold Recall Timeout I.D.	X1		5	
5	X2		X1 X2	I.D.	4 6	Go to 4 to change Timeout Go to 6 to Enter Data
6	#				7	
7	Feat				8	
8	Feat					End of program sequence
9						
10						
11						
12						

Figure 4-7. Procedure For Changing Hold Recall Timeout Period.

PROGRAM #16--CHANGING HOOK FLASH TIMING

1. This program allows changing the automatic Hook Flash Timing.

2. The program sequence takes the following form:

   (*), 16, [X1 X2,] (#), FEAT, FEAT

   Hook Flash ID

3. The system is factory programmed for three seconds. In many cases a shorter timing may be used;
   i.e. 500-700 milleseconds.

Note: Timing can be changed from 0.1 sec. to 9.9 sec. in one tenth of a second increments.

Example: * 16 10 #, FEAT, FEAT

With this program, entry of "10" flash will be 1 second.

	I.D.	Timing
X1, X2	01	0.1 sec.
	02	0.2 sec.
	⋮	⋮
	30	3.0 sec.
	⋮	⋮
	98	9.8 sec.
	99	9.9 sec.

PROGRAM 16

SEQ. NO.	DIAL PAD	DATA ENTERED	LCD DISPLAY	DISPLAY DEFINITION	NEXT IN SEQ.	NOTE
1	*				2	
2	1	Prog. No.	1		3	
3	6		1 6	Prog. No.	4	
4	X1	Flash Timing I.D.	X1		5	
5	X2		X1 X2	Timing	6	Go to 6 if timing OK
					5	Go to 5 to change timing
6	#				7	
7	Feat				8	
8	Feat					End of program sequence
9						
10						
11						
12						

Figure 4-8. Procedure For Changing Hook Flash Timing.

PROGRAM #17-- CHANGING RING TIMEOUT TIMING

1. This program allows changing the abandon incoming call ringing timeout period. The purpose of the "Ring Timeout" is to prevent false ring detection; i.e. false ringing.

2. The program sequence takes the following form:

(*), 17, [X1 X2] (#), FEAT, FEAT

Ring Timeout ID

3. Since most modern Central Offices have eight second ring cycles (4 seconds on and 4 seconds off), the system is factory programmed for an eight second timeout.

	I.D.	Timeout
X1, X2	05	5.0 sec.
	08	8.0 sec.
	11	11.0 sec.
	14	14.0 sec.
	17	17.0 sec.
	20	20.0 sec.
	23	23.0 sec.
	26	26.0 sec.

PROGRAM 17

SEQ. NO.	DIAL PAD	DATA ENTERED	LCD DISPLAY	DISPLAY DEFINITION	NEXT IN SEQ.	NOTE
1	*				2	
2	1	Prog. No.	1		3	
3	7		1 7	Prog. No.	4	
4	X1	Ring Timeout Timing I.D.	X1		5	
5	X2		X1 X2	Timing	6 5	Go to 6 if timing is correct Go to 5 to change timing
6	#				7	
7	Feat				8	
8	Feat					End of program sequence
9						
10						
11						
12						

Figure 4-9. Procedure For Changing Ring Abandon Timeout Timing

PROGRAM #18-- SELECTION OF DP OR DTMF PER CO LINE

1. This program allows selection of DP or DTMF signalling on a per CO line basis.

2. The program sequence takes the following form:

(*), 18, [X1 X2,] [X4] (#), FEAT, FEAT

[X1 X2,]: CO Line (01-30)

[X4]: DP or DTMF

Note: After CO Line number is entered, present signalling status of the CO line will be displayed in the first LCD position.

3. The system is factory programmed for DTMF signalling on all lines.

4. See Table 4-13 (Page 4-67) for programming worksheet.

Example: * 18 [01] [1] # FEAT FEAT

[01]: CO Line

[1]: DP or DTMF

With this program entry of "1" CO Line "1" would be dial pulse.

	I.D.	Definition
X4	0	DTMF
	1	DP

PROGRAM #18

SEQ. NO.	DIAL PAD	DATA ENTERED	LCD DISPLAY	DISPLAY DEFINITION	NEXT IN SEQ.	NOTE
1	*				2	
2	1	Prog. No.	1		3	
3	8		1 8	Prog. No.	4	
4	X1	CO No.	X1		5	
5	X2		X2 X1	CO No.	5	Go to 5 to change CO No.
					6	Go to 6 to change I.D.
6	X3	I.D. DP/DTMF	X1 X2 X3	CO No. I.D.	7	Ø = DTMF (Factory Prog.) 1 = DP
7	#		0 0 0 0		5	Go to 5 for next CO No.
					8	Go to 8 to end sequence
8	Feat				9	
9	Feat					End of program sequence
10						
11						
12						

Figure 4-10. Procedure For Selection Of DP OR DTMF Per CO Line.

PROGRAM #19--CHANGING DIAL PULSE SPEED

1. This program allows changing the dial pulse speed from 10pps or 20pps.

2. The program sequence takes the following form:

(*), 19, [X1 X2,] (#), FEAT, FEAT

Pulse Speed Value

3. The system is factory programmed for 10pps.

	Value	Speed
X1, X2	10	10 pps
	20	20 pps

PROGRAM 19

SEQ. NO.	DIAL PAD	DATA ENTERED	LCD DISPLAY	DISPLAY DEFINITION	NEXT IN SEQ.	NOTE
1	*				2	
2	1	Prog. No.	1		3	
3	9		1 9	Prog. No.	4	
4	X1	Dial Pulse Speed	X1		5	Speed is 10 or 20 pps.
5	X2		X1 X2	Speed	6	Go to 5 to change speed
					7	Go to 7 if speed OK
6	#					
7	Feat					
8	Feat					End of program sequence
9						
10						
11						
12						

Figure 4-11. Procedure For Changing Dial Pulse Speed.

PROGRAM #20--CHANGING DIAL PULSE BREAK RATIO

1. This program allows changing the dial pulse break ratio from 58 percent to 73 percent in one percent increments.

2. The program sequence takes the following form:

(*), 20, [X1 X2,] (#), FEAT, FEAT

Break Ratio Value

3. The system is factory programmed for 60 percent break.

	Value	Break Ratio
X1, X2	58	58%
	59	59%
	60	60%
	⋮	⋮
	70	70%
	71	71%
	72	72%

PROGRAM #20

SEQ. NO.	DIAL PAD	DATA ENTERED	LCD DISPLAY	DISPLAY DEFINITION	NEXT IN SEQ.	NOTE
1	*				2	
2	2	Prog. No.	2		3	
3	0		2 0	Prog. No.	4	
4	X1	Dial Pulse Break Ratio	X1		5	
5	X2		X1 X2	Break ratio	6 5	Go to 6 if % break OK Go to 5 to change % break
6	#				7	
7	Feat				8	
8	Feat					End of program sequence
9						
10						
11						
12						

Figure 4-12. Procedure For Changing Dial Pulse Break Ratio.

PROGRAM #21--ALLOWING OR FORBIDDING INTERNAL SPEAKER ALL PAGE AND ZONE PAGE PER STATION

1. This program allows each station to be programmed to allow or forbid internal all-page and zone-page.

2. The program sequence takes the following form:

(*), 21, |X1 X2| |X5,| (#), FEAT, FEAT

Ext No. 0=Allowed
1=Forbidden

3. The system is factory programmed to allow internal all-page and zone-page at each station.

0 = Internal Page Allowed / 1 = Internal Page Disallowed

Example: * 21 |13| |1| # FEAT FEAT

Ext Number — Allow or Forbid

With this program entry station "13" would be disallowed internal page.

PROGRAM #21

SEQ. NO.	DIAL PAD	DATA ENTERED	LCD DISPLAY	DISPLAY DEFINITION	NEXT IN SEQ.	NOTE
1	*				2	
2	2	Program No.	2		3	
3	1		2 1		4	
4	X1	Ext. No.	X1		5	
5	X2		X1 X2 X4	Ext. No. I.D.	5	Go to 5 to change Ext. No.
					6	Go to 6 to change Internal page
6	X4	Forbidden Internal Page I.D.	X1 X2 X4	Ext. No. I.D.	7	Ø = Internal Page Allowed 1 = Internal Page Forbidden
7	#		0 0 0 0		5	Go to 5 to change Ext. No.
					8	Go to 8 to end sequence
8	Feat				9	
9	Feat					End of program sequence
10						
11						
12						

Figure 4-13. Procedure For Allowing Or Forbidding Internal Speaker Page And Zone Page Per Station.

PROGRAM #22--RING ASSIGNMENT OF STATIONS

1. This program allows each station to be ring assigned to any or all of the CO/PBX lines. However, only six stations may be ring assigned to any one CO/PBX line.

2. The program sequence takes the following form:

(*), 22, [X1 X2,] [X5 X6,] (#), FEAT, FEAT

X1 X2: CO No. (01-30)
X5 X6: Extension No. (10-69)

3. All CO lines may be ring assigned to any station, a maximum of six stations may be assigned to ring each CO line.

4. See Table 4-12 (Page 4-65) for Ring Assignment Worksheet.

5. The system is factory programmed for extensions 10, 21, 22, 34, 46, and 58 which are assigned to ring on all CO lines.

Example:

* 22 [01] [10] #, 12 # 13 # 28 # 00 # [00] # FEAT FEAT

[01]: CO No. (01-30)
[10]: Ext No. (10-69)
[00]: Enter "00" to erase factory data 5th and 6th stations

With this program entry stations 10, 12, 13, and 28 will ring on CO #1

PROGRAM #22

SEQ. NO.	DIAL PAD	DATA ENTERED	LCD DISPLAY	DISPLAY DEFINITION	NEXT IN SEQ.	NOTE
1	*	Prog. No.			2	
2	2		2		3	
3	2		2 2		4	
4	X1	CO No.	X1		5	Enter No. of CO you want to Assign Stations to–
5	X2		X1 X2 X3 X4	CO No. / Present Ring Assigned Station	6	Enter 1st Digit of newly Ring Assign Station*
					7	Enter 2nd Digit of newly Ring Assign Station
6	X5	New Ring Ass. Station	X1 X2 X5		8	Go to 8 to Step to Next Station (1 through 6)
					6	Enter 1st Digit of next Ring Assign Station
7	X6		X1 X2 X5 X6	CO No. / Newly Ring Assign Station	7	Enter 2nd Digit of next Ring Assign Station
					8	FF= Cannot assign any more Station
8	#		X1 X2 X7 X8	CO No. / Next (6 max) Ring Ass. Station	4	Enter No. of next CO you want to Assign Stations to–
9	Feat				9	Go to 9 to end sequence
10	Feat					End of program sequence
11						
12						

Figure 4-14. Ring Assignment Of Station.

*Entering of ØØ will unassign a station

PROGRAM #23--NIGHTTIME ANSWER ASSIGNMENT

1. This program allows assignment of night answer stations per CO line. However a maximum of two extension numbers can be assigned to any one CO line.

2. The program sequence takes the following form:

(*), 23, |X1 X2,| |X5 X6,| (#), FEAT, FEAT

X1 X2: CO No.
X5 X6: Extension No.

3. All CO lines may be ring assigned to any station. A maximum of six stations may be assigned to ring each CO line.

4. The system is factory programmed for extensions 10 and 21 to ring on all CO lines.

5. See Table 4-12 (Page 4-65) for programming worksheet.

Example:

* 23 |01| |10| #, |18| # FEAT, FEAT

|01|: CO No. (01-30)
|10|: Ext No. (10-69)
|18|: Ext. No. (10-69)

With this program entry, stations 10 and 18 will ring on CO #1.

PROGRAM #23

SEQ. NO.	DIAL PAD	DATA ENTERED	LCD DISPLAY	DISPLAY DEFINITION	NEXT IN SEQ.	NOTE
1	*	Prog. No.			2	
2	2		1		3	
3	3		2 3		4	
4	X1	CO No.	X1		5	Enter No. of CO you want to Assign Stations to–
5	X2		X1 X2 X3 X4	CO No. / Present Ring Assign Station	6	Enter 1st Digit of Newly Assign Station*
					7	Enter 2nd Digit of Newly Assign Station
6	X5	New Ring Ass. Station	X1 X2 X5		8	Go to 8 to Step to next Station (1&2)
					6	Enter 1st Digit of 2nd Ring Assign Station
7	X6		X1 X2 X5 X6	CO No. / Newly Ring Assign Station	7	Enter 2nd Digit of 2nd Ring Assign Station
					8	FF= Cannot Assign any more Station
8	#		X1 X2 X7 X8	CO No. / Next (2 max) Ring Assign Station	4	Enter No. of next CO you want to Assign Stations to–
9	Feat				9	Go to 9 to end sequence
10	Feat					End of program sequence
11						
12						

Figure 4-15. Procedure For Assignment Of Night Answer Station.

*Entering of ØØ will unassign a station

PROGRAM #24--ASSIGNMENT OF CALL BACKUP STATION TO DSS CONSOLES

1. This program allows assignment of a call backup station to each DSS console.

2. The program sequence takes the following form:

(*), 24, #, [X1,] [X3 X4,] (#), FEAT, FEAT

- [X1,]: DSS Console (1-5)
- [X3 X4,]: Call Backup Extension (10-69)

3. If there is no CB station, "00" will show on the display.

4. The system is factory programmed for no call backup stations assigned.

Example: * 24 # [1] [16] # [2] [00] # [3] [00] # FEAT FEAT

- [1]: DSS
- [16]: CBU Station (10-69)
- [2]: DSS #2
- [00]: CBU Station (10-69)
- [3]: DSS #3
- [00]: CBU Station (10-69)

With this program entry DSS 1 would have station "16" assigned as its CBU. DSS #2 and 3 have no CBU stations assigned.

PROGRAM #24

SEQ. NO.	DIAL PAD	DATA ENTERED	LCD DISPLAY	DISPLAY DEFINITION	NEXT IN SEQ.	NOTE
1	*				2	
2	2	PROG # 24	2		3	
3	4		2 4		4	Step to first attendant back-up Assignment Location – notice no station assigned
4	#	Step	X1 0 0	ATTENDANT #1 / NO ASSIGNMENT	5	Enter 1st digit of call-back up station for #1 attendant
5	X2	Call Back-Up Station	X1 0 X2		6	Enter 2nd digit of call-back up station for #1 attendant
6	X3		X1 X2 X3	ATTENDANT #1 / CALL BACK-UP STATION #	7	Step to next DSS, Repeat this Procedure for all 5 DSS
7	#	Step	X4 0 0	ATTENDANT #2 / NO ASSIGNMENT	5	Enter 1st digit of call back-up
					8	Exit program sequence
8	FEAT				9	Exit program sequence
9	FEAT					
10						
11						
12						

Figure 4-16. Procedure for Assigning Call Back-up Station to DSS Consoles

PROGRAM #25--ASSIGNMENT OF CO LINES TO TRUNK GROUP

1. This program allows assignment of CO lines to trunk groups.

2. Each CO line may be assigned to one of nine trunk groups. The first eight trunk groups may be assigned class of service restrictions.

3. The program sequence takes the following form:

(*), 25, # [X1 X2,] [X4,] #, FEAT, FEAT

[X1 X2,]: CO Line (01-30)

[X4,]: Trunk Group No.

4. The system is factory programmed for all CO lines to be assigned to trunk group #1.

5. CO Numbers = 01-30 / Trunk Group Numbers = 1-9

6. See Table 4-8 (Page 4-60) for programming worksheet.

Example: * 25 # [01] [1] # [02] [1] # [03] [2] # FEAT FEAT

[01]: CO Line

[1]: TRK GRP NO.

[02]: CO Line

[1]: TRK GRP NO.

[03]: CO Line

[2]: TRK GRP NO.

With this program entry CO Lines "01" and "02" are in trunk group number "1" CO Line 03 is in trunk group number "2".

PROGRAM #25

SEQ. NO.	DIAL PAD	DATA ENTERED	LCD DISPLAY	DISPLAY DEFINITION	NEXT IN SEQ.	NOTE
1	*				2	
2	2	PROGRAM NO.	2		3	
3	5		2 5		4	
4	#	STEP	X1 X2 X3	CO NO.1 TRK.GRP.1	5	Enter New TRK. GRP.
					6	Step to next CO
5	X4	NEW TRK. GRP. NO.	X1 X2 X4	CO NO.1 NEW TRK. GRP.	6	Step to Next CO
6	#	STEP	X5 X6 X3	NEXT CO NO. TRK.GRP.1	5	Enter new TRK. GRP.
					6	Step to next CO
7	Feat				7	Exit Program
8	Feat					
9						
10						
11						
12						

Figure 4-17. Procedure For Assignment of CO Lines To Trunk Group.

8. See Programming Hints--Section 4

Example:	*	26	01	#	01	13	#	02	17	#	FEAT	FEAT
			COS		TRK GRP	Restriction Designator		TRK GRP	Restriction Designator			

With this program entry Trunk Group "1" in COS "1" is assigned designator "13", (Non-restricted) Trunk Group "2" is assigned designator "17". (Toll restricted 7-digits.)

PROGRAM #26

SEQ. NO.	DIAL PAD	DATA ENTERED	LCD DISPLAY	DISPLAY DEFINITION	NEXT IN SEQ.	NOTE
1	*				2	
2	2	Prog. No.	2		3	
3	6		2 6		4	
4	X1	C.O.S. No (01-16)	X1		5	Enter 1st digit of C.O.S. No.
5	X2		X1 X2	C.O.S. NO.	6	Enter 2nd Digit of C.O.S. No.
6	#	Step	X3 X4 X5 X6	TRK GRP. / RESTRICTION DESIGNATOR	9	Go to 9 if C.O.S. is unchanged
					7	Go to 7 to change Restriction designator
7	X7	*Restriction Designator	X3 X4 X5		8	
8	X8		X3 X4 X5 X6		6	*Step to next TRK GRP
9	#					
10		All TRK Grps Prog.	X1 X2 F F	C.O.S. NO. / ALL TRK. GRPS. PROGRAMMED	4	Enter next C.O.S. (01-16)
					11	Exit program
11	FEAT	Exit Program				
12	FEAT					

Figure 4-18. ASSIGNMENT OF RESTRICTION DESIGNATION TO C.O.S. NO. PER TRUNK GROUP.

*NOTE: 8 TRK GRPS CAN BE ASSIGNED C.O.S.

PROGRAM #27--ASSIGNMENT OF CLASS OF SERVICE PER STATION

1. This program allows assignment of C.O.S. to stations.

2. Each station may be assigned 1 of 16 classes of service. Each station C.O.S. is associated with trunk group C.O.S., and assigns the station access restrictions for eight trunk groups.

3. The Program sequence takes the following form:

(*), 27, |X1 X2,| |X5 X6,| (#), FEAT, FEAT

|X1 X2,|: Extension Number (10-69)
|X5 X6,|: Station C.O.S. (01-16)

4. The system is factory programmed for all stations to C.O.S. #1.

5. See associated programs #25 and #26.

6. See Table 4-10 (Page 4-62) for programming worksheet.

7. See Table 4-9 (Page 4-61) for C.O.S. assignments by trunk group.

Example: * 27, |13| |02| #, FEAT, FEAT

|13|: Extension Number
|02|: Station C.O.S.

With this program entry, station "13" will be in station class of service "02".

PROGRAM #26--TRUNK GROUP CLASS OF SERVICE ASSIGNMENT

1. This program allows C.O.S. configuration on a Trunk Group basis.

2. There can be 16 C.O.S. Each C.O.S. is configured by assignment of one of 19 restriction designators to each of eight trunk groups. (Restrictions may be assigned to trunk group #9.)

3. The restriction class designator defines the type of restriction to be featured. (See Tables 4-4 and 4-5) (Pages 4-56 and 4-57)

4. There are 19 possible types of restrictions that can be assigned to each trunk group. (See Table 4-5.) (Page 4-57)

5. The programming sequence takes the following form:

6. The system is factory programmed for all trunk groups in all C.O.S. as non restricted (Restriction Class Designator 13).

7. See associated Program Numbers 25 and 27.

PROGRAM #27

SEQ. NO.	DIAL PAD	DATA ENTERED	LCD DISPLAY	DISPLAY DEFINITION	NEXT IN SEQ.	NOTE
1	*				2	
2	2	Prog. No.	2		3	
3	7		2 7		4	
4	X1	Ext. No.	X1		5	
5	X2		X1 X2 X3 X4	Ext. No. / Old C.O.S. No.	6	
6	X5	Station C.O.S. (01-16)	X1 X2 X5		7	
7	X6		X1 X2 X5 X6	Ext. No. / New C.O.S.	5 8	Go to 5 to change Ext. No. or C.O.S. Go to 8 to enter data
8	#		0 0 0 0		5 9	Go to 4 to enter next Ext. No. Go to 9 to end sequence
9	Feat				10	
10	Feat					Exit program
11						
12						

Figure 4-19. Procedure for Assigning C.O.S. Per Station.

PROGRAM #28, 29, 30, 31--ALLOW AND DISALLOW RESTRICTION TABLE CONFIGURATION

1. The purpose of this program is to configure semi-restrict, allow and disallow tables for allowing or restricting certain numbers.

2. Each program number (28-31) corresponds directly to one of four tables, e.g.:

   Program #28=Allow Table #1 Program #29=Allow Table #2

   Program #30= Disallow Table #1 Program #31=Disallow Table #2

3. There are 40 entries of four digits in each table (including Wild Card Digits "WCDs"). Each entry may be programmed for all tables.

4. Two WCDs are available for programming. They are "P" and "A". These digits may be programmed by depressing the SPD and FLA buttons, respectively.

   SPD Key="P"=2,3,4,5,6,7,8 and 9 FLASH Key="A"=0,1,2,3,4,5,6,7,8,9,* and #

5. The purpose of the WCDs is to represent the decimal numbers "2-9" and "0-9". They may be used to represent a group of numbers with a single entry. For example, entering "POPA" will represent all area codes with middle digit "0".

6. The program sequence takes the following form:

   (*), X1 X2, (#), X5 X6 X7 X8, (#), FEAT, FEAT

   X1 X2: Program Number (28-31)

   X5 X6 X7 X8: Digits to be allowed or disallowed including "P" & "A"

   FEAT, FEAT: Exit Program

   To clear data, press the (*) button. "FFFF" indicates no data entered at the present location.

7. See Table 4-6 for programming examples and Table 4-7 for Programming Worksheet.

8. See associated programs #25 , #26 and #27.

Note: It is highly recommended that a DSS console be used for this program.

Example: * 28 # 1800 # 911A #, FEAT, FEAT

This program entry will allow only 1800 numbers and 911 to be dialed.

Example: * 30 # 976A # 411A #, FEAT, FEAT

This program entry will disallow 976 numbers and 411 to be dialed.

PROGRAM #28-31

SEQ. NO.	DIAL PAD	DATA ENTERED	LCD DISPLAY	DISPLAY DEFINITION	NEXT IN SEQ.	NOTE
1	*				2	
2	X1	Prog. No. (Table No.)	X1		3	X1,X2 — Allow 1 - Prog. #28; Allow 2 - Prog. #29; Disallow 1 - Prog. #30; Disallow 2 - Prog. #31
3	X2		X1 X2	TABLE NO.	4	
4	#		X3 X4 X5 X6	FIRST ENTRY LOCATION PRESENT DATA	5	Enter new Data to present Entry Location
					9	Step to next Entry Location
5	X7	Digits to be Allowed or Restricted P = (2-9) A = (0-9)	X7		6	Enter First Digit
6	X8		X7 X8		7	Enter Second Digit
7	X9		X7 X8 X9		8	Enter Third Digit
8	X10		X7 X8 X9 X10	FIRST ENTRY LOCATION NEW DATA	9	Enter Fourth Digit then step to next entry
9	#		X3 X4 X5 X6	NEXT ENTRY PRESENT DATA	1	
					5	Go to next entry
10		All Entries Prog.	X1 X2 F F	PROG. NUMBER / END	11	End program Sequence
11	FEAT				12	Exit program
12	FEAT					

Figure 4-20. Procedure for Entering Data Into The Semi-Restrict Allow and Disallow Tables.
NOTE: 1-"P"is entered by pressing "SPD" button
2-"A" is entered by pressing "FLA" button

PROCRAM #32--CO AND P-KEY ASSIGNMENT (NON-SQUARED)

1. This program allows changing the CO lines and assignment of any CO key.

2. P-Key or Pooled Line assignment is allowed for keys 6 or 18, of all telephones. All keys succeeding the P-Key assigned will be rendered inoperative.

3. The program sequence takes the following form:

(*),	32,	X1 X2,	(#),	X7 X8,	(#)	FEAT FEAT
		Extension No. (10-69)	Step	Trunk No. (01-30) or P-Key (9, 1-8)	Program	End Sequence

4. The system is factory programmed for squared operation. Therefore, CO Number = 01-30 = CO Line Keys 01-30.

5. Trunk No. assignment follows this format: X7, X8 = 00-30 (00=No Assignment). If line key #1 assignment changes, for example, to Trunk #10, then CO line key #10 is automatically assigned Trunk #1. If line key #2 is assigned to Trunk #11, then CO line key #11 is automatically assigned Trunk #2 etc.

6. P-Key assignment follows this format: X7 = P-Key Designator = "9"/X8 = Trunk Group desired (1-9).

7. See Table 4-11 (Page 4-63) for programming worksheet.

Note: P-Keys are assigned on a per station basis (one P-Key per station), and may be assigned to any trunk group on a per key basis. COs may be transferred to any P-Key in the system, providing that Trunk has been assigned to the P-Key trunk group.

Example: *32 [15] # [01] [01] # [02] [02] # [03] [07] . . . . [06] [92]

Ext No. (10-69)	Button No.	CO No.	Button No.	CO No.	Button No.	CO No.	Button No.	P-Key trk grp #2

With this program station number "15" is squared on CO button numbers "01 and 02". CO button number "03" is nonsquared, with CO "07" appearing on it. CO button number "06" is assigned on a P-key, trunk group number "2".

PROGRAM #32

SEQ. NO.	DIAL PAD	DATA ENTERED	LCD DISPLAY	DISPLAY DEFINITION	NEXT IN SEQ.	NOTE
1	*	Prog. No.			2	
2	3		3		3	
3	2		3 2		4	
4	X1	Ext. No.	X1		5	
5	X2		X1 X2	EXTENSION NO.	6	
6	#	Step	X3 X4 X5 X6	CO LINE KEY / PRESENT TRK NO.	9	Go to 9 if data is unchanged
					7	*Go to 7 to change TRK No.
7	X7	Trunk No. or P-Key Designation	X7		7	Enter 1st Digit of New TRK No. or 9 for P-Key
					8	Enter 2nd Digit of New TRK No. or P-Key TRK GRP
8	X8		X3 X4 X7 X8	CO LINE KEY / NEW TRK NO. OR P-KEY	9	To program New TRK No. + Step to next line key
					7	To change 1st Digit of New TRK No. or "9"
9	#		X7 X8	NEXT CO LINE KEY / PRESENT TRK NO.	8	To change 2nd Digit of New TRK No. or TRK GRP
					9	To Program and step to next line key
10		All Keys Programmed	X9 X10 F F	EXT. NO. / ALL LINE KEYS PROGRAMMED	4	Enter next Ext. No.
					11	End of program sequence
11	FEAT	End Program				
12	FEAT					

Figure 4-21. ASSIGNMENT OF CO KEYS TO NON-SQUARED CONFIGURATION AND POOLED LINE ACCESS (P-KEY)

*NOTE: ENTER "9" FOR P-KEY DESIGNATION THEN TRK GRP ASSIGNED TO P-KEY

PROGRAM #33--DO-NOT-DISTURB (ALLOW OR DISALLOW STATION)

1. This program allows a station to use the Do-Not-Disturb feature:

2. This program sequence takes the following form:

(*), 33, [X1, X2,] [X3] (#), FEAT FEAT

X1, X2 = Extension 10-69

X3 = DND 0=Allowed 1=Disallowed

3. By allowing a station:

Allow = 0

By disallowing a station:

Disallow = 1

PROGRAM #33

SEQ. NO.	DIAL PAD	DATA ENTERED	LCD DISPLAY	DISPLAY DEFINITION	NEXT IN SEQ.	NOTE
1	*				2	
2	3	Program No.	3		3	
3	3		3 3	Program No.	4	
4	X1	Station No.	X1	First digit of station No.	5	
5	X2		X1 X2	Second digit of station No.	6	
6	X3		X3	1 = Disallow 0 = Allow	7	
7	#		0 0 01 0		5 or 8	
8	Feat					End Programming
9	Feat					
10						
11						
12						

Figure 4-22. Allow or Disallow Do-Not-Disturb

Table 4-4

TRUNK GROUP CLASS OF SERVICE RESTRICTIONS

	***	Allowed Table		Disallowed Table			
Restriction Class	Designator	PGM.28 A1	PGM.29 A2	PGM.30 D1	PGM.31 D2	System Speed	Special Banks
*	01	1	0	0	0	0**	
*	02	0	1	0	0	0	
*	03	1	1	0	0	0	
*	04	0	0	1	0	0	
*	05	0	0	0	1	0	
*	06	0	0	1	1	0	
*	07	1	0	0	0	1	
*	08	0	1	0	0	1	
*	09	1	1	0	0	1	
*	10	0	0	1	0	1	
*	11	0	0	0	1	1	
*	12	0	0	1	1	1	
	13	N/R	Non-restricted			1	
	14	OCC 8	other common carrier 8-digits			1	
	15	OCC 7	other common carrier 7-digits			1	
	16	T/R 8	toll restrict 8-digits			0	
	17	T/R 7	toll restrict 7-digits			0	
	18	O/R 5	outgoing restrict 5-digits			0	
	19	O/R	outgoing restrict "0"-digits			0	

Note: * The number "1" is used to indicate "yes" when program searches a table.

The number "0" is used to indicate table not assigned when the program searches for tables.

**The number "1" is used to indicate dialing from System Special Speed Banks allowed.

The number "0" is used to indicate dialing from System Special Speed Banks not allowed.

***These are the associated program numbers for allowed and disallowed tables.

Table 4-5
ALLOWED DIALING PATTERNS FOR RESTRICTION COS

Restriction Class Designation	Class Type	DIALING PATTERN					
		Outgoing Restriction	1st "0", 411, 1411 Dial Restriction	Restriction By Allow Table	Restriction By Disallow Table	Digits Restricted to 5, 7 or 8	Special SPD Bank Access
01	SR1			X			
02	SR2			X			
03	SR3			X			
04	SR4				X		
05	SR5				X		
06	SR6				X		
07	SR7			X			X
08	SR8			X			X
09	SR9			X			X
10	SR10				X		X
11	SR11				X		X
12	SR12				X		X
13	NR						X
14*	OCC8		X			8 Digit	X
15*	OCC7		X			7 Digit	X
16	TR8		X			8 Digit	
17	TR7		X			7 Digit	
18	OR5		X			5.Digit	
19	OR	X				0 Digit	

*These classes of service restrict 7 and 8 digit calls except when special SPD Banks 88, 89 (Station) and 50, 51 (System) are accessed prior to dialing long distance. (See Section 3 Features Operation). In this case all restrictions are overridden.

SEMI-RESTRICTED ALLOW AND DISALLOW

	PROG. #28				PROG. #29				PROG. #30				PROG. #31			
Table No. / Entry No.	ALLOW 1				ALLOW 2				DISALLOW 1				DISALLOW 2			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1	1	2	1	2	5	2	A	P								
2	P	P	P	A	6	A	A	P								
3	P	A	A	P	P	P	P	P								
4									1	P	P	P	1	2	P	2
5									0	P	P	P	1	3	P	P
6									P	P	P	P	P	P	P	P
7																
8																
9																
10																
11																
12																
13																
14																
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28																
29																
30																
31																
32																
33																
34																
35																
36																
37																
38																
39																
40																

Table 4-6. Example of Entries for Semi-Restricted Allow and Disallow Tables.

SEMI-RESTRICT ALLOW and DISALLOW

Table No. / Entry No.	ALLOW 1				ALLOW 2				DISALLOW 1				DISALLOW 2			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1																
2																
3																
4																
5																
6																
7																
8																
9																
10																
11																
12																
13																
14																
15																
16																
17																
18																
19																
20																
21																
22																
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25																
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28																
29																
30																
31																
32																
33																
34																
35																
36																
37																
38																
39																
40																

Table 4-7. Worksheet for Semi-Restricted Allow and Disallow Tables.

Program #25

TRUNK	GROUP
CO #	*1-9
01	
02	
03	
04	
05	
06	
07	
08	
09	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	
21	
22	
23	
24	
25	
26	
27	
28	
29	
30	

***NOTE: 1-8 TRK GRP can have class of service. TRK GRP No. 9 has no class of service.**

Table 4-8. Worksheet for CO Trunk Group Assignment.

Program #26

C.O.S. ON TRUNK GROUP								
C.O.S.	TRUNK GROUP #							
	1	2	3	4	5	6	7	8
01								
02								
03								
04								
05								
06								
07								
08								
09								
10								
11								
12								
13								
14								
15								
16								

Table 4-9. Worksheet for Trunk Group/Station C.O.S. Assignment.

Program #27

Station C.O.S.			
STATION NO.	01-16	STATION NO.	01-16
10		40	
11		41	
12		42	
13		43	
14		44	
15		45	
16		46	
17		47	
18		48	
19		49	
20		50	
21		51	
22		52	
23		53	
24		54	
25		55	
26		56	
27		57	
28		58	
29		59	
30		60	
31		61	
32		62	
33		63	
34		64	
35		65	
36		66	
37		67	
38		68	
39		69	

Table 4-10. Worksheet for Station C.O.S. Assignment.

Program #32

LINE KEY	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
1																											
2																											
3																											
4																											
5																											
6																											
7																											
8																											
9																											
10																											
11																											
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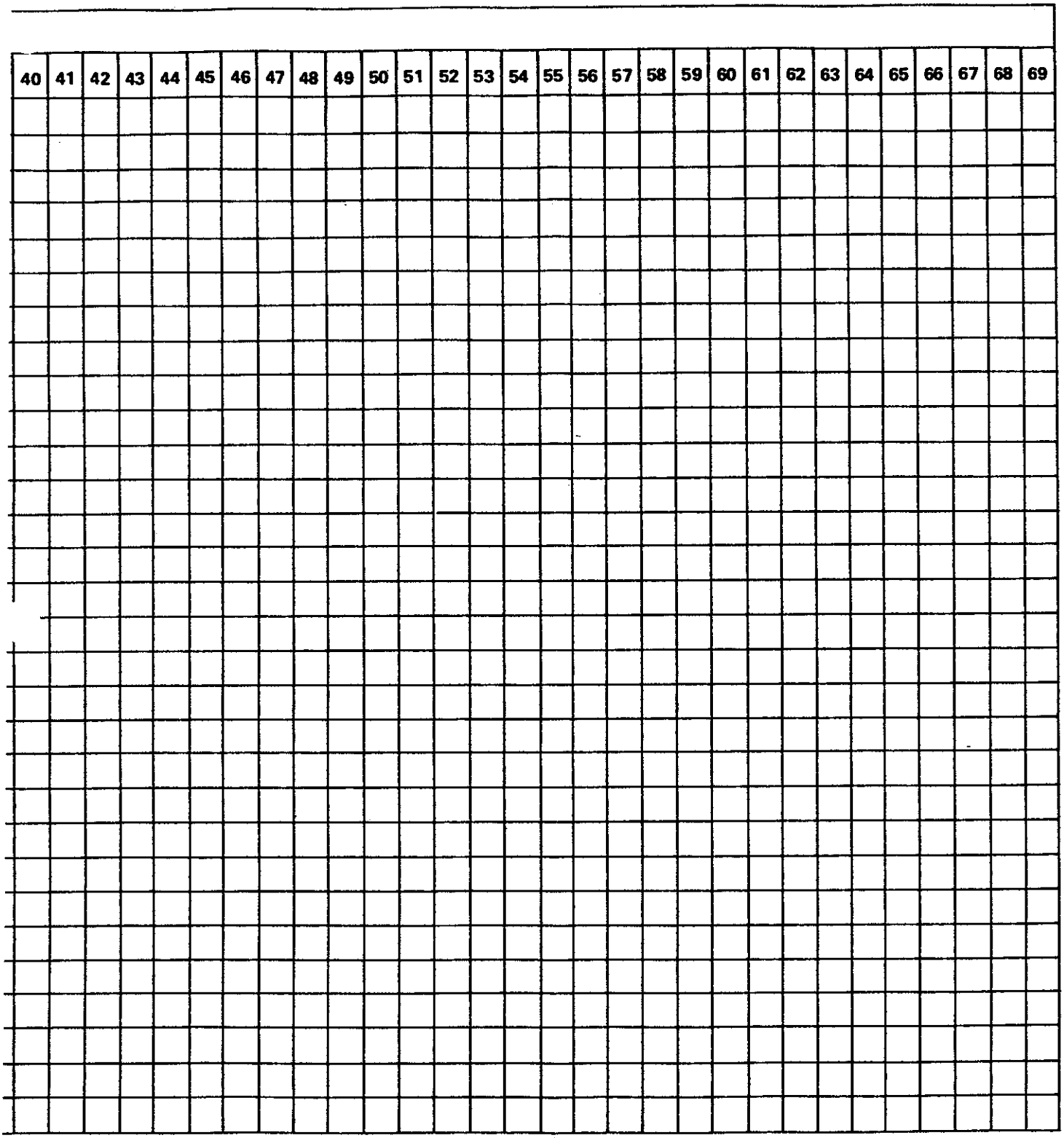
26																											
27																											
28																											
29																											
30																											

Table 4-11. Worksheet for Non-Squared CO Key Assignment.


40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69

Program #22
FLEXIBLE STATION RINGING ASSIGNMENT (10-69)

CO #	1st	2nd	3rd	4th	5th	6th
01						
02						
03						
04						
05						
06						
07						
08						
09						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						

Program #23
NIGHT STATION ASSIGNMENT (10-69)

CO #	1st	2nd
01		
02		
03		
04		
05		
06		
07		
08		
09		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		
30		

Table 4-12. Worksheets for Station Ringing Assignment and Night Ringing Assignment.

CO NO.		DTMF OR ROTORY (18)	TRUNK GROUP (25)	RING ASSIGNMENT							
				DAY (22)						NIGHT (28)	
1											
2											
3											
4											
5											
6											
7											
8											
9											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											
21											
22											
23											
24											
25											
26											
27											
28											
29											
30											

PRG

13 ICM	VOICE = O/TONE = 1		
14 TYPE OF HOLD	EXCL = O/SYS = 1		
15 HOLD RECALL	30 sec. — 9.5 min. OR NO RECALL		(00-95)
16 FLA	0.1 SEC. TO 9.9 SEC.		(01-99)
17 RING DET.	05, 08, 11, 14, 17, 20, 23, 26		
19 PULSE SPEED	10/20		
20 PULSE BK (%)	58 TO 73		

STA. CLASS INDEX TABLE

COS	TRUNK GROUP 1	2	3	4	5	6	7	8
01								
02								
03								
04								
05								
06								
07								
08								
09								
10								
11								
12								
13								
14								
15								
16								

P-KEY ASSIGNMENT

STA. NO.	6, 18 BUTTON	✓ YES P-KEY	P-KEY NO.	TRK GRP	STA. NO.	6, 18 BUTTON	✓ YES P-KEY	P-KEY NO.	TRK GRP
10					40				
11					41				
12					42				
13					43				
14					44				
15					45				
16					46				
17					47				
18					48				
19					49				
20					50				
21					51				
22					52				
23					53				
24					54				
25					55				
26					56				
27					57				
28					58				
29					59				
30					60				
31					61				
32					62				
33					63				
34					64				
35					65				
36					66				
37					67				
38					68				
39					69				

Table 4-13. Program Data Tables.

APPENDIX A

PROGRAMMING TIPS

1. When programming station specific operation-related data such as:
   a. Line Key Assignments, Program #32
   b. Ring Assignments (Day and Night) Programs #22 and #23
   c. P-Key Assignment, Program #32

   When stations are off-hook, it is necessary to enter specific program data twice. The following are examples of hypothetical operation:
   a. Suppose terminal station #25 is off-hook (busy on a CO call).
   b. You are presently programming Day-Ring Assignments and wish to program CO lines 1 through 6 to ring at station numbers #10 and #25.
   c. Enter data "01" for CO line #1. The DSS LCD displays "01/10". This is correct since you wish to have CO line #1 ring at station #10.
   d. Press (#) to step to next ring locations. The DSS LCD displays "01/21". If you do not want station 21 to ring, alter this data as follows:
   e. Enter data "25" for next ring assigned station. The DSS LCD displays "01/25".
   f. Enter (#) in order to step to next location. Notice that an error tone (multiple beep-tones) is emitted from the programming station. This error tone is an indication that station #25 is in use. Therefore, the system requires verification that you wish to change the station's present operation. Notice the DSS display has not changed from "01/25". DO NOT press (#) again. This will only tell the system to pass this ring location and resume default data for this specific assignment.

g. Reenter the data "25" for ring assignment and press (#). Reentering the actual data a second time will tell the system to store this information for use when station #25 becomes idle (on-hook condition) again. At that time, the system will reload the newly stored data into program #22 and assume the new operation for extension #25 with respect to its ring assignment.

2. Review programmed data upon completing programming. Many times information is entered incorrectly onto the dialpad due to human error. In addition, often stations are in use and proper programming procedures are not followed.

APPENDIX B

SPEAKERPHONE INSTALLATION

MARATHON SPM (Speakerphone Module) Installation

A MARATHON SPM may be installed in the MARATHON E-6, E-18, and E-30 telephone sets when CO handsfree is required. To install a MARATHON SPM:

1. Remove the modular line cord from the telephone.
2. Open the telephone by loosening two screws fastened at the base that secures the housing.
3. Place a MARATHON SPM into the card holder located on the upper middle of the base and plug a connector cable from the SPM into the connector CN40 located at the base as shown in figure below.

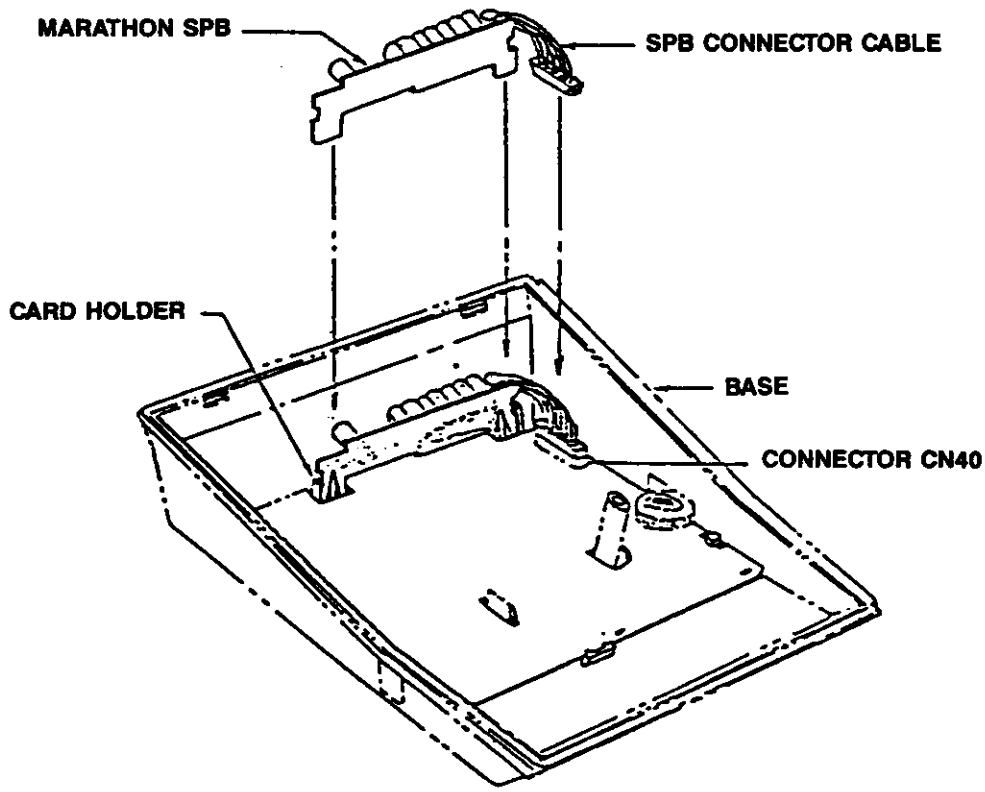


Figure B-1. Speaker Phone Installation.

APPENDIX C
Wall Phone Installation

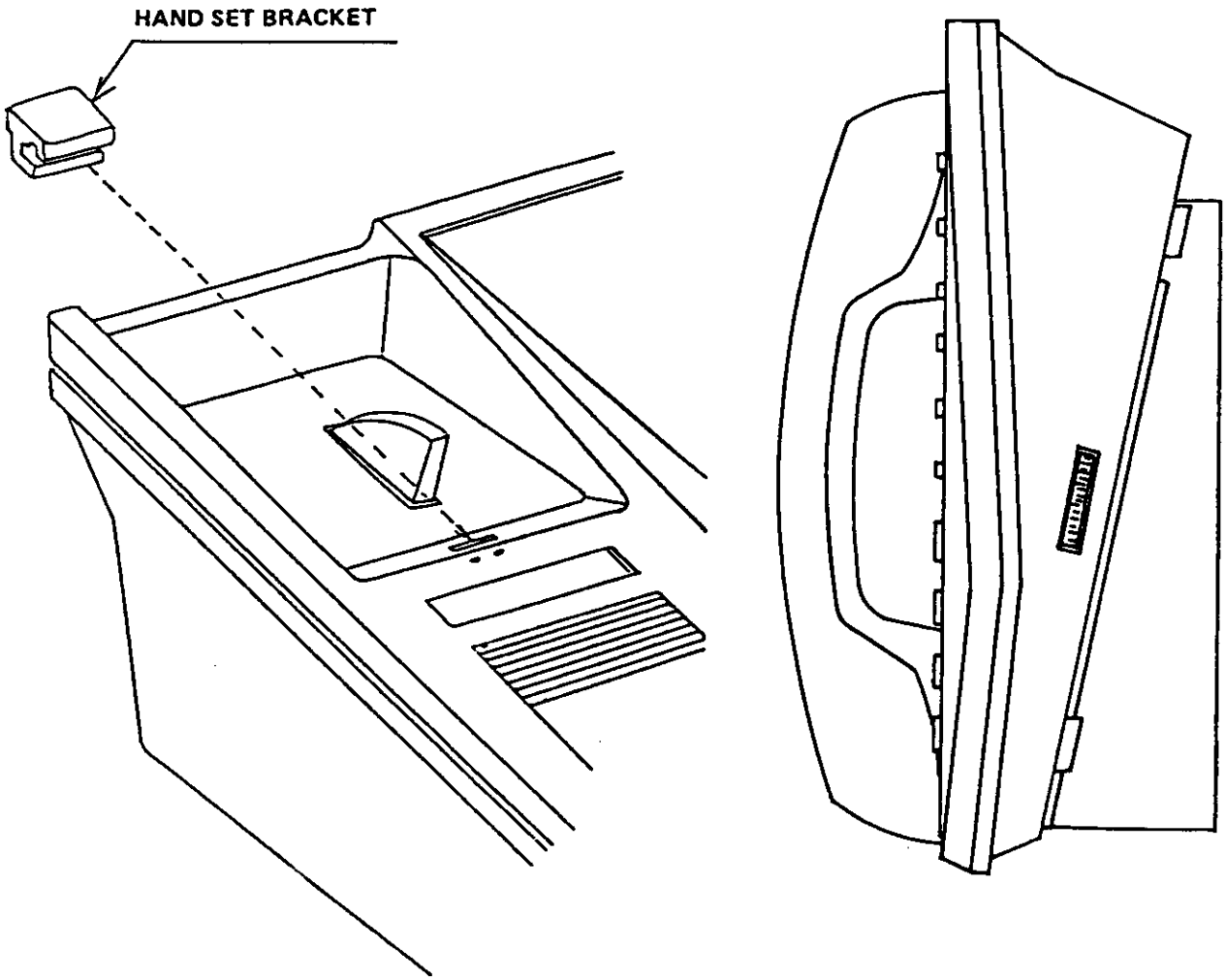


Figure C-1. Wall Phone Installation.

APPENDIX D

GLOSSARY OF TERMS

Term	Definition
BLF	Busy Lamp Field
KSU	Key Service Unit
BTU	British Thermal Unit
C-MOS	Capacitive Metal Oxide Semiconductor
CO	Central Office
CONT DISP	Control Display
CO/PBX	Central Office/Private Branch Exchange
COS	Class of Service
COU	Central Office Line Unit
CPU	Central Processing Unit
Cradle	Handset rests in Cradle (On-Hook)
Dialpad	Keypad with digits 0-9 and letters A-Z
Depress	Apply soft pressure with finger
Digital Key Pad	Same as Dialpad
DIP Switch	Dual Inline Package Switch
DP	Rotary Dial Pulse
DSS	Direct Station Select
DTMF	Dual Tone Multi Frequency
ECU	Expansion Control Unit
EMU	Expansion Matrix Unit
Enter	Depress appropriate key
Eprom	Electrically Programmable ROM
FCC	Federal Communications Commission
ICM	Intercom
Idle CO	Inactive Central Office Line
IPL	Initial Program Load
LCD	Liquid Crystal Display
LED	Light Emitting Diode
ESU	Expansion Service Unit
Line Key	Central Office Trunk Key
MDF	Main Distribution Frame

MOH	Music On Hold
ms	Millisecond
MSG	Message Key
Ohm	Value for (impedance) resistance to the flow of electrons
PBX	Private Branch Exchange
PGM	Program
PTC	Positive Temperature Coefficient Varistor
RAM	Random Access Memory
ROM	Read Only Memory
Semi Restrict	Modified Outgoing Dial Restriction
SPD	Speed Dial
SMU	Station Message Recording Unit
Splash Tone	Alerting Tone
STU	Station Terminal Unit
Tenants	Sharers of Service in the same Key System