

EX-824/1648
ELECTRONIC KEY TELEPHONE SYSTEM
INSTRUCTION MANUAL



OMEGA-PHONE
IV

3.4 EX-824/1648CM AND EX-1648EM INSTALLATION

3.4.1 General Description

This section describes the installation procedures for the EX-824/1648CM and EX-1648EM. Connection of EX-824/1648CM and EX-1648EM is very simple. These can be connected to each other by simply engaging one motherboard with the card-edge connector on the other motherboard. The processes required for CM and EM installation are explained below.

3.4.2 Unpacking and Handling

3.4.2.1 EX-824/1648CM

(1) General

The EX-824/1648CM is packed in a carton together with various accessories. The contents of the carton are shown in Table 3.4.2.1.A and Figure 3.4.2.1.A. Open the carton as illustrated in Figure 3.4.2.1.A.

Table 3.4.2.1.A EX-824/1648CM Components

	Description	Quantity	Remarks
1	EX-824/1648CM (EX-824/1648 Common Module Unit)	(1)	
2	WRCM-M (Wall and Rack Mount for Common Module-M)	2	} Accessories
3	Busing CL080632B0	2	
4	Screw TP (+) 3 x 8S	2	
5	Screw TP (+) 3 x 14S	2	
6	EX-connector clamp	1	
7	EX-connector sub clamp	1	
8	Screw KP (+) 4 x 8S	12	

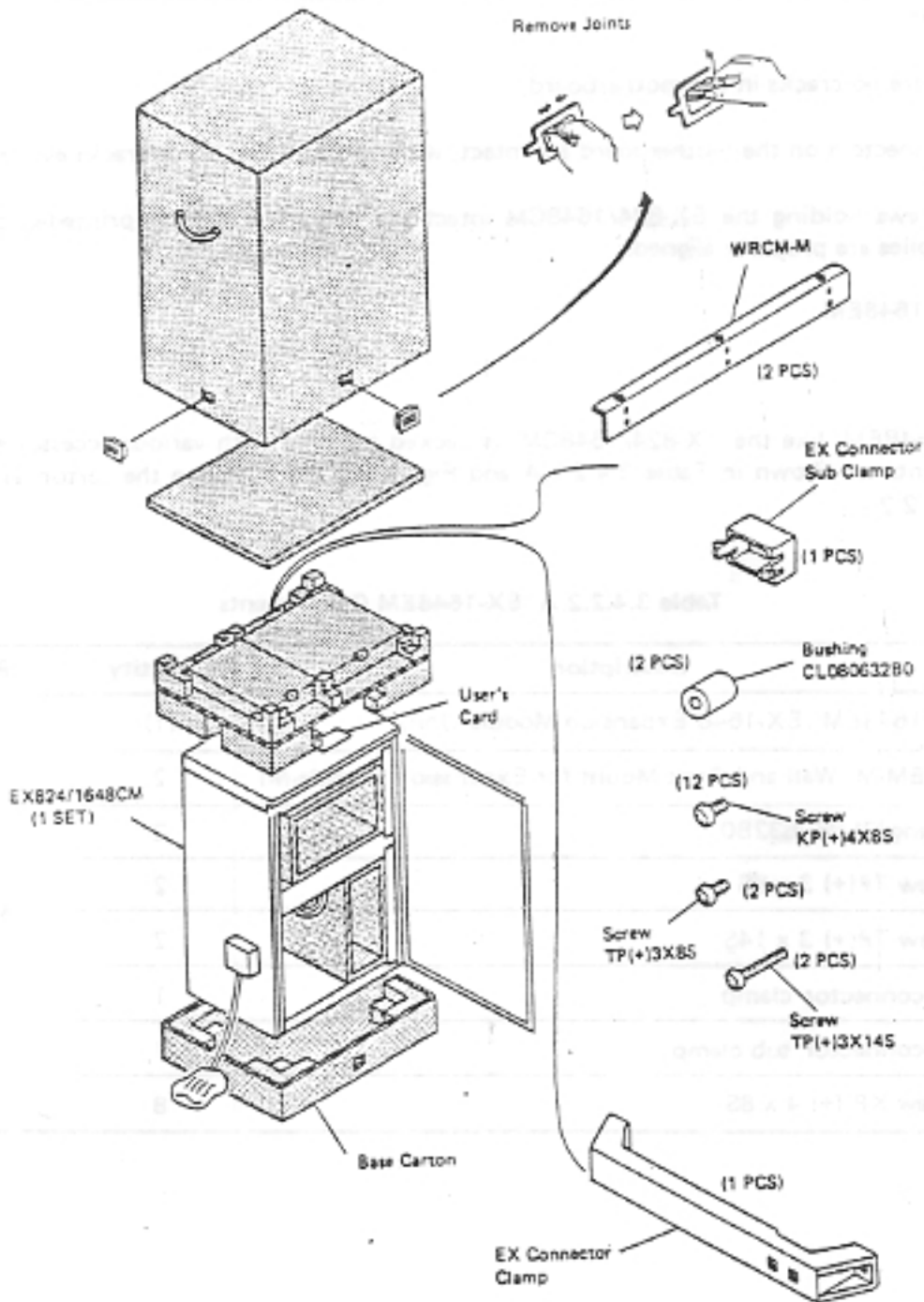


Figure 3.4.2.1.A EX-824/1648CM Unpacking and Components

(2) Inspection

After removing the front panel, inspect the EX-824/1648CM motherboard for physical damage. Ensure that:

- (a) There are no cracks in the motherboard;
- (b) All connectors on the motherboard are intact, with no short circuits or cracks evident; and
- (c) All screws holding the EX-824/1648CM intact are tight, and the CM printed-circuit mounting assemblies are properly aligned.

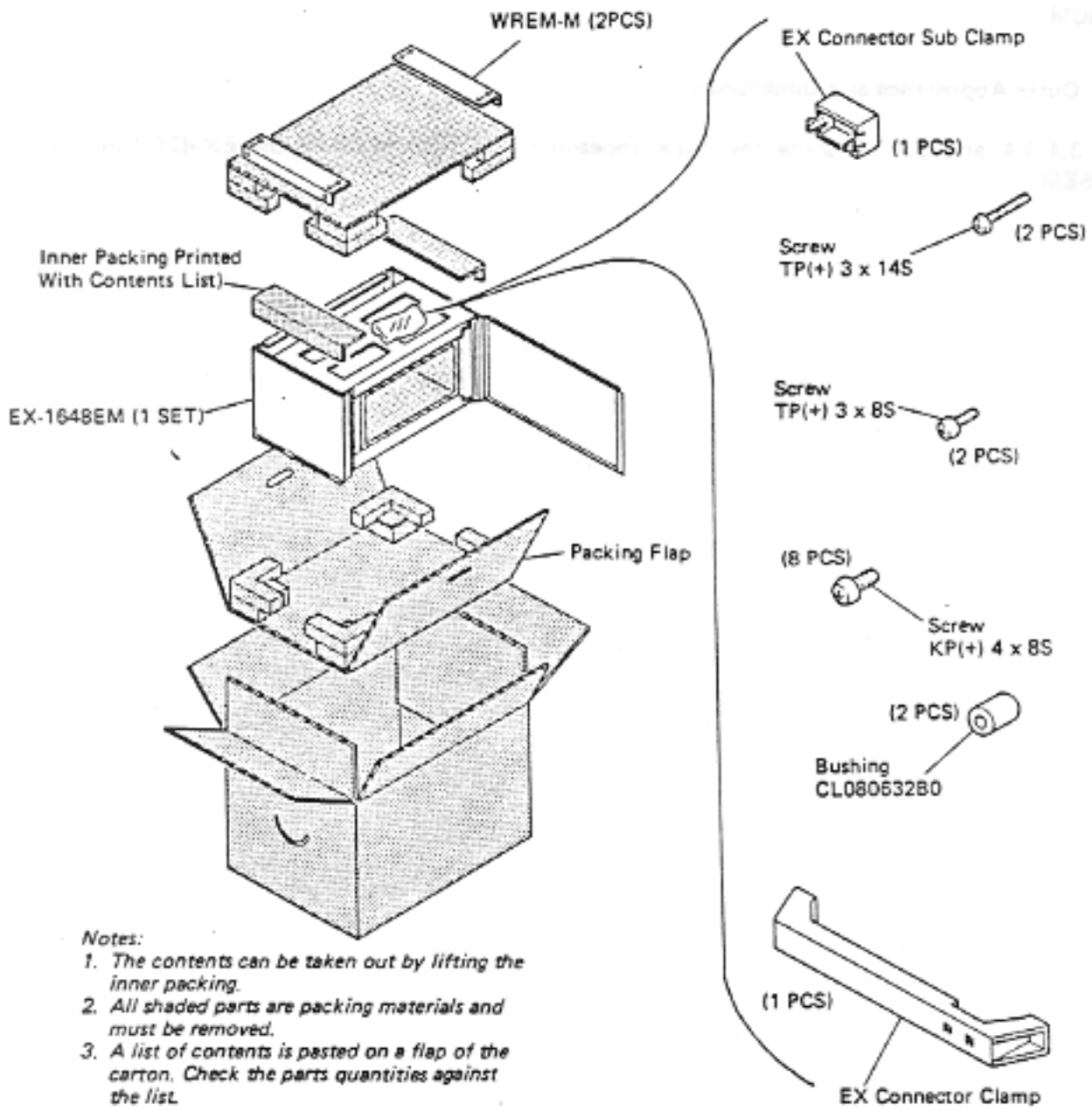
3.4.2.2 EX-1648EM

(1) General

The EX-1648EM, like the EX-824/1648CM, is packed together with various accessories in a carton. The contents are shown in Table 3.4.2.2.A and Figure 3.4.2.2.A. Open the carton as illustrated in Figure 3.4.2.2.A.

Table 3.4.2.2.A EX-1648EM Components

	Description	Quantity	Remarks
1	EX-1648EM (EX-1648 Expansion Module Unit)	(1)	
2	WREM-M (Wall and Rack Mount for Expansion Module-M)	2	Accessories
3	Busing CL080632B0	2	
4	Screw TP(+) 3 x 8S	2	
5	Screw TP(+) 3 x 14S	2	
6	EX-connector clamp	1	
7	EX-connector sub clamp	1	
8	Screw KP (+) 4 x 8S	8	



Notes:

1. The contents can be taken out by lifting the inner packing.
2. All shaded parts are packing materials and must be removed.
3. A list of contents is pasted on a flap of the carton. Check the parts quantities against the list.

Figure 3.4.2.2.A EX-1648EM Unpacking and Components

(2) Inspection

After unpacking, check the individual parts for physical damage in the same way as the EX-824/1648CM.

3.4.3 Outer Appearance and Dimensions

- Figures 3.4.3.A and 3.4.3.B show the outer appearance and dimensions of the EX-824/1648CM and EX-1648EM.

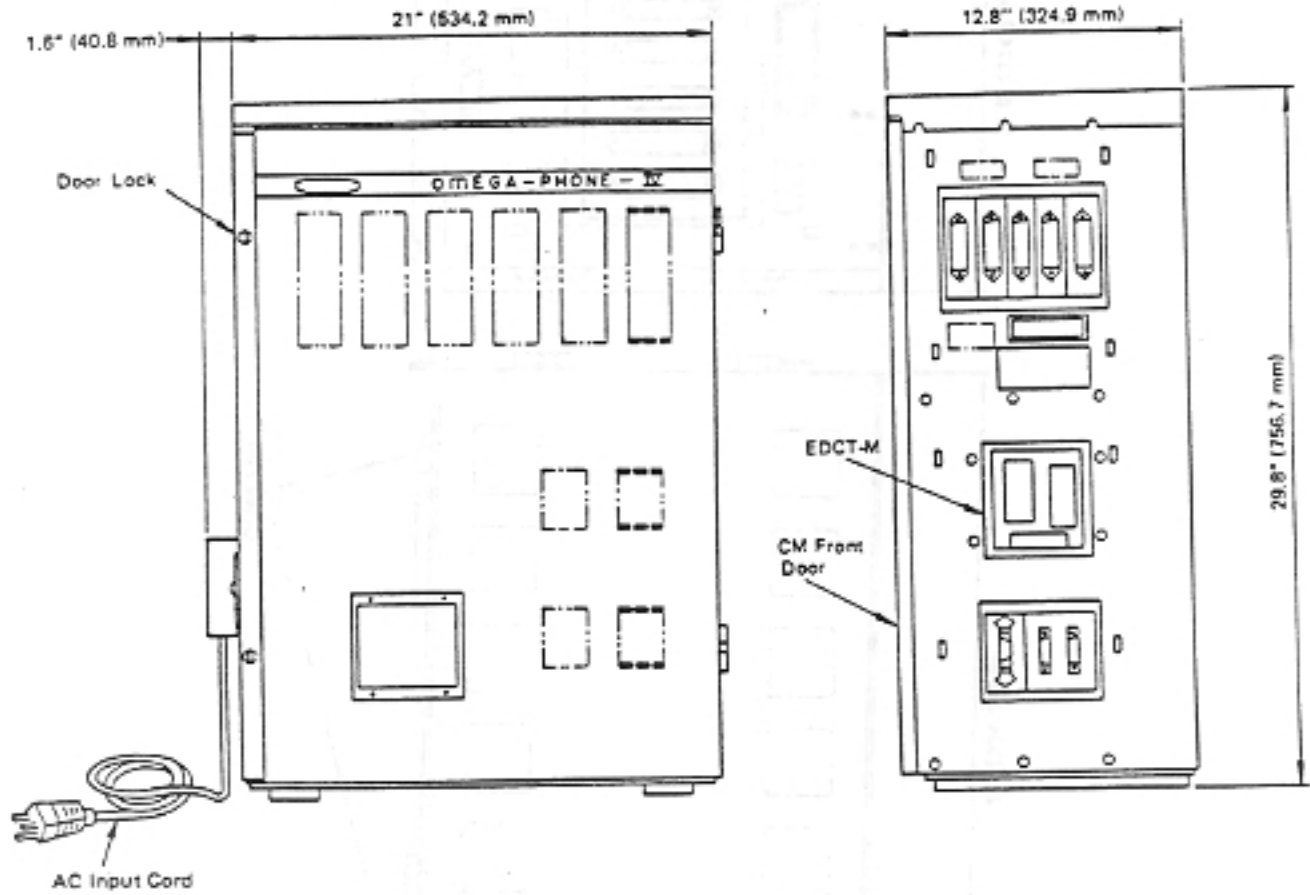


Figure 3.4.3.A EX-824/1648 Common Module Unit

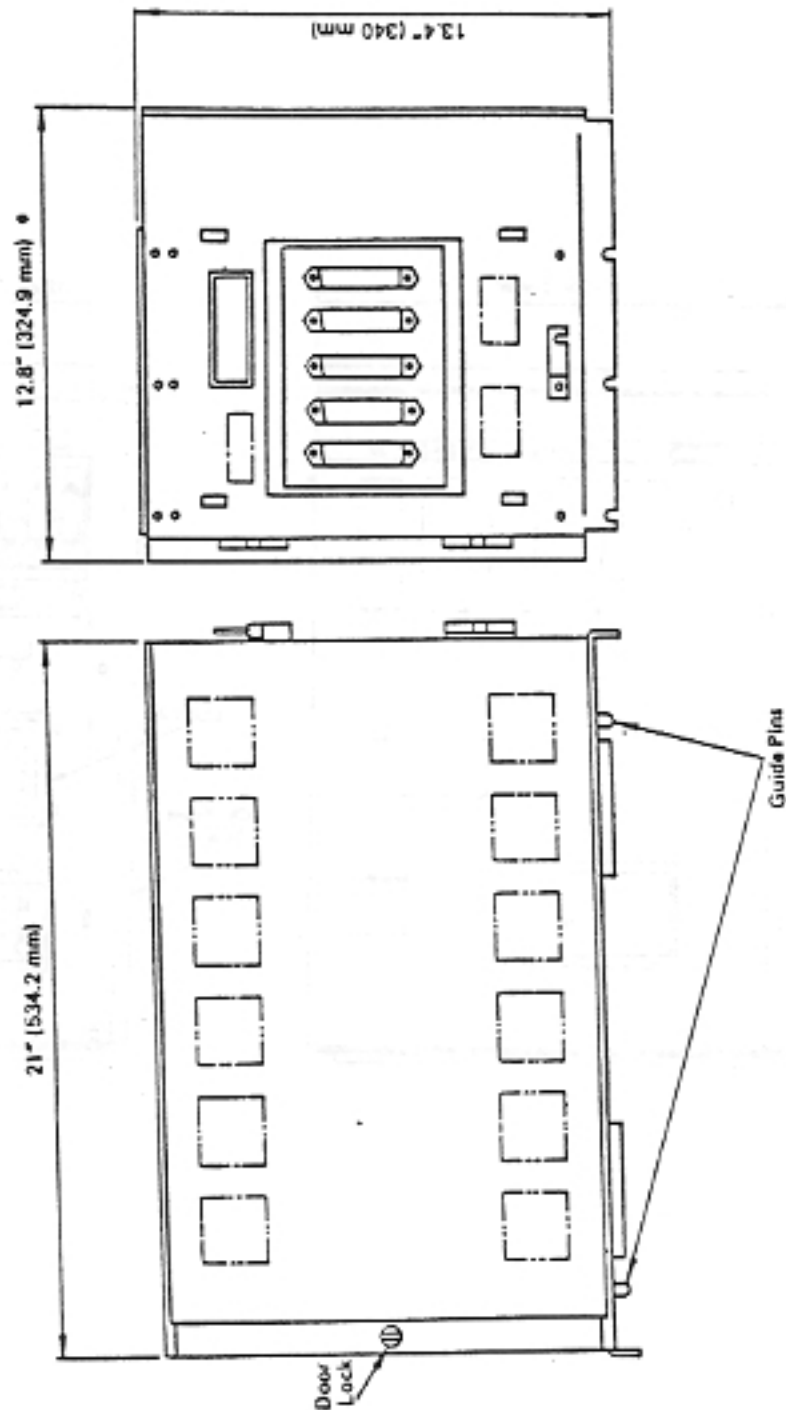


Figure 3.4.3.B EX-1648 Expansion Module Unit

3.4.4 Installation Area

3.4.4.1 Basic Conditions of Installation

The Module Units should be placed in a location that is dry and exhibits a relatively stable temperature subject to the environmental limitations given in paragraph 3.2.9. The area should be accessible to service personnel and relatively free of dust and vibration.

The area should contain a suitable number of electrical outlets of commercial power for all system components. A dedicated (separately fused) main power line source is recommended to ensure equipment operation even in the event of other equipment power failure.

Ample space should be allotted for the installation of the system components, MDF, and external equipment such as music sources and public address amplifiers. A minimum of 3-inch spacing should be maintained between the Module Units and Other Units or MDF components.

3.4.4.2 General Description of Installation

The EX-824/1648CM may consist of up to eight CO/PBX lines, 24 extensions, two DSSs, and four BLFs. Installation of an EX-1648EM increases the system capacity to a maximum of 16 CO/PBX lines, 48 extensions, two DSSs, and four BLFs.

The building block method permits easy system expansion by simply stacking the EX-1648EM upon the EX-824/1648CM. (See Figure 3.4.4.2.)

Caution: The system employs advanced electronic parts so it must be switched off before installing an EX-1648EM.

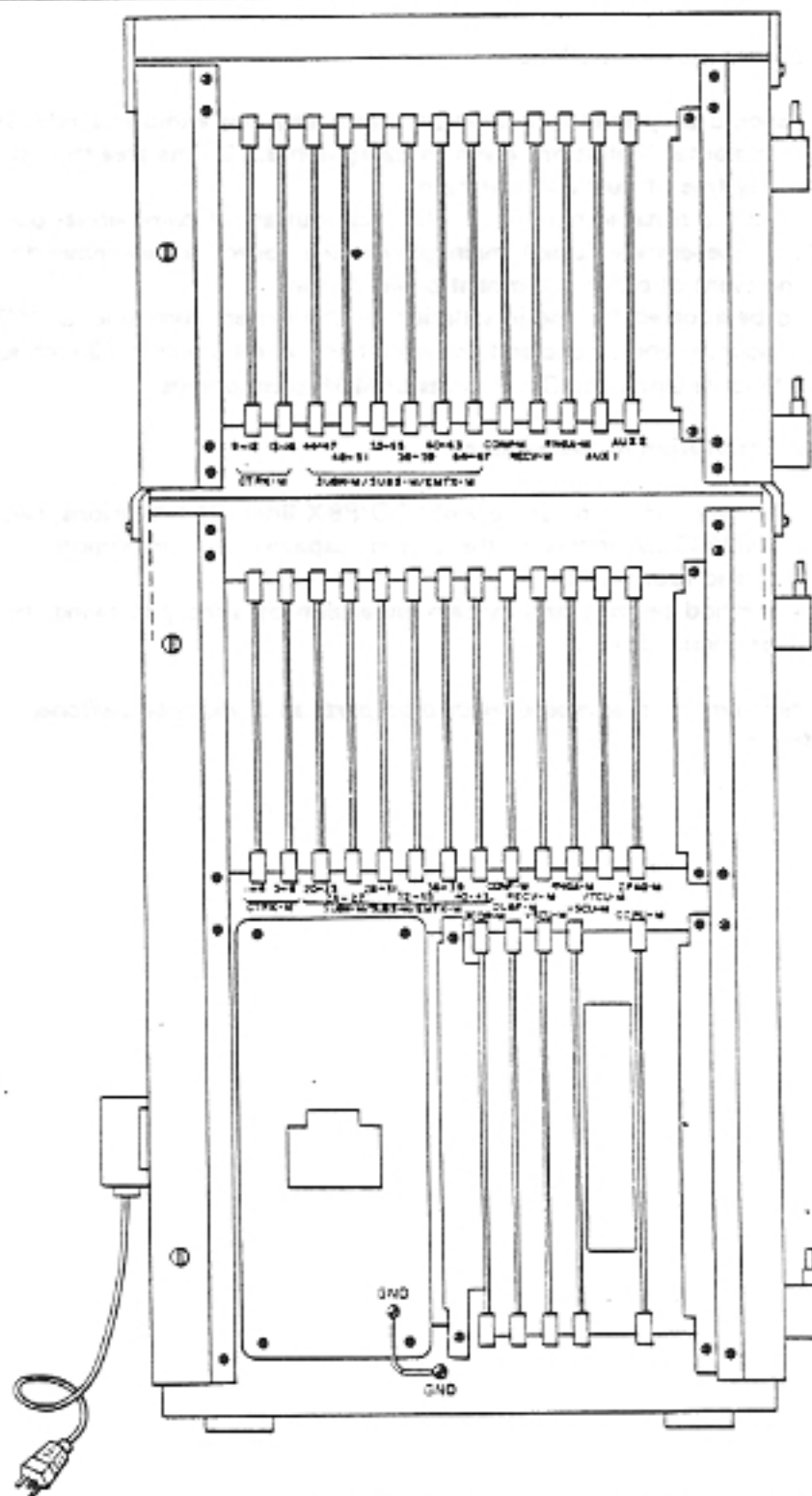


Figure 3.4.4.2 EX-824/1648CM Printed-Circuit Board Mounting

3.4.4.3 Wall- or Rack-Mounting Procedure

3.4.4.3.1 EX-824/1648CM

The EX-824/1648CM can be installed on a wall or in a rack.

It can also be mounted directly on the floor, but should be clear of the floor to protect the CM from floor dirt.

Wall- or rack-mounting can be accomplished using the same parts.

(1) Parts necessary for installation

The parts necessary for installation are shown in Table 3.4.4.3.1(1). Have the unit and parts ready for installation.

Table 3.4.4.3.1(1) Parts Necessary for Wall- or Rack-Mounting EX-824/1648CM

No.	Description	Quantity		Remarks
		Wall-Mounting	Rack-Mounting	
1	EX-824/1648 Common Module Unit (EX-824/1648CM)	1	1	
2	Wall/Rack Mount for Common Module-M (WRCM-M)	2	2	Accessories for EX-824/1648CM
3	Screw KP(+) 4 x 8S	12	12	
4	Wall- or rack-mounting screw (1/4 inch in diameter, 5/16 inch or longer)	6	6	
5	Machine bolt for wall hole (1/4 inch in diameter)	6	/	Must be procured by installer.
6	23-inch standard rack	/		

(2) Installation

(a) Wall-mounting procedure

Refer to Figures 3.4.4.3.1(2)(a)A and 3.4.4.3.1(2)(a)B for wall mounting.

- (i) Drill six bolt holes in the wall as shown in Figure 3.4.4.3.1(2)(a)A, and temporarily tighten four of the six bolts, procured by the installer, at top and bottom on both sides. (Do not fully tighten them.) Machine bolts 1/4 inch in diameter are recommended for added strength and safety.
- (ii) Attach WRCM-M to the EX-824/1648CM with screws KP(+) 4 x 8Ss at 12 points.

- (iii) Hook the assembly of the EX-824/1648CM and WRCM-M on the bolts temporarily tightened in step (i), and tighten the other two bolts in the center holes at right and left in the wall.
Fully tighten the four temporarily tightened bolts.
- (iv) The bolts and screws for wall mounting must be readied by the installer. The WRCM-M mounting holes are 0.26 inch in diameter, so bolts 1/4 inch in diameter and 5/16 inch or longer should be used.

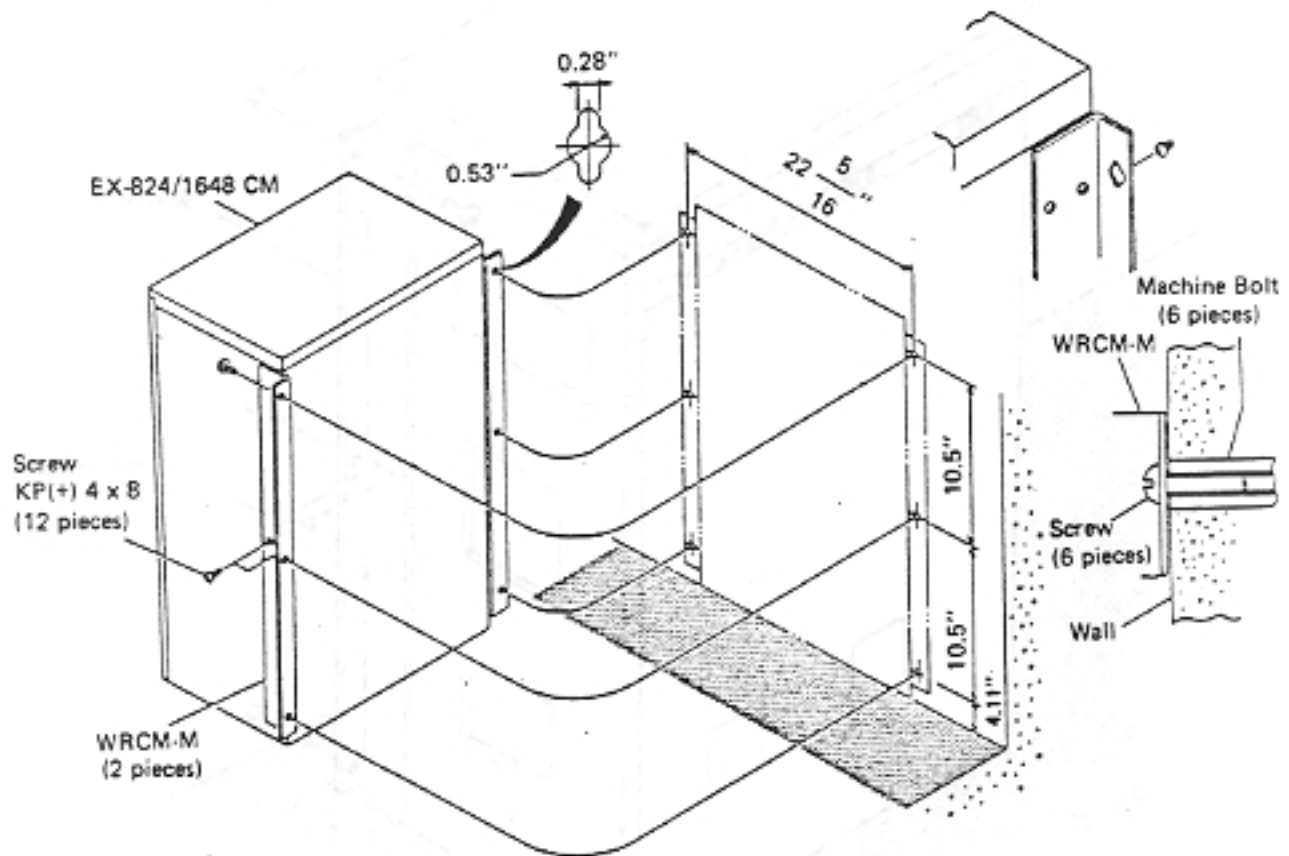


Figure 3.4.4.3.1(2)(a)A EX-824/1648CM Wall-Mounting Method

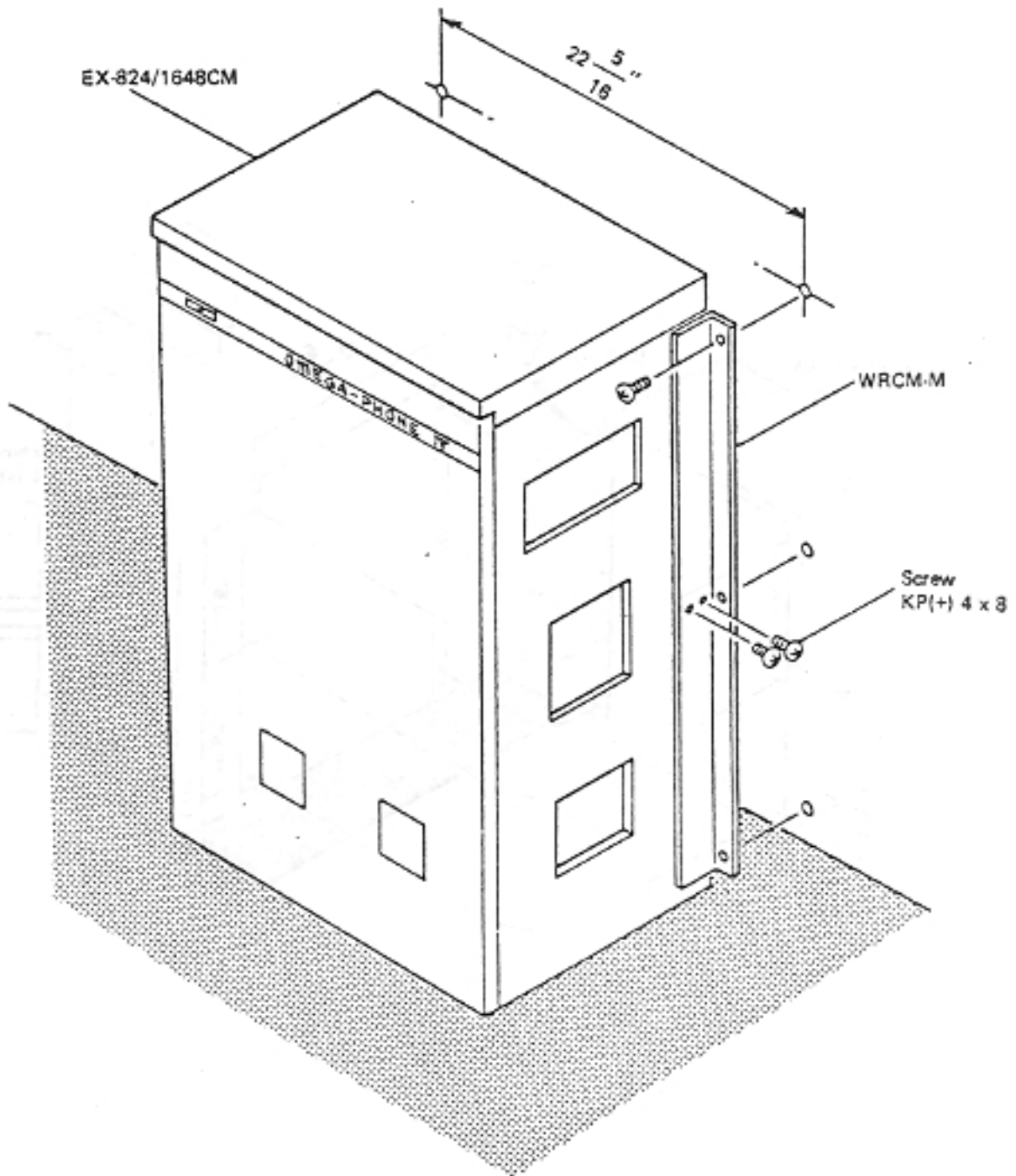
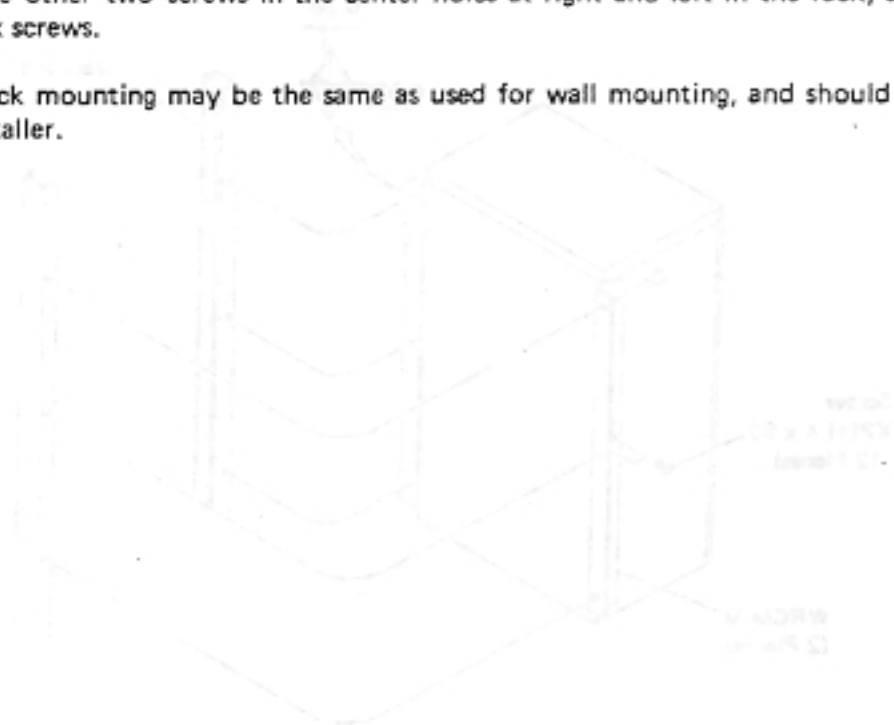


Figure 3.4.4.3.1(2)(a)B EX-824/1648CM Mounted on Wall (or Floor)

(b) Rack-mounting procedure

The EX-824/1648CM can be mounted in a 23-inch standard rack as shown in Figure 3.4.4.3.1(2)(b). The installation procedure is as follows:

- (i) Drill six screw holes (screw diameter 12-24) in a standard rack to the measurements shown in Figure 3.4.4.3.1(2)(b), and temporarily tighten four of the six screws, procured by the installer, at top and bottom on both sides.
- (ii) Attach WRCM-M to the EX-824/1648CM with screws KP(+) 4 x 8Ss at 12 points.
- (iii) Hook the assembly of the EX-824/1648CM and WRCM-M on the temporarily tightened screws, tighten the other two screws in the center holes at right and left in the rack, and fully tighten all six screws.
- (iv) The screws for rack mounting may be the same as used for wall mounting, and should be readied by the installer.



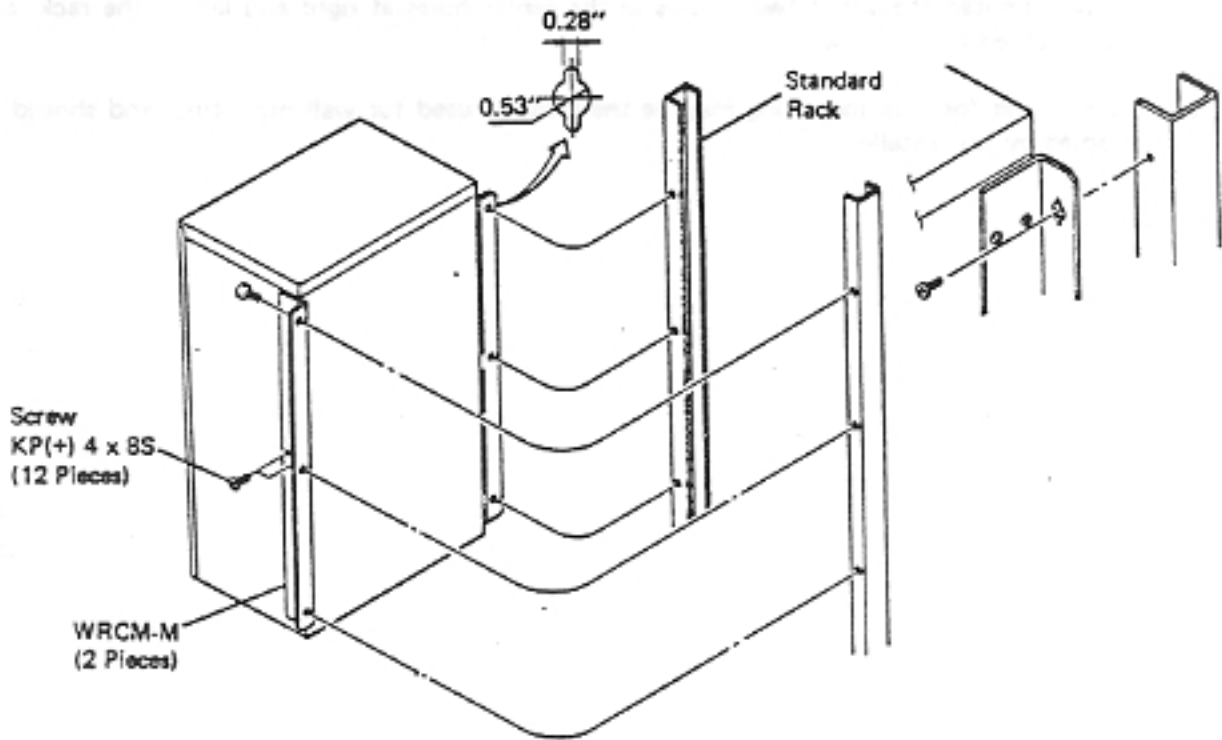


Figure 3.4.4.3.1(2)(b) EX-824CM Rack-Mounting Method

3.4.4.3.2 EX-1648EM

A detailed explanation of the EX-1648EM installation procedure is given below, supplementary to the wall- and rack-mounting procedures for the EX-824/1648CM described in Section 3.4.4.3.1.

(1) Description of structure

The motherboards in the two modules are automatically connected to each other electrically and mechanically by simply placing the EX-1648EM on the EX-824/1648CM as shown in Figures 3.4.4.3.2(1)A. No connection on the back is necessary.

Remove the top plate from the EX-824/1648CM before placing the expansion module on it. Place the removed top plate on the EX-1648EM.

(2) Parts necessary for installation

The parts necessary for installation are shown in Table 3.4.4.3.2(2). Have the unit and parts ready before starting installation.

Table 3.4.4.3.2(2) Parts Necessary for EX-1648EM Wall- or Rack-Mounting

No.	Description	Quantity		Remarks
		Wall-Mounting	Rack-Mounting	
1	EX-1648 Expansion Module Unit (EX-1648EM)	1	1	
2	Wall/Rack Mount for Expansion Module-M (WREM-M)	2	2	Accessories for EX-1648EM
3	Screw KP(+) 4 x 8S	8	8	
4	Wall- or rack-mounting screw (1/4 inch in diameter, 5/16 inch or longer)	4	4	
5	Machine bolt for wall hole (1/4 inch in diameter)	4	/	Must be procured by installer
6	23-inch standard rack			

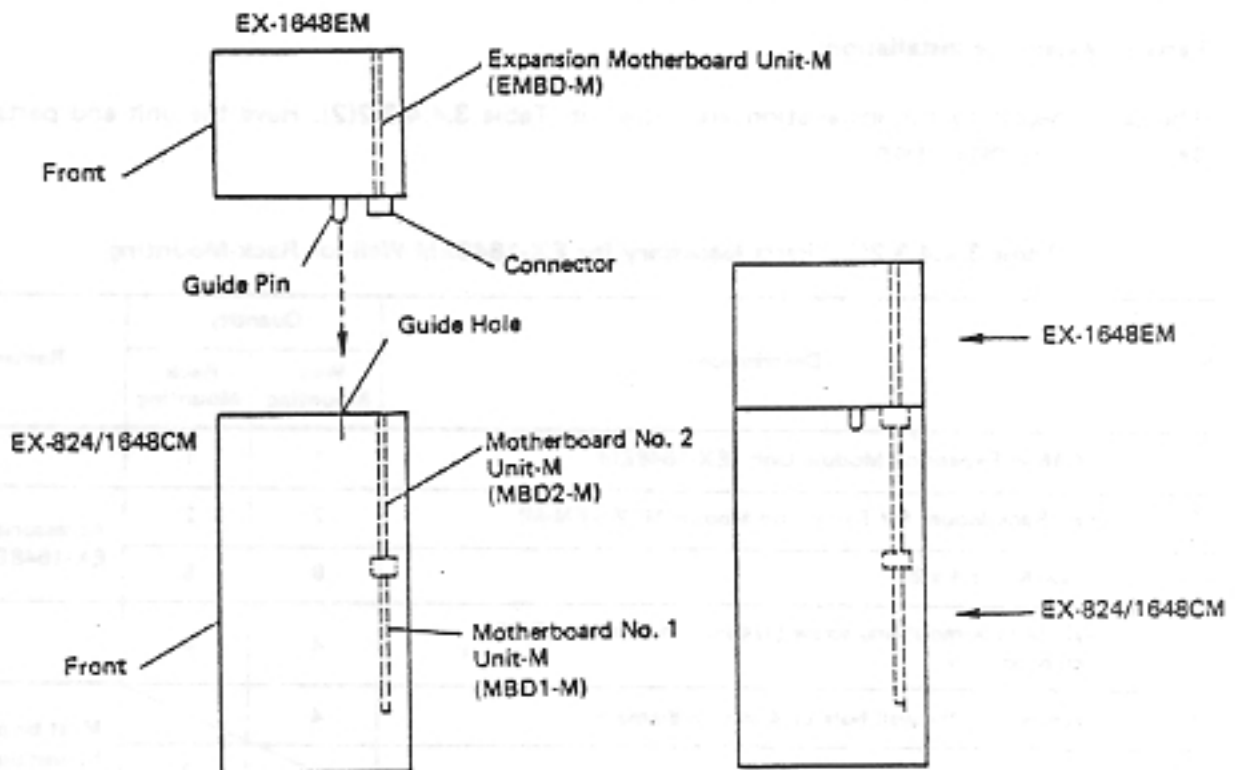


Figure 3.4.4.3.2(1)A Module Unit Structure

(3) Installation procedure

(a) Expansion

- (i) Remove the top plate from the EX-824/1648CM by loosening the six screws that fasten the top plate on the EX-824/1648CM, as shown in Figure 3.4.4.3.2(3)(a)(i). The front door on the EX-824/1648CM may be left on during installation of an expansion module, but it is suggested that the front door be removed for easier access. See Figure 3.4.4.4 for removing the front door from the EX-824/1648CM.

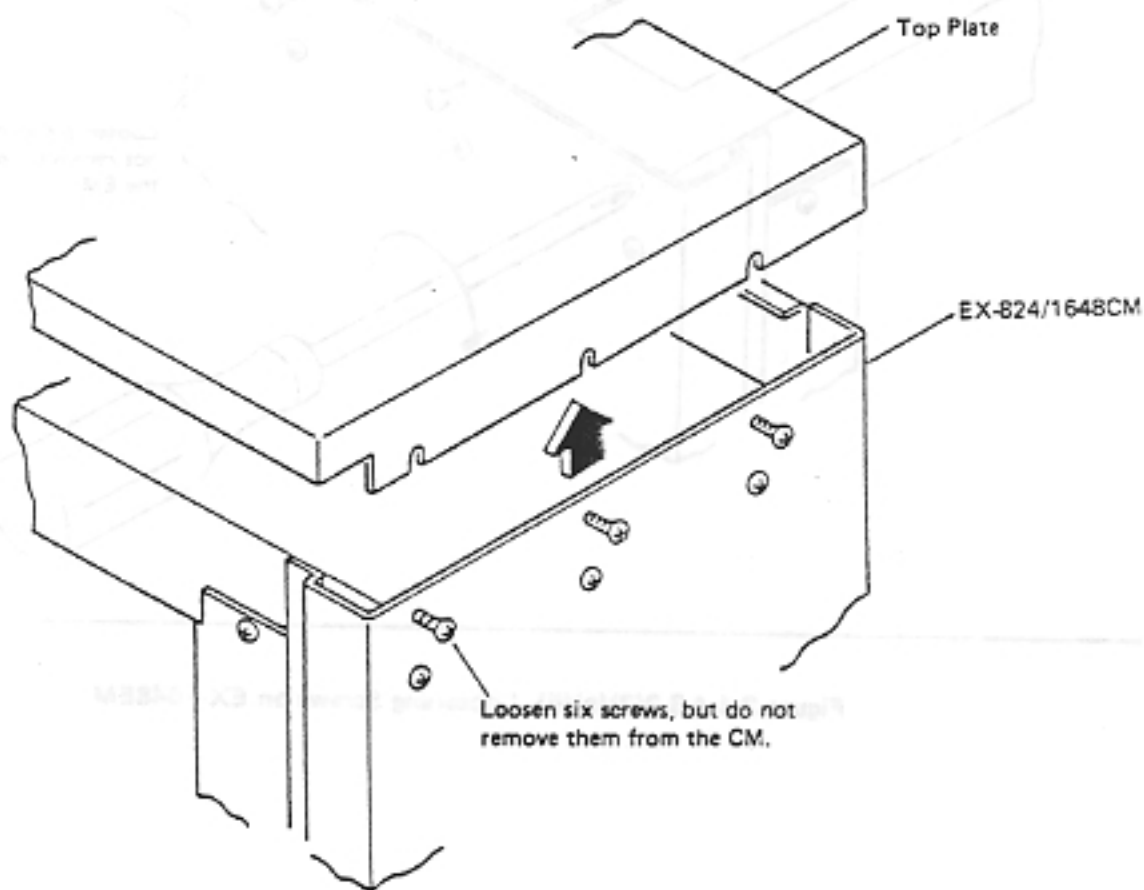


Figure 3.4.4.3.2(3)(a)(i) Removing Top Plate From EX-824/1648CM

(ii) Loosen the screws on the EX-1648EM.

Loosen the six screws on the EX-1648EM shown in Figure 3.4.4.3.2(3)(a)(ii), but do not remove them from it.

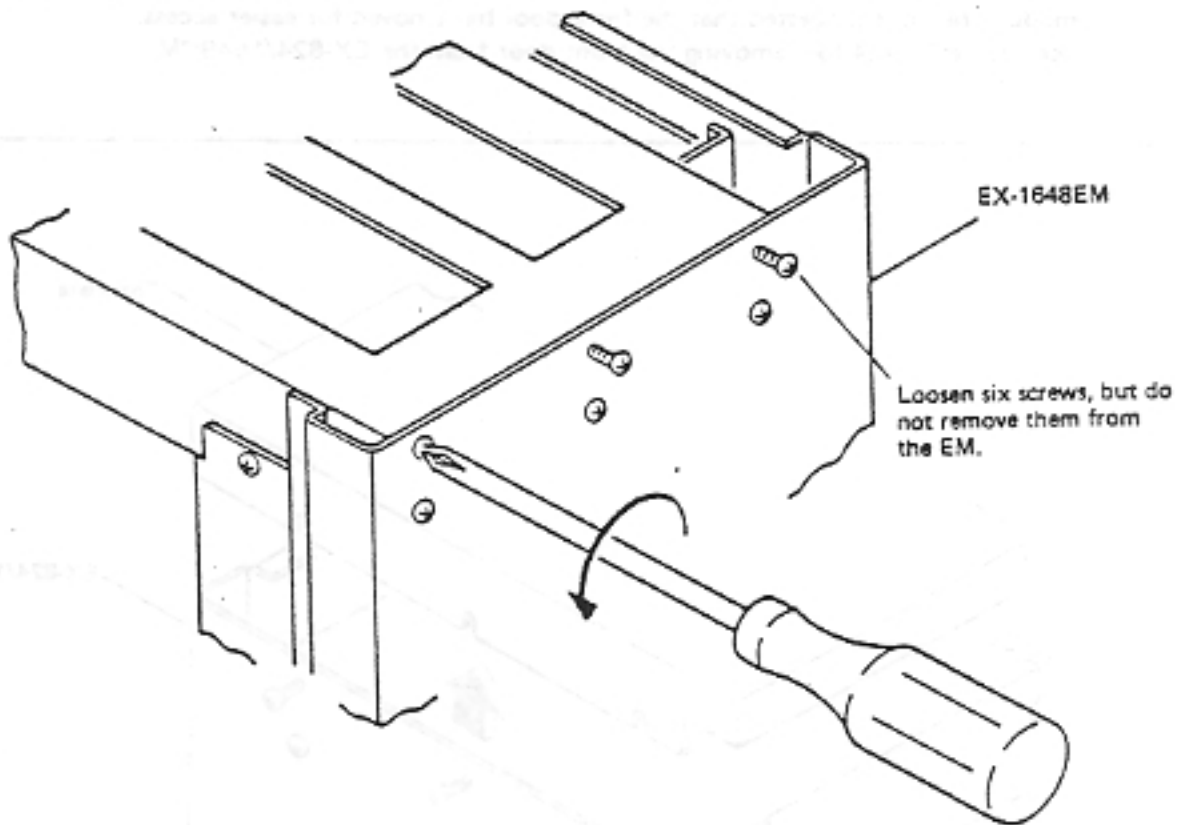


Figure 3.4.4.3.2(3)(a)(ii) Loosening Screws on EX-1648EM

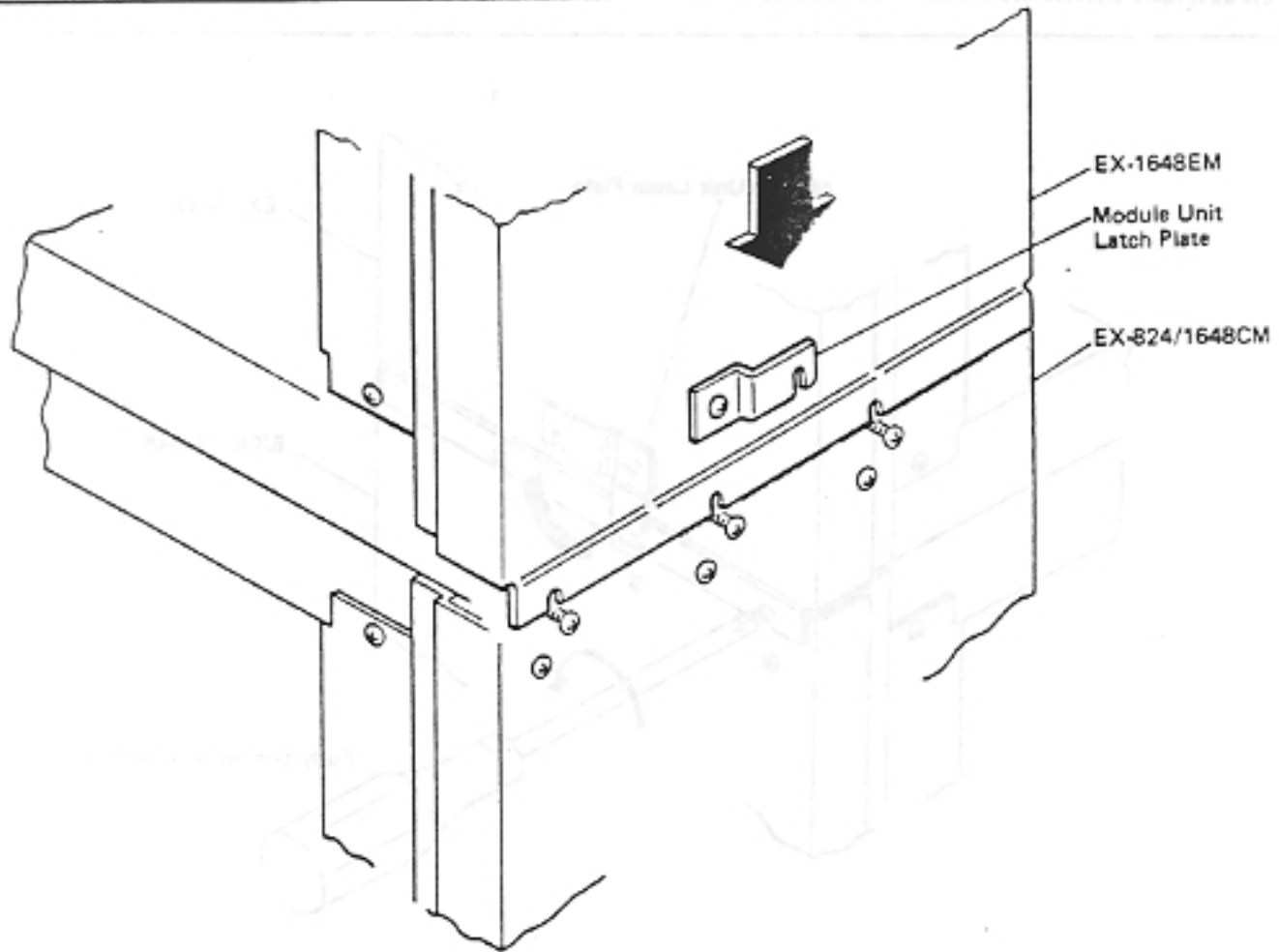


Figure 3.4.4.3.2(a)(iii) Connecting EX-824/1648CM to EX-1648EM

- (iii) Place the EX-1648EM on the EX-824/1648CM.
Place the EX-1648EM on the loosened screws on the EX-824/1648CM, and push it in the arrow direction so that the guide pins on the EX-1648EM slide into the guide holes in the EX-824/1648CM, and at the same time the connector built into the EX-1648EM engages the motherboard in the EX-824/1648CM.

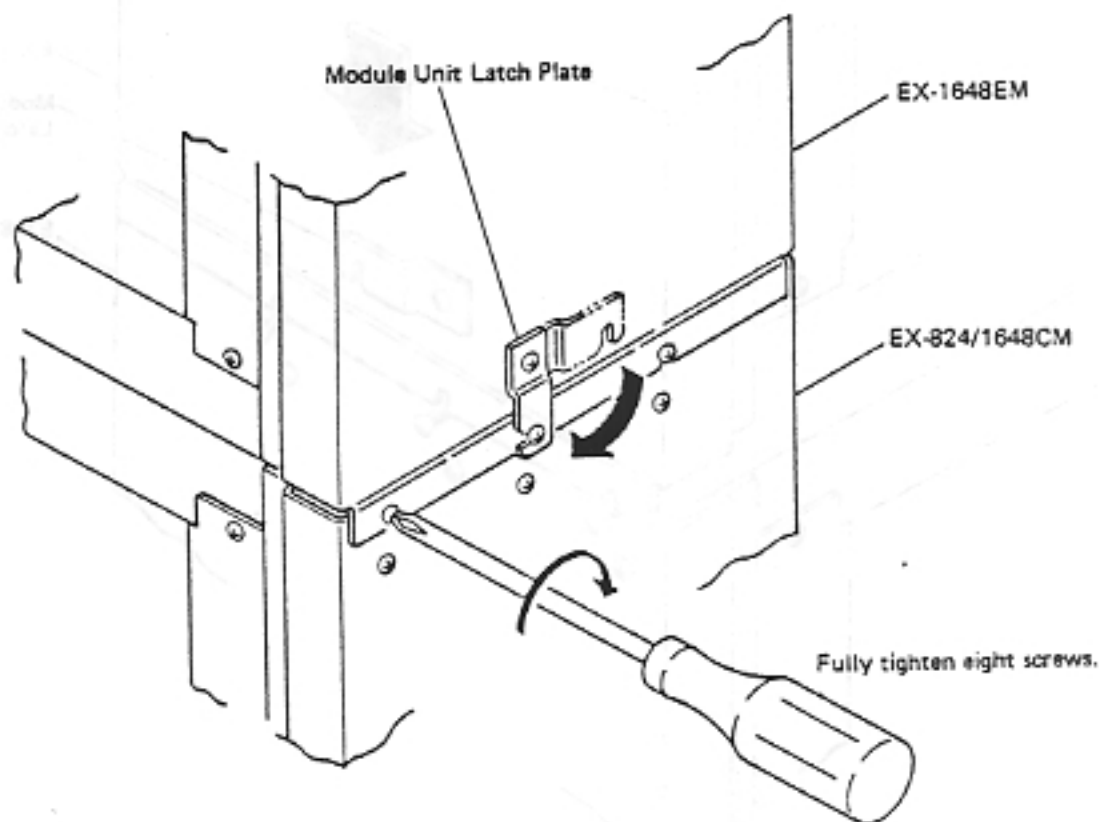


Figure 3.4.4.3.2(a)(iv) Fastening EX-824/1648CM to EX-1648EM

(iv) Fastening EX-824/1648CM and EX-1648EM

Fasten the EX-824/1648CM and EX-1648EM together as shown in Figure 3.4.4.3.2(a)(iv). After coupling them, loosen the screws that fasten the module unit latch plate on the EX-1648EM, hook it to a screw on the EX-824/1648CM as shown in the figure, and fully retighten all eight loosened screws.

If the module unit latch plate does not properly engage the screw on the EX-824/1648CM, it is because the EX-824/1648CM and EX-1648EM have not been properly connected.

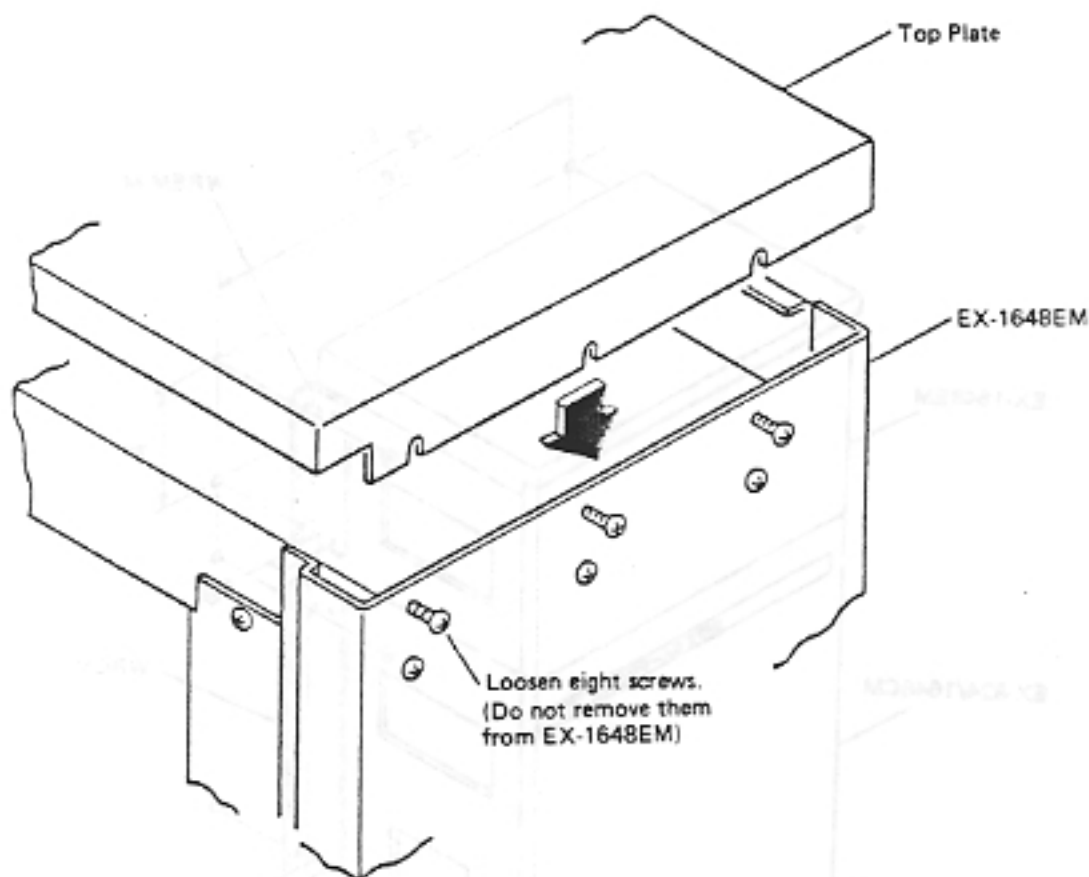


Figure 3.4.4.3.2(a)(v) Placing Top Plate on EX-1648EM

- (v) Placing the top plate on the EX-1648EM.
Place the top plate on the EX-1648EM and fasten it as shown in Figure 3.4.4.3.2(a)(v). Loosen the six screws on the EX-1648EM, place the top plate removed from the EX-824/1648CM on the EX-1648EM, and retighten the six screws securely.

The EX-1648EM has now been installed. Its wall- and rack-mounting procedures are described next.

(b) Wall- and rack-mounting procedures

Refer to Figures 3.4.4.3.2(3)(b)A and 3.4.4.3.2(3)(b)B for mounting the EX-1648EM on a wall or in a rack.

For the mounting details, refer to Section 3.4.4.3.1(2).

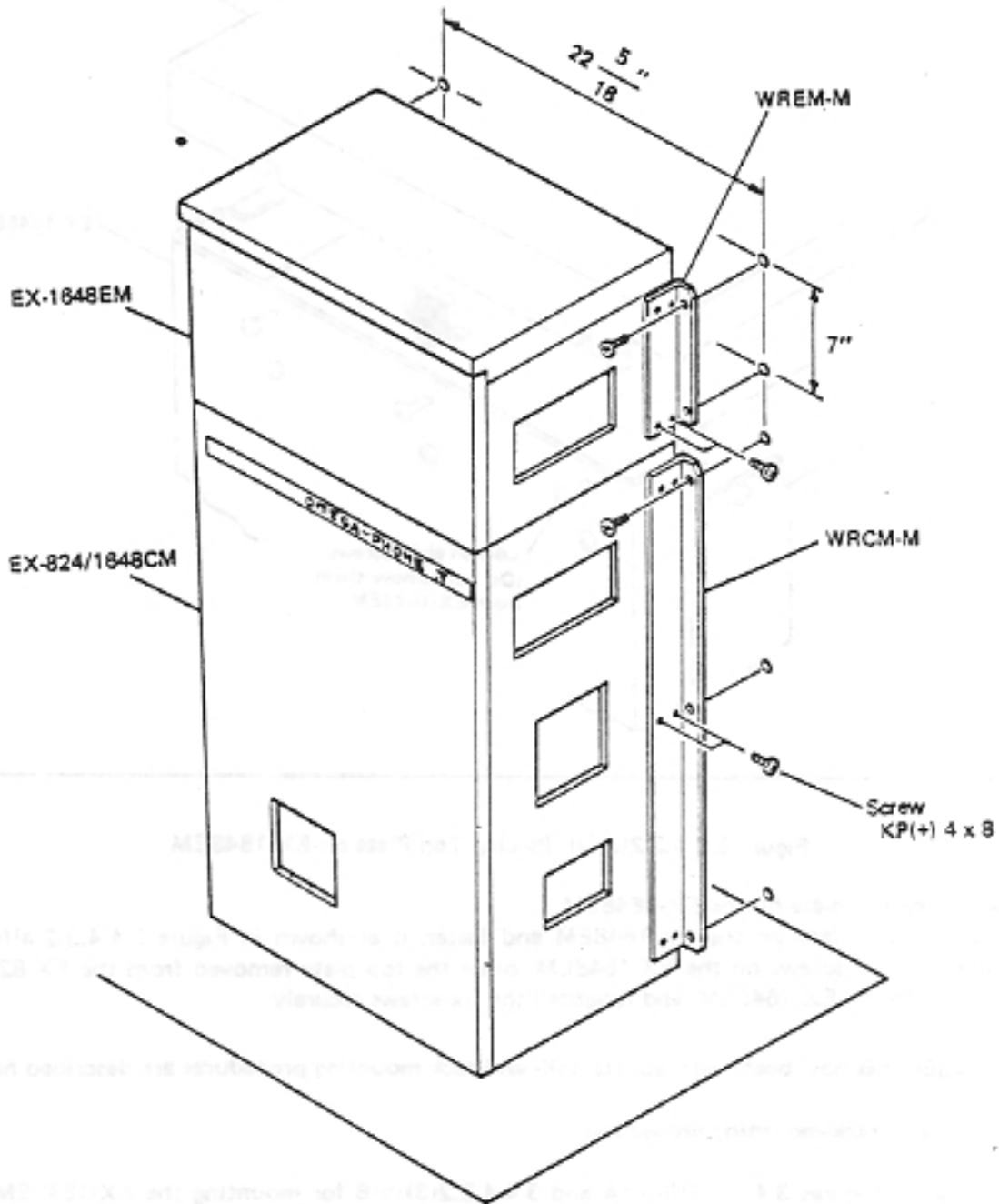


Figure 3.4.4.3.2(3)(b)A EX-1648EM Wall- or Rack-Mounting Method

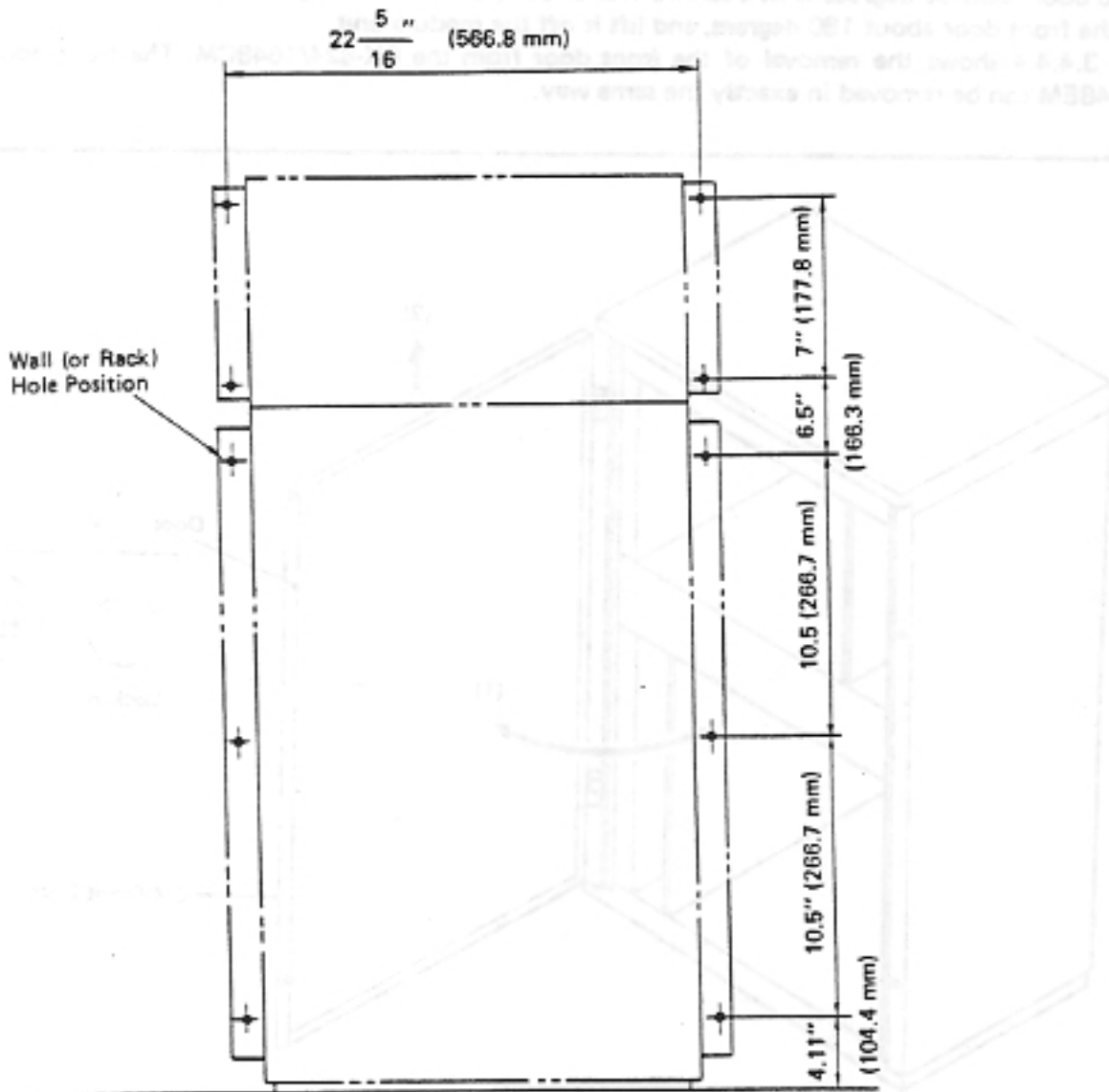


Figure 3.4.4.3.2(3)(b)B Wall Hole Measurements Diagram

3.4.4.4 Removal of Module Unit Front Door

Remove the module unit front door before starting installation. The front door can be removed by turning the two door locks 90 degrees with a screwdriver or coin, as shown in Figure 3.4.4.4.

Open the front door about 180 degrees, and lift it off the module unit.

Figure 3.4.4.4 shows the removal of the front door from the EX-824/1648CM. The front door for the EX-1648EM can be removed in exactly the same way.

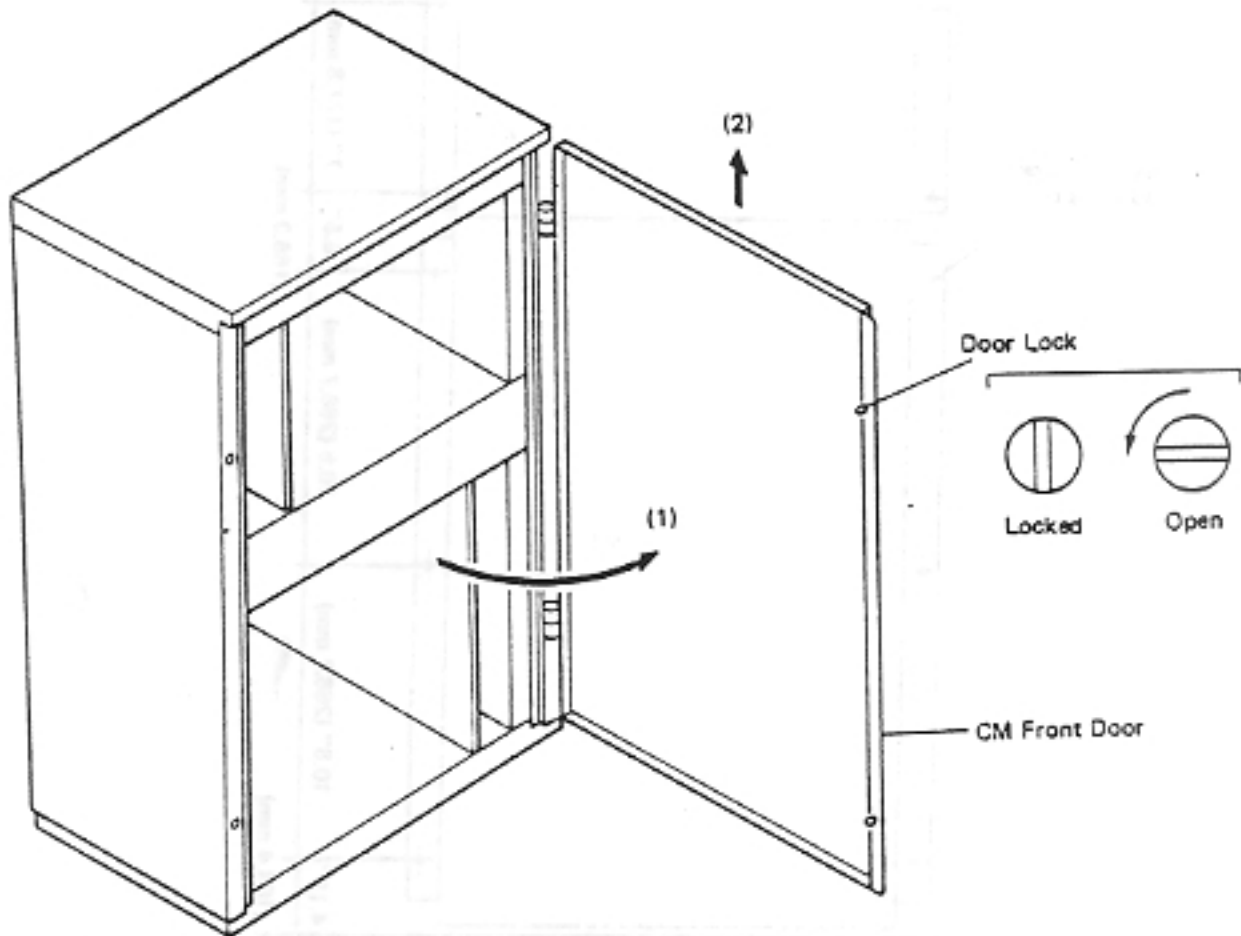


Figure 3.4.4.4 EX-824/1648CM Front Door Removal

3.4.4.5 Power Supply Installation

(1) General

A single power supply, PWS-M or PWS-MH, provides all the power required for operation of the EX-824/1648 system. The system has an adaptor, BATU-M, for connecting a battery in case of power failure. The power supply installation procedure is as follows:

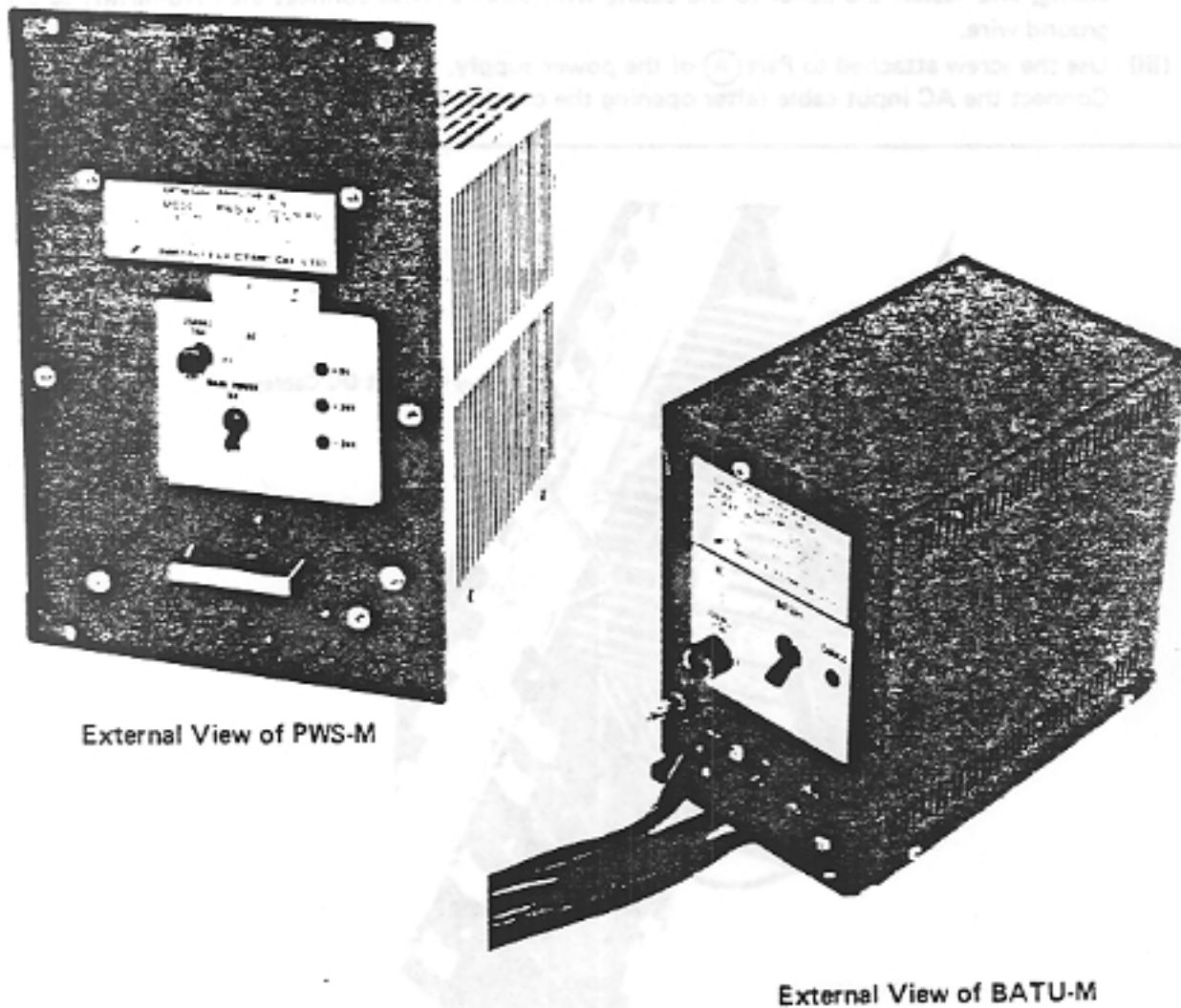


Figure 3.4.4.5(1) External Views of PWS-M and BATU-M

(2) Installation

(a) PWS-M or PWS-MH installation

Remove the front door, and proceed as follows:

- (i) Place the PWS-M in the CM/MH casing, and connect the DC cables to the PWS-M/MH. (Connect the nine-pin connector to J1 and the six-pin connector to J2.)
- (ii) Slide the PWS-M/MH into the CM casing until the PWS-M/MH panel is flush with the CM casing, and fasten the panel to the casing with screws. Also connect the PWS-M/MH to the ground wire.
- (iii) Use the screw attached to Part (A) of the power supply. Connect the AC input cable (after opening the conduit cover).

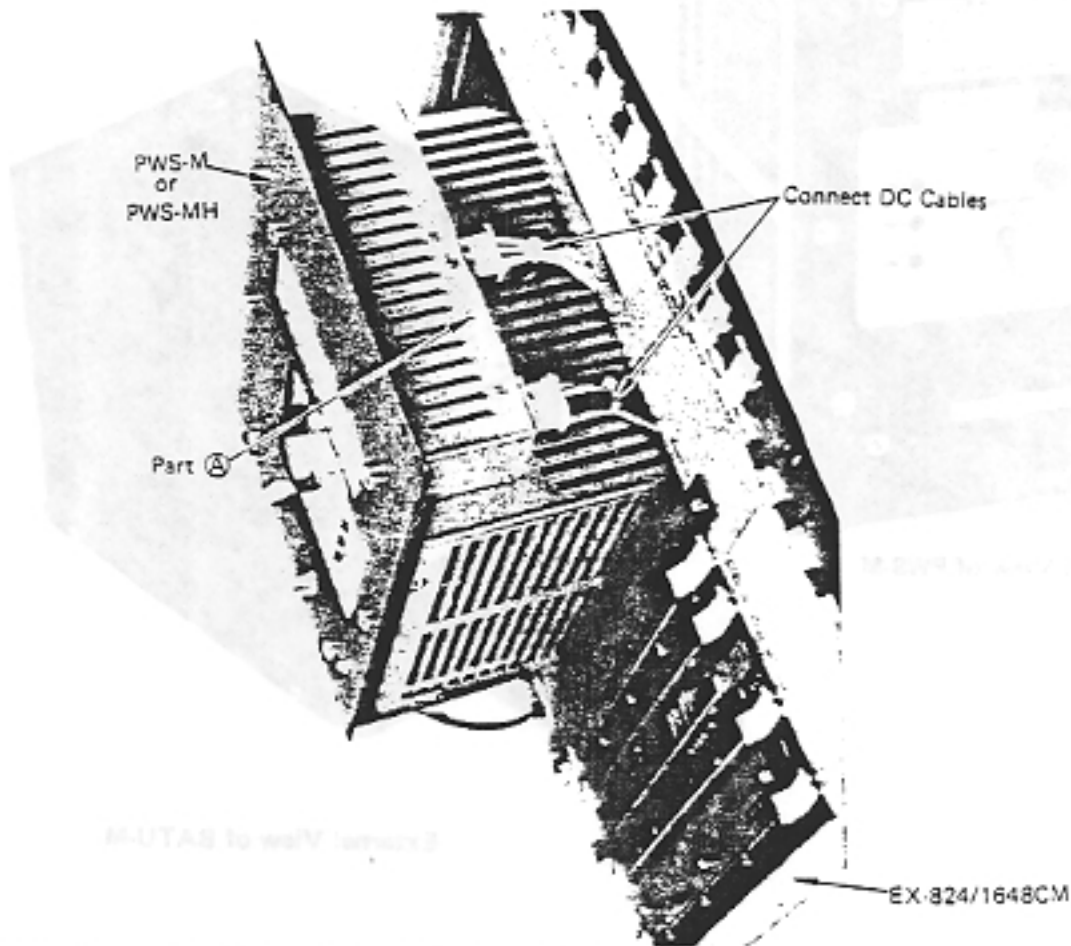


Figure 3.4.4.5(2)(a)A

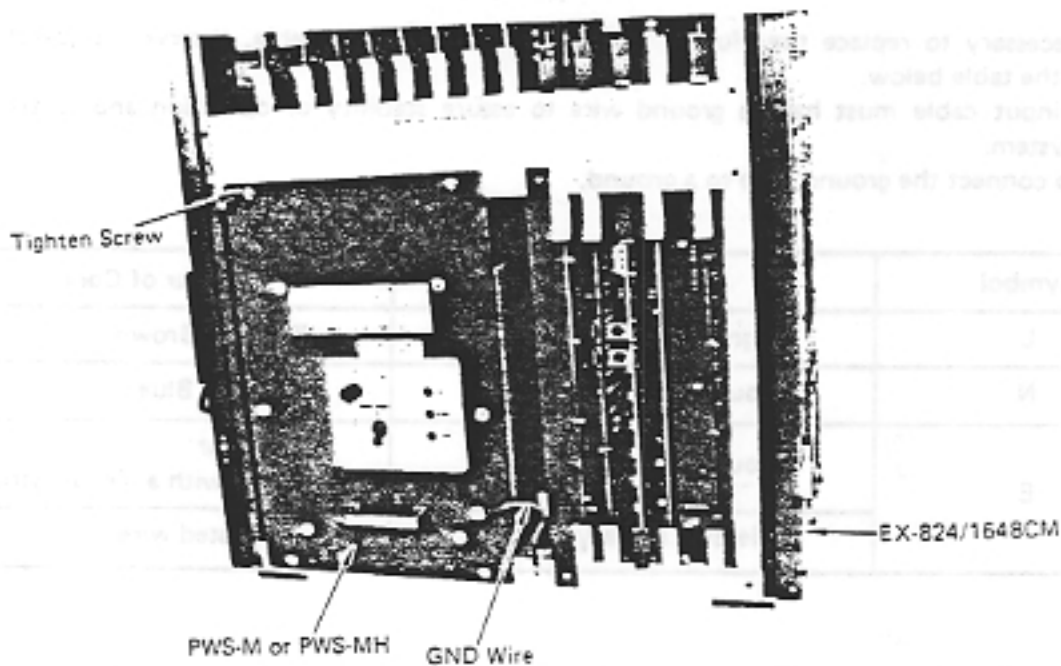


Figure 3.4.4.5(2)(a)B

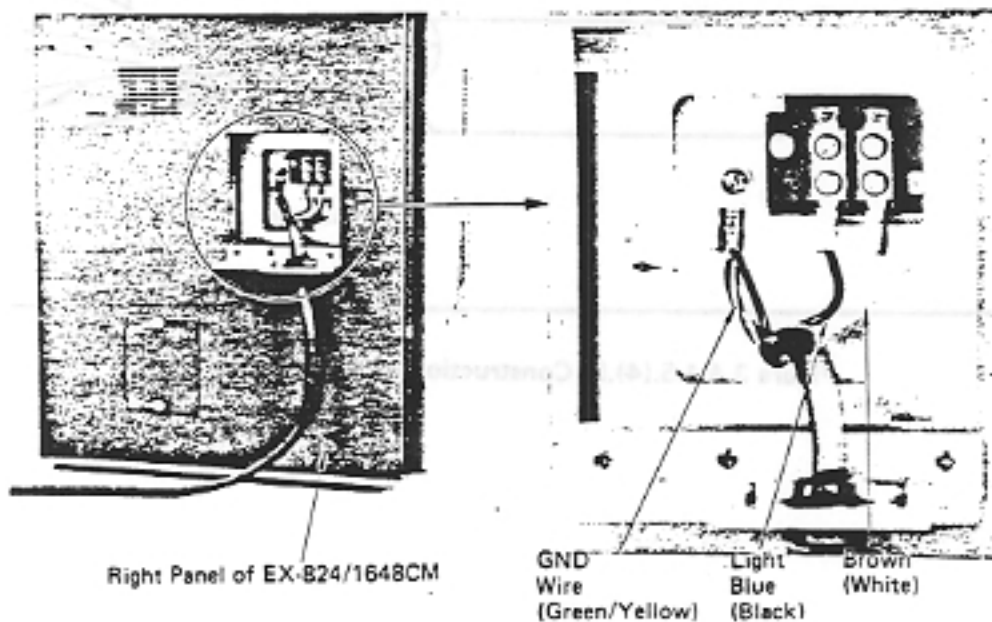


Figure 3.4.4.5(2)(a)C

If it is necessary to replace the plug at the end of the AC input cable, observe the specifications shown in the table below.

The AC input cable must have a ground wire to assure stability of operation and safety of the EX-816 system.

Be sure to connect the ground wire to a ground.

Symbol	Conductor	Color of Core
L	Ungrounded (Line)	Black or Brown
N	Grounded (Neutral)	White or Blue
E	Ground (Safety-Grund)	Green or Green with a Yellow stripe
	Shielding (Safety-Ground)	Tin-Plated wire

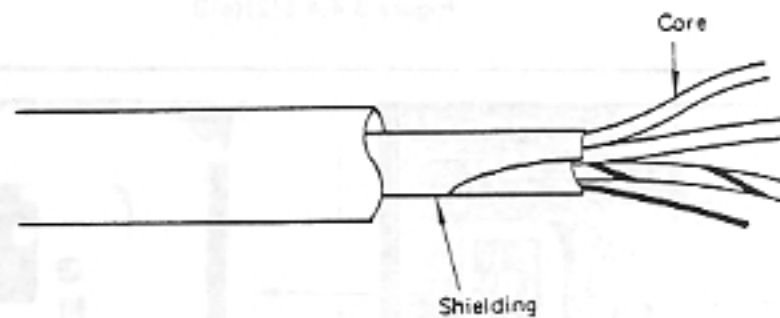


Figure 3.4.4.5.(4).B Construction of AC Input Cable

When using a different plug, connect the Line, Neutral, and Ground correctly as shown below.

Before shipment from factory

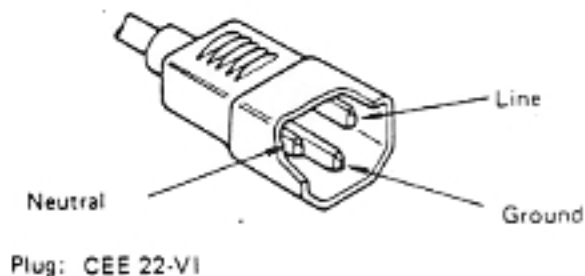
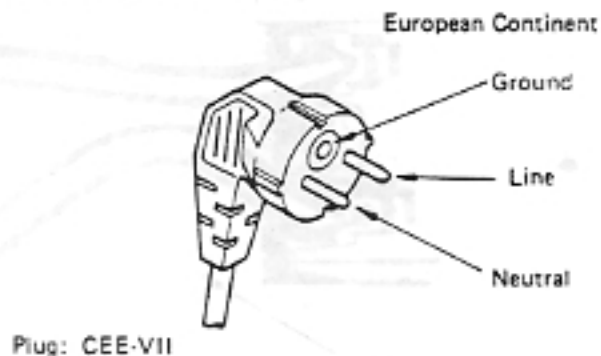
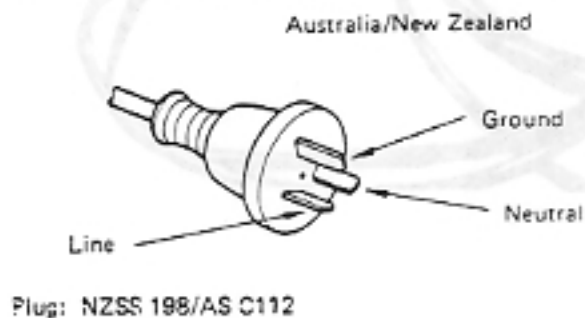
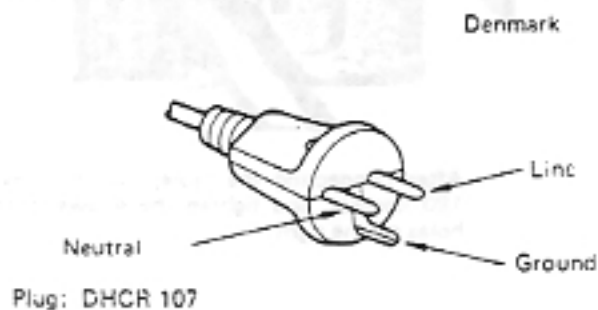
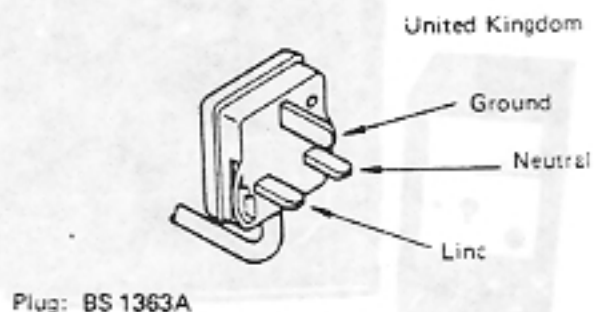
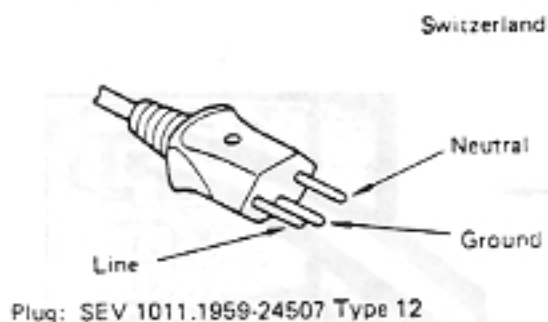
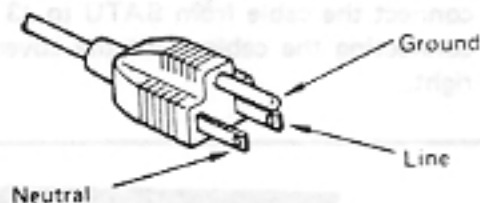


Figure 3.4.4.5.(4).D Connection of AC Input Plug

(b) BATU-M installation

Open the cover on the right panel of the EX-824/1648CM shown in Figure 3.4.4.5(2)(b), and connect the cable from BATU to J3 and J4. J3 is a four-pin jack and J4 a three-pin jack. After connecting the cable, turn the cover 180 degrees, and tighten the screws in the holes on the right.

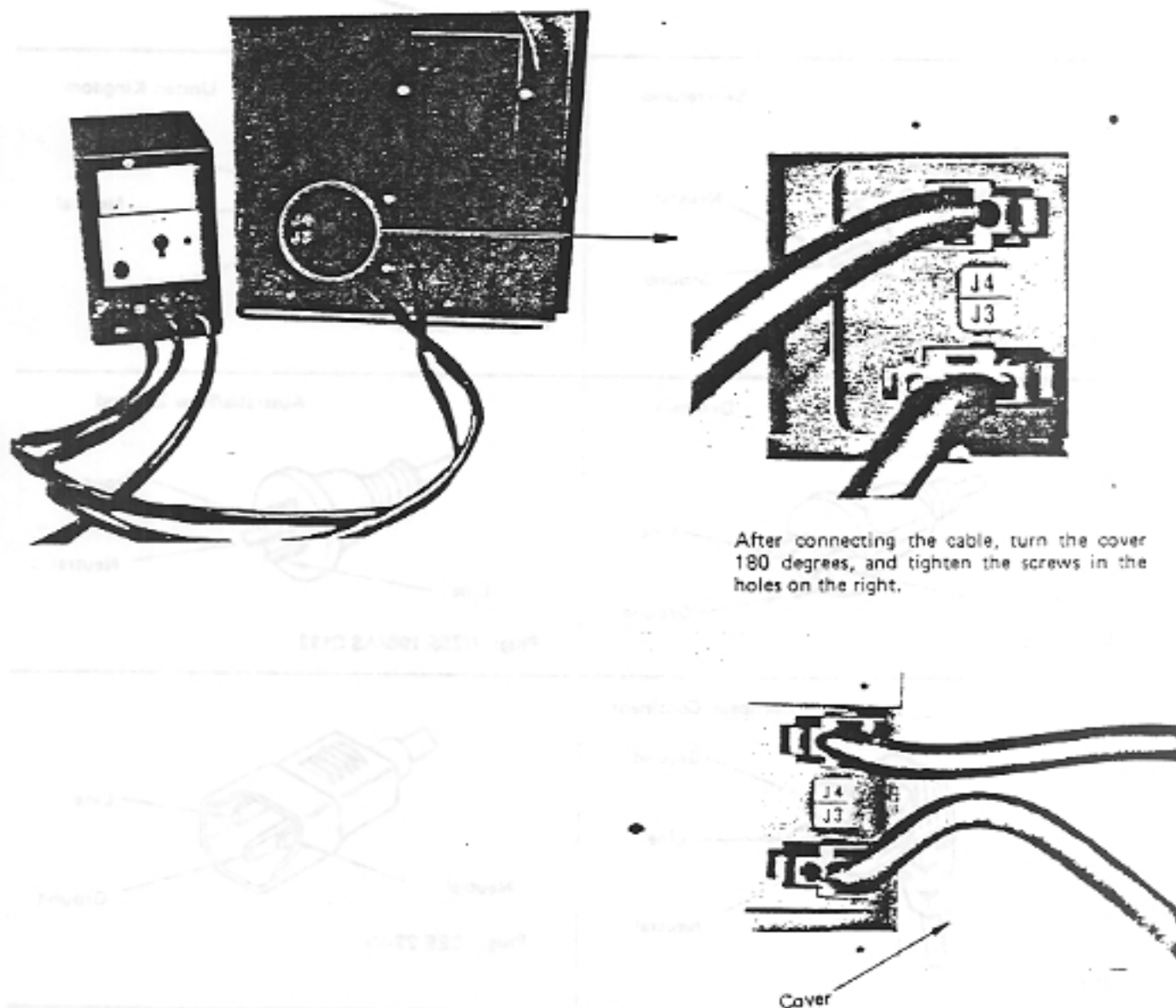


Figure 3.4.4.5(2)(b)

3.4.5 Main Distribution Frame

3.4.5.1 General

CO/PBX Lines and stations are connected to the ICU (Integrated Control Unit) via terminal blocks on the MDF (Main Distribution Frame). Prior to wiring, terminal block allocation must be determined. The mating connectors for external connectors on the ICU shown in Figure 3.4.5.1.A are as follows: Figure 3.4.5.1.B shows the cards installed in the ICU versus the external connectors. Each card has a 100-pin connector and a 25-pin connector. Figure 3.4.5.1.C shows the 25-pin connectors versus the external connectors. (For connection to DSBF-M, SCDR-M, and EDCT-M, refer to paragraphs 3.4.5.4, 3.4.6.6, and 3.4.6.)

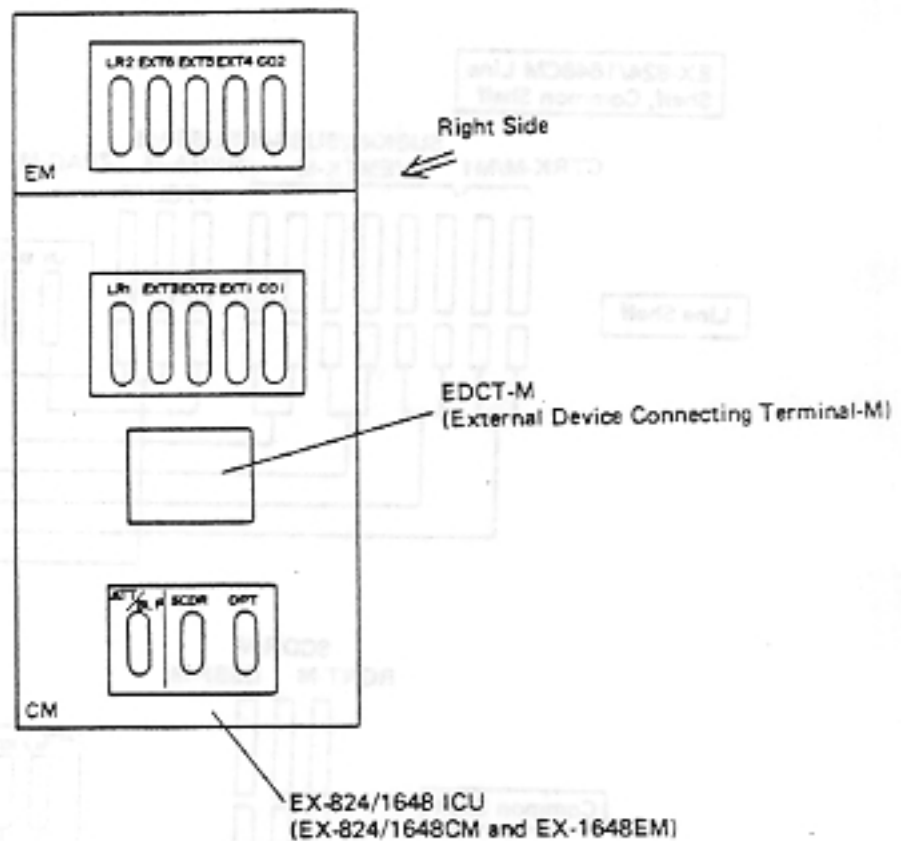
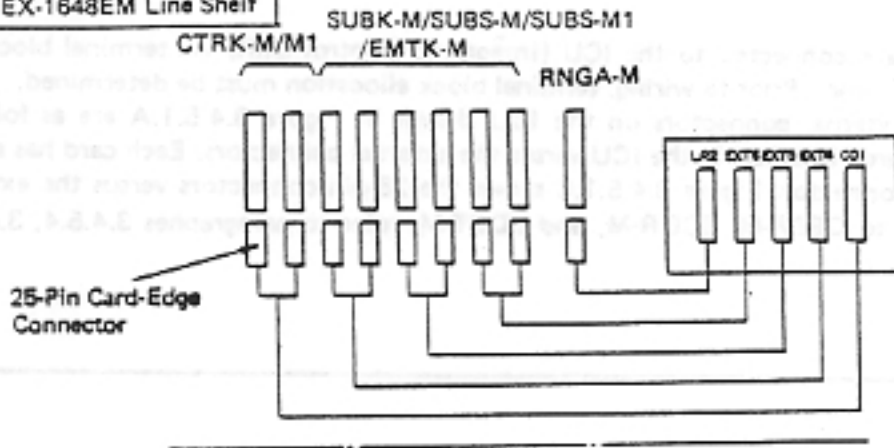


Figure 3.4.5.1.A External Connectors on ICU

EX-1648EM Line Shelf



EX-824/1648CM Line Shelf, Common Shelf

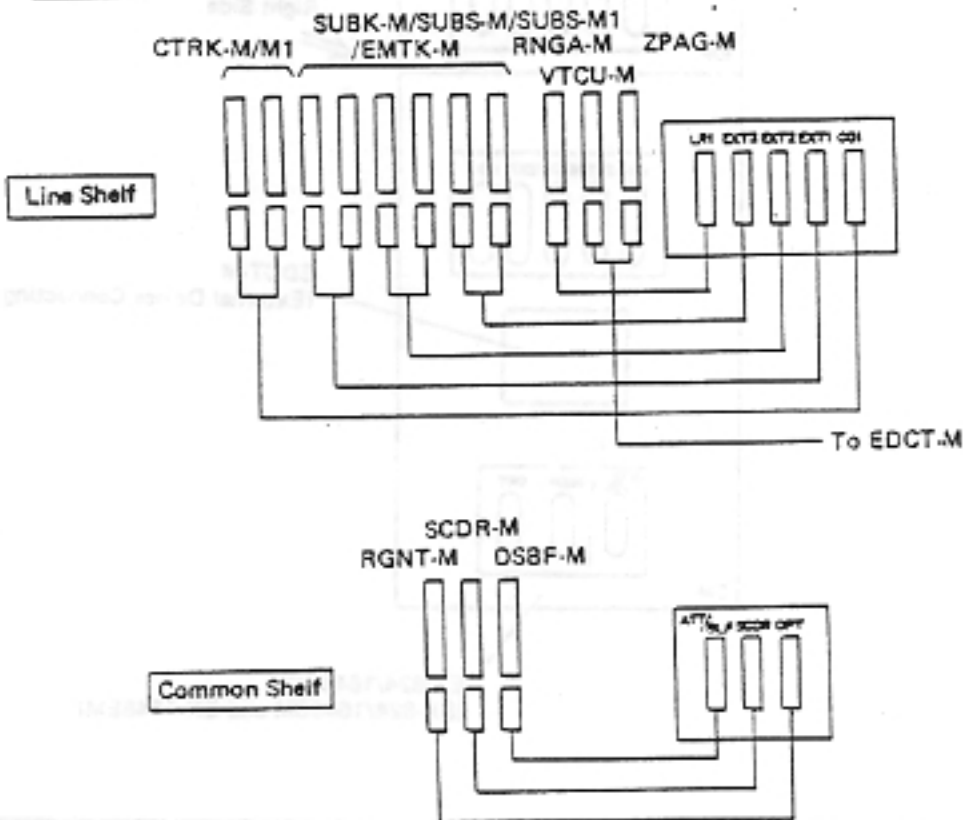


Figure 3.4.5.1.B ICU Cards Versus External Connectors

CTRK-M/M1	SUBK-M	SUBS-M/M1	ENTK-M	RNGA-M	Card Edge Conn.	ICU Conn.	
CTRK-M (1 to 4, 9 to 12), SUBK-M/SUBS-M/SUBS-M1/EMTK-M (20 to 23, 28 to 31, 36 to 39, 44 to 47, 52 to 55, 60 to 63) RNGA-M	T1	BT1		SG1	LRC1	2	26
	R1	BR1		E1	LRM1	1	1
	T2	T1	T1	T1	LRC2	4	27
	R2	R1	R1	R1	LRM2	3	3
	T3	DT1		SB1	LRC3	6	28
	R3	DR1		M1	LRM3	5	3
	T4	BT2		SG2	LRC4	8	29
	R4	BR2		E2	LRM4	7	4
		T2	T2	T2	LRC5	10	30
		R2	R2	R2	LRM5	9	5
		DT2		SB2	LRC6	12	31
		DR2		M2	LRM6	11	6
		BT3			LRC7	14	32
		BR3			LRM7	13	7
		T3	T3		LRC8	16	33
		R3	R3		LRM8	15	8
		DT3				18	34
		DR3				17	9
		BT4				20	35
		BR4				19	10
		T4	T4			22	36
		R4	R4			21	11
		DT4				24	37
		DR4				23	12
					26		
					25		
CTRK-M (5 to 8, 13 to 16), SUBK-M/SUBS-M/SUBS-M1/EMTK-M (24 to 27, 32 to 35, 40 to 43, 48 to 51, 56 to 59, 64 to 67)	T1	BT1		SG1	LRC9	2	38
	R1	BR1		E1	LRM9	1	13
	T2	T1	T1	T1	LRC10	4	39
	R2	R1	R1	R1	LRM10	3	14
	T3	DT1		SB1	LRC11	6	40
	R3	DR1		M1	LRM11	5	15
	T4	BT2		SG2	LRC12	8	41
	R4	BR2		E2	LRM12	7	16
		T2	T2	T2	LRC13	10	42
		R2	R2	R2	LRM13	9	17
		DT2		SB2	LRC14	12	43
		DR2		M2	LRM14	11	18
		BT3			LRC15	14	44
		BR3			LRM15	13	19
		T3	T3		LRC16	16	45
		R3	R3		LRM16	15	20
		DT3				18	46
		DR3				17	21
		BT4				20	47
		BR4				19	22
		T4	T4			22	48
		R4	R4			21	23
		DT4				24	49
		DR4				23	24
					26	50	
					25	25	

Note: The ICU connectors shown in the figure include CO1, CO2, EXT1, EXT2, EXT3, EXT4, EXT5, EXT6, LR1, and LR2.

Figure 3.4.5.1.C 25-Pin Connectors Versus External Connectors

3.4.5.2 ICU-MDF-CO Wiring

CO/PBX lines can be used when the CO terminals are connected to the male Amphenol connector (CO1 or CO2) on the right side of the ICU with a 25-pair cable. Figure 3.4.5.2 shows a CO terminal block wiring diagram.

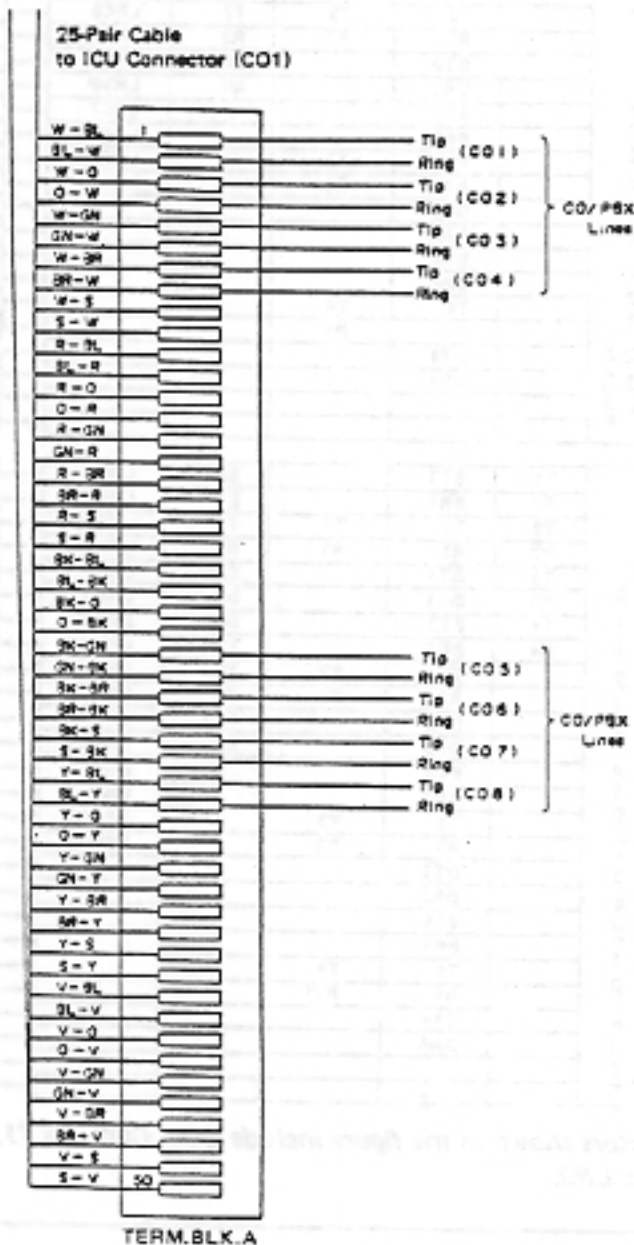


Figure 3.4.5.2 CO Terminal Block Wiring (1/2)

25-Pair Cable
to ICU Connector (CO2)

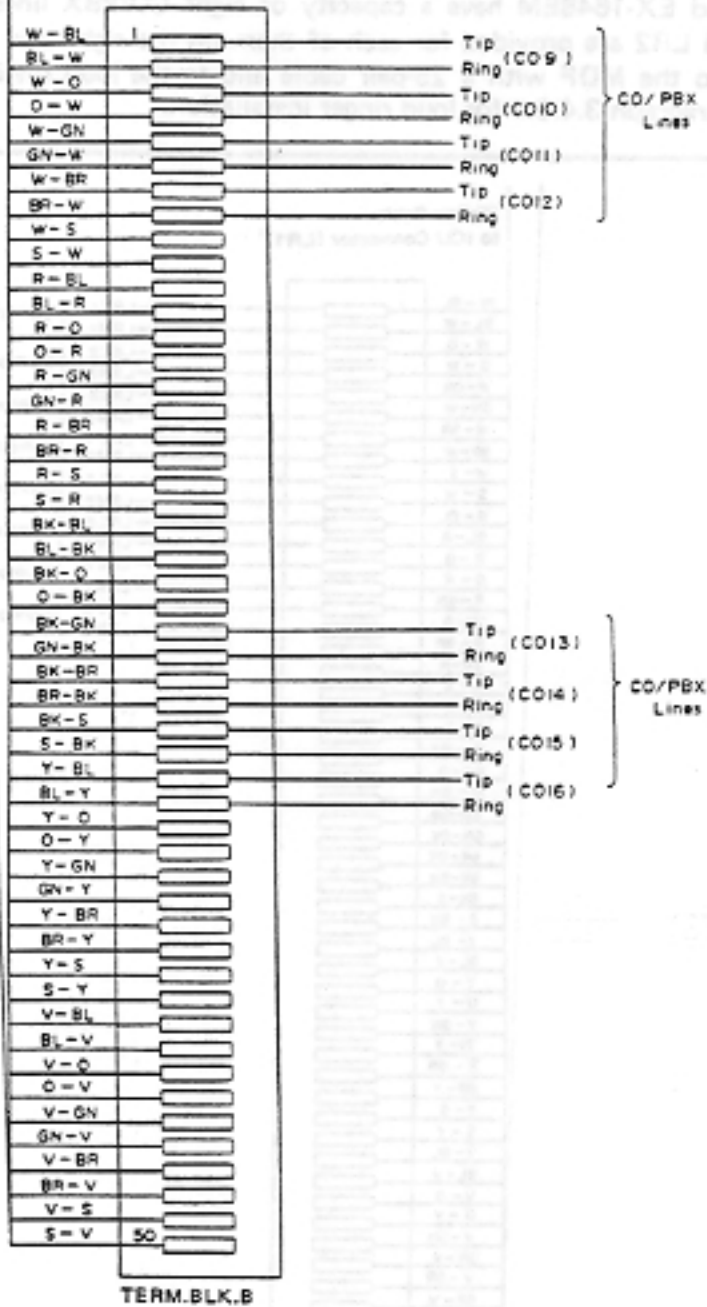
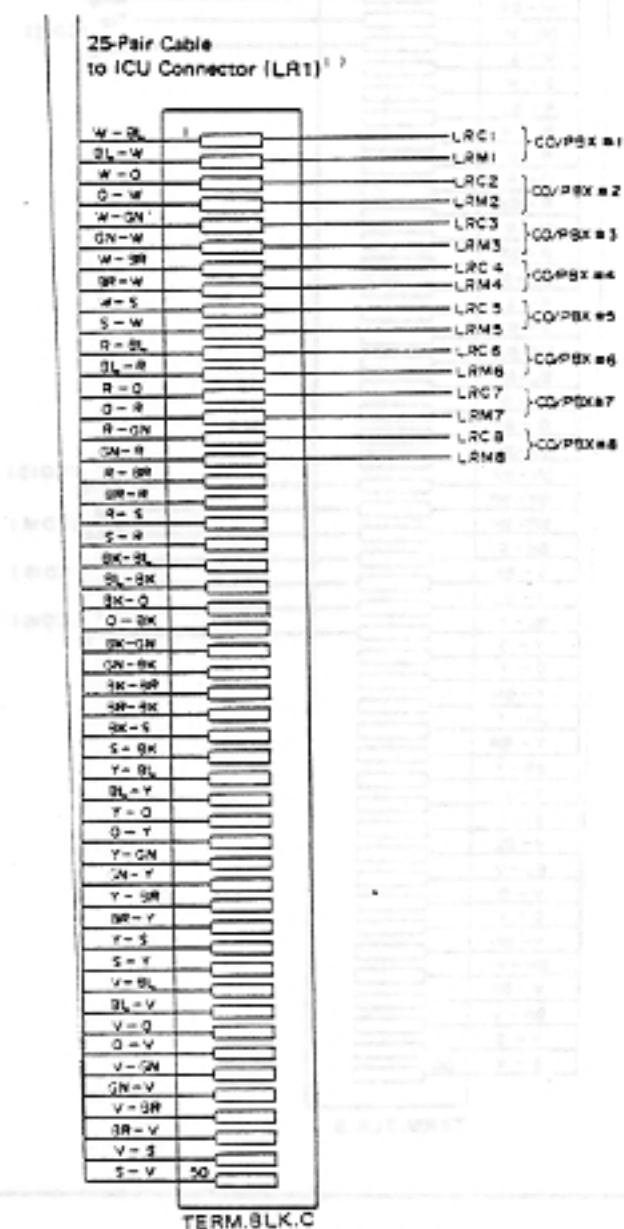


Figure 3.4.5.2 CO Terminal Block Wiring (2/2)

3.4.5.3 ICU-MDF-Loud Ringer Wiring

The EX-824/1648 system has contact outputs for driving loud ringers for individual CO/PBX lines. The EX-824/1648CM and EX-1648EM have a capacity of eight CO/PBX lines each, and female Amphenol connectors LR1 and LR2 are provided for each of them on the right side of the ICU. These connectors can be connected to the MDF with a 25-pair cable and to the loud ringers. Figure 3.4.5.3 shows loud ringer wiring. See paragraph 3.4.6.6 for loud ringer installation.



25-Pair Cable
to ICU Connector (LR2)

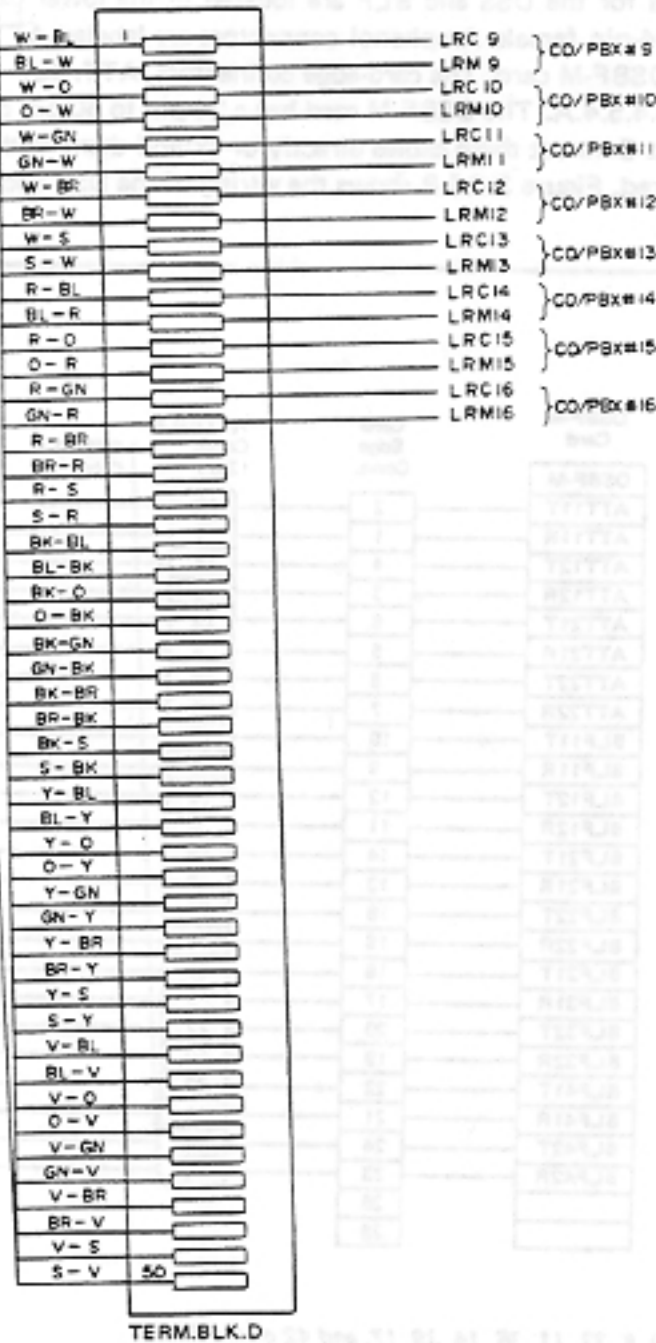
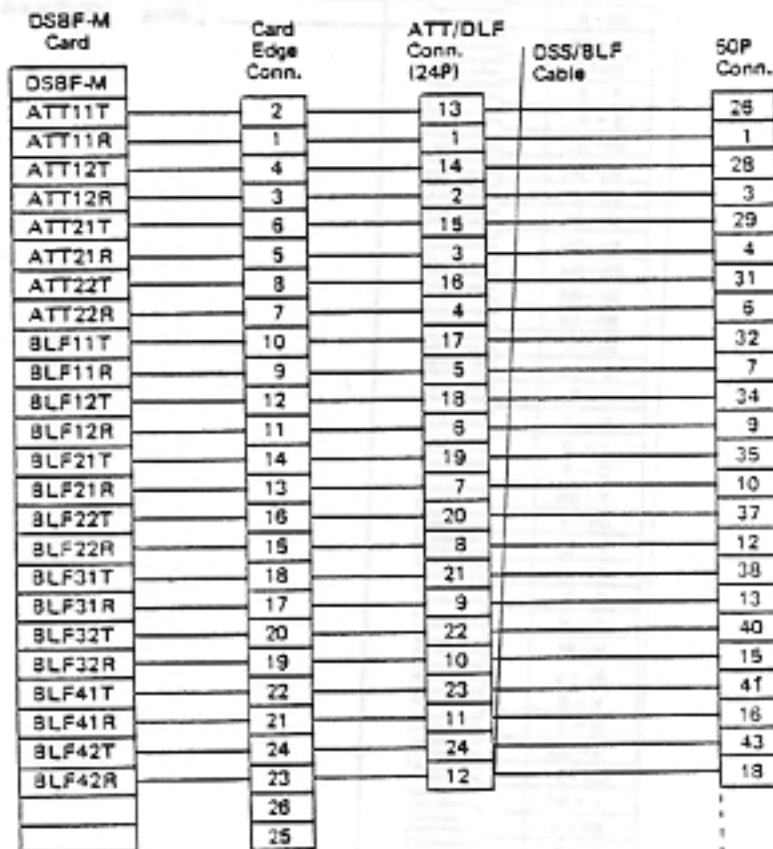


Figure 3.4.5.3 Loud Ringer Terminal Block Wiring (2/2)

3.4.5.4 ICU-MDF-DSS-M or DSS-N, and BLF-M Wiring

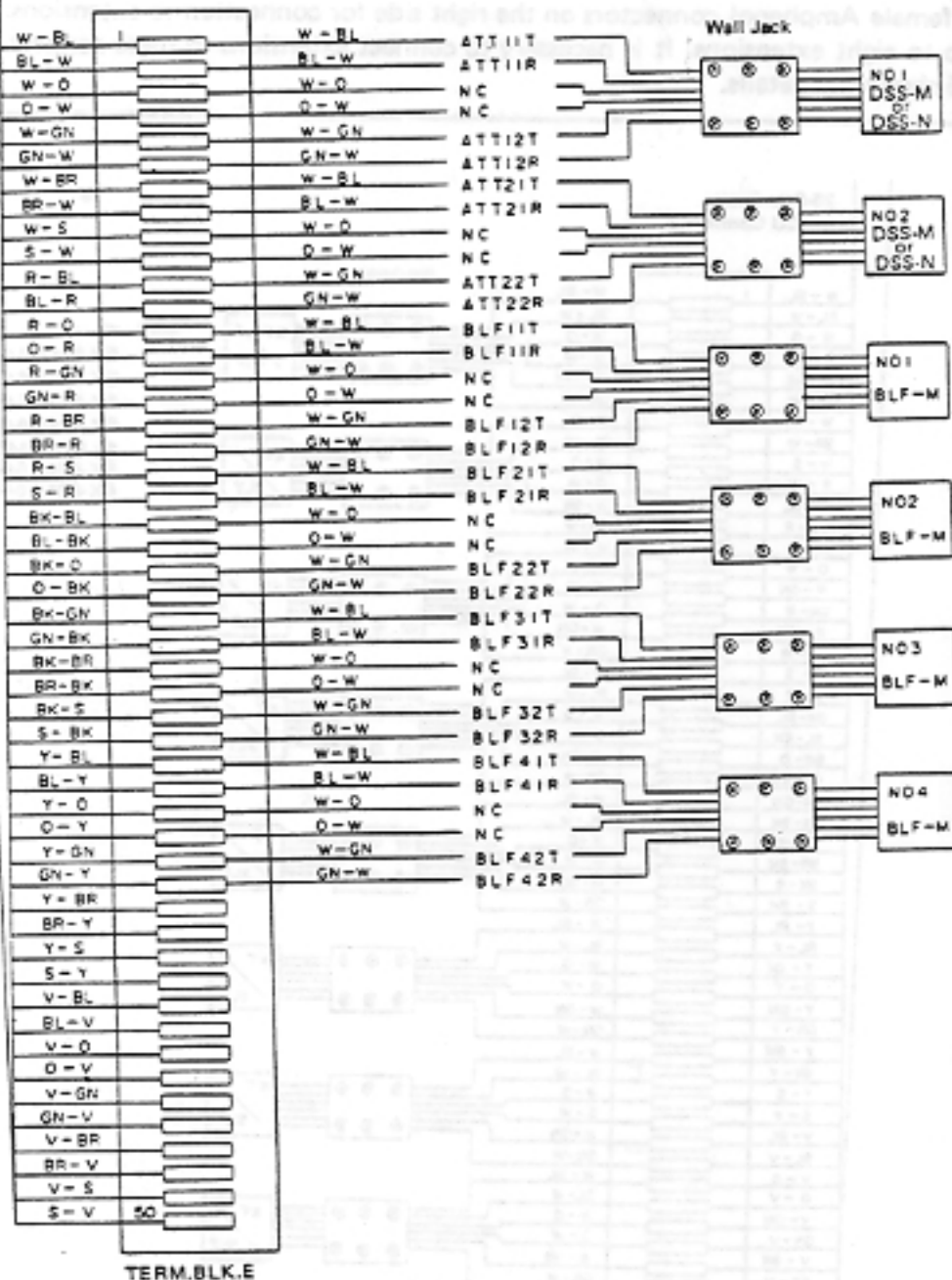
The output connectors for the DSS and BLF are located in the lower part of the right panel on the EX-824/1648CM. These 24-pin female Amphenol connectors are labeled ATT/BLF. Their signals are input to and output from the DSBF-M card. The card-edge connectors, ATT/BLF connectors, and DSS/BLF cables are shown in Figure 3.4.5.4.A. The DSBF-M card has a 24-pin to 50-pin conversion cable and a DSS/BLF-M cable attached to it. Connect these cables directly or extend them to the terminal block, via which DSS and BLF should be wired. Figure 3.4.5.B shows the wiring of the DSS and BLF terminal blocks.



Note: Pins 2, 27, 5, 30, 8, 33, 11, 36, 14, 39, 17, and 42 of the 50-pin connector are not used.

Figure 3.4.5.4.A Card-Edge Connectors Versus ATT/BLF Connectors Versus DSS/BLF Cables

25-Pair Cable
to ICU Connector (DSS/BLF cable 50 pin connector)



Note: Two of the six conductors of the cable are not actually used, but the wiring shown above is recommended for compatibility with key telephone wiring.

Figure 3.4.5.4.B DSS-M or DSS-N and BLF-M Terminal Block Wiring

3.4.5.5 ICU-MDF-Extension Wiring

The ICU has female Amphenol connectors on the right side for connection to extensions. Each connector can handle up to eight extensions. It is necessary to connect extensions to these connectors via the MDF. Figure 3.4.5.5 shows the details.

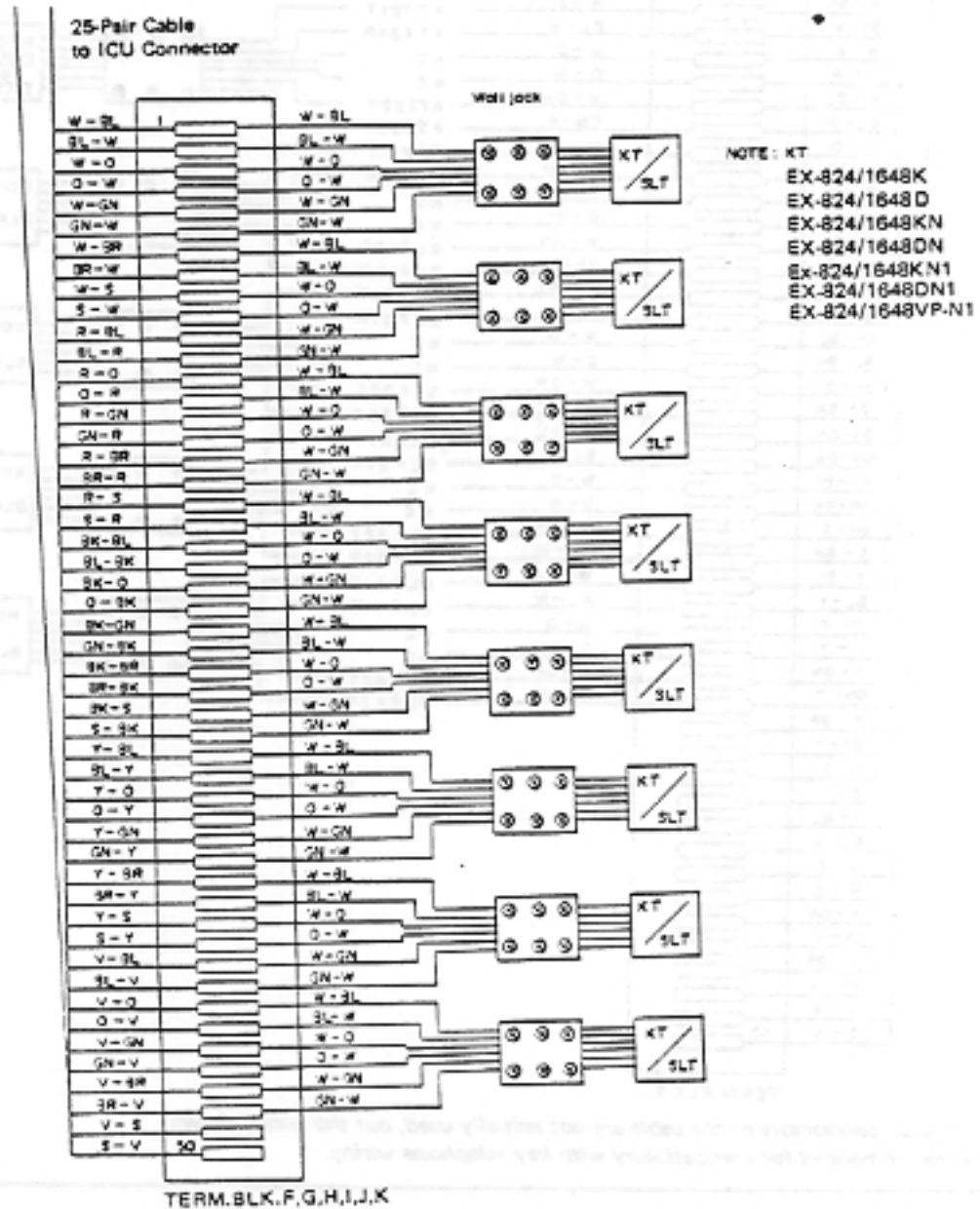


Figure 3.4.5.5 ICU-MDF-Extension Wiring (Using Six-Conductor Cable for Connecting to SLTs) (1/2)

3.4.5.6 Wall Jack Construction

Figure 3.4.5.6.A shows the construction of a six-pin wall jack. Figure 3.4.5.6.B shows the construction of a four-pin wall jack.

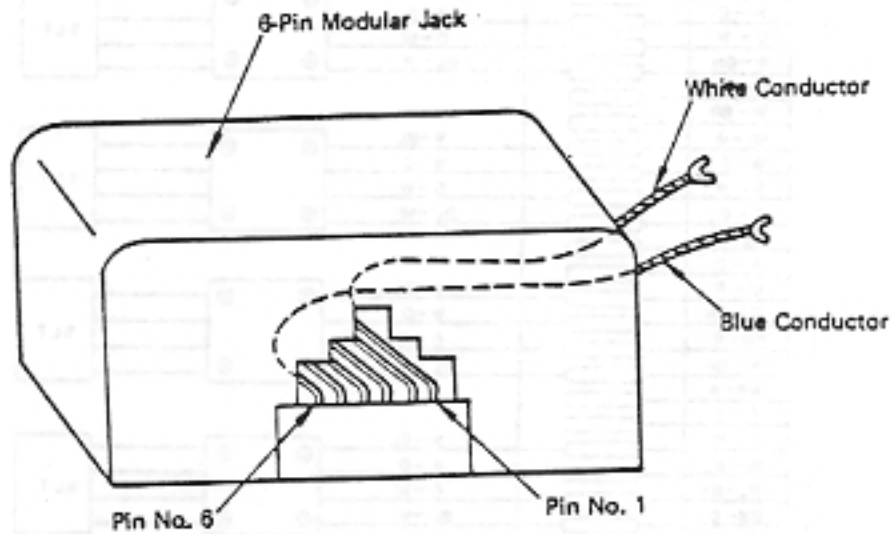


Figure 3.4.5.6.A Six-Pin Modular Jack Construction

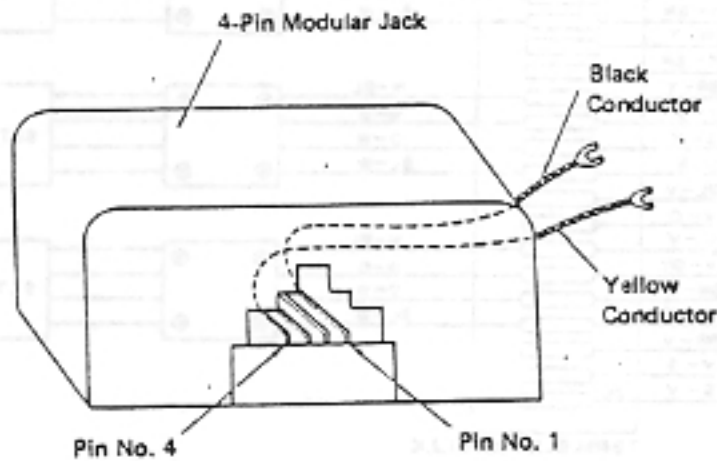


Figure 3.4.5.6.B Four-Pin Modular Jack Construction

3.4.5.7 ICU-MDF-E & M Termset Wiring

The ICU like the extensions, can be connected to the E & M termset via an MDF. E & M interface cards (EMTK-M) can be installed in subscriber card slots.

Figure 3.4.5.7 shows an example in which E & M interface cards are installed in subscriber card slots for Nos. 44 to 47. The pin number assignments shown in paragraph 3.4.5.9 are not described.

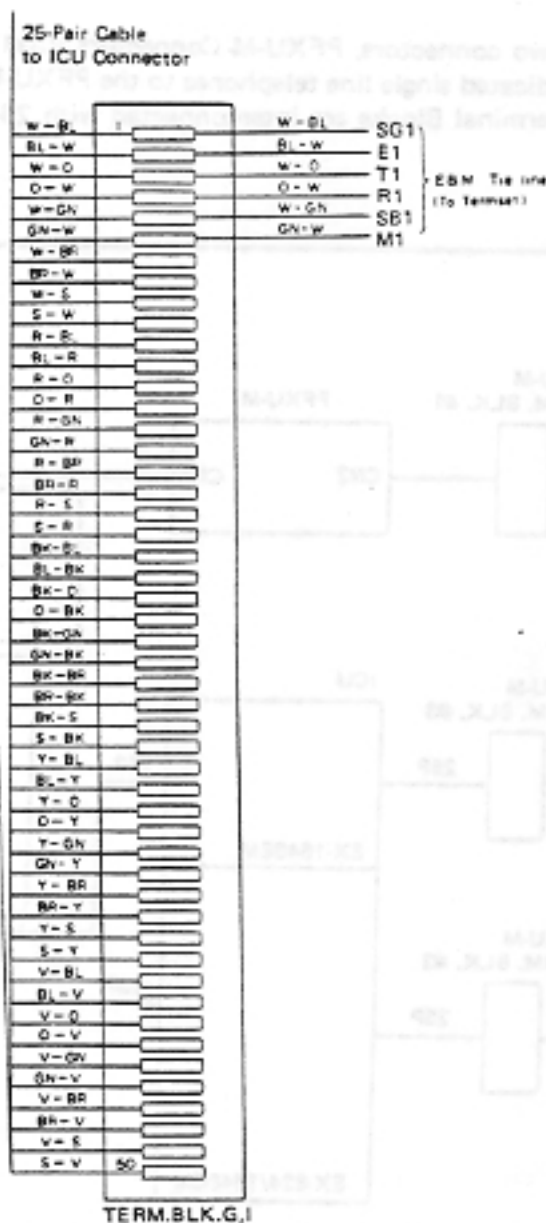
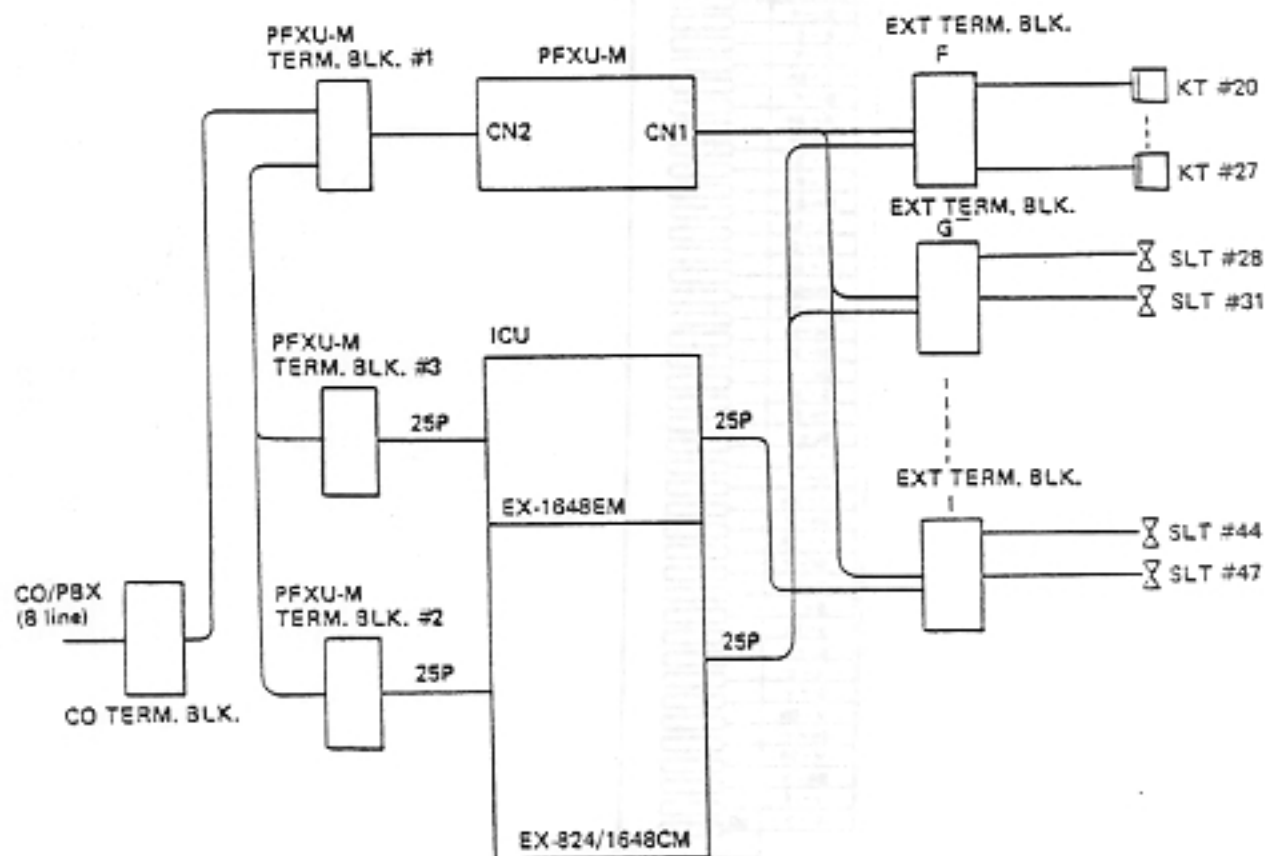


Figure 3.4.5.7 ICU-MDF-E & M Termset Wiring

3.4.5.8 ICU-MDF-PFXU-M Wiring

A brief description is given in this section. For details, refer to paragraph 3.7. Figure 3.4.5.8 shows the process of transferring CO/PBX lines to SLTs (single-line telephones) via PFXU-M (Power Failure Transfer Unit-M) during a commercial or system power supply failure. See paragraph 3.7 for terminal block details.

The PFXU is provided with two connectors, PFXU-M Connectors (CN1) and (CN2), for the connection of CO/PBX Lines, ICU and dedicated single line telephones to the PFXU-M. The PFXU-M and PFXU-M Terminal Blocks are interconnected with 25-pair, male, micro-ribbon connector cables.



- Notes:
1. One PFXU-M can transfer up to 8 CO/PBX lines during power failure.
 2. SLT #28 to #31, SLT #44 to #47 are the power failure extensions
 3. PFXU-M terminal blocks 1, 2, and 3 change the correspondence of LK keys to CO/PBX lines.

Figure 3.4.5.8 PFXU-M (Power Failure Transfer Unit-M) Wiring Example

3.4.5.9 MDF Terminal Block and ICU Connector Wiring

Table 3.4.5.9.A or Table 3.4.5.9.B shows wiring between ICU Connectors and MDF Terminal Blocks. Table 3.4.5.9.C shows ICU-MDF-Station Wiring

A 3.4.5.9

ICU Connector	MDF Terminal Block	ICU Connector	Wiring	Notes
1	U-1 - T-10	10	BT	
2	T-10 - U-28	11	BT	16 XBR100
3	U-28 - T-10	12	BT	
4	T-10 - W-60	13	BT	14 XBR100
5	W-60 - T-10	14	BT	
6	T-10 - W-60	15	BT	14 XBR100
7	W-60 - T-10	16	BT	
8	T-10 - T-26	17	BT	
9	T-26 - U-28	18	BT	
10	U-28 - U-28	19	BT	
11	U-28 - U-28	20	BT	
12	U-28 - U-28	21	BT	
13	U-28 - U-28	22	BT	
14	U-28 - U-28	23	BT	
15	U-28 - U-28	24	BT	
16	U-28 - U-28	25	BT	
17	U-28 - U-28	26	BT	
18	U-28 - U-28	27	BT	14 XBR100
19	U-28 - U-28	28	BT	
20	U-28 - U-28	29	BT	14 XBR100
21	U-28 - U-28	30	BT	
22	U-28 - U-28	31	BT	14 XBR100
23	U-28 - U-28	32	BT	
24	U-28 - U-28	33	BT	14 XBR100
25	U-28 - U-28	34	BT	
26	U-28 - U-28	35	BT	14 XBR100
27	U-28 - U-28	36	BT	
28	U-28 - U-28	37	BT	14 XBR100
29	U-28 - U-28	38	BT	
30	U-28 - U-28	39	BT	14 XBR100
31	U-28 - U-28	40	BT	
32	U-28 - U-28	41	BT	14 XBR100
33	U-28 - U-28	42	BT	
34	U-28 - U-28	43	BT	14 XBR100
35	U-28 - U-28	44	BT	
36	U-28 - U-28	45	BT	14 XBR100
37	U-28 - U-28	46	BT	
38	U-28 - U-28	47	BT	14 XBR100
39	U-28 - U-28	48	BT	
40	U-28 - U-28	49	BT	14 XBR100
41	U-28 - U-28	50	BT	
42	U-28 - U-28	51	BT	14 XBR100
43	U-28 - U-28	52	BT	
44	U-28 - U-28	53	BT	14 XBR100
45	U-28 - U-28	54	BT	
46	U-28 - U-28	55	BT	14 XBR100
47	U-28 - U-28	56	BT	
48	U-28 - U-28	57	BT	14 XBR100
49	U-28 - U-28	58	BT	
50	U-28 - U-28	59	BT	14 XBR100
51	U-28 - U-28	60	BT	
52	U-28 - U-28	61	BT	14 XBR100
53	U-28 - U-28	62	BT	
54	U-28 - U-28	63	BT	14 XBR100
55	U-28 - U-28	64	BT	
56	U-28 - U-28	65	BT	14 XBR100
57	U-28 - U-28	66	BT	
58	U-28 - U-28	67	BT	14 XBR100
59	U-28 - U-28	68	BT	
60	U-28 - U-28	69	BT	14 XBR100
61	U-28 - U-28	70	BT	
62	U-28 - U-28	71	BT	14 XBR100
63	U-28 - U-28	72	BT	
64	U-28 - U-28	73	BT	14 XBR100
65	U-28 - U-28	74	BT	
66	U-28 - U-28	75	BT	14 XBR100
67	U-28 - U-28	76	BT	
68	U-28 - U-28	77	BT	14 XBR100
69	U-28 - U-28	78	BT	
70	U-28 - U-28	79	BT	14 XBR100
71	U-28 - U-28	80	BT	
72	U-28 - U-28	81	BT	14 XBR100
73	U-28 - U-28	82	BT	
74	U-28 - U-28	83	BT	14 XBR100
75	U-28 - U-28	84	BT	
76	U-28 - U-28	85	BT	14 XBR100
77	U-28 - U-28	86	BT	
78	U-28 - U-28	87	BT	14 XBR100
79	U-28 - U-28	88	BT	
80	U-28 - U-28	89	BT	14 XBR100
81	U-28 - U-28	90	BT	
82	U-28 - U-28	91	BT	14 XBR100
83	U-28 - U-28	92	BT	
84	U-28 - U-28	93	BT	14 XBR100
85	U-28 - U-28	94	BT	
86	U-28 - U-28	95	BT	14 XBR100
87	U-28 - U-28	96	BT	
88	U-28 - U-28	97	BT	14 XBR100
89	U-28 - U-28	98	BT	
90	U-28 - U-28	99	BT	14 XBR100
91	U-28 - U-28	100	BT	

Table 3.4.5.9.A CO/PBX Terminal Block Wiring (1/2)

TERM. BLK. A

Function	Designation	ICU Conn. Pin No.	House Cable Wire Color	Term. Blk. Pin No.	Note		
CO/PBX #1	Tip	26	WHT - BLU	1			
	Ring	1	BLU - WHT	2			
CO/PBX #2	Tip	27	WHT - ORN	3			
	Ring	2	ORN - WHT	4			
CO/PBX #3	Tip	28	WHT - GRN	5			
	Ring	3	GRN - WHT	6			
CO/PBX #4	Tip	29	WHT - BRN	7			
	Ring	4	BRN - WHT	8			
—	—	30	WHT - SLT	9			
		5	SLT - WHT	10			
		31	RED - BLU	11			
		6	BLU - RED	12			
		32	RED - ORN	13			
		7	ORN - RED	14			
		33	RED - GRN	15			
		8	GRN - RED	16			
		34	RED - BRN	17			
		9	BRN - RED	18			
		35	RED - SLT	19			
		10	SLT - RED	20			
		36	BLK - BLU	21			
		11	BLU - BLK	22			
		37	BLK - ORN	23			
		12	ORN - BLK	24			
		CO/PBX #5	Tip	38	BLK - GRN	25	
			Ring	13	GRN - BLK	26	
CO/PBX #6	Tip	39	BLK - BRN	27			
	Ring	14	BRN - BLK	28			
CO/PBX #7	Tip	40	BLK - SLT	29			
	Ring	15	SLT - BLK	30			
CO/PBX #8	Tip	41	YEL - BLU	31			
	Ring	16	BLU - YEL	32			
—	—	42	YEL - ORN	33			
		17	ORN - YEL	34			
		43	YEL - GRN	35			
		18	GRN - YEL	36			
		44	YEL - BRN	37			
		19	BRN - YEL	38			
		45	YEL - SLT	39			
		20	SLT - YEL	40			
		46	VIO - BLU	41			
		21	BLU - VIO	42			
		47	VIO - ORN	43			
		22	ORN - VIO	44			
		48	VIO - GRN	45			
		23	GRN - VIO	46			
		49	VIO - BRN	47			
		24	BRN - VIO	48			
		50	VIO - SLT	49			
		25	SLT - VIO	50			

Table 3.4.5.9.A CO/PBX Terminal Block Wiring (2/2)

TERM. BLK. B

Function	Designation	ICU Conn. Pin No.	House Cable Wire Color	Term. Blk. Pin No.	Note
CO/PBX #9	Tip	26	WHT - BLU	1	
	Ring	1	BLU - WHT	2	
CO/PBX #10	Tip	27	WHT - ORN	3	
	Ring	2	ORN - WHT	4	
CO/PBX #11	Tip	28	WHT - GRN	5	
	Ring	3	GRN - WHT	6	
CO/PBX #12	Tip	29	WHT - BRN	7	
	Ring	4	BRN - WHT	8	
—	—	30	WHT - SLT	9	
		5	SLT - WHT	10	
		31	RED - BLU	11	
		6	BLU - RED	12	
		32	RED - ORN	13	
		7	ORN - RED	14	
		33	RED - GRN	15	
		8	GRN - RED	16	
		34	RED - BRN	17	
		9	BRN - RED	18	
		35	RED - SLT	19	
		10	SLT - RED	20	
		36	BLK - BLU	21	
		11	BLU - BLK	22	
		37	BLK - ORN	23	
		12	ORN - BLK	24	
CO/PBX #13	Tip	38	BLK - GRN	25	
	Ring	13	GRN - BLK	26	
CO/PBX #14	Tip	39	BLK - BRN	27	
	Ring	14	BRN - BLK	28	
CO/PBX #15	Tip	40	BLK - SLT	29	
	Ring	15	SLT - BLK	30	
CO/PBX #16	Tip	41	YEL - BLU	31	
	Ring	16	BLU - YEL	32	
—	—	42	YEL - ORN	33	
		17	ORN - YEL	34	
		43	YEL - GRN	35	
		18	GRN - YEL	36	
		44	YEL - BRN	37	
		19	BRN - YEL	38	
		45	YEL - SLT	39	
		20	SLT - YEL	40	
		46	VIO - BLU	41	
		21	BLU - VIO	42	
		47	VIO - ORN	43	
		22	ORN - VIO	44	
		48	VIO - GRN	45	
		23	GRN - VIO	46	
49	VIO - BRN	47			
24	BRN - VIO	48			
50	VIO - SLT	49			
25	SLT - VIO	50			

Table 3.4.5.9.B Loud Ringer Terminal Block Wiring (1/2)

TERM. BLK. C

Function	Designation	ICU Conn. Pin No.	House Cable Wire Color	Term. Blk. Pin No.	Note
LR1 (CO/PBX #1)	LRC 1	28	WHT - BLU	1	
	LRM 1	1	BLU - WHT	2	
LR2 (CO/PBX #2)	LRM 2	27	WHT - ORN	3	
	LRM 2	2	ORN - WHT	4	
LR3 (CO/PBX #3)	LRC 3	28	WHT - GRN	5	
	LRM 3	3	GRN - WHT	6	
LR4 (CO/PBX #4)	LRC 4	29	WHT - BRN	7	
	LRM 4	4	BRN - WHT	8	
LR5 (CO/PBX #5)	LRC 5	30	WHT - SLT	9	
	LRM 5	5	SLT - WHT	10	
LR6 (CO/PBX #6)	LRC 6	31	RED - BLU	11	
	LRM 6	6	BLU - RED	12	
LR7 (CO/PBX #7)	LRC 7	32	RED - ORN	13	
	LRM 7	7	ORN - RED	14	
LR8 (CO/PBX #8)	LRC 8	33	RED - GRN	15	
	LRM 8	8	GRN - RED	16	
		34	RED - BRN	17	
		9	BRN - RED	18	
		35	RED - SLT	19	
		10	SLT - RED	20	
		36	BLK - BLU	21	
		11	BLU - BLK	22	
		37	BLK - ORN	23	
		12	ORN - BLK	24	
		38	BLK - GRN	25	
		13	GRN - BLK	26	
		39	BLK - BRN	27	
		14	BRN - BLK	28	
		40	BLK - SLT	29	
		15	SLT - BLK	30	
		41	YEL - BLU	31	
		16	BLU - YEL	32	
		42	YEL - ORN	33	
		17	ORN - YEL	34	
		43	YEL - GRN	35	
		18	GRN - YEL	36	
		44	YEL - BRN	37	
		19	BRN - YEL	38	
		45	YEL - SLT	39	
		20	SLT - YEL	40	
		46	VIO - BLU	41	
		21	BLU - VIO	42	
		47	VIO - ORN	43	
		22	ORN - VIO	44	
		48	VIO - GRN	45	
		23	GRN - VIO	46	
		49	VIO - BRN	47	
		24	BRN - VIO	48	
		50	VIO - SLT	49	
		25	SLT - VIO	50	

Table 3.4.5.9.B Loud Ringer Terminal Block Wiring (2/2)

TERM. BLK. D

Function	Designation	ICU Conn. Pin No.	House Cable Wire Color	Term. Blk. Pin No.	Note
LR9 (CO/PBX #9)	LRC 9	26	WHT - BLU	1	
	LRM 9	1	BLU - WHT	2	
LR10 (CO/PBX #10)	LRC 10	27	WHT - ORN	3	
	LRM 10	2	ORN - WHT	4	
LR11 (CO/PBX #11)	LRC 11	28	WHT - GRN	5	
	LRM 11	3	GRN - WHT	6	
LR12 (CO/PBX #12)	LRC 12	29	WHT - BRN	7	
	LRM 12	4	BRN - WHT	8	
LR13 (CO/PBX #13)	LRC 13	30	WHT - SLT	9	
	LRM 13	5	SLT - WHT	10	
LR14 (CO/PBX #14)	LRC 14	31	RED - BLU	11	
	LRM 14	6	BLU - RED	12	
LR15 (CO/PBX #15)	LRC 15	32	RED - ORN	13	
	LRM 15	7	ORN - RED	14	
LR16 (CO/PBX #16)	LRC 16	33	RED - GRN	15	
	LRM 16	8	GRN - RED	16	
		34	RED - BRN	17	
		9	BRN - RED	18	
		35	RED - SLT	19	
		10	SLT - RED	20	
		36	BLK - BLU	21	
		11	BLU - BLK	22	
		37	BLK - ORN	23	
		12	ORN - BLK	24	
		38	BLK - GRN	25	
		13	GRN - BLK	26	
		39	BLK - BRN	27	
		14	BRN - BLK	28	
		40	BLK - SLT	29	
		15	SLT - BLK	30	
		41	YEL - BLU	31	
		16	BLU - YEL	32	
		42	YEL - ORN	33	
		17	ORN - YEL	34	
		43	YEL - GRN	35	
		18	GRN - YEL	36	
		44	YEL - BRN	37	
		19	BRN - YEL	38	
		45	YEL - SLT	39	
		20	SLT - YEL	40	
		46	VIO - BLU	41	
		21	BLU - VIO	42	
		47	VIO - ORN	43	
		22	ORN - VIO	44	
		48	VIO - GRN	45	
		23	GRN - VIO	46	
		49	VIO - BRN	47	
		24	BRN - VIO	48	
		50	VIO - SLT	49	
		25	SLT - VIO	50	

Table 3.4.5.9.C ICU-MDF-Station Wiring (1/7)

TERM. BLK. F

Function	Designation		ICU Conn. Pin No.	House Cable Wire Color	Term. Blk. Pin No.	2 Pairs Twisted-Pair or Quad and 3-Pair Twisted Cable Color		Wall Jack Pin No.		Note
	KT	SLT				4 Conductor	6 Conductor	4 Conductor	6 Conductor	
KT#20 / SLT#20	BT1	-	26	WHT - BLU	1	-	W-BL	-	1	
	BR1	-	1	BLU - WHT	2	W-BL	BL-W	1	2	
	T1	T1	27	WHT - ORN	3	W-O	W-O	2	3	
	R1	R1	2	ORN - WHT	4	O-W	O-W	3	4	
	OT1	-	28	WHT - GRN	5	BL-W	W-GN	4	5	
	OR1	-	3	GRN - WHT	6	-	GN-W	-	6	
KT#21 / SLT#21	BT2	-	29	WHT - BRN	7	-	W-BL	-	1	
	BR2	-	4	BRN - WHT	8	W-BL	BL-W	1	2	
	T2	T2	30	WHT - SLT	9	W-O	W-O	2	3	
	R2	R2	5	SLT - WHT	10	O-W	O-W	3	4	
	OT2	-	31	RED - BLU	11	BL-W	W-GN	4	5	
	OR2	-	6	BLU - RED	12	-	GN-W	-	6	
KT#22 / SLT#22	BT3	-	32	RED - ORN	13	-	W-BL	-	1	
	BR3	-	7	ORN - RED	14	W-BL	BL-W	1	2	
	T3	T3	33	RED - GRN	15	W-O	W-O	2	3	
	R3	R3	8	GRN - RED	16	O-W	O-W	3	4	
	OT3	-	34	RED - BRN	17	BL-W	W-GN	4	5	
	OR3	-	9	BRN - RED	18	-	GN-W	-	6	
KT#23 / SLT#23	BT4	-	35	RED - SLT	19	-	W-BL	-	1	
	BR4	-	10	SLT - RED	20	W-BL	BL-W	1	2	
	T4	T4	36	BLK - BLU	21	W-O	W-O	2	3	
	R4	R4	11	BLU - BLK	22	O-W	O-W	3	4	
	OT4	-	37	BLK - ORN	23	BL-W	W-GN	4	5	
	OR4	-	12	ORN - BLK	24	-	GN-W	-	6	
KT#24 / SLT#24	BT5	-	38	BLK - GRN	25	-	W-BL	-	1	
	BR5	-	13	GRN - BLK	26	W-BL	BL-W	1	2	
	T5	T5	39	BLK - BRN	27	W-O	W-O	2	3	
	R5	R5	14	BRN - BLK	28	O-W	O-W	3	4	
	OT5	-	40	BLK - SLT	29	BL-W	W-GN	4	5	
	OR5	-	15	SLT - BLK	30	-	GN-W	-	6	
KT#25 / SLT#25	BT6	-	41	YEL - BLU	31	-	W-BL	-	1	
	BR6	-	16	BLU - YEL	32	W-BL	BL-W	1	2	
	T6	T6	42	YEL - ORN	33	W-O	W-O	2	3	
	R6	R6	17	ORN - YEL	34	O-W	O-W	3	4	
	OT6	-	43	YEL - GRN	35	BL-W	W-GN	4	5	
	OR6	-	18	GRN - YEL	36	-	GN-W	-	6	
KT#26 / SLT#26	BT7	-	44	YEL - BRN	37	-	W-BL	-	1	
	BR7	-	19	BRN - YEL	38	W-BL	BL-W	1	2	
	T7	T7	45	YEL - SLT	39	W-O	W-O	2	3	
	R7	R7	20	SLT - YEL	40	O-W	O-W	3	4	
	OT7	-	46	VIO - BLU	41	BL-W	W-GN	4	5	
	OR7	-	21	BLU - VIO	42	-	GN-W	-	6	
KT#27 / SLT#27	BT8	-	47	VIO - BRN	43	-	W-BL	-	1	
	BR8	-	22	ORN - VIO	44	W-BL	BL-W	1	2	
	T8	T8	48	VIO - GRN	45	W-O	W-O	2	3	
	R8	R8	23	GRN - VIO	46	O-W	O-W	3	4	
	OT8	-	49	VIO - BRN	47	BL-W	W-GN	4	5	
	OR8	-	24	BRN - VIO	48	-	GN-W	-	6	
-	-	-	50	VIO - SLT	49	-	-	-	-	
-	-	-	25	SLT - VIO	50	-	-	-	-	

Table 3.4.5.9.C ICU-MDF-Station Wiring (2/7)

TERM. BLK. G

Function	Designation		ICU Conn. Pin No.	House Cable Wire Color	Term. Blk. Pin No.	2 Pairs Twisted-Pair or Quad and 3-Pair Twisted Cable Color		Wall Jack Pin No.		Note
	KT	SLT				4 Conductor	6 Conductor	4 Conductor	6 Conductor	
KT #28 / SLT #28	BT9	-	26	WHT - BLU	1	-	W-BL	-	1	
	BR9	-	1	BLU - WHT	2	W-BL	BL-W	1	2	
	T9	T9	27	WHT - ORN	3	W-O	W-O	2	3	
	R9	R9	2	ORN - WHT	4	O-W	O-W	3	4	
	DT9	-	28	WHT - GRN	5	BL-W	W-GN	4	5	
DR9	-	3	GRN - WHT	6	-	GN-W	-	6		
KT #29 / SLT #29	BT10	-	29	WHT - BRN	7	-	W-BL	-	1	
	BR10	-	4	BRN - WHT	8	W-BL	BL-W	1	2	
	T10	T10	30	WHT - SLT	9	W-O	W-O	2	3	
	R10	R10	5	SLT - WHT	10	O-W	O-W	3	4	
	DT10	-	31	RED - BLU	11	BL-W	W-GN	4	5	
DR10	-	6	BLU - RED	12	-	GN-W	-	6		
KT #30 / SLT #30	BT11	-	32	RED - ORN	13	-	W-BL	-	1	
	BR11	-	7	ORN - RED	14	W-BL	BL-W	1	2	
	T11	T11	33	RED - GRN	15	W-O	W-O	2	3	
	R11	R11	8	GRN - RED	16	O-W	O-W	3	4	
	DT11	-	34	RED - BRN	17	BL-W	W-GN	4	5	
DR11	-	9	BRN - RED	18	-	GN-W	-	6		
KT #31 / SLT #31	BT12	-	35	RED - SLT	19	-	W-BL	-	1	
	BR12	-	10	SLT - RED	20	W-BL	BL-W	1	2	
	T12	T12	36	BLK - BLU	21	W-O	W-O	2	3	
	R12	R12	11	BLU - BLK	22	O-W	O-W	3	4	
	DT12	-	37	BLK - ORN	23	BL-W	W-GN	4	5	
DR12	-	12	ORN - BLK	24	-	GN-W	-	6		
KT #32 / SLT #32	BT13	-	38	BLK - GRN	25	-	W-BL	-	1	
	BR13	-	13	GRN - BLK	26	W-BL	BL-W	1	2	
	T13	T13	39	BLK - BRN	27	W-O	W-O	2	3	
	R13	R13	14	BRN - BLK	28	O-W	O-W	3	4	
	DT13	-	40	BLK - SLT	29	BL-W	W-GN	4	5	
DR13	-	15	SLT - BLK	30	-	GN-W	-	6		
KT #33 / SLT #33	BT14	-	41	YEL - BLU	31	-	W-BL	-	1	
	BR14	-	16	BLU - YEL	32	W-BL	BL-W	1	2	
	T14	T14	42	YEL - ORN	33	W-O	W-O	2	3	
	R14	R14	17	ORN - YEL	34	O-W	O-W	3	4	
	DT14	-	43	YEL - GRN	35	BL-W	W-GN	4	5	
DR14	-	18	GRN - YEL	36	-	GN-W	-	6		
KT #34 / SLT #34	BT15	-	44	YEL - BRN	37	-	W-BL	-	1	
	BR15	-	19	BRN - YEL	38	W-BL	BL-W	1	2	
	T15	T15	45	SLT - YEL	39	W-O	W-O	2	3	
	R15	R15	20	SLT - YEL	40	O-W	O-W	3	4	
	DT15	-	46	VIO - BLU	41	BL-W	W-GN	4	5	
DR15	-	21	BLU - VIO	42	-	GN-W	-	6		
KT #35 / SLT #35	BT16	-	47	VIO - BRN	43	-	W-BL	-	1	
	BR16	-	22	ORN - VIO	44	W-BL	BL-W	1	2	
	T16	T16	48	VIO - GRN	45	W-O	W-O	2	3	
	R16	R16	23	GRN - VIO	46	O-W	O-W	3	4	
	DT16	-	49	VIO - BRN	47	BL-W	W-GN	4	5	
DR16	-	24	BRN - VIO	48	-	GN-W	-	6		
-	-	50	VIO - SLT	49	-	-	-	-	-	
-	-	25	SLT - VIO	50	-	-	-	-	-	

Table 3.4.5.9.C ICU-MDF-Station Wiring (3/7)

TERM. BLK. H

Function	Designation		ICU Conn. Pin No.	House Cable Wire Color	Term. Blk. Pin No.	2 Pairs Twisted-Pair or Quad and 3-Pair Twisted Cable Color		Wall Jack Pin No.		Note
	KT	SLT				4 Conductor	6 Conductor	4 Conductor	6 Conductor	
KT#36 / SLT#36	BT17	-	26	WHT - BLU	1	-	W-BL	-	1	
	BR17	-	1	BLU - WHT	2	W-BL	BL-W	1	2	
	T17	T17	27	WHT - ORN	3	W-O	W-O	2	3	
	R17	R17	2	ORN - WHT	4	O-W	O-W	3	4	
	DT17	-	28	WHT - GRN	5	BL-W	W-GN	4	5	
	DR17	-	3	GRN - WHT	6	-	GN-W	-	6	
KT#37 / SLT#37	BT18	-	29	WHT - BRN	7	-	W-BL	-	1	
	BR18	-	4	BRN - WHT	8	W-BL	BL-W	1	2	
	T18	T18	30	WHT - SLT	9	W-O	W-O	2	3	
	R18	R18	5	SLT - WHT	10	O-W	O-W	3	4	
	DT18	-	31	RED - BLU	11	BL-W	W-GN	4	5	
	DR18	-	6	BLU - RED	12	-	GN-W	-	6	
KT#38 / SLT#38	BT19	-	32	RED - ORN	13	-	W-BL	-	1	
	BR19	-	7	ORN - RED	14	W-BL	BL-W	1	2	
	T19	T19	33	RED - GRN	15	W-O	W-O	2	3	
	R19	R19	8	GRN - RED	16	O-W	O-W	3	4	
	DT19	-	34	RED - BRN	17	BL-W	W-GN	4	5	
	DR19	-	9	BRN - RED	18	-	GN-W	-	6	
KT#39 / SLT#39	BT20	-	35	RED - SLT	19	-	W-BL	-	1	
	BR20	-	10	SLT - RED	20	W-BL	BL-W	1	2	
	T20	T20	36	BLK - BLU	21	W-O	W-O	2	3	
	R20	R20	11	BLU - BLK	22	O-W	O-W	3	4	
	DT20	-	37	BLK - ORN	23	BL-W	W-GN	4	5	
	DR20	-	12	ORN - BLK	24	-	GN-W	-	6	
KT#40 / SLT#40	BT21	-	38	BLK - GRN	25	-	W-BL	-	1	
	BR21	-	13	GRN - BLK	26	W-BL	BL-W	1	2	
	T21	T21	39	BLK - BRN	27	W-O	W-O	2	3	
	R21	R21	14	BRN - BLK	28	O-W	O-W	3	4	
	DT21	-	40	BLK - SLT	29	BL-W	W-GN	4	5	
	DR21	-	15	SLT - BLK	30	-	GN-W	-	6	
KT#41 / SLT#41	BT22	-	41	YEL - BLU	31	-	W-BL	-	1	
	BR22	-	16	BLU - YEL	32	W-BL	BL-W	1	2	
	T22	T22	42	YEL - ORN	33	W-O	W-O	2	3	
	R22	R22	17	ORN - YEL	34	O-W	O-W	3	4	
	DT22	-	43	YEL - GRN	35	BL-W	W-GN	4	5	
	DR22	-	18	GRN - YEL	36	-	GN-W	-	6	
KT#42 / SLT#42	BT23	-	44	YEL - BRN	37	-	W-BL	-	1	
	BR23	-	19	BRN - YEL	38	W-BL	BL-W	1	2	
	T23	T23	45	YEL - SLT	39	W-O	W-O	2	3	
	R23	R23	20	SLT - YEL	40	O-W	O-W	3	4	
	DT23	-	46	VIO - BLU	41	BL-W	W-GN	4	5	
	DR23	-	21	BLU - VIO	42	-	GN-W	-	6	
KT#43 / SLT#43	BT24	-	47	VIO - BRN	43	-	W-BL	-	1	
	BR24	-	22	ORN - VIO	44	W-BL	BL-W	1	2	
	T24	T24	48	VIO - GRN	45	W-O	W-O	2	3	
	R24	R24	23	GRN - VIO	46	O-W	O-W	3	4	
	DT24	-	49	VIO - BRN	47	BL-W	W-GN	4	5	
	DR24	-	24	BRN - VIO	48	-	GN-W	-	6	
-	-	50	VIO - SLT	49	-	-	-	-	-	
-	-	25	SLT - VIO	50	-	-	-	-	-	

Table 3.4.5.9.C ICU-MDF-Station Wiring (4/7)

TERM. BLK. I

Function	Designation		ICU Conn. Pin No.	House Cable Wire Color	Term. Blk. Pin No.	2 Pairs Twisted-Pair or Quad and 3-Pair Twisted Cable Color		Wall Jack Pin No.		Note
	KT	SLT				4 Conductor	6 Conductor	4 Conductor	6 Conductor	
KT #44 / SLT #44	BT25	-	26	WHT - BLU	1	-	W-BL	-	1	
	BR25	-	1	BLU - WHT	2	W-BL	BL-W	1	2	
	T25	T25	27	WHT - ORN	3	W-O	W-O	2	3	
	R25	R25	2	ORN - WHT	4	O-W	O-W	3	4	
	DT25	-	28	WHT - GRN	5	BL-W	W-GN	4	5	
	DR25	-	3	GRN - WHT	6	-	GN-W	-	6	
KT #45 / SLT #45	BT26	-	29	WHT - BRN	7	-	W-BL	-	1	
	BR26	-	4	BRN - WHT	8	W-BL	BL-W	1	2	
	T26	T26	30	WHT - SLT	9	W-O	W-O	2	3	
	R26	R26	5	SLT - WHT	10	O-W	O-W	3	4	
	DT26	-	31	RED - BLU	11	BL-W	W-GN	4	5	
	DR26	-	6	BLU - RED	12	-	GN-W	-	6	
KT #46 / SLT #46	BT27	-	32	RED - ORN	13	-	W-BL	-	1	
	BR27	-	7	ORN - RED	14	W-BL	BL-W	1	2	
	T27	T27	33	RED - GRN	15	W-O	W-O	2	3	
	R27	R27	8	GRN - RED	16	O-W	O-W	3	4	
	DT27	-	34	RED - BRN	17	BL-W	W-GN	4	5	
	DR27	-	9	BRN - RED	18	-	GN-W	-	6	
KT #47 / SLT #47	BT28	-	35	RED - SLT	19	-	W-BL	-	1	
	BR28	-	10	SLT - RED	20	W-BL	BL-W	1	2	
	T28	T28	36	BLK - BLU	21	W-O	W-O	2	3	
	R28	R28	11	BLU - BLK	22	O-W	O-W	3	4	
	DT28	-	37	BLK - ORN	23	BL-W	W-GN	4	5	
	DR28	-	12	ORN - BLK	24	-	GN-W	-	6	
KT #48 / SLT #48	BT29	-	38	BLK - GRN	25	-	W-BL	-	1	
	BR29	-	13	GRN - BLK	26	W-BL	BL-W	1	2	
	T29	T29	39	BLK - BRN	27	W-O	W-O	2	3	
	R29	R29	14	BRN - BLK	28	O-W	O-W	3	4	
	DT29	-	40	BLK - SLT	29	BL-W	W-GN	4	5	
	DR29	-	15	SLT - BLK	30	-	GN-W	-	6	
KT #49 / SLT #49	BT30	-	41	YEL - BLU	31	-	W-BL	-	1	
	BR30	-	16	BLU - YEL	32	W-BL	BL-W	1	2	
	T30	T30	42	YEL - ORN	33	W-O	W-O	2	3	
	R30	R30	17	ORN - YEL	34	O-W	O-W	3	4	
	DT30	-	43	YEL - GRN	35	BL-W	W-GN	4	5	
	DR30	-	18	GRN - YEL	36	-	GN-W	-	6	
KT #50 / SLT #50	BT31	-	44	YEL - BRN	37	-	W-BL	-	1	
	BR31	-	19	BRN - YEL	38	W-BL	BL-W	1	2	
	T31	T31	45	YEL - SLT	39	W-O	W-O	2	3	
	R31	R31	20	SLT - YEL	40	O-W	O-W	3	4	
	DT31	-	46	VIO - BLU	41	BL-W	W-GN	4	5	
	DR31	-	21	BLU - VIO	42	-	GN-W	-	6	
KT #51 / SLT #51	BT32	-	47	VIO - BRN	43	-	W-BL	-	1	
	BR32	-	22	ORN - VIO	44	W-BL	BL-W	1	2	
	T32	T32	48	VIO - GRN	45	W-O	W-O	2	3	
	R32	R32	23	GRN - VIO	46	O-W	O-W	3	4	
	DT32	-	49	VIO - BRN	47	BL-W	W-GN	4	5	
	DR32	-	24	BRN - VIO	48	-	GN-W	-	6	
-	-	50	VIO - SLT	49	-	-	-	-	-	
-	-	25	SLT - VIO	50	-	-	-	-	-	

Table 3.4.5.9.C ICU-MDF-Station Wiring (5/7)

TERM. BLK. J

Function	Designation		ICU Conn. Pin No.	House Cable Wire Color	Term. Blk. Pin No.	2 Pairs Twisted-Pair or Quad and 3-Pair Twisted Cable Color		Wall Jack Pin No.		Note
	KT	SLT				4 Conductor	6 Conductor	4 Conductor	6 Conductor	
KT#52 / SLT#52	BT33	-	26	WHT - BLU	1	-	W-BL	-	1	
	BR33	-	1	BLU - WHT	2	W-BL	BL-W	1	2	
	T33	T33	27	WHT - ORN	3	W-O	W-O	2	3	
	R33	R33	2	ORN - WHT	4	O-W	O-W	3	4	
	OT33	-	28	WHT - GRN	5	BL-W	W-GN	4	5	
KT#53 / SLT#53	DR33	-	3	GRN - WHT	6	-	GN-W	-	6	
	BT34	-	29	WHT - BRN	7	-	W-BL	-	1	
	BR34	-	4	BRN - WHT	8	W-BL	BL-W	1	2	
	T34	T34	30	WHT - SLT	9	W-O	W-O	2	3	
	R34	R34	5	SLT - WHT	10	O-W	O-W	3	4	
KT#54 / SLT#54	OT34	-	31	RED - BLU	11	BL-W	W-GN	4	5	
	DR34	-	6	BLU - RED	12	-	GN-W	-	6	
	BT35	-	32	RED - ORN	13	-	W-BL	-	1	
	BR35	-	7	ORN - RED	14	W-BL	BL-W	1	2	
	T35	T35	33	RED - GRN	15	W-O	W-O	2	3	
KT#55 / SLT#55	R35	R35	8	GRN - RED	16	O-W	O-W	3	4	
	OT35	-	34	RED - BRN	17	BL-W	W-GN	4	5	
	DR35	-	9	BRN - RED	18	-	GN-W	-	6	
	BT36	-	35	RED - SLT	19	-	W-BL	-	1	
	BR36	-	10	SLT - RED	20	W-BL	BL-W	1	2	
KT#56 / SLT#56	T36	T36	36	BLK - BLU	21	W-O	W-O	2	3	
	R36	R36	11	BLU - BLK	22	O-W	O-W	3	4	
	OT36	-	37	BLK - ORN	23	BL-W	W-GN	4	5	
	DR36	-	12	ORN - BLK	24	-	GN-W	-	6	
	BT37	-	38	BLK - GRN	25	-	W-BL	-	1	
KT#57 / SLT#57	BR37	-	13	GRN - BLK	26	W-BL	BL-W	1	2	
	T37	T37	39	BLK - BRN	27	W-O	W-O	2	3	
	R37	R37	14	BRN - BLK	28	O-W	O-W	3	4	
	OT37	-	40	BLK - SLT	29	BL-W	W-GN	4	5	
	DR37	-	15	SLT - BLK	30	-	GN-W	-	6	
KT#58 / SLT#58	BT38	-	41	YEL - BLU	31	-	W-BL	-	1	
	BR38	-	16	BLU - YEL	32	W-BL	BL-W	1	2	
	T38	T38	42	YEL - ORN	33	W-O	W-O	2	3	
	R38	R38	17	ORN - YEL	34	O-W	O-W	3	4	
	OT38	-	43	YEL - GRN	35	BL-W	W-GN	4	5	
KT#59 / SLT#59	DR38	-	18	GRN - YEL	36	-	GN-W	-	6	
	BT39	-	44	YEL - BRN	37	-	W-BL	-	1	
	BR39	-	19	BRN - YEL	38	W-BL	BL-W	1	2	
	T39	T39	45	YEL - SLT	39	W-O	W-O	2	3	
	R39	R39	20	SLT - YEL	40	O-W	O-W	3	4	
KT#59 / SLT#59	OT39	-	46	VIO - BLU	41	BL-W	W-GN	4	5	
	DR39	-	21	BLU - VIO	42	-	GN-W	-	6	
	BT40	-	47	VIO - BRN	43	-	W-BL	-	1	
	BR40	-	22	ORN - VIO	44	W-BL	BL-W	1	2	
	T40	T40	48	VIO - GRN	45	W-O	W-O	2	3	
KT#59 / SLT#59	R40	R40	23	GRN - VIO	46	O-W	O-W	3	4	
	OT40	-	49	VIO - BRN	47	BL-W	W-GN	4	5	
	DR40	-	24	BRN - VIO	48	-	GN-W	-	6	
	-	-	50	VIO - SLT	49	-	-	-	-	
	-	-	25	SLT - VIO	50	-	-	-	-	

Table 3.4.5.9.C ICU-MDF-Station Wiring (6/7)

TERM. BLK. K

Function	Designation		ICU Conn. Pin No.	House Cable Wire Color	Term. Blk. Pin No.	2 Pairs Twisted-Pair or Quad and 3-Pair Twisted Cable Color		Wall Jack Pin No.		Note
	KT	SLT				4 Conductor	6 Conductor	4 Conductor	6 Conductor	
KT#60 / SLT#60	BT41	-	26	WHT - BLU	1	-	W-BL	-	1	
	BR41	-	1	BLU - WHT	2	W-BL	BL-W	1	2	
	T41	T41	27	WHT - ORN	3	W-O	W-O	2	3	
	R41	R41	2	ORN - WHT	4	O-W	O-W	3	4	
	DT41	-	28 ^a	WHT - GRN	5	BL-W	W-GN	4	5	
	DR41	-	3	GRN - WHT	6	-	GN-W	-	6	
KT#61 / SLT#61	BT42	-	29	WHT - BRN	7	-	W-BL	-	1	
	BR42	-	4	BRN - WHT	8	W-BL	BL-W	1	2	
	T42	T42	30	WHT - SLT	9	W-O	W-O	2	3	
	R42	R42	5	SLT - WHT	10	O-W	O-W	3	4	
	DT42	-	31	RED - BLU	11	BL-W	W-GN	4	5	
	DR42	-	6	BLU - RED	12	-	GN-W	-	6	
KT#62 / SLT#62	BT43	-	32	RED - ORN	13	-	W-BL	-	1	
	BR43	-	7	ORN - RED	14	W-BL	BL-W	1	2	
	T43	T43	33	RED - GRN	15	W-O	W-O	2	3	
	R43	R43	8	GRN - RED	16	O-W	O-W	3	4	
	DT43	-	34	RED - BRN	17	BL-W	W-GN	4	5	
	DR43	-	9	BRN - RED	18	-	GN-W	-	6	
KT#63 / SLT#63	BT44	-	35	RED - SLT	19	-	W-BL	-	1	
	BR44	-	10	SLT - RED	20	W-BL	BL-W	1	2	
	T44	T44	36	BLK - BLU	21	W-O	W-O	2	3	
	R44	R44	11	BLU - BLK	22	O-W	O-W	3	4	
	DT44	-	37	BLK - ORN	23	BL-W	W-GN	4	5	
	DR44	-	12	ORN - BLK	24	-	GN-W	-	6	
KT#64 / SLT#64	BT45	-	38	BLK - GRN	25	-	W-BL	-	1	
	BR45	-	13	GRN - BLK	26	W-BL	BL-W	1	2	
	T45	T45	39	BLK - BRN	27	W-O	W-O	2	3	
	R45	R45	14	BRN - BLK	28	O-W	O-W	3	4	
	DT45	-	40	BLK - SLT	29	BL-W	W-GN	4	5	
	DR45	-	15	SLT - BLK	30	-	GN-W	-	6	
KT#65 / SLT#65	BT46	-	41	YEL - BLU	31	-	W-BL	-	1	
	BR46	-	16	BLU - YEL	32	W-BL	BL-W	1	2	
	T46	T46	42	YEL - ORN	33	W-O	W-O	2	3	
	R46	R46	17	ORN - YEL	34	O-W	O-W	3	4	
	DT46	-	43	YEL - GRN	35	BL-W	W-GN	4	5	
	DR46	-	18	GRN - YEL	36	-	GN-W	-	6	
KT#66 / SLT#66	BT47	-	44	YEL - BRN	37	-	W-BL	-	1	
	BR47	-	19	BRN - YEL	38	W-BL	BL-W	1	2	
	T47	T47	45	YEL - SLT	39	W-O	W-O	2	3	
	R47	R47	20	SLT - YEL	40	O-W	O-W	3	4	
	DT47	-	46	VIO - BLU	41	BL-W	W-GN	4	5	
	DR47	-	21	BLU - VIO	42	-	GN-W	-	6	
KT#67 / SLT#67	BT48	-	47	VIO - BRN	43	-	W-BL	-	1	
	BR48	-	22	ORN - VIO	44	W-BL	BL-W	1	2	
	T48	T48	48	VIO - GRN	45	W-O	W-O	2	3	
	R48	R48	23	GRN - VIO	46	O-W	O-W	3	4	
	DT48	-	49	VIO - BRN	47	BL-W	W-GN	4	5	
	DR48	-	24	BRN - VIO	48	-	GN-W	-	6	
-	-	-	50	VIO - SLT	49	-	-	-	-	
-	-	-	25	SLT - VIO	50	-	-	-	-	

Table 3.4.5.9.C ICU-MDF-Station Wiring (7/7)

TERM. BLK. E

Function	Designation	ICU Conn. Pin No.		House Cable Wire Color	Term-Blk. Pin No.	3-Pairs Twisted-Pair Cable Color	Wall Jack Pin No.	Note
		24P	50P					
DSS-M or DSS-N #1	ATT1 1T	13	26	WHT - BLU	1	W-BL	1	
	ATT1 1R	1	1	BLU - WHT	2	BL-W	2	
	-	-	27	WHT - ORN	3	W-O	3	
	-	-	2	ORN - WHT	4	O-W	4	
	ATT1 2T	14	28	WHT - GRN	5	W-GN	5	
	ATT1 2R	2	3	GRN - WHT	6	GN-W	6	
DSS-M or DSS-N #2	ATT2 1T	15	29	WHT - BRN	7	W-BL	1	
	ATT2 1R	3	4	BRN - WHT	8	BL-W	2	
	-	-	30	WHT - SLT	9	W-O	3	
	-	-	5	SLT - WHT	10	O-W	4	
	ATT2 2T	16	31	RED - BLU	11	W-GN	5	
	ATT2 2R	4	6	BLU - RED	12	GN-W	6	
BLF-M #1	BLF1 1T	17	32	RED - ORN	13	W-BL	1	
	BLF1 1R	5	7	ORN - RED	14	BL-W	2	
	-	-	33	RED - GRN	15	W-O	3	
	-	-	8	GRN - RED	16	O-W	4	
	BLF1 2T	18	34	RED - BRN	17	W-GN	5	
	BLF1 2R	6	9	BRN - RED	18	GN-W	6	
BLF-M #2	BLF2 1T	19	35	RED - SLT	19	W-BL	1	
	BLF2 1R	7	10	SLT - RED	20	BL-W	2	
	-	-	36	BLK - BLU	21	W-O	3	
	-	-	11	BLU - BLK	22	O-W	4	
	BLF2 2T	20	37	BLK - ORN	23	W-GN	5	
	BLF2 2R	8	12	ORN - BLK	24	GN-W	6	
BLF-M #3	BLF3 1T	21	38	BLK - GRN	25	W-BL	1	
	BLF3 1R	9	13	GRN - BLK	26	BL-W	2	
	-	-	39	BLK - BRN	27	W-O	3	
	-	-	14	BRN - BLK	28	O-W	4	
	BLF3 2T	22	40	BLK - SLT	29	W-GN	5	
	BLF3 2R	10	15	SLT - BLK	30	GN-W	6	
BLF-M #4	BLF4 1T	23	41	YEL - BLU	31	W-BL	1	
	BLF4 1R	11	16	BLU - YEL	32	BL-W	2	
	-	-	42	YEL - ORN	33	W-O	3	
	-	-	17	ORN - YEL	34	O-W	4	
	BLF4 2T	24	43	YEL - GRN	35	W-GN	5	
	BLF4 2R	12	18	GRN - YEL	36	GN-W	6	
---	-	-	44	YEL - BRN	37	W-BL	1	
	-	-	19	BRN - YEL	38	BL-W	2	
	-	-	45	YEL - SLT	39	W-O	3	
	-	-	20	SLT - YEL	40	O-W	4	
	-	-	46	VIO - BLUE	41	W-GN	5	
	-	-	21	BLU - VIO	42	GN-W	6	
	-	-	47	VIO - ORN	43	W-BL	1	
	-	-	22	ORN - VIO	44	BL-W	2	
	-	-	48	VIO - GRN	45	W-O	3	
	-	-	23	GRN - VIO	46	O-W	4	
	-	-	49	VIO - BRN	47	W-GN	5	
	-	-	24	BRN - VIO	48	GN-W	6	
	-	-	50	VIO - SLT	49	-	-	
	-	-	25	SLT - VIO	50	-	-	

3.4.5.10 Description of Actual System Configuration

CO/PBX lines, stations (KTs, SLTs, DSSs), loud ringers, and power failure are described by referring to an actual system configuration.

- CO/PBX lines No. 1 through No. 16 are used.
- CO/PBX lines No. 1 through No. 4 and No. 9 through No. 12 are transferred during power failure as shown in the table below.
- Two DSS-Ms and two BLF-Ms are used.
- KT's and SLTs are as follows:
 - KTs: No. 20 through No. 35, No. 44 through No. 51
 - SLTs: No. 36 through No. 43, No. 60 through No. 67
- Loud ringers correspond to CO/PBX lines No. 1 through No. 4 and No. 9 through No. 12.

Figure 3.4.5.10.A shows a block diagram of the MDF of the above system and system installation. It is simply an example, and various other forms of installation are possible. The assignments of pin numbers on these MDF terminal blocks are shown in Tables 3.4.5.10.B through 3.4.5.10.F.

Table 3.4.5.10.A Power Failure SLT

CO/PBX No.	Transfer Destination SLT No.
# 1	# 40
# 2	# 41
# 3	# 42
# 4	# 43
# 5	# 64
# 6	# 65
# 7	# 66
# 8	# 67
# 9	Non power failure
# 10	Non power failure
# 11	Non power failure
# 12	Non power failure
# 13	Non power failure
# 14	Non power failure
# 15	Non power failure
# 16	Non power failure

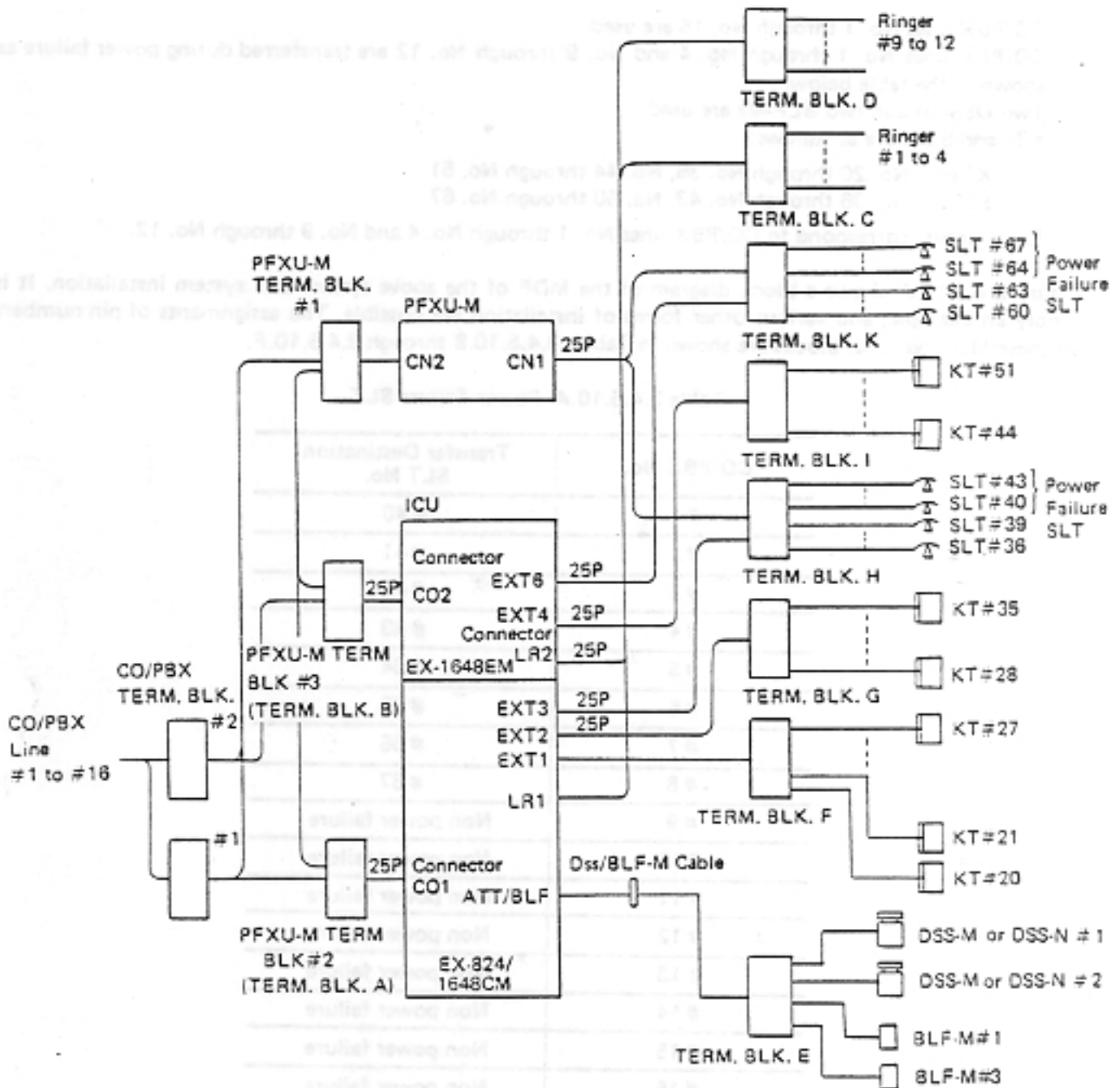


Figure 3.4.5.10.A Block Diagram of Actual System Installation

Table 3.4.5.10.B CO/PBX Terminal Block Wiring (1/2)

TERM. BLK. A (PFXU-M TERM. BLK. #2)

Function	Designation	ICU Conn. Pin No.	House Cable Wire Color	Term. Blk. Pin No.	Note
CO/PBX #1	Tip	26	WHT - BLU	1	
	Ring	1	BLU - WHT	2	
CO/PBX #2	Tip	27	WHT - ORN	3	
	Ring	2	ORN - WHT	4	
CO/PBX #3	Tip	28	WHT - GRN	5	
	Ring	3	GRN - WHT	6	
CO/PBX #4	Tip	29	WHT - BRN	7	
	Ring	4	BRN - WHT	8	
—	—	30	WHT - SLT	9	
		5	SLT - WHT	10	
		31	RED - BLU	11	
		6	BLU - RED	12	
		32	RED - ORN	13	
		7	ORN - RED	14	
		33	RED - GRN	15	
		8	GRN - RED	16	
		34	RED - BRN	17	
		9	BRN - RED	18	
		35	RED - SLT	19	
		10	SLT - RED	20	
		36	BLK - BLU	21	
		11	BLU - BLK	22	
		37	BLK - ORN	23	
		12	ORN - BLK	24	
CO/PBX #5	Tip	38	BLK - GRN	25	
	Ring	13	GRN - BLK	26	
CO/PBX #6	Tip	39	BLK - BRN	27	
	Ring	14	BRN - BLK	28	
CO/PBX #7	Tip	40	BLK - SLT	29	
	Ring	15	SLT - BLK	30	
CO/PBX #8	Tip	41	YEL - BLU	31	
	Ring	16	BLU - YEL	32	
—	—	42	YEL - ORN	33	
		17	ORN - YEL	34	
		43	YEL - GRN	35	
		18	GRN - YEL	36	
		44	YEL - BRN	37	
		19	BRN - YEL	38	
		45	YEL - SLT	39	
		20	SLT - YEL	40	
		46	VIO - BLU	41	
		21	BLU - VIO	42	
		47	VIO - ORN	43	
		22	ORN - VIO	44	
		48	VIO - GRN	45	
		23	GRN - VIO	46	
		49	VIO - BRN	47	
		24	BRN - VIO	48	
50	VIO - SLT	49			
25	SLT - VIO	50			

Table 3.4.5.10.B CO/PBX Terminal Block Wiring (2/2)

TERM. BLK. B CPFXU-M TERM. BLK. #3)

Function	Designation	ICU Conn. Pin No.	House Cable Wire Color	Term. Blk. Pin No.	Note		
CO/PBX #9	Tip	26	WHT - BLU	1			
	Ring	1	BLU - WHT	2			
CO/PBX #10	Tip	27	WHT - ORN	3			
	Ring	2	ORN - WHT	4			
CO/PBX #11	Tip	28	WHT - GRN	5			
	Ring	3	GRN - WHT	6			
CO/PBX #12	Tip	29	WHT - BRN	7			
	Ring	4	BRN - WHT	8			
---	---	30	WHT - SLT	9			
		5	SLT - WHT	10			
		31	RED - BLU	11			
		6	BLU - RED	12			
		32	RED - ORN	13			
		7	ORN - RED	14			
		33	RED - GRN	15			
		8	GRN - RED	16			
		34	RED - BRN	17			
		9	BRN - RED	18			
		35	RED - SLT	19			
		10	SLT - RED	20			
		36	BLK - BLU	21			
		11	BLU - BLK	22			
		37	BLK - ORN	23			
		12	ORN - BLK	24			
		CO/PBX #13	Tip	38	BLK - GRN	25	
			Ring	13	GRN - BLK	26	
CO/PBX #14	Tip	39	BLK - BRN	27			
	Ring	14	BRN - BLK	28			
CO/PBX #15	Tip	40	BLK - SLT	29			
	Ring	15	SLT - BLK	30			
CO/PBX #16	Tip	41	YEL - BLU	31			
	Ring	16	BLU - YEL	32			
---	---	42	YEL - ORN	33			
		17	ORN - YEL	34			
		43	YEL - GRN	35			
		18	GRN - YEL	36			
		44	YEL - BRN	37			
		19	BRN - YEL	38			
		45	YEL - SLT	39			
		20	SLT - YEL	40			
		46	VIO - BLU	41			
		21	BLU - VIO	42			
		47	VIO - ORN	43			
		22	ORN - VIO	44			
		48	VIO - GRN	45			
		23	GRN - VIO	46			
		49	VIO - BRN	47			
		24	BRN - VIO	48			
		50	VIO - SLT	49			
		25	SLT - VIO	50			

Table 3.4.5.10.C Loud Ringer Terminal Block Wiring (1/2)

TERM. BLK. C

Function	Designation	ICU Conn. Pin No.	House Cable Wire Color	Term. Blk. Pin No.	Note
LR1 (CO/PBX #1)	LRC 1	26	WHT - BLU	1	
	LRM 1	1	BLU - WHT	2	
LR2 (CO/PBX #2)	LRC 2	27	WHT - ORN	3	
	LRM 2	2	ORN - WHT	4	
LR3 (CO/PBX #3)	LRC 3	28	WHT - GRN	5	
	LRM 3	3	GRN - WHT	6	
LR4 (CO/PBX #4)	LRC 4	29	WHT - BRN	7	
	LRM 4	4	BRN - WHT	8	
		30	WHT - SLT	9	
		5	SLT - WHT	10	
		31	RED - BLU	11	
		6	BLU - RED	12	
		32	RED - ORN	13	
		7	ORN - RED	14	
		33	RED - GRN	15	
		8	GRN - RED	16	
		34	RED - BRN	17	
		9	BRN - RED	18	
		35	RED - SLT	19	
		10	SLT - RED	20	
		36	BLK - BLU	21	
		11	BLU - BLK	22	
		37	BLK - ORN	23	
		12	ORN - BLK	24	
		38	BLK - GRN	25	
		13	GRN - BLK	26	
		39	BLK - BRN	27	
		14	BRN - BLK	28	
		40	BLK - SLT	29	
		15	SLT - BLK	30	
		41	YEL - BLU	31	
		16	BLU - YEL	32	
		42	YEL - ORN	33	
		17	ORN - YEL	34	
		43	YEL - GRN	35	
		18	GRN - YEL	36	
		44	YEL - BRN	37	
		19	BRN - YEL	38	
		45	YEL - SLT	39	
		20	SLT - YEL	40	
		46	VIO - BLU	41	
		21	BLU - VIO	42	
		47	VIO - ORN	43	
		22	ORN - VIO	44	
		48	VIO - GRN	45	
		23	GRN - VIO	46	
		49	VIO - BRN	47	
		24	BRN - VIO	48	
		50	VIO - SLT	49	
		25	SLT - VIO	50	

Table 3.4.5.10.C Loud Ringer Terminal Block Wiring (2/2)

TERM. BLK. D

Function	Designation	ICU Conn. Pin No.	House Cable Wire Color	Term. Blk. Pin No.	Note
LR 9 (CO/PBX #9)	LRC 9	28	WHT - BLU	1	
	LRM 9	1	BLU - WHT	2	
LR10 (CO/PBX #10)	LRC 10	27	WHT - ORN	3	
	LRM 10	2	ORN - WHT	4	
LR11 (CO/PBX #11)	LRC 11	28	WHT - GRN	5	
	LRM 11	3	GRN - WHT	6	
LR12 (CO/PBX #12)	LRC 12	29	WHT - BRN	7	
	LRM 12	4	BRN - WHT	8	
		30	WHT - SLT	9	
		5	SLT - WHT	10	
		31	RED - BLU	11	
		6	BLU - RED	12	
		32	RED - ORN	13	
		7	ORN - RED	14	
		33	RED - GRN	15	
		8	GRN - RED	16	
		34	RED - BRN	17	
		9	BRN - RED	18	
		35	RED - SLT	19	
		10	SLT - RED	20	
		36	BLK - BLU	21	
		11	BLU - BLK	22	
		37	BLK - ORN	23	
		12	ORN - BLK	24	
		38	BLK - GRN	25	
		13	GRN - BLK	26	
		39	BLK - BRN	27	
		14	BRN - BLK	28	
		40	BLK - SLT	29	
		15	SLT - BLK	30	
		41	YEL - BLU	31	
		16	BLU - YEL	32	
		42	YEL - ORN	33	
		17	ORN - YEL	34	
		43	YEL - GRN	35	
		18	GRN - YEL	36	
		44	YEL - BRN	37	
		19	BRN - YEL	38	
		45	YEL - SLT	39	
		20	SLT - YEL	40	
		46	VIO - BLU	41	
		21	BLU - VIO	42	
		47	VIO - ORN	43	
		22	ORN - VIO	44	
		48	VIO - GRN	45	
		23	GRN - VIO	46	
		49	VIO - BRN	47	
		24	BRN - VIO	48	
		50	VIO - SLT	49	
		25	SLT - VIO	50	

Table 3.4.5.10.D ICU-MDF-Station Wiring (1/5)

TERM. BLK. F

Function	Designation		ICU Conn. Pin. No.	House Cable Wire Color	Term. Blk. Pin No.	2 Pair Twisted-Pair or Quad and 3-Pair Twisted Cable Color		Well Jack Pin. No.		Note
	KT	SLT				4 Conductor	6 Conductor			
KT#20	BT1	-	26	WHT - BLU	1	-	W-BL	-	1	
	BR1	-	1	BLU - WHT	2	-	BL-W	-	2	
	T1	-	27	WHT - ORN	3	-	W-O	-	3	
	R1	-	2	ORN - WHT	4	-	O-W	-	4	
	DT1	-	28	WHT - GRN	5	-	W-GN	-	5	
	DR1	-	3	GRN - WHT	6	-	GN-W	-	6	
KT#21	BT2	-	29	WHT - BRN	7	-	W-BL	-	1	
	BR2	-	4	BRN - WHT	8	-	BL-W	-	2	
	T2	-	30	WHT - SLT	9	-	W-O	-	3	
	R2	-	5	SLT - WHT	10	-	W-GN	-	4	
	DT2	-	31	RED - BLU	11	-	GN-W	-	5	
	DR2	-	6	BLU - RED	12	-	GN-W	-	6	
KT#22	BT3	-	32	RED - ORN	13	-	W-BL	-	1	
	BR3	-	7	ORN - RED	14	-	BL-W	-	2	
	T3	-	33	RED - GRN	15	-	W-O	-	3	
	R3	-	8	GRN - RED	16	-	O-W	-	4	
	DT3	-	34	RED - BRN	17	-	W-GN	-	5	
	DR3	-	9	BRN - RED	18	-	GN-W	-	6	
KT#23	BT4	-	35	RED - SLT	19	-	W-BL	-	1	
	BR4	-	10	SLT - RED	20	-	BL-W	-	2	
	T4	-	36	BLK - BLU	21	-	W-O	-	3	
	R4	-	11	BLU - BLK	22	-	O-W	-	4	
	DT4	-	37	BLK - ORN	23	-	W-GN	-	5	
	DR4	-	12	ORN - BLK	24	-	GN-W	-	6	
KT#24	BT5	-	38	BLK - GRN	25	-	W-BL	-	1	
	BR5	-	13	GRN - BLK	26	-	BL-W	-	2	
	T5	-	39	BLK - BRN	27	-	W-O	-	3	
	R5	-	14	BRN - BLK	28	-	O-W	-	4	
	DT5	-	40	BLK - SLT	29	-	W-GN	-	5	
	DR5	-	15	SLT - BLK	30	-	GN-W	-	6	
KT#25	BT6	-	41	YEL - BLU	31	-	W-BL	-	1	
	BR6	-	16	BLU - YEL	32	-	BL-W	-	2	
	T6	-	42	YEL - ORN	33	-	W-O	-	3	
	R6	-	17	ORN - YEL	34	-	O-W	-	4	
	DT6	-	43	YEL - GRN	35	-	W-GN	-	5	
	DR6	-	18	GRN - YEL	36	-	GN-W	-	6	
KT#26	BT7	-	44	YEL - BRN	37	-	W-BL	-	1	
	BR7	-	19	BRN - YEL	38	-	BL-W	-	2	
	T7	-	45	YEL - SLT	39	-	W-O	-	3	
	R7	-	20	SLT - YEL	40	-	O-W	-	4	
	PT7	-	46	VIO - BLU	41	-	W-GN	-	5	
	DR7	-	21	BLU - VIO	42	-	GN-W	-	6	
KT#27	BT8	-	47	VIO - ORN	43	-	W-BL	-	1	
	BR8	-	22	ORN - VIO	44	-	BL-W	-	2	
	T8	-	48	VIO - GRN	45	-	W-O	-	3	
	R8	-	23	GRN - VIO	46	-	O-W	-	4	
	DT8	-	49	VIO - BRN	47	-	W-GN	-	5	
	DR8	-	24	BRN - VIO	48	-	GN-W	-	6	
-	-	-	50	VIO - SLT	49	-	-	-	-	
-	-	-	25	SLT - VIO	50	-	-	-	-	

Table 3.4.5.10.D ICU-MDF-Station Wiring (2/5)

TERM. BLK. G

Function	Designation		ICU Conn. Pin. No.	House Cable Wire Color	Term. Blk. Pin No.	2 Pairs Twisted-Pair or Quad and 3-Pair Twisted Cable Color		Wall Jack Pin. No.		Note
	KT	SLT				4 Conductor	5 Conductor			
KT#28	BT9	-	26	WHT - BLU	1	-	W-BL	-	1	
	BR9	-	1	BLU - WHT	2	-	BL-W	-	2	
	T9	-	27	WHT - ORN	3	-	W-O	-	3	
	R9	-	2	ORN - WHT	4	-	O-W	-	4	
	OT9	-	28	WHT - GRN	5	-	W-GN	-	5	
	OR9	-	3	GRN - WHT	6	-	GN-W	-	6	
KT#29	BT10	-	29	WHT - BRN	7	-	W-BL	-	1	
	BR10	-	4	BRN - WHT	8	-	BL-W	-	2	
	T10	-	30	WHT - SLT	9	-	W-O	-	3	
	R10	-	5	SLT - WHT	10	-	W-GN	-	4	
	OT10	-	31	RED - BLU	11	-	GN-W	-	5	
	OR10	-	6	BLU - RED	12	-	GN-W	-	6	
KT#30	BT11	-	32	RED - ORN	13	-	W-BL	-	1	
	BR11	-	7	ORN - RED	14	-	BL-W	-	2	
	T11	-	33	RED - GRN	15	-	W-O	-	3	
	R11	-	8	GRN - RED	16	-	O-W	-	4	
	OT11	-	34	RED - BRN	17	-	W-GN	-	5	
	OR11	-	9	BRN - RED	18	-	GN-W	-	6	
KT#31	BT12	-	35	RED - SLT	19	-	W-BL	-	1	
	BR12	-	10	SLT - RED	20	-	BL-W	-	2	
	T12	-	36	BLK - BLU	21	-	W-O	-	3	
	R12	-	11	BLU - BLK	22	-	O-W	-	4	
	OT12	-	37	BLK - ORN	23	-	W-GN	-	5	
	OR12	-	12	ORN - BLK	24	-	GN-W	-	6	
KT#32	BT13	-	38	BLK - GRN	25	-	W-BL	-	1	
	BR13	-	13	GRN - BLK	26	-	BL-W	-	2	
	T13	-	39	BLK - BRN	27	-	W-O	-	3	
	R13	-	14	BRN - BLK	28	-	O-W	-	4	
	OT13	-	40	BLK - SLT	29	-	W-GN	-	5	
	OR13	-	15	SLT - BLK	30	-	GN-W	-	6	
KT#33	BT14	-	41	YEL - BLU	31	-	W-BL	-	1	
	BR14	-	16	BLU - YEL	32	-	BL-W	-	2	
	T14	-	42	YEL - ORN	33	-	W-O	-	3	
	R14	-	17	ORN - YEL	34	-	O-W	-	4	
	OT14	-	43	YEL - GRN	35	-	W-GN	-	5	
	OR14	-	18	GRN - YEL	36	-	GN-W	-	6	
KT#34	BT15	-	44	YEL - BRN	37	-	W-BL	-	1	
	BR15	-	19	BRN - YEL	38	-	BL-W	-	2	
	T15	-	45	YEL - SLT	39	-	W-O	-	3	
	R15	-	20	SLT - YEL	40	-	O-W	-	4	
	OT15	-	46	VIO - BLU	41	-	W-GN	-	5	
	OR15	-	21	BLU - VIO	42	-	GN-W	-	6	
KT#35	BT16	-	47	BIO - BRN	43	-	W-BL	-	1	
	BR16	-	22	ORN - VIO	44	-	BL-W	-	2	
	T16	-	48	VIO - GRN	45	-	W-O	-	3	
	R16	-	23	GRN - VIO	46	-	O-W	-	4	
	OT16	-	49	VIO - BRN	47	-	W-GN	-	5	
	OR16	-	24	BRN - VIO	48	-	GN-W	-	6	
-	-	-	50	VIO - SLT	49	-	-	-	-	
	-	-	25	SLT - VIO	50	-	-	-	-	

Table 3.4.5.10.D ICU-MDF-Station Wiring (3/5)

TERM. BLK. H

Function	Designation		ICU Conn. Pin No.	House Cable Wire Color	Term. Blk. Pin No.	2 Pairs Twisted Pair or Quad and 3-Pair Twisted Cable Color		Wall Jack Pin No.		Note
	KT	SLT				4 Conductor	6 Conductor	4 Conductor	6 Conductor	
SLT#36	-	-	26	WHT - BLU	1	-	W-BL	-	1	
	-	-	1	BLU - WHT	2	W-BL	BL-W	1	2	
	-	T17	27	WHT - ORN	3	W-O	W-O	2	3	
	-	R17	2	ORN - WHT	4	O-W	O-W	3	4	
	-	-	28	WHT - GRN	5	BL-W	W-GN	4	5	
SLT#37	-	-	3	GRN - WHT	6	-	GN-W	-	6	
	-	-	29	WHT - BRN	7	-	W-BL	-	1	
	-	-	4	BRN - WHT	8	W-BL	BL-W	1	2	
	-	T18	30	WHT - SLT	9	W-O	W-O	2	3	
	-	R18	5	SLT - WHT	10	O-W	O-W	3	4	
SLT#38	-	-	31	RED - BLU	11	BL-W	W-GN	4	5	
	-	-	6	BLU - RED	12	-	GN-W	-	6	
	-	-	32	RED - ORN	13	-	W-BL	-	1	
	-	T19	33	ORN - RED	14	W-BL	BL-W	1	2	
	-	R19	8	GRN - RED	15	W-O	W-O	2	3	
SLT#39	-	-	34	RED - BRN	16	O-W	O-W	3	4	
	-	-	9	BRN - RED	17	BL-W	W-GN	4	5	
	-	-	35	RED - SLT	18	-	GN-W	-	6	
	-	-	10	SLT - RED	19	-	W-BL	-	1	
	-	T20	36	BLK - BLU	20	W-BL	BL-W	1	2	
SLT#40	-	R20	11	BLU - BLK	21	W-O	W-O	2	3	
	-	-	37	BLK - ORN	22	O-W	O-W	3	4	
	-	-	12	ORN - BLK	23	BL-W	W-GN	4	5	
	-	-	38	BLK - GRN	24	-	GN-W	-	6	
	-	*T21	39	BLK - BRN	25	-	W-BL	-	1	
SLT#41	-	*R21	14	BRN - BLK	26	W-BL	BL-W	1	2	
	-	-	40	BLK - SLT	27	W-O	W-O	2	3	
	-	-	15	SLT - BLK	28	O-W	O-W	3	4	
	-	-	41	YEL - BLU	29	BL-W	W-GN	4	5	
	-	-	16	BLU - YEL	30	-	GN-W	-	6	
SLT#42	-	*T22	42	YEL - ORN	31	-	W-BL	-	1	
	-	*R22	17	ORN - YEL	32	W-BL	BL-W	1	2	
	-	-	43	YEL - GRN	33	W-O	W-O	2	3	
	-	-	18	GRN - YEL	34	O-W	O-W	3	4	
	-	-	44	YEL - BRN	35	O-W	O-W	3	4	
SLT#43	-	-	19	BRN - YEL	36	BL-W	W-GN	4	5	
	-	*T23	45	YEL - SLT	37	-	GN-W	-	6	
	-	*R23	20	SLT - YEL	38	-	W-BL	-	1	
	-	-	46	VIO - BLU	39	W-BL	BL-W	1	2	
	-	-	21	BLU - VIO	40	W-O	W-O	2	3	
SLT#43	-	-	47	VIO - ORN	41	O-W	O-W	3	4	
	-	-	22	ORN - VIO	42	BL-W	W-GN	4	5	
	-	*T24	48	VIO - GRN	43	-	GN-W	-	6	
	-	*R24	23	GRN - VIO	44	-	W-BL	-	1	
	-	-	49	VIO - BRN	45	W-O	W-O	2	3	
-	-	-	24	BRN - VIO	46	O-W	O-W	3	4	
	-	-	50	VIO - SLT	47	BL-W	W-GN	4	5	
	-	-	25	SLT - VIO	48	-	GN-W	-	6	
-	-	25	SLT - VIO	49	-	-	-	-		
-	-	25	SLT - VIO	50	-	-	-	-		

Note: Asterisk shows Power Failure Extension

Table 3.4.5.10.D ICU-MDF-Station Wiring (4/5)

TERM. BLK. 1

Function	Designation		ICU Conn. Pin No.	House Cable Wire Color	Term. Blk. Pin No.	2 Pairs Twisted-Pair or Quad and 3-Pair Twisted Cable Color		Wall Jack Pin No.		Note
	KT	SLT				4 Conductor	6 Conductor	4 Conductor	6 Conductor	
KT #44	BT25	-	26	WHT - BLU	1	-	W-BL	-	1	
	BR25	-	1	BLU - WHT	2	-	BL-W	-	2	
	T25	-	27	WHT - ORN	3	-	W-O	-	3	
	R25	-	2	ORN - WHT	4	-	O-W	-	4	
	OT25	-	28	WHT - GRN	5	-	W-GN	-	5	
	OR25	-	3	GRN - WHT	6	-	GN-W	-	6	
KT #45	BT26	-	29	WHT - BRN	7	-	W-BL	-	1	
	BR26	-	4	BRN - WHT	8	-	BL-W	-	2	
	T26	-	30	WHT - SLT	9	-	W-O	-	3	
	R26	-	5	SLT - WHT	10	-	O-W	-	4	
	OT26	-	31	RED - BLU	11	-	W-GN	-	5	
	OR26	-	6	BLU - RED	12	-	GN-W	-	6	
KT #46	BT27	-	32	RED - ORN	13	-	W-BL	-	1	
	BR27	-	7	ORN - RED	14	-	BL-W	-	2	
	T27	-	33	RED - GRN	15	-	W-O	-	3	
	R27	-	8	GRN - RED	16	-	O-W	-	4	
	OT27	-	34	RED - BRN	17	-	W-GN	-	5	
	OR27	-	9	BRN - RED	18	-	GN-W	-	6	
KT #47	BT28	-	35	RED - SLT	19	-	W-BL	-	1	
	BR28	-	10	SLT - RED	20	-	BL-W	-	2	
	T28	-	36	BLK - BLU	21	-	W-O	-	3	
	R28	-	11	BLU - BLK	22	-	O-W	-	4	
	OT28	-	37	BLK - ORN	23	-	W-GN	-	5	
	OR28	-	12	ORN - BLK	24	-	GN-W	-	6	
KT #48	BT29	-	38	BLK - GRN	25	-	W-BL	-	1	
	BR29	-	13	GRN - BLK	26	-	BL-W	-	2	
	T29	-	39	BLK - BRN	27	-	W-O	-	3	
	R29	-	14	BRN - BLK	28	-	O-W	-	4	
	OT29	-	40	BLK - SLT	29	-	W-GN	-	5	
	OR29	-	15	SLT - BLK	30	-	GN-W	-	6	
KT #49	BT30	-	41	YEL - BLU	31	-	W-BL	-	1	
	BR30	-	16	BLU - YEL	32	-	BL-W	-	2	
	T30	-	42	YEL - ORN	33	-	W-O	-	3	
	R30	-	17	ORN - YEL	34	-	O-W	-	4	
	OT30	-	43	YEL - GRN	35	-	W-GN	-	5	
	OR30	-	18	GRN - YEL	36	-	GN-W	-	6	
KT #50	BT31	-	44	YEL - BRN	37	-	W-BL	-	1	
	BR31	-	19	BRN - YEL	38	-	BL-W	-	2	
	T31	-	45	YEL - SLT	39	-	W-O	-	3	
	R31	-	20	SLT - YEL	40	-	O-W	-	4	
	OT31	-	46	VIO - BLU	41	-	W-GN	-	5	
	OR31	-	21	BLU - VIO	42	-	GN-W	-	6	
KT #51	BT32	-	47	VIO - ORN	43	-	W-BL	-	1	
	BR32	-	22	ORN - VIO	44	-	BL-W	-	2	
	T32	-	48	VIO - GRN	45	-	W-O	-	3	
	R32	-	23	GRN - VIO	46	-	O-W	-	4	
	OT32	-	49	VIO - BRN	47	-	W-GN	-	5	
	OR32	-	24	BRN - VIO	48	-	GN-W	-	6	
-	-	-	50	VIO - SLT	49	-	-	-	-	
-	-	-	25	SLT - VIO	50	-	-	-	-	

Table 3.4.5.10.D ICU-MDF-Station Wiring (5/5)

TERM. BLK. K

Function	Designation		ICU Conn. Pin No.	House Cable Wire Color	Term. Blk. Pin No.	2 Pairs Twisted-Pair or Quad and 3-Pair Twisted Cable Color		Wall Jack Pin. No.		Note
	KT	SLT				4 Conductor	6 Conductor	4 Conductor	6 Conductor	
SLT#60	-	-	26	WHT - BLU	1	-	W-BL	-	1	
	-	-	1	BLU - WHT	2	W-BL	BL-W	1	2	
	-	T41	27	WHT - ORN	3	W-O	W-O	2	3	
	-	R41	2	ORN - WHT	4	O-W	O-W	3	4	
	-	-	28	WHT - GRN	5	BL-W	W-GN	4	5	
SLT#61	-	-	3	GRN - WHT	6	-	GN-W	-	6	
	-	-	29	WHT - BRN	7	-	W-BL	-	1	
	-	-	4	BRN - WHT	8	W-BL	BL-W	1	2	
	-	T42	30	WHT - SLT	9	W-O	W-O	2	3	
	-	R42	5	SLT - WHT	10	O-W	O-W	3	4	
SLT#62	-	-	31	RED - BLU	11	BL-W	W-GN	4	5	
	-	-	6	BLU - RED	12	-	GN-W	-	6	
	-	-	32	RED - ORN	13	-	W-BL	-	1	
	-	-	7	ORN - RED	14	W-BL	BL-W	1	2	
	-	T43	33	RED - GRN	15	W-O	W-O	2	3	
SLT#63	-	R43	8	GRN - RED	16	O-W	O-W	3	4	
	-	-	34	RED - BRN	17	BL-W	W-GN	4	5	
	-	-	9	BRN - RED	18	-	GN-W	-	6	
	-	-	35	RED - SLT	19	-	W-BL	-	1	
	-	-	10	SLT - RED	20	W-BL	BL-W	1	2	
SLT#64	-	T44	36	BLK - BLU	21	W-O	W-O	2	3	
	-	R44	11	BLU - BLK	22	O-W	O-W	3	4	
	-	-	37	BLK - ORN	23	BL-W	W-GN	4	5	
	-	-	12	ORN - BLK	24	-	GN-W	-	6	
	-	-	38	BLK - GRN	25	-	W-BL	-	1	
SLT#65	-	-	13	GRN - BLK	26	W-BL	BL-W	1	2	
	-	*T45	39	BLK - BRN	27	W-O	W-O	2	3	
	-	*R45	14	BRN - BLK	28	O-W	O-W	3	4	
	-	-	40	BLK - SLT	29	BL-W	W-GN	4	5	
	-	-	15	SLT - BLK	30	-	GN-W	-	6	
SLT#66	-	-	41	YEL - BLU	31	-	W-BL	-	1	
	-	-	16	BLU - YEL	32	W-BL	BL-W	1	2	
	-	*T46	42	YEL - ORN	33	W-O	W-O	2	3	
	-	*R46	17	ORN - YEL	34	O-W	O-W	3	4	
	-	-	43	YEL - GRN	35	BL-W	W-GN	4	5	
SLT#67	-	-	18	GRN - YEL	36	-	GN-W	-	6	
	-	-	44	YEL - BRN	37	-	W-BL	-	1	
	-	-	19	BRN - YEL	38	W-BL	BL-W	1	2	
	-	*T47	45	YEL - SLT	39	W-O	W-O	2	3	
	-	*R47	20	SLT - YEL	40	O-W	O-W	3	4	
SLT#68	-	-	46	VIO - BLU	41	BL-W	W-GN	4	5	
	-	-	21	BLU - VIO	42	-	GN-W	-	6	
	-	-	47	VIO - ORN	43	-	W-BL	-	1	
	-	-	22	ORN - VIO	44	W-BL	BL-W	1	2	
	-	*R48	48	VIO - GRN	45	W-O	W-O	2	3	
-	-	-	23	GRN - VIO	46	O-W	O-W	3	4	
	-	-	49	VIO - BRN	47	BL-W	W-GN	4	5	
	-	-	24	BRN - VIO	48	-	GN-W	-	6	
	-	-	50	VIO - SLT	49	-	-	-	-	
	-	-	25	SLT - VIO	50	-	-	-	-	

Table 3.4.5.10.E Connecting CN1 to Terminal Blocks H and K (1/2)

Designation	PFXU-M CN1 Connector Pin Number	House Cable Wire Color	House Cable Wire Color	Term. Blk. H. Pin No. (B SIDE)	Term. Blk. H. Pin No. (A SIDE)
#1(T)	26	WHT - BLU	WHT - BLU	1	1
#1(R)	1	BLU - WHT	BLU - WHT	2	2
-	27	WHT - ORN	WHT - ORN	3	3
-	2	ORN - WHT	ORN - WHT	4	4
#2(T)	28	WHT - GRN	WHT - GRN	5	5
#2(R)	3	GRN - WHT	GRN - WHT	6	6
-	29	WHT - BRN	WHT - BRN	7	7
-	4	BRN - WHT	BRN - WHT	8	8
#3(T)	30	WHT - SLT	WHT - SLT	9	9
#3(R)	5	SLT - WHT	SLT - WHT	10	10
-	31	RED - BLU	RED - BLU	11	11
-	6	BLU - RED	BLU - RED	12	12
#4(T)	32	RED - ORN	RED - ORN	13	13
#4(R)	7	ORN - RED	ORN - RED	14	14
-	33	RED - GRN	RED - GRN	15	15
-	8	GRN - RED	GRN - RED	16	16
#5(T)	34	RED - BRN	RED - BRN	17	17
#5(R)	9	BRN - RED	BRN - RED	18	18
-	35	RED - SLT	RED - SLT	19	19
-	10	SLT - RED	SLT - RED	20	20
#6(T)	36	BLK - BLU	BLK - BLU	21	21
#6(R)	11	BLU - BLK	BLU - BLK	22	22
-	37	BLK - ORN	BLK - ORN	23	23
-	12	ORN - BLK	ORN - BLK	24	24
#7(T)	38	BLK - GRN	BLK - GRN	25	25
#7(R)	13	GRN - BLK	GRN - BLK	26	26
-	39	BLK - BRN	BLK - BRN	27	27
-	14	BRN - BLK	BRN - BLK	28	28
#8(T)	40	BLK - SLT	BLK - SLT	29	29
#8(R)	15	SLT - BLK	SLT - BLK	30	30
-	41	YEL - BLU	YEL - BLU	31	31
-	16	BLU - YEL	BLU - YEL	32	32
-	42	YEL - ORN	YEL - ORN	33	33
-	17	ORN - YEL	ORN - YEL	34	34
#1T	43	YEL - GRN	YEL - GRN	35	35
#1R	18	GRN - YEL	GRN - YEL	36	36
#2T	44	YEL - BRN	YEL - BRN	37	37
#2R	19	BRN - YEL	BRN - YEL	38	38
#3T	45	YEL - SLT	YEL - SLT	39	39
#3R	20	SLT - YEL	SLT - YEL	40	40
#4T	46	VIO - BLU	VIO - BLU	41	41
#4R	21	BLU - VIO	BLU - VIO	42	42
#5T	47	VIO - ORN	VIO - ORN	43	43
#5R	22	ORN - VIO	ORN - VIO	44	44
#6T	48	VIO - GRN	VIO - GRN	45	45
#6R	23	GRN - VIO	GRN - VIO	46	46
#7T	49	VIO - BRN	VIO - BRN	47	47
#7R	24	BRN - VIO	BRN - VIO	48	48
#8T	50	VIO - SLT	VIO - SLT	49	49
#8R	25	SLT - VIO	SLT - VIO	50	50

Refer to Figure 3.4.5.10.E.

Table 3.4.5.10.E Connecting CN1 to Terminal Blocks H and K (2/2)

Designation	PFXU-M		House Cable Wire Color	House Cable Wire Color	Term. Blk. H, Pin No. (B SIDE)	Term. Blk. H, Pin No. (A SIDE)
	CN1 Connector Pin Number	Pin Number				
#1(T)	26		WHT - BLU	WHT - BLU	1	1
#1(R)	1		BLU - WHT	BLU - WHT	2	2
-	27		WHT - ORN	WHT - ORN	3	3
-	2		ORN - WHT	ORN - WHT	4	4
#2(T)	28		WHT - GRN	WHT - GRN	5	5
#2(R)	3		GRN - WHT	GRN - WHT	6	6
-	29		WHT - BRN	WHT - BRN	7	7
-	4		BRN - WHT	BRN - WHT	8	8
#3(T)	30		WHT - SLT	WHT - SLT	9	9
#3(R)	5		SLT - WHT	SLT - WHT	10	10
-	31		RED - BLU	RED - BLU	11	11
-	6		BLU - RED	BLU - RED	12	12
#4(T)	32		RED - ORN	RED - ORN	13	13
#4(R)	7		ORN - RED	ORN - RED	14	14
-	33		RED - GRN	RED - GRN	15	15
-	8		GRN - RED	GRN - RED	16	16
#5(T)	34		RED - BRN	RED - BRN	17	17
#5(R)	9		BRN - RED	BRN - RED	18	18
-	35		RED - SLT	RED - SLT	19	19
-	10		SLT - RED	SLT - RED	20	20
#6(T)	36		BLK - BLU	BLK - BLU	21	21
#6(R)	11		BLU - BLK	BLU - BLK	22	22
-	37		BLK - ORN	BLK - ORN	23	23
-	12		ORN - BLK	ORN - BLK	24	24
#7(T)	38		BLK - GRN	BLK - GRN	25	25
#7(R)	13		GRN - BLK	GRN - BLK	26	26
-	39		BLK - BRN	BLK - BRN	27	27
-	14		BRN - BLK	BRN - BLK	28	28
#8(T)	40		BLK - SLT	BLK - SLT	29	29
#8(R)	15		SLT - BLK	SLT - BLK	30	30
-	41		YEL - BLU	YEL - BLU	31	31
-	16		BLU - YEL	BLU - YEL	32	32
-	42		YEL - ORN	YEL - ORN	33	33
-	17		ORN - YEL	ORN - YEL	34	34
#1T	43		YEL - GRN	YEL - GRN	35	35
#1R	18		GRN - YEL	GRN - YEL	36	36
#2T	44		YEL - BRN	YEL - BRN	37	37
#2R	19		BRN - YEL	BRN - YEL	38	38
#3T	45		YEL - SLT	YEL - SLT	39	39
#3R	20		SLT - YEL	SLT - YEL	40	40
#4T	46		VIO - BLU	VIO - BLU	41	41
#4R	21		BLU - VIO	BLU - VIO	42	42
#5T	47		VIO - ORN	VIO - ORN	43	43
#5R	22		ORN - VIO	ORN - VIO	44	44
#6T	48		VIO - GRN	VIO - GRN	45	45
#6R	23		GRN - VIO	GRN - VIO	46	46
#7T	49		VIO - BRN	VIO - BRN	47	47
#7R	24		BRN - VIO	BRN - VIO	48	48
#8T	50		VIO - SLT	VIO - SLT	49	49
#8R	25		SLT - VIO	SLT - VIO	50	50

Refer to Figure 3.4.5.10.E.

Note: The connection of PFXU-M and extensions is as shown below.

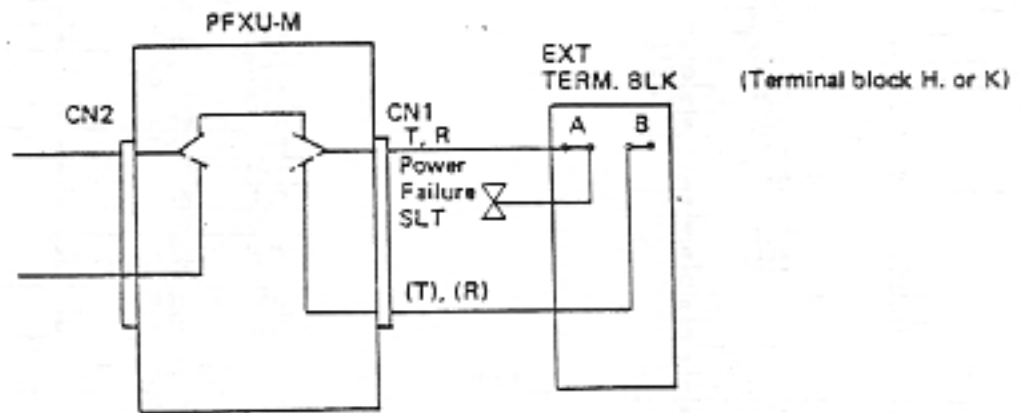


Figure 3.4.5.10.E

Table 3.4.5.10.F ICU-MDF-Station Wiring (1/1)

TERM. BLK. E

Function	Designation	ICU Conn. Pin No.		House Cable Wire Color	Term. Blk. Pin No.	3-Pair Twisted Cable Color	Wall Jack Pin No.	Note
		24P	50P					
DSS-M or DSS-N #1	ATT1 1T	13	26	WHT - BLU	1	W-BL	1	
	ATT1 1R	1	1	BLU - WHT	2	BL-W	2	
	-	-	27	WHT - ORN	3	W-O	3	
	-	-	2	ORN - WHT	4	O-W	4	
	ATT1 2T	14	28	WHT - GRN	5	W-GN	5	
	ATT1 2R	2	3	GRN - WHT	6	GN-W	6	
DSS-M or DSS-N #2	ATT2 1T	15	29	WHT - BRN	7	W-BL	1	
	ATT2 1R	3	4	BRN - WHT	8	BL-W	2	
	-	-	30	WHT - SLT	9	W-O	3	
	-	-	5	SLT - WHT	10	O-W	4	
	ATT2 2T	16	31	RED - BLU	11	W-GN	5	
	ATT2 2R	4	6	BLU - RED	12	GN-W	6	
BLF-M #1	BLF1 1T	17	32	RED - ORN	13	W-BL	1	
	BLF1 1R	5	7	ORN - RED	14	BL-W	2	
	-	-	33	RED - GRN	15	W-O	3	
	-	-	8	GRN - RED	16	O-W	4	
	BLF1 2T	18	34	RED - BRN	17	W-GN	5	
	BLF1 2R	6	9	BRN - RED	18	GN-W	6	
---	-	19	35	RED - SLT	19	W-BL	1	
	-	7	10	SLT - RED	20	BL-W	2	
	-	-	36	BLK - BLU	21	W-O	3	
	-	-	11	BLU - BLK	22	O-W	4	
	-	20	37	BLK - ORN	23	W-GN	5	
	-	8	12	ORN - BLK	24	GN-W	6	
BLF-M #3	BLF3 1T	21	38	BLK - GRN	25	W-BL	1	
	BLF3 1R	9	13	GRN - BLK	26	BL-W	2	
	-	-	39	BLK - BRN	27	W-O	3	
	-	-	14	BRN - BLK	28	O-W	4	
	BLF3 2T	22	40	BLK - SLT	29	W-GN	5	
	BLF3 2R	10	15	SLT - BLK	30	GN-W	6	
---	-	23	41	YEL - BLU	31	W-BL	1	
	-	11	16	BLU - YEL	32	BL-W	2	
	-	-	42	YEL - ORN	33	W-O	3	
	-	-	17	ORN - YEL	34	O-W	4	
	-	24	43	YEL - GRN	35	W-GN	5	
	-	12	18	GRN - YEL	36	GN-W	6	
---	-	-	44	YEL - BRN	37	W-BL	1	
	-	-	19	BRN - YEL	38	BL-W	2	
	-	-	45	YEL - SLT	39	W-O	3	
	-	-	20	SLT - YEL	40	O-W	4	
	-	-	46	VIO - BLU	41	W-GN	5	
	-	-	21	BLU - VIO	42	GN-W	6	
	-	-	47	VIO - ORN	43	W-BL	1	
	-	-	22	ORN - VIO	44	BL-W	2	
	-	-	48	VIO - GRN	45	W-O	3	
	-	-	23	GRN - VIO	46	O-W	4	
---	-	-	49	VIO - BRN	47	W-GN	5	
	-	-	24	BRN - VIO	48	GN-W	6	
	-	-	50	VIO - SLT	49	-	-	
	-	-	25	SLT - VIO	50	-	-	

Note: DSS-M or DSS-N No. 1 corresponds to the LEDs on BLF-Ms No. 1 and No. 2 and DSS-M or DSS-N No. 2 to the LEDs on BLF-Ms No. 3 and No. 4.
Each DSS-M or DSS-N corresponds to BLF-M.

3.4.6. External Device Installation

Any of the following external devices may be connected to an EX-824/1648 system:

- MOH source
- BGM source
- BGM amplifier and zone page speakers
- Night answering devices

The input terminals for connecting these external devices are located together in the EDCT-M on the right side of the EX-824/1648CM.

Note: The Ex-824/1648 system cannot directly drive an MOH source, BGM source, BGM amplifier, page amplifier, or night answering device, but provides circuits for driving the relays that control these devices.

3.4.6.1 MOH Source Installation

The EX-824/1648 system can send music-on-hold to the party whose call has been placed on hold if an external MOH source is connected to the system.

The 0.5-A relay contact appearing on the MOH, MOH-S screw terminals may be used for external MOH source power control. (see Figure 3.4.6.1.)

The input sensitivity and input impedance of the **MOH** input RCA terminal are as follows:

- Input sensitivity: 500 mV (-6 dBV) not to exceed 2 V (+6 dBV)
- Input impedance: 600 Ω

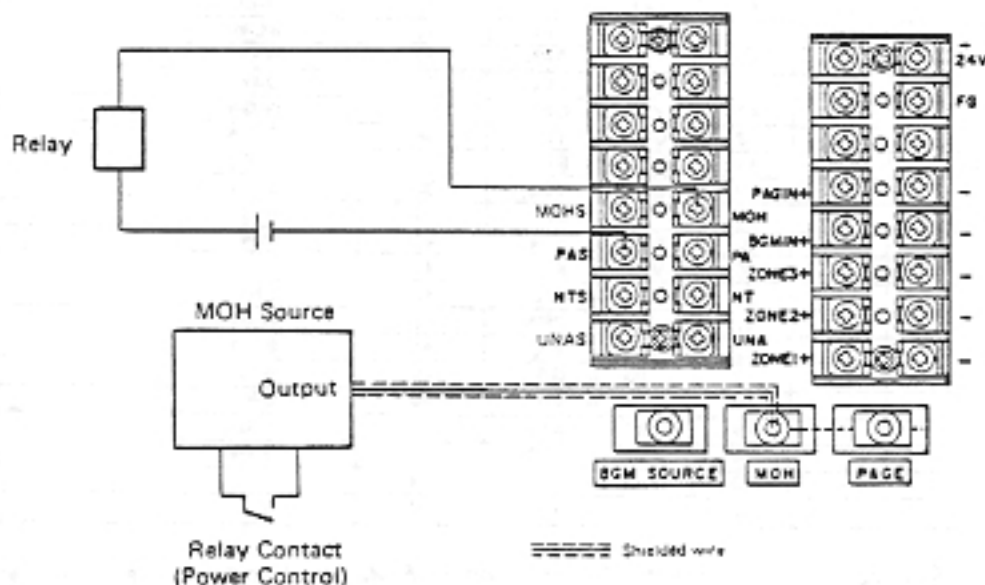


Figure 3.4.6.1 MOH Source Connection

3.4.6.2 BGM Source Installation

Background music (BGM) can be provided from the speakers of EX-824/1648K KN, D, DN, KN1, DN1 and VP-N1 key telephones and from the paging speakers if a BGM source is installed as shown in Figure 3.4.6.2. Depending on settings on the VTCU-M card (refer to 3.6.2.3(b)), the BGM can be turned off or reduced to a lower level during paging.

Connect the BGM source to input RCA terminal **BGM SOURCE** on the EDCT-M card with a phono-plug and shield wire. See Figure 3.4.6.2.

Input sensitivity: 200 mV (-14 dBV) not to exceed 1 V (0 dBV)
 Input impedance: 600 Ω

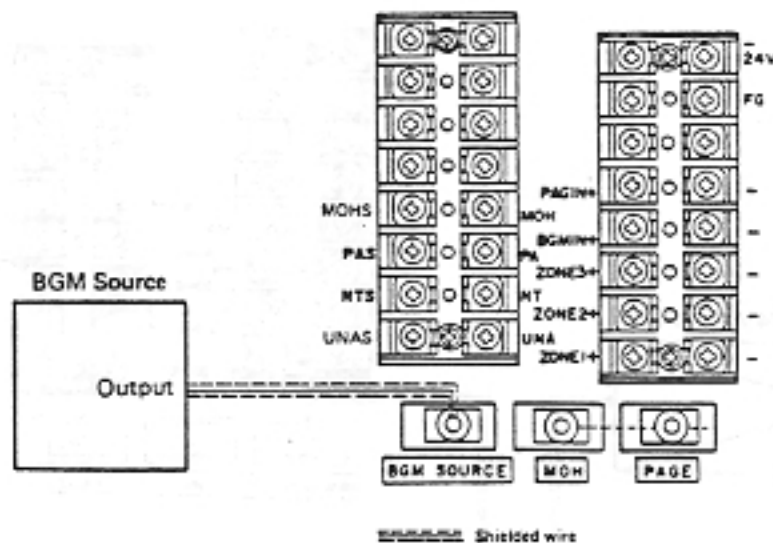


Figure 3.4.6.2 BGM Source Connection

3.4.6.3 BGM Amplifier Installation

The EX-824/1648 system permits use of overhead speakers in three zones. These speakers may reproduce not only paging voice calls but also BGM. Although an amplifier can be shared by the paging and BGM features, a separate BGM amplifier is normally installed for convenience. This section describes the connections to be made in installing a separate BGM amplifier.

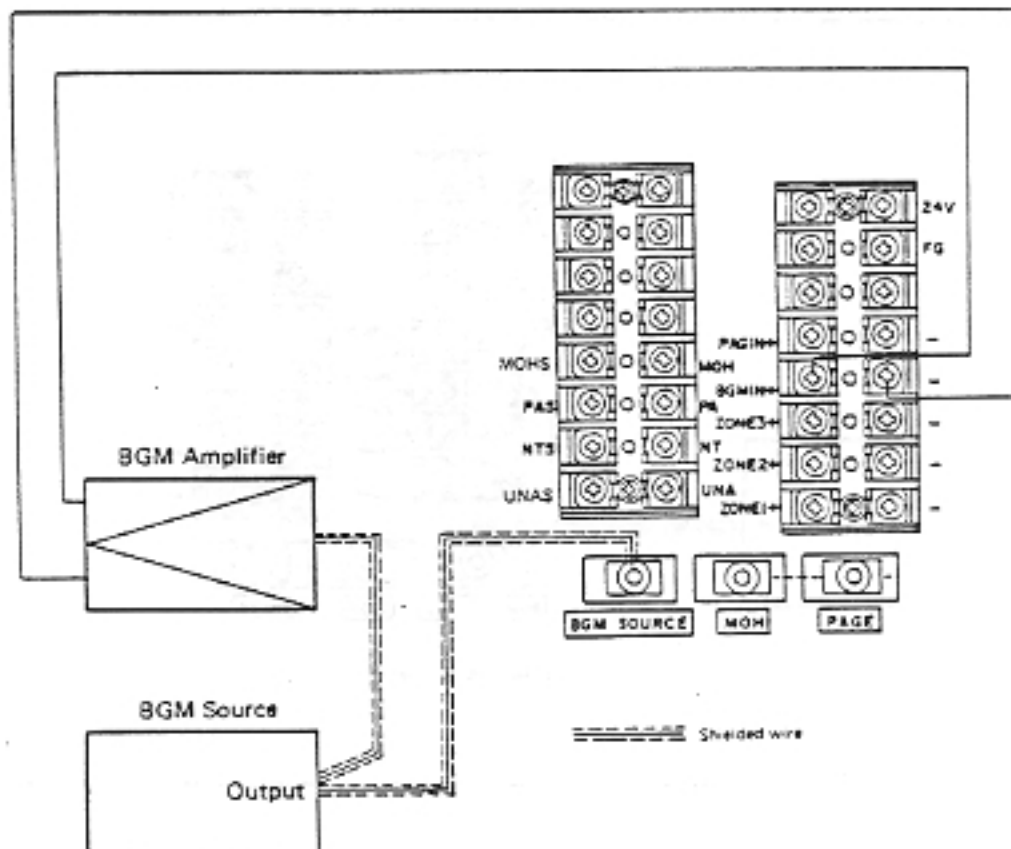


Figure 3.4.6.3 BGM Amplifier Connection

3.4.6.4 Page Amplifier and Overhead Speaker Installation

The EX-824/1648 system can output voice calls from the speakers of key telephones and also paging voice calls and BGM from ceiling speakers. If a ZPAG-M card is installed in the ICU, overhead speakers can be driven in up to three zones. Typical examples are explained in this section.

(1) No zone speakers are used (Only one overhead speaker is used)

Figure 3.4.6.4.A shows the connection method to be used if only one overhead speaker is included. All connections are made via the EDCT-M on the right side of the ICU. Use shielded cables for the amplifier or voice input and output to reduce noise. Power can be saved by using the relay contact output (contact capacity 0.5 A) provided for paging amplifier power supply control. If a BGM source is connected, the BGM is mixed with paging signals by the circuits in the ICU so that the BGM can be heard from the overhead speaker. The VTCU-M card has controls for cutting off or reducing BGM during paging. Set them as necessary.

The input sensitivity and input impedance of the page amplifier are as follows:

- Input sensitivity: 700 mV (-3 dBV)
- Input impedance: More than 600 Ω

(2) Zone speakers are used

Connection to zone speakers can be established by installing a ZPAG-M card in the ICU. See Figures 3.4.6.4.B and 3.4.6.4.C for zone speaker connection. The details are similar those of item (1) above. The method shown in Figure 3.4.6.4.B is desirable in connecting BGM to the zone speakers, but the BGM amplifier and paging amplifier may be used instead, as shown in Figure 3.4.6.4.C. In this case, however, STJs must be set on the ZPAG-M card. For details, refer to Section 3.6.2.5.4. Remember that paging amplifier power cannot be controlled.

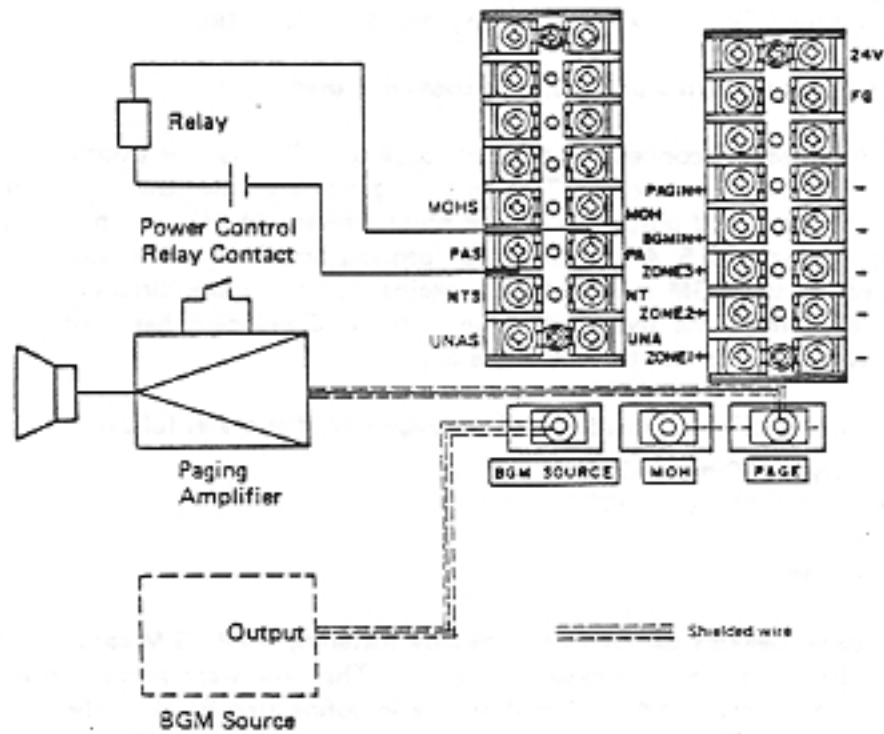


Figure 3.4.6.4.A Paging Amplifier and Overhead Speaker (No Zone Speakers)

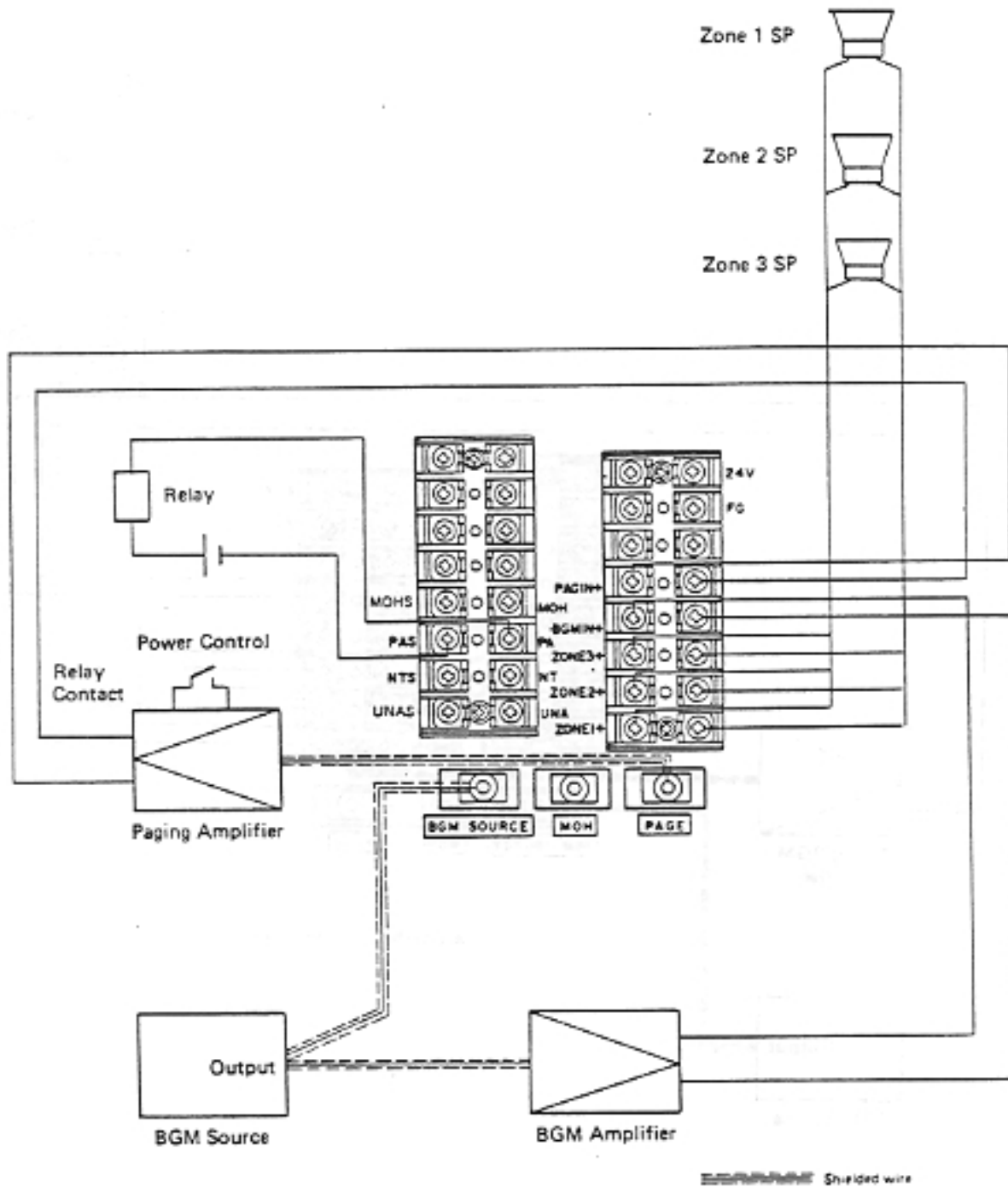


Figure 3.4.6.4.B Paging Amplifier and Overhead Speakers (With BGM Amplifier)

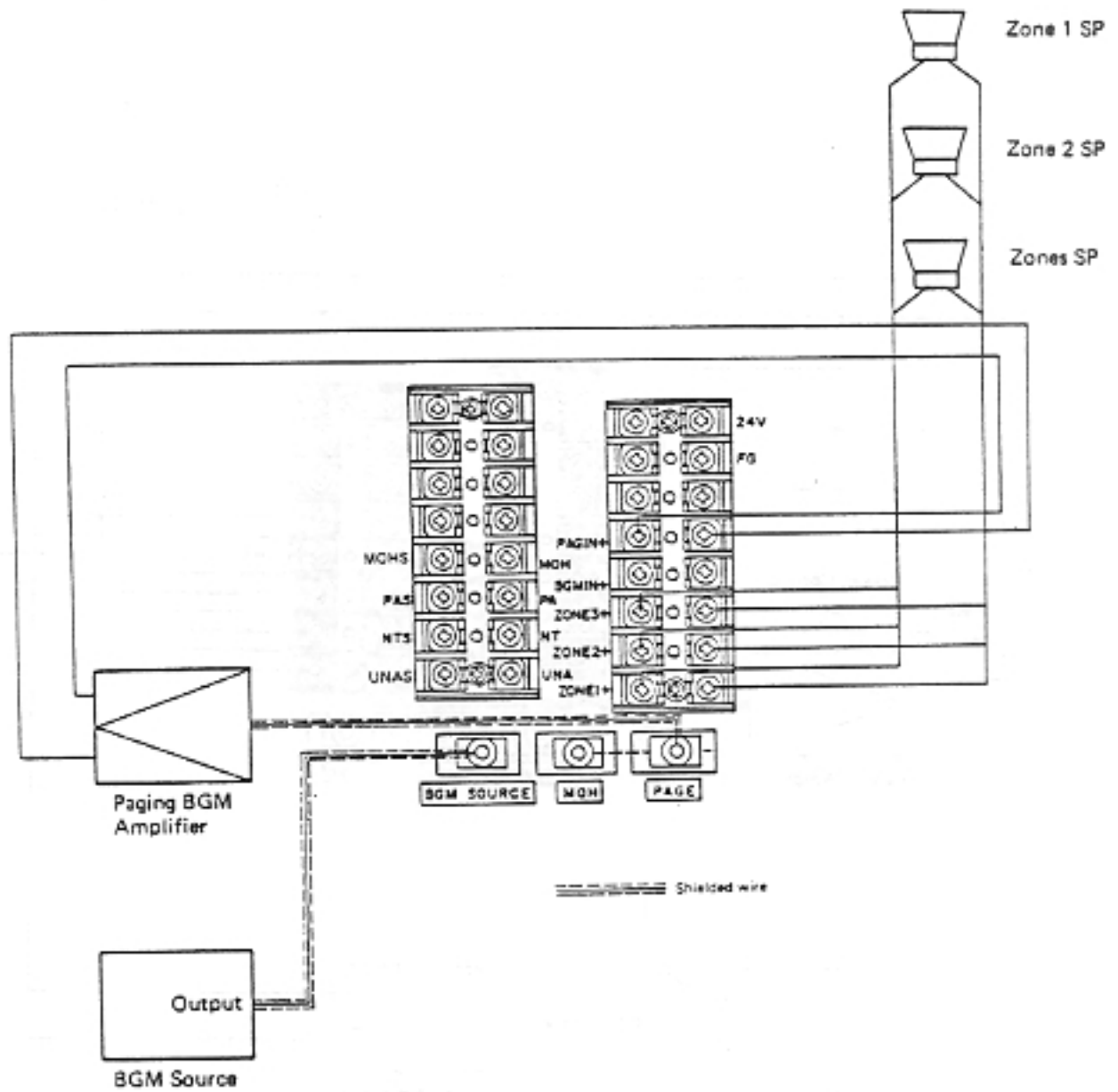


Figure 3.4.6.4.C Paging Amplifier and Overhead Speakers
(The same amplifier is shared for BGM and paging.)

3.4.6.5 Night Answering Device Installation

The EX-824/1648 system provides two types of 0.5-A relay contacts for controlling night answering devices. One type of contact repeats a cycle of 1 second closed and 3 seconds open on incoming CO/PBX line calls; this type appears at screw terminals UNA (Universal Night Answer) on the EDCT-M. The other type of contact is continuously closed, and appears at screw terminals NT (Night Relay) on the EDCT-M.

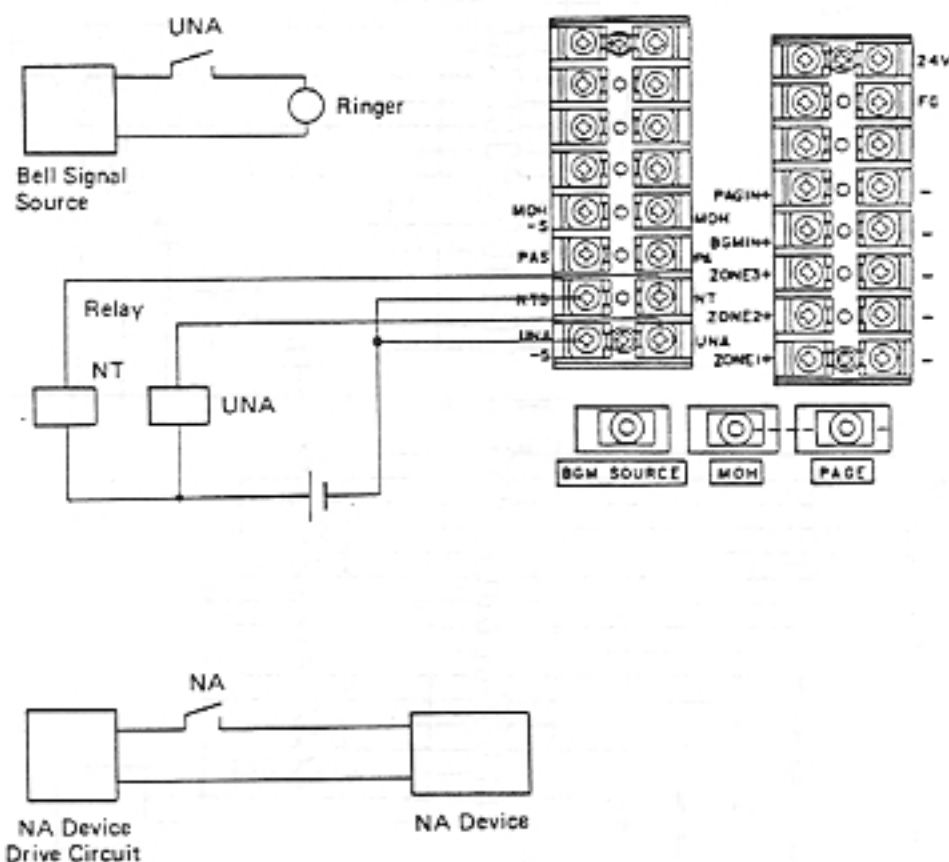


Figure 3.4.6.5 Night Answering Device Connection

3.4.6.6 Loud Ringer Installation

A bell, gong, or similar external device may be connected to the EX-824/1648 system for audible indication of incoming CO/PBX Line Calls in noisy areas.

The EX-824/1648 system has connector LR1 to which contact outputs LR1 through LR8 are connected, and connector LR2 to which contact outputs LR9 through LR16 are connected. (Each contact is rated at 0.5 A.) A ringer installation method is shown in Figure 3.4.6.6.

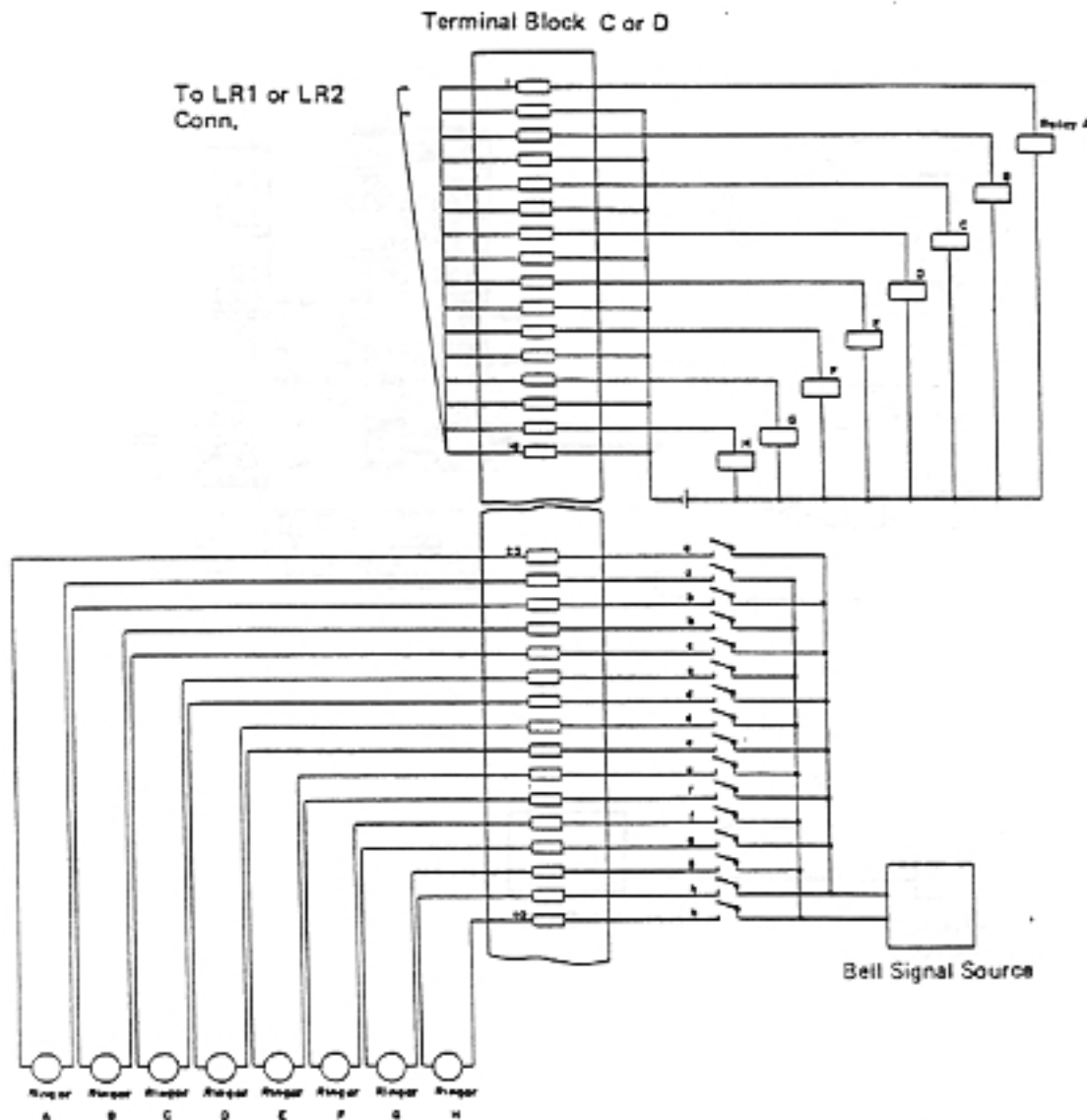


Figure 3.4.6.6

3.4.6.7 SCDR Installation

The EX-824/1648 system may use an optional SCDR-M card for outputting the condition of use of CO/PBX line per extensions to a printer or a compatibly interfaced device.

The signal output connector, labeled SCDR, is a standard RS-232C connector located in the lower part of the right side of the EX-824/1648 system. Figure 3.4.6.7 shows signals versus connector pins.

The SCDR-M card can be set in various ways as described in Section 3.6.2.5.3.

Signal	SCDR Connector Pin No.		Signal
FG	1	14	—
RD	2	15	—
TD	3	16	—
RTS	4	17	CLRP
CTS	5	18	—
DSR	6	19	—
SG	7	20	DTR
RLSD	8	21	—
—	9	22	—
—	10	23	CLSP
—	11	24	CLRM
—	12	25	CLSM
—	13		

Figure 3.4.6.7 Signals Versus Connector Pins

Note: The EX-824/1648 system is protected from lightning surges by separately grounding the signals and the equipment. Interface signals from SCDR-M are isolated by a photocoupler, and must be grounded on the connected device side.

3.4.7 Connector Clamp Installation Procedure

The EX connector clamps that are provided as accessories to the EX-824/1648CM and EX-1648EM must be used in connecting CO/PBX connectors or extension connectors to the ICU because the connectors do not have their own locking devices. It is also necessary to use supplied parts to suit the height of the individual connectors, which may vary from one to another.

The parts necessary for connector installation are shown in Tables 3.4.7.a and 3.4.7.b, and the installation procedure is shown in Figure 3.4.7.a and 3.4.7.b.

Note: As shown in Figure 3.4.7.a, EX connector cover-M, which covers connector joints, is optionally available for mounting on the ICU connectors. This connector cover is an optional part mainly for protection from electro-static trouble, and is recommended where a high level of electro-static is anticipated.

Table 3.4.7.a Installation of Usual System

EXT connector, small	EX connector clamp (1)
CO connector, large	Tapping screw 3 x 8S (2)

Table 3.4.7.b Installation of Unusual System

EXT connector, large	EX connector clamp (1) EX connector sub clamp (1) Tapping screw 3 x 14S (2)
CO connector, large	Bushing CL08 0632B0 (2)
EXT connector, small	EX connector clamp (1) EX connector sub clamp (1)
CO connector, small	Tapping screw 3 x 8S (2)

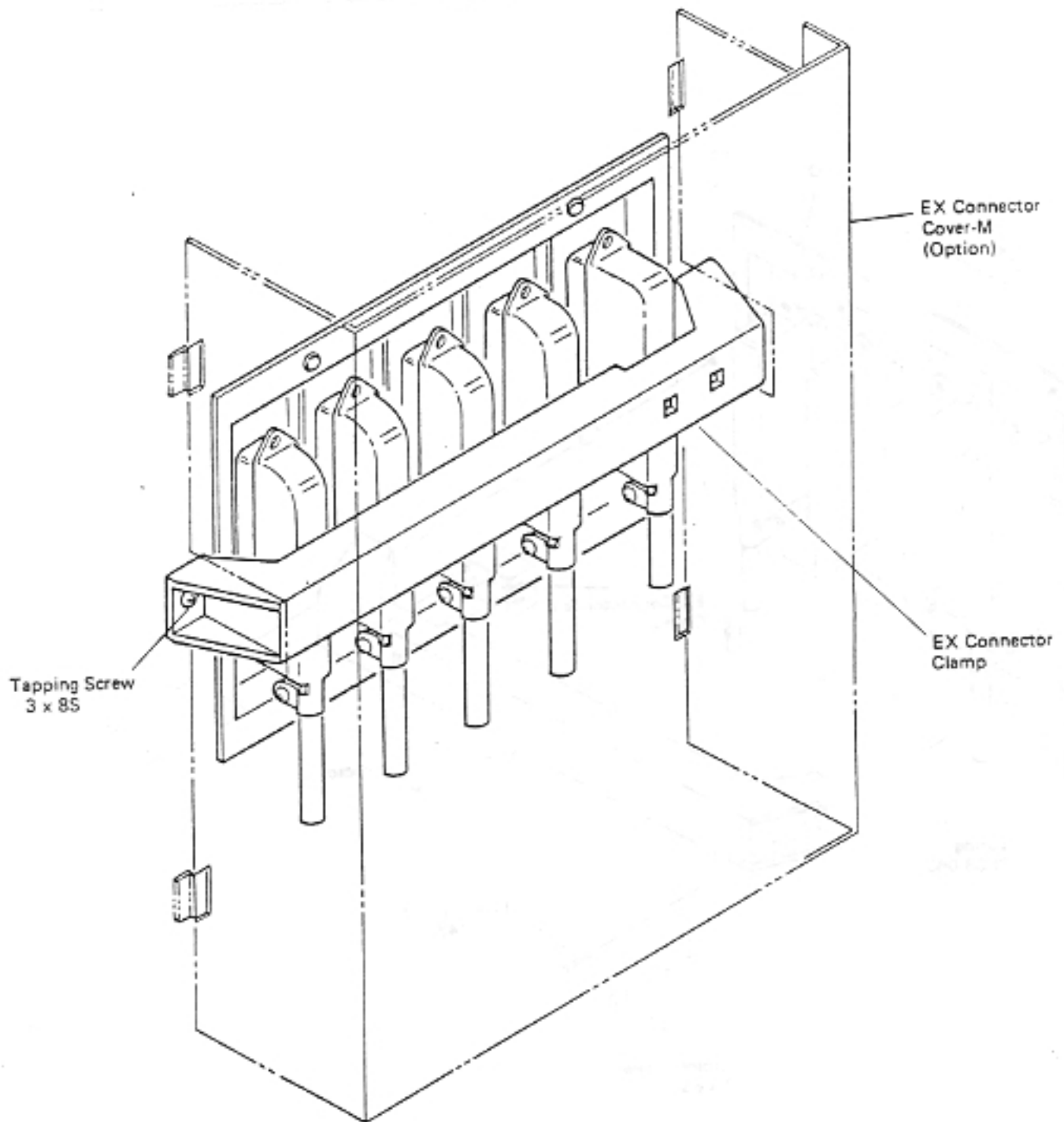


Figure 3.4.7.a Installation of Usual System

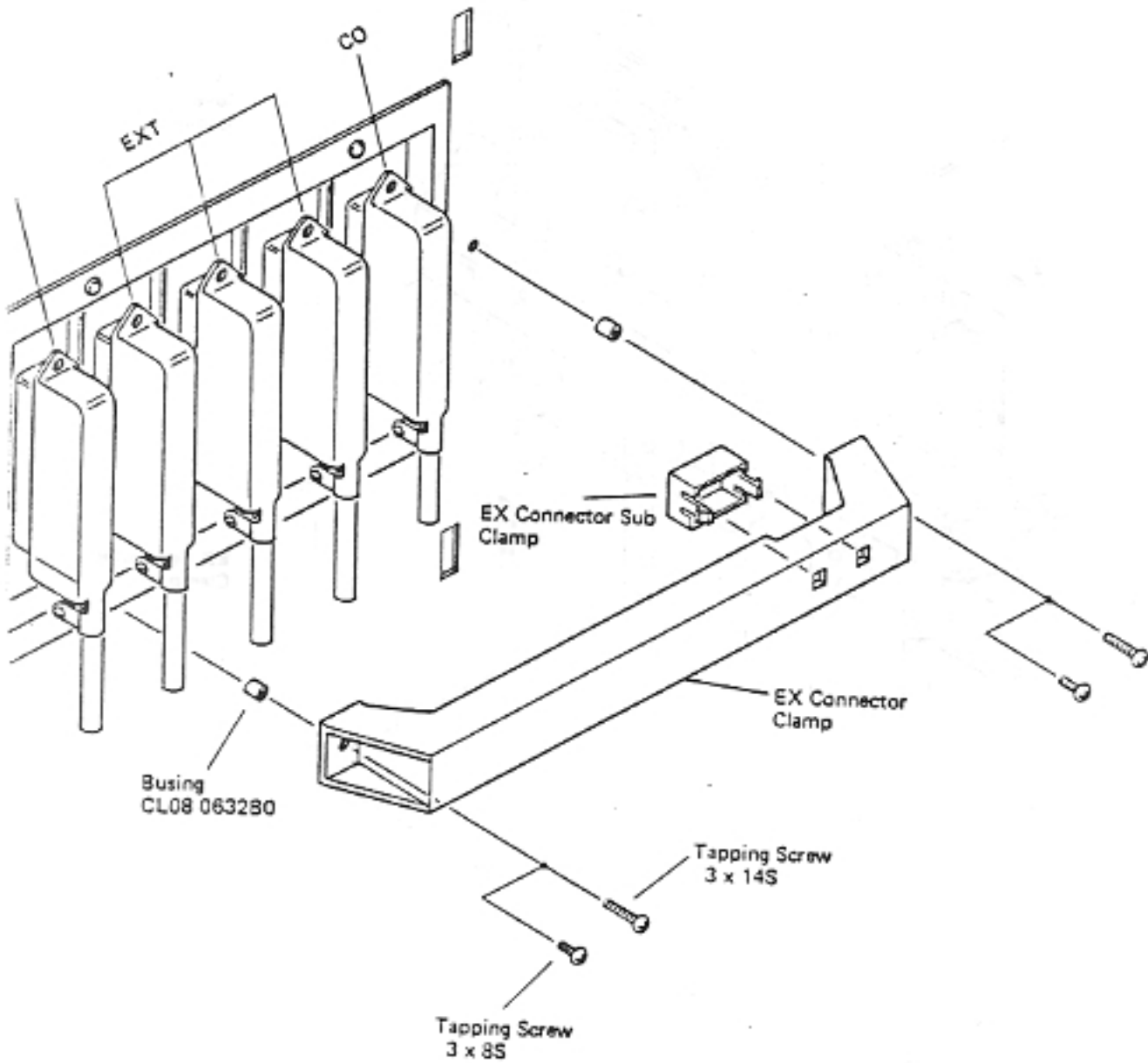


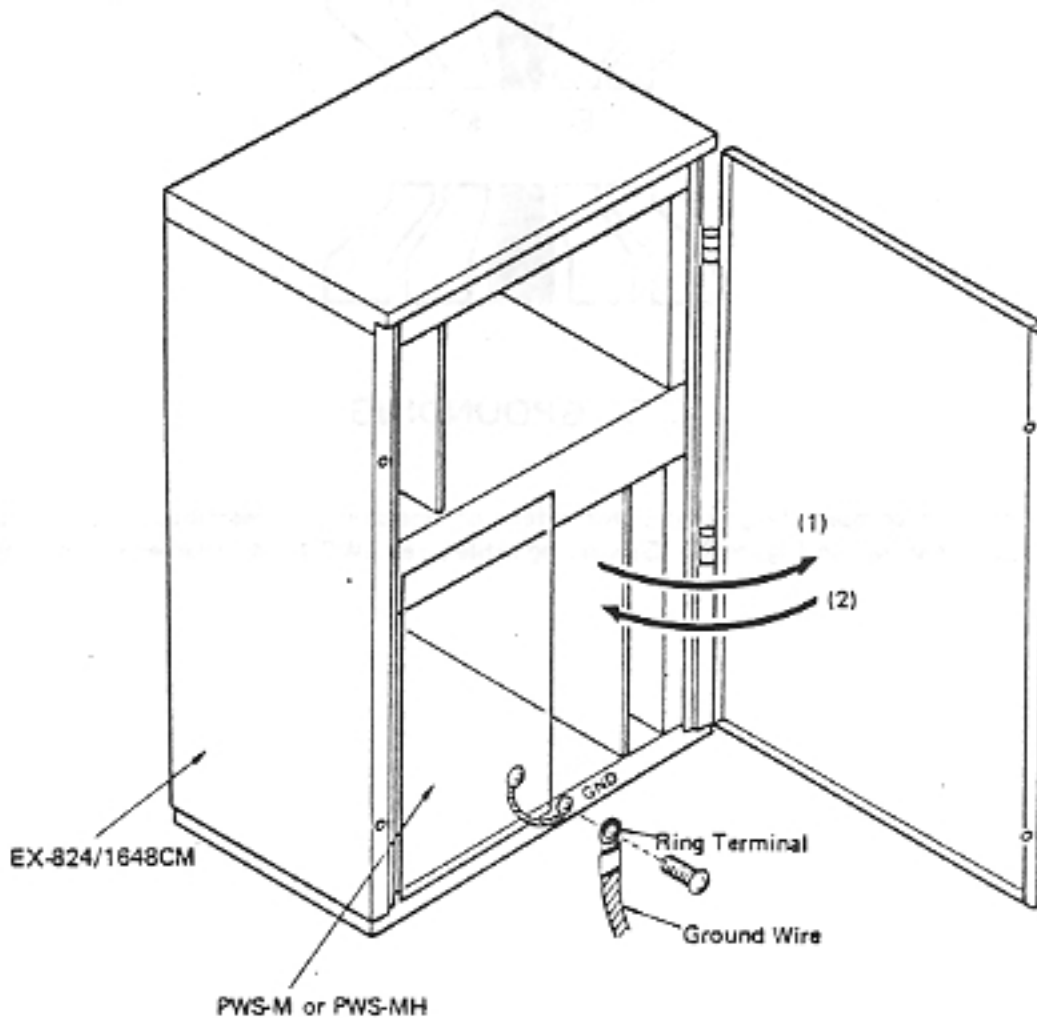
Figure 3.4.7.b Installation of Unusual System

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3.5 GROUNDING

The devices must be completely grounded for safety of operation as described in paragraph 3.2.5. A grounding method is shown in Figure 3.5. Grounding cable sizes AWG # 14 or larger are recommended.



Procedure

- (1) Open the front door.
- (2) Clamp the ground wire to terminal GND together with the existing wire.
- (3) Close the front door.

Note: Perform this work after installing the power supply (PWS-M or PWS-MH) in the cabinet. The screw for grounding the power supply is located on the power supply panel.

Figure 3.5 Grounding Method

Table 3.5 Ring Terminal and Wire

	Type of Ground Wire	Type of Amp Ring Terminal	Tool
Amp Ring Terminal	AWG 14	170722-1 170723-1	49935

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INSTRUCTION MANUAL



3.6 ICU PRINTED-CIRCUIT CARD INSTALLATION

3.6.1 General

This section describes the uses of the printed-circuit cards to be installed in the Integrated Control Unit (ICU) of the EX-824/1648 system, their features, and installation procedures (if necessary).

To prevent system damage and malfunction from errors in installation, carefully read this section until you are familiar with the proper procedures for installation or expansion.

The planning sheets mentioned in Section 3.3 must be filled out before starting actual installation. Installation according to the planning sheets is particularly important for the three types of subscriber cards (SUBK-M, SUBS-M/M1, and EMTK-M) that can be installed in the subscriber slots.

3.6.2 Safety Precautions

Observe the following precaution to prevent trouble relating to the installation and maintenance of the printed-circuit cards described in this section.

3.6.2.1 Unpacking/Handling

Generally, the circuit cards used for the EX-824/1648 system include C-MOS parts, so they must be kept as free of electrostatic as possible. This means that any electric charges that may be carried by the human body must be released to the ground before handling these circuit cards. A static protection wrist strap with a ground lead is recommended for this purpose, but if it is not available, it may be replaced by physically touching a grounded metal surface (for example; the ICU casing, or the telephone company's ground terminal or a cold water piping).

Whichever method is used, avoid directly touching the elements on the circuit cards. In holding a circuit card, hold it by a non-conductive part, such as the card edge or card ejector clip. (Be careful, however, not to touch the card edge that has contacts.) Avoid placing a circuit card on plastic or on a carpet because the electrostatic charge carried by such surfaces can damage the circuit card.

Do not stack one circuit card upon another, or place circuit cards on a metal surface. Circuit cards removed from a live system may carry electric charges in their capacitors that may damage other components, and thus require special care.

The printed-circuit cards are packed as shown in Figure 3.6.2.1. Be sure to use a protective bag in carrying or storing a printed-circuit card.

To ship a printed-circuit card for repair or other purpose, pack it as shown in Figure 3.6.2.1.

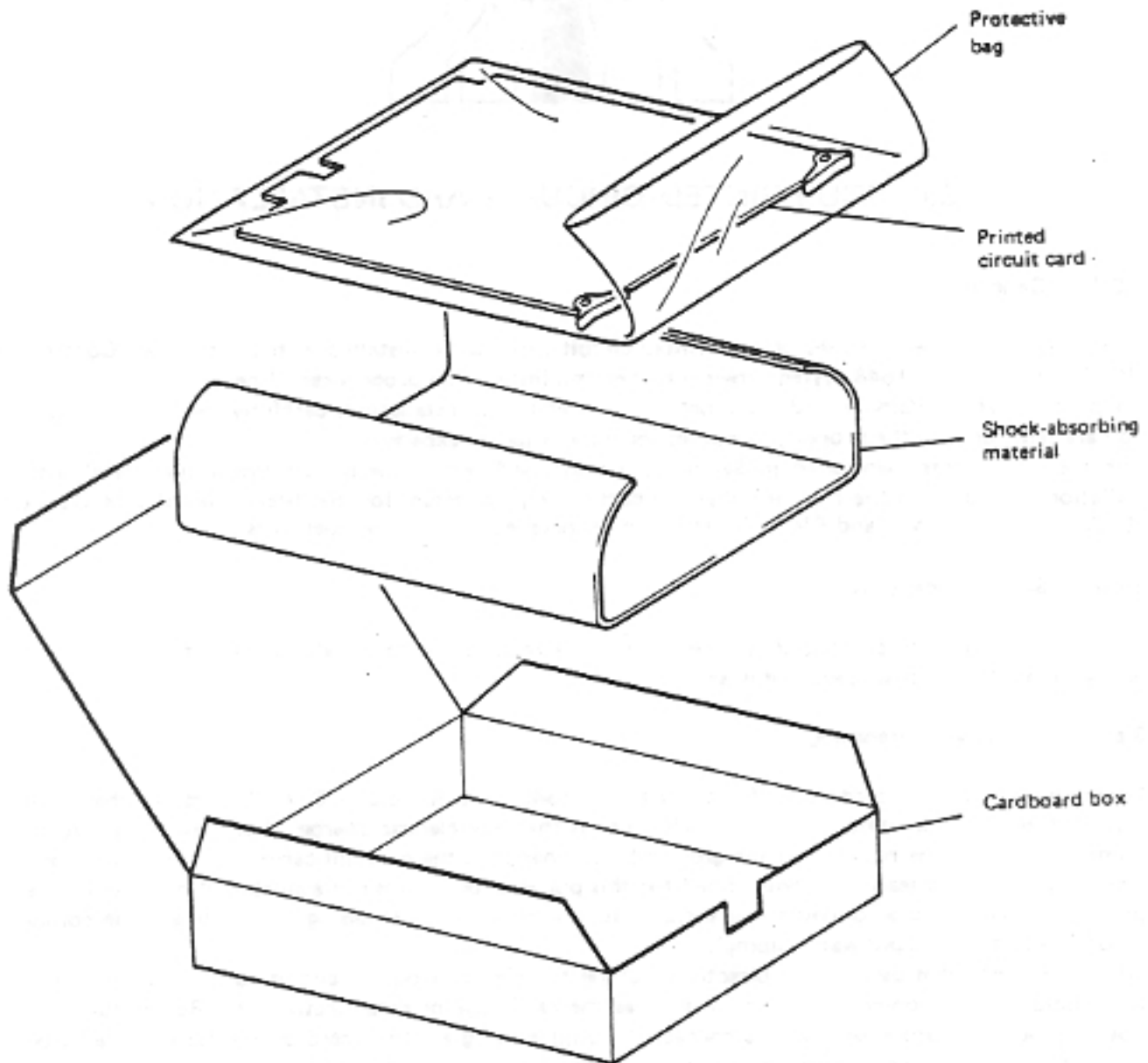


Figure 3.6.2.1 Packing of Printed Circuit Card

3.6.2.2 Card Insertion/Extraction

(1) Card positions in the ICU

The circuit cards to be installed in the ICU of the EX-824/1648 system are listed in Section 1.1.1.4. Their installation positions are clearly indicated by silk screen printing on each shelf of the ICU. If a circuit card is inserted in the wrong slot, it can damage not only the card itself but the whole system. Make sure that the circuit card names printed on the shelves agree with the cards before inserting the cards into their proper slots. The circuit card slots are shown in Figure 3.6.2.2(1).

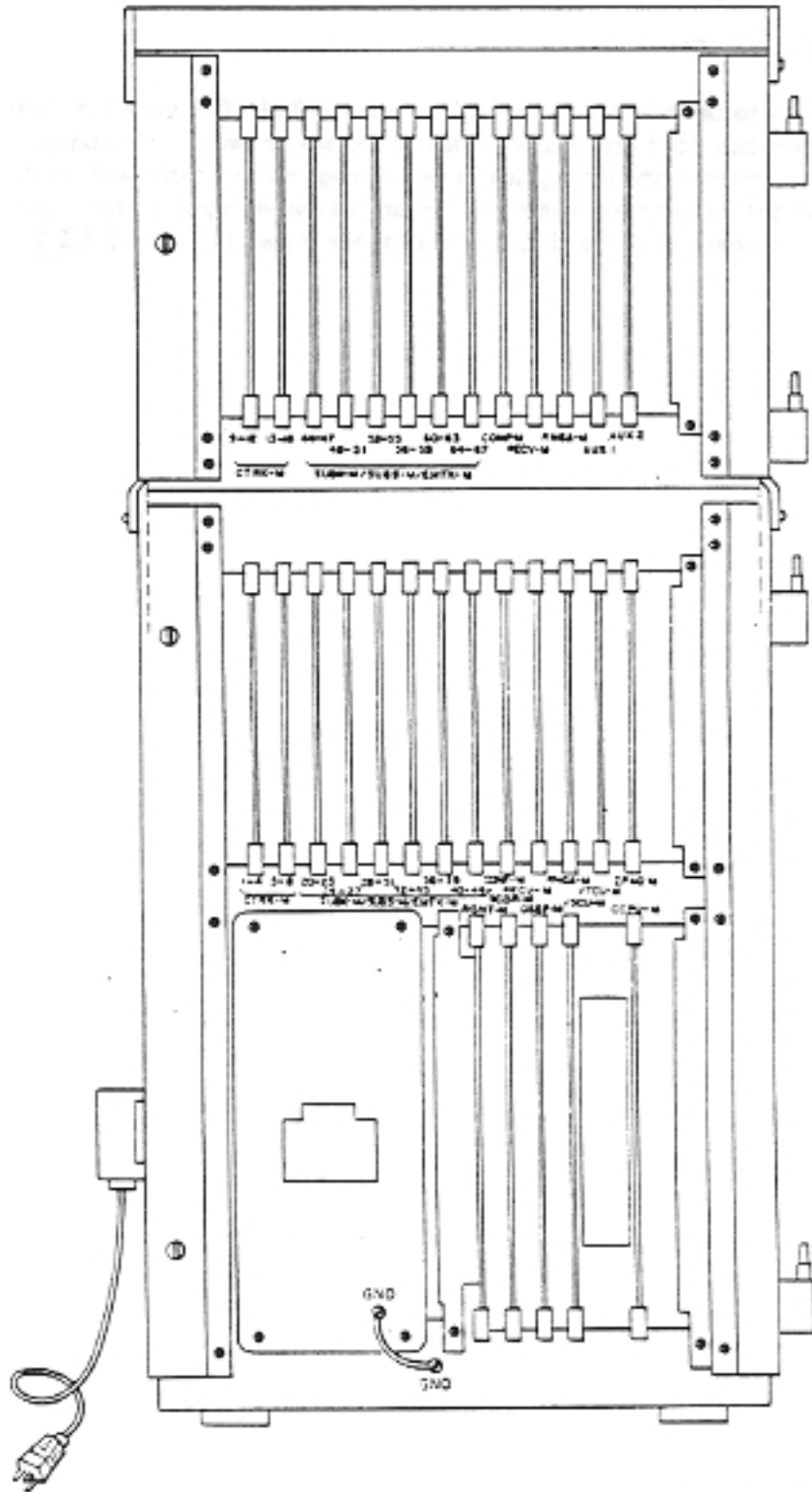


Figure 3.6.2.2(1) Printed-Circuit Board Mounting

(2) ICU card insertion/extraction

(a) General

It is suggested that the system be switched off before extracting or inserting circuit cards for maintenance or expansion purposes. If it is necessary to extract or insert circuit cards without switching the system off, be sure to observe the procedure below. Otherwise, the system is likely to be damaged.

Note: Only those circuit cards which have a green, dark blue, or light blue ejector clip can be extracted or inserted without switching power off. Never extract or insert a circuit card that has a red or orange ejector clip while power is on.

(b) Card extraction procedure

- (i) Turn off the switch equipped with PCRC-M (Printed-Circuit Board Removing Cable-M).
- (ii) Connect VTCU-M to the circuit card to be removed, using PCRC-M.
- (iii) Turn on the switch equipped with PCRC-M.
- (iv) Hook the card ejector clip on your thumb, spread it slowly in the vertical direction, and extract the circuit card. (See Figure 3.6.2.2(2)(b).)
- (v) Turn off the switch equipped with PCRC-M.
- (vi) Remove PCRC-M from the circuit card.

Note: If a circuit is in use, the BUSY lamp on the circuit card lights. If PCRM-M is inserted into the card and turn on the switch in this state, the card stops operating and will not operate normally, though it will not damage the system. Make sure that the BUSY lamp is off before connecting PCRM-M.

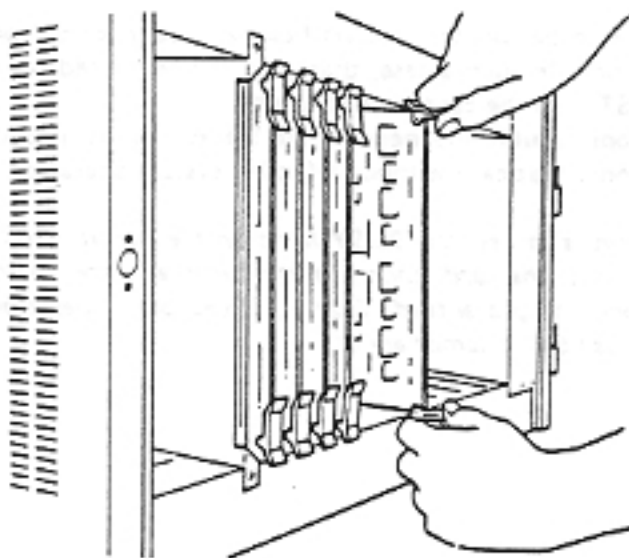


Figure 3.6.2.2(2)(b)

(c) Card insertion procedure

- (i) Turn off the switch equipped with PCRM-M.
- (ii) Connect VTCU-M to the circuit card to be inserted, using PCRC-M.
- (iii) Turn on the switch equipped with PCRC-M.
- (iv) Slide the circuit card along the guide rail, and push the top and bottom ejector clips evenly until the card engages the connector securely.
- (v) Turn off the switch equipped with PCRC-M.
- (vi) Remove PCRC-M from the circuit card.

The switch must be off when mating the 3-pin connector on the PCRC-M with the [BP] connector, or separating the 3-pin connector on the PCRC-M from [BP] connector.



The switch must be on when inserting a card into, or extracting it from, the rack.



Figure 3.6.2.2.(2)(c) Switch on the PCRC-M

(d) Forced busy

A card may have to be forcibly and artificially disconnected from the system for maintenance or trouble shooting. In such a case, that card can be turned off by simply connecting the MB strapping jack (STJ) on the card to the MB position.

If a card develops trouble independent of the system as a whole, the forced-busy operation can disconnect only that card without affecting system operation.

Note: If a circuit is in use, the BUSY lamp on the circuit card lights. If forced busy operation is performed, the card stops operating in that state. In this case, normal system operation cannot be guaranteed. That is, forced busy operation is permissible only for those units whose BUSY lamps are off.

3.6.2.3 Common Card Installation

The circuit cards that are absolutely necessary and remain unchanged in quantity regardless of system configuration in installing the EX-824/1648 ICU are called common cards. The common cards are M/K-CPU-M1 and VTCU-M. M/KCPU-M1 is the main controller and VTCU-M generates various signal tones. These cards are installed in the prescribed slots in the common module as shown in Figure 3.6.2.2(1).

Note: Be sure to switch off the system before installing these circuit cards.

3.6.2.3.1 M/KCPU-M1 (MF/KF Central Control Processor Unit-M1)

(1) General

The Central Control Processor Unit is the control center of the EX-824/1648 system, and employs a 16-bit microprocessor. All system operations are controlled by this unit. The peripheral processors mounted on other units are placed under the control of M/KCPU-M1 and various types of data-regulating system operations are routed directly, or indirectly via the peripheral processors, to M/KCPU-M1 for processing.

The random access memory (RAM), which covers the operating area of the microprocessor, a system master clock, and a backup battery, which supplies power to the memory IC and master clock when the main power switch on the power supply unit is in the off position or a commercial power failure, are assembled into a box called RAMU-M1 which is mounted on the M/KCPU-M1 card.

Figure 3.6.2.3.1(1) shows an external view of M/KCPU-M1.

Note: Be sure to use cards for selection of MF system and KF system.

(2) On-board setting

The eight DIP switches located on the front of the M/KCPU-M1 unit have the functions shown in Figure 3.6.2.3.1(2) and Table 3.6.2.3.1(2).

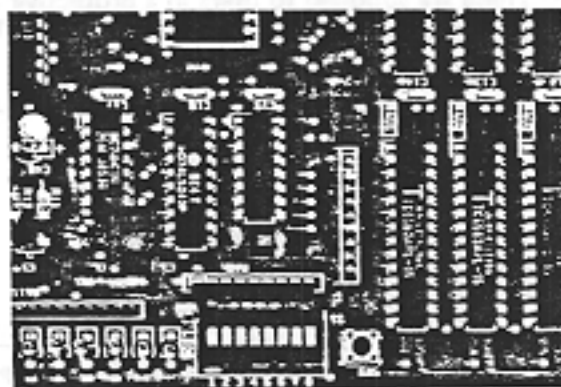


Figure 3.6.2.3.1(2) On-Board Settings

Table 3.6.2.3.1(2)

DIP Switch No.	ON	OFF	Remarks
1	Inhibit	Normal	
2	Inhibit	Normal	
3	Inhibit	Normal	
4	Inhibit	Normal	
5	Inhibit	Normal	
6	Inhibit	Normal	
7	System data save	System data print out	
8	Backup data save	Backup data clear	

Note: All the DIP switches except No. 8 are for adjustment, and it is normally unnecessary to set them during installation. Be sure however, to verify that DIP switches No. 1 through No. 7 are OFF before installing the ICU. DIP switch No. 8 is set to the OFF position to clear the memory in initializing the system. This permits programming fresh user data. Be sure to clear the memory in initializing the system. DIP switch No. 8 must be in the ON position once the system starts operating. In this way, the user data is maintained by the battery even in the event of a power failure.

(3) Precautions regarding installation

The EX-824/1648 system software consists of four independent ROM packages, one of which is originally mounted on the M/KCPU-M1 card as the basic package. The other three are optional, each consisting of two ROM ICs. These are supplied to users in a protective case.

For the functions of the individual packages, refer to Section 2.2.7. The layout of these packages is shown in Figure 3.6.2.3.1(3)A.

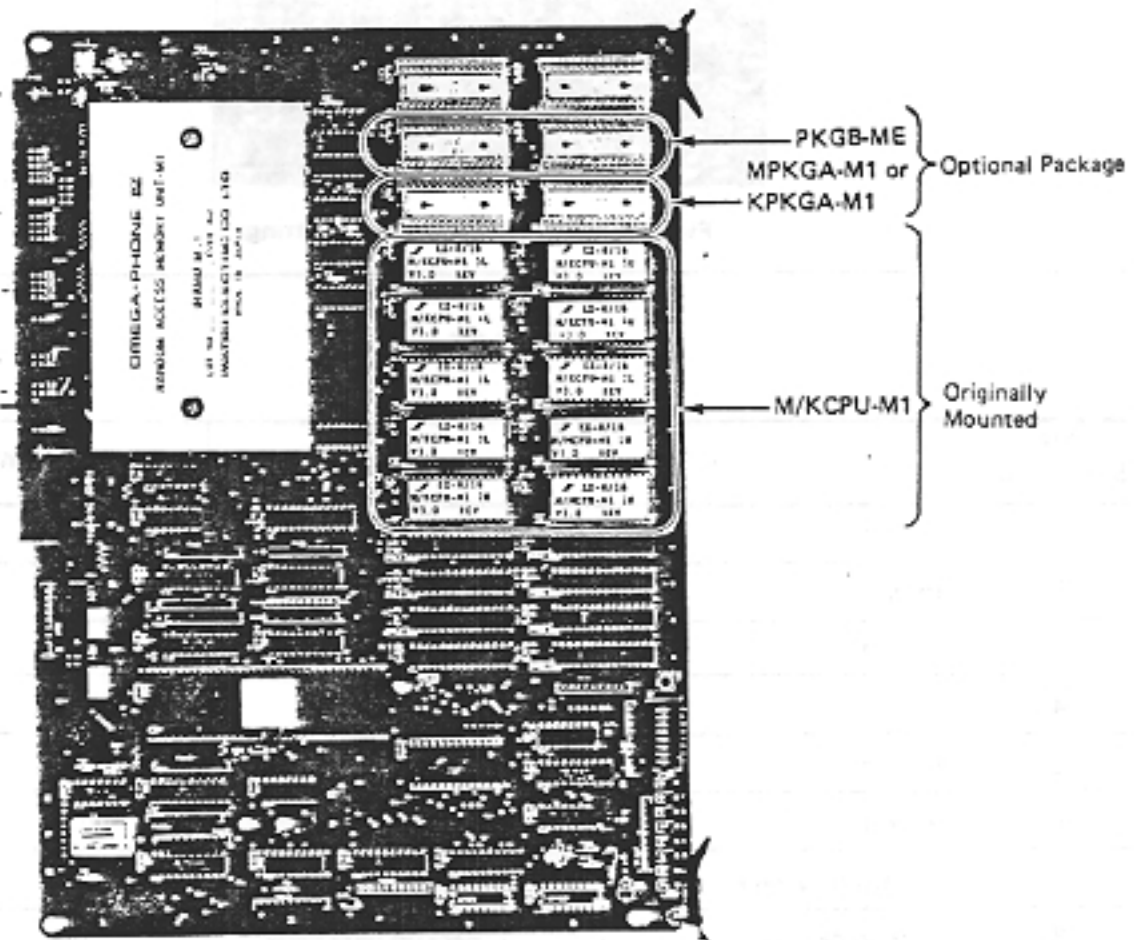


Figure 3.6.2.3.1(3)A ROM Package Layout on M/KCPU-M1 Card

In mounting ROM packages on the M/KCPU-M1 card, observe the precautions given in Section 3.6.2.1. It is suggested that the leads not be directly touched by hand to prevent the ROM ICs from being damaged by electrostatic. For easy insertion into the sockets, the leads should be formed with a metal piece (preferably grounded) or a dry piece of wood as shown in Figure 3.6.2.3.1(3)B.

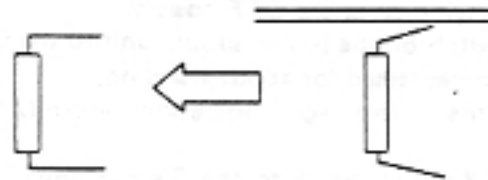


Figure 3.6.2.3.1 (3)B ROM Lead Forming.

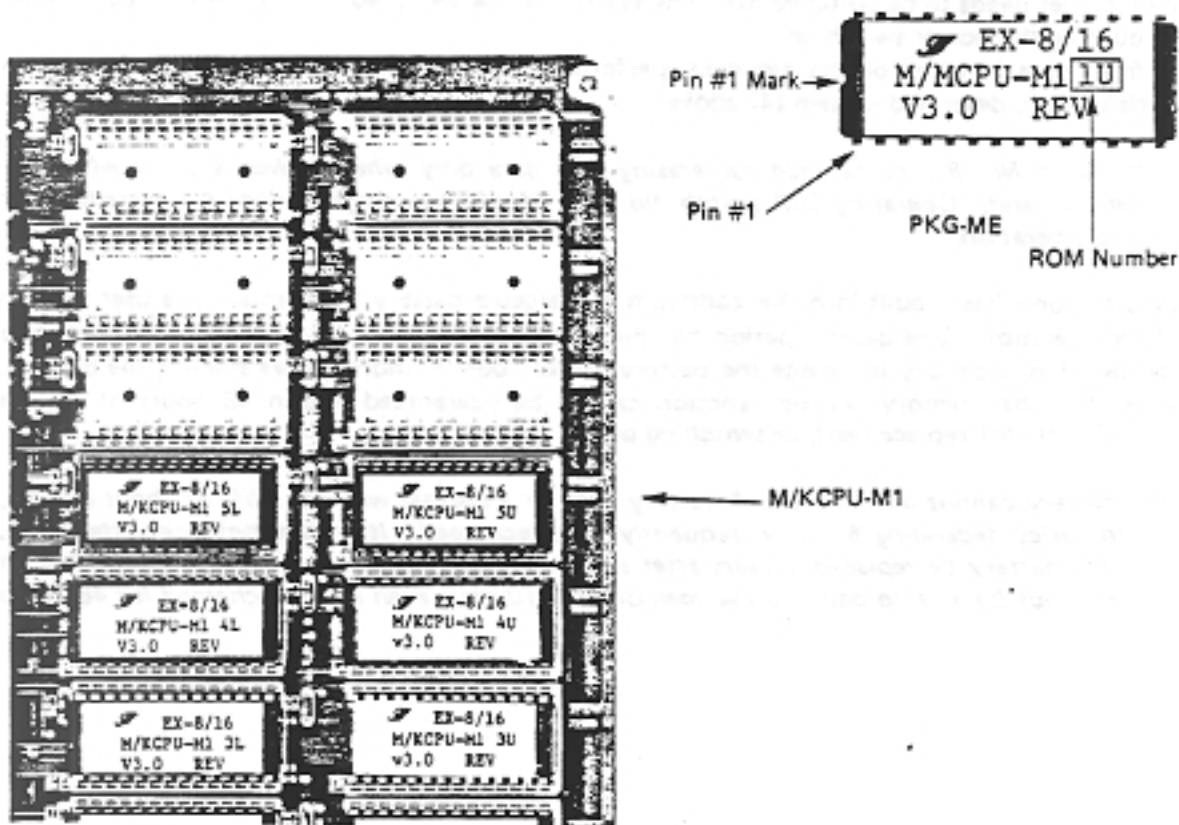


Figure 3.6.2.3.1.(3)C ROM Number and Installation Position

(4) Operation after system installation

It is uncertain what data are written in the user data area of RAMU-M1 when switching the system on for the first time after installation. Totally unknown data are written in it. It is necessary, therefore, to completely clear the memory before entering data to meet your own needs. The procedure is as follows:

- (a) Set DIP switches 1 through 8 all to the OFF position.
- (b) Set the MAIN power switch on the power supply unit to the ON position.
- (c) Keep the RESET switch depressed for about a second.
- (d) About 8 seconds after the system begins operation, return DIP switch No. 8 to the ON position.

Note: Be sure to return DIP switch No. 8 to the ON position. If it is left in OFF position, all user data in the memory will be lost when power is switched off and on.

(5) Operation for maintenance and expansion

In servicing or expanding the system without erasing the user data already stored in the memory, only system power needs to be switched off. The system can be switched on after work is completed by simply pushing the power switch on.

To enter fresh data in place of the old data, perform an operation similar to that performed in system initialization, described in item (4) above.

Note: DIP switch No. 8 may be used for erasing user data only when power is on or when the system is reset. Operating DIP switch No. 8 is totally meaningless once the system starts normal operation.

The RAMU-M1 unit has a built-in nickel-cadmium rechargeable battery to maintain the user data and master clock operation. The backup period by this battery is normally 10 days. To guarantee this 10-day period, it is necessary to charge the battery for 48 hours or more before starting the backup. This means that the memory backup function cannot be guaranteed within 48 hours of system installation, RAMU-M1 replacement, or switching power on.

Note: The battery cannot last forever. A battery used in a normal way has a life of about 8 years, which varies depending on how frequently it is recharged. It is recommended, therefore, that the battery be replaced 8 years after system installation. A battery more than 8 years old may not be able to back up the memory for 10 days even if it is recharged for 48 hours or more.

(6) Description of switches and indicators (See Figure 3.6.2.3.1(1).)

(a) RESET switch

This switch is used for manually resetting the whole system.

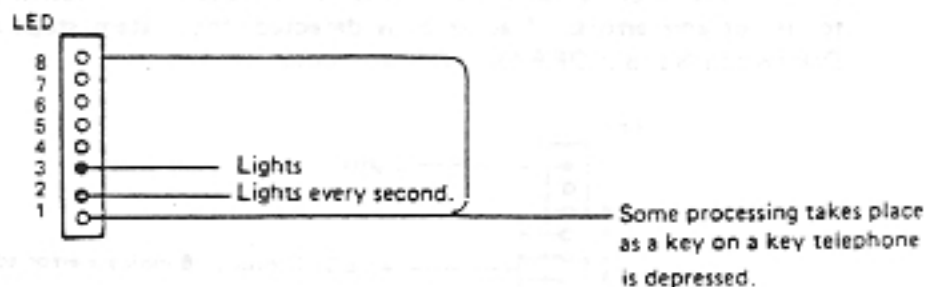
(b) DIP switches (8-bit)

The DIP switches are used for setting conditions within the unit.
Refer to item (2), On-Board Setting.

(c) Indicators

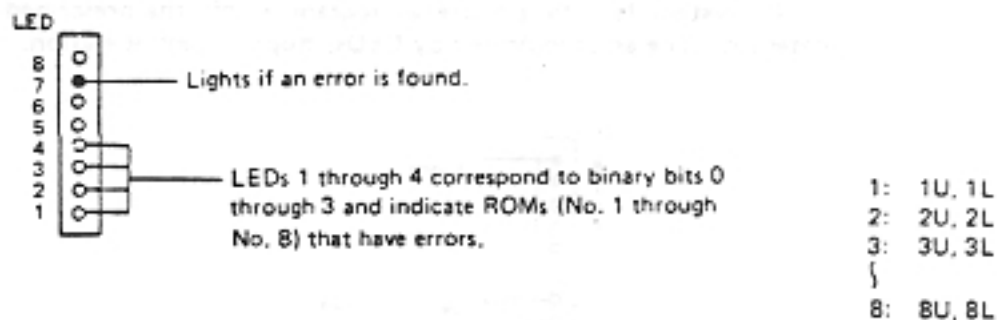
The indicators show the unit's running condition on and system faults.

(i) System running in normal condition



(ii) Program checksum error

A system program checksum is calculated when power is on. If an error is found, the system stops operating.

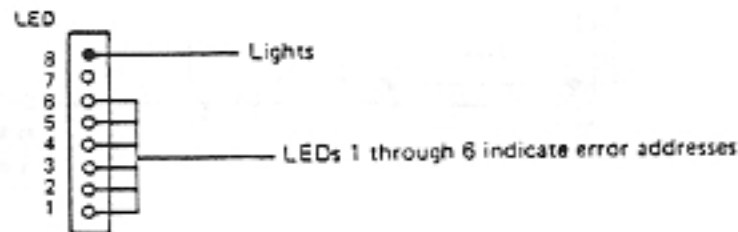


LED	Error ROMs	1U	2U	3U	4U	5U	6U	7U	8U
		1L	2L	3L	4L	5L	6L	7L	8L
1		●	○	●	○	●	○	●	○
2		○	●	●	○	○	●	●	○
3		○	○	○	●	●	●	●	○
4		○	○	○	○	○	○	○	●

● ON
○ OFF

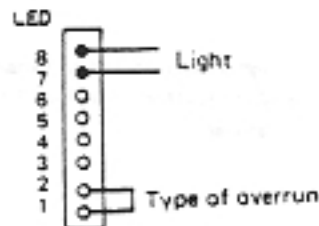
(iii) Memory read-after-write check error

When power is on, a read-after-write check is made on the system's random access memory to detect any errors. If an error is detected, the system stops operating, provided that DIP switch No. 8 is OFF for the clear mode.



(iv) Overrun error

If the system fails to execute a program within the prescribed time, an overrun error is detected. The error indicated by LEDs, stops system operation.



3.6.2.3.2 VTCU-M (Voice/Tone Control Unit-M)

(1) General

VTCU-M carries interface circuits for the various kinds of sound sources used in the system, including Music-on-Hold (MOH), Background Music (BGM), and external paging. It has relay contacts to control external MOH, external public address amplifiers, NT and UNA devices.

Figure 3.6.2.3.2(1) shows an external view of VTCU-M.

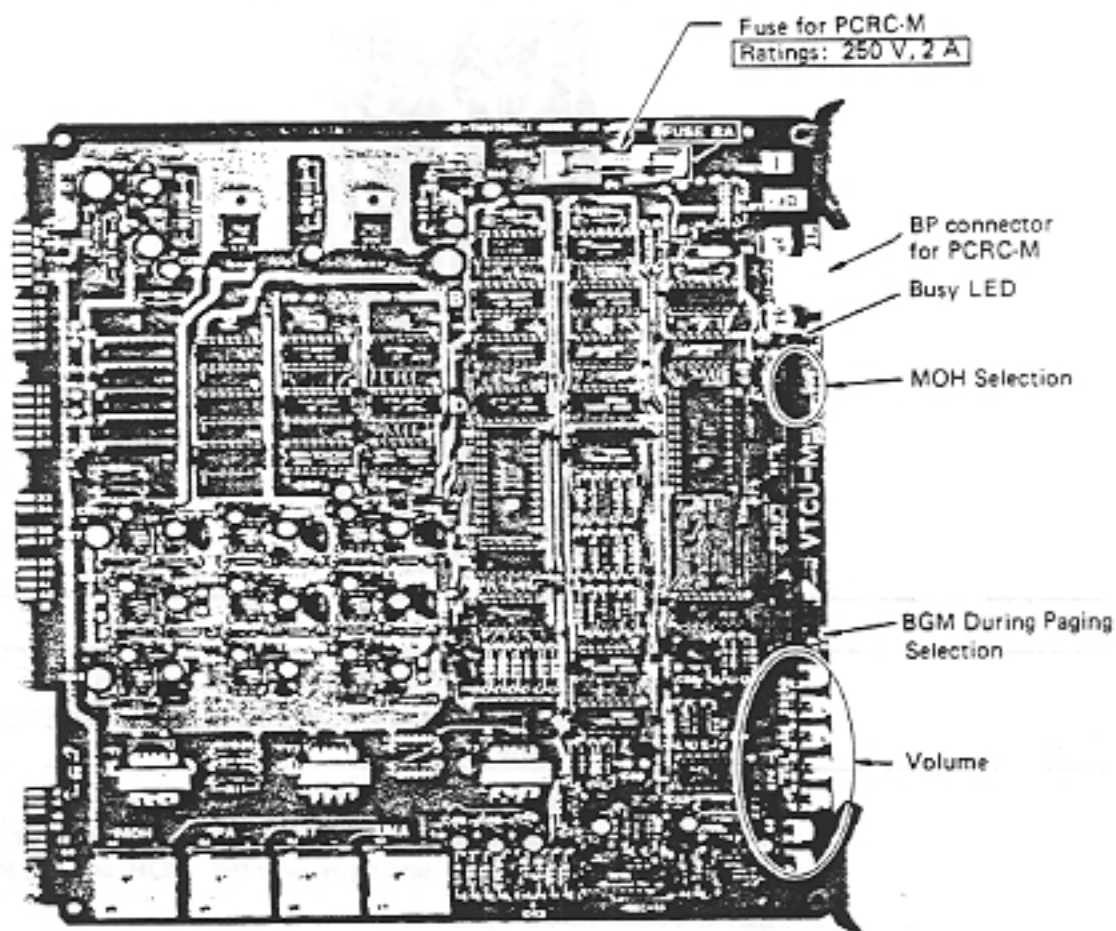


Figure 3.6.2.3.2(1) External View of VTCU-M

(2) On-board setting

(a) MOH select

Connect strapping jacks (STJs) to the necessary points among those shown in the table below.

(i) MOH source

Select an MOH source from those shown in Table 3.6.2.3.2(2)(a)(i). Two or more MOH sources cannot be selected simultaneously.



Table 3.6.2.3.2(2)(a)(i)

Symbol	MOH Source
EXT	Use an external music source. The input terminal to be used is the RCA-type pin jack indicated MOH SOURCE on the EDCT-M in the right side part of the ICU.
BGM	Use an external BGM source. The input terminal to be used is the RCA-type pin jack indicated BGM on the EDCT-M in the right side part of the ICU. If this setting is selected, MOH and BGM share the same melody.
INT	The melody generated by the melody synthesizer using an IC on the VTCU-M is used as MOH. Refer to the next section for details.

Note: INT is originally set before shipment from the factory.

- (ii) If the built-in melody synthesizer is selected as an MOH source, either of the two tunes shown in Table 3.6.2.3.2(2)(a)(ii), M1 and M2, can be selected.

Table 3.6.2.3.2(2)(a)(ii)

Symbol	Melody
M1	Home on the Range
M2	Green Sleeves

Note: M1 is originally set before shipment from the factory.

(b) BGM during paging

If a paging call accesses the system while BGM is on, the music is interrupted. If the user finds the interruption unnatural, BGM can be kept on at a quarter of the normal level during paging as shown in Table 3.6.2.3.2(2)(b).

Table 3.6.2.3.2(2)(b)

Kind	BGM During Paging
BGM OFF	No BGM
Other Side	BGM kept on at 1/4 of normal level

Note: Originally set to 1/4 of normal level before shipment from the factory.

(3) Installation precautions

- (a) Verify that there is a fuse in **FUSE 2A** on the VTCU-M. When a card is inserted into, or extracted from, the system while power is on, this fuse supplies power to the card through an optional PCRC-M.
- (b) After finishing all settings except the volume controls, check the fuse specified above, and install the VTCU-M in the ICU.
- (c) Only one VTCU-M card can be installed in the KSU. The slot for this card is indicated VTCU-M, as shown in Figure 3.6.2.2(1). Do not insert it in any other slot.

- (d) Before removing the unit from the ICU or reinserting it in the ICU, be sure to switch the system off. Never remove or insert the unit while power is on.
- (e) The volume of signals and voice to extensions and paging amplifiers can be adjusted. The volume controls are preset to the maximum level before shipment from the factory, and can be adjusted to the desired level as shown in Table 3.6.2.3.2(3)(d).

Table 3.6.2.3.2(3)(d)*

Volume Control	Description
MOH	This volume control is for the music sent to CO/PBX lines on the CTRK-M-1 card while on hold. Any of several melodies can be selected by the MOH selecting procedure described in step (2) above.
PAG	This volume control is for the voice transmitted from an extension (key telephone or single-line telephone) to the paging amplifier to originate a paging call.
NRG	If any of the CO/PBX lines on the CTRK-M-1 card is accessed by an incoming call when the system is in the night mode, a ringing tone, 440 Hz/480 Hz, 1 second ON and 3 seconds OFF, is emitted by the paging amplifier to indicate an incoming call. This volume control is used to adjust the ringing volume.
BGM PAG	This volume control is for the music sent to the paging amplifier when it provides background music. The music input to the RCA-type pin jack indicated BGM in the EDCT-M part of the ICU is routed to the paging amplifier. This music is the same as that of BGM TEL described below, but can be independently adjusted for the paging amplifier.
BGM TEL	This volume control is for the background music reproduced from the key telephone's built-in speaker. The music input to the RCA-type pin jack indicated BGM in the EDCT-M part of the ICU is emitted from the key telephone speaker. This music is the same as that of BGM PAG described above, but can be independently adjusted for the key telephone.
VC 1 VC 2	These volume controls are for the voice emitted from the built-in speakers of key telephones when an extension (key telephone or single-line telephone) originates a group call or an all call. The system has two channels to permit simultaneous routing of group calls to different groups. To adjust VC 1 and VC 2, first turn one of them to the desired position, then turn the other to the same position.

(4) Operating procedure

In extracting or inserting a circuit card for maintenance purposes without switching power off, it is necessary to connect VTCU-M to that circuit card, using PCRC-M. For details, see Section 3.6.2.2.

3.6.2.4 Speech Path Circuit Card Installation

3.6.2.4.1 General

There are three main types of speech path circuit cards:

(1) Trunk circuit cards

- | | |
|---------------|-------------------------------|
| (a) CTRK-M/1: | Central Office Trunk Card-M/1 |
| (b) EMTK-M: | E & M Trunk Card-M |

(2) Subscriber circuit cards

- | | |
|-------------|---|
| (a) SUBK-M: | Key Telephone Subscriber Card-M |
| (b) SUBS-M: | Single-Line Telephone Subscriber Card-M |

(3) DSS-M/BLF-M circuit card

- | | |
|-------------|------------------------------|
| (a) DSBF-M: | DSS and BLF Interface Card-M |
|-------------|------------------------------|

The SUBK-M, SUBS-M, and EMTK-M circuit cards are installed in the same group of slots; any of these cards may be installed according to planning sheets (see Section 3.3.1). The other circuit cards have their own installation slots. (See Figure 3.6.2.2(1).)

3.6.2.4.2 Trunk Circuit Cards

CTRK-M is the card that interfaces the EX-824/1648 system with the Central Office (CO) lines. This card is designed to suit loop-start line service of the rotary dial (DP) or DTMF type.

EMTK-M is the interface card for E & M tie lines.

3.6.2.4.2.1 FCC Considerations

This equipment has been approved by the Federal Communications Commission (FCC) as not being harmful to the telephone network when connected directly to telephone lines through the standard 50-pin micro-ribbon plug prescribed by FCC Rules.

When requesting service for CO/PBX lines encompassed under Part 68 of the FCC Rules/Regulations regarding Direct Connection of Telephone Systems, the following information must be provided to the local telephone company:

1. The Communications System being connected is an Iwatsu EX-824/1648.
2. The FCC Registration Number is BD687Y-70696-MF-E.

3. The Ringer Equivalence Number is 1.4B.

Also, the FCC Registration Number and model of any ancillary equipment apart from the EX824/1648, and its Ringer Equivalence Number (if connected on the telephone company side of the standard interface), must be included.

3.6.2.4.2.2 CTRK-M/1 (Central Office Trunk Card-M/1)

(1) General

CTRK-M/1 interfaces Central Office lines or PBX lines. Four lines are accommodated by one unit. CO/PBX lines of the rotary dial (DP) and/or DTMF types can be accommodated. Programming can be performed at DSS-M or DSS-N, line by line. This means that DP and DTMF lines can be mixed on the same card.

Figure 3.6.2.4.2.2(1) shows an external view of the card.

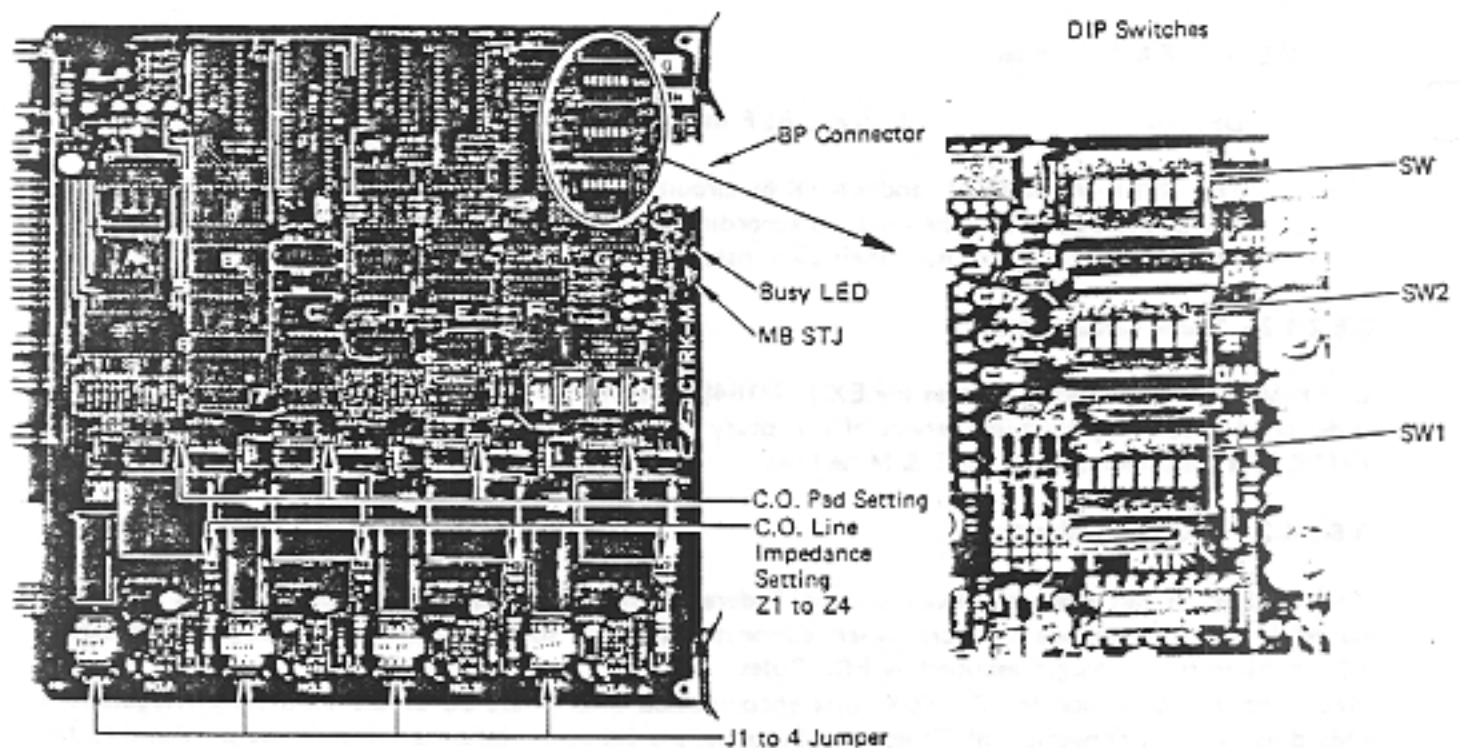


Figure 3.6.2.4.2.2(1) External View of CTRK-M

(2) On-board setting

(a) CO line protecting varistors

Varistors are installed between the CO lines and ground to protect the system from overvoltage applied to the CO lines. If noise interference occurs due to the varistors, depending on environmental conditions, the varistors can be disconnected from the circuitry by cutting jumpers J1 through J4.

(b) CO line characteristics

(i) CO line impedance matching

The impedance of each CO/PBX line can be matched with that of another by reconnecting strapping jacks (STJs) Z1 through Z4. The original preset impedance before shipment from the factory is 600 ohms.

Table 3.6.2.4.2.2(2)(b)(i)

Impedance (ohms)	Description
600	CO/PBX line impedance is 600 ohms
900	CO/PBX line impedance is 900 ohms

(ii) CO pad setting

LC/DX

Balance the circuits with the loss of each CO/PBX line by reconnecting strapping jacks (STJs) PD1 through PD4. The original setting before shipment from the factory is DX.

This setting applies if an E and M trunk (EMTK-M card) is used.
It is originally set before shipment from the factory.

Table 3.6.2.4.2.2(2)(b)(ii)

Setting	Description
LC	CO/PBX line loss is less than 3 dB
DX	CO/PBX line loss is 3 dB or more
S	Disconnect STJs No. 3 and No. 4 only when using an EMTK-M card

Note: But GRK-M Card don't have setting.

(c) DIP switches

This unit has three DIP switches, SW1 through SW3, which can be set to suit the CO line characteristics.

(ii) SW1 and SW2 setting

SW1 and SW2 set the disconnect signal time for each CO/PBX line. The originally preset disconnect signal time before shipment from the factory is 500 ms.

o SW1 setting

Table 3.6.2.4.2.2(2)(c)(ii)A

Bit	1	2	3	4	5	6
	CO line No. 1			CO line No. 2		

o SW2 setting

Table 3.6.2.4.2.2(2)(c)(ii)B

Bit	1	2	3	4	5	6
	CO line No. 3			CO line No. 4		

o Disconnect signal time

Table 3.6.2.4.2.2(2)(c)(ii)C

Bit	1	2	3	Time
	4	5	6	
	Off	Off	Off	90 ms
	On	Off	Off	150 ms
	Off	On	Off	500 ms
	On	On	Off	600 ms
	Off	Off	On	1500 ms
	On	Off	On	—
	Off	On	On	—
	On	On	On	—

Note: The best way to determine how to set CO line characteristics and DIP switches is to ask the telephone company or PBX manufacturer. If no definite information is obtained by asking them, keep the original settings as they are.

(d) Forced busy

If this STJ is set to MB, the four CO/PBX lines on this card cannot be accessed by the extension stations. Be careful not to set it to MB when a line is busy (BUSY LED is on) because it will disconnect the line. The STJ is set to the position to MB before shipment from the factory.

(3) Installation precautions

- (a) On-board settings should be finished before installing the circuit card.
- (b) Up to four CTRK-M/1 cards can be installed per system. They must be installed in the prescribed slots (see Figure 3.6.2.2(1)), never in any other slots.
- (c) It is suggested that system power be switched off before extracting the CTRK-M/1 cards from, or inserting them in, the ICU. If it is necessary to extract or insert them without switching the system off, observe the procedure described in Section 3.6.2.2.

(4) Operating procedure

None

3.6.2.4.2.3 EMTK-M (E and M Tie Line Trunk Card-M)

(1) General

The EMTK-M card can accommodate two E and M tie line circuits.

Note: The EMTK-M card is inserted into an SUB card slot in the ICU. In this case, the extensions corresponding to that slot cannot be connected. Two CTRK-M1CO/PBX line circuits are used per EMTK-M card. This means that the ICU capacity decreases by two CO/PBX line circuits and four extension line circuits for every EMTK-M card installed. An external view of the EMTK-M card is shown in figure 3.6.2.4.2.3 (1) below.

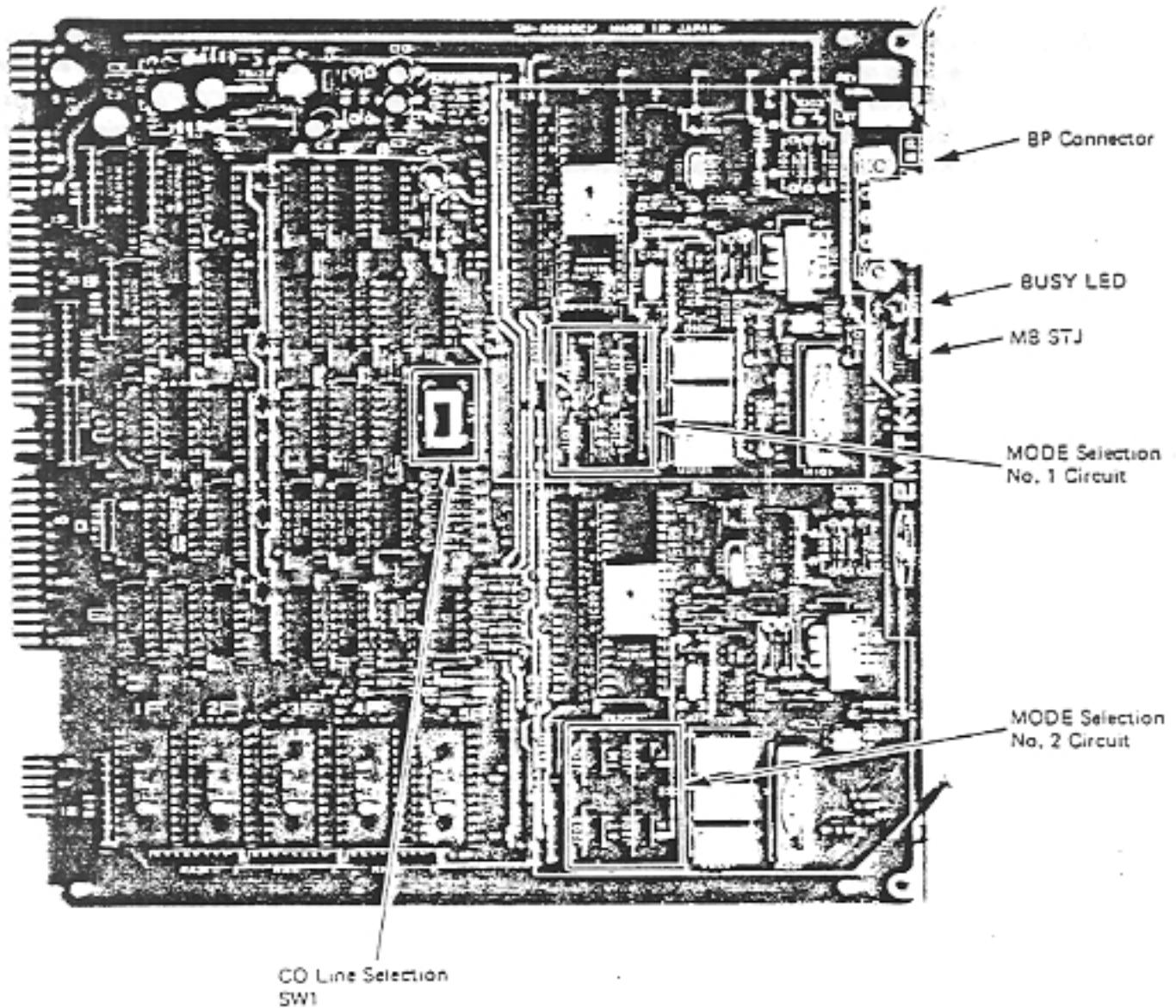


Figure 3.6.2.4.2.3 (1) External View of EMTK-M

The trunk numbers and extension numbers used by the EMTK-M card are shown in Table 3.6.2.4.2.3 (2) below.

Table 3.6.2.4.2.3 (2) Mounting Slots

ICU	SUB Slot	CO/PBX Line No.	Extension No.
EX-824/1648 CM	SUB 24-27	CO. 7, 8	EXT. 24, 25
	SUB-28-31		EXT. 28, 29
	SUB-32-35		EXT. 32, 33
	SUB 36-39		EXT. 36, 37
	SUB 40-43		EXT. 40, 41
EX-1648EM	SUB 44-47	CO. 11, 12	EXT. 44, 45
	SUB 47-51		EXT. 48, 49
	SUB 52-55		EXT. 52, 53
	SUB 56-55		EXT. 56, 57
	SUB 60-63		EXT. 60, 61
	SUB 64-67		EXT. 64, 65

(2) On-board setting

(a) Forced busy

MB STJ

If this STJ is set to MB, the two E and M tie-lines on this card cannot be accessed by the extension station. Be careful not to set it to MB when a line is busy (BUSY LED is on) because it will disconnect the line.

The STJ is set to the position opposite to MB before shipment from the factory.

(b) Mode selection

Modes can be individually selected for each E and M tie line.

Select only one of the IM, DL, AT, and WK setting pins with STJ.

The original setting before shipment from the factory is the Delay Mode (DL).

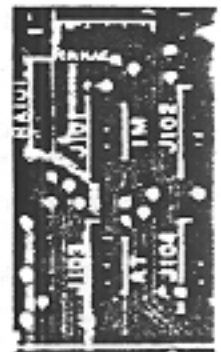
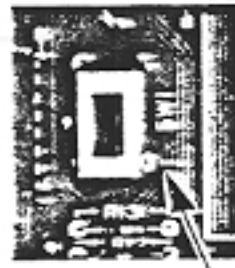


Table 3.6.2.4.2.3 (3) Mode Selection

Symbol	Mode	Description
IM	Immediate mode	After dial tone, dial information is sent and received for connection.
DL	Delay dial mode	After delay signal, dial information is sent and received for connection.
AT	Attendant mode	Connection is established by attendant operation. No dial information is sent or received.
WK	Wink mode	After wink signal, dial information is sent and received for connection.

(c) CO line selection (SW1)

This switch is used for selecting CO/PBX lines after mounting EMTK-M cards in the ICU. Installation of EMTK-M cards in the EX-824/1648 CM or EX-1648 EM or ICU automatically determines the side to which the switch should be set. That is, it cannot be freely set. Set the switch as shown in Table 3.6.2.4.2.3 (4).



Side 1

EMTK-M Mounting Slot	SW1 Setting	CO Line Used
SUB24 to SUB43 slots in EX-824/1648 CM	Side 1	No. 7 and No. 8
SUB44 to SUB67 slots in EX-824/1648 EM	Opposite to side 1	No. 11 and No. 12

(3) Installation precautions

- (a) After finishing all the on-board settings shown in (2) above, install EMTK-M cards in the ICU. Only one of six slots SUB44 to SUB67 may be used for mounting EMTK-M cards in the ICU.

- (b) Only one of the five slots SUB24 to SUB43, and only one of the six slots SUB44 to SUB67 may be used for mounting EMTK-M cards in the ICU.

That is, only one EMTK-M card can be installed in the EX-824/1648 CM and another in the EX-1648 EM.

Two or more EMTK-M cards cannot be installed in the CM or EM.

Because the slots SUB20 to SUB23 require connection from key telephones for user setting, SUBK-M cards are installed in those slots. Therefore, EMTK-M cards cannot be installed in those slots.

- (c) EMTK-M versus CTRK-M

The relationship between EMTK-M and CTRK-M must be taken into account because EMTK-M uses the crosspoint switch network for CO lines during conversation.

Their relationship is shown in Table 3.6.2.4.2.3 (5).

Table 3.6.2.4.2.3 (5) Limitations on CTRK-M

EMTK-M Mounting Slot	SW2 Setting on EMTK-M Card	CTRK-M 5-8 Slots	CTRK-M 9-12 Slots
SUB24-SUB43	Side 1	Nothing is mounted, or disengage strapping jacks Ss for No. 3 and No. 4 circuits, using CTRK-M1.	Free regardless of the specifications at left
SUB44-SUB67	Opposite to Side 1	Free regardless of the specifications at right	Nothing is mounted, or disengage strapping jacks Ss for No. 3 and No. 4 circuits, using CTRK-M1.

CAUTION:

In the above table, CTRK-M1 must be used as a CO line interface card. CTRK-M cannot be used for that purpose. CTRK-M cards may be installed in the CTRK-M slots not specified in Table 3.6.2.4.2.3 (5).

Note: CTRK-M1 is the same in function as CTRK-M except that it has an additional strapping jack S for E and M tie lines.

- (d) Do not insert EMTK-M cards in any other SUB slots than specified in Table 3.6.2.4.2.3 (2).
- (e) When an EMTK-M card is installed, install CTRK-M1 cards in the CTRK-M slots as shown in Table 3.6.4.2.3 (5).
- (f) Extensions cannot be connected to the four subscribers corresponding to the SUB slots in which EMTK-M cards are installed.
The CO/PBX lines shown in Table 3.6.2.4.2.3 (2) corresponding to the EMTK-M card will be E and M tie lines to which CO/PBX lines cannot be connected. If CO/PBX lines are connected, they are unusable.
- (g) If a BP connector is used, the EMTK-M cards can be removed from the slots or inserted back into them without switching the system off.
For details, refer to 3.6.2.2.

3.6.2.4.3 Subscriber Circuit Cards

The subscriber circuit cards are interface cards for the extensions of the EX-824/1648 system. Table 3.6.2.4.3 shows terminal devices and their interface circuit cards.

Table 3.6.2.4.3

Terminal	Interface Circuit Card
EX-824/1648 Key Telephone With Display (EX-824/1648D, DN, DN1)	SUBK-M
EX-824/1648 Key Telephone (EX-824/1648K, KN, KN1)	
EX-824/1648 Versa Phone (EX-824/1648VP-N1)	
Single-Line Telephone (Type 500, 2500)	SUBS-M/M1

3.6.2.4.3.1 SUBK-M (Key Telephone Subscriber Card-M)

(1) General

SUBK-M is the interface unit for two types of key telephones: EX-824/1648D, DN, DN1, EX-824/1648K, KN, KN1 and EX-824/1648VP-N1. Each SUBK-M can interface four key telephones.

Figure 3.6.2.4.3.1(1) shows an external view of the SUBK-M.

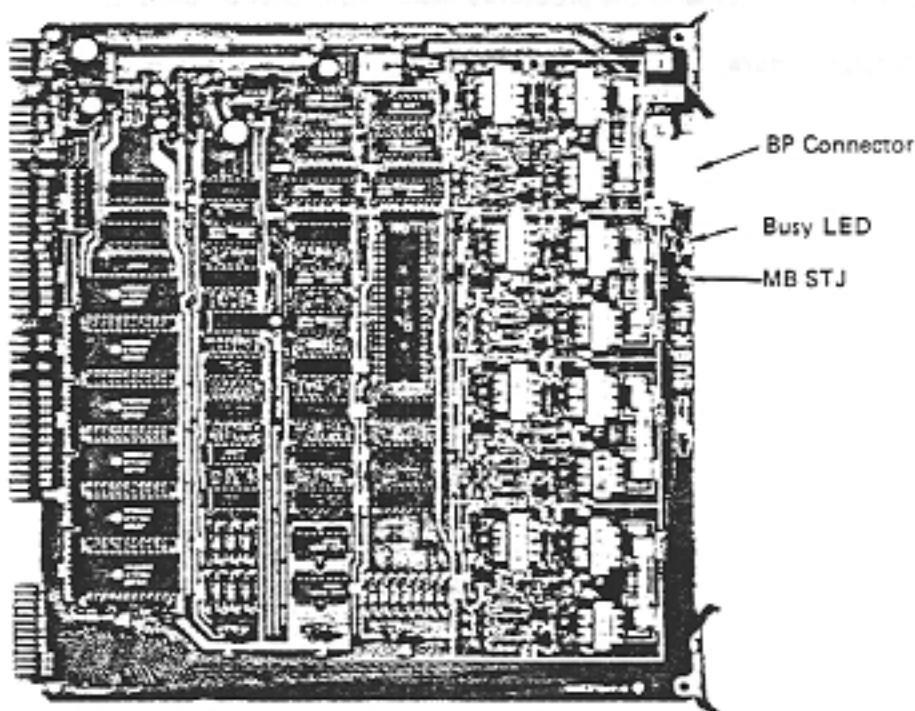


Figure 3.6.2.4.3.1(1) External View of SUBK-M

(2) On-board setting

MB STJ

If this STJ is set to MB, the four key telephones that this card accommodates become unusable. Be careful not to set it to MB when a station is busy (BUSY LED is on) because it will disconnect the station or make it impossible to access a CO/PBX line on hold.

Normally keep this STJ in the position opposite to MB. It is set to this position before shipment from the factory.

(3) Installation precautions

(a) If a fuse has blown due to a wiring error, check for the cause before replacing it with one of the same rated amperage (0.3 A). Remember that the circuit card must be removed from the ICU before replacing a blown fuse.

(b) Up to 12 SUBK-M cards can be installed per system.

It is necessary, however, to install them to suit the key telephones used, according to the planning sheets.

(c) It is suggested that system power be switched off before extracting SUBK-M cards from, or inserting them in, the ICU. If it is necessary to extract or insert the cards without switching the system off, observe the procedure described in Section 3.6.2.2.

(4) Operating procedure

None

3.6.2.4.3.2 SUBS-M/M1 (Single-Line Telephone Subscriber-M/M1)

(1) General

SUBS-M is the interface unit for type 500 or 2500 single-line telephones (SLTs). Each SUBS-M can interface four SLTs. Figure 3.6.2.4.3.2(1) shows an external view of the SUBS-M.

Up to twelve SUBS-M cards can be installed in the EX-824/1648 ICU. If twelve SUBS-M cards are mounted, all the extension will be single-line telephones.

Note: The SUBS-M1 card is designed to enable the use of -48V DC external power for speech path. Therefore, it is useful when installing Long-line SLTs or increasing the speech current.

Caution: To program customer data or use other system features, the station with extension number 20 or 21 must be a key telephone.

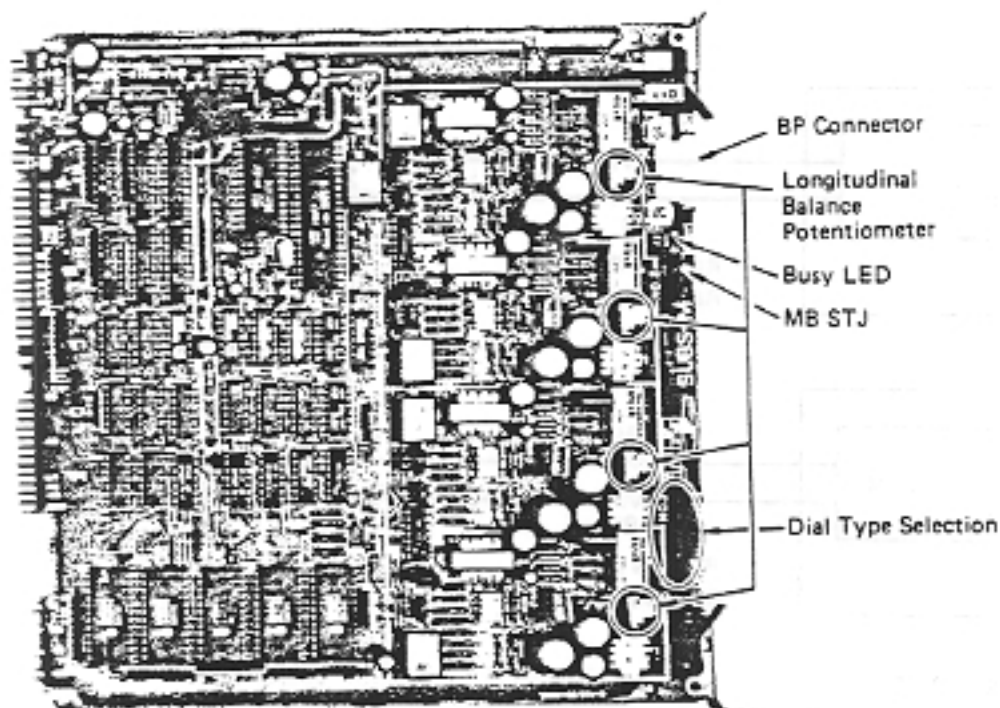


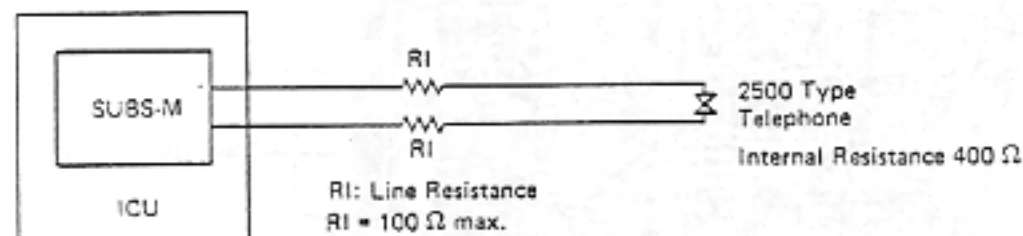
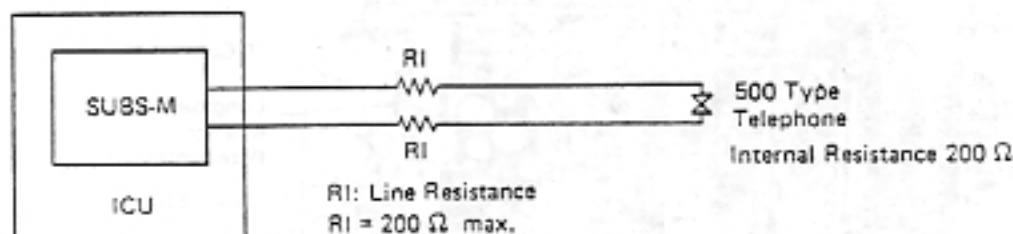
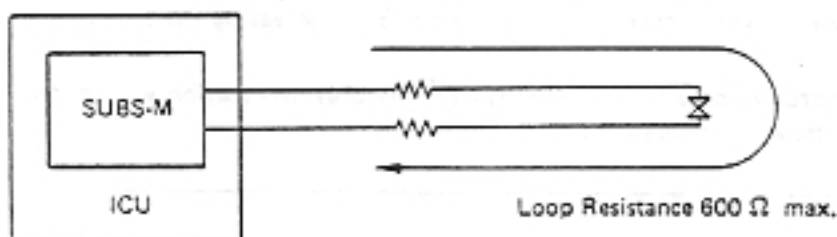
Figure 3.6.2.4.3.2(1) External View of SUBS-M Card

(2) Ratings

(a) Line resistance with SLTs.

A constant current system is used for speech path current supply by the SUBS-M card and the current value is approx. 25mA.

The loop resistance is restricted to within 600 Ω due to 24 V power used for the speech current. Therefore, the one-way line resistance is 200 Ω max. when a 500-type pulse dial telephone is used. If a 2500 type DTMF dial telephone is used, the one-way line resistance becomes 100 Ω max.



(b) Dialing system

The following dialing systems are used for SLTs.

PULSE type 10 \pm 1 pps or 20 \pm 2 pps*

DTMF type

*Caution: 20 pps pulse dialing is not applicable in Canada.

(c) Starting system

A loop starting system is used.

A ground starting cannot be made.

(3) On-board setting

This unit can be used for PULSE (type 500) and DTMF (type 2500) single-line telephones. It is necessary to make settings according to whether extensions are PULSE or DTMF type, as shown in Table 3.6.2.4.3.2(3).

Table 3.6.2.4.3.2(3)

EXT. No.	Bit SW. No.	DTMF	PULSE
# 1	1	STJ Set	NO STJ
# 2	2	STJ Set	NO STJ
# 3	3	STJ Set	NO STJ
# 4	4	STJ Set	NO STJ

The extension numbers allocated to SUBS-M are counted in order, starting with the smallest. Verify that the MB STJ is not on the MB side.

MB STJ

If this MB STJ is set to MB, the four single-line telephones that this card accommodates become unusable. Be careful not to set it to MB when a station is busy (BUSY LED is on) because it will disconnect the station or make impossible to access a CO/PBX line on hold.

The STJ is set to the position opposite to MB before shipment from the factory.

(4) Installation precautions

- (a) Up to 11 SUBS-M cards can be installed. It is necessary to install them to suit the number of single-line telephones installed, according to the planning sheets.
When the user data is to be programmed, SUBK-M cards must be mounted in the SUB 20 to 23 slot to allow connections of key telephones.
- (b) It is suggested that the system be switched off before extracting SUBS-M1 cards from, or inserting them in, the ICU. If it is necessary to extract or insert them without switching the system off, observe the procedure described in Section 3.6.2.2.
- (c) Longitudinal balance is properly adjusted before shipment from the factory. If a fine adjustment of longitudinal balance is desired because of varying line loss characteristics from the ICU to SLTs depending on user conditions, observe the following procedure:
 - (i) Originate an ICM call from the SLT whose circuit requires adjustment to the key telephone whose microphone is turned off.

- (ii) Connect a longitudinal balance test set between Tip and Ring at the ICU end (MDF) of the SLT cable.
- (iii) Put the SLT handset on the hook switch.
- (iv) Turn the balance potentiometer until the test set meter reading is minimized.

(5) Operating procedure

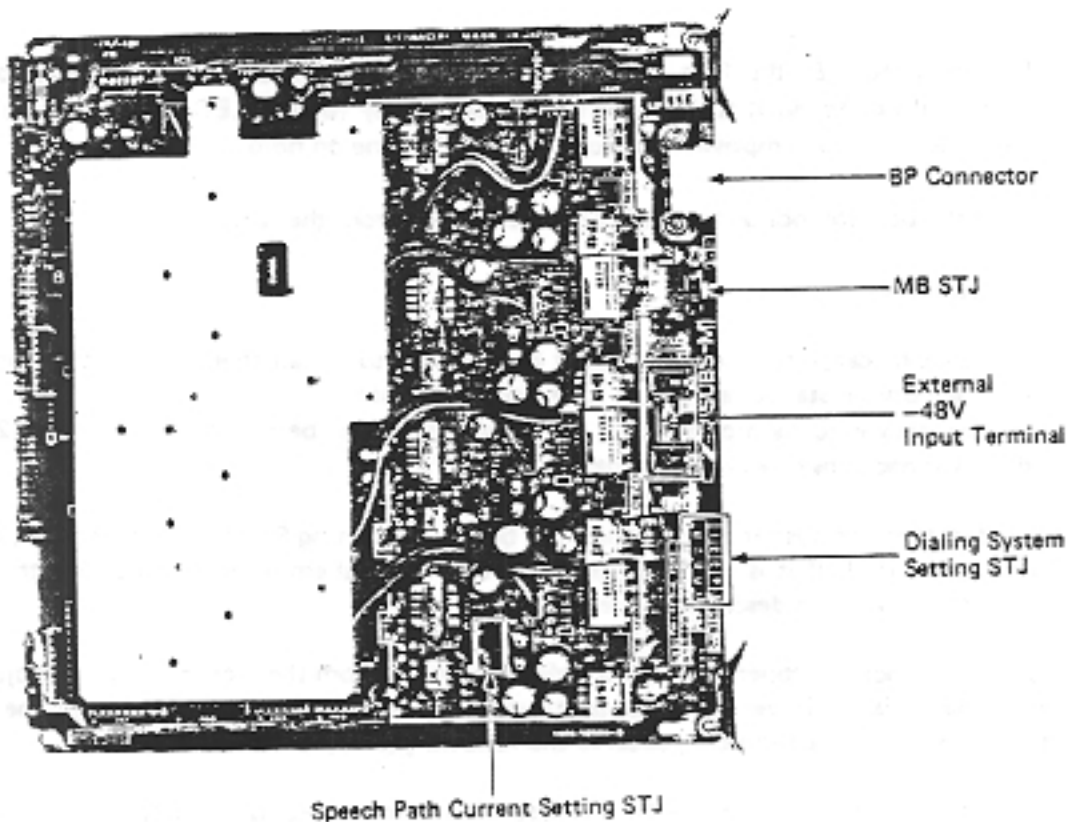
None

3.6.2.4.3.3 SUBS-M1 (Single-Line Telephone Subscriber-M1)

(1) Outline

48V power can be used for the speech path for SLTs by installing the SUBS-M1 card, accordingly a long-line SLT can also be connected.

Be sure to use this SUBS-M1 card when connecting a device other than telephones to the terminal.

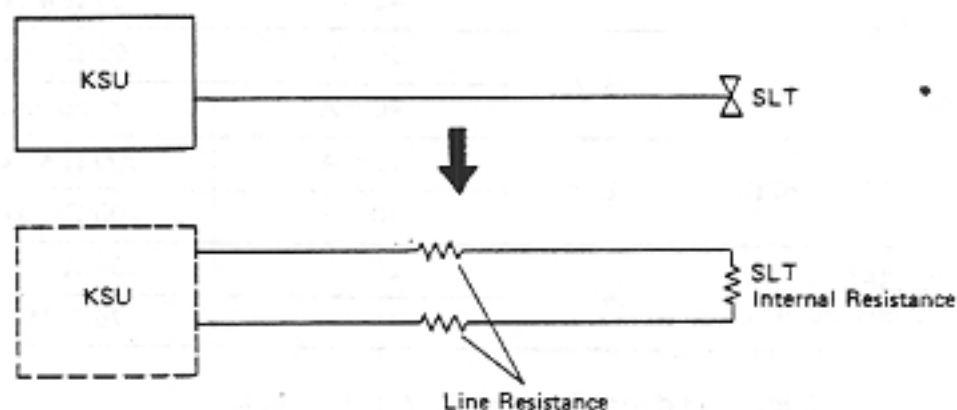


External View of SUBS-M1 Card

(2) Ratings

When connecting an SLT

(a) The line resistance for the SLT and ratings for the SLT are as follows:



The loop resistance is the sum of each line resistance and SLT's internal resistance.

Voltage	Speech Path	Loop Resistance
48 V	26 mA	1200 Ω Max.
	40 mA	600 Ω Max.
24 V	26 mA	600 Ω Max.
	40 mA	350 Ω Max.

If the SLT's internal resistances are assumed as follows as examples, the following line resistance (One-way) can be obtained.

SLT Dial Type	Internal Resistance
DTFM (2500 type)	400 Ω
PULSE (10 pps, 20 pps) (500 type)	200 Ω

Max. Line Resistance (One way)

SLT Dial Type	Voltage	Speech Path Current	Line Resistance
DTMF	48 V	26 mA	400 Ω Max.
		40 mA	100 Ω Max.
	24 V	26 mA	100 Ω Max.
		40 mA	Not applicable
PULSE (10 pps)	48 V	26 mA	500 Ω Max.
		40 mA	200 Ω Max.
PULSE* (10 pps, 20 pps)	24 V	26 mA	200 Ω Max.
		40 mA	75 Ω Max.

*Caution: 20 pps pulse dialing is not applicable in Canada.

Either the DTMF or PULSE system is used for SLT dialing and can be assigned to each line individually.

20 pps pulse dialing, however, can not be used when 48 V power is applied to the speech path.

Dialing System	Power Supply	
	24 V	48 V
DTMF	Yes	Yes
PULSE, 10 pps	Yes	Yes
PULSE, 20 pps	Yes	No

(b) When connecting a device other than SLTs

This card is available when accommodating a private line, OPS line, tie line or repeater on the extension side.

The loop resistance is restricted in the same manner as when an SLT is connected.

The 20 pps pulse dialing cannot be used when 48 V power is applied as in the case when an SLT is connected.

Caution: There are following restrictions in addition to the above.

- A. Be sure to solely ground the GND terminal of the KSU, otherwise terminal unit may not operate normally. Refer to item 3.5 for grounding.
- B. No polarity reversing occurs when receiving a call.
- C. No polarity reversing or momentary interruption of the loop during conversation.

(3) Setting

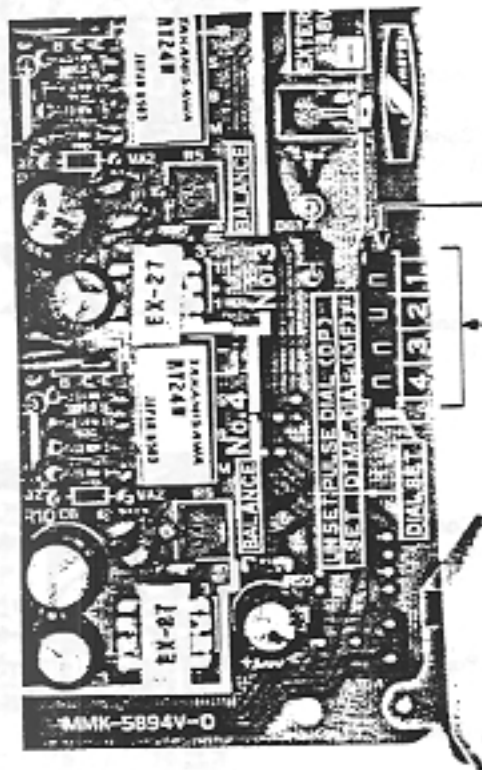
The dialing system and loop current are selected by the setting on the card.

(a) Setting of the dialing system

Setting is made by the STJ on the front of the card.
Setting can be made on each line individually.

STJ	Dialing System
Set	DTMF
Unset	PULSE 10 pps, 20 pps

All STJs are mounted and set to the DTMF system when shipped from the factory.



Dial System Setting STJ

The smallest number among the extension numbers assigned to the slots on which the card are mounted corresponds to 1.

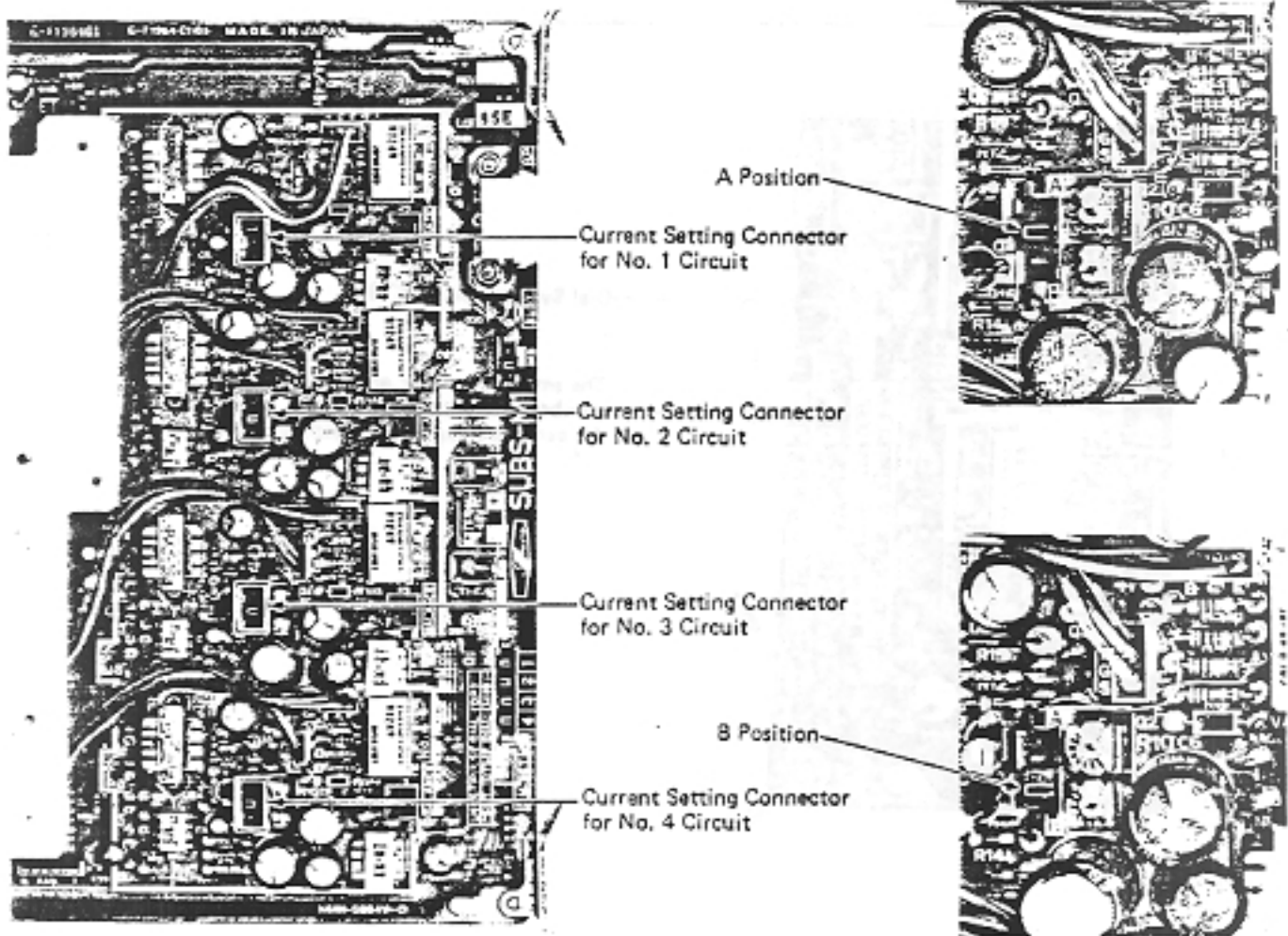
(b) Setting of the loop current (speech path current)

Setting is made by each STJ on No. 1 to No. 4 circuits on the front of the card.

Setting can be made on each line independently.

STJ Position	Loop Current
A	26 mA
B	40 mA

All STJs are set to the A position when shipped from the factory.



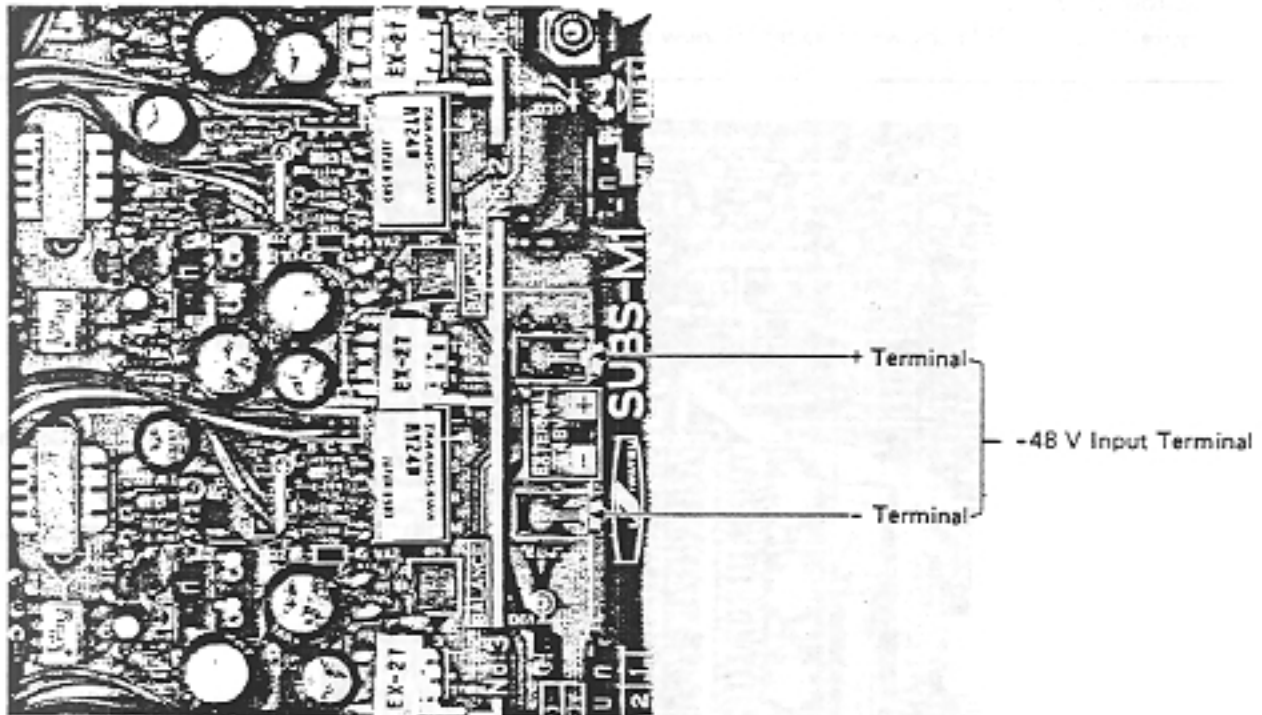
(4) Speech path power

This card uses either -24 V power within the ICU or -48 V power to be applied from the outside as the power supply to the speech path.

Switching between the KSU internal power and externally applied power is made automatically.

Connection of external -48 V power

Connect to the screw terminal on the front of the card as shown in the figure below.



Note: The + terminal is grounded through the inside of the ICU.

3.6.2.4.4 DSS-M, DSS-N and BLF Circuit Card

The EX-824/1648 system has DSBF-M as the interface circuit card for DSS-M, DSS-N and BLF-M.

3.6.2.4.4.1 DSBF-M (DSS and BLF Interface Card-M)

(1) General

DSBF-M is the interface unit for EX-Direct Station Selection-M (DSS-M) or EX-Direct Station Selection-N (DSS-N) and EX-Busy Lamp Field Unit-M (BLF-M), and can interface two DSS-Ms or DSS-Ns and four BLF-Ms.

Figure 3.6.2.4.4.1(1) shows an external view of the DSBF-M.

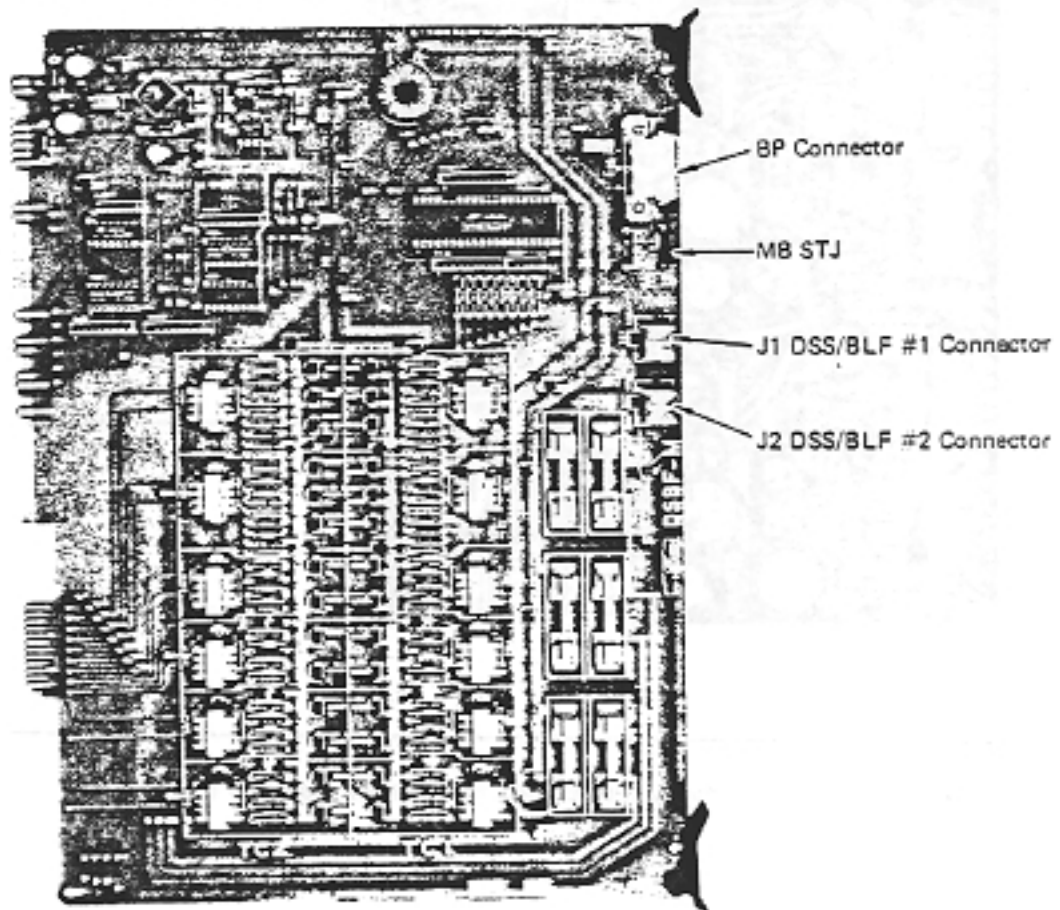


Figure 3.6.2.4.4.1(1) External View of DSBF-M

(2) On-board setting

Verify that the MB STJ is not on the MB side.

MB STJ If this MB STJ is set to MB, the DSS/BLF cannot be used. Remember that, in this case, indications by the DSS/BLF are not always correct.

(3) Installation precautions

- (a) If a fuse has blown due to a wiring error, check for the cause before replacing it with one of the same rated amperage (0.3 A). Also remember that the circuit card must be removed from the ICU before replacing a blown fuse.
- (b) Only one DSBF-M can be installed per system. It must be installed in the prescribed slot (see Figure 3.6.2.2(1)), never in any other slot.
- (c) It is suggested that the system be switched off before extracting this unit from, or inserting it in, the ICU. If it is necessary to extract or insert it without switching the system off, observe the procedure described in Section 3.6.2.2.

(4) Operating procedure

DSS-M or DSS-N. Some users, however, may not install a DSS-M or DSS-N in the system. In such a case, the installer can program software by simply installing DSBF-M in the ICU and connecting a DSS-M or DSS-N to modular jacks J1 and J2 on the DSBF-M card. If a DSS-M or DSS-N is installed in the normal way, the DSS-M or DSS-N must not be directly connected from DSBF-M unless the installed DSS-M or DSS-N is disconnected from the system.

3.6.2.5 Other Optional Cards

3.6.2.5.1 General

The EX-824/1648 system can be equipped with any of the following optional units in the ICU for additional functions:

- (1) VSCU-M (Voice Synthesizer Control Unit-M)
- (2) RGNT-M (Ringing Generator Unit for SLT-M)
- (3) SCDR-M (Station Call Detail Recorder-M)
- (4) ZPAG-M (Zone Paging Unit-M)
- (5) RINGA-M (Loud Ringer Adaptor-M)
- (6) RECV-M (DTMF Receiver Unit-M)
- (7) ERCV-M (Expanded DTMF Receiver Unit-M)
- (8) CONF-M ERCV-M (Conference Trunk-M)

3.6.2.5.2 VSCU-M (Voice Synthesizer Control Unit-M)

(1) General

VSCU-M synthesizes voices for the EX-824/1648 system to provide various kinds of voice services. One VSCU-M unit has two synthesized sound output circuits, both of which can be used simultaneously. Figure 3.6.2.5.2(1) shows an external view of the unit.

(2) On-board setting

Verify that the MB STJ is not on the MB side.

MBSTJ

When this STJ is set to MB, the VSCU-M becomes unusable. If it is set to MB when the VSCU-M is operating (BUSY LED is on), the sound may be disconnected. Normally keep the STJ in the position opposite to MB.

It is originally set to the position opposite to MB before shipment from the factory.

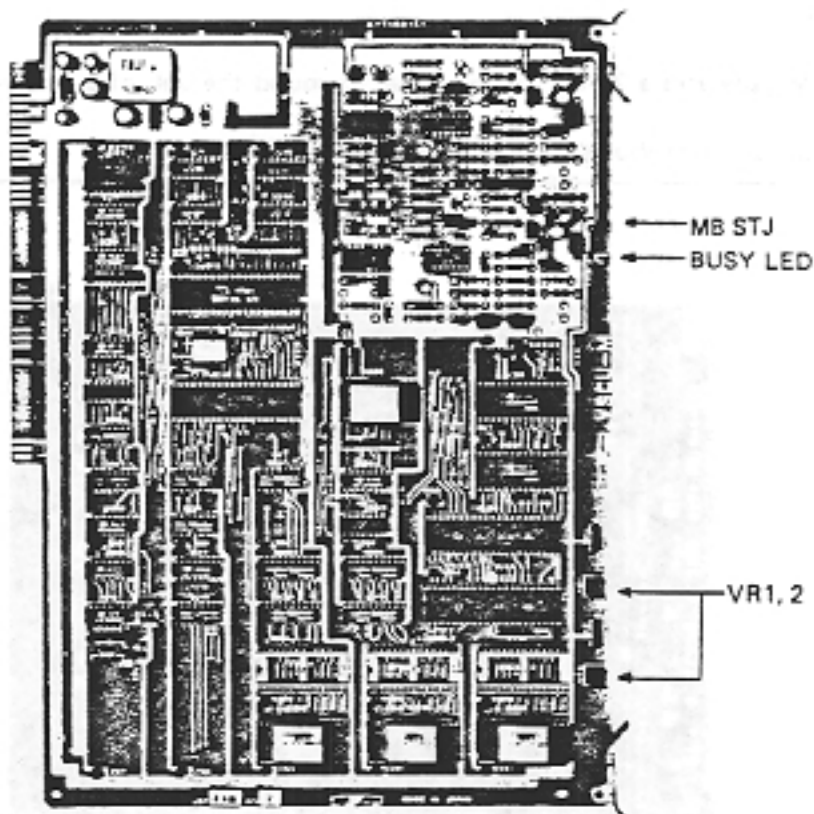


Figure 3.6.2.5.2(1) External View of VSCU-M

(3) Installation precautions

- (a) VR1 and VR2 are synthesized voice volume controls. These are preset to an appropriate level before shipment from the factory, and can be adjusted as desired by the user.
- (b) Only one VSCU-M can be installed per system. It must be installed in the prescribed slot (see Figure 3.6.2.2(1)), never in any other slot.
- (c) Switch the system off before extracting the unit from or inserting it in, the ICU. It cannot be removed or inserted without switching the system off.
- (d) SP1 and SP2 are for factory adjustment only, and cannot be used by the user.

(4) Operating procedure

None

3.6.2.5.3 RGNT-M (Ringing Generator Unit for SLT-M)

(1) General

RGNT-M generates a 20-Hz ringing signal to sound the bell of a single-line telephone used as an extension.

Figure 3.6.2.5.3(1) shows an external view of RGNT-M.

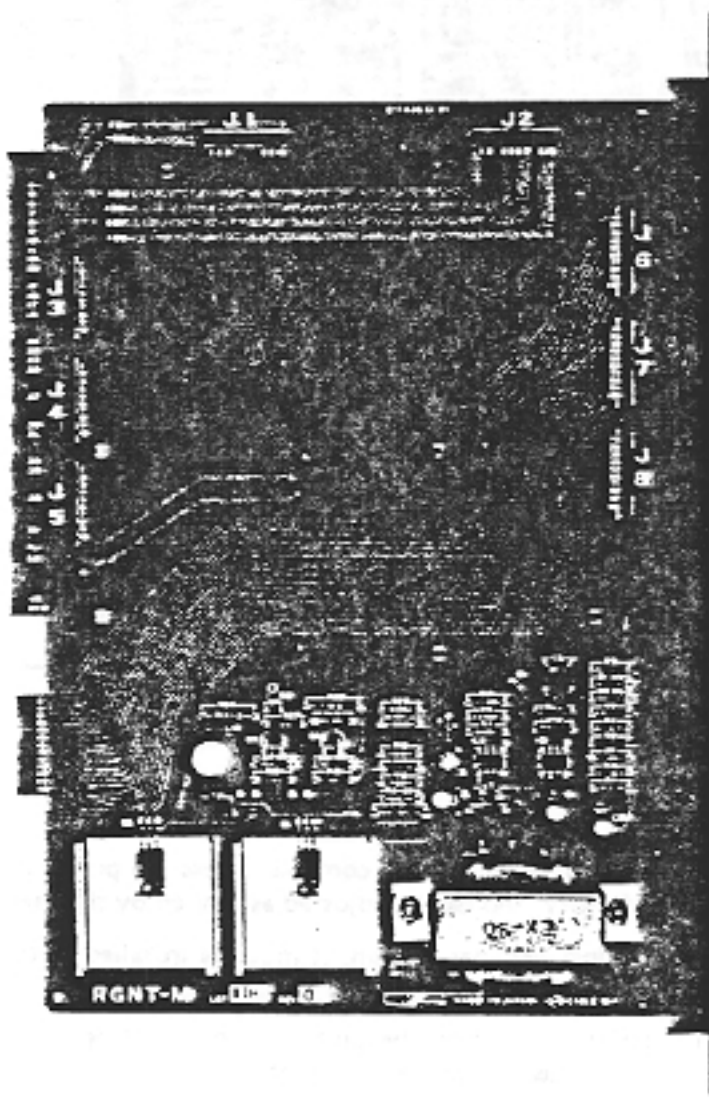


Figure 3.6.2.5.3(1) External View of RGNT-M

(2) On-board setting

None

(3) Installation precautions

- (a) Only one RGNT-M card can be installed per system. It must be installed in the prescribed slot (see Figure 3.6.2.2(1)), never in any other slot.
- (b) Switch the system off before extracting the unit from, or inserting it in, the ICU. The unit cannot be removed or inserted without switching the system off.
- (c) J1 through J8 are provided for optional units that may have to be installed to expand the functions in the future.

(4) Operating procedure

None

3.6.2.5.4 SCDR-M (Station Call Detail Recorder-M)

(1) General

The station call detail recorder card provides control and interface circuits to output various data on CO/PBX line usage to external devices. Output data can be used for various office management functions such as traffic analysis and unauthorized call verification.

It is also used in printing out the customer data stored in the memory IC on the RAMU-M1 card.

The EX-824/1648 system has only one slot in the ICU for SCDR-M.

Figure 3.6.2.5.4(1) shows the SCDR-M card.

SCDR-M has one circuit for an interfacing terminal.

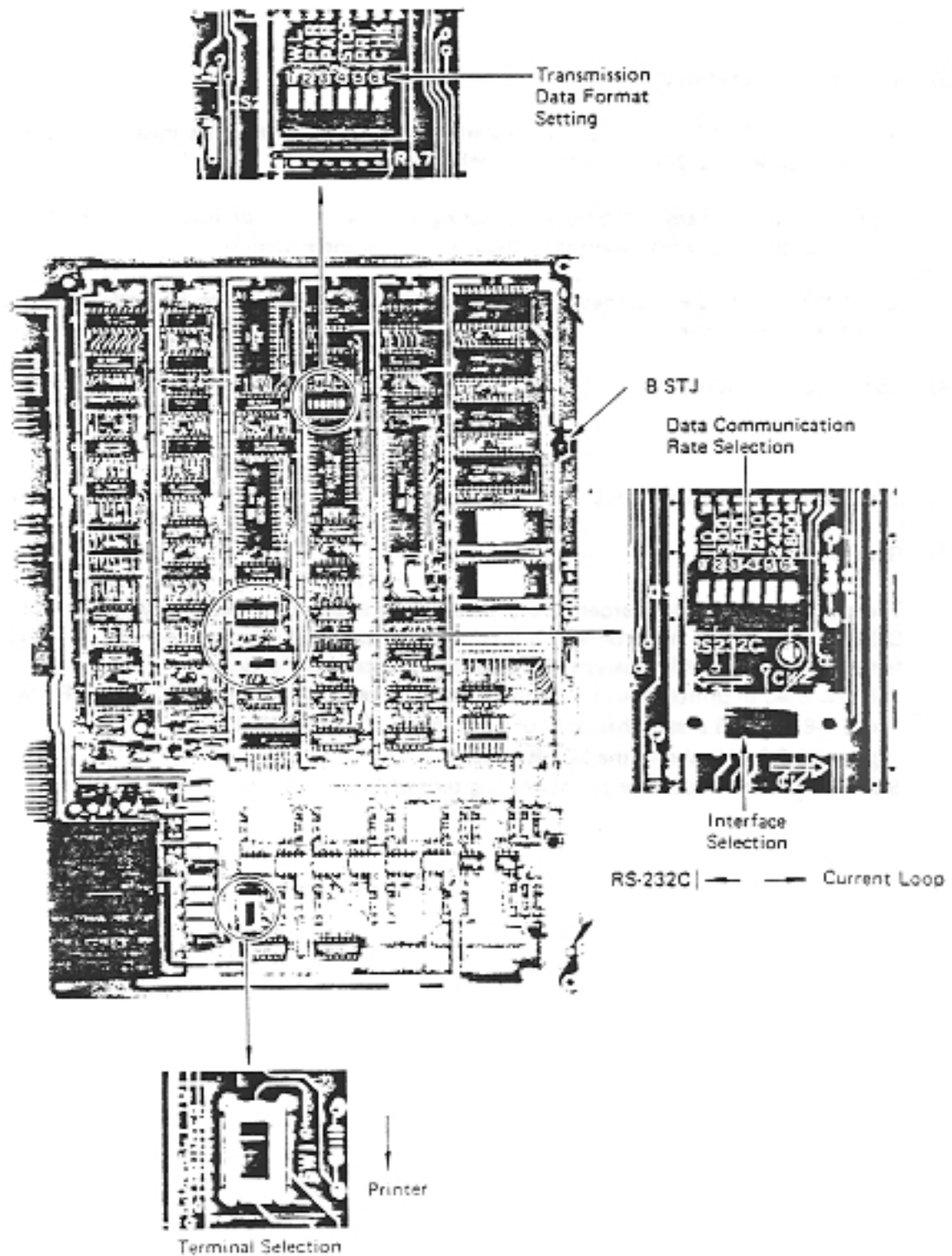


Figure 3.6.2.5.4(1) External View of SCDR-M

(a) Terminal setting

(i) Terminal selection

Terminal selection switches select the type of external device.

Set the switches to PRNTR if the terminal is a printer, or to the other if the terminal is a modem.

(ii) Interface selection

Interface selection switches select the type of interface circuit between the SCDR-M and external terminal.

Set the switches to RS-232C if an EIA standard RS-232C interface is used, or to CL if a 20-mA DC current loop is used.

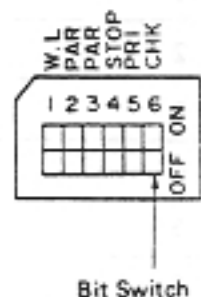
(iii) Transmission data format setting

Transmission data format setting DIP switches select the data format for transmission between the SCDR-M and external terminal.

Table 3.6.2.5.4(2)(a)(iii) shows the DIP switches and the functions associated with their positions.

Table 3.6.2.5.4(2)(a)(iii)

Bit Switch	Setting Item	OFF	ON
1	WL	7 bits	8 bits
2	PAR	Enable	Disable
3	PAR	Even	Odd
4	STOP	1 bit	2 bits
5	PRI	--	--
6	CHK	--	--

**Notes:**

The items to be set are detailed below.

1. Bit No. 1: WL (Word Length)

Bit switch 1 selects the word length per transmission (7 bits or 8 bits).

2. Bit No. 2: PAR (Parity Enable)

Bit switch 2 selects "parity generate" and "parity check." When the switch is at OFF (Enable), a parity bit is automatically added (during transmission) or deleted (during reception). When the

switch is at ON (Disable), parity bit is disregarded.

3. Bit No. 3: PAR (Parity Check)

This switch is effective only when Bit No. 2 is at Off (Parity Enable). It selects even or odd parity for "parity generate" and "parity check."

OFF: Even parity

ON: Odd parity

4. Bit No. 4: STOP (Stop Bit)

Bit No. 4 selects one stop bit or two stop bits.

5. Position switches 5 and 6 must be kept in the OFF position.

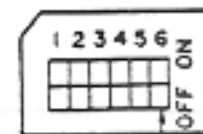
(b) Data communication rate selection

This DIP switch selects the data communication rate between the SCDR-M and terminal. Set the switch corresponding to the rate prescribed for the terminal.

Table 3.6.2.5.4(2)(b)A shows positions versus rates. Only one switch may be set ON.

Table 3.6.2.5.4(2)(b)A

Bit Switch	Position	Data Communication Rate (Bits/Second)
1	110	110
2	330	300
3	600	600
4	1200	1200
5	2400	2400
6	4800	4800



Bit Switch

Caution:

Only one of them may be set to ON. Do not set two or more switches to ON simultaneously.

Notes:

- The terminal settings described above vary with the type of terminal used. Read the specifications or manual for the terminal used, and set the interface conditions correctly. The term "baud rate" may be used instead of "data communication rate."
- The factory settings are shown in Table 3.6.2.5.4(2)(b)B.

Terminal Selection	Printer
Interface Selection	RS-232C
Format Setting	
Word Length	7 bits
Parity Enable	Enable
Parity Check	Even
Stop Bit	1 bit
Data Communication Rate	300 b/s

(c) Forced busy

Verify that the MB STJ is not on the MB side.

If MB STJ is set to MB, SCDR-M becomes unusable. If it is set to MB while the printer is printing, data errors can occur. Make sure that the printer or other external devices are not operating before setting the MB STJ to MB.

(3) Installation precautions

- (a) On-board settings, if necessary, must be finished before installation.
- (b) Only one SCDR-M card can be installed per system in a dedicated mounting position. (see Figure 3.6.2.2(1)). Do not insert it in any other slot.
- (c) Connect the external terminal to the EIA-type 25-position D-sub connector of the right side panel of the EX-824/1648 common module. (see Figure 3.6.2.5.4 (3)(c).)

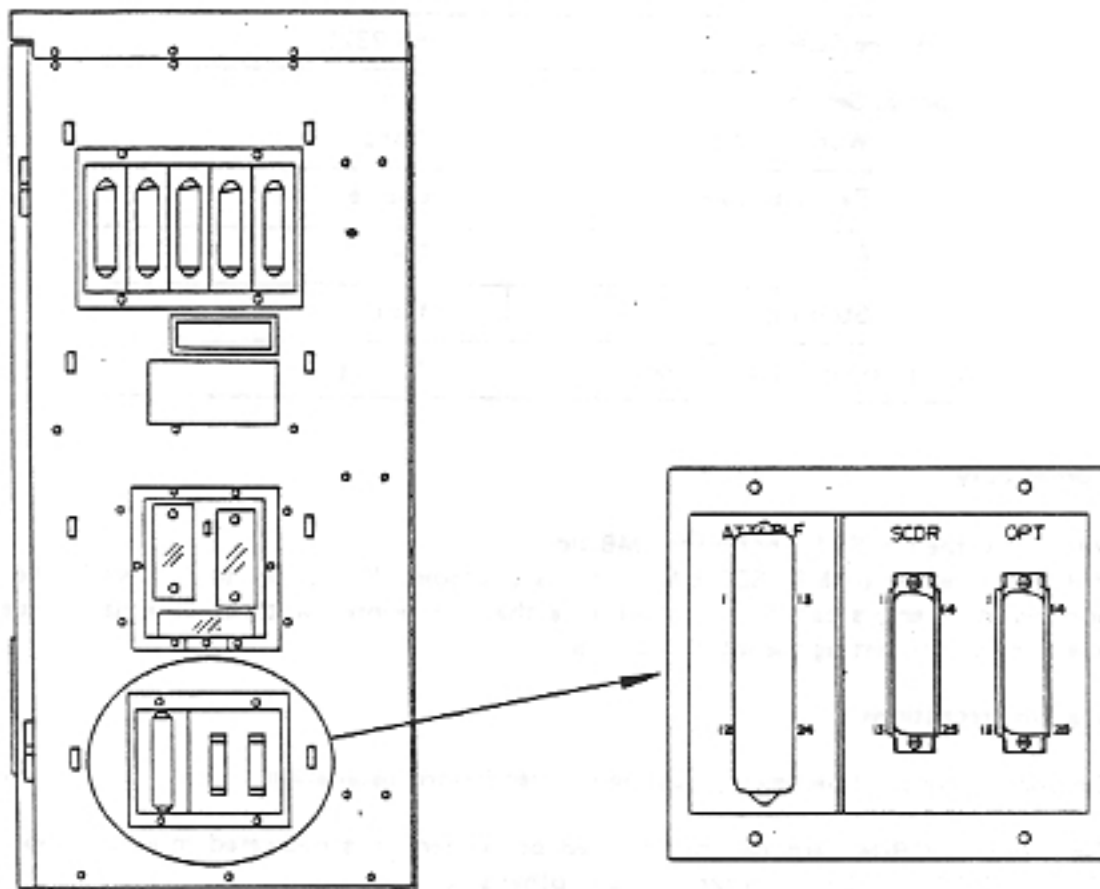


Figure 3.6.2.5.4(3)(c)

Note: When a terminal is connected to the connector tighten the lock screw to prevent disengagement.

(4) Operating procedure

The procedure for changing printing paper is described below.

- (a) Before changing the paper, press the **S** key.

The printer prints:

- STOP

and stops.

*Note: If the **S** key is pressed during printing, the printer stops after finishing the line being printed.*

- (b) After changing the printer paper, press the **S** key again so the printer prints out a tear line, data, page number, and header to start a new page, as shown in Figure 3.6.2.5.4(4)(b). If output data are stored in the buffer during paper replacement, the printer also prints out the stored data. Page and SEQ numbers are serial from those of the old paper.

DATE: 3/10							PAGE 001	
SEQ	TRK	EXT1	EXT2	TIME	DUR	CALLED NUMBER	ACCT NO.	NOTE
001	7	26	25	10:16A	0:01	2349876	123456	0A

Figure 3.6.2.5.4(4)(b) SCDR Output Format

Note: If you wish to output the next data without the page start processing shown in Figure 3.6.2.5.4(4)(b) after changing the printing paper, press the ***** and **RETURN** keys.

3.6.2.5.5 ZPAG-M (Zone Paging Unit-M)

(1) General

ZPAG-M divides the overhead speakers into a maximum of three groups, and controls paging with external amplifiers on a zone-by-zone basis. In addition to paging control, ZPAG-M also controls background music zone by zone. Figure 3.6.2.5.5(1) shows an external view of ZPAG-M.

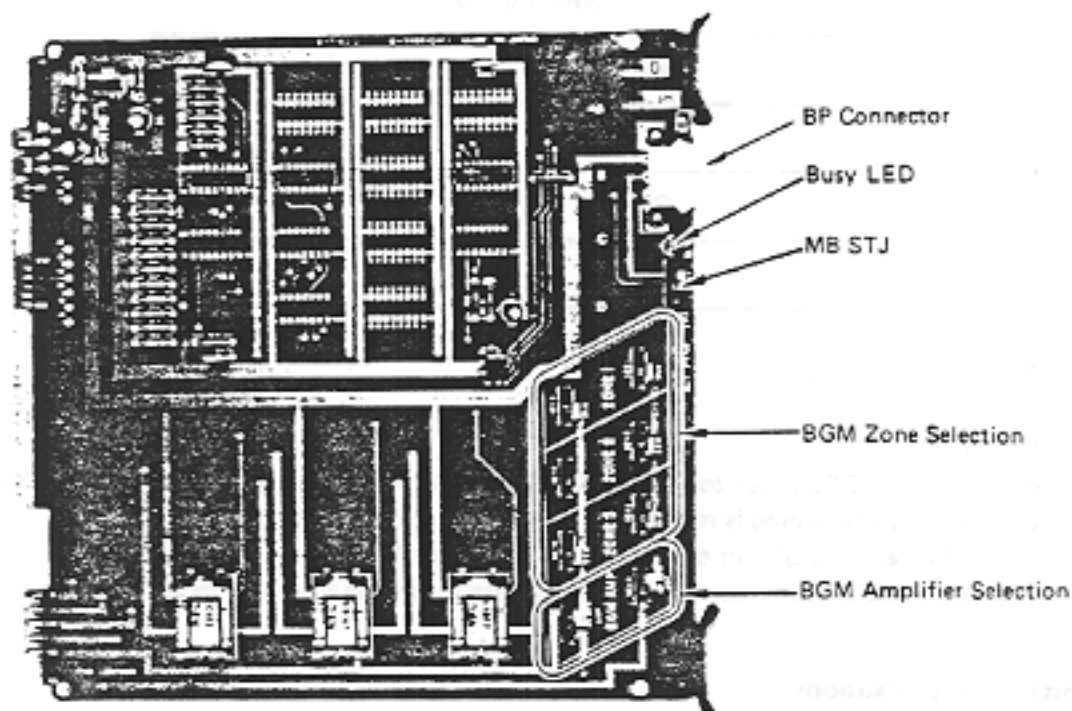


Figure 3.6.2.5.5(1) External View of ZPAG-M

(2) On-board setting

(a) Background music amplifier selection

The ZPAG-M unit is basically designed to use two external amplifiers for paging and background music. A single external amplifier can however, be shared for paging and background music.

Note: If a single external amplifier is shared for paging and background music, the zones to which background music is sent are accessed by a paging call even if it is intended to be sent to other zone. If the user finds this a nuisance, the choice is to have another external amplifier or dispense with background music.

In sharing a single external amplifier for paging and background music, both SET1 and SET2 require reconnection of strapping jacks (STJs) to NO BGM AMP. If only one of SET1 and SET2 is connected to NO BGM AMP, background music cannot be normally sent.

(b) Background music assignment

Background music can be assigned to any or all of the zones. To send background music, both strapping jacks for each zone shown in Table 3.6.2.5.5.2(b) must be reconnected to the BGM position.

Table 3.6.2.5.5.2(b)

Zone	Set
1	1, 2
2	3, 4
3	5, 6

(c) Forced busy

MB STJ

When the MS STJ is set to MB, ZPAG-M becomes unusable. If it is set to MB while the BUSY LED is on, zone paging is reset to the status of background music.

Normally keep the STJ in the position opposite to MB.

It is set to the position opposite to MB before shipment from the factory.

(3) Installation precautions

(a) On-board settings must be finished before installing the ZPAG-M card.

(b) Only one ZPAG-M can be installed per system. It must be installed in the prescribed slot (see Figure 3.6.2.2(1)), never in any other slot.

(c) The paging amplifier input terminal, background music amplifier input terminal, and speaker output terminal for each zone are located together on the EDCT-M card, which is installed in the right part of the EX-824/1648 Common Module. For connecting external amplifiers to EDCT-M, refer to Section 3.4.6.

(d) It is suggested that the system be switched off before extracting the unit from, or inserting it in, the ICU. If it is necessary to extract or insert the unit without switching the system off, observe the procedure described in Section 3.6.2.2.

(e) The ratings of the relay contacts for speaker control are shown below. These relay contacts cannot directly control 120-VAC commercial power.

Switching voltage	48 VDC/30 VAC or less
Switching current	0.5 A or less
Switching power	25 VA or less

For control of the public address amplifier output, the following apply:

Amplifier Output Impedance	160 Ω or more
Speaker Line Voltage	100 VAC or less
Amplifier Output Power	100 W or less

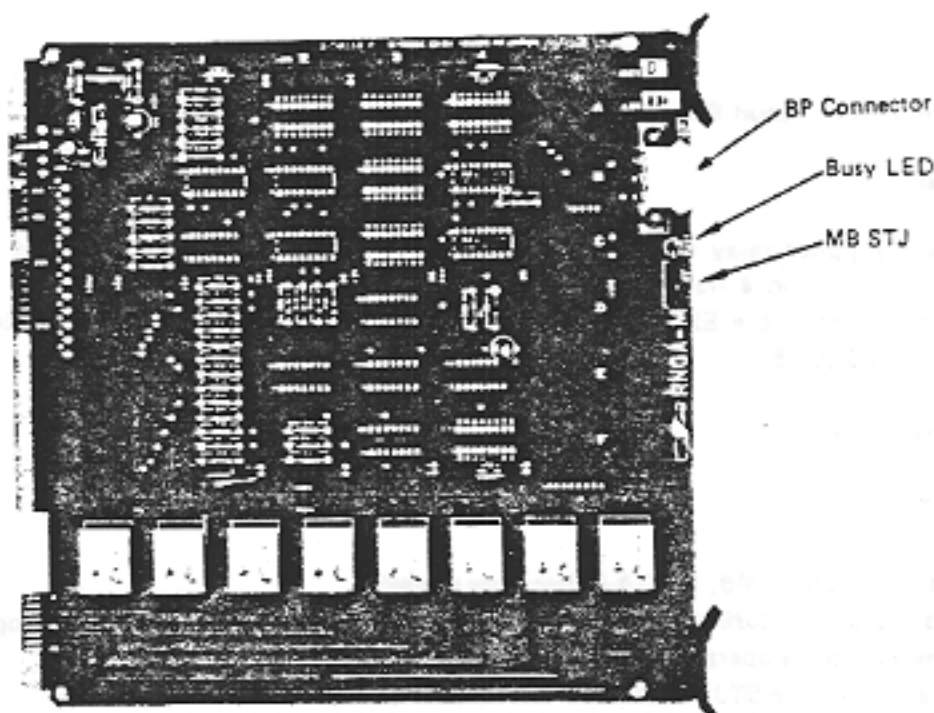


Figure 3.6.2.5.6(1) External View of RNGA-M

(3) Installation precautions

- (a) One or two RNGA-M cards can be installed per system. The one for CO1 through CO8 is installed in the Common Module, and the other for CO9 through CO16 is installed in the Expansion Module. The RNGA-M cards must be inserted in the prescribed slots (see Figure 3.6.2.2(1)), never in any other slots.
- (b) Loud ringer control relay contact outputs are connected to the loud ringer connector on the right side of the ICU. For connecting external bells and gongs, refer to Section 3.4.6.
- (c) It is suggested that the system be switched off before extracting the units from, or inserting them in, the ICU. If it is necessary to extract or insert the RNGA-M cards without switching the system off, observe the procedure described in Section 3.6.2.2.
- (d) The ratings of the relay contacts for controlling the external devices are shown in the table below;
120-VAC commercial power cannot be directly controlled.

Switching voltage	48 VDC/30 VAC or less
Switching current	0.5 A or less
Switching power	25 VA or less

The relay contacts are dry, and are not connected to others in the EX-824/1648 system. If an incoming CO call is received, these contacts repeat a cycle of 1 second on and 3 seconds off.

(4) Operating procedure

None

3.6.2.5.6 RNGA-M (Loud Ringer Adaptor-M)

(1) General

RNGA-M supplies relay contact to control external devices, such as bells and gongs, to receive incoming CO calls in a noise place. This unit controls eight ringer circuits.

Those mounted in the EX-824/1648 correspond to CO lines 1 to 8 and those in the EX-1648EM to CO lines 9 to 16.

(2) On-board setting

MG STJ

If this STJ is set to MB, RNGA-M becomes unusable.

If it is set to MB during incoming CO call access while external devices are in operation, the external devices may cease operation.

Normally keep the STJ in the position opposite to MB.

It is set to the position opposite to MB before shipment from the factory.

(4) Operating procedure

None

3.6.2.5.7 RECV-M (DTMF Receiver Unit-M)

(1) General

RECV-M receives DTMF signals from single-line telephones if the EX-824/1648 system uses type 2500 single-line telephones as extensions. One unit has two receiver circuits. An ERCV-M can be installed on this card, in which case the unit has four receiver circuits. Figure 3.6.2.5.7(1) shows an external view of the RECV-M.

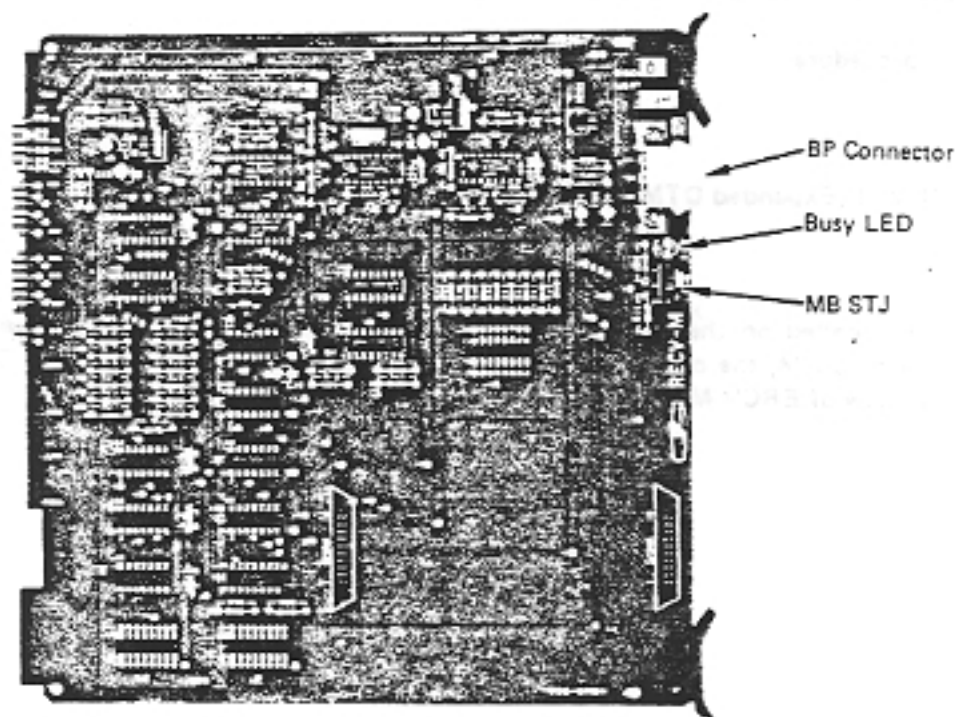


Figure 3.6.2.5.7(1) External View of RECV-M

(2) On-board setting

MG STJ

If this STJ is set to MB, RECV-M and the ERCV-M1 to be added to this card cannot be used simultaneously.

Remember, in particular, that DTMF dial single-line telephone cannot originate calls under this setting.

If the STJ is set to MB while the BUSY LED is on, a single-line telephone may be disconnected or dialing may be invalid.

Normally keep the STJ in the position opposite to MB.

It is set to the position opposite to MB before shipment from the factory.

(3) Installation precautions

- (a) One or two RECV-M cards can be installed per system. If type 2500 single-line telephones are used as extensions No. 20 through No. 44, RECV-M must be installed in the Common Module. If type 2500 single-line telephones are used as extensions No. 45 through No. 68, RECV-M must be installed in the Expansion Module. RECV-M must be installed in the prescribed slot (see Figure 3.6.2.2(1)), never in any other slot.
- (b) In installing an ERCV-M on the RECV-M card, make sure that it is securely engaged with the connector.
- (c) It is suggested that the system be switched off before extracting RECV-M from, or inserting it in, the ICU. If it is necessary to extract or insert it without switching the system off, observe the procedure described in Section 3.6.2.2.

(4) Operating procedure

None

3.6.2.5.8 ERCV-M (Expanded DTMF Receiver Unit-M)

(1) General

ERCV-M is installed on the RECV-M card. An ERCV-M has two DTMF receiver circuits; if it is installed on RECV-M, the card has a total of four DTMF receiver circuits. Figure 3.6.2.5.8(1) shows an external view of ERCV-M.

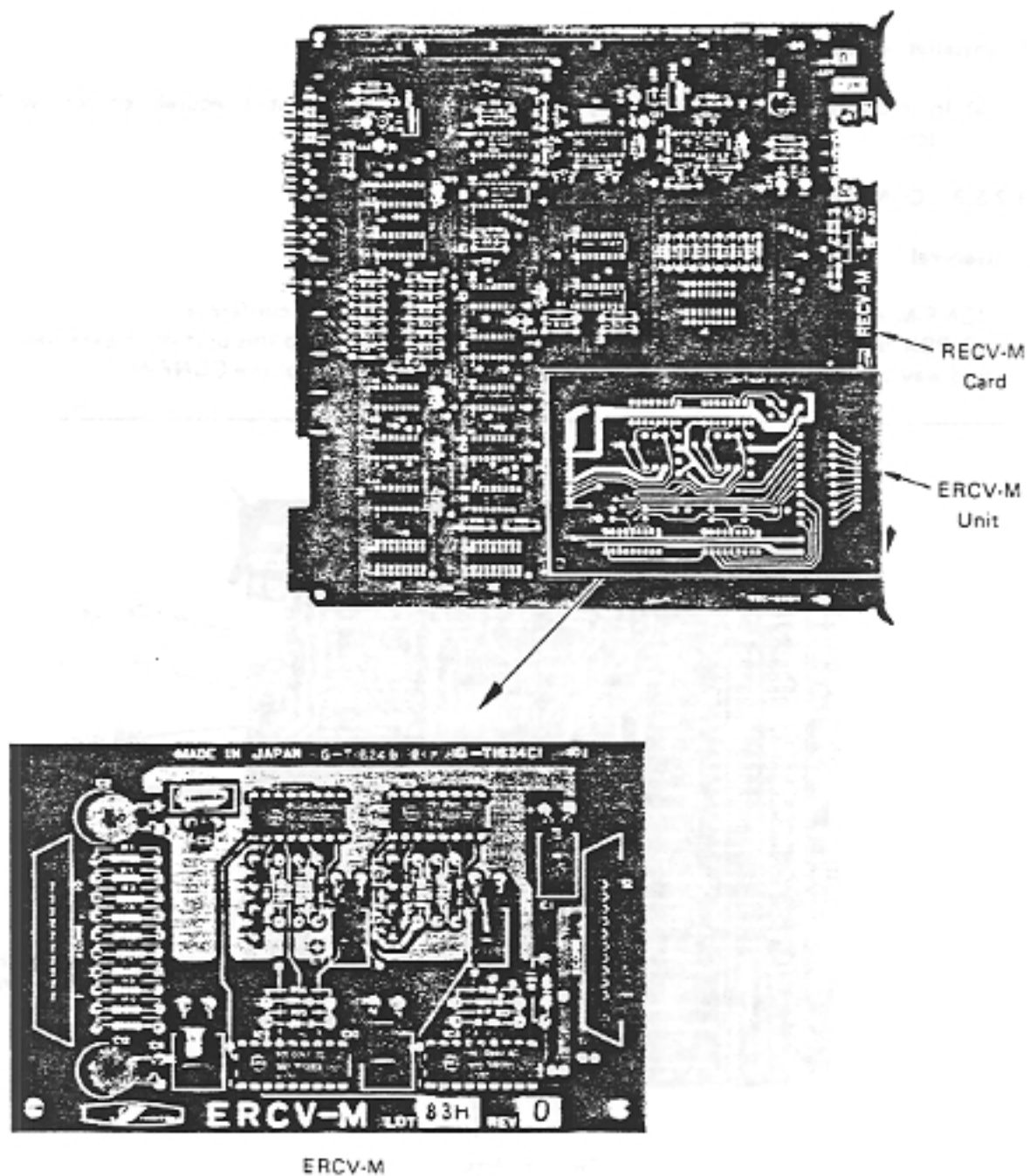


Figure 3.6.2.5.8(1) External View of ERCV-M

(2) On-board setting

None

(3) Installation precautions

- (a) In installing an ERCV-M on the RECV-M, make sure that it is securely engaged with the connector.

3.6.2.5.9 CONF-M (Conference Trunk-M)

(1) General

CONF-M is used for multi-trunk conferences and trunk-to-trunk conferences.

CO/PBX lines are connected to the two-way amplifiers built into this unit or to externally connected two-way amplifiers. Figure 3.6.2.5.9(1) shows an external view of the CONF-M.

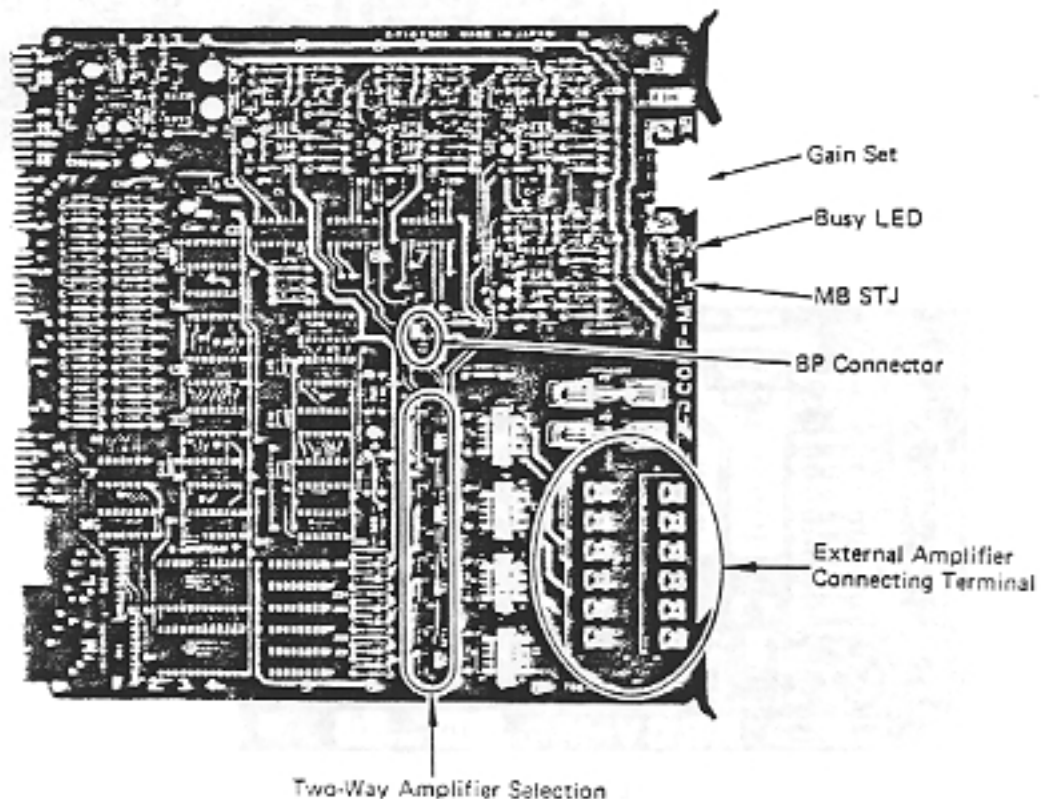


Figure 3.6.2.5.9(1) External View of CONF-M

(2) On-board setting

(a) Two-way amplifiers

CONF-M has two built-in two-way amplifiers, which compensate for line loss if CO/PBX lines are connected to each other. If CO/PBX line loss is too large to be compensated by the two built-in amplifiers, the user may use external two-way amplifiers to compensate for the line loss. The strapping jack positions for this purpose are shown in Table 3.6.2.5.9(2)(a). 1-2 jumper is original arrangement before shipment from the factory.

Table 3.6.2.5.9(2)(a)

Circuit No.	STJ No.	Built-in Amplifiers	External Amplifiers
1	SET 1, 2	1-2 Jumper	2-3 Jumper
2	SET 3, 4	1-2 Jumper	2-3 Jumper

Note: SET1 and SET2 (SET3 and SET4) must be connected on the same side. Normal operation cannot be expected if SET1 has 1-2 jumpered and SET2 2-3 jumpered, or vice versa. The same applies to SET3 and SET4.

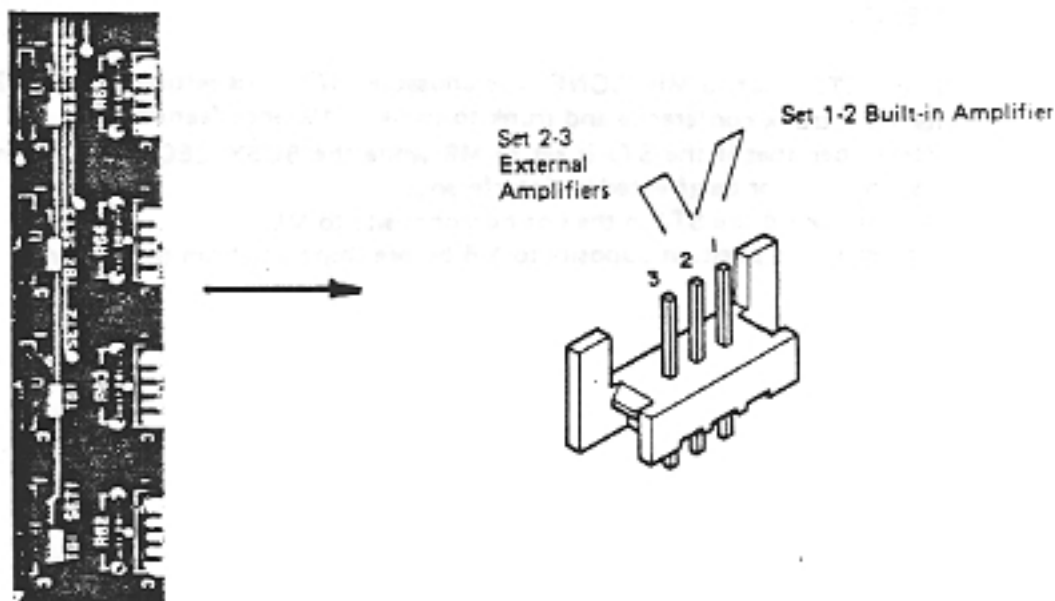


Figure 3.6.2.5.9.(2)(a) Two-Way Amplifier Selection

(b) Amplifier gain

If CO/PBX lines are not in normal condition, the two-way amplifiers may go out of balance, causing howling in a multi-trunk conference or trunk-to-trunk conference. In such a case, howling can be prevented by controlling the amplifier gain through reconnection of the strapping jack for SET5 to jumper 2-3.

Gain high is the original setting before shipment from the factory.

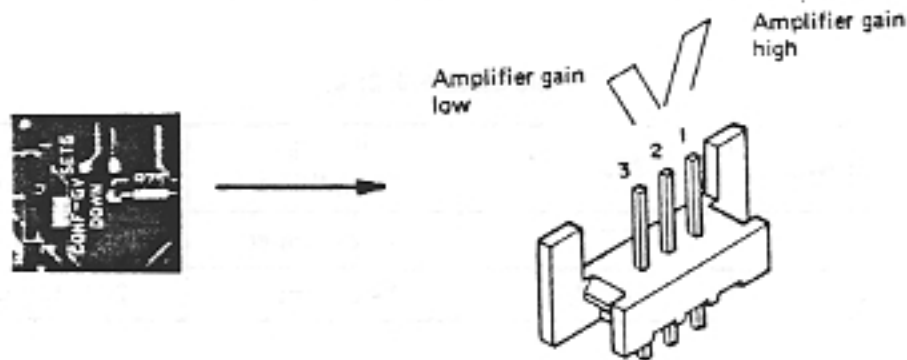


Figure 3.6.2.5.9.(2)(b) Built-in Two-Way Amplifiers Gain Selection.

(c) Forced busy

MB STJ

If the STJ is set to MB, CONF-M is unusable. With this setting, the EX-824/1648 system loses its multi-trunk conference and trunk-to-trunk conference features.

Remember that if the STJ is set to MB while the BUSY LED is on, a conference line may be disconnected or be affected by interference.

Normally keep the STJ in the position opposite to MB.

It is set to the position opposite to MB before shipment from the factory.

(d) External amplifier connection

In using two-way external amplifiers, connect them to the two 6-position terminal boards (TB1, TB2) on the front of CONF-M card.

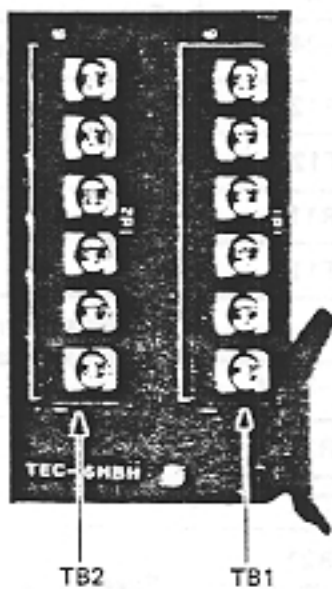
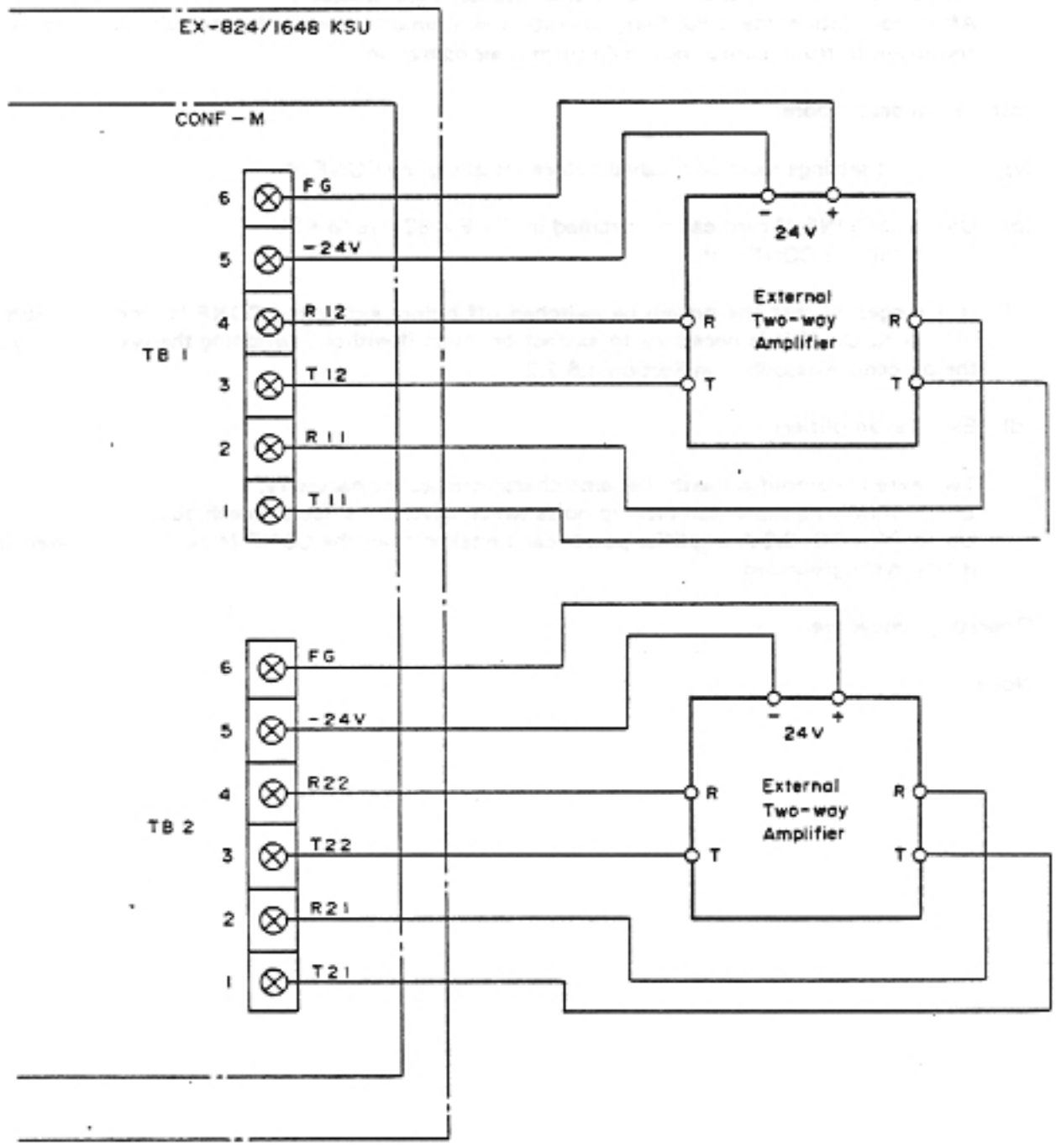


Figure 3.6.2.5.9.(2)(d) A External Amplifier Connection Terminal

The terminals on TB1 and TB2 are as shown below.

Terminal Board	Terminal No.	Symbol	Description
TB1	6	FG	Power supply of external amplifier External amplifiers with a capacity of 24 V, 0.2 A or less can be used.
	5	-24 V	
	4	R12	Speech path
	3	T12	
	2	R11	Speech path
	1	T11	
TB2	6	FG	Power supply of external amplifier External amplifiers with a capacity of 24 V, 0.2 A or less can be used.
	5	-24 V	
	4	R22	Speech path
	3	T22	
	2	R21	Speech path
	1	T21	

External amplifier connection



Use AWG24 or larger cables for connecting external amplifiers. Long connecting cables can pick up noise which adversely affects speech quality.

Two 2-way amplifiers with the same characteristics are necessary.

After connecting the amplifiers, operate them simultaneously for a multi-trunk conference and trunk-to-trunk conference to confirm their operation.

(3) Installation precautions

(a) On-board settings must be finished before installing the CONF-M.

(b) Only one CONF-M card can be installed in the EX-824/1648 KSU.
Insert it in the CONF slot.

(c) It is suggested that the system be switched off before extracting CONF-M from, or inserting it in, the KSU. If it is necessary to extract or insert it without switching the system off, observe the procedure described in Section 3.6.2.2.

(d) External amplifiers

Two external amplifiers with the same characteristics are necessary.

Long connecting cables can pick up noise which adversely affects speech quality.

Up to 24 VDC, 0.2 A amplifier power can be taken from the CONF-M card. This power supply is positively grounded.

(4) Operating procedure

None

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3.7 POWER FAILURE TRANSFER UNIT INSTALLATION

3.7.1 General

The PFXU-M (Power Failure Transfer Unit-M) transfers CO/PBX lines directly to single-line telephones, rather than via the ICU, in a power failure. One PFXU-M has eight power failure circuits, so up to two PFXU-M cards can be installed per system.

The telephone should correspond to the type of network signaling used in the system (i.e., DTMF dial telephones can only be used on DTMF-type lines).

3.7.2 Installation

3.7.2.1 Installation

An external view of the PFXU-M and its dimensions are shown in Figure 3.7.2.1. Mount the PFXU-M on a wall or the MDF board with screws. Temporarily fasten two screws about three-quarters of their length deep in a wall or the MDF board, 4.5 inches apart; hook the PFXU-M on the screws, and tighten another screw in the other hole in the PFXU-M. Last, securely tighten the two temporarily fastened screws. The installer must have suitable screws ready for these holes.

Install the PFXU-M within the length of the CBLD-F (DC Power Cable-F), which is appended to the PFXU-M, from the ICU because it must be connected to the ICU with that cable. The CBLD-F is about 9.8 feet long.

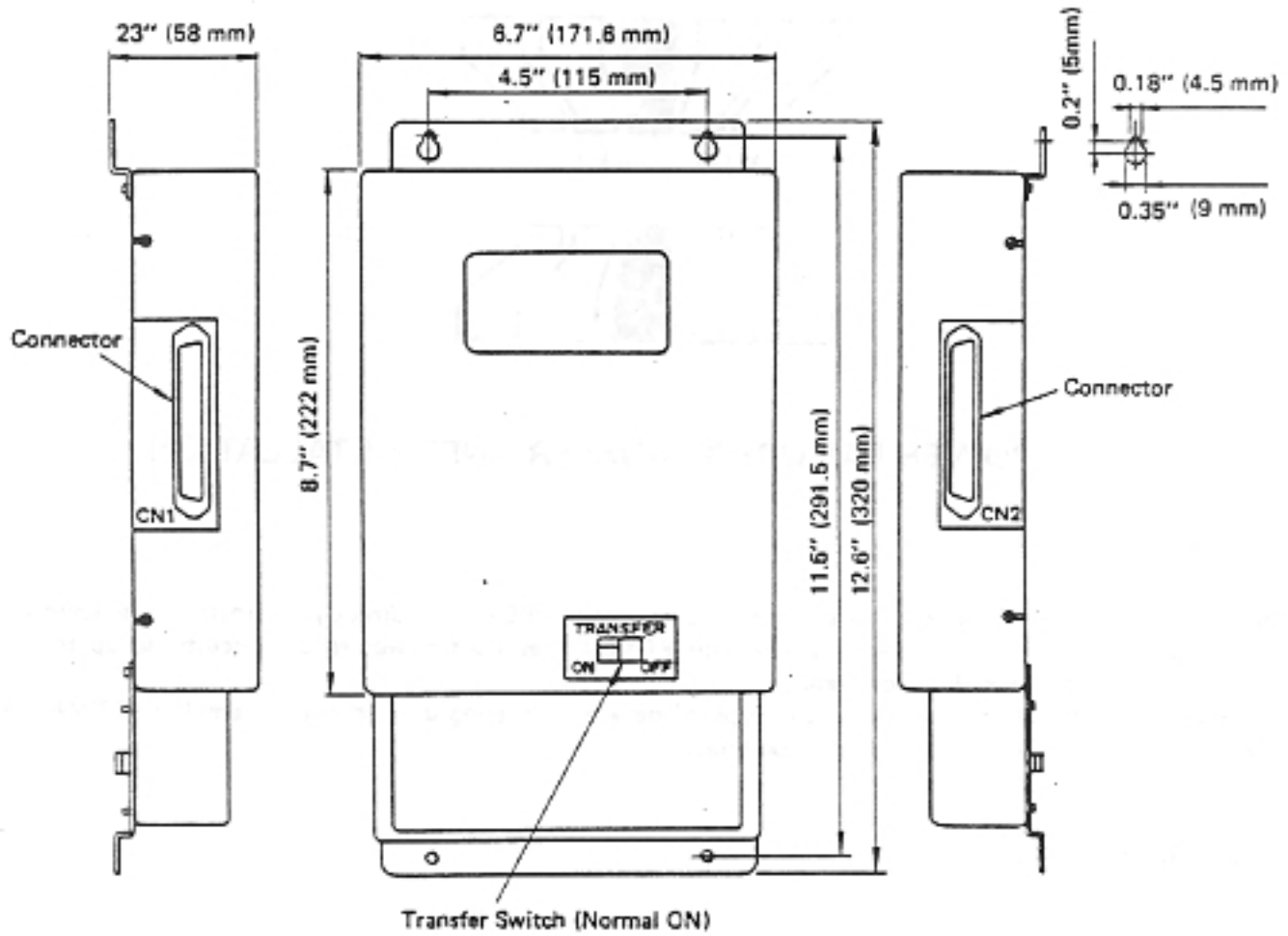


Figure 3.7.2.1 External View of PFXU-M

3.7.2.2 Power Supply

Power for the PFXU-M is supplied from the EX-816 MBD in the KSU through the CBLD-F appended to the PFXU-M. Figures 3.7.2.2A and 3.7.2.2B show how to connect the power cable.

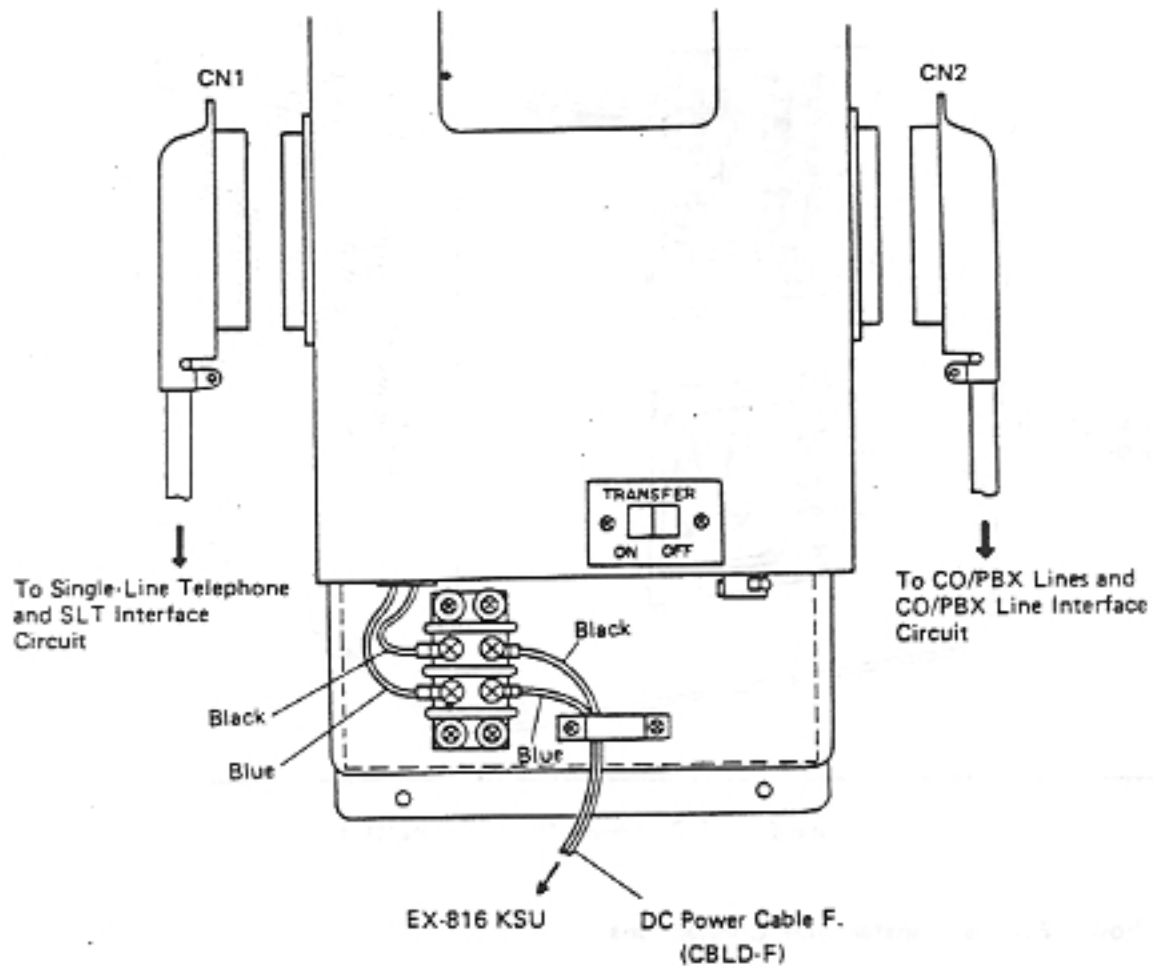


Figure 3.7.2.2.A Power Cable Connection (1)

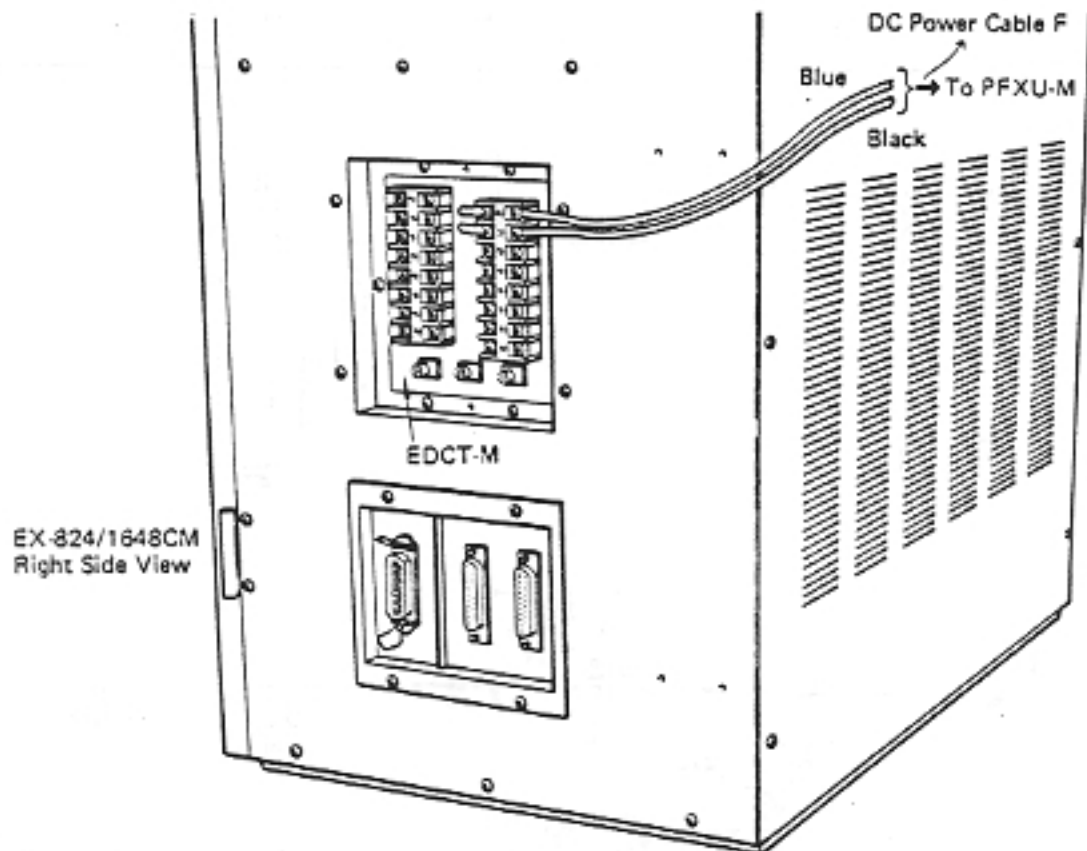


Figure 3.7.2.2.B Power Cable Connection (2)

3.7.2.3 Power Failure Transfer MDF Connections

- (1) Single-line telephone power failure transfer CO/PBX lines, single-line telephones (SLT), CO/PBX line interface circuits, and single-line telephones interface circuits are connected to the PFXU-M via three terminal blocks (TERM. BLK.). The PFXU-M has two connectors, CN1 and CN2, for connection to these TERM. BLK. CN1 connects to the single-line telephones and SLT interface circuits, and CN2 connects to the CO/PBX lines and CO/PBX interface circuits. Figure 3.7.2.3(1)A shows connection of the PFXU-M to CO/PBX lines, SLT, and CO/PBX line interface circuits. Use 25-pair, male, Amphenol-ended cables for connecting the PFXU-M to the terminal blocks. Figure 3.7.2.3(1)A shows connection of the PFXU-M to the TERM. BLK.

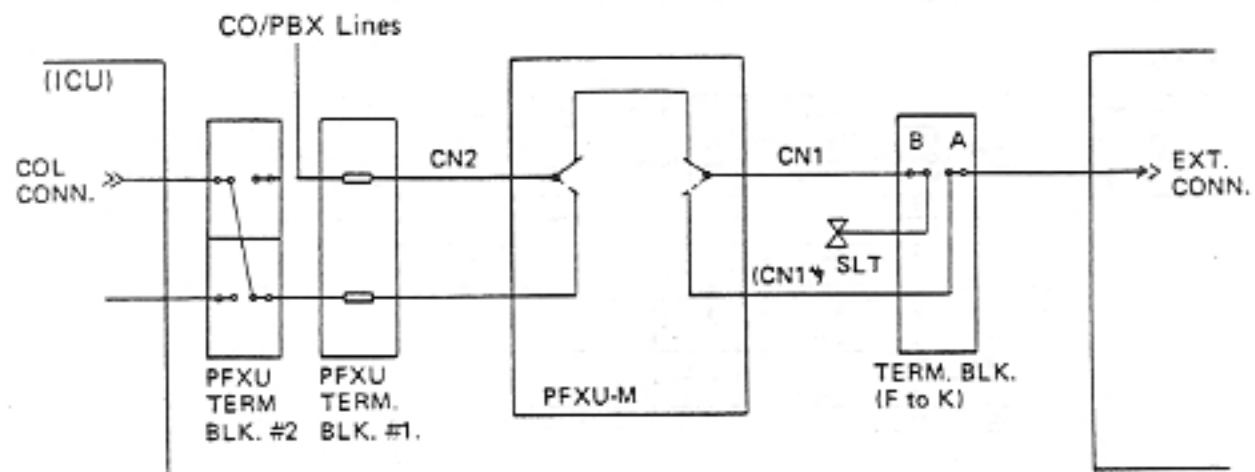


Figure 3.7.2.3(1)A SLT Power Failure Transfer

Note: Each TERM. BLK. (F through K) corresponds to one EXT CONN. This makes the total six. After cabling, secure the connectors with connector covers. (See Figure 3.7.2.3(1)B.)

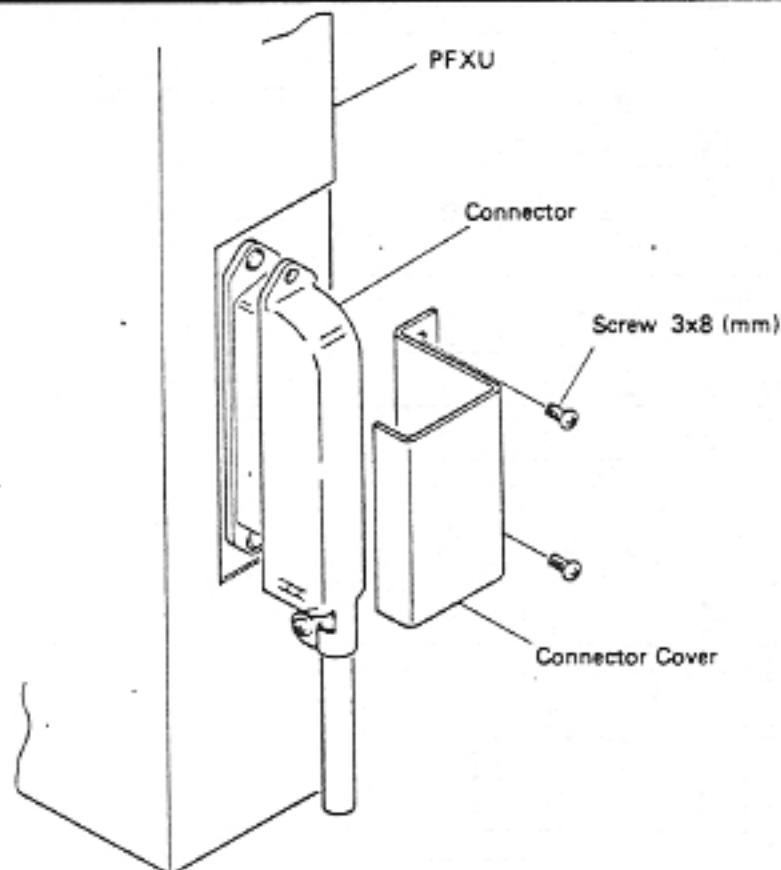


Figure 3.7.2.3(1)B

Table 3.7.2.3(1) PFXU-M Terminal Block Connections

PFXU-M EXT. T. BLK #J (J=1 to 6)

Function	ICU		Wall Jack		TERM. BLK. (F-K)		PFXU-M (CN1)		TERM. BLK. (F-K)		PFXU-M (CN1)		Designation	
	TERM. BLK. (F-K)		3 Pair Twisted Cable Wire Color	Pin No.	Pin No. A	Pin No. B	Cable Wire Color	CNI Pin No.	Pin No. A	Pin No. B	Cable Wire Color	CNI Pin No.		
	A	B												Cable Wire Color
SLT interface circuitry #1 to #8	SLT #1	WHT-BLU	28	WHT-BLU	1	1				1				
		BLU-WHT	1	BLU-WHT	2	2				2				
		WHT-ORN	27	WHT-ORN	3	3	YEL-GRN	43	3	WHT-BLU	28	T		
		ORN-WHT	2	ORN-WHT	4	4	GRN-YEL	18	4	BLU-WHT	1	R		
		WHT-GRN	28	WHT-GRN	5	5				5				
		GRN-WHT	3	GRN-WHT	6	6				6				
	SLT #2	WHT-BRN	29	WHT-BLU	1	7				7				
		BRN-WHT	4	BLU-WHT	2	8				8				
		WHT-SLT	30	WHT-GRN	3	9	YEL-BRN	44	9	WHT-GRN	28	T		
		SLT-WHT	5	ORN-WHT	4	10	BRN-YEL	19	10	GRN-WHT	3	R		
		RED-BLU	31	WHT-GRN	5	11				11				
		BLU-RED	6	GRN-WHT	6	12				12				
	SLT #3	RED-ORN	32	WHT-BLU	1	13				13				
		ORN-RED	7	BLU-WHT	2	14				14				
		RED-GRN	33	WHT-ORN	3	15	YEL-SLT	45	15	WHT-SLT	30	T		
		GRN-RED	8	GRN-WHT	4	16	SLT-YEL	20	16	SLT-WHT	5	R		
		RED-BRN	34	WHT-GRN	5	17				17				
		BRN-RED	9	GRN-WHT	6	18				18				
	SLT #4	RED-SLT	35	WHT-BLU	1	19				19				
		SLT-RED	10	BLU-WHT	2	20				20				
		BLK-BLU	36	WHT-ORN	3	21	VIO-BLU	46	21	RED-ORN	32	T		
		BLU-BLK	11	GRN-WHT	4	22	BLU-VIO	21	22	ORN-RED	7	R		
		BLK-ORN	37	WHT-GRN	5	23				23				
		ORN-BLK	12	GRN-WHT	6	24				24				
	SLT #5	BLK-GRN	38	WHT-BLU	1	25				25				
		GRN-BLK	13	BLU-WHT	2	26				26				
		BLK-BRN	39	WHT-ORN	3	27	VIO-ORN	47	27	RED-BRN	34	T		
		BRN-BLK	14	GRN-WHT	4	28	ORN-VIO	22	28	BRN-RED	9	R		
		BLK-SLT	40	WHT-GRN	5	29				29				
		SLT-BLK	15	GRN-WHT	6	30				30				
	SLT #6	YEL-BLU	41	WHT-BLU	1	31				31				
		BLU-YEL	16	BLU-WHT	2	32				32				
		YEL-ORN	42	WHT-ORN	3	33	VIO-GRN	48	33	BLK-BLU	36	T		
		ORN-YEL	17	GRN-WHT	4	34	GRN-VIO	23	34	BLU-BLK	11	R		
		YEL-GRN	43	WHT-GRN	5	35				35				
		GRN-YEL	18	GRN-WHT	6	36				36				
	SLT #7	YEL-BRN	44	WHT-BLU	1	37				37				
		BRN-YEL	19	BLU-WHT	2	38				38				
		YEL-SLT	45	WHT-ORN	3	39	VIO-GRN	49	39	BLK-GRN	38	T		
		SLT-YEL	20	GRN-WHT	4	40	GRN-VIO	24	40	GRN-BLK	13	R		
		VIO-BLU	46	WHT-GRN	5	41				41				
		BLU-VIO	21	GRN-WHT	6	42				42				
	SLT #8	VIO-ORN	47	WHT-BLU	1	43				43				
		ORN-VIO	22	BLU-WHT	2	44				44				
		VIO-GRN	48	WHT-ORN	3	45	VIO-SLT	50	45	BLK-SLT	40	T		
		GRN-VIO	23	GRN-WHT	4	46	SLT-VIO	25	46	SLT-BLK	15	R		
		VIO-BRN	49	WHT-GRN	5	47				47				
		BRN-VIO	24	GRN-WHT	6	48				48				
	SPARE	VIO-SLT	50	-	-	49				49				
		SLT-VIO	25	-	-	50				50				

Note: The above table shows that the ICU is connected to TERM. BLK. A (F through K) and the PFXU-M (CN1), and the wall jacks to TERM. BLK. B (F through K) and the PFXU-M (CN1).

Table 3.7.2.3 (1) (con.)

PFXU-M COL T. BLK#1, XCN T. BLK#1

Function	PFXU TERM. BLK. #1	PFXU TERM. BLK. #2		PFXU-M (CN2)		ICU		Designation
		A	B	CN2 Pin No.	Cable Wire Color	COL CONN. Pin No.	Cable Wire Color	
CO/PBX lines #1 to #8	1			26	WHT-BLU			1T
	2			1	BLU-WHT			1R
	3			27	WHT-ORN			2T
	4			2	ORN-WHT			2R
	5			28	WHT-GRN			3T
	6			3	GRN-WHT			3R
	7			29	WHT-BRN			4T
	8			4	BRN-WHT			4R
	9			30	WHT-SLT			5T
	10			5	SLT-WHT			5R
	11			31	RED-BLU			6T
	12			6	BLU-RED			6R
	13			32	RED-ORN			7T
	14			7	ORN-RED			7R
	15			33	RED-GRN			8T
	16			8	GRN-RED			8R
Spare	17				RED-BRN			
	18				BRN-RED			
	19				RED-SLT			
	20				SLT-RED			
	21				BLK-BLU			
	22				BLU-BLK			
	23				BLK-ORN			
	24				ORN-BLK			
	25				BLK-GRN			
	26				GRN-BLK			
	27				BLK-BRN			
	28				BRN-BLK			
	29				BLK-SLT			
	30				SLT-BLK			
	31				YEL-BLU			
	32				BLU-YEL			
	33				YEL-ORN			
	34				ORN-YEL			
	CO/PBX line interface circuits #1 to #8	35	35	1	43	YEL-GRN	26	WHT-BLU
36		36	2	18	GRN-YEL	1	BLU-WHT	1R
37		37	3	44	YEL-BRN	27	WHT-ORN	2T
38		38	4	19	BRN-YEL	2	ORN-WHT	2R
39		39	5	45	YEL-SLT	28	WHT-GRN	3T
40		40	6	20	SLT-YEL	3	GRN-WHT	3R
41		41	7	46	VIO-BLU	29	WHT-BRN	4T
42		42	8	21	BLU-VIO	4	BRN-WHT	4R
43		43	25	47	VIO-ORN	38	BLK-GRN	5T
44		44	26	22	ORN-VIO	13	GRN-BLK	5R
45		45	27	48	VIO-GRN	39	BLK-BRN	6T
46		46	28	23	GRN-VIO	14	BRN-BLK	6R
47		47	29	49	VIO-BRN	40	BLK-SLT	7T
48		48	30	24	BRN-VIO	15	SLT-BLK	7R
49		49	31	50	VIO-SLT	41	YEL-BLU	8T
50		50	32	25	SLT-VIO	16	BLU-YEL	8R

(2) PFXU-M transfer switch

PFXU-M has a transfer switch. A power failure can be simulated by setting the transfer switch to the OFF position for checking operation of the PFXU-M after its installation. Keep the transfer switch normally in the ON position.

(3) Purposes of PFXU TERM. BLK.

Figure 3.7.2.3(3) shows an example of power failure transfer in which CO1, CO2, and CO3 are transferred to extensions 25, 27, and 23. The CO/PBX lines are connected to the PFXU-M via PFXU TERM. BLK. #1, CN2 in the same order of the ICU COL CONN CO/PBX line numbers. CN1 and the terminals on TERM. BLK. F through K corresponding to the extensions are freely selected and connected to them.

PFXU TERM. BLK. #2 is used for changing the arrangement. The pin numbers in column A are the same as the corresponding pin numbers of PFXU TERM. BLK. #1, and the pin numbers in column B are arranged in the same way as the ICU COL CONN.

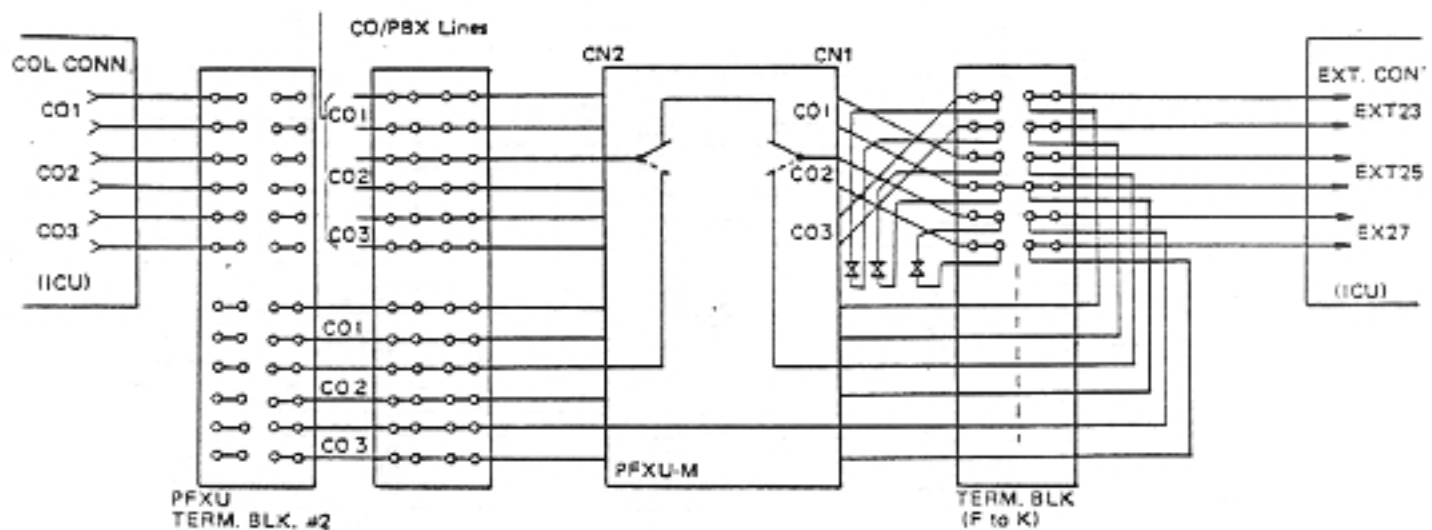


Figure 3.7.2.3(3)

Up to eight CO/PBX lines for power failure transfer can be connected to PFXU TERM. BLK. #2, and the EX-1648 system can control power failure transfer with a single PFXU-M, and PFXU TERM. BLK. #2 provided that the number of CO/PBX lines is eight or less.

IWATSU

3.7.3 Operation

TRANSFER on the PFXU-M unit is the switch for connecting or not connecting CO/PBX lines to single-line telephones.

When this switch is in the ON position, CO/PBX lines are connected to the KSU as long as power is supplied to the PFXU-M. If power fails, the switch automatically connects CO/PBX lines to single-line telephones.

When the switch is in the OFF position, CO/PBX lines are connected to single-line telephones regardless of whether power has failed.

Normally keep the switch in the ON position.

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3.8 E & M TERMSET INSTALLATION

3.8.1 General

The EX-824/1648 system can accommodate a total of four E and M tie line circuits, that is, two circuits in the EX-824/1648 CM and two in the EX-1648 EM. This Section mainly describes connections from the EX-824/1648 ICU to the termset via MDF.

3.8.2 Work in the EX-824/1648 ICU

For installation of the E and M tie line interface card EMTK-M in the ICU, refer to 3.6.2.4.2.3. Bear in mind that connection of CO/PBX lines and extensions in the ICU will be restricted if EMTK-M cards are installed. The numbers subject to this restriction are shown in Table 3.8.2 (1).

Table 3.8.2 (1) Restrictions on CO/PBX Lines and Extensions

EMTK-M Mounting Slot		CO/PBX Lines Under Restriction	Extensions Under Restriction
ICU	SUB Slot		
EX-824/1648CM	SUB 24-27	CO. 7, 8	EXT 24, 27
	SUB 28-31		EXT 28-31
	SUB 32-35		EXT 32-35
	SUB 36-39		EXT 36-39
	SUB 40-43		EXT 40-43
EX-1648EM	SUB 44-47	CO. 11, 12	EXT 44-47
	SUB 48-51		EXT 48-51
	SUB 52-55		EXT 52-55
	SUB 56-59		EXT 56-59
	SUB 60-63		EXT 60-63
	SUB 64-67		EXT 64-67

3.8.3 Wiring ICU EXT Connectors

Wiring from the ICU's EXT connectors varies with the SUB slot in which an EMTK-M is installed. Connections of 25-pair cables from the EXT connectors are shown in Table 3.8.3.

Table 3.8.3 Corresponding EXT Connectors

EMTK-M Mounting Slot		CO/PBX Lines Under Restriction	Extensions Under Restriction
ICU	SUB Slot		
EX-824/1648CM	SUB 24-27	EXT 1	Figure 3.8.3 (2)
	SUB 28-31	EXT 2	Figure 3.8.3 (1)
	SUB 32-35	EXT 2	Figure 3.8.3 (2)
	SUB 36-39	EXT 3	Figure 3.8.3 (1)
	SUB 40-43	EXT 3	Figure 3.8.3 (2)
EX-1648EM	SUB 44-47	EXT 4	Figure 3.8.3 (1)
	SUB 48-51	EXT 4	Figure 3.8.3 (2)
	SUB 52-55	EXT 5	Figure 3.8.3 (1)
	SUB 56-59	EXT 5	Figure 3.8.3 (2)
	SUB 60-63	EXT 6	Figure 3.8.3 (1)
	SUB 64-67	EXT 6	Figure 3.8.3 (2)

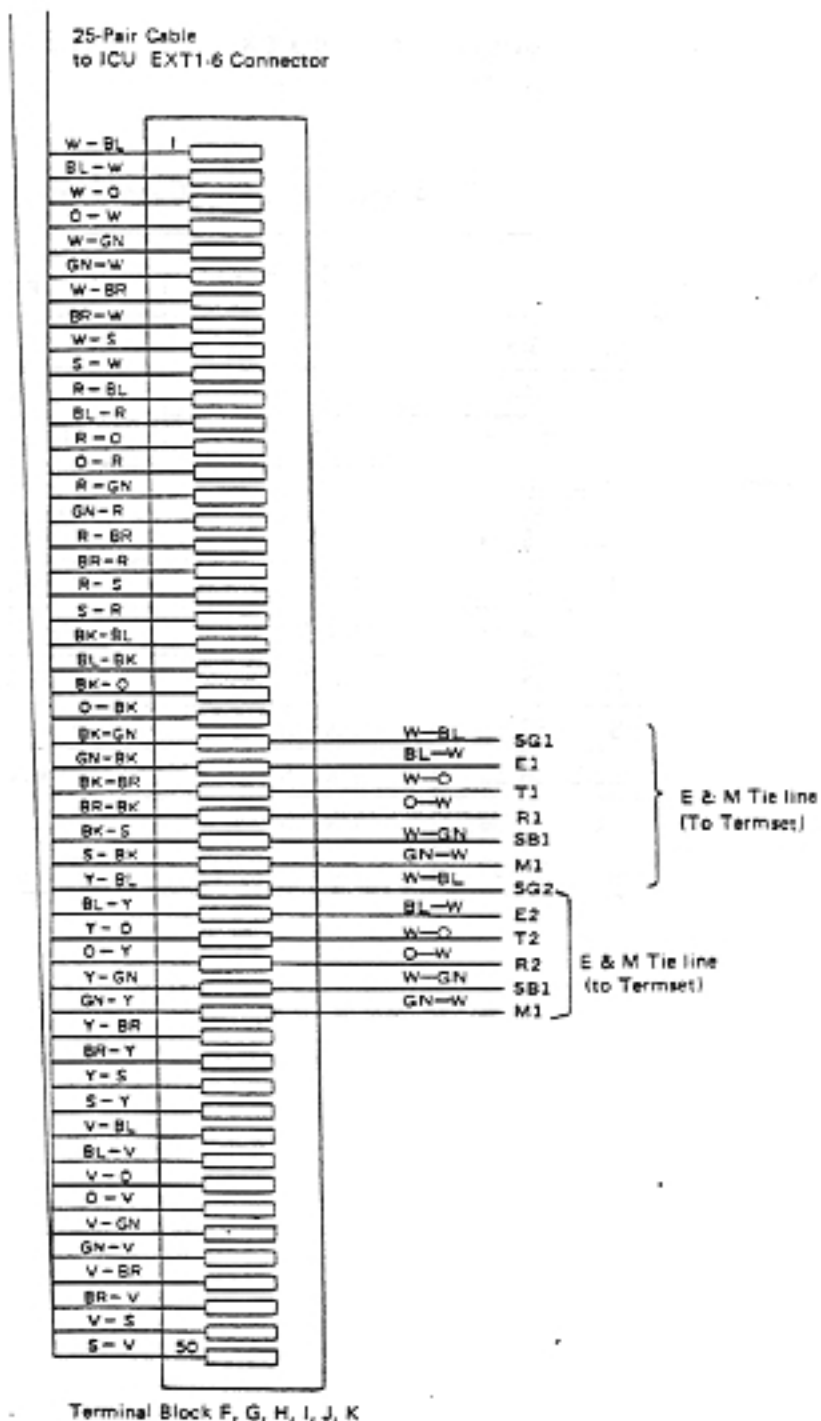


Figure 3.8.3 (2) Wiring of ICU-MDF 25 pair Cable (2)

3.8.4 MDF Wiring

Each signal carried through the 25-pair cable from the EXT connectors on the ICU is connected to the MDF as shown in figure 3.8.4 (1) to figure 3.8.4 (6) below

Table 3.8.3 Corresponding EXT Connectors

EMTK-M Mounting Slot		EXT Connector	Corresponding MDF Diagram
ICU	SUB Slot		
EX-824/1648CM	SUB 24-27	EXT 1	Figure 3.8.4 (1)
	SUB 28-31	EXT 2	Figure 3.8.4 (2)
	SUB 36-39	EXT 2	Figure 3.8.4 (3)
	SUB 36-39	EXT 3	Figure 3.8.3 (4)
	SUB 40-43	EXT 3	Figure 3.8.4 (5)
EXT-1648EM	SUB 44-47	EXT 4	Figure 3.8.4 (6)
	SUB 48-51	EXT 4	Figure 3.8.4 (7)
	SUB 52-55	EXT 5	Figure 3.8.4 (8)
	SUB 56-59	EXT 5	Figure 3.8.4 (9)
	SUB 56-59	EXT 5	Figure 3.8.4 (10)
	SUB 64-67	EXT 5	Figure 3.8.4 (11)

Function	Designation			ICU Conn. Pin No.	House Cable Wire Color	Term. Blk. Pin No.	2 Pairs Twisted-Pair or Quad and 3-Pair Twisted Cable Color		Wall Jack Pin No.	
	KT	SLT	EMTK				4 Conductor	6 Conductor	4 Conductor	6 Conductor
KT#20 / SLT#20	BT1	-		26	WHT - BLU	1	-	W-BL	-	1
	BR1	-		1	BLU - WHT	2	W-BL	BL-W	1	2
	T1	T1		27	WHT - ORN	3	W-O	W-O	2	3
	R1	R1		2	ORN - WHT	4	O-W	O-W	3	4
	DT1	-		28	WHT - GRN	5	BL-W	W-GN	4	5
KT#21 / SLT#21	DR1	-		3	GRN - WHT	6	-	GN-W	-	6
	BT2	-		29	WHT - BRN	7	-	W-BL	-	1
	BR2	-		4	BRN - WHT	8	W-BL	BL-W	1	2
	T2	T2		30	WHT - SLT	9	W-O	W-O	2	3
	R2	R2		5	SLT - WHT	10	O-W	O-W	3	4
KT#22 / SLT#22	DT2	-		31	RED - BLU	11	BL-W	W-GN	4	5
	DR2	-		6	BLU - RED	12	-	GN-W	-	6
	BT3	-		32	RED - ORN	13	-	W-BL	-	1
	BR3	-		7	ORN - RED	14	W-BL	BL-W	1	2
	T3	T3		33	RED - GRN	15	W-O	W-O	2	3
KT#23 / SLT#23	R3	R3		8	GRN - RED	16	O-W	O-W	3	4
	DT3	-		34	RED - BRN	17	BL-W	W-GN	4	5
	DR3	-		9	BRN - RED	18	-	GN-W	-	6
	BT4	-		35	RED - SLT	19	-	W-BL	-	1
	BR4	-		10	SLT - RED	20	W-BL	BL-W	1	2
E & M Tie-Line # 1 # 2	T4	T4		36	BLK - BLU	21	W-O	W-O	2	3
	R4	R4		11	BLU - BLK	22	O-W	O-W	3	4
	DT4	-		37	BLK - ORN	23	BL-W	W-GN	4	5
	DR4	-		12	ORN - BLK	24	-	GN-W	-	6
			SG1	38	BLK - GRN	25		W-BL		
			E1	13	GRN - BLK	26		BL-W		
			T1	39	BLK - BRN	27		W-O		
			R1	14	BRN - BLK	28		O-W		
			SB1	40	BLK - SLT	29		W-GN		
			M1	15	SLT - BLK	30		GN-W		
		SG2	41	YEL - BLU	31		W-BL			
		E2	16	BLU - YEL	32		BL-W			
		T2	42	YEL - ORN	33		W-O			
		R2	17	ORN - YEL	34		O-W			
		SB2	43	YEL - GRN	35		W-GN			
		M2	18	GRN - YEL	36		GN-W			
			44	YEL - BRN	37		-			
			19	BRN - YEL	38		-			
			45	YEL - SLT	39		-			
			20	SLT - YEL	40		-			
			46	VIO - BLU	41		-			
			21	BLU - VIO	42		-			
			47	VIO - BRN	43		-			
			22	ORN - VIO	44		-			
			48	VIO - GRN	45		-			
			23	GRN - VIO	46		-			
			49	VIO - BRN	47		-			
			24	BRN - VIO	48		-			
			50	VIO - SLT	49		-			
			25	SLT - VIO	50		-			

Normal
Extension
Wiring

Figure 3.8.4 (1) Terminals on Terminal Block F in Cases Where EMTK-M Card is Mounted in One of SUB24 to SUB27 Slots

Function	Designation			ICU Conn. Pin No.	House Cable Wire Color	Term. Blk. Pin No.	2 Pairs Twisted Pair or Quad and 3-Pair Twisted Cable Color		Wall Jack Pin No.		
	KT	SLT	EMTK				4 Conductor	6 Conductor	4 Conductor	6 Conductor	
E & M Tie-Line #1 #2			SG1	26	WHT - BLU	1		W-BL	to E & M Termset No. 1		
			E1	1	BLU - WHT	2		BL-W			
			T1	27	WHT - ORN	3		W-O			
			R1	2	ORN - WHT	4		O-W			
			SB1	28	WHT - GRN	5		W-GN			
			M1	3	GRN - WHT	6		GN-W			
			SG2	29	WHT - BRN	7		W-BL	to E & M Termset No. 2		
			E2	4	BRN - WHT	8		BL-W			
			T2	30	WHT - SLT	9		W-O			
			R2	5	SLT - WHT	10		O-W			
			SB2	31	RED - BLU	11		W-GN			
			M2	6	BLU - RED	12		GN-W			
				32	RED - ORN	13		--			
				7	ORN - RED	14		--			
				33	RED - GRN	15		--			
				8	GRN - RED	16		--			
				34	RED - BRN	17		--			
				9	BRN - RED	18		--			
				35	RED - SLT	19		--			
				10	SLT - RED	20		--			
				36	BLK - BLU	21		--			
				11	BLU - BLK	22		--			
				37	BLK - ORN	23		--			
				12	ORN - BLK	24		--			
KT#32 / SLT#32			BT 13	38	BLK - GRN	25	--	W-BL	--	1	
			BR 13	13	GRN - BLK	26	W-BL	BL-W	1	2	
			T 13	T 13	39	BLK - BRN	27	W-O	W-O	2	3
			R 13	R 13	14	BRN - BLK	28	O-W	O-W	3	4
			DT 13	--	40	BLK - SLT	29	BL-W	W-GN	4	5
		OR 13	--	15	SLT - BLK	30	--	GN-W	--	6	
KT#33 / SLT#33			BT 14	--	41	YEL - BLU	31	--	W-BL	--	1
			BR 14	--	16	BLU - YEL	32	W-BL	BL-W	1	2
			T 14	T 14	42	YEL - ORN	33	W-O	W-O	2	3
			R 14	R 14	17	ORN - YEL	34	O-W	O-W	3	4
			DT 14	--	43	YEL - GRN	35	BL-W	W-GN	4	5
		OR 14	--	18	GRN - YEL	36	--	GN-W	--	6	
KT#34 / SLT#34			BT 15	--	44	YEL - BRN	37	--	W-BL	--	1
			BR 15	--	19	BRN - YEL	38	W-BL	BL-W	1	2
			T 15	T 15	45	YEL - SLT	39	W-O	W-O	2	3
			R 15	R 15	20	SLT - YEL	40	O-W	O-W	3	4
			DT 15	--	46	VIO - BLU	41	BL-W	W-GN	4	5
		OR 15	--	21	BLU - VIO	42	--	GN-W	--	6	
KT#35 / SLT#35			BT 16	--	47	VIO - BRN	43	--	W-BL	--	1
			BR 16	--	22	ORN - VIO	44	W-BL	BL-W	1	2
			T 16	T 16	48	VIO - GRN	45	W-O	W-O	2	3
			R 16	R 16	23	GRN - VIO	46	O-W	O-W	3	4
			DT 16	--	49	VIO - BRN	47	BL-W	W-GN	4	5
		OR 16	--	24	BRN - VIO	48	--	GN-W	--	6	
				50	VIO - SLT	49	--	--	--	--	
				25	SLT - VIO	50	--	--	--	--	

Normal
Extension
Wiring

Figure 3.8.4 (2) Terminals on Terminal Block G in Cases Where EMTK-M Card is Mounted in One of SUB28 to SUB31 Slots

Function	Designation			ICU Conn. Pin No.	House Cable Wire Color	Term. Blk. Pin No.	2 Pairs Twisted-Pair or Quad and 3-Pair Twisted Cable Color		Wall Jack Pin No.	
	KT	SLT	EMTK				4 Conductor	6 Conductor	4 Conductor	6 Conductor
KT#28 / SLT#28	BT9	-		26	WHT - BLU	1	-	W-BL	-	1
	BR9	-		1	BLU - WHT	2	W-BL	BL-W	1	2
	T9	T9		27	WHT - ORN	3	W-O	W-O	2	3
	R9	R9		2	ORN - WHT	4	O-W	O-W	3	4
	DT9	-		28	WHT - GRN	5	BL-W	W-GN	4	5
	DR9	-		3	GRN - WHT	6	-	GN-W	-	6
KT#29 / SLT#29	BT10	-		29	WHT - BRN	7	-	W-BL	-	1
	BR10	-		4	BRN - WHT	8	W-BL	BL-W	1	2
	T10	T10		30	WHT - SLT	9	W-O	W-O	2	3
	R10	R10		5	SLT - WHT	10	O-W	O-W	3	4
	DT10	-		31	RED - BLU	11	BL-W	W-GN	4	5
	DR10	-		6	BLU - RED	12	-	GN-W	-	6
KT#30 / SLT#30	BT11	-		32	RED - ORN	13	-	W-BL	-	1
	BR11	-		7	ORN - RED	14	W-BL	BL-W	1	2
	T11	T11		33	RED - GRN	15	W-O	W-O	2	3
	R11	R11		8	GRN - RED	16	O-W	O-W	3	4
	DT11	-		34	RED - BRN	17	BL-W	W-GN	4	5
	DR11	-		9	BRN - RED	18	-	GN-W	-	6
KT#31 / SLT#31	BT12	-		35	RED - SLT	19	-	W-BL	-	1
	BR12	-		10	SLT - RED	20	W-BL	BL-W	1	2
	T12	T12		36	BLK - BLU	21	W-O	W-O	2	3
	R12	R12		11	BLU - BLK	22	O-W	O-W	3	4
	DT12	-		37	BLK - ORN	23	BL-W	W-GN	4	5
	DR12	-		12	ORN - BLK	24	-	GN-W	-	6
E & M Tie-Line #1 #2			SG1	38	BLK - GRN	25		W-BL		to E & M termset No. 1
			E1	13	GRN - BLK	26		BL-W		
			T1	39	BLK - BRN	27		W-O		
			R1	14	BRN - BLK	28		O-W		
			SB1	40	BLK - SLT	29		W-GN		
			M1	15	SLT - BLK	30		GN-W		to E & M termset No. 2
			SG2	41	YEL - BLU	31		W-BL		
			E2	16	BLU - YEL	32		BL-W		
			T2	42	YEL - ORN	33		W-O		
			R2	17	ORN - YEL	34		O-W		
			SB2	43	YEL - GRN	35		W-GN		
			M2	18	GRN - YEL	36		GN-W		
				44	YEL - BRN	37		-		
				19	BRN - YEL	38		-		
				45	YEL - SLT	39		-		
				20	SLT - YEL	40		-		
				46	VIO - BLU	41		-		
			21	BLU - VIO	42		-			
			47	VIO - BRN	43		-			
			22	ORN - VIO	44		-			
			48	VIO - GRN	45		-			
			23	GRN - VIO	46		-			
			49	VIO - BRN	47		-			
			24	BRN - VIO	48		-			
			50	VIO - SLT	49		-			
			25	SLT - VIO	50		-			

Normal
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Wiring

Figure 3.8.4 (3) Terminals on Terminal Block G in Cases Where EMTK-M Card is Mounted in One of SUB32 to SUB35 Slots

Function	Designation		ICU Conn. Pin No.	House Cable Wire Color	Term. Blk. Pin No.	2 Pairs Twisted-Pair or Quad and 3-Pair Twisted Cable Color		Wall Jack Pin No.	
	KT	SLT				EMTK	4 Conductor	6 Conductor	4 Conductor
E & M Tie-Line #1 #2			SG1	26	WHT - BLU	1		W-BL	10 E & M Termset No. 1
			E1	1	BLU - WHT	2		BL-W	
			T1	27	WHT - ORN	3		W-O	
			R1	2	ORN - WHT	4		O-W	
			SB1	28	WHT - GRN	5		W-GN	
			M1	3	GRN - WHT	6		GN-W	
			SG2	29	WHT - BRN	7		W-BL	10 E & M Termset No. 2
			E2	4	BRN - WHT	8		BL-W	
			T2	30	WHT - SLT	9		W-O	
			R2	5	SLT - WHT	10		O-W	
			SB2	31	RED - BLU	11		W-GN	
			M2	6	BLU - RED	12		GN-W	
				32	RED - ORN	13		---	
				7	ORN - RED	14		---	
				33	RED - GRN	15		---	
				8	GRN - RED	16		---	
				34	RED - BRN	17		---	
				9	BRN - RED	18		---	
				35	RED - SLT	19		---	
				10	SLT - RED	20		---	
				36	BLK - BLU	21		---	
				11	BLU - BLK	22		---	
				37	BLK - ORN	23		---	
				12	ORN - BLK	24		---	
KT#40 / SLT#40			BT 21	38	BLK - GRN	25		W-BL	1
			BR 21	13	GRN - BLK	26	W-BL	BL-W	2
			T 21	39	BLK - BRN	27	W-O	W-O	3
			R:21	14	BRN - BLK	28	O-W	O-W	4
			OT 21	40	BLK - SLT	29	BL-W	W-GN	5
KT#41 / SLT#41			DR 21	15	SLT - BLK	30		GN-W	6
			BT 22	41	YEL - BLU	31		W-BL	1
			BR 22	16	BLU - YEL	32	W-BL	BL-W	2
			T 22	42	YEL - ORN	33	W-O	W-O	3
			R 22	17	ORN - YEL	34	O-W	O-W	4
KT#42 / SLT#42			OT 22	43	YEL - GRN	35	BL-W	W-GN	5
			OR 22	18	GRN - YEL	36		GN-W	6
			BT 23	44	YEL - BRN	37		W-BL	1
			BR 23	19	BRN - YEL	38	W-BL	BL-W	2
			T 23	45	YEL - SLT	39	W-O	W-O	3
KT#43 / SLT#43			R 23	20	SLT - YEL	40	O-W	O-W	4
			OT 23	46	VIO - BLU	41	BL-W	W-GN	5
			OR 23	21	BLU - VIO	42		GN-W	6
			BT 24	47	VIO - BRN	43		W-BL	1
			BR 24	22	ORN - VIO	44	W-BL	BL-W	2
-			T 24	48	VIO - GRN	45	W-O	W-O	3
			R 24	23	GRN - VIO	46	O-W	O-W	4
			OT 24	49	VIO - BRN	47	BL-W	W-GN	5
			OR 24	24	BRN - VIO	48		GN-W	6
			-	50	VIO - SLT	49		---	---
		-	25	SLT - VIO	50		---	---	

Normal
Extension
Wiring

Figure 3.8.4 (4) Terminals on Terminal Block H in Cases Where EMTK-M Card is Mounted in One of SUB36 to SUB39 Slots

Function	Designation			ICU Conn. Pin No.	House Cable Wire Color	Term. Blk. Pin No.	2 Pairs Twisted-Pair or Quad and 3-Pair Twisted Cable Color		Wall Jack Pin No.	
	KT	SLT	EMTK				4 Conductor	6 Conductor	4 Conductor	6 Conductor
KT#36 / SLT#36	BT 17	-		25	WHT - BLU	1	-	W-BL	-	1
	BR17	-		1	BLU - WHT	2	W-BL	BL-W	1	2
	T 17	T 17		27	WHT - ORN	3	W-O	W-O	2	3
	R 17	R 17		2	ORN - WHT	4	O-W	O-W	3	4
	DT17	-		28	WHT - GRN	5	BL-W	W-GN	4	5
	DR17	-		3	GRN - WHT	6	-	GN-W	-	6
KT#37 / SLT#37	BT 18	-		29	WHT - BRN	7	-	W-BL	-	1
	BR 18	-		4	BRN - WHT	8	W-BL	BL-W	1	2
	T 18	T 18		30	WHT - SLT	9	W-O	W-O	2	3
	R 18	R 18		5	SLT - WHT	10	O-W	O-W	3	4
	DT18	-		31	RED - BLU	11	BL-W	W-GN	4	5
	DR18	-		6	BLU - RED	12	-	GN-W	-	6
KT#38 / SLT#38	BT 19	-		32	RED - ORN	13	-	W-BL	-	1
	BR 19	-		7	ORN - RED	14	W-BL	BL-W	1	2
	T 19	T 19		33	RED - GRN	15	W-O	W-O	2	3
	R 19	R 19		8	GRN - RED	16	O-W	O-W	3	4
	DT 19	-		34	RED - BRN	17	BL-W	W-GN	4	5
	DR19	-		9	BRN - RED	18	-	GN-W	-	6
KT#39 / SLT#39	BT 20	-		35	RED - SLT	19	-	W-BL	-	1
	BR20	-		10	SLT - RED	20	W-BL	BL-W	1	2
	T 20	T 20		36	BLK - BLU	21	W-O	W-O	2	3
	R 20	R 20		11	BLU - BLK	22	O-W	O-W	3	4
	DT20	-		37	BLK - ORN	23	BL-W	W-GN	4	5
	DR20	-		12	ORN - BLK	24	-	GN-W	-	6
E & M Tie-Line # 1 # 2			SG1	38	BLK - GRN	25		W-BL		
			E1	13	GRN - BLK	26		BL-W		
			T1	39	BLK - BRN	27		W-O		
			R1	14	BRN - BLK	28		O-W		
			SB1	40	BLK - SLT	29		W-GN		
			M1	15	SLT - BLK	30		GN-W		
			SG2	41	YEL - BLU	31		W-BL		
			E2	16	BLU - YEL	32		BL-W		
			T2	42	YEL - ORN	33		W-O		
			R2	17	ORN - YEL	34		O-W		
			SB2	43	YEL - GRN	35		W-GN		
			M2	18	GRN - YEL	36		GN-W		
				44	YEL - BRN	37		-		
				19	BRN - YEL	38		-		
				45	YEL - SLT	39		-		
				20	SLT - YEL	40		-		
				46	VIO - BLU	41		-		
				21	BLU - VIO	42		-		
			47	VIO - BRN	43		-			
			22	ORN - VIO	44		-			
			48	VIO - GRN	45		-			
			23	GRN - VIO	46		-			
			49	VIO - BRN	47		-			
			24	BRN - VIO	48		-			
			50	VIO - SLT	49		-			
			25	SLT - VIO	50		-			

Normal
Extension
Wiring

Figure 3.8.4 (5) Terminals on Terminal Block H in Cases Where EMTK-M Card is Mounted in One of SUB40 to SUB43 Slots

Function	Designation			ICU Conn. Pin No.	House Cable Wire Color	Term. Blk. Pin No.	2 Pairs Twisted Pair or Quad and 3-Pair Twisted Cable Color		Wall Jack Pin No.	
	KT	SLT	EMTK				4 Conductor	6 Conductor	4 Conductor	6 Conductor
E & M Tie-Line #1 #2			SG1	26	WHT - BLU	1		W-BL		
			E1	1	BLU - WHT	2		BL-W		
			T1	27	WHT - ORN	3		W-O		to E & M Termset No. 1
			R1	2	ORN - WHT	4		O-W		
			SB1	28	WHT - GRN	5		W-GN		
			M1	3	GRN - WHT	6		GN-W		
			SG2	29	WHT - BRN	7		W-BL		
			E2	4	BRN - WHT	8		BL-W		to E & M Termset No.2
			T2	30	WHT - SLT	9		W-O		
			R2	5	SLT - WHT	10		O-W		
			SB2	31	RED - BLU	11		W-GN		
			M2	6	BLU - RED	12		GN-W		
				32	RED - ORN	13				
				7	ORN - RED	14				
				33	RED - GRN	15				
				8	GRN - RED	16				
				34	RED - BRN	17				
				9	BRN - RED	18				
				35	RED - SLT	19				
				10	SLT - RED	20				
				36	BLK - BLU	21				
				11	BLU - BLK	22				
				37	BLK - ORN	23				
				12	ORN - BLK	24				
KT#48 / SLT#48			BT 29	38	BLK - GRN	25	-	W-BL	-	1
			BR 29	13	GRN - BLK	26	W-BL	BL-W	1	2
		T 29	T 29	39	BLK - BRN	27	W-O	W-O	2	3
		R 29	R 29	14	BRN - BLK	28	O-W	O-W	3	4
			DT 29	40	BLK - SLT	29	BL-W	W-GN	4	5
KT#49 / SLT#49			OR 29	15	SLT - BLK	30	-	GN-W	-	6
			BT 30	41	YEL - BLU	31	-	W-BL	-	1
			BR 30	16	BLU - YEL	32	W-BL	BL-W	1	2
		T 30	T 30	42	YEL - ORN	33	W-O	W-O	2	3
		R 30	R 30	17	ORN - YEL	34	O-W	O-W	3	4
KT#50 / SLT#50			OT 30	43	YEL - GRN	35	BL-W	W-GN	4	5
			OR 30	18	GRN - YEL	36	-	GN-W	-	6
			BT 31	44	YEL - BRN	37	-	W-BL	-	1
			BR 31	19	BRN - YEL	38	W-BL	BL-W	1	2
		T 31	T 31	45	YEL - SLT	39	W-O	W-O	2	3
KT#51 / SLT#51			R 31	20	SLT - YEL	40	O-W	O-W	3	4
			DT 31	46	VIO - BLU	41	BL-W	W-GN	4	5
			OR 31	21	BLU - VIO	42	-	GN-W	-	6
			BT 32	47	VIO - BRN	43	-	W-BL	-	1
			BR 32	22	ORN - VIO	44	W-BL	BL-W	1	2
KT#51 / SLT#51			T 32	48	VIO - GRN	45	W-O	W-O	2	3
		R 32	R 32	23	GRN - VIO	46	O-W	O-W	3	4
			DT 32	49	VIO - BRN	47	BL-W	W-GN	4	5
			OR 32	24	BRN - VIO	48	-	GN-W	-	6
				50	VIO - SLT	49	-	-	-	-
			25	SLT - VIO	50	-	-	-	-	

Normal
Extension
Wiring

Figure 3.8.4 (6) Terminals on Terminal Block 1 in Cases Where EMTK-M Card is Mounted in One of SUB44 to SUB47 Slots

Function	Designation			ICU Conn. Pin No.	House Cable Wire Color	Term. Blk. Pin No.	2 Pairs Twisted-Pair or Quad and 3-Pair Twisted Cable Color		Wall Jack Pin No.	
	KT	SLT	EMTK				4 Conductor	6 Conductor	4 Conductor	6 Conductor
KT=44 SLT=44	BT25	-		25	WHT - BLU	1	-	W-BL	-	1
	BR25	-		1	BLU - WHT	2	W-BL	BL-W	1	2
	T25	T25		27	WHT - ORN	3	W-O	W-O	2	3
	R25	R25		2	ORN - WHT	4	O-W	O-W	3	4
	DT25	-		28	WHT - GRN	5	BL-W	W-GN	4	5
	DR25	-		3	GRN - WHT	6	-	GN-W	-	6
KT=45 SLT=45	BT26	-		29	WHT - BRN	7	-	W-BL	-	1
	BR26	-		4	BRN - WHT	8	W-BL	BL-W	1	2
	T26	T26		30	WHT - SLT	9	W-O	W-O	2	3
	R26	R26		5	SLT - WHT	10	O-W	O-W	3	4
	DT26	-		31	RED - BLU	11	BL-W	W-GN	4	5
	DR26	-		6	BLU - RED	12	-	GN-W	-	6
KT=46 SLT=46	BT27	-		32	RED - ORN	13	-	W-BL	-	1
	BR27	-		7	ORN - RED	14	W-BL	BL-W	1	2
	T27	T27		33	RED - GRN	15	W-O	W-O	2	3
	R27	R27		8	GRN - RED	16	O-W	O-W	3	4
	DT27	-		34	RED - BRN	17	BL-W	W-GN	4	5
	DR27	-		9	BRN - RED	18	-	GN-W	-	6
KT=47 SLT=47	BT28	-		35	RED - SLT	19	-	W-BL	-	1
	BR28	-		10	SLT - RED	20	W-BL	BL-W	1	2
	T28	T28		36	BLK - BLU	21	W-O	W-O	2	3
	R28	R28		11	BLU - BLK	22	O-W	O-W	3	4
	DT28	-		37	BLK - ORN	23	BL-W	W-GN	4	5
	DR28	-		12	ORN - BLK	24	-	GN-W	-	6
E & M Tie-Line #1 #2			SG1	38	BLK - GRN	25		W-BL		to E & M termset No. 1
			E1	13	GRN - BLK	26		BL-W		
			T1	39	BLK - BRN	27		W-O		
			R1	14	BRN - BLK	28		O-W		
			SB1	40	BLK - SLT	29		W-GN		
			M1	15	SLT - BLK	30		GN-W		to E & M termset No. 2
			SG2	41	YEL - BLU	31		W-BL		
			E2	16	BLU - YEL	32		BL-W		
			T2	42	YEL - ORN	33		W-O		
			R2	17	ORN - YEL	34		O-W		
			SB2	43	YEL - GRN	35		W-GN		
			M2	18	GRN - YEL	36		GN-W		
				44	YEL - BRN	37		-		
				19	BRN - YEL	38		-		
				45	YEL - SLT	39		-		
				20	SLT - YEL	40		-		
				46	VIO - BLU	41		-		
				21	BLU - VIO	42		-		
				47	VIO - BRN	43		-		
				22	ORN - VIO	44		-		
			48	VIO - GRN	45		-			
			23	GRN - VIO	46		-			
			49	VIO - BRN	47		-			
			24	BRN - VIO	48		-			
			50	VIO - SLT	49		-			
			25	SLT - VIO	50		-			

Normal
Extent
Wiring

Figure 3.8.4 (7) Terminals on Terminal Block 1 in Cases Where EMTK-M Card is Mounted in One of SUB48 to SUB51 Slots

Function	Designation			ICU Conn. Pin No.	House Cable Wire Color	Term. Blk. Pin No.	2 Pairs Twisted-Pair or Quad and 3-Pair Twisted Cable Color		Wall Jack Pin No.	
	KT	SLT	EMTK				4 Conductor	6 Conductor	4 Conductor	6 Conductor
E & M Tie-Line #1 #2			SG1	26	WHT - BLU	1		W-BL		
			E1	1	BLU - WHT	2		BL-W		
			T1	27	WHT - ORN	3		W-O		to E & M Termset No. 1
			R1	2	ORN - WHT	4		O-W		
			SB1	28	WHT - GRN	5		W-GN		
			M1	3	GRN - WHT	6		GN-W		
			SG2	29	WHT - BRN	7		W-BL		
			E2	4	BRN - WHT	8		BL-W		to E & M Termset No. 2
			T2	30	WHT - SLT	9		W-O		
			R2	5	SLT - WHT	10		O-W		
			SB2	31	RED - BLU	11		W-GN		
			M2	6	BLU - RED	12		GN-W		
				32	RED - ORN	13		--		
				7	ORN - RED	14		--		
				33	RED - GRN	15		--		
				8	GRN - RED	16		--		
				34	RED - BRN	17		--		
				9	BRN - RED	18		--		
				35	RED - SLT	19		--		
				10	SLT - RED	20		--		
				36	BLK - BLU	21		--		
				11	BLU - BLK	22		--		
				37	BLK - ORN	23		--		
				12	ORN - BLK	24		--		
KT#56 / SLT#56			BT37	38	BLK - GRN	25	--	W-BL	--	1
			BR37	13	GRN - BLK	26	W-BL	BL-W	1	2
		T37	T37	39	BLK - BRN	27	W-O	W-O	2	3
		R37	R37	14	BRN - BLK	28	O-W	O-W	3	4
		DT37		40	BLK - SLT	29	BL-W	W-GN	4	5
		DR37	15	SLT - BLK	30	--	GN-W	--	6	
KT#57 / SLT#57			BT38	41	YEL - BLU	31	--	W-BL	--	1
			BR38	16	BLU - YEL	32	W-BL	BL-W	1	2
		T38	T38	42	YEL - ORN	33	W-O	W-O	2	3
		R38	R38	17	ORN - YEL	34	O-W	O-W	3	4
		DT38		43	YEL - GRN	35	BL-W	W-GN	4	5
		DR38	18	GRN - YEL	36	--	GN-W	--	6	
KT#58 / SLT#58			BT39	44	YEL - BRN	37	--	W-BL	--	1
			BR39	19	BRN - YEL	38	W-BL	BL-W	1	2
		T39	T39	45	YEL - SLT	39	W-O	W-O	2	3
		R39	R39	20	SLT - YEL	40	O-W	O-W	3	4
		DT39		46	VIO - BLU	41	BL-W	W-GN	4	5
		DR39	21	BLU - VIO	42	--	GN-W	--	6	
KT#59 / SLT#59			BT40	47	VIO - BRN	43	--	W-BL	--	1
			BR40	22	ORN - VIO	44	W-BL	BL-W	1	2
		T40	T40	48	VIO - GRN	45	W-O	W-O	2	3
		R40	R40	23	GRN - VIO	46	O-W	O-W	3	4
		DT40		49	VIO - BRN	47	BL-W	W-GN	4	5
		DR40	24	BRN - VIO	48	--	GN-W	--	6	
			50	VIO - SLT	49	--	--	--	--	
			25	SLT - VIO	50	--	--	--	--	

Normal
Extension
Wiring

Figure 3.8.4 (8) Terminals on Terminal Block J in Cases Where EMTK-M Card is Mounted in One of SUB52 to SUB55 Slots

Function	Designation			ICU Conn. Pin No.	House Cable Wire Color	Term. Blk. Pin No.	2 Pairs Twisted-Pair or Quad and 3-Pair Twisted Cable Color		Wall Jack Pin No.	
	KT	SLT	EMTK				4 Conductor	6 Conductor	4 Conductor	6 Conductor
KT= 52 / SLT= 52	BT 33	-		26	WHT - BLU	1	-	W-BL	-	1
	BR33	-		1	BLU - WHT	2	W-BL	BL-W	1	2
	T 33	T 33		27	WHT - ORN	3	W-O	W-O	2	3
	R 33	R 33		2	ORN - WHT	4	O-W	O-W	3	4
	DT33	-		28	WHT - GRN	5	BL-W	W-GN	4	5
	DR33	-		3	GRN - WHT	6	-	GN-W	-	6
KT= 53 / SLT= 53	BT 34	-		29	WHT - BRN	7	-	W-BL	-	1
	BR34	-		4	BRN - WHT	8	W-BL	BL-W	1	2
	T 34	T 34		30	WHT - SLT	9	W-O	W-O	2	3
	R 34	R 34		5	SLT - WHT	10	O-W	O-W	3	4
	DT34	-		31	RED - BLU	11	BL-W	W-GN	4	5
	DR34	-		6	BLU - RED	12	-	GN-W	-	6
KT= 54 / SLT= 54	BT 35	-		32	RED - ORN	13	-	W-BL	-	1
	BR35	-		7	ORN - RED	14	W-BL	BL-W	1	2
	T 35	T 35		33	RED - GRN	15	W-O	W-O	2	3
	R 35	R 35		8	GRN - RED	16	O-W	O-W	3	4
	DT35	-		34	RED - BRN	17	BL-W	W-GN	4	5
	DR35	-		9	BRN - RED	18	-	GN-W	-	6
KT= 55 / SLT= 55	BT 36	-		35	RED - SLT	19	-	W-BL	-	1
	BR36	-		10	SLT - RED	20	W-BL	BL-W	1	2
	T 36	T 36		36	BLK - BLU	21	W-O	W-O	2	3
	R 36	R 36		11	BLU - BLK	22	O-W	O-W	3	4
	DT36	-		37	BLK - ORN	23	BL-W	W-GN	4	5
	DR36	-		12	ORN - BLK	24	-	GN-W	-	6
E & M Tie-Line # 1 # 2			SG1	38	BLK - GRN	25		W-BL		to E & M termset No. 1
			E1	13	GRN - BLK	26		BL-W		
			T1	39	BLK - BRN	27		W-O		
			R1	14	BRN - BLK	28		O-W		
			SB1	40	BLK - SLT	29		W-GN		
			M1	15	SLT - BLK	30		GN-W		to E & M termset No. 2
			SG2	41	YEL - BLU	31		W-BL		
			E2	16	BLU - YEL	32		BL-W		
			T2	42	YEL - ORN	33		W-O		
			R2	17	ORN - YEL	34		O-W		
			SB2	43	YEL - GRN	35		W-GN		
			M2	18	GRN - YEL	36		GN-W		
				44	YEL - BRN	37		-		
				19	BRN - YEL	38		-		
				45	YEL - SLT	39		-		
				20	SLT - YEL	40		-		
				46	VIO - BLU	41		-		
				21	BLU - VIO	42		-		
				47	VIO - BRN	43		-		
				22	ORN - VIO	44		-		
			48	VIO - GRN	45		-			
			23	GRN - VIO	46		-			
			49	VIO - BRN	47		-			
			24	BRN - VIO	48		-			
			50	VIO - SLT	49		-			
			25	SLT - VIO	50		-			

Normal
Extens.
Wiring

Figure 3.8.4 (9) Terminals on Terminal Block J in Cases Where EMTK-M Card is Mounted in One of SUB56 to SUB59 Slots

Function	Designation			ICU Conn. Pin No.	House Cable Wire Color	Term. Blk. Pin No.	2 Pairs Twisted-Pair or Quad and 3-Pair Twisted Cable Color		Wall Jack Pin No.	
	KT	SLT	EMTK				4 Conductor	6 Conductor	4 Conductor	6 Conductor
E & M Tr-Line #1 #2			SG1	26	WHT - BLU	1		W-BL		
			E1	1	BLU - WHT	2		BL-W		
			T1	27	WHT - ORN	3		W-O		to
			R1	2	ORN - WHT	4		O-W		E & M Termset
			SB1	28	WHT - GRN	5		W-GN		No. 1
			M1	3	GRN - WHT	6		GN-W		
			SG2	29	WHT - BRN	7		W-BL		
			E2	4	BRN - WHT	8		BL-W		to
			T2	30	WHT - SLT	9		W-O		E & M Termset
			R2	5	SLT - WHT	10		O-W		No.2
			SB2	31	RED - BLU	11		W-GN		
			M2	6	BLU - RED	12		GN-W		
				32	RED - ORN	13		---		
				7	ORN - RED	14		---		
				33	RED - GRN	15		---		
				8	GRN - RED	16		---		
				34	RED - BRN	17		---		
				9	BRN - RED	18		---		
				35	RED - SLT	19		---		
			10	SLT - RED	20		---			
			36	BLK - BLU	21		---			
			11	BLU - BLK	22		---			
			37	BLK - ORN	23		---			
			12	ORN - BLK	24		---			
KT#64 / SLT#64	BT 45	-		38	BLK - GRN	25	-	W-BL	-	1
	BR 45	-		13	GRN - BLK	26	W-BL	BL-W	1	2
	T 45	T 45		39	BLK - BRN	27	W-O	W-O	2	3
	R 45	R 45		14	BRN - BLK	28	O-W	O-W	3	4
	DT 45	-		40	BLK - SLT	29	BL-W	W-GN	4	5
DR 45	-		15	SLT - BLK	30	-	GN-W	-	6	
KT#65 / SLT#65	BT 46	-		41	YEL - BLU	31	-	W-BL	-	1
	BR 46	-		16	BLU - YEL	32	W-BL	BL-W	1	2
	T 46	T 46		42	YEL - ORN	33	W-O	W-O	2	3
	R 46	R 46		17	ORN - YEL	34	O-W	O-W	3	4
	DT 46	-		43	YEL - GRN	35	BL-W	W-GN	4	5
DR 46	-		13	GRN - YEL	36	-	GN-W	-	6	
KT#66 / SLT#66	BT 47	-		44	YEL - BRN	37	-	W-BL	-	1
	BR 47	-		13	BRN - YEL	38	W-BL	BL-W	1	2
	T 47	T 47		45	YEL - SLT	39	W-O	W-O	2	3
	R 47	R 47		20	SLT - YEL	40	O-W	O-W	3	4
	DT 47	-		46	VIO - BLU	41	BL-W	W-GN	4	5
DR 47	-		21	BLU - VIO	42	-	GN-W	-	6	
KT#67 / SLT#67	BT 48	-		47	VIO - BRN	43	-	W-BL	-	1
	BR 48	-		22	ORN - VIO	44	W-BL	BL-W	1	2
	T 48	T 48		48	VIO - GRN	45	W-O	W-O	2	3
	R 48	R 48		23	GRN - VIO	46	O-W	O-W	3	4
	DT 48	-		49	VIO - BRN	47	BL-W	W-GN	4	5
DR 48	-		24	BRN - VIO	48	-	GN-W	-	6	
-	-	-		50	VIO - SLT	49	-	-	-	-
-	-	-		25	SLT - VIO	50	-	-	-	-

Normal
Extension
Wiring

Figure 3.8.4 (10) Terminals on Terminal Block K in Cases Where EMTK-M Card is Mounted in One of SUB60 to SUB63 Slots

Function	Designation			ICU Conn. Pin No.	House Cable Wire Color	Term. Blk. Pin No.	2 Pairs Twisted Pair or Quad and 3-Pair Twisted Cable Color		Wall Jack Pin No.	
	KT	SLT	EMTK				4 Conductor	6 Conductor	4 Conductor	6 Conductor
KT=60 / SLT=60	BT 41	-		26	WHT - BLU	1	-	W-BL	-	1
	BR 41	-		1	BLU - WHT	2	W-BL	BL-W	1	2
	T 41	T 41		27	WHT - ORN	3	W-O	W-O	2	3
	R 41	R 41		2	ORN - WHT	4	O-W	O-W	3	4
	DT 41	-		28	WHT - GRN	5	BL-W	W-GN	4	5
	DR 41	-		3	GRN - WHT	6	-	GN-W	-	6
KT=61 / SLT=61	BT 42	-		29	WHT - BRN	7	-	W-BL	-	1
	BR 42	-		4	BRN - WHT	8	W-BL	BL-W	1	2
	T 42	T 42		30	WHT - SLT	9	W-O	W-O	2	3
	R 42	R 42		5	SLT - WHT	10	O-W	O-W	3	4
	DT 42	-		31	RED - BLU	11	BL-W	W-GN	4	5
	DR 42	-		6	BLU - RED	12	-	GN-W	-	6
KT=62 / SLT=62	BT 43	-		32	RED - ORN	13	-	W-BL	-	1
	BR 43	-		7	ORN - RED	14	W-BL	BL-W	1	2
	T 43	T 43		33	RED - GRN	15	W-O	W-O	2	3
	R 43	R 43		8	GRN - RED	16	O-W	O-W	3	4
	DT 43	-		34	RED - BRN	17	BL-W	W-GN	4	5
	DR 43	-		9	BRN - RED	18	-	GN-W	-	6
KT=63 / SLT=63	BT 44	-		35	RED - SLT	19	-	W-BL	-	1
	BR 44	-		10	SLT - RED	20	W-BL	BL-W	1	2
	T 44	T 44		36	BLK - BLU	21	W-O	W-O	2	3
	R 44	R 44		11	BLU - BLK	22	O-W	O-W	3	4
	DT 44	-		37	BLK - ORN	23	BL-W	W-GN	4	5
	DR 44	-		12	ORN - BLK	24	-	GN-W	-	6
E & M Tie-Line # 1 # 2			SG1	38	BLK - GRN	25		W-BL		to E & M termset No. 1
			E1	13	GRN - BLK	26		BL-W		
			T1	39	BLK - BRN	27		W-O		
			R1	14	BRN - BLK	28		O-W		
			SB1	40	BLK - SLT	29		W-GN		
			M1	15	SLT - BLK	30		GN-W		to E & M termset No. 2
			SG2	41	YEL - BLU	31		W-BL		
			E2	16	BLU - YEL	32		BL-W		
			T2	42	YEL - ORN	33		W-O		
			R2	17	ORN - YEL	34		O-W		
			SB2	43	YEL - GRN	35		W-GN		
			M2	18	GRN - YEL	36		GN-W		
				44	YEL - BRN	37		-		
				19	BRN - YEL	38		-		
				45	YEL - SLT	39		-		
				20	SLT - YEL	40		-		
				46	VIO - BLU	41		-		
				21	BLU - VIO	42		-		
				47	VIO - BRN	43		-		
				22	ORN - VIO	44		-		
			48	VIO - GRN	45		-			
			23	GRN - VIO	46		-			
			49	VIO - BRN	47		-			
			24	BRN - VIO	48		-			
			50	VIO - SLT	49		-			
			25	SLT - VIO	50		-			

Figure 3.8.4 (11) Terminals on Terminal Block K in Cases Where EMTK-M Card is Mounted in One of SUB64 to SUB67 Slots

3.8.5 Grounding

Be sure to connect a ground wire for communication in case of using E and M tie lines.

The EX-824/1648 system has its AC input cable safety-grounded, but exclusive grounding for communication is additionally necessary.

For its connecting procedure, refer to Section 3.5.

EX-824/164B
ELECTRONIC KEY TELEPHONE SYSTEM
INSTRUCTION MANUAL



3.9 OTHER OPTIONAL UNIT INSTALLATION

3.9.1 EXCC-M Unit Installation

The ICU is cabled to external devices via various connectors. These connectors can be covered with the EX Connector Cover-M unit, mainly for protecting the system from electro-static trouble. This unit is recommended if there is a possibility of carelessly touching the connector case where strong electro-static is present.

Figure 3.9.1 shows the EXCC-M unit installation procedure.

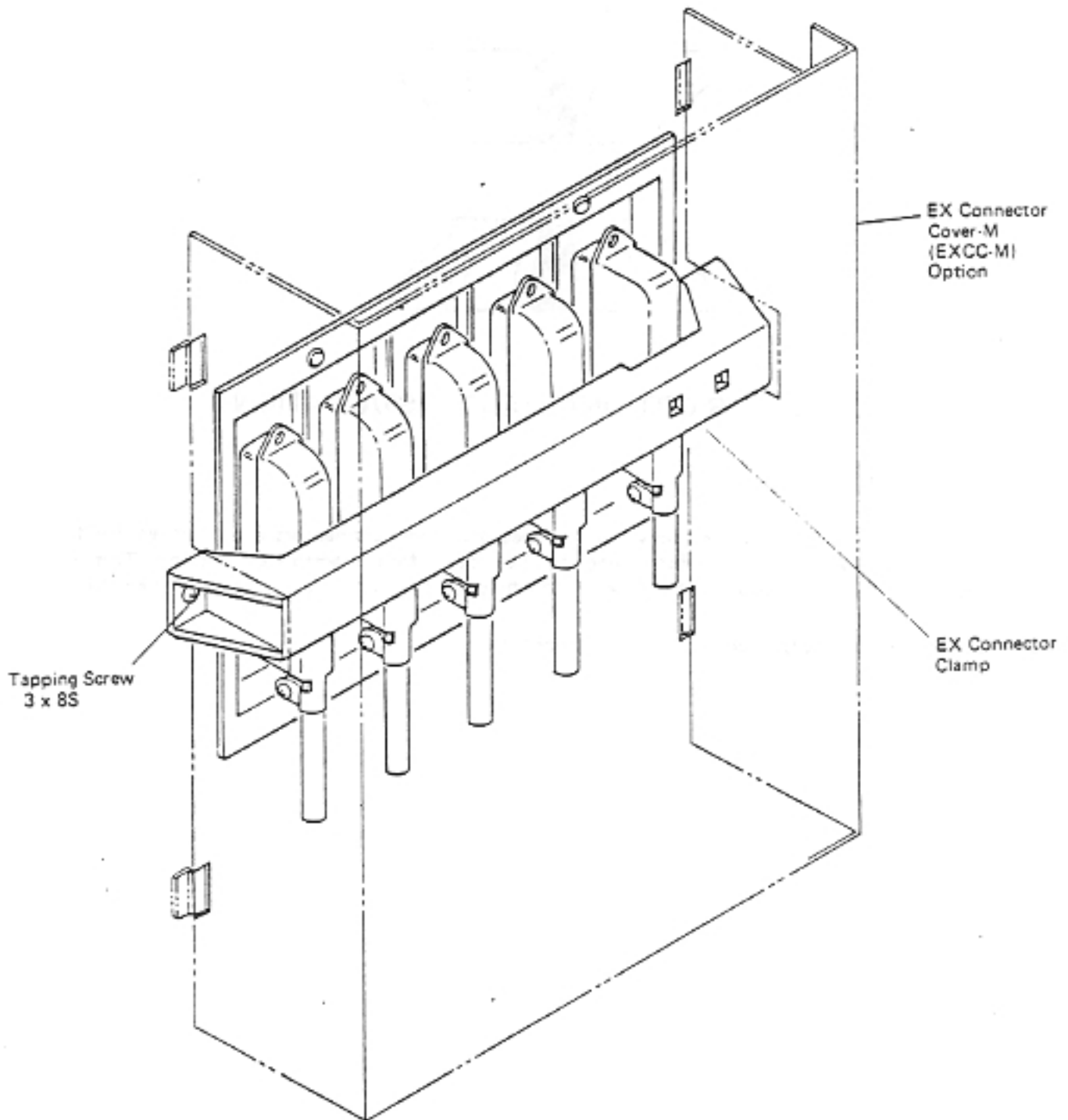


Figure 3.9.1 Installation of Usual System

EX-824/1648
ELECTRONIC KEY TELEPHONE SYSTEM
INSTRUCTION MANUAL



3.10 EXTENSION INSTALLATION

3.10.1 General Description

The EX-824/1648 features seven types of electronic key telephone station equipment: EX-824/1648K, EX-824/1648D, EX-824/1648KN/KN1, EX-824/1648DN/DN1, and EX-824/1648VP-N1 key telephones. Each KEY telephone is equipped with a modular cord for connection to a six-conductor modular station block.

The EX-824/1648K and EX-824/1648KN/KN1 many key telephone features, and the EX-824/1648D or EX-824/1648DN/DN1 a key telephone similar to the EX-824/1648K or EX-824/1648KN/KN1 except that it has a 16-digit liquid-crystal display (LCD), and has more features. The Versa Phone is a simplified key telephone with no LCD and the fewer number of keys as compared with normal key telephones. Other functions are almost the same. These seven types of key telephones can be used in key telephone systems ranging from the 824 to the 1648 type. In addition to these key telephones, MF and PULSE type single-line telephones (SLTs) can be connected to the system. In other words, the EX-824/1648 system can use four types of extension according to the intended purpose.

3.10.2 Cabling

3.10.2.1 General

The EX-824/1648K, EX-824/1648D, EX-824/1648KN/KN1, EX-824/1648DN/DN1, and EX-824/1648-VP-N1 extensions are connected to the MDF with six-conductor cables via wall jacks. The extensions and wall jacks are connected using the supplied modular cords; and the wall jacks are connected to the MDF through twisted-pair cables. An SLT (single-line telephone), however, can be connected from a wall jack to the MDF with a quad cable. For further details, see Table 3.10.2.1.A and 3.10.2.1.B.

Table 3.10.2.1.A EX-824/1648K, D, KN, DN, KN1, DN1 VP-N1 Key Telephone Wire Assignments

Designation	Function	Pair Assignment
BT	Call path(ICU ↔ EX-824/1648KT) power supply (+)	White } pair
BR		Black }
T	Speech path (ICU ↔ EX-824/1648KT)	Red } pair
R		Green }
DT	Data path (ICU ↔ EX-824/1648KT) power supply (-)	Yellow } pair
DR		Blue }

Table 3.10.2.1.B Single-Line Telephone (SLT) Wire Assignments

Designation	Function	Pair Assignment
—	Speech path (ICU ↔ SLT)	Black —
T		Red } pair
R		Green }
—		Yellow —
—	Speech path (ICU ↔ SLT)	White } pair
—		Black }
T		Red } pair
R		Green }
—	Speech path (ICU ↔ SLT)	Yellow } pair
—		Blue }

3.10.2.2 Types of Cables

As mentioned in paragraph 3.10.2.1, connections between the MDF and wall jacks should be by six-conductor twisted-pair cables, and SLTs (single-line telephones) also can be connected with four-conductor quad cables. These cables should be non-shielded and may use wire in the range of No. 22 to No. 28 AWG; No. 24 AWG wire is specially recommended.

3.10.2.3 Maximum Cable Length

The maximum cable length between the ICU and an extension varies depending on the type of cable used and the type of extension connected. Tables 3.10.2.3.A and 3.10.2.3.B show the maximum cable length in each case. If optional units are installed in an EX-824/1648K and EX-824/1648KN/KN1 or EX-824/1648D or EX-824/1648DN/DN1, the loop resistance decreases 20 ohms per optional unit.

Table 3.10.2.3.A EX-824/1648K and EX-824/1648D Maximum Cable Length

Type of Cable	Maximum Length	Maximum Loop Resistance
No. 22 AWG	1750 ft	60Ω *
No. 24 AWG	1100 ft	60Ω *
No. 26 AWG	670 ft	60Ω *
No. 28 AWG	420 ft	60Ω *

*Maximum loop resistance is 40 ohms if key telephones have an option attached to it.

Table 3.10.2.3.B Single-Line Telephone Maximum Cable Length

Type of Cable	Maximum Length	Maximum Loop Resistance
No. 22 AWG	17,400 ft (5800 ft)	600Ω (200Ω)
No. 24 AWG	11,000 ft (3600 ft)	600Ω (200Ω)
No. 26 AWG	6,700 ft (2200 ft)	600Ω (200Ω)
No. 28 AWG	4,200 ft (1400 ft)	600Ω (200Ω)

Note: The cable lengths shown in the table above apply with single-line telephone DC resistance included. The values in parentheses apply to the Model 2500 type single-line telephone.

3.10.2.4 Cable Termination

The six-conductor twisted-pair cable is connected on the MDF to the 50-conductor cable from the EX-824/1648 ICU and on the wall jack to the modular cable from an extension. Single-line telephones, however, may be connected with a four-conductor quad cable or twisted-pair cable.

These connections are shown in Tables 3.10.2.4.A and 3.10.2.4.B. For the jack pin numbers shown in the tables, refer to Figures 3.10.2.4.A and 3.10.2.4.B. Some of the colors of the 50-conductor cable are shown for example.

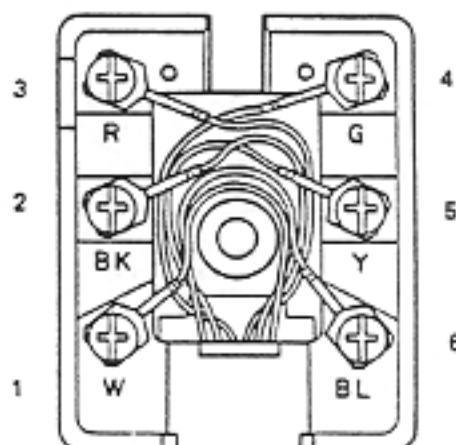
Table 3.10.2.4.A Station Jack Terminal Assignment for Key Telephone

Jack Pin No.	Wire Color	6-Conductor Twisted-Pair Cable Color	50-Conductor Cable Color	Designation
1	White	White – Blue	White – Blue	BT
2	Black	Blue – White	Blue – White	BR
3	Red	White – Orange	White – Orange	T
4	Green	Orange – White	Orange – White	R
5	Yellow	White – Green	White – Green	DT
6	Blue	Green – White	Green – White	DR

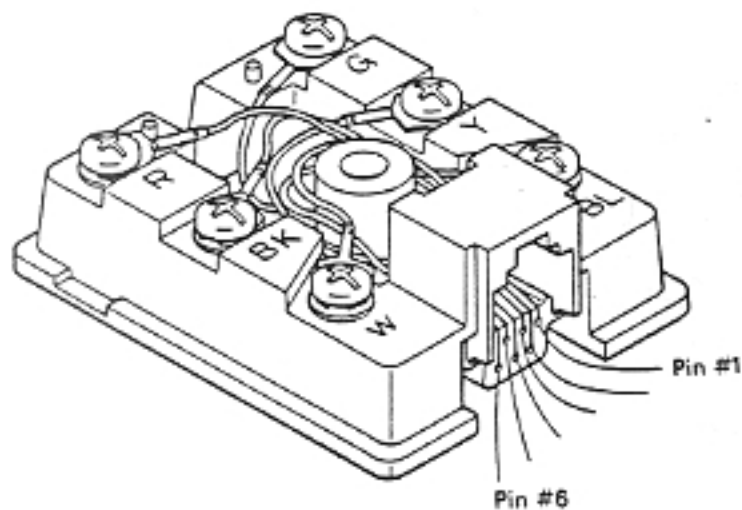
Table 3.10.2.4.B Station Jack Terminal Assignment for Single-Line Telephone

Jack Pin No.	Wire Color	4-Conductor Quad Cable or 4-Conductor Twisted-Pair Cable Color	50-Conductor Cable Color	Designation
1	Black	White – Blue	White – Blue	T R
2	Red	White – Orange	White – Orange	
3	Green	Orange – White	Orange – White	
4	Yellow	Blue – White	Blue – White	

Pin #	Color
1	White
2	Black
3	Red
4	Green
5	Yellow



↑
Modular Cable inlet side



Caution: Some wall jacks have pin 1 marked for the blue lead and pin 6 for the white lead. But connect the leads in such a way that pin 1 is next to the black lead and pin 6 is next to the yellow lead.

Figure 3.10.2.4.A Six-Position, Six-Conductor Wall Jack Construction

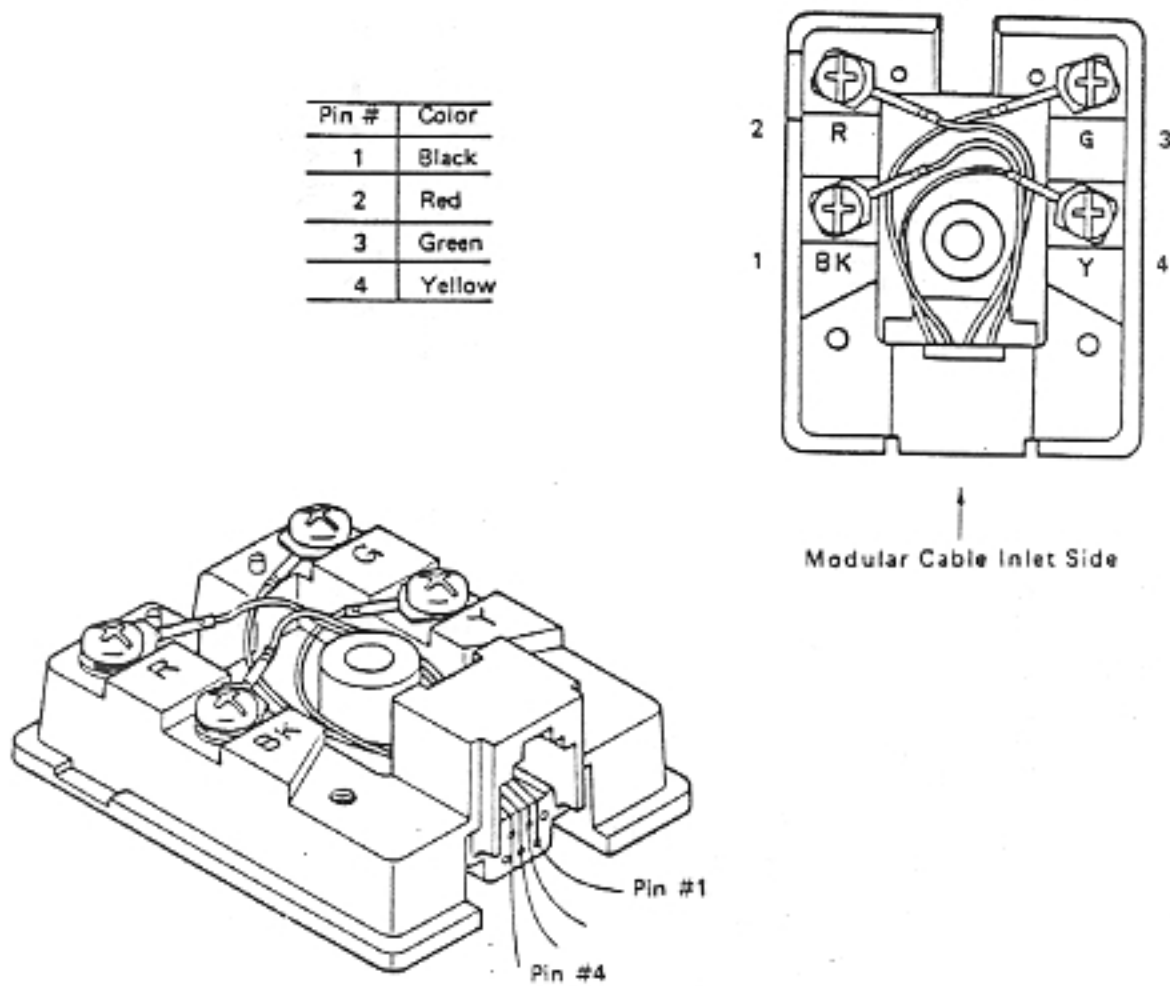


Figure 3.10.2.4.B Six-Position, Four-Conductor Wall Jack Construction

3.10.3 Intercom Dial Code Assignment

This system can accommodate up to 48 stations, using intercom dial codes 20 to 67. Extensions No. 20 and No. 21 may function as attendant stations if a DSS-M or DSS-N is connected to them.

3.10.4 EX-824/1648K and EX-824/1648D Installation

Note: For a description of the EX-824/1648KN/KN1 and EX-824/1648DN/DN1 key telephones, refer to Section 3.10.6.

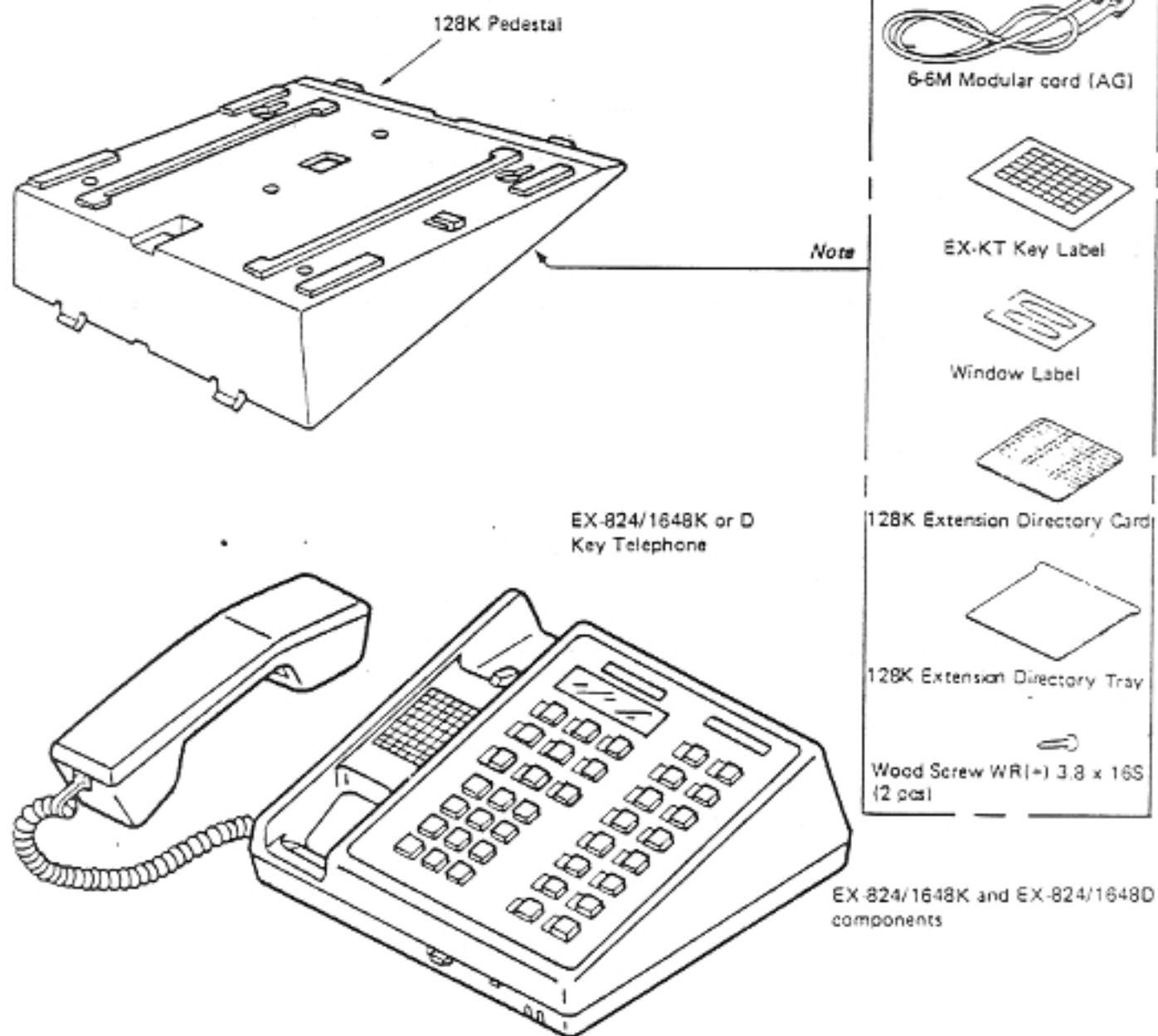
3.10.4.1 Unpacking

The EX-824/1648K and EX-824/1648D are packed in individual boxes together with various accessories, which are shown in Table 3.10.4.1 and Figure 3.10.4.1.A. For opening individual boxes, see Figure 3.10.4.1.B.

Table 3.10.4.1 Accessories for EX-824/1648K and EX-824/1648D

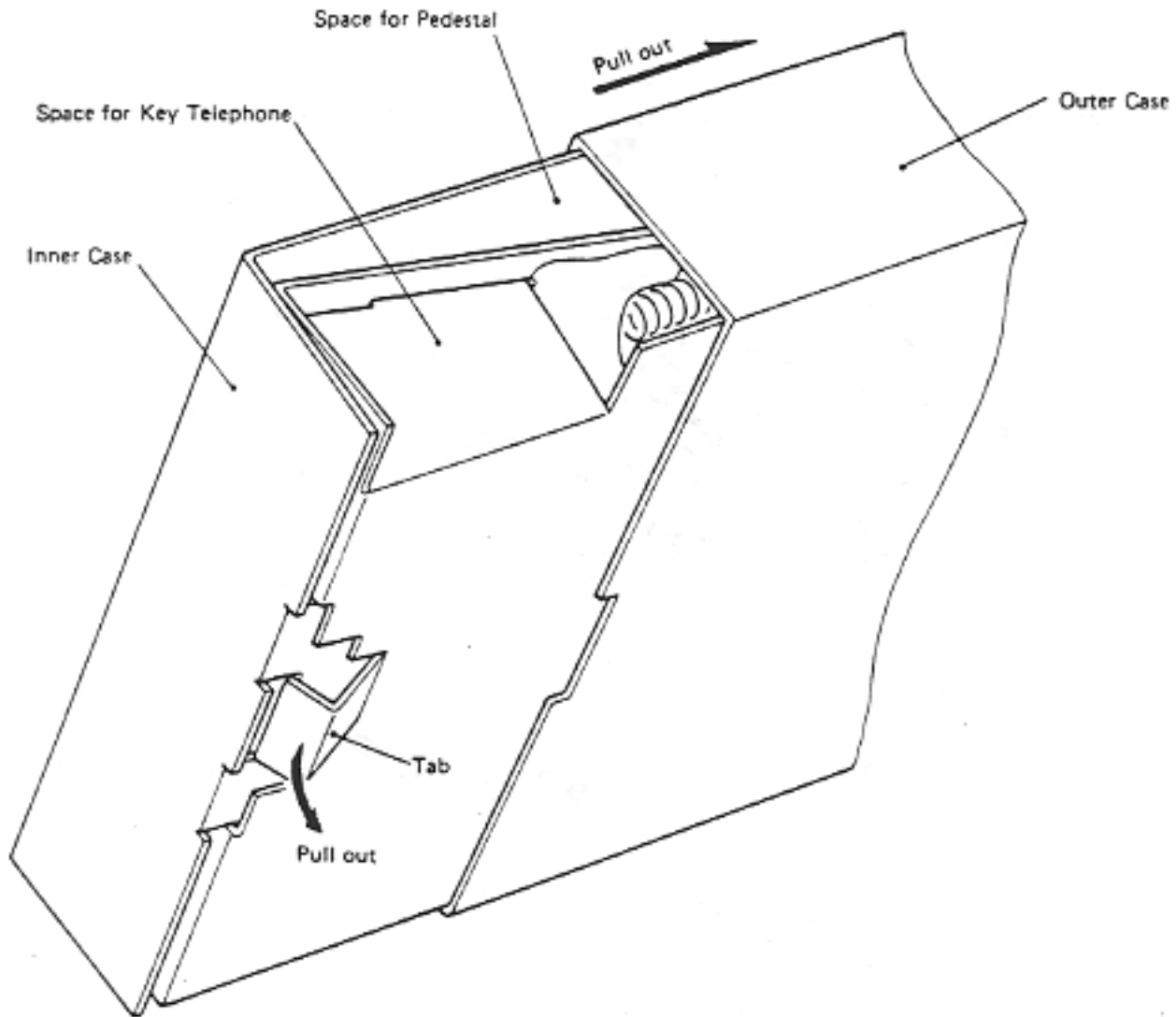
	Description	Quantity
1	Window label	1
2	EX-KT key label	1
3	6-6M modular cord (AG) *	1
4	128K pedestal	1
5	128K extension directory card	1
6	128K extension directory tray	1
7	Wood screw WR(+) 3.8 x 16S	2

*Modular cord length is about 2.1 m (7 feet).



Note: The accessories at right are placed together inside the 128K pedestal.

Figure 3.10.4.1.A EX-824/1648K and EX-824/1648D Components



Note: Pull the inner case out of the outer case, and pull out the tab at the bottom of the inner case to unlock the inner case. The key telephone and accessories can now be taken out.

Figure 3.10.4.1.B Unpacking Method for EX-824/1648K or EX-824/1648D

The EX-824/1648K and EX-824/1648D key telephones are packed as shown in Figure 3.10.4.1.C. To return these key telephones for repairs or other reasons, pack them again as shown in Figure 3.10.4.1.C before shipment.

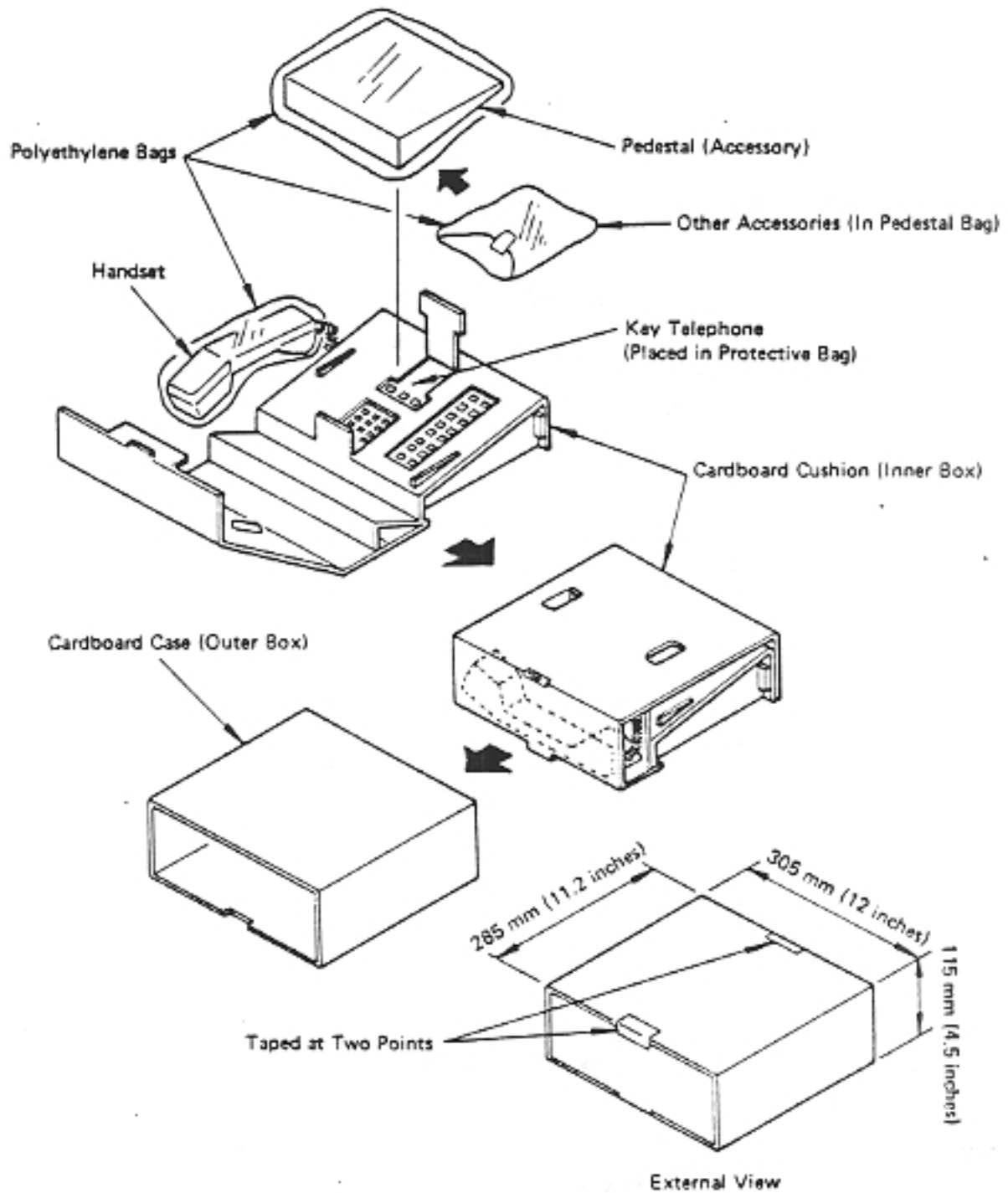


Figure 3.10.4.1.C Packing Method for Ex-824/1648K or EX-824/1648D

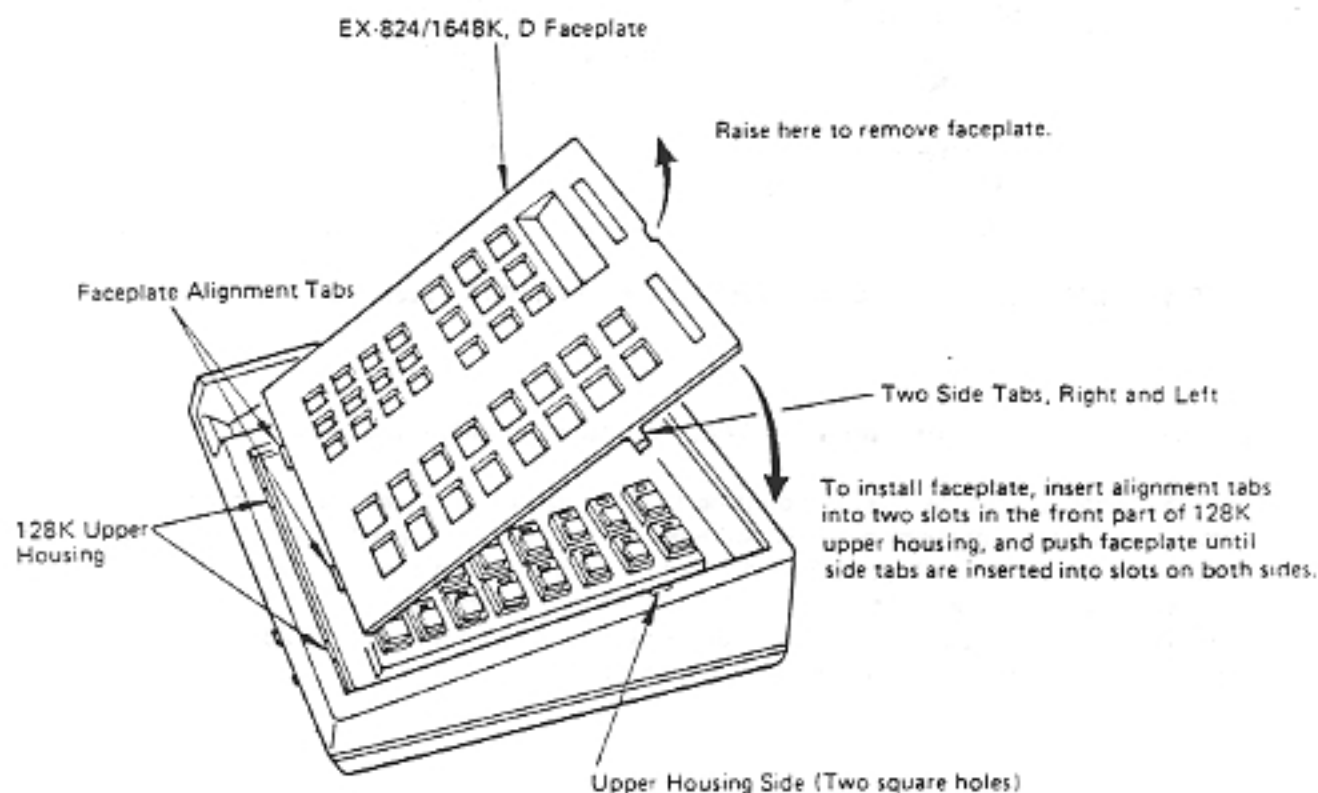
3.10.4.2 Handling

(1) Faceplate replacement and component part installation procedures

The only part put on the faceplate is the window label. (Write the extension number on the window label. Apart from the originally supplied black faceplate, optional faceplates of varied colors (blue, orange, brown) are available.

To replace the original faceplate with an optional one, pry up the slot in the upper part of the original faceplate, raise the faceplate, and disengage the side tabs from the extension upper housing; the faceplate can be then be easily removed. Insert the alignment tabs of a faceplate of the desired color into the slots in the front part of the extension upper housing, and push the upper part of the faceplate until it is fastened in the upper housing.

Figures 3.10.4.2(1)A and B show the faceplate components and their replacement.



Note: Faceplate opening and closing methods, and the faceplate and its components, are the same for the EX-824/1648K and EX-824/1648D.

Figure 3.10.4.2(1)A EX-824/1648K and EX-824/1648D Faceplate Installation

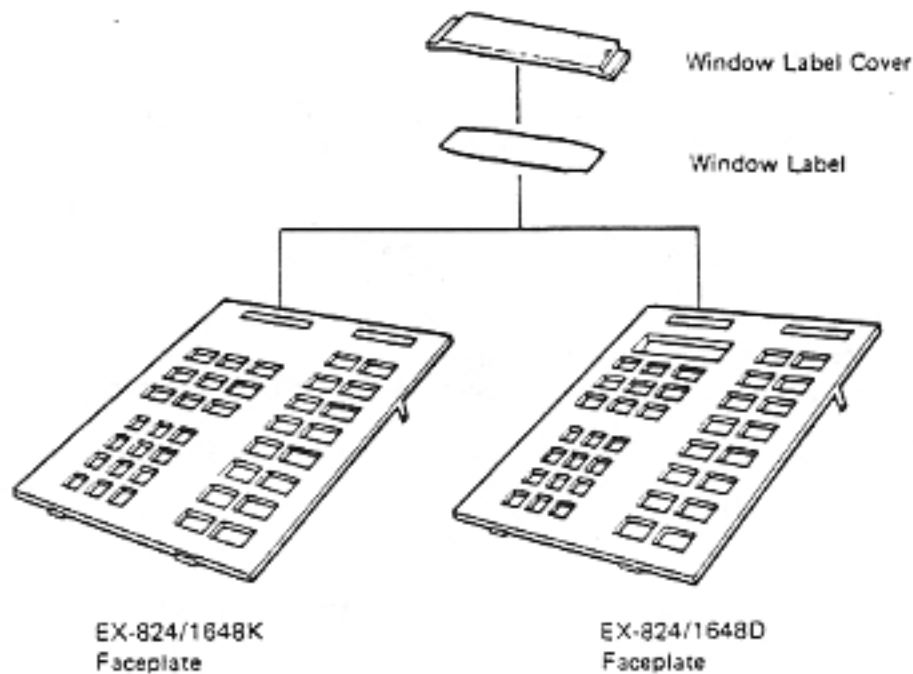


Figure 3.10.4.2.(1)B EX-824/1648K and EX-824/1648D Faceplate and Components

(2) 128K pedestal standard installation and 6-6M modular cord (AG) processing

The 128K pedestal may be used in mounting a key telephone on a wall, but for our purpose here, the pedestal installation procedure to be followed in installing a key telephone at an angle for easy operation is illustrated in Figures 3.10.4.2(2)A, B, and C. Insert the front tabs of the 128K pedestal into the two slots in the front part of the 128K lower housing, and push the rear part of the 128K pedestal until the rear tabs are inserted into the two slots in the rear of the 128K lower housing. To remove the pedestal, reverse the above procedure.

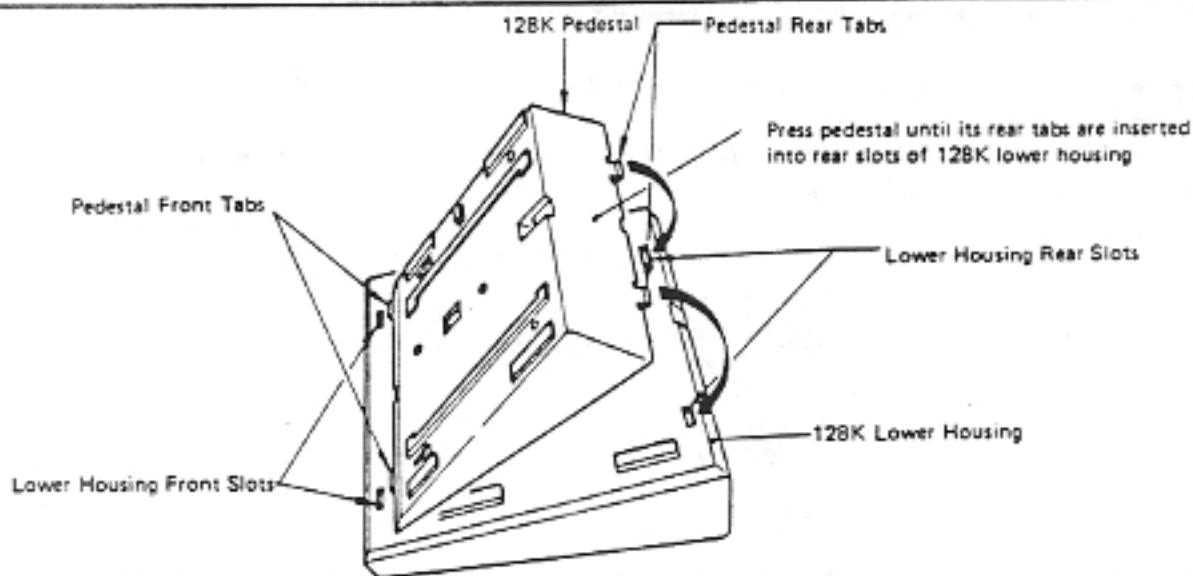


Figure 3.10.4.2 (2) A 128K Pedestal Installing

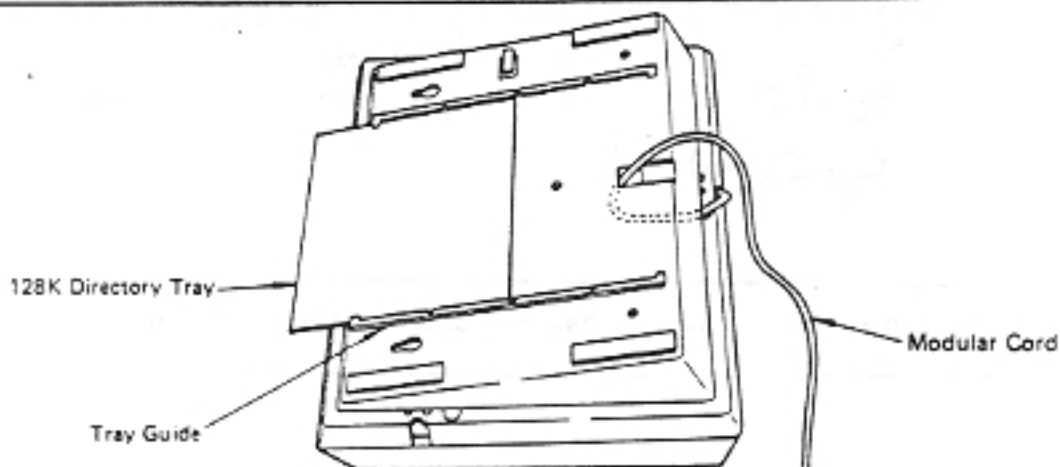


Figure 3.10.4.2 (2) B Modular Cord Processing

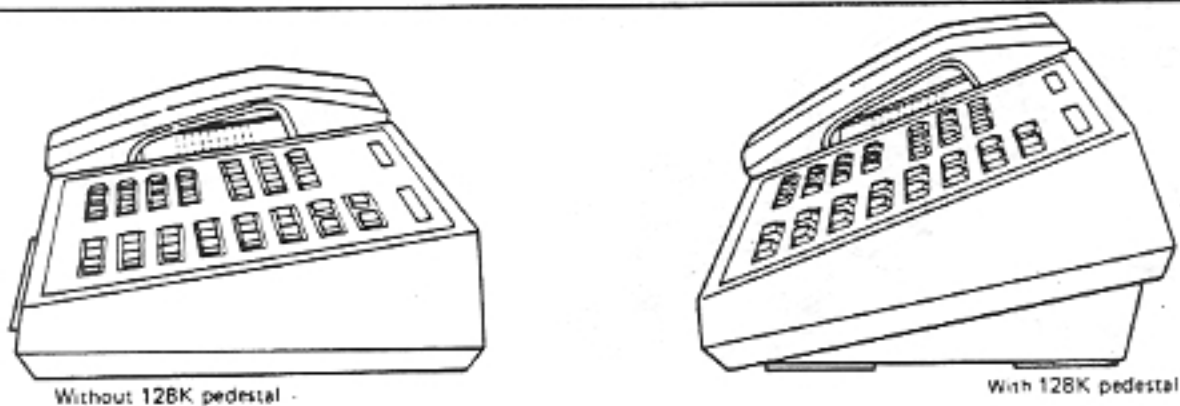
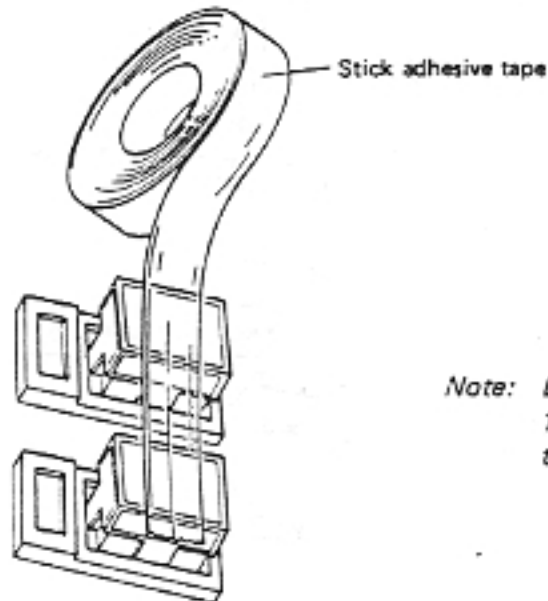


Figure 3.10.4.2(2)C Key Telephone Set on Pedestal

(3) 128K key cap removal and 128K CO key label/EX-SECR label insertion

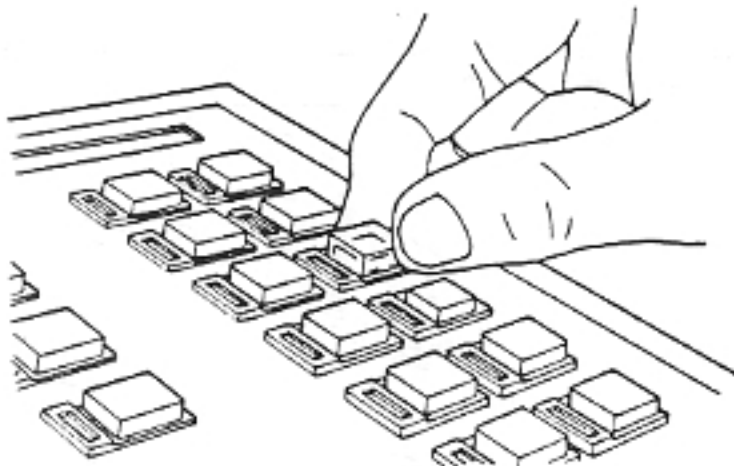
Stick cellophane tape or the like to the tops of the 128K key caps, and pull up the tape to remove the caps from the key telephone.

Key caps can also be easily removed by pulling them up with your fingers without using cellophane tape. See Figures 3.10.4.2.(3)A and B.



Note: Lightly stick cellophane tape to 128K key caps, and pull up the tape to remove the caps easily.

Figure 3.10.4.2.(3)A Removing 128K Key Caps With Cellophane Tape



Note: Hold 128K key cap firmly and pull it up to remove it from the key.

Figure 3.10.4.2.(3)B Removing 128K Key Caps With Fingers

After removing the 128K key caps, type out the necessary information on the EX-KT key labels, place them on the key tops, re-insert the 128K key caps.

Figure 3.10.4.2.(3)C shows enlarged view of the above process.

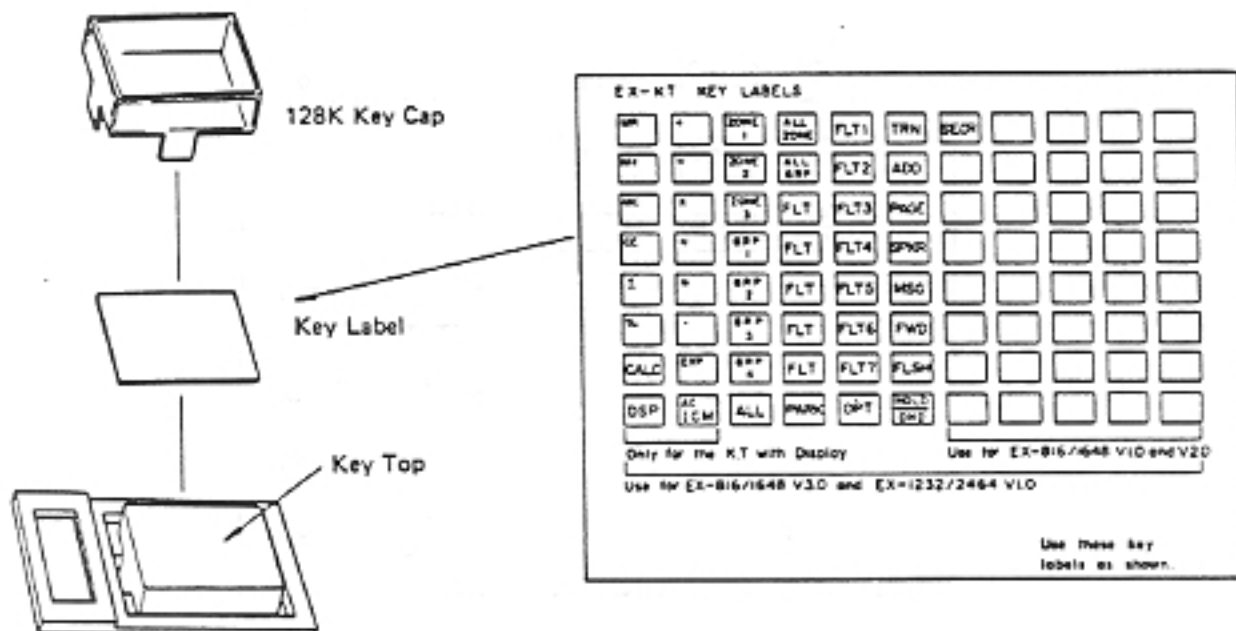


Figure 3.10.4.2.(3)C Label Installation

All the keys except FEAT key and ICM key can be allocated freely by flexible key assignment. Default values are shown below.

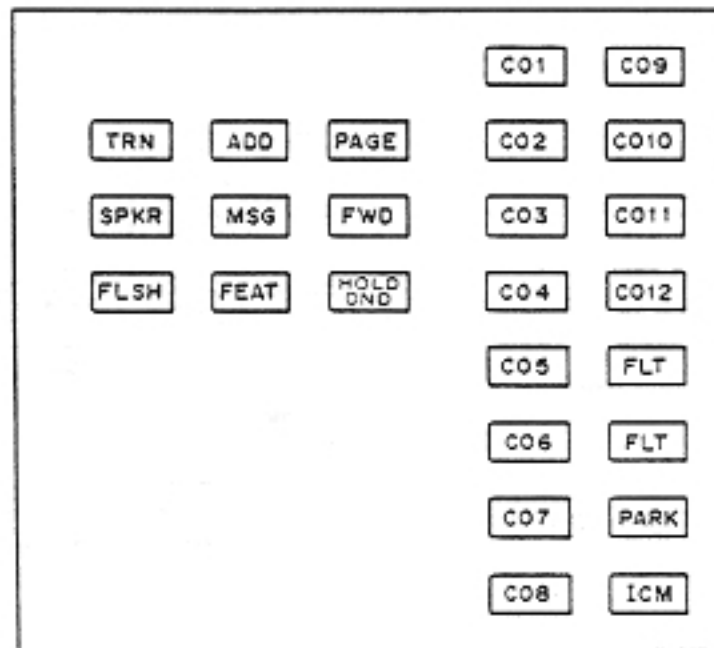


Figure 3.10.4.2.(3)D KT Default Key Assignment

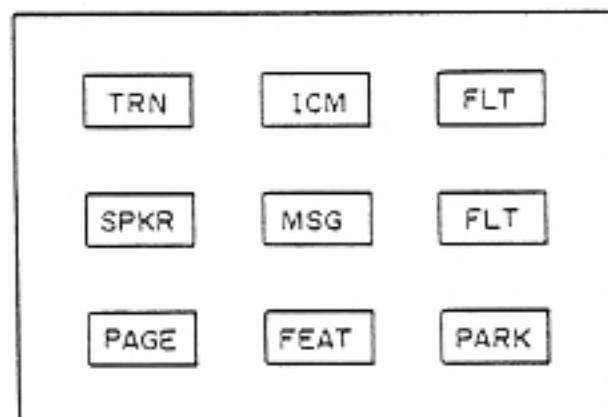



Figure 3.10.4.2.(3)E VP Default Key Assignment

- Stick the marks on operation keys as shown in Figure 3.10.4.2.(3)F when calculator function is used.
- Allocate CALC keys to the keys with .
- Calculator function can be used only with the key telephone with display unit.

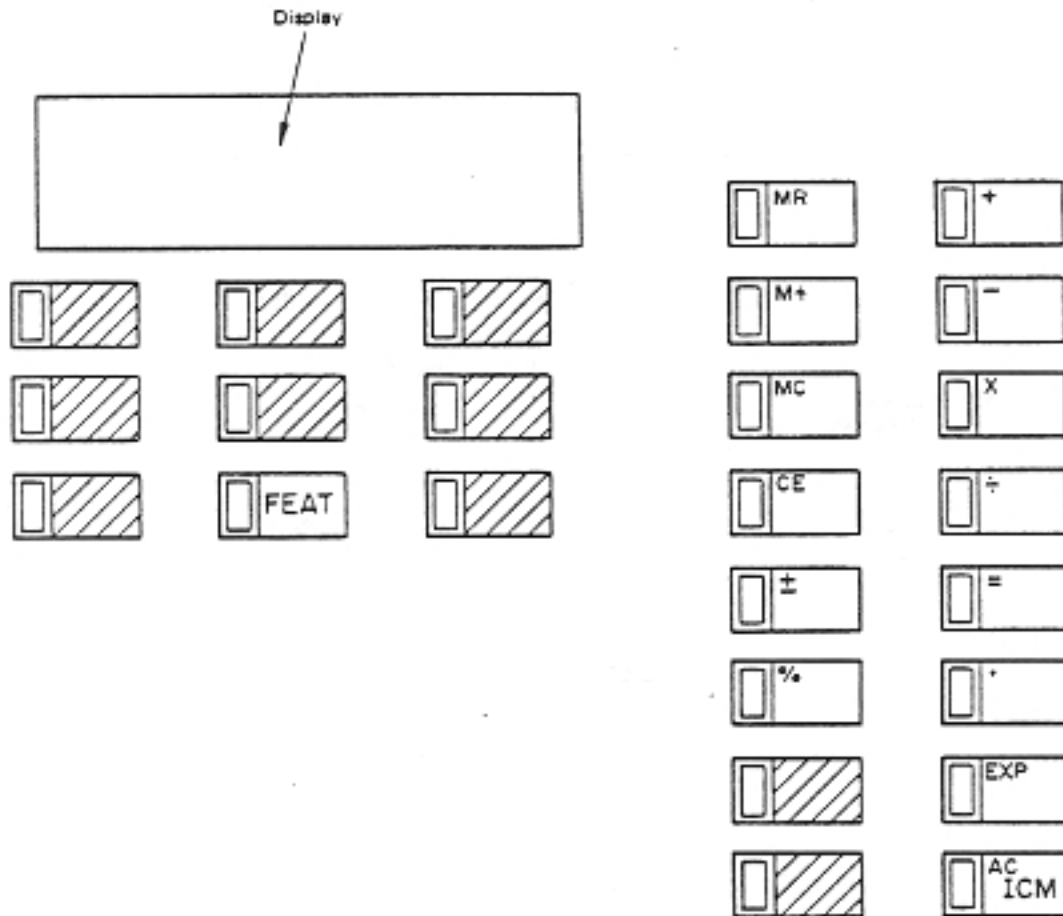


Figure 3.10.4.2.(3)F

(4) Key telephone wall mounting procedure

A key telephone can be easily mounted on a wall by reversing the 128K pedestal and the 82 handset wall bracket that is attached to the handset. Here is the procedure:

- (a) Plant the supplied wood screws, WR(+) 3.8 x 16S, in a wall, using the 128K pedestal as a gauge to determine the installation position as shown in Figure 3.10.4.2.(4)(a).

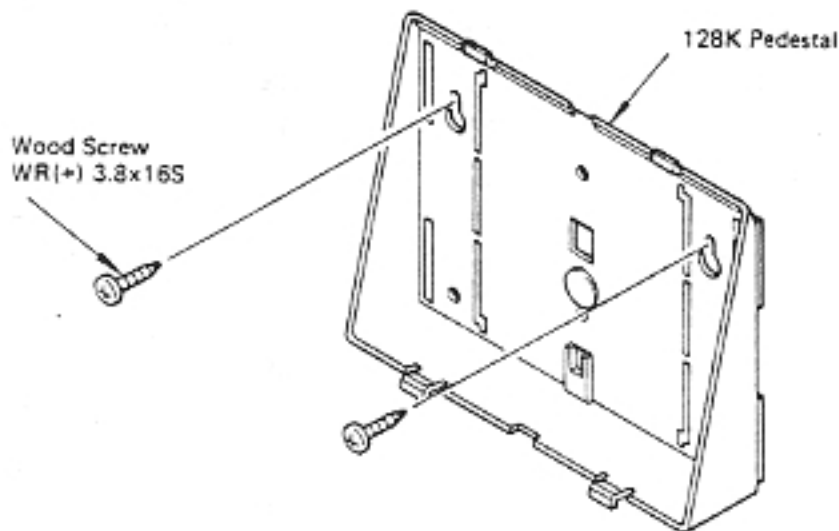


Figure 3.10.4.2.(4)(a) Mounting 128K Pedestal on Wall

- (b) Install the supplied 128K pedestal on the 128K lower housing in the direction opposite to that of normal mounting.
If the 128K pedestal is already mounted in the normal direction, remove it and remount it in the opposite way as shown in Figure 3.10.4.2.(4)(b).

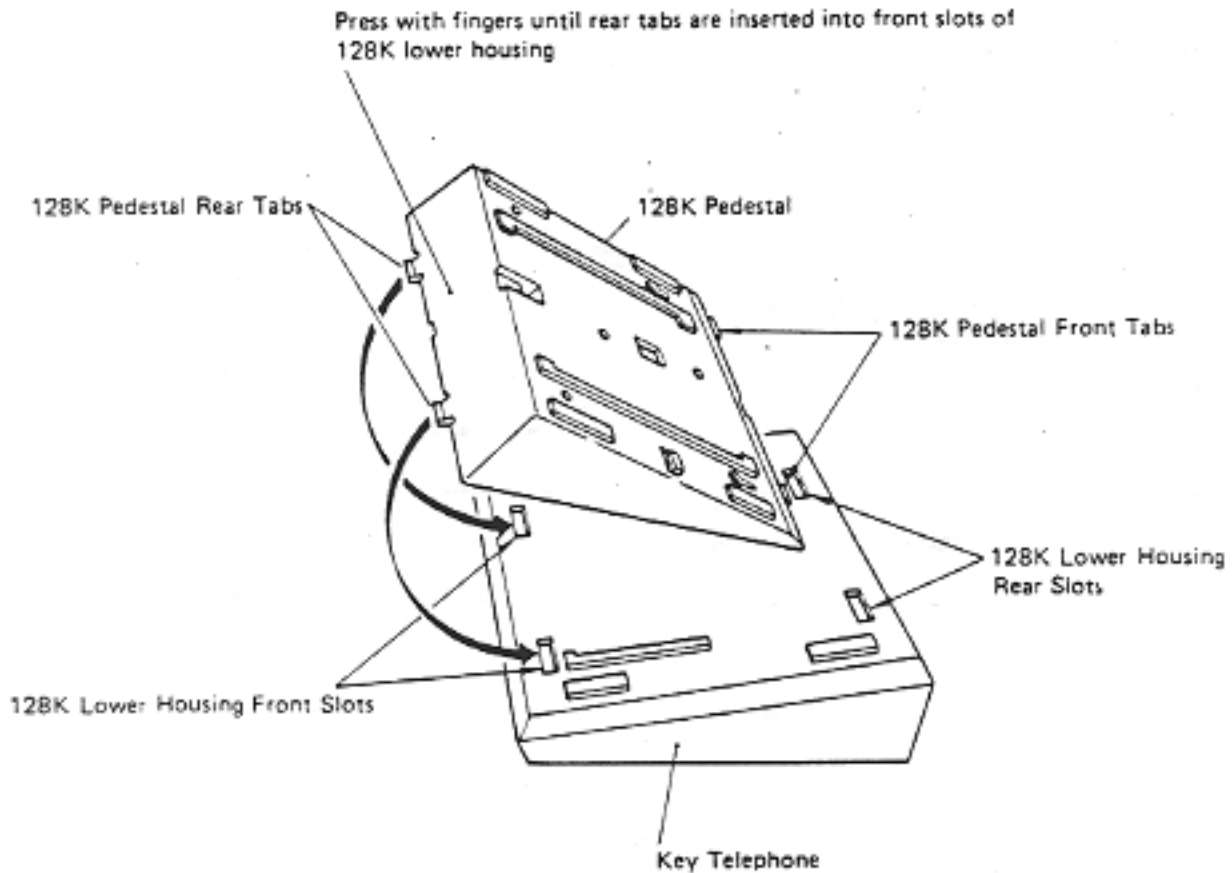


Figure 3.10.4.2(4)(b) Mounting 128K Pedestal on 128K Lower Housing

- (c) Fasten the key telephone to the screws that were planted in the wall.
- (d) The 82 handset wall bracket is fitted inside the transmitter end of the 82 handset handle base of the handset. Insert the tip of a ballpoint pen or a thick clip (1.4 to 1.0 mm ϕ AWG #16, #17, or #18) into the hole in the 82 handset wall bracket, and pry it open. The above process is illustrated in Figures 3.10.4.2(4)(d)A and B.

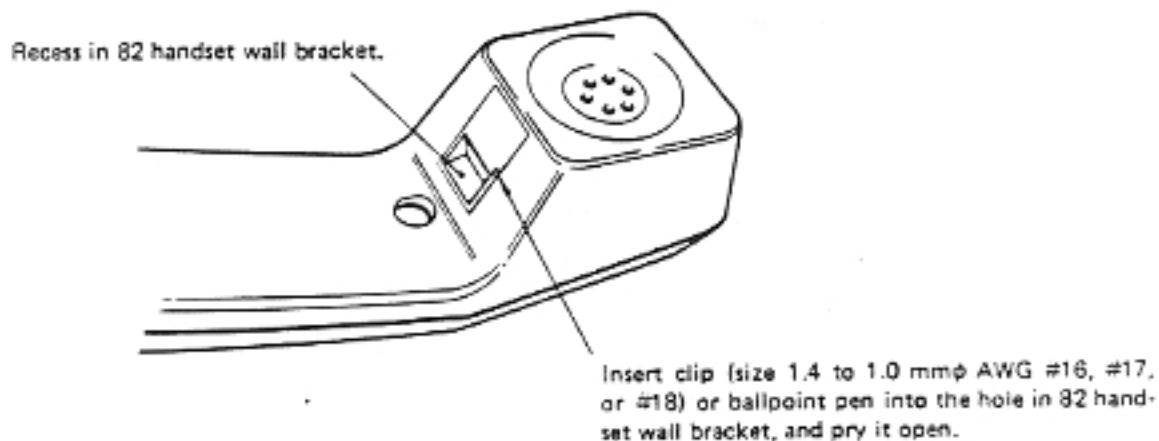


Figure 3.10.4.2(4)(d)A Handset in Normal State

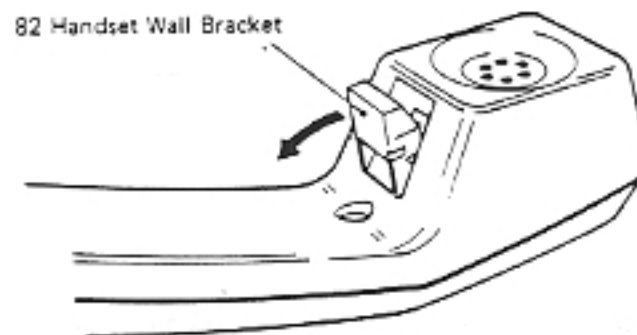


Figure 3.10.4.2(4)(d)B 82 Handset Wall Bracket Taken out of Handset

- (e) When the 82 handset wall bracket is completely out of the handset, turn it around, and fit it back into place so that the recess in the 82 handset wall bracket is closer to the transmitter. This process is shown in Figures 3.10.4.2(4)(e)A and B.

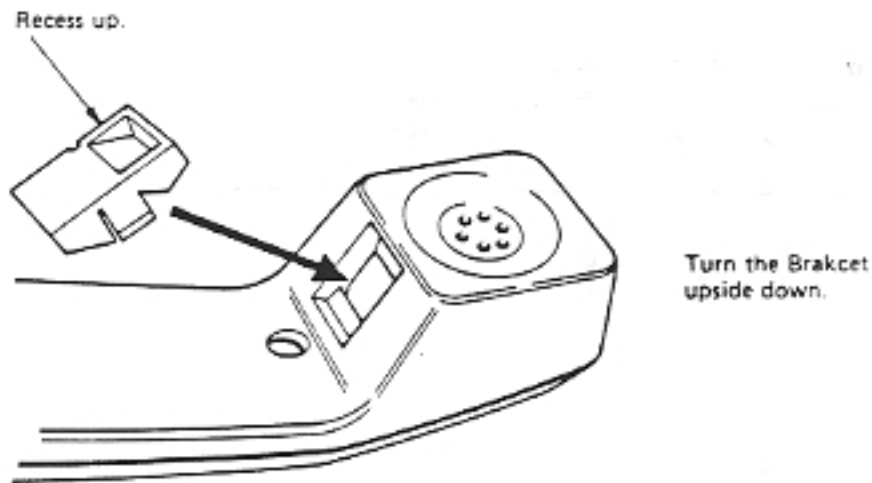


Figure 3.10.4.2(4)(e)A Turn the 82 Handset Wall Bracket Around so its Recess is up, and Fit it Back into Place.

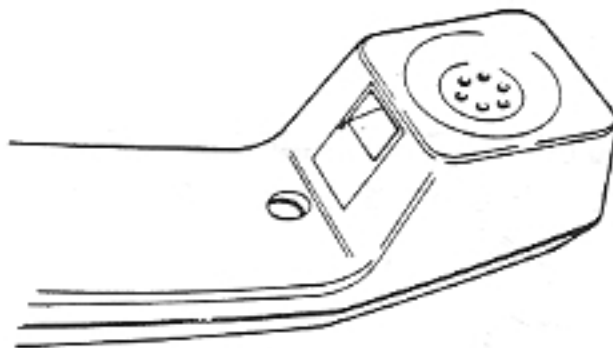


Figure 3.10.4.2(4)(e)B Handset Ready for Wall-Mounted Key Telephone

- f) Check that the handset can now be secured on the wall mounting hook that projects from the receiver side of the 128K upper housing.

- (g) The 128K extension directory tray can be slid along the rails on the 128K pedestal from above or underneath as desired.
- (h) Depending on how the 128K directory tray is mounted, pass the modular cord through the hole in the 128K pedestal or clamp it with a cord clamp so that it runs downward. These methods are illustrated in Figures 3.10.4.2(4)(h)A, 3.10.4.2(4)(h)B, and 3.10.4.2(4)(h)C.



Figure 3.10.4.2(4)(h)A Modular Cord and 128K Pedestal Processing 1
(128K Directory Tray mounted in up position)

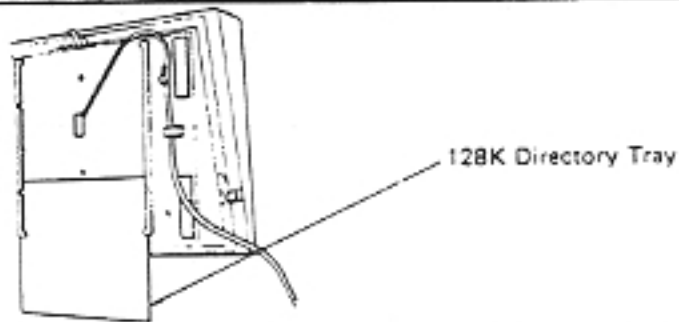


Figure 3.10.4.2(4)(h)B Modular Cord and 128K Pedestal Processing 2
(128K Directory Tray mounted in down position)

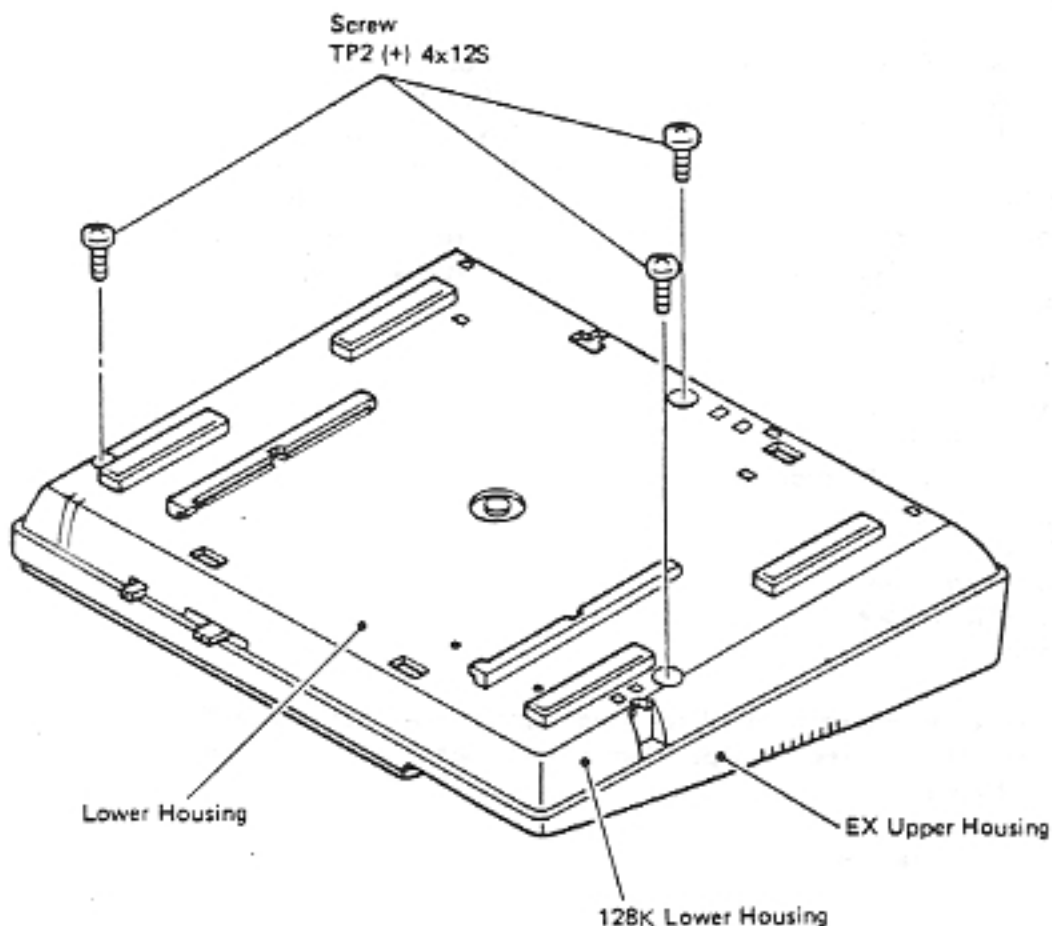


Figure 3.10.4.2(4)(h)C Key Telephone Mounted on Wall

(5) EX upper housing and 128K lower housing opening.

It is necessary to open both housings in installing optional units. These two housings can be opened by removing the three screws, TP2 (+) 4x12S, that fasten the 128K lower housing, using a screwdriver.

This is illustrated in Figure 3.10.4.2(5).



CAUTION

Be careful not to pinch the internal wires between the upper housing and lower housing during reassembly.

Figure 3.10.4.2(5) Opening the Housing

3.10.4.3 Feature Assignment

Any of the following classes of service can be assigned to the EX-824/1648K and EX-824/1648D key telephones:

- Tenant Group
- Secretary Attribute
- Protected Attribute
- Executive Attribute
- Call Forward/Busy Call Forward
- Off-Hook Signal Deny
- Off-Hook All Call Deny
- All Call Deny
- Hold Recall Deny
- Speed Dial Access Deny
- Toll Speed Dial Access Deny
- CO Auto-Answer Deny
- ICM Auto-Answer Deny
- Paging Call Access Deny
- Call Forward Deny
- Do Not Disturb Deny
- Toll Dial Class of Restriction
- CO Outgoing Level
- ANA Level
- Pickup Restriction
- Direct Station Speed Dial
- Automatic ICM
- Optimized Call Routing Access Deny
- Equal/SCC Access Deny
- Toll Dial Class of Restriction
- CO Outgoing Level
- Route Advance Step
- Pickup Restriction
- KT Key Assignment
- Personal ID Code
- Versa Phone Attribution
- Direct Station Speed Dial
- Automatic ICM

Use the system programming terminal for assignment of classes of service. For the planning procedure, refer to section 2.3, Features and Operation. For the actual assignment procedure, refer to section 4, Installation (Software).

3.10.4.4 Optional Features

(1) Description of features

A headset, SHHD (Station Hard-of-Hearing Handset — amplifier handset), or SNHD (Station Noise-Canceling Handset) can be connected to an EX-824/1648K and EX-824/1648D. These key telephones can be provided with one of these optional features by using special adaptor SHSA-M or SHHA-M and setting an STJ inside the EX-824/1648K or EX-824/1648D in mounting a headset or SNHD, or by simply setting an STJ inside the EX-824/1648K or EX-824/1648D in mounting an SNHD.

Other optional features are available, including the SRNG-M, which controls an external station loud ringer (with a relay contact output), and SSPU-M for hand-free talk, a feature exclusive to the EX-824/1648K and EX-824/1648D. For details, refer to Table 3.10.4.4(1)A.

Table 3.10.4.4.(1) A Optional Features

NO.	Feature	Description
1	Headset	A turn-key type headset (Starset or Jack Set made by Plantronics) may be connected interfaced with specified adaptor SHSA-M. An engaged call over the headset cannot be switched to the handset or vice versa.
2	SHHD (Station Hard Hearing Handset — amplified handset)	The SHHD (amplified handset) is designed to provide receiving signals at an amplified level, mainly for those who have difficulty in hearing. Replace the SOHD (Station Ordinary Handset) with SHHD attaching to the modular cord, and mount the specified adaptor SHHA-M in the Key Telephone.
3	SNHD (Station Noise Canceling Handset)	The SNHD is recommended for satisfactory communication in factories or other high-level noise locations where it is difficult to communicate through the SOHD. To use this handset, replace it with the ordinary handset, using the modular jack.
4	External station loud ringer	If ambient noise is too loud, if ringing must be heard away from the station, a commercial loud ringer can be used. In using a commercial loud ringer, install the SRNG-M adaptor that has a relay contact output to repeat a cycle of 1 second on and 3 seconds off when an incoming call accesses the station. <i>CAUTION</i> <i>Do not use the relay contact output of SRNG-M to switch on and off the AC main power of a commercial loud ringer.</i>
5	Hands-free talk	Hands-free talk is an optional feature for conversing through the built-in microphone and speaker of an extension without using the handset or headset. If an EX-824/1648K or EX-824/1648D is to use this feature, install the SSPU-M unit in the station.

Note: One of the following options can be connected to an EX-824/1648K or EX-824/1648D: headset, SHHD (Station Hard Hearing Handset), or SNHD (Station Noise Canceling Handset); plus the SRNG-M adaptor or SSPU-M unit.

The units to be used and installation procedures for these options are shown in Table 3.10.4.4.(1)B.

Table 3.10.4.4(1)B Optional Unit Installation Requirements

Optional Unit	Connector on KTSP-M		STJ on KTSP-M				Headset to Use	Other
	CONN 1 (10-pin)	CONN 2 (11-pin)	SET 1	SET 2	SET 3	SET 4		
SHSA-M (Station headset Adaptor-M)	use	/	set	/	set	/	Starset headset (Plantronics)	JS-180 (Jack set)
SHHA-M (Station hard-of-hearing handset adaptor-M)	use	/	/	/	set	set	SHHD (Station hard-of-hearing handset)	
SSPU-M/RNI (Station speakerphone unit-M)	/	use	/	/	/	/	SOHD (Station ordinary handset)	
SRNG-M (Station loud ringer unit-M)	/	use	/	/	/	/	SOHD (Station ordinary handset)	
SNHD (Station noise-canceling handset)	/	/	/	set	/	/	SNHD (Station noise-canceling handset)	

STJ Setting

To set, pull the STJ out of the jumper connector and fit it back on pins 2 and 3.

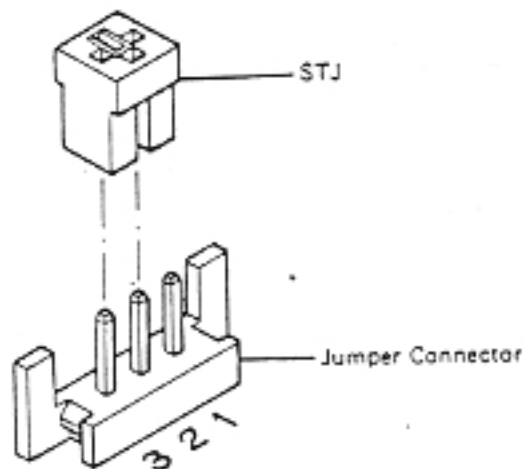


Table 3.10.4.4(1)C EX-824/1648 K, D, KN, DN, KN1, DN1, VP-N1 Optional Equipments

Optional Equipment	Note	K	D	KN	DN	KN1	DN1	VP-N1
Headset AC-011	1	X	X	X	X	X	X	X
Headset Adaptor SHSA-M	2	X	X	X	X	X	X	
External Speakerphone Adaptor ESPA-N				X	X	X	X	X
Station Speakerphone Unit SSPU-M		X	X					
Station Speakerphone Unit SSPU-N				X	X	X	X	
Station Speakerphone Unit SSPU-NS.				X	X	X	X	
Station Speakerphone Unit SSPU-RN1	3	X	X	X	X	X	X	
Hands Free Answer Back Unit HFAB-R	4	Not Required	Not Required	Not Required	Not Required	Not Required	Not Required	Not Required
Noise Prevention Handset SNHD		X	X	X	X	X	X	X
Hard-of-hearing Handset SHHD		X	X	X	X	X	X	X
Hard-of-hearing Handset Adaptor SHHA-M	5	X	X	X	X	Not Required	Not Required	Not Required
Station Loud Ringer Unit SRNG-M		X	X	X	X	X	X	

- Note: 1. Headset AC-011 does not detect hook-switch signals, so hooking with the handset is necessary.
 2. The SHSA-M is an adaptor for starset of plantronics.
 3. When mounting an SSPU-RN1 on a K or D key telephone, an SMPA-B (SSRU-RN1 Mount Plate Assembly - B) is required.
 4. HFAB (Hands Free Answer Back circuits) are built in the K, D, KN, and DN. The HFAB-R circuits are initially built in the VP-N1.
 5. SHHA circuits are built in the KN1, DN1, and VP-N1.

(2) Optional unit installation procedure

(a) General

Additional features can be provided by installing optional units in or around a key telephone. Six optional units (SHSA-M, SHHA-M, SSPU-U, SRNG-M, SHHD, and SNHD) are available for mounting in or on a key telephone. These optional units are listed in Table 3.10.4.4(1)B.

The basic method for installing these options is to open the EX upper housing and 128K lower housing, install the desired unit, and make the necessary settings.

The place for each of these options is shown in Figure 3.10.4.4(2)(a). Pass the external cable, such as from SHSA-M, through the hole opened by breaking the external cable tab in the rear of the 128K lowering housing, as shown in Figure 3.10.4.4(2)(a).

The key telephone housing can be opened by removing the three screws on the bottom, as shown in Figure 3.10.4.2 (5).

The upper housing and lower housing of the key telephone are connected to each other with leads, so do not forcibly pull or separate them.

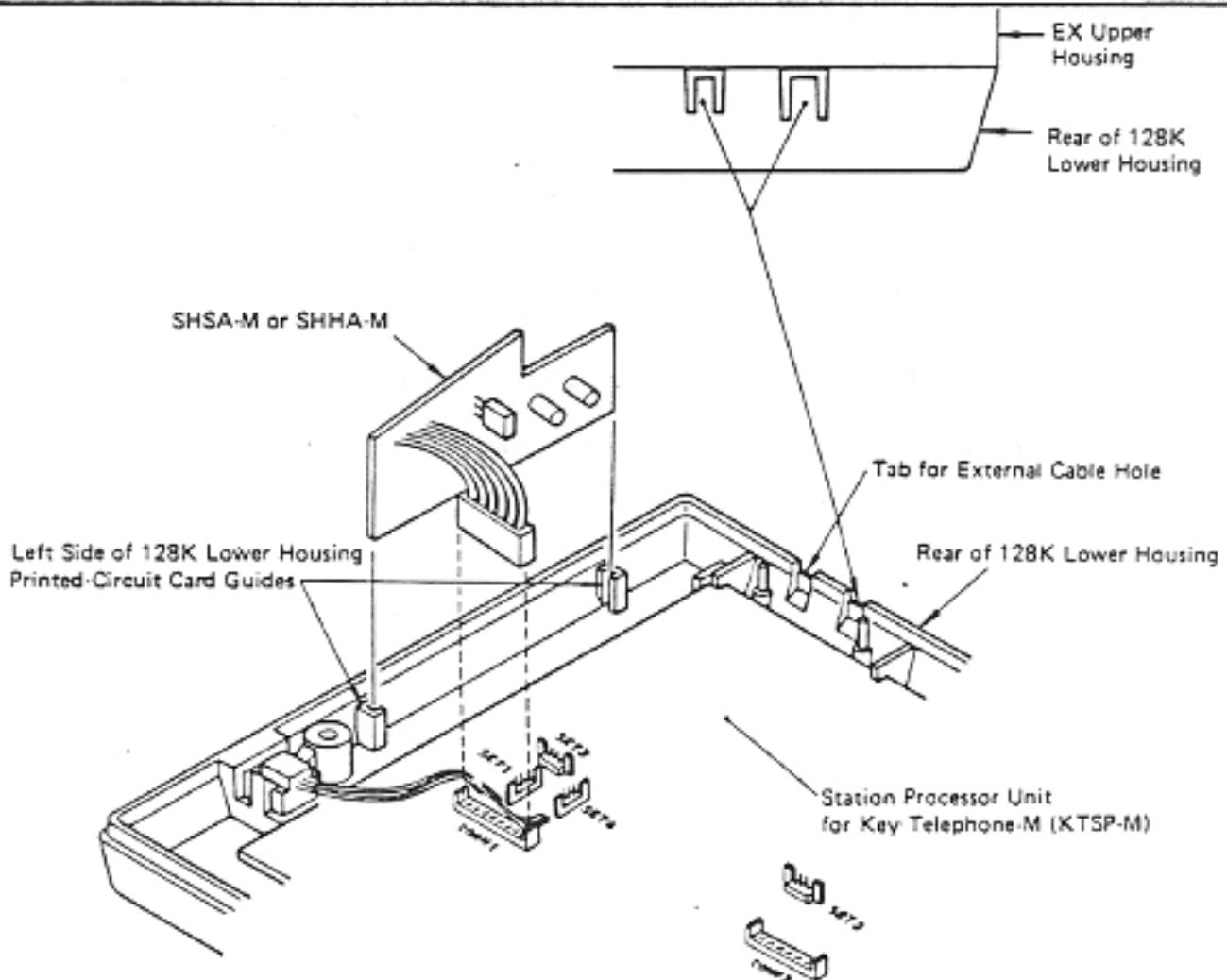


Figure 3.10.4.4(2)(a) Optional Unit Mounting in Key Telephone

(b) SHSA-M and headset installation procedure

SHSA-M is a combination of a Starset headset made by Plantronics (Graver catalog No. HSO108 or HSO143) with a jackset (Grayver catalog No. Model JS180).

Insert the spade terminals of the jackset into the SHSA-M terminals, color by color. For details, see Table 3.10.4.4(2)(b).

Table 3.10.4.4(2)(b) Connection of Jackset to SHSA-M by Colors

Cord Color of Jack set	SHSA-M terminal symbol
Brown	BR
Black	BK
Violet	V
Red	R
Blue	BL
White - Blue	W-BL
White - Green	W-G
White	W
White - Red	W-R
White - Brown	W-BR
Slate	S
Yellow	Y

Mount the SHSA-M in the left part of the 128K lower housing, and insert its connector in CONN 1. Pass the cable from the jackset through the hole opened by breaking the external cable hole tab.

The settings are shown in Table 3.10.4.4(1)B, and the way in which this option is installed in the 128K lower housing is shown in Figures 3.10.4.4(2)(b)A, B, and C.

Insulate the headset clamp and unused terminals with insulating tape so that they will not short parts of the KTSP-M.

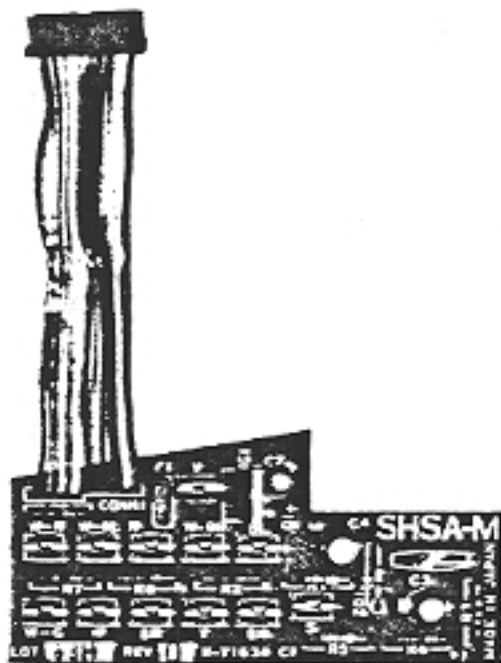


Figure 3.10.4.4(2)(b)A External View of SHSA-M

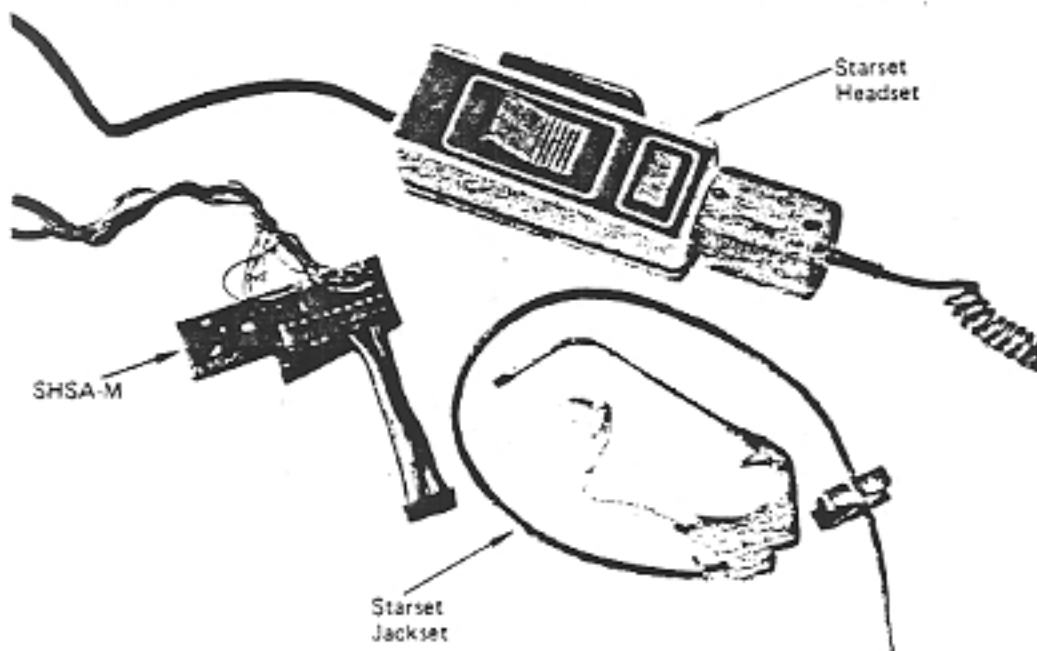


Figure 3.10.4.4(2)(b)B External View of Headset

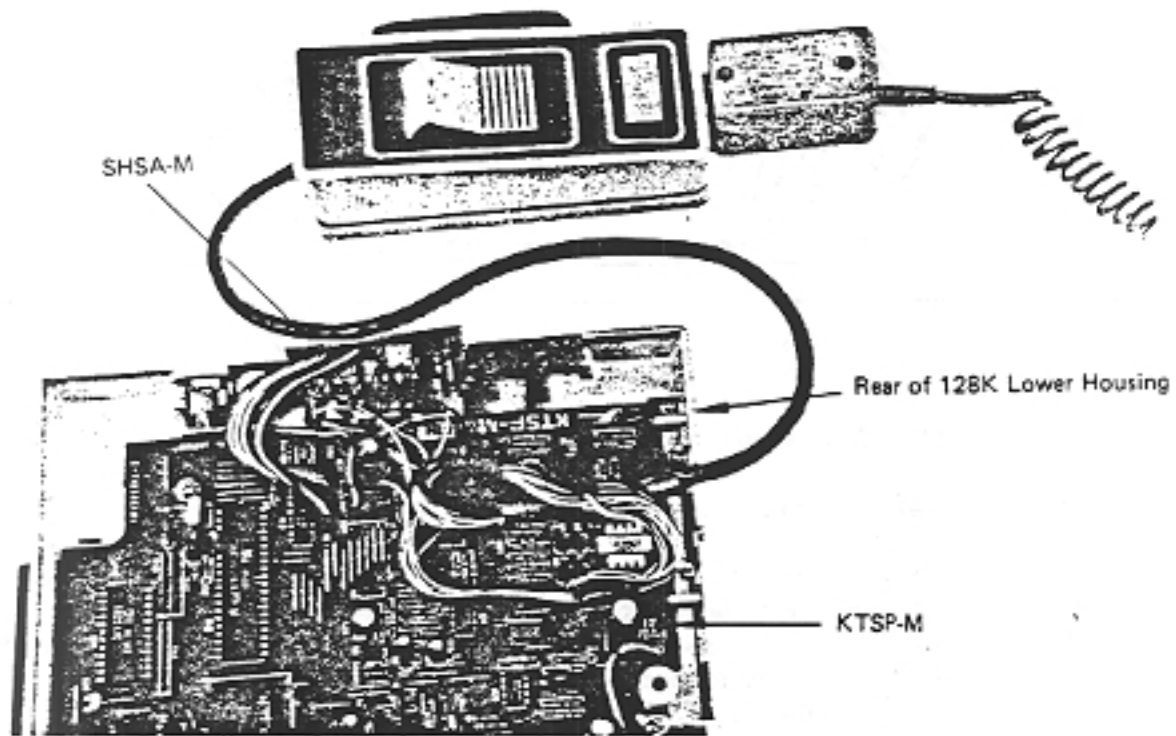


Figure 3.10.4.4(2)(b)C SHSA-M and Headset Mounted in Key Telephone

(c) SNHD installation procedure

Even if ambient noise is loud, clear communication can be made possible by using the Station Noise-Canceling Handset (SNHD).

To install it, jumper pins 2 and 3 of the jumper connector in the key telephone, and connect an SNHD to the key telephone in place of the Station Ordinary Handset (SOHD).

An external view of the SNHD is shown in Figure 3.10.4.4(2)(c).

The SNHD can be modified to suit a wall-mounted key telephone in the same way as the SOHD, as described in paragraph 3.10.4.2.4.

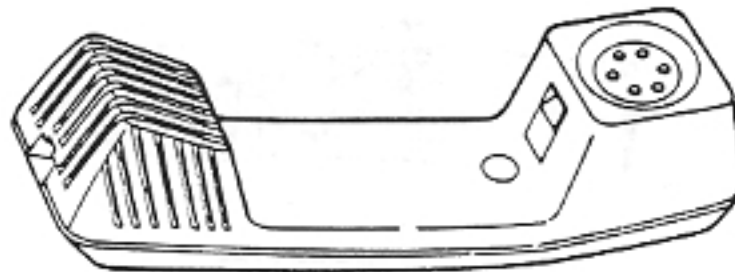


Figure 3.10.4.4(2)(c) External View of SNHD

(d) SHHA-M and SHHD installation procedure

People with hearing problems can hear clearly if a Station Hard-of-Hearing Handset (amplifier handset, SHHD) is used.

To install it, mount the Station Hard-of-Hearing Handset Adaptor-M (SHHA-M), and connect the SHHD to the key telephone in place of the Station Ordinary Handset (SOHD).

External views of the SHHD and SHHA-M are shown in Figures 3.10.4.4(2)(d)A and B. To install the SHHA-M in a key telephone, refer to Figure 3.10.4.4(2)(a) and Table 3.10.4.4(1)B.

The SHHD can be modified to suit a wall-mounted key telephone in the same way as the SOHD, as described in paragraph 3.10.4.2(4):



Figure 3.10.4.4(2)(d)A External View of SHHD

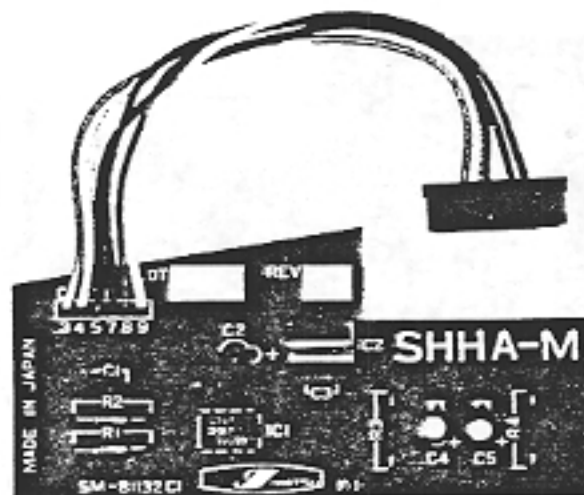


Figure 3.10.4.4(2)(d)B External View of SHHA-M

(e) SSPU-M installation procedure

If an SSPU-M is installed in the EX upper housing, the key telephone is converted into one with a built-in speakerphone.

To install it, fasten the SSPU-M on the inner side of the EX upper housing of a key telephone with two screws, as shown in Figure 3.10.4.4(2)(e), and insert its connector in the KTSP-M CONN 2.

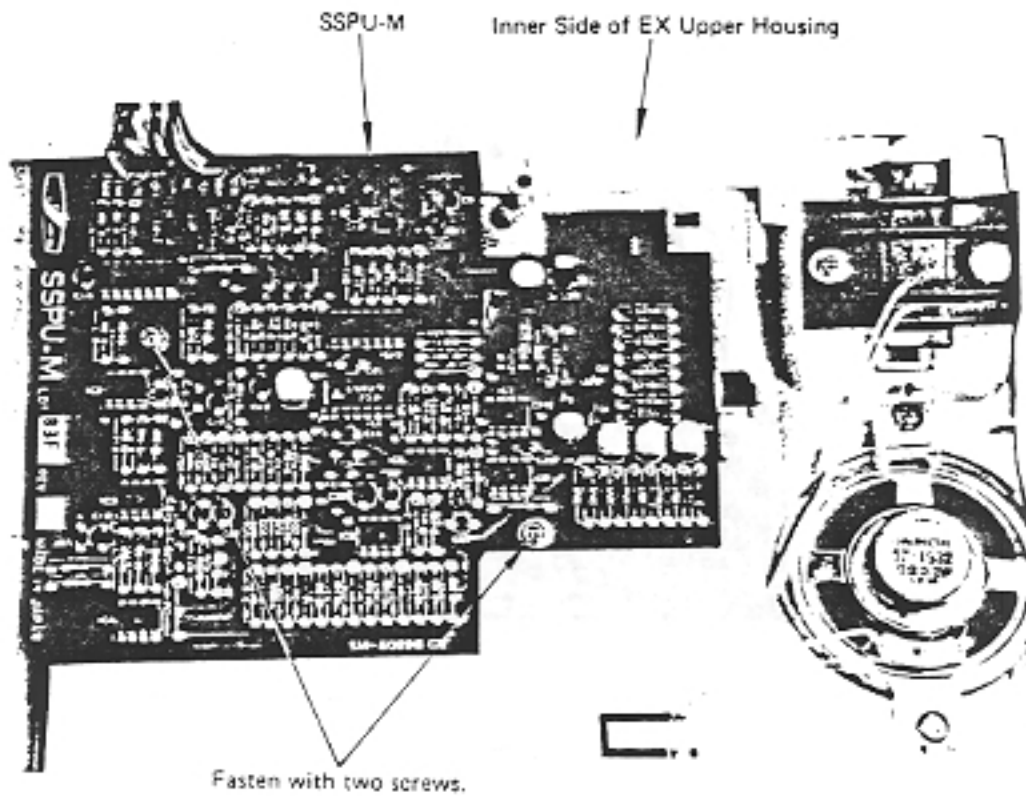


Figure 3.10.4.4(2)(e) SSPU-M Mounted in EX Upper Housing

(f) SRNG-M installation

To connect a commercial loud ringer to a key telephone, use the SRNG-M.

To install the SRNG-M, push it into an inside rear corner of the EX upper housing of a key telephone, and fasten it with a single screw. An external view of SRNG-M is shown in Figure 3.10.4.4(2)(f)B, and SRNG-M mounted in the EX upper housing is shown in Figure 3.10.4.4(2)(f)A.

Pass the external ringer terminal through the hole opened by breaking the external cable tab in the rear of the 128K lower housing.

The ratings of the external loud ringer control relay contact are as follows (commercial power supply of 120 VAC cannot be switched on and off):

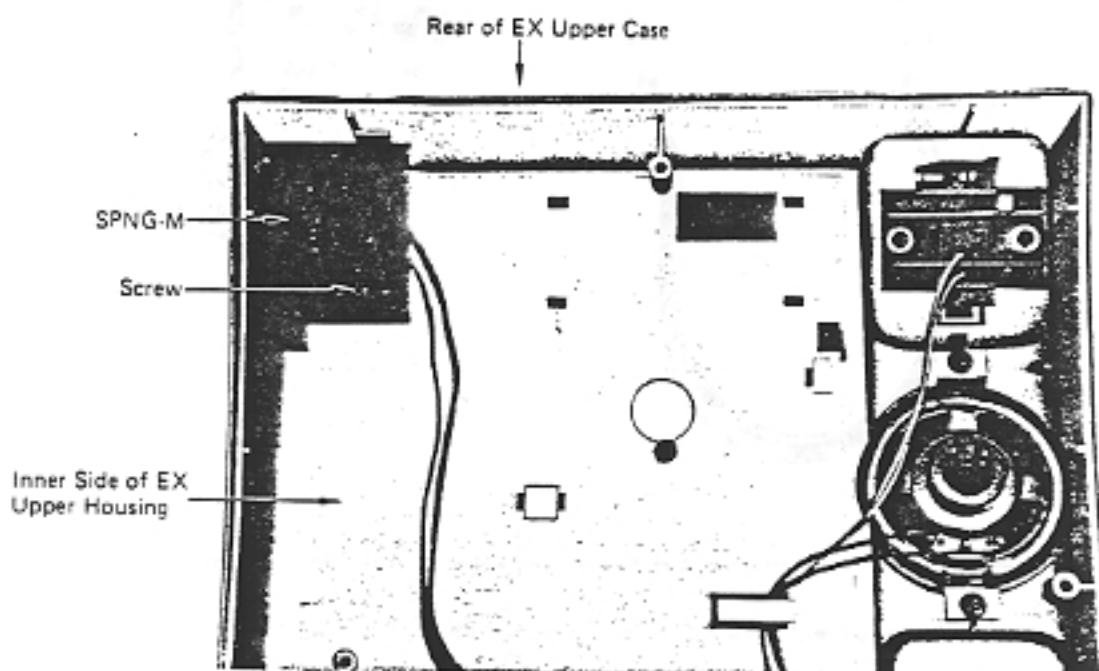


Figure 3.10.4.4(2)(f)A SRNG-M Mounted in EX Upper Housing

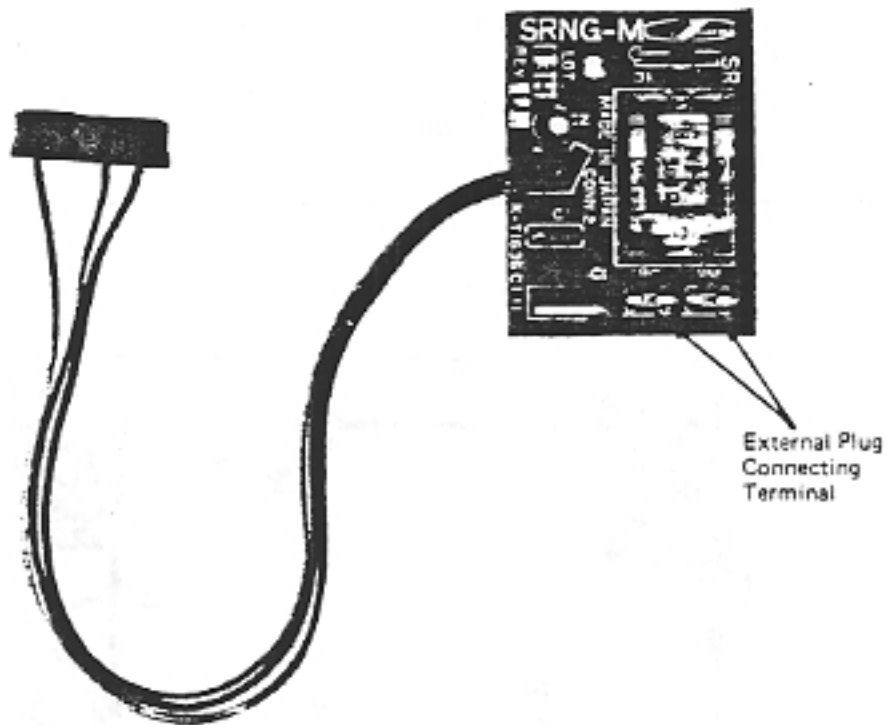


Figure 3.10.4.4(2)(f)B External View of SRNG-M

3.10.5 Single-Line Telephone (SLT) Installation

3.10.5.1 SLT Dial Mask (DMSK-M1)

A single-line telephone can also be provided with various features using the programming terminal (DSS-M or DSS-N). Figure 3.10.5.1 shows a dial mask sheet that indicates at a glance preset features versus dial numbers.

Dial mask sheets are available only for the 2500 type SLT. To put a dial mask sheet on a single-line telephone, peel off the separator from the back of the dial mask sheet, and stick the mask directly on the dial of the SLT. DMSK-M1 is available in two colors: beige, and black.

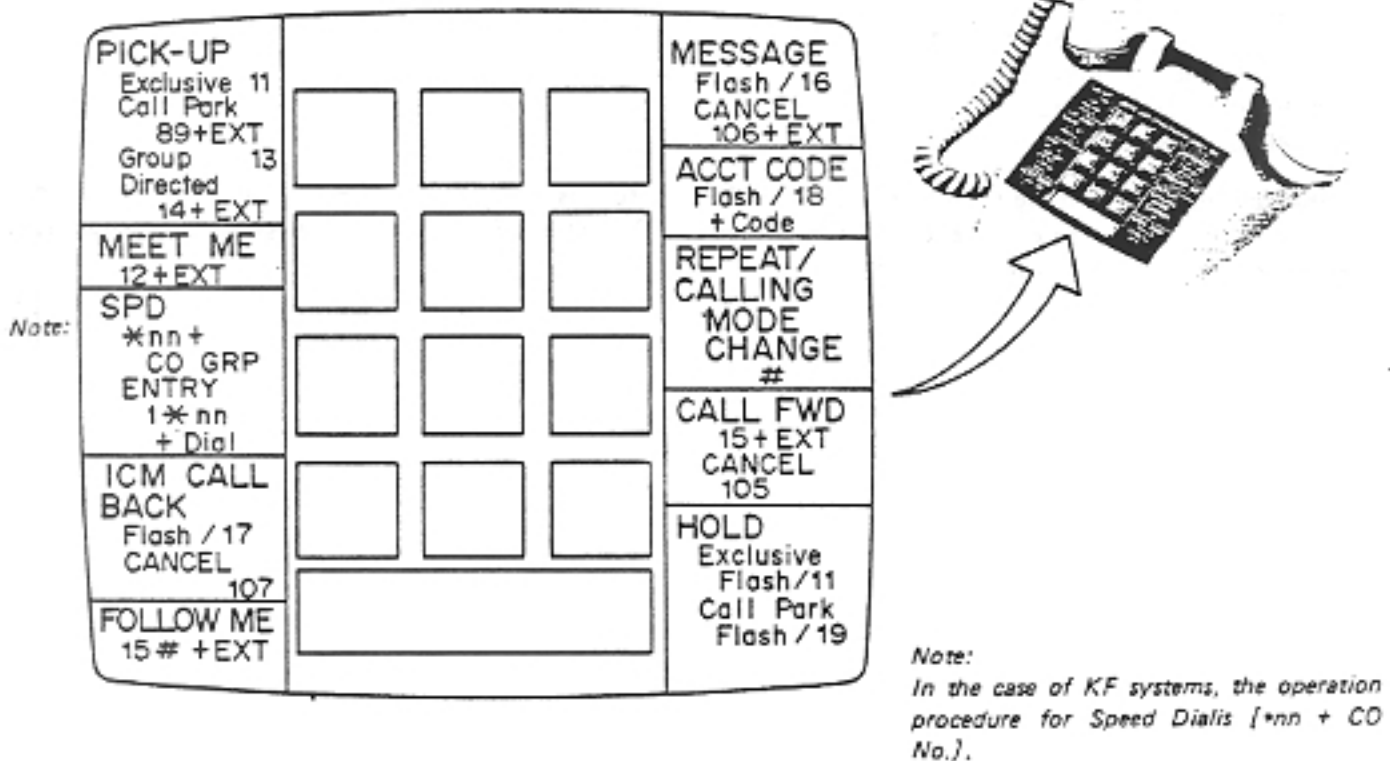


Figure 3.10.5.1 Applying Dial Mask to SLT

3.10.5.2 Feature Assignment

Any of the following classes of service can be assigned to single-line telephones (DTMF type and PULSE type):

- Tenant Group
- Call Forward/Busy Call Forward
- Hold Recall Deny
- Speed Dial Access Deny
- Toll Speed Dial Access Deny
- CO Auto-Answer Deny
- ICM Auto-Answer Deny
- Paging Call Access Deny
- Call Forward Deny
- Optimized Call Routing Access Deny
- Equal/SCC Access Deny
- Toll Dial Class of Restriction
- CO Outgoing Level
- Route Advance Step
- Pickup Restriction

Use the system programming terminals (DSS-M or DSS-N) for assigning any of these classes of service. For the planning procedure, refer to section 2.3, Features and Operation. For the actual assignment procedure, refer to section 4, Installation (Software).

3.10.6. EX-824/1648KN, EX-824/1648DN EX-824/1648KN1 and EX-824/1648DN1 Installation

3.10.6.1 Unpacking

The EX-824/1648KN, DN, KN1 and DN1 are packed in individual boxes together with various accessories, which are shown in Table 3.10.6.1 and Figure 3.10.6.1.A.

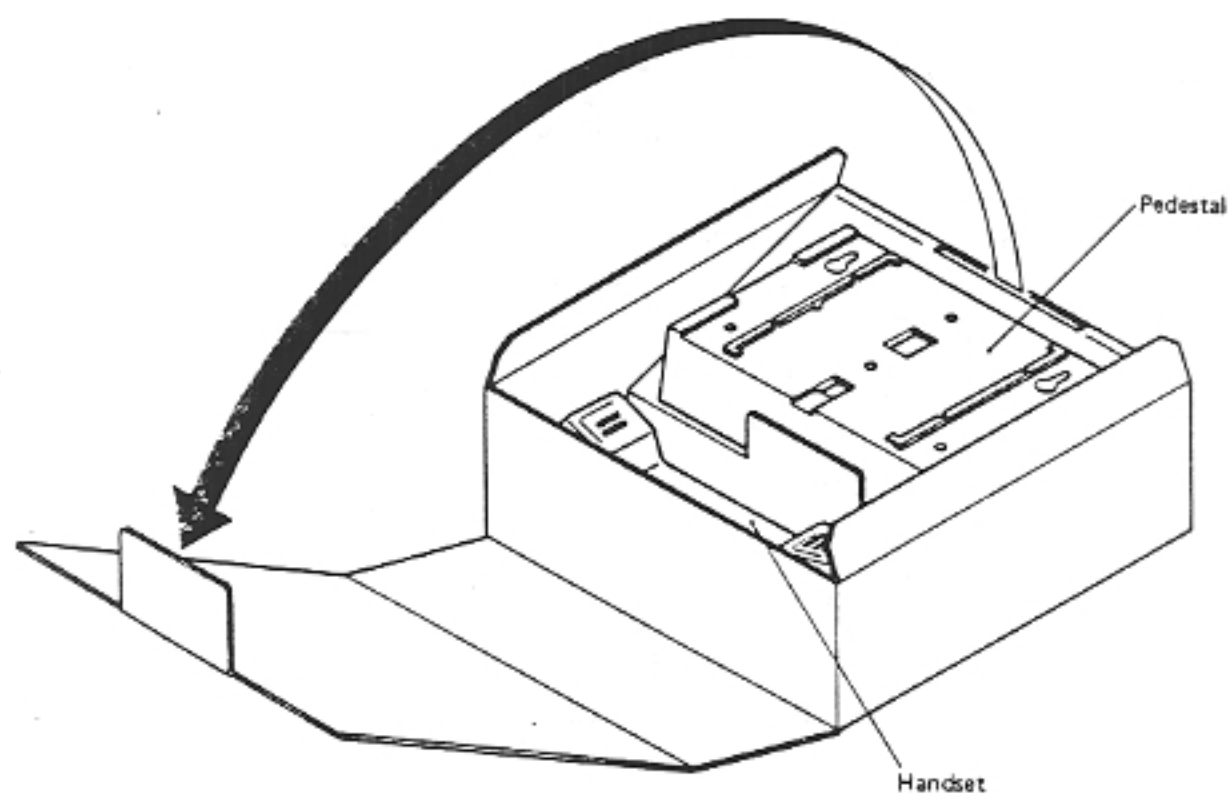
These key telephones are packed as shown in Figure 3.10.6.1.B.

Table 3.10.6.1 Accessories for EX-824/1648K and EX-824/1648D

	Description	Quantity
1	Window label	1
2	EX-KT key label	1
3	6-6M modular cord (AG)*	1
4	128K pedestal	1
5	128K extension directory card	1
6	128K extension directory tray	1
7	Wood screw WR(+) 3.8 x 16S	2

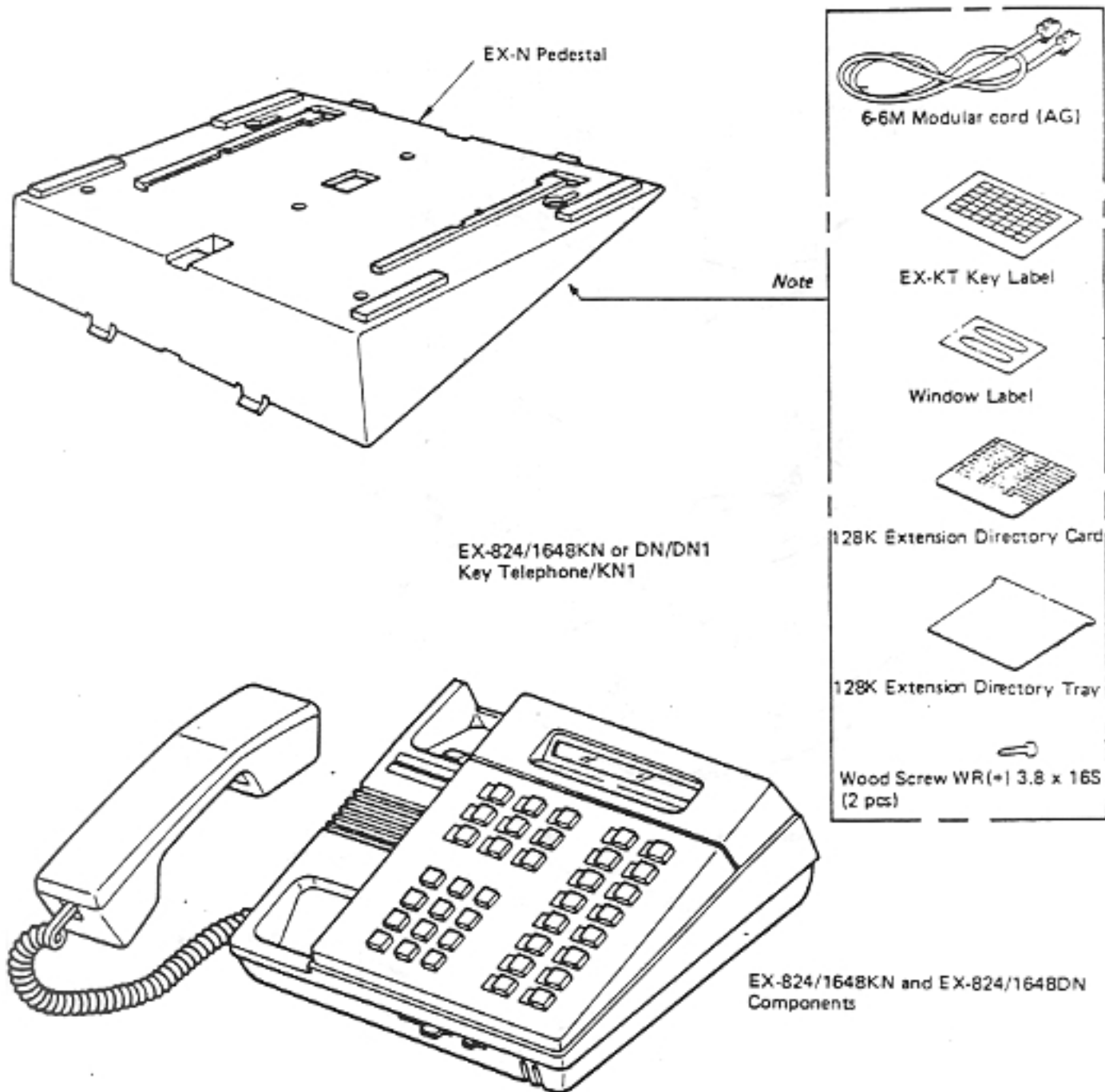
*Modular cord length is about 2.1 m (7 feet).

To return these key telephones for any reason, pack them again as shown in Figure 3.10.6.1.B.



Key Telephone is Placed Under the Pedestal.

Figure 3.10.6.1 .A Unpacking of EX-824/1648KN/KN1 or EX-824/1648DN/DN1



Note: The accessories at right are placed together inside the EX-N pedestal.

Figure 3.10.6.1.B EX-824/1648KN/KN1 and EX-824/1648DN/DN1 Components

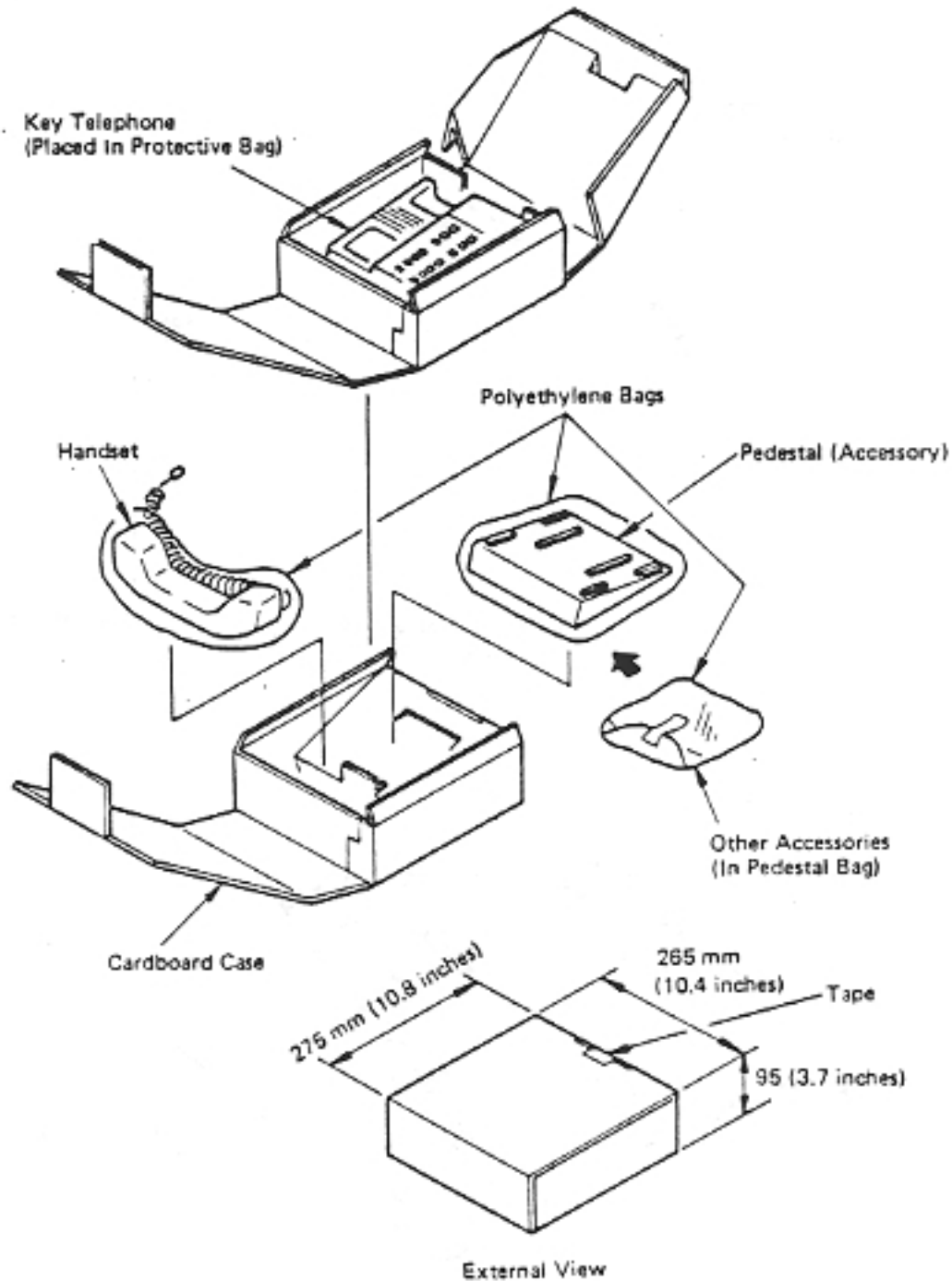


Figure 3.10.6.1C Packing Method for EX-824/1648KN/KN1 or EX-824/1648DN/DN1

3.10.6.2 Handling

(1) Component installation procedures

Window Label Placing

Remove the handset and the window label cover. Write the extension number on the window label, and place it as shown in Figure 3.10.6.2 (1).

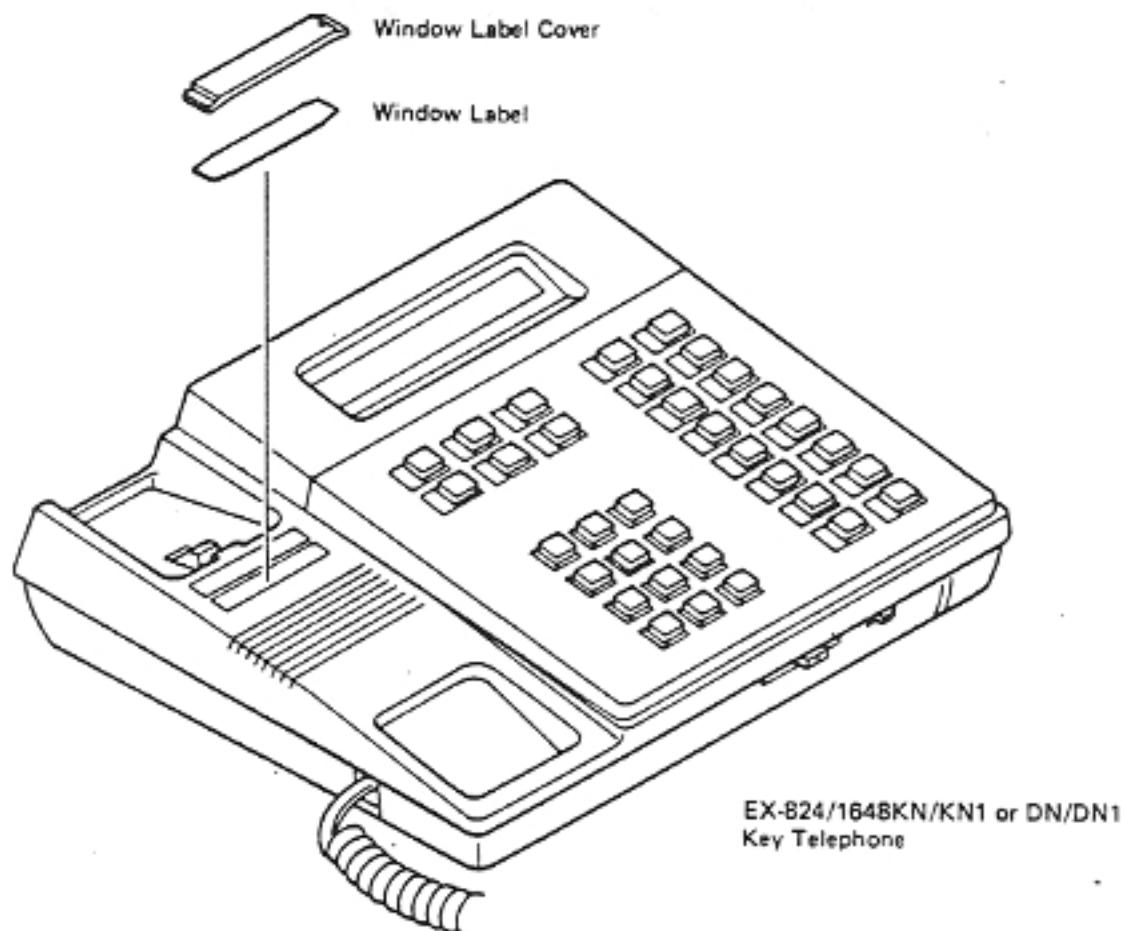


Figure 3.10.6.2.(1) Window Label Placement

(2) EX-N pedestal standard installation and 6-6M modular cord processing

The EX-N pedestal may be used in mounting a key telephone on a wall, but for our purpose here, the pedestal installation procedure to be followed in installing a key telephone at an angle for easy operation is illustrated in Figures 3.10.6.2(2)A, B, and C. Insert the front tabs of the EX-N pedestal into the two slots in the front part of the EX-N lower housing, and push the rear part of the EX-N pedestal until the rear tabs are inserted into the two slots in the rear of the EX-N lower housing.

To remove the pedestal, reverse the above procedure.

Pass the modular cable through the pedestal as shown in Figure 3.10.6.2(2)B.

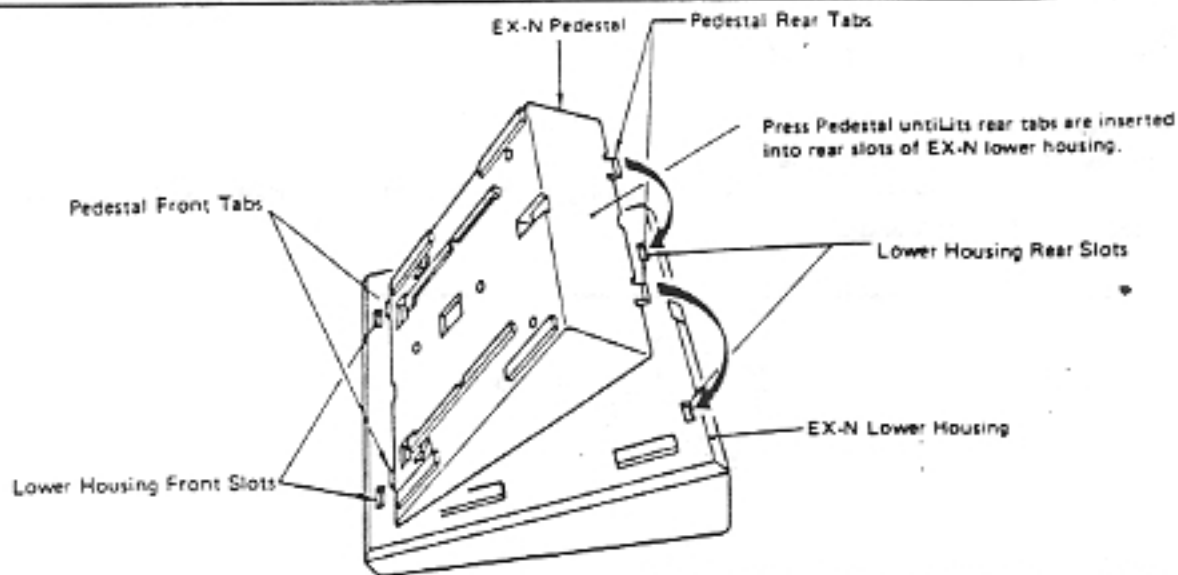


Figure 3.10.6.2(2)A EX-N Pedestal Installation

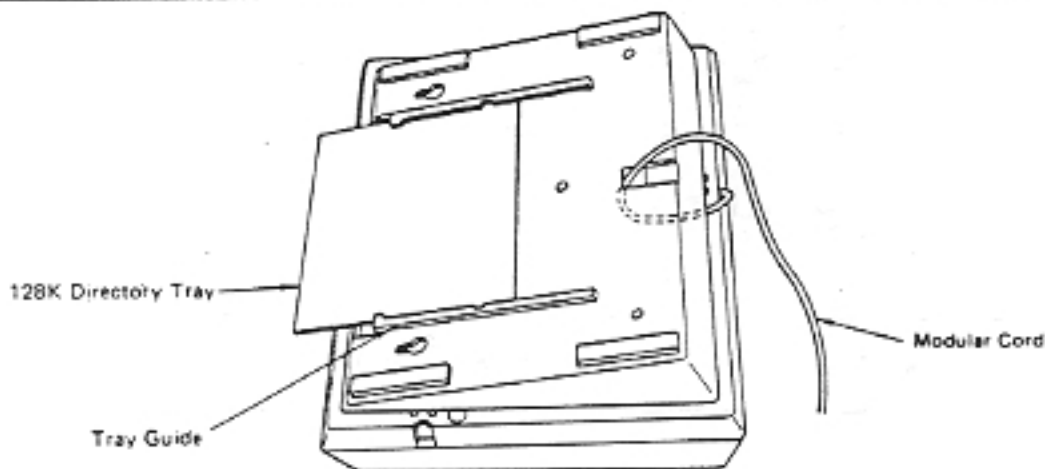


Figure 3.10.6.2(2)B Modular Cord Processing

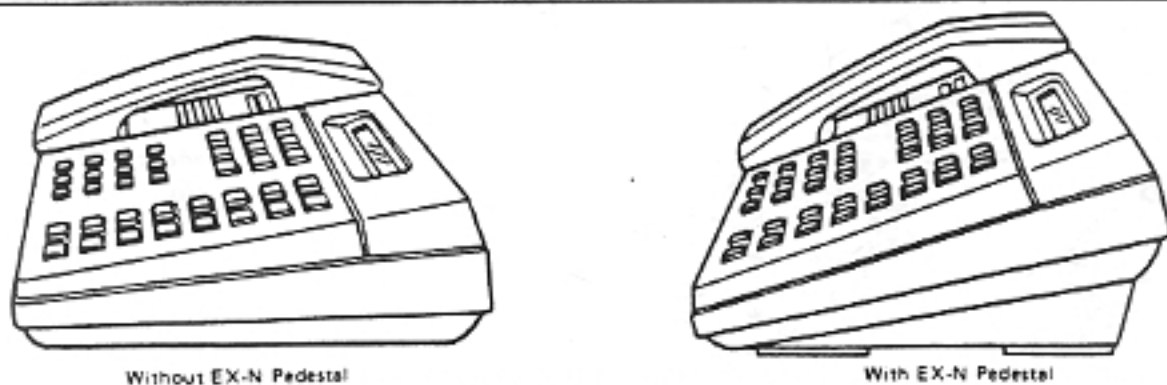
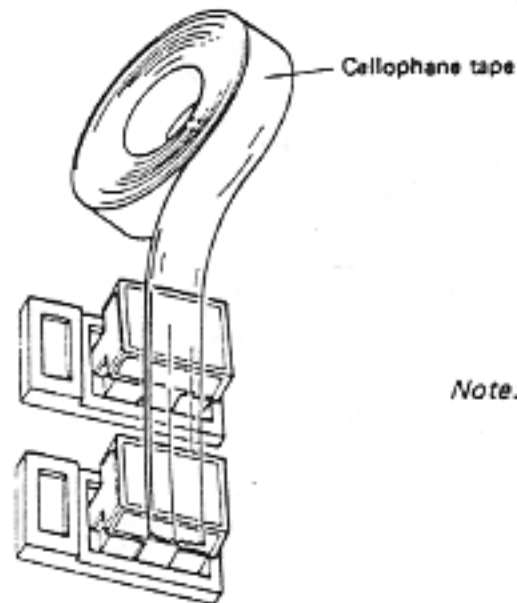


Figure 3.10.6.2(2)C Key Telephone Set on Pedestal

(3) 128K key cap removal and EX-KT key label insertion

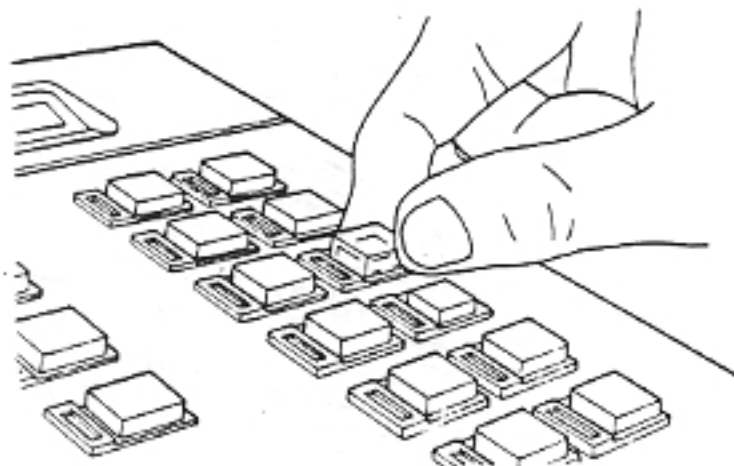
Stick cellophane tape or the like to the tops of the 128K key caps, and pull up the tape to remove the caps from the key telephone.

Key caps can also be easily removed by pulling them up with your fingers without using tape. See Figures 3.10.6.2.(3)A and B.



Note: Lightly stick cellophane tape to 128K key caps, and pull up the tape to remove the caps easily.

Figure 3.10.6.2.(3)A Removing 128K Key Caps With Cellophane Tape



Note: Hold 128K key cap firmly and pull it up to remove it from the key.

Figure 3.10.6.2.(3)B Removing 128K Key Caps With Fingers

After removing the 128K key caps, type the necessary information on the EX-KT key labels, place them on the key tops, and re-insert the 128K key caps.

Figure 3.10.6.2.(3)C shows an enlarged view of the above process.

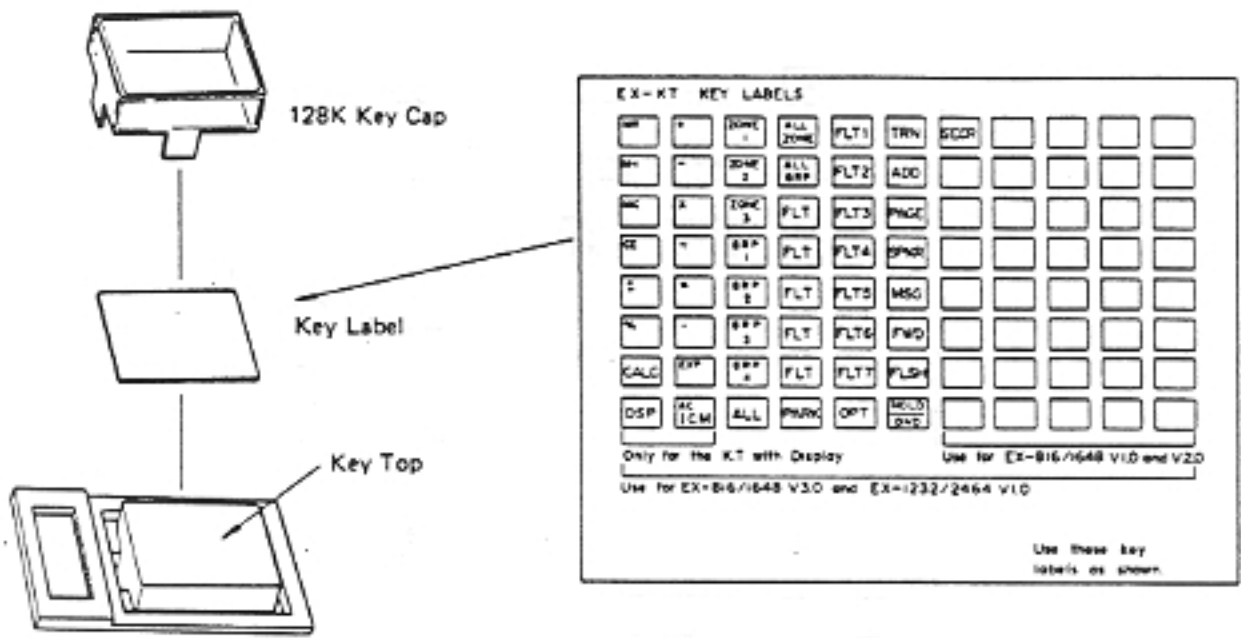


Figure 3.10.6.2.(3)C Label Installation

All the keys except FEAT key and ICM key can be allocated freely by flexible key assignment. Default values are shown below.

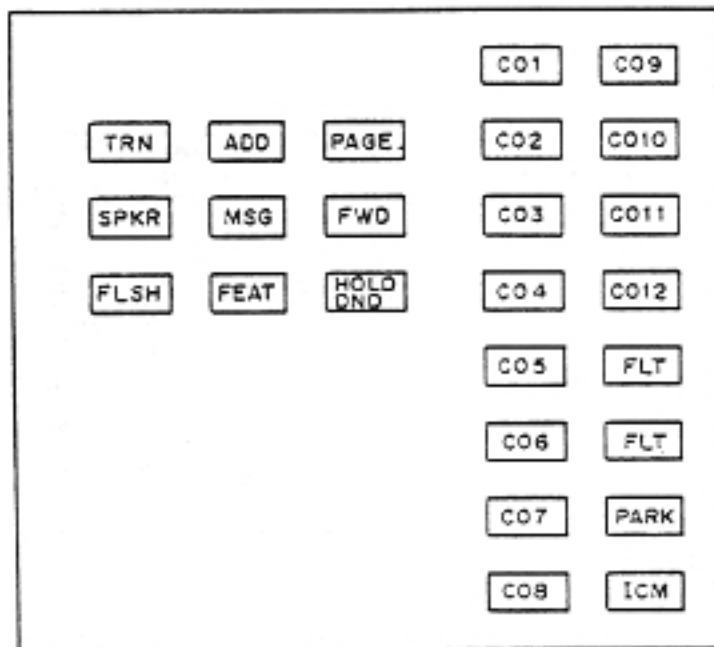


Figure 3.10.6.2.(3)D KT Default Key Assignment

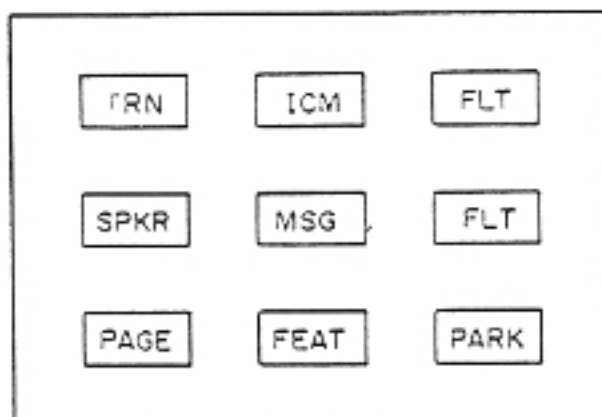



Figure 3.10.6.2.(3)E VP Default Key Assignment

- When calculator function is used, attach the marks on operation keys as shown in Figure 3.10.6.2.(3)F.
- Allocate CALC keys to the keys with .
- Calculator function can be used only with the key telephone with display unit.

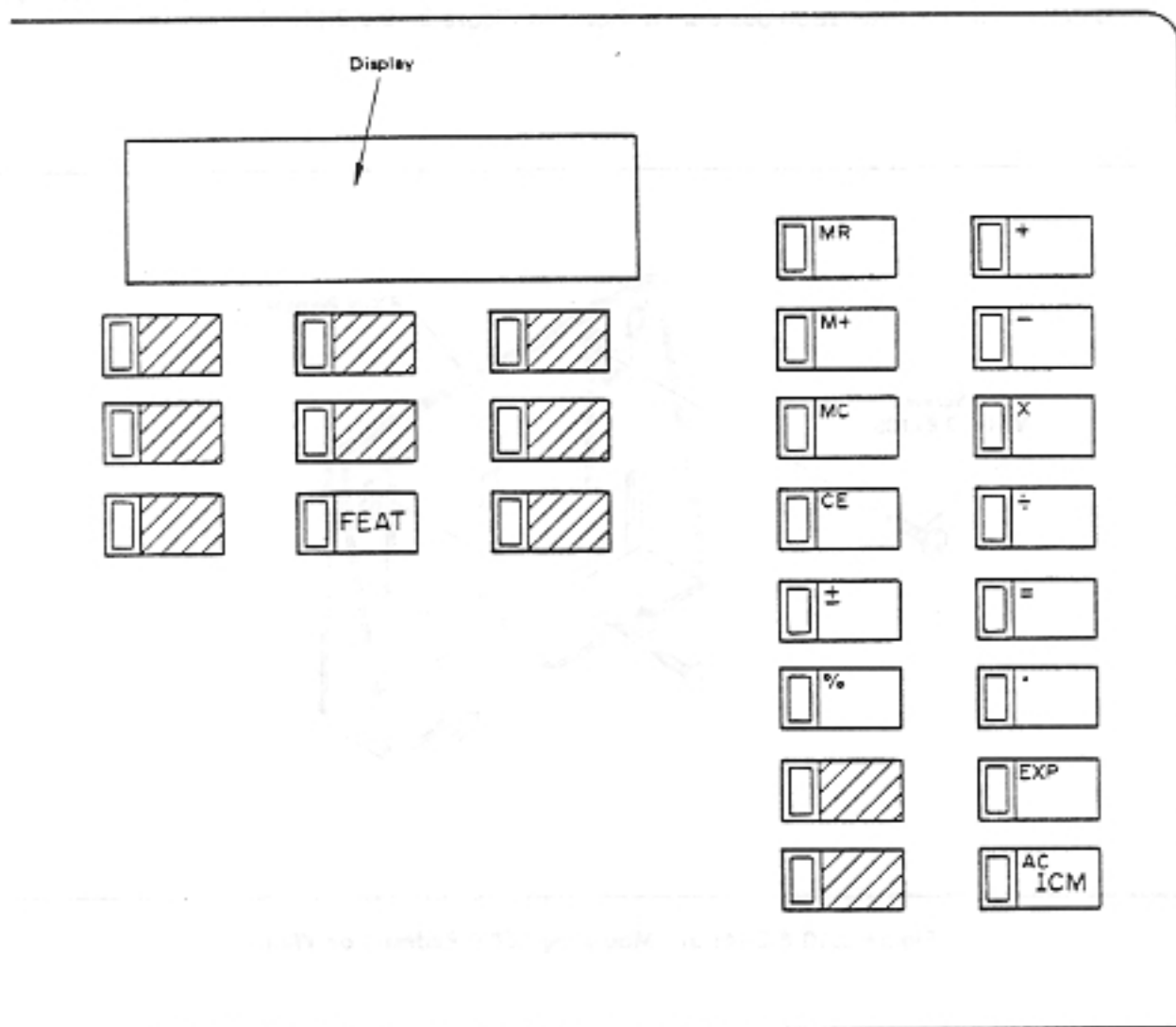


Figure 3.10.6.2.(3)F

(4) Key telephone wall mounting procedure

A key telephone can be easily mounted on a wall by reversing the EX-N pedestal and the 82 handset wall bracket that is attached to the handset. Here is the procedure:

- (a) Plant the supplied wood screws, WR(+) 3.8 x 16S, in a wall, using the EX-N pedestal as a gauge to determine the installation position as shown in Figure 3.10.6.2.(4)(a).

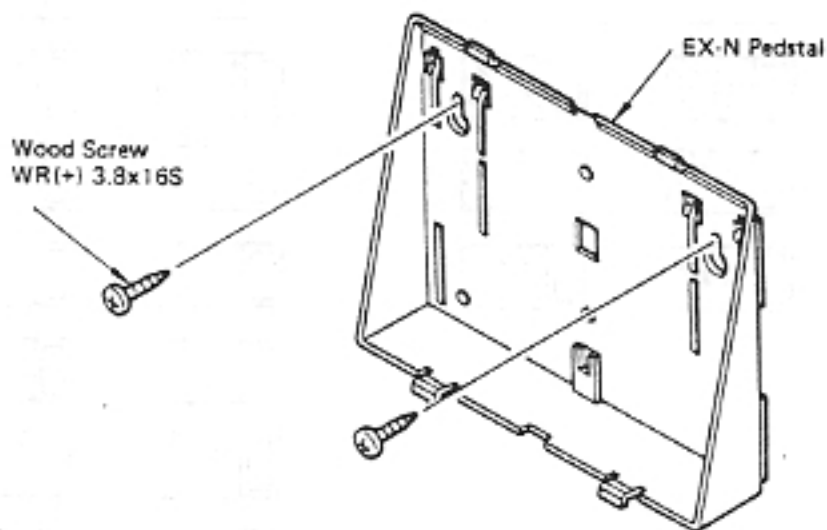


Figure 3.10.6.2.(4)(a) Mounting 128K Pedestal on Wall

- (b) Install the supplied EX-N pedestal on the EX-N lower housing in the direction opposite to that of normal mounting.

If the EX-N pedestal is already mounted in the normal direction, remove it and remount it in the opposite way as shown in Figure 3.10.6.2.(4)(b).

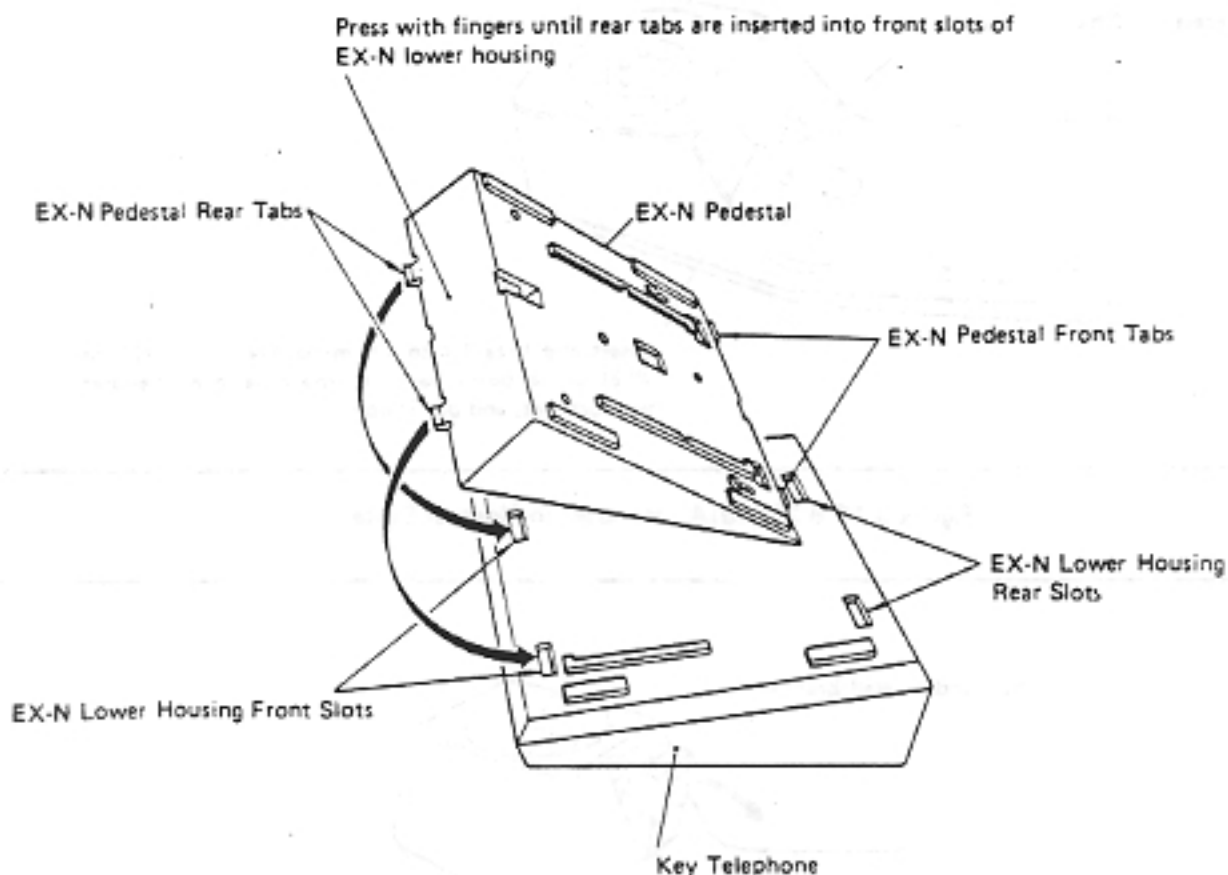


Figure 3.10.6.2(4)(b) Mounting EX-N Pedestal on EX-N Lower Housing

- (c) Fasten the key telephone to the screws that were planted in the wall.
- (d) The 82 handset wall bracket is fitted inside the transmitter end of the 82 handset handle base of the handset. Insert the tip of a ballpoint pen or a thick clip (1.4 to 1.0 mm ϕ AWG #16, #17, or #18) into the hole in the 82 handset wall bracket, and pry it open. The above process is illustrated in Figures 3.10.6.2(4)(d)A and B.

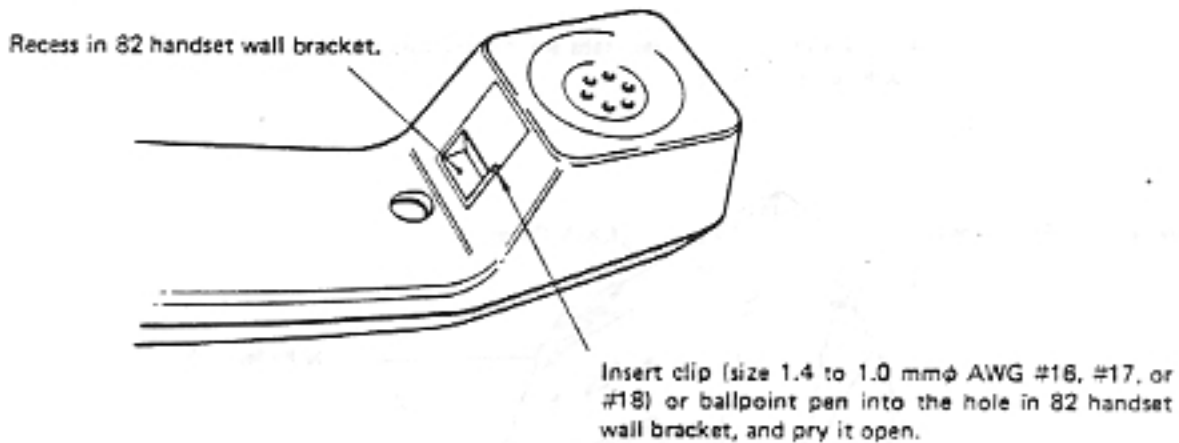


Figure 3.10.6.2(4)(d)A Handset in Normal State

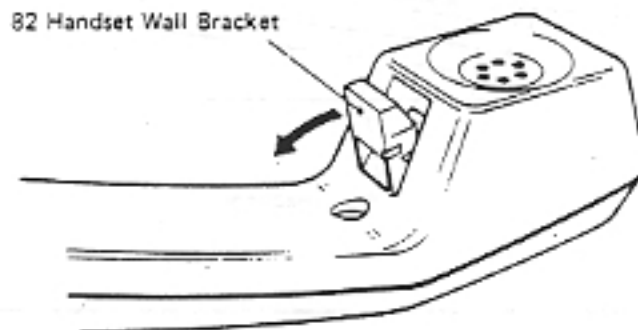


Figure 3.10.6.2(4)(d)B 82 Handset Wall Bracket Taken out of Handset

- (e) When the 82 handset wall bracket is completely out of the handset, turn it around, and fit it back into place so that the recess in the 82 handset wall bracket is closer to the transmitter. This process is shown in Figures 3.10.6.2(4)(e)A and B.

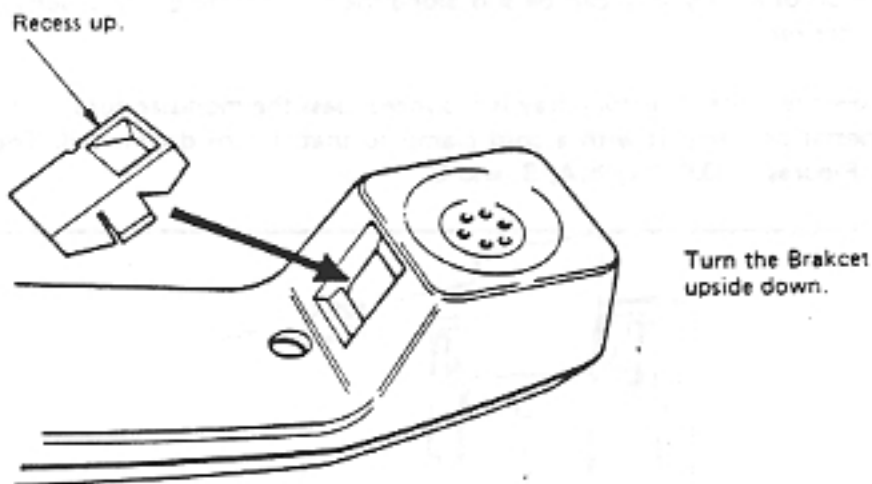


Figure 3.10.6.2(4)(e)A Turn the 82 Handset Wall Bracket Around so its Recess is up, and Fit it Back into Place.

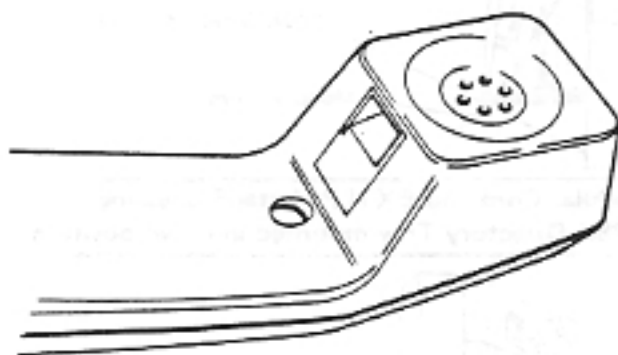


Figure 3.10.6.2(4)(e)B Handset Ready for Wall-Mounted Key Telephone

- (f) Check that the handset can now be secured on the wall mounting hook that projects from the receiver side of the EX-N upper housing.

- (g) The 128K extension directory tray can be slid along the rails on the EX-N pedestal from above or underneath as desired.
- (h) Depending on how the 128K directory tray is mounted, pass the modular cord through the hole in the EX-N pedestal or clamp it with a cord clamp so that it runs downward. These methods are illustrated in Figures 3.10.6.2(4)(h)A, B, and C.

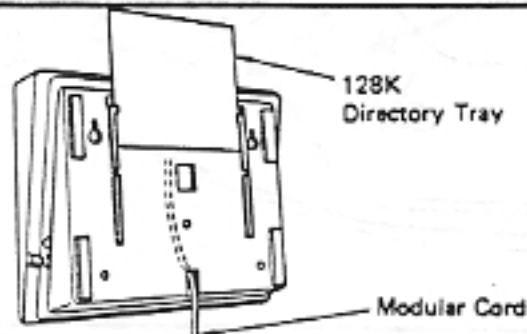


Figure 3.10.6.2(4)(h)A Modular Cord and EX-N Pedestal Processing 1
(128K Directory Tray mounted in up position)

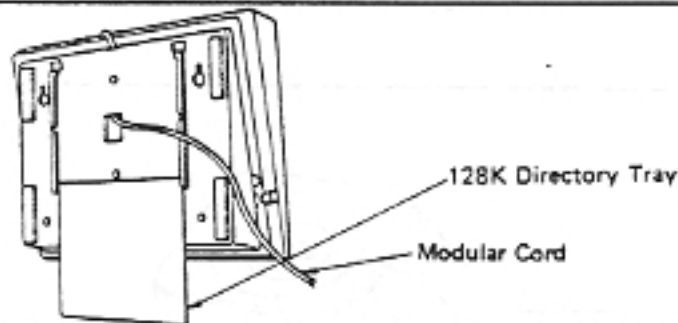


Figure 3.10.6.2(4)(h)B Modular Cord and EX-N Pedestal Processing 2
(128K Directory Tray mounted in down position)



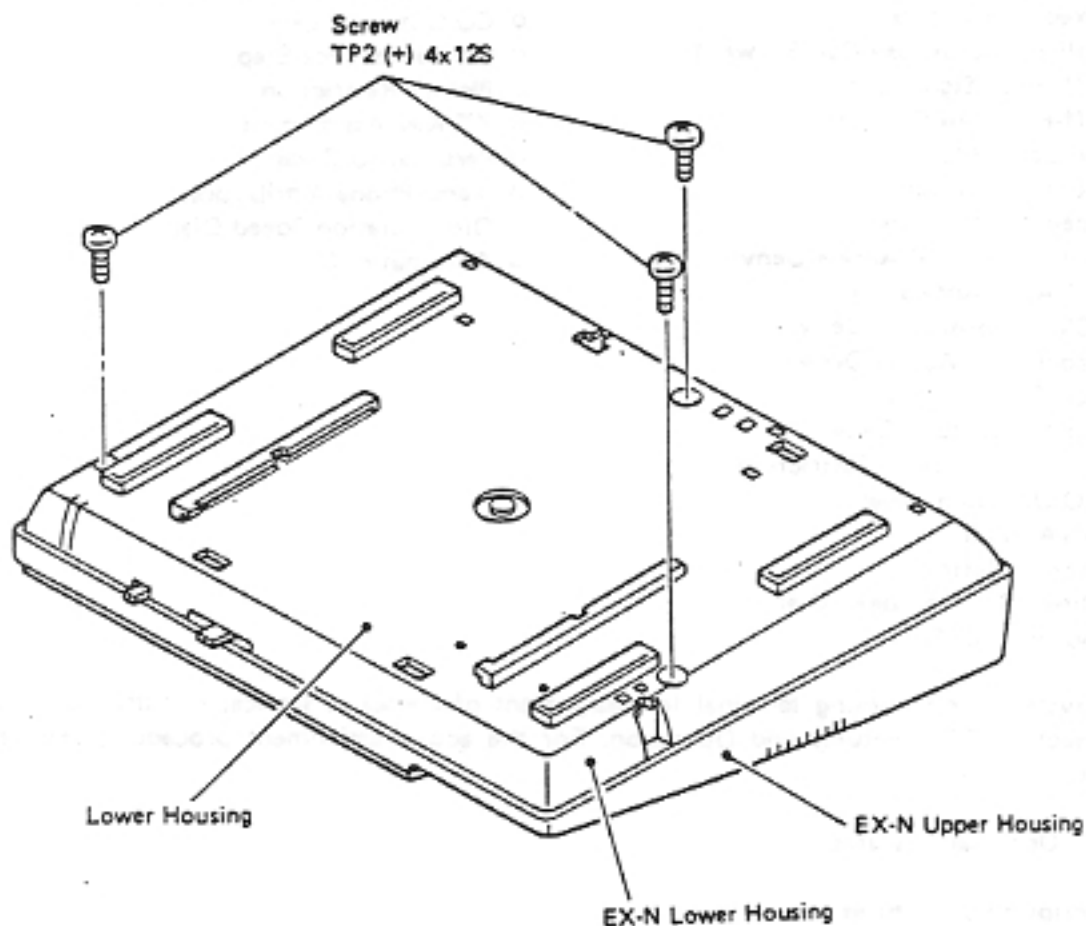
Figure 3.10.6.2(4)(h)C Key Telephone Mounted on Wall

- (5) EX upper housing and 128K lower housing opening.

It is necessary to open both housings in installing optional units. These two housings can be opened by removing the three screws, TP2 (+) 4x12S, that fasten the 128K lower housing, using a screwdriver.

(5) EX-N upper housing and EX-N lower housing opening.

It is necessary to open both housing in installing optional units. These two housings can be opened by removing the three screws, TP2 (+) 4x12S, that fasten the EX-N lower housing, using a screwdriver. This is illustrated in Figure 3.10.6.2(5).



CAUTION

Be careful not to pinch the internal wires between the upper housing and lower housing during reassembly.

Figure 3.10.6.2(5) Opening the Housing

3.10.6.3 Feature Assignment

Any of the following classes of service can be assigned to the EX-824/1648KN/KN1 and EX-824/1648DN/DN1 key telephones:

- Tenant Group
- Secretary Attribute
- Protected Attribute
- Executive Attribute
- Call Forward/Busy Call Forward
- Off-Hook Signal Deny
- Off-Hook All Call Deny
- All Call Deny
- Hold Recall Deny
- Speed Dial Access Deny
- Toll Speed Dial Access Deny
- CO Auto-Answer Deny
- ICM Auto-Answer Deny
- Paging Call Access Deny
- Call Forward Deny
- Do Not Disturb Deny
- Toll Dial Class of Restriction
- CO Outgoing Level
- ANA Level
- Pickup Restriction
- Direct Station Speed Dial
- Automatic ICM
- Optimized Call Routing Access Deny
- Equal/SCC Access Deny
- Toll Dial Class of Restriction
- CO Outgoing Level
- Route Advance Step
- Pickup Restriction
- KT Key Assignment
- Personal ID Code
- Versa Phone Attribution
- Direct Station Speed Dial
- Automatic ICM

Use the system programming terminal for assignment of classes of service. For the planning procedure, refer to section 2.3, Features and Operation. For the actual assignment procedure, refer to section 4, Installation (Software).

3.10.6.4 Optional Features

(1) Description of features

A headset, SHHD (Station Head-of-Hearing Handset – amplifier handset), or SNHD (Station Noise-Canceling Handset) can be connected to an EX-824/1648KN/KN1 and EX-824/1648DN/DN1. These key telephones can be provided with one of these optional features by using special adaptor SHSA-M or SHHA-M and setting an STJ inside the EX-824/1648KN1 or EX-824/1648DN/DN1 in mounting a headset or SNHD, or by simply setting an STJ inside the EX-824/1648KN/KN1 or EX-824/1648DN/DN1 in mounting an SNHD.

Other optional features are available, including the SRNG-M, which controls an external station loud ringer (with a relay contact output), and SSPU-N and ESPA-N for hands-free talk, a feature exclusive to the EX-824/1648KN/KN1 and EX-824/1648DN/DN1. For details, refer to Table 3.10.6.4(1)A.

Note: When using the SHHD (Station Head of Hearing Handset) with an EX-824/1648KN1 or EX-824/1648DN1 key telephone installation of the SHHA unit is not required.

Table 3.10.6.4.(1)A Optional Features

No.	Feature	Description
1	Headset	A turn-key type headset (Starset or Jack Set made by Plantronics) may be connected interfaced with specified adaptor SHSA-M. An engaged call over the headset cannot be switched to the handset or vice versa.
2	SHHD (Station Hard-of-Hearing Handset — amplifier handset)	The SHHD (amplifier handset) is designed to provide receiving signals at an amplified level, mainly for those who have difficulty in hearing. Replace the SOHD (Station Ordinary Handset) with SHHD attaching to the modular cord, and mount the specified adaptor SHHA-M in the key telephone.
3	SNHD (Station Noise-Canceling Handset)	The SNHD is recommended for satisfactory communication in factories or other high-level noise locations where it is difficult to communicate through the SOHD. To use this handset, replace the ordinary handse with it, using the modular jack. Note: Set to the STJ side on an EX-824/1648KN1 or EX-824/1648DN1 key telephone because it has a built-in SHHA.
4	External station loud ringer	If ambient noise is too loud or if ringing must be heard away from the station, a commercial loud ringer can be used. In using a commercial loud ringer, install the SRNG-M adaptor that has a relay contact output to repeat a cycle of 1 second on and 3 seconds off when an incoming call access the station, CAUTION <i>Do not use the relay contact output of SRNG-M to switch on and off the main AC power of a commercial loud ringer.</i>
5	Hands-free talk	Option 1 Hands-free talk is an optional feature for conversing through the built-in microphone and speaker of an extension without using the handset or headset. If an EX-824/1648KN/KN1 or EX-824/1648DN/DN1 is to use this feature, install the SSPU-N unit in the station. Option 2 A commercial speakerphone (Panasonic KX-T1016) can be externally attached to the telephone for hands-free talk. In this case, neither the handset nor headset is used. EXT-824/1648KN/KN1 and EX-824/1648DN/DN1 key telephones with a built-in ESPA-N unit may use an external speakerphone.

Note: One of the following options can be connected to an EX-824/1648KN/KN1 or EX-824/1648DN/DN1 headset, SHHD (Station Hard-of-Hearing Handset), or SNHD (Station Noise-Canceling Handset); plus the SRNG-M adaptor, SSPU-N or ESPA-N unit.

The units to be used and installation procedures for these options are shown in Table 3.10.6.4(1)B.

Table 3.10.6.4(1)B-1 EX-824/1648KN and DN Optional Unit Installation Requirements

Optional Unit	Connector on KTSP-N			STJ on KTSP-N						Headset to use	Other	
	CONN 1 (10-pin)	CONN 2 (11-pin)	CONN 8 (6 pin)	SET 1	SET 2	SET 3	SET 4	SET 5	SET 6			
SHSA-M (Station headset adaptor-M)	use			set		set					Starset headset (Plantronics)	JS-180 (Jack set)
SHHA-M (Station hard-of-hearing handset adaptor-M)	use					set	set				SHHD (Station hard-of- hearing handset)	
SSPU-N (Station speakerphone unit-M)		use									SOHD (Station ordinary handset)	
ESPA-N (External speakerphone Adaptor-N)			use							set	SOHD (Station ordinary handset)	
SRNG-M (Station loud ringer unit-M)		use									SOHD (Station ordinary handset)	
SNHD (Station noise-cancel- ing handset)					set						SNHD (Station noise- canceling handset)	

STJ

To set, pull the STJ out of the jumper connector and fit it on connector pins 2 and 3.

Note: SET 5 is a test connector. Do not change it when installing additional options.

Table 3.10.6.4(1)B-2 EX-824/1648KN1 and DN1 Optional Unit Installation Requirements

Optional Unit	Connector on KTSP-N1			STJ on KTSP-N1							Headset to use	Other
	CONN 1 (10-pin)	CONN 2 (11-pin)	CONN 8 (6 pin)	SET 1	SET 2	SET 3	SET 6	SET 7				
SHSA-M (Station headset adaptor-M)	use			set		set				Starset headset (Plantronics)	JS-180 (Jack set)	
SHHA-M (Station hard-of-hearing handset adaptor-M)								set		SHHD (Station hard-of- hearing headset)		
SSPU-N(RN) (Station speakerphone unit-N(RN))		use								SHOD (Station ordinary handset)		
ESPA-N (External speakerphone Adaptor-N)			use						set	SOHD (Station ordinary handset)		
SRNG-M (Station loud ringer unit-M)		use								SOHD (Station ordinary handset)		
SNHD (Station noise-cancel- ing headset)					set					SNHD (Station noise- canceling headset)		

STJ

To set, pull the STJ out of the jumper connector and fit it on connector pins 2 and 3.

Note: When using the SHHD (Station Hard of Hearing Handset) with an EX-824/1648KN1 or EX-824/1648DN1 system, installation of the SHHA unit is not required.

Table 3.10.6.4(1)C EX-824/1648 K, D, KN, DN, KN1, DN1, VP-N1 Optional Equipments

Optional Equipment	Note	K	D	KN	DN	KN1	DN1	VP-N1
Headset AC-011	1	X	X	X	X	X	X	X
Headset Adaptor SHSA-M	2	X	X	X	X	X	X	
External Speakerphone Adaptor ESPA-N				X	X	X	X	X
Station Speakerphone Unit SSPU-M		X	X					
Station Speakerphone Unit SSPU-N				X	X	X	X	
Station Speakerphone Unit SSPU-NS				X	X	X	X	
Station Speakerphone Unit SSPU-RN1	3	X	X	X	X	X	X	
Hands Free Answer Back Unit HFAB-R	4	Not Required	Not Required	Not Required	Not Required	Not Required	Not Required	Not Required
Noise Prevention Handset SNHD		X	X	X	X	X	X	X
Hard-of-hearing Handset SHHD		X	X	X	X	X	X	X
Hard-of-hearing Handset Adaptor SHHA-M	5	X	X	X	X	Not Required	Not Required	Not Required
Station Loud Ringer Unit SRNG-M		X	X	X	X	X	X	

- Note: 1. Headset AC-011 does not detect hook-switch signals, so hooking with the handset is necessary.
 2. The SHSA-M is an adaptor for handset of plantronics.
 3. When mounting an SSPU-RN1 on a K or D key telephone, an SMPA-B (SSRU-RN1 Mount Plate Assembly - B) is required.
 4. HFAB (Hands Free Answer Back circuits) are built in the K, D, KN, and DN. The HFAB-R circuits are initially built in the VP-N1.
 5. SHHA circuits are built in the KN1, DN1, and VP-N1.

(2) Optional unit installation procedure

(a) General

Additional features can be provided by installing optional units in or around a key telephone. Seven optional units (SHSA-M, SHHA-M, SSPU-N, ESPA-N, SRNG-M, SHHD, and SNHD) are available for mounting in or on a key telephone. These optional units are listed in Table 3.10.6.4(1)B.

The basic method for installing these options is to open the EX-N upper housing and EX-N lower housing, install the desired unit, and make the necessary settings.

The place for each of these options is shown in Figure 3.10.6.4(2)(a), (b). Pass the external cable, such as from SHSA-M, through the hole opened by breaking the external cable tab in the rear of the EX-N lowering housing, as shown in Figure 3.10.6.4(2)(a).

The key telephone housing can be opened, as shown in Figure 3.10.6.4(2)(a), by removing the three screws from the bottom, as shown in Figure 3.10.6.2(5). The key telephone upper housing and lower housing are connected to each other with leads, so do not forcibly pull or separate them.

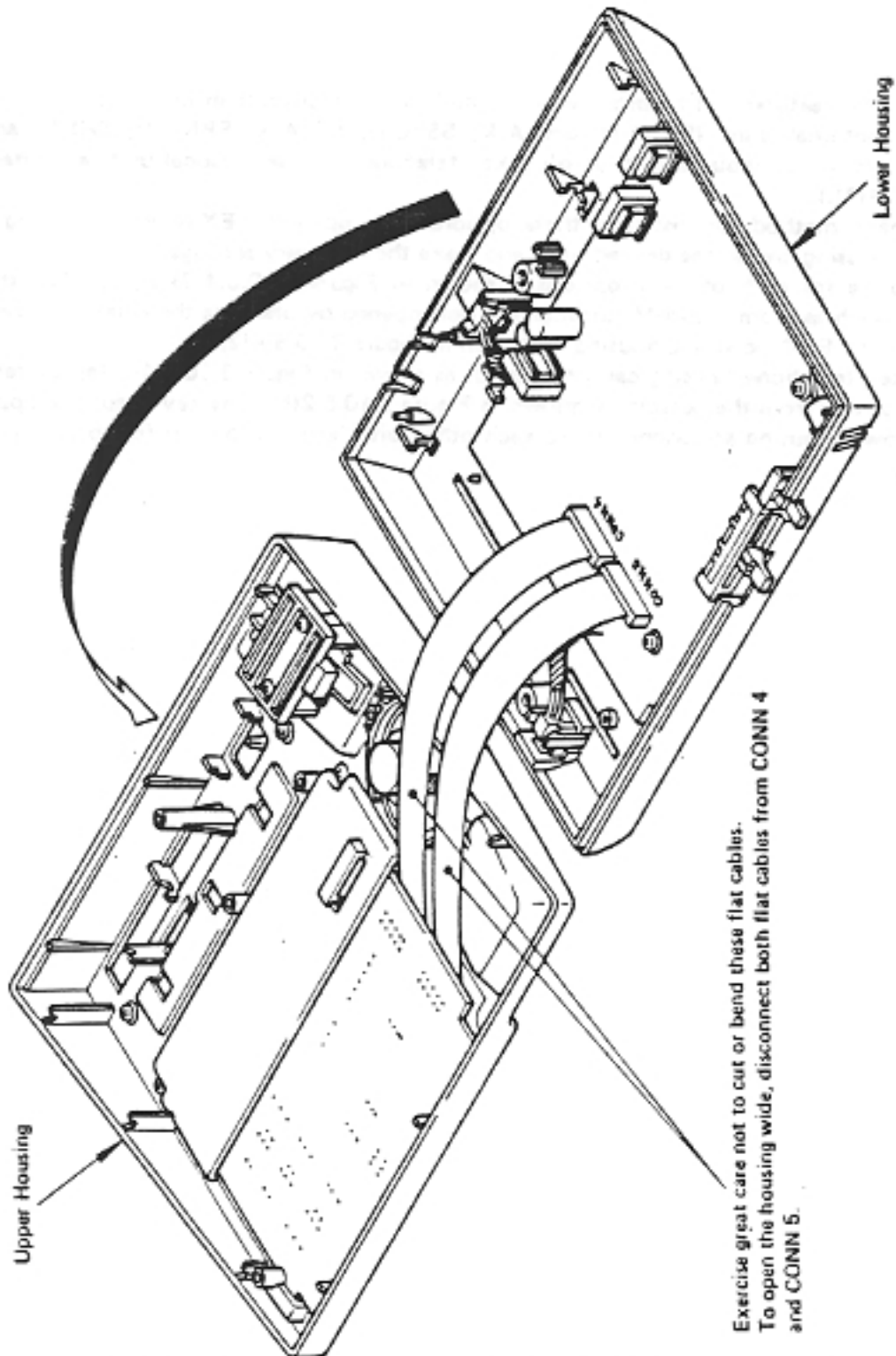


Figure 3.10.6.4(2)(a) EX824/1648 KN/DN Opening the Housing

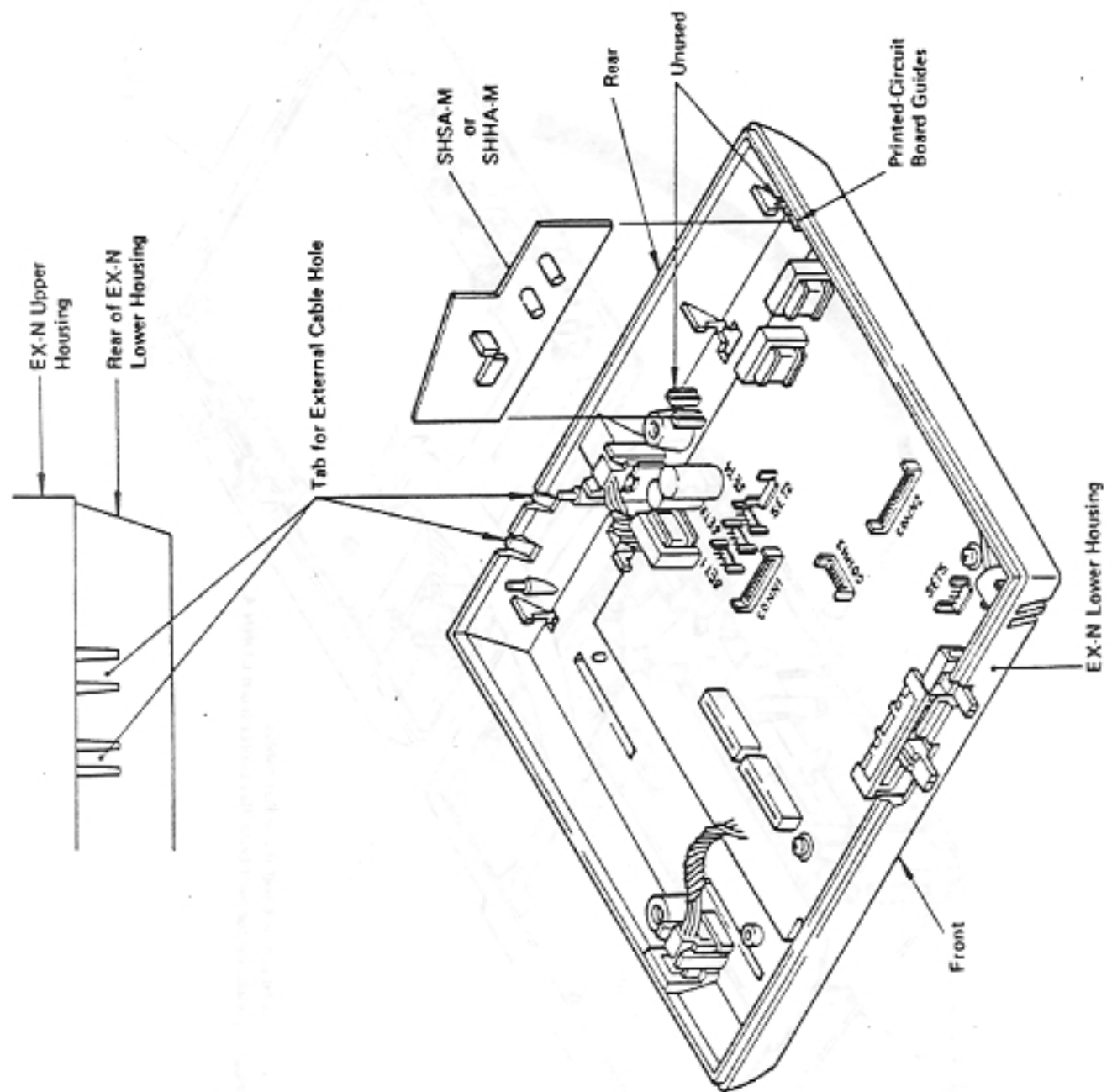


Fig. 3.10.6.4(2)(a) EX824/1648KN/DN Optional Unit Mounting in Lower Housing

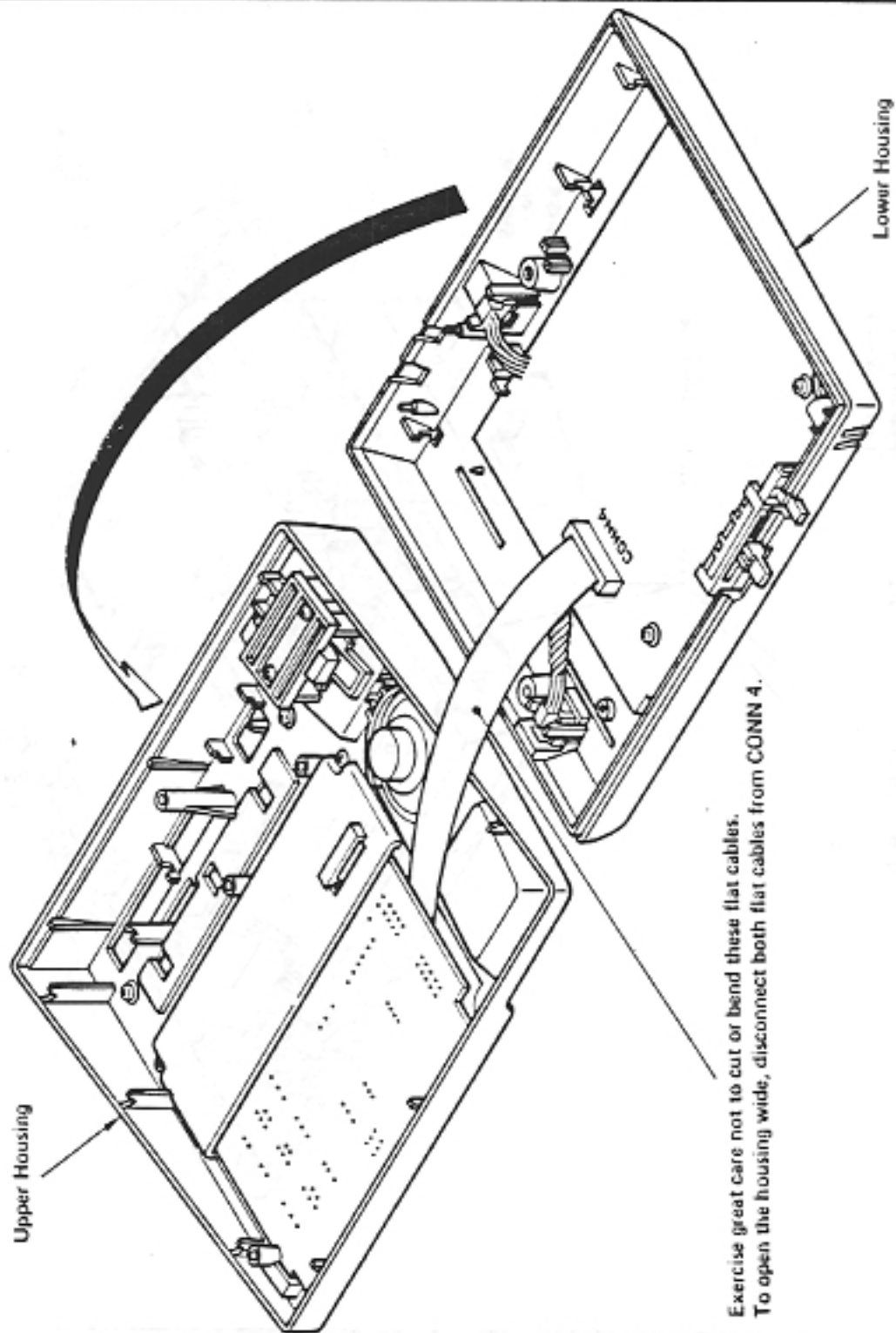


Figure 3.10.6.4(2)(C) EX-824/1648KN1/DN1 Opening the Housing

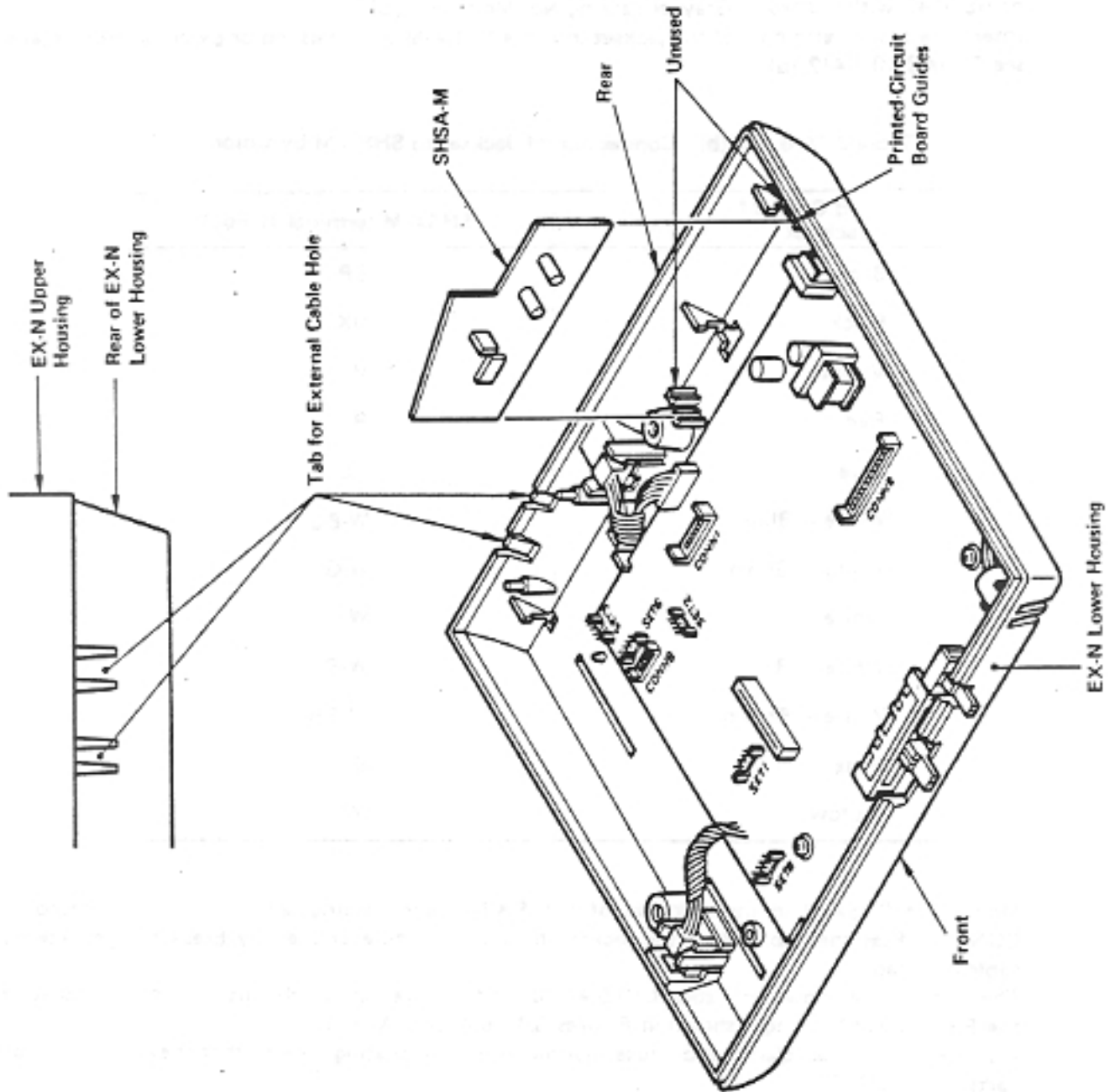


Fig. 3.10.6.4(2)(b) EX824/1648KN1/DN1 Optional Unit Mounting in Lower Housing

(b) SHSA-M and headset installation procedure

SHSA-M is a combination of a starset headset made by plantronics grayver catalog No. HSO108 or HSO143 with a jackset (Grayver catalog No. Model JS180).

Insert the spade terminals of the jackset into the SHSA-M terminals, color by color. For details, see Table 3.10.6.4(2)(b).

Table 3.10.6.4(2)(b) Connection of Jackset to SHSA-M by Colors

Cord Color of Jack set	SHSA-M terminal symbol
Brown	BR
Black	BK
Violet	V
Red	R
Blue	BL
White - Blue	W-BL
White - Green	W-G
White	W
White - Red	W-R
White - Brown	W-BR
Slate	S
Yellow	Y

Mount the SHSA-M in the rear part of the EX-N lower housing, and insert its connector in CONN 1. Pass the cable from the jackset through the hole opened by breaking the external cable hole tab.

The settings are shown in Table 3.10.6.4(1)B, and the way in which this option is installed in the EX-N lower housing is shown in Figures 3.10.6.4(2)(b)A, B, and C.

Insulate the headset clamp and unused terminals with insulating tape so that they will not short parts of the KTSP-N.

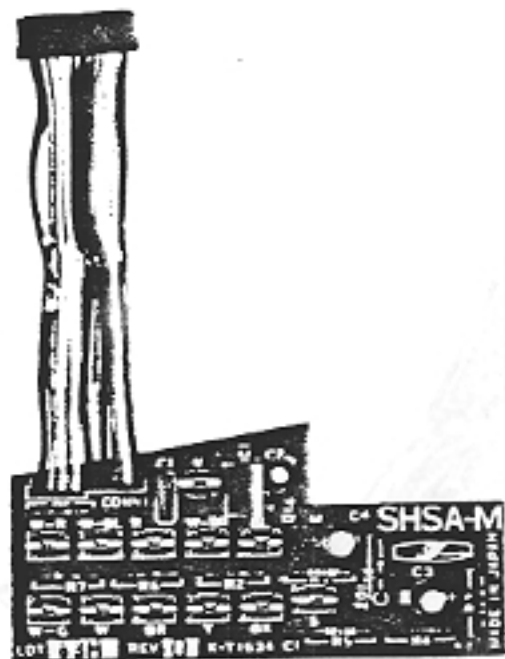


Figure 3.10.6.4(2)(b)A External View of SHSA-M

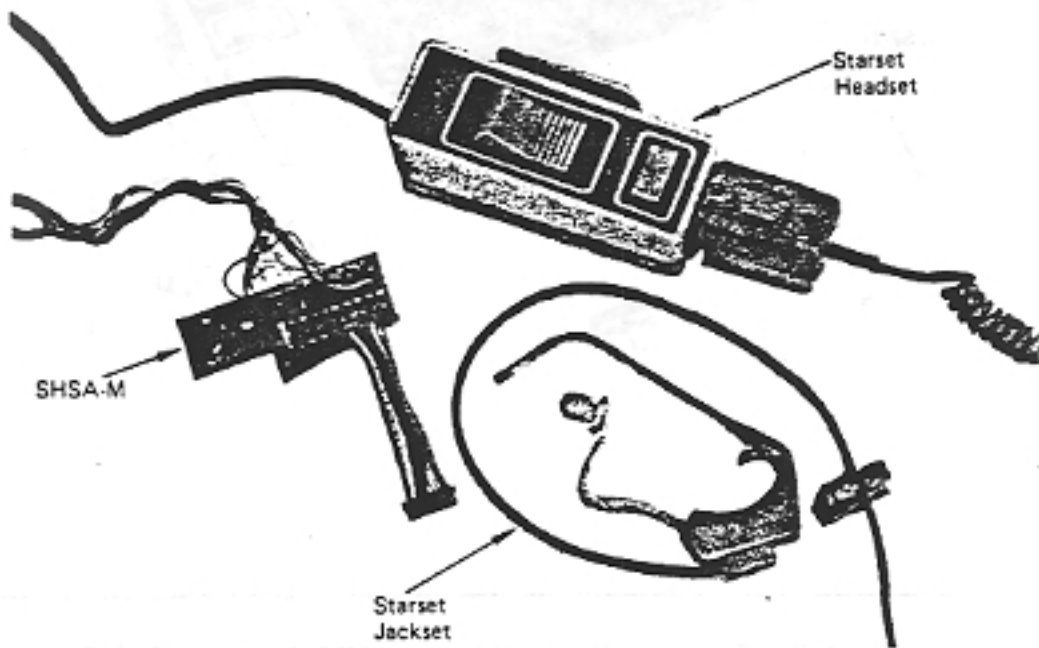


Figure 3.10.6.4(2)(b)B External View of Headset

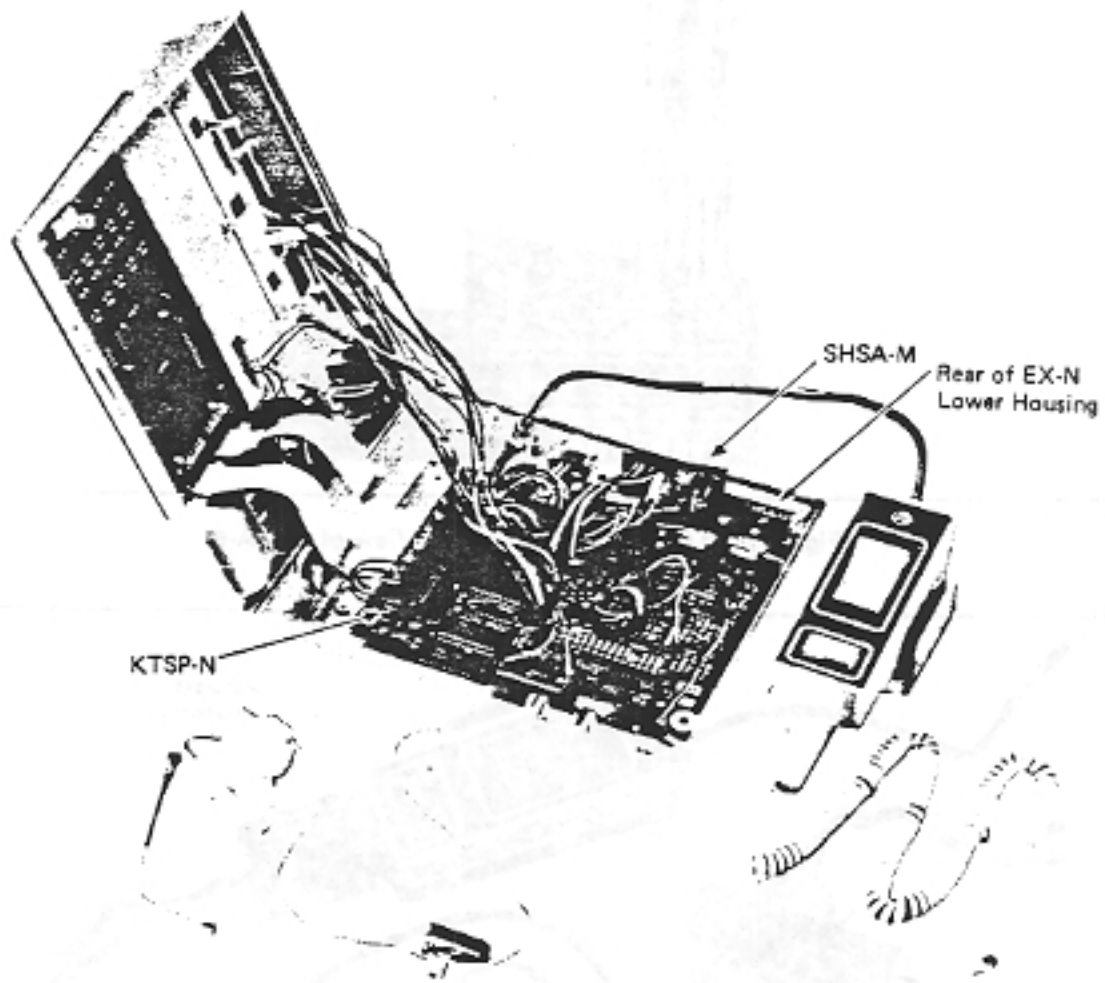


Figure 3.10.6.4(2)(b)C SHSA-M and Headset Mounted in Key Telephone

(c) SNHD installation procedure

Even if ambient noise is loud, clear communication can be made possible by using the Station Noise-Canceling Handset (SNHD).

To install it, jumper pins 2 and 3 of the jumper connector in the key telephone, and connect the SNHD to the key telephone in place of the Station Ordinary Handset (SOHD).

An external view of the SNHD is shown in Figure 3.10.6.4(2)(c).

The SNHD can be modified to suit a wall-mounted key telephone in the same way as the SOHD, as described in paragraph 3.10.6.2(4).

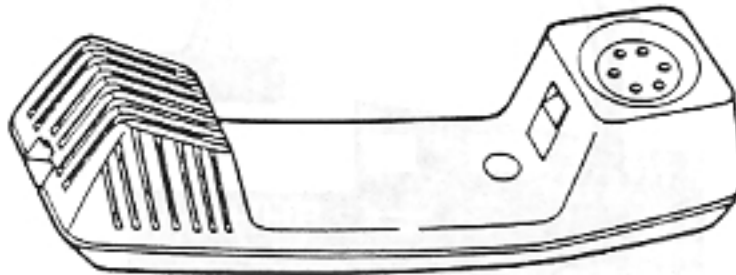


Figure 3.10.6.4(2)(c) External View of SNHD

(d) SHHA-M and SHHD installation procedure

People with hearing problems can hear clearly if a Station Hard Hearing Handset (amplified handset, SHHD) is used.

To install it, mount a Station Hard Hearing Handset Adaptor-M (SHHA-M), and connect the SHHD to the key telephone in place of the Station Ordinary Handset (SOHD).

External views of the SHHD and SHHA-M are shown in Figures 3.10.6.4(2)(d)A and B. To install the SHHA-M in a key telephone, refer to Figure 3.10.6.4(2)(a) and Table 3.10.6.4(1)B.

The SHHD can be modified to suit a wall-mounted key telephone in the same way as the SOHD, as described in paragraph 3.10.6.2(4):

Note: The EX-824/1648KN1 and DN1 have a built-in SHHA circuit.



Figure 3.10.6.4(2)(d)A External View of SHHD

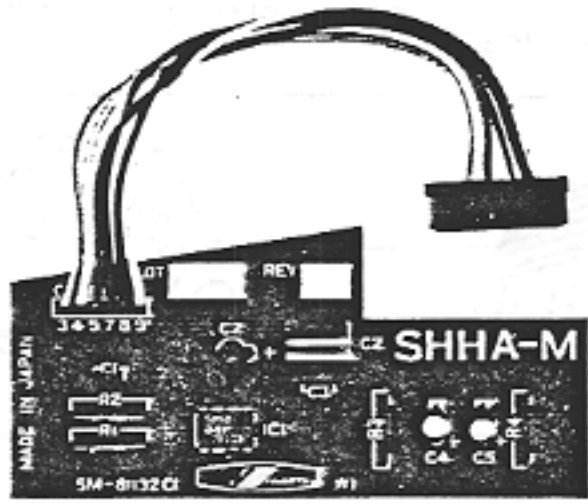


Figure 3.10.6.4(2)(d)B External View of SHHA-M

(e) SSPU-N installation procedure

If an SSPU-N is installed in the EX-N upper housing, the key telephone is converted into one with a built-in speakerphone.

To install it, fasten the SSPU-N on the inner side of the EX-N upper housing of a key telephone with two screws, as shown in Figure 3.10.6.4(2)(e), and insert its connector in the KTSP-N CONN 2.

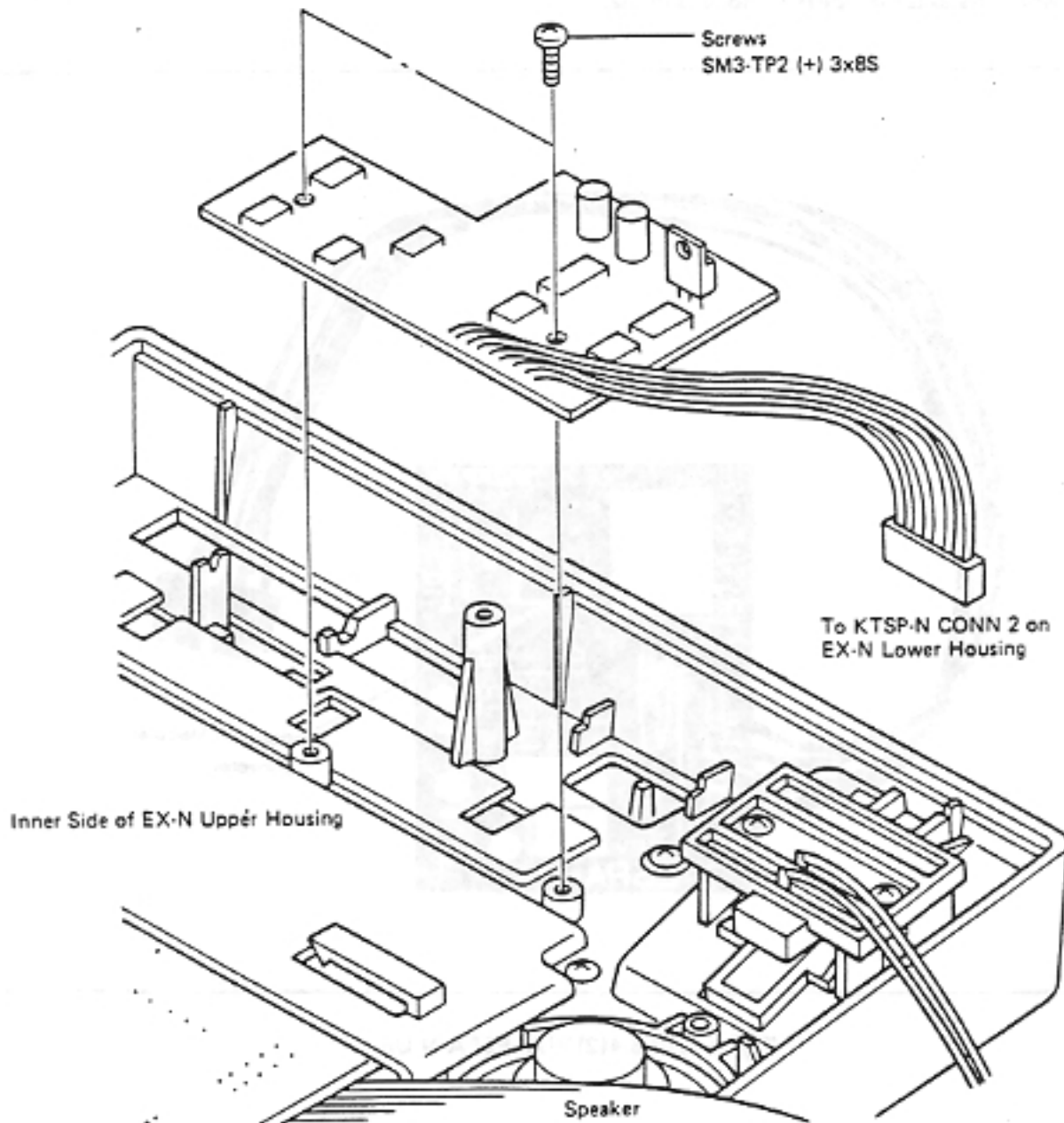


Figure 3.10.6.4(2)(e) SSPU-N Mounted in EX Upper Housing

(f) ESPA-N installation procedure

The ESPA-N is a printed-circuit board assembly as shown in Figure 3.10.6.4(2)(f)A. Install it inside the EX-N upper housing with a single screw.

To connect the external speakerphone cable, break off the external cable tab and drill a cable hole. A commercial speakerphone (Panasonic KX-T1016) can be connected to the EX-824/1648KN or EX-824/1648DN key telephone via the six-position, four-conductor modular jack on the ESPA-N. The microphone and speaker built inside the key telephone do not operate while the external speakerphone is in use.

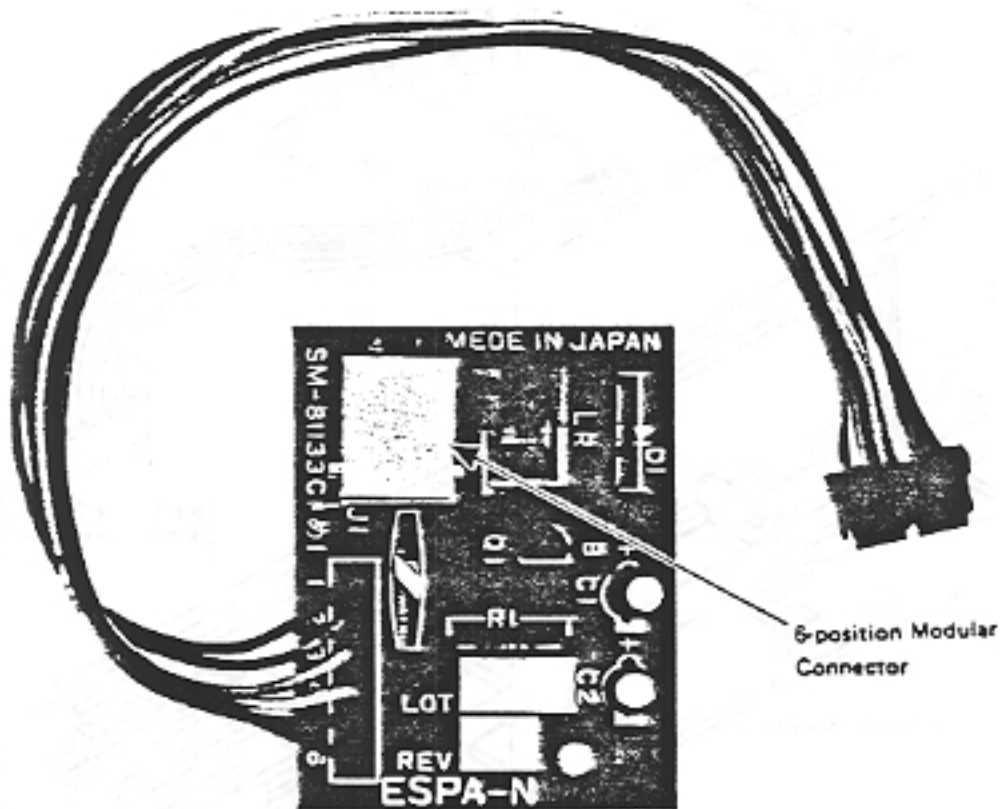


Figure 3.10.6.4(2)(f)A ESPA-N Unit

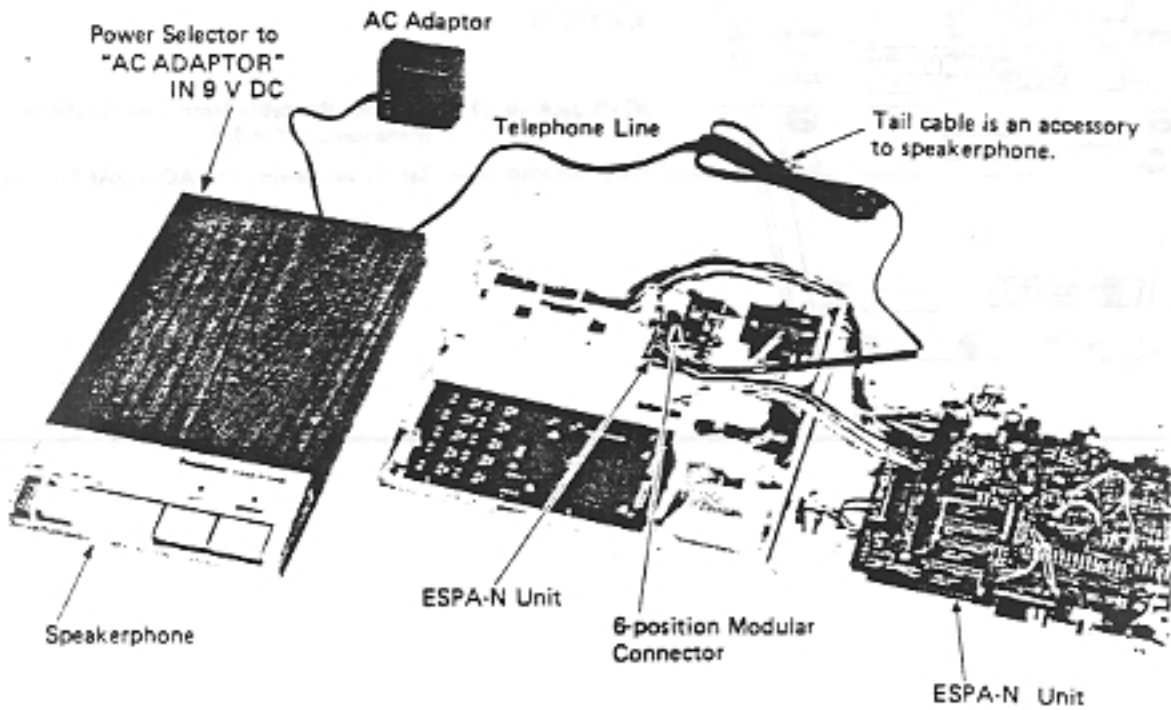
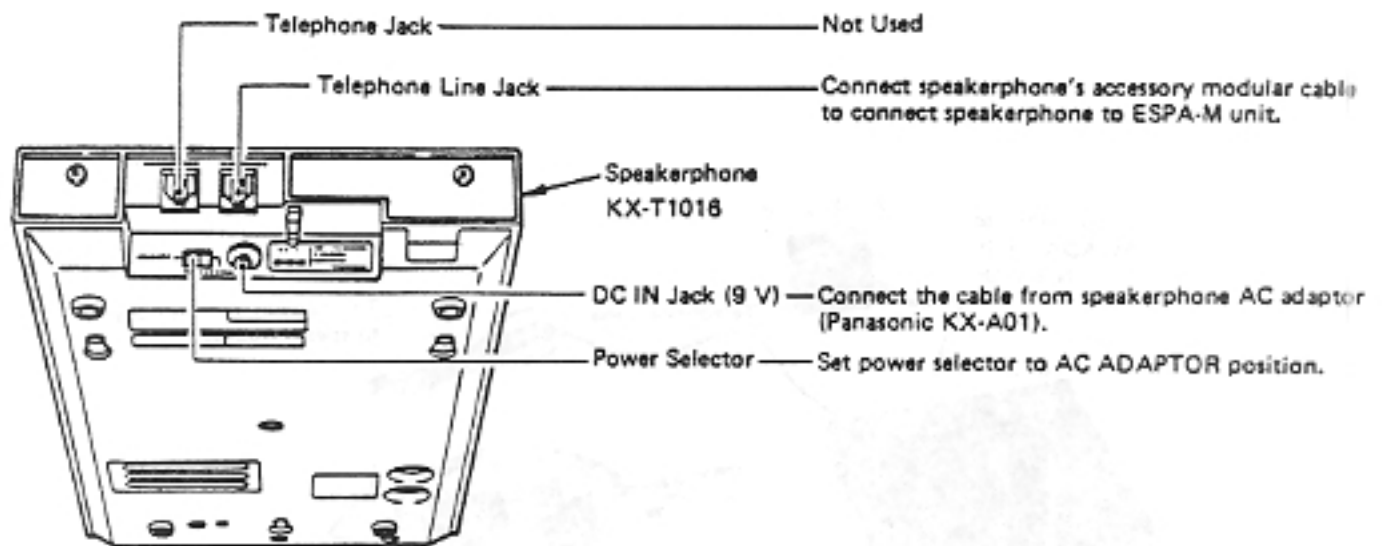


Figure 3.10.6.4(2)(f)B ESPA-N Unit and Speakerphone

Install a speakerphone as shown below.



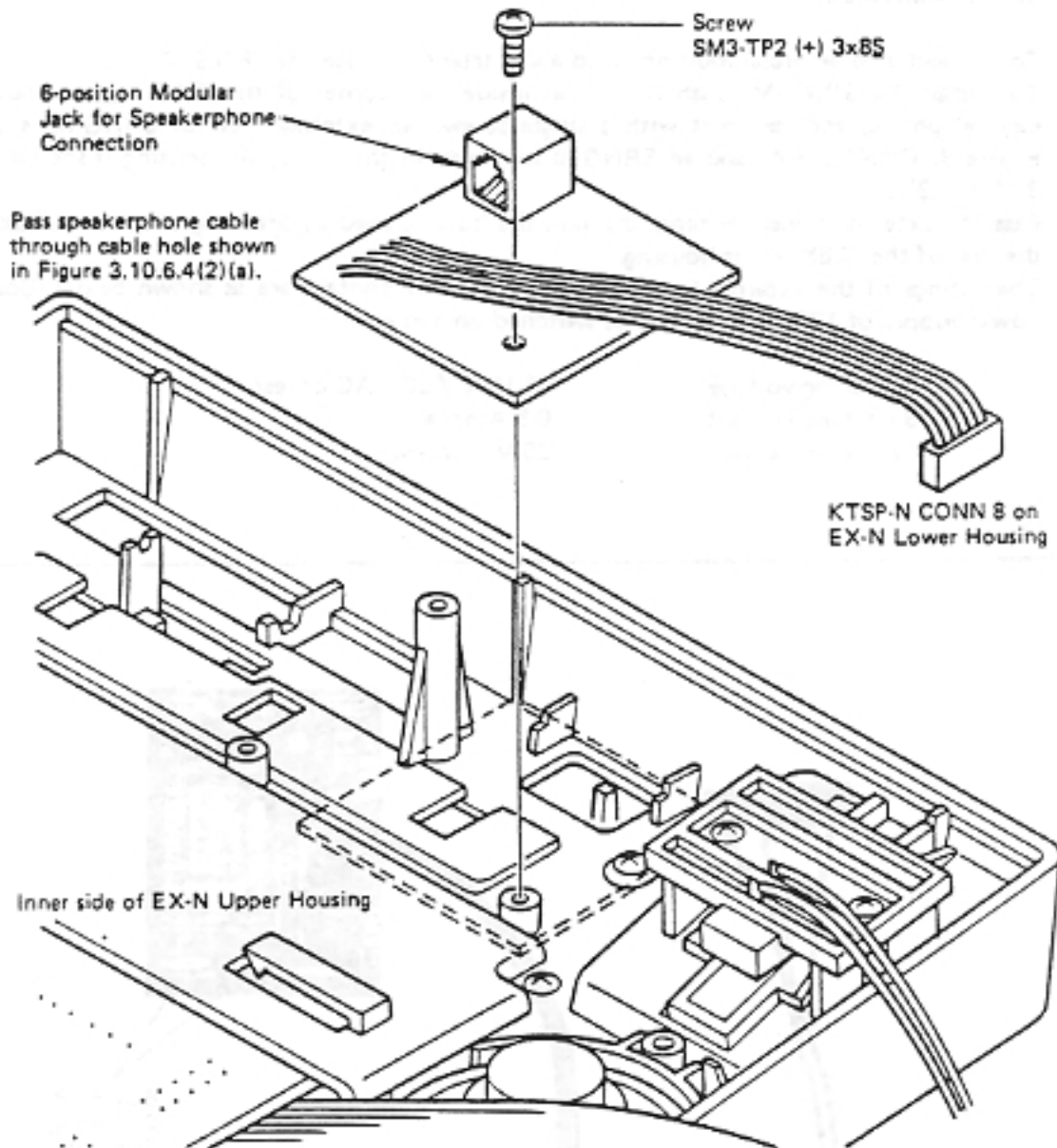


Figure 3.10.6.4(2)(f)B ESPA-N Installation

(g) SRNG-M installation

To connect a commercial loud ringer to a key telephone, use the SRNG-M.

To install the SRNG-M, push it into an inside rear corner of the EX-N upper housing of a key telephone, and fasten it with a single screw. An external view of SRNG-M is shown in Figure 3.10.6.4(2)(g)A, and an SRNG-M mounted in the EX upper housing is shown in Figure 3.10.6.4(2)(f)B.

Pass the external ringer terminal through the hole opened by breaking the external cable tab in the rear of the 128K lower housing.

The ratings of the external loud ringer control relay contact are as shown below. Commercial power supply of 120 VAC cannot be switched on and off.

Switching voltage	48 VDC/30 VAC or less
Switching current	0.5 A or less
Switching power	25 VA or less

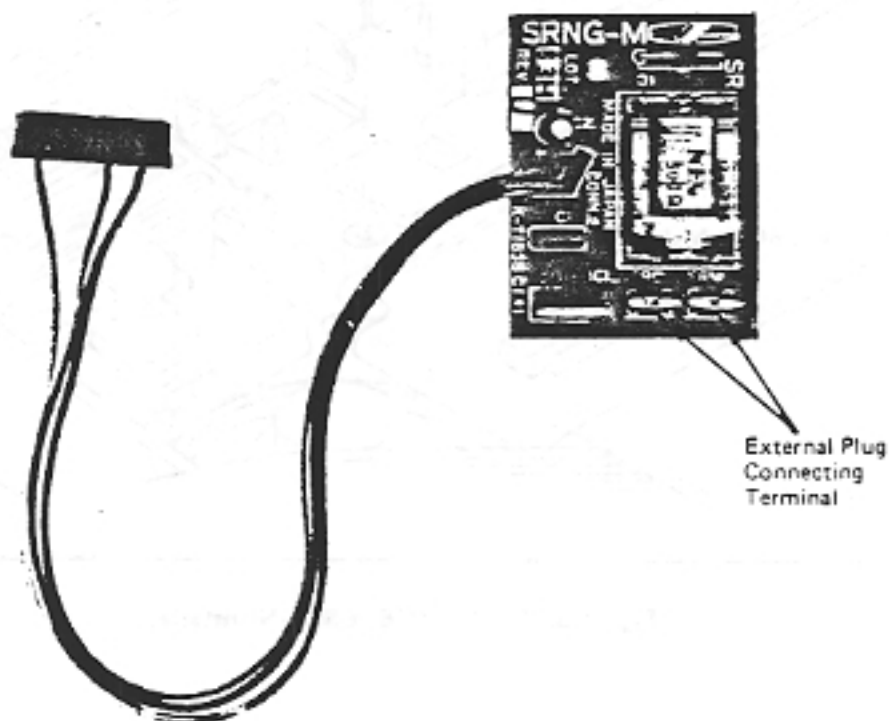


Figure 3.10.6.4(2)(g)A External View of SRNG-M

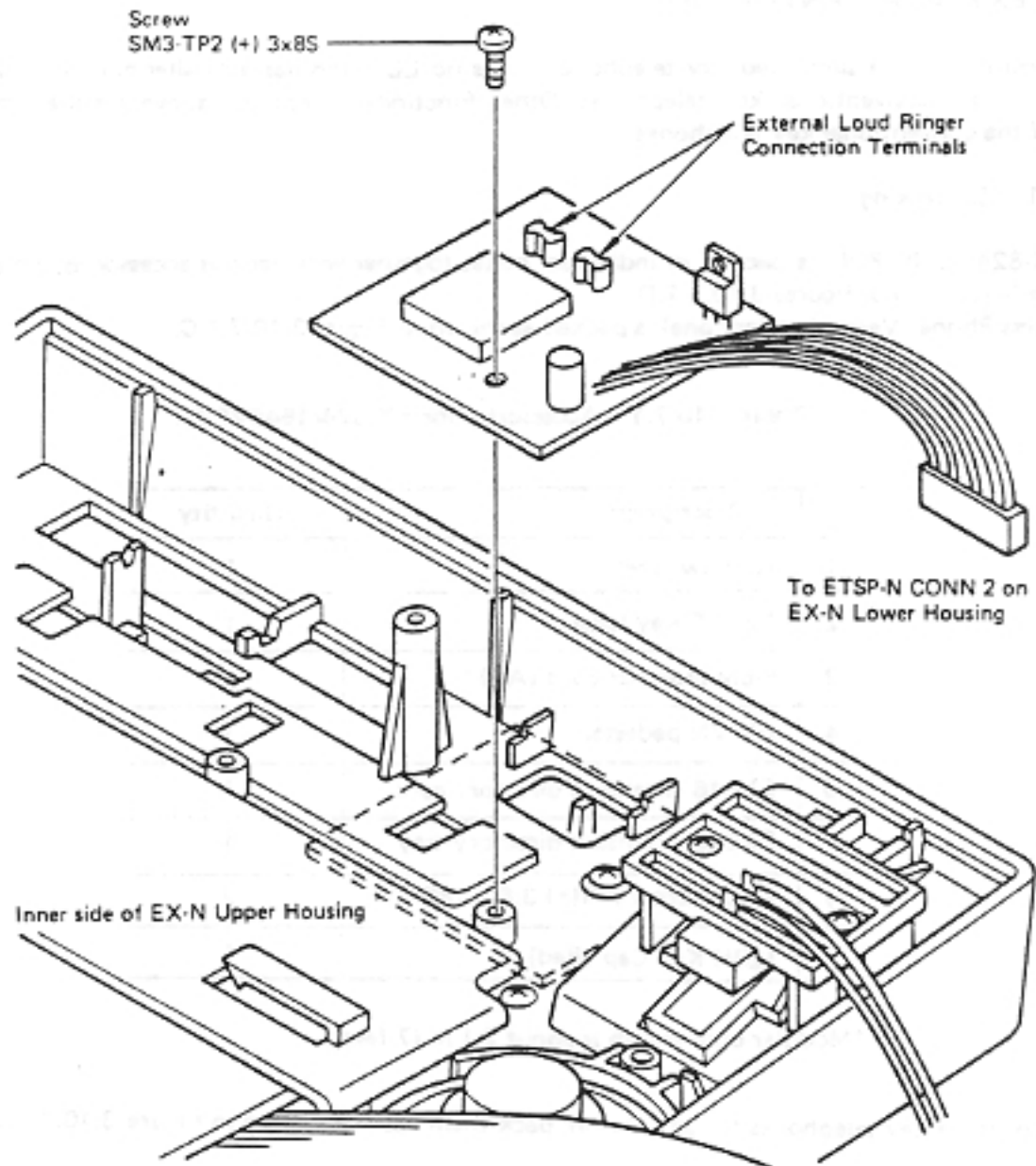


Figure 3.10.6.4(2)(g)B SRNG-M Installation

3.10.7 EX-824/1648VP-N1 installation

The Versa Phone is a simplified key telephone. It has no LCD and has a smaller number of keys as compared with the conventional key telephones. Other functions except the above are the almost same as those of the conventional key telephones.

3.10.7.1 Unpacking

The EX-824/1648VP-N1 is packed in individual boxes together with various accessories, which are shown in Table 3.10.7.1 and Figures 3.10.7.1.D.

This Versa Phone (Versatile telephone) is packed as shown in Figure 3.10.7.1.C.

Table 3.10.7.1 Accessories for EX-824/1648VP-N1

	Description	Quantity
1	Window label	1
2	EX-KT Key label	1
3	6-6M modular cord (AG) *	1
4	EX-VN pedestal	1
5	EX616 extension directory card	1
6	EX616 extension directory tray	1
7	Wood screw WR(+) 3.8 x 16S	2
8	128K Key Cap (Red)	1

*Modular cord length is about 2.1 m (7 feet).

To return these key telephones for any reason, pack them again as shown in Figure 3.10.7.1.C.

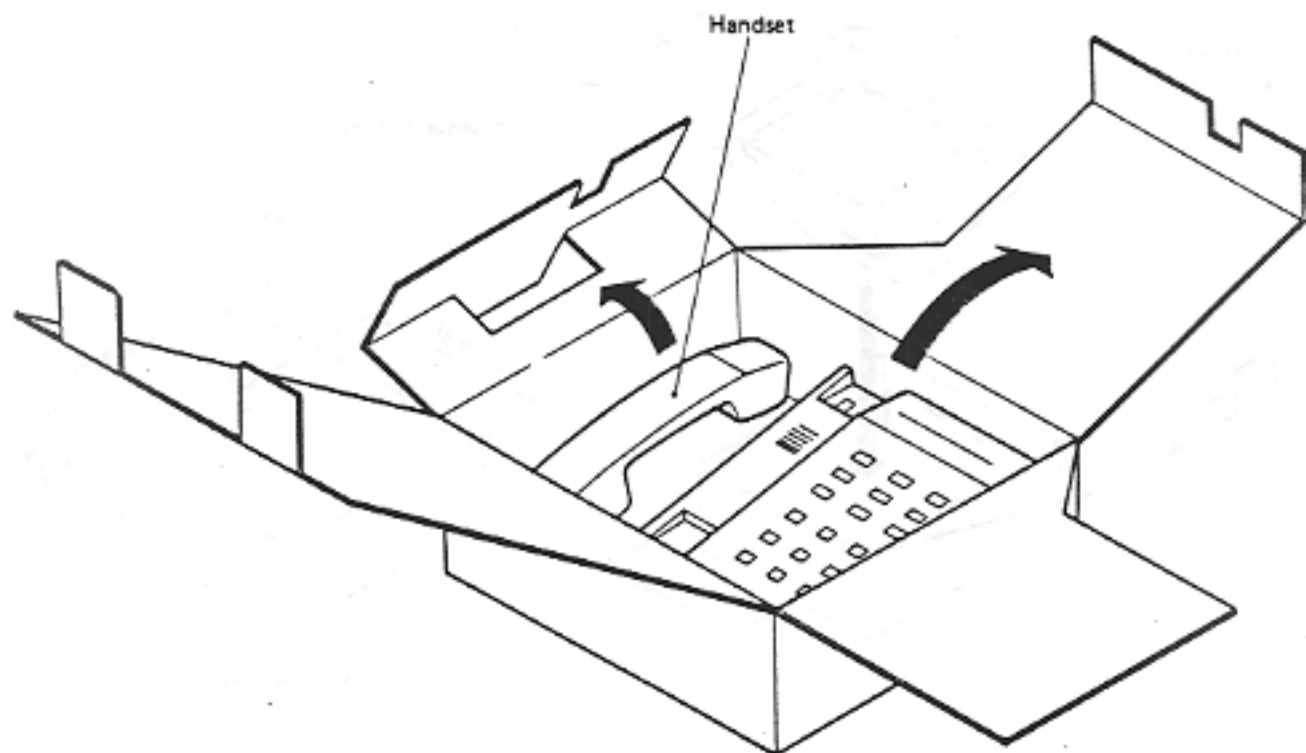
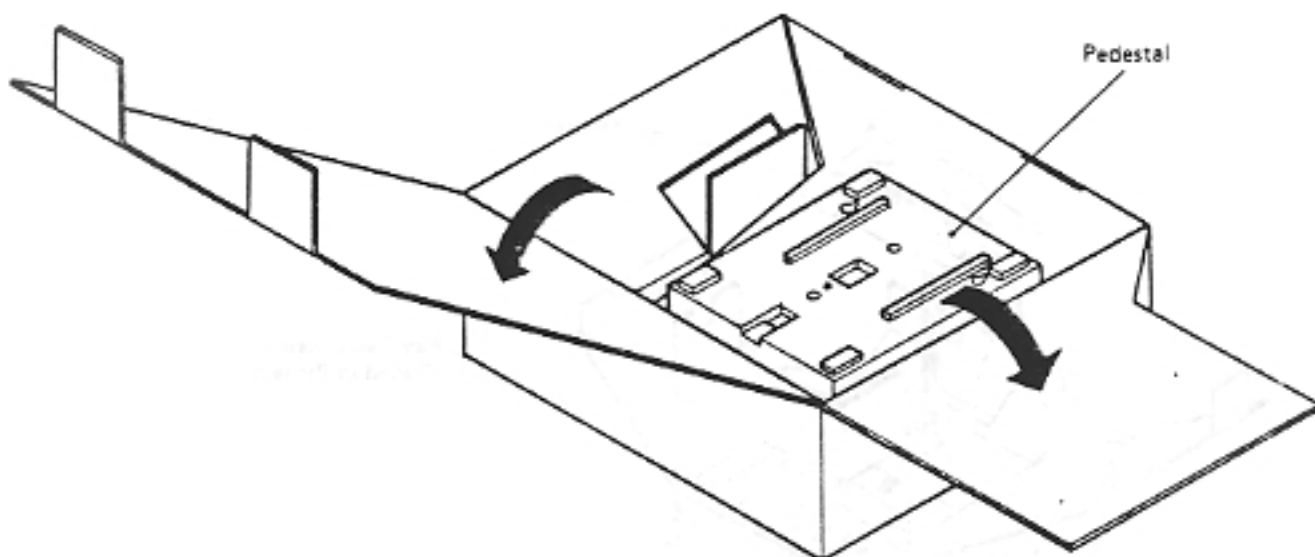


Figure 3.10.7.1.A · B Unpacking of EX-824/1648VP-N1

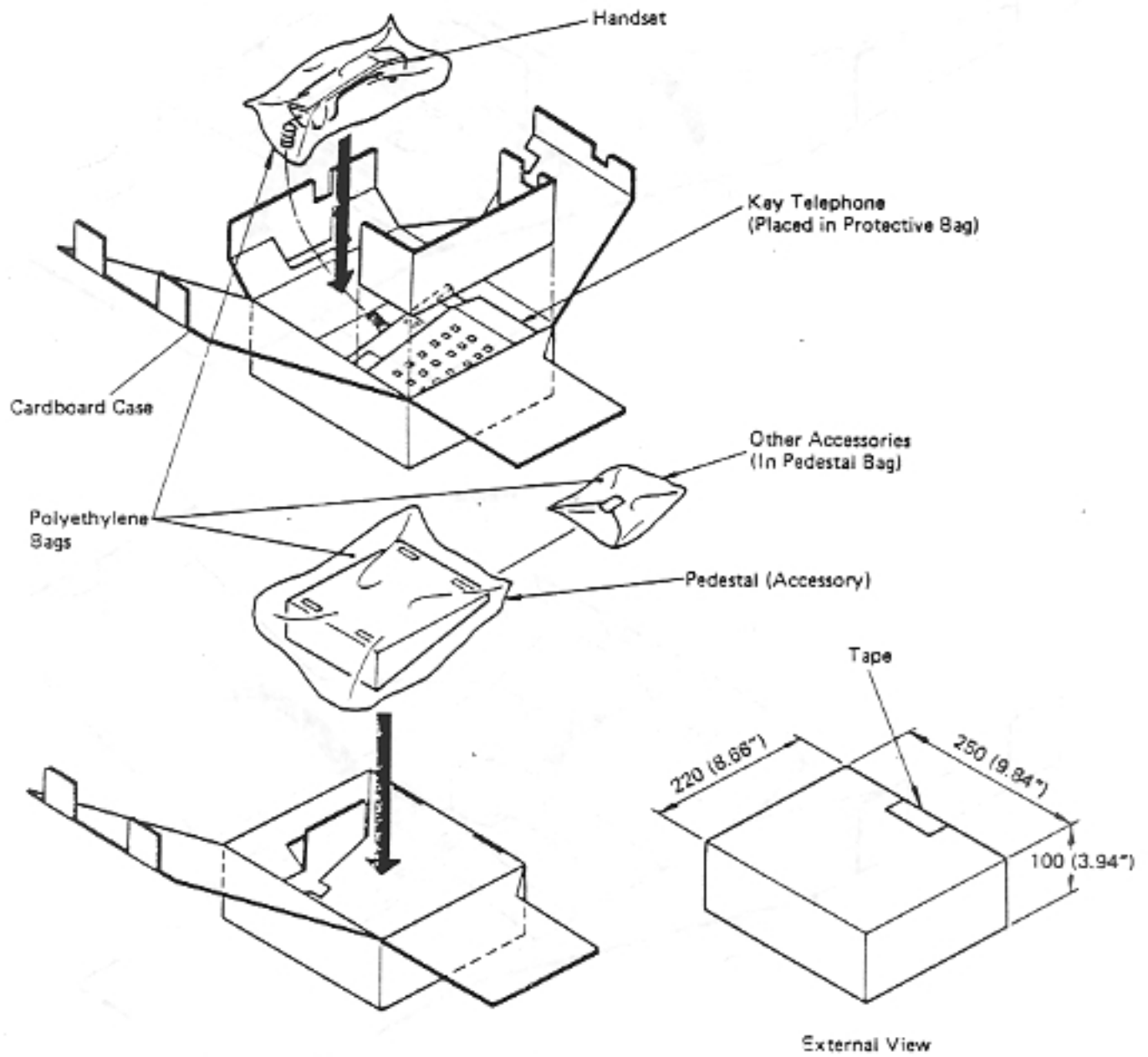
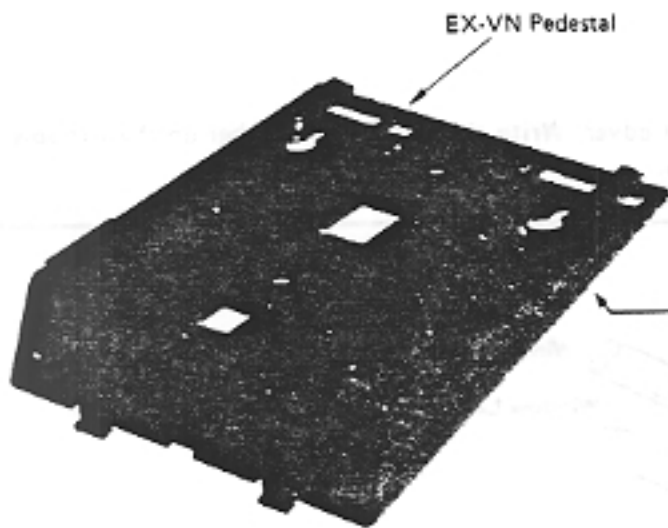


Figure 3.10.7.1.C Packing Method for EX-824/1648VP-N1



EX-VN Pedestal

Note



6-M Modular cord (AG)



EX-KT Key Label



Window Label



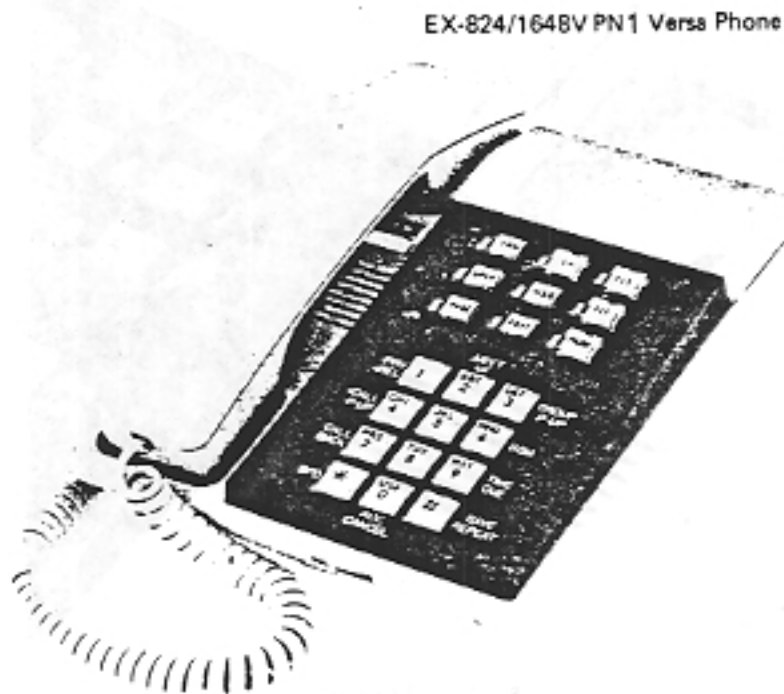
Extension Directory Card



Extension Directory Tray

Wood Screw WR(+), 3.8 x 16S
(2 pcs)

128K KEY Cap (Red)



EX-824/1648V PN1 Versa Phone

Note: The accessories at right are placed together inside the 128K pedestal.

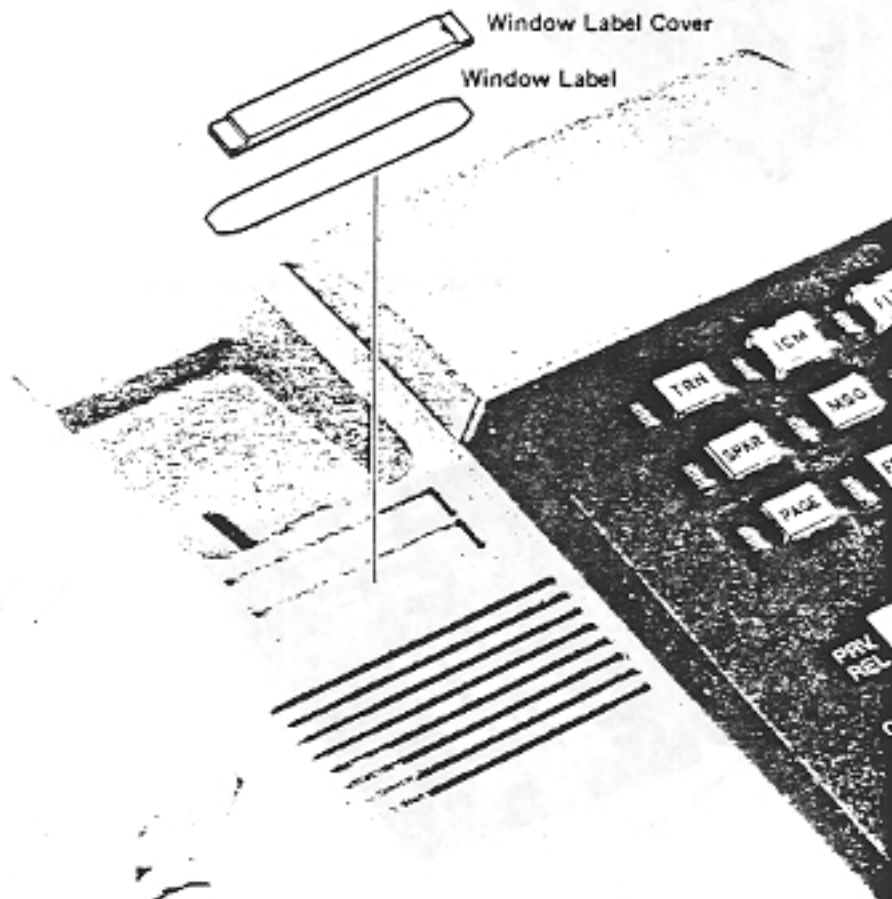
Figure 3.10.7.1.D EX-824/1648VP-N1 Components

3.10.7.2 Handling

(1) Component installation procedures

Window Label Placing

Remove the handset and the window label cover. Write the extension number on the window label, and place it as shown in Figure 3.10.7.2.(1).



EX-824/1648VP N1 Versa Phone

Figure 3.10.7.2.(1) Window Label Placement

(2) EX-VN pedestal standard installation and 6-6M modular cord processing

The EX-VN pedestal may be used in mounting a Versa Phone on a wall, but for purpose here, the pedestal installation procedure to be followed in installing a versa phone at an angle for easy operation is illustrated in Figures 3.10.7.2(2)A, B, and C. Insert the front table of the pedestal into the two slots in the front part of the lower housing, and push the rear part of the pedestal until the rear tabs are inserted into the two slots in the rear of the lower housing.

To remove the pedestal, reverse the above procedure.

Pass the modular cable through the pedestal as shown in Figure 3.10.7.2(2)B.



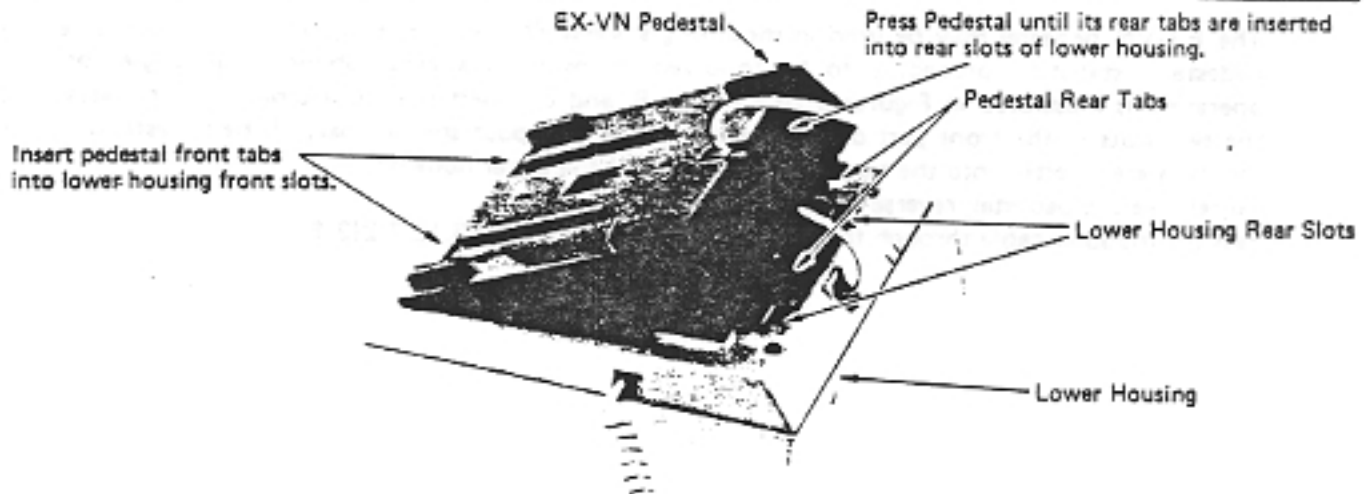
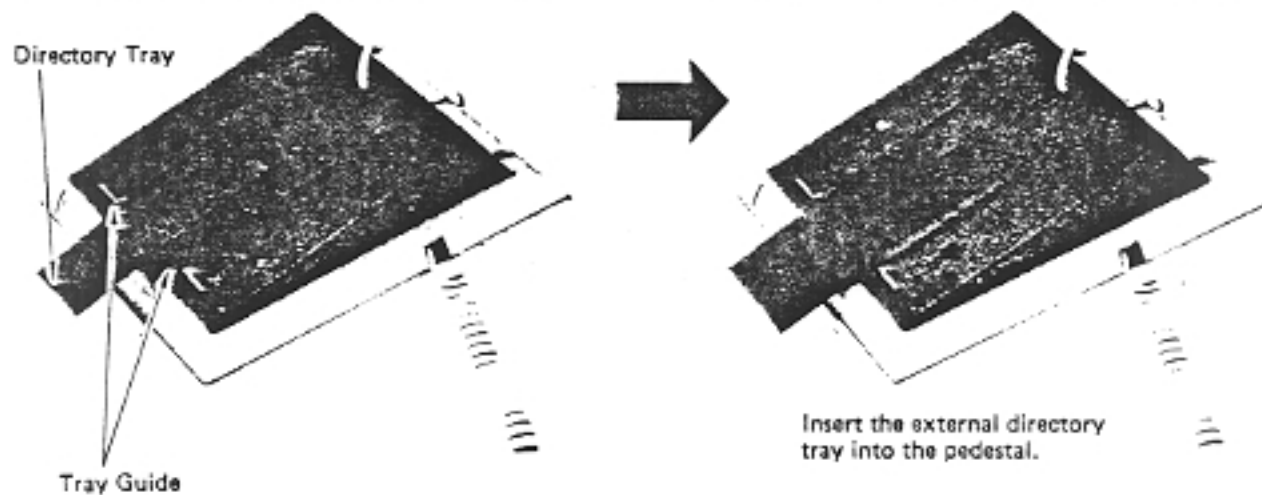


Figure 3.10.7.2(2)A Pedestal Installation



An extension directory card is provided for the user to write down telephone numbers. After writing them, peel off protective paper so the card can be easily pasted on the extension directory tray.

Figure 3.10.7.2(2)B Directory Tray Installation

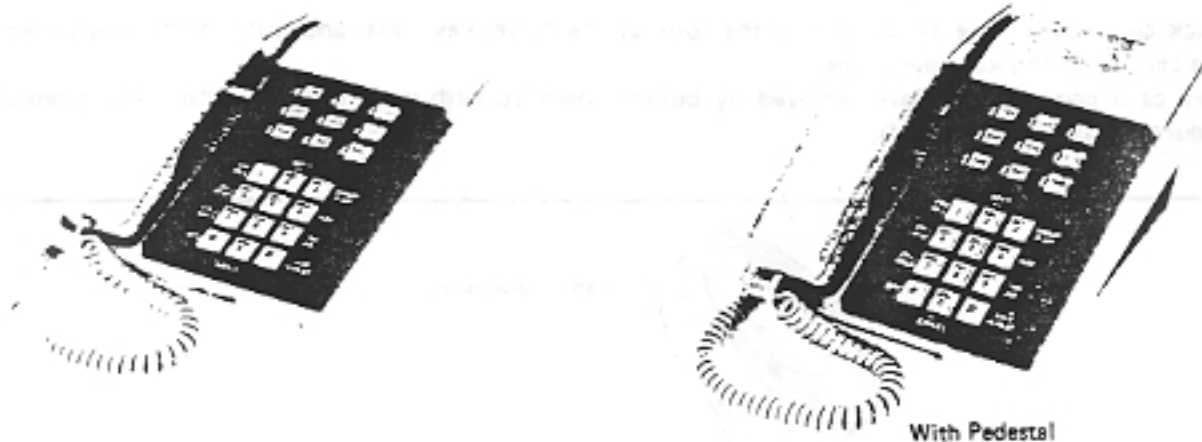
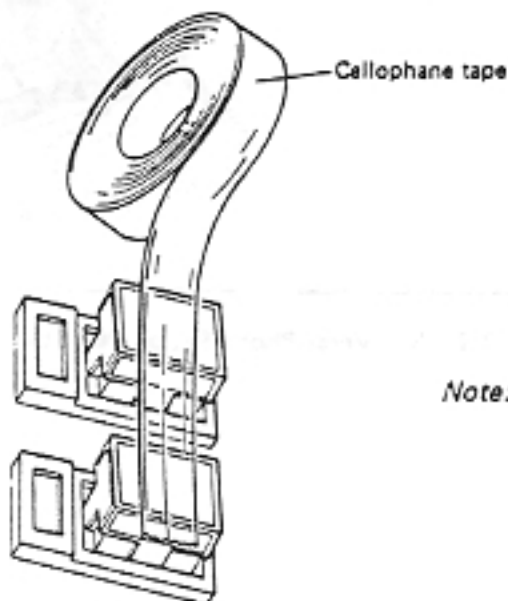


Figure 3.10.7.2(2)C Versa Phone Set on Pedestal

(3) 128K key cap removal and EX-KT key label insertion

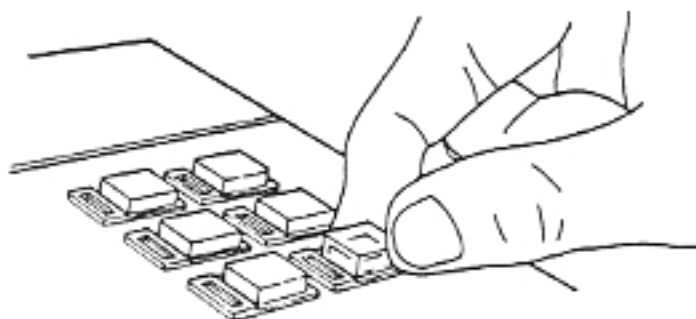
Stick cellophane tape or the like to the tops of the 128K key caps, and pull up the tape to remove the caps from the key telephone.

Key caps can also be easily removed by pulling them up with your fingers without using tape. See Figures 3.10.7.2.(3)A and B.



Note: Lightly stick cellophane tape to 128K key caps, and pull up the tape to remove the caps easily.

Figure 3.10.7.2.(3)A Removing 128K Key Caps With Cellophane Tape



Note: Hold 128K key cap firmly and pull it up to remove it from the key.

Figure 3.10.7.2.(3)B Removing 128K Key Caps With Fingers

After removing the 128K key caps, type out the necessary information on the EX-KT key labels, place them on the key tops, re-insert the 128K key caps.

Figure 3.10.4.2.(3)C shows enlarged view of the above process.

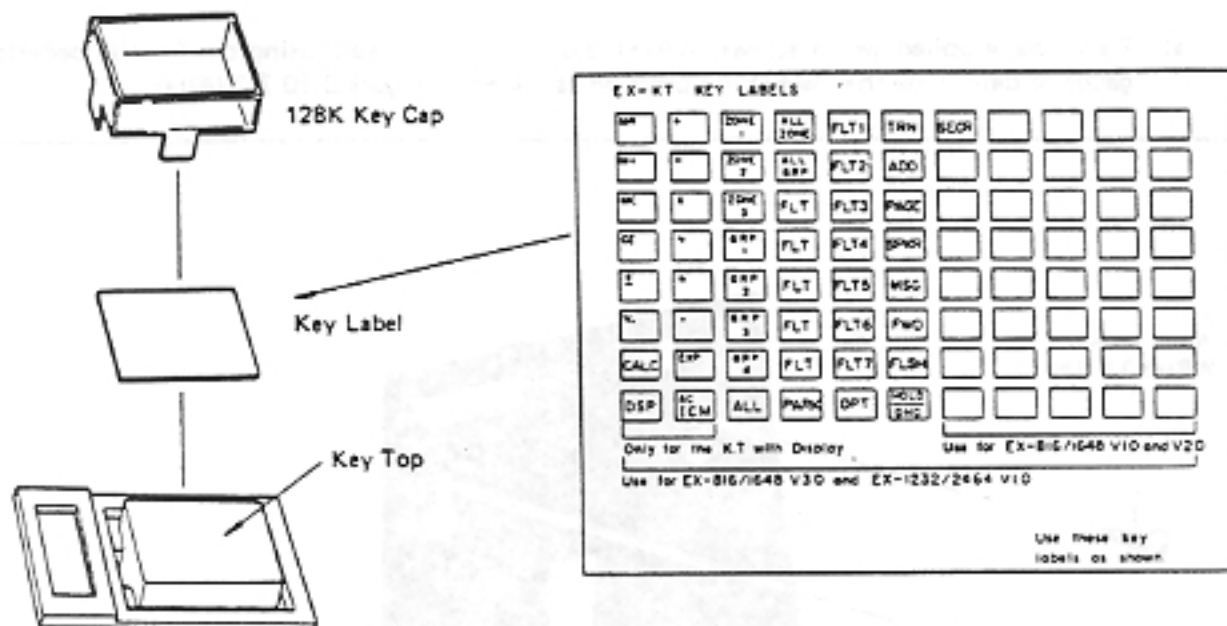


Figure 3.10.7.2.(3)C Label Installation

All the keys except FEAT key and ICM key can be allocated freely by flexible key assignment. Default values are shown in Figure 3.10.7.2(3)D.

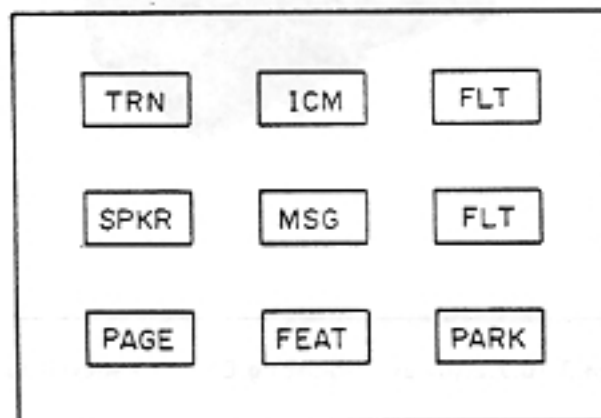


Figure 3.10.7.2(3)D VP Default Key Assignment

(4) Versa Phone wall mounting procedure

A Versa Phone can be easily mounted on a wall by reversing the EX-VN pedestal and the 82 handset wall bracket that is attached to the handset. Here is the procedure:

- (a) Plant the supplied wood screws, WR(+) 3.8 x 16S, in a wall, using the EX-VN pedestal as a gauge to determine the installation position as shown in Figure 3.10.7.2.(4)(a).

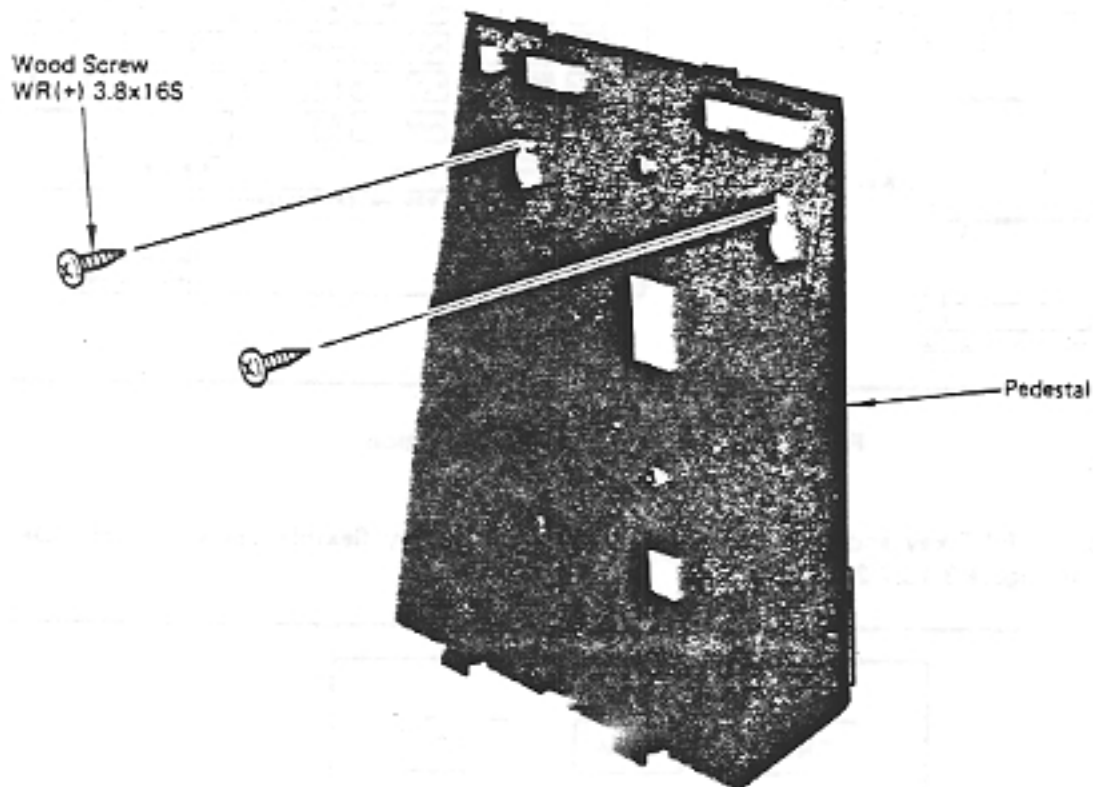


Figure 3.10.7.2.(4)(a) Mounting EX-VN Pedestal on Wall

- (b) Install the supplied EX-VN pedestal on the lower housing in the direction opposite to that of normal mounting.
If the pedestal is already mounted in the normal direction, remove it and remount it in the opposite way as shown in Figure 3.10.7.2.(4)(b).
Insert a tray into the lower housing beforehand.
Connect 6-6M Modular cord as shown in Figure 3.10.7.2(4)(b).

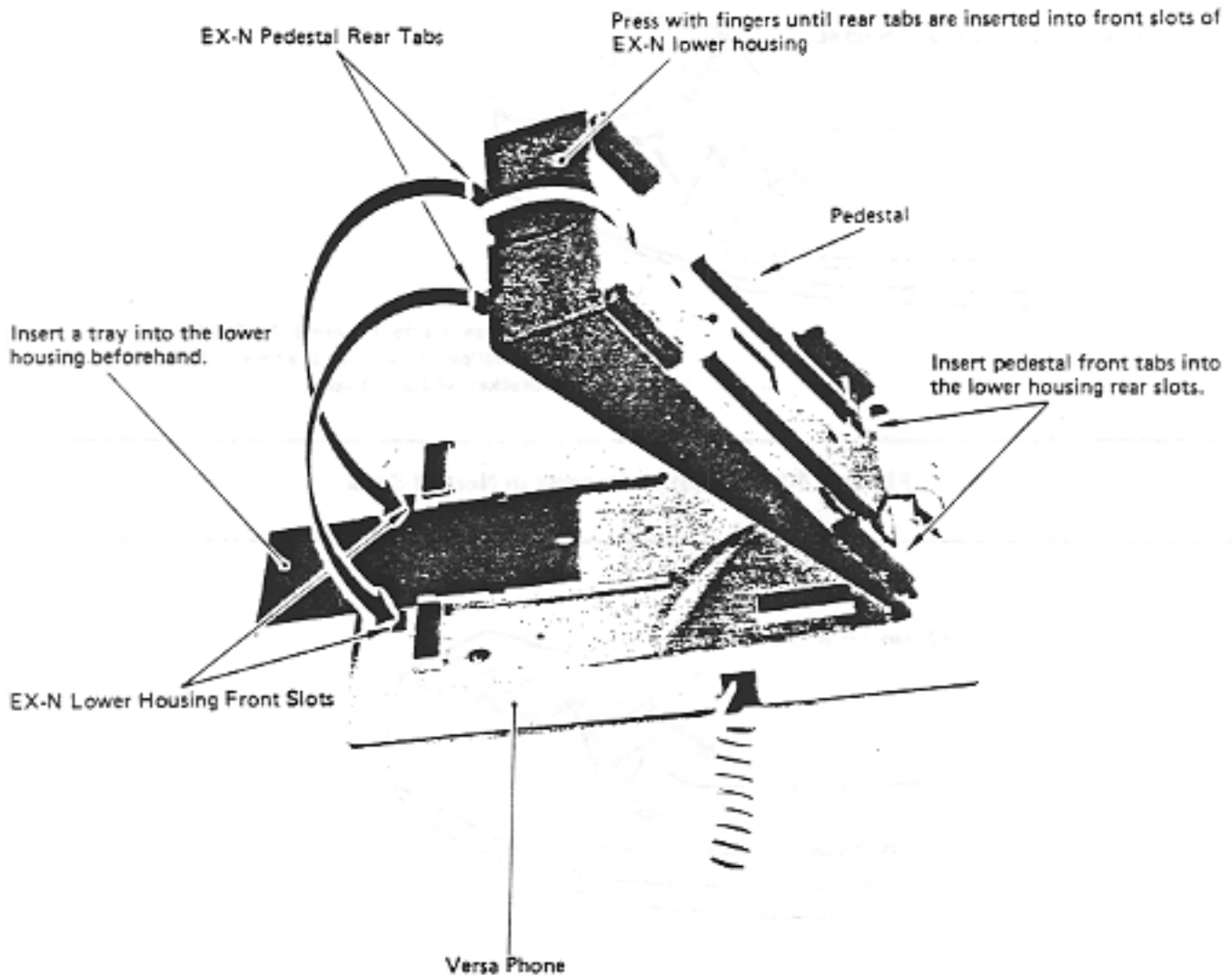


Figure 3.10.7.2(4)(b) Mounting Pedestal on Lower Housing

- (c) Fasten the Versa Phone to the screws that were planted in the wall.
- (d) The 82 handset wall bracket is fitted inside the transmitter end of the 82 handset handle base of the handset. Insert the tip of a ballpoint pen or a thick clip (1.4 to 1.0 mm ϕ AWG #16, #17, or #18) into the hole in the 82 handset wall bracket, and pry it open. The above process is illustrated in Figures 3.10.7.2(4)(d)A and B.

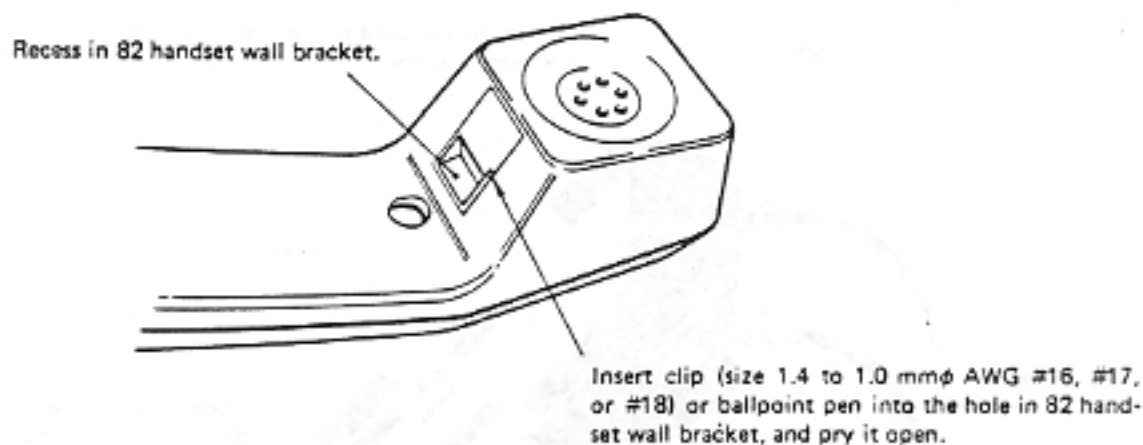


Figure 3.10.7.2(4)(d)A Handset in Normal State

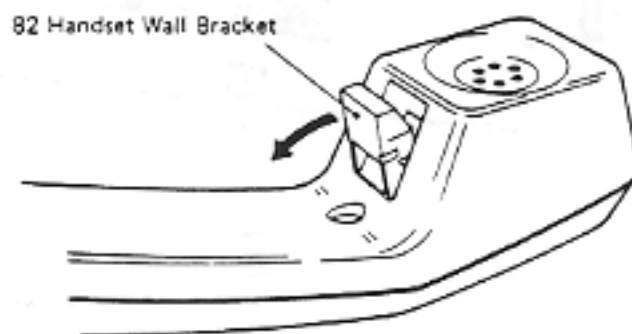


Figure 3.10.7.2(4)(d)B 82 Handset Wall Bracket Taken out of Handset

- (e) When the 82 handset wall bracket is completely out of the handset, turn it around, and fit it back into place so that the recess in the 82 handset wall bracket is closer to the transmitter. This process is shown in Figures 3.10.7.2(4)(e)A and B.

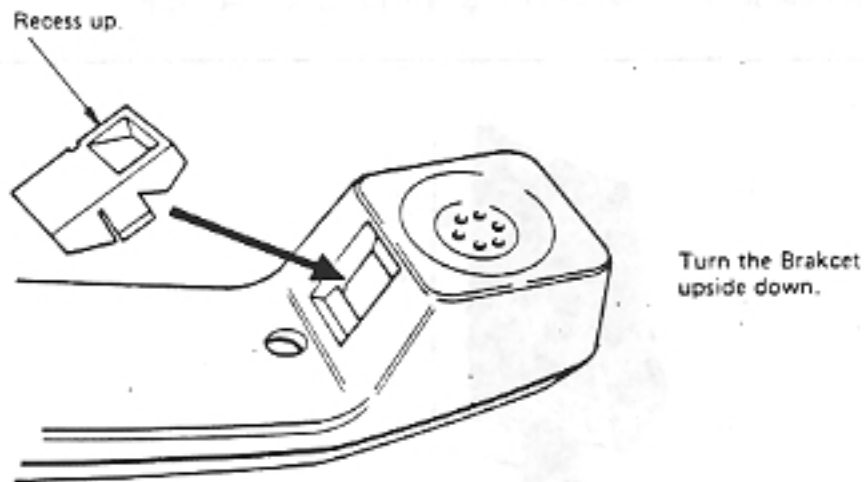


Figure 3.10.7.2(4)(e)A Turn the 82 Handset Wall Bracket Around so its Recess is up, and Fit it Back into Place.

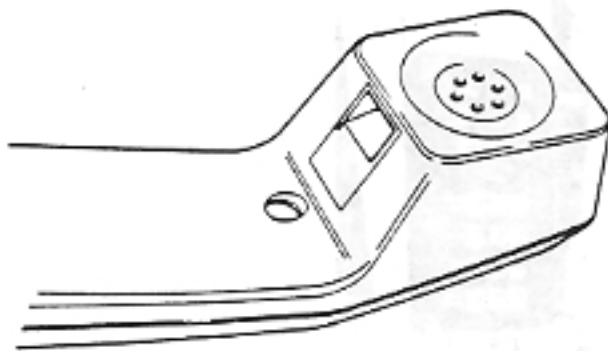


Figure 3.10.7.2(4)(e)B Handset Ready for Wall-Mounted Versa Phone

- (f) Check that the handset can now be secured on the wall mounting hook that projects from the receiver side of the upper housing.

(g) When installing a Versa Phone on a wall, first attach the extension directory tray to the telephone body and then attach the pedestal as shown in Figure 3.10.7.2(4)(g)A and B.

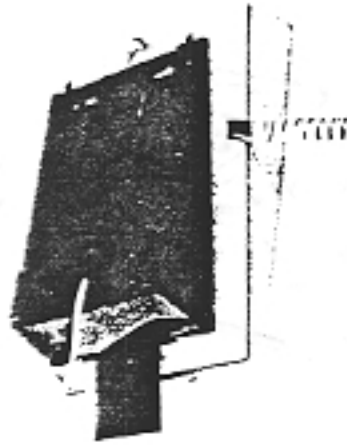


Figure 3.10.7.2(4)(g)A Modular Cord and Pedestal Processing



Figure 3.10.7.2(4)(g)B Versa Phone Mounted on Wall

3.10.7.3 Feature Assignment

Any of the following classes of service can be assigned to the EX-824/1648VP-N1 Versa Phone:

- Tenant Group
- Secretary Attribute
- Protected Attribute
- Executive Attribute
- Call Forward/Busy Call Forward
- Quick Mode Attribute
- Off-Hook Signal Deny
- Off-Hook All Call Deny
- All Call Deny
- Hold Recall Deny
- Speed Dial Access Deny
- Toll Speed Dial Access Deny
- CO Auto-Answer Deny
- ICM Auto-Answer Deny
- Paging Call Access Deny
- Call Forward Deny
- Do Not Disturb Deny
- Optimized Call Routing Access Deny
- Equal/SCC Access Deny
- Toll Dial Class of Restriction
- CO Outgoing Level
- Route Advance Step
- Pickup Restriction
- KT Key Assignment
- Personal ID Code
- Versatile Telephone Attribution
- Direct Station Speed Dial
- Automatic ICM

Use the system programming terminal for assignment of classes of service. For the planning procedure, refer to section 2.3, Features and Operation. For the actual assignment procedure, refer to section 4, Installation (Software).

3.10.7.4 Optional Features

3.10.7.4(1) Description of features

Versa Phone has the optional features listed in Table 3.10.7.4(1)A.

Table 3.10.7.4(1)A Optional Features

NO.	Feature	Description
1	Headset	Headset AC-011 can be connected in place of an SOHD (Station Ordinary Headset).
2	SHHD (Station Hard Hearing Handset — amplified handset)	The SHHD (amplified handset) is designed to provide receiving signals at an amplified level, mainly for those who have difficulty in hearing. Replace the SOHD (Station Ordinary Handset) with SHHD attaching to the modular cord, and set the STJ.
3	SNHD (Station Noise Canceling Handset)	The SNHD is recommended for satisfactory communication in factories or other high-level noise locations where it is difficult to communicate through the SOHD. To use this handset, replace it with the ordinary handset, and set the STJ.
4	Hands-free talk	A commercial speakerphone (Panasonic KX-T1016) can be externally attached to the telephone for hands-free talk. In this case, neither the handset nor headset is used. EX-824/1648VP-N1 Versa Phone with a built-in ESPA-N unit may use an external speakerphone.
5	Hands Free Answer Back (Initially built in)	Hands-free answer to an ICM call is possible. A HFAB-R is installed in the telephone for that purpose.

Note: One of the following options can be connected to an EX-824/1648VP-N1: headset, SHHD (Station Hard Hearing Handset), or SNHD (Station Noise Canceling Handset); plus ESPA-N or HFAB-R unit.

The units to be used and installation procedures for these options are shown in Table 3.10.7.4(1)B.

Table 3.10.7.4(1)B EX-824/1648 VP-N1 Optional Unit Installation Requirements

No.	Optional Unit	Connector on VPSP-R		STJ on VPSP-R				Headset to use
		CONN J9	CONN P.5	SET 1	SET 2	SET 3	SET 8	
1	Headset AC-011	/	/	/	/	/	/	HEADSET AC-011
2	SHHD (Station hard-of-hearing handset)	/	/	/	/	set	/	SHHD (Station hard-of-hearing handset)
3	SNHD (Station noise-canceling handset)	/	/	/	set	/	/	SNHD (Station noise-canceling handset)
4	ESPA-N (External speakerphone Adaptor-N)	use	/	set	/	/	/	SOHD SHHD SNHD AC-011
5	HFAB-R (Hands Free Answer Back)	/	use	/	/	/	set	SOHD SHHD SNHD AC-011

To set, pull the STJ out of the jumper connector and fit it on connector pins 2 and 3.
HFAB-R is initially built.

Table 3.10.6.4(1)C EX-824/1648 K, D, KN, DN, KN1, DN1, VP-N1 Optional Equipments

Optional Equipment	Note	K	D	KN	DN	KN1	DN1	VP-N1
Headset AC-011	1	X	X	X	X	X	X	X
Headset Adaptor SHSA-M	2	X	X	X	X	X	X	X
External Speakerphone Adaptor ESPA-N			X	X	X	X	X	X
Station Speakerphone Unit SSPU-M		X	X					
Station Speakerphone Unit SSPU-N				X	X	X	X	
Station Speakerphone Unit SSPU-NS				X	X	X	X	
Station Speakerphone Unit SSPU-RN1	3	X	X	X	X	X	X	X
Hands Free Answer Back Unit HFAB-R	4	Not Required	Not Required	Not Required	Not Required	Not Required	Not Required	Not Required
Noise Prevention Handset SNHD		X	X	X	X	X	X	X
Hard-of-hearing Handset SHHD		X	X	X	X	X	X	X
Hard-of-hearing Handset Adaptor SHHA-M	5	X	X	X	X	Not Required	Not Required	Not Required
Station Loud Ringer Unit SRNG-M		X	X	X	X	X	X	

- Note: 1. Headset AC-011 does not detect hook-switch signals, so hooking with the handset is necessary.
 2. The SHSA-M is an adaptor for starset of plantronics.
 3. When mounting an SSPU-RN1 on a K or D key telephone, an SMPA-B (SSRU-RN1 Mount Plate Assembly - B) is required.
 4. HFAB (Hands Free Answer Back circuits) are built in the K, D, KN, and DN. The HFAB-R circuits are initially built in the VP-N1.
 5. SHHA circuits are built in the KN1, DN1, and VP-N1.

(2) Optional unit installation procedure

(a) General

Additional features can be provided by installing optional units in or around a Versa Phone. Optional units ESPA-N, HFAB-R, SHHD, SNHD and Headset (AC-011) are available for mounting in or on a Versa Phone. These optional units are listed in Table 3.10.7.4(1)B.

The basic method for installing these options is to open the upper housing and lower housing, install the desired unit, and make the necessary settings.

The place for each of these options is shown in Figure 3.10.7.4(2)(b) to (f). Pass the external cable, such as the lead on the external speaker phone, through the hole opened by breaking the external cable tab in the rear of the lowering housing, as shown in Figure 3.10.7.4(2)(a)A.

Versa Phone housing can be opened by removing the four screws from the bottom, as shown in Figure 3.10.7.4(2)(a)B. The Versa Phone upper housing and lower housing are connected to each other with leads, so do not forcibly pull or separate them.

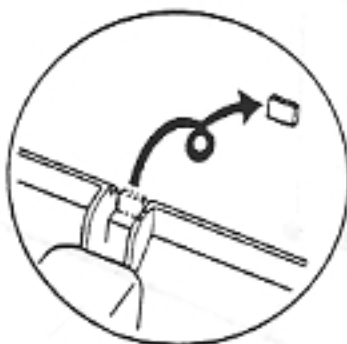
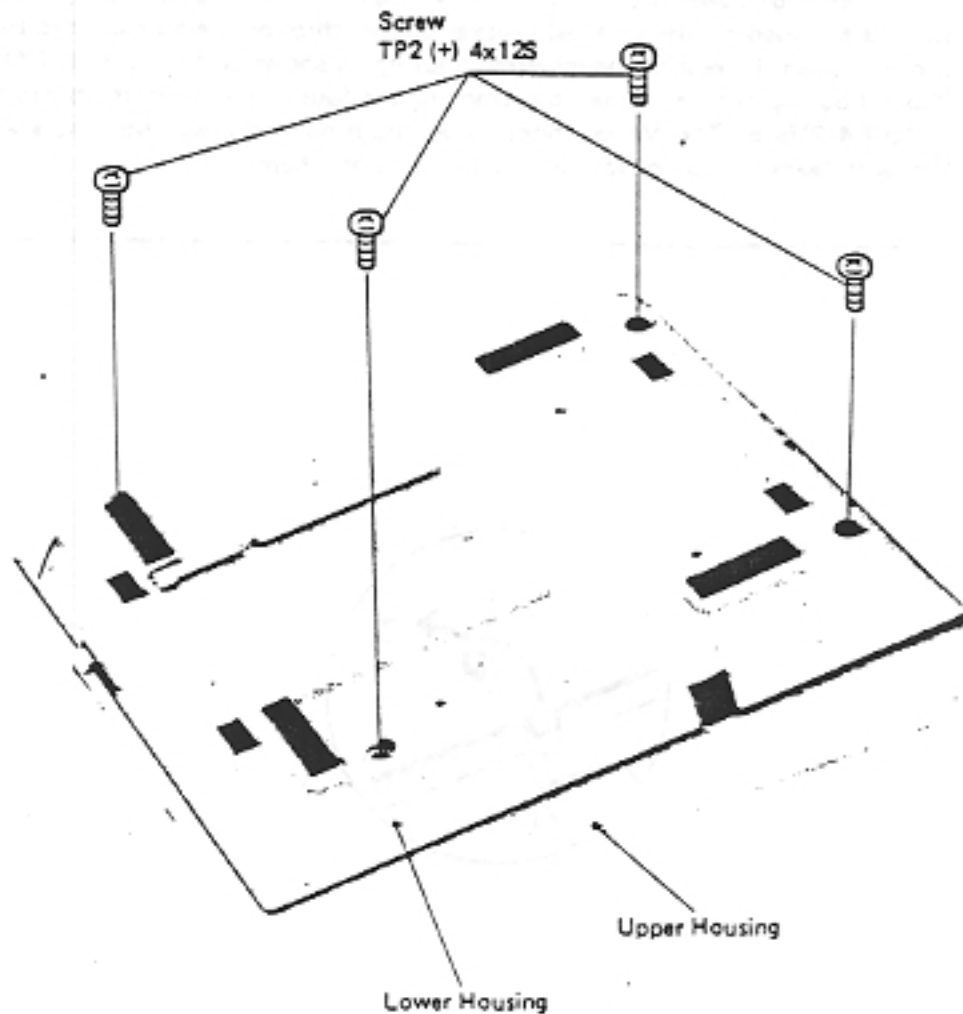


Figure 3.10.7.4(2)(a)A

Upper housing and lower housing opening.

It is necessary to open both housing in installing optional units. These two housings can be opened by removing the four screws, TP2 (+) 4x12S, that fasten the lower housing, using a screwdriver. This is illustrated in Figure 3.10.7.4(2)(a)B.

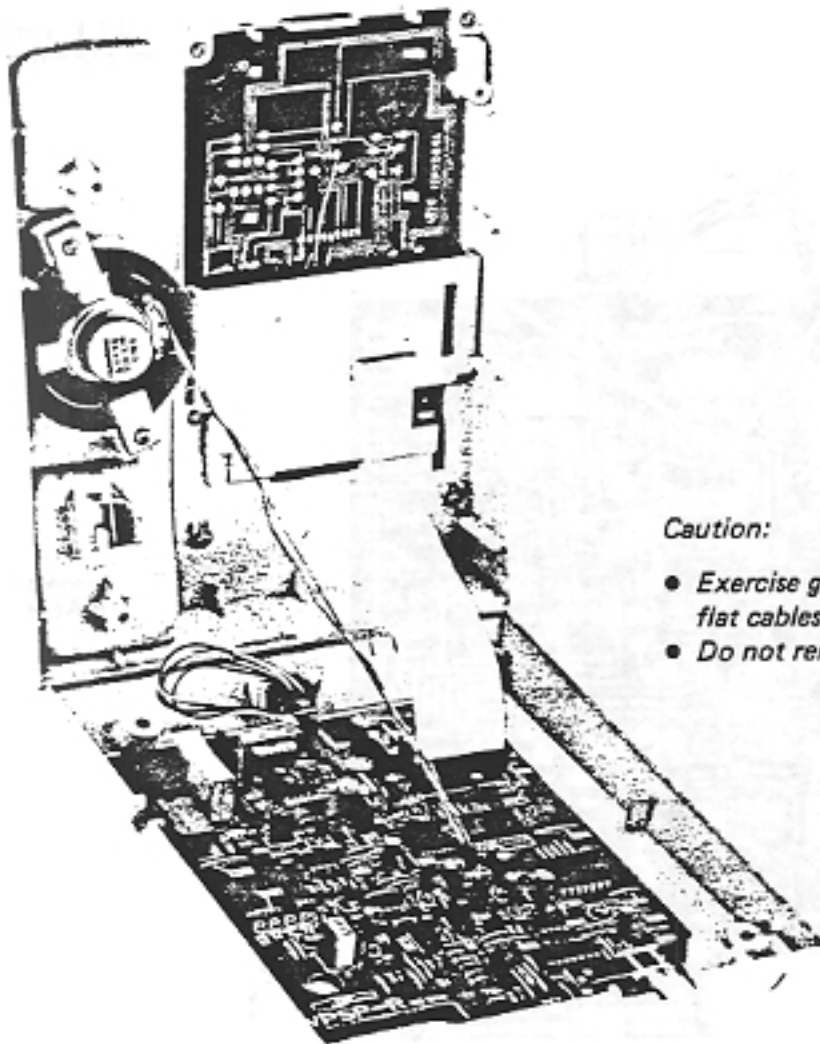


CAUTION

Be careful not to pinch the internal wires between the upper housing and lower housing during reassembly.

Figure 3.10.7.4(2)(a)B Opening the Housing

Upper Housing

**Caution:**

- Exercise great care not to cut or bend these flat cables.
- Do not remove wires from the connector.

Lower Housing

Figure 3.10.7.4(2)(a)C Inside the Housing

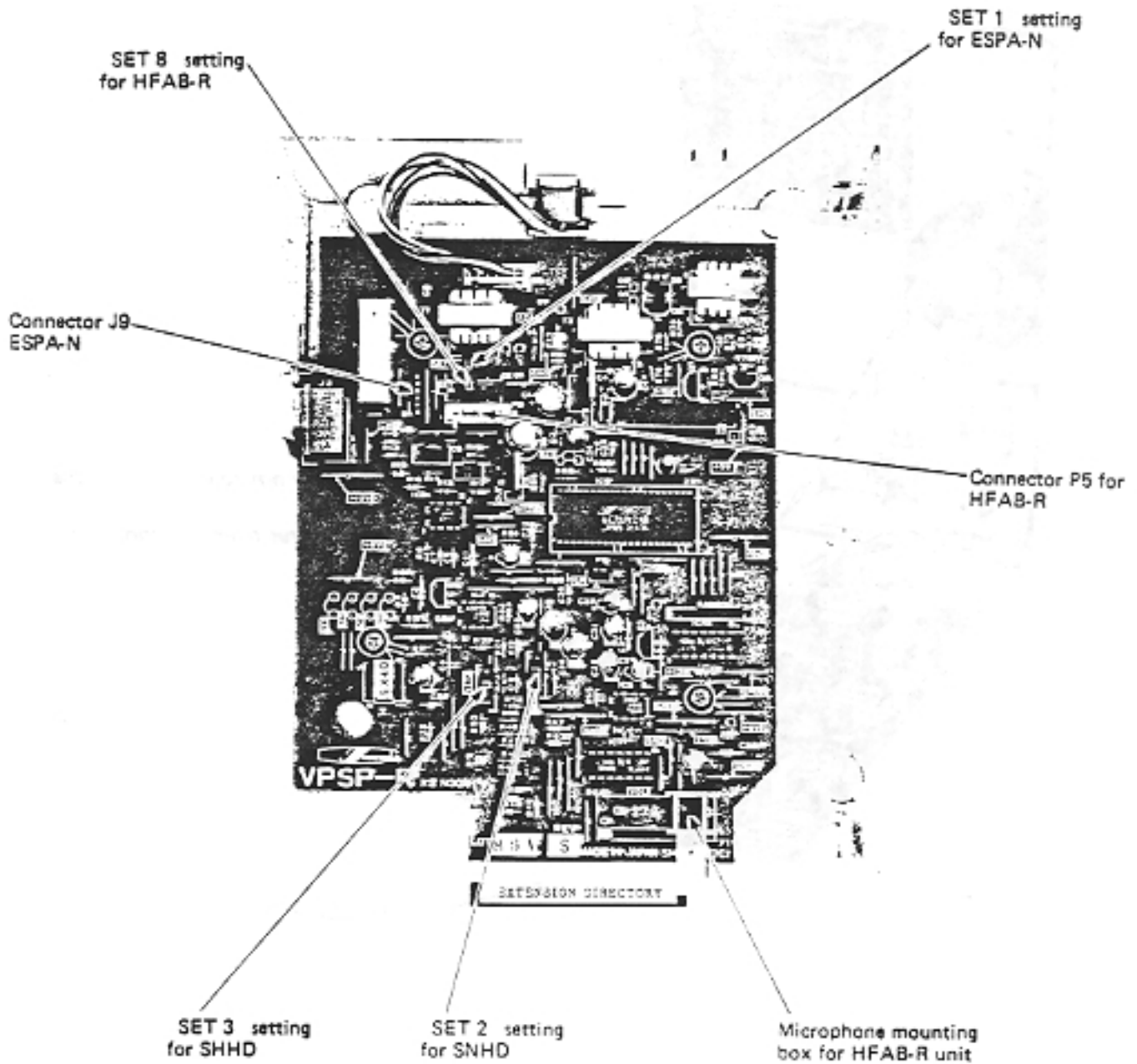


Figure 3.10.7.4(2)(a)D STJ and Connector

IWATSU

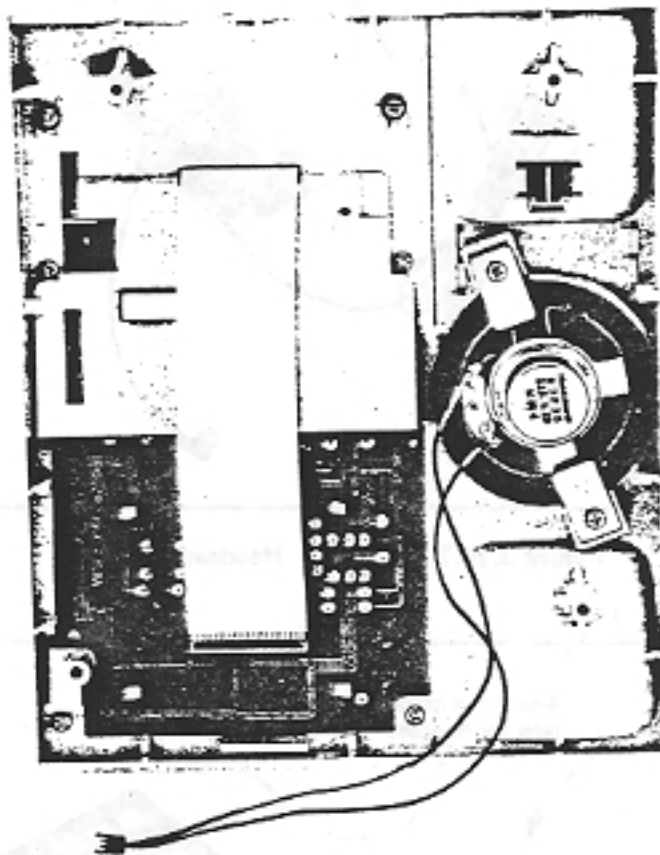


Figure 3.10.7.4(2)(a)E Rear View of the Versa Phone Upper Case
(The HFAB-R is removed.)

(b) AC-011 headset installation procedure

AC-011 headset can be used in place of an ordinary handset.

Disconnect the handset cord from the 4-position modular jack on the left side of the key telephone, and insert the 4-position modular plug of the AC-011 headset into the same jack.



Figure 3.10.7.4(2)(b)A Headset AC-011

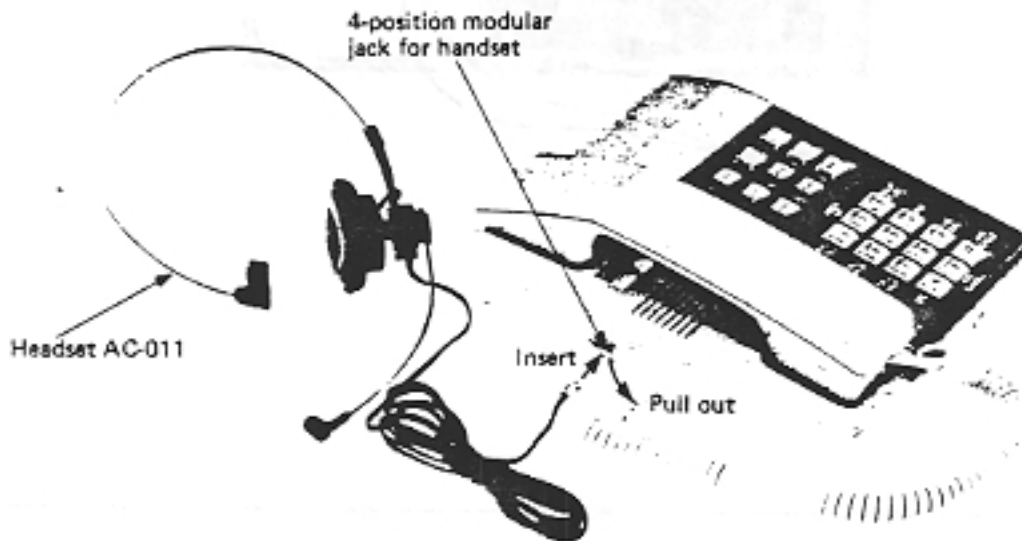


Figure 3.10.7.4(b)B Headset Installation

(c) SHHD (amplifier handset) installation procedure

The SHHD handset amplifies the volume of received voice. The receiver has a volume control switch which may be used to control the volume to normal level or higher. Open the key telephone housing, and change the STJ settings at SET3. Disconnect the cord from the ordinary handset, and connect it to SHHD.

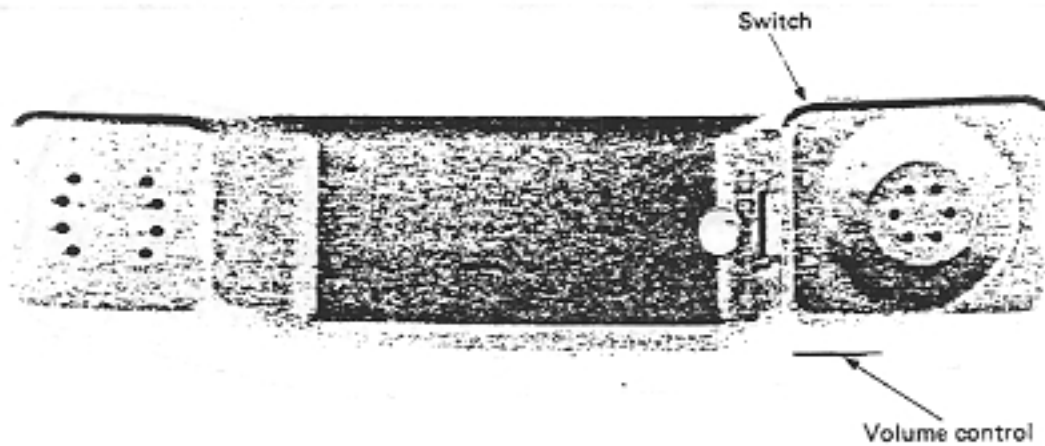


Figure 3.10.7.4(2)(c)A External View of SHHD

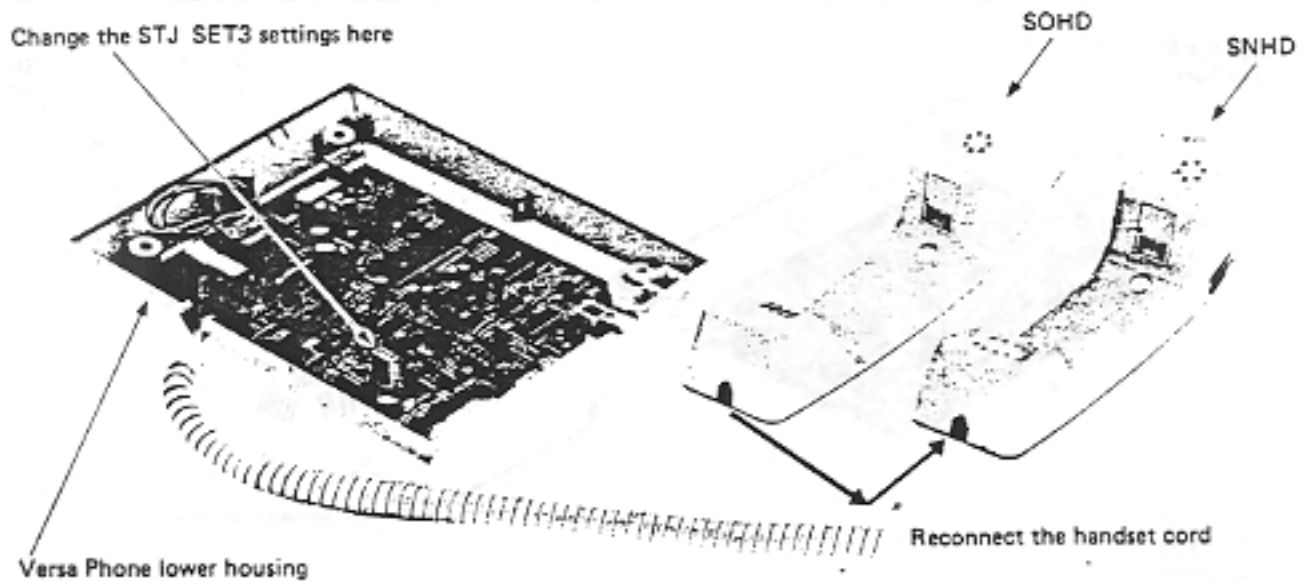


Figure 3.10.7.4(2)(c)B SNHD Installation

(d) SNHD (noise cancelling handset) installation procedure

The SNHD handset is used in noisy places to reduce the effect of noise on telephone conversation.

Caution: Do not close the holes in the transmitter during use.

Open the key telephone casing, and change the STJ settings at SET2.

Disconnect the cord from the ordinary handset, and connect it to SNHD.

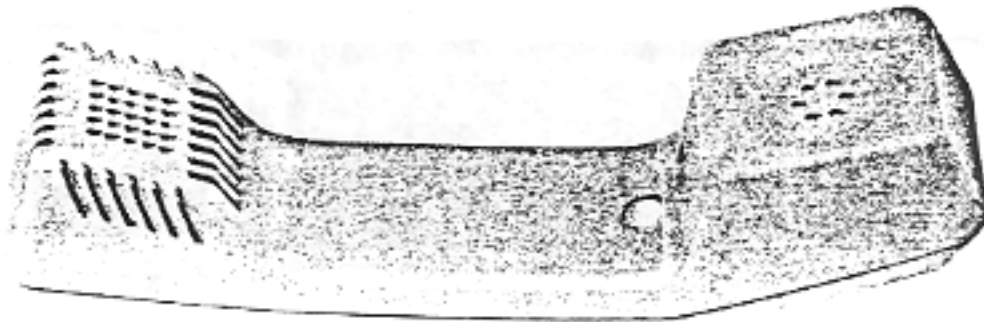
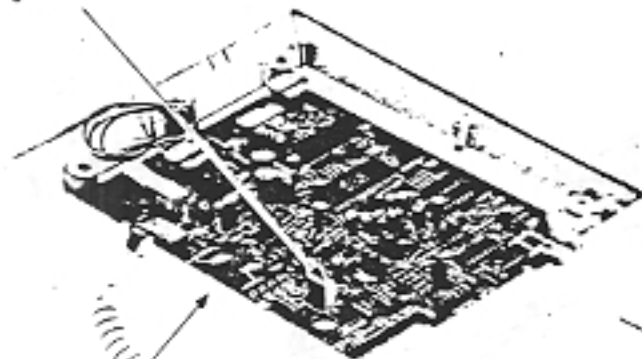


Figure 3.10.7.4(2)(d)A External View of SNHD

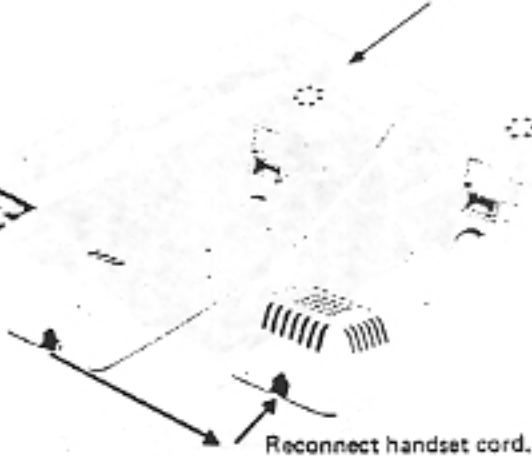
Change the STJ SET2 settings here.



Versa Phone lower housing

SOHD

SHHD



Reconnect handset cord.

Figure 3.10.7.4(2)(d)B SNHD Installation

(e) ESPA-N installation procedure

The ESPA-N is a printed-circuit board assembly as shown in Figure 3.10.7.4(2)(e)A. Install it inside the upper housing with a single screw.

To connect the external speakerphone cable, break off the external cable tab and drill a cable hole. A commercial speakerphone (Panasonic KX-T1016) can be connected to the key telephone via the six-position, four-conductor modular jack on the ESPA-N. The microphone and speaker built inside the key telephone do not operate while the external speakerphone is in use. (The install the ESPA-N, initially mounted HFAB-R must be removed.)

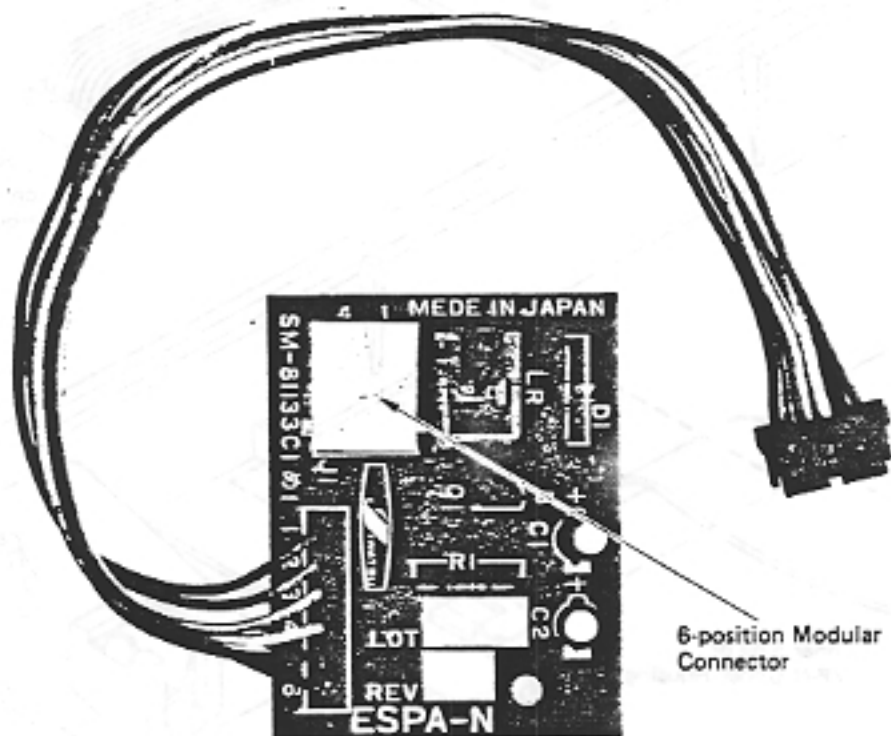


Figure 3.10.7.4(2)(e)A ESPA-N Unit

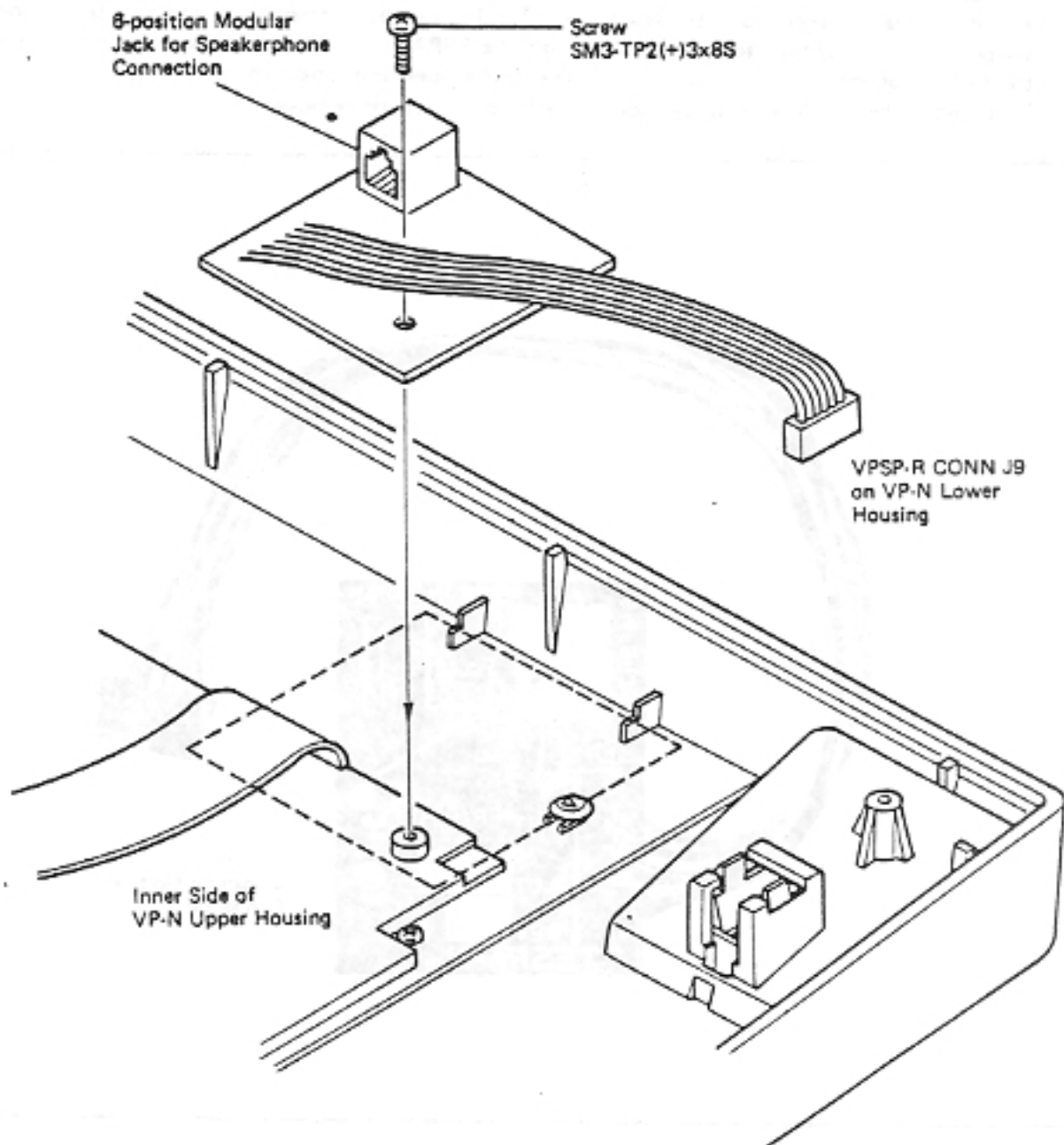
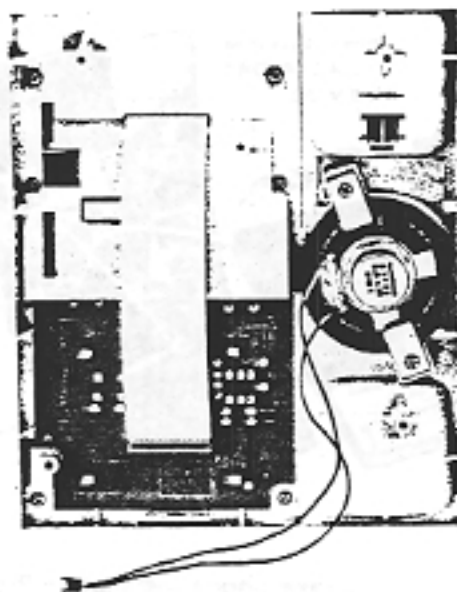
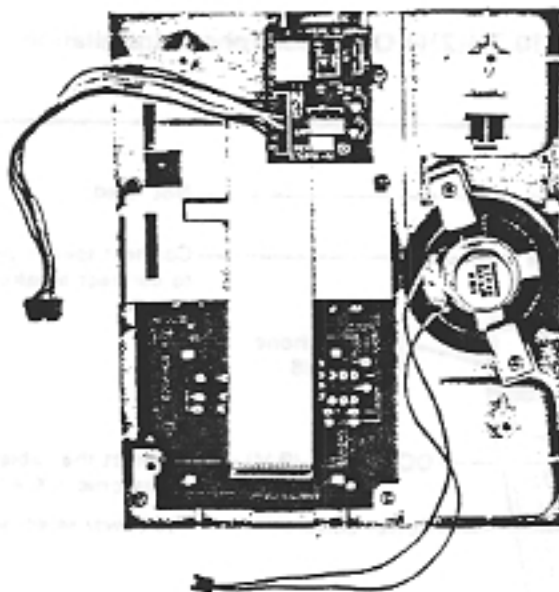


Figure 3.10.7.4(2)(e)B ESPA-N Installation

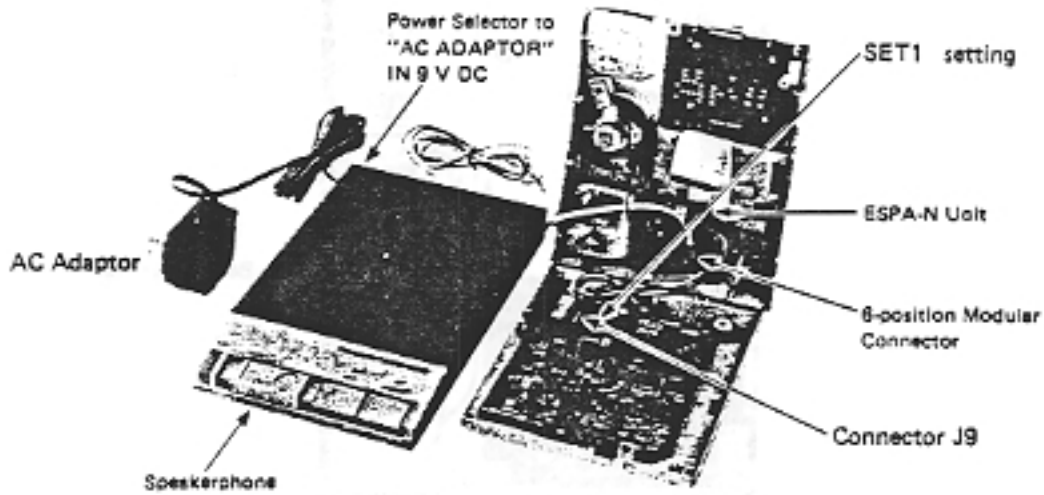


Before installation



After installation

Figure 3.10.7.4(2)(e)C Before and After ESPA-N Installation



((Speakerphone Installation Procedure Diagram))

Fasten the ESPA-N onto the keyboard case with screws and then connect the speaker phone.

Figure 3.10.7.4(2)(e)D Speakerphone Installation

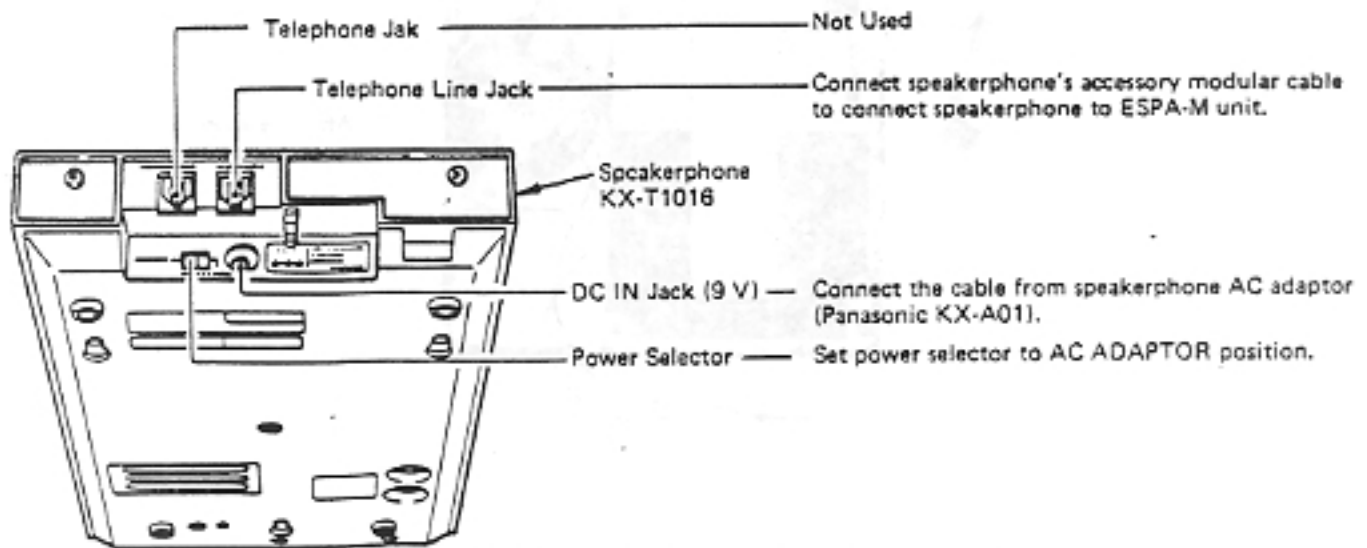


Figure 3.10.7.4(2)(e)E Speakerphone

(f) HFAB-R installation procedure

The HFAB-R is a printed-circuit board assembly as shown in Figure 3.10.7.4(2)(f)B to D. Install it inside the upper housing with a single screw.

The HFAB-R unit is initially mounted on the EX-824/1648 VP-N1.

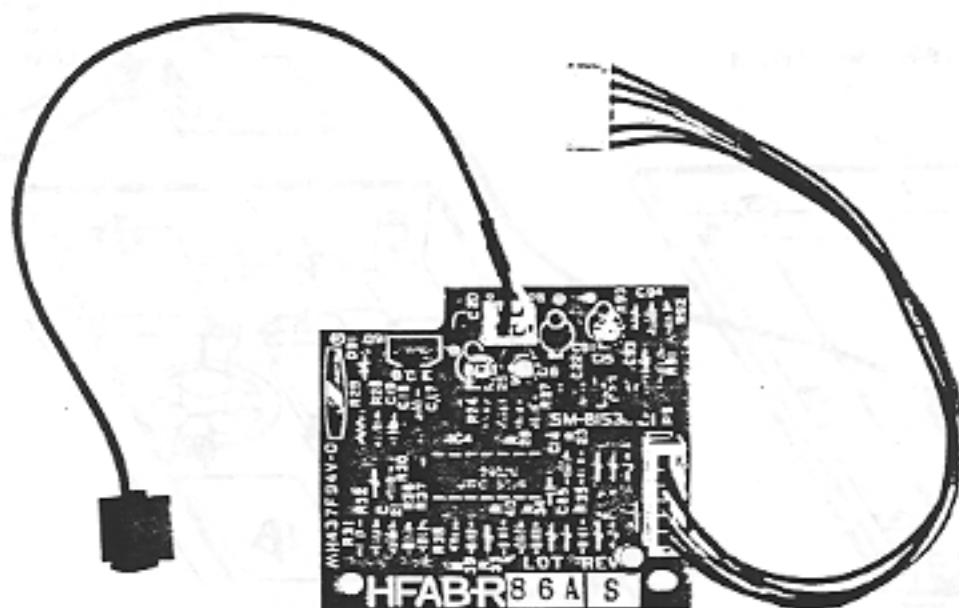


Figure 3.10.7.4(2)(f)A HFAB-R Unit (Hands Free Answer Back Adaptor-R)

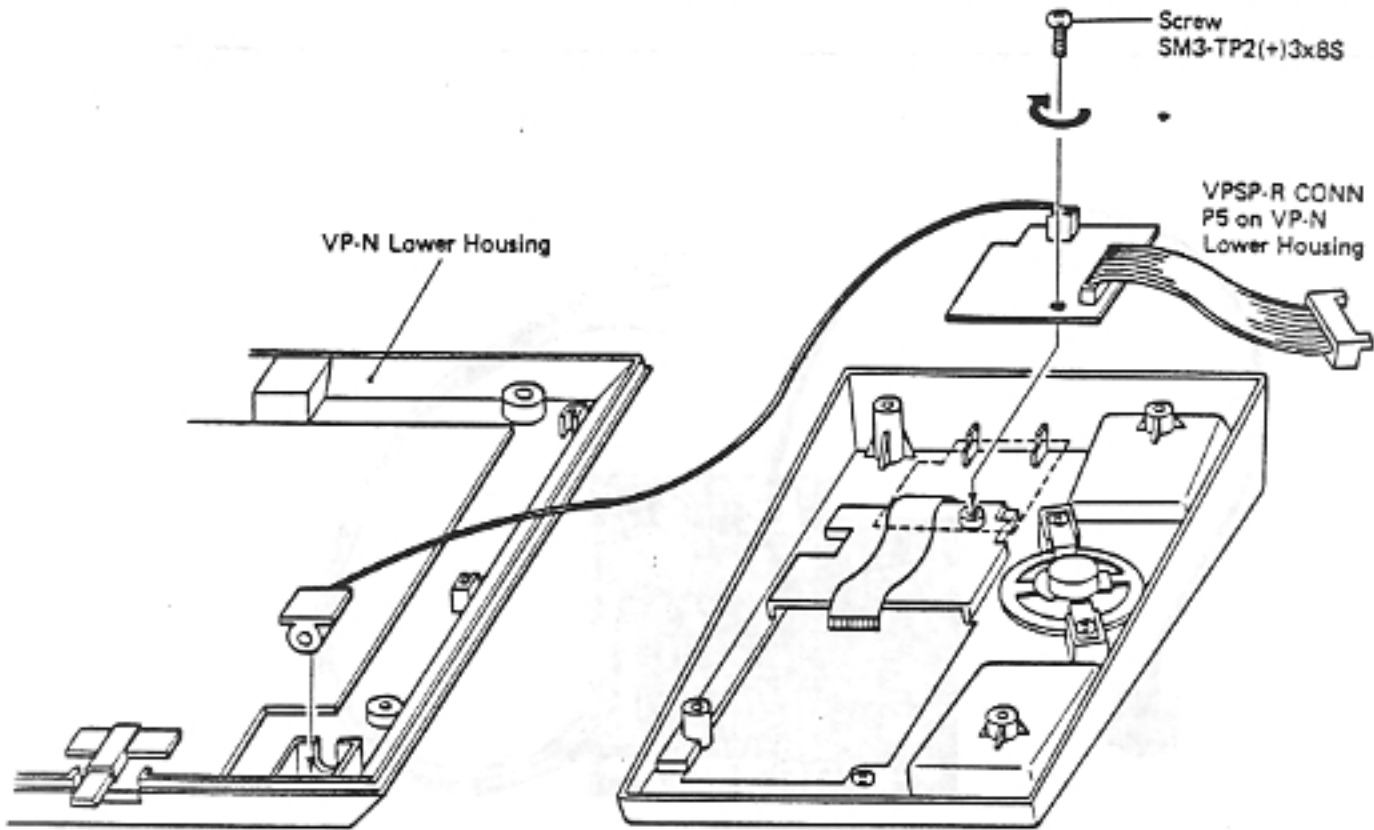
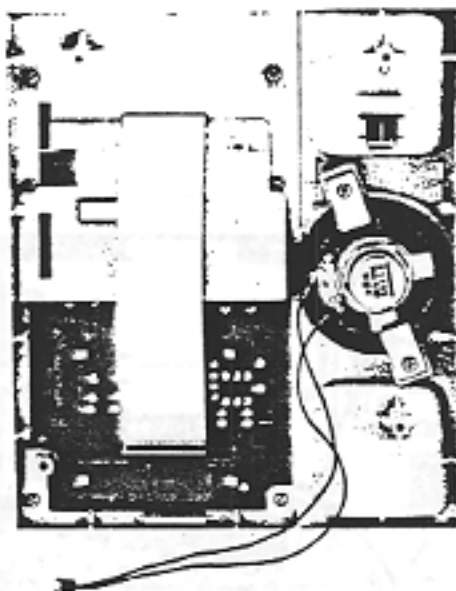
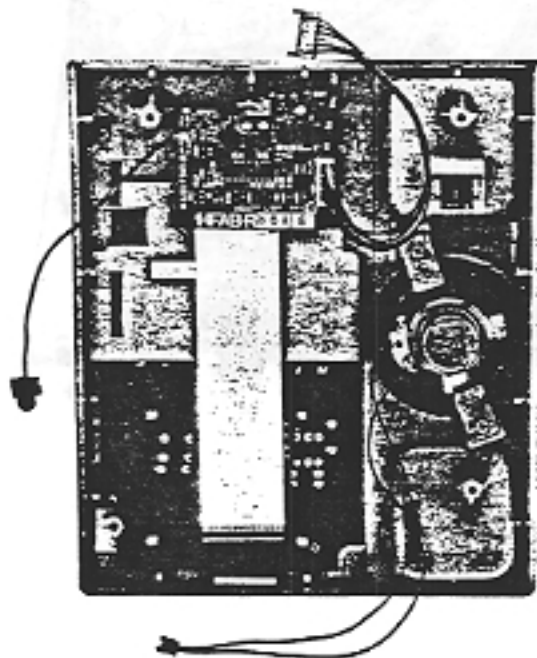


Figure 3.10.7.4(2)(f)B HFAB-R Installation



Before installation



After installation

Figure 3.10.7.4(2)(f)C

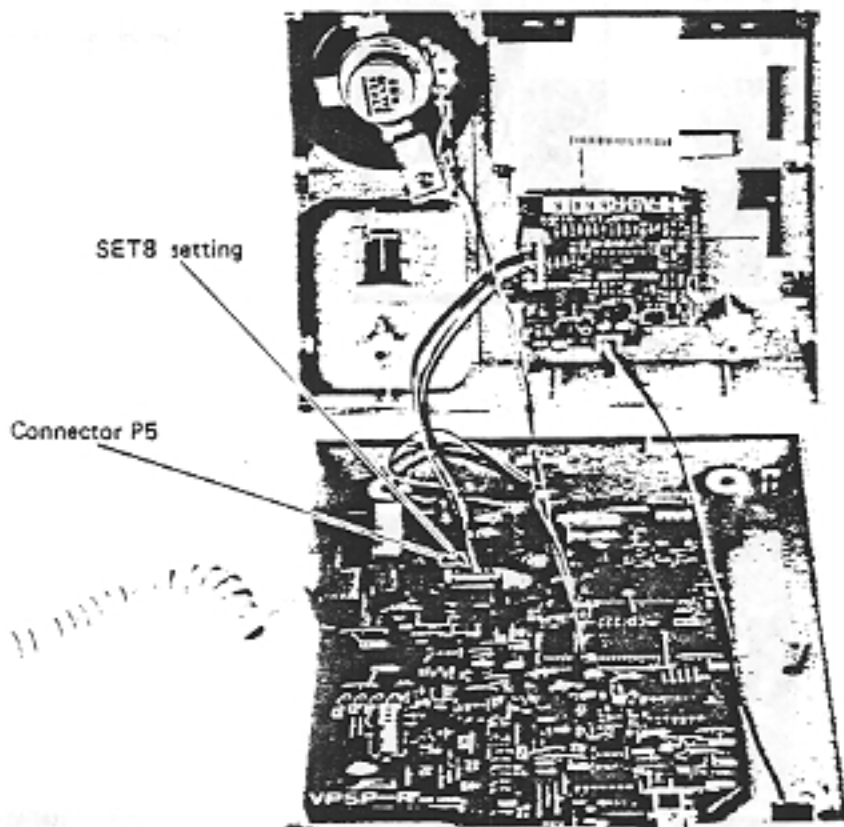


Figure 3.10.7.4(2)(f)D HFAB-R Installation

EX-824/1648
ELECTRONIC KEY TELEPHONE SYSTEM
INSTRUCTION MANUAL



3.11 DSS-M, DSLD-M1 AND BLF-M INSTALLATION

3.11.1 DSS-M and DSLD-M1 Installation

The DSS-N are shown in Item 3.11.3.

3.11.1.1 General Description

The EX-824/1648 system uses microprocessor-controlled electronic techniques to provide innovative and efficient methods for initiating and answering CO/PBX line calls, and distributing calls to extensions.

The DSS-M (EX-Direct Station Selection-M) shown in Figure 3.11.1.3 is an optional unit for the EX-824/1648 system, and is generally paired with telephone No. 20 or No. 21 as an attendant console. It can also be used as a system data input terminal.

DSS-M features very speedy CO transfer and other operations because of direct station selection in ICM calls. An optional, large-sized, 32-digit liquid-crystal display (LCD) is available for added convenience. Programming sheets are also available.

DSS-M may be installed in the system. Each DSS-M can operate independently, simultaneously answering and distributing calls to system extensions.

3.11.1.2 Cabling

(1) General

The DSS-M is connected to the MDF via a wall jack. A six-conductor Modular Cord is provided with the DSS-M for connection to the wall jack, and twisted-pair cable is required to connect the wall jack to the MDF.

Table 3.11.1.2.(1) DSS-M Wire Assignments

Designation	Function	Pair Assignment
AT11T	Channel 1 Data path power supply (+)(DSS-M ↔ EX-824/1648 ICU)	White } Pair
AT11R		Black }
3S	Spare	Red } Pair
4S		Green }
AT12T	Channel 2 Data path power supply (-)(DSS-M ↔ EX-824/1648 ICU)	Blue } Pair
AT12R		Yellow }

(2) Type of cable

As mentioned in paragraph 3.11.1.2(1), connection between the MDF and wall jack should be made by a six-conductor twisted-pair cable. The cable should be non-shielded and may be in the range of No. 22 to No. 28 AWG wire. No. 24 AWG wire is especially recommended.

(3) Maximum cable length

The maximum cable length between the ICU and an extension varies depending on the type of cable used. Table 3.11.1.2(3) shows the maximum cable length in each case.

Table 3.11.1.2(3) DSS-M Maximum Cable Length

Type of Cable	Max. Length (ft)	Max. Loop Resistance (Ω)
No. 22 AWG	1750	60
No. 24 AWG	1100	60
No. 26 AWG	670	60
No. 28 AWG	420	60

(4) Cable termination

The six-conductor twisted-pair cable is connected at the MDF to the 50-conductor cable from the EX-824/1648 ICU (the original cable that comes from the ICU is a 24-conductor type) and at a wall jack to the modular cable from the DSS-M. Two of the six conductors of the twisted-pair cable are unused. These connections are shown in Table 3.11.1.2(4).

Table 3.11.1.2(4) Station Jack Terminal Assignment

Jack Pin No.	Wire Color	Six-Conductor Twisted-Pair Cable Color	50-Conductor Cable Color	Designation
1	White	White-Blue	White-Blue	AT11T
2	Black	Blue-White	Blue-White	AT11R
3	Red	White-Orange	White-Orange	Spare
4	Green	Orange-White	Orange-White	Spare
5	Yellow	White-Green	White-Green	AT12T
6	Blue	Green-White	Green-White	AT12R

Note: NCs are unused.

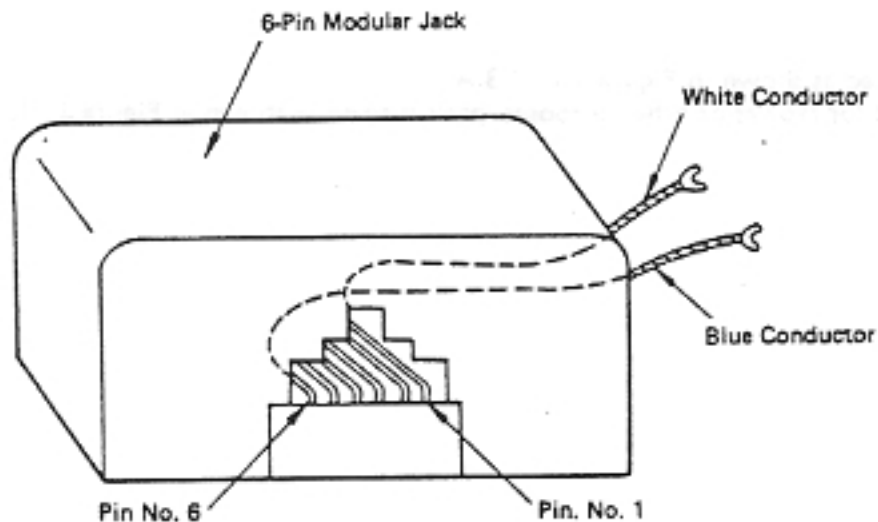


Figure 3.11.1.2(4) Six-Pin Modular Jack Construction

3.11.1.3 Unpacking

To unpack the DSS-M, pull the inner case out of the outer case as shown in Figure 3.11.1.3A, then pull the inner case tab to open the cardboard box. The contents are packed as shown in Figure 3.11.1.3B. The DSS-M is packed in a carton together with various accessories. The accessories supplied are shown in Table 3.11.1.3 and Figure 3.11.1.3C.

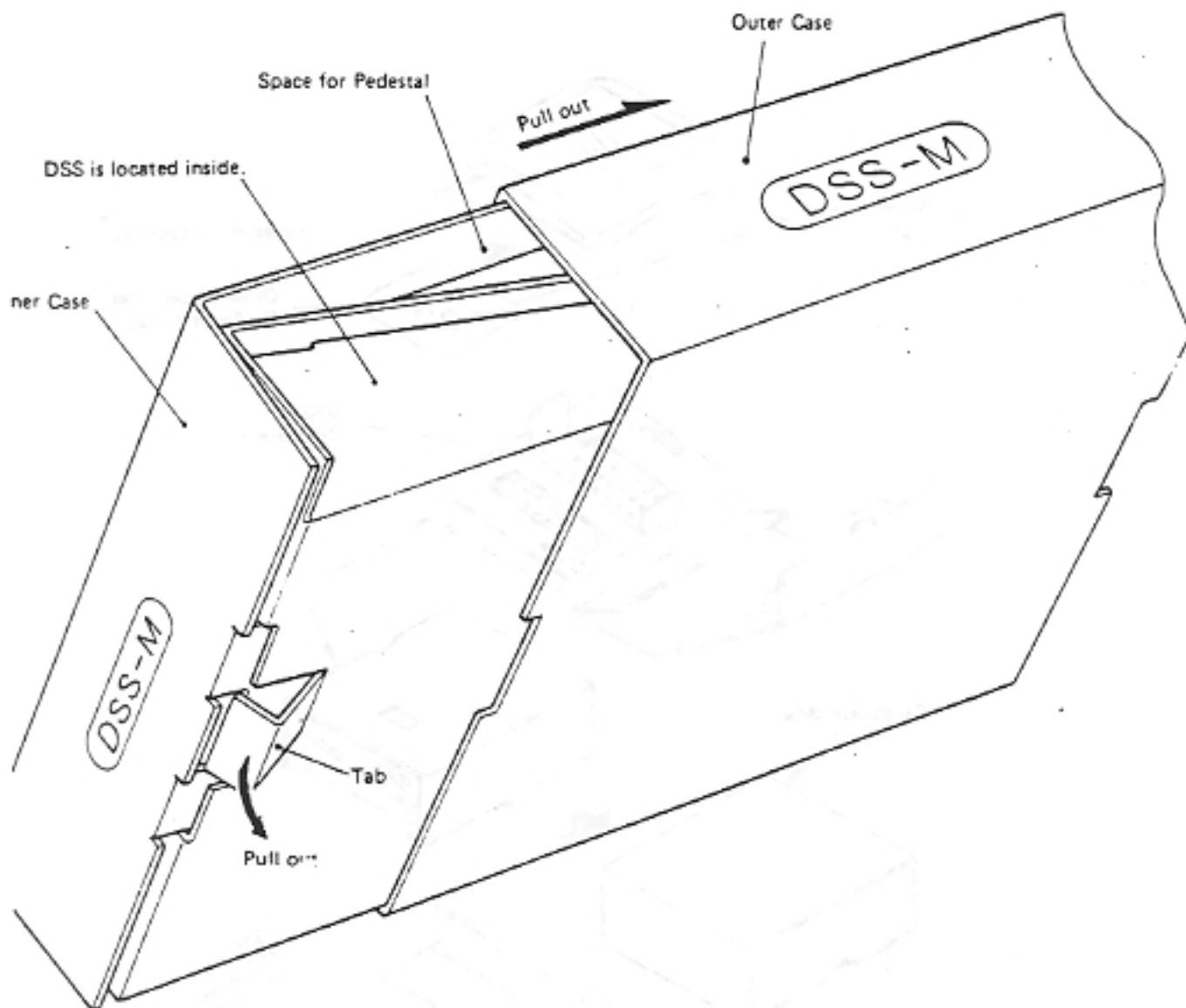
Table 3.11.1.3 DSS-M Components

No.	Description	Quantity
1	6-6M Modular Cord AG*	1
2	EX-DSS key Label	1
3	128K Tray Card	1
4	128K Telephone Tray	1
5	Screw WR(+) 3.8 X 16S	2
6	128K Pedestal	1

* Modular cord length is about 2,1 m (7 feet).

The DSS-M is packed as shown in Figure 3.11.1.3.A.

To return a DSS-M for repairs or other purposes, pack it again as shown in Figure 3.11.1.3B, and ship it.



Note: Pull the inner case out of the outer case, and pull out the tab at the bottom of the inner case to unlock the inner case. The DSS and accessories can now be taken out.

Figure 3.11.1.3.A Unpacking Method of DSS-M

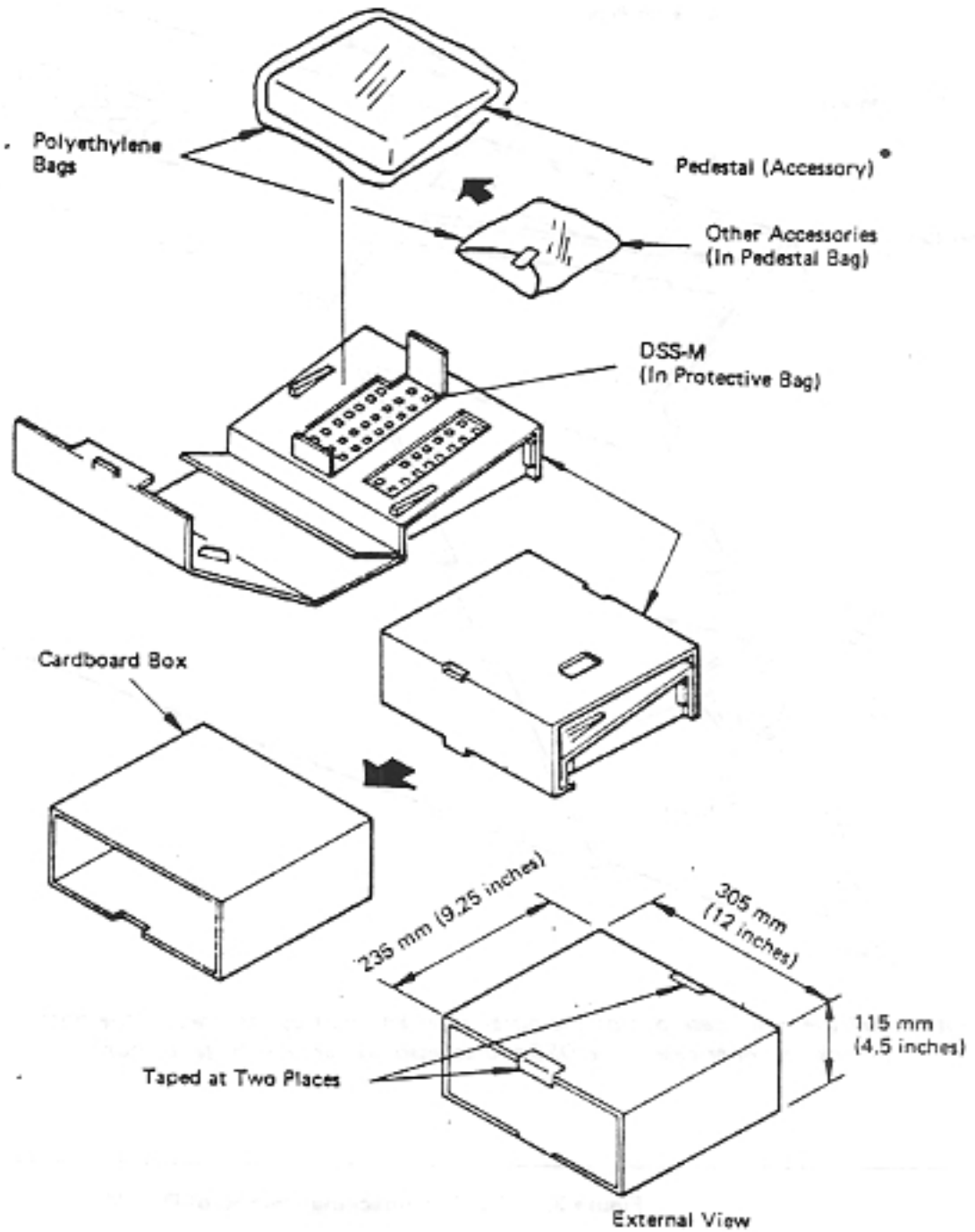
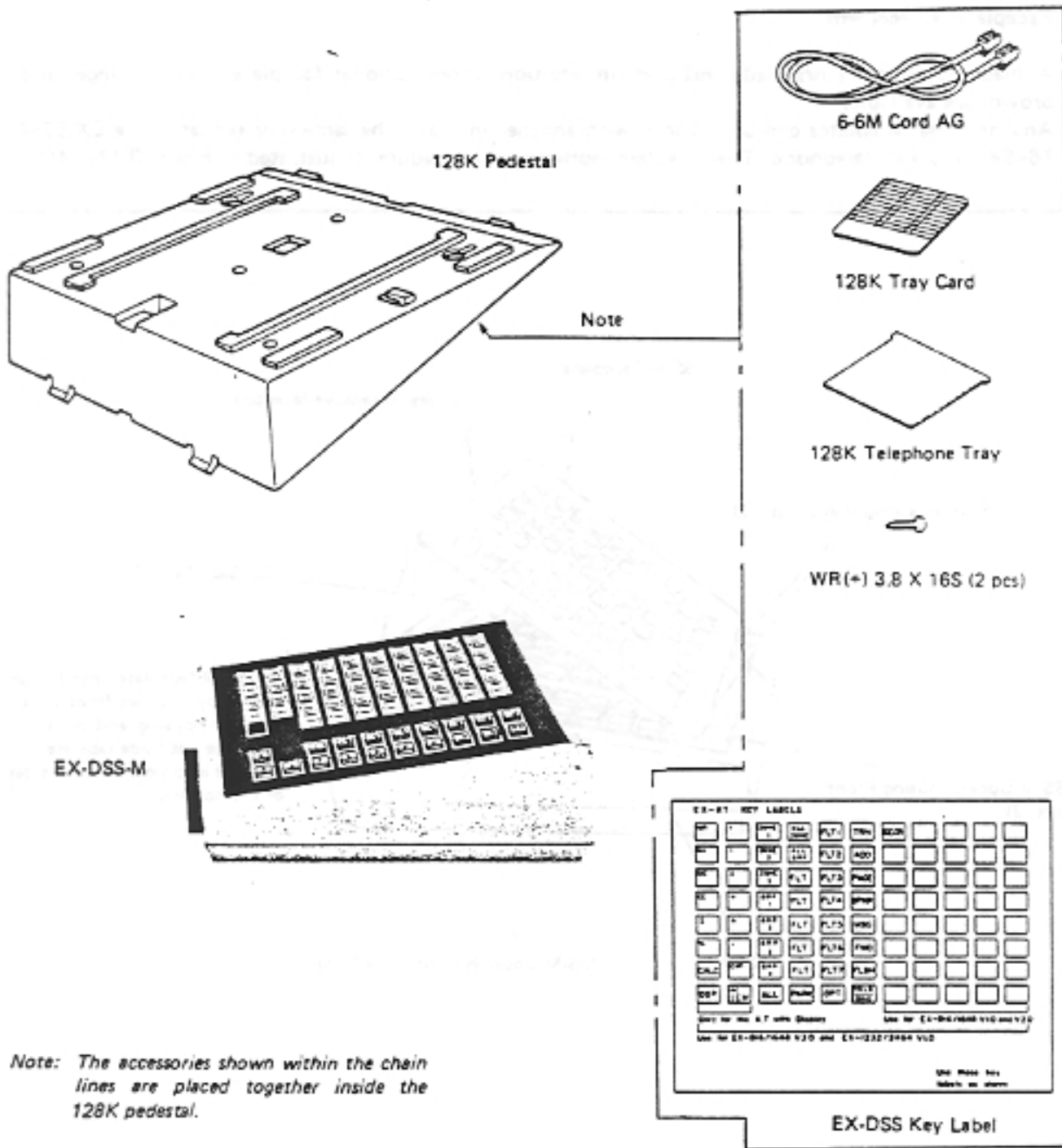


Figure 3.11.1.3.B Packing of DSS-M



Note: The accessories shown within the chain lines are placed together inside the 128K pedestal.

Figure 3.11.1.3.C DSS-M Components

3.11.1.4 Handling

(1) Faceplate replacement

A black faceplate is originally installed. In addition, three optional faceplates (blue, orange, and brown) are available.

Any of these faceplates can be replaced with another in nearly the same way as that of the EX-824/1648K or D key telephone. The faceplate replacement procedure is illustrated in Figure 3.11.1.4(1).

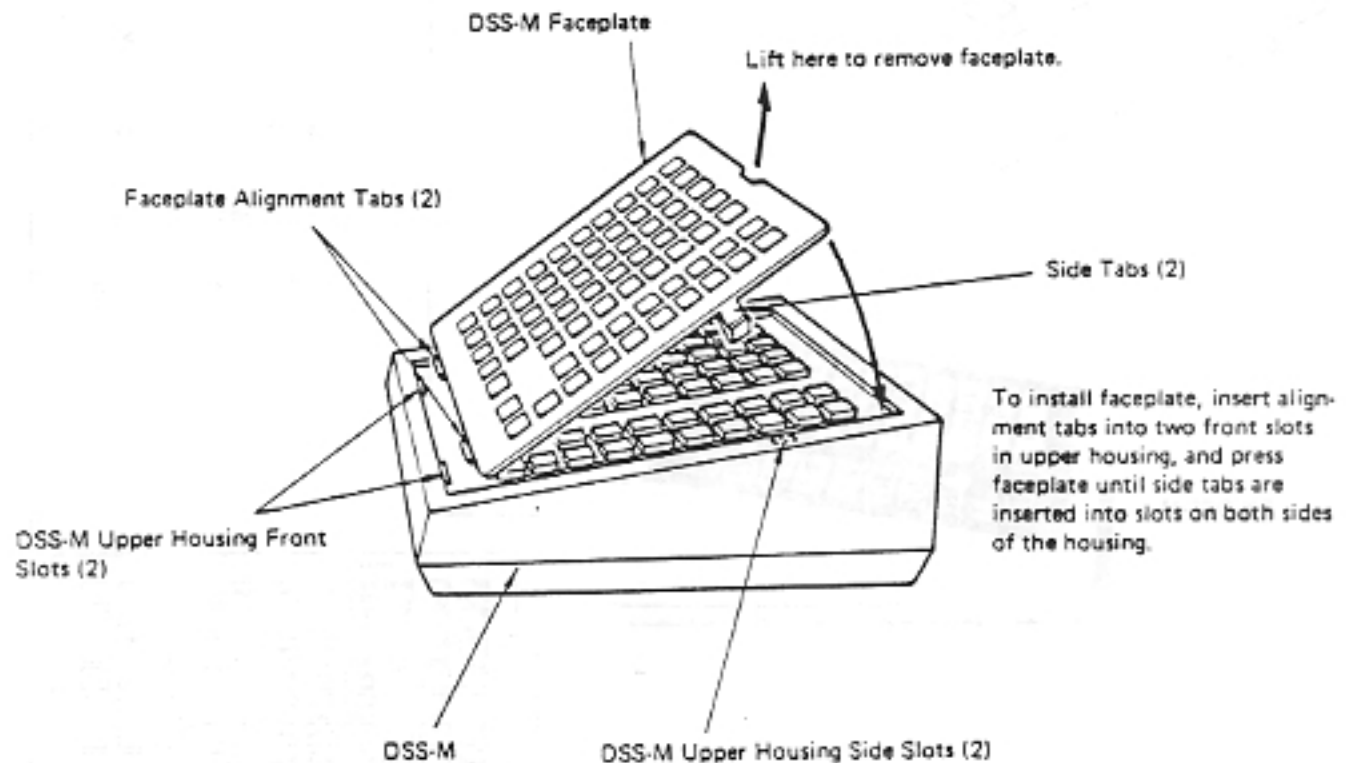


Figure 3.11.1.4(1) Faceplate Replacement

(2) 128K pedestal standard mounting and wall mounting

This procedure is exactly the same as that described in paragraphs (2), (3), and (4), Section 3.10.4.2.

(a) 128K pedestal standard mounting and modular cord processing

The 128K pedestal is used for mounting on Wall. The method of installing the 128K pedestal at an angle for easier operation of the EX-DSS-M is illustrated in Figures 3.11.1.4(2)(a) A, B, and C.

Insert the front tabs on the 128K pedestal into the two slots in the front part of the DSS-M lower housing, and push the rear of the 128K pedestal until the rear tabs are inserted into the rear slots in the DSS-M lower housing. Reverse the above procedure for removing the 128K pedestal.

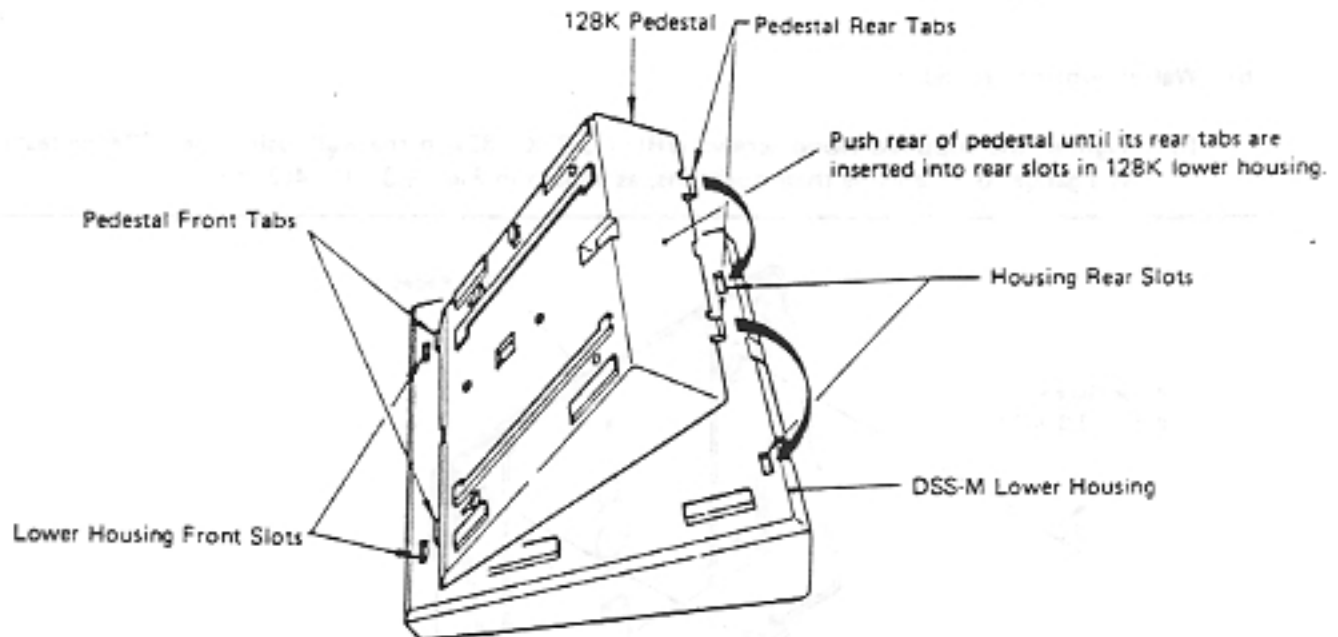


Figure 3.11.1.4(2)(a)A 128K Pedestal Mounting

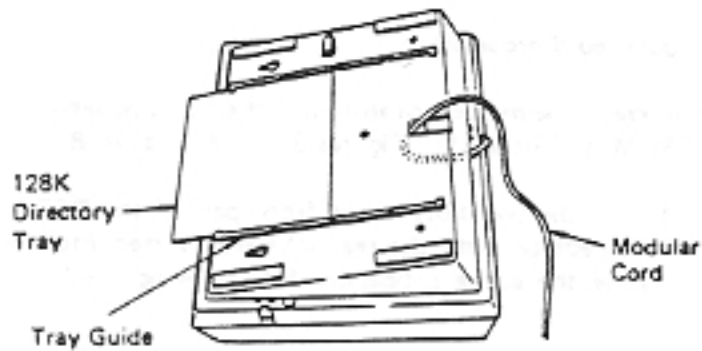


Figure 3.11.1.4(2)(a)B
Modular Cord Processing

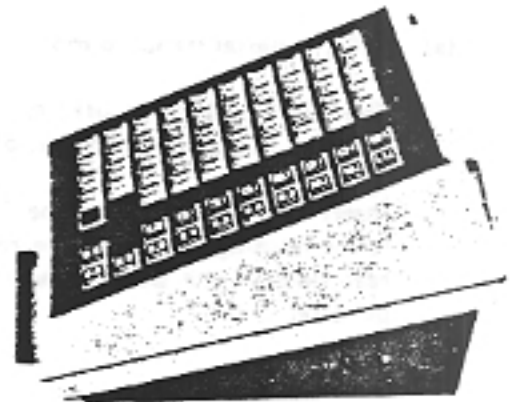


Figure 3.11.1.4(2)(a)C
EX-DSS-M With 128K Pedestal

(b) Wall-mounting procedure

- (i) Tighten the supplied wood screws WR(+)-3.8 X 16Ss in the wall, using the 128K pedestal as a gauge to determine their positions, as shown in Figure 3.11.1.4(2)(b)(i).

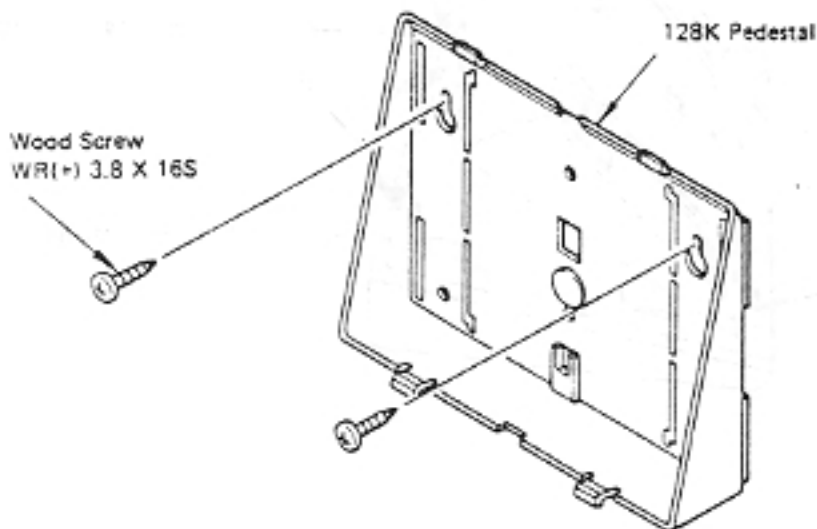


Figure 3.11.1.4(2)(b)(i) Mounting 128K Pedestal on Wall

- (ii) Mount the supplied 128K pedestal on the DSS-M lower housing opposite to the standard direction. If the 128K pedestal is mounted in the standard direction, remove it and install it in the reverse direction as shown in Figure 3.11.1.4(2)(b)(ii).

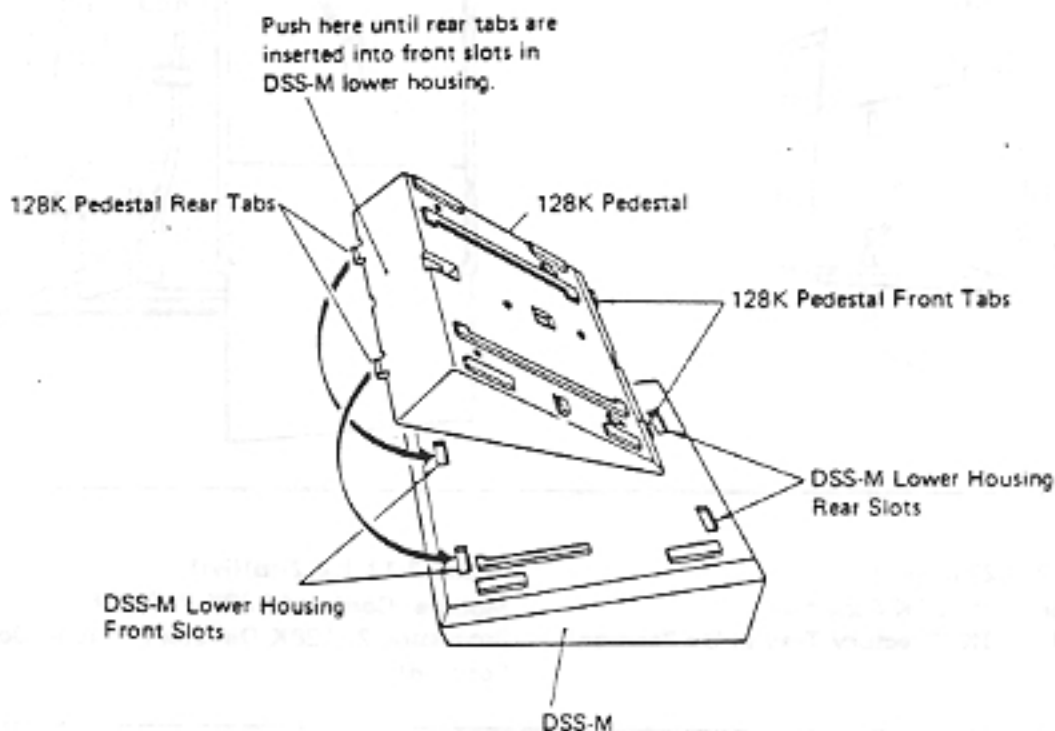


Figure 3.11.1.4(2)(b)(ii) Mounting 128K Pedestal on DSS-M Lower Housing

- (iii) Slide the 128K extension directory tray along the 128K pedestal rails from above or under as desired.
- (iv) Put the modular cord through the hole in the 128K pedestal or fasten it with the cord clamp, depending on the position of the 128K directory tray, so that the cord hangs downward.
See Figures 3.11.1.4(2)(b)(iv) A, B, and C.

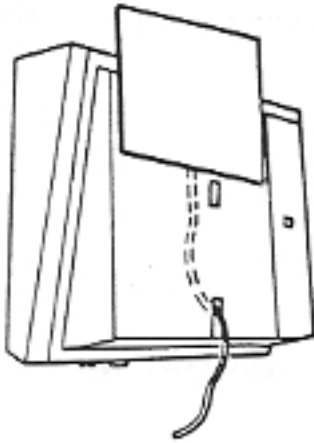


Figure 3.11.1.4(2)(b)(iv)A
Modular Cord and 128K Pedestal
Processing 1 (128K Directory Tray in Up Position)

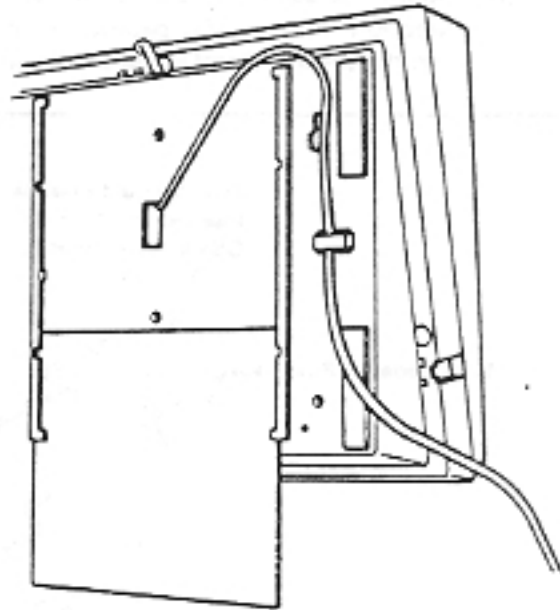


Figure 3.11.1.4(2)(b)(iv)B
Modular Cord and 128K Pedestal
Processing 2 (128K Directory Tray in Down Position)

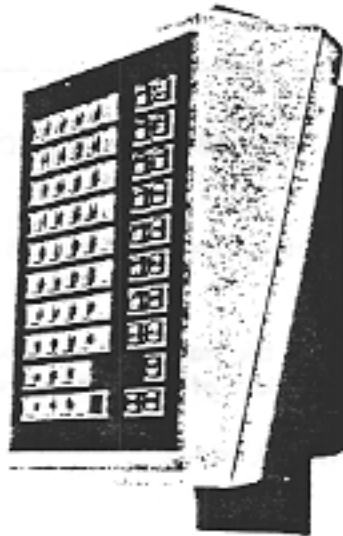


Figure 3.11.1.4(2)(b)(iv)C Wall-Mounted DSS-M

(3) 128K key cap removal and EXT card (label) placement

Place labels, with typed numbers or names, on DSS keys Nos. 20 to 35 according to the key telephones installed. Either 128K-CO cards or DSS-M EXT cards (labels) may be used.

The 128K key caps can be easily removed by putting cellophane tape on them, as shown in Figure 3.11.1.4(3), and pulling it up. The key caps can also be removed by pinching them with fingertips.

Lightly stick cellophane tape to 128K key caps and pull it up. The caps come off easily.

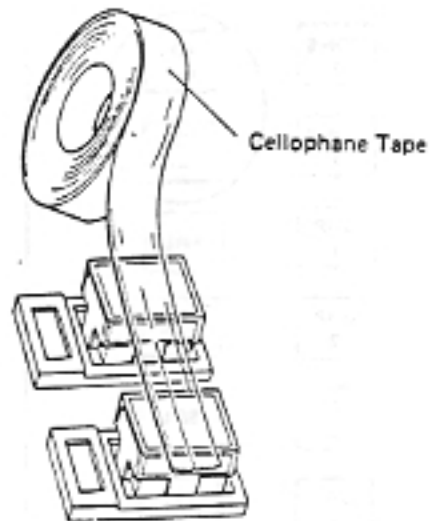


Figure 3.11.1.4(3) Removing 128K Key Caps With Cellophane Tape

(4) Label replacement

Replace existing labels of ADJ (+), and ADJ (-) with those labels of ADJ, and P-UP respectively.

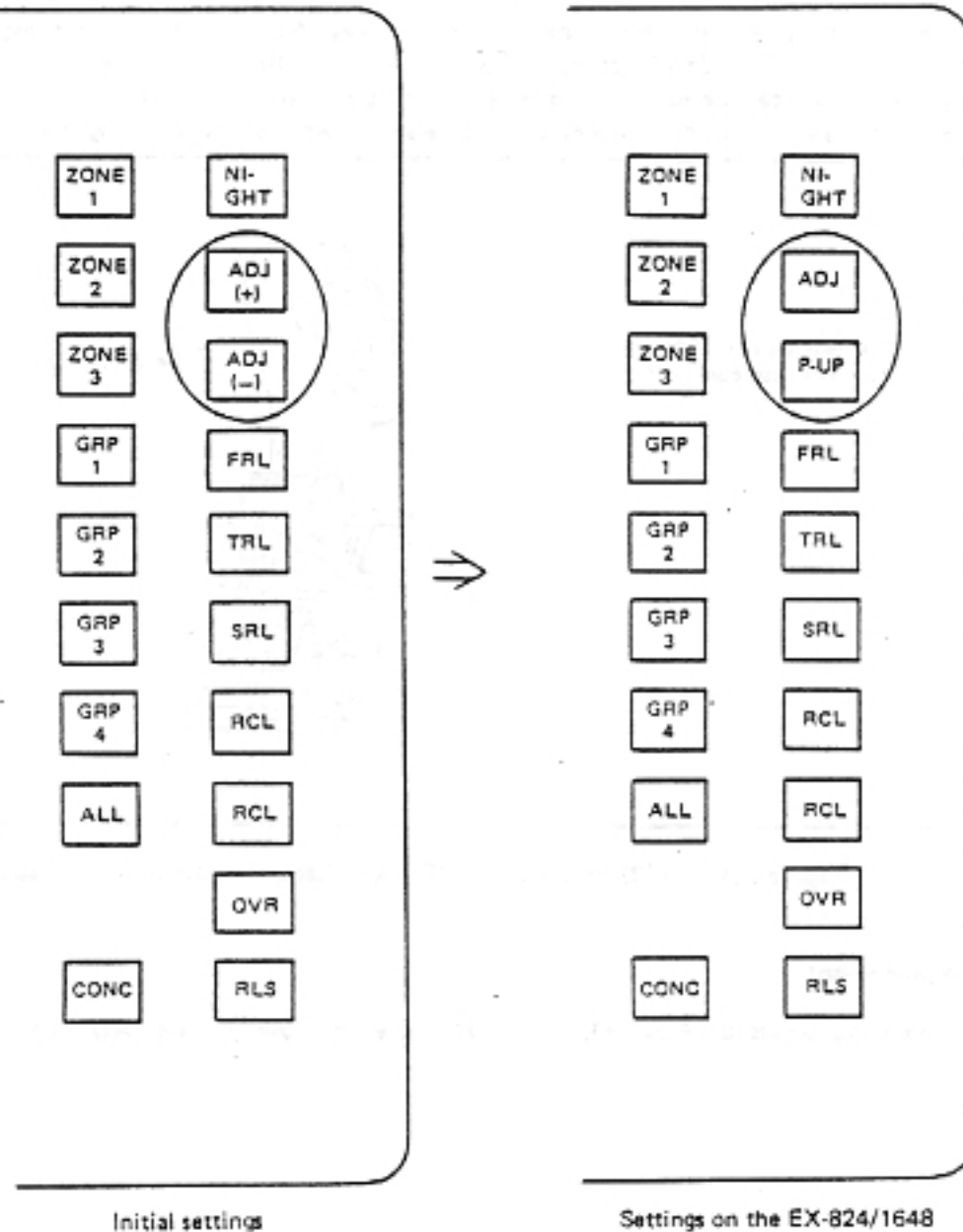


Figure 3.11.1.4(4) Label Replacement

(5) DSLD-M1 installation

The DSLD-M1 is an optional unit for the DSS-M.

It is used for programming and displaying the various features of the DSS-M. If it is installed on the DSS-M, the time can be displayed and the features of the DSS-M can be updated.

(a) DSLD-M1 components

The components of the DSLD-M1 are shown in Table 3.11.1.4(5)(a) and Figure 3.11.1.4(5)(a). The EX824/1648 uses the PROV-M.

Table 3.11.1.4(5)(a) Components of DSLD-M1

No.	Description	Quantity
1	DSL-D-M assembly	1
2	LCD case support A	2
3	LCD case support B	2
4	PROV-M (DSS programming overlay-M)	1
5	PROV-M1 (DSS programming overlay-M1)	1

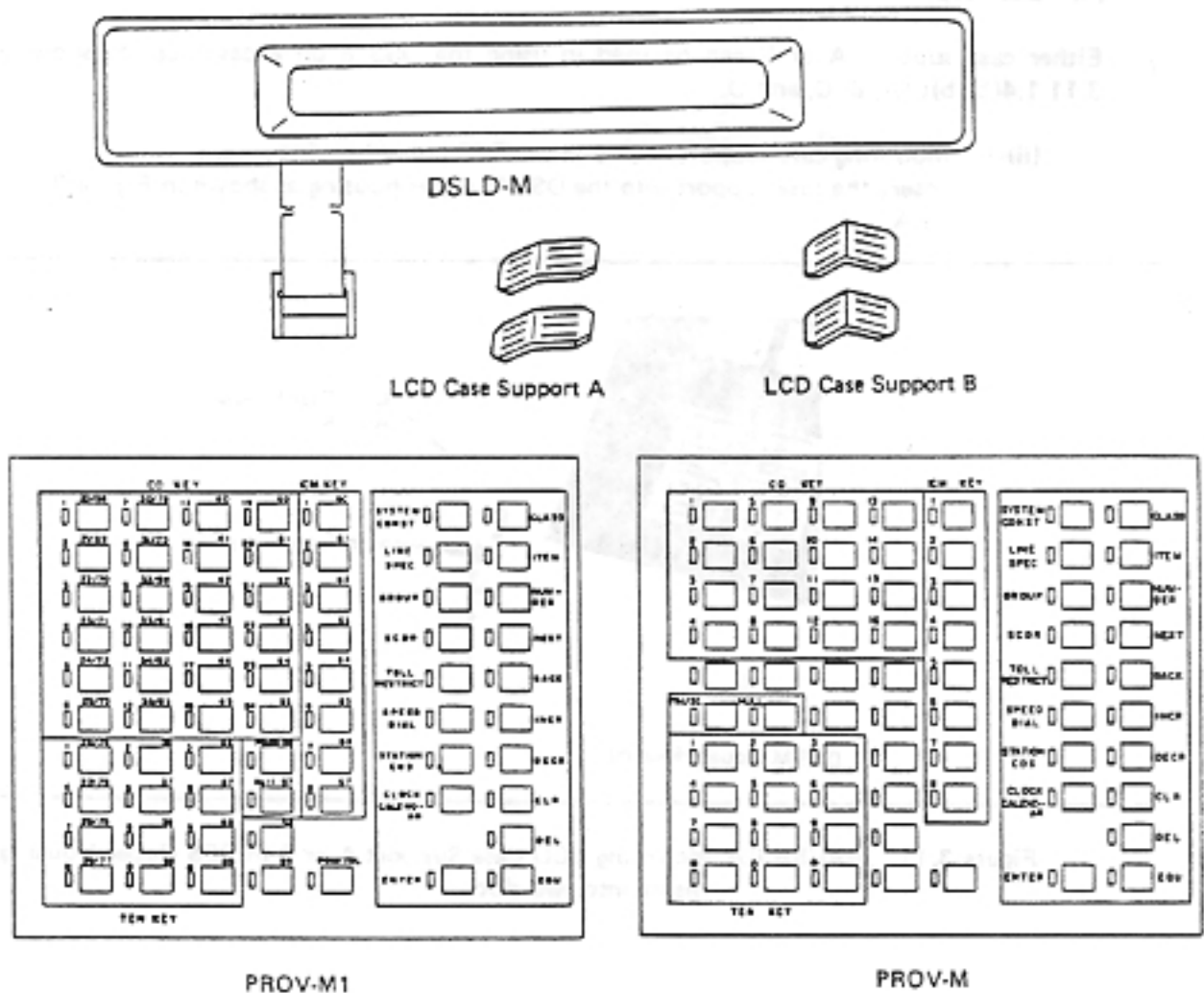


Figure 3.11.1.4(5)(a) Components of DSLD-M1

(b) DSLD-M installation**(i) General description**

The DSLD-M (liquid-crystal display unit for DSS-M) and liquid-crystal display case support A or B can be installed in the rear of the DSS-M upper housing. The PROV-M may be placed on the DSS-M faceplate to replace the keys with programming key names for easy programming of various features. Liquid-crystal display case support A or B is used for changing the angle of the DSLD-M.

The liquid-crystal display case support installation procedure is described below.

(ii) Desk top

Either case support A or B can be used in using the DSS-M on a desk top, as shown in Figures 3.11.1.4(5)(b)(i)A, B, C, and D.

(ii)-1 Mounting case support A or B in the DSS upper housing

Insert the case support into the DSS-M upper housing as shown in Figure 3.11.1.4(5)(b)(i) A.

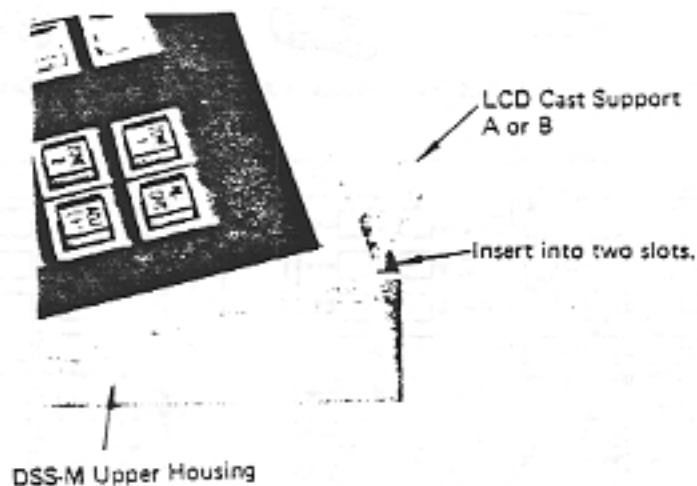


Figure 3.11.1.4(4)(b)(ii)A Mounting LCD Case Support A or B in DSS Upper Housing
Insert into two slots.

(ii)-2 Mounting DSLD-M on DSS-M

Fit the DSLD-M into liquid-crystal display support A or B on the DSS-M and engage the connector as shown in Figure 3.11.1.4(5)(b)(ii)B.

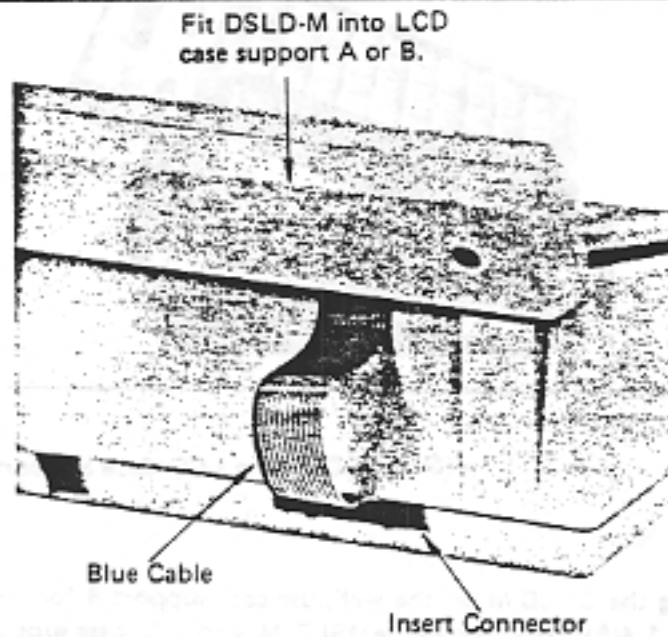


Figure 3.11.1.4(5)(b)(ii)B Mounting DSLD-M on DSS-M

(ii)-3 Assembly completed

Figures 3.11.1.4(5)(b)(ii)C and D show assemblies using liquid-crystal display (LCD) case supports A and B.



Figure 3.11.1.4(5)(b)(ii)C Using LCD Case Support A

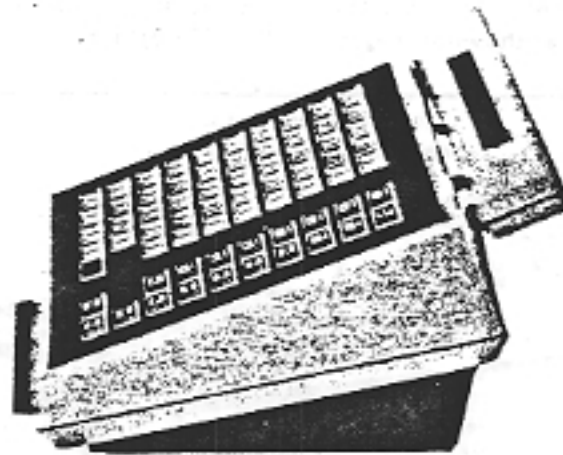


Figure 3.11.1.4(5)(b)(ii)D Using LCD Case Support B

(iii) Wall mounting

In mounting the DSLD-M on the wall, use case support B for easy visibility of the display. Figure 3.11.1.4(5)(b)(iii) shows the DSLD-M with LCD case support B mounted on the wall.

DSLID-M + LCD Case Support B

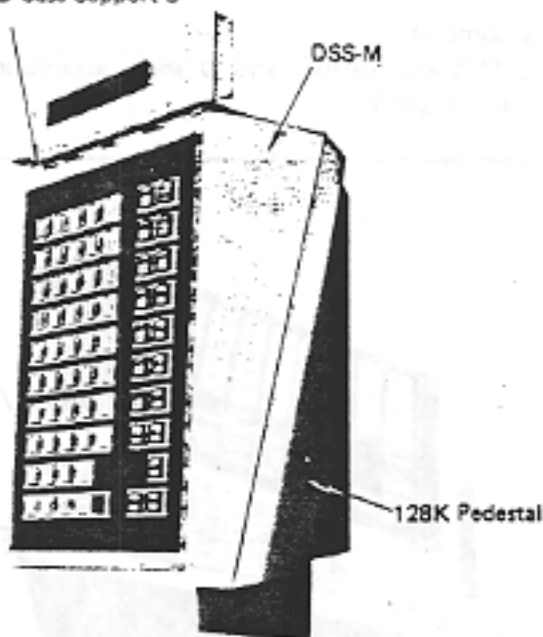


Figure 3.11.1.4(5)(b)(iii) Wall-Mounted DSLD-M

(iv) PROV-M placement

The PROV-M for feature programming needs only to be placed on the faceplate as shown Figure 3.11.1.4(5)(b)(iv).

Remove the PROV-M after programming.

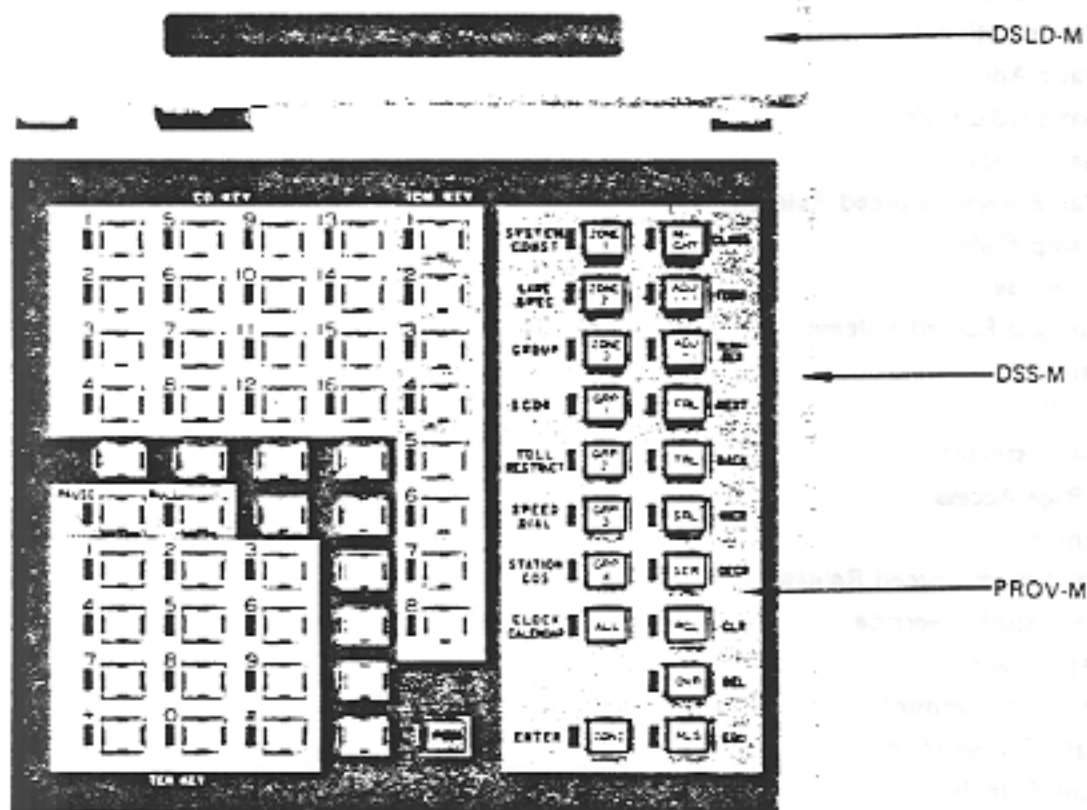


Figure 3.11.1.4(5)(b)(iv) PROV-M Set in Place

3.11.1.5 Feature Assignment

DISS-M is paired with an EX-824/1648K, DKN/KN1, DN/DN1 or VP-N1 key telephone to provide the following features:

- Attendant Call Priority
- Attendant Dedicated ICM Lines
- Attendant Display
- Attendant DSS Calling
- Audible Indications
- Automatic Add-On
- Automatic COL Hold
- Automatic Recall
- Busy Call Forward Forced Release
- Busy Lamp Field
- Busy Override
- Call Forward Forced Release
- Call Release
- Chain Call
- Clock Adjustment
- Direct Page Access
- Disconnect
- Do-Not-Disturb Forced Release
- Do-Not-Disturb Override
- Dual Attendant
- Dynamic Programming
- ICM Path Termination
- Overflow Transfer
- Serial Call
- Station Forced Release
- System Programming Terminal
- Tenant Service
- Through Dialing
- Trunk Forced Release

3.11.2 EX-BLF-M Installation

3.11.2.1 General Description

The BLF-M (EX-Busy Lamp Field Unit-M) has 12 LEDs to indicate the busy or free status of each of 12 extensions. Any 12 of the maximum of 16 extensions covered by the EX-824/1648 system can be freely selected by settings in the BLF-M for indication by the 12 LEDs.

3.11.2.2 Cabling

(1) General

The BLF-M is connected to the MDF via wall jacks. A six-conductor Modular Cord is provided with the BLF-M for connecting to wall jacks, and quad cable or twisted-pair cable is required to connect the wall jacks to the MDF.

Table 3.11.2.2(1) BLF-M Wire Assignments

Designation	Function	Pair Assignment	
AT1R	Data path channel 1 (BLF + KSU) power supply (+)	6	White } Pair
AT1S		5	
3S	Spare	4	Red } Pair
4S		3	
AT2R	Data path channel 2 (BLF + KSU) power supply (-)	2	Yellow } Pair
AT2T		1	

(2) Type of cable

As mentioned in paragraph 3.11.2.2(1), connections between the MDF and wall jacks should be made by six-conductor, twisted-pair cables. These cables should be non-shielded and may be in the range of No. 22 to No. 28 AWG wire. No. 24 AWG wire is especially recommended.

(3) Maximum cable length

The maximum cable length between the KSU and an extension varies depending on the type of cable used. Table 3.11.2.2(3) shows the maximum cable length in each case.

Table 3.11.2.2(3) BLF-M Maximum Cable Length

Type of Cable	Max. Length (ft)	Max. Loop Resistance (Ω)
No. 22 AWG	1750	60
No. 24 AWG	1100	60
No. 26 AWG	670	60
No. 28 AWG	420	60

(4) Cable termination

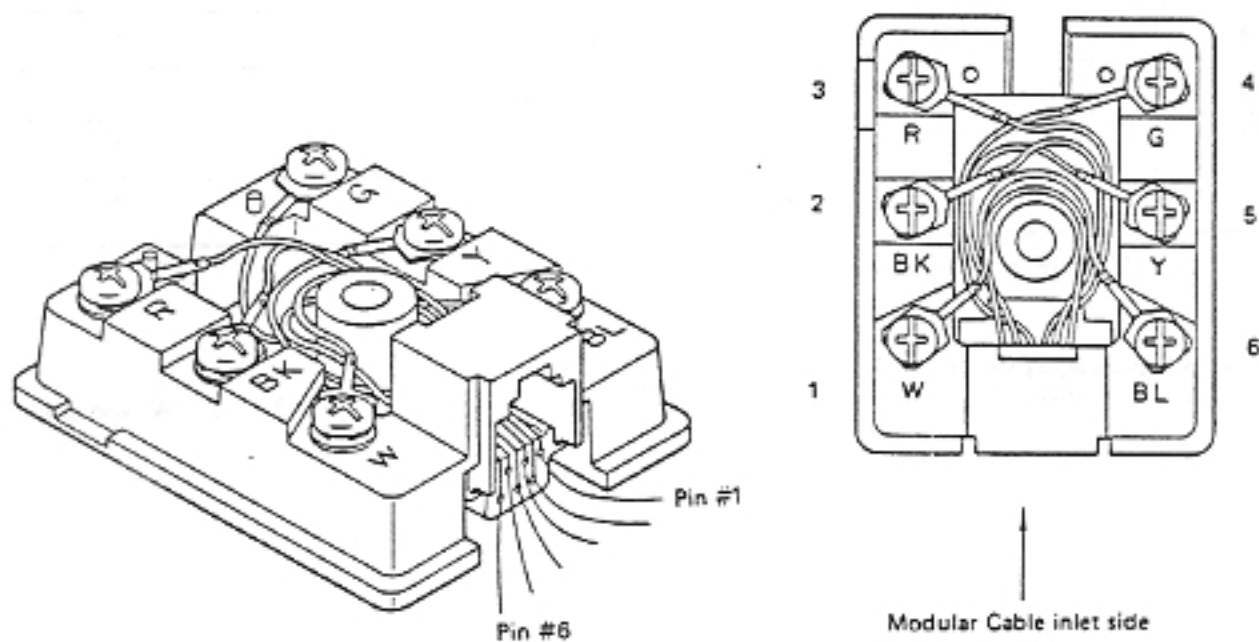
The six-conductor twisted-pair cable is connected at the MDF to the 50-conductor cable from the EX-824/1648 ICU (but the original cable that comes out of the ICU is a 24-conductor type), and at a wall jack to the modular cable from the BLF-M. Two of the six conductors are unused. These connections are shown in Table 3.11.2.2(4).

Table 3.11.2.2(4) Station Jack Terminal Assignment

Jack Pin No.	Wire Color	Six-Conductor Twisted-Pair Cable Color	50-Conductor Cable Color	Designation
1	White	White-Blue	Red-Orange	AT11R
2	Black	Blue-White	Orange-Red	AT11T
3	Red	White-Orange	Red-Green	NC
4	Green	Orange-White	Green-Red	NC
5	Yellow	White-Green	Red-Brown	AT12R
6	Blue	Green-White	Brown-Red	AT12T

Note: NCs are unused.

Pin No.	Color
1	White
2	Black
3	Red
4	Green
5	Yellow
6	Blue



Caution: Some wall jacks have pin 1 marked for the blue lead and pin 6 for the white lead. But connect the leads in such a way that pin 1 is next to the black lead and pin 6 is next to the yellow lead.

Figure 3.11.2.2.(4) Six-Position, Six-Conductor Wall Jack Construction

3.11.2.3 Unpacking

BLF-M is packed in a carton together with its various accessories. The accessories supplied with the BLF-M are shown in Table 3.11.2.3 and Figure 3.11.2.3.

Table 3.11.2.3 Accessories to BLF-M

	Description	Quantity
1	BLF-128 Pedestal	1
2	6-6M Modular Cord (AG)*	1
3	EX-BLF Face Sheet-Blue (EX-BLFS-BL)	1
4	EX-BLF Face Sheet-Orange (EX-BLFS-OR)	1
5	EX-BLF Face Sheet-Brown (EX-BLFS-BR)	1
6	Wood Screw WR(+) 3.8 X 16	2
7	Jumper Wire Assembly	8

* Modular cord length is about 2.1 m (7 feet).

The BLF-M is packed as shown in Figure 3.11.2.3.A.
To return a BLF-M for repairs or other purposes, pack it again as shown in Figure 3.11.2.3.A, and ship it.

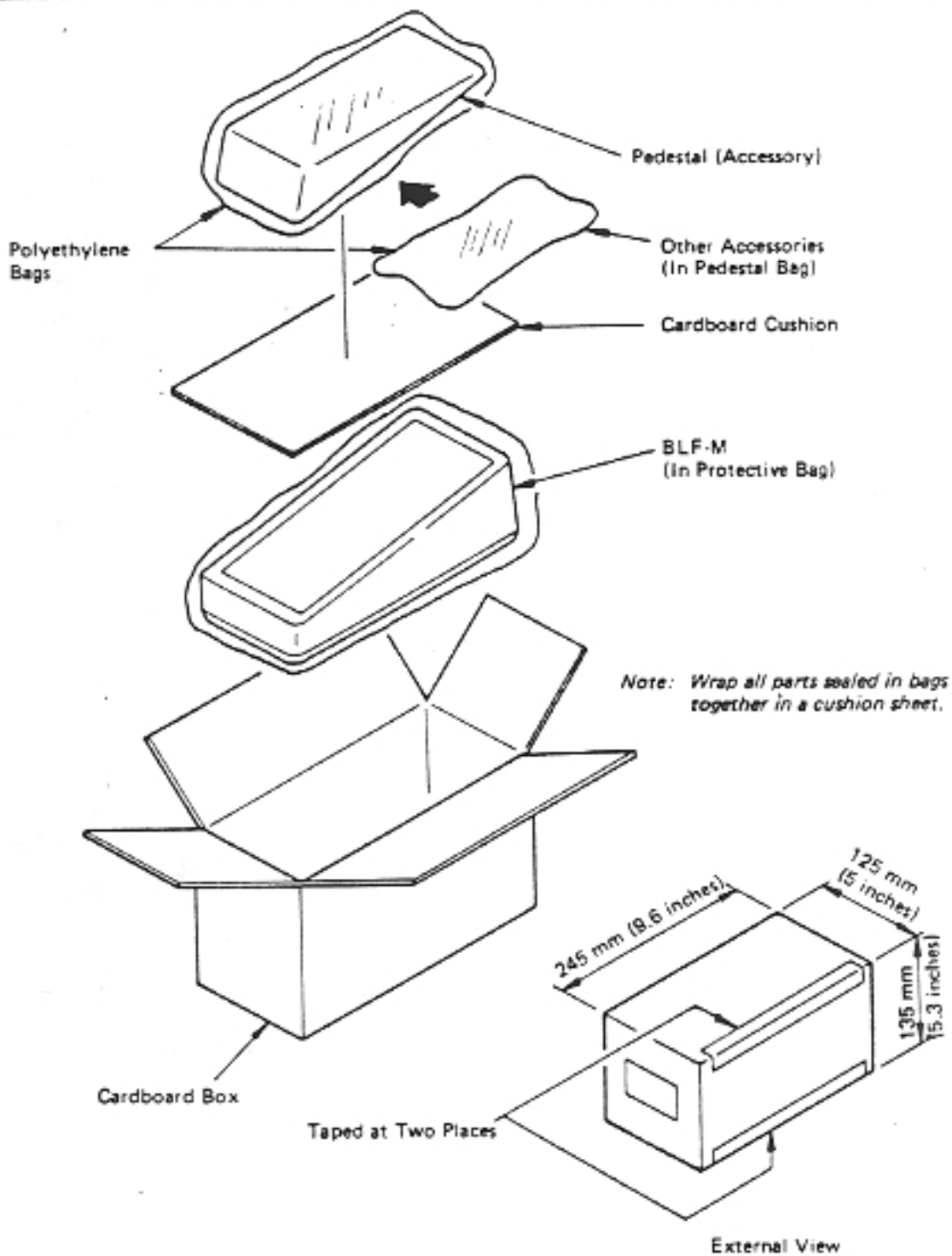


Figure 3.11.2.3.A Packing of BLF-M

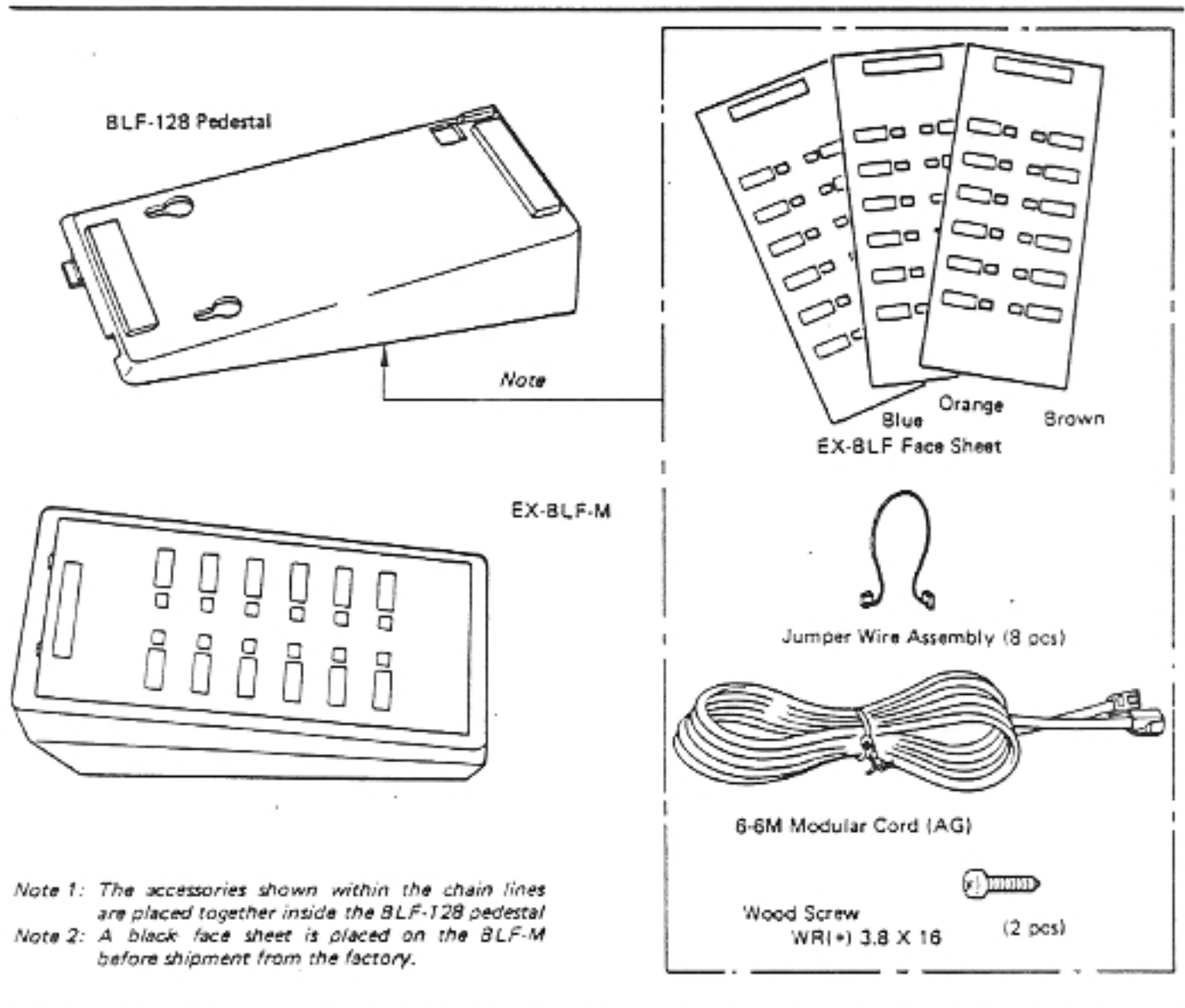


Figure 3.11.2.3.B BLF-M Components

3.11.2.4 Handling

(1) LED extension number setting

For LED number setting, first open the BLF-M housing.

Turn the BLF-M upside down, remove the two screws from the bottom. The process is illustrated in Figure 3.11.2.4.(1).A.

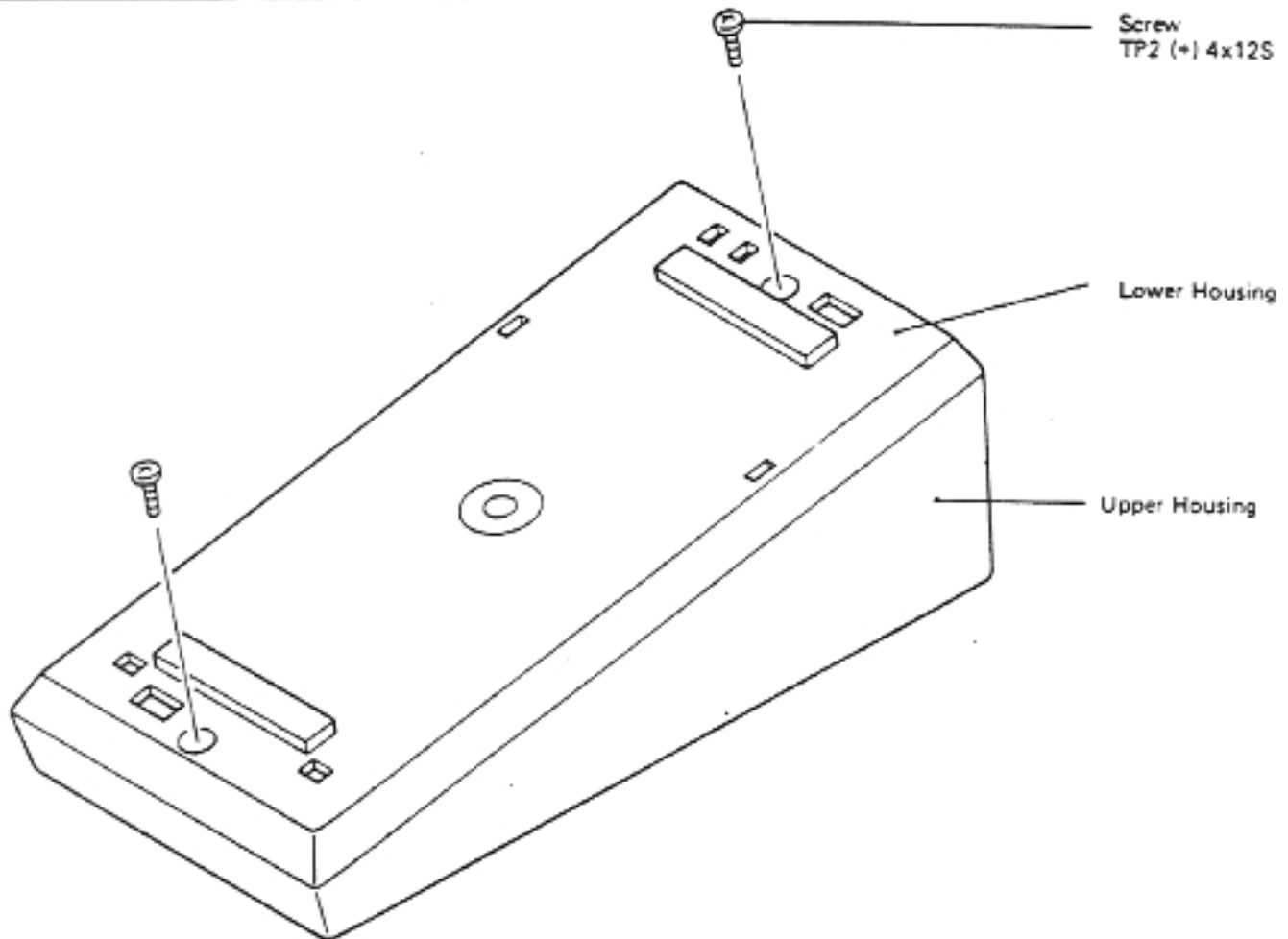
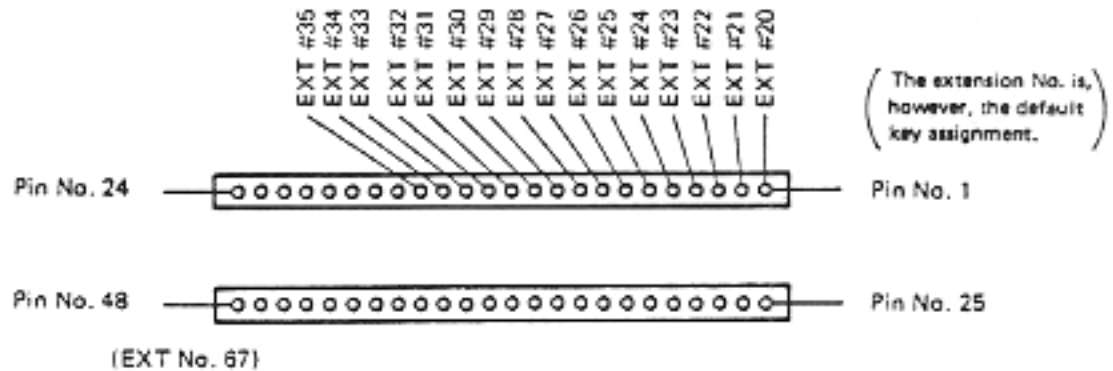


Figure 3.11.2.4.(1).A Opening the BLF-M Housing

The lower case has connectors CN1 and CN2 in the front part of the BFSP-M (Station Processor Unit for BLF-M), to which some of 12 jumper wire assemblies may be connected. Eight jumper wires are supplied with the BLF-M as spares.

As shown in Figure 3.11.2.4.(1).B, CON2 is for the LEDs, and CON1 is for extension numbers. By connecting CON1 and CON2 with jumper wire assemblies, extensions can be connected to the LEDs. After LED number setting, reassemble the housing, exercising care not to pinch the internal leads between the upper housing and lower housing.



Note: The EX-824/1648 system uses extensions 20 to 67.

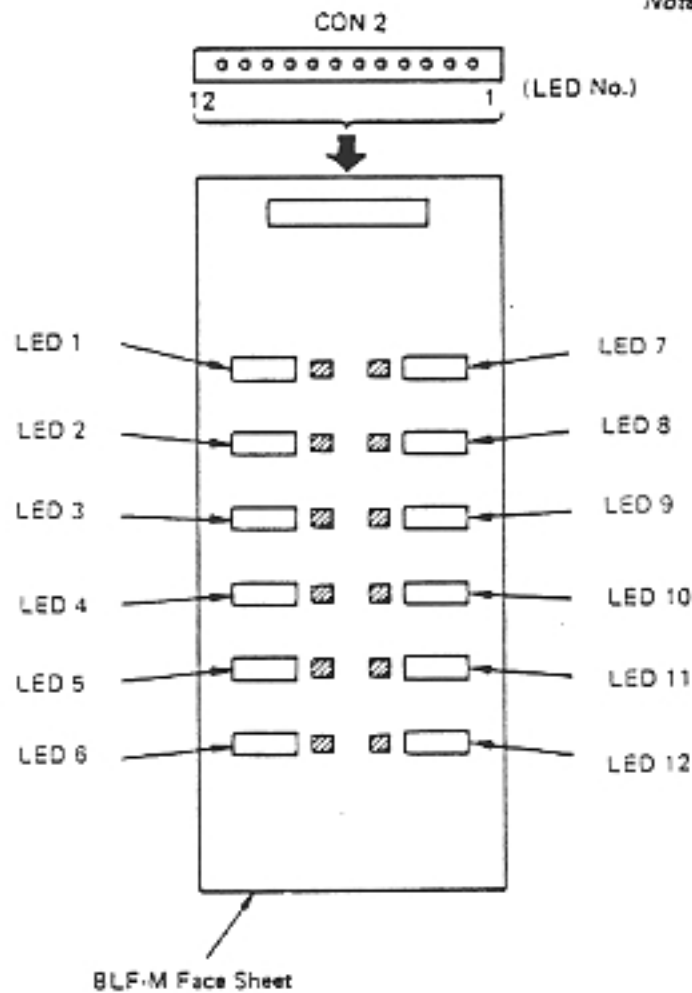


Figure 3.11.2.4.(1).B LED Extension Number Setting

Figure 3.11.2.4.(1).C shows an external view of a jumper wire assembly.



The jumper wire assembly is about 60 mm (2.3 inches) long.

Figure 3.11.2.4.(1).C External View of Jumper Wire Assembly

LED 1 displaying extension 24 is shown below as an example.
The extension No. is, however, the default key assignment.

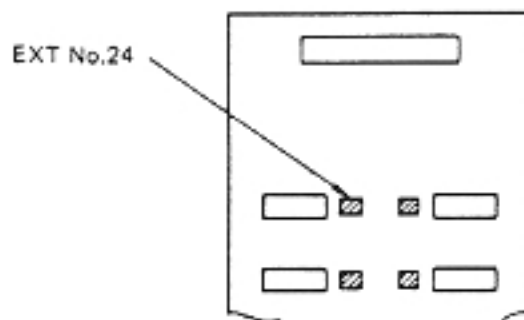


Figure 3.11.2.4.(1).D Extension Number Setting Example (LED1: Extension 24)

Connect CON1 pin 5 (corresponding to extension 24) to CON2 pin 1 (corresponding to LED1), using a jumper wire assembly as shown in Figure 3.11.2.4.(1).E.

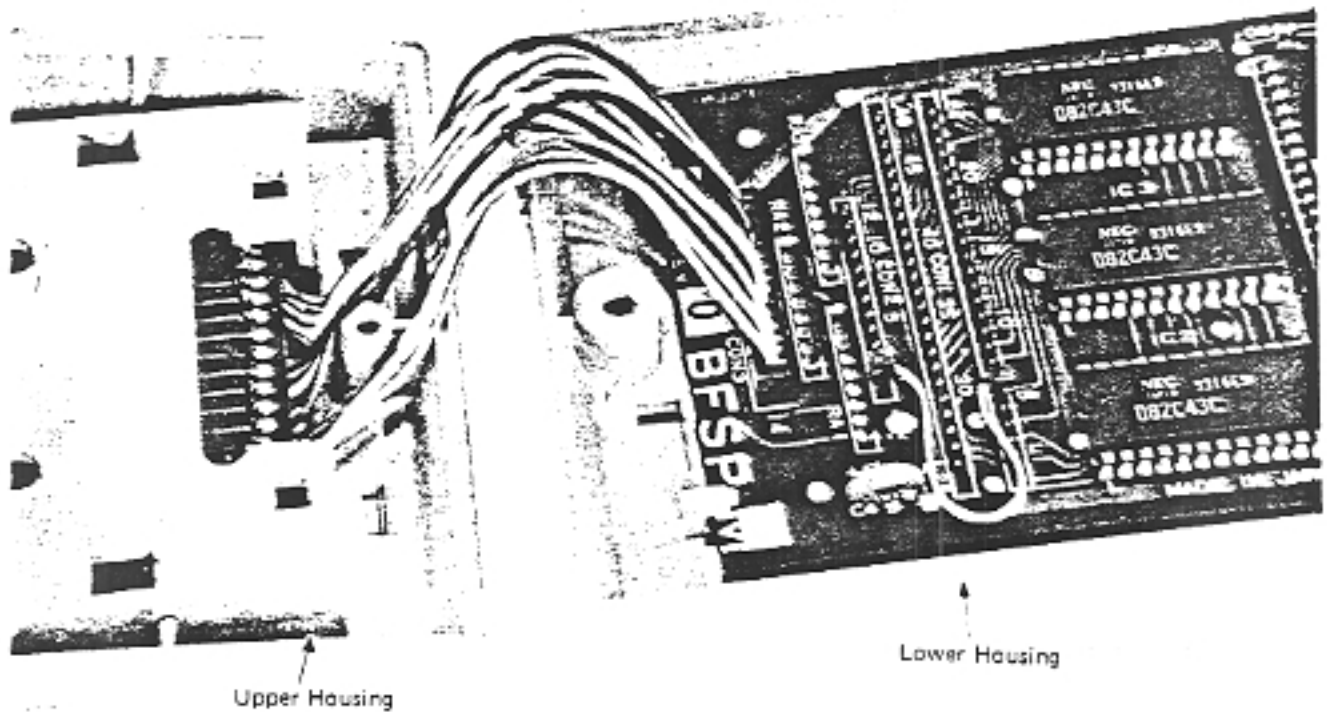


Figure 3.11.2.4.(1).E Jumper Wire Assemblies Installed (Example)

CON1 and CON2 are connected before shipment from the factory so that LEDs 1 and onward correspond to extensions 20 and onward as shown in Figure 3.11.2.4.(1).F.

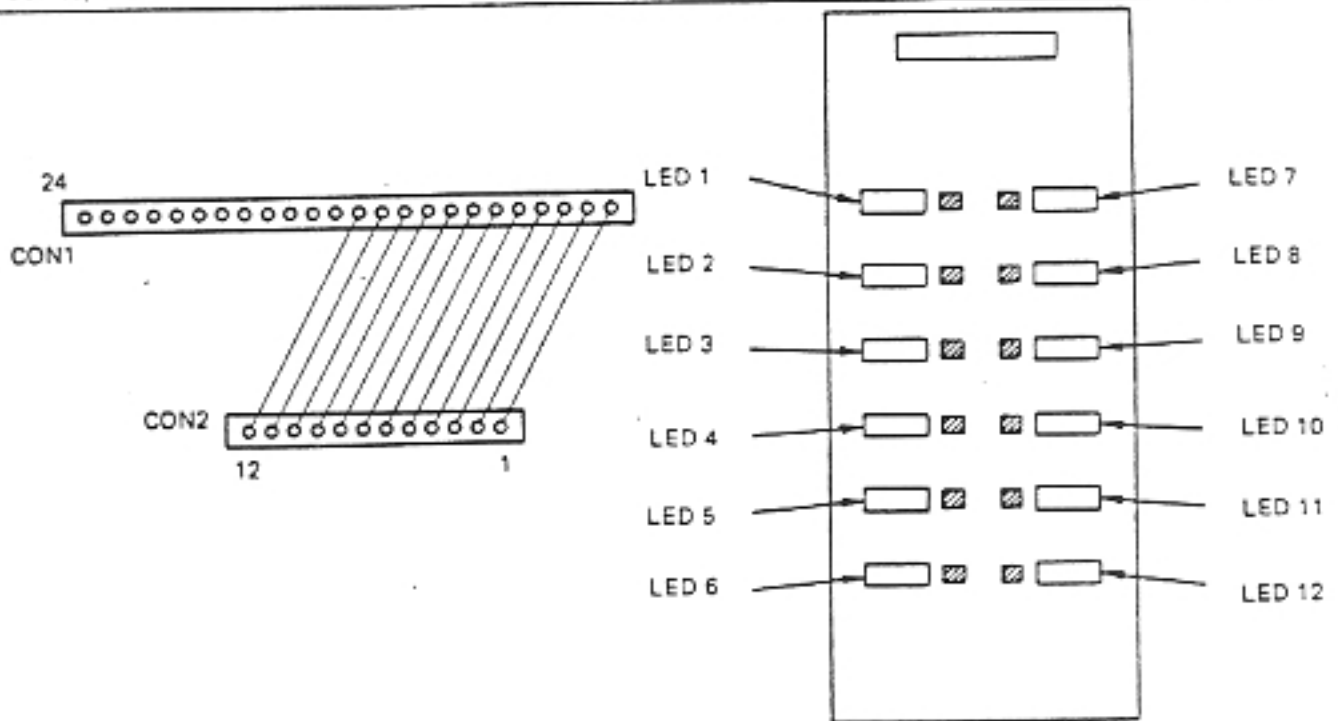


Figure 3.11.2.4.(1).F Original Setting Before Shipment From Factory

(2) Writing numbers in BLF-M face sheet

The original BLF-M face sheet is black, and three other face sheets of different colors (blue, orange, and brown) are supplied with it.

The face sheet can be easily replaced with another by removing the clear plastic IDS-BLF faceplate that is on the face sheet, using your fingers.

See Figure 3.11.2.4.(2) for how to remove it. Write extension numbers or names in the blanks of the face sheet as mentioned in item (1) above.

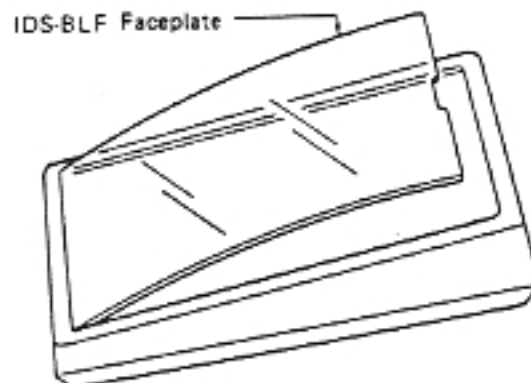


Figure 3.11.2.4.(2) Faceplate Removal

(3) BLF-128 pedestal and wall-mounting

If the BLF-128 pedestal is attached to the BLF-M, its angle is changed for easy visibility of the LEDs. If the BLF-128 pedestal is mounted in the opposite direction, the BLF-M can be mounted on the wall.

The wall-mounting procedure is exactly the same as that for key telephones. Mount the pedestal on the wall with the two supplied screws, WR(+) 3.8 X 16S, as shown in Figure 3.11.2.4.(3).A.

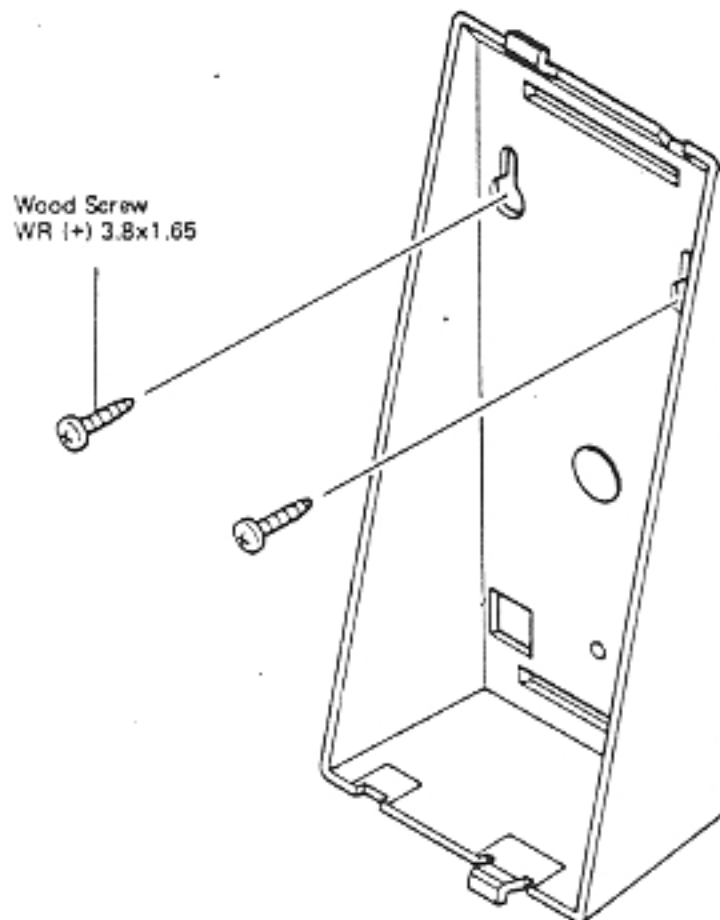


Figure 3.11.2.4.(3).A Mounting BLF Pedestal on Wall

Figures 3.11.2.4.(3).B and C show the BLF-128 pedestal mounted for desk top use and wall mounting.

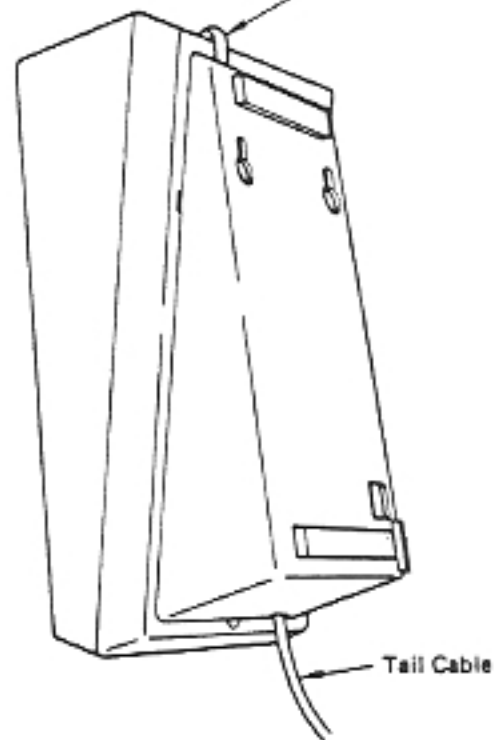
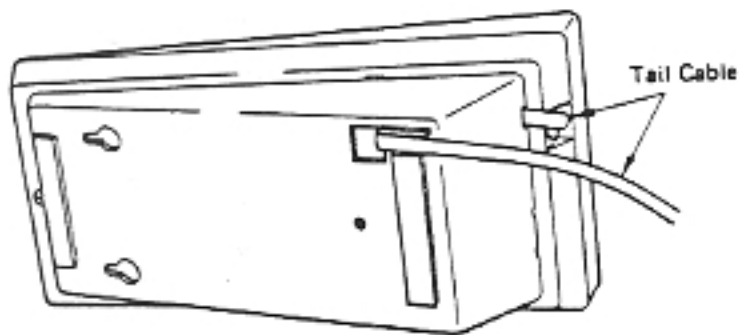
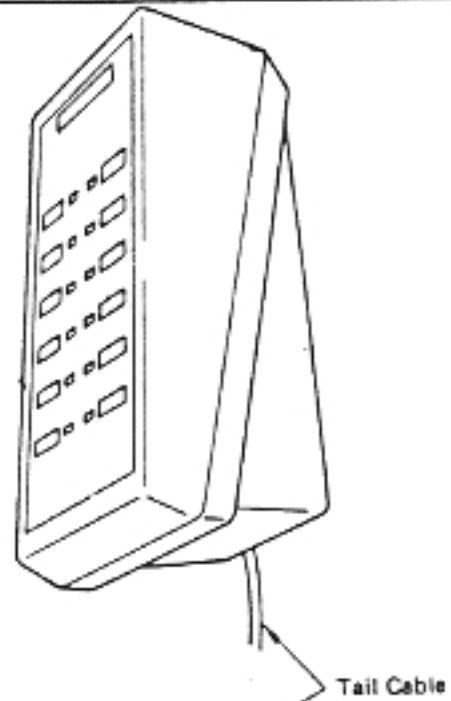
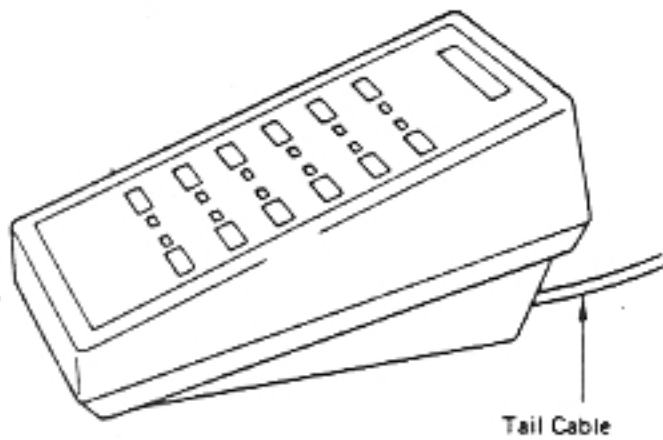


Figure 3.11.2.4.(3).B
BLF-128 Pedestal Mounted for Desk Top Use

Figure 3.11.2.4.(3).C
BLF-128 Pedestal Mounted for Wall Mounting

3.11.3 DSS-N and DSLD-M Installation

3.11.3.1 General Description

The EX-824/1648 system uses microprocessor-controlled electronic techniques to provide innovative and efficient methods for initiating and answering CO/PBX line calls, and distributing calls to extensions.

The DSS-N (EX-Direct Station Selection-N) shown in Figure 3.11.1.3 is an optional unit for the EX-816 system, and is generally paired with telephone No. 20 or No. 21 as an attendant console. It can also be used as a system data input terminal.

The DSS-N features very speedy CO transfer and other operations because of direct station selection for ICM calls. An optional, large-sized, 32-digit liquid-crystal display (LCD) is available for added convenience. Programming sheets are also available.

Two DSS-Ns may be installed in the system. Each DSS-N can operate independently, simultaneously answering and distributing calls to system extensions.

3.11.3.2 Cabling

(1) General

The DSS-N is connected to the MDF via a wall jack. A six-conductor Modular Cord is provided with the DSS-N for connection to the wall jack, and twisted-pair cable is required to connect the wall jack to the MDF.

Table 3.11.3.2.(1) DSS-N Wire Assignments

Designation	Function	Pair Assignment
AT1R	Data path channel 1 (DSS-N -- KSU) power supply (+)	White
AT1T		Black
3S	Spare	Red
4S		Green
AT2R	Data path channel 2 (DSS -- KSU) power supply (-)	Yellow
AT2T		Blue

(2) Type of cable

As mentioned in paragraph 3.11.3.2.(1), connection between the MDF and wall jack should be made by a six-conductor, twisted-pair cable. The cable should be non-shielded and may be in the range of No. 22 to No. 28 AWG wire. No. 24 AWG wire is especially recommended.

(3) Maximum cable length

The maximum cable length between the KSU and an extension varies depending on the type of cable used. Table 3.11.3.2.(3) shows the maximum cable length in each case.

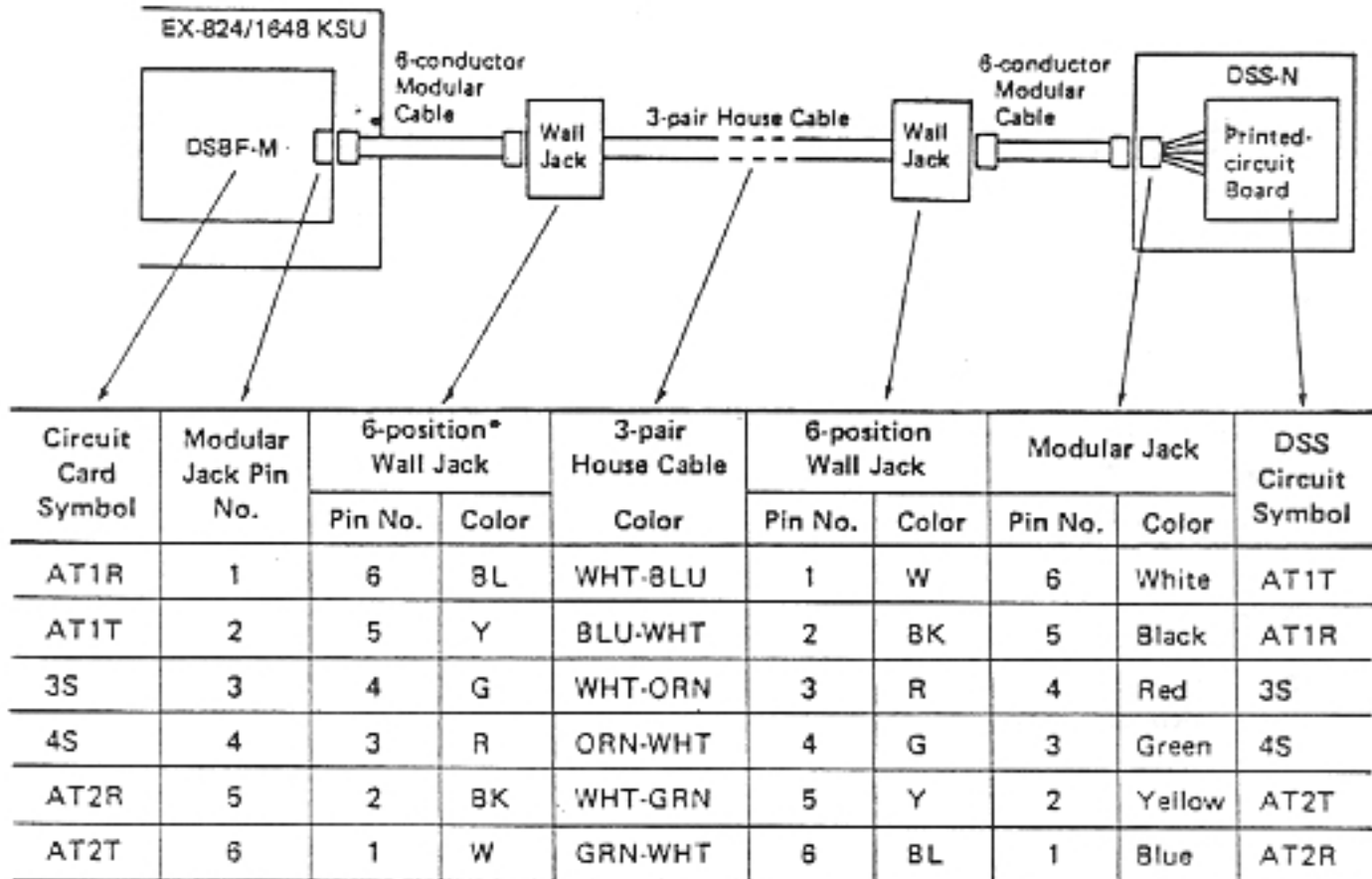
Table 3.11.3.2.(3) DSS-N Maximum Cable Length

Type of Cable	Max. Length	Max. Loop Resistance
No. 22 AWG (0.64 mm ϕ)	530 m (1750 ft)	60 Ω
No. 24 AWG (0.51 mm ϕ)	335 m (1100 ft)	60 Ω
No. 26 AWG (0.40 mm ϕ)	205 m (670 ft)	60 Ω
No. 28 AWG (0.32 mm ϕ)	130 m (420 ft)	60 Ω

(4) Wiring

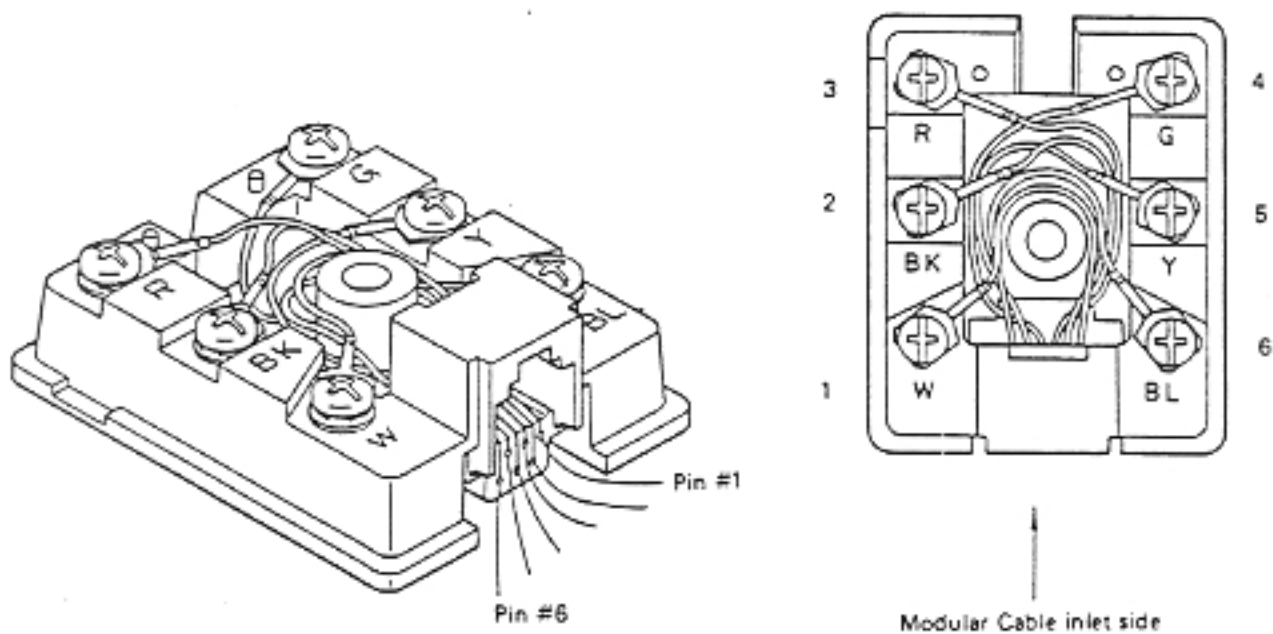
Connect the DSS-N to the EX-824/1648 KSU via the modular jack as shown in Table 3.11.3.2.(4). Use a six-conductor, twisted-pair cable as the house cable between wall jacks.

Table 3.11.3.2.(4) Station Jack Terminal Assignment (DSS)



* Remember that the wiring order for this part is opposite to the normal wiring order.

Pin No.	Color
1	White
2	Black
3	Red
4	Green
5	Yellow
6	Blue



Caution: Some wall jacks have pin 1 marked for the blue lead and pin 6 for the white lead. But connect the leads in such a way that pin 1 is next to the black lead and pin 6 is next to the yellow lead.

Figure 3.11.3.2.(4) 6-Position 6-Conductor Wall Jack Construction

3.11.3.3 Unpacking

The DSS-M is packed in a carton together with various accessories. The accessories supplied are shown in Table 3.11.3.3 and Figure 3.11.3.3.A, B.

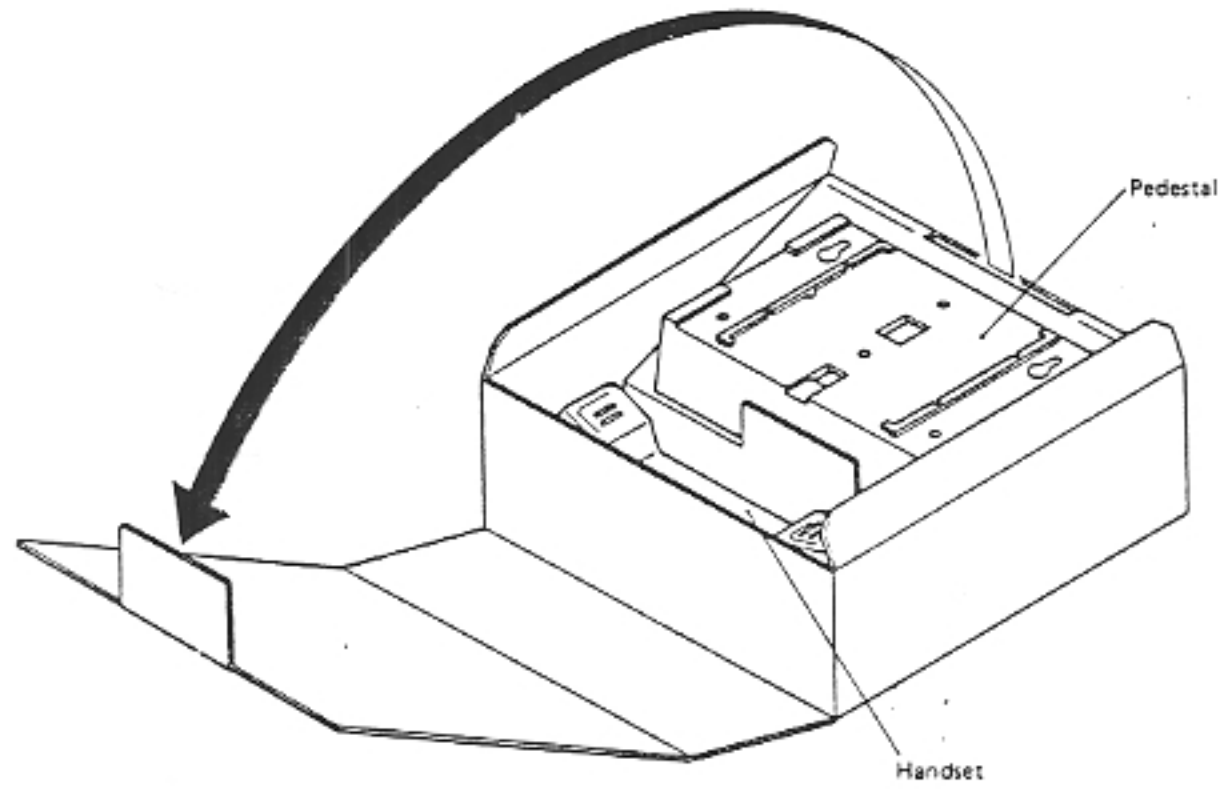
Table 3.11.3.3 DSS-N Components

No.	Description*	Quantity
1	6-6M Modular Cord AG *	1
2	EX-DSS Key Label	1
3	128K Tray Card	1
4	128K Telephone Tray	1
5	Screw WR(+) 3.8 X 16S	2
6	EX-N Pedestal	1

* Modular cord length is about 2.1 m (7 feet).

The DSS-N is packed as shown in Figure 3.11.3.3.A.

To return a DSS-N for repairs or other purposes, pack it again as shown in Figure 3.11.3.3.A, and ship it.



DSS-N is Placed Under the Pedestal.

Figure 3.11.3.3.A Unpacking of DSS-N

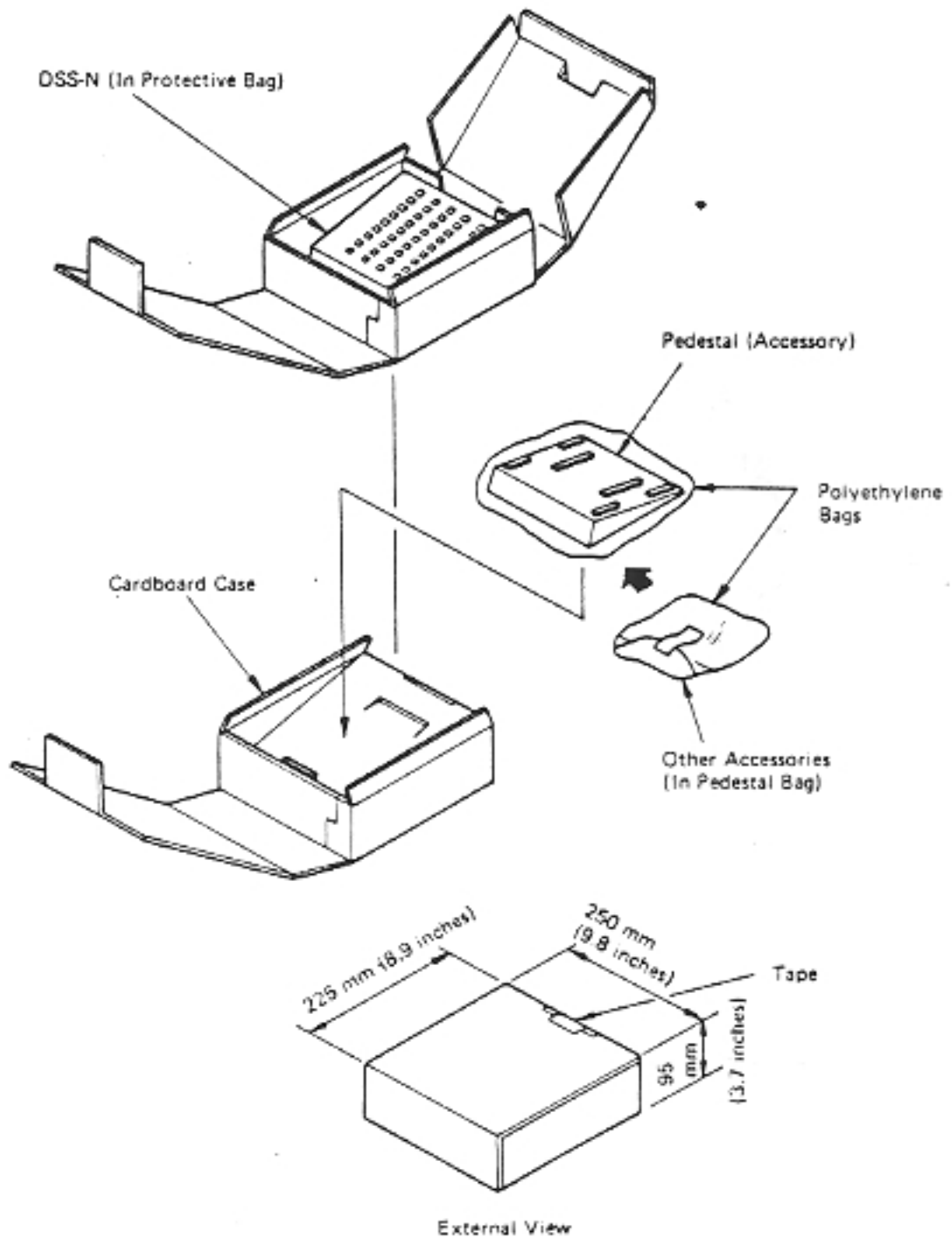
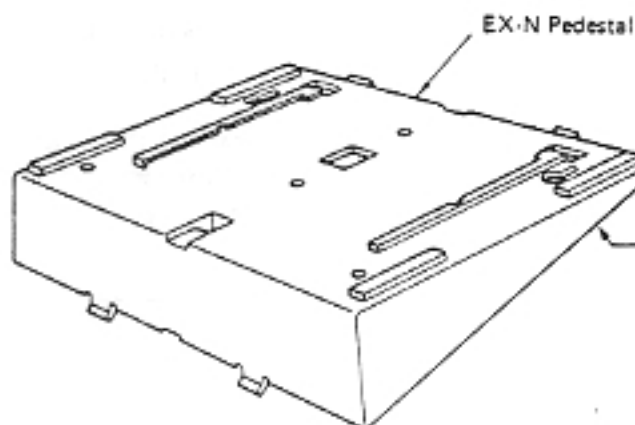


Figure 3.11.3.3.B Packing of DSS-N



Note



6-M Cord AG



128K Tray Card

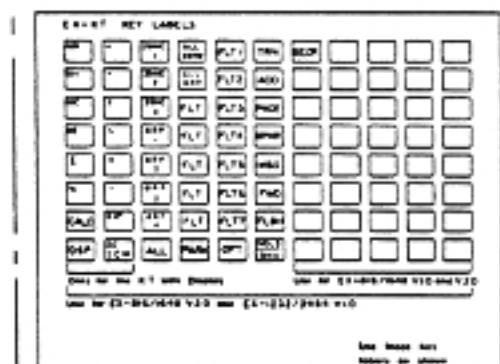
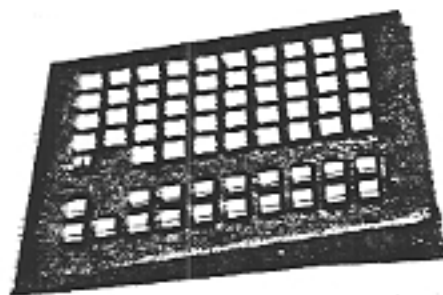


128K Telephone Tray



WR(+) 3.8 X 16S (2 pcs)

EX-DSS-N



Note: The accessories shown within the chain lines are placed together inside the EX-N pedestal.

Figure 3.11.3.3.C DSS-N Components

3.11.3.4 Handling

(1) EX-N pedestal standard mounting and wall mounting

This procedure is exactly the same as that described in paragraphs (1), (2), and (3), Section 3.10.6.2.

(a) EX-N pedestal standard mounting and 6-6M modular cord (AG) processing

The EX-N pedestal is used for mounting on a wall. The method of installing the EX-N pedestal at an angle for easier operation of the EX-DSS-N is illustrated in Figures 3.11.3.4.(1)(a) A, B, and C.

Insert the front tabs on the EX-N pedestal into the two slots in the front part of the DSS-N lower housing, and push the rear of the EX-N pedestal until the rear tabs are inserted into the rear slots in the DSS-N lower housing. Reverse the above procedure for removing the EX-N pedestal.

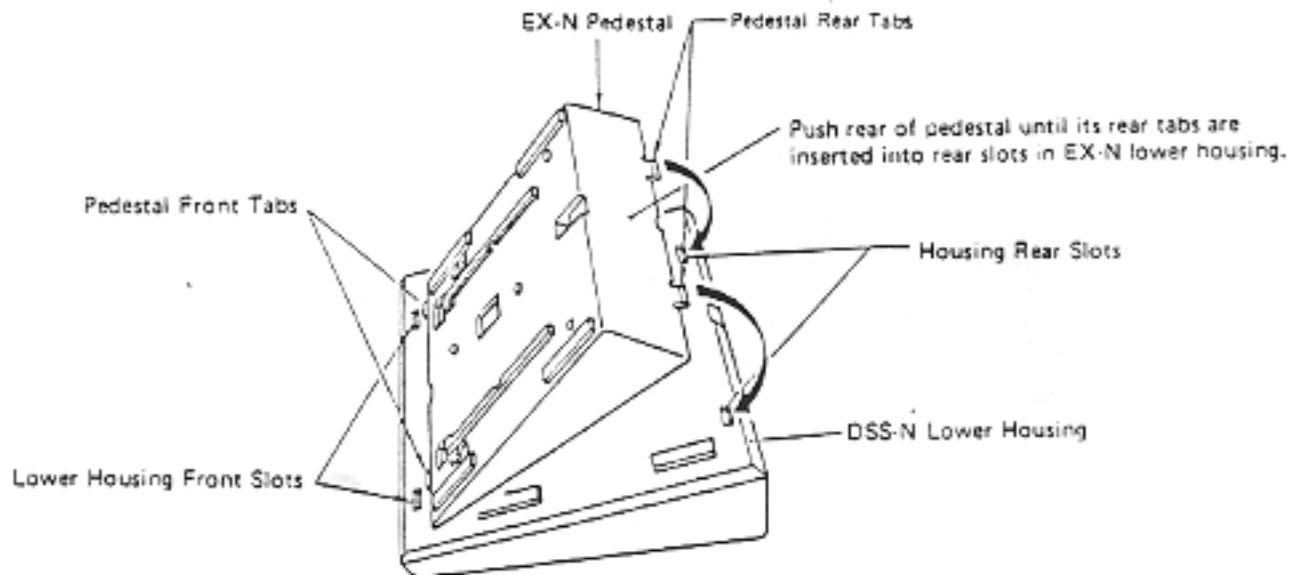


Figure 3.11.3.4.(1)(a)A 128K Pedestal Mounting

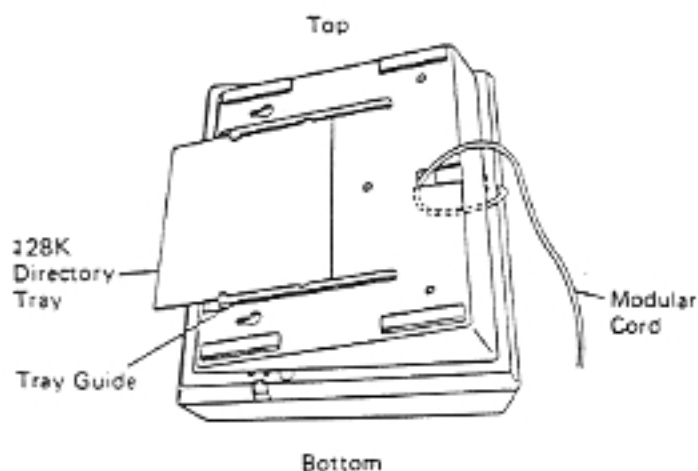


Figure 3.11.3.4.(1)(a)B
Modular Cord Processing

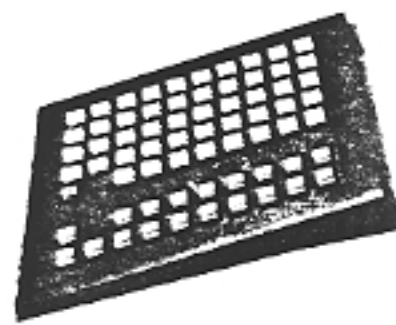


Figure 3.11.3.4.(1)(a)C
EX-DSS-N With EX-N Pedestal

(b) Wall-mounting procedure

- (i) Tighten the supplied wood screws WR(+)
3.8 X 16Ss in the wall, using the EX-N pedestal
as a gauge to determine their positions, as shown in Figure 3.11.3.4.(1)(b)(i).

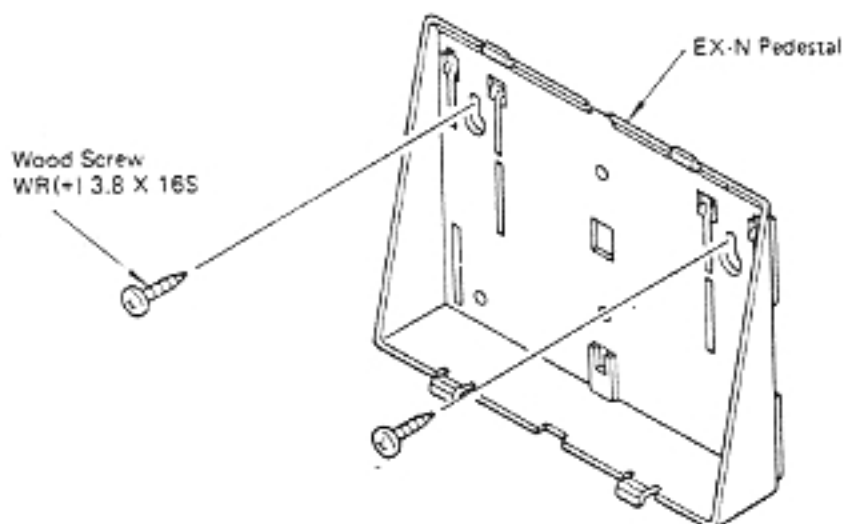


Figure 3.11.3.4.(1)(b)(i) Mounting EX-N Pedestal on Wall

- (ii) Mount the supplied EX-N pedestal on the DSS-N lower housing opposite to the standard direction. If the EX-N pedestal is mounted in the standard direction, remove it and install it in the reverse direction as shown in Figure 3.11.3.4.(1)(b)(ii).

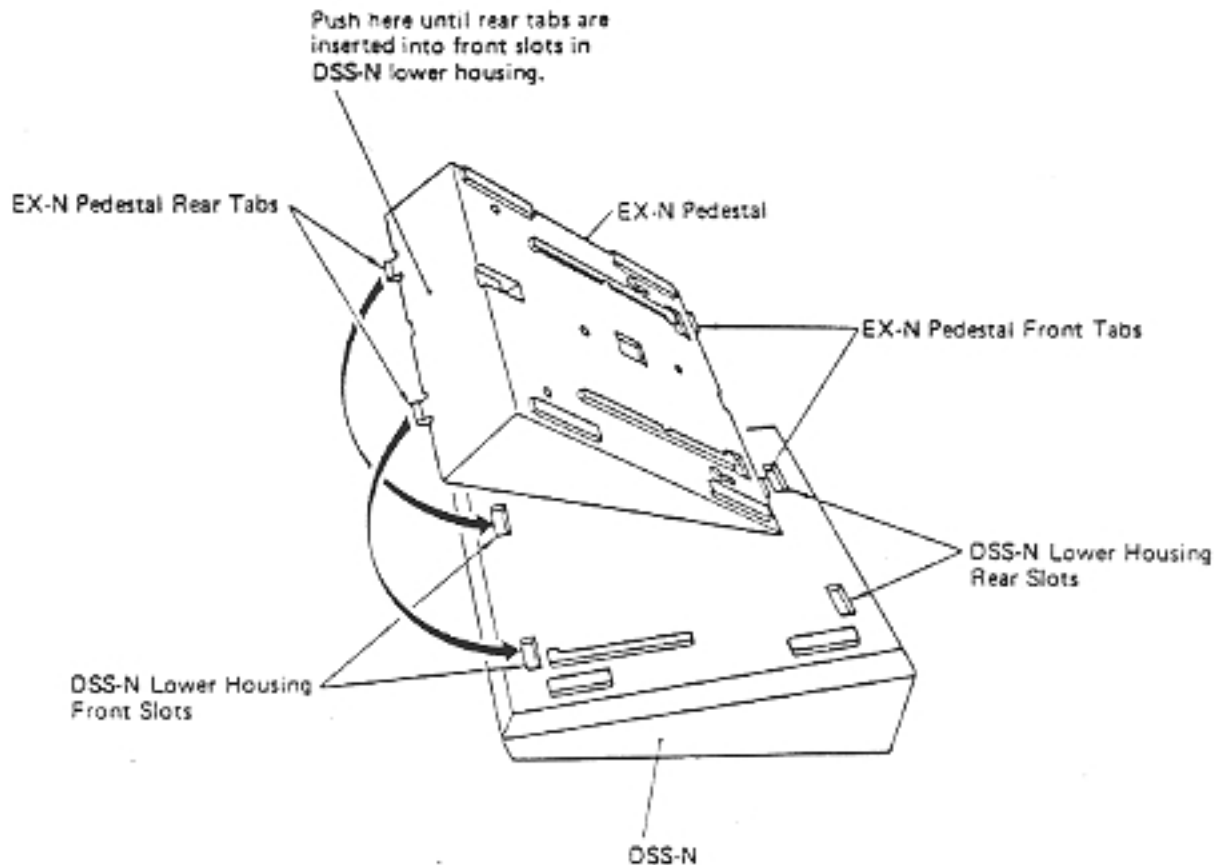


Figure 3.11.3.4.(1)(b)(ii) Mounting EX-N Pedestal on DSS-N Lower Housing

- (iii) Slide the 128K extension directory tray along the EX-N pedestal rails from above or under as desired.
- (iv) Put the modular cord through the hole in the EX-N pedestal or fasten it with the cord clamp, depending on the position of the 128K directory tray, so that the cord hangs downward.
See Figures 3.11.3.4.(1)(b)(iv)A, B, and C.

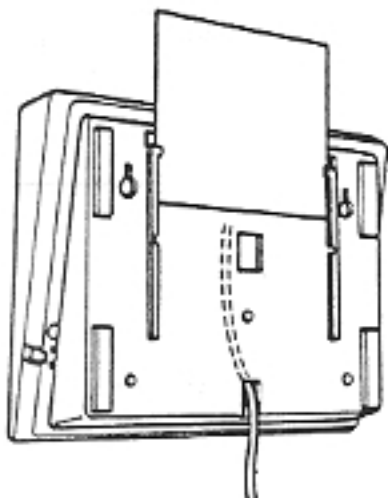


Figure 3.11.3.4.(1)(b)(iv)A
Modular Cord and EX-N Pedestal
Processing 1 (128K Directory Tray in Up Position)

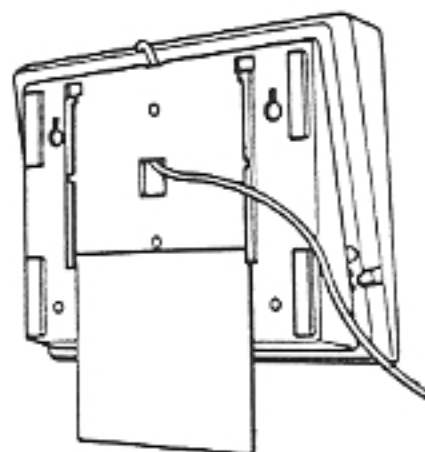


Figure 3.11.3.4.(1)(b)(iv)B
Modular Cord and EX-N Pedestal
Processing 2 (128K Directory Tray in Down Position)



Figure 3.11.3.4.(1)(b)(iv)C Wall-Mounted DSS-N

(2) 128K key cap removal and EXT card (label) placement

Place labels, with typed numbers or names, on DSS keys Nos. 20 to 35 according to the key telephones installed. Either 128K-CO cards or DSS-M EXT cards (labels) may be used.

The 128K key caps can be easily removed by putting cellophane tape on them as shown in Figure 3.11.3.4.(2) and pulling it up. The key caps can also be removed by pinching them with fingertips.

Lightly stick cellophane tape to 128K key caps and pull it up. The caps come off easily.

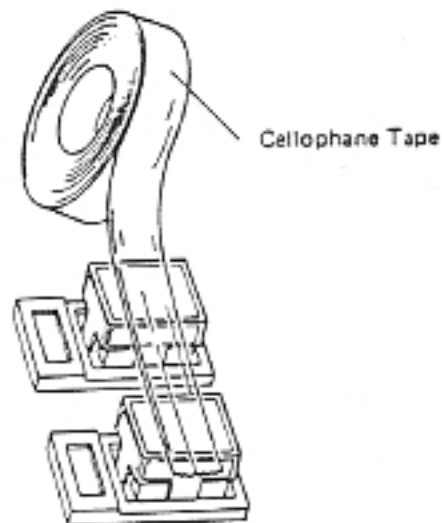


Figure 3.11.3.4.(2) Removing 128K Key Caps With Cellophane Tape

(3) Label replacement

Replace existing labels of ADJ (+), and ADJ (-) with those labels of ADJ, and P-UP respectively.

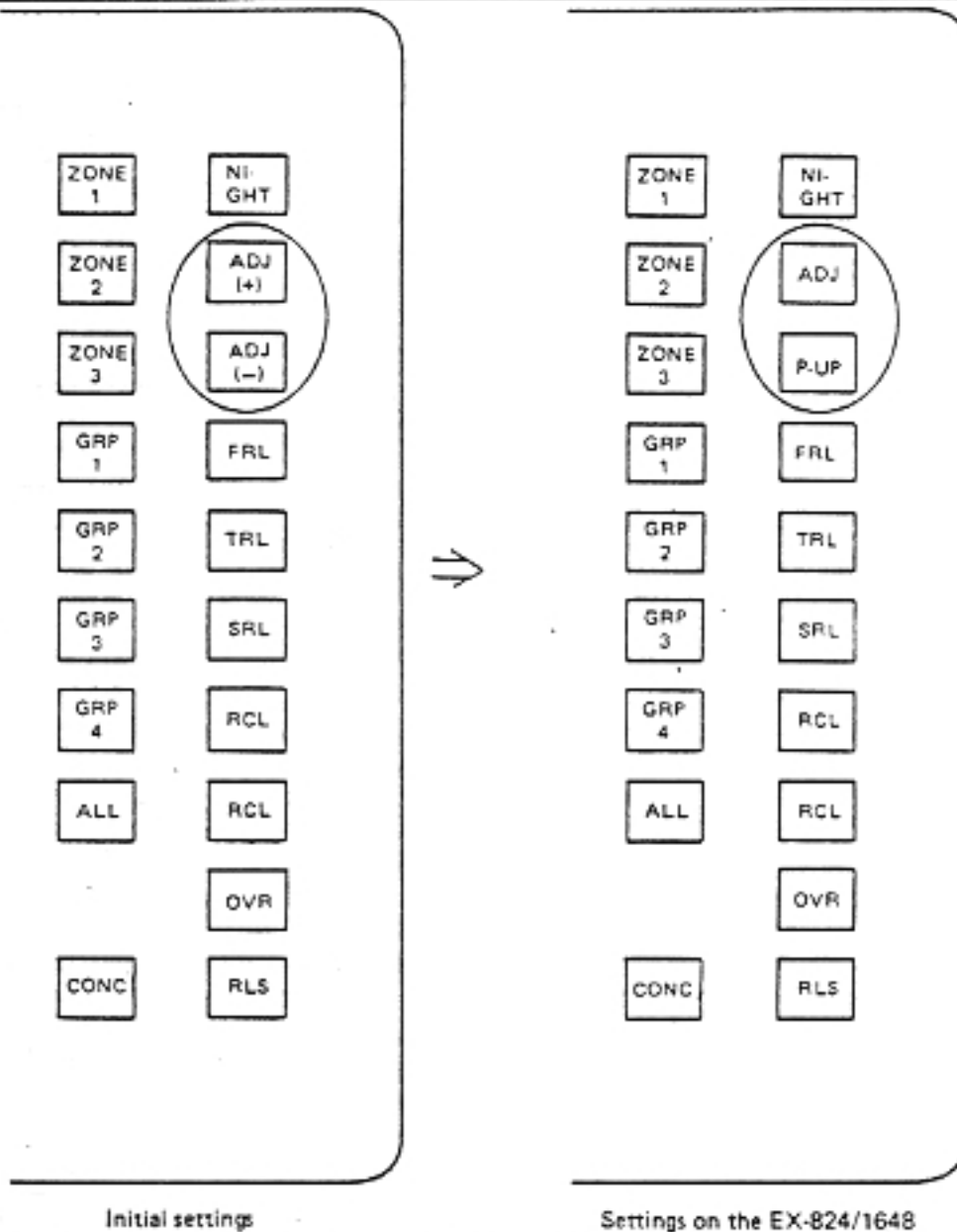


Figure 3.11.3.3(4) Label Replacement

(4) DSLD-M installation

The DSLD-M is an optional unit for the DSS-N.

It is used for programming and displaying the various features of the DSS-N. If it is installed on the DSS-N, the time can be displayed and the features of the DSS-N can be updated.

(a) DSLD-M components

The components of the DSLD-M are shown in Table 3.11.3.4(4)(a) and Figure 3.11.3.4(4)(a). The EX824/1648 system uses the PROV-M.

Table 3.11.1.4.(4).(a) Components of DSLD-M

No.	Description	Quantity
1	DSLID-M assembly	1
2	LCD case support A	2
3	LCD case support B	2
4	PROV-M (DSS programming overlay-M)	1
5	PROV-M1 (DSS programming overlay-M1)	1

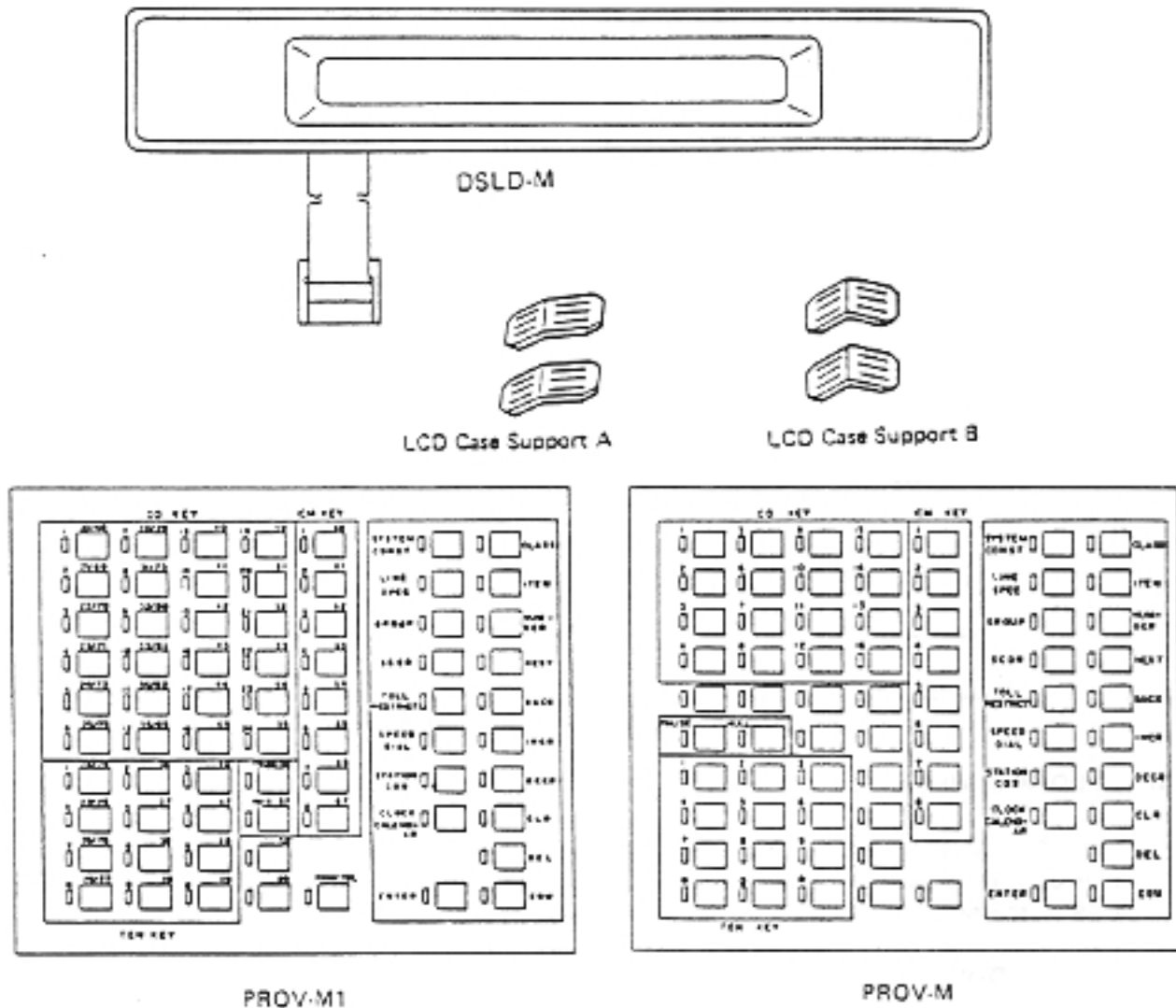


Figure 3.11.3.4.(4)(a) Components of DSLD-M1

(b) DSLD-M installation

(i) General description

The DSLD-M (liquid-crystal display unit for DSS-N) and liquid-crystal display case support A or B can be installed in the rear of the DSS-N upper housing.

The PROV-M may be placed on the DSS-N faceplate to replace the keys with programming key names for easy programming of various features.

Liquid-crystal display case support A or B is used for changing the angle of the DSLD-M.

- Figure 3.11.3.4.(4)(b)(i) shows case supports A and B.

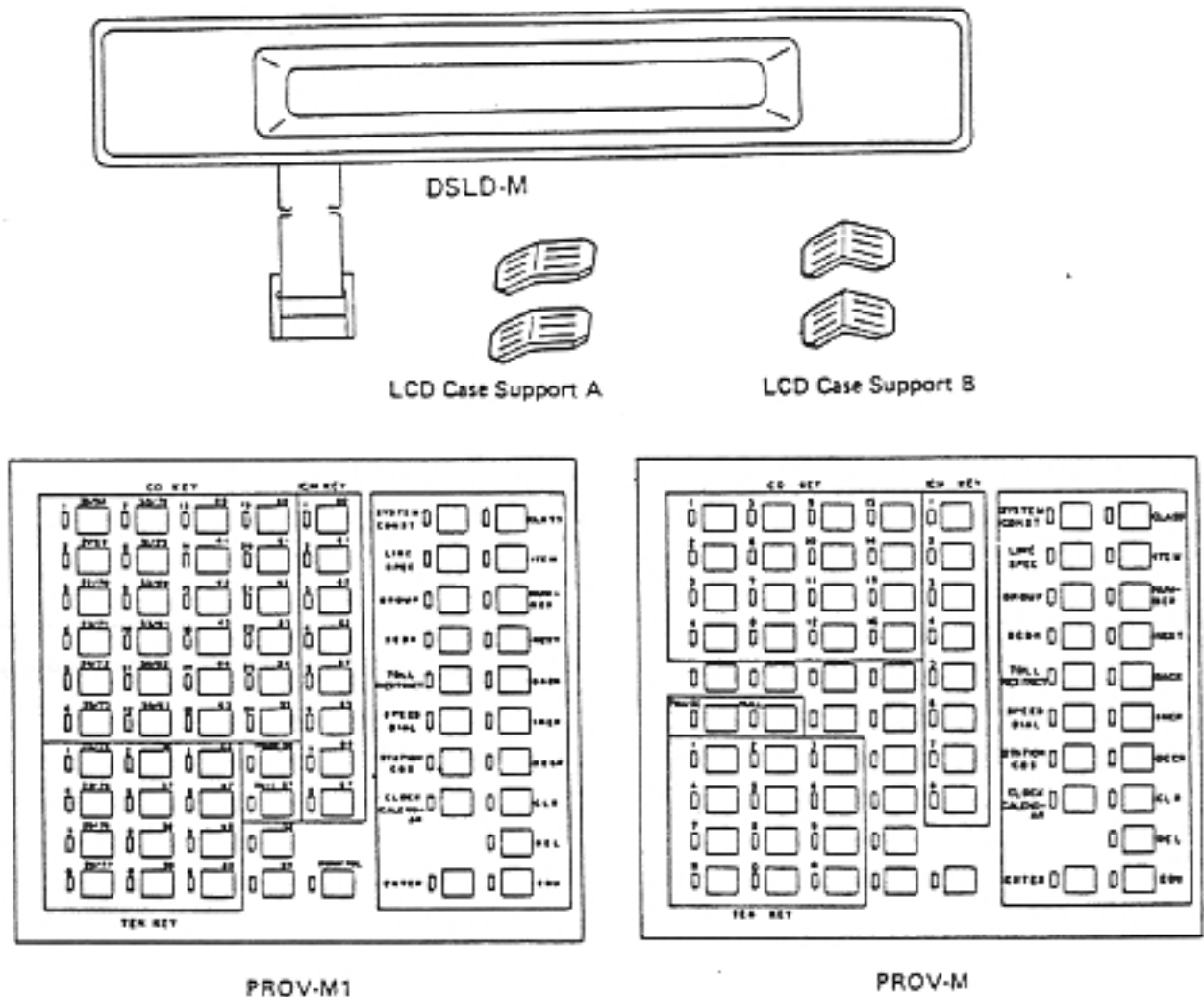


Figure 3.11.3.4.(4)(b)(i) Components of DSLD-M1

The liquid-crystal display case support installation procedure is described below.

(ii) Desk top

Either case support A or B can be used in using the DSS-N on a desk top, as shown in Figures 3.11.3.4.(4)(b)(ii) A, B, C, and D.

(ii)-1 Mounting case support A or B in the DSS upper housing

Insert the case support into the DSS-N upper housing as shown in Figure 3.11.3.4.(4)(b)(ii)A.

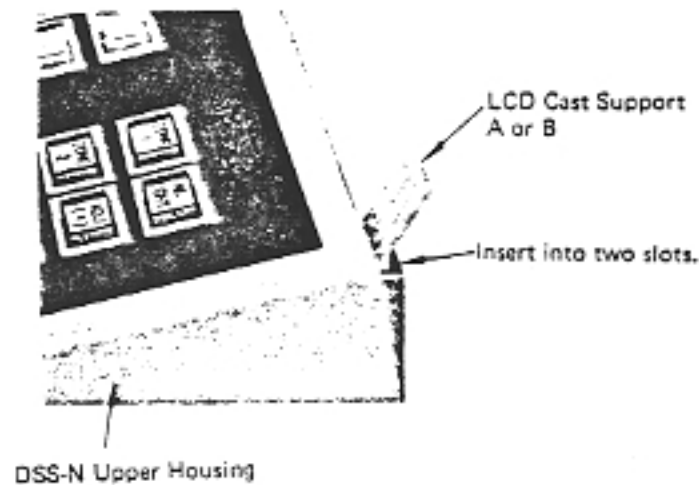


Figure 3.11.3.4.(4)(b)(ii)A Mounting LCD Case Support A or B in DSS Upper Housing
Insert into Two Slots.

- (ii)-2 Mounting DSLD-M on DSS-N.
Fit the DSLD-M into liquid-crystal display support A or B on the DSS-N and engage the connector as shown in Figure 3.11.3.4.(4)(b)(ii)B.

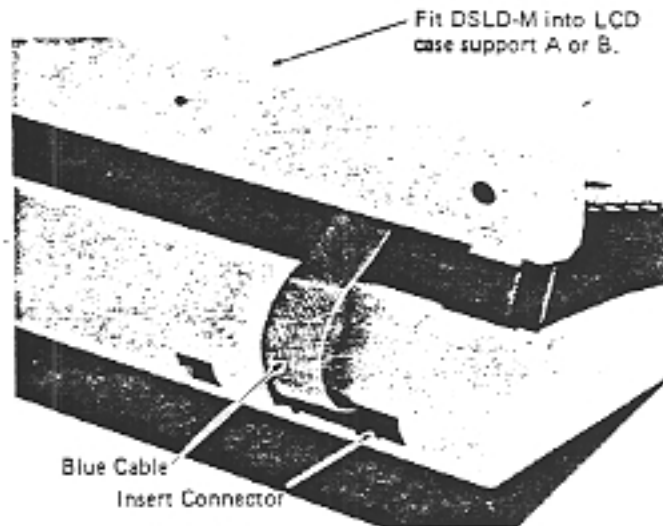


Figure 3.11.3.4.(4)(b)(ii)B Mounting DSLD-M on DSS-N

- (ii)-3 Assembly completed
Figures 3.11.3.4.(4)(b)(ii)C and D show assemblies using liquid-crystal display case supports A and B.



Figure 3.11.3.4.(4)(b)(ii)C Using Case Support A

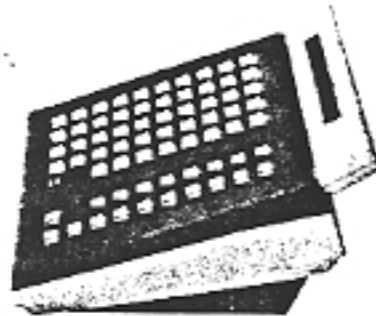


Figure 3.11.3.4.(4)(b)(ii)D Using Case Support B

(iii) Wall mounting

In mounting the DSLD-M on the wall, use case support B for easy visibility of the display. Figure 3.11.3.4.(4)(b)(iii) shows the DSLD-M with case support B mounted on the wall.

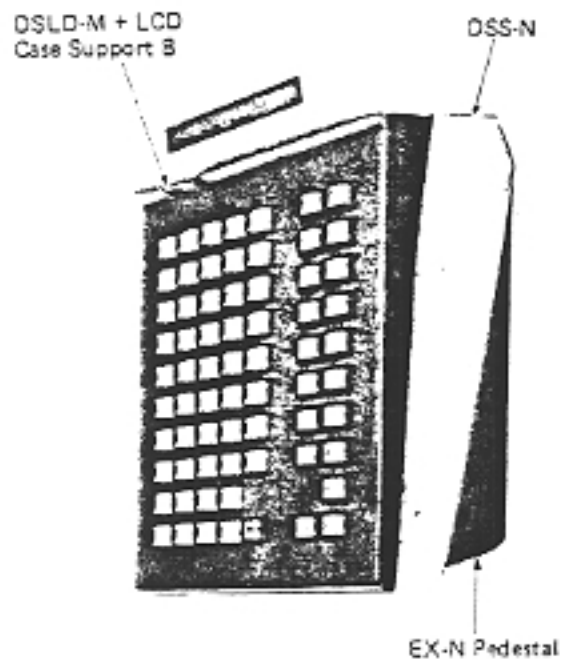


Figure 3.11.3.4.(4)(b)(iii) Wall-Mounted DSLD-M

(iv) PROV-M placement

The PROV-M for feature programming needs only to be placed on the faceplate as shown Figure 3.11.3.4.(4)(b)(iv).

Remove the PROV-M after programming.

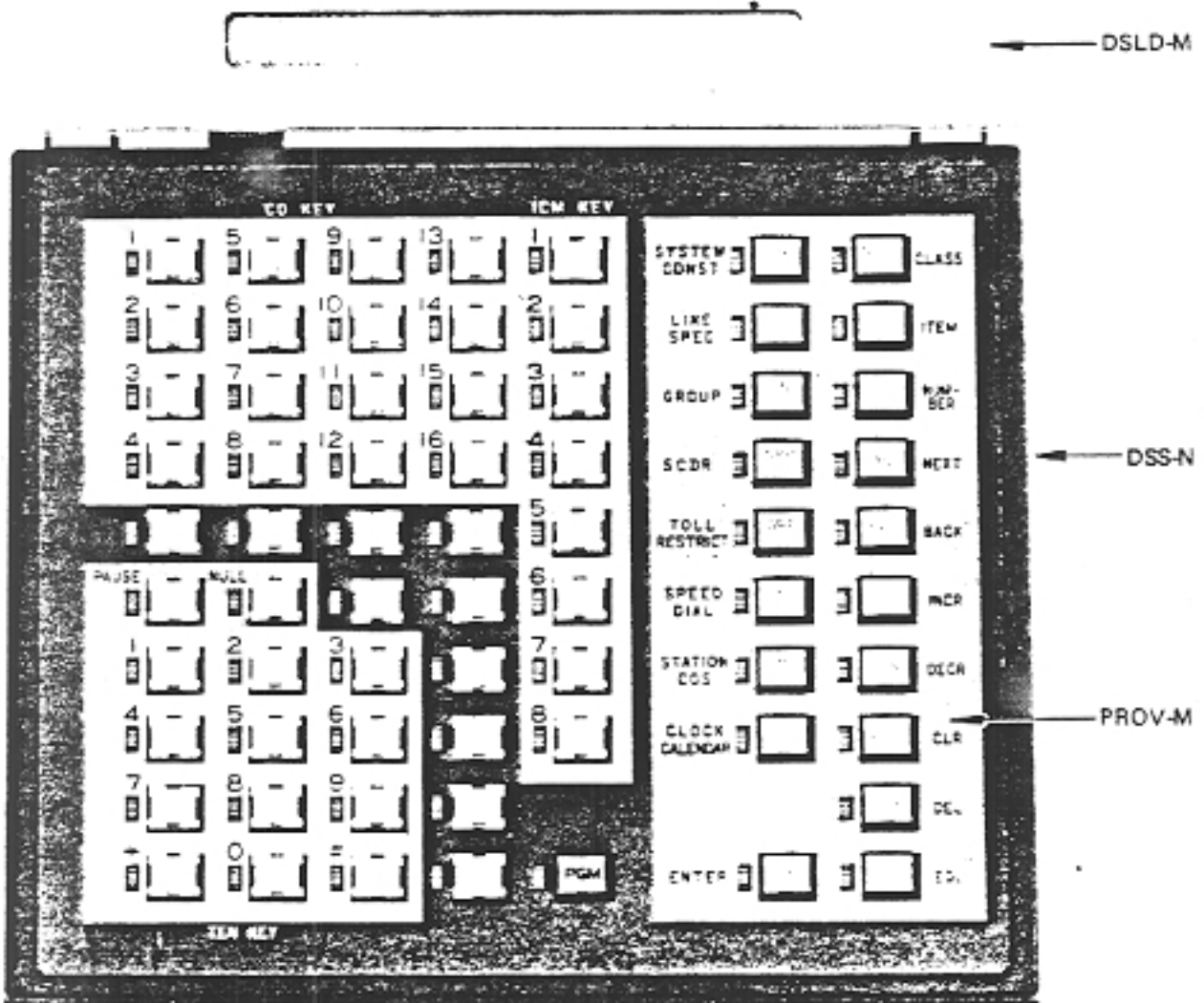


Figure 3.11.3.4.(4)(b)(iv) PROV-M Set in Place

3.11.3.5 Feature Assignment

DSS-N is paired with an EX-824/1648K, KN/KN1, D, DN/DN1 or VP-N1 key telephone to provide the following features:

- o Attendant Call Priority
- o Attendant Dedicated ICM Lines
- o Attendant Display
- o Attendant DSS Calling
- o Audible Indications
- o Automatic Add-On
- o Automatic COL Hold
- o Automatic Recall
- o Busy Call Forward Forced Release
- o Busy Lamp Field
- o Busy Override
- o Call Forward Forced Release
- o Call Release
- o Chain Call
- o Clock Adjustment
- o Direct Page Access
- o Disconnect
- o Do-Not-Disturb Forced Release
- o Do-Not-Disturb Override
- o Dual Attendant
- o Dynamic Programming
- o ICM Path Termination
- o Overflow Transfer
- o Serial Call
- o Station Forced Release
- o System Programming Terminal
- o Tenant Service
- o Through Dialing
- o Trunk Forced Release

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3.12 PROGRAMMING

3.12.1 General

After hardware installation is completed, programming is required to establish system configuration, service features, and toll restrictions. This section only summarizes programming; for details, refer to Part 4, Programming.

The EX-824/1648 system provides flexible capabilities to meet customer requirements with versatile features.

When consulting a user on desired features, refer to Part 4, paragraph 3.3, System Planning, and fill in the requirements on the planning sheets. To accomplish error-free programming efficiently, use the filled in planning sheets and in the sequence of the descriptions in Part 4, programming.

3.12.2 Explanation of Data

3.12.2.1 Default Data

- (1) Programming data consist of default data and data that must be programmed.
For details of default data, refer to paragraph 4.1.2, Default Data.

Note: Default data are automatically set when the system is initially started (power switch on and M/KCPU-M1 reset switch on) in the clear mode (M/KCPU-M1 card panel DIP switch No. 8 off), and can be input from the DSS-M in the programming mode. For details, refer to Section 3.6.2.3.1.

3.12.2.2 System Data

System data for the EX-824/1648 system are permanently kept for using the various devices during system operation. The system data can be classified into the following eight classes:

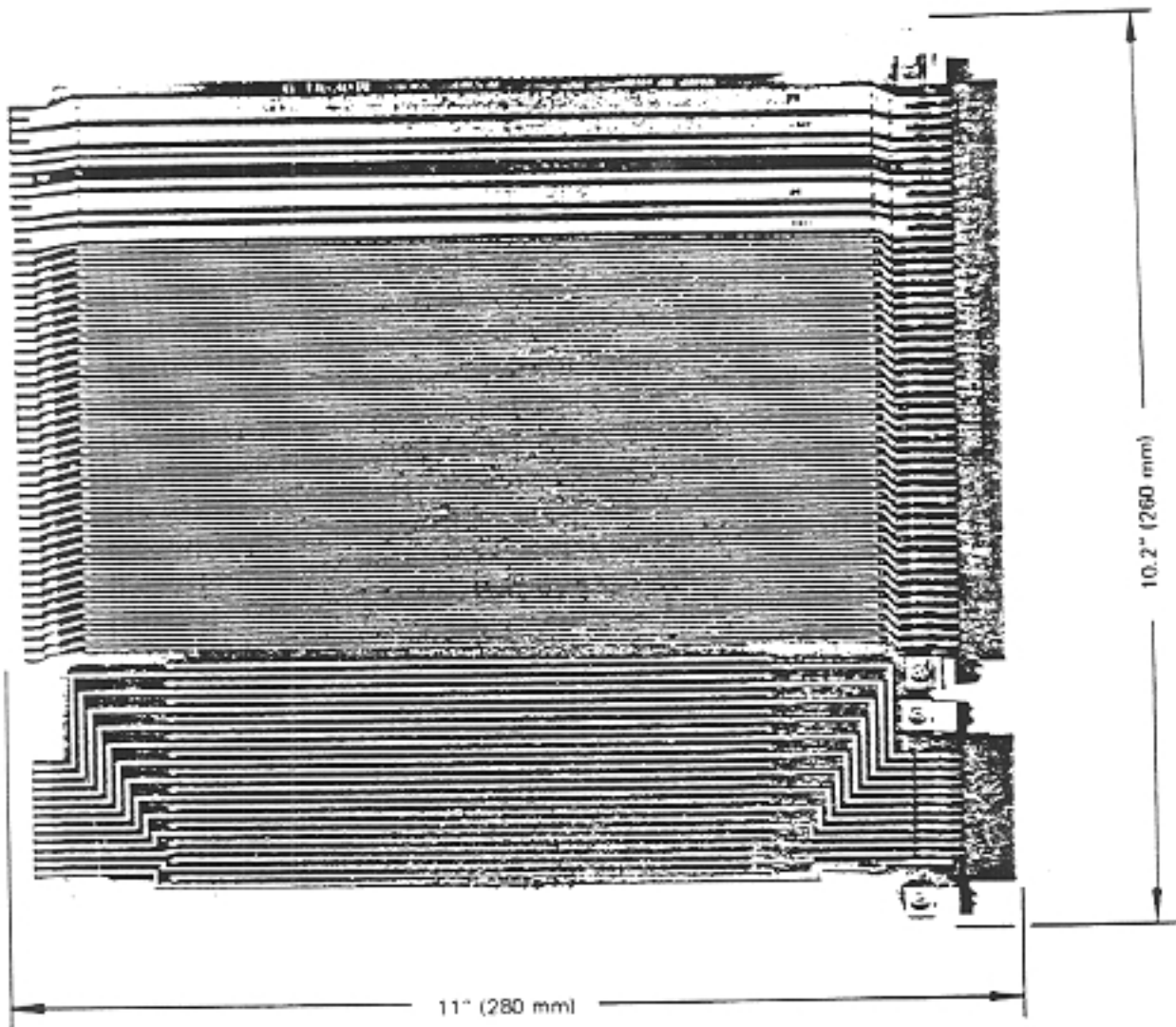
- 1) System Constant Class
- 2) Line Specification Class
- 3) Group Data Class
- 4) SCDR Data Class
- 5) Toll Restriction Class
- 6) Speed Dial Class
- 7) Station Class-of-Service Class
- 8) Clock and Calendar Class

Once the system data are set, they are semi-permanently kept by the battery in the backup mode (M/KCPU-M1 card panel DIP switch No. 8 on).

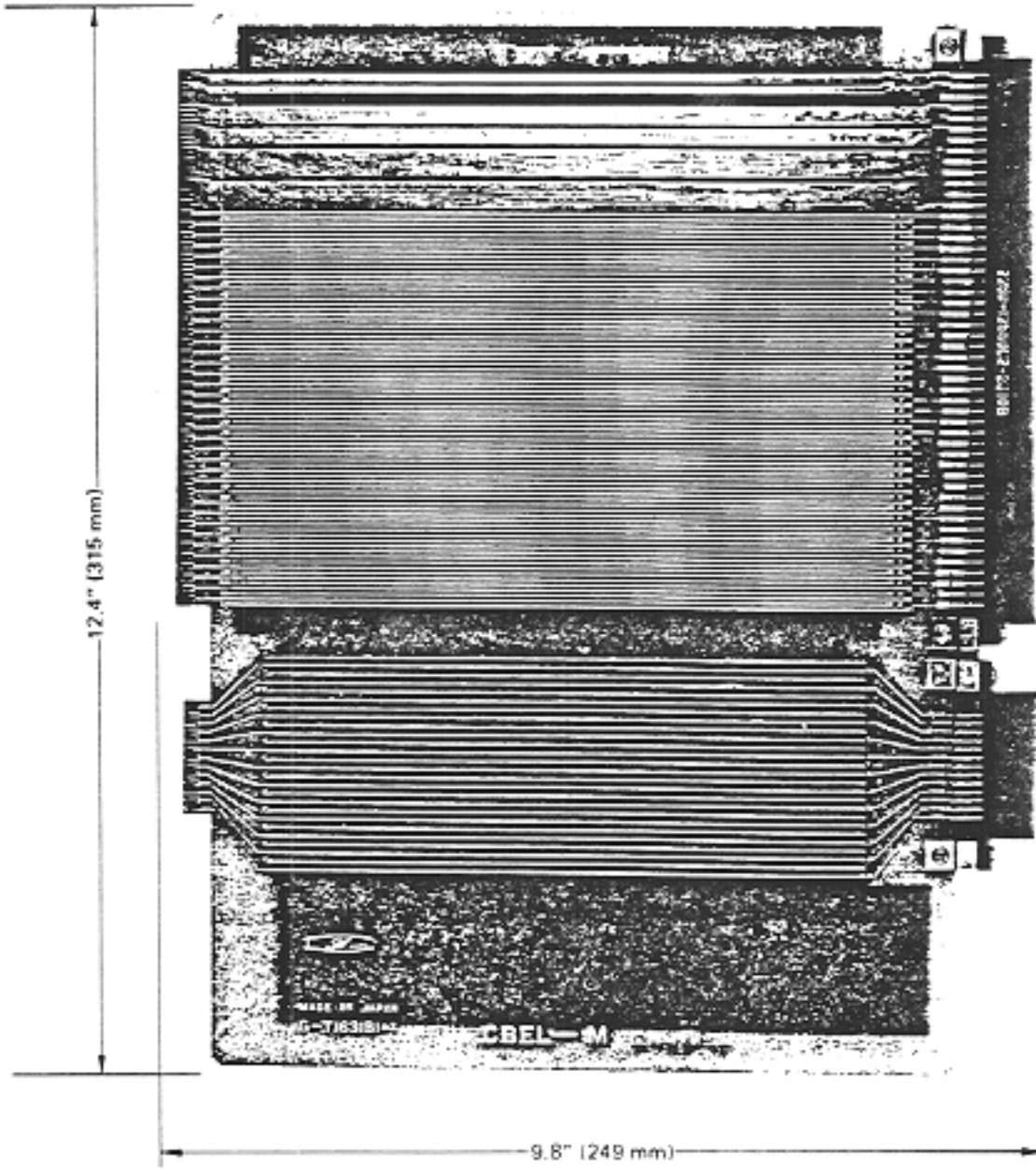
3.12.3 System Programming

System data can be input at the system programming terminals (on the DSS-M or DSS-N) in the programming mode. Programming requires a DS8F-M card, DSS-M or DSS-N console, and Key telephone No. 20 or 21 in necessary because it is paired with the DSS-M or DSS-N.

Under the above conditions, system data can be input from DSS-M or DSS-N, using the DSS key. For details, refer to Part 4.



Circuit Board Extender Small-M (CBES-M)



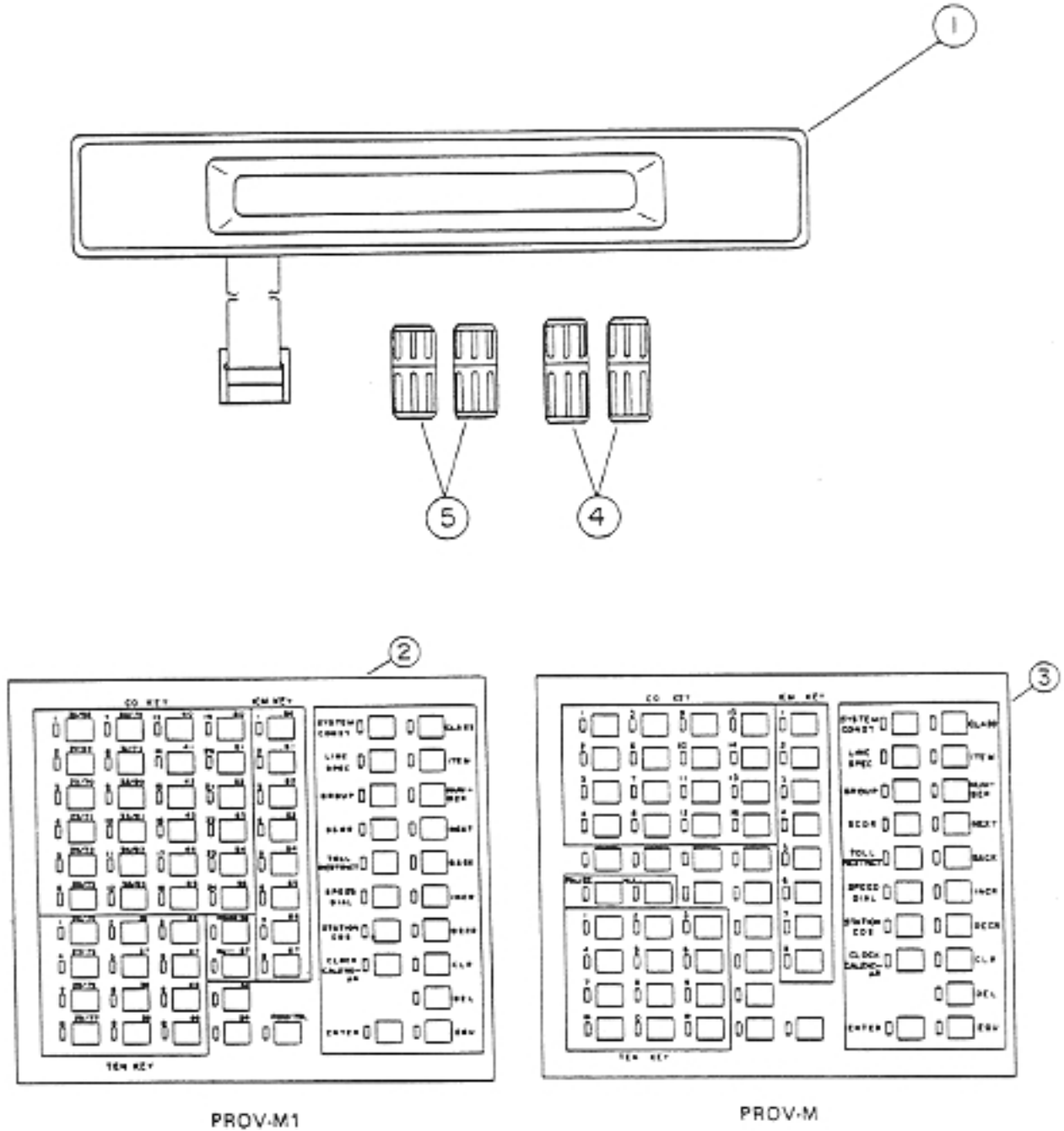
Circuit Board Extender Large-M (CBEL-M)

IWATSU

(4) LCD Unit for DSS-M1 (DSL-D-M1)

PARTS LIST

ORDERING CODE	4318		UNIT NAME	LCD UNIT FOR DSS-M1	
SUB ASSY CODE	ITEM NO.	SYM NO.	DESCRIPTION	Q'TY	NOTE
		DSL-D-M1	LCD UNIT FOR DSS-M1	(1)	
	1		DSL-D-M ASSEMBLY	1	
4278	2	PROV-M1	DSS PROGRAMMING OVERLAY-M1	1	
4246	3	PROV-M	DSS PROGRAMMING OVERLAY-M	1	
	4		LCD CASE SUPPORT A	2	
	5		LCD CASE SUPPORT B	2	



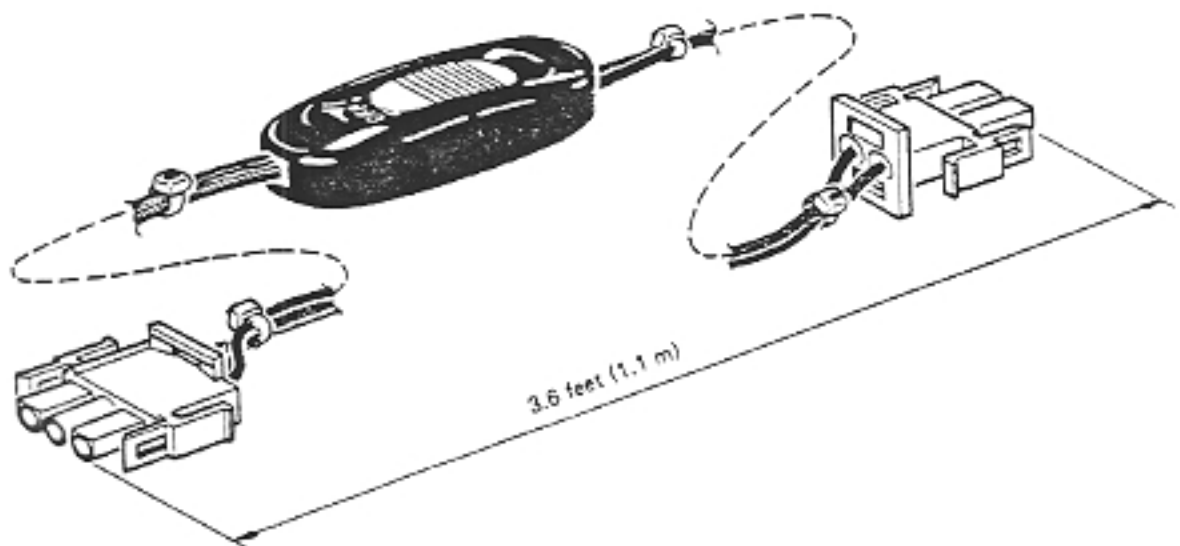
LCD Unit for DSS-M1 (DSL D-M1)

(5) Printed Circuit Board Removing Cable-M (PCRC-M)

PARTS LIST

1/1

ORDERING CODE	4280		UNIT NAME	PRINTED CIRCUIT BOARD REMOVING CABLE-M	
SUB ASSY CODE	ITEM NO.	SYM NO.	DESCRIPTION	Q'TY	NOTE
		PCRC-M	PRINTED CIRCUIT BOARD REMOVING CABLE-M	(1)	



Printed Circuit Board Removing Cable-M (PCRC-M)

IWATSU

(6) Station Ordinary Handset (SOHD)

PARTS LIST

1/1

ORDERING CODE	3315	UNIT NAME	STATION ORDINARY HANDSET (82A)		
SUB ASSY CODE	ITEM NO.	SYM NO.	DESCRIPTION	QTY	NOTE
		SOHD	STATION ORDINARY HANDSET	(1)	
	1		82 HANDSET HANDLE BASE	1	
	2		82 TRANSMITTER UNIT	1	
	3		82 HANDSET WEIGHT	1	
	4		82 HANDSET MODULAR JACK	1	
	5		82 RECEIVER UNIT	1	
	6		82 HANDSET WALL BRACKET	1	
	7		SCREW TT2 (+) 3 X 12S	4	
	8		82 HANDSET HANDLE COVER	1	
	9		SCREW 3 X 10S (B)	1	
	10		82 HANDSET SCREW COVER	1	

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4.1 SYSTEM PLANNING

4.1.1 System Data

In this system, system data are data which define the system functions.

System data are classified into eight classes:

- System Constants
- Line Specification
- Group
- SCDR
- Toll Restriction
- Speed Dial
- Station Class-of-Service
- Clock and Calendar

Default data are set automatically for system data when the system is installed. However, data is saved for reactivation after system halt (power off or resetting of M/KCPU-ME switch) in backup mode. System data is entered from the System Programming Terminal in the Programming Mode. Only one Attendant can be switched even if there are two Attendants to a system.

4.1.2 Default Values of System Data

The following tables show the default data for each setting.

Table 4.1.2.1 System Constants

Item	Number	Data	Boundary	Default
1		Hold Timeout	1 to 255 Seconds 0 : No Function	30 Seconds
2		Sender Timeout	10 to 255 Seconds	20 Seconds
3		Page Timeout	1 to 255 Seconds 0 : No Function	10 Seconds
4		Hold Recall Timeout	1 to 255 Seconds 0 : No Function	20 Seconds
5		Camp On Timeout	1 to 255 Seconds 0 : No Function	30 Seconds
6		Callback Timeout	10 to 255 Seconds	20 Seconds
7		Automatic Answer Time	1 to 255 Seconds 0 : No Function	12 Seconds
8		Attendant Intercept (No Answer)	10 to 255 Seconds	20 Seconds
9		Master Group Hunt Timeout	10 to 255 Seconds	20 Seconds
10	1 to 12	PBX outgoing Specification Code	Dial : 4 digits or less	No Function
11	ATT 1 to 2	Overflow Transfer Minimum	0 : No Function 3 to 9 Lines	0 : No Function
12	ATT 1 to 2	Overflow Transfer Extension	Specify 1 EXT	No Function
13	Tenant A/B	ICM Call Mode	0 : Voice 1 : Tone	0 : Voice
14	Tenant A	External Paging Speakers	0 : No Zone Speaker 1 : 1 Zone Speaker 2 : 2 Zone Speakers 3 : 3 Zone Speakers	0 : No Zone Speaker
15		System Prefix	0 : Not Assigned 1 : Assigned	0 : Not Assigned
16		Automatic Pause Length	1 to 10 Seconds	5 Seconds
17		Timed Trunk Queuing Interval	1 to 20 Minutes	10 Minutes
18	ATT 1 to 2X Key 1 to 48	Attendant Key Assignment	Refer to 4.2.2.5	Refer to 4.2.2.5
19	ATT 1 to 2	Attendant EXT Assignment	Specify 1 EXT	ATT 1 : EXT 20 ATT 2 : EXT 21

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Table 4.1.2.5 Toll Restriction

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1	Toll Restriction GRP x EXT Toll Class 1 to 8 1 to 4	Toll Plan NO	Toll Plan NO 0 to 15	0 : No Function
2	Toll Plan No. X Condition 1 to 15 1 to 6	Toll Plan Table	Deny/Allow + Dial Table *6 0/1 0 to 50	0 : Deny (Mode) 00 * 6 : No Function
3	Dial Table NO X Table NO 1 to 50 1 to 10	Dial Table	Dial + Dial Table NO * 2 4 Digits 1 to 50	0 : No Function
4	Tenant X Area Code A/B	E&M Area Code Table	Office Group NO 0 to 4	0 : No Function
5	Tenant X Office GRP NO X Office Code A/B 1 to 4	E&M Office Group Table	Route Table NO 0 to 8	0 : No Function
6	Tenant X Area Code A/B	Area Code Table	Route Table NO 0 to 8	0 : No Function
7	Tenant X Office Code A/B	Office Code Table	Route Table NO 0 to 8	0 : No Function
8	Tenant X Office Group NO A/B 1 to 4	Override Office Code	Override Office Code 3 Digits (Office Code)	No Function
9	Condition X Hour 1 to 4 00 to 23	Time Schedule	0 : Time Zone A 1 : Time Zone B 2 : Time Zone C	A : 8:00 to 16:59 B : 17:00 to 22:59 C : 23:00 to 7:59
10	Tenant X Rout Table No X Time Zone A/B 1 to 8 0 to 2	Route Table	CD Outgoing Group * 4 0 to 7	0, 0, 0, 0 No Function
11	Tenant X CD Outgoing Group A/B 1 to 7	Delete Index Table	Delete Data Table NO 0 to 4	0 : No Function
12	Tenant X Delete Data Table NO A/B 1 to 4	Delete Data Table	Area Code 3 Digits	No Function
13	Tenant X CD Outgoing Group A/B 1 to 7	Additional Index Table	ADD Data Area/Office Table NO 0 to 5	0 : No Function
14	Additional Data Table NO X Area Code 1 to 5	Additional Data Area Table	Prefix + Additional Table NO 0/1 1 to 10	0 : No Prefix 0 : No Function
15	Additional Data Table NO X Office Code 1 to 5	Additional Data Office Table	Prefix + Additional Table NO 0/1 1 to 10	0 : No Prefix 0 : No Function
16	Additional Table NO 1 to 10	Additional Table	Additional Flag + Dial 0/1 18 Digits or less	0 : No Function 0 : No Function
17	Tenant X Specification NO A/B 1 to 3	Specific Code Table	CD Outgoing Group 1 to 7	0 : No Function
18	Tenant X Table NO A/B 1 to 10	Equal Access Code Table	Dial 18 Digits or less	0 : No Function
19	Tenant X Table NO A/B 1 to 10	Equal Access Pin Code Table	Dial 8 Digits or less	0 : No Function
20	Tenant X Table NO A/B 1 to 10	Equal Access Pin Code Timing Table	0 : After Equal Access Code 1 : After Subscriber Code	0 : After Equal Access Code
21	Tenant X Table NO A/B 1 to 10	Equal Access Prefix Information	0 : Not Assigned 1 : Assigned	0 : No Necessity
22	CD X Table NO 1 to 16 1 to 10	Equal Access Toll Group	Toll Restriction Group 5 to 8 0 : No Function	0 : No Function

Table 4.1.2.6 Speed Dial

Item	Number	Data	Boundary	Default
1	Tenant X System Speed Dial NO A/B 0 to 99	System Speed Dial	Dial 16 digits or less	No Function
2	Tenant X System Speed Dial NO A/B 0 to 99	System Speed Dial Invisible	0 : No Attributes 1 : With Attributes	0 : No Attribution
3	EXT X Station Speed Dial NO 20 to 67 1 to 10	Station Speed Dial	Dial 16 digits or less	No Function

Table 4.1.2.2 Line Specification

Item	Number	Data	Boundary	Default
1	CO 1 to 16 ICM 1 to 8	Line Class	0: DDD (MF) 1: FX (MF) 2: PBX (MF) 3: E&M (MF) 4: WATS (MF) outward 5: WATS inward 8: DDD (DPI) 9: FX (DPI) 10: PBX (DPI) 11: E&M (SF) 12: WATS (DPI) outward 16: ICM (Ordinary) 17: ICM (ATT Dedicated) 18: ICM (Hot Line)	CO 0: DDD (MF) ICM 16: ICM (Ordinary)
2	CO 1 to 16 ICM 1 to 8	Tenant Group	0: Tenant A 1: Tenant B 2: Tenant A & B (Only ICM)	0: Tenant A
3	CO 1 to 16	Universal Night Assignment	0: Not Assigned 1: Assigned	1: Assigned
4	CO 1 to 16	Automatic Night Assignment	Each EXT	EXT: 20 Assigned
5	CO 1 to 16	Outgoing Level	0 to 4 level	0 Level
6	CO 1 to 16	Toll-Restriction Group	0: No Toll Restriction 1 to 4 group	0: No Toll Restriction
7	CO 1 to 16	Flash Signal Interval	1 to 20 * 100 ms	700 ms
8	CO 1 to 16	Prefix Dial	0: Not Assigned 1: Assigned	1: Assigned
9	CO 1 to 16	Disconnect Signal	0: No Reception 1: With Disconnect Signal	1: With Disconnect Signal
10	CO 1 to 16	COL Attendant Intercept	0: Not Assigned 1: Assigned	0: Not Assigned
11	CO 1 to 16	Individual Incoming Extension	Each EXT	EXT: 20 Assigned
12	CO 1 to 16	CO Outgoing Group	0: Not Assigned 1 to 7 group	Co Group 1
13	CO 1 to 16	E&M Wink/Delay DT Flag	0: Not Assigned 1: Assigned	0: Not Assigned

Table 4.1.2.3 Group Data

Item	Number	Data	Boundary	Default
1	Master Group X Priority 1 to 4 1 to 48	ICM Master Hunt Group	One EXT with priority	No Function
2	Call Group 1 to 4	ICM Group Call	Each EXT	All EXTs Assigned
3	Pickup Group 1 to 4	Pickup Group	Each EXT	All EXTs Assigned

Table 4.1.2.4 SCDR

Item	Number	Data	Boundary	Default
1		Print Out CO	Specify CO to be output	All COs Output
2		Print Out Extensions	Specify EXT to be output	All EXTs Output
3		Print Out Minimum Time	0 : No restrictions 1 to 30	0 : No restrictions
4		Print Out Incoming	0 : Output 1 : No Output	0 : Output
5		Print Out Calls with Account Code	0 : No restrictions 1 : Outgoing calls with account code input and all incoming calls 2 : Incoming calls with account code input and all outgoing calls 3 : Only calls with account code	0 : No restrictions
6		Print Out Toll Calls	0 : Output 1 : Toll calls only (outgoing calls)	0 : Output

Table 4.1.2.7 Station Class-of-Services

Item	Number	Data	Boundary	Default
1		Tenant Group B	Each EXT	Tenant A
2		Secretary Attribution	Each EXT	No Attribution
3		Protected Attribution	Each EXT	No Attribution
4		Executive Attribution	Each EXT	No Attribution
5		Versaphone Attribution	Each EXT	No Attribution
6		Busy Call Forward	Each EXT	Call Forward
7		Message Attribution	Each EXT	Attribution
8		Quick Mode Deny	Each EXT	Allow
9		Off-Hook Signal Deny	Each EXT	Allow
10		Off-Hook All Call Deny	Each EXT	Allow
11		All Call Deny	Each EXT	Allow
12		Hold Recall Deny	Each EXT	Allow
13		Speed Dial Access Deny	Each EXT	Allow
14		Toll Speed Dial Access Deny	Each EXT	Allow
15		CO Automatic Answer Deny	Each EXT	Allow
16		ICM Automatic Answer Deny	Each EXT	Allow
17		Paging Call Access Deny	Each EXT	Allow
18		Call Forward Deny	Each EXT	Allow
19		Do Not Disturb Deny	Each EXT	Allow
20		Optimized Call Routing Access Deny	Each EXT	Allow
21		Equal/SCC Access Deny	Each EXT	Allow
22	EXT 20 to 67	Toll Dial Class of Restriction	0 : No Function 1 to 4 class	0 : No Function
23	EXT 20 to 67	CO Outgoing Level	0 to 4 level	0 level
24	EXT 20 to 67	Route Advance Step	0 to 3 step	0 step
25	EXT 20 to 67	Pickup Restriction	Each CO	No Function
26	EXT × Key NO 20 to 67 1 to 23	KT Key Assignment	Refer to 4.2.2.5	Refer to 4.2.2.5
27	EXT 20 to 67	Personal ID Code	0 to 9 : 3 digits	Null Code

Table 4.1.2.8 Clock and Calendar

Item	Number	Data	Boundary	Default
1		Clock	00 to 23 (hour) 00 to 59 (minute)	
2		Calendar	00 to 99 (year) 01 to 12 (month) 01 to 31 (day) 1 to 7 (day of week) (sunday) to (saturday)	
3		Daylight Save Time	0 : No 1 : Yes	1 : Yes
4	NO 1 to 20	Holiday List	01 to 12 (month) 01 to 31 (day)	0 : No Function

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4.2 GENERAL DESCRIPTION OF PROGRAMMING

4.2.1 System Programming Terminal

When the mode changes from Ordinary Mode to Programming Mode, the functions of the Attendant Console keys all change and the Attendant Console becomes a System Programming Terminal. In Programming Mode, the operator is notified with the following when changing states or items:

- Key lamps
- LCD indications
- Prompts

These are described in this section.

4.2.1.1 Key Assignments of Terminal

The assignments of System Programming Terminal's Function Keys are as follows:

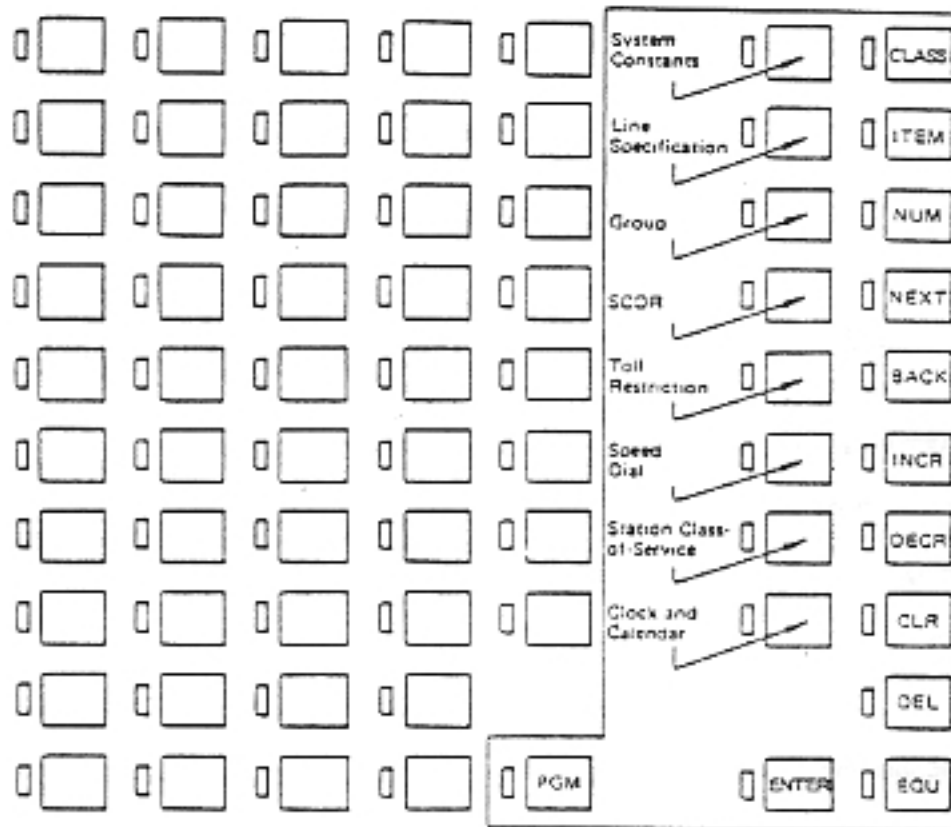


Figure 4.2.1.1.1 Function Keys

Keys that are not Function Keys are Input Data Keys.

The assignments of Input Data Keys differ according to data; Keys are assigned the following functions:

- EXT Keys
- CO and ICM Keys
- Ten-Key Pad (Note)

The patterns are as follows:

Note: In addition to numbers 0 to 9 and characters * and #, the ten-key on the System Programming terminal includes **PAUSE** and **NULL**.

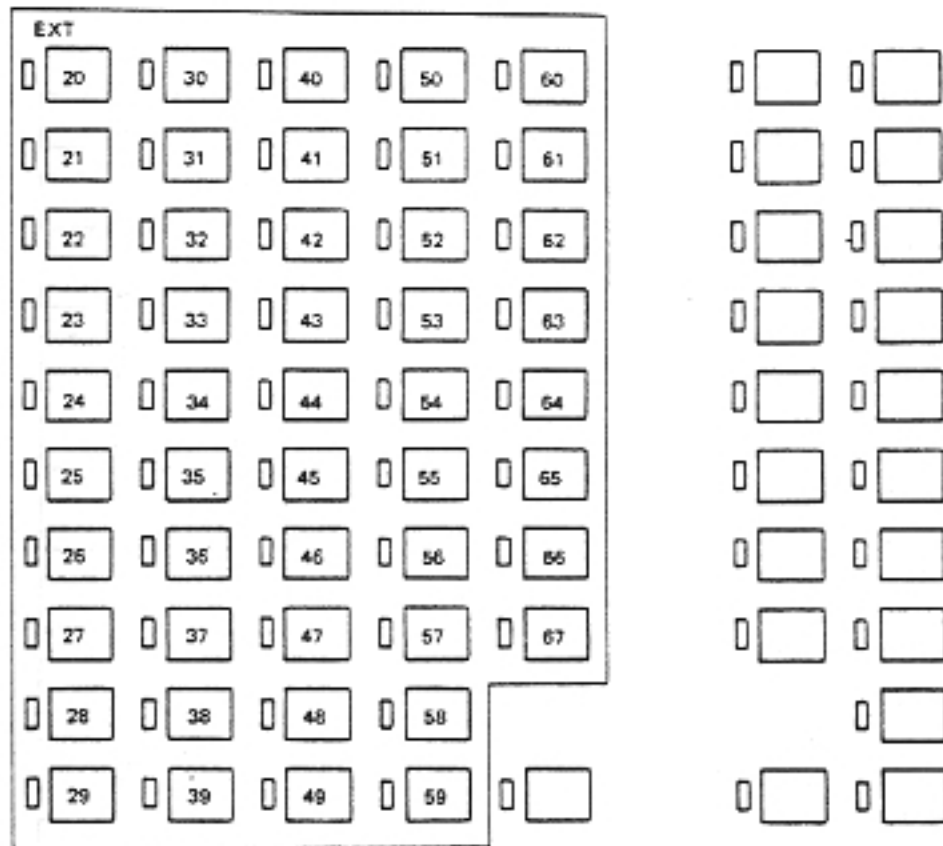


Figure 4.2.1.1.2 EXT Keys

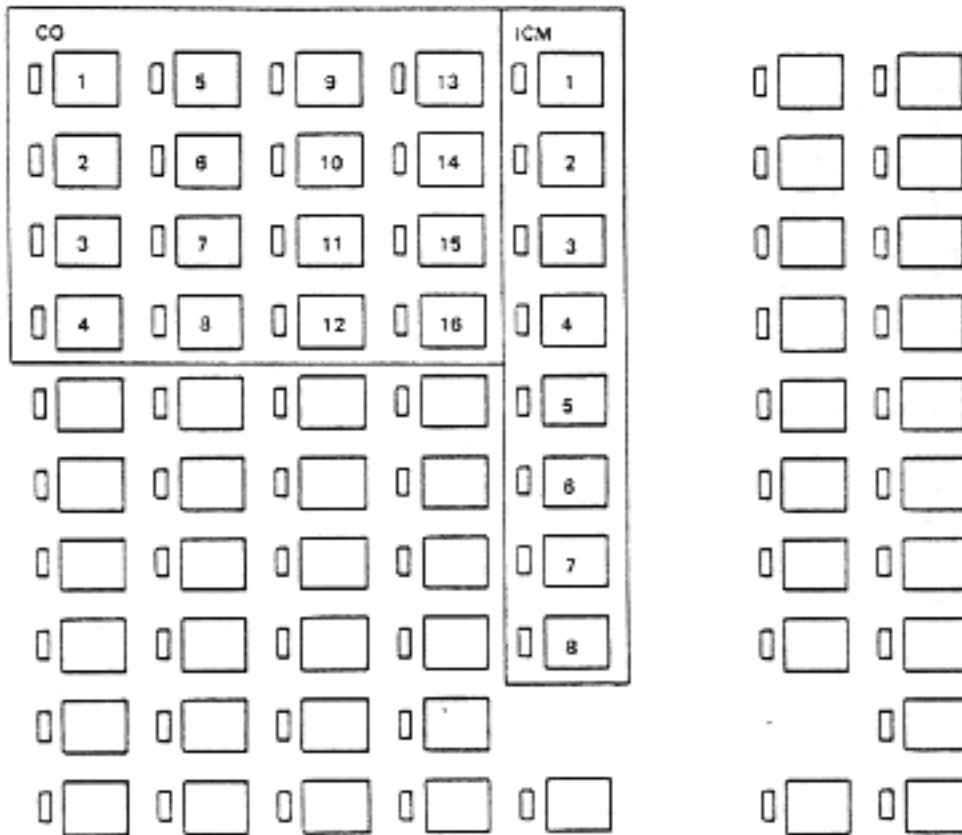


Figure 4.2.1.1.3 CO and ICM Keys

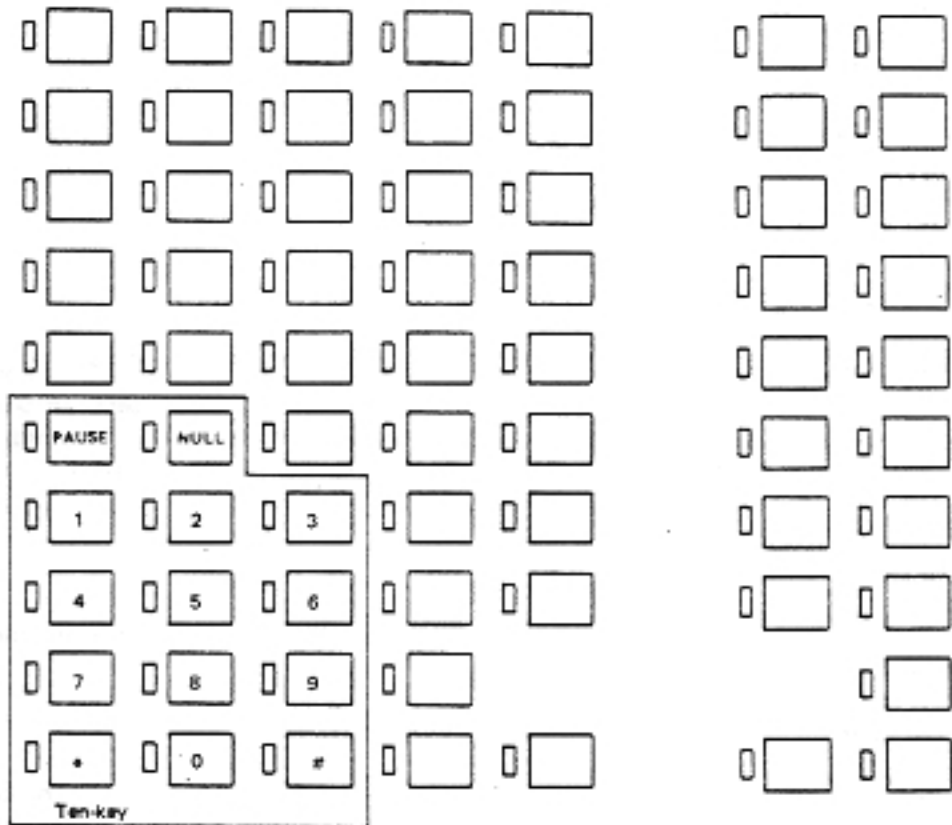


Figure 4.2.1.1.4 Ten-Key

4.2.1.2 LCD Indications

In Programming Mode, the display shows the contents of data, input prompts, and input data. The operator can check programming operation on the display. The content of the display is changed by depressing the keys. The display is changed under the following conditions:

- When displaying the input prompt:

Input prompt is displayed when the **CLASS**, **ITEM**, or **PGM** key is depressed.

CLASS "Select Class Key"

ITEM "Enter Item"

PGM "Enter Password"

- When the content of data changes:

The display content changes when the **NEXT**, **BACK**, **INCR**, or **DECR** key is depressed. When the **NUM** key is depressed, the number display is cleared and numbers can be entered. When the **DEL** key is depressed, one character at the right end of the data display is cleared. When new data is entered, the data display is cleared and the new data is displayed.

4.2.1.3 Key Lamp Indications

Key assignments for entering data were described in Section 4.2.1.1. In this section, the functions of key lamps are described.

1) Function key lamps

Function keys are used depending on the state. When a function key is available, the key lamps light, when it is not available, the key lamps go out. The following table shows the availability of function keys according to state.

Table 4.2.1.3 Available Function Keys

○ : Lit

Key \ States	Class	Item	Number	Data
System Constants	○			
Line Specification	○			
Group	○	The key lamps of the eight class keys are always blinking when entering data of the specified class. The blinking of the key indicates the class being entered and does not mean that the key is available.		
SCDR	○			
Toll Restriction	○			
Speed Dial	○			
Station Class-of-Service	○			
Clock and Calendar	○			
ENTER				○
PGM	○			
CLASS				○
ITEM		○		○
NUM			○	○
NEXT				○
BACK				○
INCR				○
DECR				○
CLR				○
DEL				○
EQU				○

In Data State, the Function Key lamps show the keys that can be used for the data item. The following describes the key lamps go out.

- The **NUM** key lamp goes out when there is no number in the specified setting.
- The **NEXT** key lamp goes out when the Item Number of the specified setting is maximum.
- The **BACK** key lamp goes out when the Item Number of the specified setting is minimum.

- d) The **INCR**, **DECR** and **EQU** key lamps go out when there are no numbers in the specified setting.
- e) The **INCR** key lamp goes out when the Number of the specified setting is maximum.
- f) The **DECR** and **EQU** key lamps go out when the Number of the specified setting is minimum. The **EQU** key lamp goes out when the data of the previous Number is not valid for the current setting or the data format is different from the previous Number.
- g) The **DEL** key lamp goes out when the data displayed on the LCD are all cleared or the data is not displayed on the LCD.

2) Input data key lamps

The Input Data key lamps also light when the keys are available and go out when they are not available.

With some data, the key lamp of Input Data Keys changes when the key is depressed. This occurs when data is displayed on the Input Data Key Lamps. In such cases, a key lamp lights when there is not set and blinks when there is set.

When data is entered for such a setting, the key lamp blinks after the key is pressed if it was lit and stays on if it was depressed when it was blinking. Input Data keys light when the **CLR** key is depressed.

The following describes how to display data on Input Data Key Lamps:

- o System Constants
 - Overflow Transfer Extension (Item 12)
 - Attendant Key Assignment (Item 18)
 - Attendant EXT Assignment (Item 19)
- o Line Specification
 - Automatic Night Assignment (Item 4)
 - Individual Incoming Extension (Item 11)
- o Group (Items 1 to 3)
- o SCDR
 - Print Out CO (Item 1)
 - Print Out Extensions (Item 2)
- o Station Class-of-Service
 - Tenant Group B (Item 1)
 - Secretary Attribution (Item 2)
 - Protected Attribution (Item 3)
 - Executive Attribution (Item 4)
 - Versaphone Attribution (Item 5)
 - Busy Call Forward (Item 6)
 - Message Attribution (Item 7)
 - Quick Mode Attribution (Item 8)
 - Off-Hook Signal Deny (Item 9)

4.2.2.1 Searching for Data

The **NEXT** and **BACK** Function Keys are useful when searching for items or verifying the content after selecting the data class.

The **NEXT** and **BACK** keys change the item in the class. The **NEXT** key changes to larger items and the **BACK** key changes to smaller items.

Example: When the **NEXT** key is depressed while the Hold Timeout (Item 1) data is displayed on the LCD, as shown in Figure 4.2.2.1.1 in System Constants Class, the display changes to the Sender Timeout setting, shown in Figure 4.2.2.1.2, which is the next item.

Hold Timeout (seconds)	130
--------------------------	-----

Figure 4.2.2.1.1

Sender Timeout (seconds)	20
----------------------------	----

Figure 4.2.2.1.2

The display returns to Figure 4.2.2.1.1 when the **BACK** is depressed while Figure 4.2.2.1.2 is displayed.

The **INCR** and **DECR** keys change the Number within items in the same manner as the **NEXT** and **BACK** keys change items within a Class. These keys allow the display to be changed within the range of Numbers within an item and enable to verify the data.

Example: When the **INCR** key is depressed while data for EXT 25 is displayed, as shown in Figure 4.2.2.1.3, when setting the Toll Dial Class of Restriction (Item 22) of Station Class-of-Service Class, the data changes to the next Number, EXT 26, as shown in Figure 4.2.2.1.4.

The image shows a rectangular LCD display with a grid of small squares. The text displayed is '<EXT25> 22. Toll Dial C.O.R 0'. The characters are spaced out across the grid.

Figure 4.2.2.1.3

The image shows a rectangular LCD display with a grid of small squares. The text displayed is '<EXT26> 22. Toll Dial C.O.R 0'. The characters are spaced out across the grid.

Figure 4.2.2.1.4

The display returns to Figure 4.2.2.1.3 if the **DECR** key is depressed while Figure 4.2.2.1.4 is displayed.

4.2.2.2 Modifying Data

When an incorrect data is entered, it can be canceled. Also a portion of displayed data can be changed. The method of modification differs according to the data displayed. The following are modification examples according to data display.

1) When data is displayed on LCD

Data is displayed on the LCD when it is entered. To cancel the "4" in Figure 4.2.2.2.1, just depress the **DEL** key. The display changes to Figure 4.2.2.2.2 and new data can be reentered.

The image shows a rectangular LCD display with a grid of small squares. The text displayed is 'Hold Timeout (seconds) 124'. The characters are spaced out across the grid.

Figure 4.2.2.2.1

- Off-Hook All-Call Deny (Item 10)
- All-Call Deny (Item 11)
- Hold Recall Deny (Item 12)
- Speed Dial Access Deny (Item 13)
- Toll Speed Dial Access Deny (Item 14)
- CO Auto-Answer Deny (Item 14)
- ICM Auto-Answer Deny (Item 15)
- Paging Call Access Deny (Item 16)
- Call Forward Deny (Item 17)
- Do not Disturb Deny (Item 18)
- Optimized Call Routing Access Deny (Item 20)
- Equal/SCC Access Deny (Item 21)
- Pickup Restriction (Item 25)
- KT Key Assignment (Item 26)

3) Blinking of lamp when Function Key is depressed

The **ENTER** key lamp blinks for 1 second when the input data is valid and is registered. This enables the operator to verify registration.

4.2.1.4 Prompts

A prompt is voice information service. It either tells the operator the next operation or is a response to an operation just performed. A prompt is issued from the Attendant KT speaker when VSCU-M, Feature Package is installed. The operator should perform the following upon receiving a prompt:

- a) "Enter Password"
Enter password "428" and return to Ordinary Mode.
- b) "Enter Class"
Select class and depress the key.
- c) "Enter Item"
Enter the item number.
- d) "Enter Number"
Enter the specified number.
- e) "Enter Data" or "Illegal Data"
Enter data to be input.
- f) "Accepted"
Go to next operation.

The execution of a function when a Function Key is depressed is verified with the Confirmation Tone for Attendant issued from the Programming Terminal. A tone is issued when the **NEXT** , **BACK** , **INCR** , **DECR** , **CLR** , **DEL** , or **EQU** key is depressed.

4.2.2 How to Program

System data is input as follows:

- 1) Specify class to be input.
- 2) Specify item to be input. Specify Number if the item has Numbers.
- 3) Enter data with the specified data key.
- 4) Depress **ENTER** to register the data.

A single item may be input in this way. If there are many items to be input, however, this method is not very efficient. In such cases, the Function Keys should be used. This section describes the use of Function Keys for such purposes.

Hold Timeout (seconds) 12

Figure 4.2.2.2

The **DEL** key is depressed as many times as there are displayed digits to cancel the numbers. This function can be used to cancel part of a number and reenter new digits.

To change the SCC Office Code data "0P52019558500" shown in Figure 4.2.2.3 to "0P52019558589", depress the **DEL** key twice to change the display to Figure 4.2.2.4 and reenter the last two digits.

1. SPD<TNT A-90> 0P52019558500

Figure 4.2.2.3

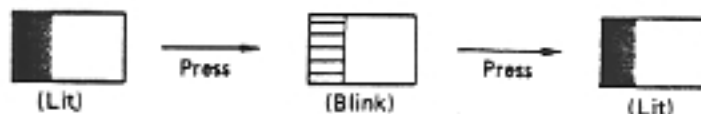
1. SPD<TNT A-90> 0P520195585

Figure 4.2.2.4

2) When displaying data on Input Data Key lamps

When an incorrect Input Data Key is depressed, just depress the key again to return to the previous data indication.

A key lamp that is lit changes to blinking when depressed once and back to steadily lit when depressed again. See Figure 4.2.2.3.4.



See and Not See of data are indicated by blinking and lighting of the key lamps.

Data is changed by depressing a key and changing the status of the key lamp.

For some items, if an error is made, the key need not be depressed once again. The previous key lamp lights (not set) automatically when a new key is depressed.

4.2.2.3 Deletion of Data

Data on the display can be cleared by depressing the Clear key. When the data is indicated on the display,

1) Data indication on the Display

When the **CLR** key is depressed while the Speed Dial Class is Station Speed Dial,

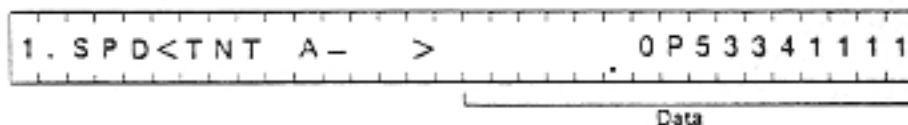


Figure 4.2.2.3.1

is displayed, then the following initial value (no function) is displayed.

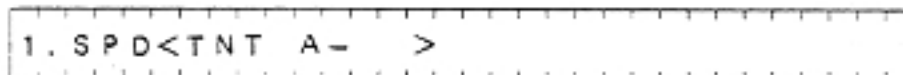


Figure 4.2.2.3.2

For a setting that displays data on the LCD, clear the data with the **DEL** key and register. This is the same as depressing the **CLR** key.

2) Data indication on the Input Data Key lamps.

All the Input Data Key lamps light (not set) even when data is blinking (set):
Some items differ from the default.

For example, when the **CLR** key is depressed while the data-indication is for SCDR Data Class Print Out CO default data, as in Figure 4.2.2.3.3, the data indication is as shown in Figure 4.2.2.3.4.

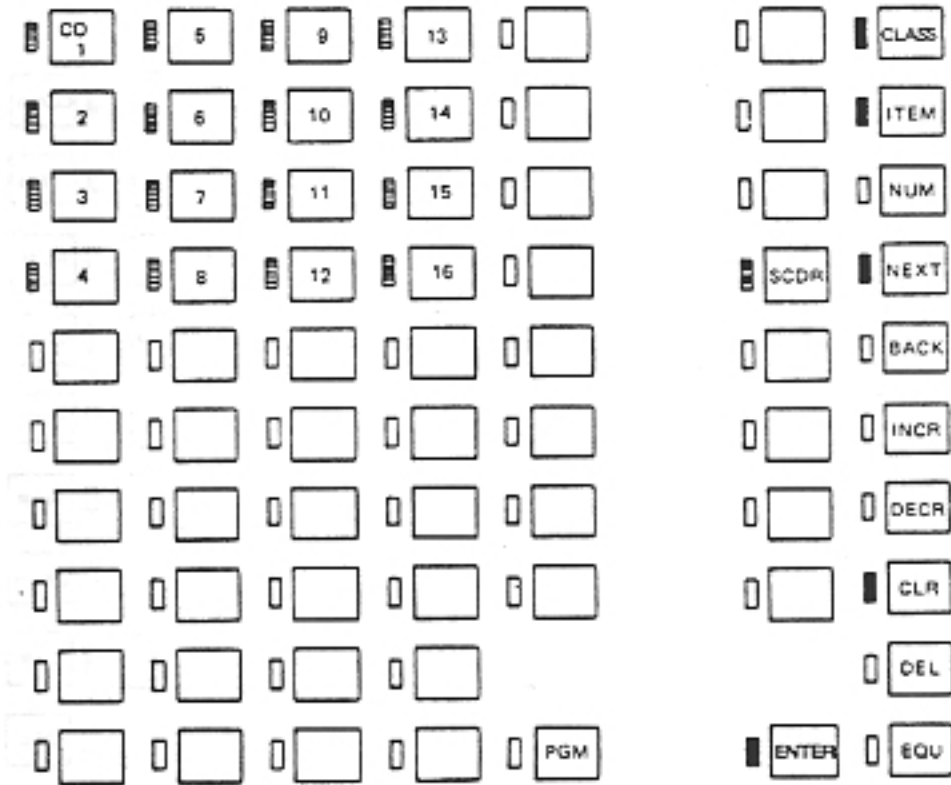


Figure 4.2.2.3.3

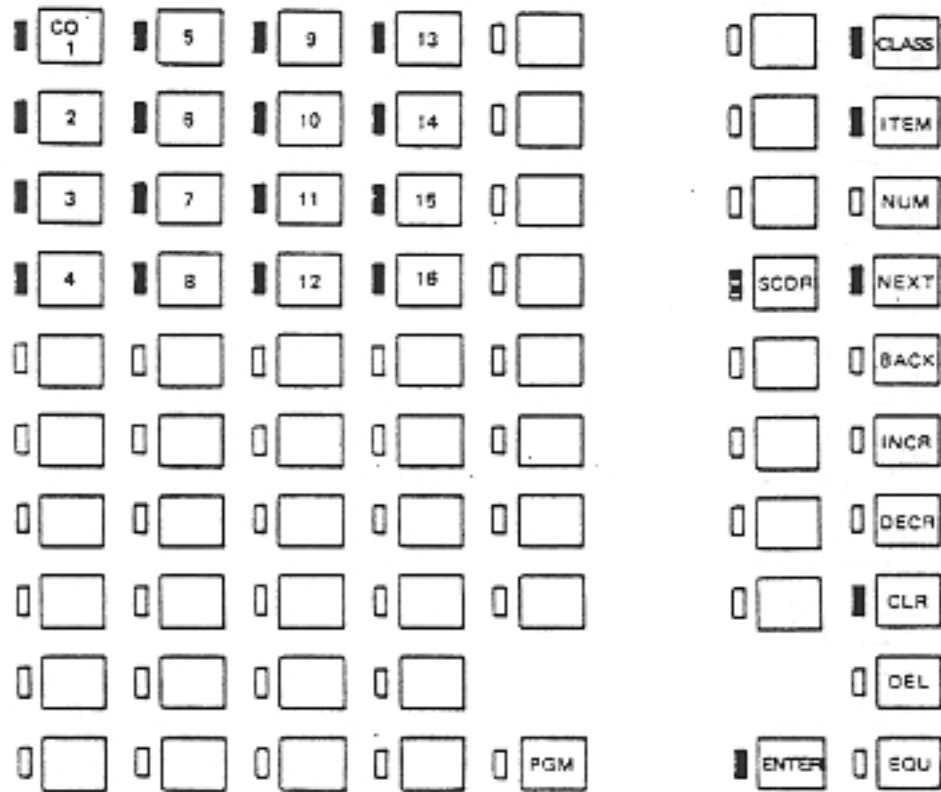


Figure 4.2.2.3.4

4.2.2.4 Modifying Data in Sequence

For items with Numbers, the same data can be input continuously. Also, Numbers can be kept constant while item is changed.

1) Registering the same data continuously

For example, to enter the Line Class (Item 1) of Line Specification Class, proceed as follows:

Depress the **INCR** key when the data for CO 2 is as shown in Figure 4.2.2.4.1 to display CO 3, shown in Figure 4.2.2.4.2.

Then depress the **EQU** key to display the CO 2 data (Figure 4.2.2.4.3).

Repeat this operation to continuously register the same data.

```
<CO 2> Line Class 1
```

Figure 4.2.2.4.1

```
<CO 3> Line Class 0
```

Figure 4.2.2.4.2

```
<CO 3> Line Class 1
```

Figure 4.2.2.4.3

2) Registering the same Number while changing the item

Some Numbers are common among items as with Line Specification. With Class, the items can be changed without changing the Number. For example, if the **NEXT** key is depressed when setting Line Class (Figure 4.2.2.4.4), the item changes to Tenant Group (Figure 4.2.2.4.5) but the Number, CO 1, does not change.

The same Number for each item can be easily entered in this manner.

This method can be applied to Line Specification and Station Class of service.

```
<CO 1> Line Class 0
```

Figure 4.2.2.4.4

```
<CO 1> Tenant Group 0
```

Figure 4.2.2.4.5

If the Number changes when **NEXT** or **BACK** is depressed, then there is not the same Number as next or previous item.

Example: For Line Specification Class Tenant Group setting, if the **NEXT** key is depressed when the Number is ICM 2 (Figure 4.2.2.4.6), the display changes to Universal Night Assignment setting (Figure 4.2.2.4.7); for this setting, however, the Numbers are from CO 1 to 16 and there is no ICM, so the data for CO 1 is displayed.

```
<ICM2> Tenant Group 0
```

Figure 4.2.2.4.6

```
<CO 1> Universal Night Assign 1
```

Figure 4.2.2.4.7

4.2.2.5 Key Assignment

Keys on a key telephone or Versa Phone and DSS keys on an Attendant can be freely assigned by setting from the programming terminal.

4.2.2.5.1 Key Telephone/Versa Phone Key Assignment

- 1) Table 4.2.2.5.1.A shows the keys that can be assigned to a key telephone or Versa Phone and their corresponding key code numbers used for setting.
- 2) The ICM and FEAT keys are fixed keys.
- 3) When assigning the PAGE (Press Page) key, the key position is fixed to Key No. 6. It cannot be assigned to a key in another position.
- 4) Setting is made by Class 7 Station Class of Service Item 27 key telephone Key Assignment.
- 5) Figure 4.2.2.5.1.A and 4.2.2.5.1.B show the default key assignment for key telephones and Versa Phones respectively.

Table 4.2.2.5.1.A

Key Message	Key	Key Code No.
ADD	Add On Conference Key	00
FLSH	Flash Key	01
FWD	Call Forward Key	02
HOLD	Hold/DND Key	03
MSG	Message Key	04
PARK	Call Park Key	05
SPKR	Speaker Key	06
TRN	Transfer Key	07
P. PAG	Press Page Key	08
CO nn	Direct COL Key	1
FLT	Floating COL Group Access Key	20
FLT 1	Floating COL Group 1 Direct Access Key	21
FLT 2	Floating COL Group 2 Direct Access Key	22
FLT 3	Floating COL Group 3 Direct Access Key	23
FLT 4	Floating COL Group 4 Direct Access Key	24
FLT 5	Floating COL Group 5 Direct Access Key	25
FLT 6	Floating COL Group 6 Direct Access Key	26
FLT 7	Floating COL Group 7 Direct Access Key	27
OPT	Optimized Routing Access Key	28
DSS mm	Direct Station Select Key	3
D. PAG n	Direct Page Key	4
HNT n	Direct Master Hunt Group Key	5
SPD nn	Direct Speed Dial Key	6
DSP	Display Key	70
CALC	Calculator Key	71

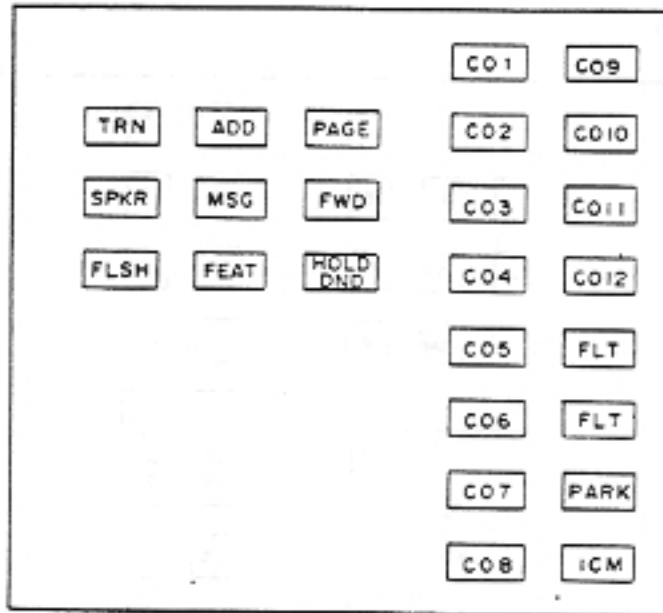


Figure 4.2.2.5.1.A KT Default Key Assignment

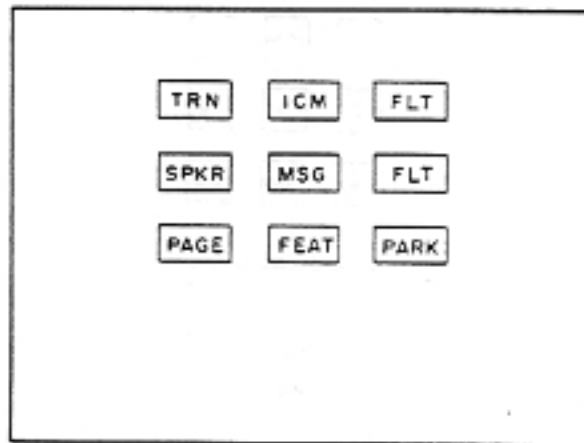


Figure 4.2.2.5.1.B VP Default Key Assignment

6) Key No. Positions on a key telephone and Versa Phones are shown in the following:

- KT key No. position

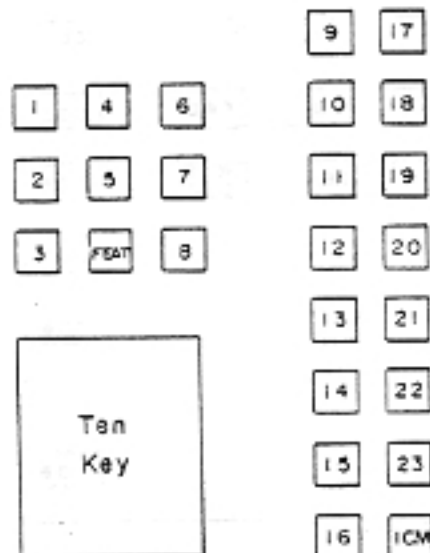


Figure 4.2.2.5.1.C

- Versa phone key No. position

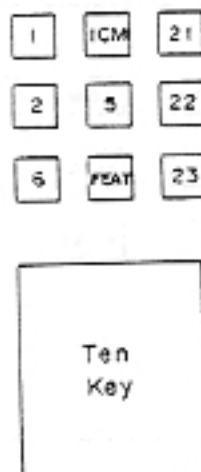


Figure 4.2.2.5.1.D

4.2.2.5.2 Attendant Key Assignment

1) Those keys that can be assigned to the DSS keys on an Attendant and their corresponding key code numbers used for setting are shown in the following:

- DSS mm Direct Station Select Key 3
- HNT n Direct Master Hunt Group Key 5
- SPD nn Direct Speed Dial Key 6

2) Setting is made by Class 1 System Constants Item 18 Attendant Key Assignment.
 3) Figure 4.2.2.5.2.A shows the Key Position numbers on the Attendant.
 4) Default DSS Key assignments on an Attendant are as shown below.

- Keys 1 to 48, DSS #20 to #67

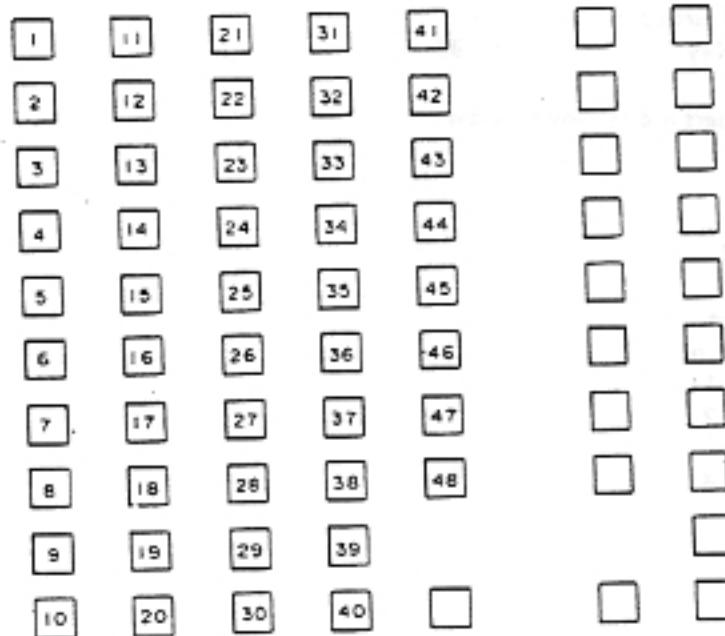


Figure 4.2.2.5.2.A

4.2.2.5.3 Key Assignment Method

Assignment of key telephone, Versa Phone, and DSS keys on an Attendant are made in the following manner.

- 1) Specify the Extension or Attendant number.
- 2) Specify the key position.

Key telephone, Versa Phone:	Refer to section 4.2.2.5.1 6)
Attendant:	Refer to section 4.2.2.4.2 4)
- 3) Depress **Clear** key to clear the present key assignments.
- 4) Input the key code number of the key to be assigned for the ten keys of the Input Data Keys.

Key telephone, Versa Phone:	Refer to section 4.2.2.5.1 1)
Attendant:	Refer to section 4.2.2.5.2 2)
- 5) Input various numbers for the assigned keys, if necessary.

Direct COL Key	CO 1 to CO 16
Direct Station Select	EXT20 to EXT67
Direct Page Key	0 to 9
Direct Master Hunt Group Key	1 to 4
Direct Speed Dial Key	00 to 99

Direct Paging numbers are as shown below:

0	All
1	Zone 1
2	Zone 2
3	Zone 3
4	All Zone
5	All Group
6	Group 1
7	Group 2
8	Group 3
9	Group 4

4.2.2.5.3.1 Explained in the following are some examples of actual key assignment procedures.

- a. Assignment of the ADD key (MSG → ADD)

```
<EXT 20 - Key 5> Key Assign MSG
```

1. Depress the **CLR** key.
Key Message on the display is cleared.

```
<EXT 20 - Key 5> Key Assign
```

2. Depress the ten key **0** of the Input Data Keys.
0 appears on the display.

```
<EXT 20 - Key 5> Key Assign 0
```

3. Depress the ten key **0** of the Input Data Keys.
Key Message ADD appears on the display.

```
<EXT 20 - Key 5> Key Assign ADD
```

4. Depress the **ENTER** key.
Registration has been completed.

- b. Key assignment of SPD (Speed Dial) #37. (CO #1 → SPD #37)

```
<EXT 20-Key 9> Key Assign COL
```

1. Depress the **CLR** key.
Key Message on the display is cleared.

```
<EXT 20-Key 9> Key Assign
```

2. Depress the ten key **6** of the Input Data Keys.
Key Message SPD appears on the display.

```
<EXT 20-Key 9> Key Assign SPD
```

3. Depress the ten keys **3** and **7** of the Input Data Keys to register Speed Dial #37.

```
<EXT 20-Key 9> Key Assign SPD 37
```

4. Depress the **ENTER** key.
Registration has been completed.

- c. Key assignment of DSS (Direct Station Select) #25. (CO #1 → DSS #25)

<EXT 20- Key 9> Key Assign COL

1. Depress the **CLR** key.
Key Message on the display is cleared.

<EXT 20- Key 9> Key Assign

2. Depress the ten key **3** of the Input Data Keys.
Key Message DSS appears on the display.

<EXT 20- Key 9> Key Assign DSS

3. Depress the extension key **25** of the Input Data Keys to register DSS #25.
Extension #25 lamp blinks.
4. Depress the **ENTER** key.
Registration has been completed.

- d. Changing the key assignment from DSS #25 to DSS #35.

```
<EXT20-KEY 15> Key Assign DSS
```

1. Depress the extension key **35** of the Input Data Keys. Extension #25 lamp changes from flashing to steady lighting and extension #35 lamp begins flashing.
2. Depress the **ENTER** key.
Registration has been completed.

- e. Changing the key assignment from SPD #07 to SPD #91.

```
<EXT20-KEY 15> Key Assign SPD 07
```

1. Depress the ten key **9** of the Input Data Keys.
The display changes into the following:

```
<EXT20-KEY 15> Key Assign SPD 9
```

2. Depress the ten key **1** of the Input Data Keys.

```
<EXT20-KEY 15> Key Assign SPD 91
```

3. Depress the **ENTER** key.
Registration has been completed.

4.2.2.5.4 Restriction on key assignments

1. No duplicated assignment of the following keys are permitted.
When changing these key assignments, clear the preset key assignment first, and then make a new assignment once.

ADD	Add on Conference Key
FLSH	Flash Key
FWD	Call Forward Key
HOLD	Hold/DND Key
MSG	Message Key
PARK	Call Park Key
SPKR	Speaker Key
TRN	Transfer Key
P. PAG	Place Page Key
COL nn	Direct COL keys on stations which terminate a COL No. nn
DSS mm	Direct station select keys on stations which terminate a DSS No. mm.

4.2.2.6 Optimized Call Routing

4.2.2.6.1 General Description

This feature analyzes dial data related to CO access, and seizes the lowest-cost CO/PBX Line in accordance with traffic and time at the moment of CO access. In the case of a tie line, for example, a special code may be added or the unnecessary area code deleted to adapt the CO access dial to the optimum CO/PBX Line. Because the optimum CO/PBX Line depends on traffic at the time of CO access, there may be up to four groups of CO/PBX Lines that can be seized to raise the probability of seizure. The system can automatically select the optimum CO/PBX Line in these groups. All extensions may use this selective feature, with different groups within which the optimum line is selected being assigned to extensions according to the positions of extension users. This group assignment can be made as described in No. (24) "Route Advance Step" in the Station Class of Service for KT/VP, and single line telephones of paragraph 3.3.2, System Planning.

This feature also enables the user to effect a rational toll restriction, suited to the desired toll plan, by means of floating toll restriction.

4.2.2.6.2 Basic Operation of Optimized Call Routing

The basic operation of optimized call routing is described below.

Note: Understanding the basic operation of optimized call routing helps the installer in preparing plans because the functions and uses of many assignment tables used in planning are described in detail in this paragraph. Never attempt planning without understanding this paragraph.

1. The subscriber presses the OPT key on the extension, or dials the optimized routing special number, 90. (The extension used by this subscriber must have "allow." assigned for Optimized Call Routing.)
2. The subscriber then dials the telephone number of the opposite party. (Depending on the area, the prefix code 1 may have to be added before the area code or office code.)

3. From the area code and office code (or from only the office code if no area code is used), the CO group best suited to that time is selected from the registration location called the Route Table No. The process of selecting this CO group is described in detail by dial data type.

Example 1: Area code – Office code – Customer code

- (1) The dial data generated by the subscriber is analyzed according to the North American Dial Number Plan. The area code is first entered in the area called the input dial table (mentioned for purposes of explanation here, though it does not come up at the time of preparing the planning sheet), followed by the office code and customer code (subscriber number). This process is illustrated in Figure 4.2.2.6.2.1.

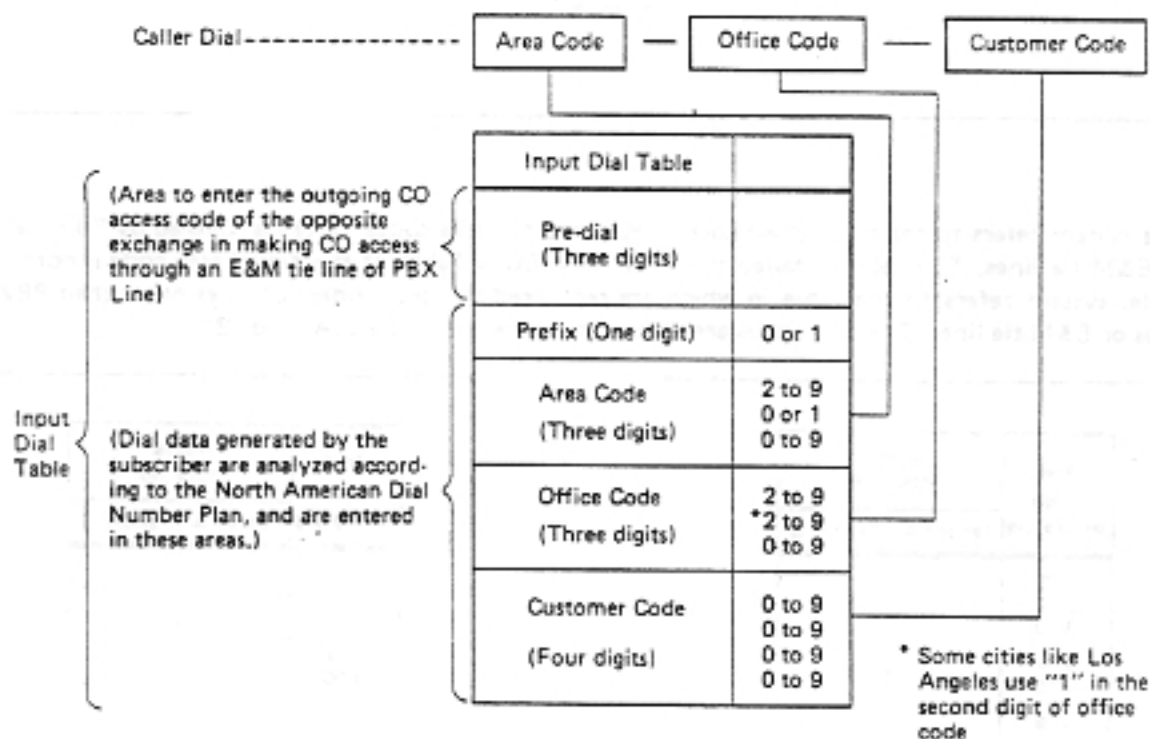
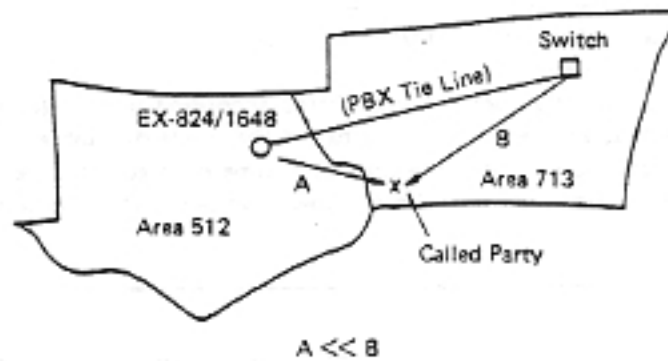


Figure 4.2.2.6.2.1 Entering Dial Data in Input Dial Table

If an E&M line or PBX Line is available between the areas to which these area codes are allocated and the EX-824/1648 system, Co access through the switch to which the tie line or PBX line is connected is generally considered cheaper. In a case such as shown below, however, calls not routed through the tie line cost less because the actual CO line length is shorter. It is necessary, therefore, to identify the geographic positions of office codes belonging to an area code.



- (2) The system refers to the table in which are registered the area codes for areas covered by PBX tie lines or E&M tie lines. This table is called the E&M Area Code Table. If the dialed area code is not in this table, system refers to the table in which are registered the area codes for lines other than PBX tie lines or E&M tie lines. The two tables are shown in Figures 4.2.2.6.2.2(A) and (B).

Area Code P1 P2 P3	Office Group No.	
	Tenant A	Tenant B
200		
219		
300		
319		
400		
419		
500		
519		
~		
700		
719		
800		
819		
900		
919		

Figure 4.2.2.6.2.2(A) E&M Area Code Table Format

Area Code P1 P2 P3	Route Table No.	
	Tenant A	Tenant B
200		
219		
300		
319		
400		
419		
500		
519		
~		
700		
719		
800		
819		
900		
919		

Figure 4.2.2.6.2.2(B) Area Code Table Format

Note: In the E&M Area Code Table, an E&M Office Group No. (not described in detail here because its meaning is classified in subsequent descriptions) must be registered for each of the area codes 200 to 919.

In the Area Code Table, a Route Table No. (not described in detail here because its meaning is clarified in subsequent descriptions) must be entered for each tenant and each of the area codes 200 to 919 (not necessarily consecutively). See Figure 4.2.2.6.2.2(B).

Both tables must be filled out during planning by the installer.

- (3) If the dialed area code is in the E&M Area Code Table (Figure 4.2.2.6.2.2 A), one of the tables called the E&M Office Group Tables, where PBX or E&M tie line office codes are entered in four groups, is selected according to the E&M Office Group No. registered for that area code and tenant. E&M Office Group Tables are shown in Figure 4.2.2.6.2.3.

Office Group No. 1			Office Group No. 2			Office Group No. 3			Office Group No. 4		
Office Code m m m	Route Table No.		Office Code m m m	Route Table No.		Office Code m m m	Route Table No.		Office Code m m m	Route Table No.	
	Tenant A	Tenant B		Tenant A	Tenant B		Tenant A	Tenant B		Tenant A	Tenant B
200			200			200			200		
201			201			201			201		
202			202			202			202		
203			203			203			203		
204			204			204			204		
205			205			205			205		
994			994			994			994		
995			995			995			995		
996			996			996			996		
997			997			997			997		
998			998			998			998		
999			999			999			999		

E&M Office Group Table

Figure 4.2.2.6.2.3 E&M Office Group Table Format

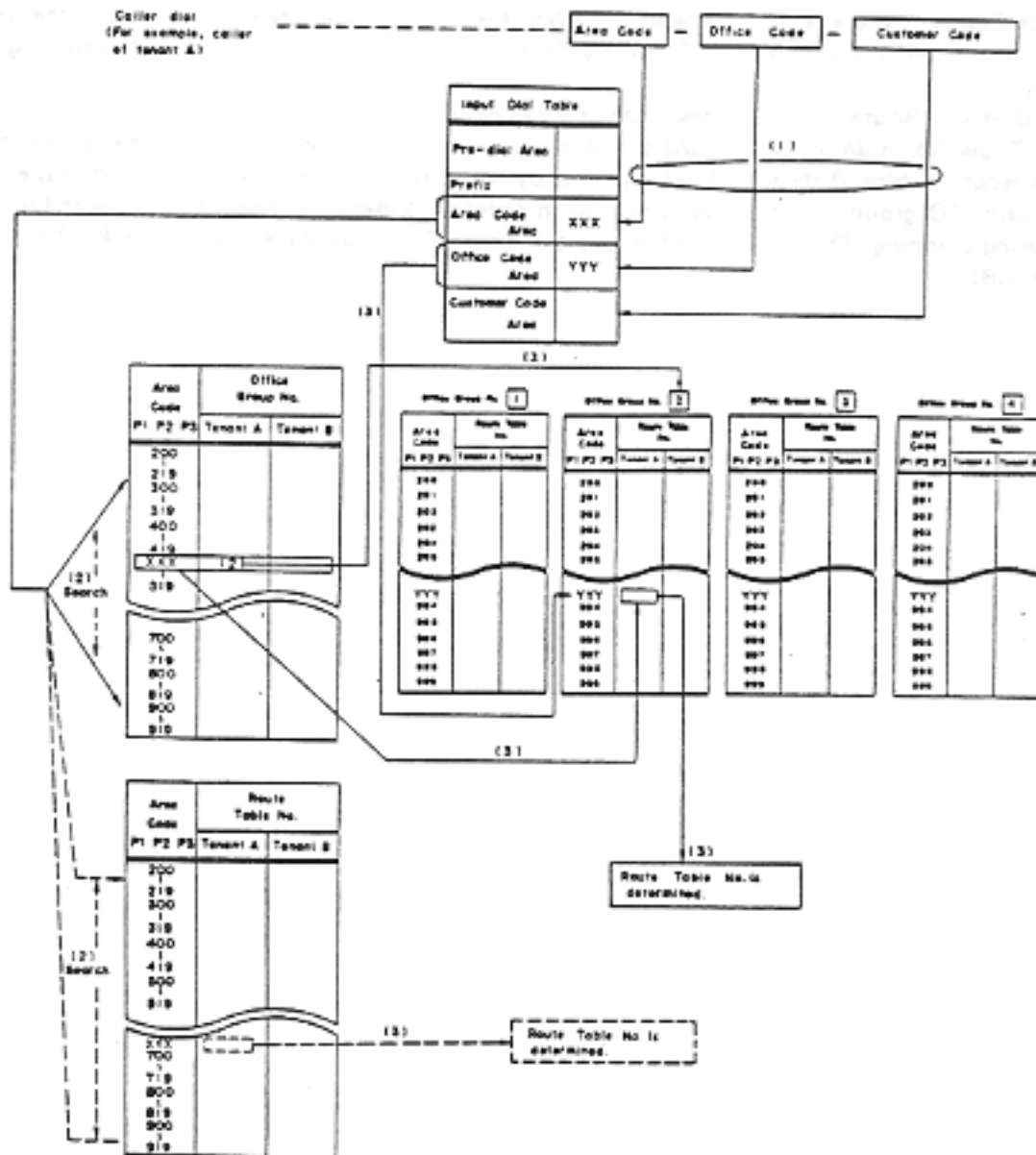
Note: In the E&M Office Group Tables, a Route Table No. must be registered for each of tenants A and B according to the office code (any codes from 200 through 999 can be registered consecutively) in the dial data. The reason that there are four E&M office groups is to make each E&M office group correspond to an E&M area code.

This table must also be filled out by the installer during planning.

The system refers to the office code registered in the selected E&M office group, and selects a Route Table No. from the location where the office code agrees with the office code registered in the input dial table (Figure 4.2.2.6.2.1) according to the type of tenant to which the caller belongs.

If the area code is not in the E&M Area Code Table, the system refers to the Area Code Table as described in item (2), example 1, and obtains the Route Table No. registered for that area code and type of tenant.

The Route Table No. is obtained by going through items (1), (2), and (3). The difference in system processing between a case in which PBX or E&M tie lines are available and other cases is described in item (3) above. That is, if PBX or E&M tie lines are available, the Route Table No. is determined by the area code and office code, whereas if PBX or E&M tie lines are not available, the Route Table No. is determined by the area code only. The process up to this point is shown in Figure 4.2.2.6.2.4.



Note: (1) in this figure means item (1), example 1.
 (2) in this figure means item (2), example 1.
 (3) in this figure means item (3), example 1.
 Solid lines apply if PBX or E&M tie lines are available (area codes are registered in the E&M Area Code Table). Dash lines apply if no tie lines are available (area codes are not registered in the E&M Area Code Table).

Figure 4.2.2.6.2.4 Process Through Selecting a Route Table No. (Where Area Code is Used)

As the process up to this point shows, the system first searches for a PBX or E&M tie line in the E&M Area Code Table. If there is no tie line in the E&M Area Code Table, the system refers to the Area Code Table to select the least-cost route. The Time Zones of the Route Tables can be set according to Time Schedule.

The Schedule and Route Tables are described in detail below.

A Route Table No. is an index showing the location of the Route Table that must be referred to. There are three Route Tables, 0 through 2, which differ by access time zone and each is divided into eight parts. In each part, CO group numbers are registered in order to preference. The installer must fill out these tables during planning. The Time Schedule and the Route Tables are shown in Figures 4.2.2.6.2.5(A) and 4.2.2.6.2.5(B).

Time Zone Hour	Condition			
	1 Weekday	2 Saturday	3 Sunday	4 Holiday
0. 0:00 to 0:59				
1. 1:00 to 1:59				
2. 2:00 to 2:59				
3. 3:00 to 3:59				
4. 4:00 to 4:59				
5. 5:00 to 5:59				
6. 6:00 to 6:59				
7. 7:00 to 7:59				
8. 8:00 to 8:59				
9. 9:00 to 9:59				
10. 10:00 to 10:59				
11. 11:00 to 11:59				
12. 12:00 to 12:59				
13. 13:00 to 13:59				
14. 14:00 to 14:59				
15. 15:00 to 15:59				
16. 16:00 to 16:59				
17. 17:00 to 17:59				
18. 18:00 to 18:59				
19. 19:00 to 19:59				
20. 20:00 to 20:59				
21. 21:00 to 21:59				
22. 22:00 to 22:59				
23. 23:00 to 23:59				

Note: Set Time Zone 0 to 2 according to conditions 1 to 4 and Time Zone Hour 0:00 to 23:59

Figure 4.2.2.6.2.5(A)1 Time Schedule

Time Zone Hour	Condition			
	1 Weekday	2 Saturday	3 Sunday	4 Holiday
0. 0:00 to 0:59	2	2	2	2
1. 1:00 to 1:59	2	2	2	2
2. 2:00 to 2:59	2	2	2	2
3. 3:00 to 3:59	2	2	2	2
4. 4:00 to 4:59	2	2	2	2
5. 5:00 to 5:59	2	2	2	2
6. 6:00 to 6:59	2	2	2	2
7. 7:00 to 7:59	2	2	2	2
8. 8:00 to 8:59	0	0	0	0
9. 9:00 to 9:59	0	0	0	0
10. 10:00 to 10:59	0	0	0	0
11. 11:00 to 11:59	0	0	0	0
12. 12:00 to 12:59	0	0	0	0
13. 13:00 to 13:59	0	0	0	0
14. 14:00 to 14:59	0	0	0	0
15. 15:00 to 15:59	0	0	0	0
16. 16:00 to 16:59	0	0	0	0
17. 17:00 to 17:59	1	1	1	1
18. 18:00 to 18:59	1	1	1	1
19. 19:00 to 19:59	1	1	1	1
20. 20:00 to 20:59	1	1	1	1
21. 21:00 to 21:59	1	1	1	1
22. 22:00 to 22:59	1	1	1	1
23. 23:00 to 23:59	2	2	2	2

Figure 4.2.2.6.2.5(A)2 Time Schedule (Default Value)

Time Zone 0

	Route Table No. 1				Route Table No. 2				Route Table No. 3				Route Table No. 4				Route Table No. 5				Route Table No. 6				Route Table No. 7				Route Table No. 8											
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
Advance Step																																								
Tenant A																																								
Tenant B																																								

Time Zone 1

	Route Table No. 1				Route Table No. 2				Route Table No. 3				Route Table No. 4				Route Table No. 5				Route Table No. 6				Route Table No. 7				Route Table No. 8											
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
Advance Step																																								
Tenant A																																								
Tenant B																																								

Time Zone 2

	Route Table No. 1				Route Table No. 2				Route Table No. 3				Route Table No. 4				Route Table No. 5				Route Table No. 6				Route Table No. 7				Route Table No. 8											
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
Advance Step																																								
Tenant A																																								
Tenant B																																								

- Note 1. CO Outgoing Group Nos. shall be set in accordance with the setting of the Tenant A/B, Time Zone, Route Table Nos. and Advance Steps.
2. CO Outgoing Group Nos. are 1 to 7.
3. The default value is 0, and it has no function.

Figure 4.2.2.6.2.5(B) Route Table

- (4) Assign a Time Zone (0 to 2) first according to Time Zone Hour.

The system selects group 0, 1, or 2, according to the Time Zone Hour set by the user. The system then selects a CO group in the Advance No. 1 column from the location corresponding to the type of tenant to which the caller belongs and the Route Table No., determined as described in item (3), example 1, and selects an idle CO/PBX Line in that CO group. If all the CO/PBX Lines in that CO group are busy, the system proceeds to search for an idle CO/PBX Line until it reaches the Route Advance Step, the extension class-of-service of the caller.

Suppose, for example, that the caller's extension belongs to tenant B and that the Route Advance Step is 2. Also, suppose that the caller originates a call at 06:30 on Weekday and that the system selects Route Table No. 0 (Time Zone 0) as a result of analyzing the dial data. In this case, the system operates in the order of (a), (b), (c), (d), (e), and (f) in Figure 4.2.2.6.2.6(B).

Time Zone Hour	Condition			
	1 Weekday	2 Saturday	3 Sunday	4 Holiday
0. 0:00 to 0:59	2	2	1	1
1. 1:00 to 1:59	2	2	1	1
2. 2:00 to 2:59	2	2	1	1
3. 3:00 to 3:59	2	2	1	1
4. 4:00 to 4:59	2	2	1	1
5. 5:00 to 5:59	0	0	1	1
6. 6:00 to 6:59	0	0	1	1

Assign Time Zone 0

Figure 4.2.2.6.2.6(A) Time Schedule Planning Sheet

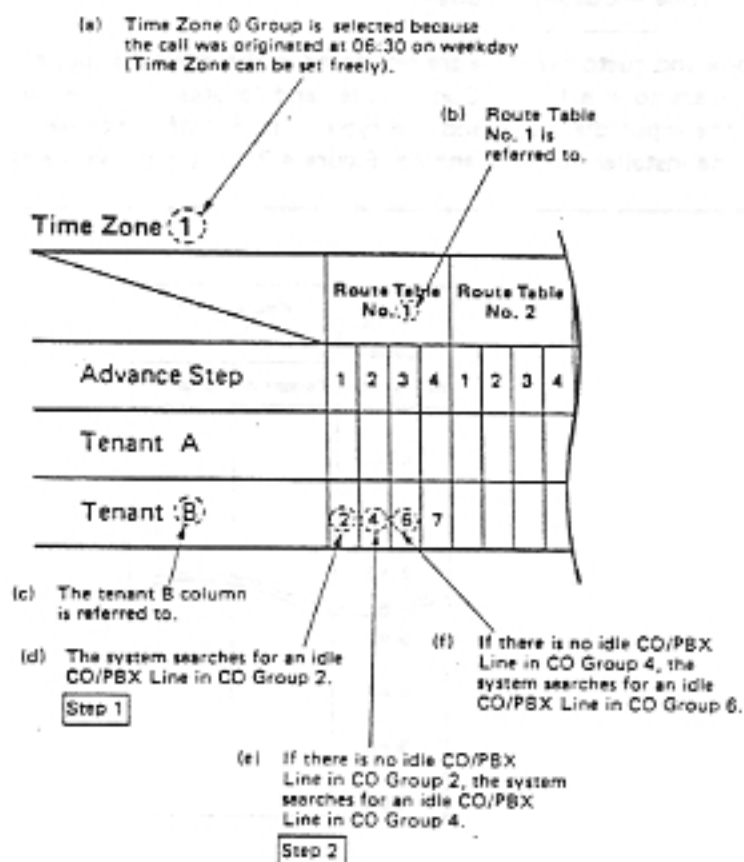


Figure 4.2.2.6.2.6(B) CO Group No. Selection

In the above example, the caller's extension was assigned Route Advance Step 2. Thus, if all the CO/PBX Lines in CO Groups 2, 4, and 6 are busy, the system will not proceed to CO Group 7, which is registered at Advance No. 4. In a case like this, the system sends a busy tone to the caller, signifying that there are no idle CO/PBX Lines. If the Route Advance Step is 0, the system searches for an idle CO/PBX Line only in the CO group of Advance No. 1.

The above process applies to selection of a CO group when the dial data include an area code, office code, and customer code. Another example of CO group selection, when dial data cover only an office and customer code, is explained next.

Example 2: Office – Customer code

- (1) The office code and customer code are registered in the input dial table. (See Figure 4.2.2.6.2.1.)
- (2) The system refers to the Office Code Table, and locates a Route Table No. from the office code registered in the input dial table and the type of tenant of the caller. The Office Code Table must be filled out by the installer during planning. Figure 4.2.2.6.2.7 shows the Office Code Table.

Office Code m m m	Route Table No.	
	Tenant A	Tenant B
200		
201		
202		
996		
997		
998		
999		

Figure 4.2.2.6.2.7 Office Code Table Format

- (3) The system then refers to the Time Schedule and Route Table, shown in Figure 4.2.2.6.2.5(A) and (B), on the basis of the Time Schedule and Route Table No. found in item (2). Thereafter, the system selects a CO group by going through the same process as in item (4), example 1.

The process of CO group selection by type of dial data has already been described. After CO group selection, the dial data to be sent to an idle CO/PBX Line in that group may have to be modified by adding a special code or deleting an unnecessary area code. The necessity of modifying dial data is now explained in a little more detail.

Suppose the dial data generated by the caller consists of an area code, office code, and customer code; that the system has seized a PBX tie line in the optimum CO group as a result of analyzing the dial data; and that the caller originated a local call that would go through the PBX tie line is connected. The user does not know that the CO/PBX Line seized is a PBX tie line, and does not dial specially to seize a PBX tie line.

It is then necessary to output one of the PBX's CO line trunk group numbers before the telephone number. Because the call is a local call as viewed from the PBX, it is not necessary to dial the area code.

Even if the EX1232/2464 system user dials the area code, that area code must be deleted. It is for this reason that the system must modify the dial data.

The process of automatically modifying dial data is explained below as part of the system processing flow. (The optimum CO group has been selected by the process up to item 3, so this explanation starts with item 4.)

4. After CO group selection, the system locates the Deleting Data Table No. (which is clarified below) corresponding to the selected CO group by referring to a table called the Deleting Index Table. Figure 4.2.2.6.2.8 shows the Deleting Index Table format. The installer must fill out this table during planning.

CO Outgoing Group No.	Delete Data Table No.	
	Tenant A	Tenant B
1	<input type="checkbox"/>	<input type="checkbox"/>
2	<input type="checkbox"/>	<input type="checkbox"/>
3	<input type="checkbox"/>	<input type="checkbox"/>
4	<input type="checkbox"/>	<input type="checkbox"/>
5	<input type="checkbox"/>	<input type="checkbox"/>
6	<input type="checkbox"/>	<input type="checkbox"/>
7	<input type="checkbox"/>	<input type="checkbox"/>

Figure 4.2.2.6.2.8 Deleting Index Table Format

If there is no Deleting Data Table No. in the location corresponding to the selected CO group, there is no data to be deleted from the dial data generated by the caller. If an addition to the dial data is necessary, the system proceeds to that step.

5. The following explanation is based on the assumption that there is a Deleting Data Table No. registered for the selected CO group. In this case again, the process is explained by the type of caller dial data.

Example 1: Area code – Office code – Customer code

- (1) The system refers to a table called the Deleting Data Table, and locates the area code in the location corresponding to the Deleting Data Table No. selected in item 4. When the area code in the input dial table (Figure 4.2.2.6.2.1) agrees with the area code from the Deleting Data Table, the area code dialed by the caller is deleted.

Figure 4.2.2.6.2.9 shows the Deleting Data Table format. This table must be filled out by the installer during planning.

Delete Data Table No.	Area Code (P1, P2, P3)					
	Tenant A			Tenant B		
1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 4.2.2.6.2.9 Deleting Data Table Format

- (2) If the area code in the input dial table does not agree with the area code from the Deleting Data Table, the area code dialed by the caller is not deleted, and the system proceeds to making an addition to the dial data if necessary.

Example 2: Office code – Customer code

- (1) Because no area code is entered in the input dial table (Figure 4.2.2.6.2.3), the system does not delete anything from the dial data, but proceeds to making an addition to the dial data if necessary.
6. Upon completion of dial data deletion (where necessary), the system refers to a table called Adding Index Table, and locates the Adding Data Area/Office Table No. clarified below corresponding to the CO group selected in item 3.
Figure 4.2.2.6.2.10 shows the Adding Index Table format. The installer must fill out this table during planning.

CO Outgoing Group No.	Delete Data Table No.	
	Tenant A	Tenant B
1	<input type="checkbox"/>	<input type="checkbox"/>
2	<input type="checkbox"/>	<input type="checkbox"/>
3	<input type="checkbox"/>	<input type="checkbox"/>
4	<input type="checkbox"/>	<input type="checkbox"/>
5	<input type="checkbox"/>	<input type="checkbox"/>
6	<input type="checkbox"/>	<input type="checkbox"/>
7	<input type="checkbox"/>	<input type="checkbox"/>

Figure 4.2.2.6.2.10 Adding Index Table Format

If there is no Adding Data Area/Office Table No. for the selected CO group, there is nothing to be added to the dial data generated by the caller.

7. It is assumed that an Adding Data Area/Office Table No. corresponding to the CO group selected in item 3 has been registered. Here again, the process is explained by the type of dial data.

Example 1: Area code – Office code – Customer code

- (1) In this case, there is an area code so the system proceeds to referring to a table called the Adding Data Area Table. (In example 2 that follows, the dial data consists of an office code and customer code only, so the system proceeds to referring to an Adding Data Office Table. That is, the table referred to differs depending on whether the dial data includes an area code.)

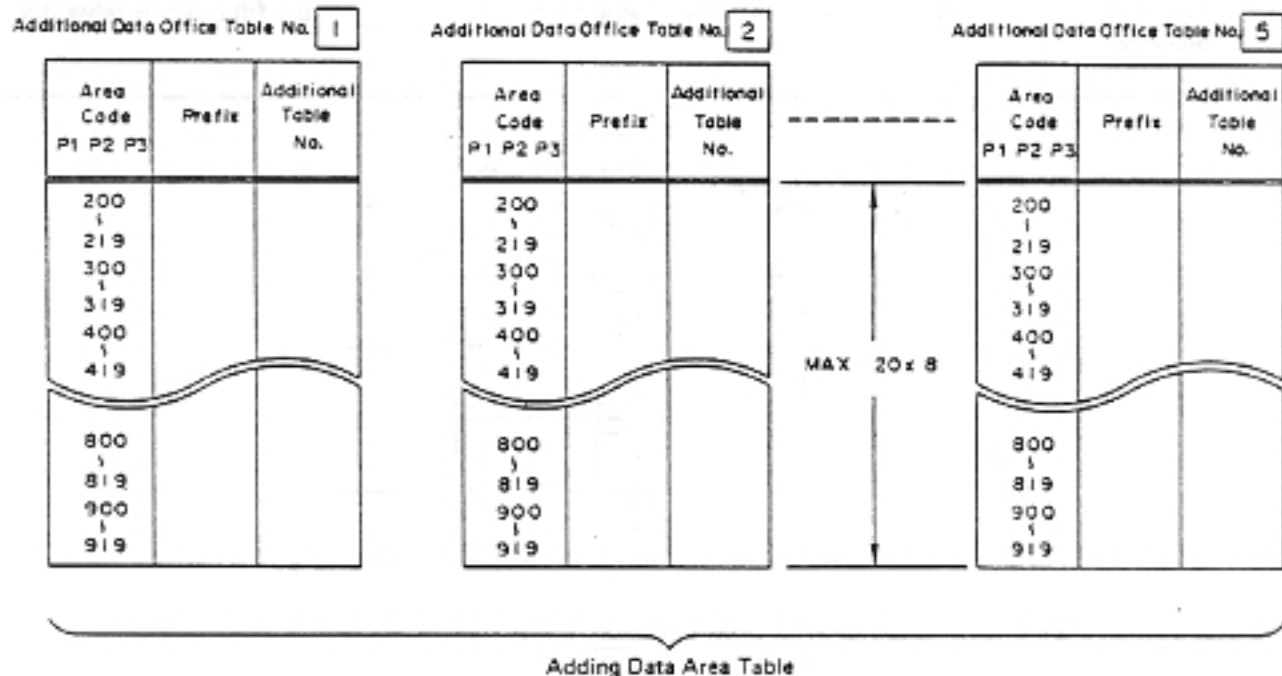


Figure 4.2.2.6.2.11 Adding Data Area Table Format

Note: There are five Adding Data Area Tables, each of which is so formatted that a prefix may be registered for each area code, and an index number may be entered in the adding table column (clarified below). The index number points the adding table where data to be added to the dial data area stored. Area codes are not consecutive, but are broken down into 20 by 8 blocks, as shown in Figure 4.2.2.6.2.11. These tables must be filled out by the installer during planning.

The system selects one of the tables shown in Figure 4.2.2.6.2.11 from the Adding Data Area/Office Table No. selected in item 6.

- (2) The system searches the Adding Data Area Table selected in item (1), example 1, for the area code registered in the input dial table (Figure 4.2.2.6.2.1) and selects the prefix and Adding Table No. registered there. The system stores in memory whether to add a "1" to the dial data to be sent, depending on whether the prefix "1" has been entered. The system then proceeds to referring to the Adding Table indicated by the selected Adding Table No.
- (3) The Adding Table has the actual dial data to be added for each Adding Table No. and a flag showing whether the adding dial data should be placed before or after the normal dial number. Figure 4.2.2.6.2.12 shows the Adding Table format.

Additional Table No.	Additional Flag	Dial
1	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
2	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
3	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
4	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
5	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
6	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
7	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
8	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
9	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
10	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

Figure 4.2.2.6.2.12 Adding Table Format

Note: There are 10 Adding Tables, each of which can register up to 18 digits of adding dial data. Flag 0 must be entered if the adding dial data must be placed before the normal dial number, and flag 1, if the adding dial data must follow the normal dial number. These tables must be filled out by the installer during planning.

The dial data consisting of an area code, office code, and customer code is modified by the above process. The factors that are determined by the system in the process of modifying the dial data to be sent after CO group selection can be summarized as follows:

- Whether to delete the area code
- Whether a prefix is necessary
- If additional dial data are necessary, data value and their position.

Example2: Office code – Customer code

- (1) In this case, the system proceeds to referring to a table called Adding Data Office Table. Figure 4.2.2.6.2.13 shows the Adding Data Office Table format.
The system selects one of the tables shown in Figure 4.2.2.6.2.13 from the Adding Data Area/Office Table No. selected in item 6.

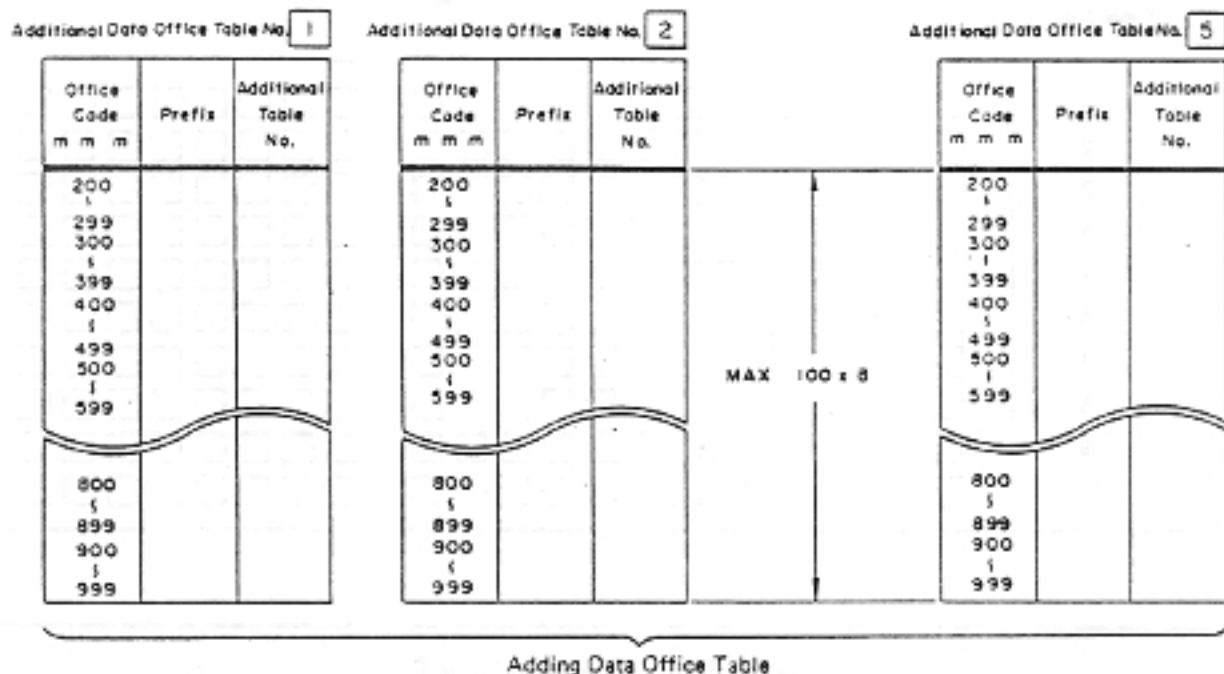


Figure 4.2.2.6.2.13 Adding Data Office Table Format

Note: There are five Adding Data Office Tables, each of which is so formatted that a prefix may be registered for each office code, and an index number may be entered in the adding table column. The index number points the adding table where the dial data to be added are stored. Office codes are consecutive, and are broken down into 100 by 8 blocks, as shown in Figure 4.2.2.6.2.13. These table must be filled out by the installer during planning.

- (2) The system searches the Adding Data Office Table selected in item (1), example 2, for the office code registered in the input dial table (Figure 4.2.2.6.2.1) and selects the prefix and Adding Table No. that are registered there. The system stores in memory whether to add a "1" to the dial data to be sent, depending on whether the prefix "1" has been entered. The system then proceeds to referring to the Adding Table indicated by the selected Adding Table No.
- (3) The Adding Table is the same as the one referred to in item 7, example 1. (See Figure 4.2.2.6.2.12). The system refers to this table, and selects dial data to be added and their position (before or after the normal dial data). Thus, the dial data, consisting of an office code and customer code, is modified. The factors that are determined by the system in the process of modifying the dial data to be sent after CO group selection can be summarized as follows:

- Whether a prefix is necessary
- If additional dial data are necessary, data value and their position

Refer to Figures 4.2.2.6.2.14 and 4.2.2.6.2.15 again to review the process of dial data modification by the system after CO group selection. Both figures show the process of dial data modification after CO group selection with reference to the tables concerned. Figure 4.2.2.6.2.14 applies to dial data consisting of an area code, office code, and customer code, and Figure 4.2.2.6.2.15, to dial data consisting of an office code and customer code.

No. in these figures indicates the applicable item number and should be followed in numeric sequence to understand the modification process.

Time Zone 0

	Route Table No. 1				Route Table No. 2				Route Table No. 3			
	1	2	3	4	1	2	3	4	1	2	3	4
Advance Step												
Tenant A												
Tenant B			2									

3. Finds CO Group 2.

4. Refers to CO Group 2 in Deleting Index Table.

6. Refers to CO Group 2 in Adding Index Table.

CO Group No.	Delete Data Table	
	Tenant A	Tenant B
1	<input type="checkbox"/>	<input type="checkbox"/>
2	<input type="checkbox"/>	<input type="checkbox"/>
3	<input type="checkbox"/>	<input type="checkbox"/>
4	<input type="checkbox"/>	<input type="checkbox"/>
5	<input type="checkbox"/>	<input type="checkbox"/>
6	<input type="checkbox"/>	<input type="checkbox"/>
7	<input type="checkbox"/>	<input type="checkbox"/>

4. Finds Deleting Table No. 4 in Deleting Index Table.

CO Group No.	Additional Index Table	
	Tenant A	Tenant B
1	<input type="checkbox"/>	<input type="checkbox"/>
2	<input type="checkbox"/>	<input type="checkbox"/>
3	<input type="checkbox"/>	<input type="checkbox"/>
4	<input type="checkbox"/>	<input type="checkbox"/>
5	<input type="checkbox"/>	<input type="checkbox"/>
6	<input type="checkbox"/>	<input type="checkbox"/>
7	<input type="checkbox"/>	<input type="checkbox"/>

6. Finds Additional Area/ Office Table No. 1. Because the area code is in the input dial table, the system proceeds to referring to Adding Data Area Table No. 1.
7. (1) The system refers to Additional Area Table No. 1.

7. (2) Finds area code xxx in Additional Data Area Table No. 1.

Delete Data Table	
Area Code P1 P2 P3	Additional Table No.

Additional Data Office Table No. 1	
Area Code P1 P2 P3	Additional Table No.

Additional Data Office Table No. 2	
Area Code P1 P2 P3	Additional Table No.

Additional Data Office Table No. 5	
Area Code P1 P2 P3	Additional Table No.

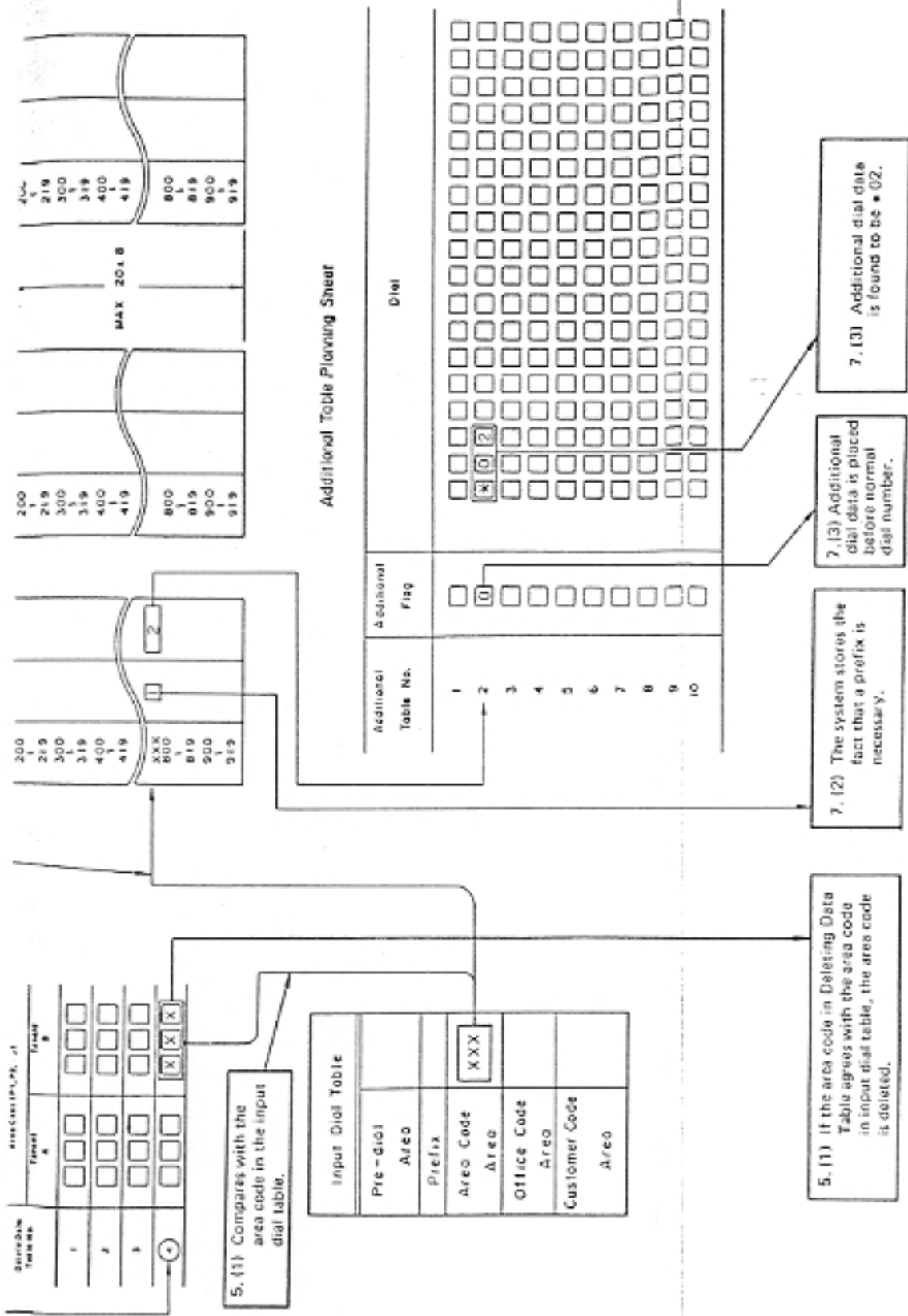
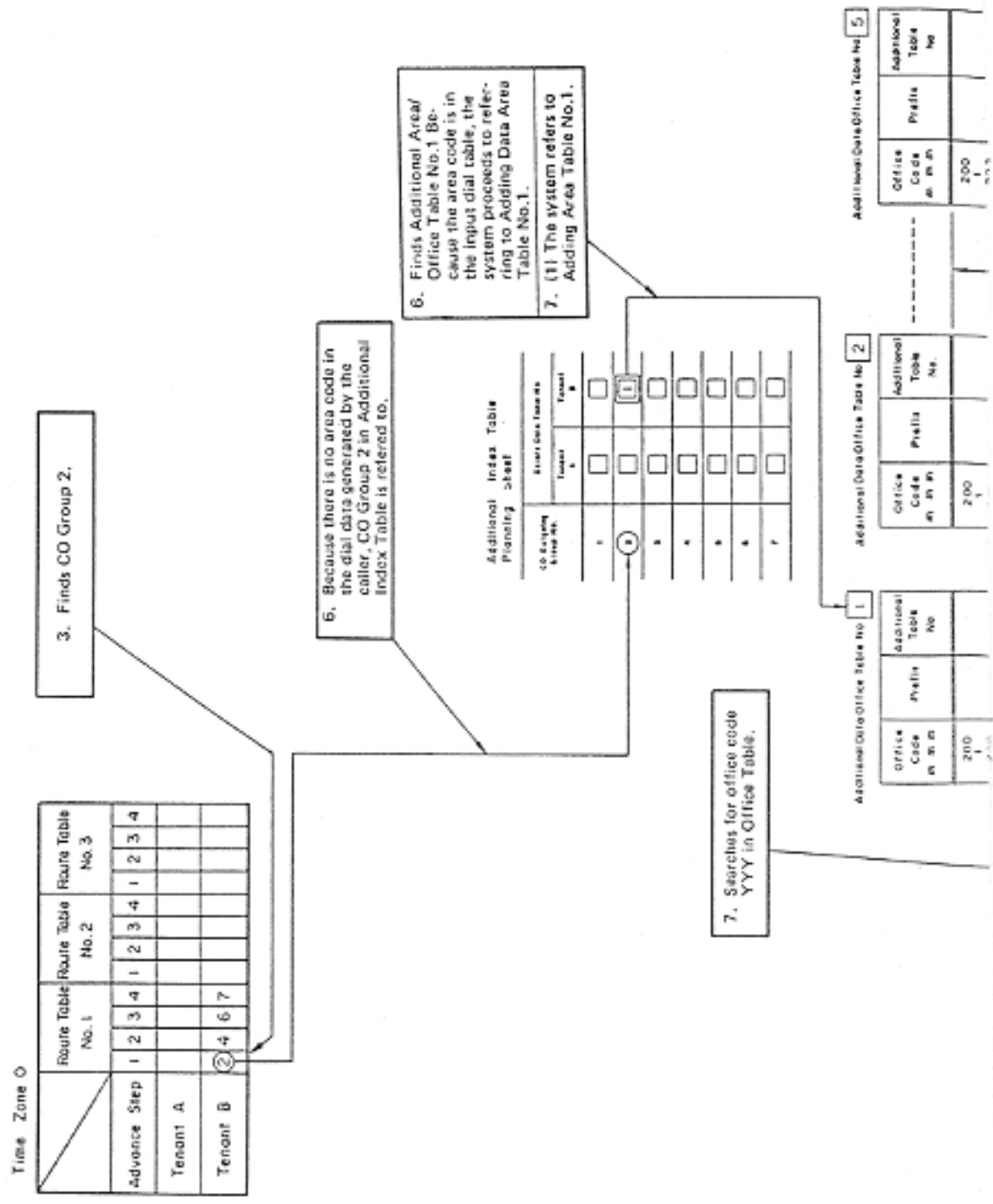


Figure 4.2.2.6.2.14 Dial Data Modification Process (With Area Code)





Input Dial Table	
Pre-dial Area	
Prefix	
Area Code Area	
Office Code Area	YYY
Customer Code Area	

Additional Table Planning Sheet

Additional Table No.	Additional Flag	Oriet
1	<input type="checkbox"/>	<input type="checkbox"/>
2	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	<input type="checkbox"/>	<input type="checkbox"/>
4	<input type="checkbox"/>	<input type="checkbox"/>
5	<input type="checkbox"/>	<input type="checkbox"/>
6	<input type="checkbox"/>	<input type="checkbox"/>
7	<input type="checkbox"/>	<input type="checkbox"/>
8	<input type="checkbox"/>	<input type="checkbox"/>
9	<input type="checkbox"/>	<input type="checkbox"/>
10	<input type="checkbox"/>	<input type="checkbox"/>

7. (2) The system scores the fact that a prefix is necessary.

7. (3) Additional dial data is placed before normal dial number.

7. (3) Additional dial data is found to be +02.

Figure 4.2.2.6.2.15 Dial Data Modification Process (Without Area Code)

7. The optimum CO groups for the time zones wherein calls are originated can be determined from previously prepared tables. It is necessary, therefore, to prepare dial data to be sent to these CO groups. The procedure for preparing tables for this purpose is explained below, referring to examples.

Example 1: An outgoing toll call placed by pressing the OPT key, or dialing Optimized Call Routing special code 90 and 212-955-1234 (Subscriber A in the network diagram of Figure 4.2.2.6.4.1). The following description proceeds in the order of Advance Nos. in Table No. 1 (Area 212, New York), Route Table (Time 0 Group).

(a) CO group No. 1 (PBX tie line 1) selected (See Advance No. 1, Figure 4.2.2.6.4.10)

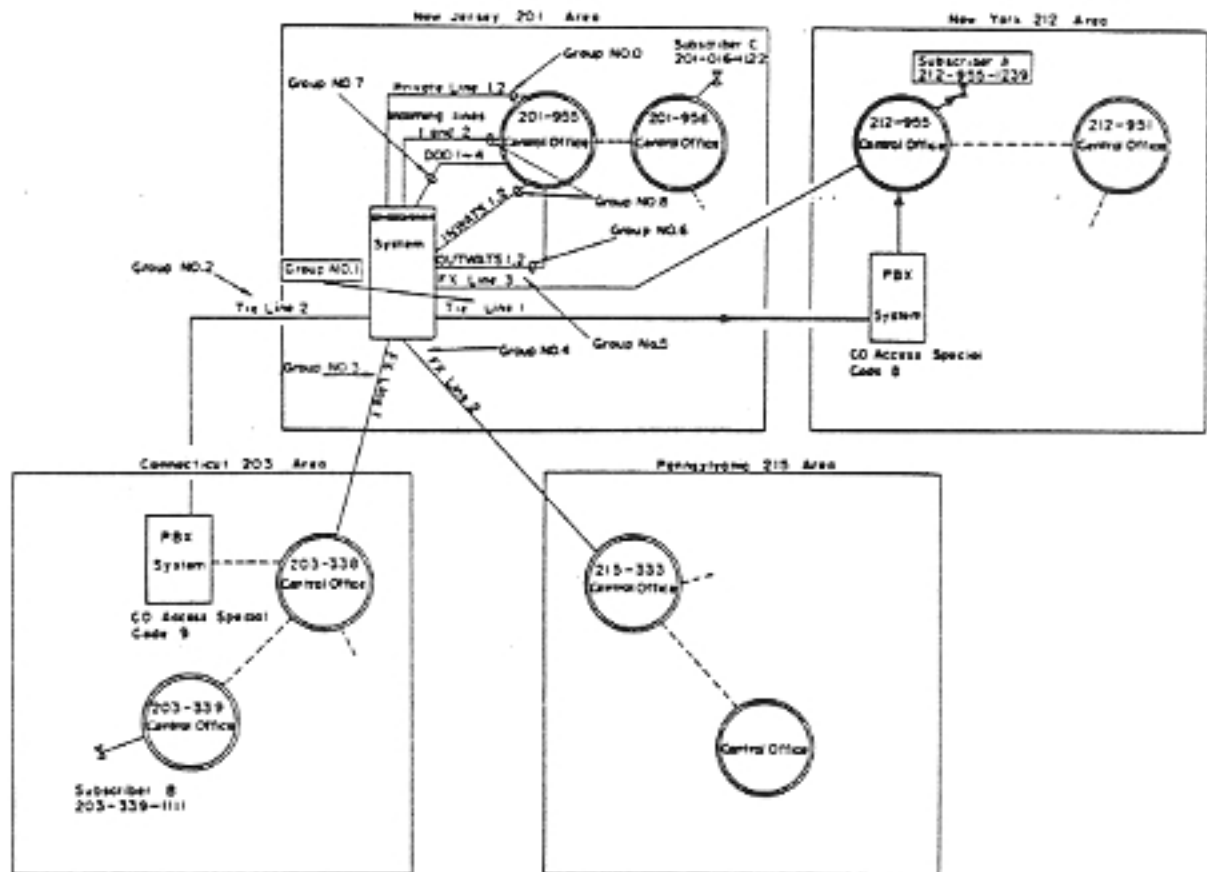


Figure 4.2.2.6.4.10 Example of Outgoing Toll Call via CO Group No. 1
(Caller dialing 212-955-1234)

The dial data to be sent through the PBX tie line must be modified as follows:

- Delete area code 212.
- Add a special code ("8" in this example) before the office code to seize the CO/PBX Line through the PBX.
- Add pause data between special code "8" and the office code to generate a 2-second pause between dialing the special code and receiving the dial tone.

The modified dial data will be:

8 - (Pause data: 2 seconds) - 955 - 1234

An example of entering the above modified dial data in a Planning Sheet is shown in Figure 4.2.2.6.4.11.

5. Proceed to preparing an Area Code Table. This table is only for the areas where tie lines are not available (Pennsylvania in this example). The entry procedure is shown in Figure 4.2.2.6.4.8.

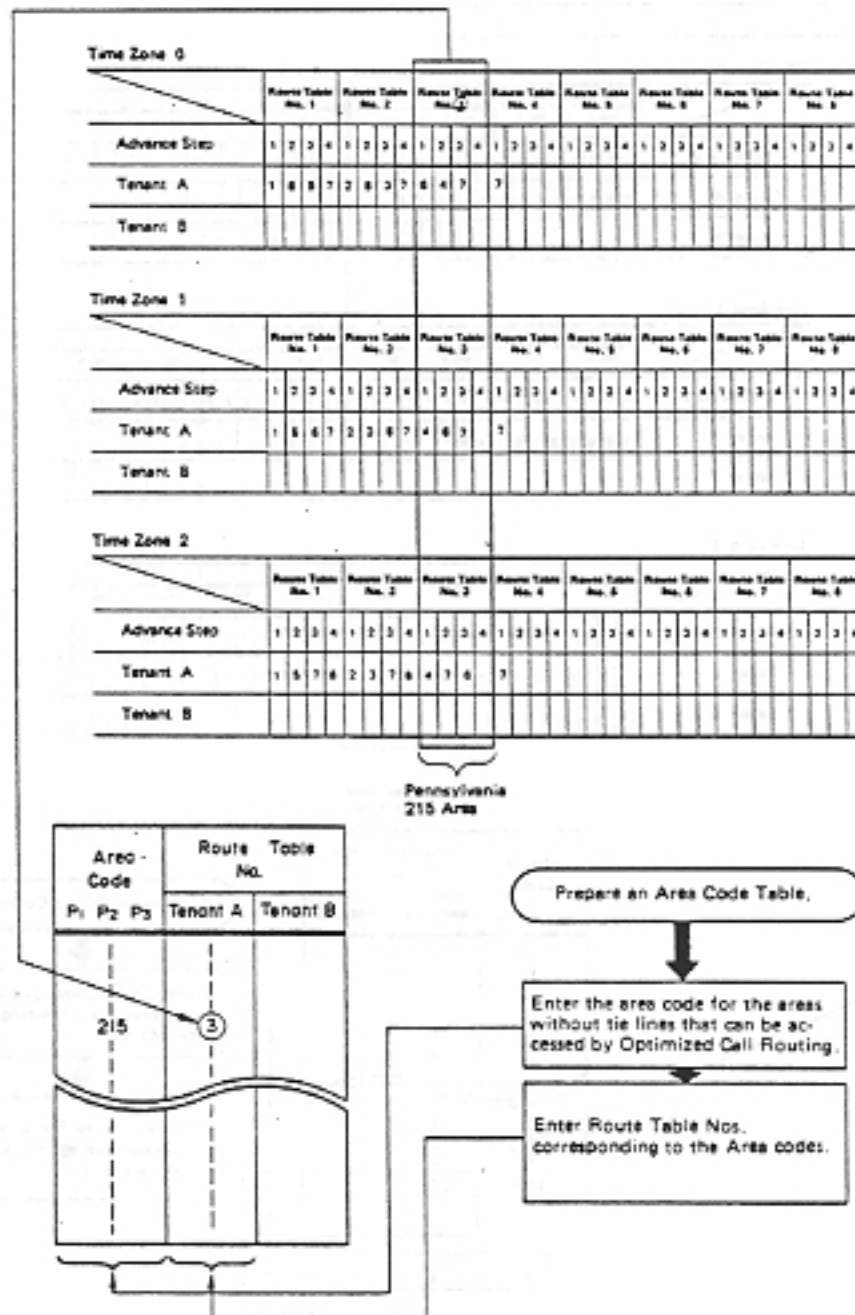


Figure 4.2.2.6.4.8 Example of Preparing Area Code Table

6. Proceed to preparing an Office Code Table. This table is referred to when dial data are for local calls. In this example, the system refers to it when a local call is originated in area 201, New Jersey. An example of preparing an Office Code Table is shown in Figure 4.2.2.6.4.9.

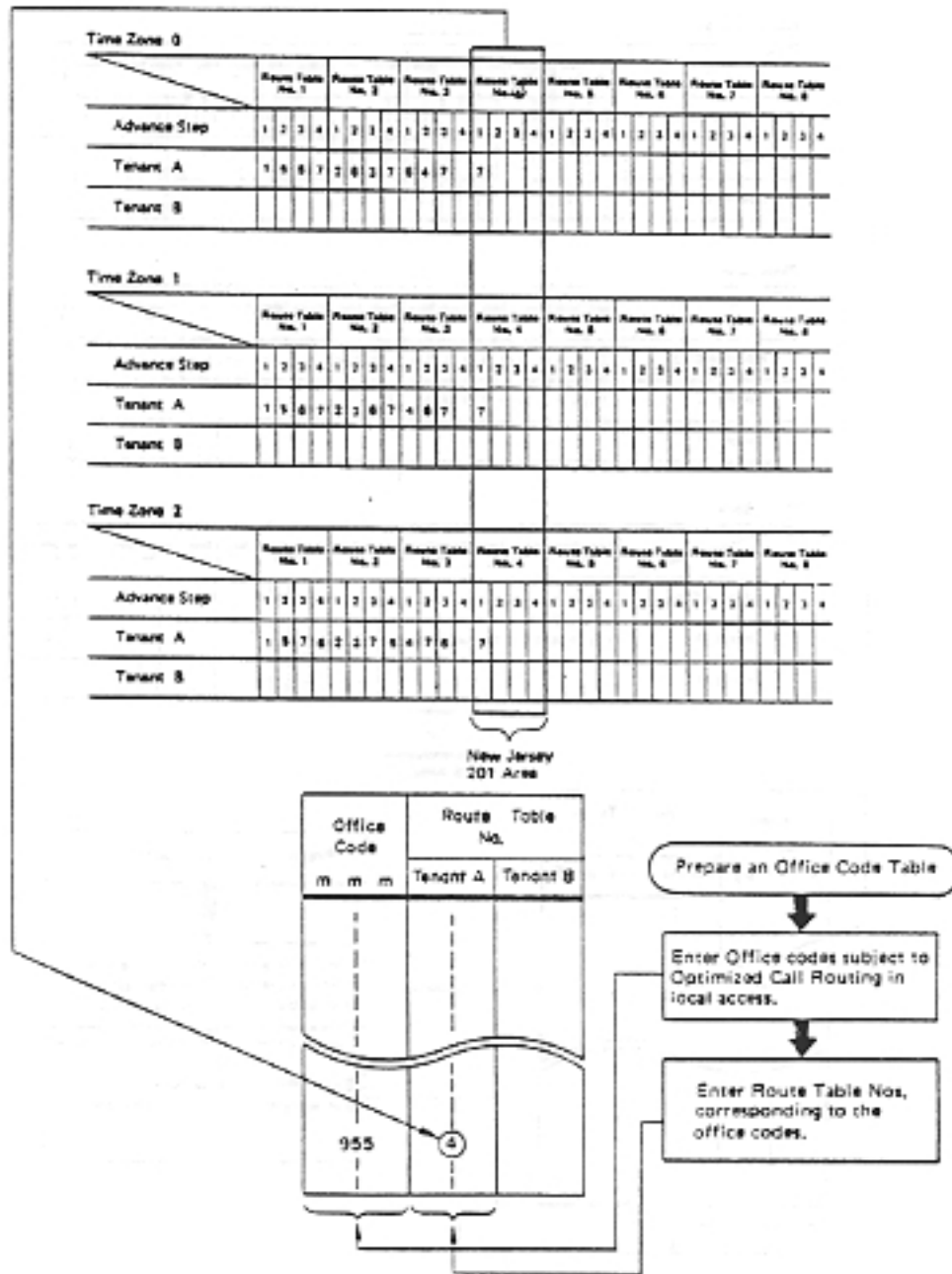


Figure 4.2.2.6.4.9 Example of Preparing Office Code Table

(d) Outgoing local calls to Office 955 in Area 201

D.D.D. lines (CO group No.7) are the cheapest for outgoing Local calls in any time zone. Therefore, the Route Tables are as Figure 4.2.2.6.4.6.

Time Zone 0									
	Route Table No. 1	Route Table No. 2	Route Table No. 3	Route Table No. 4	Route Table No. 5	Route Table No. 6	Route Table No. 7	Route Table No. 8	Route Table No. 9
Advance Step	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
Tenant A	1 5 6 7	2 5 3 6	3 4 7	7					
Tenant B									
Time Zone 1									
	Route Table No. 1	Route Table No. 2	Route Table No. 3	Route Table No. 4	Route Table No. 5	Route Table No. 6	Route Table No. 7	Route Table No. 8	Route Table No. 9
Advance Step	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
Tenant A	1 5 6 7	2 3 6 7	4 6 7	7					
Tenant B									
Time Zone 2									
	Route Table No. 1	Route Table No. 2	Route Table No. 3	Route Table No. 4	Route Table No. 5	Route Table No. 6	Route Table No. 7	Route Table No. 8	Route Table No. 9
Advance Step	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
Tenant A	1 5 7 8	2 3 7 8	4 7 8	7					
Tenant B									

Area 201
New Jersey

Figure 4.2.2.6.4.6 Example of Route Table for Outgoing Local Calls to Office 955 in Area 201

4. After preparing Route Tables, enter Route Tables Nos. corresponding to the office codes in the tables of E&M Office Groups No. 1 and No.2. (In this example, the areas where PBX tie lines are available are New York and Connecticut.) The entry procedure is shown in Figure 4.2.2.6.4.7.

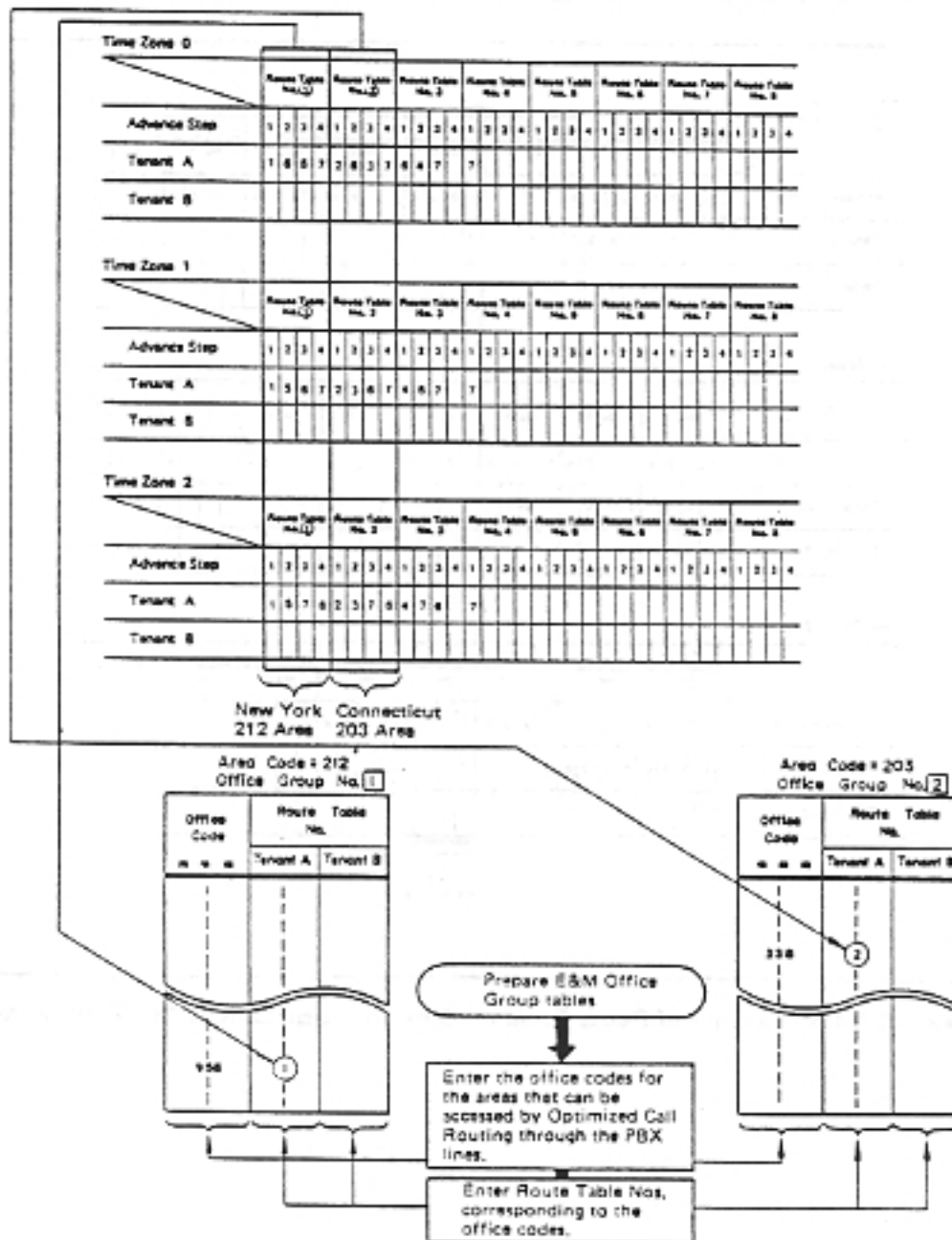


Figure 4.2.2.6.4.7 Example of Preparing E&M Office Group Table

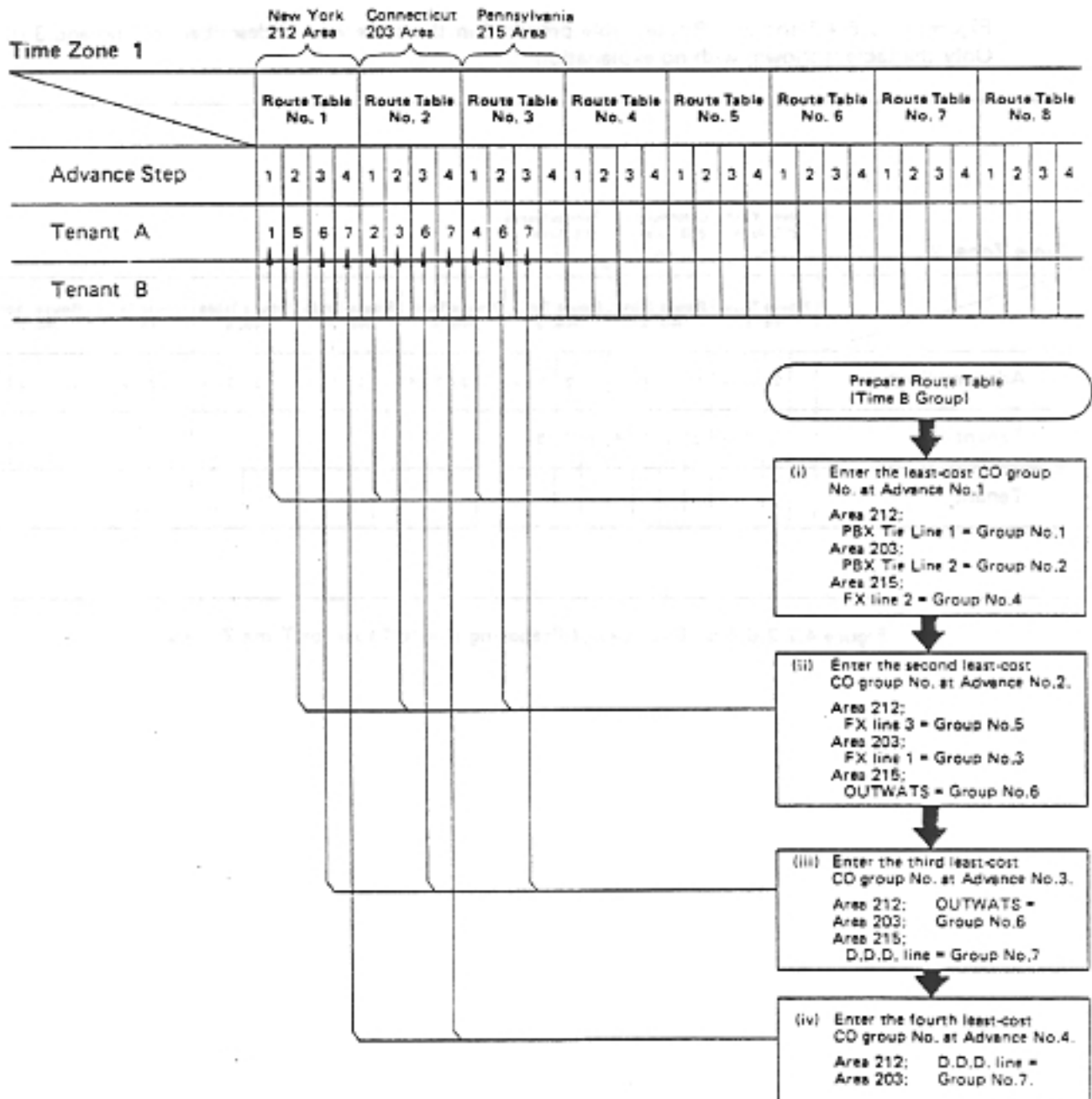


Figure 4.2.2.6.4.4 Example of Preparing Route Table for Time Zone 1

- (c) Outgoing toll calls in the time zone of 23:00 to 07:59 on weekday to New York, Connecticut, and Pennsylvania (When Time Zone is default. Time Zone can be set freely).

Figure 4.2.2.6.4.5 shows a Route Table prepared in the same way as described in 3 (a) and 3 (b). Only the table is shown, with no explanation.

Time Zone 2	New York 212 Area				Connecticut 203 Area				Pennsylvania 215 Area				Route Table No. 4				Route Table No. 5				Route Table No. 6				Route Table No. 7				Route Table No. 8											
	Route Table No. 1				Route Table No. 2				Route Table No. 3				Route Table No. 4				Route Table No. 5				Route Table No. 6				Route Table No. 7				Route Table No. 8											
Advance Step	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Tenant A	1	5	7	8	2	3	7	8	4	7	5																													
Tenant B																																								

Figure 4.2.2.6.4.5 Example of Preparing Route Table for Time Zone 2

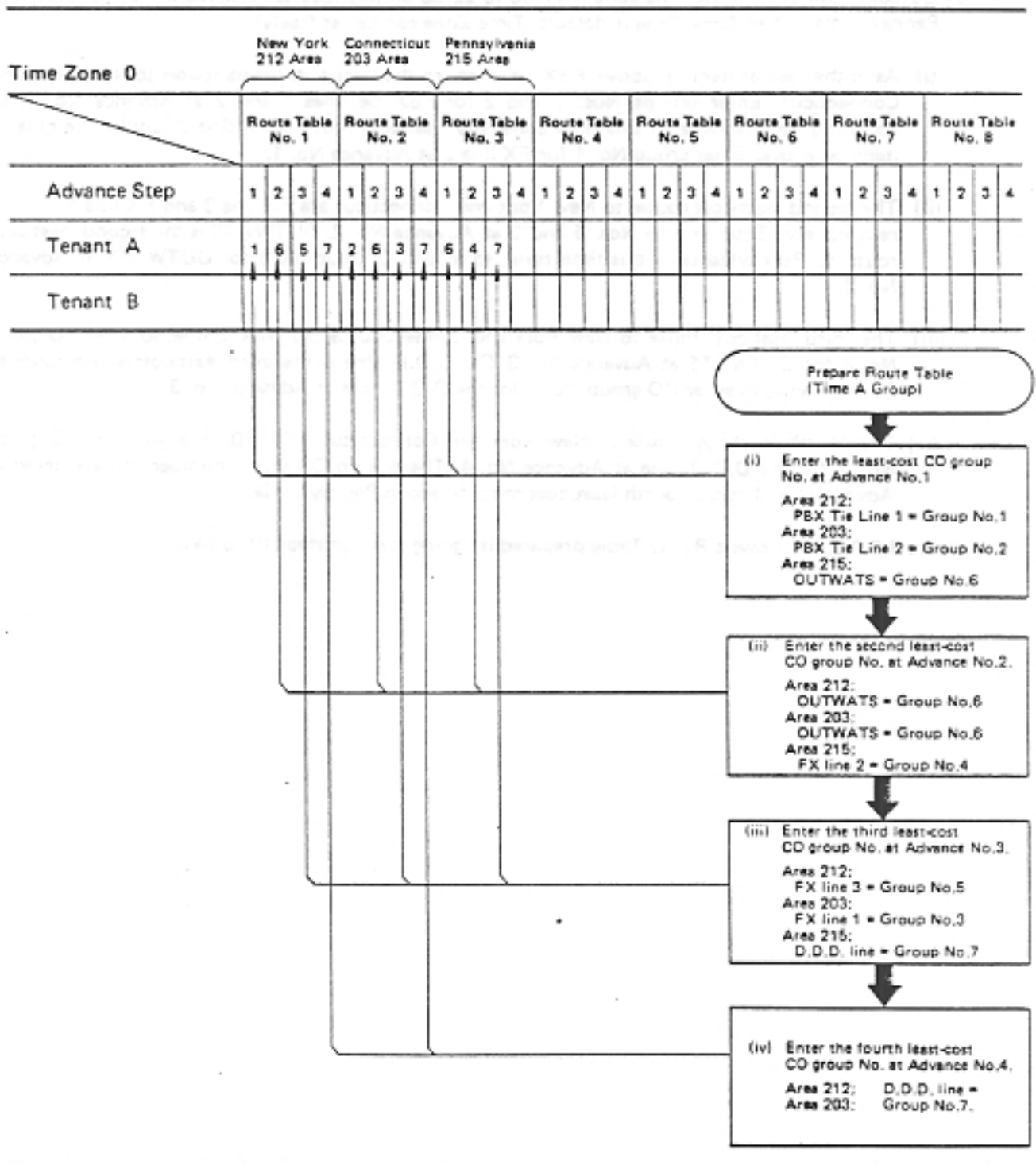


Figure 4.2.2.6.4.3 Example of Preparing Route Table for Time Zone 0

- (b) Outgoing toll calls in the time zone if 17:00 to 22:59 on weekday to New York, Connecticut, and Pennsylvania (When Time Zone is default. Time Zone can be set freely).
- (i) As in the case of item (a) above, PBX tie lines are the least-cost access routes to New York and Connecticut. Enter groups Nos. 1 and 2 for PBX tie lines 1 and 2 at Advance No. 1. In accessing Pennsylvania in this time zone, the least-cost route is FX line 2, unlike the case of item (a) above. Enter group No. 4 for FX line 2 at Advance No. 1.
 - (ii) The second least-cost routes to New York and Connecticut are FX line 3 and FX line 1 respectively. Enter groups Nos. 5 and 3 at Advance No. 2. OUTWATS is the second least-cost route to Pennsylvania in this time zone, so enter CO group No.6 for OUTWATS at Advance No. 2
 - (iii) The third least-cost route to New York and Connecticut is OUTWATS line, so enter CO group No. 6 for OUTWATS at Advance No. 3 The D.D.D. line is the third least-cost access route to Pennsylvania, so enter CO group No. 7 for the D.D.D. line at Advance No. 3.
 - (iv) The fourth least-cost route to New York and Connecticut is D.D.D. line, so enter CO group No. 7 for the D.D.D. line at Advance No. 4. There is no CO group number to be entered at Advance No. 4 as the fourth least-cost route to access Pennsylvania.

Figure 4.2.2.B.4.4 shows a Route Table prepared by going through steps (i) to (iv).

Planning Procedure

1. The CO/PBX Lines that are subject to Optimized Call Routing are those in groups 1 through 7.
2. Pay special attention to the PBX tie lines in groups 1 through 7. Enter the area codes for the PBXs to which these tie lines are connected in the E&M Area Code Table. In this example, the area code for tie line 1 is 212, and that for tie line 2 is 203. (See the network diagram in Figure 4.2.2.6.4.1). Enter these area codes and corresponding E&M office group numbers 1 and 2 as shown in Figure 4.2.2.6.4.2.

Area Code	Office Group No.	
	P1 P2 P3	Tenant A Tenant B
200		
201		
202		
203		2
1		
212		1
~ ~ ~		
700		
719		
800		
819		
900		
919		

Enter area code 203 for tie line 2 and E&M Office Group Table No.2.

Enter area code 212 for tie line 1 and E&M Office Group Table No.1.

Figure 4.2.2.6.4.2. Example of E&M Area Code Table

Note: If all outgoing calls to the above areas are cheaper than being routed through other lines, it is not necessary to use either the E&M Area Code Table or the E&M Office Group Table. In this case, enter the Route Table Nos. in the General Area Code Table in the part corresponding to the above area codes.

3. To determine a Route Table No. for entry in the E&M Office Group Table and Area Code Table that are discussed later, the optimum (least-cost) route to be connected in a specific time zone is now considered. In other words, a Route Table is prepared.
- (a) Outgoing toll calls in the time zone of 08:00 to 16:59 on weekday to New York, Connecticut, and Pennsylvania (When Time Zone is default. Time Zone can be set freely).
- Refer to the network diagram in Figure 4.2.2.6.4.1.
- (i) A PBX tie line is connected to New York and Connecticut, so this route is the cheapest. Pennsylvania can be accessed through OUTWATS, FX line 2, and D.D.D. line; the least-cost route in this time zone would be OUTWATS .
- The cheapest connecting routes, that is, CO group numbers to be registered at Advance No. 1, to the different destinations in the specified time zone is determined.
- If outgoing dial data in this time zone are 212-955-□□□□ (New York) And 203-338-□□□□ (Connecticut), let the system select PBX tie line groups Nos. 1 and 2 respectively as CO groups.
- If outgoing dial data are 215-333-□□□□ (Pennsylvania), let the system select OUTWATS CO group No. 6 as the CO group.
- Then fill in the Route Table for Time Zone 0 Group. Enter the CO group numbers for these destinations in the order of Route Tables Nos. In the entry example shown in Figure 4.2.2.6.4.3, the CO group numbers for New York, Connecticut, and Pennsylvania are entered in the order of Route Table Nos.
- (ii) CO groups to be registered at Advance No. 2 are the next least-cost routes, considered when all the least-cost CO/PBX Lines are busy. In accessing New York or Connecticut OUTWATS is the second least-cost route in the specified time zone. Thus, OUTWATS CO group No. 6 should be entered at Advance No. 2. In accessing Pennsylvania, FX line 2 is the second leastcost route, so CO group No. 4 to which FX line 2 belongs should be registered at Advance No. 2.
- (iii) CO groups to be registered at Advance No. 3 are considered when all the CO groups registered at Advance Nos. 1 and 2 are busy. In accessing New York and Connecticut, FX line 3 and FX line 1 are the third least-cost routes, so enter group No. 5 for FX line 3 and group No.3 for FX line 1 at Advance No. 3. In accessing Pennsylvania, the route through D.D.D. line is the third least-cost, so enter group No. 7 for D.D.D. line at Advance No.3.
- (iv) CO groups to be registered at Advance No.4 are considered when all the CO groups at Advance Nos. 1, 2, and 3 are busy. In accessing New York and Connecticut, the D.D.D. line is the fourth least-cost route, so enter group No. 7 for the D.D.D. line at Advance No. 4. In this example, there is no CO group to be entered as the fourth least-cost route to Pennsylvania.

The Route Table for Time 0 Group (08:00 to 16:59) has now been prepared by steps (i) through (iv), as shown in Figure 4.2.2.6.4.3. (When Time Zone is default. Time Zone can be set freely).

8. When the dial data to be output in originating an outgoing call are determined after selection of the optimum CO group, the system proceeds to processing for toll call restriction. (The flow processing toll call restriction is described in detail in paragraph 4.3.7 Programming Toll Restriction.) The system makes the following analysis in this process:
 - (1) The system obtains the value of "Toll Restriction" that has been set for the calling extension. (KT/VP and SLT)
 - (2) The system analyzes the toll plan according to the value of toll-restriction (assumed to be other than "0" because "0" signifies unconditional toll access) and the selected CO group.
 - (3) The system analyzes the caller's dial data according to the North American Dial Number Plan, and determines whether to restrict or permit toll calls by referring to the toll plan.
9. If toll calls are permitted, the modified dial data are sent to the CO/PBX Line. If toll calls are restricted a warning tone is sent to the caller. This completes all Optimized Call Routing service.

4.2.2.6.3 CO/PBX Lines Selectable by Optimized Call Routing

Because effective operation of the Optimized Call Routing feature is a great advantage to the user, its planning by the installer is a very important factor. The installer must, first of all, know the types of CO/PBX Lines connected to the system in planning this feature. As described in paragraph 4.2.2.6.2, the CO groups selectable by the Optimized Call Routing feature are any of groups 1 through 7. Refer to Item No. 12, "CO Outgoing Group", in paragraph 4.1 System Planning.

The CO/PBX Lines in groups 1 through 7 that are subject to the Optimized Call Routing feature are as follows:

- o D.D.D. lines
- o FX lines
- o OUTWATS
- o Tie lines (E&M tie lines and PBX tie lines other than the tie lines connected from the S.C.C. office)

4.2.2.6.4. Optimized Call Routing Data Planning Procedure

Optimized Call Routing data can be planned as described below. This planning is to prepare the various tables mentioned in paragraph 4.2.2.6.2. These tables are available as planning sheets. The installer must prepare plans for Optimized Call Routing after becoming familiar with the types and purposes of CO/PBX Lines to be connected to the system.

This paragraph describes the actual planning procedure, showing a system example.

1. Figure 4.2.2.6.4.1 shows the assumed location of the EX-1232/2464 system and the network of CO/PBX Lines connected to it.

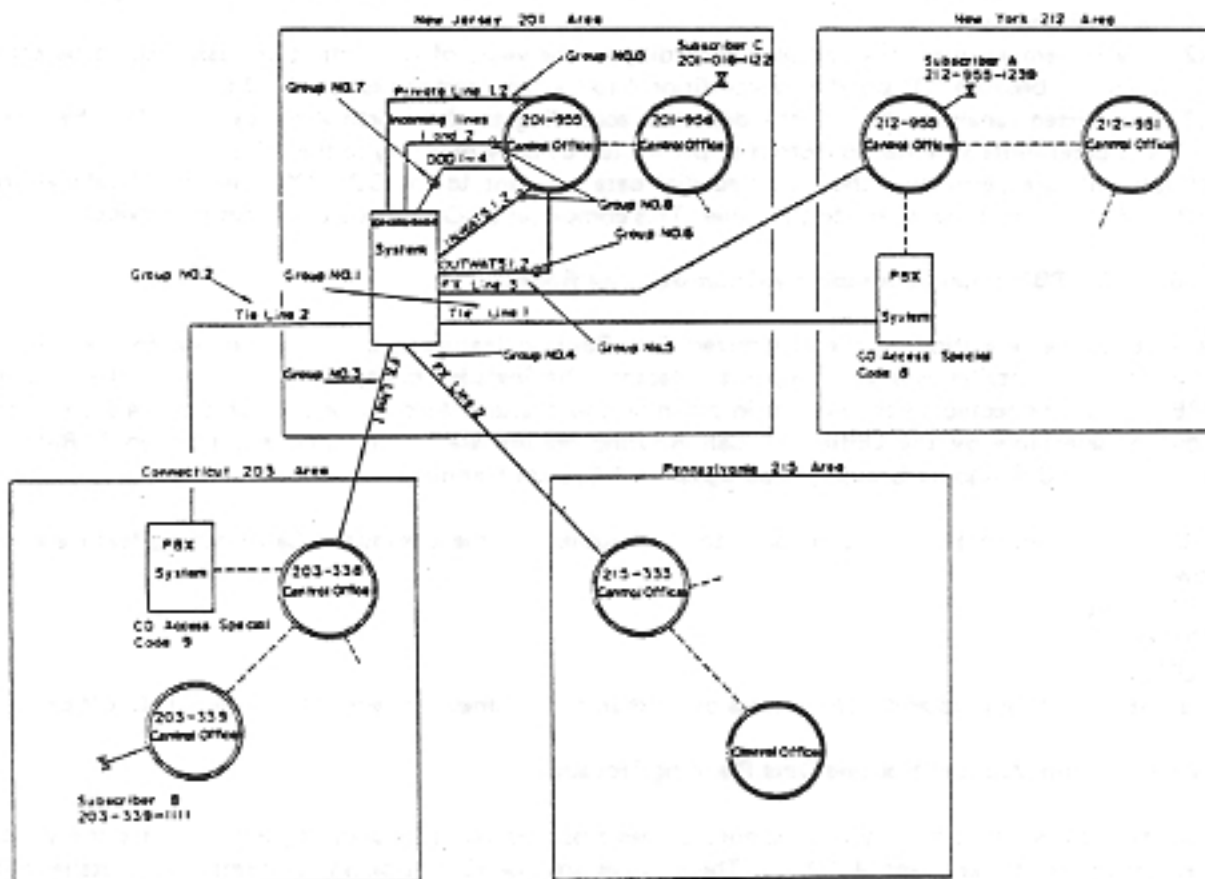


Figure 4.2.2.6.4.1. Assumed CO/PBX Line Network

(b) CO group No. 6 (OUTWATS) selected (Advance No. 2)

In this case, it is not necessary to modify dial data. Thus, no planning is necessary.

(c) CO group No. 5 (FX line 3) selected (Advance No. 3) (See Figure 4.2.2.6.4.12.)

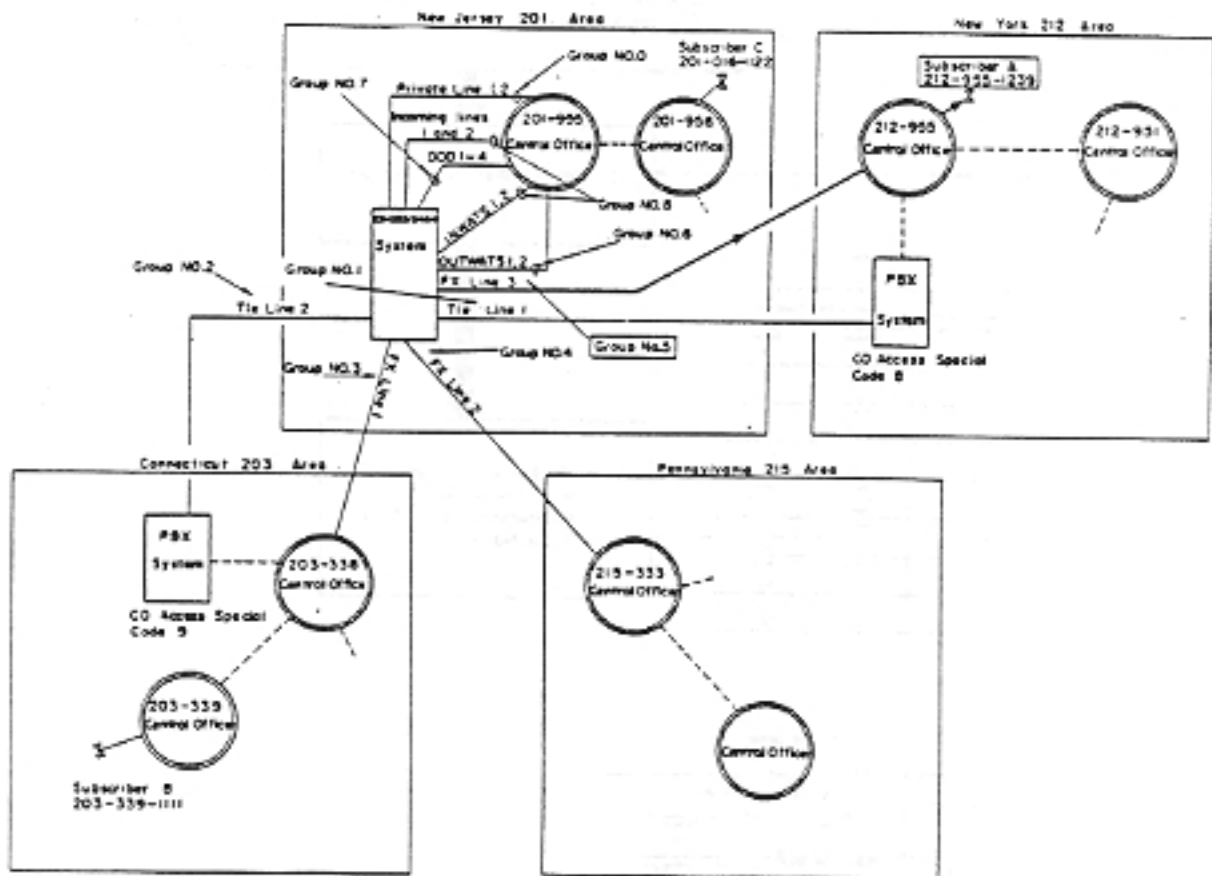


Figure 4.2.2.6.4.12 Example of Outgoing Toll Call Through CO Group No. 5 (Caller dialing 212-955-1234)

The dial data to be sent through the FX line must be modified as follows:

- Delete area code 212.

This makes the dial data: 955-1234

This planning example is illustrated in Figure 4.2.2.6.4.13

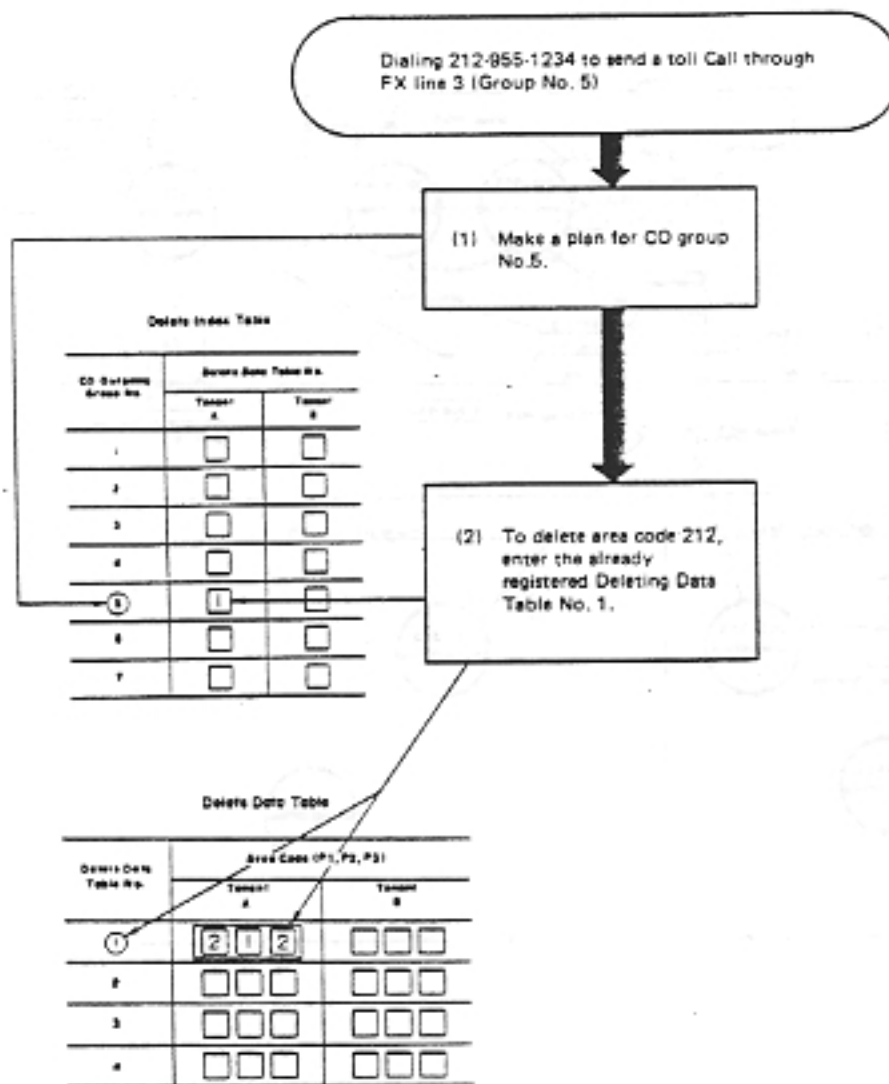


Figure 4.2.2.6.4.13 Planning Example for Dial Data Modification (FX line 3)

(d) CO group No. 7 (D.D.D. line) selected (Advance No. 4)

In this case, it is not necessary to modify dial data. Thus, no planning is necessary.

Example 2: An outgoing toll call by pressing the OPT key, or dialing Optimized Call Routing special code 90 and 203-339-1111. (Subscriber B in the network diagram of Figure 4.2.2.6.4.1). The following description proceeds in the order of Advance Nos. in Table No. 2 (Area 203, Connecticut), Route Table (Time Zone 0 Group).

(a) CO group No. 2 (PBX tie line 2) selected (See Advance No. 1, Figure 4.2.2.6.4.14.)

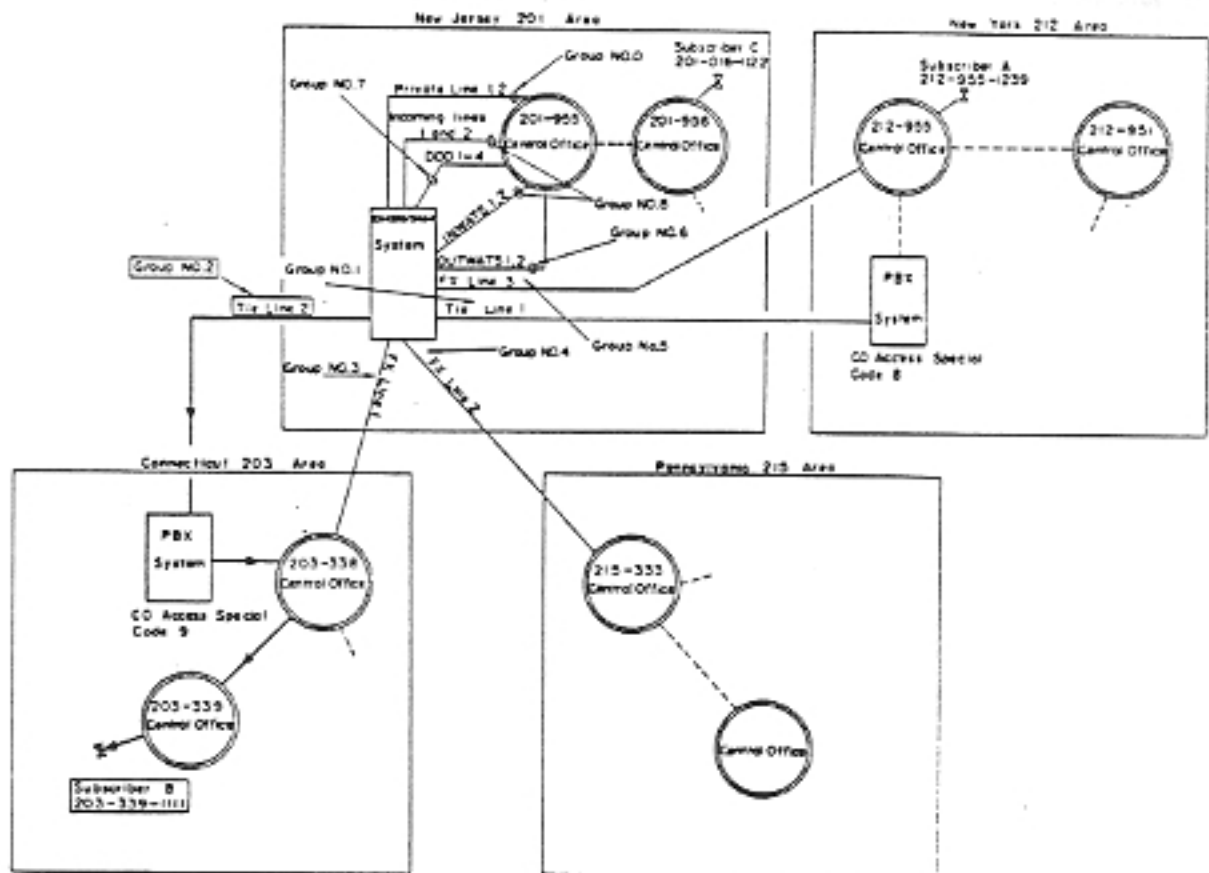


Figure 4.2.2.6.4.14 Example of Outgoing Toll Call Through CO Group No. 2 (Caller dialing 203-339-1111)

The dial data to be sent through the PBX tie line must be modified as follows:

- Delete area code 203.
- Add prefix 1 before the office code.
- Add the special code ("9" in this example) to seize the opposite PBX system before prefix 1.
- Add pause data of 2 seconds (to wait for the dial tone) between the special code and prefix 1.
The modified dial data will be:

9 - (Pause data: 2 seconds) - 1 - 339 - 1111

An example of actually entering the above modified dial data in a Planning Sheet is shown in Figure 4.2.2.6.4.15.

Dialing 212-955-1234 to Send a Toll Call Through PBX tie line 1 (Group 1)

(1) Make a plan for CO Group No. 1.

Deletes Index Table

CO Grouping Group No.	Deletes Data Table No.	
	Tenant A	Tenant B
1	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	<input type="checkbox"/>	<input type="checkbox"/>
3	<input type="checkbox"/>	<input type="checkbox"/>
4	<input type="checkbox"/>	<input type="checkbox"/>
5	<input type="checkbox"/>	<input type="checkbox"/>
6	<input type="checkbox"/>	<input type="checkbox"/>
7	<input type="checkbox"/>	<input type="checkbox"/>

Additional Index Table

CO Grouping Group No.	Additional Data Table No.	
	Tenant A	Tenant B
1	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	<input type="checkbox"/>	<input type="checkbox"/>
3	<input type="checkbox"/>	<input type="checkbox"/>
4	<input type="checkbox"/>	<input type="checkbox"/>
5	<input type="checkbox"/>	<input type="checkbox"/>
6	<input type="checkbox"/>	<input type="checkbox"/>
7	<input type="checkbox"/>	<input type="checkbox"/>

(2) Enter a Deleting Data Table No. (for example, 1) in the tenant A column.

(3) Enter area code 212 to be deleted, which corresponds to Deleting Data Table No. 1.

(4) Enter an Additional Data Area/Office Table No. (for example, 1) in the tenant A column.

(5) Enter an Additional Table No. (for example, 1) corresponding to area code 212 in Adding Area Table No. 1. This example requires no prefix.

Deletes Data Table

Deletes Data Table No.	Area Code (P1, P2, P3)		Tenant
	P1	P2	
1	200		B

Additional Data Office Table No. 1

Area Code P1, P2, P3	Prefix	Additional Table No.
200		

Additional Data Office Table No. 2

Area Code P1, P2, P3	Prefix	Additional Table No.
200		

Additional Data Office Table No. 5

Area Code P1, P2, P3	Prefix	Additional Table No.
200		

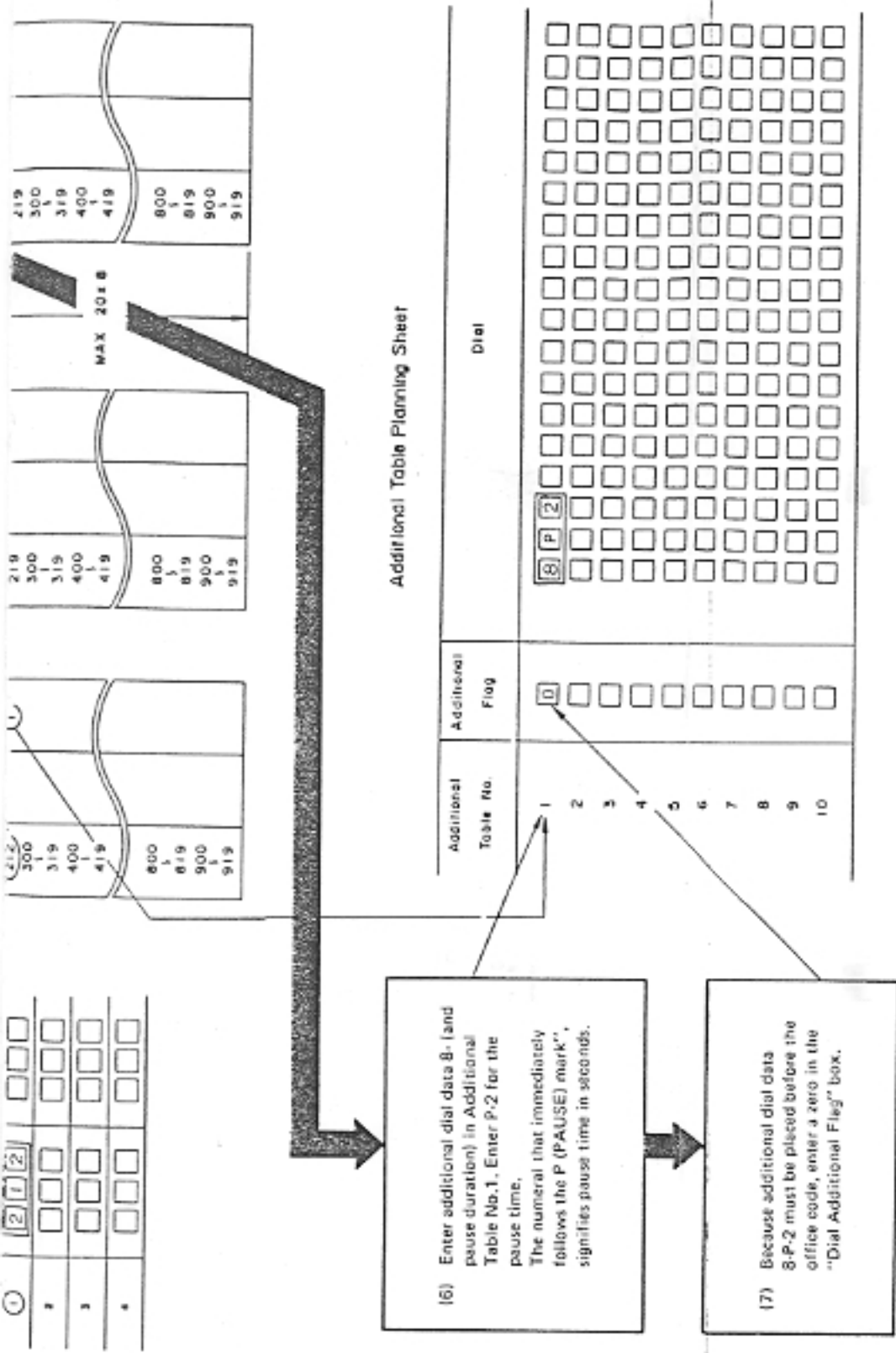


Figure 4.2.2.6.4.11 Example of Planning Dial Data Modification
(Example for PBX tie line 1)

Dialing 203-339-1111 to Send a Toll Call Through
PRX Tie Line 2 (Group No. 2)

(1) Make a plan for CO group No. 2.

Delete Index Table

CO Outgoing Group No.	Enter Data Table No.	
	Tenant A	Tenant B
1	1	<input type="checkbox"/>
2	2	<input type="checkbox"/>
3	<input type="checkbox"/>	<input type="checkbox"/>
4	<input type="checkbox"/>	<input type="checkbox"/>
5	<input type="checkbox"/>	<input type="checkbox"/>
6	<input type="checkbox"/>	<input type="checkbox"/>
7	<input type="checkbox"/>	<input type="checkbox"/>

Additional Index Table

CO Outgoing Group No.	Enter Data Table No.	
	Tenant A	Tenant B
1	1	<input type="checkbox"/>
2	2	<input type="checkbox"/>
3	<input type="checkbox"/>	<input type="checkbox"/>
4	<input type="checkbox"/>	<input type="checkbox"/>
5	<input type="checkbox"/>	<input type="checkbox"/>
6	<input type="checkbox"/>	<input type="checkbox"/>
7	<input type="checkbox"/>	<input type="checkbox"/>

(2) Enter a Deleting Data Table No (for example, 2) in the tenant A column.

(3) Enter area code 203 to be deleted, which corresponds to Deleting Data Table No. 2.

(4) Enter an Additional Table No. (for example, 2) in the tenant A column.

(5) Enter an Additional Table No. (for example, 2) corresponding to area code 203 in Additional Area Table No. 2. This example requires prefix 1.

Delete Data Table

Enter Data Table No.	Area Code (P1, P2, P3)	
	Tenant A	Tenant B
1	203	<input type="checkbox"/>
2	203	<input type="checkbox"/>

Additional Data Office Table No. 1

Area Code P1 P2 P3	Prefix	Additional Table No.
200	1	1

Additional Data Office Table No. 2

Area Code P1 P2 P3	Prefix	Additional Table No.
200	1	2

Additional Data Office Table No. 5

Area Code P1 P2 P3	Prefix	Additional Table No.
200	1	5

1	2	0	3		
3					
4					

212	219	219	219	219
300	300	300	300	300
1	1	1	1	1
319	319	319	319	319
400	400	400	400	400
1	1	1	1	1
419	419	419	419	419
800	800	800	800	800
1	1	1	1	1
819	819	819	819	819
900	900	900	900	900
1	1	1	1	1
919	919	919	919	919

MAX 20 x 8

Additional Table Planning Sheet

Additional Table No.	Additional Flag	Dial
1	0	B P 2
2	0	5 P 2
3		
4		
5		
6		
7		
8		
9		
10		

16) Enter additional dial data 9- (and pause duration) in Additional Table No. 2. Enter P-2 for the pause time. The numeral that immediately follows the P (PAUSE) mark, signifies pause time in seconds.

17) Because additional dial data 9-P-2 must be placed before the office code, enter a zero in the "Dial Additional Flag" box.

Figure 4.2.2.6.4.15 Example of Planning Dial Data Modification (Example for Tie Line 2)

(b) CO Group No. 6 (OUTWATS) selected (Advance No. 2)

In this case, it is not necessary to modify dial data. Thus, no planning is necessary.

(c) CO group No. 3 (FX line 1) selected (Advance No. 3) (See Figure 4.2.2.6.4.16.)

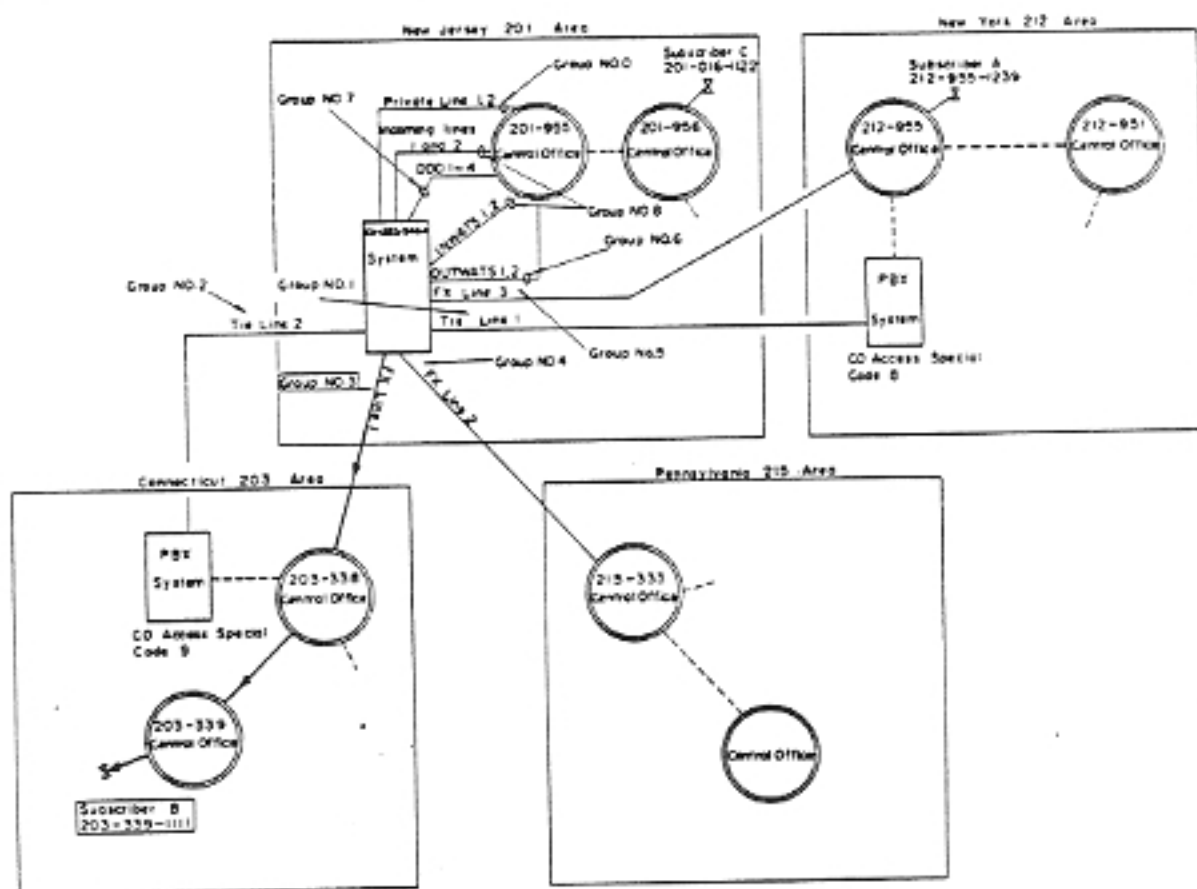


Figure 4.2.2.6.4.16 Example of Outgoing Toll Call Through CO Group No.3 (Caller dialing 203-339-1111)

The dial data to be sent through the FX line must be modified as follows:

- Delete the area code 203.
- Add prefix 1 before the office code.

This makes the dial data: 1-339-1111

This planning example is illustrated in Figure 4.2.2.6.4.17.

Dialing 203-339-1111 to send a Toll Call Through
F.X. Line 1 (Group 3)

(1) Make a plan for CO group No. 3.

Deletes Table

CO Grouping Group No.	Deletes Table	
	Target	Value
1	1	<input type="checkbox"/>
2	2	<input type="checkbox"/>
3	2	<input type="checkbox"/>
4		<input type="checkbox"/>
5	1	<input type="checkbox"/>
6		<input type="checkbox"/>
7		<input type="checkbox"/>

(2) To delete are code 203, enter the already registered Deleting Data Table No. 2.

Additional Index Table

CO Grouping Group No.	Additional Index Table	
	Target	Value
1	1	<input type="checkbox"/>
2	2	<input type="checkbox"/>
3	1	<input type="checkbox"/>
4		<input type="checkbox"/>
5		<input type="checkbox"/>
6		<input type="checkbox"/>
7		<input type="checkbox"/>

(3) Enter a 1 in the tenant A column as Additional Area/Office Table No. Do not enter a 2; if a 2 is entered, the system refers to area code 203 in Area Table No. 2 and as a result outputs the adding dial data 9- (pause time of 2 seconds) that are registered in Additional Table No. 2.

(1) Enter prefix 1, which corresponds to area code 203 in Additional Area Table No. 1. It is not necessary to enter and Additional Table No. because there are no adding dial data except prefix 1.

Deletes Data Table

Additional Data Office Table No. 1

Additional Data Office Table No. 2

Additional Data Office Table No. 5

Source Data Table No.	Tensec			Tensent		
	a	b	c	d	e	f
1	2	1	2			
2	2	0	3			
3						
4						

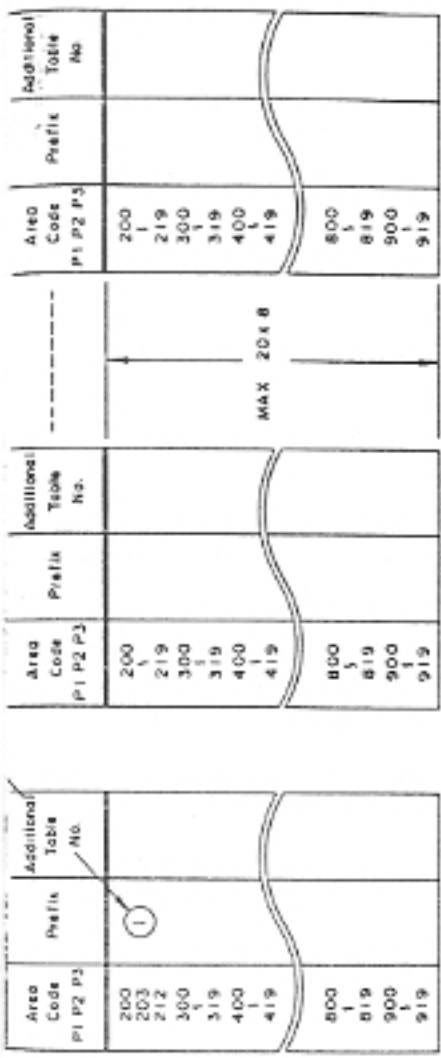


Figure 4.2.2.6.4.17 Planning Example for Dial Data Modification (Example for F.X. Line 1)