

**KANDA TELECOM INC.**

**EK-1232/2064**

**INSTALLATION &  
MAINTENANCE  
MANUAL**

Revision 3  
6/87

## NOTICE TO DEALER

The EK-1232 and EK-2064 have been registered with the Federal Communications Commission, in accordance with provisions of Part 68 Rules and Regulations. In order to comply with these FCC Rules, the following provisions must be made:

- 1) Direct connection to telephone lines must be made with FCC approved plugs and jacks.
- 2) Prior to connecting the equipment to the telephone lines, the telephone company must be advised that you wish to connect an FCC registered device. Other information that must be supplied is:
  - a) the model number and manufacturer of equipment;
  - b) the FCC registration number;
  - c) the ringer equivalence;
  - d) the particular lines affected
- 3) This equipment may not be connected to party or coin telephone lines.
- 4) In the event that harm to the telephone line is caused, your equipment should be disconnected until the source of the problem has been determined. Should your device be the source, it should remain disconnected until necessary repairs have been made.
- 5) Should the telephone company plan to make any changes to their equipment, operations or procedures which might affect operations of customer provided equipment, prior written notification must be given to user.
- 6) Repairs to this equipment must be made by the manufacturer or a technician who has been certified by Kanda Telecom Inc. If unauthorized repair is performed, the warranty will become void.



**SECTION 1. & SECTION 2.  
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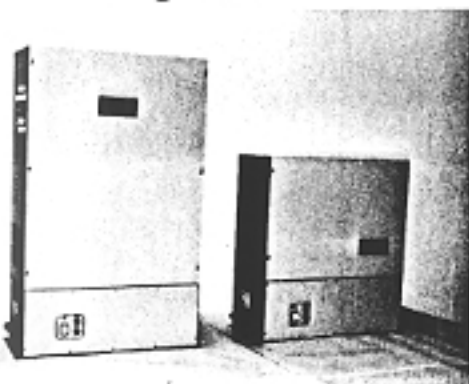
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# 1. INTRODUCTION

1.01 This manual includes general and detailed descriptions, installation practices, and maintenance and troubleshooting procedures relevant to EK-1232 and EK-2064 Electronic Key Telephone Systems.

1.02 Revision 3 currently supersedes all previous documents. This revision incorporates addendums 7.A. and 9.A. along with information on current modifications to hardware and software. Should revision of these documents become necessary in the future, the reasons for reissue will be explained in this paragraph.

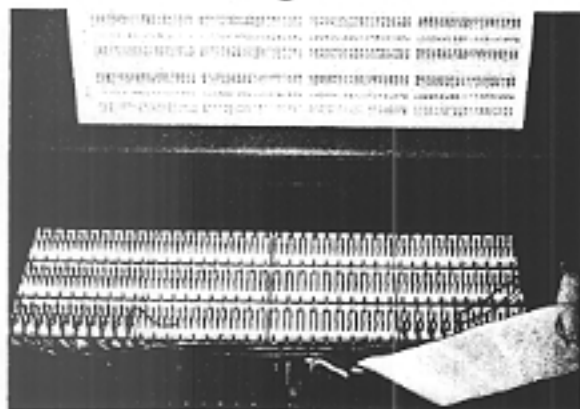
Figure 1.



EK-2064 KSU  
with Power Supply

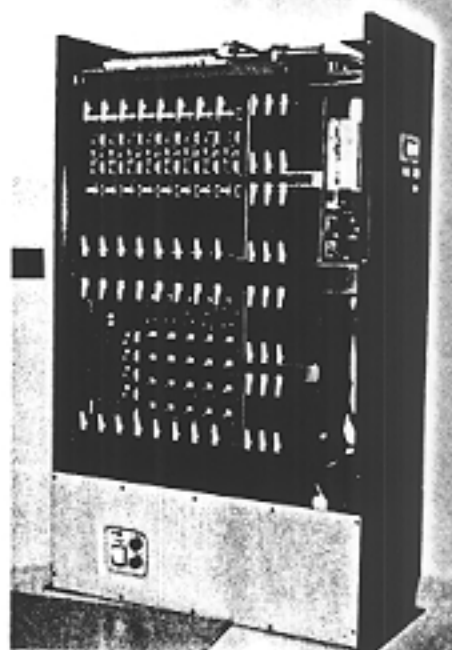
EK-1232 KSU  
with Power Supply

Figure 2.



EK-2064 MDF

Figure 3.



EK-2064 KSU  
with Power Supply

## 2. GENERAL DESCRIPTION

- 2.01 EK-1232 and EK-2064 have been designed as medium and large Electronic Key Telephone Systems for use in business applications where flexibility and reliability are prime considerations.
- 2.02 Both EK-1232 and EK-2064 utilize stored program and microprocessor technologies in order to conserve space and reduce power consumption thereby reducing installation and operating cost.
- 2.03 Erasable / Programmable Read-Only Memory (EPROM) is employed as the storage medium for the system operating instructions. Programming is stored in Random Access Memory (RAM) and is preserved in the event of commercial power failure by a lithium battery located on the CPU PCB. The System automatically restarts itself when power is restored. In addition, Complementary Metal-Oxide Semiconductor (CMOS) cross points provide space division switching of the voice paths.
- 2.04 A total of 7 card types contain all common control circuits, cross points, and line and station circuits. This relatively small number of printed circuit boards is helpful in isolating faults and in spares management.
- 2.05 Systems can be either wall or floor mounted. Power supplies may be installed either directly beneath the KSU or a short distance from the KSU cabinet. Each power supply includes a charging circuit so that reserve power can be supplied with the addition of only storage batteries.
- 2.06 Telephone subsets will operate on either DTMF or Rotary-Pulse CO/PABX lines. In addition they will also operate in "mixed" systems where both types of lines are present. Common control circuitry determines the type of dial signal to send to each line and responds accordingly.
- 2.07 Both systems are easily operated and provide a wide range of useful features and capabilities such as auto/speed dialing, tenant facilities, flexible line assignments, camp-on, do-not-disturb, toll restriction, etc. In addition to these, optional capabilities may be added to the telephone subsets such as the LCD display, handsfree speakerphone, SMDR, 1A2 Interface, wall mount kit, and DSS console.



EK-1232 Electronic Key Telephone System  
DSS console



EK-2064 Electronic Key Telephone System

## FCC REGISTRATION

2.08 These systems have been registered with the Federal Communications Commission as fully protected key systems. The registration numbers are:

EK-1232..... BI792C-70527-KF-E

EK-2064..... BI792C-70527-KF-E

Ringer equivalence number..... 0.8B

USOC Jack #..... RJ21X

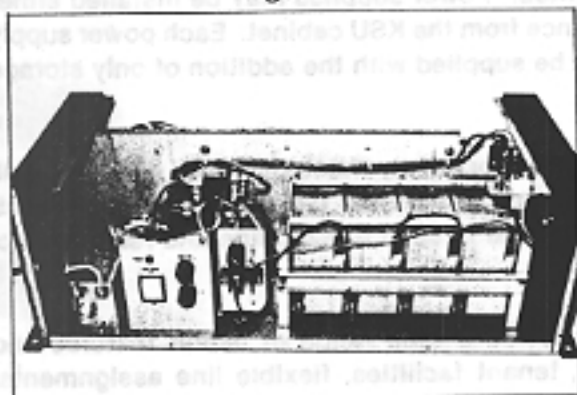
NOTE: "This equipment complies with the requirements in part 15 of the FCC Rules for a Class A computing device. Operation of this equipment in a residential area may cause unacceptable interference to radio and TV reception requiring the operator to take whatever steps are necessary to correct the interference."

2.09 EK-1232 and EK-2064 have been approved for use in Canada by the Department of Communications. The certification number is:

DOC certification number ..... 754 1454 A

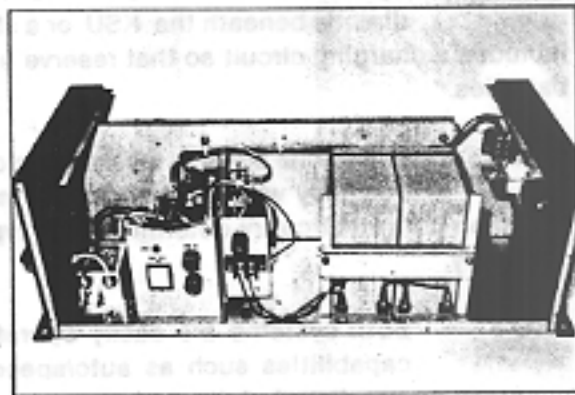
Load number ..... 12B

Figure 4.



EK-2064 Power Supply with batteries

Figure 5.



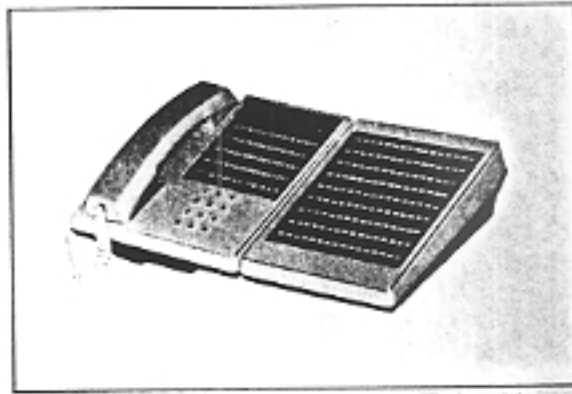
EK-1232 Power Supply with batteries

Figure 6.



EK-1232/2064 Executive Tel.

Figure 7.



EK-1232/2064 Executive Tel. with  
DSS console



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### 3 . SYSTEM CONFIGURATION

- 3.01 Both EK-1232 and EK-2064 KSUs consist of a basic cabinet which includes the component mounting shelves, main distribution frame (MDF), backplane PCB, power distribution PCB (POWU), and fuse panel.
- 3.02 System operating power is provided by a separate power supply unit which delivers 24 VDC to the POWU PCB within the KSU cabinet. Power consumption is 6 amps maximum for EK-1232 and 12 amps maximum for EK-2064.
- 3.03 In addition to the above components, each system requires common control PCBs which include one each of the CPU PCB, TONE PCB, and PX PCB. These PCBs are identical for both systems.
- 3.04 Configuring each KSU to meet individual applications requires addition of CX PCBs, 4/CO PCBs, and 8/ST PCBs. These printed circuit boards provide the crosspoint matrices, CO/PBX line circuits, and station circuits respectively. (See figures 8.-1 thru 9.-15)
- 3.05 EK-1232 can be equipped for a maximum of 12 CO/PBX lines, 32 stations, and 5 intercom talk paths.
- 3.06 EK-2064 can be equipped for a maximum of 20 CO/PBX lines, 64 stations, and 5 intercom talk paths. Optionally, EK-2064 can be equipped for 9 intercom talk paths by reducing the CO/PBX line capacity to 16.
- 3.07 DSS consoles may optionally be added to each system providing direct station selection and busy lamp indications for stations so equipped. A maximum of two dedicated DSS calling paths are available for both EK-1232 and EK-2064. These paths may be made available for use by stations if desired. DSS consoles do not reduce station capacity, require no additional cabling, and require no additional circuitry within the KSU. Any station may be equipped with a DSS console. A DSS console is required for programming but may be removed afterward.
- 3.08 Additional features and capabilities such as SMDR, 1A2 interface and Off Premise Extensions may be included in the system through addition of optional hardware.

Both EK-1232 and EK-5084 KSUs consist of a basic cabinet which includes the control mounting shelves, main distribution frame (MDF), backplane PCB, power distribution frame (PDF), and bus panel.

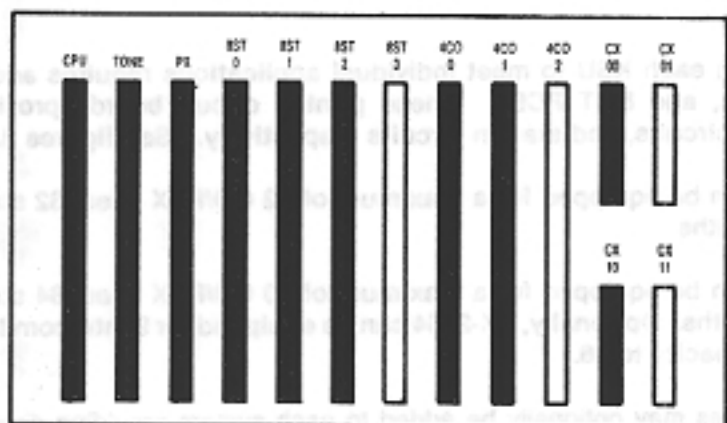
System operating power is provided by a separate power supply unit which delivers 24 VDC to the POWU PCB within the KSU cabinet. Power consumption is 5 amps maximum.

Figures 8.-1 thru 8.-9

Actual layout of cards in EK-1232 KSU

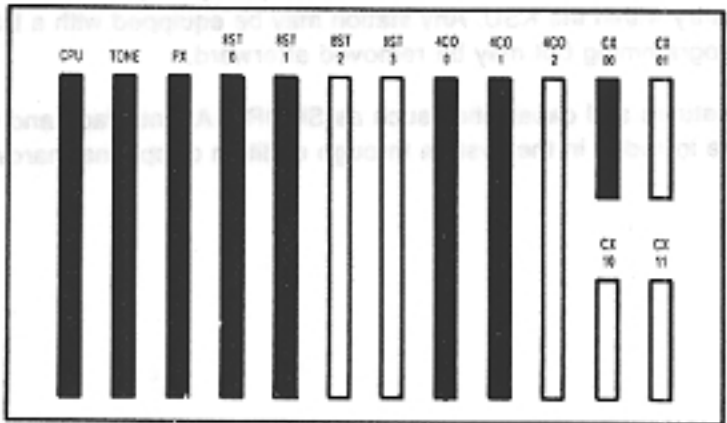
In addition to the above, the EK-1232 KSU includes a common control PCB which includes a CPU PCB, TONE PCB, and FX PCB. These PCBs are located in the KSU cabinet.

8.-1



8/24  
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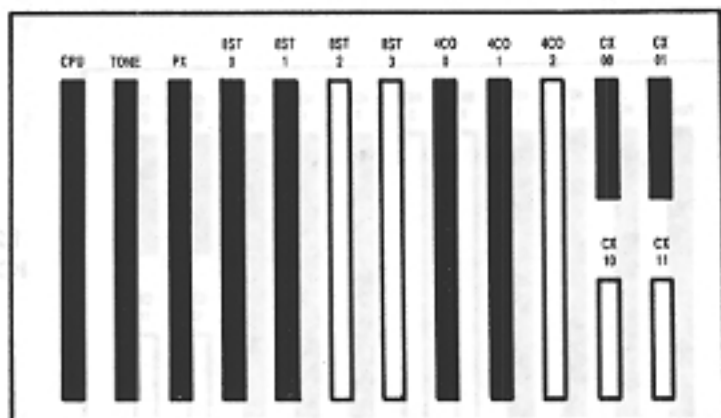
8.-2



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ICM PATH 2

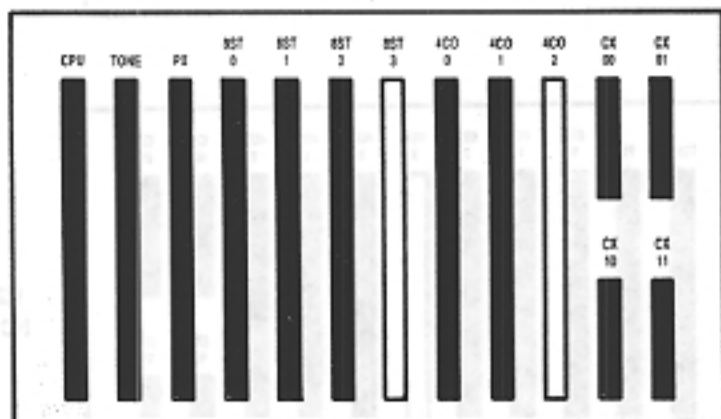


8.-3



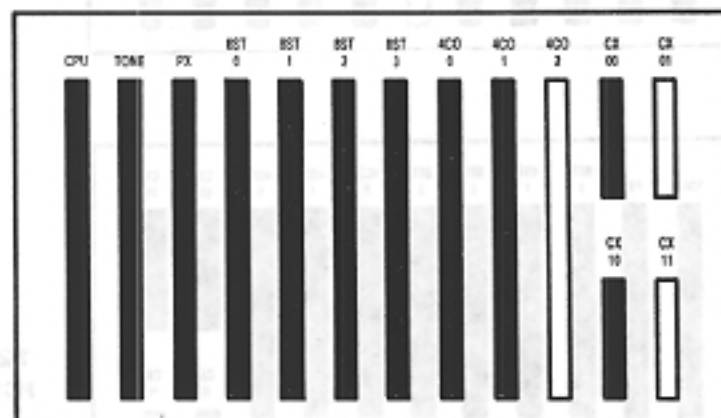
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8.-4



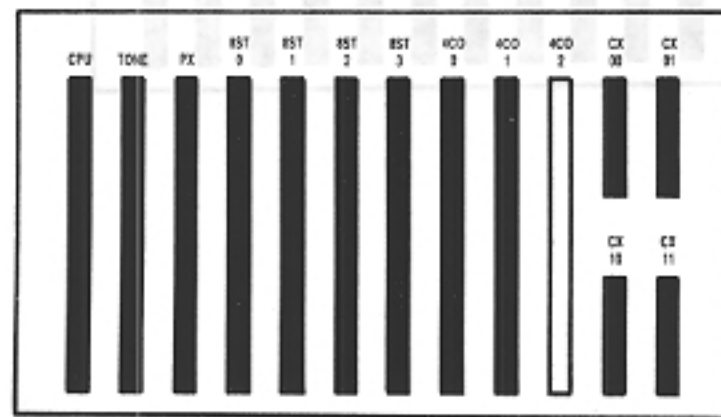
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8.-5



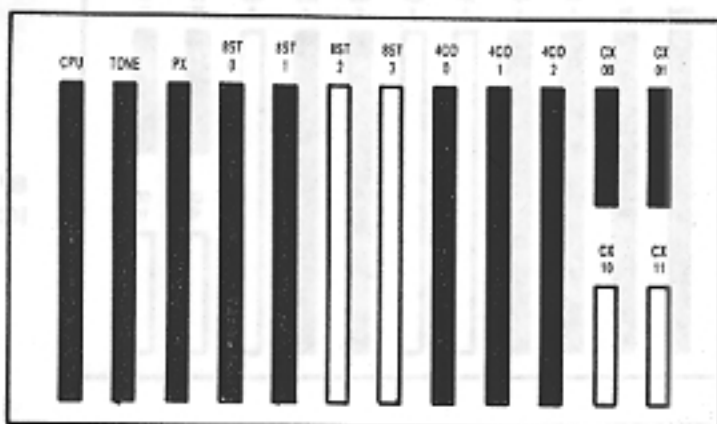
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8.-6



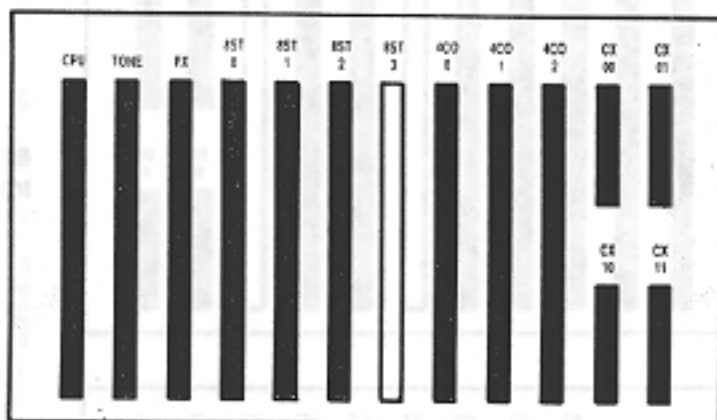
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8-7



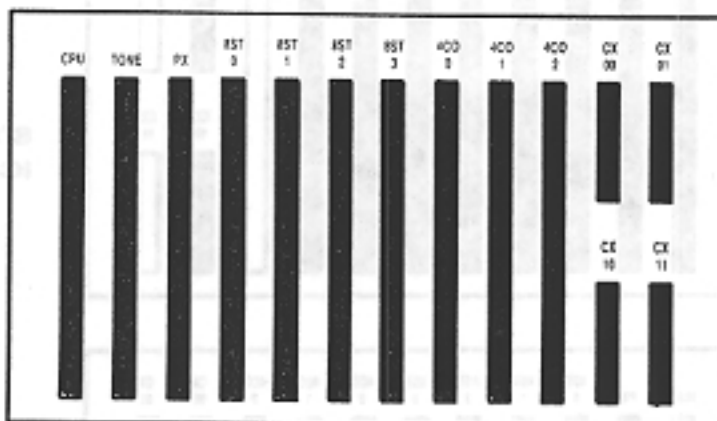
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8-8



12/24  
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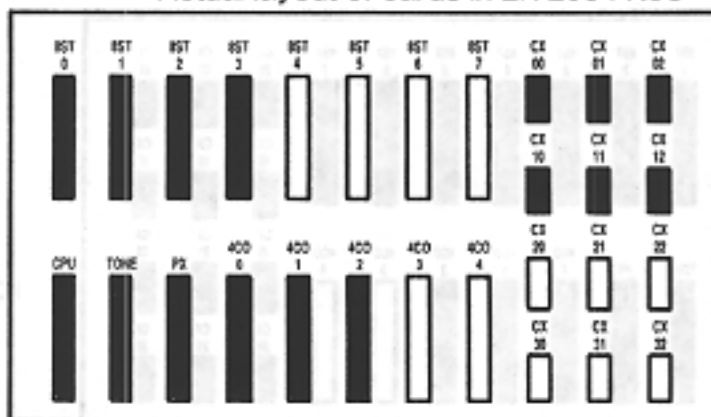
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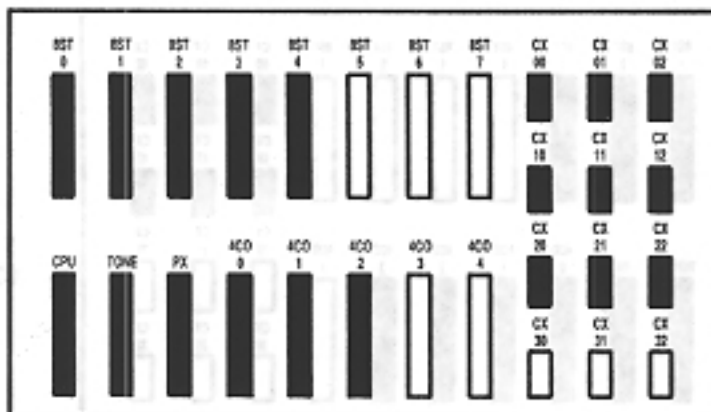
Figures 9.-1 thru 9.-15  
Actual layout of cards in EK-2064 KSU

9.-1



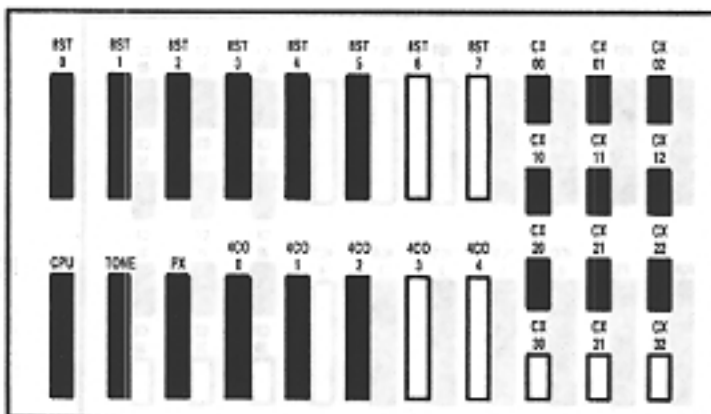
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9.-2



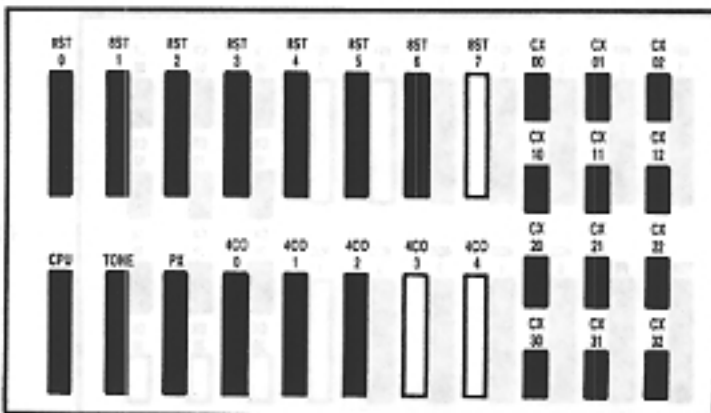
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9.-3



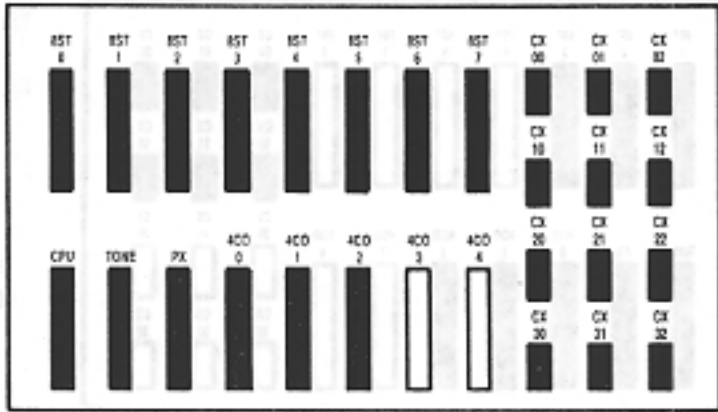
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9.-4



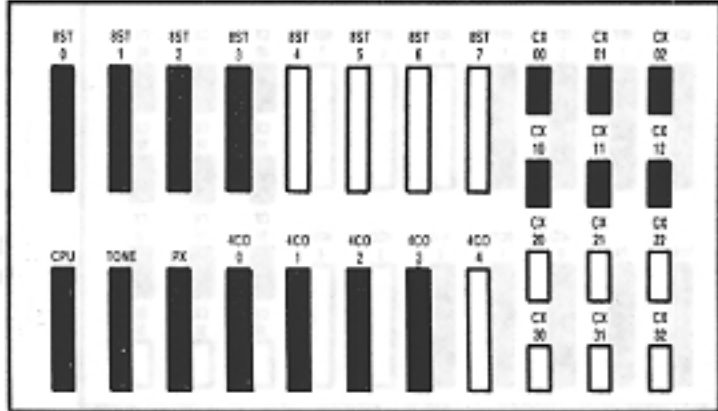
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9-5



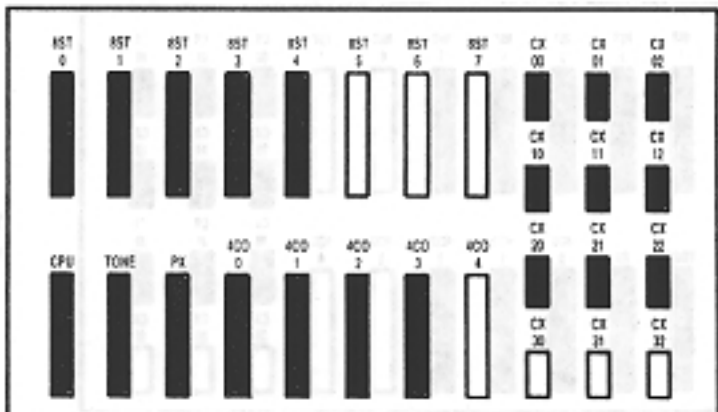
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9-6



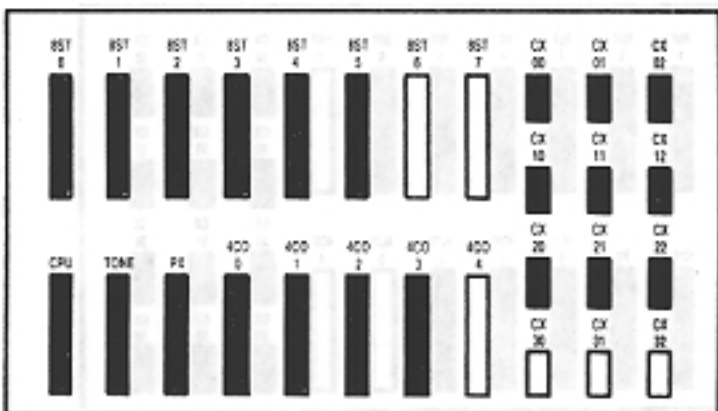
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9-7



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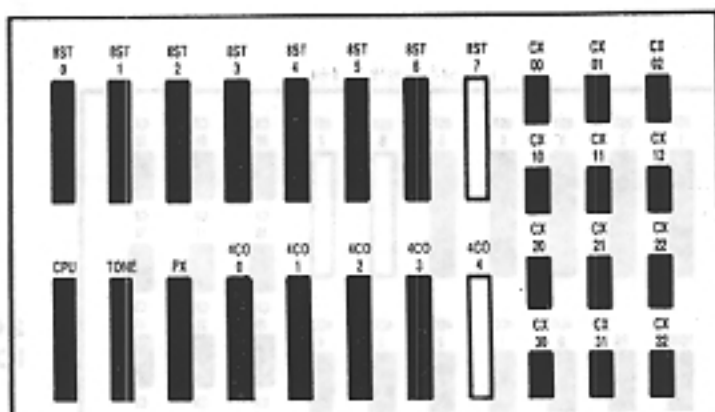
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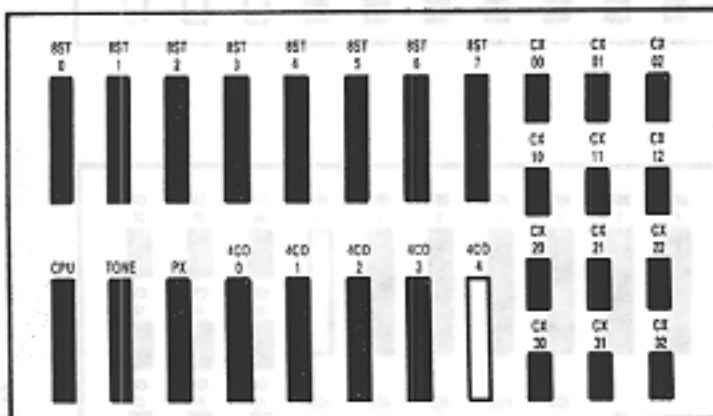


9-9



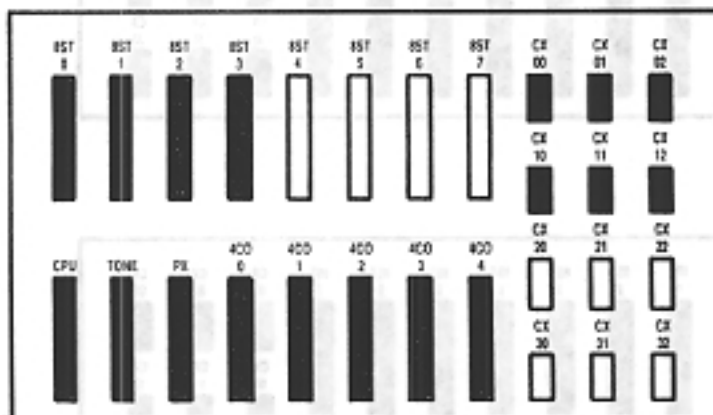
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9-10



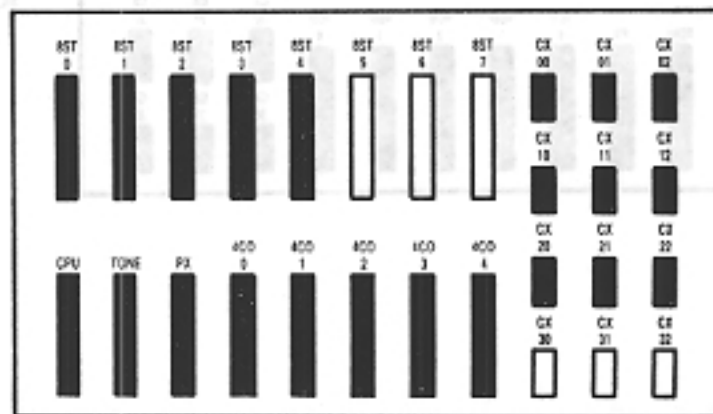
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9-11



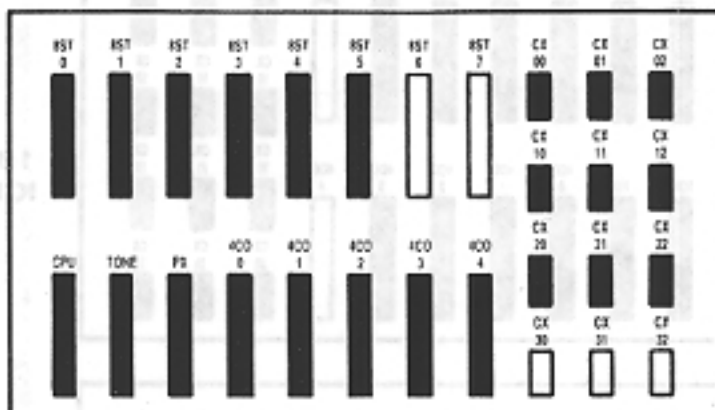
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9-12



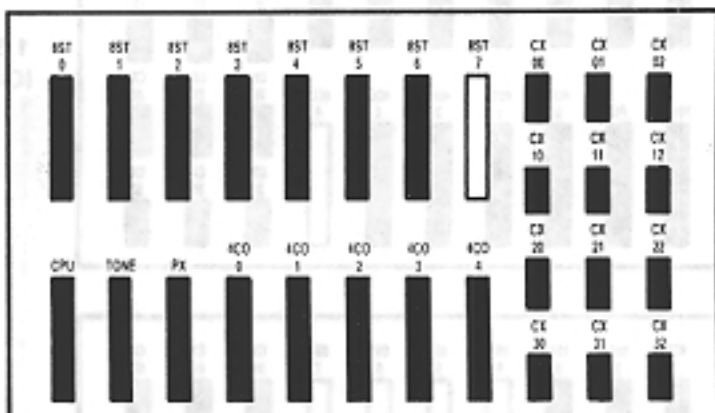
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9-13



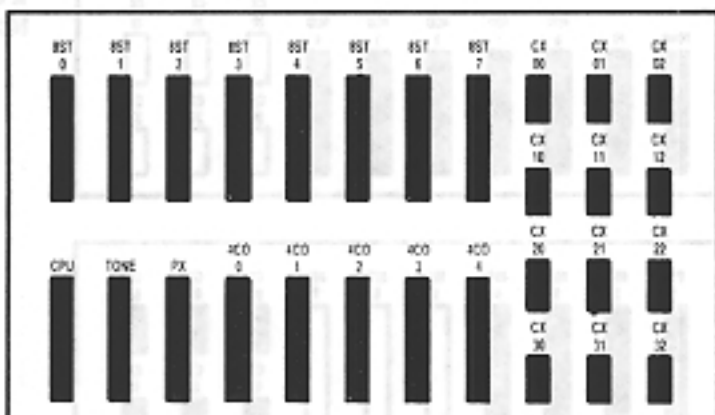
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ICM PATH 5

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	SYSTEM SPECIFICATIONS	4-1



## 4. SYSTEM SPECIFICATIONS

### 4.01 ELECTRICAL SPECIFICATIONS AND CHARACTERISTICS

ITEM	SPECIFICATION	NORMAL VALUE
Ringer Equivalence	less than 1.0	about 0.8
On-hook DC Resistance (Tip to Ring, Tip to Ground, Ring to Ground)	more than 50M ohm at 100VDC more than 150K ohm at 200VDC	more than 150M ohm more than 1M ohm
On-hook AC Impedance between Tip and Ring during Ringing Signal	more than 8K ohm at 130VAC rms 20Hz 105VDC	about 20K ohm
On-hook AC Impedance between Tip and Ring at Voice Band	More than 25K ohm at 200Hz 80K ohm at 697Hz 80K ohm at 1633Hz 60K ohm at 3200Hz (applied 3VAC rms)	more than 25K ohm 80K ohm 80K ohm 60K ohm
Ringing Sensitivity	no response at 20Hz 3Vrms response at more than 40V rms 20Hz	no response: about 10V rms response: about 21V rms
Acoustic Power of Incoming Call Tone	more than 75dBA at 50cm from Subset applied at 60V rms 20 Hz and Volume Control at maximum	more than 80dBA
AC Energy in On-hook State (noise)	less than -55dBm at 200Hz to 4000Hz & less than 10dB rnc	less than -55dBm & 10dB rnc
AC Energy in Off-hook State (noise)	less than 15dB rnc	less than 15dB rnc
Metallic Signal Power during Music on Hold	less than -9dB averaged & any 3 sec. interval	about -17dBm
Cross-talk Attenuation between any established CO line connections	more than 70dB	more than 70dB

### Characteristics of Pulse

#### Signaling:

Speed	8 to 11pps	10pps (or 20pps)
Break Ratio	58 to 64%	60% (or 66%)
Interdigit Time	300ms to 1sec.	750ms at 10pps 550ms at 20pps

### Characteristics of Tone

#### Signaling:

Signal Level: nominal	-6dBm to -4dBm	about -6.5 to to -4.5dBm
Low Group	more than -10dBm	-6.5dBm
High Group	-8dBm	-4.5dBm
Pair	less than 2dBm	-3dBm
Frequency Deviation	plus or minus 1.5%	plus or minus 1.09%
Frequency Distortion	less than -20dB at 500 to 3200Hz	25dB
Output Impedance on Return Loss	more than 3.5dB at 50mA DC	
Cycle Time	more than 100ms	220ms
Duration of Signal	50ms	100ms
Interdigit Time	4.5ms to 3sec.	120ms

Automatic Disconnect Time  
and Pause Time before Last  
Number Redial

1 sec. break before  
2 sec. pause

2 sec. break  
before 4 sec.  
pause

Start Time of Address  
Signal (behind PBX)

1 to 8 sec. variable pause  
after dialing number

2 sec.  
(programmable)

Maximum Distance between  
KSU and Subset

80 ohms & approx. 1500ft.

Maximum Distance between  
KSU and DSS console

20 ohms & approx. 350ft.

## 4.02 PHYSICAL SPECIFICATIONS

ITEM	HEIGHT	WIDTH	DEPTH	WEIGHT
EK-1232 KSU	14.37"	21.46"	9.25"	46.30 lb. (fully loaded)
EK-2064 KSU	27.40"	21.46"	9.25"	85.98 lb. (fully loaded)
EK-1232 P.S.	7.87"	21.46"	9.25"	29.76 lb.
EK-2064 P.S.	7.87"	21.46"	9.25"	30.86 lb.
EK-1232/2064 TEL.	3.80"	8.46"	9.33"	3.53 lb.
with LCD PCB	3.80"	8.46"	9.33"	3.75 lb.
with H/F PCB	3.80"	8.46"	9.33"	3.75 lb.
with LCD & H/F PCB	3.80"	8.46"	9.33"	3.97 lb.

#### 4.03 SYSTEM CAPACITIES

ITEM	EK-1232	EK-2064
CO/PBX Lines	12	16/20
Intercom Paths	5	9/5
Stations	32	64
DSS Paths	2	2

#### 4.04 POWER SUPPLY SPECIFICATIONS

ITEM	EK-1232	EK-2064
Input Voltage	120VAC +/- 10% 60Hz +/- 0.5Hz 3A	120VAC +/- 10% 60Hz +/- 0.5Hz 3A
Output Voltage	24VDC +/- 2V	24VDC +/- 2v
Output Current	0-6A	0-12A
Ripple Voltage	not more than 100mV	not more than 100mV
Noise	not more than 22dB rnc	not more than 22dB rnc

#### 4.05 RESERVE POWER REQUIREMENTS

The following table provides information on system power requirements and reserve battery back up times (using the recommended Power Sonic batteries).

SYSTEM SIZE		POWER CURRENT (A)			BACK UP TIME (HOUR)		
		MAX.	TYP.	MIN.	MAX.	TYP.	MIN.
EK-1232	824	3.53	2.63	1.73	3.18	2.09	1.56
	832	4.29	3.19	2.09	2.63	1.72	1.28
	1224	3.73	2.78	1.83	3.01	1.98	1.47
	1232	4.49	3.34	2.19	2.51	1.65	1.22
EK-2064	1232	4.84	3.39	2.19	2.97	1.92	1.34
	1248	6.36	4.51	2.91	2.23	1.44	1.02
	1264	7.88	5.63	3.63	1.79	1.15	0.82
	1632	5.39	3.74	2.29	2.84	1.74	1.21
	1648	6.91	4.86	3.01	2.16	1.34	0.94
	1664	8.43	5.98	3.73	1.74	1.09	0.77
	2032	5.94	4.09	2.44	2.86	1.59	1.09
	2048	7.46	5.21	3.16	2.06	1.25	0.87
2064	8.98	6.33	3.88	1.68	1.03	0.72	

NOTE: All specifications are subject to change without notice.

# SYSTEM CAPACITIES

ITEM	EK 1333	EK 2004
COBB Lines	12	1820
Windows Paths	6	245
Stations	25	84
Gas Paths	1	2

## 4.04 POWER SUPPLY SPECIFICATIONS

ITEM	EK 1333	EK 2004
Input Voltage	120VAC ± 1.0%	120VAC ± 1.0%
Output Voltage	24VDC ± 1.5%	24VDC ± 1.5%
Output Current	0.8A	0.15A
Ripple Voltage	not more than 100mV	not more than 100mV
Ripple Current	not more than 2500 mc	not more than 2500 mc

## 4.05 RESERVE POWER REQUIREMENTS

The following table provides information on system power requirements and reserve capacity back up times using the recommended Power Sonic batteries.

SYSTEM SIZE	POWER CURRENT (A)			BACK UP TIME (HOUR)		
	MAX.	TYP.	MIN.	MAX.	TYP.	MIN.
2004	8.00	6.00	5.00	1.00	1.00	0.75
2008	8.50	6.50	5.50	1.00	1.00	0.87
2012	9.00	7.00	6.00	1.00	1.00	1.00
2016	9.50	7.50	6.50	1.00	1.00	1.00
2020	10.00	8.00	7.00	1.00	1.00	1.00
2024	10.50	8.50	7.50	1.00	1.00	1.00
2028	11.00	9.00	8.00	1.00	1.00	1.00
2032	11.50	9.50	8.50	1.00	1.00	1.00
2036	12.00	10.00	9.00	1.00	1.00	1.00
2040	12.50	10.50	9.50	1.00	1.00	1.00
2044	13.00	11.00	10.00	1.00	1.00	1.00
2048	13.50	11.50	10.50	1.00	1.00	1.00
2052	14.00	12.00	11.00	1.00	1.00	1.00
2056	14.50	12.50	11.50	1.00	1.00	1.00
2060	15.00	13.00	12.00	1.00	1.00	1.00
2064	15.50	13.50	12.50	1.00	1.00	1.00
2068	16.00	14.00	13.00	1.00	1.00	1.00
2072	16.50	14.50	13.50	1.00	1.00	1.00
2076	17.00	15.00	14.00	1.00	1.00	1.00
2080	17.50	15.50	14.50	1.00	1.00	1.00
2084	18.00	16.00	15.00	1.00	1.00	1.00
2088	18.50	16.50	15.50	1.00	1.00	1.00
2092	19.00	17.00	16.00	1.00	1.00	1.00
2096	19.50	17.50	16.50	1.00	1.00	1.00
2100	20.00	18.00	17.00	1.00	1.00	1.00

All specifications are subject to change without notice.

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## 5 . FEATURES

5.01 A list of features presently available on EK-1232/2064 is shown below. Following the name of the feature is a letter indicating whether the feature is standard (S) or optional (O). Any additional equipment required for activation or operation of a feature is also shown.

ACCOUNT CODES	O	SMDR I/F and EXT PCB
ADD-ON CONFERENCE	S	—
ALARM INPUT	S	(EXTERNAL ALARM DEVICE)
ALL CALL PAGE	S	CPU-4CE ONLY
ALTERNATE POSITION ANSWERING	S	—
ASSIGNED NIGHT ANSWER	S	—
ATTENDANT DSS WITH BLF	O	DSS/BLF
AUTOMATIC HOLD	S	—
AUTOMATIC HOLD RECALL	S	—
AUTOMATIC HELD PARTY DISCONNECT	S	—
AUTOMATIC MUTE	S	—
AUTOMATIC PRIVACY	S	—
BACKGROUND MUSIC	S	(EXTERNAL MUSIC SOURCE)
BUSY CALL (BUSY OVERRIDE)	S	—
CALL ANNOUNCING WITH ANSWERBACK	S	—
CALL FORWARD - PRESET	S	—
CALL FORWARD SOURCE DISPLAY	O	LCD PCB
CALL MONITORING	S	—
CALL TIMER	O	LCD PCB
CALLING NUMBER DISPLAY	O	LCD PCB
CAMP-ON	S	—
CAMP-ON SOURCE DISPLAY	O	LCD PCB
CLOCK WITH ALARM SETTING	O	LCD PCB
COMMON AUDIBLE RINGING	O	(AUDIBLE DEVICE)
DIAGNOSTIC CIRCUITRY	S	—
DIALED NUMBER DISPLAY	O	LCD PCB
DO NOT DISTURB	S	—
EXCLUSIVE HOLD WITH INDICATION	S	—
EXTERNAL PAGING ACCESS	S	(EXTERNAL PAGING EQUIPMENT)
FLASH KEY	S	—
FLEXIBLE LINE ASSIGNMENT	S	—
FLEXIBLE NIGHT SERVICE	S	—
FLEXIBLE RINGING ASSIGNMENT	S	—
FLEXIBLE STATION NUMBERING	S	—
FLEXIBLE STATION PROGRAMMING	S	—
GROUP PAGING - INTERNAL	S	—
HANDSFREE OPERATION	O	HANDSFREE PCB
I-USE INDICATION	S	—
LAST NUMBER REDIAL	S	—
LINE PRESELECTION	S	—

LINE QUEUEING	S	CPU-4CE ONLY
MESSAGE WAITING	S	—
MULTI-PARTY CONFERENCE	S	—
MUSIC ON HOLD - EXTERNAL SOURCE	S	(EXTERNAL MUSIC SOURCE)
MUSIC ON HOLD - INTERNAL SOURCE	S	—
NONVOLATILE MEMORY	S	—
OFF PREMISE EXTENSIONS	O	OPX MODULE
ON HOOK DIALING	S	—
POWER FAILURE RESTART	S	—
POWER FAILURE TRANSFER	S	(STANDARD SINGLE-LINE SETS)
PRIVATE LINES	S	—
PUSHBUTTON DIALING	S	—
REPERTORY DIALING - STATIONS	S	—
REPERTORY DIALING - SYSTEM	S	—
RESERVE POWER	S	(STORAGE BATTERIES)
RING TRANSFER BY DSS	S	CPU-4CE ONLY
SHIFT CALL	S	—
STATION MESSAGE DETAIL RECORDING	O	SMDR I/F and EXT PCB
TENANT SERVICE	S	—
TOLL RESTRICTION - FIVE CLASSES	S	—
1A2 INTERFACE	O	1A2 INTERFACE and EXT PCB

## 6. FEATURE DESCRIPTIONS

**6.01 ACCOUNT CODES** - Systems equipped for SMDR include the capability for station input of account codes in order to identify calls made on behalf of customers or clients. Account codes may be up to 8 digits in length and can be input at any time during the call by pushing the ACCT # button and dialing the account number. Account codes may be recorded for both incoming and outgoing calls.

**6.02 ADD-ON CONFERENCE** - While talking on a CO line, an extension can add another party (CO line or extension) to the conversation. Another extension may be added by pushing the ADD-ON button, dialing the station number, and then pushing the CO line button (the added station must lift the handset or turn on the speakerphone). A second CO line is added by placing the first line on hold, seizing the second line, and then pushing both CO line buttons at the same time.

**6.03 ALARM INPUT** - Terminals on the MDF marked ALMIN and ALMG are provided for connection of an external alarm device. (No voltage should be applied to the MDF terminals.) The contacts of this device may be either "make" or "break" (via program plug on the PX card). Activation of the alarm contacts will cause an alerting tone to be sounded at any subset programmed to respond. The alerting tone will continue until the alarm device is reset.

**6.04 ALL CALL PAGE** - All idle stations will receive an alerting tone followed by the voice announcement when any station user pushes the GRP PAGE button and dials "0". The page can be answered by lifting the handset at any station and pushing the GRP PAGE button.

**6.05 ALTERNATE POSITION ANSWERING** - This feature allows a station to answer an intercom call intended for another station within the same group. A "group" consists of all stations having the same first digit in their extension numbers. When the call announce tone is heard, the handset is lifted, and the ANSWER button is pushed. Alternate position answering is not available in the handsfree mode.

**6.06 ASSIGNED NIGHT ANSWER** - Through DSS programming, the installer can assign ringing of individual CO lines to selected stations. Any station may be designated to ring on any combination of CO lines or on none at all. The DSS operator activates this mode of night service by pushing the NIGHT button on the DSS console and then pushing the "3" on the keypad of the subset. To de-activate night service, the NIGHT button is pushed followed by pushing "1" on the keypad of the subset. (See par. 6.32)

**6.07 ATTENDANT DSS WITH BLF** - DSS consoles may be connected as desired to either system. Both EK-1232 and EK-2064 have a maximum of two dedicated DSS calling paths (with CPU-4CE). These paths may be reassigned for common use by stations and DSS consoles if desired. The DSS allows direct station selection while also providing busy lamps for each station. The DSS is required for programming of the system but may then be removed if not needed. Installation of a DSS console requires no programming, extra cabling, or additional circuitry.



- 6.08 AUTOMATIC HOLD.** A CO line is automatically placed in a hold condition when the INTERCOM, ADD-ON, or GRP PAGE buttons are pushed. This action occurs in anticipation of another function which might involve the CO line.
- 6.09 AUTOMATIC HOLD RECALL** - A CO line will automatically alert the station which placed it on hold after a pre-programmed time-out period of up to 3 minutes. The feature can be disabled through programming.
- 6.10 AUTOMATIC HELD PARTY DISCONNECT.** The system will release a CO Line in the event that the held party abandons the call. As a programmable option, the disconnect detect time can be changed from "short" to "long" or the feature can be disabled.
- 6.11 AUTOMATIC MUTE.** While occupied in a conversation, alerting tones and other audible signals received at a station are automatically reduced in volume so as not to interfere.
- 6.12 AUTOMATIC PRIVACY.** Conversations are automatically secured against intrusion by other stations. The ADD-ON button acts as a privacy release when conferencing is desired.
- 6.13 BACKGROUND MUSIC.** An external music source connected to the BGMA and BGMB terminals of the MDF will provide background music at each telephone subset. The music can be turned on or off and the volume adjusted at each individual station. The volume of the entire system may be adjusted by VRI on the TONE card. The music source should have an impedance of 600 ohms and a range of from -20dB to 0dB.
- 6.14 BUSY CALL (BUSY OVERRIDE)** - The busy call feature allows a user to call announce to a busy station. The busy station may be involved in either a CO line or intercom conversation but cannot be talking in the handsfree mode. To operate, the calling station must push the BUSY CALL button after dialing the station number and receiving a busy tone. The called station will receive a call announce tone and can answer handsfree. If the called station wishes to answer the call through the handset, he must push the INTERCOM button. This will automatically place a CO line on hold at the called station but will release a previous intercom call. BUSY CALL can be enabled or disabled for each station through programming.
- 6.15 CALL ANNOUNCING WITH ANSWERBACK** - There are two methods of call announcing on EK-1232/2064. The first method is to dial a station number to call announce to an individual station. The called station may either answer handsfree or by picking up the handset. The second method is group call announcing (group paging) where the calling station must push the GRP PAGE button, dial the group number, and talk via the handset. The GRP PAGE button will flash at all stations in the called group and any group member may answer the page (via handset) by pushing GRP PAGE. Whether individual or group call announcing, the called parties will receive an alerting tone prior to the announcement (See par. 6.36).
- 6.16 CALL FORWARD-PRESET**-This feature allows a station to forward calls to another station. To activate, the CALL FWD button is pushed, while on hook, and the extension number of the "receiving" station is dialed. The LED below the CALL FWD button will be illuminated while call forward is in effect. To cancel, the CALL FWD button is pushed again while on hook. A station in the call forward mode will still receive and can answer group page.



**6.17 CALL FORWARD SOURCE DISPLAY.** Stations equipped with the LCD PCB are advised visually that an incoming intercom call is being forwarded from another station. The extension numbers of the forwarding station and the calling station are also shown. A call from station 10 forwarded by station 15 would be displayed as "10-CFP-15".

**6.18 CALL MONITORING.** (Microphone Muting) This feature is used during hands-free CO line conversations when a station wishes to hear the outside party without being heard. To activate, the station user pushes the MUTE button to turn the microphone off (the LED below the MUTE button will flash). To restore the two-way conversation, the button is pushed again. This function can be used to monitor a CO line that has placed the station on hold or to consult with someone nearby without being heard by the outside party.

**6.19 CALL TIMER.** Stations equipped with the optional LCD display receive visual indication of the duration of both incoming and outgoing CO line calls. The timer automatically begins about 10 seconds after the last digit is dialed or the CO line is answered. The elapsed time will continue to be displayed for a brief period after the call is terminated.

**6.20 CALLING NUMBER DISPLAY.** The optional LCD PCB displays the extension number of incoming intercom calls. A system may be equipped with as many or as few LCD's as are required.

**6.21 CAMP-ON** - A station can request a busy station (or one that does not answer) to return the call by pushing the CAMP-ON button after dialing the station number. The CAMP-ON LED at the calling station will illuminate and the LED at the called station will flash rapidly. The called party returns the call by going off hook and pushing the CAMP-ON button. A station can leave a camp-on for only one station at a time but can receive up to 3 camp-ons from other stations. The CAMP-ON button is pushed a second time to cancel. A DSS console can activate up to 10 camp-ons to other stations but can receive only 3.

**6.22 CAMP-ON SOURCE DISPLAY.** Another function of the optional LCD is to provide a display to indicate camp-on conditions. The station receiving a camp-on will see "CP" followed by the number of the station who left it. Only one camp-on indication is shown at a time but as soon as the first is handled the second indication appears and so on.

**6.23 CLOCK WITH ALARM SETTING** - The optional LCD display includes a clock which may be set for either 12 or 24 hour display. The display shows the hour, minutes, and seconds as well as the day of the week. Additionally, the clock can be set to display a secondary time zone and it can be programmed to sound an alarm as a reminder for meetings or appointments.

**6.24 COMMON AUDIBLE RINGING.** Systems equipped with a TONE PCB designated as TONE-4CB can be equipped with a customer provided common audible device which is activated by CO line ringing. Generally a loud ringing bell or horn is used. The particular CO lines which activate the common audible are selected through DSS programming. A relay is connected to the TONE-4CB PCB (or to terminals on the MDF on later systems) which when activated by CO line ringing, switches the power to the common audible on and off.

**6.25 DIAGNOSTIC CIRCUITRY.** The CPU card, station cards, and CO line cards are equipped with LED function indicators which provide a means of quickly checking the operation of these particular circuits.

- 6.26 DIALED NUMBER DISPLAY**- The LCD PCB displays any digits dialed through the keypad or as a result of activating the repertory dialing or redial features.
- 6.27 DO NOT DISTURB** - Pushing the DON'T DIST button while on hook activates the "do not disturb" feature. Calls (whether internal or external) cannot reach a station in this mode. Only alarm and automatic hold recall signals are audible. While activated the LED below the DON'T DIST button will be illuminated and calling stations will receive a busy tone. The feature is deactivated by pushing the button again. DO NOT DISTURB can be allowed or denied for use by each station through programming.
- 6.28 EXCLUSIVE HOLD WITH INDICATION**- A CO line can be placed in an exclusive hold condition by pushing the HOLD button twice. While in this condition, no other station can pick up the held line. A line can be switched from hold to exclusive hold and back again by pushing the HOLD button repeatedly. Exclusive hold is indicated at the controlling station by the alternating flash and quick-flash of the CO line LED. LED's at other stations will display a normal busy condition and a busy tone will be returned to a station attempting to pick up a line under exclusive hold.
- 6.29 EXTERNAL PAGING ACCESS**- Terminals marked EPA and EPB are provided on the MDF for connecting external paging equipment. The equipment may then be accessed by depressing the GRP PAGE button and dialing " \* ". Terminals marked ESA and ESB are available for external paging start signal output and are connected to a "make" contact with a capacity of 30VDC at 1A (maximum).
- 6.30 FLASH KEY**- Use of the RESET key allows the user to recall CO dial tone without releasing the line. This is useful when an error in dialing occurs or when the user wishes to make successive calls on the same CO line.
- 6.31 FLEXIBLE LINE ASSIGNMENT**- This feature allows CO line assignments to as many as 9 different groups of stations. Each line may be assigned to one or several groups. A station having access to a particular CO line may seize the line for outgoing calls, answer incoming calls, and conference with a station that is denied access to the line. The line may also be transferred to a station that is otherwise denied access. Creative use of this feature also allows for private line assignments.
- 6.32 FLEXIBLE NIGHT SERVICE** - The DSS operator has the option of activating one of 3 modes of night service. The mode is selected by pushing the NIGHT button on the DSS console, while on hook, and dialing a single digit on the subset. By dialing, "4", CO line ringing will only be heard at stations equipped with a DSS console. If a "3" is dialed, ringing will be heard at pre-assigned stations (See par. 6.06). When the digit "2" is dialed, all CO lines will ring at all stations. A station denied access to a line will not receive ringing on that line. Day service is restored by pushing the NIGHT button on the console and dialing "1" on the subset.
- 6.33 FLEXIBLE RINGING ASSIGNMENT**- Through DSS programming, stations are assigned incoming ringing signals for any or all CO lines to which they have access. All stations are preassigned in the default program to ring on all CO lines. Ringing assignments are totally flexible and can be programmed without regard to station or CO line sequence.

**6.34 FLEXIBLE STATION NUMBERING**- Although station numbering is pre-assigned in the default program, the station number may be changed to any two-digit number between 10 and 99 inclusive. Customized station numbering and station relocation are thereby simplified through DSS programming. A number can be assigned to only one station. Stations with no number assigned will not function.

**6.35 FLEXIBLE STATION PROGRAMMING**- Certain features are applied on a per-station basis. This allows each station to be customized with a unique set of features to match its application.

**6.36 GROUP PAGING - INTERNAL**- A maximum of 9 internal paging groups are available in EK-1232/2064. The stations within each group are determined by the first digit of the extension number (i.e. stations 10 through 19 are members of Group 1, stations 20 through 29 are members of Group 2, etc.). Group paging is accomplished by pushing the GRP PAGE button, dialing the group number, and speaking thru the handset (not possible in handsfree mode). The Shift Call feature can also be used in group paging (See par. 6.57). To answer a page, the flashing GRP PAGE button is pushed and the conversation (via handset) is established.

**6.37 HANDSFREE OPERATION**- An optional handsfree speakerphone for use on CO lines may be added to each extension by installing the Handsfree PCB within the telephone housing. The Handsfree PCB is arranged for simple plug-in installation.

**6.38 I-USE INDICATION**- A double wink of the CO line LED is used to indicate the line that an extension has in use.

**6.39 LAST NUMBER REDIAL**- The feature button marked REDIAL provides automatic last number redial. The CO line will be released, reselected, and the digits redialed when this button is activated.

**6.40 LINE PRESELECTION**- This feature allows the station user to select a CO line before picking up the handset. The handset must be picked up (or the speaker turned on) within 5 seconds of selecting the line.

**6.41 LINE QUEUEING - CO lines** can be arranged in groups through programming for line queueing purposes. When all lines in a group are busy a station can reserve access to a line by dialing "\*" and then pushing one of the CO line buttons in that group. Dial tone confirms the reservation. If access to the line is not reserved, busy tone is returned. When any line in the group becomes free, the station is alerted by a distinctive audible and visual signal. The station can then seize the line by lifting the handset and pushing the proper CO line button. If the reserved CO line is not accessed within 15 seconds, the reservation is cancelled. The reservation can also be cancelled by lifting the handset and dialing "#" or by seizing another line in the same group. A maximum of 8 line queueing groups can be established for each tenant group through programming. A line group may consist of any line or lines desired but a line can be included in only one line group.

**6.42 MESSAGE WAITING** - Message waiting on EK-1232/2064 is not itself an independent feature. Rather, it is simply another application of the Camp-On feature. It is mentioned here only to point out the versatility of Camp-On. (See par. 6.21 and 6.22)



- 6.43 MULTI-PARTY CONFERENCE.** A conference may consist of up to one CO line and as many stations as necessary. The only limitation on the number of parties involved is the transmission level which is lowered with each additional party. Multi-party conferences are set up through the add-on procedure, as explained in paragraph 6.02, with the procedure duplicated for each additional party. Since each conference uses one intercom path, the number of simultaneous conferences (whether Add-On or Multi-Party) depends on the number of available paths.
- 6.44 MUSIC ON HOLD - EXTERNAL SOURCE.** An external source for music on hold may be connected to the MDF on terminals marked EHMA and EHMB. The volume can be controlled by an adjustment on the TONE card marked VR3. The music source should have an impedance of 600 ohms and a range of from -20dB to 0dB.
- 6.45 MUSIC ON HOLD - INTERNAL SOURCE.** There are two internal sources of music provided by the TONE card within the KSU cabinet. Selection of a music source consists of placing a program plug in one of two available positions on an option block marked TN1 on the TONE card. Once the music source is selected, it will be output to all held CO lines.
- 6.46 NONVOLATILE MEMORY.** The medium used for storage of system memory is EPROM. System programming is stored in RAM and is protected against power failure by a lithium battery. The battery will hold programming for approximately five years.
- 6.47 OFF PREMISE EXTENSIONS -** An optional off premise module is available to allow installation of stations at distances beyond the normal station loop limits. Use of the OPX module extends the loop limit to 1200 ohms which is approximately 3 kilometers (9800 feet) of 24 AWG cable. A standard single line DTMF telephone is used as the off premise station instrument. The off premise station can dial other stations, receive intercom calls, receive transferred CO lines, access up to 9 designated CO lines for outgoing calls, transfer CO lines, and access system speed dial numbers. An OPX station can also be programmed for toll restriction. An OPX module (containing two OPX circuits) and a standard station circuit is required for operation of an off premise extension.
- 6.48 ON-HOOK DIALING.** On-hook dialing with call progress monitoring is possible on CO lines by pushing the SPEAKER button to activate the speaker. The number may then be dialed and the station may listen handsfree until the party answers. At this time, the handset is lifted to carry on the conversation. If the station is equipped with a handsfree circuit, the conversation may continue in the handsfree mode.
- 6.49 POWER FAILURE RESTART.** In the event of a commercial power failure, the system will automatically restart itself once power is restored. Calls in progress will be dropped at the time of power loss as well as at the time of system restart (when power failure stations are connected).
- 6.50 POWER FAILURE TRANSFER.** Terminals marked NA and NB on the MDF are provided for cut through of CO lines to standard single-line telephone sets in the event of power failure. Each pair of NA and NB terminals is numbered to correspond to the CO line it serves. Calls in progress will be dropped when power is restored.
- 6.51 PRIVATE LINES.** Through use of the tenant facilities it is possible to arrange access to private lines by individual stations. A station can be programmed as the only member of a tenant group. This tenant group can then be allowed access to all CO lines including the private line(s).

**6.52 PUSHBUTTON DIALING.** Electronic key telephones are equipped with pushbutton keypads but the dial signals are actually generated by the system. Therefore, DTMF lines will receive tones and Rotary lines will receive pulses even though the signals are initiated by the same subset. This arrangement allows the connection of both tone and rotary lines to the same telephone.

**6.53 REPERTORY DIALING - STATION.** Each station is capable of having 10 individual speed dial numbers for its private use. In the case of EK-2064 these numbers are assigned two-digit codes (00-09) which are then used to initiate dialing after the SPD DIAL button is pushed. EK-1232 has 8 buttons marked AD1 through AD8 which are used instead of the SPD DIAL button and the two-digit code. The last two speed dial numbers must be assigned a two-digit code as in EK-2064. Pauses may be inserted if needed. Each pause is counted as one digit. Speed dial numbers may be "chained" (with other speed dial numbers or with manual dialing) for numbers over 20 digits.

**6.54 REPERTORY DIALING - SYSTEM.** Both EK-1232 and EK-2064 provide the capacity to store 50 telephone numbers in memory for speed dialing. These numbers may be up to 20 digits each and are accessed by pushing the SPD DIAL button, while off hook, followed by a two-digit code (10-59). The numbers are entered into memory thru the DSS during installation and are then available for use by all extensions (unless denied by toll restriction). Pauses may be included in the number if needed and each pause is counted as one digit. "Chaining" speed dial numbers together or with manual dialing allows numbers over 20 digits to be dialed.

**6.55 RESERVE POWER.** The special power supplies offered for use with EK-1232 and EK-2064 include charging circuits allowing addition of storage batteries for reserve power applications. Various types and sizes of batteries may be used as long as output is 24VDC at 6 amps for EK-1232 or 12 amps for EK-2064.

**6.56 RING TRANSFER BY DSS -** The DSS console user may choose to transfer CO lines to other stations via ringing rather than the usual call announce mode. While on-hook, the RING XFER (F1) button is pushed to activate the ring transfer mode. The LED at this button will light steady to indicate activation. During the ring transfer mode, the DSS operator pushes the appropriate DSS button to transfer a CO line to a station. At the called station, a distinctive audible signal will be heard and the CO button LED will indicate the line being transferred. If the station is equipped with an LCD display, the CO line number will be displayed. The called station lifts the handset and pushes the CO line button to answer the call. If the line is not answered within approximately 30 seconds, it will recall to the DSS operator with a distinctive audible and visual signal. The LCD display at the DSS console will show the CO line number and the station to which the line was transferred. The ring transfer mode will be in effect at the DSS console until the RING XFER (F1) button is pushed again while on-hook.

**6.57 SHIFT CALL.** After dialing a busy station or one that does not answer, another station in the same group (a station with the same first digit) may be called by simply dialing the second digit of the station number. Shift call can also be used for group paging. In this case, once the GRP PAGE button has been pushed, group numbers can be dialed consecutively.



**6.58 STATION MESSAGE DETAIL RECORDING.** SMDR is available as an option on EK-1232/2064. The output is 80 column, ASCII through an RS232c interface. The information provided includes the date, extension number, secondary extension number (if the call was transferred), the line (TRK) number, type of call (whether incoming or outgoing), the time of day, the duration of the call, the number dialed on outgoing calls and the account code assigned (if any). The information is normally output as calls occur, however, a buffer is provided to temporarily store data in the event that the printer is busy or out of paper. (See Section 9.)

**6.59 TENANT SERVICE.** EK-1232/2064 provides service for up to 9 tenant groups within the same KSU. Tenant facilities include separation of CO lines for both incoming and outgoing access as well as individual group ringing assignments. The flexible station numbering capability is also useful in tenant applications. Tenant groups are determined by the first digit of the station number (i.e. stations 10 through 19 are members of tenant group 1). Should a tenant require more than 10 stations, two or more groups can be programmed for the same line access and ringing assignments. Intercom calling between tenant groups and transfer of CO lines between tenants is allowed.

**6.60 TOLL RESTRICTION.** Toll restriction is applied to all stations by assignment of one of 5 toll restriction classes. Assignment and definition of the toll restriction class is done through DSS programming. The default program places all stations under Class A. The 5 classes of toll restriction are:

- Class A - No Restriction
- Class B - Special Code Restriction (restricted from dialing some programmable codes)
- Class C - Toll Call Restriction (restricted to dialing within the local area code)
- Class D - Toll Call Restriction (restricted to dialing non-toll local area calls)
- Class E - Intercom only

**6.61 1A2 INTERFACE.** The 1A2 I/F unit allows CO lines to be shared by a 1A2 key system and EK-1232/2064. The 1A2 I/F unit converts CO line lamp indications from the 1A2 system into CO line LED indications on the EK-1232/2064 and vice versa. Both systems therefore receive busy, hold, and ringing indications from the other system. This allows use of the EK-1232/2064 for expansion and upgrading of an existing 1A2 key system without the expense of complete removal and replacement. In addition, intercom calling paths between the two systems can be arranged. Many other applications can be satisfied by use of the 1A2 I/F and various 1A2 key system circuit cards. (See Section 10.)

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## **7. INSTALLATION**

### **SITE SELECTION**

**7.01** The location selected for the installation of the KSU and power supply should meet the following requirements:

- a) Adequate space should be available for mounting the KSU and power supply as well as allowing easy access for initial installation and subsequent maintenance.
- b) Station and line cabling requirements should be considered for both the initial installation and future system expansion.
- c) The KSU and power supply must be located at least 3 meters (10 feet) from other electronic equipment such as copy machines, electronic typewriters, etc.
- d) A commercial power outlet (110 VAC) should be available within the length of the power cord. The circuit should not be shared with other equipment and should not include a switch which might accidentally be turned off. A surge protection device is strongly recommended to protect the system against voltage fluctuations.
- e) The location should be free of direct sunlight, corrosive fumes, and excessive dust. The temperature should be held within -10 to +55 degrees Centigrade (+14 to +99 degrees Fahrenheit). The relative humidity should not exceed 95% at +35 degrees Centigrade (+95 degrees Fahrenheit).
- f) A good quality earth ground of less than 200 ohms must be available. A 14-gauge copper wire connected to a metal cold water pipe or ground rod is recommended.
- g) The station loop limit is 80 ohms and the DSS loop limit is 20 ohms. Telephone subsets must be located within 450 meters (1500 feet) of the KSU and the DSS must be within 110 meters (350 feet).

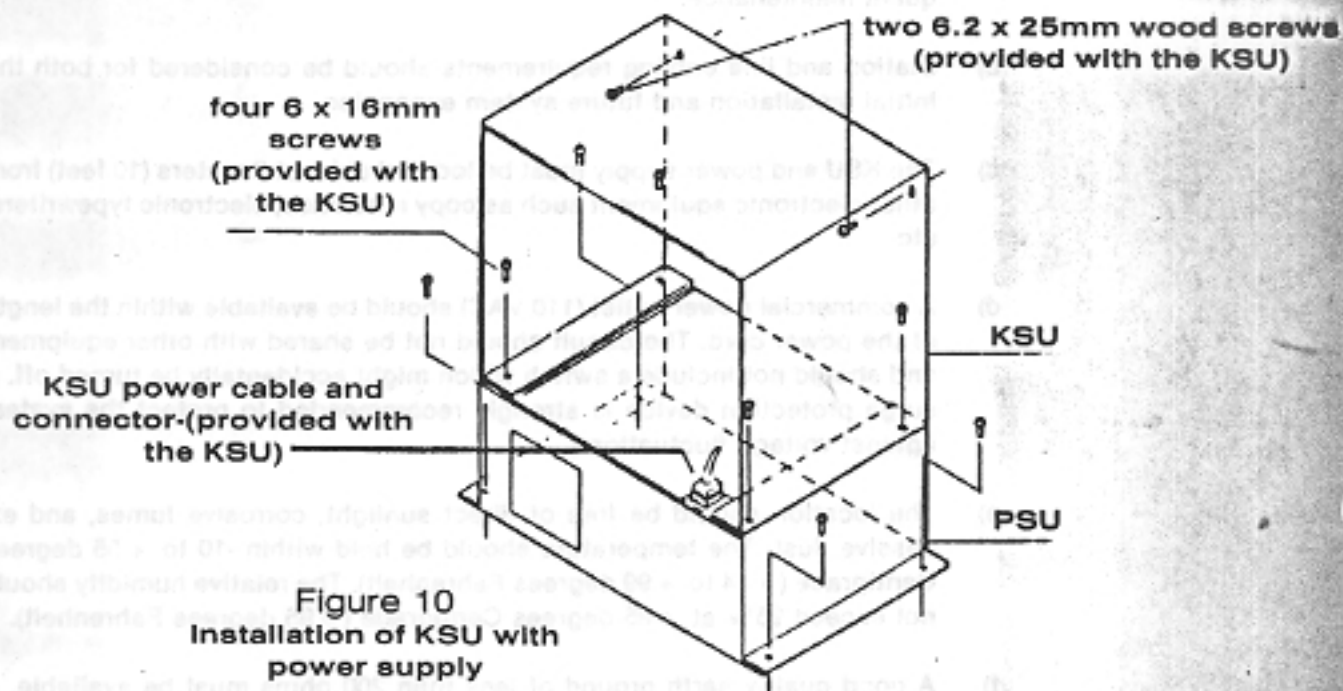
### **CABINET INSTALLATION**

**7.02** Access to the interior of the KSU can be accomplished by removing 4 phillips screws from the top panel to expose the MDF and by loosening the phillips screws on the front panel so that the panel can be lifted off.

**7.03** Both EK-1232 and EK-2064 may be either floor or wall mounted. The cabinet may be secured to a wall or backboard using the 2 6.2x25mm wood screws provided with the KSU. Also included are 4 6x16mm bolts which may be used to securely attach the KSU to the exclusive power supply unit or to any other flat solid surface. (See figure 10.)



**7.04** The cabinet must be well grounded for proper operation and protection of the system. A 14-gauge copper wire connected to a good earth ground such as a metal cold water pipe or ground rod is recommended. When the exclusive power supply unit is attached directly to the bottom of the KSU with metal bolts the ground wire can be connected to the power supply ground lug. Otherwise, the ground wire should be attached to a terminal marked CO GND on the KSU motherboard next to the MDF blocks.



## POWER SUPPLY CONNECTION

### \* CAUTION \*

Power supply should be disconnected from commercial power source during installation and while any subsequent operations such as MDF terminations, PCB installation or removal, switch settings, or PCB strapping are being performed. Be careful to avoid the possibility of electrical shock.

**7.05** An exclusive power supply unit is available for both EK-1232 and EK-2064. These are not identical units since EK-1232 requires 24 VDC at 6 amps while EK-2064 requires 24 VDC at 12 amps. Both are connected to the KSU by means of a special power cable included with the KSU. (See figures 10, and 11.)



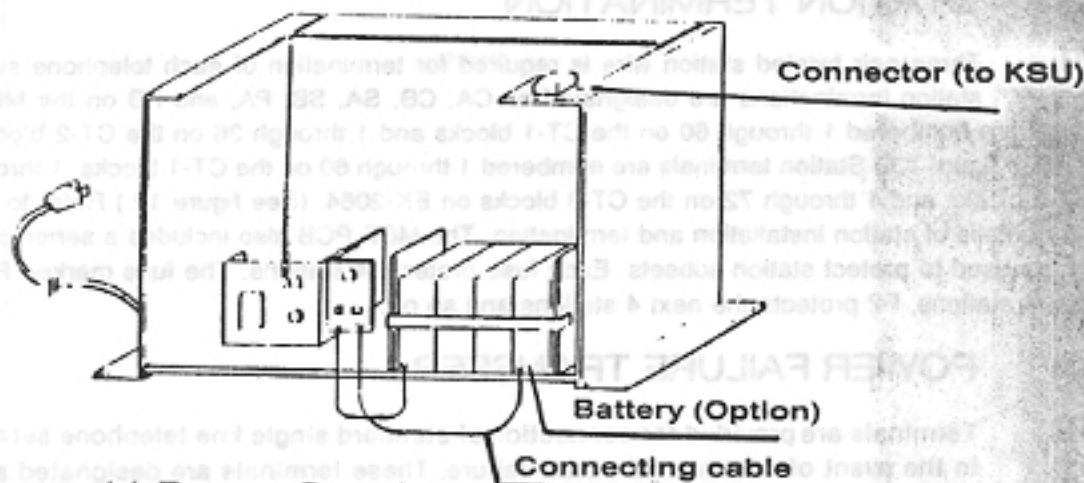


Figure 11-Power Supply

7.06 The exclusive power supply (part # 1232-PSU-A for EK-1232 and part # 2064-PSU-A for EK-2064) contains charging circuits which allow a reserve battery package to be attached to the system. The recommended battery packages consist of two 12V, 6.5 AH batteries (Power Sonic PS-1265) for EK-1232 and four 6V, 8.0AH batteries (Power Sonic PS-682) for EK-2064 wired in series to provide 24VDC and mounted in the vacant area provided in the power supply cabinets. Adapter kits are available for connecting these battery packages to the system (Z-1232-BAT ADP for EK-1232 and Z-2064-BAT ADP for EK-2064). Alternate battery packages can be mounted external to the power supply cabinet. (See figure 11.)

7.07 If an alternate power supply is used, the power cable will need to be modified by removing the plug and replacing it with the proper connector required by that power supply. Be very careful to insure that the power cable is correctly connected to the power supply. The white conductor should be connected to the positive terminal while the black conductor must be connected to the negative. Specifications for alternate power supplies must match those found in par. 4.04 in order to insure proper operation of the KSU.

## MAIN DISTRIBUTION FRAME (MDF) WIRING

7.08 Remove the top panel as explained in par. 7.02 to expose the MDF. Notice the terminal designation chart on the underside of the panel. Figures 12. and 13. are reproductions of these charts for EK-1232 and EK-2064.

7.09 The EK-1232 MDF consists of 7 40-pin quick-connect blocks while the EK-2064 MDF consists of 12. These blocks provide for all external connections to the KSU. The MDF PCB also contains a series of fuses which are used to protect the station subsets.

## CO/PBX LINE CONNECTIONS

7.10 CO/PBX lines are connected to the terminals marked LA and LB on the terminal designation charts. These terminals are numbered 69 through 80 on the CT-2 blocks of the EK-1232 and 61 through 80 on the CT-1 blocks of the EK-2064. (See figures 12. and 13.) The TIP side of the line should be connected to the LA terminal and the RING side to the LB terminal. (See figure 14.)

## STATION TERMINATION

**7.11** Three pair twisted station wire is required for termination of each telephone subset. The station terminations are designated as CA, CB, SA, SB, PA, and PB on the MDF. These terminals are numbered 1 through 60 on the CT-1 blocks and 1 through 36 on the CT-2 blocks on EK-1232. (See figure 13.) Station terminals are numbered 1 through 60 on the CT-1 blocks, 1 through 60 on the CT-2 blocks and 1 through 72 on the CT-3 blocks on EK-2064. (See figure 12.) Refer to paragraph 7.26 for details of station installation and termination. The MDF PCB also includes a series of 1A fuses which are used to protect station subsets. Each fuse protects 4 stations. The fuse marked F1 protects the first 4 stations, F2 protects the next 4 stations and so on.

## POWER FAILURE TRANSFER

**7.12** Terminals are provided for connection of standard single line telephone sets to be used in the event of commercial power failure. These terminals are designated as NA (TIP) and NB (RING) and connect one line to one telephone. The line terminated on 00LA and 00LB is cut through to 00NA and 00NB, 01LA and 01LB is cut through to 01NA and 01NB, and so on. (See figure 15.)

## AUXILIARY TERMINALS

**7.13** Additional terminals are provided on the MDF for connection of ancillary devices. These include alarm devices, external music (for music on hold), external music (for station background music), and external paging equipment.

**7.14** The alarm contacts should be connected to the terminals marked ALMIN and ALMIG which are number 41 on the CT-2 blocks of the EK-1232 and number 76 on the CT-3 blocks of the EK-2064. The alarm contacts may be defined as either "make" or "break" by a strapping option on the PX PCB. (Refer to par. 7.24) No voltage should be applied through the contacts to these terminals. (See figures 12., 13., and 16.)

**7.15** An external source for music on hold can be connected to the terminals marked EHMA and EHMB. These terminals are number 42 on the CT-2 blocks of the EK-1232 and number 77 on the CT-3 blocks of the EK-2064. (See figures 12., 13., and 16.) The music source should have an impedance of 600 ohms and a range of from -20dB to 0dB. In addition, an external source may be connected to terminals marked BGMA and BGMB to provide background music through the telephone subset. These terminals are number 43 on the CT-2 block on the EK-1232 and number 78 on the CT-3 block on the EK-2064.

**7.16** External paging equipment may be connected to the KSU if desired. Terminals marked EPA and EPB are provided for external paging output. In addition, terminals marked ESA and ESB are provided for external paging start signal output. ESA and ESB are connected to a "make" contact with a capacity of 30VDC at 1A (maximum). In EK-1232 these terminals are numbered 44 and 45 on the CT-2 block. In EK-2064 these same terminals are numbered 79 and 80 on the CT-3 block. (See figures 12., 13., and 16.)

**7.17** A common audible device may be connected to the terminals marked ECRA and ECRB if required. These terminals are number 40 on the CT-2 block of the EK-1232 and number 75 on the CT-3 block of the EK-2064. These terminals are connected to a dry contact closure on the TONE PCB which are activated by the CO line ringing. If power is applied to these terminals, it should not exceed 30VDC at 1A. Specific lines may be programmed to activate the common audible.





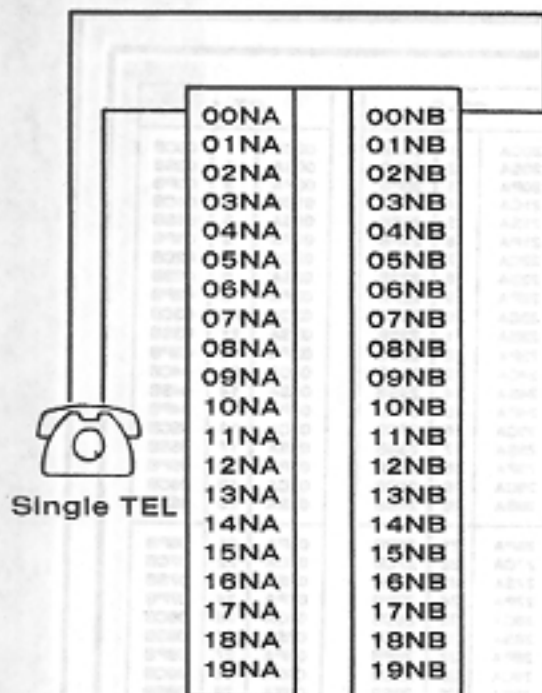


Figure 15 - Connection for NA, NB terminals

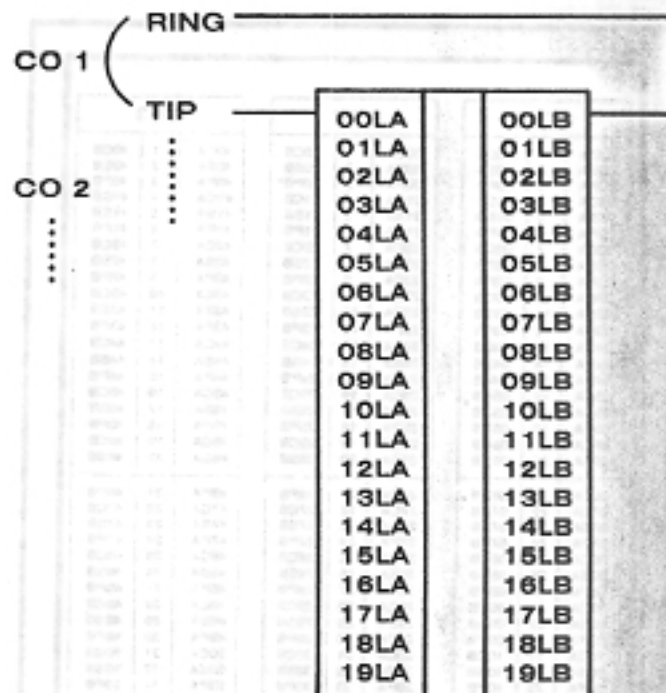


Figure 14 - Connection for LA, LB terminals

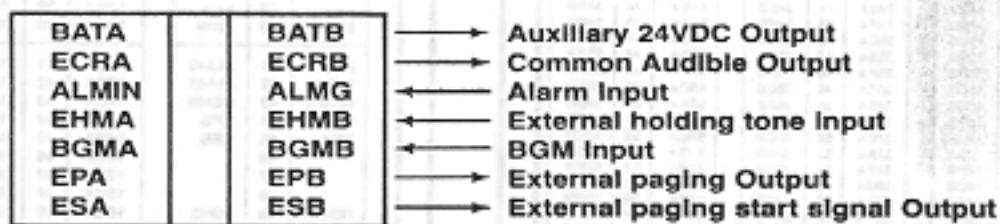


Figure 16 - Connection for other function terminals

7.18 Terminals marked BATA and BATB are provided as an auxiliary power source. These terminals will provide a maximum of 24VDC at 1A and are protected (along with 4 station sub-sets) by the fuse marked F8 on the EK-1232 and F16 on the EK-2064. These power terminals are number 39 on the CT-2 block of the EK-1232 and number 74 on the CT-3 block of the EK-2064.

## PRINTED CIRCUIT BOARD (PCB) INSTALLATION

### \* CAUTION \*

The KSU and associated PCBs consist of components which are sensitive to electrostatic discharge and should be handled only by personnel familiar with the procedures and precautions for preventing possible damage.

7.19 Before installing PCBs, visually inspect each one for any obvious signs of damage that may have occurred in shipment. Any PCBs which are pre-installed in the KSU mounting shelves (except POWU PCB) should also be removed and inspected.



**7.20** While all PCBs are removed from the mounting shelves, plug in the power supply and turn it on. Then turn the power supply off, unplug it, and check for blown fuses. Replace any bad fuses and re-apply power to the system. If blown fuses are found again, refer to Section 9, Maintenance and Troubleshooting.

**7.21** All common control, cross-point, station, and line PCBs are installed in dedicated slots within the KSU mounting shelves. Slots are plainly marked along the top edge of each mounting shelf. It is important that only the designated card be installed in each slot to prevent serious damage to the card or the KSU itself.

**7.22** Be sure that the card is properly aligned with the component side on the right. Push firmly against the card extractors at the top and bottom of the PCB until it snaps into place.

## PCB OPTIONS AND ADJUSTMENTS

**7.23** The next few paragraphs provide details on optional switch settings, strappings, and adjustments used to customize EK-1232 and EK-2064 to individual applications. In addition, Table 1. has been provided as a quick reference. No other alterations or adjustments are possible. Do not attempt any other changes.

**7.24** The CPU PCB contains only one switch operated function. Switch #1 on the DSW2 switch bank (See figure 17.) is used to initialize the system memory prior to system programming. Before power is applied to the KSU, this switch should be turned to the "ON" position. Once the system is running, it should be returned to the "OFF" position. This procedure will result in the system memory reverting to the default operating program. To protect against loss of programming in the event of a power failure, this switch should remain in the "OFF" position. A lithium battery is packed with the CPU PCB and should be plugged in to the connector marked BAT and secured to the PCB with the nylon strap.

**7.25** Several options are available on the TONE PCB. (See figure 18.) Switch #1 on DSWO switch bank is used to tell the card in which system it is installed. This switch should be placed in the "ON" position for EK-1232 and in the "OFF" position for EK-2064. Option block TN2 allows selection of either internal or external music on hold. The option plug should be positioned accordingly. If the internal music on hold is selected, either of the 2 available internal sources may be chosen by the position of an option plug on option block TN1. The volume of both the station background music and the external music on hold can be changed through adjustments marked VR1 and VR3 respectively. Switch #1 on DSW2 switch bank should be placed in the "ON" position if intercom paths 6 thru 9 are used on EK-2064. It should be in the "OFF" position when CO lines 17 thru 20 are used. Switch #8 on DSW3 switch bank is used to enable an auxiliary common audible device while in the "ON" position. Switches #1 and #2 on DSW3 switch bank are used to assign the dedication of DSS calling paths. When both of these switches are "OFF", the calling paths are non-dedicated and available for use by both stations and DSS consoles. With switch #1 "ON" and switch #2 "OFF", one calling path is dedicated for DSS use. With switch #1 "OFF" and switch #2 "ON", two paths are dedicated for use by DSS consoles.

**7.26** On the PX PCB, an option block marked AL is provided for the alarm contact selection. (See figure 19.) An option plug should be installed on AL pins 1 and 2 if a "make" contact has been terminated on the MDF. If the contact used is a "break" type contact, the option plug should be installed on AL pins 2 and 3. In addition, the PX card contains a switch bank marked DSW1. When EK-2064 is equipped with the additional intercom paths, all switches (1 through 8) on DSW1 should be turned to the "ON" position. The variable rheostat marked "VR1" controls intercom switching level. Adjustment of the rheostat is not recommended.

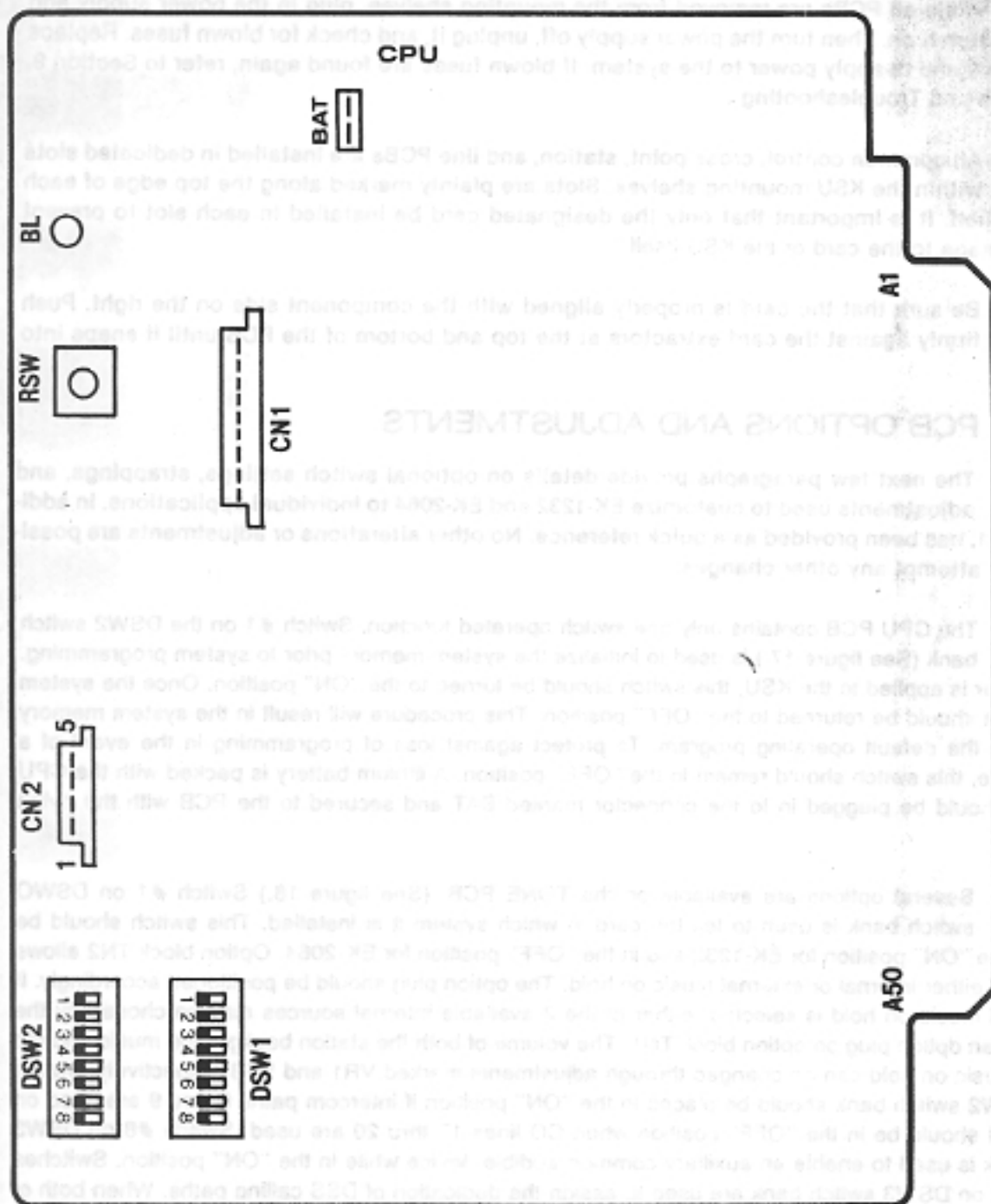


Figure 17-CPU card

- |       |  |
|-------|--|
| DSW 1 | Used for factory tests - All switches should be in "ON" position   |
| DSW 2 | Switch #1 used to Initialize RAM - Should be turned "OFF" after initialization - All other switches used for factory tests and should be in "OFF" position |
| RSW   | RESET switch - Used to reset system  |
| CN1   | Used for factory tests   |
| CN2   | Used for factory tests   |
| BAT   | Terminal for connecting lithium battery  |

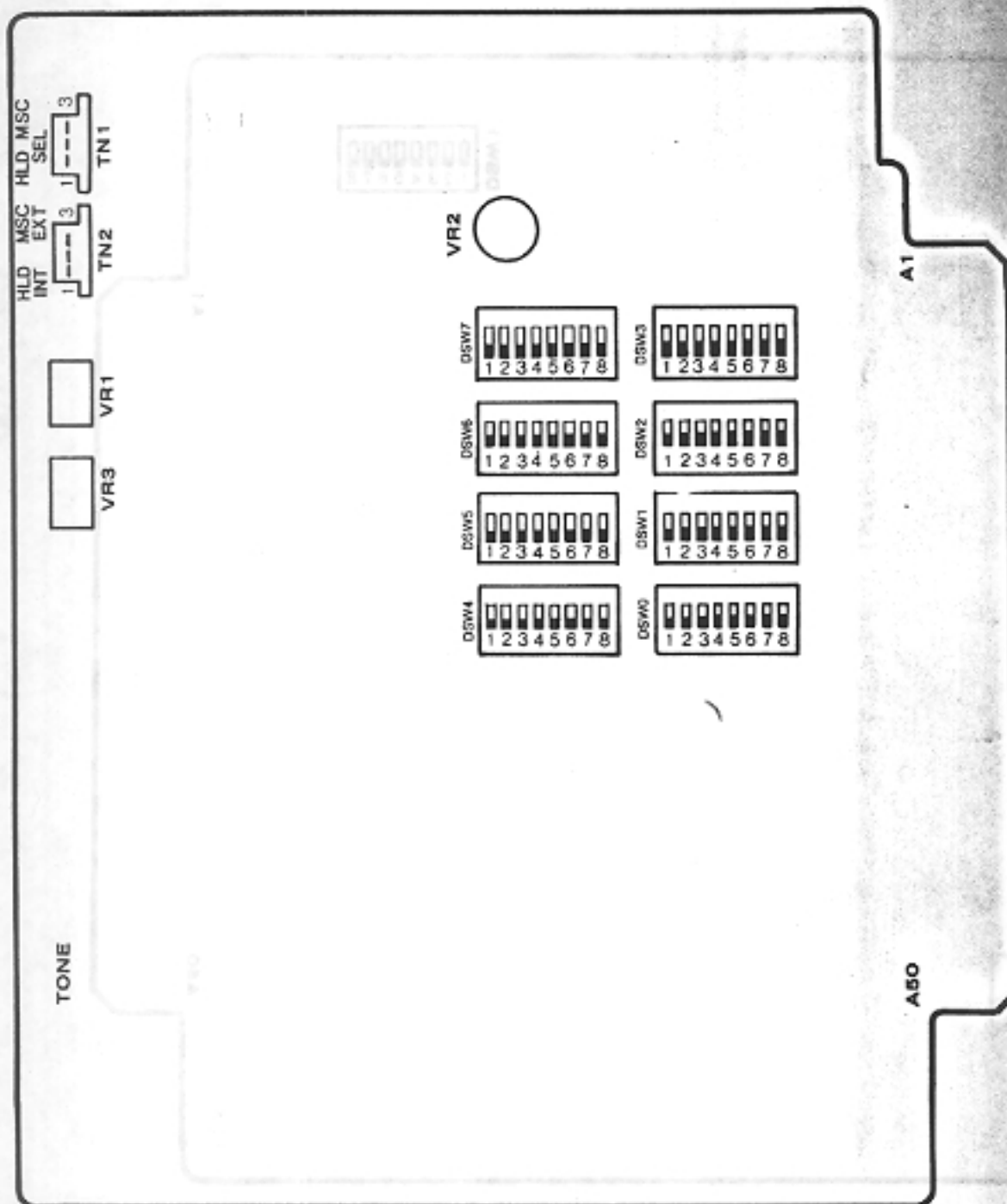


Figure 18 - TONE card

- |           |   |
|-----------|---|
| DSW 0     | - Switch 1 - Used to select system - "ON" for EK-1232 or "OFF" for EK-2064<br>Switch 2 thru switch 8 - Used to busy intercom paths (See Table 4 on page 13-11)  |
| DSW 1     | - Switch 1 thru 4 - Used to busy intercom paths (See table 4 on page 13-11)<br>Switch 5 thru 8 - Not presently used - Should be in "OFF" position   |
| DSW 2     | - Switch 1 - Used to expand intercom paths on EK-2064 - "OFF" for 5 paths or "ON" for 8 paths<br>Switch 2 & 3 - Controls Toll Restrictions - Should be in "OFF" position<br>Switch 4 thru 8 - Not presently used - Should be in "OFF" position  |
| DSW 3     | - Switch 1 & 2 - Allows common use of voice calling paths by all telephones or dedicates up to two paths for GGG use only - See Table 1.<br>Switch 3 thru 7 - Not presently used - Should be in "OFF" position<br>Switch 8 - Enables the Common Audible relay when in the "ON" position |
| DSW 4     | - Not presently used - Should be in "OFF" position  |
| DSW 5     | - Not presently used - Should be in "OFF" position  |
| DSW 6     | - Not presently used - Should be in "OFF" position  |
| DSW 7     | - Not presently used - Should be in "OFF" position  |
| TN1       | - Use to select internal hold music - Pins 1 & 2 for Melody 2 or pins 2 & 3 for Melody 1  |
| TN2       | - Used to select hold music source - Pins 1 & 2 for internal music source - Pins 2 & 3 for External music source  |
| ECRA/ECRB | - Connection for Common Audible relay   |
| VR1       | - Volume control for background music   |
| VR2       | - Factory adjustment for tone oscillator  |
| VR3       | - Volume control for external hold music  |

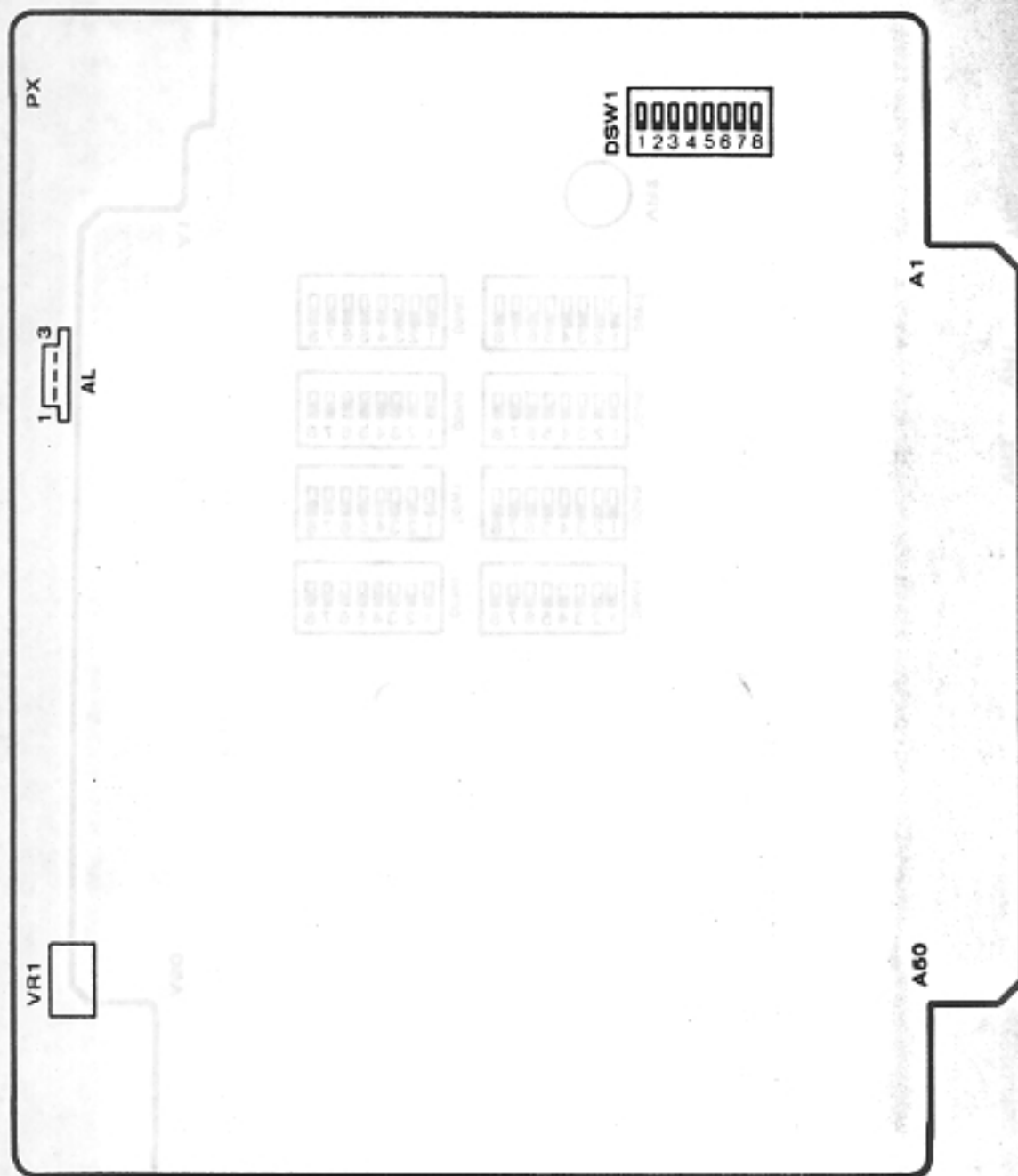


Figure 19 - PX card

- DSW 1 - Switch 1 thru 8 - used to expand intercom on EK-2064 - "ON" for intercom paths 6 thru 9 - "OFF" for CO lines 17 thru 20
- AL - Select type of alarm contact - Pins 1 & 2 for Break contact or Pins 2 & 3 - Make contact
- VR1 - Factory adjustment for intercom switching level



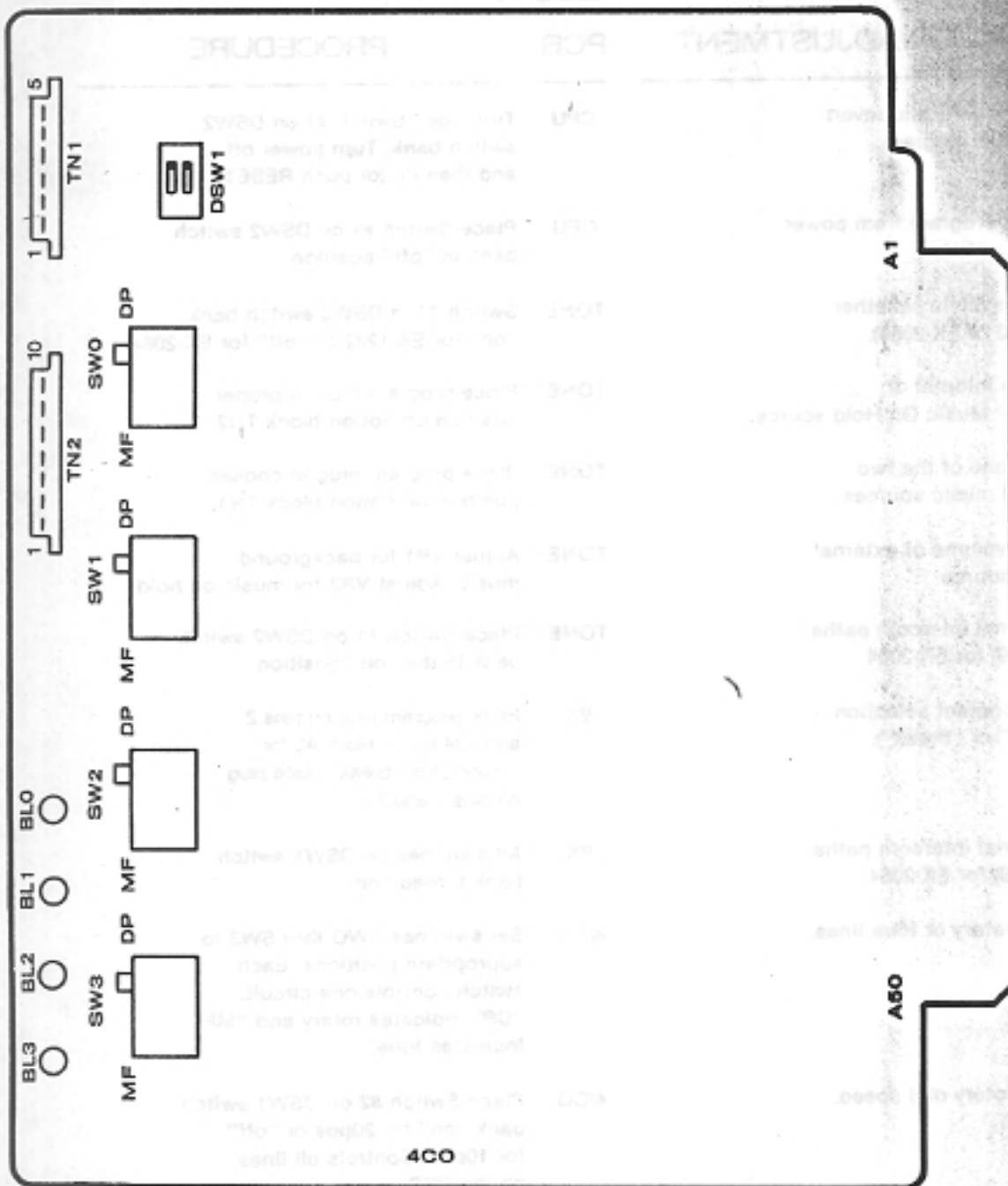


Figure 20 - 4CO card

- DSW 1 - Switch 2 - Select dial pulse speed - "ON" for 20pps or "OFF" for 10pps
- Switch 1 - Select dial make/break ratio - "ON" for 66% or "OFF" for 60%
- SW0 - Selects type of dial output - "MF" for Tone output or "DP" for pulse
- SW1 - (Same as SW0)
- SW2 - (Same as SW0)
- SW3 - (Same as SW0)
- TN1 - Used for factory test
- TN2 - Used for factory test

TABLE 1.

OPTION/ADJUSTMENT	PCB	PROCEDURE
Initialize CPU and revert to default program.	CPU	Turn "on" Switch #1 on DSW2 switch bank. Turn power off and then on (or push RESET).
Protect program from power failure	CPU	Place Switch #1 on DSW2 switch bank in "off" position.
Define system (whether EK-1232 or EK-2064).	TONE	Switch #1 in DSW0 switch bank "on" for EK-1232 or "off" for EK-2064.
Choose internal or external Music On Hold source.	TONE	Place program plug in proper position on option block TN2.
Select one of the two internal music sources.	TONE	Place program plug in chosen position on option block TN1.
Adjust volume of external music source	TONE	Adjust VR1 for background music. Adjust VR3 for music on hold
Additional intercom paths (6 thru 9) for EK-2064	TONE	Place Switch #1 on DSW2 switch bank in the "on" position.
Alarm contact selection ("make" or "break").	PX	Place program plug on pins 2 and 3 of option block AL for "make". For "break" place plug on pins 1 and 2.
Additional intercom paths (6 thru 9) for EK-2064.	PX	All switches on DSW1 switch bank turned "on".
Select rotary or tone lines.	4/CO	Set switches SW0 thru SW3 to appropriate positions. Each switch controls one circuit. "DP" indicates rotary and "MF" indicates tone.
Select rotary dial speed.	4/CO	Place Switch #2 on DSW1 switch bank "on" for 20pps or "off" for 10pps. Controls all lines on the PCB.
Select make/break ratio for rotary pulsing	4/CO	Place Switch #1 on DSW1 switch bank "on" for 60% and "off" for 66%.
Enable Common Audible (TONE-4CB)	TONE	Place Switch #8 on DSW3 switch bank "on"
Re-assign DSS calling paths	TONE	Switches #1 & #2 on DSW3 switch bank set as follows: #1 & #2 both "off" - All paths are available for common use. #1 "on", #2 "off" - One path dedicated for DSS use. #1 "off", #2 "on" - Two paths dedicated for DSS use.

7.27 4/CO PCBs are equipped with a DP/MF switch for each CO circuit on the card. These switches are marked SW0 through SW3 and are used to select the type of dial signal output for individual CO/PBX lines. (See figure 20.) Selecting the DP setting for a particular CO circuit tells the dial sender to output rotary pulses to the respective CO/PBX line. The MF setting initiates output of DTMF tones to the line. Depending on the signal requirements of the Central Office (or the PBX) each KSU may consist of rotary or tone (DTMF) lines or any combination. Since the dial sender actually produces the signals, the same telephone subsets are used in either case. Each CO PCB also includes a switch bank marked DSW1 which is used to select the pulse output speed and make/break ratio for any DP circuits on that card. Switch #1 on DSW1 should be placed in the "ON" position for a 10pps output. Placed in the "OFF" position, the output speed will be 20pps. With switch #2 on DSW1 in the "ON" position, the make/break ratio will be 66% and in the "OFF" position it will be 60%.

## STATION TELEPHONE AND DSS INSTALLATION

7.28 A 6-conductor, surface-mount, modular jack is packed with each telephone subset. This jack or an equivalent may be installed a maximum of 450 meters (1500 feet) from the KSU. Each station must be home run to the MDF. The relationship between the pins of the modular jack and the station terminals on the MDF is illustrated in figure 21.

7.29 A series of fuses located on the MDF PCB are provided for the protection of telephone subsets in the event of an overload or a reversal of the PA/PB (power) pair. Each fuse protects 4 telephone sets. The fuse marked "F1" protects telephones connected to the first 4 station circuits, "F2" protects telephones connected to the next 4 station circuits, and so on. Replacement fuses should be a maximum of 1 amp.

7.30 An optional kit is available for wall mounting the telephone sets. This kit consists of an angled plate which is attached to the base of the telephone (See figure 22.) and a handset hook which holds the handset in place (See figure 23.). The plate allows the telephone to be mounted on a modular wall jack or directly to the wall (See figures 24. thru 26.).

7.31 The DSS provides direct station selection and station busy indications. A DSS is required for initial programming of the system but may be removed once programming is completed. The DSS must be installed within 110 meters (350 feet) of the KSU. A connecting plate is packed with the DSS for securing it to the telephone subset along with a short modular cord for connecting the two together. (See figures 27. and 28.) The DSS requires no additional circuitry within the KSU and does not reduce station capacity. One or two calling paths may be assigned for exclusive use by DSS consoles or paths may be available for common use by DSS consoles and stations. DSS consoles will not function for direct station selection until a calling path is available but station busy indications will still be displayed. Bearing this in mind, any number of DSS consoles may be installed in the system.

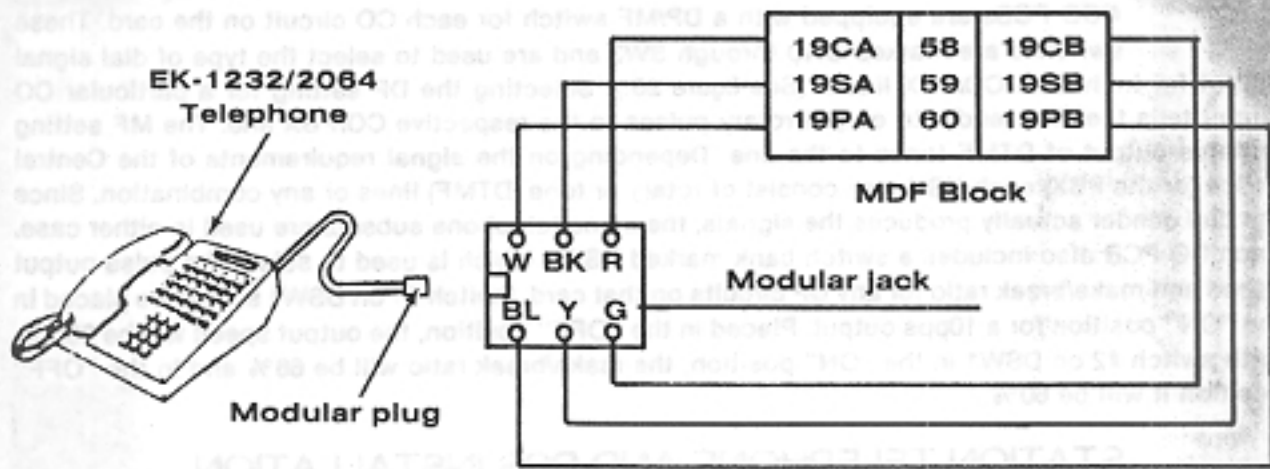


Figure 21. Station Terminations

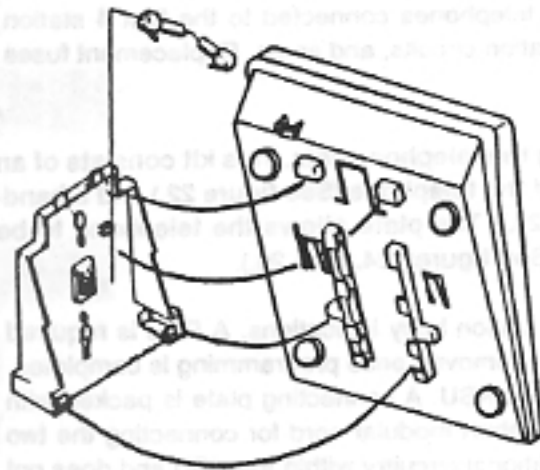


Figure 22. Wall Mounting Plate

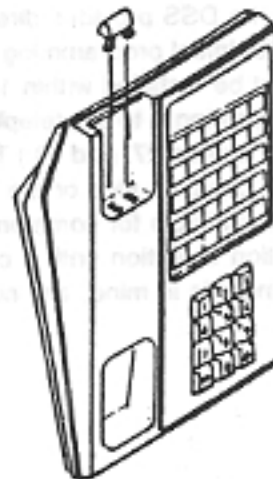
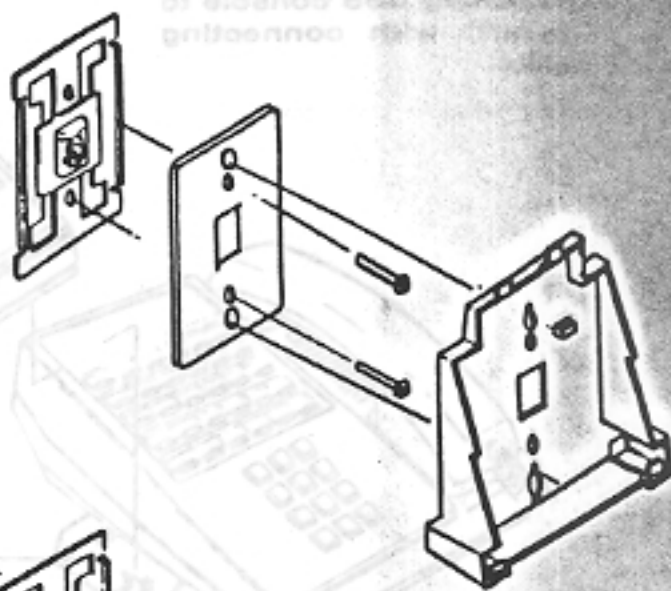


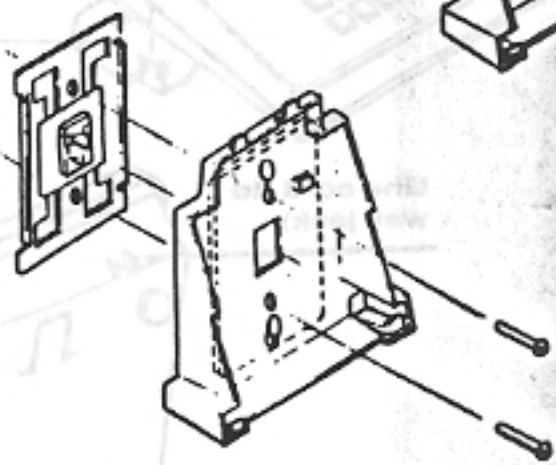
Figure 23. Handset Hook for Wall Mounting



**Figure 24.**  
Attaching cover plate to wall jack first and then attaching wall mounting plate.



**Figure 25.**  
Attaching wall mounting plate to cover plate first, then to wall jack.



**Figure 26.**  
Installing wall mounting plate directly on the wall.

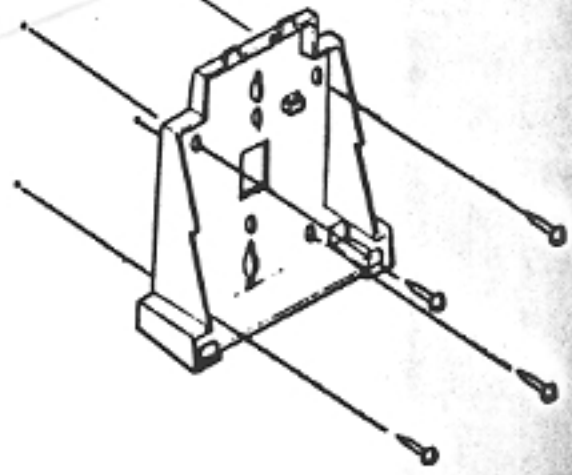
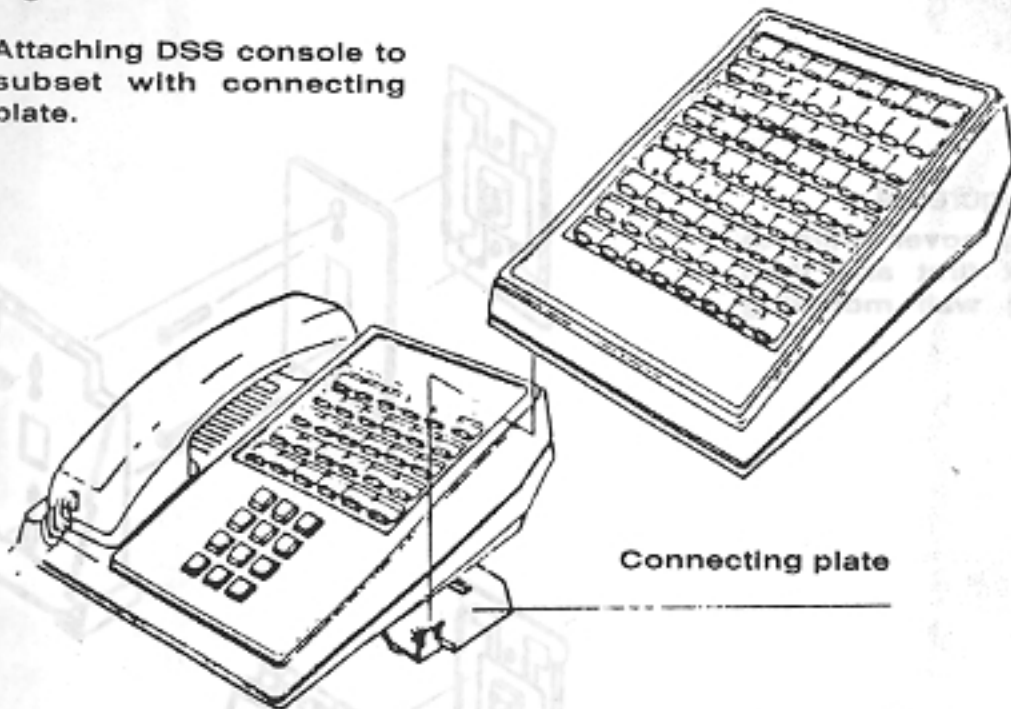


Figure 27.

Attaching DSS console to subset with connecting plate.



Line cord (to wall jack)

DSS console connections and programming switch

Jack for Telephone line cord

Programming switch

Figure 28.

## EK-1232/2064 MDF WITH 25 PAIR CONNECTORS

**7.32** The EK-1232/2064 Electronic Key System is now equipped with 25-pair amphenol-type connectors installed on the MDF PCB instead of the quick connect blocks. This change is in compliance with the requests of the majority of our dealers. Systems equipped with the 25-pair plugs are designated as "KSU-E".

**7.33** The EK-1232 is equipped with six 25-pair plugs (male) which will accept amphenol-type connectors (female) to allow quicker connection to an outboard MDF. The first four plugs (CT1, CT2, CT3 and CT4) are used for termination of the station wiring and have been arranged so that the standard color code may be followed when terminating on the external MDF. The fifth plug (CT5) is used for wiring ancillary items such as common audible, external paging, alarm input, etc. The last plug (CT6) is used for connection of CO lines and power failure transfer telephones.

**7.34** The EK-2064 is equipped with eleven plugs (male) for the same purposes. The first eight plugs (CT1 through CT8) are used for station connections. The next plug (CT9) is used for ancillary connections and the last two plugs (CT10 and CT11) are used for CO line and power fail connections.

**7.35** The following pages provide details of the connecting arrangements as provided by the 25-pair plugs. Refer to paragraphs 7.08 through 7.18 for information on the functions and purposes of the various terminal designations.

R1R	B101		R1R	B101
R1S	B102		R1S	B102
R1T	A101		R1T	A101
R1U	A102		R1U	A102
R1V	B103		R1V	B103
R1W	A103		R1W	A103
R1X	B104		R1X	B104
R1Y	A104		R1Y	A104
R1Z	B105		R1Z	B105
R2R	A105		R2R	A105
R2S	B106		R2S	B106
R2T	A106		R2T	A106
R2U	B107		R2U	B107
R2V	A107		R2V	A107
R2W	B108		R2W	B108
R2X	A108		R2X	A108
R2Y	B109		R2Y	B109
R2Z	A109		R2Z	A109
R3R	B110		R3R	B110
R3S	A110		R3S	A110
R3T	B111		R3T	B111
R3U	A111		R3U	A111
R3V	B112		R3V	B112
R3W	A112		R3W	A112
R3X	B113		R3X	B113
R3Y	A113		R3Y	A113
R3Z	B114		R3Z	B114
R4R	A114		R4R	A114
R4S	B115		R4S	B115
R4T	A115		R4T	A115
R4U	B116		R4U	B116
R4V	A116		R4V	A116
R4W	B117		R4W	B117
R4X	A117		R4X	A117
R4Y	B118		R4Y	B118
R4Z	A118		R4Z	A118
R5R	B119		R5R	B119
R5S	A119		R5S	A119
R5T	B120		R5T	B120
R5U	A120		R5U	A120
R5V	B121		R5V	B121
R5W	A121		R5W	A121
R5X	B122		R5X	B122
R5Y	A122		R5Y	A122
R5Z	B123		R5Z	B123
R6R	A123		R6R	A123
R6S	B124		R6S	B124
R6T	A124		R6T	A124
R6U	B125		R6U	B125
R6V	A125		R6V	A125
R6W	B126		R6W	B126
R6X	A126		R6X	A126
R6Y	B127		R6Y	B127
R6Z	A127		R6Z	A127
R7R	B128		R7R	B128
R7S	A128		R7S	A128
R7T	B129		R7T	B129
R7U	A129		R7U	A129
R7V	B130		R7V	B130
R7W	A130		R7W	A130
R7X	B131		R7X	B131
R7Y	A131		R7Y	A131
R7Z	B132		R7Z	B132
R8R	A132		R8R	A132
R8S	B133		R8S	B133
R8T	A133		R8T	A133
R8U	B134		R8U	B134
R8V	A134		R8V	A134
R8W	B135		R8W	B135
R8X	A135		R8X	A135
R8Y	B136		R8Y	B136
R8Z	A136		R8Z	A136
R9R	B137		R9R	B137
R9S	A137		R9S	A137
R9T	B138		R9T	B138
R9U	A138		R9U	A138
R9V	B139		R9V	B139
R9W	A139		R9W	A139
R9X	B140		R9X	B140
R9Y	A140		R9Y	A140
R9Z	B141		R9Z	B141
R0R	A141		R0R	A141
R0S	B142		R0S	B142
R0T	A142		R0T	A142
R0U	B143		R0U	B143
R0V	A143		R0V	A143
R0W	B144		R0W	B144
R0X	A144		R0X	A144
R0Y	B145		R0Y	B145
R0Z	A145		R0Z	A145
NOT USED			NOT USED	
NOT USED			NOT USED	

## 7.36

## EK-1232 MDF STATION TERMINATIONS

## KSU CONNECTOR "CT1"

## KSU CONNECTOR "CT2"

STATION PORT	TERMINAL DESIGNATION	25 PAIR COLOR CODE	STATION PORT	TERMINAL DESIGNATION	25 PAIR COLOR CODE
1	00CB	W/BL	9	08CB	W/BL
	00CA	BL/W		08CA	BL/W
	00SA	W/O		08SA	W/O
	00SB	O/W		08SB	O/W
	00PA	W/G		08PA	W/G
	00PB	G/W		08PB	G/W
2	01CB	W/BR	10	09CB	W/BR
	01CA	BR/W		09CA	BR/W
	01SA	W/S		09SA	W/S
	01SB	S/W		09SB	S/W
	01PA	R/BL		09PA	R/BL
	01PB	BL/R		09PB	BL/R
3	02CB	R/O	11	10CB	R/O
	02CA	O/R		10CA	O/R
	02SA	R/G		10SA	R/G
	02SB	G/R		10SB	G/R
	02PA	R/BR		10PA	R/BR
	02PB	BR/R		10PB	BR/R
4	03CB	R/S	12	11CB	R/S
	03CA	S/R		11CA	S/R
	03SA	BK/BL		11SA	BK/BL
	03SB	BL/BK		11SB	BL/BK
	03PA	BK/O		11PA	BK/O
	03PB	O/BK		11PB	O/BK
5	04CB	BK/G	13	12CB	BK/G
	04CA	G/BK		12CA	G/BK
	04SA	BK/BR		12SA	BK/BR
	04SB	BR/BK		12SB	BR/BK
	04PA	BK/S		12PA	BK/S
	04PB	S/BK		12PB	S/BK
6	05CB	Y/BL	14	13CB	Y/BL
	05CA	BL/Y		13CA	BL/Y
	05SA	Y/O		13SA	Y/O
	05SB	O/Y		13SB	O/Y
	05PA	Y/G		13PA	Y/G
	05PB	G/Y		13PB	G/Y
7	06CB	Y/BR	15	14CB	Y/BR
	06CA	BR/Y		14CA	BR/Y
	06SA	Y/S		14SA	Y/S
	06SB	S/Y		14SB	S/Y
	06PA	V/BL		14PA	V/BL
	06PB	BL/V		14PB	BL/V
8	07CB	V/O	16	15CB	V/O
	07CA	O/V		15CA	O/V
	07SA	V/G		15SA	V/G
	07SB	G/V		15SB	G/V
	07PA	V/BR		15PA	V/BR
	07PB	BR/V		15PB	BR/V
	NOT USED	S/V		NOT USED	V/S
	NOT USED	V/S		NOT USED	S/V



## KSU CONNECTOR "CT3"

## KSU CONNECTOR "CT4"

STATION PORT	TERMINAL DESIGNATION	25 PAIR COLOR CODE	STATION PORT	TERMINAL DESIGNATION	25 PAIR COLOR CODE
17	16CB	W/BL	25	24CB	W/BL
	16CA	BL/W		24CA	BL/W
	16SA	W/O		24SA	W/O
	16SB	O/W		24SB	O/W
	16PA	W/G		24PA	W/G
	16PB	G/W		24PB	G/W
18	17CB	W/BR	26	25CB	W/BR
	17CA	BR/W		25CA	BR/W
	17SA	W/S		25SA	W/S
	17SB	S/W		25SB	S/W
	17PA	R/BL		25PA	R/BL
	17PB	BL/R		25PB	BL/R
19	17CB	R/O	27	26CB	R/O
	18CA	O/R		26CA	O/R
	18SA	R/G		26SA	R/G
	18SB	G/R		26SB	G/R
	18PA	R/BR		26PA	R/BR
	18PB	BR/R		26PB	BR/R
20	19CB	R/S	28	27CB	R/S
	19CA	S/R		27CA	S/R
	19SA	BK/BL		27SA	BK/BL
	19SB	BL/BK		27SB	BL/BK
	19PA	BK/O		27PA	BK/O
	19PB	O/BK		27PB	O/BK
21	20CB	BK/G	29	28CB	BK/G
	20CA	G/BK		28CA	G/BK
	20SA	BK/BR		28SA	BK/BR
	20SB	BR/BK		28SB	BR/BK
	20PA	BK/S		28PA	BK/S
	20PB	S/BK		28PB	S/BK
22	21CB	Y/BL	30	29CB	Y/BL
	21CA	BL/Y		29CA	BL/Y
	21SA	Y/O		29SA	Y/O
	21SB	O/Y		29SB	O/Y
	21PA	Y/G		29PA	Y/G
	21PB	G/Y		29PB	G/Y
23	22CB	Y/BR	31	30CB	Y/BR
	22CA	BR/Y		30CA	BR/Y
	22SA	Y/S		30SA	Y/S
	22SB	S/Y		30SB	S/Y
	22PA	V/BL		30PA	V/BL
	22PB	BL/V		30PB	BL/V
24	23CB	V/O	32	31CB	V/O
	23CA	O/V		31CA	O/V
	23SA	V/G		31SA	V/G
	23SB	G/V		31SB	G/V
	23PA	V/BR		31PA	V/BR
	23PB	BR/V		31PB	BR/V
	NOT USED	S/V		NOT USED	V/S
	NOT USED	V/S		NOT USED	S/V

## 7.37

## EK-1232 MDF AUXILIARY, LINE AND POWER FAILURE TERMINATIONS

KSU CONNECTOR "CT5"		KSU CONNECTOR "CT6"	
TERMINAL DESIGNATION	25 PAIR COLOR CODE	TERMINAL DESIGNATION	25 PAIR COLOR CODE
BATA	W/BL	00LA	W/BL
BATB	BL/W	00LB	BL/W
ECRA	W/O	01LA	W/O
ECRB	O/W	01LB	O/W
ALMIN	W/G	02LA	W/G
ALMG	G/W	02LB	G/W
EHMA	W/BR	03LA	W/BR
EHMB	BR/W	03LB	BR/W
BGMA	W/S	04LA	W/S
BGMB	S/W	04LB	S/W
EPA	R/BL	05LA	R/BL
EPB	BL/R	05LB	BL/R
ESA	R/O	06LA	R/O
ESB	O/R	06LB	O/R
(THE REMAINING PAIRS IN CONNECTOR "CT5" ARE NOT USED)		07LA	R/G
		07LB	G/R
		08LA	R/BR
		08LB	BR/R
		09LA	R/S
		09LB	S/R
		10LA	BK/BL
		10LB	BL/BK
		11LA	BK/O
		11LB	O/BK
		00NA	BK/G
		00NB	G/BK
		01NA	BK/BR
		01NB	BR/BK
		02NA	BK/S
		02NB	S/BK
		03NA	Y/BL
		03NB	BL/Y
		04NA	Y/O
		04NB	O/Y
		05NA	Y/G
		05NB	G/Y
		06NA	Y/BR
		06NB	BR/Y
		07NA	Y/S
		07NB	S/Y
		08NA	V/BL
		08NB	BL/V
		09NA	V/O
		09NB	O/V
		10NA	V/G
		10NB	G/V
		11NA	V/BR
		11NB	BR/V
		NOT USED	V/S
		NOT USED	S/V

## 7.38

## EK-2064 MDF STATION TERMINATIONS

KSU CONNECTOR "CT1"			KSU CONNECTOR "CT2"		
STATION PORT	TERMINAL DESIGNATION	25 PAIR COLOR CODE	STATION PORT	TERMINAL DESIGNATION	25 PAIR COLOR CODE
1	00CB	W/BL	9	08CB	W/BL
	00CA	BL/W		08CA	BL/W
	00SA	W/O		08SA	W/O
	00SB	O/W		08SB	O/W
	00PA	W/G		08PA	W/G
	00PB	G/W		08PB	G/W
2	01CB	W/BR	10	09CB	W/BR
	01CA	BR/W		09CA	BR/W
	01SA	W/S		09SA	W/S
	01SB	S/W		09SB	S/W
	01PA	R/BL		09PA	R/BL
	01PB	BL/R		09PB	BL/R
3	02CB	R/O	11	10CB	R/O
	02CA	O/R		10CA	O/R
	02SA	R/G		10SA	R/G
	02SB	G/R		10SB	G/R
	02PA	R/BR		10PA	R/BR
	02PB	BR/R		10PB	BR/R
4	03CB	R/S	12	11CB	R/S
	03CA	S/R		11CA	S/R
	03SA	BK/BL		11SA	BK/BL
	03SB	BL/BK		11SB	BL/BK
	03PA	BK/O		11PA	BK/O
	03PB	O/BK		11PB	O/BK
5	04CB	BK/G	13	12CB	BK/G
	04CA	G/BK		12CA	G/BK
	04SA	BK/BR		12SA	BK/BR
	04SB	BR/BK		12SB	BR/BK
	04PA	BK/S		12PA	BK/S
	04PB	S/BK		12PB	S/BK
6	05CB	Y/BL	14	13CB	Y/BL
	05CA	BL/Y		13CA	BL/Y
	05SA	Y/O		13SA	Y/O
	05SB	O/Y		13SB	O/Y
	05PA	Y/G		13PA	Y/G
	05PB	G/Y		13PB	G/Y
7	06CB	Y/BR	15	14CB	Y/BR
	06CA	BR/Y		14CA	BR/Y
	06SA	Y/S		14SA	Y/S
	06SB	S/Y		14SB	S/Y
	06PA	V/BL		14PA	V/BL
	06PB	BL/V		14PB	BL/V
8	07CB	V/O	16	15CB	V/O
	07CA	O/V		15CA	O/V
	07SA	V/G		15SA	V/G
	07SB	G/V		15SB	G/V
	07PA	V/BR		15PA	V/BR
	07PB	BR/V		15PB	BR/V
	NOT USED	S/V		NOT USED	V/S
	NOT USED	V/S		NOT USED	S/V

KSU CONNECTOR "CT3"

KSU CONNECTOR "CT4"

STATION PORT	TERMINAL DESIGNATION	25 PAIR COLOR CODE	STATION PORT	TERMINAL DESIGNATION	25 PAIR COLOR CODE
17	16CB	W/BL	25	24CB	W/BL
	16CA	BL/W		24CA	BL/W
	16SA	W/O		24SA	W/O
	16SB	O/W		24SB	O/W
	16PA	W/G		24PA	W/G
	16PB	G/W		24PB	G/W
18	17CB	W/BR	26	25CB	W/BR
	17CA	BR/W		25CA	BR/W
	17SA	W/S		25SA	W/S
	17SB	S/W		25SB	S/W
	17PA	R/BL		25PA	R/BL
	17PB	BL/R		25PB	BL/R
19	17CB	R/O	27	26CB	R/O
	18CA	O/R		26CA	O/R
	18SA	R/G		26SA	R/G
	18SB	G/R		26SB	G/R
	18PA	R/BR		26PA	R/BR
	18PB	BR/R		26PB	BR/R
20	19CB	R/S	28	27CB	R/S
	19CA	S/R		27CA	S/R
	19SA	BK/BL		27SA	BK/BL
	19SB	BL/BK		27SB	BL/BK
	19PA	BK/O		27PA	BK/O
	19PB	O/BK		27PB	O/BK
21	20CB	BK/G	29	28CB	BK/G
	20CA	G/BK		28CA	G/BK
	20SA	BK/BR		28SA	BK/BR
	20SB	BR/BK		28SB	BR/BK
	20PA	BK/S		28PA	BK/S
	20PB	S/BK		28PB	S/BK
22	21CB	Y/BL	30	29CB	Y/BL
	21CA	BL/Y		29CA	BL/Y
	21SA	Y/O		29SA	Y/O
	21SB	O/Y		29SB	O/Y
	21PA	Y/G		29PA	Y/G
	21PB	G/Y		29PB	G/Y
23	22CB	Y/BR	31	30CB	Y/BR
	22CA	BR/Y		30CA	BR/Y
	22SA	Y/S		30SA	Y/S
	22SB	S/Y		30SB	S/Y
	22PA	V/BL		30PA	V/BL
	22PB	BL/V		30PB	BL/V
24	23CB	V/O	32	31CB	V/O
	23CA	O/V		31CA	O/V
	23SA	V/G		31SA	V/G
	23SB	G/V		31SB	G/V
	23PA	V/BR		31PA	V/BR
	23PB	BR/V		31PB	BR/V
	NOT USED	S/V		NOT USED	V/S
	NOT USED	V/S		NOT USED	S/V



EK-2064 MDF STATION TERMINATIONS

STATION TERMINATIONS

KSU CONNECTOR "CT5"

KSU CONNECTOR "CT6"

STATION PORT	TERMINAL DESIGNATION	25 PAIR COLOR CODE	STATION PORT	TERMINAL DESIGNATION	25 PAIR COLOR CODE
33 W	32CB	W/BL	41 W	40CB	W/BL
W/B	32CA	BL/W	W/B	40CA	BL/W
O/W	32SA	W/O	O/W	40SA	W/O
W/O	32SB	O/W	W/O	40SB	O/W
O/W	32PA	W/G	O/W	40PA	W/G
W/O	32PB	G/W	W/O	40PB	G/W
34 W	33CB	W/BR	42 W	41CB	W/BR
W/B	33CA	BR/W	W/B	41CA	BR/W
S/W	33SA	W/S	S/W	41SA	W/S
W/S	33SB	S/W	W/S	41SB	S/W
R/B	33PA	R/BL	R/B	41PA	R/BL
R/B	33PB	BL/R	R/B	41PB	BL/R
35 O/R	34CB	R/O	43 O/R	42CB	R/O
O/R	34CA	O/R	O/R	42CA	O/R
O/R	34SA	R/G	O/R	42SA	R/G
O/R	34SB	G/R	O/R	42SB	G/R
R/B	34PA	R/BR	R/B	42PA	R/BR
R/B	34PB	BR/R	R/B	42PB	BR/R
36 O/R	35CB	R/S	44 O/R	43CB	R/S
O/R	35CA	S/R	O/R	43CA	S/R
BK/B	35SA	BK/BL	BK/B	43SA	BK/BL
BK/B	35SB	BL/BK	BK/B	43SB	BL/BK
O/B	35PA	BK/O	O/B	43PA	BK/O
O/B	35PB	O/BK	O/B	43PB	O/BK
37 BK/G	36CB	BK/G	45 BK/G	44CB	BK/G
BK/G	36CA	G/BK	BK/G	44CA	G/BK
R/B	36SA	BK/BR	R/B	44SA	BK/BR
R/B	36SB	BR/BK	R/B	44SB	BR/BK
BK/S	36PA	BK/S	BK/S	44PA	BK/S
BK/S	36PB	S/BK	BK/S	44PB	S/BK
38 Y/B	37CB	Y/BL	46 Y/B	45CB	Y/BL
Y/B	37CA	BL/Y	Y/B	45CA	BL/Y
O/Y	37SA	Y/O	O/Y	45SA	Y/O
O/Y	37SB	O/Y	O/Y	45SB	O/Y
Y/O	37PA	Y/G	Y/O	45PA	Y/G
Y/O	37PB	G/Y	Y/O	45PB	G/Y
39 O/Y	38CB	Y/BR	47 O/Y	46CB	Y/BR
O/Y	38CA	BR/Y	O/Y	46CA	BR/Y
Y/S	38SA	Y/S	Y/S	46SA	Y/S
Y/S	38SB	S/Y	Y/S	46SB	S/Y
B/V	38PA	V/BL	B/V	46PA	V/BL
B/V	38PB	BL/V	B/V	46PB	BL/V
40 O/V	39CB	V/O	48 O/V	47CB	V/O
O/V	39CA	O/V	O/V	47CA	O/V
O/V	39SA	V/G	O/V	47SA	V/G
O/V	39SB	G/V	O/V	47SB	G/V
R/V	39PA	V/BR	R/V	47PA	V/BR
R/V	39PB	BR/V	R/V	47PB	BR/V
S/V	NOT USED	S/V	S/V	NOT USED	S/V
V/S	NOT USED	V/S	V/S	NOT USED	V/S

EK-2064 MDF STATION TERMINATIONS

KSU CONNECTOR "CT7"				KSU CONNECTOR "CT8"			
STATION PORT	TERMINAL DESIGNATION	25 PAIR COLOR CODE		STATION PORT	TERMINAL DESIGNATION	25 PAIR COLOR CODE	
49	48CB	W/BL		57	56CB	W/BL	
	48CA	BL/W			56CA	BL/W	
	48SA	W/O			56SA	W/O	
	48SB	O/W			56SB	O/W	
	48PA	W/G			56PA	W/G	
	48PB	G/W			56PB	G/W	
50	49CB	W/BR		58	57CB	W/BR	
	49CA	BR/W			57CA	BR/W	
	49SA	W/S			57SA	W/S	
	49SB	S/W			57SB	S/W	
	49PA	R/BL			57PA	R/BL	
	49PB	BL/R			57PB	BL/R	
51	50CB	R/O		59	58CB	R/O	
	50CA	O/R			58CA	O/R	
	50SA	R/G			58SA	R/G	
	50SB	G/R			58SB	G/R	
	50PA	R/BR			58PA	R/BR	
	50PB	BR/R			58PB	BR/R	
52	51CB	R/S		60	59SB	R/S	
	51CA	S/R			59CA	S/R	
	51SA	BK/BL			59SA	BK/BL	
	51SB	BL/BK			59SB	BL/BK	
	51PA	BK/O			59PA	BK/O	
	51PB	O/BK			59PB	O/BK	
53	52CB	BK/G		61	60CB	BK/G	
	52CA	G/BK			60CA	G/BK	
	52SA	BK/BR			60SA	BK/BR	
	52SB	BR/BK			60SB	BR/BK	
	52PA	BK/S			60PA	BK/S	
	52PB	S/BK			60PB	S/BK	
54	53CB	Y/BL		62	61CB	Y/BL	
	53CA	BL/Y			61CA	BL/Y	
	53SA	Y/O			61SA	Y/O	
	53SB	O/Y			61SB	O/Y	
	53PA	Y/G			61PA	Y/G	
	53PB	G/Y			61PB	G/Y	
55	54CB	Y/BR		63	62CB	Y/BR	
	54CA	BR/Y			62CA	BR/Y	
	54SA	Y/S			62SA	Y/S	
	54SB	S/Y			62SB	S/Y	
	54PA	V/BL			62PA	V/BL	
	54PB	BL/V			62PB	BL/V	
56	55CB	V/O		64	63CB	V/O	
	55CA	O/V			63CA	O/V	
	55SA	V/G			63SA	V/G	
	55SB	G/V			63SB	G/V	
	55PA	V/BR			63PA	V/BR	
	55PB	BR/V			63PB	BR/V	
	NOT USED	S/V			NOT USED	V/S	
	NOT USED	V/S			NOT USED	S/V	

KSU CONNECTOR "CT9"

TERMINAL DESIGNATION	25 PAIR COLOR CODE
BATA	W/BL
BATB	BL/W
ECRA	W/O
ECRB	O/W
ALMIN	W/G
ALMG	G/W
EHMA	W/BR
EHMB	BR/W
BGMA	W/S
BGMB	S/W
EPA	R/BL
EPB	BL/R
ESA	R/O
ESB	O/R

(THE REMAINING PAIRS IN CONNECTOR CT9 ARE NOT USED)

RTA	W/BL
RTB	BL/W
RTC	W/O
RTD	O/W
RTA	W/G
RTB	G/W
RTA	W/BR
RTB	BR/W
RTA	W/S
RTB	S/W
RTA	R/BL
RTB	BL/R
RTA	R/O
RTB	O/R
RTA	W/BL
RTB	BL/W
RTA	W/O
RTB	O/W
RTA	W/G
RTB	G/W
RTA	W/BR
RTB	BR/W
RTA	W/S
RTB	S/W
RTA	R/BL
RTB	BL/R
RTA	R/O
RTB	O/R
RTA	W/BL
RTB	BL/W
RTA	W/O
RTB	O/W
RTA	W/G
RTB	G/W
RTA	W/BR
RTB	BR/W
RTA	W/S
RTB	S/W
RTA	R/BL
RTB	BL/R
RTA	R/O
RTB	O/R

(THE REMAINING PAIRS IN CONNECTOR CT9 ARE NOT USED)

## KSU CONNECTOR "CT10"

TERMINAL DESIGNATION	25 PAIR COLOR CODE
00LA	W/BL
00LB	BL/W
01LA	W/O
01LB	O/W
02LA	W/G
02LB	G/W
03LA	W/BR
03LB	BR/W
04LA	W/S
04LB	S/W
05LA	R/BL
05LB	BL/R
06LA	R/O
06LB	O/R
07LA	R/G
07LB	G/R
08LA	R/BR
08LB	BR/R
09LA	R/S
09LB	S/R
10LA	BK/BL
10LB	BL/BK
11LA	BK/O
11LB	O/BK
12LA	BK/G
12LB	G/BK
13LA	BK/BR
13LB	BR/BK
14LA	BK/S
14LB	S/BK
15LA	Y/BL
15LB	BL/Y
16LA	Y/O
16LB	O/Y
17LA	Y/G
17LB	G/Y
18LA	Y/BR
18LB	BR/Y
19LA	Y/S
19LB	S/Y

(THE REMAINING PAIRS IN CONNECTOR CT10 ARE NOT USED)

## KSU CONNECTOR "CT11"

TERMINAL DESIGNATION	25 PAIR COLOR CODE
00NA	W/BL
00NB	BL/W
01NA	W/O
01NB	O/W
02NA	W/G
02NB	G/W
03NA	W/BR
03NB	BR/W
04NA	W/S
04NB	S/W
05NA	R/BL
05NB	BL/R
06NA	R/O
06NB	O/R
07NA	R/G
07NB	G/R
08NA	R/BR
08NB	BR/R
09NA	R/S
09NB	S/R
10NA	BK/BL
10NB	BL/BK
11NA	BK/O
11NB	O/BK
12NA	BK/G
12NB	G/BK
13NA	BK/BR
13NB	BR/BK
14NA	BK/S
14NB	S/BK
15NA	Y/BL
15NB	BL/Y
16NA	Y/O
16NB	O/Y
17NA	Y/G
17NB	G/Y
18NA	Y/BR
18NB	BR/Y
19NA	Y/S
19NB	S/Y

(THE REMAINING PAIRS IN CONNECTOR CT11 ARE NOT USED)



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## 8 . SYSTEM PROGRAMMING

**8.01** System programming is accomplished through a series of entries performed on the DSS console and its associated subset. The DSS should be installed in the normal manner (See par. 7.28). To initialize the system memory prior to programming, switch #1 on the DSW2 switch bank of the CPU card should be turned to the "ON" position and the RESET button should be pushed. The LED on the CPU PCB will go out for a second. (Power could be turned off instead of pushing the RESET button.) Switch #1 should now be turned to the "OFF" position to protect the memory. At this time, switch #2 on the bottom on the DSS should be placed in the "ON" position (See figure 28.) to place the DSS in programming mode. All programming must take place with the associated subset in the off hook condition (handset off hook or speaker turned on). The subset used with the DSS must be equipped with an LCD display so that programming can be verified visually.

### \* CAUTION \*

Be sure to turn switch #2 on the bottom of the DSS to the "OFF" position once programming is complete.

**8.02** The bottom row of buttons on the DSS marked F1 through F8 are program function buttons. Each button has a specific function as shown below.

- F1 - Used to initiate programming of station related features.
- F2 - Used to initiate programming of system related features.
- F3 - Used as a "break" key. When inputting data which consists of several characters, use of this key tells the system where one set of characters ends and the next begins. (For instance, this key is used to separate area codes while programming toll restriction.)
- F4 - Used as a "step" key. Allows the programmer to move ahead to the next station or group in sequence. This function is especially useful in verifying the programming.
- F5 - Used to end a particular programming mode before going on to the next one.
- F6 - Used to initiate programming of additional features.
- F7 - Used to clear data. Erases any data previously input. Clears all data under the station or group displayed on the LCD.
- F8 - Not presently used for programming.

**8.03** Other buttons used for programming include the DSS station buttons, CO line buttons and keypad on the associated subset. The function of these buttons will become apparent in the programming instructions which follow. It should be noted that due to the flexible numbering capability, stations are not represented on the LCD display as they are by the DSS buttons. Table 2. Illustrates the correlation between the two.

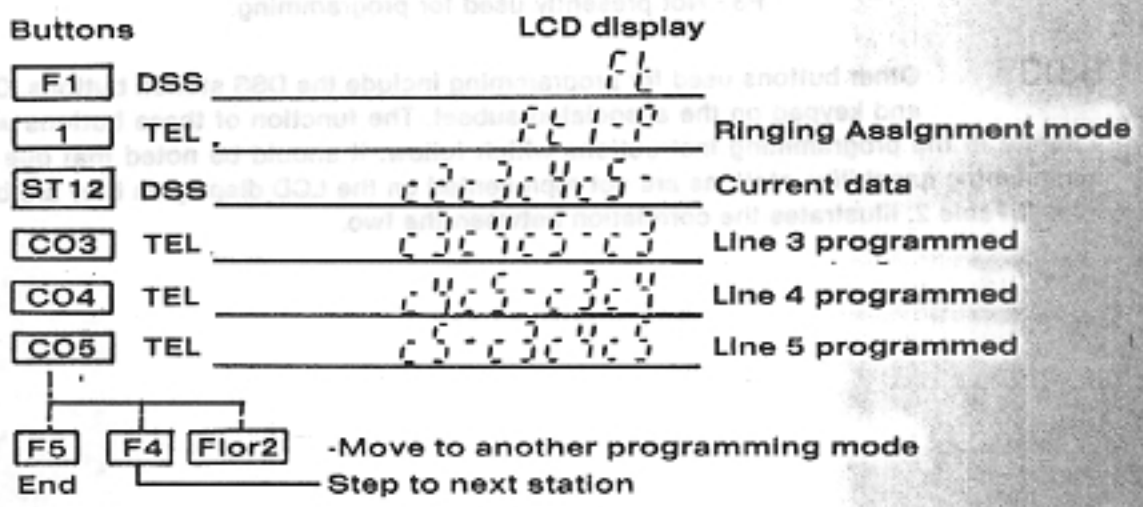
TABLE 2

DSS #	LCD #	DSS #	LCD #	DSS #	LCD #
10	P1	36	P23	63	P44
11	P2	37	P24	64	P45
12	P3	40	P25	65	P46
13	P4	41	P26	66	P47
14	P5	42	P27	67	P48
15	P6	43	P28	70	P49
16	P7	44	P29	71	P50
17	P8	45	P30	72	P51
20	P9	46	P31	73	P52
21	P10	47	P32	74	P53
22	P11	50	P33	75	P54
23	P12	51	P34	76	P55
24	P13	52	P35	77	P56
25	P14	53	P36	80	P57
26	P15	54	P37	81	P58
27	P16	55	P38	82	P59
30	P17	56	P39	83	P60
31	P18	57	P40	84	P61
32	P19	60	P41	85	P62
33	P20	61	P42	86	P63
34	P21	62	P43	87	P64
35	P22				

**FLEXIBLE RINGING ASSIGNMENT**

**8.04** Each station can be programmed to ring on selected incoming CO lines. Programming is accomplished by pushing the F1 button and then dialing "1" on the subset keypad. Then the DSS button of the station to be programmed is pushed followed by the CO line buttons on the subset representing the lines which will ring at the station.

Example: Programming station 12 to ring on CO lines 3,4, & 5





## TOLL RESTRICTION CLASSES

**8.05** Toll Restriction programming consists of first assigning one of the 5 classes of restriction to each station and then defining the 5 toll restriction lists. The 5 classes of restriction are:

- Class A- No restriction. All calls allowed under Class A.
- Class B- Stations under Class B are allowed long distance dialing except as denied under List 5 (Special Restriction Codes). In addition Class B stations are unable to dial "0" for operator assisted calls.
- Class C- Class C stations are normally unable to make any call outside the local area code. They are also unable to dial "0" for operator assistance. Long distance calls are allowed by List 2 (Special Access Codes) and List 3 (Special Lines). List 5 (Special Restriction Codes) are applied to Special Lines.
- Class D- Class D stations are identical to those under Class C except that these stations are unable to dial toll calls within the local area code. Any local area code call which is dialed with a "1" preceding it will be denied. Exceptions to Class C also apply to Class D.
- Class E- Stations under Class E restriction are usually allowed intercom dialing only. CO line calling is allowed only by the exceptions provided in List 2 (Special Access Codes) and List 3 (Special Lines). List 5 (Special Restriction Codes) apply to Special Lines.

The system default program initially assigns Class A to all stations. Reassignment of the toll restriction class is made by pushing F1 on the DSS followed by dialing "2" on the subset. The station is selected by pushing the appropriate DSS button and the class is assigned by dialing a digit on the subset. The digit "1" assigns Class A, "2" assigns Class B, "3" assigns Class C, "4" assigns Class D, and "5" assigns Class E. (See Table 3.)

Example: Assigning toll restriction Class C to station 15.

Buttons	LCD display	
<b>F1</b> DSS	<u>FL</u>	
<b>2</b> TEL	<u>FL2-0</u>	Toll Restriction Class Mode
<b>ST15</b> DSS	<u>FL2-00-0</u>	Current Data
<b>3</b> TEL	<u>FL2-00-0-C</u>	Class Changed to "C"
<b>F5</b>		
End		

Class	Dial button	LCD display
A	"1"	0
B	"2"	0
C	"3"	C
D	"4"	0
E	"5"	0

Table 3. Toll Restriction Classes

## TOLL RESTRICTION LISTS

**8.06** There are 5 toll restriction lists which are used to allow some flexibility to the standard class of service restrictions. These lists allow programming of PBX line access, special numbers which are allowed for restricted stations, access to specific lines for restricted stations, and special restricted numbers. An explanation of each list and its programming is found in the following paragraphs.

### LIST 1 - PBX LINE ACCESS CODES

**8.07** LIST 1 is relevant to toll restriction only when EK-1232/2064 is installed "behind" a PBX. List 1 may contain 2 PBX line access codes (each being up to 3 digits in length). The purpose of LIST 1 is to allow the KSU to recognize a PBX line access code and activate toll restriction only after a station has accessed an outside line. In addition, a pause is inserted after the PBX line access code is dialed. The length of this pause can be programmed for up to 8 seconds (See par. 8.26). The pause allows time for the PBX to assign a line before it receives the next digits from the KSU. Therefore, station users need not pause after dialing the PBX line access code and pauses are not necessary in speed dial numbers. PBX line access codes are entered by pushing F2 on the DSS and then dialing "2" and "1" on the subset. The codes are then dialed on the subset keypad and F3 is pushed to enter a break between each separate access number. When all codes have been entered F4 is pushed to exit the LIST 1 mode and continue to another.

Example: PBX line access codes "7" and "8" are assigned under LIST 1.

Buttons	LCD display
<b>F2</b> DSS	FF
<b>2</b> TEL	FF2-1 Toll Restriction Mode
<b>1</b> TEL	FF2-1 1- Mode for PBX access codes
<b>7</b> TEL	FF2-1 1- 7 "7" programmed
<b>F3</b> DSS	2-1 1- 7- Insert "break" to separate codes
<b>8</b> TEL	-1 1- 7-8 "8" programmed
<b>F4</b> DSS	1- 7-8 1 Ready for next Toll Restriction Mode

### LIST 2 - SPECIAL ACCESS CODES

**8.08** LIST 2 allows exceptions to the normal toll restrictions placed on stations under Classes C, D, and E. LIST 2 may contain a maximum of 10 codes (3 digits in length). These codes may be area codes, office codes, or emergency numbers (such as 911). Programming LIST 2 consists of pushing F2 on the DSS followed by dialing "2" and then "2" on the subset. Each code is entered by pushing the appropriate digits on the subset keypad. After each code is entered the F3 button is pushed to indicate the end of one code and the beginning of the next. When all codes have been entered the F4 button is pushed to continue with other programming modes.

Example: Programming special access codes "800" and "911".

Buttons	LCD display
	1 End of previous mode
[2] TEL	1 2- Mode for Special Access Codes
[8] TEL	1 2-0
[0] TEL	1 2-00
[0] TEL	1 2-000 "800" programmed
[F3] DSS	1 2-000- Insert break to separate codes
[9] TEL	1 2-000-9
[1] TEL	1 2-000-91
[1] TEL	2-000-911 "911" programmed
[F4] DSS	-000-911 1 Ready for next Toll Restriction Mode

### LIST 3 - SPECIAL LINES

8.09 LIST 3 allows the Installer to assign up to 5 lines for use by stations under Class C, D, and E restrictions. These lines may be selected as required and need not be sequential. Class C, D, and E stations are unrestricted on these lines except for dialing "0" and by special restriction under LIST 5 (See par. 8.11). The purpose of LIST 3 is to force Class C, D, and E stations to use specific lines for toll calls. This may be helpful when WATS, FX, or tie lines are available or to limit traffic on other lines. Programming of List 3 is accomplished by pushing F2 on the DSS, and dialing "2" and then "3" on the subset. The lines are then input by pushing the appropriate CO line button(s) on the subset. F4 on the DSS may then be pushed to continue with other programs.

Example: Lines 1, 3, and 6 are programmed as LIST 3-Special Lines.

Buttons	LCD display
	1 End of previous mode
[3] TEL	1 3- Special Lines mode
[CO1] TEL	1 3-c 1 Line 1 programmed
[CO3] TEL	1 3-c 1c 3 Line 3 programmed
[CO6] TEL	1 3-c 1c 3c 6 Line 6 programmed
[F4] DSS	3-c 1c 3c 6 1 Ready for next Toll Restriction Mode



## LIST 4 - LONG DISTANCE ACCESS CODES

**8.10** LIST 4 allows the installer to program 2 access codes for denial to stations under Class C and D restrictions. These codes must be 3 digits in length. These codes may include "\*" (representing any digit from 2 through 9) and "#" (representing any digit from 0 through 9). Normally this list is used to define the conditions which separate an area code from any other 3-digit string of numbers. It is possible, however to use this list for more precise restrictions by entering specific digits. Although this provides additional flexibility, care must be taken to insure that the codes entered do not cause desired numbers to be denied. Remember that any 3-digit string of numbers will be denied if it matches the code entered in LIST 4. Programming begins by pushing F2 on the DSS followed by "2" and then "4". The codes are then input through the keypad on the subset with F3 being entered to indicate the end of the first code and the beginning of the second. F4 is pushed to continue programming in another mode.

Example: Entering the normal definitions for area codes.

Buttons	LCD display	
		End of previous mode
<b>4</b> TEL	1 4 -	Mode for Long Distance
<b>*</b> TEL	1 4 - 0	Access Codes
<b>1</b> TEL	1 4 - 0 1	
<b>#</b> TEL	1 4 - 0 1 0	"*1#" programmed as area code definition
<b>F3</b> DSS	1 4 - 0 1 0 -	Insert "break" to separate codes
<b>*</b> TEL	1 4 - 0 1 0 - 0	
<b>0</b> TEL	1 4 - 0 1 0 - 0 0	
<b>#</b> TEL	4 - 0 1 0 - 0 0 0	"*0#" programmed as area code definition
<b>F4</b> DSS	- 0 1 0 - 0 0 0 1	Ready for next Toll Restriction Mode

## LIST 5 - SPECIAL RESTRICTION CODES

**8.11** LIST 5 may contain 10 codes (3 digits in length) which will be denied to any station under Class B, C, D, or E restrictions. These codes may be international access codes, area codes, office codes, or any 3-digit string. The normal application is to deny international calling and specific area codes. As in LIST 4, the "\*" and "#" may be used in these codes for added flexibility but the same consideration must be given to prevent unintentional restrictions. To program LIST 5 the F2 button is pushed followed by "2" and "5". The codes are input through the subset keypad with F3 being pushed to separate each code. F4 is then pushed to exit this programming mode and continue to another.



Example: International code 011 is denied.

Buttons	LCD display	
	1	End of previous mode
[5] TEL	1 5 -	Mode for Special Restriction Mode
[0] TEL	1 5 - 0	
[1] TEL	1 5 - 0 1	
[1] TEL	1 5 - 0 1 1	"011" programmed as Restricted Code
		(Insert break if another code is to be programmed)
[F4] [F5] DSS	1 5 - 0 1 1 1	Ready for next Toll Restriction Mode
		Next or End

## FLEXIBLE STATION NUMBERING

**8.12** Station numbers may be changed without affecting previously programmed features or options. A station may be assigned any extension number between 10 and 99 inclusive. A number can be used even though it may be presently assigned to another station, however, the first station will then have no extension number assigned at all and will not function until a new number is assigned. Programming is accomplished by pushing the F1 button followed by dialing "3" on the subset. Then the DSS button (for the station being programmed) is pushed, the new two-digit station number is entered on the keypad, and the "#" button on the keypad is pushed to complete the entry. Station numbering established by the default program is shown in paragraph 8.35.

Example: Changing extension #32 to extension #16.

Buttons	LCD display	
[F1] DSS	1 1	
[3] TEL	1 1 3 - 0	Station numbering mode
[ST32] DSS	1 1 3 - 0 1 9 - 3 2 -	Selecting circuit 19; presently station 32
[1] TEL	1 1 3 - 0 1 9 - 3 2 - 1	
[6] TEL	1 1 3 - 0 1 9 - 3 2 - 1 6	"16" programmed as new station number
[#] TEL	1 1 3 - 0 1 9 - 3 2 - 1 6 #	"#" confirms & activates the change
[F5]		
End		

## ALARM SETTING

**8.13** When external alarm devices are attached to the system each station can be programmed to receive or ignore the audible alarm signal. The default program is set so that all stations ignore the alarm signal. Programming a station to receive the audible signal is accomplished by pushing the F1 button, dialing "4" on the subset, pushing the appropriate DSS station button, and dialing "1" (ON) on the subset (to turn the signal OFF, the "0" would be dialed).

Example: Setting station 25 to receive audible alarm signal.

Buttons	LCD display	
<b>F1</b> DSS	<u>    </u>	<u>    </u>
<b>4</b> TEL	<u>    </u>	<u>    </u>
<b>ST25</b> DSS	<u>    </u>	<u>    </u>
<b>1</b> TEL	<u>    </u>	<u>    </u>
<b>F5</b>		

End

Note: "0" means "on"  
 "f" means "off"

## BACKGROUND MUSIC

**8.14** Each station may be allowed or denied background music (if an external music source has been provided). The default program allows all stations to receive background music. Programming consists of pushing the F1 button followed by dialing "5" on the keypad. Then the appropriate DSS station button is pushed and finally a "1" is dialed to allow BGM or a "0" is dialed to deny BGM.

Example: Extension #56 is denied background music.

Buttons	LCD display	
<b>F1</b> DSS	<u>    </u>	<u>    </u>
<b>5</b> TEL	<u>    </u>	<u>    </u>
<b>ST56</b> DSS	<u>    </u>	<u>    </u>
<b>0</b> TEL	<u>    </u>	<u>    </u>
<b>F5</b>		

Note: "0" means "allow"  
 "f" means "deny"

## OFF HOOK RINGING

8.15 Each station may be programmed so that it receives CO line ringing while in an off hook condition. Default program allows off hook ringing. To change the off hook ringing condition, the F1 button is pushed followed by the dialed digit "6". The appropriate DSS station button is then pushed. To complete the entry, a "1" is dialed to allow off hook ringing while a "0" is dialed to deny it.

Example: Station 63 is denied off hook ringing.

Buttons	LCD display
<b>F1</b> DSS	FL
<b>6</b> TEL	FL6-0 Off hook ringing mode
<b>ST63</b> DSS	FL6-044-0 Selecting circuit 44; ringing presently allowed
<b>0</b> TEL	FL6-044-0-f Denying off hook ringing

**F5**

End

Note: -0- means "allow"

-f- means "deny"

## TENANT FACILITIES

8.16 It is possible to allocate CO lines for incoming and outgoing service to as many as 9 different tenant groups. The default program allocates all lines to all tenant groups. If more than one tenant group is established, the stations included in each group are those with common first digit extension numbers. (Remember that Flexible Station Numbering allows some creativity in determining these groups.) Also, two or more tenant groups may be allowed access to the same CO lines which allow individual tenant groups to be combined and to function as though they were only one group. Tenant groups are established by pushing the F1 button and then dialing "7". Then the tenant number (1 through 9) is selected through the keypad. Finally, the CO line buttons are pushed one after the other.

Example: CO lines 3, 4, and 5 are assigned to Tenant Group #2.

Buttons	LCD display
[F1] DSS	FL
[7] TEL	FL 7-1 Tenant Mode
[2] TEL	c 7c 0c 9c 10- Selecting group 2; lines 7, 8, 9, & 10 presently assigned
[CO3] TEL	c 0c 9c 10-c 3 Line 3 assigned
[CO4] TEL	c 0c 10-c 3c 4 Line 4 assigned
[CO5] TEL	c 10-c 3c 4c 5 Line 5 assigned; previous data automatically cleared
[F5]	
End	Note: First digit of the extension number indicates its tenant group number (i. e. extensions 10 thru 19 are all in tenant group 1), therefore a group consists of a maximum of 10 extensions. If one tenant requires more than 10 extensions, another group may be assigned the same lines.

## ASSIGNED NIGHT ANSWER

8.17 It is possible to concentrate incoming CO line ringing to specific stations for night service. Default programming provides no ringing assignment. This function is activated by pushing the F1 button, dialing the digit "8", pushing the appropriate DSS station button and then pushing the selected CO line buttons one after the other.

Example: Setting CO lines 1 through 10 to ring at extension #80.

Buttons	LCD display
[F1] DSS	FL
[8] TEL	FL 8-8 Night Answer Mode
[ST80] DSS	FL 8-857- Selecting circuit 57
[CO1] TEL	FL 8-857-c 1 Line 1 programmed
[CO2] TEL	8-857-c 1c 2 Line 2 programmed
⋮	⋮
[CO10] TEL	c 7c 0c 9c 10 Lines 1 thru 10 have been assigned
[F5]	
End	



## SYSTEM REPERTORY DIALING

**8.18** As many as 50 numbers may be programmed for speed dialing by all stations in the system. These numbers may consist of as many as 20 digits each. The default program does not provide any speed dial numbers. To program speed dial numbers, the F2 button is pushed followed by the dialed digit "1". Then an access number (10 through 59) is selected through the keypad and the number to be stored is input (also through the keypad). Pauses may be inserted if needed by pushing the CAMP ON/ACCT # button. Each pause is counted as one digit in the speed dial number. F3 may be pushed to step to the next access number in sequence.

Example: Speed dial address "12345" is stored under access #10.

Buttons	LCD display	
<b>F2</b> DSS	<u>FS</u>	
<b>1</b> TEL	<u>FS1-0</u>	Speed dial Mode
<b>1</b> TEL	<u>FS1-01</u>	
<b>0</b> TEL	<u>FS1-010</u>	Selecting speed dial code "10"
<b>1</b> TEL	<u>FS1-010-1</u>	
<b>2</b> TEL	<u>FS1-010-12</u>	
<b>3</b> TEL	<u>FS1-010-123</u>	
<b>4</b> TEL	<u>FS1-010-1234</u>	
<b>5</b> TEL	<u>FS1-010-12345</u>	"12345" is entered; any previous number is automatically cleared
<b>F3</b> Break before next speed dial number	<b>F5</b> End	

## CONFERENCE CALL (CO LINE)

**8.19** Conferencing with 2 CO lines may be allowed or denied on a system wide basis through this programming operation. The default program allows CO line conferencing. Programming of this feature consists of pushing the F2 button followed by the dialed digit "3". Then, to allow conferencing a "1" is dialed on the keypad or, to deny, a "0" is dialed.

Example: Conferencing with 2 CO lines is allowed.

Button	LCD display
<b>F2</b> DSS _____	<u>    </u> <u>    </u> <u>    </u> <u>    </u>
<b>3</b> TEL _____	<u>    </u> <u>    </u> <u>    </u> <u>    </u> <u>    </u> <u>    </u> <u>    </u> <u>    </u>
<b>1</b> TEL _____	<u>    </u> <u>    </u> <u>    </u> <u>    </u> <u>    </u> <u>    </u> <u>    </u> <u>    </u>
<b>F5</b>	
End	

Note: -ξ- means "enable"  
 -0- means "disable"

### BUSY CALL (SYSTEM WIDE)

**8.20** The BUSY CALL feature can either be allowed or denied on a system wide basis. The default program allows this feature. The program sequence consists of pushing the F2 button followed by the dialed digit "4". Then the "1" is dialed to allow busy call or the "0" is dialed to deny it.

Example: Busy Call feature is allowed.

Buttons	LCD display
<b>F2</b> DSS _____	<u>    </u> <u>    </u> <u>    </u> <u>    </u>
<b>4</b> TEL _____	<u>    </u> <u>    </u> <u>    </u> <u>    </u> <u>    </u> <u>    </u> <u>    </u> <u>    </u>
<b>1</b> TEL _____	<u>    </u> <u>    </u> <u>    </u> <u>    </u> <u>    </u> <u>    </u> <u>    </u> <u>    </u>
<b>F5</b>	
End	

Note: -ξ- means "enable"  
 -0- means "disable"

### BUSY CALL (PER STATION)

**8.21** The Busy Call feature can either be allowed or denied for individual stations. The default program allows this feature for all stations. The program sequence consists of pushing the F1 button followed by dialing "91". Next the DSS button for the selected station is pushed. Then the "1" is dialed to allow busy call or the "0" is dialed to deny it.

Example: Busy Call feature is disabled for Station 63.

Button	LCD display
<b>F1</b> DSS _____	<u>    </u> <u>    </u> <u>    </u> <u>    </u>
<b>91</b> TEL _____	<u>    </u> <u>    </u> <u>    </u> <u>    </u> <u>    </u> <u>    </u> <u>    </u> <u>    </u>
<b>ST.63</b> DSS _____	<u>    </u> <u>    </u> <u>    </u> <u>    </u> <u>    </u> <u>    </u> <u>    </u> <u>    </u>
<b>0</b> TEL _____	<u>    </u> <u>    </u> <u>    </u> <u>    </u> <u>    </u> <u>    </u> <u>    </u> <u>    </u>
<b>F5</b>	
End	

Note: -0- means "enable"  
 -ξ- means "disable"

## HELD PARTY DISCONNECT

8.22 Held Party Disconnect is another feature that is either enabled or disabled on a system wide basis. Held Party Disconnect is enabled in the default program. To change the setting, the F2 button is pushed and then the digit "5" is dialed. Then the "1" is dialed to enable this feature or the "0" is dialed to disable it.

Example: Held Party Disconnect is disabled.

Buttons	LCD display
<b>F2</b> DSS	55
<b>5</b> TEL	555-0
<b>0</b> TEL	555-0-0
<b>F5</b> End	

Disconnect Mode; presently enabled  
Held Party Disconnect disabled

Note: **0** means "enable"  
**0** means "disable"

## HELD PARTY DISCONNECT TIMING

8.23 The disconnect timing can also be programmed for either X-bar and ESS (long) or SXS (short) Central Offices. The system defaults to the long disconnect timing. Setting the disconnect timing consists of pushing the F2 button followed by the dialed digit "6". Then the "1" can be dialed for long (450 ms) disconnect or the "0" can be dialed for short (50 ms) disconnect.

Example: Held Party Disconnect Timing is set to "long".

Button	LCD display
<b>F2</b> DSS	55
<b>6</b> TEL	556-5
<b>1</b> TEL	556-5-1
<b>F5</b> End	

Timing Mode; presently "short"  
Disconnect Timing set to "long"

Note: **5** means "short"  
**L** means "long"

## AUTOMATIC HOLD RECALL

8.24 Automatic Hold Recall can be enabled or disabled throughout the system by pushing F2 dialing "7". Then dial "1" to enable hold recall or "0" to disable it. The default program enables hold recall. Hold Recall Timing (See par. 7.25) must also be programmed in order for the Automatic Hold Recall to operate properly.

Example: Automatic Hold Recall is disabled.

Buttons	LCD Display	
<b>F2</b> DSS	<u>                    </u> <u>                    </u>	
	F5	
<b>7</b> TEL	<u>                    </u> <u>                    </u>	Hold Recall Mode; presently enabled
	F57-0	
<b>0</b> TEL	<u>                    </u> <u>                    </u>	Hold Recall disabled
	F57-0-F	
<b>F5</b>		
End		

Note: "0" means "enable"  
      "-F" means "disable"

## AUTOMATIC HOLD RECALL TIMING

8.25 Automatic Hold Recall Timing can be changed by pushing F2, dialing "8". Then a digit from "0" to "6" is dialed to select the time-out period for the recall. The default program provides a hold recall time-out period of 120 seconds.

Example: Automatic Hold Recall set for 90 seconds.

Buttons	LCD display	
<b>F2</b> DSS	<u>                    </u> <u>                    </u>	
	F5	
<b>8</b> TEL	<u>                    </u> <u>                    </u>	Hold Recall Timing presently set for 180 sec.
	F58-0	
<b>3</b> TEL	<u>                    </u> <u>                    </u>	Recall Timing set for 90 sec.
	F58-0-3	
<b>F5</b>		
End		

SELECTED DIGIT	HOLD RECALL TIME-OUT PERIOD
0	Hold Recall Disabled
1	30 Second Time-Out
2	60 Second Time-Out
3	90 Second Time-Out
4	120 Second Time-Out
5	150 Second Time-Out
6	180 Second Time-Out



## COMMON AUDIBLE RINGING

**8.26** For systems equipped with a TONE PCB designated as TONE-4CB, it is possible to connect a common audible signal and to program incoming ringing of specific lines to activate the signaling device. Any or all lines may be assigned. Programming is accomplished by pushing the F2 button on the DSS and dialing "9" on the telephone dial pad. Then push the CO line buttons on the telephone set for those lines which will activate the common audible device.

Example: Lines 3, 4, and 5 are set to activate common audible.

Buttons		LCD display	
<b>F2</b>	DSS	<u>  </u>	<b>F2</b>
<b>9</b>	TEL	<u>          888-8888                        </u>	<b>Common Audible Ringing Mode 9, &amp; 10 presently assigned</b>
<b>CO3</b>	TEL	<u>                  -8888-8888                        </u>	<b>Line 3 Selected</b>
<b>CO4</b>	TEL	<u>                  8888-8888                        </u>	<b>Line 4 Selected</b>
<b>CO5</b>	TEL	<u>                  8888-8888                        </u>	<b>Line 5 Selected</b>
<b>F5</b>			
	End		

## SPEED DIAL PAUSE DURATION

**8.27** The duration of a pause stored in system or station speed dial numbers may be programmed for up to 8 seconds in one second increments. When two or more pauses are consecutively stored in a speed dial number, the first pause will be the programmed duration. The additional pauses will be one second in duration. The initial pause duration is programmed by pushing F6 on the DSS and dialing a digit from 1 to 8. The pause duration is 4 seconds in the default program.

Example: Speed dial pause duration is set for 3 seconds.

Buttons		LCD display	
<b>F6</b>	DSS	<u>  </u>	<b>F6</b>
<b>1</b>	TEL	<u>          8881-4-                                </u>	<b>Speed Dial Pause Mode</b>
<b>3</b>	TEL	<u>                  8881-4-3                                </u>	<b>3 Second Pause Selected</b>
<b>F5</b>			
	End		

## PBX PAUSE DURATION

8.28 When a PBX line access code is dialed, the system automatically inserts a pause to allow the PBX time to assign a CO line and pass dial tone to the user (if the access code has been programmed into Toll Restriction List 1). The duration of this pause can be programmed for 1 to 8 seconds. The length of this pause is 2 seconds in the default program. Changing the length of the pause is done by pushing F6 on the DSS and "2" on the telephone dial. Then the pause duration is chosen by dialing a digit from 1 to 8 on the dial pad.

Example: Programming PBX pause duration for 1 second.

Buttons	LCD display
<b>F6</b> DSS	<u>98</u>
<b>2</b> TEL	<u>982-2</u> PBX Pause Mode
<b>1</b> TEL	<u>982-2-1</u> 1 Second Pause Selected
<b>F5</b>	
End	

## DO NOT DISTURB

8.29 Individual stations may be allowed or denied the capability of activating the Do Not Disturb feature. All stations are able to activate Do Not Disturb in the default programming. To program this feature, push the F1 button on the DSS, dial "92", and push the DSS station button for the station to be programmed. Then dial the digit "1" to allow the feature or dial "0" to deny it.

Example: Do Not Disturb is disabled at station 63.

Buttons	LCD display
<b>F1</b> DSS	<u>92</u>
<b>92</b> TEL	<u>929-2-0</u> Do Not Disturb Mode
<b>ST.63</b> DSS	<u>929-2-044-0</u> Station 63 selected; DND presently enabled
<b>0</b> TEL	<u>92-2-044-0-0</u> Do Not Disturb disabled
<b>F5</b>	
End	

Note: "0" means "enable"  
"0" means "disable"

## LINE GROUP QUEUEING

8.30 Three program functions are involved in setting up the line Group Queueing feature. CO lines must first be assigned to specific queue groups (See par. 8.31). Next, these groups are assigned to the various tenant groups (if required) through the Tenant Facilities (See par. 8.16). Finally, specific stations may be allowed or denied the capability of activating the Line Group Queueing feature (See par. 8.32). In the default program, 3 line groups are provided for EK-1232 and 5 line groups for EK-2064. The CO lines in these groups correspond to the lines served by each 4/CO PCB. The default program provides access to all line groups by all tenant groups. All stations are allowed to activate Line Group Queueing.

## LINE GROUP SETTINGS

8.31 This program function is used both for Line Group Queueing and for Tenant Facilities. To establish the Line Groups, push F1 on the DSS and dial "0" on the telephone dial pad. Then select the CO line by pushing the CO line button on the telephone. Finally, dial the digit representing the Line Group number to which the CO line will be assigned.

Example: CO line #3 is placed in Line Group 8.

Buttons	LCD display	
[F1] DSS	FL	
[0] TEL	FL0	Line Group Mode
[CO.3] TEL	FL0 c3 - 2	Line 3 selected; presently set to Group 2
[8] TEL	FL0 c3 - 2 - 8	Line 3 set to Group 8
[F5]		
End		

## LINE QUEUEING BY STATION

8.32 Each station may be allowed or denied the capability of Line Queueing. To program, push the F1 button on the DSS, dial "93" on the telephone dial pad, and then push a DSS station button to select a station to be programmed. Finally, dial the digit "1" to allow the Line Queueing feature or "0" to deny it.

Example: Line Queueing is disabled for station 25.

Buttons	LCD display	
[F1] DSS	FL	
[93] TEL	FL9-3-0	Line Queueing Mode
[ST.25] DSS	FL9-3-0 14-0	Station 25 selected; Queueing presently enabled
[0] TEL	-3-0 14-0-0	Line Queueing disabled
[F5]		
End		

NOTE: \*0\* means enabled  
-0- means disabled

## OPX SETTINGS

**8.33** A station may be defined as an OPX station when the OPX module is used. This prevents problems in the system by allowing the toll restriction to operate properly and by preventing activation of features to which the OPX station cannot respond. For example, by defining a station as an OPX, other stations receive a negative audible response when trying to place a Camp On to the OPX station. To define a station as an OPX, push the F1 button and dial "94" on the telephone dial pad. Then push the DSS button representing the OPX station and dial "1" to establish the OPX or "0" to define a standard electronic station. In the default program, no OPX stations are established.

Example: Station 63 is defined as an OPX station.

Buttons	LCD display	
<b>F1</b> DSS	<u>        </u>	
<b>94</b> TEL	<u>        </u>	OPX Setting Mode
<b>ST.63</b> DSS	<u>        </u>	Station 63 selected; presently a standard station
<b>0</b> TEL	<u>        </u>	Changed to OPX station
<b>F5</b>		
End		

Note: \*0\* means OPX station  
      \*5\* means standard station



# PROGRAMMING SUMMARY

8.34

Listed below is a summary of the programming procedures for quick reference.

Storing Speed Dial Numbers	[F2] + [1] +	$\underbrace{\square + \square + \square + \square \dots}_{\text{Speed Dial Code}}$	Telephone Number
Toll Restriction	[F2] + [2]		
List 1-PBX Access Codes	[F2] + [1] +	$\square + \square \dots$	+ [F3] <u>2nd PBX access #</u>
List 2-Special Access Codes	[F2] + [2] +	$\square + \square \dots$	+ [F3] <u>next code</u> +
List 3-Special Lines	[F2] + [3] +	CO <sub>n</sub> + ...	(next line)
List 4-Long Dist. Access Codes	[F2] + [4] +	$\square \dots \square$	+ [F3] + <u>next code</u>
List 5-Special Restriction Codes	[F2] + [5] +	$\square \dots \square$	+ [F3] + <u>next code</u> + ...
Conference Calls (2 lines)	[F2] + [3] +	[1] = enable or [0] = disable	
Busy Call (System Wide)	[F2] + [4] +	[1] = enable or [0] = disable	
Busy Call (Per Station)	[F1] + [91] +	P <sub>n</sub> + [1] = enable or [0] = disable	
Held Party Disconnect	[F2] + [5] +	[1] or [0]	
Held Party Disconnect Timing	[F2] + [6] +	[1] = long [0] = short	
Automatic Hold Recall	[F2] + [7] +	[1] = enable or [0] = disable	
Automatic Hold Recall Timing	[F2] + [8] +	[0] - [6]	
Flexible Ringing Assignment	[F1] + [1] +	P <sub>n</sub> + CO <sub>n</sub> + ...	
Toll Restriction Class	[F1] + [2] +	P <sub>n</sub> + [1] <sup>=A</sup> or [2] <sup>=B</sup> - [5] <sup>=E</sup>	
Flexible Station Numbering	[F1] + [3] +	P <sub>n</sub> + 1st digit + 2nd digit + #	

Alarm Setting	<b>[F1] + [4] + [Pn] + [1] = on or [0] = off</b>
Background Music	<b>[F1] + [5] + [Pn] + [1] or [0]</b>
Off Hook Ringing	<b>[F1] + [6] + [Pn] + [1] or [0]</b>
Tenant Facilities	<b>[F1] + [7] + [T] + [CO<sub>n</sub>] + ...</b> T = 1-9
Assigned Night Answer	<b>[F1] + [8] + [Pn] + [CO<sub>n</sub>] + ...</b>
Common Audible Ringing	<b>[F2] + [9] + [CO<sub>n</sub>] + ...</b>
Speed Dial Pause	<b>[F6] + [1] + [S] S = 1-8</b>
PBX Pause	<b>[F6] + [2] + [S] S = 1-8</b>
Do Not Disturb	<b>[F1] + [92] + [Pn] + [1] = enable or [0] = disable</b>
Line Group Settings	<b>[F1] + [0] + [CO<sub>n</sub>] + [GRP<sub>n</sub>] = Line Group Number</b>
Line Queuing By Station	<b>[F1] [93] + [Pn] + [1] = enable or [0] = disable</b>
OPX Settings	<b>[F1] + [94] + [Pn] + [1] = OPX or [0] = standard</b>

- [F1]** —Used to program station related features
- [F2]** —Used to program system related features
- [F3]** —Used as a "break" to separate blocks of data
- [F4]** —Used as a "step" to move to the next item in a sequence
- [F5]** —Used to end one programming mode before going to the next
- [F6]** —Used to program additional features
- [F7]** —Used to erase previously programmed data

## DEFAULT PROGRAM SUMMARY

8.35

The system default program is listed below for quick reference.

<b>Station Numbering Plan</b>	<b>10 thru 17</b> EK-1232/2064
	<b>20 thru 27</b> "
	<b>30 thru 37</b> "
	<b>40 thru 47</b> "
	<b>50 thru 57</b> EK-2064 only
	<b>60 thru 67</b> "
	<b>70 thru 77</b> "
	<b>80 thru 87</b> "
<b>Ringling Assignment</b>	<b>All lines ring at all stations</b>
<b>Toll Restriction Class</b>	<b>Class A assigned to all stations</b>
<b>List 1 - PBX Access Codes</b>	<b>None Assigned</b>
<b>List 2 - Special Access Numbers</b>	<b>None Assigned</b>
<b>List 3 - Special Lines</b>	<b>None Assigned</b>
<b>List 4 - Long Distance Access Codes</b>	<b>0** Assigned</b>
<b>List 5 - Special Restrictions Codes</b>	<b>00* Assigned</b>
<b>Alarm Setting</b>	<b>Alarm disabled at all stations</b>
<b>Background Music</b>	<b>Enabled at all stations</b>
<b>Off Hook Ringing</b>	<b>Enabled at all stations</b>
<b>Tenant Facilities</b>	<b>All Lines assigned to all tenants</b>
<b>Assigned Night Answer</b>	<b>No Assignment</b>
<b>System Repertory Dialing</b>	<b>No Assignment</b>
<b>Conference Call</b>	<b>Enabled</b>
<b>Busy Call</b>	<b>Enabled at all stations</b>
<b>Held Party Disconnect</b>	<b>Enabled</b>
<b>Held Party Disconnect Timing</b>	<b>"Long"</b>
<b>Automatic Hold Recall</b>	<b>120 seconds</b>
<b>Common Audible Signal</b>	<b>No Assignment</b>
<b>Speed Dial Pause Duration</b>	<b>4 seconds</b>
<b>PBX Pause Duration</b>	<b>2 seconds</b>
<b>Do Not Disturb</b>	<b>Enabled at all stations</b>
<b>Line Queuing By Station</b>	<b>Enabled at all stations</b>
<b>Line Group Settings</b>	<b>Line Group 1 — CO lines 1 thru 4</b> <b>Line Group 2 — CO lines 5 thru 8</b> <b>Line Group 3 — CO lines 9 thru 12</b> <b>Line Group 4 — CO lines 13 thru 16 (EK-2064)</b> <b>Line Group 5 — CO lines 17 thru 20 (EK-2064)</b>
<b>OPX Settings</b>	<b>No OPX stations programmed</b>

A ADDENDUM

KANDA EK-1232/2064  
"M4CE6" EPROM SOFTWARE ENHANCEMENTS

- 8.36 A software EPROM marked "M4CE6" is currently available for the EK-1232/2064 system. This EPROM can be retrofitted to all EK-1232/2064 systems which presently use a CPU PCB marked "CPU-4CE" or "CPU-4CC". The new "M4CE6" EPROM contains all the capabilities of the previous software revisions and also includes the additional features:
- 8.37 RINGING LINE DISPLAY - The audible CO line ringing will be accompanied by a visual indication at stations which are equipped with LCD displays. When the line rings at a particular station, the LCD display will show the letter "L" followed by the number of the ringing line. For example, when line number ten rings, the LCD display will show "L10". The ringing line display will be activated only when the station is idle. If a line rings at a busy station, there will be no display until that station becomes idle. At that time the line number will appear on the display (as long as the line is still ringing). If more than one line is ringing at the station, the lowest numbered line will be displayed. This LCD display will be provided only for lines which normally ring at the station.
- 8.38 CAMP-ON (MESSAGE WAITING) TONE - A Camp-On placed to a station will be indicated by the flashing Camp-ON LED and by an LCD display (if the station is equipped). In addition, an audible alerting tone will be heard at the station. The cadence of the alerting tone is 1 second on, 1 second off, 1 second on, and 5 seconds off. This alerting tone will be heard at fifteen second intervals even at stations which are in the DO NOT DISTURB mode and can therefore be used as a DND override. (See par. 6.21)



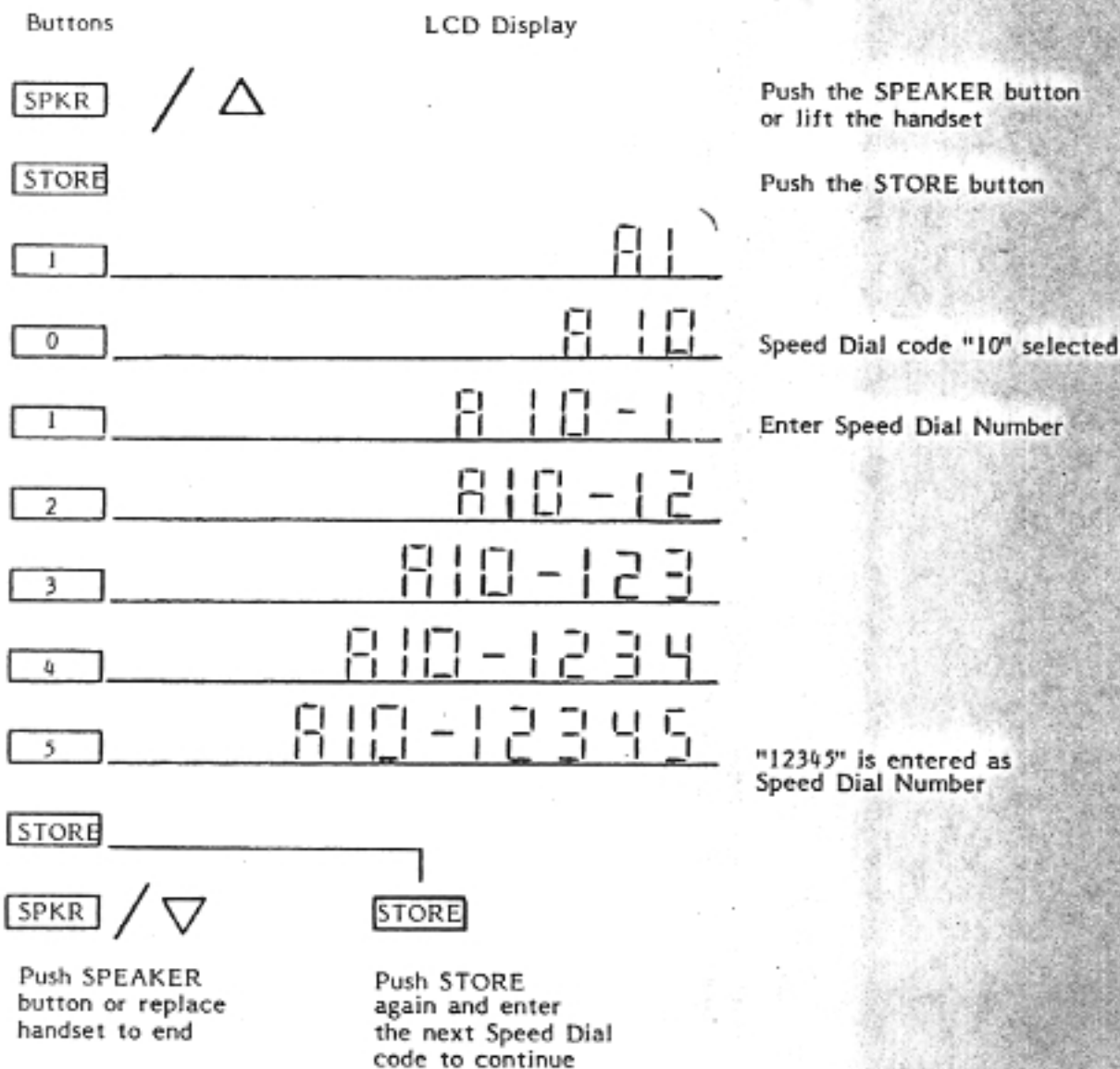
8.39 LIST 6 TOLL RESTRICTION - This system programming function allows the system to either detect or ignore the digit "1" when it is dialed as the first digit on a long distance call. This function will apply, of course, only to toll restricted stations. When the "ignore" function is selected, a call will be restricted any time the first three digits of the telephone number resemble an area code (regardless of whether or not a "1" is dialed first). When the "detect" function is selected, a call will be considered to be long distance only if a "1" has been dialed as the first digit. To program List 6 the system is placed in the programming mode and the "F2" button is pushed. The digit "2" is dialed on the telephone dial pad followed by the digit "6" to select Toll Restriction List 6. Next the digit "1" is dialed to select the "detect" function or the digit "0" is dialed to select the "ignore" function. In the default program setting the "ignore" function is activated.

Example: Detect function is selected.

Buttons	LCD Display	
[F2]	F5	
[2]	F52-1	Toll Restriction Mode
[6]	F52-L6-F-	Toll Access Mode; "1" presently ignored
[0]	F52-L6-F-0	Detect "1" Mode Activated
[F5]		
End		

9.40 SYSTEM SPEED DIAL PROGRAMMING - Any station equipped with an LCD display and a DSS console can program or change the system speed dial numbers. To program the system speed dial numbers, the station user lifts the handset (or turns on the speaker), pushes the STORE button and dials the two-digit speed dial code which is to be programmed. The LCD display will show "Axx" (where "xx" is the speed dial code) followed by the telephone number if a number has been previously entered. When the LCD display stops moving, the new number can be entered through the telephone dial pad. After the number is entered, push the STORE button again. Repeat the procedure to enter the next speed dial number or replace the handset (or turn off the speaker) to end programming.

Example: Speed dial address "12345" is stored under access code 10.



SYSTEM SOFTWARE UPGRADE PROCEDURE  
(EK-1232/2064)

UPGRADE OF "CPU-4CC" PCB TO "M4CE6" SOFTWARE

- 1) This procedure covers the upgrade of a CPU PCB which is marked as "CPU-4CC" and which includes three software EPROMs in the sockets marked "ROM1", "ROM2" and "ROM3".
- 2) Before beginning, take the appropriate measures to prevent damage caused by electro-static discharge.
- 3) After shutting off the power and removing the CPU PCB from the KSU, note the position of the "dimples" on one ends of the software EPROMs. The new EPROM must be installed with the "dimple" in the same position.
- 4) Remove the old EPROMs from the sockets by using an IC puller or by carefully prying them loose with a small flat screwdriver. Be very careful not to damage the sockets or other nearby components on the PCB.
- 5) Locate the three jumper straps maked "J3", "J4", and "J5" near the RESET button. These three straps must be repositioned as follows:
  - J3 - Remove the strap from position "1" and solder to position "3". Result: Strap between "2" and "3".
  - J4 - Remove the strap from position "3" and solder to position "1". Result: Strap between "1" and "2".
  - J5 - Remove the strap from position "3" and solder to position "1". Result: Strap between "1" and "2".
- 6) Insert the new "M4CE6" EPROM securely into the socket marked "ROM1" noting the position of the "dimple" as described in item 2. Be careful not to bend the pins of EPROM.
- 7) If the system is equipped with more than 25 telephones and the ALL CALL PAGE feature is required, resistor "R15" on the POWU PCB must be replaced with a 220 ohm, 2 watt resistor.
- 8) Plug the CPU PCB into the KSU, re-initialize the memory and reprogram the system as described in Section 8 of the Installation And Maintenance Manual.

SYSTEM SOFTWARE UPGRADE PROCEDURE  
(EK-1232/2064)

UPGRADE FROM "CD" SOFTWARE TO "M4CE6" SOFTWARE

- 1) This procedure covers the upgrade of software to the "M4CE6" level on any CPU PCB which currently contains a software EPROM labelled "CD" or "CD1". This would include any CPU PCB which is designated as a "CPU-4CE" or any "CPU-4CC" which has been previously upgraded.
- 2) Before beginning, take the appropriate measures to prevent damage caused by electro-static discharge.
- 3) After shutting off the power and removing the CPU PCB from the KSU, note the position of the "dimple" on one end of the software EPROM. The new EPROM must be installed with the "dimple" in the same position.
- 4) Remove the old EPROM from the socket by using an IC puller or by carefully prying it loose with a small flat screwdriver. Be very careful not to damage the socket or other nearby components on the PCB.
- 5) Insert the new "M4CE6" EPROM securely into the socket noting the position of the "dimple" as described in item 2. Be careful not to bend the pins of EPROM.
- 6) Plug the CPU PCB into the KSU, re-initialize the memory and reprogram the system as described in Section 8 of the Installation And Maintenance Manual.



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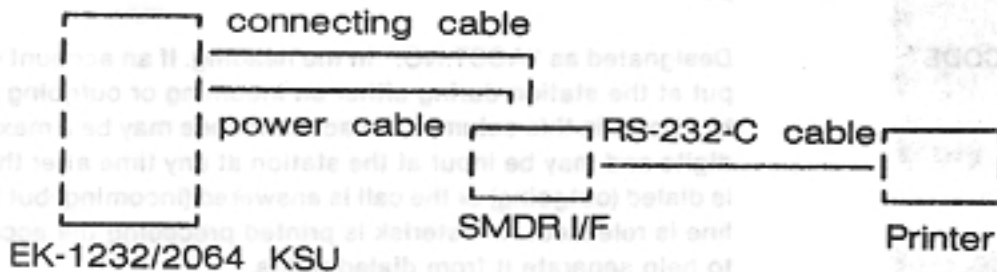
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# STATION MESSAGE DETAIL RECORDING INTERFACE INSTALLATION AND OPERATION

## 9. SMDR INTERFACE UNIT

9.01 The SMDR I/F is an optional unit which may be connected to the EK-1232/2064 electronic key telephone system for output of call detail records. The SMDR I/F is an out-board unit which is connected to the KSU by a connector cable through the EXT PCB (option). An RS-232C connector is provided for output from the SMDR I/F to a serial printer or call accounting device. Power is provided by a separate cable from the KSU. (See figure 29.)

FIGURE 29. SMDR INTERFACE CONNECTIONS



9.02 The data is output in 80-column format. The code used is ASCII and the speed is selectable from 110 to 1200 baud.

9.03 Information output by the SMDR I/F is listed below along with an example of the print-out.

**DATE** Shown as "Year/Month/Date". The date is initially set by the installer and changes automatically thereafter.

**CALL SEQUENCE** Heading is printed as "SEQ". In this column the call records are sequentially numbered as they are output. This provides a running total on each day's call records and automatically resets when the date changes.

**EXTENSION NUMBER** Shown as "EXT(1)". Shows the number of the station which originated or answered the call.

**TRANSFERRED CALL** Indicated by "EXT(2)". If the call is transferred the number of the station receiving the call is shown in this column. The call duration shown for this call record will be for the first station only. A new call record is generated for a station receiving a transferred call.

**CO LINE NUMBER** Heading shows "TRK". This column indicates the number of the CO/PBX line used. The range is from 1 to 12 for EK-1232 and 1 to 20 for EK-2064.

**TYPE OF CALL** Indicated in the heading as "CALL". In this column an incoming call is displayed as "INC" while "OUT" indicates an outgoing call.

**TIME OF CALL** Shown as "TIME". The time of day at which each call begins is indicated in this column. The time is output in 24-hour format in hours and minutes.

**DURATION OF CALL** Heading indicated as "DURATION". In this column the duration of each call is printed. At the installer's option, the output can be either hours and minutes or hours, minutes, and seconds.

**DIALED NUMBER** Indicated as "DIAL.NUMBER." in heading. The digits dialed on an outgoing call are shown in this column. A maximum of 23 digits are displayed. If more than 23 digits are dialed the first 23 will be output.

**ACCOUNT CODE** Designated as "ACCT.NO." in the heading. If an account code is input at the station during either an incoming or outgoing call it will be shown in this column. The account code may be a maximum of 4 digits and may be input at the station at any time after the address is dialed (outgoing) or the call is answered (incoming) but before the line is released. An asterisk is printed preceding the account code to help separate it from dialed digits.

**EXAMPLE OF SMDR PRINTOUT:**

DATE 11/08/84

SEQ	EXT(1)	EXT(2)	TRK	CALL	TIME	DURATION	DIAL.NUMBER.	ACCT.NO.
001	12		01	OUT	15:40	00:00:38	12125551212	
002	15		03	OUT	15:40	00:01:06	18006832554	
003	11		02	OUT	15:41	00:00:56	12039567829	*5621
004	12		07	OUT	15:44	00:01:02	859746536568714589698	*8686
005	10	11	01	OUT	15:43	00:03:02	15158367809	
006	12	15	08	OUT	15:47	00:00:51	3059683525	*23
007	11		01	OUT	15:46	00:01:30		*2513
008	15		08	OUT	15:48	00:00:46		*842

**SMDR INSTALLATION — PHYSICAL CONNECTIONS**

**9.04** The following hardware is required for installation and operation of the SMDR interface:

1. SMDR I/F unit
2. EXT PCB
3. connector cable between EXT PCB and SMDR I/F (provided)
4. power cable for SMDR I/F (provided)
5. RS-232C cable and compatible (serial) printer or other device (customer provided)

9.05 The EXT PCB must be installed in the KSU slot marked "EXT". The connector cable may be attached to either connector A or B on the EXT PCB and on the "KSU" connector of the SMDR I/F unit. (See figure 30.)

9.06 The power cable should be plugged into the power connector (marked "POWER IN DC 24V") on the SMDR I/F and one of the external power terminals marked "EXT PW1" or "EXT PW2" on the MDF of the KSU. These power terminals (EXT PW1 & EXT PW2) are not present on early systems and in this case the power cable may be attached to the KSU power cable with a branch connector. Both cables from the KSU should be connected to the SMDR I/F while power to the KSU is turned off.

9.07 The connector marked "PRINTER" is an RS-232C connector provided for interface to a serial printer or other terminal device. The output through the connector is in 80-column format, ASCII code, in selectable speeds of from 110 to 1200 baud. (See figure 30.)

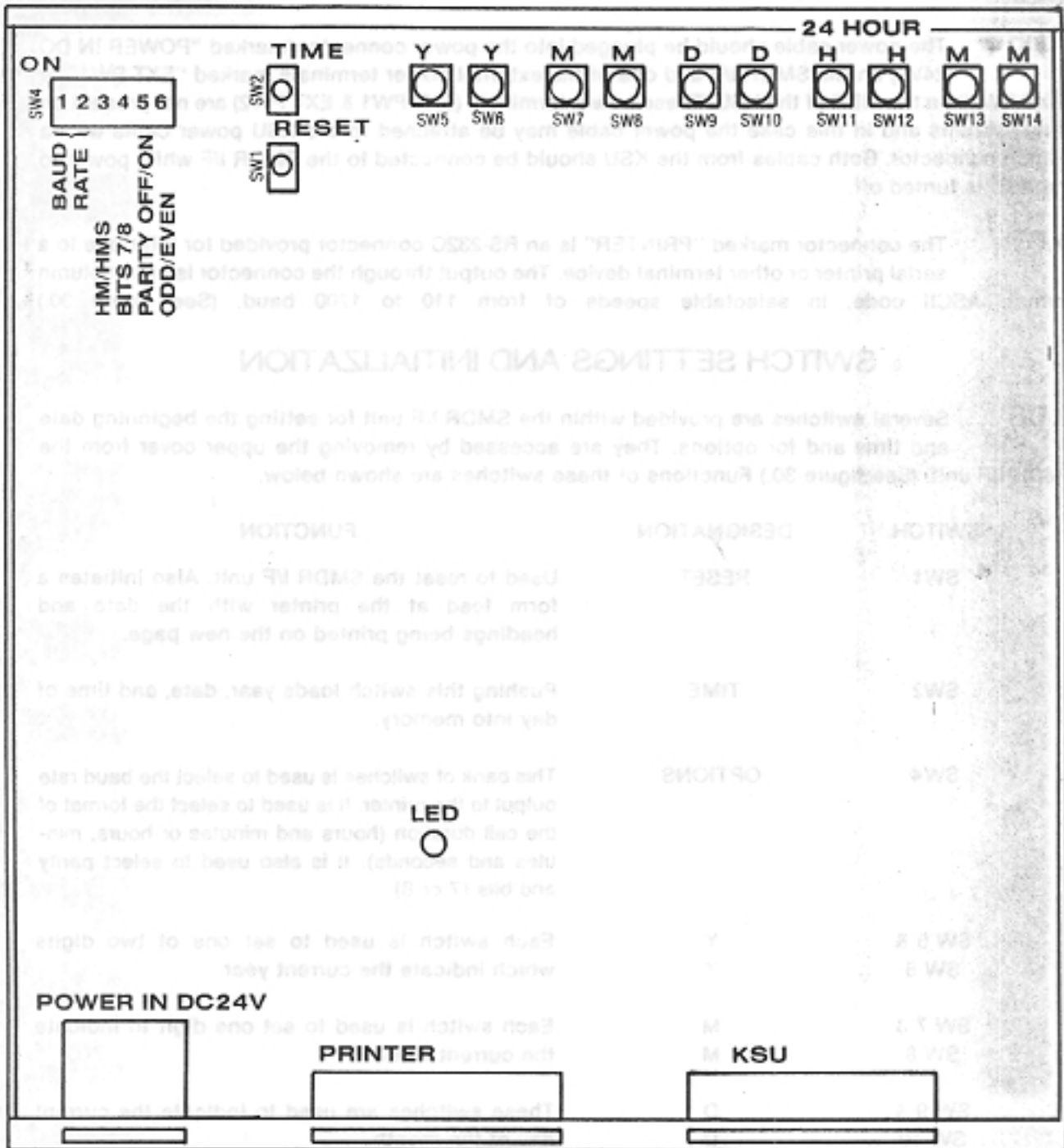
## SWITCH SETTINGS AND INITIALIZATION

9.08 Several switches are provided within the SMDR I/F unit for setting the beginning date and time and for options. They are accessed by removing the upper cover from the SMDR I/F unit. (See figure 30.) Functions of these switches are shown below.

SWITCH	DESIGNATION	FUNCTION
SW1	RESET	Used to reset the SMDR I/F unit. Also initiates a form feed at the printer with the date and headings being printed on the new page.
SW2	TIME	Pushing this switch loads year, date, and time of day into memory.
SW4	OPTIONS	This bank of switches is used to select the baud rate output to the printer. It is used to select the format of the call duration (hours and minutes or hours, minutes and seconds). It is also used to select parity and bits (7 or 8).
SW 5 & SW 6	Y Y	Each switch is used to set one of two digits which indicate the current year.
SW 7 & SW 8	M M	Each switch is used to set one digit to indicate the current month.
SW 9 & SW 10	D D	These switches are used to indicate the current day of the month.
SW 11 & SW 12	H H	Used to set the current time in hours (in 24 hour format).
SW 13 & SW 14	M M	Used to set the current time in minutes.



Figure 30: SMDR I/F (Cover removed)



9.09 The speed at which the data is output from the SMDR I/F to the printer may be selected from baud rates of 110, 300, 600 or 1200. The speed of the printer and the SMDR I/F must match for proper operation. Switches #1 and #2 on the SW4 switch bank are used to select the correct baud rate as follows:

BAUD RATE	SWITCH #1	SWITCH #2
110	OFF	OFF
300	ON	OFF
600	OFF	ON
1200	ON	ON

9.10 The call duration output by the SMDR I/F can be in hours and minutes or in hours, minutes, and seconds. This selection is made through switch #3 on switch bank SW4. This switch should be in the "OFF" position for hours and minutes only. In the "ON" position the output of the call duration will be in hours, minutes, and seconds.

9.11 Switches #4, #5 and #6 on the SW4 switch bank are used to set the number of data bits, enable parity and select the type of parity. The settings of these switches must match the printer settings in order for the printer to operate properly. The functions of these switch settings are shown below:

SWITCH SETTING	SWITCH #4	SWITCH #5	SWITCH #6
ON	8 BITS	PARITY ENABLE	PARITY EVEN
OFF	7 BITS	PARITY DISABLE	PARITY ODD

9.12 So that the proper date and time is output, this information must be entered into the memory of the SMDR I/F before it is activated. This is done by use of the switches marked SW5 through SW14 inside the unit. The switches are turned to the appropriate settings and when power is applied, the SW2 button (marked TIME) is pushed to load the information into memory. An example of these settings is shown below.

### SMDR I/F - SETTING INITIAL DATE AND TIME

DATE: AUGUST 5, 1984

TIME: 8:27PM

SWITCH	DESIGNATION	SETTING
SW5	Y	8
SW6	Y	4
SW7	M	0
SW8	M	8
SW9	D	0
SW10	D	5
SW11	H	2
SW12	H	0
SW13	M	2
SW14	M	7

(The time is in  
24-hour format.)

(This setting would be loaded into memory only when the SW2 button (marked TIME) is pushed with power applied.)

## SMDR I/F UNIT INTERNAL BUFFER

**9.13** The SMDR I/F unit contains an internal buffer which is capable of storing a maximum of 200 call records. Call records are stored any time the SMDR I/F is unable to dump them to the printer for whatever reason. If the printer runs out of paper or is turned off, call records begin to be stored in buffer automatically. When the buffer reaches its capacity, the oldest call record is purged each time a new record is received. The buffer is totally purged when the SW1 (RESET) button is pushed. When the printer is reactivated the call records are dumped in the order they were received.

## PRINTER PAPER ALARM - PROGRAMMING AND FUNCTION

**9.14** An alarm may be programmed through the DSS console for audible and visual indications at particular stations when the printer runs out of paper. This alarm is activated only if the printer being used has the "paper empty" feature. An audible alarm will sound at selected stations after the twenty-first call record is stored in the internal buffer of the SMDR I/F unit. Selected telephone subsets which are equipped with LCDs will display the alarm visually as "PAP" to indicate the paper empty condition. The alarm can be turned off at the station by pushing the "HOLD" button while on-hook.

**9.15** Programming stations to receive the alarm indication is done through the DSS console in the same manner as other system programming. While in programming mode the F2 button on the DSS is pushed and a "0" is dialed on the telephone subset. The DSS station button is then pushed for each station selected to receive the alarm. Any or all stations may receive the alarm. However, no stations are assigned to receive the alarm in the default program.

Example: Assigning stations 21 and 27 to receive "paper empty" alarm.

Buttons		LCD display	
<b>F2</b>	DSS	<u>    F5    </u>	
<b>0</b>	Tel	<u>    F50-0    </u>	Paper empty Alarm mode; No stations presently assigned
<b>ST 21</b>	DSS	<u>    F50-0 10    </u>	Station 21 assigned.
<b>ST 27</b>	DSS	<u>    50-0 10 15    </u>	Stations 21 & 27 assigned.
<b>F5</b>	DSS		
<b>END</b>			

## RS-232C PIN-OUTS

**9.16** The pin-outs for the RS-232C connector from the SMDR I/F unit are provided below.

PIN #	FUNCTION
1	GND- Ground
2	RXD -Receive data into SMDR
3	TXD -Transmit data out of SMDR
4	CTS -Clear to send into SMDR
5	RTS -Request to send out of SMDR
6	DTR -Data terminal ready out of SMDR
7	GND- Ground
20	DSR -Data set ready into SMDR

**NOTE:** If the printer does not provide CTS, strap pin 4 to pin 20 on the RS-232C connector.

## PRINTER SETTINGS

**9.17** A large percentage of the trouble encountered with the SMDR I/F unit is due to improper option settings on the printer. Be sure that the printer is set for the appropriate baud rate, parity and number of bits.



## SMDR FEATURE ENHANCEMENTS

9.18 Effective immediately, Kanda Telecom Inc. has new software available for the SMDR option on the EK-1232/2064. The new software is contained on an EPROM (designated as "P4C-C") which can be retrofitted to existing installations.

9.19 In addition to the current capabilities, the new software will provide the following options:

**ACCOUNT CODE** - The Account Code field has been expanded to allow up to 8 digits. When more than 8 digits are entered as an account code, the last 8 entered will be printed.

**INCOMING CALL** - An optional switch setting allows incoming call records to either be printed or ignored at the user's discretion. Even when the "ignore" option is selected, incoming call records will be printed if an account code is entered.

**SHORT DURATION CALLS** - Normally a call record is printed regardless of the duration of that call. This option allows calls to be ignored unless they exceed a specified duration. The call duration threshold can be set in 10 second increments to a maximum of 9 minutes and 50 seconds. When a call duration threshold is established all calls (both incoming and outgoing) will be ignored unless they exceed the threshold or unless an account code is entered. If an account code is entered, the call record will be printed regardless of the duration of the call.

**TRANSFERRED CALL FLAG** - Short calls will not be printed when the call duration option is used. This could lead to confusion, for example, when an outgoing call record (of long duration) is printed without dialed digits. Perhaps in this case, the originator of the call spoke for a short time and then transferred the call to another party who spoke for a longer time.

In order to eliminate confusion, an asterisk is printed after the station number to indicate that the call record is generated as a result of a transfer from another station. The asterisk will be present on both incoming and outgoing call records. In addition, the digits dialed by the originating station will be included in the call record for the station receiving the transfer.

9.20 An example of the SMDR printout is shown below followed by an explanation of the various call records.

SEQ	EXT(1)	EXT(2)	TRK	CALL	DURATION	DIAL.NUMBER.	ACCT. NO.
001	10	11	03	OUT	00:03:15	15128348711	*59023
002	11*		03	OUT	00:05:17	15128348711	
003	12	13	01	INC	00:02:34		*87439218
004	13*		01	INC	00:06:14		

Call record 003 shows the maximum of 8 digits entered as an account code. Because an account code was entered, this call record would be printed even if the call duration threshold had been set at 3 minutes (for example) and even if the "ignore" option had been selected for incoming calls.

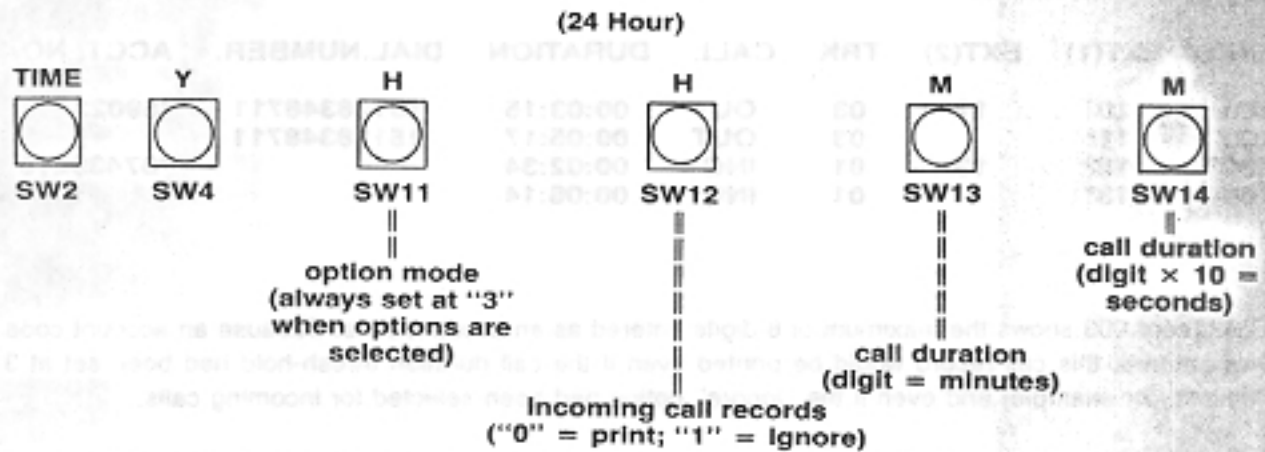
Call record 004 would not have been printed if the "ignore" option for incoming calls had been selected, regardless of the duration of the call.

Call records 002 and 004 show an asterisk behind the station number to indicate that these call records were generated as the result of a transfer from another station. In addition, the digits dialed by station 10 in call record 001 are printed under call record 002. This provides a way of retaining the destination of the call even if (under different circumstances) call record 001 had not been printed.

## SELECTING OPTIONS

9.21 Both of the "ignore" options (short duration and incoming calls) are established through switch settings inside the SMDR Interface unit. The set up procedures for the SMDR Interface should be followed as usual with the baud rate, parity, date, time, etc. all being set as desired. Once this has been done and the TIME and RESET buttons have been pushed, the switches marked SW11 through SW14 are used to set options.

Figure 30A. Switches Inside The SMDR Interface



## INCOMING CALL RECORDS

9.22 In the default setting, all incoming records will be printed. To eliminate incoming call records, turn switch SW11 to position "3" and then set switch SW12 to position "1". In order to print incoming call records, switch SW12 should be set to position "0". After setting these switches, push the TIME button.

	SWITCH SW11	SWITCH SW12
PRINT INCOMING CALL RECORDS	3	0
IGNORE INCOMING CALL RECORDS	3	1

## SHORT DURATION CALLS

9.23 In order to set a call duration thresh-hold so that short duration calls will not be printed, be sure that Switch SW11 is set to position "3". Select the minutes by turning Switch SW13 to the appropriate digit position. Seconds are determined by the setting of Switch 14. Each digit position of Switch SW14 represents a 10 second increment. (Positions "1" through "5" are the only valid setting for SW14.) For example, to set a call duration thresh-hold of 3 minutes and 50 seconds, Switch SW13 should be set to position "3" and Switch SW14 should be set to position "5". After setting the switches to the appropriate positions, push the TIME button to activate the setting.

CALL DURATION THRESH-HOLD (calls of lesser duration are ignored)	SWITCH SW13 (switch SW11 always set at "3")	SWITCH SW14
(ALL CALLS PRINTED)	0	0
10 SECONDS	0	1
20 SECONDS	0	2
50 SECONDS	0	5
1 MINUTE	1	0
1 MINUTE & 10 SECONDS	1	1
1 MINUTE & 20 SECONDS	1	2
1 MINUTE & 50 SECONDS	1	5
9 MINUTES & 50 SECONDS	9	5



# SHORT DURATION CALLS

In order to set a call duration threshold on short duration calls will not be printed, be sure that Switch SW1 is set to position "3". Select the minutes by turning Switch SW2 to the appropriate 0 or position. Seconds are determined by the setting of Switch SW3. Each digit location of Switch SW4 represents a 10 second increment. Positions "1" through "5" are the only valid settings for SW4. For example, to set a call duration threshold of 3 minutes and 50 seconds, Switch SW1 should be set to position "3" and Switch SW2 should be set to position "3". After setting the switches to the appropriate positions, push the LINE button to activate the setting.

CALL DURATION THRESHOLD (calls of lesser duration are ignored)	SWITCH SW1	SWITCH SW2	SWITCH SW3	SWITCH SW4
(ALL CALLS PRINTED)	0	0	0	0
10 SECONDS	0	0	0	1
20 SECONDS	0	0	0	2
30 SECONDS	0	0	0	3
40 SECONDS	0	0	0	4
50 SECONDS	0	0	0	5
1 MINUTE	1	0	0	0
1 MINUTE & 10 SECONDS	1	0	0	1
1 MINUTE & 20 SECONDS	1	0	0	2
1 MINUTE & 30 SECONDS	1	0	0	3
1 MINUTE & 40 SECONDS	1	0	0	4
1 MINUTE & 50 SECONDS	1	0	0	5

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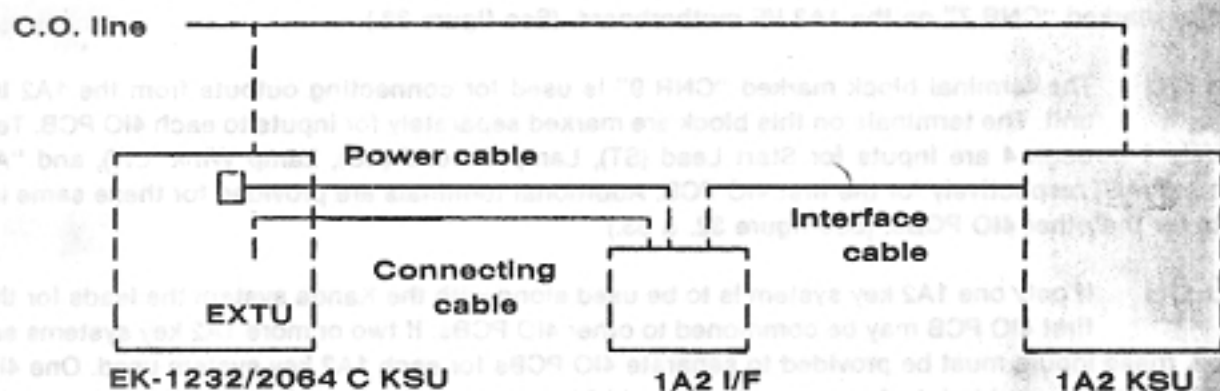
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## 1A2 INTERFACE UNIT INSTALLATION AND OPERATION

### 10. 1A2 INTERFACE UNIT

10.01 The 1A2 I/F is an optional unit which allows the EK-1232/2064 electronic key system to share up to 20 CO lines with a 1A2 electro-mechanical key system and provides the appropriate lamp/LED indications for these lines on both systems. The 1A2 I/F is an outboard unit which is connected to both the EK-1232/2064 and the 1A2 system in order to translate and transfer visual indications of CO line status from one system to the other. Connections to the EK-1232/2064 are made by use of a connector cable from the EXT PCB (option) to the 1A2 I/F. Power is provided by a separate cable from the EK-1232/2064. Connections to the 1A2 key system are made by use of customer provided jumper wire or station wire. (See figure 31.)

FIGURE 31. 1A2 INTERFACE CONNECTIONS



10.02 The 1A2 I/F unit consists of a cabinet, a CPU PCB, and up to five 4IO PCBs. The cabinet contains a PCB mounting rack, back-plane, and quick-connect terminal blocks used for the 1A2 connections. The CPU PCB (CPU-4CB) contains a processor and the operating program for controlling the functions of the unit. The CPU-4CB also includes a RESET button for clearing and restarting the CPU. Each 4IO PCB (4IO-4CA) contains four CO line interface circuits. Under control of CPU PCB, each of these interface circuits receive and transmit status indications for one CO line in the 1A2 system.

### 1A2 I/F INSTALLATION - PHYSICAL CONNECTIONS

10.03 In order for the 1A2 I/F unit to operate the EK-1232/2064 must be equipped with a CPU PCB designated as CPU-4CC which is retrofitable to any EK-1232/2064 system. The earlier CPU PCB (CPU-4CA) does not contain the system software to support the 1A2 I/F unit. Hardware required for installation of the 1A2 I/F unit (other than the CPU-4CC) is as follows:

1. 1A2 I/F unit (equipped with a CPU-4CB and 4IO PCBs as required)
2. EXT PCB
3. connector cable between EK-1232/2064 and 1A2 I/F (provided)
4. power cable for 1A2 I/F (provided)
5. Jumper wire or station wire for connecting 1A2 system to the 1A2 I/F unit (customer provided)



- 10.04** Power to the EK-1232/2064 and the 1A2 I/F unit should be turned off during installation. Remove the cover screws and lift off the cover to expose the card cage and motherboard.
- 10.05** Insert PCBs into their appropriate slots and check to be sure that they are properly seated. The CPU-4CB should be installed in the far left slot (marked "CNR 6") and the 4IO PCBs should be installed in the remaining slots (CNR 1 through CNR 5) as required. (See figure 32.)
- 10.06** The power cable provided with the 1A2 I/F should be plugged into the connector marked "CNR 8" on the 1A2 I/F motherboard (See figure 32.) and then attached to one of the power connectors (marked PW1 or PW2) on the MDF of the EK-1232/2064 KSU. In earlier systems these power connectors may not be present and in such case the power cable can be attached to the KSU power cable with a branch connector.
- 10.07** A connector cable is provided with the interface unit for connection to the EXT PCB. This cable may be attached to either connector A or B on the EXT PCB and to the connector marked "CNR 7" on the 1A2 I/F motherboard. (See figure 32.)
- 10.08** The terminal block marked "CNR 9" is used for connecting outputs from the 1A2 I/F unit. The terminals on this block are marked separately for inputs to each 4IO PCB. Terminals 1 through 4 are inputs for Start Lead (ST), Lamp Ground (LG), Lamp Wink (LW), and "A" Ground (AG) respectively for the first 4IO PCB. Additional terminals are provided for these same inputs for the other 4IO PCBs. (See figure 32. & 33.)
- 10.09** If only one 1A2 key system is to be used along with the Kanda system the leads for the first 4IO PCB may be commoned to other 4IO PCBs. If two or more 1A2 key systems are used, these inputs must be provided to separate 4IO PCBs for each 1A2 key system used. One 4IO PCB cannot be used to interface more than one 1A2 key system. Jumper wire or station wire can be used for connections between the 1A2 key system and the 1A2 I/F unit.

## 1A2 INSTALLATION - PHYSICAL CONNECTIONS

In order for the 1A2 I/F unit to operate the EK-1232/2064 must be equipped with a CPU-4CB designated as CPU-4CB which is compatible to any EK-1232/2064 system. The CPU-4CB (CPU-4CB) does not contain the system software to support the 1A2 I/F unit. The system software for the 1A2 I/F unit (CPU-4CB) is as follows:

- 1. 1A2 I/F unit (equipped with a CPU-4CB and 4IO PCBs as needed)
- 2. EXT PCB
- 3. Connector cable between EK-1232/2064 and 1A2 I/F (provided)
- 4. Power cable for 1A2 I/F (provided)
- 5. Jumper wire or station wire for connecting 1A2 system to the 1A2 I/F unit (customer provided)

Figure 32. 1A2 INTERFACE UNIT WITH COVER REMOVED

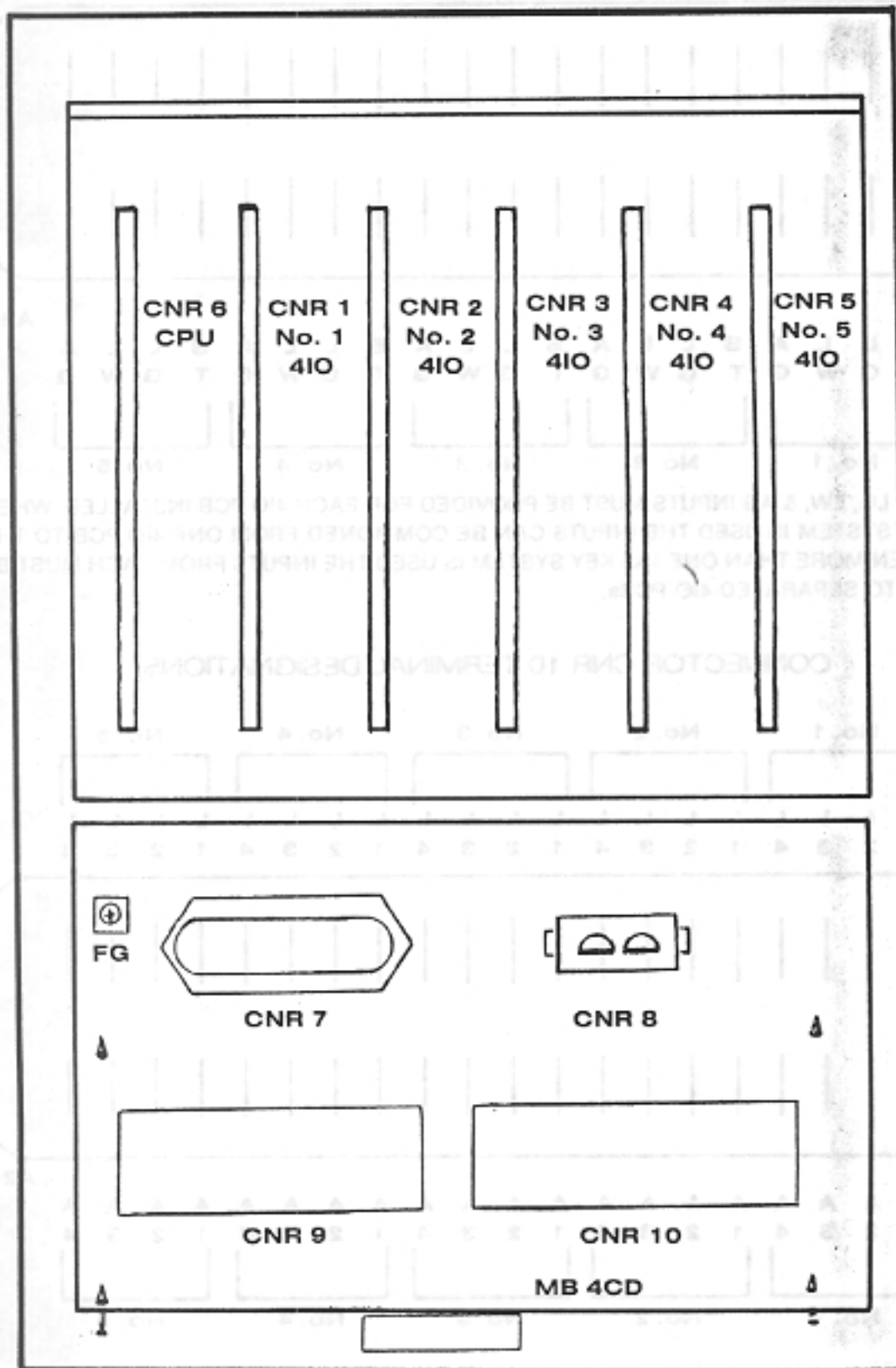
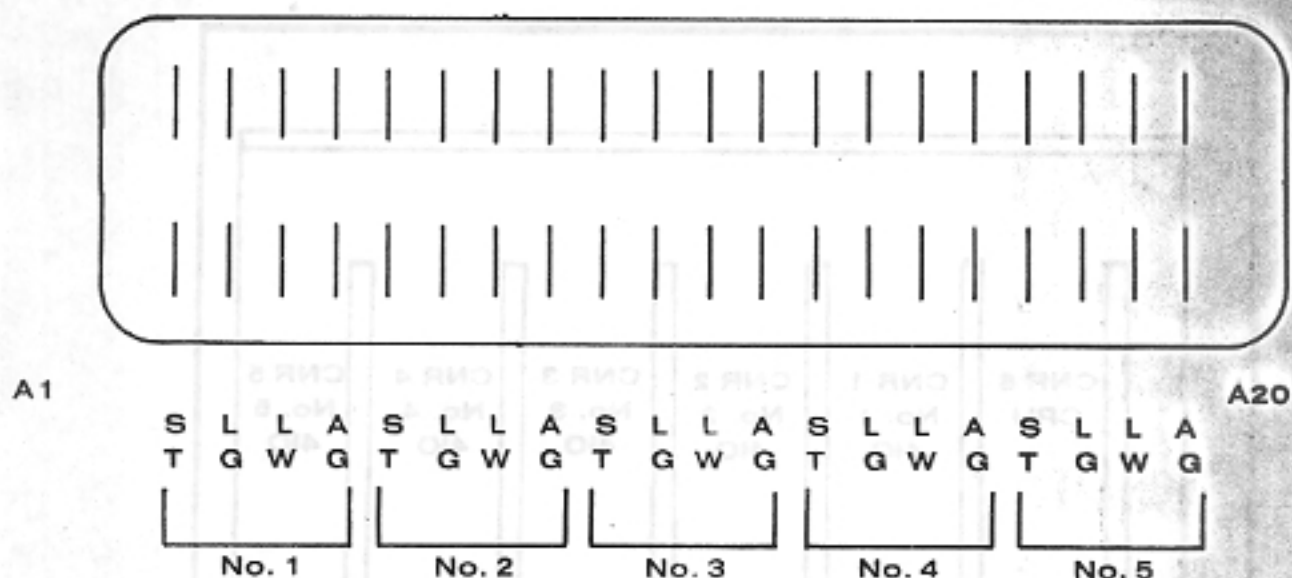
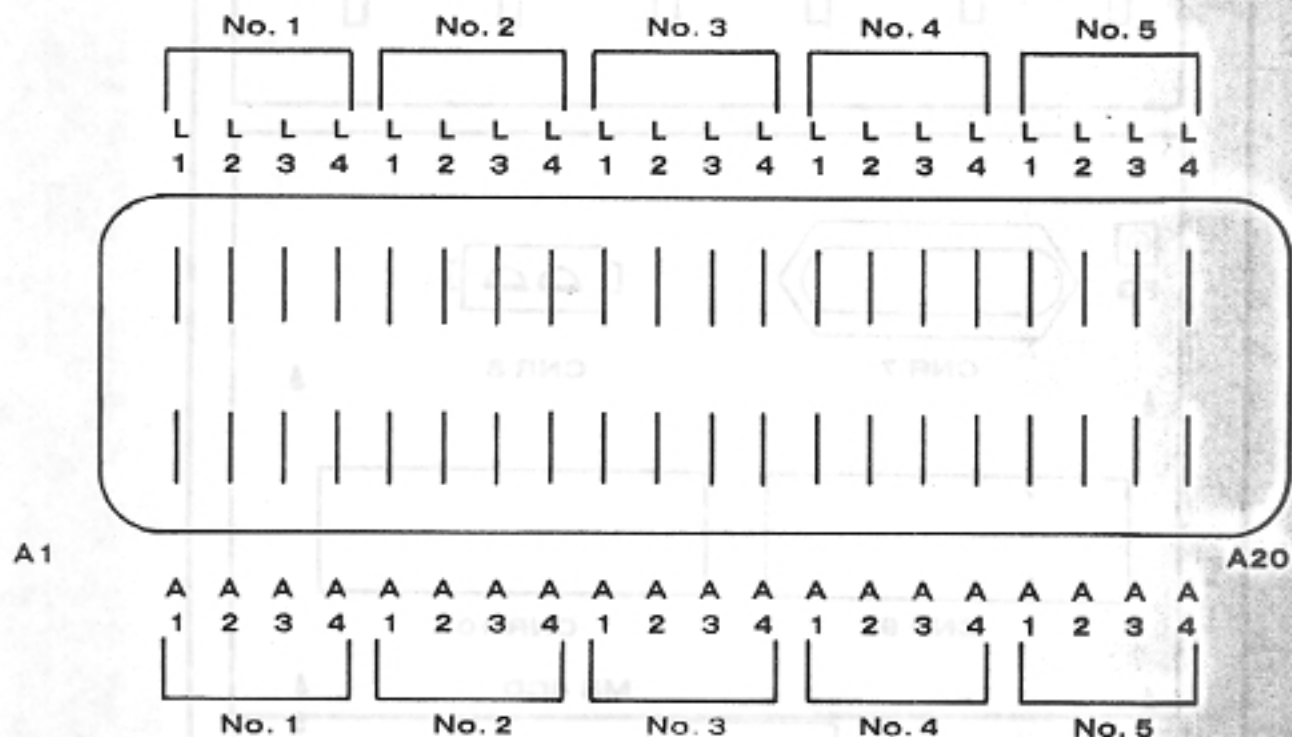


Figure 33. CONNECTOR CNR 9 TERMINAL DESIGNATIONS



NOTE: ST, LG, LW, & AG INPUTS MUST BE PROVIDED FOR EACH 4IO PCB INSTALLED. WHEN ONE 1A2 KEY SYSTEM IS USED THE INPUTS CAN BE COMMONED FROM ONE 4IO PCB TO THE OTHERS. WHEN MORE THAN ONE 1A2 KEY SYSTEM IS USED THE INPUTS FROM EACH MUST BE CONNECTED TO SEPARATED 4IO PCBs.

Figure 34. CONNECTOR CNR 10 TERMINAL DESIGNATIONS



NOTE: L AND A INPUTS MUST BE PROVIDED SEPARATELY FOR EACH 1A2 CO LINE. BE CAREFUL TO TERMINATE THESE INPUTS AT THE APPROPRIATE TERMINALS SO THAT THEY APPEAR AT THE CORRECT CO LINE LED ON THE KANDA SYSTEM.

10.10 A terminal block marked "CNR 10" is provided for input of the A-Lead and Lamp Lead for each individual CO line. (See figure 32. & 34.) The terminals are arranged and numbered in groups of four representing the individual interface circuits on each 4IO PCB. Jumper wire or station wire can be used to provide the A-Lead and Lamp Lead inputs. The relationship between the terminals on CRN 10, the 4IO PCBs, and the CO lines on the Kanda system is shown below.

CNR 10 terminal	4IO PCB	Kanda CO line
# 1 (L1 & A1)	No. 1 - 1st circuit	CO 1
# 2 (L2 & A2)	No. 1 - 2nd circuit	CO 2
# 3 (L3 & A3)	No. 1 - 3rd circuit	CO 3
# 4 (L4 & A4)	No. 1 - 4th circuit	CO 4
# 5 (L1 & A1)	No. 2 - 1st circuit	CO 5
# 6 (L2 & A2)	No. 2 - 2nd circuit	CO 6
# 7 (L3 & A3)	No. 2 - 3rd circuit	CO 7
# 8 (L4 & A4)	No. 2 - 4th circuit	CO 8
# 9 (L1 & A1)	No. 3 - 1st circuit	CO 9
# 10 (L2 & A2)	No. 3 - 2nd circuit	CO 10
# 11 (L3 & A3)	No. 3 - 3rd circuit	CO 11
# 12 (L4 & A4)	No. 3 - 4th circuit	CO 12
# 13 (L1 & A1)	No. 4 - 1st circuit	CO 13
# 14 (L2 & A2)	No. 4 - 2nd circuit	CO 14
# 15 (L3 & A3)	No. 4 - 3rd circuit	CO 15
# 16 (L4 & A4)	No. 4 - 4th circuit	CO 16
# 17 (L1 & A1)	No. 5 - 1st circuit	CO 17
# 18 (L2 & A2)	No. 5 - 2nd circuit	CO 18
# 19 (L3 & A3)	No. 5 - 3rd circuit	CO 19
# 20 (L4 & A4)	No. 5 - 4th circuit	CO 20

## 1A2 I/F UNIT - OPERATION

10.11 The operation of the 1A2 I/F unit is automatic and requires no attention of either the Kanda station user or the 1A2 key telephone user. CO line lamps and LEDs are displayed for each line condition as they normally would be shown on the respective system.

10.12 The only unusual reaction by the 1A2 key telephone occurs when a Kanda station user activates exclusive hold. In this case the CO line lamp on the 1A2 system will light steady (as do the LEDs on the other Kanda telephones). This lamp response is an intentional part of the operational design of the 1A2 I/F unit.



## 1A2 I/F USED WITH SMDR

**10.13** The Kanda SMDR I/F unit is not designed to generate call records for a 1A2 key system connected through the 1A2 I/F unit. Some information, however, is provided through the SMDR I/F when CO lines are transferred from one system to the other.

**10.14** When calls are originated or answered and terminated at the 1A2 key system, no call record is generated by the SMDR I/F unit. However, if a call is originated or answered at the 1A2 system and then transferred to the Kanda key system, a call record will be generated to indicate this transfer. An example of this call record is shown below.

DATE 11/08/84

SEQ	EXT (1)	EXT (2)	TRK	CALL	TIME	DURATION	DIAL.NUMBER.	ACCT.NO.
002	A2	14	01	INC	15:43	00:00:00		
003	14		01	INC	15:43	00:00:42		

"A2" Indicates that the call was originated or answered by the 1A2 key system.  
 "14" Indicates the Kanda station number to which the call was transferred.  
 "01" Shows that CO line NO. 1 on the Kanda system was used.  
 "INC" Type of call will always be shown as "incoming" when it is originated or answered by the 1A2 key system.  
 "TIME" The time that the call was transferred will be shown in this column.  
 "DURATION" Duration of the call for the 1A2 system will always be zero (00:00:00).  
 "DIAL.NUMBER" No dialed digits will be shown for the 1A2 key system.

**10.15** Calls transferred from the Kanda system to the 1A2 key system will generate the same information as if the call had been transferred to another Kanda station except that "A2" will be printed in the "EXT (2)" column. No transferred call record will be generated for the 1A2 key system. An example is shown below.

DATE 11/08/84

SEQ	EXT (1)	EXT (2)	TRK	CALL	TIME	DURATION	DIAL.NUMBER.	ACCT.NO.
001	14	A2	01	OUT	15:40	00:00:41	19349996	

**10.16** CO lines answered or seized at the same time by a Kanda station and a 1A2 telephone are controlled by the Kanda station in so far as the SMDR call records are concerned. A call record is printed for the Kanda station regardless of which station hangs up. No call record is printed for the 1A2 telephone.

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## OFF PREMISE EXTENSION MODULE INSTALLATION AND OPERATION

### 11. OFF PREMISE EXTENSION MODULE

11.01 The OPX module is an optional unit for use with Kanda EK-1232/2064 electronic key systems. This module provides the capability to connect single-line tone dialing telephone sets to Kanda station circuits and operate these single-line telephones at much greater distances from the KSU than the electronic key telephone. In addition, the single-line telephone requires only 2-conductor wiring. The loop limit for an OPX circuit is 1200 ohms which is approximately 9800 feet (3 kilometers) when 24 gauge cable is used. (NOTE: See par. 8.33 for programming OPX stations.)

11.02 The OPX module is an outboard unit which can be wall-mounted and consists of a cabinet which contains the circuitry to support 2 off-premise extensions. Three-pair station wire is used to connect each OPX circuit to selected station terminals on the MDF of the KSU. A single pair of wires is then used to connect the single-line telephone to the OPX circuit. (See figure 35.)

11.03 The OPX module is used in conjunction with a standard 8/ST PCB. Power to operate the OPX module and the single-line telephone is supplied by the KSU through the PA/PB station pair so that no auxiliary power supply or ring generator is required.

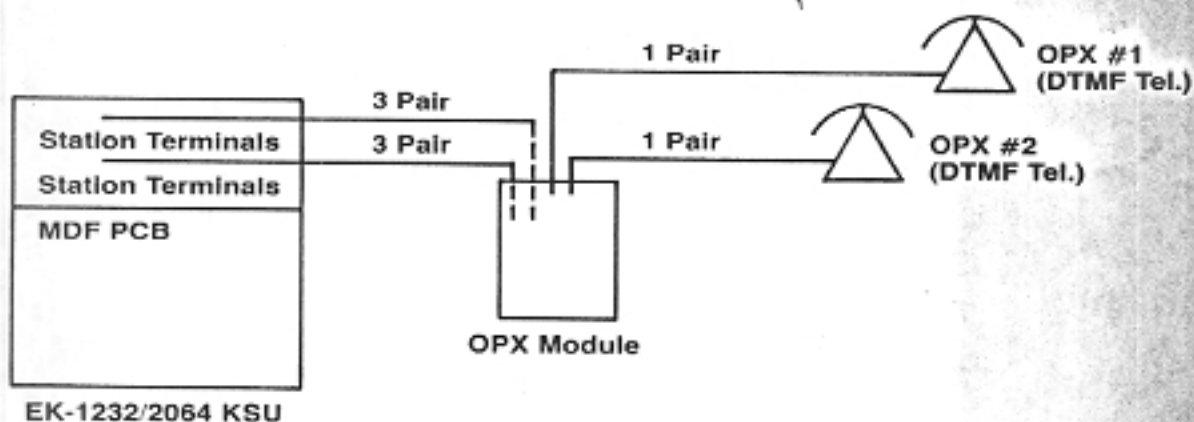


Figure 35: Off Premise Extension Module Connections

### OPX INSTALLATION

11.04 The cabinet containing the OPX circuitry is arranged with key-holes in the back cover to allow wall mounting. When the cabinet is opened, by removing four screws in the cover, it can be held next to the wall or backboard so that the positions can be marked for mounting screws.

11.05 Three-pair station wire is used to connect each OPX station circuit to the MDF on the KSU. The connections at the MDF should be made the same as for the electronic key telephone (See par. 7.11). Connections are then made on the quick-connect block in the OPX module on terminals marked 1CA & 1CB, 1SA & 1SB, and 1PA & 1PB. The terminals are marked to correspond with the terminals on the MDF in the KSU (See figure 36).



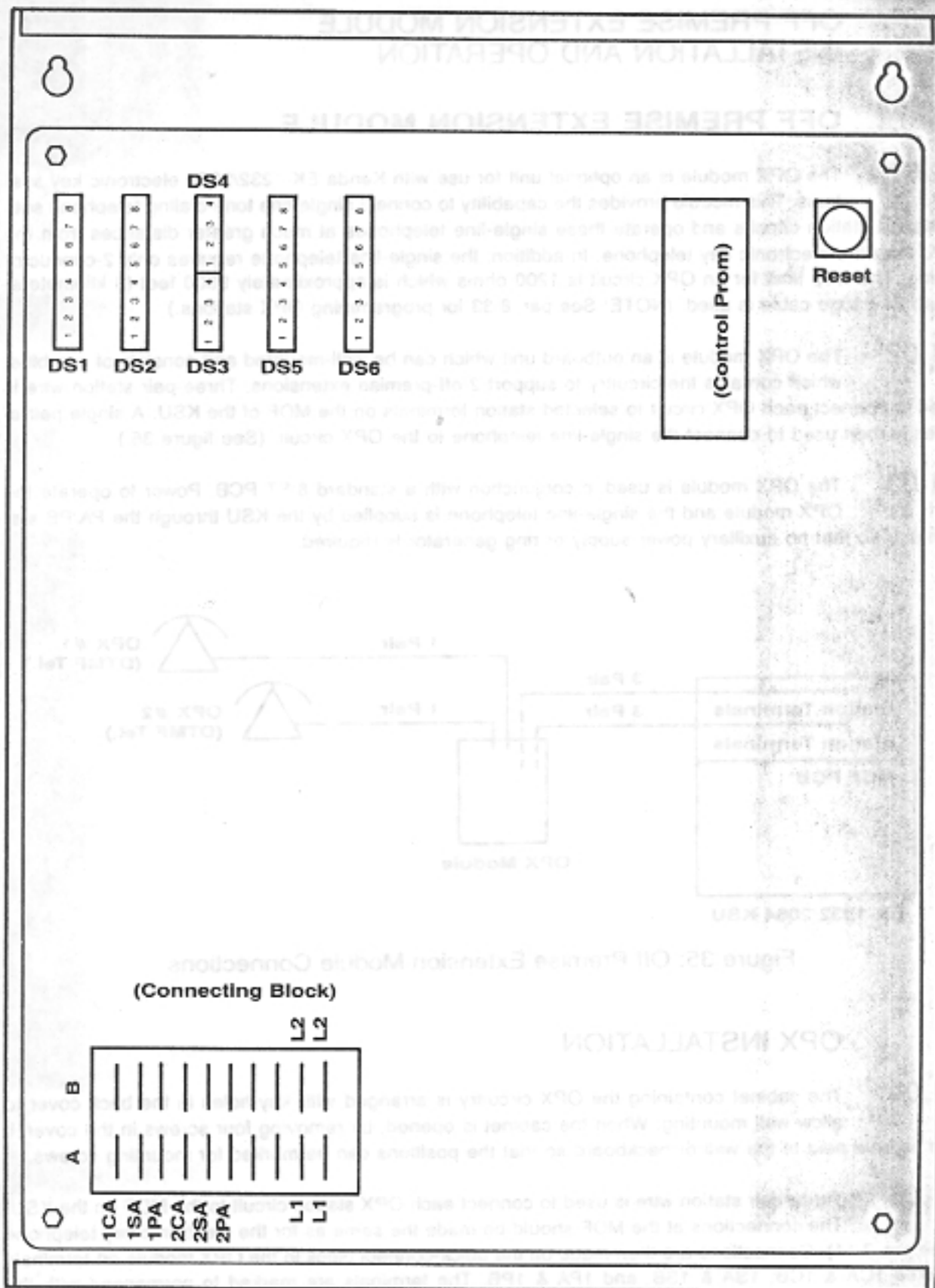


Figure 36: Off Premise Extension Module (Cover Removed)

11.06 A single pair of station wires is then terminated on the quick-connect block terminals marked L1 & L2. L1 is the "tip" side and L2 is the "ring" side. This pair of wires is then run to the remote location for connection to the single-line telephone set (See figures 35. & 36.).

**NOTE**

The OPX module is designed to be used with an industry standard, single-line telephone equipped with a DTMF dial. Because of the wide variety of single-line telephones and feature phones available on the market, KANDA cannot guarantee that all single-line telephones will operate properly when used in conjunction with the OPX module.

11.07 Power for operation of the OPX module and for generating the ringing voltage for the single-line telephone is provided from the EK-1232/2064 key system through the PA/PB station pair. No additional power is required for operation of the OPX station. A maximum of two single-line DTMF telephones can be connected to each off-premise circuit.

## OPX LINE ASSIGNMENTS

11.08 The off-premise telephone may be allowed direct dial access to as many as 9 CO lines. Access to these lines is allowed through switch settings in the OPX module (See figure 36.). Switch banks marked DS1, DS2, and DS4 are used for assignment of lines to the first off-premise circuit. Switch banks marked DS3, DS5, and DS6 are used for line assignments to the second off-premise circuit. Each set of 3 switch banks provide a total of 20 switches so that any 9 of the possible 20 lines (in EK-2064) could be assigned to each OPX telephone. In this way, each OPX station can be allowed access to a different group of lines. Once the switches are set as desired, the RESET button should be pushed to activate the switch settings.

11.09 The OPX station accesses a particular CO line by lifting the handset and dialing a 2-digit access code (01 thru 09). The access code dialed does not necessarily correspond to the CO line numbering sequence on an electronic key telephone. Dialing line access code "03" at the OPX station would result in seizure of the line associated to the 3rd enabled switch on the line access switch banks. An example of the line access switch settings is shown below.

Example: Circuit #1 on the OPX module is set for access of CO lines 3, 7, 9, 10, 12, 15, 16, 17, & 20 (in EK-2064 KSU.)

SWITCH ENABLED	KSU LINE CIRCUIT ENABLED	OPX ACCESS CODE
DS1 #3	circuit #3	01
DS1 #7	circuit #7	02
DS2 #1	circuit #9	03
DS2 #2	circuit #10	04
DS2 #4	circuit #12	05
DS2 #7	circuit #15	06
DS2 #8	circuit #16	07
DS4 #1	circuit #17	08
DS4 #4	circuit #20	09

## OPX FEATURES

- 11.10 ACCOUNT CODES** - The OPX station is capable of entering account codes which will be output with the call records through the SMDR I/F unit. The account code is entered by dialing "\*" and up to eight digits. (See par. 6.01) Account codes can be entered on out-going calls only and must be input immediately after dialing the outgoing number.
- 11.11 ADD-ON CONFERENCE** - OPX stations can be included in conferences in exactly the same way as a standard station. The conference must be initiated by an electronic key station. The OPX station cannot initiate a conference of any kind. (See par. 6.02)
- 11.12 ALTERNATE POSITION ANSWERING** - A standard Kanda station is able to pick up intercom calls directed to an OPX station in the same group by lifting the handset and pushing the ANSWER button. However, the OPX station does not have access to this feature and therefore cannot answer calls for other stations.
- 11.13 ATTENDANT DSS WITH BLF** - A DSS console cannot be connected to the OPX station. However, a DSS installed at a standard station can be used to signal the OPX station and will provide visual indications as to the status of the OPX station. (See par. 6.07)
- 11.14 AUTOMATIC HOLD RECALL** - This feature operates at the OPX station in the same way as at standard stations. When the CO line recalls at the OPX station, the handset is lifted and the recalling CO line is automatically seized. (See par. 6.09)
- 11.15 AUTOMATIC HELD PARTY DISCONNECT** - This feature operates at the OPX station exactly as it does at any other station. (See par. 6.10)
- 11.16 AUTOMATIC PRIVACY** - As with any other station in the system, CO line and intercom conversations are protected against intrusion by other stations. (See par. 6.12)
- 11.17 CALL ANNOUNCING WITH ANSWERBACK** - The OPX station is able to dial a 2-digit station number and call announce to electronic key telephones and hear the handsfree reply from that station. The electronic key telephones can dial the 2-digit OPX station number and speak to that station user after the handset is lifted at the OPX telephone. The E-key user will hear ringback tone until the OPX telephone is answered. An OPX station does not have group call announce capability. (See par. 6.15)
- 11.18 CALL FORWARD PRESET** - An OPX station can be set up to receive forwarded calls from another station but cannot forward calls. (See par. 6.16)
- 11.19 FLEXIBLE LINE ASSIGNMENT** - Up to 9 CO lines may be assigned for direct dial access by the OPX station. These lines may be different for each OPX station if desired. The OPX station seizes a CO line by lifting the handset and dialing a 2-digit access code (01 thru 09) corresponding to the desired line. Access to these lines is subject to denial through tenant programming. (See par. 6.31 & 6.59)
- 11.20 FLEXIBLE RINGING ASSIGNMENT** - CO line ringing at the OPX telephone is subject to ringing assignments programmed through the DSS console by the installer. In any case, a line will not ring unless the OPX station has access to that line. (See par. 6.33)



- 11.21 **FLEXIBLE STATION NUMBERING** - The OPX station can be programmed with any 2-digit station number (from 10 to 99 inclusive) exactly like any other station. (See par. 6.34)
- 11.22 **LAST NUMBER REDIAL** - The OPX station may dial "##" to activate automatic last number redial after seizing an idle CO line. The OPX station must dial "##" again to redial the second string of digits if the last number dialed was done by "chaining" speed dial numbers and manual dialing. (See par. 6.39)
- 11.23 **LINE HOLD** - A hook switch flash is used at the OPX station to place a CO line on hold. Exclusive hold is not available to the OPX station. A line placed on hold will receive hold music if equipped in the system (either internal or external source) and will recall to the OPX telephone after the timeout period. (See par. 6.09, 6.44 & 6.45).
- 11.24 **MULTI-PARTY CONFERENCE** - An OPX station may be included in a conference but cannot initiate a conference. (See par. 6.43)
- 11.25 **PRIVATE LINES** - Through the tenanting program and the line access switch settings in the OPX module, it is possible to arrange private line access for the OPX station if desired.
- 11.26 **REPERTORY DIALING** - The OPX station has access to the system speed dial numbers the same as any other station. To access the speed dial numbers the OPX station user must first seize a CO line and then dial "#" and the 2-digit speed dial code. After the digits have been dialed, additional digits can be dialed manually if required. (See par. 6.54)
- 11.27 **RESERVE POWER** - Since the OPX module and telephone set are powered by the KSU exclusively, the optional reserve battery package can be used to provide uninterrupted service to the OPX station as well as to other stations in the system. (See par. 6.55)
- 11.28 **SHIFT CALL** - An OPX station has the same shift call capability as other stations in the system. If the OPX station calls a station which is busy or does not answer, the call can be "shifted" to another station in the same group by dialing only the last digit of the station number. (See par. 6.57)
- 11.29 **STATION MESSAGE DETAIL RECORDING** - Call records are generated and output by the optional SMDR I/F unit exactly the same as for any other station in the system. (See par. 6.58)
- 11.30 **TENANT SERVICE** - The tenant capabilities of the EK-1232/2064 are applied to the OPX station in the same manner and under the same conditions as for other stations in the system. The switch settings provided in the OPX module for CO line access assignments are another consideration when tenant service is applied to the OPX station. (See par. 6.59)
- 11.31 **TOLL RESTRICTION** - The OPX station is subject to restrictions based on toll class or entries in the toll lists just as any other station in the system. (See par. 6.60)
- 11.32 **1A2 INTERFACE UNIT** - When the 1A2 I/F unit is installed, the CO line activity of the OPX station will be shown at the 1A2 key system in the same manner and under the same conditions as any other Kanda station. The OPX station circuit could also be connected to a line position on the 1A2 system for direct dial access to Kanda stations.



## FEATURE ACCESS CODE SUMMARY

11.33 The following listing provides a summary of the access codes used by an OPX station to activate the various features.

FEATURE	ACCESS CODE	REMARKS
ACCOUNT CODE ENTRY	"*" XXXX	"XXXX" = account code Account code (maximum 8 digits) must be entered immediately after address is dialed on outgoing call.
CALL ANNOUNCE	(Station #)	Dial the 2-digit station number.
LAST NUMBER REDIAL	"##"	Repeat to dial 2nd string of digits in a "chained" number.
LINE ACCESS	01 - 09	A 2-digit code 01 through 09 used to access an individual line.
LINE HOLD	(Hook flash)	Hook flash puts line on hold.
REPERTORY (SPEED) DIAL	"#" XX	"XX" represents speed dial code. (Manual dialing can be done after the speed dial number.)
SHIFT CALL	X	"X" represents the 2nd digit of an alternate station number. (Both stations must have same 1st digit in their station numbers.)

## OPX USER INSTRUCTIONS

### INTERCOM CALL

- Originating** Lift the handset and listen for the intercom dial tone. Dial a two-digit station number. Listen for the call announce tone and then speak into the handset.
- Shift Call** If the station you dial is busy or does not answer, you can call another station by dialing the last digit of the station number (as long as the first digit is the same as the original station). This saves the time and trouble of hanging up before initiating the second call.
- Receiving** When you hear the distinctive intercom ringing tone, lift the handset and speak.

### CO LINE (OUTSIDE) CALL

- Originating** Lift the handset and listen for intercom dial tone. Dial a two-digit access code (01 - 09) to seize an outside line and then dial the number immediately.
- Receiving** When you hear the distinctive ringing tone, lift the handset and you will be connected automatically to the incoming call.
- Line Hold** A call on an outside line can be placed on hold by momentarily depressing the hookswitch and then releasing it. The line will be placed on hold and you will hear intercom dial tone. At this time you can dial a station number to make an intercom call or place the handset in the cradle to leave the line on hold.
- Hold Pick Up** A line on hold is automatically answered when the handset is picked up. If the line was put on hold so that an intercom call could be placed, hang up after the intercom call and then lift the handset.
- Line Transfer** Place the outside line on hold by momentarily depressing the hookswitch. Listen for intercom dial tone and dial a station number. Announce the call and ask the called party to pick up the handset. Hang up and the call will be transferred to the called station.
- Account Code Entry** If the system is equipped with the SMDR option an account code can be entered and printed for a call. To enter the account code after dialing an outside call, push the "\*" button and dial up to eight digits.
- Last Number Redial** The last number dialed on an outside line can be automatically redialed by dialing "##" after hearing outside dial tone. If the original digits were dialed by "chaining", the second string of digits can be dialed by pushing "##" again.
- Speed Dialing** To use the system repertory (speed) dial numbers access an outside line and dial "\*" and the two-digit speed dial code.

# OPX USER INSTRUCTIONS

## LOCAL CALL

Let the handset and listen for the intercom dial tone. Dial a two-digit station number. Listen for the call announcement tone and then speak into the handset.

If the station you dial is busy or does not answer, you can call another station by dialing the last digit of the station number (as long as the first digit is the same as the original station). This saves the time and trouble of hanging up before dialing the second call.

When you hear the distinctive intercom ringing tone, lift the handset and speak.

## CO LINE (OUTSIDE) CALL

Lift the handset and listen for intercom dial tone. Dial a two-digit access code (01 - 09) to reach an outside line and then dial the number you want to call.

When you hear the distinctive ringing tone, lift the handset and you will be connected automatically to the incoming call.

A call on an outside line can be placed on hold by momentarily depressing the hookswitch and then releasing it. The line will be placed on hold and you will hear intercom dial tone. At this time you can dial a station number to make an intercom call or place the handset in the cradle to leave the line on hold.

A line on hold is automatically answered when the handset is placed on it. The line will be placed on hold so that an intercom call could be placed. Hang up after the intercom call and then lift the handset.

Place the outside line on hold by momentarily depressing the hookswitch. Listen for intercom dial tone and dial a station number. Announce the call and ask the called party to pick up the handset. Hang up and the call will be transferred to the called station.

If the system is equipped with the SMCH option an account code can be entered and printed for a call. To enter the account code after dialing an outside call, push the "K" button and dial up to eight digits.

The last number dialed on an outside line can be automatically repeated by dialing "K" after hearing outside dial tone. If the original digit was dialed by dialing "K" the second digit can be dialed by dialing "K" again.

To use the system memory (speed) dial numbers access an outside line and dial "K" and the two-digit speed dial code.

Handset

Call Call

Receiving

Outgoing

Receiving

Line Hold

Hold Pick Up

Line Transfer

Account Code

Last Number Repeated

Speed Dialing

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## 12 . PRINTED CIRCUIT BOARD (PCB) DESCRIPTIONS

12.01 The following paragraphs provide descriptions of the various PCBs used in the EK-1232/2064 systems. This information is subject to change without notice.

12.02 **CPU PCB** - This card is responsible for the overall system processing functions and contains the system software. The major components on the CPU PCB are:

- 1) Central processing unit - This is an 8-bit, Z-80B microprocessor which controls the system functions.
- 2) Chip selector - The chip selector controls access to the EPROMs and RAMs on the CPU PCB.
- 3) ROM - One 256K EPROM contains all system operating instructions.
- 4) RAM - Three 128K RAMs are used for storing the data programmed through the DSS console.
- 5) I/O circuit - This circuit is the interface between the CPU and the other system circuits.
- 6) Timing control circuit - This circuit assigns and controls time slots for communications between the CPU and other system circuits.
- 7) Clock - Generates minimum clock pulses for system timing functions. (Approx. 6MHz)
- 8) Reset circuit - Resets CPU and initializes the entire KSU. The Reset circuit is activated manually by a reset switch or automatically by the Watchdog timer.
- 9) Watchdog timer - This circuit detects any unusual occurrence within the CPU and activates the Reset circuit.
- 10) Memory backup - This circuit includes a lithium battery which prevents the contents of RAM memory from being erased due to power failure or other trouble.
- 11) Strapping circuit - This contains switches which are used for factory test purposes. One of these switches is used for clearing the contents of the RAM memory for system initialization.
- 12) Power circuit - This is a DC power input circuit which is filtered so as to suppress outside noise.

12.03 **TONE PCB** - The TONE PCB generates the various call progress and alerting tones in the system. The circuits included on the TONE PCB are:

- 1) Intercom call tone circuits - Two circuits are used so that intercom call tones can be sent to 2 subsets at the same time. Intercom call tone is a single 400Hz burst.
- 2) DSS call tone circuits - Two circuits are provided so that tones can be sent to 2 subsets from 2 DSS consoles at the same time. DSS call tone is a single burst at 500Hz.
- 3) Group paging & external paging tone circuit - The same circuit is used to generate both paging tones. A double chime tone (400 Hz and 500Hz) is used as the paging alert tone.
- 4) Dial tone circuit - This circuit mixes and amplifies 2 tones (400 Hz and 500 Hz) to provide the system dial tone.
- 5) Busy tone circuit - By amplifying a 400Hz tone and providing a 1Hz interruption, this circuit produces the busy tone used in the system.
- 6) Incoming call tone circuit - This circuit amplifies signals of 400Hz and 500Hz and alternates them (8Hz) to produce the incoming call tone.

- 7) Alarm tone and background music circuit - Alarm tone is produced by amplifying and alternating tones of 1000Hz and 2000Hz. This circuit is also used to amplify the external music source for background music.
- 8) Background music input circuit - This circuit acts as an interface between an external music source and the background music amplifier.
- 9) Tone generator - This circuit divides a 4000Hz tone clock to generate the various signal sources.
- 10) Tone start circuit - Actuates and controls various tone generating circuits according to instructions received thru the bus line from the CPU.
- 11) Hold music source circuit - This circuit contains an amplifier and music synthesizer along with a strapping circuit for selecting the internal hold music source.
- 12) External hold music interface - This is an input interface for the external hold music source.
- 13) System strapping circuit - Used to define the system (whether EK-1232 or EK-2064) and when expanding the intercom paths in the EK-2064 system.
- 14) Power supply circuit - This is the DC power input circuit and includes a filter to suppress outside noise.

**12.04 PX PCB** - The PX PCB contains cross-points used to connect the transmission path and the signal path, an amplifier used for internal call, and a voice switching circuit. The major circuits on this card are:

- 1) Intercom call path - Consists of 2 intercom paths equipped with voice amplifiers and voice switches and circuitry to prevent singing.
- 2) DSS call paths - Included here are 2 DSS paths which are equipped with voice amplifiers and voice switches and circuitry to prevent singing.
- 3) Group page circuit - This is an amplifier circuit used for the group paging function.
- 4) External page circuit - Consists of an interface circuit used to output the voice to an external paging device.
- 5) Cross-point switch circuit - This is a cross-point matrix (consisting of 8 ICs) for connecting the transmission path to the intercom paths, group page, and external page circuits.
- 6) Chip selector - This is used to select and close the appropriate cross-points.
- 7) Transmission path protector - Used for the protection of the cross-point ICs.
- 8) Alarm start circuit - This interface circuit receives the input from an external alarm device and activates the alarm tone.
- 9) Bus line - This bus is used for communication between the PX PCB and the CPU.
- 10) Strapping circuit - Used for expansion of intercom paths on EK-2064.
- 11) Power circuit - This is a DC power input circuit which is filtered to suppress outside noise.

**12.05 4/CO PCB** - This card provides the interface circuitry between 4 Central Office or PBX lines and the KSU. A microcomputer on the card communicates with the main CPU and controls line seizure, line loop supervision, ring detection, dial signaling (tone & pulse), line

hold, delivery of hold music, and coupling and isolating the transmission path. Major circuits included on this PCB are as follows:

- 1) Dial pulse sender - The CO line is seized by operation of the "A" relay and dial pulses are sent through interruption of this relay.
- 2) Loop supervisor & ring detector - A photo-coupler is operated by the ring signal from the CO line and the information is passed to the microprocessor on the 4/CO PCB. When the line loop is closed the photo-coupler informs the microprocessor and loop supervision begins.
- 3) Transmission path - The transmission path isolates the CO line by use of a DC transformer and connects it to the cross-point switches when ringing is detected.
- 4) Tone sender - This circuit receives signals through the tone amplifier from the tone generator and sends them to the CO line for address signaling.
- 5) Hold music switching circuit - This is a gate circuit which sends music to the line through the transmission circuit when the line is held.
- 6) Tone generator - Seven precise tones are generated by this circuit and are sent through the tone amplifier to the tone sender for CO line signaling.
- 7) Strapping circuit - Dial signal (tone or pulse), pulse speed (10pps or 20pps), and break ratio (60% or 66%) are the 3 strapping options that are controlled through this circuit.
- 8) Tone amplifier - Signals are received from the tone generator, distortion is reduced, and the signals are amplified before being sent to the tone sender.
- 9) Bus line - This bus is a communication path between the main CPU and the 4/CO PCB.
- 10) Power circuit - This is the input circuit for filtered DC power.
- 11) Line protector - Located on the MDF board, this circuit protects the system from damage due to lightning surges introduced through CO lines.

**12.06 8/ST PCB** - The 8/ST PCB provides interface circuitry between the KSU and 8 station subsets. Circuits included on this card are:

- 1) DC power circuit - This circuit provides the talk current for all transmission paths.
- 2) Signal path - This path is used for sending various call tones and hands-free answer-back to the subset. It is also used as a data path between the KSU and the subsets.
- 3) Data circuit - Used to send and receive data between the main CPU and the individual microprocessors in the subsets.
- 4) Cross-point circuit A - This cross-point switching circuit is used for connecting the intercom path, DSS path, and busy tone path with the subset.
- 5) Cross-point circuit B - This is a cross-point switching circuit used for connecting a signal path (for call tones) to the subset.
- 6) Chip selector - Used for selecting and closing the appropriate cross-point switches.
- 7) Bus line - This bus is used as a communications path between the main CPU and the 8/ST PCB and subsets.
- 8) Card check circuit - Confirms the existence of other cards in the system.
- 9) Transmission path protector - This is a protective device for preventing damage to the cross-point circuits.
- 10) Power circuit - Provides filtered DC power to the 8/ST PCB.



**12.07 CX PCB** - The CX PCB is a cross-point switching circuit which provides the facilities for connections between station subsets, lines and stations, DSS and stations, etc. The

CX PCB is made up of the following circuits:

- 1) Cross-point switch - This switching circuit consists of 16 cross-point ICs thru which connections to the various transmission paths are made.
- 2) Chip selector - Used for selecting the appropriate IC and closing the switch.
- 3) Transmission path protector A - Installed at the input line side for protecting the cross-point ICs.
- 4) Transmission path protector B - Installed at the output line side for protecting the cross-point ICs.
- 5) Bus line - The bus line is used for receiving instructions from the main CPU.
- 6) Power circuit - This circuit provides filtered DC power to the CX PCB.

**12.08 POWU PCB** - The purpose of this card is to receive the 24VDC output from the power supply and break it down to the voltages (15VDC, 5VDC, & 8VDC) required by the various system components. Circuits found on the POWU PCB are:

- 1) Input protector - This circuit consists of fuses F1 (2A), F2 (2A), and F3 (3A) which protect the PCB from any overload from the power supply.
- 2) Ripple filter - This filter is used to reduce noise on transmission paths.
- 3) 15V regulator - Converts 24VDC to filtered 15VDC for use by various CMOS ICs.
- 4) 15V overload detector - Detects any overload and interrupts power to protect ICs from "latch-up".
- 5) 8V regulator - Provides a filtered 8VDC to center potential of each CMOS cross-point circuit and operational amplifier.
- 6) 5V regulator - This is a switching regulator which provides 5VDC for use by the microprocessors in the KSU.
- 7) 5V overload detector - Protects microprocessors from overload by momentarily interrupting power.

**12.09 TEL PCB and KEYBOARD** - These are the major components of the subset and include a 4 bit microprocessor which communicates with the main CPU through the data line to control various station functions. The circuits included here are:

- 1) Speech network - This is used for handset conversations with CO lines or other stations and includes a hybrid circuit separating the transmitter side and receiver side.
- 2) Data interface & hybrid circuit - This is an interface circuit used to receive data from the KSU and a hybrid circuit used for handsfree answer-back through the signal path.
- 3) Level control circuit - Controls the input to the speaker amplifier.
- 4) Speaker amplifier circuit - Amplifies the input from the signal path of CO lines and drives the speaker.
- 5) Microphone amplifier circuit - Amplifies the input from the microphone.

- 6) Data circuit - Includes a data sending circuit and a data receiving circuit for communications between the main CPU and the CPU on the TEL PCB.
- 7) Reset circuit - This circuit resets the TEL PCB microprocessor when power is turned on or the subset is connected to the KSU.
- 8) CPU circuit - Consists of a 4 bit microprocessor and 4K memory. This circuit controls the subset based on instructions from the main CPU or information received from the keyboard.
- 9) Keyboard interface circuit - This is used for transfer of data between the keyboard and the CPU on the TEL PCB.
- 10) Keyboard - The keyboard transmits information to the microprocessor through activation of the line and feature buttons. LEDs on the keyboard are lit according to the microprocessors instructions.
- 11) Power circuit - Regulates 24VDC from the KSU to 10VDC for use by the subset.

**12.10 DSS PCB and KEYBOARD** - These components control direct station selection functions and communicate instructions to the main CPU when the DSS console is in the programming mode. The circuits included here are:

- 1) Transmission path - This is an extension of the path from the KSU to the subset.
- 2) Signal path & data circuit A - This circuit relays the signal path from the KSU to the subset and is used for data transfer between the DSS and the KSU.
- 3) Signal path & data circuit B - Transmits and receives data between the DSS microprocessor and the subset microprocessor.
- 4) CPU circuit - Consists of an 8 bit microprocessor on the DSS PCB which controls DSS functions.
- 5) ROM circuit - This is a 2K EPROM which contains the program for the DSS operations.
- 6) RAM - This is used as a buffer memory for temporary storage of information to be used by the DSS CPU. It has a capacity of 4K.
- 7) Chip selector - The chip selector circuit is used to control the I/O port.
- 8) Timing control circuit - used for assignment and control of time slots.
- 9) Clock - This is a real-time clock which provides timing for DSS operations.
- 10) Reset circuit - Resets the DSS microprocessor when power is turned on or the DSS is connected.
- 11) LED output port - Receives data from the DSS CPU and sends it to the keyboard for activation of the LEDs.
- 12) Key input port - This port receives data from the keyboard and sends it to the DSS CPU.
- 13) Keyboard interface circuit - Used for scanning and flashing the LEDs.
- 14) Keyboard - Provides information to the DSS CPU thru activation of the buttons and receives instructions for operating the LEDs.
- 15) Power circuit - This is a DC/DC convertor which uses 24VDC from the KSU to provide 5VDC and 10VDC for the DSS.

**12.11 LCD PCB** - This board contains a liquid crystal display and a microprocessor for driving the display. The components found on the LCD PCB are as follows:

- 1) Tone generator - Generates a 2KHz signal used for beep tones.

- 2) CPU circuit - The CPU controls the characters on the LCD. This circuit includes a 4 bit microprocessor, a 2K ROM, a .5K RAM, and an LCD driver and timer.
- 3) LCD connector - Connects the LCD PCB to the TEL PCB.
- 4) Card check circuit - This circuit confirms to the CPU on the TEL PCB that an LCD is connected.
- 5) Data path protector - Provides protection to the CPU on the LCD PCB.
- 6) Power circuit - This is a 5VDC power input circuit.

**12.12 H/F PCB** - This is the board which provides the speakerphone for use on CO lines. Components found on this PCB are:

- 1) Receiving level amp & rectifier - This circuit is used to amplify and rectify the sounds received from the CO line.
- 2) Transmission level amp & rectifier - Amplifies and rectifies signals from the microphone while reducing background noise.
- 3) Comparative circuit - Compares the transmit level with the receive level and sends switching instructions to the voice switch control circuit.
- 4) Voice switching circuit - This circuit switches off reception during transmission.
- 5) Transmission path circuit - Amplifies the transmission level and switches it off during reception.
- 6) Noise level control - This circuit is activated manually to reduce the background noise during transmission.
- 7) Voice switch control circuit - Controls the switching of transmission and reception based on information from the comparative circuit.
- 8) Power circuit - This is a power input circuit which provides 5VDC and 10VDC to the H/F PCB.

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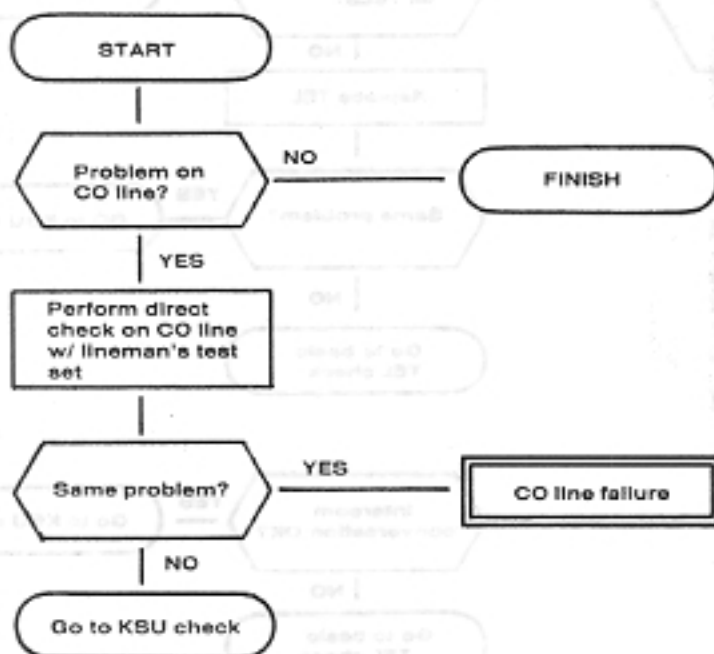
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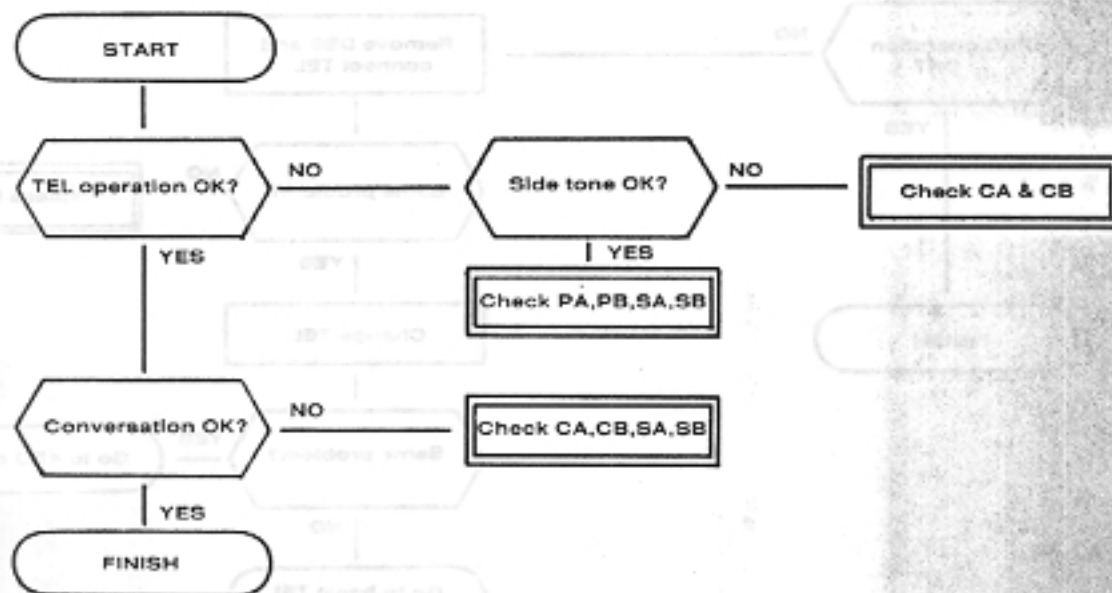
## 13. TROUBLE SHOOTING

13.01 The following flow charts are included to assist in the identification and isolation of faults in the system, telephone, and individual printed circuit boards.

### 13.02 CO/PBX LINE CHECK

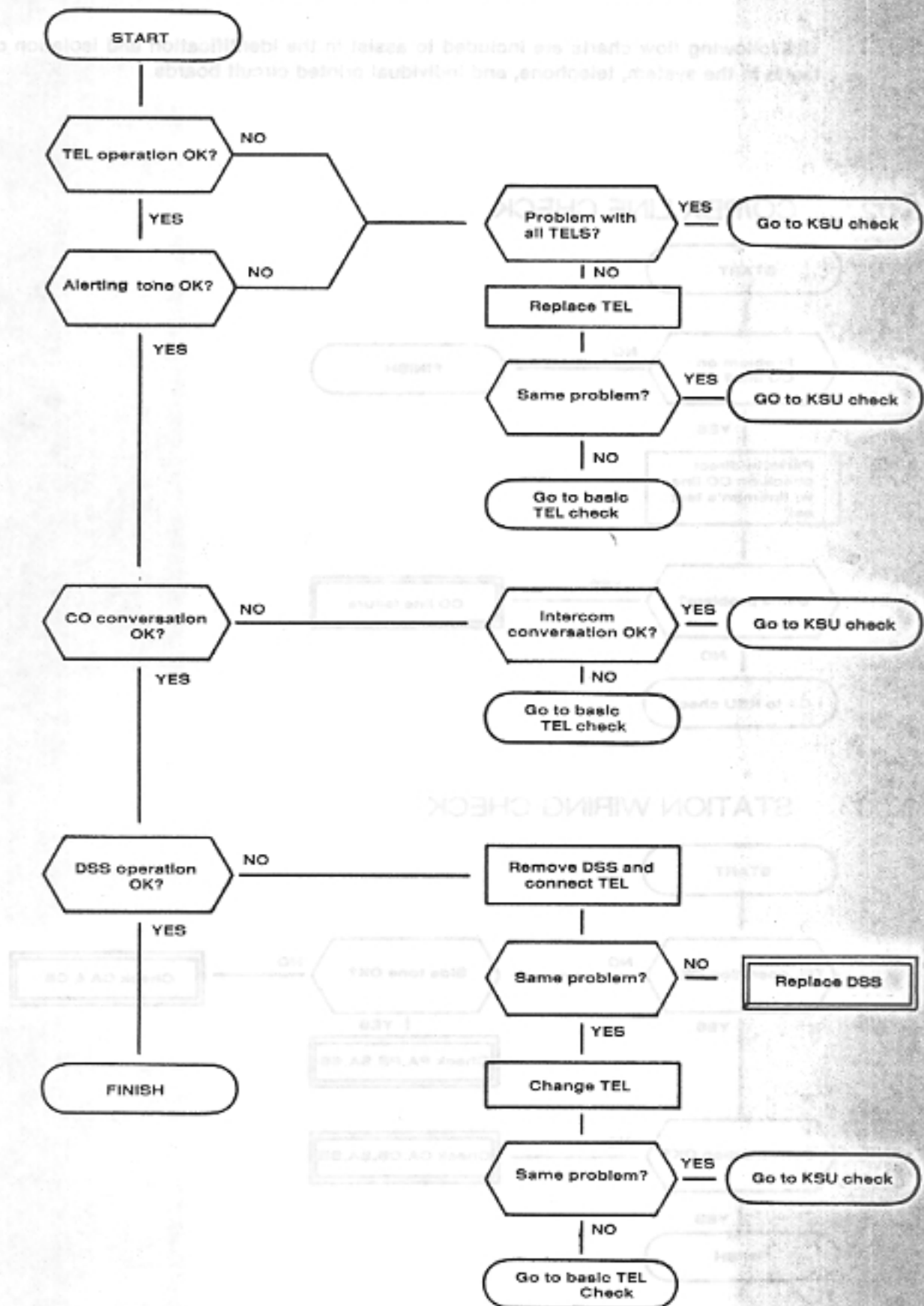


### 13.03 STATION WIRING CHECK

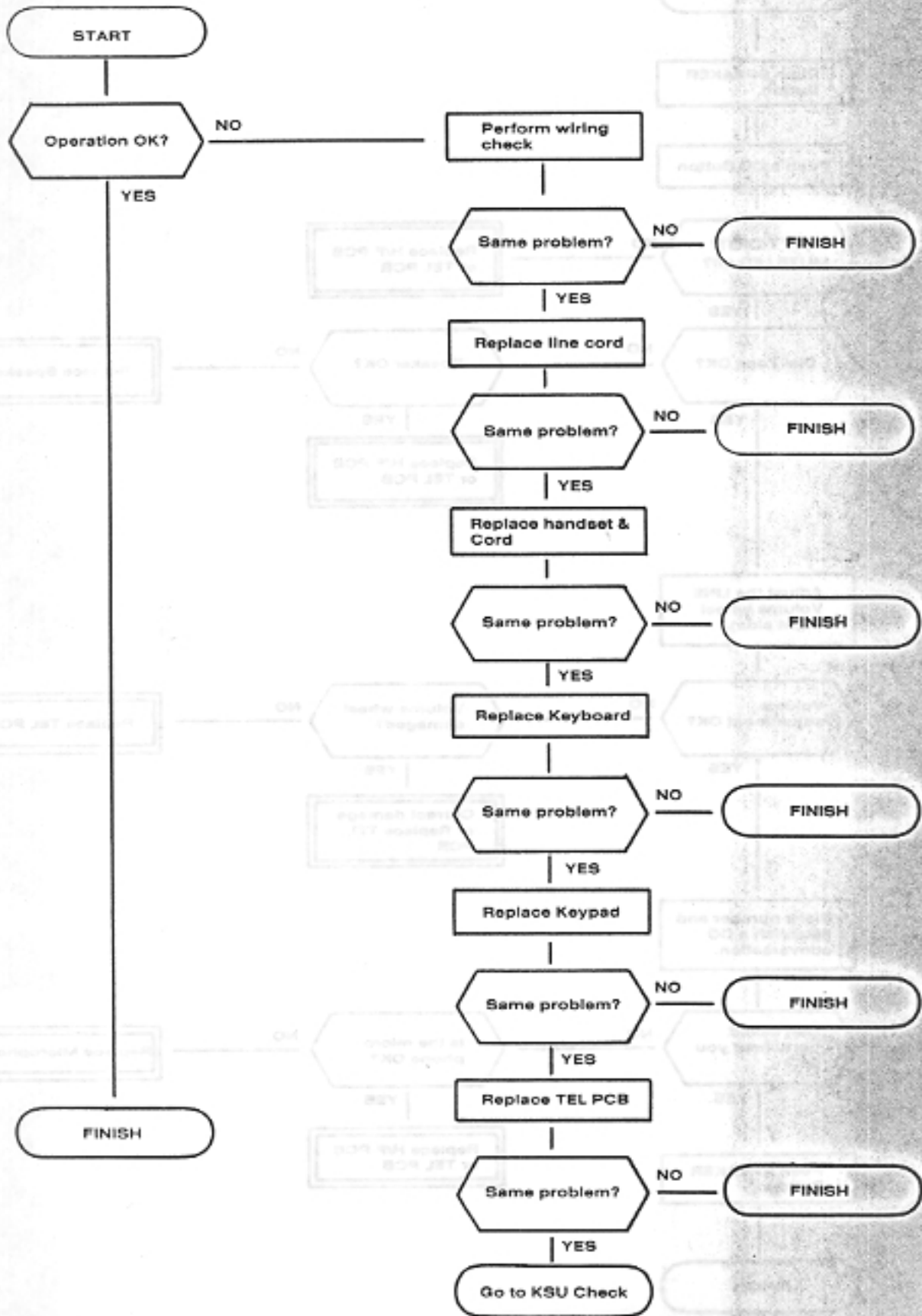


13.04

GENERAL OPERATION CHECK

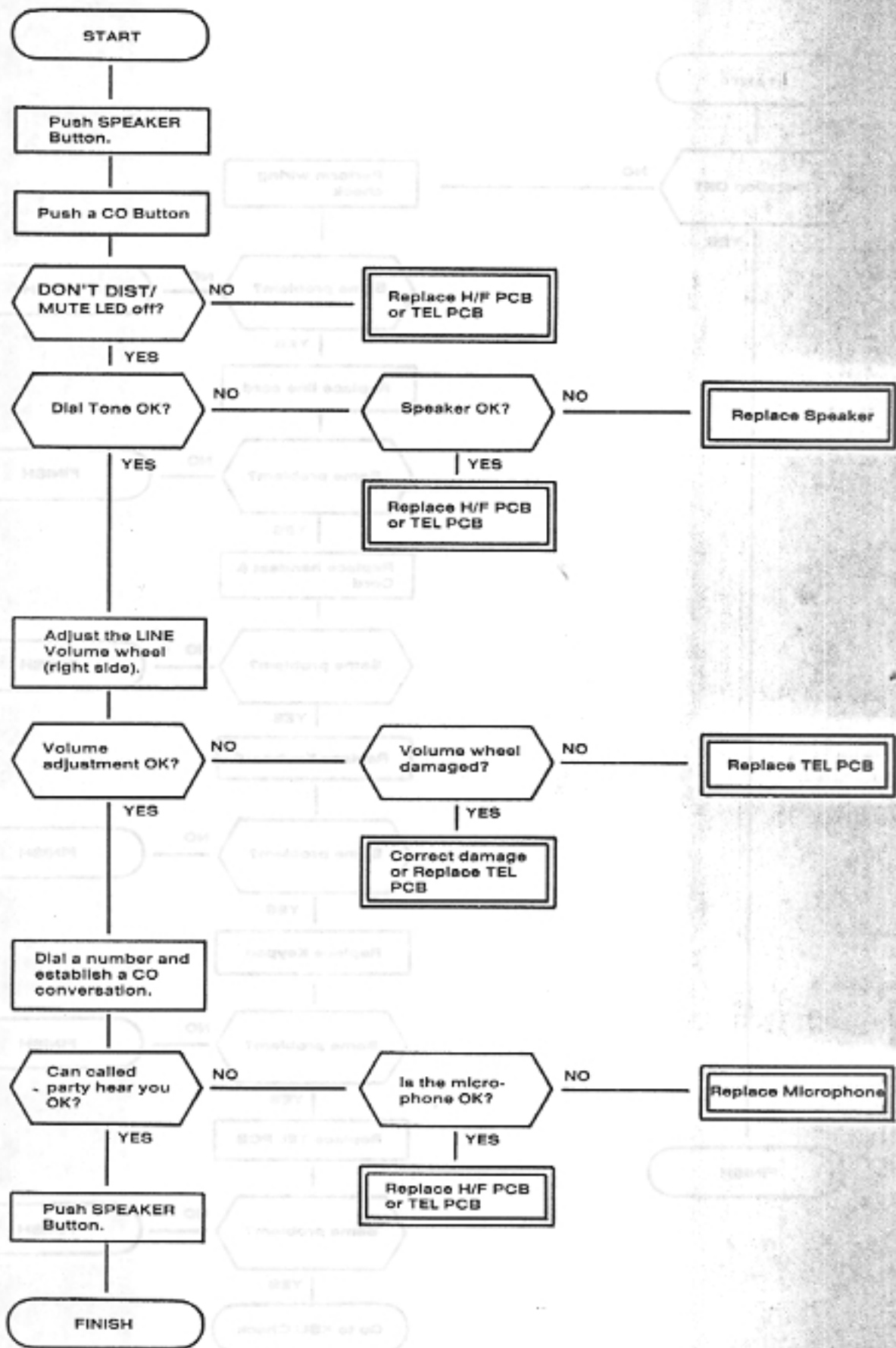


# 13.05 BASIC TELEPHONE CHECK

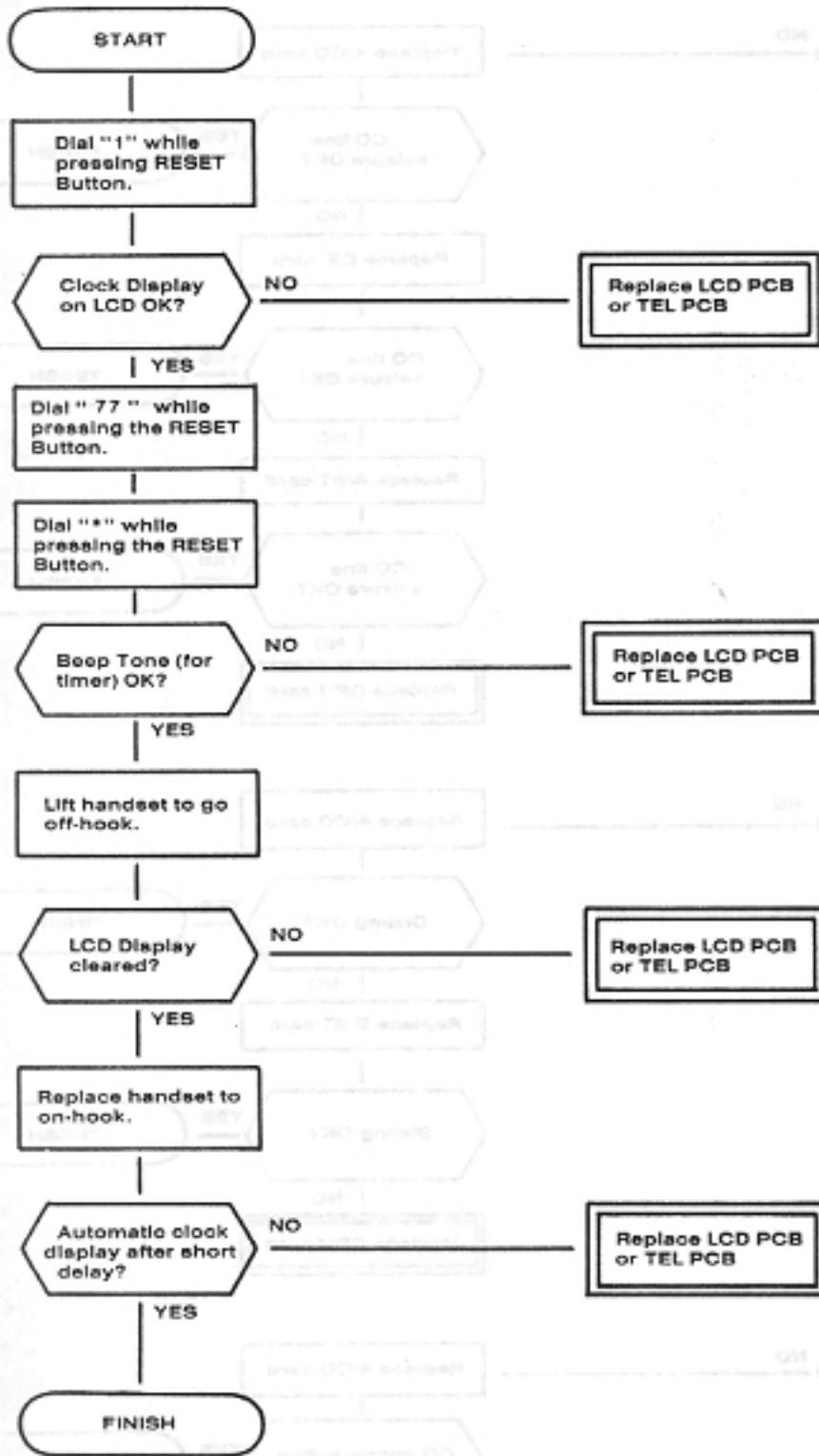




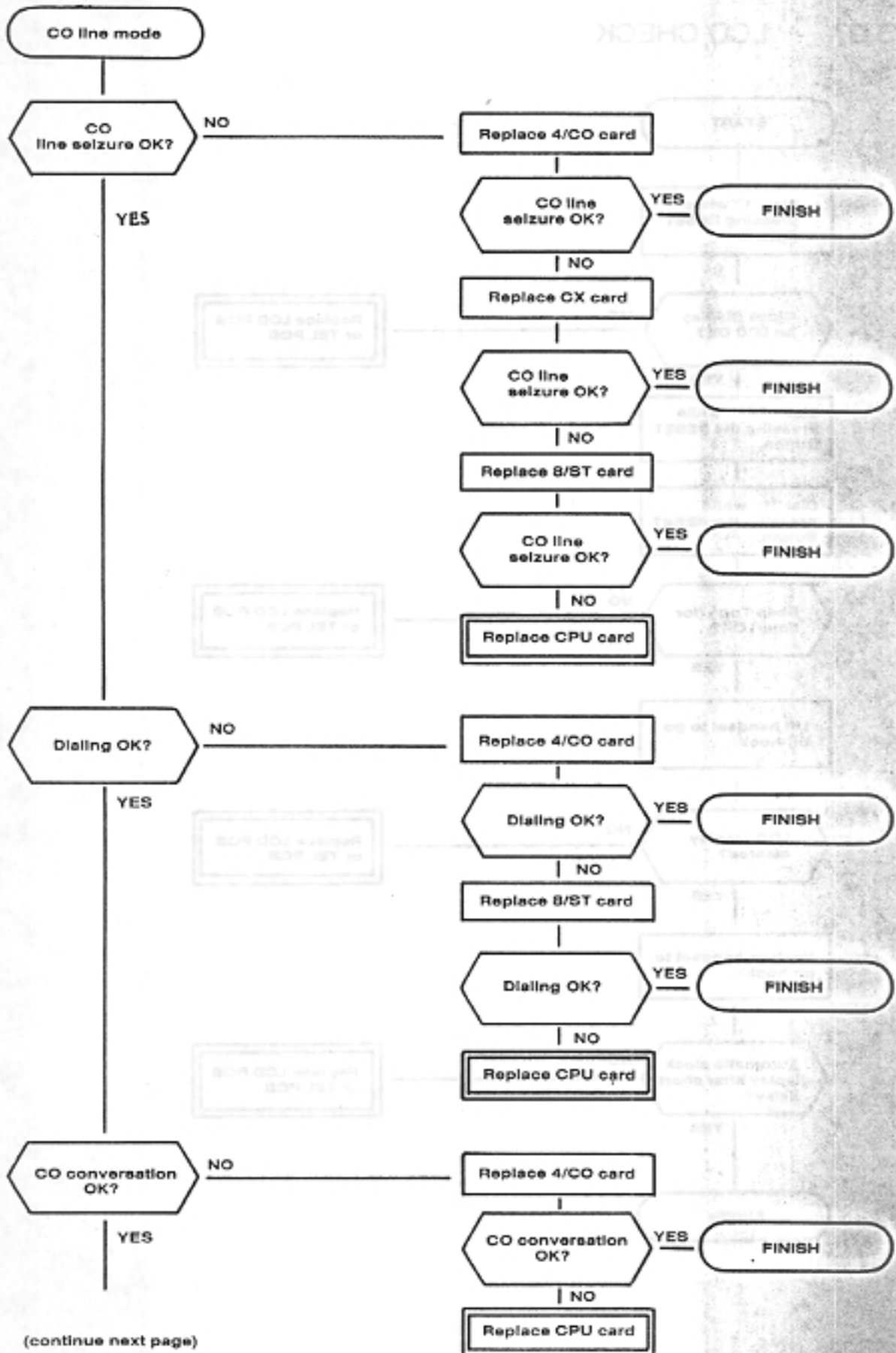
# 13.06 HANDSFREE CHECK



# 13.07 LCD CHECK

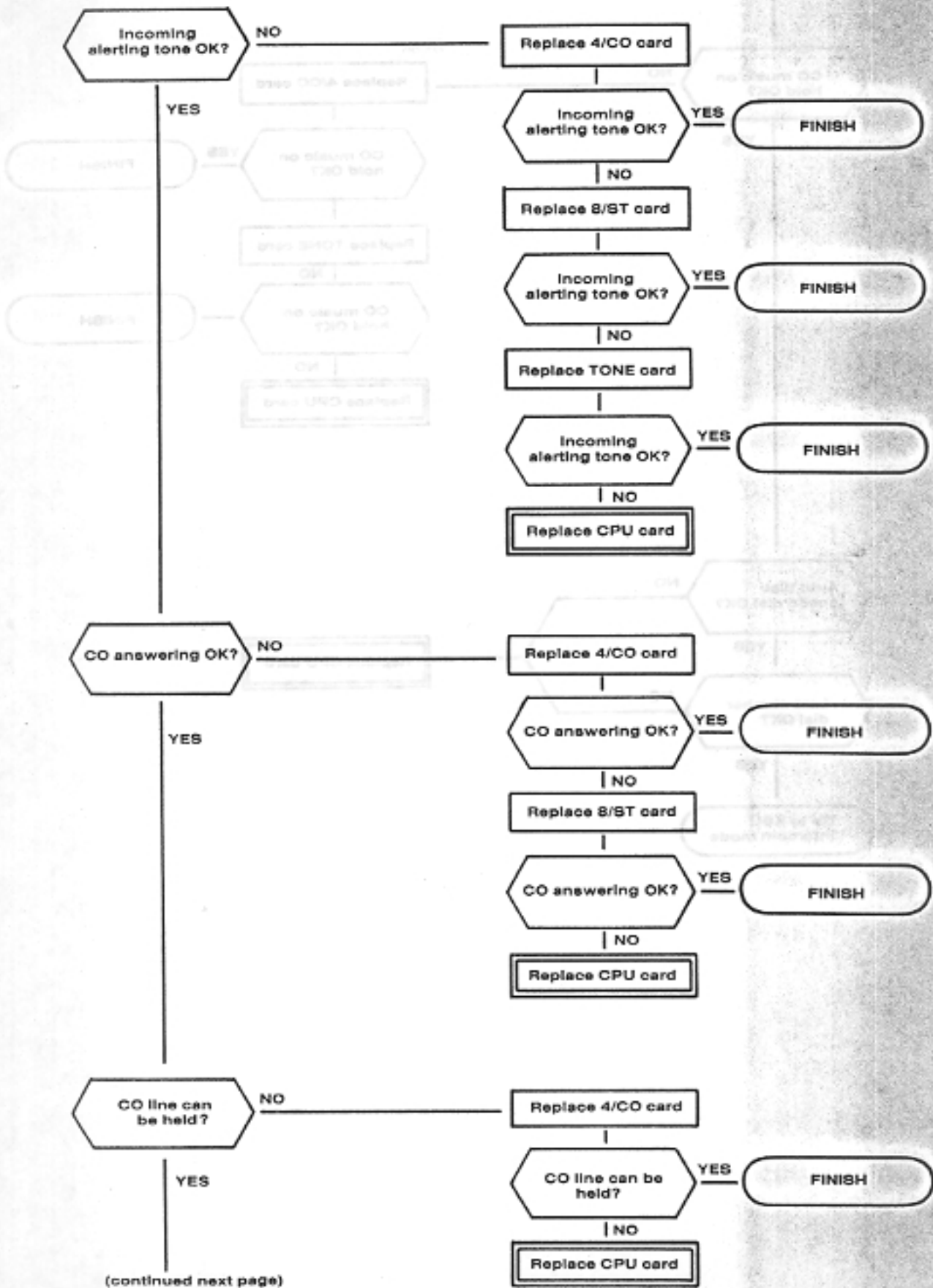


# 13.08 KSU CHECK-CO LINE MODE



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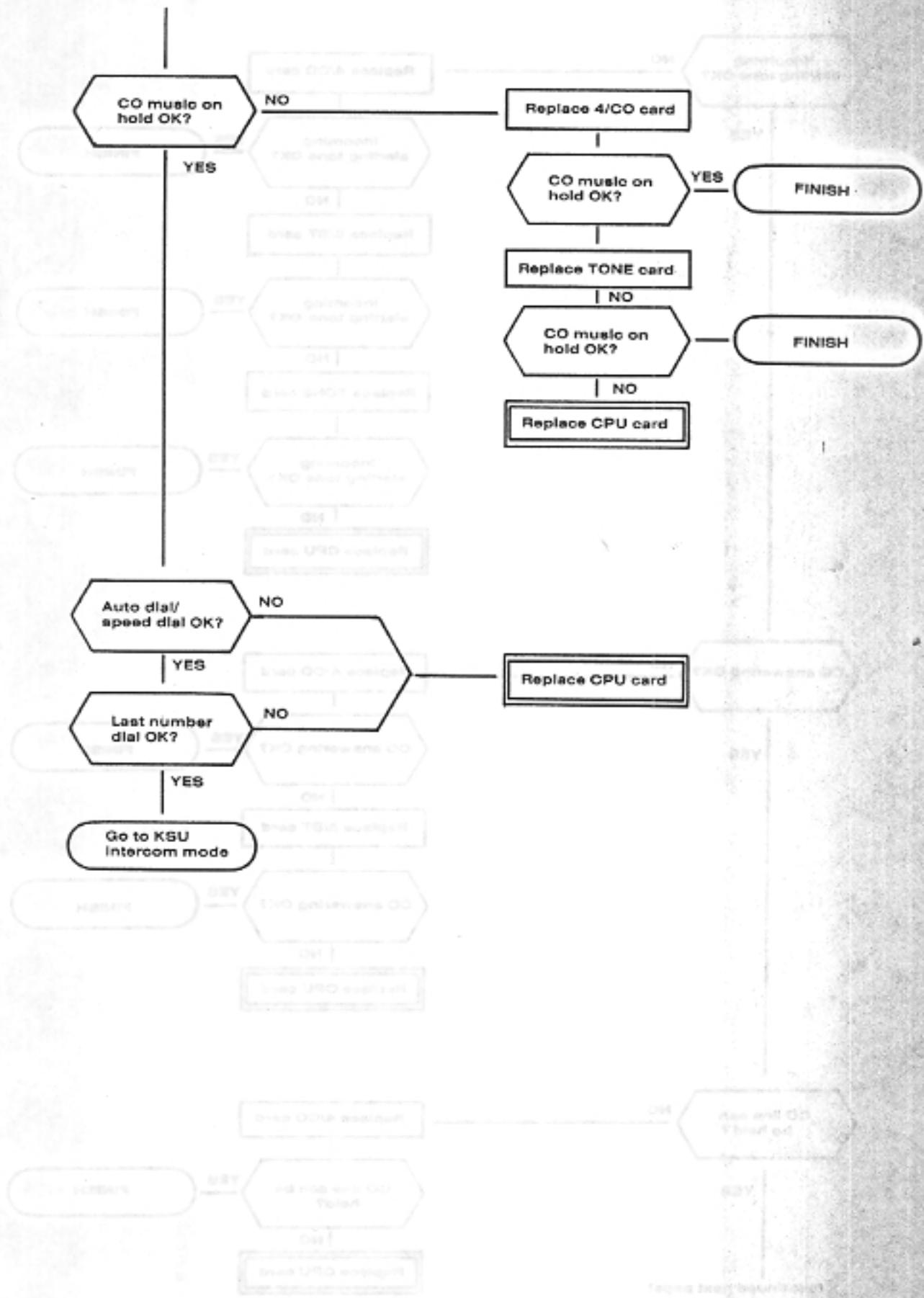
# KSU CHECK-CO LINE MODE (continued)



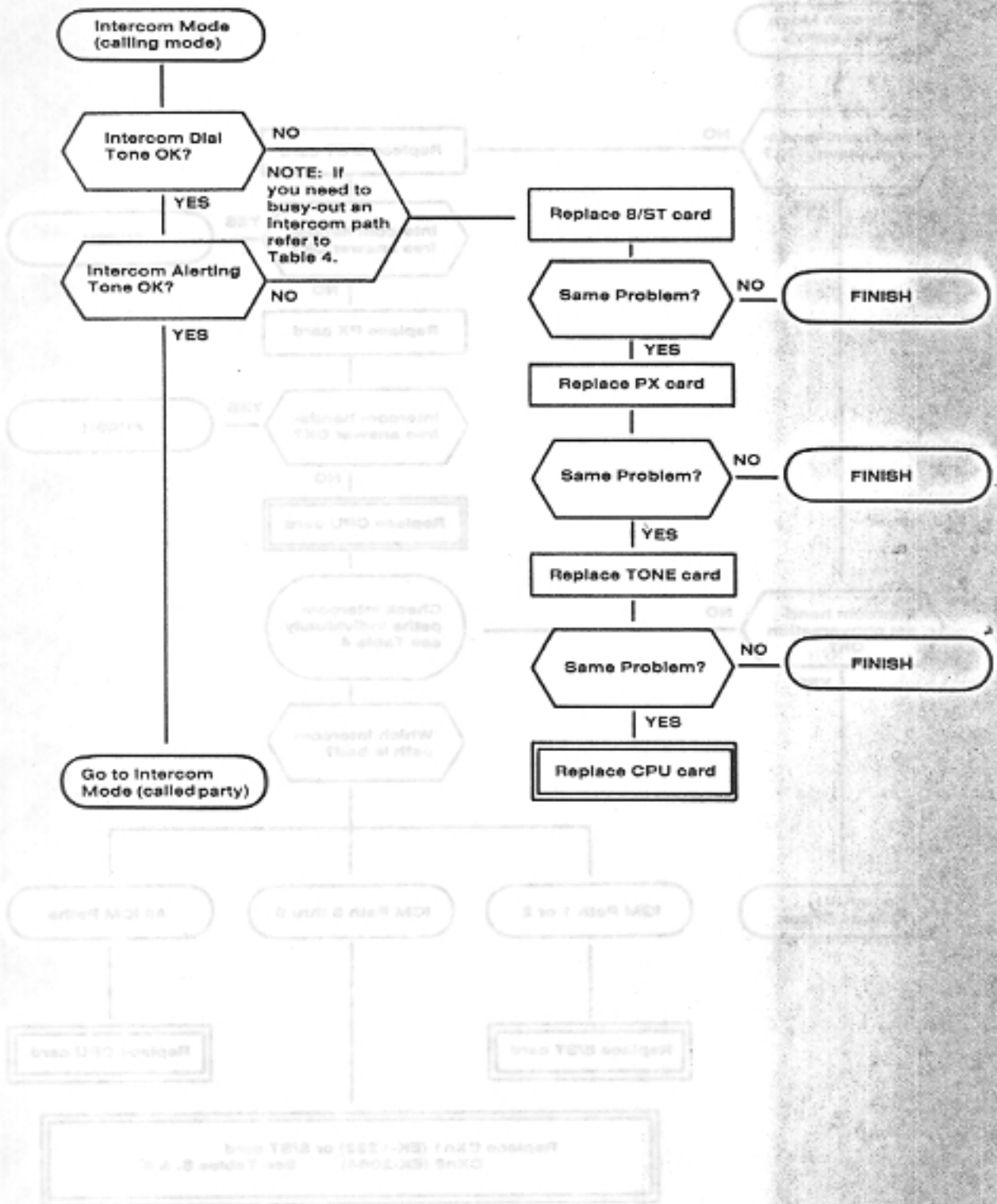
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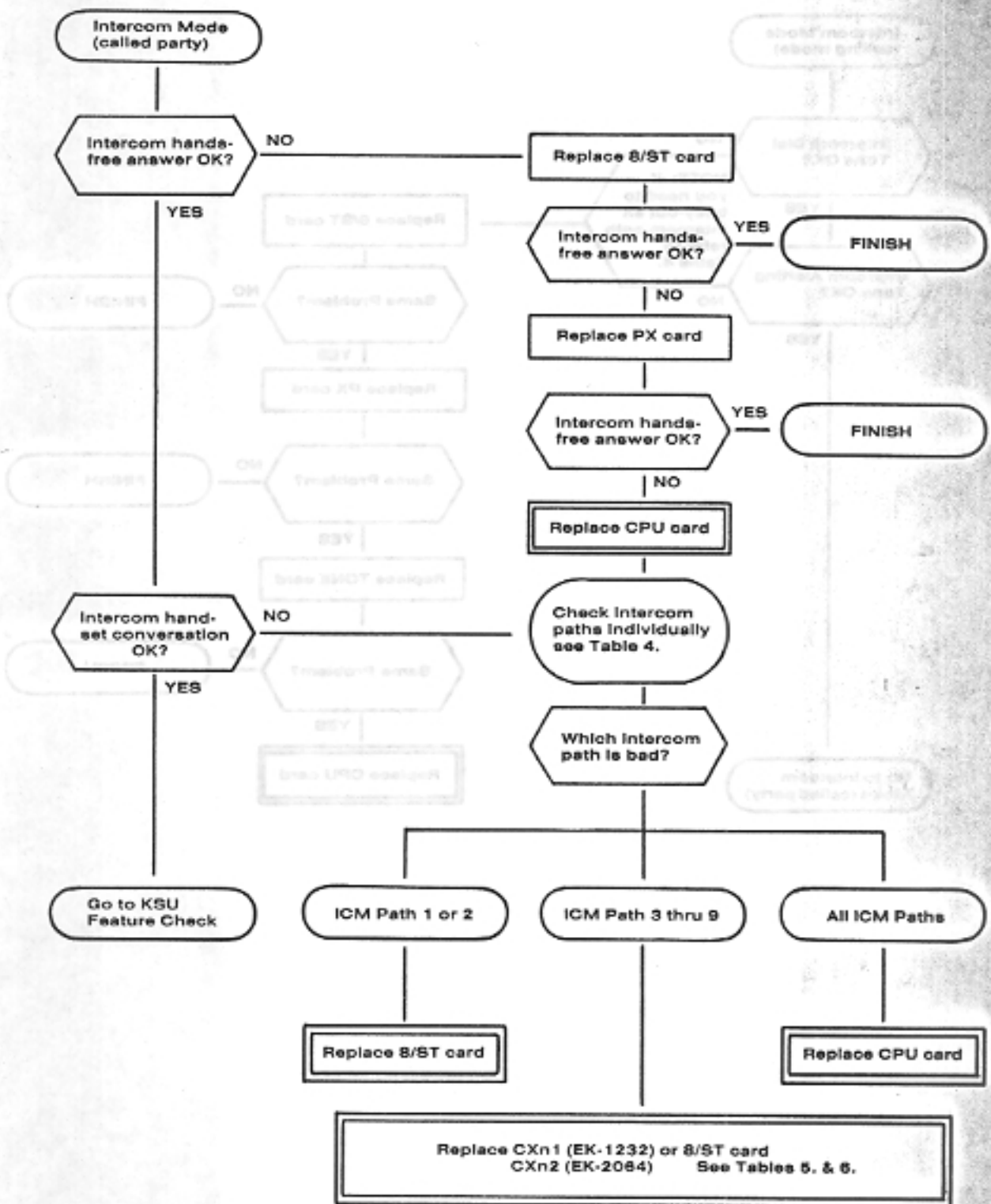
# KSU - CO LINE MODE (continued)



# 13.09 KSU CHECK - INTERCOM MODE (calling party)



# 13.10 KSU CHECK - INTERCOM MODE (called party)



**TABLE 4.**

Switches on the TONE PCB are used to busy-out individual intercom paths for fault isolation. Check each intercom path sequentially by busying-out all others. Establish an intercom call to be sure that intercom dial tone, alerting tone, and handset conversation function normally.

SWITCH BANK	SWITCH #	INTERCOM PATH
DSW0	3 ON	PATH #1 BUSY
DSW0	4 ON	PATH #2 BUSY
DSW0	6 ON	PATH #3 BUSY
DSW0	7 ON	PATH #4 BUSY
DSW0	8 ON	PATH #5 BUSY
DSW1	1 ON	PATH #6 BUSY
DSW1	2 ON	PATH #7 BUSY
DSW1	3 ON	PATH #8 BUSY
DSW1	4 ON	PATH #9 BUSY

**TABLE 5.**

EK-1232 - Relationship of CX PCBs to intercom paths, and CO/PBX lines.

PATH	STATION 1-16	STATION 17-32
CO 1-8	CX00	CX10
CO 9-12	CX01	CX11
ICM 3-5	CX01	CX11

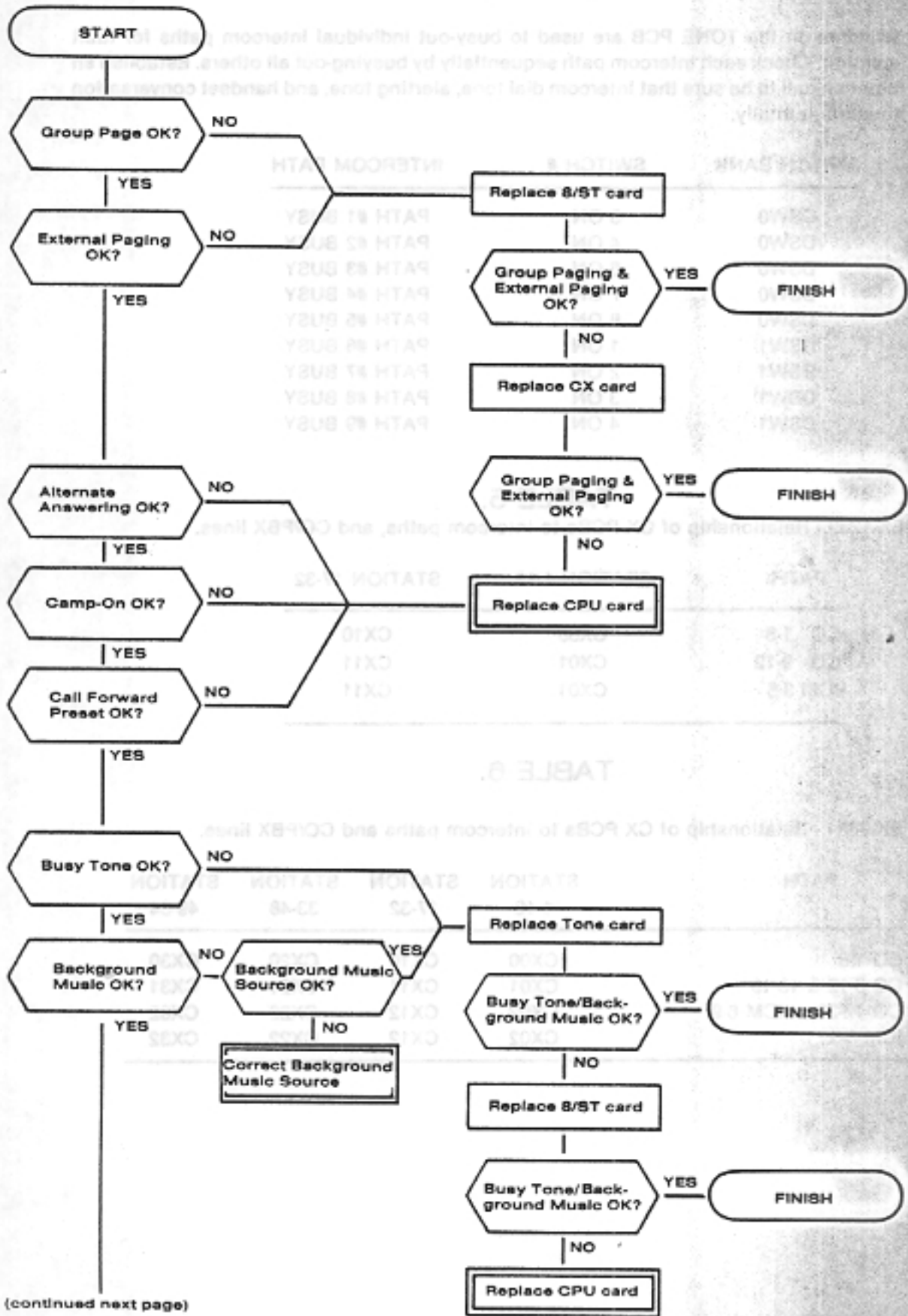
**TABLE 6.**

EK-2064 - Relationship of CX PCBs to intercom paths and CO/PBX lines.

PATH	STATION 1-16	STATION 17-32	STATION 33-48	STATION 49-64
CO 1-8	CX00	CX10	CX20	CX30
CO 9-12 & 13-16	CX01	CX11	CX21	CX31
CO 17-20 or ICM 6-9	CX02	CX12	CX22	CX32
ICM 3-5	CX02	CX12	CX22	CX32

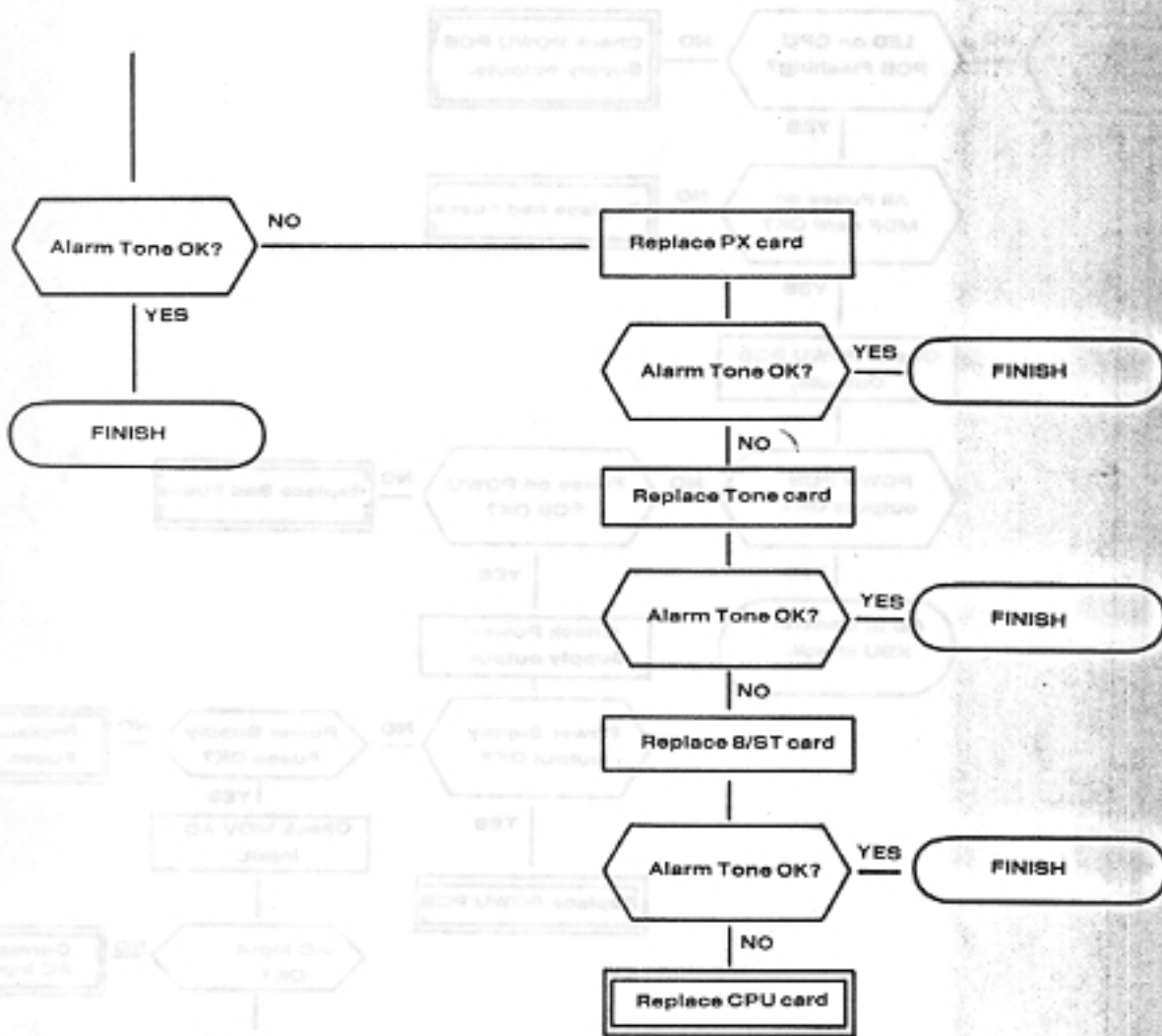


# 13.11 KSU CHECK - FEATURE MODE

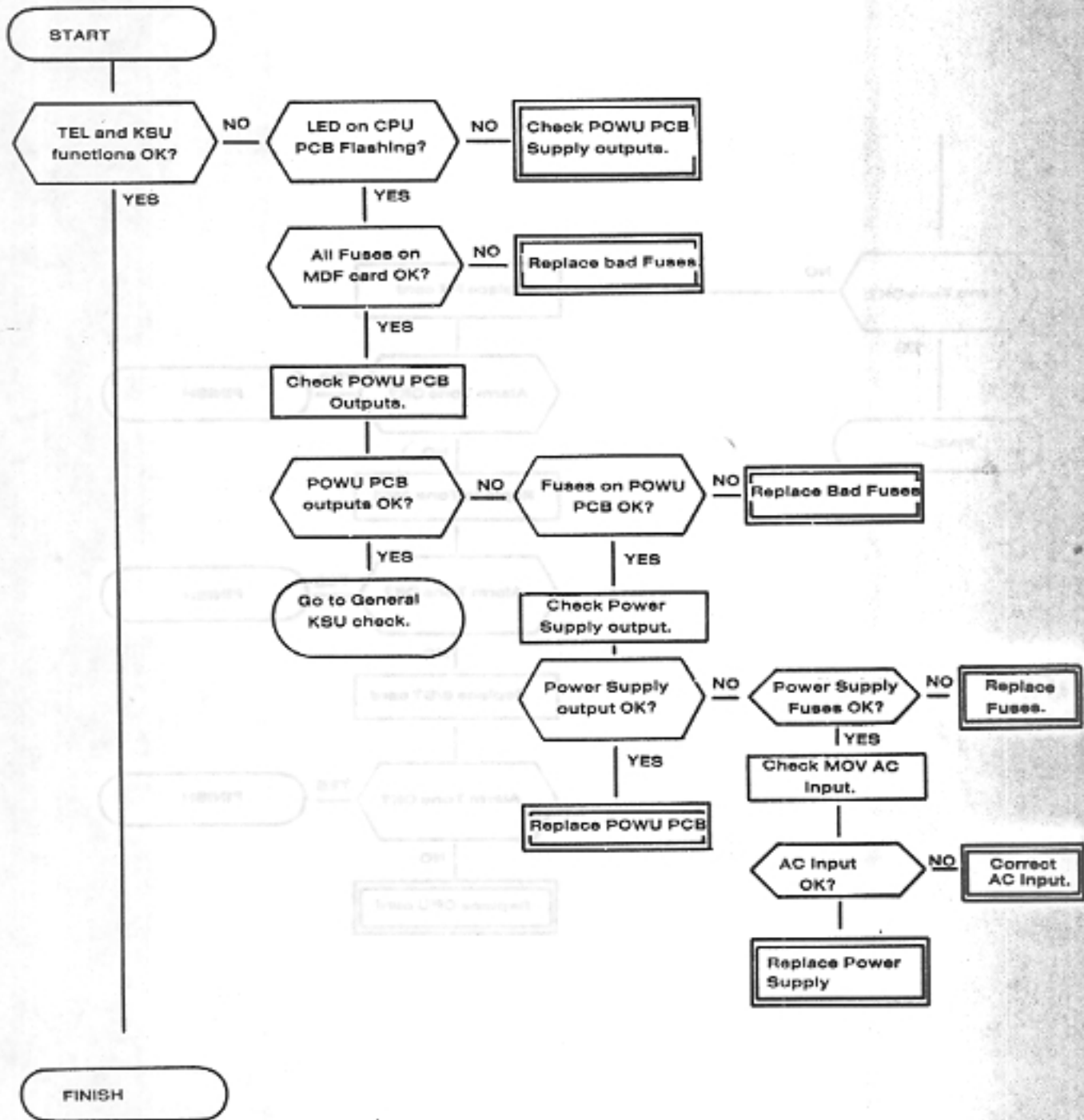


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# KSU CHECK - FEATURE MODE (continued)



# 13.12 POWER CHECK



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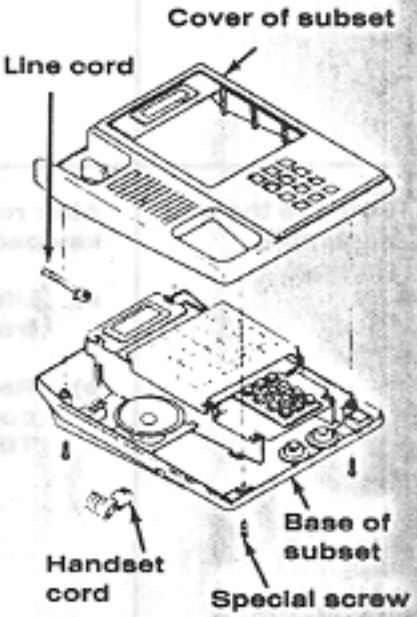
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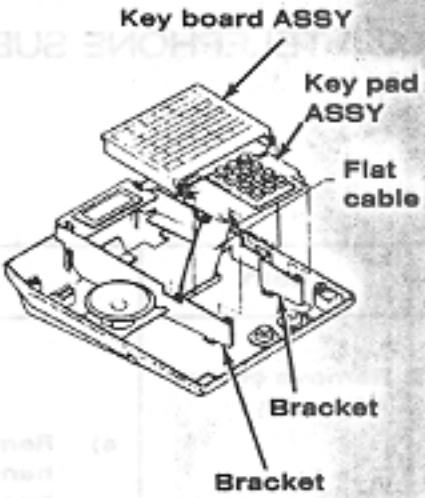
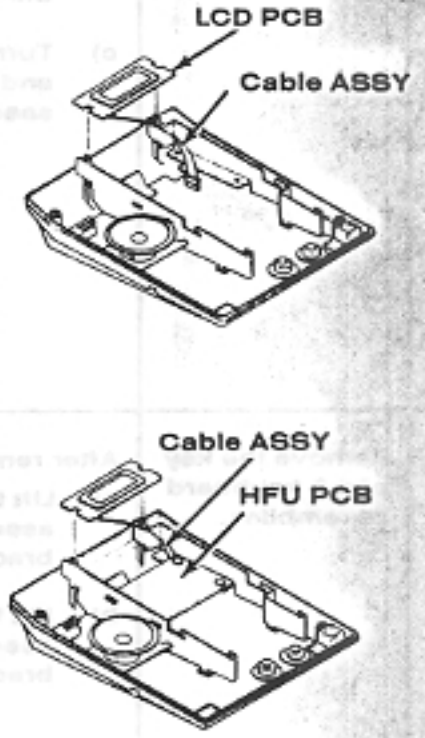
14-1	COMPONENT DISASSEMBLY
14-2	TELEPHONE SUBSET
14-3	DSS CONSOLE
14-4	KEY SERVICE UNIT (KSU)

## 14. COMPONENT DISASSEMBLY

14.01 The following diagrams are provided to assist in the repair and replacement of components within the telephone subset, the DSS console and the KSU itself. Reverse the procedures for reassembly of the components.

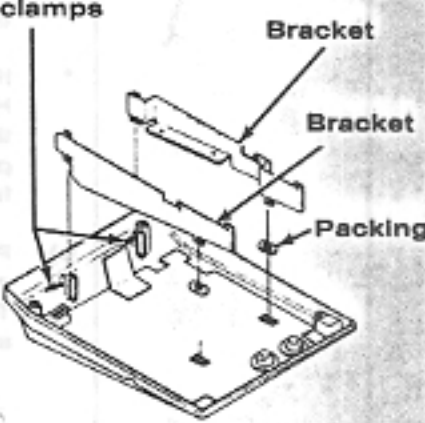
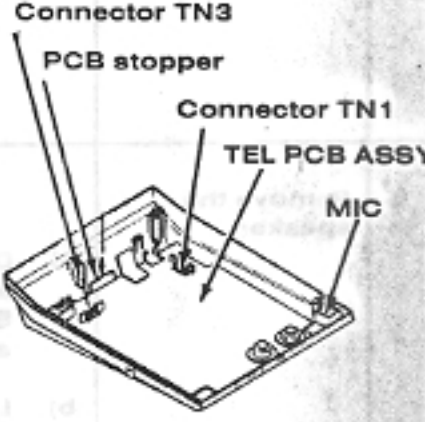
### 14.02 TELEPHONE SUBSET

No.	Item	Procedure	Figures
1	Remove cover Assembly.	<ul style="list-style-type: none"><li>a) Remove line cord and handset cord from the base of the subset.</li><li>b) Turn the subset over and remove the 4 screws from the base.</li><li>c) Turn the subset upright and lift off the cover assembly.</li></ul>	 <p>The diagram illustrates the removal of the cover assembly. It shows two views: the top view where the cover is being lifted off the base, and the bottom view showing the internal components of the base. Labels include 'Cover of subset', 'Line cord', 'Handset cord', 'Base of subset', and 'Special screw'.</p>
2	Remove the key pad & keyboard assemblies.	<p>After removing the cover:</p> <ul style="list-style-type: none"><li>a) Lift the key pad assembly from the bracket.</li><li>b) Lift the keyboard assembly from the bracket.</li></ul>	

No.	Item	Procedure	Figures
		<p>c) Remove the flat cable from connector TN4 on the TEL PCB assembly.</p> <p>d) Remove the cable assembly from connector CN6 on the keyboard.</p>	
3	Remove the LCD assembly. (option)	<p>After removing the cover, key pad &amp; keyboard:</p> <p>a) Lift the LCD assembly from the bracket</p> <p>b) Remove the cable from connector TN5 on the TEL PCB Assembly.</p>	

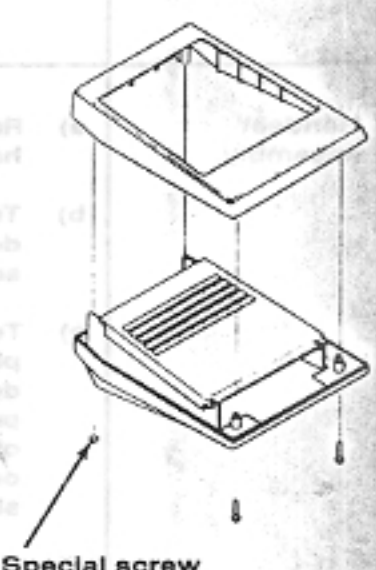
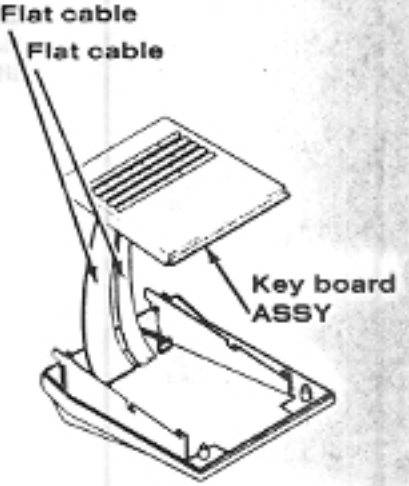
No.	Item	Procedure	Figures
4	Remove the HFU PCB assembly. (option)	<p>a) Pull out the two rivets from the right side bracket, and lift the HFU PCB assembly from the bracket.</p> <p>* If necessary, lift the HFU PCB assembly with the bracket, and then pull the two rivets from the bracket.</p> <p>b) Pull out the cable assembly from connector TN2 on the TEL PCB assembly.</p>	
5	Remove the speaker.	<p>a) Disconnect the cable assembly from connector SP on the TEL PCB assembly.</p> <p>b) Lift off the speaker bracket and disengage it from the left keyboard bracket.</p>	


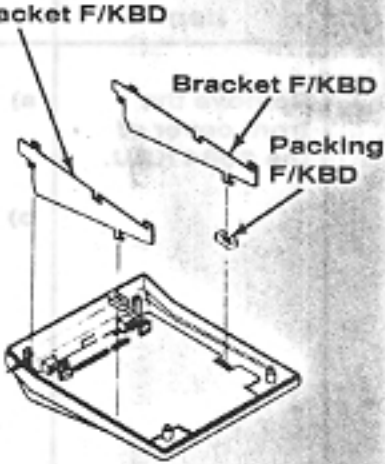

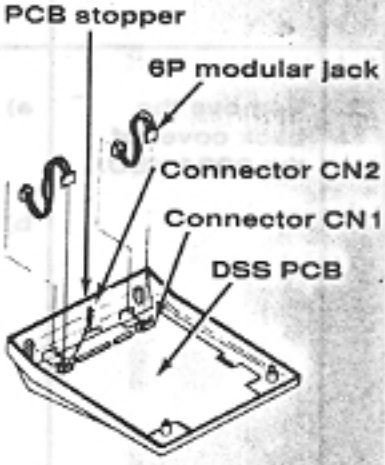


No.	Item	Procedure	Figures
		<p>c) Pull the speaker free from the rubber cushion and the cushion free from the bracket.</p>	
6	<p>Remove keyboard brackets.</p>	<p>a) Pull back the plastic clamp and lift the bracket free from the clamp.</p> <p>b) Push the bracket toward the back of the base and lift.</p>	
7	<p>Remove TEL PCB assembly.</p>	<p>a) Remove the cable for the microphone assembly from the connector MIC on the TEL PCB assembly.</p> <p>b) Disconnect the cable for the 4P modular jack from connector TN3 on the TEL PCB assembly.</p> <p>c) Remove the cable for the 6P modular jack from connector TN1 on the TEL PCB assembly.</p>	

NO.	Item	Procedure	Figures
		<p>d) Push the TEL PCB ASSY forward slightly while pushing down the PCB stopper, and lift off the PCB ASSY 4CA.</p>	
<p>B</p>	<p>Handset assembly.</p>	<p>a) Remove the modular handset cord.</p> <p>b) Turn the handset upside down and remove the two screws.</p> <p>c) To remove the cover, place the handset face down on a flat surface, press down on the middle of the cover and lift up on the short edge as shown.</p> <p>d) Remove the transmitter and receiver brackets by using a small flat screwdriver to carefully pry the bracket from its seat. The rest of the handset components will lift out easily.</p>	


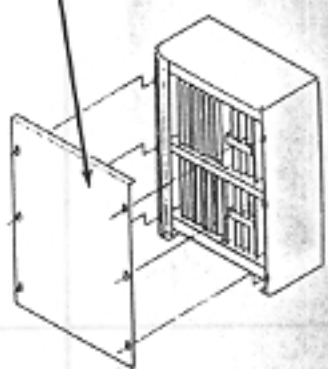

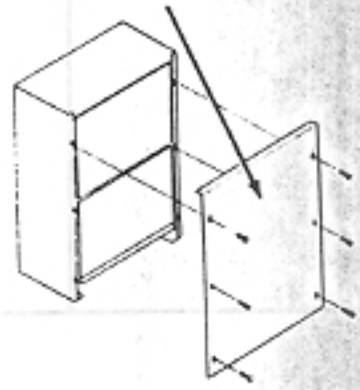
14.03 DSS CONSOLE

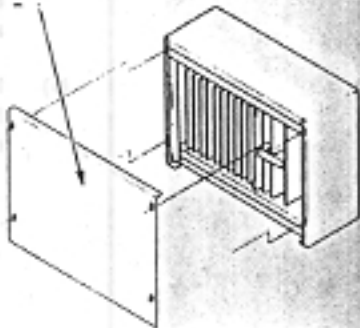
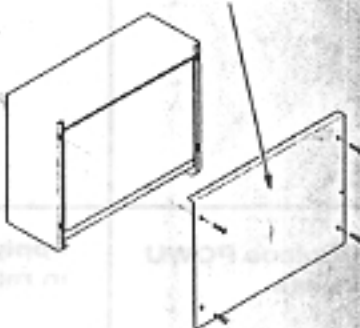
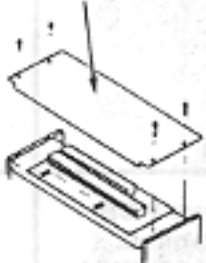
No.	Item	Procedure	Figures
1	Remove the cover assembly.	<p>a) Remove both line cords.</p> <p>b) Turn the console over and remove the 4 screws.</p> <p>c) Turn the console upright and lift off the cover.</p>	 <p>Special screw</p>
2	Remove the key-board assembly.	<p>a) Lift the keyboard assembly from the bracket.</p> <p>b) Disconnect the flat cables from connectors CN4 &amp; CN3 on the DSS PCB assembly.</p>	 <p>Flat cable</p> <p>Flat cable</p> <p>Key board ASSY</p>
3	Remove the key-board bracket.		


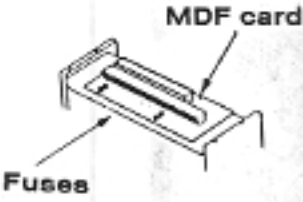
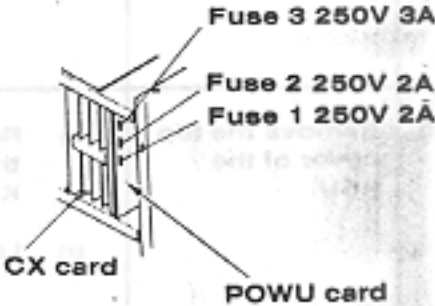

No.	Item	Procedure	Figures
		<p>a) Push the right bracket slightly forward and lift up.</p> <p>b) Release the clamp on the left bracket while lifting it up. Then pull the bracket forward and lift up.</p>	
4	<p>Remove the DSS PCB assembly.</p> 	<p>a) Disconnect the cables for the 6P modular jacks from connectors CN1 &amp; 2 on the DSS PCB assembly.</p> <p>b) Push the DSS PCB ASSY forward slightly while pushing down the PCB stopper, and lift off the DSS PCB ASSY.</p>	

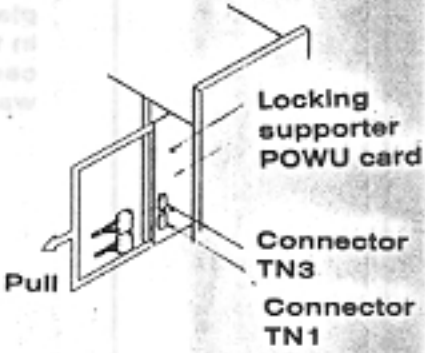
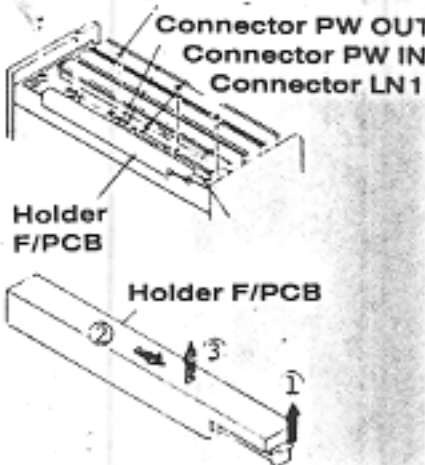


## 14.04 KEY SERVICE UNIT (KSU)


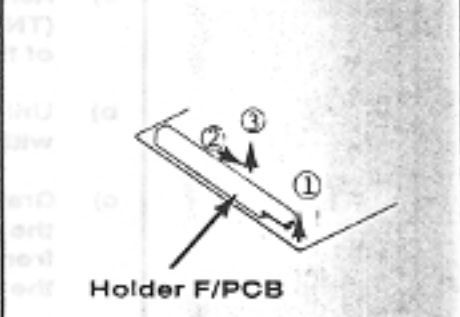

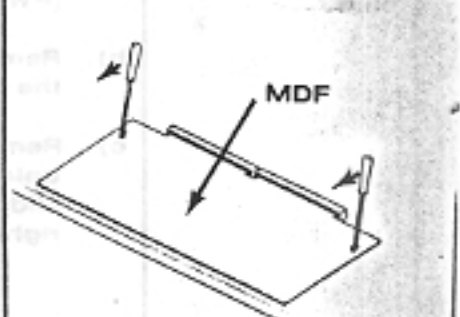
No.	Item	Procedure	Figures
1	<p>Remove the front cover of the 2064 KSU.</p> 	<p>a) Loosen 6 screws on the front cover of the 2064 KSU slightly.</p> <p>b) Lift up the front cover and pull it forward.</p>	<p>Front cover of 2064 KSU</p> 
2	<p>Remove the back cover of the 2064 KSU.</p> 	<p>a) Remove 6 screws on the back cover of the 2064 KSU.</p> <p>b) Pull off the cover.</p>	<p>Back cover of 2064 KSU</p> 

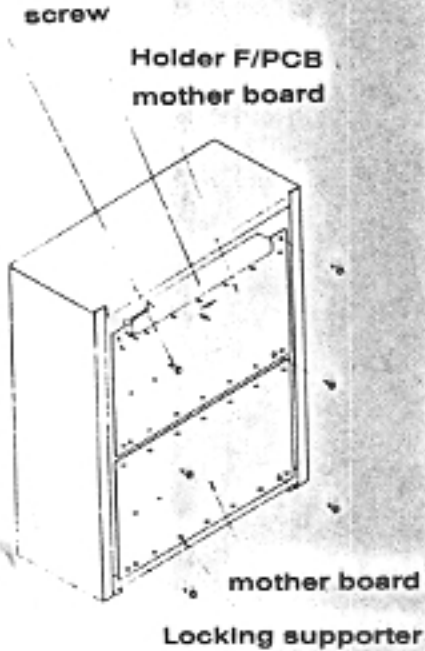
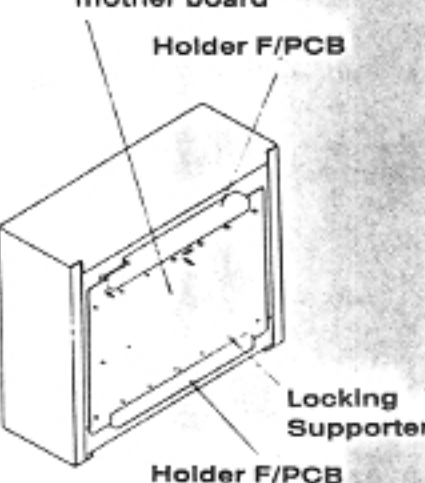
No.	Item	Procedure	Figures
3	Remove the front cover of the 1232 KSU.	(Same as No. 1, only 4 screws.)	<p data-bbox="1019 285 1227 338">Front cover of 1232 KSU</p> 
4	Remove the back cover of the 1232 KSU.	(Same as No.2, only 4 screws.)	<p data-bbox="1146 768 1344 821">Back cover of 1232 KSU</p> 
5	Remove the top cover of the KSU.	<p data-bbox="537 1230 951 1304">a) Remove the 4 screws on the top cover of the KSU.</p> <p data-bbox="537 1335 837 1367">b) Lift off the cover.</p>	<p data-bbox="1138 1220 1325 1272">Top cover of KSU</p> 
6	Replace MDF fuses.	As mentioned in Item 5, remove the top cover of the KSU.	

No.	Item	Procedure	Figures
		<p>a) If a fuse is blown, check for the cause and correct before replacing.</p> <p>b) Be sure to replace with fuses of the same rating. (250V 1A)</p>	
7	Replace POWU Fuses.	apply the same cautions as in replacing MDF fuses.	
8	Remove PCB assemblies. (except POWU, MDF & MB)	a) Pull the circuit board ejectors forward to disengage each card from the connector on the mother board.	 <p>Circuit board ejector</p>

No	Item	Procedure	Figures
9	Remove POWU card.	a) Remove the connectors (TN1 & 3) on the front of the POWU card. b) Unlock the supporter with pliers. c) Grasp the front of the card and pull it from the connector on the mother board.	
10	Remove the MDF card.	a) Remove all connectors. (PWOUT, PWIN, LN1, LN2) b) Remove the screws on the MDF card. c) Remove the holder by unlatching the clamp, sliding it to the right and lifting up.	



No.	Item	Procedure	Figures
		<p>d) Remove the MDF from the motherboard by placing screwdrivers in the holes on the card and pulling forward.</p>	
			

No.	Item	Procedure	Figures
11	Remove the mother board from the 2064 KSU.	<p>After removing the back cover of the KSU and all cards:</p> <ol style="list-style-type: none"> <li>Remove the screws on the mother board(s).</li> <li>Release the locking clip of the PCB holder (from inside the KSU) and slide the holder to the left.</li> <li>With pliers, carefully pinch the nylon pins to release them while gently pulling the mother board toward you.</li> <li>Remove connectors (TN1,2 &amp; 3) on the mother boards.</li> </ol>	 <p>screw</p> <p>Holder F/PCB mother board</p> <p>mother board</p> <p>Locking supporter</p>
12	Remove the mother board from the 1232 KSU.	<p>After removing the back cover of the KSU and all cards:</p> <ol style="list-style-type: none"> <li>Release the locking clip of the upper PCB holder (from inside the KSU) and slide the holder to the left.</li> <li>With pliers, carefully pinch the nylon pins to release them while gently pulling the mother board toward you. when all the pins have been released, lift the mother board free and remove it.</li> </ol>	 <p>mother board</p> <p>Holder F/PCB</p> <p>Holder F/PCB</p> <p>Locking Supporter</p>

**SECTION 15.  
CONTENTS**

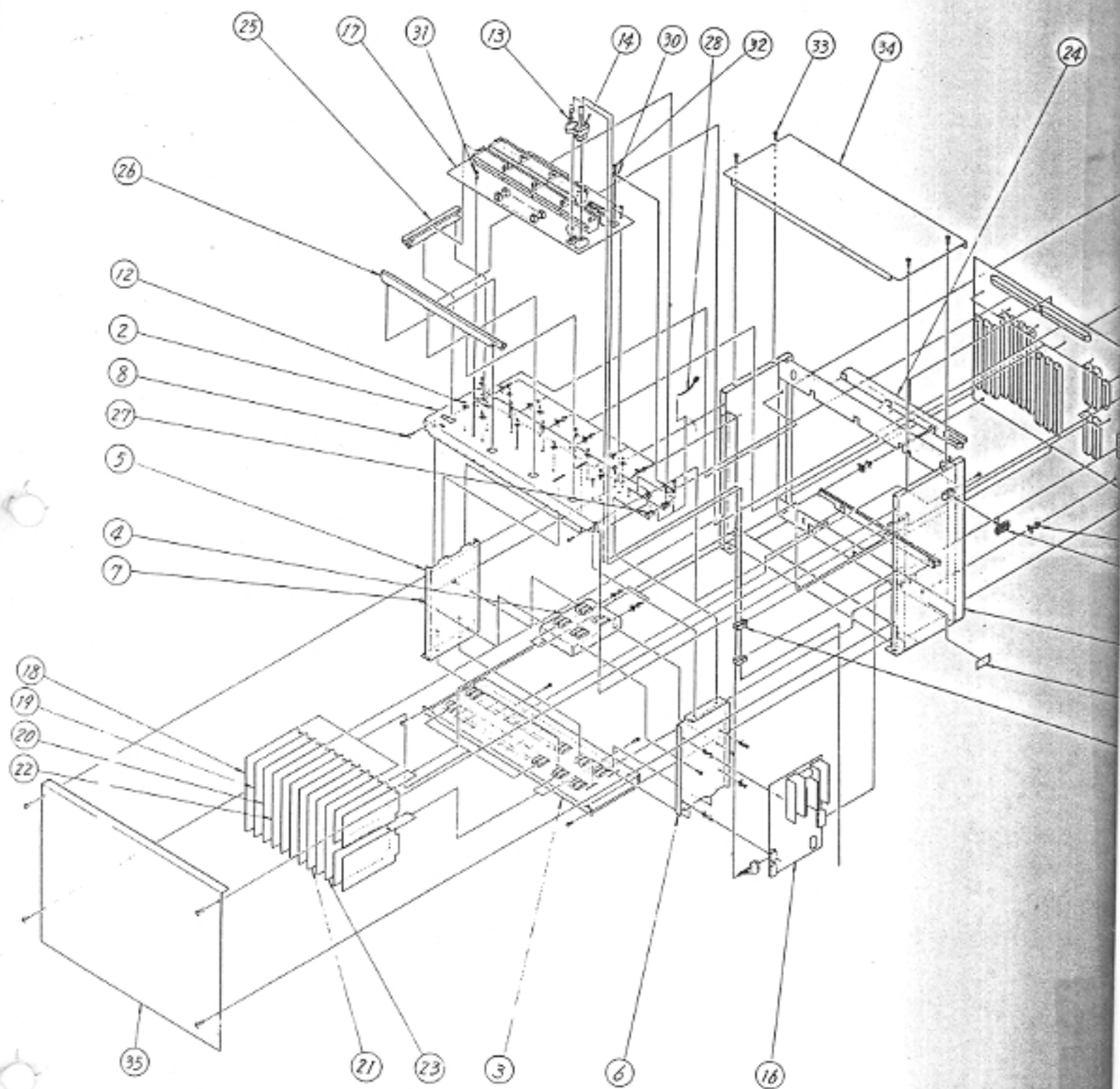
15.	<b>EXPLODED VIEWS.....</b>	<b>15-1</b>
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## 15. EXPLODED VIEWS

15.01 The following pages consist of exploded views of the EK-1232 and EK-2064 key service units along with the telephone subset, the telephone handset and the DSS console. This information is provided to assist in the identification of components for repair and replacement purposes.

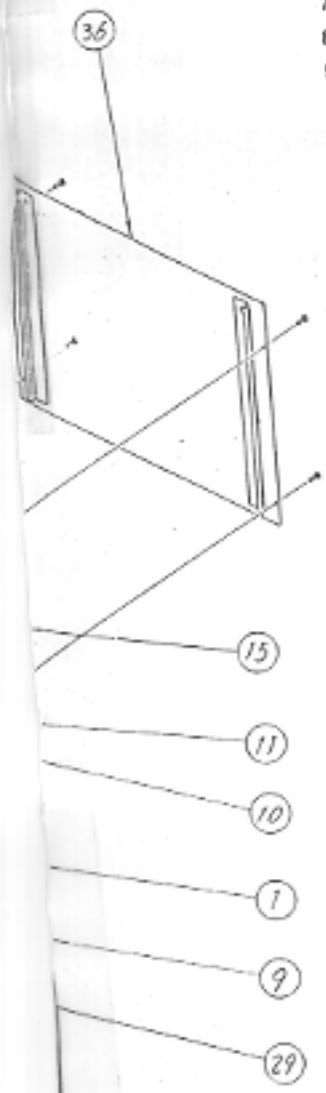


KANDA  
EK-1232  
Exploded view of KSU

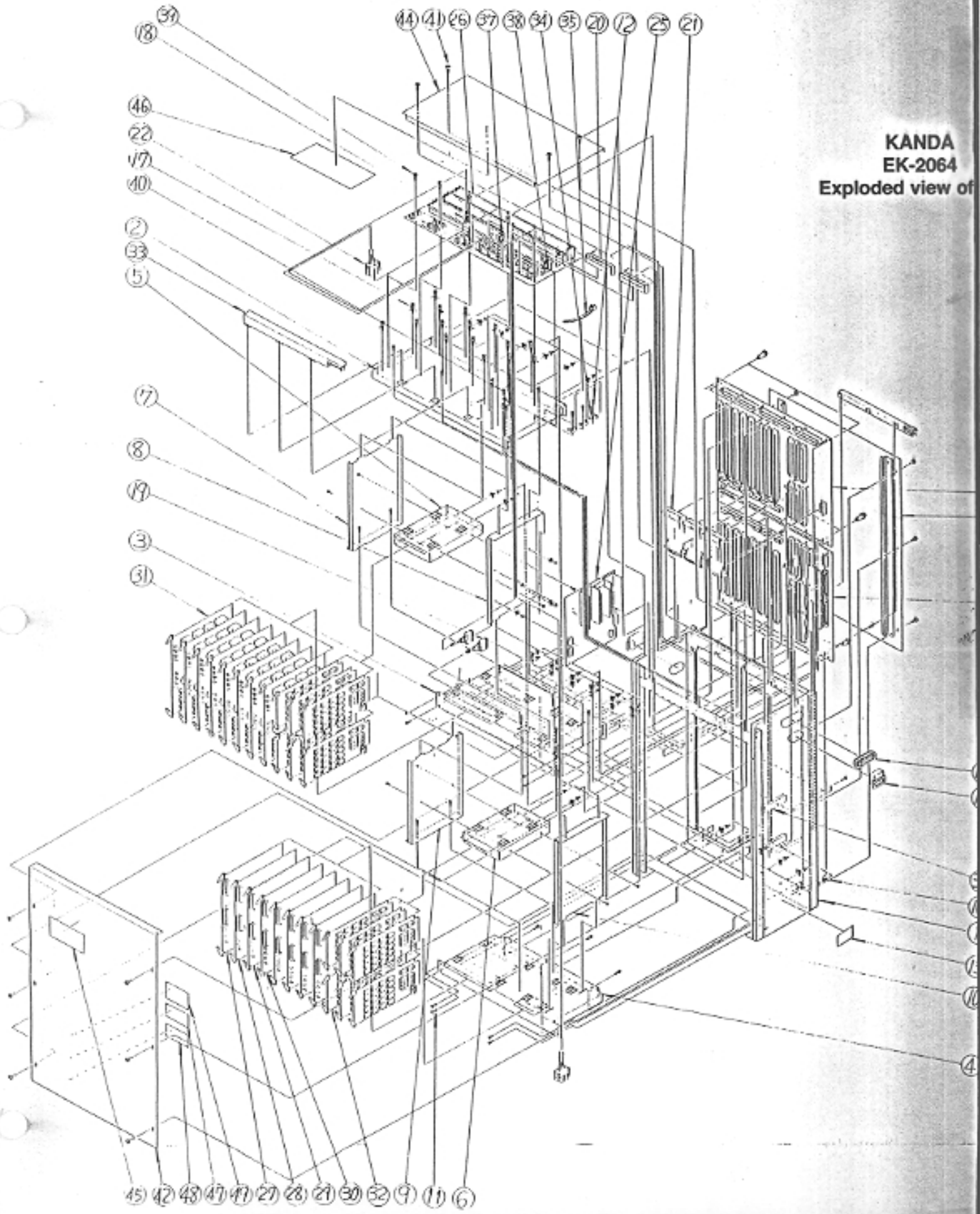


# EK-1232 KSU

NO.	DESCRIPTION	PART NUMBER	QTY	REMARKS
1	KSU BASE 4CB	2630530	1	
2	SHELF F/MDF CARDS 4CF	2630640	1	
3	SHELF F/8ST CARDS 4CG	2630650	1	
4	SHELF F/CX CARDS 4CH	2630660	1	
5	LEFT BRACKET 4CK	2630670	1	
6	RIGHT BRACKET 4CL	2630680	8	
7	TAP TIGHT SCREW	2972130	10	
8	TAP TIGHT SCREW	2972140	1	
9	CAUTION LABEL A	2430110	1	
10	BUSHING 4CA	2730240	12	
11	SUPPORTER F/PCB	2982360	16	
12	SUPPORTER F/PCB	2982370	1	
13	CABLE ASSY 4CH	2230490	1	
14	CABLE ASSY 4CI	2230500	1	
15	MB-4CA	5520510	1	
16	POWU PCB	5520520	1	
17	MDF PCB	5520670	1	(CPU-4CE)
18	CPU PCB	5520542	1	
19	TCNE PCB	5520561	1	
20	PX PCB	5520582	3	MAXIMUM
21	4/CO PCB	5211870	4	MAXIMUM
22	8/ST PCB	5211910	4	MAXIMUM
23	CX PCB	5211680	2	
24	HOLDER F/PCB 4CA	4310950	1	
25	HOLDER F/PCB 4CB	4310200	1	
26	HOLDER F/PCB 4CC	4310210	2	
27	CLAMP F/CABLE A	2982330	2	
28	BAND F/CABLE	2982340	2	
29	CLAMP F/CABLE	2982350	1	
30	EARTH WIRE ASSY B	2230270	2	
31	SCREW W/SPACER	2982420	1	
32	SCREW W/ SPRING WASHER	2913210	12	
33	BINDING SCREW	2950360	1	
34	TOP COVER OF KSU 4CC	2630400	1	
35	FRONT COVER F/1232 KSU	2630510	1	
36	BACK COVER F/1232 KSU	2630520	4	
	SCREW	2910730	2	
	WOOD SCREW	2963500	1	
	CONNECTOR F/POWER SUPPLY	3860210	9	250V 1A
	FUSE F/MDF CARD	2980720	2	250V 2A
	FUSE F/POWU PCB	2982430	1	250V 3A
	FUSE F/POWU PCB	2982440	1	



**KANDA**  
**EK-2064**  
Exploded view of

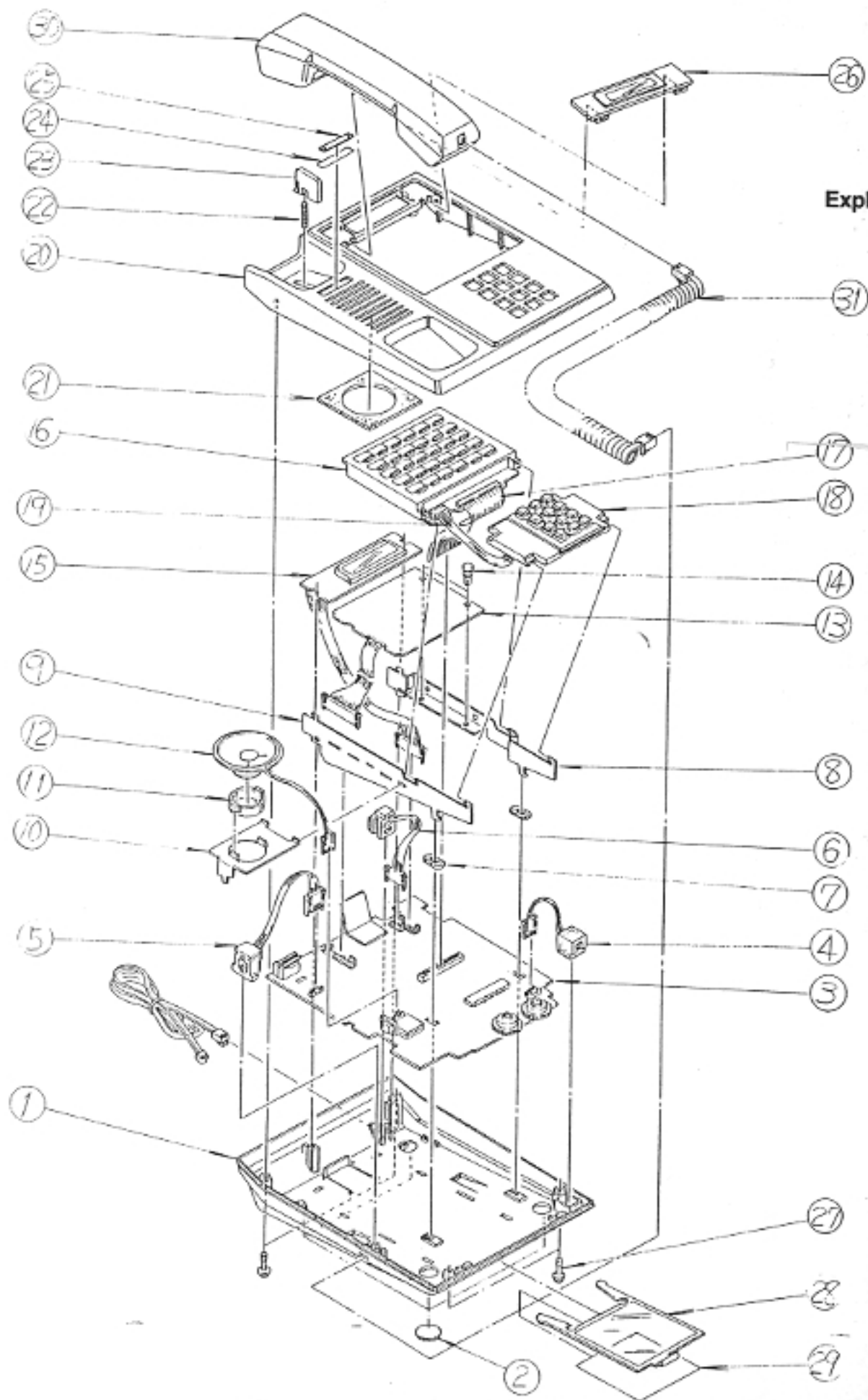


## EK-2064 KSU

NO.	DESCRIPTION	PART NUMBER	QTY	REMARKS
1	KSU BASE 4CA	2630410	1	
2	SHELF F/MDF CARD 4CA	2630420	1	
3	SHELF F/6ST CARDS 4CB	2630430	1	
4	SHELF F/4CO CARDS 4CC	2630440	1	
5	UPPER SHELF F/CX CARDS 4CD	2630450	1	
6	LOWER SHELF F/CX CARDS 4CE	2630460	1	
7	LEFT BRACKET 4CD	2630490	1	
8	RIGHT BRACKET 4CE	2630500	1	
9	LEFT BRACKET 4CF	2630470	1	
10	RIGHT BRACKET 4CG	2630480	1	
11	TAP TIGHT SCREW	2972130	38	
12	TAP TIGHT SCREW	2972140	3	
13	CAUTION LABEL A	2430110	1	
14	HANDLING RUBBER	2982310	2	
15	BUSHING 4CA	2730240	1	
16	SUPPORTER F/PCB	2982360	30	
17	SUPPORTER F/PCB	2982370	20	
18	CABLE ASSY 4CA	2230440	1	
19	CABLE ASSY 4CB	2230450	1	
20	CABLE ASSY 4CC	2230460	2	
21	CABLE ASSY 4CD	2230470	3	
22	CABLE ASSY 4CF	2230480	1	
23	MB-4CB	5520700	1	
24	MB-4CC	5520720	1	
25	POWU PCB	5520520	1	
26	MDF PCB	5520680	1	
27	CPU PCB	5520542	1	(CPU-4CE)
28	TONE PCB	5520561	1	
29	PX PCB	5520582	1	
30	4/CO PCB	5211870	5	MAXIMUM
31	8/ST PCB	5211910	8	MAXIMUM
32	CX PCB	5211880	12	MAXIMUM
33	HOLDER F/PCB 4CA	4310950	2	
34	CLAMP F/CABLE A	2982330	3	
35	BAND F/CABLE	2982340	3	
36	CLAMP F/CABLE B	2982320	2	
37	CLAMP F/CABLE	2982350	2	
38	EARTH WIRE ASSY B	2230270	1	
39	SCREW W/SPACER	2982420	11	
40	SCREW W/SPRING WASHER	2913210	1	
41	BINDING SCREW	2950360	16	
42	FRONT COVER F/2064 KSU 4CA	2630380	1	
43	BACK COVER F/2064 KSU 4CB	2630390	1	
44	TOP COVER F/2064 KSU 4CC	2630400	1	
	SCREW	2910730	4	
	WOOD SCREW	2963500	2	
	CONNECTOR F/POWER SUPPLY	3860210	1	
	FUSE F/MDF CARD	2980720	17	250V 1A
	FUSE F/POWU CARD	2982430	2	250V 2A
	FUSE F/POWU CARD	2982440	1	250V 3A



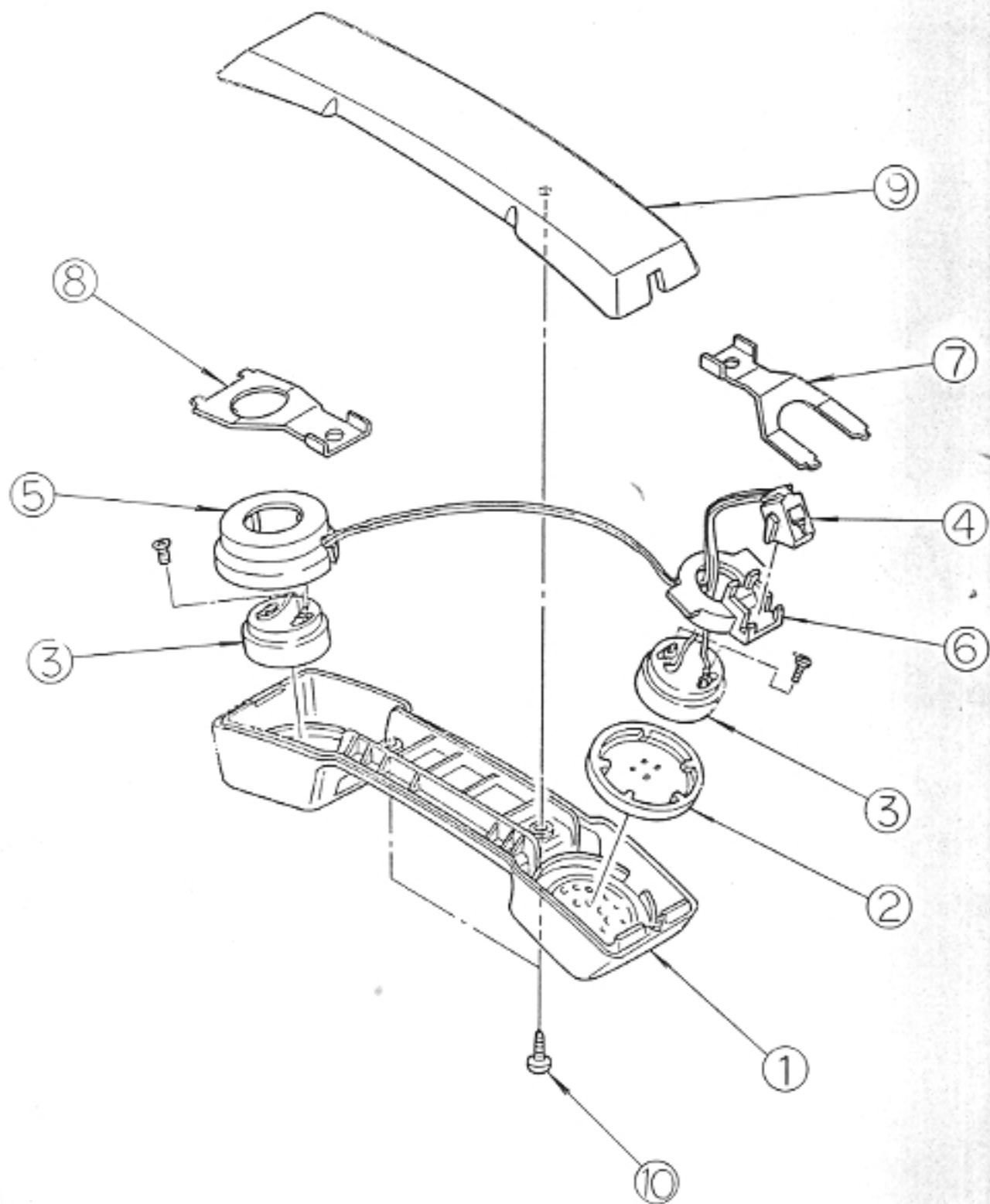
KANDA  
EK-1232/2064  
Exploded view of Subset



EK-1232/2064 TELEPHONE

	DESCRIPTION	PART NUMBER	QTY	REMARKS
	TEL BASE 4CA	4310910	1	
	RUBBER LEG	2730020	4	
3	TEL PCB ASSY 4CA	5520420	1	
4	MICROPHONE ASSY 4CA	5220950	1	
5	4P MODULAR JACK ASSY	2230020	1	
6	6P MODULAR JACK ASSY	2230010	1	
7	PACKING F/KBD 4CB	2730220	2	
8	BRACKET F/KBD 4CM	2630710	1	
9	BRACKET F/KBD 4CN	2630720	1	
10	BRACKET F/SPEAKER 4CD	2630730	1	
11	CUSHION F/SPEAKER	2720010	1	
12	SPEAKER ASSY	2980750	1	
13	HFU PCB ASSY 4CA	5520460	1	OPTION
14	RIVET F/HFU	2982260	2	OPTION
15	LCD PCB ASSY 4CA	5520440	1	OPTION
16	KEYBOARD ASSY 4CA	2530140	1	
17	FLAT CABLE F/KBD 4CA	2230400	1	
18	KEY PAD 4CA	2530130	1	
19	CABLE ASSY F/KBD 4CG	2230390	1	
20	TEL COVER ASSY	5220960	1	
21	PACKING F/SPKR 4CA	2730210	1	
22	COIL SPRING F/H SWITCH 4CA	2630360	1	
23	HOOK BUTTON 4CA	4310900	1	
24	TEL NUMBER CARD	2410010	1	
25	COVER F/TEL NUMBER CARD	2410150	1	
26	PANEL ASSY F/LCD 4CA	2130350	1	OPTION
26	PANEL 4CA	2130370	1	
27	SCREW F/COVER 4CA	2630370	4	
28	CASE F/SPEED DIAL CARD 4CA	2130360	1	
29	SPEED DIAL CARD 4CA	2430540	1	
30	HANDSET ASSY 4CA	5220860	1	
31	HANDSET CORD 4CA	2230510	1	
	LINE CORD 4CA	2230410	1	ACCESSORY
	6P TERMINAL BLOCK	2980900	1	ACCESSORY
	PANEL F/KPD 4CF DIAL OVERLAY	2730390	1	ACCESSORY
	HANDSET CORD 14 FEET	2230511	1	OPTION

KANDA  
EK-1232/2064  
Exploded view of Handset

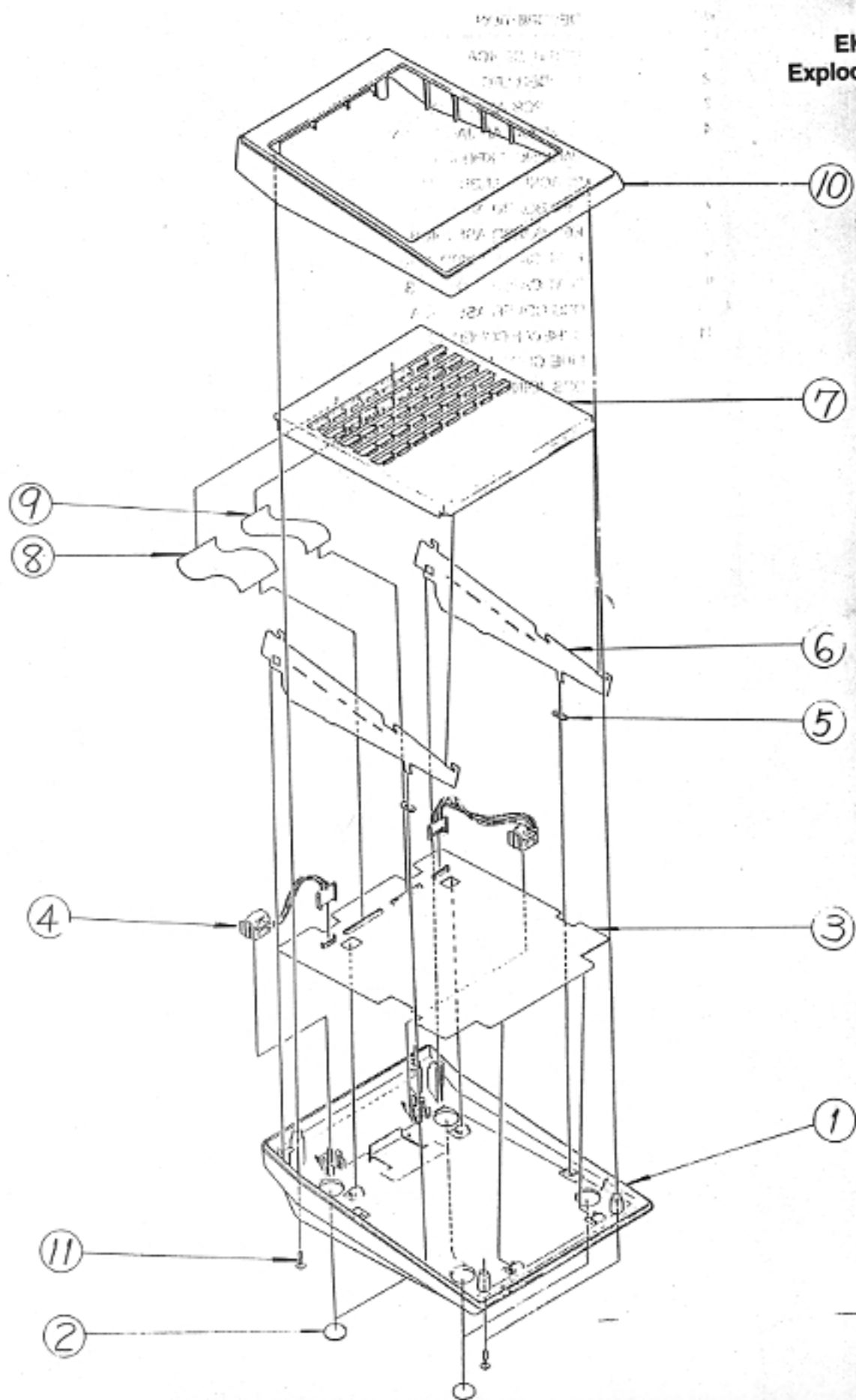


# TELEPHONE HANDSET

NO.	DESCRIPTION	PART NUMBER	QTY	REMARKS
1	HANDSET BASE 4CA	2130390	1	
2	ADAPTOR F/TRANSMITTER 4CA	2130400	1	
3	RECEIVER	2980770	2	
4	MODULAR JACK ASSY F/HSET	2230030	1	
5	ADAPTOR F/RECEIVER 4CB	2130410	1	
6	T-CUP 4CC	2130420	1	
7	BRACKET F/TRANSMITTER 4CP	2630690	1	
8	BRACKET F/RECEIVER 4CQ	2630700	1	
9	HANDSET COVER ASSY 4CA	5220970	1	
10	TAPPING SCREW	2960510	2	



KANDA  
EK-1232/2064  
Exploded view of DSS



## DSS CONSOLE

NO.	DESCRIPTION	PART NUMBER	QTY	REMARKS
1	DSS BASE 4CA	4310920	1	
2	RUBBER LEG	2730020	4	
3	DSS PCB ASSY 4CA	5520480	1	
4	6P MODULAR JACK ASSY	2230010	2	
5	PACKING F/KBD 4CF	2730330	2	
6	BRACKET F/KBD 4CN	2630720	2	
7	KEY BOARD ASSY 4CC	2530150	1	(FOR EK-1232)
7	KEY BOARD ASSY 4CB	2530160	1	(FOR EK-2064)
8	FLAT CABLE F/KBD 4CA	2230400	1	
9	FLAT CABLE F/KBD 4CB	2230420	1	
10	DSS COVER ASSY 4CA	5220980	1	
11	SCREW F/COVER 4CA	2630370	4	
	LINE CORD F/DSS 4CA	2230430	1	ACCESSORY
	DSS JOINTER 4CA	4310930	1	ACCESSORY